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SERIES M: TELECOMMUNICATION MANAGEMENT, INCLUDING TMN AND NETWORK MAINTENANCE

Designations and information exchange

Formalization of data for service management

ITU-T Recommendation M.1402

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ITU-T Recommendation M.1402

Formalization of data for service management

Summary

ITU-T Recommendation M.1402 contains definitions of data for service management. The data are defined in the way they are presented to the end users at their terminals, and conceptual or internal data structures are not defined. Therefore, this Recommendation defines an external terminology schema for the given application domain.

This Recommendation focuses on defining data for products, customers, accounts, contracts, deals, addresses, prices, various segments and relationships between all these. Some attributes that are essential for identifying objects and associations between them are defined, as well.

Order data and detailed mappings to network elements are not covered. Also, billing, marketing, sales, retailer, distributor, number management, device management, location management, logistics and finance are not covered. Finally, alarms, trouble tickets, call records and other call centre information are missing.

As the data defined in this Recommendation are designed for human usage, they are independent of the functions in which they are used. Hence, the data may be applied in any functions, e.g., in customer requests, call centres, billing, service platforms, etc.

This Recommendation uses the notation and conventions found in ITU-T Recommendation M.1401, "Formalization of interconnection designations among operators' telecommunication networks".

Appendix I explains the creation of product and customer service databases.

Appendix II explains creation of interfaces to service platforms.

Source

ITU-T Recommendation M.1402 was approved on 6 August 2007 by ITU-T Study Group 4 (2005-2008) under the ITU-T Recommendation A.8 procedure.

Keywords

Data, definitions, CRM, customer, product.

FOREWORD

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Introduction

This Recommendation defines data as they are presented to the end users at their terminals. The data are defined in an external terminology schema that provides the glossary and grammar of all permissible data to the end user.

The external terminology schema defines elementary sentence types only, which prescribe elementary sentences like "Contract 1 contains Product instance 12345678". The schema does not prescribe compound sentences, like "Contract 1 contains Product instance 12345678, which has Installation address Storgata 6", as is required at the end user interfaces. Note that the relative pronoun "which" is not used in external terminology schemata, but may be used in the "Contents schema" for each screen or report.

The proposed external terminology schema is intended for harmonization of data across all sub-domains within service management and all channels to this application domain.

The external terminology schema focuses on end users' need for harmonized data and not on needs for storage or communication formats.

ITU-T Recommendation M.1402

Formalization of data for service management

1 Scope

Service management is the universe of discourse (UoD) of this Recommendation. This UoD comprises products, customers, accounts, contracts, deals, addresses, prices and various segments and relationships between these.

The focus of this Recommendation is on end user terminology as defined in an external terminology schema and which puts requirements on other schemata and implementations. As such, this Recommendation focuses on the definition of object and reference classes, and provides most identifiers and name bindings (i.e., subordinate object indicated by reversed arrowheads) for these. It also provides some attribute groups and attributes which are essential to define the data structure. Other attributes, e.g., to indicate entity history, are not covered. Also data structures for orders are not covered.

The data definitions are meant to cover the needs for customer inquiries and customer sales about the customer, their services and relations to the operator, but the definitions do not provide background information for sales people and account managers who provide offers and contracts to large customers. These may need processed information about turnover and plans for a customer/cooperation. The data structure may apply for these needs as well, but additional attributes are required. The data structure lacks the means to provide overviews for market analyses. Also, a network view for answering customer inquiries and service delivery is missing.

The data definitions cover product types as they are defined in product catalogues and cover product instances in customer databases. A subset of these product types and product instances may be implemented as telecommunication services, e.g., in a service platform. The broader context of product catalogues and customer databases is essential for definition and harmonization of service types and instances. The object class service is not defined in this Recommendation. However, the data structure defines the scope of service management.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T M.1401] ITU-T Recommendation M.1401 (2006), *Formalization of interconnection designations among operators' telecommunication networks*.

3 Terms and Definitions

This Recommendation is a structured list of definitions. The notation for these definitions is found in Appendix III of [ITU-T M.1401]. Constructs from [ITU-T M.1401] used in this Recommendation are:

- Attribute
- Attribute class
- Attribute group

- Identifier attribute
- Object
- Object class
- Population
- Reference
- Reference class
- Schema
- Subordinate object
- Subordinate object class

4 Abbreviations

This Recommendation uses the following abbreviations:

CC Country Code

CRM Customer Relationship Management

ICC ITU Carrier Code

KID Customer IDentifier

LID Local Identifier

UoD Universe of Discourse

5 Conventions

This Recommendation uses 5 mm bulleted indentations to indicate subordinate data.

Textual definitions and explanations are provided in paragraphs that are indented 5 more mm to the right.

Object classes are underlined; attribute group and attribute classes are not.

References to other object classes are written in blue fonts, in italics and underlined.

The figures use rectangles to indicate object classes.

Lines with reversed arrowheads indicate subordinate object class.

Two-way arrows indicate references between object classes.

A dashed one-way arrow supported with an S at the arrowhead indicates a schema reference from a population. Each element subordinate to a schema may be instantiated to several elements subordinate to the population. And, the schema reference may itself be instantiated, like any other reference.

A dashed one-way arrow supported with a colon (:) at the arrowhead indicates a data type. This is analogous to super-class references in object-oriented languages, where properties of the subordinate class are inherited from the data type.

A reference one level up in the data tree is indicated by a (‘).

A recursive use of any number of dashes is indicated by (&).

An existential condition is stated by (<>). A data node on the left-hand side of the condition can only exist if the node referenced on the right-hand side exists.

