

Configuring Multiple and Colocated P-GWs and S-GWs on the MobileNext Broadband Gateway



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Configuring Multiple and Colocated P-GWs and S-GWs on the MobileNext Broadband Gateway

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Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

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Documentation Conventions

Table 1 on page x defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 2 on page x defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: <code>user@host> configure</code>
Fixed-width text like this	Represents output that appears on the terminal screen.	<code>user@host> show chassis alarms</code> <code>No alarms currently active</code>
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies book names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS System Basics Configuration Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: <code>[edit]</code> <code>root@# set system domain-name <i>domain-name</i></code>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> To configure a stub area, include the stub statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level. The console port is labeled CONSOLE.
< > (angle brackets)	Enclose optional keywords or variables.	<code>stub <default-metric <i>metric</i>>;</code>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast <i>(string1 string2 string3)</i>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Enclose a variable for which you can substitute one or more values.	community name members [community-ids]
Indentation and braces ({ })	Identify a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop address; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
J-Web GUI Conventions		
Bold text like this	Represents J-Web graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> In the Logical Interfaces box, select All Interfaces. To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select Protocols>Ospf .

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- Document or topic name
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- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://www.juniper.net/alerts/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
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To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

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- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [Introducing Multiple and Colocated P-GWs and S-GWs on page 3](#)

CHAPTER 1

Introducing Multiple and Colocated P-GWs and S-GWs

- [Understanding Multiple and Colocated and Mobile Gateways on page 3](#)

Understanding Multiple and Colocated and Mobile Gateways

The MobileNext Broadband Gateway offers a mobile service provider flexible configuration options. A mobile network operator can utilize the same broadband gateway chassis as a Packet Data Network Gateway (P-GW), a Service Gateway (S-GW), or both P-GW and S-GW.

Depending on how to best service subscribers, you can configure the broadband gateway as:

- Multiple P-GWs on the same chassis
- Multiple S-GWs on the same chassis
- A colocated P-GW and S-GW on the same chassis
- Multiple colocated P-GWs and S-GWs on the same chassis

Of course, you can configure the broadband gateway chassis as a single S-GW or P-GW, and that is the beginning configuration for the more complex examples.

- [What Are Multiple and Colocated Mobile Gateways? on page 3](#)
- [MobileNext Broadband Gateway Hardware Terminology on page 10](#)
- [Use Case and Benefits on page 10](#)
- [Multiple Colocated Gateways Configuration Guidelines on page 11](#)

What Are Multiple and Colocated Mobile Gateways?

The basic architecture of the broadband gateway consists of Routing Engines (we recommend two), session Dense Port Concentrators (DPCs) (we recommend two or more), and interface Modular Port Concentrators (MPCs) (we recommend two or more). The interface MPCs house the input and output Packet Forwarding Engines and physical interfaces. Other service PICs and interface cards can be installed, but only the elements configured to run the mobility software package can be part of the broadband gateway function. In other words, some elements of the broadband gateway might not be involved

in mobile packet flows at all, but may implement a provider edge (PE) router function, related Network Address Translation (NAT), IP Security (IPsec) services, and so on. This Network Configuration Example describes only the configuration of the broadband gateway.

The easiest way to see how multiple and colocated gateways are supported on the broadband gateway is to outline the basic packet flow for control packets and uplink and downlink data packets through a P-GW. Colocated gateways support simultaneous packet flows to an P-GW and S-GW configured on the same chassis. Multiple gateways support simultaneous packet flows to several P-GWs or S-GWs on the same chassis. Multiple colocated gateways support both multiple and colocated gateway features in combination.

To set up user sessions through a P-GW, Session PICs in Dense Port Concentrators (DPCs) handle all GPRS tunneling protocol, control (GTP-C) signaling requests and the GTP responses. New GTP sessions are anchored on a selected Session PIC, and all control plane functions are handled by the same Session PIC. In this example, the mobile and packet network interfaces are all housed in MPCs.

Figure 1: Basic GTP-C Packet Flow for a P-GW

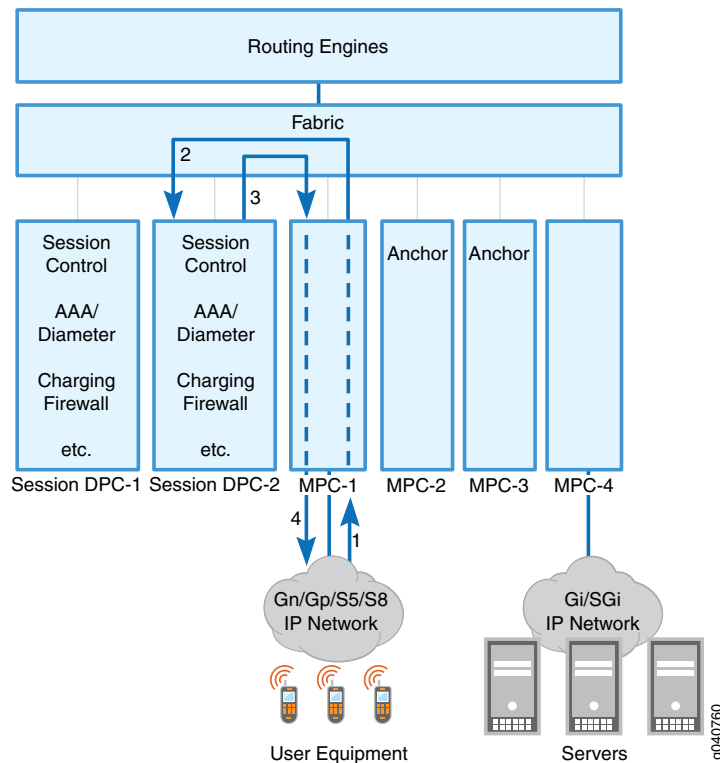
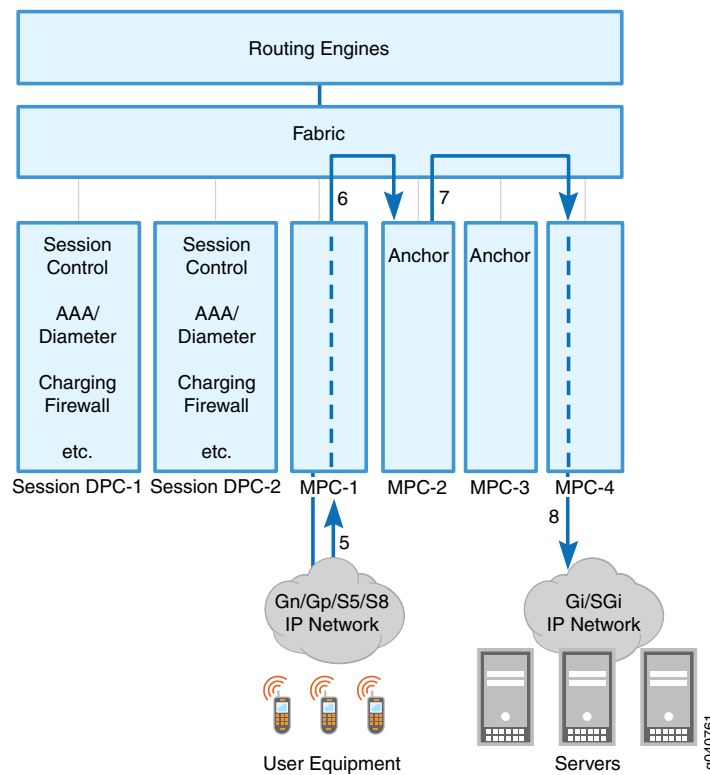


Figure 1 on page 4 shows the four steps that GTP-C signaling packets take through the broadband gateway configured as a P-GW:

1. An attached Radio Access Network (RAN) device such as the MME or SGSN activates a session and sends a Create Session Request GTP-C signaling packet to a mobile interface on the broadband gateway.
2. The Gn/Gp or S5/S8 interface MPC parses the GTP-C packet based on the outer IP address and selects a Session DPC (PIC) for the new session based on the International Mobile Subscriber Identifier (IMSI) of the requestor user equipment. A new session is created when the Tunnel Endpoint ID (TEID) is 0. The MPC then sends the GTP-C signaling packet through the fabric to a session DPC that will anchor the session for control purposes. The session DPC performs the admission control, authentication, authorization, and accounting (AAA), Dynamic Host Configuration Protocol (DHCP), and charging operations required.
3. If the session is accepted, the session DPC selects an anchor Packet Forwarding Engine for the GTP-U data packets and sets the Tunnel Endpoint Identifier (TEID) for the GTP-C packets (the Packet Forwarding Engine selects the TEID for GTP-U tunnels). The session DPC also sends a Create Session Response GTP-C signaling packet to the interface MPC that received the GTP message.
4. The Gn/Gp or S5/S8 interface MPC sends the GTP-C response back to the user equipment.

The MPCs or DPCs handle all uplink user payload packet flow requests from user equipment. All user traffic flows through the anchor interface MPC or DPC.

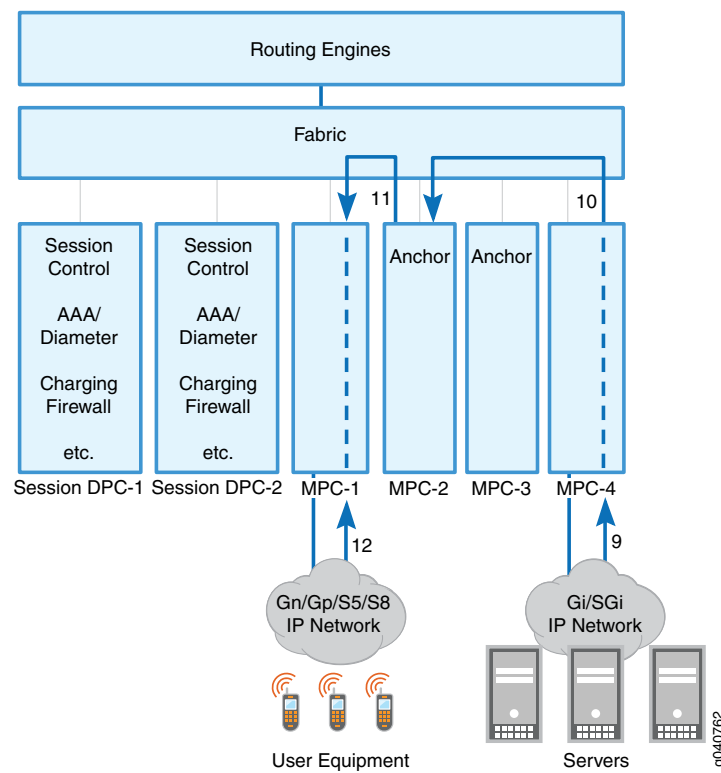
Figure 2: P-GW Uplink User Packet Flow on the Broadband Gateway



After the GTP-C packets establish a session [Figure 2 on page 6](#) shows the next four steps that the uplink user payload GTP user plane (GTP-U) packets take through the broadband gateway configured as a P-GW:

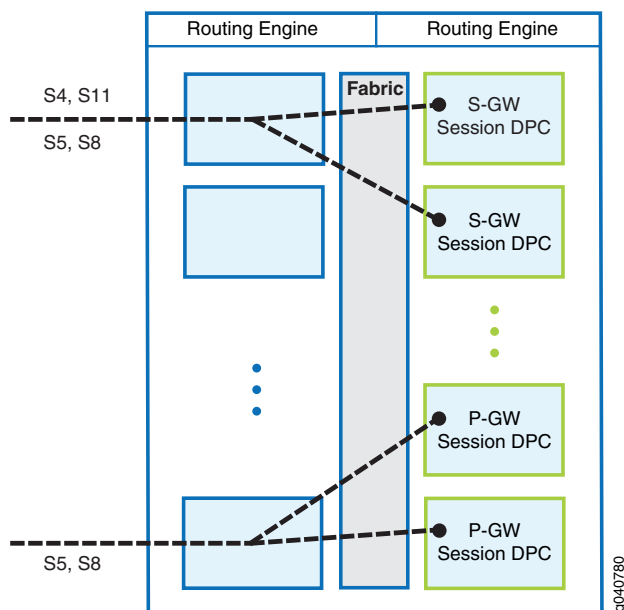
5. An attached user equipment sends an uplink payload GTP-U packet to a mobile interface on the broadband gateway.
6. The interface MPC sends the GTP-U packet to the anchor interface MPC chosen during the control phase to anchor the user session data flow. The anchor MPC performs all subscriber-specific access control, policing, statistic gathering, and other parameters set for the subscriber based on the inner IP address in the GTP-U packet.
7. The anchor interface MPC sends the user packet to the uplink MPC that leads to the correct IP packet network.
8. The uplink interface MPC sends the user payload packet to the IP network on the Gi or SGi interface.

The MPCs or DPCs also handle all downlink user payload packet flow requests from an IP network back to the user equipment. All user traffic flows through the anchor interface MPC or DPC.



9. The IP network sends a downlink data packet to a mobile Gi or SGi interface on the broadband gateway.
10. The interface MPC sends the downlink packet to the anchor interface MPC chosen during the control phase to anchor the user session data flow. The anchor MPC performs all subscriber-specific access control, policing, statistic gathering, and other parameters set for the subscriber.
11. The anchor interface MPC sends the encapsulated GTP-U packet to the downlink interface that leads to the correct user equipment.
12. The downlink interface MPC sends the GTP-U user payload packet to the user equipment.

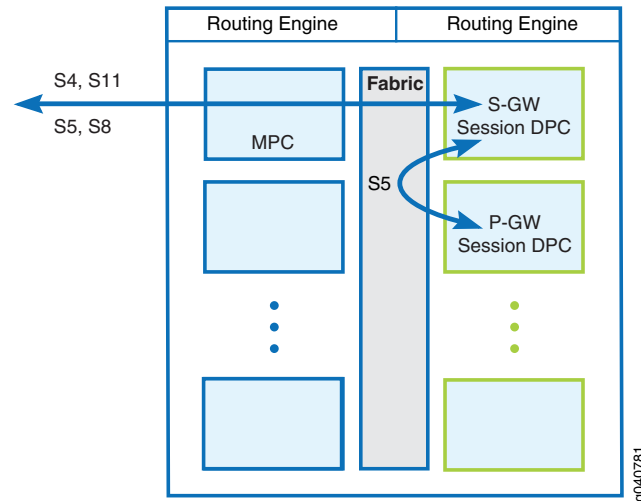
Figure 4: Multiple Colocated S-GWs and P-GWs



NOTE: You can only configure a Session PIC to support the S-GW or the P-GW function. A Session PIC cannot be configured as part of both functions at the same time. If you try to configure the chassis this way, the commit operation will fail. You can, however, configure the two Session PICs in a Session DPC to support a S-GW and P-GW.

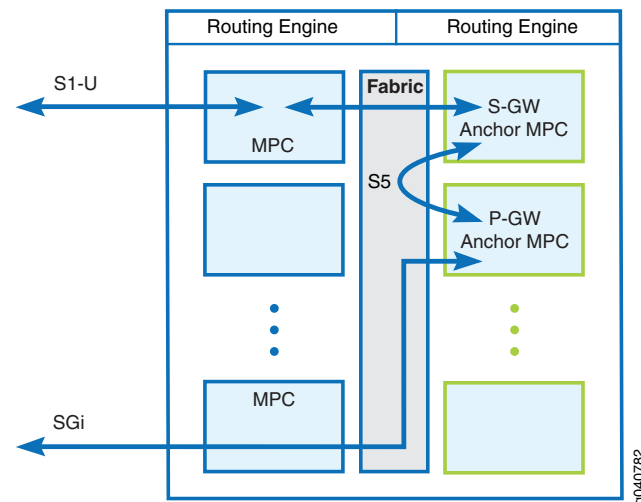
You do not have to configure multiple colocated gateways in a broadband gateway chassis. A single colocated pair configuration consisting of an S-GW and P-GW is also supported. The GTP-C packet flow through an internal S5 interface is shown in [Figure 5 on page 9](#).

Figure 5: Control Packet Flow Through a Colocated S-GW and P-GW



User GTP-U packets pass through the S-GW and P-GW anchor Packet Forwarding Engines (housed in MPCs) for their respective bearers, but the packets do not flow through a services PIC unless required to do so for the delivery of a service.

