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Preface

This guide describes how to configure multiple levels of service for the same service and to rate each level differently by using provisioning in Oracle Communications Billing and Revenue Management (BRM).

Audience

This guide is intended for developers who customize the provisioning framework in BRM and for pricing analysts and others who configure pricing components in Pricing Design Center.

Related Documentation

Before reading this book, read BRM Concepts.

Documentation Accessibility

For information about Oracle’s commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.
This document describes how to set up services framework for provisioning telco services in Oracle Communications Billing and Revenue Management (BRM).

See also:
- About Provisioning
- Provisioning Telco Services by Using Services Framework Manager
- Provisioning Non-Telco Services by Using Services Framework
- Setting Up Provisioning for GPRS Services
- Creating Provisioning Tags
- Implementing Provisioning Tags for Telco Services

**About Service Provisioning**

You use service provisioning to make changes on the network based on changes in service status in BRM or changes to the product offerings that customers purchase. For example:

- If a customer purchases a charge offer that includes voice mail, you can send commands to create the voice mailbox on the network when the charge offer is purchased.
- If a customer changes the status of a service, you can send a command to the network to activate or deactivate the service.
- You can activate or deactivate service extensions and supplementary services; such as call forwarding.

You can use one of the following methods to define provisioning tags, depending on what the tag is for:

- For telco services, use Services Framework Manager to define provisioning tags in most cases. You must use Services Framework Manager if the provisioning tag creates supplementary services or service extensions. See "Provisioning Telco Services by Using Services Framework Manager".
- For non-telco services, the provisioning tag framework is the recommended method of creating provisioning tags. However, you can also use Services Framework Manager to provision non-telco services. See "Provisioning Non-Telco Services by Using Services Framework".
This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Services Framework provisioning works.

Topics in this document:
- About Provisioning Services
- About Service Orders
- About the Provisioning Process
- About Delayed Provisioning

See also:
- About Provisioning
- Provisioning Non-Telco Services by Using Services Framework
- Setting Up Provisioning for GPRS Services
- Creating Provisioning Tags
- Implementing Provisioning Tags for Telco Services
- Testing Provisioning Using BRM Network Simulator
- About XML Provisioning

Important:
- For telco services, use Services Framework Manager to define provisioning tags in most cases. You must use Services Framework Manager if the provisioning tag creates supplementary services or service extensions. See "Provisioning Telco Services by Using Services Framework Manager".
- For non-telco services, the provisioning tag framework is the recommended method of creating provisioning tags. However, you can also use Services Framework Manager to provision non-telco services. See "Provisioning Non-Telco Services by Using Services Framework".
About Provisioning Services

Service provisioning enables you to assign and change network resources on external networks when the status of a prepaid service or device changes; for example, when a service is activated or deactivated.

When the status changes, service provisioning does the following:

1. Creates a service order, which provides information about the service and the provisioning action required.
2. Sends the service order to the external network through the Provisioning Data Manager (DM), dm_prov_telco.
3. Updates the service order’s status.
4. Updates the status of the service and device associated with the service order.

Provisioning occurs whenever customer data on the network must be changed. For example:

- Activating, changing, and inactivating GSM services and supplementary services. (During service activation and inactivation, phone numbers and SIM cards can also be provisioned or unprovisioned.)
- Pre-provisioning SIM cards.
- Changing SIM cards, phone numbers, and other service attributes, such as call forwarding.

BRM can provision both telco services and non-telco services.

- All telco services (/service/telco/* objects) are automatically recognized and provisioned.
- Non-telco services are provisioned only if they are listed in the /config/service_framework/permitted_service_types object. You specify the non-telco services that Services Framework supports by using the "load_pin_service_framework_permitted_service_types" utility. See "Specifying the Non-Telco Services Supported by Services Framework".

About Service Orders

Services Framework provisioning uses service orders to alert external provisioning agents about account and service changes. The service order includes details about what changed, including the following:

- POID of the device, service, or profile object that changed.
- The current status of the service order. See "About Service Order Status".
- The provisioning action to perform: activation, deactivation, suspension, reactivation, change, or ignore.
- Specified fields from the /service or /device object. See "About Adding Details to the Service Order".

The service order is sent to the external provisioning agent and stored in the BRM database in an /event/provisioning/service_order/telco/service_name object.

About Creating Service Orders for Supplementary Services

Supplementary services are added to or removed from service objects (/service/telco/service_name) when charge offers and bundles are purchased or
canceled. Services Framework service management initially sets the service status to NEW. If supplementary services are not included with the service, Services Framework provisioning adds them to the service order.

Note: Some features may be part of two or more charge offers purchased separately. In this case, the one added later takes the status of the existing one and is not included in the service order.

You can localize the status flags for the service and the status for the supplementary service by using the load_localized_strings utility, which updates the /strings storable class based on localized configuration file. See “Creating a Localized Version of BRM” in BRM Developer’s Guide.

About Creating Service Orders for Devices

Device service order creation is controlled by the device status stored in the configuration object (/config/device_state). If the device status is listed in the configuration object, a service order is created. The action associated with this service order is the one specified in the configuration for this device status entry.

The /event/device/associate and /event/device/disassociate events occur during an update services action. These events get device information needed to create the service order from the device objects. Only events for device types listed in the /config/telco/provisioning object are processed. The fields read from the device objects are specified in the /config/telco/provisioning object for this type of device.

When a device is changed, the /event/device/state event is generated as part of the device state change. PCM_OP_TCF_CREATE_SVC_ORDER reads the configuration object (/config/telco/provisioning) to determine if the device state requires that a service order be created. If so, this opcode creates it as part of the service order event (/event/provisioning/service_order/telco/service_name).

PCM_OP_TCF_PROV_POL_CREATE_SVC_ORDER is called as part of the state transition and can be customized to change some value in the service order. This opcode calls the opcodes that update the service order.

About Service Order Status

Like services, service orders have different statuses in their lifetimes. Table 2–1 shows the default values for service order status:

<table>
<thead>
<tr>
<th>Service Order Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW</td>
<td>This is the initial service order state.</td>
</tr>
<tr>
<td>READY</td>
<td>A READY service order is ready to be sent to the provisioning agent. The provisioning FMs have all the necessary data to completely fill in the service order and send it to the network provisioning interface.</td>
</tr>
<tr>
<td>PROCESSING</td>
<td>After the service order is received by the network provisioning interface, the state is changed to PROCESSING.</td>
</tr>
<tr>
<td>COMPLETED</td>
<td>If the service order is successfully processed and the devices are provisioned, the service order state changes to COMPLETED.</td>
</tr>
</tbody>
</table>
About the Provisioning Process

BRM uses event notification to alert Services Framework provisioning that one of the following occurred:

- A service was created or modified.
- A device was associated with or disassociated from a service.
- A device was replaced with a new device.
- A device’s state changed.
- A profile was modified.

Note: To configure event notification to alert Services Framework provisioning that other events occurred, see “Setting Up Event Notification for Provisioning”.

Services Framework provisioning then performs the following main functions:

- Generates a service order and adds specified details to it. See "About Adding Details to the Service Order".
- Retrieves the service order state transitions for the specified service or device type. See "About Valid Service Order State Transitions".
- Optionally tests the provisioning process by using the Network Simulator. See "Testing Provisioning Using BRM Network Simulator".
- Publishes the service order and, depending on the provisioning mode, either finishes processing or waits for a response from the network provisioning agent. See "About Provisioning Modes".

About Adding Details to the Service Order

Service orders contain information about the service, device, or profile that changed as well as the provisioning action to perform. You can also have other details about the service, device, or profile added to the service order before it is sent to the external provisioning agent. For example, you can add the quality of service (QoS) values and APN names to GSM service orders.

You specify the service, device, or profile object fields to add to the service order in the BRM_home/sys/data/config/pin_telco_provisioning configuration file. You then load the file into the provisioning configuration object (config/telco/provisioning and /config/telco/provisioning/fieldlist) by using the "load_pin_telco_provisioning" utility.

During the provisioning process, Services Framework determines the object fields to include in the service order by reading the provisioning configuration object:

- For telco services, the provisioning configuration object is /config/telco/provisioning/ServiceType, where ServiceType is the service passed in

<table>
<thead>
<tr>
<th>Service Order Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAILED</td>
<td>If there are errors during device provisioning or in the network, the status of the service order is set to FAILED.</td>
</tr>
</tbody>
</table>
the input flist. For example, if the service is `/service/telco/gprs/telephony`, the provisioning configuration object is `/config/telco/provisioning/gprs/telephony`.

- For non-telco services, the `/config/service_framework/permitted_service_types` object lists the provisioning configuration object to use.

To configure the service, device, and profile object fields to add to the service order, see "Specifying the Details to Add to the Service Order".

### About Valid Service Order State Transitions

Service orders can be set to a NEW, READY, PROCESSING, COMPLETED, or FAILED state. When a service order is first created, it is set to the NEW state by default. The service order can then transition from the NEW state to a list of permitted states that you specify.

For each service order state, you define the valid states to which it can transition. For example, you specify whether service orders can transition from a NEW state to only a READY state or from a NEW state to either a READY state or a PROCESSING state.

You specify the valid state transitions for each service in the `BRM_home/sys/data/pin_telco_service_order_state` configuration file. You then load the file into the `/config/telco/service_order_state/*` database object by using the `load_pin_telco_service_order_state` utility.

**Note:** You can also configure BRM to call an opcode when a service order transitions from one state to another.

To specify the valid state transitions, see "Specifying the Available States for Each Service Order".

### About Provisioning Modes

After service orders are published, the provisioning process cannot continue until the network provisioning agent returns a response. You can configure whether Services Framework provisioning sends the service order directly to the agent and waits for a response or publishes the service order to a queue by setting the provisioning mode:

- **Queued provisioning mode.** Services Framework provisions service orders in two separate transactions. In the first transaction, Services Framework generates a service order and queues it for the external provisioning agent. In the second transaction, the external provisioning agent responds that provisioning failed or was successful and then Services Framework updates the service in the BRM database. This is the default provisioning mode.

- **Confirmed provisioning mode.** Services Framework publishes the service order immediately to the external provisioning agent, waits for a response, and updates the service in the BRM database in one transaction. Specifically, Services Framework:
  - Processes the request and converts the service order information into a provisioning payload object in XML format.
  - Sends the service order to the network provisioning agent through a TCP/IP connection.
  - Waits for a response from the network provisioning agent.
About Delayed Provisioning

If the wait exceeds the timeout value, the transaction is rolled back. See "Setting a Timeout Value for Requests Sent in Confirmed Mode".

You specify the provisioning mode on a service-by-service basis by using the `pin_service_framework_permitted_service_types.xml` configuration file. You then load the XML file into the BRM database’s `/config/service_framework/permitted_service_types` object by using the "load_pin_service_framework_permitted_service_types" utility. See "Specifying the Non-Telco Services Supported by Services Framework".

You can also customize the `PCM_OP_TCF_POL_PROV_HANDLE_SVC_ORDER` policy opcode to set an event’s provisioning mode based on service order attributes. The policy opcode overrides the provisioning mode set in the `/config/service_framework/permitted_service_types` object.

---

**Note:** The `/config/service_framework/permitted_service_types` object and the `PCM_OP_TCF_POL_PROV_HANDLE_SVC_ORDER` policy opcode are used primarily to configure non-telco services. However, they can be used to specify the provisioning mode for telco services.

---

About Delayed Provisioning

GSM service provisioning is triggered according to the charge offer or bundle purchase date or end date:

- If the purchase or end date is not specified, the date is by default the current date. This means that the service is provisioned or unprovisioned as soon as the charge offer or bundle is purchased or canceled.
- If the purchase or end date is in the future, the service is provisioned at the future date. This is known as _delayed provisioning_.

You should use delayed provisioning whenever possible. For example, instead of performing a charge offer upgrade on the same day it is requested, schedule the upgrade for the following day.

The advantage of using delayed provisioning is that provisioning is triggered for only the net difference between the existing supplementary services and the new supplementary services. For example, an account might own a charge offer that includes these supplementary services:

- Voice mail
- Call forwarding

Using delayed activation, you cancel the existing charge offer and add a charge offer that includes these supplementary services:

- Voice mail
- Call blocking

In this case, BRM unprovisions call forwarding, and provisions call blocking. The customer’s voice mail configuration, including any existing messages, is unchanged.
Provisioning Telco Services by Using Services Framework Manager

This document describes how to set up services framework for provisioning telco services in Oracle Communications Billing and Revenue Management (BRM).

Topics in this document:

- Setting Up Event Notification for Provisioning
- Specifying the Details to Add to the Service Order
- Specifying the Available States for Each Service Order
- Configuring Service Status Change for Device-to-Service Associations

See also:

- About Provisioning
- Setting Up Provisioning for GPRS Services
- Implementing Provisioning Tags for Telco Services
- Testing Provisioning Using BRM Network Simulator
- About XML Provisioning

Setting Up Event Notification for Provisioning

BRM uses event notification to start the Services Framework provisioning process. You specify which notification events trigger provisioning by editing the event notification configuration file and then loading it into the database with the `load_pin_notify` utility.

