# PSI Terms, Abbreviations and Definitions


## PSI-TAD

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# 1 Document Meta Information

## 1.1 Document Signature Table

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|---|---|---|---|
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Table 1.1: Signature Table.

### 1.1.1 Document Change Record

#### 1.1.1.1 Changes

| Date | Version | author | message |
|---|---|---|---|
| 2022-07-07 | MS1 | Wolfgang Robben | Initial version |
| 2022-07-14 | MS1.1 | Wolfgang Robben | Updated to resolve RID comments |
| 2022-09-30 | MS2 | Christian Grubert | various updates. |
| 2022-12-31 | MS3 | Dafinka Srezoska | Minor updates due to MS2 action items. Various additional updates |
| 2023-04-19 | MS4 | Christian Grubert | Added change_orders, beam characteristics, user missions, overbooking and best-effort-options |
| 2023-07-27 | MS5 | Norbert Czeranka | Added SLI, SLA, SLO, SLS, KPI and KPQ, OTM and UI and some rephrasing to overbooking. |

| Date | Version | author | message |
|---|---|---|---|
| 2023-10-06 | MS6 | Hendrik Oppenberg | Clarified on overbooking, overselling and overprovisioning, adjusted TAD definitions, resolved MS5 action items |
| 2024-01-25 | MS7 | Bela Lars Mueller | Elaborated on provider journey. Add examples of bundled offerings. Finalized overbooking concepts |
| 2024-09-11 | MS8 [1.2.0] | Thomas Schulz | Public release adjustments. |
| 2024-12-09 | MS9 [1.2.1] | Dominik Ogrodnik | SLA redefinition from UnifiedAPIs. |
| 2025-02-03 | MS10 [1.2.2] | Hendrik Oppenberg | Mission API: mission assets, products and mission management stubs. |
| 2025-04-23 | MS11 [1.3.0] | Wolfgang Robben | SatCom Ontology, Geospatial, EU CID 2023/1054. |

Table 1.2: DCR Table.

#### 1.1.1.2 Source Control

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| Repo | Date | Author | Branch | Hash |
|---|---|---|---|---|

Table 1.3: GIT Changelog Table.

Figure 1.1: DCR QR-Code.

## 1.2 Documents

### 1.2.1 Reference Documents

| Acronym | Reference | Title | Version |
|---|---|---|---|
| PSI-DL | PSI-DL | PSI CGI Document List | current MS (doc version) |
| PSI-ICD | PSI-ICD | PSI Interface Control Document | see before |
| PSI-TAD | PSI-TAD | PSI Terms, Abbreviations and Definitions | see before |

Table 1.4: Reference Documents.

# 2 Introduction

The Pooling & Sharing Interfaces Definitions (PSID) project is an ESA co-funded effort to define a common standard for the interfaces of Pooling & Sharing Systems (PSS) for Satellite Communication (SatCom) services. A PSS is a digital platform for matchmaking (Gov)SatCom users' demands (both commercial and institutional) with (Gov)SatCom providers' offers. Bringing together multiple (Gov)SatCom providers in one platform makes the market transparent, thus allowing users to get an overview of the market and to compare different offers efficiently. Additionally, a PSS assists users with little knowledge about the (Gov)SatCom domain defining their requirements on the (Gov)SatCom services. Those two aspects combined allow for fast access to the services and an efficient usage of the available capacities. To accomplish this, a PSS steps in between the usual processes of finding a provider/supplier, requesting an offer, and ordering the desired products or services, either as a service broker or by pooling products and services from different providers and offering them as an intermediary or distributor. Subsequently, the PSS can be used to monitor the services and manage multiple missions in a single application.

Eventually, a PSS can also be used as (or manage) a community hub, i.e., a number of end users or customers with similar interest that *share* their common resources and utilize a commonly obtained *pool* of (Gov)SatCom capacities. This strategy increases the efficient usage of scarce resources further.

There are already different approaches on PSSs, that might lead to an unnecessary fragmentation of the market. Therefore, a common standard for the interfaces of a PSS is required to allow the interaction between those different PSSs and reduce the effort of (Gov)SatCom providers to offer their product and services via multiple PSSs to maximize their reach.

Such a standard needs to take care of the different interfaces involved in the aforementioned processes, i.e.,

The goal of this project is to mainly define aspect 1 and to develop a software mock-up as needed to validate the various interfaces being developed.

The PSI standard derives from the existing industry-standard "Open Digital Framework" of **TM Forum** alliance[1]. The "Open Digital Framework" is a reference framework for delivering online Information, Communications and Entertainment services to the telecom world. It empowers market participants to compete and cooperate. One of PSI's goals is to make this existing standard fit for the world of satellite communication.

The consortium for this project consists of the service & technology providers SES Techcom and CGI, as well as of the (Gov)SatCom operators SES, Hellas Sat, Hispasat, Hisdesat, and LuxGovSat, and Inmarsat being both a service & technology provider and a (Gov)SatCom operator.

[1] See https://www.tmforum.org/resources/reference/gb991-tm-forums-core-concepts-and-principles-v22-0-0/

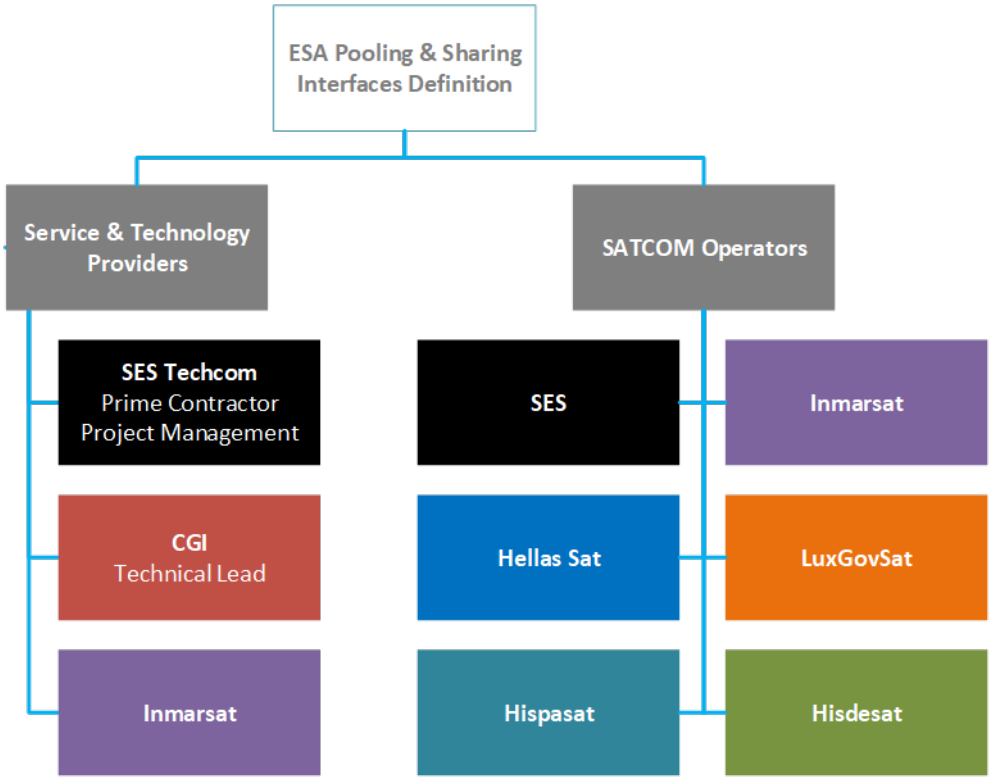


Figure 2.1: The PSI consortium.

## 2.1 Document Scope

This document contains all explanations of terminology, abbreviations and definitions used within the Pooling And Sharing Interfaces Standardisation Project (PSI).

### 2.1.1 Compiled Document

**NOTE**: THIS IS A COMPILED DOCUMENT [2]

This document has been compiled/generated from external sources and is not being written as-is. Therefore, any changes made within this compiled version of the document will be lost upon recompilation!

To make (permanent) changes, edit the respective sources directly or contact the PSID team.

### 2.1.2 Signature

Changes to this document are tracked electronically. No signature is required by the authors. The information in the “Source Control” chapter can prove the integrity of the document and reveal any change.

[2] Document compiled on 2025-04-23 12:38.

### 2.1.3 Development State

Current document version is `1.3.0`.

### 2.1.4 Release Notes

[[*TOC*]]

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### 2.1.5 PSI Release Notes

#### 2.1.5.1 Introduction

Welcome to the latest release of the Pooling and Sharing Interface (PSI) API!
This document outlines the new features, improvements, and important updates included in this version.

#### 2.1.5.2 Key Highlights

The central focus of this release is the implementation of the **Mission Management ODA Blueprint**.
This component complements the mission-related APIs by providing a *reference implementation of graphical user interfaces* that help users specify their product and service requirements.

Designed with users in mind, this component uses templates to simplify mission creation and introduces a governance layer to facilitate and control the requirements collection process.
It's built as a standalone micro-frontend and can be easily integrated into existing OSS/BSS/PSS systems.

The interface includes multiple visualization modes:

Another major update in this release is the migration to **TM Forum APIs Version 5 (TMF5)**.
All APIs have been ported to the current TMF baseline.
However, TMF5 introduced some gaps in the Component Test Kit (CTK), resulting in partial test coverage for certain APIs. This limitation will be addressed once TM Forum updates the CTK.

Additionally, this release introduces **MEF-compatible APIs**, marking the beginning of convergence between MEF and TMF frameworks within PSI.
Our goal moving forward is to support both API standards in their respective areas.

#### 2.1.5.3 What's New

##### 2.1.5.3.1 Newly Added APIs

##### 2.1.5.3.2 Updated APIs

##### 2.1.5.3.3 Added Requirements

#### 2.1.5.4 Known Limitations

#### 2.1.5.5 Feedback and Contributions

We appreciate your input!
If you experience any issues or have suggestions, please don't hesitate to contact us.
We also encourage community contributions to help enhance PSI further.

# 3 Preamble

The Pooling and Sharing Interface Definition (PSID) project develops the specifications for the interfaces of a Pooling & Sharing system based on the Open Digital Framework of TM Forum. The Open Digital Framework defines processes and business entities that are commonly used by telecommunication providers to achieve the best possible compatibility between them. Although most of the work is built around terrestrial communication services, satellite providers are interested to adapt it, too. PSID follows the same domain structure, including but not necessarily restricted to:

The terms in these documents refer to the Aggregate Business Entities (ABEs) of the Information Framework (Shared Information/Data Model, SID), including some addendums. They are described again to show the actual scope (excluding what is not required for this project) and to add some more information on how they are applied to the satellite communication context.

The actual API specification is based on the Open APIs of TM Forum, which is certified to comply with the SID. PSID applies a set of patches to create tailored OpenApi files, which are then used to generate the code stubs of the prototypes.

Note that we distinguish between the definition (PSID) and its implementation, the Pooling & Sharing Interface (PSI).

In addition, we make use of MEF's standardization approach for products via schemas. MEF (formerly Metro Ethernet Forum) is a nonprofit, global industry consortium of network, cloud, and technology providers that develops and promotes technical standards, certification programs, and best practices to drive interoperable and agile Carrier Ethernet and digital service delivery.

# 4 Terminology & Concepts

This chapter describes some core concepts and terminology necessary for the correct understanding of PSID project's approach for a standardisation and, consequently, for its development project and any follow-up activities.

## 4.1 Understanding and different Scenarios of a Pooling & Sharing Systems (PSS)

A pooling & sharing system (PSS) for (Gov)SatCom services is a centralised platform that connects users' needs and providers' offers. A provider can offer their services and add their resources to a common pool managed by the PSS from which users can select the best fitting option for their needs. A PSS gives its users a dedicated interface to specify their needs in such a way that their input can be processed automatically to find suitable options or at least to identify providers that are capable of making a serious offer. In the commercial domain, this enables open competition between providers in the (Gov)SatCom market by striving to make better and more attractive offers for the users, that can promote innovation and growth. In the governmental domain, this allows to optimise the usage of governmental (Gov)SatCom resources, e.g., as part of a common space communication plan for EU member states. Users can share the ordered resources among each other, but this is internally handled by a PSS. For example, a PSS can support defining the hierarchical structure of an organization with its sub-organizations and community of users. Therefore, an organization as a user of a PSS might order an internet access service that will be used by its sub-organizations/users.

### 4.1.1 Types of Pooling & Sharing Systems

There are different types of pooling & sharing systems and various scenarios how the stakeholders can interact with each other.

