



Configuring T1/QSIG Trunk between Avaya Communication Manager and Toshiba Strata CIX670 - Issue 1.0

Abstract

These Application Notes present a sample configuration for a network comprised of Avaya S8300 Media Server, Avaya G350 Media Gateway, and Toshiba Strata CIX670. The focus is on the basic inter-switch calling features between Avaya Communication Manager and Toshiba Strata CIX670. The configuration of Avaya Communication Manager T1/QSIG signaling groups, T1/QSIG trunk groups, call routing, and the corresponding configuration of Toshiba Strata CIX670 is documented. Using this configuration, calls can be made between Toshiba digital and IP telephones and Avaya IP telephones over a T1/QSIG trunk. The results should be applicable to other Avaya media servers and gateways.

1. Introduction

These Application Notes present a sample configuration for a network comprised of an Avaya S8300 Media Server, Avaya G350 Media Gateway, and a Toshiba Strata CIX670. The focus is on the Avaya Communication Manager configuration for the T1/QSIG signaling groups, T1/QSIG trunk groups, call routing, and the corresponding configuration on the Toshiba Strata CIX670. Using this configuration, calls can be made between Toshiba digital and IP telephones and Avaya IP telephones over a T1/QSIG trunk. The results should be applicable to other Avaya media servers and gateways. The basic call features such as conference, transfer, hold, call forwarding, and station display were verified.

Figure 1 illustrates the verified network configuration. Local extensions for the Avaya Communication Manager are of the form 70XXX. Local extensions for the Toshiba site are of the form 20XXX. The switches have dialing plans that allow subscribers to call each other using five digit dialing.

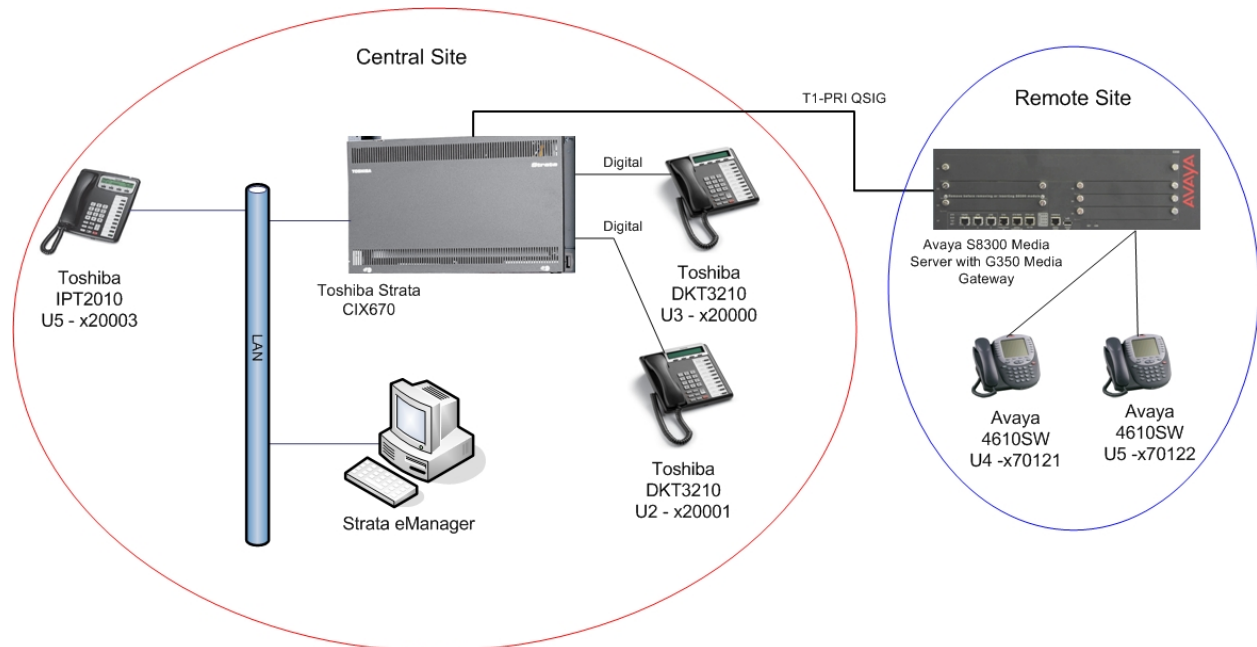


Figure 1: T1/QSIG Network Configuration

2. Equipment and Software Validated

Equipment	Software
Avaya S8300 Media Server with Avaya G350 Media Gateway	Avaya Communication Manager 3.1.1 (R013x.01.1.628.7)
Avaya MM710 DS1	HW05 FW013
Avaya 4610SW IP Telephone	Release 2.3
Toshiba Strata CIX670	4.10
Toshiba IPT2010-SD IP Telephone	V1.A
Toshiba DKT3210-SD Digital Telephone	V2.0
Toshiba BPTU T1-PRI Interface Card	V1.A
Toshiba LIPU-X1A IP Interface Card	V1.D
Toshiba Strata eManager Software	4.10A38

3. Verify Customer Options on Avaya Communication Manager

The following steps specify the optional features needed for T1-PRI QSIG on Avaya Communication Manager.

Step	Description
1.	Log into Avaya Communication Manager and enter the “display system-parameters customer-options” command. Go to Page 3. Verify that ‘ARS’ is enabled. <pre> display system-parameters customer-options Page 3 of 10 OPTIONAL FEATURES Abbreviated Dialing Enhanced List? n Audible Message Waiting? n Access Security Gateway (ASG)? n Authorization Codes? n Analog Trunk Incoming Call ID? n Backup Cluster Automatic Takeover? n A/D Grp/Sys List Dialing Start at 01? n CAS Branch? n Answer Supervision by Call Classifier? n CAS Main? n ARS? y Change COR by FAC? n ARS/AAR Partitioning? y Computer Telephony Adjunct Links? n ARS/AAR Dialing without FAC? y Cvg Of Calls Redirected Off-net? y ASAI Link Core Capabilities? n DCS (Basic)? n ASAI Link Plus Capabilities? n DCS Call Coverage? n Async. Transfer Mode (ATM) PNC? n DCS with Rerouting? n Async. Transfer Mode (ATM) Trunking? n ATM WAN Spare Processor? n Digital Loss Plan Modification? n ATMS? n DS1 MSP? n Attendant Vectoring? n DS1 Echo Cancellation? n (NOTE: You must logoff & login to effect the permission changes.) </pre>

Step	Description
2.	Go to Page 4 and verify that 'ISDN-PRI' is enabled. display system-parameters customer-options Page 4 of 10 OPTIONAL FEATURES Emergency Access to Attendant? y IP Stations? y Enable 'dadmin' Login? y Internet Protocol (IP) PNC? n Enhanced Conferencing? n ISDN Feature Plus? n Enhanced EC500? n ISDN Network Call Redirection? n Enterprise Survivable Server? n ISDN-BRI Trunks? n Enterprise Wide Licensing? n ISDN-PRI? y ESS Administration? n Local Survivable Processor? n Extended Cvg/Fwd Admin? n Malicious Call Trace? n External Device Alarm Admin? n Media Encryption Over IP? n Five Port Networks Max Per MCC? n Mode Code for Centralized Voice Mail? n Flexible Billing? n Forced Entry of Account Codes? n Multifrequency Signaling? y Global Call Classification? n Multimedia Appl. Server Interface (MASI)? n Hospitality (Basic)? y Multimedia Call Handling (Basic)? n Hospitality (G3V3 Enhancements)? n Multimedia Call Handling (Enhanced)? n IP Trunks? n IP Attendant Consoles? n (NOTE: You must logoff & login to effect the permission changes.)
3.	Go to Page 5 and verify that 'Uniform Dialing Plan' and 'Private Networking' are enabled. display system-parameters customer-options Page 5 of 10 OPTIONAL FEATURES Multinational Locations? n Station and Trunk MSP? n Multiple Level Precedence & Preemption? n Station as Virtual Extension? n Multiple Locations? n Personal Station Access (PSA)? n System Management Data Transfer? n Posted Messages? n Tenant Partitioning? n PNC Duplication? n Terminal Trans. Init. (TTI)? n Port Network Support? n Time of Day Routing? n Uniform Dialing Plan? y Usage Allocation Enhancements? y Processor and System MSP? n TN2501 VAL Maximum Capacity? y Private Networking? y Processor Ethernet? n Wideband Switching? n Wireless? n Remote Office? n Restrict Call Forward Off Net? y Secondary Data Module? y (NOTE: You must logoff & login to effect the permission changes.)

