CHAPTER 4

Managing RAN Backhaul Services

This chapter describes how to use Prime Provisioning to manage radio access network (RAN) backhaul services in Prime Provisioning. It contains the following sections:

Overview of RAN Backhaul Services

Radio access network (RAN) transport manages the backhaul traffic (both voice and data) from the cell site base transceiver stations (BTSs) to aggregation nodes and to base station controllers (BSCs), between BSCs, and between the BSC and an associated mobile switching center (MSC). Figure 4-1 shows an example RAN backhaul topology.

Figure 4-1 Example RAN Backhaul Topology

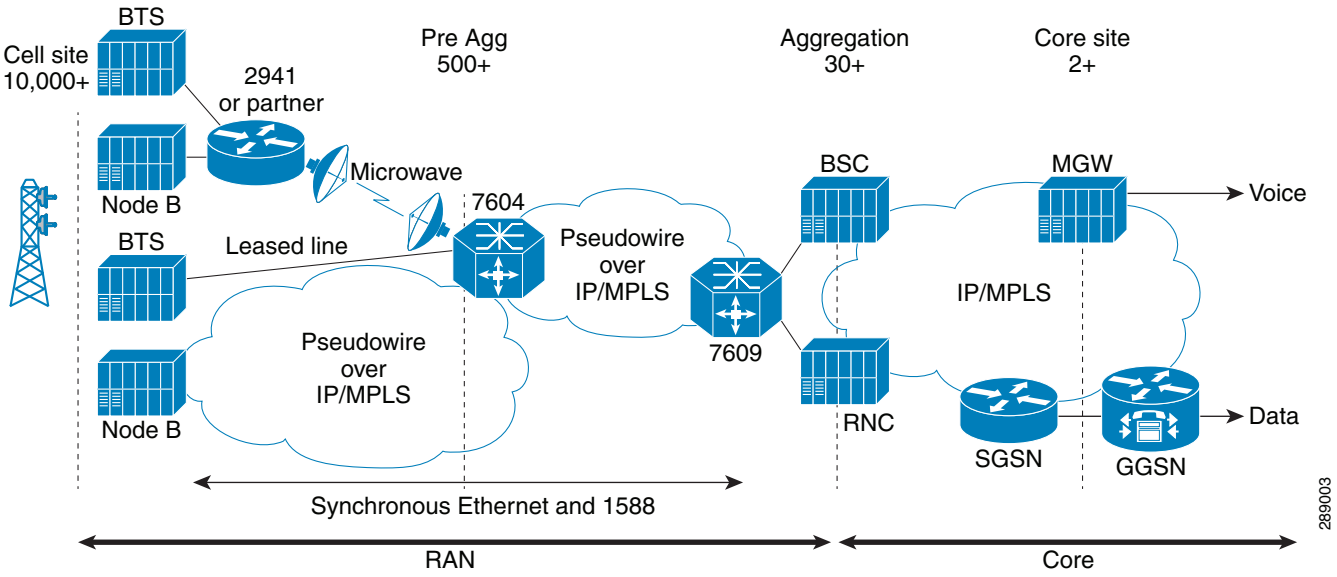
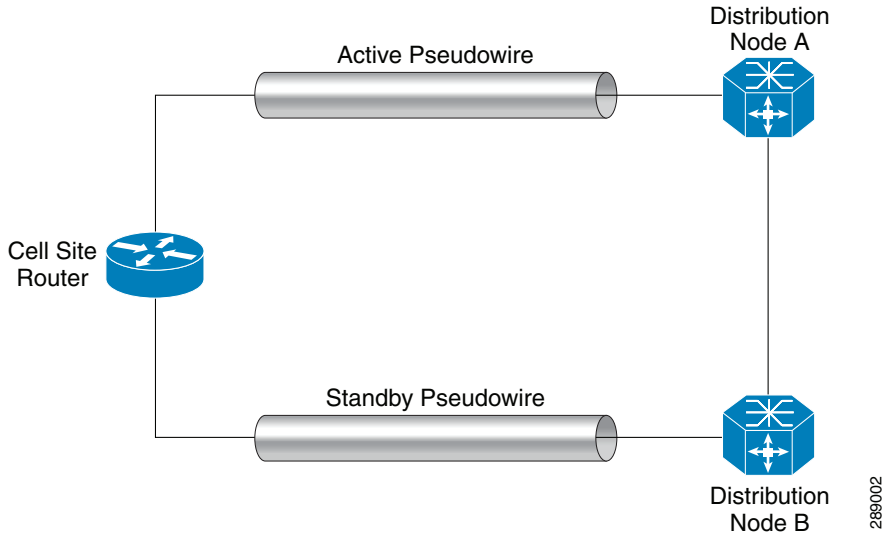


