

Vanguard Applications Ware Release 6.5 Service Pak 1.5 (6.5S150) Advisory Notice

1 Introduction

This notice contains information on software improvements and changes made by the Vanguard Applications Ware Release 6.5R00A Service Pak 6.5S150.

This notice supplements the Vanguard Applications Ware 6.5R00A Software Release Notice (Part Number T0001-47 Rev A)

This release will support Load Balancing for equal weight static routes and using this feature will support BGP load balancing using multiple IP paths (up to 8) between internal or loopback addresses in 2 BGP routers. This release also supports performance enhancement supporting up to 8000 IP cache entries and scalability enhancement by increasing the routing table size to 20,000 on Gen II 7300 CPU. A number of statistic improvements have been added for BGP troubleshooting and viewing active IP static route table. BGP peer enhancements such as Passive Peer, Peer Boot and Peer State recovery will allow BGP peers to recover quicker when errors or collisions occur. Changing the default degree Of Preference (DOP) on routes imported from the local AS into BGP will allow the implementer greater flexibility when creating routing design.

2 Install Service Pack

Executable File

Follow these steps to install the Service Pack 6.5.S150 patch executable file:

Note

For more detailed patch installation instructions, refer to the *Vanguard Software Builder Manual* (Part Number T0030).

Step Action

- 1** If you have not already done so, install Vanguard Software Builder from any Vanguide Release 6.5.R000 CD-ROM (**Part Number 72608-36 A**).
- 2** Download the 65S150.ZIP file from Vanguard Managed Solutions, please save the file to a local drive on your computer.
<http://www.vanguardms.com/support/downloads/servicepaks/>
- 3** Use WinZip® to extract the ZIP file. The 65S150.ZIP file contains the 65S150.EXE file and a copy of this advisory notice in PDF format.
- 4** Run or open the 65S150.EXE executable file from your local drive.
- 5** The patch executable file prompts you with installation instructions. Insert the Vanguide 6.5R000 CD-ROM into the CD-ROM drive and select its drive letter. Follow the installation instructions provided by the installer.

Part No. 72608-36, Rev A

Build an Image After you install the Service Pack Patch executable file, you must build a custom release and load the custom image. This table provides general instructions for these procedures:

Note

For detailed instructions on building a software image and using the Vanguard Software Loader, see the *Vanguard Software Builder Manual* (Part Number T0030) and the *Vanguard Software Loader Manual* (Part Number T0057).

Viewing Alarms and Reports

Alarms and Reports appear in the CTP or in your network management system. For explanations of Vanguard alarms and fatal error reports (FERs), see the *Vanguard Alarms and Reports Manual* (Part Number T0005), or visit the Alarms Search database on: www.vanguardms.com/support/

Step Action

1 Using Vanguard Software Builder, build a custom Release 65S150 Service Pack image by selecting the appropriate Release (6.5.S150 for example) from the **Release** drop-down menu. Select features or options that you want to include in the image.

2 Load the custom image using the Vanguard Software Loader.

Part No. 72608-36, Rev A December, 2005

3 Summary of Enhancements

3.1 IP Enhancements

3.1.1 IP Static Route Load Balancing:

- Allow equal weight static routes to be configured
- Static IP Load Balance up to 8 equal cost paths
- Load balancing will be Session based.
- Both default route and non default equal weight routes are supported
- Allowing support for Static route load balancing will permit BGP balancing using a single BGP path between Internal addresses (Loopback)

3.1.2 IP Performance: IP Cache increase:

- 7300 maximum number of configurable cache entries is increased to 8000 from 2000.
- This applies to IP cache entries and aggregated cache entries.

3.1.3 IP Scalability: IP Routing table OSPF External LSA and BGP routing table increase:

- Gen II 7300 CPU is increased to maximum routing table size of 20,000 routes. BGP table in Gen II 7300 CPU supports 20,000 routes. OSPF routing table supports 7500 OSPF routes and 20,000 External routes.