To configure event notification for provisioning:

1. Open the `BRM_home/sys/data/config/pin_notify_telco` file in a text editor.
2. If your system has multiple configuration files for event notification, merge them with the `pin_notify_telco` file.
3. Add the following entry for each service or device type that you want to provision:

   ```
   OpcodeNumber   Flag   Event
   ```

   where:
Specifying the Details to Add to the Service Order

- **OpcodeNumber** specifies the hard-coded number for an opcode. To find an opcode’s number, see the opcode header files (*.h) in the BRM_ home/include/ops directory.

- **Flag** is the name of the flag to pass to the opcode when it is called by the event notification feature. 0 means no flag is passed.

- **Event** is the name of the event that triggers the execution of the opcode. You can use any BRM default or custom event defined in your system.

The default pin_notify.telco file includes the following lines, which indicate that PCM_OP_TCF_PROV_CREATE_SVC_ORDER (opcode number 4016), PCM_OP_TCF_PROV_HANDLE_SVC_ORDER (opcode number 4017), and PCM_OP_TCF_PROV_UPDATE_PROV_OBJECT (opcode number 4019) are called whenever these notification events occur:

```
4016 0 /event/notification/service/pre_create
4016 0 /event/notification/service/create
4016 0 /event/notification/service/pre_change
4016 0 /event/notification/service/post_change
4016 0 /event/device/associate
4016 0 /event/device/disassociate
4016 0 /event/device/replace
4016 0 /event/notification/profile/pre_modify
4016 0 /event/notification/profile/modify
4016 0 /event/device/state
4017 0 /event/provisioning/service_order/telco
4017 0 /event/provisioning/service_order/telco/gsm
4017 0 /event/provisioning/service_order/telco/gsm/telephony
4017 0 /event/provisioning/service_order/telco/gsm/data
4017 0 /event/provisioning/service_order/telco/gsm/fax
4017 0 /event/provisioning/service_order/telco/gsm/sms
4017 0 /event/provisioning/service_order/telco/gprs
4019 0 /event/provisioning/service_order/telco
4019 0 /event/provisioning/service_order/telco/gsm
4019 0 /event/provisioning/service_order/telco/gsm/telephony
4019 0 /event/provisioning/service_order/telco/gsm/data
4019 0 /event/provisioning/service_order/telco/gsm/fax
4019 0 /event/provisioning/service_order/telco/gsm/sms
4019 0 /event/provisioning/service_order/telco/gprs
```

4. Save and close the file.
5. Load your final event notification list (pin_notify_file) into the BRM database by using the `load_pin_notify` utility:
   ```
   load_pin_notify pin_notify_file
   ```
6. Restart the Connection Manager (CM).

For more information, see "Using Event Notification" in BRM Developer’s Guide.

Specifying the Details to Add to the Service Order

You specify the services and associated devices (if any) to include in a provisioning service order by editing the `pin_telco_provisioning` file. You load the file into the BRM database’s `config/telco/provisioning` object by using the "load_pin_telco_provisioning" utility.
To specify the service, device, and profile object fields to add to service orders:

1. Open the `BRM_home/sys/data/config/pin_telco_provisioning` file in a text editor.
2. Add the following lines for each `service` that you want to provision:

   ```
   Service provisioning info:
   ServiceType, ProvAction,
   Field1,
   Field2,
   Field3
   ```

   where:
   - `ServiceType` specifies the type of service being provisioned.
   - `ProvAction` specifies the provisioning action sent in the service order. The external provisioning system uses this information to determine the appropriate provisioning action. Use `A` (activate), `C` (close), `D` (deactivate), `I` (ignore), `P` (provisioning), `R` (reactivate), and `S` (suspend).
   - `FieldX` specifies the service object fields to include in the service order.

   For example, the following lines specify to add the bearer service name, APN name, and QOS profile name to the service order when a GPRS service is being activated. Note that the fields specified are part of the `/service/telco/gprs` schema.

   ```
   Service provisioning info:
   /service/telco/gprs, A,
   PIN_FLD_GPRS_INFO.PIN_FLD_BEARER_SERVICE,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_APN,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_QOS_PROFILE_NAME
   ```

3. (Optional) Add the following lines to specify devices associated with the service. Each device you include requires a separate line, separated by commas.

   ```
   Device provisioning info:
   DeviceType, ProvAction, Field1, "String1",
   DeviceType, ProvAction, Field2, "String2"
   ```

   where:
   - `DeviceType` specifies the type of device associated with the service.
   - `ProvAction` specifies the provisioning action for the device objects in the service order. The external provisioning system uses this information to determine the appropriate provisioning action. Use `A` (activate), `C` (close), `D` (deactivate), `I` (ignore), `P` (provisioning), `R` (reactivate), and `S` (suspend).
   - `FieldX` specifies the name of a field that contains a device attribute to include in the service order. Field names are replaced by values when you run `pin_telco_provisioning`.
   - `StringX` specifies a string used in the service order to identify the attribute specified by the Field value. You can query for the string in the service order.

   For example, the following line activates a phone number. The phone number value is included in the service order identified by the MSISDN string.

   ```
   DeviceType, ProvAction, Field1, "String1",
   DeviceType, ProvAction, Field2, "String2"
   ```
Specifying the Available States for Each Service Order

You specify the available service order state transitions for each service by editing the `pin_telco_service_order_state` file. You then load the file into the BRM database’s `/config/telco/service_order_state/*` object by using the "load_pin_telco_service_order_state" utility.

To specify the state transitions:

1. Open the `BRM_home/sys/data/config/pin_telco_service_order_state` file in a text editor.

2. Add the following lines for each service that you want to provision:

```
<table>
<thead>
<tr>
<th>ServiceType</th>
<th>StateID</th>
<th>StateType</th>
<th>OpcodeNum</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>raw</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>init</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>normal</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>end</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
```

where:

- **ServiceType** specifies the service being provisioned.
- **StateID** specifies the starting service order state: NEW (1), READY (2), PROCESSING (3), COMPLETED (4), and FAILED (5).
- **StateType** specifies the state type: raw (0), init (1), normal (2), and end (3).
- **NextState** specifies the state to which the service order can be transitioned from the starting state: NEW (1), READY (2), PROCESSING (3), COMPLETED (4), and FAILED (5).
- **OpcodeNum** specifies the opcode to call when the transition is made. To not call an opcode, use 0.
- **Flags** specifies the flag to pass to the opcode.

For example, the following lines specify that service orders can transition from a NEW state to a READY state, from a READY state to a PROCESSING state, and from a PROCESSING state to a COMPLETED or FAILED state:

```
/event/service_order/telco/gsm
1: 1: 0: 0
   2: 0: 0
2: 2: 0: 0
   3: 0: 0
3: 3: 0: 0
```
3. Save and close the `pin_telco_service_order_state` file.
4. Use the following command to run the `load_pin_telco_service_order_state` utility:
   ```
   load_pin_telco_service_order_state pin_telco_service_order_state
   ```
   For the complete command syntax, see "load_pin_telco_service_order_state".
5. Restart the Connection Manager (CM).

To verify that the data was loaded, you can display the `/config` objects by using the Object Browser or use the `robj` command with the `testnap` utility. (See "Reading an Object and Writing Its Contents to a File" in `BRM Developer’s Guide`.)

### Configuring Service Status Change for Device-to-Service Associations

By default, when you associate a device with a service, BRM activates the service, provisions the associated supplementary features, updates the status of the service and the associated supplementary features, and generates a service order that contains the service status and the status of the associated supplementary features. When you disassociate a device from a service, BRM deactivates the service, unprovisions the associated supplementary features, updates the status of the service and the associated supplementary features, and updates the service order.

You can configure BRM to not update the status of a service when you associate a device with a service or disassociate a device from a service.

To enable this feature, run the `pin_bus_params` utility to change the `RestrictDeviceToServiceStatePropagation` business parameter. For information about this utility, see `BRM Developer’s Guide`.

To configure service status change for device-to-service associations:

1. Go to `BRM_home/sys/data/config`.
2. Create an XML file from the `/config/business_params` object:
   ```bash
   pin_bus_params -r BusParamsTCF bus_params_TCF.xml
   ```
3. In the file, change `disabled` to `enabled`:
   ```
   <RestrictDeviceToServiceStatePropagation>enabled</RestrictDeviceToServiceStatePropagation>
   ```
4. Save the file as `bus_params_TCF.xml`.
5. Load the XML file into the BRM database:
   ```bash
   pin_bus_params bus_params_TCF.xml
   ```
6. Stop and restart the CM.
7. (Multischema systems only) Run the `pin_multidb` script with the `-R CONFIG` parameter. For more information, see `BRM System Administrator’s Guide`.
Provisioning Non-Telco Services by Using Services Framework

This document describes how to set up services framework for provisioning non-telco services in Oracle Communications Billing and Revenue Management (BRM).

Topics in this document:

- Specifying the Non-Telco Services Supported by Services Framework
- Customizing the Provisioning Mode Based on Service Order Attributes
- Setting a Timeout Value for Requests Sent in Confirmed Mode

See also:

- About Provisioning
- Setting Up Provisioning for GPRS Services
- Implementing Provisioning Tags for Telco Services
- Testing Provisioning Using BRM Network Simulator
- About XML Provisioning

Important:

- For telco services, use Services Framework Manager to define provisioning tags in most cases. You must use Services Framework Manager if the provisioning tag creates supplementary services or service extensions. See "Provisioning Telco Services by Using Services Framework Manager".

- For non-telco services, the provisioning tag framework is the recommended method of creating provisioning tags. However, you can also use Services Framework Manager to provision non-telco services. See "Provisioning Non-Telco Services by Using Services Framework".

Specifying the Non-Telco Services Supported by Services Framework

You specify the non-telco services supported by Services Framework by editing the `pin_service_framework_permitted_service_types.xml` configuration file. You then load the XML file into the BRM database's `/config/service_framework/permitted_service_types` object by using the "load_pin_service_framework_permitted_service_types" utility.
The pin_service_framework_permitted_service_types.xml file specifies the following for each supported service:

- The provisioning configuration object, which defines the fields to include in a service order.
- The service order configuration object, which specifies the service order state transitions.
- The provisioning mode: Queued or Confirmed.

---

**Note:** You use the XML file primarily to configure your non-telco services, but you can use it to specify the provisioning mode for telco services. To do this, list only the telco service and the provisioning mode.

---

To specify the supported non-telco services, perform these tasks:

1. Open the BRM_home/sys/data/config/pin_service_framework_permitted_service_types.xml file in an XML editor.

2. For each non-telco service supported by Services Framework, add the following entries:
   a. Specify the supported non-telco service on the ServiceType line. For example, replace ServiceType with /service/cable.
      ```xml
      <ServiceType>ServiceType</ServiceType>
      ```
   b. Specify the provisioning configuration object to use on the ConfigTypeProvisioningDetails line. For example, replace ProvDetails with /config/telco/provisioning/cable.
      ```xml
      <ConfigTypeProvisioningDetails>ProvDetails</ConfigTypeProvisioningDetails>
      ```
      For information, see "About Adding Details to the Service Order".
   c. Specify the service order configuration object to use on the ConfigTypeServiceOrderState line. For example, replace SOstate with /config/telco/service_order_state/cable.
      ```xml
      <ConfigTypeServiceOrderState>SOstate</ConfigTypeServiceOrderState>
      ```
      For information, see "About Valid Service Order State Transitions".
   d. Specify the provisioning mode on the ProvisioningMode line. Replace Value with 0 for Queued mode and with 1 for Confirmed mode.
      ```xml
      <ProvisioningMode>Value</ProvisioningMode>
      ```

3. Save and close the file.

4. Use the following command to load the list of non-telco services into the database:
   ```
   load_pin_service_framework_permitted_service_types
   ```
   See "load_pin_service_framework_permitted_service_types".

---

**Note:** This utility requires a configuration (pin.conf) file in the directory from which you run the utility. See "Creating Configuration Files for BRM Utilities" in BRM System Administrator’s Guide.
5. Stop and restart the CM.

To verify that the data loaded successfully, you can display the `/config/service_ framework/permitted_service_types` object by using Object Browser or by using the `robj` command with the `testnap` utility. See "Reading an Object and Writing Its Contents to a File" in `BRM Developer’s Guide`.

Customizing the Provisioning Mode Based on Service Order Attributes

By default, Services Framework assigns provisioning modes to events based on the service. You can customize Services Framework to assign the provisioning mode based on other attributes, such as service order details, by customizing the `PCM_OP_TCF_POL_PROV_HANDLE_SVC_ORDER` policy opcode. You can also customize the policy opcode to modify service order event details before they are published to the external provisioning agent.

