APPENDIX B

Configuration Examples

This appendix provides real-world examples of RAN-O configurations.

Note The network addresses in these examples are generic addresses, so you must replace them with actual addresses for you network.

Overview

The Radio Access Network-Optimization (RAN-O) supports a variety of topology designs based on various Global System for Mobile Communications (GSM) and Universal Mobile Telecommunications System (UMTS) configurations. Here are some common pieces to this topology:

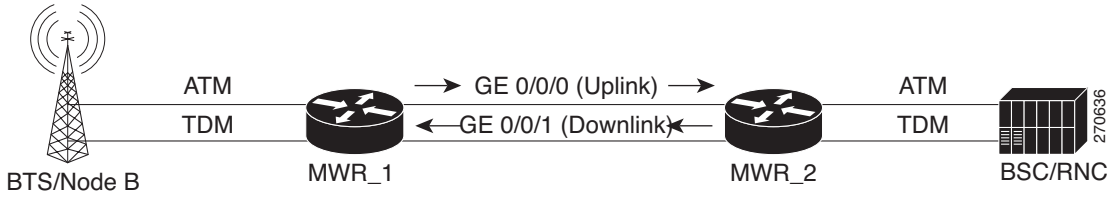
- A *backhaul* interface is used to transfer optimized GSM/UMTS traffic between RAN-O devices. The traditional backhaul interface is comprised of one or more T1/E1 controllers logically combined to form a *multilink* connect (except High-Speed Down link Packet Access [HSDPA] which uses the backhaul interface for T1/E1 line clocking). The current versions of RAN-O deployment will include faster backhaul interfaces such as Fast Ethernet (FE) and Gigabit Ethernet (GE).

- A *shorthaul* interface is used to transfer GSM and UMTS traffic from the Base Transceiver Station (BTS)/Node-B to the Cisco 3825 router and from the Cisco 3825 router to the Base Station Controller/Radio Network Controller (BSC/RNC). The traditional shorthaul connections on the RAN-O devices are connected through the Cisco 2-port T1/E1-RAN interface cards.
- Topology naming conventions such as, 3x2 and 4x3 are used to describe the type of deployment. The first number signifies the number of GSM/UMTS shorthaul interface connections while the second number signifies the number of multilink backhaul interface connections. In the case of a combined GSM/UMTS network, the conventional 3:2x2 can be used where :2 signifies the number of UMTS shorthaul interface connections.

Asymmetric PWE3 Configuration

The following is an example of an Asymmetric PWE3 configuration (see Figure B-1):

Figure B-1 Asymmetric PWE3 Configuration



PE_1

```
version 12.4
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
no service password-encryption
!
hostname MWR1
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 2147483
!
no aaa new-model
memory-size iomem 25
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/1/1
```

```
ipran-alt-interrupt tracing
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
no ip domain lookup
vlan ifdescr detail
multilink bundle-name authenticated
mpls label protocol ldp
mpls traffic-eng tunnels
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 clock source internal
 cem-group 1 unframed
!
controller E1 0/0/1
 clock source internal
 cem-group 20 unframed
!
controller E1 0/1/0
 clock source internal
 cem-group 12 unframed
 description connected to E1 4/0 of BERT
!
controller E1 0/1/1
 clock source internal
 cem-group 30 unframed
!
controller E1 0/2/0
 clock source internal
 cem-group 8 unframed
!
controller E1 0/2/1
 clock source internal
 cem-group 25 unframed
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
```

```
!
controller E1 1/0/1
 mode atm aim 1
 clock source internal
!
controller E1 1/1/0
 mode atm aim 1
 clock source internal
!
controller E1 1/1/1
!
!
pseudowire-class mpls
 encapsulation mpls
 sequencing both
 preferred-path peer 50.0.0.2
!
pseudowire-class l2tp
 encapsulation l2tpv3
 sequencing both
 ip protocol udp
 ip local interface Loopback50
!
!
class cem cemclass
 sample-rate 2
!
class cem cemclass1
 dejitter-buffer 400
!
!
!
!
!
!
!
interface Loopback50
 ip address 50.0.0.1 255.255.255.255
!
interface CEM0/0/0
 no ip address
 cem 1
  xconnect 50.0.0.2 1 encapsulation mpls
 !
!
interface GigabitEthernet0/0
 ip address 20.0.0.1 255.0.0.0
 load-interval 30
 duplex auto
 speed auto
 mpls label protocol ldp
 mpls ip
!
interface CEM0/0/1
 no ip address
 cem 20
  xconnect 50.0.0.2 2 encapsulation mpls
!
interface GigabitEthernet0/1
 ip address 60.0.0.1 255.0.0.0
 duplex auto
 speed auto
 mpls ip
!
```

```
interface CEM0/1/0
 no ip address
 cem 12
  xconnect 50.0.0.2 3 encapsulation mpls
 !
!
interface CEM0/1/1
 no ip address
 cem 30
  xconnect 50.0.0.2 4 encapsulation mpls
!
interface CEM0/2/0
 no ip address
 cem 8
  xconnect 50.0.0.2 5 encapsulation mpls
 !
!
interface CEM0/2/1
 no ip address
 cem 25
  xconnect 50.0.0.2 6 encapsulation mpls
 !
!
interface ATM0/IMA0
 no ip address
 load-interval 30
 atm mcpt-timers 2000 6000 10000
 no atm ilmi-keepalive
 pvc 1/10 l2transport
  xconnect 50.0.0.2 101 encapsulation mpls sequencing both
 !
 pvc 1/11 l2transport
  xconnect 50.0.0.2 102 pw-class mpls
 !
 pvc 1/21 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 2
  xconnect 50.0.0.2 111 encapsulation mpls sequencing both
 !
 pvc 1/22 l2transport
  encapsulation aal0
  cell-packing 18 mcpt-timer 3
  xconnect 50.0.0.2 112 encapsulation mpls sequencing both one-to-one
 !
!
interface ATM0/IMA0.1 point-to-point
 no snmp trap link-status
 pvc 1/12 l2transport
  xconnect 50.0.0.2 103 encapsulation mpls sequencing both
 !
!
interface ATM0/IMA0.2 multipoint
 no snmp trap link-status
 atm cell-packing 20 mcpt-timer 2
 xconnect 50.0.0.2 104 pw-class mpls
 pvc 1/13 l2transport
  encapsulation aal0
 !
 pvc 1/14 l2transport
  encapsulation aal0
 !
!
interface ATM0/IMA0.3 point-to-point
 no snmp trap link-status
```

```
 pvc 1/15 l2transport
  encapsulation aal0
  cell-packing 10 mcpt-timer 3
  xconnect 50.0.0.2 105 pw-class mpls
 !
!
interface ATM0/IMA0.4 point-to-point
 no snmp trap link-status
 pvc 1/16 l2transport
  encapsulation aal0
  cell-packing 14 mcpt-timer 3
  xconnect 50.0.0.2 106 pw-class mpls one-to-one
 !
!
interface ATM0/IMA0.6 multipoint
 no snmp trap link-status
 pvc 1/17 l2transport
  xconnect 50.0.0.2 107 pw-class mpls
 !
 pvc 1/18 l2transport
  encapsulation aal0
  xconnect 50.0.0.2 108 encapsulation mpls sequencing both
 !
 pvc 1/19 l2transport
  encapsulation aal0
  cell-packing 12 mcpt-timer 1
  xconnect 50.0.0.2 109 encapsulation mpls sequencing both one-to-one
 !
!
interface ATM1/0/0
 no ip address
 load-interval 30
 scrambling-payload
 atm mcpt-timers 1000 5000 10000
 no atm ilmi-keepalive
 pvc 0/5 l2transport
  encapsulation aal0
  cell-packing 10 mcpt-timer 3
  xconnect 50.0.0.2 10 pw-class l2tp
 !
 pvc 0/6 l2transport
  xconnect 50.0.0.2 20 pw-class l2tp
 !
 pvc 0/7 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 50.0.0.2 30 encapsulation mpls pw-class mpls one-to-one
 !
 pvc 0/8 l2transport
  xconnect 50.0.0.2 40 pw-class mpls
 !
 pvc 0/9 l2transport
  encapsulation aal0
  xconnect 50.0.0.2 50 pw-class mpls one-to-one
 !
!
interface ATM1/0/0.1 point-to-point
 no snmp trap link-status
 pvc 0/15 l2transport
  xconnect 50.0.0.2 13 pw-class mpls
 !
!
interface ATM1/0/0.2 multipoint
 no snmp trap link-status
```

```
 atm cell-packing 2 mcpt-timer 1
 xconnect 50.0.0.2 12 encapsulation mpls sequencing both
 pvc 0/10 l2transport
  encapsulation aal0
 !
 pvc 0/11 l2transport
  encapsulation aal0
 !
 pvc 0/12 l2transport
  encapsulation aal0
 !
 pvc 0/13 l2transport
  encapsulation aal0
 !
!
interface ATM1/0/0.3 point-to-point
 no snmp trap link-status
 pvc 0/16 l2transport
  encapsulation aal0
  xconnect 50.0.0.2 14 encapsulation mpls
 !
!
interface ATM1/0/0.4 point-to-point
 no snmp trap link-status
 pvc 0/17 l2transport
  encapsulation aal0
  xconnect 50.0.0.2 15 pw-class mpls one-to-one
 !
!
interface ATM1/0/0.6 multipoint
 no snmp trap link-status
 pvc 0/26 l2transport
  xconnect 50.0.0.2 16 pw-class mpls
 !
 pvc 0/27 l2transport
  encapsulation aal0
  cell-packing 8 mcpt-timer 3
  xconnect 50.0.0.2 17 pw-class mpls
 !
 pvc 0/28 l2transport
  encapsulation aal0
  cell-packing 16 mcpt-timer 2
  xconnect 50.0.0.2 18 pw-class mpls sequencing both one-to-one
 !
!
interface ATM1/0/0.7 multipoint
 no snmp trap link-status
!
interface ATM1/0/1
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 5000 10000
 no atm ilmi-keepalive
 atm cell-packing 20 mcpt-timer 2
 xconnect 50.0.0.2 11 encapsulation mpls sequencing both
 pvc 0/21 l2transport
  encapsulation aal0
 !
 pvc 0/22 l2transport
  encapsulation aal0
 !
 pvc 0/23 l2transport
  encapsulation aal0
 !
```

```
!
interface ATM1/0/1.1 point-to-point
 no snmp trap link-status
!
interface ATM1/0/1.2 multipoint
 no snmp trap link-status
!
interface ATM1/1/0
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
ip route 9.10.0.254 255.255.255.255 9.11.49.254
ip route 30.0.0.0 255.0.0.0 GigabitEthernet0/0
ip route 50.0.0.2 255.255.255.255 20.0.0.2
ip route 50.0.0.5 255.255.255.255 20.0.0.2
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback50 force
!
!
!
!
!
alias exec cpu show proc cpu | i CPU
alias exec hist show proc cpu history
alias exec clc clear counters
alias exec cmpls clear mpls counters
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 login
!
end
```

