

Service Basic - DDP BA

TMF518_SB

Version 1.3



September, 2011

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Executive Summary

This document presents the MTOSI Service Management technology neutral data model. It initiates from the SID service management information model with several extensions and adaptations introduced to fit the business needs for service activation and inventory (those modifications will be proposed to the SID team as suggestion for improvement).

It defines the static and structural requirements of the managed objects that are visible across the Service Activation Interface(s) and the Service Component Activation Interface, and the Service Inventory interface.

1 Introduction

1.1 DDP Structure

In order to allow for more efficient release delivery, the previous monolithic BA, IA and SS documents have been partitioned into smaller self-contained (though not independent) units called Document Delivery Packages (DDPs).

This is similar to the 3GPP concept of Integration Reference Point (IRP). The basic idea is that the Interface, which is specified by the entire document set (of a release), is partitioned into DDPs where each DDP specifies “a certain aspect” of the Interface, which needs to be very clearly scoped.

There are three kinds of DDPs:

- the FrameWork DDP (FMW) – this DDP contains the generic artifacts that are applicable to all the other DDPs.
- Data Model DDP (DM-DDP) – a DDP that concerns a data model (entities, data structures, attributes, state, but no operations)
- Operation Model DDP (OM-DDP) – a DDP that concerns a computational model (operations, notifications, transactions) for a given functional area (such as resource inventory management)

The unified deliverables structure for any given MTOSI / MTNM product release is as follows:

- Product Release Notes:
 - a scope specification for the type and extent of the delivered product,
 - the partitioning of the release into DDPs (i.e., definitions of various aspects of the release),
 - and an overview of the release’s (delta) deliverables;
- For each DDP:
 - Business Agreements (BAs): a business view specification
 - Information Agreements (IAs): a system view specification
 - Interface Implementation Specifications (ISSs): implementation and deployment view specification per supported enabling technology (mapping of the IA to either CORBA (IDL, services usage) or XML (WSDL, XSD, bindings...))
 - Supporting Documentation: normative and informative supporting documents.
- Reference Implementation (optional) of core IIS fragments for selected interfaces and enabling technologies.

1.2 Document Structure

The following sections are included in this document:

- Section 1 is this introduction.
- Section 2 defines the business problem and project scope

- Section 3 has the requirements and associated descriptive text.
- Section 4 contains the use cases.
- Section 5 has traceability matrices between the use cases and the requirements.
- Section 6 provides a list of open issues to be considered in later versions of this document.
- Section 7 lists references and states IPR claims, if any.
- Section 8 provides administrative details such as document history and acknowledgements

1.3 Terminology Used In This Document

This DM DDP document introduces many terms for which a definition is presented. For those terms, the same definitions are also available in the [SD0-1](#) supporting document with many other terms commonly used in the MTNM / MTOSI products.

2 Business Problem Description, Project Scope

2.1 Project Scope

The TM Forum Integration Program is responsible for all of the interface and business services work within the TM Forum. In some cases, interface work is delegated to other teams but the final verification for technical uniformity and integrity is the responsibility of the TM Forum Integration Program.

Initially, the TM Forum Integration Program was formed to coordinate the various existing TM Forum interfaces activities (as shown in **Figure 2-1**). In particular, the responsibility for maintaining MTOSI and MTNM is now covered by the MTOSI-MTNM Users Group which is a team within the TM Forum Integration Program. The long term plan (which is already well under progress) is to migration the various input work to a single harmonized suite of interfaces.

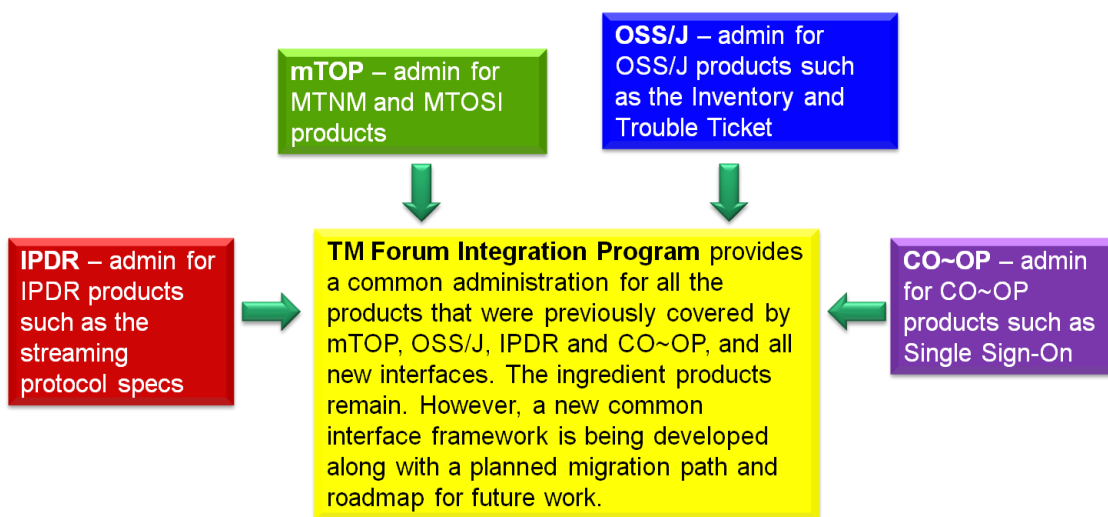


Figure 2-1. Inputs to the TM Forum Integration Program

Figure 2-2 provides a summary of the team within the TM Forum Integration Program as well as a few teams outside of the program but which also do some interface work. In terms of MTOSI and MTNM, the main input for updates come from the Resource and Service Management Team.

