



Ethernet Routing Switch 4500, 5000, Avaya
Business Communications Manager 50, 450,
Avaya Communication Server 1000, Avaya
Communication Server 2100, Avaya CS 1000
Survivable Remote Gateway 50
Engineering

Avaya Automatic QoS Technical Configuration Guide for the ERS 4500, 5000, Avaya BCM 50, 450, Avaya CS 1000, Avaya CS 2100 and Avaya SRG 50

Avaya Data Solutions
Document Date: October_2010
Document Number: NN48500-576
Document Version: 1.1

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Abstract

The purpose of this Technical Configuration Guide (TCG) is to provide configuration examples on various Avaya voice and data products (Ethernet Routing Switch 4500, 5000, Avaya BCM 50, 450, Avaya CS1000, Avaya CS 2100 and Avaya SRG 50) that support Avaya Automatic QoS. Avaya Automatic QoS is a set of capabilities that dramatically simplifies configuration of Quality of Service (QoS) in a network to ensure proper prioritization and forwarding of different traffic types.

Revision Control

No	Date	Version	Revised by	Remarks
1	1/27/2009	1.0	EBS	First External Release

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Conventions

This section describes the text, image, and command conventions used in this document.

Symbols:



Tip – Highlights a configuration or technical tip.



Note – Highlights important information to the reader.



Warning – Highlights important information about an action that may result in equipment damage, configuration or data loss.

Text:

Bold text indicates emphasis.

Italic text in a Courier New font indicates text the user must enter or select in a menu item, button or command:

```
ERS5520-48T# show running-config
```

Output examples from Avaya devices are displayed in a Lucinda Console font:

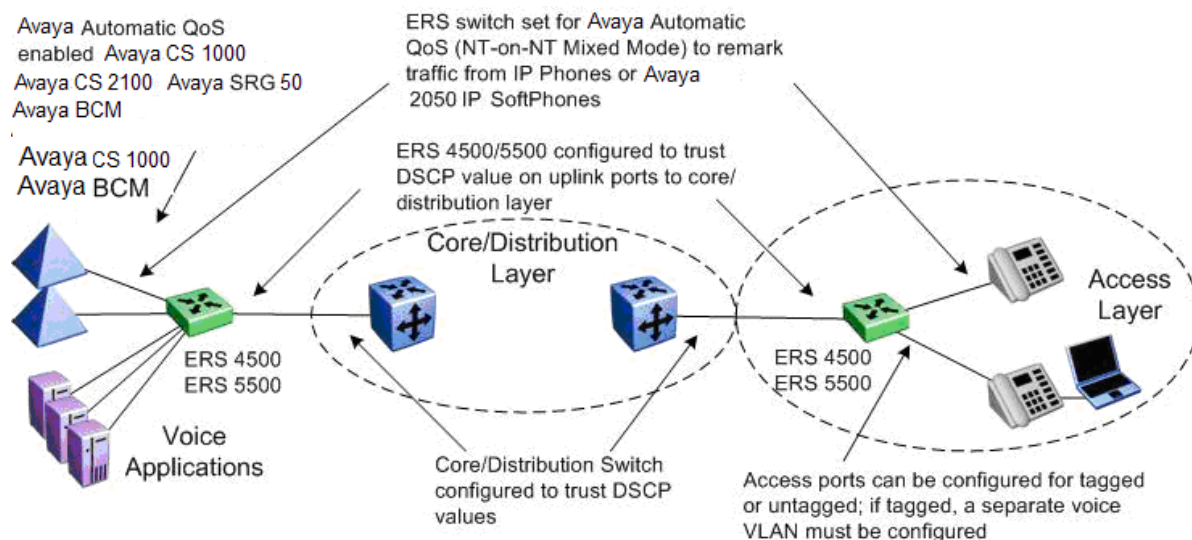
```
ERS5520-48T# show running-config
```

```
! Embedded ASCII Configuration Generator Script
! Model = Ethernet Routing Switch 5520-24T-PWR
! Software version = v5.0.0.011
enable
configure terminal
```

