

Self-overload Detection and Admission Control of Sx at UP

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Revision History

Note Revision history details are not provided for features introduced before release 21.24.

Revision Details	Release
First introduced	Pre 21.24

Feature Description

Overload detection and control at User Plane (UP) is implemented using the eMPS functionality. During an overload scenario at Sx, the Session Establishment and Modification requests that are received at Sx (UP) are rejected for all non-eMPS subscribers.

Currently, overload control is supported for Sx Control Plane (CP). To support eMPS at UP, the CP adds the eMPS value to Message Priority IE in the PFCP header and sends the message over to UP.

The UP, on receipt of the Sx Session Establishment/Modification request, performs an overload check. If the detected system load is normal, the session establishment/modification is allowed, and the session is marked as a priority session based on the MP flag set in the PFCP header.

If the detected system load is overloaded, the Sx Session Establishment/Modification is rejected for all eMPS subscribers.

The system load level is determined by the following factors:

- System Utilization (CPU, Memory, and Licenses)
- Session Manager Utilization (CPU and Memory)
- VPP-CPU Utilization

Limitations

The following are the known limitations of the feature:

- Data throttling is not supported.
- Alarms are not supported.
- Bulk statistics are not supported.
- No support for handling APN-based emergency calls in a Pure-S scenario. Other emergency calls such as – IMSI-based and IMEI-valid based are handled.
- Only self-overload protection is supported in this release.
- User Plane ICSR not supported in this release.
- Impact on existing calls: If **userplane-overload-control-profile** is configured and associated to user plane service. Also, if the system moves to overload condition and the user plane service rejects SX Session Establishment and SX session modification messages, this leads to call cleanup/drop of relevant calls triggering SX session modification messages. This behavior continues until the system returns to the normal load condition.

Configuring Overload Control at User Plane

eMPS Profile Creation and Association to S-GW and P-GW Services of Control Plane



Important This configuration must be done before configuring an overload control profile at UP.

```
configure
   emps-profile profile_name
      earp earp_value
      end
configure
   context context_name
      sgw-service service_name
         associate emps-profile profile_name
         exit
      pgw-service service_name
         associate emps-profile profile_name
         end
```

Configuring the Overload Control Profile at UP

Use the following commands to configure overload control profile.

```
configure
  userplane-overload-control-profile profile_name
  end
```

Configuring Overload Threshold Parameters

Use the following commands to configure overload threshold parameters.

```
configure
  userplane-overload-control-profile profile_name
    overload-threshold system lower-limit limit_value upper-limit limit_value
 sessmgr lower-limit limit_value upper-limit limit_value vpp-cpu lower-limit
 limit_value upper-limit limit_value
     end
```

NOTES:

- **overload-threshold**: Configures Overload thresholds limits for system, sessmgr and vpp-cpu.
- **system**: Configures overload system threshold after which node moves to self-protection mode.
- **vpp-cpu**: Configures the overload vpp-cpu threshold after which node moves to self-protection mode.
- **sessmgr**: Configures the overload threshold for session manager after which node moves to self-protection mode.
- **upper-limit** *limit_value*: Configures overload vpp-cpu threshold L2 after which node moves to self-protection mode. Default limit value is 60%.
- **lower-limit** *limit_value*: Configures overload vpp-cpu threshold L1 after which node moves to self-protection mode. Default limit value is 50%.

Configuring System Weightage Parameters

Use the following commands to configure session manager weightage parameters.

```
configure
  userplane-overload-control-profile profile_name
     system-weightage system-cpu-utilization utilization_value
system-memory-utilization utilization_value license-session-utilization
utilization_value
     end
```

NOTES:

- **system-weightage**: Configures system weightage for various overload control parameters. Total weightage of all the parameters should be 100. The default values are 40% weightage to system-cpu-utilization, 30% weightage to system-memory-utilization and 30% weightage to license-session-utilization.
- **system-cpu-utilization**: Configures system CPU utilization weightage in percentage. Default weightage in overload factor is 40%.

- **system-memory-utilization**: Configures system memory utilization weightage in percentage. Default weightage in overload factor is 30%.
- **license-session-utilization**: Configures license session utilization weightage for User Plane service in percentage. Default weightage in overload factor is 30%.

Configuring Session Manager Weightage Parameters

Use the following commands to configure session manager weightage parameters.

```
configure
  userplane-overload-control-profile profile_name
    sessmgr-weightage sessmgr-cpu-utilization utilization_value
sessmgr-memory-utilization utilization_value
    end
```

NOTES:

- **sessmgr-weightage**: Configures sessmgr weightage for various overload control parameters. Total weightage of all the parameters should be 100. The default values are 35% weightage to sessmgr-cpu-utilization and 65% weightage to sessmgr-memory-utilization.
- **sessmgr-cpu-utilization**: Configures session manager CPU utilization weightage in percentage. Default weightage in overload factor is 35%.
- **sessmgr-memory-utilization**: Configures session manager memory utilization weightage in percentage. Default weightage in overload factor is 65%.

Associating an Overload Control Profile with a User Plane Service

Use the following commands to associate the Overload Control profile to a use plane service.

```
configure
  context context_name
    user-plane-service service_name
    [ no ] associate userplane-overload-control-profile profile_name
```

NOTES:

- **associate**: This command associates the user plane overload control profile with a user plane service.

Monitoring and Troubleshooting

Show Commands Input and/or Outputs

This section provides information regarding show commands and their outputs in support of the feature.

show user-plane-service name *name*

The following fields are displayed in support of this feature:

- Service name
  - Service-Id
  - Context
  - Status
  - PGW Ingress GTPU Service
  - SGW Ingress GTPU Service
  - SGW Egress GTPU Service
  - Control Plane Tunnel GTPU Service
  - Sx Service
  - Control Plane Group
  - Userplane Overload Control Profile
  - Fast-Path service

show user-plane-service statistics name *user_plane_service_name*

The following fields are displayed in support of this feature:

- Overload Control Information
  - Current Overload Factor System: Average of all user plane service values
  - Current Overload Factor SessMgr
  - Current Overload Factor VPP-CPU
  - No of times Overload Threshold Reached
  - No of Session Eshtablishment Req rejected during overload
  - No of Session Modif Req rejected during overload
  - No of eMPS Session Eshtablishment Req allowed during overload
  - No of eMPS Session Modif Req allowed during overload

show userplane-overload-control-profile name *name*

The following fields are displayed in support of this feature:

- User Plane Overload Control Profiles
- User Plane Overload Control Profile Name
- System Weightage and Thresholds:
  - CPU Utilization Weightage
  - Memory Utilization Weightage

- License Session Utilization Weightage
- System Threshold Lower Limit
- System Threshold Upper Limit

- Sessmgr Weightage and Thresholds:
  - CPU Utilization Weightage
  - Memory Utilization Weightage
  - Sessmgr Threshold Lower Limit
  - Sessmgr Threshold Upper Limit

- VPP Weightage and Thresholds:
  - VPP Utilization Weightage
  - vpp-cpu Threshold Lower Limit
  - vpp-cpu Threshold Upper Limit