

Service Assignment for Subscribers

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or Functional Area	PCF
Applicable Platform(s)	SMI
Default Setting	Enabled – Always-on
Related Documentation	Not Applicable

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2020.01.0

Important Due to non-backward compatible changes in PCF operations center configuration model, a direct PCF upgrade is not possible. You must perform a fresh PCF installation after un-deploying the previous installation and clearing out the PCF configmaps from CNEE.

Feature Description

A service dictates the capabilities that are assigned to a subscriber (in USuM). An administrator assigns a service to a user through the service configurations. Depending on the service provider's requirements, PCF lets you flexibly map the service configuration with the policies.

For instance, a user with the GOLD account might get a high upload/download speed in comparison to a BRONZE user.

In a tier-based classification, if the quota is "y" then the users from the first tier are redirected to a portal and users belonging the second tier would only experience a downgrade in the speed.

Service

A service is effectively a "code" to label the service and a collection of Service Options which contain the definition of what a service is. Multiple services can be assigned to a single subscriber. If multiple services are assigned to a subscriber, the service options are combined between all assigned services.

Adding a Service

Before adding a service, ensure that you have created the corresponding Use Case template for the service that you intend to add. For information on how to create a use case template, see Configuring the Use Case Template, on page 3.

Use the following steps to add a service through Policy Builder.

1. Log in to Policy Builder.
2. Click the **Use Case Templates** from the left pane and select the template that you have created.
3. In the right pane, click **Add** to include a new service.
4. In the **Select Service Configuration** dialog box, click the appropriate entry to view the associated services.
5. Select the service and click **OK**. The selected service is added as a new service.
6. In the left pane, choose **Services** > **Service Options** to view the options.
7. Expand the service that you have created and select the child.

Note The service name resembles the name that you specified for the use case template.

8. In the **Service Option** pane, click the service under **Service Configurations** and specify the parameters referring to the relevant configuration.

Service Configuration

PCF uses the low-level configuration objects to drive a feature in the system. You can configure the Service Configuration objects from the **Service** > **Service Option** > **Use Case Template**.

Types of service configurations:

- PriorityConfiguration: Only one configuration is allowed to be active at a time. If multiples priority configurations are added, the configuration of the highest priority is used. These are used in cases where only a single value makes sense. For example, when sending an Accept message, only one template is required. Objects of this type always have a priority field. If multiple priority configurations are added, the highest priority object is used. For example, AccessAcceptConfiguration and RegisterMacAddress.
- GroupConfiguration (most common): Only 1 configuration per 'Group Name' is allowed to be active. If multiple configurations are added, the highest priority per Group Name is used. These configurations are used in cases where a configuration only makes sense for a single "group" (key). For example, to control the upload/download speed based on the network type (cell, Wi-Fi, and so on). A service configuration to control network speed with a group set for cell/Wi-Fi would allow multiple service configurations to be added. These objects always have a group field and a priority field. For each unique group value, the highest priority is used. For example, IsgServiceConfiguration, All Diameter Configurations, and OneTimeUsageCharge.
- ServiceConfiguration: Multiple configurations are allowed. If multiple configurations are added, all are used. For example, AutoChargeUpAccounts, AutoProvisionQuota, and BalanceRateConfiguration.



Note The Modify feature in PB for Use Case Options/Service Options can override the values conditionally.

Use Case Templates

Use case templates are the essential elements of the PCF architecture. The values that you define in the templates allow you to design and configure one or more services once and reuse them.

Only advanced users such as administrators are authorized to create a use case template.

On a higher-level, the use case template lets you:

- Define the Service Configuration objects to be set by a Service Option.
- Provide default values and hide values which the use case must not configure.
- Optionally, contains Initiators (Conditions) which define when the template is active.
- Makes Service Option and Service creation easier. For example, a use case template setup to create different upload or download speeds includes a DefaultBearer QoS Service Configuration object. The user creating a use case template can set default and hide the values for ARP and other values that are not directly related to upload or download speed. This allows the creation of the Service Option to be much simpler.
- A copy of the Use Case Options is created while copying a use case template.

Configuring the Use Case Template

This section describes how to configure the use case template.

Use the following steps to configure the use case template through Policy Builder.

1. Log in to Policy Builder.
2. Select the **Services** tab, and from the left pane click **Use Case Templates** to create a new service.
3. On the left pane, click **Summary** to open the **Summary** pane.
4. Under **Actions**, click **Use Case Template**.
5. In the **Use Case Template** pane, specify the name for the template.
6. Click the **Actions** tab and select **Add**.
7. In the **Select Service Configuration** dialog box, select the service and click **OK**. The **Use Case template** with the specified name is created.
8. In the left pane, click **Services > Service Options** to view the options. The newly created service appears in the **Service Options**.
9. Select the service that you have created.
10. Under **Service Configurations**, click **Add** to open the **Select Service Configuration** dialog box.
11. Under **Service Configurations**, select the service, then click **OK**.

