

# **Network Region Job Aid**

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February 2007

Release 4.0

**DRAFT 11/17/2006**

## Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

## Warranty

Avaya Inc. provides a limited warranty on this product. Refer to your sales agreement to establish the terms of the limited warranty. In addition, Avaya's standard warranty language as well as information regarding support for this product, while under warranty, is available through the following Web site: <http://www.avaya.com/support>.

## Preventing Toll Fraud

"Toll fraud" is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there may be a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

## Avaya Fraud Intervention

If you suspect that you are being victimized by toll fraud and you need technical assistance or support, in the United States and Canada, call the Technical Service Center's Toll Fraud Intervention Hotline at 1-800-643-2353.

## How to Get Help

For additional support telephone numbers, go to the Avaya support Web site: <http://www.avaya.com/support>. If you are:

- Within the United States, click the Escalation Management link. Then click the appropriate link for the type of support you need.
- Outside the United States, click the Escalation Management link. Then click the International Services link that includes telephone numbers for the international Centers of Excellence.

## Providing Telecommunications Security

Telecommunications security (of voice, data, and/or video communications) is the prevention of any type of intrusion to (that is, either unauthorized or malicious access to or use of) your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf. Whereas, a "malicious party" is anyone (including someone who may be otherwise authorized) who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time-multiplexed and/or circuit-based) or asynchronous (character-, message-, or packet-based) equipment or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent)

Be aware that there may be a risk of unauthorized intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company (including but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs).

## Responsibility for Your Company's Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - Avaya's customer system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources including but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure:

- Your Avaya-provided telecommunications systems and their interfaces
- Your Avaya-provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products

## TCP/IP Facilities

Customers may experience differences in product performance, reliability and security depending upon network configurations/design and topologies, even when the product performs as warranted.

## Standards Compliance

Avaya Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Avaya Inc. The correction of interference caused by such unauthorized modifications, substitution or attachment will be the responsibility of the user. Pursuant to Part 15 of the Federal Communications Commission (FCC) Rules, the user is cautioned that changes or modifications not expressly approved by Avaya Inc. could void the user's authority to operate this equipment.

## Product Safety Standards

This product complies with and conforms to the following international Product Safety standards as applicable:

Safety of Information Technology Equipment, IEC 60950, 3rd Edition including all relevant national deviations as listed in Compliance with IEC for Electrical Equipment (IECEE) CB-96A.

Safety of Information Technology Equipment, CAN/CSA-C22.2 No. 60950-00 / UL 60950, 3rd Edition

Safety Requirements for Customer Equipment, ACA Technical Standard (TS) 001 - 1997

One or more of the following Mexican national standards, as applicable: NOM 001 SCFI 1993, NOM SCFI 016 1993, NOM 019 SCFI 1998

The equipment described in this document may contain Class 1 LASER Device(s). These devices comply with the following standards:

- EN 60825-1, Edition 1.1, 1998-01
- 21 CFR 1040.10 and CFR 1040.11.

The LASER devices operate within the following parameters:

- Maximum power output: -5 dBm to -8 dBm
- Center Wavelength: 1310 nm to 1360 nm

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Klass 1 Laser Apparat

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposures. Contact your Avaya representative for more laser product information.

## Electromagnetic Compatibility (EMC) Standards

This product complies with and conforms to the following international EMC standards and all relevant national deviations:

Limits and Methods of Measurement of Radio Interference of Information Technology Equipment, CISPR 22: 1997 and EN55022: 1998.

Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement, CISPR 24: 1997 and EN55024: 1998, including:

- Electrostatic Discharge (ESD) IEC 61000-4-2
- Radiated Immunity IEC 61000-4-3
- Electrical Fast Transient IEC 61000-4-4
- Lightning Effects IEC 61000-4-5
- Conducted Immunity IEC 61000-4-6
- Mains Frequency Magnetic Field IEC 61000-4-8
- Voltage Dips and Variations IEC 61000-4-11
- Powerline Harmonics IEC 61000-3-2
- Voltage Fluctuations and Flicker IEC 61000-3-3

## Federal Communications Commission Statement

### Part 15:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### Part 68: Answer-Supervision Signaling

Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public switched network when:

- answered by the called station,
- answered by the attendant, or
- routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.

This equipment returns answer-supervision signals on all direct inward dialed (DID) calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered.
- A busy tone is received.
- A reorder tone is received.

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

## REN Number

### For MCC1, SCC1, CMC1, G600, and G650 Media Gateways:

This equipment complies with Part 68 of the FCC rules. On either the rear or inside the front cover of this equipment is a label that contains, among other information, the FCC registration number, and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

### For G350 and G700 Media Gateways:

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the rear of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. The digits represented by ## are the ringer equivalence number (REN) without a decimal point (for example, 03 is a REN of 0.3). If requested, this number must be provided to the telephone company.

### For all media gateways:

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

REN is not required for some types of analog or digital facilities.

## Means of Connection

Connection of this equipment to the telephone network is shown in the following tables.

### For MCC1, SCC1, CMC1, G600, and G650 Media Gateways:

| Manufacturer's Port Identifier | FIC Code  | SOC/REN/A.S. Code | Network Jacks       |
|--------------------------------|-----------|-------------------|---------------------|
| Off premises station           | OL13C     | 9.0F              | RJ2GX, RJ21X, RJ11C |
| DID trunk                      | 02RV2-T   | 0.0B              | RJ2GX, RJ21X        |
| CO trunk                       | 02GS2     | 0.3A              | RJ21X               |
|                                | 02LS2     | 0.3A              | RJ21X               |
| Tie trunk                      | TL31M     | 9.0F              | RJ2GX               |
| Basic Rate Interface           | 02IS5     | 6.0F, 6.0Y        | RJ49C               |
| 1.544 digital interface        | 04DU9-BN  | 6.0F              | RJ48C, RJ48M        |
|                                | 04DU9-IKN | 6.0F              | RJ48C, RJ48M        |
|                                | 04DU9-ISN | 6.0F              | RJ48C, RJ48M        |
| 120A4 channel service unit     | 04DU9-DN  | 6.0Y              | RJ48C               |

## For G350 and G700 Media Gateways:

| Manufacturer's Port Identifier | FIC Code  | SOC/REN/A.S. Code | Network Jacks |
|--------------------------------|-----------|-------------------|---------------|
| Ground Start CO trunk          | 02GS2     | 1.0A              | RJ11C         |
| DID trunk                      | 02RV2-T   | AS.0              | RJ11C         |
| Loop Start CO trunk            | 02LS2     | 0.5A              | RJ11C         |
| 1,544 digital interface        | 04DU9-BN  | 6.0Y              | RJ48C         |
|                                | 04DU9-DN  | 6.0Y              | RJ48C         |
|                                | 04DU9-IKN | 6.0Y              | RJ48C         |
|                                | 04DU9-ISN | 6.0Y              | RJ48C         |
| Basic Rate Interface           | 02IS5     | 6.0F              | RJ49C         |

## For all media gateways:

If the terminal equipment (for example, the media server or media gateway) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242- 2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. It is recommended that repairs be performed by Avaya certified technicians.

The equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

This equipment, if it uses a telephone receiver, is hearing aid compatible.

## Canadian Department of Communications (DOC) Interference Information

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

## Declarations of Conformity

United States FCC Part 68 Supplier's Declaration of Conformity (SDoC)

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.

Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.

Copies of SDoCs signed by the Responsible Party in the U. S. can be obtained by contacting your local sales representative and are available on the following Web site: <http://www.avaya.com/support>.

All Avaya media servers and media gateways are compliant with FCC Part 68, but many have been registered with the FCC before the SDoC process was available. A list of all Avaya registered products may be found at: <http://www.part68.org/> by conducting a search using "Avaya" as manufacturer.

## European Union Declarations of Conformity



Avaya Inc. declares that the equipment specified in this document bearing the "CE" (Conformité Européenne) mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive (1999/5/EC), including the Electromagnetic Compatibility Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC). This equipment has been certified to meet CTR3 Basic Rate Interface (BRI) and CTR4 Primary Rate Interface (PRI) and subsets thereof in CTR12 and CTR13, as applicable.

Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative and are available on the following Web site: <http://www.avaya.com/support>.

## Japan

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## Document Copies

To order copies of this and other documents:

**Call:** Avaya Publications Center  
Voice 1.800.457.1235 or 1.207.866.6701  
FAX 1.800.457.1764 or 1.207.626.7269

**Write:** Globalware Solutions  
200 Ward Hill Avenue  
Haverhill, MA 01835 USA  
Attention: Avaya Account Management

**E-mail:** [totalware@gwsmail.com](mailto:totalware@gwsmail.com)

For the most current versions of documentation, go to the Avaya support Web site: <http://www.avaya.com/support>.

# Table Of Contents

## **Upgrade Notice** **7**

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## **Introduction** **7**

---

|  |    |
|--|----|
| Initial Installation Procedure Overview  | 7  |
| Continued Administration and Maintenance | 8  |
| Network Region Wizard                    | 9  |
| Using This Job Aid                       | 10 |
| Troubleshooting Macro Problems           | 11 |

## **Electronic Worksheets and Templates** **13**

---

|                                       |    |
|---------------------------------------|----|
| Network Region Job Aid Workbook       | 13 |
| Electronic Pre-Installation Worksheet | 13 |
| Network Region Custom Template        | 15 |

## **Step-by-Step** **21**

---

### **Creating the Network Diagram** **22**

---

|   |    |
|---|----|
| Setup   | 22 |
| Locations   | 23 |
| Layout Locations on the Diagram                             | 25 |
| Cabinets, IP Interfaces, Media Gateways, and Backup Servers | 26 |
| Creating Network Regions                                    | 29 |
| Create Network Regions from the Network Diagram             | 30 |
| Assign Equipment to Regions                                 | 38 |
| Connections Between Regions                                 | 40 |
| IGAR Considerations   | 41 |
| Direct Connections  | 41 |
| Indirect Connections  | 43 |
| Limits & RTCP Monitor Servers                               | 44 |
| Using the EPW and the NRW                                   | 45 |

## **Index** **47**

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# Upgrade Notice

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The *Network Region Job Aid Workbook* internal file format has changed due to changes in NRW and the NRW-EPW (*Electronic Pre-Installation Workbook*) Release 4.0:

- Save any data in earlier versions of the *Network Region Job Aid Workbook* by exporting files.
- After installing the new workbook, import the files.
- The new Time-to-Service fields will be populated.
- Export the files again to save in the new format.

## Introduction

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This Job Aid explains the tools available for partitioning networks into regions. These tools include:

- *Network Region Job Aid* (PDF) & *Network Region Job Aid Workbook*. (Excel spreadsheet)
- *Electronic Pre-Installation Workbook* (EPW-NRW, Excel spreadsheet).
- *Custom Template* (CT-NRW, Excel spreadsheet).
- *Network Region Wizard* (NRW). An application running on the Communication Manager you are configuring.



