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TECHNICAL REPORT

**Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Study on User Data Convergence (UDC) information
model handling and provisioning: Example use cases
(3GPP TR 32.901 version 12.0.0 Release 12)**

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Contents

Foreword

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    x the first digit:

        1 presented to TSG for information;

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    y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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1   Scope

3GPP TR 22.985 Service requirement for the UDC [5] describes the architecture of the User Data Convergence, a concept that proposes to move the user data from where it has been distributed and siloed in Network Elements, Applications, and other network resources to a single logical consolidated facility here called User Data Repository (UDR) where it can be accessed, stored and managed in a common way.

The introduction of a User Data Convergence of user data for network services and management applications could significantly enhance the ability of 3GPP based networks to offer complex and combined services.   User data can be decomposed and reformed by a common data model framework (e.g. tree-like data model, rational data model) provided by UDR. In that case, user data categorized by services can be regrouped and identified by user ID, leaving no data redundancy. Also, convergence in data model will unify the user data access interface and its protocol, which will promote new service application development. Thereby, the capability of user data convergence can be open to creation of data-less applications.

Methods for data protection against access by unauthorized parties are outside the scope of this document.

3GPP TS 32.181 UDC Framework for Model Handling and Management [3] and 3GPP TS 29.335 UDC; User Data Repository Access Protocol over the Ud interface; Stage 3 [4] provide various types of information and data models associated with the architecture of UDC.
These include the Common Baseline Information Model (CBIM) (see 3GPP TS 32.182 [7]), the Specialized Information Model (SpIM), Application Information Models (AIMs), Application Data Models (ADMs), and the Consolidated Data Model (CDM) of the User Data Repository (UDR).
Figure 1 from 3GPP TS 32.181 UDC Framework for Model Handling and Management [3] shows the operational environment of the UDC.
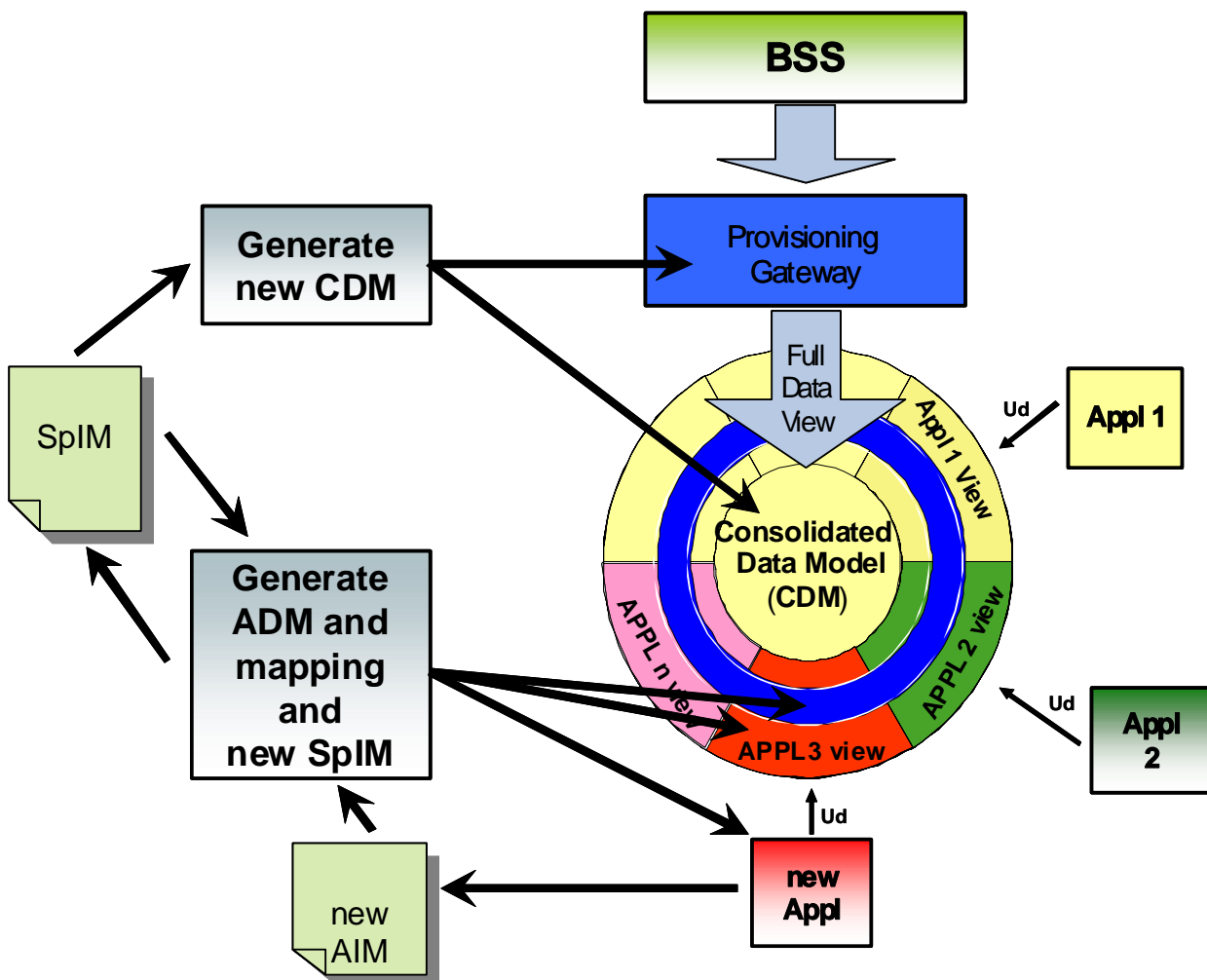