Step	Description
4.	Go to Page 8 and verify that 'Basic Call Setup' and 'Basic Supplementary Services' are enabled. <pre> display system-parameters customer-options Page 8 of 10 QSIG OPTIONAL FEATURES Basic Call Setup? y Basic Supplementary Services? y Centralized Attendant? y Interworking with DCS? n Supplementary Services with Rerouting? y Transfer into QSIG Voice Mail? n Value-Added (VALU)? n (NOTE: You must logoff & login to effect the permission changes.) </pre>

4. Configure Avaya Communication Manager

This section presents the configuration steps for adding the T1/QSIG interface, signaling group, trunk group and call routing options to allow communication with the Toshiba switch.

Step	Description
1.	Add the DS1 circuit pack. Type "add ds1 v3" where 'v3' is the slot of the DS1 circuit pack. In this sample configuration, Avaya Communication Manager was configured as 'peer-master' and Toshiba CIX670 was configured as 'peer-slave'. Set the 'Side' option to 'a' to agree with the 'peer-master' setting. The 'b8zs' and 'esf' options are required by the Toshiba T1-PRI card. The 'pbx' option is used since the Toshiba is a peer switch. The 'isdn-pri' and 'Q-SIG' options are selected to enable the T1-PRI QSIG features on the trunk. The remaining options are left at their default values. <pre> add ds1 v3 Page 1 of 2 DS1 CIRCUIT PACK Location: 001V3 Name: Toshiba CIX Bit Rate: 1.544 Line Coding: b8zs Line Compensation: 1 Framing Mode: esf Signaling Mode: isdn-pri Connect: pbx Interface: peer-master TN-C7 Long Timers? n Peer Protocol: Q-SIG Interworking Message: PROgress Side: a Interface Companding: mulaw CRC? n Idle Code: 11111111 DCP/Analog Bearer Capability: 3.1kHz T303 Timer(sec): 4 Slip Detection? n Near-end CSU Type: other </pre>

Step	Description
2.	Add a signaling group. Type “add signaling-group 1”. Set the highlighted fields as indicated. Setting the ‘Supplementary Service Protocol’ to ‘b’ enables QSIG supplementary services on this signaling group. Set the ‘Associated Signaling’ and ‘Primary D-Channel’ options to use the D-channel of the DS1 card added in Step 1. add signaling-group 1 Page 1 of 1 SIGNALING GROUP Group Number: 1 Associated Signaling? y Max number of NCA TSC: 0 Primary D-Channel: 001V324 Max number of CA TSC: 0 Trunk Group for NCA TSC: Trunk Group for Channel Selection: Supplementary Service Protocol: b T303 Timer(sec): 10

Step	Description
3.	Add a trunk group that connects to the Toshiba switch. Type “add trunk 6” and associate this trunk with the previously configured DS1. Set ‘Group Type’ to ‘isdn’ to allow QSIG features. Set the ‘TAC’ to ‘*006’ to identify this trunk. Set the ‘Service Type’ to ‘tie’ since this is a general purpose trunk. <pre> add trunk-group 6 TRUNK GROUP Page 1 of 20 Group Number: 6 Group Type: isdn CDR Reports: y Group Name: Toshiba CIX COR: 1 TN: 1 TAC: *006 Direction: two-way Outgoing Display? n Dial Access? n Busy Threshold: 255 Night Service: Queue Length: 0 Service Type: tie Auth Code? n TestCall ITC: rest Far End Test Line No: TestCall BCC: 4 </pre> Set ‘Supplementary Service Protocol’ to ‘b’ which enables QSIG features. <pre> add trunk-group 6 Group Type: isdn TRUNK PARAMETERS Page 2 of 21 Codeset to Send Display: 6 Codeset to Send National IEs: 6 Max Message Size to Send: 260 Charge Advice: none Supplementary Service Protocol: b Digit Handling (in/out): enbloc/enbloc Trunk Hunt: cyclical Incoming Calling Number - Delete: Insert: Digital Loss Group: 13 Bit Rate: 1200 Synchronization: async Format: Disconnect Supervision - In? y Out? n Duplex: full Answer Supervision Timeout: 0 </pre> Enable ‘Send Name’, ‘Send Calling Number’ and ‘Send Connected Number’ options so that name and number information will be displayed on Toshiba telephones. <pre> add trunk-group 6 TRUNK FEATURES Page 3 of 21 ACA Assignment? n Measured: none Wideband Support? n Internal Alert? n Maintenance Tests? y Data Restriction? n NCA-TSC Trunk Member: Send Name: y Send Calling Number: y Used for DCS? n Hop Dgt? n Send EMU Visitor CPN? n Suppress # Outpulsing? n Format: public Outgoing Channel ID Encoding: preferred UUI IE Treatment: service-provider Replace Restricted Numbers? n Replace Unavailable Numbers? n Send Connected Number: y Hold/Unhold Notifications? y Modify Tandem Calling Number? n Send UUI IE? y Send UCID? n Send Codeset 6/7 LAI IE? y Ds1 Echo Cancellation? n Network (Japan) Needs Connect Before Disconnect? n Apply Local Ringback? N </pre>

Step	Description
	Assign bearer channels to the trunk group. In this sample configuration, six channels are sufficient to carry the call traffic between the switches. <pre> add trunk-group 6 Page 5 of 21 TRUNK GROUP Administered Members (min/max): 1/6 GROUP MEMBER ASSIGNMENTS Total Administered Members: 6 Port Code Sfx Name Night Sig Grp 1: 001V301 MM710 2: 001V302 MM710 3: 001V303 MM710 4: 001V304 MM710 5: 001V305 MM710 6: 001V306 MM710 </pre>
4.	Type “display dialplan analysis”. Verify dialed strings are configured for a 5-digit dial plan; local extensions begin with 7, Toshiba extensions begin with 2 and are routed using ‘aar’. Alternatively, uniform dial plan may have been used instead of AAR dialing without FAC. <pre> display dialplan analysis Page 1 of 12 DIAL PLAN ANALYSIS TABLE Percent Full: 0 Dialed Total Call Dialed Total Call Dialed Total Call String Length Type String Length Type String Length Type 0 3 fac 1 3 fac 2 5 aar 6 5 aar 7 5 ext 9 1 fac * 2 fac * 3 fac * 4 dac # 2 fac # 3 fac </pre>
5.	Type “change aar analysis 2”. In this configuration, 5-digit dial strings beginning with 2 will be routed over route pattern ‘22’, which will contain the T1/QSIG trunk to the Toshiba switch as defined in step 6 below. <pre> change aar analysis 2 Page 1 of 2 AAR DIGIT ANALYSIS TABLE Percent Full: 0 Dialed Total Route Call Node ANI String Min Max Pattern Type Num Reqd 2 5 5 22 aar n </pre>

