

PTO/SB/16 (8/96)

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

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TITLE OF THE INVENTION (280 characters max)

Multi-Billing

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ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification Number of Pages 17 ☐ Small Entity Statement
☐ Drawing(s) Number of Sheets ☒ Other (specify)
Express Mail Certificate

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)

☒ A check or money order is enclosed to cover the filing fees
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filing fees and credit Deposit Account No. 02-2666

Filing Fee Amount (\$) 160.00

This invention was made by an agency of the United States Government or under 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:

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Additional inventors are being named on separately numbered sheets attached hereto

PROVISIONAL UNITED STATES PATENT APPLICATION

Multi-Billing

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Docket No. 3399P102Z

"Express Mail" mailing label number: EL821850645US

Date of Deposit: June 28, 2002

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IDEA PROPOSAL

Problem

We have a system that provides services to end-users (customers). For each provided service, the end-user should be charged a fee. The system is therefore capable of connecting to an external billing system and provides billing events to that system. This scenario assumes that all customers belong to one single organization that also owns the billing system. Furthermore, it assumes that a single currency and single prize policy is used. Most multi-national organizations have a mother company and subsidiaries in each country. Each subsidiary has implemented its own support/business infrastructure in order to deal with local regulations and customs. This applies especially to the billing process. Consequently, the system must be able to generate billing events and direct them to the appropriate external billing system. Furthermore, it must be able to present the customer with a charge for each service, which is in the applicable currency and expressed in a way that appropriate considering prize policy, taxes, fees and other regulations.

Known approaches

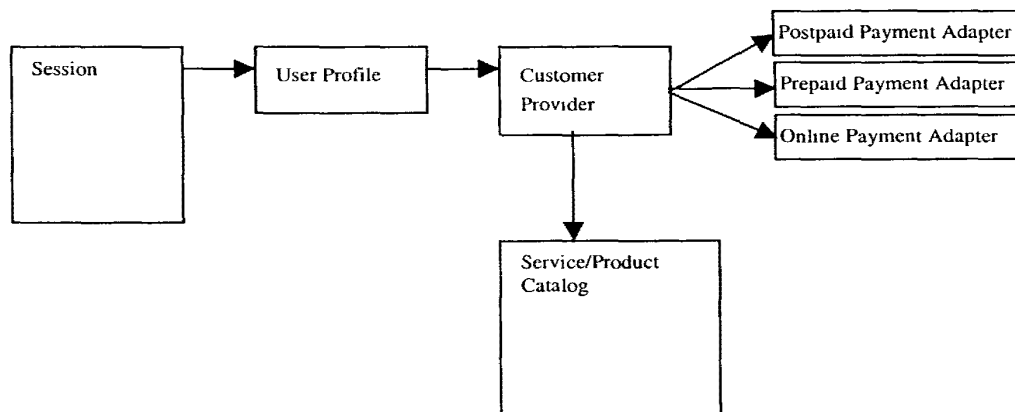
The most common way to address the problem (but only partially solves it) is to use credit card systems. In this scenario, the system still provides services, organizations provide their customers and the credit card company acts as an intermediate in the billing process. This approach consolidates all billing to one point. It will then perform settlement between the service provider and the customer provider for a fee. It does not handle the currency, taxes, fees and regulations issues.

Comments

The proposed solution assumes that there are local billing mechanisms in place. Each of these billing mechanisms has an established relationship with the customer already. It operates in the local currency using the local taxes, fees and other applicable charges for the region. It also invoices at intervals that are customary for the region.

The invention allows a service to have many different prices, one in each supported currency. There are no dependencies between the prices other than that they all apply to one service. This feature supports localized pricing policies and local taxes, charges to be considered.

Each user has a user profile that points to the organization that is responsible for invoicing him/her. The user profile can also hold additional information, such as the actual billing scheme. There are essentially three schemes available: post-paid, pre-paid or online credit card systems.



Any time a user logs on to the system, a session is created. The session holds a reference to the unique user profile.

The *User Profile* holds the following information:

- A unique identifier for the *customer provider* (organization that owns the billing relationship). A user can only belong to one customer provider (unless, of course, each user sets up more than one account.)
- The applicable *payment model* (post-paid, pre-paid, online) for this user. A User Profile only points to one payment model.

The profile holds other data as well, but that is outside the scope of this invention.