GenericServiceConfiguration

This section describes the parameters for the GenericServiceConfiguration service configuration object.

Table 3: GenericServiceConfiguration Parameters

Parameters	Description
Priority	Denotes the priority of the message for processing. The higher the number, the higher the priority. Default for most settings: 0
Group Name	Specifies a group name. Only 1 per Group Name is allowed to be active. If multiple configurations are added highest priority per Group Name is used.
Code	Specifies a code for the AVP.
Value	Specifies a value for the AVP.
String Value	Specifies the string value.
Int Value	Indicates the integer value.
Long Value	Indicates the long value.
Boolean Value	Specifies the boolean value.

Parameters	Description
String Value to Override	Indicates whether overriding is required. For virtual services, if the value of “String Value” field matches exactly with the value of “String Value To Override”, then the value of “String Value” is over written with the “New String Value".
New String Value	The new string value that is used to overwrite the “String Value” if the value of “String Value” field matches exactly with the value of “String Value To Override”.
Precedence	Defines the second-level priority when the highest priority matches among the multiple generic service configurations.

Common Parameters

These parameters are common between many service configuration objects.

Table 4: Common Service Configuration Object Parameters

Parameter	Description
Apn Agg Max Bit Rate DL	Defines the total bandwidth usage for the downlink direction of non-GBR QCIs at the APN.
Apn Agg Max Bit Rate UL	Defines the total bandwidth usage for the uplink direction of non-GBR QCIs at the APN.
Arp	AllocationRetentionPriority • Priority Level – Priority-Level AVP value. • Preemption Capability – Preemption-Capability AVP value. • Preemption Vulnerability – Preemption-Vulnerability AVP value.
Balance Code	Indicates with which balance the quota is associated. You can subscribe to multiple balances, but the monitoring key is associated with one balance.
Diameter Client	The client configuration is used to apply different policies based on PCF type. To filter a service based on the Diameter client, specify which Diameter client you want the service to be applied to. Diameter clients are configured in the **Reference Data > Diameter Clients > Diameter Clients** section of the interface. This parameter is optional.
Dosage	How much quota to initially give the client (in bytes). Default: 0

Parameter	Description
Dual Stack Session	Set to enable or disable the parameter. Default: disabled
Enable Resource Allocation Notification	Can be set to enabled or disabled. Default: disabled
Encoding Format	Can be set to true or false. If the Monitoring Key parameter is numeric, set this parameter to true. Default: false
Event Trigger	Used primarily to notify the starting and stopping of applications or to report usage. It is not used to rerequest rules.
Flow Status	Defines whether the service data flow is enabled or disabled.
Framed I P Type	Can be set to one of the following options: • ANY_ONE • BOTH • IPv4_ADDRESS • IPv6_ADDRESS Default: ANY_ONE
Guaranteed Bit Rate DL	Defines the guaranteed bit rate allowed for the downlink direction.
Guaranteed Bit Rate UL	Defines the guaranteed bit rate allowed for the uplink direction.
List of Input Column Avp Pairs (List)	Defines the mapping between the AVP Names and the key columns defined in the selected STG. These AVPs are used as inputs while evaluating the CRD table in STG. • Avp Name – The name of the Diameter AVP that is used as input for CRD table evaluation. For example: Flow-Number, Media-Component-Number, and so on. • Column – The key column in STG that corresponds to the specified AVP.
List Of Output Column Avp Pairs (List)	Defines the mapping between the AVP Names and the output columns defined in the selected STG. These mappings indicate how the output columns values are mapped to AVPs after the CRD is evaluated. • Avp Name – The name of the Diameter AVP to which the value of the output column is mapped while setting the charging parameters on the dynamic rule (for the Dedicated Bearer). For example: Rating-Group Service-Identifier. • Column – The output column defined in the selected STG.

Parameter	Description
Max Req Bandwidth DL	Defines the maximum bit rate allowed for the downlink direction.
Max Req Bandwidth UL	Defines the maximum bit rate allowed for the uplink direction.
Monitoring Key	Identifies a usage monitoring control instance. You can specify any value.
Monitoring Level	Can be set to one of the following values: • SESSION_LEVEL (0) • PCC_RULE_LEVEL (1) • ADC_RULE_LEVEL (2)
Mute Notification	Indicates whether notifications for application starts and stops are muted for ADC Rule by the TDF.
New String Value	The new string value that is used to overwrite the “String Value” if the value of “String Value” field matches exactly with the value of “String Value To Override”.
Online	Defines whether the online charging interface from PCF for the associated PCC rule is enabled. The default charging method provided by PCF takes precedence over any preconfigured default charging method at PCF. • Enable: Indicates that the online charging interface for the associated PCC rule is enabled. • Disable: Indicates that the online charging interface for the associated PCC rule is disabled.
Offline	Defines whether the offline charging interface from PCF for the associated PCC rule is enabled. The default charging method provided by PCF takes precedence over any preconfigured default charging method at PCF. • Enable: Indicates that the offline charging interface for the associated PCC rule is enabled. • Disable: Indicates that the offline charging interface for the associated PCC rule is disabled.
Precedence	Defines the second-level priority when the highest priority matches among the multiple generic service configurations.