A reference to a data node without referencing its label is stated by a parenthesis ( ), e.g., (Operator) refers to a superior node of Operator, i.e., the Corporation in the graph. However, by not referring to the Corporation, we can reference any node corresponding to the Corporation, i.e., one of its Populations.

Red (combined dashed and dotted) lines indicate derived references.

6 External terminology schema

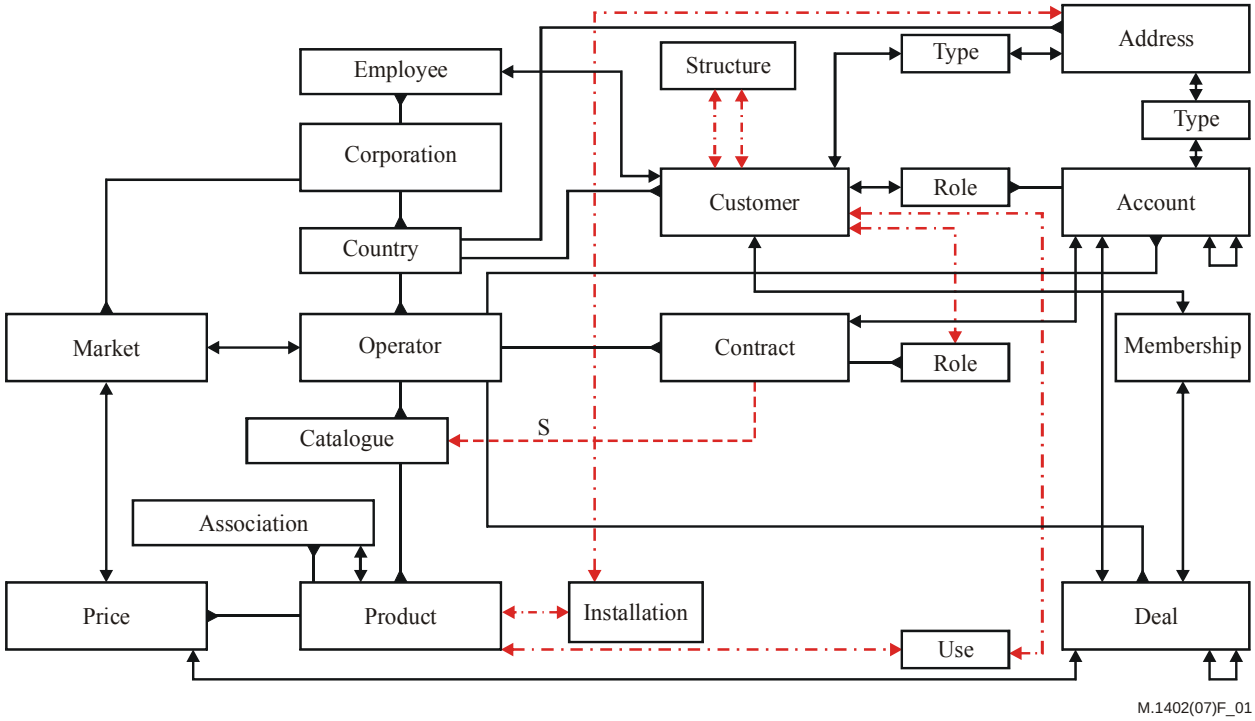

Figure 1 – External terminology schema graph for service management

Corporation

This Recommendation defines a schema of a system of a Corporation. The schema is called Corporation.

The schema contains data classes of the system. Each class acts as an original/prototype that can be copied into (several) instances subordinate to each of the populations of the schema. The S reference from a population to another data item makes the other item act as a schema relative to the population item.

Overlapping subsets of a schema may be implemented as separate systems.

- Country

  A Country may be an independent state or a state within a union.

  Operators are identified with a unique International Carrier Code within a Country. This means that a corporation must be defined with (minimum) one Operator within each Country.

  - CC

    Country Code is a 3-character value according to ISO 3166-1.

  - Name

    The Country Name identifies a Country, dependency, or other area of particular geopolitical interest. Countries are assigned a globally unique Name in ISO 3166-1.

▪ ▪ Address

An Address identifies a geographical place. The identifier is independent from application domain, vendor or market segment of its use.

The Address notion does not cover bank accounts and the like. However, the post box notion is covered by the identifiers. Also, postal addresses given by place and postal code/post area are covered by the identifiers.

In this Recommendation, Address is treated as one object class only; this requires further study, e.g., separate object classes for streets, local areas, etc.

▪ ▪ ▪ *Installation*

An Address may have one or more subordinate Installations, which each defines a role of an Installation in this Address.

▪ ▪ ▪ *Type*

An Address may have one or more subordinate Types, which each indicates a role of a Type of an Account.

▪ ▪ ▪ *Type*

An Address may have one or more subordinate Types, which indicates a role of a Type of a Customer.

▪ ▪ Customer

Customer indicates a legal person whom the Operator relates to. This legal person may have one or more roles to Accounts, Contracts, product instances, Deals or Employees in or from the Operator. The Role notions allow the Operator to register the Customer relative to these legal notions and not to register the Customer's internal organization structure, which may change without the Operator's knowledge.

A Customer may be a private person or a legal organization. The Customer's internal organization may indicate family, cohabitant and friendship relations, or indicate organization of geographically distributed companies and collaborative relations. The Operator may not want or be able to record this internal organization of the Customer.

▪ ▪ ▪ KID

Each Customer of the corporation's Operators shall be assigned a customer identifier (KID) that is unique within the corporation in a Country and is not specific for each business unit/Operator. It shall be possible to undertake credit control of the Customer based on the customer identifier (KID).

