



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
61/660,772	06/17/2012		125	07001.1560		

CONFIRMATION NO. 8616

35856
SMITH RISLEY TEMPEL SANTOS LLC
Two Ravinia Drive
Suite 700
ATLANTA, GA 30346

FILING RECEIPT



OC000000054979734

Date Mailed: 06/25/2012

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

George Backhaus, Atlanta, GA;
Romero Jose, Atlanta, GA;
Paul Rubenstein, Atlanta, GA;
John Green, Atlanta, GA;

Power of Attorney:

Matthew Hoots--67778

If Required, Foreign Filing License Granted: 06/21/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/660,772**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Cross Carrier Mobile Device Client Using Data Channel for SIP Call

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same

page 1 of 3

effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with

respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

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, facilitate, and accelerate 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.

Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

Remove

Given Name

Middle Name

Family Name

City

State

Country i

George

Backhaus

Atlanta

GA

US

Inventor 2

Remove

Given Name

Middle Name

Family Name

City

State

Country i

Romero

Jose

Atlanta

GA

US

Inventor 3

Remove

Given Name

Middle Name

Family Name

City

State

Country i

Paul

Rubenstein

Atlanta

GA

US

Inventor 4

Remove

Given Name

Middle Name

Family Name

City

State

Country i

John

Green

Atlanta

GA

US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

Add

Title of Invention

Cross Carrier Mobile Device Client Using Data Channel for SIP Call

Attorney Docket Number (if applicable)

07001.1560

Correspondence Address

Direct all correspondence to (select one):

☒ The address corresponding to Customer Number

☐ Firm or Individual Name

Customer Number

35856

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

- ☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27
☐ No

Warning

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Matthew T. Hoots/			Date (YYYY-MM-DD)	2012-06-17
First Name	Matthew	Last Name	Hoots	Registration Number (If appropriate)	67778

This collection of information is required by 37 CFR 1.51. 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 1.11 and 1.14. This collection is estimated to take 8 hours 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. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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.

SYSTEM AND METHOD FOR PROVISION OF A SECOND LINE SERVICE TO A TELECOMMUNICATIONS DEVICE

CROSS-REFERENCE

[0001] The Appendix attached hereto is a part of the specification.

BACKGROUND

[0002] In simpler times, communication meant a face to face conversation, a hand written note or, perhaps, a phone call between two land lines. Times have changed. People today communicate constantly and simultaneously via myriad channels, most of which are mobile. Of all the means of communication available to today's users, the cellular telephone may be the most ubiquitous. It seems that everybody has one and that everybody uses their mobile device to stay connected, keep their busy lives moving forward, and fulfill their endless responsibilities.

[0003] For many people, those endless responsibilities are of a personal and professional mix. Fielding phone calls and texts from family and friends on the same mobile device from which you endeavor to conduct business is a recipe for confusion. When taking a call from your top client, it's probably a good idea to avoid getting it mixed up with a call from your spouse. The greeting "Hey, Honey!" can undermine even the best of business relationships.

[0004] To keep the personal and business channels of communication separated, many people simply carry two separate mobile devices, each with its own dedicated phone number and service options. If mobile device "A" rings, the user knows it's of a personal nature. If mobile device "B" rings, the user knows that it's a business related call. Although carrying two mobile devices with you is one solution for keeping personal and business demands separate, keeping track of two mobile devices and their related service plans, however, can be frustrating and expensive.

[0005] For many users, porting a second phone number to a single device makes more sense – in doing so, at least the number of devices that must be kept up with in order to keep personal and business matters segregated have been reduced. But current systems and methods for managing multiple numbers on a single device are not without issues. For example, adding a second line to a service plan often dictates that the user have a more expensive "family plan" established with the service provider and often there still is no

fool proof way to know which number a calling party has dialed. Using a dual-SIM (“subscriber identity module”) phone is another solution, with each SIM card being dedicated to a separate line, but the cost of redundant service plans to accommodate the multiple SIM cards, not to mention the cost of the dual-SIM phone itself, can be exorbitant.

[0006] Another solution is to offer a second line number in the form of a virtual number. Calls to the virtual number are intercepted and forwarded to the primary number of a subscriber’s mobile device. To distinguish that the incoming call was originally directed to the virtual number as opposed to the primary number associated with the device, virtual number services known in the art simply populate a calling party field with the virtual number. The user sees the virtual number on the caller ID display and knows that the incoming call was made to the virtual number. If the virtual number is being used for a business venture, for example, seeing the virtual number on the caller ID display prompts the user to answer the call with an appropriate greeting. Notably, however, in some virtual number services the user of the virtual number service has no way of identifying the source of the incoming call – he can only know that the incoming call was directed to the virtual number.

[0007] In other virtual number services, the problem of identifying the call as an incoming call to the virtual number without sacrificing the ability to also know the source of the incoming call is solved with the addition of a dialable prefix to the incoming call identification (e.g., 88*770.283.5555). Notably, however, to provide such a solution the virtual number service must work in cooperation with the subscriber’s primary service provider so that the dialable prefix is acknowledged as a trigger to forward the incoming call to the subscriber’s device.

[0008] Accordingly, what is needed is a system and method for providing a plurality of dedicated phone numbers to a single telecommunications device in such a manner that the user of the device can separate and manage communications on each. Further, what is needed is a system and method for providing a second line service to a device in such a manner that only a single primary phone number is required from the device’s primary service provider. Even further, what is needed is a system and method for providing a second line service to a device in such a manner that the second line service can be provided to the subscriber without having to coordinate the provisioning through the subscriber’s primary service provider.

SUMMARY OF THE DISCLOSURE

- [0009] A method and system are described for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”). An exemplary method according to one aspect includes receiving a call at an SLS platform that is interposed between a network of a primary service provider to the subscriber TD and a network of a primary service provider to the third party TD. The call, although directed by the third party TD to the subscriber TD associated with the second line service, is routed to the SLS platform.
- [0010] Upon receiving the call, the SLS platform queries a local database to identify a relationship number that serves to map the subscriber’s primary number to the combination of the third party calling number and the subscriber’s second line number. The call is then redirected to the primary number of the subscriber’s TD and the call is completed. Notably, receipt of the call at the subscriber TD includes transmission of the relationship number and third party calling number combination, thus enabling an application on the subscriber TD to save the combination in a local database.
- [0011] Advantageously, the relationship number can be used at a later time should the subscriber desire to call the third party. Dialing the third party number from the SLS application on the subscriber TD causes the relationship number for the third party to be dialed. As such, the call is actually routed to the SLS platform which subsequently uses the second line service number of the subscriber TD and the relationship number that routed the call to the SLS platform to determine the actual third party called number. Using the actual third party called number, the SLS platform completes the second leg of the call.
- [0012] By associating the SLS number of the subscriber, the primary number of the subscriber and the primary number of a third party via a common relationship number, calls can be directed to and from a second service line of a subscriber TD without having to provide the second line service through the subscriber’s primary service provider.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0013] In the Figures, like reference numerals refer to like parts throughout the various views unless otherwise indicated. For reference numerals with letter character designations such as “102A” or “102B”, the letter character designations may differentiate two like parts or elements present in the same figure. Letter character designations for reference

numerals may be omitted when it is intended that a reference numeral encompass all parts having the same reference numeral in all figures.

- [0014] FIG. 1 is a high level diagram illustrating exemplary components of a system for providing a second line service (“SLS”) to a user of telecommunications device (“TD”).
- [0015] FIG. 2 is a diagram of an exemplary computer architecture for the system of FIG. 1.
- [0016] FIGS. 3A-3B illustrate exemplary data tables that may be leveraged by a redirection module of an SLS platform and an SLS module of a subscriber TD to provide a second line service to a user of the subscriber TD.
- [0017] FIGS. 4A-4D collectively illustrate an exemplary method for routing calls between a third party TD and a subscriber TD.
- [0018] FIG. 5 illustrates an exemplary method for routing calls from a subscriber TD associated with a primary number and a second line number to a third party TD.
- [0019] FIG. 6 illustrates an exemplary method for routing calls from a third party TD to a subscriber TD associated with a primary number and a second line number.

DETAILED DESCRIPTION

- [0020] The word “exemplary” is used herein to mean “serving as an example, instance, or illustration.” Any aspect described herein as “exemplary” is not necessarily to be construed as preferred or advantageous over other aspects.
- [0021] In this description, the terms “application” and “app” may also include files having executable content, such as: object code, scripts, byte code, markup language files, and patches. In addition, an “application” referred to herein, may also include files that are not executable in nature, such as documents that may need to be opened or other data files that need to be accessed. Further, an “application” may be a complete program, a module, a routine, a library function, a driver, etc.
- [0022] The term “content” may also include files having executable content, such as: object code, scripts, byte code, markup language files, and patches. In addition, “content” referred to herein, may also include files that are not executable in nature, such as documents that may need to be opened or other data files that need to be accessed.
- [0023] As used in this description, the terms “component,” “database,” “module,” “system,” and the like are intended to refer to a computer-related entity, either hardware, firmware, a combination of hardware and software, software, or software in execution. For example, a component may be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program,

and/or a computer. By way of illustration, both an application running on a computing device and the computing device may be a component.

- [0024] One or more components may reside within a process and/or thread of execution, and a component may be localized on one computer and/or distributed between two or more computers. In addition, these components may execute from various computer readable media having various data structures stored thereon. The components may communicate by way of local and/or remote processes such as in accordance with a signal having one or more data packets (*e.g.*, data from one component interacting with another component in a local system, distributed system, and/or across a network such as the Internet with other systems by way of the signal).
- [0025] In this description, the terms “telecommunications device,” “communication device,” “wireless device,” “wireless telephone,” “wireless communication device” and “wireless handset” are used interchangeably. With the advent of third generation (“3G”) and fourth generation (“4G”) wireless technology, greater bandwidth availability has enabled more portable computing devices with a greater variety of wireless capabilities. Therefore, a telecommunications device (“TD”) may include a cellular telephone, a pager, a PDA, a smartphone, a navigation device, a tablet personal computer (“PC”), or a hand-held computer with a wireless connection or link.
- [0026] In this description, the terms “call” and “communication,” in their noun forms, envision any data transmission routed across a network from one device to another including, but not limited to, a voice transmission, a text message, a video message, a page, a data transmission, etc.
- [0027] Referring to FIG. 1, depicted is a high level diagram illustrating exemplary components of a system 100 for providing a second line service to a user of TD 110. TD 110 is also associated with a primary phone number assigned to it by a primary service provider, as is understood by one of ordinary skill in the art. A subscriber to a second line service (“SLS”) offered through exemplary system 100 may receive calls at TD 110 that are directed to either of the primary phone number provided by the primary service provider or the secondary phone number (“SLS phone number”) provided by the SLS platform 115.
- [0028] In general, any call directed to either of the primary phone number or the SLS phone number are transmitted from a third party TD 120 to the subscriber TD 110 by way communications network 125. Notably, communications network 125 envisions any and all networks for transmitting and terminating communications between

telecommunications devices such as, but not limited to, cellular networks, PSTNs, cable networks and the Internet. Methods for effecting the transmission of data across communications network 125 from one device to another, including call setups, terminations and the like are understood by those of ordinary skill in the art of data transmission.

[0029] A call made from a third party TD 120 to the primary number associated with subscriber TD 110 is transmitted across communications network 125 and routed to subscriber TD 110, as is understood in the art. The radio transceiver 104, if the TD 110 is a portable and wireless device, enables the receipt and transmission of signals to and from subscriber TD 110. The call signal may include the calling line identification (“CLID”), i.e. the phone number, associated with third party TD 120 such that when the call is received at subscriber TD 110, the CLID may be displayed for the benefit of the subscriber on display component 103. Notably, although the exemplary embodiments described in the present disclosure use the CLID as an example of data that may be displayed for the benefit of the user of a subscriber TD 110, it will be understood that any data associated with the third party TD 120, subscriber TD 110, SLS platform 115 or the like may be rendered for the benefit of the user of the system 100 and, as such, only describing that the CLID is displayed will not limit the scope of what is envisioned by the disclosure. Moreover, it is envisioned that any data uniquely associated with a call to a primary number or an SLS number may be displayed for the benefit of a subscriber to the system 100.

[0030] Returning to the FIG. 1 illustration, a call made from a third party TD 120 to an SLS number associated with subscriber TD 110 is transmitted across network 125. The network 125 recognizes where the call needs to be routed based on the called number (the SLS number associated with the subscriber) and routes the call to SLS platform 115. SLS platform 115 thus effectively intercepts the call, determines that the call was intended for subscriber TD 110 and then forwards the call to subscriber TD 110. In this way, while a call directed to a primary number associated with subscriber TD 110 is routed directly to subscriber TD 110, a call directed to a second line number associated with subscriber TD 110 is routed to SLS platform 115 instead. Once received at SLS platform 115, a query of central SLS database 116 by redirection module 117 may determine that the call from third party TD 120 was meant for the second line number associated with subscriber associated with TD 110. Once the determination is made, redirection module 117 may modify the call data to include data that reflects its

identification as a call for the second line number and then forward the call to the primary number associated with subscriber TD 110.

[0031] Because the call includes data identifying it as a call to the second line number associated with subscriber TD 110, SLS module 105 may intercept the incoming call, or otherwise be injected into the call processing activity for the call, and then leverage data stored in local SLS database 106 to render it in such a way that the user or subscriber associated with TD 110 knows that the call is for the second line number as opposed to the primary number. The SLS module 105 is designed to work with radio transceiver 104 and any stored or retrievable content in local SLS database 106 to terminate a call to a second line number, render associated data and provide services uniquely associated with the second line number such as, but not limited to, dedicated voicemail, ringtones, caller ID, automated responses, etc.

[0032] A more detailed description of the exemplary method, including exemplary methods for receiving a call from a third party TD 120 and making a call to a third party TD 120 by way of the SLS platform 115 will be described below relative to Figs. 4-6.

[0033] Referring to FIG. 2, a diagram of exemplary computer architecture 101 for the system 100 of FIG. 1 is depicted. The exemplary architecture 101 may include a subscriber telecommunications device ("TD") 110 and a third party TD 120. An SLS platform 115 may be connected to the subscriber TD 110 via a first provider network 201 and to the third party TD 120 via a second provider network 202, although it is envisioned that TDs 110 and 120 may be associated with a common service provider. The SLS platform 115 may include an SLS server 205 configured to receive calls directed to and from a second line number associated with subscriber TD 110.

[0034] As illustrated in FIG. 2, the SLS server 205 includes a processor 209 and a memory 211 coupled to the processor 209. The memory 211 may include instructions for executing one or more of the method steps described herein. Further, the processor 209 and the memory 211 may serve as a means for executing one or more of the method steps described herein. As indicated, the memory 211 may also include a redirection module 117 and a central SLS database 116. Notably, it should be understood that the term server 205 may refer to a single server system or multiple systems or multiple servers. One of ordinary skill in the art will appreciate that the various server arrangements may be selected depending upon computer architecture design constraints and without departing from the scope of the invention.

- [0035] As further illustrated in FIG. 2, the subscriber TD 110 may include a processor 208 and a memory 207 coupled to the processor 208. The memory 207 may include instructions for executing one or more of the method steps described herein. Further, the processor 208 and the memory 207 may serve as a means for executing one or more of the method steps described herein. As indicated, the memory 207 may also include an SLS module 105 and a local SLS database 106.
- [0036] Referring to FIGS. 3A-3B, illustrated are exemplary data tables that may be leveraged by a redirection module 117 of an SLS platform 115 and an SLS module 105 of a subscriber TD 110 to provide a second line service to a user of a subscriber TD 110. The Second Line Public ID Table 305 and Private Relationship ID Table 310 of FIG. 3A may be stored in a central SLS database 116 while the exemplary Private Relationship ID Table 315 of FIG. 3B may be stored in a local SLS database 106. An illustrative embodiment of a method for providing a second line service will now be described in the context of the exemplary data tables reflected in FIGS. 3A-3B.
- [0037] Embodiments of the method for providing a second line service leverage intermediate phone numbers to ensure that calls meant for the user of subscriber TD 110 route to the SLS platform 115. Once the call reaches the SLS platform 115, an application running on redirection module 117 makes a translation to complete the call. The SLS platform 115 maintains a master list of SLS phone numbers that are in service. In some embodiments, these numbers may be owned by the SLS service provider. In the telephone network 125, these numbers route to the SLS platform 115 (i.e., the SLS platform may exist in network 125 as a telephony peripheral).
- [0038] The SLS service provider that manages the SLS platform 115 essentially has a group of SLS numbers that are his inventory and are provided to subscribers of the SLS service. Referring to the Second Line Public ID Table 305, the example subscriber #1 has been issued SLS number 1.770.555.0001. As such, subscriber #1 may choose to use his SLS number as a business number and give it out to contacts. Notably, in Second Line Public ID Table 305 the primary number, 1.408.544.1212, that is assigned to the subscriber TD 110 by the primary service provider 201 is associated with subscriber #1 and his SLS number 1.770.555.0001.
- [0039] For each subscriber to the SLS service, a Private Relationship ID Table 310 is also maintained. Referring to the Private Relationship ID Table 310, it can be seen that the SLS service provider has another list of dialable phone numbers, i.e. relationship numbers, which are maintained. These relationship numbers are essentially “hidden

numbers” that are used to facilitate calls between the subscriber’s TD 110 (which, again, is actually a TD with a number and service provided by a primary service provider, such as primary service provider 201) and the SLS platform 115 operated by the SLS service provider.

[0040] Concerning the Private Relationship ID Table 310, one of ordinary skill in the art will understand that certain embodiments may not formally distinguish one subscriber’s records from that of another via individual private relationship ID tables. Rather, as is understood in the art of database management and query, a more general relational database including records associated with multiple subscribers may be used to map subscriber number and third party number combinations to given relationship numbers. As such, it will be understood that the description in this disclosure of exemplary embodiments that include individual private relationship ID tables are offered for illustrative purposes only and will not limit the scope of the disclosure.

[0041] Additionally, concerning the use of relationship numbers, it is envisioned that certain relationship numbers may be used for a plurality of subscriber number and third party number combinations, i.e. in certain embodiments a given relationship number may not be unique to a given subscriber number and third party number combination. For example, in an illustrative embodiment, subscribers D, E, F and G, may all have database records that map relationship number X to third party numbers J, K, L and D, respectively. Notably, in this exemplary scenario, the last subscriber number and third party number combination (G:D) is meant to envision a case where G has a calling relationship with D. In such case, although D is a subscriber to the SLS service he may also be treated as a third party caller relative to subscriber G. To carry the example further, if G has a relationship with D, D also has one with G. However, the D:G combination may or may not use a different relationship number Y.

[0042] Returning to the FIG. 3 illustrations, as mentioned above, the relationship numbers are “behind the scenes” numbers that are hidden from the subscriber. This is accomplished by an app running on SLS module 105 residing on subscriber TD 110. As will be explained in more detail, the SLS module 105 leverages the app to translate any number calling the subscriber, or called by the subscriber, into the appropriate Relationship Number. The application run by the SLS module 105 on subscriber TD 110 uses a relationship number to access the SLS platform 115 over the telephone network 125. The SLS number is used by the redirection module 117 of the SLS platform 115 to complete calls with any external party calling the subscriber’s SLS number or being

called by the SLS subscriber using SLS module 105 of subscriber TD 110. Essentially, by leveraging the relationship numbers, an SLS service provider may insert itself into the middle of a call between a third party TD 120 and a subscriber TD 110 which have primary services provided by different service providers 202 and 201, respectively.

- [0043] For example, referring back to the tables in FIG. 3 and the system architectures described in FIGs. 1-2, Subscriber #1 associated with subscriber TD 110 already has mobile phone service via primary service provider 201 using mobile phone number 1.408.544.1212. Subscriber #1 subsequently subscribes to an SLS service provided by way of SLS platform 115 and is assigned SLS number (i.e., a second line number) 1.770.555.0001. The relationship between the subscriber's primary number and the SLS number is reflected in Second Line Public ID Table 305 of FIG. 3A. 1.770.555.0001, for example, may be the phone number that subscriber #1 publishes for his side business, personal calls, etc.
- [0044] A third party, identified in Private Relationship ID Table 310 of FIG. 3A as being Subscriber Contact #1, is associated with a third party TD 120A having a primary phone number 1.305.229.9999. The service associated with the third party's TD 120 and primary phone number 1.305.229.9999 may be provided by service provider 202. Notably, as one of ordinary skill in the art understands, as with any phone service, a called party can receive calls over the telephone network 125 from a telecommunications device on any service provider's network.
- [0045] Returning to the example, the third party uses TD 120A to place a call to the subscriber #1 SLS number 1.770.555.0001. As described above, the call is routed to the SLS platform 115. The SLS platform 115 accepts the call (without connecting the voice path to the third party TD 120A) and determines that the call is for SLS number 1.770.555.0001 and that 1.770.555.0001 does not yet have a "relationship" set up for the calling number, 1.305.229.9999 (for purposes of this example, subscriber #1 has only recently subscribed to the SLS service and Private Relationship ID Table 310 does not yet contain any records – i.e., the third party associated with TD 120A is the first to place a call to the SLS number of subscriber #1).
- [0046] The SLS platform 115 creates the following relationship in Private Relationship ID Table 310: When 1.770.555.0001 receives (or places) a call from/to 1.305.229.9999, the interaction with the subscriber's phone (1.408.544.1212) will use dialable telephone number 1.678.222.0001. Notably, it is envisioned that a given relationship number, such as relationship number 1.678.222.0001 in the present example, may be used as a

relationship number for many different SLS subscribers as it is the combination of the subscriber's primary number and/or the SLS number and the relationship number that map to the external number (in this case, 1.305.229.2999).

- [0047] Returning to the example, now that the relationship number 1.678.222.0001 has been established in connection with subscriber #1 and the calling third party, the SLS platform 115 may proceed to establish the second half of the call – the call from the SLS platform 115 to the subscriber's TD 110. The SLS platform 115 places the call to the primary number 1.408.544.1212 that points to subscriber TD 110 per its primary service provider 201.
- [0048] The calling party field of the call placed from SLS platform 115 to subscriber TD 110 may contain a specially encoded message for the SLS phone app running on SLS module 105. In some embodiments, the calling party field may contain the relationship number established by the SLS platform 115 (in this example, 1.678.222.0001) and the actual primary number of the calling third party (in this example, 1.305.229.9999), separated by a dialable separator such as a "star" character. Notably, it is envisioned that other embodiments may populate the calling party field, or provide other metadata, that serves to trigger recognition of the incoming call as a call directed to the SLS number of the subscriber. As such, by describing the exemplary embodiment to populate the calling party field with a combination of the relationship number and the third party's actual phone number, the scope of the disclosure will not be limited.
- [0049] Returning to the example, having recognized that the incoming call is from the SLS platform 115, the SLS module 105 stores the combination of the relationship number 1.678.222.0001 and third party actual number 1.305.229.9999 in the local SLS database 106. To complete the exemplary call, the SLS module 105 may cause the actual phone number associated with the third party TD 120A, 1.305.229.9999, to be rendered on display component 103 as an identification of the calling party and rings the phone. Once the subscriber #1 answers, the SLS platform 115 connects the two legs of the call (leg 1 represented by third party TD 120A to SLS platform 115 and leg 2 represented by SLS platform 115 to subscriber TD 110) by methods known and understood by those of ordinary skill in the art of telecommunications. As non-limiting examples, the calls can be connected via a forward or a bridge, as well as other technologies.
- [0050] Notably, in the example, the combination of the relationship number 1.678.222.0001 and the third party actual calling number 1.305.229.9999 is now stored in the central SLS database 116 at SLS platform 115 and also in the local SLS database 106 in

subscriber TD 110. As one of ordinary skill in the art will recognize, the importance of the relationship number is that it may also provide a mechanism by which the SLS platform may intercept calls originating from subscriber TD 110 via SLS number.

- [0051] Furthering the example, Subscriber #1 desires to originate a call to the third party associated with 1.305.229.9999 from his SLS number 1.770.555.0001. Because the third party associated with 1.305.229.9999 had previously placed a call to the SLS number 1.770.555.0001, the relationship combination that maps Subscriber #1's SLS number 1.770.555.0001 and the third party phone number 1.305.229.9999 to relationship number 1.678.222.0001 is already stored in both the central SLS database 116 at SLS Platform 115 and the local SLS database 106 in subscriber TD 110.
- [0052] To place calls from his SLS number, Subscriber #1 uses the SLS phone app of SLS module 105 as his dialer. In the SLS dialer (not depicted in the Figures), Subscriber #1 dials the third party number 1.305.229.9999 which is reflected in the Private Relationship ID Tables 310, 315 as being associated with his Contact #1. The SLS module 105 queries Private Relationship ID Table 315 in local SLS database 106 and translates the called third party number 1.305.229.9999 to relationship number 1.678.222.0001. The SLS module 105 may indicate to the subscriber via display 103 that it is calling 1.305.229.9999, but instead it calls the relationship number 1.678.222.0001. By calling the relationship number associated with Contact #1, the network 125 routes the call to the SLS platform 115 instead of directly to third party TD 120A phone. The SLS module 105 may also modify the "calling number" field in the signaling, that is instead of populating the field with the actual number of the calling device (1.408.544.1212), it may populate it with the SLS number (1.770.555.0001). In this way, it will appear to Contact #1 that he is receiving a call originating from the SLS number of the subscriber instead of the primary number (1.408.544.1212) associated with subscriber TD 110.
- [0053] When the SLS platform 115 processes this first leg of the call, it may recognize that the calling number is the subscriber's SLS number 1.770.555.0001 and the called number is the relationship number 1.678.222.0001. Querying the Private Relationship ID Table 310 in central SLS database 116, the redirection module 117 may apply the following logic: "when SLS number 1.770.555.0001 calls relationship number 1.678.222.0001, it is actually calling 1.305.229.9999." The SLS platform 115 may then follow that logic and complete the subscriber's call by calling the actual number 1.305.229.9999 associated with third party TD 120A. Notably, in completing the second leg of the call

from Subscriber #1 to the third party associated with third party TD 120A, the SLS platform 115 may cause the calling number to be reflected as the SLS number 1.770.555.0001 instead of the actual primary number of subscriber TD 110.

- [0054] As described above, it is envisioned that another SLS subscriber (for example, Subscriber #2 having SLS number 1.770.555.0002) could also call using the same relationship number (1.678.222.0001), but it would map to a different external number associated with a contact of Subscriber #2. The encoded representation of the actual called number is a combination of the SLS number and the relationship number.
- [0055] FIGs. 4A-4D collectively illustrate an exemplary method 400 for routing calls between a third party telecommunications device, such as third party TD 120, and a telecommunications device associated with a subscriber to a second line service, such as subscriber device 110. At block 402, a call is routed to and received by an SLS platform 115. Next, at decision block 404, the SLS platform 115 determines whether the call originated from a third party seeking to connect to a subscriber's device, i.e. whether a third party has dialed an SLS number associated with an active subscriber to the SLS service provided by SLS platform 115. If the call did not originate from a third party, then the "no" branch is followed to block 432 of FIG. 4C. If the call did, in fact, originate from a third party, then the "yes" branch is followed to block 406. Notably, if a call is directed to the SLS platform 115, one of ordinary skill in the art will recognize that the actual number used for routing the call to the SLS platform 115 was either an SLS number of a subscriber (if dialed by a third party) or a relationship number (if leveraged by an SLS module 105 of a subscriber TD 110), consistent with that which has been described above.
- [0056] At block 406, the SLS platform 115 queries central SLS database 116 for the calling line ID ("CLID"), i.e. the phone number of the calling party, in association with the relationship number that caused the call to be routed to the SLS platform 115. If at decision block 408, the SLS platform 115 successfully queries the calling party CLID and relationship number combination, then the "yes" branch is followed to block 422 of FIG. 4B. If the calling party CLID and relationship number combination are not successfully queried, then the "no" branch is followed to block 410.
- [0057] At block 410, the SLS platform 115 may associate a new relationship number with the calling third party number and the subscriber's primary number and SLS number. At block 412, the central SLS database 116 is updated to include the newly created record – the calling third party is listed as a contact of the subscriber in the Private Relationship

ID Table 310. At block 414, the call is redirected to the subscriber's primary number, thereby routing it to the subscriber TD 110. In redirecting the call, the calling party field may be populated with a combination of the newly assigned relationship number and the third party CLID.

