

Online Charging Enablement over N7 to SMF

Table 1: Feature History

Feature Name	Release Information	Description
Enhancement to online and offline charging over N7 to SMF	2023.04	PCF does not support the simultaneous online and offline charging while sending the CHF address to SMF over the N7 interface. **Default Setting**: Disabled - Configuration required to enable

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Feature Summary and Revision History

Summary Data

Table 2: Summary Data

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

Revision History

Table 3: Revision History

Revision Details	Release
Added an enhancement to not support simultaneous online and offline charging in the SmPolicyDecision data structure.	2023.4.0
First introduced.	2020.01.0

Feature Description

PCF supports converged online and offline charging. As part of this support, PCF sends the CHF address to the SMF over the N7 interface. This allows the SMF to connect to the specified CHF for converged online and offline charging. In addition, PCF sends charging-specific attributes (charging decision attributes) in the PCC rules to SMF over the N7 interface.

How it Works

This section describes how this feature works.

The ability to send CHF addresses in "ChargingInformation" in SM policy create response is added to PCF. In the subsequent SM policy updates, the same address is sent to the SMF. Similarly, the ability to send charging decision attributes in the PCC rules is available in PCF.

The charging information includes primary and secondary CHF addresses. The charging decisions include the following attributes- chgId, meteringMethod, offline, online, ratingGroup, reportingLevel, serviceId, sponsorId, appSvcProvId, and afChargingIdentifier.

Note

- The charging decisions are supported only for a table-driven PCC and dynamic PCC rules.
- If offline charging applies, the PCF includes the `offline` attribute set to `true` or if online charging applies, the `online` attribute set to `true` within the `SmPolicyDecision` data structure in the response to HTTP POST message.

Charging Information

- After the SM create control request is received, the PCF reads the charging information service configuration and adds the charging information in the PCF session (if it is not already added).
- PCF uses the charging information in the PCF session and sends the ChargingInformation field in "ChgDecs" in response.

Charging Data

- After the SM create control request is received, PCF retrieves the PCC rules using "TableDrivenDynamicPccRule" or "DynamicPccRule" service configurations.
- The PCC retrieves "ChgIds" (it can either be single chgid value or multiple based on comma separated values) from the "TableDrivenDynamicPccRule" and "ChgID" "from the DynamicPccRule" service configurations.
- PCF queries the Charging Data CRD table and retrieves the list of charging data to be sent, after the charging ids are found and "TableDrivenChargingDecisions" is configured.
- PCF creates response by adding all charging data under "ChgDecs" and also adds the reference in PCC rules by specifying the "refChgData" array.

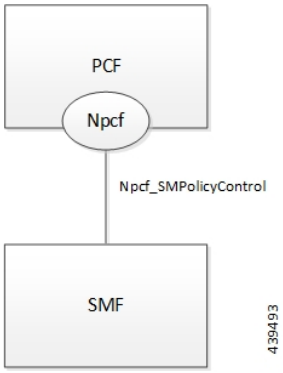
Call Flows

This section describes the key call flows for this feature.

Online and Offline Charging over N7 to SMF

This section describes the Online and Offline Charging over N7 to SMF call flow.

Figure 1: Charging over N7 Call Flow



Creating SM Policy

This section describes the Creating SM Policy call flow.