Figure 1.1: Evolution of the CDM in a UDR

In addition to the models previously mentioned, Figure 1.1 introduces the aspect of the Provisioning Gateway, which is essential for the operation of the UDR. The Provisioning Gateway provides a single logical point for access to provisioning of user data for **all** services in the UDR.   The Provisioning Gateway is shown supporting an interaction with the operator's BSS; by implication this interaction is associated with the provisioning of user subscription and service data in the UDR via the Provisioning Gateway.

This study analyzes the progression of information models displayed in the above figure using some specific application examples, in particular the applications of HSS-IMS and MMTel.   It provides guidelines and preliminary requirements for the BSS provisioning capabilities and information model handling when new applications and related services are implemented in the operator's UDR by doing the following:

- Develop several example initial SpIMs for discussion purposes.

- Examine what BSS interactions with the Provisioning Gateway would be required to support provisioning of user service and subscription data in the UDR for these SpIMs.

- Study the relationship to the information model of 3GPP TS 32.172 Subscription Management (SuM) Network Resource Model (NRM) IRP Information Service [9].

- Develop understanding of CBIM-derived entities of Application Information Models (AIM) for HSS-IMS and MMTel from application data elements available in 3GPP TS 29.364 IMS Application Server service data descriptions for AS interoperability [11], 3GPP TS 23.008 Organization of subscriber data [12], and other relevant specifications.

- Discuss the integration and consolidation of these AIM entities with the example initial SpIMs above.

- Evaluate the potential changes to the BSS provisioning interactions for the implementation of HSS-IMS and MMTel applications in the UDR and implications concerning the information model of 3GPP TS 32.172 Subscription Management (SuM) Network Resource Model (NRM) IRP Information Service [9].

This study does not derive findings concerning the Ud reference point, the subject of 3GPP TR 23.845 Study on UDC Evolution [10].

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   3GPP TS 23.335: "User Data Convergence (UDC); Technical realization and information flows; Stage 2".

[3]   3GPP TS 32.181: "User Data Convergence (UDC); Framework for Model Handling and Management".

[4]   3GPP TS 29.335: "User Data Convergence (UDC); User Data Repository Access Protocol over the Ud interface; Stage 3".

[5]   3GPP TR 22.985: "Service requirement for the User Data Convergence (UDC)".

[6]   3GPP TS 22.101: "Service aspects; Service principles".

[7]   3GPP TS 32.182: "User Data Convergence; Common Baseline Information Model".