1. Overview: Avaya Automatic QoS

Avaya Automatic QoS provides application traffic prioritization allowing for the ability to identify and prioritize Avaya application traffic on both an Avaya only or Avaya edge and third party core data infrastructure to provide application aware networking. Avaya application traffic is defined as IP Telephony and Multimedia applications. By identifying Avaya application traffic, Avaya Automatic QoS transparently provides appropriate traffic prioritization handling and in turn improves application performance particularly in times of network congestion. Avaya Automatic QoS is applied end-to-end from the application traffic to the Avaya or third party data infrastructure without the need to configure individual application filters and QoS components across a variety of platforms. Simply enable/disable the appropriate Avaya Automatic QoS mode and all underlying QoS configurations to identify Avaya application traffic are automatically configured. Well known Avaya application traffic that is automatically identified via DSCP values will be given preferential treatment and will be handled by the appropriate egress queue on the Ethernet switching infrastructure.

As shown in the diagram below, dynamic prioritization is provided by enabling Avaya Automatic QoS on the ERS 4500 or ERS 5000 edge access switch and on the Avaya CS 1000, Avaya CS 2100, Avaya BCM, and/or Avaya SRG call servers. In regards to the edge switch, the ERS 4500 or ERS 5000 support dynamic prioritization for either tagged or untagged IP telephony traffic. The only other configuration required on the edge switch is setting the uplink port members attached to the core/distribution layer as trusted port members. In the core, all that is required is enabling the port members as QoS trusted.



Please note that Avaya Automatic QoS configuration on an Avaya switch or Avaya voice application is referred to as Avaya on Avaya configuration in the initial release.

1.1 Avaya Automatic QoS Edge Mode: ERS 4500 and ERS 5000

On the ERS 4500 and ERS 5000, when enabling dynamic prioritization via Avaya Automatic QoS Edge, there are two modes to choose from, mixed mode and pure mode.

In mixed mode, the ERS 4500 or ERS 5000 will recognize and remark the traffic from the attached IP phone, IP Softphone 2050 client or Avaya BCM/Avaya SRG/Avaya CS 1000/Avaya CS 2100 according to values shown in Table 1. As long as the switches used in the core/distribution layer are configured as QoS trusted, these remarked DSCP values will be given preferential treatment and will be handled by the appropriate egress queue.

Table 1: NT DSCP Mapping Values

NT DSCP from IP Phone	Traffic Type	Standard DSCP
0x2F (47)	VoIP Data (Premium)	0x2E (EF)
0x29 (41)	VoIP Signaling (Platinum)	0x28 (CS5)
0x23 (35)	Video (Platinum)	0x22 (AF41)
0x1B (27)	Streaming (Gold)	0x1A (AF31)



Please note that all other traffic types not identified will be handled as normal unidentified traffic and will be remarked as “Standard/Best Effort” with DSCP value of 0x00 and treated as untrusted traffic.

In pure mode, the ERS 4500 or ERS 5000 will recognize and not remark the traffic from the attached IP phone, Avaya 2050 IP Softphone client or Avaya BCM/Avaya SRG/Avaya CS 1000/Avaya CS 2100. Avaya DSCP values will be given preferential treatment and will be handled by the appropriate egress queue and the packet will retain these DSCP values as shown in Table 2.

Table 2: NT DSCP Values

NT DSCP	Traffic Type
0x2F (47)	VoIP Data (Premium)
0x29 (41)	VoIP Signaling (Platinum)
0x23 (35)	Video (Platinum)
0x1B (27)	Streaming (Gold)



Please note that all other traffic types not identified will be handled as normal unidentified traffic and will be remarked as “Standard/Best Effort” with DSCP value of 0x00 and treated as untrusted traffic.

Avaya Automatic QoS support is envisioned as a multi-phase project. In phase 1 of Avaya Automatic QoS, ADAC, NSNA, Avaya Automatic QoS pure mode, or 802.1AB is not supported simultaneously. This

will be added in subsequent phases of Avaya Automatic QoS. Avaya Automatic QoS Edge (mixed and pure mode) is planned for the ERS 2500 in a future release.

