Configuring DSL Equipment

This chapter presents key details of configuring the DSL equipment as used in the solution, and presents the following topics:

Note Ericsson DSL equipment was tested in this solution. This appendix does not provide detailed information about Ericsson products. Refer to Ericsson user documentation for further information.

Network Diagram

Figure D-1 on page D-2 illustrates an example network of Ericsson DSL equipment. A Public Ethernet Manager (PEM) terminal communicates with an Ethernet Controller Node (here an ECN320), which in turn aggregates traffic from one or more Ethernet DSLAM Nodes (here an EDN312xp DSLAM). The DSLAM, in turn, communicates with an HM340d home access gateway (HAG).

Table D-1 on page D-2 lists the VLANs, their descriptions, and addresses for the ECN320 and EDN312xp DSLAM. Table D-2 on page D-3 lists the configuration parameters for the HM340d.

Figure D-1 Example Ericsson Network

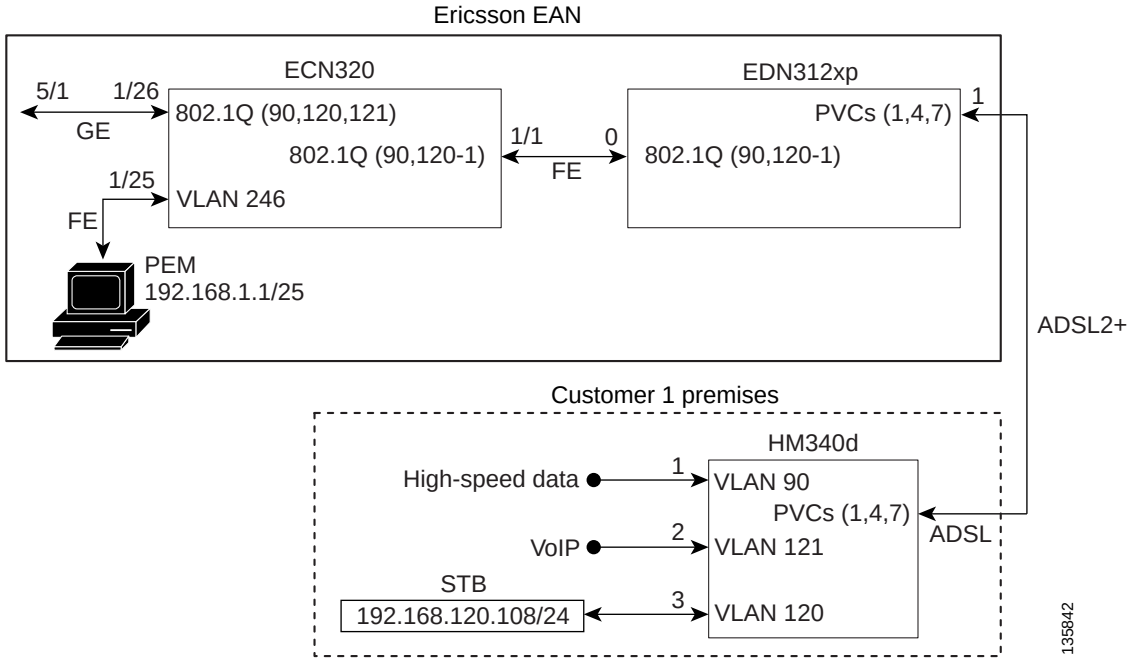

Table D-1 ECN320 and EDN312xp DSLAM VLANs, Descriptions, and IP Addresses

Node	VLAN	Description	IP Address
ECN320	90	High-speed data	Layer 2
	120	Video	Layer 2
	121	VoIP	Layer 2
	246	External interface	192.168.1.100/25
	247	Internal interface	10.0.100.1/16
	248	Untagged	10.1.100.1/24
EDN312xp DSLAM	90	High-speed data	Layer 2
	120	Video	Layer 2
	121	VoIP	Layer 2
	247	Internal interface	10.0.100.?/16
	248	Untagged	10.1.100.?/24

Table D-2 HM340d Configuration Parameters

Traffic	VLAN	HAG Ports	PVC[1]	VPI[2]	VCI[3]	Encapsulation	Service Class	PCR[4]	SCR[5]	MBS[6]
HSD	90	0	1	8	35	LLC	UBR	—	—	—
VoIP	121	1	4	0	51		CBR	—	300	—
Video	120	2	7	8	59		VBR-RT	1200	600	10

1. Permanent virtual connection
2. Virtual path identifier
3. Virtual connection identifier
4. Peak cell rate
5. Sustained cell rate
6. Maximum burst size

Hardware and Software Versions

Table D-3 on page D-3 lists the hardware and software versions for the Ericsson equipment.

