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Reseller's Guide

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About this Manual

This manual describes how resellers can prepare, offer, and sell services defined by suppliers on a marketplace with Open Service Catalog Manager (OSCM) .

This manual is structured as follows:

Chapter	Description
Introduction on page 6	Outlines the role of a reseller in OSCM and gives an overview of the reseller's tasks.
Service Management on page 9	Describes the basic concepts of services and explains how to update service definitions and publish services to a marketplace.
Customer Management on page 12	Describes the different tasks involved in customer management.
Billing and Payment on page 15	Describes how OSCM supports resellers in collecting payments from customers and calculating their revenue shares.
Reporting on page 18	Describes the reports available for resellers in OSCM.
LDAP Keys on page 19	Lists the keys to be defined for enabling access to a customer's LDAP system.
Customer Billing Data on page 21	Describes the elements of an XML file created by exporting customer billing data.

Readers of this Manual

This manual is directed to people who want to offer services defined by suppliers to customers applying their own terms and conditions. It assumes that you are familiar with the OSCM concepts as explained in the *Overview* manual.

Notational Conventions

This manual uses the following notational conventions:

Add	Names of graphical user interface elements.
`init`	System names, for example command names and text that is entered from the keyboard.
`<variable>`	Variables for which values must be entered.
`[option]`	Optional items, for example optional command parameters.
`one | two`	Alternative entries.
`{one | two}`	Mandatory entries with alternatives.

Abbreviations

This manual uses the following abbreviations:

IaaS	Infrastructure as a Service
LDAP	Lightweight Directory Access Protocol
OSCM	Open Service Catalog Manager
PaaS	Platform as a Service
SaaS	Software as a Service

Available Documentation

The following documentation on OSCM is available:

- *Overview:* A PDF manual introducing OSCM. It is written for everybody interested in OSCM and does not require any special knowledge.
- *Operator's Guide:* A PDF manual for operators describing how to administrate and maintain OSCM.
- *Technology Provider's Guide:* A PDF manual for technology providers describing how to prepare applications for usage in a SaaS model and how to integrate them with OSCM.
- *Supplier's Guide:* A PDF manual for suppliers describing how to define and manage service offerings for applications that have been integrated with OSCM.
- *Reseller's Guide:* A PDF manual for resellers describing how to prepare, offer, and sell services defined by suppliers.
- *Broker's Guide:* A PDF manual for brokers describing how to support suppliers in establishing relationships to customers by offering their services on a marketplace.
- *Marketplace Owner's Guide:* A PDF manual for marketplace owners describing how to administrate and customize marketplaces in OSCM.
- *Microsoft Azure Integration:* A PDF manual for operators describing how to offer and use virtual systems controlled by Microsoft Azure through services in OSCM.
- *Amazon Web Services Integration:* A PDF manual for operators describing how to offer and use virtual servers controlled by the Amazon Elastic Compute Cloud Web service through services in OSCM.
- *OpenStack Integration:* A PDF manual for operators describing how to offer and use virtual systems controlled by OpenStack through services in OSCM.
- *VMware vSphere Integration:* A PDF manual for operators describing how to offer and use virtual machines provisioned on a VMware vSphere server through services in OSCM.
- *Shell Integration:* A PDF manual for operators describing how to use Shell scripts through services in OSCM.
- *Online Help:* Online help pages describing how to work with the administration portal of OSCM. The online help is intended for and available to everybody working with the administration portal.

1 Introduction

Open Service Catalog Manager (OSCM) is a set of services which provide all business-related functions and features required for turning on-premise applications and tools into "as a Service" (aaS) offerings and using them in the Cloud. This includes ready-to-use account and subscription management, online service provisioning, billing and payment services, and reporting facilities.

With its components, OSCM supports software vendors as well as their customers in leveraging the advantages of Cloud Computing.

The basic scenario of deploying and using applications as services in the OSCM framework involves the following organizations:

- **Technology providers** (e.g. independent software vendors) technically prepare their applications for usage in the Cloud and integrate them with OSCM. They register the applications as technical services in OSCM.
- **Suppliers** (e.g. independent software vendors or sales organizations) define service offerings, so-called marketable services, for the technical services in OSCM. They publish the services to a marketplace.
- **Customers** register themselves or are registered by an authorized organization in OSCM and subscribe to one or more services. Users appointed by the customers work with the underlying applications under the conditions of the corresponding subscriptions.
- **Marketplace owners** are responsible for administrating and customizing the marketplaces to which services are published.
- **Operators** are responsible for deploying and maintaining OSCM.

  OSCM is provided in Docker containers and deployed in a container environment. The applications integrated with OSCM and their data may be hosted on the same system (Docker host) as OSCM or in different locations.

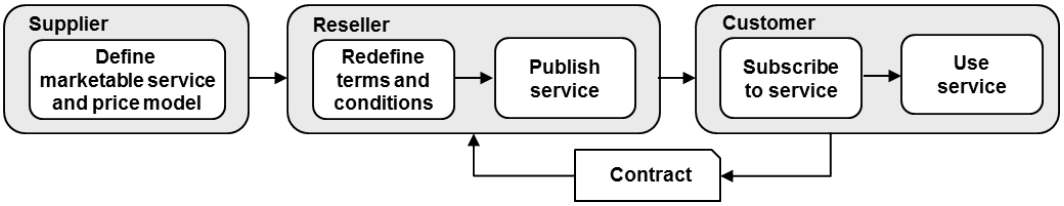
In extended usage scenarios, the suppliers who define marketable services may involve additional users and organizations in offering and selling these services:

- **Brokers** support suppliers in establishing relationships to customers by offering the suppliers' services on a marketplace. A service subscription is a contract between the customer and the supplier.
- **Resellers** offer services defined by suppliers to customers applying their own terms and conditions. A service subscription establishes a contract between the customer and the reseller.

1.1 The Reseller's Tasks in OSCM

As a reseller, you offer the services defined by one or more suppliers on marketplaces to which you have been granted access. In order to offer a service, you need an explicit permission by the

supplier. While you cannot change the definition and price model of a service, you can apply your own terms and conditions, for example, as to licenses.



A subscription to a service establishes a contract between the customer and your reseller organization. This contract is based on the price model defined by the supplier and on the terms and conditions defined by you.

For subscribing to services you offer, customers need to register with OSCM, or you can register them. The customers can register or import any number of users who work with the services.

Apart from offering services to customers, your role as a reseller involves the following tasks:

- Managing your customers. This includes, for example, explicitly terminating a customer's subscription.
- Preparing billing and payment for the customers. As users work with a service, the usage charges are calculated based on the fees defined in the related price model. This billing data can be used for generating invoices. You are responsible for the processing of the billing data and for the payment collection.
- Handling revenue shares. As a reseller, you are usually not entitled to keep the entire revenue collected from your customers, but only a certain share thereof. This revenue share is defined by the operator. It may be different for each marketplace where you offer services or even for individual services. Depending on your contracts with the operator, marketplace owner, and suppliers, you have to pay them their respective shares or they will collect their shares from you. You can at any time retrieve billing data and information on the actual revenues depending on the usage of the services.

If required, you can also act as a customer in OSCM. As a reseller, you are automatically privileged to subscribe to services and work with the services you have subscribed to.

If you need to perform marketplace owner tasks, your organization must be assigned the corresponding role by the OSCM operator. Note that a reseller organization cannot additionally be assigned the technology provider, supplier, or broker role.

1.2 Accessing OSCM

To perform your tasks, you use the OSCM user interface. The role of your organization as a reseller and your user role within the organization determine which features are available to you at the OSCM user interface.

OSCM distinguishes between the following user roles within reseller organizations:

- **Administrator**: Each organization must have at least one user with this role. An administrator can manage the organization's account and subscriptions as well as its users and their roles. The first administrator of an organization is defined when the organization is created.
- **Reseller**: This role allows a user to publish a supplier's marketable services under different terms and conditions.

To access the OSCM user interface, you use the login information provided by OSCM in the email confirming the creation of your user account. If your organization uses an external authentication system, passwords are managed in this system. This means that you log in with the password as stored in this system, and the email sent by OSCM does not contain a password.

To log in to the administration portal where you will perform most of your tasks:

1. Click the link provided in the email, or type the access URL in your Web browser's address bar.

   The access URL has the following format:

   `https://<host_fqdn>:8081/oscm-portal`

   `<host_fqdn>` is the fully qualified name or IP address of the host used to access OSCM, `8081` is the port. Omit the port if OSCM is operated with its proxy. `oscm-portal` is the default context root of OSCM and cannot be changed.