[8]   3GPP TR 32.808: "Study of Common Profile Storage (CPS) Framework of User Data for network services and management".

[9]   3GPP TS 32.172: "Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

[10]   3GPP TR 23.845: "Study on UDC Evolution".

[11]   3GPP TS 29.364: "IP Multimedia System (IMS) Application Server (AS) service data descriptions for AS interoperability".

[12]   3GPP TS 23.008: "Organization of subscriber data".

3   Definitions and abbreviations

3.1   Abbreviations

For the purposes of the present document, the following abbreviations apply:

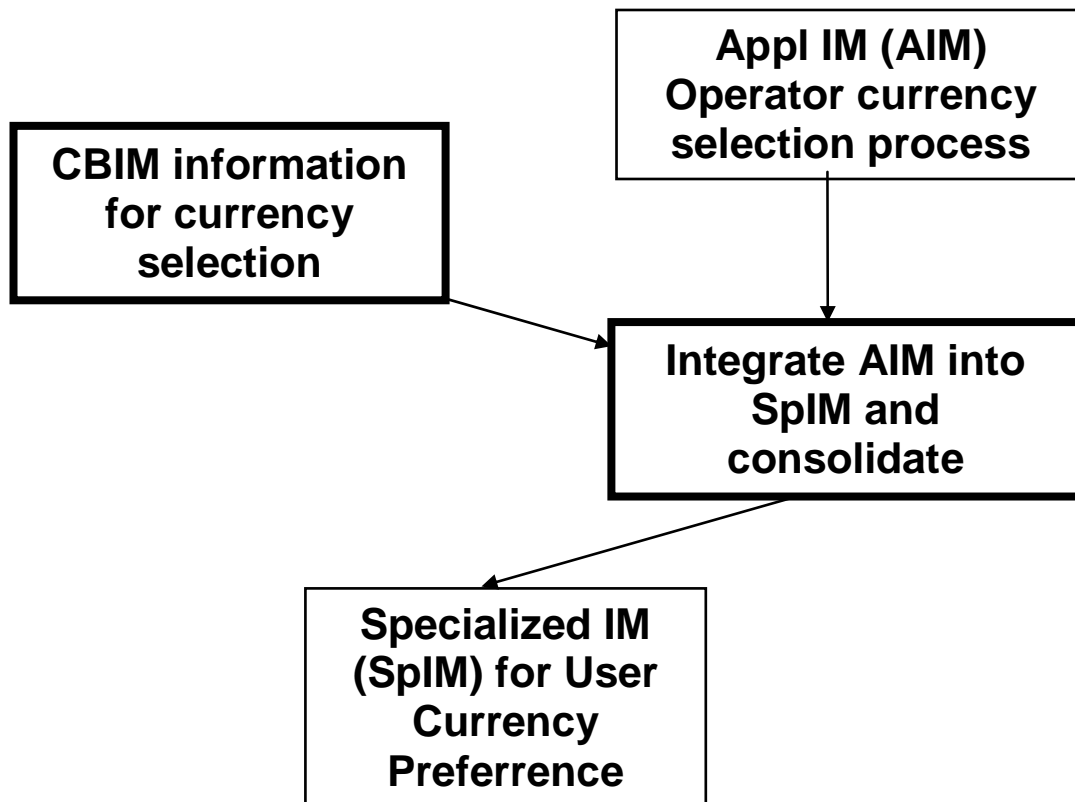|	
AIM	Application Information Model
ADM	Application Data Model
BSS	Business Support System
CBIM	Common Baseline Information Model
CDM	Consolidated Data Model
CPS	Common Profile Storage
FE	Front End
HSS	Home Subscriber Server
IMS	IP Multimedia System
IRP	Integration Reference Point

IS   Information Service
LDAP   Lightweight Directory Access Protocol
MMTel   MultiMedia Telephony
NRM   Network Resource Model
RDM   Reference Data Model
SpIM   Specialized Information Model
SuM   Subscription Management
UDC   User Data Convergence
UDR   User Data Respository