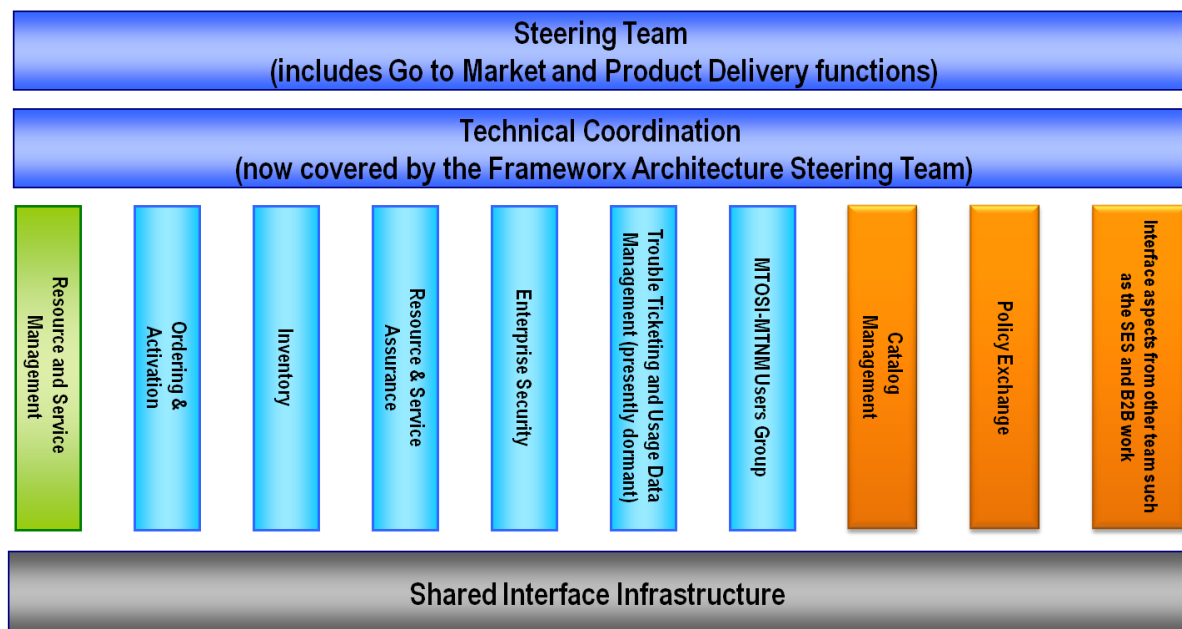


Figure 2-2. TM Forum Integration Program

2.2 Benefits

MTOSI and MTNM provide a set of Interface specifications that allow for resource and service management (with only MTOSI covering service management, but with MTOSI and MTNM both covering resource management, using very much the same information model).

These specifications are intended to lower design, implementation, Verification Validation & Testing (VVT), and maintenance costs for management interfaces. These Interfaces are intended for use by service providers, suppliers of equipment and OSS suppliers. The intention is to also encourage system integrator usage of management systems that make use of the Interfaces.

In particular, the followed approach tends to minimize the cost of integration, provide access to all necessary information and control, and support all vendor/operator differentiation. The intent of the interface is to provide compatibility among different version, for a detailed description see [SD2-6 VersioningAndExtensibility](#).

2.2.1 Service Provider Benefits

The service provider benefits are as follows:

- One stop shopping concerning feature requests for much of the TM Forum contract specification work is part of the defined Change Control Group (CCG) process that TM Forum makes available in order to control the interface.
- The technical deliverables are also of high value to the service provider. The Interface specifications allow for an open, multi-supplier environment, shorten delivery times and lower integration costs.

- The MTOSI and MTNM products provide an integrated, multi-technology interface with support for most key layer 1 and layer 2 transport technologies. This is in contrast to earlier approaches where each technology-specific forum provided a single-technology management interface. The service provider was faced with having to use many different, uncoordinated management interfaces.
- These products are not bound to any one middleware, transport or computing language. So, the service provider will be able to evolve to new technologies as they arise.

2.2.2 Supplier Benefits

The supplier benefits are as follows:

- Fewer Adapters leads to Lower Costs – in as much as MTOSI and MTNM gain market penetration (and there has already been significant market acceptance of these interfaces), the supplier is faced with the need to build fewer adapters between their products and the products of their partners. A supplier can also directly see cost savings in the use of the Interfaces among its own products (as the need for an open interface arises).
- Lower Middleware Transitions Costs – the Interfaces are defined to be middleware and transport independent. So, the supplier can migrate from one middleware or transport technology to another without changing the supporting business logic in the code.
- Increase Usage by System Integrators (SIs) – a supplier's support of their own "open" interfaces goes only so far to encourage SIs. Clearly, an SI would like to make use of supplier products (both equipment and OSS suppliers) that make use of well supported standard interfaces rather than supplier specific interfaces. The latter case forces the SI into a situation characterized by many pair-wise negotiations between various suppliers.
- Lower Training Cost – in as much as a supplier re-uses the Interfaces for multiple products and for multiple customers, the various training costs are lower because the designers, system engineers, developers and testers are using the same Interfaces over and over again.

3 Business Processes

3.1 Business Requirements

Not applicable for this DDP.

3.2 Category I: Static and Structural Requirements

The following diagram illustrates the relationship between some of the key MTOSI Service Management entities involved in service activation.

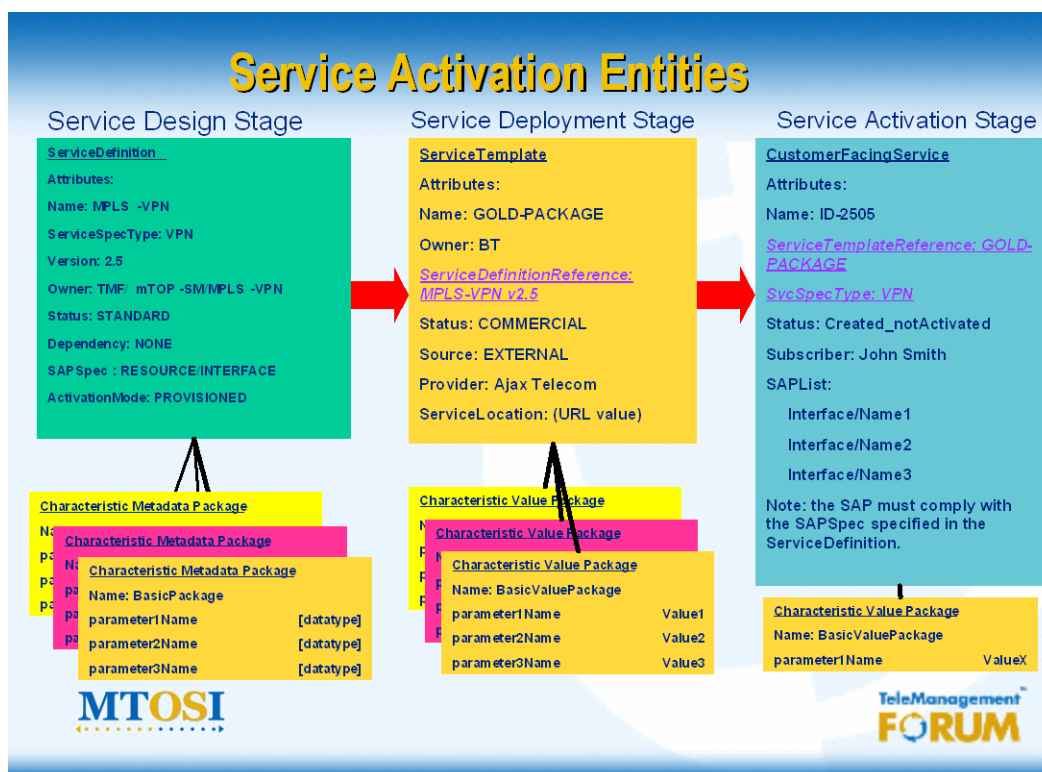


Figure 3-1. Entities involved in the MTOSI Service Activation interaction.