[0058] At block 416, the subscriber TD 110 may receive the redirected call via SLS module 105 and the local SLS database 106 updated to include the newly assigned relationship number in association with the third party CLID. At block 418, the third party CLID is displayed to the subscriber and the subscriber is alerted to the incoming call. Notably, it is envisioned that displaying the CLID may include rendering the CLID itself, rendering a picture of the third party, rendering a name, etc. as is understood by those with skill in the art of graphical user displays and interfaces. At block 420, the call is connected by the SLS platform 115 when the subscriber answers the call with his subscriber TD 110.

[0059] Turning now to FIG. 4B, if the "yes" branch is followed from decision block 408 of FIG. 4A, at block 422 the SLS platform 115 queries the central SLS database 116 for the relationship number that maps to the combination of the third party CLID and subscriber's SLS number. At block 424, the subscriber's primary number, as also identified from the query of block 422, is called by the SLS platform 115. At block 426, the call is received at the subscriber's TD 110 and the SLS module 105 recognizes that it originated from the SLS platform 115. At block 426, the relationship number and third party CLID contained in the calling party field of the call signaling causes the SLS module 105 to handle the call and display the third party CLID for the benefit of the subscriber. Notably, because the third party CLID may be queried from the local SLS database 106 by use of the relationship number, it is envisioned that some embodiments may not necessarily include the third party CLID in the calling party field of the call signaling.

[0060] At block 428 the subscriber is alerted to the incoming call and at block 430 the call is connected to the subscriber TD 110 by the SLS platform 115 when the subscriber answers the call. It is envisioned that, if the subscriber elects not to answer a call to the SLS number, the SLS module 105 in some embodiments may leverage a voicemail service or message service in response to the unanswered call. That is, it is envisioned that an SLS service may provide features and services dedicated to the SLS subscriber and separate from similar features and services associated with the subscriber's primary number.

[0061] Turning now to FIG. 4C, if the “no” branch is followed from block 404 of FIG. 4A, at decision block 432 the SLS platform 115 determines whether the call is directed to a relationship number. Notably, if the call is directed to a relationship number, then it must have originated from a TD 110 associated with a subscriber of the SLS service. If the call was not routed to the SLS platform 115 because of being directed to a relationship number, the “no” branch is followed to block 442 of FIG. 4D. If, however, the call was routed to the SLS platform 115 because it was directed to a relationship number then the “yes” branch is followed to block 434.

[0062] At block 434, the central SLS database 116 is queried for the relationship number in combination with the SLS number from which the call originated. At block 436, the SLS platform 115 may determine the actual third party number with which the relationship number and the SLS number combination is associated. Having identified the actual third party number, the SLS redirection module 117 may deduce that the subscriber desires to contact the third party TD 120 associated with that actual third party number and, at block 438, the SLS platform 115 redirects the call to such TD 120. The calling party field of the call is populated with the subscriber’s SLS number so that the third party will associate the incoming call with the second line number of the subscriber and not the primary number of the subscriber. At block 440, the call is connected to the third party TD 120.

[0063] Turning now to FIG. 4D, if the “no” branch is followed from block 432 of FIG. 4C, at decision block 442 the SLS platform 115 determines whether the call originated from an SLS number of a subscriber. If not, then it is assumed that it was an errant call and the “no” branch is followed to block 444 and the call is disconnected. If the call did originate from a second line number (i.e., an SLS module 105 in a subscriber TD 110) associated with a subscriber to the SLS service, then the “yes” branch is followed to block 446. At block 446, it is deduced by the SLS platform 115 that the subscriber associated with the calling SLS number and/or the calling primary number desires to call a third party with which no relationship number has been associated with the actual third party number. The central SLS database 446 is queried to determine the next available relationship number for the subscriber’s given SLS number. It is envisioned that the SLS module 105 may communicate with the SLS platform 115 in some embodiments to obtain a relationship number for a third party that has not previously been called via a session-based protocol such as, but not limited to, an unstructured supplementary services data (“USSD”) protocol. As is understood in the art of

telecommunications protocols, a gateway such as a USSD gateway may be used to route messages from a signaling network to service applications and back. In this way, certain embodiments of an SLS module 105 may communicate with an SLS platform 115 to designate and acquire a relationship number to a third party who has not been called by the subscriber before (or, for that matter, a third party who has not placed a call to the subscriber before). Moreover, USSD is offered herein for exemplary purposes and is not meant to limit the type of communications protocol that may be leveraged by certain embodiments. For example, it is envisioned that short message service (“SMS”) protocol, multimedia messaging service (“MMS”) protocol, and/or other protocols may be used by some embodiments. It is envisioned that an IP-based interaction over the TD’s data service may be used by some embodiments. As would be recognized by one of ordinary skill in the art, use of session based protocols or other communication protocols may minimize temporal delays in allocating and acquiring relationship numbers between an SLS module 105 and an SLS platform 115.

[0064] At block 448, the determined next available relationship number is returned to the SLS module 105 of the subscriber TD 110. At block 450, the SLS module 105 sends back to the SLS platform 115 the next available relationship number it was provided in combination with the third party number the subscriber desires to call. At block 452, having the relationship number, the third party CLID, the subscriber’s primary number and the subscriber’s SLS number, the SLS platform 115 may update the central SLS database 116 to include the record at block 454. Advantageously, at such point, the central SLS database 116 and the local SLS database 106 contain consistent records with regard to the relationship between the third party and the subscriber.

[0065] At block 456, the call is redirected by the SLS platform 115 and the calling party field is populated with the second line number of the subscriber for the benefit of the called third party. To the third party TD 120, it will look as if the call originated from the second line number of the subscriber instead of the primary line number associated with subscriber TD 110. At block 458, both legs of the call are connected by the SLS platform 115.

[0066] FIG. 5 illustrates an exemplary method 500 for routing calls from a telecommunications device associated with a primary number and a second line number, such as subscriber device 110, to a third party telecommunications device, such as third party TD 120A. At block 502, the SLS module 105 is used by the user of subscriber TD 110 to dial the phone number of a third party associated with third party TD 120A. The SLS module

105 queries local SLS database 106 for the dialed third party number. If the third party number is recognized in the query, at decision block 506, the “yes” branch is followed to block 508 and a call is placed to the relationship number associated with the third party number and reflected in the queried record. Further, at block 508, when the relationship number is called (thus routing the call to the SLS platform for eventual connection to the third party TD 120A) the called party field is populated with the third party number and rendered on the display component 103 of the subscriber TD 110 for the benefit of the subscriber.

[0067] If the third party number is not recognized at decision block 506, then the “no” branch is followed to block 510. At block 510, the SLS platform 115 is contacted and at block 512 a next available relationship number is provided back to the SLS module 105. At blocks 514 and 516, the SLS module 105 updates the local SLS database 106 with the relationship number in combination with the associated third party number. The call is completed at block 508 by leveraging the relationship number as previously described.

[0068] FIG. 6 illustrates an exemplary method 600 for routing calls from a third party telecommunications device, such as third party TD 120A, to a telecommunications device associated with a primary number and a second line number, such as subscriber device 110. Beginning at block 602, an incoming call from a third party TD 102A is received at a subscriber TD 110. At decision block 604, the SLS module 105 determines whether the call was directed to the primary number associated with the TD 110 or the SLS number associated with the subscriber TD 110. If the call was directed to the primary number, then the “yes” branch is followed to block 606 and the call is answered in association with the features and services of the primary number. If the call was directed to the SLS number associated with the subscriber TD 110 then the “no” branch is followed block 608. At block 608, the SLS module 105 queries local SLS database 106 to find the relationship number associated with the incoming call. At block 610, the call is answered with the features and services associated with the second line service and the called party field on the display 103 used by SLS module 105 is populated with the third party CLID for the benefit of the subscriber.

[0069] Certain steps or blocks in the processes or process flows described in this specification naturally precede others for the invention to function as described. However, the invention is not limited to the order of the steps or blocks described if such order or sequence does not alter the functionality of the invention. That is, it is recognized that some steps or blocks may performed before, after, or parallel (substantially

simultaneously with) other steps or blocks without departing from the scope and spirit of the invention. In some instances, certain steps or blocks may be omitted or not performed without departing from the invention. Also, in some instances, multiple actions depicted and described as unique steps or blocks in the present disclosure may be comprised within a single step or block. Further, words such as “thereafter”, “then”, “next”, “subsequently”, etc. are not intended to limit the order of the steps or blocks. These words are simply used to guide the reader through the description of the exemplary method.

- [0070] Additionally, one of ordinary skill in programming is able to write computer code or identify appropriate hardware and/or circuits to implement the disclosed invention without difficulty based on the flow charts and associated description in this specification, for example. Therefore, disclosure of a particular set of program code instructions or detailed hardware devices is not considered necessary for an adequate understanding of how to make and use the invention. The inventive functionality of the claimed computer implemented processes is explained in more detail in the above description and in conjunction with the Figures which may illustrate various process flows.
- [0071] In one or more exemplary aspects, the functions described may be implemented in hardware, software, firmware, or any combination thereof. If implemented in software, the functions may be stored on or transmitted as one or more instructions or code on a computer-readable medium. Computer-readable media include both computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another.
- [0072] A storage media may be any available media that may be accessed by a computer. By way of example, and not limitation, such computer-readable media may comprise RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium that may be used to carry or store desired program code in the form of instructions or data structures and that may be accessed by a computer.
- [0073] Also, any connection is properly termed a computer-readable medium. For example, if the software is transmitted from a website, server, or other remote source using a coaxial cable, fiber optic cable, twisted pair, digital subscriber line (“DSL”), or wireless technologies such as infrared, radio, and microwave, then the coaxial cable, fiber optic

cable, twisted pair, DSL, or wireless technologies such as infrared, radio, acoustic and microwave are included in the definition of medium.

[0074] Disk and disc, as used herein, includes compact disc (“CD”), laser disc, optical disc, digital versatile disc (“DVD”), floppy disk and blu-ray disc where disks usually reproduce data magnetically, while discs reproduce data optically with lasers. Combinations of the above should also be included within the scope of computer-readable media.

[0075] Therefore, although selected aspects have been illustrated and described in detail, it will be understood that various substitutions and alterations may be made therein without departing from the spirit and scope of the present invention, as defined by the following claims.

CLAIMS

What is claimed is:

1. A method for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”), the method comprising the steps of:
 - receiving a call at an SLS platform, wherein the SLS platform is in communication with a network of a primary service provider to the subscriber TD and a network of a primary service provider to the third party TD;
 - determining that the call was routed to the SLS platform from the third party TD because it was directed to an SLS number associated with a subscriber to the SLS;
 - identifying a relationship number associated with both the SLS number and an actual calling number associated with the third party TD; and
 - based on the relationship number, redirecting the call to a primary number associated with the subscriber TD.
2. The method of claim 1, further comprising populating the calling party field of the call with a combination of the relationship number and the actual calling number associated with the third party TD.
3. The method of claim 2, wherein populating the calling party field of the call with a combination of the relationship number and the actual calling number associated with the third party TD triggers notification to the subscriber TD that the incoming call was directed to the SLS number.
4. The method of claim 2, further comprising storing the relationship number and the actual calling number associated with the third party in a local database to the subscriber TD.
5. The method of claim 4, further comprising using the relationship number to direct a call to the third party TD from the subscriber TD, wherein use of the relationship number by the subscriber TD causes the call to be routed to the SLS platform.

6. The method of claim 5, further comprising receiving the call to the third party TD at the SLS platform and using the relationship number to determine the actual calling number associated with the third party TD and redirecting the call to the determined actual calling number.
7. The method of claim 2, further comprising displaying the actual calling number associated with the third party TD to a user of the subscriber TD.
8. The method of claim 1, further comprising answering the call with the subscriber TD.
9. The method of claim 1, wherein the primary service provider to the subscriber TD is the same service provider as the primary service provider to the third party TD.
10. The method of claim 1, wherein the subscriber TD is a cellular telephone.
11. A system for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”), the system comprising:
 - an SLS platform that is in communication with a network of a primary service provider to the subscriber TD and a network of a primary service provider to the third party TD and configured to:
 - receive a call routed to the SLS platform;
 - determine that the call was routed to the SLS platform from the third party TD because it was directed to an SLS number associated with a subscriber to the SLS;
 - identify a relationship number associated with both the SLS number and an actual calling number associated with the third party TD; and
 - based on the relationship number, redirect the call to a primary number associated with the subscriber TD.
12. The system of claim 11, wherein the SLS platform is further configured to populate the calling party field of the call with a combination of the relationship number and the actual calling number associated with the third party TD.

13. The system of claim 12, wherein populating the calling party field of the call with a combination of the relationship number and the actual calling number associated with the third party TD triggers notification to the subscriber TD that the incoming call was directed to the SLS number.

14. The system of claim 12, wherein the subscriber TD is configured to store the relationship number and the actual calling number associated with the third party in a local database.

15. The system of claim 14, wherein the subscriber TD is further configured to use the relationship number to direct a call to the third party TD, wherein use of the relationship number causes the call to be routed to the SLS platform.

16. The system of claim 15, wherein the SLS platform is further configured to receive the call at the SLS platform and use the relationship number to determine the actual calling number associated with the third party TD and redirect the call to the determined actual calling number.

17. The system of claim 12, wherein the subscriber TD is further configured to display the actual calling number associated with the third party TD to a user of the subscriber TD.

18. The system of claim 11, wherein the subscriber TD is further configured to answer the call.

19. The system of claim 11, wherein the primary service provider to the subscriber TD is the same service provider as the primary service provider to the third party TD.

20. The system of claim 11, wherein the subscriber TD is a cellular telephone.

21. A method for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”), the method comprising the steps of:

receiving a call at an SLS platform, wherein the SLS platform is in communication with a network of a primary service provider to the subscriber TD and a network of a primary service provider to the third party TD;

determining that the call was routed to the SLS platform from the subscriber TD via a relationship number, wherein the relationship number maps an SLS number associated with the subscriber TD to a third party phone number;

based on the SLS number and the relationship number, identifying the third party phone number; and

redirecting the call to the third party phone number.

22. The method of claim 21, further comprising populating the calling party field of the call with the SLS number.

23. The method of claim 21, wherein the primary service provider to the subscriber TD is the same service provider as the primary service provider to the third party TD.

24. The method of claim 21, wherein the subscriber TD is a cellular telephone.

25. A method for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”), the method comprising the steps of:

receiving a user actuation of the subscriber TD requesting a call to a third party phone number associated with the third party TD; and

based on the third party phone number, placing a call to a relationship number, wherein the relationship number:

routes the call to an SLS platform that is in communication with a network of a primary service provider to the subscriber TD and a network of a primary service provider to the third party TD; and

maps an SLS number associated with the subscriber TD to the third party phone number.

26. The method of claim 25, further comprising populating the calling party field of the call with the SLS number.
27. The method of claim 25, wherein the primary service provider to the subscriber TD is the same service provider as the primary service provider to the third party TD.
28. The method of claim 25, wherein the subscriber TD is a cellular telephone.
29. The method of claim 25, further comprising the steps of:
requesting the relationship number from the SLS platform;
receiving the relationship number at the subscriber TD; and
storing the relationship number at the subscriber TD in association with the third party number.
30. The method of claim 29, wherein requesting the relationship number from the SLS platform comprises using a session based communication protocol.
31. The method of claim 30, wherein the session based communication protocol is an unstructured supplementary services data (“USSD”) protocol.

ABSTRACT

A method for routing calls between a third party telecommunications device (“TD”) and a subscriber TD associated with a primary service and a second line service (“SLS”) involves associating the SLS number of the subscriber, the primary number of the subscriber and the primary number of a third party via a common relationship number. Calls directed from a third party to the SLS number of a subscriber are routed to an SLS platform and redirected to the subscriber TD. Calls directed from the subscriber TD to the third party use the relationship number to route the call to the SLS platform. The combination of the SLS number and the relationship number identifies the third party calling number for call completion. Calls can be directed to and from an SLS number of a subscriber TD without having to coordinate the provisioning of a call through the subscriber’s primary service provider.