**note:** The media server Home Page contains a link to access the NRW for installations. You can get the latest version of all of these files by downloading them from the <http://support.avaya.com/avayaiw> web site.

## Initial Installation Procedure Overview

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The procedure for an initial installation is as follows:

- The data for network locations and equipment is recorded in the *Network Region Job Aid Workbook*.
- This Job Aid explains what data to collect and what data to generate to create the network regions.
- This Job Aid explains how to partition a network into regions.
- This Job Aid explains how to set up Inter Gateway Alternate Routing (IGAR) using the Public Service Telephone Network (PSTN).
- The network region and IGAR data is recorded in the *Network Region Job Aid Workbook*.
- This Job Aid explains how to create special codec sets or default data settings using the *Custom Template* (CT-NRW).

- This Job Aid explains how to copy some of the network region information to the *EPW-NRW*.
- The *Network Region Wizard* reads in the basic data from the *EPW-NRW* and *Custom Template*.
- The *Network Region Wizard* requests additional information from the *Network Region Job Aid Workbook*.
- The *Network Region Wizard* calculates all indirect routings and forces the user to select specific routing when multiple indirect routes exist.
- The *Network Region Wizard* uploads parameters to the Communication Manager.

### **Continued Administration and Maintenance**

The procedure for continued administration and maintenance is as follows:

- The changed data is recorded in a blank *Network Region Job Aid Worksheet*.
- The *Network Region Wizard* reads existing data from the *Communications Manager* and updated information from the *Custom Template* (not used if nothing is changed).
- Changes in the *Custom Template* only effect new items. Other changes are input manually using the NRW.
- The *Network Region Wizard* recalculates all indirect routings and forces the user to select specific routing when multiple indirect routes exist.
- The *Network Region Wizard* uploads parameters to the *Communication Manager*.



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## Network Region Wizard

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The *Avaya Network Region Wizard* (NRW) is a browser-based wizard that is available on Avaya Media Servers running Communication Manager 3.1 or higher software. The NRW guides you through the steps required to define network regions and set all necessary parameters through a simplified, task oriented interface.

The purpose of the NRW is to simplify and expedite the provisioning of multiple IP network regions, including Call Acceptance Control via Bandwidth Limits (CAC-BL) and Inter Gateway Alternate Routing (IGAR) for large distributed **single-server** systems that have several network regions. The NRW is especially valuable for provisioning systems with dozens or hundreds of network regions, for which administration via the System Access Terminal (SAT) scales poorly.

NRW provisioning tasks include:

- Specification and assignment of codec sets to high-bandwidth (intra-region) LAN's and lower-bandwidth (inter-region) WAN's.
- Configuration of IP network regions, including all *intra*-region settings as well as *inter*-region administration of CAC-BL and IGAR for inter-region links.
- Ongoing network region administration by the customer as well as by Avaya technicians and Business Partners to accommodate changes in the customer network following cutover.
- Assignment of VoIP resources (C-LANs, MedPro/Prowler cards, Media Gateways), and endpoints to IP network regions.

The NRW simplifies and expedites network region provisioning in several ways:

- NRW uses algorithms and heuristics based on graph theory to greatly reduce the repetitive manual entry required by the SAT to configure codec's, CAC-BL, and IGAR for inter-region links. With the SAT, the number of inter-region links that need to be configured by the user does not scale well; with the NRW, the number of region pairs that require manual administration will increase *linearly* with the number of regions.
- NRW provides templates of widely applicable default values for codec sets and intra-region parameter settings. Users have the ability to customize these templates with their own default values.
- NRW runs on Microsoft Internet Explorer and takes advantage of browser capabilities to offer user-friendly prompting and context-sensitive online help.

### **Using This Job Aid**

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This Job Aid explains how to collect or generate the information necessary to administer multi-region networks. To the extent possible, "best processes" are suggested or enforced in the *Network Region Job Aid Workbook*, the EPW-NRW, and the NRW because following these "best practices" lowers administration and maintenance costs.

Please see separate sections depending on your job needs:

- Electronic Worksheets and Templates
- Installation Tasks Step-By-Step

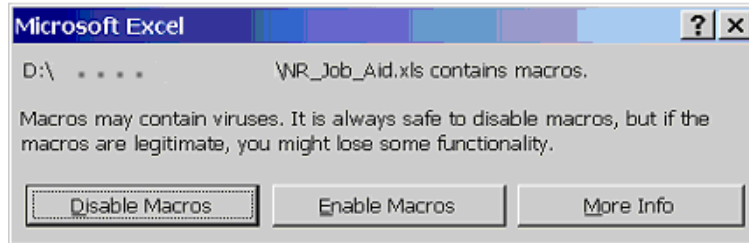
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## Troubleshooting Macro Problems

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When you start the *Network Region Job Aid Workbook*, a start up screen may display indicating you should look in this section for instructions to enable macros to fix the problem.

Close the *Network Region Job Aid Workbook*, and open it again. If you see the following (or similar) dialog box when opening the *Network Region Job Aid Workbook*, click **Enable Macros**.

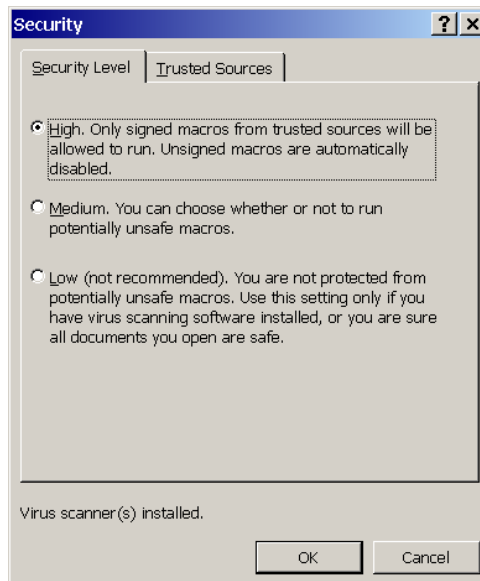


This should fix the problem.

If you do not see the dialog box, try the following:

1. Click **Tools>Macro>Security...**

The Security dialog box displays



2. Click **Medium**.
3. Click **OK**.

When you restart the *Network Region Job Aid Workbook*, the Enable Macros dialog box should display.

If the macros still do not work, or if you cannot get the Enable Macros dialog box to appear, your site may have a policy that prevents macros from executing. Please check with your Help Desk for instructions.



# Electronic Worksheets and Templates

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To allow the NRW to maximize automation, obtain the latest version of the files by downloading them from the <http://support.avaya.com/avayaiw> web site.

- *Network Region Wizard* (NRW)
- *NRW Electronic Pre-Installation Worksheet* (EPW-NRW)
- *NRW Custom Template* (CT-NRW)
- *Network Region Job Aid & Network Region Job Aid Workbook*. (This document and workbook)

The *Network Region Job Aid Workbook* is included with this Job Aid.

Instructions for using these files are in "Installation Tasks Step-By-Step."

## Network Region Job Aid Workbook

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The *Network Region Job Aid Workbook* is an Excel workbook that is filled in by the customer and project manager. Part of the data from this workbook can be copied to the Electronic Pre-Installation Worksheet for automatic entry. The remaining information is copied into the NRW, when requested.

## Electronic Pre-Installation Worksheet

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The *Electronic Pre-Installation Worksheet* (EPW-NRW) is an Excel worksheet that can be filled in by copying data from the *Network Region Job Aid Workbook*. The data from the EPW-NRW is automatically pulled into the NRW to configure the network regions. While it is possible to enter all of the data directly into the Network Region Wizard, it is much easier to use the EPW-NRW for initial setup and the online NRW for just the calculation and upload phases.

The following data can be copied from the *Network Region Job Aid Workbook* to the EPW-NRW:

- **Limits & RTCP** (from *Limits & RTCP* worksheet to NRW or EPW-NRW *Limits* worksheet):

| Field Name                                | Default Value | Notes  |
|---|---------------|--|
| Number of Network Regions                 | 1             | Used to determine how many rows of data to read from the Communication Manager or from the EPW-NRW or CT-NRW.    |
| Number of Locations                       | 1             |  |
| Number of RTCP Monitor Servers            | 0             |  |
| Default Server IP Address                 |               | If more than 1 RTCP Monitor Server is used, specify the additional configurations using the NRW Custom Template. |
| Default Server Port                       | 5005          |  |
| Default Server Report Period (in seconds) | 5             |  |

- Locations (from *Locations* worksheet to EPW-NRW *Locations* worksheet)

| Number | Name | Time Zone Offset |     |      | Rule | Location Params |
|--------|------|------------------|-----|------|------|-----------------|
|        |      | +/-              | Hrs | Mins |      |                 |
| 1      |      |                  |     |      |      |                 |
| 2      |      |                  |     |      |      |                 |
| etc.   |      |                  |     |      |      |                 |

Double-clicking the exported file <ProjectName>.Locations.csv will open a new Excel worksheet with exactly the same columns as the EPW-NRW.

- Regions (from *Regions* worksheet to EPW-NRW *Network Regions* worksheet)

| Reg # | Loc # | Home Domain | LDN   | Del | Ins    | Max Trnk | BACKUP SERVER |   |   |   |   |   | Security Procedures |   |   |   |  |
|-------|-------|-------------|-------|-----|--------|----------|---------------|---|---|---|---|---|---------------------|---|---|---|--|
|       |       |             |       |     |        |          | 1             | 2 | 3 | 4 | 5 | 6 | 1                   | 2 | 3 | 4 |  |
| 1     | 1     |             | 73504 | 1   | 732599 | 3        |               |   |   |   |   |   | Challenge           |   |   |   |  |
| 2     | 2     |             |       |     |        |          |               |   |   |   |   |   | Challenge           |   |   |   |  |
| etc.  |       |             |       |     |        |          |               |   |   |   |   |   |                     |   |   |   |  |

| Use Enhanced TTS | Min Port | Max Port |
|------------------|----------|----------|
| Y                | 61440    | 61444    |
| N                | 61440    | 61444    |
|                  |          |          |

Opening the exported file <ProjectName>.Regions.csv will display a new Excel worksheet with exactly the same columns as the EPW-NRW. (The column names are not included and are slightly different.)