The “Service Definition” object is used at design time to define the service characteristics and their associated data types, as well as other information to describe the service. The “Service Template” is

used in the service deployment phase to define the invariant characteristics of all associated services. The CFS and the RFS are used by the SAI and SCAI respectively at service activation time.

Some of the attributes specified in the objects or data structures presented in this DM DDP are used to make reference to another object by using its name (the unique name on the CCV).

References are typically used to represent associations between objects:

- for example, the association between a ServiceTemplate instance and a ServiceDefinition instance - both SM&O objects -
- or the association between a ServiceDefinition instance and a ProductSpecification instance (this latter object belongs to the CRM domain)

In particular, the MTOSI SM interfaces use references to CRM objects of the following classes:

- Product
- ProductSpecification
- ProductOffering
- ProductSpecificationCharacteristic
- Subscriber
- User

3.2.1 State Attributes

The ITU-T defines in specification X.731 a *State Management Function*. This specification dates back to the early days of OSI, and was implemented in systems supporting CMIP/CMIS. As part of this standard are two specific states:

- *Administrative State*
The administration of managed objects operates independently of the operability and usage of managed objects and is described by the administrative state attribute, which has three values: *locked*, *unlocked* and *shutting down*.
The original definitions from X.731 state as follows:
locked means the entity is administratively prohibited from use.
shuttingDown means that usage is administratively limited to current instances of use.
unlocked means the entity is not administratively prohibited from use.
- *Operational State*
Defines the operability of a resource and may take two values: *enabled*, *disabled*.
disabled means the resource is totally inoperable.
enabled means the resource is partially or fully operable

One sees the mixing of the usage of these states in the convergence of telecommunications and data networks, and over time the same state concepts have been applied to *services*, due to lack of standardization in this area.

In addition to the two ITU-T X.731 states, the Service Activation interfaces use the notion of “service state”, which can take on one of the following values: Planning_FeasibilityCheck (PFC), Planning_Designed (PD), Reserved (RES), Provisioned_Inactive (PI), Provisioned_Active (PA) and Terminated (TERM).

Those three states are used in the three entities: CFS, RFS, SAP.

The following table illustrates the relationships between the SAI service states, and ITU-T X.731 states:

SAI Service State >	PFC	PD	RES	PI	PA	TERM
ITU-T Admin State						
Locked	N/A	N/A	N/A	X	N/A	N/A
Unlocked	N/A	N/A	N/A	N/A	X	N/A
Shutting Down	N/A	N/A	N/A	N/A	X	N/A
ITU-T Operational State						
Enabled	N/A	N/A	X	X	X	N/A
Disabled	N/A	N/A	X	X	X	X

Note 1: N/A implies that there is no direct relationship between the ITU states and the SAI service states.

Note 2: The *Administrative State* attribute is included to preserve any backward compatibility with implementations using the ITU-T X.731 administrative state to represent actual service states.

- The "unlocked" value corresponds to a "Provisioned_Active" state, and indicates that the service has been provisioned and activated, or that the service was previously deactivated (suspended), and has been reactivated (resumed).
- The "locked" value corresponds to a "Provisioned_Inactive" state and indicates that the service has been successfully deactivated.
- The "shutting down" value corresponds to a service that was previously in a "Provisioned_Active" state, was deactivated, but has not yet successfully transitioned to a "Provisioned_Inactive" state. Once the transition is successful, the adminState would change to "locked".

3.2.2 Attributes Common to all MTOSI SM Objects

R_TMF518_SB_I_0001	<p>The requirement for the set of attributes common to all MTNM / MTOSI objects is specified in the TMF518_FMW BA (see requirement R_TMF518_FMW_I_0001). In summary, this requirement identifies the following attributes common to all the MTNM / MTOSI objects:</p> <ul style="list-style-type: none"> • name • discovered name • naming OS • user label • owner • alias name list • vendor extensions <p>The following MTOSI Service Management first class objects must contain all the attributes common to the MTOSI objects:</p>
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	<ul style="list-style-type: none"> • CFS • RFS • SAP • SAPSpecification • ServiceCatalog • ServiceDefinition • ServiceTemplate <p>The following MTOSI Service Management first class objects must contain only the "name" attribute and not the other attributes common to the MTOSI objects</p> <ul style="list-style-type: none"> • ServiceSpecCharacteristic (SSC)
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0002	<p>In addition to the attributes common to all the MTOSI objects, as required in R_TMF518_SB_I_0001 above, the following attribute is common to all the MTOSI SM objects</p> <ol style="list-style-type: none"> 1. description Textual description of the object. (Optional)
Source	TMF518_SB, Version 1.0