Figure 6: Data Packet Flow Through a Colocated S-GW and P-GW



For data flows, the usual path of user packets from an eNodeB radio network (S1-U) to the internal S5 interface to the SGi interface is shown in [Figure 6 on page 9](#). Services PICs supply other packet-related services such as Deep Packet Inspection (DPI).



NOTE: The broadband gateway chassis can have other services PICs that are not associated with the S-GW or P-GW.

MobileNext Broadband Gateway Hardware Terminology

The terminology used for the broadband gateway is often confusing to users not familiar with the functional packaging. You order DPCs or MPCs, but configure Packet Forwarding Engines, Session PICs, and services PICs for the broadband gateway (at the chassis level, you configure FPCs and PICs to run the mobility services software). This section explains the use of broadband gateway hardware terminology in more detail, showing the relationships. The main mobile protocol, the GPRS tunneling protocol (GTP), runs for the control plane (GTP-C) and for the user plane (GTP-U) on the broadband gateway.

GTP-C runs on broadband gateway Session PICs.

- Additional services associated with a traffic flow, such as HTTP header extensions (HTTP-HE) or DPI, are delivered by a services PIC (not a Session PIC).
- Two PICs are housed in a single Multiservices DPC (MS-DPC, part MX-MOB-SDPC). You can individually configure the two PICs as either a Session PIC or a services PIC, both on the same Multiservices DPC.
- A Session PIC is associated with a single P-GW, S-GW, or a single service.

Each configured P-GW or S-GW must have a unique set of Session PICs. We recommend configuring Session PICs in redundant pairs. Although a pair of MS-DPC cards can theoretically support up to four gateways, we recommend redundancy (for a total of two gateways per card). Services PICs should also be deployed in redundant pairs.

GTP-U runs on broadband gateway anchor Packet Forwarding Engines. You have two options for anchor Packet Forwarding Engines:

- The 16-port 10-Gigabit Ethernet SFPP mobile-enhanced MPC (Part MPCE-3D-16XCE-SFPP). This MPC provides four anchor Packet Forwarding Engines in each MPC.
- The Mobile Enhanced MPC2 with Enhanced Queuing (Part MPC2E-3D-EQ). You can place any 1-Gigabit Ethernet or 10-Gigabit Ethernet 3D MICs into this MPC. However, this MPC provides only two anchor Packet Forwarding Engines in each MPC.

Each configured P-GW or S-GW must have a unique set of anchor Packet Forwarding Engines. We recommend configuring anchor Packet Forwarding Engines in redundant pairs. Although a pair of 16-port 10-Gigabit Ethernet cards can theoretically support eight gateways, we recommend redundancy (for a total of four gateways per card).

Use Case and Benefits

Why would a service provider configure one chassis to perform multiple functions? Why not just leave the S-GW and P-GW as separate network elements?

There are many benefits when a service provider configures multiple colocated gateways on the same broadband gateway:

- **Cost**—The cost of a single chassis is less than the cost of multiple network elements.
- **Space**—Not only do consolidated network elements take up less space, but in some cases a single MX chassis can replace a whole rack of equipment.
- **Ease of configuration**—There is a single configuration for all components of the multiple colocated gateways. There is no need to coordinate multiple changes over different locations and pieces of equipment.
- **Ease of administration**—There is a single management interface, not just logically, but physically, for the entire gateway complex.
- **More effective pipelining**—Packets and flows can be more effectively processed when they do not have to travel over a link to another network element. The endpoint of an IPsec tunnel can also be where the DPI takes place.
- **Enhanced reliability**—It might sound counter-intuitive, but a single network element with 96 percent availability is more reliable than two network elements with 97 percent availability ($0.97 \times 0.97 = 0.9409$). Also, with redundancy, the broadband gateway architecture allows for the failure of system cards without the catastrophic loss of the whole network element.
- **Enhanced security**—Colocated network elements not only provide "compartments" for different categories of users, but the risk of packet injection and altering is less when the packets remain within the same network element.

Multiple Colocated Gateways Configuration Guidelines

Prerequisites are minimal with regard to configuring multiple colocated gateways on the MobileNext Broadband Gateway. Although multiple colocated gateways are supported on all valid broadband gateway hardware configurations, we recommend larger systems for more elaborate multiple colocated gateway configurations.

This network configuration example uses the following hardware and software components:

- Junos OS Release 12.1W
- Juniper Networks MobileNext Broadband Gateway, including the following components:
 - MX960 3D Universal Edge Router
 - Mobile Multiservices DPC (MS-DPC)
 - Mobile 10-Gigabit Ethernet MPC with SFP+ or Mobile 40-Gigabit Ethernet Enhanced Queuing MPC line card

Related Documentation

- [Example: Configuring Multiple P-GWs on page 15](#)
- [Example: Configuring a Colocated P-GW and S-GW on page 34](#)
- [Example: Configuring a Multiple Colocated P-GW and S-GW on page 54](#)

PART 2

Configuration

- [Multiple and Colocated P-GWs and S-GWs on page 15](#)

CHAPTER 2

Multiple and Colocated P-GWs and S-GWs

- [Example: Configuring Multiple P-GWs on page 15](#)
- [Example: Configuring a Colocated P-GW and S-GW on page 34](#)
- [Example: Configuring a Multiple Colocated P-GW and S-GW on page 54](#)

Example: Configuring Multiple P-GWs

This example describes how to configure the MobileNext Broadband Gateway with multiple Packet Data Network Gateways (P-GWs) sharing a single MX chassis. The emphasis is on P-GW configuration, and does not include many other parameters that a full device configuration requires.

- [Requirements on page 15](#)
- [Overview on page 16](#)
- [Configuration on page 17](#)
- [Verification on page 33](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.1W
- Juniper Networks MobileNext Broadband Gateway chassis (MX Series-based)
- Two (redundant) session DPCs (Session PICs, Part MX-MOB-SDPC)
- Two (redundant) anchor MPCs (Packet Forwarding Engines, Part MPC2E-3D-EQ or MPCE-3D-16XCE-SFPP)



NOTE: You can use the MPCE-3D-16XCE-SFPP as an anchor MPC, but only the MPC2E-3D-EQ is used in this example.

Before you configure multiple colocated gateways, be sure you have:

- Installed the Flexible PIC Concentrator (FPC) and associated hardware correctly in the MX chassis
- Installed the mobility software correctly

Overview

This example describes how to configure the broadband gateway as a multiple P-GW gateway. There are two P-GWs (PGW1 and PGW2). Both P-GWs use the same chassis, which is named **MBG1**.

Topology

[Table 3 on page 16](#) shows the redundancy scheme used in this example: the second PIC or Packet Forwarding Engine in each FPC slot.

Table 3: Redundancy Scheme for the Configuration

FPC Chassis Slot	Configuration	Function
0	ms-0/0/0 (mams-0/0/0)	Session PIC for PGW1
	ms-0/1/0 (mams-0/1/0)	Backup Session PIC for PGW2
1	ms-1/0/0 (mams-1/0/0)	Session PIC for PGW2
	ms-1/1/0 (mams-1/1/0)	Backup Session PIC for PGW1
2	pfe-2/0/0	Anchor Packet Forwarding Engine for PGW1
	pfe-2/1/0	Backup anchor Packet Forwarding Engine for PGW2
3	pfe-3/0/0	Anchor Packet Forwarding Engine for PGW2
	pfe-3/1/0	Backup anchor Packet Forwarding Engine for PGW1

- For the two P-GWs on the broadband gateway:
 - The Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-2/0/0** and **xe-2/0/1**, respectively. The Gn and Gi interfaces for PGW2 are in the main routing instance and are configured as **xe-3/0/0** and **xe-3/0/1**, respectively.
 - The backup Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-3/1/0** and **xe-3/1/1**, respectively. The backup Gn and Gi interfaces for PGW2 are in the main routing instance and are configured as **xe-2/1/0** and **xe-2/1/1**, respectively.

- The loopback address (**lo0.0**) for PGW1 is **10.33.33.33** and the loopback address for PGW2 is **10.44.44.44**.
- The APN (**APN1**) on PGW1 uses mobile interface **mif.3** and the APN (**APN2**) on PGW2 uses mobile interface **mif.4**.



NOTE: This example uses private RFC1918 IP addresses throughout. Normally, a public loopback IP address is advertised onto the network. GTP peer IP addresses are used to route tunneled packets between mobile network elements. This example uses a different IP address on each gateway, which is not strictly required when using the main routing instance for all gateways.

Configuration

To configure multiple gateways, perform these tasks:

- [Configuring the Chassis on page 17](#)
- [Configuring P-GW System Interfaces and Redundancy on page 23](#)
- [Configuring P-GW Charging on page 25](#)
- [Configuring P-GW GTP Services on page 30](#)
- [Configure P-GW APNs on page 32](#)

Configuring the Chassis

CLI Quick Configuration

Begin by performing a load and merge with the predefined mobility hardware defaults. Then apply the mobility group to the FPC slots with the Session PICs and the mobility forwarding package to the FPC slots with the anchor Packet Forwarding Engines.

You must include every Session PIC configured with the **jservices-mobile** package at the **[edit unified-edge gateways (ggsn-pgw | sgw) gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway. You must include every anchor Packet Forwarding Engine configured with the mobile forwarding package at the **[edit unified-edge gateways (ggsn-pgw) gateway-name system interfaces]** hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.



NOTE: This section does not configure the Aggregated Multiservices Session PICs (**ams-**) for the gateways. The **ams-** interfaces for redundancy are configured in other gateway sections.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
```

```

load merge /etc/config/mobility-defaults.conf
set chassis fpc 0 apply-groups mobility
set chassis fpc 1 apply-groups mobility
set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
set chassis fpc 2 pfe 1 forwarding-packages mobility ggsn-pgw
set chassis fpc 3 pfe 0 forwarding-packages mobility ggsn-pgw
set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
set interfaces xe-2/0/0 unit 0 family inet description Gn interface for PGW1
set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
set interfaces xe-2/0/1 unit 0 family inet description Gi interface for PGW1
set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
set interfaces xe-3/0/0 unit 0 family inet description Gn interface for PGW2
set interfaces xe-3/0/0 unit 0 family inet address 10.33.0.1/16
set interfaces xe-3/0/1 unit 0 family inet description Gi interface for PGW2
set interfaces xe-3/0/1 unit 0 family inet address 10.44.0.1/16
set interfaces xe-2/1/0 unit 0 family inet description Backup Gn interface for PGW2
set interfaces xe-2/1/0 unit 0 family inet address 10.33.0.2/16
set interfaces xe-2/1/1 unit 0 family inet description Backup Gi interface for PGW2
set interfaces xe-2/1/1 unit 0 family inet address 10.44.0.2/16
set interfaces xe-3/1/0 unit 0 family inet description Backup Gn interface for PGW1
set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface for PGW1
set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
set interfaces mif unit 3 family inet
set interfaces mif unit 4 family inet
set interfaces lo0 unit 0 family inet address 10.11.11.11/32
set interfaces lo0 unit 0 family inet address 10.22.22.22/32
set interfaces lo0 unit 0 family inet address 10.33.33.33/32
set interfaces lo0 unit 0 family inet address 10.44.44.44/32

```



NOTE: This configuration is for the P-GWs only. Other statements, such as for routing protocols or network management, are needed to make this a complete device configuration.

Step-by-Step Procedure

To configure the chassis:

1. Load and merge the default configuration file for the **mobility** group.

[edit]

```
user@mbg-1# load merge /etc/config/mobility-defaults.conf
```

2. Configure the **mobility** group on the Session PICs.

[edit]

```
user@mbg-1# set chassis fpc 0 apply-groups mobility
```

```
user@mbg-1# set chassis fpc 1 apply-groups mobility
```



NOTE: You must include every Session PIC configured with the `jservices-mobile` package at the `[edit unified-edge gateways ggsn-pgw gateway-name system session-pics]` hierarchy level on the broadband gateway. If you do not include the Session PIC, then the Session PIC cannot be used by the broadband gateway.

3. Configure the interface DPC or MPC at the Packet Forwarding Engine level.

[edit]

```
user@mbg-1# set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 2 pfe 1 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 3 pfe 0 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
```



NOTE: You must include every Packet Forwarding Engine configured with the `ggsn-pgw` forwarding package at the `[edit unified-edge gateways ggsn-pgw gateway-name system anchor-pfes]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine will not be used by the broadband gateway.

4. Configure physical interfaces for the P-GWs.

```
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet description Gn interface for
PGW1
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet description Gi interface for
PGW1
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
user@mbg-1# set interfaces xe-3/0/0 unit 0 family inet description Gn interface for
PGW2
user@mbg-1# set interfaces xe-3/0/0 unit 0 family inet address 10.33.0.1/16
user@mbg-1# set interfaces xe-3/0/1 unit 0 family inet description Gi interface for
PGW2
user@mbg-1# set interfaces xe-3/0/1 unit 0 family inet address 10.44.0.1/16
user@mbg-1# set interfaces xe-2/1/0 unit 0 family inet description Backup Gn
interface for PGW2
user@mbg-1# set interfaces xe-2/1/0 unit 0 family inet address 10.33.0.2/16
user@mbg-1# set interfaces xe-2/1/1 unit 0 family inet description Backup Gi interface
for PGW2
user@mbg-1# set interfaces xe-2/1/1 unit 0 family inet address 10.44.0.2/16
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet description Backup Gn
interface for PGW1
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface
for PGW1
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
```

5. Configure the mobile interfaces for the P-GW APNs.

```
user@mbg-1# set interfaces mif unit 3 family inet
user@mbg-1# set interfaces mif unit 4 family inet
6. Configure loopback interfaces for both gateways.

[edit]
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.33.33.33/32
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.44.44.44/32
```

Results When you have finished this section of the configuration, your results should be similar to this **show chassis | display inheritance** command output:

```
chassis {
  fpc 0 {
    pic 0 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
  fpc 1 {
    pic 1 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
}
chassis {
  fpc 1 {
    pic 0 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
  fpc 1 {
    pic 1 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
}
```



```

    }
  }
}
fpc 2 {
  pfe 0 {
    forwarding-packages {
      mobility ggsn-pgw;
    }
  }
  pfe 1 {
    forwarding-packages {
      mobility ggsn-pgw;
    }
  }
}
fpc 3 {
  pfe 0 {
    forwarding-packages {
      mobility ggsn-pgw;
    }
  }
  pfe 1 {
    forwarding-packages {
      mobility ggsn-pgw;
    }
  }
}
}
interfaces {
  lo0 {
    unit 0 {
      family inet {
        address 10.33.33.33/32;
        address 10.44.44.44/32;
      }
    }
  }
  mif {
    unit 3 {
      family inet;
    }
  }
  mif {
    unit 4 {
      family inet;
    }
  }
  xe-2/0/0 {
    unit 0 {
      family inet {
        description Gn interface for PGW1
        address 10.11.0.1/16
      }
    }
  }
}

```

```
}
xe-2/0/1 {
  unit 0 {
    family inet {
      description Gi interface for PGW1;
      address 10.22.0.1/16;
    }
  }
}
xe-2/1/0 {
  unit 0 {
    family inet {
      description Backup Gn interface for PGW2;
      address 10.33.0.2/16;
    }
  }
}
xe-2/1/1 {
  unit 0 {
    family inet {
      description Backup Gi interface for PGW2;
      address 10.44.0.2/16;
    }
  }
}
xe-3/0/0 {
  unit 0 {
    family inet {
      description Gn interface for PGW2;
      address 10.33.0.1/16;
    }
  }
}
xe-3/0/1 {
  unit 0 {
    family inet {
      description Gi interface for PGW2;
      address 10.44.0.1/16;
    }
  }
}
xe-3/1/0 {
  unit 0 {
    family inet {
      description Backup Gn interface for PGW1;
      address 10.11.0.2/16;
    }
  }
}
xe-3/1/1 {
  unit 0 {
    family inet {
      description Backup Gi interface for PGW1;
      address 10.22.0.2/16;
    }
  }
}
```

