选的 SCUDIF 呼叫业务。

10、根据权利要求 9 所述的方法，其特征在于，步骤 B 之后进一步包括：

当无线资源满足时，接入网请求所述核心网将语音业务修改为多媒体业务。

11、根据权利要求 1 所述的方法，其特征在于，步骤 A 所述核心网通知接入网将所述业务修改为 SCUDIF 呼叫业务的方法为：

核心网向接入网发送携带多媒体单配置的无线接入承载 RAB 指配消息，或者携带多媒体单配置的重定位请求消息；

所述 RAB 指配消息在按照语音业务切换过程，将业务切换回 3G 网络之后发送；

所述重定位请求消息在业务从 2G 网络切换回 3G 网络的重定位过程中发送；所述重定位请求消息的 RAB 参数中，携带多媒体单配置；

所述步骤 B 中，接入网根据 RAB 指配消息或者重定位请求消息中携带的配置信息，将业务修改为多媒体业务。

12、根据权利要求 4 或 11 所述的方法，其特征在于，步骤 A 所述核心网通知接入网将所述业务修改为 SCUDIF 呼叫业务的方法为：

核心网的移动交换中心 MSC 向接入网的无线网络控制器 RNC 发送携带业务配置信息的 RAB 指配消息，或者携带业务配置信息的重定位请求消息；

所述步骤 B 中，RNC 根据 RAB 指配消息或者重定位请求消息中携带的业务配置信息，将业务修改为 SCUDIF 呼叫业务。

从第二代切换回第三代移动通信系统的业务更改方法

技术领域

本发明涉及移动通信系统间切换技术，特别涉及从第二代切换回第三代移动通信系统的业务更改方法。

背景技术

随着第三代移动通信（3G）宽带码分多址接入（WCDMA）技术的日趋成熟，全球许多国家都已部署 WCDMA 网络。在 3G 网络的建设过程中，为了降低建网成本、提供业务连续服务的功能，需要以第二代移动通信（2G）网络为依托，逐步实现连续覆盖的目标。因此，在较长的一段时间内，2G 网络和 3G 网络将共同存在、互相补充。

无限制数字信息/限制数字信息（UDI/RDI）业务更改及回落（SCUDIF）呼叫是 3G 网络提供的一种支持双承载能力信元值（BCIE）的多媒体呼叫，在无线资源不满足或者网络不支持等一些特定情况下，SCUDIF 呼叫将被降质为语音呼叫；而在无线资源满足或者一些特定的条件满足时，SCUDIF 呼叫将能够由语音呼叫提升为多媒体呼叫。

当用户在 2G 网络和 3G 网络共同覆盖的区域内进行多媒体业务通话时，使用双模终端的用户会出现从 3G 网络到 2G 网络、或者从 2G 网络到 3G 网络的系统间切换；

如果用户的呼叫为 SCUDIF 呼叫，那么，在从 3G 网络切换到 2G 网络的过程中，由于 2G 网络不支持多媒体业务，所以用户的多媒体业务将被降质为语音业务；

若终端的网络选择优选为 3G 网络，当无线资源条件满足时，终端会再次切换回 3G 网络，根据第三代合作伙伴计划的技术规范 3GPP TS 23.009 R6 协议

的描述，从2G网络到3G网络的系统间切换采用重定位过程实现，由于此前用户从3G网络切换到2G网络时，SCUDIF呼叫已经被降质为语音呼叫，所以在从2G网络切换回3G网络后，用户的业务仍然为语音业务。

如此，在3G网络的接入网侧出现了信息缺失，因此，即使在无线资源条件满足的情况下，无线网络控制器（RNC）设备也不会主动请求将业务从语音业务提升为多媒体业务，导致用户在系统间切换之后不能切换回SCUDIF呼叫业务。

发明内容

有鉴于此，本发明的主要目的在于提供一种SCUDIF呼叫3G网络切换到2G网络，再由2G网络切换回3G网络时的业务更改方法，达到将在2G网络中被降质的SCUDIF呼叫恢复为SCUDIF呼叫的目的。

为达到上述目的，本发明的技术方案具体是这样实现的：

一种无限制/限制数字信息业务更改及回落SCUDIF呼叫从第三代移动通信3G网络切换到第二代移动通信2G网络，再由2G网络切换回3G网络时的业务更改方法，该方法包括以下步骤：

A、3G网络中的核心网确定切换回的业务在2G网络中被降质后，通知接入网将所述业务修改为无限制/限制数字信息业务更改及回落SCUDIF呼叫业务；

B、所述接入网根据所述通知将所述业务修改为SCUDIF呼叫业务。

其中，步骤A所述3G网络中的核心网确定切换回的业务在2G网络中被降质的方法可以为：

3G网络中的核心网根据呼叫建立阶段记录的用户业务能力值，与所述切换回的业务进行比较，在该用户业务能力值与所述切换回的业务不相同时，确定所述切换回的业务在2G网络中被降质。

其中，所述3G网络中的核心网记录用户业务能力值的方法可以为：

在用户终端呼叫建立阶段，由该用户终端所接入的3G网络的移动交换中

心 MSC 记录用户业务能力值。

其中，步骤 A 所述核心网通知接入网将所述业务修改为 SCUDIF 呼叫业务的方法可以为：

核心网向接入网发送携带多媒体、语音业务双配置的无线接入承载 RAB 指配消息，或者携带多媒体、语音业务双配置的重定位请求消息；

所述 RAB 指配消息可以在按照语音业务切换过程，将业务切换回 3G 网络之后发送；

所述重定位请求消息可以在业务从 2G 网络切换回 3G 网络的重定位过程中发送；所述重定位请求消息的 RAB 参数中，可以携带多媒体、语音业务双配置；

所述步骤 B 中，接入网可以根据 RAB 指配消息或者重定位请求消息中携带的配置信息，将业务修改为 SCUDIF 呼叫业务。

其中，当接入网支持用户能力双配置时，继续执行步骤 B，并在步骤 B 之后可以进一步向核心网返回相应的成功响应；

否则，可以向核心网返回相应的失败响应。

其中，所述接入网向核心网返回的失败响应中可以包含失败原因值；

当所述核心网向接入网发送的消息为 RAB 指配消息，且失败原因为配置不支持时，核心网可以向接入网发送仅携带多媒体单配置的 RAB 指配消息；

所述步骤 B 中，接入网可以根据所述 RAB 指配消息将业务修改为多媒体业务；

在步骤 B 之后可以进一步向核心网返回 RAB 指配成功响应。

其中，所述多媒体、语音业务双配置的类型，可以由预先在核心网中设置的策略指定；

所述双配置类型包括：多媒体为首选业务、语音为可选业务的双配置，或者语音为首选业务、多媒体为可选业务的双配置。

其中，所述多媒体、语音业务双配置可以为：多媒体为首选业务、语音为可选业务的双配置；

所述携带多媒体、语音业务双配置的方法可以为：将 RAB 指配消息、或者

重定位请求消息中的 RAB 参数的首选业务配置为多媒体业务，并在可选 RAB 配置信元值中配置语音业务;

所述步骤 B 中，接入网可以根据所述双配置将业务修改为多媒体首选、语音可选的 SCUDIF 呼叫业务。

其中，所述多媒体、语音业务双配置可以为：语音为首选业务、多媒体为可选业务的双配置;

所述携带多媒体、语音业务双配置的方法可以为：将 RAB 指配消息、或者重定位请求消息中的 RAB 参数的首选业务配置为语音业务，并在可选 RAB 配置信元值中配置多媒体业务;

所述步骤 B 中，接入网可以根据所述双配置将业务修改为语音首选、多媒体可选的 SCUDIF 呼叫业务。

进一步地，在步骤 B 之后可以包括：当无线资源满足时，接入网请求所述核心网将语音业务修改为多媒体业务。

其中，步骤 A 所述核心网通知接入网将所述业务修改为 SCUDIF 呼叫业务的方法可以为:

核心网向接入网发送携带多媒体单配置的无线接入承载 RAB 指配消息，或者携带多媒体单配置的重定位请求消息;

所述 RAB 指配消息可以在按照语音业务切换过程，将业务切换回 3G 网络之后发送;

所述重定位请求消息可以在业务从 2G 网络切换回 3G 网络的重定位过程中发送；所述重定位请求消息的 RAB 参数中，携带多媒体单配置;

所述步骤 B 中，接入网可以根据 RAB 指配消息或者重定位请求消息中携带的配置信息，将业务修改为多媒体业务。

由上述技术方案可见，本发明的这种从第二代移动通信系统切换回第三代移动通信系统的业务更改方法，3G 网络中的核心网确定切换回的业务在 2G 网络中被降质后，通知接入网将所述业务修改为 SCUDIF 呼叫业务；所述接入网根据所述通知将所述业务修改为 SCUDIF 呼叫业务。如此，可以恢复 3G 网络

下接入网侧的业务信息，从而达到了将在 2G 网络中被降质的 SCUDIF 呼叫恢复为 SCUDIF 呼叫的目的。

附图说明

图 1 为本发明实施例一实现业务更改的方法流程图。

图 2 为本发明实施例二实现业务更改的方法流程图。

具体实施方式

为使本发明的目的、技术方案及优点更加清楚明白，以下参照附图并举实施例，对本发明作进一步详细说明。

本发明的主要思想是：当 SCUDIF 呼叫从 3G 网络切换到 2G 网络，再由 2G 网络切换回 3G 网络时，3G 网络中的核心网确定切换回的业务在 2G 网络中被降质后，通知接入网将所述业务修改为 SCUDIF 呼叫业务；所述接入网根据所述通知将所述业务修改为 SCUDIF 呼叫业务。

本发明提供了两种核心网通知接入网进行业务修改的方式：以 RAB 指配消息通知，和以重定位请求消息通知。前一种方式是在系统间切换完成之后，核心网向接入网发送携带多媒体、语音双配置的 RAB 指配消息，以通知接入网进行业务修改；后一种方式是在系统间切换的重定位过程中，核心网在向接入网发送的重定位请求消息中的 RAB 参数中携带多媒体、语音双配置，以通知接入网进行业务修改。

多媒体、语音双配置可以是多媒体为首选业务、语音为可选业务的双配置，也可以是语音为首选业务、多媒体为可选业务的双配置。本发明可以预先在核心网中设置相应的策略，由该策略指定在 RAB 指配消息、或者重定位请求消息中所携带的双配置类型。

下面通过在核心网中的移动交换中心（MSC），和接入网中的无线网络控制器（RNC）之间实施本发明的两个实施例，对本发明的技术方案进行详细说明。

实施例一:

本实施例采用 MSC 在 RAB 指配消息中携带多媒体为首选业务、语音为可选业务双配置的方式，通知 RNC 将业务修改为 SCUDIF 呼叫业务。

通常，RAB 指配消息用于业务建立阶段，使用 RAB 指配消息能够建立、修改、或者删除用户的业务。

本实施例中，用户的双模终端处于 2G 网络和 3G 网络双网覆盖区域，正在进行支持双 BCIE 的 SCUDIF 呼叫。由于用户处于移动之中，导致无线资源变化，使用户从 3G 网络切换到 2G 网络，而 SCUDIF 呼叫在用户由 3G 网络切换到 2G 网络时将被降质为语音呼叫;

当用户的移动使得无线资源条件满足时，用户再次从 2G 网络切换回 3G 网络，该切换过程按照语音业务的系统间切换过程进行;

当整个系统间切换完成之后，3G 网络的 MSC 根据呼叫建立阶段记录的用户业务能力值判断用户的业务在 2G 网络中是否被降质，当确定用户的业务被降质后，MSC 主动向 RNC 下发 RAB 指配消息，该消息中携带可选 RAB 配置信元值（Alternative RAB Configuration IE），以及多媒体为首选业务、语音为可选业务的双配置，以通知 RNC 将业务修改为 SCUDIF 呼叫业务。

图 1 为本发明实施例一实现业务更改的方法流程图。参见图 1，图中的 BSC_A 和 MSC_A 分别是 2G 网络中的 BSC、MSC 设备，RNC_B 和 MSC_B 分别是 3G 网络中的 RNC、MSC 设备。该方法包括以下步骤:

步骤 101: 主叫用户设备（UE）向 BSC_A 上报测量报告(Measure_Report)，BSC_A 根据该测量报告，确定需要进行 2G 网络到 3G 网络的系统间切换。

步骤 102: BSC_A 通过 A 接口向 MSC_A 发送切换请求消息(A_HO_Required)。

步骤 103: MSC_A 通过移动应用部分（MAP）信令向 3G 网络的 MSC_B 请求系统间切换(MAP_Prep_HO_REQ)。

步骤 104: MSC_B 向 RNC_B 发送重定位请求(Iu_Relocation_Request)，请求 3G 网络的 RNC_B 分配切换用业务资源。

步骤 105：RNC_B 分配切换用业务资源，并向 MSC_B 发送重定位准备完成的应答消息(Iu_Relocation_Request_ACK)。

步骤 106：MSC_B 通过 E 接口通知 MSC_A 系统间切换准备完成(MAP_Prep_HO_RSP)。

步骤 107：MSC_A 向 BSC_A 发送切换命令(A_HO_COMMAND)，进行切换过程。

步骤 108：BSC_A 通知 UE 执行切换(HO_COMMAND)。

步骤 109：RNC_B 监测到主叫 UE 在 3G 网络中的活动之后，通知 MSC_B(Iu_Relocation_Detect)。

步骤 110：MSC_B 收到该活动通知之后，通过 MAP 消息通知 MSC_A(MAP_Process_Access_Signal_Req)。

步骤 111：进行空口切换。

本步骤中的空口切换过程为现有技术，因此，对于空口切换的具体实施方法，在此不再赘述。

步骤 112：空口切换完成后，RNC_B 通知 MSC_B 整个重定位过程完成(Iu_Relocation_Complete)，即完成了 2G 网络到 3G 网络的系统间切换。

步骤 113：MSC_B 通过 MAP 消息通知 MSC_A 系统间切换完成(MAP_Send_End_Signal_Req)。

步骤 114：对 2G 网络侧资源进行清除。

本步骤中的 2G 网络侧资源清除过程为现有技术，因此，对于该资源清除过程的具体实施方法，在此不再赘述。

至此，从 2G 网络到 3G 网络的语音业务系统间切换完成，下面将进行本发明的业务更改过程。

步骤 115：MSC_B 确定用户的业务在 2G 网络中被降质后，使用 RAB 指配消息通知 RNC_B 将用户的业务修改为 SCUDIF 呼叫业务。

在呼叫建立阶段，用户所接入的 3G 网络中的 MSC 将记录用户的业务能力值；在通话过程中，虽然用户可能会切换到其他网络，但是用户最初所接入的

3G 网络中的 MSC 将通过与用户终端的信令交互获知用户的通话状态；在用户通话未结束之前，用户最初所接入的 3G 网络中的 MSC 将一直保留该用户的业务能力值；因此，本步骤中，MSC_B 可以根据呼叫建立阶段记录的用户业务能力值，与用户当前切换回的业务进行比较，在该用户业务能力值与所述切换回的业务不相同时，确定该切换回的业务在 2G 网络中被降质。例如，本实施例中，MSC_B 记录的用户业务能力值为 SCUDIF 呼叫业务，而切换回的业务为语音业务，则 MSC_B 确定用户的业务在 2G 网络中被降质。

本步骤中，MSC_B 经过判断，确定用户的业务在 2G 网络中被降质后，通过在 RAB 指配消息中携带表示多媒体为首选业务、语音为可选业务的双配置以通知 RNC_B 将业务修改为 SCUDIF 呼叫业务。具体实施方法是：将所述 RAB 指配消息的首选业务配置为多媒体业务，并在可选 RAB 配置信元值中配置语音业务。

由于，只有支持 3GPP TS R6 以后的版本的 RNC 设备，才能支持用户能力双配置，因此，根据 RNC_B 支持的协议版本不同，分以下两种情况进行说明：第一种情况：若切换后的 RNC 设备支持 3GPP R6 以后的版本，即 RNC_B 支持用户能力双配置，则执行步骤 115.1a。

步骤 115.1a：MSC_B 向 RNC_B 发送 RAB 指配请求消息(Iu_RAB_Assignment_REQ)，该消息中携带表示：多媒体业务为首选业务、语音业务为可选业务的双配置。

步骤 115.1b: RNC_B 根据该 RAB 指配消息对 RAB 进行修改，将用户的业务修改为多媒体业务，且语音业务为用户的可选业务。

本步骤中，RAB 修改，即无线承载（RB）重配过程为现有技术，因此，对于修改 RAB 的具体实施方法，在此不再赘述。

步骤 115.1c：RAB 修改完成后，RNC_B 向 MSC_B 返回成功响应(Iu_RAB_Assignment_RSP)，至此，主叫端业务更改过程完成，用户的业务被修改为多媒体首选、语音可选的 SCUDIF 呼叫业务。

步骤 115.1d：MSC_B 通知网络及被叫端用户进行业务修改。

本步骤中，MSC_B 可以在系统间切换完成后的任何时刻，向网络及被叫端用户发起修改业务的通知。被叫端业务修改过程为现有技术，因此，对于被叫端业务修改的具体实施方法，在此不再赘述。

至此，系统间切换完成，并且用户的业务已被修改为 SCUDIF 呼叫业务。

第二种情况：若切换后的 RNC 设备仅支持 3GPP R6 以前的版本，即 RNC_B 仅支持用户能力单配置方案，则执行步骤 115.2a。

步骤 115.2a：MSC_B 向 RNC_B 发送 RAB 指配请求消息(Iu_RAB_Assignment_REQ)，该消息中携带表示：多媒体业务为首选业务、语音业务为可选业务的双配置。

步骤 115.2b：RNC_B 接收该 RAB 指配消息，由于 RNC_B 不支持双配置，RNC_B 向 MSC_B 返回失败响应(Iu_RAB_Assignment_RSP)。

步骤 115.2c：MSC_B 收到失败响应后，对失败原因进行分析，当失败原因是配置不支持时，MSC_B 重新向 RNC_B 发送 RAB 指配请求(Iu_RAB_Assignment_REQ)，该消息中仅携带多媒体配置方案。

步骤 115.2d：RNC_B 根据该 RAB 指配消息对 RAB 进行修改，将用户的业务修改为多媒体业务。

本步骤中，RAB 修改过程为现有技术，因此，对于修改 RAB 的具体实施方法，在此不再赘述。

步骤 115.2e：RAB 修改完成后，RNC_B 向 MSC_B 返回成功响应(Iu_RAB_Assignment_RSP)，至此，主叫端修改过程完成，用户的业务被修改为多媒体业务。

步骤 115.2f：MSC_B 通知网络及被叫端用户进行业务修改。

本步骤中，MSC_B 可以在系统间切换完成后的任何时刻，向网络及被叫端用户发起修改业务的通知。被叫端业务修改过程为现有技术，因此，对于被叫端业务修改的具体实施方法，在此不再赘述。

若步骤 115.2d 修改失败，即第二次修改请求失败，则不再进行修改尝试。

至此，系统间切换完成，并且用户的业务已被修改为多媒体业务。

由上述技术方案可见，本实施例中，首先按照语音业务的系统间切换过程对用户进行2G网络到3G网络的切换;

待整个系统间切换完成之后，3G网络中的MSC根据呼叫建立阶段记录的用户业务能力值，与所述切换回的业务进行比较，判断用户的业务在2G网络中是否被降质;

在该用户的业务能力值与所述切换回的业务不相同时，确定用户的业务被降质，MSC主动向RNC下发RAB指配消息，并在该消息中携带多媒体为首选业务、语音为可选业务双配置，通知RNC将业务修改为SCUDIF呼叫业务，从而实现了将被降质的SCUDIF呼叫恢复为SCUDIF呼叫的目的。

实施例二:

本实施例采用MSC在重定位请求消息中的RAB参数中携带语音为首选业务、多媒体为可选业务双配置的方式，通知RNC将业务修改为SCUDIF呼叫业务。

重定位请求消息是在系统间切换的重定位过程中，由MSC向RNC发送的请求。

本实施例中，用户的双模终端处于2G网络和3G网络双网覆盖区域，正在进行支持双BCIE的SCUDIF呼叫。由于用户处于移动之中，导致无线资源变化，使用户从3G网络切换到2G网络，而SCUDIF呼叫在用户由3G网络切换到2G网络时将被降质为语音呼叫;

当用户的移动使得无线资源条件满足时，用户再次从2G网络切换回3G网络，在该切换过程中，3G网络的MSC根据呼叫建立阶段记录的用户业务能力值判断用户的业务在2G网络中是否被降质，当确定用户的业务被降质后，MSC利用重定位请求消息中的RAB参数携带多媒体为首选业务、语音为可选业务双配置，以通知RNC将业务修改为SCUDIF呼叫业务。

图 2 为本发明实施例二实现业务更改的方法流程图。参见图 2，图中的BSC_A和MSC_A分别是2G网络中的BSC、MSC设备，RNC_B和MSC_B分别是3G网络中的RNC、MSC设备。该方法包括以下步骤:

步骤 201：主叫用户设备（UE）向 BSC_A 上报测量报告(Measure_Report)，BSC_A 根据该测量报告，确定需要进行 2G 网络到 3G 网络的系统间切换。

步骤 202：BSC_A 通过 A 接口向 MSC_A 发送切换请求消息(A_HO_Required)。

步骤 203：MSC_A 通过移动应用部分（MAP）信令向 3G 网络的 MSC_B 请求系统间切换(MAP_Prep_HO_REQ)。

步骤 204：MSC_B 向 RNC_B 发送重定位请求(Iu_Relocation_Request)，请求 3G 网络的 RNC_B 分配切换用业务资源；并且，当 MSC_B 确定用户的业务在 2G 网络中被降质后，在该重定位请求消息的 RAB 参数中携带表示多媒体为首选业务、语音为可选业务的双配置，以通知 RNC_B 将业务修改为 SCUDIF 呼叫业务。

本步骤中，MSC_B 判断用户的业务在 2G 网络中是否被降质的方法与实施例一步骤 115 中的方法相同，请参见实施例一步骤 115 的描述。

本步骤中，MSC_B 经过判断，确定用户的业务在 2G 网络中被降质后，按照 3GPP 技术规范中规定的重定位请求的格式，在重定位请求的 RAB 参数中携带双配置，即将所述 RAB 参数的首选业务配置为多媒体业务，并在所述 RAB 参数的可选 RAB 配置信元值中配置语音业务。

步骤 205：RNC_B 接收该重定位请求，并根据其自身是否支持所述业务修改，作出相应的响应。

由于，只有支持 3GPP TS R6 以后的版本的 RNC 设备，才能支持用户能力双配置，因此，根据 RNC_B 支持的协议版本不同，本步骤中分以下两种情况进行说明：

第一种情况：若 RNC 设备支持 3GPP R6 以后的版本，即 RNC_B 支持用户能力双配置，则执行步骤 205.1a。

步骤 205.1a：RNC_B 根据该重定位请求中的 RAB 参数对 RAB 进行修改，将用户的业务修改为多媒体业务，且语音业务为用户的可选业务。

本步骤中，RAB 修改过程为现有技术，因此，对于修改 RAB 的具体实施

方法，在此不再赘述。

步骤 205.1b：RNC_B 分配切换用业务资源，并向 MSC_B 发送重定位准备完成的应答消息(Iu_Relocation_Request_ACK)，继续执行步骤 206。

本步骤中，通过在重定位请求的 RAB 参数中携带双配置，直接在 3G 网络下建立了支持双 BCIE 的 SCUDIF 通话，实现了将用户的业务修改为 SCUDIF 呼叫业务的目的。

第二种情况：若 RNC 设备仅支持 3GPP R6 以前的版本，即 RNC_B 仅支持用户能力单配置方案，则执行步骤 205.2。

步骤 205.2: RNC_B 接收该重定位请求，由于 RNC_B 不支持双配置，RNC_B 向 MSC_B 返回切换失败应答(Iu_Relocation_Request_ACK)，系统间切换失败，且业务更改失败，结束本流程业务更改。

步骤 206：本实施例的步骤 206 至步骤 214，与实施例一的步骤 106 至步骤 114 的操作完全相同，请参照实施例一中的相应部分，在此不再赘述。

步骤 215：MSC_B 通知网络及被叫端用户进行业务修改。

本步骤中，MSC_B 可以在系统间切换完成后的任何时刻，向网络及被叫端用户发起修改业务的通知。被叫端业务修改过程为现有技术，因此，对于被叫端业务修改的具体实施方法，在此不再赘述。

至此，完成本实施例的系统间切换，且用户的业务被更改为多媒体首选、语音可选的 SCUDIF 呼叫业务。

由上述技术方案可见，本实施例中，在系统间切换的重定位过程中，3G 网络的 MSC 根据呼叫建立阶段记录的用户业务能力值，与所述切换回的业务进行比较，判断用户的业务在 2G 网络中是否被降质；

在该用户的业务能力值与所述切换回的业务不相同时，确定用户的业务被降质，MSC 利用了重定位请求消息中的 RAB 参数携带多媒体为首选业务、语音为可选业务的双配置，通知 RNC 将业务修改为 SCUDIF 呼叫业务；

当 RNC 设备支持 3GPP TS R6 以后的协议版本时，能够直接在 3G 网络下建立支持双 BCIE 的 SCUDIF 通话，从而达到了将在 2G 网络中被降质的 SCUDIF

呼叫恢复为 SCUDIF 呼叫的目的。

上述两个实施例中，预先在 MSC 中设置的策略所指定的双配置为：多媒体为首选业务、语音为可选业务的双配置。预先在 MSC 设置的策略所指定的双配置也可以为：语音为首选业务、多媒体为可选业务的双配置。在 RAB 指配消息、或者重定位请求消息中携带语音为首选业务、多媒体为可选业务双配置的方法为：将所述 RAB 指配消息、或者重定位消息中的 RAB 参数的首选业务配置为语音业务，并在可选 RAB 配置信元值中配置多媒体业务。

对于在 RAB 指配消息、或者重定位消息中携带表示：语音为首选业务、多媒体为可选业务的双配置的情况，当切换后的 RNC 支持用户能力双配置，且无线资源满足时，RNC 将请求 MSC 将语音业务修改为多媒体业务。

此外，在 MSC 通知 RNC 进行业务修改时，也可以使用携带多媒体单配置的 RAB 指配消息、或者重定位请求消息，这样能够保证在 RNC 不支持用户能力双配置时将业务提升为多媒体业务，但是，由于用户没有可选的业务，当无线资源不满足时，用户不能将多媒体业务降质为语音业务，这将增加掉话的几率。因此，在实施本发明时，推荐采用在 RAB 指配消息、或者重定位消息中携带双配置的方法，将业务恢复为 SCUDIF 呼叫业务。

以上所述仅为本发明的较佳实施例而已，并非用于限定本发明的保护范围。凡在本发明的精神和原则之内所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

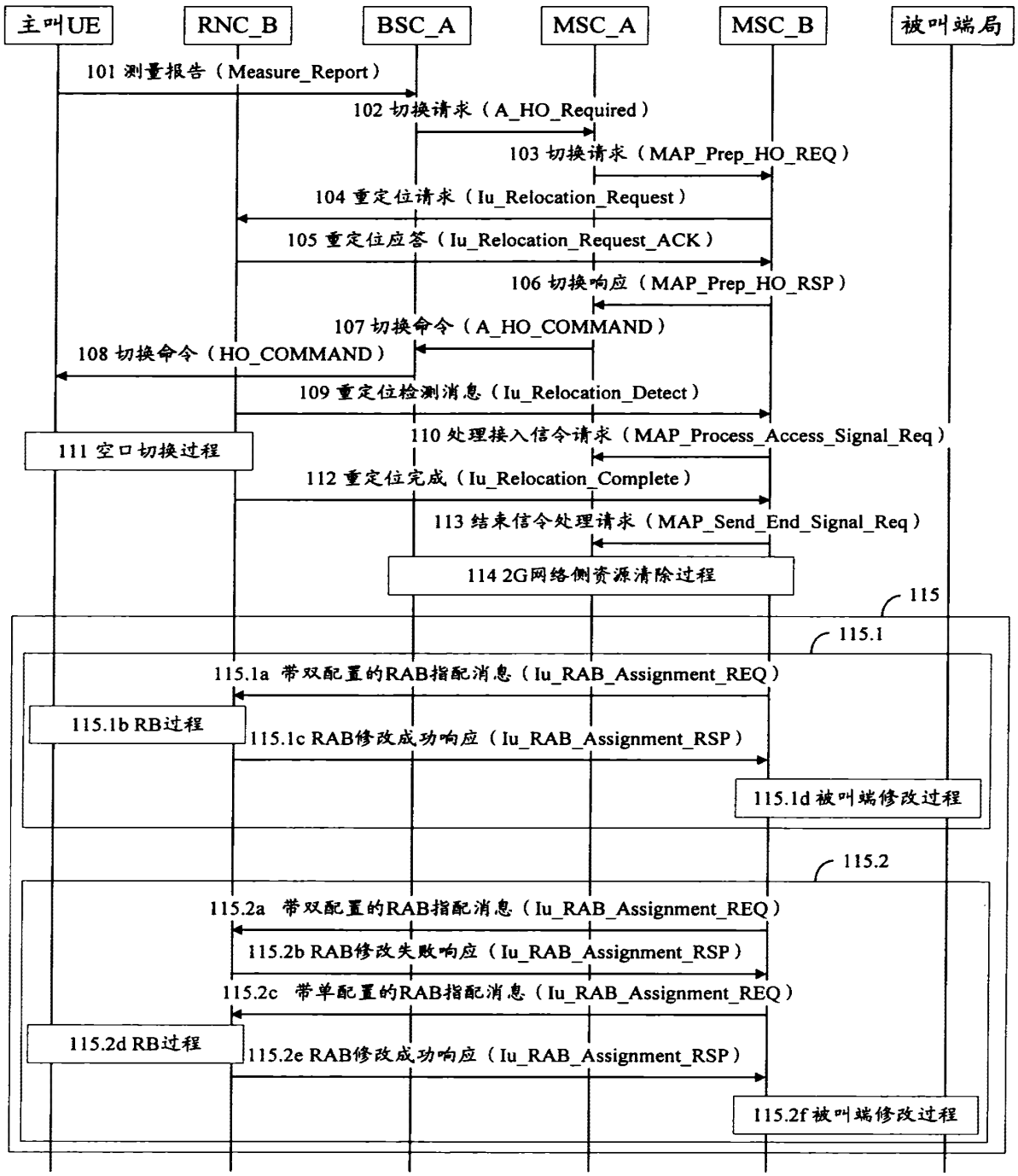

主叫UE
RNC_B
BSC_A
MSC_A
MSC_B
被叫端局
101 测量报告（Measure_Report）
102 切换请求（A_HO_Required）
103 切换请求（MAP_Prep_HO_REQ）
104 重定位请求（Iu_Relocation_Request）
105 重定位应答（Iu_Relocation_Request_ACK）
106 切换响应（MAP_Prep_HO_RSP）
107 切换命令（A_HO_COMMAND）
108 切换命令（HO_COMMAND）
109 重定位检测消息（Iu_Relocation_Detect）
111 空口切换过程
110 处理接入信令请求（MAP_Process_Access_Signal_Req）
112 重定位完成（Iu_Relocation_Complete）
113 结束信令处理请求（MAP_Send_End_Signal_Req）
114 2G网络侧资源清除过程
115
115.1
115.1a 带双配置的RAB指配消息（Iu_RAB_Assignment_REQ）
115.1b RB过程
115.1c RAB修改成功响应（Iu_RAB_Assignment_RSP）
115.1d 被叫端修改过程
115.2
115.2a 带双配置的RAB指配消息（Iu_RAB_Assignment_REQ）
115.2b RAB修改失败响应（Iu_RAB_Assignment_RSP）
115.2c 带单配置的RAB指配消息（Iu_RAB_Assignment_REQ）
115.2d RB过程
115.2e RAB修改成功响应（Iu_RAB_Assignment_RSP）
115.2f 被叫端修改过程

图 1

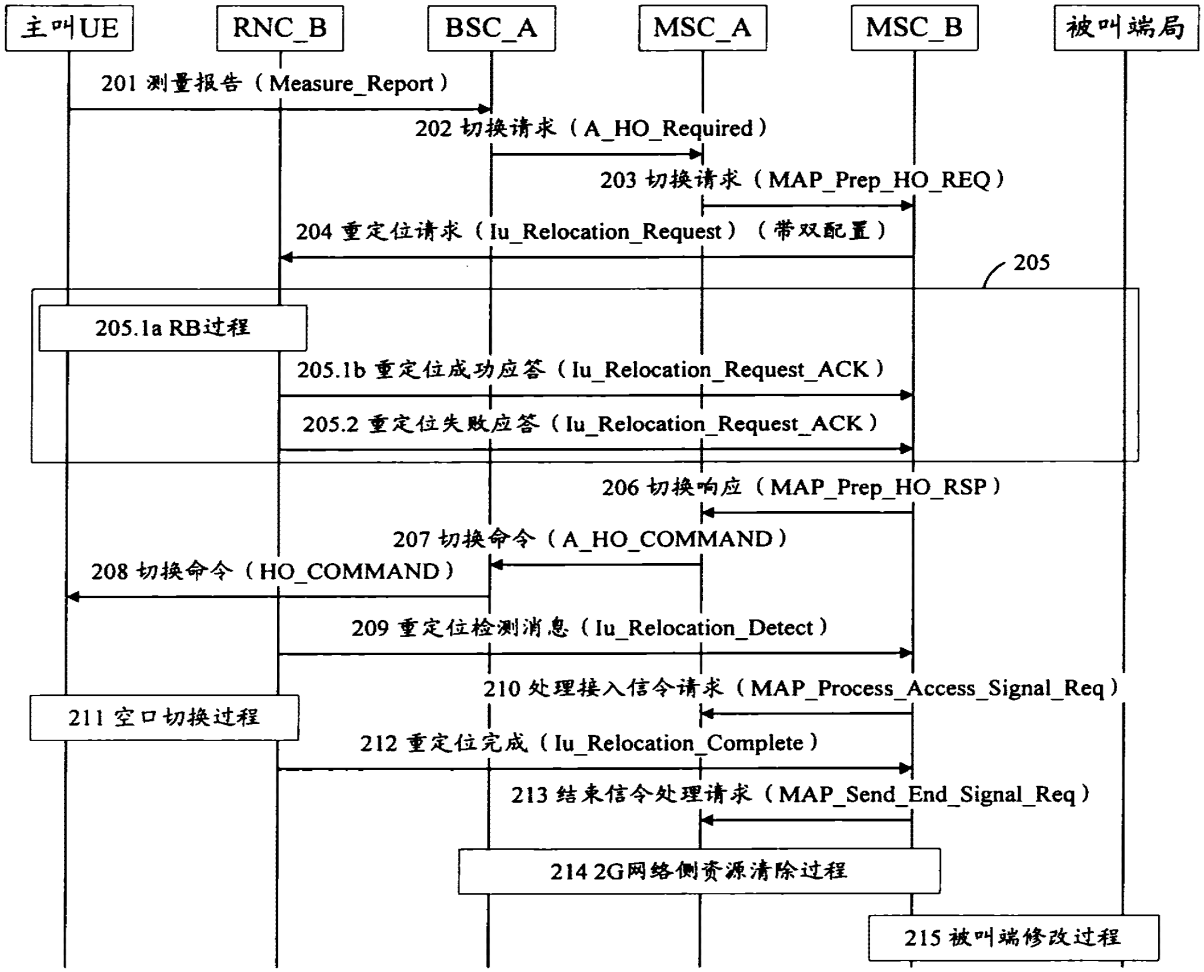

主叫UE
RNC_B
BSC_A
MSC_A
MSC_B
被叫端局
201 测量报告（Measure_Report）
202 切换请求（A_HO_Required）
203 切换请求（MAP_Prep_HO_REQ）
204 重定位请求（Iu_Relocation_Request）（带双配置）
205
205.1a RB过程
205.1b 重定位成功应答（Iu_Relocation_Request_ACK）
205.2 重定位失败应答（Iu_Relocation_Request_ACK）
206 切换响应（MAP_Prep_HO_RSP）
207 切换命令（A_HO_COMMAND）
208 切换命令（HO_COMMAND）
209 重定位检测消息（Iu_Relocation_Detect）
210 处理接入信令请求（MAP_Process_Access_Signal_Req）
211 空口切换过程
212 重定位完成（Iu_Relocation_Complete）
213 结束信令处理请求（MAP_Send_End_Signal_Req）
214 2G网络侧资源清除过程
215 被叫端修改过程

图 2

[19] 中华人民共和国国家知识产权局

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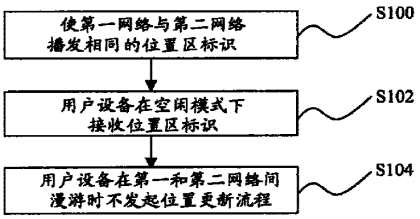
权利要求书 5 页 说明书 16 页 附图 6 页

[54] 发明名称

无线通信系统和移动性管理方法

[57] 摘要

本发明公开了一种无线通信系统和移动性管理方法。 无线通信系统包括第一无线网络和第二无线网络。 第一无线网络和第二无线网络播发的位置区标识相同，位置区标识由移动终端接收，从而使处于空闲模式下的移动终端在第一无线网络与第二无线网络之间漫游时，不发起位置更新流程。 在第一无线网络的核心网中的支持节点和第二无线网络的核心网中的支持节点中的至少一个支持节点的配置信息中设置用于表示优选网络的信息。



1. 一种无线通信系统，包括第一无线网络和第二无线网络，其特征在于，所述第一无线网络和第二无线网络播发的位置区标识相同。

2. 根据权利要求 1 所述的无线通信系统，其特征在于，所述第二无线网络是所述第一无线网络的演进网络。

3. 根据权利要求 1 所述的无线通信系统，其特征在于，所述第一无线网络与所述第二无线网络的覆盖范围至少部分重叠。

4. 根据权利要求 3 所述的无线通信系统，其特征在于，所述位置区标识为路由区标识或跟踪区标识。

5. 根据权利要求 1 至 4 中任一项所述的无线通信系统，其特征在于，在所述第一无线网络的核心网中的支持节点和所述第二无线网络的核心网中的支持节点中的至少一个支持节点的配置信息中包括用于表示优选网络的信息。

6. 根据权利要求 5 所述的无线通信系统，其特征在于，所述用于表示优选网络的信息选自包括以下内容的组：不优选网络、优选第一无线网络、以及优选第二无线网络。

7. 根据权利要求 6 所述的无线通信系统，其特征在于，所述系统还包括至少一个移动终端，当所述用于表示优选网络的信息为优选第一无线网络时，所述移动终端的上下文保留在所述第一无线网络的核心网中，当所述用于表示优选网络的信息为优选第二无线网络时，所述移动终端的上下文保留在所述第二无线网络的核心网中。

8. 一种用于多网络间的移动性管理方法，其特征在于，包括以下步骤：

为多网络覆盖区域设置相同的位置区标识；

当移动终端在所述多网络间漫游时，所述移动终端获取所述位置区标识，而不发起位置更新流程。

9. 根据权利要求 8 所述的移动性管理方法，其特征在于，所述多网络包括第一无线网络和第二无线网络，所述第二无线网络为所述第一无线网络的演进网络。

10. 根据权利要求 9 所述的移动性管理方法，其特征在于，所述第一无线网络与所述第二无线网络的覆盖区域至少部分重叠。

11. 根据权利要求 10 所述的移动性管理方法，其特征在于，所述第一无线网络的位置区标识为该网络覆盖区域的路由区标识，所述第二无线网络的位置区标识被直接设置为所述第一无线网络的路由区标识。

12. 根据权利要求 9 至 11 中任一项所述的移动性管理方法，其特征在于，所述方法还包括在所述多网络的核心网的支持节点中的至少一个支持节点的配置信息中设置用于表示优选网络的信息。

13. 根据权利要求 12 所述的移动性管理方法，其特征在于，所述方法还包括，根据所述用于表示优选网络的信息，将移动终端的上下文保留在第一无线网络或第二无线网络中。

14. 一种用于多网络间的移动性管理方法，其特征在于，在第一无线网络的核心网中的支持节点和第二无线网络的核心网中的支持节点中的至少一个支持节点的配置信息中设置用于表示优选网络的信息。

15. 根据权利要求 14 所述的移动性管理方法，其特征在于，所述用于表示优选网络的信息选自包括以下内容的组：不优选网络；优选第一无线网络，所述移动终端的上下文保留在第一无线网络的核心网中；以及优选第二无线网络，所述移动终端的上下文保留在第二无线网络的核心网中。

16. 根据权利要求 15 所述的移动性管理方法，其特征在于，所述设置用于表示优选网络的信息的步骤是通过在所述支持节点中的配置信息中增加一个字段，该字段为 3 比特，其值对应于移动终端的上下文的优选保存的网络位置。

17. 根据权利要求 15 所述的移动性管理方法，其特征在于，如果所述第二无线网络为优选网络，则当移动终端从第三无线网络漫游至所述第一无线网络时，通过比较由广播信道下发的位置区标识与其保存的位置区标识，判决发起位置区更新流程，包括以下信令流程：

1）所述移动终端发送包括原注册信息的注册请求到所述第一无线网络的核心网中的第一支持节点；

2）所述第一支持节点将接收到的所述原注册信息发送给所述第三无线网络的核心网中的原支持节点，以获取用户信息；

3）所述原支持节点发送用户信息给所述第一支持节点；

4）所述移动终端通过第一支持节点进行鉴权；

5）所述第一支持节点检查其内配置的所述优选网络信息以及所述移动终端的接入能力，判决所述移动终端应驻留在所述第二无线网络侧，所述第一支持节点选择所述第二无线网络的核心网中的一个新支持节点，并向其发送用户上下文配置请求消息，请求该新支持节点为所述移动终端生成移动性管理上下文；

6）所述新支持节点将自身注册成所述移动终端的服务节点；

7）在所述原支持节点中所述移动终端上下文将被删除，或者所述移动终端被标志为不在其服务区；

8）归属用户服务器确认所述新支持节点注册成功，用户签约信息转移给所述新支持节点，计费策略信息也随之转移到所述新支持节点；

9）所述新支持节点接受所述移动终端的网络附着，并且分配一个临时身份给所述移动终端，并向所述第一支持节点确认用户上下文配置完成；以及

10）所述第一支持节点收到用户上下文配置响应消息后，向所述移动终端确认注册完成。

18 根据权利要求 17 所述的移动性管理方法，其特征在于，所述信令流程 5）中所述的所述第一支持节点选择所述第二无线网络的核心网中的一个新支持节点的步骤，是在支持所述移动终端所在的路由区的支持节点中进行选择。

19. 根据权利要求 14 至 17 中任一项所述的移动性管理方法，其特征在于，所述第二无线网络为所述第一无线网络的演进网络。

20. 根据权利要求 19 所述的移动性管理方法，其特征在于，所述第一无线网络与所述第二无线网络的覆盖范围至少部分重叠。

21. 根据权利要求 19 所述的移动性管理方法，其特征在于，所述第三无线网络的类型与所述第一无线网络和所述第二无线网络中的一种的类型相同。

无线通信系统和移动性管理方法

技术领域

本发明涉及无线移动通信领域，尤其涉及无线通信系统和移动性管理方法。

背景技术

通用移动通信系统（Universal Mobile Telecommunications System，UMTS）是采用宽带码分多址接入（Wideband Code Division Multiple Access，WCDMA）空中接口技术的第三代移动通信系统（3G），通常也把 UMTS 称为 WCDMA 通信系统。如图 1 所示，UMTS 采用了与第二代移动通信系统（2G）类似的结构，包括无线接入网络（Radio Access Network，RAN）**20** 和核心网络（Core Network，CN）**30**。其中无线接入网络 **20** 用于处理所有与无线有关的功能，而核心网络 **30** 处理 UMTS 内所有的话音呼叫和数据连接，并实现与外部网络 **40** 的交换和路由功能。核心网络从逻辑上分为电路交换域（Circuit Switched Domain，CS）**32** 和分组交换域（Packet Switched Domain，PS）**34**。UMTS 陆地无线接入网（UMTS Territorial Radio Access Network，UTRAN）**20**、核心网络 **30**、与用户设备（User Equipment，UE）**10** 一起构成了整个 UMTS。

如图 2 所示，UTRAN 包含一个或几个无线网络子系统（Radio Network Subsystem，RNS）**22**。一个无线网络子系统 **22** 由一个无线网络控制器（Radio Network Controller，RNC）**24** 和一个或多个基站（NodeB）**26** 组成。无线网络控制器 **24** 与核心网络 **30** 之间的

接口是 Iu 接口，NodeB **26** 与无线网络控制器 **24** 通过 Iub 接口连接。在 UTRAN 内部，无线网络控制器 **24** 之间通过 Iur 接口互联，Iur 接口可以通过无线网络控制器 **24** 之间的直接物理连接或通过传输网连接。无线网络控制器 **24** 用来分配和控制与之相连或相关的 NodeB **26** 的无线资源（Radio Resource）。NodeB **26** 则完成 Iub 接口与 Uu 接口之间的数据流的转换，同时也参与一部分无线资源管理。

NodeB **26** 是 WCDMA 系统的基站，包括无线收发信机和基带处理部件。通过标准的 Iub 接口与无线网络控制器 **24** 互连，主要完成 Uu 接口物理层协议的处理。它的主要功能是扩频、调制、信道编码以及解扩、解调、信道解码，还包括基带信号和射频信号的相互转换等功能。

无线网络控制器 **24** 用于控制 UTRAN 的无线资源，主要完成连接建立和断开、切换、宏分集合并、无线资源管理控制等功能。

以上的网络架构是基于 3GPP Rel6 以前版本的架构，目前 3GPP（3rd Generation Partnership Project）正在研究一种全新的演进网络架构，以满足未来十年甚至更长时间内移动网络的应用需求。由于是一种全新的网络架构，因此现有架构的所有节点、功能、和流程都将发生实质性的变化。

3GPP 考虑到未来网络的竞争能力，目前正在积极研究一种演进的 3GPP 网络系统，目前有很多种演进方案在 3GPP 展开了讨论，网络演进的目的是希望提供一种低时延、高数据速率、高系统容量和覆盖、低成本、完全基于 IP 的网络。

其中，网络演进的目标之一就是实现演进的 UMTS 陆地无线接入网（Evolved UMTS Territorial Radio Access Network，E-UTRAN）和 UTRAN、GSM/EDGE 无线接入网（GSM/EDGE Radio Access

Network，GERAN）之间的移动性管理，目前提出了一种解决所述3GPP接入系统间移动性管理的方案，该方案基于如图3所示的网络架构。

现有的不同无线接入类型（Radio Access Type，RAT）间的移动性管理方案对于位置区的规划采用的是基于不同的接入技术的方案。如图3所示，长期演进（Long Term Evolution，LTE）路由区（Routing Area，RA）**52**为演进的E-UTRAN小区，2G/3G路由区**50**为传统网络中的UMTS或GPRS小区。当作为移动终端的用户设备**10**在演进的系统架构演进（System Architecture Evolution，SAE）网络和传统的2G/3G网络间漫游时，用户设备**10**为了接收网络提供的业务，需要向网络侧发起路由区更新过程。在这种网络架构下，用户设备发起的路由区更新流程如下：

1）当用户设备**10**从2G/3G网络覆盖下进入演进的SAE网络覆盖下，用户设备**10**通过监听广播信道获得其所在的演进网络路由区标识（identify）信息。发现与原有的2G/3G网络路由区标识不匹配，则用户设备**10**向网络侧发起路由区更新流程。

2）用户设备**10**发送一个路由区更新请求到MME/UPE（Mobility Management Entity，移动性管理实体；User Plane Entity，用户平面实体）**82**，消息包括原来的注册信息（如临时身份等，如果没有临时身份就用永久身份）。路由区更新请求还可以包括缺省IP接入承载（Access Bearer）信息（如用户优选的IP地址和APN）。

3）MME/UPE **82**将接收到的原注册信息发送给原来的MME/UPE **25**以获取用户的信息。

4）原来的MME/UPE **25**发送用户信息（如永久用户身份）给新MME/UPE **82**。

5）用户设备通过新的 MME/UPE **82** 进行鉴权。

6）新 MME/UPE **82** 将自身注册成用户设备 **10** 的服务节点。

7）在原 MME/UPE **25** 中用户设备 **10** 的信息将被删除，或者用户设备 **10** 被标志为不在本服务区。

8）归属用户服务器（Home Subscriber Server，HSS）**60** 确认 MME/UPE **82** 注册成功，授权使用缺省 IP 接入承载的用户签约信息转移给 MME/UPE **82**，计费策略信息也随之转移到 MME/UPE **82**。

9）选择 Inter AS Anchor **70**。

10）Inter AS Anchor **70** 配置 IP 层。用户平面在 UPE-Inter AS Anchor 之间建立起来，并且使用缺省的计费和策略。

11）MME/UPE **82** 将缺省 IP 接入承载的服务质量（Quality of Service，QOS）配置信息提供给演化的无线接入网络。MME/UPE **82** 接受用户设备 **10** 的位置更新请求，并为用户设备 **10** 分配一个临时标识。

12）MME/UPE **82** 确认用户设备路由区更新成功。

从上面的流程可以看出，现有的不同无线接入类型间的空闲模式（LTE_IDLE）下的移动性管理方案存在如下的缺点：在空闲模式下，用户设备从 2G/3G 移动到 SAE/LTE 接入系统时，将发生位置更新的一系列过程，包括 MME/UPE 之间用户设备上下文（UE Context）的转移，MME 向 HSS 注册，UPE 向 Inter AS Anchor 做路由更新等，因此将导致一系列的空闲模式下的位置管理信令流量。而由于演进网络建网初期 E-UTRAN 小区覆盖范围较小，随着用户设备的漫游，其在 E-UTRAN 和 UTRAN、GERAN 之间频繁移动，

从而导致系统频繁进行位置更新的流程，极大地增加了空闲模式下的信令流量负荷。

发明内容

本发明的主要目的在于提供一种移动性管理方法及无线通信系统，用于克服由于现有技术的局限和缺陷而造成的在不同无线接入类型的接入网络之间频繁移动导致的系统频繁进行位置更新的问题。

为了实现上述目的，根据本发明的第一方面，本发明提供了一种无线通信系统。该无线通信系统包括第一无线网络和第二无线网络。当处于空闲模式下的移动终端所接收到的位置区标识发生变化时，其发起位置更新流程。第一无线网络和第二无线网络播发的位置区标识相同，使得处于空闲模式下的移动终端在第一无线网络与第二无线网络之间漫游时，不发起位置更新流程。

在该无线通信系统中，第一无线网络与第二无线网络的覆盖范围可以部分重叠。第一无线网络和第二无线网络中的一种可以是另一种的演进网络。第一无线网络和第二无线网络中的一种可以包括2G、2.5G、和3G网络中的至少一种。位置区标识可以为路由区标识或跟踪区标识。

为了实现上述目的，根据本发明的第二方面，本发明提供了一种移动性管理方法。为多网络覆盖区域设置相同的位置区标识。位置区标识由移动终端接收，从而使处于空闲模式下的移动终端在多网络间漫游时，不发起位置更新流程。

多网络可以包括第一无线网络和第二无线网络。第一无线网络与第二无线网络的覆盖范围可以部分重叠。第一无线网络和第二无

线网络中的一种可以是另一种的演进网络。第一无线网络和第二无线网络中的一种可以包括 2G、2.5G、和 3G 网络中的至少一种。

位置区标识可以为路由区标识或跟踪区标识。第一无线网络的位置区标识可以为该网络覆盖区域的路由区标识，第二无线网络的位置区标识被直接设置为第一无线网络的路由区标识。

为了实现上述目的，根据本发明的第三方面，本发明提供了一种移动性管理方法。在第一无线网络的核心网中的支持节点和第二无线网络的核心网中的支持节点中的至少一个支持节点的配置信息中设置用于表示优选网络的信息。

第一无线网络与第二无线网络的覆盖范围可以部分重叠。第一无线网络和第二无线网络中的一种可以是另一种的演进网络。

用于表示优选网络的信息可以选自包括以下内容的组：不优选网络；优选第一无线网络，移动终端的上下文保留在第一无线网络的核心网中；以及优选第二无线网络，移动终端的上下文保留在第二无线网络的核心网中。

设置用于表示优选网络的信息的步骤可以是通过在支持节点中的配置信息中增加一个字段，字段可以为 3 比特，其值对应于移动终端的上下文的优选保存网络位置。

如果第二无线网络为优选网络，则当移动终端从第三无线网络漫游至第一无线网络时，通过比较由广播信道下发的位置区标识与其保存的位置区标识，判决发起位置区更新流程，包括以下信令流程：

1）移动终端发送包括原注册信息的注册请求到第一无线网络的核心网中的第一支持节点；

2）第一支持节点将接收到的原注册信息发送给第三无线网络的核心网中的原支持节点，以获取用户信息；

3）原支持节点发送用户信息给第一支持节点；

4）移动终端通过第一支持节点进行鉴权；

5）第一支持节点检查其内配置的优选网络信息以及移动终端的接入能力，判决移动终端应驻留在第二无线网络侧，第一支持节点选择第二无线网络的核心网中的一个新支持节点，并向其发送用户上下文配置请求消息，请求该新支持节点为移动终端生成移动性管理上下文；

6）新支持节点将自身注册成移动终端的服务节点；

7）在原支持节点中移动终端上下文将被删除，或者移动终端被标志为不在其服务区；

8）归属用户服务器确认新支持节点注册成功，用户签约信息转移给新支持节点，计费策略信息也随之转移到新支持节点；

9）新支持节点接受移动终端的网络附着，并且分配一个临时身份给移动终端，并向第一支持节点确认用户上下文配置完成；以及

10）第一支持节点收到用户上下文配置响应消息后，向移动终端确认注册完成。

第三无线网络的类型可与第一无线网络和第二无线网络中的一种的类型相同。

通过上述技术方案，本发明实现了如下技术效果。由于不同无线接入类型的网络采用相同的位置区标识，使得移动终端在不同无线接入类型的网络的覆盖区域间漫游时，不会发起位置更新的流程，避免了由于系统频繁进行位置更新流程而导致的空闲模式下的信令流量负荷的大量增加。此外，保持移动终端的实际驻留网络和保留移动终端上下文的网络的一致性，有效的减小了移动终端上下文的迁移。

附图说明

此处所说明的附图用来提供对本发明的进一步理解，构成本申请的一部分，本发明的示意性实施例及其说明用于解释本发明，并不构成对本发明的不当限定。在附图中：

图 1 是 UMTS 系统结构图；

图 2 是 UTRAN 网络结构图；

图 3 示出 3GPP SAE/LTE 与 2G/3G 接入系统间的移动；

图 4 是根据本发明的移动性管理方法的流程图；

图 5 是根据本发明的无线通信系统的框图；

图 6 是根据本发明的移动性管理方法的流程图；

图 7 是根据本发明实施例的演进路由区规划示意图；

图 8 是根据本发明实施例的演进路由区的结构示意图；以及

图 9 示出根据本发明实施例的用户设备附着流程。

具体实施方式

下面将参考附图详细说明本发明。

本发明基于现有的演进网络架构，提出了一种新的不同无线接入类型间位置区的规划方案，并提出了基于此位置区规划方案的移动性管理方案，有效的解决了用户设备在 E-UTRAN 和 UTRAN、GERAN 之间频繁移动导致的系统频繁进行位置更新的问题。

如图 4 所示，本发明所提供的无线通信系统包括：第一无线网络 **1**；第二无线网络 **2**。当处于空闲模式下的用户设备 **10** 所接收到的路由区或跟踪区标识发生变化时，其发起位置更新流程。第一无线网络 **1** 和第二无线网络 **2** 播发的路由区或跟踪区标识相同，使得处于空闲模式下的用户设备 **10** 在第一无线网络 **1** 与第二无线网络 **2** 之间漫游时，不发起位置更新流程。

在该无线通信系统中，第一无线网络 **1** 与第二无线网络 **2** 的覆盖范围可以部分重叠。第一无线网络 **1** 和第二无线网络 **2** 中的一种可以是另一种的演进网络。第一无线网络 **1** 和第二无线网络 **2** 中的一种可以是 2G、2.5G、或 3G 网络。

如图 5 所示，本发明所提供的移动性管理方法包括为多网络覆盖区域设置相同的位置区标识，当移动终端在多网络间漫游时，移动终端获取位置区标识，而不发起位置更新流程。多网络包括第一无线网络和第二无线网络。具体步骤如下：S100，使第一无线网络与第二无线网络播发相同的位置区标识；S102，当用户设备在处于空闲模式时，其接收无线网络所播发的位置区标识；以及 S104，当用户设备在第一无线网络与第二无线网络之间漫游时，不发起位置更新流程。

第一无线网络与第二无线网络的覆盖范围可以部分重叠。第一无线网络和第二无线网络中的一种可以是另一种的演进网络。第一无线网络和第二无线网络中的一种可以是 2G、2.5G 或 3G 网络。位置区标识可以为路由区标识或跟踪区标识。

如图 6 所示，本发明所提供的另一种移动性管理方法包括以下步骤：S200，在第一无线网络的核心网和/或第二无线网络的核心网中的支持节点的配置信息中增加一个字段，该字段可以为 3 比特，其值对应于用户设备的上下文的优选保存网络位置；S202，使字段表示优选网络信息，例如，不优选；优选第一无线网络，用户设备的上下文保留在第一无线网络的核心网中；以及优选第二无线网络，用户设备的上下文保留在第二无线网络的核心网中。

如果配置为优选第一无线网络时（S204），则当用户设备从第三无线网络漫游至第二无线网络时，发起位置更新流程（S206）。如果配置为优选第二无线网络时（S208），则当用户设备从第三无线网络漫游至第一无线网络时，发起位置更新流程（S210）。

第一无线网络与第二无线网络的覆盖范围可以部分重叠。第一无线网络和第二无线网络中的一种是另一种的演进网络。第三无线网络的类型与第一无线网络和第二无线网络中的一种的类型相同。

第一无线网络和第二无线网络播发的位置区标识可以相同。无论第一无线网络和第二无线网络播发的位置区标识是否相同，在第一无线网络的核心网和/或第二无线网络的核心网中的支持节点的配置信息中都可以包括用于表示优选网络的信息，该用于表示优选网络的信息可以是增加的字段。

如果第二无线网络被配置为优选网络，则当用户设备从第三无线网络漫游至第一无线网络时，通过比较由广播信道下发的位置区

标识与其保存的位置区标识，判决发起位置区更新流程，包括以下信令流程：

1）用户设备发送包括原注册信息的注册请求到第一无线网络的核心网中的第一支持节点；

2）第一支持节点将接收到的原注册信息发送给第三无线网络的核心网中的原支持节点，以获取用户信息；

3）原支持节点发送用户信息给第一支持节点；

4）用户设备通过第一支持节点进行鉴权；

5）第一支持节点检查其内配置的优选网络信息以及用户设备的接入能力，判决用户设备应驻留在第二无线网络侧，第一支持节点选择第二无线网络的核心网中的一个新支持节点，并向其发送用户上下文配置请求消息，请求该新支持节点为用户设备生成移动性管理上下文；

6）新支持节点将自身注册成用户设备的服务节点；

7）在原支持节点中用户设备上下文将被删除，或者用户设备被标志为不在其服务区；

8）归属用户服务器确认新支持节点注册成功，用户签约信息转移给新支持节点，计费策略信息也随之转移到新支持节点；

9）新支持节点接受用户设备的网络附着，并且分配一个临时身份给用户设备，并向第一支持节点确认用户上下文配置完成；

10）第一支持节点收到用户上下文配置响应消息后，向用户设备确认注册完成。

[实施例一]

在新的演进路由区（Evolved Routing Area，ERA）规划方案中，原有的2G/3G网络覆盖的区域仍保持原有的路由区规划，而演进网络覆盖的区域则采用和同地区的传统2G/3G网络联合规划的方式，形成演进路由区（演进路由区还可以自定义称为：统一（unified）路由区、联合（united）路由区、接合（joint）路由区、关联（associated）路由区、或组合（combined）路由区）。在本实施例中，可以将原有的2G/3G网络视为第一无线网络，演进网络视为第二无线网络。

图7所示的是演进路由区规划示意图。图中共有三种类型的网络覆盖：由无线网络控制器**24**管理的3G网络的UTRAN小区；由边界无线站（Edge Radio Station，ERS）**84**管理的演进网络的E-UTRAN网络小区；由基站控制器（Base Station Controller，BSC）**28**管理的2G网络的GERAN小区。其中由于BSC **28**控制的GERAN小区为独立的传统2G/3G网络覆盖，则BSC **28**下的小区按照现有的路由区规划方案，分解成多个路由区 **56**。而无线网络控制器 **24**控制的UTRAN小区和ERS **84**控制的E-UTRAN小区覆盖同一地区，因此将UTRAN小区和E-UTRAN小区进行统一规划，形成统一的演进路由区 **54**。

如图8所示，演进路由区由两部分组成：传统的3G网络覆盖下的UTRAN小区组成的路由区RA **56**;演进网络覆盖的E-UTRAN小区组成的跟踪区TA1 **58**和TA2 **59**。在演进路由区规划方案中，针对每一个演进路由区都定义一个路由区标识。考虑到演进网络从现有的2G/3G网络中平滑演进的需求，可以采用将演进网络覆盖的E-UTRAN 小区并入到传统网络的路由区的方式规划演进路由区。

即新增的 E-UTRAN 小区组成的跟踪区 TA **58**、**59** 的标识直接采用原有的 UTRAN 小区组成的路由区 RA **56** 的标识。

当用户设备 **10** 在演进路由区中漫游时，无论是从传统的 3G 网络覆盖下的 UTRAN 小区漫游到演进网络覆盖的 E-UTRAN 小区，还是从演进网络覆盖的 E-UTRAN 小区漫游到传统的 3G 网络覆盖下的 UTRAN 小区，由于两种网络覆盖的位置区标识相同，用户设备 **10** 不会发起位置更新的流程，避免了由于演进网络建网初期 E-UTRAN 小区覆盖范围较小而导致的系统频繁进行位置更新流程和由此极大增加的空闲模式下的信令流量负荷。

[实施例二]

本发明在演进路由区规划方案的基础上，提出了一种根据策略优选无线接入类型驻留的路由区更新方案。优选技术的实现方法如下：将控制同一演进路由区 ERA 的服务 GPRS 支持节点（Serving GPRS Support Node，SGSN）和演进系统 SAE MME/UPE 规划为一个资源池。在 SGSN 或 MME 的配置信息中增加一个 3bit 的字段，用于保留运营商配置的优选网络信息，字段设置方式为：000 表示不优选网络；001 表示优选 E-UTRAN 网络，当用户设备驻扎在此演进路由区 ERA 时，其上下文由池内的 SAE MME 保留；010 表示优选 2G/3G 网络，当用户设备驻扎在此演进路由区 ERA 时，其上下文由池内 SGSN 保留。同时，可以对本方案进行灵活扩展，只需要对该字段增加新的定义即可。

应用此种路由更新的方法，当优选 E-UTRAN 网络时，由于用户设备的上下文始终保存在演进网络侧，当用户设备处于 E-UTRAN 网络覆盖下时，可以便捷的获得演进网络的优质服务；而建网的初期则可以优选 GSM 网络，此时用户设备的上下文始终保存在 SGSN 中。由于建网初期，E-UTRAN 网络的建网范围有限，

用户设备在绝大多数的情况下将处于现有的 2G/3G 覆盖下，保持用户设备的实际驻留网络和保留用户设备上下文的网络的一致性，有效的减小了用户设备上下文的迁移。

类似实施例一，可以将原有的 2G/3G 网络视为第一无线网络，演进网络（E-UTRAN 网络）视为第二无线网络。那么第一无线网络的核心网中的支持节点为 SGSN，第二无线网络的核心网中的支持节点为 MME/UPE。

值得注意的是，本实施例的实现可以基于实施例一的实现，但是也可以在第一无线网络和第二无线网络播发的位置区标识不相同的情况下得以实现。

图 9 示出 E-UTRAN 为优选网络的情况下用户设备路由区更新的完整消息流程。这是假设 E-UTRAN 网络被配置为优选网络，并且用户设备从另一 E-UTRAN 路由区漫游至该演进路由区的情况。根据实际情况，也可能是 2G/3G 网络被配置为优选网络。另外，用户设备漫游前所处的第三无线网络也可能是 2G/3G 网络。该用户设备附着的流程描述如下：

1）用户设备 **10** 漫游至演进路由区的 UTRAN 网络覆盖部分，通过比较广播信道下发的路由区标识与其保存的路由区标识，判决发起路由区更新流程。用户设备 **10** 发送一个注册请求到 SGSN **28**，消息包括原来的注册信息（如临时身份等，如果没有临时身份就用永久身份）。

2）SGSN **28** 将接收到的原注册信息发送给原来的 MME/UPE **82a**，以获取用户的信息。

3）原来的 MME/UPE **82a** 发送用户信息（如永久用户身份）给 SGSN **28**。

4）用户设备 **10** 通过 SGSN **28** 进行鉴权。

5）SGSN **28** 检查其内配置的优选网络信息以及用户设备 **10** 的接入能力（是否能够接入演进网络），判决用户设备 **10** 应驻留在演进网络侧。由于 MME/UPE 与演进的基站（Evolved NodeB，ENB）间是多对多的连接关系，因此 SGSN **28** 应根据负荷分担原则选择一 MME/UPE **82b**，并向其发送用户上下文配置请求消息，请求该 MME/UPE **82b** 为用户设备 **10** 生成 MM 上下文。该消息包括，用户永久标识，用户的位置信息，安全信息等。

6）新 MME/UPE **82b** 将自身注册成用户设备 **10** 的服务节点。

7）在原 MME/UPE **82a** 中用户设备 **10** 的信息将被删除，或者用户设备 **10** 被标志为不在本服务区。

8）HSS **60** 确认 MME/UPE **82b** 注册成功，用户签约信息转移给 MME/UPE **82b**，计费策略信息也随之转移到 MME/UPE **82b**。

9）新的 MME/UPE **82b** 接受用户设备 **10** 的网络附着，并且分配一个临时身份给用户设备 **10**，并向 SGSN **28** 确认用户上下文配置完成。

10）SGSN **28** 收到用户上下文配置响应消息后，向用户设备 **10** 确认注册完成。

11）Inter AS Anchor **76** 配置 IP 层。用户平面在 UPE-Inter AS Anchor 之间建立起来，并且使用缺省的计费和策略。

通过本发明的上述实施例，克服了现有的不同无线接入类型间的空闲模式下的移动性管理方案的如下缺点：在空闲模式下，用户设备从 2G/3G 移动到 SAE/LTE 接入系统时，将发生位置更新的一系列过程，包括 MME/UPE 之间用户设备上下文的转移，MME 向 HSS 注册，UPE 向 Inter AS Anchor 做路由更新等，因此将导致一系列的空闲模式下的位置管理信令流量。而由于演进网络建网初期 E-UTRAN 小区覆盖范围较小，随着用户设备的漫游，其在 E-UTRAN 和 UTRAN、GERAN 之间频繁移动，从而导致系统频繁进行位置更新的流程，极大地增加了空闲模式下的信令流量负荷。本发明提出的新的不同无线接入类型间位置区的规划方案，有效的解决了用户设备在 E-UTRAN 和 UTRAN、GERAN 之间频繁移动导致的系统频繁进行位置更新的问题。此外，保持用户设备的实际驻留网络和保留用户设备上下文的网络的一致性，有效的减小了用户设备上下文的迁移。

以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

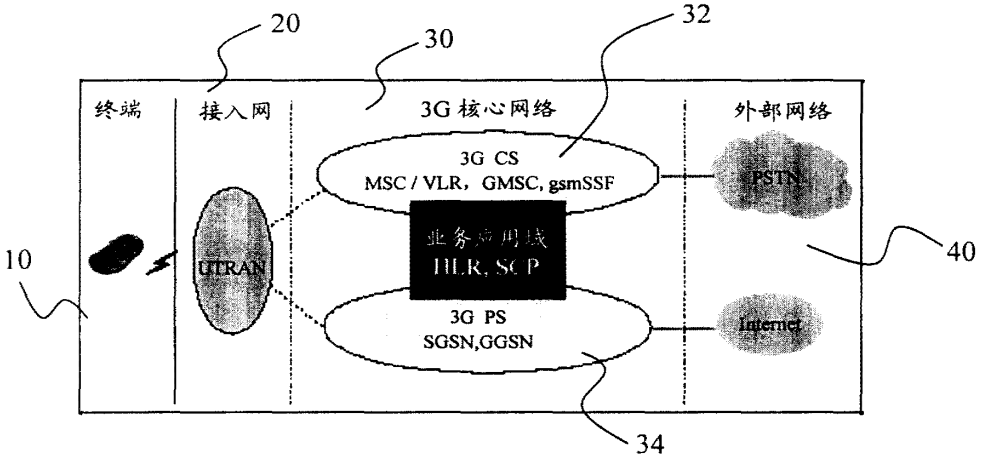

20
30
32
终端
接入网
3G 核心网络
外部网络
3G CS
MSC / VLR，GMSC, gsmSSF
PSTN
业务应用域
HLR, SCP
UTRAN
10
40
3G PS
SGSN,GGSN
Internet
34

图 1

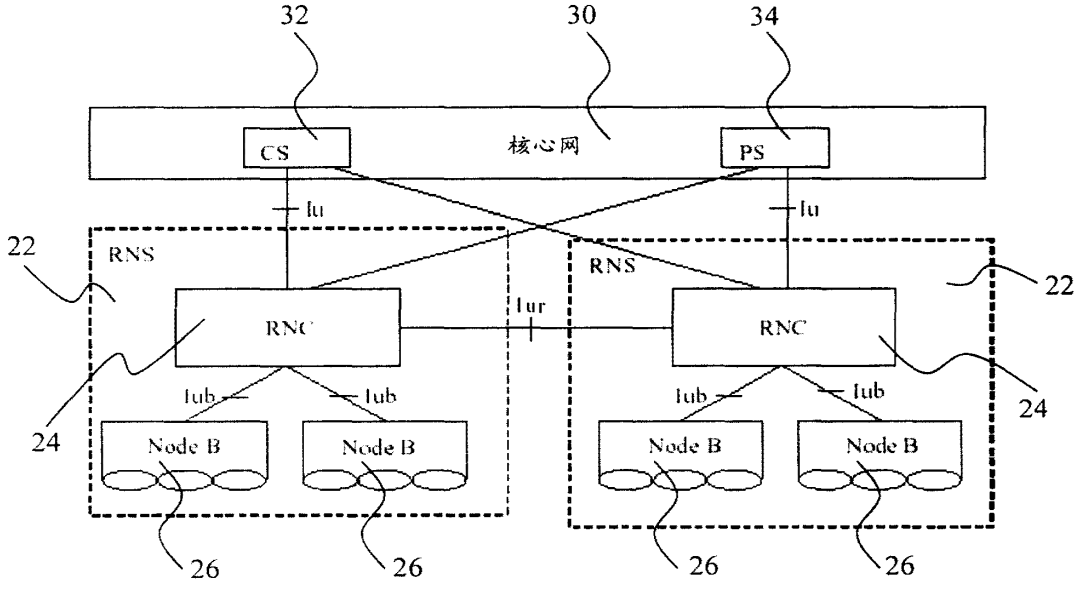

32
30
34
CS
核心网
PS
Iu
Iu
22
RNS
RNS
22
RNC
Iur
RNC
Iub
Iub
Iub
Iub
24
24
Node B
Node B
Node B
Node B
26
26
26
26

图 2

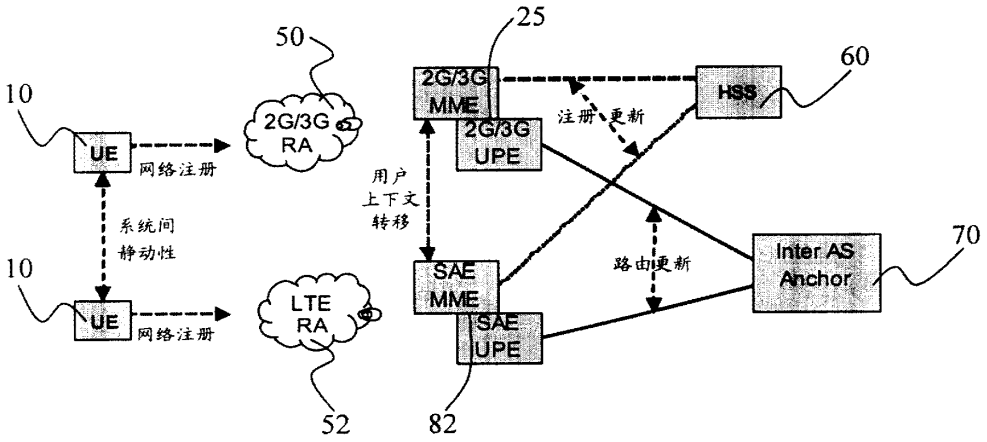

10
UE
网络注册
系统间
静动性
10
UE
网络注册
50
2G/3G
RA
LTE
RA
52
25
2G/3G
MME
2G/3G
UPE
用户
上下文
转移
SAE
MME
SAE
UPE
82
注册更新
HSS
60
路由更新
Inter AS
Anchor
70

图 3

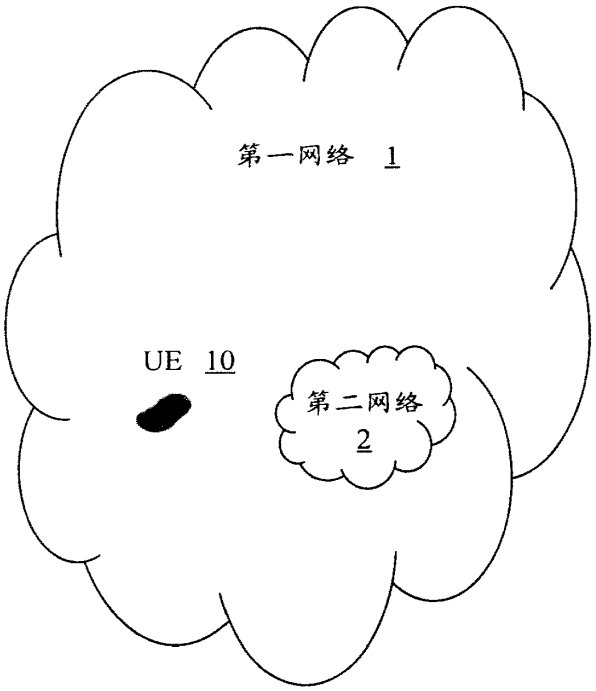

第一网络 1
UE 10
第二网络
2

图 4

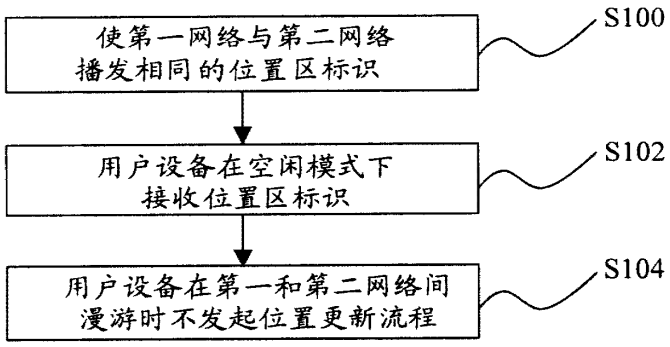

使第一网络与第二网络
播发相同的位置区标识
S100
用户设备在空闲模式下
接收位置区标识
S102
用户设备在第一和第二网络间
漫游时不发起位置更新流程
S104

图 5

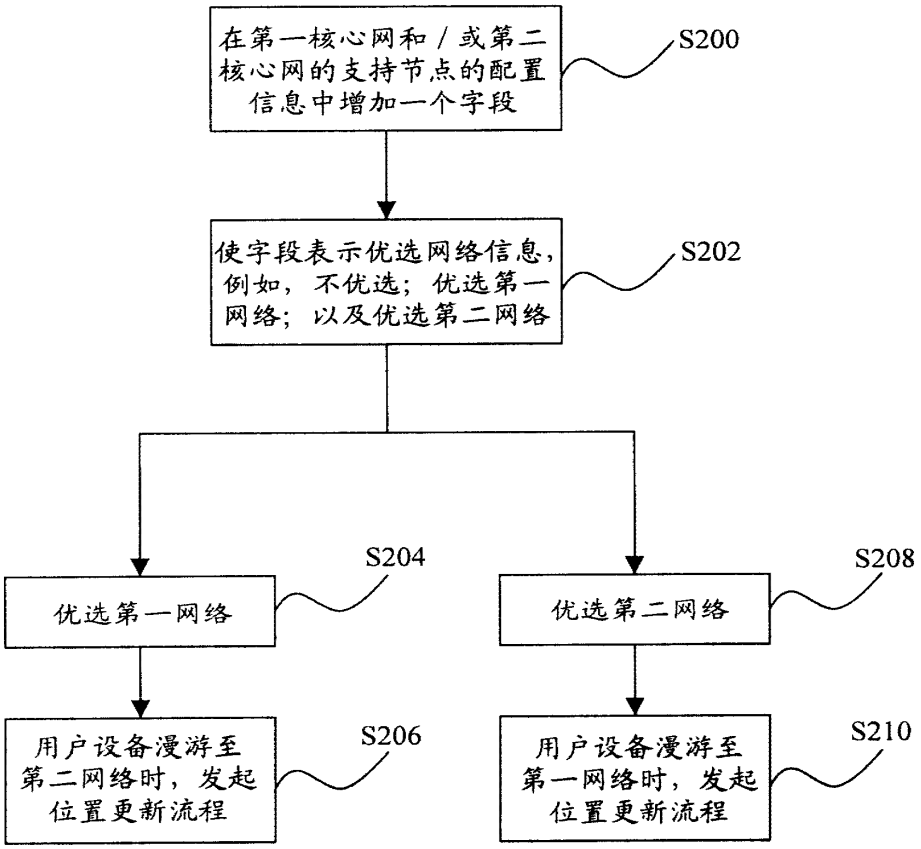

在第一核心网和/或第二核心网的支持节点的配置信息中增加一个字段
S200
使字段表示优选网络信息，例如，不优选；优选第一网络；以及优选第二网络
S202
优选第一网络
S204
优选第二网络
S208
用户设备漫游至第二网络时，发起位置更新流程
S206
用户设备漫游至第一网络时，发起位置更新流程
S210

图 6

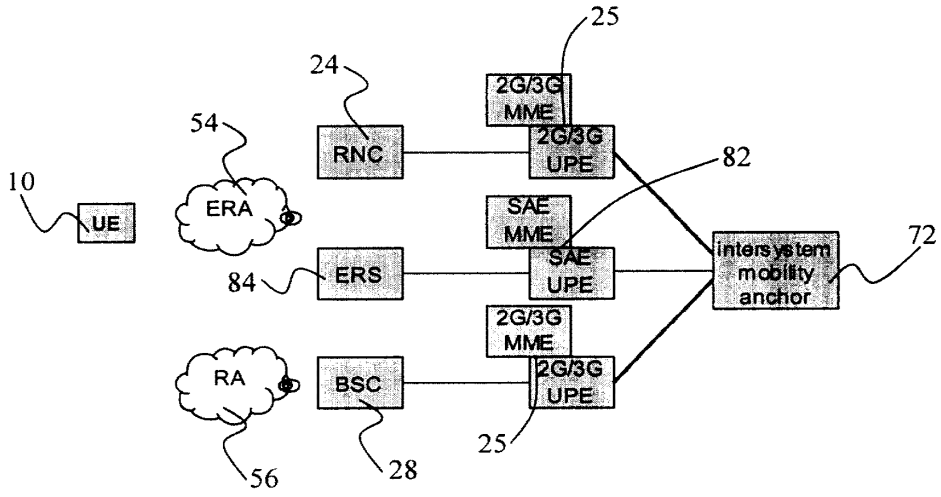

25
24
2G/3G MME
54
RNC
2G/3G UPE
82
10
UE
ERA
SAE MME
84
ERS
SAE UPE
inter system mobility anchor
72
2G/3G MME
RA
BSC
2G/3G UPE
25
56
28

