

Configuring ATM–PPP Internetworking

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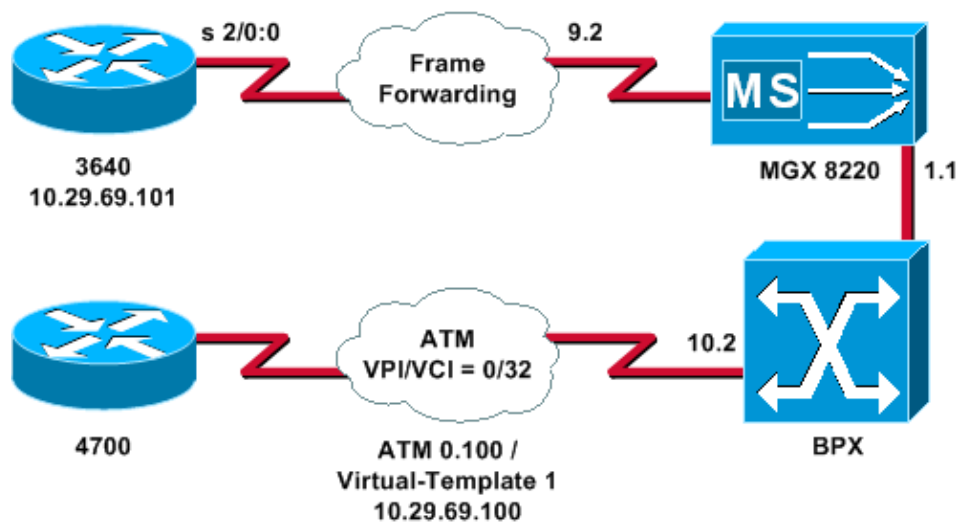
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Introduction

This document contains a simple ATM to Point-to-Point Protocol (PPP) configuration. It is intended to serve as an example of how to set up ATM–PPP Internetworking between Cisco routers and Cisco or StrataCom WAN switches. For more detail on the configuration of the various components, refer to the Technology Information Documentation, PPP Over ATM, and Virtual Access PPP Features in Cisco IOS.



Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Configuring the MGX 8220 Shelf

Follow this procedure to configure the MGX 8220 shelf:

1. Verify that the line exists.

```
mgx8220a.1.9.FRSM.a > dsplns
```

Line Type	Conn	Type	Status/Coding	Length	XmtClock Source	Alarm	Stats Alarm
9.1	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		
9.2	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		
9.3	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		
9.4	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		

```
LineNumOfValidEntries: 4
```

Syntax : **dsplns**

2. Enable the line.

```
mxg8820a.1.9.FRSM.a > addln 2
```

```
mxg8820a.1.9.FRSM.a >
```

If this works, then you will get only the prompt back; you can issue the **dsplns** command again, to ensure that the status is enabled.

```
mgx8220a.1.9.FRSM.a > dsplns
```

Line Type	Conn	Type	Status/Coding	Length	XmtClock Source	Alarm	Stats Alarm
9.1	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		
9.2	DB-15	dsx1ESF	Ena/dsx1B8ZS	0-110 ft	LocalTim	No	No
9.3	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		
9.4	DB-15	dsx1ESF	Dis/dsx1B8ZS	0-110 ft	LocalTim		

```
LineNumOfValidEntries: 4
```

Syntax : **dsplns**

3. Use the **cnfln** command to change the line parameters to meet the needs of your environment.
4. Add the logical port configuration.

This example demonstrates how to set up a full T1 port (24 channels) between the 3640 and the MGX 8220 shelf, with a port type of **frame forward**:

```
mgx8220a.1.9.FRSM.a > addport 1 2 2 1 24 3
```

5. Issue the **dsports** command to verify that the port has been added and that the configuration is correct.

```
mgx8220a.1.9.FRSM.a > dsports
```

Port	Ena/Speed	EQServ Ratio	SignalType	T391	T392	N391	N392	N393	Type	Alarm
------	-----------	-----------------	------------	------	------	------	------	------	------	-------

9.2.1	Add/1536k	1	NoSignalling	10	15	6	3	4	frForwar	No
-------	-----------	---	--------------	----	----	---	---	---	----------	----

```
Number of ports:          1
PortDs0UsedLine1:        0x00000000
PortDs0UsedLine2:        0x00ffffff
PortDs0UsedLine3:        0x00000000
PortDs0UsedLine4:        0x00000000
PortNumNextAvailable:    36
```

Syntax : **dsports**

6. Add the frame forwarding channel.

Now you are ready to add the frame forwarding channel. This step demonstrates how to add a connection using logical channel number 100 on logical port 1 (timeslots 1 to 24). It is configured with data link connection identifier (DLCI) 0 with a CIR of 1536000 using frame forwarding. The concept of DLCI is slightly misleading. Frame forwarding connections do not direct traffic based on the DLCI.