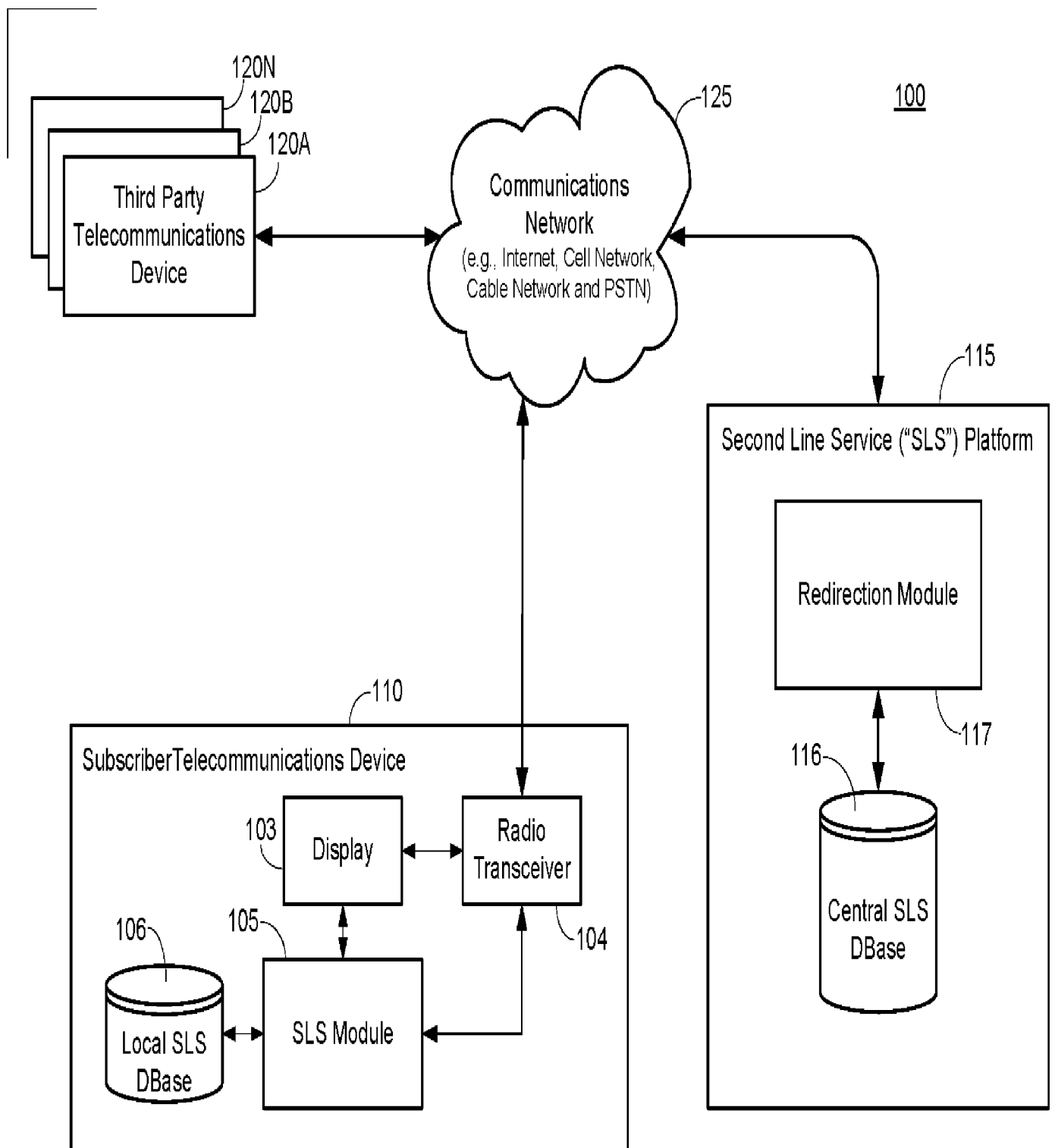


FIG. 1

WAS 5

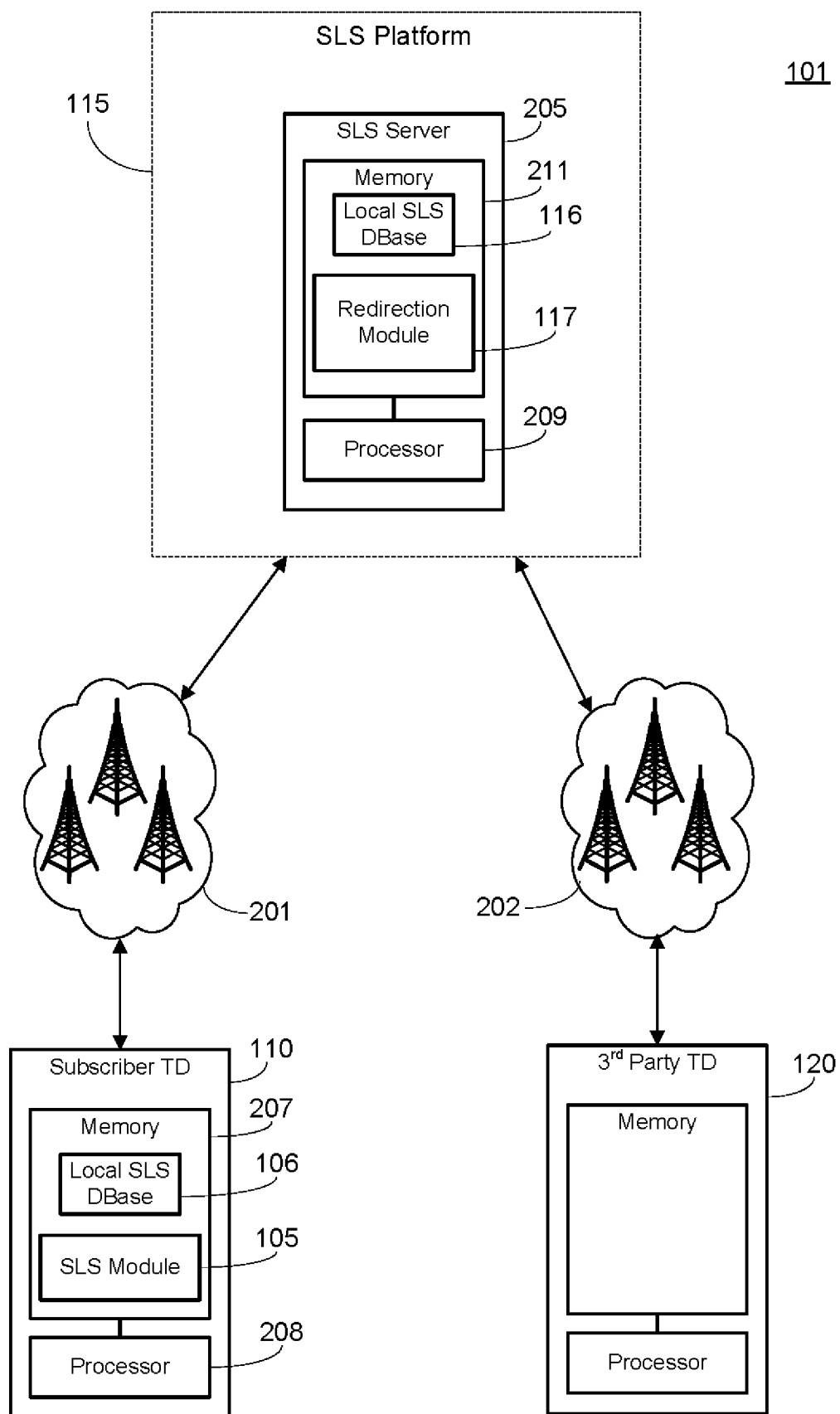


FIG. 2

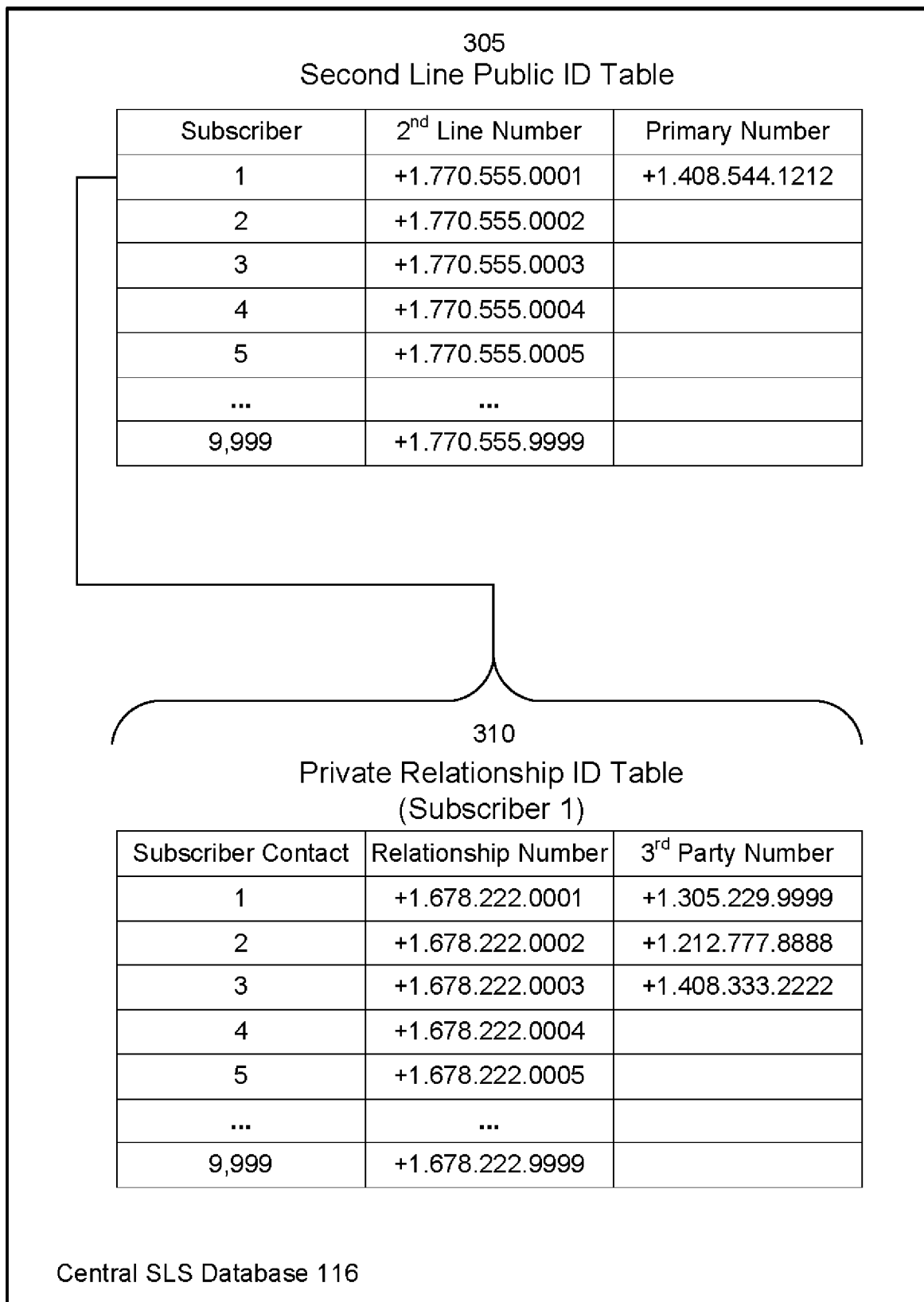


FIG. 3A

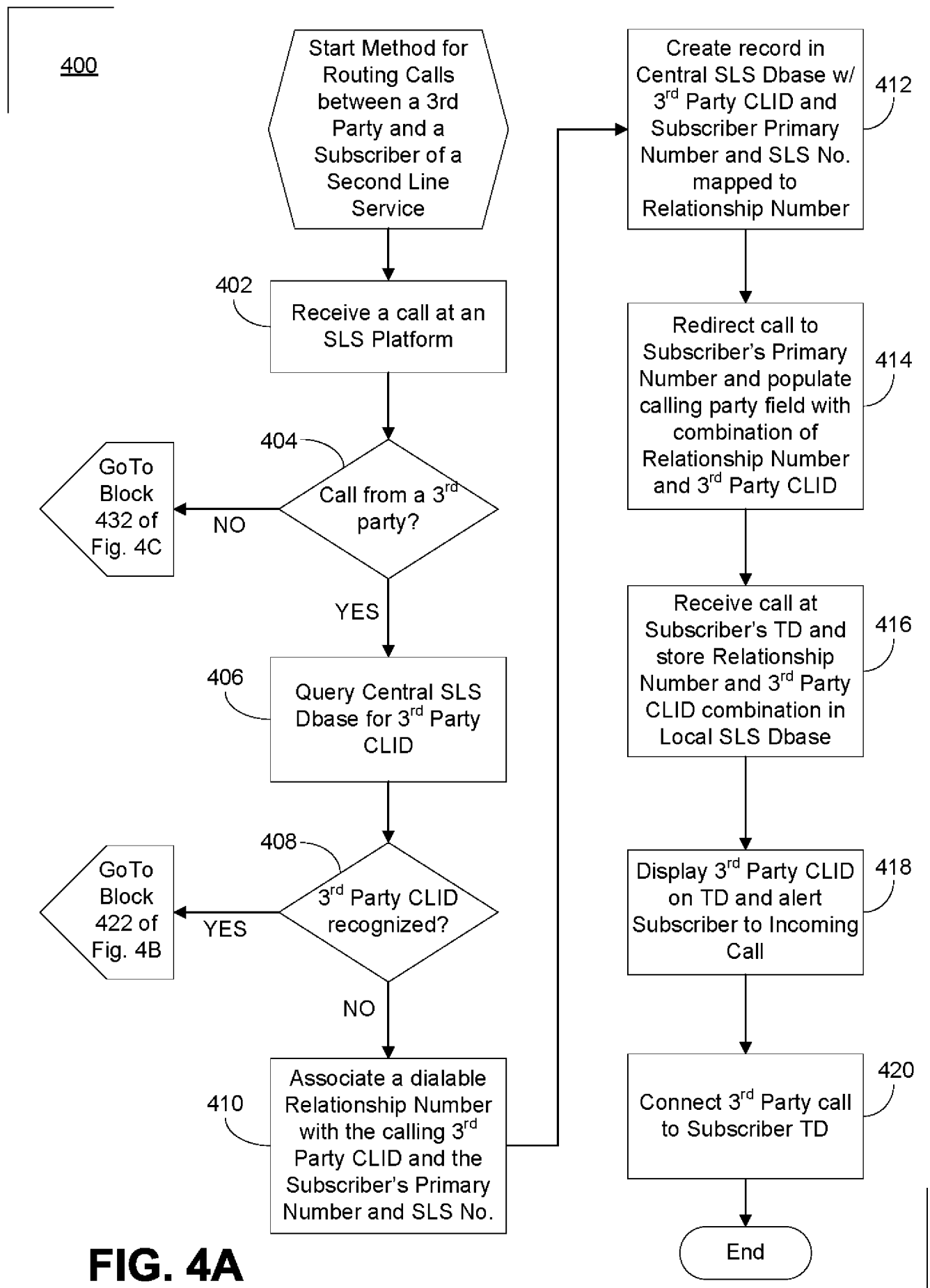


315
Private Relationship ID Table

Subscriber Contact	Relationship Number	3 rd Party Number
1	+1.678.222.0001	+1.305.229.9999
2	+1.678.222.0002	+1.212.777.8888
3	+1.678.222.0003	+1.408.333.2222
4	+1.678.222.0004	
5	+1.678.222.0005	
...	...	
9,999	+1.678.222.9999	

Local SLS Database 106

FIG. 3B



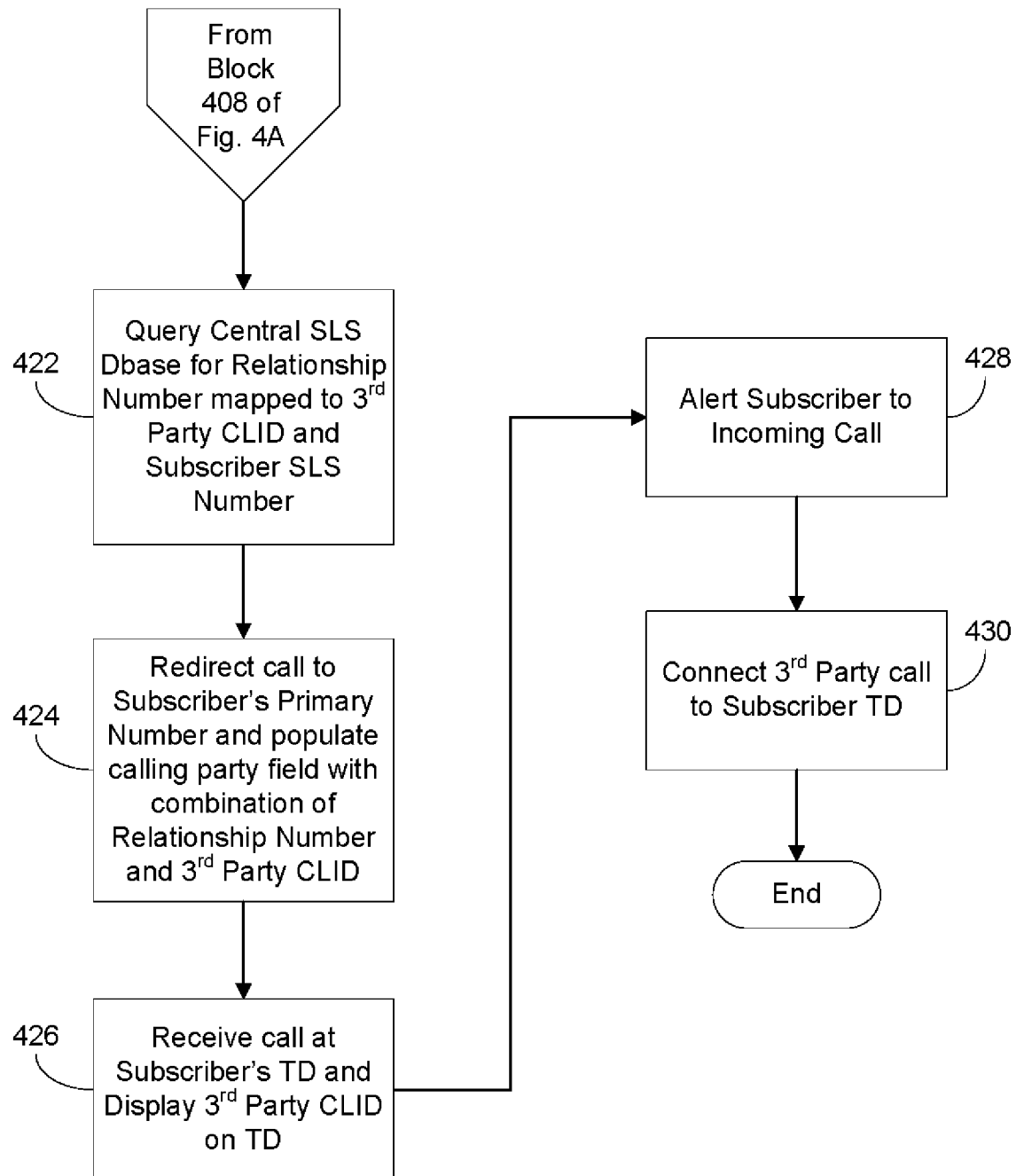


FIG. 4B

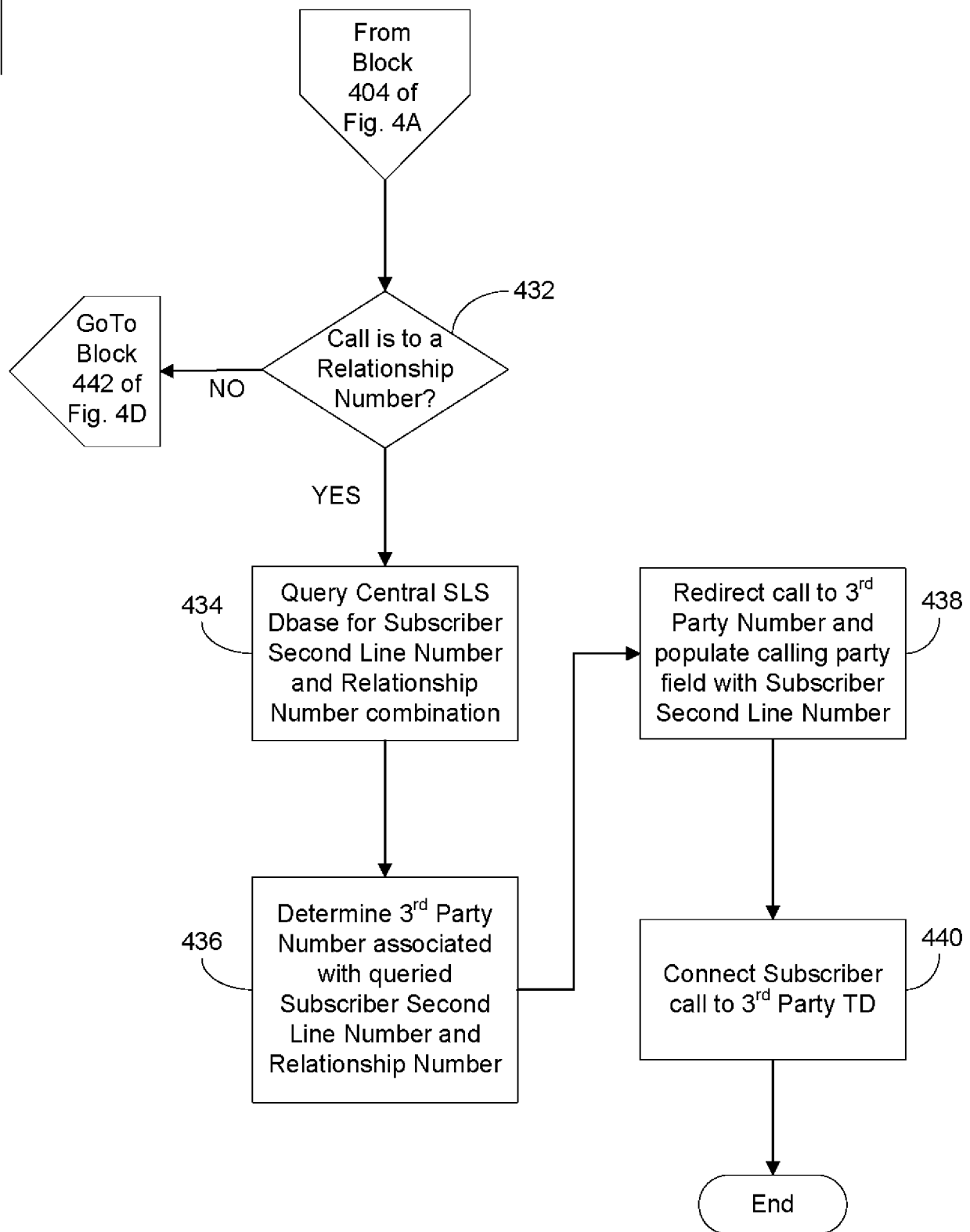


FIG. 4C

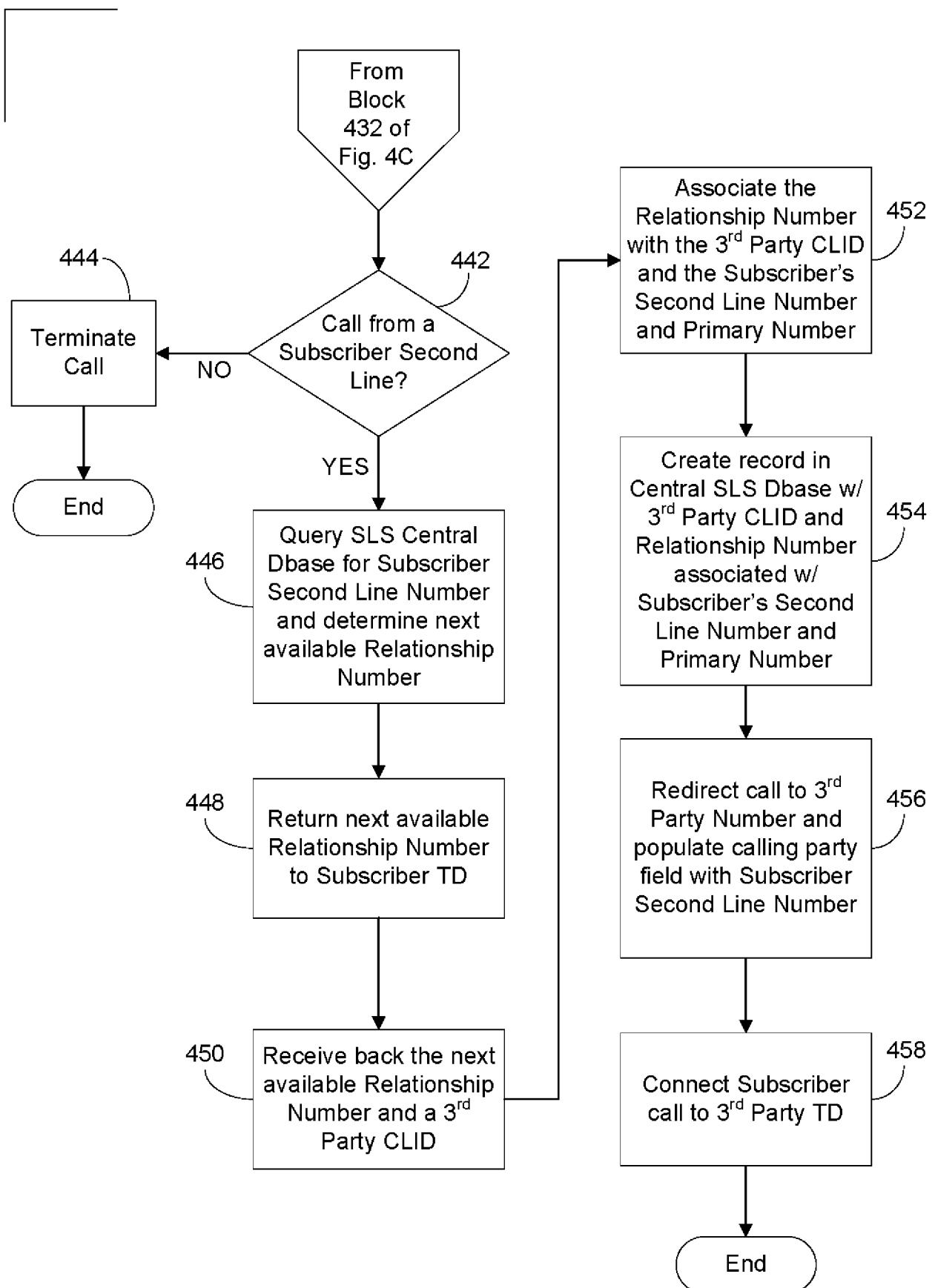


FIG. 4D

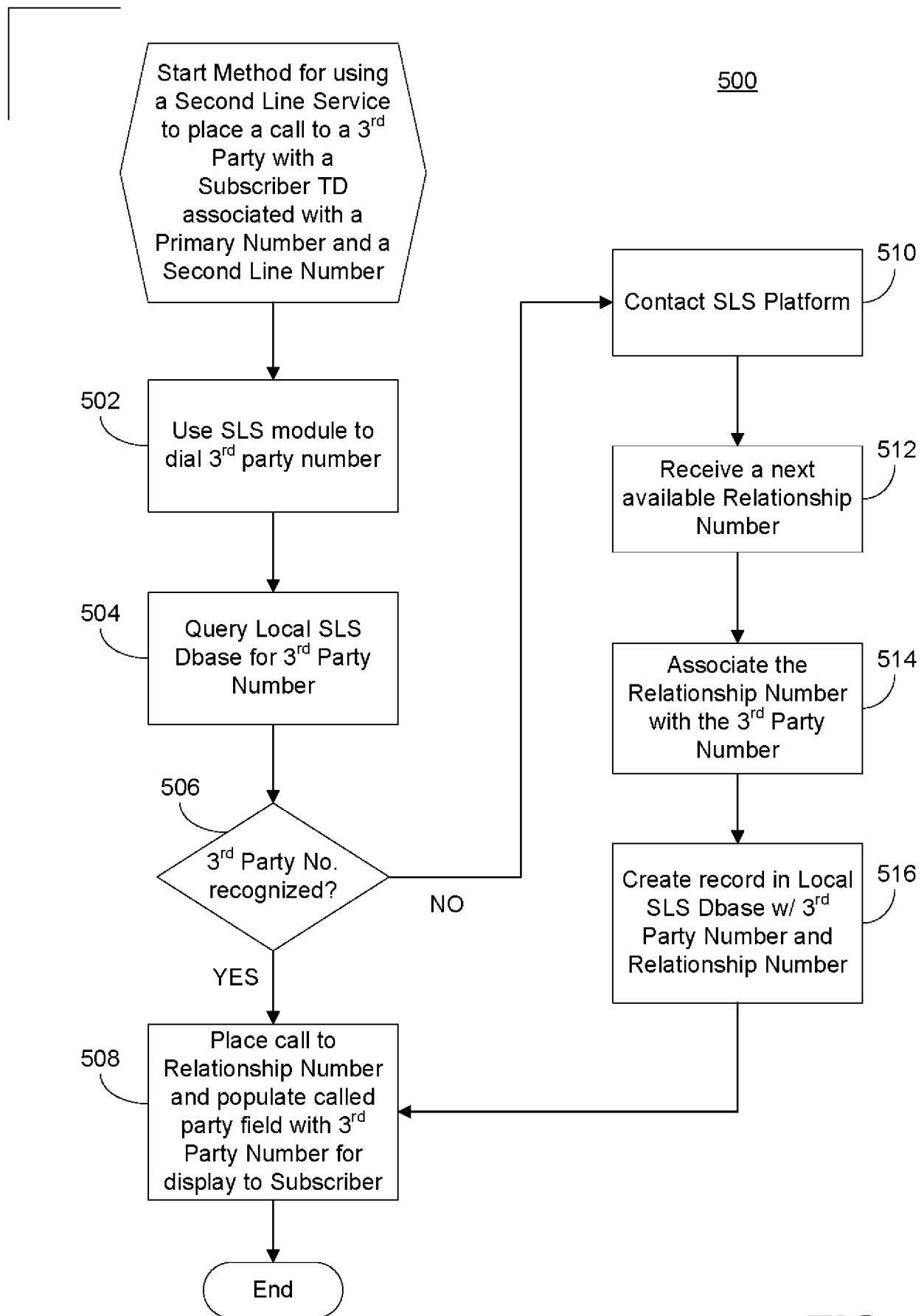


FIG. 5

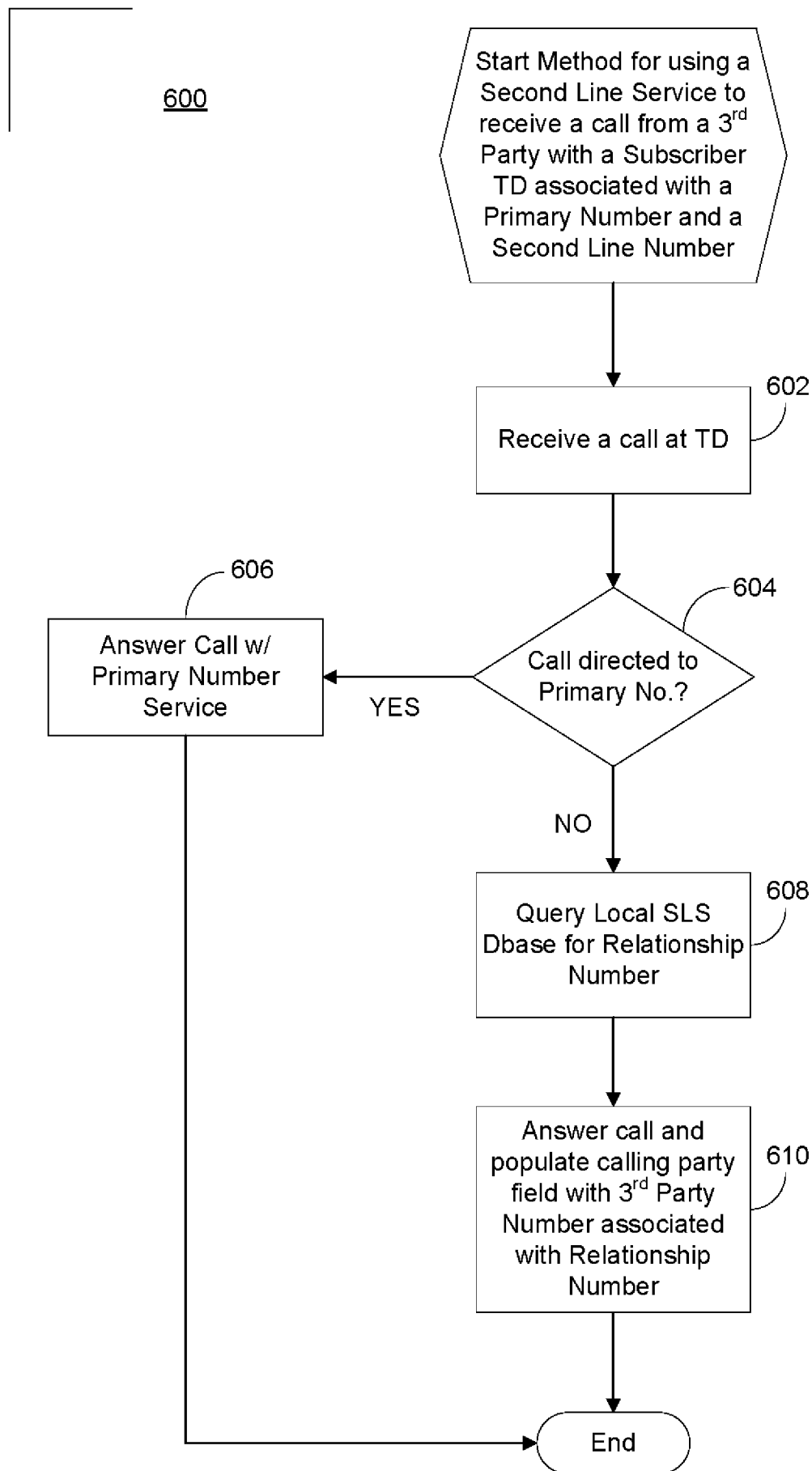


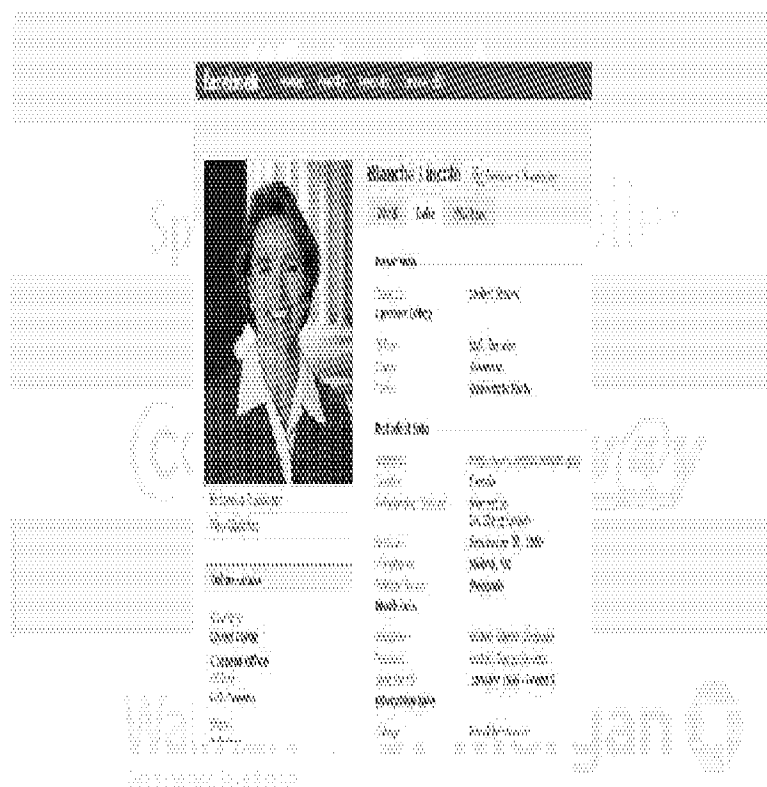
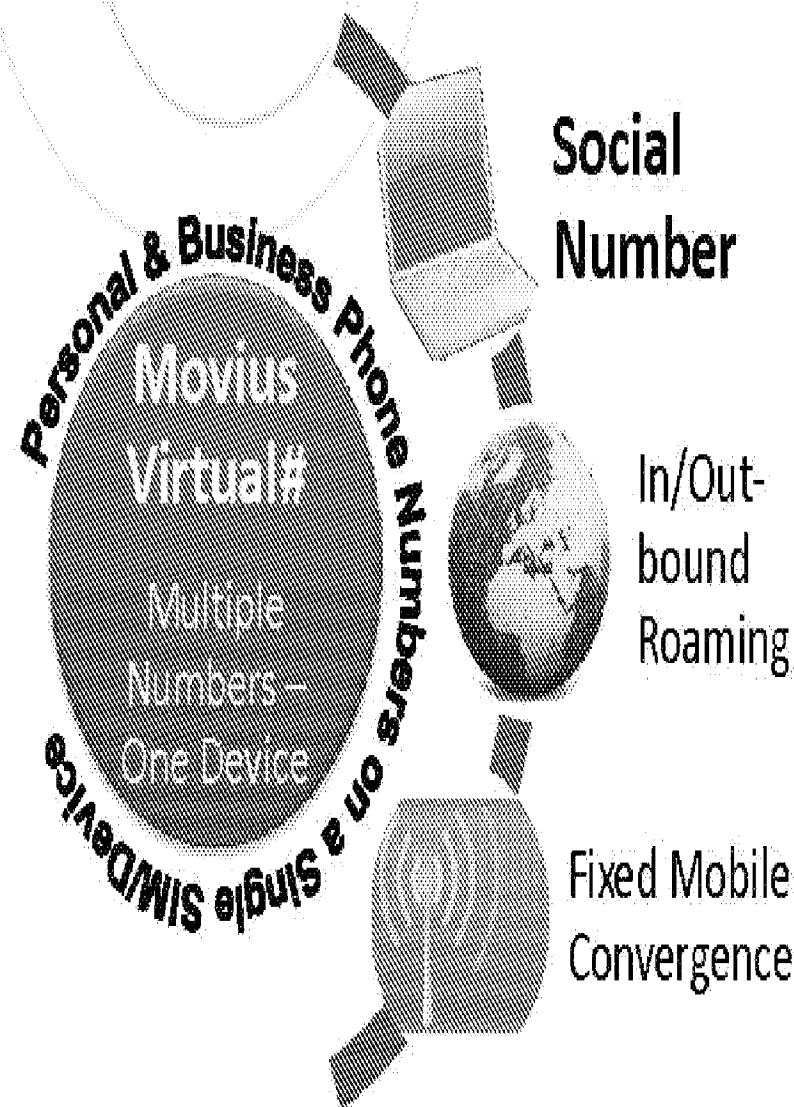
FIG. 6

