



# Multiple Control Plane Support on User Plane

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## Revision History



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

Revision Details	Release
With this release, the feature is enhanced to support connection of upto five CPs with a single UP.	21.25
First introduced.	Pre 21.24

## Feature Description

In releases prior to 21.19.1, the CUPS architecture supported only a single Sx interface between User Plane (UP) and Control Plane (CP). In 21.19.1 and later releases, this feature enables single UP to establish multiple Sx interfaces to multiple CPs. Multiple Sx peers in a CP group are configured on UP to establish multiple Sx associations between a single UP and multiple CPs.

When Multiple CPs are connected to single UP, it allows a subscriber to connect to UP using any of the available CP. One of the primary use case of Multiple Sx feature is Active-Active redundancy. Even though it does not offer redundancy, as the calls are not recovered, multiple Sx allows the UPs connected to one CP to be still accessible in case of a CP failure. If a CP fails, the calls serviced by that CP are lost. When they re-attach, the calls are routed to other available CPs which reuses the same UP pool.

In 21.20 and later releases, the feature supports configuration of same APN, and all related configuration, across multiple CPs so that the subscriber can attach using any of the available CP.

The Sx IP pool update message contains the CP address to enable UP VPNMgr to distinguish between routes installed from various CPs.

**Note**

- Both CP and UP are separately configured.
- Instead of a PFD push, the Redundancy and Configuration Management (RCM) pushes the configuration on UP.
- It's recommended not to configure more than four CP peer IP addresses in a single CP group.

## How it Works

To configure multiple CPs with different Active Charging System (ACS) service, this feature leverages Redundancy and Configuration Management (RCM) functionality to push a super-set of configuration to UP.

### Prerequisites

The following prerequisites must be met to configure multiple CPs:

- **Ruledef:**

UP provides UE service with different rule definition (Ruledef) configurations on multiple CPs under the same ACS (ECS) service. However, the Ruledef with the same name on different CPs must be common. For example, the following table shows Ruledef configurations on multiple CPs.

CP1	CP2	CP3	CP4
Rule_def 1	Rule_def 1	Rule_def 2	Rule_def 2
Rule_def 3	Rule_def 4	Rule_def 5	Rule_def 6

- **Group-of-Ruledefs (GoR):**

UP provides UE service with different Group-of-Ruledefs (GoR) configurations on multiple CPs under the same ACS (ECS) service. However, the GoR with the same name on different CPs must be common. For example, the following table shows GoR configurations on multiple CPs.

CP1	CP2	CP3	CP4
GoR 1	GoR 1	GoR 2	GoR 2
GoR 3	GoR 4	GoR 5	GoR 6

- **Rulebase:**

UP provides UE service with different Rulebase (RB) configurations on multiple CPs under the same ACS (ECS) service. However, the rulebase with the same name on different CPs must be common. For example, the following table shows Rulebase configurations on multiple CPs.

CP1	CP2	CP3	CP4
RB 1	RB 1	RB 2	RB 2
RB 3	RB 4	RB 5	RB 6

- **IP Pools:**

Each CP must be configured with mutually exclusive IP pools. This is to ensure that the unique IP address is assigned to subscriber when subscribers with same APN are serviced by different CPs. For example, the following table shows IP Pool configurations on multiple CPs.

CP1	CP2	CP3	CP4
Pool 1	Pool 2	Pool 3	Pool 4

Each CP pushes IP Pool configuration to UP during Sx Association procedure.

UP1	UP2
Pool 1	Pool 1
Pool 2	Pool 2
Pool 3	Pool 3
Pool 4	Pool 4

- **APN:**

UP provides UE service with different APN definition configurations on multiple CPs. However, the APN definition with the same name on different CPs, must be common and they should point to the same egress context. For example, the following table shows APN configurations on multiple CPs.

CP1	CP2	CP3	CP4
APN 1	APN 1	APN 2	APN 2
APN 3	APN 4	APN 5	APN 6

- **Egress Context**

Each CP must be configured with same context name which is configured as egress context for APNs configured in that CP. UP must be configured with all the egress context present on different CPs, to push the IP pools from CP to specific egress context on UP. For example, the following table shows egress context configurations on multiple CPs.