Each **Customer Provider** holds the following information:

- three adapters, one for each implemented payment model. The applicable adapter is always determined by the User Profile (see above).
- Local currency.
- Value Added Tax and other charges that normally apply to the offered services in the region.

The **Service/Product Catalog** holds the following information:

- Name and description of each service/product.
- The price for the service/product. There is one entry for each supported local currency. There are no dependencies between the prices in various currencies for the same product.

The following use case describes a purchase:

1. The customer (user) selects a service category.
2. The system looks in the **User Profile** and finds a reference to the **Customer Provider**.
3. The system looks in the **Customer Provider** and finds the local currency.
4. The system makes a search in the **Product Catalog** and receives a result set with services and their prices in the local currency.
5. The customer selects a service and accepts the price.
6. The system looks in the **User Profile** and finds the applicable *payment model*.
7. The system fetches the **Payment Model Adapter** from the **Customer Provider** with *payment model* as an argument.
8. The system sends the billing event to the **Payment Model Adapter**.

Ellipsus Systems

infiniteMAP	Version: 0.1
Feature Specification	Date:
MAP-002-FS-22-PartnerMgr - Partner Manager	

Revision History

Date	Version	Description	Author
	0.1	Initial draft, informal feature set. Things left to do: - Couple this FS with applicable requirements from [R.1]. - Define more use cases. - Create feature sets. - Define architecturally significant design packages.	Rikard Kjellberg
	0.2	Created FS and specified architecturally significant design packages.	Martin Bergljung
	0.3	Updates to reflect the practical design	Peter Häggård

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Feature Specification

1. Introduction

1.1 Purpose

This document describes the detailed features for the Partner Manager (PAM), which is called a *major feature set* (MFS). It uses the requirements from the functional requirements specification for infiniteMAP [R.1] as *feature sets* (FS) and details them into features.

1.2 Scope

This document is confined to the Partner Manager and the features that it shall provide to its users (partners and administrators). It provides a system description, which can be viewed as an *informal feature set*. It also analyses the consequences that this MFS has on other system components within infiniteMAP.

1.3 Definitions, Acronyms and Abbreviations

The definitions, acronyms and abbreviations from [R.1] apply to this document.

1.3.1 Definitions

Term	Description
Product	A product consists of a product description and the implementations of the product.
Implementation	The implementation of a product consists of two parts – the description and its binaries. The implementation description is typically downloaded to the client and drives the downloading of the binaries of the implementation.
Binary	A binary is the content delivered to the client that constitutes the product.
Content	Content is a synonym for description of the implementation and all binaries that belong to an implementation.
Instrument	Modify the object code in a binary so that additional code gets executed. Patching is often used as a synonym to instrumentation.

1.3.2 Acronyms

Acronym	Description
MFS	Major Feature Set
FS	Feature Set
SLA	Service Level Agreement
PPM	Product Provider Manager
MAP	Mobile Application Provisioning system
CP	Customer Provider
AP	Access Provider
PP	Product Provider
PAM	Partner Manager
WSP	Wireless Service Provider

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1.3.3 Abbreviations

Abbreviation	Description
Pri	Priority

1.4 References

<u>Id</u>	<u>Description (title, version, date, publisher, source)</u>
[R.1]	Functional Requirements Specification, MAP-002-RS-01, Ellipsus Systems.

1.5 Overview

This FS is a detailed design document derived from applicable requirements in [R.1], which is the overall functional requirement specification of the MAP.

Each feature is assigned a priority (pri). This priority can take the following values:

<u>Value</u>	<u>Priority</u>	<u>Meaning</u>
L	Low	This feature can be deferred to later in the project or even to a later release.
M	Medium	This feature can be deferred to later in the project but should be implemented prior to first release.
H	High	This feature should be implemented as soon as possible to verify that it can be realized, or to be able to implement other aspects of the system, which rely on this requirement.
N/A	Not Applicable	This feature is not subject to prioritization since it is of general character and affects the overall development project.

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2. System Description

- The system description constitutes the informal feature set of the PAM.

NOTE! In the source code for the Partner Manager the term Customer Provider has been replaced by the term Subscriber Provider.