Mōvius

Virtual Number Service for Verticals



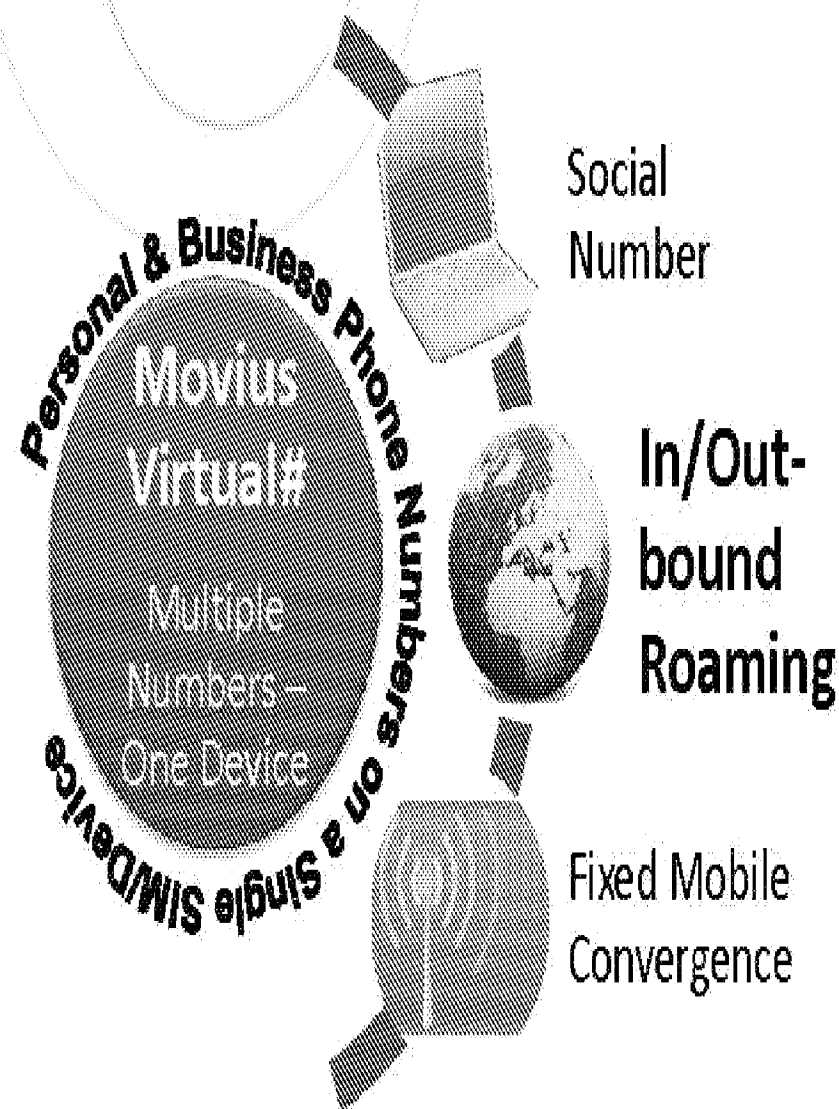
One Service, Many Verticals



Provide a public number for social communities:

- Privacy controls
- Safe environment
- Protect personal number

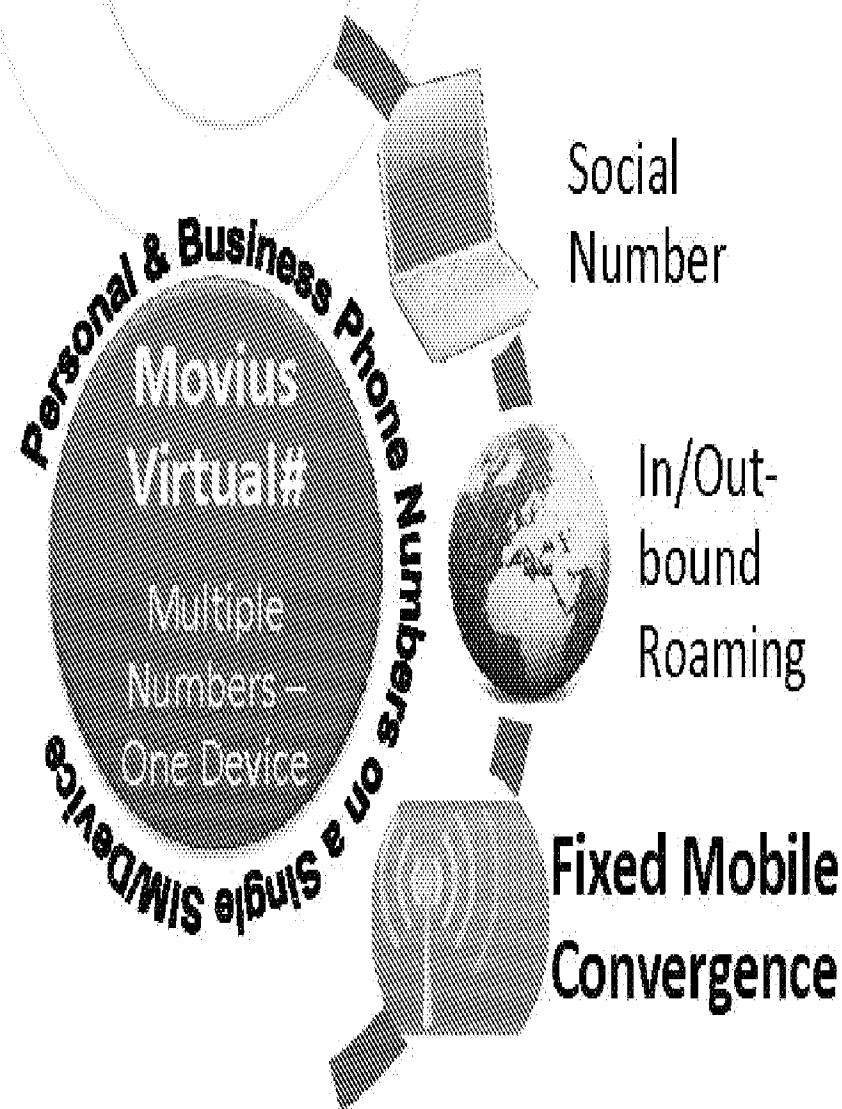
One Service, Many Verticals



Roam Locally or Internationally with your virtual number

- Your Virtual # works anywhere you go
- IR21 Roaming
- Local # Call Origination & Termination

One Service, Many Verticals



Extend your fixed line to your mobile:

- Generate and receive calls from your mobile phone using your fixed caller ID
- Fully Configurable based on Time of Day

Receiving a Call



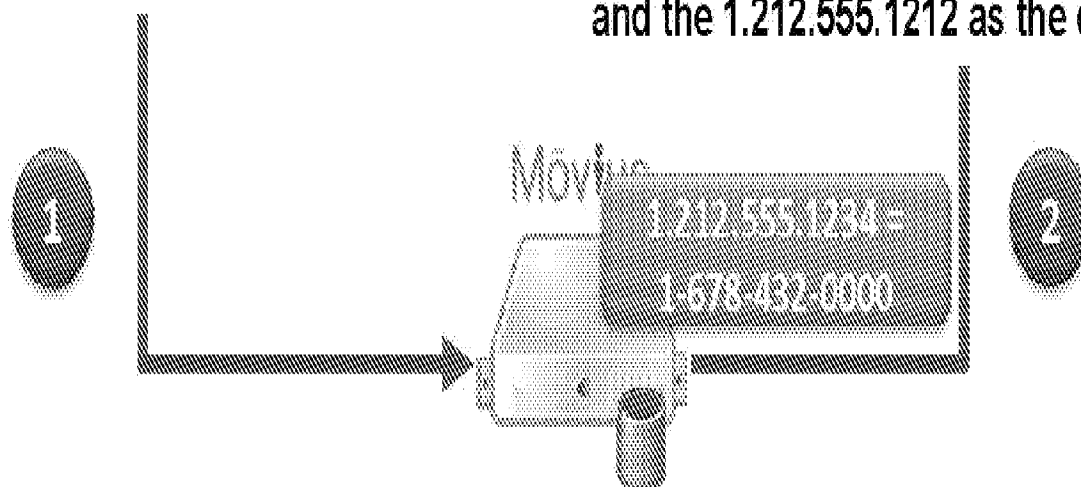
A client calls John on his business number:

Client#: +1.212.555.1234

Johns #: +1.770.283.2039

John's smartphone identifies the CID as a second line call and uses a second line splash screen.

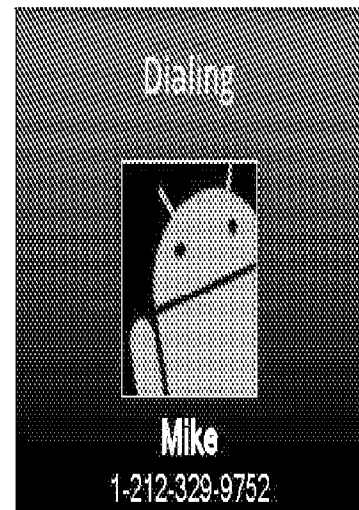
It then stores 1.678.432.0000 as the dial in number and the 1.212.555.1212 as the display number.



Movius looks up John's second number and routes the call accordingly.

The platform assigns a relationship to the calling number (1.212.555.1234 = 1.678.432.0000) and passes CID as "1.678.432.0000*1.212.555.1234"

Making a Call from Contact List

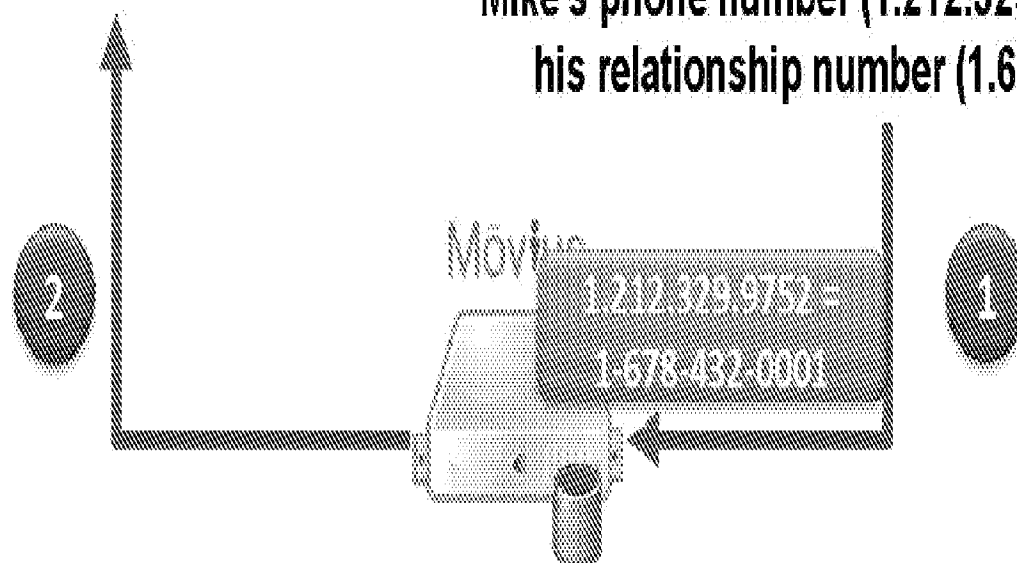


Client receives a call from John:

Mike#: +1.212.329.9752

Johns #: +1.770.283.2039

John searches Mike's contact from his contact list and selects to call him. His device displays Mike's phone number (1.212.329.9752) but dials his relationship number (1.678.432.0001).



Movius looks up the relationship number (1.678.432.0001) and routes the call to Mike (1.212.329.9752) using John's second phone number as CID

Making a Call from Dial pad

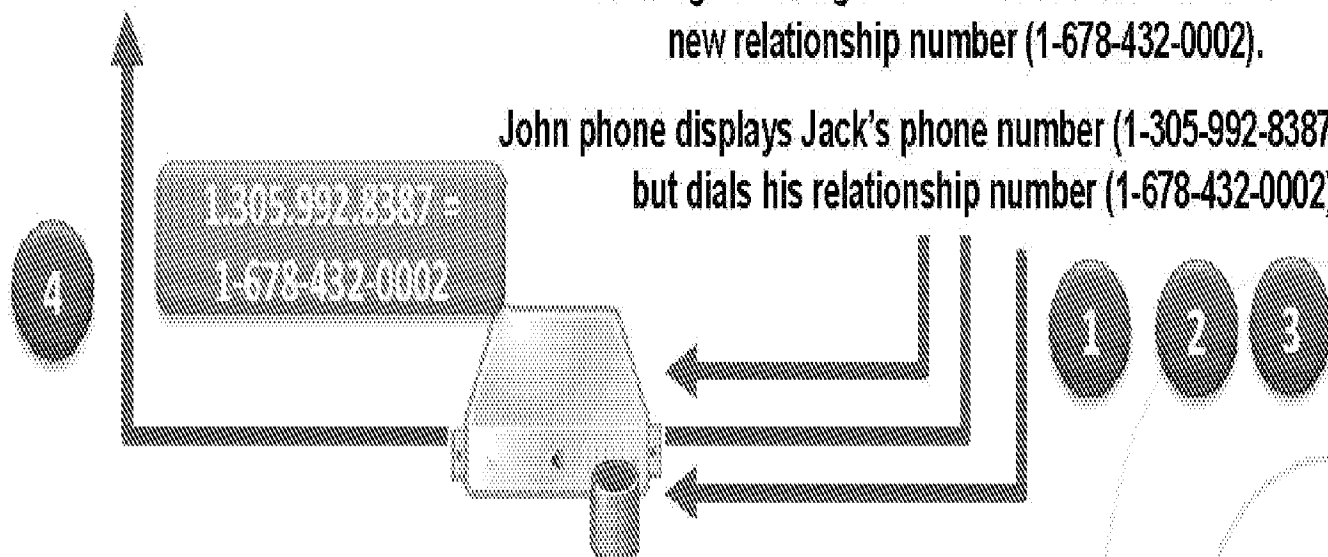


Jack receives a call from John:
Jack's#: +1.305.992.8387
Johns #: +1.770.283.2039



John dials Jack's phone number on the dial pad and calls.
His device prompts him to add a new contact while sending a message to the Movius server to retrieve a new relationship number (1-678-432-0002).

John phone displays Jack's phone number (1-305-992-8387) but dials his relationship number (1-678-432-0002).



Movius looks up the relationship number and routes the call to Jack using John's second phone number

Movius assigns a new relationship number to Jack's CID and send back the new number (1-678-432-0002) to John.

The Relational Index Tables

Key Components
& Call Flow

Call Redirection Engine

Virtual Line Public ID

Virtual# Customer	2 nd Line Number
1	+1.770.555.0000
2	+1.770.555.0001
3	+1.770.555.0002
4	+1.770.555.0003
5	+1.770.555.0004
:	:
9,999	+1.770.555.9998
10,000	+1.770.555.9999

This is the number a subscriber would give to the public in order to be reached on the virtual line. In the example above, there are a maximum of 10,000 Virtual# subs.

Private Relationship ID

Contact #	Relationship ID
1	+1.678.222.0000
2	+1.678.222.0001
3	+1.678.222.0002
4	+1.678.222.0003
5	+1.678.222.0004
:	:
999	+1.678.222.0998
1,000	+1.678.222.0999

This is a number that has a dynamic relationship with each Virtual# subscriber contact list number. The Virtual# subscriber would call the number above to reach a contact with using their Virtual# CID.

Receiving a Call from an Unknown

Second Line Public ID

Virtual# Customer	2 nd Line Number	Primary Number
1	+1.770.555.0000	+1.408.544.1212
2	+1.770.555.0001	
3	+1.770.555.0002	
4	+1.770.555.0003	
5	+1.770.555.0004	
:	:	
9,999	+1.770.555.9998	
10,000	+1.770.555.9999	

Private Relationship ID

Contact #	Relationship ID	Source ID
1	+1.678.222.0000	+1.305.229.9999
2	+1.678.222.0001	
3	+1.678.222.0002	
4	+1.678.222.0003	
5	+1.678.222.0004	
:	:	
999	+1.678.222.0998	
1,000	+1.678.222.0999	

Call from A (305.229.9999) to
B2 (770.555.0000) gets routed
to B1 (408.544.1212)
B's CID will be
1.678.222.0000*1.305.229.9999

Original Subscriber (A)

A (Virtual#): 305-229-9999

Calling:

1-770-555-0000



A calling B2, routes to B1

B's CID will be "R1*A"

Virtual# Subscriber (B)

Primary (B1): 408-544-1212

Secondary (B2): 770-555-0000

B

Call from*:

1-678-222-0000

*1-305-229-9999



Receiving a Call from another Unknown

Second Line Public ID

Virtual# Customer	2 nd Line Number	Primary Number
1	+1.770.555.0000	+1.408.544.1212
2	+1.770.555.0001	
3	+1.770.555.0002	
4	+1.770.555.0003	
5	+1.770.555.0004	
:	:	
9,999	+1.770.555.9998	
10,000	+1.770.555.9999	

Private Relationship ID

Contact #	Relationship ID	Source ID
1	+1.678.222.0000	+1.305.229.9999
2	+1.678.222.0001	+1.212.777.8888
3	+1.678.222.0002	
4	+1.678.222.0003	
5	+1.678.222.0004	
:	:	
999	+1.678.222.0998	
1,000	+1.678.222.0999	

Call from A (212.777.8888) to
B2 (770.555.0000) gets routed
to B1 (408.544.1212)
B's CID will be
1.678.222.0001*1.212.777.8888

Original Subscriber (A)

A (Virtual#): 212-777-8888

Calling:

1-770-555-0000



A calling B2, routes to B1

B's CID will be "R2*A"

Virtual# Subscriber (B)

Primary (B1): 408-544-1212

Secondary (B2): 770-555-0000

B

Call from*:

1-678-222-0001

*1-212.777.8888



Making a Call to the first contact

Second Line Public ID

Virtual# Customer	2 nd Line Number	Primary Number
1	+1.770.555.0000	+1.408.544.1212
2	+1.770.555.0001	
3	+1.770.555.0002	
4	+1.770.555.0003	
5	+1.770.555.0004	
:	:	
9,999	+1.770.555.9998	
10,000	+1.770.555.9999	

Private Relationship ID

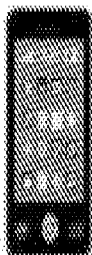
Contact #	Relationship ID	Source ID
1	+1.678.222.0000	+1.305.229.9999
2	+1.678.222.0001	+1.210.555.7888
3	+1.678.222.0002	
4	+1.678.222.0003	
5	+1.678.222.0004	
:	:	
999	+1.678.222.0998	
1,000	+1.678.222.0999	

Call from B2 (770.555.0000) to
R1* (678.222.0000) gets
routed to A (305.229.9999)
A's CID will be 770.555.0000

Original Subscriber (A)

A (305.229.9999)

Call from:
1-770-555-0000



Virtual# Subscriber (B)

Primary (B1): 408-544-1212

Secondary (B2): 770-555-0000

B2

Calling:
1-678-222-0000



B2 calling R1, routes to A

A's CID will be B2

Making a Call to the second contact

Second Line Public ID

Virtual# Customer	2 nd Line Number	Primary Number
1	+1.770.555.0000	+1.408.544.1212
2	+1.770.555.0001	
3	+1.770.555.0002	
4	+1.770.555.0003	
5	+1.770.555.0004	
:	:	
9,999	+1.770.555.9998	
10,000	+1.770.555.9999	

Private Relationship ID

Contact #	Relationship ID	Source ID
1	+1.678.222.0000	+1.305.229.9999
2	+1.678.222.0001	+1.212.777.8888
3	+1.678.222.0002	
4	+1.678.222.0003	
5	+1.678.222.0004	
:	:	
999	+1.678.222.0999	
1,000	+1.678.222.0999	

Call from B2 (770.555.0000) to
R2* (678.222.0001) gets
routed to A (212.777.8888)
A's CID will be 770.555.0000

Original Subscriber (A)

A (212.777.8888)

Call from:
1-770-555-0000



B2 calling R2, routes to A
A's CID will be B2

Virtual# Subscriber (B)

Primary (B1): 408-544-1212

Secondary (B2): 770-555-0000

B2

Calling:
1-678-222-0001



Making a Call to a New Contact

Second Line Public ID

Virtual# Customer	2 nd Line Number	Primary Number
1	+1.770.555.0000	+1.408.544.1212

* The first time a number is dialed that is not in the contact list, the smartphone client needs to first "provision" the new number by sending a message to the system and getting a relationship ID. The client will then replace A with R3. For more details see the section: Smartphone Client Experience

Private Relationship ID

Contact #	Relationship ID	Source ID
1	+1.678.222.0000	+1.305.229.9999
2	+1.678.222.0001	+1.212.777.8888
3	+1.678.222.0002	+1.408.333.2222
4	+1.678.222.0003	
5	+1.678.222.0004	
:	:	
999	+1.678.222.0999	
1,000	+1.678.222.0999	

Call from B2 (770.555.0000) to R3* (678.222.0002) gets routed to A (408.333.2222)
A's CID will be 770.555.0000

Original Subscriber (A)

A (B1): 408-333-2222

Call from:
1-770-555-0000



B2 calling R3, routes to A

A's CID will be B2

Virtual# Subscriber (B)

Primary (B1): 408-544-1212
Secondary (B2): 770-555-0000

B2

Calling:
1-678-222-0002



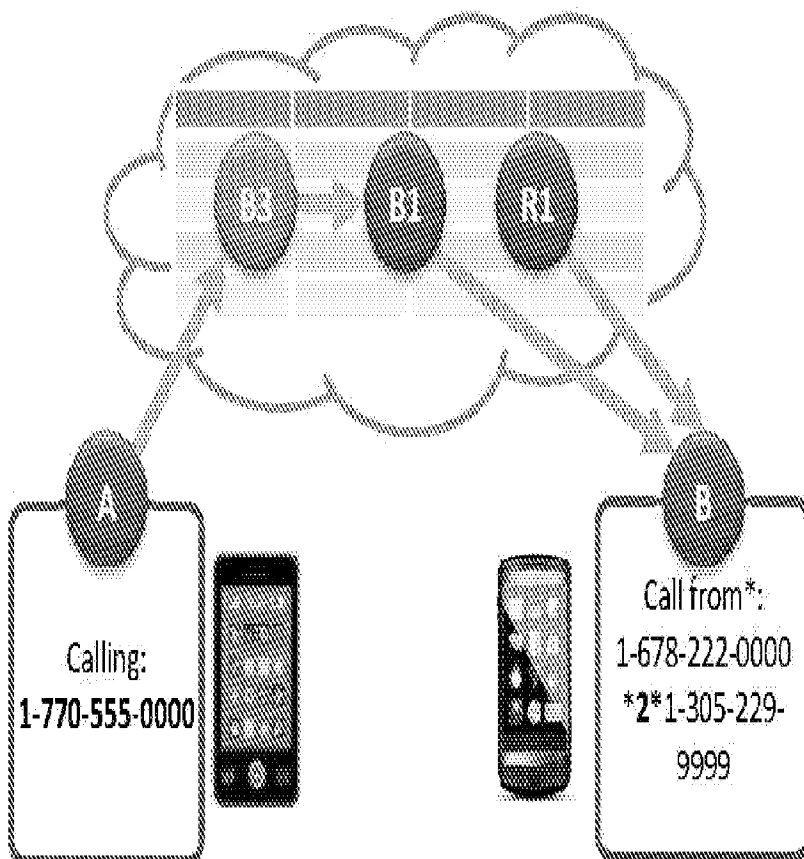
Call Flow Use Case Variations

Various Additional #s

Markets

- Wireless – Provide multiple phone numbers to SMBs for enhanced presence.
- Social Networks – Provide multiple public numbers for various groups or identities.

Inbound CID – “R# * Line# * CID”



Wireless Carriers

Sprint

T-Mobile

Verizon Wireless

Comcast

hathw@y

Life Insurance

Walmart

JPMorgan

Inter Carrier Networks

AT&T

SYBASE

Social Networks & Dating

facebook

match.com

Wire-line Carriers

BT

ctbc

Mövius

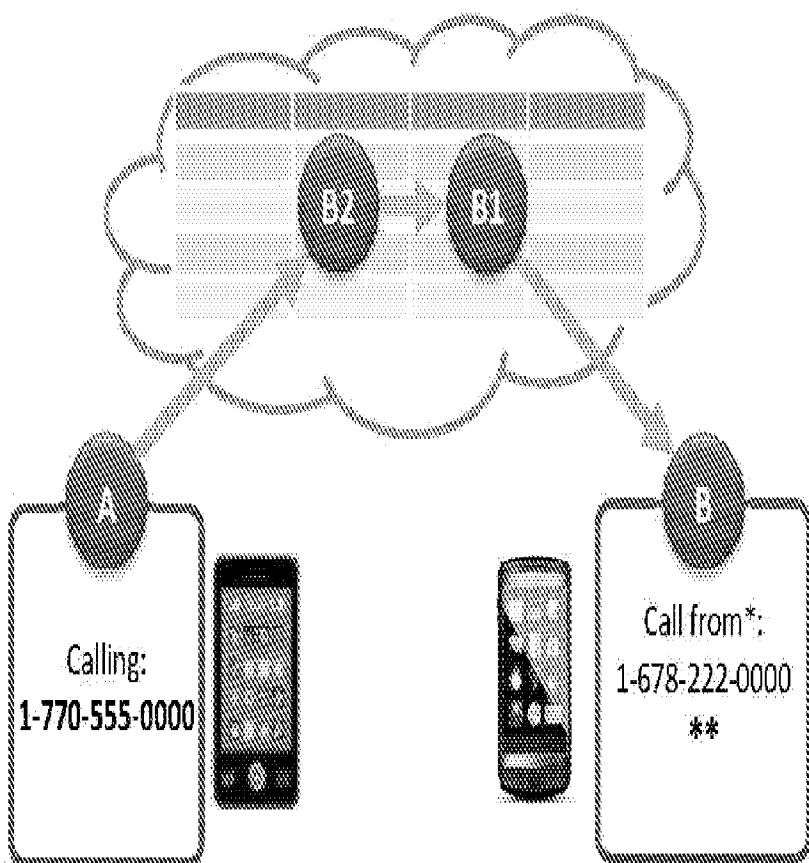
Call Flow Use Case Variations

Private #

Markets

- Dating Sites – Provide a private phone number that masks caller's identity.