```
}
}
```

Configuring P-GW System Interfaces and Redundancy

CLI Quick Configuration

Next, establish load-balancing of GTP-C packets and redundancy for the P-GWs named PGW1 and PGW2. There is no specific “load-balance” broadband gateway hierarchy, nor is there any Session DPC redundancy section. Instead, you configure load balancing at the **[edit interfaces]** hierarchy level by creating sets of load-balanced Aggregated Multiservice (**ams**) interfaces as Mobile Aggregated Multiservice (**mams**-) interfaces and select one of them as a preferred backup. You configure redundant Packet Forwarding Engines by establishing a primary list of anchors and a secondary list for a group of interfaces.

Include every Session PIC configured with the **jservices-mobile** package for the particular broadband gateway at the **[edit unified-edge gateways ggsn-pgw gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway.

To establish redundancy for GTP-U traffic flows, include every anchor Packet Forwarding Engine configured with the mobile forwarding package for the particular broadband gateway at the **[edit unified-edge gateways ggsn-pgw gateway-name system interfaces pfes]** hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
set interfaces ams0 description "Aggregate Multiservices Session DPC for PGW1 with
members mams-0/0/0 and mams-1/1/0"
set interfaces ams0 load-balancing-options member-interface mams-0/0/0
set interfaces ams0 load-balancing-options member-interface mams-1/1/0
set interfaces ams0 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams0 load-balancing-options high-availability-options many-to-one preferred
backup mams-1/1/0
set interfaces ams1 description "Aggregate Multiservices Session DPC for PGW2 with
members mams-1/0/0 and mams-0/1/0"
set interfaces ams1 load-balancing-options member-interface mams-1/0/0
set interfaces ams1 load-balancing-options member-interface mams-0/1/0
set interfaces ams1 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams1 load-balancing-options high-availability-options many-to-one preferred
backup mams-0/1/0
[edit unified-edge gateways ggsn-pgw PGW1 system session-pics]
set interface ams0
[edit unified-edge gateways ggsn-pgw PGW2 system session-pics]
set interface ams1
[edit interfaces apfe0 anchoring-options]
set primary-list pfe-2/0/0
set secondary pfe-3/1/0
[edit interfaces apfe1 anchoring-options]
```

```
set primary-list pfe-3/0/0
set secondary pfe-2/1/0
[edit unified-edge gateways ggsn-pgw PGW1 system pfes]
set interface apfe0
[edit unified-edge gateways ggsn-pgw PGW2 system pfes]
set interface apfe1
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
interfaces {
  ams0 {
    description "Aggregate Multiservices Session DPC for PGW1 with members
      mams-0/0/0 and mams-1/1/0"
    load-balancing-options {
      member-interface mams-0/0/0;
      member-interface mams-1/1/0;
      high-availability-options {
        redistribute-all-traffic {
          enable-rejoin;
        }
        many-to-one {
          preferred-backup mams-1/1/0;
        }
      }
    }
  }
  apfe0 {
    anchoring-options {
      primary-list {
        pfe-2/0/0;
      }
      secondary pfe-3/1/0;
    }
  }
  ams1 {
    description "Aggregate Multiservices Session DPC for PGW2 with members mams-1/0/0
      and mams-0/1/0"
    load-balancing-options {
      member-interface mams-1/0/0;
      member-interface mams-0/1/0;
      high-availability-options {
        redistribute-all-traffic {
          enable-rejoin;
        }
        many-to-one {
          preferred-backup mams-0/1/0;
        }
      }
    }
  }
  apfe1 {
    anchoring-options {
      primary-list {
        pfe-3/0/0;
      }
    }
  }
}
```

```

    }
    secondary pfe-2/1/0;
  }
}

unified-edge gateways ggsn-pgw PGW1 system {
  session-pics {
    interface ams0;
  }
  pfes {
    interface apfe0;
  }
}

unified-edge gateways ggsn-pgw PGW2 system {
  session-pics {
    interface ams1;
  }
  pfes {
    interface apfe1;
  }
}

```

Configuring P-GW Charging

CLI Quick Configuration

Both P-GWs use offline charging. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude
  plmn-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude rat-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
  volume-limit 1024
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
  volume-limit direction both
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways cdr-release r8
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways peer-order peer p_cfg
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways switch-back-time 36
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper profile-id
  1
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
  transport-profile p_tsp
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
  trigger-profile p_tp
set unified-edge gateways ggsn-pgw PGW1 charging gtp transport-protocol tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtp version v1
set unified-edge gateways ggsn-pgw PGW1 charging gtp header-type long
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg
  destination-ipv4-address 10.33.33.99

```

```
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  lo0.0
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  ipv4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg destination-port
  3386
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg transport-protocol
  tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg t3-response 5
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg header-type long
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg pending-queue-size
  1000
set unified-edge gateways ggsn-pgw PGW1 charging global-profile default-profile p_juniper
set unified-edge gateways ggsn-pgw PGW1 charging global-profile profile-selection-order
  static
```

[edit]

```
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp exclude
  plmn-change
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp exclude
  rat-change
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp offline
  volume-limit 1024
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp offline
  volume-limit direction both
set unified-edge gateways ggsn-pgw PGW2 charging transport-profiles p_tsp offline
  charging-gateways cdr-release r8
set unified-edge gateways ggsn-pgw PGW2 charging transport-profiles p_tsp offline
  charging-gateways peer-order peer p_cfg
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper profile-id
  1
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper
  transport-profile p_tsp
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper
  trigger-profile p_tp
set unified-edge gateways ggsn-pgw PGW2 charging gtp transport-protocol tcp
set unified-edge gateways ggsn-pgw PGW2 charging gtp version v1
set unified-edge gateways ggsn-pgw PGW2 charging gtp header-type long
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg
  destination-ipv4-address 10.44.44.99
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg source-interface
  lo0.0
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg source-interface
  ipv4-address 10.44.44.44
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg destination-port
  3386
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg transport-protocol
  tcp
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg t3-response 5
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg header-type long
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg pending-queue-size
  1000
set unified-edge gateways ggsn-pgw PGW2 charging global-profile default-profile p_juniper
```

```
set unified-edge gateways ggsn-pgw PGW2 charging global-profile profile-selection-order
static
```

Step-by-Step Procedure

To configure the offline charging parameters:

1. Configure charging for the P-GW called PGW1.

```
[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 charging
```
2. Specify the global GTP Prime properties of PGW1 to transmit CDRs to the external charging gateway.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v1
user@mbg1# set gtp header-type long
```
3. Specify the GTP Prime properties of PGW1 for the GTP Prime peers.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.33.33.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.33.33.33
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfg version v1
user@mbg1# set gtp peer p_cfg n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000
```
4. Configure the transport and profiles referenced by the charging profile of PGW1 for offline charging.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r8
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36
```
5. Configure the charging and global profiles for PGW1.

```
[edit unified-edge gateways ggsn-sgw PGW1 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile p_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```
6. Configure charging for the P-GW called PGW2.

```
[edit]
```

```
user@mbg1# edit unified-edge gateways ggsn-pgw PGW2 charging
```

7. Specify the global GTP Prime properties of PGW2 to transmit CDRs to the external charging gateway.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v1
user@mbg1# set gtp header-type long
```

8. Specify the GTP Prime properties of PGW2 for the GTP Prime peers.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set gtp peer p_cgf destination-ipv4-address 10.44.44.99
user@mbg1# set gtp peer p_cgf source-interface lo0.0
user@mbg1# set gtp peer p_cgf source-interface ipv4-address 10.44.44.44
user@mbg1# set gtp peer p_cgf destination-port 3386
user@mbg1# set gtp peer p_cgf transport-protocol tcp
user@mbg1# set gtp peer p_cgf version v1
user@mbg1# set gtp peer p_cgf n3-requests 1
user@mbg1# set gtp peer p_cgf t3-response 5
user@mbg1# set gtp peer p_cgf header-type long
user@mbg1# set gtp peer p_cgf pending-queue-size 1000
```

9. Configure the transport and profiles referenced by the charging profile of PGW2 for offline charging.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r8
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
```

10. Configure the charging and global profiles for PGW2.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile p_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
trigger-profiles {
  p_tp {
    exclude {
      plmn-change;
      rat-change;
    }
    offline {
      volume-limit 1024;
    }
  }
}
```



```

        volume-limit direction both;
    }
}
transport-profiles {
    p_tsp {
        offline {
            charging-gateways {
                cdr-release r8;
                peer-order peer p_cfg;
                switch-back-time 36
            }
        }
    }
}
charging-profiles {
    p_juniper {
        profile-id 1;
        transport-profile p_tsp;
        trigger-profile p_tp;
    }
}
gtp {
    peer {
        p_cfg {
            destination-ipv4-address 10.33.33.99;
            destination-port 3386;
            header-type long;
            n3-requests 1;
            pending-queue-size 1000;
            source-interface lo0.0;
            source-interface ipv4-address 10.33.33.33;
            t3-response 5;
            transport-protocol tcp;
        }
    }
    header-type long;
    transport-protocol tcp;
    version v1;
}
global-profile {
    default-profile p_juniper;
    profile-selection-order static;
}
[edit unified-edge gateways ggsn-pgw PGW2 charging]
trigger-profiles {
    p_tp {
        exclude {
            plmn-change;
            rat-change;
        }
        offline {
            volume-limit 1024;
            volume-limit direction both;
        }
    }
}

```

```
}
transport-profiles {
  p_tsp {
    offline {
      charging-gateways {
        cdr-release r8;
        peer-order peer p_cfg;
        switch-back-time 36
      }
    }
  }
}
charging-profiles {
  p_juniper {
    profile-id 1;
    transport-profile p_tsp;
    trigger-profile p_tp;
  }
}
gtp {
  peer {
    p_cfg {
      destination-ipv4-address 10.33.33.99;
      destination-port 3386;
      header-type long;
      n3-requests 1;
      pending-queue-size 1000;
      source-interface lo0.0;
      source-interface ipv4-address 10.33.33.33;
      t3-response 5;
      transport-protocol tcp;
    }
  }
  header-type long;
  transport-protocol tcp;
  version v1;
}
global-profile {
  default-profile p_juniper;
  profile-selection-order static;
}
```

Configuring P-GW GTP Services

CLI Quick Configuration

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways ggsn-pgw PGW1 gtp interface lo0.0
set unified-edge gateways ggsn-pgw PGW1 gtp interface v4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 gtp n3-requests 5
set unified-edge gateways ggsn-pgw PGW1 gtp t3-response 3
set unified-edge gateways ggsn-pgw PGW1 gtp echo-interval 60
set unified-edge gateways ggsn-pgw PGW1 gtp path-management enable
set unified-edge gateways ggsn-pgw PGW1 gtp echo-n3-requests 5
```

```

set unified-edge gateways ggsn-pgw PGW1 gtp echo-t3-response 30
set unified-edge gateways ggsn-pgw PGW2 gtp interface lo0.0
set unified-edge gateways ggsn-pgw PGW2 gtp interface v4-address 10.44.44.44
set unified-edge gateways ggsn-pgw PGW2 gtp n3-requests 5
set unified-edge gateways ggsn-pgw PGW2 gtp t3-response 3
set unified-edge gateways ggsn-pgw PGW2 gtp echo-interval 60
set unified-edge gateways ggsn-pgw PGW2 gtp path-management enable
set unified-edge gateways ggsn-pgw PGW2 gtp echo-n3-requests 5
set unified-edge gateways ggsn-pgw PGW2 gtp echo-t3-response 30

```

Step-by-Step Procedure

To configure GTP services:

1. Configure the GTP services for the P-GW called PGW1.

```

[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 gtp

```
2. Configure GTP services for the P-GW interfaces for PGW1 with path management disabled.

```

[edit unified-edge gateways pgw PGW1 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.33.33.33
user@mbg1# set n3-requests 5
user@mbg1# set t3-response 3
user@mbg1# set echo-interval 60
user@mbg1# set path-management disable
user@mbg1# set echo-n3-requests 5
user@mbg1# set echo-t3-responses 30

```
3. Configure the GTP services for the P-GW called PGW2.

```

[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW2 gtp

```
4. Configure GTP services for the P-GW interfaces for PGW2 with path management disabled.

```

[edit unified-edge gateways pgw PGW2 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.44.44.44
user@mbg1# set n3-requests 5
user@mbg1# set t3-response 3
user@mbg1# set echo-interval 60
user@mbg1# set path-management disable
user@mbg1# set echo-n3-requests 5
user@mbg1# set echo-t3-responses 30

```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```

[edit unified-edge gateways ggsn-pgw PGW1 ]
gtp {
  echo-interval 60;
  interface lo0.0;
  interface v4-address 10.33.33.33;
  n3-requests 5;

```

```

path-management {
    enable;
}
t3-response 3;
}
[edit unified-edge gateways ggsn-pgw PGW2 ]
gtp {
    echo-interval 60;
    interface lo0.0;
    interface v4-address 10.44.44.44;
    n3-requests 5;
    path-management {
        enable;
    }
    t3-response 3;
}

```

Configure P-GW APNs

CLI Quick Configuration

The APNs configured are not complex. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 mobile interface mif.3
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 address-assignment local
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 selection-mode from-ms
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 mobile interface mif.4
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 address-assignment local
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 selection-mode from-ms

```

Step-by-Step Procedure

To configure APNs for the P-GWs called PGW1 and PGW2:

1. Configure APN1 for the P-GW called PGW1.

```

[edit]
user@mbg1 edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1]
user@mbg1 set mobile-interface mif.3
user@mbg1 set address-assignment local
user@mbg1 set selection-mode from-ms

```



NOTE: A local address assignment uses the default mobile pool to assign the IP address. The default pool is configured in the routing instance that is associated with the mobile interface of the APN and is not detailed here.

2. Configure APN2 for the P-GW called PGW2.

```
[edit]
user@mbg1 edit unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2
[edit unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2]
user@mbg1 set mobile-interface mif.4
user@mbg1 set address-assignment local
user@mbg1 set selection-mode from-ms
```



NOTE: A local address assignment uses the default mobile pool to assign the IP address. The default pool is configured in the routing instance that is associated with the mobile interface of the APN and is not detailed here.

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns]
APN1 {
  address-assignment local;
  mobile-interface mif.3;
  selection-mode from-ms;
}
[edit unified-edge gateways ggsn-pgw PGW2 apn-services apns]
APN2 {
  address-assignment local;
  mobile-interface mif.4;
  selection-mode from-ms;
}
```

Verification

Verifying Gateway Status

Purpose Verify the gateways for the broadband gateway.

Action user@mbg1> show unified-edge gateways brief