#### 4.1.1.1 Stand-Alone PSS for One Provider

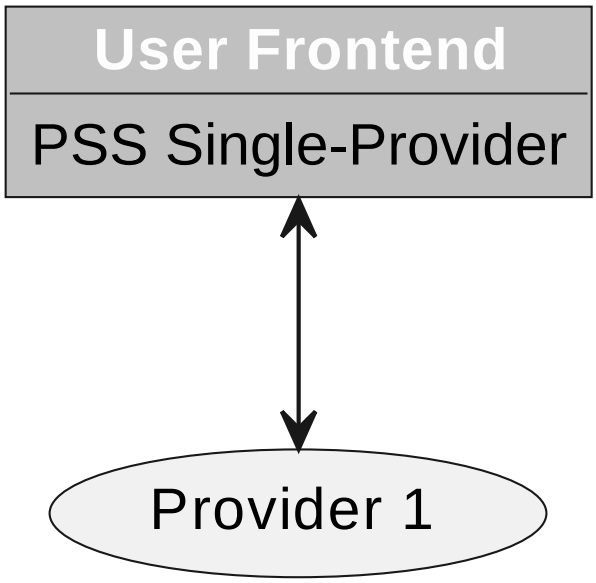


Figure 4.1: PSS set-up scenario 1.

A single provider can implement a PSS and use it basically as their sales frontend. In that case, it offers products and combines space assets/resources of a single operator. This is a scenario mainly applicable to commercial (Gov)SatCom providers but can be envisioned as a platform for non-commercial usage as well, e.g., as a tool to request secure (Gov)SatCom capacities as part of a governmental framework contract. With this setup of digitalised services, a commercial CSP can couple the PSS to their other systems seamlessly, e.g., to their Content Management or Enterprise Resource Planning systems.

It is even possible to have a direct connection with their teleport, i.e., the PSS offers a contingent of preconfigured services that are automatically configured on the teleport's hub systems. Then, a user can book or request services right away and minimal, if any, human interaction is required to set up a service through the digital (Gov)SatCom value chain created.

#### 4.1.1.2 Stand-Alone PSS for Multiple Providers

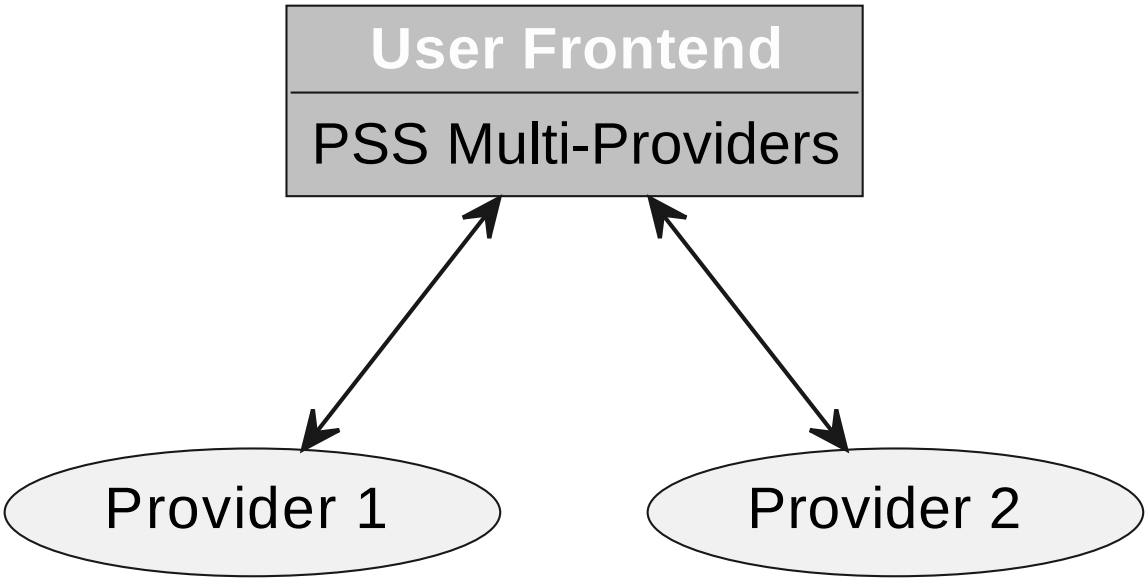


Figure 4.2: PSS set-up scenario 2.

This type of Pooling and Sharing System is similar to the one above but offers products from multiple providers. A PSS that hosts offers from different providers can work in two modes: A broker-mode and a provider-mode. As service broker, the PSS connects users and providers with each other. Therefore, the PSS supports the user to make a standardised request or browse and filter a catalogue of available products. This request is processed and a list of fitting products is presented to the user. If no option is found, the request can be forwarded to a list of providers as request for quote (RFQ) or published as an invitation to tender (ITT). The list can be filtered by the PSS to show only providers that the PSS is aware of offering similar services. In addition, a PSS can act as a provider on its own. For this, the PSS's governance can buy capacity from different providers and resell them to its users, which can be lucrative to providers. From the governance's perspective, the availability of remaining capacity that they can offer to users can be easily calculated, meaning they are less dependent on the individual providers for forecasting of demand and supply. Additionally, the governance can combine products from different providers to create high-redundancy packages for users with high-availability requirements. Such a PSS can be an open market platform for commercial services, or a hub PSS.

#### 4.1.1.3 PSS to PSS

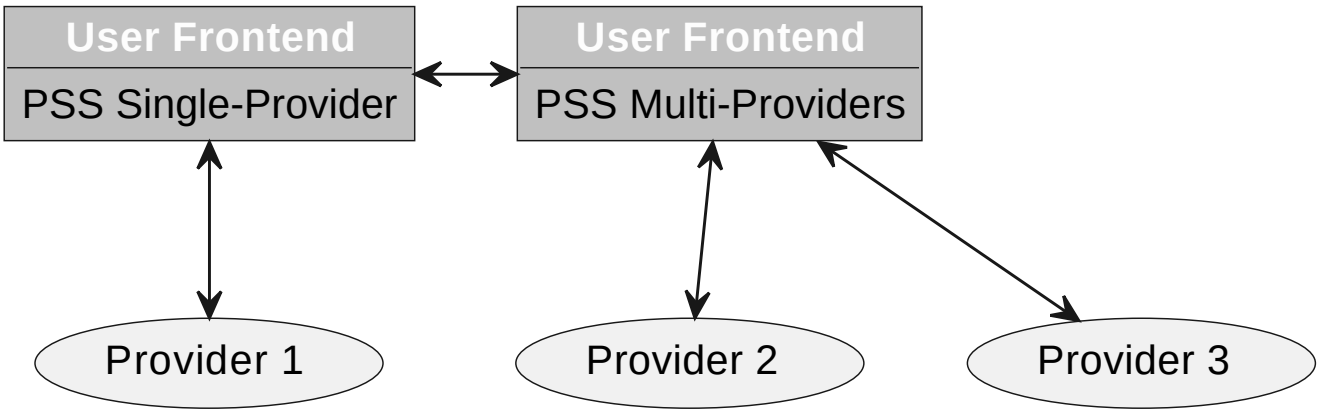


Figure 4.3: PSS set-up scenario 3.

Potentially, different PSSs can interact with each other to reach out to providers they do not have in their own portfolio. To establish new associations, it is irrelevant how many providers are onboarded on the PSS systems and how many external PSS systems are already connected. It only demands unified APIs to enable communication between the PSS instances.

#### 4.1.1.4 Hub PSS

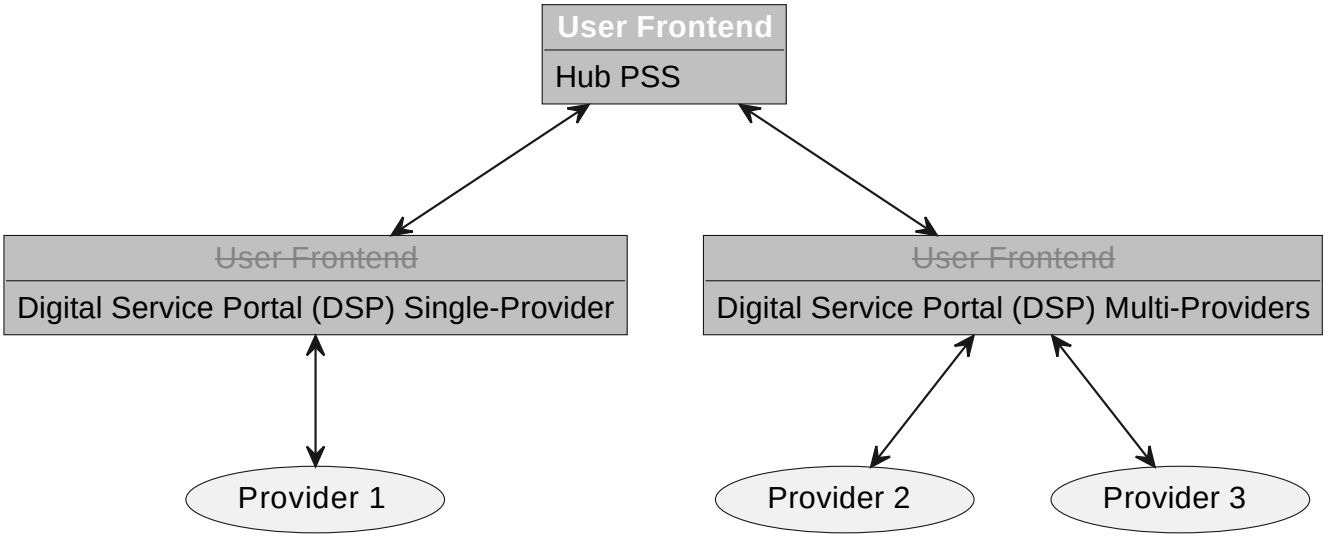


Figure 4.4: PSS set-up scenario 4.

The user frontend for those PSSs connected to the overall hub PSS is not needed and replaced with a uniform hub frontend. It is a “reference PSS” federating different PSSs including their respective provider combinations. All examples given above can potentially be combined to form a hub PSS. As depicted in the diagram, the hub PSS offers a centralised user frontend, hence the user frontends of the individual PSSs that are connected to the hub PSS are obsolete. There are plans for a European (Gov)SatCom hub to centralise the (Gov)SatCom demand & supply by European public authorities.

> The hub PSS setup is not addressed within PSI, but it is only elaborated for the completeness of the different PSS types.

#### 4.1.1.5 Control over a PSS or hub PSS

The control over a PSS or a hub federating multiple PSSs can be *community* or *commercially* driven. For example, community stakeholders controlling a PSS or hub PSS could be a consortium of humanitarian aid organisations, aiming at centralising and pooling resources to reduce costs while optimising the usage of booked (Gov)SatCom capacities.

A commercially driven PSS or hub PSS would be controlled by commercial parties.

### 4.1.2 Interactions

Regardless of the type of the PSS, it might be able to interact with other PSSs. For example, the governance of a governmental hub PSS wants to buy capacities for its pool from a commercial PSS, thus addressing the providers listed within a commercial PSS. Changing the point of view, a provider might want to offer resources to multiple PSSs as well. Despite various target systems, the provider would be greatly helped if they only had to prepare and provide their portfolio once. This can be done by exporting the data of one PSS and importing it in another, or via direct transfer. It has to be ensured however that declared resources are made available if they are listed and offered within several PSSs. In the former case, a standardised PSS-provider interface is required, in the latter one a standardised PSS-PSS interface. This way, a standardised interface enables several automated interactions that currently require a lot of human intervention. Additionally, it facilitates connections that were not thought of initially.

## 4.2 SatCom Ontology

A Satellite Communication (SatCom) ontology is a structured framework that systematically categorizes and defines the various components, relationships, and parameters within the satellite communication domain. By establishing clear definitions and interconnections among elements such as service types, network topologies, frequency bands, and security levels, the ontology provides a comprehensive understanding of the complex SatCom ecosystem. This structured approach facilitates effective communication among stakeholders, including service providers, regulatory bodies, and end-users, by ensuring a common understanding of terms and concepts.

Applying the SatCom ontology enables the precise characterization of services by mapping specific service offerings to defined categories and parameters within the framework. For instance, a governmental communication service can be described in terms of its service type (e.g., End-to-End Service), network topology (e.g., Star Topology), frequency band (e.g., Ka-Band), and security level (e.g., Assured). This detailed characterization aids in identifying suitable services for specific operational needs, ensuring compatibility between different system components, and supporting decision-making processes related to service selection, system design, and policy development. Moreover, the ontology's structured nature allows for the integration of new technologies and evolving service requirements, ensuring its relevance in the dynamic field of satellite communications.