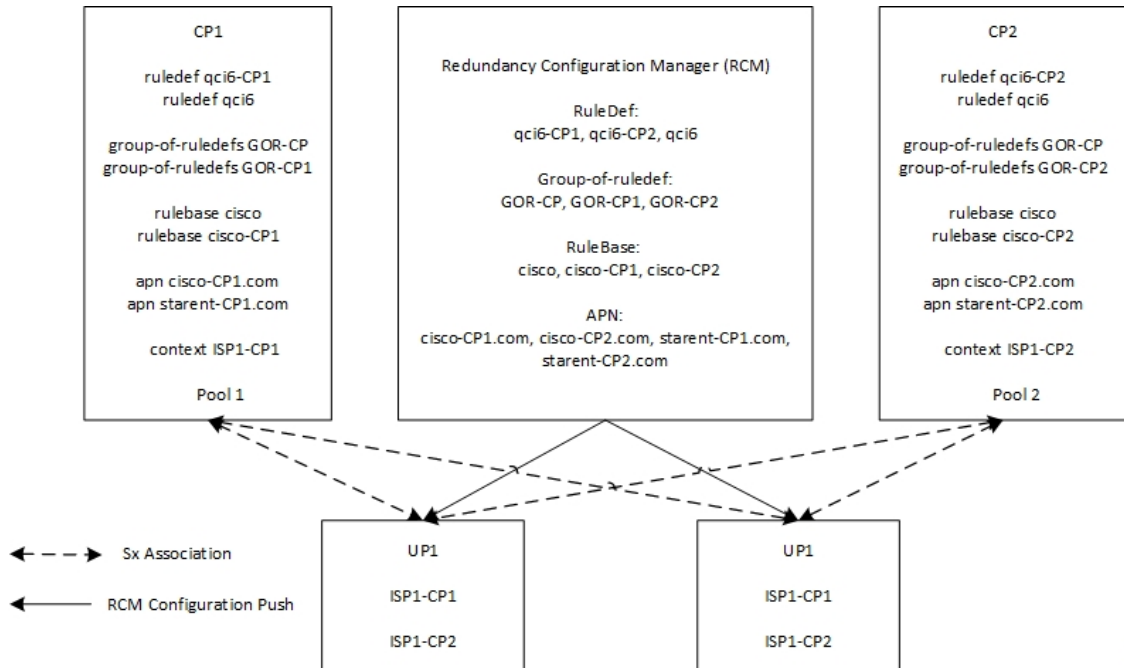
CP1	CP2	CP3	CP4
ISP1	ISP1	ISP1	ISP1

For example, the following table shows egress context configurations on multiple UPs.

UP1	UP2
ISP1	ISP1

The following image shows a sample RCM configuration of two CPs communicating with two UPs.

Figure 1: Sample RCM Configuration of Two CPs Communicating with Two UPs



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## Configuring Multiple Control Plane Support on User Plane

This section provides information about CLI commands that are available in support of this feature.

### Disabling PFD Configuration Push from CP

As configuration push to UP is done through RCM, use the following CLI commands to disable PFD configuration push from CP.

```

configure
  user-plane-group group_name
    sx-pfd-push disabled
  end

```

### Configuring Multiple CP on UP

Use the following CLI commands to configure multiple CP on UP by adding multiple peer node under Control Plane Group Configuration mode.

```

configure
  control-plane-group group_name
    peer-node-id ipv4-address ipv4_address
    peer-node-id ipv4-address ipv4_address
  end

```

# Monitoring and Troubleshooting

This section provides information about monitoring and troubleshooting the Multiple CP Support on UP feature.

## Show Commands and/or Outputs

This section describes the show commands that are available in support of this feature.