Table D-3 Hardware and Software Versions for Ericsson Equipment

Equipment	Hardware Version	Software Version
Switch	ECN320, R01	CXC 132 7380 R3C06
DSLAM	EDN312xp, R1	CXC 132 8112 R2C05
HAG	HM340dp Home Access Gateway, ZAT 759 89/1, R1A	CXC 132 7758 R2A

Configuring Ericsson Components

The following tasks are presented in the general order in which they should occur:

Configuring the Switch

To configure the Ericsson ECN320 switch, use Hyperterminal or a similar application to set parameters as follows:

Interface	Area	Parameter and Setting
Management interface toward PEM	External interface	vlan = 246
		IP = 192.168.1.100
		Netmask = 255.255.255.0
Management interface toward internal nodes	Internal interface	vlan = 247
		IP = 10.0.100.1
		Netmask = 255.255.0.0
		Untagged vlan = 248
		IP = 10.0.100.1
		Netmask = 255.255.255.0

To save the completed configuration, use the following command:

config save-configuration

Configuring the DSLAM

To configure the access network on the EDN312xp DSLAM, use Ericsson's Network Configuration Manager Application and set parameters as follows:

Choose ...	Area	Parameter and Setting
Network > Line Terminations and Regions	Region	Region Name = Root

Choose ...	Area	Parameter and Setting
Network Elements >	DHCP Server	Name = DHCPServer
		Region = (root)
		Lease Time = 11520
	Domain File Server	IP addr = 192.168.1.1
		FTP User = ftpuser
		FTP PW = ericsson
		Remote Storage Login = eda-mp
		Remote Storage PW = ericsson
		Region = (root)
	NTP Server	IP addr = 192.168.1.1
	PEM[1] Domain Service	IP addr = 192.168.1.1
		Region = (root)
Networks >	IP Network	ID = 192.168.1.0
		Mask = 255.255.255.0
		GW = 192.168.1.20
		Max Ethernet Frame Size = 1526
	Domain Subnets	Name = Subnet1
		DHCP Server = DHCPServer
		Domain File Server = 192.168.1.1
		PEM Domain Service = DomainService
		NTP Server = 192.168.1.1
	IP Ranges	Network ID = 192.168.1.0
		Network Mask = 255.255.255.0
		Lower Limit = 192.168.1.50
		Upper Limit = 192.168.1.100

1. Public Ethernet Manager, Ericsson's DSLAM configuration application.

Note For more information on these configurations, see the document *Ericsson EDA Network and System Administration*.

Configuring the HAG

Two files are used to configure the Ericsson HM340d HAG:

- **atm.conf** describes the ATM permanent virtual circuits (PVCs) that are configured in the HAG, allowing PVC Ethernet frames to be bridged in accordance with RFC 2684. This filed is used for both the user profiles that are created. (See Creating Services and Profiles, page D-9.)
- **bridge.conf** maps the ports on the HAG to a specific VLAN/PVC number. This filed is copied and edited as appropriate for both the user profiles that are created.

Note For HAG configuration parameters, see Table D-2 on page D-3. For more information, refer to the document *Ericsson Service Gateway HM340d Operator's Guide*.

Because the HAG configuration files used in the solution are not the Ericsson defaults, you must edit the default files to configure the HAG to forward the three VLANs and services. This information is part of the DSLAM service configurations, and must also be included in the HAG configuration.

Note Data is on port 1, voice is on port 2, and video is on ports 3 and 4. The DSLAM ports are physically labeled 1 through 4 on the outside of the HAG, although in the file bridge.conf these numbers correspond to 0 through 3.