```
Total number of configured gateways: 2
```

```
Gateway name: PGW1
Gateway type: ggsn-pgw
Gateway id: 1
```

```
Gateway name: PGW2
Gateway type: ggsn-pgw
Gateway id: 2
```

Meaning The **show unified-edge gateways brief** command displays information about the configured gateways.

Related Documentation

- [Understanding Multiple and Colocated and Mobile Gateways on page 3](#)
- [Example: Configuring a Colocated P-GW and S-GW on page 34](#)
- [Example: Configuring a Multiple Colocated P-GW and S-GW on page 54](#)

Example: Configuring a Colocated P-GW and S-GW

This example describes how to configure the MobileNext Broadband Gateway with a colocated Packet Data Network Gateway (P-GW) and Serving Gateway (S-GW) sharing a single MX chassis. The emphasis is on P-GW and S-GW configuration, and does not include many other parameters that a full device configuration requires.

- [Requirements on page 34](#)
- [Overview on page 34](#)
- [Configuration on page 36](#)
- [Verification on page 54](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.1W
- Juniper Networks MobileNext Broadband Gateway chassis (MX Series-based)
- Two (redundant) session DPCs (Session PICs, Part MX-MOB-SDPC)
- Two (redundant) anchor MPCs (Packet Forwarding Engines, Part MPC2E-3D-EQ or MPCE-3D-16XCE-SFPP)



NOTE: You can use the MPCE-3D-16XCE-SFPP as an anchor MPC, but only the MPC2E-3D-EQ is used in this example.

Before you configure multiple colocated gateways, be sure you have:

- Installed the Flexible PIC Concentrator (FPC) and associated hardware correctly in the MX chassis
- Installed the mobility software correctly

Overview

This example describes how to configure the broadband gateway as a multiple colocated gateway. There are two P-GWs (PGW1 and PGW2) and two S-GWs (SGW1 and SGW2). All P-GWs and S-GWs use the same chassis, which is named **MBG1**.

Topology

[Table 4 on page 35](#) shows the redundancy scheme used in this example: the second PIC or Packet Forwarding Engine in each FPC slot.

Table 4: Redundancy Scheme for the Configuration

FPC Chassis Slot	Configuration	Function
0	ms-0/0/0 (mams-0/0/0)	Session PIC for PGW1
1	ms-1/1/0 (mams-1/1/0)	Backup Session PIC for PGW1
2	pfe-2/0/0	Anchor Packet Forwarding Engine for PGW1
3	pfe-3/1/0	Backup anchor Packet Forwarding Engine for PGW1
7	ms-7/0/0 (mams-7/0/0)	Session PIC for SGW1
8	ms-8/1/0 (mams-8/1/0)	Backup Session PIC for SGW1
9	pfe-9/0/0	Anchor Packet Forwarding Engine for SGW1
10	pfe-10/1/0	Backup anchor Packet Forwarding Engine for SGW1

- For the P-GW on the broadband gateway:
 - The Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-2/0/0** and **xe-2/0/1**, respectively.
 - The backup Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-3/1/0** and **xe-3/1/1**, respectively.
 - The loopback address (**lo0.0**) for PGW1 is **10.33.33.33**.
 - The APN (**APN1**) on PGW1 uses mobile interface **mif.3**.
- For the S-GW on the broadband gateway:
 - The S1-U data, S5, and S11 control reference points are in the main routing instance and use different physical interfaces. (These reference points can all share the same physical interface because they are all in the same routing domain, but will require separate addresses if they run different versions of GTP.) The physical interfaces are configured as **xe-** interfaces on their respective Packet Forwarding Engines.
 - The loopback address (**lo0.0**) for SGW1 is **10.11.11.11**.



NOTE: This example uses private RFC1918 IP addresses throughout. Normally, a public loopback IP address is advertised onto the network. GTP peer IP addresses are used to route tunneled packets between mobile network elements. This example uses a different IP address on each gateway, which is not strictly required when using the main routing instance for all gateways.

Configuration

To configure colocated gateways, perform these tasks:

- [Configuring the Chassis on page 36](#)
- [Configuring P-GW System Interfaces and Redundancy on page 42](#)
- [Configuring P-GW Charging on page 44](#)
- [Configuring P-GW GTP Services on page 47](#)
- [Configure P-GW APN on page 48](#)
- [Configuring S-GW System Interfaces and Redundancy on page 48](#)
- [Configuring S-GW Charging on page 50](#)
- [Configuring S-GW GTP Services on page 53](#)

Configuring the Chassis

CLI Quick Configuration

Begin by performing a load and merge with the predefined mobility hardware defaults. Then apply the mobility group to the FPC slots with the Session PICs and the mobility forwarding package to the FPC slots with the anchor Packet Forwarding Engines.

You must include every Session PIC configured with the **jservices-mobile** package at the **[edit unified-edge gateways (ggsn-pgw | sgw) gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway. You must include every anchor Packet Forwarding Engine configured with the mobile forwarding package at the **[edit unified-edge gateways (ggsn-pgw | sgw) gateway-name system interfaces]** hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.



NOTE: This section does not configure the Aggregated Multiservices Session PICs (**ams-**) for the gateways. The **ams-** interfaces for redundancy are configured in other gateway sections.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
load merge /etc/config/mobility-defaults.conf
set chassis fpc 0 apply-groups mobility
set chassis fpc 1 apply-groups mobility
set chassis fpc 7 apply-groups mobility
set chassis fpc 8 apply-groups mobility
set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
set chassis fpc 9 pfe 0 forwarding-packages mobility sgw
set chassis fpc 10 pfe 1 forwarding-packages mobility sgw
set interfaces xe-2/0/0 unit 0 family inet description Gn interface for PGW1
```



```

set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
set interfaces xe-2/0/1 unit 0 family inet description Gi interface for PGW1
set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
set interfaces xe-2/1/1 unit 0 family inet address 10.44.0.2/16
set interfaces xe-3/1/0 unit 0 family inet description Backup Gn interface for PGW1
set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface for PGW1
set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
set interfaces mif unit 3 family inet
set interfaces mif unit 4 family inet
set interfaces xe-9/0/0 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/0 unit 0 family inet address 10.5.0.1/16
set interfaces xe-9/0/1 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/1 unit 0 family inet address 10.5.0.2/16
set interfaces xe-9/0/2 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/2 unit 0 family inet address 10.5.0.3/16
set interfaces xe-9/0/3 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/3 unit 0 family inet address 10.5.0.4/16
set interfaces xe-10/1/0 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/0 unit 0 family inet address 10.5.0.11/16
set interfaces xe-10/1/1 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/1 unit 0 family inet address 10.5.0.12/16
set interfaces xe-10/1/2 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/2 unit 0 family inet address 10.5.0.13/16
set interfaces xe-10/1/3 unit 0 family inet description Back up interface for SGW1
set interfaces xe-10/1/3 unit 0 family inet address 10.5.0.14/16
set interfaces lo0 unit 0 family inet address 10.11.11.1/32
set interfaces lo0 unit 0 family inet address 10.33.33.33/32

```



NOTE: This configuration is for the S-GW and P-GW only. Other statements, such as for routing protocols or network management, are needed to make this a complete device configuration.

Step-by-Step Procedure

To configure the chassis:

1. Load and merge the default configuration file for the **mobility** group.

[edit]

```
user@mbg-1# load merge /etc/config/mobility-defaults.conf
```

2. Configure the **mobility** group on the Session PICs.

[edit]

```

user@mbg-1# set chassis fpc 0 apply-groups mobility
user@mbg-1# set chassis fpc 1 apply-groups mobility
user@mbg-1# set chassis fpc 7 apply-groups mobility
user@mbg-1# set chassis fpc 8 apply-groups mobility

```



NOTE: You must include every Session PIC configured with the `jservices-mobile` package at the `[edit unified-edge gateways sgw gateway-name system session-pics]` hierarchy level on the broadband gateway. If you do not include the Session PIC, then the Session PIC cannot be used by the broadband gateway.

3. Configure the interface DPC or MPC at the Packet Forwarding Engine level.

[edit]

```
user@mbg-1# set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 9 pfe 0 forwarding-packages mobility sgw
user@mbg-1# set chassis fpc 10 pfe 1 forwarding-packages mobility sgw
```



NOTE: You must include every Packet Forwarding Engine configured with the `ggsn-pgw` or `sgw` forwarding package at the `[edit unified-edge gateways ggsn-pgw gateway-name system anchor-pfes]` or `[edit unified-edge gateways sgw gateway-name system anchor-pfes]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine will not be used by the broadband gateway.

4. Configure physical interfaces for the P-GW.

```
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet description Gn interface for PGW1
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet description Gi interface for PGW1
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet description Backup Gn interface for PGW1
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface for PGW1
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
```

5. Configure the mobile interfaces for the P-GW APN.

```
user@mbg-1# set interfaces mif unit 3 family inet
```

6. Configure physical interfaces for the S-GW.

```
user@mbg-1# set interfaces xe-9/0/0 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/0 unit 0 family inet address 10.5.0.1/16
user@mbg-1# set interfaces xe-9/0/1 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/1 unit 0 family inet address 10.5.0.2/16
user@mbg-1# set interfaces xe-9/0/2 unit 0 family inet description interface for SGW1
```

```

user@mbg-1# set interfaces xe-9/0/2 unit 0 family inet address 10.5.0.3/16
user@mbg-1# set interfaces xe-9/0/3 unit 0 family inet description interface for
SGW1
user@mbg-1# set interfaces xe-9/0/3 unit 0 family inet address 10.5.0.4/16
user@mbg-1# set interfaces xe-10/1/0 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/0 unit 0 family inet address 10.5.0.11/16
user@mbg-1# set interfaces xe-10/1/1 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/1 unit 0 family inet address 10.5.0.12/16
user@mbg-1# set interfaces xe-10/1/2 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/2 unit 0 family inet address 10.5.0.13/16
user@mbg-1# set interfaces xe-10/1/3 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/3 unit 0 family inet address 10.5.0.14/16

```

7. Configure loopback interfaces for both gateways.

```

[edit]
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.11.11.11/32
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.33.33.33/32

```

Results When you have finished this section of the configuration, your results should be similar to this **show chassis | display inheritance** command output:

```

chassis {
  fpc 0 {
    pic 0 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
  fpc 1 {
    pic 1 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;
            package jservices-mobile;
          }
        }
      }
    }
  }
  fpc 2 {
    pfe 0 {
      forwarding-packages {

```

```
        mobility ggsn-pgw;
    }
}
fpc 3 {
    pfe 1 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
}
fpc 7 {
    pic 0 {
        adaptive-services {
            service-package {
                extension-provider {
                    control-cores 1;
                    data-pollers 1;
                    package jservices-mobile;
                }
            }
        }
    }
}
fpc 8 {
    pfe 1 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
    fpc 9 {
        pfe 0 {
            forwarding-packages {
                mobility sgw;
            }
        }
    }
    fpc 10 {
        pfe 1 {
            forwarding-packages {
                mobility sgw;
            }
        }
    }
}
}
interfaces {
    lo0 {
        unit 0 {
            family inet {
                address 10.11.11.11/32;
                address 10.33.33.33/32;
            }
        }
    }
}
mif {
```

```
    unit 3 {
        family inet;
    }
}
xe-2/0/0 {
    unit 0 {
        family inet {
            description Gn interface for PGW1
            address 10.11.0.1/16
        }
    }
}
xe-2/0/1 {
    unit 0 {
        family inet {
            description Gi interface for PGW1;
            address 10.22.0.1/16;
        }
    }
}
xe-3/1/0 {
    unit 0 {
        family inet {
            description Backup Gn interface for PGW1;
            address 10.11.0.2/16;
        }
    }
}
xe-3/1/1 {
    unit 0 {
        family inet {
            description Backup Gi interface for PGW1;
            address 10.22.0.2/16;
        }
    }
}
xe-9/0/0 {
    unit 0 {
        family inet {
            description interface for SGW1;
            address 10.5.0.1/16;
        }
    }
}
xe-9/0/1 {
    unit 0 {
        family inet {
            description interface for SGW1;
            address 10.5.0.2/16;
        }
    }
}
xe-9/0/2 {
    unit 0 {
        family inet {
            description interface for SGW1;
```

```
        address 10.5.0.3/16;
    }
}
xe-9/0/3 {
    unit 0 {
        family inet {
            description interface for SGW1;
            address 10.5.0.4/16;
        }
    }
}
xe-10/1/0 {
    unit 0 {
        family inet {
            description Backup interface for SGW1;
            address 10.5.0.41/16;
        }
    }
}
xe-10/1/1 {
    unit 0 {
        family inet {
            description Backup interface for SGW1;
            address 10.5.0.42/16;
        }
    }
}
xe-10/1/2 {
    unit 0 {
        family inet {
            description Backup interface for SGW1;
            address 10.5.0.43/16;
        }
    }
}
xe-10/1/3 {
    unit 0 {
        family inet {
            description Backup interface for SGW1;
            address 10.5.0.44/1;6
        }
    }
}
}
```

Configuring P-GW System Interfaces and Redundancy

CLI Quick Configuration

Next, establish load-balancing of GTP-C packets and redundancy for the P-GW named PGW1. There is no specific “load-balance” broadband gateway hierarchy, nor is there any Session DPC redundancy section. Instead, you configure load balancing at the **[edit interfaces]** hierarchy level by creating sets of load-balanced Aggregated Multiservice (**ams**) interfaces as Mobile Aggregated Multiservice (**mams**-) interfaces and select one

of them as a preferred backup. You configure redundant Packet Forwarding Engines by establishing a primary list of anchors and a secondary list for a group of interfaces.

Include every Session PIC configured with the `jservices-mobile` package for the particular broadband gateway at the `[edit unified-edge gateways ggsn-pgw gateway-name system session-pics]` hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway.

To establish redundancy for GTP-U traffic flows, include every anchor Packet Forwarding Engine configured with the mobile forwarding package for the particular broadband gateway at the `[edit unified-edge gateways ggsn-pgw gateway-name system interfaces pfes]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
set interfaces ams0 description "Aggregate Multiservices Session DPC for PGW1 with
members mams-0/0/0 and mams-1/1/0"
set interfaces ams0 load-balancing-options member-interface mams-0/0/0
set interfaces ams0 load-balancing-options member-interface mams-1/1/0
set interfaces ams0 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams0 load-balancing-options high-availability-options many-to-one preferred
backup mams-1/1/0
[edit unified-edge gateways ggsn-pgw PGW1 system session-pics]
set interface ams0
[edit interfaces apfe0 anchoring-options]
set primary-list pfe-2/0/0
set secondary pfe-3/1/0
[edit unified-edge gateways ggsn-pgw PGW1 system pfes]
set interface apfe0
```

Results When you have finished this section of the configuration, your results should be similar to these `show` command outputs:

```
interfaces {
  ams0 {
    description "Aggregate Multiservices Session DPC for PGW1 with members
mams-0/0/0 and mams-1/1/0"
    load-balancing-options {
      member-interface mams-0/0/0;
      member-interface mams-1/1/0;
      high-availability-options {
        redistribute-all-traffic {
          enable-rejoin;
        }
        many-to-one {
          preferred-backup mams-1/1/0;
        }
      }
    }
  }
}
```

```
apfe0 {
  anchoring-options {
    primary-list {
      pfe-2/0/0;
    }
    secondary pfe-3/1/0;
  }
}

unified-edge gateways ggsn-pgw PGW1 system {
  session-pics {
    interface ams0;
  }
  pfes {
    interface apfe0;
  }
}
```

Configuring P-GW Charging

CLI Quick Configuration

The P-GW uses offline charging. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude
  plmn-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude rat-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
  volume-limit 1024
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
  volume-limit direction both
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways cdr-release r8
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways peer-order peer p_cfg
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
  charging-gateways switch-back-time 36
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper profile-id
  1
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
  transport-profile p_tsp
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
  trigger-profile p_tp
set unified-edge gateways ggsn-pgw PGW1 charging gtp transport-protocol tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtp version v1
set unified-edge gateways ggsn-pgw PGW1 charging gtp header-type long
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg
  destination-ipv4-address 10.33.33.99
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  lo0.0
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  ipv4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg destination-port
  3386
```



```

set unified-edge gateways ggsn-pgw PGW1 charging gtpv peer p_cfg transport-protocol
tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtpv peer p_cfg n3-requests 1
set unified-edge gateways ggsn-pgw PGW1 charging gtpv peer p_cfg t3-response 5
set unified-edge gateways ggsn-pgw PGW1 charging gtpv peer p_cfg header-type long
set unified-edge gateways ggsn-pgw PGW1 charging gtpv peer p_cfg pending-queue-size
1000
set unified-edge gateways ggsn-pgw PGW1 charging global-profile default-profile p_juniper
set unified-edge gateways ggsn-pgw PGW1 charging global-profile profile-selection-order
static

```

Step-by-Step Procedure

To configure the offline charging parameters:

1. Configure charging for the P-GW called PGW1.

```

[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 charging

```
2. Specify the global GTP Prime properties of PGW1 to transmit CDRs to the external charging gateway.

```

[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtpv transport-protocol tcp
user@mbg1# set gtpv version v1
user@mbg1# set gtpv header-type long

```
3. Specify the GTP Prime properties of PGW1 for the GTP Prime peers.

```

[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtpv peer p_cfg destination-ipv4-address 10.33.33.99
user@mbg1# set gtpv peer p_cfg source-interface lo0.0
user@mbg1# set gtpv peer p_cfg source-interface ipv4-address 10.33.33.33
user@mbg1# set gtpv peer p_cfg destination-port 3386
user@mbg1# set gtpv peer p_cfg transport-protocol tcp
user@mbg1# set gtpv peer p_cfg version v1
user@mbg1# set gtpv peer p_cfg n3-requests 1
user@mbg1# set gtpv peer p_cfg t3-response 5
user@mbg1# set gtpv peer p_cfg header-type long
user@mbg1# set gtpv peer p_cfg pending-queue-size 1000

```
4. Configure the transport and profiles referenced by the charging profile of PGW1 for offline charging.

```

[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r8
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36

```
5. Configure the charging and global profiles for PGW1.

```

[edit unified-edge gateways ggsn-sgw PGW1 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp

```

```
user@mbgl1# set charging-profiles p_juniper trigger-profile p_tp
user@mbgl1# set charging-profiles p_juniper global-profile p_juniper
user@mbgl1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
trigger-profiles {
  p_tp {
    exclude {
      plmn-change;
      rat-change;
    }
    offline {
      volume-limit 1024;
      volume-limit direction both;
    }
  }
}
transport-profiles {
  p_tsp {
    offline {
      charging-gateways {
        cdr-release r8;
        peer-order peer p_cfg;
        switch-back-time 36
      }
    }
  }
}
charging-profiles {
  p_juniper {
    profile-id 1;
    transport-profile p_tsp;
    trigger-profile p_tp;
  }
}
gtp {
  peer {
    p_cfg {
      destination-ipv4-address 10.33.33.99;
      destination-port 3386;
      header-type long;
      n3-requests 1;
      pending-queue-size 1000;
      source-interface lo0.0;
      source-interface ipv4-address 10.33.33.33;
      t3-response 5;
      transport-protocol tcp;
    }
  }
  header-type long;
  transport-protocol tcp;
```

```

    version v1;
  }
  global-profile {
    default-profile p_juniper;
    profile-selection-order static;
  }

```

Configuring P-GW GTP Services

CLI Quick Configuration To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways ggsn-pgw PGW1 gtp interface lo0.0
set unified-edge gateways ggsn-pgw PGW1 gtp interface v4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 gtp n3-requests 5
set unified-edge gateways ggsn-pgw PGW1 gtp t3-response 3
set unified-edge gateways ggsn-pgw PGW1 gtp echo-interval 60
set unified-edge gateways ggsn-pgw PGW1 gtp path-management enable
set unified-edge gateways ggsn-pgw PGW1 gtp echo-n3-requests 5
set unified-edge gateways ggsn-pgw PGW1 gtp echo-t3-response 30

```

Step-by-Step Procedure To configure GTP services:

1. Configure the GTP services for the P-GW called PGW1.