### show sx-service statistics address <ip\_address>

Use this command to display Sx statistics for a CP node. The following is a sample output:

```

Session Management Messages:
Session Establishment Request:
  Total TX:                0    Total RX:                2
  Initial TX:              0    Initial RX:              2
  Retrans TX:              0    Retrans RX:              0
  Discarded:               0
  No Rsp RX:               0
  Throttled:               0

Session Establishment Response:
  Total TX:                2    Total RX:                0
  Initial TX:              2    Initial RX:              0
  Accepted:                2    Accepted:                0
  Denied:                  0    Denied:                  0
  Retrans TX:              0    Discarded:               0

Session Modification Request:
  Total TX:                0    Total RX:                10
  Initial TX:              0    Initial RX:              10
  Retrans TX:              0    Retrans RX:              0
  Discarded:               0    Intf Type Mismatch:     0
  No Rsp RX:               0

Session Modification Response:
  Total TX:                10   Total RX:                0
  Initial TX:              10   Initial RX:              0
  Accepted:                10   Accepted:                0
  Denied:                  0    Denied:                  0
  Retrans TX:              0    Discarded:               0

Session Deletion Request:
  Total TX:                0    Total RX:                2
  Initial TX:              0    Initial RX:              2
  Retrans TX:              0    Retrans RX:              0
  Discarded:               0
  No Rsp RX:               0

Session Deletion Response:
  Total TX:                2    Total RX:                0
  Accepted:                2    Accepted:                0
  Denied:                  0    Denied:                  0
  Discarded:               0

Session Report Request:
  Total TX:                3    Total RX:                0
  Initial TX:              3    Initial RX:              0

```

```
show sx-service statistics address <ip_address>
```

```

Retrans TX: 0 Retrans RX: 0
Discarded: 0
No Rsp RX: 0

Session Report Response:
Total TX: 0 Total RX: 3
Initial TX: 0 Initial RX: 3
Accepted: 0 Accepted: 3
Denied: 0 Denied: 0
Retrans TX: 0 Discarded: 0

Node Management Messages:
Prime PFD Management Request:
Total TX: 0 Total RX: 0
Initial TX: 0 Initial RX: 0
Retrans TX: 0 Retrans RX: 0
No Rsp received TX: 0 Discarded: 0

Prime PFD Management Response:
Total TX: 0 Total RX: 0
Initial TX: 0 Initial RX: 0
Accepted: 0 Accepted: 0
Denied: 0 Denied: 0
Retrans TX: 0 Discarded: 0

Association Setup Request:
Total TX: 1 Total RX: 0
Initial TX: 1 Initial RX: 0
Retrans TX: 0 Retrans RX: 0
No Rsp received TX: 0 Discarded: 0

Association Setup Response:
Total TX: 0 Total RX: 1
Initial TX: 0 Initial RX: 1
Accepted: 0 Accepted: 1
Denied: 0 Denied: 0
Retrans TX: 0 Discarded: 0

Association Update Request:
Total TX: 0 Total RX: 3
Initial TX: 0 Initial RX: 3
Retrans TX: 0 Retrans RX: 0
No Rsp received TX: 0 Discarded: 0

Association Update Response:
Total TX: 3 Total RX: 0
Initial TX: 3 Initial RX: 0
Accepted: 3 Accepted: 0
Denied: 0 Denied: 0
Retrans TX: 0 Discarded: 0

Association Release Request:
Total TX: 0 Total RX: 0
Initial TX: 0 Initial RX: 0
Retrans TX: 0 Retrans RX: 0
No Rsp received TX: 0 Discarded: 0

Association Release Response:
Total TX: 0 Total RX: 0
Initial TX: 0 Initial RX: 0
Accepted: 0 Accepted: 0
Denied: 0 Denied: 0
Retrans TX: 0 Discarded: 0

```

```

Node Report Request:
  Total TX:                0    Total RX:                0
  Initial TX:              0    Initial RX:              0
  Retrans TX:              0    Retrans RX:              0
  No Rsp received TX:     0    Discarded:               0

Node Report Response:
  Total TX:                0    Total RX:                0
  Initial TX:              0    Initial RX:              0
  Accepted:                0    Accepted:                0
  Denied:                  0    Denied:                  0
  Retrans TX:              0    Discarded:               0

Heartbeat Request:
  Total TX:                1398  Total RX:                1398
  Initial TX:              1398  Initial RX:              1398
  Retrans TX:                0

Heartbeat Response:
  Total TX:                1398  Total RX:                1398

Stats framework related messages:
Stats Query Request:
  Total TX:                0    Total RX:                0
  Initial TX:              0    Initial RX:              0
  Retrans TX:              0    Retrans RX:              0
  No Rsp received TX:     0    Discarded:               0

Stats Query Response:
  Total TX:                0    Total RX:                0
  Initial TX:              0    Initial RX:              0
  Accepted:                0    Accepted:                0
  Denied:                  0    Denied:                  0
  Retrans TX:              0    Discarded:               0

Stats Query Acknowledgement:
  Total TX:                0    Total RX:                0
  Initial TX:              0    Initial RX:              0
  Retrans TX:              0    Retrans RX:              0
  Discarded:               0

Total Signalling Packets:
  TX:                      21          RX:                      21

Total Signalling Bytes:
  TX:                      2092         RX:                      5381

```

Use the **clear sx-service statistics address ip\_address** CLI command to clear Sx statistics for a CP node.