You customize the policy opcode to find events with specific flist fields, assign the appropriate provisioning tag and change service order details, and then return the provisioning mode in the `PIN_FLD_MODE` output flist field.

Setting a Timeout Value for Requests Sent in Confirmed Mode

When provisioning service orders in Confirmed mode, `dm_prov_telco` waits for a response from the external provisioning agent before activating the service in the BRM database. If the external provisioning agent encounters an error or fails, `dm_prov_telco` might have to wait indefinitely. To prevent this problem, you can configure `dm_prov_telco` to close the connection and roll back the transaction if the wait exceeds a specified amount of time.

To specify a timeout value, perform these tasks:

1. Open the `dm_prov_telco` configuration file (`BRM_home/sys/dm_prov_telco/pin.conf`) in a text editor.

2. Set the `prov_timeout` entry to the amount of time, in seconds, that `dm_prov_telco` waits for a response from the external provisioning agent before timing out. For example, to set the timeout value to 30 seconds, enter the following:

   ```
   -dm_provision prov_timeout 30
   ```

   By default, the timeout value is set to 20. If you specify 0, `dm_prov_telco` waits an infinite amount of time for the external provisioning agent to respond.

3. Save and close the file.

4. Stop and restart `dm_prov_telco`. 

This document describes how to set up provisioning for GPRS services in Oracle Communications Billing and Revenue Management (BRM).

Topics in this document:
- Creating Provisioning Tags for GPRS Services
- Specifying the Provisioning Configuration for GPRS Services
- Specifying the Available States for Each GPRS Service Order

See also:
- About Provisioning
- About XML Provisioning
- Testing Provisioning Using BRM Network Simulator

Creating Provisioning Tags for GPRS Services

To implement service extensions, such as bearer services, APNs, QoS values, and extended rating attributes (ERAs) for GPRS services, you define provisioning tags. You then use PDC to include provisioning tags in charge offers. A tag becomes available to an individual account and service when a charge offer containing the tag is purchased. This is also known as charge offer–level provisioning.

To define provisioning tags for GPRS services, you modify the pin_telco_tags_gprs file. You then load the file into the BRM database’s /config/telco/gprs and /config/account_era objects by using the load_pin_telco_tags utility.

To specify provisioning tags for GPRS services, perform the following:

1. Open the BRM_home/sys/data/config/pin_telco_tags_gprs file in a text editor.
2. If necessary, edit the pin_telco_tags_gprs file. The sample file includes these entries:

```
provisioning_tag  
"/config/telco/gprs"  "Data Premium"  "Data Service"  "y"

service_extn      "BEARER_SERVICE"  "BS 70"
service_extn      "APN"  "apn.portal.com"
service_extn      "QOS"  "Platinum"
service_era       "FRIENDS_FAMILY"  12 13  "n"
service_era       "HOME_CELL"  16 17  "y"
service_era       "HOME_REGION"  14 15  "y"
service_era       "SERVICELEVEL"  10 11  "n"
service_era       "RATEPLAN"  18 19  "n"
```
1. Save the `pin_telco_tags_gprs` file.

2. Use the following command to run the `load_pin_telco_tags` utility:

   ```bash
   load_pin_telco_tags pin_telco_tags_gprs
   ```

   For the complete command syntax, see "load_pin_telco_tags".

3. Restart the Connection Manager (CM).

   To verify that the account ERAs were loaded, you can display the `/config` objects by using the Object Browser or use the `robj` command with the `testmap` utility. (See "Reading an Object and Writing Its Contents to a File" in BRM Developer’s Guide.)

### Specifying the Provisioning Configuration for GPRS Services

The provisioning configuration data includes information about which fields must be included to create a service order for GPRS services. You specify the configuration in the GPRS provisioning configuration file (`pin_telco_provisioning_gprs`) and then load the file in the BRM database’s `/config/telco/provisioning` object by using the "load_pin_telco_provisioning" utility.

To specify the provisioning configuration information for GPRS services, perform the following:

1. Open the `BRM_home/sys/data/config/pin_telco_provisioning_gprs` file in a text editor.

2. If necessary, edit the `pin_telco_provisioning_gprs` file. The default file includes these entries:

   ```
   Service provisioning info:
   /service/telco/gprs, A,
   PIN_FLD_GPRS_INFO.PIN_FLD_BEARER_SERVICE
   PIN_FLD_APN_ARRAY[*].PIN_FLD_APN,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_QOS_PROFILE_NAME

   Service provisioning info:
   /service/telco/gprs, C,
   PIN_FLD_GPRS_INFO.PIN_FLD_BEARER_SERVICE
   PIN_FLD_APN_ARRAY[*].PIN_FLD_APN,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_QOS_PROFILE_NAME

   Service provisioning info:
   /service/telco/gprs, D,
   PIN_FLD_GPRS_INFO.PIN_FLD_BEARER_SERVICE
   PIN_FLD_APN_ARRAY[*].PIN_FLD_APN,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_QOS_PROFILE_NAME

   Service provisioning info:
   /service/telco/gprs, R,
   PIN_FLD_GPRS_INFO.PIN_FLD_BEARER_SERVICE
   PIN_FLD_APN_ARRAY[*].PIN_FLD_APN,
   PIN_FLD_APN_ARRAY[*].PIN_FLD_QOS_PROFILE_NAME
   ```

   **Note:** List the APN and QoS entries in order, so that the PIN_FLD_APN_ARRAY is populated by taking the APN name along with its associated QoS. In addition, the QoS entry is optional for each APN.
Specifying the Available States for Each GPRS Service Order

You specify the available states for GPRS service orders by editing the `pin_telco_service_order_state_gprs` file. You then load the file into the BRM database’s `/config/telco/service_order_state/gprs` object by using the `load_pin_telco_service_order_state` utility.

See "About Service Order Status" for more information.

To specify the available states, perform the following:

1. Open the `BRM_home/sys/data/config/pin_telco_service_order_state_gprs` file in a text editor.
2. If necessary, edit the entries to support your business needs. The default entries are shown below:

   1: 1: 0: 0
   2: 0:0
   3: 0:0
   4: 0:0
   5: 0:0
   # READY -> PROCESSING

   2: 2: 0: 0
   1: 0: 0
   2: 0: 0
   3: 0: 0
   4: 0: 0
   5: 0:0
   # PROCESSING -> FAILED or COMPLETED

   3: 2: 0: 0
   1: 0: 0
   2: 0: 0
   3: 0: 0
   4: 0: 0
   5: 0:0

For more information on how to edit the file, see "load_pin_telco_provisioning".

3. Save the `pin_telco_provisioning_gprs` file.
4. Use the following command to run the `load_config_provisioning_tags` utility:

   `load_pin_telco_provisioning pin_telco_provisioning_gprs`

   For the complete command syntax, see "load_pin_telco_provisioning".

5. Restart the Connection Manager (CM).

To verify that the account ERAs were loaded, you can display the `/config` objects by using the Object Browser or use the `robj` command with the `testnap` utility. (See "Reading an Object and Writing Its Contents to a File" in BRM Developer’s Guide.)
# Completed Provisioning -> Completed Provisioning (terminating state)
4: 3: 0: 0
  1: 0: 0
  2: 0: 0
  3: 0: 0
  4: 0: 0
  5: 0: 0
# Failed Provisioning -> Failed Provisioning (terminating state)
5: 3: 0: 0
  1: 0: 0
  2: 0: 0
  3: 0: 0
  4: 0: 0
  5: 0: 0

For more information about editing the input file, see "Specifying the Available States for Each Service Order".

3. Save and close the pin_telco_service_order_state_gprs file.

4. Use the following command to run the load_pin_telco_service_order_state utility:

   load_pin_telco_service_order_state pin_telco_service_order_state_gprs

   For the complete command syntax, see "load_pin_telco_service_order_state".

5. Restart the Connection Manager (CM).

To verify that the account ERAs were loaded, you can display the /config objects by using the Object Browser or use the robj command with the testnap utility. (See "Reading an Object and Writing Its Contents to a File" in BRM Developer’s Guide.)
Creating Provisioning Tags

This chapter describes how to create provisioning tags in Oracle Communications Billing and Revenue Management.

Topics in this document:

- About Provisioning Tags
- Using the Provisioning Tag Framework
- Configuring Provisioning Tags
- Modifying Provisioning Tags
- Loading Provisioning Tag Configurations
- Modifying and Compiling the Provisioning Policy Source File
- Sample Provisioning Tag XML File

See also:

- About Provisioning
- Creating Provisioning Tags
- Implementing Provisioning Tags for Telco Services
- About XML Provisioning
- Testing Provisioning Using BRM Network Simulator

Important:

- For telco services, use Services Framework Manager to define provisioning tags in most cases. You must use Services Framework Manager if the provisioning tag creates supplementary services or service extensions. See "Creating Provisioning Tags".

- For nontelco services, the provisioning tag framework is the recommended method of creating provisioning tags. However, you can also use Services Framework Manager to provision non-telco services. See "Provisioning Non-Telco Services by Using Services Framework".
About Provisioning Tags

You use service provisioning to make changes on the network based on changes in service status in BRM or changes to the product offerings that customers purchase. For example:

- If a customer purchases a charge offer that includes voice mail, you can send commands to create the voice mailbox on the network when the charge offer is purchased.
- If a customer changes the status of a service, you can send a command to the network to activate or deactivate the service.
- You can activate or deactivate service extensions and supplementary services; such as call forwarding.

In this example, the email service is associated with three charge offers. Each charge offer has an associated provisioning tag. Each provisioning tag defines a different service configuration based on mailbox size. When a customer signs up for email service and purchases a package, the mailbox size is configured according to the associated provision tag.

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge Offer</th>
<th>Provisioning Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/service/email</td>
<td>Basic Email</td>
<td>Basic</td>
<td>Sets the minimum mailbox size to 0MB, the maximum mailbox size to 10MB, and specifies the path to the mail server.</td>
</tr>
<tr>
<td>/service/email</td>
<td>Regular Email</td>
<td>Regular</td>
<td>Sets the minimum mailbox size to 0MB, the maximum mailbox size to 20MB, and specifies the path to the mail server.</td>
</tr>
<tr>
<td>/service/email</td>
<td>Power Email</td>
<td>Power</td>
<td>Sets the minimum mailbox size to 0MB, the maximum mailbox size to 30MB, and specifies the path to the mail server.</td>
</tr>
</tbody>
</table>

You can use one of the following methods to define provisioning tags, depending on what the tag is for:

- **Provisioning tag framework**: You create provisioning tags by defining them in an XML file that is loaded into a configuration object in BRM. You can create provisioning tags for any service or account.
  
  You also might need to add the tag to the provisioning policy source file and compile the file.

  **Important:**

  - For telco services, use Services Framework Manager to define provisioning tags in most cases. You must use Services Framework Manager if the provisioning tag creates supplementary services or service extensions.
  
  - For nontelco services, the provisioning tag framework is the recommended method of creating provisioning tags.

  **Telco tag text file**: For telco services only, you can create service provisioning tags by defining them in a text file and then loading the file into BRM. You can include supplementary services in the tags.
### Configuring Provisioning Tags

To create provisioning tags, you configure the provisioning tags configuration file, `pin_config_provisioning_tags.xml`. This file is located in the `BRM_home/sys/data/config` directory.

To define a provisioning tag in this configuration file, you specify the following:

- A unique name for the provisioning tag.
Configuring Provisioning Tags

Note: The provisioning tag for a charge offer or discount must be the name of the offer profile with which the charge offer or discount is associated.

- For a service tag, the permitted services.
- For an account tag, /account.
- The name and number of each opcode to run when the charge offer or discount containing the provisioning tag is purchased or canceled. These opcodes contain the business logic to perform the actual provisioning, such as creating a profile.
- Parameters that specify the fields to be added to each opcode's input flist and the value for each field.

Important:

- Do not remove existing provisioning tags from pin_config_provisioning_tags.xml when adding new tags unless you want existing tags removed from the /config/provisioning_tag objects in the database.
- When you load pin_config_provisioning_tags.xml, all existing instances of /config/provisioning_tag are removed from the database, so only the provisioning tags defined in the file when you load it are in the database.