   If your organization uses an external system for user management and authentication, the identifier of a corresponding tenant may be appended to the URL:

   `https://<host_fqdn>:8081/oscm-portal/?tenantID=<id>`

2. On the **Login** page, type your user ID and password.

   Depending on the system used for user authentication, the **Login** page may be that of OSCM or of an external provider like Microsoft Azure, or it may be skipped entirely if single sign-on is supported and you are already logged in.

3. Click **Login**, or press **Return**.

You are either logged in directly, or you are prompted to change your initial password when you log in for the first time. It is highly recommended to change the initial password.

If you try to log in with a wrong password, your account may be locked after the third attempt. This depends on whether your organization maintains its user data in an external authentication system. In this case, passwords can only be changed or reset in this system. If user data are maintained in the platform, contact your administrator who can reset your password. You will get a new temporary password for your next login.

If you have forgotten your password, click **Forgot your password?** on the **Login** page. This allows you to define a new password for your user ID. Defining a new password is not possible if your account is locked or if your organization maintains its user data in an external authentication system.

If you have forgotten your user ID, contact your administrator who can look up the IDs of all users registered for your organization.

If your session expires, you have to log in again.

2 Service Management

Your main task as a reseller is to sell services defined by suppliers. To this end, you prepare the services and offer them on a marketplace to which you have been granted access by the marketplace owner.

The supplier of a service is responsible for:

- Defining the service and specifying its parameters, conditions, and restrictions.
- Defining a price model for the service which specifies whether and how much customers subscribing to the service will be charged for using it.
- Granting you the permission to publish the service on a marketplace of your choice.

As a reseller, you cannot change the service definition and the price model. The contract between you and the customer subscribing to a service is based on the prices defined by the supplier. It is up to the supplier to change the prices, if required.

As a reseller who has been granted the permission for a service, you can:

- View the service definition and price model.
- Define your own license agreement for using the service.
- Publish the service.

These tasks are described in more detail in the sections below.

2.1 Viewing and Updating Services

You can view the details of all services for which you have been granted a resale permission. The following information on a service is available:

- The service name and short description which are shown in the service catalog on a marketplace when you publish the service.
- The service description which provides details of the features offered by the service. It is displayed on a marketplace when customers request details of the service.
- The license agreement which must be read and accepted by customers when they subscribe to the service.
- The details of the price model defined by the supplier of the service. The service can be free of charge or with costs. If customers are charged for using the service, you can view the charging conditions and prices.

The information can only be viewed, except for the license agreement. You are free to use the license agreement as defined by the supplier, or you can specify a new one.

To view and update the details of a service, use the **Manage service** menu option in the **Marketable service** menu of the OSCM administration portal. The license agreement you specify is stored in the language defined by your user profile. If you want to localize the text, change the language in your user profile and enter the corresponding translation.

2.2 Publishing Services

Publishing a service means making it available to customers for subscription on a marketplace.

The following prerequisites must be fulfilled for publishing a service:

- You need the permission to publish the service by the supplier.

- You must have been granted access and admitted as a seller to the marketplace by the marketplace owner.

Publishing a service involves selecting the marketplace, activating the service, and publishing the URL of the marketplace. These tasks are described in more detail in the sections below.

Specifying a Marketplace

As a prerequisite for publishing a service, you need to specify the desired marketplace.

A service can be published to exactly one marketplace. If you want to publish it to a different marketplace, you have to deactivate it before you can select the new marketplace.

Specifying a marketplace includes:

- Deciding whether the service is to be public.

  A public service is visible in the service catalog for anybody accessing the marketplace. A service that has not been marked as public is available for subscription to registered customers only.

- Selecting the marketplace.

  You can publish the service to a marketplace that is open to any seller, or to a marketplace that is not open but for which you have been admitted as a seller by the marketplace owner. The marketplace must be public or you need to be granted access by the marketplace owner.

- Assigning categories.

  Provided that categories are defined for the marketplace you select, you can assign one or multiple categories to your service. The marketplace owner is responsible for creating the categories you can choose from. Customers can use the categories for browsing the service catalog and filtering the services on the marketplace. The marketplace owner may also decide to display the services on the marketplace home page grouped by categories.

To specify the marketplace, use the **Define publishing options** menu option in the **Marketable service** menu of the OSCM administration portal.

Activating a Service

To make a service available for subscription, you must activate it. To do this, use the **Activate or deactivate services** menu option in the **Marketable service** menu of the OSCM administration portal.

The menu option can also be used for deactivating a service. This is required if you do not want to offer it any longer or if you want to change the marketplace. If you deactivate a service, customers can no longer subscribe to it. Existing subscriptions are not affected.

Publishing the URL of a Marketplace

To make your service offering known to customers, you publish the URL of the marketplace. You can do this, for example, by email or on your website or portal. You can obtain the URL from the marketplace owner, who receives it from OSCM via email when the marketplace is created.

The URL has the following format:

`https://<host_fqdn>:8081/oscm-portal?marketplaceId=<mId>`

`<host_fqdn>` is the fully qualified name or IP address of the host used to access OSCM, `8081` is the port. Omit the port if OSCM is operated with its proxy. `oscm-portal` is the default context root of OSCM and cannot be changed. `<marketplaceId>` is the ID of the marketplace.

People who use the URL for accessing a marketplace can view all services that are marked as public. When subscribing to a service, they are either redirected to the registration Web page or they can log in to OSCM directly, provided they are already registered as a customer.

You can also publish the URL of the registration Web page of OSCM. This allows customers to directly register with OSCM. Registered customers can see all services, no matter whether they are marked as public or not. A registered customer is sent an email with the login data and an initial password to be used for the first login.

The URL of the registration Web page has the following format:

```
https://<host_fqdn>:8081/oscm-portal/marketplace/registration.jsf?marketplaceId=<mId>
```

Note: The marketplace owner may restrict the access to a marketplace to the users of specific organizations. In this case, the users need to log in to be able to see, subscribe to, and use the services published on the marketplace. New customers cannot register themselves on the marketplace but need to be registered by a supplier, broker, reseller, or the platform operator.

3 Customer Management

OSCM offers various features for managing your organization's interaction with customers. Customer management involves the following tasks:

- Registering customers.
- Configuring an external user authentication system, if required.
- Handling subscriptions.

These tasks are described in more detail in the sections below.

3.1 Registering Customers

You can register customers with OSCM so that they do not need to do this themselves. The new customer automatically receives the login information that enables him to access the given marketplace and subscribe to services.

The information and steps required to register a new customer organization and its first administrator depend on how the OSCM user authentication and management is configured:

- **INTERNAL** mode - users are authenticated by OSCM: The user IDs and passwords of the customer organization are created and maintained in OSCM or in an existing LDAP system of the organization. The use of an LDAP system requires additional configuration steps described in *Configuring an LDAP System for User Authentication* on page 13.
- **OIDC** mode - users are authenticated against an external provider such as Microsoft Azure Active Directory: The user IDs and passwords of an organization are created and maintained in the OIDC provider system.

  When registering a customer organization, you need to select a marketplace which is associated with a specific OIDC provider. The user you specify as the first administrator must exist in the OIDC provider system. He is automatically registered as a user in OSCM. Together with the customer organization, a corresponding group is created in the OIDC provider system and the user is assigned to it as a member. Additional group members need to be added in the OIDC provider system. The organization in OSCM is synchronized automatically with the group at the OIDC provider.

If you need more details about user authentication and management, contact your platform operator.

Depending on the user authentication mode, registering a customer includes entering the following user data for the first administrator of the new customer organization:

- **User ID** of the administrator.
- **Title**, **first name**, and **last name** of the administrator.
- **Email address** that is used for notifying the customer about the registration.
- **Language** in which the user interface, available documentation, and emails are presented to the administrator.

Registering a customer includes entering the data for the new organization:

- **Name**, **address**, and **phone number**.
- **Email address**.
- **Website**.
- **Country** where the customer organization is located.
- **Description** that provides, for example, information from the company's profile.

- **Marketplace** to which the customer is directed.

To register a customer, use the **Register customer** menu option in the **Customer** menu of the OSCM administration portal.

Once you have registered a customer, the organization data can only be edited by the customer's administrators. If you want to update the organization data, you must be registered as an administrator of your customer.

As a reseller, you can view the organization data that is defined for your customers. To view the data, use the **View customer** menu option in the **Customer** menu of the OSCM administration portal.

3.2 Configuring an LDAP System for User Authentication

Depending on the configuration of OSCM, you can allow your customer to connect to his organization's own identity management system for user authentication. OSCM supports user authentication against remote LDAP systems via secure VPN connections.