```

[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 gtp

```

2. Configure GTP services for the P-GW interfaces for PGW1 with path management disabled.

```

[edit unified-edge gateways pgw PGW1 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.33.33.33
user@mbg1# set n3-requests 5
user@mbg1# set t3-response 3
user@mbg1# set echo-interval 60
user@mbg1# set path-management disable
user@mbg1# set echo-n3-requests 5
user@mbg1# set echo-t3-responses 30

```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```

[edit unified-edge gateways ggsn-pgw PGW1 ]
gtp {
  echo-interval 60;
  interface lo0.0;
  interface v4-address 10.33.33.33;
  n3-requests 5;
  path-management {
    enable;
  }
  t3-response 3;
}

```

Configure P-GW APN

CLI Quick Configuration The APN configured is not complex. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 mobile interface mif.3
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 address-assignment
  local
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 selection-mode
  from-ms
```

Step-by-Step Procedure To configure APN for the P-GW called PGW1:

1. Configure APN1 for the P-GW called PGW1.

```
[edit]
user@mbg1 edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1]
user@mbg1 set mobile-interface mif.3
user@mbg1 set address-assignment local
user@mbg1 set selection-mode from-ms
```



NOTE: A local address assignment uses the default mobile pool to assign the IP address. The default pool is configured in the routing instance that is associated with the mobile interface of the APN and is not detailed here.

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns]
APN1 {
  address-assignment local;
  mobile-interface mif.3;
  selection-mode from-ms;
}
```

Configuring S-GW System Interfaces and Redundancy

CLI Quick Configuration Now, establish load-balancing of GTP-C packets and redundancy for the S-GW named SGW1. There is no specific “load-balance” broadband gateway hierarchy, nor is there any Session DPC redundancy section. Instead, you configure load balancing at the **[edit interfaces]** hierarchy level by creating sets of load-balanced Aggregated Multiservice (**ams**) interfaces as Mobile Aggregated Multiservice (**mams-**) interfaces and select one of them as a preferred backup. You configure redundant Packet Forwarding Engines by establishing a primary list of anchors and a secondary list for a group of interfaces.

Include every Session PIC configured with the `jservices-mobile` package for the particular broadband gateway at the `[edit unified-edge gateways sgw gateway-name system session-pics]` hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway.

To establish redundancy for GTP-U traffic flows, include every anchor Packet Forwarding Engine configured with the mobile forwarding package for the particular broadband gateway at the `[edit unified-edge gateways sgw gateway-name system interfaces]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
set interfaces ams2 description "Aggregate Multiservices Session DPC for SGW1 with
members mams-7/0/0 and mams-8/1/0"
set interfaces ams2 load-balancing-options member-interface mams-7/0/0
set interfaces ams2 load-balancing-options member-interface mams-8/1/0
set interfaces ams2 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams2 load-balancing-options high-availability-options many-to-one preferred
backup mams-8/1/0
```

Step-by-Step Procedure

1. Configure the Multiservices PIC interfaces for the S-GWs.

```
[edit]
user@mbg-1# set interfaces ams2 description "Aggregate Multiservices Session
DPC for SGW1 with members mams-7/0/0 and mams-8/1/0"
user@mbg-1# set interfaces ams2 load-balancing-options member-interface
mams-7/0/0
user@mbg-1# set interfaces ams2 load-balancing-options member-interface
mams-8/1/0
user@mbg-1# set interfaces ams2 load-balancing-options member-failure-options
redistribute-all-traffic enable-rejoin
user@mbg-1# set interfaces ams2 load-balancing-options high-availability-options
many-to-one preferred backup mams-8/1/0
```

Results When you have finished this section of the configuration, your results should be similar to this `show` command output:

```
interfaces {
  ams2 {
    description "Aggregate Multiservices Session DPC for SGW1 with members mams-7/0/0
and mams-8/1/0"
    load-balancing-options {
      member-interface mams-7/0/0;
      member-interface mams-8/1/0;
    }
    high-availability-options {
      redistribute-all-traffic {
        enable-rejoin;
      }
      many-to-one {
        preferred-backup mams-8/1/0;
      }
    }
  }
}
```

```

    }
  }
}
apfe2 {
  anchoring-options {
    primary-list {
      pfe-9/0/0;
    }
    secondary pfe-10/1/0;
  }
}
}

unified-edge gateways sgw SGW1 system {
  session-pics {
    interface ams2;
  }
  pfes {
    interface apfe2;
  }
}

```

Configuring S-GW Charging

CLI Quick Configuration

Although S-GWs have no APNs, they still must understand user charging rules and Charging Detail Records (CDRs) to the charging gateway. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways sgw SGW1 charging trigger-profiles s_tp offline volume-limit 1024
set unified-edge gateways sgw SGW1 charging trigger-profiles s_tp offline volume-limit direction both
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline charging-gateways cdr-release r9
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline charging-gateways peer-order peer p_cfg
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline charging-gateways switch-back-time 36
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper profile-id 1
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper transport-profile p_tsp
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper trigger-profile s_tp
set unified-edge gateways sgw SGW1 charging gtp transport-protocol tcp
set unified-edge gateways sgw SGW1 charging gtp version v2
set unified-edge gateways sgw SGW1 charging gtp header-type long
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg destination-ipv4-address 10.11.11.99
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg source-interface lo0.0
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg source-interface ipv4-address 10.11.11.11
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg destination-port 3386
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg transport-protocol tcp

```

```

set unified-edge gateways sgw SGW1 charging gtp peer p_cfg version v2
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg t3-response 5
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg header-type long
set unified-edge gateways sgw SGW1 charging gtp peer p_cfg pending-queue-size 1000
set unified-edge gateways sgw SGW1 charging global-profile default-profile p_juniper
set unified-edge gateways sgw SGW1 charging global-profile profile-selection-order static

```

Step-by-Step Procedure

To configure the charging parameters:

1. Configure charging for the S-GW called SGW1.

```

[edit]
user@mbg1# edit unified-edge gateways sgw SGW1 charging

```
2. Specify the global GTP Prime properties of SGW1 to transmit CDRs to the external charging gateway.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v2
user@mbg1# set gtp header-type long

```
3. Specify the GTP Prime properties of SGW1 for the GTP Prime peers.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.11.11.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.11.11.11
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfg version v2
user@mbg1# set gtp peer p_cfgfw n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000

```
4. Configure the transport and profiles referenced by the charging profile of SGW1 for offline charging.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set trigger-profiles s_tp offline volume-limit 1024
user@mbg1# set trigger-profiles s_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r9
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36

```
5. Configure the charging and global profiles for SGW1.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile s_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static

```

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
[edit unified-edge gateways sgw SGW1 charging]
trigger-profiles {
  p_tp {
    exclude {
      plmn-change;
      rat-change;
    }
    offline {
      volume-limit 1024;
      volume-limit direction both;
    }
  }
}
transport-profiles {
  p_tsp {
    offline {
      charging-gateways {
        cdr-release r9;
        peer-order peer p_cfg;
        switch-back-time 36;
      }
    }
  }
}
charging-profiles {
  p_juniper {
    profile-id 1;
    transport-profile p_tsp;
    trigger-profile p_tp;
  }
}
gtp {
  peer {
    p_cfg {
      destination-ipv4-address 10.11.11.99;
      destination-port 3386;
      header-type long;
      n3-requests 1;
      pending-queue-size 1000;
      source-interface lo0.0;
      source-interface ipv4-address 10.11.11.11;
      t3-response 5;
      transport-protocol tcp;
    }
  }
  header-type long;
  transport-protocol tcp;
  version v2;
}
global-profile {
  default-profile p_juniper;
  profile-selection-order static;
}
```



```
}
```

Configuring S-GW GTP Services

CLI Quick Configuration To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways sgw SGW1 gtp interface lo0.0
set unified-edge gateways sgw SGW1 gtp interface v4-address 10.11.11.11
set unified-edge gateways sgw SGW1 gtp path-management disable
set unified-edge gateways sgw SGW1 gtp control path-management disable
set unified-edge gateways sgw SGW1 gtp data path-management disable
set unified-edge gateways sgw SGW1 gtp s1u echo-interval 60
set unified-edge gateways sgw SGW1 gtp s11 echo-n3-requests 5
set unified-edge gateways sgw SGW1 gtp s11 echo-t3-response 30
```

Step-by-Step Procedure To configure GTP services:

1. Configure the GTP services for the S-GW called SGW1.

```
[edit]
user@mbg1# edit unified-edge gateways sgw SGW1 gtp
```
2. Configure GTP services for the S-GW GTP interfaces for SGW1 with path management disabled.

```
[edit unified-edge gateways sgw SGW1 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.11.11.11
user@mbg1# set path-management disable
user@mbg1# set control path-management disable
user@mbg1# set data path-management disable
user@mbg1# set s1u echo-interval 60
user@mbg1# set s11 echo-n3-requests 5
user@mbg1# set s11 echo-t3-responses 60
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways sgw SGW1]
gtp {
  interface lo0.0;
  interface v4-address 10.11.11.11;
  control {
    path-management {
      disable;
    }
  }
  data {
    path-management {
      disable;
    }
  }
  path-management {
    disable;
  }
}
```

```
}
slu {
    echo-interval 60;
}
sll {
    echo-n3-requests 5;
    echo-t3-responses 60;
}
}
```

Verification

Verifying Gateway Status

Purpose Verify the gateways for the broadband gateway.

Action user@mbg1> show unified-edge gateways brief

Total number of configured gateways: 2

Gateway name: PGW1
Gateway type: ggsn-pgw
Gateway id: 1

Gateway name: SGW1
Gateway type: sgw
Gateway id: 2

Meaning The `show unified-edge gateways brief` command displays information about the configured gateways.

Related Documentation

- [Understanding Multiple and Colocated and Mobile Gateways on page 3](#)
- [Example: Configuring Multiple P-GWs on page 15](#)
- [Example: Configuring a Multiple Colocated P-GW and S-GW on page 54](#)

Example: Configuring a Multiple Colocated P-GW and S-GW

This example describes how to configure the MobileNext Broadband Gateway with multiple colocated Packet Data Network Gateways (P-GWs) and Serving Gateways (S-GWs) sharing a single MX chassis. The emphasis is on P-GW and S-GW configuration, and does not include many other parameters that a full device configuration requires.

- [Requirements on page 55](#)
- [Overview on page 55](#)
- [Configuration on page 57](#)
- [Verification on page 88](#)

Requirements

This example uses the following hardware and software components:

- Junos OS Release 12.1W
- Juniper Networks MobileNext Broadband Gateway chassis (MX Series-based)
- Four (redundant) session DPCs (Session PICs, Part MX-MOB-SDPC)
- Four (redundant) anchor MPCs (Packet Forwarding Engines, Part MPC2E-3D-EQ or MPCE-3D-16XCE-SFPP)



NOTE: You can use the MPCE-3D-16XCE-SFPP as an anchor MPC, but only the MPC2E-3D-EQ is used in this example.

Before you configure multiple colocated gateways, be sure you have:

- Installed the Flexible PIC Concentrator (FPC) and associated hardware correctly in the MX chassis
- Installed the mobility software correctly

Overview

This example describes how to configure the broadband gateway as a multiple colocated gateway. There are two P-GWs (PGW1 and PGW2) and two S-GWs (SGW1 and SGW2). All P-GWs and S-GWs use the same chassis, which is named **MBG1**.

Topology

Table 5 on page 55 shows the redundancy scheme used in this example: the second PIC or Packet Forwarding Engine in each FPC slot.

Table 5: Redundancy Scheme for the Configuration

FPC Chassis Slot	Configuration	Function
0	ms-0/0/0 (mams-0/0/0)	Session PIC for PGW1
	ms-0/1/0 (mams-0/1/0)	Backup Session PIC for PGW2
1	ms-1/0/0 (mams-1/0/0)	Session PIC for PGW2
	ms-1/1/0 (mams-1/1/0)	Backup Session PIC for PGW1
2	pfe-2/0/0	Anchor Packet Forwarding Engine for PGW1
	pfe-2/1/0	Backup anchor Packet Forwarding Engine for PGW2
3	pfe-3/0/0	Anchor Packet Forwarding Engine for PGW2
	pfe-3/1/0	Backup anchor Packet Forwarding Engine for PGW1

Table 5: Redundancy Scheme for the Configuration (*continued*)

FPC Chassis Slot	Configuration	Function
7	ms-7/0/0 (mams-7/0/0)	Session PIC for SGW1
	ms-7/1/0 (mams-7/1/0)	Backup Session PIC for SGW2
8	ms-8/0/0 (mams-8/0/0)	Session PIC for SGW2
	ms-8/1/0 (mams-8/1/0)	Backup Session PIC for SGW1
9	pfe-9/0/0	Anchor Packet Forwarding Engine for SGW1
	pfe-9/1/0	Backup anchor Packet Forwarding Engine for SGW2
10	pfe-10/0/0	Anchor Packet Forwarding Engine for SGW2
	pfe-10/1/0	Backup anchor Packet Forwarding Engine for SGW1

- For the two P-GWs on the broadband gateway:
 - The Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-2/0/0** and **xe-2/0/1**, respectively. The Gn and Gi interfaces for PGW2 are in the main routing instance and are configured as **xe-3/0/0** and **xe-3/0/1**, respectively.
 - The backup Gn and Gi interfaces for PGW1 are in the main routing instance and are configured as **xe-3/1/0** and **xe-3/1/1**, respectively. The backup Gn and Gi interfaces for PGW2 are in the main routing instance and are configured as **xe-2/1/0** and **xe-2/1/1**, respectively.
 - The loopback address (**lo0.0**) for PGW1 is **10.33.33.33** and the loopback address for PGW2 is **10.44.44.44**.
 - The APN (**APN1**) on PGW1 uses mobile interface **mif.3** and the APN (**APN2**) on PGW2 uses mobile interface **mif.4**.
- For the two S-GWs on the broadband gateway:
 - The S1-U data, S5, and S11 control reference points are in the main routing instance and use different physical interfaces. (These reference points can all share the same physical interface because they are all in the same routing domain, but will require separate addresses if they run different versions of GTP.) The physical interfaces are configured as **xe-** interfaces on their respective Packet Forwarding Engines.
 - The loopback address (**lo0.0**) for SGW1 is **10.11.11.11** and the loopback address for SGW2 is **10.22.22.22**.



NOTE: This example uses private RFC1918 IP addresses throughout. Normally, a public loopback IP address is advertised onto the network. GTP peer IP addresses are used to route tunneled packets between mobile network elements. This example uses a different IP address on each gateway, which is not strictly required when using the main routing instance for all gateways.

Configuration

To configure multiple colocated gateways, perform these tasks:

- [Configuring the Chassis on page 57](#)
- [Configuring P-GW System Interfaces and Redundancy on page 68](#)
- [Configuring P-GW Charging on page 70](#)
- [Configuring P-GW GTP Services on page 75](#)
- [Configure P-GW APNs on page 77](#)
- [Configuring S-GW System Interfaces and Redundancy on page 78](#)
- [Configuring S-GW Charging on page 81](#)
- [Configuring S-GW GTP Services on page 86](#)

Configuring the Chassis

CLI Quick Configuration

Begin by performing a load and merge with the predefined mobility hardware defaults. Then apply the mobility group to the FPC slots with the Session PICs and the mobility forwarding package to the FPC slots with the anchor Packet Forwarding Engines.