In this example, the DLCI value is used as a place holder:

```
mgx8220a.1.9.FRSM.a > addchan 100 1 0 1536000 5
```

```
SAR-MSG>>LCN 100 is enabled
```

7. Verify the channel:

```
mgx8220a.1.9.FRSM.a > dspchans
```

DLCI	Chan	EQ	I/EQDepth	I/EQDEThre	I/EECNThre	Fst/ DE	Type	Alarm
9.2.1.1000	100	2	65535/65535	32767/32767	6553/6553	Dis/Dis	frFor	No

```
Number of channels:      1
ChanNumNextAvailable:   23
```

Syntax : **dspchans**

Configuring the BPX

Follow this procedure to configure the BPX:

1. Make sure that the ATM Service Interface (ASI) port is up and active.
 - a. Up the line:

```
upln 10.2
```

- b. Issue the **dsplns** command to verify that the line is operational.

```
bpX8620a    TN    Cisco    BPX8620    9.3.45    Jul. 10 2003 05:25 EDT
```

Line	Type	Current Line	Alarm Status
10.1	OC3	Major -	Loss of Sig (RED)

```

10.2    OC3    Clear - OK
11.1    T3     Major - Loss of Sig (RED)
11.2    T3     Clear - OK

```

Last Command: **dsplns**

c. Issue the **upport** command to up the port.

```

bpx8620a  TN  Cisco  BPX8620  9.3.45  Jul. 10 2003 05:23 EDT

```

```

Port:          10.2    [ACTIVE  ]
Interface:     MMF-2
Type:          UNI
%Util Use:     Disabled
Speed:         353208 (cps)
Shift:         SHIFT ON HCF (Normal Operation)
VBR Queue Depth: 492

```

```

Protocol:      ILMI
VPI.VCI:      0.16
ILMI Polling Enabled  N
Trap Enabled      Y
T491 Polling Interval 30
N491 Error Threshold  3
N492 Event Threshold  4

```

Last Command: **upport 10.2**

d. Issue the **dspport** command to make sure the port is active.

e. Issue the **cnfport** command to make any changes to the port that are necessary to adapt the port configuration to your environment.

2. Add the shelf to the network.

a. Up the trunk on the BNI port 1.1:

```

uptrk 1.1

```

b. Add the MGX 8220 shelf connected to 1.1:

```

addshelf 1.1 A

```

3. Verify that the MGX 8220 shelf exists on the network.

Issue the **dspnode** command to see if the MGX 8220 shelf is listed.

4. Add the connection from the ASI (port 10.2) to the BNI (1.1) where the MGX 8220 shelf is located.

a. Use the slot number (9) and channel number (100) configured in the Configuring the MGX 8220 Shelf section.

```

addcon 10.2.0.32 bpx8620a 1.1.9.100 atfr * 1536 * * * * * * * *

```

◇ The connection can be the same node or a different node in the network.

◇ The quality of service and bandwidth requirements must match your network requirements. In this example, the 1536 Kbps line-rate setup on the MGX 8220 shelf is matched to the PCR, and the CIR is set equal to the SCR.

b. Issue the **dspcon** command to verify your work.

```

bpx8620a  TN  Cisco  BPX8620  9.3.45  Jul. 10 2003 05:25 EDT

```

```

Conn: 10.2.0.32      bpx8620a  1.1.9.100      atfr      Status:OK
      PCR(0+1)      SCR      MBS      MCR      SCR EN UPC CLP RM  % util
      1536/1536    1536/1536  1000/1000  --/--    1/1    y    y  n/n  100/100

```

```

Path:  Route information not applicable for local connections

```

```
bpx8620a      ASI-OC3      : OK          bpx8620a  BNI-T3      : OK
              Line 10.2   : OK          Line 1.1   : OK
              OAM Cell RX: Clear        NNI        : OK
              NNI         : OK
```

Last Command: **dspcon 10.2.0.32**

Configuring the ATM–Attached Router

The ATM–attached router (a Cisco 4700, in the example) must be running a version of Cisco IOS® software that supports ATM–PPP functionality. This feature was added in the 11.2(4)F image for certain platforms. Check the release notes to ensure that this functionality has been included in the Cisco IOS release on your router.

This is the required configuration for the ATM–attached router.

Note: The hostname and username items are included for the CHAP negotiation.

```
hostname bell
username wansw-3640-2 password chappwd
!
interface Virtual-Template1
 ip address 10.29.69.100 255.255.255.0
 cdp enable
 ppp authentication chap
!
!
interface ATM0
 no ip address
!
interface ATM0.100 point-to-point
 atm pvc 10 0 32 aal5ppp 1536 1535
 96 virtual-template 1
!
```

Configuring the Serial–Attached Router

This example uses a Cisco 3640 router with an integrated channel service unit (CSU), which requires configuration of the controller information as well. If you are using an external channel service unit/data service unit (CSU/DSU) to a 2500 series, for example, the controller configuration is required.

