



## Timers Support

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## Feature Summary and Revision History

### Summary Data

*Table 1: Summary Data*

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Disabled – Configuration Required
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

### Revision History

*Table 2: Revision History*

Revision Details	Release
First introduced.	2020.02.0

## Feature Description

The SMF supports configurable timers that are either 3GPP compliant or custom-driven.

This chapter provides detailed information about the function, operation, and configuration of the timers. This chapter covers the following topics:

- 3GPP-compliant timers
  - GTP timer
  - N11 timer
- Custom-driven timers
  - Absolute timer
  - Control plane inactive timer
  - User plane inactive timer

## 3GPP-compliant Timers

### GTP and N11 Timers Support

#### Feature Description

The SMF supports retransmission through the GTP and N11 timers. With this provision, when the peer does not respond with the timer value, the SMF retransmits the GTP and N11 requests. The SMF lets you configure the maximum number of retransmissions.




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**Note** The SMF provides configuration support for GTP timer and N11 timers.

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#### How it Works

The SMF supports the following 3GPP timers:

- **GTP retransmission timer:**

The SMF/PGW-C starts the timer denoted in the T3-RESPONSE. The timer is invoked when a signalling message (for which a reply is expected) is sent. A signalling message or the triggered message might get lost if a response is not received before the T3-RESPONSE timer expires.

Once the T3-RESPONSE timer expires, the message corresponding to the T3-RESPONSE timer is then retransmitted if the total number of retry attempts is less than N3REQUESTS.

- **5G N1N2 reattempt timer:**

If AMF rejects the N1N2 MessageTransfer with cause code as "Temporary reject registration ongoing" or "Temporary reject handover ongoing", then the SMF starts the timer for reattempting N1N2 MessageTransfer.

Once the timer expires, the message corresponding to N1N2 MessageTransfer is reattempted based on the configured retry attempts.

## Standards Compliance

The 3GPP timers support feature complies with the following standards:

- 3GPP TS 29.510 V15.2.0 (2018-12)

## Configuring the GTP and N11 Timers

This section describes how to configure the 3GPP-compliant timers—GTP and N11 timers.

### Configuring the N11 Timers

This section describes how to configure the N11 timers.

The N11 timer configuration is invoked when AMF rejects the N1N2 message transfer with the cause code as "Temporary reject registration ongoing" or "Temporary reject handover ongoing", then SMF considers the timer and reattempts the message transfer. When the timer expires, the transfer is reattempted based on the configured retry count.

#### configure

```
profile failure-handling failure_handling_name
  interface [ gtpc | N11 ] message message_type
    cause-code [ temp-reject-register | temp-reject-handover ]
    action [ retry { timeout timeout_duration |
      max-retry retry_count } | clear | terminate ]
  end
```

#### NOTES:

- **profile failure-handling** *failure\_handling\_name*— Enter the name of the profile for failure handling.
- **interface [ gtpc | N11 ]**— Configures the interface over which the message transfer must happen.
- **message** *message\_type*— Configures the message type that must be transferred over the interface. The N11 interface supports the message type as n1n2transfer.
- **cause-code [ temp-reject-register | temp-reject-handover ]**— Configures the HTTP cause code. You can configure multiple cause code values for a message.
- **action [ retry | clear | terminate ]**— Configures the action that must be performed when the message transfer is not successful.




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**Note** Clear and terminate are not supported for the N11 interface.

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- **action [ retry { max-retry *retry\_count* | timeout *timeout\_duration* }**— Specifies the number of times the message transfer must be reattempted and the time interval between the consecutive attempts.

### Example Configuration

Following is an example of N11 timer configuration.

```
show running-config
profile failure-handling n11-fht
  interface n11 message n1n2transfer
    cause-code temp-reject-register
```

```

action retry
  timeout 1000
  max-retry 2

```

## Configuring the GTP Timers

This section describes how to configure the GTP timers.

The GTP timer configuration is implemented when a signaling message or triggered message (for which a reply is expected) is lost as it did not get a response before the T3-RESPONSE timer expired. After the T3-RESPONSE timer expires, the message corresponding to the T3-RESPONSE timer is retransmitted if the total number of retry attempts is less than the N3-REQUESTS times.