3.1.4 IP Statistics: Added IP statistics for Static Load Balancing and Cache

- Added IP statistics to show active IP Static routes
- Added IP statistics to show all static next hops when Load Balancing
- Allow flushing of IP Cache.

3.2 BGP Enhancements

3.2.1 BGP Passive Peer:

- Allow BGP Peer to be configured as Passive mode. (Will accept BGP session but will not initiate)

3.2.2 BGP Peer State machine enhancements:

- Allow boot of Peer session without change of Peer table entries
- Automatic recovery from error state

3.2.3 BGP Degree of Preference on imported IGP routes:

- BGP routes DOP imported from IGP imported at 32768 instead of 65535. This allows user the ability to configure higher DOP on routes coming from EBGp sessions.

4 Limitations resolved in this release

Change Request Number	Release where Problem was reported	Interim Patch Release Replaced By 6.5S150	Problem Description
16234	6.4R00A	6.5.T13A	[7300 T1/E1 Rev C]: The card is not recognized by ONS.
16236	6.5R00A	6.5.T13A	[7300 T1/E1 Rev C]: The card is not recognized by ONS.
16098	6.4TA02	6.4TB1B	BGP routes are not always imported into OSPF after Node Boot
16123	6.4TB1A	6.4TB1B	BGP is not propagating route to external peer
16136	6.4TB1A	6.4TB1B	Node Crash FER FAULT: ISI 750 Exception Encountered
16253	6.4TB1C	6.4TD1G	LCON remains in connected state when PPP link is down.
16339	6.4T1PD	6.4T1PE	Unable to configure AAM station as VBR.
15720	6.3T19A	6.4.TB1C	IP Routing Backup failure
16022	6.4T1VA	6.4.TB1C	BGP does not select best path route when best path is down
15962	6.4S10A	6.4.TB1C	BGP cannot run on a internal NAT interface.
16101	6.4TA02	6.4.TB1C	BGP routing loop
16248	6.4TB1C	6.4TD1A	7310 freezes when trying to view BGP Peer Detailed Statistics stat via HTTP

Change Request Number	Release where Problem was reported	Interim Patch Release Replaced By 6.5S150	Problem Description
15569	6.3R00A	6.4TD1A	Can't change ATM station Traffic Category from UBR to VBR
16313	6.4TB1C	6.4TD1E	Getting IP.4 and IP.5 alarms when passing IP data.
15043	6.4R00A	6.4TD1E	BGP packets do not get END service
16310	6.4T1RA	6.4TD1G	NAT - FTP translator does not work
16282	6.4TB1C	6.4T1YC	Bring in support of New 8port T1/E1 card
16291	6.4TB1C	6.4TD1A	Node crashing every five minutes FER FAULT: ISI 750 Exception Encountered
15990	6.4S10A	6.4TD1E	Incoming aggregated route does not update Ip routing table properly
15903	6.4T1ED	6.4TD1E	OSPF_Aggregated_External_Route in not distributed to other OSPF routers
16179	N/A	6.5P05A	Expand IP,BGP routing table from 15,000 to 20,000 entries.(7300 Gen II)
16122	6.3R00A	6.3T10A	BGP gets stuck in an "Error" state after a link restores.
15858	N/A	N/A	IP load balance via static routes, IP Cache Increase
16111	6.4R10A	6.4TD1H	Node boot required to disable Encryption on a LCON.
16162	6.4T1EC	6.4TD1H	Node crashing FER FAULT: Data TLB Miss Exception Encountered
16219	6.4T1EC	6.4TD1H	VG6455;6.4T1EC;Node crash with FAULT: Data TLB Miss Exception
16126	6.4R10A	6.5T10A	High failure rate on SI-3210RevE device on Quad FXS 72985G20
16240	6.4S10A	6.4TD1C	Router will learn MAC addresses on a disabled Bridge Link
16312	6.4TB1C	6.4TD1C	BGP peer Fail to recover quickly
15607	6.4S10A	6.4T1KB	NAT proxy becomes corrupted
16278	6.5S100	6.5T17A	FAULT: System Reset Exception Encountered
16318	6.5S100	6.5T17A	Unable to configure a Class C address for IPSec Proxy
16344	6.5S100	6.5T17A	[IPSec]: Unable to configure valid masks in Tunnel Source/Dest Proxy Masks
16370	N/A	N/A	IP Cache Overflow causes severe drop-off off cached entries