## show user-plane-service statistics peer-address <ip\_address>

Use this command to display the node-level service statistics for a UP. The following is a sample output:

```

Peer IP                : 209.165.200.225

Subscribers Total:
PDNs Total:
Active:                1          Setup:                1
Released:              0          Rejected:              0

PDNs By PDN-Type:
IPv4 PDNs:
Active:                1          Setup:                1
Released:              0

```

```
show user-plane-service statistics peer-address <ip_address>
```

```

IPv6 PDNs:
Active:                0          Setup:                0
Released:             0

IPv4v6 PDNs:
Active:                0          Setup:                0
Released:             0

eMPS PDNs Total:
Active:                0          Setup:                0
Released:             0          Rejected:             1

PDNs By interface-Type:
Sxa interface-type PDNs:
Active:                0          Setup:                0
Released:             0

Sxb interface-type PDNs:
Active:                1          Setup:                1
Released:             0

Sxab interface-type PDNs:
Active:                0          Setup:                0
Released:             0

N4 interface-type PDNs:
Active:                0          Setup:                0
Released:             0

PDNs Rejected By Reason:
No Resource:          0          Missing or unknown APN: 0
Addr not alloc:      0          Addr not present:      0
No memory available: 0          System Failure:        0
Rule install failed: 0          SFW policy mismatch:   0

PDNs Released By Reason:
Network initiated release: 0          Admin disconnect:      0

Total Data Statistics:
Uplink :
Total Pkts:           0          Downlink :
Total Bytes:          0          Total Pkts:            0
Total Dropped Pkts:  0          Total Bytes:           0
Total Dropped Bytes: 0          Total Dropped Pkts:   0
Total Dropped Bytes: 0          Total Dropped Bytes:  0

Data Statistics Per PDN-Type:
IPv4 PDNs:
Uplink :
Total Pkts:           0          Downlink :
Total Bytes:          0          Total Pkts:            0
Total Bytes:          0          Total Bytes:           0

IPv6 PDN Data Statistics:
Uplink :
Total Pkts:           0          Downlink :
Total Bytes:          0          Total Pkts:            0
Total Bytes:          0          Total Bytes:           0

IPv4v6 PDN Data Statistics:
Uplink :
Total Pkts v4:        0          Downlink :
Total Bytes v4:       0          Total Pkts v4:         0
Total Pkts v6:        0          Total Bytes v4:         0
Total Bytes v6:        0          Total Pkts v6:         0
Total Bytes v6:        0          Total Bytes v6:         0

```



Use the **clear user-plane-service statistics peer-address ip\_address** CLI command to clear the node-level service statistics for a UP.

## show ip chunks peer <ip\_address>

Use this command to display per CP IPv4 pool chunks at UP. The following is a sample output.

```

=====
Peer Address: 1.0.0.1
=====
|-----|-----|-----|-----|-----|
| chunk-id | chunk-size |         vrf-name         | start-addr | end-addr |
| used-addr |            |                           |             |           |
|-----|-----|-----|-----|-----|
| 1048576 | 1024 |           | 192.0.2.1 | 192.0.2.2 |
| 0 |      |           |           |           |
| 1048577 | 1024 |           | 192.0.2.3 | 192.0.2.4 |
| 0 |      |           |           |           |
| 1048578 | 1024 |           | 192.0.2.5 | 192.0.2.6 |
| 0 |      |           |           |           |
| 3145728 | 1024 | vrf1 | 192.0.2.7 | 192.0.2.8 |
| 0 |      |           |           |           |
| 3145729 | 1024 | vrf1 | 192.0.2.9 | 192.0.2.10 |
| 0 |      |           |           |           |
| 3145730 | 1024 | vrf1 | 192.0.2.11 | 192.0.2.12 |
| 0 |      |           |           |           |
| 4194304 | 1024 |           | 192.0.2.13 | 192.0.2.14 |
| 0 |      |           |           |           |
| 4194305 | 1024 |           | 192.0.2.15 | 192.0.2.16 |
| 0 |      |           |           |           |
| 4194306 | 1024 |           | 192.0.2.17 | 192.0.2.18 |
| 0 |      |           |           |           |
|-----|-----|-----|-----|-----|