### 4.2.1 Service Types According to EU CID 2023/1054

In satellite communications, service types are designed to address diverse user requirements and operational preferences. These services cater to varying needs by offering different levels of management and infrastructure support.

#### 4.2.1.1 End-to-End Service

The End-to-End Service provides a comprehensive communication solution that encompasses the entire transmission path from the user's terminal to the destination network. This includes satellite connectivity, ground station

operations, and integration with terrestrial networks. The service provider assumes full management responsibility, ensuring seamless interoperability and consistently high performance. This approach offers a turnkey solution ideal for users seeking minimal management overhead.

#### 4.2.1.2 Anchored Capacity Service

The Anchored Capacity Service combines satellite bandwidth with access to terrestrial anchor stations, also known as teleports. These anchor stations serve as gateways between the satellite network and ground-based infrastructure, facilitating data routing to and from terrestrial networks. While the service provider supplies the satellite capacity and manages the anchor station facilities, users are responsible for configuring and managing their own network services beyond the anchor point. This model balances provider-managed infrastructure with user-controlled network management.

#### 4.2.1.3 Raw Capacity Service

The Raw Capacity Service provides unprocessed satellite bandwidth without additional infrastructure or management services. In this model, the service provider delivers the satellite capacity, while users are responsible for all implementation aspects, including ground station operations and network configuration. This approach offers maximum flexibility, allowing customization to meet unique requirements, though it necessitates a higher level of technical expertise and resource investment from the user.

### 4.2.2 Service Profiles According to CID 2023/1053

The Union Secure Connectivity Programme has delineated specific service profiles to cater to the diverse communication needs of governmental users. These predefined profiles are designed to ensure secure, reliable, and efficient satellite-based communication services across various operational scenarios. Each of these profiles is structured to meet specific operational requirements, ensuring that governmental users have access to tailored communication solutions that align with their mission-critical needs.

#### 4.2.2.1 Robust Worldwide Low-latency Service

This profile offers global coverage with an emphasis on low-latency communications, ensuring rapid data transmission essential for time-sensitive governmental operations. It is engineered to provide robust security measures, safeguarding the integrity and confidentiality of transmitted information. This service is particularly suitable for applications requiring immediate data exchange, such as real-time situational awareness and command-and-control communications.

#### 4.2.2.2 Space Data Relay

The Space Data Relay profile facilitates real-time data transmission between satellites, aerial platforms, and ground stations. This service is crucial for continuous monitoring and data collection activities, enabling seamless communication links for Earth observation missions, unmanned aerial systems, and other platforms that demand uninterrupted data flow to ground-based users.

#### 4.2.2.3 Assured Worldwide Low-latency Service

Designed to provide secure and reliable low-latency communication on a global scale, this profile ensures that critical governmental communications are delivered promptly and securely. It is tailored for operations that cannot tolerate delays, ensuring that mission-critical information is transmitted efficiently, supporting activities such as emergency response and military operations.

#### 4.2.2.4 Assured Worldwide Narrowband Service

This profile delivers secure narrowband communication services globally, focusing on applications that require lower data rates but demand high reliability and security. It is ideal for services such as telemetry, tracking, and command functions, as well as for connecting Internet of Things (IoT) devices used in various governmental applications, including environmental monitoring and infrastructure management.

### 4.2.3 Profile and Service Type Use Cases

| Profile \ Service Type | End-to-End Service | Anchored Capacity Service | Raw Capacity Service |
|---|---|---|---|
| **Robust Worldwide Low-latency Service** | Provides a complete communication pathway with robust security and low latency, suitable for critical applications requiring high reliability. | Offers robust, low-latency communication with integration into existing terrestrial networks via anchor stations. | Supplies raw satellite capacity with robust features, allowing users to implement custom low-latency solutions. |
| **Space Data Relay** | Delivers comprehensive data relay services, facilitating real-time data transmission between satellites, aerial platforms, and ground stations. | Provides data relay capabilities with access to anchoring station facilities for integration with terrestrial networks. | Offers raw data relay capacity, enabling users to establish customised relay networks. |
| **Assured Worldwide Low-latency Service** | Ensures a secure, low-latency communication pathway, ideal for sensitive governmental operations. | Provides assured, low-latency communication with anchoring station access for seamless integration. | Delivers raw satellite capacity with assured security features, allowing for tailored low-latency implementations. |
| **Assured Worldwide Narrowband Service** | Offers a secure narrowband communication pathway, suitable for applications like IoT devices. | Provides narrowband capacity with assured security and anchoring station access. | Supplies raw narrowband satellite capacity with assured features for custom solutions. |

Table 4.1: Service profiles and service types

## 4.3 Parties

Business interactions are executed between two or more parties, which are either natural persons (“individuals”) or organizations. A party can have different roles in different interactions. For example a service provider can also be the customer and business partner of another provider, who is then a supplier, too.

A PSS might also be used as a hub where different users share resources without cost, where access to them is merely requested and approved. For easier reading, these users are also referred as customers even though they don’t explicitly pay for the resources that they are using.

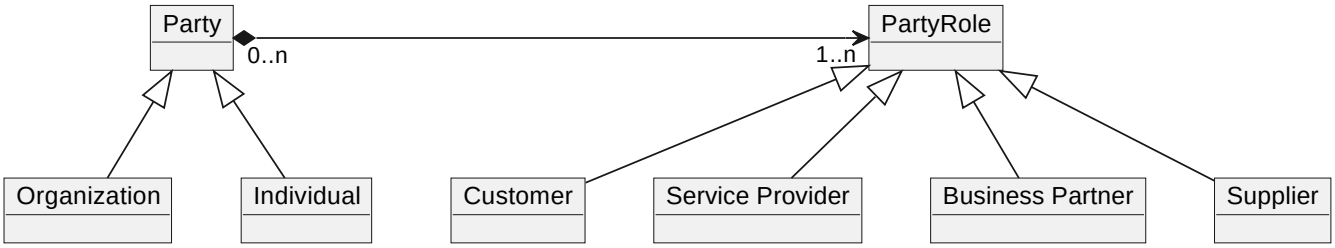


Figure 4.5: Parties and roles.

### 4.3.1 Party Relations

There are two aspects to describe the relations of parties:

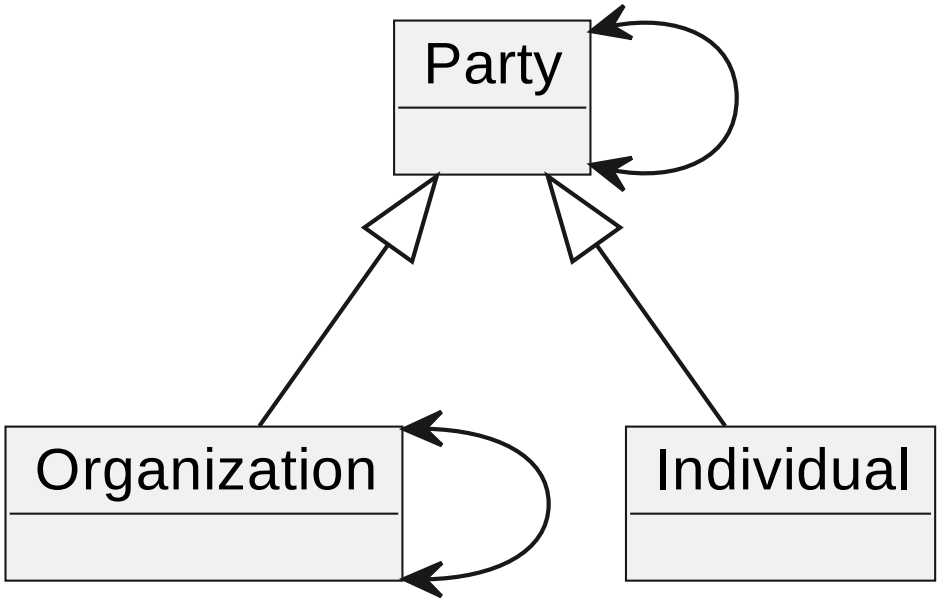


Figure 4.6: Party relations.

### 4.3.2 Party Roles

The following roles are used by the PSID in compliance with the SID[3]. As mentioned before, each party can have different roles in different contexts:

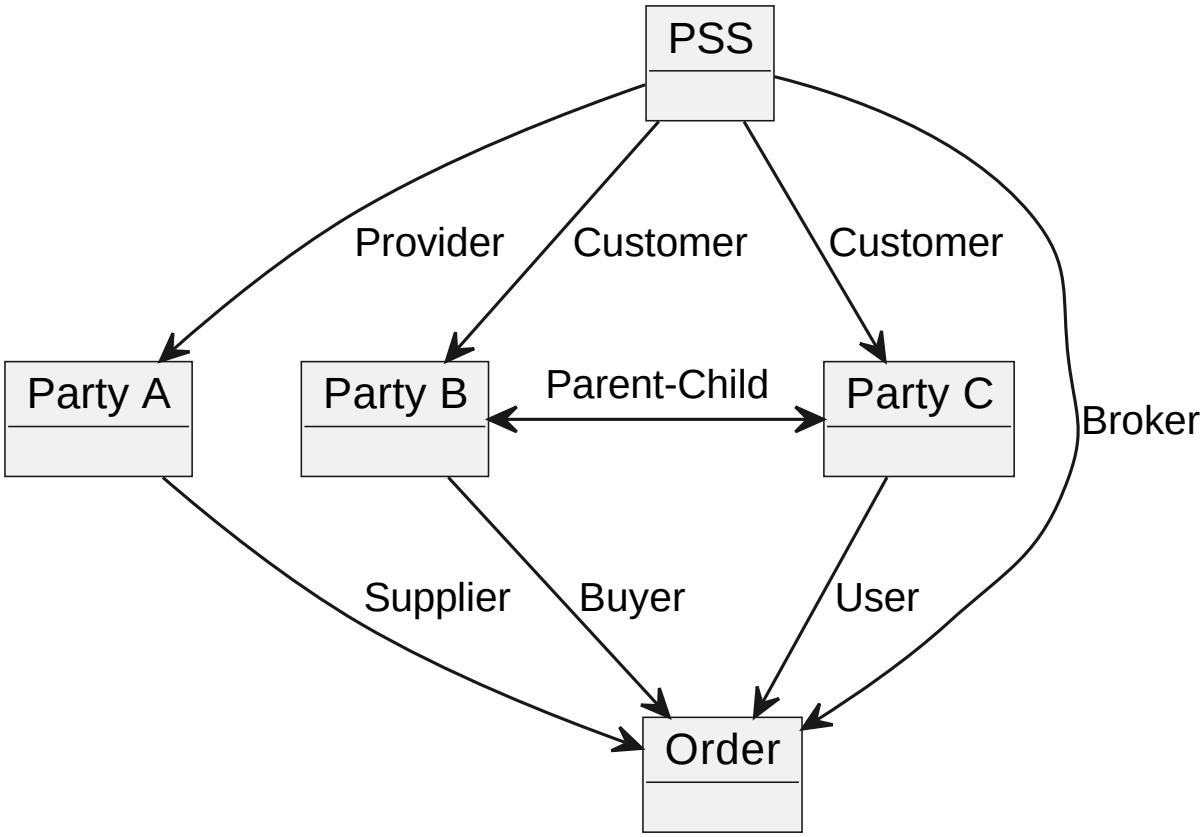


Figure 4.7: Party role example.

## 4.4 User Missions

Users conduct missions, which require certain assets to achieve a given goal; e.g. humanitarian aid or disaster recovery. Such a user mission entity is generally composed of some header information (name and description, time frame and other characteristics) and lists of places. Following TMF, the places are expressed as addresses (which may be incomplete, e.g. only a country) and/or a location object, which contains the actual coordinates (point, line or polygon). The `MissionAsset` assigns an InquiredProduct, ordered Product or User Resources to the mission. They can be in relationship with each other, e.g. a fire truck may require an internet connection to stream data.