5 Known Limitations

CR16378: [TFTP]: 7300 routers running 6.4 or less Application Ware Images are unable to download 6.5 Application Ware images which exceeds 9 MB

Workaround: 1) Download 6.5 Option 12 or Option 15 via Cloder with a serial connection.

Workaround: 2) Download a smaller image such as Option 11 via TFTP first. Boot the node to load that image.

Once the node is verified to be running with Option 11, download 6.5 Option 12 (or Option 15) with TFTP.

Workaround: 3) Create the same image with SW Builder, using the standard image's .des file. Although the image is identical, the physical image size will be less than 9 MB.

CR16384 [SNMP]: Node Crash due to querying AAM port status with non-AAM port numbers such as virtual FRI, X.25 and other port types.

Workaround: None. Do not perform this type query.

6 New Applications Supported in this release

6.1 Static route Load balancing

Refer to figure 4.1. Equal weight static routes will all appear in IP routing table up to 8 paths. On route lookup the next hop is selected on round robin basis.

In the application below 2 T1 links are configured to the ISP. IP addresses are obtained statically from the provider. Two static routes are configured for default route (0.0.0.0/0.0.0.0) with the next hops as 192.168.1.2 and 192.168.2.2. Any route lookup that does match entry in the IP routing table will be assigned next hop of the oldest used default entry. This lookup is placed in IP cache and all subsequent packets for this session will follow to the same next hop. This is known as session based load balancing.

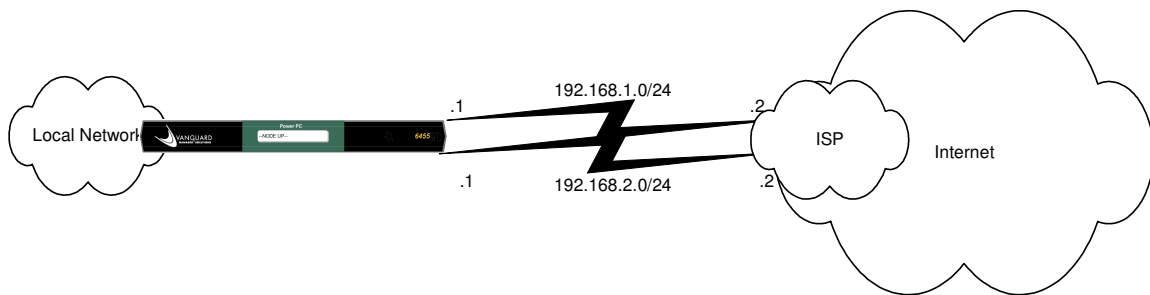


Figure 4.1

6.2 BGP indirect Peer Load Balancing

Refer to figure 4.2. BGP load balancing is achieved using the 2 T1 paths using equal cost static route load balancing. (Up to 8 paths are supported) A BGP Peer session is configured between the internal addresses in AS100 router (10.1.1.1/32) and AS200 router (10.1.1.2/32). A single BGP path is established between these 2 routers. The next hop for all routes received from AS200 router in the AS100 routers BGP routing table will be 10.1.1.2. The next hop for all routes received from AS100 router in the AS200 routers BGP routing table will be 10.1.1.1.