Table 6–1 lists the elements in the pin_config_provisioning_tags.xml file, the syntax to use for each element, and a description of how to specify each element. The syntax is based on the default version of the file:

<table>
<thead>
<tr>
<th>Table 6–1</th>
<th>Elements in pin_config_provisioning_tags XML File</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
<td><strong>Syntax</strong></td>
</tr>
<tr>
<td>ProvisioningTag Configuration</td>
<td><code>&lt;ProvisioningTagConfiguration&gt;</code></td>
</tr>
<tr>
<td>ProvisioningTag List</td>
<td><code>&lt;ProvisioningTagList&gt;</code></td>
</tr>
<tr>
<td>ProvisioningTag</td>
<td><code>&lt;ProvisioningTag name=&quot;__DEFAULT__&quot;&gt;</code></td>
</tr>
</tbody>
</table>
### Table 6–1 (Cont.) Elements in pin_config_provisioning_tags XML File

<table>
<thead>
<tr>
<th>Element</th>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PermittedTypes</td>
<td><code>&lt;PermittedTypes&gt;/service/ip&lt;/PermittedTypes&gt;</code></td>
<td>Specifies a service or account valid for the provisioning tag. One or more of these tags can be part of a provisioning tag definition. When the API for getting a list of provisioning tags is called, the array of permitted types is looked up; only provisioning tags applicable to the specified service are returned.</td>
</tr>
<tr>
<td>OpcodeList</td>
<td><code>&lt;OpcodeList&gt;</code></td>
<td>Contains the definition of one opcode. The opcodes specified for a provisioning tag contain the business logic required for provisioning when purchasing and canceling a charge offer. A provisioning tag can include multiple opcodes.</td>
</tr>
<tr>
<td>OpcodeName</td>
<td><code>&lt;OpcodeName&gt;</code>&lt;br&gt;PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING&lt;br&gt;<code>&lt;/OpcodeName&gt;</code></td>
<td>Specifies the opcode’s name.</td>
</tr>
<tr>
<td>OpcodeNumber</td>
<td><code>&lt;OpcodeNumber&gt;</code>417<code>&lt;br&gt;</code>&lt;/OpcodeNumber&gt;`</td>
<td>Specifies the hard-coded number for an opcode. To find an opcode’s number, see the opcode header files in the BRM_home/include/ops directory.</td>
</tr>
<tr>
<td>OpcodeMode</td>
<td><code>&lt;OpcodeMode&gt;0&lt;/OpcodeMode&gt;</code></td>
<td>Indicates when the opcode should be called, as follows:&lt;br&gt;- 0: on charge offer or discount purchase&lt;br&gt;- 1: on charge offer or discount cancellation&lt;br&gt;- 2: on both purchase and cancellation</td>
</tr>
<tr>
<td>OpcodeParamsList</td>
<td><code>&lt;OpcodeParamsList&gt;</code></td>
<td>Defines a parameter for an opcode. You can have multiple parameters. Each parameter is a name-value pair.</td>
</tr>
<tr>
<td>OpcodeParamName</td>
<td><code>&lt;OpcodeParamName&gt;</code>PIN_FLD_POID<code>&lt;br&gt;</code>&lt;/OpcodeParamName&gt;`</td>
<td>Specifies a field name to be added to the input flist. If the field is part of a substruct or array, use a period to separate the substruct or array name and the field name. For example: <code>PIN_FLD_EVENT.PIN_FLD_ACCOUNT_OBJ</code></td>
</tr>
</tbody>
</table>
Configuring Provisioning Tags

Specifying an Opcode in a Provisioning Tag to Create an ERA

When defining a configuration for the provisioning tag framework, you specify one or more opcodes to perform an action, such as creating an ERA. You can specify that an opcode run when a charge offer or discount is purchased, canceled, or both. You can use an existing opcode or design a custom opcode.

If the provisioning tag is designed to create an ERA, you can specify that the PCM\_OP\_SUBSCRIPTION\_PROVISION\_ERA opcode run at both purchase and cancellation time. This opcode creates, modifies, or deletes a profile (/profile object). ERAs are stored in profiles.

The actions PCM\_OP\_SUBSCRIPTION\_PROVISION\_ERA takes depends on the value specified for the PIN\_FLD\_ACTION parameter in the provisioning tag:

- If PIN\_FLD\_ACTION is Purchase, the opcode checks if a profile already exists. If the profile does not exist, the opcode calls PCM\_OP\_CUST\_CREATE\_PROFILE to create the profile. If the profile does exist, the opcode calls PCM\_OP\_CUST\_MODIFY\_PROFILE to add data passed in from the input flist and to increment the reference counter by 1.
- If PIN\_FLD\_ACTION is Cancel, the opcode decrements the reference counter by 1. If the counter is 0, the opcode calls PCM\_OP\_CUST\_DELETE\_PROFILE to delete the profile.

For example, you can create a friends and family ERA for a service by calling the PCM\_OP\_SUBSCRIPTION\_PROVISION\_ERA at purchase time with the parameters in Table 6–2:

<table>
<thead>
<tr>
<th>OpcodeParamName</th>
<th>OpcodeParamValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN_FLD_POID</td>
<td>0.0.0.0 /profile/serv_extrating -1</td>
</tr>
<tr>
<td>PIN_FLD_ACCOUNT_OBJ</td>
<td>$ACCOUNT$</td>
</tr>
<tr>
<td>PIN_FLD_FLAGS</td>
<td>0</td>
</tr>
<tr>
<td>PIN_FLD_SERVICE_OBJ</td>
<td>$SERVICE$</td>
</tr>
<tr>
<td>PIN_FLD_STR_VAL</td>
<td>12, 13</td>
</tr>
<tr>
<td>PIN_FLD_NAME</td>
<td>FRIENDS_FAMILY</td>
</tr>
<tr>
<td>PIN_FLD_INHERITED_INFO.</td>
<td></td>
</tr>
<tr>
<td>PIN_FLD_EXTRATING.</td>
<td></td>
</tr>
<tr>
<td>PIN_FLD_LABEL</td>
<td>MYFRIENDS</td>
</tr>
</tbody>
</table>

These name-value pairs indicate that an ERA named FRIENDS\_FAMILY and an ERA label named MYFRIENDS are created. Because both the account and service POIDs are specified, the opcode creates a service profile (/profile/serv\_extrating) object. If the service POID was not specified, the opcode would create an account profile (/profile/acct\_extrating) object.
Configuring Provisioning Tags

Creating Provisioning Tags

You must include the opcode twice in a provisioning tag, once with PIN_FLD_FLAGS set to 0 and once with PIN_FLD_FLAGS set to 1, so that it runs both at purchase and cancellation time.

- PIN_FLD_STR_VAL specifies that the profile name and profile description are localized and are stored in the /string object under string IDs 12 and 13.
- PIN_FLD_ACCOUNT_OBJ and PIN_FLD_SERVICE_OBJ use variables.

Variables for Parameter Values

You can use the following variables in Table 6–3 to specify certain values available only at the time the opcode is run:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ACCOUNT$</td>
<td>Account object POID</td>
</tr>
<tr>
<td>$SERVICE$</td>
<td>Service object POID</td>
</tr>
<tr>
<td>$PRODUCT$</td>
<td>Charge offer POID</td>
</tr>
<tr>
<td>$DISCOUNT$</td>
<td>Discount offer POID</td>
</tr>
<tr>
<td>$OFFERING$</td>
<td>POID of the purchased charge offer or discount offer</td>
</tr>
<tr>
<td>$PROVTAG$</td>
<td>Provisioning tag</td>
</tr>
</tbody>
</table>

Default Provisioning Tag

The default /config/provisioning_tag object contains the __DEFAULT__ provisioning tag. This tag is defined in the default pin_config_provisioning_tags.xml file. The tag calls the following opcodes:

- PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING, on charge offer purchase.
- PCM_OP_SUBSCRIPTION_POL_CANCEL_PROD_PROVISIONING, on charge offer cancellation.

If you have customized these opcodes, they set and clear fields in /service objects when a charge offer is purchased and canceled. If you have not customized these opcodes, you do not need to use them. You can specify other opcodes in the provisioning tags file to perform necessary actions.
Modifying Provisioning Tags

The __DEFAULT__ provisioning tag is always called for specified services when a charge offer is purchased or canceled, so you do not need to include these opcodes in any other provisioning tags you define. See the default pin_config_provisioning_tags.xml file for the list of services.

Using Custom Opcodes

You can create custom opcodes to perform actions not supported by existing opcodes and specify the custom opcodes in the provisioning tags configuration file. For example, you can write an opcode to add fields to a /service object.

Modifying Provisioning Tags

You use provision tags as the names of offer profiles associated with charge offers and discounts. If you modify a provision tag used as an offer profile, be sure to modify the corresponding offer profile name accordingly.

Important:

- Do not remove existing provisioning tags from pin_config_provisioning_tags.xml when adding new tags unless you want existing tags removed from the /config/provisioning_tag objects in the database.
- When you load pin_config_provisioning_tags.xml, all existing instances of /config/provisioning_tag are removed from the database, so only the provisioning tags defined in the file when you load it are in the database.

Loading Provisioning Tag Configurations

After you configure provisioning tags in the pin_config_provisioning_tags.xml file, load the tags into the database with the load_config_provisioning_tags utility.

Caution: The utility that loads provisioning tags into the database overwrites existing provisioning tags. When updating provisioning tags, you cannot load new provisioning tags only. You must load the complete set of provisioning tags each time you run the utility.

To load provisioning tag configurations:

1. Go to the directory in which the pin_config_provisioning_tags.xml file is located. The default location is BRM_home/sys/data/config.
2. Use the following command to run the load_config_provisioning_tags utility:

   load_config_provisioning_tags pin_config_provisioning_tags.xml
Modifying and Compiling the Provisioning Policy Source File

If a provisioning tag defined in the provisioning tag framework uses the PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING policy opcode, you must add the tag to the fm_subscription_pol_provisioning.c file and recompile the file. You can also use the PCM_OP_PROV_POL_UPDATE_SVC_ORDER opcode to customize service orders. See BRM Opcode Guide.

A provisioning tag uses PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING opcode if it is included in a charge offer and if it uses a service associated with the __DEFAULT__ provisioning tag.

Modifying and compiling the provisioning policy source file enables PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING to handle the tags.

To modify the provisioning policy source file for provisioning tags created using the provisioning tag framework:

1. Open the BRM_home/source/sys/fm_subscription_pol/fm_subscription_pol_provisioning.c file.
2. Add the provisioning tag name to the service_info table for the appropriate service.

For example, to add a provisioning tag called test to /service/ip, change this code:

```c
static char *tags_ip[] = {
    "example",
    NULL /* MUST BE LAST! */
};
```

to the following:

```c
static char *tags_ip[] = {
    "example",
    "test",
    NULL /* MUST BE LAST! */
};
```
3. Add code in the plp function to handle the new tag. You do this in the PROVISIONING FUNCTIONS section. The functions are grouped by service. For example, to add the provisioning tag *test* to /service/ip, change this code:

```c
static void plp_ip(pcm_context_t *ctxp, poid_t *svc_obj_p, int32 buy, char *tag, pin_errbuf_t *ebufp)
{
    if (strcmp(tag, "example") == 0) {
        plp_example(ctxp, svc_obj_p, buy, tag, ebufp);
    } else{
        plp_ssg(ctxp, svc_obj_p, buy, tag, ebufp);
    }
}
```