When using an LDAP system, your customer does not need to register his users manually with OSCM. The administrator of the customer organization can import the users, thus automatically registering them.

To enable access to the customer's LDAP system, you need to perform the following steps:

1. Create an LDAP configuration file on your file system.
2. Define the LDAP connection settings in the file. For a list of the relevant keys, refer to *LDAP Keys* on page 19.
3. Activate the LDAP-based authentication when registering the customer, and use the **LDAP settings** option to store the connection settings specified in the configuration file in OSCM.

   If you do not store any organization-specific connection settings in OSCM, OSCM will use default settings for LDAP connections.

Access to the LDAP system is enabled for the customer as soon as the customer is registered with OSCM. The administrator of the new customer organization can then import the required users from the LDAP system. The administrator can choose to import all users from the LDAP system or apply filter criteria to select specific users only. The imported users are sent an email with the URL for accessing the provided services. If required, the administrator of the customer organization can change the LDAP settings you defined for the organization.

User data maintained in the LDAP system such as the password, first name, or last name, can only be changed in the LDAP system. If the data is changed, OSCM automatically synchronizes its own data with it. An automatic synchronization is not possible in case a user ID is changed in the LDAP system. Such a user has to be imported again.

3.3 Handling Subscriptions

You can view the details of all subscriptions customers have created for your services. The following information on a subscription is available:

- Activation date and number of users assigned to the subscription.
- Details of the marketable service to which the customer subscribed.
- Details of the underlying technical service.
- Details of the price model defined for the marketable service.

To view the details of a subscription, use the **View subscription** menu option in the **Customer** menu of the OSCM administration portal.

To offer support to customers, OSCM enables you to enter a support email address for your organization. This allows administrators and subscription managers of customer organizations to directly contact you in case they have questions or want to report issues on a service they have subscribed to. To enter a support email address, use the **Edit profile** menu option in the **Account** menu of the OSCM administration portal.

You can explicitly terminate a customer subscription. This may be required, for example, if a customer does not comply with a license agreement or does not pay for a subscription. Terminating a subscription is possible even if users are currently using the underlying service.

To terminate a subscription, use the **Terminate a subscription** menu option in the **Customer** menu of the OSCM administration portal. As soon as you terminate a subscription, the customer is sent an email informing him about the termination and the reason you have entered.

4 Billing and Payment

As users work with the services, OSCM automatically calculates the charges based on the related price models. It aggregates all the events, users, and configuration data associated with a subscription and rates them according to the associated price model.

At daily intervals, the database content is checked for organizations which have produced billing-relevant data. The data is collected and stored in the database. At monthly intervals (billing periods), the billing data is calculated. These checks and calculations are called "billing runs for customer billing data". The costs for all customer subscriptions that were produced in the course of a billing period are calculated by the billing run executed on the start day of the next billing period plus the offset defined by the operator.

Examples:

- You define that the billing period is to start on the 8th of a month, and the offset is set to 5 days and 4 hours. In this case, the billing run is executed on the 13th of each month at 04:00:00.000. The start day of the billing period, and thus the billing period itself, may be different for each supplier and reseller.
- Assume, the offset is set to 0 and the billing period starts on the 8th of a month. On January 5th, a customer subscribes to a service. The price model of this service defines per time unit calculation with charges based on MONTH as well as a one-time fee. On January 20th, the customer terminates this subscription.

  In this case:

  - The billing run executed on January 8th calculates the one-time fee only.
  - The billing run executed on February 8th calculates the time unit that ended on January 31st, i.e. the month of January is fully charged.

The customer billing data can be used for creating invoices. You are responsible for charging your customers and for collecting the payments.

As a reseller, you are usually entitled to keep a share of the revenue from your customers' service usage. The operator is responsible for defining the revenue shares you can claim. They may be different for each marketplace where you offer services or even for individual services. You are not authorized to change any revenue shares. OSCM offers various features that support you in paying the other participating parties their shares of the revenue.

The revenue shares are calculated every month based on the results of the daily checks for customer billing data. This calculation is called "billing run for revenue share data". The billing period for this billing run cannot be changed; it is always executed for the previous calendar month on the first day of a month plus the offset defined by the operator.

The following sections describe your tasks involved in billing and payment, and in handling revenue shares.

4.1 Managing Billing and Payment for Customers

Managing the billing and payment for customers involves the following tasks:

- Specify the payment types to be offered to customers.
- Define your own billing period.
- Export billing data to make it available to external accounting systems.

Managing Payment Types

You are responsible for specifying how your customers may pay for their subscriptions:

- On receipt of invoice.
- With credit card.
- By direct debit.

Your operator is responsible for configuring the payment types you can offer. Payment on receipt of invoice is automatically set up for all suppliers and resellers. This means that you can always allow your customers to pay on receipt of invoice without additional preparations by your operator. Payment on receipt of invoice implies that you are responsible for creating invoices and collecting payments.

OSCM allows you to specify the payment types for individual customers and individual services used by the customers. If you decide to offer more than one payment type to a customer, the customer is free to choose the type he prefers when subscribing to a service. If you remove a used payment type, the customer must specify a new one before he can continue using the service.

Be aware of the following effects of removing a used payment type:

- If you remove a used payment type during a customer's free trial period, the free trial period is not extended by the time the service could not be used.
- If you remove a used payment type for a subscription for which the charges are calculated per time unit, the customer may be charged with additional costs from stepped prices. Any customer who does not continue using the service in the time unit in which you removed the payment type, is affected. The resumed subscription is treated like a new subscription. This means that additional costs result, for example, from the sum of time units the users are assigned to the subscription or from the number of events that occur.

To specify the payment types, use the **Manage payment types** menu option in the **Customer** menu of the OSCM administration portal.

Note:	In specific scenarios, your operator may deactivate any possibilities for customers to select payment types and specify billing addresses. If this is the case, the definition of payment types is not possible.

Defining the Billing Period

A billing period is the time interval for which billing data for customer subscriptions is generated. It is always one month.

By default, a billing period starts on the 1st day of a month at 00:00:00.000 and ends on the last day of a month at 23:59:59.999. However, this is not always suitable in real business. For this reason, you can define your desired start day of the billing period.

When you change the start day of the billing period, this affects all subscriptions which are created or reactivated afterwards. Existing subscriptions are not affected.

The billing period start and end date and time are displayed in the **Revenue share report**.

To define the start day for billing periods, use the **Define billing period** menu option in the **Account** menu of the OSCM administration portal.

Exporting Billing Data

You can export the billing data from OSCM and process it using billing and payment facilities that have already been established in your organization. This is the standard procedure for all customers who have decided to pay on receipt of invoice.

You can export the data of one or several customers for a specific time frame. The data can be saved to an XML file or opened in an editor of your choice. You can edit it and work with it as required. The data can be forwarded, for example, to an accounting system.

To export billing data, use the **Export billing data** menu option in the **Account** menu of the OSCM administration portal.

Refer to *Customer Billing Data* on page 21 for a detailed description of the elements and attributes that may occur in the generated XML file.

4.2 Handling Revenue Shares

OSCM offers the following options for handling your revenue share from your customers' service usage:

- You can view the revenue share that is defined.
- You can retrieve and export information on the actual revenue.

For details, refer to the following sections. You can also use reports for retrieving information on your actual revenue. For details, refer to *Reporting* on page 18.

Viewing the Revenue Share

You can view the percentage you are entitled to keep from the total revenue generated by a service.

For this purpose, use the **Define publishing options** menu option in the **Marketable service** menu of the OSCM administration portal.

Exporting Revenue Share Data

At the end of each calendar month (plus an offset defined by the operator), OSCM calculates the revenue share data for a marketplace.

To retrieve information on your actual revenue for a specific time frame, OSCM allows you to export the corresponding data. To do this, use the **Export billing data** menu option in the **Account** menu of the OSCM administration portal.

The data can be saved to an XML file or opened in an editor of your choice. You can edit it and work with it as required. The data can, for example, be forwarded to an accounting system. Depending on your contracts with the operator, the marketplace owner, and the suppliers, you can use it for paying them their respective shares, or for forecasting the shares that they will collect from you.

Refer to *Customer Billing Data* on page 21 for a detailed description of the elements and attributes that may occur in the generated XML file.

5 Reporting

OSCM offers comprehensive reports for different purposes and at different levels of detail.

As a reseller, you can generate a reseller revenue share report which shows your actual revenue depending on the usage of the services you sell. The report breaks down the data to the individual suppliers who provide the services.