You must include every Session PIC configured with the `jservices-mobile` package at the `[edit unified-edge gateways (ggsn-pgw | sgw) gateway-name system session-pics]` hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway. You must include every anchor Packet Forwarding Engine configured with the mobile forwarding package at the `[edit unified-edge gateways (ggsn-pgw | sgw) gateway-name system interfaces]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.



NOTE: This section does not configure the Aggregated Multiservices Session PICs (`ams-`) for the gateways. The `ams-` interfaces for redundancy are configured in other gateway sections.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
load merge /etc/config/mobility-defaults.conf
set chassis fpc 0 apply-groups mobility
```

```
set chassis fpc 1 apply-groups mobility
set chassis fpc 7 apply-groups mobility
set chassis fpc 8 apply-groups mobility
set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
set chassis fpc 2 pfe 1 forwarding-packages mobility ggsn-pgw
set chassis fpc 3 pfe 0 forwarding-packages mobility ggsn-pgw
set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
set chassis fpc 9 pfe 0 forwarding-packages mobility sgw
set chassis fpc 9 pfe 1 forwarding-packages mobility sgw
set chassis fpc 10 pfe 0 forwarding-packages mobility sgw
set chassis fpc 10 pfe 1 forwarding-packages mobility sgw
set interfaces xe-2/0/0 unit 0 family inet description Gn interface for PGW1
set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
set interfaces xe-2/0/1 unit 0 family inet description Gi interface for PGW1
set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
set interfaces xe-3/0/0 unit 0 family inet description Gn interface for PGW2
set interfaces xe-3/0/0 unit 0 family inet address 10.33.0.1/16
set interfaces xe-3/0/1 unit 0 family inet description Gi interface for PGW2
set interfaces xe-3/0/1 unit 0 family inet address 10.44.0.1/16
set interfaces xe-2/1/0 unit 0 family inet description Backup Gn interface for PGW2
set interfaces xe-2/1/0 unit 0 family inet address 10.33.0.2/16
set interfaces xe-2/1/1 unit 0 family inet description Backup Gi interface for PGW2
set interfaces xe-2/1/1 unit 0 family inet address 10.44.0.2/16
set interfaces xe-3/1/0 unit 0 family inet description Backup Gn interface for PGW1
set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface for PGW1
set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
set interfaces mif unit 3 family inet
set interfaces mif unit 4 family inet
set interfaces xe-9/0/0 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/0 unit 0 family inet address 10.5.0.1/16
set interfaces xe-9/0/1 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/1 unit 0 family inet address 10.5.0.2/16
set interfaces xe-9/0/2 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/2 unit 0 family inet address 10.5.0.3/16
set interfaces xe-9/0/3 unit 0 family inet description Interface for SGW1
set interfaces xe-9/0/3 unit 0 family inet address 10.5.0.4/16
set interfaces xe-10/1/0 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/0 unit 0 family inet address 10.5.0.11/16
set interfaces xe-10/1/1 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/1 unit 0 family inet address 10.5.0.12/16
set interfaces xe-10/1/2 unit 0 family inet description Backup interface for SGW1
set interfaces xe-10/1/2 unit 0 family inet address 10.5.0.13/16
set interfaces xe-10/1/3 unit 0 family inet description Back up interface for SGW1
set interfaces xe-10/1/3 unit 0 family inet address 10.5.0.14/16
set interfaces xe-10/0/0 unit 0 family inet description Interface for SGW2
set interfaces xe-10/0/0 unit 0 family inet address 10.6.0.1/16
set interfaces xe-10/0/1 unit 0 family inet description Interface for SGW2
set interfaces xe-10/0/1 unit 0 family inet address 10.6.0.2/16
set interfaces xe-10/0/2 unit 0 family inet description Interface for SGW2
set interfaces xe-10/0/2 unit 0 family inet address 10.6.0.3/16
set interfaces xe-10/0/3 unit 0 family inet description Interface for SGW2
set interfaces xe-10/0/3 unit 0 family inet address 10.6.0.4/16
set interfaces xe-9/1/0 unit 0 family inet description Backup interface for SGW2
set interfaces xe-9/1/0 unit 0 family inet address 10.6.0.11/16
set interfaces xe-9/1/1 unit 0 family inet description Backup interface for SGW2
```

```

set interfaces xe-9/1/1 unit 0 family inet address 10.6.0.12/16
set interfaces xe-9/1/2 unit 0 family inet description Backup interface for SGW2
set interfaces xe-9/1/2 unit 0 family inet address 10.6.0.13/16
set interfaces xe-9/1/3 unit 0 family inet description Back up interface for SGW2
set interfaces xe-9/1/3 unit 0 family inet address 10.6.0.14/16
set interfaces lo0 unit 0 family inet address 10.11.11.11/32
set interfaces lo0 unit 0 family inet address 10.22.22.22/32
set interfaces lo0 unit 0 family inet address 10.33.33.33/32
set interfaces lo0 unit 0 family inet address 10.44.44.44/32

```



NOTE: This configuration is for the S-GWs and P-GWs only. Other statements, such as for routing protocols or network management, are needed to make this a complete device configuration.

Step-by-Step Procedure

To configure the chassis:

1. Load and merge the default configuration file for the **mobility** group.

```

[edit]
user@mbg-1# load merge /etc/config/mobility-defaults.conf

```

2. Configure the **mobility** group on the Session PICs.

```

[edit]
user@mbg-1# set chassis fpc 0 apply-groups mobility
user@mbg-1# set chassis fpc 1 apply-groups mobility
user@mbg-1# set chassis fpc 7 apply-groups mobility
user@mbg-1# set chassis fpc 8 apply-groups mobility

```



NOTE: You must include every Session PIC configured with the **jservices-mobile** package at the **[edit unified-edge gateways sgw gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC, then the Session PIC cannot be used by the broadband gateway.

3. Configure the interface DPC or MPC at the Packet Forwarding Engine level.

```

[edit]
user@mbg-1# set chassis fpc 2 pfe 0 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 2 pfe 1 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 3 pfe 0 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 3 pfe 1 forwarding-packages mobility ggsn-pgw
user@mbg-1# set chassis fpc 9 pfe 0 forwarding-packages mobility sgw
user@mbg-1# set chassis fpc 9 pfe 1 forwarding-packages mobility sgw
user@mbg-1# set chassis fpc 10 pfe 0 forwarding-packages mobility sgw
user@mbg-1# set chassis fpc 10 pfe 1 forwarding-packages mobility sgw

```



NOTE: You must include every Packet Forwarding Engine configured with the `ggsn-pgw` or `sgw` forwarding package at the `[edit unified-edge gateways ggsn-pgw gateway-name system anchor-pfes]` or `[edit unified-edge gateways sgw gateway-name system anchor-pfes]` hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine will not be used by the broadband gateway.

4. Configure physical interfaces for the P-GWs.

```
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet description Gn interface for PGW1
user@mbg-1# set interfaces xe-2/0/0 unit 0 family inet address 10.11.0.1/16
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet description Gi interface for PGW1
user@mbg-1# set interfaces xe-2/0/1 unit 0 family inet address 10.22.0.1/16
user@mbg-1# set interfaces xe-3/0/0 unit 0 family inet description Gn interface for PGW2
user@mbg-1# set interfaces xe-3/0/0 unit 0 family inet address 10.33.0.1/16
user@mbg-1# set interfaces xe-3/0/1 unit 0 family inet description Gi interface for PGW2
user@mbg-1# set interfaces xe-3/0/1 unit 0 family inet address 10.44.0.1/16
user@mbg-1# set interfaces xe-2/1/0 unit 0 family inet description Backup Gn interface for PGW2
user@mbg-1# set interfaces xe-2/1/0 unit 0 family inet address 10.33.0.2/16
user@mbg-1# set interfaces xe-2/1/1 unit 0 family inet description Backup Gi interface for PGW2
user@mbg-1# set interfaces xe-2/1/1 unit 0 family inet address 10.44.0.2/16
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet description Backup Gn interface for PGW1
user@mbg-1# set interfaces xe-3/1/0 unit 0 family inet address 10.11.0.2/16
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet description Backup Gi interface for PGW1
user@mbg-1# set interfaces xe-3/1/1 unit 0 family inet address 10.22.0.2/16
```

5. Configure the mobile interfaces for the P-GW APNs.

```
user@mbg-1# set interfaces mif unit 3 family inet
user@mbg-1# set interfaces mif unit 4 family inet
```

6. Configure physical interfaces for the S-GWs.

```
user@mbg-1# set interfaces xe-9/0/0 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/0 unit 0 family inet address 10.5.0.1/16
user@mbg-1# set interfaces xe-9/0/1 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/1 unit 0 family inet address 10.5.0.2/16
user@mbg-1# set interfaces xe-9/0/2 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/2 unit 0 family inet address 10.5.0.3/16
user@mbg-1# set interfaces xe-9/0/3 unit 0 family inet description interface for SGW1
user@mbg-1# set interfaces xe-9/0/3 unit 0 family inet address 10.5.0.4/16
```



```

user@mbg-1# set interfaces xe-10/1/0 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/0 unit 0 family inet address 10.5.0.11/16
user@mbg-1# set interfaces xe-10/1/1 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/1 unit 0 family inet address 10.5.0.12/16
user@mbg-1# set interfaces xe-10/1/2 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/2 unit 0 family inet address 10.5.0.13/16
user@mbg-1# set interfaces xe-10/1/3 unit 0 family inet description Backup interface
for SGW1
user@mbg-1# set interfaces xe-10/1/3 unit 0 family inet address 10.5.0.14/16
user@mbg-1# set interfaces xe-10/0/0 unit 0 family inet description interface for
SGW2
user@mbg-1# set interfaces xe-10/0/0 unit 0 family inet address 10.6.0.1/16
user@mbg-1# set interfaces xe-10/0/1 unit 0 family inet description interface for
SGW2
user@mbg-1# set interfaces xe-10/0/1 unit 0 family inet address 10.6.0.2/16
user@mbg-1# set interfaces xe-10/0/2 unit 0 family inet description interface for
SGW2
user@mbg-1# set interfaces xe-10/0/2 unit 0 family inet address 10.6.0.3/16
user@mbg-1# set interfaces xe-10/0/3 unit 0 family inet description interface for
SGW2
user@mbg-1# set interfaces xe-10/0/3 unit 0 family inet address 10.6.0.4/16
user@mbg-1# set interfaces xe-9/1/0 unit 0 family inet description Backup interface
for SGW2
user@mbg-1# set interfaces xe-9/1/0 unit 0 family inet address 10.6.0.11/16
user@mbg-1# set interfaces xe-9/1/1 unit 0 family inet description Backup interface
for SGW2
user@mbg-1# set interfaces xe-9/1/1 unit 0 family inet address 10.6.0.12/16
user@mbg-1# set interfaces xe-9/1/2 unit 0 family inet description Backup interface
for SGW2
user@mbg-1# set interfaces xe-9/1/2 unit 0 family inet address 10.6.0.13/16
user@mbg-1# set interfaces xe-9/1/3 unit 0 family inet description Backup interface
for SGW2
user@mbg-1# set interfaces xe-9/1/3 unit 0 family inet address 10.6.0.14/16

```

7. Configure loopback interfaces for all gateways.

```

[edit]
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.11.11.11/32
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.22.22.22/32
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.33.33.33/32
user@mbg-1# set interfaces lo0 unit 0 family inet address 10.44.44.44/32

```

Results When you have finished this section of the configuration, your results should be similar to this `show chassis | display inheritance` command output:

```

chassis {
  fpc 0 {
    pic 0 {
      adaptive-services {
        service-package {
          extension-provider {
            control-cores 1;
            data-pollers 1;

```

```
        package jservices-mobile;
    }
}
}
pic 1 {
    adaptive-services {
        service-package {
            extension-provider {
                control-cores 1;
                data-pollers 1;
                package jservices-mobile;
            }
        }
    }
}
}
fpc 1 {
    pic 0 {
        adaptive-services {
            service-package {
                extension-provider {
                    control-cores 1;
                    data-pollers 1;
                    package jservices-mobile;
                }
            }
        }
    }
}
pic 1 {
    adaptive-services {
        service-package {
            extension-provider {
                control-cores 1;
                data-pollers 1;
                package jservices-mobile;
            }
        }
    }
}
}
fpc 2 {
    pfe 0 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
    pfe 1 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
}
fpc 3 {
    pfe 0 {
        forwarding-packages {
```

```

        mobility ggsn-pgw;
    }
}
pfe 1 {
    forwarding-packages {
        mobility ggsn-pgw;
    }
}
}
fpc 7 {
    pic 0 {
        adaptive-services {
            service-package {
                extension-provider {
                    control-cores 1;
                    data-pollers 1;
                    package jservices-mobile;
                }
            }
        }
    }
}
pic 1 {
    adaptive-services {
        service-package {
            extension-provider {
                control-cores 1;
                data-pollers 1;
                package jservices-mobile;
            }
        }
    }
}
}
fpc 8 {
    pfe 0 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
    pfe 1 {
        forwarding-packages {
            mobility ggsn-pgw;
        }
    }
}
fpc 9 {
    pfe 0 {
        forwarding-packages {
            mobility sgw;
        }
    }
    pfe 1 {
        forwarding-packages {
            mobility sgw;
        }
    }
}
}

```

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```

    }
  }
}
xe-2/1/1 {
  unit 0 {
    family inet {
      description Backup Gi interface for PGW2;
      address 10.44.0.2/16;
    }
  }
}
xe-3/0/0 {
  unit 0 {
    family inet {
      description Gn interface for PGW2;
      address 10.33.0.1/16;
    }
  }
}
xe-3/0/1 {
  unit 0 {
    family inet {
      description Gi interface for PGW2;
      address 10.44.0.1/16;
    }
  }
}
xe-3/1/0 {
  unit 0 {
    family inet {
      description Backup Gn interface for PGW1;
      address 10.11.0.2/16;
    }
  }
}
xe-3/1/1 {
  unit 0 {
    family inet {
      description Backup Gi interface for PGW1;
      address 10.22.0.2/16;
    }
  }
}
xe-9/0/0 {
  unit 0 {
    family inet {
      description interface for SGW1;
      address 10.5.0.1/16;
    }
  }
}
xe-9/0/1 {
  unit 0 {
    family inet {
      description interface for SGW1;
      address 10.5.0.2/16;
    }
  }
}

```

```
    }  
  }  
}  
xe-9/0/2 {  
  unit 0 {  
    family inet {  
      description interface for SGW1;  
      address 10.5.0.3/16;  
    }  
  }  
}  
xe-9/0/3 {  
  unit 0 {  
    family inet {  
      description interface for SGW1;  
      address 10.5.0.4/16;  
    }  
  }  
}  
xe-9/1/0 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW2;  
      address 10.5.0.11/16;  
    }  
  }  
}  
xe-9/1/1 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW2;  
      address 10.5.0.12/16;  
    }  
  }  
}  
xe-9/1/2 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW2;  
      address 10.5.0.13/16;  
    }  
  }  
}  
xe-9/1/3 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW2;  
      address 10.5.0.14/16;  
    }  
  }  
}  
xe-10/0/0 {  
  unit 0 {  
    family inet {  
      description interface for SGW2;  
      address 10.5.0.21/16;  
    }  
  }  
}
```

```
    }  
  }  
}  
xe-10/0/1 {  
  unit 0 {  
    family inet {  
      description interface for SGW2;  
      address 10.5.0.22/16;  
    }  
  }  
}  
xe-10/0/2 {  
  unit 0 {  
    family inet {  
      description interface for SGW2;  
      address 10.5.0.23/16;  
    }  
  }  
}  
xe-10/0/3 {  
  unit 0 {  
    family inet {  
      description interface for SGW2;  
      address 10.5.0.34/16;  
    }  
  }  
}  
xe-10/1/0 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW1;  
      address 10.5.0.41/16;  
    }  
  }  
}  
xe-10/1/1 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW1;  
      address 10.5.0.42/16;  
    }  
  }  
}  
xe-10/1/2 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW1;  
      address 10.5.0.43/16;  
    }  
  }  
}  
xe-10/1/3 {  
  unit 0 {  
    family inet {  
      description Backup interface for SGW1;  
      address 10.5.0.44/1;6
```

```
    }  
  }  
}
```

Configuring P-GW System Interfaces and Redundancy

CLI Quick Configuration

Next, establish load-balancing of GTP-C packets and redundancy for the P-GWs named PGW1 and PGW2. There is no specific “load-balance” broadband gateway hierarchy, nor is there any Session DPC redundancy section. Instead, you configure load balancing at the **[edit interfaces]** hierarchy level by creating sets of load-balanced Aggregated Multiservice (**ams**) interfaces as Mobile Aggregated Multiservice (**mams-**) interfaces and select one of them as a preferred backup. You configure redundant Packet Forwarding Engines by establishing a primary list of anchors and a secondary list for a group of interfaces.