PE_2

```
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname MWR2
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 1000000
enable password lab
!
no aaa new-model
```

```
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
network-clock-select 2 E1 0/0/1
network-clock-select 3 E1 0/1/0
network-clock-select 4 E1 0/1/1
network-clock-select 5 E1 0/2/0
network-clock-select 6 E1 0/2/1
ipran-alt-interrupt tracing
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
no ip domain lookup
vlan ifdescr detail
multilink bundle-name authenticated
mpls label protocol ldp
mpls traffic-eng tunnels
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 cem-group 1 unframed
!
controller E1 0/0/1
 cem-group 20 unframed
!
controller E1 0/1/0
 cem-group 12 unframed
!
controller E1 0/1/1
 cem-group 30 unframed
!
```

```
controller E1 0/2/0
 cem-group 8 unframed
!
controller E1 0/2/1
 cem-group 25 unframed
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
!
controller E1 1/0/1
 mode atm aim 1
 clock source internal
!
controller E1 1/1/0
 mode atm aim 1
 clock source internal
!
controller E1 1/1/1
 clock source internal
!
pseudowire-class mpls
 encapsulation mpls
 sequencing both
 preferred-path peer 50.0.0.1
!
pseudowire-class l2tp
 encapsulation l2tpv3
 sequencing both
 ip protocol udp
 ip local interface Loopback50
!
!
class cem test
!
class cem cemclass
 sample-rate 2
!
!
!
!
!
!
!
interface Loopback50
 ip address 50.0.0.2 255.255.255.255
!
interface CEM0/0/0
 no ip address
 cem 1
  xconnect 50.0.0.1 1 encapsulation mpls
 !
!
interface GigabitEthernet0/0
 ip address 30.0.0.1 255.0.0.0
 duplex auto
 speed auto
 mpls ip
!
interface CEM0/0/1
 no ip address
 cem 20
  xconnect 50.0.0.1 2 encapsulation mpls
 !
```

```
!
interface GigabitEthernet0/1
 ip address 70.0.0.1 255.0.0.0
 no ip proxy-arp
 duplex auto
 speed auto
 mpls ip
!
interface CEM0/1/0
 no ip address
 cem 12
  xconnect 50.0.0.1 3 encapsulation mpls
 !
!
interface CEM0/1/1
 no ip address
 cem 30
  xconnect 50.0.0.1 4 encapsulation mpls
 !
!
interface CEM0/2/0
 no ip address
 cem 8
  xconnect 50.0.0.1 5 encapsulation mpls
 !
!
interface CEM0/2/1
 no ip address
 cem 25
  xconnect 50.0.0.1 6 encapsulation mpls
 !
!
interface ATM0/IMA0
 no ip address
 load-interval 30
 atm mcpt-timers 2000 6000 10000
 no atm ilmi-keepalive
 pvc 1/10 l2transport
  xconnect 50.0.0.1 101 encapsulation mpls sequencing both
 !
 pvc 1/11 l2transport
  xconnect 50.0.0.1 102 pw-class mpls
 !
 pvc 1/21 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 111 encapsulation mpls sequencing both
 !
 pvc 1/22 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 112 encapsulation mpls sequencing both one-to-one
 !
!
interface ATM0/IMA0.1 point-to-point
 no snmp trap link-status
 pvc 1/12 l2transport
  xconnect 50.0.0.1 103 encapsulation mpls sequencing both
 !
!
interface ATM0/IMA0.2 multipoint
 no snmp trap link-status
 atm cell-packing 15 mcpt-timer 3
 xconnect 50.0.0.1 104 pw-class mpls
 pvc 1/13 l2transport
  encapsulation aal0
```

```
 !
 pvc 1/14 l2transport
  encapsulation aal0
 !
!
interface ATM0/IMA0.3 point-to-point
 no snmp trap link-status
 pvc 1/15 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 105 pw-class mpls
 !
!
interface ATM0/IMA0.4 point-to-point
 no snmp trap link-status
 pvc 1/16 l2transport
  encapsulation aal0
  cell-packing 7 mcpt-timer 2
  xconnect 50.0.0.1 106 pw-class mpls one-to-one
 !
!
interface ATM0/IMA0.6 multipoint
 no snmp trap link-status
 pvc 1/17 l2transport
  xconnect 50.0.0.1 107 pw-class mpls
 !
 pvc 1/18 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 108 encapsulation mpls sequencing both
 !
 pvc 1/19 l2transport
  encapsulation aal0
  cell-packing 9 mcpt-timer 3
  xconnect 50.0.0.1 109 encapsulation mpls sequencing both one-to-one
 !
!
interface ATM1/0/0
 ip address 1.1.1.2 255.0.0.0
 load-interval 30
 scrambling-payload
 atm mcpt-timers 1000 5000 10000
 no atm ilmi-keepalive
 pvc 0/5 l2transport
  encapsulation aal0
  cell-packing 25 mcpt-timer 3
  xconnect 50.0.0.1 10 pw-class l2tp
 !
 pvc 0/6 l2transport
  xconnect 50.0.0.1 20 pw-class l2tp
 !
 pvc 0/7 l2transport
  encapsulation aal0
  cell-packing 12 mcpt-timer 2
  xconnect 50.0.0.1 30 encapsulation mpls pw-class mpls one-to-one
 !
 pvc 0/8 l2transport
  xconnect 50.0.0.1 40 pw-class mpls
 !
 pvc 0/9 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 50 pw-class mpls one-to-one
 !
 pvc 0/99
  protocol ip 1.1.1.1 broadcast
  encapsulation aal5snap
```

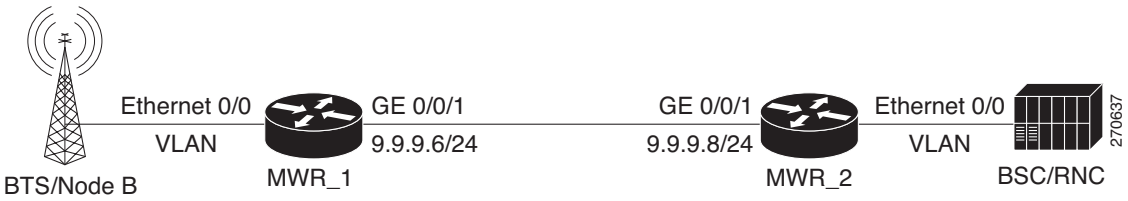
```
 !
!
interface ATM1/0/0.1 point-to-point
 no snmp trap link-status
 pvc 0/15 l2transport
  xconnect 50.0.0.1 13 pw-class mpls
 !
!
interface ATM1/0/0.2 multipoint
 no snmp trap link-status
 atm cell-packing 10 mcpt-timer 2
 xconnect 50.0.0.1 12 encapsulation mpls sequencing both
 pvc 0/10 l2transport
  encapsulation aal0
 !
 pvc 0/11 l2transport
  encapsulation aal0
 !
 pvc 0/12 l2transport
  encapsulation aal0
 !
 pvc 0/13 l2transport
  encapsulation aal0
 !
!
interface ATM1/0/0.3 point-to-point
 no snmp trap link-status
 pvc 0/16 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 14 encapsulation mpls
 !
!
interface ATM1/0/0.4 point-to-point
 no snmp trap link-status
 pvc 0/17 l2transport
  encapsulation aal0
  xconnect 50.0.0.1 15 pw-class mpls one-to-one
 !
!
interface ATM1/0/0.6 multipoint
 no snmp trap link-status
 pvc 0/26 l2transport
  xconnect 50.0.0.1 16 pw-class mpls
 !
 pvc 0/27 l2transport
  encapsulation aal0
  cell-packing 18 mcpt-timer 3
  xconnect 50.0.0.1 17 pw-class mpls
 !
 pvc 0/28 l2transport
  encapsulation aal0
  cell-packing 24 mcpt-timer 2
  xconnect 50.0.0.1 18 pw-class mpls sequencing both one-to-one
 !
!
interface ATM1/0/0.7 multipoint
 no snmp trap link-status
!
interface ATM1/0/1
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 5000 10000
 no atm ilmi-keepalive
 atm cell-packing 20 mcpt-timer 2
```

```
 xconnect 50.0.0.1 11 encapsulation mpls sequencing both
 pvc 0/21 l2transport
  encapsulation aal0
 !
 pvc 0/22 l2transport
  encapsulation aal0
 !
 pvc 0/23 l2transport
  encapsulation aal0
 !
!
interface ATM1/1/0
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
ip route 9.10.0.254 255.255.255.255 9.11.49.254
ip route 20.0.0.0 255.0.0.0 GigabitEthernet0/0
ip route 50.0.0.1 255.255.255.255 70.0.0.2
ip route 50.0.0.5 255.255.255.255 70.0.0.2
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback50 force
!
!
!
!
!
alias exec cpu show proc cpu | i CPU
alias exec hist show proc cpu history
alias exec clc clear counters
alias exec cmpls clear mpls counters
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 login
!
end
```