The report outputs your liabilities to the other participating parties. Depending on your contracts with the operator, the marketplace owner, and the suppliers, you can use the report data for paying them their respective shares, or for forecasting the shares that they will collect from you.

To create a report, use the **Create report** menu option in the **Account** menu of the OSCM administration portal and choose **Reseller revenue share report**. The menu option allows you to specify the month for which to generate the report.

The generated report is instantly displayed at the OSCM administration portal. You can choose to print the report or save it in several formats.

Note:	Contact your platform operator if the reporting functionality is not available. He is responsible for defining the respective configuration parameters.

Appendix A: LDAP Keys

The following keys must be defined in a configuration file for enabling access to an organization's LDAP system:

Key	Description
LDAP_URL	Mandatory. Provider URL of the LDAP server. This LDAP server is used for user authentication. Example: `LDAP_URL=ldap://myldapserver.lan.est.company.de:389`
LDAP_BASE_DN	Mandatory. Position in the LDAP directory tree at which to start looking for users. Example: `LDAP_BASE_DN=ou=people,dc=est,dc=mycompany,dc=de`
LDAP_PRINCIPAL	Optional. Name of the user who is allowed to query the LDAP server. Example: `LDAP_PRINCIPAL=uid=admin,ou=system`
LDAP_CREDENTIALS	Optional. Password of the user who is allowed to query the LDAP server. Example: `LDAP_CREDENTIALS=secret`
LDAP_ATTR_UID	Mandatory. LDAP attribute from which a user ID is read. The default used when an organization is created is `uid` unless the operator has defined a different value in the platform LDAP settings. Example: `LDAP_ATTR_UID=uid`
LDAP_ATTR_EMAIL	Optional. LDAP attribute from which the email address of a user is read. Example: `LDAP_ATTR_EMAIL=scalixEmailAddress`
LDAP_ATTR_FIRST_NAME	Optional. LDAP attribute from which the first name of a user is read. Example: `LDAP_ATTR_FIRST_NAME=givenName`
LDAP_ATTR_LAST_NAME	Optional. LDAP attribute from which the last name of a user is read. Example: `LDAP_ATTR_LAST_NAME=sn`
LDAP_ATTR_ADDITIONAL_NAME	Currently not used.
LDAP_ATTR_LOCALE	Optional. LDAP attribute from which the default language to be stored for a user is read. Example: `LDAP_ATTR_LOCALE=locale`

LDAP_CONTEXT_FACTORY	Mandatory. Context factory which provides the API to query the LDAP server. The default used when an organization is created is `com.sun.jndi.ldap.LdapCtxFactory` unless the operator has defined a different value in the platform LDAP settings. Example: `LDAP_CONTEXT_FACTORY=com.sun.jndi.ldap.LdapCtxFactory`
LDAP_ATTR_REFERRAL	Optional. Property defining how LDAP referrals are to be processed. If an organization uses an Active Directory with sub-domains from which users are to be imported into OSCM, the sub-domains can be modeled as referrals. In this sense, a referral is a reference to another directory partition or sub-domain. By default, values from referrals are not retrieved. This property can take on the following values: `follow`: Referrals are followed, i.e. users are imported from all referenced directory partitions or sub-domains. `ignore`: Referrals are ignored (default), i.e. users are imported from the current domain directory only. Example: `LDAP_ATTR_REFERRAL=ignore`

Appendix B: Customer Billing Data

The charges for the usage of a service in OSCM are calculated based on the price model defined for the service, customer, or subscription.

A supplier or reseller can export the billing data for one or several of his customers for a specific time. Suppliers also have access to the billing data of customers of broker organizations that sell their services. The exported data can be forwarded, for example, to an accounting system for further processing.

The result of the export is stored in an XML file, the customer billing data file. The billing data file conforms to the XML schema `BillingResult.xsd`, which can be found in the OSCM integration package.

The billing data file is named `<date>BillingData.xml`, where `<date>` represents the creation date.

This appendix describes the meaning of the elements and attributes that may occur in a billing data file.

BillingDetails

Top-level container element of a billing data file. For each subscription, a `BillingDetails` element is added to the billing data file.

A `BillingDetails` element contains the following subelements:

- `Period` (see *Period* on page 21)
- `OrganizationDetails` (see *OrganizationDetails* on page 22)
- `Subscriptions` (see *Subscriptions* on page 22)
- `OverallCosts` (see *OverallCosts* on page 35)

A `BillingDetails` element has the following attributes:

`key` - (optional, data type `long`) Unique identifier allowing, for example, accounting systems to relate billing data to an invoice. The billing data key is printed on the invoice. Suppliers and customers may use the billing data key to create a detailed billing report for an existing invoice or subscription. A supplier can retrieve the key from a billing report, a customer gets the billing data key from the corresponding invoice.

`timezone` - (required, data type `string`) Time zone based on the UTC time standard. It reflects the standard server time without daylight saving time. For example, 18:00:00 o'clock on June 1st in Berlin (UTC+1) will be output as follows in the XML file:

```
<BillingDetails timezone="UTC+01:00" key="31122">
  <Period startDate="1370106000000"
  startDateIsoFormat="2013-06-01T16:00:00.000Z" ..."/>
```

The time zone is relevant for price models with costs (see *PriceModel* on page 24).

Period

Specifies the billing period for which the data is exported. The start and end time of the billing period are output according to the start day of the billing period which was defined by the supplier or reseller.

A `Period` element has the following attributes:

- **`startDate`** - (data type `long`) Start time of the period. The start time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.

- **startDateIsoFormat** - (optional, data type `dateTime`) Same as `startDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`) .
- **endDate** - (data type `long`) End time of the period. The end time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.
- **endDateIsoFormat** - (optional, data type `dateTime`) Same as `endDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`).

Example:

```
<Period startDateIsoFormat="2012-08-31T22:00:00.000Z"
  startDate="1346450400000"
  endDateIsoFormat="2012-09-30T22:00:00.000Z"
  endDate="1349042400000"/>
```

OrganizationDetails

Provides details of the customer for which the billing data have been exported. The details may include a `Udas` element with custom attributes that store additional information on the customer organization.

An `OrganizationDetails` element contains the following subelements:

Email

Specifies the email address of the organization (data type `string`).

Name

Specifies the name of the organization (data type `string`).

Address

Specifies the address of the organization (data type `string`).

Paymenttype

Specifies the payment type used for subscriptions of the organization (data type `string`).

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
  <OrganizationDetails>
    <Email>info@company.com</Email>
    <Name>company</Name>
    <Address>Street</Address>
    <Paymenttype>INVOICE</Paymenttype>
  </OrganizationDetails>
...
</BillingDetails>
```

Subscriptions

Contains the billing data for the subscriptions of the customer which are relevant for the current billing period.

For every subscription of an organization, the `Subscriptions` element contains a `Subscription` element. In this element, the costs of the affected subscription are specified.

A `Subscription` element has the following attributes:

- **id** - (required, data type `string`) Unique subscription name.

- **purchaseOrderNumber** - (data type `string`) Optional reference number as specified by the customer when subscribing to a service.

A `Subscription` element contains a `PriceModel` element with the billing data for the price model of the subscription (see *PriceModel* on page 24). A `Udas` element with custom attributes that store additional information on the subscription may also be included (see *Udas* on page 23).

If a subscription is assigned to an organizational unit at the end of the billing period, the `Subscription` element also contains an `OrganizationalUnit` element with the following attributes:

- **name** - (required, data type `string`) Required name of the organizational unit to which the subscription is assigned.
- **referenceID** - (optional, data type `string`) Optional reference ID of the organizational unit to which the subscription is assigned.

Be aware that the organizational units to which the subscription may have been assigned before the generation of the billing data are not shown.

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
  <Subscriptions>
    <Subscription id="Mega Office Basic" purchaseOrderNumber="12345">
      <OrganizationalUnit name="ProjectTeam" referenceID="123abc"/>
      <PriceModels>
        <PriceModel calculationMode="PRO_RATA" id="14001">
...
        </PriceModel>
      </PriceModels>
    </Subscription>
  </Subscriptions>
...
</BillingDetails>
```

Udas

Contains custom attributes that store additional information on an organization or subscription. This could be, for example, the profit center to which a customer's revenue is to be accounted.

A `Udas` element may be included in an `OrganizationDetails` or a `Subscription` element.

For every custom attribute, a `Uda` element is included in the `Udas` element.

A `Uda` element has the following attributes:

- **id** - (required, data type `string`) ID of the custom attribute.
- **value** - (required, data type `string`) Value of the custom attribute.