1.2 Avaya Automatic QoS Support

1.2.1 Ethernet Switches – Avaya Automatic QoS Edge Support

Avaya Automatic QoS is available on the Avaya switching platforms shown below.

- **ERS 4500**
 - Release 5.2
 - Edge with Avaya Automatic QoS mixed or pure mode
- **ERS 5000**
 - Release 6.0 (not formally supported)
 - Release 6.1 (Q209 with formal support)
 - Edge with Avaya Automatic QoS mixed or pure mode
- **ERS 2500**
 - POI Q409

1.2.2 Ethernet Switches – Avaya Automatic QoS Core Support

In order to support Avaya Automatic QoS pure mode (DSCP values maintained end to end over Avaya infrastructure), the core switches must be able to recognize and honor the Avaya Automatic QoS DSCP values.

Presently, only Avaya Automatic QoS Edge mixed mode is supported. When the edge switch is configured for Avaya Automatic QoS Edge mixed mode, the application traffic that is recognized by the edge switch is remarked to standard DSCP values as shown in Table 1. In the core, these DSCP values can then be recognized and honored by either Avaya or any third party core switch supporting Differentiated Services.

Avaya Automatic QoS Core support will be added to the following switches as shown below. The will allow the Core Ethernet switch to recognize and honor the DSCP value when the Edge switch is configured for Avaya Automatic QoS pure mode without the requirement of the Edge switch to remark the Avaya Automatic QoS values from the attached device.

- **ERS 8300**
 - POR Q209
- **ERS 8600**
 - POI Q209

2. Avaya Automatic QoS Configuration

2.1 ERS 4500 – Edge Switch

2.1.1 Avaya Automatic QoS CLI Configuration

Avaya Automatic QoS is configured by using the following command:

- 4526GTX-PWR(config)#**qos agent nt-mode ?**
 - disable** NT application traffic processing disabled on all ports
 - mixed** NT application traffic processing enabled on all ports with egress DSCP remapping
 - pure** NT application traffic processing enabled on all ports without egress DSCP remapping

where:

Parameter	Description
disable	Disables Avaya Automatic QoS functionality for the system
mixed	Enables Avaya Automatic QoS functionality with DSCP remarking at egress enabled. Private Avaya DSCP values will be remarked to corresponding standard DSCP values as noted in table 2.
pure	Enables Avaya Automatic QoS functionality with DSCP remarking at egress disabled. Private DSCP values will be honored as noted in table 1 while all other traffic is remarked to QoS level of Standard. Please note that this mode is not supported at this time.



Please note that phase 1 of Avaya Automatic QoS does not support ADAC, NSNA, or 802.1AB simultaneously.

Only Avaya Automatic QoS mixed mode is supported

2.1.2 Core Ports

The core or uplink port members should be configured as QoS trusted ports. This can be accomplished by first adding a new QoS interface group and then adding the port members to this interface group.

- 4548GT_5-PWR(config)# **qos if-group name <if-group_name> class trusted**
- 4550T_5-PWR(config)# **qos if-assign port <port members> name <if-group_name>**
- 4548GT_5-PWR(config)# **qos if-assign port <port members> name <if-group_name>**

2.2 ERS 5000 – Edge Switch

2.2.1 Avaya Automatic QoS CLI Configuration

Avaya Automatic QoS is configured by using the following command:

- 5520-6#(config)# **qos agent nt-mode ?**
 - disable** NT application traffic processing disabled on all ports
 - mixed** NT application traffic processing enabled on all ports with egress DSCP remapping
 - pure** NT application traffic processing enabled on all ports without egress DSCP remapping

2.2.2 Core Ports

The core or uplink port members should be configured as QoS trusted ports. This can be accomplished by first adding a new QoS interface group and then adding the port members to this interface group.