In the AS100 router 2 static routes for 10.1.1.2/32 will be added with equal metric with next hop being 192.168.1.2 and 192.168.2.2. When a match occurs for BGP routing entry during lookup in the BGP table with next hop of 10.1.1.2 a recursive lookup occurs because 10.1.1.2/32 is an indirect IP address. During the recursive lookup for 10.1.1.2 the next hop will be assigned for the oldest used static entry. This lookup is placed in IP cache and all subsequent packets for this session will follow to the same next hop. This is known as session based load balancing.

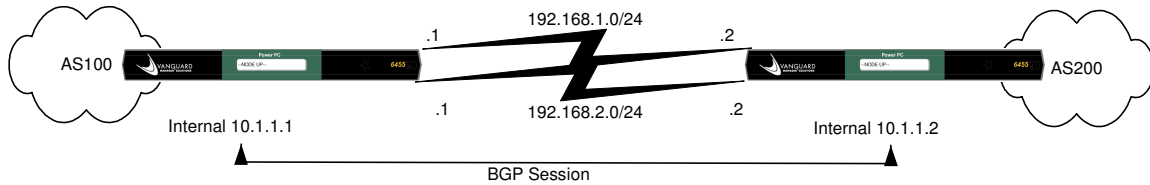


Figure 4.2

6.3 BGP Passive Peer

During BGP session connection collisions can occur where both Peers attempt BGP Open at the same time. When this occurs both peers back off and retry the Open. This can cause delay in getting BGP session established and the subsequent exchange of routing information. This feature allows the Peer to be enabled in Passive mode. If configured as Passive the router will not attempt a BGP open but allow the Peer router initiate the BGP session. If configured for Passive the other router must be configured for Active Mode.

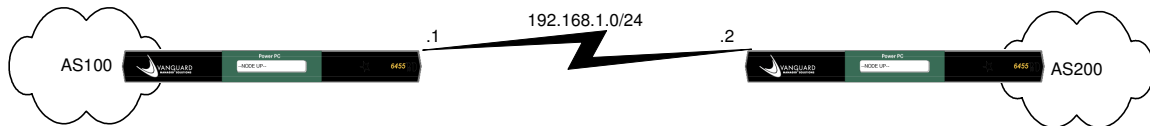


Figure 4.3

7 Configuration

7.1 IP Parameters

7.1.1 New IP 7300 Gen I CPU configuration Parameters

*IP Route Table Size: 768/?

Range = 64-15000

Default = 768

The maximum number of routes that may be stored in the IP routing table.

*Note: A change to this parameter requires a node boot to take effect

7.1.2 New IP 7300 Gen II CPU configuration Parameters

*IP Route Table Size: 768/?

Range = 64-20000

Default = 768

The maximum number of routes that may be stored in the IP routing table.

*Note: A change to this parameter requires a node boot to take effect.

7.1.3 New IP Cache Size

*IP Route Cache Size: 8000/?

Range = 2-8000

Default = 1024

The maximum number of entries that may be stored in the IP Route cache. The IP Route Cache holds the destination addresses of recently received packets and for each entry maintains a count of packets forwarded to that destination.

*Note: A change to this parameter requires a node boot to take effect.

7.2 OSPF Parameters

7.2.1 New OSPF 7300 Gen I Configuration Parameters

Configure OSPF Routing Parameters

Enable OSPF routing : Disable/

Number of External Routes: 1000/

Range = 0-15000

Default = 1000

This is the maximum number of AS external routes (i.e. external global Internet addresses) that will be imported into the OSPF routing domain.

Number of OSPF Routes: 50/

Range = 0-15000

Default = 50

This is the maximum number of routers allowed in the organizations OSPF routing domain. The sum of this parameter and the number of AS externals should not exceed the size of the IP routing table.

7.2.2 New OSPF 7300 Gen 2 Configuration Parameters

Configure OSPF Routing Parameters

Enable OSPF routing : Disable/

Number of External Routes: 1000/

Range = 0-20000

Default = 1000

This is the maximum number of AS external routes (i.e. external global Internet addresses) that will be imported into the OSPF routing domain.