▪ ▪ ▪ Name

Each Customer shall have a Name within a Country. Several Customers may have identical Names. Customers may be distinguished by Address or other information.

▪ ▪ ▪ Business role

This attribute may have the following value set:

A – Employee in the corporation

F – Retailer of the corporation

D – Distributor of the corporation

L – Operator in the corporation

K – Competitor of the corporation

Sources for this information are not identified and responsibility for updating is not assigned in this Recommendation.

- Customer status

  Customer status is provided by the business register within the Country.

  K – valid customer

  UK – (terminated) bankrupt

  UF – (terminated) wrong registration

  US – (terminated) merged

  UO – (terminated) closed

  UT – (terminated) legal action

  For persons, the following states are used:

  K – customer

  KU – customer emigrated

  KF – customer disappeared

- Importance

  This attribute indicates that the Customer is a Very Important Person in his relationships to the corporation.

  V – Very Important Person

  This Recommendation does not prescribe how this attribute will be maintained, but the attribute may become updated if the Customer gets a Role as Very Important Person to an Account or Contract, and be deleted if the Role as Very Important Person is deleted.

- *Employee*

  A Customer may have one or more subordinate Employees that each is a role of an Employee. This way, it is possible to state that the "customer" is employed by some Operator of some product instances. However, only employment in the corporation is registered and not by each Operator.

  Normally, there is a one-to-one correspondence between Customer and Employee, but in some cases there may be several Employee roles per Customer. This relationship shall not be used to register that an Employee has responsibility for a set of Customers. This information is registered by letting the employee Customer have Roles to several Accounts or Contracts.

- *Membership*

  A Customer may have several subordinate Memberships, which each indicates a role of a Membership, which has a subordinate Deal, which is a role of a Deal.

- *Role*

  A Customer may have several subordinate Roles, which each indicates a role of a Contract's subordinate Role.

- *Role*

  A Customer may have several Roles, which each indicates a role of an Account's subordinate Role.

- *Subordinate structure*

  A Customer may have several Subordinate structures, which each indicates a role of a Structure object, used to define the Customer's internal organization structure.

  For a corporate Customer, the Subordinate structure's Subordinate customer indicates an organization unit within the corporation.

For a private person Customer, the Subordinate structure's Subordinate customer indicates a family member, etc.

Sometimes the Subordinate structure is not explicitly registered, but is derived from geographic addresses and relationships to Accounts, Contracts or product instances, e.g.:

- When looking upon a Customer, list all subordinate Accounts and Contracts which have usage address at a given address.
- The terminal user assumes that the Customer with the Role Type Owner has a subordinate unit at the given address.

▪ ▪ ▪ *Superior structure*

A Customer may have a subordinate Superior structure, which indicates a role of a Structure indicating the Customer's organizational association. The Customer's subordinate Superior structure's Superior customer indicates this relationship.

▪ ▪ ▪ *Type*

A Customer may have several subordinate Types, which each indicates a role to a Type (of Address), which has a subordinate Address, which is a role of an Address.

▪ ▪ ▪ *Use*

A Customer may have several subordinate Uses, which each indicates a role of a Use, which has a subordinate Product, which indicates a role of a product instance.

▪ ▪ Operator

An Operator – i.e., an instance of the data class Operator – defines a business unit for sales and delivery of telecommunication services.

An Operator must always be defined locally to a Country.

The definition of Operators may reflect the organization structure of the corporation.

For more information on Operator, see [ITU-T M.1401].

▪ ▪ ▪ ICC

An Operator is assigned an ITU Carrier Code by the Administration/Regulator in each Country.

For more information on Operator, see [ITU-T M.1401].

▪ ▪ ▪ LID

Every Operator in the corporation may be assigned a unique Local identifier (LID) within the corporation.

▪ ▪ ▪ Billing system

This attribute provides the identification of default Billing system for all Accounts under this Operator.

▪ ▪ ▪ Rating system

This attribute provides the identification of default Rating system for all Contracts under this Operator.

▪ ▪ ▪ Account

An Account provides information on agreed and delivered payments from a Customer.

▪ ▪ ▪ ▪ Account number

The Account number is a unique identifier of an Account within an Operator.

▪ ▪ ▪ ▪ Payment form

E – prepaid

O – postpaid

▪ ▪ ▪ ▪ Role

An Account may have several subordinate Roles, which each indicates a relationship to a Customer.

▪ ▪ ▪ ▪ ▪ Category

The Category indicates which role a Customer plays to an Account. The Category is an attribute group that consists of attributes.

If the value of the Type attribute is updated by the terminal user, then the value of the Update attribute is set to manual (M). If the role is created by the system itself, then the value of the Update attribute is set to derived (B). Only roles that are updated manually need to be stored.

▪ ▪ ▪ ▪ ▪ ▪ Type

A Role's subordinate Type may have one of the following values:

E – owner

B – payer

F – billing address

Y – authorized

K – contact

V – very important person

U – user

A – provider agent

R – responsible employee

An Account may only have one Role of Type owner (E), payer (B), user (U) or provider agent (A), but may have several Roles of Type contact (K) and very important person (V).

If some Roles are not explicitly provided for an Account, and the Account has one Contract only, then the Roles of the Account are copied from the Roles of the Contract.

If owner (E) is provided, and payer (B) is missing, then the payer is equal to the owner.

If owner (E) is provided, and billing address (F) is missing, then the billing address is equal to the owner.

If owner (E) is provided, and user (U) is missing, the user is equal to the owner.

If payer (B) is provided, and owner (E) is missing, the owner is equal to payer.