Include every Session PIC configured with the **jservices-mobile** package for the particular broadband gateway at the **[edit unified-edge gateways ggsn-pgw gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway.

To establish redundancy for GTP-U traffic flows, include every anchor Packet Forwarding Engine configured with the mobile forwarding package for the particular broadband gateway at the **[edit unified-edge gateways ggsn-pgw gateway-name system interfaces pfes]** hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
set interfaces ams0 description "Aggregate Multiservices Session DPC for PGW1 with  
  members mams-0/0/0 and mams-1/1/0"  
set interfaces ams0 load-balancing-options member-interface mams-0/0/0  
set interfaces ams0 load-balancing-options member-interface mams-1/1/0  
set interfaces ams0 load-balancing-options member-failure-options redistribute-all-traffic  
  enable-rejoin  
set interfaces ams0 load-balancing-options high-availability-options many-to-one preferred  
  backup mams-1/1/0  
set interfaces ams1 description "Aggregate Multiservices Session DPC for PGW2 with  
  members mams-1/0/0 and mams-0/1/0"  
set interfaces ams1 load-balancing-options member-interface mams-1/0/0  
set interfaces ams1 load-balancing-options member-interface mams-0/1/0  
set interfaces ams1 load-balancing-options member-failure-options redistribute-all-traffic  
  enable-rejoin  
set interfaces ams1 load-balancing-options high-availability-options many-to-one preferred  
  backup mams-0/1/0  
[edit unified-edge gateways ggsn-pgw PGW1 system session-pics]  
set interface ams0  
[edit unified-edge gateways ggsn-pgw PGW2 system session-pics]  
set interface ams1  
[edit interfaces apfe0 anchoring-options]  
set primary-list pfe-2/0/0
```



```

set secondary pfe-3/1/0
[edit interfaces apfel anchoring-options]
set primary-list pfe-3/0/0
set secondary pfe-2/1/0
[edit unified-edge gateways ggsn-pgw PGW1 system pfes]
set interface apfe0
[edit unified-edge gateways ggsn-pgw PGW2 system pfes]
set interface apfel

```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```

interfaces {
  ams0 {
    description "Aggregate Multiservices Session DPC for PGW1 with members
      mams-0/0/0 and mams-1/1/0"
    load-balancing-options {
      member-interface mams-0/0/0;
      member-interface mams-1/1/0;
      high-availability-options {
        redistribute-all-traffic {
          enable-rejoin;
        }
        many-to-one {
          preferred-backup mams-1/1/0;
        }
      }
    }
  }
  apfe0 {
    anchoring-options {
      primary-list {
        pfe-2/0/0;
      }
      secondary pfe-3/1/0;
    }
  }
  ams1 {
    description "Aggregate Multiservices Session DPC for PGW2 with members mams-1/0/0
      and mams-0/1/0"
    load-balancing-options {
      member-interface mams-1/0/0;
      member-interface mams-0/1/0;
      high-availability-options {
        redistribute-all-traffic {
          enable-rejoin;
        }
        many-to-one {
          preferred-backup mams-0/1/0;
        }
      }
    }
  }
  apfel {
    anchoring-options {

```

```
        primary-list {
            pfe-3/0/0;
        }
        secondary pfe-2/1/0;
    }
}

unified-edge gateways ggsn-pgw PGW1 system {
    session-pics {
        interface ams0;
    }
    pfes {
        interface apfe0;
    }
}

unified-edge gateways ggsn-pgw PGW2 system {
    session-pics {
        interface ams1;
    }
    pfes {
        interface apfe1;
    }
}
```

Configuring P-GW Charging

CLI Quick Configuration

Both P-GWs use offline charging. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude
plmn-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp exclude rat-change
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
volume-limit 1024
set unified-edge gateways ggsn-pgw PGW1 charging trigger-profiles p_tp offline
volume-limit direction both
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
charging-gateways cdr-release r8
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
charging-gateways peer-order peer p_cgf
set unified-edge gateways ggsn-pgw PGW1 charging transport-profiles p_tsp offline
charging-gateways switch-back-time 36
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper profile-id
1
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
transport-profile p_tsp
set unified-edge gateways ggsn-pgw PGW1 charging charging-profiles p_juniper
trigger-profile p_tp
set unified-edge gateways ggsn-pgw PGW1 charging gtp transport-protocol tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtp version v1
set unified-edge gateways ggsn-pgw PGW1 charging gtp header-type long
```

```

set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg
  destination-ipv4-address 10.33.33.99
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  lo0.0
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg source-interface
  ipv4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg destination-port
  3386
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg transport-protocol
  tcp
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg t3-response 5
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg header-type long
set unified-edge gateways ggsn-pgw PGW1 charging gtp peer p_cfg pending-queue-size
  1000
set unified-edge gateways ggsn-pgw PGW1 charging global-profile default-profile p_juniper
set unified-edge gateways ggsn-pgw PGW1 charging global-profile profile-selection-order
  static

```

[edit]

```

set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp exclude
  plmn-change
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp exclude
  rat-change
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp offline
  volume-limit 1024
set unified-edge gateways ggsn-pgw PGW2 charging trigger-profiles p_tp offline
  volume-limit direction both
set unified-edge gateways ggsn-pgw PGW2 charging transport-profiles p_tsp offline
  charging-gateways cdr-release r8
set unified-edge gateways ggsn-pgw PGW2 charging transport-profiles p_tsp offline
  charging-gateways peer-order peer p_cfg
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper profile-id
  1
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper
  transport-profile p_tsp
set unified-edge gateways ggsn-pgw PGW2 charging charging-profiles p_juniper
  trigger-profile p_tp
set unified-edge gateways ggsn-pgw PGW2 charging gtp transport-protocol tcp
set unified-edge gateways ggsn-pgw PGW2 charging gtp version v1
set unified-edge gateways ggsn-pgw PGW2 charging gtp header-type long
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg
  destination-ipv4-address 10.44.44.99
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg source-interface
  lo0.0
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg source-interface
  ipv4-address 10.44.44.44
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg destination-port
  3386
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg transport-protocol
  tcp
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg t3-response 5
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg header-type long

```

```
set unified-edge gateways ggsn-pgw PGW2 charging gtp peer p_cfg pending-queue-size
1000
set unified-edge gateways ggsn-pgw PGW2 charging global-profile default-profile p_juniper
set unified-edge gateways ggsn-pgw PGW2 charging global-profile profile-selection-order
static
```

**Step-by-Step
Procedure**

To configure the offline charging parameters:

1. Configure charging for the P-GW called PGW1.

```
[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 charging
```
2. Specify the global GTP Prime properties of PGW1 to transmit CDRs to the external charging gateway.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v1
user@mbg1# set gtp header-type long
```
3. Specify the GTP Prime properties of PGW1 for the GTP Prime peers.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.33.33.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.33.33.33
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfg version v1
user@mbg1# set gtp peer p_cfg n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000
```
4. Configure the transport and profiles referenced by the charging profile of PGW1 for offline charging.

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r8
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36
```
5. Configure the charging and global profiles for PGW1.

```
[edit unified-edge gateways ggsn-sgw PGW1 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile p_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

6. Configure charging for the P-GW called PGW2.

```
[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW2 charging
```

7. Specify the global GTP Prime properties of PGW2 to transmit CDRs to the external charging gateway.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v1
user@mbg1# set gtp header-type long
```

8. Specify the GTP Prime properties of PGW2 for the GTP Prime peers.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.44.44.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.44.44.44
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfg version v1
user@mbg1# set gtp peer p_cfgfw n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000
```

9. Configure the transport and profiles referenced by the charging profile of PGW2 for offline charging.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r8
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
```

10. Configure the charging and global profiles for PGW2.

```
[edit unified-edge gateways ggsn-pgw PGW2 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile p_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways ggsn-pgw PGW1 charging]
trigger-profiles {
  p_tp {
    exclude {
      plmn-change;
      rat-change;
```

```
    }
    offline {
        volume-limit 1024;
        volume-limit direction both;
    }
}
}
transport-profiles {
    p_tsp {
        offline {
            charging-gateways {
                cdr-release r8;
                peer-order peer p_cfg;
                switch-back-time 36
            }
        }
    }
}
charging-profiles {
    p_juniper {
        profile-id 1;
        transport-profile p_tsp;
        trigger-profile p_tp;
    }
}
gtp {
    peer {
        p_cfg {
            destination-ipv4-address 10.33.33.99;
            destination-port 3386;
            header-type long;
            n3-requests 1;
            pending-queue-size 1000;
            source-interface lo0.0;
            source-interface ipv4-address 10.33.33.33;
            t3-response 5;
            transport-protocol tcp;
        }
    }
    header-type long;
    transport-protocol tcp;
    version v1;
}
global-profile {
    default-profile p_juniper;
    profile-selection-order static;
}
[edit unified-edge gateways ggsn-pgw PGW2 charging]
trigger-profiles {
    p_tp {
        exclude {
            plmn-change;
            rat-change;
        }
        offline {
            volume-limit 1024;
```

```

        volume-limit direction both;
    }
}
transport-profiles {
    p_tsp {
        offline {
            charging-gateways {
                cdr-release r8;
                peer-order peer p_cfg;
                switch-back-time 36
            }
        }
    }
}
charging-profiles {
    p_juniper {
        profile-id 1;
        transport-profile p_tsp;
        trigger-profile p_tp;
    }
}
gtp {
    peer {
        p_cfg {
            destination-ipv4-address 10.33.33.99;
            destination-port 3386;
            header-type long;
            n3-requests 1;
            pending-queue-size 1000;
            source-interface lo0.0;
            source-interface ipv4-address 10.33.33.33;
            t3-response 5;
            transport-protocol tcp;
        }
    }
    header-type long;
    transport-protocol tcp;
    version v1;
}
global-profile {
    default-profile p_juniper;
    profile-selection-order static;
}

```

Configuring P-GW GTP Services

CLI Quick Configuration

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways ggsn-pgw PGW1 gtp interface lo0.0
set unified-edge gateways ggsn-pgw PGW1 gtp interface v4-address 10.33.33.33
set unified-edge gateways ggsn-pgw PGW1 gtp n3-requests 5
set unified-edge gateways ggsn-pgw PGW1 gtp t3-response 3

```

```
set unified-edge gateways ggsn-pgw PGW1 gtp echo-interval 60
set unified-edge gateways ggsn-pgw PGW1 gtp path-management enable
set unified-edge gateways ggsn-pgw PGW1 gtp echo-n3-requests 5
set unified-edge gateways ggsn-pgw PGW1 gtp echo-t3-response 30
set unified-edge gateways ggsn-pgw PGW2 gtp interface lo0.0
set unified-edge gateways ggsn-pgw PGW2 gtp interface v4-address 10.44.44.44
set unified-edge gateways ggsn-pgw PGW2 gtp n3-requests 5
set unified-edge gateways ggsn-pgw PGW2 gtp t3-response 3
set unified-edge gateways ggsn-pgw PGW2 gtp echo-interval 60
set unified-edge gateways ggsn-pgw PGW2 gtp path-management enable
set unified-edge gateways ggsn-pgw PGW2 gtp echo-n3-requests 5
set unified-edge gateways ggsn-pgw PGW2 gtp echo-t3-response 30
```

**Step-by-Step
Procedure**

To configure GTP services:

1. Configure the GTP services for the P-GW called PGW1.

```
[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW1 gtp
```
2. Configure GTP services for the P-GW interfaces for PGW1 with path management disabled.

```
[edit unified-edge gateways pgw PGW1 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.33.33.33
user@mbg1# set n3-requests 5
user@mbg1# set t3-response 3
user@mbg1# set echo-interval 60
user@mbg1# set path-management disable
user@mbg1# set echo-n3-requests 5
user@mbg1# set echo-t3-responses 30
```
3. Configure the GTP services for the P-GW called PGW2.

```
[edit]
user@mbg1# edit unified-edge gateways ggsn-pgw PGW2 gtp
```
4. Configure GTP services for the P-GW interfaces for PGW2 with path management disabled.

```
[edit unified-edge gateways pgw PGW2 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.44.44.44
user@mbg1# set n3-requests 5
user@mbg1# set t3-response 3
user@mbg1# set echo-interval 60
user@mbg1# set path-management disable
user@mbg1# set echo-n3-requests 5
user@mbg1# set echo-t3-responses 30
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways ggsn-pgw PGW1 ]
gtp {
  echo-interval 60;
```



```

interface lo0.0;
interface v4-address 10.33.33.33;
n3-requests 5;
path-management {
    enable;
}
t3-response 3;
}
[edit unified-edge gateways ggsn-pgw PGW2 ]
gtp {
    echo-interval 60;
    interface lo0.0;
    interface v4-address 10.44.44.44;
    n3-requests 5;
    path-management {
        enable;
    }
    t3-response 3;
}

```

Configure P-GW APNs

CLI Quick Configuration

The APNs configured are not complex. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 mobile interface mif.3
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 address-assignment local
set unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1 selection-mode from-ms
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 mobile interface mif.4
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 address-assignment local
set unified-edge gateways ggsn-pgw PGW2 apn-services apns APN1 selection-mode from-ms

```

Step-by-Step Procedure

To configure APNs for the P-GWs called PGW1 and PGW2:

1. Configure APN1 for the P-GW called PGW1.

```

[edit]
user@mbg1 edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns APN1]
user@mbg1 set mobile-interface mif.3
user@mbg1 set address-assignment local
user@mbg1 set selection-mode from-ms

```



NOTE: A local address assignment uses the default mobile pool to assign the IP address. The default pool is configured in the routing instance that is associated with the mobile interface of the APN and is not detailed here.

2. Configure APN2 for the P-GW called PGW2.

```
[edit]
user@mbg1 edit unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2
[edit unified-edge gateways ggsn-pgw PGW2 apn-services apns APN2]
user@mbg1 set mobile-interface mif.4
user@mbg1 set address-assignment local
user@mbg1 set selection-mode from-ms
```



NOTE: A local address assignment uses the default mobile pool to assign the IP address. The default pool is configured in the routing instance that is associated with the mobile interface of the APN and is not detailed here.

