

Attach Rate Throttling

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

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

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2022.04.0

Feature Description

Attach rate limit is the maximum number of new connections that AMF can process. The new connections include Initial Registration Request, Namf_Communication_CreateUEContext Request, and N26 Forward Relocation Request.

Setting the rate limit enables the operators to manage the traffic and reduce the signaling on the external nodes.



Note AMF does not throttle emergency, periodic, and mobility registration.

How it Works

This section describes how this feature works.

When you enable the attach rate throttling feature, AMF buffers and queues new connection requests (excluding Emergency Registration). The AMF prioritizes the processing of these requests in the FIFO (first in, first out) order.

If the queue is full, AMF drops or rejects packets with a cause code which is based on the configured action.

Feature Configuration

To configure this feature, use the following configuration:

```
config
   amf-global
      network-protection-overload
         attach-rate
            rate-limit permitted_connection_count
            queue-size queue_size
            action
               drop
               initial-registration reject-with-cause { congestion |
protocol_error_unspecified }
               in14-create-ue-context reject-with-http-code {403}
               in26-fwd-reloc reject-with-cause { gtpc-entity-congestion
 | relocation-failure | no-resources-available }
               end
```

NOTES:

- **amf-global**—Enter the AMF global configuration mode.
- **attach-rate**—Configure the attach rate feature.
- **rate-limit** *permitted_connection_count*—Specify the number of new connections that AMF accepts per second. *permitted_connection_count* must be an integer in the range 50—5000.

- **queue-size** *queue_size*—Specify the size of queue that AMF uses for buffering the packets. AMF uses this queue when the new connection requests exceed the value that you have specified for **rate-limit**.

  queue_size must be an integer in the range 50—1000. The default *queue_size* is 50.

- **action**—Configure the action that AMF takes when the queue is full. The default action is Reject for all requests with #default reject cause.

  The following options are available for Action:

  - **drop**—Configure to drop all the new connection requests.
  - **initial-registration reject-with-cause { congestion | protocol_error_unspecified }**—Configure AMF to reject the UE-initiated Initial Registration Request with the one of the following causes in the reject message:
    - **congestion**—The message is congestion (22).
    - **protocol_error_unspecified**—The message is protocol_error_unspecified (111) #default.
  - **n14-create-ue-context reject-with-http-code {403}**—Configure AMF to reject the new Namf_Communication_CreateUEContext Request with the HTTP error code. The AMF receives this request in the source AMF during the UE-initiated inter-AMF N2 handover. With the error code as 403, the Cause attribute of the ProblemDetails is set to HANDOVER_FAILURE #default.
  - **n26-fwd-reloc reject-with-cause { gtpc-entity-congestion | relocation-failure | no-resources-available }**—Configure AMF to reject the new MME-initiated forward relocation requests through the N26 interface.

    If AMF rejects the inbound forward-relocation requests, it uses one of the following cause codes:

    - No resources available (73)
    - gtpc-entity-congestion (120)
    - relocation-failure (81) #default



Note

- AMF does not support dynamic change configuration.
- The configured rate-limit and queue-size are applied to each amf-service pod and not at the aggregation of all service pods.

Configuration Example

The following is an example configuration.

```
amf-global
network-protection-overload attach-rate
  rate-limit 100
  queue-size 100
  action
   initial-registration reject-with-cause congestion
   n14-create-ue-context reject-with-http-code 403
   n26-fwd-reloc reject-with-cause relocation-failure
```

```
  exit
exit
exit
amf-global
network-protection-overload attach-rate
  rate-limit 100
  queue-size 100
  action
   drop
  exit
exit
exit
```

OAM Support

This section describes operations, administration, and maintenance support for this feature.

Bulk Statistics Support

AMF supports the following statistics for the Attach Rate Throttling feature.

attach_rate_trottle

Description: The message-level statistics that AMF uses to reject or drop connection requests when the queue is full.

Labels:

- app_name
- message_type: GTPCFwdRelocReq, N14UeContextCreateReq, N1RegistrationRequest
- action: drop, reject