Step	Description																																																																																																																																																														
6.	Type “change route-pattern 22”. In the route pattern, specify the T1/QSIG trunk group that connects to the Toshiba switch, set ‘Grp No’ to ‘6’. change route-pattern 22 Page1 of 3 Pattern Number: 22Pattern Name: Toshiba CIXSecure SIP? n <table><thead><tr><th>Grp No</th><th>FRL</th><th>NPA</th><th>Pfx Mrk</th><th>Hop Lmt</th><th>Toll List</th><th>No. Del</th><th>Inserted Digits</th><th>DCS/ QSIG Intw</th><th>IXC</th></tr></thead><tbody><tr><td>1: 6</td><td></td><td>0</td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr><tr><td>2:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr><tr><td>3:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr><tr><td>4:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr><tr><td>5:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr><tr><td>6:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>n</td><td>user</td></tr></tbody></table> <table><thead><tr><th>BCC</th><th>VALUE</th><th>TSC</th><th>CA-TSC Request</th><th>ITC</th><th>BCIE</th><th>Service/Feature</th><th>PARM</th><th>No. Dgts</th><th>Numbering Format</th><th>LAR</th></tr><tr><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>W</th><th></th><th></th><th></th><th></th><th></th></tr></thead><tbody><tr><td>1:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr><tr><td>2:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr><tr><td>3:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr><tr><td>4:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr><tr><td>5:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr><tr><td>6:</td><td>y</td><td>y</td><td>y</td><td>y</td><td>y</td><td>n</td><td>n</td><td></td><td>rest</td><td>none</td></tr></tbody></table>	Grp No	FRL	NPA	Pfx Mrk	Hop Lmt	Toll List	No. Del	Inserted Digits	DCS/ QSIG Intw	IXC	1: 6		0						n	user	2:								n	user	3:								n	user	4:								n	user	5:								n	user	6:								n	user	BCC	VALUE	TSC	CA-TSC Request	ITC	BCIE	Service/Feature	PARM	No. Dgts	Numbering Format	LAR	0	1	2	3	4	W						1:	y	y	y	y	y	n	n		rest	none	2:	y	y	y	y	y	n	n		rest	none	3:	y	y	y	y	y	n	n		rest	none	4:	y	y	y	y	y	n	n		rest	none	5:	y	y	y	y	y	n	n		rest	none	6:	y	y	y	y	y	n	n		rest	none
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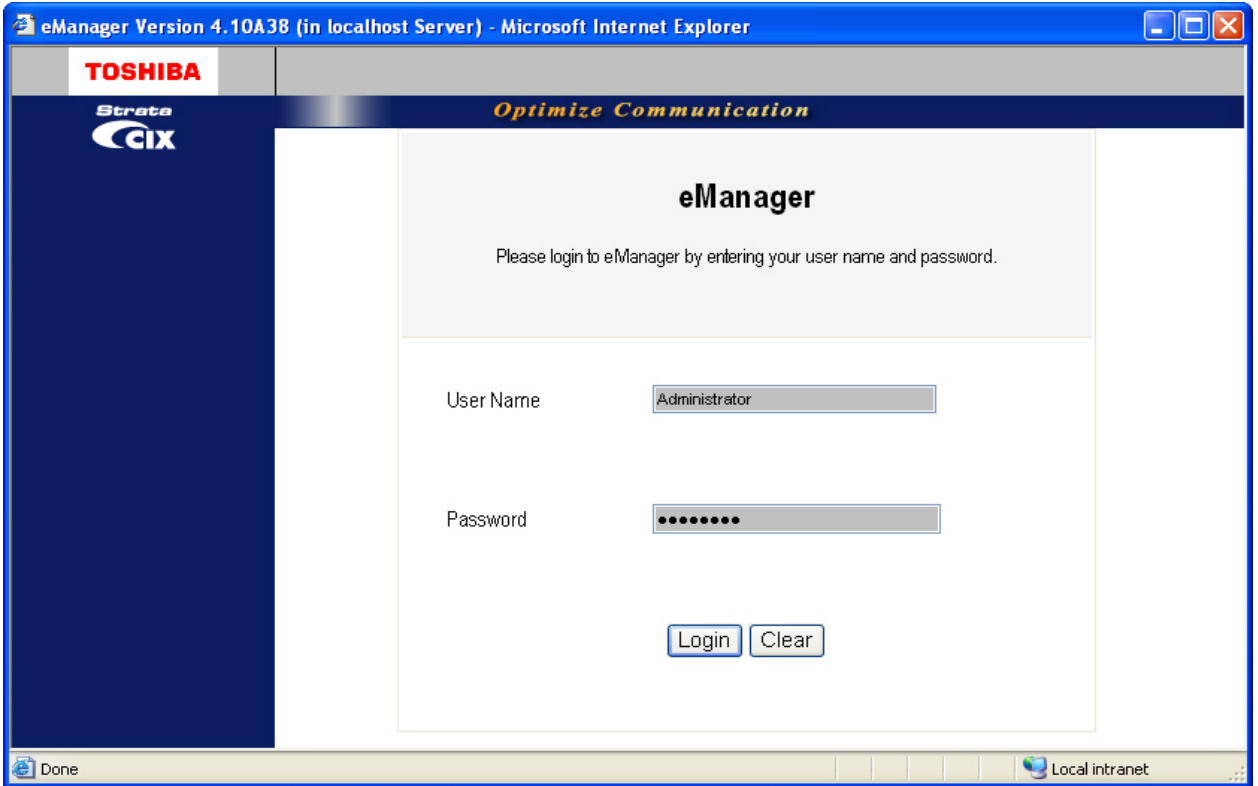
5. Configure the Toshiba Strata CIX670

The Toshiba switch is configured using a web application running on a Windows PC. The application is called Strata eManager. An eManager screen typically has three parts. The left hand side of the window contains cascading tabs that open the corresponding feature or options page. The light green tab in the screen shots below is the currently opened selection. The middle part of the screen is the option set that is currently being viewed or modified. The right hand part of the display has a list of previously configured items for that screen. The right hand display list does not apply to all screens.