Figure 2: Create SM Policy Call Flow

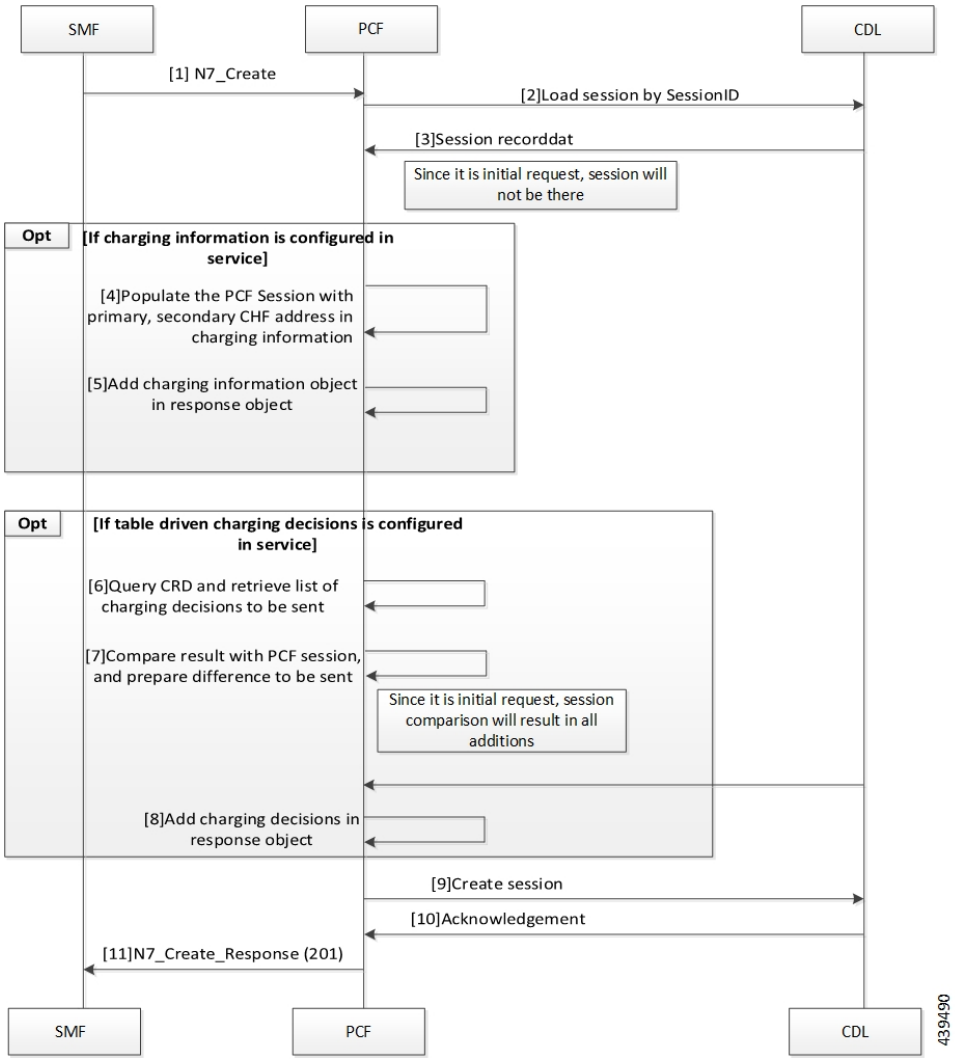


Table 4: Create SM Policy Call Flow Description

Step	Description
1	The SMF sends a N7 Create request to the PCF.
2	The PCF sends a Load Session request to the CDL.
3	The CDL sends a Session Record request to the PCF.
4	If the charging information is configured in the service, then PCF populates the PCF session with primary and secondary CHF address.
5	The PCF adds the charging information in the response object.
6	If the table-driven charging decision is configured in the service, then PCF queries the CRD to retrieve the list of charging decisions.

Step	Description
7	The PCF compares the results with the PCF session and identifies the differences.
8	The PCF adds charging decisions in the response object.
9	The PCF sends a Create Session request to the CDL.
10	In response, the CDL sends an acknowledgment to the PCF.
11	The PCF sends an N7 Create response to the SMF.

Updating SM Policy

This section describes the Updating SM Policy call flow.