If payer (B) is provided, and user (U) is missing, the user is equal to payer.

If user (U) is provided, and owner (E) is missing, the owner is equal to user.

If user (U) is provided, and payer (B) is missing, the payer is equal to user.

If some Roles are not provided for a related Contract, then the Roles of the Contract are equal to those of the Account.

Derived Types may be indicated by a separate colour at the user interface, or they may be hidden.

- Update

  The Type of a Role may be updated

  M – manually

  B – automatic

- *Customer*

  A Role must have a subordinate Customer that is a role of a Customer.

- *Address type*

  An Account may have a subordinate Address type, which indicates a role to a Type of an Address.

- *Contract*

  An Account may have a subordinate Contract, which is a role of a Contract, which is billed by this Account.

  Note that the Account may be owned by an employee and have a reference to the Contract of this employee. The company in which the person is employed may have an Account that refers to the same Contract. The company Account may have references to a Contract of each employee.

- *Deal*

  An Account may have a subordinate Deal, which is a role of a Deal, which is billed by this Account.

  This reference is typically established when the Deal is settled between an organization Customer and the Operator. The Deal refers to Price of a Product in a product Catalogue of an Operator. When a member of the organization uses the Deal, the Price is instantiated to a Product instance under a Contract that has a reference to one or more Accounts. One of the Accounts may be the Account that has the reference to the Deal.

- *Subordinate account*

  An Account may have several Subordinate accounts, which each indicates a role of another Account. The Subordinate account provides information on parts of the Superior account. The account structure indicates how the Customer wants his payment information to be structured and split. Figures from the current Account may then be calculated to all Superior accounts. Therefore, the account structure may have several top nodes, but one Account cannot be contained (recursively) via different paths within the same node. An attribute indicates if the Account shall result in a bill or not. One Customer may receive several bills on the same Product instance and the same period, e.g., partly prepaid and postpaid.

- *Superior account*

  An Account may have a Superior account, which indicates a role of another Account. In this case, the current Account provides information on parts of the Superior account. An Account may have several Superior accounts. Figures from the current Account may then be calculated to all Superior accounts. Therefore, the account structure may have several top nodes, but one Account cannot be contained (recursively) via different paths within the same node. An attribute indicates if the Account shall result in a bill or not. One Customer may receive several bills on the same Product instance and the same period, e.g., partly prepaid and postpaid.

▪ ▪ ▪ Catalogue

A Catalogue contains an overview of all Products, i.e., product types, available from the superior Operator of the Catalogue. Due to needs to manage several versions of offers, an Operator may have several Catalogues. Also, separate Catalogues may be defined for technical products and product types which are inherited, or by other means are used to construct products for sale. A Product from one Catalogue may be inherited or composed of Products from other Catalogues.

▪ ▪ ▪ Product

Product type

A product type (under a Catalogue) is a type of service with a predefined functionality.

Note that a product type is an instance of Product class (under Catalogue). Product types are normally for sale, and these only are visible in the customer channels. Separate product types may be defined as technical products, which are used to implement products for sale. Also, particular product types may be defined for inheritance of definitions. See the Association Type I.

The product type may be defined as a market product or a technical product. This allows one Operator A to deliver a product type to another Operator B. The delivered product type may be a technical product from A that is used to deliver a bundled market product from B, and the market product only is visible to the Customers of B. This way, products may be bundled in several steps. A separate attribute indicates if the Product type is a market product in this Catalogue.

Due to the bundling mechanisms indicated above, there is no distinction between product, service and resource. Products may have service attributes, and products may have attributes that refer to resources.

Note that a service may be defined to be a Product that is delivered from a service platform to a user. However, this notion is outside the scope of this Recommendation. See Appendix I.

As only Products may have Prices, if the parameters of the resources imply different pricing, a separate Product must be defined for each of these parameter values. This means that if the service platform has a parameter for bandwidth and the different bandwidths have different Prices, then a separate Product may be defined for each bandwidth.

The product type may be an individual product type or be bundled as a predefined set of other product types, see Association Type B.

A product type may have a set of permissible additional product types, see Association Type M, and the product type may exclude use of other product types, see Association Type I.

The topmost node in the product type hierarchy, by bundling or inheritance, i.e., Association Type B or I, shall itself be an ordinary product type (for sale), and the hierarchy shall not be used for categorization of products, shall not indicate organization, deals or other information.

A product type may inherit properties or subordinate structures from several other product types.

Each product type will have a Type (identifier) that is unique for the entire corporation, and not just for the Catalogue or Operator.

In addition, a product type may have a Resource type identifier, provided by the Operator, and which tells that an instance of this Resource type may be replaced by another instance of the same type.

Product instance

A Product instance is an instance of exactly one product type, and there may be several instances of the same type. This is accomplished by the S(chema) reference from Contract to Catalogue. This specifies that:

– All data classes subordinate to Catalogue are considered to be subordinate to Contract, as well;

– The S(chema) reference itself may be instantiated to refer from a specific Contract instance to one or more specific Catalogue instances;

– The data instances in the tree subordinate to a Contract are instances of the data, i.e., product types, under the referenced Catalogues.

A product instance may be contained in a product instance bundle, may have additional product instances and exclude use of others according to the prescriptions in its product types.

Note that a product instance may only be contained in one superior product bundle, while a product type may be contained in several superior product bundle types.

The product instance has an Identifier. This Identifier is made up of a Type and a Number. The number may be a telephone number, circuit number or a similar resource identifier. In addition, the product instance may have a Resource type attribute.

Note that generalization of Number to an alphanumeric field is for further study.