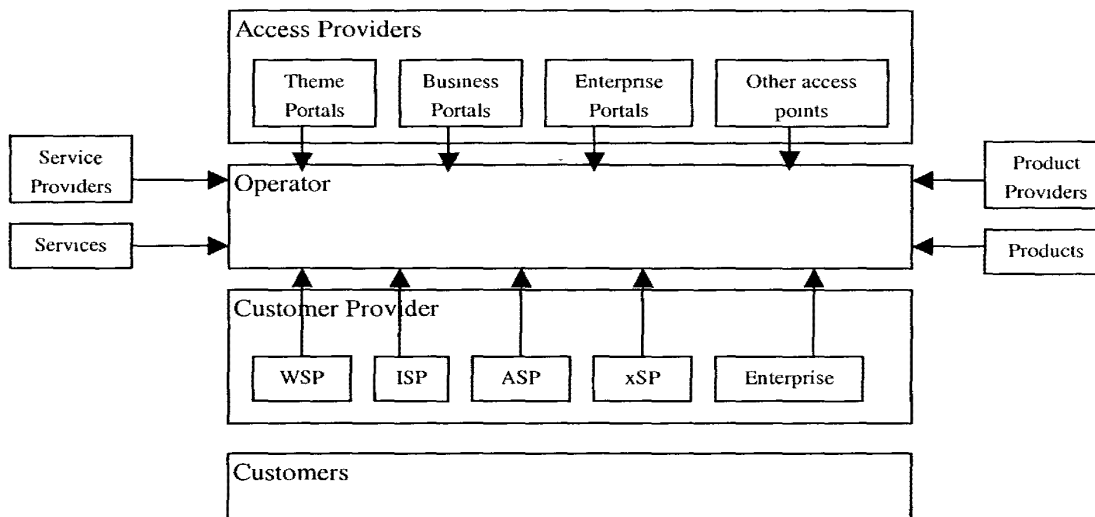
2.1 Purpose

The purpose of the PAM is to manage *partners*. A partner is some external entity, or system that interfaces to the MAP and affects its behavior. There are currently two kinds of partners defined for the MAP:

- Access Providers* (AP), which provide the entry into the MAP, such as portals.
- Customer Providers* (CP), which represent the relationship with the customers using the MAP. The most important aspect of this is the billing relationship.

2.2 Overview

The MAP is managed by an *operator*. The operator is normally a Wireless Service Provider (WSP) or some other organization, which has the facilities and procedures to operate an online provisioning system such as infiniteMAP. The operator allows the consumers to access the MAP via access points provided by access providers. The most common type of access point is some sort of portal. Consumers, who have a relation to a *customer provider* can be billed for digital products and services that have been acquired via the MAP.



Role	Description	Examples
Operator	The organization responsible for hosting and operating the provisioning system.	Could be a wireless operator, or other company with experience in hosting and operation of 7/24 systems
Access Provider	The system, through which customers get access to the products that are published through the provisioning system.	Mobile portals Internet portals Enterprise specific portals
Customer Provider	The organization that has a billing relationship with the customer.	Wireless Service providers, ASP's, ISP's, any enterprise with a consumer relationship, such as banks, insurance companies etc

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Role	Description	Examples
Product Provider	A vendor, which has an agreement to provide electronic products for consumption	The system handles products of various kinds, Java applications (J2ME, J2SE), native applications, video clips, images etc
Service Provider	A vendor, which has a Web Services/SOAP interface to a resource that could be used by applications provisioned by the system.	A map database, an analysis tool, location server, SMS center.

The customers are the end-users of the system. Any time they are logged on, they are associated with a session, which holds user profile and any dynamic data.

2.3 Partners

There are currently two types of partners: Access Providers and Customer Providers. These partners have the following common attributes:

Attribute	Description
Unique Id	A unique identifier that can be used as a key.
Name	Name of partner.
Description	Short description of the organization.
Org Registration number	Organizational number as assigned by a government authority.
Address	The mailing address and phone numbers of the authority.
Web site	A URL pointing to the web site of the organization.
Primary contact person	The name of a person that can be contacted with respect to partner issues.
Telephone number	A telephone number where the contact person and/or the company can be reached.
Mobile number	A mobile telephone number where the contact person and/or the company can be reached.
Fax number	A fax telephone number where the contact person and/or the company can be reached.
Email address	An email address that can be used for communication between the PPAD and the PP.
Revenue share	This is the split in revenue between the operator and the partner.
Login user name	A name used during login to the PAM.
<i>Not implemented in version 2.1</i>	
Login password	A password used during login to the PAM.
<i>Not implemented in version 2.1</i>	
Rating adapters	Holds a list of rating adapters that should be invoked for any session related to this partner.
Filtering adapters	Holds a list of filtering adapters that should be invoked for any session related to this partner.
Revenue accumulator	This accumulator holds the accumulated revenue through this partner channel. It will later be used together with the revenue share value to calculate a settlement between the MAP operator and the partner.
Service list	Holds a list of partner specific resources available to the user and/or client applications. These resources are generally provided as Web Services. Examples are SMS centers, Location servers, Presence servers etc. Each such resource is expected to present a Web Services interface to the MAP.
<i>NOTE! Not implemented in version 2.1</i>	
Assortment list	Holds a list of partner specific product assortments. This is one way of creating compelling product offerings specific to a partner. An assortment will bundle various products in community related packages.
<i>NOTE! Not implemented in version 2.1</i>	