Number of OSPF Routes: 50/?

Range = 0-20000

Default = 50

This is the maximum number of routers allowed in the organizations OSPF routing domain. The sum of this parameter and the number of AS externals should not exceed the size of the IP routing table.

7.3 New BGP configuration Parameters

7.3.1 BGP Routing table size 7300 Gen I CPU

Bgp Routing Table Size: 4096/?

Range = 1024-15000

Default = 4096

This parameter specifies the maximum number of routes which can be stored in BGP Routing Table.

Configure BGP Peer Parameters

7.3.2 BGP Routing table size 7300 Gen II CPU

Bgp Routing Table Size: 4096/?

Range = 1024-20000

Default = 4096

This parameter specifies the maximum number of routes which can be stored in BGP Routing Table.

Configure BGP Peer Parameters

7.3.3 BGP Peer Control Parameter

Entry Number: 1/

[1] Peer Control: Enabled/?

Range = Enabled,Disabled,Passive

Default = Enabled

This parameter controls the BGP peering with this peer.

When disabled, peering will not be formed. When passive, local peer will wait for the remote peer to start the BGP session

8 Statistics

8.1 New IP router Statistics

The following highlighted items have changed since 6.5S100 release to support equal weight static routes.

Menu: IP Stats

Path: (Main.5.15.7)

1. IP Interfaces
- 2. IP Routing Table**
- 3. Dump IP Routing Table**
- 4. Dump IP Static Route List**
5. IP Routing Cache
6. IP Routing Errors
7. Reset IP Stats
- 8. Flush All IP Caches**
9. PBR Statistics
10. IP Aggregated Cache

8.2 New Dump IP Routing Table

Node: BGP_200 Address: 200
IP Routing Table

Date: 8-MAR-2006 Time: 16:56:53

* Static/Direct Route
% RIP Route Control
@ Load Balancing

Type	Dest net	Mask	Metric	Age	Next hop
Stat*	0.0.0.0	00000000	15	0	150.40.1.1
Sbnt	10.0.0.0	ff000000	1	0	None
Dir	10.1.1.0	ffffff00	1	0	SL/51
Dir	10.1.2.0	ffffff00	1	0	SL/52
Dir	10.1.3.0	ffffff00	1	0	SL/53
Dir	10.1.4.0	ffffff00	1	0	SL/54
Dir	10.1.5.0	ffffff00	1	0	SL/55
Dir	10.1.6.0	ffffff00	1	0	SL/56
Dir	10.1.7.0	ffffff00	1	0	SL/57
Dir	10.1.8.0	ffffff00	1	0	SL/58
Dir	10.1.9.0	ffffff00	1	0	SL/59
Dir	10.1.10.0	ffffff00	1	0	SL/60
Dir	10.1.11.0	ffffff00	1	0	SL/61
Dir	10.1.13.0	ffffff00	1	0	SL/63
Dir	10.1.14.0	ffffff00	1	0	SL/64
Dir	10.200.0.0	ffff0000	1	0	ETH/1
Sbnt	150.40.0.0	ffff0000	1	0	150.40.1.1
Dir	150.40.1.0	ffffff00	1	0	ETH/4
Stat*	192.168.1.100	ffffff00	1	0	10.1.2.1 (Eq. Wt.)
Dir	192.168.1.200	ffffff00	1	0	INT/101