Ethernet over MPLS—VLAN and Port Mode Configuration

The following is an example of an Ethernet over Multiprotocol Label Switching (MPLS) configuration in VLAN and Port mode (see Figure B-2):

Figure B-2 Ethernet over MPLS—VLAN and Port Mode Configuration



The following represents both a VLAN and port mode in an Ethernet over MPLS configuration:

MWR_1

```
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe1
!
boot-start-marker
boot-end-marker
!
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/1/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
!
!
no ip domain lookup
vlan ifdescr detail
multilink bundle-name authenticated
mpls label protocol ldp
```

```
vpdn enable
!
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 clock source internal
 !
controller E1 0/0/1
!
controller E1 0/1/0
 !
controller E1 0/1/1
 clock source internal
 !
controller E1 1/0/0
  clock source internal
!
controller E1 1/0/1
!
controller E1 1/1/0
 !
controller E1 1/1/1
  clock source internal
!
!
!
!
!
!
!
!
interface Loopback0
 no ip address
!
interface Loopback1
 ip address 1.1.1.1 255.255.255.255
 load-interval 30
!
interface Loopback101
 no ip address
!
! Port mode
interface GigabitEthernet0/0
 no ip address
 load-interval 30
 speed 1000
 full-duplex
 no cdp enable
 xconnect 2.2.2.2 1 encapsulation mpls
!
! vlan mode
interface GigabitEthernet0/0.3
encapsulation dot1q 3
 xconnect 2.2.2.2 2 encapsulation mpls
!
interface GigabitEthernet0/1
 ip address 9.9.9.6 255.255.255.0
 load-interval 30
 speed 1000
 full-duplex
 mpls ip
```

```
!
!
ip forward-protocol nd
ip route 2.2.2.2 255.255.255.255  9.9.9.8
!
ip http server
no ip http secure-server
!
!
snmp-server community public RO
!
!
!
control-plane
!
!
!
!
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

MRW_2

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe2
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
```

```
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip arp proxy disable
ip cef
!
!
!
!
no ip domain lookup
vlan ifdescr detail
l2tp-class l2tp
multilink bundle-name authenticated
mpls label protocol ldp
mpls ldp session protection
mpls oam
 echo revision 4
vpdn enable
!

!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 !
controller E1 0/0/1
 clock source internal
!
controller E1 0/1/0
!
controller E1 0/1/1
 clock source internal
  !
controller E1 0/2/0
 clock source internal
 !
controller E1 0/2/1
!
controller E1 1/0/0
```

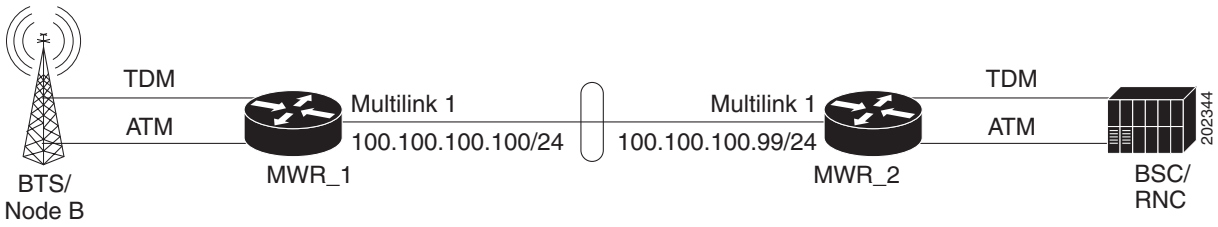
```
 clock source internal
!
controller E1 1/0/1
 clock source internal
 !
controller E1 1/1/0
 clock source internal
 !
controller E1 1/1/1
  clock source internal
!
!
!
interface Loopback1
 ip address 2.2.2.2 255.255.255.255
!
!  port mode
interface GigabitEthernet0/0
 no ip address
 load-interval 30
 speed 1000
 full-duplex
 no cdp enable
 xconnect 1.1.1.1 1 encapsulation mpls
!
! vlan mode
interface GigabitEthernet0/0.3
encapsulation dot1q 3
xconnect 1.1.1.1 2 encapsulation mpls
!
!
interface GigabitEthernet0/1
 ip address 9.9.9.8 255.255.255.0
 load-interval 30
 speed 1000
 full-duplex
 mpls ip
 no cdp enable
!
ip forward-protocol nd
ip route 1.1.1.1 255.255.255.255  9.9.9.6
!
no ip http server
no ip http secure-server
!
!
snmp-server community private RW
snmp-server community public RO
snmp-server ifindex persist
snmp-server trap link ietf
no snmp-server sparse-tables
snmp-server queue-length 100
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ipran
no cdp run
route-map test permit 10
 match mpls-label
!
!
!
mpls ldp router-id Loopback1 force
!
control-plane
!
```

```
no call rsvp-sync
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

PWE3 over MLPPP Configuration

The following is an example of a PWE3 over Multi-link Point-to-Point Protocol (MLPPP) configuration (see Figure B-3):

Figure B-3 PWE3 over MLPPP Configuration



MWR_1

```
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe1
!
boot-start-marker
boot-end-marker
!
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/1/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
!
!
no ip domain lookup
vlan ifdescr detail
multilink bundle-name authenticated
mpls label protocol ldp
vpdn enable
```

```
!
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 clock source internal
 cem-group 0 unframed
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 clock source internal
 cem-group 3 timeslots 1-31
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
!
controller E1 1/0/1
 channel-group 0 timeslots 1-31
!
controller E1 1/1/0
 channel-group 0 timeslots 1-31
!
controller E1 1/1/1
 mode atm aim 1
 clock source internal
!
!
class-map match-any mpls
 match mpls experimental topmost 1
!
!
policy-map llq-policy
 class mpls
  priority percent 99
 class class-default
  bandwidth percent 1
  queue-limit 45
!
!
!
pseudowire-class class1
 encapsulation mpls
 sequencing both
 mpls experimental 1
!
!
!
!
!
!
interface Loopback0
 no ip address
!
interface Loopback1
 ip address 1.1.1.1 255.255.255.255
 load-interval 30
```

```
!
interface Loopback101
 no ip address
!
interface Multilink1000
 ip address 100.100.100.100 255.255.255.0
 ip tcp header-compression ietf-format
 mpls ip
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1000
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface CEM0/0/0
no ip address
 cem 0
  xconnect 2.2.2.2 1 pw-class class1
 !
!
interface GigabitEthernet0/0
 ip address 172.18.18.78 255.255.255.0
 load-interval 30
 speed 1000
 full-duplex
 no cdp enable
!
interface GigabitEthernet0/1
 ip address 9.9.9.6 255.255.255.0
 load-interval 30
 shutdown
 speed 1000
 full-duplex
 mpls ip
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface CEM0/1/1
 no ip address
 cem 3
  xconnect 2.2.2.2 2 pw-class class1
 !
!
```

```
interface ATM1/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 xconnect 2.2.2.2 3 pw-class class1
 pvc 0/1 l2transport
  encapsulation aal0
 !
!
interface Serial1/0/1:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface Serial1/1/0:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface ATM1/1/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 pvc 0/1 l2transport
  encapsulation aal0
  xconnect 2.2.2.2 4 pw-class class1
 !
 pvc 0/2 l2transport
  encapsulation aal5
  xconnect 2.2.2.2 5 pw-class class1
 !
 pvc 0/5 l2transport
  encapsulation aal0
  xconnect 2.2.2.2 6 pw-class class1 one-to-one
 !
!
ip forward-protocol nd
ip route 2.2.2.2 255.255.255.255 Multilink1000
!
ip http server
no ip http secure-server
!
!
snmp-server community public RO
!
!
!
control-plane
!
!
!
!
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
```

```
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

MWR_2

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe2
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip arp proxy disable
ip cef
!
!
!
!
no ip domain lookup
ip host bizarre 64.102.16.25
vlan ifdescr detail
l2tp-class l2tp
multilink bundle-name authenticated
mpls label protocol ldp
mpls ldp session protection
mpls oam
 echo revision 4
vpdn enable
!
!
!
```

```
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 cem-group 0 timeslots 1-31
!
controller E1 0/0/1
 clock source internal
 cem-group 1 unframed
!
controller E1 0/1/0
!
controller E1 0/1/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/2/0
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/2/1
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
!
controller E1 1/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 1/1/0
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 1/1/1
 mode atm aim 1
 clock source internal
!
!
class-map match-any mpls
 match mpls experimental topmost 1
!
!
policy-map llq-policy
 class mpls
```