Figure 4-2 is an abstracted topology view that is used in this chapter when discussing how to configure RAN backhaul services in the Prime Provisioning GUI.

Figure 4-2 Abstracted RAN Backhual Topology



Prime Provisioning uses Internet Protocol (IP) to transport backhaul traffic in RANs. You use Ethernet Virtual Circuit (EVC) policies and service requests in Prime Provisioning to provision the following services to support RAN backhaul traffic management:

- Circuit Emulation Time Delay Multiple Access (CEM TDM)
- Pseudowire provisioning of Asynchronous Transfer Mode (ATM)

In addition, the EVC service requests use CEM and pseudowire class objects to bundle common attributes for resuse on every node where the service is provisioned.

The basic workflow for configuring and managing RAN backhaul services in Prime Provisioning, involves the following tasks:

1. Verify prerequisites and preform necessary setup tasks.
2. Create CEM and/or pseudowire classes to be used in RAN backhaul policies and service requests.
3. Create the CEM TDM or ATM policy.
4. Create template(s) for use in the CEM TDM or ATM service request.
5. Create the CEM TDM or ATM service request.
6. Deploy the service request to the device(s) on the network.

The chapter is organized into two sections, one for CEM TDM services and one for ATM services. The above workflow tasks are documented in each of these sections.

Prerequisites

This section covers prerequisites and limitations you should be aware of before configuring RAN backhaul services in Prime Provisioning.

To create CEM TDM policies and service requests, you must first define the service-related elements Prime Provisioning, such as target devices and network links. Normally, you create these elements once. For some coverage of these tasks, see Setting Up the Prime Provisioning Services, page 3-7. Also see other chapters of this guide for how to perform basic infrastructure set up and discovery tasks. The information in the following chapters assumes you have already performed these preliminary tasks.

- Chapter 4, “Working with CEM TDM Services (RAN Backhaul)”
- Chapter 5, “Working with ATM Services (RAN Backhaul)”

Sample Configlets for RAN Backhaul Services

This section provides sample configlets for RAN backhaul service provisioning in Prime Provisioning. It contains the following subsections:

Overview

The configlets provided in this section show the CLIs generated by Prime Provisioning for particular services and features. Each configlet example provides the following information:

- Service
- Feature
- Devices configuration (network role, hardware platform, relationship of the devices and other relevant information)
- Sample configlets for each device in the configuration
- Comments

Note The configlets generated by Prime Provisioning are only the delta between what needs to be provisioned and what currently exists on the device. This means that if a relevant CLI is already on the device, it does not show up in the associated configlet.

Note The CLIs shown in bold are the most relevant commands.

CEM TDM using SAToP PW3

Configuration

- Service: RAN Backhaul.
- Feature: This sections contains sample configlets that would be generated for CEM TDM SAToP PW3 service on a cell site router and two distribution nodes (A and B).
- Device configuration:
  - The cell site router is an MWR 2941-DC router with an IOS image.

    Controller: E1 0/0

    Interface(s): CEM 0/0
  - Distribution node A is a 760X series device with IOS image.

    Contoller: SONET 3/0/0

    Interface(s): CEM 3/0/0
  - Distribution node B is a 760X series device with IOS image.