- 5520-6#(config)# **qos if-group name <if-group_name> class trusted**
- 5520-6#(config)# **qos if-assign port <port members> name <if-group_name>**
- 5520-6#(config)# **qos if-assign port <port members> name <if-group_name>**

2.2.3 Queue Set

By default, the ERS 5000 is configured with Queue set 2 and Large buffers. This can be verified by using the following command:

- 5520-6# **show qos agent**

```
QoS NVRam Commit Delay: 10 seconds
QoS Queue Set: 2
QoS Buffering: Large
QoS UBP Support Level: Disabled
```

To view the various settings for each queue set, enter the following command:

- 5520-6(config)# **show qos queue-set**

After choosing the queue set you wish to use, enter the following command:

- 5520-6(config)# **qos agent queue-set <1-8>**



Please refer to the document titled “Filters and QoS Configuration for Ethernet Routing Switch 5000 Technical Configuration Guide” document number NN48500-559 for more details.

As shown below, the default queue set of 2 should not be used for Avaya Automatic QoS. It is recommended to use at least queue set 8 which has one strict queue and seven weighted round robin queues and use regular buffers.

- 5520-6# **show qos queue-set**

```
5520-6#show qos queue-set
```

Set Queue		General	Bandwidth	Absolute	Bandwidth	Service	Size
ID	ID	Discipline	(%)	Bandwidth	Allocation	Order	(Bytes)
			(Kbps)				
1	1	Priority Queuing	100	0	Relative	1	26214
2	1	Priority Queuing	100	0	Relative	1	18022
2	2	Priority Queuing	100	0	Relative	2	81920
3	1	Priority Queuing	100	0	Relative	1	10956
3	2	Weighted Round Robin	75	0	Relative	2	87040
3	3	Weighted Round Robin	25	0	Relative	2	65536
4	1	Priority Queuing	100	0	Relative	1	81920
4	2	Weighted Round Robin	65	0	Relative	2	74240
4	3	Weighted Round Robin	26	0	Relative	2	61440
4	4	Weighted Round Robin	9	0	Relative	2	44544
5	1	Priority Queuing	100	0	Relative	1	64000
5	2	Weighted Round Robin	58	0	Relative	2	59904
5	3	Weighted Round Robin	27	0	Relative	2	53760
5	4	Weighted Round Robin	11	0	Relative	2	46080
5	5	Weighted Round Robin	4	0	Relative	2	38400
6	1	Priority Queuing	100	0	Relative	1	51200
6	2	Weighted Round Robin	52	0	Relative	2	49152
6	3	Weighted Round Robin	24	0	Relative	2	47104
6	4	Weighted Round Robin	14	0	Relative	2	43008
6	5	Weighted Round Robin	7	0	Relative	2	37376
6	6	Weighted Round Robin	3	0	Relative	2	34304
7	1	Priority Queuing	100	0	Relative	1	49152
7	2	Weighted Round Robin	45	0	Relative	2	46080
7	3	Weighted Round Robin	21	0	Relative	2	39936
7	4	Weighted Round Robin	15	0	Relative	2	33280
7	5	Weighted Round Robin	10	0	Relative	2	31232
7	6	Weighted Round Robin	6	0	Relative	2	31232
7	7	Weighted Round Robin	3	0	Relative	2	31232
8	1	Priority Queuing	100	0	Relative	1	49152
8	2	Weighted Round Robin	41	0	Relative	2	47104
8	3	Weighted Round Robin	19	0	Relative	2	45056
8	4	Weighted Round Robin	13	0	Relative	2	43008
8	5	Weighted Round Robin	11	0	Relative	2	39936
8	6	Weighted Round Robin	8	0	Relative	2	36864
8	7	Weighted Round Robin	5	0	Relative	2	33792
8	8	Weighted Round Robin	3	0	Relative	2	30720

2.3 ERS 8600 – Used as Core Switch only

There is no edge configuration for Avaya Automatic QoS on the ERS 8600. Presently, when used as a core switch for Avaya Automatic QoS with either the ERS 4500 or ERS 5000 as an edge switch, only Avaya Automatic QoS mixed mode is supported on the edge switch

2.3.1 CLI Configuration – R Modules

When used as a core switch, the edge ERS 4500 or ERS 5000 uplinks ports to the ERS 8600 should be configured as DiffServ core ports with 802.1p-bit over-ride enabled.