图 7

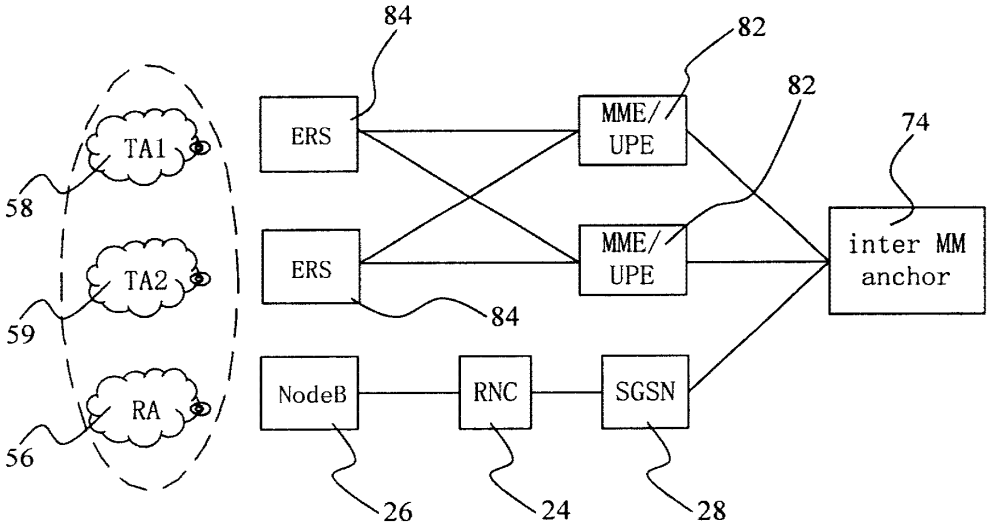

84
82
82
74
TA1
ERS
MME/ UPE
58
TA2
ERS
MME/ UPE
inter MM anchor
59
84
RA
NodeB
RNC
SGSN
56
26
24
28

图 8

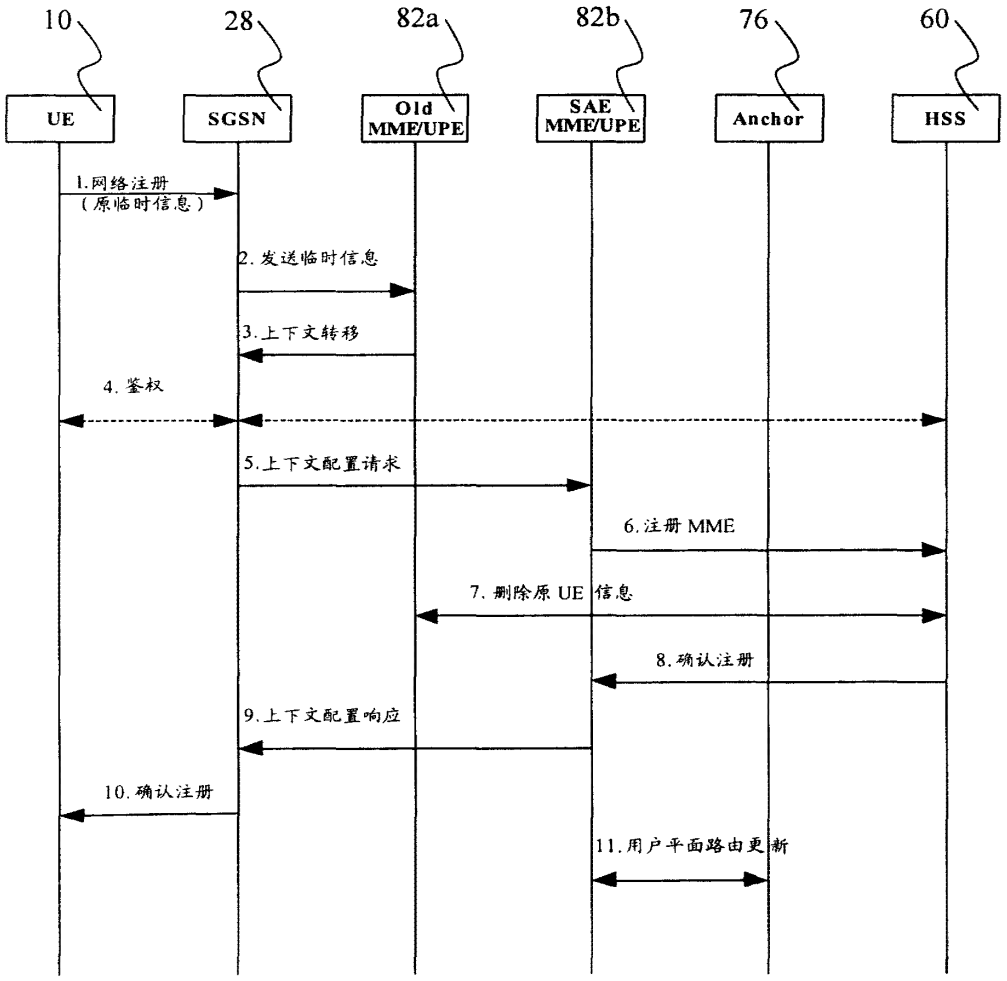

10
28
82a
82b
76
60
UE
SGSN
Old MME/UPE
SAE MME/UPE
Anchor
HSS
1.网络注册（原临时信息）
2.发送临时信息
3.上下文转移
4.鉴权
5.上下文配置请求
6.注册 MME
7.删除原 UE 信息
8.确认注册
9.上下文配置响应
10.确认注册
11.用户平面路由更新

图 9

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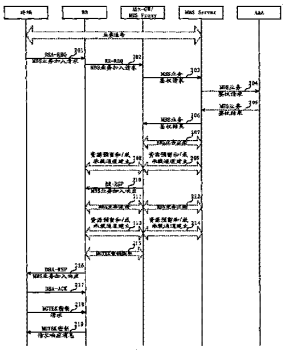
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(54)发明名称

无线网络中终端加入多播广播业务的方法及其系统

(57)摘要

本发明涉及无线通信领域，公开了一种无线网络中终端加入多播广播业务的方法及其系统，使得终端能够成功加入MBS业务，接收MBS业务内容。本发明中，终端从网络侧获取多播广播业务MBS业务参数，其中包含指示空口连接的第一标识和指示业务内容的第二标识，使得终端在收到该MBS业务参数后，能够从第一标识指示的空口连接中接收第二标识指示的MBS业务内容，成功加入该MBS业务。终端可以通过发送加入MBS业务的请求消息发起MBS业务加入过程，获取MBS业务参数，加入所需的MBS业务；网络侧也可以主动发起的MBS业务加入过程，向终端发送MBS业务参数，邀请终端加入MBS业务。



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1. 一种无线网络中终端加入多播广播业务的方法，其特征在于，终端从网络侧获取多播广播业务 MBS 业务参数，该 MBS 业务参数中包含用于指示空口连接的第一标识和用于指示业务内容的第二标识；

所述终端根据所述 MBS 业务参数，从所述第一标识指示的空口连接中接收所述第二标识指示的 MBS 业务内容；

其中，如果接入服务网或 MBS 域内当前无终端接收该 MBS 业务，则还包含以下步骤：

MBS 服务器直接更新其保存的所述 MBS 业务的下行播放列表；或者，

由接入服务网网关或 MBS 代理向所述 MBS 服务器请求注册该 MBS 业务，触发该 MBS 服务器更新其保存的所述 MBS 业务的下行播放列表。

2. 根据权利要求 1 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述终端通过发送加入 MBS 业务的请求消息，或通过网络侧发起的 MBS 业务加入过程从所述网络侧获取所述 MBS 业务参数。

3. 根据权利要求 2 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述终端通过动态业务流添加过程发送所述加入 MBS 业务的请求消息，所述请求消息中包含 MBS 内容标识和 / 或 MBS 域标识。

4. 根据权利要求 2 所述的无线网络中终端加入多播广播业务的方法，其特征在于，通过 3 层多播技术辅助所述 MBS 业务的加入过程，终端发送的所述加入 MBS 业务的请求消息中包含所述 MBS 业务的 IP 多播地址列表和 / 或 MBS 内容标识。

5. 根据权利要求 2 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述网络侧在终端入网时或要求动态建立 MBS 业务时，向所述终端发送加入 MBS 业务的请求，发起所述 MBS 业务加入过程；

所述向终端发送的加入 MBS 业务的请求中包含所述 MBS 业务的空口连接标识、至少一个 MBS 内容标识、和 / 或多播安全联盟标识。

6. 根据权利要求 2 所述的无线网络中终端加入多播广播业务的方法，其特征在于，

在所述网络侧向所述终端发起 MBS 业务加入过程或所述终端发送所述加入 MBS 业务的请求消息之前，所述终端订阅所述 MBS 业务并获取所述 MBS 业务的授权密钥。

7. 根据权利要求 2 所述的无线网络中终端加入多播广播业务的方法，其特征在于，

在所述网络侧向所述终端发起 MBS 业务加入过程或向所述终端下发所述 MBS 业务参数之前，所述网络侧根据所述终端的 MBS 业务签约信息和 / 或该终端的 MBS 业务认证结果对所述终端进行 MBS 业务鉴权，确定所述终端有权接收所述 MBS 业务。

8. 根据权利要求 7 所述的无线网络中终端加入多播广播业务的方法，其特征在于，网络侧发起所述 MBS 业务加入过程的网元是以下之一：锚接入服务网网关或该网关中的功能实体、MBS 服务器、MBS 代理；

网络侧对所述终端进行 MBS 业务鉴权的网元是以下之一：锚接入服务网网关或该网关中的功能实体，MBS 服务器，MBS 代理，认证、授权、计费服务器。

9. 根据权利要求 8 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述锚接入服务网网关或该网关中的功能实体、MBS 服务器、MBS 代理、认证、授权、计费服务器中任一网元完成终端的 MBS 业务鉴权后，将鉴权结果和 / 或所述 MBS 业务签约信息下发到上述其他网元之一或其任意组合。

10. 根据权利要求 3 或 4 所述的无线网络中终端加入多播广播业务的方 法，其特征在于，所述终端发送的加入 MBS 业务的请求消息中还包含 MBS 业务鉴权信息，所述网络侧根据所述终端的 MBS 业务签约信息、MBS 业务鉴权信息和 / 或该终端的 MBS 业务认证结果对所述终端进行 MBS 业务鉴权，确定所述终端是否有权接收所述 MBS 业务。

11. 根据权利要求 3 或 4 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述加入 MBS 业务的请求中还包含指示所述终端最大 MBS 业务能力的信息，所述方法还包含 ：

网络侧根据所述终端的最大 MBS 业务能力和 / 或网络侧保存的该 MBS 的业务资源预留信息，鉴定所述终端是否能够接收所述 MBS 业务。

12. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述 MBS 业务参数还包含 MBS 业务服务质量参数，所述终端收到所述 MBS 业务参数后，根据本终端最大 MBS 业务能力和所述 MBS 业务服务质量参数，确定所述终端是否能够接收所述 MBS 业务。

13. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，如果所述 MBS 业务的播送范围是动态建立的，且基站内当前无终端接收该 MBS 业务，则还包含以下步骤 ：

接入服务网网关直接更新其保存的所述 MBS 业务的下行播放列表 ；或者，

由所述基站向所述接入服务网网关请求注册该 MBS 业务，触发该接入服务网网关更新其保存的所述 MBS 业务的下行播放列表。

14. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，在所述终端加入 MBS 业务后，还包含以下步骤 ：

MBS 服务器、接入服务网网关 /MBS 代理、基站分别更新所述 MBS 业务的用户统计数。

15. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，如果基站与接入服务网网关之间用于承载所述 MBS 业务的资源和 / 或承载通道不是预先配置的，则还包含以下步骤 ：

如果在终端请求加入所述 MBS 业务时，还未进行基站与接入服务网网关之间的资源预留和 / 或建立相应承载通道，且所述基站持有所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，则所述基站根据 MBS 业务要求的资源预留信息和 / 或承载通道信息请求接入服务网网关或 MBS 代理进行资源预留和 / 或建立承载通道 ；

所述接入服务网网关或 MBS 代理根据网络资源状况和服务策略，确定是否接受所述资源预留请求和 / 或承载通道建立请求。

16. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，还包含以下步骤 ：

如果在所述终端通过 MBS 业务鉴权后还未进行相应的资源预留和 / 或建立相应的承载通道，

则接入服务网网关或 MBS 代理通过向基站发送资源预留请求和 / 或承载通道建立请求，为所述 MBS 业务在基站和接入服务网之间的传输进行资源预留和 / 或建立承载通道 ；或者，由 MBS 服务器下发所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，所述基站根据该资源预留信息和 / 或承载通道信息请求服务网网关或 MBS 代理进行资源预留和 / 或建

立承载通道；

所述基站或接入服务网网关或 MBS 代理根据网络资源状况和服务策略确定是否接受对应的资源预留请求和 / 或承载通道建立请求。

17. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，如果接入服务网网关与 MBS 服务器之间的用于承载所述 MBS 业务的资源不是预先配置的，则还包含以下步骤：

如果在所述终端请求加入所述 MBS 业务时，还未进行相应的资源预留 和 / 或建立相应的承载通道，且所述接入服务网网关 /MBS 代理持有所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，则所述接入服务网网关或 MBS 代理根据 MBS 业务要求的资源预留信息和 / 或承载通道信息，请求 MBS 服务器进行资源预留和 / 或建立承载通道；

所述 MBS 服务器根据网络资源状况和服务策略，确定是否接受所述资源预留请求和 / 或承载通道建立请求。

18. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，还包含以下步骤：

如果在所述终端通过 MBS 业务鉴权后，还未进行相应的资源预留和 / 或建立相应的承载通道，

则 MBS 服务器通过向接入服务网网关或 MBS 代理发送资源预留请求和 / 或承载通道建立请求，为所述 MBS 业务在接入服务网和 MBS 服务器之间的传输进行相应的资源预留和 / 或建立相应的承载通道；

或，由所述 MBS 服务器下发所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，所述接入服务网网关或 MBS 代理根据该资源预留信息和 / 或承载通道信息请求 MBS 服务器进行相应的资源预留和 / 或建立相应的承载通道；

所述接入服务网网关或 MBS 代理或 MBS 服务器根据网络资源状况和服务策略确定是否接受对应的资源预留请求和 / 或承载通道建立请求。

19. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述第一标识是空口单播连接标识、或空口多播连接标识、或空口广播标识；

所述第二标识是 MBS 内容标识或所述多播组的 IP 多播地址；

所述 MBS 业务参数还包含以下之一或其任意组合：

所述 MBS 业务对应的 MBS 域标识、MBS 内容标识、多播安全联盟标识、单播安全联盟标识、MBS 业务服务质量参数、MBS 服务流标识。

20. 根据权利要求 19 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述终端获取所述多播安全联盟标识后，从基站获取所述 MBS 的业务密钥，利用所述 MBS 业务密钥和网络侧下发给所述终端的 MBS 授权密钥生成 MBS 业务加密密钥，通过所述 MBS 业务加密密钥接收所述 MBS 业务内容。

21. 根据权利要求 20 所述的无线网络中终端加入多播广播业务的方法，其特征在于，所述 MBS 业务密钥由所述基站生成，或由所述基站从所述接入服务网网关或所述 MBS 代理获取。

22. 根据权利要求 1 至 9 中任一项所述的无线网络中终端加入多播广播业务的方法，其特征在于，如果所述 MBS 业务在 IP 层使用 IP 多播技术，则还包含以下步骤：所述接入服务

网网关或所述 MBS 代理通知多播路由器将所述终端加入相应的多播组。

23. 一种无线网络中终端加入多播广播业务的系统，包含终端和网络侧，其特征在于，所述网络侧包含用于为所述终端提供 MBS 业务参数的单元，所述业务参数包含指示空口连接的第一标识和指示业务内容的第二标识；

所述终端包含用于从所述网络侧获取所述 MBS 业务参数的单元，和根据所获取的 MBS 业务参数，从所述第一标识指示的空口连接中接收所述第二标识指示的 MBS 业务内容的单元；

其中，在接入服务网或 MBS 域内当前无终端接收该 MBS 业务时，MBS 服务器用于直接更新其保存的所述 MBS 业务的下行播放列表；或者，接入服务网网关或 MBS 代理用于向所述 MBS 服务器请求注册该 MBS 业务，触发该 MBS 服务器更新其保存的所述 MBS 业务的下行播放列表。

24. 根据权利要求 23 所述的无线网络中终端加入多播广播业务的系统，其特征在于，所述终端还包含用于向网络侧发送加入 MBS 业务的请求消息，通过所述请求消息发起 MBS 业务加入过程，获取所述 MBS 业务参数的单元。

25. 根据权利要求 23 所述的无线网络中终端加入多播广播业务的系统，其特征在于，所述网络侧还包含用于在终端入网时或要求动态建立 MBS 业务时，向所述终端发起 MBS 业务加入过程，为所述终端提供所述 MBS 业务参数的单元。

26. 根据权利要求 23 所述的无线网络中终端加入多播广播业务的系统，其特征在于，所述网络侧还包含以下单元之一或其任意组合：

用于对所述终端是否有能力接收所述 MBS 业务进行评判的单元；

用于对所述终端进行 MBS 业务鉴权的单元；

用于对所述 MBS 业务进行资源预留的单元；

用于为所述 MBS 业务建立承载通道的单元；

用于对所述 MBS 业务进行注册和 / 或下行播放列表更新的单元；

用于为所述 MBS 业务生成密钥的单元；

用于为所述 MBS 业务进行用户数统计的单元。

27. 根据权利要求 23 至 26 中任一项所述的无线网络中终端加入多播广播业务的系统，其特征在于，所述单元是以下之一或其任意组合：

基站，接入服务网网关和 / 或 MBS 代理，MBS 服务器，认证、授权、计费服务器。

无线网络中终端加入多播广播业务的方法及其系统

技术领域

[0001] 本发明涉及无线通信领域，特别涉及多播广播技术。

背景技术

[0002] IEEE802.16是电子和电气工程师协会(Institute ofElectrical andElectronics Engineers，简称“IEEE”)于2001年12月颁布的，用于在城域网中提供最后一公里无线宽带接入的标准。IEEE802.16标准主要包含802.16a、802.16RevD与802.16e三个标准。

[0003] 微波接入全球互通(Worldwide Interoperability for Microwave Access，简称“WiMAX”)是目前业界对基于IEEE802.16系列标准的无线城域网接入技术，其基本目标是提供一种在城域网一点对多点的多厂商环境下，可有效互操作的宽带无线接入手段。

[0004] 具体地说，802.16系列标准规定了WiMAX系统的空中接口部分协议层，主要包括物理层(PHY)，以及媒体接入控制(Medium Access Control，简称“MAC”)层。其中，PHY层在物理上完成对信号的调制解调以及编解码等操作，而MAC层主要完成WiMAX系统的媒体接入控制功能。

[0005] 图1示出WiMAX端到端参考模型。其中R1接口为无线空中接口，主要由IEEE802.16d/e定义。其余接口均为有线接口。

[0006] 如图可见，WiMAX主要包含移动台(Mobile Station，简称“MS”)/用户站(Subscribe Station，简称“SS”)、接入服务网络(Access ServiceNetwork，简称“ASN”)与连接服务网络(Connectivity Service Network，简称“CSN”)。

[0007] 其中，ASN定义为为WiMAX用户终端提供无线接入服务的网络功能集合，ASN包含了BS和ASN网关(ASN GateWay简称“ASN-GW”)网元，一个ASN可能被多个CSN共享。

[0008] CSN定义为为WiMAX用户终端提供IP连接服务。

[0009] MS/SS为(移动)终端，用户使用该终端接入WiMAX网络。

[0010] 人们通常所说的通信是在一个节点和另外一个节点之间的通信，但是随着用户需求的增加，以及多种媒体的引入，用户需要进行一对多或多对多的通信，从而产生了点到多点(Point to Multipoint，简称“PTM”)的传输模式。为了在移动网上支持这些模式，实现一对多的多播广播业务，同时为了有效地利用移动网络资源，现有技术在WiMAX的基础上定义了MBS业务。MBS业务是在移动网络中提供一个数据源向多个用户发送数据的点到多点业务，实现网络资源共享，提高网络资源的利用率，尤其是空口接口资源。WiMAX定义的MBS不仅能实现纯文本低速率的消息类多播和广播，而且还能实现高速多媒体业务的多播和广播，这无疑顺应了未来移动数据发展的趋势。

[0011] 基于WiMAX网络的MBS业务支持两种接入模式：单基站接入和多基站接入。在多基站接入模式下，定义了MBS域(即MBS Zone，用MBS_zoneID来标识)的概念，所谓一个MBS域就是一个基站的集合，一个MBS域内的所有基站用相同的Multicast CID和MBS组安全联盟(MBS Group SecurityAssociation，简称“MBS GSA”)，发送同一MBS业务流的内

容，注册了 MBS 服务的终端可以在该 MBS 域内通过多个基站接收 MBS 业务数据，并且处于空闲态的终端在 MBS 域内跨基站移动时，不需重建连接，可以不受影响的接收 MBS 业务，实现 MBS 业务的无缝切换。单基站接入 MBS 是多基站接入 MBS 的一种特例，MBS 域范围限定为一个基站覆盖范围内，一个 MBS 域内接收该 MBS 的所有用户使用同一个多播连接标识。现有技术对单 基站模式没有详细的描述；但是对多基站模式下，基站如何发送 MBS 数据，终端如何接收 MBS 数据，以及基站如何通知终端感兴趣的 MBS 数据的发送，都有相应的描述。

[0012] 现有协议对 MBS 系统中空口有相应的描述，但没有关于终端如何加入 MBS 业务的相关技术。

发明内容

[0013] 本发明的主要目的在于提供一种无线网络中终端加入多播广播业务的方法及其系统，使得终端能够成功加入 MBS 业务，接收 MBS 业务内容。

[0014] 为实现上述目的，本发明提供了一种无线网络中终端加入多播广播业务的方法，终端从网络侧获取多播广播业务 MBS 业务参数，该 MBS 业务参数中包含用于指示空口连接的第一标识和用于指示业务内容的第二标识；

[0015] 所述终端根据所述 MBS 业务参数，从所述第一标识指示的空口连接中接收所述第二标识指示的 MBS 业务内容；

[0016] 其中，如果接入服务网或 MBS 域内当前无终端接收该 MBS 业务，则还包含以下步骤：

[0017] MBS 服务器直接更新其保存的所述 MBS 业务的下行播放列表；或者，

[0018] 由接入服务网网关或 MBS 代理向所述 MBS 服务器请求注册该 MBS 业务，触发该 MBS 服务器更新其保存的所述 MBS 业务的下行播放列表。

[0019] 其中，所述终端通过发送加入 MBS 业务的请求消息，或通过网络侧发起的 MBS 业务加入过程从所述网络侧获取所述 MBS 业务参数。

[0020] 此外在所述方法中，所述终端通过动态业务流添加过程发送所述加入 MBS 业务的请求消息，所述请求消息中包含 MBS 内容标识和 / 或 MBS 域标识。

[0021] 此外在所述方法中，通过 3 层多播技术辅助所述 MBS 业务的加入过程，终端发送的所述加入 MBS 业务的请求消息中包含所述 MBS 业务的 IP 多播地址列表和 / 或 MBS 内容标识。

[0022] 此外在所述方法中，所述网络侧在终端入网时或要求动态建立 MBS 业务时，向所述终端发送加入 MBS 业务的请求，发起所述 MBS 业务加入过程；

[0023] 所述向终端发送的加入 MBS 业务的请求中包含所述 MBS 业务的空口连接标识、一个或多个 MBS 内容标识、和 / 或多播安全联盟标识。

[0024] 此外在所述方法中，在所述网络侧向所述终端发起 MBS 业务加入过程或所述终端发送所述加入 MBS 业务的请求消息之前，所述终端先订阅所述 MBS 业务并获取所述 MBS 业务的授权密钥。

[0025] 此外在所述方法中，在所述网络侧向所述终端发起 MBS 业务加入过程或向所述终端下发所述 MBS 业务参数之前，所述网络侧根据所述终端的 MBS 业务签约信息和 / 或该终端的 MBS 业务认证结果对所述终端进行 MBS 业务鉴权，确定所述终端有权接收所述 MBS 业

务。

[0026] 此外在所述方法中，网络侧发起所述 MBS 业务加入过程的网元是以下之一：锚接入服务网网关或该网关中的功能实体、MBS 服务器、MBS 代理；

[0027] 网络侧对所述终端进行 MBS 业务鉴权的网元是以下之一：锚接入服务网网关或该网关中的功能实体，MBS 服务器，MBS 代理，认证、授权、计费服务器。

[0028] 此外在所述方法中，所述锚接入服务网网关或该网关中的功能实体、MBS 服务器、MBS 代理、认证、授权、计费服务器中任一网元完成终端的 MBS 业务鉴权后，将鉴权结果和 / 或所述 MBS 业务签约信息下发到上述其他网元之一或其任意组合。

[0029] 此外在所述方法中，所述终端发送的加入 MBS 业务的请求消息中还包 含 MBS 业务鉴权信息，所述网络侧根据所述终端的 MBS 业务签约信息、MBS 业务鉴权信息和 / 或该终端的 MBS 业务认证结果对所述终端进行 MBS 业务鉴权，确定所述终端是否有权接收所述 MBS 业务。

[0030] 此外在所述方法中，所述加入 MBS 业务的请求中还包含指示所述终端最大 MBS 业务能力的信息，网络侧根据所述终端的最大 MBS 业务能力和 / 或网络侧保存的该 MBS 的业务资源预留信息，鉴定所述终端是否能够接收所述 MBS 业务。

[0031] 此外在所述方法中，所述 MBS 业务参数还包含 MBS 业务服务质量参数，所述终端收到所述 MBS 业务参数后，根据本终端最大 MBS 业务能力和所述 MBS 服务质量参数，确定所述终端是否能够接收所述 MBS 业务。

[0032] 此外在所述方法中，如果所述 MBS 业务的播送范围是动态建立的，且基站内当前无终端接收该 MBS 业务，则还包含以下步骤：

[0033] 接入服务网网关直接更新其保存的所述 MBS 业务的下行播放列表；

[0034] 或，由所述基站向所述接入服务网网关请求注册该 MBS 业务，触发该接入服务网网关更新其保存的所述 MBS 业务的下行播放列表。

[0035] 此外在所述方法中，在所述终端加入 MBS 业务后，还包含以下步骤：

[0036] MBS 服务器、接入服务网网关 /MBS 代理、基站分别更新所述 MBS 业务的用户统计数。

[0037] 此外在所述方法中，如果基站与接入服务网网关之间用于承载所述 MBS 业务的资源和 / 或承载通道不是预先配置的，则还包含以下步骤：

[0038] 如果在终端请求加入所述 MBS 业务时，还未进行基站与接入服务网网关之间的资源预留和 / 或建立相应承载通道，且所述基站持有所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，则所述基站根据 MBS 业务要求的资源预留信息和 / 或承载通道信息请求接入服务网网关或 MBS 代理进行资源 预留和 / 或建立承载通道；

[0039] 所述接入服务网网关或 MBS 代理根据网络资源状况和服务策略，确定是否接受所述资源预留请求和 / 或承载通道建立请求。

[0040] 此外在所述方法中，还包含以下步骤：

[0041] 如果在所述终端通过 MBS 业务鉴权后还未进行相应的资源预留和 / 或建立相应的承载通道，

[0042] 则接入服务网网关或 MBS 代理通过向基站发送资源预留请求和 / 或承载通道建立请求，为所述 MBS 业务在基站和接入服务网之间的传输进行资源预留和 / 或建立承载通道；

或者由 MBS 服务器下发所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，所述基站根据该资源预留信息和 / 或承载通道信息请求服务网网关或 MBS 代理进行资源预留和 / 或建立承载通道 ；

[0043] 所述基站或接入服务网网关或 MBS 代理根据网络资源状况和服务策略确定是否接受对应的资源预留请求和 / 或承载通道建立请求。

[0044] 此外在所述方法中，如果接入服务网网关与 MBS 服务器之间的用于承载所述 MBS 业务的资源不是预先配置的，则还包含以下步骤 ：

[0045] 如果在所述终端请求加入所述 MBS 业务时，还未进行相应的资源预留和 / 或建立相应的承载通道，且所述接入服务网网关 /MBS 代理持有所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，则所述接入服务网网关或 MBS 代理根据 MBS 业务要求的资源预留信息和 / 或承载通道信息，请求 MBS 服务器进行资源预留和 / 或建立承载通道 ；

[0046] 所述 MBS 服务器根据网络资源状况和服务策略，确定是否接受所述资源预留请求和 / 或承载通道建立请求。

[0047] 此外在所述方法中，还包含以下步骤 ：

[0048] 如果在所述终端通过 MBS 业务鉴权后，还未进行相应的资源预留和 / 或 建立相应的承载通道，

[0049] 则 MBS 服务器通过向接入服务网网关或 MBS 代理发送资源预留请求和 / 或承载通道建立请求，为所述 MBS 业务在接入服务网和 MBS 服务器之间的传输进行资源预留和 / 或建立承载通道 ；

[0050] 或，由所述 MBS 服务器下发所述 MBS 业务要求的资源预留信息和 / 或承载通道信息，所述接入服务网网关或 MBS 代理根据该资源预留信息和 / 或承载通道信息请求 MBS 服务器进行资源预留和 / 或建立承载通道 ；

[0051] 所述接入服务网网关或 MBS 代理或 MBS 服务器根据网络资源状况和服务策略确定是否接受对应的资源预留请求和 / 或承载通道建立请求。

[0052] 此外在所述方法中，所述第一标识是空口单播连接标识、或空口多播连接标识、或空口广播标识 ；

[0053] 所述第二标识是 MBS 内容标识或所述多播组的 IP 多播地址 ；

[0054] 所述 MBS 业务参数还包含以下之一或其任意组合 ：

[0055] 所述 MBS 业务对应的 MBS 域标识、至少一个 MBS 内容标识、多播安全联盟标识、单播安全联盟标识、MBS 业务服务质量参数、MBS 服务流标识。

[0056] 此外在所述方法中，所述终端获取所述多播安全联盟标识后，从基站获取所述 MBS 的业务密钥，利用所述 MBS 业务密钥和网络侧下发给所述终端的 MBS 授权密钥生成的 MBS 业务加密密钥，通过所述 MBS 业务加密密钥接收所述 MBS 业务内容。

[0057] 此外在所述方法中，所述 MBS 业务密钥由所述基站生成，或由所述基站从所述接入服务网网关或所述 MBS 代理获取。

[0058] 此外在所述方法中，如果所述 MBS 业务在 IP 层使用 IP 多播技术，则还包含以下步骤 ：所述接入服务网网关或所述 MBS 代理通知多播路由器将所 述终端加入相应的多播组。

[0059] 本发明还提供了一种无线网络中终端加入多播广播业务的系统，包含终端和网络侧，所述网络侧包含用于为所述终端提供 MBS 业务参数的单元，所述业务参数包含指示空

口连接的第一标识和指示业务内容的第二标识；

[0060] 所述终端包含用于从所述网络侧获取所述 MBS 业务参数的单元，和根据所获取的 MBS 业务参数，从所述第一标识指示的空口连接中接收所述第二标识指示的 MBS 业务内容的单元；

[0061] 其中，在接入服务网或 MBS 域内当前无终端接收该 MBS 业务时，MBS 服务器用于直接更新其保存的所述 MBS 业务的下行播放列表；或者，接入服务网网关或 MBS 代理用于向所述 MBS 服务器请求注册该 MBS 业务，触发该 MBS 服务器更新其保存的所述 MBS 业务的下行播放列表。

[0062] 其中，所述终端还包含用于向网络侧发送加入 MBS 业务的请求消息，通过所述请求消息发起 MBS 业务加入过程，获取所述 MBS 业务参数的单元。

[0063] 此外在所述系统中，所述网络侧还包含用于在终端入网时或要求动态建立 MBS 业务时，向所述终端发起 MBS 业务加入过程，为所述终端提供所述 MBS 业务参数的单元。

[0064] 此外在所述系统中，所述网络侧还包含以下单元之一或其任意组合：

[0065] 用于对所述终端是否有能力接收所述 MBS 业务进行评判的单元；

[0066] 用于对所述终端进行 MBS 业务鉴权的单元；

[0067] 用于对所述 MBS 业务进行网络侧资源预留的单元；

[0068] 用于为所述 MBS 业务建立承载通道的单元；

[0069] 用于对所述 MBS 业务进行注册和 / 或下行播放列表更新的单元；

[0070] 用于为所述 MBS 业务生成密钥的单元。

[0071] 用于为所述 MBS 业务进行用户数统计的单元。

[0072] 此外在所述系统中，所述设备是以下之一或其任意组合：

[0073] 基站，接入服务网网关和 / 或 MBS 代理，MBS 服务器，认证、授权、计费服务器。

[0074] 通过比较可以发现，本发明的技术方案与现有技术的主要区别在于，终端从网络侧获取多播广播业务 MBS 业务参数，其中包含指示空口连接的第一标识和指示业务内容的第二标识，使得终端在收到该 MBS 业务参数后，能够从第一标识指示的空口连接中接收第二标识指示的 MBS 业务内容，成功加入该 MBS 业务。

[0075] 终端可以通过发送加入 MBS 业务的请求消息发起 MBS 业务加入过程，获取 MBS 业务参数，加入所需的 MBS 业务；网络侧也可以主动发起的 MBS 业务加入过程，向终端发送 MBS 业务参数，邀请终端加入 MBS 业务。从而使网络侧和终端侧均能根据实际需求主动操作。

[0076] 终端可以通过 DSA 过程发送 MBS 业务请求消息，在该消息中携带 MBS 域标识，告知网络侧该终端所需要加入的 MBS 业务。由于 MBS 域中可能同时包含多个 MBS 业务，为了明确标识，在该消息中还可以携带 MBS 内容标识，以便唯一指示所要加入的 MBS 业务，使得终端无需同时加入同一 MBS 域中其他 MBS 业务。另外，在 MBS 内容标识是全局唯一的情况下，也可以只携带 MBS 内容标识。

[0077] 或者，终端可以通过因特网组管理协议（Internet Group Management Protocol，简称“IGMP”）协议消息发送 MBS 业务请求，在消息中携带 IP 多播地址，同样能够明确指示网络侧该终端所需要加入的 MBS 业务。

[0078] 在网络侧，MBS 服务器可以通过与 AAA 服务器交互对该终端进行 MBS 业务鉴权，

或由ASN网关/MBS代理根据预先获取的鉴权结果对该终端进行MBS业务鉴权，通过业务鉴权，确保加入该MBS业务的终端均已经订阅了该MBS业务并获得了该业务的授权，防止非法用户获取相关服务，妨害合法用户的权益。

[0079] 网络侧或终端本身对终端的最大能力和该MBS业务所需的最低要求进行比较，确定终端是否有能力承载该MBS业务，防止终端在能力范围以外接收业务，造成网络资源的浪费和终端的额外损耗。

[0080] 在终端加入该业务时，基站或ASN网关或MBS代理或MBS服务器需要对其下使用该MBS业务的用户数目进行重新统计，从而能够采用合理的模式承载该MBS业务；在之前没有终端使用该MBS业务时，ASN网关或MBS代理或MBS服务器需要进行相关的业务播放列表的更新，确保播放列表的内容与实际相符合。

[0081] 如果基站与ASN网关或ASN网关与MBS服务器之间用于承载该MBS业务的资源或承载通道不是预先配置的，且还未进行相应的资源预留和承载通道的建立，则基站或ASN网关或MBS服务器可以根据MBS业务实际要求的资源预留信息和承载通道信息，在向终端下发MBS业务参数之前的任意时间，进行相应的资源预留和承载通道的建立。

[0082] 附图说明

[0083] 图1是现有技术中WiMAX的网络结构示意图；

[0084] 图2是根据本发明第一实施方式的无线网络中终端加入MBS业务的方法流程图；

[0085] 图3是根据本发明第四实施方式的无线网络中终端加入MBS业务的方法流程图；

[0086] 图4是根据本发明第五实施方式的无线网络中终端加入MBS业务的方法流程图；

[0087] 图5是根据本发明第六实施方式的无线网络中终端加入MBS业务的方 法流程图。

具体实施方式

[0088] 为使本发明的目的、技术方案和优点更加清楚，下面将结合附图对本发明作进一步地详细描述。

[0089] 在本发明中，终端从网络侧获取多播广播业务MBS业务参数，其中包含指示空口连接的第一标识和指示业务内容的第二标识，使得终端在收到该MBS业务参数后，能够从第一标识指示的空口连接中接收第二标识指示的MBS业务内容，成功加入该MBS业务。

[0090] 下面对本发明第一实施方式进行说明。本发明第一实施方式涉及无线网络中终端加入MBS业务的方法，在本实施方式中，由终端主动发起MBS业务加入过程，终端在加入MBS业务之前已经明确其感兴趣的MBS业务在哪些MBS域(MBS Zone)内播送，实际操作中，终端可在业务通告阶段(ServiceAnnounce)获得相关信息；终端还可在当前BS广播的DCD消息中获知当前BS属于哪些MBS Zone，如果广播的这些MBS Zone中有终端感兴趣的MBS业务所在的MBS Zone，终端即可发起MBS业务加入过程。具体如图2所示。

[0091] 在步骤201中，终端发送MBS业务加入请求消息DSA-REQ至BS，该消息中携带欲加入的MBS业务所在的MBS Zone标识(MBS Zone ID)和/或MBS业务鉴权信息。

[0092] 可选的，该消息还可携带终端当前支持的最大MBS业务能力信息，用于告知网络侧并由网络侧根据MBS业务的实际服务质量(Quality of Service，简称“QoS”)要求决策此终端是否能够正常接收业务。

[0093] 在步骤202中，BS收到终端的MBS业务加入请求后，首先验证请求消息的消息认

证码 HMAC/CMAC 以验证终端是否是网络的合法用户，验证成 功后 BS 向接入服务网络网关 (Access Service Network GateWay，简称“ASN-GW”) 发送 MBS 业务加入请求消息，如 RR-REQ，该消息中携带终端标志 MSID、MBS Zone ID 和 / 或 MBS 业务鉴权信息等。在本步骤中还存在以下几种情况 ：

[0094] a) 如果 BS 与 ASN-GW 间的用于承载该 MBS 业务的资源不是预先配置的，且还未进行相应的资源预留，且 BS 当前持有该 MBS 业务要求的资源预留信息，则 BS 向 ASN-GW 发送的 MBS 业务加入请求消息还包含资源预留申请，请求为该 MBS 业务在 BS 和 ASN-GW 上进行相应的资源预留 ；

[0095] b) 如果 BS 与 ASN-GW 间的用于传输该 MBS 业务的承载通道不是预先配置的，且还未创建相应的承载通道，如果 BS 持有 MBS 业务要求的承载通道信息则上述 BS 向 ASN-GW 发送的 MBS 业务加入请求消息还包含承载通道建立请求，为传输该 MBS 业务在 BS 和 ASN-GW 上申请建立承载通道。BS 和 ASN-GW 间的承载通道的实现可以通过通用路由封装 (Generic RouteEncapsulation，简称“GRE”)、虚拟局域网 (Virtual Local Area Network，简称“VLAN”)、多协议标记交换 (Multi Protocol Label Switching，简称“MPLS”) 等隧道技术，可参见现有技术。

[0096] c) 对于请求消息中包含终端的最大 MBS 业务能力信息的情况，如果 BS 持有 MBS 业务的实际能力要求，即 MBS 业务要求的资源预留信息，则 BS 直接判断该终端是否能够正常接收此 MBS ；如果 BS 上没有该 MBS 业务的资源预留信息，则 BS 向 ASN-GW 发送的 MBS 业务加入请求消息还包含终端的最大 MBS 业务能力信息，请求 ASN-GW 进一步对其进行判决。

[0097] 在步骤 203 中，ASN-GW 收到来自 BS 的 MBS 业务加入请求后，向 MBS 服务器 (MBS Server) 发送 MBS 业务鉴权请求，请求 MBS 服务器验证该终端是否具有接收该 MBS 业务的权利。该请求中还可携带 MBS Zone ID、终端的网络接入标识 (Network Access ID，简称“NAI”) 和 / 或 MBS 业务鉴 权信息等。在本步骤中还存在以下几种情况 ：

[0098] a) 如果 ASN-GW 或 ASN-GW 上的功能实体，如业务流授权者 (ServiceFlow Authorization，简称“SFA”) 或 MBS Proxy，已经保存有 MBS 业务的授权信息 (业务认证结果)，则 ASN-GW 无需再向 MBS Server 发送 MBS 业务鉴权请求，自行根据维护的 MBS 授权信息处理相应终端的 MBS 业务加入请求即可。

[0099] b) 如果 ASN-GW 与 MBS Server 间的用于承载该 MBS 业务的资源不是预先配置的，且还未进行相应的资源预留，并且 ASN-GW 持有 MBS 业务要求的资源预留信息，则在本步骤中 ASN-GW 向 MBS Server 发送的 MBS 业务鉴权请求消息中还包含资源预留申请，为承载该 MBS 业务在 ASN-GW 和 MBS Server 上申请相应的资源预留。

[0100] c) 如果 ASN-GW 与 MBS Server 间的用于传输该 MBS 业务的承载通道不是预先配置的，且还未创建相应的承载通道，并且 ASN-GW 持有 MBS 业务要求的承载通道信息则在本步骤中 ASN-GW 向 MBS Server 发送的 MBS 业务鉴权请求消息还包含承载通道建立请求，为传输该 MBS 业务在 ASN-GW 和 MBS Server 上申请建立承载通道。ASN-GW 和 MBS Server 间的承载通道的实现可以是 GRE、第二层隧道协议 (Layer2 Tunneling Protocol，简称“L2TP”)、VLAN、MPLS、IP 安全 (IP Security，简称“IPSec”) 等隧道技术也可是 IP 多播技术，如 IGMP、多播监听发现 (Multicast ListenerDiscovery，简称“MLD”) 等。

[0101] d)ASN-GW 收到终端的最大 MBS 业务能力信息后，如果 ASN-GW 持有 MBS 业务的实际

能力要求，即资源预留信息，则 ASN-GW 根据收到的终端最大能力信息和该 MBS 业务所要求的资源预留信息，判断该终端是否能够正常接收该 MBS 业务；反之，如果 ASN-GW 当前没有该 MBS 业务的资源预留信息，则临时保存接收到的该终端的最大能力信息，以便后续进一步判决。

[0102] 在步骤 204 中，MBS Server 收到来自 ASN-GW 的 MBS 业务鉴权请求后，如果自身维护了该终端的 MBS 业务授权信息，则检索 MBS 业务授权信息，查找并确认该终端是否具有享受该 MBS 业务的权利，如终端是否在该 MBS 业务的订阅组中，以及该终端是否已经被授权，获取该 MBS 业务的授权密钥 (MAK) 等；如果 MBS Server 没有维护相应的信息，无法独立判断终端是否具有享受该 MBS 业务的能力，则 MBS Server 还需向终端开户所在的 AAA 服务器请求进行 MBS 业务鉴权。

[0103] 如果 AAA 服务器收到来自 MBS 服务器的鉴权请求，则进入步骤 205，根据用户签约信息和服务策略判断该终端是否具有享受该 MBS 业务的能力，并将业务鉴权结果返回 MBS Server。同时，可选的，AAA 服务器还可以将该终端的 MBS 业务签约信息下发给 MBS Server，以便 MBS Server 在之后的过程中能够直接处理接收到的该终端的 MBS 业务鉴权请求。

[0104] 在步骤 206 中，MBS Server 将 MBS 业务鉴权结果返回 ASN-GW。同时，可选的，MBS Server 可以将该终端的 MBS 业务鉴权信息下发给 ASN-GW 或 ASN-GW 中的某个功能实体，如 SFA 或 MBS Proxy，以便 ASN-GW 在今后的过程中能够直接处理接收到的该终端的 MBS 业务加入请求。在本步骤中还存在以下任意情况：

[0105] a) 可选的，如果 MBS 业务的播送范围是动态建立的，且该 ASN 或 MBSZone 内还没有任何终端接收该 MBS 业务，则 MBS 业务鉴权成功后 MBSServer 可直接更新该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加 ASN-GW 或 MBS Proxy 的标识或 IP 地址。

[0106] b) 可选的，MBS 业务鉴权成功后，MBS Server 更新该 MBS 业务的用户统计数，以便 MBS Server 确定当前使用该 MBS 业务的实际用户数。

[0107] c) 可选的，如果 ASN 网络实体，如 BS、ASN-GW，之前没有获知 MBS 业务要求的资源预留信息和 / 或承载通道信息，则本步骤中 MBS Server 可同时下发该 MBS 业务要求的资源预留信息和 / 或承载通道信息。

[0108] d) 对应步骤 203 的可选项 b)，如果 MBS Server 收到来自 ASN-GW 的资源预留申请，则根据自身的资源状况和服务策略判断是否接受该资源预留申请，并在本步骤中向 ASN-GW 返回资源预留的结果。

[0109] e) 对应步骤 203 的可选项 c)，如果 MBS Server 收到来自 ASN-GW 的承载通道建立请求，则 MBS Server 根据自身的资源状况和服务策略判断是否接受该请求，并在本步骤中向 ASN-GW 返回承载通道建立的结果。

[0110] 可选的，在步骤 207 中，如果 MBS 业务的播送范围是动态建立的，且该 ASN 或 MBS Zone 内还没有任何终端接收该 MBS 业务，且在步骤 206 中，MBS Server 没有更新下行播放列表，则 MBS 业务鉴权成功后 ASN-GW 或 MBS Proxy 向 MBS Server 注册该 MBS 业务，触发 MBS Sever 更新其保存的该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加 ASN-GW 或 MBS Proxy 的标识或 IP 地址；另外，如果之前没有建立 ASN-GW 与 MBS Server 间的承载通道，或当前还未下发该 MBS 业务的承载通道信息和 / 或资源预留信息 (即 ASN-GW/

MBS Proxy 没有该 MBS 业务的承载通道信息和 / 或资源预留信息，无法请求 MBS Sever 建立相应的承载通道和 / 或预留相应的资源），则 MBS Server 在回应注册请求的同时，将 MBS 业务的承载通道信息和 / 或资源预留信息下发至 ASN-GW/MBS Proxy。

[0111] 可选的，在步骤 208 中，如果 BS 与 ASN-GW 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且还未进行相应的资源预留和 / 或创建相应的承载通道（即在步骤 202 中，BS 未发送承载通道建立请求和 / 或资源预留请求），则 ASN-GW 向 BS 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 BS 和 ASN-GW 间传输进行资源预留和 / 或建立相应的承载通道。

[0112] 可选的，在步骤 209 中，如果 ASN-GW 与 MBS Server 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且还未进行相应的资源预留和 / 或创建相应的承载通道（即在步骤 203 中，ASN-GW 未发送承载通道建立请求和 / 或资源预留请求），则在本步骤中，ASN-GW 向 MBS Server 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 ASN-GW 和 MBS Server 间传输进行资源预留和 / 或建立相应的承载通道。

[0113] 步骤 208 和步骤 209 可以以任意先后顺序进行，或并行展开。

[0114] 接着进入步骤 210，ASN-GW 收到来自 MBS Sever 的 MBS 业务鉴权结果后，根据该鉴权结果向 BS 返回 MBS 业务加入请求的结果。在此步骤中还存在以下任意情况：

[0115] a) 对应步骤 202 中情况 a)，如果 ASN-GW 收到 BS 的资源预留申请，则根据网络资源状况和服务策略判断是否接受该资源预留申请。如果接受，则进行相应的资源预留。在本步骤中向 BS 返回资源预留的结果。

[0116] b) 对应步骤 202 中情况 b)，如果 ASN-GW 收到 BS 的承载通道创建请求，则 ASN-GW 根据网络资源状况和服务策略判断是否接受该请求。如果接受，则进行相应的承载通道建立。在本步骤中向 BS 返回承载通道建立的结果。

[0117] c) 可选的，如果在步骤 203d) 中，ASN-GW 没有该 MBS 所需的资源预留信息，无法进行终端能力的判断，但在之后的步骤中，如步骤 206 中，收到了 MBS Server 下发的 MBS 业务资源预留信息，则 ASN-GW 根据 MBSServer 下发的 MBS 业务资源预留信息和步骤 203d) 中保存的终端最大 MBS 业务能力信息判断该终端是否能够正常接收该 MBS 业务。并在本步骤中通知 BS 判决结果。

[0118] d) 可选的，如果 MBS 业务的播送范围是动态建立的，且该 BS 内还没有任何终端接收该 MBS 业务，则 MBS 业务鉴权成功后 ASN-GW 还需更新 该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加基站标识 BSID；

[0119] e) 可选的，ASN-GW 在收到 MBS 业务鉴权成功的消息后，可以直接更新该 MBS 业务的用户统计数，以便 ASN-GW 或 MBS Proxy 正确统计该 BS 范围内当前使用该 MBS 业务的用户数，进而也可获知该 ASN 或 MBS Zone 内使用该 MBS 业务的用户数；

[0120] f) 对应步骤 206 中的 c)，可选的，ASN-GW 在获得 MBS 业务的资源预留信息和承载通道信息后，在本步骤中将该信息一并下发给 BS。

[0121] 可选的，在步骤 211 中，BS 收到加入 MBS 业务请求的应答后，如果 MBS 业务的播送范围是动态建立的，且该 BS 内还没有任何终端接收该 MBS 业务，ASN-GW 也没有更新下行播放列表，则 MBS 业务鉴权成功后，BS 向 ASN-GW 注册该 MBS 业务，触发 ASN-GW 更新其保存的该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加基站标识 (BSID)；ASN-GW

更新下行播放列表后，如果当前还没有建立ASN-GW与MBS Server间的承载通道，且ASN-GW未向MBS Server发起该MBS业务的注册，则ASN-GW可以进一步向MBS Server注册，以更新MBS Server上该MBS业务下行播放列表，即触发MBS Server在该MBS业务的下行播放列表中添加ASN-GW或MBS Proxy的标识或IP地址。

[0122] 可选的，在步骤212中，ASN-GW收到BS的注册请求后，如果当前ASN-GW与MBS Server间的用于传输该MBS业务的承载通道和/或资源预留没有建立，且在之前的步骤中，ASN-GW未向MBS Sever发起注册，则ASN-GW可在本步骤中向MBS Sever注册该MBS业务，由MBS Sever在响应注册请求时，下发相应的资源预留信息和/或承载通道信息，ASN-GW收到的后，在响应BS的注册请求时，进一步将该MBS业务的资源预留信息和/或承载通道信息下发至BS。

[0123] 可选的，在步骤213中，BS收到资源预留信息和/或承载通道信息后，如果BS与ASN-GW间的用于传输该MBS业务的承载通道和/或资源预留不是预先配置的，且在之前的步骤中，BS未曾发送相应的资源预留请求和/或承载通道的创建请求，且ASN-GW未曾主动下发资源预留请求和/或承载通道的创建请求，则在本步骤中，BS向ASN-GW发送资源预留请求和/或承载通道建立请求，为传输该MBS业务在BS和ASN-GW间传输进行资源预留和/或建立相应的承载通道。

[0124] 可选的，在步骤214中，ASN-GW为该MBS业务进行相应的资源预留和/或建立相应承载通道后，如果ASN-GW与MBS Server间的用于传输该MBS业务的承载通道和/或资源预留不是预先配置的，且在之前的步骤中，还未进行相应的资源预留和/或创建相应的承载通道，则在本步骤中，ASN-GW向MBS Server发送资源预留请求和/或承载通道建立请求，为传输该MBS业务在ASN-GW和MBS Server间传输进行资源预留和/或建立相应的承载通道。

[0125] 可选的，在步骤215中，如果BS使用链路层多播方式传送该MBS业务且该MBS业务不是广播业务，则BS还需获取MBS组业务加密密钥(MBSGroup Traffic Encryption Key，简称“MGTEK”)，该密钥用于生成MBS业务在空口传输时的业务加密密钥(MTK)。

[0126] BS可以通过向ASN-GW发送MGTEK密钥的请求消息，请求ASN-GW将其生成的MGTEK下发给BS，如果ASN-GW当前还未为该MBS业务产生MGTEK，则先为该MBS业务生成MGTEK，再将生成的MGTEK下发给BS。

[0127] 如果BS已有MGTEK或该MGTEK可由BS生成，则省略本步骤或在本步骤中触发BS生成MGTEK。

[0128] 接着进入步骤216，BS向终端发送MBS业务加入响应消息DSA-RSP，该消息中携带终端请求加入的MBS业务对应的MBS Zone ID、空口连接标识CID或空口多播连接标识MCID、该CID或MCID上承载的所有MBS内容标识、多播安全联盟标识GSA ID。

[0129] 接着进入步骤217，终端收到MBS业务加入响应消息后向BS发送MBS业务加入确认消息DSA-ACk，用来确认该过程已完成。

[0130] 可选的，在终端加入该MBS业务时，BS可以更新其覆盖范围内该MBS业务的用户统计数。

[0131] 接着进入步骤218，终端获得多播安全联盟标识后，向BS发起密钥请求消息Key Request，用于请求该MBS业务的多播业务密钥MGTEK，该请求消息中携带该MBS业务的GSA

ID。

[0132] 接着进入步骤219，BS收到请求后，将之前产生或获得的MGTEK发送给终端，由终端根据预先获得的MAK和MGTEK共同生成MBS业务加密密钥MTK，并根据从网络侧获取的多播广播业务参数接收相应的MBS业务。在本实施方式中，资源预留信息是指分类器参数和规则、QoS参数和/或头压缩参数和规则等承载该MBS业务所需的资源的描述信息。承载通道信息是指承载通道类型、承载通道标识和/或承载通道协议类型等承载该MBS业务的承载通道所需的资源描述消息。终端的最大MBS业务能力信息是指终端当前持有的能接收MBS业务的最大资源描述信息，如带宽、丢包率等。通常是指终端的设备能力或当前未被占用的资源总和。MBS业务是指IEEE802.16d/e定义的一个服务流(SF)。

[0133] 值得一提的是，在本实施方式中，如果终端请求加入的是MBS多播业务，则终端在加入MBS业务之前需要先订阅该MBS业务并获取该MBS业务的授权密钥(MAK)。如果终端请求加入的是MBS广播业务，则在上述流程中不需要鉴权过程，步骤201至203的请求消息中可不携带MBS的鉴权信息，或该鉴权信息仅用于通知网络侧各节点该终端加入该MBS业务。此时步骤204的业务鉴权可以省略，并且之后的步骤中也无需再下发任何业务鉴权结果或业务授权信息。

[0134] 本发明第二实施方式涉及无线网络中终端加入MBS业务的方法，本实施方式与第一实施方式大致相同，其区别在于，在第一实施方式中，终端在加入MBS业务的请求消息中携带MBS Zone ID，来标识需要加入的MBS业务，然而由于一个MBS Zone中可能存在多个MBS业务，在本实施方式中，终端在请求消息中除了携带MBS Zone ID外，还需携带该MBS业务的MBS内容标识MBS Content ID。因此，在本实施方式中，需要修改空口标准IEEE802.16e，使得在DSA-REQ消息中可携带MBS Content ID。

[0135] 本发明第三实施方式涉及无线网络中终端加入MBS业务的方法，本实施方式与第二实施方式大致相同，其区别在于，在第二实施方式中，终端在加入MBS业务的请求消息中需携带请求加入的MBS业务的MBS Zone ID和具体的MBS Content ID，而本实施方式在第二实施方式的基础上进行了改进，在本实施方式中，MBS业务的MBS Content ID是全局唯一的，在业务加入请求消息中，只需携带指定的MBS Content ID即可，无需关心业务在哪个MBS Zone上播送。在本实施方式中，同样需要修改空口标准IEEE802.16e，要求在DSA-REQ中可携带MBS Content ID。

[0136] 本发明第四实施方式涉及无线网络中终端加入MBS业务的方法，在本实施方式中，使用3层多播技术辅助完成终端加入MBS业务的过程，使得在不更改现有空口协议(IEEE802.16d/e)的基础上，完成终端加入指定的某个MBS业务的过程。

[0137] 在本实施方式中，终端在加入MBS业务之前就已经获得了其感兴趣的MBS业务相关的IP多播地址列表、MBS业务承载的MBS Content ID列表、IP多播地址和MBS Content ID的对应关系和/或该MBS业务在哪些MBSZone内播送，具体应用中，终端如可在业务通告阶段或通过其它途径获得上述信息。终端在发起MBS业务加入过程前，如果获知该业务在哪些MBS Zone内播送，则还可通过检测当前BS广播的DCD消息获知当前BS属于哪些MBS Zone，以便确定当前终端是否处于其感兴趣的MBS业务所在的MBSZone，如果不是则不用发起加入过程。具体如图3所示。

[0138] 在步骤301中，终端发送MBS业务加入请求IGMP Join至锚ASN-GW(Anchor

ASN-GW)，该消息中携带欲加入的 IP 多播地址和 / 或业务鉴权信息。该消息可承载在终端的初始业务流 (Initial Service Flow，简称“ISF”) 通道上。

[0139] 在步骤 302 中，锚 ASN-GW 收到终端的 MBS 业务加入请求后，向 MBSProxy 发送 MBS 业务加入请求，该请求中携带终端标识 MSID 和终端欲加入的 IP 多播组地址和 / 或业务鉴权信息。

[0140] 在步骤 303 中，MBS Proxy 收到 MBS 业务加入请求后向 MBS Server 发送 MBS 业务鉴权请求，用于请求验证该终端是否具有接收该 MBS 业务的权利。该请求中还可携带终端的网络接入标识 NAI、IP 多播组地址和 / 或 MBSContent ID 等。在此步骤中还存在以下几种情况：

[0141] a) 如果 MBS Proxy 或 MBS Proxy 所在的 ASN-GW 上的某个功能实体，如 SFA，已经保存有 MBS 业务的授权信息，即 MBS Proxy 已经能够进行 MBS 业务鉴权处理，则 MBS Proxy 无需再向 MBS Server 发送 MBS 业务鉴权请求，自行根据维护的 MBS 授权信息处理相应终端的 MBS 业务加入请求即可。

[0142] b) 如果 ASN-GW 与 MBS Server 间的用于传输该 MBS 业务的承载通道不是预先配置的，且还未创建相应的承载通道，则 MBS Proxy 向 MBS Server 发送的 MBS 业务鉴权请求消息还包含承载通道建立请求，为传输该 MBS 业务在 ASN-GW 和 MBS Server 上申请建立承载通道。ASN-GW 和 MBS Server 间的承载通道的实现可以是 GRE、L2TP、VLAN、MPLS、IPSec 等隧道技术也可是 IP 多播技术，如 IGMP、MLD 等。

[0143] 在步骤 304 中，MBS Server 收到 MBS 业务鉴权请求后，如果自身维护了终端的 MBS 业务授权信息，则检索 MBS 业务授权信息查找并确认该终端是否具有享受该 MBS 业务的能力；如果 MBS Server 没有维护相应的授权信息，不能判断终端是否具有享受该 MBS 业务的能力，则 MBS Server 还需向终端开户所在的 AAA 服务器请求进行 MBS 业务鉴权。

[0144] 在步骤 305 中，AAA 根据用户签约信息和服务策略判断该终端是否具有享受该 MBS 业务的能力，并将业务鉴权结果告知 MBS Server。此时，可选的，AAA 可同时将该终端的 MBS 业务授权信息下发给 MBS Server，以便 MBS Server 在之后的过程中能够直接处理接收到的该终端的 MBS 业务鉴权请求。

[0145] 在步骤 306 中，MBS Server 将 MBS 业务鉴权结果返回 MBS Proxy。同时，可选的，MBS Server 可以将该终端的 MBS 业务授权信息下发给 MBSProxy 或 MBS Proxy 所在 ASN-GW 中的某个功能实体，如 SFA，以便 MBSProxy 在之后的过程中能够直接处理接收到的该终端的 MBS 业务加入请求。另外，在本步骤中还可能存在以下几种情况：

[0146] a) 可选的，如果 MBS 业务的播送范围是动态建立的，且该 ASN 或 MBS Zone 内还没有任何终端接收该 MBS 业务，则 MBS 业务鉴权成功后 MBSServer 可以直接更新该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加 ASN-GW 或 MBS Proxy 的标识或 IP 地址。

[0147] b) 可选的，MBS 业务鉴权成功后，MBS Server 更新该 MBS 业务的用户统计数，以便 MBS Server 统计出使用该 MBS 业务的实际用户数。

[0148] c) 可选的，如果 ASN-GW 和 / 或 MBS Porxy 之前没有获知 MBS 业务要求的资源预留信息和 / 或承载通道信息，则本步骤中 MBS Server 可同时下发该 MBS 业务要求的资源预留信息和 / 或承载通道信息。

[0149] d) 对应步骤 303b)，MBS Server 根据自身的资源状况和服务策略判断是否接受承载通道的创建请求，并在本步骤中向 MBS Proxy 返回承载通道建 立的结果。

[0150] MBS Proxy 收到来自 MBS 服务器的 MBS 业务鉴权结果后，接着进入步骤 307 或步骤 308，步骤 307 和步骤 308 不存在先后关系。

[0151] 在步骤 307 中，MBS Proxy 根据该鉴权结果向 Anchor ASN-GW 返回该 MBS 业务加入请求的结果。

[0152] 在步骤 308 中，MBS Proxy 根据该鉴权结果向 BS 发送 MBS 业务加入请求，如 RR-REQ。在本步骤中还可能存在以下几种情况：

[0153] a) 如果 BS 与 ASN-GW 间的用于承载该 MBS 业务的资源不是预先配置的，且还未进行相应的资源预留（即在之前的步骤中 BS 未曾发送资源预留申请），则 MBS Proxy 向 BS 发送的终端加入 MBS 业务的响应消息中还包含资源预留申请，为承载该 MBS 业务在 BS 和 ASN-GW 上申请相应的承载资源。

[0154] b) 如果 BS 与 ASN-GW 间的用于传输该 MBS 业务的承载通道不是预先配置的，且还未创建相应的承载通道（即在之前的步骤中 BS 未曾发送承载通道创建请求），则 MBS Proxy 向 BS 发送的终端加入 MBS 业务的响应消息中还包含承载通道建立请求，为传输该 MBS 业务在 BS 和 ASN-GW 上申请建立承载通道。BS 和 ASN-GW 间的承载通道的实现可以是 GRE、VLAN、MPLS 等隧道技术。

[0155] c) 可选的，如果 MBS 业务的播送范围是动态建立的，且该 BS 内还没有任何终端接收该 MBS 业务，则 MBS 业务鉴权成功后 MBS Proxy 可以直接更新该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加基站标识 BSID。

[0156] d) 可选的，MBS 业务鉴权成功后，MBS Proxy 更新该 MBS 业务的用户统计数，以便 ASN-GW 或 MBS Proxy 统计出该 BS 下使用该 MBS 业务的用户数，进而也可获知 ASN 或 MBS Zone 内使用该 MBS 业务的用户数。

[0157] 在步骤 309 中，BS 收到该 MBS 业务加入请求响应后，如果该响应是成功响应，则 BS 向终端发送 MBS 业务加入请求消息 DSA-REQ，该消息中携带欲加入的 MBS 业务对应的 MBS Zone ID、空口连接标识 CID 或空口多播连接标识 MCID、该 CID 或 MCID 上承载的所有 MBS 内容标识 MBS ContentID、多播安全联盟标识 GSA ID 或单播安全联盟、MBS 业务的 QoS 参数中一个或多个。

[0158] 可选的，在步骤 310 中，如果 BS 决定使用链路层多播方式传送该 MBS 业务且该 MBS 业务不是广播业务，则 BS 还需获取 MBS 组业务加密密钥 MGTEK，该密钥用于生成 MBS 业务在空口传输时的业务加密密钥 MTK。

[0159] BS 可以通过向 ASN-GW 发送 MGTEK 密钥的请求消息，请求 ASN-GW 将其生成的 MGTEK 下发给 BS，如果 ASN-GW 当前还未为该 MBS 业务产生 MGTEK，则先为该 MBS 业务生成 MGTEK，再将生成的 MGTEK 下发给 BS。

[0160] 如果 BS 已有 MGTEK 或该 MGTEK 可由 BS 生成，则省略本步骤或在本步骤中触发 BS 生成 MGTEK。

[0161] 本步骤与步骤 309 并无固定的先后顺序。

[0162] 接着进入步骤 311，终端收到来自 BS 的 DSA-REQ 消息后，根据 MBS 业务的 QoS 参数要求和终端本身所能承受的最大 MBS 业务能力判断是否能正常接收该 MBS 业务，如果能则

保存相应的 MBS 业务上下文。终端回应 MBS 业务加入响应消息 DSA-RSP 至 BS，消息中携带加入 MBS 业务的结果。

[0163] 可选的，步骤 312，如果 MBS 业务的播送范围是动态建立的，且之前该 BS 内还没有任何终端接收该 MBS 业务，即 BS 未曾向 MBS Proxy 注册该 MBS 业务，则 BS 向 MBS Proxy 发起业务注册，以更新 ASN-GW 中该 MBS 业务的下行播放列表，即在该 MBS 业务的下行播放列表中添加基站标识 BSID。

[0164] 同样可选的，在步骤 313 中，MBS Proxy 更新 ASN-GW 中该 MBS 业务 的下行播放列表后，如果之前 ASN 或 MBS Zone 内没有任何终端接收该 MBS 业务，即 MBS Proxy 没有向 MBS Server 注册过该 MBS 业务，则在本步骤中 MBS Proxy 向 MBS Server 注册以更新 MBS Server 中该 MBS 业务下行播放列表，即在 MBS Server 中该 MBS 业务的下行播放列表中添加 ASN-GW 或 MBSProxy 的标识或 IP 地址。

[0165] 可选的，在本步骤中，如果 ASN-GW/MBS Proxy 与 MBS Server 间的用于传输该 MBS 业务的承载通道和 / 或资源预留没有建立，且之前未曾下发相应的资源预留信息和 / 或承载通道信息。则 MBS Server 在响应 ASN-GW 的注册请求的同时下发资源预留信息和 / 或承载通道建立信息。ASN-GW 收到后进一步在响应 BS 的注册请求时将该 MBS 业务的资源预留信息和 / 或承载通道信息下发至 BS。

[0166] 可选的，在步骤 314 中，如果 BS 与 ASN-GW 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且在之前的步骤中，BS 未进行相应的资源预留请求和 / 或创建相应的承载通道请求，ASN-GW 或 MBSProxy 也未主动发起资源预留请求和 / 或创建相应的承载通道请求，则在本步骤中，BS 向 ASN-GW 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 BS 和 ASN-GW 间传输进行资源预留和 / 或建立相应的承载通道。

[0167] 可选的，在步骤 315 中，ASN-GW 或 MBS Proxy 收到来自 BS 的资源预留请求和 / 或承载通道建立请求后，可根据网络资源情况确定是否同意进行相应的资源预留和 / 或建立相应的承载通道。另外，如果该 ASN-GW 与 MBSServer 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且在之前的步骤中，未向 MBS Sever 发送相应的资源预留请求和 / 或创建相应承载通道的请求，则 MBS Proxy 向 MBS Server 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 ASN-GW 和 MBS Server 间传输进行资源预留和 / 或建立相应的承载通道。

[0168] 在步骤 316 中，BS 将终端的 MBS 业务加入请求响应结果发送给 MBSProxy 或 Serving ASN-GW。在本步骤中还可能存在以下几种情况：

[0169] a) 如果在步骤 308a) 中，MBS Proxy 向 BS 发送的终端加入 MBS 业务的响应消息中还包含资源预留申请，则在本步骤中 BS 根据空口资源状况和准入控制策略判断是否接受资源预留申请。如果接受，则进行相应的资源预留。在本步骤中向 MBS Proxy 返回资源预留的结果。

[0170] b) 如果在步骤 308b) 中，MBS Proxy 向 BS 发送的终端加入 MBS 业务的响应消息中还包含承载通道创建请求，则在本步骤中，BS 根据空口资源状况和准入控制策略判断是否接受该承载通道建立申请。如果接受，则进行相应的承载通道建立。在本步骤中向 MBS Proxy 返回承载通道建立的结果。

[0171] 在步骤 317 中，BS 收到 MBS 业务加入响应 DSA-RSP 消息后向终端发送 MBS 业务加

入确认消息 DSA-ACK，用来确认该过程已完成。

[0172] 在步骤 318 中，终端获得多播安全联盟标识后，向 BS 发起密钥请求消息 Key Request，用于请求该 MBS 业务的多播业务密钥 MGTEK，该请求消息中携带该 MBS 业务的 GSA ID。

[0173] 在步骤 319 中，BS 收到请求后，将之前产生或获得的 MGTEK 发送给终端，由终端根据预先获得的 MAK 和 MGTEK 共同生成 MBS 业务加密密钥 MTK，并根据从网络侧获取的多播广播业务参数接收相应的 MBS 业务。

[0174] 值得一提的是，在本实施方式中，如果终端请求加入的是 MBS 多播业务，则终端在加入 MBS 业务之前需要先订阅该 MBS 业务并获取该 MBS 业务的授权密钥 (MAK)。如果终端请求加入的是 MBS 广播业务，则在上述流程中不需要鉴权过程，步骤 301 至 303 的请求消息中可不携带 MBS 的鉴权信息，或该鉴权信息仅用于通知网络侧各节点该终端加入该 MBS 业务。并且步骤 304 的业务鉴权可以省略，之后的步骤中也无需再下发任何业务鉴权结果或业务授权信息。

[0175] 本发明第五实施方式涉及无线网络中终端加入 MBS 业务的方法，本实施方式与第四实施方式大致相同，其区别在于，在第四实施方式中，终端在发起 MBS 业务加入过程之前，已经获取 IP 多播地址和 MBS Content ID 的对应关系，而在本实施方式中，终端在加入 MBS 业务之前没有获取 IP 多播地址和 MBS Content ID 的对应关系，由网络侧在终端加入 MBS 业务过程中将其通知终端。

[0176] 具体如图 4 所示，步骤 401 至步骤 417 与步骤 301 至步骤 317 相类似，在此不再赘述。

[0177] 在步骤 418 中，MBS Proxy/Serving ASN-GW 收到 BS 发送的 MBS 业务加入结果后，向终端发送其加入的 IP 多播地址对应的 MBS Content ID 列表，该消息还可携带欲加入的 MBS 业务对应的 MBS Zone ID、空口连接标识 CID 或空口多播连接标识 MCID、该 CID 或 MCID 上承载的所有 MBS 内容标识 MBS Content ID、多播安全联盟标识 GSA ID 或单播安全联盟中的一个或多个。

[0178] 本步骤与步骤 417 不存在固定的先后关系。

[0179] 步骤 419 和步骤 420 与步骤 318 和步骤 319 相类似。

[0180] 本发明第六实施方式无线网络中终端加入 MBS 业务的方法，在本实施方式中，由网络侧主动发起的 MBS 业务加入过程，该过程可发生在终端入网后预置流的建立过程中，也可发生在网络侧实体要求动态建立 MBS 业务时。对于多播业务，在网络侧请求终端加入 MBS 业务之前，该终端需要先订阅该 MBS 业务并获取该 MBS 业务的授权密钥 MAK，其中订阅消息可包含在用户的签约消息中。具体如图 5 所示。

[0181] 在本实施方式中，网络侧实体发送 MBS 业务创建请求存在以下几种可能性：

[0182] 如果在终端初始入网阶段，用户的签约消息已经下发到接入网实体 Anchor ASN-GW 中，则在步骤 501 中，可由 Anchor ASN-GW 或 AnchorASN-GW 中的功能实体，如 SFA，向 MBS Proxy 发起 MBS 业务创建请求，该请求中还需携带终端标识 MSID。

[0183] 或者在步骤 501′ 中，由 MBS Server 向 MBS Proxy 发送 MBS 业务创建请求，该消息中携带 NAI 或 MSID。在该步骤中还可以包含以下可选项：

[0184] a) 可选的，如果 MBS 业务的播送范围是动态建立的，且该 ASN 或 MBSZone 内还没有

任何终端接收该MBS业务，则MBS Server可以直接更新该MBS业务的下行播放列表，即在该MBS业务的下行播放列表中添加ASN-GW或MBS Proxy的标识或IP地址。

[0185] b)可选的，MBS Server可以更新该MBS业务的用户统计数，以便MBSServer统计出当前使用该MBS业务的实际用户数。

[0186] 在步骤502中，如果MBS Proxy在终端入网鉴权认证阶段就已经获得用户签约消息，则MBS Proxy可直接触发MBS业务创建请求，或者，MBS Proxy在收到来自MBS Sever或Anchor ASN-GW的MBS业务创建请求后，进一步向BS发起该MBS业务创建请求。如果MBS业务传输在IP层时使用IP多播技术，则MBS Proxy还负责通知相应的多播路由器(Multicast Route，简称“MR”)，将该终端加入相应的多播组。

[0187] 此外，在本步骤中还可以包含以下可选项：

[0188] a)可选的，如果MBS业务的播送范围是动态建立的，且之前该BS内还没有任何终端接收此MBS业务，则MBS Proxy可以直接更新该MBS业务的下行播放列表，即在该MBS业务的下行播放列表中添加基站标识BSID。

[0189] b)可选的，MBS Proxy更新该MBS业务的用户统计数，以便ASN-GW或MBS Proxy统计出该BS下使用该MBS业务的用户数，进而也可获知ASN网络或MBS Zone内使用该MBS业务的用户数。

[0190] c)如果ASN-GW与BS间的用于承载该MBS业务的资源不是预先配置的，且还未进行相应的资源预留，则MBS Proxy向BS发送的MBS业务创建请求消息还可以包含资源预留申请，为承载该MBS业务在BS和ASN-GW上申请相应的承载资源。

[0191] d)如果BS与ASN-GW间的用于传输该MBS业务的承载通道不是预先配置的，且还未创建相应的承载通道，则MBS Proxy向BS发送的终端加入MBS业务的请求消息还包含承载通道建立请求，为传输该MBS业务在BS和ASN-GW上申请建立承载通道。BS和ASN-GW间的承载通道的实现可以是GRE、VLAN、MPLS等隧道技术。

[0192] 可选的，步骤503，如果BS使用链路层多播方式传送该MBS业务且该MBS业务不是广播业务，则BS向MBS Proxy请求MBS业务密钥MGTEK，该密钥用于生成MBS业务在空口传输时的业务加密密钥MTK。

[0193] BS可以通过向ASN-GW发送MGTEK密钥的请求消息，请求ASN-GW将其生成的MGTEK下发给BS，如果ASN-GW当前还未为该MBS业务产生MGTEK，则先为该MBS业务生成MGTEK，再将生成的MGTEK下发给BS。

[0194] 如果BS已有MGTEK或该MGTEK可由BS生成，则省略本步骤或在本步骤中触发BS生成MGTEK。

[0195] 在步骤504中，BS向终端发送MBS业务加入请求消息DSA-REQ，该消息中携带欲加入的MBS业务对应的MBS Zone ID、空口连接标识CID或空口多播连接标识MCID、该CID或MCID上承载的所有MBS内容标识MBSContent ID、多播安全联盟标识GSA ID或单播安全联盟、MBS业务的QoS参数中一个或多个。

[0196] 在步骤505中，终端收到DSA-REQ消息后，根据MBS业务的QoS参数要求和终端本身所能承受的最大MBS业务能力判断是否能正常接收该MBS业务，如果能则保存相应的MBS业务上下文。终端向BS返回MBS业 务加入响应消息DSA-RSP，消息中携带加入MBS业务的结果。

[0197] 可选的，在步骤 506 中，如果 MBS 业务的播送范围是动态建立的，且之前该 BS 内还没有任何终端接收此 MBS 业务，即 BS 没有向 MBS Proxy 注册过该 MBS 业务，则 BS 向 ASN-GW 发起注册以更新该 MBS 业务的下行播放列表，即在 ASN-GW 中该 MBS 业务的下行播放列表中添加基站标识 BSID。

[0198] 同样可选的，在步骤 507 中，MBS Proxy 更新 ASN-GW 中该 MBS 业务的下行播放列表后，如果之前 ASN 或 MBS Zone 内没有任何终端接收该 MBS 业务，即 MBS Proxy 没有向 MBS Server 注册过该 MBS 业务，则在本步骤中 MBS Proxy 向 MBS Server 注册以更新 MBS Server 中该 MBS 业务下行播放列表，即在 MBS Server 中该 MBS 业务的下行播放列表中添加 ASN-GW 或 MBSProxy 的标识或 IP 地址。

[0199] 可选的，在本步骤中，如果 ASN-GW/MBS Proxy 与 MBS Server 间的用于传输该 MBS 业务的承载通道和 / 或资源预留没有建立，且之前未曾下发相应的资源预留信息和 / 或承载通道信息。则 MBS Server 在响应 ASN-GW 的注册请求的同时下发资源预留信息和 / 或承载通道建立信息。ASN-GW 收到后进一步在响应 BS 的注册请求时将该 MBS 业务的资源预留信息和 / 或承载通道信息下发至 BS。

[0200] 可选的，在步骤 508 中，如果 BS 与 ASN-GW 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且还未进行相应的资源预留和 / 或创建相应的承载通道，且在步骤 502 中，MBS Proxy 向 BS 发送的 MBS 业务创建请求消息未包含资源预留申请和 / 或承载通道建立请求，则在本步骤中，BS 向 ASN-GW 或 MBS Proxy 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 BS 和 ASN-GW 间传输进行资源预留和 / 或建立相应的承载通道。

[0201] 可选的，在步骤 509 中，ASN-GW 或 MBS Proxy 收到来自 BS 的资源预 留请求和 / 或承载通道建立请求后，可根据空口资源情况确定是否同意进行相应的资源预留和 / 或建立相应的承载通道。并且，如果 ASN-GW 与 MBS Server 间的用于传输该 MBS 业务的承载通道和 / 或资源预留不是预先配置的，且还未进行相应的资源预留和 / 或创建相应的承载通道，则 ASN-GW 或 MBS Proxy 向 MBS Server 发送资源预留请求和 / 或承载通道建立请求，为传输该 MBS 业务在 ASN-GW 和 MBS Server 间传输进行资源预留和 / 或建立相应的承载通道。

[0202] 在步骤 510 中，BS 收到 DSA-RSP 消息后，将 MBS 业务加入请求结果返回 MBS Proxy，具体可通过响应消息 RR-RSP。另外，在本步骤中还可能存在以下几种情况：