Inbound CID – "R# ***"



Web Services

Sprint

T-Mobile

MSO Networks

Comcast

hathw@y

Edge Networks

Walmart

JPMorgan

Inter Carrier Networks

AT&T

SYBASE

Social Networks & Dating

facebook

match.com

Wire-line Carriers

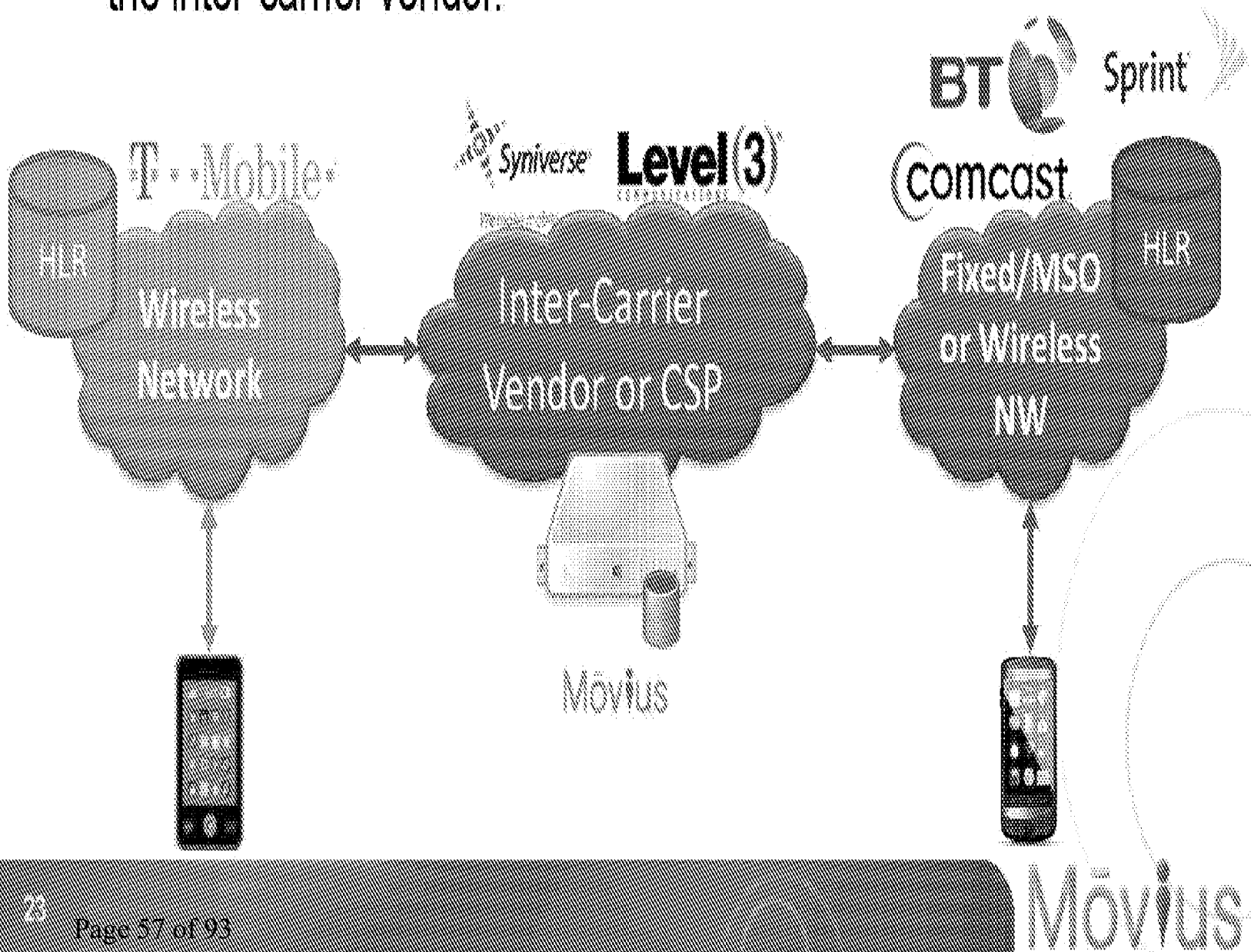
BT

ctbc

Mövius

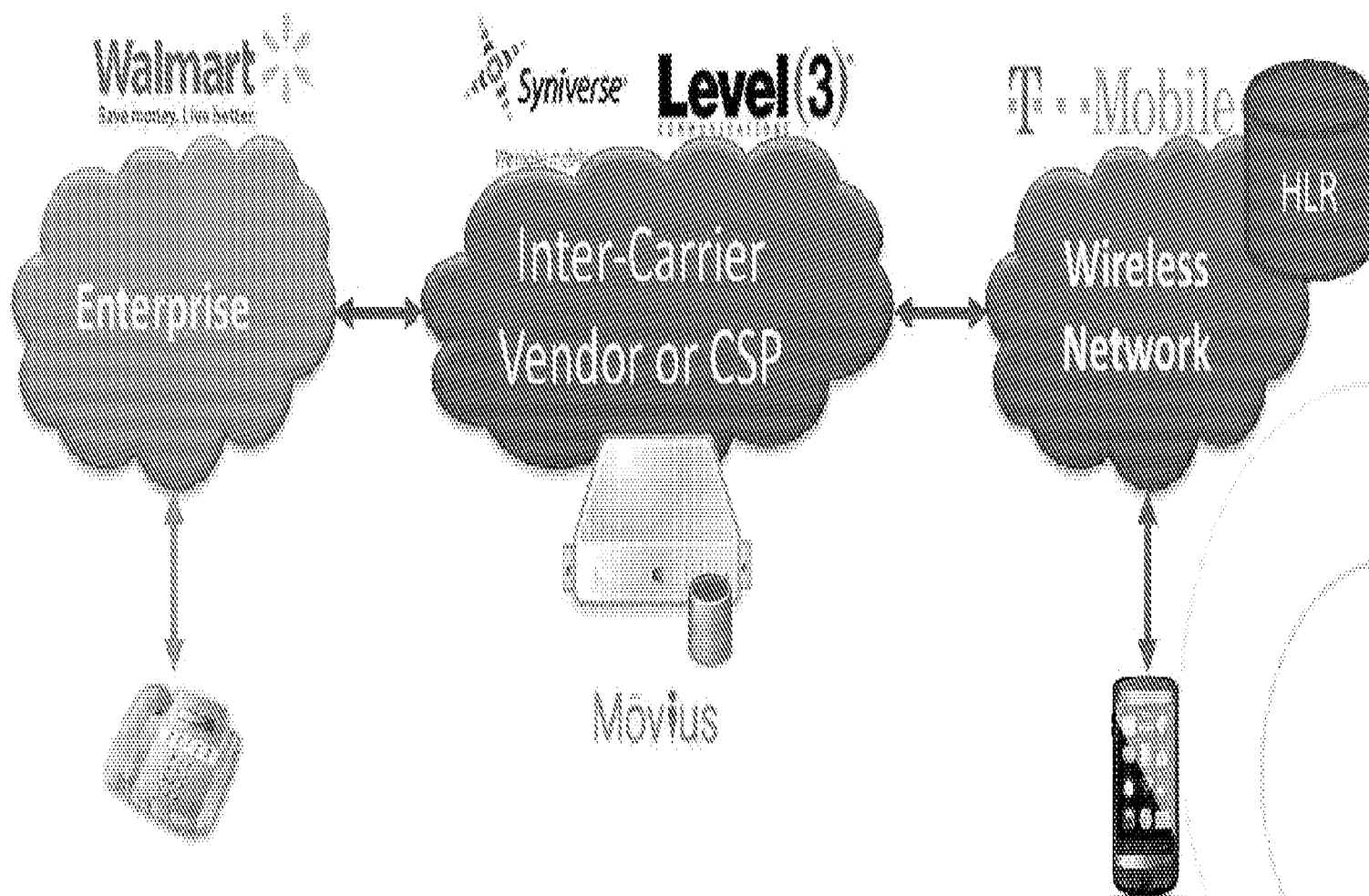
Extra-Carrier Virtual Number

- This solution can be positioned within an inter-carrier vendor to provide a secondary number that is or can be independent of the operator.
- For example, a Sprint customer could have their secondary number with T-Mobile or vice versa. This would be brokered by the inter-carrier vendor.



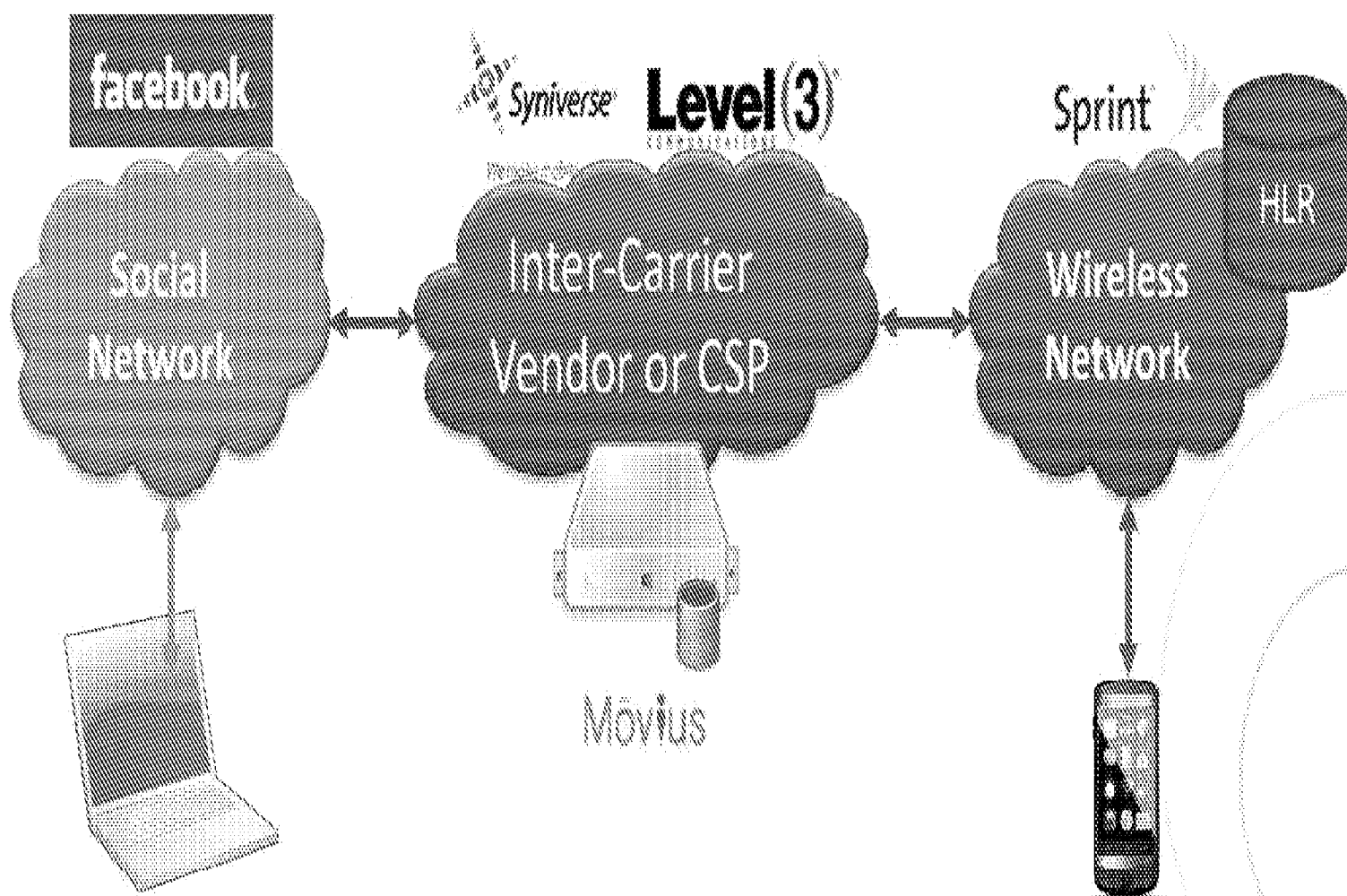
BYOD – Bring Your Own Device

- 1 An enterprise could extend employees desk phones to their mobile device(s) having their virtual number be their desk line.
- 2 Employees could answer and make calls from their mobile phones using their desk phone number (or virtual number) and configure availability based on time of day.



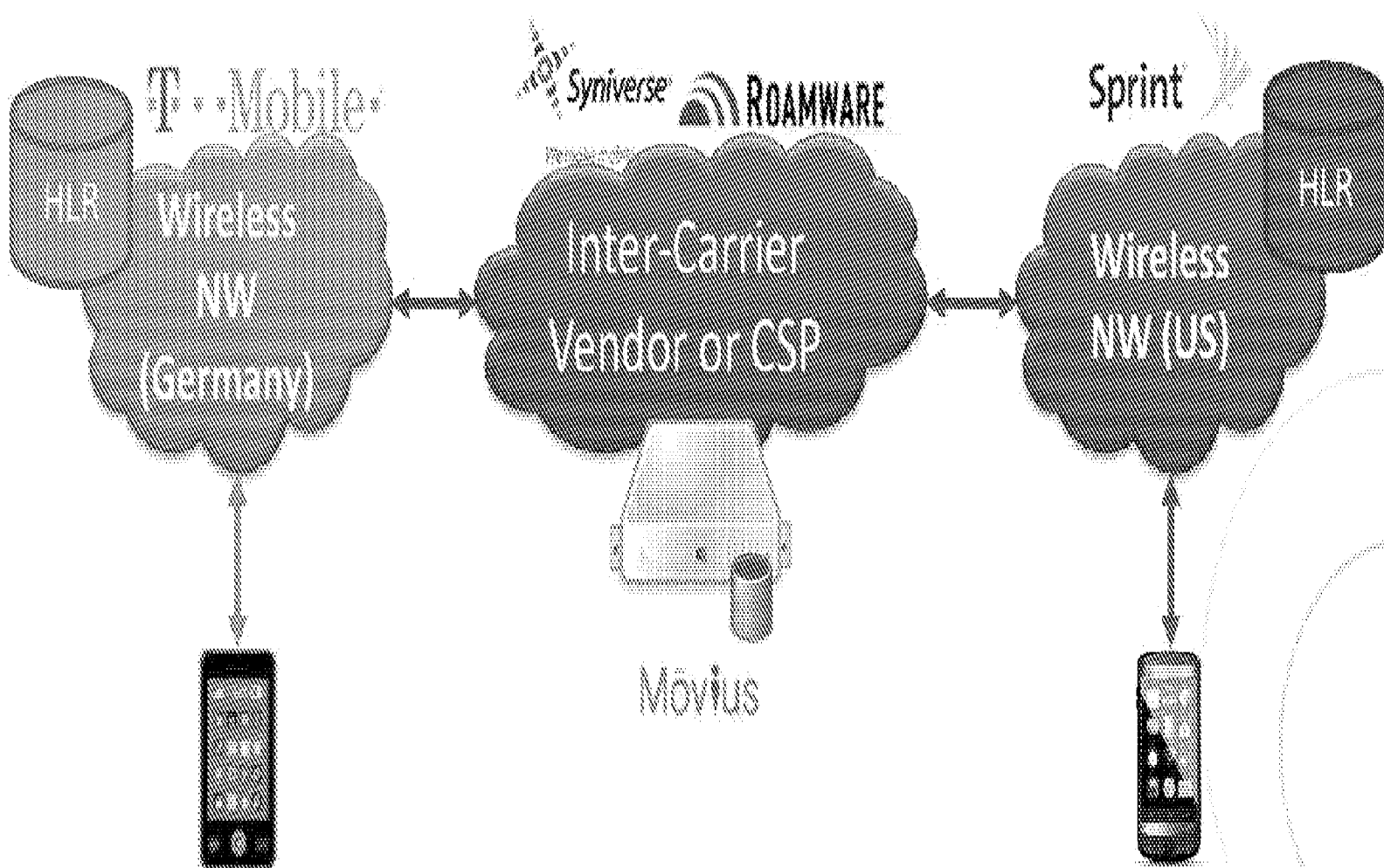
Social Number

- 1 A social network subscriber can have a social (virtual) number to allow other connections to make contact. While maintaining their “Prime Number’s Privacy”
- 2 Virtual number users can configure “Black/White Lists and Time of Day Availability” features to enhance the Client Experience.



Outbound/Inbound Roaming

- Enables International Roamers to have a local number when traveling
 - Home Network Provided (Out Bound) e.g. Business & Personal Use Cases
 - Local Network Provided (In Bound) e.g. Business & Personal Use Cases
- Enables new Post & Pre-Paid Calling plan revenue schemes.
- Enables “One # Global Service” on Preferred Roaming Networks



SLS Product and the Carrier-Independent Improvement

SLS is a service that provides a 2nd number to a mobile device. This is for business/personal separation, running multiple small businesses, etc.

In a first SLS product, the routing of the calls to and from the SLS phone number relies on the cooperation of the service provider that provides the primary number. The primary number is the number associated with the physical device. This is your “normal” mobile number.

SLS provides a 2nd number that reaches the same phone. This is done by using a prefix for the SLS number. The subscriber’s primary number service provider is also the provider of the SLS number, so it is in their own interests to establish a dialable prefix that causes the calls involving the SLS number to route to the SLS platform within the primary service provider’s network.

In the first SLS product, the supplier of the SLS service must be the service provider that supplies the primary service.

In a second SLS product, it is desirable for an independent service provider to offer SLS service. This SLS service provider would sell an SLS number and service to a subscriber of any primary service provider.

The methodology uses intermediate phone numbers to ensure that calls route to the SLS service provider’s own network. Once the call reaches the SLS service provider’s own network, the application makes a translation to complete the call.

Using the slide deck, the SLS platform maintains the list of SLS phone numbers that are in service. These numbers are owned by the SLS service provider. In the telephone network, these numbers route to the SLS service provider’s platform (telephony peripheral).

As shown in the left side of Slide 13, the SLS service provider has a group of numbers that are his inventory. He provides these numbers to subscribers that subscribe to the service. In these example slides, the example subscriber has been issued 1.770.555.0000 as their SLS number. This is the number that they give out to contacts.

On the right side of Slide 13, we see that the SLS service provider has another list of dialable phone numbers that they maintain. These “relationship” numbers are “hidden numbers” that facilitate calls between the subscriber’s phone (which is actually a phone with a number and service provided by the primary service provider) and the SLS platform operated by the SLS service provider.

The Relationship Numbers are a pool of numbers that are used to service all SLS subscribers. This will be explained in more detail on a later slide.

As mentioned, the Relationship Numbers are behind the scenes numbers that are hidden from the subscriber. This is accomplished by a phone app residing on the subscriber's smart phone. As will be explained in detail on a later slide, the phone app translates any number calling the subscriber or called by the subscriber into the appropriate Relationship Number.

Another way to look at these numbers is to realize that any SLS call consists of two legs, with the SLS platform in the middle. Examples of this can be seen on Slides 9-11. The phone app on the subscriber's phone uses a Relationship Number to access the SLS platform over the telephone network. The SLS number is used by the SLS platform to complete calls with any external party calling the subscriber's SLS number or being called by the SLS subscriber.

Refer to Slide 14 for a detailed description of how the Relationship Number works. The relationship number is the key to the methodology. It is what allows the SLS service provider to insert itself into the middle of a call between two phones that are served by other service providers.

In the example, Subscriber A already has mobile phone service via primary service provider X using mobile phone number 1.408.544.1212. Subscriber A now subscribes to SLS service from the SLS service provider Z. Z assigns 1.770.555.0000 to Subscriber A. that relationship is shown in the table on the left side of Slide 14. 1.770.555.000 is the phone number that subscriber A publishes for his side business, personal calls, etc.

Caller K is using a phone with the number 1.305.229.9999. This phone service can be provided by any service provider. (As with any phone service, a called party can receive calls over the telephone network from a phone on any service provider's network).

Caller K dials 1.770.555.0000. That is an SLS number that the telephone network routes to the SLS platform. The SLS platform accepts the call (without connecting the voice path to the caller; this is just signaling so far). It sees that the call is for 1.770.555.0000 and that 1.770.555.0000 does not yet have a "relationship" set up for the calling number, 1.305.229.9999. (Consider this to be brand new SLS service and this is the first person to call the subscriber.)

The SLS platform creates the following relationship: When 1.770.555.0000 receives (or places) a call from 1.305.229.2999, the interaction with the subscriber's phone (1.408.544.1212) will use dialable telephone number 1.678.222.0000.

Note that 1.678.222.0000 will be used as a relationship number for many different SLS subscribers. It is the combination of the SLS number and the relationship number that map to the external number (in this case, 1.305.229.2999)
Back to the call in progress.

The SLS platform will establish the 2nd half of the call. This is the call from the SLS platform to the subscriber's phone. The SLS platform places the call to the subscriber's

primary number (1.408.544.1212). In the signaling, the SLS platform uses the “calling number” fields in a unique way. This is possible because the SLS Service Provider has provided the SLS phone app on the subscriber’s mobile device.

As shown at the lower center of Slide 13, the calling party field contains a specially encoded message for the SLS phone app. The field will contain the Relationship Number and the actually calling party number, separated by a dialable separator such as a “star” character.

The SLS phone app stores the relationship. It stores the relationship number 1.678.222.0000 and the actual calling party number 1.305.229.2999. To complete this call, the SLS phone app displays 1.305.229.9999 as the calling party and rings the phone. Once the subscriber answers, the SLS Platform connects the two parts of the call by one of several methods.

How are the relationship numbers used from this point forward? The relationship in the example above is now stored in the SLS platform and also in the SLS phone app on the subscriber’s mobile device. The importance of the relationship number is that it allows the SLS platform to intercept calls originated from the Subscriber’s mobile device using the SLS number.

On Slide 17, Subscriber A is going to originate a call for party B. Since B had previously called A on A’s SLS number, the relationship that maps A’s SLS number and B’s phone number to a Relationship Number is already stored in both the SLS platform and the SLS phone app on A’s phone.

To place calls from his SLS number, Subscriber A uses the SLS phone app as his dialer. In the SLS dialer, A dials B’s number (1.305.229.9999). The dialer looks in the SLS phone apps’s relationship table and translates 1.305.229.9999 to 1.678.222.0000. The SLS dialer shows the subscriber that it is calling 1.305.229.9999, but instead it calls 1.678.222.0000. That causes the telephone network to route the call to the SLS platform instead of directly to B’s phone. The SLS dialer also modifies the “calling number” field in the signaling. Instead of populating the field with the actual number of the calling device (1.408.544.1212), it populates it with the SLS number (1.770.555.0000).

When the SLS Platform processes this leg of the call, it sees the calling number as 1.770.555.0000 and the called number as 1.678.222.0000. Its logic knows to use these two numbers to read the relationship table. The logic is “when SLS number 1.770.555.0000 calls relationship number 1.678.222.0000, it is actually calling 1.305.229.9999.” It now completes the call by calling 1.305.229.9999 and showing the calling number as the SLS number, 1.770.555.0000.

Note that another SLS subscriber (for example, 1.770.555.1111) could also call using the same relationship number (1.678.222.0000), but it would map to a different external number. The encoded representation of the actual called number is a combination of the SLS number and the relationship number.

We are still designing the case where the SLS subscriber wants to place a call to a number for which it does not yet have a relationship. One possible design is that the SLS phone app would look at the relationship table in its own memory, realize that there is no relationship for the called number, and interface with the SLS platform over USSD, or by overdialing once the SLS platform answers, etc.

Cross Carrier Second Number (SideLine) Service
1. Cross Carrier Mobile Device Client Using Data Channel for SIP Call

June 14, 2012

George Backhaus (with Jose Romero, Paul Rubenstein and John Green)

In the above disclosed Cross Carrier Second Line Service, there is an SLS client on the primary mobile device of the subscriber. This client uses the means of the previous disclosure to route calls from the mobile device to the SLS platform. Embodiments of the SLS platform may leverage aspects of embodiments described in the above disclosure to place another call to the called party and then connect the two parts of the call. Exemplary combinations of calling and called parties are shown in the flow diagrams for the following Scenarios.

Note: In these Scenarios, “KT” is the mobile operator that is also providing Second Number service. “SKT” is another mobile operator that, while providing mobile service to their subscribers, does not participate in operator KT’s Second Number service.

- Scenario 1B – A KT Mobile calls a KT provided Second Number where SKT provides the Primary Service to the called Mobile Device.
- Scenario 2B – An SKT Mobile calls a KT provided Second Number where SKT provides the Primary Service to the called Mobile Device.
- Scenario 4B – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call another KT provided Second Number where SKT provides the Primary Service to the called Mobile Device.
- Scenario 6A – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call a KT Mobile Device.
- Scenario 6B – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call an SKT Mobile Device.

In these situations, the carrier providing the primary mobile device and its number will generate a bill for the call between the subscriber’s handset and the SLS platform. The carrier providing the SLS service will generate a bill for the call between the SLS platform and the other party. The “other party” is the ultimate called number if the SLS subscriber originates the call, or the originating caller). This dual billing is less than optimal. In addition, the call records and mobile phone bills will list a call between the

subscriber's handset and the SLS platform that will show a call to/from a hidden Relationship Number. This may be confusing to the subscriber.

In each Scenario, the MOC (Mobile Originating Call) and MTC (Mobile Terminating Call) call billing records are shown near the bottom of the flow diagram.

An improvement on the above disclosed method is for the SLS Client in the subscriber's Mobile Device to either access a separate SIP calling program or use SIP calling capability within that SLS Client. The SLS client would place the first call over the data channel of the mobile device using SIP. This is the call from the Mobile Device to the SLS Platform. Examples of these calls are in the following Scenarios:

- Scenario 7A – A KT Mobile calls a KT provided Second Number where SKT provides the Primary Service to the called Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 1B)
- Scenario 7B – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call a KT Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 6A)
- Further Scenarios not shown for brevity:
- Scenario 7C – An SKT Mobile calls a KT provided Second Number where SKT provides the Primary Service to the called Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 2B)
- Scenario 7D – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call another KT provided Second Number where SKT provides the Primary Service to the called Mobile Device. The calls between the SLS platform and the SKT Mobile Devices are both SIP calls over the data service provided to the respective Mobile Devices by SKT. (This Scenario is analogous to Scenario 4B).
- Scenario 7E – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call an SKT Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 6B)

The advantage is that there is not a voice channel call generated, reported or billed from the primary phone number of the Mobile Device to the SLS Platform. Therefore,

- The carrier supplying the primary number of the mobile device will not bill for or report a call between the Mobile Device's primary number and the relationship number on the SLS Platform.
- The subscriber will not see the above call and be confused by this call record involving an unfamiliar hidden number. This is noted in the example Scenario 7A and 7B call flow diagrams. There is no MOC or MTC call detail record. The connection is over the data service to the SKT Mobile Device.
- Any revenue to the primary carrier is limited to usage against the subscriber's primary number data plan or overage in the data plan.
- The SLS carrier is free to collect all the call revenue associated with the call. This is because the SLS carrier will report and bill for a call between the SLS platform and the ultimate originating or called party. This call will be shown as a call involving the subscriber's SLS number provided by the SLS carrier.

2. Calls between a Cross Carrier SLS subscriber and a Direct SLS Subscriber

In embodiments of the above disclosed Cross Carrier Second Line Service, there is an SLS client on the primary mobile device of the subscriber. This client uses embodiments in the above disclosure to route calls from the mobile device to the SLS platform. The SLS platform uses the means of the previous disclosure to place another call to the called party and then connects the two parts of the call.