    Contoller: SONET 3/0/0

    Interface(s): CEM 3/0/0

Configlets

Cell Site Router

```
pseudowire-class c76a3-1
 encapsulation mpls
!
pseudowire-class c76a3-2
 encapsulation mpls
!
controller E1 0/0
 clock source internal
 cem-group 0 unframed
!
interface CEM0/0
 no ip address
 cem 0
  xconnect 10.0.0.1 2090102001 pw-class c76a3-1
   backup peer 10.0.0.4 2090403001 pw-class c76a3-2
```

Distribution Node A	Distribution Node B

pseudowire-class c76a3-1
 encapsulation mpls
 preferred-path interface Tunnel211
!
controller SONET 3/0/0
 ais-shut
 framing sdh
 clock source line
 aug mapping au-4
 !
 au-4 1 tug-3 2
  mode c-12
 tug-2 1 e1 1 description m29a2-3(CEM0/0)
  tug-2 1 e1 1 cem-group 100 unframed
!
interface CEM3/0/0
 no ip address
 cem 100
  xconnect 10.0.0.1 2090102001 pw-class
c76a3-1 sequencing both
	pseudowire-class c76a3-2
	 encapsulation mpls
	 preferred-path interface Tunnel340
	!
	controller SONET 3/0/0
	 ais-shut
	 framing sdh
	 clock source line
	 aug mapping au-4
	 !
	 au-4 1 tug-3 2
	  mode c-12
	 tug-2 1 e1 1 description m29a2-3(CEM0/0)
	  tug-2 1 e1 1 cem-group 100 unframed
	  tug-2 1 e1 1 framing unframed
	!
	interface CEM3/0/0
	 cem 100
	  xconnect 10.0.0.4 2090403001 pw-class
	c76a3-2 sequencing both

Comments

- None.

CEM TDM using CESoPSN

Configuration

- Service: RAN Backhaul.
- Feature: This sections contains sample configlets that would be generated for CEM TDM CESoPSN service on a cell site router and two distribution nodes (A and B).
- Device configuration:
  - The cell site router is an MWR 2941-DC router with an IOS image.

    Contoller: E1 0/4

    Interface(s): CEM 0/4
  - Distribution node A is a 760X series device with IOS image.

    Contoller: SONET 3/0/0

    Interface(s): CEM 3/0/0
  - Distribution node B is a 760X series device with IOS image.

    Contoller: SONET 3/0/0

    Interface(s): CEM 3/0/0

Configlets

Cell Site Router

```
pseudowire-class c76a3-1
 encapsulation mpls
!
pseudowire-class c76a3-2
 encapsulation mpls
!
controller E1 0/4
 clock source internal
 cem-group 0 timeslots 1-7
!
interface CEM0/4
 cem 0
  xconnect 10.0.0.1 3090102001 pw-class c76a3-1
   backup peer 10.0.0.4 3090403001 pw-class c76a3-2
```

Distribution Node A	Distribution Node B

pseudowire-class c76a3-1
 encapsulation mpls
 preferred-path interface Tunnel211
!
controller SONET 3/0/0
 ais-shut
 framing sdh
 clock source line
 aug mapping au-4
 !
 au-4 1 tug-3 2
  mode c-12
 tug-2 2 e1 2 description m29a2-3(CEM0/4 cem 0)
  tug-2 2 e1 2 cem-group 104 timeslots 1-7
 !
 interface CEM3/0/0
  cem 104
  xconnect 10.0.0.1 3090102001 pw-class c76a3-1 sequencing both
	pseudowire-class c76a3-2
	 encapsulation mpls
	 preferred-path interface Tunnel340
	!
	controller SONET 3/0/0
	 ais-shut
	 framing sdh
	 clock source line
	 aug mapping au-4
	 !
	 au-4 1 tug-3 2
	  mode c-12
	tug-2 2 e1 2 description m29a2-3(CEM0/4 cem 0)
	  tug-2 2 e1 2 cem-group 104 timeslots 1-7
	!
	interface CEM3/0/0
	 cem 104
	  xconnect 10.0.0.4 3090403001 pw-class c76a3-2 sequencing both

Comments

- None.

ATM/IMA PVP Service

Configuration

- Service: RAN Backhaul.
- Feature: This sections contains sample configlets that would be generated for ATM PVP service on a cell site router and two distribution nodes.
- Device configuration:
  - The cell site router is an MWR 2941-DC router with an IOS image.

    Contoller(s): E1 0/12, E1 0/13

    Interface(s): ATM0/IMA2
  - Distribution node A is a 760X series device with IOS image.

    Interface(s): ATM 3/1/1
  - Distribution node B is a 760X series device with IOS image.