- ERS-8610:5# **config ethernet <slot/port> enable-diffserv true**
- ERS-8610:5# **config ethernet <slot/port> 802.1p-override enable**

2.3.2 CLI Configuration – Legacy Modules

- ERS8600-4:5# **config ethernet <slot/port> enable-diffserv true**
- ERS8600-4:5# **config ethernet <slot/port> access-diffserv false (default setting)**

2.4 ERS 8300 – Used as Core Switch only

Similar to the ERS 8600, there is no edge configuration for Avaya Automatic QoS on the ERS 8300, but it can still be used as a core switch.

2.4.1 CLI Configuration

When used as a core switch, the edge ERS 4500 or ERS 5000 uplinks ports to the ERS 8300 should be configured using ACL's to trust the DSCP values. Assuming no ACL or ACG's have been configured, using ACL 1 and ACG 1, enter the following commands:

- ERS8300-2:5# **config filter acl 1 create ip acl-name "trust"**
- ERS8300-2:5# **config filter acl 1 ace 1 action permit trust-dscp enable "trust" precedence 1**
- ERS8300-2:5# **config filter acg 1 create 1 acg-name "acg_trust"**

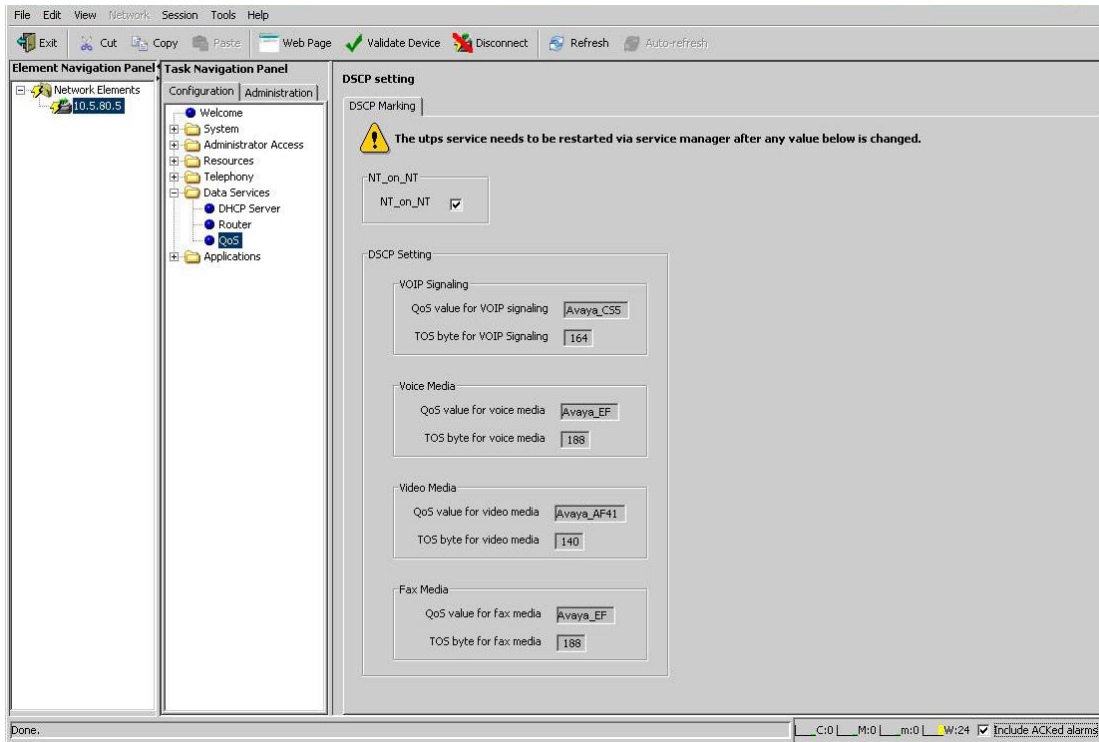
Finally, add the ACG 1 to the appropriate interfaces connected the edge ERS 4500 or ERS 5000 uplinks:

- ERS8300-2:5# **config ethernet <slot/port> filter create 1**

2.5 Avaya BCM 50, Avaya SRG 50, and Avaya BCM 450 Configuration

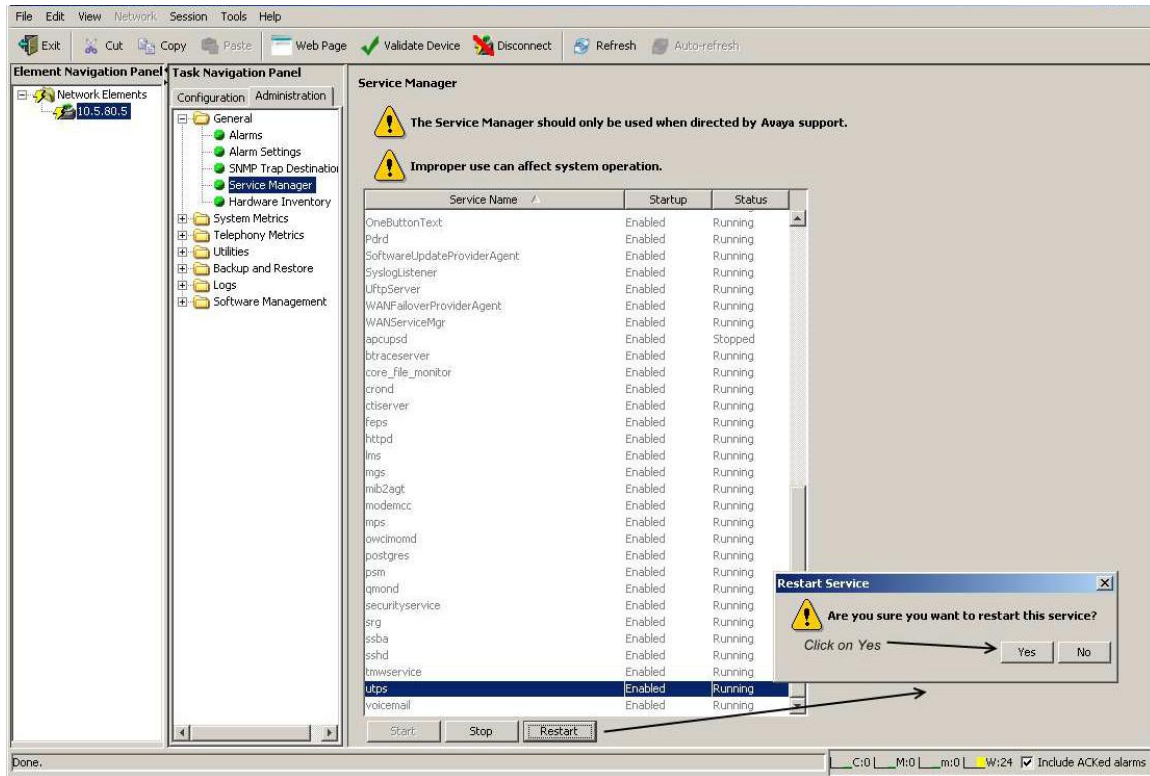
2.5.1 Enable Avaya Automatic QoS

To enable Avaya Automatic QoS on the Avaya BCM 50 or Avaya SRG 50, open the BCM Element Manager and go to *Data Services>QoS* and check the box labeled *NT_on_NT*.



2.5.2 Restart the UTPS service

After you have enabled Avaya Automatic QoS, you need to restart the *utps* service. Start by clicking on the *Administration* icon via the *Task Navigation Panel* and click on *Service Manager*. Scroll down to *utps* and click the *Restart* icon and select *Yes* to restart the service.



Warning – use caution when restarting the UTPS as all IP Sets registered with the BCM server are temporarily reset.



Note: These Business Element Manager screen shots are from an Avaya BCM 50 system. The process on an Avaya BCM 450 is the same, although the setting is referred to as “Avaya on Avaya”.



Note: the Avaya BCM200/400 does not support NT_on_NT settings or the ability to remark DSCP values at source, although it is possible to re-mark DSCP values for traffic egressing any BCM interface using the built-in BCM Firewall configuration and manually configuring new rules.