3.2.3 The Customer Facing Service (CFS) Object

R_TMF518_SB_I_0003	A CFS (Customer Facing Service) represents the instantiation of a given service that is bound to a particular product. It is an abstraction that defines the characteristics and behavior of a particular service as seen by the customer.
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0004	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the CFS object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. containedByCFSReference Indicates the reference (the name) to the composite CFS object containing this CFS (a given CFS may be contained in at most one composite CFSs). (Optional) 2. containsCFSReferenceList Used when the CFS is composite to
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	<p>indicate the list of references (the names) to the CFS objects constituting the first level down the CFS hierarchy tree. (Optional)</p> <p>3. hasStarted This is a Boolean attribute that, if TRUE, signifies that this Service has already been started. If the value of this attribute is FALSE, then this signifies that this Service has NOT been Started.</p> <p>4. isMandatory This is a Boolean attribute that, if TRUE, signifies that this Service is mandatory (i.e., this Service must be running when the managed environment is in a non-failed state). If the value of this attribute is FALSE, then this means that this Service is not required to run.</p> <p>5. startMode This attribute is an enumerated integer that indicates how the Service is started. Values include: 0: Unknown 1: Automatically by the managed environment 2: Automatically by the owning device 3: Manually by the Provider of the Service 4: Manually by a Customer 5: Any of the above</p> <p>6. isStateful This is a Boolean attribute that, if TRUE, means that this Service can be changed without affecting any other services.</p> <p>7. adminState (Mandatory) This attribute is included to preserve any backward compatibility with implementations using the ITU-T X.731 administrative state to represent actual service states.</p> <ul style="list-style-type: none"> - The "unlocked" value corresponds to a "Provisioned_Active" state, and indicates that the service has been provisioned and activated, or that the service was previously deactivated (suspended), and has been reactivated (resumed). - The "locked" value corresponds to a "Provisioned_Inactive" state and indicates that the service has been successfully deactivated. - The "shutting down" value corresponds to a service that was previously in a "Provisioned_Active" state, was deactivated, but has not yet successfully transitioned to a "Provisioned_Inactive" state. Once the transition is successful, the adminState would change to "locked". <p>8. serviceState Indicates the state of the service; refer to R_TMF518_SA_2_II_0010 from the TMF518_SA_2 BA (Mandatory)</p> <p>9. operationalState Indicates whether the service is operational and takes</p>
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	<p>on a value of “enabled”, or “disabled”. This value is set by the OS responsible for delivery of the service, and never by the activation OS. (Mandatory)</p> <p>10. serviceTemplateReference Provides a reference (the name) to the associated Service Template object. (Mandatory)</p> <p>11. rFSReferenceList Provides a list of references (the names) to the associated RFS objects. (Optional)</p> <p>12. productReference Provides a reference (the name) to the product object (at in the CRM layer) associated with this CFS (Optional)</p> <p>13. subscriberReference Provides a reference (the name) to the subscriber object (at the CRM layer) having subscribed to the service. (Optional)</p> <p>14. userReferenceList Provides a set of references to the user objects (at the CRM layer) who could access the service. (Optional)</p> <p>15. sapList Provides a set of associated service access point(s). (Mandatory)</p> <p>16. describedByList (Mandatory for those SSCs in the associated ServiceDefinition which are NOT globally set or to override globally set SSCs)</p> <p>This attribute is used to register the values specific to this CFS object which have been passed over the Activation Interface to convey the value of an <i>individually</i> set SSC (i.e. not reference in a ServiceTemplate) or to override the value of a <i>globally</i> set SSC (present in the associated ServiceTemplate)</p> <p>Each of item of this attribute list is twofold:</p> <ul style="list-style-type: none"> – serviceSpecCharacteristicReference Provides a reference (the name) to a ServiceSpecCharacteristic object (Mandatory) note that the same SSC reference must be present as well in the ServiceTemplate associated to the CFS – globally set – or in the corresponding ServiceDefinition – individually set, if not present in the ServiceTemplate - – value a ServiceCharacteristicValue used either as a value of an individually set service
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	characteristic - i.e. not referenced in the associated ServiceTemplate - or to override a globally set characteristic value - present in the associated ServiceTemplate - (Mandatory)
Source	TMF518_SB, Version 1.0

3.2.4 The Resource Facing Service (RFS) Object

R_TMF518_SB_I_0005	A RFS (Resource Facing Service) is an abstraction that defines the characteristics and behavior of a service that is not directly seen or purchased by a customer. It is an "internal" service that is required to support one or more customer facing services.
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0006	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the RFS object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. containedByRFSReference Indicates the reference (the name) to the composite RFS object containing this RFS (a given RFS may be contained in at most one composite RFSs). (Optional) 2. containsRFSReferenceList Used when the RFS is composite to indicate the list of references (the names) to the RFS objects constituting the first level down the RFS hierarchy tree. (Optional) 3. hasStarted This is a Boolean attribute that, if TRUE, signifies that this Service has already been started. If the value of this attribute is FALSE, then this signifies that this Service has NOT been Started. 4. isMandatory This is a Boolean attribute that, if TRUE, signifies that this Service is mandatory (i.e., this Service must be running when the managed environment is in a non-failed state). If the value of this attribute is FALSE, then this means that this Service is not required to run. 5. startMode This attribute is an enumerated integer that indicates how the Service is started. Values include: 0: Unknown 1: Automatically by the managed environment 2: Automatically by the owning device 3: Manually by the Provider of the Service 4: Manually by a Customer 5:
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	<p>Any of the above</p> <p>6. isStateful This is a Boolean attribute that, if TRUE, means that this Service can be changed without affecting any other services.</p> <p>7. adminState (Mandatory) This attribute is used when one wishes to “suspend” or “resume” a service, and may take the values of “locked”, “unlocked” or “shutting down”. In the case of a multi-point service, this action takes effect on the entire service and will cause all connected subscribers to have their traffic suspended. It is set by an activation OS. This attribute is included to preserve any backward compatibility with implementations using the ITU-T X.731 administrative state to represent actual service states.</p> <ul style="list-style-type: none"> - The "unlocked" value corresponds to a "Provisioned_Active" state, and indicates that the service has been provisioned and activated, or that the service was previously deactivated (suspended), and has been reactivated (resumed). - The "locked" value corresponds to a "Provisioned_Inactive" state and indicates that the service has been successfully deactivated. - The "shutting down" value corresponds to a service that was previously in a "Provisioned_Active" state, was deactivated, but has not yet successfully transitioned to a "Provisioned_Inactive" state. Once the transition is successful, the adminState would change to "locked". <p>8. serviceState Indicates the state of the service; refer to R_TMF518_SA_2_II_0010 from the TMF518_SA_2_BA. (Mandatory)</p> <p>9. operationalState Indicates whether the service is operational and takes on a value of “enabled”, or “disabled”. This value is set by the OS responsible for delivery of the service, and never the activation OS. (Mandatory)</p> <p>10. serviceTemplateReference Provides a reference (the name) to the associated Service Template object. (Mandatory)</p> <p>11. cFSReference Provides a reference (the name) to the associated CFS object. (Mandatory)</p> <p>12. subscriberReference Provides a reference (the name) to the subscriber object (at the CRM layer) having subscribed to the service. (Optional)</p> <p>13. userReferenceList</p>
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	<p>Provides a set of references to the user objects (at the CRM layer) who could access the service. (Optional)</p> <p>14. sapList Provides a set of associated service access point(s). (Mandatory)</p> <p>15. describedByList (Mandatory only if there are SSC in the ServiceDefinition which are NOT globally set)</p> <p>This attribute is used to register the values specific to this RFS object which have been passed over the Service Component Activation Interface to convey the value of an <i>individually</i> set SSC (i.e. not referenced in a ServiceTemplate) or to override the value of a <i>globally</i> set SSC (present in the associated ServiceTemplate)</p> <p>Each item of this attribute list is twofold:</p> <ul style="list-style-type: none"> – serviceSpecCharacteristicReference Provides a reference (the name) to a ServiceSpecCharacteristic object (Mandatory) note that the same SSC reference must be present as well in the ServiceTemplate associated to the RFS – globally set – or in the corresponding ServiceDefinition – individually set, if not present in the ServiceTemplate - – value a ServiceCharacteristicValue used either as a value of an individually set service characteristic - i.e. not referenced in the associated ServiceTemplate - or to override a globally set characteristic value - present in the associated ServiceTemplate - (Mandatory)
Source	TMF518_SB, Version 1.0