## Network Region Custom Template

The NR Custom Template (CT-NRW) is an Excel worksheet that allows automatic administration of default parameter values. As supplied, the NRW standard template should be applicable for 80% or more of customers. Any of the default parameter values can be customized. These include:

- Default values for Codec Sets 1 through 6.
  - Codec Set 1 is for LAN (intra-region) usage.

|    | Audio Codec | Silence Suppr | Frames Per Pkt | Packet Size (ms) | Intended Usage                  |
|----|-------------|---------------|----------------|------------------|---------------------------------|
| 1: | G.711MU     | n             | 2              | 20               | IP Phones                       |
| 2: | G.729       | n             | 2              | 20               | Softphones over DSL/Cable Modem |
| 3: | G.723-6.3K  | n             | 1              | 20               | Softphones over Low-Speed Modem |

|    | Media Encryption |
|----|------------------|
| 1: | None             |
| 2: |                  |
| 3: |                  |

### Direct-IP Multimedia Codecs

|  |     |       |
|--|-----|-------|
| Allow Direct-IP Multimedia Codecs?         | n   |       |
| Maximum Call Rate for Direct-IP Multimedia | 384 | Kbits |

### Fax/Modem Parameters for Codec Set 1

|               | Mode         | Redundancy | Notes                        |
|---------------|--------------|------------|------------------------------|
| Fax           | pass-through | 0          | See FAX note below           |
| Modem         | off          | 0          | See Modem note below         |
| TDD/TTY       | pass-through | 0          | See TDD/TTY note below       |
| Clear-Channel | n            | 0          | See Clear-Channel note below |

- Codec Set 2 is for WAN (Intra-region) usage.

|    | Audio Codec | Silence Suppr | Frames Per Pkt | Packet Size (ms) | Intended Usage                  |
|----|-------------|---------------|----------------|------------------|---------------------------------|
| 1: | G.729       | n             | 2              | 20               | Most Traffic over WAN link      |
| 2: | G.723-6.3K  | n             | 2              | 20               | Softphones over Low-Speed Modem |
| 3: |             |               |                |                  |                                 |

|    | Media Encryption |
|----|------------------|
| 1: | None             |
| 2: |                  |
| 3: |                  |

### Direct-IP Multimedia Codecs

|  |     |       |
|--|-----|-------|
| Allow Direct-IP Multimedia Codecs?         | n   |       |
| Maximum Call Rate for Direct-IP Multimedia | 384 | Kbits |

### Fax/Modem Parameters for Codec Set 2

|       | Mode         | Redundancy | Notes                |
|-------|--------------|------------|----------------------|
| Fax   | Pass-through | 0          | See FAX note below   |
| Modem | off          | 0          | See Modem note below |

|               |              |   |                              |
|---------------|--------------|---|------------------------------|
| TDD/TTY       | pass-through | 0 | See TDD/TTY note below       |
| Clear-Channel | n            | 0 | See Clear-Channel note below |

- Codec Set 3 is for LAN (intra-region) usage in Europe.

|    | Audio Codec | Silence Suppr | Frames Per Pkt | Packet Size (ms) | Intended Usage                  |
|----|-------------|---------------|----------------|------------------|---------------------------------|
| 1: | G.711A      | n             | 2              | 20               | IP Phones                       |
| 2: | G.729       | n             | 2              | 20               | Softphones over DSL/Cable Modem |
| 3: | G.723-6.3K  | n             | 1              | 20               | Softphones over Low-Speed Modem |

| Media Encryption |      |
|------------------|------|
| 1:               | None |
| 2:               |      |
| 3:               |      |

#### Direct-IP Multimedia Codecs

|  |     |       |
|--|-----|-------|
| Allow Direct-IP Multimedia Codecs?         | n   |       |
| Maximum Call Rate for Direct-IP Multimedia | 384 | Kbits |

#### Fax/Modem Parameters for Codec Set 3

|               | Mode         | Redundancy | Notes                        |
|---------------|--------------|------------|------------------------------|
| Fax           | Pass-through | 0          | See FAX note below           |
| Modem         | off          | 0          | See Modem note below         |
| TDD/TTY       | pass-through | 0          | See TDD/TTY note below       |
| Clear-Channel | n            | 0          | See Clear-Channel note below |

- Codec Sets 4, 5, and 6 are available for user definition.



- **note:** Codec Set 7 may be defined through the SAT, and selected whenever a codec set is required. It is not otherwise supported through the NRW, the Custom Template, or this Job Aid.



#### notes:

- **FAX:**  
Redundancy must be 0 or 1.

- **Off**
- **Pass-Through**

FAX calls are transported over an IP data networks by using PCM (G.711) codec in an attempt to simulate a circuit-switched "clear channel." The MedPro (media processor card) Detects Fax tones and changes the voice codec "on the fly" to G.711 mode and jitter buffers remain static during the call.



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- **Relay (FoIP)**

FAX calls are passed over IP data networks by terminating/originating the FAX call at the near and far ends. Support of the T.30 FAX protocol suite includes: FAX tone detection, control signaling, and FAX data pump modulation/demodulation according to the V.xx protocols. In this field, Relay refers specifically to the existing Avaya proprietary FAX relay rather than standards based T.38 FAX Relay.

- **T.38-Standard**

ITU-T defined standard for FAX relay. Uses H.323/H.245 signaling/capabilities exchange for FAX relay. FAX bearer traffic is relayed (encoded/decoded) according to the T.38 specification.

- **Modem:**

Redundancy must be 0 – 3.

- **Off**

- **Pass-through**

Modem calls are passed over an IP trunk by using PCM (G.711) codec in an attempt to simulate a circuit-switched "clear channel." Modem tones are detected by the MedPro (media processor card). The existing voice codec on the call is changed "on the fly" to G.711 mode and jitter buffers remain static during the call.

- **Relay**

Modem calls are passed over an IP trunk by terminating/originating the modem at the near and far ends. Modem tones are detected by the MedPro (media processor card). This includes modem tone detection, control signaling/negotiation, data modulation/demodulation, error correction, and data compression defined in the V.xx ITU-T protocols

- **TDD/TTY:**

Redundancy must be 0 – 3.

- **Off**
- **Pass-through**

TTY calls are passed over an IP trunk by using PCM (G.711) codec in an attempt to simulate a circuit-switched “clear channel.” TTY tones are detected by the MedPro (media processor card). The existing voice codec on the call is changed “on the fly” to G.711 mode and jitter buffers remain static during the call.

- **US / UK**

TTY calls are passed over an IP trunk by detecting TTY at the near-end, relaying TTY characters over IP network, and then regenerating TTY tones/characters at the far-end by the MedPro (media processor card). TIA-EIA- 840 specifies the technical details for the Baudot 45.45/50 standards. There are minor differences between the UK and US versions.

- **Clear-Channel:**

Redundancy must be 0 or 1.

- y (yes)
- n (no)

- Changeable default values for the following intra-region parameters. In most cases, the values shown will be appropriate.

In multi-region networks with more than one RTCP Monitor Server, set *Use Default Server Parameters?* To “No” and specify the RTCP Monitor Server for each network region (that has monitoring) in the table at the end of the custom template.

| Parameter | Default Value | Notes |
|-----------|---------------|-------|
|-----------|---------------|-------|

#### Media Parameters

|              |      |   |
|--------------|------|---|
| Codec Set    | 1    | Codec Set 1 (Mu-Law) or Codec Set 3 (A-Law). This Codec Set is used for LAN (intra-region). Codec Set 2 set on Direct Connections is used for WAN (inter-region). |
| UDP Port Min | 2048 |   |
| UDP Port Max | 3028 |   |

#### Diffserv/TOS Parameters

|                        |    |
|------------------------|----|
| Call Control PHB Value | 46 |
| Audio PHB Value        | 46 |
| Video PHB Value        | 26 |

#### 802.1P.Q Parameters

|                              |   |
|------------------------------|---|
| Call Control 802.1p Priority | 6 |
| Audio 802.1p Priority        | 6 |

#### Shuffling

|                                 |     |
|---------------------------------|-----|
| Intra-Region IP-IP Direct Audio | yes |
| Inter-Region IP-IP Direct Audio | yes |
| IP Audio Hairpinning?           | y   |

#### RTCP Monitoring Parameters

|                               |   |   |
|-------------------------------|---|---|
| RTCP Recording Enabled?       | y | If only one Server, input directly to NRW. If “No,” use next section to set individual network region parameters. |
| Use Default Server Parameters | y |   |

#### Audio Resource Reservation Parameters

|                                  |                    |   |
|----------------------------------|--------------------|---|
| RSVP Enabled?                    | n                  | These fields required only if <i>RSVP Enabled</i> = “Yes” |
| RSVP Refresh Rate (secs)         | 15                 |   |
| Retry upon RSVP Failure Enabled? | y                  |   |
| RSVP Profile                     | Guaranteed Service |   |
| RSVP Unreserved (BBE) PHB Value  | 46                 |   |

- Definitions for two or more Non-Default RTCP Monitor Servers:

| Network Region Number | RTCP Monitor Server IP Address | Server Port | RTCP Report Period (secs) |
|-----------------------|--------------------------------|-------------|---------------------------|
| 1                     |                                |             |                           |
| 2                     |                                |             |                           |
| etc.                  |                                |             |                           |

When there is exactly one RTCP Monitor Server, the information is entered directly into the NRW and used for all regions. For multi-region networks with more than one RTCP Monitor Server, this table defines the RTCP Monitor Server (if any) used by each network region.

# Step-by-Step

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**note:** Please read this entire section (“Installation Step-By-Step”) before collecting data. Understanding how the information is used will help you collect the correct information the first time.

For new network region setup

- Information should be collected and entered into the *Network Region Job Aid Workbook*, EPW-NRW, and the Custom Template.
- The NRW imports the EPW-NRW and Custom Template.
- The NRW requests additional information that is copied from the *Network Region Job Aid Workbook*.
- The NRW finishes up the details of network partitioning and routing.
- When approved, the final translations are uploaded to the *Communications Manager*.

|   |  |
|---|--|
| If the user doesn't really understand network regions, or hasn't already developed a good understanding on paper of what their network regions should be:                               | Start with the <i>Network Region Tutorial</i> and <i>IP Telephony Implementation Guide</i> available at the <a href="http://www.avaya.com/support">www.avaya.com/support</a> web site. |
| If the user has already configured their network regions on paper, or has a good network diagram showing how the network regions relate to geographic locations and physical equipment. | Proceed with the <i>Network Region Job Aid Workbook</i> . EPW-NRW, Custom Template, and NRW network region configuration process using this Job Aid.                                   |

This Job Aid supplements the capabilities of both EPW-NRW and NRW network region configuration. The following outline shows the steps necessary to help the user design their network regions from scratch. The associated step-by-step topics (in the next section) explain what information needs to be generated or collected.