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
[edit unified-edge gateways ggsn-pgw PGW1 apn-services apns]
APN1 {
  address-assignment local;
  mobile-interface mif.3;
  selection-mode from-ms;
}
[edit unified-edge gateways ggsn-pgw PGW2 apn-services apns]
APN2 {
  address-assignment local;
  mobile-interface mif.4;
  selection-mode from-ms;
}
```

Configuring S-GW System Interfaces and Redundancy

CLI Quick Configuration Now, establish load-balancing of GTP-C packets and redundancy for the S-GWs named SGW1 and SGW2. There is no specific “load-balance” broadband gateway hierarchy, nor is there any Session DPC redundancy section. Instead, you configure load balancing at the **[edit interfaces]** hierarchy level by creating sets of load-balanced Aggregated Multiservice (**ams**) interfaces as Mobile Aggregated Multiservice (**mams-**) interfaces and select one of them as a preferred backup. You configure redundant Packet Forwarding Engines by establishing a primary list of anchors and a secondary list for a group of interfaces.

Include every Session PIC configured with the **jservices-mobile** package for the particular broadband gateway at the **[edit unified-edge gateways sgw gateway-name system session-pics]** hierarchy level on the broadband gateway. If you do not include the Session PIC as a system interface, then the Session PIC cannot be used by the broadband gateway.

To establish redundancy for GTP-U traffic flows, include every anchor Packet Forwarding Engine configured with the mobile forwarding package for the particular broadband gateway at the **[edit unified-edge gateways sgw gateway-name system interfaces]** hierarchy level on the broadband gateway. If you do not specify the Packet Forwarding Engine as

an anchor interface, then the Packet Forwarding Engine cannot be used by the broadband gateway.

To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
set interfaces ams2 description "Aggregate Multiservices Session DPC for SGW1 with
members mams-7/0/0 and mams-8/1/0"
set interfaces ams2 load-balancing-options member-interface mams-7/0/0
set interfaces ams2 load-balancing-options member-interface mams-8/1/0
set interfaces ams2 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams2 load-balancing-options high-availability-options many-to-one preferred
backup mams-8/1/0
set interfaces ams3 description "Aggregate Multiservices Session DPC for SGW2 with
members mams-8/0/0 and mams-7/1/0"
set interfaces ams3 load-balancing-options member-interface mams-8/0/0
set interfaces ams3 load-balancing-options member-interface mams-7/1/0
set interfaces ams3 load-balancing-options member-failure-options redistribute-all-traffic
enable-rejoin
set interfaces ams3 load-balancing-options high-availability-options many-to-one preferred
backup mams-7/1/0
```

Step-by-Step Procedure

1. Configure the Multiservices PIC interfaces for the S-GWs.

```
[edit]
user@mbg-1# set interfaces ams2 description "Aggregate Multiservices Session
DPC for SGW1 with members mams-7/0/0 and mams-8/1/0"
user@mbg-1# set interfaces ams2 load-balancing-options member-interface
mams-7/0/0
user@mbg-1# set interfaces ams2 load-balancing-options member-interface
mams-8/1/0
user@mbg-1# set interfaces ams2 load-balancing-options member-failure-options
redistribute-all-traffic enable-rejoin
user@mbg-1# set interfaces ams2 load-balancing-options high-availability-options
many-to-one preferred backup mams-8/1/0
user@mbg-1# set interfaces ams3 description "Aggregate Multiservices Session
DPC for SGW2 with members mams-8/0/0 and mams-7/1/0"
user@mbg-1# set interfaces ams3 load-balancing-options member-interface
mams-10/0/0
user@mbg-1# set interfaces ams3 load-balancing-options member-interface
mams-9/1/0
user@mbg-1# set interfaces ams3 load-balancing-options member-failure-options
redistribute-all-traffic enable-rejoin
user@mbg-1# set interfaces ams3 load-balancing-options high-availability-options
many-to-one preferred backup mams-7/1/0
```

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
interfaces {
  ams2 {
    description "Aggregate Multiservices Session DPC for SGW1 with members mams-7/0/0
and mams-8/1/0"
    load-balancing-options {
```

```
        member-interface mams-7/0/0;
        member-interface mams-8/1/0;
        high-availability-options {
            redistribute-all-traffic {
                enable-rejoin;
            }
            many-to-one {
                preferred-backup mams-8/1/0;
            }
        }
    }
}
apfe2 {
    anchoring-options {
        primary-list {
            pfe-9/0/0;
        }
        secondary pfe-10/1/0;
    }
}
ams3 {
    load-balancing-options {
        member-interface mams-8/0/0;
        member-interface mams-7/1/0;
        high-availability-options {
            redistribute-all-traffic {
                enable-rejoin;
            }
            many-to-one {
                preferred-backup mams-7/1/0;
            }
        }
    }
}
apfe3 {
    anchoring-options {
        primary-list {
            pfe-10/0/0;
        }
        secondary pfe-9/1/0;
    }
}
}

unified-edge gateways sgw SGW1 system {
    session-pics {
        interface ams2;
    }
    pfes {
        interface apfe2;
    }
}

unified-edge gatewayssgw SGW2 system {
    session-pics {
```

```

        interface ams3;
    }
    pfes {
        interface apfe3;
    }
}

```

Configuring S-GW Charging

CLI Quick Configuration Although S-GWs have no APNs, they still must understand user charging rules and Charging Detail Records (CDRs) to the charging gateway. To quickly configure this example, copy the following commands and paste them into the router terminal window:

```

[edit]
set unified-edge gateways sgw SGW1 charging trigger-profiles s_tp offline volume-limit
  1024
set unified-edge gateways sgw SGW1 charging trigger-profiles s_tp offline volume-limit
  direction both
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline
  charging-gateways cdr-release r9
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline
  charging-gateways peer-order peer p_cfg
set unified-edge gateways sgw SGW1 charging transport-profiles p_tsp offline
  charging-gateways switch-back-time 36
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper profile-id 1
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper transport-profile
  p_tsp
set unified-edge gateways sgw SGW1 charging charging-profiles p_juniper trigger-profile
  s_tp
set unified-edge gateways sgw SGW1 charging gtpv transport-protocol tcp
set unified-edge gateways sgw SGW1 charging gtpv version v2
set unified-edge gateways sgw SGW1 charging gtpv header-type long
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg destination-ipv4-address
  10.11.11.99
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg source-interface lo0.0
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg source-interface
  ipv4-address 10.11.11.11
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg destination-port 3386
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg transport-protocol tcp
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg version v2
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg n3-requests 1
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg t3-response 5
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg header-type long
set unified-edge gateways sgw SGW1 charging gtpv peer p_cfg pending-queue-size 1000
set unified-edge gateways sgw SGW1 charging global-profile default-profile p_juniper
set unified-edge gateways sgw SGW1 charging global-profile profile-selection-order static

[edit]
set unified-edge gateways sgw SGW2 charging trigger-profiles p_tp exclude plmn-change
set unified-edge gateways sgw SGW2 charging trigger-profiles p_tp exclude rat-change
set unified-edge gateways sgw SGW2 charging trigger-profiles s_tp offline volume-limit
  1024
set unified-edge gateways sgw SGW2 charging trigger-profiles s_tp offline volume-limit
  direction both

```

```

set unified-edge gateways sgw SGW2 charging transport-profiles p_tsp offline
charging-gateways cdr-release r9
set unified-edge gateways sgw SGW2 charging transport-profiles p_tsp offline
charging-gateways peer-order peer p_cfg
set unified-edge gateways sgw SGW2 charging transport-profiles p_tsp offline
charging-gateways switchback-time 36
set unified-edge gateways sgw SGW2 charging charging-profiles p_juniper profile-id 1
set unified-edge gateways sgw SGW2 charging charging-profiles p_juniper transport-profile
p_tsp
set unified-edge gateways sgw SGW2 charging charging-profiles p_juniper trigger-profile
s_tp
set unified-edge gateways sgw SGW2 charging gtp transport-protocol tcp
set unified-edge gateways sgw SGW2 charging gtp version v0
set unified-edge gateways sgw SGW2 charging gtp header-type long
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg destination-ipv4-address
10.22.22.99
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg source-interface lo0.0
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg source-interface
ipv4-address 10.22.22.22
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg destination-port 3386
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg transport-protocol tcp
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg version v2
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg n3-requests 1
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg t3-response 5
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg header-type long
set unified-edge gateways sgw SGW2 charging gtp peer p_cfg pending-queue-size 1000
set unified-edge gateways sgw SGW2 charging global-profile default-profile p_juniper
set unified-edge gateways sgw SGW2 charging global-profile profile-selection-order static

```

Step-by-Step Procedure

To configure the charging parameters:

1. Configure charging for the S-GW called SGW1.

```

[edit]
user@mbg1# edit unified-edge gateways sgw SGW1 charging

```
2. Specify the global GTP Prime properties of SGW1 to transmit CDRs to the external charging gateway.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v2
user@mbg1# set gtp header-type long

```
3. Specify the GTP Prime properties of SGW1 for the GTP Prime peers.

```

[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.11.11.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.11.11.11
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfg version v2
user@mbg1# set gtp peer p_cfg n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000

```

4. Configure the transport and profiles referenced by the charging profile of SGW1 for offline charging.

```
[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set trigger-profiles s_tp offline volume-limit 1024
user@mbg1# set trigger-profiles s_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r9
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36
```

5. Configure the charging and global profiles for SGW1.

```
[edit unified-edge gateways sgw SGW1 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile s_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

6. Configure charging for the S-GW called SGW2.

```
[edit]
user@mbg1# edit unified-edge gateways sgw SGW2 charging
```

7. Specify the global GTP Prime properties of SGW2 to transmit CDRs to the external charging gateway.

```
[edit unified-edge gateways sgw SGW2 charging]
user@mbg1# set gtp transport-protocol tcp
user@mbg1# set gtp version v2
user@mbg1# set gtp header-type long
```

8. Specify the GTP Prime properties of SGW2 for the GTP Prime peers.

```
[edit unified-edge gateways sgw SGW2 charging]
user@mbg1# set gtp peer p_cfg destination-ipv4-address 10.22.22.99
user@mbg1# set gtp peer p_cfg source-interface lo0.0
user@mbg1# set gtp peer p_cfg source-interface ipv4-address 10.22.22.22
user@mbg1# set gtp peer p_cfg destination-port 3386
user@mbg1# set gtp peer p_cfg transport-protocol tcp
user@mbg1# set gtp peer p_cfgfw version v0
user@mbg1# set gtp peer p_cfgfw n3-requests 1
user@mbg1# set gtp peer p_cfg t3-response 5
user@mbg1# set gtp peer p_cfg header-type long
user@mbg1# set gtp peer p_cfg pending-queue-size 1000
```

9. Configure the transport and profiles referenced by the charging profile of SGW2 for offline charging.

```
[edit unified-edge gateways sgw SGW2 charging]
user@mbg1# set trigger-profiles p_tp exclude plmn-change
user@mbg1# set trigger-profiles p_tp exclude rat-change
user@mbg1# set trigger-profiles p_tp offline volume-limit 1024
user@mbg1# set trigger-profiles p_tp offline volume-limit direction both
user@mbg1# set transport-profiles p_tsp offline charging-gateways cdr-release r9
```

```
user@mbg1# set transport-profiles p_tsp offline charging-gateways peer-order peer
p_cfg
user@mbg1# set transport-profiles p_tsp offline charging-gateways
switch-back-time 36
```

10. Configure the charging and global profiles for SGW2.

```
[edit unified-edge gateways sgw SGW2 charging]
user@mbg1# set charging-profiles p_juniper profile-id 1
user@mbg1# set charging-profiles p_juniper transport-profile p_tsp
user@mbg1# set charging-profiles p_juniper trigger-profile s_tp
user@mbg1# set charging-profiles p_juniper global-profile p_juniper
user@mbg1# set charging-profiles p_juniper global-profile profile-selection-order
static
```

Results When you have finished this section of the configuration, your results should be similar to this **show** command output:

```
[edit unified-edge gateways sgw SGW1 charging]
trigger-profiles {
  p_tp {
    exclude {
      plmn-change;
      rat-change;
    }
    offline {
      volume-limit 1024;
      volume-limit direction both;
    }
  }
}
transport-profiles {
  p_tsp {
    offline {
      charging-gateways {
        cdr-release r9;
        peer-order peer p_cfg;
        switch-back-time 36;
      }
    }
  }
}
charging-profiles {
  p_juniper {
    profile-id 1;
    transport-profile p_tsp;
    trigger-profile p_tp;
  }
}
gtp {
  peer {
    p_cfg {
      destination-ipv4-address 10.11.11.99;
      destination-port 3386;
      header-type long;
      n3-requests 1;
    }
  }
}
```



```

        pending-queue-size 1000;
        source-interface lo0.0;
        source-interface ipv4-address 10.11.11.11;
        t3-response 5;
        transport-protocol tcp;
    }
}
header-type long;
transport-protocol tcp;
version v2;
}
global-profile {
    default-profile p_juniper;
    profile-selection-order static;
}
[edit unified-edge gateways sgw SGW2 charging]
trigger-profiles {
    p_tp {
        exclude {
            plmn-change;
            rat-change;
        }
        offline {
            volume-limit 1024;
            volume-limit direction both;
        }
    }
}
transport-profiles {
    p_tsp {
        offline {
            charging-gateways {
                cdr-release r9;
                peer-order peer p_cfg;
                switch-back-time 36;
            }
        }
    }
}
charging-profiles {
    p_juniper {
        profile-id 1;
        transport-profile p_tsp;
        trigger-profile p_tp;
    }
}
gtp {
    peer {
        p_cfg {
            destination-ipv4-address 10.22.22.99;
            destination-port 3386;
            header-type long;
            n3-requests 1;
            pending-queue-size 1000;
            source-interface lo0.0;
            source-interface ipv4-address 10.22.22.22;

```

```
t3-response 5;
transport-protocol tcp;
}
}
header-type long;
transport-protocol tcp;
version v2;
}
global-profile {
  default-profile p_juniper;
  profile-selection-order static;
}
```

Configuring S-GW GTP Services

CLI Quick Configuration To quickly configure this example, copy the following commands and paste them into the router terminal window:

```
[edit]
set unified-edge gateways sgw SGW1 gtp interface lo0.0
set unified-edge gateways sgw SGW1 gtp interface v4-address 10.11.11.11
set unified-edge gateways sgw SGW1 gtp path-management disable
set unified-edge gateways sgw SGW1 gtp control path-management disable
set unified-edge gateways sgw SGW1 gtp data path-management disable
set unified-edge gateways sgw SGW1 gtp slu echo-interval 60
set unified-edge gateways sgw SGW1 gtp s11 ech0-n3-requests 5
set unified-edge gateways sgw SGW1 gtp s11 echo-t3-response 30
set unified-edge gateways sgw SGW2 gtp interface lo0.0
set unified-edge gateways sgw SGW2 gtp interface v4-address 10.22.22.22
set unified-edge gateways sgw SGW2 gtp control path-management disable
set unified-edge gateways sgw SGW2 gtp data path-management disable
set unified-edge gateways sgw SGW2 gtp slu echo-interval 60
set unified-edge gateways sgw SGW2 gtp s11 ech0-n3-requests 5
set unified-edge gateways sgw SGW2 gtp s11 echo-t3-response 30
```

Step-by-Step Procedure To configure GTP services:

1. Configure the GTP services for the S-GW called SGW1.

```
[edit]
user@mbg1# edit unified-edge gateways sgw SGW1 gtp
```

2. Configure GTP services for the S-GW GTP interfaces for SGW1 with path management disabled.

```
[edit unified-edge gateways sgw SGW1 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.11.11.11
user@mbg1# set path-management disable
user@mbg1# set control path-management disable
user@mbg1# set data path-management disable
user@mbg1# set slu echo-interval 60
user@mbg1# set s11 echo-n3-requests 5
user@mbg1# set s11 echo-t3-responses 60
```

3. Configure GTP services for the S-GW GTP interfaces for SGW2 with path management disabled.

```
[edit unified-edge gateways sgw SGW2 gtp]
user@mbg1# set interface lo0.0
user@mbg1# set interface v4-address 10.22.22.22
user@mbg1# set path-management disable
user@mbg1# set control path-management disable
user@mbg1# set data path-management disable
user@mbg1# set slu echo-interval 60
user@mbg1# set sll echo-n3-requests 5
user@mbg1# set sll echo-t3-responses 60
```

Results When you have finished this section of the configuration, your results should be similar to these **show** command outputs:

```
[edit unified-edge gateways sgw SGW1]
gtp {
  interface lo0.0;
  interface v4-address 10.11.11.11;
  control {
    path-management {
      disable;
    }
  }
  data {
    path-management {
      disable;
    }
  }
  path-management {
    disable;
  }
  slu {
    echo-interval 60;
  }
  sll {
    echo-n3-requests 5;
    echo-t3-responses 60;
  }
}
[edit unified-edge gateways sgw SGW2]
gtp {
  interface lo0.0;
  interface v4-address 10.22.22.22;
  control {
    path-management {
      disable;
    }
  }
  data {
    path-management {
      disable;
    }
  }
}
```

```
path-management {
  disable;
}
slu {
  echo-interval 60;
}
sll {
  echo-n3-requests 5;
  echo-t3-responses 60;
}
}
```

Verification

Verifying Gateway Status

Purpose Verify the gateways for the broadband gateway.

Action user@mbg1> show unified-edge gateways brief

Total number of configured gateways: 4

Gateway name: PGW1
Gateway type: ggsn-pgw
Gateway id: 1

Gateway name: PGW2
Gateway type: ggsn-pgw
Gateway id: 2

Gateway name: SGW1
Gateway type: sgw
Gateway id: 3

Gateway name: SGW2
Gateway type: sgw
Gateway id: 4

Meaning The `show unified-edge gateways brief` command displays information about the configured gateways.

Related Documentation

- [Understanding Multiple and Colocated and Mobile Gateways on page 3](#)
- [Example: Configuring Multiple P-GWs on page 15](#)
- [Example: Configuring a Colocated P-GW and S-GW on page 34](#)

PART 3

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