▪ ▪ ▪ ▪ ▪ Identifier

A Product has a unique identifier within the superior Catalogue or Contract.

The Type is unique within its Catalogue, while Type plus Number is unique within the Contract. However, the Type may be made unique for the corporation, and likewise for the Type plus Number.

▪ ▪ ▪ ▪ ▪ ▪ Type

Each product type will have a unique Type within its superior Catalogue. However, since every product type first may be defined in a common Catalogue for the entire corporation and thereafter be copied into the Operator specific Catalogues, the Type will be unique for the entire corporation. There may be several copies of the same product type in different Catalogues.

Each product instance under a Contract instance will be assigned a Type from the S(chema) referenced Catalogue of the Contract.

It is the responsibility of the Catalogue administrator to avoid Type conflicts within one Operator, such that different product instances of the same Contract will not get the same Identifier.

▪ ▪ ▪ ▪ ▪ ▪ Number

The product types within a Catalogue instance will normally have an empty Number.

Product instances within a Contract instance will have a unique Number. According to the application schema graph, this Number is unique within the Contract and the Type.

However, for some Types, e.g., TLF, the Number may be globally unique, such that one may look up a product instance directly, based on the Number only.

- Association

  A Product's subordinate Association indicates a role to one or more other Products relative to the first Product.

  - Type

    A Product's Association to one or more other Products may be of the following Types:

    B – Bundle, where the other Products are components

    M – Main product, where the other Products are additional products

    C – Constrained product, where the other Products are excluded products

    I – Product instance, where the other Product is the product type of the current product

    N – Next service; if the user is not present at the current service, try the next

  - *Contained product*

    An Association's subordinate Contained product is a Product that is referenced in the Association.

- *Installation*

  A Product's subordinate Installation indicates a role of an Installation.

- *Superior association*

  A Product's subordinate Superior association is an Association that references the Product.

  The recursive references on the product types under a Catalogue put constraints on the product instances under Contracts.

  A product instance must contain exactly the Association Type Bundle, which are prescribed by the product type.

  A product instance may only have a subset of the Association Type Main product that are given for the product type.

  A product instance may not contain or be part of a product that is associated by the Association Type Constrained product of the product type.

  A product instance can only have the Association Type Next to products of product types having this association from the product type of the product instance.

  A product instance obeys all rules that are prescribed for its product type, as well as the type's recursively superior types.

  A product type or product instance may have an Association Type I to another product type. When this Association is between two product types, it is used to inherit properties. When it is between an instance and a type, it is used for instantiation. Inheritance may be seen as a constrained form of instantiation. Note that the Association from instance to type may or may not be explicitly stored. Also, the Type of the instance Identifier will tell about this Association.

  Note that specialized associations may be derived from the various Association Types, e.g., a S(chema) reference from the Association Type I. Such derived associations are not covered by this Recommendation.

▪ ▪ ▪ ▪ ▪ Price

A Product may have a Price in one or more Markets.

The Price may be the same in several Markets, or it may be different in each Market. A product type may have several Prices – even in the same Market, e.g., a fixed and a variable Price.

Also, a Product may have a particular Price in a particular Deal.

▪ ▪ ▪ ▪ ▪ ▪ *Deal*

A Price's subordinate Deal indicates a role of a Deal subordinate to the Price.

▪ ▪ ▪ ▪ ▪ ▪ *Market*

A Price's subordinate Market indicates a role of a Market. The Market indicates the market segment for which this Price applies.

▪ ▪ ▪ ▪ ▪ *Use*

A product instance may have a Use, which is a role of a Use. Use refers to a Customer and his relationship to the product instance.

▪ ▪ ▪ *Market*

An Operator may have several subordinate Markets, which each indicates a role of a Market of this Operator.

▪ ▪ ▪ Contract

A Contract is a contract with a Customer on delivery of services, which are called product instances in this data structure.

Permissible product types for sale can be found in two ways:

– By the schema reference (S) to Catalogues, which are explicitly referred to from the Contract;

– If no explicit schema reference is provided, the permissible product types are found under the first Catalogue under the Contract's superior Operator.

Note that older product types under the current Contract may come from older Catalogues under the current Operator.

▪ ▪ ▪ ▪ Contract number

A Contract's subordinate Contract number is a unique identifier of a Contract within the Operator.

A Contract number may by default be identical to a phone number used to identify a product instance subordinate to the Contract. If a Contract number is assigned this way, one must avoid that this number comes in conflict with numbers assigned differently.

The customer may not always be informed about the Contract number, and the Operator may not expect that the Customer is able to inform about his Contract number. Rather, the Customer may inform about a Number of a product instance, e.g., a phone number.

▪ ▪ ▪ ▪ Amount

A Contract's subordinate Amount indicates the available amount for usage under this Contract.

▪ ▪ ▪ ▪ ▪ Prepaid amount

An Amount's subordinate Prepaid amount indicates the set amount for usage from the Prepaid date under this Contract.

The Prepaid amount is the Prepaid amount minus the Spent amount before the Prepaid date plus the additional amount paid at this date.

▪ ▪ ▪ ▪ ▪ Prepaid date

The Prepaid date gives the last date when the Prepaid amount under this Contract was updated.

▪ ▪ ▪ ▪ ▪ Spent amount

An Amount's subordinate Spent amount indicates the used amount under this Contract since the Prepaid date. The available amount for usage is Prepaid amount ÷ Spent amount.

NOTE – More attributes, e.g., for Available amount, Last usage update, etc., could be defined, if needed.

▪ ▪ ▪ ▪ Internet address

A Contract's subordinate Internet address indicates the Customer's contact address. A Customer may have more Internet addresses, and each Internet address is recorded as a product instance.