To create network regions, follow these steps:

- Create the Network Diagram
  - List locations and collect data
  - Layout the diagram showing:
    - Cabinets
    - IP Interfaces
    - Media Gateways
    - LSPs
    - IP Connections

- Create Network Regions from the Network Diagram
  - Create location regions
  - Add regions to partition resources
  - Add regions for special processing
- Assign Equipment to Regions
  - Assign Cabinets
  - Assign IP Interfaces
  - Assign Media Gateways
  - Assign IP Network Maps (Stations)
- Collect Direct Connection Data
  - Regions connected by WAN
  - Regions connected by IGAR (PSTN)
  - Call Acceptance Control via Bandwidth Limitation
- Using the Electronic Pre-Installation Worksheet (EPW) and the Network Region Wizard (NRW)

## Creating the Network Diagram

---

Create or obtain a Network Diagram from the Sales Team, the Account Team, or the Customer. Augment it as necessary with information from the Customer.

- Obtain a list of locations with the equipment at each location. Equipment includes IP Interface boards (C-LAN and MedPro), Media Gateways, LSPs, and IP Phones and adjunct devices.
- Obtain a list of LANs to which the above equipment is connected, and a list of direct connections (backbone or WAN) between locations (or LANs).
- Obtain the traffic estimates for each direct connection and determine if the engineered backbone or WAN direct connections were implemented or not. (If not, the Call Acceptance Control via Bandwidth Limits (CAC-BL) may require further restriction, or more IGAR PSTN trunks may be required.)

You may have to accumulate this information from the Sales Team, the Account Team, and the Customer.

## Setup

---

If the system has locations in more than one nation, or has multiple locations that require more than one set of network access parameters, go to the *Setup* worksheet and check the **Enable Multi-Nationals / Multiple Locations** checkbox. Checking this option enables **Location Params** on the *Locations* worksheet to have values from 1 to 25 (with 1 as default). If this option is not checked, **Location Params** is fixed at 1. (The Multi-Nationals or Multiple Locations feature must be included in the customer's license.)

---

## Locations

---



**note:** The assignment of Locations is critical for telephony routing. Locations must be assigned by someone familiar with VoIP communications over multiple network regions.

You will need the following data for each location:

- **Location Number**

This field defines each table row. There is one row for each location (starting at 1). Once an association between a row and a location name has been made, it should never be changed because only the number is used for linking. (The name can be changed as long as it refers to the same place.) Available location numbers range from 1 to 250. )

When **AutoNumber** is checked, the **Location Number** is automatically filled in on the *Locations* sheet of the *Network Region Job Aid Workbook*.

- **Name**

Usually the site or city name. (Names can be up to 20 characters.)

- **Time Zone Offset**

The time zone offset in hours measured from GMT. The drop-down list on the *Locations* sheet of the *Network Region Job Aid Workbook* allows most selections by place name.

- **Rule**

The number of the rule (0 through 15) used for daylight savings time.

- **Location Params**

For multi-national systems, the number of the *Location Parameters* form that contains the national and international access codes to be used in this location for PSTN calls. For systems that do not require multiple access codes, this is always 1.

Enter this data on the *Locations* worksheet in the *Network Region Job Aid Workbook*.

| Loc # | Location Name | Offset |      |     | Rule | Timezone   | Location Params |
|-------|---------------|--------|------|-----|------|--|-----------------|
|       |               | Sign   | Hour | Min |      |  |                 |
| 1     | New York      | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 2     | Los Angeles   | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
| 3     | Boston        | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 4     | Atlanta       | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 5     | Seattle       | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
| 6     | San Francisco | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
|       |               |        |      |     |      |  |                 |

Enter the basic data on the *Locations* worksheet of the *Network Region Job Aid Workbook*. The gray columns will fill in automatically from the Timezone selection.

The Locations entered become available in a drop-down list whenever Location is necessary on the following worksheets.



**note:** You can print a set of blank forms by clearing the workbook and then printing the workbook. The *Regions* form is landscape and has 25 rows per page. All other forms are portrait and have 50 rows per page. Photocopy the blank forms as necessary.

For each location, prepare a separate pack of sheets to hold its expanded data. You can make up packs of blank forms as necessary.



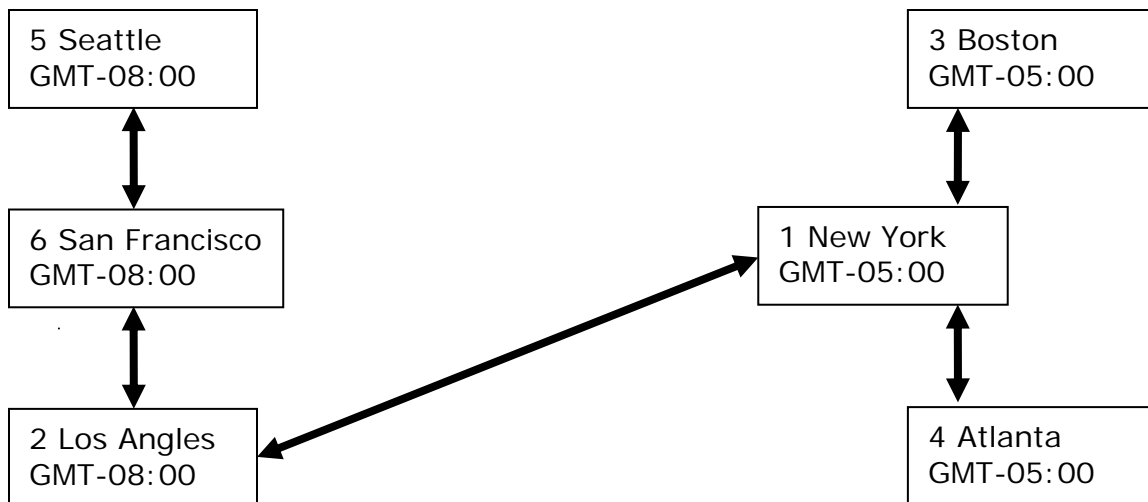
---

## Layout Locations on the Diagram

---

Layout a diagram showing each geographic location with its name, number, and time zone offset.

- The diagram doesn't have to be geographically accurate.
- There is an advantage to laying out the diagram to show the direct connections between regions.
- Count the number of locations and compare to the number of table rows.
- The main part of the diagram need show only major features of the network. Each "region" on the main diagram can have a smaller "regional" diagram with additional nearby locations. The main diagram should show the direct connections that cannot be contained within one "region."



This could also be shown as:



But it's not as useful that way because it doesn't give enough detail to make a decision.

## **Cabinets, IP Interfaces, Media Gateways, and Backup Servers**

---

On each location's expanded data sheets, show the cabinets (port networks), the primary controller (Local Survivable Processor [LSP], Avaya Media Server with Processor Ethernet [PE] enabled, or Enterprise Survivable Server [ESS]), and all media gateways and IP interfaces (C-LAN and MedPro boards).

You can use the NRW to help you get this information:

- The NRW "discovers" hardware by interrogating the Communication Manager.
- By stepping through the early parts of the NRW, you can obtain a list of Cabinets, IP Interfaces, Media Gateways, and Backup Servers that have been discovered by interrogation.

You need these lists to enter additional data and to assign equipment to regions. You can also get this information from the source forms used to configure the system through the SAT, but it's harder that way.

To use the NRW to obtain this information, follow these steps:

1. Login and proceed to the Cabinets page.
2. For each Cabinet, copy the **Cabinet Number** and **Layout** to the Cabinets worksheet of the *Network Region Job Aid Workbook*.

| <b>Cab #</b> | <b>Layout</b> | <b>Reg #</b> | <b>Region Name</b> |
|--------------|---------------|--------------|--------------------|
| 1            | Five-Carrier  |              |                    |
|              |               |              |                    |

- **Cabinet Number**  
Identifies each cabinet. This field is required.
  - **Layout**  
The arrangement of carriers. Used to identify the cabinet type.
  - **Network Region Number**  
The network region will be assigned later.
3. Proceed to the IP Interfaces page.
  4. For each IP Interface, copy the **Board Location** or **Node Name** and the **Board Type** to the *IP Interfaces* worksheet of the *Network Region Job Aid Workbook*.

---

You must have **Board Type** and at least one of **Board Location** and **Node Name** to be able to associate the network region *with a specific board*. (If you're only going to record one, use **Board Location**. Since they are sorted by **Board Location**, this will usually be easier when you enter the region later.)



**note:** If you intend to use the **Node Name** of a C-LAN board to specify a backup server, you must include the **Node Name**.

*Depending on the node-naming scheme used for the IP Interface boards, you only really need to know the count of each Board Type at each Location. When you assign them to regions, just choose the correct count of each type from the available boards. If the naming scheme for the boards prevents this, you will have to record individual boards.*

- **Board Location**

The Location, cabinet, and slot where the board is installed. If you are counting boards by type, you can specify the location without the cabinet and slot.

- **Board Type**

Indicates whether the board is a Communications LAN (C-LAN) or Media Processor (MedPro) board. This field is required.

- **Node Name**

The name assigned to the board. If you are counting boards by type, don't record this information.



**note:** If you intend to use the **Node Name** of a C-LAN board to specify a backup server, you must include the **Node Name**.

- **Network Region Number**

The network region will be assigned later.

| Bd Loc | Node Name | Type   | Reg # | Region Name |
|--------|-----------|--------|-------|-------------|
| 1      |           | C-LAN  |       |             |
| 1      |           | C-LAN  |       |             |
| 1      |           | C-LAN  |       |             |
| 1      |           | MedPro |       |             |
| 1      |           | MedPro |       |             |
| 1      |           | MedPro |       |             |
|        |           |        |       |             |

5. Proceed to the Media Gateways page.

6. For each Media Gateway, copy the **Number**, **Type**, and **Serial Number** to the *Media Gateways* worksheet of the *Network Region Job Aid Workbook*.

- **Number**

*This is the only source that associates this number with a particular Media Gateway. You must have this number if any direct connection uses CAC-BL with dynamic bandwidth limits.*

- **Type**

The equipment type as configured.

- **Name**

The name assigned to this Media Gateway. You must supply this name. All Media Gateways must be named. (You can do it later.)

- **Serial Number**

The equipment unique identifier.

- **Network Region Number**

The network region will be assigned later.

| MG # | Type | Name           | Serial # | Reg # | Region Name |
|------|------|----------------|----------|-------|-------------|
| 1    | G350 | MG New York    | 23456    |       |             |
| 2    | G350 | MG Long Island | 45678    |       |             |
| 3    | G600 | MG Los Angles  | 67891    |       |             |
|      |      |                |          |       |             |

7. Proceed to the Network Regions page.

8. Click the wrench icon next to network region 1.

The Network Region Parameters page appears.

9. Click any of the Backup Server drop-down lists.

Copy the Backup Server name (and Location number if shown) from the drop-down list to the *Backup* worksheet of the *Network Region Job Aid Workbook*. If the locations are not shown, it should be fairly easy to associate a backup server with a location either from its name, or from other data collected.



**note:** This list should contain all Local Survivable Processors [LSP], Avaya Media Servers with Processor Ethernet [PE] enabled, and Enterprise Survivable Servers [ESS].