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2.3.1 Customer Providers

The Customer Provider (CP) is the organization that “owns” the customer. This could be an operator with a billing relationship (postpaid and/or prepaid). It could be an enterprise with a mobile workforce, a bank with its customers etc. Generally this would be an affiliate to the operator, but it could also be an online payment system, such as Valimo. The MAP currently supports CP via:

- **User profile.** Should hold information that states which CP the user belongs to.
- **Payment adapters.** The appropriate payment adapter should be invoked based on information in the user profile.

In addition to the common attributes, the CP also has the following unique attributes:

Attribute	Description
VAT	Value Added Tax. This is the local tax that is applied when purchasing these kinds of products.
Other taxes	Other applicable taxes that shall be applied to a purchase.
Other charges	Other fixed charges that shall be applied to a purchase.
Local currency	The currency that is used by the billing system (should point into a billing system). Shall also decide the currency used when presenting products to the consumers.
Payment model adapters <i>NOTE! Implemented as three different id's in version 2.1 One id for each of the three payment models (postpaid, prepaid and online)</i>	Holds a list of payment model adapters that should be invoked when the partner is representing a CP. This list could be further divided into prepaid, postpaid and online payment adapters. The actual category is decided by user profile.

2.3.2 Access Providers

An access provider, such as a portal, is *community oriented*. This means that it generally has one or more of the following features:

- **Themes.** The portal is addressing a certain user group, such as youths, businessmen or people with a specific interest.
- **Promotions.** The portal will promote certain things in order to drive usage. These promotions are specific to the portal and commonly associated with the theme. Promotions include product placement, pure marketing efforts for the portal etc.
- **Events.** The portal can support events, like sports events, holidays etc.

A user could potentially access the provisioning system through more than one access provider. This means that the features from the access provider, that can affect the user, will be assigned in real-time, when the user does initial access.

The MAP currently has the following support for secure and community oriented access:

- **Rating adapters.** Can be used in order to rate prices based on the user's access path.
- **User sessions.** The user session can include information about which access provider the user accessed through. It will also be possible to retain this information when a client device, such as the Siemens SL45i, reconnects directly to download content.
- **Front Controller.** If the front controller is positioned after the access provider, in front of the operator, either the IP-address or some header information can identify the access provider. An authenticator can then use this when updating the user session.
- **Secure connections.** In order to facilitate secure communication, the MAP supports communication over SSL/TLS.

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In addition to the common attributes, the AP also has the following unique attributes:

Attribute	Description
IP Address range	Holds all IP addresses that this partner may use when interacting with the MAP. This attribute may be used by the MAP when identifying a partner.
<i>NOTE! Implemented as a string in version 2.1</i>	

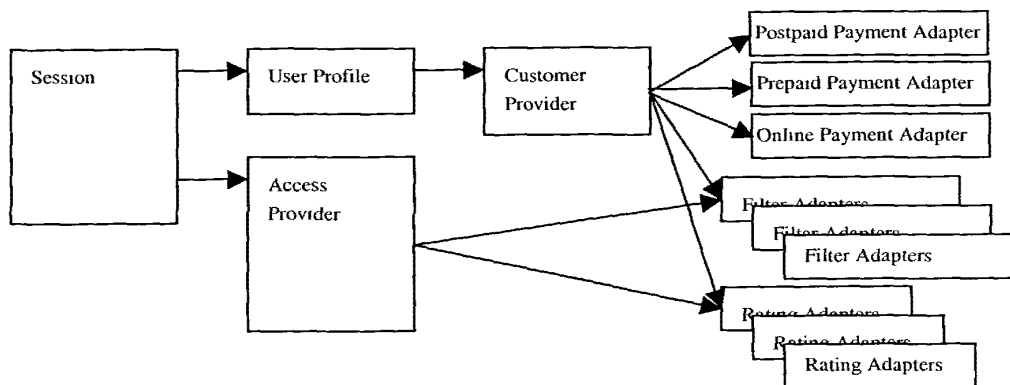
2.4 Rationale

The rationale for using this partner approach can be argued for by looking at the consequences for not supporting it:

- *Partner roles.* Access providers as well as customer providers are partners to the operator. A partner can be access provider and customer provider at the same time, but does not necessarily have to be like that. So, setting up a new system will work *only* when they are the same organization. If that is not the case, you still have a problem knowing how/where to route billing information.
- *Configuration or deployment.* If the system supports the partner scheme, adding a new partner becomes a configuration issue. If it does not, it is now a deployment issue with all that comes with it in terms of hardware, software, hosting, administration and operation.
- *Product deployment.* A product provider deploys products in order to expose them to the largest audience possible. A one-time deployment is preferred over multiple deployments over several different systems. Even if this distribution was automated, it is error prone, quite difficult to synchronize and maintain.

2.5 Relations

Any user connecting to the system is assigned a session. The session holds context for the user. Some of this context is partner related. When the user makes requests via an AP, the reference to the AP is stored in the session. It is also possible to find the reference to the CP via the user profile, which is stored in the session as well.



The CP also decides the currency in which products are displayed. The appropriate price is fetched from the product catalog based on local currency defined for the CP.

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2.5.1 Consequences

The following relational consequences have been identified:

1. The user profile (consumer) must hold a reference to the Customer Provider (CP). This is best implemented by an attribute that points to the *unique partner identifier*. Note that there are usually three different payment model adapters for each CP, one for prepaid, one for postpaid and one for online credit card payments. The right one to invoke is determined by the user profile.
2. When a session is first established, the session context shall be complemented with a reference to the Access Provider (AP). This means that the authentication mechanism must have the capability to detect the AP.
3. The Rating Manager must work with an adapter set, which is user specific.
4. The Payment Manager must work with an adapter set, which is user specific.
5. The Filtering Manager must work with an adapter set, which is user specific.
6. The Product Catalog must allow the product providers to enter prices for each local currency supported by the system. This means that a product can have several prices in several currencies concurrently.
7. The MAP must have an exchange rate table between local currencies and the system currency. This is used during settlement between stakeholders (see settlement).

2.5.2 Recommendations

It is recommended that when a session is first established, each adapter manager (rating, payment, filter, pricing etc) set up a list in the session context, which is the sum of user specific adapters and those adapters that are generally applicable in the system. Each manager can then retrieve this list and invoke the adapters as appropriate.

The Product Provider (PP) and Service Provider is not a part of the infiniteMAP 2.1 release but a thought came up during implementation that could affect all of the different providers, so it should be written down so that it is not forgotten. The product provider and service provider are as it sounds providers of products and services respectively. They of course provide products and services that generate different amount of revenue depending on price and popularity. All the current providers (CP & AP) has one accumulator and one revenue share percentage. But this assumed that there is a one-to-one relationship from the operator to the provider of something. This assumption makes it easy to say that a provider "x" of something "y" gets a certain percentage of the total revenue for providing the "y". Now here is the thought:

A CP provides the operator with customers that that utilizes the net. Should the CP get a larger percentage if the customer is a part of consumption hungry category "z" that the CP is very good at targeting? Not all customers are in this category "z" but this certain CP has a lot of them and consequently fewer of the "y" category. At present the CP gets a fixed percentage for all its customers. Should it always be like that?

This discussion may seem a bit far reaching when regarding the CP since the revenue share percentage can be renegotiated based on the customer stock the provider has every year, month, week or more frequent if necessary. The same is true for an access provider (AP) that can provide access through a few different media where one may be more popular than the other and generates more traffic or a service provider (SP) that provides some service that is more popular than the others.

But for a product provider (PP) that has many different products and is more sensitive to the popularity of a product it is essential to know how much revenue a certain product has generated after the rating has been performed. The same statistic need could of course be argued for the other providers, feedback on your business is essential.