[0203] a) 对应步骤 502a)，如果 MBS Proxy 向 BS 发送的 MBS 业务创建请求消息未包含资源预留申请，则在本步骤中，BS 根据空口资源状况和准入控制策略判断是否接受该资源预留申请。如果接受，则进行相应的资源预留。并在本步骤中一并告知 ASN-GW 资源预留的结果。

[0204] b) 对应步骤 502b)，如果 MBS Proxy 向 BS 发送的 MBS 业务创建请求消息未包含承载通道建立请求，则在本步骤中，BS 根据空口资源状况和准入控制策略判断是否接受申请的承载通道建立。如果接受，则进行相应的承载通道建立。并在本步骤中一并告知 ASN-GW 承载通道建立的结果。

[0205] MBS Proxy 获知 MBS 业务创建结果后，通知 MBS 业务创建请求的发起者。如果 MBS 业务创建请求的发起方是 Anchor ASN-GW，即对应步骤 501 和步骤 501′，则进入步骤 511，MBS Proxy 将业务创建结果返回 AnchorASN-GW；如果 MBS 业务创建请求的发起方是

MBS Server，即对应步骤 501′，则进入步骤 511′，MBS Proxy 将业务创建结果返回 MBS Server；如果 MBS 业务创建请求的发起方是 MBS Proxy，则可省略本步骤。

[0206] 在步骤 512 中，BS 收到 MBS 业务加入响应消息 DSA-RSP 后向终端发 送 MBS 业务加入确认消息 DSA-ACK，用来确认该业务加入过程已完成。

[0207] 在步骤 513 中，终端获得多播安全联盟标识后，向 BS 发起密钥请求消息 Key Request，用于请求该 MBS 业务的多播业务密钥 MGTEK，该请求消息中携带该 MBS 业务的 GSA ID。

[0208] 在步骤 514 中，BS 收到请求后，将之前产生或获得的 MGTEK 发送给终端，由终端根据预先获得的 MAK 和 MGTEK 共同生成 MBS 业务加密密钥 MTK，并根据从网络侧获取的多播广播业务参数接收相应的 MBS 业务。

[0209] 值得一提的是，以上各实施方式中，各实体可以独立存在或存在于一个功能实体内，上述实体在同一个物理实体内时，它们之间的交互使用的是内部原语。如 ASN-GW 和 BS 可以为同一物理实体，Anchor ASN-GW 和 ServingASN-GW 可以为同一物理实体，MBS Proxy 和 ASN-GW 可以为同一物理实体等等。

[0210] 其中，MBS Proxy 实体是 ASN 网络或 MBS Zone 内为终端处理 MBS 业务信令和 / 或业务的功能实体。在上述各实施方式中，该功能实体可位于 Anchor ASN-GW 中也可位于 Serving ASN-GW 中，也可独立存在于 MBS Zone 内。当 MBS Proxy 位于 Anchor ASN-GW 中时，其与 Anchor ASN-GW 间的消息交互就通过内部原语实现。

[0211] 本发明第七实施方式涉及无线网络中终端加入多播广播业务的系统，包含终端和网络侧，其中，网络侧包含用于在终端入网时或要求动态建立 MBS 业务时，向终端发起 MBS 业务加入过程，为终端提供 MBS 业务参数的单元。该业务参数包含指示空口连接的第一标识和指示业务内容的第二标识；终端还包含用于从网络侧获取 MBS 业务参数的单元；根据所获取的 MBS 业务参数，从第一标识指示的空口连接中接收第二标识指示的 MBS 业务内容的单元；和 / 或用于向网络侧发送加入 MBS 业务的请求消息，通过请求消息发起 MBS 业务加入过程，获取 MBS 业务参数的单元。

[0212] 另外，网络侧还可以包含以下单元之一或其任意组合：

[0213] 用于对终端是否有能力接收 MBS 业务进行评判的单元；

[0214] 用于对终端进行 MBS 业务鉴权的单元；

[0215] 用于对 MBS 业务进行网络侧资源预留的单元；

[0216] 用于为 MBS 业务建立承载通道的单元；

[0217] 用于对 MBS 业务进行注册和 / 或下行播放列表更新的单元；

[0218] 用于为 MBS 业务生成密钥的单元。

[0219] 上述单元可以是以下之一或其任意组合：基站，ASN-GW 和 / 或 MBS 代理，MBS 服务器，AAA 服务器。

[0220] 虽然通过参照本发明的某些优选实施方式，已经对本发明进行了图示和描述，但本领域的普通技术人员应该明白，可以在形式上和细节上对其作各种改变，而不偏离本发明的精神和范围。

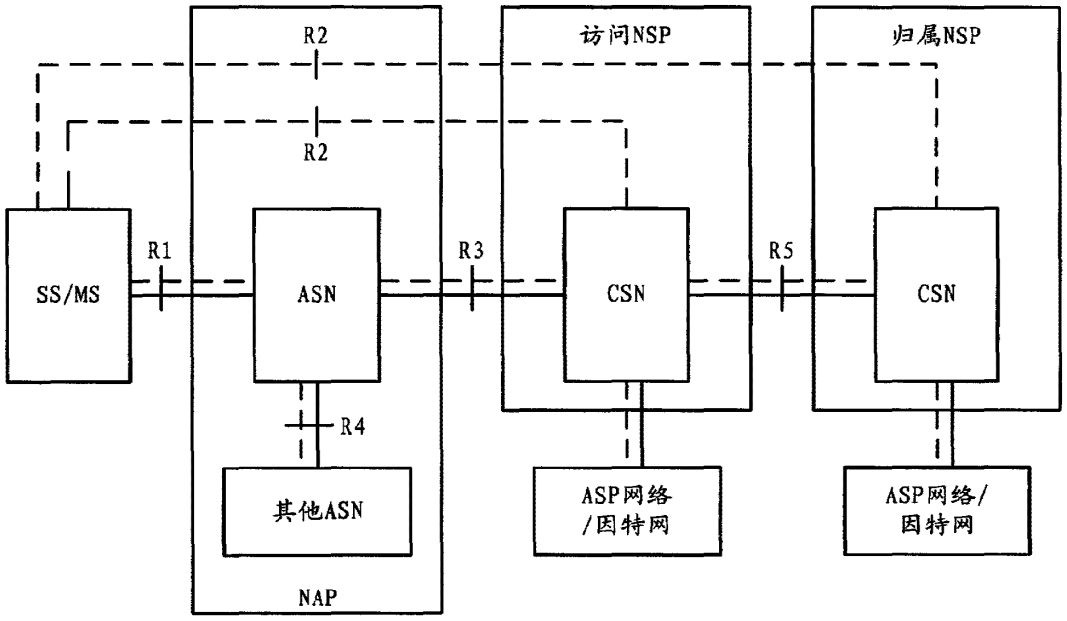

R2
访问NSP
归属NSP
R2
R1
R3
R5
SS/MS
ASN
CSN
CSN
R4
其他ASN
ASP网络
/因特网
ASP网络/
因特网
NAP

图 1

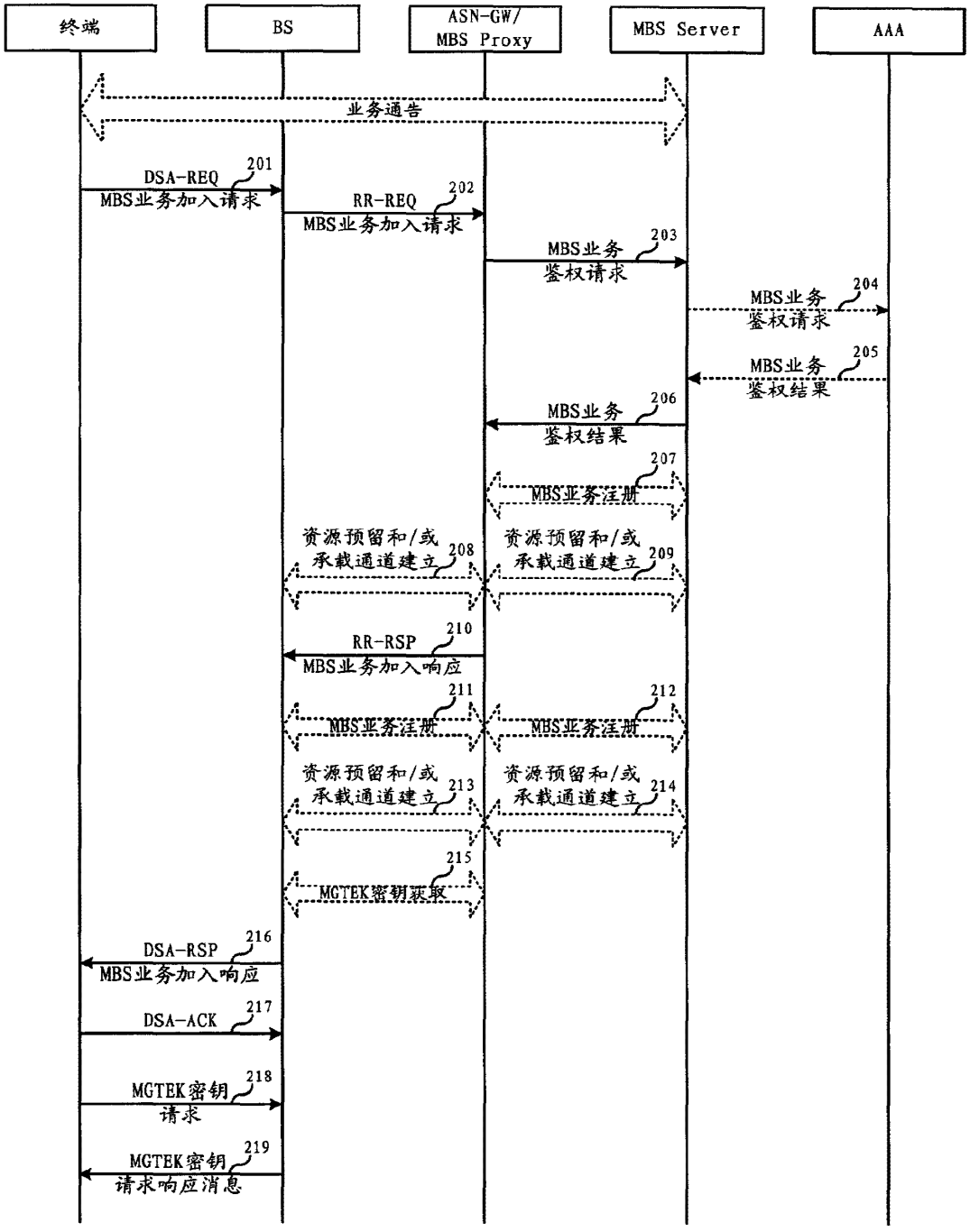

终端
BS
ASN-GW/
MBS Proxy
MBS Server
AAA
业务通告
DSA-REQ
MBS业务加入请求
201
RR-REQ
MBS业务加入请求
202
MBS业务
鉴权请求
203
MBS业务
鉴权请求
204
MBS业务
鉴权结果
205
MBS业务
鉴权结果
206
MBS业务注册
207
资源预留和/或
承载通道建立
208
资源预留和/或
承载通道建立
209
RR-RSP
MBS业务加入响应
210
MBS业务注册
211
MBS业务注册
212
资源预留和/或
承载通道建立
213
资源预留和/或
承载通道建立
214
MGTEK密钥获取
215
DSA-RSP
MBS业务加入响应
216
DSA-ACK
217
MGTEK密钥
请求
218
MGTEK密钥
请求响应消息
219

图 2

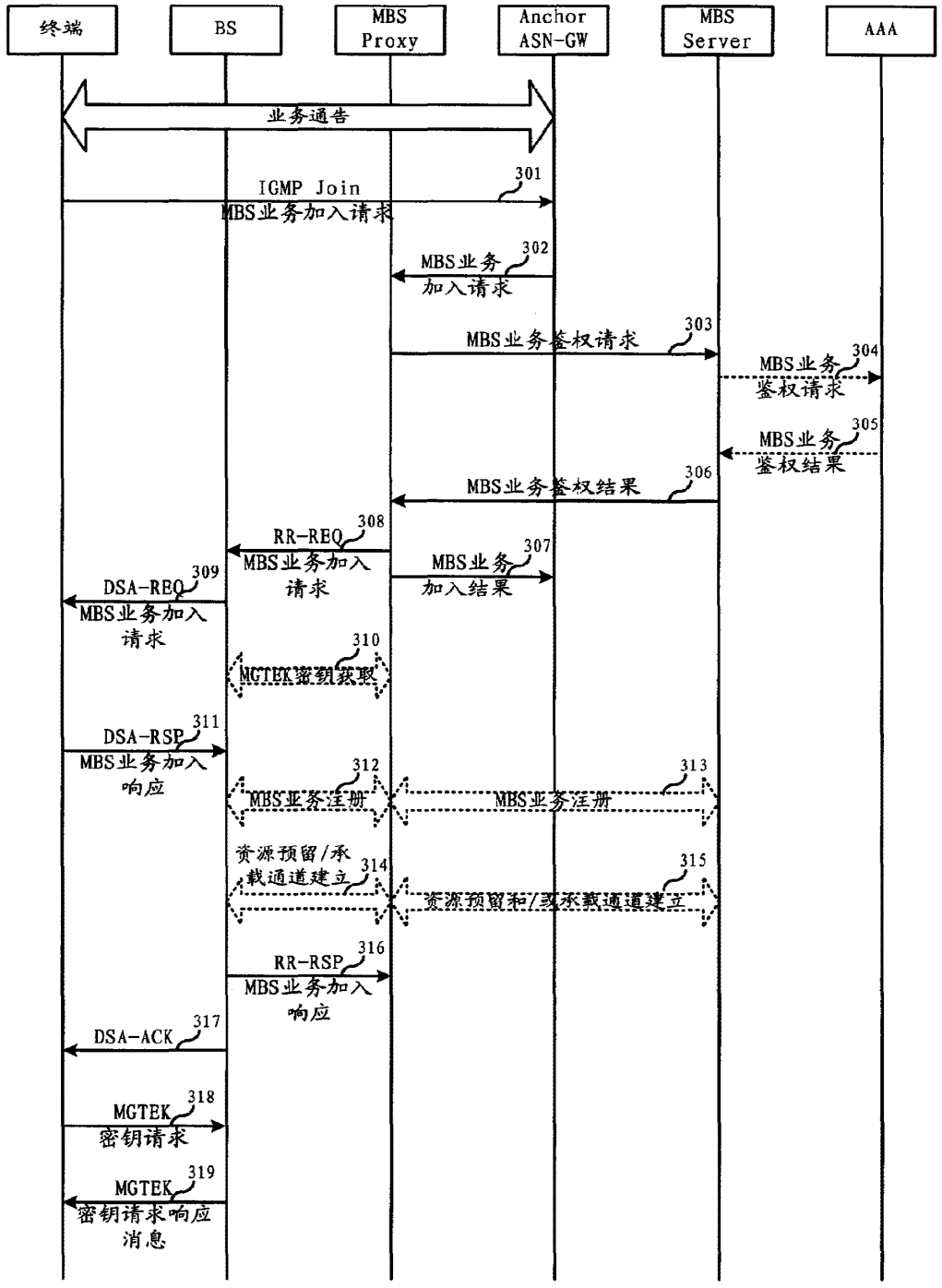

终端
BS
MBS Proxy
Anchor ASN-GW
MBS Server
AAA
业务通告
IGMP Join
MBS业务加入请求
301
MBS业务加入请求
302
MBS业务鉴权请求
303
MBS业务鉴权请求
304
MBS业务鉴权结果
305
MBS业务鉴权结果
306
RR-REQ
MBS业务加入请求
308
MBS业务加入结果
307
DSA-REQ
MBS业务加入请求
309
MGTEK密钥获取
310
DSA-RSP
MBS业务加入响应
311
MBS业务注册
312
MBS业务注册
313
资源预留/承载通道建立
314
资源预留和/或承载通道建立
315
RR-RSP
MBS业务加入响应
316
DSA-ACK
317
MGTEK密钥请求
318
MGTEK密钥请求响应消息
319

图 3

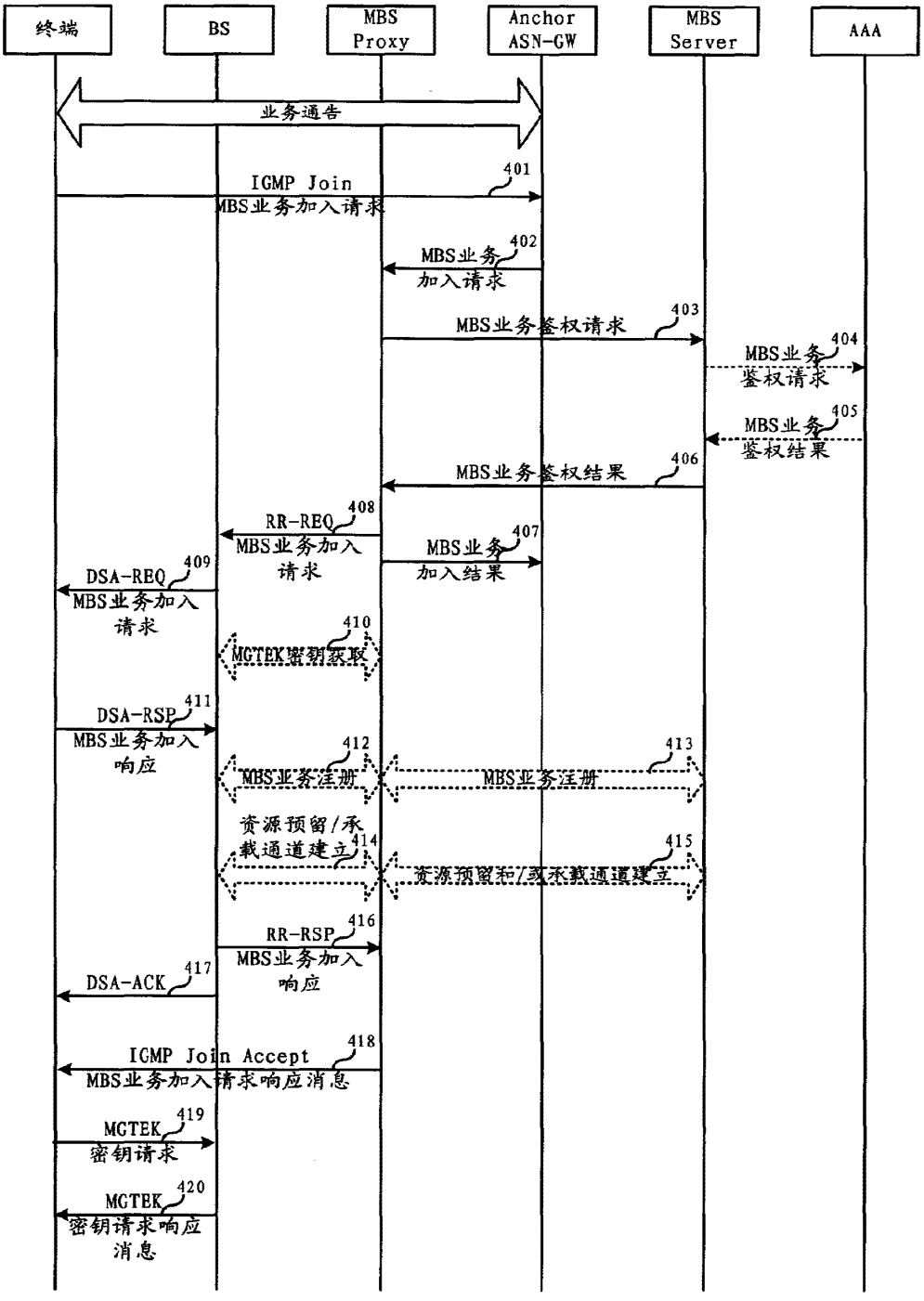

终端
BS
MBS Proxy
Anchor ASN-GW
MBS Server
AAA
业务通告
IGMP Join
MBS业务加入请求
401
MBS业务加入请求
402
MBS业务鉴权请求
403
MBS业务鉴权请求
404
MBS业务鉴权结果
405
MBS业务鉴权结果
406
RR-REQ
MBS业务加入请求
408
MBS业务加入结果
407
DSA-REQ
MBS业务加入请求
409
MGTEK密钥获取
410
DSA-RSP
MBS业务加入响应
411
MBS业务注册
412
MBS业务注册
413
资源预留/承载通道建立
414
资源预留和/或承载通道建立
415
RR-RSP
MBS业务加入响应
416
DSA-ACK
417
ICMP Join Accept
MBS业务加入请求响应消息
418
MGTEK
密钥请求
419
MGTEK
密钥请求响应消息
420

图 4

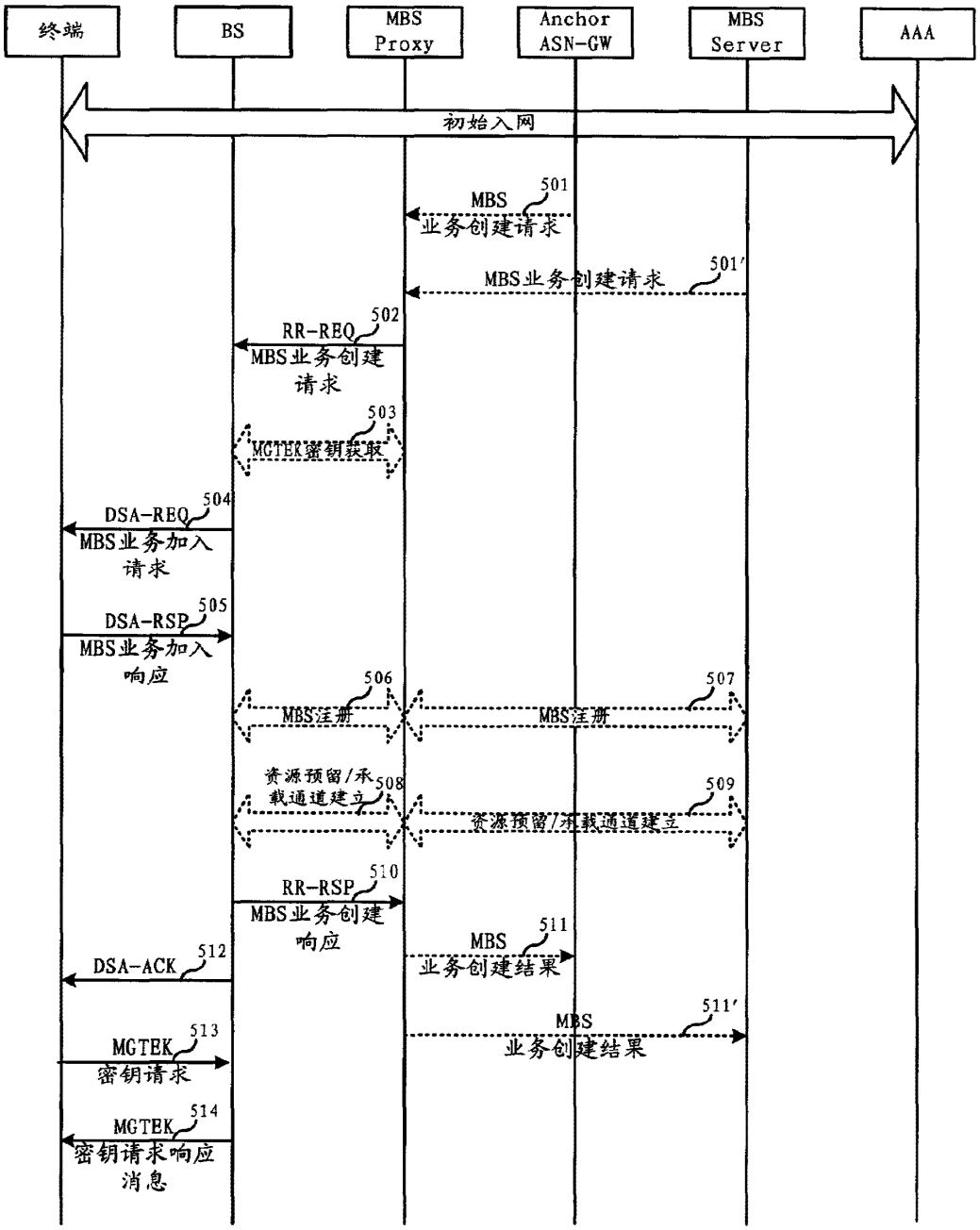

终端
BS
MBS Proxy
Anchor ASN-GW
MBS Server
AAA
初始入网
501
MBS 业务创建请求
501'
MBS业务创建请求
502
RR-REQ MBS业务创建请求
503
MGTEK密钥获取
504
DSA-REQ MBS业务加入请求
505
DSA-RSP MBS业务加入响应
506
MBS注册
507
MBS注册
资源预留/承载通道建立
508
509
资源预留/承载通道建立
510
RR-RSP MBS业务创建响应
511
MBS 业务创建结果
512
DSA-ACK
511'
MBS 业务创建结果
513
MGTEK 密钥请求
514
MGTEK 密钥请求响应消息

图 5

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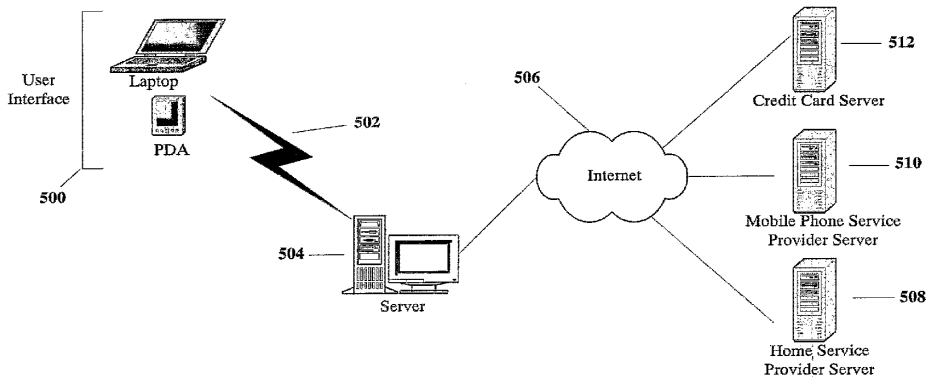
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(54) Title: METHOD AND SYSTEM FOR USER-FRIENDLY LOGIN TO SELECTED INTERNET SERVICE PROVIDERS



(57) Abstract: A method and system is disclosed for roaming users to access a host service provider's network utilising a variety of authentication methods in an intuitive and user-friendly manner. The interface and workflow greatly enhances ease-of-use by minimising the amount of technical knowledge required by users and providing the ability for support pages to be delivered in user's native languages. This reduces user confusion and customer support costs.

WO 2005/008995 A1

METHOD AND SYSTEM FOR USER-FRIENDLY LOGIN
TO SELECTED INTERNET SERVICE PROVIDERS

FIELD OF INVENTION

The present invention relates to a method and system for allowing users to access a service provider's wireless LAN services in an intuitive and user-friendly manner while supporting a wide range of authentication & billing options.

BACKGROUND

The Internet consists of a large number of computers, devices and networks all interconnected via communications links. Users gain access to the Internet via communications service providers, which can be, among others, Internet service providers, wireless Internet service providers, mobile telephone service providers or fixed line service providers.

Such communications service providers typically have a limited footprint, that is, they can only provide local access to the Internet in certain areas. For example, a mobile telephone service provider may only provide access to the Internet when the mobile telephone user is within the defined coverage area of the said service provider's mobile network. Another example would be an internet service provider that maintains a national telephone number to deliver Internet access nationwide, but is unable to provide a local access number for a subscriber who travels out of the country of service.

In order to provide local Internet services, communications service providers enter into bilateral or multilateral roaming agreements with each other where they provide local ("host") services to subscribers of the other operators ("guests"). Authentication and billing services are provided by the subscribers' "home" operator, which will then settle with an aggregator or the "host" operator directly.

There are a number of access mechanisms for providing roaming local internet access. The most common is via dial-up access, where at least one local access telephone

(PSTN) number is provided to travellers to each region. Generally, dial-up roaming access is managed by client software that runs on the guest's computer. This software maintains a searchable database of access numbers for every region and will automatically dial an appropriate local access number based on the guest's indicated current location.

A new and emerging method for providing roaming internet access is the IEEE 802.11 series of Wireless LAN technologies, known as WLAN or WiFi "hot-spots." Because WLAN hotspots do not require the use of a telephone (PSTN) number, access is typically currently managed by having a "walled garden" that allows any user to connect to the hotspot, but not go beyond the boundaries of the hotspot. All traffic out of the hotspot is blocked, and all World-Wide Web (HTTP) requests are redirected to a "landing page" which allows guest identification via a username or password pair.

There are a couple of problems with the existing method. First, a guest's native language may be different from that of the landing page, or a client may not be available in the guest's native language. This could potentially confuse the guest, thus leading to lost revenue and higher customer support costs.

Another shortcoming of existing methods is that they generally require guests to follow a slightly different log-in procedure while they are roaming. Instead of merely entering their username and password as they do while they are at home, guests must now enter their username followed by a "domain" in the form username@domain. This additional information is required to allow the host service provider to identify the home provider communications company, but adds an additional burden to the user, and is non-intuitive.

SUMMARY OF THE INVENTION

It is therefore a first object of the present invention to provide a method or system for wireless network or internet access which goes some way to overcoming the above mentioned disadvantages in the prior art or which will at least provide the public with a

useful choice.

It is a second object of the invention to provide a method and a system that allows a roaming user to utilise the services of a service provider in an intuitive manner, whether or not the user has any pre-existing relationship with the service provider. The user operates a client system that is provided an identifier that identifies a login session. The client system provides the provided identifier to an authentication server system, together with information about the user's identity & billing relationship and a request to gain access to the Internet. The authenticating server verifies the billing relationship, referring some or all of the provided information to other servers as necessary, then grants or denies services to the requesting client system.

Accordingly in a first aspect the present invention consists in a system for providing wireless network or internet access comprising:

an interface configured to input a selection from predetermined service providers

a display configured to enable authentication to said selected service provider in a language and layout depending on said selection

a server allowing network or internet access depending on the success of said authentication.

Preferably said system further comprising a billing module configured to associate a cost with any authenticated network or internet access according to predetermined criteria and communicate said cost to said selected service provider to allow billing.

Preferably said display configured to provide an authentication web page substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

Preferably said display configured to provide information at least depending on said cost or said predetermined criteria.

In a second aspect the present invention consists in a system for providing wireless network or internet access configured to:

store predetermined service providers

input a selection from said predetermined service providers

attempt to authenticate to the selected service provider in a format dependant on said selection, and

allow network or internet access dependant on whether said authentication is successful.

Preferably said system further configured to input any further information dependant on said selection and optionally using said further information in said attempted authentication.

Preferably said system further comprising a RADIUS proxy allowing authentication with a RADIUS proxy server associated with said selected service provider.

Preferably said system configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

Preferably said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

Preferably said system configured to supply billing information to said selected service provider dependant on network or internet access provided.

Preferably said system configured to allow further attempts if said authentication is unsuccessful.

In a third aspect the present invention consists in a method of allowing access to the Internet for a user comprising the steps of:

storing predetermined service providers

inputting a selection from said predetermined service providers

attempting to authenticate to the selected service provider in a format dependant on said selection, and

allowing network or internet access dependant on whether said authentication is successful.

Preferably said method further comprising the step of inputting any further information dependant on said selection and optionally using said further information in said attempted authentication.

Preferably said method further comprising the step of authenticating between a local RADIUS proxy and a RADIUS proxy associated with said selected service

provider.

Preferably said method configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

Preferably said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

Preferably said method configured to supply billing information to said selected service provider dependant on network or internet access provided.

Preferably said method configured to allow further attempts if said authentication is unsuccessful.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

The invention consists in the foregoing and also envisages constructions of which the following gives examples.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred forms of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 A flow diagram of the entire log-in process for a guest at a host operator using the access control panel to authenticate via a roaming agreement with a home operator

Figure 2 Illustrates the "landing page" (displayed by the client) that greets a guest upon an attempt to access the host service provider network.

Figure 3 Illustrates the guest's home operator page (displayed by the client) that is used to provide native language support information, authenticate and bill for the network session via a roaming agreement with the home operator

Figure 4 A block diagram illustrating an embodiment of the present invention that allows a user to gain access to the network via multiple authentication and billing options.

Figure 5 is a block diagram indicative of the hardware involved in the communication paths there between.

PREFERRED MODE OF IMPLEMENTING THE INVENTION

In a first preferred embodiment of the present invention a method and system for roaming users to access a host service provider's network is provided which utilises a variety of authentication methods in an intuitive and user-friendly manner. In this embodiment an interface and workflow is provided which greatly enhances ease-of-use by minimising the amount of technical knowledge required by users and providing the ability for support pages to be delivered in users' native languages. This reduces user confusion and customer support costs while facilitating the growth of the roaming Internet user market.

In one embodiment, the service gateway controlling network access assigns a unique identifier to the client (such as a Web browser or custom software) upon an access attempt. The identifier allows the service gateway to identify the unique login session. The client then allows the user to select a supported billing relationship, including, but not limited to, the user's home operator or clearinghouse which is affiliated with the host service provider, a mobile telephone service provider or a credit card account. The client provides the selected identifier together with the chosen billing relationship to the service gateway, which then determines the appropriate content that the client should display in order to collect any necessary information as shown in Figure 2.

Access option # 1 (100) could for example represent a selection of affiliated or supported home operators from which the user can one click select (102). Access option # 2 (104) could for example be a drop down box of supported or affiliated mobile telephone service providers from which the user could similarly one click select the provider which they already have a billing relationship with. It is necessary that each of

the options the user is able to select are predetermined so that the service gateway is able to determine the appropriate remote servers to communicate with as well as further content required. If the users home operator is not affiliated then the credit card option e.g. access option # 3 (106) may still allow access.

Home Service Provider Selection

In particular, if the user's chosen billing relationship allows identification of the user's home service provider, country of origin or preferred language, the service gateway can provide the client with general support information and specific login procedures (e.g. via a Web page) in the user's native language and in a format & layout that would be most familiar to the user as seen in Figure 3.

For example the user ID (200) would be entered along with the password (202) in a single frame where the user might click on login (206). An advantage to this embodiment of the present invention is that the home operator's login page is familiar to the user both in language and environment such that the user is easily able to gain access.

Once the appropriate content has been identified, the service gateway sends it to the client, along with the previously-assigned identifier, a second identifier that indicates the chosen billing relationship and instructions to the client to collect any further required information from the user. One skilled in the art would appreciate that the service gateway need not be a monolithic element – for example, the logic that determined the appropriate information to deliver to the client could reside on a separate system that communicated with the service gateway in a manner transparent to the client.

Authentication

Referring to Figure 1 once the guest has selected the home operator (300) and the user has entered the password and ID (302), the client logic appends the appropriate realm suffix (304) to the user ID according to the specific home operator selected. The service gateway then sends the credentials to the home operator radius proxy via the

host's radius proxy (306). If the authentication is successful the customer is granted access (308) and can use the Internet in a normal fashion. If authentication is not successful the user is prompted for the ID and password again (310), optionally after a set number of attempts the user will be currently blocked.

The client processes the server's instructions, displays the content to the user and collects any other required information from the user before returning all relevant information to the server for processing, including the identifiers provided by the server.

Upon receipt of all necessary information required to successfully authenticate and bill the user via the selected billing mechanism, the service gateway will query various specialised upstream servers (which could include RADIUS or merchant servers), providing them with the necessary information to enable them to verify the user's credentials and return an appropriate result. Based on the outcome of this verification process, the service gateway will grant or deny the user's system access to the network.

Internet Access

Referring to Figure 4 the network server (400) includes the server engine (402) the host radius proxy (404) the host user database (406) which in turn communicate through the service control point (408) to the user's browser (410). Other communication includes links to the home radius proxy (412) the home user database (414) and other authentication servers (416). Once authentication takes place the server engine (402) allows access in that web page request etc form the user's browser (410) are passed through to the internet and the resulting data stream is passed back to the user's browser (410).

Referring to Figure 5 the hardware layout is illustrated. Interface (500) may for example represent the users own computer, a WAP phone or other WiFi capable data device. It is also possible that the hotspot could provide its own terminals with the facility through the present invention of billing for their use through the users home service provider. Wireless communication (502) between Interface (500) and server

(504) occurs according to any of the proceeding embodiments of the present invention. Server (504) may communicate through the internet (506), network or other communication paths to a plurality of home service provider servers' (508), mobile phone service provider servers' (510), credit card service provider servers' (512) and any other affiliated service provider servers' or clearinghouse authentication servers'.

CLAIMS:

1. A system for providing wireless network or internet access comprising:

an interface configured to input a selection from predetermined service providers

a display configured to enable authentication to said selected service provider in a language and layout depending on said selection

a server allowing network or internet access depending on the success of said authentication.

2. A system as claimed in claim 1 further comprising a billing module configured to associate a cost with any authenticated network or internet access according to predetermined criteria and communicate said cost to said selected service provider to allow billing.

3. A system as claimed in claim 2 wherein said display configured to provide an authentication web page substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

4. A system as claimed in claim 3 wherein said display configured to provide information at least depending on said cost or said predetermined criteria.

5. A system for providing wireless network or internet access configured to:

store predetermined service providers

input a selection from said predetermined service providers

attempt to authenticate to the selected service provider in a format dependant on said selection, and

allow network or internet access dependant on whether said authentication is successful.

6. A system as claimed in claim 5 further configured to input any further information dependant on said selection and optionally using said further information in said attempted authentication.

7. A system as claimed in claim 5 further comprising a RADIUS proxy allowing authentication with a RADIUS proxy server associated with said selected service provider.

8. A system as claimed in claim 7 configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

9. A system as claimed in claim 8 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

10. A system as claimed in claim 7 configured to supply billing information to said selected service provider dependant on network or internet access provided.

11. A system as claimed in claim 8 configured to allow further attempts if said authentication is unsuccessful.

12. A method of allowing access to the Internet for a user comprising the steps of:
storing predetermined service providers
inputting a selection from said predetermined service providers
attempting to authenticate to the selected service provider in a format dependant on said selection, and
allowing network or internet access dependant on whether said authentication is successful.

13. A method as claimed in claim 12 further comprising the step of inputting any further information dependant on said selection and optionally using said further information in said attempted authentication.

14. A method as claimed in claim 12 further comprising the step of authenticating

between a local RADIUS proxy and a RADIUS proxy associated with said selected service provider.

15. A method as claimed in claim 14 configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

16. A method as claimed in claim 15 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

17. A method as claimed in claim 15 configured to supply billing information to said selected service provider dependant on network or internet access provided.

18. A method as claimed in claim 16 configured to allow further attempts if said authentication is unsuccessful.

AMENDED CLAIMS

[received by the International Bureau on 04 January 2005 (04.01.2005);
original claims, 1, 5, 12, amended, remaining claims unchanged (03 pages)]

1. A system for providing a billing arrangement for wireless network or internet access for an unknown user comprising:

an interface configured to input a selection from predetermined service providers;

a display configured to request authentication information for said selected service provider in a language and layout depending on said selection;

a communication link to said selected service provider, configured to send said authentication information to said selected provider and receive back either a verification or denial of an existing billing arrangement with said unknown user;

a server allowing network or internet access depending on the verification of said authentication information.

2. A system as claimed in claim 1 further comprising a billing module configured to associate a cost with any authenticated network or internet access according to predetermined criteria and communicate said cost to said selected service provider to allow billing.

3. A system as claimed in claim 2 wherein said display configured to provide an authentication web page substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

4. A system as claimed in claim 3 wherein said display configured to provide information at least depending on said cost or said predetermined criteria.

5. A system for providing wireless network or internet access including control means having a stored program which when executed on said control means is characterised by:

storing predetermined service providers

receiving a user selection from said predetermined service providers

requesting authentication information via a predetermined format dependant on said selection,

attempting to authenticate to the selected service provider using received

authentication information, and

allowing network or internet access dependant on whether said authentication is successful.

6. A system as claimed in claim 5 further configured to input any further information dependant on said selection and optionally using said further information in said attempted authentication.

7. A system as claimed in claim 5 further comprising a RADIUS proxy allowing authentication with a RADIUS proxy server associated with said selected service provider.

8. A system as claimed in claim 7 configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

9. A system as claimed in claim 8 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

10. A system as claimed in claim 7 configured to supply billing information to said selected service provider dependant on network or internet access provided.

11. A system as claimed in claim 8 configured to allow further attempts if said authentication is unsuccessful.

12. A method of allowing access to the Internet for a user comprising the steps of:

storing predetermined service providers,

receiving a user selection from said predetermined service providers,

requesting authentication information via a predetermined format dependant on said selection,

attempting to authenticate to the selected service provider using received authentication information, and

allowing network or internet access dependant on whether said authentication is successful.

13. A method as claimed in claim 12 further comprising the step of inputting any further information dependant on said selection and optionally using said further information in said attempted authentication.

14. A method as claimed in claim 12 further comprising the step of authenticating between a local RADIUS proxy and a RADIUS proxy associated with said selected service provider.

15. A method as claimed in claim 14 configured to communicate with a remote user terminal, wherein a user is able to select a service provider and can authenticate to the selected service provider using the service providers own web page on a remote user terminal.

16. A method as claimed in claim 15 wherein said web page is substantially the same layout and language as would be experienced with direct network or internet access through said selected service provider.

17. A method as claimed in claim 15 configured to supply billing information to said selected service provider dependant on network or internet access provided.

18. A method as claimed in claim 16 configured to allow further attempts if said authentication is unsuccessful.

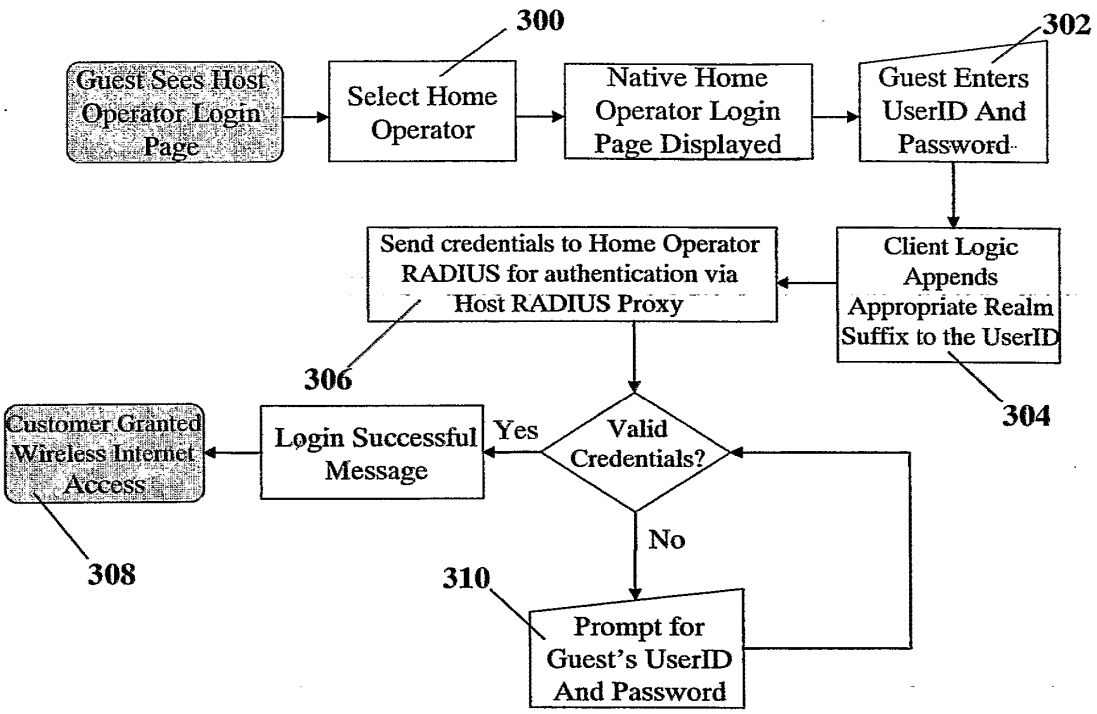


FIGURE 1

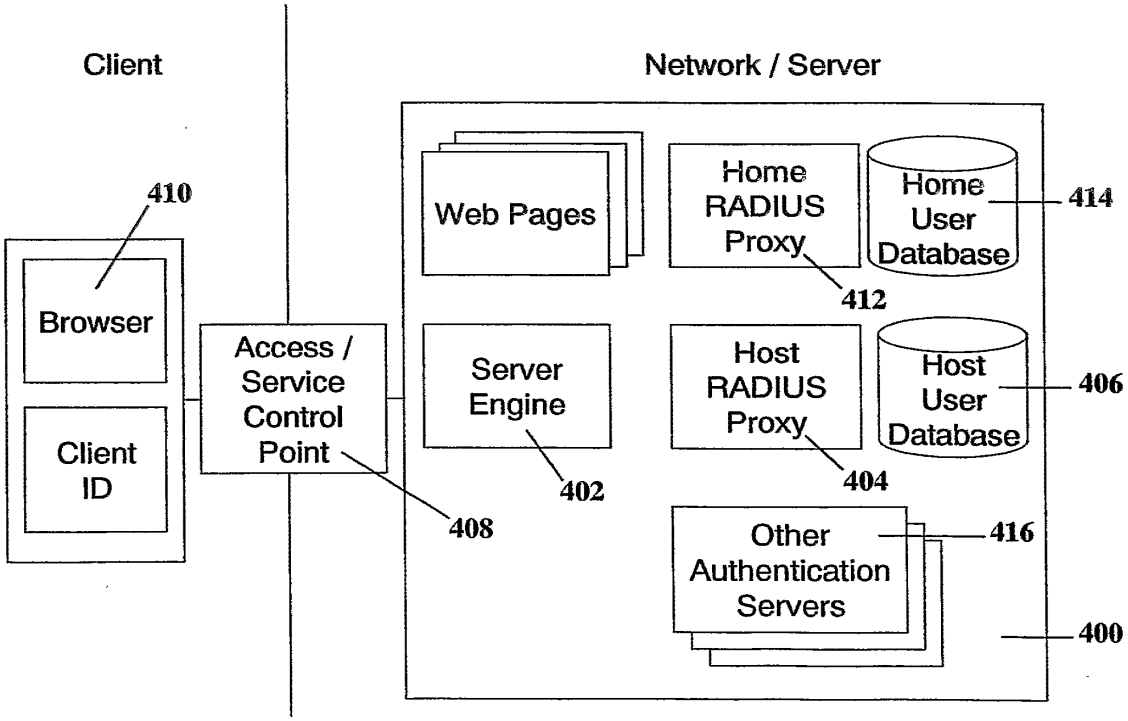


FIGURE 4

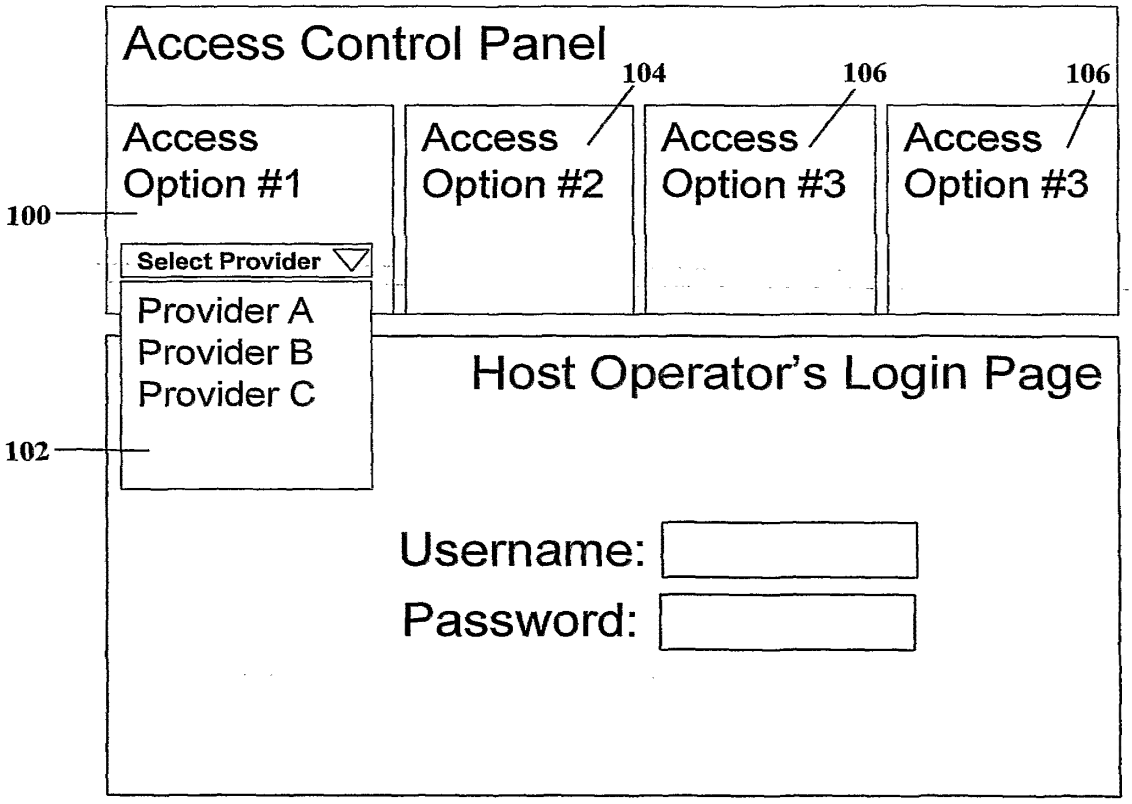


FIGURE 2

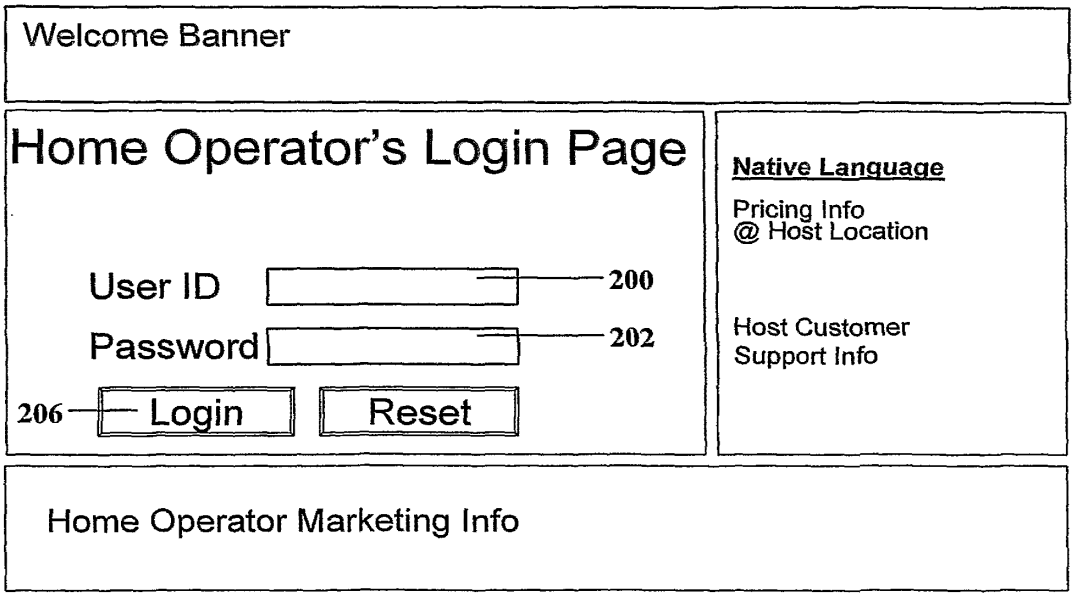


FIGURE 3

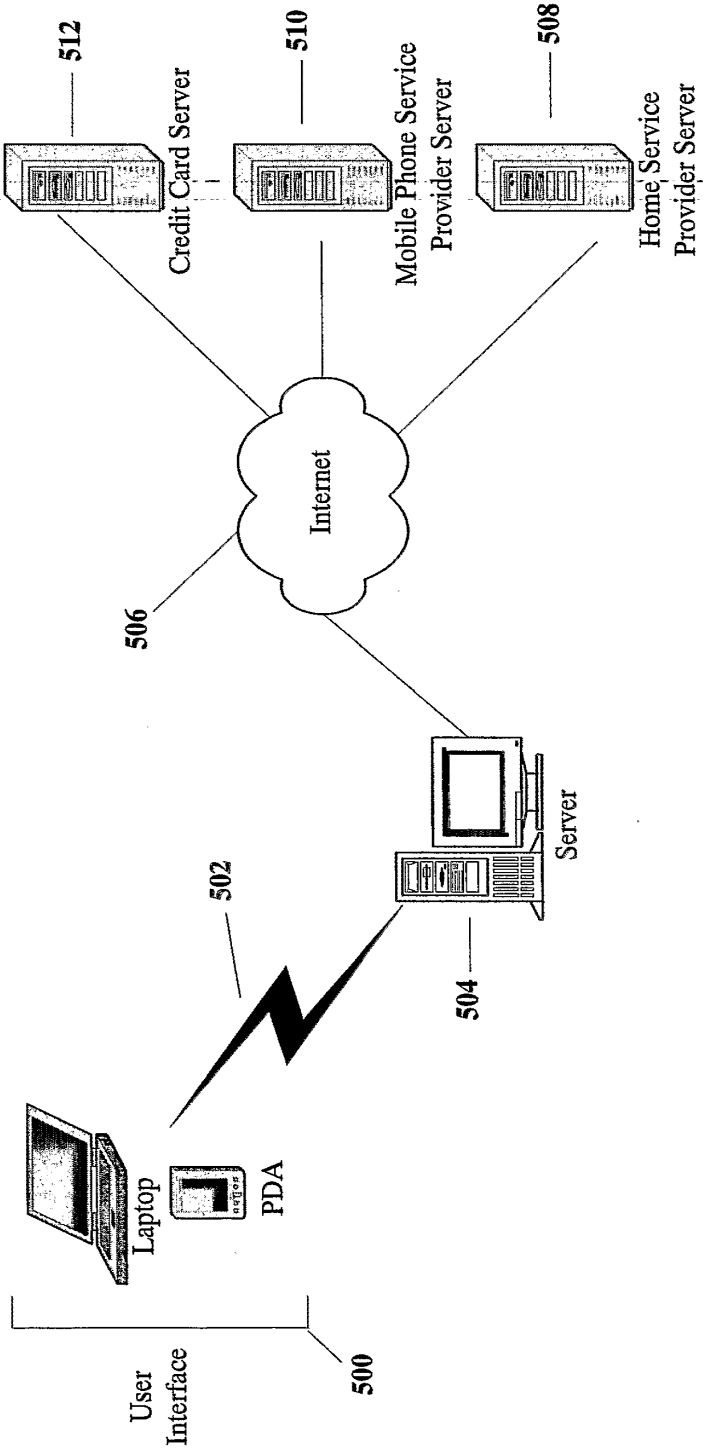

512
Credit Card Server
510
Mobile Phone Service Provider Server
508
Home Service Provider Server
Internet
506
Server
502
504
Laptop
PDA
User Interface
500

FIGURE 5

INTERNATIONAL SEARCH REPORT

International Application No
PCT/SG2004/000213

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L29/06 H04L12/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 241 902 A (STAR HOME GMBH) 18 September 2002 (2002-09-18) paragraphs '0227! - '0242! paragraphs '0253! - '0262! figures 2-6	1-18
Y	US 5 881 234 A (SCHWOB PIERRE R) 9 March 1999 (1999-03-09) column 3, line 4 - column 5, line 21; figure 1	1-18

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 October 2004	04/11/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Bengi-Akyuerek, K

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/SG2004/000213

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DATABASE WPI Section EI, Week 200257 Derwent Publications Ltd., London, GB; Class T01, AN 2002-534781 XP002302414 YOON H S: "Multinational electronic commerce method using internet" & KR 2002 011 604 A ((YOON-I) YOON H S) 9 February 2002 (2002-02-09) abstract	1-18
A	US 5 898 780 A (LU JUAN ET AL) 27 April 1999 (1999-04-27) column 1, line 9 - column 2, line 4 figures 1-8	1-18

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/SG2004/000213

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 1241902	A	18-09-2002	EP	1241902 A2	18-09-2002
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			WO	9741586 A1	06-11-1997
KR 2002011604	A	09-02-2002	NONE		
US 5898780	A	27-04-1999	NONE		

Form PCT/ISA/210 (patent family annex) (January 2004)

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International Application Number:	
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First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	15-JUL-2013
Filing Date:	15-JAN-2013
Time Stamp:	22:51:29
Application Type:	Utility under 35 USC 111(a)

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1	Information Disclosure Statement (IDS) Form (SB08)	P007C05_1.pdf	1823998 db639cf399d221c37502ffd56cdae5588a090d05	no	10

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4	Foreign Reference	CN1889777A.pdf	928344 9a22716535cc0ec62b3db71f323c7634d266e61a	no	19
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8	Non Patent Literature	P002OAChinaC.pdf	701930 fe2a550495b4cafd68226270319982165c79f77a	no	9
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Information:					
		Total Files Size (in bytes):	9492330		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100241544		2010-09-23	Benson, Dan et al.	
	2	20090157792		2009-06-18	Fiatal, Trevor	

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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

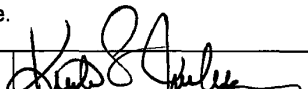
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-07-17
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt

EFS ID:	16347621
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	17-JUL-2013
Filing Date:	15-JAN-2013
Time Stamp:	22:30:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	P007C05.pdf	692996 c21184d5fe3297e81420d6e70f1f5471b0307a2e	no	3

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Total Files Size (in bytes):	692996

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Raleigh	Examiner:	Rudy, Andrew J.
Serial No.:	13/742,312	Art Unit:	3687
Filed:	January 15, 2013	Conf. No.:	5058
Title:	Automated Device Provisioning and Activation		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AND RESPONSE

Madam:

In response to the Restriction Requirement dated June 25, 2013, the deadline for response being July 25, 2013, please amend the above-identified application as follows:

Amendments to the Claims begin on page 2.

Remarks begin on page 8.

AMENDMENTS TO THE CLAIMS

Without prejudice and without surrender of any subject matter, please amend the claims as follows:

1. (Currently amended) A wireless device, comprising:

one or more modems for enabling the wireless device to communicate over at least a first wireless network;

a user interface;

memory configured to store a control policy associated with a first application on the wireless device, the first application at least enabling the wireless device to access at least a first data service over the first wireless network; and

one or more processors configured to:

assist in obtaining a user input through the user interface,

determine at least an aspect of the control policy based on the user input, the at least an aspect of the control policy for at least assisting in controlling a first access to the first wireless network by the first application on the wireless device, the at least an aspect of the control policy enabling a first control of the first access to the first wireless network by the first application on the wireless device that differs from a second control of a second access to the first wireless network by a second application on the wireless device, **~~the second application at least enabling the wireless device to access at least a second data service over the first wireless network,~~** and

apply the control policy, thereby at least assisting in controlling the first access to the first wireless network by the first application on the wireless device.

2. (Original) The wireless device recited in claim 1, wherein the first application is configured to at least assist in applying the control policy.

3. (Currently amended) The wireless device recited in claim 1, wherein controlling the first access to the first wireless network by the first application on the wireless device comprises

preventing or restricting communication**[[s]]** associated with the first application over the first wireless network.

4. (Currently amended) The wireless device recited in claim 1, wherein controlling the first access to the first wireless network by the first application on the wireless device comprises preventing or restricting communication**[[s]]** associated with the first application over the first wireless network when the first application runs as a background process.

5. (Original) The wireless device recited in claim 1, wherein the first wireless network comprises a cellular network, a roaming network, or an access network associated with a cost.

6. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy~~at least assisting in controlling the first access to the first wireless network by the first application on the wireless device~~** comprises **at least assist in** routing or directing at least a portion of ~~**access network**~~ traffic associated with the first application **over the first wireless network** to a particular network communication end point, route, or tunnel.

7. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy~~at least assisting in controlling the first access to the first wireless network by the first application on the wireless device~~** comprises identify**[[ing]]** or insert**[[ing]]** a flow tag in a traffic flow associated with the first application, the flow tag configured to assist in preserving the association of the traffic flow with the first application when the traffic flow is processed by one or more wireless-device functions that operate on the traffic flow.

8. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy~~at least assisting in controlling the first access to the first wireless network by the first application on the wireless device~~** comprises **[[using]]use** an application programming interface to communicate with a software component that at least assists in controlling the first access to the first wireless network by the first application.

9. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy**~~**at least assisting in controlling the first access to the first wireless network by the first application on the wireless device**~~ comprises **[[using]]use** an application programming interface to communicate information **[[with]]to** a software component that at least assists in controlling the first access to the first wireless network by the first application, the information being associated with the first wireless network, a cost associated with the first wireless network, a connection state of the first wireless network, or a user preference.

10. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy**~~**at least assisting in controlling the first access to the first wireless network by the first application on the wireless device**~~ comprises **[[using]]use** an application programming interface to communicate with a software component that **at least** assists in controlling an e-mail transfer option, a media content resolution, or a compression level.

11. (Currently amended) The wireless device recited in claim 1, wherein **apply the control policy**~~**at least assisting in controlling the first access to the first wireless network by the first application on the wireless device**~~ comprises **[[using]]use** an application programming interface to communicate with a software component that **at least** assists in controlling a background access.

12. (Original) The wireless device recited in claim 1, wherein the control policy is further based on a relationship between a usage limit and a measure of usage of the first wireless network associated with the first application on the wireless device.

13. (Original) The wireless device recited in claim 1, wherein the control policy is further based on a network administrator input.

14. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, enable, disable, turn on, turn off, allow, throttle, delay, quarantine, accelerate, or shape **at least a portion of**~~**access-network**~~ traffic **over the first wireless network** associated with the first application on the wireless device.

15. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, allow, throttle, delay, quarantine, accelerate, or shape **at least a portion of** ~~**access network**~~ traffic **over the first wireless network** associated with the first application when an amount or cost of ~~**access network traffic**~~ **usage of the first wireless network** associated with the first application satisfies a condition relative to a threshold.

16. (Original) The wireless device recited in claim 15, wherein the user input further comprises an indication of the threshold or information associated with the threshold.

17. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, allow, throttle, delay, quarantine, accelerate, or shape **at least a portion of** ~~**access network**~~ traffic **over the first wireless network** associated with the first application when a quality of a second wireless network satisfies a condition relative to a threshold.

18. (Original) The wireless device recited in claim 1, wherein the one or more processors are further configured to:

assist in establishing a secure control link between the wireless device and a network element, the secure control link secured by an encryption protocol and configured to support control-plane communications between the wireless device and the network element, and

obtain at least a portion of the control policy from the network element over the secure control link.

19. (Currently amended) The wireless device recited in claim 1, wherein the control policy **at least** assists in controlling the second access to the first wireless network by the second application on the wireless device, and wherein the user input is a first user input, and wherein the at least an aspect of the control policy is a first aspect of the control policy, and wherein the one or more processors are further configured to:

assist in obtaining a second user input through the user interface, and

determine at least a second aspect of the control policy based on the second user input, the at least a second aspect of the control policy for at least assisting in controlling the second access to the first wireless network by the second application on the wireless device.

20. (Original) The wireless device recited in claim 1, wherein the control policy assists in controlling a third access to a second wireless network by the first application on the wireless device.

21. (Original) The wireless device recited in claim 20, wherein the at least an aspect of the control policy is further based on a characteristic of the first wireless network or the second wireless network.

22. (Original) The wireless device recited in claim 20, wherein the at least an aspect of the control policy is further based on a user preference comprising a directive to allow access to the first wireless network by the first application based on a characteristic of the second wireless network.

23. (Original) The wireless device recited in claim 1, wherein the control policy is a first control policy, and wherein the memory is further configured to store a second control policy associated with the first application on the wireless device, the second control policy for at least assisting in controlling a third access to a second wireless network by the first application on the wireless device, and wherein the one or more processors are further configured to apply the second control policy.

24. (Currently amended) The wireless device recited in claim 1, wherein the first application on the wireless device is configured to assist in providing a forwarding service, the forwarding service for forwarding traffic between **(a)** one or more other devices communicatively coupled to the wireless device over a second network and **(b)** a network system communicatively coupled to the wireless device over the first wireless network, and wherein the at least an aspect of the control policy at least assists in determining whether the forwarding service is available to one or more of the one of more other devices.

25. (Currently amended) The wireless device recited in claim 1, wherein the wireless device is **capable of being** communicatively coupled to an intermediate networking device over the first wireless network, the intermediate networking device providing a forwarding service for forwarding traffic between the wireless device and a network system communicatively coupled to the intermediate networking device over a second wireless network, and wherein the one or more processors are further configured to determine the at least an aspect of the control policy based on a characteristic of the second wireless network.

26. (Currently amended) The wireless device recited in claim 1, wherein the one or more processors are further configured to obtain a measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device.

27. (Currently amended) The wireless device recited in claim 26, wherein obtain a measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device comprises determine the measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device.

28. (Currently amended) The wireless device recited in claim 26, wherein obtain a measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device comprises obtain, from a network element, the measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device.

29. (Currently amended) The wireless device recited in claim 26, wherein the measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device comprises an amount of data, a cost, or a time.

30. (Currently amended) The wireless device recited in claim 26, wherein the one or more processors are further configured to present, through the user interface, information based on the measure quantifying **at least** the first access to the first wireless network by the first application on the wireless device.

REMARKS

The Office Action dated June 25, 2013 imposes a restriction requirement on claims 1-30, asserting that the application contains claims directed to patentably distinct species and referring to Figures 1-64. It is not entirely clear from the Office Action how the figures are related to patentably distinct species, e.g., whether the Examiner is asserting that each of the sixty-four figures comprises one of sixty-four patentably distinct species, or that there are fewer or more than sixty-four patentably distinct species. Applicant cannot unambiguously determine from the Office Action how the Examiner is determining patentably distinct species, and therefore Applicant requests reconsideration of the election requirement.

Notwithstanding Applicant's partial understanding of the assertions of the Office Action and Applicant's request for reconsideration of the election requirement, Applicant respectfully requests examination of the species represented at least by Figure 16. Applicant's review of the currently pending claims does not indicate that any of the currently pending claims need to be withdrawn at this time given that election.

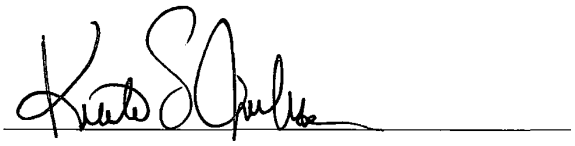
In addition to the election, Applicant respectfully requests entry of the enclosed amendments to claims 1, 3, 4, 6-11, 14, 15, 17, 19, 24-30. Applicant respectfully submits that the amendments introduce no new matter.

CONCLUSION

If the Examiner has any questions or needs any additional information, the Examiner is invited to contact the undersigned.

The Commissioner is authorized to charge any fee deficiency or credit any overpayment to Deposit Account 50-5876.

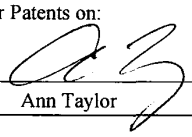
Respectfully submitted,

Date: July 19, 2013 By: 

Krista S. Jacobsen
Reg. No. 59,374
Head Counsel
Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065
(650) 517-2798

CERTIFICATE OF ELECTRONIC TRANSMISSION

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Date: July 19, 2013 By: 
Ann Taylor

Electronic Acknowledgement Receipt

EFS ID:	16365923
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	19-JUL-2013
Filing Date:	15-JAN-2013
Time Stamp:	15:26:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P007C5RRR.pdf	226913 359bab65a8bc85f46165832904e0190c6a0bc00e	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response to Election / Restriction Filed	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	9
Warnings:			
Information:			
	Total Files Size (in bytes):	226913	

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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/742,312	Filing Date 01/15/2013	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **07/19/2013**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $40 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/CHRISTINE MOLLISH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

106963 7590 08/29/2013

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

EXAMINER	
RUDY, ANDREW J	
ART UNIT	PAPER NUMBER
3687	

NOTIFICATION DATE	DELIVERY MODE
08/29/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent@headwaterllc.com

Office Action Summary for Applications Under Accelerated Examination	**Application No.** 13/742,312	**Applicant(s)** RALEIGH, GREGORY G.	
	Examiner ANDREW JOSEPH RUDY	**Art Unit** 3687	**AIA (First Inventor to File) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

***Since this application has been granted special status under the accelerated examination program, NO extensions of time under 37 CFR 1.136(a) will be permitted and a SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE:* ONE MONTH OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION – if this is a non-final action or a *Quayle* action.**

(Examiner: For **FINAL** actions, please use PTOL-326.)

The objective of the accelerated examination program is to complete the examination of an application within twelve months from the filing date of the application. Any reply must be filed electronically via EFS-Web so that the papers will be expeditiously processed and considered. If the reply is not filed electronically via EFS-Web, the final disposition of the application may occur later than twelve months from the filing of the application.

Status

1)☒ Responsive to communication(s) filed on *19 July 2013*.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

11)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some *c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Figure 16 in the reply filed on July 19, 2013 is acknowledged. Claims 1-30 are pending. Claims 1-30 read upon Figure 16.

Claim Rejections - 35 USC § 112

2. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.
>
> The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-30 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 1, line 5, "a first application" is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, lines 6-7, "a first data service" is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, line 11, "a first access" is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, line 14, “a first control” is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, line 15, “a second control” is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, line 15, “a second access” is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Claim 1, line 16, “a second application on the wireless device” is not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Clarification is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-30, as understood, are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Kaminsky et al., US 8,495,227.

Kaminsky discloses, e.g. Figs. 1-4 and related text, networks, a wireless device, e.g. 408, 426, memory, e.g. col. 5, lines 27-32, processors, e.g. 406, 420, network control policy, e.g. 412, and applications, e.g. 404. Kaminsky does not explicitly

disclose the terminology of a first and second control of first/second access to a wireless device. Official Notice is taken that applying a control policy associated with a wireless device has been common knowledge in the art. To have provided such for Kaminsky would have been obvious to one of ordinary skill in the art.

6. Pertinent references of interest are noted on the attached PTO-892.

7. Applicant's seven Information Disclosure Statements (IDS's) have been reviewed. Note the attached IDS's.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW JOSEPH RUDY whose telephone number is (571)272-6789. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Gart can be reached on 571-272-3955. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW JOSEPH RUDY/

Primary Examiner, Art Unit 3687

Notice of References Cited	Application/Control No. 13/742,312	Applicant(s)/Patent Under Reexamination RALEIGH, GREGORY G.	
	Examiner ANDREW JOSEPH RUDY	Art Unit 3687	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,504,729	08-2013	Pezzutti, David A.	709/250
*	B	US-8,495,227	07-2013	Kaminsky et al.	709/229
*	C	US-8,472,371	06-2013	Bari et al.	370/328
*	D	US-8,447,607	05-2013	Weider et al.	704/250
*	E	US-8,351,898	01-2013	Raleigh, Gregory G.	455/405
*	F	US-8,166,040	04-2012	Brindisi et al.	707/741
*	G	US-8,134,954	03-2012	Godfrey et al.	370/328
*	H	US-8,126,396	02-2012	Bennett, James D.	455/41.2
*	I	US-8,116,781	02-2012	Chen et al.	455/452.2
*	J	US-8,086,497	12-2011	Oakes, III, Charles Lee	705/26.1
*	K	US-8,078,163	12-2011	Lemond et al.	455/431
*	L	US-8,068,829	11-2011	Lemond et al.	455/431
*	M	US-8,045,973	10-2011	Chambers, Michael D.	455/422.1

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/742,312	Applicant(s)/Patent Under Reexamination RALEIGH, GREGORY G.	
	Examiner ANDREW JOSEPH RUDY	Art Unit 3687	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,969,950	06-2011	Iyer et al.	370/338
*	B	US-7,930,446	04-2011	Kesselman et al.	710/30
*	C	US-7,774,456	08-2010	Lownsbrough et al.	709/224
*	D	US-7,756,757	07-2010	Oakes, III, Charles Lee	705/26.1
*	E	US-7,535,880	05-2009	Hinman et al.	370/338
*	F	US-7,529,204	05-2009	Bourlas et al.	370/328
*	G	US-7,502,672	03-2009	Kolls, H. Brock	701/31.6
*	H	US-7,499,438	03-2009	Hinman et al.	370/338
*	I	US-7,496,652	02-2009	Pezzutti, David	709/223
*	J	US-7,478,420	01-2009	Wright et al.	726/1
*	K	US-7,322,044	01-2008	Hrastar, Scott E.	726/22
*	L	US-7,139,569	11-2006	Kato, Akira	455/432.3
*	M	US-7,102,620	09-2006	Harries et al.	345/169

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	N					
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	Examiner ANDREW JOSEPH RUDY	Art Unit 3687	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,957,067	10-2005	Iyer et al.	455/435.1
*	B	US-6,934,249	08-2005	Bertin et al.	370/218
*	C	US-6,654,814	11-2003	Britton et al.	709/246
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C5

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6754470		2004-06-22	Hendrickson, Keith et al.	
	2	8122128		2012-02-21	Burke, II, Robert M. et al.	
	3	8149823		2012-04-03	Turcan, Diane Brown et al.	
	4	8131256		2012-03-06	Martti, Jyrki et al.	
	5	6381316		2002-04-30	Joyce, Simon James et al.	
	6	7965983		2011-06-21	Swan, Tim et al.	
	7	8284740		2012-10-09	O'Connor, Dennis M.	
	8	8116223		2012-02-14	Tian, Dan et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

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	Attorney Docket Number	RALEP007C5

	9	6154738		2000-11-28	Call, Charles Gainor	
	10	8423016		2013-04-16	Buckley, Adrian et al.	

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20110173678		2011-07-14	Kaippallimalil, John et al.	
	2	20080235511		2008-09-25	O'Brien, William G. et al.	
	3	20080240373		2008-10-02	Wilhelm, Robert D.	
	4	20100027559		2010-02-04	LIN, Hung-Ming et al.	
	5	20020116338		2002-08-22	Gonthier, Jean-Charles et al.	
	6	20070061878		2007-03-15	Hagiu, Costin et al.	
	7	20100020822		2010-01-28	Zerillo, Anthony J. et al.	

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	8	20040203755		2004-10-14	Brunet, Jeffrey et al.	
	9	20090172077		2009-07-02	Roxburgh, David et al.	
	10	20080051076		2008-02-28	O'Shaughnessy, John et al.	
	11	20080313730		2008-12-18	Iftimie, Sorin et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2006120558A1	WO		2006-11-16	Nokia Corp.		☐

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature	/Andrew Joseph Rudy/	Date Considered	08/21/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
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	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6035281		2000-03-07	Crosskey, James P. et al.	
	2	6996393		2006-02-07	Pyhalammi, Seppo et al.	
	3	7760711		2010-07-20	Kung, Fen-Chung et al.	
	4	8000318		2011-08-16	Wiley, William L. et al.	
	5	8098579		2012-01-17	Ray, Amar N. et al.	
	6	8155670		2012-04-10	Fullam, Scott et al.	
	7	8374090		2013-02-12	Morrill, Robert J. et al.	
	8	7457265		2008-11-25	Julka, Vibhor et al.	

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	10	7929973		2011-04-19	Zavalkovsky, Arthur et al.	
	11	7945945		2011-05-17	Graham, Richard et al.	
	12	8059530		2011-11-15	Cole, Terry L.	
	13	8266681		2012-09-11	Deshpande, Sumit B. et al.	
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	18	8191116		2012-05-29	Gazzard, Daryl	
	19	6292828		2001-09-18	Williams, David L.	

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	Attorney Docket Number	RALEP007C05

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	21	7472189		2008-12-30	Mallya, Arvind R. et al.	
	22	7944948		2011-05-17	Chow, Albert T. et al.	
	23	8005009		2011-08-23	McKee, Neil et al.	
	24	7760861		2010-07-20	Croak, Marian et al.	
	25	8060463		2011-11-15	Spiegel, Joel R.	
	26	8224773		2012-07-17	Spiegel, Joel R.	
	27	8352980		2013-01-08	Howcroft, Jerald Robert	
	28	8386386		2013-02-26	Zhu, Kevin	
	29	8340718		2012-12-25	Colonna, Massimo et al.	
	30	8385896		2013-02-26	Proctor, Jr., James A. et al.	

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	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

	31	8320949		2012-11-27	Matta, Sudheer Poorna Chandra	
	32	8279864		2012-10-02	Wood, Daniel M.	
	33	8271045		2012-09-18	Parolkar, Satish et al.	
	34	8233883		2012-07-31	De Froment, Eric	
	35	8224382		2012-07-17	Bultman, Michael J.	
	36	8184590		2012-05-22	Rosenblatt, Ariel	
	37	8174970		2012-05-08	Adamczyk, Maria et al.	
	38	8165576		2012-04-24	Raju, Vishwanath et al.	
	39	8073721		2011-12-06	Lewis, Lundy	
	40	8032899		2011-10-04	Archer, Charles J. et al.	
	41	7974624		2011-07-05	Gallagher, Michael D. et al.	

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	Examiner Name	Rudy, Andrew J.
	Attorney Docket Number	RALEP007C05

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	43	7778176		2010-08-17	Morford, Michael Robert|	
	44	7725570		2010-05-25	Lewis, Lundy	
	45	7634388		2009-12-15	Archer, Charles J. et al.	
	46	7633438		2009-12-15	Tysowski, Piotr Konrad	
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	Art Unit	3687
	Examiner Name	Rudy, Andrew J.
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	Art Unit	2447
	Examiner Name	not yet assigned
	Attorney Docket Number	RALEP007C5

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Examiner Signature	/Andrew Joseph Rudy/	Date Considered	08/21/2013

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SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/742,312	01/15/2013	705	3687	RALEP007C05

APPLICANTS

Gregory G. Raleigh, Woodside, CA;
HEADWATER PARTNERS I LLC, Redwood Shores, CA

**** CONTINUING DATA ***************************

This application is a CON of 12/380,780 03/02/2009
which claims benefit of 61/206,354 01/28/2009
and claims benefit of 61/206,944 02/04/2009
and claims benefit of 61/207,393 02/10/2009
and claims benefit of 61/207,739 02/13/2009

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
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Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /ANDREW JOSEPH RUDY/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	106	30	1

ADDRESS

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065
UNITED STATES

TITLE

AUTOMATED DEVICE PROVISIONING AND ACTIVATION

FILING FEE RECEIVED		
1783	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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Search Notes

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13/742,312	RALEIGH, GREGORY G.	
Examiner	**Art Unit**	
ANDREW JOSEPH RUDY	3687	

SEARCHED			
Class	Subclass	Date	Examiner
709	203,219, 223,224, 225	8/24/2013	AJR
455	405-409	8/24/2013	AJR
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SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Continuity data reviewed.	8/24/2013	AJR
Inventor name search conducted.	8/24/2013	AJR
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	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2447
	Examiner Name	not yet assigned
	Attorney Docket Number	RALEP007C5

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Attorney Docket Number	RALEP007C05

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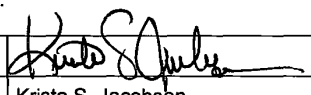
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(71) Applicant *(for all designated States except US)*: SONERA OY [FI/FI]; Sturenkatu 16, FIN–00510 Helsinki (FI).