---

| Backup Server Name | Loc # | Location Name |
|--------------------|-------|---------------|
| LSP New York       | 1     | New York      |
| LSP Los Angles     | 2     | Los Angles    |
|                    |       |               |

## Creating Network Regions

---

The *Network Region Tutorial* provides detailed information on how to partition a network into regions. The summaries provided here assume that you are already familiar with network partitioning.

### What is a Network Region?

A network region is a group of IP endpoints (IP stations, IP trunks and Avaya™ Media Gateways) that share characteristics and resources. Every IP endpoint on an Avaya Communication Manager system belongs to a network region. By default all IP endpoints are in network region 1, all share the same characteristics defined by network region 1, and all use the same resources.

In many cases this is neither sufficient nor efficient, and multiple network regions should be configured. The most common of these cases are as follows:

- One group of endpoints requires a different codec set than another group. (Different characteristics. For example, dialup versus broadband access.)
- Calls between separate groups of endpoints require a different codec set than calls within a single group of endpoints. (Bottleneck such as LAN connected by T1 to LAN – limited bandwidth.)
- Specific C-LAN or MedPro or other resources must be accessible to only a specific group of endpoints. (Priority use of resources or remote use of resources not available locally.)
- One group of endpoints requires a different UDP port range or QoS parameters than another group. (Different carrier or equipment type.)
- One group of endpoints reports to a different VoIP RTCP Monitoring Server than another group. (Local resource priority.)

Somewhat related to network regions is the concept of locations. A location is a distinct geographic place, primarily for call routing purposes. The location identifier ensures that calls access the proper PSTN trunks, based on the origin and destination of each call.

*A location often has multiple regions. A region may occasionally have multiple locations.*

Each network region consists of a group of IP endpoints with the same characteristics, and with the same Voice over IP (VoIP) and Signaling resources. The parameters that must be common within a network region include:

- Audio Parameters
  - Codec Set
  - UDP port Range
  - Enable/Disable Direct IP-IP connections (shuffling)
  - Enable/Disable Hairpinning

Default values are defined in the Custom Template.

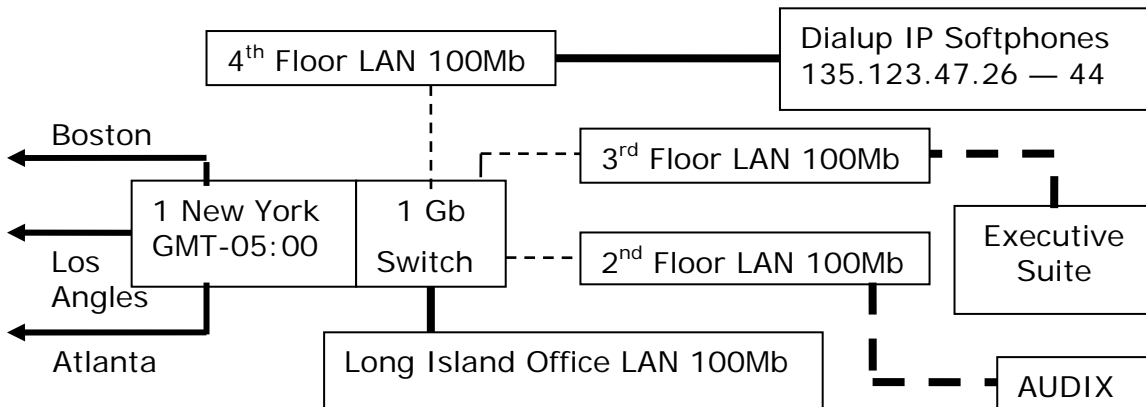
- Quality of Service Parameters:
  - Diffserv settings
  - 802.1p/Q settings
  - RTCP settings
  - RSVP settings

Default values are defined in the Custom Template.

- Other Parameters:
  - Location  
Entered through tables in the EPW-NRW.

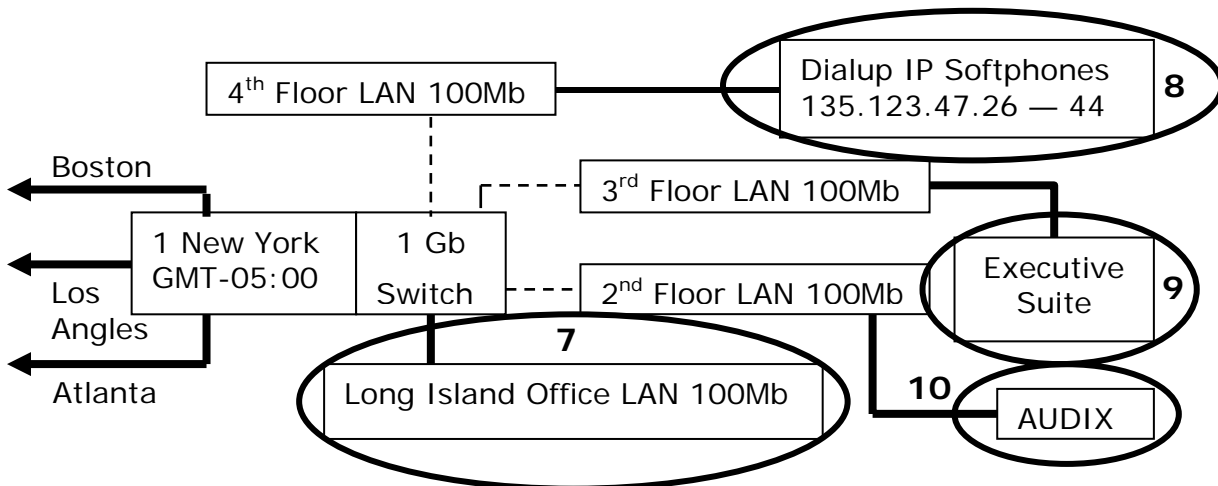
## Create Network Regions from the Network Diagram

Expand the network diagram to include “regional” details. (Use subdiagrams for each of the main “regions.”)



- Identify and add additional IP network regions as needed to partition resources (C-LAN's, etc.), and assign a number and name to each of these regions. These regions will also be associated with the locations shown in the diagram. Use the following guidelines to do this:
  - Each Audix system should have its own region (e.g., 10, NY AUDIX).
  - Each CMS should have its own region.
  - Any VPN that serves remote IP Softphones should have its own region (e.g., 8, NY Softphones).
  - Each VMM server after the first will require an extra region.

- If some endpoints require non-default UDP port ranges or QoS settings, they will require a separate region.
- Tenant systems will require at least one region per partition.
- If there is a desire to dedicate VoIP resources for certain endpoints (e.g., the "Executive Suite"), it will require a separate region (9, Executive Club).
- If there is a bottleneck caused by a low-speed connection, a separate region should be on each side (7, Long Island).



- You can add Locations for convenience. Note that only the Long Island office needs a new location.

(To skip location numbers, turn off **AutoNumber** on the *Locations* worksheet and add a location with the number you want to use next. Blank rows are inserted up to the highest number used. Location numbers can run from 1 to 250. The blank rows can be updated later if you need to use the numbers.)

| Loc # | Location Name | Offset |      |     | Rule | Timezone   | Location Params |
|-------|---------------|--------|------|-----|------|--|-----------------|
|       |               | Sign   | Hour | Min |      |  |                 |
| 1     | New York      | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 2     | Los Angeles   | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
| 3     | Boston        | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 4     | Atlanta       | -      | 05   | 00  | 1    | GMT-05:00 Eastern Time (USA & Canada), Bogota, Lima, Quito | 1               |
| 5     | Seattle       | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
| 6     | San Francisco | -      | 08   | 00  | 1    | GMT-08:00 Pacific Time (USA & Canada), Tijuana             | 1               |
|       |               |        |      |     |      |  |                 |

- If the system includes IGAR, go to the *Setup* worksheet and check the box to **Configure IGAR**. This enables the entry of optional IGAR parameters on other worksheets.
- Create locations and network regions as necessary. For each region, create or obtain the following information:

- **Region Number**

This field defines each table row. There is one row for each region (starting at 1). Once an association between a row and a region name has been made, it should never be changed because only the number is used for linking. (The name can be changed as long as it refers to the same place.) Available region numbers range from 1 to 250. )

When **AutoNumber** is checked, the **Region Number** is automatically filled in on the *Regions* sheet of the *Network Region Job Aid Workbook*.

- **Name**

A descriptive name for the region.

- **Location Number**

Select the primary location for this region from the drop down list of locations.



- 
- **Home Domain** (SIP-enabled systems only)

The domain name used for SIP signaling.

- **LDN**

The LDN (listed Directory Number) is the extension used for incoming PSTN calls used as an alternate route for inter gateway traffic. The PSTN may be used for additional capacity when bandwidth limits have been exceeded, or may be used to segment signaling on network with bearers channels on demand from the PSTN. This field is used only with IGAR.

- **Conversion Delete Digits**

To convert the LDN to a dialable number, first the specified number of digits are deleted from the beginning of the number. This field is used only with IGAR.

- **Conversion Insert Digits**

To convert the LDN to a dialable number, after any leading digits have been deleted, the specified digits are inserted at the front. An optional "+" at the front of the digit string indicates that the appropriate international or national access code is dialed before the number. For multi-national systems, the code is found using the **Location Param** form specified on the *Locations* worksheet. This field is used only with IGAR.



**note:** Conversion to a dialable number lets the system compare numbers to determine that calls were placed by IGAR rather than just an arbitrary caller. For example:

LDN: 74705

Del: 1 → 4705

Ins: +732555 → +7325554705

74705 is an IGAR call when the calling number matches one of the defined, "dialable" LDNs. 74705 does not accept any non IGAR call. 74705 will accept (and make) calls as necessary until the **Max Trunks** parameter is reached.

- **Max Trunks**

This field indicates the maximum number of trunks (calls) to be connected over the PSTN between this region and other regions. This field is used only with IGAR.

The calling number for each outgoing call is the dialable version of the LDN. The calling number for each incoming call must be the dialable version of the LDN for the calling region.

- **Backup Servers (1 – 6)**

Specify which of the configured Local Survivable Processors [LSP], Avaya Media Servers with Processor Ethernet [PE] enabled, Enterprise Survivable Servers [ESS] or Node Names (for CLAN cards) are associated with this Network Region by selecting one or more by name from the drop down lists. Use the position in the list for priority. The first-listed Backup Server has the highest priority.

- **Security Procedures (1 – 4)**

These fields indicate the Security Procedures to be used within a region in order of precedence. Select appropriate procedures from the drop-down list.

The security procedures provide a secure mechanism for IP endpoints and gatekeepers to mutually authenticate themselves and the contents of the messages they exchange.