```
  priority percent 99
 class class-default
  bandwidth percent 1
  queue-limit 45
!
pseudowire-class class1
 encapsulation mpls
 sequencing both
 mpls experimental 1
!
!
!
!
!
!
!
interface Loopback1
 ip address 2.2.2.2 255.255.255.255
!
!
interface Multilink1000
 ip address 100.100.100.99 255.255.255.0
 ip tcp header-compression ietf-format
 mpls ip
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1000
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface CEM0/0/0
 no ip address
 cem 0
  xconnect 1.1.1.1 2 pw-class class1
 !
!
interface GigabitEthernet0/0
 ip address 172.18.18.179 255.255.255.0
 load-interval 30
 speed 1000
 full-duplex
 mpls mtu 2000
 no cdp enable
!
interface CEM0/0/1
 no ip address
 cem 1
  xconnect 1.1.1.1 1 pw-class class1
 !
!
interface GigabitEthernet0/1
 ip address 9.9.9.8 255.255.255.0
 load-interval 30
 shutdown
 speed 1000
```

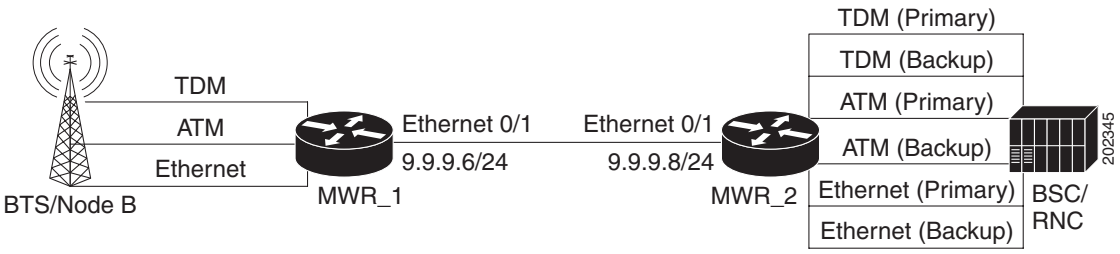
```
 full-duplex
 mpls ip
 no cdp enable
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface Serial0/2/0:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!

interface ATM1/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 xconnect 1.1.1.1 3 pw-class class1
 pvc 0/1 l2transport
  encapsulation aal0
 !
!
interface Serial1/0/1:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface Serial1/1/0:0
 no ip address
 encapsulation ppp
 ppp multilink
 ppp multilink group 1000
 max-reserved-bandwidth 100
!
interface ATM1/1/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 pvc 0/1 l2transport
  encapsulation aal0
  xconnect 1.1.1.1 4 pw-class class1
 !
 pvc 0/2 l2transport
  encapsulation aal5
  xconnect 1.1.1.1 5 pw-class class1
 !
 pvc 0/5 l2transport
  encapsulation aal0
  xconnect 1.1.1.1 6 pw-class class1 one-to-one
 !
!
ip forward-protocol nd
ip route 1.1.1.1 255.255.255.255 Multilink1000
!
no ip http server
no ip http secure-server
```

```
!
!
snmp-server community private RW
snmp-server community public RO
snmp-server ifindex persist
snmp-server trap link ietf
no snmp-server sparse-tables
snmp-server queue-length 100
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ipran
no cdp run
route-map test permit 10
 match mpls-label
!
!
!
mpls ldp router-id Loopback1 force
!
control-plane
!
no call rsvp-sync
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

PWE3 Redundancy Configuration

The following is an example of a PWE3 Redundancy configuration (see Figure B-4):

Figure B-4 PWE3 Redundancy Configuration



MWR_1

```
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe1
!
boot-start-marker
boot-end-marker
!
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/1/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
!
!
no ip domain lookup
vlan ifdescr detail
multilink bundle-name authenticated
mpls label protocol ldp
vpdn enable
!
```

```
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 clock source internal
 cem-group 0 unframed
!
controller E1 0/0/1
!
controller E1 0/1/0
!
controller E1 0/1/1
 clock source internal
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
!
controller E1 1/0/1
!
controller E1 1/1/0
!
controller E1 1/1/1
 clock source internal
!
interface cem0/0/0
cem 0
 xconnect 2.2.2.2 1 encapsulation mpls
 backup peer 2.2.2.2 2
 backup delay 20 20
!
interface ATM01/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 xconnect 2.2.2.2 3 encapsulation mpls
 backup peer 2.2.2.2 4
 backup delay 20 20
 pvc 0/1 l2transport
  encapsulation aal0
!
interface Loopback0
 no ip address
!
interface Loopback1
 ip address 1.1.1.1 255.255.255.255
 load-interval 30
!
interface Loopback101
 no ip address
!
!
!
!
interface GigabitEthernet0/0.3
encapsulation dot1q 3
 xconnect 2.2.2.2 5 encapsulation mpls
 backup peer 2.2.2.2 6
 backup delay 20 20
!
interface GigabitEthernet0/1
 ip address 9.9.9.6 255.255.255.0
```

```
 load-interval 30
 speed 1000
 full-duplex
 mpls ip
!
!
ip forward-protocol nd
ip route 2.2.2.2 255.255.255.255  9.9.9.8
!
ip http server
no ip http secure-server
!
!
snmp-server community public RO
!
!
!
control-plane
!
!
!
!
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

MWR_2

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr-pe2
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
card type e1 1 1
logging buffered 10000000
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
```

```
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip arp proxy disable
ip cef
!
!
!
!
no ip domain lookup
vlan ifdescr detail
l2tp-class l2tp
multilink bundle-name authenticated
mpls label protocol ldp
mpls ldp session protection
mpls oam
 echo revision 4
vpdn enable
!

!
!
!
archive
 log config
  hidekeys
!
!
controller E1 0/0/0
 cem-group 0 unframed
!
controller E1 0/0/1
 clock source internal
 cem-group 0 unframed
!
controller E1 0/1/0
!
controller E1 0/1/1
 clock source internal
!
controller E1 0/2/0
 clock source internal
 !
controller E1 0/2/1
!
controller E1 1/0/0
 mode atm aim 1
 clock source internal
!
controller E1 1/0/1
 clock source internal
 !
controller E1 1/1/0
 clock source internal
 !
controller E1 1/1/1
```

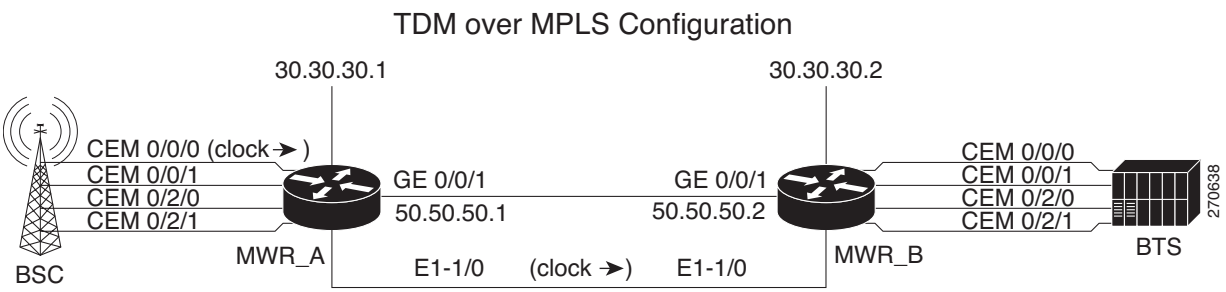
```
 mode atm aim 1
 clock source internal
!
! Primary
interface cem0/0/0
cem 0
 xconnect 1.1.1.1 1 encapsulation mpls
!
! Backup
interface cem0/0/1
cem 0
 xconnect 1.1.1.1 2 encapsulation mpls
!
! Primary
interface ATM1/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 xconnect 1.1.1.1 3 encapsulation mpls
 pvc 0/1 l2transport
  encapsulation aal0
 !
! Backup
interface ATM1/1/1
no ip address
 scrambling-payload
 no atm ilmi-keepalive
 xconnect 1.1.1.1 4 encapsulation mpls
 pvc 0/1 l2transport
  encapsulation aal0
 !
!
interface Loopback1
 ip address 2.2.2.2 255.255.255.255
!

! Primary
interface GigabitEthernet0/0.3
encapsulation dot1q 3
xconnect 1.1.1.1 5 encapsulation mpls
!
! Backup

interface GigabitEthernet0/0.4
encapsulation dot1q 4
xconnect 1.1.1.1 6 encapsulation mpls
!
!
!
interface GigabitEthernet0/1
 ip address 9.9.9.8 255.255.255.0
 load-interval 30
 speed 1000
 full-duplex
 mpls ip
 no cdp enable
!
ip forward-protocol nd
ip route 1.1.1.1 255.255.255.255  9.9.9.6
!
no ip http server
no ip http secure-server
!
!
```

```
snmp-server community private RW
snmp-server community public RO
snmp-server ifindex persist
snmp-server trap link ietf
no snmp-server sparse-tables
snmp-server queue-length 100
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps ipran
no cdp run
route-map test permit 10
 match mpls-label
!
!
!
mpls ldp router-id Loopback1 force
!
control-plane
!
no call rsvp-sync
!
!
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
exception data-corruption buffer truncate
!
end
```

TDM over MPLS Configuration

The following is an example of a time-division multiplexing (TDM) over MPLS configuration (see Figure B-5):

Figure B-5 TDM over MPLS Configuration



MWR_A

```
!
version 12.4
service timestamps debug datetime msec localtime show-timezone
service timestamps log datetime msec localtime show-timezone
no service password-encryption
service internal
!
hostname mwr_A
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type t1 0 2
enable password xxx
!
no aaa new-model
clock timezone est -5
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 2
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
controller E1 0/0/0
cem-group 0 timeslots 1-31
description E1 CESoPSN example
!
controller E1 0/0/1
clock source internal
cem-group 1 unframed
description E1 SATOP example
```

```
!
controller T1 0/2/0
framing esf
clock source internal
linecode b8zs
cem-group 4 unframed
description T1 SATOP example
!
controller T1 0/2/1
framing esf
clock source internal
linecode b8zs
cem-group 5 timeslots 1-24
description T1 CESoPSN example
!
controller E1 1/0/0
clock source internal
!
controller E1 1/0/1
!
interface Loopback0
ip address 30.30.30.1 255.255.255.255
!
interface CEM0/0/0
no ip address
cem 0
  xconnect 30.30.30.2 300 encapsulation mpls
!
!
interface GigabitEthernet0/0
no ip address
no ip proxy-arp
duplex auto
speed auto
no cdp enable
!
interface CEM0/0/1
no ip address
cem 1
  xconnect 30.30.30.2 301 encapsulation mpls
!
!
interface GigabitEthernet0/1
ip address 50.50.50.1 255.255.255.0
no ip proxy-arp
duplex auto
speed auto
mpls ip
no cdp enable
!
interface CEM0/2/0
no ip address
cem 4
  xconnect 30.30.30.2 304 encapsulation mpls
!
!
interface CEM0/2/1
no ip address
cem 5
  xconnect 30.30.30.2 305 encapsulation mpls
!
!
no ip classless
ip route 30.30.30.2 255.255.255.255 50.50.50.2
```

```
!
no ip http server
no ip http secure-server
!
line con 0
password xxx
login
line aux 0
password xxx
login
no exec
line vty 0 4
password xxx
login
!
end
```