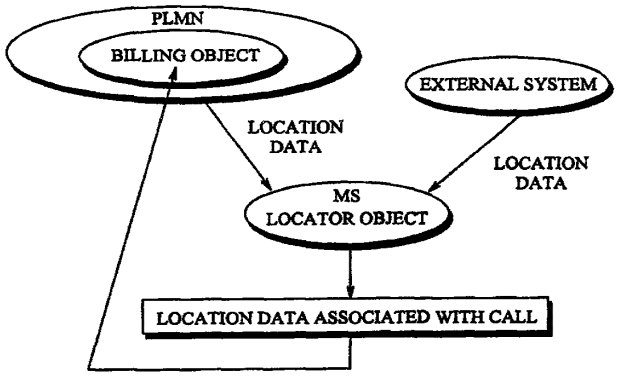
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(74) Agent: PAPULA REIN LAHTELA OY; Fredrikinkatu 61 A, P.O. Box 981, FIN–00101 Helsinki (FI).

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(54) Title: CHARGING METHOD IN A MOBILE TELECOMMUNICATION SYSTEM



(57) Abstract

The charging principles regarding mobile calls can be improved by providing the mobile station with a locator object, which at certain intervals determines the cell in which the mobile station is currently located. Stored in the mobile station is also a list of areas permitting application of a special rate. The locator object monitors calls made from the mobile station. When it detects that a call is being started, it checks whether the mobile station was in a special rate area at the time when its location was determined last. If this is the case, then the object will inform the network that the call is entitled to a special rate. As the last location function was executed just before the call setup was started, a special rate call is possible even if the mobile station has moved some distance into the area of a cell applying a normal rate. Placed in a billing centre is a billing object, to which the locator object sends data indicating whether the call was started from a cell or area where a special rate is applicable, as well as data identifying the call. The second object receives the billing records generated by the mobile switching centre, which also contain call identifying data, and compares the call–specific data in them with the data sent by the first object. In this way, the second object can find from the billing records the calls that are entitled to a special rate, regardless of whether the mobile station has moved during call setup from the original cell into a cell where another rate, e.g. a higher rate is applicable.

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CHARGING METHOD IN A MOBILE TELECOMMUNICATION SYSTEM

SCOPE OF THE INVENTION

The present invention relates to the formation of the principles of calculation of call price in a cellular mobile communication system.

TECHNOLOGICAL BACKGROUND

In a wired network, the charge for a call depends on whether the call is a local call, a trunk call or an international call, in other words, a geographically defined call, or whether it is a call to a service number. Thus, when dialling the number of a called subscriber, the calling subscriber already knows the principles on which the price of the call will be calculated.

The principles used in a wired network for calculating the call price cannot be directly applied in mobile telephone networks. This is because the mobile subscriber is not tied to a given locality while the called subscriber may be a locality-dependent wired network subscriber or a mobile subscriber in the same mobile communication network or a subscriber in another operator's mobile communication network. Within the mobile communication network, no distinction is made between local calls and long-distance calls regarding pricing; moreover, in distinction from the wired network, even the called subscriber is liable to pay a portion of the price of a received call in certain cases.

In mobile communication networks, a difficulty in locality-dependent determination of price is that the exact locality of neither the calling nor the called subscriber is known. To give an understanding of the principles of calculation of call price, the

call setup process in a mobile communication network will now be described in general outline, referring to Fig. 1.

When a calling subscriber in cell a1 in location area 1 under mobile switching centre MSC1 makes a call to a subscriber in location area 2 under another mobile switching centre MSC2, he/she will dial the MSISDN number (Mobile Subscriber International ISDN number) of the called subscriber on his/her mobile station MS-A, which sends it in a message to the base transceiver station 1, step 1. Upon receiving the message, MSC1 checks whether the request can be accepted. As a part of this check, the subscriber data of the calling subscriber are retrieved from the visitor location register VLR1 associated with MSC1, where they have been stored in conjunction with the location updating procedure. If the request is accepted, the mobile switching centre MSC1 will send to the home location register HLR an enquiry containing the called subscriber's MSISDN number, step 2. Based on this number, the HLR retrieves the data for the called subscriber, which indicate that the called subscriber has roamed to visitor location register VLR2. Next, the HLR sends the IMSI (International Mobile Subscriber Identity) data to visitor location register VLR2, asking the latter to give the roaming number, step 3, whereupon VLR2 sends the roaming number MSRN to the home location register HLR, step 4, from where it is sent further to MSC1, step 5.

After this, the call can be routed from mobile switching centre MSC1 to mobile switching centre MSC2 on the basis of the MSRN number (Mobile Subscriber Roaming Number) received from VLR2, step 6. Upon receiving the start message, the mobile switching centre MSC2 of the called subscriber retrieves the subscriber data for the called subscriber from the associated VLR2. From the subscriber data, MSC2 learns

the location area LAI 2 of the called subscriber, so MSC2 is able to send a paging message via the appropriate base station controller 2 (step 7) to the cells b1, b2, b3 in the location area in question. After the called subscriber's mobile station MS-B has responded to the paging, the call is finally set up to the called subscriber. From what was said above, it is obvious that it is only after the called subscriber's mobile station has responded to the paging message that the relevant mobile switching centre MSC2 is informed of the called subscriber's location at the cell level.

The mobile switching centre may also be linked to a service switching point SSP of an intelligent network IN to allow connections from the mobile communication network to the intelligent network. Via an intelligent network, a wide variety of services can be offered to the subscribers of the mobile communication network, including services like follow-me-diversion of calls, call rerouting distribution, premium rate calls, etc.

In a state-of-the-art mobile communication network, the main rule regarding call charging is that the calling subscriber is charged for the connection between him/her and the home network of the called subscriber while the called subscriber is charged for the connection between his/her current locality and his/her home network.

To increase flexibility regarding the billing principles, a known method is to set a special billing parameter that allows calls made from the subscriber number associated with the parameter to be billed at a rate lower than normal at times when the load on the mobile communication network is low and, correspondingly, at a higher rate when the load on the mobile communication network is high. This parameter creates a time-dependent call charging principle, but in other

respects the pricing of calls follows the above-mentioned principles. Another known practice is to charge a lower price for calls between a mobile station and a specified wired network telephone than for normal calls. This can be implemented by assigning for all subscribers to the service a common service number, e.g. 020100, as the called subscriber number, which directs the call to an intelligent network. In the intelligent network, a service program searches a database to find the called subscriber number associated with the calling subscriber number, and the call is routed to this number.

A comparison of the principles of call price calculation used in mobile communication networks with those used in wired networks reveals certain problems. Since all cells are equal with respect to the mobile communication network, it is difficult to offer the various user groups any other principles of call price calculation than e.g. the aforesaid price variation based on the time of the day. At present, there are no special call price calculation principles applicable to calls within the same cell or calls between certain cells. However, it would be attractive for a mobile telephone network operator to be able to provide various services dependent on the locality where the call is started and/or where it is terminated. Such services include e.g. locality-dependent pricing solutions.

Specifications WO-96/20570 and WO/96/20571 present solutions for determining the principles of call price calculation. The price calculation principles can be improved by setting a given cell or a number of cells of a mobile telephone network as a special cell group. During call setup, the mobile switching centre or a service control point SCP in an intelligent network analyses the call to determine whether the cell in whose area the calling subscriber is lo-

cated and/or the cell in whose area the called subscriber is located belong(s) to the group of special cells. When the calling and called subscribers are located in cells belonging to different switching centres, data regarding the cell of the called subscriber is transmitted to the switching centre of the calling subscriber or to an intelligent network before a voice connection is established. Thus, based on whether the subscribers are in a group of special cells or not, it is possible to vary the call charging rates applied.

Specification WO-96/34499 describes a system in which the subscribers are divided into normal subscribers and "fixed" subscribers. A normal subscriber may start a call in any cell, whereas a fixed subscriber has limited access to the network from a subscriber area comprising one or more cells. When a fixed subscriber is at the boundary of his/her area, the call is forcibly directed to the base transceiver station of the subscriber area if possible.

These solutions allow the application of more fine-grained call charging principles than those generally used. A feature common to these solutions is that the right to a differently priced call is determined according to the cell in whose area the subscriber is physically located at the time of the call, i.e. according to the base transceiver station that connects the subscriber to the network. This is because the metering record generated at the start of the call includes, among other data, an identifier of the base transceiver station via which the connection is set up, and the base station identifier again reveals whether the base station belongs to a group of special cells. In other words, the base station identifier functions as a factor that ultimately determines the price of the call.

However, there is a problem associated with these prior-art solutions. In most mobile telephone

systems, it is the network that makes the decision as to which base station is to be used to transmit the subscriber's calls. When the subscriber is in the fringe area of a cell where a lower call charge is applicable, the network may repeatedly command the mobile station to perform a handover between two base stations, which means that the calling end of the connection alternates between the base station of a "cheaper" cell and the base station of an adjacent cell. It the adjacent cell is not one of the cells where a lower call charge is applicable, then the result would be that the call price would vary during the same call as the connection is handed over from one base station to another, the call charge being thus lower at one moment and higher at the next, without the subscriber having any chance to influence the situation in any way.

One solution proposed to cope with this problem is to give the mobile station some of the handover control functions between base stations. In the idle state, the mobile station would remain as long as possible in signalling contact with a cell applying a lower call charge when in the fringe area of the cell, in other words, the mobile station would remain "hanging" in the cell even when a neighbouring cell would provide a better connection quality. During a communication connection, too, the mobile station would continue hanging in the old cell when in the area of another cell, and it would inform the network e.g. in conjunction with a change of base station or the call setup procedure that it gives preference to the old base station providing cheaper service instead of other base stations.

However, this solution has the drawback of increased co-channel interference, which is due to the fact that, when the communication connection is forcibly maintained via the base station of a cheaper cell

although the mobile station is located in the area of an adjacent cell that would provide a better connection, the mobile station has to use a higher transmission power to compensate for the signal attenuation caused by the longer distance. Therefore, the mobile telephone interferes with other mobile stations using the same frequency that are communicating at the reuse distance of this frequency. Another drawback is that changes need to be made in certain network components, such as the base station controller and the telephone itself. Changes must be made at least in the handover criterion and algorithm.

Another solution proposed to deal with the problem is to have information presented on the display of the mobile station in the idle state to indicate the cell in whose area the mobile station is currently located. The idea is to allow the subscriber to move into the area of a cell with a lower call charge at least when the subscriber is at the boundary between cells. A drawback with this solution is that, as the billing record is generated at the beginning of the call when the telephone is already in the active state, the subscriber may move on to the area of a cell with a higher call charge during the call setup procedure although the subscriber has seen from the display before the transmission of the call setup request that the mobile station is still located in the area of a cheap cell.

The object of the present invention is to achieve a system that is free of the drawbacks of prior-art systems and that does not produce co-channel interference. In the system, determination of location of a mobile station should be implemented in a manner that allows a call started from a special cell to continue being charged at the rate applicable in that cell even if the mobile station should move on to a cell with a normal charging rate during call setup. A

further object is to ensure that, even if call setup is started in a cell with a normal charging rate but a moment earlier the mobile station has been in a special cell, the call can still be charged at the rate applicable in the special cell. The length of time of the moment should also be adjustable.

Yet another object is to achieve a system in which the area of a specially priced call is not dependent on the cell coverage area but may consist of any geographic area. The area may even consist of a part of one cell and a part of another cell. Location of the mobile station should therefore be independent of the information transmitted by the base stations.

The objects stated above can be achieved with the attributes defined in the independent claims.

SUMMARY OF THE INVENTION

According to the basic idea of the invention, the mobile station is provided with a first object, a locator object, which determines the location of the mobile station. The location function can be carried out with an accuracy of a cell or a sub-area of a cell, making use of the existing properties of the mobile communication system. By utilising location methods external to the mobile telephone system, completely cell-independent location can be achieved. The location function is executed at certain intervals. The mobile station also contains a stored list of cells and/or areas where a special charging rate is applicable. The locator object monitors the calls originated from the mobile station. When it detects that a call is being started, it checks whether the mobile station was in a cell or area with a special charging rate at the time when the location function was executed last. If this is the case, then the object will inform the network that the call is entitled

to a special rate. The last location function has even been executed before call setup is started, so a call chargeable at a special rate is possible even if the mobile station has moved some distance into the area of a cell applying a normal rate. Channel allocation is done independently of location in accordance with the normal procedures in the system, which means that co-channel interference is avoided.

One of the network elements is provided with a second object, a billing object, to which the first object sends information indicating whether the call has been started from a cell or area where a special rate is applicable. The second object receives the billing records generated by the mobile switching centre and compares the call-specific data in them with the data sent by the first object. In this way, the second object can find those calls in the billing records that are entitled to a special rate, even if the mobile station has moved during the call setup from the original cell or area into a cell where another rate, e.g. a higher rate is applicable.

Cells allowing the application of a special rate can be divided into groups of cells or areas, and each of the groups may have a different rate applicable in that group. Thus, when the final telephone bill is being compiled, the rate applicable in the special rate group can be checked and the call charge can be determined accordingly.

The locator object may send the data regarding a call entitled to a special rate to the network during the call or alternatively it may collect such data for a desired length of time and send the data at once to the billing object. However, the latter method has the drawback that it leads to a more difficult generation of the telephone bill if the data are received after the call records received during the billing period have been subjected to post-processing.

LIST OF FIGURES

A preferred embodiment of the invention is described by referring to the attached figures, of which

Fig. 1 illustrates call setup in a mobile telephone network,

Fig. 2 illustrates the principle of the invention in a simplified form,

Fig. 3 illustrates the system in a mobile telephone network, and

Fig. 4 presents a flow and signalling diagram consistent with the procedure, applied to a known mobile telephone system.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 2 illustrates the principle of the invention in a simplified form. A mobile telephone system PLMN (Public Land Mobile Network) 22 is provided with a billing object. It is placed in a network element where call data are collected in a centralised manner for billing purposes, so a natural place for it is the billing centre, to which the mobile switching centres send their call data records. Installed in the mobile station, i.e. mobile telephone MS, is a locator object 21, whose function is to establish the location of the mobile station and to send the location data to the billing object 22.

The locator object receives the information required for the determination of location in two ways: either from the mobile telephone network PLMN or from an external system.

The first-mentioned method is based on the fact that the base stations in all known mobile telephone networks transmit information about themselves in a signal that, depending on the system, can be

called e.g. a beacon signal, a broadcast signal, a pilot signal, or using a corresponding designation. From this signal, the locator object can easily determine its location at least with an accuracy of one cell. In some countries, the regulations by authorities stipulate mobile station location determination with an accuracy beyond the level of the cell coverage area. To meet this requirement, several different methods have been proposed, such as methods based on a timing advance. In these, the network measures timing advance values between several base stations and the mobile station, and since the timing advance between the mobile station and each base station is directly proportional to the distance, three timing advance values will be sufficient to produce coordinates defining the location of the mobile station with a reasonable accuracy. If the PLMN network computes the location data, then these data are transmitted to the locator object.

The second method is based on the principle that the mobile station determines its location in a manner independent of the PLMN network by using some external system. Such a system could be e.g. the previously known GPS (Global Positioning System) satellite location system. In this case, the locator object would contain a GPS receiver.

In both methods, the location data is transmitted during or after the call to the billing object, which uses it as a basis for calculating the charge for the call.

Next, a description will be given of how the invention is applied in the previously known GSM system.

Fig. 3 presents the essential parts of the system, complemented with objects according to the invention. Many of the network elements have already been described in conjunction with Fig. 1. In the state-of-the-art system, when a mobile station MS ini-

tiates a call, the mobile switching centre MSC generates a call data record CDR, in which a desired amount of information relating to the call is stored. Usually this information comprises at least the call start time, termination time, calling and called numbers and a cell identifier Cell ID. The mobile switching centre MSC transmits a large number of CDR records at a time to the billing centre, where a billing program post-processes the call data records and generates the bills to be sent to the subscribers.

In the GSM system, as in other modern systems, the mobile station MS actually consists of two parts: mobile equipment ME and SIM card (Subscriber Identity Module), so a workable mobile station MS is only obtained by inserting a SIM card into the mobile equipment ME. The SIM card can be used as a storage medium for storing telephone numbers, but above all it is used for subscriber authentication. Identification based on the SIM card inserted by the user into the mobile station MS is designed to prevent illicit use of e.g. stolen equipment and to ensure that only subscribers who pay their bills can use the network. Stored on the card are a user identifier, i.e. PIN code (Personal Identity Number) as well as a subscriber identity code IMSI to be used in the network, the identification algorithm A3 to be used in the authentication and a subscriber-specific identification key K_i.

According to the invention, the mobile station MS is provided with a new function, which in this context is designated as locator object, Fig. 3. The function of the locator object is to establish whether the mobile station is in an area where the charging rate applied to calls originated from that area are different from the rate for calls made from other areas. Usually the rate is lower. For this purpose, the locator object needs to know the location of the mo-

bile station. In the determination of location, the broadcast information sent by the base transceiver stations is utilised. The base transceiver stations keep on sending information about themselves and their environment in their broadcast control channel. This information includes a cell identity code CI, information about adjacent cells and a location area identifier LAI. In its idle state, according to the specification, the mobile station performs frequency measurements on the BCCH (Broadcast Control Channel) channels. From a certain number of BCCH signals, e.g. six signals of highest strength, it decodes the BCCH data block, from which it obtains the BSIC data (Base Transceiver Station Colour Code). Each signal contains a cell identity code CI. The cell identity code and the carrier frequency form a pair that is individual to each base transceiver station. The one of the base transceiver stations that sends the BCCH frequency with the highest signal strength is regarded by the mobile station as its "own" base station. If the mobile station MS detects upon a change of base transceiver station BTS that the location area identifier LAI has changed, then it will send a location update request to the network.

Instead of the actual cell identity code CI, the location data used may consist of almost any unambiguous code obtained from the BSIC and updated at ½ second intervals that allows identification of the network cell or cell area. Such codes include the components of the world-wide CGI identifier (Cell Global Identification), which, according to the GSM recommendations, comprise a Mobile Country Code MCC, a Mobile Network Code MNC, a Location Area Identifier LAI and the above-mentioned Cell Identity code CI.

From the data listed above, a desired item can be selected to be used as the location data monitored by the locator object, so the area permitting

calls at a special charging rate can be defined as the entire network of the operator, as a location area or as a group of one or more cells.

The locator object picks the location data decoded by the mobile equipment and stores it in memory. The picking frequency may be the same as the frequency at which the identifiers are decoded, but since the mobile station cannot advance a long way in half a second, it is preferable to use a lower picking frequency. A suitable frequency is about once in a minute. This length of time is such that the mobile station may start a call setup process in one cell, whose base station identifier it has decoded, but the call setup process is terminated in another cell, whose base station identifier is decoded and placed in the call data record to be generated.

Stored in the memory of the locator object is a list of location data for cells permitting special call charging rates. The locator object compares the decoded location data it has picked with the stored data, and if the location data is found in the storage, then the object may give a command to display the data on the display of the equipment. It may display the cell identity code as it is or it may display e.g. a text saying "special cell" or the like to indicate to the user that calls in the current location area are cheaper. If the decoded location data cannot be found in the storage, this means that calls in the location area are charged for at normal rates, so there is no need to display any information. In this case, a list of special cells has been stored in the memory of the locator object and the locator object compares the located cell identity code with the identifiers in the list, and when this comparison indicates sameness, the above-mentioned texts are displayed.

When the locator object detects that the user is entering a telephone number and that the last loca-

tion check indicates that the mobile station is currently in an area where a special charging rate is applicable, it creates a record of the call data record type, which is designated here as compensation record. The compensation record contains the location data either as such or preferably as a suitable code. Moreover, it contains at least the calling and the called subscriber numbers.

The locator object transmits the compensation record in a special call data message to the billing object 22 in the network, Fig. 3. The billing object is located in the billing centre. The compensation record may be transmitted either during the call or after the call. The locator object may also collect compensation records for a longer time and send the collected compensation records periodically to the billing object. The billing object gathers the call data records sent by the mobile switching centre and the compensation records sent by the locator object and finds the ones of the call data records that are entitled to a different (lower) call charge even if the cell identity code in the call data record should indicate that the call is a normal rate call.

The locator object can be implemented as follows:

In the so-called Phase 2+ of the follow-up specification of the GSM system by ETSI (European Telecommunications Standards Institute), the functions of the SIM card have been considerably increased as compared with the original specifications. The new definitions are presented in detail in specification GSM 11.14 "Digital cellular communications system (Phase 2+): Specification of the SIM Application Toolkit for the Subscriber Identity Module-Mobile Equipment (SIM-ME) Interface. It defines mechanisms that allow applications on the SIM card to cooperate and work with any mobile equipment ME that supports

these functions. The features that can be utilised in the implementation of the invention include Proactive SIM, which provides mechanisms by means of which, upon initiative by the SIM card, the mobile equipment performs certain functions, such as sending a message of max. 160 characters from the SIM card and displaying it, sending an USSD string (Unstructured Supplementary Service Data) to the network. An important feature in respect of the invention is the Call Control by SIM function described in section 9 in the specification. When this function has been activated on the SIM card, the mobile equipment ME will perform the following functions:

- During each call attempt, the mobile equipment transfers the numbers dialled by the user as well as the associated parameters to the SIM card. The only exception is a redialled attempt, of which only certain details of call setup are transferred to the SIM card.

- The SIM gives a certain response to the mobile equipment, according to which the mobile equipment either starts call setup in accordance with the numbers dialled, does not start call setup at all or uses the data given by the SIM in the call setup procedure.

- If an extra service function is in use, the mobile equipment ME transfers a service control string to the SIM card before the service is implemented.

- The SIM gives the mobile equipment a response of the same type as in the case of dialled numbers, whereupon the mobile equipment either starts the service or does not start it or starts it in accordance with the instructions given by the SIM card.

Moreover, section 6.4.15 of Phase 2+ defines the command PROVIDE LOCAL INFORMATION, which the SIM can use to request the mobile equipment to send current location information. When the SIM issues this

command to the mobile equipment, the latter responds by giving a TERMINAL RESPONSE, which contains the Mobile Country Code MCC, Mobile Network Code MNC, Location Area Identifier LAI and the Cell Identity code CI.

In addition, Phase 2+ defines the command DISPLAY TEXT. By giving this command, the SIM can cause the mobile equipment to display a desired text on the display of the equipment.

These new features of the SIM-ME interface as defined in Phase 2+ are preferably utilised in the implementation of the invention. Referring to Fig. 4, the operation of the locator object will now be described by using the concepts mentioned above. The figure illustrates the functions of the locator object and the messages exchanged between the SIM card, the mobile equipment ME and the base transceiver station BTS.

The locator object, which is a suitable program, is implemented on the SIM card. At regular time intervals ΔT, the object sends a PROVIDE LOCAL INFORMATION message to the mobile equipment ME. In response to this message, the mobile equipment sends a TERMINAL RESPONSE message, which contains the mobile country code MCC, mobile network code MOBILE NETWORK CODE MNC, location area code LAC and the cell identity code CI (Cell Id). Let us suppose that the object uses the cell identity code CI as location data. Upon receiving the message, the locator object checks whether the cell identity code is included in the list stored on the SIM card. The list has been stored on the card beforehand by the network operator. If it is not found in the list, then the cell identity data last saved is reset and, after the set time interval ΔT, the locator object sends a new request for location data and again compares the cell identity code received with the

list. But if the cell identity code is found in the list, this means that the mobile equipment has received location data from the BCCH carrier while in a cell for which the operator has set a special charging rate for calls originated from that cell. In this case, the location data is stored in memory. Again, after an interval of ΔT, a request for location data is sent and the above-described procedure is repeated. If the cell identity code is not found in the list, then the previously stored cell identity code is reset.

When the location data has been stored, the locator object sends a DISPLAY TEXT message to the mobile equipment, which then displays the cell identity code comprised in the message either as it is or in plain-language form, e.g. "Reduced call charge" or the like.

When the user dials a telephone number to make a call, the mobile equipment transfers the called number dialled by the user in an ENVELOPE message to the SIM card. If the locator object accepts the number, it will send an ALLOWED acknowledgement message. After this, call setup proceeds in the normal manner and ends with a CONNECT message sent by the network, whereupon the speech path is connected. In response to the CONNECT message, the mobile equipment sends a TERMINAL RESPONSE message to the SIM card, letting the locator object know that the speech path has been connected.

The locator object now retrieves the location data from the storage. If it is not zero, which would mean "not a special rate cell", the locator object will start generating a compensation record by placing in the record the location data and call identification data specifying the call so that the billing object will be able to link the compensation record and the call data record generated by the mobile switching

centre together. The call identification data may include at least a running sequence number N, which is reset when it reaches a maximum value M. The sequence number thus changes as moduloM. Each successful call would thus be given a sequence number, but since a compensation record is not generated for every call, the locator object will receive compensation records with a sequence number N that does not grow regularly. For this reason, the mobile switching centre must be provided with a function that adds to the call data record a sequence number N increasing in the same way moduloM. Thus, the billing object will be able to link the compensation records with call data records having the same N value and charge the customer on the basis of the location data given in the compensation record. Of course it is also possible to include the calling and the called numbers in the compensation record.

During the call, the locator object transfers the compensation record to the mobile equipment, which sends it over the network to the billing object during the call. The transmission can also be effected in the form of a short message SMS (Short Message Service), in which case the locator object will give the mobile equipment a Send SMS command, or using the USSD (Unstructured Supplementary Service Data) consistent with the GSM standard, in which case it will give a Send USSD command.

In the foregoing description, the compensation record was sent during the call. As another alternative, the locator object may collect compensation records for some time and send them to the billing object in a larger batch. The limit for the batch size is set by the maximum length of the short message, which is 160 characters. The transmission of the batch can be done in the same way as the transmission of a compensation record during a call. However, if the compensation records are not sent during the call but

periodically in larger batches, there is a risk that the compensation records associated with the calls will be received after the actual billing period. This would be difficult because it would be necessary to send credit notes to the customers. Therefore, real-time transmission of compensation records is a preferable alternative.

In both alternatives, the billing object gathers the call data records sent by the mobile switching centre and the compensation records sent by the locator object together and finds those ones of the call data records which, according to the compensation record, are entitled to a different (lower) call charge, even if the cell identity code in the call data record should indicate that the call is a normal rate call. If the billing object cannot match a call data record produced by the mobile switching centre with a compensation record produced by the locator object, then it will assume that the call has been made in a normal rate area.

For the transmission of the compensation records to the billing object, a reliable data transmission link must be available between the objects. The SMS and USSD used in the GSM system are sufficiently reliable for this purpose.

The invention is not restricted to the example presented in the foregoing, but many different embodiments are possible within the scope of the definitions given in the claims. The locator object may also be implemented in the mobile equipment while only a list of special cells is stored on the SIM card by the operator.

Besides the cell identity code CI, the data used as location data may consist of the mobile country code MCC, the mobile network code MNC or the location area code LAC or a combination of these. In the CDMA system, the base station pilot signal data can be

used as location data because each base station keeps sending its own individual pilot signal. If the mobile communication system comprises, e.g. because required by the authorities, a feature for calculating the location of the mobile station using timing advance values or some other method, then this information is transmitted e.g. in the form of coordinates to the locator object. In this case, the locator object can be provided with tables of special location areas, whose boundaries need not coincide with cell area boundaries. The tables contain e.g. coordinate values and the locator object compares the current location data with the table to establish whether the location is within a special area. It is also possible to provide the mobile station with a location system such as a GPS receiver. The locator object compares the coordinate values obtained from the system with the table values and proceeds as above.

CLAIMS

1. Procedure for forming the principle of calculation of call charge in a cellular mobile telephone network, which comprises

a mobile switching centre, which produces a call data record for each call,

and a plurality of base transceiver stations, each of which transmits the calls of the mobile stations located in the area served by the respective base transceiver station,

and in which at least one special area has been formed and a special charging rate has been set for calls originated from such an area, and in which the mobile station determines its location at time intervals of a predetermined length,

c h a r a c t e r i s e d in that

a list of the location identifiers of the special areas is stored in the mobile station in advance,

and that in the mobile station;

a check is carried out to establish whether the location data of the mobile station is comprised in the special areas on the list,

the location data is stored in memory for said time interval of predetermined length if it is comprised in the list,

a compensation record associated with a call initiated from the mobile station is generated during the call if the location data has been stored in memory, the information placed in said compensation record comprising at least the location data and data identifying the call,

the compensation record is transmitted to the mobile telephone network,

and that in the mobile telephone network;

to determine the charge for the call, the data in the compensation record and the data in the call data record are combined.

2. Procedure as defined in claim 1, characterised in that the determination of location is effected by utilising identifier data sent by the mobile telephone network.

3. Procedure as defined in claim 1, characterised in that the determination of location is effected by utilising data sent by an external system.

4. Procedure as defined in claim 3, characterised in that the external system used is a satellite positioning system.

5. Procedure as defined in claim 1, characterised in that the data identifying the call is a parameter placed in both the compensation record and the call data record, being the same in both records.

6. Procedure for improving the principles of calculation of call charge in a cellular mobile telephone network, in which

the mobile stations order the broadcast channels received from different base transceiver stations according to signal strength and decode at least from the strongest broadcast channel the various identifier data sent by the base transceiver station,

at least one special area has been formed and a special charging rate has been set for calls started from such an area, and

the mobile station determines its location at time intervals of a predetermined length,

characterised in that

a list of special areas is stored in the mobile station,

and that in the mobile station;

a check is carried out to establish whether the mobile station is located in a special area,

the location data is stored in memory for said time interval of predetermined length if the mobile station is in a special area,

a compensation record associated with a call started from the mobile station is generated during the call if the location data has been stored in memory, the information placed in said compensation record comprising at least the location data and data identifying the call,

the compensation record is transmitted to the mobile telephone network.

7. Procedure as defined in claim 6, characterised in that, when the identifier data is stored in memory, information indicating that the mobile station is in a special area is shown on the display of the mobile station.

8. Procedure as defined in claim 6, characterised in that the length of the predetermined time interval is substantially longer than the interval at which the mobile station decodes the signal of the strongest broadcast channel.

9. Procedure as defined in claim 6, characterised in that the special area comprises at least one cell and the list of special areas contains the identifiers of the cells in the special areas.

10. Procedure as defined in claim 6, characterised in that the compensation record is sent during the call.

11. Procedure as defined in claim 6, characterised in that a plurality of compensation records are collected into a batch and the batch is sent to the mobile telephone network.

12. Procedure as defined in claim 6, characterised in that the call data records generated by the mobile switching centre are compared

with the compensation records sent by the mobile station and when, based on the data identifying the call, records corresponding to each other are found, the price of the call is calculated on the basis of the rate set for the special area specified by the background record.

13. Procedure as defined in claim 6, characterised in that the list of special areas is stored in the Subscriber Identity Module.

14. Cellular mobile telephone system, which comprises

a mobile switching centre,

a plurality of base transceiver stations, each of which keeps sending its own identifier data in its broadcast channel,

mobile stations which consist of a mobile equipment (ME) and a subscriber identity module mounted in it and which order the broadcast channels received from different base transceiver stations according to signal strength and decode at least from the strongest broadcast channel the identifier data sent by the base transceiver station,

and in which system at least one special area has been formed and a special charging rate has been set for calls made from such an area, and

characterised in that the mobile station contains a list containing data regarding the special areas, and a locator object which

determines the location of the mobile station at time intervals of predetermined length and compares the resulting location data with the list,

stores the location data in memory for said time interval of predetermined length if it is comprised in the list,

during a call started from a mobile telephone, generates a compensation record associated with the call if the location data is currently stored in

memory and places in the compensation record at least the location data and data identifying the call and sends the compensation record to the mobile telephone network,

and that the system contains a billing object, which compares the compensation records with the call data records generated by the mobile switching centre and, when the call identifying data in said records correspond to each other, generates a call charge using the rate set for the special area indicated in the compensation record.

15. System as defined in claim 14, characterised in that the locator object is located in the subscriber identity module (SIM) and the billing object is located in conjunction with a billing centre.

16. System as defined in claim 14, characterised in that the interface between the mobile equipment and the subscriber identity module is consistent with GSM system specification 11.14.

17. System as defined in claim 16, characterised in that the locator object sends to the mobile equipment a Provide Local Information message at time intervals of predetermined length, and in response to a Terminal Response return message the locator object checks whether the decoded identifier data is included in the list.

18. System as defined in claim 17, characterised in that, when the identifier data is included in the list, the locator object sends to the mobile equipment a Display Text message, in response to which the mobile equipment displays the identifier data on its display screen.

19. System as defined in claim 14, characterised in that, in response to a message sent to the subscriber identity module (SIM) indicating es-

tablishment of a speech connection, the locator object generates a compensation record.

20. System as defined in claim 14, characterised in that the locator object sends to the mobile equipment a Send Short Message message, in response to which the mobile equipment sends the compensation record to the billing object.

21. System as defined in claim 14, characterised in that the locator object sends to the mobile equipment a Send USSD message, in response to which the mobile equipment sends the compensation record to the billing object.

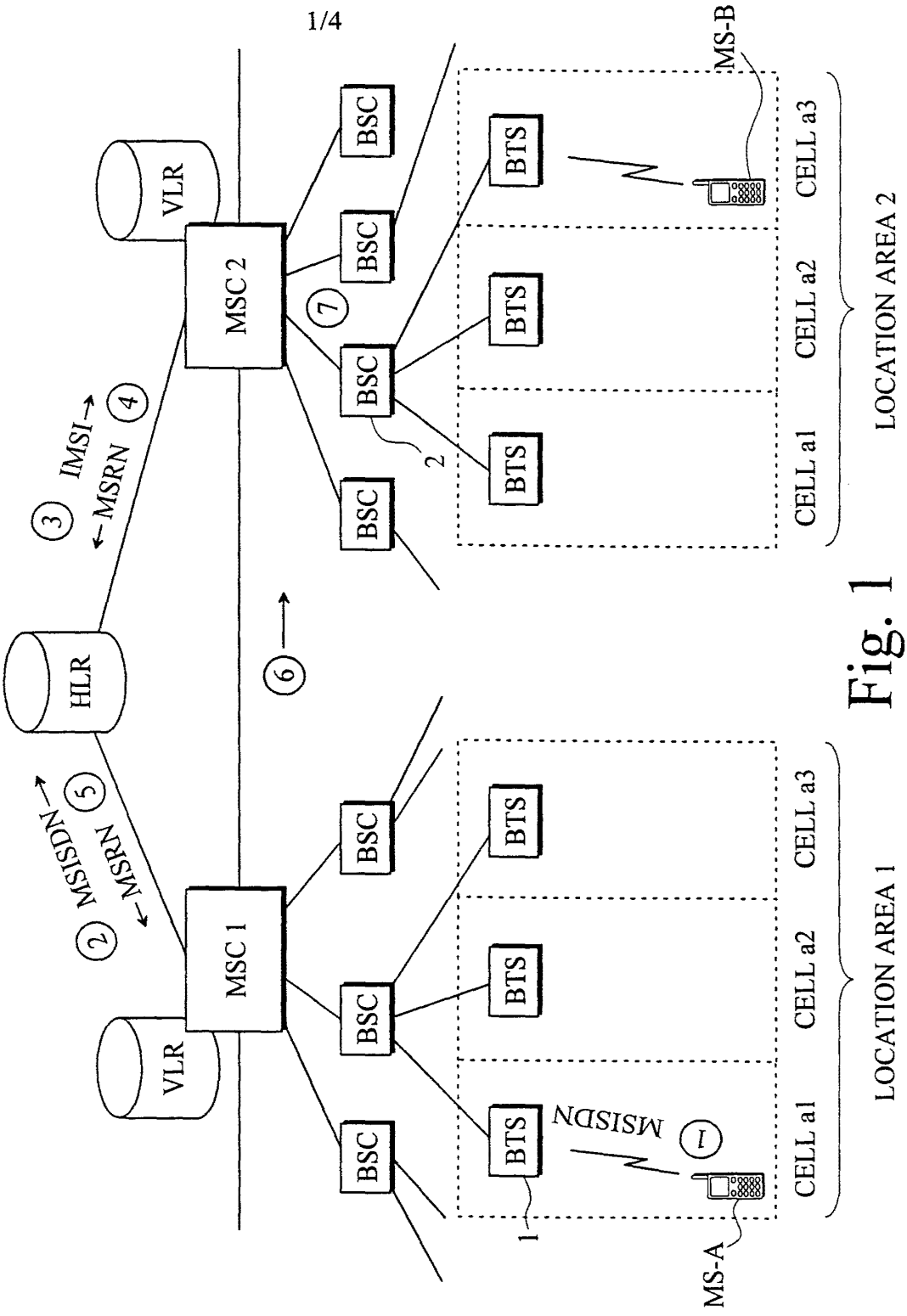

MS-B
CELL a3
CELL a2
CELL a1
LOCATION AREA 2
BTS
BSC
VLR
MSC 2
HLR
MSC 1
IMSI
MSRN
MSISDN
MS-A
LOCATION AREA 1
1
2
3
4
5
6
7

Fig. 1

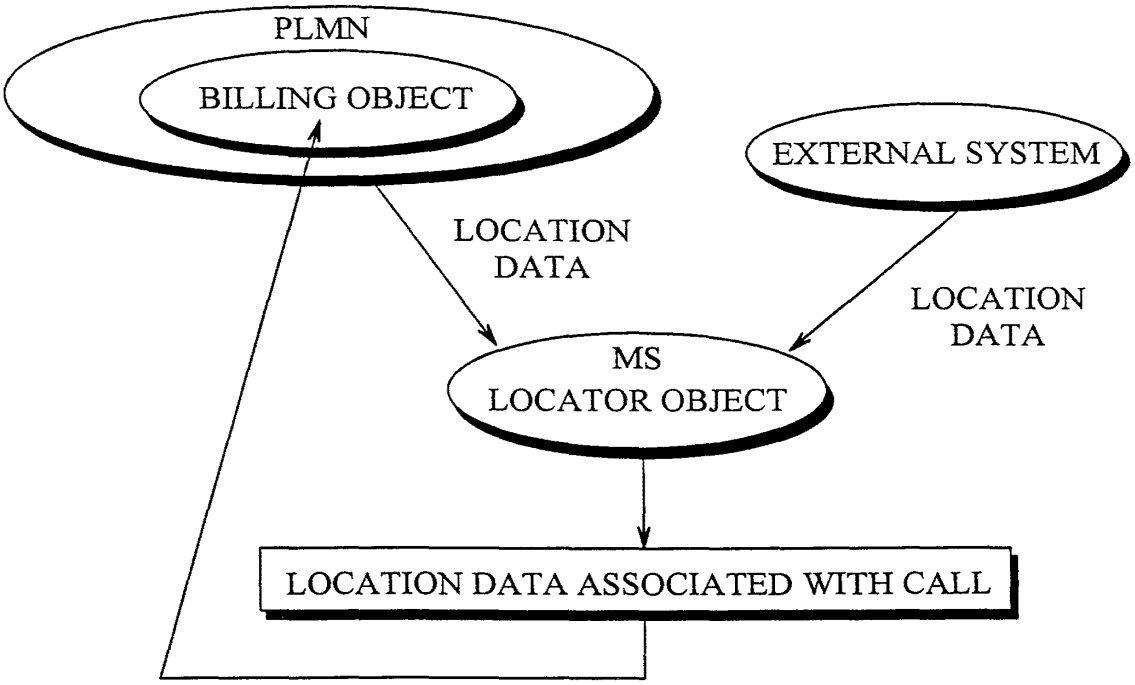

PLMN
BILLING OBJECT
EXTERNAL SYSTEM
LOCATION DATA
LOCATION DATA
MS LOCATOR OBJECT
LOCATION DATA ASSOCIATED WITH CALL

Fig. 2

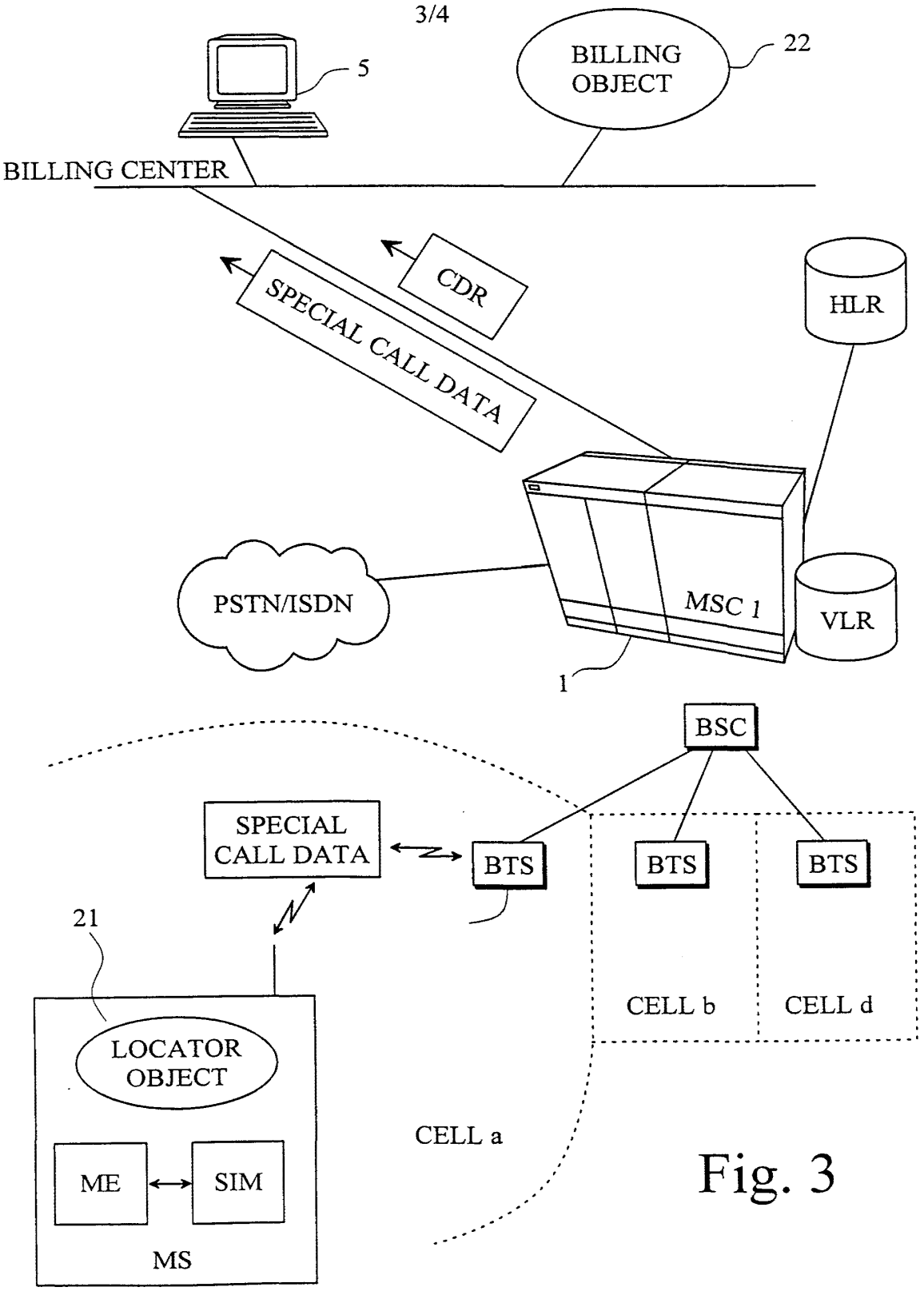

5
BILLING OBJECT
22
BILLING CENTER
CDR
SPECIAL CALL DATA
HLR
PSTN/ISDN
MSC 1
VLR
1
BSC
SPECIAL CALL DATA
BTS
BTS
BTS
21
CELL b
CELL d
LOCATOR OBJECT
CELL a
ME
SIM
MS

Fig. 3

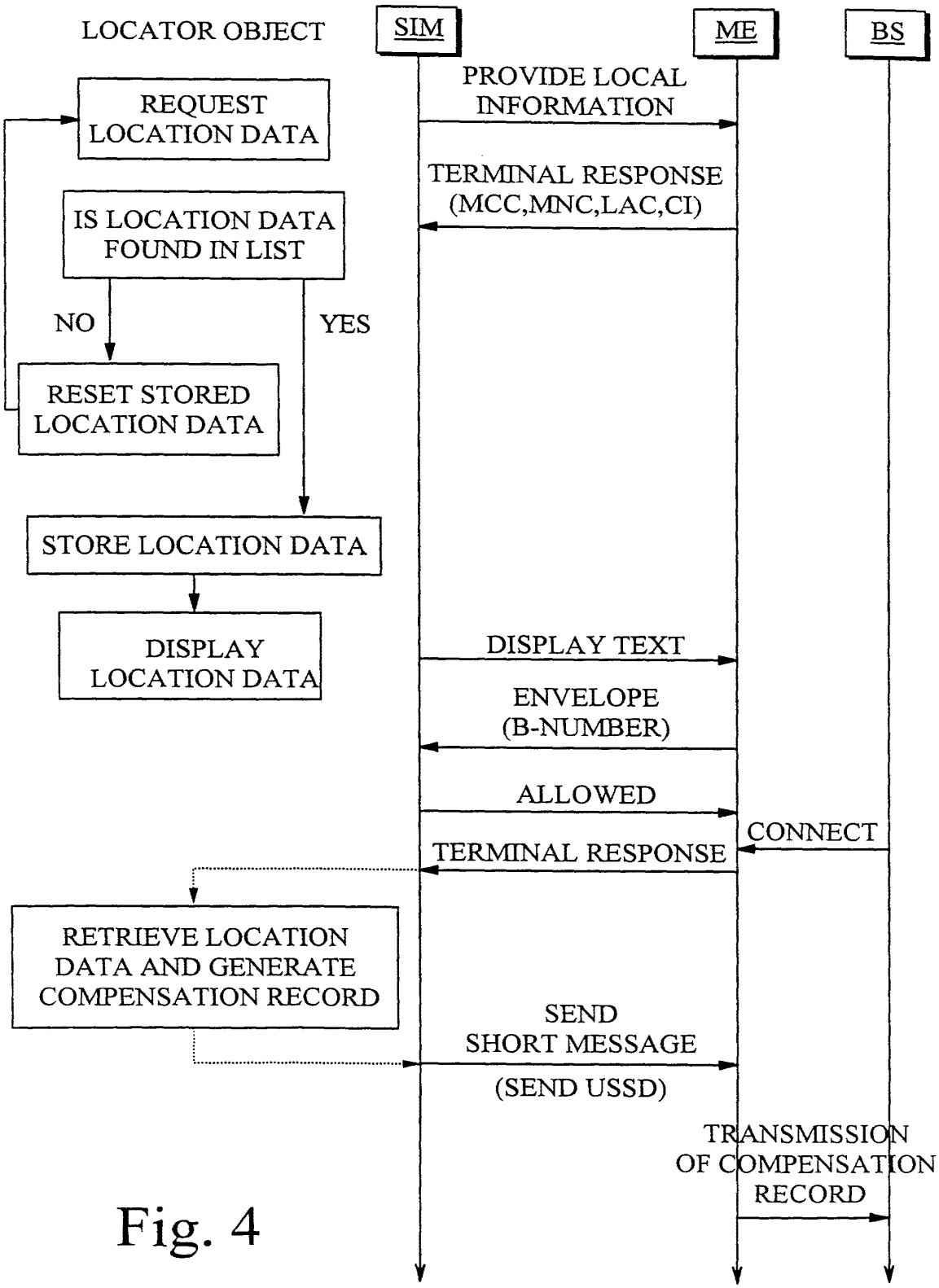

LOCATOR OBJECT
SIM
ME
BS
REQUEST LOCATION DATA
PROVIDE LOCAL INFORMATION
TERMINAL RESPONSE (MCC,MNC,LAC,CI)
IS LOCATION DATA FOUND IN LIST
NO
YES
RESET STORED LOCATION DATA
STORE LOCATION DATA
DISPLAY LOCATION DATA
DISPLAY TEXT
ENVELOPE (B-NUMBER)
ALLOWED
CONNECT
TERMINAL RESPONSE
RETRIEVE LOCATION DATA AND GENERATE COMPENSATION RECORD
SEND SHORT MESSAGE
(SEND USSD)
TRANSMISSION OF COMPENSATION RECORD

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00515

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/22, H04M 15/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q, H04M, G01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EDOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0568824 A2 (US WEST, INC.), 10 November 1993 (10.11.93), column 3, line 11 - column 4, line 2; column 4, line 55 - column 6, line 6; column 15, line 10 - line 39, figures 2,10, abstract --	1-21
Y	EP 0734144 A2 (SIEMENS AKTIENGESELLSCHAFT), 25 Sept 1996 (25.09.96), column 3, line 5 - column 5, line 9, figure 3, abstract --	1-21
A	WO 9620570 A1 (NOKIA TELECOMMUNICATIONS OY), 4 July 1996 (04.07.96), cited in the application --	1-21

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Patrik Rydman Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00515

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

05/10/98

International application No.
PCT/FI 98/00515

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		WO 9313618 A	08/07/93

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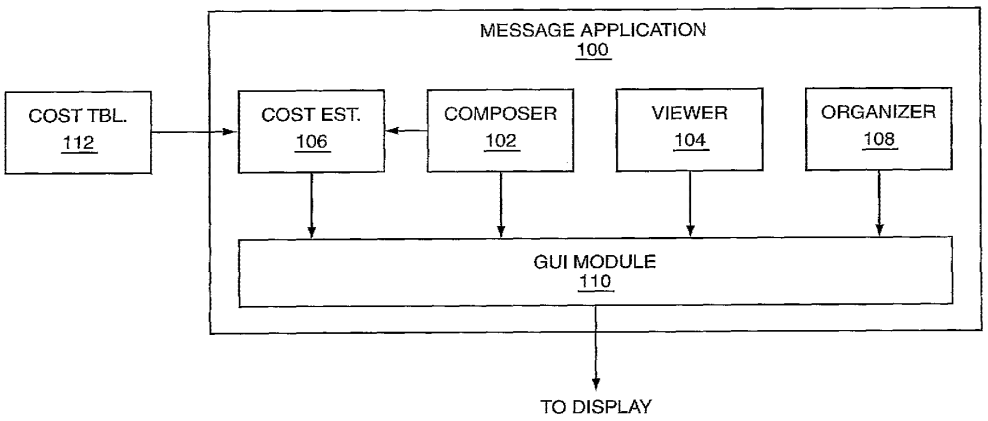
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Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: COST ESTIMATION IN MESSAGING APPLICATION FOR A MOBILE COMMUNICATION DEVICE



(57) Abstract: A messaging application (100) for a mobile communication device (10) comprises an integrated message composer (102) for creating messages of two or more different types, and a cost estimation function (106) for estimating the cost of messages based on the message type and cost data stored in memory (14) and for providing the estimated cost of the message to the user before the message is sent. Providing the user with information about the cost of the message gives the user confidence that messages will not be undesirably expensive and the increased confidence in the cost of messages will encourage use of messaging services.

WO 2007/097786 A1

COST ESTIMATION IN MESSAGING APPLICATION FOR A MOBILE COMMUNICATION DEVICE

BACKGROUND

The present invention relates generally to messaging applications for mobile communication devices, and more particularly, to an integrated messaging application capable of sending text messages, multimedia messages, email messages and instant messages.

Mobile communication devices, such as cellular telephones, offer customers a wide variety of messaging services, enabling customers to send and receive text messages, multimedia messages, email messages and instant messages. To facilitate ease of use, the current trend is to integrate some or all of the available messaging applications into a single integrated application with a common composer for creating messages. The common composer typically includes a set of editing tools for creating and sending messages. The user can thus use the same interface and a consolidated set of editing tools to create different types of messages.

Cellular operators and service providers often have different charging schemes for different types of messages. For example, a service provider may charge on a per message basis for SMS text messages, a flat monthly fee for email, and a cost per bit for multimedia messages. When using an integrated message composer, the user may not realize what type of message the user is creating. Since there may be a substantial cost difference between different types of messages, the user may unknowingly incur undesired expenses to send a message that would have been substantially cheaper using a different service. For example, a simple SMS text message intended for a relatively inexpensive transport may unwittingly become a more expensive multimedia message when the user attaches a sound file or image. Thus, while the integrated message composer is intended as a convenience for the user, it may cause confusion and worry about the cost of messages being sent.

SUMMARY

The present invention relates to a messaging application that provides the user with information about the type and cost of messages to be sent. In one exemplary embodiment, the messaging application includes a common composer for creating messages of two or more different types. For example, the common composer application may be used to create simple text messages, email messages, instant messages, and multimedia messages. The messaging application includes a cost estimation function for estimating the cost of a message and indicating the estimated costs of the message to the user before it is sent. The estimated cost may be displayed to the user in a portion of an application window for the message composer. For example, the type and cost of the message can be displayed to the user in a title bar, menu bar, or

status bar of an application window. The estimated cost of the message could also be presented to the user in a pop-up window, such as a message box or dialog box. The pop-up window may prompt the user to confirm a previous command to send a message so that the user does not inadvertently send an undesirably expensive message. The user is thus given an opportunity to edit the content of the message before it is sent such that a cheaper transport can be used to send the message if desired. By giving users confidence in the cost of messages being sent, the present invention may encourage otherwise hesitant users to send messages without fear that the messages will incur undesired expenses.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a functional block diagram of a messaging application for a mobile communication device according to one exemplary embodiment.

Fig. 2 illustrates an exemplary GUI for a message composer displayed on a mobile communication device.

Fig. 3A illustrates an exemplary GUI for a message composer displayed on a mobile communication device.

Fig. 3B illustrates an exemplary GUI for a message composer displayed on a mobile communication device.

Fig. 4 illustrates an exemplary GUI for a message composer displayed on a mobile communication device.

Fig. 5 illustrates an exemplary GUI for a message composer displayed on a mobile communication device.

Fig. 6 is a block diagram of an exemplary mobile communication device.

Fig. 7 illustrates an exemplary cost table embodied in XML code.

DETAILED DESCRIPTION

Figure 1 illustrates the main components of a messaging application 100 for a mobile communication device 10. The messaging application 100 includes a message composer 102, a message viewer 104, a cost estimation function 106, an organizer 108, and a graphical user interface (GUI) module 110. The message composer 102 is used to create messages to be sent. The message composer 102 provides a common interface and a common set of editing tools for creating messages of two or more different types. In one exemplary embodiment, the message composer 102 is capable of creating simple text messages, multimedia messages, instant messages and email messages. The message viewer 104 provides tools for viewing messages received by the mobile communication device 10. The cost estimation function 106 estimates the cost of messages to be sent. The cost estimation function 106 receives information from the

message composer 102 about the type, size and content of messages. The cost estimation function 108 also has access to cost information stored in a cost table 112 in the memory of the mobile communication device 10. The organizer 108 provides a set of management tools to manage messages sent and received. The GUI module 110 creates a GUI for the components of the messaging application 100 that is presented to the user on a display 40 of the mobile communication device 10. In the exemplary embodiment, the GUI is a conventional windowing interface. Those skilled in the art will appreciate, however, that the nature of the software interface is not a material part of the invention and that other types of interfaces may be used with the present invention, including command line interfaces and other types of GUI interfaces.

Figs. 2 – 5 illustrate a GUI for the message composer 102 as it appears on the display 40 of the mobile communication device 10. The GUI for the message composer 102 comprises an application window 150 having a title bar 152 at the top of the window 150, a menu bar 154 at the bottom of the window, and a message field 156 where the message being composed is displayed. In this example, the message field 156 displays a simple text message which the user is composing. The title bar 152 includes information identifying the type and estimated cost of the message. In this example, the information contained in the title bar 152 indicates that the message is a text message using the Short Message Service (SMS) for transport, and that the estimated cost of the message is 10 cents. The menu bar 154 at the bottom of the application window 150 includes one or more menu items 158 that can be selected by pressing the selection keys 32 adjacent to the display. A navigation control 34 is also provided to enable the user to navigate through menus and make selections.

The menu bar 154 in the exemplary embodiment displays two menu items 158 that are used to access pop-up menus as shown in Figs. 3A and 3B. The CONTINUE menu, shown in Fig. 3A, provides a list of options for handling messages, such as SAVE, SEND, and DELETE. The MORE menu, shown in Fig. 3B, provides a set of editing tools for editing messages. In this example, the editing tools allow the user to add or attach images, audio, and video to the message.

As additional content is added to the message, the type and/or cost of the message may change. Referring to Figure 4, the user has added an image of a clock to the original text message. The information contained in the title bar 152 changes to reflect that the message type has changed. The estimated cost has also been updated. Following the addition of the image, the message has become a multimedia message using the Multimedia Messaging Service (MMS) for transport. The estimated cost of the message is 49 cents.

Providing information to the user about the type and cost of the message before it is sent provides more certainty about the cost of messages being sent. Some users that are hesitant to use messaging services because of worries about the cost of such services will be encouraged to

make more use of messaging services. If a message is considered too costly, the user also has an opportunity to change the content of the message to reduce the cost before the message is sent.

In the exemplary embodiment described above, cost information is provided for individual messages and is not stored. That is, the cost information is discarded after the message is sent. In some embodiments, the messaging application 100 can store historical cost information about the cost of each message sent. Also, some embodiments may track the cumulative cost of all messages sent over a defined period of time. The cumulative cost of all messages sent over a defined period may also be displayed to the user.

In some embodiments of the invention, the messaging application 100 may generate a pop-up window 160 before the message is sent to inform the user of the cost of the message as shown in Fig. 5. The pop-up window 160 may be displayed responsive to a request or command to send the message. The pop-up window 160 may further include a prompt requesting the user to confirm the send command. In Fig. 5, the pop-up window 160 displays information indicating the cost of the message being sent and prompts the user to confirm the send command. In this example, the pop-up window 160 includes two buttons 162, 164. Button 162 is used to confirm the send command. Button 164 is used to cancel the send command. When the send command is canceled, the message may be displayed to the user in the message composer window for editing.

The user may consider the display of the pop-up window 160 with every message to be annoying. Therefore, the messaging application 100 may allow the user to set preferences to control when the pop-up window 160 is displayed. The user preferences may permit the user to suppress the pop-up window 160 for all messages, or for some messages based on a predefined criterion. The pop-up window 160 may be suppressed depending on the type or cost of the message, the time of day, the cumulative cost of messages sent over a defined period, or other criteria. For example, the user may chose to suppress the pop-up window 160 for text messages and to enable the pop-up window 160 for all other messages. In another example, the user may select to suppress the pop-up window 160 where the cost of the individual message is less than a specified amount, e.g. 10 cents, or where the cumulative cost of all messages sent over a defined period is less than a specified amount. In other embodiments, the user may enable the pop-up window for specified times of the day when costs are high and suppress the pop-up window 160 for times of day when the rates are lower.

Fig. 6 is a block diagram illustrating a mobile communication device 10 in which the present invention may be implemented. The mobile terminal 10 may, for example, comprise a cellular telephone for use in a mobile communication network, a personal digital assistant (PDA), a laptop computer, or a hand-held computer. The mobile terminal 10 includes a system controller 12 to control overall operation of the mobile terminal 10 and a memory 14 to store program instructions and data needed for operation. The system controller 12 may comprise one or more processors,

microcontrollers, hardware, firmware, or a combination thereof. Memory 14 may comprise one or more memory devices, including removable memory devices such as SIM cards and smart cards.

A transceiver 16 coupled to an antenna 18 and under the control of the system controller 12 enables communication with remote devices. The transceiver 16 may, for example, comprise a fully functional cellular transceiver operating according to any known standard. A user interface 20 enables the user to interact with the mobile terminal 10. The user interface 20 includes a microphone 22 for converting audible signals into electrical audio signals, a speaker 24 for converting electrical audio signals into audible sounds, one or more input controls indicated generally by the numeral 30 for receiving user input, and a display 40 to display information for viewing by the user. Any known type of input controls 30 for receiving user input may be used including hard and soft keys, programmable keys, keypads, dials, joysticks, buttons, thumbwheels, touch pads, etc. The selection keys 32 and navigation keys 34 shown in Figs. 2 – 5 are exemplary input controls 30. Display 40 may comprise a color display, such as a liquid crystal display (LCD) or a touchscreen display that can also be used for user input.

The messaging application 100 is stored in memory 14 and executed by the system processor 12. Memory 14 further stores cost information, which may be in the form of a cost table 112, that is accessed by the cost estimation function 106 to estimate the cost of messages. In one exemplary embodiment, the cost table 112 is stored in a SIM card or other removable memory device. The cost table 112 is downloaded into memory 14 during device provisioning, which may occur over-the-air. The service provider can update the cost table 112 whenever the pricing for messaging services changes or when the user changes service plans. The cost table 112 contains cost information for all messaging services, and may include information on roaming costs and time-of-day pricing.

Fig. 7 illustrates an exemplary cost table 112 implemented as an XML script. The cost table 112 in Fig. 7 represents a hypothetical pricing structure for SMS, MMS and IMS services. Between 6:00 am and 9:00 pm, SMS messages cost 10 cents per message, with a 25 cent roaming surcharge for roaming. From 9:00 pm to 6:00 am, SMS messages are free, but the roaming surcharge still applies. IMS is charged at a fixed rate of $6.00 per month. MMS is charged at a fixed rate of $6.00 per month, plus an additional 2 cents per kilobyte. Thus, it can be seen that the present invention accommodates any arbitrarily complex pricing structure.

While the implementation of the cost table as an XML document provides a convenient method for updating the cost table, those skilled in the art will appreciate that the cost table could be implemented in other ways. For example, the cost table could be implemented as a database table, associative hash table, or other data structure.

The present invention may, of course, be carried out in other ways than those specifically set forth herein without departing from essential characteristics of the invention. The present

embodiments are to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

CLAIMS

What is claimed is:

1. A mobile communication device (10), comprising:
   a processor (12);
   a memory (14);
   a messaging application (100) stored in said memory (14) and executed by said processor (12) for sending and receiving messages, said messaging application (100) including a message composer (102) for creating messages to be sent;
   a cost estimation function (106) integrated with said message composer (102) for estimating the cost of said messages and for indicating the cost of said messages to a user.

2. The mobile communication device of claim 1 wherein the mobile communication device (10) further comprises a display (40) and wherein the messaging application (100) includes a graphical user interface that is displayed to the user on said display (40).

3. The mobile communication device of claim 2 wherein the graphical user interface displays the estimated cost of a message to be sent.

4. The mobile communication device of claim 3 wherein the graphical user interface comprises an application window (150) and wherein the estimated cost of the message is displayed in a portion of the application window (150).

5. The mobile communication device of claim 4 wherein the estimated cost is displayed in one of a title bar (152), menu bar (154), or status bar of the application window (150).

6. The mobile communication device of claim 3 wherein the estimated cost is displayed to the user in a pop-up window (160).

7. The mobile communication device of claim 3 wherein the messaging application (100) prompts the user to send the message after displaying the estimated cost.

8. The mobile communication device of claim 7 wherein the estimated cost and prompt are displayed together in a pop-up window (160).

9. The mobile communication device of claim 8 wherein the messaging application (100) is configured to selectively suppress the pop-up window (160) based on a predefined criterion.

10. The mobile communication device of claim 9 wherein the messaging application (100) suppresses the pop-window (160) when the cost of a message is less than a predetermined amount.

11. The mobile communication device of claim 9 wherein the messaging application (100) suppresses the pop-window (160) based on a type of the message.

12. The mobile communication device of claim 9 wherein the messaging application (100) suppresses the pop-window (160) based on time of day.

13. The mobile communication device of claim 1 further comprising a cost table stored in memory (14) and containing cost information for estimating the cost of message to be sent.

14. The mobile communication device of claim 13 wherein the cost table is stored in a removable memory device.

15. A method of providing information to a user of a mobile communication device (10) about the cost of messages being sent, said method comprising:

storing cost information in a memory (14) in the mobile communication device (10);

estimating the cost of a message to be sent based on said cost information stored in memory (14); and

displaying the estimated cost of the message to the user before the message is sent.

16. The method of claim 15 wherein displaying the estimated cost of the message comprises displaying the estimated cost on a display (40).

17. The method of claim 16 wherein the estimated cost is displayed in a graphical user interface.

18. The method of claim 17 wherein the estimated cost is displayed in a portion of an application window (150) of a graphical user interface.

19. The method of claim 18 wherein the estimated cost is displayed in one of a title bar (152), menu bar (154), or status bar of the application window (150).

20. The method of claim 17 wherein the estimated cost is displayed to the user in a pop-up window (160).

21. The method of claim 20 further comprising prompting the user to send the message after displaying the estimated cost.

22. The method of claim 21 wherein the cost is displayed together with a user prompt in the pop-up window (160).

23. The method of claim 20 further comprising selectively suppressing the pop-up window (160) based on a predefined criterion.

24. The method of claim 23 wherein the pop-window (160) is suppressed when the cost of a message is less than a predetermined amount.

25. The method of claim 23 wherein the pop-window (160) is suppressed based on a type of the message.

26. The method of claim 23 wherein the pop-window (160) is suppressed based on time of day.

27. The method of claim 15 wherein the cost information is stored in a table.

28. The method of claim 27 wherein the cost table is stored in a removable memory device.

29. A messaging application (100) for a mobile communication device (10) comprising:
a message composer (102) for creating messages of two or more different types;
a cost estimation function (106) for estimating the cost of messages and for indicating the estimated cost to the user.

30. The messaging application of claim 29 wherein the mobile communication device (10) further comprises a display (40) and wherein the messaging application (100) includes a graphical user interface that is displayed to the user on said display (40).

31. The messaging application of claim 30 wherein the graphical user interface comprises an application window (150) and wherein the estimated cost of the message is displayed in a portion of the application window (150).

32. The messaging application of claim 31 configured to display the estimated cost in one of a title bar (152), menu bar (154), or status bar of the application window (150).

33. The messaging application of claim of 32 configured to display the estimated cost in a pop-up window (160).

34. The messaging application of claim 33 configured to prompt the user to send the message after displaying the estimated cost.

35. The messaging application of claim 34 configured to display the estimated cost and prompt together in the pop-up window (160).

36. The messaging application of claim 33 configured to selectively suppress the pop-up window (160) based on a predefined criterion.

37. The messaging application of claim 36 configured to suppress the pop-window (160) when the cost of a message is less than a predetermined amount.

38. The messaging application of claim 36 configured to suppress the pop-window (160) based on a type of the message.

39 The messaging application of claim 36 configured to suppress the pop-window (160) based on time of day.

40. The messaging application of claim 29 including a cost table stored in memory (14) containing cost information for estimating the cost of message to be sent.

41. The messaging application of claim 40 wherein the cost table is stored in a removable memory device.

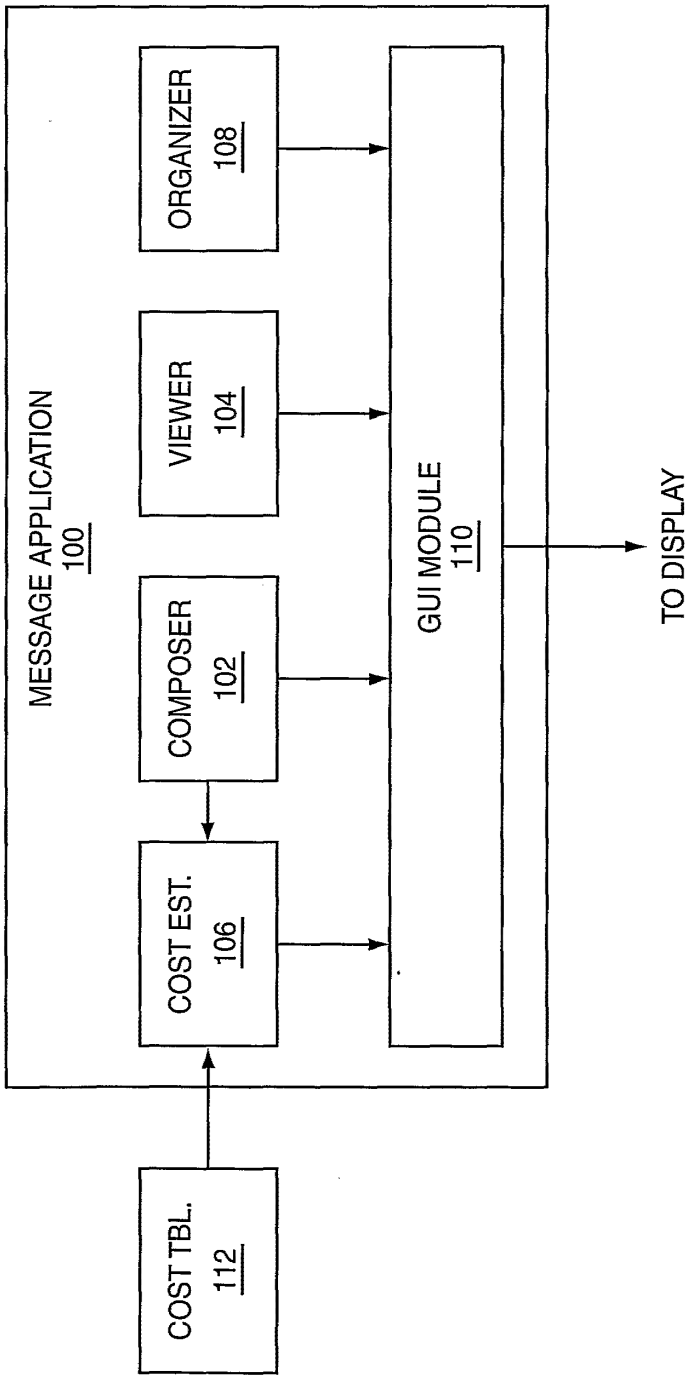

MESSAGE APPLICATION
100
ORGANIZER
108
VIEWER
104
COMPOSER
102
COST EST.
106
GUI MODULE
110
TO DISPLAY
COST TBL.
112

FIG. 1

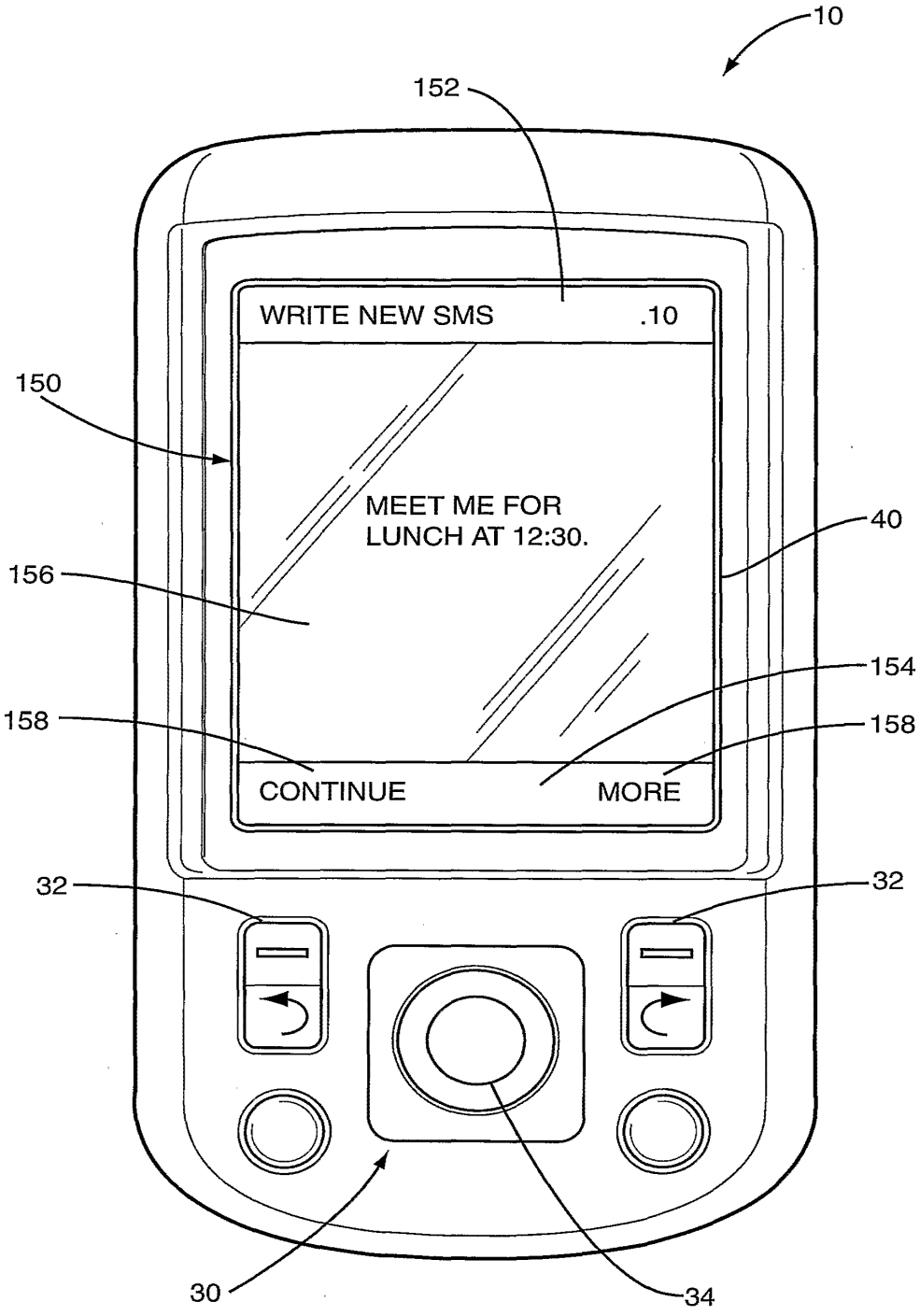

10
152
WRITE NEW SMS .10
150
MEET ME FOR
LUNCH AT 12:30.
40
156
154
158
158
CONTINUE
MORE
32
32
30
34

FIG. 2

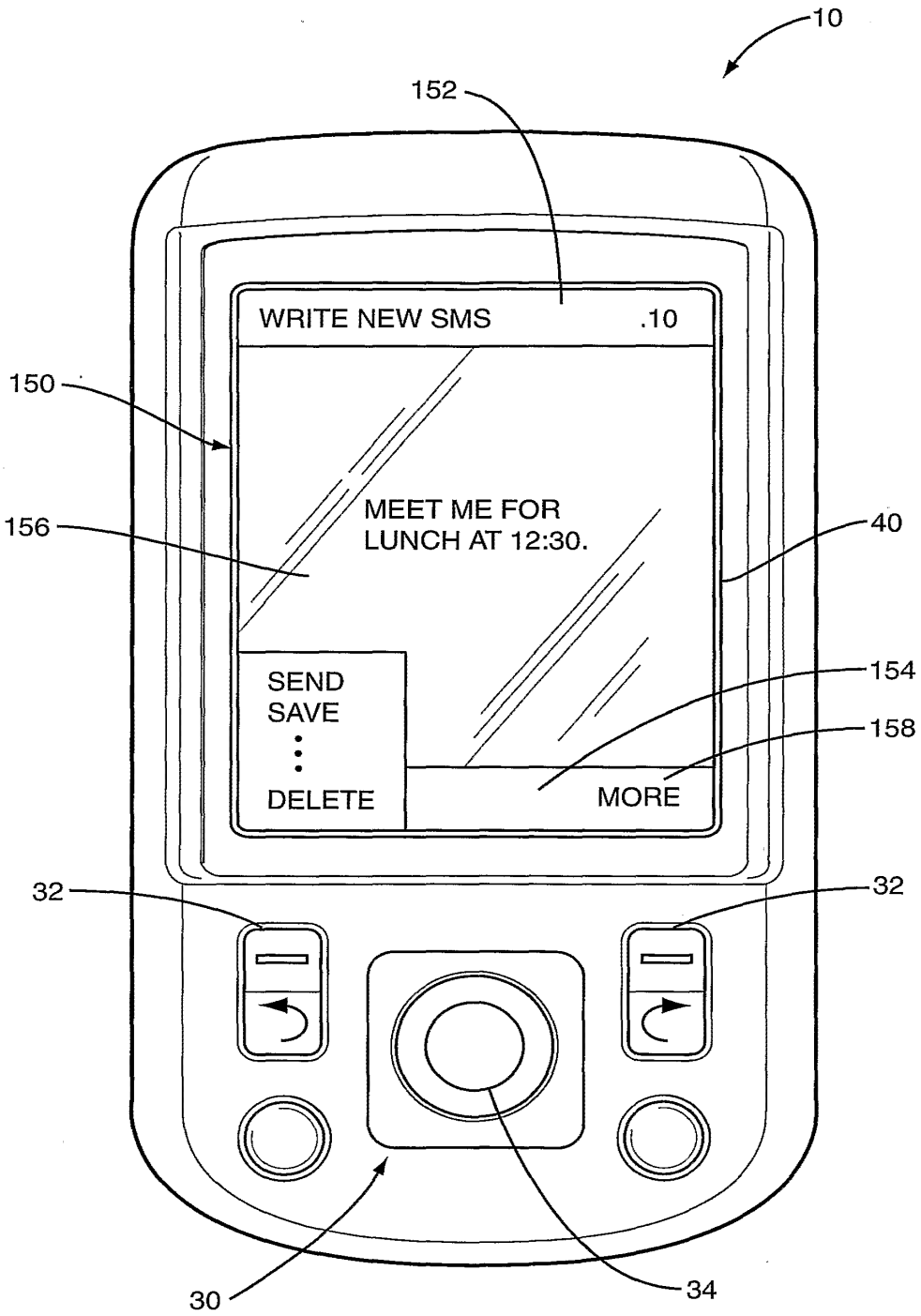

10
152
WRITE NEW SMS .10
150
MEET ME FOR
LUNCH AT 12:30.
156
40
SEND
SAVE
DELETE
154
158
MORE
32
32
30
34

FIG. 3A

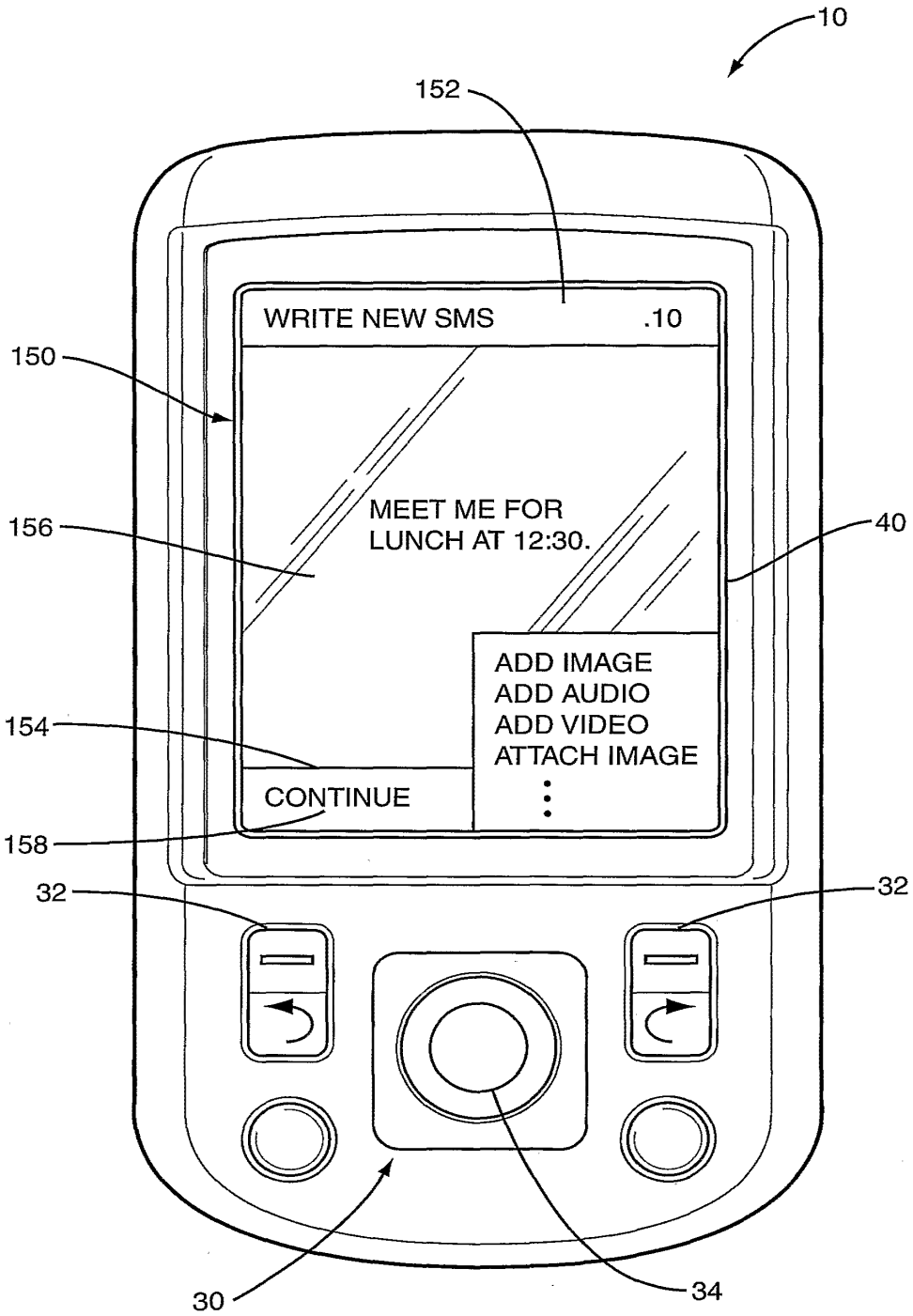

10
152
WRITE NEW SMS .10
150
MEET ME FOR
LUNCH AT 12:30.
156
40
ADD IMAGE
ADD AUDIO
ADD VIDEO
ATTACH IMAGE
154
CONTINUE
158
32
32
30
34