The following security procedures are available:

- **challenge**

Uses an encryption key based on Personal Identification Number (PIN) or password to encrypt a challenge from the gatekeeper, and return the result for verification. Media stream privacy is ensured by encryption of the audio streams using a session key distributed by the gatekeeper. This mechanism is strong enough to deter the casual interloper, but is weak against a determined attacker using a brute-force search over the entire PIN space. The challenge method does not provide authentication of individual signaling messages sent or received.

Some early versions of IP telephone software or firmware may require this procedure rather than one of the stronger procedures.

- **strong**

Permits the use of any strong security profile. At present, only the **pin-eke** profile fits in this category.

---

- **pin-eke**

PIN-EKE adds Encrypted Key Exchange (EKE) to the challenge method. Using EKE results in the negotiation of a strong secret shared between the endpoint and the gatekeeper. This strong secret is used to derive a set of secrets which are used to digitally sign all RAS and call signaling messages, and to encrypt selected elements of call signaling messages. If one or the other parties does not possess the correct PIN, their computed "shared" secrets will be different, message authentication will fail, and the parties will refuse to communicate. Use of the PIN is combined with the Diffie-Hellman (D-H) key exchange in such a way that the D-H negotiation protects the PIN from guessing attacks, while the PIN protects the D-H exchange from a man-in-the-middle attack. EKE provides "perfect forward secrecy" so that a compromise of the master secret from one exchange cannot be used to attack a future (or past) secret.

- **All**

Any of the above as appropriate for the endpoint hardware and firmware.

- **none**

Some network regions may be interconnected by Application Level Gateways (ALGs) that modify signaling (for example, to translate addresses), but which cannot decrypt the messages and/or cannot reauthenticate the messages after modification. If a signaling channel passes through such an ALG, security profiles must be disabled for that inter-region path. This is permitted on a region-by-region basis.

Some endpoints may require "none." These endpoints are not equipped with the firmware necessary to authenticate with the gatekeeper.

The first field defaults to **challenge** with the remaining three fields blank.

- **Use Enhanced TTS**

Enhanced Time-to-Service separates the H.323 registration of endpoints from the establishment of TCP sockets between the server and the endpoint for call signaling messages. This has the following effects:

- Only the H.323 registration process is needed to bring an endpoint into service. H.323 registration does not require a TCP socket. The server establishes the call signaling socket when it is needed rather than when the endpoint registers.
- IP endpoints do not need to re-register for network outages that do not cause the system to failover to an Enterprise Survivable Server (ESS) or Local Survivable Processor (LSP). IP endpoints still need to re-register with Communication Manager for failovers and for resets that clear CM memory or IP endpoint memory (power cycle on the endpoint).

Without enhanced TTS, whenever the TCP sockets are dropped, the IP endpoints always need to re-register, and they always reestablish the TCP socket at the same time.

Enhanced TTS drastically reduces the number of times that an IP endpoint needs to re-register. It also drastically reduces the network load when multiple IP endpoints attempt to re-register at the same time because the TCP sockets are established when needed, rather than at re-registration.

When using enhanced TTS in a region, the following conditions apply:

- Only call servers in the region that are running CM 4.0 or later will *use* enhanced TTS. Enabling the feature without updating CM will show only limited improvement.
- Only IP endpoints in the region that have compatible firmware or software will *use* enhanced TTS. Enabling the feature without updating the endpoint firmware or software will show only limited improvement.
- With server-based NAT or firewall environments, the firewalls must be configured to allow TCP connections from the server to the endpoints. (Formerly, the TCP connections were from the endpoint to the server.)
- There are a very small number of cases where a proxy server or another security device is being used in a non-supported configuration such that CM cannot open the TCP socket. In those cases, disable the feature (per network region) and the old methodology will still apply.

**Use Enhanced TTS** defaults to "Y" for new regions. For existing regions (in files saved before release 4.0), **Use Enhanced TTS** defaults to "N" so that the firewall and proxy conditions can be addressed before attempting to use the feature.

**Min Port** and **Max Port** specify a range of ports for TCP connections. A fixed range simplifies the administration of firewalls. The valid range for the ports is 1024 to 65535. The difference between the minimum and the maximum should be at least 5. The default minimum port is 61440 (0xf000) and the default maximum port is 61444 (0xf004).

Enter this data on the *Regions* sheet in the *Network Region Job Aid Workbook*.

| Reg # | Name           | Loc # | Location Name | Home Domain | LDN   | Del | Insert  | Max Trunk |
|-------|----------------|-------|---------------|-------------|-------|-----|---------|-----------|
| 1     | New York       | 1     | New York      |             | 74705 | 1   | +732555 | 4         |
| 2     | Los Angeles    | 2     | Los Angeles   |             |       |     |         |           |
| 3     | Boston         | 3     | Boston        |             |       |     |         |           |
| 4     | Atlanta        | 4     | Atlanta       |             |       |     |         |           |
| 5     | Seattle        | 5     | Seattle       |             |       |     |         |           |
| 6     | San Francisco  | 6     | San Francisco |             |       |     |         |           |
| 7     | Long Island    | 7     | Long Island   |             |       |     |         |           |
| 8     | NY Softphones  | 1     | New York      |             |       |     |         |           |
| 9     | Executive Club | 1     | New York      |             |       |     |         |           |
| 10    | NY Audix       | 1     | New York      |             |       |     |         |           |
|       |                |       |               |             |       |     |         |           |

| Backup Servers in Priority Order |   |   |   |   |   | Security Procedures |   |   |   | Enh TTS | Min Port | Max Port |
|----------------------------------|---|---|---|---|---|---------------------|---|---|---|---------|----------|----------|
| 1                                | 2 | 3 | 4 | 5 | 6 | 1                   | 2 | 3 | 4 |         |          |          |
| LSP New York                     |   |   |   |   |   | Challenge           |   |   |   | Y       | 16440    | 16444    |
| LSP Los Angeles                  |   |   |   |   |   | Challenge           |   |   |   | N       | 16440    | 16444    |

- Identify any special requirements for Codec Sets within regions that might require splitting one region into multiple regions:

Create the necessary regions and enter this data on the *Regions* sheet in the *Network Region Job Aid Workbook*.

- If any regions require different codec sets, be sure to update the Custom Template.

## Assign Equipment to Regions

---

After the regions have been created and entered on the *Regions* sheet in the *Network Region Job Aid Workbook*, equipment can be assigned to the regions.

- Go back to the *Cabinets* sheet in the *Network Region Job Aid Workbook* and fill in the **Region** to which each port network is assigned.

| Cab # | Layout       | Reg # | Region Name |
|-------|--------------|-------|-------------|
| 1     | Five-Carrier | 1     | New York    |
| 2     | Five-Carrier | 2     | Los Angeles |
|       |              |       |             |

- Go back to the *IP Interfaces* sheet in the *Network Region Job Aid Workbook* and fill in the **Region** to which each board is assigned.

| Bd Loc | Node Name | Type   | Reg # | Region Name    |
|--------|-----------|--------|-------|----------------|
| 1      |           | C-LAN  | 9     | Executive Club |
| 1      |           | C-LAN  | 1     | New York       |
| 1      |           | C-LAN  | 1     | New York       |
| 1      |           | MedPro | 9     | Executive Club |
| 1      |           | MedPro | 1     | New York       |
| 1      |           | MedPro | 1     | New York       |
|        |           |        |       |                |

- Go back to the *Media Gateways* sheet in the *Network Region Job Aid Workbook* and fill in the **Region** to which each MG is assigned.

| MG # | Type | Name           | Serial # | Reg # | Region Name |
|------|------|----------------|----------|-------|-------------|
| 1    | G350 | MG New York    | 23456    | 1     | New York    |
| 2    | G350 | MG Long Island | 45678    | 7     | Long Island |
| 3    | G600 | MG Los Angles  | 67891    | 2     | Los Angles  |
|      |      |                |          |       |             |

- Identify groups of IP stations and assign them to regions.

While this is not a mandatory task – CM assigns IP stations automatically to the regions of the IP Interfaces or media gateways (MGs) with which they register – it is highly recommended to assign IP stations explicitly to control resource utilization and to ensure that IP Phones assume the correct routing and time-of-day properties for their geographic location)

---

Specify each group by starting (or only) and ending IP address and assign it to a specific Region.

Enter this data on the *IP Ranges* sheet in the *Network Region Job Aid Workbook*.

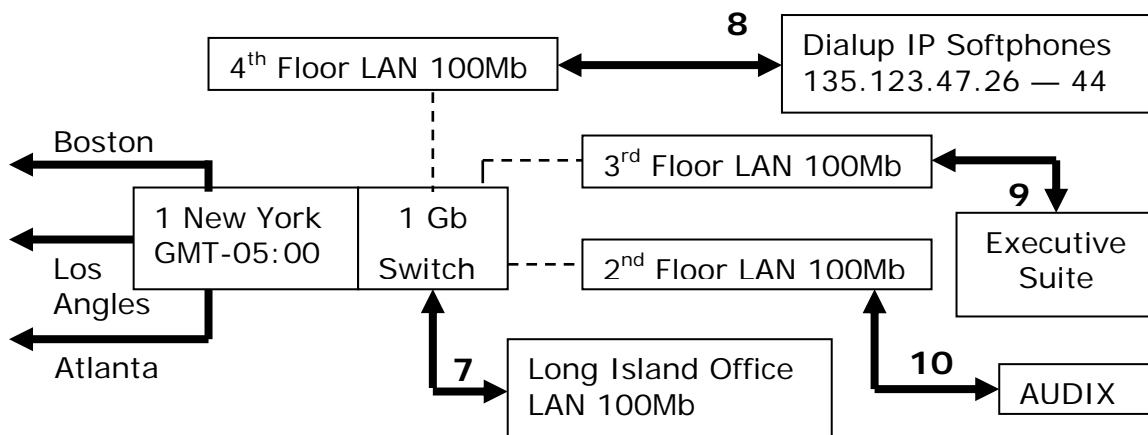
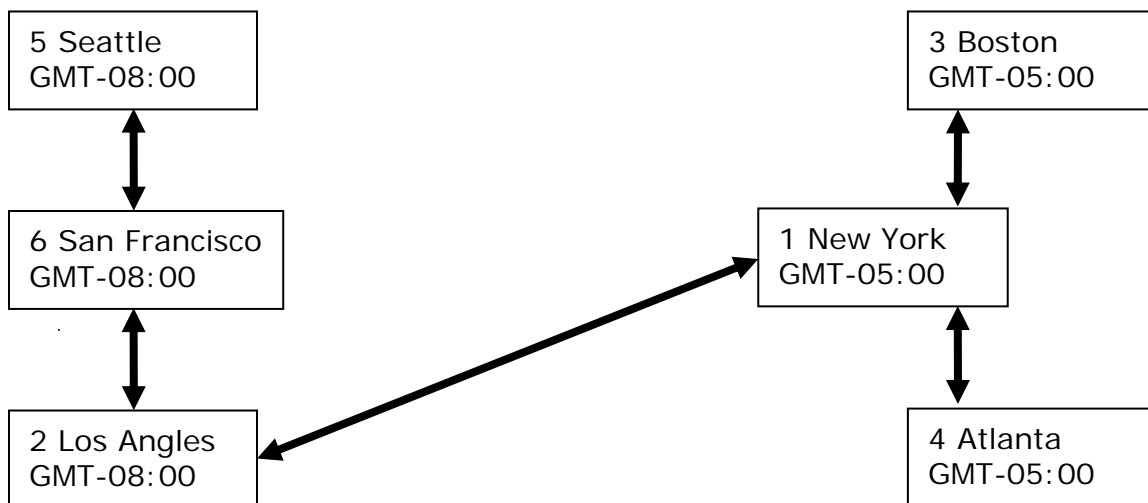
| <b>Start IP Addr</b> | <b>End IP Addr</b> | <b>Reg #</b> | <b>Region Name</b> |
|----------------------|--------------------|--------------|--------------------|
| 135.123.47.26        | 135.123.47.44      | 8            | NY Softphones      |
|                      |                    |              |                    |