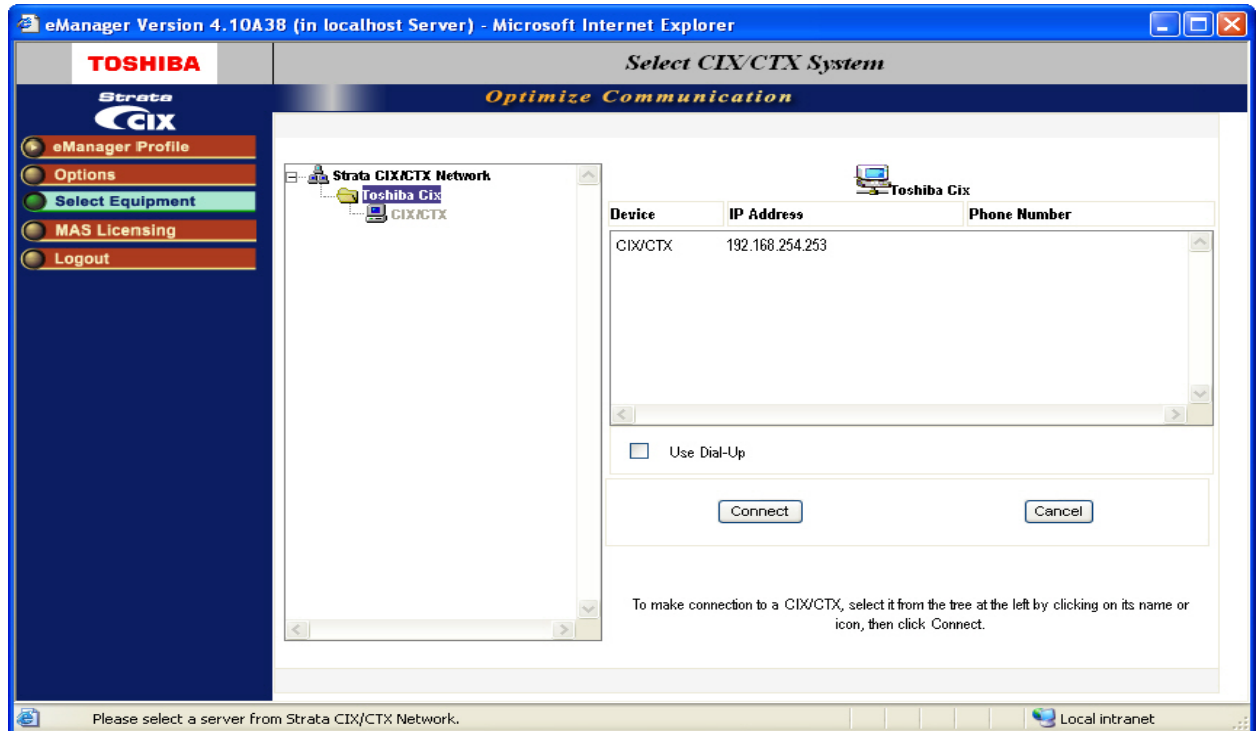
The following sections show the Toshiba configuration for the T1/QSIG trunk that connects to Avaya Communication Manager, the local stations, and the call routing.

5.1. Log in and connect to the Toshiba switch.

Verify the hardware configuration and the Licensing configuration.

Step	Description
1.	Log in to the eManager application. 

2. Open the 'Select Equipment' tab and click the 'Connect' button to access the CIX switch configuration screens.



3. Verify that the necessary Licensing options have been enabled. The '**Strata Net Channels**' enables inter-switch calling. The '**CIX IP Telephony**' option is required to use the IPT telephones. And the '**Number of IP End Points**' controls the number of IPT phones that can be used.

eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer

TOSHIBA

Strata CIX

License Information

Optimize Communication

Equipped License Information

CIX/CTX Release Number	1	Maximum Number Of Cabinets	2
Number of Serial Port(s)	1	Number of DTMF Receivers	4
Strata Net Channels	Unlimited	Number of Basic Ports	64
System Type	CIX575	Number of CTI Sessions	0
Number Of Attendant Consoles	0	Number of Softphones	0
Number Of IP End Points	3	CIX IP Telephony	Enabled

Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253]

Local intranet

4. Verify the installed hardware. In this configuration, slot 1 is the digital stations board. Hardware addresses or 'PDN Equipment Number' consist of the cabinet, slot, and port number of the card. The digital ports used here would be 010101 and 010102 for the first two ports. Slot 2 is an analog card. Slots 3 and 5 are T1 PRI cards. The T1 cards in this configuration only support the B8ZS and ESF line coding option, while line buildout lengths and loop-back options are set by DIP switches on the card. Slot 6 is the IP telephony card. Slot 7 is an onboard voice mail system, not used in this example.

eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer

TOSHIBA *Card Assignment*
Optimize Communication

100 CIX/CTX CABINET SLOT PCB ASSIGNMENTS

Cab: 01 Slot: 01 Assign Remove

PCB Type: BDKU or BWDKU - 8 DKTs without Spkr OCA

Cabinet	Slot	PCB Type
01	01	BDKU or BWDKU - 8 DKTs without Spkr OCA
01	02	RSTU BSTU or IVP8 - 8 standard telephone ports
01	03	RPTU or BPTU - 24 channel PRI
01	04	Empty Slot or RRCU
01	05	RPTU or BPTU - 16 channel PRI
01	06	LIPU-X - 16 IP Station
01	07	BDKU/BDKS or BWDKU - 16 DKTs without Spkr OCA; or iES32
01	08	Empty Slot or RRCU
02	01	Empty Slot or RRCU
02	02	Empty Slot or RRCU
02	03	Empty Slot or RRCU
02	04	Empty Slot or RRCU
02	05	Empty Slot or RRCU
02	06	Empty Slot or RRCU
02	07	Empty Slot or RRCU
02	08	Empty Slot or RRCU
02	09	Empty Slot or RRCU
02	10	Empty Slot or RRCU

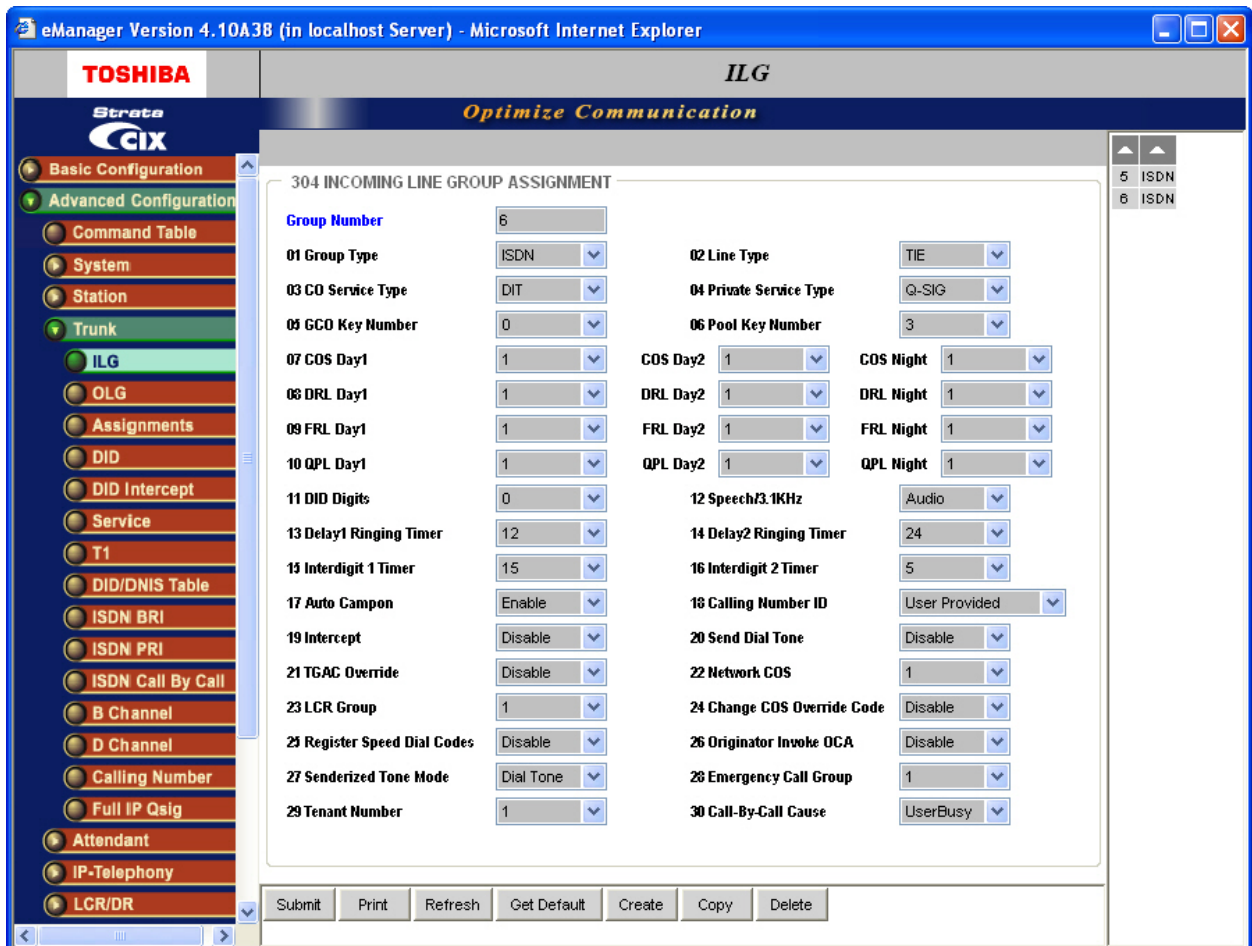
Print Refresh

Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253] Local intranet

5.2. Configure the T1/QSIQ Trunk

The Toshiba switch uses the Incoming Line Group (ILG) and Outgoing Line Group (OLG) pages to define the options related to the trunk. The ILG and OLG are then used to create a Channel Group that defines a two-way trunk.