[3] https://www.tmforum.org/Browsable_HTML_SID_R20.0/content/_3E3F0EC000E93E389BB6023C-content.html

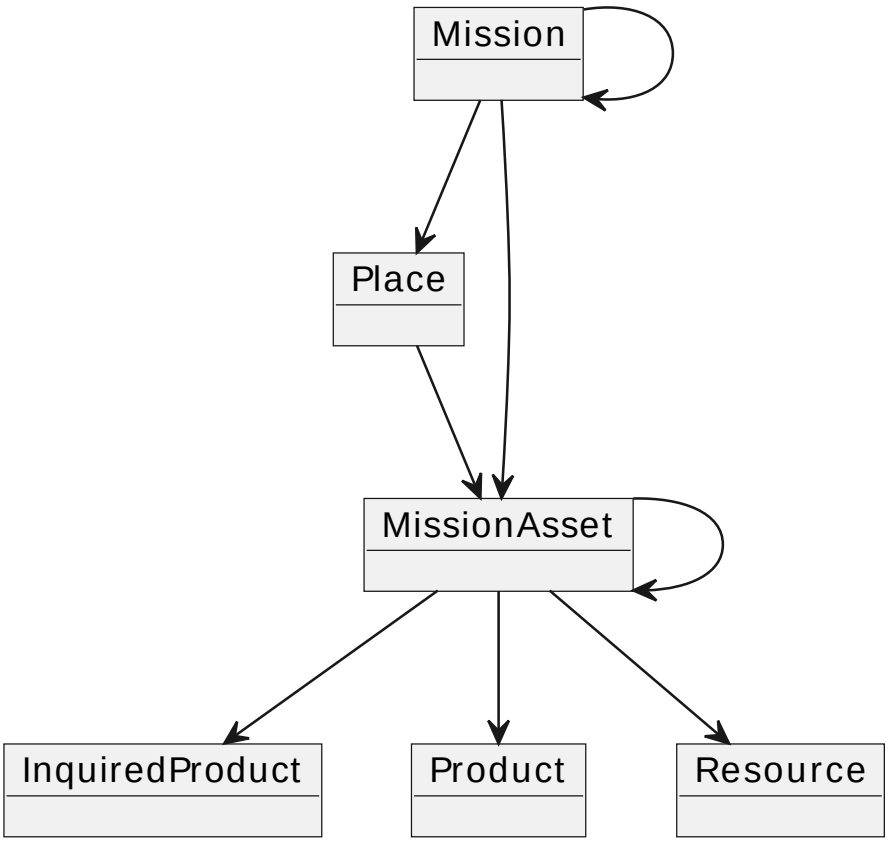


Figure 4.8: User Mission.

## 4.5 Resources, Services and Products

TM Forum introduces the concepts of resources, services, and products to allow for maximal flexibility in modelling a provider's portfolio. Resources are the different parts that are required for a service. They can either be customer-facing or hidden under a service. Then, a service is the *action*, usually performed on some set of resources. Finally, a product combines any number of customer-facing resources and/or services. A product is something a customer can actually order, e.g., if a customer wants a specific resource, this resource needs to be wrapped into a product.

Another aspect of this model is the difference between a specification and an instance of the specification. This will be discussed in Specifications, Catalogs and Offerings.

### 4.5.1 Resources

Resources are physical or logical components which are used to implement communication services. The physical ones are those you can see, touch, and hold. They are generally divided into the following groups:

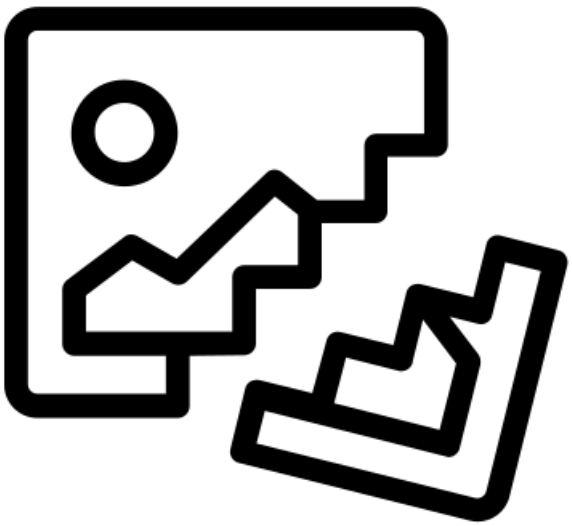

Figure 4.9: Resources and Service Demarcation Points.

Resources can be utilised either in the on-site user segment or the space segment and teleport (see figure 4.9). The ones used in the on-site user segment are a visible part of the product offered by the provider. For example, a terminal antenna could be bundled into a product and offered as part of it, or it could be offered separately to the user. If the user already owns a compatible antenna, they may want to use it to realise the offered product. On the other end, the space segment and the teleport equipment are not directly visible to the user but are required by the provider to implement the service.

The diagram below demonstrates the relationship between a resource, a service and a product. A product, or a service may require resources to be realised. Resources can be related to other resources, e.g. when a chunk of bandwidth of a provider (resource A) is leased (as resource B) to a customer (child of A). They are also related to parties which own, manage and/or use the resources.

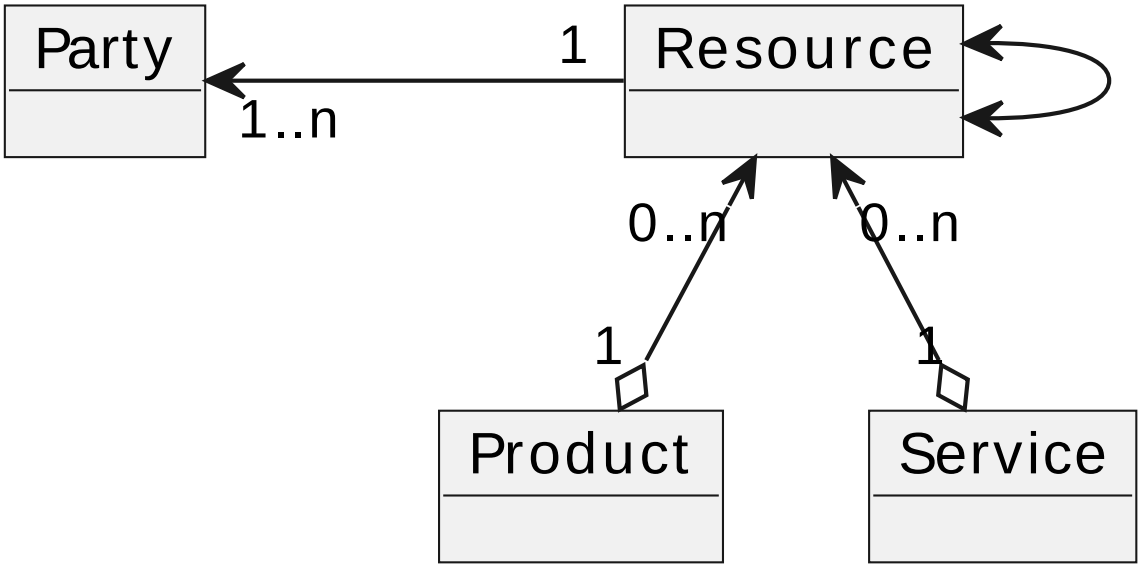


Figure 4.10: Relations of resources.

### 4.5.2 Services

Services are a predefined utilization of different resources in the teleport and the space segment, which providers offer to users, e.g. Internet Access, Telephony or Site-to-Site IP-Trunk. They may also provide value-added services, e.g. network management or field services, which do not employ resources. Services (and on-site resources) are then bundled to products, which are sold to a user.


Figure 4.11: Relations of services.

### 4.5.3 Products

A product is a wrapper entity for a services or on-site resources which is sold to a user within an order. Though it is possible to combine multiple services and resources in a single product, the nominal layer to combine them is a (bundled) offering.

The diagram below demonstrates the relationship between a product and its bundled resources and services. A product may require zero or many resources and/or services to be realised.

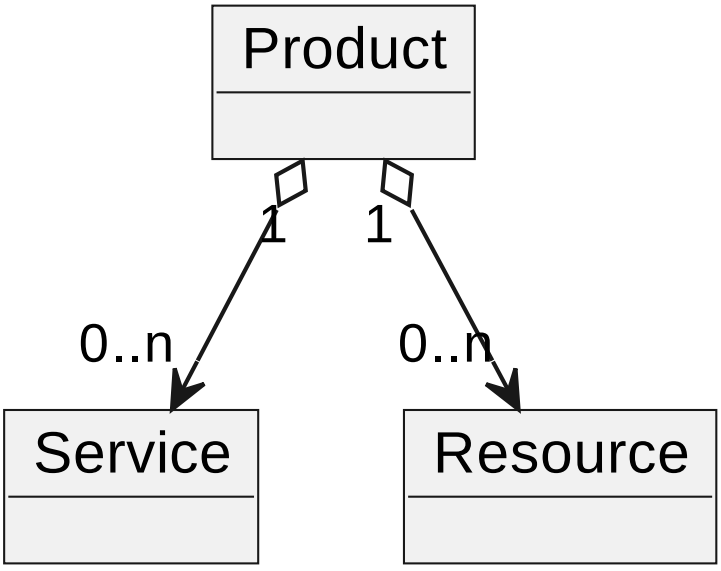


Figure 4.12: Relations of products.

## 4.6 Specifications, Catalogs and Offerings

The above-mentioned terms (resource, service and product) describe the operational business entities. They are managed in the “inventory” of the provider, customer or PSS. Before this, the user has to be made aware (e.g. by a PSS) of what a provider *could* sell them. To describe this, there are three terms defined by the SID:

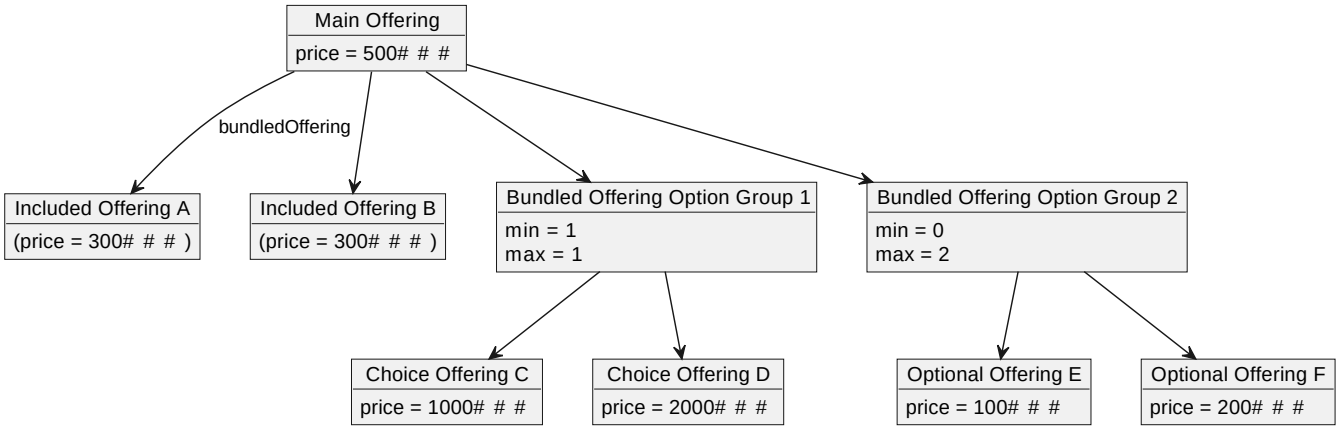


Figure 4.13: Bundled Offerings.

The example 4.13 shows an offering that bundles the two other offerings **A** and **B**, providing a discount that results in a lower package price. The included offerings may also be unpriced, which makes them sellable in said package only. Additionally, the customer must choose exactly one offering, either **C** or **D**, from option group 1. Depending on their selection, the price of the selected offering is added to the overall price. The second option group contains two optional offerings **E** and **F**, which are also added to the price when selected. The customer can select to have none of these added, add only one or two instances of **E**, add only one or two instances of **F**, or add one instance of both, **E** and **F**. Other permutations of these cases are possible, e.g., an offering for a single product with some additional options.

### 4.6.1 Types and Characteristics

The PSS defines a set of supported types for resources, services and products in consultation with the providers. It provides them in a JSON Schema file that is made available through the API itself or can be exchanged offline (cf. [PSI-ICD]). Each type then defines characteristics that describe its exact nature. For example, a resource of type “Bandwidth” contains the start and end frequencies as characteristics, while an “Internet Access” service is defined by the information rates. These definitions are then used by the providers to create specifications with concrete values in the catalogs, which can be accessed by the matchmaking to find an implementation for the needs of the customer. After a successful order, the instances that are created in the inventory are also based on the same schema.