Default gateway in use.
Type Cost Age Next hop
Stat 15 0 150.40.1.1

Routing table currently uses 20 of 768 available routes

8.3 IP Routing Table Lookup

A change has been made for IP routing table lookup. If Static route is displayed with **(Eq.Wt.)** after the next Hop. All equal weight routes can be displayed.

```
#Enter Selection: 2
IP Search Prefix : 192.168.1.100 (

Node: BGP_200   Address: 200           Date:  8-MAR-2006   Time:
17:08:45
IP Routing Table

*   Static/Direct Route
%   RIP Route Control
@   Load Balancing

Type  Dest net          Mask          Metric      Age  Next hop
Stat* 192.168.1.100     ffffffff      1           0   10.1.2.1
Stat* 192.168.1.100     ffffffff      1           0   10.1.1.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.4.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.7.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.8.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.3.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.6.1      @
Stat* 192.168.1.100     ffffffff      1           0   10.1.5.1      @

8 entries matched

Press any key to continue ( ESC to exit ) ...
```

8.4 Dump IP Static Route List

The ability to view all available Static routes has been added to IP statistics menu.

```
Node: BGP_200   Address: 200           Date: 9-MAR-2006   Time: 12:55:25
Menu: IP Stats   Path: (Main.5.15.7)
```

1. IP Interfaces
2. IP Routing Table
3. Dump IP Routing Table
- 4. Dump IP Static Route List**
5. IP Routing Cache
6. IP Routing Errors
7. Reset IP Stats
- 8. Flush All IP Caches**
9. PBR Statistics
10. IP Aggregated Cache

```
#Enter Selection: 4
```

Node: BGP_200 Address: 200
12:53:16

Date: 9-MAR-2006 Time:

Static Route List

Dest net	Mask	Metric	Next hop	Status
192.168.1.100	ffffffff	1	10.1.8.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.7.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.6.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.5.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.4.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.3.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.2.1	: AVAIL
192.168.1.100	ffffffff	1	10.1.1.1	: AVAIL
0.0.0.0	00000000	15	150.40.1.1	: AVAIL

8.5 Flush all IP Cache

The ability to force flush of all IP routing cache has been added to IP statistics menu.

Node: BGP_200 Address: 200

Date: 9-MAR-2006 Time: 12:55:25

Menu: IP Stats

Path: (Main.5.15.7)

1. IP Interfaces
2. IP Routing Table
3. Dump IP Routing Table
4. Dump IP Static Route List
5. IP Routing Cache
6. IP Routing Errors
7. Reset IP Stats
- 8. Flush All IP Caches**
9. PBR Statistics
10. IP Aggregated Cache

#Enter Selection: **8**

(4) BGP_200 09-MAR-2006 12:55 IP.68 routing cache cleared

Caches flushed

Press any key to continue (ESC to exit) ...