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
  <Subscriptions>
    <Subscription id="Mega Office Basic" purchaseOrderNumber="12345">
...
      <Udas>
        <Uda id="Profit Center" value="My Company"/>
      </Udas>
    </Subscription>
  </Subscriptions>
```

```
...
</BillingDetails>
```

PriceModel

Contains the billing data for a price model used to calculate the utilization charges for a subscription.

A `PriceModel` element is included in every subscription element. It contains the following subelements:

- `UsagePeriod` (see *UsagePeriod* on page 24)
- `GatheredEvents` (see *GatheredEvents* on page 25)
- `PeriodFee` (see *PeriodFee* on page 26)
- `UserAssignmentCosts` (see *UserAssignmentCosts* on page 27)
- `OneTimeFee` (see *OneTimeFee* on page 28)
- `PriceModelCosts` (see *PriceModelCosts* on page 28)
- `Parameters` (see *Parameters* on page 29)

A `PriceModel` element has the following attributes:

`id` - (required, data type `string`) Unique name identifying the price model.

`calculationMode` - (required, data type `string`) Cost calculation option of the price model. Can be set to one of the following values: `FREE_OF_CHARGE` (the service is free of charge), `PRO_RATA` (the costs are calculated exactly for the time a service is used, based on milliseconds), `PER_UNIT` (the costs are calculated based on fixed time units).

UsagePeriod

Specifies the actual period in which a price model is used for calculating the charges of a subscription.

A usage period usually begins when a customer subscribes to a service and ends when the subscription is terminated. In case a free trial period is defined for the service, the usage period begins when the free trial period has ended. When the customer upgrades or downgrades the subscription, a new usage period is started in which the price model of the new service is applied. If the customer changes elements that determine how the charges for the service are calculated (e.g. the number of assigned users, the service roles of the assigned users, or the parameter values), a new usage period is started in which the updated elements are applied.

A `UsagePeriod` element is contained in a `PriceModel` element.

A `UsagePeriod` element has the following attributes:

- **`startDate`** - (data type `long`) Start time of the period. The start time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.
- **`startDateIsoFormat`** - (optional, data type `dateTime`) Same as `startDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`) .
- **`endDate`** - (data type `long`) End time of the period. The end time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.
- **`endDateIsoFormat`** - (optional, data type `dateTime`) Same as `endDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`).

Example:

```
<PriceModel calculationMode="PRO_RATA" id="14001">
```

```
  <UsagePeriod endDate="1306879200000"
   endDateIsoFormat="2011-05-31T22:00:00.000Z"
   startDate="1304755088065"
   startDateIsoFormat="2011-05-07T07:58:08.065Z"/>
...
</PriceModel>
```

GatheredEvents

Specifies the costs for all chargeable events that occurred in the current usage period of the subscription. These include, for example, login and logout by users to the underlying application, the completion of specific transactions, or the creation or deletion of specific data. It depends on the implementation and integration of the underlying application which events are available.

A `GatheredEvents` element is contained in a `PriceModel` element.

A `GatheredEvents` element contains the following subelements:

- `Event`
- `GatheredEventsCosts`

Event

For every event, an `Event` element is included in the `GatheredEvents` element.

An `Event` element has the following attribute:

`id` - (required, data type `string`) Event ID as specified in the technical service definition.

An `Event` element contains the following subelements:

- `Description`
- `SingleCost`
- `NumberOfOccurence`
- `CostForEventType`

Description

Contains the description of the event.

SingleCost

Specifies the price for the event as defined in the price model. If an event has stepped prices, this element is omitted. A `SteppedPrices` element is included instead (see *SteppedPrices* on page 34).

A `SingleCost` element has the following attribute:

`amount` - (required, data type `decimal`) Price for a single event.

NumberOfOccurence

Specifies how often the event occurred.

A `NumberOfOccurence` element has the following attribute:

`amount` - (required, data type `long`) Number of times the event occurred.

CostForEventType

Specifies the total costs for the event in the billing period.

A `CostForEventType` element has the following attribute:

`amount` - (required, data type `decimal`) Total costs for the event. The total costs for an event are calculated from the singular costs (`SingleCost`) multiplied with the number of occurrences (`NumberOfOccurence`). If role-based costs and/or stepped prices are specified for events, these

costs are added (see *RoleCosts* on page 33 and *SteppedPrices* on page 34). The value is rounded to two decimal places.

GatheredEventsCosts

Specifies the total costs for all events in the current `GatheredEvents` element.

A `GatheredEventsCosts` element has the following attribute:

`amount` - (required, data type `decimal`) Total costs for events. The value is rounded to two decimal places.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="14001">
...
  <GatheredEvents>
    <Event id="USER_LOGOUT_FROM_SERVICE">
      <Description xml:lang="en">Logout from the service.</Description>
      <SingleCost amount="100.00"/>
      <NumberOfOccurrence amount="3"/>
      <CostForEventType amount="300.00"/>
    </Event>
...
    <GatheredEventsCosts amount="1200.00"/>
  </GatheredEvents>
...
</PriceModel>
```

PeriodFee

Specifies the costs for using the subscription in the given usage period.

For each subscription, a charge can be defined that a customer has to pay on a recurring basis. Monthly, weekly, daily, or hourly periods are supported. The recurring charge for a subscription is independent of the amount of users, events, or other usage data.

The calculation of the charges depends on the cost calculation option which was chosen for the price model (see *PriceModel* on page 24 for details).

A `PeriodFee` element is contained in a `PriceModel` element.

A `PeriodFee` element has the following attributes:

- **`basePeriod`** - (required, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (required, data type `decimal`) Recurring charge per base period according to the price model.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the period fee for the subscription. The factor is calculated from the usage period of the subscription divided by the base period (`basePeriod`). The recurring charge is multiplied with this factor to calculate the total costs (`price`).
- **`price`** - (required, data type `decimal`) Total period fee for the subscription. This value is calculated from the recurring charge (`basePrice`) multiplied with the factor (`factor`). The value is rounded to two decimal places.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="14001">
...
  <PeriodFee basePeriod="MONTH" basePrice="10.00"
 factor="0.4020212567204301" price="4.02"/>
```

```
...
</PriceModel>
```

UserAssignmentCosts

Specifies the costs for the user assignments to the subscription.

For the users assigned to a subscription, a charge can be defined that a customer has to pay on a recurring basis. Monthly, weekly, daily, or hourly periods are supported. The charge depends on the amount of time units one or more users are assigned to the subscription. This type of charge can only be defined for services with the login or user access type.

The recurring charge for users is independent of the recurring charge per subscription or other usage data.

For this type of charge, stepped prices can be applied: Recurring charges can be defined that depend on the sum of the time units of all user assignments.

The calculation of the charges depends on the cost calculation option which was chosen for the price model (see *PriceModel* on page 24 for details).

With per time unit calculation, the costs for a time unit in which a user is assigned to a subscription are always fully charged. There is no difference in the costs between a user who is assigned from the start until the end of the time unit and a user who is assigned for a part of the time unit only. A time unit is charged only once if a user is deassigned from and re-assigned to a subscription within the same time unit. Yet, canceling an assignment, deleting the user, and then creating a new user with the same user ID is treated as if two different users are assigned to the subscription. The time unit is charged twice, accordingly.

A `UserAssignmentCosts` element is contained in a `PriceModel` element.

A `UserAssignmentCosts` element has the following attributes:

- **`basePeriod`** - (optional, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (optional, data type `decimal`) Recurring charge for users per base period according to the price model. If the charge for users has stepped prices, this attribute is omitted.
- **`factor`** - (optional, data type `decimal`) Factor used to calculate the costs for the user assignments. The factor is calculated by summing up the factors for each user specified in the `UserAssignmentCostsByUser` element. The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`).
- **`numberOfUsersTotal`** - (optional, data type `long`) Number of users assigned to the subscription in the usage period.
- **`total`** - (data type `decimal`) Total costs for the user assignments including role-based costs and stepped prices. The value is rounded to two decimal places. For details on role-based costs and stepped prices, refer to *RoleCosts* on page 33 and *SteppedPrices* on page 34.
- **`price`** - (optional, data type `decimal`) Costs for the user assignments. This value is calculated from the recurring charge (`basePrice`) multiplied with the factor (`factor`). The value is rounded to two decimal places.

A `UserAssignmentCosts` element contains the following subelement. If role-based costs and/or stepped prices are specified, a `RoleCosts` element and/or `SteppedPrices` element is also present (see *RoleCosts* on page 33 and *SteppedPrices* on page 34).

UserAssignmentCostsByUser

Specifies the fraction of the usage period a user was assigned to the subscription.

A `UserAssignmentCostsByUser` element has the following attributes:

- **`factor`** - (required, data type `decimal`) Fraction of the usage period the given user was assigned to the subscription. The factors of the single user assignments are summed up to calculate the total costs for the user assignments.
- **`userId`** - (required, data type `string`) User ID.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="18000">
...
  <UserAssignmentCosts basePeriod="MONTH" basePrice="19.00"
   factor="0.5337726052867383" numberOfUsersTotal="2"
   total ="50.00" price="10.14">
     <UserAssignmentCostsByUser factor="1.0499215949820788E-4"
     userId="admin"/>
     <UserAssignmentCostsByUser factor="0.5336676131272401"
     userId="miller"/>
   </UserAssignmentCosts>
...
</PriceModel>
```

OneTimeFee

Specifies the one-time fee for the subscription.