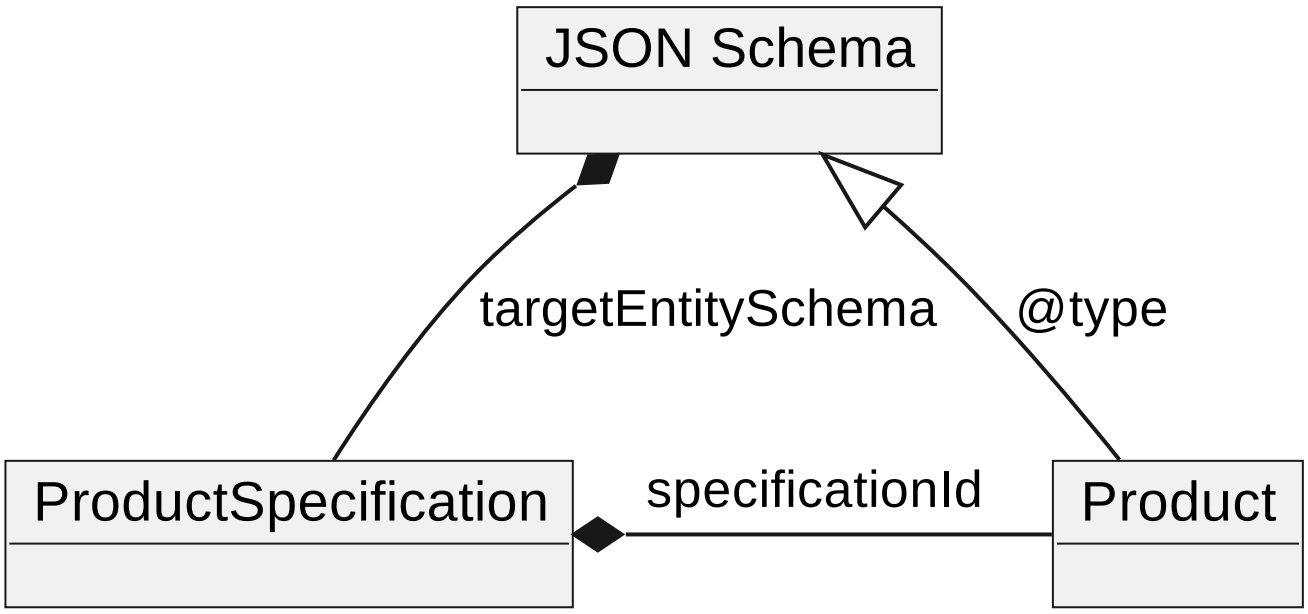


Figure 4.14: Relation between schema ("type"), specification and instance

A special characteristic is the definition of beam footprints and service areas. There are three cases considered:

## 4.7 Service Quality

### 4.7.1 Service Level Specification

A service level specification represents a predefined or negotiated set of service level objectives (SLO). The SLO, in turn, defines for a key performance/quality indicator a threshold which is to be adhered to. In case the targets are not met, the consequences define the expected outcome which in most cases would be generating an alarm.

A service specification may refer to a list of service level specifications (SLS) that must be capable of being met by corresponding service instances.

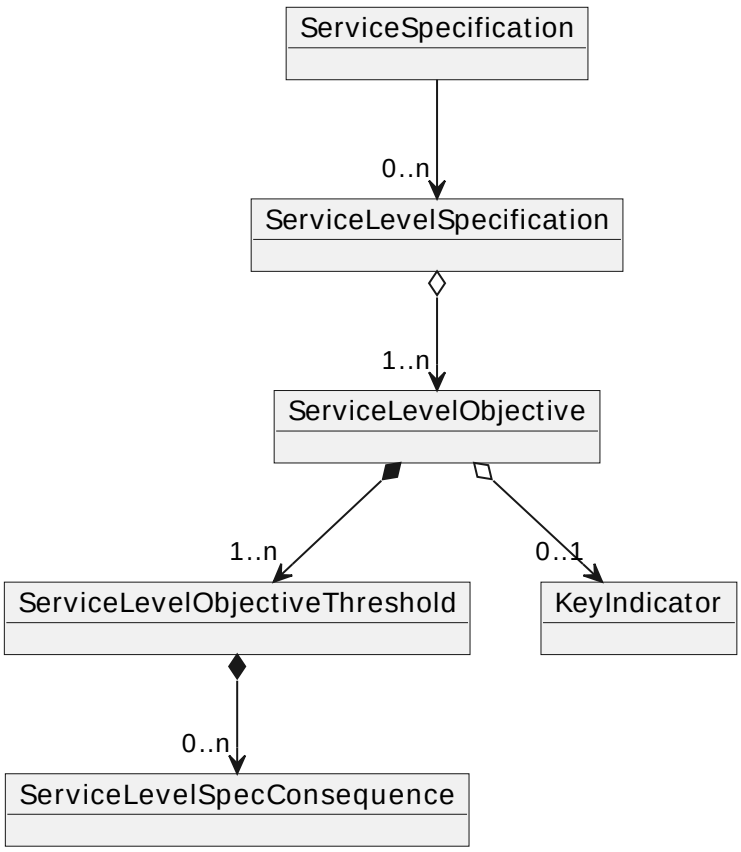


Figure 4.15: Service Level Specifications.

The service level specifications could then be used to establish a service level agreement between the customer and the provider.

### 4.7.2 Performance Monitoring

In case of services with attached service level specification, a service provider will enable performance monitoring for a provisioned service to measure the applicable KPIs/KQIs of the service as defined by the service level objectives. Examples of performance objectives encompass various metrics such as frame/packet delay, frame/packet loss ratio, inter-frame/packet delay variation, and more. These objectives serve as measurable criteria for assessing the performance characteristics of a service. In this scenario, a service provider is responsible for provisioning the appropriate measurement points and performance objectives, together with measurement intervals and schedules, as well as gathering data. Measured values are available for retrieval by the PSS by generating a performance monitoring report for the requested key indicators.

For an ad-hoc performance measurement (not related to an SLS but e.g. for supporting troubleshooting during service assurance) that is initiated for a limited time (typically a single run or non-continuous run) the on-demand performance monitoring job is provisioned to carry out the measurement of key indicators. The on-demand performance job is indicated by a performance monitoring job type. The execution of the performance monitoring job results in the generation of performance measurement reports, which deliver comprehensive performance collections.

The PSS API does not define performance indicators' specifications but can be used in combination with any specifications. This is delivered by the ServiceSpecificPayload attribute of the performance monitoring job entity which

serves as an extension point for configuring service-specific performance indicators. Reports delivered by the performance job contain ResultPayload attribute which similarly acts as an extension point for capturing and representing the outcome of performance monitoring.

### 4.7.3 Alarm

An Alarm is a specific type of notification related to detected faults or abnormal conditions. Alarms are generated by a service provider in case thresholds specified in a service level specification are violated. Alarm generation results in the creation of an event that is received by an interested party.

Alarms support both resources and services and are not restricted to any particular technology or vendor. Important entities and relationships are depicted in the following diagram.

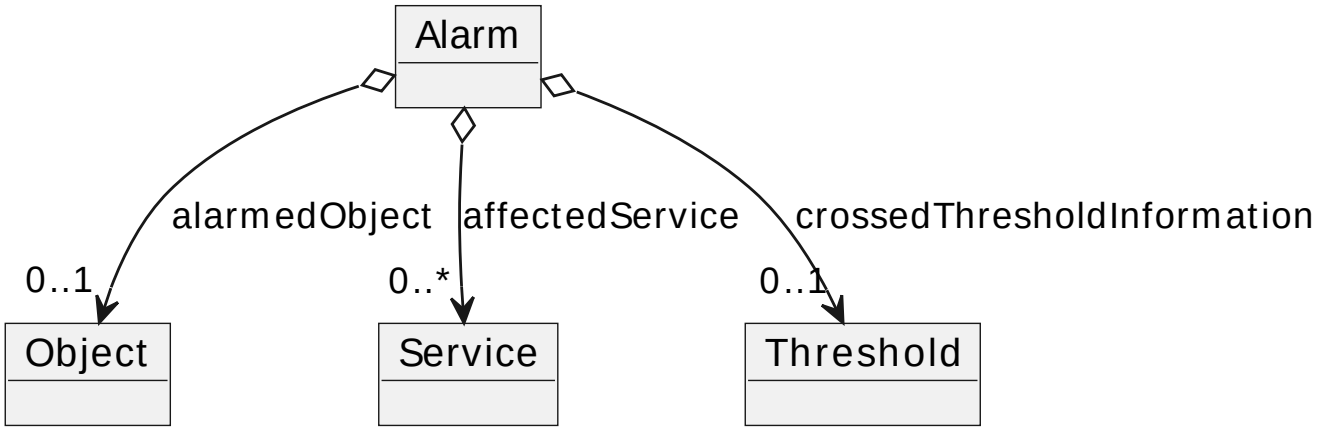


Figure 4.16: Alarm.

## 4.8 Service Demarcation Points

ESA and the associated so-called PACIS groups introduced the following classification scheme for services based on their demarcation points:

| Class | Layer | Covered OSI-Layer | Example |
|---|---|---|---|
| **L0** | Physical Communication Medium | 1 & 2 | Leasing 10 MHz bandwidth in Ka-Band |
| **L1** | Network Access / Data Transport incl. teleport | 2 & 3 | IP trunk between two sites, internet access or PSTN access |
| **L2** | Network Access / Data Transport incl. remote site | 2 & 3 | IP trunk between two sites, internet access or PSTN access |
| **L3** | Application / Value-added Services | >3 | VoIP via L1/L2 link or L1/L2 link + (leased) terminal(s) |

Table 4.2: PACIS/SSPS Service classification based on demarcation points, ISO/OSI, examples.

The demarcation points of a service define relevant parameters for the SLS of an offering, e.g., the measured latency of their connection. A basic L0 service grants a user access to a space segment (a GEO satellite, a MEO constellation, etc.) via a defined frequency bandwidth or channel. The corresponding service demarcation points are marked as **B** and **C** (Teleport as the sender) or **B'** and **C'** (Remote Terminal as the sender) in 4.17, i.e., the user is responsible for connecting to the satellite. Both sides can act either as a sender or as the receiver. The service starts when the satellite's transponder receives the signal, and ends when the signal can be received at the defined remote site. Note that neither the teleport or site sending the signal nor the remote site antenna receiving the signal are included in the service. Therefore, only the availability of the space segment and the round-trip latency from point **B** to point **C** or **B'** to **C'** can be part of an SLS.

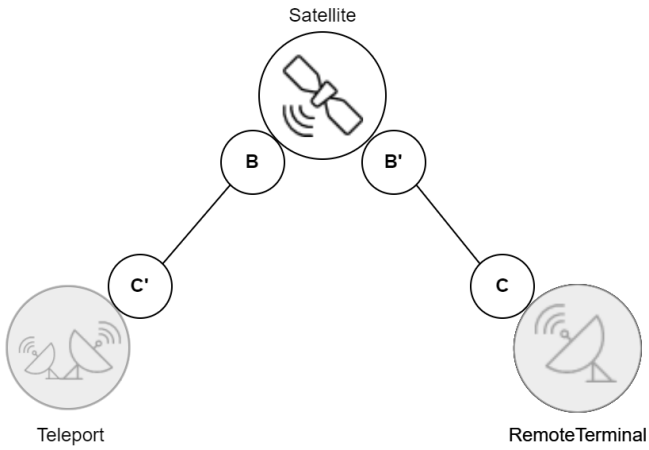


Figure 4.17: Service Demarcation Points L0.

As soon as a provider's teleport is included, the demarcation point shifts from point **B** (or **C'**) to point **A** in 4.18, which corresponds to an L1 service. This allows a provider to actively manage the connection and provide a data bandwidth with access to the internet and/or a user's private network. Thus, the provider has access to half of the connection's endpoints and is able to make statements on the network availability on their side.

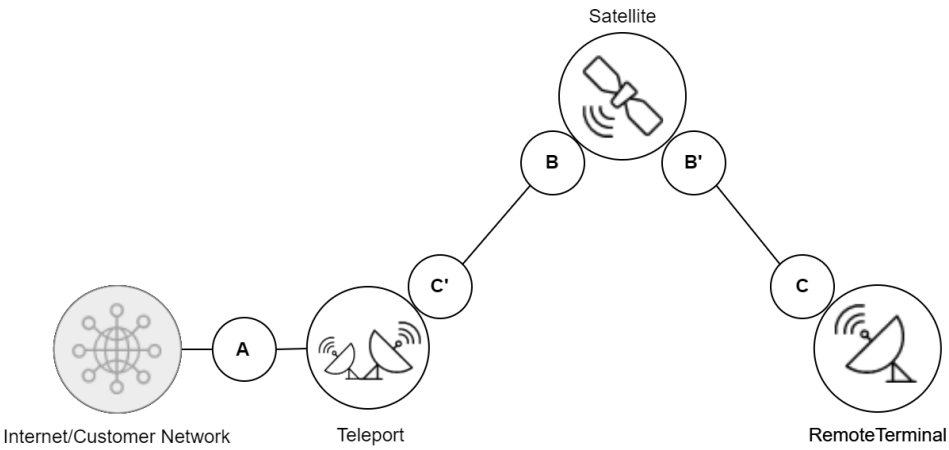


Figure 4.18: Service Demarcation Points L1.