4 Example SpIMs

4.1 Example SpIM for Preferred Currency

A user can request that any charging or pricing information be provided using a specific currency. The method is operator specific, but the example shown below is typical of what would transpire to derive the SpIM and resulting Data Model.

```
┌──────────────────────┐        ┌──────────────────────┐
│   CBIM information    │        │    Appl IM (AIM)     │
│    for currency       │        │  Operator currency   │
│     selection         │        │  selection process   │
└──────────────────────┘        └──────────────────────┘
              \                            │
               \                           ▼
                \              ┌──────────────────────┐
                 \             │   Integrate AIM into  │
                  ───────────▶ │      SpIM and         │
                               │     consolidate       │
                               └──────────────────────┘
                                        /
                  ┌──────────────────┐ /
                  │  Specialized IM  │◀
                  │  (SpIM) for User │
                  │     Currency     │
                  │   Preferrence    │
                  └──────────────────┘
```

4.2 Example SpIM for User Name

A user can request that his/her name be made available for messaging and special services as a particular value, e.g. 'Jane M. Doe', or 'Dr. Terry W. Smith IV'. The method is operator specific, but the example shown below is typical of what would transpire to derive the SpIM and resulting Data Model.
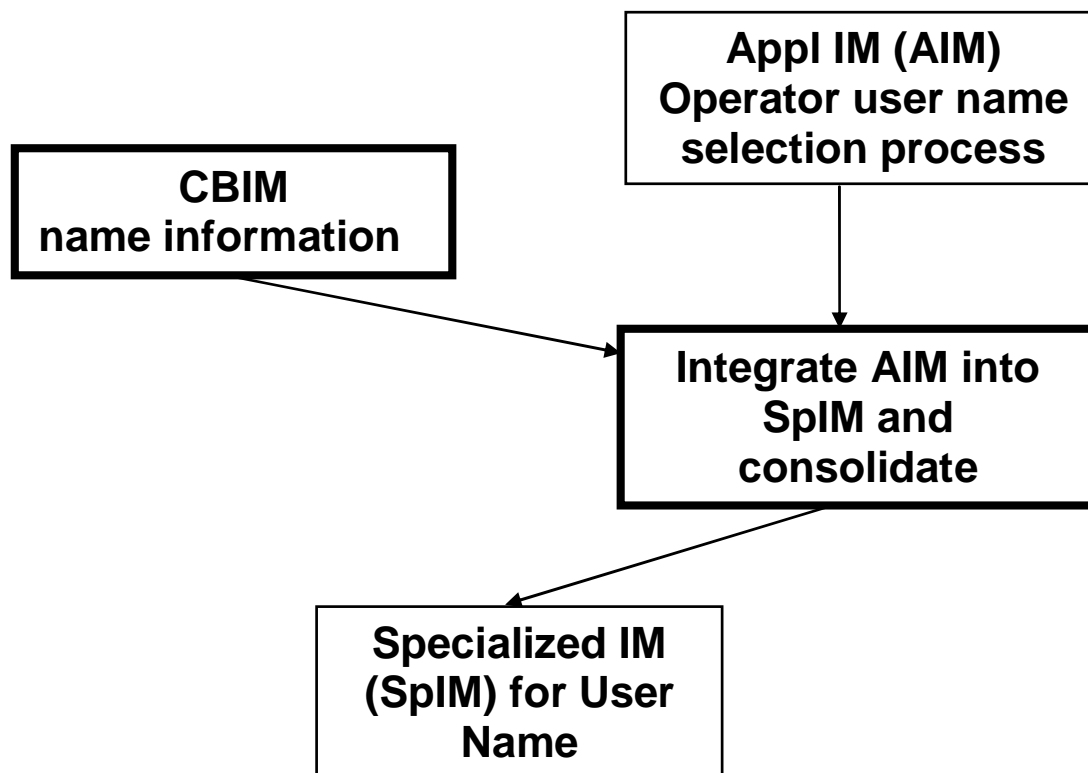
5   Applications

This section describes application data for all network domains supporting UDC handling and provisioning.

The domains shown below are at the AIM level including CS, EPS, and IMS.