A one-time fee defines the amount a customer has to pay for a subscription in the first billing period of the subscription. It is added to the total charges for the first billing period. It is independent of the number of users, events, or other usage data.

If a one-time fee is defined for a service to which a customer upgrades or downgrades a subscription, it is added to the total charges for the customer, even if the service from which the customer migrates also defines a one-time fee.

A `OneTimeFee` element is contained in a `PriceModel` element.

A `OneTimeFee` element has the following attributes:

- **`amount`** - (required, data type `decimal`) Total costs for the one-time fee. The value is rounded to two decimal places.
- **`baseAmount`** - (required, data type `decimal`) One-time fee as defined in the price model.
- **`factor`** - (required, data type `long`) Factor used for calculating the one-time fee. Since this charge occurs only once, the factor is 1 for the first billing period, and 0 in case the one-time fee has already been charged in a previous billing period.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="14001">
...
  <OneTimeFee amount="10.00" baseAmount="10.00" factor="1"/>
...
</PriceModel>
```

PriceModelCosts

Specifies the total costs for the subscription in the current usage period.

A `PriceModelCosts` element is contained in a `PriceModel` element.

A `PriceModelCosts` element has the following attributes:

- **`currency`** - (required, data type `string`) ISO code of the currency in which the costs are calculated.
- **`amount`** - (required, data type `decimal`) Total amount of the costs for the subscription. The value is rounded to two decimal places.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="14001">
...
  <PriceModelCosts currency="EUR" amount="990.00"/>
</PriceModel>
```

Parameters

Specifies the costs for parameters defined for the service underlying the subscription.

A price model can define prices for service parameters and options. It depends on the implementation and integration of the underlying application whether and which parameters and options are available.

A price can be defined for every parameter and option, and the price can be charged per subscription or per user assigned to the subscription. Numeric parameters are a multiplier for the price. For boolean parameters, the multiplier is `1` if the value is `true`. In all other cases, the multiplier is `0`.

The calculation of charges for parameters and options depends on the cost calculation option which was chosen for the price model (see *PriceModel* on page 24 for details).

If the charges for a subscription are calculated per time unit and a customer changes a parameter value within a time unit, the affected time unit is charged pro rata. This means that the customer is charged exactly for the time each parameter value is set.

For numeric parameters, stepped prices can be applied per subscription: Different prices can be defined depending on the parameter values.

The prices for parameters and options are independent of other price model elements.

A `Parameters` element is contained in a `PriceModel` element.

A `Parameters` element contains the following subelements:

- `Parameter`
- `ParametersCosts`

Parameter

For every parameter, a `Parameter` element is included in the `Parameters` element.

A `Parameter` element has the following attribute:

`id` - (required, data type `string`) Parameter ID.

A `Parameter` element contains the following subelements:

- `ParameterUsagePeriod`
- `ParameterValue`
- `PeriodFee`
- `UserAssignmentCosts`
- `ParameterCosts`
- `Options`

ParameterUsagePeriod

Specifies the actual usage period for the parameter.

The usage period for a parameter begins when a customer subscribes to the service with the given parameter definition in the price model and ends when the subscription is terminated.

In case a free trial period is defined for the service, the usage period for the subscription begins when the free trial period has ended. If a parameter value is changed, a new usage period is started in which the updated value is applied for calculating the costs.

A `ParameterUsagePeriod` element has the following attributes:

- **`startDate`** - (data type `long`) Start time of the period. The start time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.
- **`startDateIsoFormat`** - (optional, data type `dateTime`) Same as `startDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`) .
- **`endDate`** - (data type `long`) End time of the period. The end time is specified in milliseconds, the starting point for the calculation is `1970-01-01, 00:00`.
- **`endDateIsoFormat`** - (optional, data type `dateTime`) Same as `endDate`, but specified in ISO 8601 format (`YYYY-MM-DDThh:mm:ss.fffZ`).

ParameterValue

Specifies the costs and data type for the parameter.

A `ParameterValue` element has the following attributes:

- **`amount`** - (required, data type `string`) Costs for the parameter as defined in the price model.
- **`type`** - (required, data type `string`) Data type of the parameter. Can be set to one of the following values: `BOOLEAN`, `INTEGER`, `LONG`, `STRING`, `ENUMERATION`, `DURATION`.

PeriodFee

Specifies the costs for using the parameter in the given usage period. If a parameter has stepped prices, a `SteppedPrices` element is included in the `PeriodFee` element.

A `PeriodFee` element has the following attributes:

- **`basePeriod`** - (required, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (optional, data type `decimal`) Recurring charge per base period according to the price model. If a parameter has stepped prices, this attribute is omitted.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the costs for using the parameter. The factor is calculated from the usage period divided by the base period (`basePeriod`). The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`).
- **`price`** - (required, data type `decimal`) Costs for using the parameter. This value is calculated from the recurring charge (`basePrice`) multiplied with the factors (`factor` and `valueFactor`). The value is rounded to two decimal places.
- **`valueFactor`** - (required, data type `float`) Factor to calculate the total costs for using the parameter depending on the parameter value. The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`). This factor is set depending on the data type of the parameter. For numeric parameters it is set to the value of the parameter. For boolean parameters, the factor is set to `1` if the value is `true`. In all other cases, the factor is set to `0`.

UserAssignmentCosts

Specifies the costs for the parameter related to the user assignments of the subscription based on the price per user for the parameter as defined in the price model. If costs for service roles are

defined, a `RoleCosts` element is included in the `UserAssignmentCosts` element (see *RoleCosts* on page 33 for details).

A `UserAssignmentCosts` element has the following attributes:

- **`basePeriod`** - (required, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (required, data type `decimal`) Recurring charge for users per base period for the parameter according to the price model.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the costs for using the parameter. The factor is calculated from the parameter usage period divided by the base period (`basePeriod`) multiplied with the number of users. The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`).
- **`price`** - (required, data type `decimal`) Costs for using the parameter. This value is calculated from the recurring charge (`basePrice`) multiplied with the factors (`factor` and `valueFactor`). The value is rounded to two decimal places. If stepped prices are defined for user assignments, the costs are given in the `price` attribute.
- **`total`** - (data type `decimal`) Total costs for using the parameter including role-based costs. The value is rounded to two decimal places. For details on role-based costs, refer to *RoleCosts* on page 33.
- **`valueFactor`** - (required, data type `float`) Factor to calculate the total costs for using the parameter depending on the parameter value. The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`). This factor is set depending on the data type of the parameter. For numeric parameters it is set to the value of the parameter. For boolean parameters, the factor is set to `1` if the value is `true`. In all other cases, the factor is set to `0`.

ParameterCosts

Specifies the total costs for using the parameter.

A `ParameterCosts` element has the following attribute:

`amount` - (required, data type `decimal`) Total costs for the parameter calculated by summing up the costs specified in the `PeriodFee` and the `UserAssignmentCosts` element for the parameter and its options. If role-based costs and/or stepped prices are specified for the parameter, these are added (see *RoleCosts* on page 33 and *SteppedPrices* on page 34). The value is rounded to two decimal places.

ParametersCosts

Specifies the total costs for all parameters.

A `ParametersCosts` element has the following attribute:

`amount` - (required, data type `decimal`) Total costs for the parameters calculated by summing up the costs of the individual parameters as specified in the `ParameterCosts` elements. The value is rounded to two decimal places.