The next step is to include the user's remote site, which corresponds to an L2 service. If a provider has to manage this one as well, the demarcation point shifts from **C** to **D**, as seen in 4.19. In this scenario, the provider has full control over the link and is able to make sophisticated statements on the network uptime and availability, as well as the network latency.

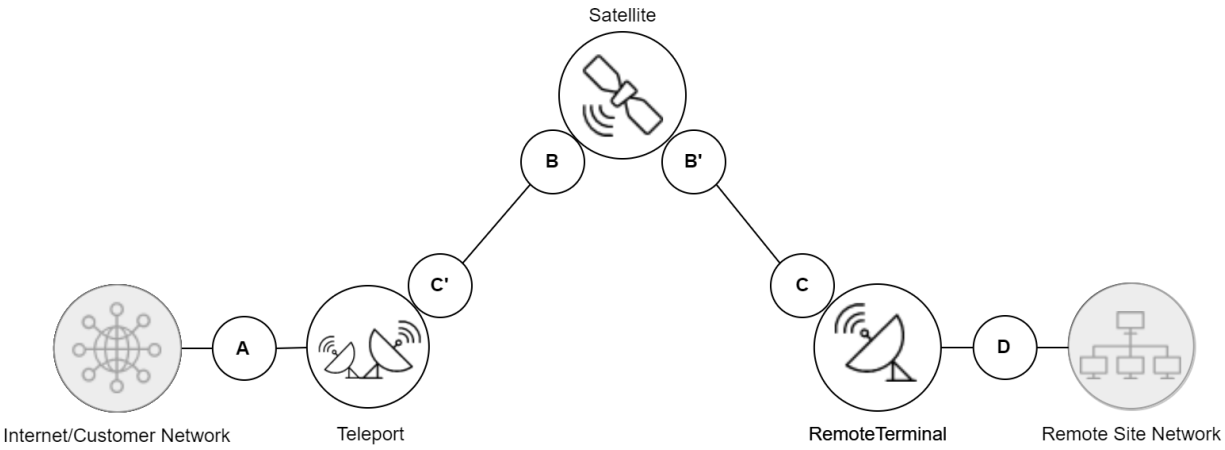


Figure 4.19: Service Demarcation Points L2.

Finally, adding value-added services to the package, e.g., 24/7 remote site support or remote site network management might shift the demarcation point even further from **D** to **E**, see 4.20. Other value-added services, such as provision of colocation space, VoIP, etc., can be located next to the Teleport. There is a cornucopia of value-added services, some depending on the details of the implemented connection. Therefore, they are collectively listed as L3 services and might involve other parts of the service not considered here.

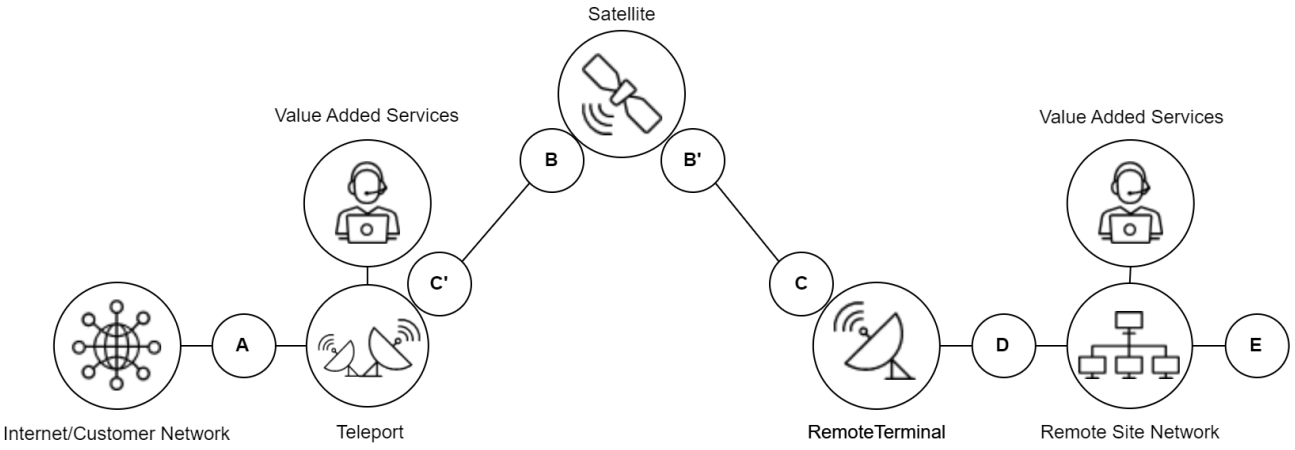


Figure 4.20: Service Demarcation Points L3.

Not categorized but inherently included in the corresponding services of each layer are the resources in the space segment (satellites, constellations, transponders), which are owned or leased by providers. Note that this model needs to be adjusted slightly if a service does not need a teleport, e.g., with point-to-point (P2P) connections. It does not include any details on the systems behind the demarcation points, e.g., if the service is deployed on a maritime vessel or if it is a connection between governmental sites.

The Information Framework (SID) of TM Forum (and by extension PSID) defines services not in relation to the underlying resources and the service demarcation points, see chapter Resources, Services and Products, although this model can be applied within this model as well. Therefore, the service demarcation points are used to define the key performance indicators (KPIs) that are part of an offering. This way, the resources and services are still kept separated, while their interdependency is still valid. Then, L3 includes all sorts of value-added services (VAS), e.g., remote site survey, sparse part management, etc., but also turn-key solutions. A VAS can be mapped to a separated product that can be bundled in an offer without interfering with the L0-L2 services.

## 4.9 Resource Pool

Pools can be used by the PSS governance to make resources available to different groups of customers. For example, they can create a separate pool for high priority users that is not accessible by others. The number and kind of pools can vary, so the following figure assume two pools to explain the concept. Entities that are not assigned to any visible pool can be interpreted to be in a “private pool” of the provider or customer, although the governance may decide to make private pools explicit.

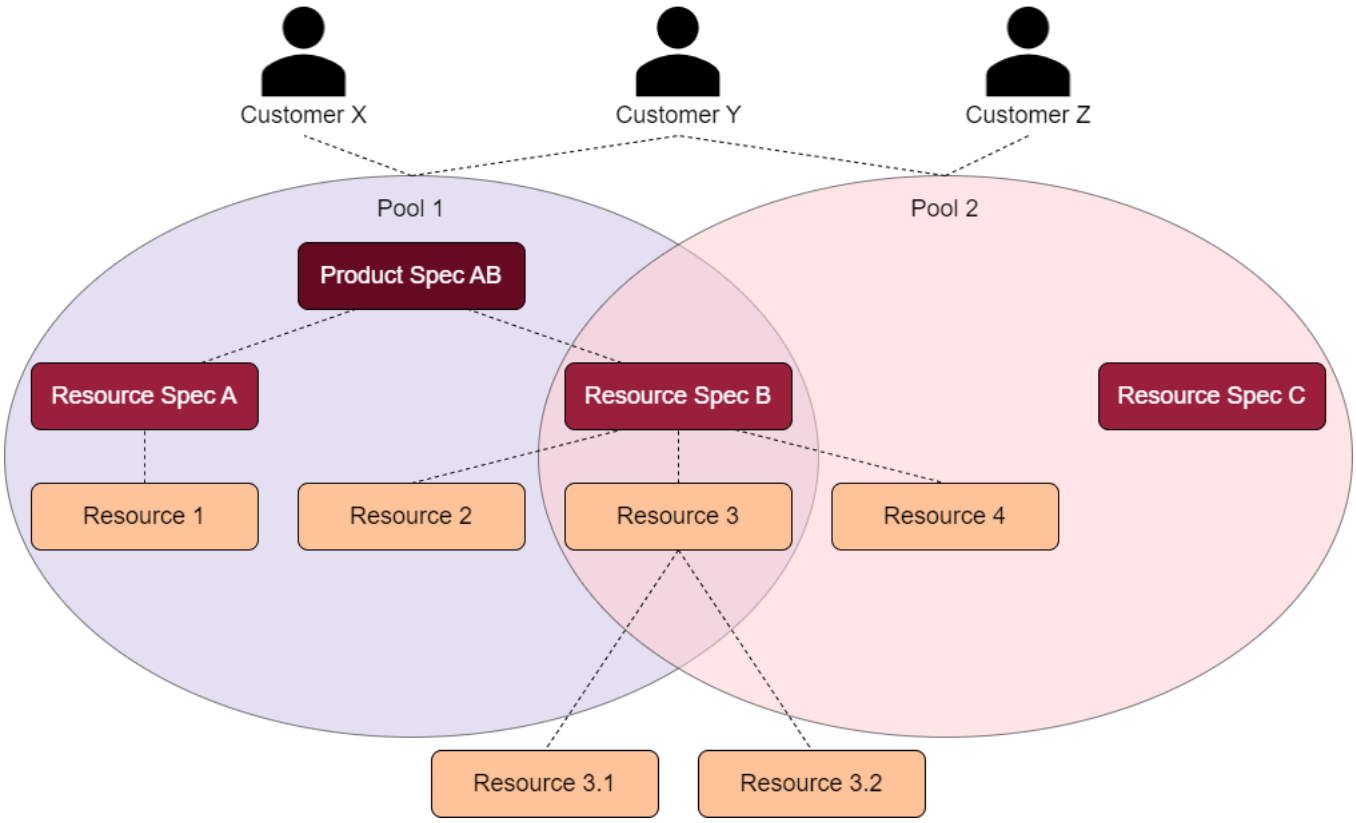


Figure 4.21: Illustration of Pools.

The assignment starts with the resource specification. It must be assigned to at least one pool, but can also be assigned to multiple ones. This makes the specification visible to all users that can access at least one of the pools. All other entities based on it (service/product specifications, offerings and committed resource instances) can be assigned to the same pools or a subset. They shall never be assigned to a pool that does not contain the underlying specification. If a product specification or offering combines multiple resource or service specification, they can only be assigned to the intersection of the pools of the latter.

Applied to the example in figure 4.21, this means that “Customer X” will find the product specification AB in a matchmaking and can access the resources 1-3 to implement it. In case resources 2 and 3 are already booked (and can not be pre-empted), the customer is **not** able to access resource 4. Customer Y in contrast could do so, as they can access both pools. Customer Z on the other hand can see the specifications B and C and even the available resources 3-4, but will have to request a quote since there is no visible product (and therefore no offering) for them. Resource 3 is booked two times and therefore has sub-resources in private pools of unlisted customers for the respective timespan of their bookings.

## 4.10 Inquiry

A user issues an inquiry to obtain product offerings from the providers. There are four types to distinguish for better comprehension:

The general data format required to exchange inquiries is expected to be the same for all cases, but the PSS will have to implement different processes for each use case.