4. Compile and save the file.

### Sample Provisioning Tag XML File

Following is the default provisioning tag XML file. This file defines the provisioning tag named __DEFAULT__, which includes several permitted services and two opcodes:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<BusinessConfiguration
    xmlns="http://www.portal.com/schemas/BusinessConfig"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.portal.com/schemas/BusinessConfig business_configuration.xsd">
    <ProvisioningTagConfiguration>
        <ProvisioningTagList>
            <ProvisioningTag name="__DEFAULT__">
                <PermittedTypes>/service/email</PermittedTypes>
                <PermittedTypes>/service/ip/gprs</PermittedTypes>
                <PermittedTypes>/service/content</PermittedTypes>
            </ProvisioningTag>
        </ProvisioningTagList>
    </ProvisioningTagConfiguration>
</BusinessConfiguration>
```
<PermittedTypes>/service/vpdn</PermittedTypes>
<PermittedTypes>/service/ip</PermittedTypes>
<PermittedTypes>/service/ip/gprs</PermittedTypes>
<PermittedTypes>/service/telco</PermittedTypes>
<PermittedTypes>/service/telco/gsm</PermittedTypes>
<PermittedTypes>/service/telco/gsm/data</PermittedTypes>
<PermittedTypes>/service/telco/gsm/fax</PermittedTypes>
<PermittedTypes>/service/telco/gsm/sms</PermittedTypes>
<PermittedTypes>/service/telco/gsm/telephony</PermittedTypes>

<OpcodeList>
  <OpcodeName>PCM_OP_SUBSCRIPTION_POL_PURCHASE_PROD_PROVISIONING</OpcodeName>
  <OpcodeNumber>417</OpcodeNumber>
  <OpcodeMode>0</OpcodeMode>

  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_POID</OpcodeParamName>
    <OpcodeParamValue>$SERVICE$</OpcodeParamValue>
  </OpcodeParamsList>

  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_PROVISIONING_TAG</OpcodeParamName>
    <OpcodeParamValue>$PROVTAG$</OpcodeParamValue>
  </OpcodeParamsList>

</OpcodeList>

<OpcodeList>
  <OpcodeName>PCM_OP_SUBSCRIPTION_POL_CANCEL_PROD_PROVISIONING</OpcodeName>
  <OpcodeNumber>418</OpcodeNumber>
  <OpcodeMode>1</OpcodeMode>

  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_POID</OpcodeParamName>
    <OpcodeParamValue>$SERVICE$</OpcodeParamValue>
  </OpcodeParamsList>

  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_PROVISIONING_TAG</OpcodeParamName>
    <OpcodeParamValue>$PROVTAG$</OpcodeParamValue>
  </OpcodeParamsList>

</OpcodeList>

</ProvisioningTag>

</ProvisioningTagList>

</ProvisioningTagConfiguration>
Implementing Provisioning Tags for Telco Services

This document describes how to set up provisioning tags for prepaid services, supplementary services, and extended rating attributes (ERAs) in your Oracle Communications Billing and Revenue Management (BRM) system.

Topics in this document:

- About Provisioning Tags for Telco Services
- Examples of Provisioning Tags for Prepaid Services
- About GSM Supplementary Services
- Defining Provisioning Tags for Telco Services by Using the pin_telco_tags File
- Supported Supplementary Services

See also:

- About Provisioning
- Provisioning Telco Services by Using Services Framework Manager
- Setting Up Provisioning for GPRS Services
- Testing Provisioning Using BRM Network Simulator

About Provisioning Tags for Telco Services

To implement supplementary services, service extensions such as bearer services, and extended rating attributes (ERAs) for telco services, you define provisioning tags. You then use PDC to include provisioning tags in charge offers. A tag becomes available to an individual account and service when a charge offer containing the tag is purchased. This is also known as charge offer–level provisioning.

Use the `pin_telco_tags_service` file to define provisioning tags for telco services, for example, `pin_telco_tags_gsm` and the `load_pin_telco_tags` utility. Use this method to create provisioning tags with custom ERAs. See "Defining Provisioning Tags for Telco Services by Using the pin_telco_tags File".

Use these methods for provisioning tags for telco services, except for the following cases:

- For a provisioning tag that creates an ERA or other type of profile that you want to associate with a discount. Services Framework Manager does not process provisioning tags associated with discounts.
For a provisioning tag that populates default values to a profile when creating it. Services Framework Manager cannot populate default values to the profiles.

In both of these cases, use the provisioning tag framework to create provisioning tags.

Service-level provisioning tags are stored in service-specific /config/telco objects, such as /config/telco/gsm/telephony.

You can also use the pin_telco_tags_service file to create account-level ERAs, which do not depend on a specific service. These ERAs are stored in /config/account_era objects.

Examples of Provisioning Tags for Prepaid Services

You can create different types of provisioning tags; for example:

- A provisioning tag for a single bearer service, such as a type of voice service.
- A provisioning tag for one or more supplementary services without a bearer service. A charge offer with this type of provisioning tag is typically included in an add-on package because the customer must have the service before adding the supplementary services.
- A provisioning tag for one or more service-level ERAs. This type of provisioning tag can be used only in an add-on package.
- A provisioning tag can include combinations of a bearer service, supplementary services, and service-level ERAs.

For example, you might include two different provisioning tags for a GSM telephony service charge offer:

- The VoicePremium provisioning tag implements the following:
  - A voice bearer service
  - The Call Forwarding supplementary service
  - The Home Cell Assignment service ERA

- The VoiceFamily provisioning tag implements the following:
  - A voice bearer service
  - The Caller ID supplementary service
  - The Friends and Family service ERA

You might also create charge offers such as these:

- A charge offer that implements a voice bearer service.
- An add-on charge offer that implements Call Forwarding and the Home Cell Assignment ERA.
- An add-on charge offer that implements Caller ID and the Friends and Family ERA.
About GSM Supplementary Services

GSM supplementary services are features such as call forwarding and call blocking. They are not implemented as BRM services. Instead, they are implemented by using charge offer provisioning.

For example, you might have a charge offer that includes the GSM telephony service and a provisioning tag that implements the call forwarding supplementary service.

**Note:** Supplementary services can be used only with GSM services.

Value-added services, such as voice mail, are similar to supplementary services. The difference is that value-added services are not part of the GSM network standard.

**Note:** In this documentation, supplementary services and value-added services are referred to collectively as supplementary services.

You include supplementary services in charge offers by using provisioning tags. You can create charge offers that add supplementary services to an existing account (for example, a charge offer that adds call forwarding).

You cannot activate supplementary services in Billing Care. After BRM provisions a supplementary service, a customer usually activates the supplementary service using the telephone keypad. For example, a customer can define a number to use for call forwarding.

A customer’s supplementary services are defined in the service objects owned by the customer’s account, such as `/service/telco/gsm`.

You define systemwide supplementary services in `/service/telco/gsm` objects. For example, supplementary voice telephony services are defined in `/service/telco/gsm/telephony`.

Defining Provisioning Tags for Telco Services by Using the pin_telco_tags File

This section describes defining provisioning tags through the `pin_telco_tags` file for a specific telco service. For example, you use `pin_telco_tags_gsm` for GSM provisioning tags.
You can include service-level ERAs, supplementary services, and service extensions in a provisioning tag defined in a \texttt{pin_telco_tags} file.

To define provisioning tags using the \texttt{pin_telco_tags} file:

- Configure provisioning tags in the \texttt{pin_telco_tags\_service} file.
- Load the \texttt{pin_telco_tags\_service} file into the BRM database with the \texttt{load_pin\_telco_tags} utility.

You can also define account-level ERAs in the \texttt{pin_telco_tags} file.

To configure a provisioning tag in the \texttt{pin_telco_tags} file:

1. Open the \texttt{pin_telco_tags\_service} file. For example, use \texttt{pin_telco_tags\_gsm} for GSM services.

   The default \texttt{pin_telco_tags} files are in \texttt{BRM\_home/sys/data/config}. They include examples and instructions.

2. Use this syntax to add a provisioning tag:

   
   
   \begin{verbatim}
   provisioning_tag "Class" "ProvTag" "PTDescription" "DelayedProvReqd"
   service_extn "Extension Type Name" "Extension Value"
   features "One Or More Feature Name String Values"
   service_era "ServiceERA" "StringIdERA" "StringIdServiceERADesc" "ProvBool" "ERALabel"
   \end{verbatim}

   Enter each value in quotation marks.

A provisioning tag can be any combination of service extensions, features, and service-level ERAs. You do not need to include all three types of data in a tag.

Table 7–1 describes the provisioning tag syntax:

\begin{table}[h]
\centering
\begin{tabular}{|c|c|l|}
\hline
Tag Element & Value & Description \\
\hline
provisioning \_tag & Class & The object that stores the tag. For example: \\
 & & \\
 & & \\
provisioning \_tag & ProvTag & The name of the provisioning tag. For example: \\
 & & \\
 & & \\
provisioning \_tag & PTDescription & The description of the provisioning tag. For example: \\
 & & \\
 & & \\
provisioning \_tag & DelayedProvReqd & Whether the tag is unprovisioned when the charge offer containing the tag is canceled. Possible values are: \\
 & & \\
 & & "y" specifies that cancellation triggers unprovisioning. \\
 & & In most cases, use this setting. \\
 & & "n" specifies that cancellation does not trigger \\
 & & unprovisioning. \\
 & & Use this setting to leave a customer's service \\
 & & configuration unchanged. For example, you might \\
 & & want to leave a voice mailbox intact. \\
 & & \\
service_extn & Extension Type Name & The type of service extension. For example: \\
 & & \\
 & & \\
\hline
\end{tabular}
\end{table}
This example shows a provisioning tag for a telephony charge offer that includes a bearer service, call waiting and voice mailbox supplementary services, and friends and family service ERAs:

```
# Standard Telephony Package
provisioning_tag "/config/telco/gsm/telephony" "Voice Standard" "Voice Standard Service package with Called ID, Call Waiting, Voice mail and Friends and Family" "y"

service_extn "BEARER_SERVICE" "T11"
features "CLIP" "CW" "VMBOX"