This leads to the conclusion that it should be further discussed and investigated about the possibility to enhance the infiniteMAP with differentiated revenue share percentages depending on what the provider offers. I.e., maybe a provider "x" should have 22% of the total revenue for providing "y" but 29% of the total revenue for providing "z".

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2.6 Settlement

Any time a product is acquired and some charge is generated, various stakeholders are affected. The stakeholders are:

- The *customers*, who purchase and consumes the products.
- The *Access Providers*, who provides the customers with access to the products and promotes use via the community activities.
- The *Customer Providers*, who provide the billing relationship and makes sure that revenue is generated.
- The *Operator*, who manages the product providers, their products, and broker this to the customers via the portals.
- The *Product Providers*, who provide products for consumption.
- The *Service Providers*, who provide resources that can be used by the client applications.

NOTE! When the Product Provider sets the price for a product license it should be the final price including VAT, other taxes and other charges. This price is the one shown to the customer/subscriber. When the price is set, then the VAT should be added first, secondly the other taxes and finally the other charges. The VAT and other taxes is always regarded as a percentage of the total amount in the system but the other charges is regarded as an added amount. That is, the total price should be calculated according to the formula:

*Total product price ::= Net product price * VAT * Other taxes + Other charges*

This assumes that:

- a VAT of 25% is stored in the partner as 1.25
- Other taxes of 1,5% is stored in the partner as 1.015
- Other charges of, for example, 1.50 SEK is stored in the partner as 1.50

The reason for this is that sometimes the partner whom the customer/subscriber has a billing relationship, requires the price that the billing system gets is the price with no taxes or other charges included. This means that it should be possible to recalculate the price in infiniteMAP before it is sent to the Customer Provider using the formula:

*Net product price ::= (Total product price - Other charges) / (VAT * Other taxes)*

2.6.1 Product and Service Purchase

The user profile points to the unique CP identifier. The CP determines the currency in which products and services will be presented to the consumer. The total price, including VAT and other charges, is always expressed in the product catalog.

Once the product is acquired and a billing record has been generated, the system will use VAT and other charge attributes from the CP to recalculate a price excluding taxes and charges. This price is then converted into the system currency using the current exchange table. A record of this transaction is logged (i.e. the system price and the used exchange rate) and the different *accumulators* are updated.

The user is always viewing his/her Virtual Product Storage (VPS) in the local currency including VAT and other charges.

All accumulators use the *system currency* excluding VAT and any other taxes that may have been applied during customer purchase. The following settlement accumulators are required:

Accumulator	Description
Product	This is actually two accumulators:
Acc(P)	1. Keep track of the total revenue generated by this product over its lifetime.

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	2. Keep track of accumulated revenue during this settlement period. Will be reset upon settlement. Other accumulations, such as a specific time period, other than the settlement period, should be provided via reports looking in the event database.
Customer Provider Acc(CP)	Any time a product is sold, this accumulator is updated in order to show how much the customer provider will bill its customers.
Access Provider Acc(AP)	Any time a product is sold, this accumulator is updated in order to show how much customers, who used this access point, contributed to the revenue.
Product Provider Acc(PP)	Any time a product is sold, this accumulator is updated in order to see how much products from this product provider contributes to the total revenue.
Service Provider Acc(SP)	Any time a service is used, this accumulator is updated in order to see how much services from this service provider contributes to the total revenue.

2.6.2 Performing the Settlement

Settlement originates at the CP when the CP sends the invoice to its customers (unless its prepaid of course). The invoice is expressed in the local currency with applied VAT and other taxes. The Operator then assumes control over the settlement process. The algorithm is as follows:

1. Send an "invoice" to each CP with $[Acc(CP) \times (1 - RevShare(CP))]$.
2. Send a "payment" to each AP with $[Acc(AP) \times RevShare(AP)]$.
3. Send a "payment" to each PP with $[Acc(PP) \times RevShare(PP)]$.
4. Send a "payment" to each SP with $[Acc(SP) \times RevShare(SP)]$.
5. Reset settlement accumulators.

Note that there are in reality three payments in the algorithm. In step 1 the invoice holds a rebate, where the rebate is the revenue share percentage.

This is the difference between what the CP will charge the customer and what the CP has to pay back to the Operator. This can be viewed as an indirect payment to the CP.

2.7 Use-Case view of the Partner Manager

The following use-cases provide added information about the PAM and how it interacts with other system components.