In the following steps, only the options that need to be changed from their default value will be indicated. An option that needs to be changed will be indicated by its 2-digit number and name followed by its new value.

Step	Description
1.	Configure Incoming Line Group 6 to be used for Avaya Communication Manager. Click the 'Create' button at the bottom of the screen to create a new group. Set the '01 Group Type' to 'ISDN', the '02 Line Type' to 'TIE', and the '04 Private Service Type' to 'Q-SIG'. Click the 'Submit' button to activate the new group. The new group will now appear in the list on the right hand side of screen. 

2. Configure Outgoing Line Group 3 to be used for Avaya Communication Manager. Set the '01 Group Type' to 'ISDN', the '02 Trunk Type' to 'TIE/E&M', the '03 Service Type' to 'Q-SIG' and the '17 QSIG Sending Type' to 'Cut Through'. Click the 'Submit' button to save the changes.

The screenshot displays the Toshiba CIX eManager web interface, version 4.10A38, running in Microsoft Internet Explorer. The interface is titled "eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer". The main header shows "TOSHIBA" and "OLG" (Optimize Communication). The left sidebar contains a navigation menu with options: Basic Configuration, Advanced Configuration, Command Table, System, Station, Trunk, ILG, OLG (selected), Assignments, DID, DID Intercept, Service, T1, DID/DNIS Table, ISDN BRI, ISDN PRI, ISDN Call By Call, B Channel, D Channel, Calling Number, Full IP Qsig, Attendant, IP-Telephony, and LCR/DR. The main content area is titled "306 OUTGOING LINE GROUPS" and shows the configuration for Group Number 3. The configuration fields are as follows:

Field	Value
Group Number	3
01 Group Type	ISDN
02 Trunk Type	TIE/E&M
03 Service Type	Q-SIG
04 GCO Key1 Number	0
06 Pool Key1 Number	3
07 Pool Key2 Number	0
08 COS Day1	1
COS Day2	1
COS Night	1
09 FRL Day1	1
FRL Day2	1
FRL Night	1
10 QPL Day1	1
QPL Day2	1
QPL Night	1
11 Speech/3.1KHz	Audio
12 MOH Source	1 Processor MOH Jack
13 Account Code	Enable (radio button selected)
14 Destination Restriction	Enable (radio button selected)
15 Credit Card Calling	Enable (radio button selected)
16 Send CESID	Enable (radio button selected)
17 QSIG Sending Type	Cut Through
18 Network COS	1
19 Recall on AC15	

At the bottom of the configuration area, there are buttons: Submit, Print, Refresh, Get Default, Create, Copy, and Delete. The status bar at the bottom indicates "Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253]" and "Local intranet".

3. Create 'Channel Group' '2' to specify the PRI features of the trunk. The '01 Equipment No.' is the PRI card that is connected to Avaya Communication Manager, '010501'. Set '03 Incoming Line Group' to '6' and set '04 Outgoing Line Group' to '3'. Set the protocol options to match the T1/QSIG trunk on the Avaya switch, set '02 Protocol' to 'Q-Sig', '26 Network Mode' to 'Slave'. Click the 'Submit' button to save the changes.

eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer

TOSHIBA **ISDN PRI**

Strata CIX *Optimize Communication*

Basic Configuration
Advanced Configuration
Command Table
System
Station
Trunk
ILG
OLG
Assignments
DID
DID Intercept
Service
T1
DID/DNIS Table
ISDN BRI
ISDN PRI
ISDN Call By Call
B Channel
D Channel
Calling Number
Full IP Qsig
Attendant
IP-Telephony
LCR/DR
Networking
Miscellaneous
External Devices
Utilities
Help