2.6 CS1000 – Node Configuration

To enable Avaya Automatic QoS on the CS1000, open Element Manager and go to IP Network and click on Edit for the appropriate node that you wish to enable Avaya Automatic QoS. Then check the box labeled “Enable Avaya on Avaya” under the QoS heading as shown below.

Managing: 10.1.5.13
System » IP Network » Node Configuration » IP Telephony: Node ID 5010 » Edit

Edit

Save and Transfer Cancel

Click here to enable Avaya Automatic QoS

+ IP Telephony Node

+ VGW and IP phone codec profile

- QoS

Enable Avaya on Avaya ☒

Diffserv Codepoint(DSCP) Control packets 41 (0 - 63)

Diffserv Codepoint(DSCP) Voice packets 47 (0 - 63)

Enable 802.1Q support ☐

802.1Q Bits value (802.1p) 6 (0 - 7)

+ LAN configuration

+ SNTP

+ Virtual Trunk Network Health Monitor configuration

+ H323 GW Settings

+ Firmware

+ SIP GW Settings

+ SIP URI Map

+ SIP CD Services

+ SIP CTI Services

+ Microsoft Unified Messaging

+ Cards Add

+ Signaling Servers Add

Save and Transfer Cancel

Internet

2.7 CS 1000 – Media Gateway Controller (MGC) Configuration

To enable Avaya Automatic QoS on the CS1000 for MGC, open Element Manager and go to IP Network>Media Gateways and check the box labeled “Enable Avaya on Avaya” under the QoS heading as shown below.

Managing: 10.1.5.13
System > IP Network > Media Gateways > IPMG 4.0 Property Configuration > IPMG 4.0 Media Gateway Controller (MGC) Configuration

IPMG 4.0 Media Gateway Controller (MGC) Configuration

- Media Gateway Controller

Hostname: MGC-10

Management LAN (ELAN) IP address: 10.1.5.14

Management LAN (ELAN) gateway IP address: 10.1.5.1

Management LAN (ELAN) subnet mask: 255.255.255.0

Voice LAN (TLAN) IP address: 47.17.200.14

Voice LAN (TLAN) gateway IP address: 47.17.200.1

Voice LAN (TLAN) subnet mask: 255.255.255.224

+ DSP Daughterboard 1

+ DSP Daughterboard 2

+ VGW and IP phone codec profile

- QoS

Enable Avaya on Avaya ☒ Click here to enable Avaya Automatic QoS

Diffserv Codepoint(DSCP) Control packets: 41 Range: 0 to 63

Diffserv Codepoint(DSCP) Voice packets: 47 Range: 0 to 63

+ LAN configuration

Submit Cancel VGW Channels

** Mandatory fields of current configuration*

2.8 CS 2100

To enable Avaya on Avaya QoS capabilities on the Communication Server 2100 work with your Avaya Implementation team to make sure all components of the customer’s network are coordinated to support this enhancement.

2.9 Software Baseline

- **ERS 4500**
 - Release 5.2
 - Edge with Avaya Automatic QoS mixed or pure mode
- **ERS 5000**
 - Release 6.0
 - Edge with Avaya Automatic QoS mixed or pure mode
- **CS1000**
 - Avaya Automatic QoS supported in Element Manager
 - Release 5.5
 - Patch MPLR26485 is required
- **CS 2100**
 - SE10
 - Edge with Avaya Automatic QoS supported in Element Manager
- **Avaya BCM 50, Avaya SRG 50, and Avaya BCM 450**
 - Avaya BCM 50/Avaya SRG 50 requires minimum of Release 3.0 software with Smart Update BCM050.R300.SU.System-115 or later
 - Avaya BCM 450 requires minimum of Release 1.0 software with Smart Update BCM450.R100.SU.System-003 or later



Note: The Business Element Manager from these System Smart Updates must be downloaded and installed before being able to configure the Avaya Automatic QoS settings. Also note that Avaya BCM 450 Release 1.0 refers to this setting as “Avaya on Avaya”.

3. Customer service

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