9 Configuration example BGP Load Balance using equal weight Static Routes

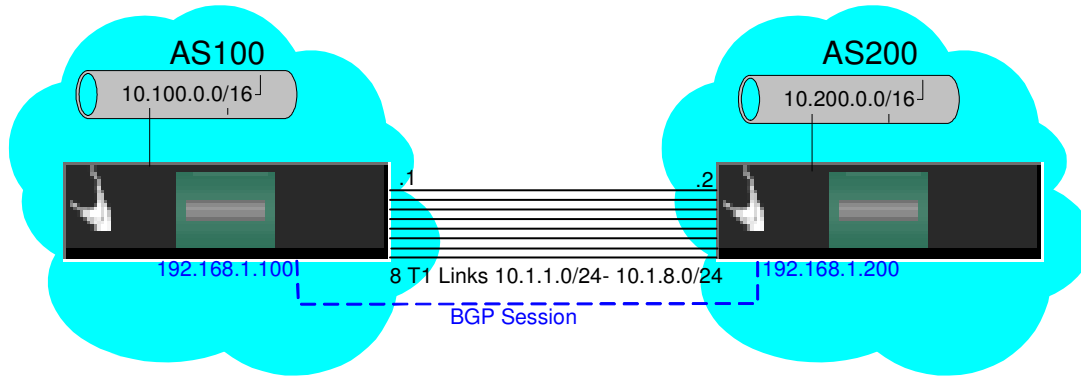


Figure 7.1

9.1 BGP_100 CLI Configuration Script

```

>getnondefaultall
node
Node Name:BGP_100
Node Address:100
Node Number:100
Alarm Selection:HIGH+MED

ethernet:101
Transmit Queue Limit:1000
Port Operating Mode:100FD
Router Interface Number:1

fri:2201
Control Protocol Support:LMI

fri2202-2206 same

fri-station:2201.1
*Station Type:BYPASS
DLCI:301
Committed Information Rate
(CIR):1536000
Committed Burst Size (BC):1536000
fri-station:2202.1-2208.1 same

lcon:1
*Router Interface Number:51

Lcon:2-Lcon:8 connect to Router
interface 52-58

pvc-setup:1
*Source:lcon-1
*Destination:fri-2201s1

pvc-setup:2-8 connect Lcon-2-8 to fri-
2202s1-fri2208s1

* vpmt:1
*Virtual Port Type:TDM-DATA
*Virtual Port Number:2201
*Physical T1/E1 Port Number:201
*Time Slot:1-24

vpmt:2-vpmt:8 connect Virtual Port
2202-2208 to Physical T1/E1 Port
Number:202-208

```

router-interface-states:51
*Interface State :Enabled

router-interface-states:52-58 is Enabled

ip-parameter
Internal IP Address:192.168.1.100
Internal Net Mask:255.255.255.255
RIP Enable:Disabled
*IP Route Table Size:8000
*IP Route Cache Size:8000

Interface Number:1
IP Address :10.100.1.0
IP Address Mask:255.255.0.0
Accept RIP:DISABLED
Send RIP Version:None

ip-interface:51
Interface Number:51
IP Address :10.1.1.1
Accept RIP:DISABLED
Send RIP Version:None

Ip interface 52-58 configured same for 10.1.2.1/24 thru 10.1.8.1/24

ip-static-routes:1
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.1.2

ip-static-routes:2
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.2.2

ip-static-routes:3
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255

Next Hop:10.1.3.2

ip-static-routes:4
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.4.2

ip-static-routes:5
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.5.2

ip-static-routes:6
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.6.2

ip-static-routes:7
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.7.2

ip-static-routes:8
IP Network/Subnet:192.168.1.200
IP Address Mask:255.255.255.255
Next Hop:10.1.8.2

bgp-global-param

BGP:Enabled
BGP Max Peers:64
As Number:100
Bgp id:192.168.1.100
Bgp Routing Table Size:4096
Default Igp Import Policy:Direct+Static
Default Inbound Policy:PERMIT
Default Outbound Policy:PERMIT

bgp-peer-parameter:1

Peer Control:Enabled
 Peer As No:200
 Peer IP Address List :192.168.1.200

9.2 BGP_200 CLI Configuration Script

```

>getnondefaultall
node
Node Name:BGP_200
Node Address:200
Node Number:200
Alarm Selection:HIGH+MED

ethernet:101
Transmit Queue Limit:1000
Port Operating Mode:100FD
Router Interface Number:1

fri:2201
Control Protocol Support:LMI

fri2202-2206 same

fri-station:2201.1
*Station Type:BYPASS
DLCI:301
Committed Information Rate
(CIR):1536000
Committed Burst Size (BC):1536000

fri-station:2202.1-2208.1 same

lcon:1
*Router Interface Number:51

Lcon:2-Lcon:8 connect to Router
interface 52-58

pvc-setup:1
*Source:lcon-1
*Destination:fri-2201s1
  
```

pvc-setup:2-8 connect Lcon-2-8 to fri-2202s1-fri2208s1

```

* vpmt:1
*Virtual Port Type:TDM-DATA
*Virtual Port Number:2201
*Physical T1/E1 Port Number:201
*Time Slot:1-24

vpmt:2-vpmt:8 connect Virtual Port
2202-2208 to Physical T1/E1 Port
Number:202-208

router-interface-states:51
*Interface State :Enabled

router-interface-states:52-58 is Enabled

ip-parameter
Internal IP Address:192.168.1.200
Internal Net Mask:255.255.255.255
RIP Enable:Disabled
*IP Route Table Size:8000
*IP Route Cache Size:8000

Interface Number:1
IP Address :10.200.1.0
IP Address Mask:255.255.0.0
Accept RIP:DISABLED
Send RIP Version:None

ip-interface:51
Interface Number:51
  