Parameter	Description
Preemption Capability	When provided within the QoS-Information AVP, the AVP defines whether a service data flow can get resources that were already assigned to another service data flow that has a lower priority level. If it is provided within the Default-EPS-Bearer-QoS AVP, the AVP defines whether the Default Bearer can get resources that were already assigned to another bearer with a lower priority level. • 0: Indicates that the service data flow or bearer is allowed to get resources that were already assigned to another service data flow or bearer with a lower priority level. • 1: Indicates that the service data flow or bearer is not allowed to get resources that were already assigned to another service data flow or bearer with a lower priority level. This is the default value applicable if this AVP is not supplied.
Preemption Vulnerability	When provided within the QoS-Information AVP, the AVP defines whether a service data flow can lose the resources assigned to it in order to admit a service data flow that has a higher priority level. If it is provided within the Default-EPS-Bearer-QoS AVP, the AVP defines whether the Default Bearer can lose the resources assigned to it in order to admit a pre-emption capable bearer with a higher priority level. • 0: Indicates that the resources assigned to the service data flow or bearer can be pre-empted and allocated to a service data flow or bearer with a higher priority level. This is the default value applicable if this AVP is not supplied. • 1: Indicates that the resources assigned to the service data flow or bearer cannot be pre-empted and allocated to a service data flow or bearer with a higher priority level.
Priority	The priority of the message for processing. The higher the number, the higher the priority. Default for most settings: 0
Priority Levels	Used to decide whether a bearer establishment or modification request can be accepted, or rejected due to resource limitations (typically used for admission control of GBR traffic). The AVP can also be used to decide which existing bearers to pre-empt during resource limitations. The priority level defines the relative importance of a resource request. Values 1–15 are defined, with value 1 as the highest level of priority. • Values: 1–8 – Assigned for services that are authorized to receive Prioritized treatment within an operator domain. • Values: 9–15 – Assigned to resources that are authorized by the Home network and thus applicable when a UE is roaming.

Parameter	Description
Provision Default Bearer QoS	Must be bound to the appropriate column in the STG. The data contained in the STG column is of type True/False. If the value is True, the Default Bearer QoS information from the session is applied to the rule, while QoS information derived from the prior parameters in this STG is ignored.
Qci	The Quality of Service (QoS) Class Identifier. The QoS class identifier identifies a set of IP-CAN specific QoS parameters that define QoS, excluding the applicable bitrates and ARP. It is applicable both for uplink and downlink direction. The QCI values 0, 10–255 are divided for usage as follows: • 0: Reserved • 10-127: Reserved • 128-254: Operator specific • 255: Reserved
Rating Group	The charging key for the PCC rule used for rating purposes.
Realm	The destination realm where the message is sent from PCF.
Redirect Address	Indicates the target for redirected application traffic.
Redirect Address Type	Defines the address type of the address given in the Redirect-Server-Address AVP. Default: IPV4_ADDRESS
Redirect Server Address	Indicates the target for redirected application traffic.
Redirect Support	This value indicates that Redirection is enabled for a detected application's traffic.
Retry Profile	Indicates the Rule Retry Profile to be used. When PCF receives a Charging-Rule-Report indicating failure to install or to activate one or more rules, it evaluates the failed rules and takes further action.
Rule Group	Used to classify rules at PCF to change set of predefined rules based on policy. This parameter is optional.
Rule Name	A partial name configured in Policy Builder (as derived using AF-Application-Identifier and Media-Type values from the Custom dynamic rule name table in Gx Client). Default: AF

Parameter	Description
Scheduled Hour	Can be set to one of the following values: • Default: Turns off the Hour Boundary RAR enhancement feature for look-ahead rules installation at hour boundary. This causes rules to be installed at hour boundary as applicable. • CurrentHour: Rule activation time will be current time, deactivation time will be the next hour. • NextHour: Rule activation time will be the next hour, and deactivation time will be next-next hour.
Search Column	Must be bound to the Key column in the STG. The data contained in the STG column is of type Text.
Search Group	A constant value that PCF uses to search within the Search Table Group indicated by the Search Table parameter.
Search Table	The name of the table from which to perform a lookup.
String Value to Override	Indicates whether overriding is required. For virtual services, if the value of “String Value” field matches exactly with the value of “String Value To Override”, then the value of “String Value” is over written with the “New String Value".
Tdf Application Identifier	References the application detection filter (for example, its value may represent an application such as a list of URLs) to which the PCC rule for application detection and control in PCF applies.
ToD Schedule	Identifies the schedule for rule activation and deactivation.