Example:

```
<Parameters>
...
  <Parameter id="MAX_FOLDER_NUMBER2">
    <ParameterUsagePeriod endDate="1306879200000"
     endDateIsoFormat="2011-05-31T22:00:00.000Z"
     startDate="1304755088065"
     startDateIsoFormat="2011-05-07T07:58:08.065Z"/>
    <ParameterValue amount="200" type="INTEGER"/>
    <PeriodFee basePeriod="MONTH" basePrice="0.00"
     factor="0.5337789669205496" price="0.00" valueFactor="200.0"/>
```

```
    <UserAssignmentCosts basePeriod="MONTH" basePrice="0.00"
     factor="0.5337726052867383" total ="0.00"
     price="0.00" valueFactor="200.0"/>
    <ParameterCosts amount="0.00"/>
  </Parameter>

...
  <ParametersCosts amount="600.00"/>
</Parameters>
```

Options

Specifies the costs for parameter options.

An `Options` element is contained in a `Parameter` element.

For every option, an `Option` element is included in the `Options` element.

An `Option` element has the following attribute:

`id` - (required, data type `string`) Option ID.

An `Option` element contains the following subelements:

- `PeriodFee`
- `UserAssignmentCosts`
- `OptionCosts`

PeriodFee

Specifies the costs for using the parameter option in the given usage period.

A `PeriodFee` element has the following attributes:

- **`basePeriod`** - (required, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (required, data type `decimal`) Recurring charge per base period according to the price model.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the costs for using the parameter option. The factor is calculated from the usage period divided by the base period (`basePeriod`). The recurring charge (`basePrice`) is multiplied with this factor to calculate the total costs (`price`).
- **`price`** - (required, data type `decimal`) Costs for the parameter option. This value is calculated from the recurring charge (`basePrice`) multiplied with the factor (`factor`), and is rounded to two decimal places.

UserAssignmentCosts

Specifies the costs for the parameter option related to the user assignments of the subscription based on the price per user for the option as defined in the price model. If costs for service roles are defined, a `RoleCosts` element is included in the `UserAssignmentCosts` element (see *RoleCosts* on page 33).

A `UserAssignmentCosts` element has the following attributes:

- **`basePeriod`** - (required, data type `string`) Period on which the charges are based. Can be set to one of the following values: `MONTH`, `WEEK`, `DAY`, `HOUR`.
- **`basePrice`** - (required, data type `decimal`) Recurring charge for users per base period for the parameter option according to the price model.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the costs for using the parameter option. The factor is calculated from the usage period divided by the base period

(basePeriod). The recurring charge (basePrice) is multiplied with this factor to calculate the costs (price).

- **total** - (data type decimal) Total costs for using the parameter option including role-based costs. The value is rounded to two decimal places. For details on role-based costs, refer to *RoleCosts* on page 33.
- **price** - (required, data type decimal) Costs for using the parameter option. This value is calculated from the recurring charge (basePrice) multiplied with the factor (factor). The value is rounded to two decimal places. If stepped prices are defined for user assignments, the costs are given in the price attribute.

OptionCosts

Specifies the total costs for using the parameter option.

An OptionCosts element has the following attribute:

amount - (required, data type decimal) Total costs for the parameter option calculated by summing up the costs specified in the PeriodFee and the UserAssignmentCosts element. The value is rounded to two decimal places.

Example:

```
<Parameter id="MEMORY_STORAGE">
...
  <Options>
    <Option id="2">
      <PeriodFee basePeriod="MONTH" basePrice="100.00"
       factor="1.0" price="100.00"/>
      <UserAssignmentCosts basePeriod="MONTH" basePrice="0.00"
       factor="1.0" total ="0.00" price="0.00"/>
      <OptionCosts amount="100.00"/>
    </Option>
  </Options>
...
</Parameter>
```

RoleCosts

Specifies the costs for service roles.

If defined for the underlying application, roles can be used to grant specific privileges to different users. The roles are specified in the technical service definition as service roles. Service roles can be mapped to corresponding permissions in the application.

For each role, a price can be defined. This price is added to the base price per user in the cost calculation for a billing period.

The calculation of the charges for service roles depends on the cost calculation option which was chosen for the price model (see *PriceModel* on page 24 for details).

If the charges are calculated per time unit and the role assignment of a user is changed within a time unit, the affected time unit is charged pro rata. This means that the customer is charged exactly for the time each user role is assigned.

If the charges are calculated per time unit and a user with a specific role is removed from the subscription and assigned to it again with a different role in the same time unit, the customer is also charged for the time during which the user is not assigned to the subscription. This means that he is charged with the price for the first service role until the user is assigned to the subscription with the second service role.

A `RoleCosts` element is contained in a `UserAssignmentCosts` element (as subelement of the `PriceModel`, `Parameters`, or `Option` element).

A `RoleCosts` element has the following attribute:

`total` - (required, data type `decimal`) Total amount of costs for the service roles. The value is rounded to two decimal places.

For every service role, a `RoleCost` element is included in the `RoleCosts` element.

A `RoleCost` element has the following attributes:

- **`id`** - (required, data type `string`) ID of the service role.
- **`basePrice`** - (required, data type `decimal`) Recurring charge for the service role according to the price model.
- **`factor`** - (required, data type `decimal`) Factor used to calculate the costs for the service role. The factor is calculated as a fraction of the actual usage period. The recurring charge (`basePrice`) is multiplied with this factor to calculate the costs (`price`).
- **`price`** - (required, data type `decimal`) Costs for the service role. This value is calculated from the recurring charge (`basePrice`) multiplied with the factor (`factor`). The value is rounded to two decimal places.

Example:

```
<Parameter id="MEMORY_STORAGE">
...
  <RoleCosts total="0.00">
    <RoleCost basePrice="0.00" factor="0.4020087753882915"
     id="USER" price="0.00"/>
    <RoleCost basePrice="0.00" factor="0.8040175186678614"
     id="ADMIN" price="0.00"/>
  </RoleCosts>
...
</Parameter>
```

SteppedPrices

Specifies the stepped prices for a user assignment, event, or parameter.

Stepped prices allow for the definition of ranges for which different price factors apply. Step limits, i.e. the upper limits of ranges, can be set for:

- The **sum of the time units** users are assigned and work with a subscription in a billing period. For example, up to 10 hours one user is assigned to a subscription cost 10.00 € per hour, every additional hour the user is assigned costs 8.00 €.
- The **number of events** occurring in the usage of a subscription. For example, up to 10 file downloads cost 1.00 € per download, any additional download costs 0.50 €.
- **Values of numeric parameters**. For example, uploading up to 100 files costs 1.00 € per file, any additional upload costs 0.50 € per file.

Stepped prices are independent of any other price model elements.

A `SteppedPrices` element is contained in `UserAssignmentCosts` (as subelement of the `PriceModel` element), `Event`, and `PeriodFee` (as subelement of the `Parameters` element) elements.

A `SteppedPrices` element has the following attribute:

`amount` - (required, data type `decimal`) Summed up costs for all steps including the last one.

For every price step, a `SteppedPrice` element is included in a `SteppedPrices` element.

A `SteppedPrice` element has the following attributes:

- **`additionalPrice`** - (required, data type `decimal`) Summed up costs for the previous steps. The costs are calculated from the `limit`, `freeAmount` and `basePrice` attributes of the previous step (`(limit - freeAmount) * price`). The `additionalPrice` attribute of the first step always has a value of `0`. The value is rounded to two decimal places.
- **`basePrice`** - (required, data type `decimal`) Costs for the current step according to the price model.
- **`freeAmount`** - (required, data type `long`) Amount of units for the current step that are considered as a fixed discount, for example, the number of users that are free of charge. The value corresponds to the value of the `limit` attribute in the previous step. The `freeAmount` attribute of the first step always has a value of `0`.
- **`limit`** - (required, data type `string`) Step limit as defined in the price model.
- **`stepAmount`** - (optional, data type `decimal`) Summed up costs for the current step. These costs are calculated from the `basePrice` and `stepEntityCount` attributes of the current step. The value is rounded to two decimal places.
- **`stepEntityCount`** - (optional, data type `decimal`) Factor used to calculate the costs for the current step.

Example:

```
<PriceModel calculationMode="PRO_RATA" id="350001">
...
  <UserAssignmentCosts basePeriod="MONTH" factor="2.707940780619112"
 numberOfUsersTotal="4" price="1283.18">
    <SteppedPrices amount="1283.18">
      <SteppedPrice additionalPrice="0.00" basePrice="500.00"
       freeAmount="0" limit="2" stepAmount="1000.00"
 stepEntityCount="2"/>
      <SteppedPrice additionalPrice="1000.00" basePrice="400.00"
       freeAmount="2" limit="3" stepAmount="283.18"
       stepEntityCount="0.707940780619112"/>
      <SteppedPrice additionalPrice="1400.00" basePrice="300.00"
       freeAmount="3" limit="null" stepAmount="0.00"
 stepEntityCount="0"/>
    </SteppedPrices>
  </UserAssignmentCosts>
...
</PriceModel>
```

OverallCosts

Contains the total amount of the charges to be paid by a customer for all subscriptions in the current billing period. The costs are given in the currency specified in the price model.