Edit the default files to conform to the following.

atm.conf

The following shows the atm.conf file used for both user profiles.

```
# atm.conf -- ATM PVC configuration

# Each line in this file will result in a ATM PVC being configured, and on this PVC
ethernet frames will be bridged (RFC 2684).


# ATM PVC Interface number 0 (zero) is the management PVC.


PVC           VPI   VCI Encap     Service Class    Parms

------------------------------------------------------------

0             12     35  llc      nrtvbr           300 150 10

1              8     35  llc      ubr

2              0     35  llc      ubr

3              0     43  llc      ubr_pcr          600

4              0     51  llc      cbr              300

5              8     51  llc      nrtvbr           600 300 10

6              8     43  llc      rtvbr            600 300 10

7              8     59  llc      rtvbr            1200 600 10
```

bridge.conf

The following shows the bridge.conf file used for Profile1.

```
# bridge.conf -- virtual/software ethernet bridge configuration


# The information in this file determines which logical ethernet bridges should be
present.



# Each line is a bridge with the members as a space-separated list, were each member is
either a PVC or a tagged or untagged ethernet port. A PVC member is listed as "pvcN" where
N is the ATM PVC identifier from the /etc/atm.conf   configuration file. An untagged port
member is listed as "portN", and a tagged port as "tagged-portN", were N is the port
number (0-3, inclusive).

Each logical port (PVC, tagged or untagged ethernet port) may only be a member of one
bridge. If one untagged port (for example "port2") is used, the corresponding tagged port
("tagged-port2") may not be used, and vice versa.


# VLAN id                  Members

   90         port0           pvc1

   120        port2           pvc7

   121        port1           pvc4
```

The following shows the bridge.conf file used for Profile2. Note the addition of port 3.

```
# bridge.conf -- virtual/software ethernet bridge configuration


# The information in this file determines which logical ethernet bridges should be
present.


# Each line is a bridge with the members as a space-separated list, were each   member is
either a PVC or a tagged or untagged ethernet port. A PVC member is listed as "pvcN" where
N is the ATM PVC identifier from the /etc/atm.conf   configuration file. A untagged port
member is listed as "portN", and an tagged port as "tagged-portN", were N is the port
number (0-3, inclusive).

Each logical port (PVC, tagged or untagged ethernet port) may only be a member of one
bridge. If one untagged port (for example "port2") is used, the corresponding tagged port
("tagged-port2") may not be used, and vice versa.


# VLAN id                  Members

   90         port0           pvc1

   120        port2 port3     pvc7

   121        port1           pvc4
```

Creating Line Configurations

Line configurations are required to establish communication between the DSLAM and the HAG. A separate line configuration is used be each profile.

Using the Ericsson PEM configuration application, choose *Service Configuration* > *DSL Line*, and set (or confirm) parameters are as follows:

Profile	Area	Parameter	Setting
1	Channel 0	Name	OneVideoVoiceDataLow
		Transmission mode	Autodetect
		Min. bit rate downstream	7008
		Min. bit rate upstream	512
		Max. bit rate downstream	24000
		Max. bit rate upstream	1408
		Interleave delay downstream	0
		Interleave delay upstream	0
	Line	Transmit PSD	Priority to rate
		Target SNR margin downstream	6.0
		Target SNR margin upstream	6.0
		Max. SNR margin downstream	6.0
		Max. SNR margin upstream	6.0
		Rate adaptation mode	Disabled
2	Channel 0	Name	TwoVideoVoiceDataLow
		Transmission mode	Autodetect
		Min. bit rate downstream	7008
		Min. bit rate upstream	512
		Max. bit rate downstream	24000
		Max bit rate upstream	1408
		Interleave delay downstream	0
		Interleave delay upstream	0
	Line	Transmit PSD	Priority to rate
		Target SNR margin downstream	6.0
		Target SNR margin upstream	6.0
		Max. SNR margin downstream	6.0
		Max. SNR margin upstream	6.0
		Rate adaptation mode	Disabled

Creating Services and Profiles

Using the PEM configuration application, create services and user profiles for video, voice, and data. These services create the bridge between the Ethernet VLAN services for video, voice and data and the ATM PVC (VPI/VCI pairs).

Creating Services and Profiles for Video

Creating a Video Service

To create a video service using the Ericsson PEM configuration application, choose *Service Configuration* > *Action* > *Create New*, and set (or confirm) parameters as follows:

Parameter	Setting
Service Name	Video
Customer Service type	Video
CPE access method	Static IP
Relay agent configuration	Not used
IP settings	Enable IGMP snooping (checked)
Broadcast Allowed	Not checked
Default Gateway	192.168.120.1
Enable Mac forced forwarding	Checked
Enable virtual Mac address	Checked
Connections allowed	2
ATM Service Class	VBR-rt
VPI	8
VCI	59
Enable upstream policing	Checked
VLAN Usage	Service VLAN preconfigured to all switches
Ethernet Priority	5
VLAN ID	120

Creating Video Bandwidth Profiles

Create two different bandwidth configurations (profiles) for video. These can be applied to the video service configuration depending on the profile the user is using.