service_era "FRIENDS_FAMILY" 12 13 "n" "MYFRIENDS"
```

### Table 7–1 (Cont.) Provisioning Tag Syntax

<table>
<thead>
<tr>
<th>Tag Element</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>service_extn</td>
<td>Extension Value</td>
<td>The code for a GSM bearer service or other service extension. For example: &quot;B46&quot; Codes are defined in the GSM specification. You must use the exact code that the network requires.</td>
</tr>
<tr>
<td>features</td>
<td>One or More Feature Name String Values</td>
<td>The GSM supplementary services provisioned when this charge offer is purchased. The services are entered as codes in one line. For example: &quot;CLIP&quot; &quot;CW&quot; These codes are defined in the GSM specification. You must use the exact code that the network requires. For a list of codes, see &quot;Supported Supplementary Services&quot;.</td>
</tr>
<tr>
<td>service_era</td>
<td>ServiceERA</td>
<td>The service ERA code. For example: &quot;FRIENDS_FAMILY&quot;</td>
</tr>
<tr>
<td>service_era</td>
<td>StringIdERA StringIdServiceERADesc</td>
<td>The IDs for the ERA name and description. For example: &quot;12&quot; &quot;13&quot; You define a localized name and description for these IDs in the <code>era descr.locale</code> file.</td>
</tr>
</tbody>
</table>
| service_era | ProvBool | Whether or not provisioning is required. The possible values are:  
  - "y" specifies that provisioning is required.  
  - "n" specifies that provisioning is not required. |
| service_era | ERALabel | The name of a list within the ERA. An ERA can have one or more lists. For example: "MYFRIENDS" Note: You cannot localize the ERA label. You cannot have duplicate label names associated with the same ERA code. |

### Loading the pin_telco_tags File

Run the `load pin_telco_tags` utility to load the contents of the `pin_telco_tags.service` file: for example, the `pin_telco_tags.gsm` file: into the BRM database. This utility creates or updates `/config/telco/service` and `/config/account_era` objects.
Supported Supplementary Services

**Caution:** By default, the `load_pin_telco_tags` utility appends telco provisioning tags and account-level ERAs to the BRM database. But if you use the `-x` parameter, this utility overwrites existing telco provisioning tags and account-level ERAs. Do not use the `-x` parameter unless you are certain you want to overwrite existing objects.

**Important:** The `load_pin_telco_tags` utility requires a configuration file. See “Creating Configuration Files for BRM Utilities” in BRM System Administrator’s Guide.

1. Edit the `pin_telco_tags_service` file to add the custom account-level ERAs. The default `pin_telco_tags_gsm` file in `BRM_home/sys/data/config` includes examples and instructions.

2. Save the `pin_telco_tags_service` file.

3. Use the following command to run the `load_pin_telco_tags` utility:

   ```plaintext
   load_pin_telco_tags pin_telco_tags_service
   ```

   For the complete command syntax, see "load_pin_telco_tags".

4. Restart the Connection Manager (CM).

   To verify that the account ERAs were loaded, you can display the `/config` objects by using the Object Browser or use the `robj` command with the `testnap` utility. (See "Reading an Object and Writing Its Contents to a File" in BRM Developer’s Guide.)

---

**Supported Supplementary Services**

Table 7–2 shows the supplementary services supported by GSM Manager. You select from these codes when configuring GSM provisioning tags in PDC.

These codes are defined in the GSM provisioning DTD file (`GSM.dtd`), which is used by the GSM provisioning components. If you customize the GSM provisioning components to add supplementary services, you must be sure to use the new codes in the provisioning tags.

**Table 7–2  GSM Manager Supported Supplementary Services**

<table>
<thead>
<tr>
<th>Supplementary Service</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advice of charge (charging)</td>
<td>AOCC</td>
</tr>
<tr>
<td>Advice of charge (information)</td>
<td>AOCI</td>
</tr>
<tr>
<td>Barring all incoming calls</td>
<td>BAIC</td>
</tr>
<tr>
<td>Barring all outgoing calls</td>
<td>BAOC</td>
</tr>
<tr>
<td>Barring all outgoing international calls</td>
<td>BOIC</td>
</tr>
<tr>
<td>Barring all outgoing international calls except those directed to the HOME PLMN country</td>
<td>BOICXH</td>
</tr>
<tr>
<td>Completion of calls to busy subscribers</td>
<td>CCBS</td>
</tr>
<tr>
<td>Call deflection</td>
<td>CD</td>
</tr>
<tr>
<td>Call forwarding on mobile subscriber busy</td>
<td>CFB</td>
</tr>
<tr>
<td>Supplementary Service</td>
<td>Code</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Call forwarding on mobile subscriber not reachable</td>
<td>CFNRC</td>
</tr>
<tr>
<td>Call forwarding on mobile subscriber no reply</td>
<td>CFNRY</td>
</tr>
<tr>
<td>Call forwarding unconditional</td>
<td>CFU</td>
</tr>
<tr>
<td>Calling line identification presentation</td>
<td>CLIP</td>
</tr>
<tr>
<td>Calling line identification restriction</td>
<td>CLIR</td>
</tr>
<tr>
<td>Name identification</td>
<td>CNAP</td>
</tr>
<tr>
<td>Connected line identification presentation</td>
<td>COLP</td>
</tr>
<tr>
<td>Connected line identification restriction</td>
<td>COLR</td>
</tr>
<tr>
<td>Call waiting</td>
<td>CW</td>
</tr>
<tr>
<td>Explicit call transfer</td>
<td>ECT</td>
</tr>
<tr>
<td>Call holding</td>
<td>HOLD</td>
</tr>
<tr>
<td>Multicall</td>
<td>MC</td>
</tr>
<tr>
<td>Enhanced multilevel precedence</td>
<td>MLPP</td>
</tr>
<tr>
<td>Multiparty</td>
<td>MPTY</td>
</tr>
<tr>
<td>Support of private numbering package</td>
<td>SPNP</td>
</tr>
<tr>
<td>User-to-user signaling</td>
<td>UUS</td>
</tr>
<tr>
<td>Voice/fax mail service</td>
<td>VMBOX</td>
</tr>
</tbody>
</table>
This document describes how to enable in-flight changes to provisioning in Oracle Communications Billing and Revenue Management (BRM).

Topics in this document:
- Configuring Provisioning Tags for Policy-Driven Charging
- Collecting Data for Provisioning Tags
- Loading Provisioning Tags for Policy-Driven Charging
- Default Provisioning Tag for Policy-Driven Charging

See also:
- About Provisioning
- Creating Provisioning Tags
- Testing Provisioning Using BRM Network Simulator

Configuring Provisioning Tags for Policy-Driven Charging

Configure the balances that BRM should track by creating provisioning tags for your services. Each provisioning tag contains the balance elements valid for that tag and information on the policy attributes used in provisioning policy for that balance element.

Policy attributes are the configured characteristics associated with a provisioning policy. They contain the information you must provide to the specific opcode which is to process changes to the charge offer or discount associated with that provisioning tag (for example, an offer profile threshold breach notification is required and/or the language in which the subscriber requires the notification).

---

**Note:** BRM stores policy attributes as subscriber preferences (`/profile/subscriber_preferences`) objects containing the following elements:

- Name (required)
- Type (optional)
- Value (optional)
BRM provides a default provisioning tag in the `pin_offer_profile_provisioning_tags_policy_attributes.xml` file located in `BRM_home/sys/data/config` directory.

The first section of the definition seen in Example 8–1 shows the valid balance elements for the default provisioning tag. It is followed by the information on the opcodes to be called when the charge offer or discount containing the provisioning tag is purchased or canceled and the parameters that specify the fields to be added to the opcode’s input flist and the value for each field.

Collecting Data for Provisioning Tags

Collect the following data for any additional services that BRM should track for policy-driven charging.

- The name for your provisioning tag. This must be the name of the offer profile with which you associate this provisioning configuration.
- Permitted types of services.
- Subscriber preferences for the service stored in the database as `/profile/subscriber_preferences` objects.
- Opcodes to use in association with the provisioning tag.

You must set up the following for each opcode included in a provisioning tag:

- The name and number of each opcode to run and when the opcode must be run. These opcodes contain the business logic to perform the provisioning, such as creating a profile.
- Parameters that specify the fields to add to each opcode’s input flist and the value for each field.

This information can now be configured in the `pin_offer_profile_provisioning_tags_policy_attributes.xml` file for use with your offer profiles.

Configuring Provisioning Tags for Offer Profiles

To configure provisioning tags for use with your offer profiles:

1. Go to the `BRM_home/sys/data/config` directory.
2. Open the `pin_offer_profile_provisioning_tags_policy_attributes.xml` file an XML editor or text editor.

   **Tip:** Save a copy of the default configuration file before you make any changes to it.

3. Do one of the following to update this file:
   - Edit the default provisioning tag contained in this file.
   - Add your provisioning tag by placing your definition just below the default provisioning tag (Platinum). Include the following for each provisioning tag:
     - Provisioning tag name:
       ```xml
       <ProvisioningTag name="YourProvisioningTagName"/>
       ```
       where `YourProvisioningTagName` is the name of your offer profile.
     - Each service valid for the provisioning tag as a `PermittedType` element as shown in Example 8–1.
Specifying the opcodes to call for this provisioning tag as shown in Example 8–1.

4. Save the pin_offer_profile_provisioning_tags_policy_attributes.xml file.

Loading Provisioning Tags for Policy-Driven Charging

Use the load_config_provisioning_tags utility to load the pin_offer_profile_provisioning_tags_policy_attributes.xml file into the BRM database.

To do so:

1. Ensure that the provisioning tags required for policy-driven charging are configured in the pin_offer_profile_provisioning_tags_policy_attributes.xml XML file.

2. Go to the directory in which the pin_offer_profile_provisioning_tags_policy_attributes.xml file is located. The default location is BRM_home/sys/data/config.

3. Commit the provisioning tags and policy attributes XML file to the BRM database.

   load_config_provisioning_tags -d -v pin_offer_profile_provisioning_tags_policy_attributes.xml

   where:
   - -d creates a log file for debugging purposes.
   - -v displays information about successful or failed processing as the utility runs.

   For more information on the load_config_provisioning_tags utility, see "load_config_provisioning_tags" in BRM Developer’s Guide.

4. To verify that the provisioning tags were loaded, display the /config/provisioning_tag object by using the Object Browser or the robj command with the testnap utility.

5. Stop and restart the Connection Manager (CM).

The provisioning tags and policy attributes information associated with policy-driven charging is now stored in /config/provisioning_tag objects in the database.

Default Provisioning Tag for Policy-Driven Charging

Example 8–1 shows the default provisioning tag provided by BRM in the pin_offer_profile_provisioning_tags_policy_attributes.xml file located in the BRM_home/sys/data/config directory.

Example 8–1 Default Provisioning Tag Configuration

<?xml version="1.0" encoding="UTF-8"?>
  <ProvisioningTagConfiguration>
    <ProvisioningTagList>
      <ProvisioningTag name="Platinum">
        <PermittedTypes>/service/email</PermittedTypes>
        <PermittedTypes>/service/ip/gprs</PermittedTypes>
        <PermittedTypes>/service/content</PermittedTypes>
        <PermittedTypes>/service/vpdn</PermittedTypes>
        <PermittedTypes>/service/ip</PermittedTypes>
        <PermittedTypes>/service/fax</PermittedTypes>
      </ProvisioningTag>
    </ProvisioningTagList>
  </ProvisioningTagConfiguration>
</BusinessConfiguration>
<PermittedTypes>/service/ip/gprs</PermittedTypes>
<PermittedTypes>/service/telco</PermittedTypes>
<PermittedTypes>/service/telco/gsm</PermittedTypes>
<PermittedTypes>/service/telco/gsm/data</PermittedTypes>
<PermittedTypes>/service/telco/gsm/fax</PermittedTypes>
<PermittedTypes>/service/telco/gsm/sms</PermittedTypes>
<PermittedTypes>/service/telco/gsm/sms</PermittedTypes>

<OpcodeList>
  <OpcodeName>PCM_OP_CUST_SET_SUBSCRIBER_PREFERENCES</OpcodeName>
  <OpcodeNumber>3916</OpcodeNumber>
  <OpcodeMode>0</OpcodeMode>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_POID</OpcodeParamName>
    <OpcodeParamValue>0.0.0.0 /profile/subscriber_preferences -1</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_DELETED_FLAG</OpcodeParamName>
    <OpcodeParamValue>0</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_ACCOUNT_OBJ</OpcodeParamName>
    <OpcodeParamValue>$ACCOUNT$</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SERVICE_OBJ</OpcodeParamName>
    <OpcodeParamValue>$SERVICE$</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_NAME</OpcodeParamName>
    <OpcodeParamValue>SET_SUBSCRIBER_PREFERENCES</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[0].PIN_FLD_NAME</OpcodeParamName>
    <OpcodeParamValue>Language</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[0].PIN_FLD_VALUE</OpcodeParamName>
    <OpcodeParamValue>English</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_NAME</OpcodeParamName>
    <OpcodeParamValue>Channel</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_VALUE</OpcodeParamName>
    <OpcodeParamValue>IVR</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_SUBSCRIBER_PREFERENCE_ID</OpcodeParamName>
    <OpcodeParamValue>1</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_NAME</OpcodeParamName>
    <OpcodeParamValue>Channel</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_VALUE</OpcodeParamName>
    <OpcodeParamValue>IVR</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SUBSCRIBER_PREFERENCES[1].PIN_FLD_SUBSCRIBER_PREFERENCE_ID</OpcodeParamName>
    <OpcodeParamValue>2</OpcodeParamValue>
  </OpcodeParamsList>
</OpcodeList>
<OpcodeList>
  <OpcodeName>PCM_OP_CUST_SET_SUBSCRIBER_PREFERENCES</OpcodeName>
  <OpcodeNumber>3916</OpcodeNumber>
  <OpcodeMode>1</OpcodeMode>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_POID</OpcodeParamName>
    <OpcodeParamValue>0.0.0.0 /profile/subscriber_preferences -1</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_DELETED_FLAG</OpcodeParamName>
    <OpcodeParamValue>1</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_ACCOUNT_OBJ</OpcodeParamName>
    <OpcodeParamValue>$ACCOUNT$</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_SERVICE_OBJ</OpcodeParamName>
    <OpcodeParamValue>$SERVICE$</OpcodeParamValue>
  </OpcodeParamsList>
  <OpcodeParamsList>
    <OpcodeParamName>PIN_FLD_NAME</OpcodeParamName>
    <OpcodeParamValue>DEL_SUBSCRIBER_PREFERENCES</OpcodeParamValue>
  </OpcodeParamsList>
</OpcodeList>
Enabling In-Flight Changes to Service Orders

This document describes how to enable in-flight changes to provisioning in Oracle Communications Billing and Revenue Management (BRM).

See also:

- About Provisioning
- Provisioning Telco Services by Using Services Framework Manager
- Testing Provisioning Using BRM Network Simulator

Enabling In-Flight Changes to Service Orders

By default, Services Framework provisioning generates only one service order for a particular service at a time. For example, when a customer adds a service, such as GPRS telephony, Services Framework provisioning generates a service order to activate the service. Services Framework does not generate any other service orders for that GPRS telephony service until the external provisioning agent sends a response and Services Framework updates the GPRS telephony service’s status in the BRM database. This prevents the external provisioning agent from overwriting service changes or processing service orders out of order.

You can enable Services Framework provisioning to generate multiple service orders for a particular service before it receives a response from the external provisioning agent and updates the service’s status. This enables you to make in-flight changes to a service’s provisioning request. For example, one service order could activate a GPRS telephony service and a second service order could correct the device ID associated with the service.

Note: When Services Framework sends multiple service orders for a particular service to the external provisioning agent, it waits until it has received a response for all requests before updating the service’s status in the BRM database.

To enable Services Framework provisioning to generate new service orders for a service that already has a provisioning request in process:

1. Open the CM configuration file (BRM_home/sys/cm/pin.conf) in a text editor.
2. Add the following `support_multiple_so` entry to the file:

   - fm_tcf support_multiple_so 1

   where:
Enabling In-Flight Changes to Service Orders

- 0 prohibits Services Framework provisioning from generating new service orders for a service that already has a provisioning request in process. This is the default.
- 1 allows Services Framework provisioning to generate service orders for services that already have a provisioning request in process.

3. Save and close the file.
4. Restart the CM.
This chapter describes how to use the Oracle Communications Billing and Revenue Management (BRM) Network Simulator to test your Telco implementation.

Topics in this document:

- About the Network Simulator
- Using the Perl-Based Network Simulator
- Running the Java-Based Simulator

See also:

- About Provisioning
- Creating Provisioning Tags

### About the Network Simulator

The Network Simulator simulates a network provisioning agent by receiving and processing XML provisioning payload files from the Provisioning DM.

**Important:** To use this simulator, the Provisioning DM must be running.

The Network Simulator includes a Perl-based simulator and a Java-based simulator.

The Perl-based simulator (`agent_sim.pl`) captures Service Order XML provisioning payload files from the Provisioning DM as follows:

- If the `$PIN_HOME` environment variable is set, the Perl-based simulator captures and saves the XML file in `BRM_home/apps/telco/service_orders` with the name `SvcOrder_EventObject_id.xml`.
- If the `$PIN_HOME` environment variable is not set, the XML file is created in the directory where the simulator is launched.

The Java-based simulator:

1. Processes the XML file according to command-line arguments.
2. Updates the service order status by calling the `PCM_OP_PROV_UPDATE_SVC_ORDER` opcode.
Using the Perl-Based Network Simulator

To use the Network Simulator:

1. Open the CM configuration file (`BRM_home/sys/cm/pin.conf`).
2. Uncomment the `agent_return` entry and set it to 1:
   ```
   fm_tcf agent_return 1
   ```
3. Be sure that the internal simulator is turned off by setting the `simulate_agent` entry to 0.
   ```
   fm_tcf simulate_agent 0
   ```
4. Save the file.
5. Restart the CM.
6. Start the Perl-based simulator:
   ```
   Perl agent_sim.pl &
   ```
7. Start the Provisioning DM:
   ```
   start_dm_prov_telco
   ```

   **Important:** Always start the Perl-based simulator before you start the Provisioning DM.

8. Create a provisioning event.
9. To test provisioning by simulating the network, run the Java-based simulator `RunSimulator`. See "Running the Java-Based Simulator".

Running the Java-Based Simulator

You use the Java-based simulator command `RunSimulator` to process the XML provisioning payload file that was created with the Perl-based simulator.

If you include a parameter to change the state of a supplied service order, the status of associated service changes accordingly. For example, when a successful service order is returned, the service, charge offer, and supplementary service (feature) status is set to `Active`.

To run the Java-based simulator:

- Run `RunSimulator` at the command prompt:

  ```bash
  RunSimulator [-d] [-s status] [-f status_flags] [-t feature_status] [-m status_msg] [-x xml_file]
  ```

**Parameters**

- `-d`
  Debug mode.
- `-s`
Status of service order.
Possible values: 0 (success; this is the default), 1 (failed)

-\textbf{f}
Status flag of service order to be returned.

-\textbf{t}
Supplementary service (feature) status to be returned.

-\textbf{m}
Status message.

-\textbf{x}
XML provisioning payload file.

**Java-Based Simulator Sample Command**
This is a sample command line for running the Java-based simulator in Network Simulator:

```
RunSimulator -x SvcOrder_EventObject_id.xml
```
This document describes how XML files are used for provisioning in Oracle Communications Billing and Revenue Management (BRM).

Topics in this document:
- About XML Provisioning
- Sample XML Document
- Service Order XML DTD

See also:
- Provisioning Telco Services by Using Services Framework Manager
- Provisioning Non-Telco Services by Using Services Framework
- Creating Provisioning Tags

About XML Provisioning

To initiate service provisioning on a carrier network, GSM Manager sends service order information to a third-party network provisioning agent in the form of XML-formatted provisioning payload files. The provisioning agent returns the result of the provisioning request to GSM Manager.

The basic network provisioning process:

1. Provisioning Data Manager (DM) (dm_prov_telco):
   a. Receives a service order.
   b. Creates an XML provisioning payload file that includes fields specified in the provisioning configuration file (/config/provisioning/telco).
   c. Sends it to the network provisioning agent.

2. The Provisioning DM (dm_prov_telco) waits for an acknowledgment from the network provisioning agent.

   This is a sample POID field from a service creation response:

   0.0.0.1 /event/provisioning/service_order/telco/gsm/telephony 18832

3. The network provisioning agent returns the provisioning result (Success or Failure) to an opcode which updates the service order using the POID field from the response.

   For more information on supported fields, see "Service Order XML DTD".
The following is a sample XML provisioning payload file generated for service creation:

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<order>
    <POID>0.0.10.2 / 0 0</POID>
    <EVENT_OBJ>0.0.0.1 /event/provisioning/service_order/telco/gsm/telephony 18832 0</EVENT_OBJ>
    <SVC_ORDER>
        <STATUS>1</STATUS>
    </SVC_ORDER>
    <SERVICE_ORDER_INFO elem="0">
        <ACTION>A</ACTION>
        <POID>0.0.0.1 /device/sim 13947 1</POID>
        <PARAMS elem="0">
            <VALUE>000000020001152</VALUE>
            <ACTION>I</ACTION>
            <NAME>IMSI</NAME>
        </PARAMS>
        <PARAMS elem="1">
            <VALUE>00000000200011526</VALUE>
            <ACTION>I</ACTION>
            <NAME>SIM</NAME>
        </PARAMS>
    </SERVICE_ORDER_INFO>
    <SERVICE_ORDER_INFO elem="1">
        <ACTION>A</ACTION>
        <POID>0.0.0.1 /device/num 10105 1</POID>
        <PARAMS elem="0">
            <VALUE>00493451212</VALUE>
            <ACTION>I</ACTION>
            <NAME>MSISDN</NAME>
        </PARAMS>
    </SERVICE_ORDER_INFO>
    <SERVICE_ORDER_INFO elem="2">
        <NAME>MOBTEL</NAME>
        <ACTION>A</ACTION>
        <POID>0.0.0.1 /service/telco/gsm/telephony 18400 8</POID>
        <PARAMS elem="0">
            <VALUE>T00</VALUE>
            <ACTION>I</ACTION>
            <NAME>BEARER_SERVICE</NAME>
        </PARAMS>
    </SERVICE_ORDER_INFO>
    <PARAMS elem="1">
        <NAME>VMBOX</NAME>
    </PARAMS>
    <PARAMS elem="2">
        <NAME>CLIP</NAME>
    </PARAMS>
    <PARAMS elem="3">
        <NAME>CFU</NAME>
    </PARAMS>
    <PARAMS elem="4">
        <NAME>CW</NAME>
    </PARAMS>
</PARAMS>
</order>
```
Table 2-5 describes the main fields of the payload file:

Table 11-1 Payload File Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVC_ORDER.STATUS</td>
<td>The status of the service order.</td>
</tr>
<tr>
<td></td>
<td>Possible values (preappend):</td>
</tr>
<tr>
<td></td>
<td>■ NEW</td>
</tr>
<tr>
<td></td>
<td>■ READY</td>
</tr>
<tr>
<td></td>
<td>■ PROCESSING</td>
</tr>
<tr>
<td></td>
<td>■ COMPLETED</td>
</tr>
<tr>
<td></td>
<td>■ FAILED</td>
</tr>
<tr>
<td>SVC_ORDER.STATUS_MSG</td>
<td>Status message for service order.</td>
</tr>
<tr>
<td>SERVICE_ORDER_INFO[0].ACTION</td>
<td>The action to be performed.</td>
</tr>
<tr>
<td></td>
<td>Possible values:</td>
</tr>
<tr>
<td></td>
<td>■ A (Activate)</td>
</tr>
<tr>
<td></td>
<td>■ D (Deactivate)</td>
</tr>
<tr>
<td></td>
<td>■ S (Suspend)</td>
</tr>
<tr>
<td></td>
<td>■ C (Change)</td>
</tr>
<tr>
<td></td>
<td>■ R (Reactivate)</td>
</tr>
<tr>
<td></td>
<td>■ I (Ignore)</td>
</tr>
<tr>
<td>SERVICE_ORDER_INFO[0].NAME</td>
<td>The name of the object to be provisioned.</td>
</tr>
<tr>
<td></td>
<td>Possible values:</td>
</tr>
<tr>
<td></td>
<td>■ MOBTEL</td>
</tr>
<tr>
<td></td>
<td>■ MOBFAX</td>
</tr>
<tr>
<td></td>
<td>■ MOBDATA</td>
</tr>
<tr>
<td></td>
<td>■ MOBSMS</td>
</tr>
</tbody>
</table>
Service Order XML DTD

The following lists the XML DTD:

```
<!ELEMENT template (version?,
  name,
  start_line,
  loading_controls,
  file_type?,
  file_format,
  comment_line_prefix?,
  global_record_info,
  global_field_info,
  records)>  
<!ELEMENT version (#PCDATA)>  
<!ELEMENT name (#PCDATA)>  
<!ELEMENT start_line (#PCDATA)>  
<!ELEMENT loading_controls ANY>  
  <!ATTLIST loading_controls group_by CDATA #REQUIRED>  
<!ELEMENT file_type (#PCDATA)>  
<!ELEMENT file_format (#PCDATA)>  
<!ELEMENT comment_line_prefix ANY>  
<!ELEMENT global_record_info (record_delimiter?,
  discard_prefix?,
  record_type_locator?,
  record_length_locator?,
  ignore_record_types?,
  record_length?)>  
<!ELEMENT record_delimiter ANY>  
<!ELEMENT discard_prefix ANY>  
<!ELEMENT record_type_locator ANY>  
  <!ATTLIST record_type_locator name CDATA #IMPLIED>  
  <!ATTLIST record_type_locator position CDATA #IMPLIED>  
  <!ATTLIST record_type_locator start CDATA #IMPLIED>  
  <!ATTLIST record_type_locator end CDATA #IMPLIED>  
<!ELEMENT record_length_locator ANY>  
  <!ATTLIST record_length_locator name CDATA #IMPLIED>  
  <!ATTLIST record_length_locator position CDATA #IMPLIED>  
  <!ATTLIST record_length_locator start CDATA #IMPLIED>  
  <!ATTLIST record_length_locator end CDATA #IMPLIED>  
```

---

**Table 11–1 (Cont.) Payload File Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| SERVICE_ORDER_INFO[0].PARAMS[*].SUB_NAME | The name of the Parameter/supplementary services/ VAS. Examples include:  
  - CFU  
  - CW  
  - CLIP  
  - VMBOX |
| SERVICE_ORDER_INFO[0].PARAMS[*].SUB_VALUE | Value associated with the NAME |
| SERVICE_ORDER_INFO[1].* | Information about the ESN |
| SERVICE_ORDER_INFO[2].* | Information about the NUM |

---

**Service Order XML DTD**

The following lists the XML DTD:
<!ELEMENT ignore_record_types (ignore_record_type*)>
<!ELEMENT ignore_record_type (#PCDATA)>
<!ELEMENT record_length (#PCDATA)>

<!ELEMENT global_field_info (trim_white_space?,
  padding_char?,
  field_delimiter?,
  justification?,
  attribute_value_separator?,
  consecutive_delimiters_is_one?,
  literal_indicator?,
  missing_field_indicator?)>
<!ELEMENT trim_white_space (#PCDATA)>
<!ELEMENT padding_char (#PCDATA)>
<!ELEMENT field_delimiter ANY>  
<!ELEMENT justification (#PCDATA)>
<!ELEMENT attribute_value_separator ANY>
<!ELEMENT consecutive_delimiters_is_one (#PCDATA)>
<!ELEMENT literal_indicator ANY>  
<!ELEMENT missing_field_indicator ANY>

<!ELEMENT records (record*)>
<!ELEMENT record (field_definitions?,
  user_mapping_info?,
  event_mapping_info?,
  filters?,
  checks?)>
<!ATTLIST record name CDATA #REQUIRED>
<!ATTLIST record type CDATA #IMPLIED>
<!ATTLIST record record_length CDATA #IMPLIED>
<!ATTLIST record event_class CDATA #IMPLIED>
<!ATTLIST record service_class CDATA #IMPLIED>
<!ATTLIST record event_opcode_name CDATA #IMPLIED>
<!ATTLIST record event_opcode_num CDATA #IMPLIED>
<!ATTLIST record user_info_opcode_name CDATA #IMPLIED>
<!ATTLIST record user_info_opcode_num CDATA #IMPLIED>

<!ELEMENT field_definitions (field*)>
<!ELEMENT field (field*)>
<!ATTLIST field name CDATA #IMPLIED>
<!ATTLIST field start CDATA #IMPLIED>
<!ATTLIST field end CDATA #IMPLIED>
<!ATTLIST field position CDATA #IMPLIED>
<!ATTLIST field data_type CDATA #IMPLIED>
<!ATTLIST field override_value CDATA #IMPLIED>
<!ATTLIST field default_value CDATA #IMPLIED>
<!ATTLIST field date_format_string CDATA #IMPLIED>
<!ATTLIST field inf_data_type CDATA #IMPLIED>
<!ATTLIST field inf_data_type_num CDATA #IMPLIED>
<!ATTLIST field inf_field_name CDATA #IMPLIED>
<!ATTLIST field inf_field_num CDATA #IMPLIED>
<!ATTLIST field elem_num CDATA #IMPLIED>
<!ATTLIST field elem_position CDATA #IMPLIED>

<!ELEMENT user_mapping_info (field*)>
<!ELEMENT event_mapping_info (field*)>
<!ELEMENT filters (filter*)>
<!ELEMENT filter (regexp, infix_regexp?)>
<!ATTLIST filter name CDATA #REQUIRED>
<!ATTLIST filter discard CDATA #REQUIRED>
<!ATTLIST filter log CDATA #REQUIRED>
<!ELEMENT regexp ANY>
<!ELEMENT infix_regexp ANY>
<!ELEMENT checks (check*)>
<!ELEMENT check (#PCDATA)>
  <!ATTLIST check name CDATA #REQUIRED>
  <!ATTLIST check type CDATA #REQUIRED>
  <!ATTLIST check expr CDATA #REQUIRED>
  <!ATTLIST check field_name CDATA #IMPLIED>
  <!ATTLIST check field_pos CDATA #REQUIRED>
This chapter provides reference information for Oracle Communications Billing and Revenue Management (BRM) provisioning utilities.

Topics in this document:

- `load_pin_service_framework_permitted_service_types`
- `load_pin_telco_provisioning`
- `load_pin_telco_service_order_state`
- `load_pin_telco_tags`
Use the Oracle Communications Billing and Revenue Management (BRM) `load_pin_service_framework_permitted_service_types` utility to load the list of non-telco services supported by the Services Framework into the `/config/service_framework/permitted_service_types` object in the BRM database. You define the supported non-telco services in the `BRM_home/sys/data/config/pin_service_framework_permitted_service_types.xml` file.