▪ ▪ ▪ ▪ *Account*

A Contract may have one or more subordinate Accounts, which each is a role of an Account. Normally a Contract has one Account only, but use of multiple Accounts allows for split bills. Rules given for each Account specifies which costs go where, e.g., before 17.00 hours to the company customer and after 17.00 hours to the private customer. Also, the Account hierarchy may help to accomplish this split.

▪ ▪ ▪ ▪ Role

A Contract's subordinate Role indicates the Customer's relationship to this Contract.

▪ ▪ ▪ ▪ ▪ Category

The Category indicates which role a Customer plays relative to a Contract. The Category is an attribute group that consists of attributes.

If the value of the Type attribute is updated by the terminal user, then the value of the Update attribute is set to manual (M). If the role is created by the system itself, then the value of the Update attribute is set to derived (B). Only roles that are updated manually need to be stored.

▪ ▪ ▪ ▪ ▪ ▪ Type

A Role's subordinate Type may have one of the following values:

E – owner

B – payer

Y – authorized

K – contact

V – very important person

U – user

A – provider agent

R – responsible employee

A Contract may only have one Role of Type owner (E), payer (B), user (U) or provider agent (A), but may have several Roles of Type contact (K) and very important person (V).

If some Roles are not explicitly provided for a Contract, and the Contract has one Account only, then the Roles of the Contract are copied from the Roles of the Account.

If the Role of Type user (U) is not indicated for the Contract, but is the same for several subordinate product instances, then this role is copied to the Contract.

If owner (E) is provided, and payer (B) is missing, then the payer is equal to the owner.

If owner (E) is provided, and user (U) is missing, the user is equal to the owner.

If payer (B) is provided, and owner (E) is missing, the owner is equal to payer.

If payer (B) is provided, and user (U) is missing, the user is equal to payer.

If user (U) is provided, and owner (E) is missing, the owner is equal to user.

If user (U) is provided, and payer (B) is missing, the payer is equal to user.

If Use is not provided for some subordinate product instances, then these are copied from the user (U) Type of the Contract.

If some Roles are not provided for a related Account, and this Account has only this Contract, then the Roles of the Account are equal to those of the Contract.

Derived Types may, e.g., be indicated by a separate colour at the user interface, or they may be hidden.

▪ ▪ ▪ ▪ ▪ ▪ Update

The Type of a Role may be updated

M – manually

B – automatic

▪ ▪ ▪ ▪ ▪ *Customer*

A Role must have a subordinate Customer that is a role of a Customer.

▪ ▪ ▪ ▪ *S <>'& (Corporation (Country (Operator (Catalogue*

A Contract's superior Operator's first subordinate Catalogue is a S(chema) for the Product instances subordinate to the Contract.

Note that the reference may go all the way up to the object Corporation via wild card (&) down to some other Operator than the directly superior Operator. However, if no explicit S(schema) reference is provided, then the first Catalogue of the directly superior Operator is used.

Note that the S(chema) reference may itself be instantiated. Then the reference goes via the Population of the Schema.

The product instances subordinate to the Contract are instances of the product types subordinate to the S(chema) referenced Catalogue.

The recursive references on the product types put restrictions on the product instances subordinate to the Contract:

- A product instance must contain exactly the Associations with the Type Bundle that are prescribed for its product types;
- A product instance may only contain a subset of the Associations with the Type Main product that are allowed for its product types;
- A product instance must not contain Associations with the Type Constrained that are prescribed for its product types;
- A product instance must obey all constraints that are defined for its product types as well as its recursively superior product types, indicated by the Association Type I.

▪ ▪ ▪ Deal

A Deal defines a relationship from an Operator via a Membership to a Customer on one or more product instance prices of given product types. A Deal is valid for a limited time period, with a defined start and stop.

A Deal may be a campaign for a product type or a result of a campaign for a product instance.

Note that a product instance may be related via Price to several Deals, and Deals may become terminated, while a product instance is contained in a Contract that cannot be removed without removing its product instances, as well.

▪ ▪ ▪ ▪ *Account*

A Deal may have a subordinate Account, which is a role of an Account, which is the billing Account for this Deal.

▪ ▪ ▪ ▪ *Membership*

A Deal may have subordinate Memberships, which each is a role of a Membership.

▪ ▪ ▪ ▪ *Price*

A Deal may have several subordinate Prices, which each is a role of a Price. The Prices may be both types (under Product in a Catalogue) and instances (under Product in a Contract).

▪ Employee

Employee is an employee of an Operator of Product instances to Customers.

▪ ▪ Employee number

Employee number is a unique identifier of an Employee of an Operator of product instances. Some employees may have several Employee numbers. In this case, several Employees are related to the same Customer, who plays the role of being the person that is employed.

Note that Employee number is unique across all Operators of a corporation.

▪ ▪ *Customer*

An Employee may have a subordinate Customer, who indicates a role of the employee as a Customer.

Note that the employee's role to other Customers is registered from his Customer role to the other Customers.

▪ Installation

Installation indicates a reference to the installation address of a product instance.

- Change

  Change indicates state and time interval for the installation.

  - State

    State indicates

    H – historic

    I – installed

  - Time interval

    Time interval indicates the time period for the establishment or termination of an installation.

- *Installation address*

  An Installation must have a subordinate Installation address that indicates the Address where the product instance is installed.

- *Product*

  An Installation must have a subordinate Product, which indicates the product instance that is installed at the Address.

- Market

  A Market defines a market segment, which the Operator chooses to handle in a harmonized manner.

  A Market may be defined by customer groupings, channel groupings or by other means.