The AIM import from existing applications is outside the scope of the present document. This study is not an application guide.

5.1   Application Information Models (AIM)

AIM may be imported from existing applications or may be generated from information elements already existing in the UDR. *The import method is for further study*.

An AIM should contain IOCs for

-    the Service Profile(s) of the particular application,

-    Identifier(s) used by the application.

and additionally, if needed, any other IOC defined in CBIM. E.g. related End Device, if such is to be connected to one or more identifiers within the application.

5.1.1   Information Object Classes

5.1.1.0   General

The information object classes described in 5.1.1.1 through 5.1.1.10 are meant to illustrate the use of example data within the context of this study document, and not meant as replacements or to supersede any IOCs in any 3GPP specifications,

5.1.1.1 UdcASServiceProfile

This *is a class created only to represent some ASServiceProfile data within the context of this example*. It can be unique to the operator.

5.1.1.2 UDCBasicServiceProfile

This is a *class created only to represent some BasicServiceProfile data within the context of this example*. It can be unique to the operator.

5.1.1.3 UDCCSCFServiceProfile

This is a *class created only to represent some CSCFServiceProfile data within the context of this example*. It can be unique to the operator.

5.1.1.4 UdcHSSServiceProfile

This is a *class created only to represent some HSSServiceProfile data within the context of this example*. It can be unique to the operator.

5.1.1.5 UdcSpecialServicesProfile

This is a *class created only to represent some SpecialServicesProfile data within the context of this example*. It can be unique to the operator.

5.1.1.6 UdcCSServiceProfile

This object class is provided in 3GPP TS 32.182, and represents the part of the `UdcServiceProfile` that contains data related to Circuit-Switched services. An example of further specialization of this object class, including attributes, is provided in 3GPP TS 32.181.

5.1.1.7 UdcEPSServiceProfile

This object class represents the part of the `UdcServiceProfile` that contains data related to the Evolved Packet System services. An example of further specialization of this object class, including attributes, is provided in 3GPP TS 32.181.

5.1.1.8 UdcGPRSServiceProfile

This object class is provided in 3GPP TS 32.182, and represents the part of the `UdcServiceProfile` that contains data related to Packet-Switched services. An example of further specialization of this object class, including attributes, is provided in 3GPP TS 32.181.

5.1.1.9 UdcIMSServiceProfile

This object class is provided in 3GPP TS 32.182, and represents the part of the `UdcServiceProfile` that contains data related to IMS services. An example of further specialization of this object class, including attributes, is provided in 3GPP TS 32.181.

5.1.1.10 UdcMMTelServiceProfile

This is a class created only to represent some MMTelServiceProfile data within the context of this example. It can be unique to the operator. The use of MMTel data is typically transparent to applications and is usually part of the ASServiceProfile. It is shown here as one example of how the data is modeled.

5.1.2 CS/GPRS

5.1.2.1 HLR
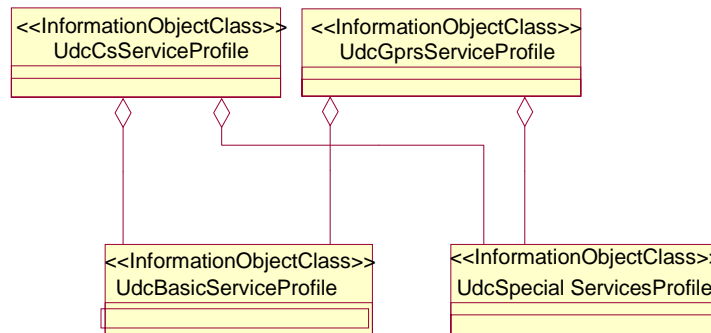
Figure 5.1-1: Consolidation of data in the application for CS/GPRS-HLR
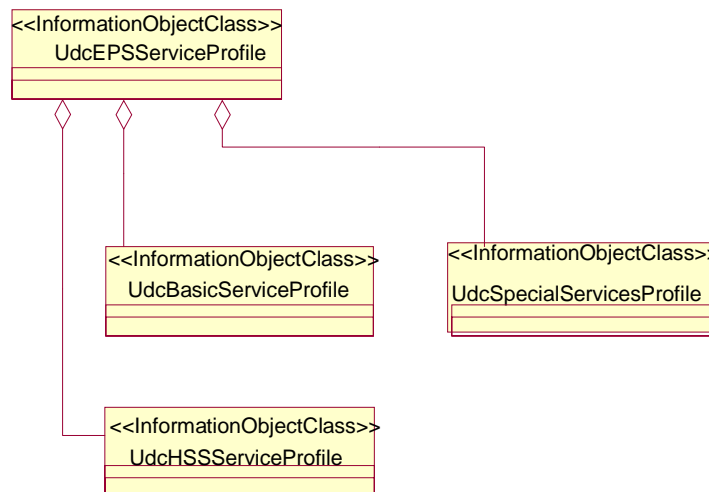
Editor's note: This diagram is an example and is FFS.