To create video bandwidth profiles using the Ericsson PEM configuration application, choose *Service Configuration* > *Video* > *Bandwidth* > *Create*, and set parameters as follows:

Profile	Parameter	Setting
1	Name	VideoLowBW
	PCR Down/Up	6016/512
	SCR Down/Up	5014/128
	MBS Down/Up	30/30
2	Name	VideoBW
	PCR Down/Up	10016/512
	SCR Down/Up	10016/128
	MBS Down/Up	30/30

Creating Services and Profiles for Voice

Creating a Voice Service

To create a voice service using the Ericsson PEM configuration application, choose *Service Configuration* > *Action* > *Create New*, and set (or confirm) parameters as follows:

Parameter	Setting
Service Name	Voice
Customer Service type	Voice
CPE access method	Static IP
Relay agent configuration	Not used
IP settings	Enable IGMP snooping (not checked)
Broadcast Allowed	Not checked
Default Gateway	192.168.121.1
Enable Mac forced forwarding	Checked
Enable virtual Mac address	Checked
Connections allowed	1
ATM Service Class	CBR
VPI	0
VCI	51
Enable upstream policing	Checked
VLAN Usage	Service VLAN preconfigured to all switches

Parameter	Setting
Ethernet Priority	6
VLAN ID	121

Creating a Voice Bandwidth Profile

Create a single bandwidth configuration (profile) for voice. This can be applied to the voice service configuration for both Profile 1 and Profile 2.

To create video bandwidth profiles using the Ericsson PEM configuration application, choose *Service Configuration* > *Voice* > *Bandwidth* > *Create*, and set parameters as follows:

Profile	Parameter	Setting
1, 2	Name	VoiceBW
	Down/Up	320/320
	IP address	192.168.121.107/24

Creating Services and Profiles for Data

Creating a Data Service

To create a data service using the Ericsson PEM configuration application, choose *Service Configuration* > *Action* > *Create New,* and set (or confirm) parameters as follows:

Parameter	Setting
Service Name	Data
Customer Service type	Data
CPE access method	Transparent LAN
Relay agent configuration	Not used
IP settings	Enable IGMP snooping (not checked)
Broadcast Allowed	N/A
Enable Mac forced forwarding	N/A
Enable virtual Mac address	N/A
ATM Service Class	UBR
VPI	8
VCI	35
Enable upstream policing	Checked
VLAN Usage	Service VLAN preconfigured to all switches
Ethernet Priority	0
VLAN ID	90

Note No IP address is required because a transparent VLAN for data service is used. A filter is not applicable.

Creating Data Bandwidth Profiles

Create two different bandwidth configurations (profiles) for data. These can be applied to the data service configuration depending on the profile the user is using.

To create video bandwidth profiles using the Ericsson PEM configuration application, choose *Service Configuration > Data > Bandwidth > Create*, and set parameters as follows:

Profile	Parameter	Setting
1	Name	DataLowBW
	PCR Down/Up	1152/512
	SCR Down/Up	N/A
	MBS Down/Up	N/A
2	Name	DataBW
	PCR Down/Up	1728/512
	SCR Down/Up	N/A
	MBS Down/Up	N/A

Creating User Profiles and Adding Services

Line and service configurations must be completed before you can user profiles.

The following tasks use the Ericsson PEM configuration application to create two user profiles and add video, voice, and data services.

Creating Profile 1

Do the following to create Profile 1 and add services.

Step 1 Create the profile.

- **a.** Choose *Service Configuration > End User > New EDA End-User.*
- **b.** Under Customer number, enter **User101**.
- **c.** Choose *End User > Line Setup*.
- **d.** Under Line Configuration, select OneVideoVoiceDataLow.

Step 2 Add video service.

- **a.** In the Add Customized Services window, click Add.
- **b.** From the drop-down menu, choose Video.
- **c.** Under Bandwidth, choose VideoLowBW.
- **d.** For Static IP Address, enter **192.168.120.109**.
- **e.** For a filter, choose FilterAll.