```

IP Address :10.1.1.2
 Accept RIP:DISABLED
 Send RIP Version:None

**Ip interface 52-58 configured same
 for 10.1.2.2/24 thru 10.1.8.2/24**

ip-static-routes:1
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.1.1

ip-static-routes:2
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.2.1

ip-static-routes:3
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.3.1

ip-static-routes:4
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.4.1

ip-static-routes:5
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.5.1

ip-static-routes:6
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.6.1

ip-static-routes:7
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.7.1

ip-static-routes:8
 IP Network/Subnet:192.168.1.100
 IP Address Mask:255.255.255.255
 Next Hop:10.1.8.1

bgp-global-param

BGP:Enabled
 BGP Max Peers:64
 As Number:200
 Bgp id:192.168.1.200
 Bgp Routing Table Size:4096
 Default Igp Import Policy:Direct+Static
 Default Inbound Policy:PERMIT
 Default Outbound Policy:PERMIT
 ;

bgp-peer-parameter:1

Peer Control:Enabled
 Peer As No:100
 Peer IP Address List :192.168.1.100

9.3 Load Balancing statistics

9.3.1 IP Cache Statistics

IP Load balancing can best be viewed in the IP Cache statistics. IP cache is always used for initial route lookup. If route is eligible for fast path all subsequent forwarding will be in aggregated cache. See Figure 7.4.1 (IP Cache) and 7.4.2 (IP Aggregated cache.) If Cache overflows are occurring there could be a situation where the entry is in

aggregated cache but not in IP cache. It is best to avoid cache overflows to not effect performance.

```
Node: BGP_100 Address: 100 Date: 9-MAR-2006 Time: 14:53:13
IP Routing Cache
IP Cache uses 1130 of the 8000 entries available.

Destination      Usage  Next hop
10.100.4.66      2     10.100.4.66 (ETH/1)
10.200.0.17      2     10.1.4.2   (SL/54)
10.200.5.150     2     10.1.4.2   (SL/54)
10.200.5.152     2     10.1.1.2   (SL/51)
10.100.5.238     2     10.100.5.238 (ETH/1)
10.200.5.154     2     10.1.2.2   (SL/52)
10.100.0.53      2     10.100.0.53 (ETH/1)
10.200.5.155     2     10.1.7.2   (SL/57)
10.100.0.55      2     10.100.0.55 (ETH/1)
10.200.5.156     2     10.1.8.2   (SL/58)
10.200.0.21      2     10.1.4.2   (SL/54)
10.200.5.157     2     10.1.6.2   (SL/56)
10.100.0.57      2     10.100.0.57 (ETH/1)
10.100.5.243     2     10.100.5.243 (ETH/1)
10.100.0.58      2     10.100.0.58 (ETH/1)

Press any key to continue ( ESC to exit ) ...
```

Figure 7.4.1

Node: BGP_100 Address: 100 Date: 9-MAR-2006 Time: 14:51:36
Aggregated Router Cache - 8000 max entries avail.

Destination	Usage	Nexthop	MAC Addr	Lcon/Eth ID
10.200.4.212	459		LCON-2	
10.200.4.159	460		LCON-6	
10.200.5.74	460		LCON-3	
10.200.5.80	460		LCON-7	
10.200.5.59	460		LCON-5	
10.200.5.185	460		LCON-5	
10.100.5.211	460	00-00-00-00-00-05	ENET-101	
10.100.5.73	460	00-00-02-00-00-5A	ENET-101	

Figure 7.4.2

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