302 PRI and IP QSIG

Channel Group: 2

01 Equipment No.: 010501 02 Protocol: Q-Sig

03 Incoming Line Group: 6 04 Outgoing Line Group: 3

05 Trunk ID Type: Implicit 06 Trunk ID: 0

07 D Ch Position: 24

☒ 08 Bearer Svc - Speech ChMethod: Channel Number B

☒ 09 Bearer Svc - 3.1KHz Audio ChMethod: Channel Number B

☐ 10 Bearer Svc - 7KHz Audio ChMethod: Channel Number B

☐ 11 Bearer Svc - Unrestr 64K ChMethod: Channel Number B

☐ 12 Bearer Svc - Unrestr 16K ChMethod: Channel Number B

☐ 13 Bearer Svc - Unrestr 2x64K ChMethod: Channel Number B

☐ 14 Bearer Svc - Unrestr 384K ChMethod: Channel Number B

☐ 15 Bearer Svc - Unrestr 1136K ChMethod: Channel Number B

☐ 16 Bearer Svc - Unrestr 1920K ChMethod: Channel Number B

☐ 17 Bearer Svc - Restr Digital ChMethod: Channel Number B

☐ 18 Bearer Svc - Video ChMethod: Channel Number B

☐ 19 Bearer Svc - Multirate Unrestricted

20 B-Ch Selection Method: Preferred 21 B-Ch Selection: Backward Terminal

24 T-Wait Timer: Disable 25 RBT on Incoming Call: Enable

26 Network Mode: Slave 27 Negotiation Priority: Side B

28 Layer 1 short break tolerant: 29 2-B channel Transfer: Disable

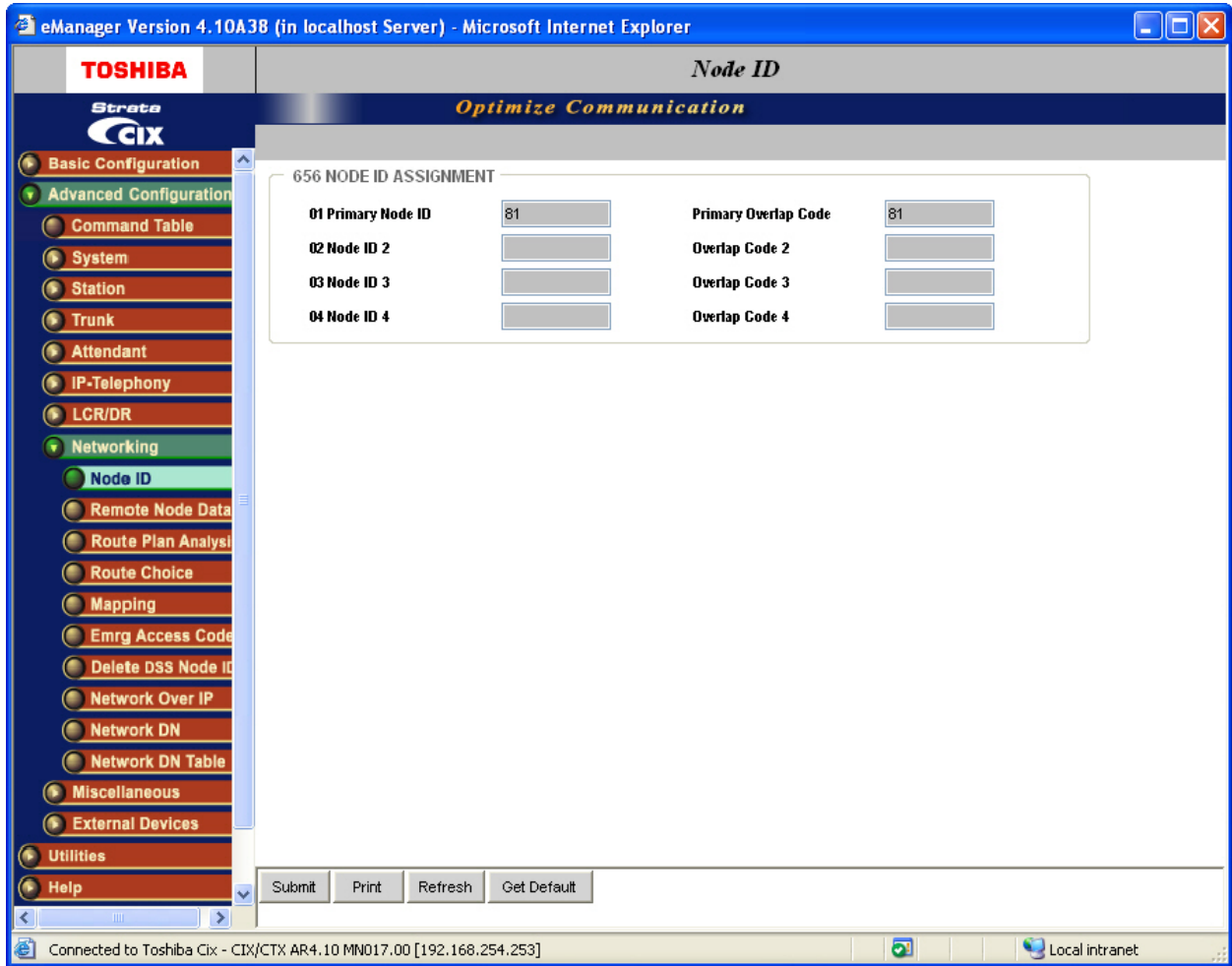
30 Q931 Protocol Timer: Normal 31 Send Malicious Call ID:

Submit Print Refresh Get Default Create Copy Delete

Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253] Local intranet

5.3. Configure Network Routing Information

The Toshiba switch uses a Node ID to identify the various switches in the network. In this example, the Toshiba switch was assigned 81 and Avaya Communication Manager was assigned 83. The Private Routing Plan Analysis Table uses the remote node ID to route the call. The routing plan entry identifies the Outgoing Line Group and any digit modifications that are applied to the dialed number. In this example, Route Choice 2 was used to connect to the Avaya switch. Route Choice 2 is also configured to strip the two leading digits since the Toshiba switch prepends the remote node ID to the dialed number. The last step is to configure all of the Network Directory Numbers (DN) that the Toshiba will route. Each individual number must be assigned to a Node ID, the Toshiba switch does not have a feature that allows a range of numbers to be entered.

Step	Description
1.	Assign '01 Primary Node ID' the value '81' to identify the Toshiba switch. Click the 'Submit' button to save the changes. 

2. Assign '**00 Node ID**' the value '**83**' for Avaya Communication Manager and assign '**01 Pvt Ntwk Route Choice Table Number**' the value '**2**'. Click the 'Submit' button to save the changes.

eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer

TOSHIBA *Route Plan Analysis*
Optimize Communication

Basic Configuration
Advanced Configuration
Command Table
System
Station
Trunk
Attendant
IP-Telephony
LCR/DR
Networking
Node ID
Remote Node Data
Route Plan Analysis
Route Choice
Mapping
Emrg Access Code
Delete DSS Node ID
Network Over IP
Network DN
Network DN Table
Miscellaneous
External Devices
Utilities
Help

651 PRIVATE ROUTING PLAN ANALYSIS TABLE ASSIGNMENT

00 Node ID 83 List
01 Pvt Ntwk Route Choice Table Number 2

Submit Print Refresh Get Default Create Copy

Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253] Local intranet

3. Configure the **'00 Pvt Ntwk Route Choice Table Number'** entry number '2'. Dialed numbers that are on the Avaya switch will be routed using this route table entry. Set the **'01 Route Definition Table 1'** to '2'. Set the **'01 Outgoing Line Group'** to '3' and set the **'02 Digit Modification Table'** to '1'. The Toshiba switch prepends the NodeID of the destination switch to the dialed number. In this example, the NodeID is deleted before dialing the number. Set the **'01 Deleted Digits'** entry to '2'. Click the 'Submit' button to save the changes.

TOSHIBA **Route Choice Definition**
Optimize Communication

Strata CIX

Basic Configuration
Advanced Configuration
Command Table
System
Station
Trunk
Attendant
IP-Telephony
LCR/DR
Networking
Node ID
Remote Node Data
Route Plan Analysis
Route Choice
Mapping
Emrg Access Code
Delete DSS Node ID
Network Over IP
Network DN
Network DN Table
Miscellaneous
External Devices
Utilities
Help

653 PVT NTKW ROUTE CHOICE TABLE ASSIGNMENT

00 Pvt Ntwk Route Choice Table Number.	2	Copy
01 Route Definition Table 1	2	
02 Route Definition Table 2	0	
03 Route Definition Table 3	0	
04 Route Definition Table 4	0	
05 Route Definition Table 5	0	
06 Route Definition Table 6	0	

