Services

Overview

In ANDSF, a 'Service' is what is assigned to a subscriber (in USuM) to define how that subscriber is treated. Some basic examples of services would be a 'GOLD' user might get a high upload/download speed whereas a 'BRONZE' user would get a low one. Other examples would include having one type of user be redirected to a portal when their Quota is exhausted whereas another type would only have their speed downgraded.

As the Service maps as closely as possible to how a Service Provider wants to classify their customers, the Service in ANDSF is flexibly defined to allow configuration at different levels.

Below is an overview of the different objects referenced in the Services tab in Policy Builder. The detailed description of each object is provided in below sections.

Figure 1: Service

Service

- A service is effectively just a 'code' to label the service and a collection of Service Options which contain the definition of what a service 'is'.
- What a Customer Service Representative assigns to a subscriber to describe the user's plan.
- 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. Therefore, there is no logical difference between a subscriber with:
  • A single service with 10 service options
  • 10 services with 1 option each

Service Option

• Provides the concrete values which can be re-used for multiple services.

• What values are configurable in a Service Option are setup by the Use Case Template object. The Use Case Template can provide defaults to the Service Option or hide values in Service Configuration objects not necessary for certain use cases.

• If a Service Configuration's value is not defined in a Service Option, the value from the Use Case Template will be used.

Service Configuration

• The low-level configuration objects is used by the ANDSF code to drive functionality. These objects are used to drive functionality in the system. The whole point of the Service > Service Option > Use Case Template chain of functionality is to flexibly configure these Service Configuration objects which the code uses to drive system logic.

• These objects are defined by the code.

• Types of service configurations:
  • PriorityConfiguration: Only 1 allowed to be active at a time. If multiples priority configurations are added, highest priority is used.
    These are used in cases where only a single value makes sense. For example, when sending an 'Accept' message, we can only have one template and multiples don't make sense.
    Objects of this type always have a priority field. If multiple priority configurations are added, the highest priority object is used.
    Example: AccessAcceptConfiguration, RegisterMacAddress
  • GroupConfiguration (most common): Only 1 per 'Group Name' are allowed to be active. If multiple configurations are added highest priority per 'Group Name' is used.
    These are used in cases where a configuration only makes sense for a single 'group' (key). For example, if it makes sense to control the upload/download speed based on the network type (cell, wifi and so on), a service configuration to control network speed with a group set for cell/wifi would allow multiple service configurations to be added.
    These objects always have a group field as well as a priority field. For each unique group value, the highest priority is used.

Use Case Template

• Defines the Service Configuration objects to be set by a Service Option and can provide default values and/or hide values which don't need to be set by a use case.
• Optionally contains 'Initiators' (Conditions) which define when the template is active.
• Created by an advanced user (usually Engineering/AS).
• Makes Service Option and Service creation easier.

**Use Case Option**

• A child of Use Case Template used to add/modify Service Configurations objects when certain conditions occur.
• Provides a way to separate Service Configurations within a use case based on conditions.
• Contains the same functionality of a Use Case Template.
• Can add new service options or modify service options from parent Use Case Template.

**Service Screens**

**Default ANDSF Service**

*Figure 2: Default ANDSF Service*

This is the default ANDSF service which retrieves static policy based on the following two Service Options:
• Andsf_DEF_NAMED
• Andsf_Location_OR
Service Options

**Andsf_DEF_NAMED**

This service option will lookup Named Ext Location lookup (default :null) Name from Policy Extension Location lookup.

*Figure 2: Service Option - Andsf_DEF_NAMED*

**Andsf_Location_OR**

This service option will lookup TGPP Location or WLAN Location Name from Policy Extension Location lookup during provisioning. This also maps DevInfo and UELocation parameters to its URI Types.
Figure 4: Service Option - Andsf_Location_OR

<table>
<thead>
<tr>
<th>Name</th>
<th>Use Case Template: Andsf_TSMP_LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andsf_Location_OR</td>
<td></td>
</tr>
</tbody>
</table>

### Service Configurations

<table>
<thead>
<tr>
<th>Name</th>
<th>Backend Provision</th>
<th>LookupDMTP</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LookupDMT Provision Parameters