5.1.3 EPS

5.1.3.1 HSS

Figure 5.1-2: Consolidation of data in the application for EPS-HSS

Editor's note: This diagram is an example and is FFS.

5.1.4 IMS

5.1.4.1 CSCF
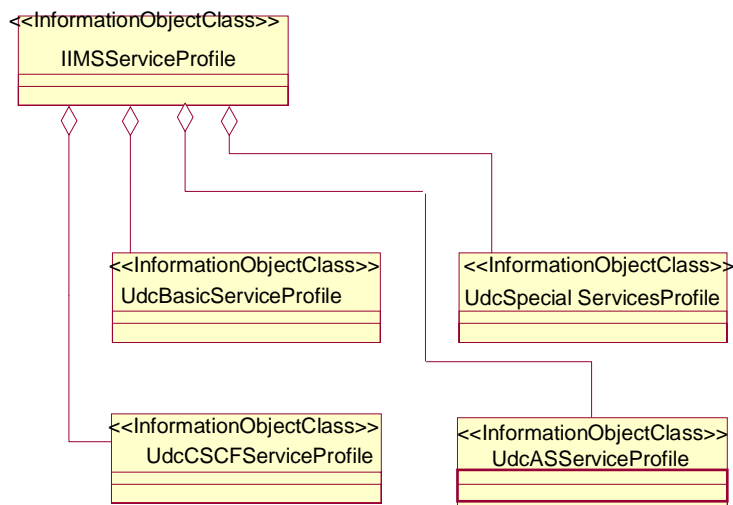
Figure 5.1-3: Consolidation of data in the application for IMS CSCF

Editor's note: This diagram is an example and is FFS.

5.1.4.2 MMTel
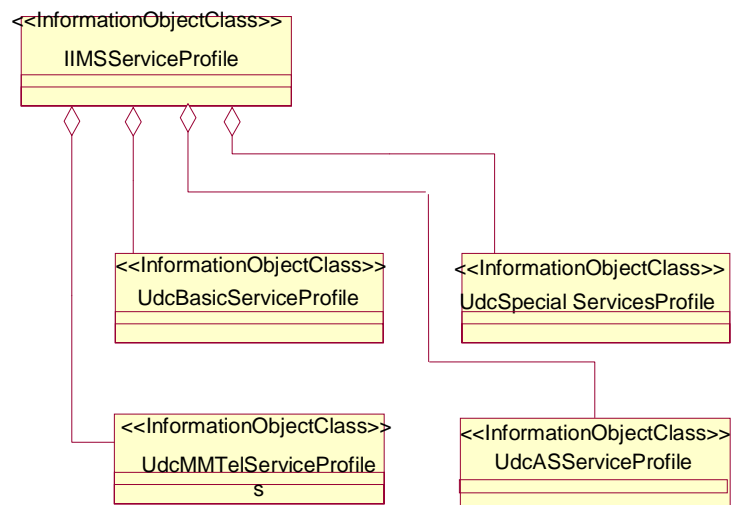
Figure 5.1-4: Consolidation of data in the application for IMS MMTel

Editor's note: This diagram is an example and is FFS.