FIG. 3B

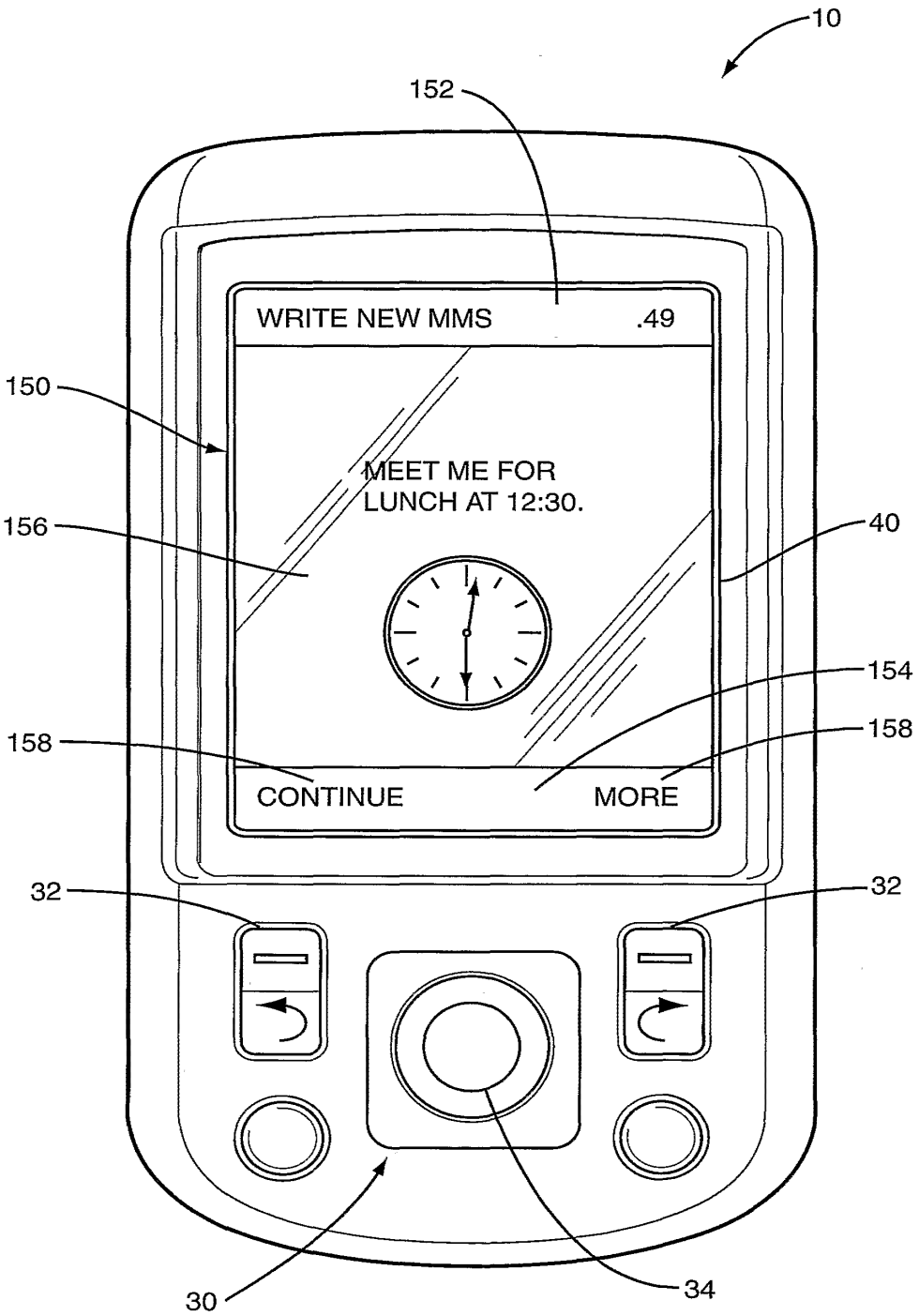

10
152
WRITE NEW MMS .49
150
MEET ME FOR
LUNCH AT 12:30.
156
40
154
158
158
CONTINUE
MORE
32
32
30
34

FIG. 4

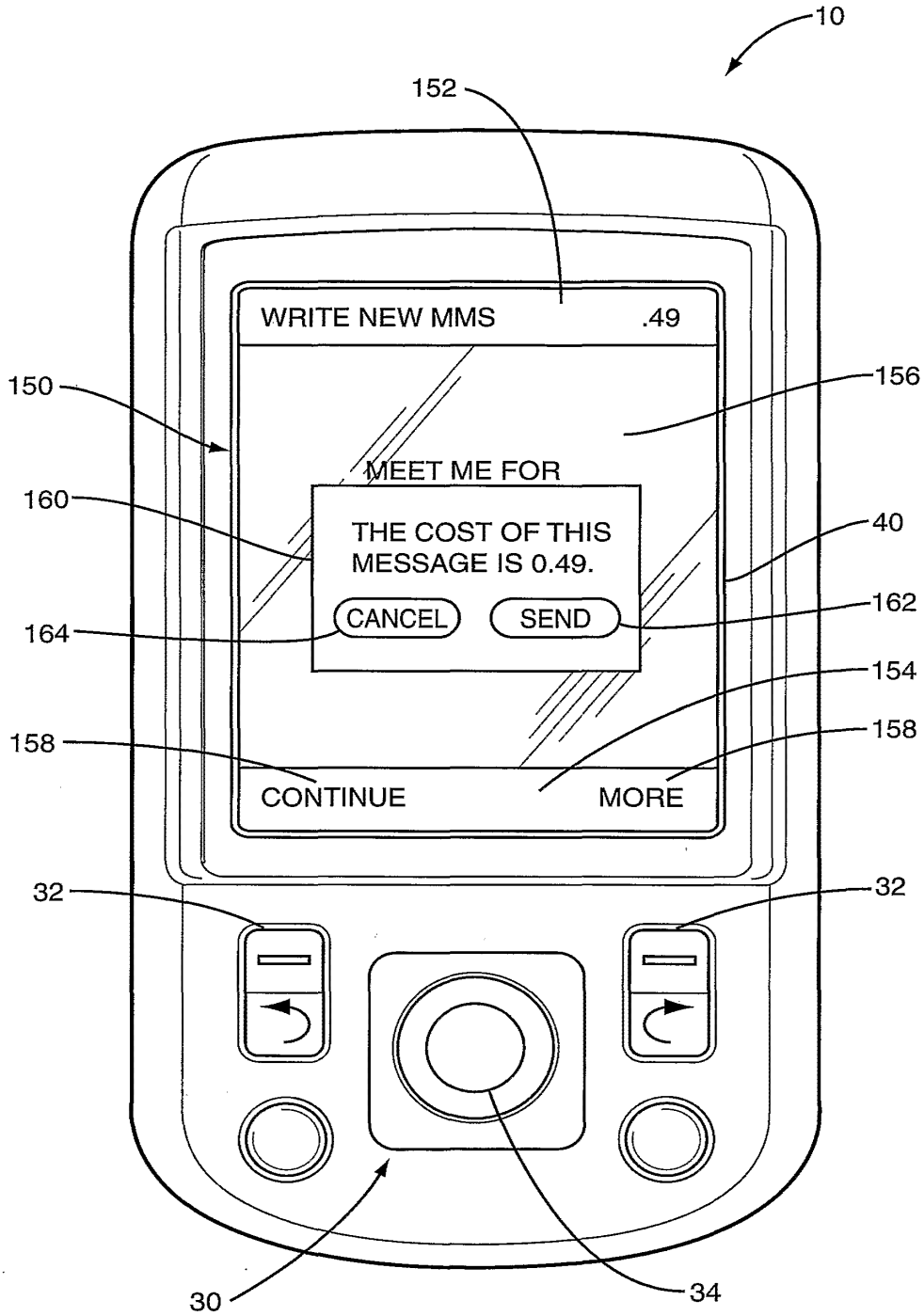

10
152
WRITE NEW MMS .49
150
156
MEET ME FOR
160
THE COST OF THIS MESSAGE IS 0.49.
40
CANCEL
SEND
162
164
154
158
158
CONTINUE
MORE
32
32
30
34

FIG. 5

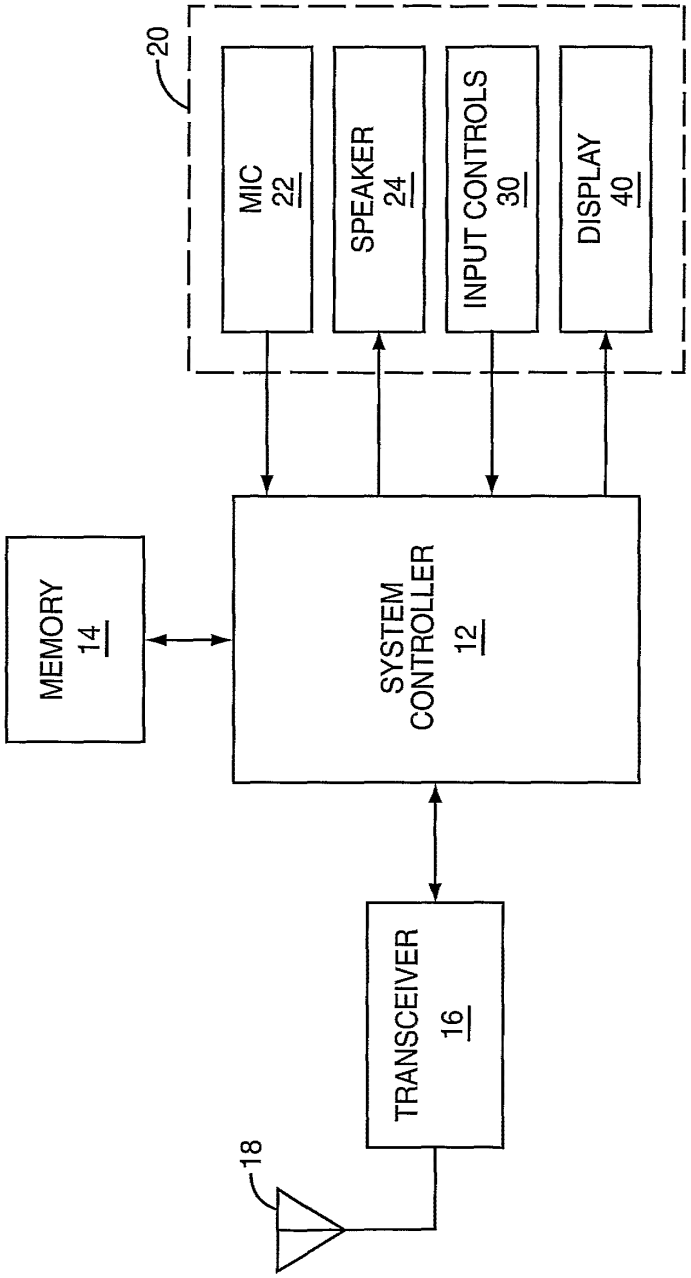

20
MIC
22
SPEAKER
24
INPUT CONTROLS
30
DISPLAY
40
MEMORY
14
SYSTEM
CONTROLLER
12
TRANSCEIVER
16
18

FIG. 6

```
<?xml version="1.0"?>
<message-price-table>
     <service name="SMS">
          <schemes>
               <scheme>
                    <time-of-day start="0600" end="2100"/>
                    <applies-to>message</applies-to>
                    <price>0.10</price>
                    <roaming-surcharge>0.25</roaming-surcharge>
               </scheme>
               <scheme>
                    <time-of-day start="2100" end="0600"/>
                    <applies-to>message</applies-to>
                    <price>0.00</price>
                    <roaming-surcharge>0.25</roaming-surcharge>
               </scheme>

          </schemes>
     </service>
     <service name="IMS">
          <schemes>
               <scheme>
                    <applies-to>monthly</applies-to>
                    <price>6.00</price>
               </scheme>
          </schemes>
     </service>
     <service name="MMS">
          <schemes>
               <scheme>
                    <applies-to>monthly</applies-to>
                    <price>6.00</price>
               </scheme>
               <scheme>
                    <applies-to>kilobytes</applies-to>
                    <price>0.02</price>
               </scheme>
          </schemes>
     </service>
</message-price-table>
```

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/041665

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M15/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04M H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2001/038625 A1 (SATOH KAZUNORI [JP]) 8 November 2001 (2001-11-08) abstract figures 1a,1ab,1c,2 paragraphs [0023] - [0034] claims 1-3	1-41
X	US 2004/122684 A1 (KAIKURANTA TERHO [FI]) 24 June 2004 (2004-06-24) figures 2-10 paragraphs [0011] - [0015] paragraphs [0045] - [0079] claims 1-27	1-41

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 April 2007	09/05/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Maciejewski, Robert

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/041665

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/046197 A (GIESECKE & DEVRIENT GMBH [DE]; LEINEWEBER HARALD [DE]; RANKL WOLFGANG) 19 May 2005 (2005-05-19) abstract page 3, lines 4-28 page 5, line 26 - page 11, line 18 figures 1,2	1-41

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2006/041665

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001038625 A1	08-11-2001	GB 2365663 A	20-02-2002
		JP 3397196 B2	14-04-2003
		JP 2001257719 A	21-09-2001
US 2004122684 A1	24-06-2004	CN 1520088 A	11-08-2004
WO 2005046197 A	19-05-2005	DE 10351763 A1	09-06-2005

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Patent Application Fee Transmittal

Application Number:	13742312
Filing Date:	15-Jan-2013
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Krista Susan Jacobsen/Ann Taylor
Attorney Docket Number:	RALEP007C05

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	16791540
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	07-SEP-2013
Filing Date:	15-JAN-2013
Time Stamp:	02:53:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7671
Deposit Account	505876
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	P007C05.pdf	1704219 e8033e2272db1a38dcd509cdd2dbf340102 29d1f	no	9
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Foreign Reference	2035_SONERA.pdf	1449270 83f568206d53812bd422a23bc97d8efdc21 2af6a	no	36
Warnings:					
Information:					
3	Foreign Reference	2036_SONY.pdf	831108 a6a0c393147acb9517804ca2ded34f2a1d3 6d44c	no	22
Warnings:					
Information:					
4	Non Patent Literature	3025_ANTON.PDF	608012 129dd45630f651b9102a169bcfd96b3eb36 41016	no	37
Warnings:					
Information:					
5	Non Patent Literature	5044_P002EPSearchRpt.pdf	324774 a6433bf83e463c8900190208ae5bb3b3529 24461	no	6
Warnings:					
Information:					
6	Non Patent Literature	5101_P007C6OA.pdf	195420 1c038b7c0b224b445ccc318322c935a7514 0074c	no	5
Warnings:					
Information:					
7	Non Patent Literature	5104_P002NZExamRpt.pdf	119509 1c4510b28155b006d909f895333d8bb6453 2c733	no	2
Warnings:					
Information:					

8	Fee Worksheet (SB06)	fee-info.pdf	30272 40796ecd830befebb115900ee7f16667307a183c	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	5262584	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Raleigh	Examiner:	RUDY, Andrew J.
Serial No.:	13/742,312	Art Unit:	3687
Filed:	January 15, 2013	Conf. No.:	5058
Title:	Automated Device Provisioning and Activation		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AND RESPONSE

Madam:

In response to the Office Action dated August 29, 2013, the deadline for response being September 30, 2013, please amend the above-identified application as follows:

Amendments to the Claims begin on page 2.

Remarks begin on page 9.

AMENDMENTS TO THE CLAIMS

Without prejudice and without surrender of any subject matter, please amend the claims as follows:

1. (Currently amended) A wireless device, comprising:

one or more modems for enabling the wireless device to communicate over at least a first wireless network;

a user interface;

memory configured to store a control policy associated with a first application on the wireless device, the first application at least enabling the wireless device to access at least a first data service over the first wireless network; and

one or more processors configured to **execute one or more machine-executable instructions that, when executed by the one or more processors, cause the one or more processors to**:

assist in obtaining a user input through the user interface,

determine at least an aspect of the control policy based on the user input, the at least an aspect of the control policy for at least assisting in **restricting or preventing** ~~**controlling**~~ a first access to the first wireless network by the first application **when the first application is executing** ~~**on the wireless device**~~, the at least an aspect of the control policy enabling a first control of the first access to the first wireless network by the first application **when the first application is executing** ~~**on the wireless device**~~ that differs from a second control of a second access to the first wireless network by a second application on the wireless device, and

apply the control policy, thereby at least assisting in **restricting or preventing** ~~**controlling**~~ the first access to the first wireless network by the first application **when the first application is executing** ~~**on the wireless device**~~.

2. (Currently amended) The wireless device recited in claim 1, wherein the first application is configured to at least assist in **restricting or preventing the first access to the first wireless**

network by the first application when the first application is executing ~~**applying the control policy**~~.

3. (Currently amended) The wireless device recited in claim 1, wherein **restricting or preventing** ~~**controlling**~~ the first access to the first wireless network by the first application **when the first application is executing** ~~**on the wireless device**~~ comprises ~~**preventing or**~~ restricting communication associated with the first application over the first wireless network **when the first application runs as a background process**.

4. (Currently amended) The wireless device recited in claim 1, wherein **restricting or preventing** ~~**controlling**~~ the first access to the first wireless network by the first application ~~**on the wireless device**~~ comprises preventing ~~**or restricting**~~ communication associated with the first application over the first wireless network when the first application runs as a background process.

5. (Previously presented) The wireless device recited in claim 1, wherein the first wireless network comprises a cellular network, a roaming network, or an access network associated with a cost.

6. (Previously presented) The wireless device recited in claim 1, wherein apply the control policy comprises at least assist in routing or directing at least a portion of traffic associated with the first application over the first wireless network to a particular network communication end point, route, or tunnel.

7. (Currently amended) The wireless device recited in claim 1, wherein apply the control policy comprises identify or insert a flow tag in a traffic flow associated with the first application, the flow tag configured to assist in preserving the association of the traffic flow with the first application when the traffic flow is processed by one or more ~~**wireless device**~~ functions **of the wireless device** that operate on the traffic flow.

8. (Currently amended) The wireless device recited in claim 1, wherein apply the control policy comprises use an application programming interface to communicate with a software component that at least assists in **restricting or preventing** ~~**controlling**~~ the first access to the first wireless network by the first application **when the first application is executing**.

9. (Currently amended) The wireless device recited in claim 1, wherein apply the control policy comprises use an application programming interface to communicate information to a software component that at least assists in **restricting or preventing** ~~**controlling**~~ the first access to the first wireless network by the first application **when the first application is executing**, the information being associated with**: (a)** the first wireless network, **(b)** a cost associated with the first wireless network, **(c)** a connection state of the first wireless network, **[[or]](d)** a user preference**, or (e) a combination of these**.

10. (Previously presented) The wireless device recited in claim 1, wherein apply the control policy comprises use an application programming interface to communicate with a software component that at least assists in controlling an e-mail transfer option, a media content resolution, or a compression level.

11. (Previously presented) The wireless device recited in claim 1, wherein apply the control policy comprises use an application programming interface to communicate with a software component that at least assists in controlling a background access.

12. (Currently amended) The wireless device recited in claim 1, wherein the control policy is further based on a relationship between a usage limit and a measure of usage of the first wireless network associated with the first application ~~**on the wireless device**~~.

13. (Previously presented) The wireless device recited in claim 1, wherein the control policy is further based on a network administrator input.

14. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, ~~**enable,**~~ disable, ~~**turn on,**~~ turn off, ~~**allow,**~~ throttle, delay, quarantine, ~~**accelerate,**~~ or shape at least a portion of traffic over the first wireless network associated with the first application ~~**on the wireless device**~~.

15. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, ~~**allow,**~~ throttle, delay, quarantine, ~~**accelerate,**~~ or shape at least a portion of traffic over the first wireless network associated with the first application when an amount or cost of usage of the first wireless network associated with the first application satisfies a condition relative to a threshold.

16. (Previously presented) The wireless device recited in claim 15, wherein the user input further comprises an indication of the threshold or information associated with the threshold.

17. (Currently amended) The wireless device recited in claim 1, wherein the user input comprises a directive to restrict, block, ~~**allow,**~~ throttle, delay, quarantine, ~~**accelerate,**~~ or shape at least a portion of traffic over the first wireless network associated with the first application when a quality of a second wireless network satisfies a condition relative to a threshold.

18. (Currently amended) The wireless device recited in claim 1, wherein**, when executed by** the one or more processors**, the one or more machine-executable instructions** ~~**are**~~ further **cause the one or more processors** ~~**configured**~~ to:

assist in establishing a secure control link between the wireless device and a network element, the secure control link secured by an encryption protocol and configured to support control-plane communications between the wireless device and the network element, and

obtain at least a portion of the control policy from the network element over the secure control link.

19. (Currently amended) The wireless device recited in claim 1, wherein the control policy at least assists in controlling the second access to the first wireless network by the second

application on the wireless device, and wherein the user input is a first user input, and wherein the at least an aspect of the control policy is a first aspect of the control policy, and wherein**,** **when executed by** the one or more processors**, the one or more machine-executable instructions** ~~are~~ further **cause the one or more processors** ~~configured~~ to:

assist in obtaining a second user input through the user interface, and

determine at least a second aspect of the control policy based on the second user input, the at least a second aspect of the control policy for at least assisting in controlling the second access to the first wireless network by the second application on the wireless device.

20. (Currently amended) The wireless device recited in claim 1, wherein the control policy assists in controlling a third access to a second wireless network by the first application ~~on the wireless device~~.

21. (Previously presented) The wireless device recited in claim 20, wherein the at least an aspect of the control policy is further based on a characteristic of the first wireless network or the second wireless network.

22. (Currently amended) The wireless device recited in claim 20, wherein the at least an aspect of the control policy is further based on a user preference comprising a directive to allow access to the **second** ~~first~~ wireless network by the first application based on a characteristic of the **first** ~~second~~ wireless network.

23. (Currently amended) The wireless device recited in claim 1, wherein the control policy is a first control policy, and wherein the memory is further configured to store a second control policy associated with the first application ~~on the wireless device~~, the second control policy for at least assisting in controlling a third access to a second wireless network by the first application **when the first application is executing** ~~on the wireless device~~, and wherein**, when executed by the one or more processors, the one or more machine-executable instructions further cause** the one or more processors ~~are further configured~~ to apply the second control policy.

24. (Currently amended) The wireless device recited in claim 1, wherein the first application ~~on the wireless device~~ is configured to assist in providing a forwarding service, the forwarding service for forwarding traffic between (a) one or more other devices communicatively coupled to the wireless device over a second network and (b) a network system communicatively coupled to the wireless device over the first wireless network, and wherein the at least an aspect of the control policy at least assists in determining whether the forwarding service is available to one or more of the one of more other devices.

25. (Currently amended) The wireless device recited in claim 1, wherein the wireless device is capable of being communicatively coupled to an intermediate networking device over the first wireless network, the intermediate networking device providing a forwarding service for forwarding traffic between the wireless device and a network system communicatively coupled to the intermediate networking device over a second wireless network, and wherein**, when executed by** the one or more processors**, the one or more machine-executable instructions** ~~are~~ further **cause the one or more processors** ~~configured~~ to determine the at least an aspect of the control policy based on a characteristic of the second wireless network.

26. (Currently amended) The wireless device recited in claim 1, wherein**, when executed by the one or more processors, the one or more machine-executable instructions further cause** the one or more processors ~~are further configured~~ to obtain a measure quantifying at least the first access to the first wireless network by the first application ~~on the wireless device~~.

27. (Currently amended) The wireless device recited in claim 26, wherein obtain a measure quantifying at least the first access to the first wireless network by the first application ~~on the wireless device~~ comprises determine the measure quantifying at least the first access to the first wireless network by the first application ~~on the wireless device~~.

28. (Currently amended) The wireless device recited in claim 26, wherein obtain a measure quantifying at least the first access to the first wireless network by the first application ~~on the~~

~~**wireless device**~~ comprises obtain, from a network element, the measure quantifying at least the first access to the first wireless network by the first application ~~**on the wireless device**~~.

29. (Currently amended) The wireless device recited in claim 26, wherein the measure quantifying at least the first access to the first wireless network by the first application ~~**on the wireless device**~~ comprises an amount of data, a cost, or a time.

30. (Currently amended) The wireless device recited in claim 26, wherein**, when executed by the one or more processors, the one or more machine-executable instructions further cause** the one or more processors ~~**are further configured**~~ to **assist in** present**ing**, through the user interface, information based on the measure quantifying at least the first access to the first wireless network by the first application ~~**on the wireless device**~~.

REMARKS

Claims 1-30 are pending and stand rejected by the Office Action dated August 29, 2013.

In section 3, the Office Action rejects claims 1-30 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

In section 5, the Office Action rejects claims 1-30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 8,495,227 to Kaminsky *et al.* (hereinafter, "Kaminsky").

Applicant is amending claims 1-4, 7-9, 12, 14, 15, 17-20, and 22-30. No new matter is being added.

Applicant respectfully requests reconsideration.

Claim Rejections – 35 U.S.C. § 112

In section 3, the Office Action rejects claims 1-30 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular, the Office Action states that the claim 1 phrases "a first application" (line 5), "a first data service" (lines 6-7), "a first access" (line 11), "a first control" (line 14), "a second control" (line 15), "a second access" (line 15), and "a second application on the wireless device" (line 16) are not clear in juxtaposition to the drawing figures and descriptive portion of the specification.

Applicant respectfully submits that the phrases "a first application" and "a second application on the wireless device" are supported at least by paragraphs [0075], [0085], [00145], [00171], [00186], [00204], [00216], [00219], [00221], [00222], [00227]-[00229], [00315], [00337], [00338], [00341], [00345], [00351], [00355], [00358], [00360], [00363], and [00426].

Applicant respectfully submits that the phrase "a first data service" is supported at least by paragraphs [0072]-[0075], [0079]-[0082], [00234], [00237], [00241], [00255], [00258], [00275], [00291], [00315], [00341], [00367], [00395], [00400], [00403], [00405], [00406],

[00426]-[00429], [00435], [00440], [00464], [00490], [00503], [00511], [00512], [00517]-[00520], [00524], [00532], and [00540].

Applicant respectfully submits that the phrases "a first access," "a first control," "a second control," and "a second access" are supported at least by paragraphs [00204], [00228]-[00230], [00255], [00315], [00337], [00341], [00347], and [00358]-[00365].

Therefore, Applicant respectfully submits that all claims comply with 35 U.S.C. § 112, and Applicant respectfully requests that the rejection of claims 1-30 under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claim Rejections – 35 U.S.C. § 103

In section 5, the Office Action rejects claims 1-30 under 35 U.S.C. § 103(a) as being unpatentable over Kaminsky.

Overview of Kaminsky

Kaminsky discloses a method to distribute policies that includes transmitting a policy template or an identification assigned to a policy template to an enforcement point. Kaminsky at col. 1, ll. 37-40. The identification (ID), which may be a serial number or a more descriptive identification of the template, may be transmitted instead of the complete policy template for efficiency and to reduce transmission costs and the use of limited data processing and communication resources. *Id.* at col. 3, ll. 21-23, 25-28.

The policy template may be defined by a policy administrator. *Id.* at col. 2, ll. 47-49. The template may be in the form of an "if-then" clause, such as "if some precondition or preconditions, then some decision is made." *Id.* at col. 3, ll. 1-3. For example, a template may take the form of a statement "if <shift> and <customer level> then <response time goal>," where "shift" might take values of "first," "second," and "third"; "customer level" might take values of "gold," "silver," and "bronze"; and "response time goal" might take values of "100 ms," "500 ms," or "1000 ms." *Id.* at col. 3, ll. 1-11. At least one set of parameters to be associated with each policy template can be identified or defined by the policy administrator. *Id.*

at col. 3, ll. 38-43. The parameters may be preconditions, values that are set if one or more preconditions are met, or an operation to be performed if one or more preconditions are met. *Id.* at col. 3, ll. 45-49. Each parameter or set of parameters may be identified by name and type of parameter, where types of parameters include a precondition, a value, or a type of operation or function. *Id.* at col. 3, ll. 45-51. The parameters may be updated or changed from time to time in a selected policy template. *Id.* at col. 3, ll. 53-54. A set of parameters to be used in each associated policy template may be transmitted by the policy administrator to the respective enforcement points. *Id.* at col. 3, ll. 59-61.

When an enforcement point receives a template ID, it may determine if the policy template corresponding to each received template ID is present or stored at the enforcement point. *Id.* at col. 3, ll. 62-64. If the policy template is available at the enforcement point, the enforcement point may substitute or bind the parameters to each associated template for enforcement. *Id.* at col. 3, l. 64 – col. 4, l. 1. If the policy template is not present or stored at the enforcement point, the enforcement point may transmit a query to a repository where policy templates are stored or maintained. *Id.* at col. 4, ll. 1-5. In response, any policy templates may be transmitted to the enforcement point, including any IDs assigned to the transmitted policy templates. *Id.* at col. 4, 8-11. The enforcement point may store the template, bind or substitute the parameters into the associated template, and begin implementing or enforcing the policy associated with the template. *Id.* at col. 4, ll. 19-27.

Claim 1

In rejecting claim 1, the Office Action states that Kaminsky discloses networks (*e.g.*, FIGS. 1-4 and related text), a wireless device (*e.g.*, 408, 426), memory (*e.g.*, at col. 5, lines 27-32), processors (*e.g.*, 406, 420), network control policy (*e.g.*, 412), and applications (*e.g.*, 404). The Office Action states that Kaminsky does not disclose the terminology of a first and second control of first/second access to a wireless device, but the Office Action takes Official Notice that applying a control policy associated with a wireless device has been common knowledge in the art, and that to have provided such for Kaminsky would have been obvious to one of ordinary skill in the art.

Applicant is amending claim 1 to recite:

> A wireless device, comprising:
>
> one or more modems for enabling the wireless device to communicate over at least a first wireless network;
>
> a user interface;
>
> memory configured to store a control policy associated with a first application on the wireless device, the first application at least enabling the wireless device to access at least a first data service over the first wireless network; and
>
> one or more processors configured to execute one or more machine-executable instructions that, when executed by the one or more processors, cause the one or more processors to:
>
> assist in obtaining a user input through the user interface,
>
> determine at least an aspect of the control policy based on the user input, the at least an aspect of the control policy for at least assisting in restricting or preventing a first access to the first wireless network by the first application when the first application is executing, the at least an aspect of the control policy enabling a first control of the first access to the first wireless network by the first application when the first application is executing that differs from a second control of a second access to the first wireless network by a second application on the wireless device, and
>
> apply the control policy, thereby at least assisting in restricting or preventing the first access to the first wireless network by the first application when the first application is executing.

The amendments to claim 1 are supported at least by paragraphs [0069], [00204], [00228]-[00230], [00255], [00315], [00337], [00341], [00347], and [00358]-[00365].

Applicant respectfully submits that Kaminsky does not render obvious claim 1 at least because Kaminsky does not disclose or render obvious a single wireless device comprising one or more processors configured to execute one or more machine-executable instructions that, when executed by the one or more processors, cause the one or more processors to "assist in obtaining a user input through the user interface," "determine at least an aspect of the control

policy based on the user input, the at least an aspect of the control policy for at least assisting in restricting or preventing a first access to the first wireless network by the first application when the first application is executing, the at least an aspect of the control policy enabling a first control of the first access to the first wireless network by the first application when the first application is executing that differs from a second control of a second access to the first wireless network by a second application on the wireless device," and "apply the control policy, thereby at least assisting in restricting or preventing the first access to the first wireless network by the first application when the first application is executing."

Neither the policy administrator of Kaminsky nor the enforcement point of Kaminsky meets all of the limitations of claim 1. The policy administrator device comprises a processor and one or more input and output devices that may facilitate defining policy templates and assigning an ID to each policy template. Kaminsky at col. 4, l. 64 – col. 5, l 1. Assuming, *arguendo*, that the policy administrator of Kaminsky obtains, through a user interface, a user input associated with the policy template, Kaminsky does not disclose that the policy administrator device itself determines any aspect of a control policy based on such user input. Kaminsky states that policy templates are in the form of an "if-then" clause or similar clause or statement, and Kaminsky provides, as an example, a statement "if <shift> and <customer level> then <response time goal>," where "shift" might take values of "first," "second," and "third," "customer level" might take values of "gold," "silver," and "bronze," and "response time goal" might take values of "100 ms," "500 ms," or "1000 ms." *Id.* at col. 3, ll. 1-11. But Kaminsky does not disclose or appear to suggest that the policy administrator device determines any of the parameters or values of the policy template. Kaminsky does disclose that the policy administrator may assign an ID to a template, *id.* at col. 4, l. 66 – col. 5, l. 1, but even if the ID constitutes an aspect of a control policy, Kaminsky does not disclose that the ID is based on any user input obtained through a user interface. Thus, Applicant respectfully submits that Kaminsky does not disclose that the policy administrator determines at least an aspect of a control policy based on a user input obtained through a user interface of the policy administrator.

Furthermore, Kaminsky does not disclose that the policy administrator device applies any policy. Indeed, the premise of Kaminsky is that a policy is distributed by the policy

administrator device to one or more enforcement points that then bind or substitute the parameters into the template and implement or enforce the policy. *Id*. at col. 4, ll. 19-27, 38-40. Thus, Kaminsky states that it is the enforcement points—and not the policy administrator—that implement or enforce policies associated with the templates.

The enforcement points of Kaminsky do not meet the limitations of claim 1, either, at least because Kaminsky does not disclose or suggest that the enforcement points comprise one or more processors configured to execute one or more machine-executable instructions that, when executed by the one or more processors, cause the one or more processors to "assist in obtaining a user input through the user interface" and "determine at least an aspect of the control policy based on the user input, the at least an aspect of the control policy for at least assisting in restricting or preventing a first access to the first wireless network by the first application when the first application is executing, the at least an aspect of the control policy enabling a first control of the first access to the first wireless network by the first application when the first application is executing that differs from a second control of a second access to the first wireless network by a second application on the wireless device." Indeed, Kaminsky does not disclose that the enforcement points obtain any user input at all. Although each enforcement point may include a processor, one or more input devices, and one or more output devices, these elements facilitate the enforcement point receiving, from the policy administrator device, the ID assigned to the policy template or the policy template itself. *Id.* at col. 5, ll. 33-39. Likewise, although each enforcement point may include a browser to facilitate access to the communication network, *id.* at col. 5, ll. 45-48, Kaminsky does not disclose or suggest that such browser facilitates obtaining a user input as recited in claim 1. And because Kaminsky does not disclose that the enforcement point obtains a user input through a user interface, it follows that Kaminsky also does not disclose that the enforcement point determines an aspect of a control policy based on such user input.

Thus, Applicant respectfully submits that Kaminsky does not disclose or render obvious a single wireless device that meets all of the limitations of claim 1. For at least the reasons provided above, Applicant respectfully submits that claim 1 is patentable over Kaminsky.

Claims 2-30

Claims 2-30 depend, directly or indirectly, from claim 1 and are therefore patentable over Kaminsky for at least the same reasons that claim 1 is patentable over Kaminsky.

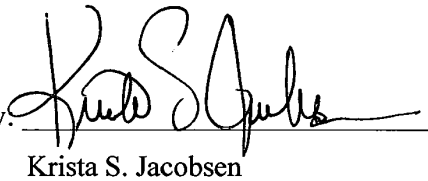
CONCLUSION

Applicant respectfully requests entry of these amendments as provided herein. The application is believed to be in condition for allowance, and a Notice of Allowance is hereby respectfully requested. If the Examiner has any questions or needs any additional information, the Examiner is invited to contact the undersigned.

The Commissioner is authorized to charge any fee deficiency or credit any overpayment to Deposit Account 50-5876.

Respectfully submitted,

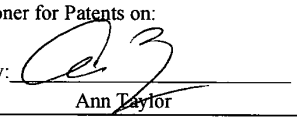
Date: September 30, 2013

By: 

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Ann Taylor

Electronic Acknowledgement Receipt

EFS ID:	16998881
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	30-SEP-2013
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P007C05OAR.pdf	298005 0dab0e9e985746b9992cd74d87396e90493576ac	yes	16

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	16
Warnings:			
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/742,312	Filing Date 01/15/2013	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/30/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/CHARMISE CARTER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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NOTICE OF ALLOWANCE AND FEE(S) DUE

106963 7590 11/20/2013

Headwater Partners I LLC
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Redwood Shores, CA 94065

EXAMINER
RUDY, ANDREW J

ART UNIT	PAPER NUMBER
3687	

DATE MAILED: 11/20/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

TITLE OF INVENTION: AUTOMATED DEVICE PROVISIONING AND ACTIVATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$890	$0	$0	$890	02/20/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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106963 7590 11/20/2013
Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

TITLE OF INVENTION: AUTOMATED DEVICE PROVISIONING AND ACTIVATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$890	$0	$0	$890	02/20/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
RUDY, ANDREW J	3687	705-030000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

106963 7590 11/20/2013

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

EXAMINER	
RUDY, ANDREW J	

ART UNIT	PAPER NUMBER
3687	

DATE MAILED: 11/20/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notices of Allowance and Fee(s) Due mailed between October 1, 2013 and December 31, 2013

(Addendum to PTOL-85)

If the "Notice of Allowance and Fee(s) Due" has a mailing date on or after October 1, 2013 and before January 1, 2014, the following information is applicable to this application.

If the issue fee is being timely paid on or after January 1, 2014, the amount due is the issue fee and publication fee in effect January 1, 2014. On January 1, 2014, the issue fees set forth in 37 CFR 1.18 decrease significantly and the publication fee set forth in 37 CFR 1.18(d)(1) decreases to $0.

If an issue fee or publication fee has been previously paid in this application, applicant is not entitled to a refund of the difference between the amount paid and the amount in effect on January 1, 2014.

Notice of Allowability	Application No. 13/742,312	Applicant(s) RALEIGH, GREGORY G.	
	Examiner ANDREW JOSEPH RUDY	Art Unit 3687	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the 30 September 2013 Amendment*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-30*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☒ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

DETAILED ACTION

Allowable Subject Matter

1. Pursuant to Applicant's September 30, 2013 Amendment and REMARKS, claims 1-30 are allowed.

2. The following is an examiner's statement of reasons for allowance: The prior art of record, either alone or in combination, does not disclose, or suggest, Applicant's claim language.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

3. Further pertinent references of interest are noted on the attached PTO-892.

4. Applicant's Information Disclosure Statement (IDS) submitted September 7, 2013 has been reviewed. Note the attached IDS.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW JOSEPH RUDY whose telephone number is (571)272-6789. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Gart can be reached on 571-272-3955. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANDREW JOSEPH RUDY/
Primary Examiner, Art Unit 3687

Notice of References Cited	Application/Control No. 13/742,312	Applicant(s)/Patent Under Reexamination RALEIGH, GREGORY G.	
	Examiner ANDREW JOSEPH RUDY	Art Unit 3687	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,826,607	11-2010	de Carvalho Resende et al.	379/225
*	B	US-7,555,757	06-2009	Smith et al.	719/328
*	C	US-7,203,169	04-2007	Okholm et al.	370/232
*	D	US-7,013,469	03-2006	Smith et al.	719/328
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/742,312	RALEIGH, GREGORY G.	
	Examiner	Art Unit	
	ANDREW JOSEPH RUDY	3687	

ISSUE CLASSIFICATION

ORIGINAL						CROSS REFERENCE(S)						
CLASS				SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
709				225	455	414.1						
INTERNATIONAL CLASSIFICATION												
G	0	6	F	15/173								
H	0	4	W	4/00								
				/								
				/								
				/								

XXXXXXXXXXXXXXXXXXXXXX (Assistant Examiner) (Date)		**Total Claims Allowed: 30**
(Legal Instruments Examiner) (Date)	/Andrew Joseph Rudy/ 11/13/13 (Primary Examiner) (Date)	O.G. Print Claim(s): 1 / O.G. Print Fig.: 38

☒ **Claims renumbered in the same order as presented by applicant** ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		31		61		91		121		151		181
2	2		32		62		92		122		152		182
3	3		33		63		93		123		153		183
4	4		34		64		94		124		154		184
5	5		35		65		95		125		155		185
6	6		36		66		96		126		156		186
7	7		37		67		97		127		157		187
8	8		38		68		98		128		158		188
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11	11		41		71		101		131		161		191
12	12		42		72		102		132		162		192
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15	15		45		75		105		135		165		195
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20	20		50		80		110		140		170		200
21	21		51		81		111		141		171		201
22	22		52		82		112		142		172		202
23	23		53		83		113		143		173		203
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26	26		56		86		116		146		176		206
27	27		57		87		117		147		177		207
28	28		58		88		118		148		178		208
29	29		59		89		119		149		179		209
30	30		60		90		120		150		180		210

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/742,312	RALEIGH, GREGORY G.	
	Examiner	Art Unit	
	ANDREW JOSEPH RUDY	3687	

SEARCHED			
Class	Subclass	Date	Examiner
prior			
search	updated	11/13/2013	AJR
455	432.3	11/13/2013	AJR

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
709	**225**	**11/13/2013**	**AJR**
455	414.1	11/13/2013	AJR

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Continuity data reviewed.	11/13/2013	AJR
Inventor name search conducted.	11/13/2013	AJR
Bibliographic data reviewed.	11/13/2013	AJR

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13742312
Filing Date	2013-01-15
First Named Inventor	Gregory G. Raleigh
Art Unit	3687
Examiner Name	Andrew J RUDY
Attorney Docket Number	RALEP007C05

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5630159	A	1997-05-13	Zancho, William F.	
	2	5633484	A	1997-05-27	Zancho, William F. et al.	
	3	5814798	A	1998-09-29	Zancho, William F.	
	4	5915008	A	1999-06-22	Dulman, Scott	
	5	7039713	B1	2006-05-02	Van Gunter, David et al.	
	6	7286848	B2	2007-10-23	Vireday, Richard P. et al.	
	7	7313237	B2	2007-12-25	Bahl, Paramvir et al.	
	8	7444669	B1	2008-10-28	Bahl, Paramvir et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	9	7493659	B1	2009-02-17	Wu, Handong et al.	
	10	7548976	B2	2009-06-16	Bahl, Paramvir et al.	
	11	7583964	B2	2009-09-01	Wong, Gregory A.	
	12	7593730	B2	2009-09-22	Khandelwal, Deepak et al.	
	13	7720960	B2	2010-05-18	Pruss, Richard Manfred et al.	
	14	7801985	B1	2010-09-21	Pitkow, Jim et al.	
	15	7881697	B2	2011-02-01	Baker, Matthew Donald et al.	
	16	7899438	B2	2011-03-01	Baker, Matthew Donald et al.	
	17	7929959	B2	2011-04-19	DeAtley, Dallas et al.	
	18	7945238	B2	2011-05-17	Baker, Matthew Donald et al.	
	19	7948953	B2	2011-05-24	Melkote, Keerti G. et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

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	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	20	8000276	B2	2011-08-16	Scherzer, Shimon et al.	
	21	8027339	B2	2011-09-27	Short, Joel E. et al.	
	22	8032409	B1	2011-10-04	Mikurak, Michael G.	
	23	8078140	B2	2011-12-13	Baker, Matthew Donald et al.	
	24	8090359		2012-01-03	Proctor Jr., James Arthur et al.	
	25	8090616		2012-01-03	Proctor Jr., James Arthur et al.	
	26	8095112	B2	2012-01-10	Chow, Richard et al.	
	27	8116749		2012-02-14	Proctor Jr., James Arthur et al.	
	28	8126476	B2	2012-02-28	Vardi, Yosef et al.	
	29	8150431		2012-04-03	Wolovitz, Lionel et al.	
	30	8200509	B2	2012-06-12	Kenedy, Andrew Alexander et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

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	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	31	8242959	B2	2012-08-14	Mia, Rashidus S. et al.	
	32	8270972	B2	2012-09-18	Otting, Marcia J. et al.	
	33	8285249	B2	2012-10-09	Baker, Matthew Donald et al.	
	34	8307067	B2	2012-11-06	Ryan, Nicholas M.	
	35	8325638		2012-12-04	Jin, Haipeng et al.	
	36	8326319	B2	2012-12-04	Davis, Richard W.	
	37	8356336	B2	2013-01-15	Johnston, Keith et al.	
	38	8358638	B2	2013-01-22	Scherzer, Tamir et al.	
	39	8374592		2013-02-12	Proctor, Jr. James A. et al.	
	40	8483135		2013-07-09	Cai, Yigang et al.	
If you wish to add additional U.S. Patent citation information please click the Add button.						
U.S.PATENT APPLICATION PUBLICATIONS						

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	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20010048738	A	2001-12-06	Baniak, Paul G. et al.	
	2	20020049074	A	2002-04-25	Eisinger, Bernd et al.	
	3	20020161601	A	2002-10-31	Nauer, Bernhard et al.	
	4	20030233332	A	2003-12-18	Keeler, James D. et al.	
	5	20040102182	A	2004-05-27	Reith, Lothar et al.	
	6	20060068796	A	2006-03-30	Millen, Stephanie L. et al.	
	7	20060135144	A	2006-06-22	Jothipragasam, Premkumar	
	8	20070033197	A	2007-02-08	Scherzer, Shimon et al.	
	9	20070109983	A	2007-05-17	Shankar, Rohit et al.	
	10	20080022354	A	2008-01-24	Grewal, Karanvir et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

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	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	11	20080089295	A	2008-04-17	Keeler, James D. et al.	
	12	20080250053	A	2008-10-09	Aaltonen, Janne et al.	
	13	20090005000	A	2009-01-01	Baker, Matthew et al.	
	14	20090006116	A	2009-01-01	Baker, Matthew et al.	
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	16	20110013569	A	2011-01-20	Scherzer, Shimon et al.	
	17	20110081881	A	2011-04-07	Baker, Matthew Donald et al.	
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.R./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	22	20120238287	A	2012-09-20	Scherzer, Shimon	
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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	1998058505	WO		1998-12-23	Sonera Oy		☐
	2	2007097786	WO	A	2007-08-30	Sony Ericsson Mobile Communications AB		☐

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

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	Attorney Docket Number	RALEP007C05

	1	ANTON, B. et al., "Best Current Practices for Wireless Internet Service Provider (WISP) Roaming"; Release Date February 2003, Version 1.0; Wi-Fi Alliance – Wireless ISP Roaming (WISPr)	☐
	2	European Search Report and Opinion mailed July 4, 2013; 10736206.3-1856/2391948; PCT/US2010021227	☐
	3	Office Action in U.S. Application No. 13/742,317, August 29, 2013	☐
	4	Second Examination Report in New Zealand Patent Application Number 594724, August 22, 2013	☐

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EXAMINER SIGNATURE

Examiner Signature	/Andrew Joseph Rudy/	Date Considered	10/31/2013

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
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Attorney Docket Number	RALEP007C05

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5983270	A	1999-11-09	Abraham et al.	
	2	6104700	A	2000-08-15	Haddock, Stephen R. et al.	
	3	6542992		2003-04-01	Peirce, Kenneth L. et al.	
	4	6598034	B1	2003-07-22	Kloth, Axel K.	
	5	6748195	B1	2004-06-08	Phillips, W. Garland	
	6	6873988	B2	2005-03-29	Herrmann et al.	
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	9	7113780	B2	2006-09-26	Mckenna Daniel et al.	
	10	7286834	B2	2007-10-23	Walter	
	11	7310424		2007-12-18	Gehring, Stephan Walter et al.	
	12	7356011		2008-04-08	Waters, Christopher J.F. et al.	
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	20	7616962	B2	2009-11-10	Oswal, Anand K. et al.	
	21	7653394	B2	2010-01-26	McMillin, Brian K.	
	22	7697540	B2	2010-04-13	Haddad et al.	
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	50	8437734		2013-05-07	Ray, Amar N. et al.	
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	66	8571474	B2	2013-10-29	Chavez et al.	
	67	8571993	B2	2013-10-29	Kocher et al.	
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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060174035	A	2006-08-03	Tufail, Mudassir	
	2	20070025301	A	2007-02-01	Petersson et al.	
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	10	20110264923	A	2011-10-27	Kocher et al.	
	11	20130144789		2013-06-06	Aaltonen, Janne et al.	

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	1	101115248A	CN		2008-01-30	Lenovo Beijing Ltd.		☐
	2	101341764A	CN		2009-01-07	Telefonaktiebolaget LM Ericsson		☐

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	3	1538730A	CN		2004-10-20	Zhongxing Communication Co., Ltd.		☐
	4	1802839A	CN		2006-07-12	Motorola Inc.		☐
	5	2004064306	WO		2004-07-29	Motorola Inc.		☐
	6	2007068288	WO		2007-06-21	Telefonaktiebolaget LM Ericsson		☐

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	"The Construction of Intelligent Residential District in Use of Cable Television Network," Shandong Science, Vol. 13, No. 2, June 2000	☐
	2	VerizonWireless.com news, "Verizon Wireless Adds to Portfolio of Cosumer-Friendly Tools With Introduction of Usage Controls, Usage Controls and Chaperone 2.0 Offer Parents Full Family Security Solution," August 18, 2008	☐
	3	9/30/2013 Office Action Response in U.S. Application No. 13/742,317	☐

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EXAMINER SIGNATURE

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	Attorney Docket Number	RALEP007C05

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

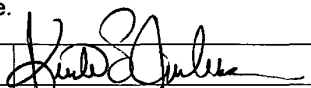
☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-11-25
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Raleigh	Examiner:	RUDY, Andrew J.
Serial No.:	13/742,312	Art Unit:	3687
Filed:	January 15, 2013	Conf. No.:	5058
Title:	Automated Device Provisioning and Activation		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Madam:

On July 15, 2013, Applicant submitted an Information Disclosure Statement (IDS) that included a translation of an Office Action, dated May 27, 2013, for a Chinese application in which Applicant is pursuing claims that are similar to those of the instant application. According to the translation, the Chinese Examiner did not cite any references in rejecting any claims, but the Chinese Examiner appears to be insisting on what amounts to literal support for the claim language.

In the United States "[t]he subject matter of the claim need not be described literally (*i.e.*, using the same terms or *in haec verba*)." MPEP § 2163.02. Therefore, Applicant believes the Chinese Office Action is, at best, marginally material. Nevertheless, out of an abundance of caution, Applicant has submitted the Chinese Office Action for the Examiner's consideration.

The Examiner has allowed the instant application. Applicant assumes that during examination of the instant application, the Examiner considered the language of the claims and concluded that the allowed claims are clear and are supported by the specification and drawings.

At this time, Applicant has not incurred the expense of obtaining a translation of Applicant's response to the Chinese Office Action. Applicant is filing this IDS to inform the

Examiner that Applicant has filed a response to the Chinese Office Action, and that Applicant will obtain a translation of Applicant's response if the Examiner requests one.

CONCLUSION

If the Examiner has any questions or needs any additional information, such as a translation of Applicant's response to the Chinese Office Action discussed above, the Examiner is invited to contact the undersigned.

The Commissioner is authorized to charge any fee deficiency or credit any overpayment to Deposit Account 50-5876.

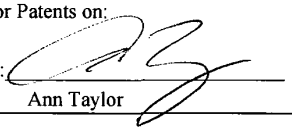
Respectfully submitted,

Date: November 25, 2013 By: 

Krista S. Jacobsen
Reg. No. 59,374
Head Counsel
Headwater Partners I LLC
350 Marine Parkway, Suite 300
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(650) 517-2798

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H04M 15/00 H04M 17/00
H04L 9/32 H04L 12/14

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[22] 申请日 2003.4.15 [21] 申请号 03113227.8

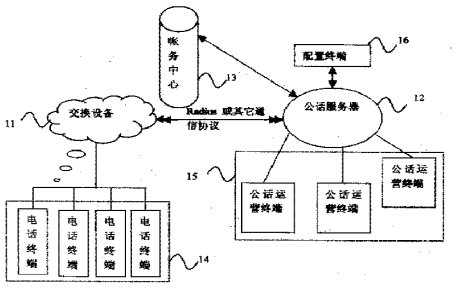
[71] 申请人 中兴通讯股份有限公司
地址 518057 深圳市南山区高新技术产业园科技南路中兴通讯大厦法律部
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权利要求书 2 页 说明书 5 页 附图 3 页

[54] 发明名称 一种宽带公话系统及其实现方法

[57] 摘要

本发明提供一种宽带公话系统及其实现方法，该系统包括交换设备、公话服务器、帐务中心、公话运营终端和电话终端，其中所述电话终端挂接在所述交换设备上，在所述公话运营终端的数据控制下，与所述公话服务器之间进行通讯；该实现方法包含以下步骤：对用户发起的呼叫进行认证；以及对用户资费结帐。采用本发明提供的宽带公话系统，能够提供具有良好的开放性、易于扩充规模的公话系统，可跨地域运行，很好地适应了现代通信网的高度智能化的要求，降低了投资，易于维护，具有良好的性价比；其实现方法可对多个公话运营点进行集中控制和管理，防止了人为违规资费发生，具有较高的可靠性、安全性，不易被攻击，同时还可达到计费准确度高的效果。



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1．一种宽带公话系统，该系统包括交换设备、公话服务器、帐务中心、公话运营终端和电话终端，其中电话终端挂接在交换设备上，在公话运营终端的数据控制下，与公话服务器之间进行通讯。

2．如权利要求1所述的宽带公话系统，其中所述交换设备和所述公话服务器之间采用标准的RADIUS协议，或其他等效通信协议。

3．如权利要求 1 所述的宽带公话系统，其中所述公话服务器和所述公话运营终端 15 之间采用标准的 RADIUS 协议，或其他等效通信协议。。

4．如权利要求 1 所述的宽带公话系统，其特征在于所述系统还可采用一个交换设备带多个公话服务器的连接方式。

5．如权利要求 1 所述的宽带公话系统，其特征在于所述系统还采用多个交换设备共用一个公话服务器的连接方式。

6．如权利要求 1 所述的宽带公话系统，对于在网上不具有支持 RADIUS 协议功能的交换设备，可将这些设备接入软交换系统，从而获得支持这些通信协议的能力。

7．一种宽带公话系统实现方法，其特征在于该方法包含以下步骤：

对用户发起的呼叫进行认证；及

对用户资费结帐。

8．如权利要求 7 所述的宽带公话系统实现方法，其特征在于所述对用户发起的呼叫进行认证的步骤，还包括以下步骤：

用户到运营终端申请使用公话业务；

管理员在运营终端指定的所述电话终端，并输入该终端的信用额度；

公话服务器接受运营终端的输入，指定电话终端处于开启状态；

用户使用终端发起呼叫；

交换设备向公话服务器进行该终端信用认证；

若认证不能通过，则终端话机被置于闭锁状态，用户不能使用业务；

若认证通过，则公话服务器向交换设备传递信用额度；

用户开始使用该终端，进行呼叫业务；

如果用户结束业务使用，或信用额度不足，则业务结束。

9．如权利要求 7 所述的宽带公话系统实现方法，其特征在于所述对用户发起的呼叫进行认证的步骤，还包括以下步骤：

授权认证业务结束后，交换设备向公话服务器发出业务结束指示；

公话服务器向帐务中心(或独立的计费服务器)传递详细通话记录；

公话服务器从帐务中心(或独立的计费服务器)获得该此通话的费用帐单；

公话服务器将此帐单传递给指定的公话运营终端；

公话运营终端向用户输出通话帐单，整个公话系统业务结束。

一种宽带公话系统及其实现方法

技术领域

本发明涉及电信网络运营系统，特别是涉及该系统中的有人值守宽带公话系统及其实现方法。

背景技术

在现代电信固话运营业务中，公用电话（以下简称公话）系统是运营商获得利润的一个重要手段。特别是随着目前 IP 电话的广泛使用，宽带公话运营已是运营商重要的利润增长点，通过提供这种立即付费的公话业务，可以为广大用户提供方便。

现有技术的公话系统大致可分为无人值守和有人值守两种模式：其中对于无人值守公话系统，常见的为磁卡、IC 卡电话；而有人值守公话系统，常见的为电信营业厅或者写字楼的商务中心中使用的公用电话系统，对于有人值守公话系统，其主要的功能为：

1. 由控制终端设备发起呼叫，防止未授权用户使用业务；

2. 用户使用终端通话结束后输出通话费用.运营商获得收入.

本发明正是针对有人值守公话系统，而提出的一种新的公话系统及其实现方法。

目前的宽带公话系统的实现一般独立于交换系统，只是在交换终端对终端设备予以计量控制，一般采用以下几种模式：

1. 使用公话计费器来提供服务

只需配置计费器，将话机和计费器连接即可，由计费器对话机进行控制，并在通话结束后显示通话费用。 这种模式的实现较为简单，但存在着计费精度低，易引发用户话费纠纷等缺点，特别是如遇资费调整则存在着巨大的数据配置工作量，平时也具有较大的维护工作量；

2. 使用公话计费服务器

增加硬件设备，将若干用户线进行转接集成，（或在环路中继上进行控制，）由服务器对终端设备进行控制，采用内置计费服务器的办法，因此可能于帐务中心的帐单输出有差异，并且同样存在着计费精度低的缺点；

3. 使用小交换系统完成

在需要配置为公话的终端话机上接入小交换设备，从而使其接入交换网，在

小交换设备上对话机终端控制，利用小交换设备的计费系统完成资费计算。这和第二种实现方式本质相同，存在计费精度底、投资成本高的缺点。

并且，当运营商需要设置多个营业点时，利用现有的以上这些系统，需要相应的投资多套软硬件设备，因此其成本较高，维护工作量较大。

并且这些实现方式，普遍存在以下缺点：

1. 智能化较低，不能高效进行集中管理；
2. 在资费政策变化时，数据修改工作量巨大；
3. 内部接口不具有很好的开放性；
4. 由于计算电话费用的设备一般配置较低，无法获得精确计费；
5. 在运营规模扩大时需要投入多套设备，投资成本高，维护工作量大；
6. 系统运营受地域限制，一套系统一般集中在一个城市的一个地域，不能跨地域城市运营。

经检索，“ 深圳市冠日高科技发展有限公司”申请获得了“公用电话网的构成及其实现方法”专利，其核心内容是建立独立的公话交换系统，并对其予以公话网管，接入到运营电信网上，其思想内容类似于上述第三种实现方式，该发明需要建立独立的公话交换网，不能充分利用网上的现有设备，同时， 需要建立独立的计费模块，不能从已有的帐务中心获取计费信息，存在着投资大、实际建设困难的弱点。

上述现有的公话系统的实现都是基于运营的交换系统，其具有相对的封闭性，和第三方设备不具有开放的通信能力，因此第三方设备无法控制交换设备的动作，不便于直接从交换设备采集话单. 因此其实现基于对交换终端附以另外的设备，或加以计价设备，或建立另外的交换设备从而达到控制终端话机，采集话单的目的.

随着电信网的演变，宽带交换系统（例如软交换系统）已经推向市场，这种系统以 IP 协议为基石，其系统具有良好的开放性和扩充性，也为新的公话系统的实现提供了基础。

本发明正是在现代交换网络（特别使软交换网络）的智能化程度越来越高的情况下，充分运用电信网上的已有资源，使得交换设备和第三方设备更易于进行信息交流，保护运营商的已有投资；采用灵活的框架结构,实现公话系统。

发明内容

本发明的目的是针对上述背景技术中存在的缺陷，提供一种宽带公话系统及其实现方法，即在公话服务器的控制下，利用交换设备完成对电话终端的控制，实现通话，并由公话服务器提供费用帐单，由公话运营终端来完成和用户的界面交互。

为了达到上述目的，本发明提供一种宽带公话系统，该系统包括交换设备、公话服务器、帐务中心、信令处理模块，公话运营终端和电话终端，其中所述电话终端挂接在所述交换设备上，在所述公话运营终端的数据控制下，与所述公话服务器之间进行通讯。

本发明还提供一种宽带公话系统实现方法，其特征在于该方法包含以下步骤：

对用户发起的呼叫进行认证，；

对用户资费结帐。

采用本发明提供的宽带公话系统，能够提供具有良好的开放性、易于扩充规模的公话系统，可跨地域运行，很好地适应了现代通信网的高度智能化的要求，降低运营商投资，且该系统易于操作维护，具有良好的性价比；其实现方法可对多个公话运营点进行集中控制和管理，防止了人为违规资费发生，具有较高的可靠性、安全性，不易被攻击，同时还可达到计费准确度高的效果。

下面将结合实施例并参照附图对该发明的技术方案进行详细说明。

附图说明

图 1 为本发明的系统结构图。

图 2 为本发明的实现方法流程图。

图 3 为本发明系统结构扩充形态图一。

图 4 为本发明系统结构扩充形态图二。

具体实施方式

如图 1 所示，为本发明系统结构图，也是本发明系统结构的基本形态，它由一个公话服务器接入一个交换设备，带有多个运营终端，系统规模可以为某一城市地域，，可为跨地域模式，即系统不受地域限制，该系统由以下几部分组成：交换设备 11，它是电话业务的提供者，主要用于实现电话业务，在实际应用中一般是指运营商网上运营的交换设备，具有支持鉴权认证通信协议的能力；公话服务器 12，用于控制并完成话机终端的认证、授权操作，通过帐务中心（或计费服务器）13 完成通话资费，并将帐单传递给公话运营终端；在公话服务器 12 上，可通过配置终端 16 配置不同的策略服务，以便对由不同运营终端控制的话机终端提供不同的控制方式，实现个性化的服务（例如指定有的用户可先打电话后付费；有的需要交付押金后才可打电话；有的可以进行通话累计优惠活动）；公话运营终端 15，它是运营商的业务使用界面，用于指定话机的开放/闭锁状态、

录入指定终端的信用额度、配合公话服务器完成终端话机的认证，实现授权操作，以及在通话输出后,从公话服务器获得通话帐单，完成电信运营收入；电话终端14，它是用户使用终端，用于完成用户通话，可以是普通的电话机或其他智能终端，它在本发明的系统可以有任意多个；

以上各单元的连接关系是：电话终端14挂接在交换设备11上，在公话运营终端的数据控制下，与公话服务器12之间进行通讯，其中交换设备11和公话服务器之间可采用标准的RADIUS协议（或其他通信协议）；公话服务器12和公话运营终端15之间也采用标准的RADIUS协议（或其他通信协议）。

图2所示为为本发明公话系统的实现方法流程图，该流程的具体步骤包括：首先，对用户发起的呼叫进行认证，以防止未授权的用户使用业务，步骤201；对用户资费结帐，步骤202。

本发明所采用的系统结构除了如图 1 所示的基本形态外，还可以有如图 3和图4所示的两种扩充形态，其中图3所示的扩充形态一，系统可由一个交换设备11带多个公话服务器32组成,这些公话服务器分布在不同地域,以不同的策略提供个性化的服务；图4所示的扩充形态二，采用多个交换设备41共用一个公话服务器12的连接方式，并且此时的交换设备可以为异种交换设备(如交换机、软交换设备等)。

下面试举一具体实例，更进一步说明本发明的技术方案：

在实际应用中，本发明所提到的宽带公话系统，其硬件部分包括帐务中心、交换设备、公话服务器、公话运营终端、电话终端设备，其中帐务中心和交换设备为运营商已有的系统，公话服务器可根据运营规模选用市场上的商用服务器，公话运营终端可为普通的PC机；该系统的实现方法可通过执行以下步骤来完成：

1．在交换设备上指定若干话机为公话话机终端，并指定受控公话服务器地址；

2．在公话服务器的配置终端上，对公话服务器进行配置,将所控制的公话终端，分配到相应的公话运营终端作用域；

3．用户使用公话终端进行通话，需到该终端的公话运营终端进行业务使用申请；

4．公话运营终端受理用户申请，并向服务器报告该终端当前的信用情况；

5．用户摘机发起呼叫，交换设备判断为公话服务，则向指定的公话服务器发起认证请求；

6．公话服务器依据该用户的信用情况，控制认证结果，如果信用不足以发起呼叫,则通知交换设备，闭锁话机；

7．如果该用户有足够的信用，则判断用户可使用业务的时间长度（或字节流量）；

8．当用户主动结束业务，或用户业务使用耗尽其信用额度，则交换设备主动中止业务.此时业务结束；

9.业务结束后,公话服务器向计费中心,或指定的计费服务器索取通话帐单,并安全传递给公话运营终端；

10．运营终端接受帐单和用户结算；

11．运营商可在公话服务器侧对各运营终端进行业务统计，决定各运营点设备的增加或减少。

该系统的软件部分分为：用户认证和资费结账两部分。

其中用户认证步骤具体还包括以下处理内容：（在本过程中可使用 RADIUS 协议，或其他通信协议）

用户到运营终端申请使用公话业务；

管理员在运营终端指定的电话终端，并输入该终端的信用额度；

公话服务器接受运营终端的输入，指定电话终端处于开启状态；

用户使用终端发起呼叫；

交换设备向公话服务器进行该终端信用认证；

认证不能通过则终端话机被置于闭锁状态，用户不能使用业务；

认证通过则公话服务器向交换设备传递信用额度；

用户开始使用该终端，进行呼叫业务；

如果用户结束业务使用，或信用额度不足，则业务结束，至此，认证授权步骤结束。

资费结帐部分：

授权认证业务结束后，交换设备指示公话服务器业务结束；

公话服务器向帐务中心(或独立的计费服务器)传递详细通话记录；

公话服务器从帐务中心(或独立的计费服务器)获得该此通话的费用帐单；

公话服务器将此帐单传递给指定的公话运营终端；

公话运营终端向用户输出通话帐单，整个公话系统业务结束。

很明显本系统要求交换系统能够支持一定的通信协议,比如 RADIUS 协议,以实现和公话服务器的通讯,对于网上不具有此功能的交换设备,运营商可将这些设备接入软交换系统,从而获得支持这些通信协议的能力。

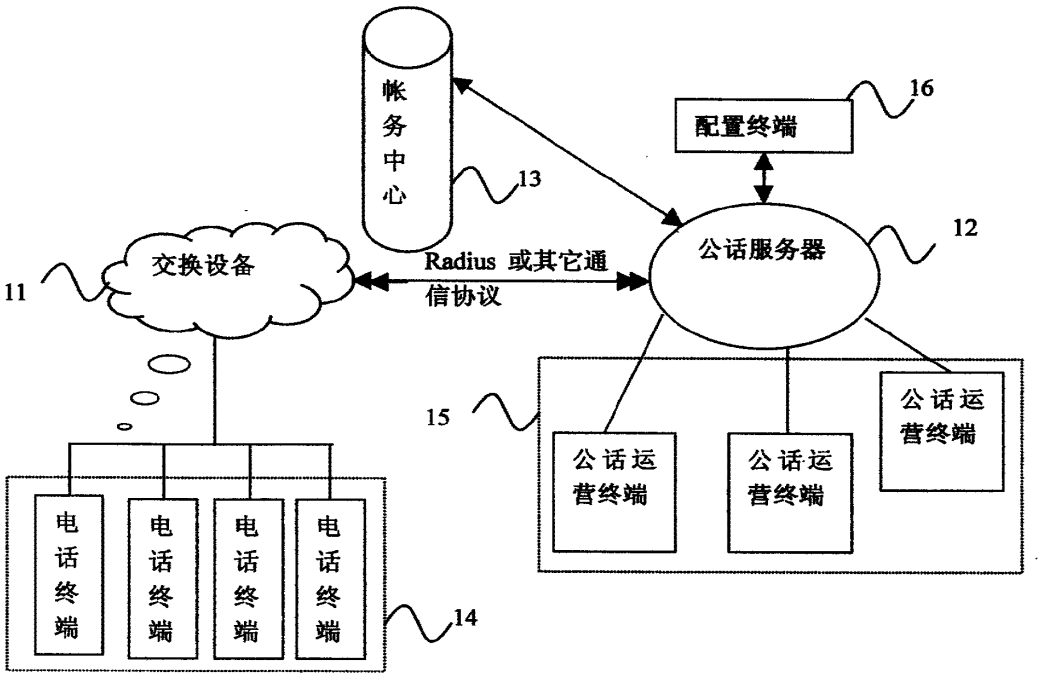

帐务中心
13
配置终端
16
公话服务器
12
交换设备
11
Radius 或其它通信协议
15
公话运营终端
公话运营终端
公话运营终端
电话终端
电话终端
电话终端
电话终端
14

图 1

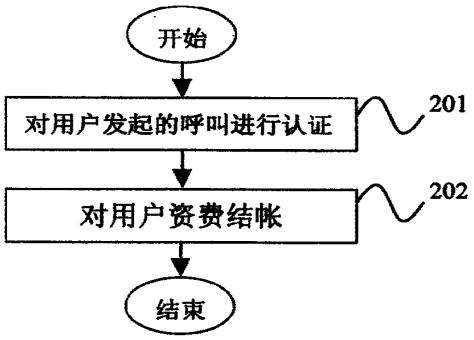

开始
对用户发起的呼叫进行认证
201
对用户资费结帐
202
结束

图 2

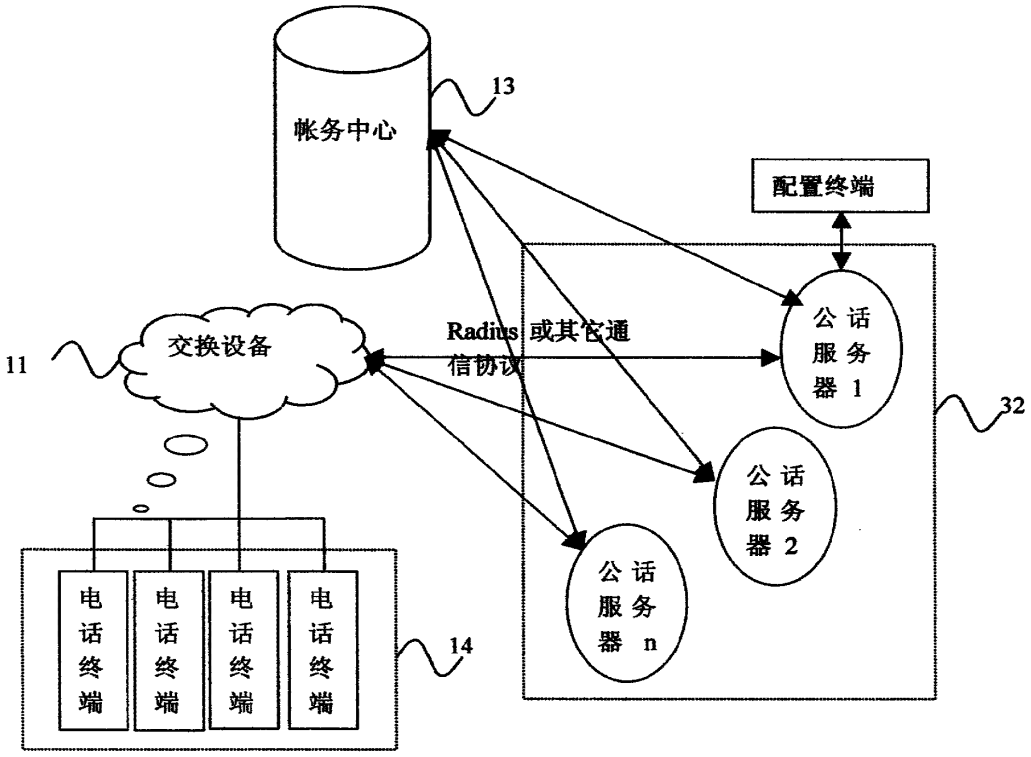

帐务中心
13
配置终端
交换设备
11
Radius 或其它通信协议
公话服务器 1
32
公话服务器 2
公话服务器 n
电话终端
电话终端
电话终端
电话终端
14

图 3

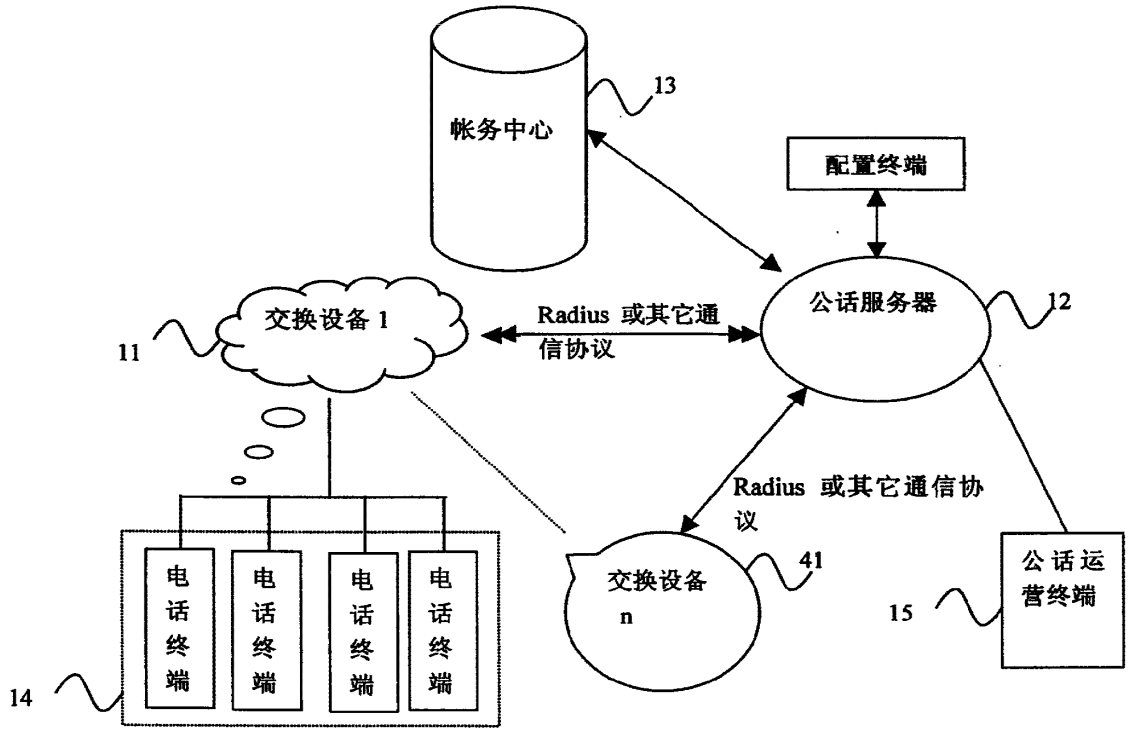

帐务中心
13
配置终端
交换设备 1
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Radius 或其它通信协议
公话服务器
12
Radius 或其它通信协议
电话终端
电话终端
电话终端
电话终端
14
交换设备 n
41
15
公话运营终端

图 4

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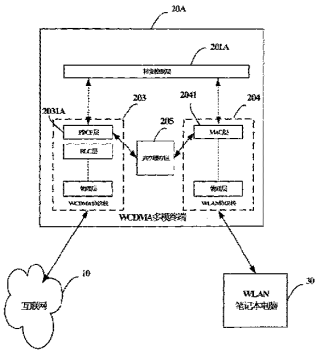
权利要求书 2 页 说明书 7 页 附图 5 页

(54)发明名称

多模终端及其数据转发方法

(57)摘要

本发明公开了一种多模终端及其数据转发方法。本发明的多模终端，具有至少一个移动通信协议栈，至少一个无线局域网协议栈，共享缓存区以及转发控制器。其中，移动通信协议栈用于将从互联网接收到的IP数据包存放到共享缓存区后通知转发控制层；转发控制层用于将IP数据包在共享缓存区中的存放地址通知无线局域网协议栈；无线局域网协议栈用于从共享缓存区取出IP数据包并将其发送到无线设备，移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将IP数据包的目的IP地址修改为无线设备在无线局域网连接中的IP地址。本发明的多模终端及其数据转发方法可以有效的提高数据传输效率。



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1. 一种多模终端，具有至少一个移动通信协议栈，至少一个无线局域网协议栈，以及转发控制层，其特征在于，多模终端进一步包括共享缓存区，其中，

移动通信协议栈用于将从互联网接收到的 IP 数据包存放到共享缓存区后通知转发控制层；

转发控制层用于将 IP 数据包在共享缓存区中的存放地址通知无线局域网协议栈；

无线局域网协议栈用于从共享缓存区取出 IP 数据包并将其发送到无线设备，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的目的 IP 地址修改为无线设备在无线局域网连接中的 IP 地址。

2. 根据权利要求 1 所述的多模终端，其特征在于，

无线局域网协议栈，进一步用于将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知所述转发控制层；

转发控制层，进一步用于将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；

移动通信协议栈，进一步用于从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的源地址修改为多模终端在互联网中对应的 IP 地址。

3. 根据权利要求 1 或 2 所述的多模终端，其特征在于，无线局域网协议栈为 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中的一个。

4. 根据权利要求 1 或 2 所述的多模终端，其特征在于，移动通信协议栈为 TD-SCDMA、WCDMA、GSM、CDMA 1x、CDMA2000、GPRS 中的一个。

5. 一种多模式终端的数据转发方法，其特征在于，包括以下步骤：

移动通信协议栈将从互联网接收到的 IP 数据包存放到共享缓存区后通知转发控制层；

转发控制层将 IP 数据包在共享缓存区中的存放地址通知无线局域网协议栈；

无线局域网协议栈从共享缓存区取出 IP 数据包并将其发送到无线设备，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的目的 IP 地址修改为无线设备在无线局域网连接中的 IP 地址。