Some embodiments of an SLS Second Number solution are termed Direct Second Number Services. In a Direct Second Number Service, the provider of the Second Number Service is the same provider that provides the Primary Service to the subscriber's Mobile Device. The advantage of Direct Second Number Service is that the subscriber can have multiple phone numbers associated with one device using a single USIM or SIM.

For background purposes, Direct Second Number Service is described in the following Scenarios:

- Scenario 1A – A KT Mobile calls a KT provided Second Number where KT provides the Primary Service to the called Mobile Device.
- Scenario 2A – An SKT Mobile calls a KT provided Second Number where KT provides the Primary Service to the called Mobile Device.
- Scenario 3A – A subscriber with a Mobile Device whose Primary Service is provided by KT uses a Second Number (provided by KT) to call another KT provided Second Number where KT provides the Primary Service to the called Mobile Device.
- Scenario 5A – A subscriber with a Mobile Device whose Primary Service is provided by KT uses a Second Number (provided by KT) to call a KT Mobile Device.

- Scenario 5B – A subscriber with a Mobile Device whose Primary Service is provided by KT uses a Second Number (provided by KT) to call an SKT Mobile Device.

As shown in detail in these Scenarios, calls involving the Direct Second Number Service involve a novel way of using CAP (CAMEL) signaling to give the appearance that the Second Number is a number associated with the physical subscriber Mobile Device. This appearance applies to billing records and Called/Calling Number information to be displayed on the second party's telephone display.

As described in detail in the above disclosure and in the Call Flow diagrams for Scenarios 1B, 2B, 4B, 6A and 6B immediately above, calls involving a Cross Carrier Second Number Service subscriber do not use CAP to change billing or call presentation information. These calls are connected using ISUP signaling only.

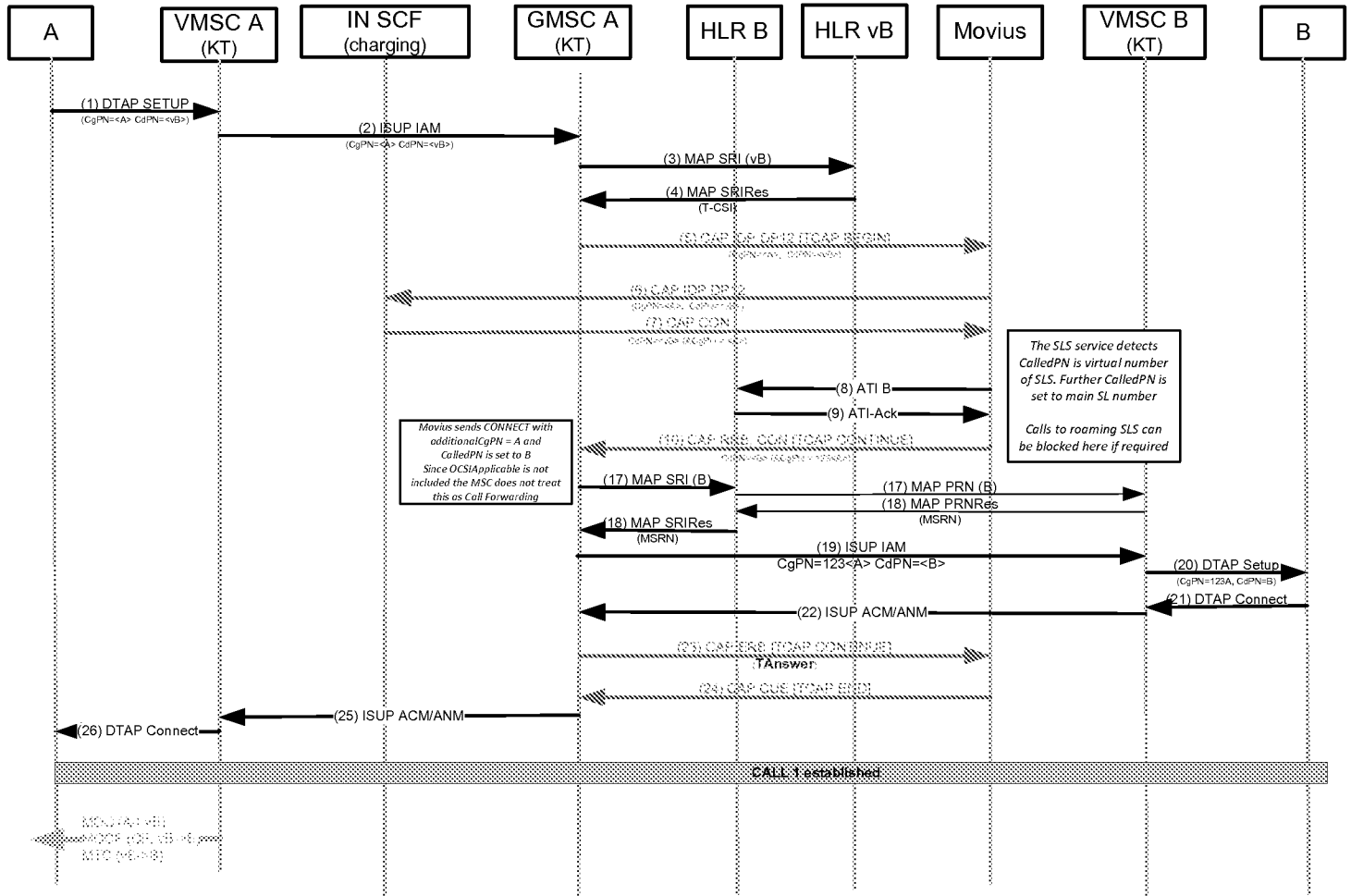
There is a set of use cases where a call is placed between a Cross Carrier Second Number and a Direct Second Number. The detailed Call Flow diagrams for following Scenarios describe the novel method for using one form of signaling to interact with the Cross-Carrier Second Number subscriber and a different method of signaling to interact with the Direct Second Number subscriber. For each type of subscriber, the billing and reporting aspects of their type of Second Number service is preserved.

- Scenario 3B – A subscriber with a Mobile Device whose Primary Service is provided by KT uses a Second Number (provided by KT) to call another KT provided Second Number where SKT provides the Primary Service to the called Mobile Device.
- Scenario 4A – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call another KT provided Second Number where KT provides the Primary Service to the called Mobile Device.

Also, as described in Section 1 above, this same novel solution can be used if the ISUP signaling for the part of the call involving the Cross Carrier Second Number subscriber is replaced by a SIP call over that subscriber's data service. Although not shown for brevity, these would be the following Scenarios:

- Scenario 8A – A subscriber with a Mobile Device whose Primary Service is provided by KT uses a Second Number (provided by KT) to call another KT provided Second Number where SKT provides the Primary Service to the called Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 3B)
- Scenario 8B – A subscriber with a Mobile Device whose Primary Service is provided by SKT uses a Second Number (provided by KT) to call another KT provided Second Number where KT provides the Primary Service to the called

Mobile Device. The call between the SLS platform and the SKT Mobile Device is a SIP call over the data service provided to the Mobile Device by SKT. (This Scenario is analogous to Scenario 4A)



Sequence Description

- (1) A calls vB number (call from virtual is deactivated for A)
 - (2) VMSC(A) sends IAM to GMSC
 - (3-4) GMSC requests HLR for routing information to vB and MSC returns T-CSI provisioned to vB
 - (5) GMSC sends Movius an RDP DP12 (A to vB)
 - (6) Movius sends IN SCF an RDP DP12
 - (7) IN SCF sends Movius CON (confirming vB is active)
 - (8-9) Movius asks HLR for status of the number vB. If B is roamer then Movius might rejects/releases the call. Otherwise call continues
 - (10) Movius sends the CAP Connect to change call destination to B. CCSIApplicable flag is excluded. No real call forwarding does not happen while destination address is updated. The Additional CgPN (equal to 123A) is added into general number list to be presented to called mobile station
 - (17-18) GMSC requests HLR for B routing number and HLR replies with MSRN (HLR may ask VMSC B to provide roaming number)
 - (19) GMSC routes the IAM in accordance with MSRN received from HLR
 - (20) VMSC(B) requests to connect to B.
 - (21) B answers the call.
 - (22) VMSC(B) informs GMSC about B addressed and answered.
 - (23) GMSC informs Movius that called subscriber answered
 - (24) Movius commands to continue (CUE) the call and finishes the Camel transaction.
 - (25-26) GMSC informs VMSC(A) about B addressed and answered. VMSC(A) informs A about that.
- Call between A and B is established

As result of the call MOC will present to A following CDRs:
MOC (A to 123A) - MOC
MOC (A to vB)
MOC (vB to vB)
MOC (vB to vB)
MOC (vB to vB)

Requirements:

1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

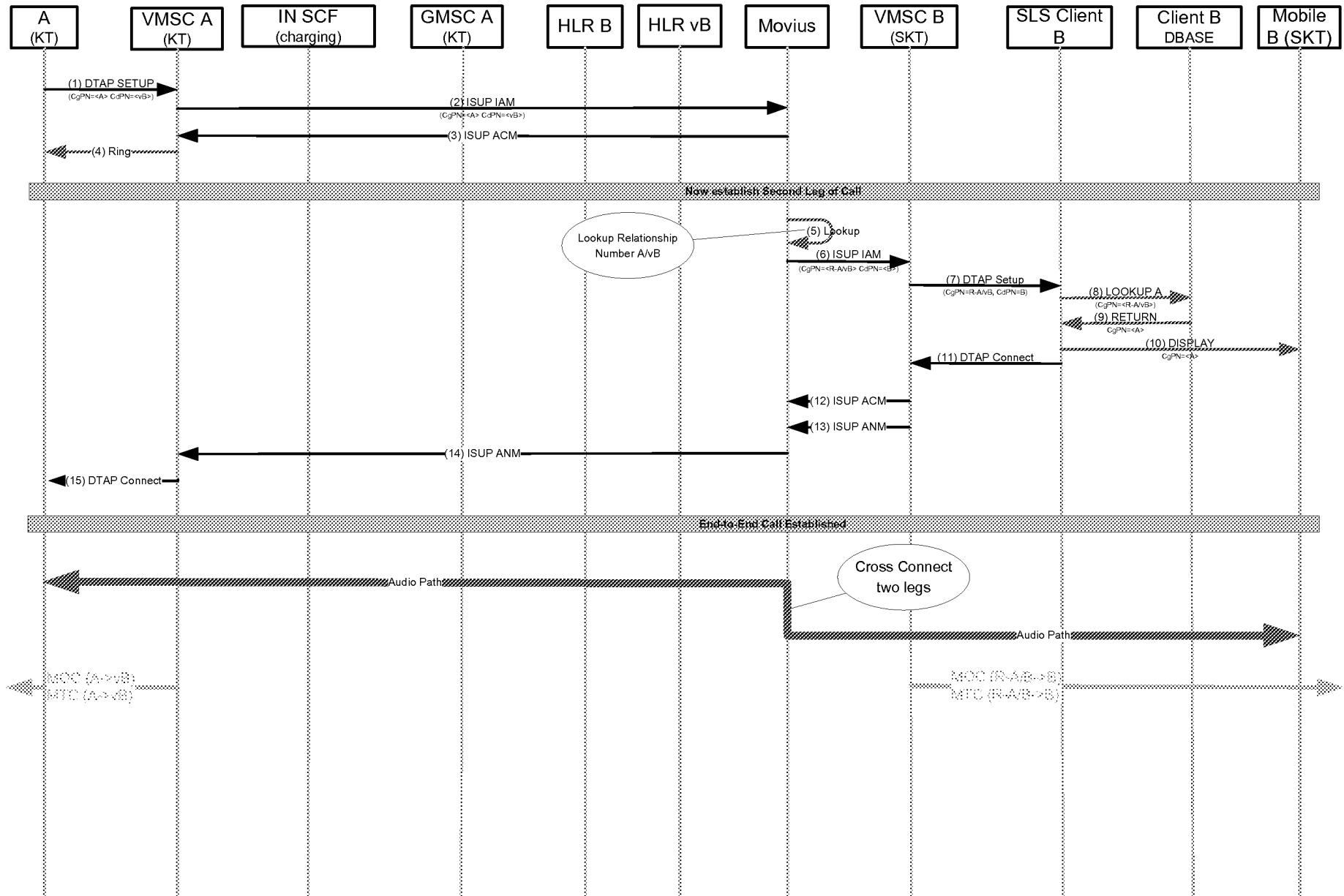
* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

Glossary

ISUP IAM – Initial Address Message
ISUP ACM – Address Complete Message
ISUP ANM – ANswer Message
MAP SRI – Send Routing Info
CAP IERB – Reporting (phase 1+)
CAP IACH – Accept Charging (phase 1+)
CAP IDP – Initial Detection Point (phase 1+)
CAP RRB – Request Report BCSM (phase 1+)
CAP CON – Connect
CAP CUE – Continue

MOC – Call Data Record for Mobile Originated Call
MTC – Call Data Record for Mobile Terminated Call

Signal and Media Flows (MAP/ISUP) Scenario 1B: Call from KT to SKT SLS



Sequence Description

- (1) A calls vB number
 - (2) VMSC(A) sends IAM to Movius
 - (3) Movius returns ACM to VMSC(A)
 - (4) VMSC(A) provides Ring to A
 - (5) Movius looks up Relationship Number R-A/vB
 - (6) Movius sends IAM to VMSC(B)
 - (7) VMSC(B) sends DTAP Setup to Handset B
 - (8-9) SLS Client retrieves stored A based on R-A/vB
 - (10) A number displayed on B screen as Calling Number
 - (11) Handset B responds with DTAP Connect
 - (12-13) VMSC(B) answers call with ACM/ANM
 - (14) Movius answers first leg of call with ANM to VMSC(A)
 - (15) VMSC(A) sends DTAP Connect to Handset A
- Call between A and vB is established

Requirements:

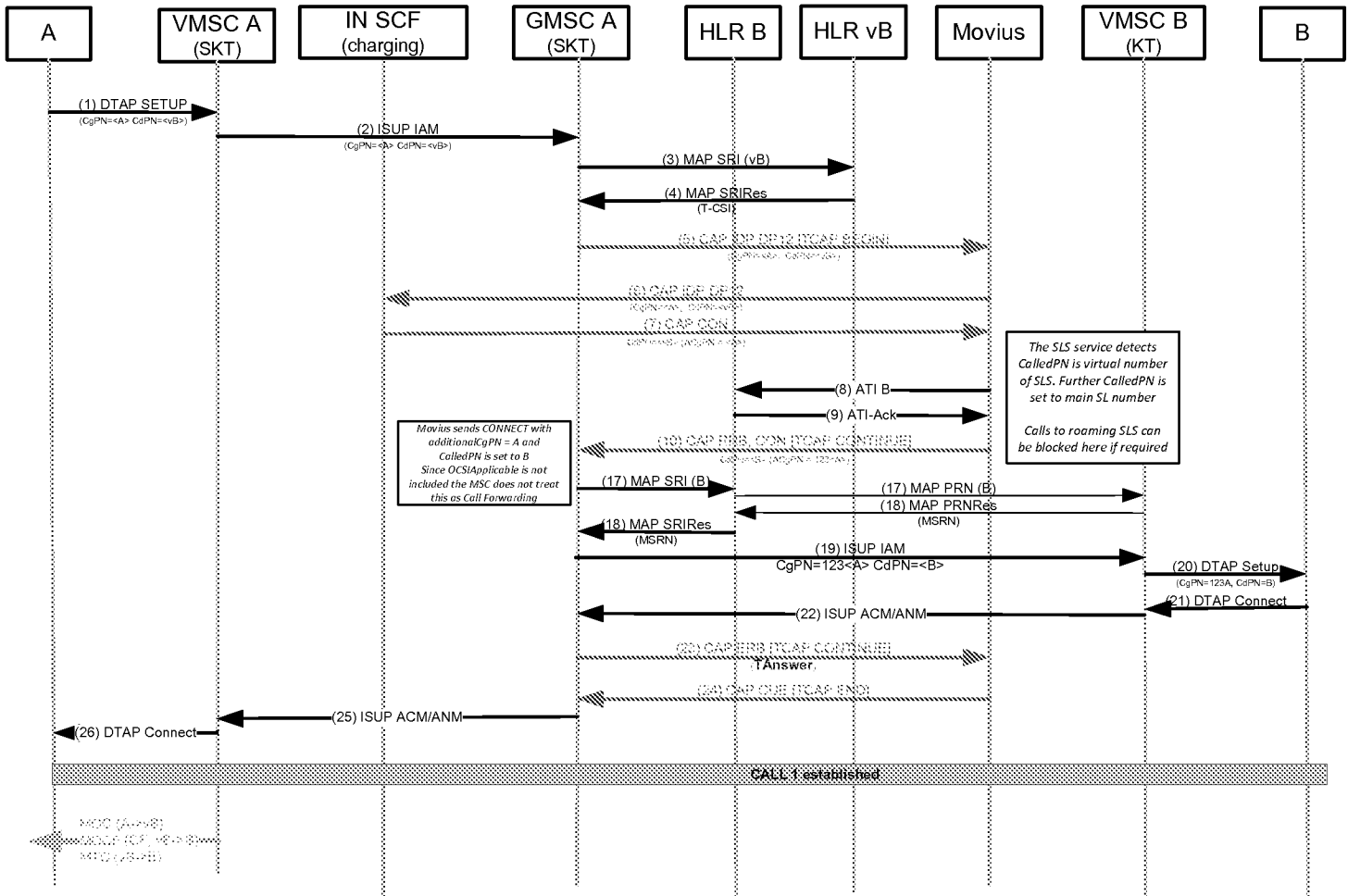
1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

Glossary

ISUP\IAM – Initial Address Message
 ISUP\ACM – Address Complete Message
 ISUP\ANM – Answer Message
 MAP\SRI – Send Routing Info
 CAP\ERB – Reporting (phase 1+)
 CAP\ACH – Accept Charging (phase 1+)
 CAP\IDP – Initial Detection Point (phase1+)
 CAP\RRB – Request Report BCSM (phase 1+)
 CAP\CON – Connect
 CAP\CUE – Continue

MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call



Sequence Description

- (1) A calls vB number (call from virtual is deactivated for A)
- (2) VMSC(A) sends IAM to GMSC
- (3-4) GMSC requests HLR for routing information to vB and MSC returns T-CSI provisioned to vB
- (5) GMSC sends Movius an IDP DP12 (A to vB)
- (6) Movius sends IN SCF an IDP DP12
- (7) IN SCF sends Movius CCM (confirming vB is active)
- (8-9) Movius asks HLR for status of the number vB. If B is roamer then Movius might rejects/releases the call. Otherwise call continues
- (10) Movius sends the CAP Connect to change call destination to B. (DCSApplicable flag is excluded. So real call forwarding does not happen while destination address is updated. The Additional CgPN (equal to 123A) is added into genericNumbers list to be presented to called mobile station.
- (17-18) GMSC requests HLR for B routing number and HLR replies with MSRN (HLR may ask VMSC B to provide roaming number).
- (19) GMSC routes the IAM in accordance with MSRN received from HLR
- (20) VMSC(B) requests to connect to B.
- (21) B answers the call.
- (22) VMSC(B) informs GMSC about B addressed and answered.
- (23) GMSC informs Movius that called subscriber answered
- (24) Movius comments to continue (CUE) the call and finishes the Camel transaction.
- (25-26) GMSC informs VMSC(A) about B addressed and answered. VMSC(A) informs A about that.

Call between A and B is established

At end of the call MSC will generate the following CDRs:
 - MOC (A->vB)
 - MTC (vB->B)
 - MOC (A->B)
 - MTC (A->B)

Requirements:

1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

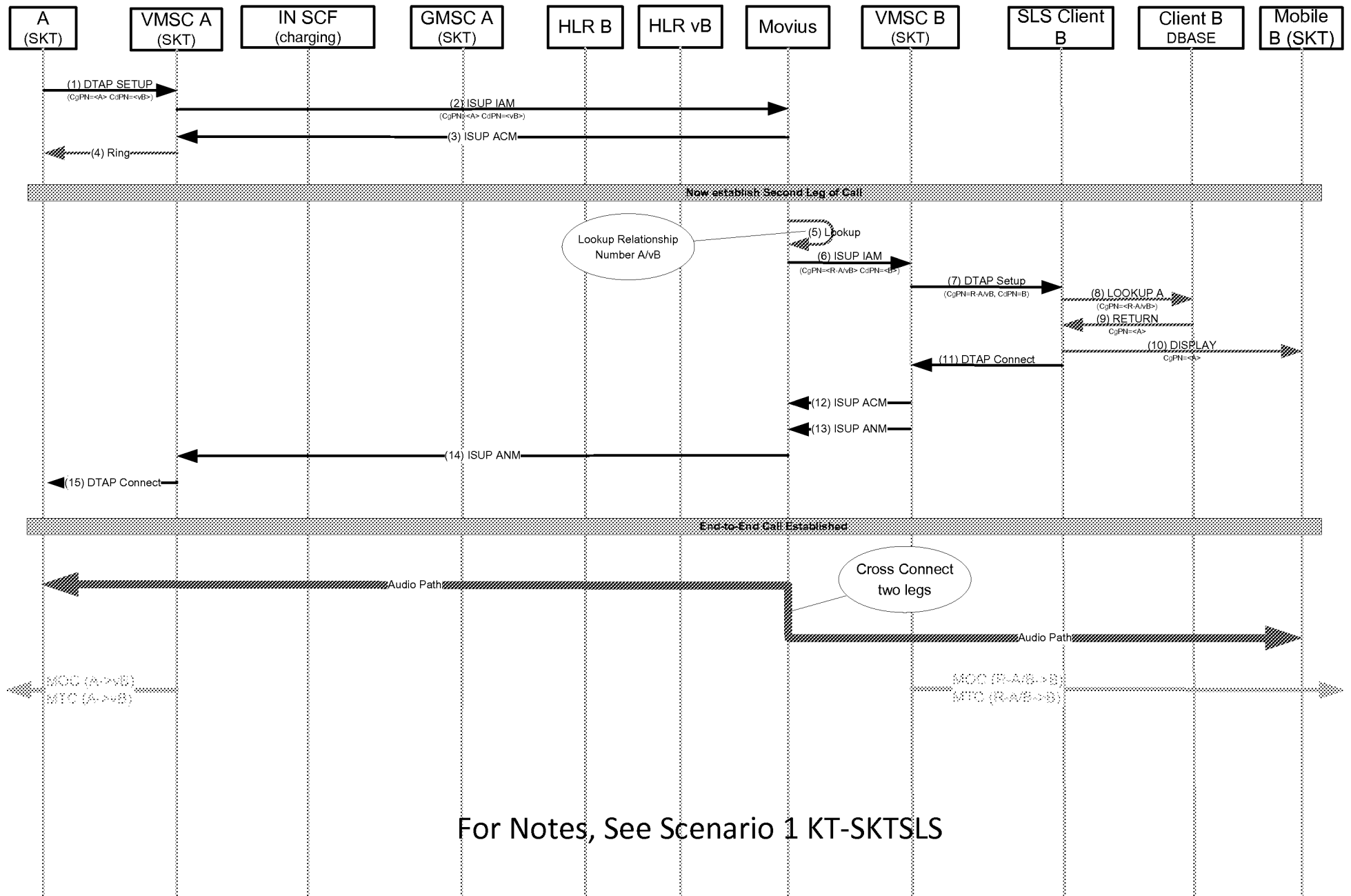
Glossary

ISUP/IAM – Initial Address Message
 ISUP/ACM – Address Complete Message
 ISUP/ANM – Answer Message
 MAP/SRI – Send Routing Info
 CAP/ERB – Reporting (phase 1+)
 CAP/ACH – Accept Charging (phase 1+)
 CAP/IDP – Initial Detection Point (phase 1+)
 CAP/RRB – Request Report BCSM (phase 1+)
 CAP/CON – Connect
 CAP/CUE – Continue

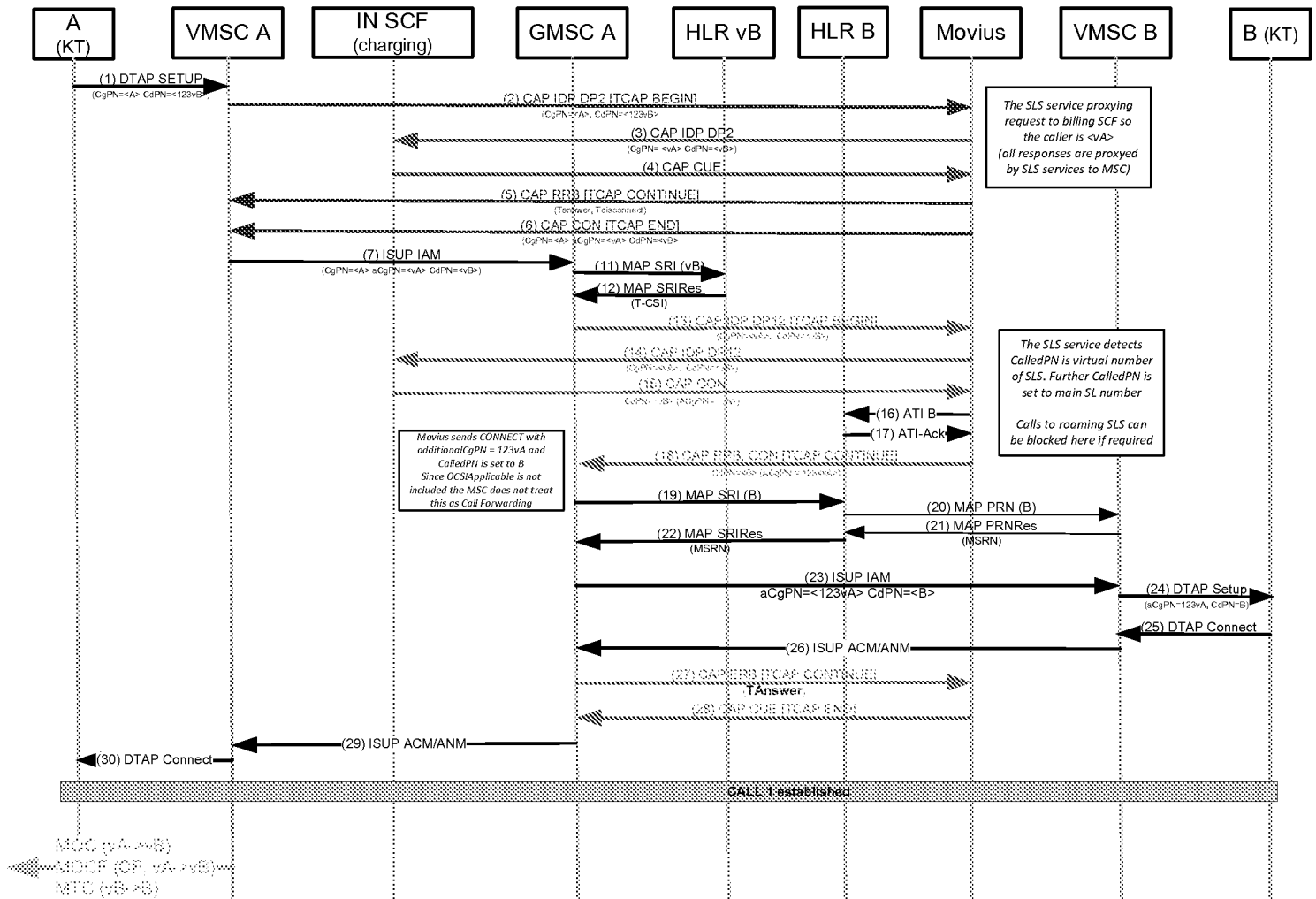
MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call

Signal and Media Flows (MAP/ISUP)

Scenario 2B: Call from SKT to SKT SLS



For Notes, See Scenario 1 KT-SKTSLS



Sequence Description

- (1) A calls vB number (call from virtual is activated)
- (2) Subscriber A is provisioned with OCSI. SCF is Movius instead of billing IN SCF. Call is interrupted in DP2 and MSC sends IDP to Movius.
- (3) Movius sends IDP to IN to apply charging for a call from vA to vB number.
- (4) Any responses from IN SCF are proxied to MSC.
- (5) Movius subscribes to (Answer/Disconnect) events from VMSC A.
- (6) Movius sends the CAP Connect command, where additional CgPN is updated to vA.
- (7) VMSC(A) sends IAM to GMSC
- (11-12) GMSC requests HLR for routing information to vB and MSC returns T-CSI provisioned to vB
- (13) GMSC sends Movius IDP DP12 (vA -> vB)
- (14) Movius sends an IDP DP12 to IN SCF
- (15) IN SCF send Movius a CON confirming vB is active
- (16-17) Movius asks HLR B for status of B. If B is roaming, Movius may reject/release the call if required
- (18) Movius sends CAP CON to charge call destination to B. OCSIApplicable flag is executed so real call forwarding is prevented while destination address is updated. The Additional CgPN (aCgPN=<123vA>) is added into generalNumber list to be presented to called mobile station.
- (19-22) GMSC requests HLR-B for B's routing number. HLR responds with MSRN (HLR may ask VMSC to provide roaming number)
- (23) GMSC routes the IAM in accordance with MSRN received from HLR-B
- (24) VMSC(B) requests to connect to B.
- (25) B answers the call.
- (26) VMSC-B sends ISUP ACM/ANM to GMSC-A
- (27) GMSC A informs Movius that called subscriber answered
- (28) Movius commands to continue (CUE) the call and finish the transaction
- (29) GMSC-A informs VMSC-A that B answers.