MWR_B

```
!
version 12.4
service timestamps debug datetime msec localtime show-timezone
service timestamps log datetime msec localtime show-timezone
no service password-encryption
service internal
!
hostname mwr_B
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type t1 0 2
enable password xxx
!
no aaa new-model
clock timezone est -5
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-select 1 E1 1/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
controller E1 0/0/0
clock source internal
cem-group 0 timeslots 1-31
description E1 CESoPSN example
!
controller E1 0/0/1
clock source internal
cem-group 1 unframed
description E1 SATOP example
!
```

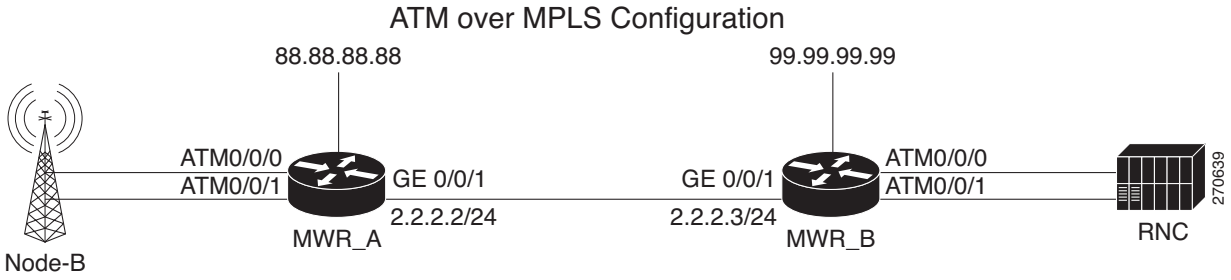
```
controller T1 0/2/0
framing esf
clock source internal
linecode b8zs
cem-group 4 unframed
description T1 SATOP example
!
controller T1 0/2/1
framing esf
clock source internal
linecode b8zs
cem-group 5 timeslots 1-24
description T1 CESoPSN example
!
controller E1 1/0/0

!
controller E1 1/0/1
!
interface Loopback0
ip address 30.30.30.2 255.255.255.255
!
interface CEM0/0/0
no ip address
cem 0
  xconnect 30.30.30.1 300 encapsulation mpls
!
!
interface GigabitEthernet0/0
no ip address
no ip proxy-arp
duplex auto
speed auto
no cdp enable
!
interface CEM0/0/1
no ip address
cem 1
  xconnect 30.30.30.1 301 encapsulation mpls
!
!
interface GigabitEthernet0/1
ip address 50.50.50.2 255.255.255.0
no ip proxy-arp
duplex auto
speed auto
mpls ip
no cdp enable
!
interface CEM0/2/0
no ip address
cem 4
  xconnect 30.30.30.1 304 encapsulation mpls
!
!
interface CEM0/2/1
no ip address
cem 5
  xconnect 30.30.30.1 305 encapsulation mpls
!
!
no ip classless
ip route 30.30.30.2 255.255.255.255 50.50.50.1
!
```

```
no ip http server
no ip http secure-server
!
line con 0
password xxx
login
line aux 0
password xxx
login
no exec
line vty 0 4
password xxx
login
!
end
```

ATM over MPLS Configurations

The illustration below configures an ATM port mode pseudowire (PW) on interface ATM 0/0/0, ATM AAL5 SDU mode PW on ATM0/0/1 PVC 0/100, ATM N:1 VCC cell mode PW on ATM0/0/1 PVC 0/101, multiple PVCs N:1 VCC cell mode PW on ATM 0/0/1.1, and ATM 1:1 VCC cell mode PW on ATM0/0/1 PVC 0/102. It also configures Cell-Packing for port mode PWs, VCC cell-relay mode PWs and PVC mapping for ATM0/0/1.1 N:1 VCC cell relay PWs (see Figure B-6).

Figure B-6 ATM over MPLS Configuration



MWR_A

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr_A
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
logging buffered 4096
enable password lab
!
no aaa new-model
memory-size iomem 25
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
```

```
!
no ip domain lookup
ip domain name cisco.com
multilink bundle-name authenticated
mpls label range 100 100000 static 16 99
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 mode atm aim 1
 clock source internal
!
controller E1 0/0/1
 mode atm aim 1
 clock source internal
!
controller E1 0/1/0
 mode atm aim 1
 clock source internal
!
controller E1 0/1/1
 mode atm aim 1
 clock source internal
!
controller E1 0/2/0
!
controller E1 0/2/1
!
controller E1 1/0/0
!
controller E1 1/0/1
!
pseudowire-class mpls-exp-5
 encapsulation mpls
 sequencing both
 mpls experimental 5
!
!
!
!
!
!
!
!
```

```
interface Loopback0
 ip address 88.88.88.88 255.255.255.255
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 atm cell-packing 28 mcpt-timer 3
 xconnect 99.99.99.99 100 encapsulation mpls sequencing both
 pvc 1/35 l2transport
  encapsulation aal0
 !
 pvc 1/36 l2transport
  encapsulation aal0
 !
 pvc 1/37 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/0
 ip address 172.18.52.129 255.255.255.0
 duplex auto
 speed auto
 no keepalive
!
interface ATM0/0/1
 no ip address
 load-interval 30
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 pvc 0/10
 !
 pvc 0/100 l2transport
  encapsulation aal5
  xconnect 99.99.99.99 1100 encapsulation mpls sequencing both
 !
 pvc 0/101 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 99.99.99.99 1101 encapsulation mpls sequencing both
 !
 pvc 0/102 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 99.99.99.99 1102 encapsulation mpls sequencing both one-to-one
 !
 pvc 0/103 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 99.99.99.99 1103 pw-class mpls-exp-5
 !
!
interface ATM0/0/1.1 multipoint
 no snmp trap link-status
 atm cell-packing 28 mcpt-timer 3
 xconnect 99.99.99.99 1200 encapsulation mpls sequencing both
 pvc 1/35 l2transport
  encapsulation aal0
  pw-pvc 2/135
 !
 pvc 1/36 l2transport
  encapsulation aal0
```

```
  pw-pvc 2/136
 !
 pvc 1/37 l2transport
  encapsulation aal0
  pw-pvc 2/137
 !
!
interface GigabitEthernet0/1
 description interface to 7600 fas 3/5
 ip address 2.2.2.2 255.255.255.0
 duplex auto
 speed auto
 mpls ip
 no keepalive
!
interface ATM0/1/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
!
interface ATM0/1/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
!
interface ATM0/IMA1
 no ip address
 no atm ilmi-keepalive
!
ip route 0.0.0.0 0.0.0.0 172.18.52.1
ip route 99.99.99.99 255.255.255.255 2.2.2.3
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback0
disable-eadi
!
!
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 privilege level 15
 password lab
 no login
!
end
```

MWR_B

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr_B
!
```

```
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
logging buffered 4096
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
no ip domain lookup
ip domain name cisco.com
multilink bundle-name authenticated
mpls label protocol ldp
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 mode atm aim 1
!
controller E1 0/0/1
 mode atm aim 1
!
controller E1 0/1/0
 mode atm aim 1
!
controller E1 0/1/1
 mode atm aim 1
```

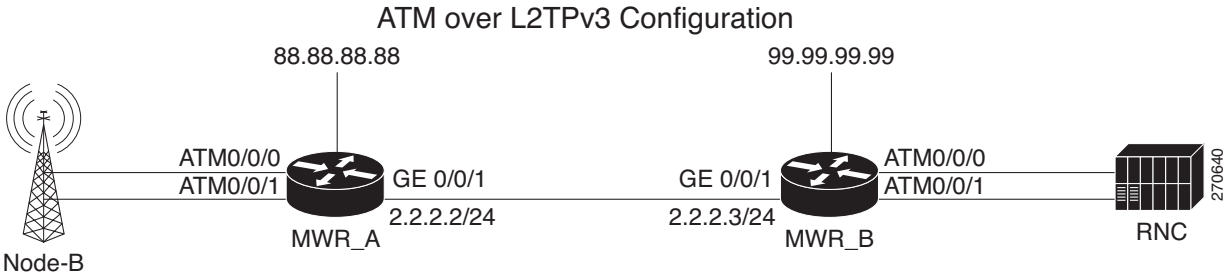
```
!
controller E1 0/2/0
!
controller E1 0/2/1
!
pseudowire-class mpls-exp-5
 encapsulation mpls
 sequencing both
 mpls experimental 5
!
!
!
!
!
!
!
!
interface Loopback0
 ip address 99.99.99.99 255.255.255.255
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 atm cell-packing 28 mcpt-timer 3
 xconnect 88.88.88.88 100 encapsulation mpls sequencing both
 pvc 1/35 l2transport
  encapsulation aal0
 !
 pvc 1/36 l2transport
  encapsulation aal0
 !
 pvc 1/37 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/0
 ip address 172.18.52.130 255.255.255.0
 duplex auto
 speed auto
 keepalive 1
!
interface ATM0/0/1
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 pvc 0/2
 !
 pvc 0/100 l2transport
  encapsulation aal5
  xconnect 88.88.88.88 1100 encapsulation mpls sequencing both
 !
 pvc 0/101 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 88.88.88.88 1101 encapsulation mpls sequencing both
 !
 pvc 0/102 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 88.88.88.88 1102 encapsulation mpls sequencing both one-to-one
 !
```

```
 pvc 0/103 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 88.88.88.88 1103 pw-class mpls-exp-5
 !
!
interface ATM0/0/1.1 multipoint
 no snmp trap link-status
 atm cell-packing 28 mcpt-timer 3
 xconnect 88.88.88.88 1200 encapsulation mpls sequencing both
 pvc 2/135 l2transport
  encapsulation aal0
 !
 pvc 2/136 l2transport
  encapsulation aal0
 !
 pvc 2/137 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/1
 ip address 2.2.2.3 255.255.255.0
 duplex auto
 speed auto
 mpls ip
!
interface ATM0/1/0
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
interface ATM0/1/1
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
ip route 0.0.0.0 0.0.0.0 172.18.52.1
ip route 88.88.88.88 255.255.255.255 2.2.2.2
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback0
!
!
!
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
end
```