3.2.5 The Service Access Point (SAP) Object

R_TMF518_SB_I_0007	A SAP (Service Access Point) represents a set of parameters associated (directly or indirectly) with a unique (logical and/or physical) resource where the single Service can be accessed. A Service is often associated with a list of SAPs.
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0008	In addition to the attributes common to all the MTOSI objects or
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	<p>common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the Service Access Point object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. type Identifies the type of SAP. This attribute is used in the Service Definition to identify the type of SAP required at service activation time. (Optional) 2. adminState (Optional) This attribute is used when one wishes to “suspend” or “resume” a service, and may take the values of “locked”, “unlocked” or “shutting down”. It represents the suspension (or resumption) of traffic for a given subscriber. This value is only set by the activation OS. This attribute is included to preserve any backward compatibility with implementations using the ITU-T X.731 administrative state to represent actual service states. <ul style="list-style-type: none"> - The “unlocked” value corresponds to a “Provisioned_Active” state, and indicates that the service has been provisioned and activated, or that the service was previously deactivated (suspended), and has been reactivated (resumed). - The “locked” value corresponds to a “Provisioned_Inactive” state and indicates that the service has been successfully deactivated. - The “shutting down” value corresponds to a service that was previously in a “Provisioned_Active” state, was deactivated, but has not yet successfully transitioned to a “Provisioned_Inactive” state. Once the transition is successful, the adminState would change to “locked”. 3. serviceState Indicates the state of the service associated to the SAP; refer to R_TMF518_SA_2_II_0010 from the TMF518_SA_2_BA. (Optional) 4. operationalState Shall represent the operational state of the service and may take on a value of “enabled” or “disabled”. This value is only set by the OS responsible for delivery of the service for a given subscriber. (Optional) 5. subscriberReference Provides a reference to the subscriber object (at the CRM layer) accessing the service through this SAP. (Optional) 6. userReferenceList Provides a set of references to the user objects (at the CRM layer) who could access the service through this SAP. (Optional) 7. resourceReference Reference to the resource by which the service is accessed. This attribute is the name of an object
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	<p>representing such things as a mobile phone, laptop, PDA, set-top box, physical or logical connection point. (Mandatory)</p> <p>8. sAPSpecReference Provides a reference (the name) to the corresponding SAP Specification object. (Optional)</p> <p>9. describedByList (Mandatory only if there are SSC in the ServiceDefinition which are NOT globally set)</p> <p>This attribute is used to register the values specific to this SAP object which have been passed over the Activation Interface to convey the value of an <i>individually</i> set SSC (i.e. not reference in a ServiceTemplate) or to override the value of a <i>globally</i> set SSC (present in the associated Sap Specification)</p> <p>Each of item of this attribute list is twofold:</p> <ul style="list-style-type: none"> – serviceSpecCharacteristicReference Provides a reference (the name) to a ServiceSpecCharacteristic object (Mandatory) note that the same SSC reference must be present as well in the Sap Specification <ul style="list-style-type: none"> – globally set or in the corresponding ServiceDefinition – individually set, if not present in the Sap Specification – value a ServiceCharacteristicValue used either as a value of an individually set service characteristic - i.e. not referenced in the associated Sap Specification - or to override a globally set characteristic value - present in the associated Sap Specification (Mandatory)
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0009	<p>The SAP shall support six service states that are options in the serviceState attribute of the service access point object:</p> <ul style="list-style-type: none"> • Created: All resources required for the delivery of a component service to a subscriber and his/her associated service access point are available. (They have yet to be allocated and reserved). Applicable only to RFSS. • Waiting for components: At least one resource required for the service component activation for a particular subscriber and his/her associated service access point
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	<p>has yet to be fully activated. Applicable only to RFSs.</p> <ul style="list-style-type: none"> Provisioned_active: The SAP in question is allowed to deliver services defined by the CFS/RFS allocated to it. Provisioned_inactive: The SAP in question is not allowed to deliver the services defined by the CFS/RFS allocated to it. Retired: The SAP in question has been to removed from the CFS/RFS it was allocated to.
Source	New

3.2.6 The Service Access Point Specification (SAPSpecification) Object

R_TMF518_SB_I_0010	The SAP Specification defines a set of attributes and (optionally) associated values. A SAP Spec may be applied to one or more SAPs
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0011	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the Service Access Point Specification object shall have the following attributes:</p> <ol style="list-style-type: none"> applicableServices Provides a list of serviceSpecificationTypes that could use this type of SAP applicableStateValues Designates the set of the state values a SAP could have. Some SAPs may have different state values, depending on their type. serviceDefinitionReferenceList A list of references to Service Definition objects that can be supported by this SAP Spec. (Optional) describedByList This attribute specifies values (SSCVs) for the SSCs that are globally set and are to be used specifically for SAP specifications. However, when activating a Service, it may be possible to specify over the Activation Interface a ServiceCharacteristicValue on the SAP which overrides the corresponding ServiceSpecCharacteristicValue available in the associated Sap Specification. In this case the new proposed value applies only to the SAP instance created, and the ServiceSpecCharacteristicValue in the Sap Specification is not modified. The possibility to override or not must be specified for
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	<p>each ServiceSpecCharacteristic in the Sap Specification.</p> <p>Each item of this attribute list is threefold:</p> <ul style="list-style-type: none"> – serviceSpecCharacteristicReference a reference (the name) to a SSC object; this SSC object must be referenced as well in the associated Service Definition object and its must be qualified as a globally set one. (Mandatory) – serviceSpecCharacteristicUse - indicates whether the value of this SSC can be overridden (through a SCV passed over the interface) or not (Mandatory) - indicates the characteristic role, which in this case should be “Sap”, meaning it is used to defined a Sap and not the service. - also indicates possible further restrictions in terms of minCardinality and maxCardinality compared to the SSC referenced in the Service Definition (Optional) – value the unique Service Characteristic Value data structure used to indicate the SSCV value associated with the referenced SSC. (Mandatory)
Source	TMF518_SB, Version 1.0

3.2.7 The Service Catalog Object

R_TMF518_SB_I_0012	A Service Catalog represents a grouping of Service Specifications and SSCs. For example a catalog could group all internet related Service Specifications.
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0013	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the Service Catalog object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. serviceSpecCharacteristicReferenceList Provides a set of reference (names) to the different ServiceSpecCharacteristic objects available in this catalog. 2. serviceDefinitionReferenceList Provides a set of references (names) to the Service
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	<p>Definition objects available in this Service Catalog.</p> <p>3. serviceTemplateReferenceList Provides a set of references (names) to the Service Template objects available in this Service Catalog.</p>
Source	TMF518_SB, Version 1.0