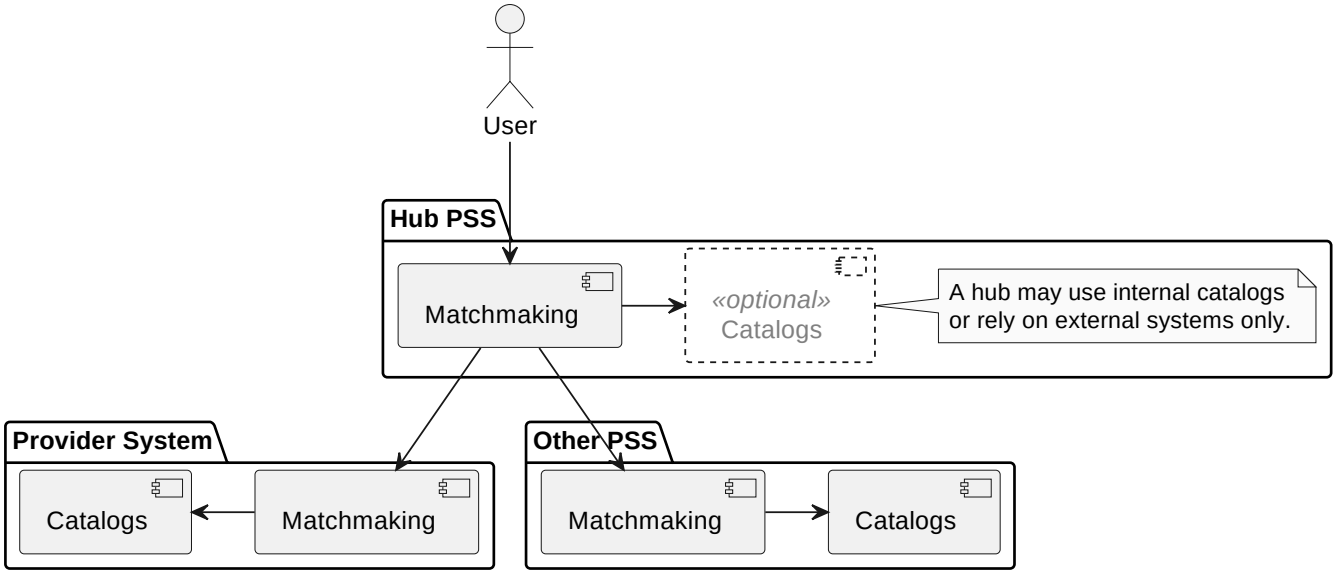


Figure 4.22: Distributed Matchmaking

As part of the inquiry request, the customer can define inquired product types and characteristics (e.g. internet access with 50 Mbps download rate). But the more restrictive the characteristics, the higher the probability that no suitable options will be found. To alleviate this situation, the customer (or the PSS) can define their absolute minimum or maximum values (e.g. 40 Mbps download rate instead of 50 Mbps). Product offerings that do not fully meet the inquired characteristics are referred to as *partial matches* and shall contain human-readable *notes* describing the rationale for deviations. This is possible for any type of customer inquiry (matchmaking, ITT, RFQ or change request).

To prevent long delays, the response time of the providers to an RFQ or ITT should be limited. When forwarding the inquiry to the providers, the PSS is responsible to pass the information for the maximum response time until the PSS is expecting the product offerings. In case the provider exceeds the given deadline, its product offerings may not be considered for the issued inquiry.

## 4.11 Order

An order lists the product offerings that the customer finally wants to book from the providers. The order also references all the parties that are related to that order. For example, it contains the customer who ordered it, the broker PSS and the service provider. The parties involved get access to the details of the order items, including e.g. quantities, selected variants, agreed prices, contractual data and further negotiation results. When necessary, this list can be extended to additional related parties such as technical contact persons. The order starts as a product order by the user and is decomposed to service and resource orders on the provider side.

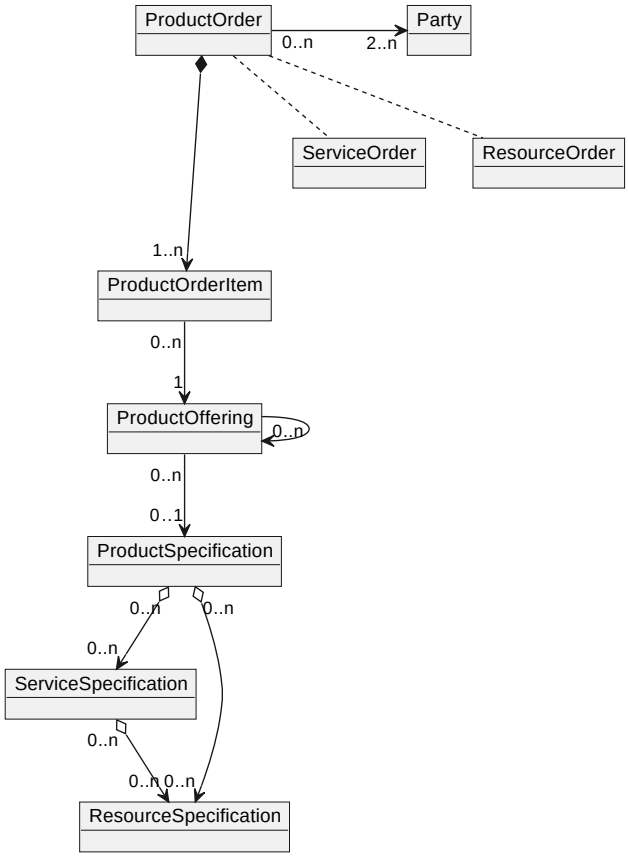


Figure 4.23: Relations of orders.

Orders can also be used to change characteristics of an active service. The PSS can show the possible options of the previously ordered product and let the user select the new values. As with the initial order, an offering for that value combination must exist or be requested via an inquiry. Then the old order is marked as `completed` and a new order is created, which defines that the old service is replaced with a new one. This way, the provider can ensure a smooth transition of operations.

## 4.12 Overbooking, Contention, and Pre-emption

*Overbooking* describes the scenario of instances of items (i.e. resources, services, and products) being offered by a provider exceeding their availability. It can be perceived as a boolean characteristic of such an item, e.g., a parameter stating that a resource is overbooked within a PSS. While overbooking is not an issue *per se*, it becomes a major one when the instances in question are finally about to be used. Then a contention situation arises. In consequence, this leads to reduced service quality of low priority customers, which may or may not be within the boundaries of their SLAs.

Overbooking and contention can be mitigated by either cancelling the order of the item or by offering a replacement. Ideally, this is done by the PSS in the overbooking-phase, before the actual contention occurs. Cancellation might result in penalties being imposed as well as bad reputation for a provider.

Additionally, priority schemes for customers can be implemented that allow for pre-emption of already booked items. Such a priority schemes might include different levels, e.g., first based on the type of customer (emergency response before private customers) followed by the product type (private customers paying for higher priority). These strategies are enabled in the API as the corresponding parameter, e.g., in the party profile.

The PSS is in charge of handling the overbooking process for committed resources and, vice versa, the providers for on-demand resources. The PSS might already be able to implement optimization of costs and accommodate a high-priority request, i.e., downgrading another request within given SLA limits. Therefore, the PSS can implement a priority scheme, that allows, e.g., for pre-emption. The PSS can submit the priority with the request/inquiry to the provider (e.g. in form of a priority list of customers or via the party profile with an agreed mechanism for handling priorities) for some resource or service request, allowing the provider to mitigate potential overbooking issues of non-committed items. However, if the PSS has (potentially) no control over the resource, therefore, this might be just a mere suggestion. Such an algorithm needs to be part of the PSS, fed by information provided by the provider and sent via the PSI API.

Every order will create a sub-entity in the PSS (optionally also in the provider system) that is assigned to the customer for the given timespan. Each child contains the actual configuration of the item for that specific customer and allows a discrete state tracking (e.g. planned, shipped, installed, returned). Depending on the implementation, the resource can be further subdivided, e.g., if it is shared with another user or is resold by a service provider. The API allows transferring the information on a resource state.

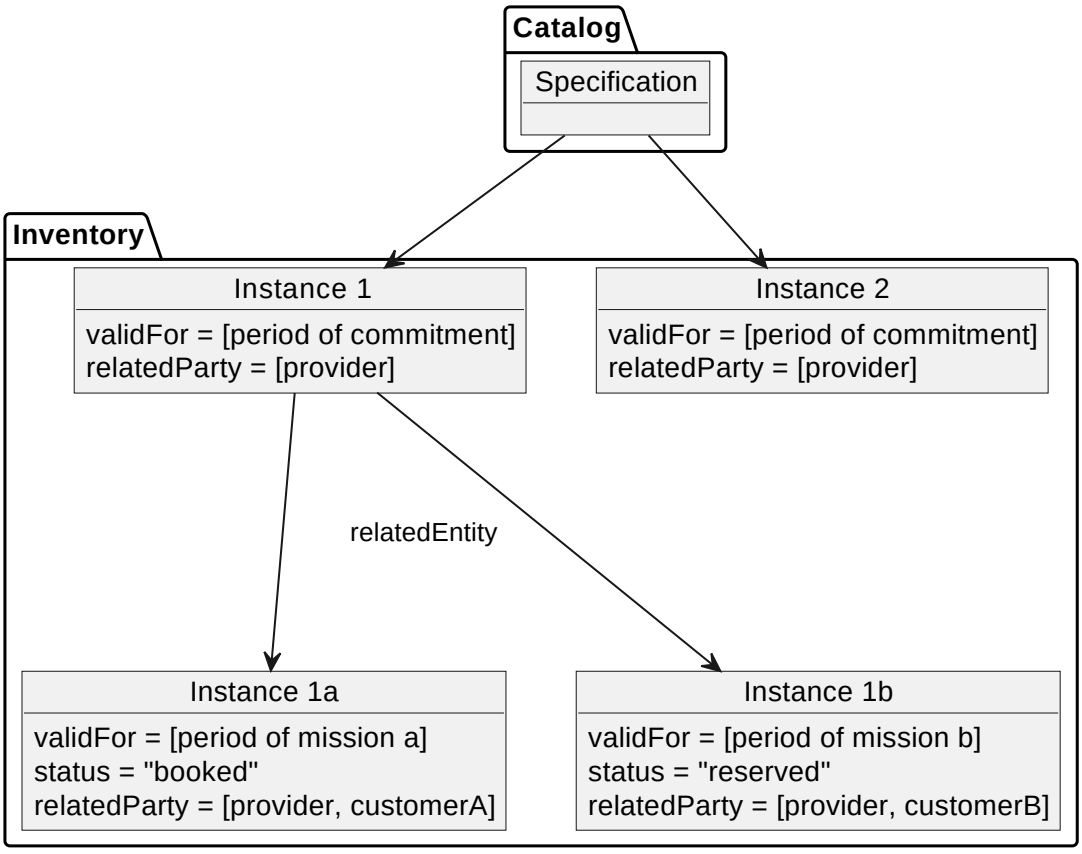


Figure 4.24: Tree of resources.

For committed resources, the PSS can calculate the booking capability as part of the matchmaking: Physical resources (e.g. terminals) are bookable when there is no sub-entity in the inquired timespan. For logical resources (e.g. bandwidth) the implementation has to sum up the assigned amount (MHz or Mbit), subtract it from the available amount and compare it with the inquired value. If the resource is booked as part of *Product A*, it is not available for *Product B* any more (excluding pre-emption etc.). As for on-demand resources, the PSS may still send a check-stock-request to the provider to ask for additional resources.

Another aspect to overbooking is *reserving* a specific resource, e.g., reserving a raw bandwidth for a dedicated period of time without actually booking it. For example, a customer may anticipate a mission starting in two months

but doesn't actually know if it will really take place. Some providers offer an option to reserve the bandwidth for a certain time. This allows the customer to set up the mission, knowing, that the required resources will be available. A reservation might be cheaper (although not cost-neutral) than actually booking a resource ahead of time. Again, the decision on such a possibility is to be implemented within a PSS or even on provider side, if they allow reservations on their resources. Thus, the API itself allows to transfer a state to the resource without actively deciding if reservation is possible.

Lastly, a PSS can distribute resources into multiple regional pools in order to perform demand/supply forecast. It could be assumed then that the actual resources are not required at same time and in same pool. However, if this does not hold true, workflows shall be in place to mitigate resource conflicts. The actual overbooking subsequently has an impact on the supply to demand ratio of multiple regional pools. Overbooking is handled according to the type of product. For physical and logical resources (e.g. raw bandwidth) no overbooking is envisioned. However, leasing raw bandwidth for very short time frames is already supported by the API. In contrast, managed services already distinguish between *committed* and *peak* information rates. As result, the CIR is booked and cannot be overbooked; the PIR however can be shared.

Since the processes elaborated here are internal to the PSS, they are not covered in more detail here. Rather, overbooking in all aspects as described within this chapter is a process that will be handled by the PSS. PSI shall allow overbooking, i.e., send the information to the PSS that is then enabled to handle overbooking situations accordingly, but not impose any mechanisms based on overbooking situations.