5.2 SPIM Level

5.2.1 Preferred Currency Use Case

Expression of currency information to the subscriber in a particular currency may be supported by setting the optional "Currency Preference" subscription data element. The values for this data element may be any national currency (euros, Japanese yen, U.S. dollars, etc.):

5.2.1.1 Setting or modification of the value of this data item

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative.

5.2.1.2 Scenarios for use of the data element

Below are examples of scenarios in which different applications may use the same Currency Preference data element to beneficially improve the subscriber"s service experience. One type of subscriber case where use of this data element would be most meaningful would be a when a person has travelled to another country (either as a tourist or on business) and starts a subscription with an operator in that visited country.

a) A subscriber calls a freephone number to automated routine of Acme Airlines to get a ticket price for a certain itinerary. This "prompt and collect menu-driven application is running on an AS in the network. At the point where the application is about ready to provide the price quote, It checks the subscriber"s profile for the Preferred Currency setting, and provides the quote in that currency.

b) A subscriber with a smartphone is at the operator"s smartphone "app store". The app store checks the subscriber"s subscriber"s profile for the Preferred Currency setting. As the subscriber browses apps, the app prices are stated in the preferred currency.

c) The subscriber makes an international call and invokes the operator"s Advice of Charge supplementary service to be told the price of the call when it ends. And perhaps may be provided the cumulative price-so-far updates at periodic intervals during the call. The Advice of Charge application checks the subscriber"s profile for a preferred currency, and indicates the advice of charge information to the subscriber in that currency.

5.2.2 Age and Birth Date Use Case

Expression of age and birth date to the subscriber may be supported by setting the optional "Age Preference" subscription data element. The values for this data element may be age in years or birth date:

5.2.2.1 Setting or modification of the value of this data item

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative. The operator has to responsibility to verify the age of the subscriber to ensure age appropriate information is conveyed.

5.2.2.2 Scenarios for use of the Age data element

Below are examples of scenarios in which different applications may use the same Age data element to beneficially improve the subscriber"s service experience, perhaps is a criteria for deciding if service fulfilment is to be allowed, either according to operator policy or national regulations, or perhaps as a way of targeting specific advertising to the subscriber.

a) A subscriber calls a freephone number for Acme airlines, e.g., for travel information or to make a reservation. There is a queue. The Acme airlines application checks the subscriber profile for age information and, if set, selects the type of music or advertising or both that are played to that specific subscriber while in queue.

b) A subscriber with a smartphone is browsing the operator"s app store. Certain apps with inappropriate themes for children are not to be displayed to subscribers/users under the age of 18, due to operator policy or federal regulation. The app store checks the subscriber profile and uses the Age data element to determine whether the under 18. (Note: in order to purchase, this may still be followed up with a step where the users must confirm that they are over 18.)

A subscriber calls a freephone number for a "Find Me A Restaurant" application and asks for recommendations for a good Italian restaurant in the local area. In this particular case there are lots of such restaurants, and so the application needs to apply some criteria determining just what recommendations to make available to the subscriber. Statiscally, the application knows that some of the restaurants are more popular with the younger crowd and others with the older crowd. The application checks the subscriber profile for the Age value to help determine the specfiic restaurant

suggestions to the subscriber. (Note: the application could certainly use other criteria as well.) It may also use the Age value to select the appropriate coupon enticement to offer to the subscriber (free appetizer, free drink, or free dessert).

5.2.3 Name Use Case

The name of the subscriber may be supported by setting the optional "Name" subscription data element.

5.2.3.1 Input for Name

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative.

5.2.3.2 Scenarios for use of the data element Name

Below are examples of scenarios in which different applications may use the Name data element to beneficially improve the subscriber"s service experience. One type of subscriber case where use of this data element would be most meaningful would be a when a person wishes to have his or her name be known for personalized notices and offerings.

   a) A subscriber receives a personalized greeting, and is asked that name be maded available for friends list, or to a vendor for product offerings.

   b) A subscriber with a smartphone is at the operator"s smartphone "app store". The "app store" checks the subscriber"s subscriber"s profile for the Name setting. As the subscriber browses apps, the app prices are stated to the subscriber in their name.

   c) The subscriber makes a a call and their name is presented to the called party.