- *Operator*

  A Market may have a subordinate Operator, which is a role of an Operator for whom the given Prices apply.

- *Price*

  A Market may have subordinate Prices, which each indicates a role of a Price of a Product (type or instance).

- Membership

  A Membership indicates an association between a Customer and a Deal of an Operator.

  - Category

    A Category indicates a role that a Customer plays in a Deal. Category is an attribute group, which contains two attributes.

    If Type is updated manually by the terminal user, the Update attribute value is set to manual (M). If the Type is updated by the system itself, the Update attribute value is set to derived (B). Only manual updates need to be stored.

    - Type

      The Type of a Membership may have one of the following values:

      K – contact

      M – member

      E – owner

      Note that often the members will only be registered by a reference to their phone numbers, i.e., Number within a product instance. In this case, the memberships will be derived automatically from product instances via Use to Customer.

- Update

  Types may be updated

  M – manually

  B – derived

- *Customer*

  A Membership may have a subordinate Customer that is a role of a Customer of the corporation.

- *Deal*

  A Membership may have a subordinate Deal, which indicates a role of a Deal subordinate to Operator.

- Structure

  A Structure indicates the organization of the Customer.

  The Operator will normally not register this Structure, but sometimes the implied organization of a corporation into its constituent business units may be derived from the geographical locations, or of families from their relationships to common account numbers and addresses.

  The Operator will normally only register the Customer's associations to Accounts, Contracts and Products, which indicates agreed relationships between the Customer and Operator.

- Type

  Type indicates which role a Subordinate customer plays to a Superior customer.

  V – indicates subordinate business unit

  M – indicates Member of a family

  U – indicates subordinate Unspecified membership

  H – indicates historical entity of the current entity

- *Subordinate customer*

  A Structure's Subordinate customer indicates a role of a Customer that is superior to this Structure.

- *Superior customer*

  A Structure's Superior customer indicates a role of a Customer that is subordinate to this Structure.

- Type

  A Type indicates the type of Address of the Customer.

- Type

  Type indicates the role of the referenced Address relative to the Customer.

  S – location

  P – postal address

- *Address*

  A Type must have a subordinate Address, which indicates a role of an Address.

- *Customer*

  A Type must have a subordinate Customer that indicates a role of a Customer.

- Type

  A Type indicates the type of Address of the Account.

- - Type

    Type indicates the role of the referenced Address relative to the Account.

    A – address of responsible person

    B – billing address

    A company customer may have several Accounts, which each may have different responsible persons.

- - *Account*

    A Type must have a subordinate Account, which indicates a role of an Account.

- - *Address*

    A Type must have a subordinate Address, which indicates a role of an Address.

- Use

  Use indicates a role between a product instance and a Customer. The role is defined in the attribute group Category.

- - Category

    Category indicates the role that a Customer has to be a product instance. Category is an attribute group which consists of two attributes.

    If the attribute Type is updated by the terminal user, the Update attribute is assigned the value Manual (M). If the role is established by the system itself, the Update attribute is assigned the value automatic (B). Only roles that are updated manually need to be stored.

- - - Date

      Date for establishment of a certain Type of Use.

- - - Type

      The subordinate Type of a Use may have one of the following values:

      K – contact person

      U – user

      A Product may have one user (U) only, but may have several contacts (K).

      If a particular Role is not provided for the superior Contract, and this role is given for the current product instance in the Contract, then the Role of the Contract is derived automatically from the role of the product instance.

      If Use is not given for a product instance, this is derived automatically from the Role of the Contract.

      From the above, if a role is given for a particular product instance only, then this role is inherited to all product instances within the Contract. However, the inherited roles may be overridden by manual insertion of particular roles for a product instance, Contract or Account.

      Derived Types may be indicated by use of a separate colour in the end user dialog, or they may be hidden.

- Update

  The Type of a Use may be updated

  M – manual(ly)

  B – automatic

- *Customer*

  A Use must have a subordinate Customer, who is a role of a Customer.

- *Product*

  A Use must have a subordinate Product, which is a role of a product instance.

Appendix I

Product and customer service databases

(This appendix does not form an integral part of this Recommendation)

Products in a Catalogue may be instantiated into Products in a Contract. This is illustrated in Figure I.1, which depicts how classes within the Catalogue class apply within any Contract. The Contract plays the role of being a P(opulation) of the Catalogue, which acts as a S(chema) of the Contract.

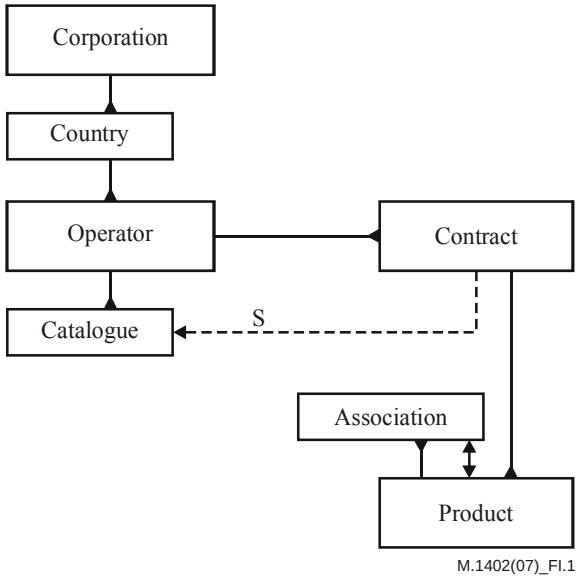

Figure I.1 – Example inheritance from the Product Catalogue

The Product class and its subordinate classes, such as Price, may be instantiated into a product database. An example instantiation is shown in Figure I.2.