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Value</th>
<th>Pull value from...</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQDN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI Client</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO Type</td>
<td>ISMP</td>
<td></td>
</tr>
<tr>
<td>Request Type</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>Lookup Type</td>
<td>Policy_EXT_LOCATION</td>
<td></td>
</tr>
</tbody>
</table>

**Lookup By (List)**

- **Lookup Keys**
  - Match Type: Equals
  - Join By: OR
  - Key: TCPP_Location (Policy_EXT_LOCATION)

- **Lookup Keys**
  - Match Type: Equals
  - Join By: OR
  - Key: WLAN_Location (Policy_EXT_LOCATION)

Max Locations: false

Add | Remove | Add Child |
The Match Type for LookupKeys includes the values: Endswith, Equals, RegEx (regular expression), and Startswith. If you are using RegEx, you must not use the Match Type in Control Center. You can use RegEx to define a search pattern with wildcards. For example, the following image shows how you can use the RegEx in Control Center: .*silver|bronze.* In this example, ANDSF looks for MO Type that may include either silver or bronze in the name.

*Figure 5: RegEx Example in Control Center*

<table>
<thead>
<tr>
<th>Name</th>
<th>TGGP_Location</th>
<th>WLAN_Location</th>
<th>Tier</th>
<th>Group Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChangeMO_GCM</td>
<td>UseCase_Tier_TGGP</td>
<td></td>
<td></td>
<td>UseCase_SSID_grp</td>
</tr>
<tr>
<td>new_1_Inst</td>
<td>UseCase_Tier_WLAN</td>
<td></td>
<td>Silver</td>
<td>UseCase_SSID_grp</td>
</tr>
<tr>
<td>ANDSF_CRUD_Test</td>
<td>UseCase_Tier_TGGP</td>
<td>UseCase_Tier_WLAN</td>
<td>Gold</td>
<td>UseCase_Tier_grp</td>
</tr>
<tr>
<td>Test</td>
<td>TGGP_Location_Tier</td>
<td>WLAN_Location_Tier</td>
<td></td>
<td>UseCase_SSID_grp</td>
</tr>
</tbody>
</table>

**Use Case Template**

The following Use Case Templates are used to create the service options:

- Andsf_ISMP_DEF
- Andsf_ISMP_LOC
Andsf_ISMP_DEF

**Figure 6: Use Case Template - Andsf_ISMP_DEF**

<table>
<thead>
<tr>
<th>Use Case Template (Read Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Andsf_ISMP_DEF</td>
</tr>
</tbody>
</table>

**Service Configurations**

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>DefaultDMTProvision-Named Location</td>
</tr>
</tbody>
</table>

**DefaultDMTProvision-Named Lookup Parameters**

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Value</th>
<th>Bind Field</th>
<th>Allow Override</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANDSF Client</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO Type</td>
<td>ISMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request Type</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM Tree Lookup</td>
<td>Policy_EXT_LOCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM Lookup Name</td>
<td>Named_Ext_Location_lookup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send URI</td>
<td>false</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Actions**

- Create Child:
  - Use Case Option
- Copy:
  - Current Use Case Template

Andsf_ISMP_LOC

**Figure 7: Use Case Template - Andsf_ISMP_LOC**

<table>
<thead>
<tr>
<th>Use Case Template (Read Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Andsf_ISMP_LOC</td>
</tr>
</tbody>
</table>

**Service Configurations**

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>LookupDMTProvision</td>
</tr>
<tr>
<td>LookupDMTProvision-DeviceInfo</td>
</tr>
<tr>
<td>LookupDMTProvision-ULocation</td>
</tr>
</tbody>
</table>

**LookupDMTProvision Parameters**

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Value</th>
<th>Bind Field</th>
<th>Allow Override</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANDSF Client</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO Type</td>
<td>ISMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request Type</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lookup Type</td>
<td>Policy_EXT_LOCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lookup By (List)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Locations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send URI</td>
<td>false</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Actions**

- Create Child:
  - Use Case Option
- Copy:
  - Current Use Case Template
This is the default override service where incoming TGPP and WLAN locations override existing values (based on Default Location Override Lookup).