6. 根据权利要求 5 所述的方法，其特征在于，所述方法进一步包括以下步骤：

无线局域网协议栈将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知所述转发控制层；

转发控制层将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；

移动通信协议栈从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的源地址修改为多模终端在互联网中对应的 IP 地址。

7. 根据权利要求 5 或 6 所述的方法，其特征在于，无线局域网协议栈为 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中的一个。

8. 根据权利要求 5 或 6 所述的方法，其特征在于，移动通信协议栈为 TD-SCDMA、WCDMA、GSM、CDMA 1x、CDMA2000、GPRS 中的一个。

9. 一种多模终端，具有至少一个移动通信协议栈，至少一个无线局域网协议栈，以及转发控制层，其特征在于，多模终端进一步包括共享缓存区，其中，

无线局域网协议栈用于将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知转发控制层；

转发控制层用于将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；

移动通信协议栈用于从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的源地址修改为多模终端在互联网中对应的 IP 地址。

10. 根据权利要求 9 所述的多模终端，其特征在于，无线局域网协议栈为 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中的一个。

11. 根据权利要求 9 所述的多模终端，其特征在于，移动通信协议栈为 TD-SCDMA、WCDMA、GSM、CDMA 1x、CDMA2000、GPRS 中的一个。

12. 一种多模终端的数据转发方法，其特征在于，包括以下步骤：

无线局域网协议栈将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知转发控制层；

转发控制层将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；

移动通信协议栈从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，

移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的源地址修改为多模终端在互联网中对应的 IP 地址。

13. 根据权利要求 12 所述的方法，其特征在于，无线局域网协议栈为 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中的一个。

14. 根据权利要求 12 所述的方法，其特征在于，移动通信协议栈为 TD-SCDMA、WCDMA、GSM、CDMA 1x、CDMA2000、GPRS 中的一个。

多模终端及其数据转发方法

技术领域

[0001] 本发明涉及一种移动通信技术，特别是一种多模终端及其数据转发方法。

背景技术

[0002] 当今科技的发展带来了多种无线接入技术和蜂窝通信技术，下一代网络将出现由多种不同无线技术支撑的混合网络环境。能在多种不同的蜂窝移动通信网络或无线接入网络中使用或支持多种无线网络的移动通信终端称为“多模移动通信终端”，以下简称“多模终端”。目前，移动终端多模融合已经成为移动通信终端发展的趋势。

[0003] 现有多模终端一般包括蜂窝移动通信网络 (PLMN) 模块，例如 TD-SCDMA、WCDMA、GSM、CDMA1x、CDMA2000，GPRS 等，以及无线接入网络 (RAN) 模块，例如 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 等。多模终端可以通过不同的模块执行不同的业务，例如，用户可以通过蜂窝移动通信网络模块连接到移动通信网络来进行语音或者数据业务，也可以通过无线接入网络模块连接无线接入网络，构成无线局域网 (WLAN) 来连接其它设备进行无线业务。

[0004] 目前，多模终端的各个模块之间主要采用多模分离协议栈。例如移动通信协议栈和无线接入协议栈（为了说明的目的，本发明中将多模终端的蜂窝移动通信协议栈简称为移动通信协议栈，将多模终端的无线接入协议栈称为 WLAN 协议栈），分别处理移动通信业务和无线接入业务。

[0005] 当用户通过蜂窝移动通信网络模块连接到移动通信网络来进行数据业务时，移动通信协议栈中的分组数据集中协议 (Packet Data ConvergenceProtocol，PDCP) 层将下层解压的数据进行 PDCP 数据包的解包操作，将恢复出来的 IP 数据包提交给移动通信协议栈的上层用户，例如 TCP/IP 协议层，进行 TCP/IP 数据包的解包等操作，再由互联网浏览器之类的用户应用程序使用；或者，移动通信协议栈中的 PDCP 层将上层用户要发送的 TCP/IP 数据包进行 PDCP 数据包的打包，转发到移动通信协议栈下层的协议层，最终通过移动通信网络发送出去。

[0006] 当用户通过 WLAN 与其它设备建立连接时，数据以 MAC 帧格式进行传递。WLAN 协议栈中的 MAC 层从下层收到的 MAC 帧数据中恢复出 IP 数据包，并提交给 WLAN 协议栈的上层用户，例如 TCP/IP 协议层，进行 TCP/IP 数据包的解包等操作，再由其它用户应用程序使用；或者，WLAN 协议栈中的 MAC 层将上层用户要发送的 TCP/IP 数据包进行 MAC 数据帧的打包，转发到 WLAN 协议栈下层的协议层，最终通过 WLAN 网络发送出去。

[0007] 然而，不同目前多模终端的各种无线协议栈之间的用户面之间没有交互，因此对于移动通信协议栈和 WLAN 协议栈之间的业务数据的传递，需要在两套协议栈的上层增加一个转发控制层来协调处理两套协议栈的数据转发。

[0008] 例如，在火车上使用 WLAN 笔记本电脑通过身边的 3G/WLAN 双模手机上网时，手机通过 3G 网络从互联网下载的数据，经过手机的移动通信网络协议栈处理之后，解压出互联网 IP 数据包，发送到手机的互联网通信协议栈，由手机的互联网通信协议栈从互联网 IP 数

据包中解压出原始数据，转发到手机用户面控制层，再由手机用户面控制层调用 IP 层再次进行数据打包之后，交给手机的 WLAN 协议栈，通过 WLAN 微网络发送到笔记本电脑的 WLAN 协议栈。

[0009] 或者，手机的 WLAN 协议栈在收到笔记本电脑通过 WLAN 微网络发送的数据之后，解压出 IP 数据包，交给用户面控制层，由用户面控制层调用 IP 层再次进行数据打包之后，交给手机的互联网通信协议栈，通过手机的移动通信网络协议栈发送出去。

[0010] 以上是一种协议栈之间松耦合的方式，这种方式的问题是分组交换域（PS 域）的用户数据需要经过两套协议栈的数据处理，进行了两次 IP 数据的打包，并需要单独开发一个用户面控制层进行数据转发，效率比较低。

发明内容

[0011] 本发明的目的在于提供一种多模终端。

[0012] 本发明的另一目的在于提供上述多模终端的数据转发方法。

[0013] 本发明的一种多模终端，具有至少一个移动通信协议栈，至少一个无线局域网协议栈，共享缓存区以及转发控制器。其中，移动通信协议栈用于将从互联网接收到的 IP 数据包存放到共享缓存区后通知转发控制层；转发控制层用于将修改后的 IP 数据包在共享缓存区中的存放地址通知无线局域网协议栈；无线局域网协议栈用于从共享缓存区取出修改后的 IP 数据包并将其发送到无线设备，移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的目的 IP 地址修改为无线设备在无线局域网连接中的 IP 地址。

[0014] 在上述多模终端中，无线局域网协议栈进一步用于将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知所述转发控制层；转发控制层进一步用于将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；移动通信协议栈进一步用于从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的的源地址修改为互联网中对应的 IP 地址。

[0015] 本发明的一种多模式终端的数据转发方法，包括以下步骤：

[0016] 移动通信协议栈将从互联网接收到的 IP 数据包存放到共享缓存区后通知转发控制层；

[0017] 转发控制层将 IP 数据包在共享缓存区中的存放地址通知无线局域网协议栈；

[0018] 无线局域网协议栈从共享缓存区取出 IP 数据包并将其发送到无线设备，

[0019] 移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的目的 IP 地址修改为无线设备在无线局域网连接中的 IP 地址。

[0020] 在上述方法中，可以进一步包括以下步骤：

[0021] 无线局域网协议栈将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知所述转发控制层；

[0022] 转发控制层将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；

[0023] 移动通信协议栈从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据

包发送到互联网，

[0024] 移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的的源地址修改为互联网中对应的 IP 地址。本发明的另一种多模终端，具有至少一个移动通信协议栈，至少一个无线局域网协议栈，共享缓存区以及转发控制器。其中，无线局域网协议栈用于将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知转发控制层；转发控制层用于将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；移动通信协议栈用于从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的的源地址修改为互联网中对应的 IP 地址。

[0025] 本发明的另一种多模终端的数据转发方法，包括以下步骤：

[0026] 无线局域网协议栈将从无线设备接收到的 IP 数据包转送到共享缓存区，并通知转发控制层；转发控制层将从无线设备接收到的 IP 数据包在共享缓存区中的存放地址通知移动通信协议栈；移动通信协议栈从共享缓存区取出从无线设备接收到的 IP 数据包，将该 IP 数据包发送到互联网，移动通信协议栈、转发控制层、无线局域网协议栈中的任何一个将 IP 数据包的的源地址修改为互联网中对应的 IP 地址。

[0027] 在上述多模终端及其数据转发方法中，无线局域网协议栈为 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中的一个，移动通信协议栈为 TD-SCDMA、WCDMA、GSM、CDMA1x、CDMA2000，GPRS 中的一个。

[0028] 应用本发明提供的技术，通过将 IP 数据包的目的 IP 地址修改为无线设备在无线局域网连接中的 IP 地址，实现了在将数据从互联网转发到无线局域网的过程中，仅对数据进行一次打包；通过将 IP 数据包的源地址修改为多模终端在互联网中对应的 IP 地址，实现了在将数据从无线局域网转发到互联网的过程中，仅对数据进行一次打包；本发明通过修改 IP 地址的方式避免了现有技术中数据转发需要两次打包，从而可以有效的提高数据传输效率。

附图说明

[0029] 图 1 所示为根据现有技术，笔记本电脑通过连接互联网的多模终端从互联网获取数据或者发送数据到互联网时数据移动路径的示意图；

[0030] 图 2 所示为描述根据现有技术笔记本电脑通过连接互联网的多模终端从互联网获取数据的过程的流程图；

[0031] 图 3 所示为描述根据现有技术笔记本电脑通过连接互联网的多模终端发送数据到互联网的过程的流程图；

[0032] 图 4 所示为根据本发明的一种实施方式，笔记本电脑通过连接互联网的多模终端从互联网获取数据或者发送数据到互联网时数据移动路径的示意图；

[0033] 图 5 所示为描述根据本发明一种实施方式，笔记本电脑通过连接互联网的多模终端从互联网获取数据的过程的流程图；

[0034] 图 6 所示为描述根据本发明的一种实施方式，笔记本电脑通过连接互联网的多模终端发送数据到互联网的过程的流程图。

具体实施方式

[0035] 实际上，当多模手机通过移动通信协议栈与互联网建立 IP 连接，并同时通过 WLAN 协议栈与诸如笔记本的其它终端建立 IP 连接时，两个连接之间传递的底层数据格式都是 IP 数据包，因此，有可能通过 IP 地址映射，找到一种数据包之间简单的转换方法。

[0036] 根据本发明的方法，当笔记本通过 WLAN 微网络连接多模手机，通过多模手机进行互联网业务时，在多模手机的移动通信协议栈的 PDCP 层解压出互联网 IP 数据包之后，进行 IP 地址转换，将 IP 数据包的目的 IP 地址转换为笔记本在 WLAN 微网络中的 IP 地址，并直接调用 WLAN 协议栈的接口发送给笔记本；或者，手机的 WLAN 协议栈在收到笔记本发送的微网络 IP 数据包之后，将微网络 IP 数据包转发给移动通信协议栈的 PDCP 层，由 PDCP 层将该数据包的源 IP 地址转换为手机在互联网中的 IP 地址，并通过移动通信协议栈发送出去。本发明的方法可以实现 3G 移动通信协议栈和 WLAN 无线接入协议栈用户面数据直接交互，提高数据传输效率。

[0037] 移动通信协议栈中的 PDCP 层的主要功能是 IP 数据流的头部压缩与解压缩，用于从移动通信协议栈下层的无线链路层 (RLC) 接收无线数据之后，使用 RFC25.07 算法进行解压缩之后传递给移动通信协议栈的上层用户，例如 TCP/IP 等高层网络协议；或者将从移动通信协议栈的上层用户接收的数据按照 RFC25.07 算法进行压缩，再发送到移动通信协议栈下层转发出去。

[0038] 另外，WLAN 协议栈中的 MAC 层的主要功能是 IP 数据流的 MAC 帧打包或者解包，用于从 WLAN 协议栈下层的基带层接收 MAC 帧格式的无线数据之后，进行 MAC 帧解包之后传递给 WLAN 栈的上层用户，例如 TCP/IP 等高层网络协议；或者将从 WLAN 协议栈的上层用户接收的数据打包为 MAC 帧数据，再发送到 WLAN 协议栈的下层转发出去。

[0039] 当例如在上面所述的场景中，即多模终端通过移动通信协议栈连接互联网，笔记本电脑通过 WLAN 微网络与多模终端连接从而连接到互联网的场景下，此时多模终端在互联网中具有 IP 地址，而在 WLAN 微网络中，多模终端与笔记本电脑也分别具有该 WLAN 微网络中的 IP 地址。

[0040] 图 1 所示为根据现有技术，笔记本电脑通过连接互联网的多模终端从互联网获取数据或者发送数据到互联网的数据移动路径的示意图。

[0041] 现在首先参考图 2 的流程图并结合图 1 来描述根据现有技术笔记本电脑通过连接互联网的多模终端从互联网获取数据的过程。

[0042] 从图 1 可见具有 WCDMA 协议栈 203 的 WCDMA 多模终端 20 同时具有 WLAN（可以是 WiFi、WiMax、BlueTooth、UWB、Zigbee、RFID 中任何一种）协议栈 204。

[0043] 当多模终端 20 在 WLAN 连接中利用 ad hoc 模式建立了与附近的 WLAN 笔记本电脑 30 的联系，完成了 WLAN 节点之间的链路建立工作，并且同时已经使用 WCDMA 移动链路建立流程，完成了与互联网 10 之间的空中链路的建立。

[0044] 此时，当笔记本电脑 30 通过多模终端 20 从互联网下载数据时，数据移动过程如下：

[0045] 在步骤 S1，多模终端 20 中的 WCDMA 协议栈 203 中的 PDCP 层 2031 将从 WCDMA 协议栈 203 下层的无线链路层 (RLC 层) 接收来自互联网的无线数据之后，使用 RFC25.07 算法进行解压缩，得到以多模终端 20 在互联网中的 IP 地址为目标地址的 IP 数据包，并传递给

WCDMA 协议栈的上层用户，即 TCP/IP 协议层 202。

[0046] 在步骤 S2，TCP/IP 协议层 202 对 IP 数据包进行解包操作，恢复出 IP 数据包的内容并转交给转发控制层 201。

[0047] 在步骤 S3，转发控制层 201 调用 TCP/IP 协议层，按照 WLAN 笔记本电脑 30 在 WLAN 微网络中的 IP 地址（作为目的地址）再次将原 IP 数据包的内容打包为新的 IP 数据包并发送到 WLAN 协议栈 204。

[0048] 之后，在步骤 S4 中，由 WLAN 协议栈 204 中的 MAC 层 2041 将新打包的 IP 数据包再次打包为 MAC 帧的格式之后通过 WLAN 协议栈 204 的下层发送出去由 WLAN 笔记本电脑 30 接收。

[0049] 可以看到，由于多模终端的移动通信协议栈与 WLAN 协议栈之间不能进行数据交互，数据在多模终端 20 中进行了多次转发，并且有一次 IP 数据包的解包操作以及一次 IP 数据包的打包操作。这很大的占用了多模终端的系统资源并且效率很低。

[0050] 下面参考图 3 描述根据现有技术笔记本电脑通过连接互联网的多模终端发送数据到互联网的过程。

[0051] 在步骤 R1，笔记本电脑 30 通过 WLAN 将要发送的数据发送到多模终端 20 的 WLAN 协议栈 204。

[0052] 在步骤 R2，WLAN 协议栈 204 的 MAC 层从 MAC 帧数据中恢复出 IP 数据包，并交给 TCP/IP 层 202，该 IP 数据包的源地址为 WLAN 笔记本电脑 30。

[0053] 在步骤 R3，TCP/IP 协议层 202 对 IP 数据包进行解包操作，恢复出 IP 数据包中的数据并转交给转发控制层 201。

[0054] 在步骤 R4，转发控制层 201 调用 TCP/IP 层，按照多模终端 20 在互联网中的 IP 地址（作为源地址）再次将原 IP 数据包中的内容打包为新 IP 数据包并发送到 WCDMA 协议栈 203。

[0055] 在步骤 R5，WCDMA 协议栈 203 中的 PDCP 层 2031 将新 IP 数据包按照 RFC25.07 算法进行压缩之后，再通过 WCDMA 协议栈下层转发出去。

[0056] 可以看到，与前面一样，由于多模终端的移动通信协议栈与 WLAN 协议栈之间不能进行数据交互，数据在多模终端 20 中进行了多次转发，并且有一次 IP 数据包的解包操作以及一次 IP 数据包的打包操作。

[0057] 而根据本发明的方法，在多模终端移动通信协议栈的 PDCP 层和 WLAN 协议层的 MAC 协议层之间直接进行数据传递，在数据转发过程中对 IP 数据包进行 IP 地址变化，从而避免多余的 IP 数据包解压和压缩操作，以及多次的数据转发，从而避免资源的浪费。

[0058] 图 4 所示为根据本发明，笔记本电脑通过连接互联网的多模终端从互联网获取数据或者发送数据到互联网的数据移动路径的示意图。

[0059] 可以看到，本发明的多模终端 20A 中，使多模终端 20A 的 WCDMA 协议栈 203 的 PDCP 层 2031A 具备了 IP 地址变化的功能，PDCP 层 2031A 和 WLAN 协议栈 204 的 MAC 协议层 2041 之间通过共享缓存区 205 进行数据传递。可以使多模终端 20A 在执行数据转发的状态下，在多模终端 20A 中设定一个网络协同工作模式，使其按照本发明的方法进行数据的转发。

[0060] 下面参考图 5 的流程图并结合图 4 来描述根据本发明的一种实施方式，笔记本电脑通过连接互联网的多模终端从互联网获取数据的过程。

[0061] 当多模终端 20A 在 WLAN 连接中利用 ad hoc 模式建立了与附近的 WLAN 笔记本电脑 30 的联系，完成了 WLAN 节点之间的链路建立工作，并且同时已经使用 WCDMA 移动链路建立流程，完成了与互联网 10 之间的空中链路的建立。

[0062] 并且，假定此时多模终端 20A 设定了网络协同工作模式。

[0063] 此时，当笔记本电脑 30 通过多模终端 20A 从互联网下载数据时，数据移动过程如下：

[0064] 在步骤 M1，多模终端 20A 中的 WCDMA 协议栈 203 中的 PDCP 层 2031A 从 WCDMA 协议栈 203 下层的无线链路层（RLC 层）接收来自互联网的无线数据后，使用 RFC25.07 算法进行解压缩，得到以多模终端 20 在互联网中的 IP 地址为目标地址的 IP 数据包之后，由于设定了网络协同工作模式，因此 PDCP 层 2031A 将 IP 数据包的目标 IP 地址变化为笔记本在 WLAN 微网络中的 IP 地址，存放在共享缓存区 205，并通知转发控制层 201A。

[0065] 在步骤 M2，转发控制层 201 将 IP 数据包在缓存区的地址通知 WLAN 协议栈 204 的 MAC 层 2041。

[0066] 在步骤 M3，MAC 层 2041 从共享缓存区取出经过地址改变的 IP 数据包再次打包为 MAC 帧的格式之后通过 WLAN 协议栈 204 的下层发送出去由 WLAN 笔记本电脑 30 接收。

[0067] 可以看到，数据直接由 PDCP 层发送到 MAC 层，并且没有 IP 数据包的解包操作和打包操作。

[0068] 上面的实施方式中由 PDCP 层改变接收到的 IP 数据包的目标 IP 地址，然而，PDCP 层也可以不改变接收到的 IP 数据包的 IP 地址而直接将它存放到共享缓存区中，由转发控制层来将 IP 数据包的目标 IP 地址变化为笔记本在 WLAN 微网络中的 IP 地址，再通知 MAC 层将数据包从共享缓存区取出发送出去；或者 PDCP 层和转发控制层都不改变 IP 数据包的目标 IP 地址，由 MAC 层在将 IP 数据包发送出去之前将 IP 数据包的目标 IP 地址变化为笔记本在 WLAN 微网络中的 IP 地址。

[0069] 下面参考图 6 描述根据本发明的一种实施方式，笔记本电脑通过连接互联网的多模终端发送数据到互联网的过程。

[0070] 在步骤 N1，笔记本电脑 30 通过 WLAN 将要发送的数据发送到多模终端 20 的 WLAN 协议栈 204。

[0071] 在步骤 N2，WLAN 协议栈 204 的 MAC 层 2041 从 MAC 帧数据中恢复出 IP 数据包，该 IP 数据包的源 IP 地址为 WLAN 笔记本电脑 30 在 WLAN 微网络中的 IP 地址，由于设置了网络协同工作模式，因此 MAC 层 2041 将数据存放在共享缓存区之后，通知转发控制层 201A。

[0072] 在步骤 N3，转发控制层 201 将 IP 数据包在缓存区的地址通知 WCDMA 协议栈 203 中的 PDCP 层 2031A。

[0073] 在步骤 N4，WCDMA 协议栈 203 中的 PDCP 层 2031 将 IP 数据包从共享缓存区中取出，将数据包的源 IP 地址修改为多模终端 20 在互联网中的 IP 地址，之后按照 RFC25.07 算法进行压缩，再通过 WCDMA 协议栈下层转发出去。

[0074] 可以看到，数据直接由 MAC 层发送到 PDCP 层，而不需要进行多次的转发，并且没有 IP 数据包的解包操作和打包操作。

[0075] 上面的实施方式中由 PDCP 层改变要发送的 IP 数据包的源 IP 地址，然而，也可以由转发控制层在 MAC 层将 IP 数据包存放在共享缓存区之后改变 IP 数据包的源 IP 地址，或

者由MAC层将通过无线局域网协议栈接收的IP数据包改变源IP地址之后放到共享缓存区中，再由转发控制层通知PDCP层取出源IP地址改变的IP数据包发送出去。

[0076] 另外，以上以多模终端的移动通信协议栈为WCDMA协议栈为例进行了说明，然而，本领域技术人员应该可以理解，多模终端的移动通信协议栈还可以是具有PDCP层的任何一种移动通信协议栈，例如TD-SCDMA、GSM、CDMA 1x、CDMA2000，GPRS等。

[0077] 根据本发明的数据转发方式可以让多模手机在后台完成网络数据传递功能，同时手机可以进行提供其它如打电话、收发短信等通信服务，不占用前台人机操作界面。

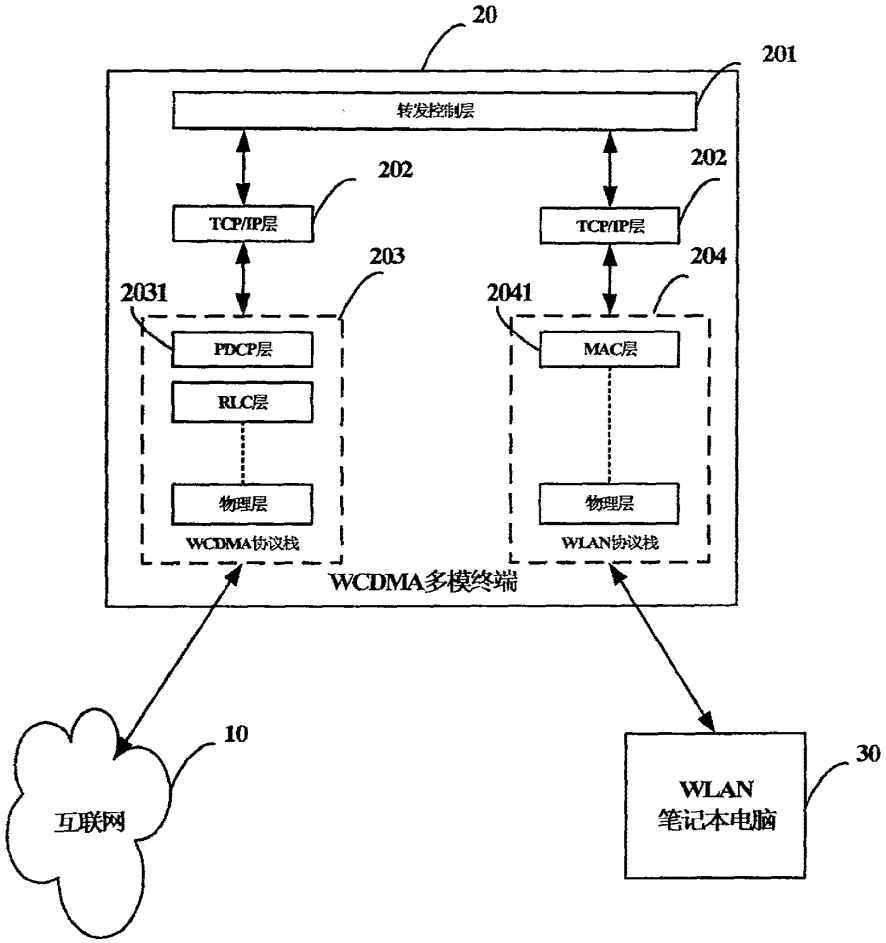

20
201
转发控制层
202
TCP/IP层
202
TCP/IP层
203
2031
PDCP层
RLC层
物理层
WCDMA协议栈
204
2041
MAC层
物理层
WLAN协议栈
WCDMA多模终端
10
互联网
30
WLAN
笔记本电脑

图 1

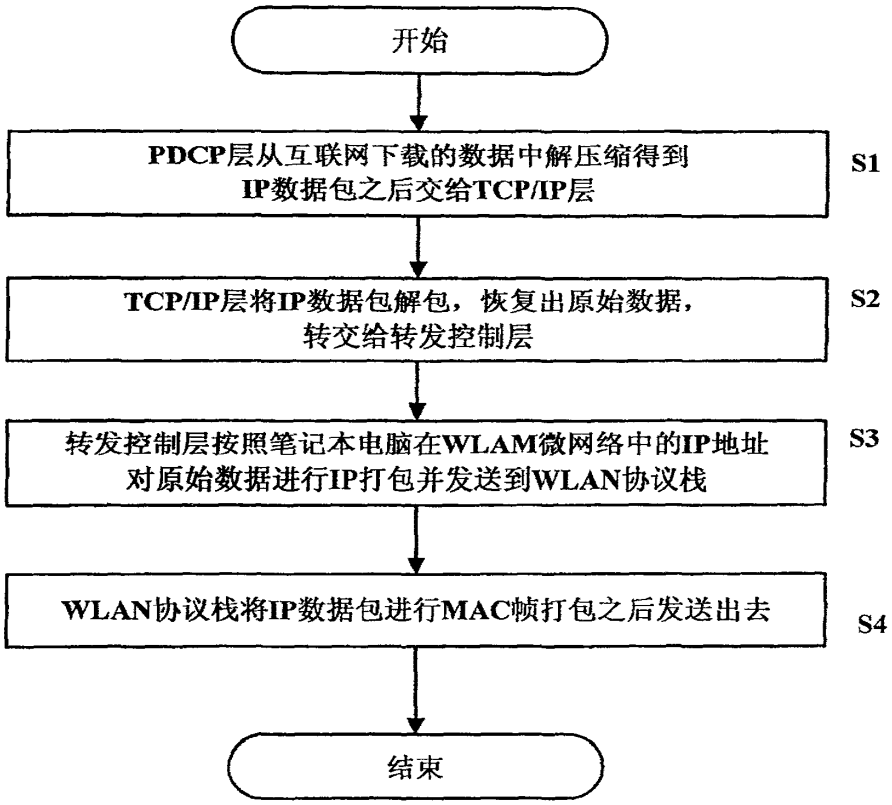

开始
PDCP层从互联网下载的数据中解压缩得到IP数据包之后交给TCP/IP层
S1
TCP/IP层将IP数据包解包，恢复出原始数据，转交给转发控制层
S2
转发控制层按照笔记本电脑在WLAM微网络中的IP地址对原始数据进行IP打包并发送到WLAN协议栈
S3
WLAN协议栈将IP数据包进行MAC帧打包之后发送出去
S4
结束

图 2

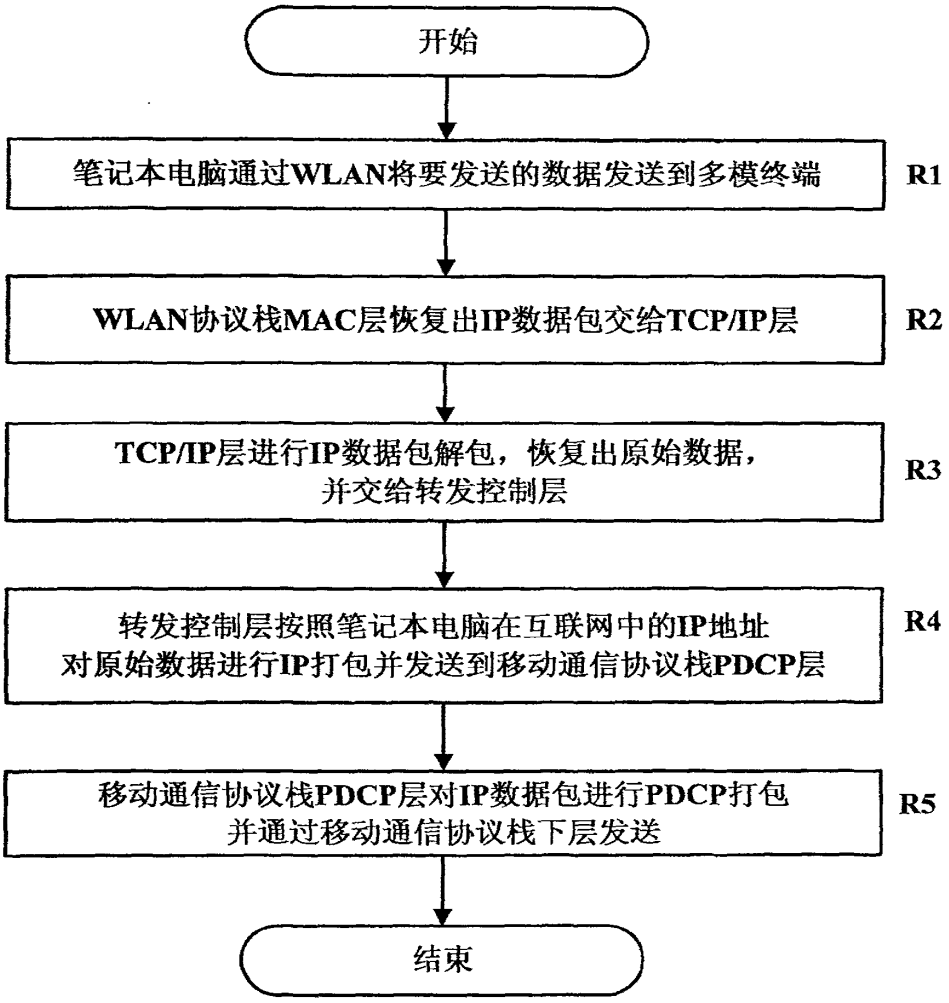

开始
笔记本电脑通过WLAN将要发送的数据发送到多模终端
R1
WLAN协议栈MAC层恢复出IP数据包交给TCP/IP层
R2
TCP/IP层进行IP数据包解包，恢复出原始数据，
并交给转发控制层
R3
转发控制层按照笔记本电脑在互联网中的IP地址
对原始数据进行IP打包并发送到移动通信协议栈PDCP层
R4
移动通信协议栈PDCP层对IP数据包进行PDCP打包
并通过移动通信协议栈下层发送
R5
结束

图 3

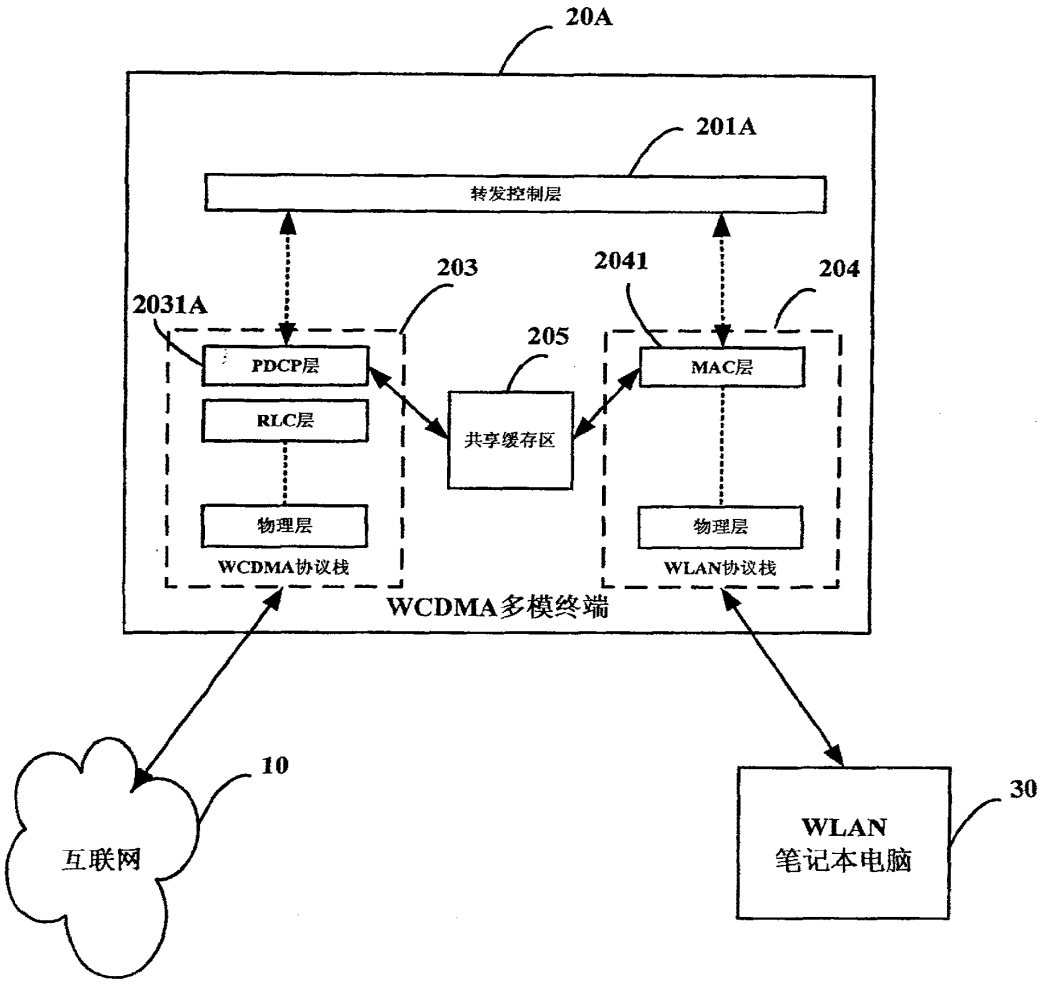

20A
201A
转发控制层
203
2041
204
2031A
205
PDCP层
RLC层
物理层
WCDMA协议栈
共享缓存区
MAC层
物理层
WLAN协议栈
WCDMA多模终端
10
互联网
30
WLAN
笔记本电脑

图 4

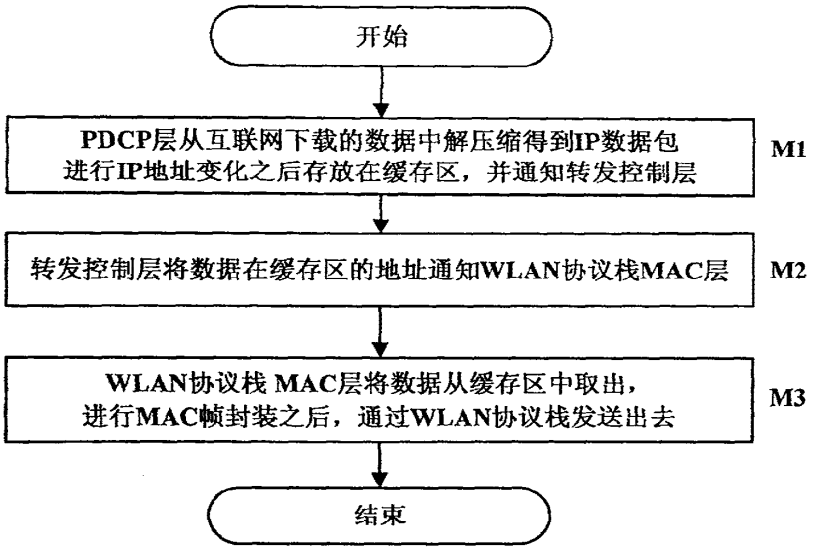

开始
PDCP层从互联网下载的数据中解压缩得到IP数据包
进行IP地址变化之后存放在缓存区，并通知转发控制层
M1
转发控制层将数据在缓存区的地址通知WLAN协议栈MAC层
M2
WLAN协议栈 MAC层将数据从缓存区中取出，
进行MAC帧封装之后，通过WLAN协议栈发送出去
M3
结束

图 5

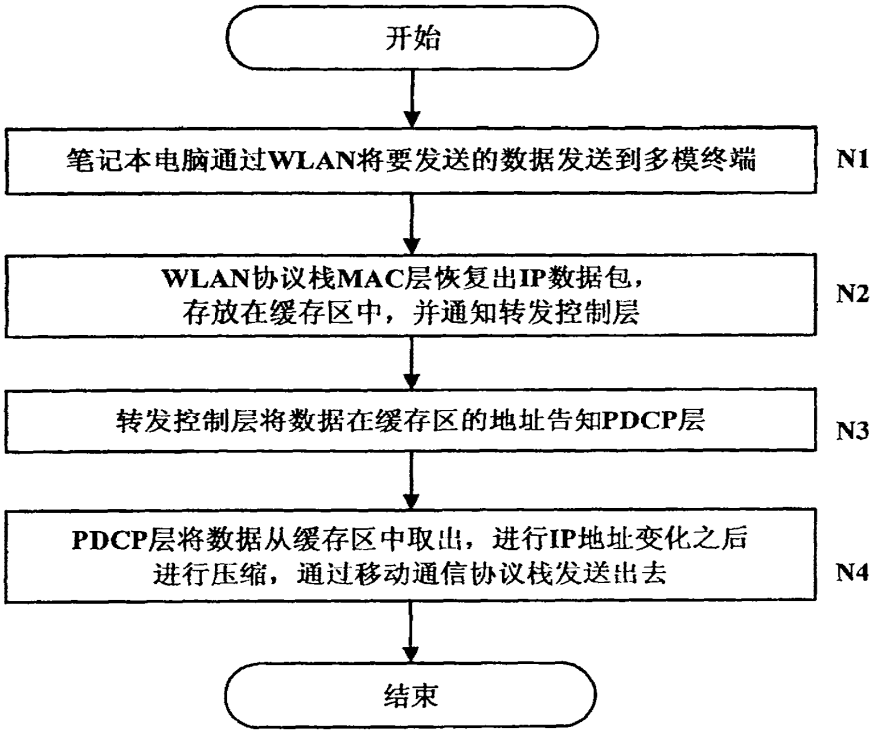

开始
笔记本电脑通过WLAN将要发送的数据发送到多模终端
N1
WLAN协议栈MAC层恢复出IP数据包，
存放在缓存区中，并通知转发控制层
N2
转发控制层将数据在缓存区的地址告知PDCP层
N3
PDCP层将数据从缓存区中取出，进行IP地址变化之后
进行压缩，通过移动通信协议栈发送出去
N4
结束

图 6

[19] 中华人民共和国国家知识产权局

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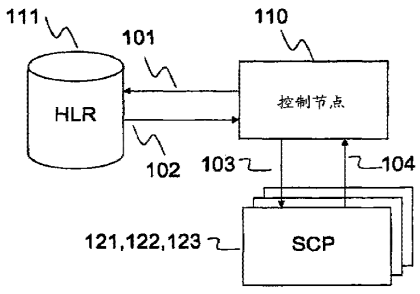
权利要求书 3 页 说明书 15 页 附图 6 页

[54] 发明名称

智能网服务

[57] 摘要

公开了用于处理与对移动电信网络的订户的呼叫相关联的智能网服务的方法、控制节点(110)和计算机程序，该网络包括所述控制节点(110)、HLR 5(111)和一个或多个 SCP(121、122、123)。所述控制节点(110)a)向所述 HLR(111)发送(101)与所述呼叫相关的路由信息的一个或多个请求；b)从所述 HLR(111)接收(102)与所述服务相关联的服务触发元素；c)使用所述触发元素在所述一个或多个(SCP)(121、122、123)中调用(103)所述服务；和 d)从所述一个或多个 SCP(121、122、123)接收与所述触发元素所关联的服务相关的信息。



1. 一种用于处理与对移动电信网络的订户的呼叫相关联的智能网服务的方法，该网络包括控制节点（110）、归属位置寄存器（111）和一个或多个服务控制点（121、122、123），该方法包括以下步骤：

a. 所述控制节点（110）向所述归属位置寄存器（111）发送（101）与所述呼叫相关的路由信息的一个或多个请求；

b. 所述控制节点（110）从所述归属位置寄存器（111）接收（102）与所述服务相关联的服务触发元素；

c. 所述控制节点（110）使用所述触发元素在所述一个或多个服务控制点（121、122、123）中调用（103）所述服务；

d. 所述控制节点（110）从所述一个或多个服务控制点（121、122、123）接收（104）与所述触发元素所关联的所述服务相关的信息。

2. 根据权利要求 1 所述的方法，其中所述归属位置寄存器（111）响应于路由信息的第一请求发送所述多个服务触发元素中的第一服务触发元素，并且响应于路由信息的第二请求发送所述多个服务触发元素中的第二服务触发元素。

3. 根据权利要求 1 所述的方法，其中所述归属位置寄存器（111）响应于路由信息的第一请求发送所述多个服务触发元素。

4. 根据权利要求 2 或 3 所述的方法，其中所述归属位置寄存器（111）响应于路由信息的第二请求发送所请求的路由信息。

5. 根据权利要求 2-4 中任何一个权利要求所述的方法，其中所述路由信息的第二请求与所述控制节点（110）和被访问移动服务交换中心（112）之间信令连接的建立相关联。

6. 根据前面任何一个权利要求所述的方法，其中所述请求的路由信息包括用于对所述订户的呼叫的移动站漫游号码。

7. 根据前面任何一个权利要求所述的方法，其中多个所述服务触发元素包括在一个移动应用部分消息中。

8. 根据权利要求 7 所述的方法，其中由于移动应用部分的分段，所述一个移动应用部分消息在多个信令连接控制部分消息中从所述归属位置寄存器（111）发送到所述控制节点。

9. 根据权利要求 1-6 中任何一个权利要求所述的方法，其中所述一个或多个所述服务触发元素作为前缀或后缀包括在移动站漫游号码

中。

10. 根据权利要求 1-6 中任何一个权利要求所述的方法，其中所述服务触发元素包括分离的参数。

11. 根据前面任何一个权利要求所述的方法，其中所述服务的第一服务在所述一个或多个服务控制点（121、122、123）中的第一服务控制点（121）中执行，并且所述服务的第二服务在所述一个或多个服务控制点（121、122、123）中的第二服务控制点（122）中执行。

12. 根据权利要求 11 所述的方法，其中所述服务的第一服务是预付费计费服务。

13. 根据权利要求 11 或 12 所述的方法，其中所述服务的第二服务是诸如个人问候服务的移动被叫服务。

14. 根据前面任何一个权利要求所述的方法，其中所述控制节点（110）是网关移动交换中心（110）。

15. 根据权利要求 2-14 中任何一个权利要求所述的方法，其中所述第一请求包含所述订户的移动站 ISDN 号码。

16. 根据权利要求 2-15 中任何一个权利要求所述的方法，其中所述第二请求包含所述订户的移动站 ISDN 号码和“抑制 T-CSI”参数。

17. 根据前面任何一个权利要求所述的方法，其中所述路由信息的一个或多个请求中的第一或第二请求包括移动应用部分发送路由信息消息。

18. 一种用于处理与对移动电信网络的订户的呼叫相关联的智能网服务的控制节点（110），该网络包括控制节点（110）、归属位置寄存器（111）和一个或多个服务控制点（121、122、123）；控制节点（110）配置用于向所述归属位置寄存器（111）发送对与所述呼叫相关联的路由信息的一个或多个请求；控制节点（110）还配置用于从所述归属位置寄存器(111)接收与所述服务相关联的多个服务触发元素，并且用于通过使用所述触发元素在所述一个或多个服务控制点（121、122、123）中调用所述服务；控制节点还配置用于从所述一个或多个服务控制点（121、122、123）接收与所述触发元素所关联的所述服务相关的信息。

19. 一种计算机程序，其包括致使计算机执行依照权利要求 1-17 中任何一个所述的方法的程序指令。

20. 一种载体上的计算机程序，其包括致使计算机执行依照权利要求 1-17 的方法的计算机可执行指令。

21. 根据权利要求 19 所述的计算机程序，其中所述载体是记录介质、计算机存储器、只读存储器或电载体信号。

智能网服务

技术领域

本发明涉及用于处理与对移动电信网络的订户的呼叫相关的智能网服务的方法和控制节点。

背景技术

在当前的电信网络技术诸如GSM（全球移动通信系统）中，智能网服务是众所周知的。

GSM网络的核心网络子系统的中央部件是移动服务交换中心（MSC）。它起类似于PSTN或ISDN的交换节点的作用，并且另外提供用于处理移动订户所需的所有功能，诸如注册、鉴权、位置更新、移交和到漫游订户的呼叫路由。这些服务连同几个功能实体一起被提供，它们一起构成了核心网络子系统。网关MSC（GMSC）提供到固定网络（诸如PSTN或ISDN）的连接。核心网络子系统中的功能实体之间的信令使用7号信令系统，7号信令系统在ISDN中用于中继信令并且在当前的公共网络中广泛使用。

归属位置寄存器（HLR）和访问位置寄存器（VLR）与MSC一起提供GSM的呼叫路由和漫游能力。HLR包含在相应的GSM网络中注册的每个订户的所有管理信息，以及该移动站的当前位置。移动站的位置通常是与该移动站相关联的VLR的信令地址的形式。在逻辑上说，每个GSM网络一个HLR，尽管它可以实现为分布式数据库。

VLR为当前位于由该VLR控制的地理区域内并且当前由该VLR服务的每个移动站包含对于呼叫控制和提供预订的服务所必须的来自HLR的选定管理信息。尽管每个功能实体可以实现为独立的单元，当前所有的交换设备制造商将VLR与MSC一起实现，这样由MSC控制的地理区域与VLR所控制的地理区域相对应，从而简化了所需的信令。MSC不包含关于特定移动站的信息；这个信息在位置寄存器中存储。

接下来，将描述GSM网络中典型的入局呼叫建立（移动被叫（mobile terminating call））。

当订户对移动电话发起呼叫，它拨打与该电话用户相关联的电话号

码，即所谓的移动站 ISDN（MSISDN）号码，并且该呼叫被路由到该移动电话运营商的网关 MSC。网关是用于互连两个网络的节点。网关通常在 MSC 中实现，在这种情况下 MSC 称为 GMSC。GMSC 作为从公共交换电话网络的外面部分到供应商网络的入口。

如上所述，电话可以自由地漫游到运营商网络之中或漫游合作商的网络上的任何地方，包括其它国家。因此，网关 MSC 的第一个任务是确定移动电话的当前位置以便连接该呼叫。它通过咨询 HLR 来做到这一点，如上所述 HLR 知道在该时刻该电话与哪个访问位置寄存器（VLR）相关联（如果有的话）。

当 HLR 接收到这个查询消息，它确定是否应该将该呼叫路由到另一个号码（称为转移）或者应该将该呼叫直接路由到被呼叫订户的移动站。

如果电话的所有者先前已经请求将所有的入局呼叫转接到另一个号码，该补充服务也称为到被转接号码（FTN）的无条件呼叫转接（CFU），那么这个 FTN 被存储在 HLR 中。如果是这种情况，那么将 FTN 返回该网关 MSC 以便立即路由到那个目的地。

如果移动站当前不与 VLR 相关联（例如因为电话已经关机），那么 HLR 返回称为呼叫不可转接（CFNR）号的号码给 GMSC，并且该呼叫被转接到那里。许多运营商可以将这个值自动设置为该电话的语音邮箱号码，这样呼叫者可以留下消息。

最后，如果 HLR 知道该电话在特定 VLR 的管辖范围之内，那么它将从该 VLR 请求一个临时号码，即所谓的移动站漫游号（MSRN）。这个号码被中继到 GMSC，GMSC 使用它将该呼叫路由到称为被访问 MSC（VMSC）的另一个 MSC。

当 VMSC 接收到该呼叫时，使用 MSRN 在 VLR 中寻找该电话的记录。这个记录标识该电话的位置区域。对该区域中的所有移动电话杆（mobile phone mast）发生寻呼。当订户的移动电话响应时，该电话的确定位置被返回给 VMSC。VMSC 随后将呼叫转接到合适的电话杆，并且该电话响铃。如果订户应答，通过该 VMSC 和 GMSC 创建回到人进行呼叫的网络的语音通路，并且随后是一般的电话呼叫。

也可能呼叫没有被应答。如果订户在忙于另一个呼叫（并且没有使用呼叫等待），那么 VMSC 将呼叫路由到预定的遇忙呼叫转接（CFB）

号码。类似的，如果订户在一段时间（通常是 30 秒）之后没有应答呼叫，那么 VMSC 将该呼叫路由到预定的无应答呼叫转接（CFNRy）号码。再次的，运营商可以决定默认将这个值设置为该电话的语音邮箱，以便呼叫者能够留下消息。

智能网（IN）是与电信网络耦合的使得运营商能够采用运营商特有的增值服务（VAS）的网络。通过来自智能网的智能增加了交换机中驻留的智能，智能网中的智能安置在分布在网络中各处的计算机节点中。这给网络运营商提供了更有效地开发、采用和控制服务的方式。新的服务可以快速引入到电信网络中。一旦引入，服务可以容易地定制以满足个体客户的需求。

IN 服务通常由服务控制点（SCP）提供。SCP 是与电信网络中的其它节点和实体通信的控制计算机。SCP 包括一个或多个 IN 服务的服务逻辑，并且可选包括 IN 服务预订数据，该预订数据允许 SCP 依照订户的特定设置执行 IN 服务，即特制对该订户的服务执行。当建立了呼叫时，电信网络可以询问 SCP 并且请求处理这个呼叫的指令。例如，SCP 被咨询提供 800 号码到实际电话号码的翻译，并且为该呼叫对该 800 号码的所有者计费。SCP 在物理上可以与智能网的其它组件分离，或者可以与这些其它组件组合到单个节点中。

在 GSM 网络中，IN 服务预订信息在 HLR 中存储。HLR 中驻留两个类型的信息：（1）静态订户信息和（2）动态订户信息。后者例如需要允许将入局呼叫路由到该移动订户。HLR 存储以下信息及其它：

- 国际移动订户身份（IMSI）；只由该网络使用的内部订户身份；
- MSISDN 号码；
- VLR 地址；
- 关于补充服务的订户数据。

IN 服务可以分为两个种类。一个种类包括为发起呼叫（终端发起呼叫-MOC）的订户调用的服务。这些服务称为终端发起（MO）服务。MO 服务的一个例子是出局呼叫屏蔽。

每个 IN 服务订户在他的 HLR 中用发起 CAMEL 预订信息（O-CSI）元素标记，该元素用于在 SCP 标识特定服务。一旦订户启动 MO 呼叫，O-SCI 启动 MOC 服务的触发。在上述例子中采用了 CAMEL，其代表“用于移动网络增强逻辑的定制应用”。CAMEL 发展为用于扩展陆地线路 IN 电话

服务的标准，诸如呼叫等待和到 GSM 移动电话的呼叫转接。

另一种类包括为接收呼叫（移动被叫-MTC）的订户调用的服务。这些服务称为移动被叫（mobile terminating,MT）服务。移动被叫服务的例子是呼叫转移服务和个人问候服务（PGS）。PGS 是与漫游支线相关的服务。PGS 使得当在 GMSC 和 VMSC 之间（所谓的漫游支线）建立了信令连接，向呼叫方显示个人化的问候。个人化问候替换了传统的警报音调（“响铃音调”）。这样，个人化问候主要与漫游支线的建立相关；只有当漫游支线建立并且警报了被呼叫方的时候响铃音调才变得有效。每个 IN 服务订户在他的 HLR 中利用终止 CAMEL 预订信息（T-SCI）标志来标记，该标记用于在 SCP 标识特定服务。这在试图对订户呼叫期间启动 MTC 服务的触发。

依照当前技术，控制节点在 MTC 处理期间可以询问 HLR 以便获得来自 HLR 的指令。控制节点可以是 GMSC。响应于控制节点的询问，HLR 可以发送用于被叫的 IN 触发信息。在 HLR 和控制节点之间交换的 IN 触发信息已经被标准化。例如，如在 3GPP TS 29.002 中由 3GPP（第三代合作伙伴计划）指定的，T-CSI 是 GSM 标准化的用于被叫的 IN 触发信息。IN 触发信息包括 IN 服务所驻留的 SCP 的地址和标识该 SCP 内的特定 IN 服务的服务关键字。

按照在 IN 触发信息中为订户指定的，控制节点使用该 IN 触发信息来调用 SCP 中的 IN 服务。响应于服务调用，SCP 依赖于该服务执行的结果向控制节点发送指令，例如继续建立呼叫或被叫。当前网络通常设置为为一个 MTC 处理 IN 服务的单个调用。但是近来的发展显示，在被叫处理期间需要调用两个或更多 IN 服务。

专利申请 WO00/25528 公开了在 SCP 中包含的服务交互管理器。服务交互管理器的任务是确定应该为订户执行 SCP 中的哪些可用服务并且以特定顺序调用这些服务。

发明内容

本发明的目的是提供通过允许订户对于一个呼叫拥有多于一种 IN 服务来克服当前技术的缺点的方法和设备。

在本发明的第一方面，提出了一种处理与对移动电信网络的订户的呼叫相关的智能网服务的方法，该网络包括控制节点、归属位置寄存

器和一个或多个服务控制点，该方法包括以下步骤：

a. 所述控制节点向所述归属位置寄存器发送与所述呼叫相关的路由信息的一个或多个请求；

b. 所述控制节点从所述归属位置寄存器接收与所述服务相关的服务触发元素；

c. 所述控制节点使用所述服务触发元素在所述一个或多个服务控制点中调用所述服务；

d. 所述控制节点从所述一个或多个服务控制点接收与所述触发元素所关联的所述服务相关的信息。

以此方式，可以为预订了属于订户的一个呼叫的一个或多个 IN 服务的该订户处理多个服务触发元素。IN 服务不需知道在用于该呼叫的控制节点中一个或多个其它 IN 服务的存在。换句话说，第一服务不需知道是否将调用第二服务，反之亦然。因为服务不要求关于为这个呼叫可能调用其它 IN 服务的知识，服务可以运行在不同平台上并且可以由不同的卖主供应。

存在本发明的若干实施例。

例如，本发明可以规定归属位置寄存器响应于路由信息的第一请求而发送所述多个服务触发元素中的第一服务触发元素，并且响应于路由信息的第二请求而发送所述多个服务触发元素中的第二服务触发元素。

所述路由信息的第一请求可以包括：

- 订户的 MSISDN 号码。

对路由信息的第一请求的响应可以包括：

- 第一服务触发元素。

路由信息的第二请求可以包括：

- 订户的 MSISDN 号码；
- HLR 应该在所述响应中抑制第一服务触发元素的指示。这个指示可以是例如“抑制 T-SCI”参数。

对路由信息的第二请求的响应可以包括：

- 用于呼叫被服务订户的 MSRN；
- 第二服务触发元素；
- 订户的 MSRN 的前缀或后缀。

由于 MAP 分段，MAP 消息可以在多个信令连接控制部分消息中被从 HLR 发送给 GMSC。第一服务，例如预付费计费服务，在第一服务控制点中执行，第二服务，例如 PGS，在第二 SCP 中执行。

以此方式，可以将预付费服务和 PGS 提供给相同订户；预付费服务和 PGS 可以在不同平台上运行并且彼此不相关。

当本发明用于 PGS 时，呼叫订户可以收听任何呼叫进程消息，即使当利用最优路由的早期呼叫转接或晚期呼叫转接发生的时候。

本发明的另一个优点是可以将 PGS 提供给虚拟私人网（VPN）订户。

在本发明的第二方面，提出了一种处理与对移动电信网络的订户的呼叫相关的智能网服务的控制节点，该网络包括所述控制节点、HLR 和一个或多个 SCP；控制节点配置用于向所述 HLR 发送与所述呼叫相关的路由信息的一个或多个请求；控制节点还配置用于从所述 HLR 接收与所述服务相关联的多个服务触发元素，并且用于通过使用所述触发元素在所述一个或多个 SCP 中调用所述服务；控制节点进一步配置用于从所述一个或多个 SCP 接收与所述触发元素所关联的服务相关的信息。

在优选实施例中，控制节点包括 GMSC。无论如何，控制节点也可以包括诸如 MSC 或 SCP 的设备。

本发明的第三方面提出了一种计算机程序，该计算机程序包括致使计算机执行依照本发明的方法的程序指令。

计算机程序可以存储在载体上，并且可以包括致使计算机执行依照本发明的方法的计算机可执行指令。

计算机程序的载体可以是记录介质、计算机存储器、只读存储器或电载体信号。

本发明提出可以为对订户的特定呼叫类型提供多种 IN 服务。至此，HLR 可以已经注册了特定 IN 呼叫类型预订的多个指示（此后称为 IN 触发元素）。

附图说明

图 1 是移动电信网络中设备的当前技术配置的框图。

图 2 是依照本发明的方法和设备的信令图。

图 3 是依照本发明的设备的框图。

图 4 是本发明的方法实施例的信令图。

图 5 是本发明的方法实施例的信令图。

图 6 是本发明的方法实施例的信令图。

具体实施方式

为了本发明的目的，GMSC 中的 MT 呼叫处理可以分为两个逻辑部分：

（1） 被叫处理；

（2） 漫游支线处理。

被叫处理包括从 HLR 获取 T-CSI 并且调用第一 CAMEL 服务。第一 CAMEL 服务可以强加呼叫限制或者可以施加呼叫转接。通常，对于被呼叫订户漫游的情况，第一 CAMEL 服务也可以用于终止计费。HLR 也可以与 T-CSI 一起返回其它 IN 触发元素。

漫游支线处理包括从 HLR 获取 MSRN 并且将呼叫从 GMSC 路由到终止 MSC，在终止 MSC 被呼叫方在该时刻注册。注意“漫游支线”同等适用于订户在被访问公共陆地移动网络（VPLMN）和订户在归属公共陆地移动网络（HPLMN）中的情况。也就是说，在这个例子中“漫游”不与“在另一个网络或另一个国家中”相关联。

本发明提出了沿着上述区别的线路，为 MT 呼叫进行两个 IN 服务的调用。依照本发明，可以定义用于 MT 呼叫的两种类型的 IN 服务：

（1）需要对 MT 呼叫的控制并且可能需要影响该呼叫的路由的能力的 IN 服务。这些类型的 IN 服务还需要知道目的地订户的位置，从而可以施加计费。

（2）只要求到目的地订户的漫游支线的 IN 服务。这类 IN 服务只有在建立了漫游支线，即 GMSC 已经从 HLR 接收到 MSRN 的时候，才被调用。

如果 HLR 返回转接号码（FTN）而不是 MSRN，那么将不存在漫游支线，并且随后将不会调用与漫游支线相关的 IN 服务。

图 1 是移动电信网络中的设备的当前技术配置的框图。所示的实体至少在概念上属于不同于移动通信网络的智能网。智能网包括 HLR 111、SCP1 121、SCP2 122 和 GMSC 110。GMSC 110 与 SCP1 和 SCP2 以及 HLR 111 对接，以执行众所周知的 IN 触发功能。SCP1 和 SCP2 包括在处理移动被叫期间可以被顺序调用的智能网服务。

图 2 是依照本发明的方法和设备的信令图，其具有各种元件之间的

关系的概览。该方法包括以下步骤:

步骤 101 控制节点 110 向 HLR 111 发送与所述呼叫相关的路由信息的一个或多个请求;

步骤 102 HLR 111 向所述控制节点 110 发送与所述服务相关联的多个服务触发元素;

步骤 103 控制节点 110 使用所述触发元素在一个或多个服务控制点 121、122、123 中调用一个或多个服务;

步骤 104 所述一个或多个服务控制点 121、122、123 向所述控制节点 110 发送与所述触发元素所关联的一个或多个服务相关的信息。

图 3 是依照本发明的设备和它们的相互关系的框图。

所述块(设备)之间的线表示通信路径。HLR 111 可以与 GMSC 110 和 VMSC 112 通信。GMSC 可以与 SCP1 121 和其它随后被调用的 SCP(SCPn) 122 通信。GMSC 110 可以与 VMSC 112 通信。

图 4 是本发明的方法实施例的信令图,该实施例包括图 3 所示的设备之间的通信序列,所述设备包括 GMSC 110、HLR 111、多个 SCP121、122 和 VMSC 112。在这个例子中,订户预订了 CAMEL 服务并且另外预订了可能是 IN 服务的至少一个服务。对于这个例子,只示出了与两个 SCP 121、122 的通信。但是,可以为第三个 SCP 重复步骤 6-11,并且以此类推。以下步骤发生:

步骤 401 ISUP 初始地址消息(IAM)到达 GMAC 110; GMSC 110 分析 ISUP IAM 中的被呼叫方号码并且推导出该被呼叫方号码是属于它自己的网络的 MSISDN。

步骤 402 GMSC 110 向 HLR 111 发送 MAP 发送路由信息(SRI)。GMSC 110 在 MAP SRI 中指示它支持 CAMEL。

步骤 403 被呼叫方具有对用于 MT 呼叫处理的 CAMEL 服务的预订。结果是,HLR 111 向 GMSC 110 发送 MAP SRI-Res,其包括用于 MT 呼叫的 IN 触发信息,T-CSI。

步骤 404 GMSC 110 使用 T-CSI 来调用 CAMEL 服务。GMSC 110 例示内部 GSM 服务交换功能(gsmSSF)实体; gsmSSF 向 SCP 发送 CAP 初始检测点(IDP)。SCP1 121 的地址和与这个 IN 对话相关的其它数据从 T-CSI 获得。GsmSSF 功能与 GMSC 交互工作。基于在用户的预订中定义的并且从 HLR 发送给 GMSC 的信息,设置 GMSC 和 gsmSSF 内的服务触发。

这些触发用于指示 gsmSSF 何时应该与 gsmSCF 通信。这接下来将确定如何处理基于 IN 的服务。

步骤 405 SCP1 121 以 CAP 继续（CUE）响应，以便通知 GMSC 110 MT 呼叫处理可以继续，即可以将呼叫传递给被呼叫订户。SCP1 121 和 GMSC 110 之间的控制会话可以保持。SCP1 121 中的 CAMEL 服务不需要具有关于除了该 CAMEL 服务外当前执行的其它 IN 服务的知识。

步骤 406 GMSC110 向 HLR 111 发送第二询问，即向 HLR 111 发送第二 MAP SRI。第二 MAP SRI 包括“抑制 T-CSI”标志。

步骤 407 HLR 111 通过“抑制 T-CSI”的存在识别出该 MAP SRI 是第二 SRI，并且通过向被呼叫方当前所注册的 VMSC 112 发送 MAP 提供漫游号码（PRN）来响应。

步骤 408 VMSC 112 分配用于这个呼叫的 MSRN，并且通过向 HLR 111 发送 MAP PRN-Res 而向 HLR 111 返回该 MSRN。

步骤 409 HLR 111 通过向 GMSC 110 发送 MAP SRI 响应（SRI-Res）而将该 MSRN 转发给 GMSC 110。被呼叫订户预订了用于 MT 呼叫处理的第二 IN 服务。第二 IN 服务是如前面本发明的公开部分所述的漫游支线处理类型。HLR 111 在所述 MAP SRI-Res 中包括与这个第二 IN 服务相关联的 IN 触发信息。为了本发明的目的，这个第二 IN 触发信息命名为“RICK”（漫游支线 IN 种类关键字）。RICK 可以具有如 T-CSI 或 TICK（终止 IN 种类关键字）的结构。为了能够接收 RICK，GMSC 110 在第二 MAP SRI（步骤 6）中指示它支持这个信息元素，即它支持 RICK。“支持 RICK”的指示类似于“支持 TICK”的指示。从 GMSC 向 HLR 发送的“支持 TICK”向 HLR 表明它支持 TICK。TICK 具有与 T-CSI 可比的功能性；但是，TICK 不是标准化的。

步骤 410 GMSC 110 认识到 MSRN 伴随有 RICK。RICK 对于 GMSC 110 作为表明漫游支线应该服从 IN 服务的指示。因此，GMSC 110 通过向 SCPn 122 发送 CAP IDP，使用 RICK 调用 IN 服务。SCPn 122 的地址和与这个 IN 对话相关的其它数据从 RICK 获得。

步骤 411 SCPn 122 以 CAP CUE 响应，通知 GMSC 110 该 MT 呼叫处理可以继续，即可以建立到被呼叫订户的漫游支线。

步骤 412 GMSC 110 通过向目的地交换机发送 ISUP IAM，建立到被叫订户的漫游支线。该 ISUP IAM 包含从 HLR 111 接收到的 MSRN。

步骤 401-408 表示一般 GSM 呼叫处理。

步骤 409 表示对现有 MT 呼叫处理的改进。HLR 111 一般将只返回 MSRN 给 GMSC 110。步骤 409 对 MAP SRI-Res 添加了 RICK。

步骤 410 和 411 在现有漫游支线处理中不存在。这些步骤表示在 GMSC 110 中对用于 MT 呼叫处理的第二 IN 服务的调用。

当该呼叫被传递到被呼叫订户时，两个 IN 服务可以维持有效。作为向 GMSC 110 发送 T-CSI 的结果而触发的第一 IN 服务可以对整个呼叫维持有效，并且按照用于那个服务的 IN 协议所允许的具有完全可用的能力。

作为向 GMSC 110 发送 RICK 的结果而触发的第二 IN 服务也可以对整个呼叫维持有效。但是，这个 IN 服务应该使用具有某些限制的 IN 能力。作为一个例子，这个服务不应该应用呼叫转接，因为那将影响该呼叫的预付费服务。

本发明可以应用在不同类型的 GSM 呼叫转接上。通过取类似于个人问候服务（PGS）的服务作为例子，可以充分显示出这一点。在呼叫转接的情况下，呼叫的目的地发生变化。一些运营商要求当到语音邮箱的呼叫转接发生时，PGS 服务终止。

关于在呼叫转接的情况下终止 PGS 服务，基本存在两种类型的呼叫转接：早期呼叫转接（ECF）和晚期呼叫转接（LCF），当在 GMSC 110 中发生早期呼叫转接的时候，GMSC 110 没有从 HLR 111 接收用于这个呼叫的 MSRN 并且没有建立漫游支线。GMSC 110 将不建立到被呼叫方的漫游支线，并且作为结果，将不调用漫游支线 IN 服务。

在早期呼叫转接的情况中，HLR 111 不在第二 SRI 结果中返回 MSRN 并且依照本发明不返回 RICK。GMSC 110 现在将该呼叫转接到转接目的地，其可以是例如语音邮箱或者是呼叫结束服务。因为 HLR 111 没有返回 RICK，将不存在 PGS 调用。呼叫订户现在可以收听语音邮箱播放的任何通告，即使语音邮箱将 ISUP 应答消息（ISUP ANM）的生成推迟了限定的持续时间。

当在 VMSC 112 中发生晚期转接的时候，随后可以应用晚期呼叫转接的最佳路由（ORLCF）以便将呼叫处理返回给 GMSC 110。GMSC 110 终止该漫游支线，并且因而漫游支线 IN 服务同样将被终止。在晚期呼叫转接的情况下，所述呼叫已经被路由到被呼叫订户的目的地 MSC。当晚

期呼叫转接的情况发生，VMSC 112 可以向 GMSC 110 发送 MAP 恢复呼叫处理（RCH）；MAP RCH 的发送是 ORLCF 的一部分。

当 GMSC 110 接收到 MAP RCH 并且批准对 ORLCF 的请求，它释放漫游支线并且创建转接支线。呼叫方可以收听由转接目的地生成的任何通告。

一些运营商采用语音邮箱系统，由此初始通告是免费的。这可以通过令语音邮箱推迟 ISUP ANM 的生成来实现。如果 PGS 在这样的情况下保持有效，那么呼叫方将不会收听到在 ISUP 地址完成消息（ACM）和 ISUP ANM 之间播放的任何通告。原因是个人问候服务保持有效，直到检测到 ISUP ANM。在那种情况下将不会收听到语音邮箱的初始通告。

本发明解决了那个问题，因为在晚期呼叫转接联合 ORLCF 的情况下 PGS 将被终止。

如果晚期呼叫转接没有经受 ORLCF，那么漫游支线服务可以监视诸如呼叫进程（CPG）和 ACM 的 ISUP 消息。这些 ISUP 消息可以指示转接正在发生。

一些运营商应用 PGS 的服务节点解决方案。这意味着对于 PGS 订户，漫游支线需要通过特殊的服务节点（位于内嵌在用于漫游支线的 ISUP 通信链路内）路由。服务节点将把该呼叫广播给目的地 MSC。依照本发明可以实现通过服务节点的漫游支线的路由。利用 RICK 调用的 IN 服务可以为 MSRN 提供前缀，导致呼叫被通过所述服务节点路由。

可替换地，包括在 SRI-Res 中的 RICK 可以具有数字前缀的形式；诸如 GMSC 的交换节点在将该呼叫转接到下一个交换节点之前，将该 RICK 放置在 MSRN 的前面。

可以配置在这个转换节点中的 B-号码分析，使得 RICK 导致选择到所述服务节点的路由。

漫游支线的预订的或一般的 IN 服务的概念可以用于以下类型的服务：

- 个人问候：只有当漫游支线成功建立的时候需要播放个人问候；如果由于无论什么原因，漫游支线没有能够建立或者在应答之前终止，那么不需要个人问候。运营商可以希望在为呼叫分配 MSRN 之前调用 PGS。那样的效果可能是，当到第二被呼叫方的转接发生时，呼叫方将仍然听到第一方的个人问候。另外，这样的配置将具有可能没有收听

到呼叫转接通告的效果。

- 服务节点路由：对于特定订户，漫游支线可能需要通过服务节点被路由。

- 载体选择：订户可以预订只适用于漫游支线的载体选择服务。

当 HLR 111 向 GMSC 110 发送包括 MSRN 的 SRI-Res 时，它可以包括 RICK。作为可选的实施方式，HLR 111 可以应用在 SRI-Res 中包括 RICK 的标准，类似于借此 HLR 111 应用在第一 SRI-Res 中包括 T-CSI 的标准的情况。这些标准可以是例如：

- 只有当订户在 HPLMN 中的时候在 SRI-Res 中包括 RICK;
- 只有当入局呼叫是语音呼叫的时候在 SRI-Res 中包括 RICK。

不是所有的 MT 呼叫需要终止 IN 服务。类似的，不是所有的 MT 呼叫需要 RICK 服务。作为一个例子，当预付费订户在 HPLMN 中的时候，HLR 111 可以在 SRI 中抑制 T-CSI。结果是，将没有 MT 呼叫服务被触发。如果在这种情况下仍然需要调用漫游支线服务，那么 HLR 111 可以在第一 SRI-Res 中包括 RICK。GMSC 110 中对 RICK 的进一步处理如前所述。

图 5 是本发明的方法实施例的信令图，其中通过在 GMSC 110 建立漫游支线之前由 GMSC 110 向 HLR 111 询问多个（IN）服务来执行对多个服务的调用。在这个实施例中，HLR 111 在第一询问发送所述 IN 服务的所有信息。步骤 501-502 依照当前技术执行。在这里例子中涉及 3 个 SCP，尽管本发明可以应用于多个 SCP。

步骤 501 ISUP IAM 到达 GMSC 110。

步骤 502 GMSC 110 分析 ISUP IAM 中的被呼叫方号码并且推导出该被呼叫方号码是属于它自己的网络的 MSISDN。GMSC 110 向 HLR 111 发送 MAP SRI。GMSC 110 在 MAP SRI 中指示它支持 CAMEL。GMSC 可以支持多个 CAMEL 阶段。

步骤 503 被呼叫方具有对用于 MT 呼叫处理的 CAMEL 服务的预订。结果是，HLR 111 向 GMSC 110 发送 MAP SRI-Res，其包括用于 MT 呼叫的 IN 触发信息，T-CSI。

步骤 504 GMSC 110 使用 T-CSI 来调用 CAMEL 服务。GMSC 110 例示内部 gsmSSF 实体；gsmSSF 向 SCP 121 发送 CAP IDP。SCP1 121 的地址和与这个 IN 对话相关的其它数据从 T-CSI 获得。

步骤 505 SCP1 121 以 CAP 继续（CUE）或 CAP 连接（CON）响应，以便通知 GMSC 110 MT 呼叫处理可以继续，即可以将呼叫传递给被呼叫订户。依赖于 IN 服务的要求，SCP1 121 和 GMSC 110 之间的控制会话可以保持或者终止。SCP1 121 中的 CAMEL 服务不具有关于除了该 CAMEL 服务外当前执行的其它 IN 服务的知识。

步骤 506 GSMC 110 基于 T-CSI 通过调用第二 IN 服务响应，第二 IN 服务可以仍是 CAMEL 服务。SCPn 122 的地址从第二 T-CSI 获得。

步骤 507 SCP 以 CAP CUE 或 CAP CON 响应，以便通知 GMSC 110 该呼叫处理可以继续，即可以将呼叫传递给被呼叫订户。这里，同样的，SCP2 122 中的 CAMEL 服务不具有关于这个呼叫的第一服务和第三服务的知识。

步骤 508 GMSC 110 检查是否为该订户提供了其它 IN 服务；如果提供的有，那么它基于 T-CSI 通过调用第三 IN 服务进行响应，该第三 IN 服务还可以是 CAMEL 服务。SCP3 123 的地址从第三 T-CSI 获得。

步骤 509 SCP 123 以 CAP CUE 或 CAP CON 响应，以便通知 GMSC 110 该呼叫处理可以继续，即可以将呼叫传递给被呼叫订户。SCP3 123 中的 CAMEL 服务不具有关于这个呼叫的第一服务和第二服务的知识。

步骤 510 GMSC 110 检查是否为该订户提供了其它 IN 服务；如果没有用于该订户的更多 IN 服务，那么 GMSC 110 通过向 HLR 111 发送第二询问进行响应，即向 HLR 111 发送第二 MAP SRI。

步骤 511 HLR 111 识别出该 MAP SRI 是第二 SRI 并且通过向被呼叫方当前被注册的 VMSC 112 发送 MAP 提供漫游号码（PRN）进行响应。

步骤 512 VMSC 112 分配 MSRN，并且通过向 HLR 111 发送 MAP PRN-Res 而向 HLR 111 返回该 MSRN。

步骤 513 HLR 111 通过向 GMSC 110 发送 MAP RSI-Res 将 MSRN 转发给 GMSC 110。

步骤 514 GMSC 110 通过向目的地交换机发送 ISUP IAM 建立到被呼叫订户的漫游支线。ISUP IAM 包含从 HLR 111 接收到的 MSRN。

图 6 是本发明的方法实施例的信令图，由此为 MO 呼叫调用多个 IN 服务。在这个实施例中发生以下步骤：

步骤 601 订户 621 利用 MSC 623 在被访问 GSM 网络中注册。

步骤 602 MSC 623 联系订户 621 的归属 PLMN 中的 HLR 111。

步骤 603 HLR 111 向 MSC 623 发送用于 IN 服务的多个触发元素。这些触发元素与用于终端发起呼叫和移动转接呼叫的 IN 服务相关联。

步骤 604 订户 621 建立 MO 呼叫。

步骤 605 MSC 623 使用第一触发元素以调用在与所述第一触发元素相关联的 SCP1 121 中的第一 IN 服务。

步骤 606 SCP1 121 中的第一 IN 服务通过发送 CAP 继续消息或 CAP 连接消息将呼叫的控制交回 MSC 623。

步骤 607 MSC 623 使用来自触发元素列表的第二触发元素在 SCP2 122 中调用第二 IN 服务。

对 SCP2 122（步骤 607 和 608）和 SCP3 123（609、610）重复步骤 605 和 606，并且直到调用了所有指示的 IN 服务。MSC 623 中的呼叫处理一般继续步骤 611:

步骤 611 MSC 623 将该呼叫路由到目的地 627。任何调用的 IN 服务可以在该呼叫的整个持续时间保持有效，或者可以在较早的阶段终止。

本发明覆盖以下情景:

1） GMSC 中用于 MT 呼叫处理的 IN 服务调用后跟随 GMSC 中用于漫游支线的 IN 服务调用。

2） GMSC 中用于漫游支线的 IN 服务调用。

3） 如同（1），由此 HLR 在第一询问响应中发送多个 IN 服务触发元素，目的是这些多个触发元素用于与所述 MT 呼叫相关联的多个 IN 服务的调用。

4） 如同（1），由此 HLR 在第二询问响应中发送多个 IN 服务触发元素，目的是这些多个触发元素用于与所述漫游支线相关联的多个 IN 服务的调用。

5） 如同（2），由此 HLR 在第二询问响应中发送多个 IN 服务触发元素，目的是这些多个触发元素用于与所述漫游支线相关联的多个 IN 服务的调用。

6） 如同（1），由此（3）和（4）组合。

7） 如同（1），由此 HLR 在第一询问响应中发送多个 IN 服务触发元素，目的是这些多个触发元素中的一些用于与所述 MT 呼叫相关联的多个 IN 服务的调用，并且这些多个触发元素中的一些用于与所述漫游支线相关联的多个 IN 服务