```

## show ipv6 chunks peer <ip\_address>

Use this command to display per CP IPv6 pool chunks at UP. The following is a sample output.

```

=====
Peer Address: 1.0.0.101
=====
|-----|-----|-----|-----|-----|
| chunk-id | chunk-size |         vrf-name         | start-prefix | end-prefix |
| used-prefixes |            |                           |               |             |
|-----|-----|-----|-----|-----|
| 2098200576 | 1024 |           | 3001:: | 3001:0:0:3ff:: |
| 0 |      |           |         |                 |
| 2098200577 | 1024 |           | 3001:0:0:400:: | 3001:0:0:7ff:: |
| 0 |      |           |         |                 |
| 2098200578 | 1024 |           | 3001:0:0:800:: | 3001:0:0:bff:: |
| 0 |      |           |         |                 |
| 2099249152 | 1024 | vrf1 | 4001:: | 4001:0:0:3ff:: |
| 0 |      |           |         |                 |
| 2099249153 | 1024 | vrf1 | 4001:0:0:400:: | 4001:0:0:7ff:: |
| 0 |      |           |         |                 |
| 2099249154 | 1024 | vrf1 | 4001:0:0:800:: | 4001:0:0:bff:: |
| 0 |      |           |         |                 |
|-----|-----|-----|-----|-----|

```

## Sample RCM Configuration

The following is a sample RCM configuration to configure the feature.

```

configure
etcd replicas 1
endpoint rcm-chkptmgr
  replicas 7
  vip-ip 209.165.200.225
exit
endpoint rcm-configmgr
  vip-ip 209.165.200.225
exit
endpoint rcm-bfdmgr
  vip-ip 209.165.200.226
exit
endpoint rcm-controller
  vip-ip 209.165.200.225
exit
logging level application trace
logging level transaction trace
logging level tracing off
logging name infra.config.core level application trace
logging name infra.config.core level transaction trace
logging name infra.resource_monitor.core level application debug
logging name infra.resource_monitor.core level transaction debug
k8 smf profile rcm-config-ep disable-cm apn gtpm creditCtrl packetFilter urrList ruledef
rulebase miscacs global chargingAction upfCpg upSvcSxService gtpuService upfIfc
lawfulIntercept apnprofile
k8 smf profile rcm-bfd-ep bfd-monitor group 1
  endpoint ipv4 209.165.200.227
  endpoint ipv4 209.165.200.228
  endpoint ipv4 209.165.200.229
  standby 1
exit
system mode running
helm default-repository smf
helm repository smf
  access-token
dev-deployer.gen:AKCp5ekcXA7TknM9DbLASNBw4jwVEsx9Z9WpQwEvCvCQ2mJhLymcz6BfbH38YJiWC6fn1cKmw
  url http://example.com
exit
k8s name          unknown
k8s namespace     rcm
k8s nf-name       rcm
k8s registry      dockerhub.xxx.com/smi-fuse-docker-internal
k8s single-node   false
k8s use-volume-claims false
k8s ingress-host-name 209.165.200.225.nip.io
profile smf rcm
  node-id 123456
exit
svc-type upinterface
svc-type sxsvc
svc-type upsvc
svc-type gtpusvc
svc-type cpgrp
  redundancy-group 1
  host 209.165.200.225:22
host 295 "config "
host 296 "control-plane-group CPGROUP21 "
host 297 "peer-node-id ipv4-address 209.165.200.230 "
```

```

host 298 "peer-node-id ipv4-address 209.165.200.231 "
host 299 "exit "
host 300 "end "
exit
exit
svc-type sxsvc
svc-type upsvc
svc-type gtpusvc
svc-type cpgrp
  redundancy-group 1
    host 209.165.200.225:22
host 393 " config "
host 394 "control-plane-group CPGROUP21 "
host 395 "peer-node-id ipv4-address 209.165.200.230 "
host 396 "peer-node-id ipv4-address 209.165.200.231 "
host 397 "48 exit "
host 398 "49 end "
exit
exit
exit
redundancy-group 1
common 1 " sleep 5 "
common 2 " config "
common 3 " active-charging service ACS "
common 4 " #exit "
common 5 " ruledef ipv6 "
common 6 " icmpv6 any-match = TRUE "
common 7 " #exit "
common 8 " ruledef qci1 "
common 9 " tcp src-port = 1001 "
common 10 " #exit "
common 11 " ruledef qci2 "
common 12 " tcp src-port = 1002 "
common 13 " #exit "
common 14 " ruledef qci6 "
common 15 " tcp src-port = 1006 "
common 16 " #exit "
common 17 " ruledef qci6-CP1 "
common 18 " udp src-port = 1010 "
common 19 " #exit "
common 20 " ruledef qci6-CP2 "
common 21 " udp src-port = 1020 "
common 22 " #exit "
common 23 " group-of-ruledefs GOR "
common 24 " add-ruledef priority 11 ruledef qci1 "
common 25 " add-ruledef priority 22 ruledef qci2 "
common 26 " add-ruledef priority 33 ruledef ipv6 "
common 27 " #exit "
common 28 " group-of-ruledefs GOR-CP1 "
common 29 " add-ruledef priority 11 ruledef qci1 "
common 30 " add-ruledef priority 33 ruledef ipv6 "
common 31 " #exit "
common 32 " group-of-ruledefs GOR-CP2 "
common 33 " add-ruledef priority 11 ruledef qci2 "
common 34 " add-ruledef priority 33 ruledef ipv6 "
common 35 " #exit "
common 36 " packet-filter ipv6 "
common 37 " ip protocol = 58 "
common 38 " priority 22 "
common 39 " #exit "
common 40 " packet-filter qci1 "
common 41 " ip protocol = 6 "
common 42 " ip remote-port = 1001 "
common 43 " priority 1 "