ATM over L2TPv3 Configuration

The illustration below configures an ATM port mode PW on interface ATM 0/0/0, ATM AAL5 SDU mode PW on ATM0/0/1 PVC 0/100, ATM N:1 VCC cell mode PW on ATM0/0/1 PVC 0/101, and multiple PVCs N:1 VCC cell mode PW on ATM 0/0/1.1. It also configures Cell-Packing for port mode PWs, VCC cell-relay mode PWs and PVC mapping for ATM0/0/1.1 N:1 VCC cell relay PWs (see Figure B-7).

Figure B-7 ATM over L2TPv3 Configuration



MWR_A

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr_A
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
card type e1 0 2
card type e1 1 0
logging buffered 4096
enable password lab
!
no aaa new-model
memory-size iomem 25
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate slot 1
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 1/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
```

```
!
no ip domain lookup
ip domain name cisco.com
multilink bundle-name authenticated
mpls label range 100 100000 static 16 99
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 mode atm aim 1
 clock source internal
!
controller E1 0/0/1
 mode atm aim 1
 clock source internal
!
controller E1 0/1/0
 mode atm aim 1
 clock source internal
!
controller E1 0/1/1
 mode atm aim 1
 clock source internal
!
controller E1 0/2/0
!
controller E1 0/2/1
!
controller E1 1/0/0
!
controller E1 1/0/1
!
pseudowire-class l2tp
 encapsulation l2tpv3
 sequencing both
 ip local interface Loopback0
 ip tos value 15
!
!
!
!
!
!
!
```

```
!
interface Loopback0
 ip address 88.88.88.88 255.255.255.255
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 atm cell-packing 28 mcpt-timer 3
 xconnect 99.99.99.99 100 pw-class l2tp
 pvc 1/35 l2transport
  encapsulation aal0
 !
 pvc 1/36 l2transport
  encapsulation aal0
 !
 pvc 1/37 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/0
 ip address 172.18.52.129 255.255.255.0
 duplex auto
 speed auto
 no keepalive
!
interface ATM0/0/1
 no ip address
 load-interval 30
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 pvc 0/100 l2transport
  encapsulation aal5
  xconnect 99.99.99.99 1100 pw-class l2tp
 !
 pvc 0/101 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 99.99.99.99 1101 pw-class l2tp
 !
!
interface ATM0/0/1.1 multipoint
 no snmp trap link-status
 atm cell-packing 28 mcpt-timer 3
 xconnect 99.99.99.99 1200 pw-class l2tp
 pvc 1/35 l2transport
  encapsulation aal0
  pw-pvc 2/135
 !
 pvc 1/36 l2transport
  encapsulation aal0
  pw-pvc 2/136
 !
 pvc 1/37 l2transport
  encapsulation aal0
  pw-pvc 2/137
 !
!
interface GigabitEthernet0/1
 description interface to 7600 fas 3/5
 ip address 2.2.2.2 255.255.255.0
 duplex auto
```

```
 speed auto
 mpls ip
 no keepalive
!
interface ATM0/1/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
!
interface ATM0/1/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
!
interface ATM0/IMA1
 no ip address
 no atm ilmi-keepalive
!
ip route 0.0.0.0 0.0.0.0 172.18.52.1
ip route 99.99.99.99 255.255.255.255 2.2.2.3
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback0
disable-eadi
!
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 privilege level 15
 password lab
 no login
!
end
```

MWR_B

```
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mwr_B
!
boot-start-marker
boot-end-marker
!
card type e1 0 0
card type e1 0 1
logging buffered 4096
enable password lab
!
no aaa new-model
!
redundancy
  mode y-cable
```

```
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip cef
!
!
no ip domain lookup
ip domain name cisco.com
multilink bundle-name authenticated
mpls label protocol ldp
vpdn enable
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
!
!
controller E1 0/0/0
 mode atm aim 1
!
controller E1 0/0/1
 mode atm aim 1
!
controller E1 0/1/0
 mode atm aim 1
!
controller E1 0/1/1
 mode atm aim 1
!
controller E1 0/2/0
!
controller E1 0/2/1
!
pseudowire-class l2tp
 encapsulation l2tpv3
 sequencing both
 ip local interface Loopback0
 ip tos value 15
!
!
```

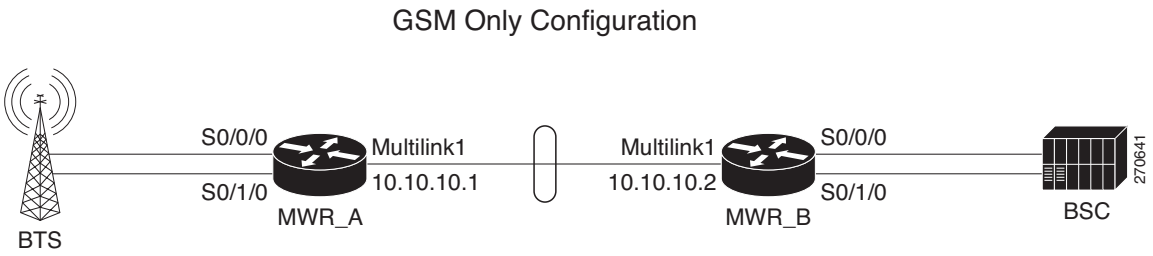
```
!
!
!
!
!
!
interface Loopback0
 ip address 99.99.99.99 255.255.255.255
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 atm cell-packing 28 mcpt-timer 3
 xconnect 88.88.88.88 100 pw-class l2tp
 pvc 1/35 l2transport
  encapsulation aal0
 !
 pvc 1/36 l2transport
  encapsulation aal0
 !
 pvc 1/37 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/0
 ip address 172.18.52.130 255.255.255.0
 duplex auto
 speed auto
 keepalive 1
!
interface ATM0/0/1
 no ip address
 scrambling-payload
 atm mcpt-timers 1000 2000 3000
 no atm ilmi-keepalive
 pvc 0/2
 !
 pvc 0/100 l2transport
  encapsulation aal5
  xconnect 88.88.88.88 1100 pw-class l2tp
 !
 pvc 0/101 l2transport
  encapsulation aal0
  cell-packing 28 mcpt-timer 3
  xconnect 88.88.88.88 1101 pw-class l2tp
 !
!
interface ATM0/0/1.1 multipoint
 no snmp trap link-status
 atm cell-packing 28 mcpt-timer 3
 xconnect 88.88.88.88 1200 pw-class l2tp
 pvc 2/135 l2transport
  encapsulation aal0
 !
 pvc 2/136 l2transport
  encapsulation aal0
 !
 pvc 2/137 l2transport
  encapsulation aal0
 !
!
interface GigabitEthernet0/1
```

```
 ip address 2.2.2.3 255.255.255.0
 duplex auto
 speed auto
 mpls ip
!
interface ATM0/1/0
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
interface ATM0/1/1
 no ip address
 scrambling-payload
 ima-group 0
 no atm ilmi-keepalive
!
ip route 0.0.0.0 0.0.0.0 172.18.52.1
ip route 88.88.88.88 255.255.255.255 2.2.2.2
!
!
ip http server
no ip http secure-server
!
!
mpls ldp router-id Loopback0
!
!
!
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
!
end
```

GSM Only Configuration

The standard GSM topology includes one or more shorthaul interface connections from the BTS to a RAN-O device via separate T1/E1 connections. The RAN-O devices are connected back-to-back using an MLPPP backhaul connection (two or more T1/E1 connections). At the BSC side, the RAN-O to BSC connectivity is exactly like the BTS to RAN-O connections. In this scenario, only GSM traffic traverses the topology (see Figure B-8).

Figure B-8 GSM Only Configuration



MWR_A

```
!
card type E1 0 0
card type E1 0 1
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
```

```
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4446
 gsm-abis remote 10.10.10.2 4446
 gsm-abis set dscp ef
 no keepalive
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