Call between A and B is established

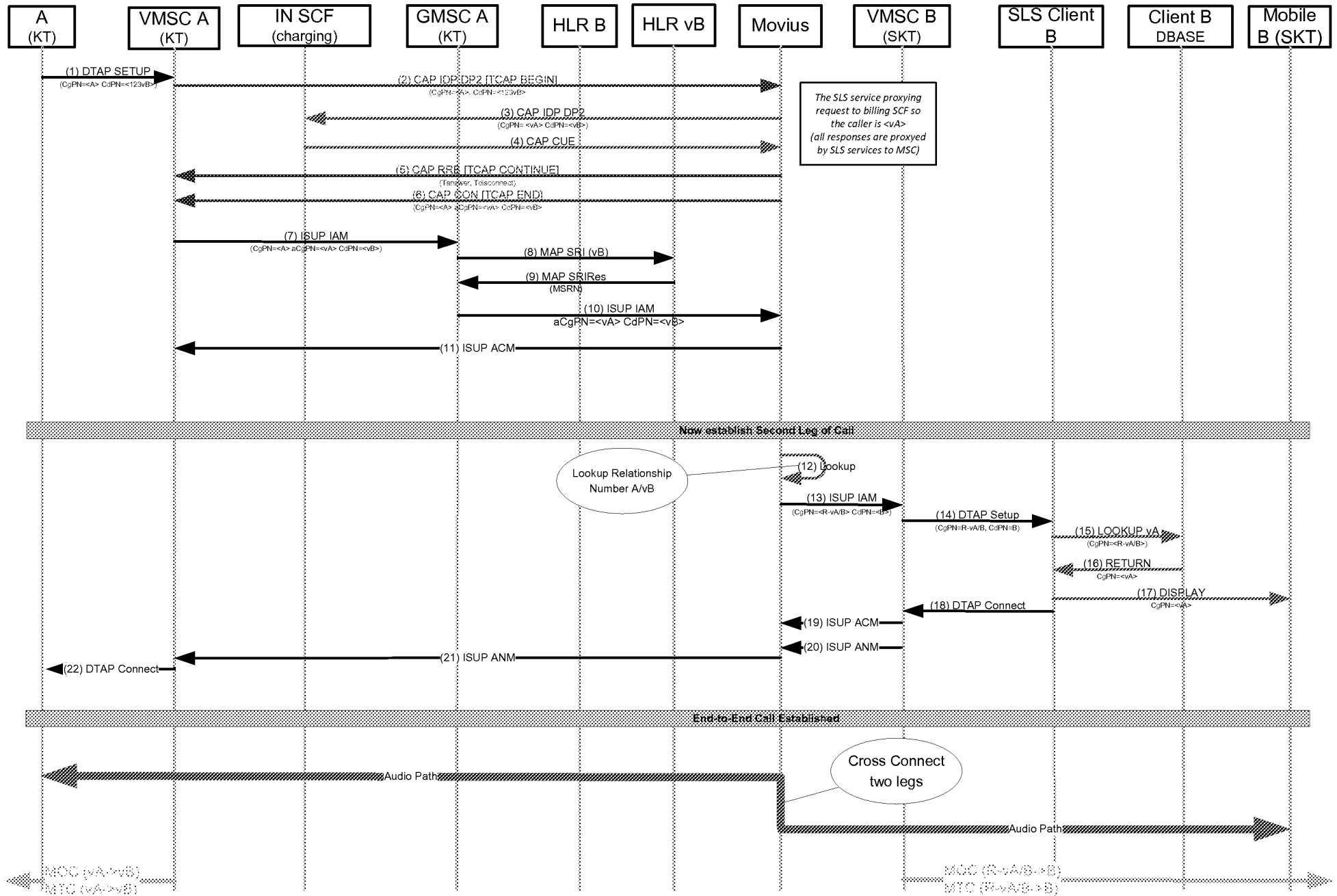
Requirements:

1. SL subscriber is provisioned with O-CSI, SCF=Movius
2. MSC and HLR supports CAMEL and MAP
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.

Glossary

ISUP IAM – Initial Address Message
ISUP ACM – Address Complete Message
ISUP ANM – Answer Message
MAP SRI – Send Routing Info
CAP IERB – Reporting (phase 1+)
CAP IACH – Accept Charging (phase 1+)
CAP IDP – Initial Detection Point (phase 1+)
CAP IRRB – Request Report BCSM (phase 1+)
CAP ICUE – Continue
CAP ICON – Connect

MOC – Call Data Record for Mobile Originated Call
MTC – Call Data Record for Mobile Terminated Call



Sequence Description

- (1) A calls vB number (call from virtual is activated)
 - (2) Subscriber A is provisioned with OCSI, SCF is Movius instead of billing IN SCF. Call is interrupted in DP2 and MSC sends IDP to Movius.
 - (3) Movius sends IDP to IN to apply charging for a call from vA to vB number.
 - (4) Any responses from IN SCF are proxied to MSC
 - (5) Movius subscribes to (Answer/Disconnect) events from VMSC A
 - (6) Movius sends the CAP Connect command, where additional CgPN is updated to vA.
 - (7) VMSC(A) sends IAM to GMSC
 - (8-9) GMSC requests HLR for routing information to vB and MSC returns T-CSI provisioned to vB (The location of vB is Movius)
 - (10) GMSC sends IAM to Movius
 - (11) Movius returns ACM to VMSC(A) via GMSC
 - (12) Movius looks up Relationship Number R-vA/B
 - (13) Movius sends IAM to VMSC(B)
 - (14) VMSC(B) sends DTAP Setup to Handset B
 - (15-16) SLS Client retrieves stored A based on R-vA/B
 - (17) A number displayed on B screen as Calling Number
 - (18) Handset B responds with DTAP Connect
 - (19-20) VMSC(B) answers call with ACM/ANM
 - (21) Movius answers first leg of call with ANM to VMSC(A)
 - (22) VMSC(A) sends DTAP Connect to Handset A
- Call between vA and vB is established

Requirements:

1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

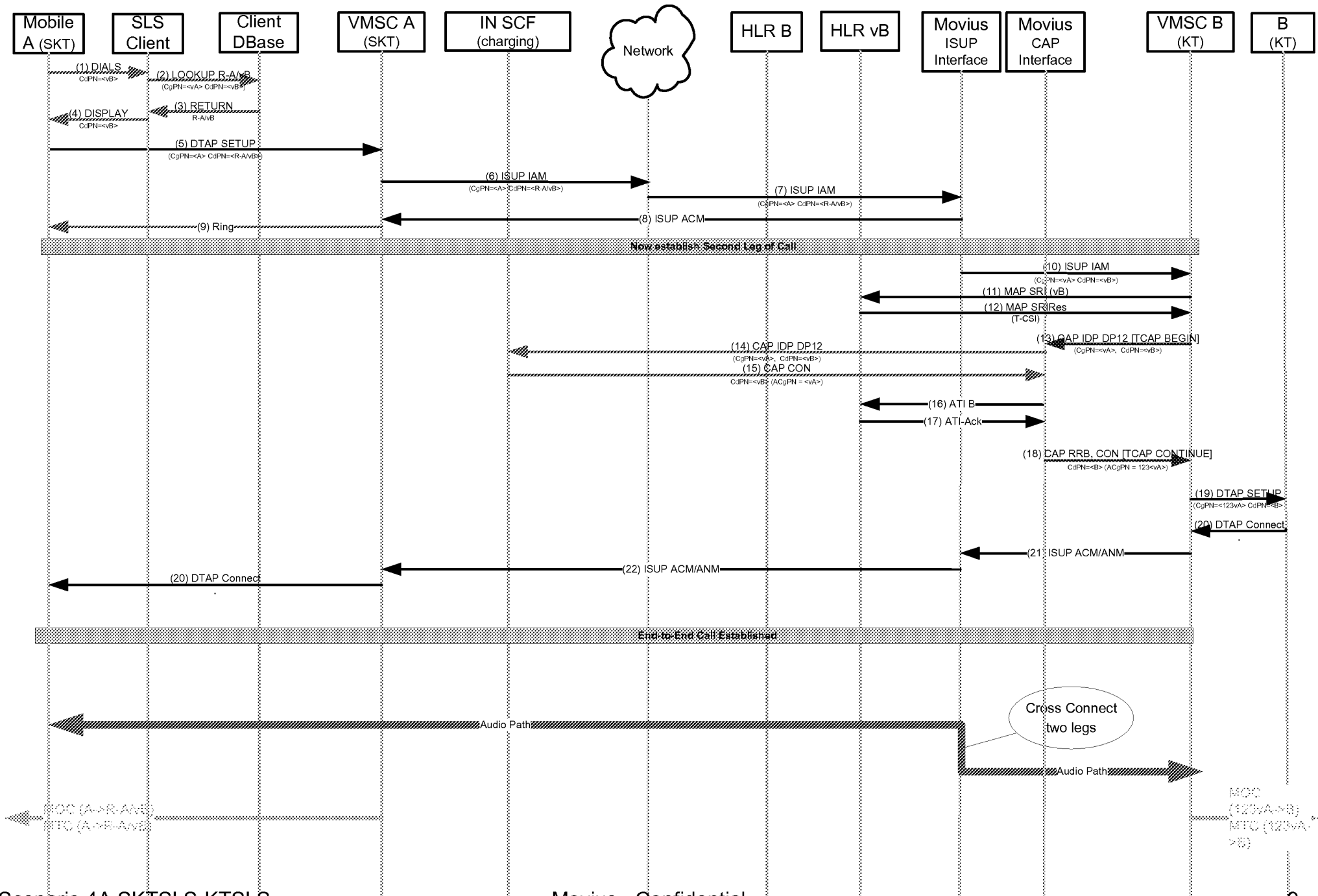
Glossary

ISUP\IAM – Initial Address Message
 ISUP\ACM – Address Complete Message
 ISUP\ANM – Answer Message
 MAP\SRI – Send Routing Info
 CAPI\ERB – Reporting (phase 1+)
 CAPI\ACH – Accept Charging (phase 1+)
 CAPI\DP – Initial Detection Point (phase1+)
 CAPI\RRB – Request Report BCSM (phase 1+)
 CAPI\CON – Connect
 CAPI\CUE – Continue

MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call

Signal and Media Flows (MAP/ISUP)

Scenario 4A: Call from SKT SLS to KT SLS



Sequence Description

- (1) A dials vB number using vA SLS dialer
(2-3) SLS Client retrieves stored Relationship Number R-A/vB based on vB
(4) vB number displayed on A screen as Called Number
- (5) Mobile A sends DTAP SETUP to VMSC(A)
(6-7) VMSC(A) sends IAM to Movius CgPN=A, CdPN=R-A/vB
(8) Movius sends ACM to VMSC(A)
(9) VMSC(A) rings A
- (10) Movius sends IAM to VMSC(B) (CdPN=vB)
- (11-12) VMSC(B) requests HLR for routing information to vB and HLRvB returns T-CSI provisioned to vB
(13) VMSC(B) sends Movius an IDP DP12 (vA to vB).
(14) Movius sends IN SCF an IDP DP12
(15) IN SCF sends Movius CON (confirming vB is active)
(16-17) Movius asks HLR for status of the number vB. If B is roamer then Movius might reject/release the call. Otherwise call continues
(18) Movius sends the CAP Connect to change call destination to B. OCSIApplicable flag is excluded. So real call forwarding does not happen while destination address is updated. The Additional CgPN (equal to 123A) is added into generic Numbers list to be presented to called mobile station
(17-18) GMSC requests HLR for B routing number and HLR replies with MSRN (HLR may ask VMSC B to provide roaming number).
- (19) VMSC(B) sends DTAP Setup to Handset B
(20) Handset B responds with DTAP Connect
- (21-22) VMSC(B) answers call with ACM/ANM
- (23) Movius answers first leg of call with ANM to VMSC(A)
(24) VMSC(A) sends DTAP Connect to Handset A
- Call between vA and vB is established

Requirements:

1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

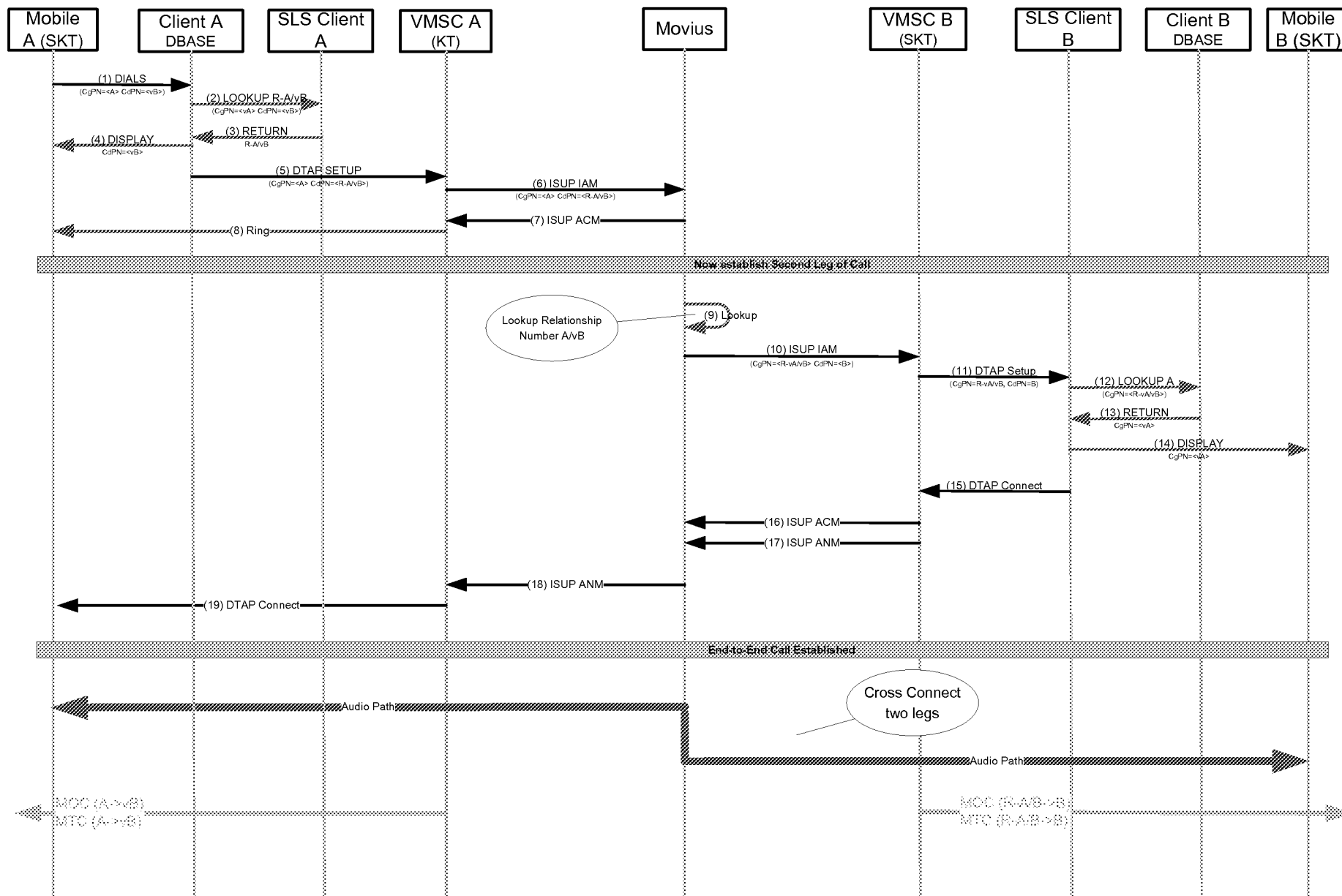
* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

Glossary

ISUP\IAM – Initial Address Message
ISUP\ACM – Address Complete Message
ISUP\ANM – ANswer Message
MAP\SRI – Send Routing Info
CAP\ERB – Reporting (phase 1+)
CAP\ACH – Accept Charging (phase 1+)
CAP\IDP – Initial Detection Point (phase1+)
CAP\RRB – Request Report BCSM (phase 1+)
CAP\CON – Connect
CAP\CUE – Continue

MOC – Call Data Record for Mobile Originated Call
MTC – Call Data Record for Mobile Terminated Call

Signal and Media Flows (MAP/ISUP) Scenario 4B: Call from SKT SLS to SKT SLS



Sequence Description

- (1) A dials vB number
- (2-3) SLS Client retrieves stored Relationship Number R-A/vB based on vB
- (4) vB number displayed on A screen as Called Number

- (5) Mobile A sends DTAP SETUP to VMSC(A)
- (6) VMSC(A) sends IAM to Movius CgPN=A, CdPN=R-A/vB
- (7) Movius sends ACM to VMSC(A)
- (8) VMSC(A) rings A

- (2) VMSC(A) sends IAM to Movius
- (3) Movius returns ACM to VMSC(A)
- (4) VMSC(A) provides Ring to A

- (9) Movius looks up Relationship Number R-A/vB

- (10) Movius sends IAM to VMSC(B)
- (11) VMSC(B) sends DTAP Setup to Handset B

- (12-13) SLS Client retrieves stored A based on R-A/vB
- (14) vA number displayed on B screen as Calling Number

- (15) Handset B responds with DTAP Connect
- (16-17) VMSC(B) answers call with ACM/ANM

- (18) Movius answers first leg of call with ANM to VMSC(A)
- (19) VMSC(A) sends DTAP Connect to Handset A

- Call between A and vB is established

Requirements:

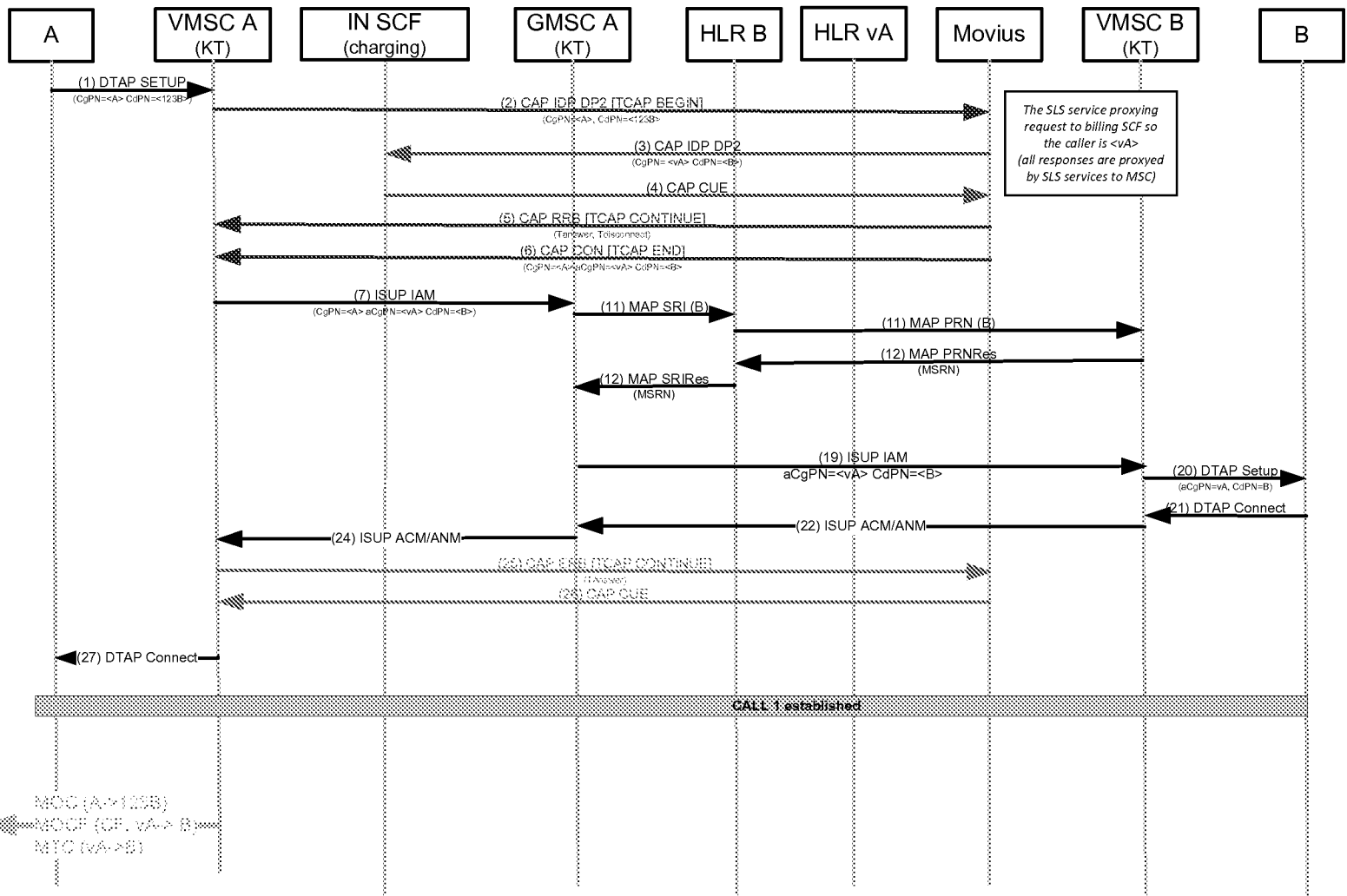
1. SL virtual number is real subscriber and provisioned with T-CSI DP12
2. MSC and HLR supports Camel Phase 2
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.
4. Call from SL subscriber to its virtual number and backward* is free of charge.

* SL service will reject any attempts of SL subscriber to make call from its main number to its virtual number.

Glossary

ISUP\IAM – Initial Address Message
 ISUP\ACM – Address Complete Message
 ISUP\ANM – Answer Message
 MAP\SRI – Send Routing Info
 CAPI\ERB – Reporting (phase 1+)
 CAPI\ACH – Accept Charging (phase 1+)
 CAPI\DP – Initial Detection Point (phase 1+)
 CAPI\RRB – Request Report BCSM (phase 1+)
 CAPI\CON – Connect
 CAPI\CUE – Continue

MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call



Sequence Description

- (1) A calls B number (call from virtual is activated) 123 is the prefix A uses to call from vA, the SLS number.
 - (2) Subscriber A is provisioned with OCSI, SCF is Movius instead of billing IN SCF. Call is interrupted in DP2 and MSC sends IDP to Movius.
 - (3) Movius sends IDP to IN to apply charging for a call from vA to B number.
 - (4) Any responses from IN SCF are proxied to MSC.
 - (5) Movius subscribes to (Answer/Disconnect) events from VMSC A.
 - (6) Movius sends the CAP Connect command, where additional CdPN is updated to vA.
 - (7) VMSC(A) sends IAM to GMSC.
 - (11-12) GMSC requests HLR for routing information to B and MSC returns MSRN for B.
 - (19) GMSC routes the IAM in accordance with MSRN received from HLR.
 - (20) VMSC(B) requests to connect to B.
 - (21) B answers the call.
 - (22) VMSC(B) informs GMSC about B addressed and answered.
 - (23) GMSC informs VMSC(A) about B addressed and answered.
 - (24) VMSC A informs Movius that called subscriber answered.
 - (25) Movius commands to continue (CUE) the call and finish the transaction.
 - (26) VMSC(A) informs A that B answers.
- Call between A and B is established

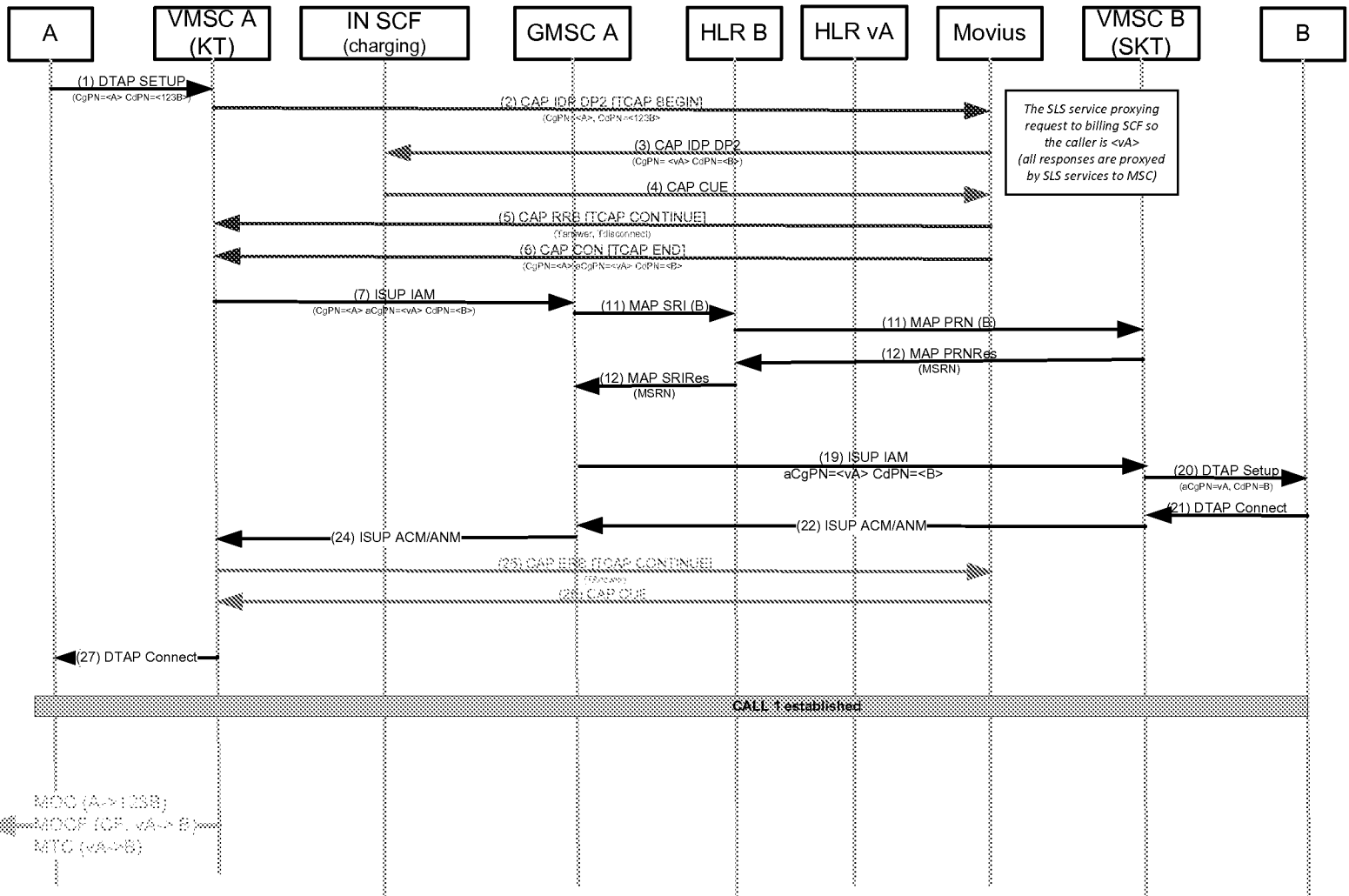
Requirements:

1. SL subscriber is provisioned with O-CSI, SCF=Movius
2. MSC and HLR supports CAMEL and MAP
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.