```

```

common 44 " #exit "
common 45 " packet-filter qci2 "
common 46 "     ip protocol = 6 "
common 47 "     ip remote-port = 1002 "
common 48 "     priority 2 "
common 49 " #exit "
common 50 " packet-filter qci6 "
common 51 "     ip protocol = 6 "
common 52 "     ip remote-port = 1006 "
common 53 "     priority 6 "
common 54 " #exit "
common 55 " packet-filter qci6-CP1 "
common 56 "     ip protocol = 17 "
common 57 "     ip remote-port = 1010 "
common 58 "     priority 1 "
common 59 " #exit "
common 60 " packet-filter qci6-CP2 "
common 61 "     ip protocol = 17 "
common 62 "     ip remote-port = 1020 "
common 63 "     priority 1 "
common 64 " #exit "
common 65 " urr-list URR_ID_LIST "
common 66 "     rating-group 1 urr-id 1 "
common 67 "     rating-group 2 urr-id 2 "
common 68 "     rating-group 3 urr-id 3 "
common 69 "     rating-group 4 urr-id 4 "
common 70 "     rating-group 5 urr-id 5 "
common 71 "     rating-group 6 urr-id 6 "
common 72 "     rating-group 7 urr-id 7 "
common 73 "     rating-group 8 urr-id 8 "
common 74 "     rating-group 9 urr-id 9 "
common 75 "     rating-group 10 urr-id 10 "
common 76 "     rating-group 11 urr-id 11 "
common 77 "     rating-group 12 urr-id 12 "
common 78 "     rating-group 13 urr-id 13 "
common 79 "     rating-group 14 urr-id 14 "
common 80 " #exit "
common 81 " charging-action ipv6 "
common 82 "     content-id 11 "
common 83 "     billing-action egcdr "
common 84 "     billing-action rf "
common 85 "     cca charging credit rating-group 11 "
common 86 "     qos-class-identifier 5 "
common 87 "     flow limit-for-bandwidth id 2 "
common 88 "     tft packet-filter ipv6 "
common 89 " #exit "
common 90 " charging-action qcil "
common 91 "     content-id 1 "
common 92 "     billing-action egcdr "
common 93 "     billing-action rf "
common 94 "     cca charging credit rating-group 1 "
common 95 "     qos-class-identifier 1 "
common 96 "     flow limit-for-bandwidth id 1 "
common 97 "     allocation-retention-priority 1 pvi 0 pci 1 "
common 98 "     tft packet-filter qcil "
common 99 " #exit "
common 100 " charging-action qcil-GOR "
common 101 "     content-id 1 "
common 102 "     billing-action egcdr "
common 103 "     billing-action rf "
common 104 "     cca charging credit rating-group 1 "
common 105 "     qos-class-identifier 1 "
common 106 "     flow limit-for-bandwidth id 1 "
common 107 "     allocation-retention-priority 1 pvi 0 pci 1 "