3.2.8 The Service Definition Object

R_TMF518_SB_I_0014	<p>A Service Definition represents a type of Service Specification (from the SID) introduced for the purposes of Service Fulfillment.</p> <p>It defines ALL the ServiceSpecCharacteristics that must be used to create corresponding Service instances. This includes the SSCs which are:</p> <ul style="list-style-type: none"> globally set (the corresponding values are defined only in ServiceTemplates and are sometimes designated as “invariant”) and set per instance (since the ServiceDefinition does not contain any value for such SSCs, the corresponding values can be defined only over the Activation Interface and are sometimes designated as “variant”)
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0015	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the Service Definition object shall have the following attributes:</p> <ol style="list-style-type: none"> serviceSpecificationType Used to distinguish the kind of service. It contains the following attributes: <ol style="list-style-type: none"> name A short set of text readable characters to identify the kind of service - e.g. IPTV, VoIP, IMS...- (Mandatory) description A set of text readable characters giving some addition information (Optional) version Identifies the version of this service type (Optional) version Identifies the version of the Service Definition.
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	<p>(Optional)</p> <ol style="list-style-type: none"> 3. activationMode Indicates whether the designed service is activated through provisioning, or is signaled. (Mandatory) 4. sapSpecificationReferenceList A list of references to a service access point specifications that define the type of SAP allowed when accessing a given service. (Mandatory) 5. describedByList This attribute indicates ALL the SSCs that must be used to create corresponding Service instances; there are two kinds of SSCs: <ul style="list-style-type: none"> - the ones which are <i>globally</i> set (the corresponding values are defined only in ServiceTemplates and are sometimes designated as "invariant") - and the ones which are set <i>individually</i> (the corresponding values can be defined only over the Activation Interface and are sometimes designated as "variant"). <p>Each item of this attribute list is threefold:</p> <ul style="list-style-type: none"> – serviceSpecCharacteristicReference a reference (the name) to a SSC object (Mandatory) – serviceSpecCharacteristicUse <ul style="list-style-type: none"> - indicates whether the value of this SSC must be set globally (through a Service Template) or individually. (Mandatory) - also indicates possible restrictions in terms of minCardinality and maxCardinality compared to the SSC. (Optional) – valueList list of Service Characteristic Value data structures used to indicate: <ul style="list-style-type: none"> - either the exhaustive list of valid values (SSCVs) for the referenced SSC for this Service Definition - or possible further restrictions compared to the valueList proposed in the SSC (Mandatory if no value is available in the SSC). 6. containedByServiceSpecRef Provides the relationship to a Service Definition that will contain this Service Definition. For example, a parent Service Definition may be IP-Services, and this Service Definition is for IP-VPN. 7. containsServiceSpecRefList Provides a list of Service Definitions that are contained
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	<p>by this Definition.</p> <ol style="list-style-type: none"> 8. status The status of the Service Definition. It may take on one of the following values: Draft, Standard, or Proprietary. (Optional) 9. dependencies Pre-requisite service definitions that are required in order to implement this service definition. (Optional) 10. productSpecificationReference Provides a reference (the name) to the productSpecification object (at the CRM layer) associated with this ServiceDefinition (Optional) 11. serviceCatalogReferenceList List of references (the name) to the Service Catalog objects which contain this Service Definition object.
Source	TMF518_SB, Version 1.0

3.2.9 The Service Template Object

R_TMF518_SB_I_0016	<p>A Service Template represents a type of Service Specification (from the SID) introduced for the purposes of Service Fulfillment.</p> <p>It defines specific ServiceSpecCharacteristicsValues for the globally set ServiceSpecCharacteristics that can be dynamically referenced by multiple Service instances during their lifecycle span.</p> <p>A ServiceTemplate is checked against its associated ServiceDefinition by verifying the presence of the ServiceSpecCharacteristics and the validity of the corresponding assigned ServiceSpecCharacteristicsValues.</p> <p>Each of the associated Service instances will have the same invariant characteristics which values are taken from the ServiceTemplate.</p> <p>However, when activating a Service, it may be possible to specify over the Activation Interface a ServiceCharacteristicsValue which overrides the corresponding ServiceSpecCharacteristicValue available in the associated ServiceTemplate. In this case the new proposed value applies only to the Service instance created, and the ServiceSpecCharacteristicValue in the ServiceTemplate is not modified.</p>
Source	TMF518_SB, Version 1.0
R_TMF518_SB_I_0017	<p>In addition to the attributes common to all the MTOSI objects or common to all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the</p>

	<p>Service Template object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. serviceSpecificationType Used to distinguish the kind of service. It contains the following attributes: <ol style="list-style-type: none"> 1. name A short set of text readable characters to identify the kind of service - e.g. IPTV, VoIP, IMS...- (Mandatory) 2. description A set of text readable characters giving some addition information (Optional) 3. version Identifies the version of this service type (Optional) 2. version Identifies the version of the Service Template. (Optional) 3. source Determines whether the source of the OS providing the Service Template is "external" or "internal" to a given organization. (Optional) 4. serviceLocation Gives the URL of where the service component activation OS is actually located. (Optional) 5. serviceDefinitionReference A reference (the name) to the associated service Definition object. 6. describedByList This attribute specifies values (SSCVs) for the SSCs that are globally set and can be dynamically referenced by multiple Service instances during their lifecycle span. Each of the associated Service instances will have the same invariant characteristics which values are taken from the ServiceTemplate. However, when activating a Service, it may be possible to specify over the Activation Interface a ServiceCharacteristicValue which overrides the corresponding ServiceSpecCharacteristicValue available in the associated ServiceTemplate. In this case the new proposed value applies only to the Service instance created, and the ServiceSpecCharacteristicValue in the ServiceTemplate is not modified. The possibility to override or not must be specified for each ServiceSpecCharacteristic in the ServiceTemplate. <p>Each item of this attribute list is threefold:</p>
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	<ul style="list-style-type: none"> – serviceSpecCharacteristicReference a reference (the name) to a SSC object; this SSC object must be referenced as well in the associated Service Definition object and its must be qualified as a globally set one. (Mandatory) – serviceSpecCharacteristicUse - indicates whether the value of this SSC can be overridden (through a SCV passed over the interface) or not (Mandatory) - indicates the characteristic role, which in this case should be “Service”, meaning it is used to define a Service and not the SAP. - also indicates possible further restrictions in terms of minCardinality and maxCardinality compared to the SSC referenced in the Service Definition (Optional) – value the unique Service Characteristic Value data structure used to indicate the SSCV value associated with the referenced SSC. (Mandatory) <p>7. containedByServiceSpecRef Provides the relationship to a Service Template that will contain this Service Template. For example, a parent Service Template may be IP-Services, and this Service Template is for IP-VPN</p> <p>8. containsServiceSpecRefList Provides a list of Service Definitions that are contained by this Definition.</p> <p>9. status The status of the Service Template. It may take on one of the following values: Draft, Pilot, Commercial, Retired. (Optional)</p> <p>10. productOfferingReference Provides a reference (the name) to the productOffering object (at in the CRM layer) associated with this ServiceTemplate (Optional)</p> <p>11. serviceCatalogReferenceList List of references (the name) to the Service Catalog objects which contain this Service Template object.</p>
Source	TMF518_SB, Version 1.0