# 5 Abbreviations

## 5.1 General Abbreviations

The table 5.1 below lists all abbreviations used in the context of PSID, i.e. in communication, design/documents and implementation.

| Abbreviation | Expansion |
|---|---|
| ABE | Aggregated Business Entity |
| ACL | Access Control List |
| ADR | Architecture Decision Records |
| AITF | Automated Integration Test Framework |
| AOO | Area of Operation |
| AOP | Aspect-Oriented Programming |
| API | Application Programming Interface |
| ASF | Apache Software Foundation |
| BSS | Broadcasting Satellite Service |
| BUC | Block Up Converter |
| CD | Continuous Delivery |
| CI | Configuration Item |
| CI/CD | Continuous Integration / Continuous Delivery |
| CIA | Confidentiality, Integrity, Availability |
| CIR | Committed Information Rate |
| COTS | Commercial Off-The-Shelf |
| CRM | Customer Relationship Management |
| CRUD | Create, Read, Update, and Delete |
| CSP | Communication Service Provider |
| DaC | Documentation-as-Code |
| DI | Dependency Injection |
| DL | Document List |
| EIRP | Effective Isotropic Radiated Power |
| ESA | European Space Agency |
| eTOM | TM Forum Business Process Framework, formerly known as Enhanced Telecom Map |
| EU | European Union |
| GDPR | General Data Protection Regulation |

| Abbreviation | Expansion |
|---|---|
| GEO | Geostationary Earth Orbit |
| HMI | Human-Machine-Interface |
| ISMS | Integrated Security Management System |
| ITT | Invitation To Tender |
| IVV | Integration, Verification and Validation |
| JMS | Java Messaging Service |
| JWE | JSON Web Encryption |
| JWT | JSON Web Token |
| KPI | Key Performance Indicator |
| KQI | Key Quality Indicator |
| LNB | Low-Noise Block Downconverter |
| MEF | A nonprofit global consortium that defines standards for Carrier Ethernet and digital services |
| MEO | Medium Earth Orbit |
| MIR | Maximum Information Rate |
| N/A | Not applicable |
| NMS | Network Management System |
| OS | Operating System |
| OSS | Operations Support System |
| OTM | On-the-move |
| P&S | Pooling & Sharing |
| PACIS | Pacific Asia Conference on Information Systems |
| PIR | Peak Information Rate |
| PKI | Public Key Infrastructure |
| PMDB | Project Management Database |
| P2P | Point-to-point |
| PM | Performance Monitoring |
| PSI | Pooling And Sharing Interfaces Definition Project, implementation |
| PSID | Pooling And Sharing Interfaces Definition Project, definition |
| PSS | Pooling & Sharing System |
| PSTN | Public Switched Telephone Network |
| RBAC | Role based access control |
| RC | Recurring Charge |

| Abbreviation | Expansion |
|---|---|
| REST | Representational State Transfer |
| RF | Radio frequency |
| RFQ | Request for Quote |
| RTM | Requirements Traceability Matrix |
| SCPC | Single Channel per Carrier |
| SID | Information Framework |
| SLA | Service Level Agreement |
| SLI | Service Level Indicator |
| SLO | Service Level Objective |
| SLS | Service Level Specification |
| SSPS | Secure (Gov)SatCom Pooling And Sharing System |
| TAD | Terms, Abbreviations, and Definitions |
| TBD | To Be Defined |
| TLS | Transport Layer Security |
| TMF | TM Forum, TeleManagement Forum |
| TOD | Tasks and Operations Dictionary |
| TS | Technical Specification |
| Telco | Telecommunications Company |
| UCSM | Unified Communication Service Manager, COTS PSS Software by CGI |
| UI | User Interface |
| URI | Uniform Resource Identifier |
| VAS | Value-Added Services |

Table 5.1: General abbreviations used in the scope of PSID.

# 6 Definitions

The table below lists all definitions that are being used in the context of PSID, i.e. in communication, design/documents and implementation.

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Agent | An *Agent* is a system with non-trivial reasoning capabilities, a state, a memory and the means to initiate actions. | |
| Alarm | An *Alarm* is a specific type of notification concerning detected faults or abnormal conditions. | Alarms are generated by a Service provider in case thresholds specified in a service level specifications are violated. |
| API Gateway | The *API Gateway* is the only access point for all clients and hides the backend from the caller. | Modern applications distribute the work and responsibility among a collection of backend services. This complexity of the backend is of no relevance for the caller and is hidden behind the *API Gateway*. In addition, the *API Gateway* takes care of common tasks like authentication, load balancing, security measures, rate limiting, etc. |
| Area Of Operation | *Areas Of Operation* (AOOs) are predefined geographical areas in and for which a PSS is willing to provide services to its customers. | An AOO is defined by the system governance who should keep track of AOOs where no service is available. Note that this is very different from a mission zone, which is defined by a customer and can cover areas where the PSS cannot offer any service. |
| Attachment | An *attachment* represents an actual binary content along with the mime type, size, or url to a file storage where the actual attachment can be accessed. | An *attachment* belongs to a document. |
| Catalog | A subset of the portfolio containing only currently offered entities. The *catalog* thus contains product specifications, service specifications, and resource specifications, as well as product offerings. | Required for on-demand and offered resources. |
| Contention | A *contention* situation arises, if the sum of the capacity (e.g., the CIRs) allocated for all services sharing the capacity of the same underlying resources actually exceeds the total available capacity, i.e., when the overbooking actually manifests itself. | *Contention* always needs to be mitigated, e.g., by processes implemented by the PSS based on priority and/or pre-emption. |

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Customer | A customer utilizes a PSS to model/specify, find and acquire services and resources, usually becoming customers of providers. | A role of a business party. |
| Dedicated Service | A *dedicated service* is a special kind of service that can either have no PIR assigned or have the PIR equal to the CIR. If a resource is used to implement multiple instances of a service or different services, each customer has a dedicated chunk of the underlying resource that is never shared with another customer. | |
| Document | A *document* describes the metadata for associated attachment(s). It contains characteristics such as name, related parties, version, lifecycle status, etc. | A *document* contains a list of one or more attachments. |
| Geospatial Intelligence | *Geospatial Intelligence* is information obtained through a detailed analysis of images, data, and calculations related to a specific location, often used to address geographic challenges. This includes, but is not limited to, analyzing imagery, location data, and information derived from processed spectral, spatial, and time-integrated sources. | |
| Inventory | A set of concrete products, services, and resources. | Required to commit items, but may also be dynamically managed as part of the order process to enable monitoring. |
| Item | Sometimes used collectively for resource, service, and product. | |
| Key Performance Indicator | *Key Performance Indicators* (KPI) are technical and organizational parameters and requirements on services. KPIs are features/criteria guaranteed (incl. e.g. boundary conditions) by the provider to a customer. | They can also exist at PSS level, e.g., coverage of different areas, frequency bands available, delay between request and offer, ratio of successful request served etc. |
| Mission | A *mission* is a set of customer-defined products within the same operational context and scope. | |
| Mission Zone | A *mission zone* is a geographical area that a mission takes place in. | A mission has one or more mission zones. Services terminate in one or more mission zones. |

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Operation | An *operation* is a low-level activity towards concluding a certain task. It is the third level of hierarchy of the TOD. | |
| Order | An *order* is created when a customer requests to book a product. | |
| Order Process | The *order process* describes the full lifecycle of an order, beginning with an order request by the customer and the termination of the order by deletion through the customer or provider or by the end of the booked period. | |
| Overbooking | *Overbooking* refers to the scenario of more instances of an item being offered by a provider than are actually in stock. | For example, If the sum of the CIRs of all services sharing the capacity of the same underlying resources will exceed the total available capacity at some point in the future, the services are subject to overbooking. |
| Oversub-scription | Shared services are subject to oversubscription if the sum of the PIRs of all services sharing the capacity of the same underlying resources exceeds the total available capacity, but the sum of the CIRs does not. | |
| Partial Match | An inquiry initiated by a customer leads to the identified product offerings. An offering is called a partial match if it does not fully satisfy the inquired product characteristics. | For example, the customer inquires about a 50 Mbps download rate for internet access, but the provider can only offer a maximum of 40 Mbps. A PSS can enable the customer to specify the allowed deviation for each product characteristic in the customer inquiry. |
| Business Party | An organisation or individual taking part of a business interaction, e.g., as a customer or provider. | A party can have different roles in different interactions. |

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Performance Monitoring Job | *Performance monitoring jobs* contain the configuration of performance objectives, the related subject (service or other type of entity), measurement intervals and schedules to enable performance monitoring. Examples of performance objectives encompass various metrics such as frame/packet delay, frame/packet loss ratio, inter-frame/packet delay variation, and more. These objectives serve as measurable criteria for assessing the performance characteristics of a service. | The PSS implementation supports a single type of jobs. On-demand performance monitoring jobs are initiated for a limited time, typically a single run or non-continuous run, to carry out the performance measurement tests and support troubleshooting during service assurance. |
| Performance Monitoring Report | *Performance monitoring reports* are output of the performance monitoring job processing or generated on request. They contain performance data produced as a result of the provisioning of a service with an attached SLS. *Performance monitoring reports* deliver comprehensive performance collections to the requesting party. | |
| Personal Data | *Personal Data* as defined by the EU GDPR; a PSS needs to be EU GDPR-compliant. | |
| Pool | A pool is an arbitrary set of resources that can be used to organize, analyse, and manage them. | |
| Portfolio | A set of product, service and resource specifications that where, are, or will be offered to the customer. | May be used by the PSS to look up “system familiar” resources. |
| Product | A *product* bundles one or more service or resource to be offered to customers. | |
| Product Offering | A *product offering* is a concrete offer of a product specification to a customer. This can be through a catalog or directly to a user (as the result of ITT or RFQ). It also contains other business-related information such as SLSs and pricing information. | |
| Product Specification | A *product specification* describes general characteristics a product can have based on its resource type. | The *product specification* allows a provider to specify the parameters they can offer. |

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Provider | *Providers* offer their products to customers of a PSS. | A role of a business party. |
| PSS | An expert system and service broker for SatCom-centric service. | The solution aggregates both the supply and demand of (Gov)SatCom services, and provides business processes facilitating the management of the services and resources. |
| Resource | A communication(-associated) resource like RF bandwidth, terminal hardware etc. A resource implements an underlying resource specification with a specific resource type. | Resources are inputs to a PSS and are brought into by providers. A PSS constructs/markets/brokers products from resources. |
| Resource Precedence | The hierarchy / precedence of resource that a PSS might offer/use. | Customers' private resources > committed resources > offered resources > non-offered resources (fitting resource known, but no offers) => query providers > non-existent resources (no fitting resource known => query providers) |
| Resource Specification | A *resource specification* describe general characteristics a resource can have based on its resource type. | The *resource specification* allows a provider to specify the parameters they can offer. |
| Resource Type | A *resource type* is an abstraction of a resource based on type (e.g. "terminal", "router", "constellation", ...), which describes all necessary parameters for resource specifications and resources of that type. | The *resource type* is defined by a JSON schema and is referenced by the `@type` parameter. |
| Service | A communication service that is specified by and brokered/given to customers of a PSS. A service implements an underlying service specification with a specific service type. | *Services* are inputs to a PSS and are brought into by providers. A PSS constructs/markets/brokers products from services. |
| Service Specification | A *resource specification* describe general characteristics a resource can have based on its service type. | The *service specification* allows a provider to specify the parameters they can offer. |
| Service Termination Type | A service's *termination type* specifies for each mission zone in which manner it shall be terminated (e.g. fixed, on-the-move, aviation, maritime). | |

| Term | Definition | Explanation / Understanding |
|---|---|---|
| Service Type | A *service type* is an abstraction of communication services based on type (e.g. “internet access”, “telephony”, ...), which describes all necessary parameters for services of that type. | |
| Shared Service | A *shared service* has different values for CIR and PIR. The total capacity can be shared by multiple customers. | |
| System Actor | System actors are entities (organisations, people, systems) who interact with a PSS. | Examples of system actors are system operators, customers, and providers. |
| System Governance | The *system governance* is the governing body of a PSS. | A PSS’s governance is tasked with e.g. the management of service and the adjustment of workflows and configuration parameters to tailor a PSS to the operational rules, needs and realities. |
| Task | A *task* represents a business process which consists of a group of low-level operations that need to be performed to conclude it. It is the second level of hierarchy of the TOD. | An example task is *Party Management*. It involves low-level operations such as *Create Party Profile* or *Delete Party Profile*. |
| Task Category | A *category* provides logical grouping of tasks that belong to a same high-level business process. It is the first level of hierarchy of the TOD. | An example category is ‘Product Publishing’. |
| Topic | *Topic* is the target container for events in the *Event Management* task. The benefit of storing different events into different topics is to separate them into domains. | Example topics for events in a PSS are *inquiry* and *order*. |
| User | Please refer to customer. | |

Table 6.1: Definitions used in the scope of PSI.

## 6.1 Documentation Tags

| Abbreviation | Expansion |
|---|---|
| [ToBeDesigned] | Chapters or sections with this tag require further content which will be designed and developed within the PSID project. |
| [ToBeInvestigated] | Chapters or subsections with this tag still require further analysis, which will be explored or taken forward in the PSID project. |

Table 6.2: Documentation tags used in the scope of PSID-documents.

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