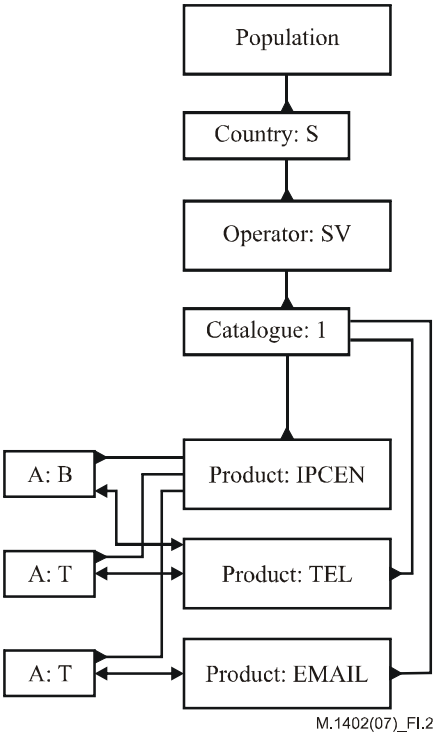

Figure I.2 – Example instances in a product database

Note that the labels used in Figure I.2 are incomplete, due to lack of space inside the boxes. For example A: B means Association Type B. Population is the name of the product database.

The instances in a product database may act as classes of product instances in a customer service database. This is illustrated in Figure I.3.

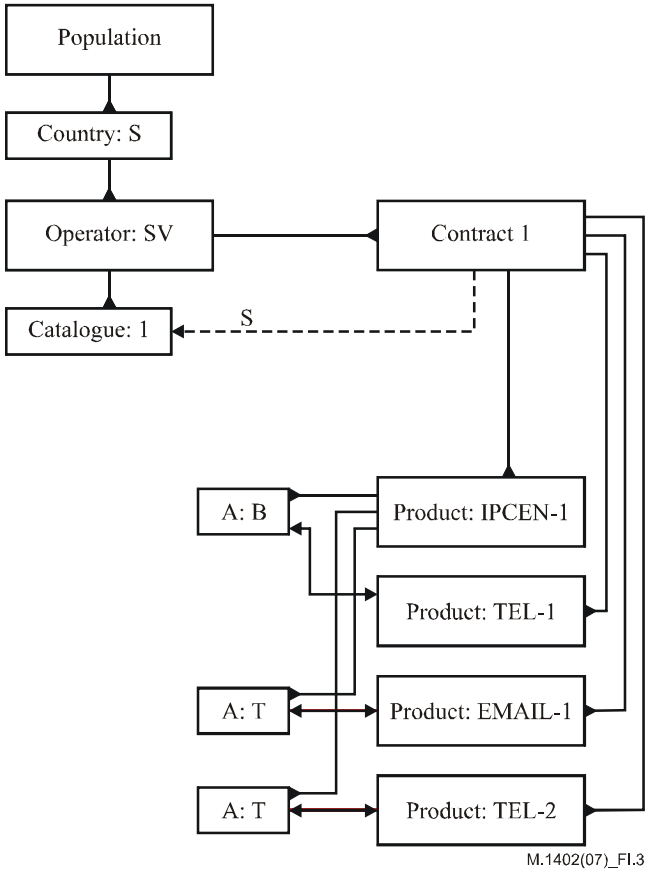

Figure I.3 – Example instances in a customer service database

Note that there is a homomorphic mapping from instances to their classes, i.e., there is a many-to-one mapping from instances to classes, and for each box, line or label among the instances there is an identical box, line or label among their classes.

Appendix II

Interface to a service platform

(This appendix does not form an integral part of this Recommendation)

Some of the product instances in the customer service database may be implemented as services within a service platform. Hence, information of the subset of product types and product instances need to be communicated over the interface to the service platform. Figure II.1 depicts the basic data structure needed for communicating instance data to and from the service platform.

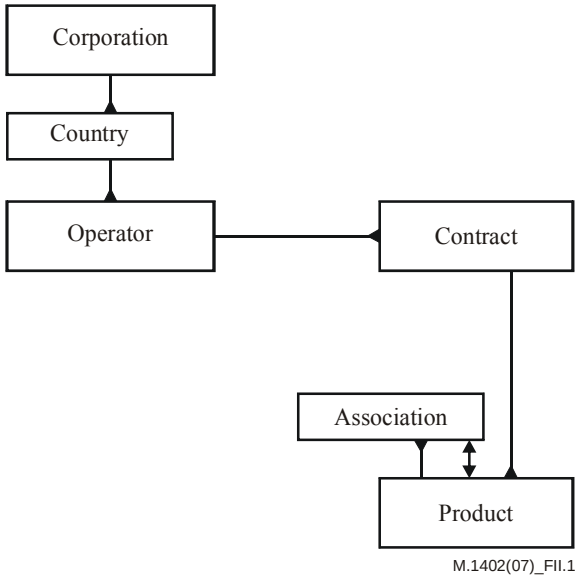

Figure II.1 – Example data structure for interface specification

The interface specification towards the service platform is designed to be simple.

The interface is anticipated to be implemented as a replication of a subset, i.e., horizontal partition, of the customer service database.

Alternatively, the interface may be designed as an exchange of service orders; this alternative is not shown in this Recommendation.

For pricing information, both Price and Deal may be added to the shown data structure.

Note that what appears as a networked data structure (in the Application layer of the Data Architecture) may be turned into a tree (defined in a Distribution Schema) when being communicated over the interface to the service platform.

Note that the data structure provides multi-operator support on one and the same service platform.

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