Policy retrieval is based on the following service options:

- Andsf_ISMP_DEF_LOC_OVER

## Service Options

**Andsf_ISMP_DEF_LOC_OVER**

This service option will lookup Default_Loc Override UseCase Name from Policy Default Override Location lookup during provisioning.
The following Use Case Template is used to create the service options:

- Andsf_ISMP_DEF_LOC.Override
Andsf_ISMP_DEF_LOC_OVERRIDE

**Figure 10: Use Case Template**

- **Location based ANDSF Service**

  - **Figure 11: Location Based ANDSF Service**

This is a location based service where incoming TGPP and WLAN Locations are used for policy lookup. Policy retrieval is based on the following service option:
- Andsf_Location_OR

Service Options

Refer to Andsf_Location_OR.

Use Case Template

Refer to Andsf_ISMP_LOC, Use Case Template, on page 6.

Tier based ANDSF Service

*Figure 12: Tier based ANDSF Service*

This is a tier based service where incoming TGPP and WLAN Locations, along with subscriber tier are used for policy lookup. Policy retrieval is based on the following service option:

- Andsf_Location_Tier

Service Options

This service option will lookup TGPP_Location, WLAN_Location and Tier UseCase Name from Policy Extension tier lookup during provisioning. It will also map DevInfo and UELocation parameters to its URI types.
Figure 13: Service Option - Andsf Location Tier

Use Case Template

Refer to Andsf_ISMP_LOC, Use Case Template, on page 6.
Geo Location based ANDSF Service

This is a location based service where incoming Geo locations are used for policy lookup. Policy retrieval is based on following service option:

- **Andsf_ISMP_GEO_LOC_STATIC**

**Service Options**

This service option will lookup GEO_Location UseCase Name from Geo Location Based lookup during provisioning.
It will also map DevInfo and Geo_Location parameters to its URI types.

**Use Case Template**

The following Use Case Template is used to create this service option:
Configure Lookup for External SPRs

Create a service as per your requirements and configure a Lookup for External SPR on the basis of the feature list coming from the External SPR Response:

In Policy Builder Reference Data > DM configuration, configure a key named Feature in the Lookup. Bind this value to the Session Policy Field <ANDSF External SPR feature>.

In Control Center, add the actual lookup. Add the appropriate fields and the DM group as required.

Configure Lookup for Extended Device Information

You can set up ANDSF server to facilitate the dynamic configuration of lookup keys based on any entry in the DevInfo MO. You can then use this configuration to create and deliver policies based on extended Device Information in general.

The following example illustrates how to configure lookup based on battery level of the device.

Policy Builder

Perform the following steps in Policy Builder:

1. Configure CRD for the new data type: Add a CRD table for the new URI to be added on the basis of which the lookup needs to be designed.
2. Configure URI Type: Add the new URI in the DM Configuration and provide the reference to the CRD that you have configured.

3. Configure the new lookup with the new URI binding.

4. Configuring the new Service for the New Client URI: Add the following service configuration in the Use Case so that the Lookup can configure the new URI.
Perform the following steps in Policy Builder:

1. Configure the CRD with the value from the UE.
2. Configure the new lookup according to the new URI Values.

You can verify the URI processing in the qns.log files. The following log file entry is a sample:

```
INFO : (ANSDF) DevInfo processed : vendor NA DevId: US14525_Test_1 DevType: samsung
INFO : (ANSDF) Processed URI ./DevInfo value: [smartswitch]
INFO : (ANSDF) Processed URI ./DevInfo/Ext/UEClientVendor value: [ChemringTMO]
INFO : (ANSDF) checking state: RESP_GET {40}
INFO : (ANSDF) checking state: LOOKUP {90}
INFO : (ANSDF) Processing lookup Policy_EXT_ClientVendor
INFO : (ANSDF) Lookup using TIER value: [Gold]
INFO : (ANSDF) Lookup using ./DevInfo/Ext/UEClientVendor value: [ChemringTMO]
INFO : (ANSDF) Lookup Group:NewGroup
```