654 PVT NTKW ROUTE DEFINITION TABLE ASSIGNMENT

00 Pvt Ntwk Route Definition	2	Copy
01 Outgoing Line Group	3	
02 Digit Modification Table	1	

655 PVT NTKW DIGIT MODIFICATION TABLE ASSIGNMENT

00 Pvt Ntwk Digit Modification Table	1	Copy
01 Deleted Digits	2	
02 Insert Leading Digits		

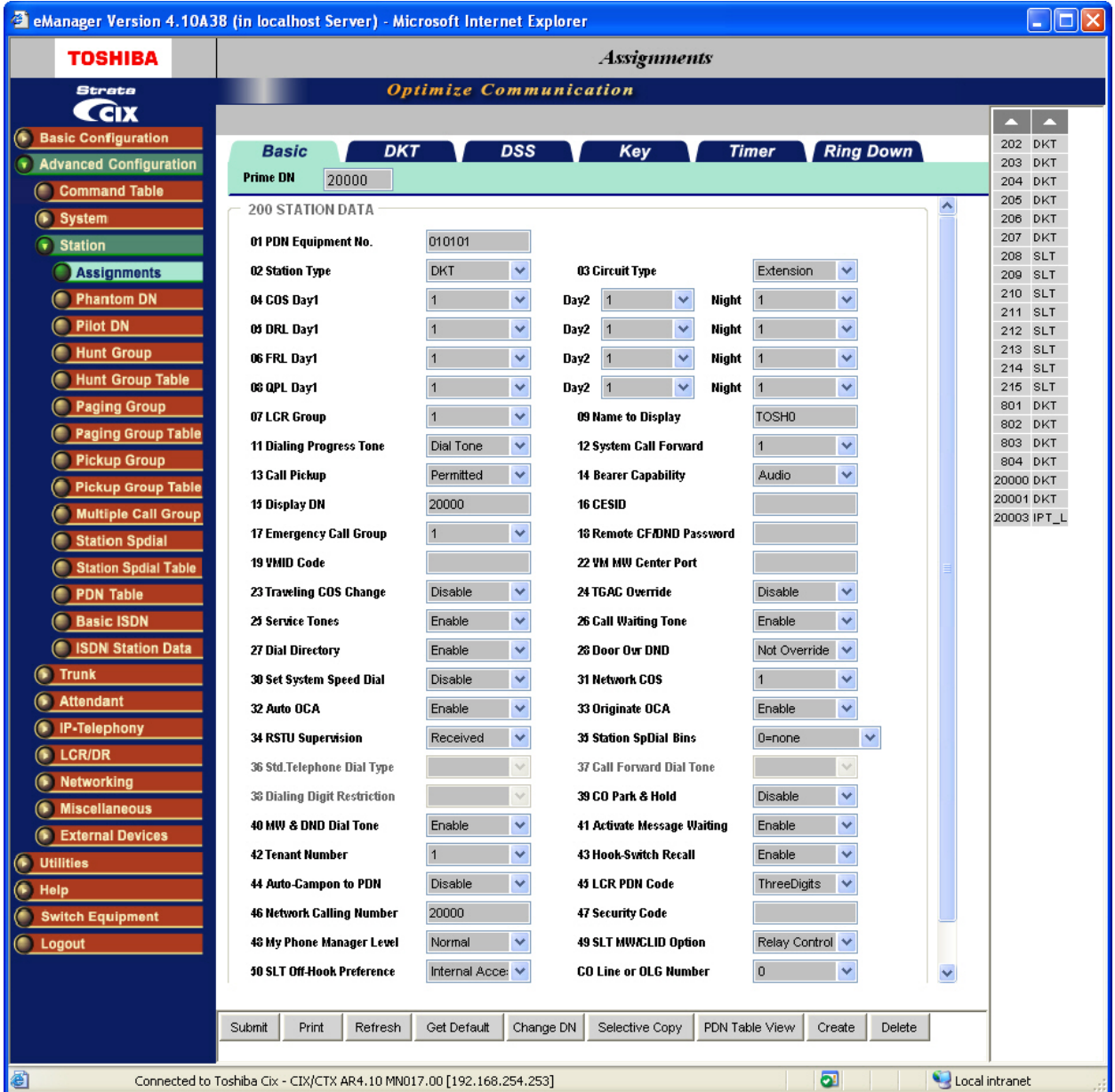
Submit Print Refresh Get Default

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4. Configure each dialed number that the Toshiba will route. In this sample configuration, extensions 70121 and 70122 are on the Avaya switch. Set the **'00 Network DN'** to **'70121'** and the **'01 Node ID'** to **'83'**, click the 'Submit' button to save the change. Set the **'00 Network DN'** to **'70122'** and the **'01 Node ID'** to **'83'**, click the 'Submit' button to save the change. The Toshiba switch does not have a way to enter a range of numbers, each number must be entered individually.

The screenshot displays the Toshiba eManager web interface within a Microsoft Internet Explorer browser window. The browser title is "eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer". The interface has a header with the "TOSHIBA" logo and the text "Network DN Table" and "Optimize Communication". A left-hand navigation menu lists various configuration options: Basic Configuration, Advanced Configuration, Command Table, System, Station, Trunk, Attendant, IP-Telephony, LCR/DR, Networking (highlighted), Node ID, Remote Node Data, Route Plan Analysis, Route Choice, Mapping, Emrg Access Code, Delete DSS Node ID, Network Over IP, Network DN (highlighted), Network DN Table, Miscellaneous, External Devices, Utilities, and Help. The main content area is titled "661 NETWORK DN TABLE" and contains two input fields: "00 Network DN" with the value "70121" and "01 Node ID" with the value "83". A "List" button is located to the right of the "00 Network DN" field. At the bottom of the main area, there are buttons for "Submit", "Print", "Refresh", "Get Default", "Create", and "Delete". The status bar at the bottom indicates "Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253]" and "Local intranet".

5.4. Configure the IP and Digital Stations

Step	Description
1.	Configure a digital station, extension 20000. Select 20000 from the table on the right hand side of the screen. Set the '09 Name to Display' field to 'TOSH0', set '15 Display DN' to '20000' and '46 Network Calling Number' to '20000'. The default values for all the other options were used. This configuration only used the 'Basic' tab, the other tabs were not required. Click the 'Submit' button to save the changes. Configure the 20001 station similarly.  The screenshot shows the eManager interface for configuring a station. The left sidebar contains a tree view with categories like Basic Configuration, Advanced Configuration, System, and Station. The 'Station' category is expanded, and 'Assignments' is selected. The main area shows the 'Assignments' configuration for station 20000. The 'Basic' tab is active, displaying various configuration fields. Key fields include '09 Name to Display' set to 'TOSH0', '15 Display DN' set to '20000', and '46 Network Calling Number' set to '20000'. Other fields like '01 PDN Equipment No.', '02 Station Type', '03 Circuit Type', '04 COS Day1', '05 DRL Day1', '06 FRL Day1', '08 QPL Day1', '07 LCR Group', '11 Dialing Progress Tone', '13 Call Pickup', '17 Emergency Call Group', '19 VMID Code', '23 Traveling COS Change', '25 Service Tones', '27 Dial Directory', '30 Set System Speed Dial', '32 Auto OCA', '34 RSTU Supervision', '36 Std. Telephone Dial Type', '38 Dialing Digit Restriction', '40 MW & DND Dial Tone', '42 Tenant Number', '44 Auto-Campon to PDN', '48 My Phone Manager Level', '50 SLT Off-Hook Preference', '12 System Call Forward', '14 Bearer Capability', '16 CESID', '18 Remote CF/DND Password', '22 VM MW Center Port', '24 TGAC Override', '26 Call Waiting Tone', '28 Door Ovr DND', '31 Network COS', '33 Originate OCA', '35 Station SpDial Bins', '37 Call Forward Dial Tone', '39 CO Park & Hold', '41 Activate Message Waiting', '43 Hook-Switch Recall', '45 LCR PDN Code', '47 Security Code', '49 SLT MWCLID Option', and '60 Line or OLC Number' are also visible. A list of stations on the right side of the screen shows 20000 selected.

2. Configure an IP station, extension 20003. Select 20003 from the table on the right hand side of the screen. Set the '10 Name to Display' field to 'TOSH3', set '15 Display DN' to '20003' and '19 VMID Code' to '20003'. The default values for all the other options were used. This configuration only used the 'Basic' tab, the other tabs were not required. Click the 'Submit' button to save the changes.

eManager Version 4.10A38 (in localhost Server) - Microsoft Internet Explorer

TOSHIBA *Assignments*

Strata **CIX**

Basic Configuration
Advanced Configuration
Command Table
System
Station
Assignments
Phantom DN
Pilot DN
Hunt Group
Hunt Group Table
Paging Group
Paging Group Table
Pickup Group
Pickup Group Table
Multiple Call Group
Station Spdial
Station Spdial Table
PDN Table
Basic ISDN
ISDN Station Data
Trunk
Attendant
IP-Telephony
LCR/DR
Networking
Miscellaneous
External Devices
Utilities
Help
Switch Equipment
Logout