    Interface(s): ATM 3/1/1

Configlets

Cell Site Router

```
pseudowire-class c76a3-1
 encapsulation mpls
!
pseudowire-class c76a3-2
 encapsulation mpls
!
controller E1 0/12
 framing NO-CRC4
 clock source internal
 ima-group 2 scrambling-payload
!
controller E1 0/13
 framing NO-CRC4
 clock source internal
 ima-group 2 scrambling-payload
!
interface ATM0/IMA2
 no ip address
 ima version 1.0
 ima group-id 2
 atm mcpt-timers 1000 5000 10000
 atm pvp 9 l2transport
  cell-packing 28 mcpt-timer 3
  xconnect 10.0.0.1 4090102003 pw-class c76a3-1
   backup peer 10.0.0.4 4090403003 pw-class c76a3-2
 no atm ilmi-keepalive
```

Distribution Node Z	Distribution Node Z Backup

pseudowire-class c76a3-1
 encapsulation mpls
 preferred-path interface Tunnel211
!
interface ATM3/1/1
 no ip address
 atm mcpt-timers 1000 5000 10000
 atm pvp 9 l2transport
  cell-packing 28 mcpt-timer 3
  xconnect 10.0.0.1 4090102003 pw-class c76a3-1
 no atm enable-ilmi-trap
	pseudowire-class c76a3-2
	 encapsulation mpls
	 preferred-path interface Tunnel340
	!
	interface ATM3/1/1
	 no ip address
	 atm mcpt-timers 1000 5000 10000
	 atm pvp 9 l2transport
	  cell-packing 28 mcpt-timer 3
	  xconnect 10.0.0.4 4090403003 pw-class c76a3-2
	 no atm enable-ilmi-trap

Comments

- None.

ATM/IMA VCC Service

Configuration

- Service: RAN Backhaul.
- Feature: This sections contains sample configlets that would be generated for ATM VCC service on a cell site router and two distribution nodes.
- Device configuration:
  - The cell site router is an MWR 2941-DC router with an IOS image.

    Contoller(s): E1 0/8, E1 0/9

    Interface(s): ATM0/IMA0, ATM0/ IMA0
  - Distribution node A is a 760X series device with IOS image.

    Interface(s): ATM 3/1/0
  - Distribution node B is a 760X series device with IOS image.

    Interface(s): ATM 3/1/0

Configlets

Cell Site Router

```
pseudowire-class c76a3-1
 encapsulation mpls
!
pseudowire-class c76a3-2
 encapsulation mpls
!
controller E1 0/8
 framing NO-CRC4
 clock source internal
 ima-group 0 scrambling-payload
!
controller E1 0/9
 framing NO-CRC4
 clock source internal
 ima-group 0 scrambling-payload
!
interface ATM0/IMA0
 ima version 1.0
 ima group-id 0
 atm mcpt-timers 1000 5000 10000
!
interface ATM0/IMA0.1 point-to-point
 snmp trap link-status
 pvc 9/34 l2transport
  cbr 255
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 10.0.0.1 4090102001 pw-class c76a3-1
   backup peer 10.0.0.4 4090403001 pw-class c76a3-2
```

Distribution Node Z	Distribution Node Z Backup

pseudowire-class c76a3-1
 encapsulation mpls
 preferred-path interface Tunnel211
!
interface ATM3/1/0
 atm mcpt-timers 1000 5000 10000
!
interface ATM3/1/0.9001 point-to-point
 description m29a2-3 - ATM0/IMA0
 no atm enable-ilmi-trap
 pvc 9/34 l2transport
  cell-packing 28 mcpt-timer 3
  encapsulation aal0
  xconnect 10.0.0.1 4090102001 pw-class c76a3-1
	pseudowire-class c76a3-2
	 encapsulation mpls
	 preferred-path interface Tunnel340
	!
	interface ATM3/1/0
	 atm mcpt-timers 1000 5000 10000
	!
	interface ATM3/1/0.9001 point-to-point
	 description m29a2-3 - ATM0/IMA0
	 no atm enable-ilmi-trap
	 pvc 9/34 l2transport
	  cell-packing 28 mcpt-timer 3
	  encapsulation aal0
	  xconnect 10.0.0.4 4090403001 pw-class c76a3-2

Comments

- None.