LDAP and Sh Interface

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Product(s) or FunctionalArea	PCF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration required to enable
Related Documentation	Not Applicable

Revision History

Revision Details	Release
Enhancement introduced. PCF supports IPv6 connectivity on LDAP endpoint.	2021.04.0
First introduced.	2020.01.0

Feature Description

PCF supports the LDAP and Sh versions of the N36 reference point to and from the simulated UDR to access subscriber profile information and to write dynamic session data as required for session processing.

This feature provides the following capabilities:

- Support for Sh Interface: PCF communicates with HSS and downloads the subscription profile. It sends policies that are based on the subscription profile.
- Support for policy changes based on subscription changes in PCF: Based on subscription changes that are received from Sh or LDAP or local configuration, PCF invokes the Npcf_SMPolicyControl_UpdateNotify service to update the policies in SMF.
- PCF supports both IPv4 and IPv6 connectivity on LDAP endpoint.

Call Flows

This section describes the key call flow for this feature.

Sh Interface Call Flow

This section describes the Sh Interface call flow.

Figure 1: Sh Interface Call Flow

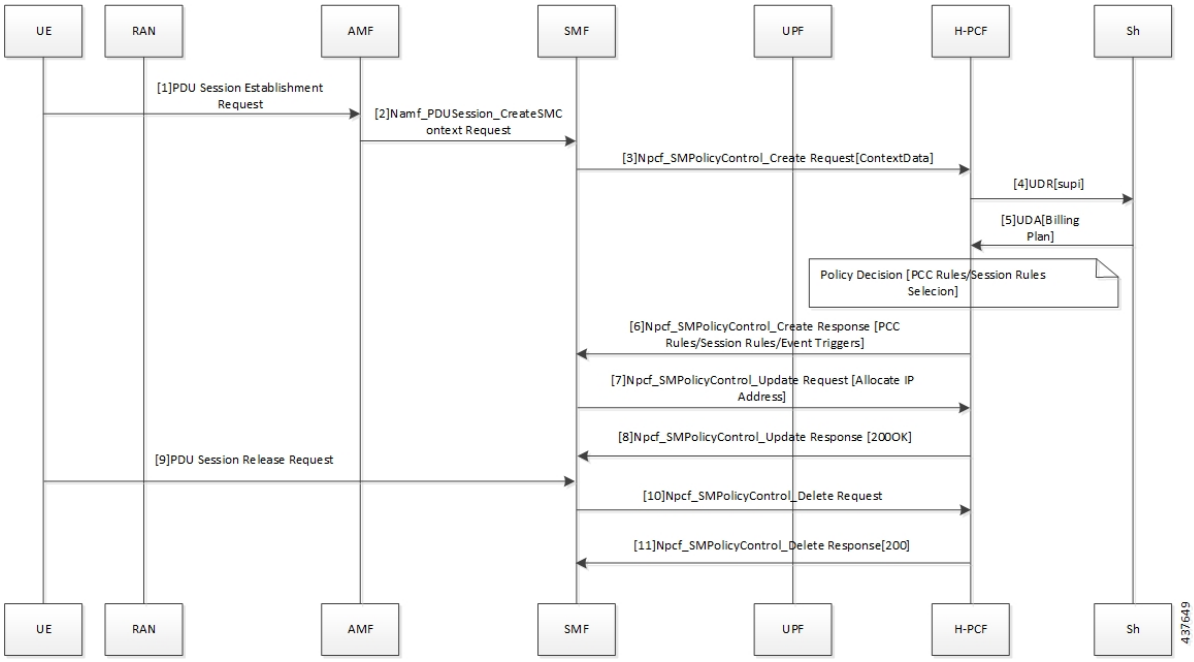

Table 2: Sh Interface Call Flow Description

Step	Description
1	The User Equipment (UE) sends a PDU Session Establishment request to the Access and Mobility Management (AMF) function.
2	The AMF creates the Namf_PDUSession_CreateSMConext_Request service and sends it to SMF.

Step	Description
3	The SMF creates and sends the Npcf_SMPolicyControl_CreateRequest[ContextData] service to H-PCF.
4	The PCF sends a request to the User Data Repository (UDR) through the Sh interface.
5	The Sh interface sends the UDA (Billing Plan) to the PCF.
6	The PCF responds with the Npcf_SMPolicyControl_Create service to the SMF.
7	The SMF sends the Npcf_SMPolicyControl_Update request to the PCF.
8	The PCF responds with the Npcf_SMPolocyControl_Update response to the SMF.
9	The UE sends the PDU Session Release request to SMF.
10	The SMF forwards the Npcf_SMPolicyContro_Delete request to the PCF.
11	The PCF sends the Npcf_SMPolicyControl_Delete response to SMF.

Configuring PCF to use LDAP

This section describes how to configure PCF to leverage the LDAP interface.

The configuration support for LDAP involves the following steps:

1. Setting Up Additional Profile Data
2. Associating PCF with LDAP

Setting Up Additional Profile Data

This section describes how to set up the profile data.

PCF establishes a connection with an LDAP server to access the subscriber profile data that resides on an external database. Upon receiving the PCF query, the LDAP searches its database to retrieve the user profile and other information.

You can set an LDAP interface profile for a new or an existing domain. By configuring the Domain, you direct PCF to retrieve data from an LDAP query.