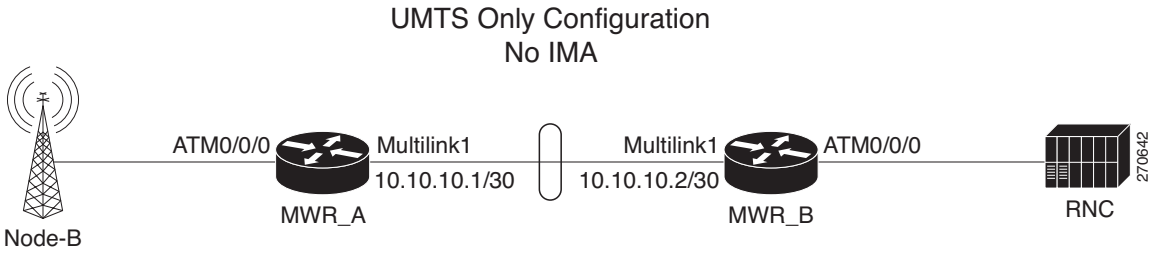
```
!
card type E1 0 0
card type E1 0 1
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
network-clock-select 2 E1 0/1/0
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
```

```
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4446
 gsm-abis remote 10.10.10.1 4446
 gsm-abis set dscp ef
 no keepalive
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

UMTS Only Configuration without IMA

The traditional UMTS configuration is similar to the GSM configuration except only UMTS traffic traverses the topology. Unlike GSM traffic, UMTS traffic arrives at the RAN-O device via ATM PVCs. The UMTS traffic is then routed over the traditional MLPPP backhaul connection. At the RNC side, the RAN-O to RNC connectivity is exactly like the Node-B to RAN-O interface connections. Aside from the necessity of ATM connectivity, the physical connectivity for UMTS is exactly like the GSM topology (see Figure B-9 on page B-59).

Figure B-9 UMTS Only Configuration without IMA



MWR_A

```
!
card type E1 0 0
card type E1 0 1
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
mode atm aim 1
clock source internal
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
```

```
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub local 10.10.10.1 6000
 umts-iub remote 10.10.10.2 6000
 pvc 1/1 qsaal
 !
 pvc 1/2 qsaal
 !
 pvc 1/100
  encapsulation aal0
 !
!
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

```
!
card type E1 0 0
card type E1 1
```

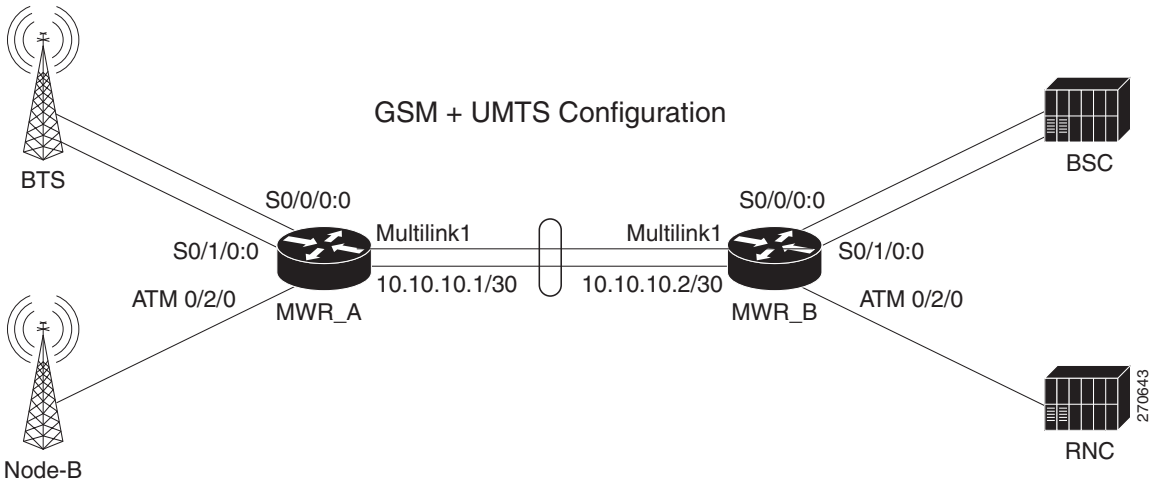
```
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
mode atm aim 1
!
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface ATM0/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub local 10.10.10.2 6000
 umts-iub remote 10.10.10.1 6000
 pvc 1/1 qsaal
 !
 pvc 1/2 qsaal
```

```
 !
 pvc 1/100
  encapsulation aal0
 !
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

Combined GSM and UMTS Configuration

The combined GSM and UMTS configuration allows both the GSM and UMTS technologies to become aggregated over the traditional multilink backhaul connection (see Figure B-10).

Figure B-10 Combined GSM and UMTS Configuration



MWR_A

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
network-clock-select 1 E1 0/1/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
```

```
!
controller E1 0/1/1
 channel-group 0 timeslots 1-31
!
controller E1 0/2/0
  clock source internal
mode atm aim 1
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4446
 gsm-abis remote 10.10.10.2 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
```

```
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub local 10.10.10.1 6000
 umts-iub remote 10.10.10.2 6000
 pvc 1/1 qsaal
 !
 pvc 1/2 qsaal
 !
 pvc 1/100
  encapsulation aal0
 !
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
network-clock-select 2 E1 0/1/0
network-clock-select 3 E1 0/2/0
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
```

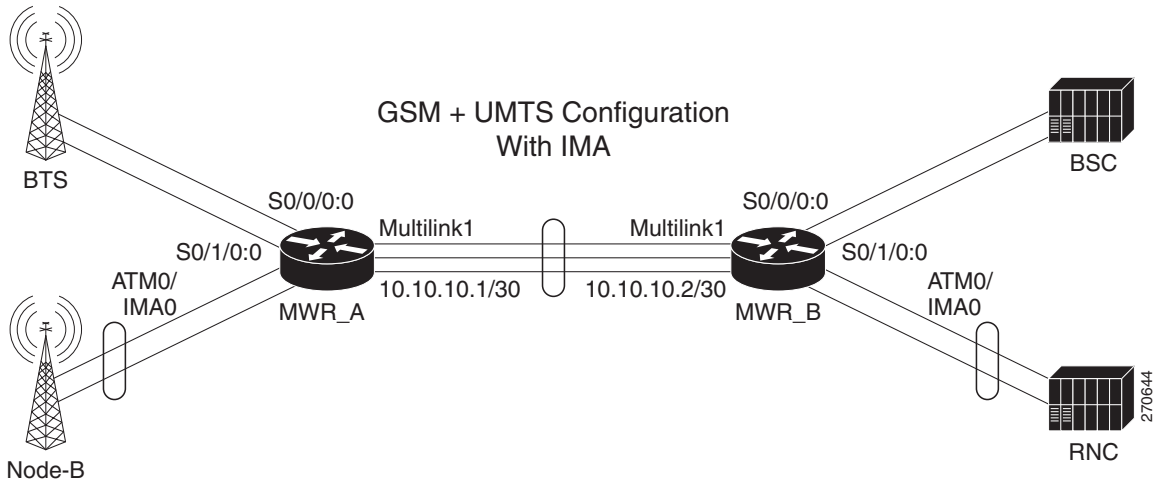
```
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 clock source internal
 channel-group 0 timeslots 1-31
!
!
controller E1 0/2/0
mode atm aim 1
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
```

```
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4446
 gsm-abis remote 10.10.10.1 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub local 10.10.10.2 6000
 umts-iub remote 10.10.10.1 6000
 pvc 1/1 qsaal
 !
 pvc 1/2 qsaal
 !
 pvc 1/100
  encapsulation aal0
 !

!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

GSM and UMTS with IMA Configuration

The combined GSM and UMTS with Inverse Multiplexing over ATM (IMA) configuration allows both the GSM and UMTS technologies to become aggregated over the traditional multilink backhaul connection (see Figure B-11).

Figure B-11 GSM and UMTS with IMA Configuration



MWR_A

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
card type E1 1 0
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate slot 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
network-clock-select 2 E1 0/1/1
network-clock-select 3 E1 0/2/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
```

```
controller E1 0/1/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 channel-group 0 timeslots 1-31
!
controller E1 0/2/0
  clock source internal
mode atm aim 1
!
controller E1 0/2/1
 channel-group 0 timeslots 1-31
!
controller E1 1/0/0
  clock source internal
mode atm aim 1
!

class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
```

```
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4446
 gsm-abis remote 10.10.10.2 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface Serial0/2/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM1/0/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface ATM0/IMA0
no ip address
atm bandwidth dynamic
atm umts-iub
umts-iub set dscp ef
umts-iub local 10.10.10.1 6000
umts-iub remote 10.10.10.2 6000
no atm ilmi-keepalive
pvc 2/1
  encapsulation aal0
!
pvc 2/2 qsaal
!
!
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
card type E1 1 0
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate slot 1
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
network-clock-select 2 E1 0/1/0
network-clock-select 3 E1 0/2/0
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 clock source internal
 channel-group 0 timeslots 1-31
!
!
controller E1 0/2/0
  mode atm aim 1
!
controller E1 0/2/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 1/0/0
  mode atm aim 1
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
```