3.2.10 The Service Order Object

R_TMF518_SB_I_0018	<p>A Service Order is a type of request (as defined in the SID model). In particular, a Service Order is used to track and control the progress of a request for some action (e.g., provision or activation) on the Services that comprise a given product instance.</p> <p>It should be mentioned that the OSS/J Order Management API (JSR 264) defines Service Order as follows:</p> <p>“A type of Request that represents a Customer Order's products decomposed into the services through which the products are realized. Service Orders are generated within the confines of the SM&O layer.”</p>
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0019	<p>This object is used for compatibility with the OSS/J Oder Management API. As such, it does <i>not</i> contain the attributes common to all the MTOSI objects or common to all the MTOSI SM objects.</p> <p>The Service Order object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. clientID This identifies the OS that made the service request. As this may change, it may be necessary to track the various values. (Mandatory) 2. interactionDate The date and time at which the client OS made the request. (Mandatory) 3. requestedCompletionDate The date and time that the client OS has requested for completion of the service order. (Mandatory) 4. expectedCompletionDate The date and time at which the target OS expects to complete the service order. (Mandatory) 5. interactionDateComplete The actual date and time when the order was completed. Note that the requestedCompletionDate and the interactionDateComplete can be different, e.g., the service provider may be able to deliver the service before the requestedCompletionDate or the service provider may slip the date. (Mandatory) 6. validFor An indication of how long the service order shall be valid if not completed or otherwise closed. The time duration starts from the interactionDate.
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	<p>(Mandatory)</p> <p>7. description Textual information related to the service request. This can be appended to or replaced. (Mandatory)</p> <p>8. state The state of the service order. (Mandatory)</p> <p>9. priority This attribute allows the request to specify a priority for execution of the service request. This attribute is a positive integer. (Mandatory)</p> <p>10. purchaseOrder Identifies the associated customer order. (Optional)</p> <p>11. orderOwner This is the person or object (e.g., work center) that has been assigned to track the order. (Optional)</p> <p>12. serviceRequestID This is the identifier of the service request that gave rise to this order. If the service order is not created via the Service Activation Interface, then this attribute is not relevant. (Mandatory)</p> <p>13. serviceOrderItemReferenceList Provides a set of references (the names) to the service order items related to this order. (Mandatory)</p> <p>14. failedOrderItemReferenceList Provides a set of references (the names) to the service order items for which the order attempt has failed. (Mandatory)</p> <p>Note: the "Name" attribute from common attributes serves as the Service Order Id.</p>
Source	TMF518_SB, Version 1.0

3.2.11 The Service Order Item Object

R_TMF518_SB_I_0020	<p>A Service Order Item is used to represent the order aspects of the Service associated with a given Service Order. There is one Service Order Item for each Service associated with a Service Order.</p> <p>This object is used for compatibility with the OSS/J Order Management API.</p>
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Source	TMF518_SB, Version 1.0
R_TMF518_SB_I_0021	<p>This object is used for compatibility with the OSS/J Order Management API. As such, it does <i>not</i> contain the attributes common to all the MTOSI objects or common to all the MTOSI SM objects.</p> <p>The Service Order Item object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. quantity The number of such items involved in the order. (Optional) 2. action The action to take for this item. The possible values are <i>create</i>, <i>cancel</i> and <i>modify</i>.. (Mandatory) 3. description This is a string, and defines a textual free-form description of the object. (Mandatory) 4. involvedRoles This attribute references a set of 0 or more business interaction roles (Mandatory) 5. references A set of references to other (associated) order items which are not necessarily at the service level (Mandatory) 6. places This attribute references a set of 0 or more business interaction locations (Mandatory) 7. cFSReference Provides a reference (the name) to the single CFS instance associated to the Service Order Item. (Mandatory) 8. serviceTemplateReference Provides a reference (the name) of the Service Template instance associated to the CFS. (Mandatory)
Source	TMF518_SB, Version 1.0

3.2.12 The Service Spec Characteristic (SSC) Object

R_TMF518_SB_I_0022	<p>A SSC (Service Spec Characteristic) object represents a characteristic quality or distinctive feature of a Service as represented in a ServiceSpecification (specialized as ServiceDefinition or ServiceTemplate).</p>
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	<p>In particular it contains typing information which can be arbitrarily complex.</p> <p>A SSC can be atomic or composite (also called “packages”). The components of a composite SSC can in turn be atomic or composite, thus constituting a hierarchy.</p> <p>SSC objects are created at the design stage and exist on their own independently of the creation of Service Definitions and Service Templates.</p> <p>Service Definition and Service Template objects contain reference associations to SSCs through their characterizedByList attribute. Indeed the same SSC can be referenced from several Service Definitions or Service Template objects.</p> <p>CFS and RFS may also contain reference associations to SSCs through their describedByList attribute.</p>
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0023	<p>In addition to the “name” and the “description” attributes also present in all the MTOSI SM objects (see R_TMF518_SB_I_0001 and R_TMF518_SB_I_0002), the Service Spec Characteristic object shall have the following attributes:</p> <ol style="list-style-type: none"> 1. id A unique identifier for the SSC (Optional) 2. unique An indicator that specifies if a value is unique for the specification. Possible values are; "unique while value is in effect" and "unique whether value is in effect or not" (Optional) 3. valueType Specifies the valid type for values of this characteristic (Mandatory if the SSC is atomic, not applicable for composite SSCs). 4. minCardinality (Optional) 5. maxCardinality (Optional) 6. extensible An indicator that specifies that the values for the characteristic can be extended by adding new values when instantiating a characteristic for an entity. 7. derivationFormula A rule or principle represented in symbols, numbers, or letters, often in the form of an equation used to derive the value of a characteristic value (Optional, not
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	<p>applicable for composite SSC).</p> <ol style="list-style-type: none"> 8. validFor The period of time for which this SSC is applicable (Optional). 9. containedBySSCRefList Indicates the list of references (the names) to the composite SSC objects containing the SSC (a SSC may be contained in 0, 1 or more composite SSCs). (Optional) 10. containsSSCRefList Used when the SSC is a composite SSC (a package) to indicate the list of references (the names) to the SSC objects constituting the first level down the SSC hierarchy tree. (Optional) 11. productSpecCharacteristicReference A reference (the name) to the associated Product Specification Characteristic (Optional) 12. serviceCatalogRefList List of references (the name) to the Service Catalog objects which contain this SSC 13. valueList list of Service Characteristic Value data structures used to indicate the exhaustive list of valid values (SSCVs) for this SSC (Optional).
Source	TMF518_SB, Version 1.0

An example of a discrete value type SSC that will contain a non empty valueList attribute is the “802.1P priority bit”. The list of the 8 possible valid values is fixed by the IEEE standard between 0 to 7. As a consequence it make sense to associate with a “802.1P priority bit” SSC this list of valid values.