Note This filter is created in Creating an IP Filter, page D-15.

Step 3 Add voice service.

a. In the Add Customized Services window, click Add.

b. From the drop-down menu, choose Voice.

c. Under Bandwidth, choose VoiceBW.

d. For the IP Address, enter **192.168.121.107**.

e. For a filter, choose FilterAll.

Step 4 Add data service.

a. In the Add Customized Services window, click Add.

b. From the drop-down menu, choose Data.

c. Under Bandwidth, choose DataLowBW.

Note No IP address is required because a transparent VLAN for data service is used. A filter is not applicable.

d. Set the EDN Name and EDF position used by the PEM to identify the line configuration for this user:

EAN Name: **ECN320-192-168-1-100**

MDF Position: **1.0.1**

e. Select Line Activate and Apply to activate User101 with the line and service configuration.

Note The connection status LED on the PEM should be green.

Creating Profile 2

Do the following to create Profile 2 and add services.

Step 1 Create the profile.

a. Choose *Service Configuration > End User > New EDA End-User.*

b. Under Customer number, enter **User102**.

c. Choose *End User > Line Setup*.

d. Under Line Configuration, select TwoVideoVoiceDataLow.

Step 2 Add video service.

a. In the Add Customized Services window, click Add.

b. From the drop-down menu, choose Video.

c. Under Bandwidth, choose VideoBW.

d. For Static IP Address, enter **192.168.120.108**, **192.168.120.110**

e. For a filter, choose FilterAll.

Step 3 Add voice service.

a. In the Add Customized Services window, click Add.

b. From the drop-down menu, choose Voice.

c. Under Bandwidth, choose VoiceBW.

d. For the IP Address, enter **192.168.121.107**.

e. For a filter, choose FilterAll.

Step 4 Add data service.

a. In the Add Customized Services window, click Add.

b. From the drop-down menu, choose Data.

c. Under Bandwidth, choose DataBW.

Note No IP address is required because a transparent VLAN for data service is used. A filter is not applicable.

d. Set the EDN Name and EDF position used by the PEM to identify the line configuration for this user:

EDN Name: **ECN320-192-168-1-100**

MDF Position: **1.0.2**

e. Select Line Activate and Apply to activate User102 with the line and service configuration.

Note The connection status LED on the PEM should be green.

Creating an IP Filter

If a static IP address is used as part of a video, voice, or data service configuration, an IP filter must be applied for the static IP address to work. Ericsson does not provide a default filter that allows all addresses in the downstream direction to be passed through to the HAG. At least one IP address must be entered into the filter, with that IP address to be marked as "allow" or "deny." Because the **range** command is not supported in the filter configuration in the downstream direction, each address through which traffic is allowed to pass must be entered individually into the filter.

A workaround is to create a filter that denies only one IP address in the downstream direction. The IP address to deny can be any IP address that will not be used to send to, or receive from, the HAG attached to the DSLAM line port for this service configuration. This solution is easier than attempting to add all the IP addresses of all devices that will be sending to, or receiving from, the device attached to the port of the HAG.

Do the following to create an IP filter.

Step 1 Using the Ericsson PEM configuration application, choose *Service Configuration > New EDA Filter.*

Step 2 Under Configuration name, enter **FilterAll**.

Step 3 Uncheck the box labeled "ICMP security enabled."

Step 4 Create an upstream filter to allow a range of IP addresses.

- **a.** Select the Up Stream tab.
- **b.** Enter **192.168.0.0 – 255.255.255.255**
- **c.** Click Allow.
- **d.** Click OK.

Step 5 Create a downstream filter to deny one IP address and allow all other addresses.

- **a.** Select the Down Stream tab.
- **b.** To create a filter that allows any IP addresses except the following (any IP address not used in the system), enter **172.2.2.2**.
- **c.** Click Deny.
- **d.** Click OK.

Step 6 Assign the filter to the desired service and line configuration.

Special Issues

Note the following special issues:

1. If multicast (broadcast) video is to be delivered to the STB through the DSLAM, the Service Configuration for Video must have IGMP snooping enabled.
2. At the time of this printing, Ericsson DSL equipment does not support IGMP version 3. If IGMPv3 commands are sent to the Ericsson equipment, messages are discarded and the broadcast is not played through the STB. Consequently, Cisco switches connected to the Ericsson ECN320 switch must send IGMPv2 commands to the Ericsson equipment.