的调用。

8） 只有当漫游支线建立的时候需要用于 MT 呼叫的某些 IN 服务。本发明提供实现这一点的工具。

9） 本发明可以用于在预订的基础上或者对于所有服务的订户通过 ISUP 服务节点路由漫游支线。

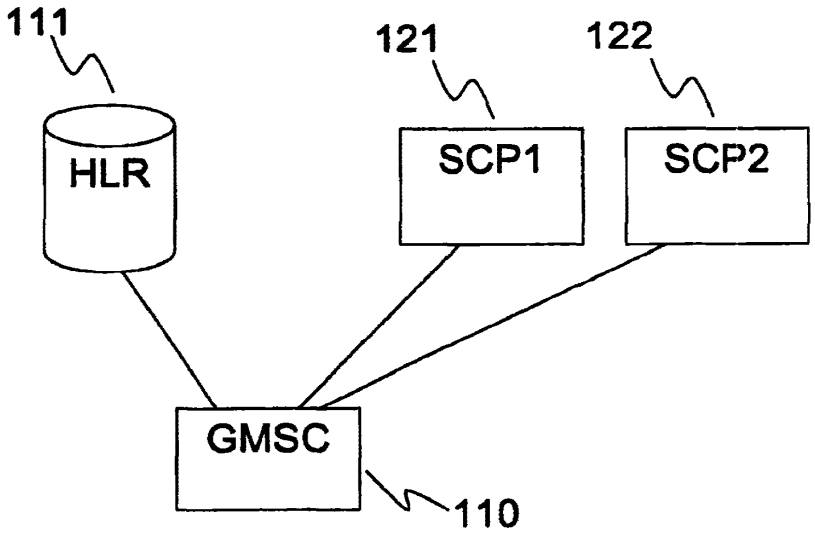


图 1

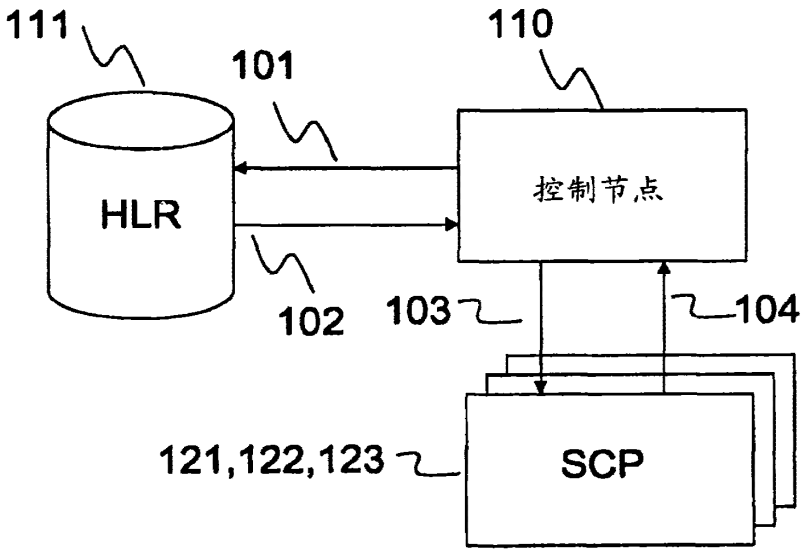


图 2

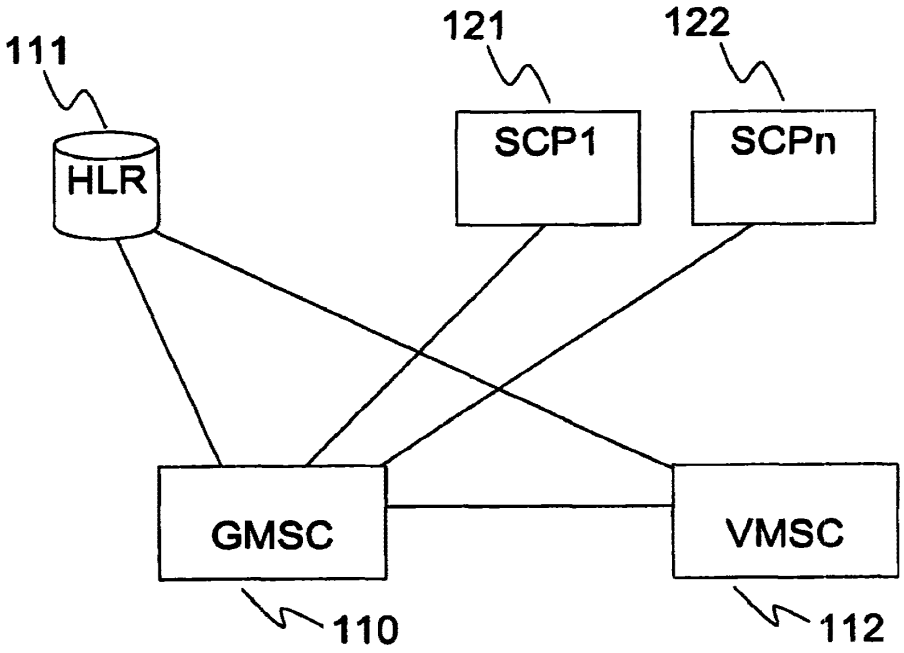


图 3

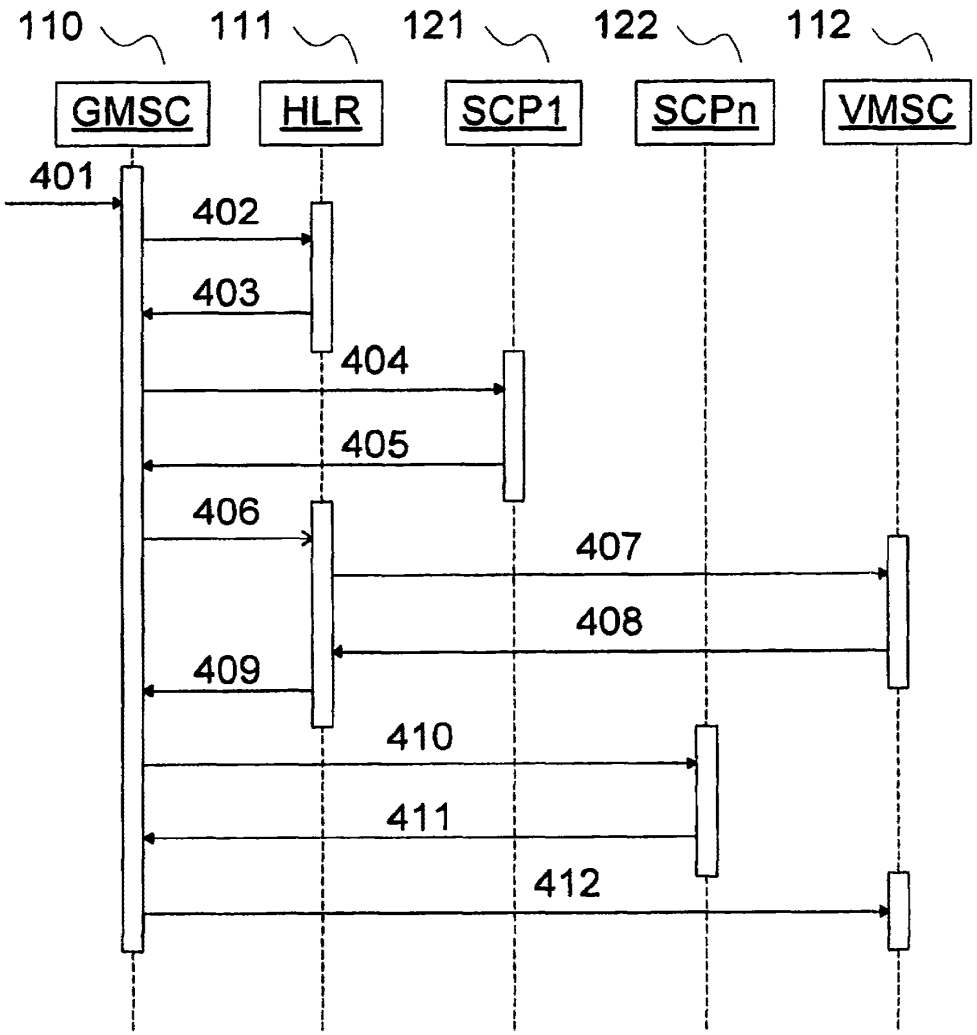

110
111
121
122
112
GMSC
HLR
SCP1
SCPn
VMSC
401
402
403
404
405
406
407
408
409
410
411
412

图 4

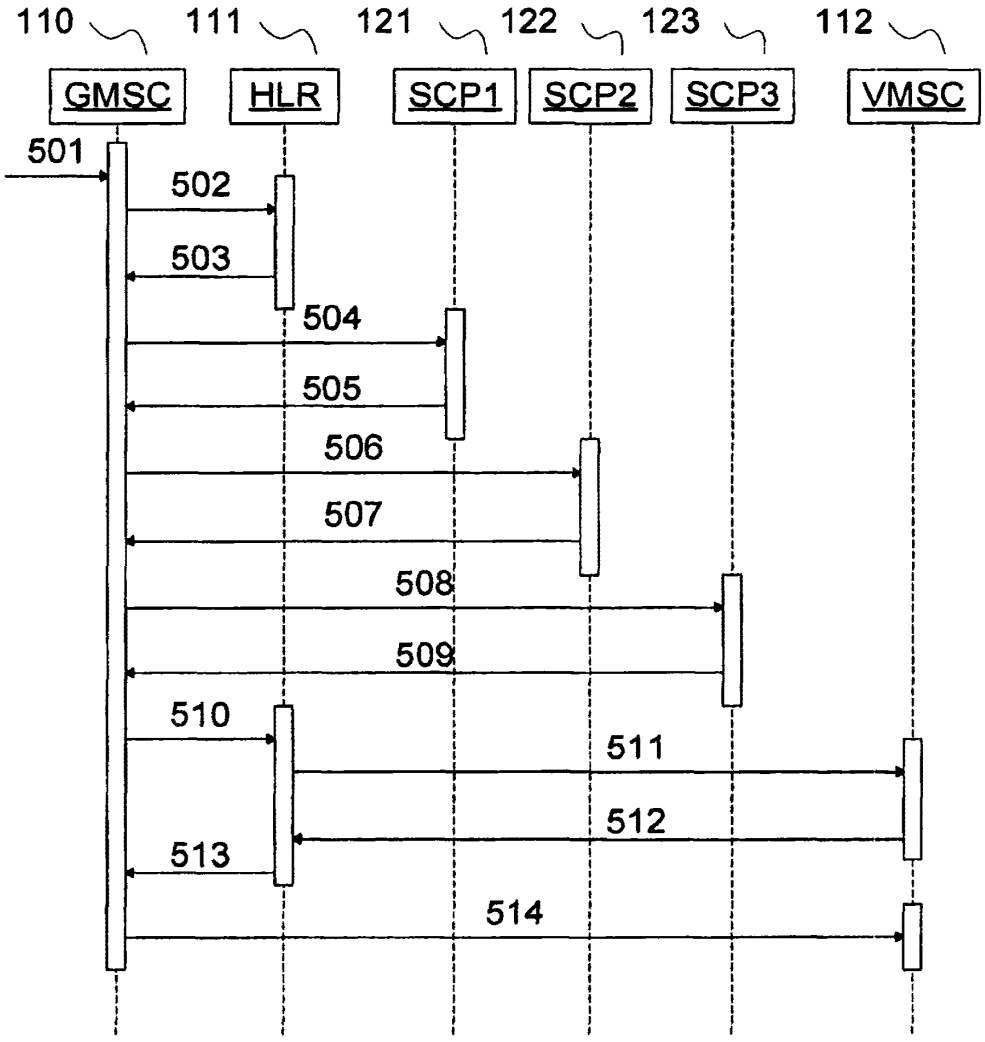

110
111
121
122
123
112
GMSC
HLR
SCP1
SCP2
SCP3
VMSC
501
502
503
504
505
506
507
508
509
510
511
512
513
514

图 5

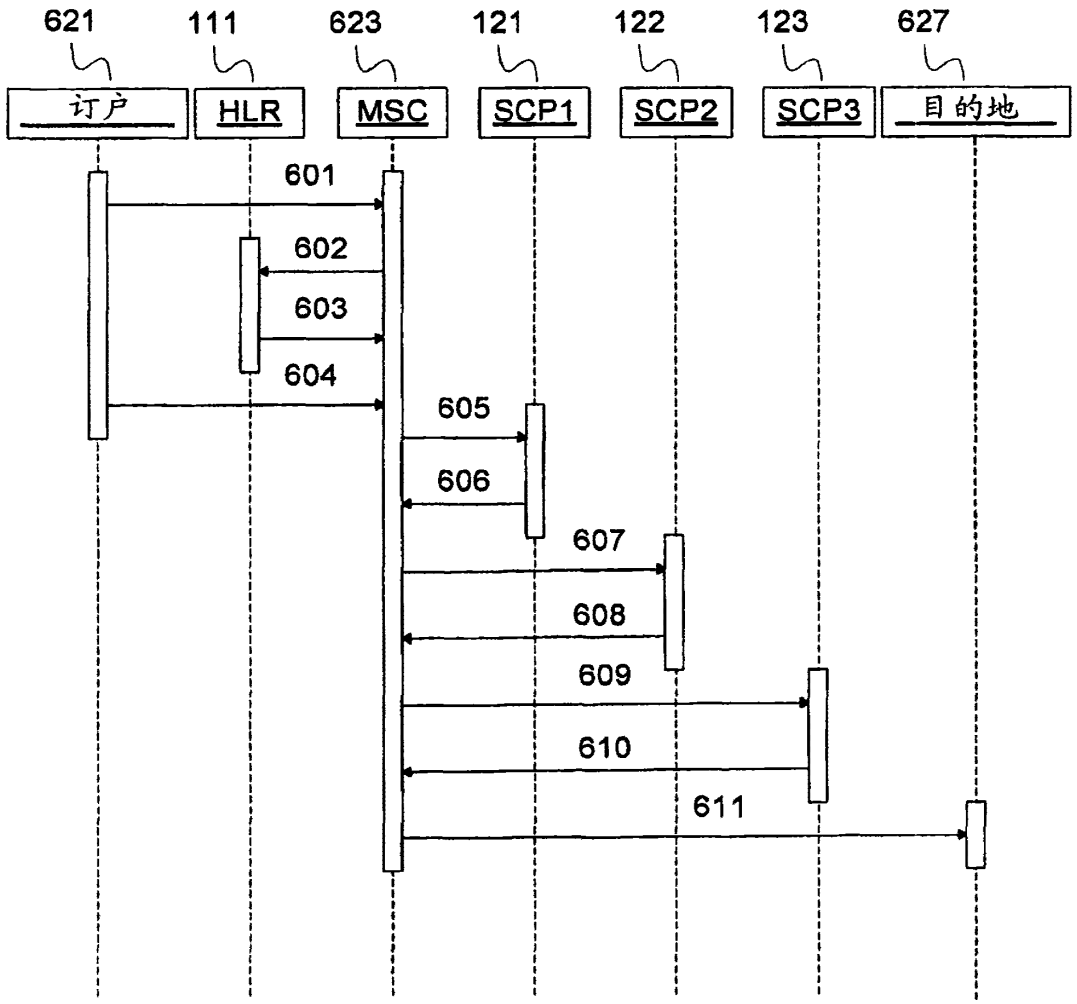

621
111
623
121
122
123
627
订户
HLR
MSC
SCP1
SCP2
SCP3
目的地
601
602
603
604
605
606
607
608
609
610
611

图 6

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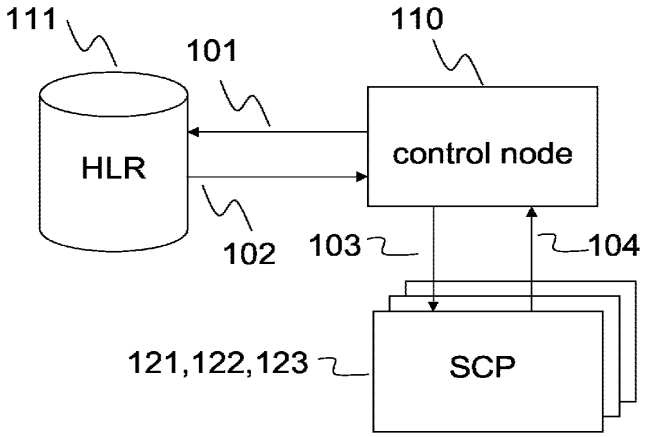
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(54) Title: INTELLIGENT NETWORK SERVICES



(57) Abstract: A method and control node (110) and computer program are disclosed for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network, the network comprising said c ontrol node (110), a HLR 5 (111) and one or more SCPs (121, 122, 123). Said control node (110) a) sends (101) to said HLR (111) one or more requests for routing information associated with said call; b) receives (102) from said HLR (111) service trigger elements associated with said services; c) uses said trigger elements for invoking (103) said services in said one ore more SCPs (121, 122, 123); and d) receives (104) from said one or more 10 SCPs (121, 122, 123) information related to said services associated with said trigger elements.

WO 2007/068288 A1

INTELLIGENT NETWORK SERVICES

FIELD OF INVENTION

The invention relates to a method and control node for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network.

BACKGROUND

Intelligent Network services are well known in the state of the art telecommunications networks such as GSM (Global System for Mobile communications).

The central component of the Core Network subsystem of a GSM network is the Mobile services Switching Center (MSC). It acts like a switching node of the PSTN or ISDN, and additionally provides all the functionality needed to handle a mobile subscriber, such as registration, authentication, location updating, handovers, and call routing to a roaming subscriber. These services are provided in conjunction with several functional entities, which together form the Core Network subsystem. A Gateway MSC (GMSC) provides the connection to the fixed networks (such as the PSTN or ISDN). Signaling between functional entities in the Core Network subsystem uses Signaling System Number 7 (SS7), used for trunk signaling in ISDN and widely used in current public networks.

The Home Location Register (HLR) and Visitor Location Register (VLR), together with the MSC, provide the call-routing and roaming capabilities of GSM. The HLR contains all the administrative information of each subscriber registered in the corresponding GSM network, along with the current location of the mobile station. The location of the mobile station is typically in the form of the signaling address of the VLR associated with the mobile station. There is logically one HLR per GSM network, although it may be implemented as a distributed database.

The VLR contains selected administrative information from the HLR, necessary for call control and provision of the subscribed services, for each mobile station currently located in the geographical area controlled by the VLR and currently served by that VLR. Although each functional entity can be implemented as an independent unit, currently all manufacturers of switching equipment implement the VLR together with the MSC, so that the geographical area controlled by the MSC corresponds to that controlled by the VLR, thus simplifying the signaling required. The MSC contains no information about particular mobile stations; this information is stored in the location registers.

Next, a typical incoming call setup (mobile terminating call) in a GSM network is described.

When a subscriber places a call to a mobile phone, he dials the telephone number associated with the phone user, the so-called Mobile Station ISDN (MSISDN) number, and the call is routed to the mobile phone operator's Gateway MSC. A gateway is a node used to interconnect two networks. The gateway is often implemented in an MSC, in which case the MSC is referred to as the GMSC. The GMSC acts as the "entrance" from exterior portions of the Public Switched Telephone Network onto the provider's network.

As noted above, the phone is free to roam anywhere in the operator's network or on the networks of roaming partners, including in other countries. So the first job of the Gateway MSC is to determine the current location of the mobile phone in order to connect the call. It does this by consulting the HLR, which, as described above, knows which Visited Location Register (VLR) the phone is associated with at the moment, if any.

When the HLR receives this query message, it determines whether the call should be routed to another number (called a divert), or the call should be routed directly to the mobile station of the called subscriber.

If the owner of the phone has previously requested that all incoming calls be diverted to another number, which supplementary service is also known as Call Forwarding Unconditional (CFU) to a Forwarded-to-Number (FTN), then this FTN is stored in the HLR. If that is the case, then the FTN is returned to the Gateway MSC for immediate routing to that destination.

If the mobile station is not currently associated with a VLR (e.g. because the phone has been turned off), then the HLR returns a number known as the Call Forwarding Not Reachable (CFNRc) number to the GMSC, and the call is forwarded there. Many operators may set this value automatically to the phone's voice mail number, so that callers may leave a message.

Finally, if the HLR knows that the phone is in the jurisdiction of a particular VLR, then it will request a temporary number, a so called Mobile Station Roaming Number (MSRN) from that VLR. This number is relayed to the GMSC, which uses it to route the call to another MSC, called the Visited MSC (VMSC).

When the call is received by the VMSC, the MSRN is used to find the phone's record in the VLR. This record identifies the phone's location area. Paging occurs to all mobile phone masts in that area. When the subscriber's mobile responds, the exact location of the mobile is returned to the VMSC. The VMSC then forwards the call to the appropriate phone mast, and the phone rings. If the subscriber answers, a speech path is created through the VMSC and GMSC back to the network of the person making the call, and a normal telephone call follows.

It is also possible that the phone call is not answered. If the subscriber is busy on another call (and call waiting is not being used), then the VMSC routes the call to a pre-determined Call Forwarding Busy (CFB) number. Similarly, if the subscriber does not answer the call after a period of time (typically 30 seconds), then the VMSC routes the call to a pre-determined Call Forwarding No Reply (CFNRy) number. Once again, the operator may decide to set this value by default to the voice mail of the mobile so that callers can leave a message.

An Intelligent Network (IN) is a network that is coupled to a telecommunications network that enables operators to deploy operator-specific Value Added Services (VAS). The intelligence that resides in the switch is augmented by intelligence from the Intelligent Network, which is placed in computer nodes that are distributed throughout the network. This provides the network operator with the means to develop, deploy and control services more efficiently. New services can be rapidly introduced into the telecommunications network. Once introduced, services are easily customized to meet individual customers' needs.

IN services are typically provided by a Service Control Point (SCP). An SCP is a control computer that communicates with other nodes and entities in the telecommunications network. The SCP comprises the service logic of one or more IN services and optionally IN service subscription data that allows the SCP to execute an IN service in accordance with the specific settings of a subscriber, i.e. tailor the service execution to the subscriber. When a call is established, the telecommunications network may query the SCP and ask for instructions for handling this call. For instance, an SCP is consulted to provide the translation of an 800 number to an actual phone number and to bill the owner of the 800 number for the call. SCPs may be physically separated from other components of the Intelligent Network or may be combined with these other components into a single node.

In a GSM network the IN service subscription information is stored in the HLR. Two types of information reside in the HLR: (1) static subscriber information and (2) dynamic subscriber information. The latter is e.g. needed to allow incoming calls to be routed to the mobile subscriber. The HLR stores, amongst others:

- the International Mobile Subscriber Identity (IMSI); an internal subscriber identity used only by the network;
- MSISDN number;
- VLR address;
- subscriber data on supplementary services.

IN services may be divided into two categories. One category comprises services to be invoked for subscribers who initiate a call (Mobile Originated Call – MOC). These services are called Mobile Originating (MO) services. An example of an MO service is outgoing call screening.

Each IN service subscriber is marked in his HLR with an Originating CAMEL Subscription Information (O-CSI) element, which is used to identify a specific service at the SCP. The O-CSI initiates the triggering of the MOC service as soon as the subscriber initiates a MO call. In the above example CAMEL is deployed, which stands for “Customised Applications for Mobile network Enhanced Logic”. CAMEL was developed as a standard for extending landline IN telephony services such as call waiting and call forwarding to GSM mobile phones.

The other category comprises services to be invoked for subscribers who receive a call (Mobile Terminated Call – MTC). These services are called mobile terminating (MT) services. Examples of mobile terminating services are call diversion services and Personal Greeting Service (PGS). PGS is a service that is associated with a roaming leg. PGS entails that when a signalling connection is established between a GMSC and VMSC (a so called "roaming leg"), then a personalised greeting is played to the calling party. The personalised greeting replaces the conventional alerting tone ("ring tone"). As such, the personalised greeting is primarily related to the establishment of the roaming leg; the ring tone becomes active only when the roaming leg is established and the called party is alerted. Each IN service subscriber is marked in his HLR with a Terminating CAMEL Subscription Information (T-CSI) flag, which is used to identify a specific service at the SCP. This initiates the triggering of the MTC service during a call attempt to the subscriber.

According to the state of the art, a control node may query a HLR during MTC handling to obtain instructions from the HLR. The control node may be a GMSC. In response to the query by the control node, the HLR may send IN trigger information for the terminating call. The IN trigger information exchanged between the HLR and the control node has been standardized. For example T-CSI is the GSM standardized IN trigger information for terminating calls, as specified by 3GPP (3rd Generation Partnership Project) in 3GPP TS 29.002. IN trigger information comprises among others the address of the SCP where the IN service resides and the service key, which identifies a particular IN service within the SCP.

The control node uses the IN trigger information to invoke the IN service in the SCP as specified for the subscriber in the IN trigger information. In response to the service invocation, the SCP sends an instruction to the control node to e.g. continue call set up or to terminate the call depending on the outcome of the service execution.
Current networks are typically arranged to handle a single invocation of an IN service for an MTC. Recent developments show however, that there is a need to invoke two or more IN services during terminating call handling.

Patent application WO00/25528 discloses a Service Interaction Manager, which is included in an SCP. The task of the Service Interaction Manager is to determine which

of the available services in the SCP should be executed for a subscriber and to invoke those services in a particular sequence.

SUMMARY

It is an object of the invention to provide a method and devices that overcome the drawbacks of the state of the art by permitting subscribers to have more than one IN Service for one call.

In a first aspect of the invention a method is proposed for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network, the network comprising a control node, a Home Location Register and one or more Service Control Points, the method comprising the steps of:

a. said control node sending to said Home Location Register, one or more requests for routing information associated with said call;
b. said control node receiving from said Home Location Register service trigger elements associated with said services;
c. said control node using said trigger elements for invoking said services in said one ore more Service Control Points;
d. said control node receiving from said one or more Service Control Points information related to said services associated with said trigger elements.

In this way multiple service trigger elements may be handled for a subscriber who is subscribed to one or more IN services pertaining to one call of the subscriber. IN Services need not be aware of the existence of one or more other IN services in that control node for that call. In other words, a first service does not need to know whether a second service will be invoked and vice versa. Since the services do not require knowledge about the possible invocation of other IN services for this call, the services may run on different platforms and may be supplied by different vendors.

There are several embodiments of the invention.

For example, the invention may provide for a Home Location Register to send a first service trigger element of said multiple service trigger elements, in response to a first request for routing information and a second service trigger element of said multiple service trigger elements in response to a second request for routing information.

The first request for routing information may comprise:

- MSISDN number of the subscriber.

The response to the first request for routing information may comprise:

- the first service trigger element.

The second request for routing information may comprise:

- MSISDN number of the subscriber;
- an indication that the HLR shall suppress the first service trigger element in the response. This indication may e.g. be the "suppress T-CSI" parameter.

The response to the second request for routing information may comprise:

- an MSRN to be used for the call to the served subscriber;
- the second service trigger element;
- a prefix or a suffix to the MSRN of the subscriber.

The MAP message may be sent from the HLR to a GMSC in multiple Signalling Connection Control Part messages, due to MAP segmentation. A first service, for example a pre-paid charging service, is executed in a first service control point and a second service, for example PGS, is executed in a second SCP.

In this way the pre-paid service and PGS may be offered to the same subscriber; the pre-paid service and PGS may run on different platforms and are not related to one another.

When the present invention is used for PGS, the calling subscriber may hear any call progress message even when early call forwarding or late call forwarding with optimal routing takes place.

Another advantage of the invention is, that PGS may be offered to Virtual Private Network (VPN) subscribers.

In a second aspect of the invention a control node is proposed for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network, the network comprising said control node, an HLR and one or more SCPs; the control node configured to send to said HLR one or more requests for routing information associated with said call; the control node further configured to receive from said HLR multiple service trigger elements associated with said services, and for invoking said services in said one ore more SCPs by using said trigger elements;

the control node further configured to receive from said one or more SCPs information related to said services associated with said trigger elements.

In a preferred embodiment the control node comprises a GMSC. The control node may however also comprise a device such as an MSC or an SCP.

A third aspect of the invention proposes a computer program, comprising program instructions for causing a computer to perform the method according to the invention.
The computer program may be stored on a carrier and may comprise computer executable instructions for causing a computer to perform the method according to invention.
The carrier of the computer program may be a record medium, computer memory, read-only memory or an electrical carrier signal.

The present invention proposes that multiple IN services may be provided for a particular call type to a subscriber. Hereto, an HLR may have registered multiple indications of particular IN call type subscriptions (hereinafter referred to as IN trigger elements).

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of a prior art configuration of devices in a mobile telecommunications network.
Figure 2 is a signalling diagram of the method and devices according to the present invention.
Figure 3 is a block diagram of devices according to the present invention.
Figure 4 is a signalling diagram of an embodiment of the method of the present invention.
Figure 5 is a signalling diagram of an embodiment of the method of the present invention.
Figure 6 is a signalling diagram of an embodiment of the method of the present invention.

DETAILED DESCRIPTION

For the purpose of the present invention, MT call handling in the GMSC may be divided in two logical parts:

(1) Terminating call handling;

(2) Roaming leg handling.

The terminating call handling includes the retrieving of T-CSI from the HLR and the invocation of the first CAMEL service. The first CAMEL service may enforce call restriction or may apply call forwarding. Typically, this first CAMEL service is also used for terminating charging, for the case that the called subscriber is roaming. The HLR may also return other IN trigger elements in combination with T-CSI.

The roaming leg handling includes the retrieving of the MSRN from HLR and the routing of the call from the GMSC to the terminating MSC, where the called party is registered at that moment. It is noticed that "roaming leg" is equally applicable for the case that the subscriber is in the Visited Public Land Mobile Network (VPLMN) and for the case that the subscriber is in the Home Public Land Mobile Network (HPLMN). I.e. "roaming" shall in this case not be associated with "being in another network or in another country".

The present invention proposes that the invocation of two IN services for an MT call is done along the line of above-described distinction. According to the present invention, two types of IN services for MT call may be defined:

(1) IN services that need control over the MT call and that may need the capability to influence the routing of the call. These kind of IN services also need to know the location of the destination subscriber, so charging may be applied.

(2) IN services that are required only for the roaming leg to the destination subscriber. This type of IN service is invoked only when a roaming leg is established, i.e. the GMSC has received an MSRN from the HLR.

If the HLR returns a Forwarded-to-Number (FTN) instead of an MSRN, then there will not be a roaming leg and consequently, no roaming leg-associated IN service will be invoked.

Figure 1 is a block diagram of a prior art configuration of devices in a mobile telecommunications network. The shown entities belong, at least conceptually, to an intelligent network that is distinct from the mobile communications network. The intelligent network includes HLR 111, SCP1 121, SCP2 122 and GMSC110. GMSC 110 interfaces to SCP1 and SCP2 as well as to HLR 111 for performing well known IN triggering functions. SCP1 and SCP2 contain intelligent network services that may be invoked sequentially during the handling of a mobile terminating call.

Figure 2 is a signalling diagram of the method and devices according to the present invention with a general overview of relations between various elements. The method comprises next steps:

Step 101 A control node 110 sends to a HLR 111, one or more requests for routing information associated with said call;

Step 102 The HLR 111 sends to said control 110 node multiple service trigger elements associated with said services;

Step 103 The control node 110 uses said trigger elements to invoke one or more services in one ore more Service Control Points 121, 122, 123;

Step 104 The one or more Service Control Points 121, 122, 123 sends to said control node 110 information related to on one or more services associated with said trigger elements.

Figure 3 is a block diagram of devices and their interrelations according to the present invention.

The lines between the blocks (devices) represent communication paths. HLR 111 may communicate with GMSC 110 and to VMSC 112. GMSC may communicate with SCP1 121 and other subsequently invoked SCPs (SCPn) 122. GMSC 110 may communicate with VMSC 112.

Figure 4 is a signalling diagram of an embodiment of the method of the present invention comprising a communication sequence between the devices as shown in figure 3, comprising GMSC 110, HLR 111, multiple SCPs 121, 122 and a VMSC 112. In this example a subscriber is subscribed to a CAMEL service and additionally to at least one service, which may be an IN, service. For this example only the communication with two

SCPs 121, 122 is shown. However, steps 6-11 may be repeated for a third SCP and so on. The following steps occur:

Step 401 ISUP Initial Address Message (IAM) arrives at the GMSC 110; the GMSC 110 analyses the Called Party Number in ISUP IAM and deduces that the Called Party Number is an MSISDN belonging to its own network.

Step 402 The GMSC 110 sends MAP Send Routing Information (SRI) to the HLR 111. The GMSC 110 indicates in MAP SRI that it supports CAMEL.

Step 403 The called subscriber has a subscription to a CAMEL service for MT call handling. As a result, the HLR 111 sends MAP SRI-Res to the GMSC 110, including the IN trigger information for MT calls, T-CSI.

Step 404 The GMSC 110 uses T-CSI to invoke a CAMEL service. The GMSC 110 instantiates an internal GSM Service Switching Function (gsmSSF) entity; the gsmSSF sends CAP Initial Detection Point (IDP) to the SCP. The address of the SCP1 121, and other data related to this IN dialogue, is obtained from T-CSI. The gsmSSF function interworks with the GMSC. Based on information defined in the user's subscription, and sent from the HLR to the GMSC, service triggers within the GMSC and gsmSSF are set. These triggers are used to dictate when the gsmSSF shall communicate with the gsmSCF. This in turn will determine how IN based services are handled.

Step 405 The SCP1 121 responds with CAP Continue (CUE), to inform the GMSC 110 that MT call handling may continue, i.e. the call may be delivered to the called subscriber. The control dialogue between SCP1 121 and GMSC 110 may be retained. The CAMEL service in SCP1 121 does not need to have knowledge about other IN services than the CAMEL service it's currently executing.

Step 406 The GMSC 110 sends a second interrogation to the HLR 111, i.e. sends a second MAP SRI to the HLR 111. The second MAP SRI includes the flag "suppress T-CSI".

Step 407 The HLR 111 recognizes the MAP SRI as a second SRI, by virtue of the presence of "suppress T-CSI", and responds by sending MAP Provide

Roaming Number (PRN) to the VMSC 112 where the called party is currently registered.

Step 408 The VMSC 112 allocates an MSRN for this call and returns the MSRN to the HLR 111, by sending MAP PRN-Res to the HLR 111.

Step 409 The HLR 111 forwards the MSRN to the GMSC 110, by sending MAP SRI Response (SRI-Res) to the GMSC 110. The called subscriber subscribes to a second IN service for MT call handling. The second IN service is of the type Roaming Leg handling, as described in an earlier part of the present invention disclosure. The HLR 111 includes the IN trigger information associated with this second IN service, in the MAP SRI-Res. For the purpose of the present invention, this second IN trigger information is named "RICK" (Roaming leg IN Category Key). RICK may have the structure as T-CSI or TICK (Terminating IN Category Key). In order to be able to receive RICK, the GMSC 110 would have indicated in the 2nd MAP SRI (step 6) that it supports this information element, i.e. it supports RICK. This indication of "RICK support" is similar to the indication of "TICK support". The "TICK support", which is sent from GMSC to HLR, indicates to HLR that it supports the TICK. The TICK has functionality that may be compared with T-CSI; TICK is, however, not standardised.

Step 410 The GMSC 110 recognizes that the MSRN is accompanied by a RICK. The RICK serves as an indication for the GMSC 110 that the roaming leg shall be subject to an IN service. The GMSC 110 therefore uses RICK to invoke an IN service, by sending CAP IDP to the SCPn 122. The address of the SCPn 122, and other data related to this IN dialogue, is obtained from RICK.

Step 411 The SCPn 122 responds with CAP CUE, to inform the GMSC 110 that MT call handling may continue, i.e. the roaming leg towards the called subscriber may be established.

Step 412 The GMSC 110 establishes the roaming leg towards the called subscriber, by sending ISUP IAM towards the destination exchange. The ISUP IAM contains the MSRN that was received from the HLR 111.

Steps 401 – 408 represent normal GSM call handling.

Step 409 represents an enhancement to the existing MT call handling. The HLR 111 will normally return only the MSRN to the GMSC 110. Step 409 adds the RICK to the MAP SRI-Res.

Step 410 and step 411 do not exist in existing Roaming Leg handling. These steps represent the invocation of the second IN service for the MT call handling in the GMSC 110.

When the call is delivered to the called subscriber, the two IN services may remain active. The first IN service, triggered as a result of the sending of T-CSI to the GMSC 110, may remain active for the entire call and has the full capability available as allowed by the IN protocol used for that service.

The second IN service, triggered as a result of the sending of RICK to the GMSC 110, may also remain active for the entire call. This IN service shall, however, use the IN capability with certain restrictions. As an example, this service shall not apply call forwarding, as that would affect a pre-paid service for the call.

The present invention may be applied on various types of GSM call forwarding. This may be shown most adequately by taking a service like Personal Greeting Service (PGS) as an example. In the case of call forwarding, the destination of the call changes. Some operators require that the PGS service be terminated when call forwarding to a voice mailbox takes place.

With regard to terminating a PGS service in a call forwarding situation there are basically two types of call forwarding: Early call forwarding (ECF) and Late Call Forwarding (LCF)

When early call forwarding takes place in the GMSC 110, the GMSC 110 does not receive an MSRN form the HLR 111 for this call and no roaming leg is established. The GMSC 110 will not establish a roaming leg to the called party and as a result, no roaming-leg IN service will be invoked.

In the case of early call forwarding, the HLR 111 does not return an MSRN in the second SRI Result and, according to the present invention, does not return the RICK. The GMSC 110 now forwards the call to the forwarded-to destination, which may e.g. be a voice mailbox or call completion service. Since the HLR 111 has not returned RICK,

there will not be a PGS invocation. The calling subscriber may now hear any announcement that is played by the voice mailbox, even when the voice mailbox defers the generation of the ISUP Answer Message (ISUP ANM) for a defined duration.

When late call forwarding takes place in the VMSC 112, then Optimal Routing of Late Call Forwarding (ORLCF) may be applied to return the call handling to the GMSC 110. The GMSC 110 terminates the roaming leg and hence, the roaming-leg IN service will be terminated as well. In the case of late call forwarding, the call is already routed to the destination MSC of the called subscriber. When the late call forwarding condition occurs, the VMSC 112 may send MAP Resume Call Handling (RCH) to the GMSC 110; the sending of MAP RCH is part of ORLCF.

When the GMSC 110 receives MAP RCH and approves the request for ORLCF, it releases the roaming leg and creates a forwarded leg. The calling party may hear any announcement generated by the forwarded-to destination.

Some operators deploy a voice mailbox system whereby the initial announcement is free of charge. This may be accomplished by having the voice mailbox defer the generation of the ISUP ANM. If PGS remains active in such situation, then the calling party will not hear any announcement that is played between ISUP Address Complete Message (ACM) and ISUP ANM. Reason is that the personal greeting remains active until the ISUP ANM is detected. The initial announcement of the voice mail would in that case not be heard.

The present invention resolves that problem, since PGS will be terminated in the case of late call forwarding in combination with ORLCF.

If late call forwarding is not subject to ORLCF, then the Roaming Leg service may monitor for ISUP messages such as Call Progress (CPG) and ACM. These ISUP messages may indicate that forwarding is taking place.

Some operators apply a service node solution for PGS. This means that for PGS subscribers, the roaming leg needs to be routed through a special service node (located in-line with the ISUP traffic link for the roaming leg). The service node will propagate the call to the destination MSC. The routing of the roaming leg through a service node may be accomplished in accordance with the present invention. The IN service that is

invoked with RICK may provide a prefix for the MSRN, resulting in that the call is routed through the service node.

Alternatively, the RICK that is included in the SRI-Res may have the form of a number prefix; a switching node such as a GMSC places the RICK in front of the MSRN, prior to forwarding the call to a next switching node.

The B-number analysis in this transition node may be configured such that the RICK results in the selection of a route to the service node.

The concept of a subscribed or generic IN service for a roaming leg may be used for the following type of services:

- Personal greeting: the playing of the personal greeting is required only when the roaming leg is successfully established; if the roaming leg can, for whatever reason, not be established or is terminated before answer, then the personal greeting is not required. An operator may wish to invoke PGS prior to the allocation of a MSRN for the call. The effect of that may be that when forwarding to a second called party takes place, the calling party will still hear a first party's personalised greeting. In addition, such configuration would have the effect that call forwarding announcements may not be heard.
- Service-node routing: for a particular subscriber, the roaming leg may need to be routed through a service node.
- Carrier selection: a subscriber may subscribe to a carrier selection service that is applicable for roaming leg only.

When the HLR 111 sends SRI-Res to GMSC 110 including MSRN, it may include RICK. As an implementation option, the HLR 111 may apply criteria for the inclusion of RICK in SRI-Res, similar to the case whereby the HLR 111 applies criteria for the inclusion of T-CSI in the first SRI-Res. These criteria may e.g. be:

- include RICK in SRI-Res only when subscriber is in HPLMN;
- include RICK in SRI-Res only when the incoming call is a speech call

Not all MT calls need a terminating IN service. Likewise, not all MT calls need a RICK service. As an example, when a pre-paid subscriber is in the HPLMN, the HLR

111 may suppress T-CSI in SRI. As a result, there will not be a MT call service triggered. If the invocation of the Roaming leg service is still required in this case, then the HLR 111 may include RICK in the first SRI-Res. The further handling of RICK in the GMSC 110 is as described earlier.

Figure 5 is a signalling diagram of an embodiment of the method of the present invention, wherein the invocation of multiple services is performed by a GMSC 110 interrogating an HLR 111 for multiple (IN) services before the GMSC 110 sets up the roaming leg. In this embodiment the HLR 111 sends all the information of the IN services at the first interrogation. Steps 501-502 are performed according to the current state of the art. In this example 3 SCPs are involved, although the invention is applicable to multiple SCPs.

Step 501 ISUP IAM arrives at the GMSC 110.

Step 502 The GMSC 110 analyses the Called Party Number in ISUP IAM and deduces that the Called Party Number is an MSISDN belonging to its own network. The GMSC 110 sends MAP SRI to the HLR 111. The GMSC 110 indicates in MAP SRI that it supports CAMEL. The GMSC may support multiple CAMEL phases.

Step 503 The called subscriber has a subscription to a CAMEL service for MT call handling. As a result, the HLR 111 sends MAP SRI-Res to the GMSC 110 including IN trigger information for MT calls, T-CSI.

Step 504 The GMSC 110 uses T-CSI to invoke a CAMEL service. The GMSC 110 instantiates an internal gsmSSF entity; the gsmSSF sends CAP IDP to the SCP 121. The address of the SCP1 121, and other data related to this IN dialogue, is obtained from T-CSI.

Step 505 The SCP1 121 responds with CAP Continue (CUE) or CAP Connect (CON), to inform the GMSC 110 that MT call handling may continue, i.e. the call may be delivered to the called subscriber. The control dialogue between SCP1 121 and GMSC 110 may be retained or terminated, depending on IN service requirements. The CAMEL service in SCP1 121 has no knowledge about other IN services than the CAMEL service that it is currently executing.

Step 506 The GMSC 110 responds by invoking a second IN service, which could again be a CAMEL service, based on T-CSI. The address of SCPn 122 is obtained from the second T-CSI.

Step 507 The SCP responds with CAP CUE or CAP CON, to inform the GMSC 110 that call handling may continue, i.e. the call may be delivered to the called subscriber. Here as well, the CAMEL service in SCP2 122 has no knowledge about the first service and the third service for this call.

Step 508 The GMSC 110 checks whether further IN services are provisioned for the subscriber; if they are, then it responds by invoking the third IN service, which could again be a CAMEL service, based on T-CSI. The address of SCP3 123 is obtained from the third T-CSI.

Step 509 The SCP 123 responds with CAP CUE or CAP CON, to inform the GMSC 110 that call handling may continue, i.e. the call may be delivered to the called subscriber. The CAMEL service in SCP3 123 has no knowledge about the first service and the second service for this call.

Step 510 The GMSC 110 checks whether further IN services are provisioned for the subscriber; if there are no more IN services for the subscriber, then the GMSC 110 responds by sending a second interrogation to the HLR 111, i.e. sends a second MAP SRI to the HLR 111.

Step 511 The HLR 111 recognises the MAP SRI as a second SRI and responds by sending MAP Provide Roaming Number (PRN) to the VMSC 112 where the called party is currently registered.

Step 512 The VMSC 112 allocates an MSRN and returns the MSRN to the HLR 111, by sending MAP PRN-Res to the HLR 111.

Step 513 The HLR 111 forwards the MSRN to the GMSC 110, by sending MAP SRI-Res to the GMSC 110.

Step 514 The GMSC 110 establishes the roaming leg towards the called subscriber, by sending ISUP IAM towards the destination exchange. The ISUP IAM contains the MSRN that was received from the HLR 111.

Figure 6 is a signalling diagram of an embodiment of the method of the present invention, whereby multiple IN services are invoked for an MO call. The following steps occur in this embodiment.

Step 601 A subscriber 621 registers with an MSC 623 in a visited GSM network.

Step 602 The MSC 623 contacts the HLR 111 in the Home PLMN of the subscriber 621.

Step 603 HLR 111 sends multiple trigger elements for IN services to the MSC 623. These trigger elements are associated to IN services for mobile originating calls and mobile forwarding calls.

Step 604 The subscriber 621 establishes an MO call.

Step 605 The MSC 623 uses a first trigger element to invoke a first IN service in SCP1 121 associated with the first trigger element.

Step 606 The first IN service in SCP1 121 gives control of the call back to the MSC 623, by sending a CAP Continue message or a CAP Connect message

Step 607 The MSC 623 uses the second trigger element from the list of trigger elements to invoke a second IN service in SCP2 122.

The steps 605 and 606 are repeated with SCP 2 122 (steps 607, 608) and SCP3 123 (609, 610) and further, until all indicated IN services are invoked. Call processing in MSC 623 continues with step 611 as normal:

Step 611 The MSC 623 routes the call to the destination 627. Any of the invoked IN services may remain active for the entire duration of the call, or may terminate at an earlier stage.

The following scenarios are covered by the invention:

1) IN service invocation in GMSC for MT call handling, followed by IN service invocation in GMSC for roaming leg.
2) IN service invocation in GMSC for roaming leg.

3) As (1), whereby the HLR sends multiple IN service trigger elements in the first interrogation response, with the purpose that these multiple trigger elements are used for the invocation of multiple IN services associated with the MT call.
4) As (1), whereby the HLR sends multiple IN service trigger elements in the second interrogation response, with the purpose that these multiple trigger elements are used for the invocation of multiple IN services associated with the roaming leg.
5) As (2), whereby the HLR sends multiple IN service trigger elements in the second interrogation response, with the purpose that these multiple trigger elements are used for the invocation of multiple IN services associated with the roaming leg.
6) As (1), whereby (3) and (4) are combined.
7) As (1), whereby the HLR sends multiple IN service trigger elements in the first interrogation response, with the purpose that some of these multiple trigger elements are used for the invocation of multiple IN services associated with the MT call and some of these multiple trigger elements are used for the invocation of multiple IN services associated with the roaming leg.
8) Certain IN services for MT calls are required only when a roaming leg is established. The present invention offers the tools to accomplish this.
9) The present invention may be used to route a roaming leg through an ISUP service node on a subscription basis or generically for all served subscribers.

CLAIMS

1. A method for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network, the network comprising a control node (110), a Home Location Register (111) and one or more Service Control Points (121, 122, 123) , the method comprising the steps of:
   a. said control node (110) sending (101) to said Home Location Register (111), one or more requests for routing information associated with said call;
   b. said control node (110) receiving (102) from said Home Location Register (111) service trigger elements associated with said services;
   c. said control node (110) using said trigger elements for invoking (103) said services in said one ore more Service Control Points (121, 122, 123);
   d. said control node (110) receiving (104) from said one or more Service Control Points (121, 122, 123) information related to said services associated with said trigger elements.

2. The method according to claim 1, wherein said Home Location Register (111) sends a first service trigger element of said multiple service trigger elements in response to a first request for routing information and a second service trigger element of said multiple service trigger elements in response to a second request for routing information.

3. The method according to claim 1, wherein said Home Location Register (111) sends said multiple service trigger elements in response to a first request for routing information.

4. The method according to claim 2 or 3, wherein said Home Location Register (111) sends the requested routing information in response to a second request for routing information.

5. The method according to any of the claims 2-4, wherein said second request for routing information is associated with the establishment of a signalling

connection between said control node (110) and a Visited Mobile services Switching Center (112).

6. The method according to any one of the preceding claims, wherein said requested routing information comprises a Mobile Station Roaming Number to be used for the call to said subscriber.

7. The method according to any one of the preceding claims, wherein a plurality of said service trigger elements is comprised in one Mobile Application Part message.

8. The method according to claim 7, wherein said one Mobile Application Part message is sent from said Home Location Register (111) to said Control Node in multiple Signalling Connection Control Part messages, due to Mobile Application Part segmentation.

9. The method according to any of the claims 1-6, wherein one or more of said service trigger elements is included in a Mobile Station Roaming Number as a prefix or a suffix.

10. The method according to any of the claims 1-6, wherein said service trigger elements comprise separate parameters.

11. The method according to any one of the preceding claims, wherein a first service of said services is executed in a first Service Control Point (121) of said one or more Service Control Points (121, 122, 123) and a second service of said services is executed in a second Service Control Point (122) of said one or more Service Control Points (121, 122, 123).

12. The method according to claim 11, wherein a first service of said services is a pre-paid charging service.

13. The method according to claim 11 or 12, wherein a second service of said services is a mobile terminating service such as a personal greeting service.

14. The method according to any one of the preceding claims, wherein said control node (110) is a Gateway Mobile Switching Centre (110).

15. The method according to any of the claims 2-14, wherein said first request contains a Mobile Station ISDN number of said subscriber.

16. The method according to any of the claims 2-15, wherein said second request contains a Mobile Station ISDN number of said subscriber and a "Suppress T-CSI" parameter.

17. The method according to any one of the preceding claims, wherein a first or a second request of said one or more requests for routing information comprises a Mobile Application Part Send Routing Information message.

18. A control node (110) for handling Intelligent Network services associated with a call to a subscriber of a mobile telecommunications network, the network comprising said control node (110), a Home Location Register (111) and one or more Service Control Points (121, 122, 123); the control node (110) configured to send to said Home Location Register (111) one or more requests for routing information associated with said call; the control node (110) further configured to receive from said Home Location Register (111) multiple service trigger elements associated with said services, and for invoking said services in said one ore more Service Control Points (121, 122, 123) by using said trigger elements; the control node further configured to receive from said one or more Service Control Points (121, 122, 123) information related to said services associated with said trigger elements.

19. A computer program comprising program instructions for causing a computer to perform the method according to of any of the claims 1-17.

20. A computer program on a carrier and comprising computer executable instructions for causing a computer to perform the method according to claims 1-17.

21. A computer program according to claim 19, wherein said carrier is a record medium, computer memory, read-only memory or an electrical carrier signal.

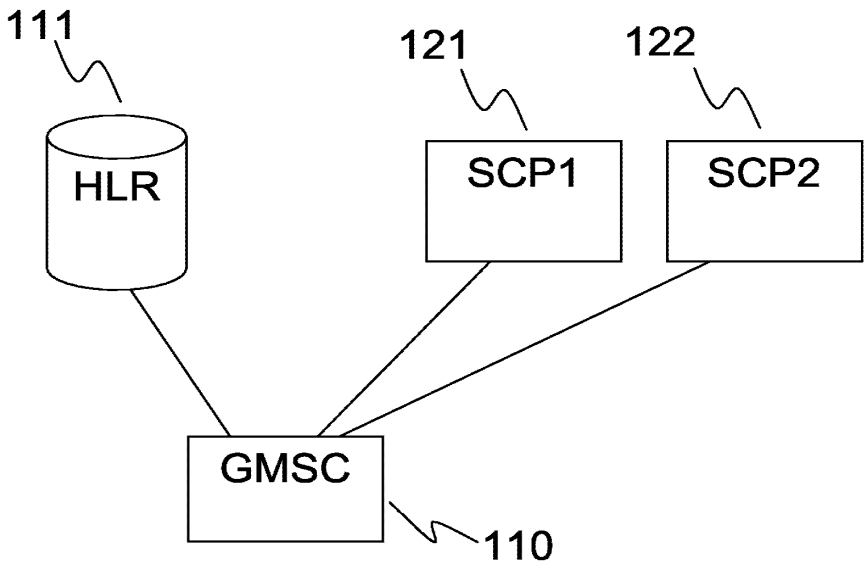


Fig. 1

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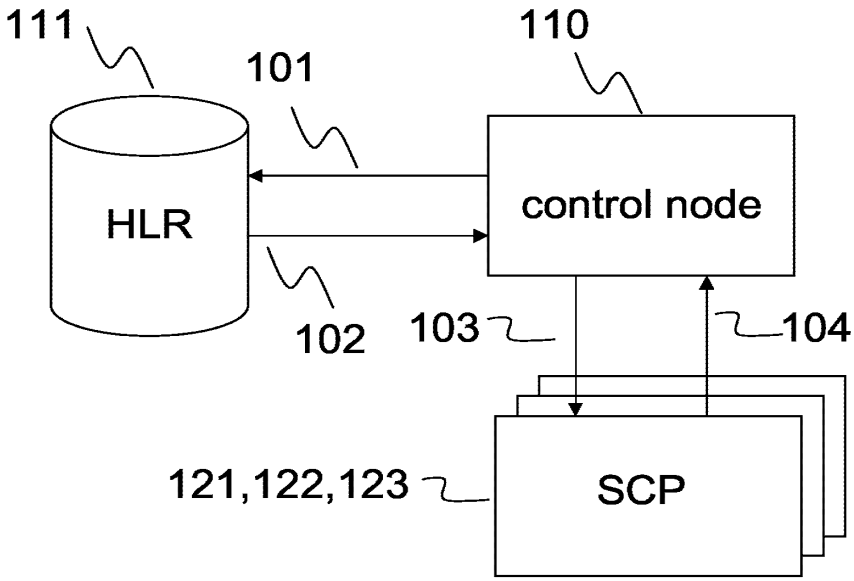


Fig. 2

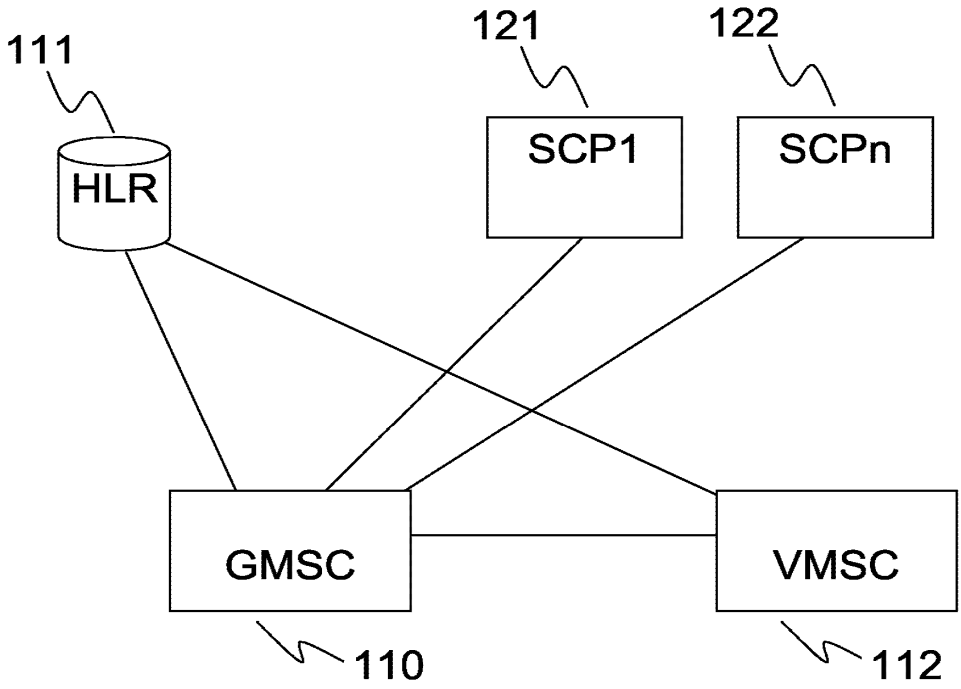


Fig. 3

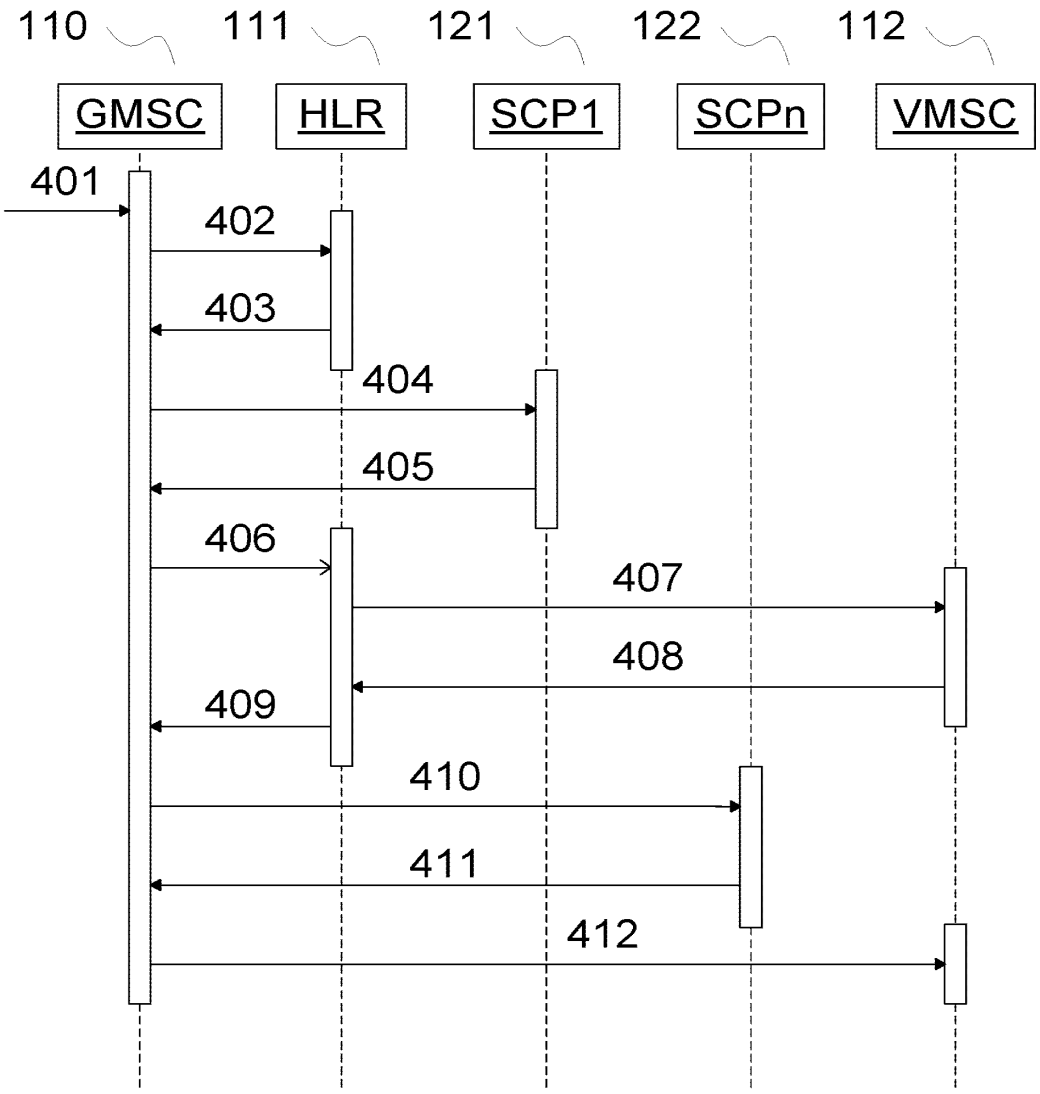

110
111
121
122
112
GMSC
HLR
SCP1
SCPn
VMSC
401
402
403
404
405
406
407
408
409
410
411
412

Fig. 4

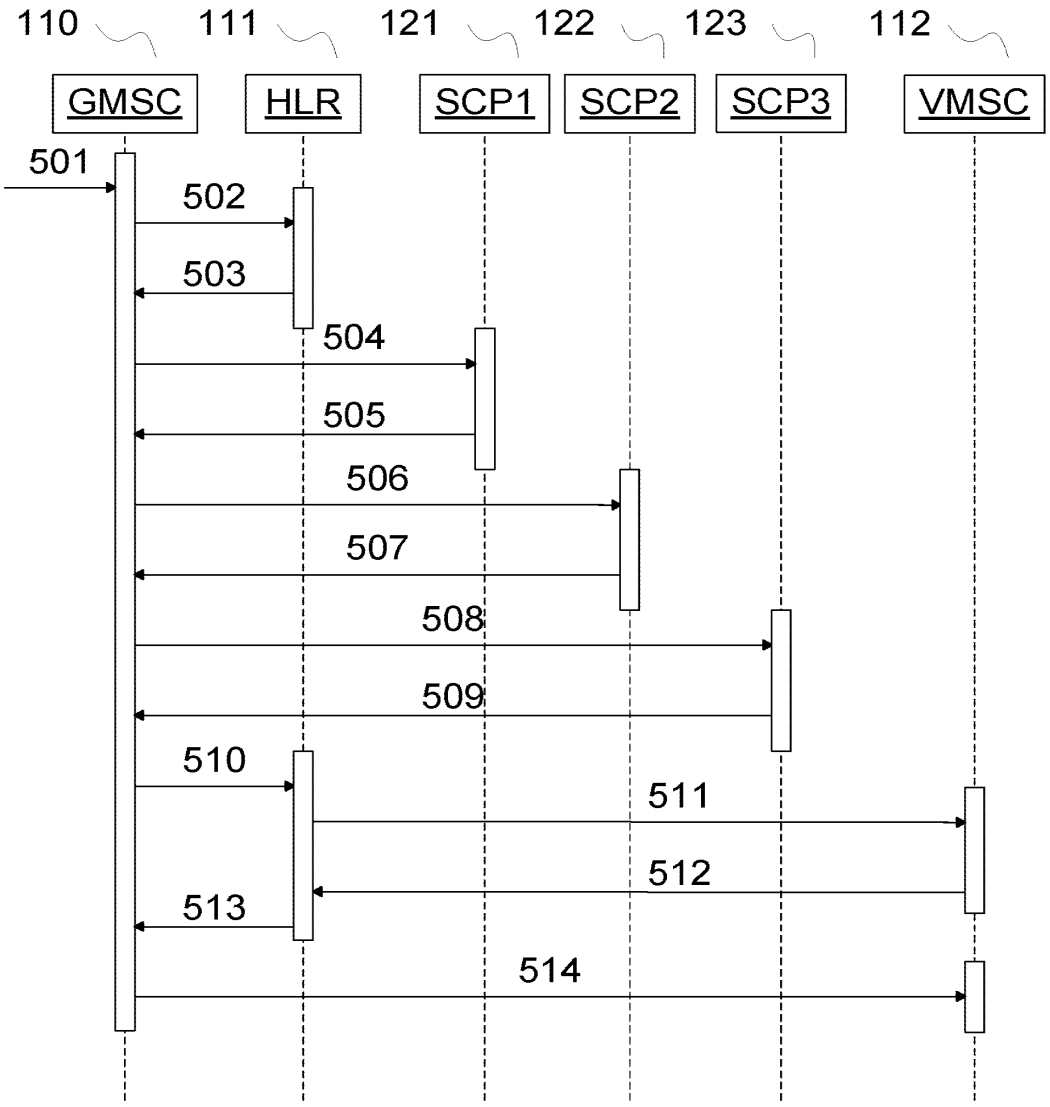

110
111
121
122
123
112
GMSC
HLR
SCP1
SCP2
SCP3
VMSC
501
502
503
504
505
506
507
508
509
510
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512
513
514

Fig. 5

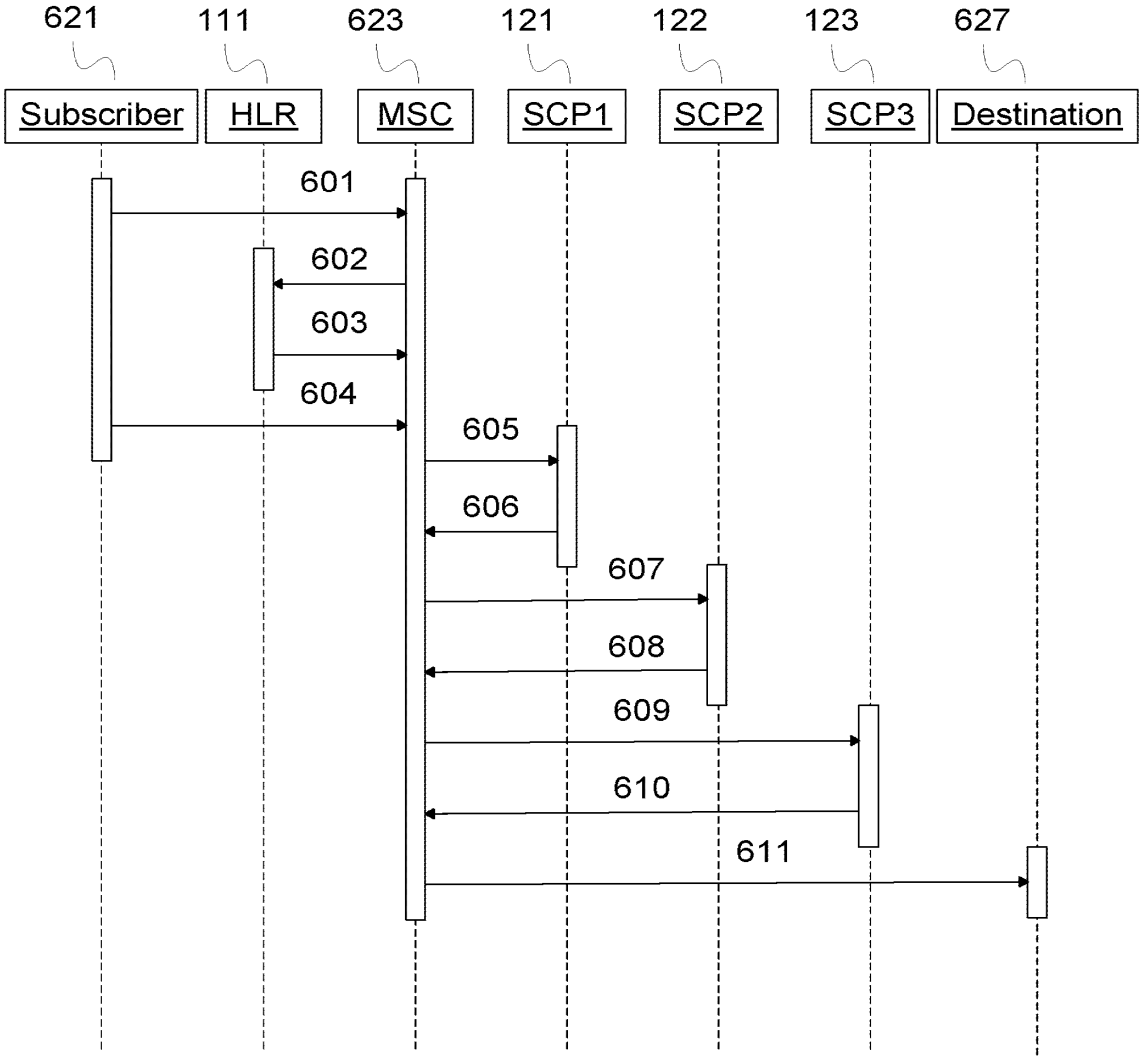

621
111
623
121
122
123
627
Subscriber
HLR
MSC
SCP1
SCP2
SCP3
Destination
601
602
603
604
605
606
607
608
609
610
611

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2005/056843

A. CLASSIFICATION OF SUBJECT MATTER
H04Q3/00 H04Q7/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/103012 A (SIEMENS AKTIENGESELLSCHAFT; KASTL, PETRA; WOELKNER, CHRISTIAN) 25 November 2004 (2004-11-25) page 9, line 7 - page 10, line 37	1-21
X	WO 97/07637 A (MOTOROLA LTD; CHAMBERS, DAVID; CRICHTON, PAUL; DODD, ADRIAN) 27 February 1997 (1997-02-27) page 3, line 26 - page 5, line 24 figure 1	1-21

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 February 2006	27/02/2006

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Chassatte, R

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2005/056843

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Form PCT/ISA/210 (patent family annex) (April 2005)

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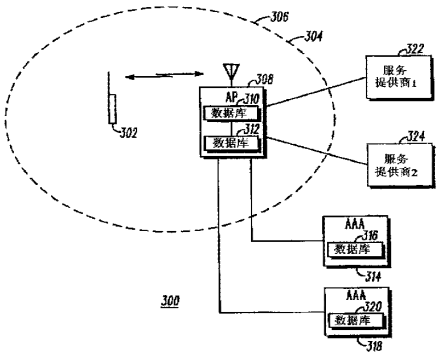
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代理人 李 涛 钟 强
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[54] 发明名称

通过无线局域网向移动站提供网络服务信息的方法和装置

[57] 摘要

一种无线局域网(WLAN)通信系统(300)，包括与移动站(302)通信的接入点(308)以及至少一个鉴别、授权、结算(AAA)服务器(314、318)，提供鉴别过程，由此移动站用户可以在被鉴别之前从一个或多个 WLAN 服务提供商和/或一个或多个 3GPP 服务提供商(322、324)中选择 WLAN 服务提供商，进而根据与所选服务提供商相关联的、除了服务集标识符(SSID)之外的网络服务信息来作出订制所选服务提供商的服务的决定。



1. 一种用于提供网络服务信息给接入无线局域网的移动站用户的方法，包括：

接收鉴别移动站的请求；和

作为对接收到上述请求的响应，传送关于多个服务提供商中每个服务提供商的网络识别和服务信息到移动站。

2. 如权利要求 1 所述的方法，其中，鉴别移动站的请求与网络识别和服务信息每个都是在媒介接入控制层消息中传送的。

3. 如权利要求 1 所述的方法，进一步包括：

请求鉴别信息；和

接收包括对从多个服务提供商中选择服务提供商的选择的鉴别信息。

4. 如权利要求 3 所述的方法，进一步包括：

根据接收到的鉴别信息来确定鉴别、授权、结算服务器；和

通过确定的鉴别、授权、结算服务器来请求对移动站的授权。

5. 一种用于接入无线局域网的方法，包括：

传送鉴别移动站的请求；

接收关于服务提供商的网络识别和服务信息；和

根据接收到的网络识别和服务信息来确定是否接入无线局域网。

6. 如权利要求 5 所述的方法，其中，鉴别移动站的请求与网络识别和服务信息每个都是在媒介接入控制层消息中传送的。

7. 如权利要求 5 所述的方法，其中，接收关于服务提供商的网络识别和服务信息包括接收关于多个服务提供商中的每个服务提供商

的网络识别和服务信息，并且其中，该方法进一步包括：

接收对鉴别信息的请求；和

传送对从多个服务提供商中选择服务提供商的选择。

8. 一种无线局域网中的接入点，包括：

存储器，储存关联于多个服务提供商中每个服务提供商的服务提供商标识符和网络服务信息；和

处理器，连接到存储器，组装一个或多个消息，所述消息包括与多个服务提供商中每个服务提供商相关联的服务提供商标识符和网络服务信息，并将这一个或多个消息传送到移动站。

9. 如权利要求 8 所述的接入点，其中，所述一个或多个消息包括第一一个或多个消息，并且其中，所述处理器接收鉴别移动站的请求，作为对接收到该请求的响应，组装所述第一一个或多个消息，进而组装包括对鉴别信息的请求的第二消息，然后将所述第二消息传送到移动站。

10. 如权利要求 9 所述的接入点，其中，所述处理器进而响应于传送对鉴别信息的请求，接收所请求的鉴别信息，而且，作为对接收到所请求的鉴别信息的响应，组装请求对移动站的授权的第三消息，然后将所述第三消息传送到服务器。

11. 如权利要求 10 所述的接入点，其中，所述存储器，关联于服务器，储存服务提供商标识符，其中，所接收到的鉴别信息包括服务提供商标识符，并且其中，所述处理器根据所接收到的服务提供商标识符来确定所述服务器。

通过无线局域网向移动站提供网络服务信息的方法和装置

技术领域

本发明一般涉及无线局域网，具体涉及由无线局域网基础设施向移动站提供网络覆盖、网络可接入性和网络服务信息。

背景技术

局域网（LAN）允许组织在高速网络上共享信息，其可以由相对便宜的硬件组件来组装。LAN 还通过允许 LAN 内的多用户通过对所有用户公用的接口连接到 LAN 外多个网络中的每个，来提供相对便宜的硬件连接给超出 LAN 的网络。直到近来，LAN 受限于硬连线的基础设施，需要用户通过有线连接物理上连接到 LAN。但是，随着无线技术和无线消息传递的近来的发展，无线通信也被用于 LAN 领域，导致无线局域网（WLAN）的发展。

图 1 是现有技术的示例无线局域网（WLAN）通信系统 100 的框图。通信系统 100 包括 WLAN，其包括基本服务集（BSS）104，BSS 又包括一个或多个接入点（AP）106、108（示出了两个）。与 BSS 104 相关联的是服务集标识符（SSID），该 SSID 为 BSS 104 中每个 AP 106、108 所公有，并由 BSS 104 中每个 AP 106、108 储存，起到 BSS 的标识符的作用。WLAN，尤其是一个或多个 AP 106、108 中的每个，连接到鉴别（Authentication）、授权（Authorization）、结算（Accounting）（AAA）服务器 110，AAA 服务器 110 向 WLAN 提供鉴别、授权、结算服务。AAA 服务器 110 包括数据库 112，其储存与授权接入 WLAN 的每个移动站（MS）相关联的标识符，并且进一步储存与每个标识符相关联的密码。

当 MS 102 希望接入 WLAN 时，MS 首先必须建立和配置与一个

或多个 AP 106、108 中的一个 AP 的链路，通常通过主动或被动扫描 WLAN 来完成。在主动扫描中，MS 102 通过广播探测请求（Probe Request）来开始建立和配置链路。探测请求包括服务集标识符（SSID）以及 MS 所支持的功能和数据率。一旦接收到探测请求，一个或多个 AP 106、108 中的每个 AP 确定探测请求中包含的 SSID 是否同与 AP 相关联的 SSID 相同。当 SSID 相同时，AP 响应探测请求，发送探测响应回到 MS，其包括与 AP 相关联的 SSID 以及 AP 所支持的功能和数据率。基于接收到的探测响应，MS 102 从一个或多个 AP 106、108 中选择最佳 AP，诸如 AP 106，并且发送关联请求到所选的 AP 106，其包括 SSID，还包括 MS 所支持的功能和数据率。一旦接收到关联请求，AP 106 发送关联响应到 MS 102，其包括唯一关联于 AP 的标识符，即 AP 地址，和 AP 将要支持的功能和数据率，并且建立 MS 和所选 AP 之间的链路。

在被动扫描中，不利用探测请求和探测响应，MS 102 可以选择 AP 并发送关联请求到所选 AP，以响应于接收到一个或多个 AP 106、108 中每个断断续续地发射的信标（Beacon）。类似于探测响应，每个信标包括与 AP 相关联的 SSID 以及 AP 所支持的功能和数据率。

在建立了 MS 102 和 AP 106 之间的链路之后，在对 MS 102 授权发送数据业务到 AP 106（即，不封锁对 WLAN 的接入）之前必须鉴别 MS 102。图 2 是现有技术的 WLAN 鉴别过程的信号流图 200。鉴别过程开始于MS 102发送EAPOL(Extensible Application Protocol Over LAN，局域网可扩展应用协议）-开始消息 202 到 AP 106。响应于接收到 EAPOL-开始消息 202，AP 106 发送 EAPOL-EAP（Extensible Application Protocol，可扩展应用协议）-请求/识别消息 204 到 MS 102。EAPOL-EAP-请求/识别消息 204 从 MS 请求鉴别信息，诸如唯一关联于 MS 的标识符和密码。一旦接收到 EAPOL-EAP-请求/识别消息 204，MS 102 发送 EAPOL-EAP-响应/识别消息 206 到 AP 106，其提供了所请求的信息。

一旦接收到 EAPOL-EAP-响应/识别消息 206，AP 106 将 MS 102 所提供的标识符和密码通过半径（RADIUS）-EAP-响应/识别消息 208 转发到 AAA 服务器。一旦接收到识别消息，AAA 服务器 110 选择 EAP 鉴别方法。该方法包括一轮或多轮的 EAP 鉴别请求消息 210、212，从 AAA 服务器 110 传送到 MS 102，以及作为响应的 EAP 鉴别响应消息 214、216，从 MS 传送到 AAA 服务器。EAP 消息在 AAA 服务器 110 和 AP 106 之间携带在半径消息中，在 AP 106 和 MS 102 之间携带在 EAPOL 消息中。在鉴别请求和鉴别响应的最终交换的结束处，AAA 服务器 110 基于储存在数据库 112 中的一个或多个公知的用户标识符，诸如密码、共享秘密、公钥或数字证书，来鉴别 MS 102。如果 AAA 服务器 110 能够成功地鉴别 MS 102，那么 AAA 110 将半径-EAP-成功消息 218 传送到 AP 106。一旦接收到半径-EAP-成功消息 218，AP 106 将 EAPOL-EAP-成功消息 220 传送到 MS 102，并且不再封锁对 MS 102 的接入。如果 AAA 服务器 110 不能成功鉴别 MS 102，则 AAA 服务器将半径-EAP-失败消息传送到 AP 106，AP 106 继续封锁对 MS 102 的接入。

随着 WLAN 逐渐普及，WLAN 建立在更多数量的商业设施和公共场所中，诸如咖啡馆、机场、图书馆、学校以及会议中心。由于订制不同服务提供商的服务的不同人群在这些场所表达了希望接入 WLAN 服务的需求，因此对于提供商来说，将发展需要以提供交叠服务。但是，当前对于 AP 的共享并没有规定任何过程。相反地，在当前最新技术中，每个提供商提供独立的 AP，其配置以自己的 SSID 并且广播该 SSID。这样的系统十分浪费，因为它迫使服务提供商提供冗余的系统。而且，提供 WLAN 服务的可用带宽是有限的，主要的 WLAN 场所，诸如机场和会议中心，可能不具有足够的带宽来支持多个服务提供商中每个所使用的交叠 AP。

此外，当前最新技术仅仅允许用户根据 SSID 来选择服务提供商。

当用户能够接入多个服务提供商的每个的网络时，SSID 独自不可能向用户提供足够的信息来作出有关使用哪个服务提供商的充分有见识（fully informed）的决定。而且，当用户执行被动扫描时，用户可能不得不在选择与所需服务提供商相关联的 SSID 之前扫描和处理多个信标，消耗了向 MS 供电的有限寿命电池的过多的电量。

因此，需要一种方法和装置，允许接入 WLAN 的 MS 用户根据一个或多个标准，诸如每个服务提供商所支持的服务、服务价格、付费方法、访问的网络提供商和用户的归属网络之间的关系，从多个服务提供商中选择服务提供商，并进一步允许多个服务提供商共享 AP。

附图说明

图 1 是现有技术的示例无线局域网的框图。

图 2 是现有技术鉴别过程的信号流图。

图 3 是根据本发明实施例的无线通信系统的框图。

图 4 是根据本发明实施例的图 3 的移动站的框图。

图 5 是根据本发明实施例的图 3 的无线通信系统所执行的鉴别过程的信号流图。

具体实施方式

为了解决上述需要，即一种方法和装置，用于允许接入无线局域网（WLAN）的 MS 用户根据一个或多个标准，诸如每个服务提供商所支持的服务、服务价格、付费方法、访问的网络提供商和用户的归属网络之间的关系，从多个服务提供商中选择服务提供商，并进一步允许多个服务提供商共享 AP，提供一种 WLAN 通信系统，其包括与移动站通信的接入点，至少一个鉴别、授权、结算（AAA）服务器提供鉴别过程，由此移动站用户可以在被鉴别之前从一个或多个 WLAN 服务提供商和/或一个或多个 3GPP 服务提供商中选择 WLAM 服务提供商，进一步根据与所选服务提供商相关联的、除了服务集标识符（SSID）之外的网络服务信息来作出订制所选服务提供商的服务的决

定。

一般地，本发明的实施例包括一种用于向接入无线局域网的移动站用户提供网络服务信息的方法。该方法包括接收鉴别移动站的请求，作为对接收到请求的响应，传送关于多个服务提供商中每个服务提供商的网络识别和服务信息到移动站。