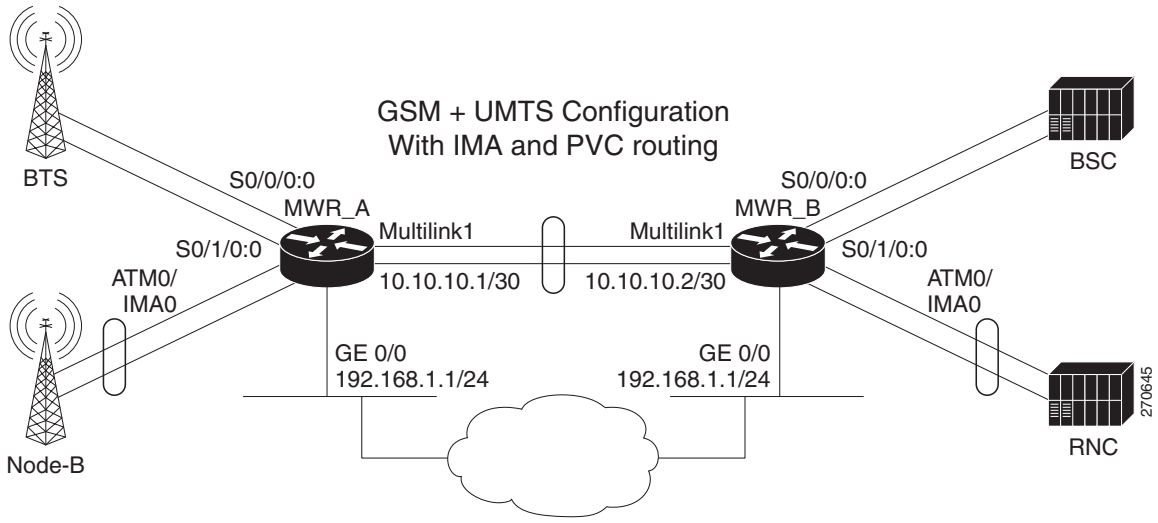
```
interface Multilink1
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4446
 gsm-abis remote 10.10.10.1 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface Serial0/2/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM1/0/0
 no ip address
```

```
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface ATM0/IMA0
no ip address
atm bandwidth dynamic
atm umts-iub
umts-iub set dscp ef
umts-iub local 10.10.10.2 6000
umts-iub remote 10.10.10.1 6000
no atm ilmi-keepalive
pvc 2/1
  encapsulation aal0
!
pvc 2/2 qsaal
!
!
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

GSM and UMTS with IMA and PVC Routing (HSDPA Offload) Configuration

The combined GSM and UMTS with IMA and PVC Routing configuration allows PVC Routing to be off-loaded to an alternate backhaul (see Figure B-12 on page B-74).

Figure B-12 GSM and UMTS with IMA and PVC Routing (HSDPA Offload) Configuration



MWR_A

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
network-clock-select 2 E1 0/1/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 clock source internal
```

```
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 channel-group 0 timeslots 1-31
!
!
controller E1 0/2/0
  clock source internal
mode atm aim 1
!
controller E1 0/2/1
  clock source internal
mode atm aim 1
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface GigabitEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
```

```
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4446
 gsm-abis remote 10.10.10.2 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface ATM0/2/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface ATM0/IMA0
no ip address
atm bandwidth dynamic
atm umts-iub
umts-iub set dscp ef
umts-iub set peering dscp ef
umts-iub local 10.10.10.1 6000
umts-iub remote 10.10.10.2 6000
no atm ilmi-keepalive
pvc 2/1
  encapsulation aal0
!
pvc 2/2 qsaal
!
!
interface ATM0/IMA0.1 multipoint
 atm umts-iub
 umts-iub set dscp ef
 umts-iub set peering dscp ef
 umts-iub local 192.168.1.1
 umts-iub remote 192.168.1.2
 pvc 2/3
   encapsulation aal0

!
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
```

```
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

```
!
card type E1 0 0
card type E1 0 1
card type E1 0 2
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
network-clock-select 2 E1 0/1/0
network-clock-select 3 E1 0/2/0
network-clock-select 4 E1 0/2/1
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/1/0
 framing NO-CRC4
 channel-group 0 timeslots 1-31
!
controller E1 0/1/1
 clock source internal
 channel-group 0 timeslots 1-31
!
controller E1 0/2/0
  mode atm aim 1
!
controller E1 0/2/1
  mode atm aim 1
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
```

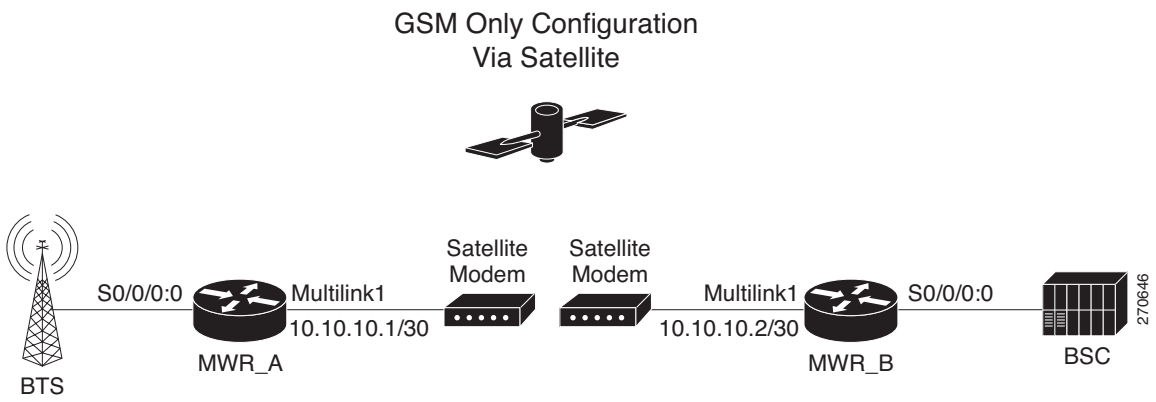
```
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
interface GigabitEthernet0/0
 ip address 192.168.1.2 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface Serial0/1/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4446
 gsm-abis remote 10.10.10.1 4446
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/1/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
!
interface ATM0/2/1
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 ima-group 0
```

```
!
interface ATM0/IMA0
no ip address
atm bandwidth dynamic
atm umts-iub
umts-iub set dscp ef
umts-iub set peering dscp ef
umts-iub local 10.10.10.2 6000
umts-iub remote 10.10.10.1 6000
no atm ilmi-keepalive
pvc 2/1
  encapsulation aal0
!
pvc 2/2 qsaal
!
!
interface ATM0/IMA0.1 multipoint
atm umts-iub
umts-iub set dscp ef
umts-iub peering dscp ef
umts-iub local 192.168.1.2
umts-iub remote 192.168.1.1
pvc 2/3
  encapsulation aal0

!
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

GSM Only Configuration via Satellite

The GSM only via satellite configuration allows for point-to-point network optimization (see Figure B-13).

Figure B-13 GSM Only Configuration via Satellite



MWR_A

```
!
card type E1 0 0
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate aim 1
network-clock-select 1 E1 0/0/1
!
ipran-mib snmp-access inBand
ipran-mib location cellSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 clock source internal
 channel-group 0 timeslots 1-20
!
controller E1 0/0/1
 channel-group 0 timeslots 1-20
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
```

```
interface Multilink1
ip address 10.10.10.1 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis set dscp ef
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

MWR_B

```
!
card type E1 0 0
!
!
redundancy
  mode y-cable
   standalone
!
network-clock-participate wic 0
network-clock-participate aim 1
network-clock-select 1 E1 0/0/0
!
ipran-mib snmp-access outOfBand
ipran-mib location aggSite
!
!
controller E1 0/0/0
 framing NO-CRC4
 channel-group 0 timeslots 1-20
!
controller E1 0/0/1
 clock source internal
 channel-group 0 timeslots 1-20
!
!
class-map match-any llq-class
match ip dscp ef
!
!
policy-map llq-policy
class llq-class
  priority percent 99
class class-default
  bandwidth remaining percent 1
  queue-limit 45
!
interface Multilink1
ip address 10.10.10.2 255.255.255.252
load-interval 30
 no keepalive
 no cdp enable
 ppp pfc local request
 ppp pfc remote apply
 ppp acfc local request
 ppp acfc remote apply
 ppp multilink
 ppp multilink interleave
 ppp multilink group 1
 ppp multilink fragment delay 0 1
 ppp multilink multiclass
 max-reserved-bandwidth 100
 service-policy output llq-policy
 hold-queue 50 out
 ip rtp header-compression ietf-format
!
!
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis set dscp ef
```

```
 no keepalive
!
interface Serial0/0/1:0
 no ip address
 encapsulation ppp
 keepalive 1
 ppp multilink group 1
 max-reserved-bandwidth 100
!
logging history size 500
logging history debugging
logging trap warnings
snmp-server community public RO
snmp-server queue-length 100
snmp-server enable traps snmp linkdown linkup coldstart warmstart
snmp-server enable traps ipran
snmp-server enable traps syslog
snmp-server trap link ietf
snmp-server ifIndex persist
no snmp-server sparse-table
snmp-server host 64.50.100.254 version 2c V2C
disable-eadi
```

GSM Congestion Management

The GSM congestion management configuration.

BTS side:

```
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.1 4444
 gsm-abis remote 10.10.10.2 4444
 gsm-abis congestion enable
 gsm-abis congestion critical 1-10
 gsm-abis congestion critical 31
 gsm-abis set dscp ef
 no keepalive
```

BSC side:

```
interface Serial0/0/0:0
 no ip address
 encapsulation gsm-abis
 gsm-abis local 10.10.10.2 4444
 gsm-abis remote 10.10.10.1 4444
 gsm-abis congestion enable
 gsm-abis congestion critical 1-10
 gsm-abis congestion critical 31
 gsm-abis set dscp ef
 no keepalive
```

UMTS Congestion Management

The UMTS congestion management configuration.

Node-B side:

```
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub congestion-control
 umts-iub local 10.10.10.1 6000
 umts-iub remote 10.10.10.2 6000
 pvc 1/1 qsaal
  umts-iub congestion priority protected
 !
 pvc 1/2 qsaal
  umts-iub congestion priority 2
 !
 pvc 1/100
encapsulation aal0
  umts-iub congestion priority 5
 !
```

RNC side:

```
interface ATM0/2/0
 no ip address
 scrambling-payload
 no atm ilmi-keepalive
 atm umts-iub
 umts-iub set dscp ef
 umts-iub congestion-control
 umts-iub local 10.10.10.2 6000
 umts-iub remote 10.10.10.1 6000
 pvc 1/1 qsaal
   umts-iub congestion priority protected
 !
 pvc 1/2 qsaal
   umts-iub congestion priority 2
 !
 pvc 1/100
encapsulation aal0
 umts-iub congestion priority 5
 !
```