An example a discrete value type SSC that will NOT contain any proposed valueList is “color”, leaving to the ServiceDefinition objects, using this SSC, the responsibility to chose a list of possible valid colors. Two different ServiceDefinition objects may chose a totally different list of valid colors.

3.2.13 Service Characteristic Value (SCV)

R_TMF518_SB_I_0024	<p>A SCV (ServiceCharacteristicValue) is used to define the values of a set of attributes that are associated with a corresponding set of attributes in a ServiceCharacteristic object or a ServiceSpecCharacteristic object.</p> <p>A SCV can be used in two different roles always in association with a SSC reference:</p> <ul style="list-style-type: none"> • as a Service Spec Characteristic Value (SSCV): <ul style="list-style-type: none"> • When associated with a SSC reference in a ServiceDefinition, it is used to restrict the typing
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	<p>information (in this case several SSCVs may be used) or to specify additional information (e.g. default value).</p> <ul style="list-style-type: none"> When associated with a SSC reference in a ServiceTemplate, it is used to specify the value that will apply <i>globally</i> to all the Service instances conformant to this ServiceTemplate. In this case, the SSCV is set at the design stage when the ServiceTemplate is created, and it cannot be modified afterwards. as a Service Instance Characteristic Value (SICV): a SCV may be passed over the Activation Interface to convey an <i>individually</i> set ServiceCharacteristic (i.e. not reference in a ServiceTemplate) or to override a <i>globally</i> set SSCV (present in a ServiceTemplate). This value will apply only to the specific Service instance created and is stored in its <i>describedByList</i> attribute (see R_TMF518_SB_I_0004 and R_TMF518_SB_I_0006).
Source	TMF518_SB, Version 1.0

R_TMF518_SB_I_0025	<p>The only attributes of a SCV data structure shall be:</p> <ol style="list-style-type: none"> 1. valueType A kind of value that the characteristic can take on, such as “discrete”, “range” or “derived” -from a formula - (Mandatory). 2. default 3. value A discrete value that the characteristic can take on (Optional, required if the valueType is “discrete”) 4. unitOfMeasure Used to represent the unit in which the value attributes are expressed (e.g. Gbps, Mbps). 5. valueFrom The low range value that a characteristic can take on (Optional, required if the valueType is “range”). 6. valueTo The upper range value that a characteristic can take on (Optional, required if the valueType is “range”). 7. validFor The period of time for which the corresponding SSCV or SICV is applicable (Optional). 8. rangeInterval The range of values that a characteristic can take on (Optional) 9. validFor The time period for which the value is valid
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	10. containsSSCVList Used when the SSC is a composite SSC (a package) to indicate the list of associated SSCVs that are to be composite(Optional)
Source	TMF518_SB, Version 1.0

3.3 Category II: Normal Sequences, Dynamic Requirements

Not applicable for this DDP.

3.4 Category III: Abnormal or Exception Conditions, Dynamic Requirements

Not applicable for this DDP.

3.5 Category IV: Expectations and Non-Functional Requirements

Not applicable for this DDP.

3.6 Category V: System Administration Requirements

Not applicable for this DDP.

4 Use Cases

Not applicable for this DDP.

5 Traceability Matrices

Not applicable for this DDP.

6 Future Directions

7 References

7.1 References

- [1] [TMF518_FMW](#), Framework DDP-BA
- [2] [TMF518_SA_2](#), Service Activation DDP-BA, Service Activation Interface
- [3] [TMF518_SA_3](#), Service Activation DDP-BA, Service Component Activation Interface
- [4] [SD0-1](#), Dictionary

7.2 IPR Releases and Patent Disclosure

There are no known IPR claims on the material in this document. As per the TM Forum bylaws, any TM Forum member company that has IPR claims on this or any TM Forum specification needs to make the claims known to the TM Forum membership immediately.

8 Administrative Appendix

This Appendix provides additional background material about the TM Forum and this document.

8.1 About this document

This document has been generated from the [SD0-3 Template BA.dot](#) Word template.

8.2 Use and Extension of a TM Forum Business Agreement

This document defines the business problem and requirement model for Service Management. The Business Agreement is used to gain consensus on the business requirements for exchanging information among processes and systems in order to solve a specific business problem. The Business Agreement should feed the development of Information Agreement(s), which is a technology-neutral model of one or more interfaces. While the Business Agreement contains sufficient information to be a “stand alone” document, it is better read together with the Information Agreement document TMF612_SB when the Information Agreement is available. Reviewing the two documents together helps in gaining a full understanding of how the technology neutral information model solution is defined for this requirement model. An initial Business Agreement may only deal with a subset of the requirements. It is acceptable for subsequent issues of the document to add additional requirements not addressed by earlier releases of the BA. Business Agreements are the basis for requirement traceability for information models.

It is expected that this document will be used:

- As the foundation for a TM Forum Information Agreement(s)
- To facilitate requirement agreement between Service Providers and vendors
- As input to a service Provider's Request for Information / Request for Proposal (RFI/RFP—RFX)
- As input for vendors developing COTS products
- As a source of requirements for other bodies working in this area

8.3 Document History

Version	Date Modified	Description of changes
1.0	October 2007	This is the first version of the document and as such, there are no changes to report.
1.1	May 2008	Consolidation based on review comments from the team

1.2	Dec 2010	<p>For CFS and RFS: change sapReferenceList into sapList</p> <p>For SAP and SAP Specification: add describedByList</p> <p>For Service Definition and Service Template: change characterizedByList into describedByList, add containedByServiceSpecRef and containsServiceSpecRefList</p> <p>For SSC: add id, unique, extensible</p> <p>For SCV: add rangeInterval, validFor, containsSSCVList</p>
1.3	September 2011	<p>Updated sections 1.1 and 2.</p> <p>Replaced mTOP by MTNM / MTOSI everywhere in the document</p>

8.4 Company Contact Details

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8.5 Acknowledgments

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