```

```

common 108 "      tft packet-filter ipv6 "
common 109 "      tft packet-filter qci1 "
common 110 "      tft packet-filter qci2 "
common 111 "      #exit "
common 112 "      charging-action qci1-GOR-CP1 "
common 113 "      content-id 1 "
common 114 "      billing-action egcdr "
common 115 "      billing-action rf "
common 116 "      cca charging credit rating-group 1 "
common 117 "      qos-class-identifier 1 "
common 118 "      flow limit-for-bandwidth id 1 "
common 119 "      allocation-retention-priority 1 pvi 0 pci 1 "
common 120 "      tft packet-filter ipv6 "
common 121 "      tft packet-filter qci1 "
common 122 "      #exit "
common 123 "      charging-action qci1-GOR-CP2 "
common 124 "      content-id 1 "
common 125 "      billing-action egcdr "
common 126 "      billing-action rf "
common 127 "      cca charging credit rating-group 1 "
common 128 "      qos-class-identifier 1 "
common 129 "      flow limit-for-bandwidth id 1 "
common 130 "      allocation-retention-priority 1 pvi 0 pci 1 "
common 131 "      tft packet-filter ipv6 "
common 132 "      tft packet-filter qci2 "
common 133 "      #exit "
common 134 "      charging-action qci2 "
common 135 "      content-id 2 "
common 136 "      billing-action egcdr "
common 137 "      billing-action rf "
common 138 "      cca charging credit rating-group 2 "
common 139 "      qos-class-identifier 2 "
common 140 "      flow limit-for-bandwidth id 1 "
common 141 "      allocation-retention-priority 2 pvi 0 pci 1 "
common 142 "      tft packet-filter qci2 "
common 143 "      #exit "
common 144 "      charging-action qci6 "
common 145 "      content-id 6 "
common 146 "      billing-action egcdr "
common 147 "      billing-action rf "
common 148 "      cca charging credit rating-group 6 "
common 149 "      qos-class-identifier 6 "
common 150 "      flow limit-for-bandwidth id 2 "
common 151 "      allocation-retention-priority 6 pvi 0 pci 1 "
common 152 "      tft packet-filter qci6 "
common 153 "      #exit "
common 154 "      charging-action qci6-CP1 "
common 155 "      content-id 12 "
common 156 "      billing-action egcdr "
common 157 "      billing-action rf "
common 158 "      cca charging credit rating-group 12 "
common 159 "      qos-class-identifier 6 "
common 160 "      flow limit-for-bandwidth id 2 "
common 161 "      allocation-retention-priority 6 pvi 0 pci 1 "
common 162 "      tft packet-filter qci6-CP1 "
common 163 "      #exit "
common 164 "      charging-action qci6-CP2 "
common 165 "      content-id 13 "
common 166 "      billing-action egcdr "
common 167 "      billing-action rf "
common 168 "      cca charging credit rating-group 13 "
common 169 "      qos-class-identifier 6 "
common 170 "      flow limit-for-bandwidth id 2 "
common 171 "      allocation-retention-priority 6 pvi 0 pci 1 "

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common 172 "      tft packet-filter qci6-CP2 "
common 173 "      #exit "
common 174 "      bandwidth-policy bw_policy1 "
common 175 "      flow limit-for-bandwidth id 1 group-id 1 "
common 176 "      flow limit-for-bandwidth id 2 group-id 2 "
common 177 "      group-id 1 direction downlink peak-data-rate 256000 peak-burst-size
768000 violate-action discard committed-data-rate 128000 committed-burst-size 384000 "
common 178 "      group-id 1 direction uplink peak-data-rate 256000 peak-burst-size 768000
violate-action discard committed-data-rate 128000 committed-burst-size 384000 "
common 179 "      group-id 2 direction downlink peak-data-rate 256000 peak-burst-size
768000 violate-action discard "
common 180 "      group-id 2 direction uplink peak-data-rate 256000 peak-burst-size 768000