## Connections Between Regions

On the Network Diagram, show all IP LAN and IP WAN connections between regions including:

- Primary controller (Communications Manager) and Media Gateways or IP Interfaces
- Media Gateways or IP Interfaces and other Media Gateways or IP Interfaces
- Any groups of IP endpoints that are connected to Media Gateways or IP Interfaces in other locations
- Any groups of dialup IP endpoints (different codecs are required).
- Any groups of privileged endpoints (executive groupings).

On the diagram that follows, direct connections between regions are shown as heavy lines with arrows on both ends. These are **not** physical trunks. They are **defined pathways between regions for the purpose of defining network priority (limiting traffic and reserving high-priority bandwidth) and for the purpose of routing calls.**



These are the pathways used for routing calls and for bandwidth restriction.



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## IGAR Considerations

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You can use IGAR in several ways:

- for overflow to the PSTN when IP bandwidth or resource limitations prevent call placement inside the network. In this case, specify CAC Bandwidth Limits for direct links and also specify **IGAR** as Yes.
- for direct communications between regions in place of multi-hop routing over the network when IP bandwidth or resource limitations prevent call placement completely inside the network. In this case, specify IGAR as Yes for indirect (multi-hop) links.
- for on-demand use of the PSTN for all calls while retaining signaling inside the network. In this case, specify **Codec Set** as PSTN for all direct links. **IGAR** will be set to Forced.
- For backup of the network on the PSTN. In this case, specify **Codec Set** as 1-7 and **IGAR** as Yes.

---

## Direct Connections

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For each direct connection between regions, get the following information (as engineered, then check it as implemented):

- **Codec Set**

When the **Codec Set** is "PSTN," **IGAR** is set to "Forced" and the CAC Bandwidth Limitations are not applicable (since the call travels on the PSTN).

When the **Codec Set** is 1-7, CAC Bandwidth Limitations apply, and IGAR may be either "No" (not used) or "Yes" (used for overflow).



**note:** Double-clicking on the **Codec Set** column heading when it appears in the NRW on the *Network Region Parameters* screen or Indirect Connections screen displays the current codec sets in a pop-up window.

- **IGAR**

When the **Codec Set** is "PSTN," **IGAR** is set to "Forced" and the CAC Bandwidth Limitations are not applicable (since the call travels on the PSTN).

When the **Codec Set** is 1-7, CAC Bandwidth Limitations apply, and IGAR may be either "No" (not used) or "Yes" (used for overflow).

- CAC Bandwidth **Limit Type**

Indicates whether Call Acceptance Control with Bandwidth Limits (CAC/BL) applies to this trunk. Select **Limit Type** from the drop down list and enter **Limit Value** or **Dynamic CAC Gateway** as appropriate for the **Limit Type** selected.

When the **Codec Set** is "PSTN," the CAC Bandwidth Limitations are not applicable (since the call travels on the PSTN).



**note:** Since the bandwidth limit is by direct connection, the single bandwidth limitation applies to the combined audio and video traffic.

- **Calls, Kbits, Mbits**

**Limit Value** indicates maximum bandwidth in the specified units.

- **Dynamic**

The maximum bandwidth will be determined dynamically based on network load algorithms in media gateways that have this capability. (Drop-down list.)

- **No Limit**

- CAC Bandwidth **Limit Value**

The number of calls, Kbits, or Mbits to establish the limit.

- **Dynamic CAC Gateway**

This number is assigned by Communication Manager. Only Media Gateways with this capability are included in the drop-down list. (Currently G350 only.)

Enter this data on the *Direct Connections* sheet in the *Network Region Job Aid Workbook*.

Enter each direct connection only once with the lower numbered region first (in the **Source Region** field) and the higher numbered region last (in the **Destination Region** field).

| Source Region |            | Destination Region |                | Codec Set | CAC Limit |       | Dyn CAC Gateway | IGAR |
|---------------|------------|--------------------|----------------|-----------|-----------|-------|-----------------|------|
| #             | Name       | #                  | Name           |           | Type      | Value |                 |      |
| 1             | New York   | 2                  | Los Angles     | 2         | Calls     | 100   |                 | No   |
| 1             | New York   | 3                  | Boston         | 2         | Calls     | 25    |                 | Yes  |
| 1             | New York   | 4                  | Atlanta        | 2         | Calls     | 25    |                 | Yes  |
| 1             | New York   | 7                  | Long Island    | 2         | Calls     | 25    |                 | Yes  |
| 1             | New York   | 8                  | NY Softphones  | 2         | Calls     | 25    |                 | Yes  |
| 1             | New York   | 9                  | Executive Club | 1         | Unlimited |       |                 | No   |
| 1             | New York   | 10                 | AUDIX          | 1         | Unlimited |       |                 | No   |
| 2             | Los Angles | 6                  | San Francisco  | 2         | Calls     | 25    |                 | Yes  |
| 5             | Seattle    | 6                  | San Francisco  | 2         | Calls     | 25    |                 | Yes  |
|               |            |                    |                |           |           |       |                 |      |

---

## Indirect Connections

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Indirect connections do not need to be entered into the NRW Job Aid Worksheet except for direct communications between regions in place of multi-hop routing over the network when IP bandwidth or resource limitations prevent call placement completely inside the network. In this case, specify **IGAR** as Yes for indirect (multi-hop) links. (Without this specification, a call may be placed partially inside the network with PSTN used for another part of the call.)

Enter this data on the *Indirect Connections* sheet in the *Network Region Job Aid Workbook*.

Enter each indirect connection only once with the lower numbered region first (in the **Source Region** field) and the higher numbered region last (in the **Destination Region** field).

| Source Region |             | Destination Region |         | Codec Set | IGAR |
|---------------|-------------|--------------------|---------|-----------|------|
| #             | Name        | #                  | Name    |           |      |
| 2             | Los Angeles | 3                  | Boston  | 2         | Yes  |
| 3             | Boston      | 4                  | Atlanta | 2         | Yes  |
|               |             |                    |         |           |      |



**note:** Double-clicking on the **Codec Set** column heading when it appears in the NRW on the *Network Region Parameters* screen or *Indirect Connections* screen displays the current codec sets in a pop-up window.

## Limits & RTCP Monitor Servers

---

- Assign a server IP address, port number and RTCP reporting period for the default VoIP Monitoring Manager [*system-parameters ip-options*]
  - If there is more than one RTCP Monitor Server, the IP address, port number and RTCP reporting period for *each* server must be specified in the Custom Template.
  - If there is exactly one RTCP Monitor Server, enter this data in the *Limits & RTCP* sheet of the *Network Region Job Aid Workbook*.
- Count:
  - The number of RTCP Monitor Servers (None, One, Multiple).  
See above.
  - The number of locations.  
Compare to the number shown on the *Limits & RTCP* sheet of the *Network Region Job Aid Workbook*. The count should be equal to the highest location number used.
  - The number of regions.  
Compare to the number shown on the *Limits & RTCP* sheet of the *Network Region Job Aid Workbook*. The count should be equal to the highest region number used.

---

## Using the EPW and the NRW

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For the Custom Template (CT-NRW):

- Determine if custom codecs are required.
  - Do any regions require A-law encoding?
  - Do any regions require media encryption?

Define custom codecs in the [Custom Template](#).

- Determine if the preferred values for miscellaneous system IP options [*system-parameters ip-options*] are the same as the defaults. If not, define custom values in the [Custom Template](#).
- If there is more than one RTCP Monitor Server, the IP address, port number and RTCP reporting period for *each* server must be specified in the Custom Template.

For the EPW-NRW:

- Copy the six data fields from the *Limits & RTCP* worksheet of the *Network Region Job Aid Workbook* to the *NRW Limits* worksheet of the *EPW-NRW* workbook.
- Copy the data from the *Locations* worksheet of the *Network Region Job Aid Workbook* to the *Locations* worksheet of the *EPW-NRW* workbook. If you export data from the *Network Region Job Aid Workbook*, you can double-click file <projectname>.Locations.csv to get just the necessary columns in a separate worksheet.
- Copy the data from the *Regions* worksheet of the *Network Region Job Aid Workbook* to the *Network Regions* worksheet of the *EPW-NRW* workbook. If you export data from the *Network Region Job Aid Workbook*, you can double-click file <projectname>.Regions.csv to get just the necessary columns in a separate worksheet.



**note:** There is a format change in the *EPW-NRW* at Release 4.0. The *Network Region Job Aid Workbook* Release 4.0 or later must be used to get this data in the new format.

For the Network Region Wizard (NRW):

- Import the Custom Template and the EPW-NRW as necessary.
- Enter the data from the *Cabinets*, *IP Interfaces*, *Media Gateways*, *Backup*, *Direct Connections*, *Indirect Connections*, and *IP Network Maps* worksheets of the *Network Region Job Aid Workbook* when the data is requested.
- The NRW will lead you through multi-hop routing as necessary to get unambiguous routing between all regions.