This is the configuration for the Cisco 3640 attached to the MGX 8220 shelf:

```
hostname wansw-3640-2
!
username bell password chappwd
!
controller T1 2/0
 framing esf
 linecode b8zs
 channel-group 0 timeslots 1-24 speed 64
!
interface Serial2/0:0
 ip address 10.29.69.101 255.255.255.0
 encapsulation ppp
 ppp authentication chap
!
```

Verifying Connectivity

MGX 8220 Shelf

Issue the **dspchancnt** command to see the frames and the bytes that are traversing the serial interface for this particular channel:

```
mgx8220a.1.9.FRSM.a > dspchancnt 100

ChanNum:                100
ChanState:               okay
ChanUpTime:              71

                                Tx                                Rx
                                -----                                -----
AbitState:               Sending A=1                                Off
ATMState:                Not sending any state                    Not receiving any state
Total Frames:            20                                        21
Total Bytes:             1097                                    1398
Frames DE:                0                                        0
Bytes DE:                 0                                        0
Frames Discarded:        0                                        0
Bytes Discarded:         0                                        0
FramesDiscXceedQDepth:   0                                        0
BytesDiscXceedQDepth:    0                                        0
FramesDiscXceedDEThresh: 0                                        0
Frames FECN:              0                                        0
Frames BECN:              0                                        0
FramesTagged FECN:       0                                        0
FramesTagged BECN:       0                                        0
KbpsAIR:                  0                                        0
FramesTaggedDE:           0                                        0
BytesTaggedDE:            0                                        0
RcvFramesDiscShelfAlarm:                                0
XmtFramesDiscPhyLayerFail: 0
XmtFramesDiscCRCError:   0
XmtFramesDiscReAssmFail: 0
XmtFramesDiscSrcAbort:   0
XmtFramesDuringLMIAAlarm: 0
XmtBytesDuringLMIAAlarm: 0
RcvFramesDiscUPC:                                0
XmtFramesInvalidCPIs:    0
XmtFramesLengthViolations: 0
XmtFramesOversizedSDUs:  0
XmtFramesUnknownProtocols: 0
RcvFramesUnknownProtocols: 0
```

BPX

On the BPX side, issue the **dspchstats** command to get a cell count for the ATM interface.

```
bpx8620a      TN      Cisco      BPX8620      9.3.45      Jul. 10 2003 05:25 EDT

Channel Statistics for 10.2.0.32      Cleared: Sep. 10 1997 05:26 (-)
PCR: 2170 cps                          Collection Time: 0 day(s) 00:00:36      Corrupted: NO
  Traffic      Cells      Avg CPS      %util
From Port    :      37      1      0
To Network   :      37      1      0
From Network :      44      1      0
To Port      :      44      1      0
```

This Command: **dspchstats 10.2.0.32**

Routers

For the serial-connected router, issue the **show interface serial** command to verify that link control protocol (LCP) and any other desired control protocols are open, and to verify that traffic is passing.

```
wansw-3640-2# show interface serial 2/0:0

Serial2/0:0 is up, line protocol is up
Hardware is DSX1
Internet address is 10.29.69.101/24
MTU 1500 bytes, BW 1536 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation PPP, loopback not set, keepalive set (10 sec)
LCP Open
Open: IPCP, CDP
Last input 00:00:04, output 00:00:04, output hang never
Last clearing of "show interface" counters 01:02:05
Input queue: 0/75/1 (size/max/drops); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/64/0 (size/threshold/drops)
  Conversations 0/1 (active/max active)
  Reserved Conversations 0/0 (allocated/max allocated)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  570 packets input, 21903 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  1 input errors, 1 CRC, 0 frame, 0 overrun, 0 ignored, 1 abort
  737 packets output, 25962 bytes, 0 underruns
  0 output errors, 0 collisions, 50 interface resets
  0 output buffer failures, 0 output buffers swapped out
  4 carrier transitions
Timeslot(s) Used:1-24, Transmitter delay is 0 flags
```

For the ATM-connected router, issue the **show interface virtual-access** command to see the virtual access interface and to assess connectivity.

```
bell# show interface virtual-access 1

Virtual-Access1 is up, line protocol is up
Hardware is Virtual Access interface
Internet address is 10.29.69.100/24
MTU 1500 bytes, BW 100000 Kbit, DLY 100000 usec, rely 255/255, load 1/255
Encapsulation PPP, loopback not set, keepalive set (10 sec)
DTR is pulsed for 5 seconds on reset
LCP Open
Open: IPCP, CDP
Bound to ATM0.100 VCD: 10, VPI: 0, VCI: 32
Cloned from virtual-template: 1
Last input 00:00:08, output never, output hang never
Last clearing of "show interface" counters 00:43:41
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  386 packets input, 14956 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  476 packets output, 17424 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
```

In this example, both routers are configured to use the Cisco Discovery Protocol (CDP). A quick look at the CDP neighbor table verifies connectivity.

```
wansw-3640-2# show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater
```

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
bell	Ser 2/0:0	167	R	4700	Virtual-Access1

```
bell# show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge  
S - Switch, H - Host, I - IGMP, r - Repeater
```

Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
wansw-3640-2	Virtual-Access1153		R	3640	Ser 2/0:0

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