Basic DKT DSS Key Timer Ring Down

Prime DN 20003

260 Full IP Station Assignment

02 PDN Equipment Number	0000	03 LAN Interface Number	1
01 Type	IPT	Day2	1
05 COS Day1	1	Night	1
06 DRL Day1	1	Day2	1
07 FRL Day1	1	Night	1
09 QPL Day1	1	Day2	1
06 LCR Group	1	Night	1
11 Dialing Progress Tone	Dial Tone	10 Name to Display	TOSH3
13 Call Pickup	Permitted	12 System Call Forward	
15 Display DN	20003	14 Bearer Capability	Audio
17 Emergency Call Group	1	16 CESID	
19 VMID Code	20003	18 Remote CF/DND Password	
21 Travel COS Change	Disable	20 VM MW Center Port	850
23 Service Tones	Enable	22 TGAC Override	Disable
25 Dial Directory	Enable	24 Call Waiting Tone	Enable
27 Set System Speed Dial	Disable	26 Door Over DND	Not Override
29 Auto OCA	Enable	28 Network COS	1
31 RSTU Supervision	Received	30 Originate OCA	Enable
33 Call Forward Dial Tone		32 Station SpDial Bins	0=none
35 CO Park & Hold	Disable	34 Dialing Digit Restriction	
37 Activate Message Waiting	Enable	36 MW & DND Dial Tone	Enable
39 Hook-Switch Recall	Enable	38 Tenant Number	1
41 LCR PDN Code	ThreeDigits	40 Auto-Campon to PDN	Disable
43 Security Code		42 Network Calling Number	
45 Speaker OCA	Disable	44 My Phone Manager Level	Normal

Submit Print Refresh Get Default Change DN Selective Copy PDN Table View Create Delete

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202	DKT
203	DKT
204	DKT
205	DKT
206	DKT
207	DKT
208	SLT
209	SLT
210	SLT
211	SLT
212	SLT
213	SLT
214	SLT
215	SLT
801	DKT
802	DKT
803	DKT
804	DKT
20000	DKT
20001	DKT
20003	IPT_L

3. Configure the IP address for the 20003 IPT station. Set the '03 Station IP Address' to '192.168.254.50'. Click the 'Submit' button to save the changes.

The screenshot displays the eManager Version 4.10A38 web interface in Microsoft Internet Explorer. The page is titled "TOSHIBA IPT Data" and "Optimize Communication". The left sidebar shows a navigation menu with categories like Basic Configuration, Advanced Configuration, and IP-Telephony. The "IPT Data" category is selected, and the "250 IPT DATA ASSIGNMENT" page is shown for station 20003. The configuration fields are as follows:

Field	Value
00 Prime DN	20003
01 Station ID	20003
02 Station IP Address Type	Any
03 Station IP Address	192 . 168 . 254 . 50
04 Auto Assign Station ID	Do Not Care
05 Station Terminal Authentication Mode	Do Not Care
06 Station MAC Address	00080D35363F
07 Voice Packet Table	1
08 Audio Codec	G711
09 Display Software Version Number of IPT	DIP2T1QC
10 SIP Terminal URI	
11 SIP Terminal Password	
14 Secondary Audio Codec for Full IP station	G729A
15 Secondary Voice Packet Index	3
16 IPT NATNo Peer to Peer	Disable

At the bottom of the configuration area, there are buttons for "Submit", "Print", "Refresh", and "Get Default". The status bar at the bottom indicates "Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253]" and "Local intranet".

5. Configure the LIPU IP telephony card. Set the '01 IP Address' to '192.168.254.200'. Click the 'Submit' button to save the changes.

The screenshot shows the Toshiba eManager Version 4.10A38 interface in Microsoft Internet Explorer. The main window is titled "LIPU Configuration" and "Optimize Communication". The left sidebar contains a tree view with categories like Basic Configuration, Advanced Configuration, Command Table, System, Station, Trunk, Attendant, IP-Telephony, LCR/DR, Networking, Miscellaneous, External Devices, Utilities, Help, and Switch Equipment. The "IP-Telephony" category is expanded, showing "LIPU Configuration". The main content area displays the "161 LIPU CONFIGURATION" form. The form includes fields for "00 Cabinet & Slot Number" (0106), "01 IP Address" (192.168.254.200), "02 Subnet Address" (255.255.255.0), "03 Default Gateway Address" (0.0.0.0), "07 Version Number of LIPU" (LIPX37D), "09 LIPU Idle IP Port Number Display" (15), "04 LIPS IP Address" (0.0.0.0), "05 LIPS Subnet Address" (0.0.0.0), "06 LIPS Default Gateway Address" (0.0.0.0), "08 Version Number of LIPS", "10 Available LIPS IP Ports" (0), "11 LIPU Packet Prioritization" (Enable/Disable), "12 LIPU Packet Prioritization Type" (Best Effort/Voice), "13 LIPU IEEE802.1Q VLAN" (Enable/Disable), "14 LIPU IEEE802.1Q VLAN ID", "15 LIPS Packet Prioritization" (Enable/Disable), "16 LIPS Packet Prioritization Type" (Best Effort/Voice), "17 LIPS IEEE802.1Q VLAN" (Enable/Disable), and "18 LIPS IEEE802.1Q VLAN ID". At the bottom of the form are buttons for "Submit", "Print", "Refresh", and "Get Default". The status bar at the bottom indicates "Connected to Toshiba Cix - CIX/CTX AR4.10 MN017.00 [192.168.254.253]" and "Local intranet".

6. Verification Steps

Verification involves several tests to exercise the basic call features between stations on the two switches.

- Verify that the Avaya T1 trunk group is in-service using the “**status trunk 6**” command on the Communication Manager SAT terminal.

status trunk 6				
TRUNK GROUP STATUS				
Member	Port	Service State	Mtce Connected	Ports Busy
0006/001	001V301	in-service/idle	no	
0006/002	001V302	in-service/idle	no	
0006/003	001V303	in-service/idle	no	
0006/004	001V304	in-service/idle	no	
0006/005	001V305	in-service/idle	no	
0006/006	001V306	in-service/idle	no	

- Place a test call to a station on the Avaya switch from a station on the Toshiba switch. Verify the talk path is 2-way and that the called station displays the calling party name and number. The Avaya station displays the name and 5-digit extension of the calling party. The Toshiba station displays the name and 5-digit called party.
- Place a test call from a station on Avaya Communication Manager to a station on the Toshiba switch. Verify the talk path is 2-way and that the called station displays the calling party name and number.
- Initiate a 3-way conference call from a station on the Toshiba switch to two stations on the Avaya switch. Verify all parties are joined to the conference
- Initiate a 3-way conference call from a station on the Avaya switch to two stations on the Toshiba switch. Verify all parties are joined to the conference.
- Place a call from the Toshiba IP phone to a station on the Avaya switch, then transfer the call from the Avaya station to a station on the Toshiba switch. Verify the talk path is 2-way between the two local stations.
Note: Path replacement is not supported in this configuration.
- Place a call from a station on the Avaya switch to a station on the Toshiba switch, then transfer the call from the Toshiba station to a station on the Avaya switch. Verify the talk path is 2-way between the two local stations.
- Use the Mute and Hold buttons during test calls. Verify that the talk path is restored when the feature is deactivated.

7. Conclusion

These Application Notes present a sample configuration for a network comprised of an Avaya S8300 Media Server, Avaya G350 Media Gateway, and a Toshiba Strata CIX670. The configuration of Avaya Communication Manager T1/QSIG signaling groups, T1/QSIG trunk

groups, call routing, and the corresponding configuration on the Toshiba Strata CIX670 is documented. Using this configuration, calls can be made between Toshiba digital and IP telephones and Avaya IP telephones over a T1/QSIG trunk. Basic inter-switch calling features were verified.

8. References

- Feature Description and Implementation for Avaya Communication Manager, 555-245-205, Issue 4, February 2006. Available on <http://support.avaya.com>
- Toshiba Strata CIX, CTX28, CTX100, and CTX670 General Description, January 2005
- Toshiba Strata CIX Installation and Maintenance Manual (Release 4.1), January 2006
- Toshiba Strata CIX Programming manual Volume 1 (Release 4.1), January 2006
- Toshiba Strata CIX and CTX IPT/DKT Telephone Administration Manual, December 2004

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