1. Log in to Policy Builder and select the **Services** tab.
2. Navigate to the **Domains** tab and select DATA_5G.
3. In the **Domains** pane, click the **Additional Profile Data** tab.
4. Select **Generic Ldap Search** in the drop-down menu on the right-hand side of the **Additional Profile** section heading.
5. Under **Profile Mappings**, click **Add** to configure a new row for each attribute that is retrieved from the LDAP server. In the **Profile Mappings** table, the following parameters can be configured for the new row:

a. External Code: The LDAP attribute name to retrieve.

b. Mapping Type: The mapping of the data to an internal PCF data type.

c. Regex Expression and Regex Group: If parsing of the incoming AVP is required then define a regular expression and regular expression group to support retrieval of the parsed values.

d. Missing AVP: Defines the default AVP value when the subscriber attribute that is received from the external profile is missing.

Note

- If a subscriber attribute is missing and its missing AVP value is not configured, PCF does not create or update policy derived AVP for this subscriber with Missing AVP Value.
- This parameter is applicable only for Mapping Type as Subscriber Attribute or Service. For all other mapping types, this column is not applicable.

e. Empty AVP Value: Defines the default AVP value when a subscriber attribute that is received from an external profile has empty or blank value.

Note

- If a subscriber attribute is empty or blank and its empty or blank AVP value is not configured, PCF does not create or update policy derived AVP for this subscriber with Empty AVP Value.
- This parameter is applicable only for Mapping Type as Subscriber Attribute or Service. For all other mapping types, this column is not applicable.

f. Apply Timer: This check box indicates whether Timer Attribute is applicable to other subscriber attributes or not. Select the check box if Timer Attribute that must be applied for that subscriber attribute.

g. Discard If Empty: When checked, deletes the LDAP attribute from the session (thus preventing any further use) if regex (when configured) does not match the received value. By default, the check box is unchecked (false).

6. Enter the appropriate value in the following fields for completing the configuration:

   The following table describes the configuration service parameters.

Table 3: Configuration Parameters

Field	Description
Ldap Server Set	Associate the LDAP server set defined in the LDAP Server Set Definition.
Base Dn	Specify the Base DN that is sent in the LDAP query. If not defined, then the request does not contain a base DN.

Field	Description
Filter	Set to the filter value that is sent in the LDAP query. If not defined, then the request does not contain a filter. **Note** This string supports string replacement using the find and replace of strings with variables from the policy state as defined in the "Replacement Rules" table.
Dereference Policy	This is an optional field that controls whether to disable the LDAP query. This is often used along with Custom Reference Data tables and other session attributes to optionally disable an LDAP query. If the calculated CRD AVP has a value (ignoring case) of "false", then the LDAP query is skipped.
Avp Code to Disable Query	Set this to the dereference policy that the LDAP query requires. Default value is NEVER.
Profile Refresh Interval (mins)	Set this value to automatically refresh a profile by querying the profile after specified delay.
Replacement Rules	In the replacement rules table, add one row per replacement string to substitute into the Base DN or Filter string on a request by request basis.
Subscriber Timer Attribute	Indicates which attribute is a timer attribute among all the LDAP server attributes. The timer follows the ISO 8601 time standards. See ISO 8601 for more information.
Lower Bound For Timer Attribute In Minutes	Indicates how much time before the start time of Subscriber Timer Attribute PCF has to accept when LDAP server sends timer attribute. Default value is 30 mins.

Associating PCF with LDAP

This section describes how to associate PCF with LDAP.

When you configure PCF environment to interact with a defined LDAP, PCF must connect to the LDAP server using a trusted authentication method. This method is known as binding. PCF uses the binding information while making LDAP queries to retrieve the required subscriber information from the LDAP server.

To associate PCF with LDAP, use the following configuration:

```
config
 product pcf
    ldap replicas replica_count
    ldap server-set server_set
       search-user dn cn=username,dc=C ntdb
       search-user password
       health-check interval-ms interval
       initial-connections connection_count
```

```
max-connections maximum_connections
retry-count retry_count
retry-timer-ms retry_time
max-failover-connection-age-ms maximum_failover
binds-per-second binds
number-consecutive-timeout-for-bad-connection consecutive_timeout
connection ip_address
  priority priority
  connection-rule connection_type
  auto-reconnect [ true | false ]
  timeout-ms timeout
  bind-timeout-ms bind_timeout
  end
```

NOTES:

- **product pcf**—Enters the PCF configuration mode.
- **ldap replicas** *replica_count*—Specify the LDAP replica count. Depending on the count, the LDAP pods are created.
- **ldap server-set** *server_set*—Specify the LDAP server set details.
- **search-user dn cn**=*username*, **dc**=*C ntdb*—Specify the domain details.
- **search-user** *password*—Specify the password.
- **health-check interval-ms** *interval*—Specify the interval at which the health check should be initiated.
- **initial-connections** *connection_count*—Specify the number of connections that can be attempted initially.
- **max-connections** *maximum_connections*—Specify the maximum number of connections at any point of time.
- **retry-count** *retry_count*—Specify the number of retries that the PCF Engine must attempt on a timeout.
- **retry-timer-ms** *retry_time*—Specify the interval after which the PCF Engine must reattempt.
- **max-failover-connection-age-ms** *maximum_failover*—Specify the maximum number of connection failures after which failover must happen
- **binds-per-second** *binds*—Specify the interval in seconds for the bind operation.
- **number-consecutive-timeout-for-bad-connection** *consecutive_timeout*—Specify the number of bad connections after which the timeout occurs.
- **connection** *ip_address*—Specify the IPv4/IPv6 address of the LDAP server that attempts the connection.
- **priority** *priority*—Specify the priority of the connection.
- **connection-rule** *connection_type*—Specify the connection type. The default rules are "Fastest" or "Round Robin".
- **auto-reconnect [true | false]**—Specify if the auto-connect capability should be enabled or disabled.
- **timeout-ms** *timeout*—Specify the period between the LDAP client or endpoint when the timeout must happen.
- **bind-timeout-ms** *bind_timeout*—Specify the bind timeout.