# Index

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|   |                     |
|---|---------------------|
| <b>8</b>  |                     |
| 802.1P.Q Parameters .....                                       | 19                  |
| <b>A</b>  |                     |
| <b>Administration Overview</b> .....                            | 8                   |
| <b>Assign Equipment to Regions</b> .....                        | 38                  |
| Audio 802.1p Priority   |                     |
| Default Value.....  | 19                  |
| <b>Audio Parameters</b> .....                                   | 19                  |
| Audio PHB Value   |                     |
| Default Value.....  | 19                  |
| Audio Resource Reservation Parameters ..                        | 19                  |
| AutoNumber  |                     |
| Locations Worksheet.....  | 23                  |
| <b>B</b>  |                     |
| Best Processes .....  | 10                  |
| Board Location.....   | 27                  |
| Board Type .....  | 27                  |
| <b>C</b>  |                     |
| Cabinet Number.....   | 26                  |
| <b>Cabinets</b> .....   | 26                  |
| Cabinets Worksheet.....   | 26, 38              |
| CAC-BL..... See Call Acceptance Control via<br>Bandwidth Limits |                     |
| Call Acceptance Control via Bandwidth<br>Limits.....            | 9                   |
| Call Control 802.1p Priority Default Value..                    | 19                  |
| Call Control PHB Value  |                     |
| Default Value.....  | 19                  |
| C-LAN.....  | 9                   |
| Codec Set.....  | 7                   |
| Assignment .....  | 9                   |
| Default Values.....   | 15, 19              |
| Direct Connections Worksheet .....                              | 41                  |
| Indirect Connections Worksheet.....                             | 43                  |
| Specification .....   | 9                   |
| Codec Set 7 .....   | 16                  |
| Configure IGAR.....   | 32                  |
| Conversion Delete Digits  |                     |
| Network Regions Worksheet.....                                  | 33                  |
| Conversion Insert Digits  |                     |
| Network Regions Worksheet.....                                  | 33                  |
| Conversion to Dialable Number .....                             | 33                  |
| <b>Creating Network Regions</b> .....                           | 29, 30              |
| CT-NRW .....  | See Custom Template |
| Custom Template.....  | 7, 13, 15           |
| <b>Using</b> .....  | 45                  |
| <b>D</b>  |                     |
| Daylight Savings Rule.....                                      | 23                  |
| Diffserv/TOS Parameters .....                                   | 19                  |
| <b>Direct Connections Worksheet</b> .....                       | 41                  |
| Dynamic CAC Gateway   |                     |
| Direct Connections Worksheet .....                              | 42                  |
| <b>E</b>  |                     |
| Electronic Pre-Installation Workbook .....                      | 7                   |
| Electronic Pre-Installation Worksheet .....                     | 13                  |
| <b>Using</b> .....  | 45                  |
| <b>Electronic Worksheets and Templates</b> ..                   | 13                  |
| Enable Multi-Nationals .....                                    | 22                  |
| Enhanced TTS.....   | 35                  |
| EPW-NRW.... See Electronic Pre-Installation<br>Workbook         |                     |
| <b>Equipment</b>  |                     |
| <b>Assign to Region</b> .....                                   | 38                  |
| <b>H</b>  |                     |
| Home Domain   |                     |
| Network Regions Worksheet.....                                  | 33                  |
| <b>I</b>  |                     |
| IGAR... See Inter Gateway Alternate Routing                     |                     |
| Direct Connections Worksheet .....                              | 41                  |
| Indirect Connections Worksheet.....                             | 43                  |
| <b>IGAR Considerations</b>                                      |                     |
| <b>Regions</b> .....  | 41                  |
| <b>Indirect Connections Worksheet</b> .....                     | 43                  |
| <b>Installation Overview</b> .....                              | 7                   |
| Installation Steps.....   | 21                  |
| <b>Installation Tasks</b> .....                                 | 21                  |
| Inter Gateway Alternate Routing .....                           | 7, 9                |
| Inter-Region .....  | 19                  |
| Intra-Region IP-IP Direct Audio                                 |                     |
| Default Value.....  | 19                  |
| Intra-Region Parameters   |                     |
| Default Values .....  | 19                  |
| <b>Introduction</b> .....                                       | 7                   |
| IP26  |                     |
| IP Audio Hairpinning  |                     |
| Default Value.....  | 19                  |
| <b>IP Interfaces</b> .....                                      | 26                  |
| IP Interfaces Worksheet.....                                    | 38                  |
| IP Ranges Worksheet .....                                       | 38                  |

|  |        |
|--|--------|
| <b>L</b>                               |        |
| LAN.....                               | 9      |
| Layout (Cabinet) .....                 | 26     |
| LDN                                    |        |
| Conversion .....                       | 33     |
| Network Regions Worksheet.....         | 33     |
| Limit Type                             |        |
| Direct Connections Worksheet .....     | 41     |
| Limit Value                            |        |
| Direct Connections Worksheet .....     | 42     |
| Limits & RTCP Worksheet .....          | 44     |
| Copy to NRW .....                      | 13     |
| Location Name.....                     | 23     |
| Location Number.....                   | 23     |
| Network Regions Worksheet.....         | 32     |
| Location Params .....                  | 22, 23 |
| <b>Locations</b>                       |        |
| <b>Mapping</b> .....                   | 25     |
| Locations Worksheet .....              | 23     |
| Copy to NRW .....                      | 14     |
| <b>LSP</b>                             |        |
| <b>Network Regions Worksheet</b> ..... | 34     |
| LSP Drop-Down List .....               | 28     |
| LSP Location.....                      | 28     |
| LSP Name .....                         | 28     |
| <b>LSPs</b> .....                      | 26     |
| <b>M</b>                               |        |
| <b>Macro Problems</b>                  |        |
| <b>Troubleshooting</b> .....           | 11     |
| <b>Maintenance Overview</b> .....      | 8      |
| <b>Mapping Locations</b> .....         | 25     |
| Max Port                               |        |
| Network Regions Worksheet.....         | 37     |
| Max Trunks                             |        |
| Network Regions Worksheet.....         | 33     |
| Media Gateway.....                     | 9      |
| <b>Media Gateways</b> .....            | 26     |
| Worksheet.....                         | 27     |
| Media Gateways Worksheet .....         | 38     |
| MedPro Cards.....                      | 9      |
| Min Port                               |        |
| Network Regions Worksheet .....        | 37     |
| <b>N</b>                               |        |
| Name                                   |        |
| Media Gateway .....                    | 28     |
| <b>Network Map</b>                     |        |
| <b>Creating</b> .....                  | 22     |
| Network Region                         |        |
| <b>Definition</b> .....                | 29     |
| Resources .....                        | 9      |
| Network Region Job Aid.....            | 7, 13  |
| Using.....                             | 10     |
| <b>Workbook</b> .....                  | 13     |

|   |                              |
|---|------------------------------|
| Network Region Number                       |                              |
| Cabinets Worksheet .....                    | 26                           |
| IP Interfaces Worksheet .....               | 27                           |
| Media Gateway Worksheet .....               | 28                           |
| Network Region Wizard .....                 | 7, 8, 13                     |
| <b>Overview</b> .....                       | 9                            |
| <b>Using</b> .....                          | 45                           |
| Network Regions.....                        |                              |
| <b>Creating</b> .....                       | 29, 30                       |
| Criteria.....                               | 29                           |
| Worksheet .....                             | 28                           |
| Node Name.....                              | 27                           |
| NRW .....                                   | See Network Region Wizard    |
| Number                                      |                              |
| Media Gateway .....                         | 28                           |
| <b>O</b>                                    |                              |
| <b>Overview</b>                             |                              |
| <b>Administration</b> .....                 | 8                            |
| <b>Installation</b> .....                   | 7                            |
| <b>Maintenance</b> .....                    | 8                            |
| <b>Network Region Wizard</b> .....          | 9                            |
| <b>P</b>                                    |                              |
| <b>Parameters</b>                           |                              |
| 802.1P.Q .....                              | 19                           |
| <b>Audio</b> .....                          | 19                           |
| Audio Resource Reservation Parameters ..... | 19                           |
| Diffserv/TOS.....                           | 19                           |
| RTCP Monitoring.....                        | 19                           |
| Shuffling .....                             | 19                           |
| Partitioning Networks .....                 | 7                            |
| Print                                       |                              |
| Blank Forms .....                           | 24                           |
| Prowler Cards .....                         | 9                            |
| PSTN .....                                  | See Public Service Telephone |
| Network                                     |                              |
| Public Service Telephone Network .....      | 7                            |
| <b>R</b>                                    |                              |
| Region Name                                 |                              |
| Network Regions Worksheet .....             | 32                           |
| Region Number                               |                              |
| Network Regions Worksheet.....              | 32                           |
| Regions                                     |                              |
| <b>Assign Equipment</b> .....               | 38                           |
| <b>Connections</b> .....                    | 40                           |
| <b>Direct Connections</b> .....             | 41                           |
| <b>IGAR Considerations</b> .....            | 41                           |
| Partitioning Networks.....                  | 7                            |
| Regions Worksheet                           |                              |
| Copy to NRW .....                           | 14                           |
| Retry upon RSVP Failure Enabled             |                              |
| Default Value.....                          | 19                           |
| RSVP Enabled                                |                              |



---

|                                   |        |   |    |
|-----------------------------------|--------|---|----|
| Default Value.....                | 19     |   |    |
| RSVP Profile                      |        |   |    |
| Default Value.....                | 19     |   |    |
| RSVP Refresh Rate                 |        |   |    |
| Default Value.....                | 19     |   |    |
| RSVP Unreserved (BBE) PHB Value   |        |   |    |
| Default Value.....                | 19     |   |    |
| <b>RTCP Monitor Servers</b> ..... | 44     |   |    |
| RTCP Monitoring Parameters .....  | 19     |   |    |
| RTCP Recording Enabled            |        |   |    |
| Default Value.....                | 19     |   |    |
| <b>S</b>                          |        |   |    |
| Scaling.....                      | 10     |   |    |
| Serial Number                     |        |   |    |
| Media Gateway .....               | 28     |   |    |
| <b>Setup</b> .....                | 22, 32 |   |    |
| Shuffling Parameters .....        | 19     |   |    |
|                                   |        | <b>T</b>                                    |    |
|                                   |        | Templates .....                             | 10 |
|                                   |        | Time Zone Offset .....                      | 23 |
|                                   |        | <b>Troubleshooting Macro Problems</b> ..... | 11 |
|                                   |        | TTS.....                                    | 35 |
|                                   |        | Type  |    |
|                                   |        | Media Gateway .....                         | 28 |
|                                   |        | <b>U</b>                                    |    |
|                                   |        | UDP Port Max                                |    |
|                                   |        | Default Values .....                        | 19 |
|                                   |        | UDP Port Min                                |    |
|                                   |        | Default Values .....                        | 19 |
|                                   |        | Upgrade Notice .....                        | 7  |
|                                   |        | Use Default Server Parameters               |    |
|                                   |        | Default Value.....                          | 19 |
|                                   |        | Use Enhanced TTS                            |    |
|                                   |        | Network Regions Worksheet .....             | 35 |
|                                   |        | <b>V</b>                                    |    |
|                                   |        | VoIP Resources .....                        | 9  |
|                                   |        | <b>W</b>                                    |    |
|                                   |        | WAN .....                                   | 9  |