If a discount was specified, the net amount of the costs is given in the `Discount` element (see *Discount* on page 37). If a VAT rate was defined, it is given in the `VAT` element (see *VAT* on page 36).

An `OverallCosts` element has the following attributes:

- **`netAmount`** - (required, data type `decimal`) Net costs after the net discount has been deducted from the original net costs (see *Discount* on page 37). The value is rounded to two decimal places.
- **`currency`** - (required, data type `string`) ISO code of the currency in which the costs are calculated.

- **grossAmount** - (required, data type `decimal`) Gross amount of the costs, calculated from the net costs (`netAmount`) plus VAT (see *VAT* on page 36). The value is rounded to two decimal places.

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
<OverallCosts netAmount="900.00" currency="EUR" grossAmount="1053.00"/>

</OverallCosts>
</BillingDetails>
```

VAT

Specifies the VAT rate to be applied.

A supplier can define a basic VAT rate that applies by default to all prices for his customers. In addition to this basic VAT rate, country-specific or even customer-specific VAT rates can be defined. You can:

- Enable VAT rate support for your organization.
- Define a default VAT rate that applies to all prices for all customers.
- Define a country-specific VAT rate for every country where you want to sell your services.
- Define a customer-specific VAT rate, for example, in case a customer organization has a subsidiary located in another country than its parent organization.

The VAT rate settings have the following effects on the cost calculation for a customer:

- If VAT rate support is disabled, prices are calculated as net prices; no VAT is added to the overall costs.
- A customer-specific VAT rate takes priority over any default or country-specific VAT rate.
- The country-specific VAT rate for the country where the customer organization is located is applied to the cost calculation when no customer-specific VAT rate is defined.
- The default VAT rate is used in all other cases.

The VAT rate does not affect any price model elements. The calculated VAT amount is added to the overall costs and results in the gross price to be paid by a customer.

A `VAT` element is contained in the `OverallCosts` element.

A `VAT` element has the following attributes:

- **percent** - (required, data type `float`) VAT rate in percent, specified as a decimal number.
- **amount** - (required, data type `decimal`) Net amount of VAT to be added to the net costs (`netAmount` attribute of the `OverallCosts` element). The value is rounded to two decimal places.

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
  <OverallCosts netAmount="900.00" currency="EUR" grossAmount="1053.00">
    <VAT percent="17.0" amount="153.00"/>
  </OverallCosts>
</BillingDetails>
```

Discount

Specifies the discount granted to the customer.

A discount can be defined for a customer which applies to all subscriptions of the customer to services. A discount may be valid as of the current or a future month. It can be restricted to a certain period of time. Before the time expires, the customer is notified by email so that he can react and contact the supplier.

The discount is defined as a percentage that is subtracted from the regular total price for a subscription. It is granted for all costs of a customer that incur in a billing period in which the discount is valid. It does not matter whether the discount is valid for the whole billing period or only a part of it.

A discount is completely independent of what a customer might purchase. If a discount is changed, the new discount is valid the next time the billing data is generated. Usually, a discount is only changed in agreement with the relevant customer.

A `Discount` element is contained in the `OverallCosts` element.

A `Discount` element has the following attributes:

- **`percent`** - (required, data type `float`) Percentage of costs to be deducted from the net costs, specified as a decimal number.
- **`discountNetAmount`** - (required, data type `decimal`) Net discount to be deducted from the original net costs (`netAmountBeforeDiscount`). The value is rounded to two decimal places.
- **`netAmountAfterDiscount`** - (required, data type `decimal`) Net costs after the net discount (`discountNetAmount`) has been deducted from the original net costs (`netAmountBeforeDiscount`). The value is rounded to two decimal places.
- **`netAmountBeforeDiscount`** - (required, data type `decimal`) Net costs before the net discount (`discountNetAmount`) has been deducted. The value is rounded to two decimal places.

Example:

```
<BillingDetails key="10002" timezone="UTC+01:00">
...
  <OverallCosts netAmount="900.00" currency="EUR" grossAmount="1053.00">
    <Discount percent="10.00" discountNetAmount="100.00"
     netAmountAfterDiscount="900.00"
     netAmountBeforeDiscount="1000.00" />
    <VAT percent="17.0" amount="153.00"/>
  </OverallCosts>
</BillingDetails>
```

Glossary

Administrator

A privileged user role within an organization with the permission to manage the organization's account and subscriptions as well as its users and their roles. Each organization has at least one administrator.

Application

A software, including procedures and documentation, which performs productive tasks for users.

Billing System

A system responsible for calculating the charges for using a service.

Broker

An organization which supports suppliers in establishing relationships to customers by offering the suppliers' services on a marketplace, as well as a privileged user role within such an organization.

Cloud

A metaphor for the Internet and an abstraction of the underlying infrastructure it conceals.

Cloud Computing

The provisioning of dynamically scalable and often virtualized resources as a service over the Internet on a utility basis.

Customer

An organization which subscribes to one or more marketable services in OSCM in order to use the underlying applications in the Cloud.

Infrastructure as a Service (IaaS)

The delivery of computer infrastructure (typically a platform virtualization environment) as a service.

Marketable Service

A service offering to customers in OSCM, based on a technical service. A marketable service defines prices, conditions, and restrictions for using the underlying application.

Marketplace

A virtual platform for suppliers, brokers, and resellers in OSCM to provide their services to customers.

Marketplace Owner

An organization which holds a marketplace in OSCM, where one or more suppliers, brokers, or resellers can offer their marketable services.

Marketplace Manager

A privileged user role within a marketplace owner organization.

OIDC

An authentication mode of OSCM where users are managed and authenticated by means of OpenID Connect in an external system such as Microsoft Azure Active Directory, the so-called OIDC provider.

OIDC Tenant

An entity in OSCM representing a configuration of settings and parameters required to connect to a specific tenant at an OIDC provider, for example, a specific domain and directory in Microsoft Azure Active Directory.

Operator

An organization or person responsible for maintaining and operating OSCM.

Organization

An organization typically represents a company, but it may also stand for a department of a company or a single person. An organization has a unique account and ID, and is assigned one or more of the following roles: technology provider, supplier, customer, broker, reseller, marketplace owner, operator.

Organizational Unit

A set of one or more users within an organization representing, for example, a department in a company, an individual project, a cost center, or a single person. A user may be assigned to one or more organizational units.

OU Administrator

A privileged user role within an organization allowing a user to manage the organizational units for which he has been appointed as an administrator, and to create, modify, and terminate subscriptions for these units.

Payment Type

A specification of how a customer may pay for the usage of his subscriptions. The operator defines the payment types available in OSCM; the supplier or reseller determines which payment types are offered to his customers, for example payment on receipt of invoice, direct debit, or credit card.

Platform as a Service (PaaS)

The delivery of a computing platform and solution stack as a service.

Price Model

A specification for a marketable service defining whether and how much customers subscribing to the service will be charged for the subscription as such, each user assigned to the subscription, specific events, or parameters and their options.

Reseller

An organization which offers services defined by suppliers to customers applying its own terms and conditions, as well as a privileged user role within such an organization.

Role

A collection of authorities that control which actions can be carried out by an organization or user to whom the role is assigned.

Seller

Collective term for supplier, broker, and reseller organizations.

Service

Generally, a discretely defined set of contiguous or autonomous business or technical functionality, for example an infrastructure or Web service. OSCM distinguishes between technical services and marketable services, and uses the term "service" as a synonym for "marketable service".

Service Manager

A privileged user role within a supplier organization.

Standard User

A non-privileged user role within an organization.

Software as a Service (SaaS)

A model of software deployment where a provider licenses an application to customers for use as a service on demand.

Subscription

An agreement registered by a customer for a marketable service in OSCM. By subscribing to a service, the customer is given access to the underlying application under the conditions defined in the marketable service.

Subscription Manager

A privileged user role within an organization with the permission to create and manage his own subscriptions.

Supplier

An organization which defines marketable services in OSCM for offering applications provisioned by technology providers to customers.

Technical Service

The representation of an application in OSCM. A technical service describes parameters and interfaces of the underlying application and is the basis for one or more marketable services.

Technology Manager

A privileged user role within a technology provider organization.

Technology Provider

An organization which provisions applications as technical services in OSCM.