Figure 3: Update SM Policy Call Flow

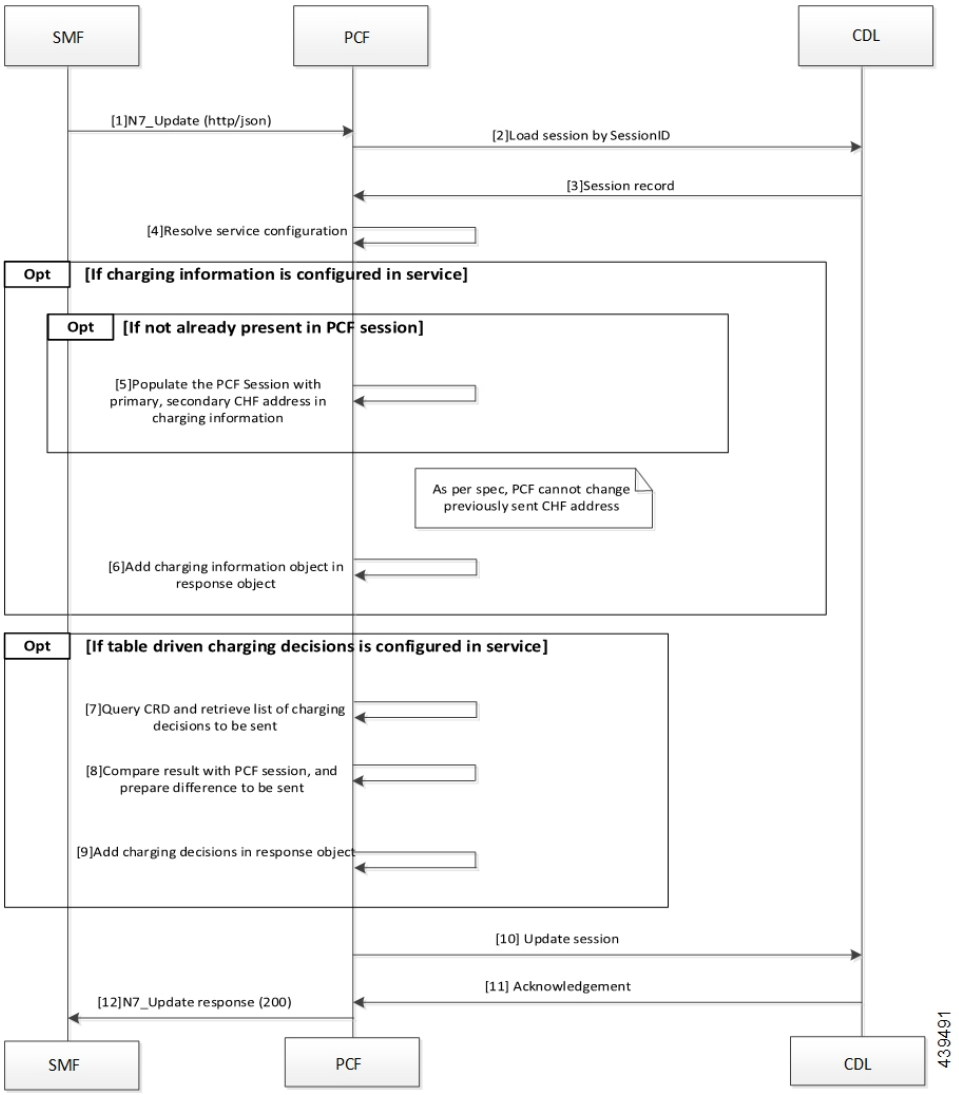


Table 5: Update SM Policy Call Flow Description

Step	Description
1	The SMF sends an N7 Update request to the PCF.
2	The PCF sends a load session by SessionID to the CDL.
3	In response, the CDL sends the Session Record to the PCF.
4	The PCF resolves the service configuration.
5	If the charging information is not available in the PCF session, then PCF populates the session with the primary and secondary CHF address.
6	If the charging information is configured in the service, then PCF adds the charging information object in the response object.
7	If the table driven charging decision is configured in the service, then PCF queries CRD to retrieve the list of charging decision.
8	The PCF compares the result with the PCF session and identifies the delta information.
9	The PCF adds the charging decision in the response object.
10	The PCF sends the Update Session request to the CDL.
11	The CDL acknowledges the update request by sending an acknowledgment to the PCF.
12	The PCF sends an N7 Update response to the SMF.

Updating Notify SM Policy

This section describes the Updating Notify SM Policy call flow.