2.7.1 Consumer

2.7.1.1 Purchase a Product

1. The *consumer* selects a product category, or enters some search criteria.
2. The *system* looks at the CP profile pointed to by the user profile (found in the session context) and adds the local currency to the search context.
3. The *system* adds other search criteria, such as device capabilities to the search context.
4. The *system* sends the search context to the *product catalog*.
5. The *product catalog* executes the search.
6. The resulting set of products is sent to the *rating manager* for rating.
7. The *rating manager* retrieves the rating adapters from the session context and executes the rating.
8. The rated result is presented to the user.
9. The *consumer* selects a product and accepts the rated price, expressed in the local currency including VAT and other charges.
10. The product license together with the rated and converted price is moved into the VPS.
11. If applicable, a billing event is generated using the rated price, in local currency including VAT and other charges.
12. The event is logged.
13. An *event consumer* reads the event and removes VAT and other charges, based on information found in

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the CP profile.

14. The *event consumer* converts the price to system currency using the *currency exchange table*.
15. The converted price is sent to the *AP accumulator*.
16. The converted price is sent to the *CP accumulator*.
17. The converted price is sent to the *Product accumulator*.
18. The converted price is sent to the *Product Provider accumulator*.

2.7.2 Partner Administrator

2.7.2.1 Perform Partner Settlement

1. The *system* sends an "invoice" to each *CP* with $[Acc(CP) \times (1 - RevShare(CP))]$.
2. The *system* sends a "payment" to each *AP* with $[Acc(AP) \times RevShare(AP)]$.
3. The *system* sends a "payment" to each *PP* with $[Acc(PP) \times RevShare(PP)]$.
4. The *system* sends a "payment" to each *SP* with $[Acc(SP) \times RevShare(SP)]$.
5. The *system* resets the settlement accumulators.

3. Features

3.1 Requirements

The following requirements have been extracted from [R.1] and form the *feature sets* for this module. One requirement can result in several Feature Sets. Several requirements can also fit in one single feature set.

Req #	Requirement	Pri	Description	Notes	Owner	Feature Set

Feature Set: Managing a Partner

There are currently two types of partners: Access Providers and Customer Providers. The administrator of infiniteMAP can add/remove/update new partners to the system and setup revenue sharing models.

#	Feature	Notes	Pri	Owner
1	Edit the <i>attributes</i> for an access provider		H	
2	Edit the <i>attributes</i> for a customer provider		H	
3	Get the <i>access providers</i> for a MAP system		H	
4	Get the <i>customer providers</i> for a MAP system		H	
5	View the <i>account status</i> for an access provider		M	
6	View the <i>account status</i> for a customer provider		M	
7	View the <i>account status</i> for a service provider		L	

3.2 Feature Set: Managing a Product Purchase

A product purchase occurs when the user selects a product for download.

#	Feature	Notes	Pri	Owner
1	Update the <i>total revenue accumulator</i> for a product		H	
2	Update the <i>revenue accumulator</i> for a product		H	
3	Update the <i>revenue accumulator</i> for a customer provider		H	
4	Update the <i>revenue accumulator</i> for an access provider		H	
5	Update the <i>revenue accumulator</i> for a product provider		H	
6	Update the <i>revenue accumulator</i> for a service provider		L	

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Feature Specification	Date:
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3.3 Feature Set: Managing a Partner Settlement

Settlement originates at the CP when the CP sends the invoice to its customers (unless its prepaid of course). The invoice is expressed in the local currency with applied VAT and other taxes. The Operator then assumes control over the settlement process.

#	Feature	Notes	Pri	Owner
1	Send the <i>invoice data</i> to a customer provider		H	
2	Send the <i>payment data</i> to an access provider		H	
2	Send the <i>payment data</i> to an service provider		L	
2	Send the <i>payment data</i> to an product provider		H	
2	Reset the <i>revenue accumulator</i> for a product		H	
2	Reset the <i>revenue accumulator</i> for a customer provider		H	
3	Reset the <i>revenue accumulator</i> for an access provider		H	
4	Reset the <i>revenue accumulator</i> for a product provider		H	
5	Reset the <i>revenue accumulator</i> for a service provider		L	

4. Architecturally Significant Design Packages

The following packages should be used when implementing the partner manager.

```
com.ellipsus.imap.partner.  
com.ellipsus.imap.partner.dao  
com.ellipsus.imap.partner.ejb  
com.ellipsus.imap.partner.event  
com.ellipsus.imap.partner.vo
```