violate-action discard "
common 181 "      #exit "
common 182 "      rulebase cisco "
common 183 "      billing-records egcdr "
common 184 "      action priority 1 dynamic-only group-of-ruledefs GOR charging-action
qci1-GOR "
common 185 "      action priority 11 dynamic-only ruledef qci1 charging-action qci1 "
common 186 "      action priority 22 dynamic-only ruledef qci2 charging-action qci2 "
common 187 "      action priority 66 dynamic-only ruledef qci6 charging-action qci6 "
common 188 "      action priority 666 dynamic-only ruledef ipv6 charging-action ipv6 "
common 189 "      egcdr threshold interval 3600 "
common 190 "      egcdr threshold volume total 100000 "
common 191 "      bandwidth default-policy bw_policy1 "
common 192 "      #exit "
common 193 "      rulebase cisco-CP1 "
common 194 "      billing-records egcdr "
common 195 "      action priority 1 dynamic-only group-of-ruledefs GOR-CP1 charging-action
qci1-GOR-CP1 "
common 196 "      action priority 11 dynamic-only ruledef qci1 charging-action qci1 "
common 197 "      action priority 22 dynamic-only ruledef qci2 charging-action qci2 "
common 198 "      action priority 66 dynamic-only ruledef qci6-CP1 charging-action qci6-CP1
"
common 199 "      action priority 666 dynamic-only ruledef ipv6 charging-action ipv6 "
common 200 "      egcdr threshold interval 1000 "
common 201 "      egcdr threshold volume total 100000 "
common 202 "      bandwidth default-policy bw_policy1 "
common 203 "      #exit "
common 204 "      rulebase cisco-CP2 "
common 205 "      billing-records egcdr "
common 206 "      action priority 1 dynamic-only group-of-ruledefs GOR-CP2 charging-action
qci1-GOR-CP2 "
common 207 "      action priority 11 dynamic-only ruledef qci1 charging-action qci1 "
common 208 "      action priority 22 dynamic-only ruledef qci2 charging-action qci2 "
common 209 "      action priority 66 dynamic-only ruledef qci6-CP2 charging-action qci6-CP2
"
common 210 "      action priority 666 dynamic-only ruledef ipv6 charging-action ipv6 "
common 211 "      egcdr threshold interval 1000 "
common 212 "      egcdr threshold volume total 100000 "
common 213 "      bandwidth default-policy bw_policy1 "
common 214 "      #exit "
common 215 "      rulebase default "
common 216 "      #exit "
common 217 "      credit-control group default "
common 218 "      diameter origin endpoint PGW-Gy "
common 219 "      diameter peer-select peer PGW-Gy-server "
common 220 "      quota time-threshold 10 "
common 221 "      diameter pending-timeout 150 deciseconds msg-type any "
common 222 "      diameter session failover "
common 223 "      trigger type rat qos sgsn serving-node "
common 224 "      pending-traffic-treatment noquota pass "
common 225 "      pending-traffic-treatment quota-exhausted buffer "
common 226 "      timestamp-rounding floor "

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common 227 "      #exit "  
common 228 "      traffic-optimization-policy default "  
common 229 "      #exit "  
common 230 "      #exit "  
common 231 " end "  
common 232 " config "  
common 233 " context ISP1-CP1 "  
common 234 "     apn xxx-CP1.com "  
common 235 "     ip context-name ISP1-CP1 "  
common 236 "     exit "  
common 237 "     apn yyy-CP1.com "  
common 238 "     ip context-name ISP1-CP1 "  
common 239 "     exit "  
common 240 " end "  
common 241 " config "  
common 242 " context ISP1-CP2 "  
common 243 "     apn xxx-CP2.com "  
common 244 "     ip context-name ISP1-CP2 "  
common 245 "     exit "  
common 246 "     apn yyy-CP2.com "  
common 247 "     ip context-name ISP1-CP2 "  
common 248 "     exit "  
common 249 " end "  
exit
```