本发明的另一个实施例包括一种用于接入无线局域网的方法。该方法包括传送鉴别移动站的请求，接收关于服务提供商的网络识别和服务信息，以及根据接收到的网络识别和服务信息来确定是否接入该无线局域网。

本发明又一个实施例包括一种无线局域网中的接入点。接入点包括存储器和连接到存储器的处理器。存储器储存与多个服务提供商中的每个服务提供商相关联的标识符和网络服务信息，并将一个或多个消息传送到移动站。

通过参考图 3-5 可更加全面地描述本发明。图 3 是根据本发明实施例的无线通信系统 300 的框图。通信系统 300 包括无线局域网（WLAN）304，其包括具有一个或多个接入点（AP）308（示出了一个）的基本服务集（BSS）306。AP 308 提供无线通信服务给用户设备（UE），也就是，移动站（MS），诸如 MS 302，其位于 AP 所服务的覆盖区域内。优选地，MS 302 是便携、移动、或蜂窝通信设备，诸如但不限于蜂窝电话、无线电话、或无线调制解调器，其包括在数据终端设备内或连接到数据终端设备，诸如个人电脑、笔记本电脑、工作站、打印机、或传真机，其能够在 WLAN 通信系统中工作。BSS 306 和 AP 308 是由能够与 WLAN 网络交互的多个公共和/或专用网络服务提供商 322、324（示出了两个）所共享的，也就是说，代表这多个公共和/或专用网络服务提供商 322、324 来提供无线通信服务，这些服务提供商诸如但不限于，3GPP（第三代合作项目）、3GPP2、和企业

网络服务提供商，其允许 MS 与有效连接到 AP 的相应的外部网络进行通信。

通信系统 300 还包括一个或多个鉴别、授权、结算（AAA）服务器 314、318（示出了两个），其有效连接到 WLAN 304，具体连接到 AP 308，并且提供鉴别、授权和结算服务给 WLAN。多个 AAA 服务器 314、318 的每个 AAA 服务器都与关联于 BSS 306 和 AP 308 的多个服务提供商 322、324 之一相关联。每个 AAA 服务器 314、318 包括各自的数据库 316、320，其储存与被授权接入 WLAN 304 的每个移动站（MS）相关联的标识符，进一步地，关联于每个标识符，储存密码和相关付费信息，诸如与 MS 相关联的归属服务提供商。在本发明的另一实施例中，AP 308，或 BSS 306 和 AP 308，可以仅代表单一的 WLAN 服务提供商，诸如服务提供商 322，来提供无线通信服务。

AP 308 包括处理器 310，诸如一个或多个微处理器、微控制器、数字信号处理器（DSP）、其组合或者本领域普通技术人员已知的这样的其他设备。AP 308 还包括与处理器相关联的一个或多个存储设备 312，诸如随机存取存储器（RAM）、动态随机存取存储器（DRAM）、和/或只读存储器（ROM）或其等价物，其储存可由处理器执行的数据和程序。存储设备 312 还关联于与 AP 相关的每个服务提供商 322、324，储存服务提供商标识符或网络标识符、优选储存服务集标识符（SSID），以及网络服务信息，诸如关于服务提供商所支持的服务的信息、服务提供商所支持的每项服务的价格、为所提供的服务付费的方法、以及每个服务提供商与用户的归属服务提供商之间的关系，诸如其他服务提供商（即，归属网络）的订户使用该服务提供商网络（即访问网络）时该服务提供商所征收的任何额外费用。

图 4 是根据本发明实施例的 MS 302 的框图。MS 302 包括连接到处理器 404 的用户接口 402，处理器 404 诸如一个或多个微处理器、微控制器、数字信号处理器（DSP）、其组合或者本领域普通技术人

员已知的这样的其他设备。用户接口 402 向 MS 的用户提供与 MS 交互的能力，包括输入指令到 MS。在本发明的一个实施例中，用户接口 402 包括显示屏幕，其包括触摸屏，触摸屏能够确定用户在触摸屏上触摸的位置(即 X 坐标和 Y 坐标)，并把位置数据传送到处理器 404。根据位置数据，处理器 404 随后将用户的触摸转换成指令。在本发明的另一个实施例中，用户接口 402 可包括显示屏幕和键盘。

MS 302 还包括与处理器 404 相关联的一个或多个存储设备 406，诸如随机存取存储器（RAM）、动态随机存取存储器（DRAM）、和/或只读存储器（ROM）或其等价物，其储存可由处理器执行的数据和程序。存储设备 406 还储存唯一关联于 MS 的 MS 标识符以及 SSID 和相应的鉴别标识符，诸如密码、共享秘密、公钥、数字证书等等，关联于每个服务提供商，诸如 MS 302 所订制的一个或多个服务提供商 322、324。此外，存储设备 406 储存用于组装 MS 与 WLAN 304 所交换的消息的指令。

优选地，通信系统 300 根据用于 WLAN 通信系统的电气电子工程师协会（IEEE）802.11 标准、尤其是根据 IEEE P802.1X/D11 和 802.11i/D2 标准来工作，该标准在此整体结合进来，其可以从 IEEE 行政办公机构（Piscataway, NJ）或者通过 standards.ieee.org 在线获得。此外，通信系统 300 优选还根据第三代合作项目（3GPP）对于 WLAN-蜂窝交互标准(TR 22.934 和 TR 23.934)的要求工作，该标准可从 ETSI 的 3GPP 处（Mobile Competence Centre, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France）或通过 3gpp.org 在线获得，还有因特网工程任务组（IETF）RFC（请求注解）2284，其可以从 IETF 办公机构（Reston, VA）或者通过 ietf.org/rfc 在线获得，其描述了媒介接入控制（MAC）层可扩展鉴别协议（EAP），提供了鉴别协议的 MAC 层协商，用于在允许网络层协议通过链路发送之前鉴别对等设备，这些标准和协议，以及 IETF 备忘录“EAP AKA Authentication”, H. Haverinen, February 2002, 和“EAP SIM Authentication”, H. Haverinen,

June 2002 都在这里整体结合进来。

为了让 MS 302 接入 WLAN 304，MS 首先根据公知的链路建立和配置技术建立与 WLAN 的链路。一旦建立了这条链路，通信系统 300 在授权 MS 发送数据业务之前鉴别 MS 302。在现有技术中，为了订制 WLAN 的服务，鉴别过程仅仅允许 MS 用户根据相关服务提供商的 SSID 作出订制决定。跟现有技术不同，通信系统 300 提供了鉴别过程，从而 MS 302 的用户可以在被鉴别之前从一个或多个 WLAN 服务提供商和/或一个或多个 3GPP 服务提供商中选择 WLAN 服务提供商，进而根据与所选服务提供商相关联的、除了服务集标识符（SSID）之外的网络服务信息作出订制所选服务提供商的服务的决定。

图 5 是根据本发明实施例的通信系统 300 所执行的鉴别过程的信号流图 500。鉴别过程开始于 MS 发送鉴别步骤开始消息 502，优选为 EAPOL（局域网可扩展应用协议）-开始消息，到 WLAN 304，具体是到 AP 308。一旦接收到鉴别步骤开始消息 502，AP 308，具体是 AP 的处理器 310，从存储器 312 中提取关于与 AP 相关联的每个服务提供商（诸如服务提供商 322 和 324）的网络识别和服务信息。AP 308 随后在网络识别和服务信息消息 504、优选为 EAPOL-EAP-请求/信息消息中将提取的网络识别和服务信息传送到 MS 302。

一旦接收到网络识别和服务信息消息 504，MS 302 在用户接口 402 的显示屏幕中显示 508 关联于相应服务提供商 322、324 的至少一部分的接收到的网络识别和服务信息。通过显示网络识别和服务信息，MS 302 允许 MS 用户作出关于订制服务提供商用于特定通信会话的有见识的（informed）选择，而不是局限于仅仅根据 SSID 就作出选择。而且，通过在鉴别过程的开始处向 MS 302 提供对应于与 AP 308 相关联的每个服务提供商 322、324 的网络识别和服务信息，系统 300 减少了 MS 302 通过向 AP 提供单一 SSID 并反过来接收对应于所提供的 SSID 的网络服务信息而单独恳请与 BSS 相关联的每个服务提供商的

网络服务信息的需要。

根据在 MS 302 的用户接口 402 上显示的信息，MS 用户随后能够决定是否接入 WLAN 304。一旦确定接入 WLAN，用户向 MS 302 输入，同时 MS 从用户接收 508，对服务提供商的选择。例如，用户可能通过选择用户接口的显示屏幕上显示的软按键或者文本消息或者通过按下用户接口的键盘上的按键来输入他或她的选择。在本发明的另一个实施例中，其中，AP 308 只代表单一的服务提供商提供无线通信服务，MS 302 用户可能不需要输入服务提供商的选择，而是输入希望接入 WLAN 304 的指示。在本发明又一个实施例中，MS 的用户或卖家可能在 MS 302 的存储设备 406 中储存服务偏好。储存的偏好可能随后由 MS 302 用于自动选择服务提供商或根据 MS 从 AP 308 所接收到的网络和服务信息确定是否接入 WLAN 304。

一旦接收到网络服务信息消息 504，MS 302 通过传送确认 510、优选为 EAPOL-EAP-响应/信息/ACK 消息回到 AP 308 来确认消息的接收。一旦接收到确认 510，AP 308 将消息 512 传送到 MS 302，从 MS 请求鉴别信息，诸如唯一关联于 MS 的标识符、与所选服务提供商相关联的 SSID、和密码。优选地，请求鉴别信息的消息 512 是 EAPOL-EAP-请求/识别消息。一旦接收到请求鉴别信息的消息 512 并且一旦从 MS 用户接收到对服务提供商的选择、接收到用户希望接入 WLAN 304 的指示、或自动选择了服务提供商或确定接入 WLAN 304，MS 302 就发送提供请求的鉴别信息的消息 514，优选为 EAPOL-EAP-响应/识别消息，其包括所选网络的标识符、即 SSID，以及至少一部分的接收到的网络识别和服务信息。通过提供 SSID 和至少一部分的接收到的网络识别和服务信息，MS 302 向 WLAN 304、具体是 AP 308 提供所选的服务提供商。根据从 MS 接收的 SSID 和信息，WLAN 能够确定合适的 AAA 服务器 314、318 用于鉴别 MS。

一旦接收到请求的鉴别信息，AP 308 能够确定合适的 AAA 服务

器 314、318 来进行鉴别。AP 308 随后在鉴别信息消息 516、优选为半径-EAP-响应/识别消息中将 MS 302 所提供的标识符和密码转发给与所选服务提供商相关联的 AAA 服务器，诸如 AAA 服务器 314。类似于通信系统 100，一旦接收到鉴别信息消息 516，AAA 服务器 314 就选择 EAP 鉴别方法，AAA 服务器就要通过该方法鉴别 MS 302。EAP 鉴别方法包括一轮或多轮的 EAP 鉴别请求消息 518、520，其分别从 AAA 服务器 314 传送到 AP 308 和从 AP 308 传送到 MS 302，而作为响应，还包括 EAP 鉴别响应消息 522、524，分别从 MS 到 AP 和从 AP 到 AAA 服务器。在本发明的一个实施例中，EAP 消息是 MAC 层消息或数据链路层消息，其携带在 AAA 服务器 314 和 AP 308 之间的半径协议消息以及 AP 308 和 MS 302 之间的 EAPOL 消息中。在本发明的另一实施例中，在 AAA 服务器 314 和 AP 308 之间交换的 EAP 消息是 MAC 层消息或数据链路层消息，其携带在直径（Diameter）协议消息中。

在鉴别请求和鉴别响应的最终交换的结尾处，AAA 服务器 314 根据储存在 AAA 数据库 316 中的一个或多个公知鉴别标识符，诸如密码、共享秘密、公钥、或数字证书，来鉴别 MS 302。如果 AAA 服务器 314 能够成功鉴别 MS 302，则 AAA 服务器 314 传送授权消息 526、优选为半径-EAP-成功消息，到 AP 308，用于授权 AP 不再封锁对 MS 302 的接入。一旦接收到授权消息 526，AP 308 传送授权消息 528、优选为 EAPOL-EAP-成功消息，到 MS 302，用于授权 MS 接入 WLAN 304 并解除对 MS 302 的接入的封锁。如果 AAA 服务器 314 不能成功鉴别 MS 302 的话，则 AAA 服务器传送授权失败消息 532、优选为半径-EAP-失败消息，到 AP 308。在此情况下，AP 308 继续到框 534 接入 MS 302。

总而言之，WLAN 通信系统 300 提供了鉴别过程，由此 MS 302 用户可以在被鉴别之前从共享 WLAN 的一个或多个 WLAN 服务提供商和/或一个或多个 3GPP 服务提供商 322、324 中选择 WLAN 服务提

供商，进而根据与所选服务提供商相关联的、除服务集标识符（SSID）之外的网络服务信息，作出订制所选服务提供商的服务的决定。作为鉴别过程的一部分，WLAN 304 向 MS 提供关于一个或多个服务提供商的网络识别和服务信息，诸如每个服务提供商所支持的服务、服务价格、付费方法、以及访问的网络提供商和用户的归属网络之间的关系，从而允许 MS 用户作出关于 WLAN 服务提供商的有见识的选择。MS 可随后从这一个或多个服务提供商中选择服务提供商并且通过向 WLAN 传送相关 SSID 和至少一部分的接收到的网络识别和服务信息来通知 WLAN 所选的服务提供商。根据从 MS 接收到的 SSID 和信息，WLAN 能够确定合适的 AAA 服务器 314、318，用于鉴别 MS。

尽管本发明具体通过结合特定其实施例而显示和描述，但本领域技术人员将理解，可以作出各种变化以及进行要素的等价替换，这并不偏离本发明如权利要求所述的范围。因此，说明书和附图都应被视为说明性的而非限制性的，所有这样的变化和替换都包括在本发明的范围之内。

上面已经关于特定实施例描述了益处、其他优点、和问题的解决方案。但是，益处、优点、问题的解决方案，以及任何能够引起任何益处、优点或解决方案，或者使之出现或变得更显著的要素都不应被视作是任意或所有权利要求的决定性的、必需的或者关键的特征或要素。如这里所使用的，术语“包括、包含”或其任何变形，都意欲覆盖非排他性的包含，因此，包括一系列要素的过程、方法、物品或装置不仅仅包括那些列出的要素，还有可能包括其他未明确列出或者这样的过程、方法、物品或装置所固有的其他要素。还应当理解，关系术语的使用（如果有的话），诸如第一和第二、顶和底等等，都仅仅是用来区分一个实体或行为与另一个实体或行为，而不必要求或暗示这样的实体或行为之间的任何实际的这样的关系或顺序。

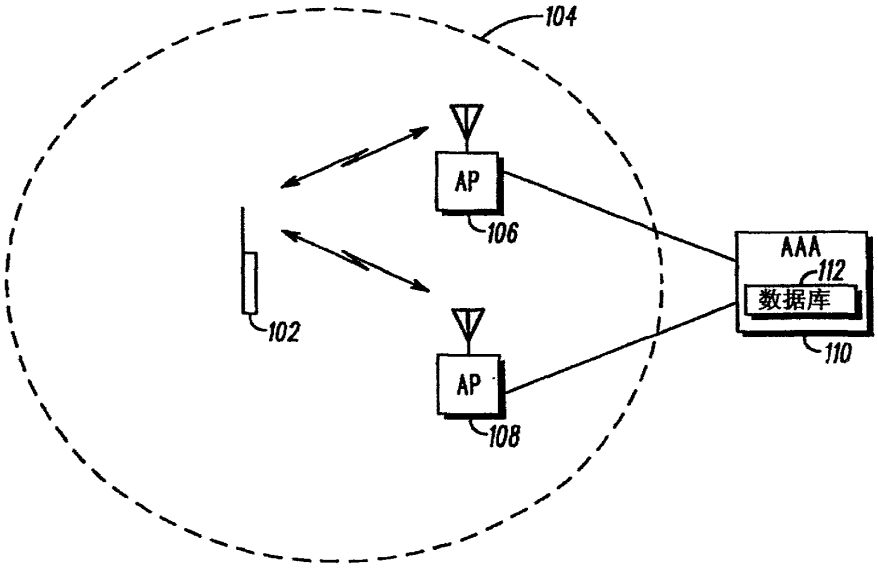


图1
现有技术

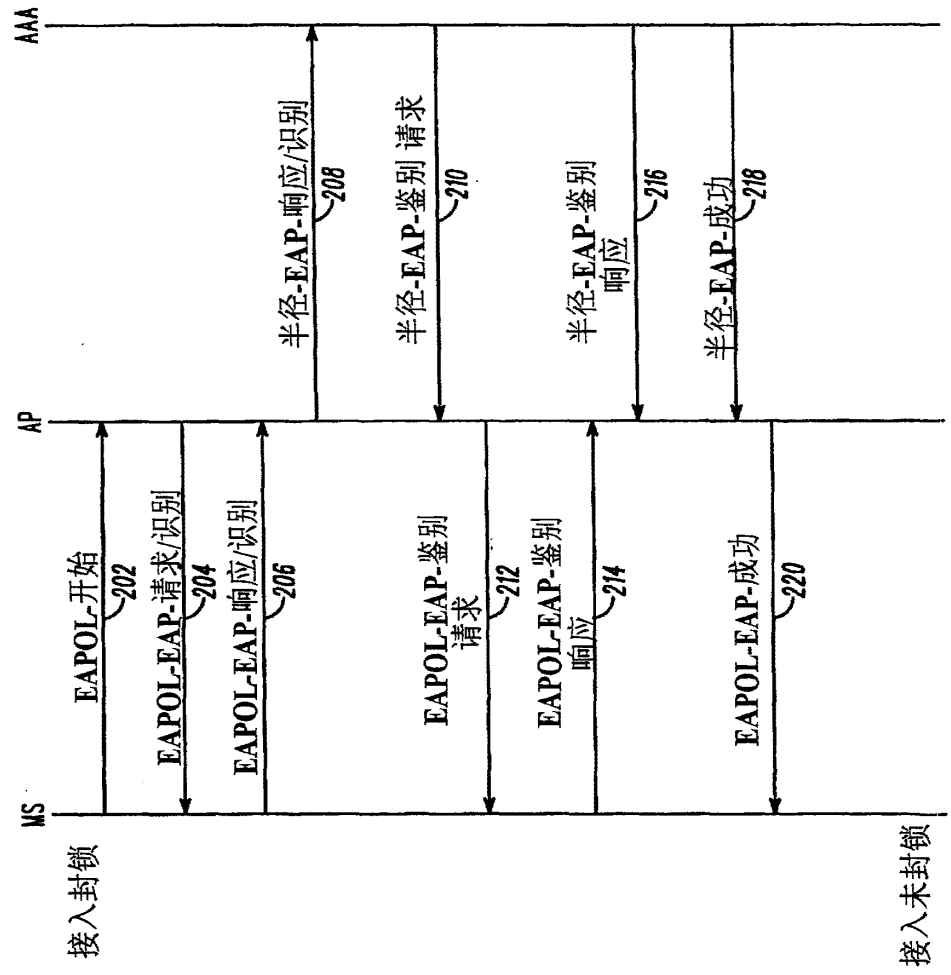

AAA
AP
MS
接入封锁
EAPOL-开始
202
EAPOL-EAP-请求/识别
204
EAPOL-EAP-响应/识别
206
半径-EAP-响应/识别
208
半径-EAP-鉴别 请求
210
EAPOL-EAP-鉴别 请求
212
EAPOL-EAP-鉴别 响应
214
半径-EAP-鉴别 响应
216
半径-EAP-成功
218
EAPOL-EAP-成功
220
接入未封锁
200

图2
现有技术

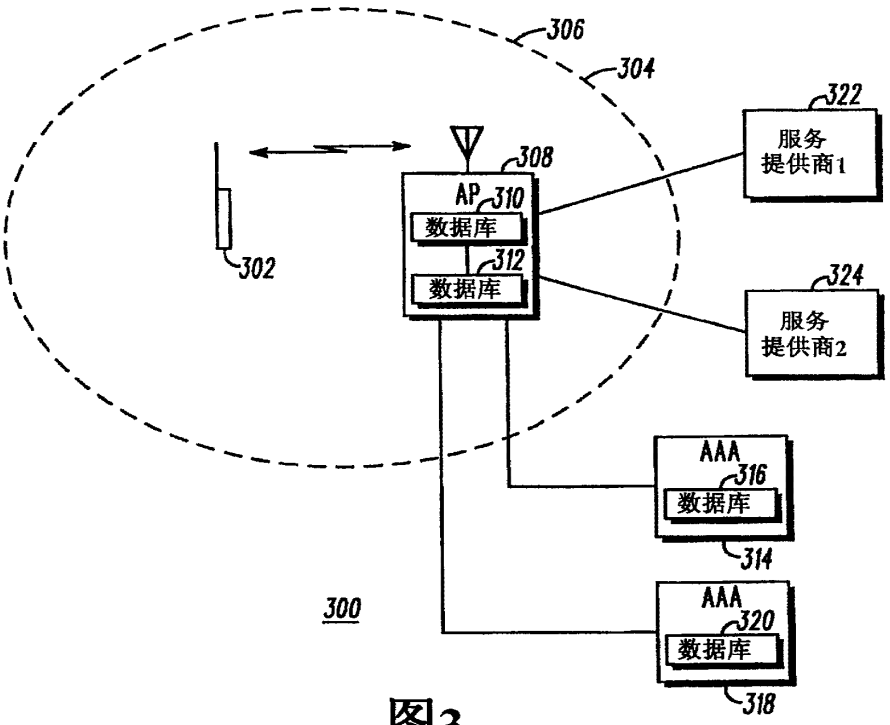

306
304
322
服务
提供商1
308
AP
310
数据库
312
数据库
302
324
服务
提供商2
AAA
316
数据库
314
300
AAA
320
数据库
318

图3

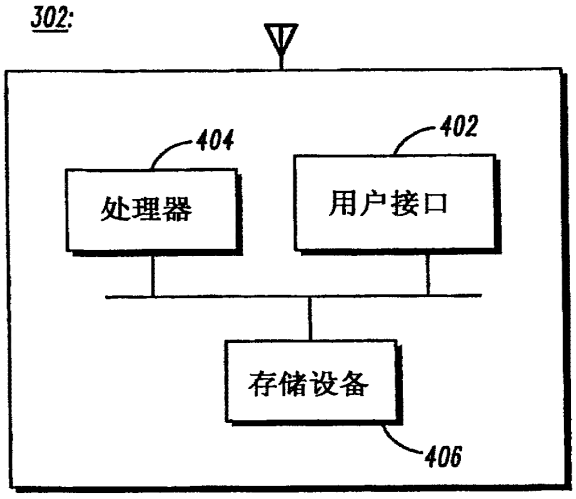

302:
404
处理器
402
用户接口
存储设备
406

图4

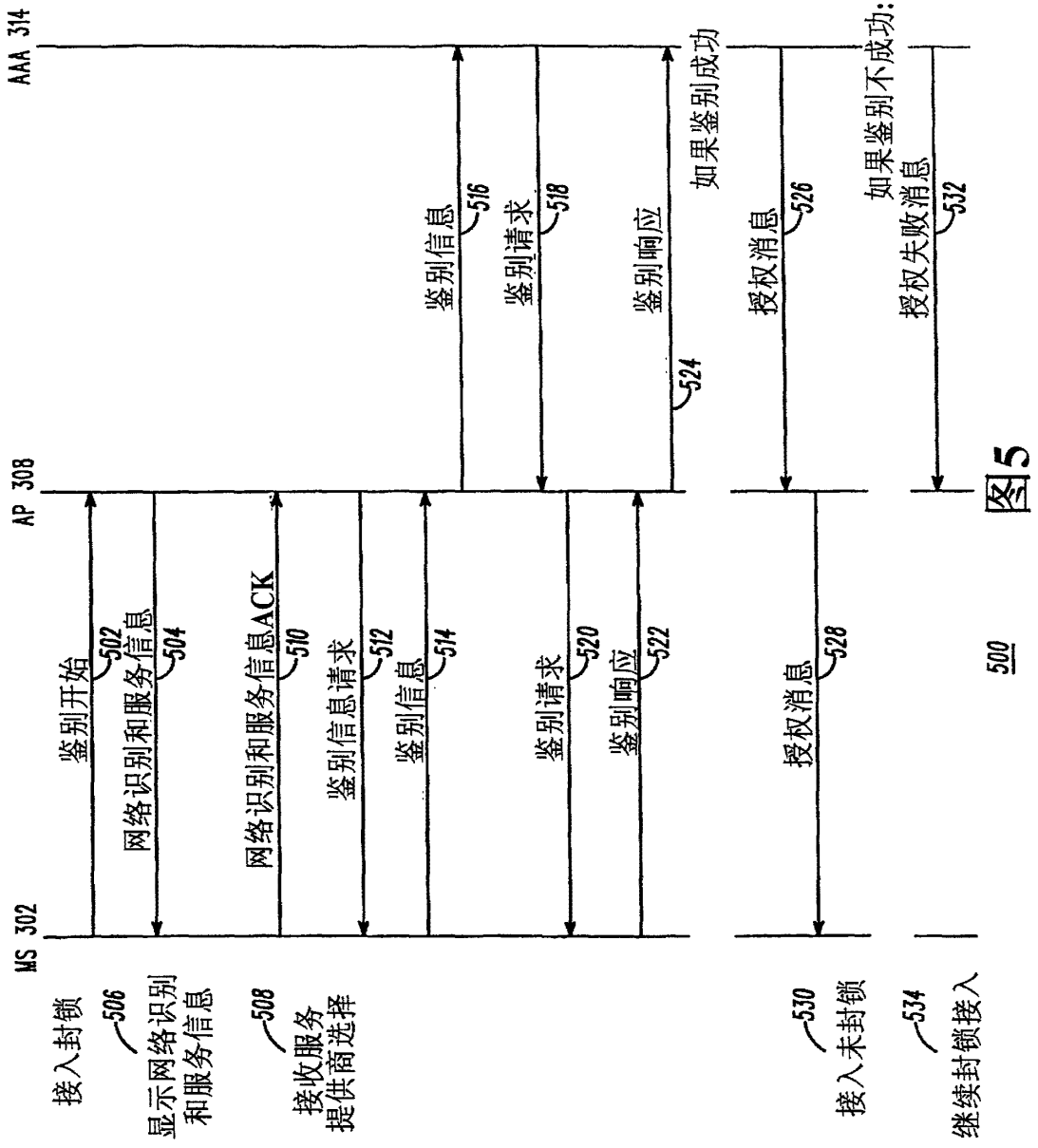

MS 302
AP 308
AAA 314
接入封锁
鉴别开始 502
网络识别和服务信息 504
显示网络识别和服务信息 506
网络识别和服务信息ACK 510
接收服务提供商选择 508
鉴别信息请求 512
鉴别信息 514
鉴别信息 516
鉴别请求 518
鉴别请求 520
鉴别响应 522
鉴别响应 524
如果鉴别成功
授权消息 526
授权消息 528
接入未封锁 530
如果鉴别不成功:
授权失败消息 532
继续封锁接入 534
500

图5

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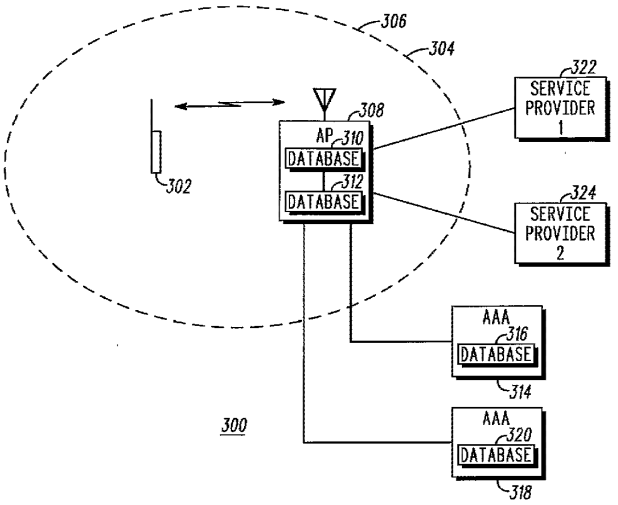
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR PROVIDING NETWORK SERVICE INFORMATION TO A MOBILE STATION BY A WIRELESS LOCAL AREA NETWORK



(57) Abstract: A wireless local area network (WLAN) communication system (300) that includes an access point (308) in communication with a mobile station (302) and at least one Authentication, Authorization, and Accounting (AAA) server (314, 318) provides an authentication process whereby a user of the mobile station may select a WLAN service provider from among one or more WLAN service providers and/or one or more 3GPP service providers (322, 324) before being authenticated and further to make a decision to subscribe to the services of the selected service provider based on network service information, other than or in addition to an Service Set Identifier (SSID), associated with the selected service provider.

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METHOD AND APPARATUS FOR PROVIDING NETWORK SERVICE INFORMATION TO A MOBILE STATION BY A WIRELESS LOCAL AREA NETWORK

Field of the Invention

The present invention relates generally to wireless local area networks and, in particular, to provision of network coverage, network accessibility, and network service information by a wireless local area network infrastructure to a mobile station.

Background of the Invention

Local area networks (LANs) allow organizations to share information over a high speed network that may be assembled with relatively inexpensive hardware components. LANs also provide for relatively inexpensive hardware connections to networks beyond the LAN by allowing multiple users within the LAN to connect to each of multiple networks outside of the LAN through an interface common to all users. Until recently, LANs were limited to hardwired infrastructure, requiring the user to physically connect to the LAN via a wired connection. However, with the recent growth of wireless telephony and wireless messaging, wireless communications have also been applied to the realm of LANs, resulting in the development of wireless local area networks (WLANs).

FIG. 1 is a block diagram of an exemplary wireless local area network (WLAN) communication system 100 of the prior art. Communication system 100 includes a WLAN that comprises a Basic Service Set (BSS) 104, which BSS in turn comprises one or more Access Points (APs) 106, 108 (two shown). Associated with BSS 104 is a Service Set Identifier (SSID), which SSID is common to, and stored by, each AP 106, 108 in BSS 104 and functions as an identifier of the BSS. The WLAN, and in particular each of the one or more APs 106 and 108, is coupled to an Authentication, Authorization, and Accounting (AAA) server 110 that provides authentication, authorization, and

accounting services to the WLAN. AAA server 110 includes a database 112 that stores identifiers associated with each mobile station (MS) that is authorized to access the WLAN and further stores a password in association with each identifier.

When an MS 102 wishes to access the WLAN, the MS must first establish and configure a link with an AP of the one or more APs 106, 108, typically by actively or passively scanning the WLAN. In an active scan, MS 102 initiates the establishment and configuration of a link by broadcasting a Probe Request. The Probe Request includes a Service Set Identifier (SSID) and capabilities and data rates supported by the MS. Upon receiving the Probe Request each AP of the one or more APs 106, 108 determines whether the SSID included in the Probe Request is the same as the SSID associated with the AP. When the SSIDs are the same, the AP responds to the Probe Request by transmitting a Probe Response back to the MS that includes the SSID associated with the AP and capabilities and data rates supported by the AP. Based on the received Probe Responses, MS 102 selects a best AP, such as AP 106, of the one or more APs 106, 108 and transmits an Association Request to the selected AP 106 that includes the SSID and further includes the capabilities and data rates supported by the MS. Upon receiving the Association Request, AP 106 transmits an Association Response to MS 102 that includes an identifier uniquely associated with the AP, that is, an AP address, and the capabilities and data rate that will be supported by the AP, and establishes a link between the MS and the selected AP.

In a passive scan, instead of utilizing a Probe Request and a Probe Response, MS 102 may select an AP and transmit an Association Request to the selected AP in response to receiving a Beacon that is intermittently transmitted by each of the one or more APs 106, 108. Similar to the Probe Response, each Beacon includes the SSID associated with the AP and capabilities and data rates supported by the AP.

After a link is established between MS 102 and AP 106, MS 102 must be authenticated before the MS is authorized to transmit data traffic to AP 106, that is, is access to the WLAN is unblocked. FIG. 2 is a signal flow diagram 200 of a WLAN authentication process of the prior art. The authentication process begins when MS 102 transmits an EAPOL (Extensible Application Protocol Over LAN)-Start message 202 to

the AP 106. In response to receiving EAPOL-Start message 202, AP 106 transmits an EAPOL-EAP (Extensible Application Protocol)-Request/Identity message 204 to the MS 102. EAPOL-EAP-Request/Identity message 204 requests authentication information from the MS, such as an identifier uniquely associated with the MS and a password. Upon receiving EAPOL-EAP-Request/Identity message 204, MS 102 transmits an EAPOL-EAP-Response/Identity message 206 to AP 106 that provides the requested information.

Upon receiving EAPOL-EAP-Request/Identity message 206, AP 106 forwards the identifier and password provided by MS 102 to AAA server 110 in a RADIUS-EAP-Response/Identity message 208. On receiving the identity message AAA server 110 chooses an EAP authentication method. The method involves one or more rounds of EAP authentication request messages 210, 212 that are conveyed from AAA server 110 to MS 102 and, in response, EAP authentication response messages 214, 216 that are conveyed from the MS to the AAA server. The EAP messages are carried in RADIUS messages between AAA server 110 and AP 106 and in EAPOL messages between AP 106 and MS 102. At the end of the final exchange of authentication requests and authentication responses, AAA server 110 authenticates MS 102 based on one or more well known user identifiers, such as a password, a shared secret, a public key, or a digital certificate, that is stored in database 112. If AAA server 110 can successfully authenticate MS 102, then AAA 110 conveys a RADIUS-EAP-Success message 218 to AP 106. Upon receiving the RADIUS-EAP-Success message 218, AP 106 conveys an EAPOL-EAP-Success message 220 to MS 102 and unblocks access to the MS 102. If AAA server 110 cannot successfully authenticate MS 102, then the AAA server conveys a RADIUS-EAP-Failure message to the AP 106. In this case, AP 106 continues to block access to MS 102.

With the increasing popularity of WLANs, WLANs are being set up in an increasing number of commercial establishments and public places, such as coffee houses, airports, libraries, schools, and convention centers. As diverse groups of people who subscribe to the services of a diversity of service providers express their desire to access WLAN services in such places, the need will evolve for the providers to provide overlapping services. However, currently no process is prescribed for a sharing of an AP.

Instead, in the current state of the art, each provider provides a separate AP that is configured with, and broadcasts, its own SSID. Such a system is wasteful in that it forces service providers to provide redundant systems. Furthermore, the bandwidth available for provision of WLAN services is limited and prime WLAN locations, such as airports and convention centers, may not have sufficient bandwidth to support overlapping APs employed by each of multiple service providers.

In addition, the current state of the art permits a user to select a service provider based only on SSID. When a user is capable of accessing the networks of each of multiple service providers, the SSID alone may not provide the user with sufficient information to make a fully informed decision concerning which service provider to use. Furthermore, when the user performs a passive scan, the user may have to scan and process multiple beacons before selecting an SSID associated with a desired service provider, consuming an excessive amount of power of a limited life battery powering an MS.

Therefore a need exists for a method and apparatus that permits a user of an MS accessing a WLAN to select a service provider from among multiple service providers based on one or more criterion, such as services supported by each service provider, service costs, methods of billing, and a relationship between the visited network provider and the user's home network, and that further allows multiple service providers to share an AP.

Brief Description of the Drawings

FIG. 1 is a block diagram of an exemplary wireless local area network of the prior art.

FIG. 2 is a signal flow diagram of a prior art authentication process.

FIG. 3 is a block diagram of a wireless communication system in accordance with an embodiment of the present invention.

FIG. 4 is a block diagram of the mobile station of FIG. 3 in accordance with an embodiment of the present invention.

FIG. 5 is a signal flow diagram of an authentication process performed by the wireless communication system of FIG. 3 in accordance with an embodiment of the present invention.

Detailed Description of the Invention

To address the need for a method and an apparatus that that permits a user of an MS accessing a wireless local area network (WLAN) to select a service provider from among multiple service providers based on one or more criterion, such as services supported by each service provider, service costs, methods of billing, and a relationship between the visited network provider and the users home network, and that further allows multiple service providers to share an AP, a WLAN communication system that includes an access point in communication with a mobile station and at least one Authentication, Authorization, and Accounting (AAA) server provides an authentication process whereby a user of the mobile station may select a WLAN service provider from among one or more WLAN service providers and/or one or more 3GPP service providers before being authenticated and further to make a decision to subscribe to the services of the selected service provider based on network service information, other than or in addition to an Service Set Identifier (SSID), associated with the selected service provider.

Generally, an embodiment of the present invention encompasses a method for providing network service information to a user of a mobile station accessing a wireless local area network. The method includes receiving a request to authenticate the mobile station and, in response to receiving the request, conveying network identification and service information with respect to each service provider of a plurality of service providers to the mobile station.

Another embodiment of the present invention encompasses a method for accessing a wireless local area network. The method includes conveying a request to authenticate a mobile station, receiving network identification and service information with respect to a service provider, and determining whether to access the wireless local area network based on the received network identification and service information.

Yet another embodiment of the present invention encompasses an Access Point in a wireless local area network. The Access Point includes a memory and a processor coupled to the memory. The memory stores an identifier and network service information in association with each service provider of a plurality of service providers. The processor assembles one or more messages comprising the service provider identifier and the network service information associated with each service provider of a plurality of service providers and conveys the one or more messages to a mobile station.

The present invention may be more fully described with reference to FIGs. 3-5. FIG. 3 is a block diagram of a wireless communication system 300 in accordance with an embodiment of the present invention. Communication system 300 comprises a wireless local area network (WLAN) 304 that includes a Basic Service Set (BSS) 306 comprising one or more Access Points (APs) 308 (one shown). AP 308 provides wireless communication services to user equipment (UEs), that is, mobile stations (MSs), such as MS 302, located in a coverage area serviced by the AP. Preferably MS 302 is a portable, mobile, or cellular communication device, such as but not limited to a cellular telephone, a radiotelephone, or a wireless modem that is included in or coupled to data terminal equipment, such as a personal computer, a laptop computer, a workstation, a printer, or a facsimile machine, that is capable of operating in a WLAN communication system. BSS 306 and AP 308 are shared by, that is, provide wireless communication services on behalf of, multiple public and/or private network service providers 322, 324 (two shown) capable of interworking with a WLAN network, such as but not limited to 3GPP (Third Generation Partnership Project), 3GPP2, and enterprise network service providers, that allow the MS to communicate with a corresponding external network operably coupled to the AP.

Communication system 300 further includes one or more Authentication, Authorization, and Accounting (AAA) servers 314, 318 (two shown) that are operably coupled to WLAN 304, and in particular to AP 308, and that provide authentication, authorization, and accounting services to the WLAN. Each AAA server of the multiple AAA servers 314, 318 is associated with one of the multiple service providers 322, 324 associated with BSS 306 and AP 308. Each AAA server 314, 318 includes a respective database 316, 320 that stores identifiers associated with each mobile station (MS) that is

authorized to access WLAN 304 and further stores, in association with each identifier, a password and related billing information, such as a home service provider associated with the MS. In another embodiment of the present invention, AP 308, or BSS 306 and AP 308, may provide wireless communication services on behalf of only a single WLAN service provider, such as service provider 322.

AP 308 includes a processor 310, such as one or more microprocessors, microcontrollers, digital signal processors (DSPs), combinations thereof or such other devices known to those having ordinary skill in the art. AP 308 further includes one or more memory devices 312 associated with processor such as random access memory (RAM), dynamic random access memory (DRAM), and/or read only memory (ROM) or equivalents thereof, that store data and programs that may be executed by the processor. Memory devices 312 further store, in association with each service provider 322, 324 associated with the AP, an address of an AAA server 314, 318 associated with the service provider, a service provider identifier or network identifier, preferably a Service Set Identifier (SSID), and network service information, such as information concerning services supported by the service provider, a cost of each service supported by the service provider, methods of billing for the provided services, and a relationship between each service provider and users' home service providers, such as any extra fees the service provider may assess for use of the service provider's network, that is, a visited network, by subscribers to other service providers, that is, a home network.

FIG. 4 is a block diagram of MS 302, in accordance with an embodiment of the present invention. MS 302 includes a user interface 402 coupled to a processor 404, such as one or more microprocessors, microcontrollers, digital signal processors (DSPs), combinations thereof or such other devices known to those having ordinary skill in the art. User interface 402 provides a user of the MS with the capability of interacting with the MS, including inputting instructions into the MS. In one embodiment of the present invention, user interface 402 includes a display screen that comprises a touch screen that is able to determine a position (i.e., an X-coordinate and a Y-coordinate) of a user's touch on the touch screen and convey the position data to processor 404. Based on the position data, processor 404 then translates the user's touch into an instruction. In another embodiment of the present invention, user interface 402 may include a display screen and

a keypad.

MS 302 further includes one or more memory devices 406 associated with processor 404, such as random access memory (RAM), dynamic random access memory (DRAM), and/or read only memory (ROM) or equivalents thereof, that store data and programs that may be executed by the processor. Memory devices 406 further store an MS identifier that is uniquely associated with the MS and an SSID and a corresponding authentication identifier, such as a password, a shared secret, key, a digital certificate, etc., associated with each service provider, such as one or more of service providers 322, 324, subscribed to by MS 302. In addition, memory devices 406 store instructions for assembling messages that are exchanged by the MS with WLAN 304.

Preferably, communication system 300 operates in accordance with the Institute for Electrical and Electronic Engineers (IEEE) 802.11 standards for WLAN communication systems, and in particular the IEEE P802.1X/D11 and 802.11i/D2 standards, which standards are hereby incorporated herein in their entirety and are available from the IEEE administrative offices in Piscataway, NJ, or on-line at standards.ieee.org. In addition, communication system 300 preferably further operates in accordance with the Third Generation Partnership Project (3GPP) requirements for WLAN-Cellular Interworking standards (TR 22.934 and TR 23.934), which standards are available from the 3GPP at ETSI, Mobile Competence Centre, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France, or on-line at 3gpp.org, the Internet Engineering Task Force (IETF) RFC (Request For Comments) 2284, which is available from the IETF offices in Reston, VA, or on-line at ietf.org/rfc and describes a medium access control (MAC) layer Extensible Authentication Protocol (EAP) that provides for MAC layer negotiation of an Authentication Protocol for authenticating a peer before allowing Network Layer protocols to transmit over a link, which standards and protocols are hereby incorporated herein in their entirety, and the IETF memoranda "EAP AKA Authentication," by H. Haverinen, dated February 2002, and "EAP SIM Authentication," by H. Haverinen, dated June 2002.

In order for MS 302 to obtain access to WLAN 304, the MS first establishes a communication link with the WLAN in accordance with well known link establishment

and configuration techniques. Upon establishing the link, communication system 300 authenticates MS 302 before authorizing the MS to transmit data traffic. In the prior art, in order to subscribe to the services of a WLAN, the authentication process merely allowed a user of an MS to make a subscription decision on a basis of an SSID of an associated service provider. Unlike the prior art, communication system 300 provides an authentication process whereby a user of MS 302 may select a WLAN service provider from among one or more WLAN service providers and/or one or more 3GPP service providers before being authenticated and further to make a decision to subscribe to the services of the selected service provider based on network service information, other than or in addition to an Service Set Identifier (SSID), associated with the selected service provider.

FIG. 5 is a signal flow diagram 500 of an authentication process executed by communication system 300 in accordance with an embodiment of the present invention. The authentication process begins when the MS transmits an authentication procedure start message 502, preferably an EAPOL (Extensible Application Protocol Over LAN)-Start message, to WLAN 304, and in particular to AP 308. Upon receiving authentication procedure start message 502, AP 308, an in particular processor 310 of the AP, retrieves from memory 312 network identification and service information concerning each service provider associated with the AP, such as service providers 322 and 324. AP 308 then conveys the retrieved network identification and service information to MS 302 in a network identification and services information message 504, preferably an EAPOL-EAP-Request/Information message.

Upon receiving network identification and services information message 504, MS 302 displays 508, in the display screen of user interface 402, at least a portion of the received network identification and service information in association with the corresponding service provider 322, 324. By displaying the network identification and services information, MS 302 permits a user of the MS to make an informed selection of the service provider subscribed to for a particular communication session instead of being limited to making a selection merely based on SSIDs. Furthermore, by providing MS 302 with network identification and service information corresponding to each service provider 322, 324 associated with AP 308 at the outset of the authentication process,

system 300 reduces the need for MS 302 to individually solicit the network service information of each service provider associated with a BSS by providing an AP with a single SSID and receiving, in return, the network service information corresponding to the provided SSID.

Based on the information displayed on user interface 402 of MS 302, a user of the MS is then able to decide whether to access WLAN 304. Upon determining to access the WLAN, the user inputs to MS 302, and the MS receives 508 from the user, a selection of a service provider. For example, the user may input his or her selection by selecting a softkey or a text message displayed on the display screen of the user interface or by depressing a key in a keypad of the user interface. In another embodiment of the present invention, wherein AP 308 provides wireless communication services on behalf of only a single service provider, the user of MS 302 may not need to input a selection of a service provider and may instead input an indication of a desire to access WLAN 304. In yet another embodiment of the present invention, the user or a vendor of the MS may store service preferences in memory devices 406 of MS 302. The stored preferences may then be used by MS 302 to automatically select a service provider or determine whether to access WLAN 304 based on the network and services information received by the MS from AP 308.

Upon receiving network services information message 504, MS 302 acknowledges receipt of the message by conveying an acknowledgment 510, preferably an EAPOL-EAP-Response/Information/ACK message, back to AP 308. Upon receiving acknowledgment 510, AP 308 conveys a message 512 to MS 302 requesting authentication information from the MS, such as an identifier uniquely associated with the MS, an SSID associated with a selected service provider, and a password. Preferably the message 512 requesting authentication information is an EAPOL-EAP-Request/Identity message. Upon receiving message 512 requesting authentication information and upon receiving a selection of a service provider from a user of the MS, receiving an indication of the user's desire to access WLAN 304, or automatically selecting a service provider or determining to access WLAN 304, MS 102 transmits a message 514 providing the requested authentication information, preferably an EAPOL-EAP-Response/Identity message that includes the identifier of the selected network, that

is, the SSID, and at least a portion of the received network identification and services information. By providing the SSID and the at least a portion of the received network identification and services information, MS 302 provides WLAN 304, and in particular AP 308, with the selected service provider. Based on the SSID and information received from the MS, the WLAN is able to determine an appropriate AAA server 314, 318 for authenticating the MS.

Upon receiving the requested authentication information, AP 308 is able to determine an appropriate AAA server 314, 318 for performing authentication. AP 308 then forwards the identifier and password provided by MS 302 to the AAA server associated with the selected service provider, such as AAA server 314, in an authentication information message 516, preferably a RADIUS-EAP-Response/Identity message. Similar to communication system 100, upon receiving authentication information message 516, AAA server 314 then chooses an EAP authentication method by which the AAA server authenticates MS 302. The EAP authentication method involves one or more rounds of EAP authentication request messages 518, 520 that are respectively conveyed from AAA server 314 to AP 308 and from AP 308 to MS 302 and, in response, EAP authentication response messages 522, 524 that are respectively conveyed from the MS to the AP and from the AP to the AAA server. In one embodiment of the present invention, the EAP messages are MAC layer messages or data link layer messages that are carried in RADIUS protocol messages between AAA server 314 and AP 308 and in EAPOL messages between AP 308 and MS 302. In another embodiment of the present invention, the EAP messages exchanged between AAA server 314 and AP 308 are MAC layer messages or data link layer messages that are carried in Diameter protocol messages.

At the end of the final exchange of authentication requests and authentication responses, AAA server 314 authenticates MS 302 based on one or more well known authentication identifiers, such as a password, a shared secret, a public key, or a digital certificate, that is stored in the AAA's database 316. If AAA server 314 can successfully authenticate MS 302, then AAA server 314 conveys an authorization message 526, preferably RADIUS-EAP-Success message, to AP 308 authorizing the AP to unblock access to MS 302. Upon receiving authorization message 526, AP 308 conveys an

authorization message 528, preferably an EAPOL-EAP-Success message, to MS 302 authorizing the MS to access WLAN 304 and unblocks 530 access to MS 302. If AAA server 314 cannot successfully authenticate MS 302, then the AAA server conveys an authorization failure message 532, preferably a RADIUS-EAP-Failure message, to the AP 308. In this case, AP 308 continues to block 534 access to MS 302.

In summary, WLAN communication system 300 provides an authentication process whereby a user of MS 302 may select a WLAN service provider from among one or more WLAN service providers and/or one or more 3GPP service providers 322, 324 sharing the WLAN before being authenticated and further to make a decision to subscribe to the services of the selected service provider based on network service information, other than or in addition to an Service Set Identifier (SSID), associated with the selected service provider. As part of the authentication process, WLAN 304 provides to the MS network identification and services information concerning the one or more service providers, such as services supported by each service provider, service costs, methods of billing, and a relationship between the visited network provider and the user's home network, thereby allowing the user of the MS to make an informed selection of a WLAN service provider. The MS may then select a service provider from among the one or more service provider and inform the WLAN of the selected service provider by conveying to the WLAN an associated SSID and at least a portion of the received network identification and services information. Based on the SSID and information received from the MS, the WLAN is able to determine an appropriate AAA server 314, 318 for authenticating the MS.

While the present invention has been particularly shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that various changes may be made and equivalents substituted for elements thereof without departing from the scope of the invention as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather then a restrictive sense, and all such changes and substitutions are intended to be included within the scope of the present invention.

Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or element of any or all the claims. As used herein, the terms "comprises," "comprising," or any variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. It is further understood that the use of relational terms, if any, such as first and second, top and bottom, and the like are used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions.

What is claimed is:

1. A method for providing network service information to a user of a mobile station accessing a wireless local area network comprising:

receiving a request to authenticate the mobile station; and

in response to receiving the request, conveying network identification and service information with respect to each service provider of a plurality of service providers to the mobile station.

2. The method of claim 1, wherein the request to authenticate the mobile station and the network identification and service information are each conveyed in a medium access control layer message.

3. The method of claim 1, further comprising:

requesting authentication information; and

receiving authentication information comprising a selection of a service provider from among the plurality of service providers.

4. The method of claim 3, further comprising:

determining an Authentication, Authorization, and Accounting server based on the received authentication information; and

requesting authorization of the mobile station by the determined Authentication, Authorization, and Accounting server.

5. A method for accessing a wireless local area network comprising:

conveying a request to authenticate a mobile station;

receiving network identification and service information with respect to a service provider; and

determining whether to access the wireless local area network based on the received network identification and service information.

6. The method of claim 5, wherein the request to authenticate the mobile station and the network identification and service information are each conveyed in a medium access control layer message.

7. The method of claim 5, wherein receiving network identification and service information with respect to a service provider comprises receiving network identification and service information with respect to each service provider of a plurality of service providers and wherein the method further comprises:

receiving a request for authentication information; and

conveying a selection of a service provider from among the plurality of service providers.

8. An Access Point in a wireless local area network comprising:

a memory that stores a service provider identifier and network service information in association with each service provider of a plurality of service providers; and

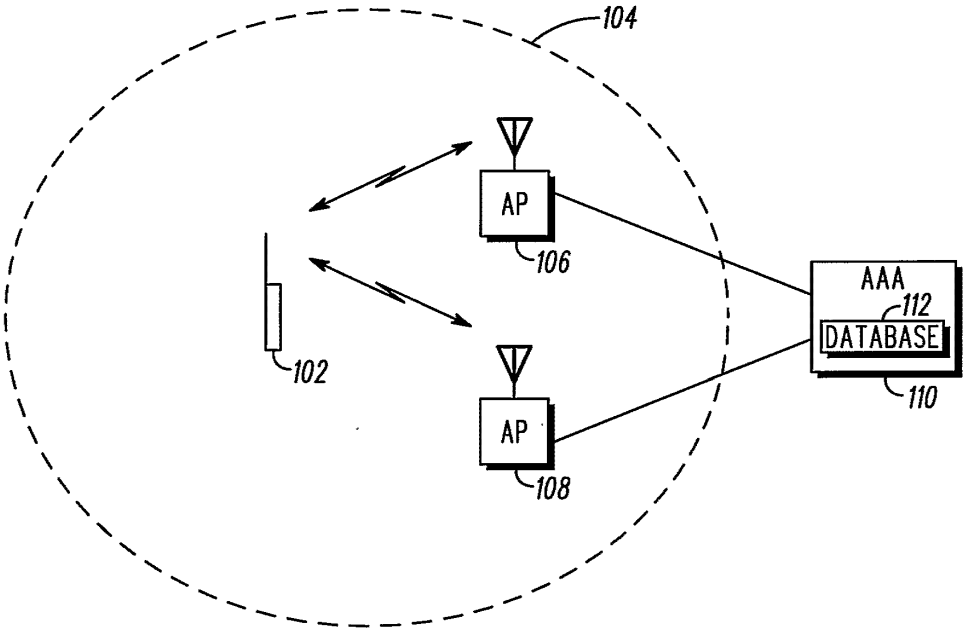
a processor coupled to the memory that assembles one or more messages comprising the service provider identifier and the network service information associated with each service provider of a plurality of service providers and conveys the one or more messages to a mobile station.

9. The Access Point of claim 8, wherein the first one or more messages comprises a first one or more messages and wherein the processor receives a request to authenticate the mobile station, in response to receiving the request, assembles the first one or more messages, and further assembles a second message comprising a request for authentication information and conveys the second message to the mobile station.

10. The Access Point of claim 9, wherein the processor further, in response to conveying the request for authentication information, receives the requested authentication information and, in response to receiving the requested authentication information, assembles a third message requesting authorization of the mobile station and conveys the third message to a server.

11. The Access Point of claim 10, wherein the memory stores, in association with the server, a service provider identifier, wherein the received authentication information comprises the service provider identifier, and wherein the processor determines the server based on the received service provider identifier.

5



100

FIG. 1
—PRIOR ART—

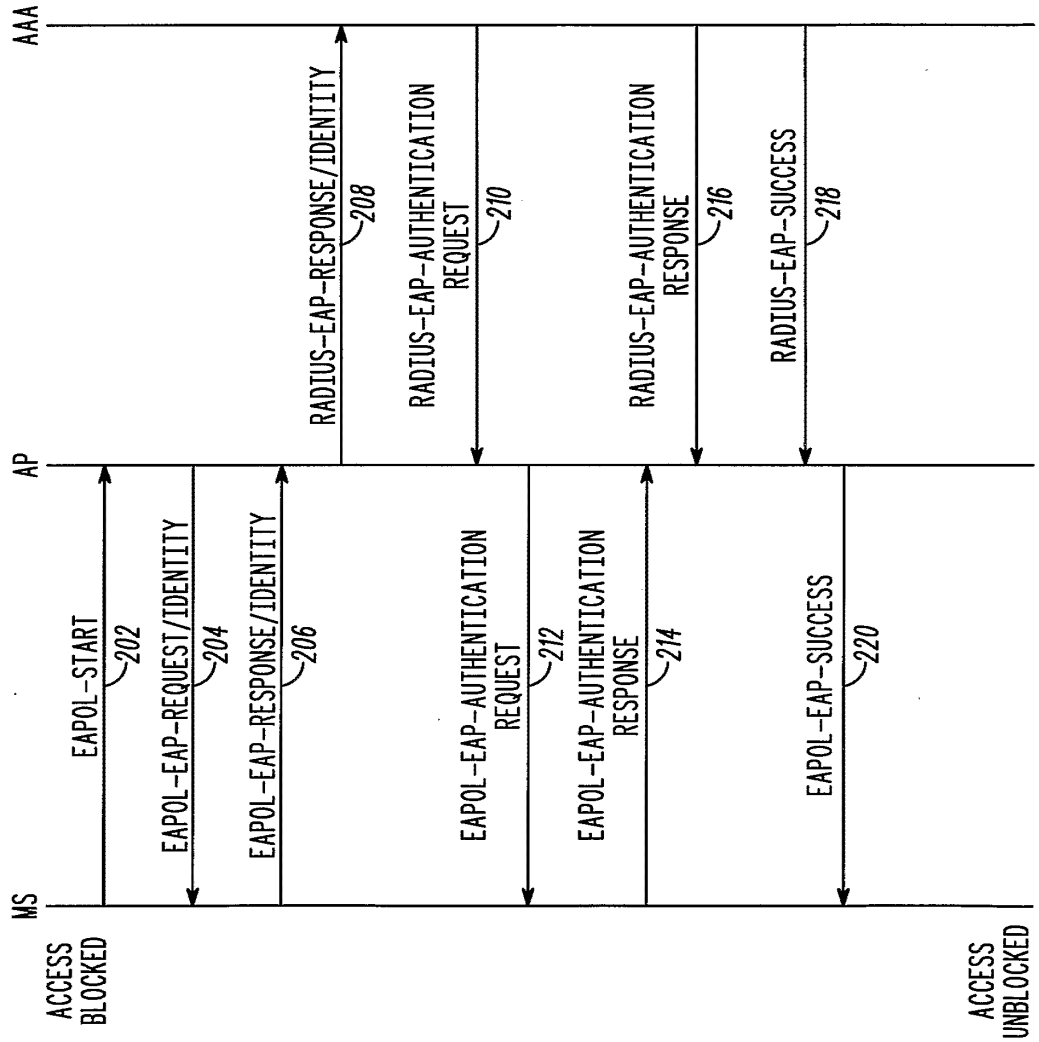


FIG. 2 200
—PRIOR ART—

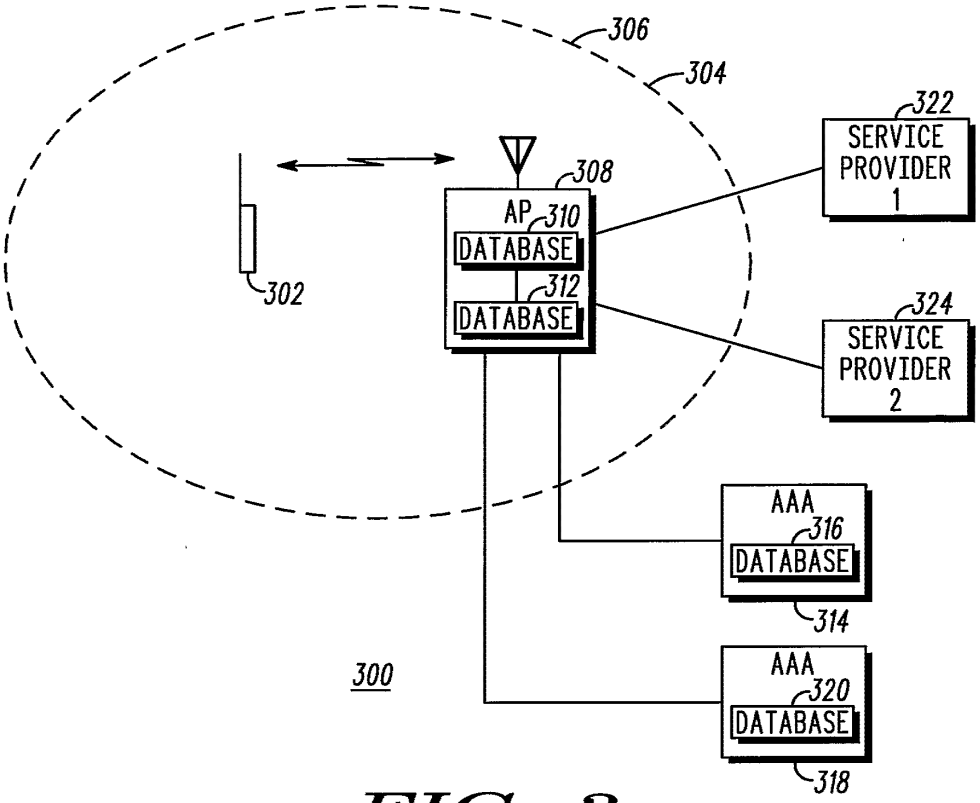

306
304
322
SERVICE PROVIDER 1
308
AP 310
DATABASE
312
DATABASE
302
324
SERVICE PROVIDER 2
AAA
316
DATABASE
314
300
AAA
320
DATABASE
318

FIG. 3

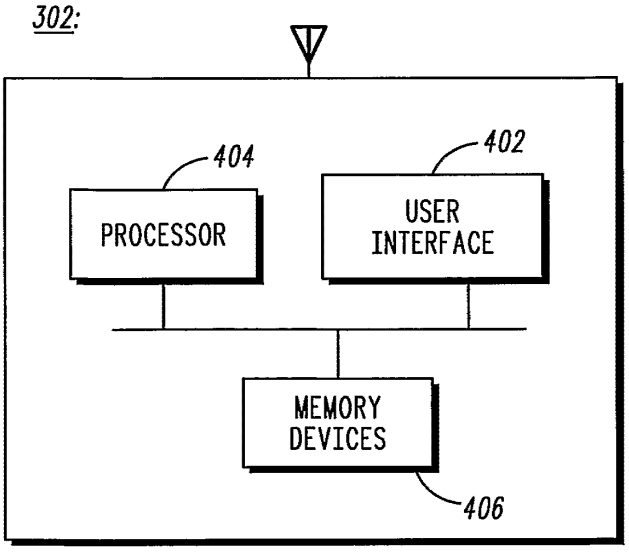
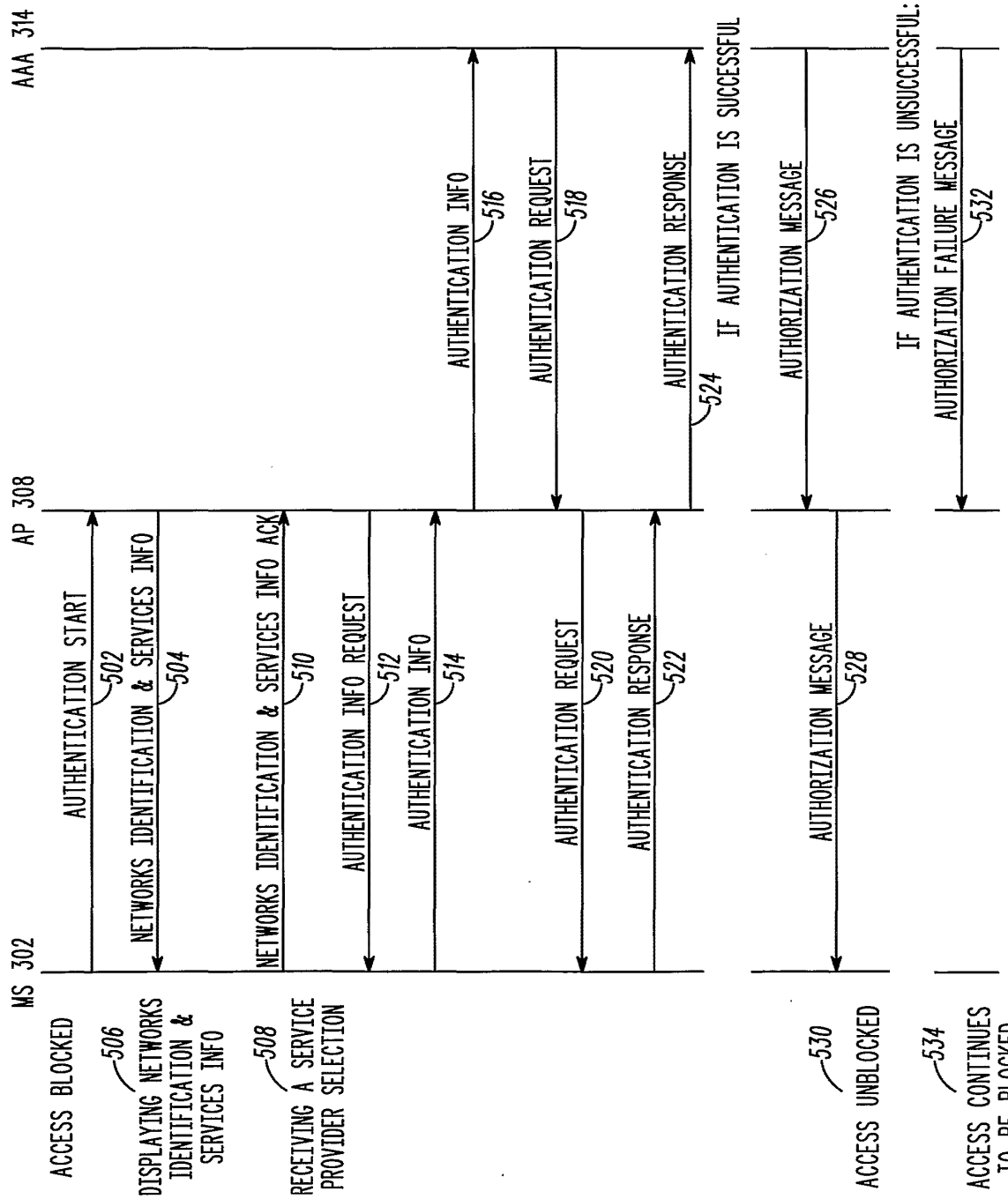

302:
404
PROCESSOR
402
USER INTERFACE
MEMORY DEVICES
406

FIG. 4


MS 302
AP 308
AAA 314
ACCESS BLOCKED
AUTHENTICATION START
502
NETWORKS IDENTIFICATION & SERVICES INFO
504
DISPLAYING NETWORKS IDENTIFICATION & SERVICES INFO
506
NETWORKS IDENTIFICATION & SERVICES INFO ACK
510
RECEIVING A SERVICE PROVIDER SELECTION
508
AUTHENTICATION INFO REQUEST
512
AUTHENTICATION INFO
514
AUTHENTICATION INFO
516
AUTHENTICATION REQUEST
518
AUTHENTICATION REQUEST
520
AUTHENTICATION RESPONSE
522
AUTHENTICATION RESPONSE
524
IF AUTHENTICATION IS SUCCESSFUL
AUTHORIZATION MESSAGE
528
ACCESS UNBLOCKED
530
AUTHORIZATION MESSAGE
526
IF AUTHENTICATION IS UNSUCCESSFUL:
AUTHORIZATION FAILURE MESSAGE
532
ACCESS CONTINUES TO BE BLOCKED
534

500 FIG. 5

Electronic Patent Application Fee Transmittal

Application Number:	13742312
Filing Date:	15-Jan-2013
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Krista Susan Jacobsen/Ann Taylor
Attorney Docket Number:	RALEP007C05

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	17501913
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	25-NOV-2013
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Time Stamp:	23:28:46
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Payment was successfully received in RAM	$180
RAM confirmation Number	13638
Deposit Account	505876
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Information Disclosure Statement (IDS) Form (SB08)	P007C05IDS.pdf	380152 d19e67a5cd43149b121c0477c44c6f312c32d8cd	no	12
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Form (SB08)	P007C05TransLtr.pdf	444912 1886c3b3bdd052a61752ad42c00172b40fa5a754	no	3
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Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	2037_CN1538730A.pdf	550169 2e3e24baa9d5890cdf219fc4a3d0303062aeda8c	no	11
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Warnings:					
Information:					
5	Foreign Reference	2039_CN101341764A.pdf	1138895 2e2dbcd7a125a434c6548925e43e263bfbdc4a20	no	25
Warnings:					
Information:					
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Information:					
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Information:					
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Information:					

9	Non Patent Literature	3032_Verizon.pdf	80548 984c09646690e8def9b16a30b9eef2c953a6263d	no	2
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Information:					
10	Non Patent Literature	3033_ChineseLit.pdf	692944 27c80a849cc8dbc81b552f052687e58018a96512	no	2
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Information:					
		Total Files Size (in bytes):	6445751		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060156398	A	2006-07-13	Ross et al.	
	2	20060173959	A	2006-08-03	Mckelvie et al.	
	3	20080201266	A	2008-08-21	Chua et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

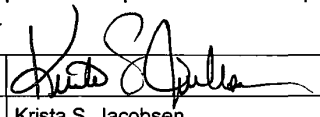
☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-12-04
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Patent Application Fee Transmittal

Application Number:	13742312
Filing Date:	15-Jan-2013
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Krista Susan Jacobsen/Ann Taylor
Attorney Docket Number:	RALEP007C05

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	17568565
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	04-DEC-2013
Filing Date:	15-JAN-2013
Time Stamp:	17:26:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	4939
Deposit Account	505876
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Information Disclosure Statement (IDS) Form (SB08)	P007C05IDS.pdf	695602 d7d6576c86ed898737f9f460956c0a7f9499ef28	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Fee Worksheet (SB06)	fee-info.pdf	30272 f752d168c4aeb77e3e8a4314d2a10a5cc7be1c54	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	725874		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	1	"Communication Concepts for Mobile Agent Systems," by Joachim Baumann et al.; Inst. Of Parallel and Distributed High-Performance Systems, Univ. of Stuttgart, Germany, pp. 123-135, 1997	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	3687
	Examiner Name	Andrew J RUDY
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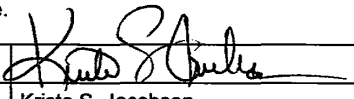
☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-12-04
Name/Print	Krista S. Jacobsen	Registration Number	59374

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Electronic Patent Application Fee Transmittal	
Application Number:	13742312
Filing Date:	15-Jan-2013
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Krista Susan Jacobsen/Ann Taylor
Attorney Docket Number:	RALEP007C05
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	17583239
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	05-DEC-2013
Filing Date:	15-JAN-2013
Time Stamp:	20:45:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7909
Deposit Account	505876
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	P007C05IDS.pdf	705250 4077dbf74dfc98121afc92a9073d54950173 6f8e	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Fee Worksheet (SB06)	fee-info.pdf	30272 15003e62d0789f0154a031b57823c44b936 2ac9b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	735522		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

106963 7590 11/20/2013
Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Ann Taylor	(Depositor's name)
	(Signature)
December 5, 2013	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

TITLE OF INVENTION: AUTOMATED DEVICE PROVISIONING AND ACTIVATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$890	$0	$0	$890	02/20/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
RUDY, ANDREW J	3687	705-030000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Krista S. Jacobsen
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Headwater Partners I LLC
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Redwood City, CA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 505876 (enclose an extra copy of this form).

PTOL-85 (Rev. 02/11)

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29	NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
☐ Applicant asserting small entity status. See 37 CFR 1.27	NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
☐ Applicant changing to regular undiscounted fee status.	NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date December 5, 2013

Typed or printed name Krista S. Jacobsen Registration No. 59374

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Electronic Patent Application Fee Transmittal

Application Number:	13742312
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Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Krista Susan Jacobsen/Ann Taylor
Attorney Docket Number:	RALEP007C05

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	890	890
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**890**

Electronic Acknowledgement Receipt	
EFS ID:	17583256
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP007C05
Receipt Date:	05-DEC-2013
Filing Date:	15-JAN-2013
Time Stamp:	20:48:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$890
RAM confirmation Number	7929
Deposit Account	505876
Authorized User	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	P007C05IssueFee.pdf	497813 3143ca18da6475a78f82f022f306a86e64d8d041	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30434 fd70dc77052fb92cd73dd542b2b26e4cd5966c43	no	2
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<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/15/2013	Gregory G. Raleigh	RALEP007C05	5058

106963 7590 12/24/2013

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

EXAMINER	
RUDY, ANDREW J	
ART UNIT	PAPER NUMBER
3687	

NOTIFICATION DATE	DELIVERY MODE
12/24/2013	ELECTRONIC

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Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
13/742,312	15 January, 2013	RALEIGH, GREGORY G.	RALEP007C05

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

EXAMINER	
ANDREW JOSEPH RUDY	
ART UNIT	PAPER
3687	20131217

DATE MAILED:

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Commissioner for Patents

Applicant's three Information Disclosure Statements (IDS's) submitted November 25, 2013; December 4, 2013 and December 5, 2013 have been reviewed. Note the attached IDS's.

/ANDREW JOSEPH RUDY/
Primary Examiner
Art Unit: 3687

PTO-90C (Rev.04-03)

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

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	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

/A.R./	1	"Communication Concepts for Mobile Agent Systems," by Joachim Baumann et al.; Inst. Of Parallel and Distributed High-Performance Systems, Univ. of Stuttgart, Germany, pp. 123-135, 1997	☐

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Examiner Signature	/Andrew Joseph Rudy/	Date Considered	12/17/2013

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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Art Unit	3687
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Attorney Docket Number	RALEP007C05

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/A.R./	1	20060156398	A	2006-07-13	Ross et al.	
/A.R./	2	20060173959	A	2006-08-03	Mckelvie et al.	
/A.R./	3	20080201266	A	2008-08-21	Chua et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Signature	/Andrew Joseph Rudy/	Date Considered	12/17/2013

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	2	6104700	A	2000-08-15	Haddock, Stephen R. et al.	
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	Attorney Docket Number	RALEP007C05

	9	7113780	B2	2006-09-26	Mckenna Daniel et al.	
	10	7286834	B2	2007-10-23	Walter	
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	20	7616962	B2	2009-11-10	Oswal, Anand K. et al.	
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	31	7958029	B1	2011-06-07	Bobich et al.	
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	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	42	8204505	B2	2012-06-19	Jin et al.	
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	First Named Inventor	Gregory G. Raleigh
	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

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	57	8509082	B2	2013-08-13	Heinz, John M. et al.	
	58	8520589		2013-08-27	Bhatt, Yogesh et al.	
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	Art Unit	3687
	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	64	8544105	B2	2013-09-24	Mclean et al.	
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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060174035	A	2006-08-03	Tufail, Mudassir	
	2	20070025301	A	2007-02-01	Petersson et al.	
	3	20070140145	A	2007-06-21	Kumar et al.	
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	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	5	20070155365	A	2007-07-05	Kim, Sung-Jun et al.	
	6	20070168499	A	2007-07-19	Chu, Jing-Long	
	7	20080120129	A	2008-05-22	Seubert et al.	
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	10	20110264923	A	2011-10-27	Kocher et al.	
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101115248A	CN		2008-01-30	Lenovo Beijing Ltd.		☐
	2	101341764A	CN		2009-01-07	Telefonaktiebolaget LM Ericsson		☐

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	Examiner Name	Andrew J RUDY
	Attorney Docket Number	RALEP007C05

	3	1538730A	CN		2004-10-20	Zhongxing Communication Co., Ltd.		☐
	4	1802839A	CN		2006-07-12	Motorola Inc.		☐
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	6	2007068288	WO		2007-06-21	Telefonaktiebolaget LM Ericsson		☐

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	1	"The Construction of Intelligent Residential District in Use of Cable Television Network," Shandong Science, Vol. 13, No. 2, June 2000	☐
	2	VerizonWireless.com news, "Verizon Wireless Adds to Portfolio of Cosumer-Friendly Tools With Introduction of Usage Controls, Usage Controls and Chaperone 2.0 Offer Parents Full Family Security Solution," August 18, 2008	☐
	3	9/30/2013 Office Action Response in U.S. Application No. 13/742,317	☐

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	Application Number	13742312
	Filing Date	2013-01-15
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2447
	Examiner Name	not yet assigned
	Attorney Docket Number	RALEP007C5

	218	7565141		~~2009-06-24~~ 07/2009	Macaluso, Anthony G.	
	219	7373179		2008-05-13	Stine, Ted et al.	
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	221	7039403		2006-05-02	Wong, Gregory A.	

Change(s) applied to document.
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	1	1463238	EP		2004-09-29	Alcatel		☐
	2	1739518	EP		2007-01-03	Research In Motion Limited		☐

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/742,312	01/28/2014	8639811	RALEP007C05	5058

106963 7590 01/08/2014

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Gregory G. Raleigh, Woodside, CA;
HEADWATER PARTNERS I LLC, Redwood Shores, CA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Raleigh	Patent No.: 8,639,811
Serial No.: 13/742,312	Issue Date: January 28, 2014
Filing Date: January 15, 2013	Conf. No.: 5058
Title: Automated Device Provisioning and Activation	

Commissioner for Patents
Office of Data Management
ATTN: Certificate of Correction Branch
P.O. Box 1450
Alexandria, VA 22313-1450

MISCELLANEOUS COMMUNICATION REGARDING CERTIFICATE OF CORRECTION

Applicant/Patentee (hereinafter, "Applicant") respectfully requests that the Office issue a Certificate of Correction for U.S. Patent No. 8,639,811 to correct a typographical error in claim 24. The error being corrected is Applicant's error.

In both Applicant's amendment filed on September 30, 2013 and in the issued patent, claim 8 recites:

> 24. The wireless device recited in claim 1, wherein the first application is configured to assist in providing a forwarding service, the forwarding service for forwarding traffic between (a) one or more other devices communicatively coupled to the wireless device over a second network and (b) a network system communicatively coupled to the wireless device over the first wireless network, and wherein the at least an aspect of the control policy at least assists in determining whether the forwarding service is available to one or more of the one **of** more other devices.

The word "of" in the last sentence should be corrected to the word "or".

Applicant respectfully requests issuance of the Certificate of Correction to correct the typographical error in claim 24. Because the error in claim 24 was Applicant's error, Applicant is submitting the fee for a Certificate of Correction with this request. The Office is authorized to charge any fee deficiency or credit any overpayment to Deposit Account 50-5876.

Respectfully submitted,

Date: February 8, 2018 By: /James E. Harris/

James E. Harris
Reg. No. 40,013
Patent Counsel
Headwater Research LLC
1011 Pruitt Place
Tyler, TX 75703
(903) 201-6212

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being filed electronically via EFS-Web addressed to the Commissioner for Patents on:

Date: Feb. 9, 2018 By: /Ann Taylor/
Ann Taylor

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.
(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 8,639,811

APPLICATION NO.: 13/742,312

ISSUE DATE : January 28, 2014

INVENTOR(S) : Raleigh

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 166, line 16, (the ninth line of claim 24) the word "of" in the phrase "the one of" should be changed to --or--

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Headwater Research LLC
1011 Pruitt Place
Tyler, TX 75703

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	13742312
Filing Date:	15-Jan-2013
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	James E. Harris/Ann Taylor
Attorney Docket Number:	RALEP007C05

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
CERTIFICATE OF CORRECTION	2811	1	150	150

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**150**

Electronic Acknowledgement Receipt	
EFS ID:	31749247
Application Number:	13742312
International Application Number:	
Confirmation Number:	5058
Title of Invention:	AUTOMATED DEVICE PROVISIONING AND ACTIVATION
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	106963
Filer:	James E. Harris/Ann Taylor
Filer Authorized By:	James E. Harris
Attorney Docket Number:	RALEP007C05
Receipt Date:	09-FEB-2018
Filing Date:	15-JAN-2013
Time Stamp:	12:56:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$150
RAM confirmation Number	020918INTEFSW00009668505876
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	P007C05_ReqforCoC.pdf	60773 9b0a2e22ad8c4987a78a9032bf86ac60a82c88e3	no	2
Warnings:					
Information:					
2	Request for Certificate of Correction	P007C05_COCForm.pdf	164100 87dcafcefb5e6fbe35c3139247114e3ec1ddc3cf	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29938 ab058a1bce0da4484618a1dede3d2fa8b1065acd	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	254811		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 8,639,811 B2
APPLICATION NO.	: 13/742312
DATED	: January 28, 2014
INVENTOR(S)	: Raleigh

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Column 166, Line 16, (the ninth line of Claim 24) the word "of" in the phrase "the one of" should be changed to --or--

Signed and Sealed this
Twenty-fourth Day of April, 2018

Andrei Iancu
Director of the United States Patent and Trademark Office