See "Specifying the Non-Telco Services Supported by Services Framework" for information.

**Location**

`BRM_home/bin`

**Syntax**

```
load_pin_service_framework_permitted_service_types [-f xml_file] [-v] [-h]
```

**Parameters**

- `-f xml_file`
  The name and location of the XML file that defines the list of non-telco services supported by Services Framework. By default, the utility uses the `BRM_home/sys/data/config/pin_service_framework_permitted_service_types.xml` file.

  If you do not run the utility from the directory in which the file is located, you must include the complete path to the file.

- `-v`
  Displays information about successful or failed processing as the utility runs.

- `-h`
  Displays the syntax and parameters for this utility.

**Results**

The utility notifies you when it successfully creates the `/config/service_framework/permitted_service_types` object or if it encountered errors. You can view more detailed error messages by looking in the `default.pinlog` file. This file is either in the directory from which the utility was started or in a directory specified in the utility configuration file.
**load_pin_telco_provisioning**

Use this utility to load your provisioning configuration into the Oracle Communications Billing and Revenue Management (BRM) database.

The provisioning configuration specifies the service, device, and profile object fields that must be added to a provisioning service order. You specify the configuration in a provisioning configuration file (`telco_prov_config_filename`) and use that file as input for the utility. The default file is `BRM_home/sys/data/config/pin_telco_provisioning`.

This utility creates the `/config/telco/provisioning` and `/config/telco/provisioning/fieldlist` configuration objects.

For information, see "Specifying the Details to Add to the Service Order".

**Location**

`BRM_home/bin`

**Syntax**

```
load_pin_telco_provisioning [-d] [-v] telco_prov_config_filename
```

**Parameters**

- `-d`
  Creates a log file for debugging purposes. Use this parameter for debugging when the utility appears to have run with no displayed errors, but mapping between events and opcode numbers do not appear to be loaded correctly.

- `-v`
  Displays information about successful or failed processing as the utility runs.

**`telco_prov_config_filename`**

The name and location of the `telcoProv_config_filename` file.

If you copy `telco_prov_config_filename` to the same directory from which you run the `load_pin_telco_provisioning` utility, you do not have to specify either the path or the file name.

If you run the command in a different directory from where the `telco_prov_config_filename` file is located, you must include the entire path for the file.

**Results**

By default, `load_pin_telco_provisioning` notifies you only if it encounters errors. However, if you use the `-v` flag, the utility displays confirmation messages when running.

**Important:** After you run this utility, you must restart the Connection Manager (CM).
load_pin_telco_service_order_state

Use this utility to load service order state configuration data for a specific telco service, such as GSM, into the Oracle Communications Billing and Revenue Management (BRM) database.

This utility creates the /config/telco/service_order_state configuration object.

---

**Tip:** Use the instructions and examples included in BRM_home/sys/data/config/pin_service_order_state file. For more information on BRM configuration files, see "Creating Configuration Files for BRM Utilities" in BRM System Administrator’s Guide.

For information, see "Specifying the Available States for Each Service Order".

**Location**

BRM_home/bin

**Syntax**

load_pin_service_order_state [-d] [-v] service_order_state_config_file

---

**Tip:** Use a naming convention to identify the input files for each service, as in this example:

```plaintext
load_pin_service_order_state -d -v pin_telco_service_order_state_gsm
```

**Parameters**

- **-d**
  Creates a log file for debugging purposes. Use this parameter for debugging when the utility appears to have run with no displayed errors, but mapping between events and opcode numbers do not appear to be loaded correctly.

- **-v**
  Displays information about successful or failed processing as the utility runs.

  **service_order_state_config_file**
  The path and name of the service order state file that you are loading for a particular service.

  If you copy service_order_state_config_file to the same directory from which you run the load_pin_service_order_state utility, you do not have to specify the path.

  If you run the command in a different directory from where the service_order_state_config_file file is located, you must include the entire path for the file.

**Results**

load_pin_telco_service_order_state notifies you only if it encounters errors. However, if you use the -v flag, the utility displays confirmation messages when running.
**Important:** After you run this utility, you must restart the Connection Manager (CM).
**load_pin_telco_tags**

Use the `load_pin_telco_tags` utility to load provisioning tags for telco services into the appropriate `/config/telco/service` object and account-level extended rating attributes (ERAs) into the `/config/account_era` object in the Oracle Communications Billing and Revenue Management (BRM) database.

You define telco provisioning tags and account-level ERAs in a `pin_telco_tags_service` file: for example, `pin_telco_tags_gsm` located in `BRM_home/sys/data/config`.

For more information, see “Setting Up Provisioning for GPRS Services”, and “Defining Provisioning Tags for Telco Services by Using the pin_telco_tags File”.

**Location**

`BRM_home/bin`

**Syntax**

```
load_pin_telco_tags [-d] [-v] [-h] [-x] pin_telco_tags_file
```

**Parameters**

- `-d`
  Creates a log file for debugging purposes. Use this parameter for debugging when the utility appears to have run with no displayed errors, but mapping between events and opcode numbers do not appear to be loaded correctly.

- `-v`
  Displays information about successful or failed processing as the utility runs.

  **Note:** This parameter is always used in conjunction with other parameters and commands. It is not position dependent. For example, you can enter `-v` at the beginning or end of a command to initiate the verbose parameter. To redirect the output to a log file, use the following syntax with the verbose parameter. Replace `filename.log` with the name of the log file:

  ```
  load_pin_telco_tags any_other_parameter -v > filename.log
  ```

- `-h`
  Displays the syntax and parameters for this utility.

- `-x`
  Overwrites all account ERAs and telco provisioning tags in the database, including the provisioning tags created by using PDC, with those in the file.

  **Caution:** Use the `-x` parameter with care.

**pin_telco_tags_file**

The name and location of the `pin_telco_tags` file that you are loading. The default `pin_telco_tags` files are located in `BRM_home/sys/data/config`. 
If you do not run the utility from the directory in which the file is located, you must include the complete path to the file, for example:

```bash
load_pin_telco_tags BRM_home/sys/data/config/pin_telco_tags_gsm
```

**Tip:** If you copy the `pin_telco_tags` file to the directory from which you run the `load_pin_telco_tags` utility, you do not have to specify the path. If you do not include a file name, the utility loads the default generic telco file, `pin_telco_tags`.

---

### Results

The `load_pin_telco_tags` utility notifies you only if it encounters errors. However, if you use the `-v` parameter, the utility displays confirmation messages when running.

To verify that the objects were loaded, you can display the `/config/telco_service` object (for example, `/config/telco/gsm`) and the `/config/account_era` object by using the Object Browser, or use the `robj` command with the `testnap` utility. See “Reading an Object and Fields” in *BRM Developer’s Guide*.

---

**Important:** You must restart the Connection Manager (CM) to make new provisioning tags and ERAs available.
This document describes flags used for provisioning in Oracle Communications Billing and Revenue Management.

Topics in this document:

- About GSM Service Provisioning Flags
- About Supplementary Service Provisioning Flags
- About Service ERA Provisioning Flags

See also:

- About Provisioning
- Provisioning Telco Services by Using Services Framework Manager
- Creating Provisioning Tags
- Implementing Provisioning Tags for Telco Services

**About GSM Service Provisioning Flags**

GSM services use the standard BRM status attributes: active, inactive, and closed. In addition, GSM services include provisioning flags that indicate provisioning status.

Service orders often include multiple provisioning requests. For example, a service order might include provisioning requests for the following:

- The bearer service.
- One or more supplementary services.
- A voice mailbox.

In some cases, only some of the provisioning requests in an order can be completed, while others fail. In most cases, if a service can be configured so that the customer can at least perform some activities, the service order status is successful. In that case, the remaining provisioning requests can be completed later. Your business policies or your provisioning configuration might be different. For example, you might specify which services or supplementary services must be provisioned before an account can be created.

You can use the provisioning flags to customize your business policies, use event notification to trigger e-mail, or write status changes to a log file.

If provisioning or unprovisioning fails, you must perform the provisioning operation manually on the network, or complete the processing in the provisioning system. You cannot resend the provisioning service order.
Table 2–2 lists the GSM service provisioning flags.

<table>
<thead>
<tr>
<th>Provisioning Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing-Provisioning</td>
<td>Provisioning for the GSM service is in progress. This flag is set by BRM when you create or activate a service.</td>
</tr>
</tbody>
</table>
| Provisioning-Failed     | Provisioning for the GSM service has failed. This flag is set by BRM:  
  - When provisioning fails while activating a service.  
  - When provisioning fails while inactivating or closing a service.  
  If a service is closed but has a Provisioning-Failed flag, BRM returns an error. |
| Unprovisioning          | The GSM service is in the process of being unprovisioned. This flag is set by BRM when you close or inactivate a service.                   |
| Suspend                 | The GSM service is suspended. This flag is set by BRM when you inactivate a service.                                                      |

About Supplementary Service Provisioning Flags

Customer Center displays the provisioning flags of supplementary services in the Service tab.

The default supplementary service provisioning flags are shown in Table 2–3:

<table>
<thead>
<tr>
<th>Provisioning Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning</td>
<td>The supplementary service is in the process of being provisioned.</td>
</tr>
<tr>
<td>Provisioning Failed</td>
<td>Supplementary service provisioning failed.</td>
</tr>
<tr>
<td>Active</td>
<td>Supplementary service provisioning completed successfully.</td>
</tr>
<tr>
<td>Suspending</td>
<td>The supplementary service is in the process of being inactivated.</td>
</tr>
<tr>
<td>Suspending Failed</td>
<td>Unprovisioning failed while the supplementary service was being inactivated.</td>
</tr>
<tr>
<td>Suspended</td>
<td>The supplementary service was successfully inactivated.</td>
</tr>
<tr>
<td>Unprovisioning</td>
<td>The supplementary service was canceled and the supplementary service is in the process of being unprovisioned.</td>
</tr>
<tr>
<td>Unprovisioning Failed</td>
<td>The supplementary service was canceled but unprovisioning failed.</td>
</tr>
<tr>
<td>Unprovisioned</td>
<td>The supplementary service was successfully canceled and unprovisioned.</td>
</tr>
</tbody>
</table>
About Service ERA Provisioning Flags

Customer Center displays the provisioning flags of service-based ERAs that have a provisioning impact. (Some ERAs do not require provisioning.) The default provisioning flags are shown in Table 2–4:

### Table A–3 Service ERA Provisioning Flags

<table>
<thead>
<tr>
<th>Provisioning Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No_op</td>
<td>There is no provisioning impact.</td>
</tr>
<tr>
<td>Provisioning</td>
<td>The ERA is in the process of being provisioned.</td>
</tr>
<tr>
<td>Provisioning Failed</td>
<td>ERA provisioning failed.</td>
</tr>
<tr>
<td>Active</td>
<td>ERA provisioning completed successfully.</td>
</tr>
<tr>
<td>Suspending</td>
<td>The ERA is in the process of being inactivated.</td>
</tr>
<tr>
<td>Suspending Failed</td>
<td>Unprovisioning failed while the ERA was being deleted.</td>
</tr>
<tr>
<td>Suspended</td>
<td>The ERA was successfully deleted.</td>
</tr>
<tr>
<td>Unprovisioning</td>
<td>The ERA was deleted and is in the process of being unprovisioned.</td>
</tr>
<tr>
<td>Unprovisioning Failed</td>
<td>The ERA unprovisioning failed.</td>
</tr>
<tr>
<td>Unprovisioned</td>
<td>The ERA was successfully unprovisioned.</td>
</tr>
</tbody>
</table>
Using a Policy Source File to Set Up Provisioning

This document describes how to enable provisioning by using a policy opcode in Oracle Communications Billing and Revenue Management (BRM). This method does not use the provisioning tag framework; provisioning tags are configured in the opcode.

See also:
- About Provisioning
- Creating Provisioning Tags

Using a Policy Source File to Set Up Provisioning

You can define provisioning tags directly in the `fm_subscription_pol_provisioning.c` file without using the provisioning tag framework. This file is the single source file for all provisioning operations.

---

**Important:** The provisioning tags framework is the preferable method for creating provisioning tags.

---

To define provisioning tags directly in source code, follow these steps:

1. Open the `BRM_home/source/sys/fm_subscription_pol/fm_subscription_pol_provisioning.c` file.
2. Define your provisioning tags by following the instructions in the file.
   a. In each entry in the `provisioning_tags` table, include the name of the service associated with the tag, the tag name, and calls to service-specific functions.
   b. Ensure that each function included in the table does the following:
      - Changes fields in the service object when customers purchase the service
      - Clears the appropriate fields when customers cancel the service
3. Compile and save the file.

If you create a provisioning tag in the policy source file, you must modify and recompile the source file to modify or delete the tag.