5.2.4 Gender Use Case

The gender of the subscriber may be supported by setting the optional "Gender" subscription data element.

5.2.4.1 Setting or modification of the value of this data item

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative.

5.2.4.2 Scenarios for use of the data element

Below are examples of scenarios in which different applications may use the Gender data element to beneficially improve the subscriber"s service experience. One type of subscriber case where use of this data element would be most meaningful would be a when a subscriber's gender required for specific services.

   a) A subscriber calls a merchant to get a price for a certain item. This "prompt and collect menu-driven application is running on an AS in the network. At the point where the application is about ready to provide the price quote, It checks the subscriber"s profile for the Gender setting, and provides the information asked for and offers some gender related suggestions..

   b) A subscriber with a smartphone wishes to be networked into a gender related social action group, or a gender related group is seeking membership and solicits the subscriber to join its organization.

   c) The subscriber makes a call and asks for assiistance. The responders can target their actions based on appropriate gender.

5.2.5 Preferred Language Use Case

Expression of language information to the subscriber in a particular language may be supported by setting the optional "Language Preference" subscription data element. The values for this data element may be any language supported by the network.

5.2.5.1 Setting or modification of the value of this data item

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative.

5.2.5.2 Scenarios for use of the data element

Below are examples of scenarios in which different applications may use the same Language Preference data element to beneficially improve the subscriber"s service experience. One type of subscriber case where use of this data element would be most meaningful would be a when a person has travelled to another country (either as a tourist or on business) and starts a subscription with an operator in that visited country.

a) A subscriber calls a freephone number to automated routine of Acme Airlines to get information for a certain itinerary. This "prompt and collect menu-driven application is running on an AS in the network. At the point where the application is about ready to provide the itinerary, It checks the subscriber"s profile for the Preferred Langauge setting, and provides the information in that language.

b) A subscriber with a smartphone is at the operator"s smartphone "app store". The "app store"checks the subscriber"s subscriber"s profile for the Preferred Language setting. As the subscriber browses apps, the app items are stated in the preferred language.

c) The subscriber makes an international call and invokes the operator"s Advice of Charge supplementary service to be told the price of the call when it ends. And perhaps may be provided the cumulative price-so-far updates at periodic intervals during the call. The Advice of Charge application checks the subscriber"s profile for a preferred langauge, and indicates the advice of charge information to the subscriber in that langauge.

5.2.6 Friend/Friends List Use Case

The list of friends of the subscriber may be supported by setting the optional "Friends List" subscription data element. The values for this data element may be a list representing a friends call group' or individual friend call numbers.

5.2.6.1 Setting or modification of the value of this data item

The subscriber may be able to change the value of this data element through an appropriate procedure at any time, e.g., a subscription profile web interface that the operator provides, or through interaction with an operator customer representative.

5.2.6.2 Scenarios for use of the data element

Below are examples of scenarios in which different applications may use the Friends identifier data element to beneficially improve the subscriber"s service experience. One type of subscriber case where use of this data element would be most meaningful would be a when a person wishes to contact an individual friend or group of friends.

a) A subscriber wants to notify a friend or group of friends of a particular event.. This "notification' menu-driven application is running on an AS in the network. At the point where the application is about to process the service, it determines that a friends list exist, and will forward the notification to all members in that list.

b) An operator has just provided a specific application service to the subscriber who has a friends list. The Friends List data elements are then used to notify all members in that list of the service. Some examples are

The subscriber has just landed on an internation al flight and registers his mobile with the local operator. The operator determines the presence of the Friends List application and checks which type of subscribed notifications can be applied. The AS then notifies the friend or friends of the arrival.and local registration.

The subscriber has a specific event and wants friends to be automatically notified. The friends AS will send the notice to all members in the list.

6 Recommendations regarding provisioning guidelines and requirements

The result of this study is for further consideration and is a guide for use by operators in the application of UDC for specialized services.

Annex A:
Change history

Change history								
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2012-12	--	--	--	--	Publication	--	1.0.0	11.0.0
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History

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