Figure 4: Update Notify SM Policy Call Flow

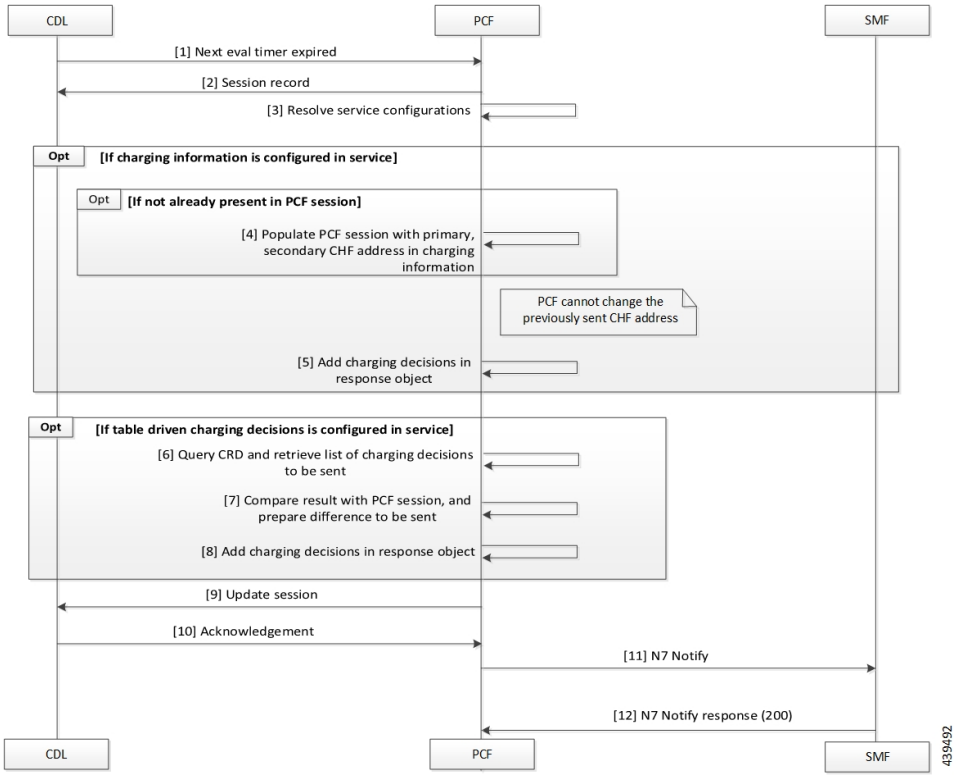


Table 6: Update Notify SM Policy Call Flow Description

Step	Description
1	The CDL sends a next evaluation timer request to the PCF.
2	The PCF sends the Session Record in response to the CDL.
3	The PCF resolves the service configuration.
4	If the charging information is not available in the PCF session, PCF populates the PCF session with primary and secondary CHF address in the charging information.
5	If the charging information is configured in the service, PCF adds the charging information in the response object.
6	If the table driven charging decision is configured in the service, PCF queries the CRD to retrieve the list pf charging decisions.
7	The PCF compares the results with the PCF session to identify the delta.
8	The PCF adds the charging decisions in the response object.
9	The PCF sends the Update Session request to the CDL.
10	In response, the CDL sends an acknowledgment to the PCF.

Step	Description
11	The PCF sends a N7 Notify request to the SMF.
12	The SMF sends a N7 Notify response to the PCF.

Configuration Support for Online Charging

The configuration of online charging enablement over N7 to SMF involves the following steps:

1. ChargingInformation
2. TableDrivenChargingDecision

ChargingInformation

This section describes how to configure the ChargingInformation service.

1. Log in to Policy Builder and navigate to **Services** tab > **Use Case Templates**.
2. Under **Actions > Create Child**, click **Use Case Template**, and add **ChargingInformation** in Service Configuration.
3. Navigate to **Services > Service Option** (for that use case template).
4. Attach the service option to the service.

TableDrivenChargingDecision

This section describes how to configure the TableDrivenChargingDecision service.

1. Log in to Policy Builder and navigate to **Custom Reference Data Table**, and create a search table group for the charging decision table.
2. Navigate to **Services > Use Case Templates**.
3. Under **Actions > Create Child**, click **Use Case Template**, and add **TableDrivenChargingDecision** in Service Configuration.
4. Navigate to **Services > Service Option** (for that use case template).
5. Attach the Service Option to the service.
6. Map the source field to Custom Reference Data (CRD) table created in **Step 1**.