**config**

```

endpoint gtp
  retransmission { max-retry retry_count | timeout timeout_duration }
end

```

**NOTES:**

- **endpoint gtp**: Enters the GTP retransmission configuration.
- **max-retry retry\_count**: Specifies the number of times the signalling message request to SMF must be reattempted. The accepted range is 0–5. Default range is 3. When the *retry\_count* is set to "0", the retransmission feature is disabled.
- **timeout timeout\_duration**: Configures the interval of time (in milliseconds) after which the GTP retransmission request is reattempted. The accepted range is 0–10. Default range is 2. When the *timeout\_duration* is set to "0", the retransmission feature is disabled.

### Example Configuration

Following is an example of GTP timer configuration.

```

show running-config

endpoint gtp
  retransmission max-retry 2 timeout 5

```

# Custom-driven Timers

## Absolute Timer Support

### Feature Description

The SMF supports Absolute Session Timeout for each PDU session. With this support, the SMF can retain the PDU session resources until the absolute session timer expires.

You can configure the absolute session timeout value under the DNN profile. If you have not configured the timeout value, the session timeout feature appears disabled and no timer is initiated.

Based on the configured value under the DNN profile, the absolute session timer is triggered during the session creation. You cannot modify the timer value during interim handling of any access and mobility procedures

for that session. After the timer expires, the SMF performs SMF-initiated release by informing all SBI interfaces and N4 Interfaces, that is, toward UE, UDM, PCF, CHF, and UPF interfaces.

## Configuring Absolute Session Timeout

To configure Absolute Session Timeout parameter under the DNN profile:

```
configure  
  profile dnn dnnprofile_name  
    timeout absolute absolutetimer_value  
  end
```

### NOTES:

- **profile dnn** *dnnprofile\_name*: Specifies the name of the DNN profile. *dnnprofile\_name* must be an alphanumeric string.
- **timeout**: Specifies the timeout option.
- **absolute** *absolutetimer\_value*: Specifies the maximum duration of the session (in seconds), before the system automatically terminates the session. The default value is 0, which indicates that the function is disabled.

*absolutetimer\_value* must be an integer in the range of 0-2147483647.

The following is a sample configuration.

```
smf(config)# profile dnn intershat timeout absolute 900
```

## Inactivity Timer Support

### Feature Description

The SMF supports the following timers to handle the user plane (UP) and control plane (CP) inactive requests:

- UP inactivity timer
- UP idle timer
- CP idle timer

### Configuring UP Inactivity Timer

To configure the UP inactivity timer under DNN profile, use the following commands:

```
configure  
  profile dnn dnnprofile_name  
    userplane-inactivity-timer timer_value  
  end
```

### NOTES:

- **userplane-inactivity-timer** *timer\_value*: Specifies the timer value in seconds. *timer\_value* must be an integer in the range of 0-86400. The default value of the timer is 0, which means the function is disabled.

- The SMF sends the configured inactivity timer to the UPF through the N4 PDU Session Establishment request. After the session establishment, if the configured value changes, the SMF reports the changes to the UPF through N4 modification request.
- The UPF starts the inactivity timer when there is no uplink or downlink data transmission over the N3 tunnel. The UPF stops the timer when the data transmission over N3 tunnel is resumed. On expiry of the timer, the UPF sends session report to the SMF with the user plane inactivity request (UPIR) flag set. After receiving the report indication for a session, the SMF clears the session if it is a 4G session and initiates idle mode entry if it is a 5G session.

## Configuring CP and UP Session Idle Timer

To configure the CP and UP idle timers under DNN profile, use the following commands:

```
configure
  profile dnn dnnprofile_name
    timeout { cp-idle timer_value | up-idle timer_value }
  end
```

### NOTES:

- **cp-idle** *timer\_value*: Specifies the maximum duration of the 5G session after the migration to CP idle state and before the automatic termination. The default value is 0, which indicates the function is disabled. *timer\_value* must be an integer in the range of 0-2147483647.
- **up-idle** *timer\_value*: Specifies the maximum duration of the 5G session after the migration to UP idle state and before the automatic termination. The default value is 0, which indicates the function is disabled. *timer\_value* must be an integer in the range of 0-2147483647.
- The up-idle timer starts when an AN-initiated or Network-initiated 5G session enters the idle mode. This timer stops when the session exits the idle mode. On expiry of the timer, the SMF clears the 5G sessions.
- The cp-idle timer starts when any 4G or 5G procedure ends, and stops when any new procedure starts. If the timer expires, the SMF clears the session.