Glossary

ISUP IAM – Initial Address Message
ISUP ACM – Address Complete Message
ISUP ANM – Answer Message
MAP SRI – Send Routing Info
CAP ERB – Reporting (phase 1+)
CAP ACH – Accept Charging (phase 1+)
CAP IDP – Initial Detection Point (phase 1+)
CAP RRB – Request Report BCSM (phase 1+)
CAP CUE – Continue
CAP CON – Connect

MOC – Call Data Record for Mobile Originated Call
MTC – Call Data Record for Mobile Terminated Call



Sequence Description

- (1) A calls B number (call from virtual is activated) 123 is the prefix A uses to call from vA, the SLS number.
 - (2) Subscriber A is provisioned with OCSI, SCF is Movius instead of billing IN SCF. Call is interrupted in DP2 and MSC sends IDP to Movius.
 - (3) Movius sends IDP to IN to apply charging for a call from vA to B number.
 - (4) Any responses from IN SCF are proxied to MSC.
 - (5) Movius subscribes to (Answer/Disconnect) events from VMSC A.
 - (6) Movius sends the CAP Connect command, where additional CdPN is updated to vA.
 - (7) VMSC(A) sends IAM to GMSC
 - (11-12) GMSC requests HLR for routing information to B and MSC returns MSRN for B
 - (19) GMSC routes the IAM in accordance with MSRN received from HLR
 - (20) VMSC(B) requests to connect to B.
 - (21) B answers the call.
 - (22) VMSC(B) informs GMSC about B addressed and answered.
 - (23) GMSC informs VMSC(A) about B addressed and answered.
 - (24) VMSC A informs Movius that called subscriber answered.
 - (25) Movius commands to continue (CUE) the call and then the transaction.
 - (26) VMSC(A) informs A that B answers.
- Call between A and B is established

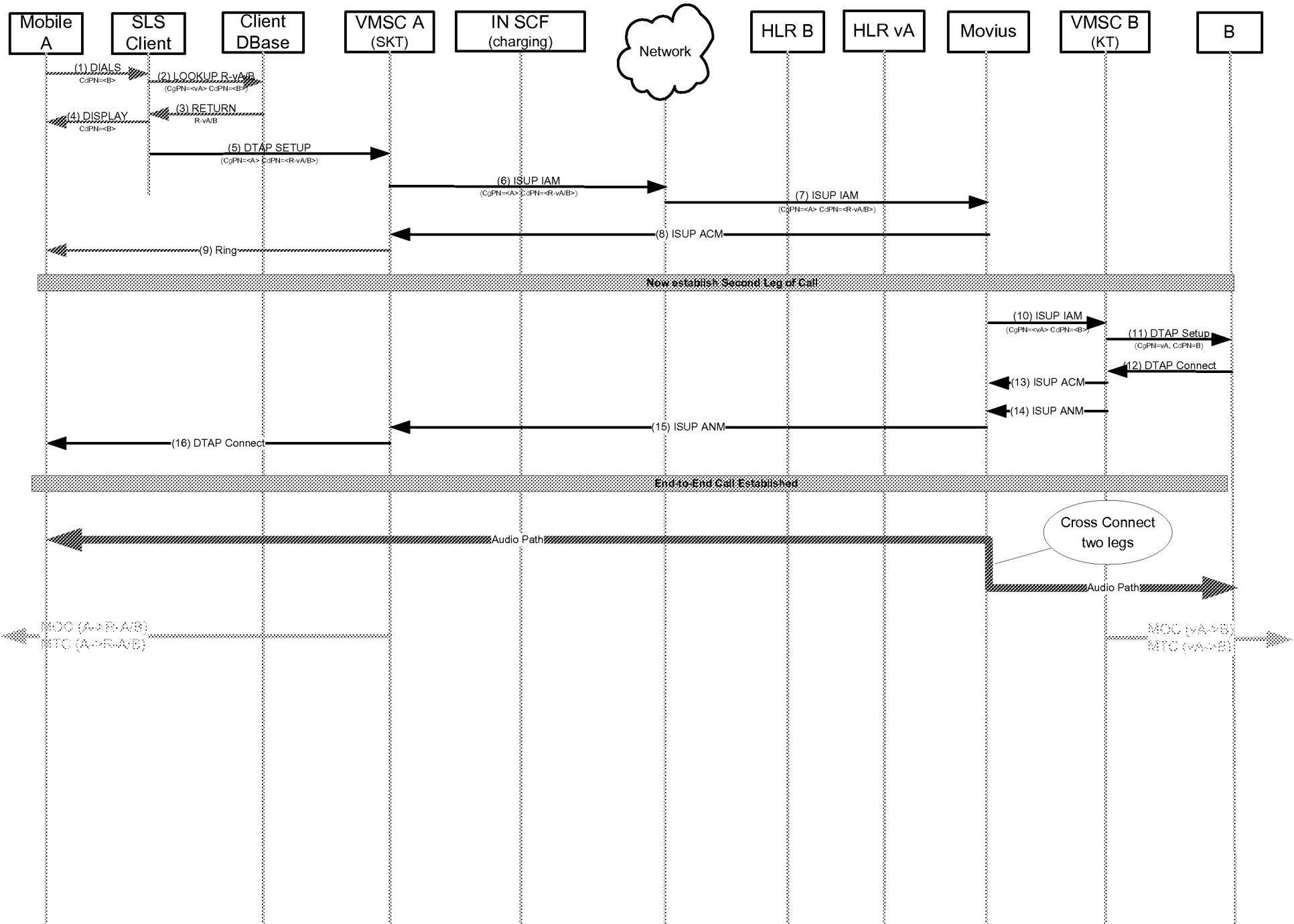
Requirements:

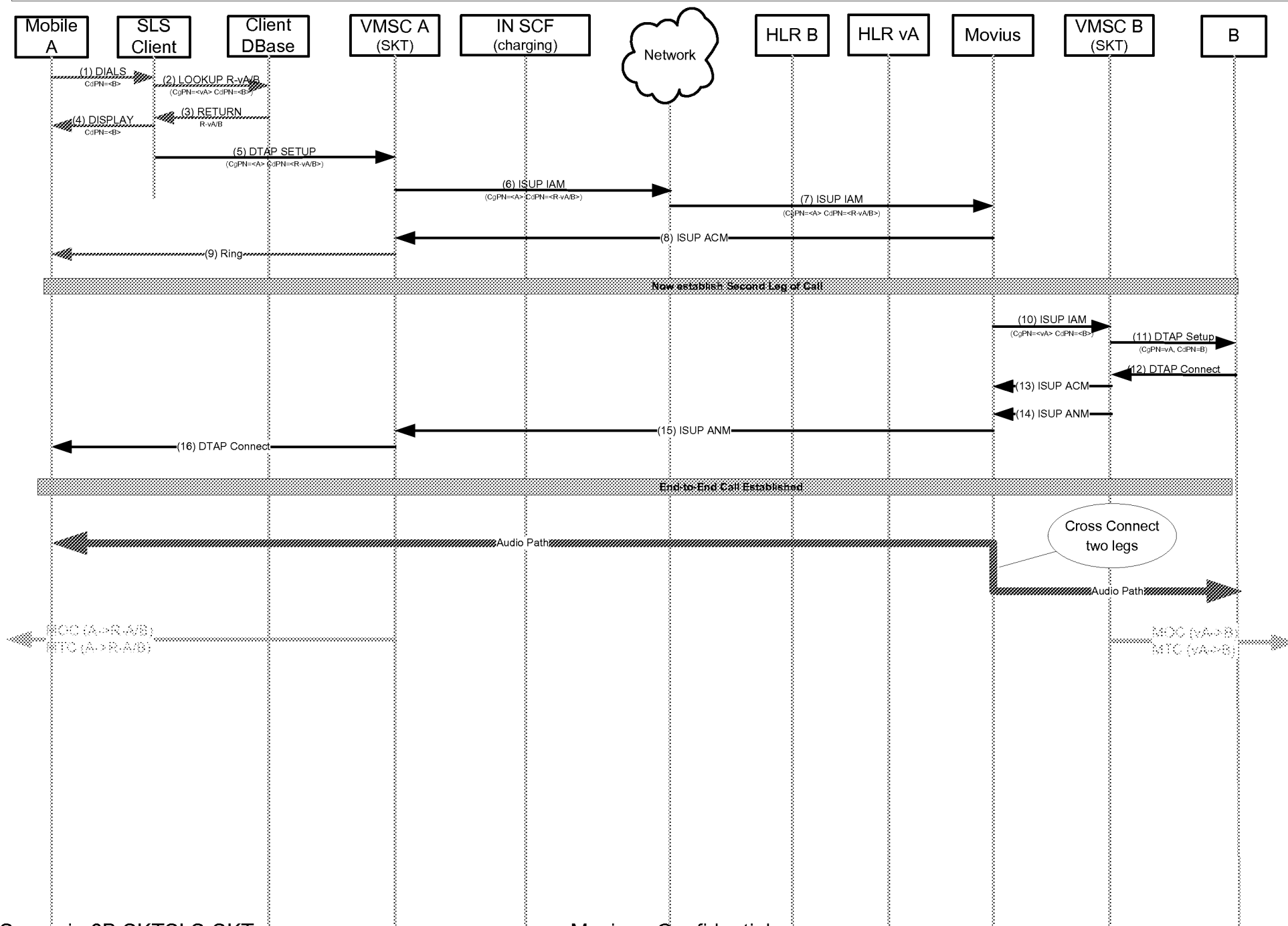
1. SL subscriber is provisioned with O-CSI, SCF=Movius
2. MSC and HLR supports CAMEL and MAP
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.

Glossary

ISUP\IAM – Initial Address Message
 ISUP\ACM – Address Complete Message
 ISUP\ANM – Answer Message
 MAP\SRI – Send Routing Info
 CAP\ERB – Reporting (phase 1+)
 CAP\ACH – Accept Charging (phase 1+)
 CAP\IDP – Initial Detection Point (phase 1+)
 CAP\RRB – Request Report BCSM (phase 1+)
 CAP\CUE – Continue
 CAP\CON – Connect

MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call





Sequence Description

- (1) A uses SLS Client to Dial B number
- (2-3) SLS Client retrieves stored Relationship Number for calls between vA and B (R-vA/B)
- (4) B number displayed on A screen as Called Number
- (5) SLS Client calls R-vA/B (R-vA/B routes to Movius)
- (6-7) VMSC(A) sends IAM to Movius
- (8) Movius returns ACM to VMSC(A)
- (9) VMSC(A) provides Ring to A
- (10) Movius sends IAM to VMSC(B)
- (11) VMSC(B) sends DTAP Setup to Handset B
- (12) Handset B responds with DTAP Connect
- (13-14) Handset B answers call from Movius with ACN/ANM
- (15) Movius answers original call by sending ANM to VMSC(A)
- (16) VMSC(A) sends DTAP Connect to Handset A

Requirements:

1. SL subscriber is provisioned with O-CSI, SCF=Movius
2. MSC and HLR supports CAMEL and MAP
3. MSC supports presentation of Additional Calling Party Number (A-CgPN) to called mobile.

Glossary

ISUP\IAM – Initial Address Message

ISUP\ACM – Address Complete Message

ISUP\ANM – Answer Message

MAP\SRI – Send Routing Info

CAP\ERB – Reporting (phase 1+)

CAP\ACH – Accept Charging (phase 1+)

CAP\IDP – Initial Detection Point (phase 1+)

CAP\RRB – Request Report BCSM (phase 1+)

CAP\CUE – Continue

CAP\CON – Connect

MOC – Call Data Record for Mobile Originated Call

MTC – Call Data Record for Mobile Terminated Call

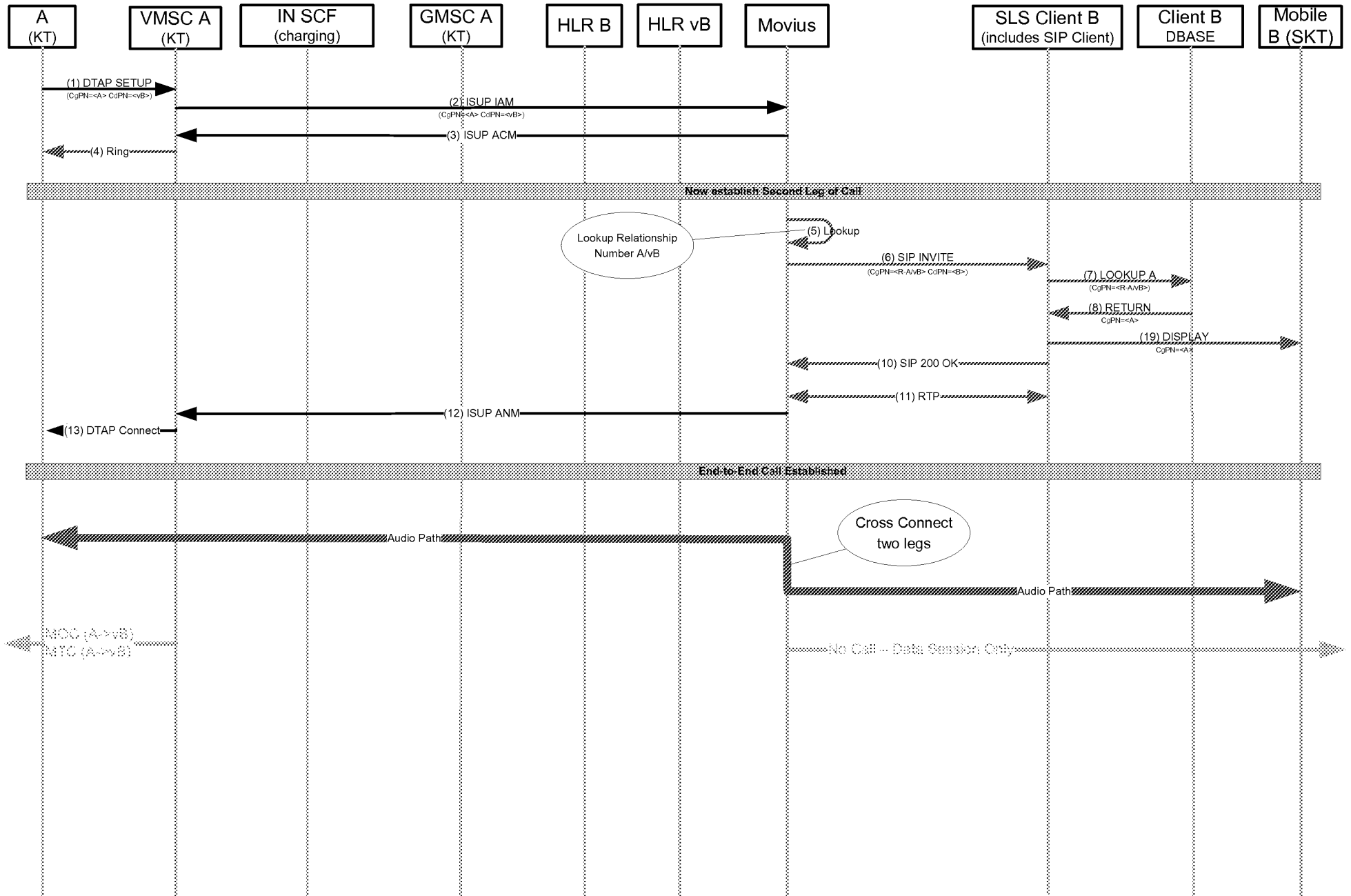
vA – the SLS Number

A – the SIM/USIM Number

R-A/B – Relationship Number between vA and B

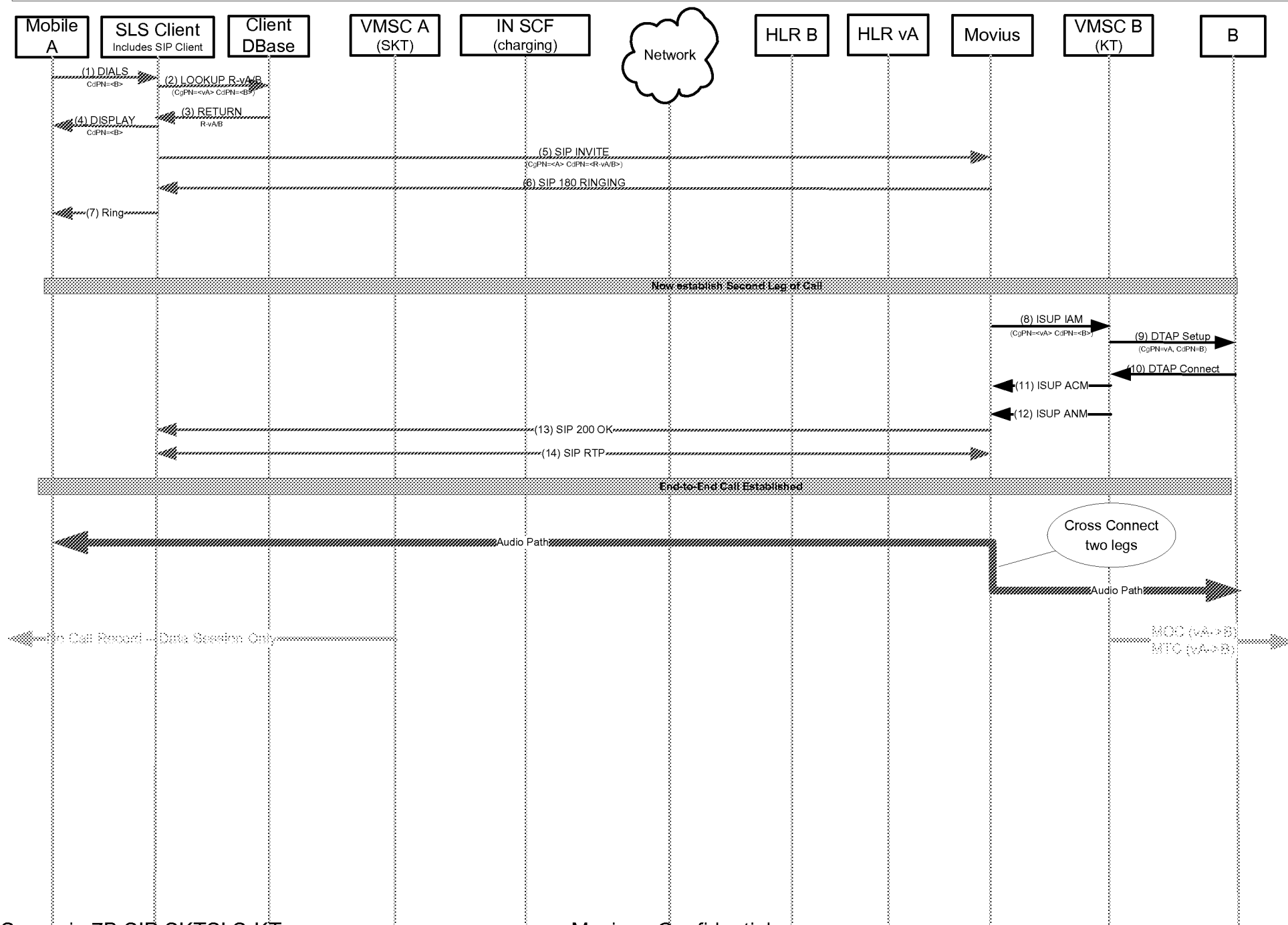
Signal and Media Flows (MAP/ISUP)

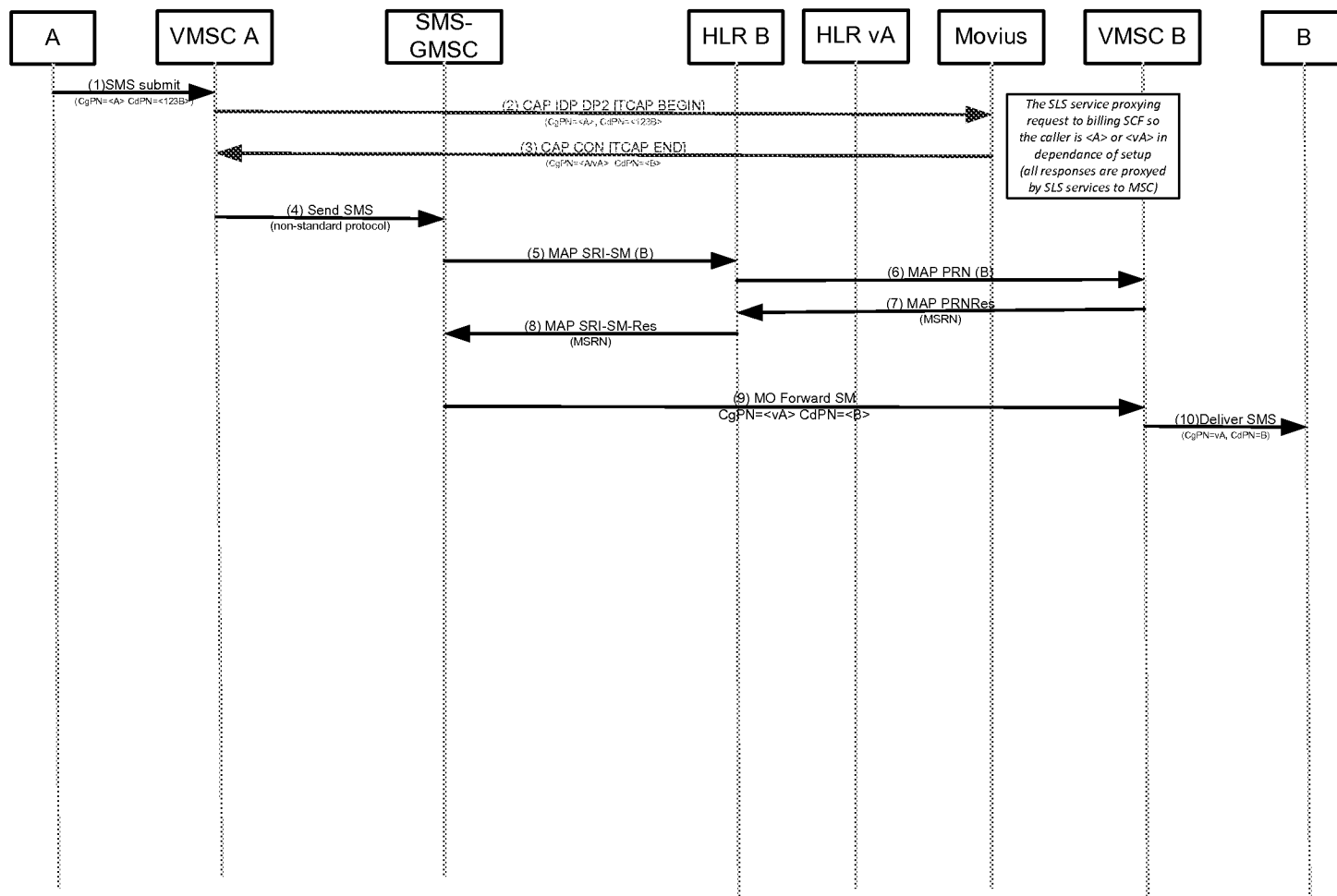
Scenario 7A: Call from KT to SKT SLS (SIP)



Signal and Media Flows (MAP/ISUP)

Scenario 7B: Call from SKT SLS to KT (SIP)





Sequence Description

- (1) A submit new SMS to B
- (2) Subscriber A is provisioned with SMS-MO-CSI, SCF is Movius instead of billing IN SCF. Sending of message is interrupted in DP2 and MSC sends IDP to Movius.
- (3) if sls is activated the Movius sends the CAP Connect command, where CdPN is updated to vA. if sls is not activated Movius sends the CAP Continue to continue call without modifications
- (4) VMSC(A) sends SMS to SMS-GMSC (Via SMS)
- (5-8) SMS-GMSC requests HLR for SMS routing information to B and MSC returns MSRN
- (9) SMS-GMSC forwards SMS to VMSC B
- (10) VMSC(B) delivers SMS to B.

Requirements:

1. SL subscriber is provisioned with SMS-MO-CSI, SCF=Movius
2. MSC and HLR supports Camel phase3

Glossary

ISUP\IAM – Initial Address Message
 ISUP\ACM – Address Complete Message
 ISUP\ANM – Answer Message
 MAP\SRI – Send Routing Info
 CAP\ERB – Reporting (phase 1+)
 CAP\ACH – Accept Charging (phase 1+)
 CAP\IDP – Initial Detection Point (phase1+)
 CAP\RRB – Request Report BCSM (phase 1+)
 CAP\CUE – Continue
 CAP\CON – Connect

MOC – Call Data Record for Mobile Originated Call
 MTC – Call Data Record for Mobile Terminated Call

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	Cross Carrier Mobile Device Client Using Data Channel for SIP Call			
First Named Inventor/Applicant Name:	George Backhaus			
Filer:	Matthew T. Hoots			
Attorney Docket Number:	07001.1560P			
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional Application filing fee	2005	1	125	125
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:				
Total in USD (\$)				125

Electronic Acknowledgement Receipt

EFS ID:	13033639
Application Number:	61660772
International Application Number:	
Confirmation Number:	8616
Title of Invention:	Cross Carrier Mobile Device Client Using Data Channel for SIP Call
First Named Inventor/Applicant Name:	George Backhaus
Customer Number:	35856
Filer:	Matthew T. Hoots
Filer Authorized By:	
Attorney Docket Number:	07001.1560P
Receipt Date:	17-JUN-2012
Filing Date:	
Time Stamp:	18:02:41
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 125
RAM confirmation Number	8423
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
-----------------	----------------------	-----------	----------------------------------	------------------	------------------

1	Provisional Cover Sheet (SB16)	07001_1560_cover.pdf	2071344 d19a5f11f621b92eb4dba92dd676660f80d4c83f	no	3
Warnings:					
Information:					
2	Specification	07001_1560_provisional_as_filed.pdf	6712757 e9d5ba75f0bd9b2963621c29ad815ad6cdeb7304	no	83
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29453 3ab0cc69bd9c6720af95d94c03823d3eed94b42b	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			8813554		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <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.					