

Enterprise Branch Gateway, EBG

OPERATIONAL DIRECTIONS



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1 GENERAL

1.1 CAPACITY AND LIMITATIONS

Note: The Enterprise Branch Gateway (EBG) or Integrated Trunk Gateway (ITG) are not for new sales, but only included in migrated solutions from ASB 501 04 to MX-ONE.

Depending on the hardware capacity of the EBG 8, 16, or 32 simultaneous gateway calls can be made.

A maximum number of 128 extensions can be registered to one EBG. However, it is not recommended in heavy call usage scenarios (for example, greater than 0.25 erlang per user) to register more than 95 users to one EBG.

The ITG allows a maximum traffic capacity of 32 simultaneous VoIP gateway calls.

A maximum number of 20 EBG and ITG systems can be included in one EBG/ITG cluster, if more systems are needed, they must be networked together.

1.2 GLOSSARY

For a complete list of abbreviations and a glossary, see the description for *ACRONYMS, ABBREVIATIONS AND GLOSSARY*.

2

PREREQUISITES

2.1

SITE SURVEY

It is very important that the IP network infrastructure and traffic should be analyzed prior to installation and a proper Quality of Service (QoS) mechanism should be implemented to ensure high voice quality when connecting MX-ONE systems via an IP network.

Therefore, a site survey should be done to ensure that all parties agree on the required actions needed to run high quality Voice over IP (VoIP) in the customer's Local Area Network (LAN) and Wide Area Network (WAN) environment. This includes any Virtual Private Network (VPN) service from an ISP, where IP telephony traffic is to be transported between sites.

2.2

QUALITY OF SERVICE REQUIREMENTS

When introducing EBGs for MX-ONE systems via an IP network, it is necessary to ensure that the LAN and WAN are suitable for handling both the traffic volume, as well as, the highest IP quality Type of Service (ToS).

The best option for achieving the highest QoS and security between MX-ONE systems networked via an EBG is when a customer's LAN and WAN are set up for Layer 3 ToS (Type of Service) prioritization and/or Layer 2 Class of Service (CoS) in accordance with IEEE 802.1Q, and the appropriate bandwidth has been allocated to handle both Voice and Data. This applies for VPN services provided via an ISP. Whatever Layer 2 ToS/Diffserv values are used in the customer environment must be honored in the ISP VPN network as well. It is highly recommended to obtain a Service Level Agreement from the service provider with guarantees on latency and jitter, when using a VPN connection for IP telephony traffic.

3 AIDS

3.1 TOOLS

To be able install an EBG the following equipment is necessary:

- PC with installed Net Manager SW
- LAN connection.

3.2 DOCUMENTS

The following documents are included in the EBG (WebSwitch) Media Kit.

- Quick installation guide, EN/LZT 108 4637.
- Net Manager Administrator Guide, EN/LZT 108 3607.
- SNMP Administrator Guide, EN/LZT 108 5507.

4

PROCEDURES

4.1

INSTALLATION CONSIDERATION

It is assumed that the MX-ONE Version 4.0 is running. It is also assumed that the appropriate IPLU board or boards are present in the MX-ONE and that the IP extension and IP networking licenses are installed.

In the Branch office, it is assumed that the necessary DBC 42x IP phones and ECC PC clients are installed and set up to communicate towards the central site MX-ONE. If survivability is the only requirement, then the EBG is the only necessary component. The Branch office must be equipped with one EBG. However, if local hop-off / local presence is required then, the MX-ONE must also be equipped with the IPLU board with the appropriate IP Networking port licenses, which are set up with routes and destination codes for access to and from the EBGs.

The EBGs used for survivability and local hop-off must be running with WebSwitch V3.1.3 (v3.1 SP3) software or higher. It is also assumed that the systems have the appropriate Voice Processing Module (VPM) channels and the EBG is equipped with at least one E1, BRI or Analog trunk connection to the public network.

It is assumed that the IPLU boards are properly set up and connected to the IP network. The EBG should be rack mounted in the branch office and the BRI or PRI cables connected to the Network Termination (NT) from the local PSTN. A supplied serial cable should then be plugged into the front serial port so as to set up the IP address, time/date and optional password via a Hyper-terminal connection. Once this is done, the system shall be restarted via the reset command and connected to a LAN switch cable via the supplied RJ45 cable. Once the system is restarted, the EBGs should be accessible via telnet and Net Manager from Dynamic Network Administration (D.N.A.) and Extension Manager (EMG) toolbox for configuration purposes.

If Channel Associated Signaling (CAS) extension operation is required, ensure that the ITG is inserted and active in the MX-ONE. It is expected that the Hyper-terminal configuration operation as stated above for the EBG is also done with the ITG. The appropriate TLU76/3 board(s) should also be present in the MX-ONE and the recommended cable is inserted between the TLU76/3 connector and the ITG E1 connector.

For additional information regarding the ITG, see the installation instructions for *IP GATEWAY WITH ITG*.

For additional information regarding IP Networking, see the installation instructions for *IP NETWORKING*.

4.2

EBG CONFIGURATION USING NET MANAGER FOR V3.1.6 OR HIGHER

For simplicity, first set up the EBG as a survivability node without taking into consideration the Local hop-off issue. The delta in the configuration for local hop-off is minor as it only requires routing and destination code tables to be added, see 4.3 EBG Route and Destination code table configuration with MX-ONE on page 19.

From a pure configuration perspective in Net Manager, the EBG corresponds to a WebSwitch 2000 M2. Therefore, to add one to the NetManager configuration, right click on the WebSwitches main tab and choose *Add a WebSwitch* . Then in the general tab choose WebSwitch M2 as the model name.

4.2.1

SET UP PSTN BOARDS AND VPMS

After adding the EBG in the main icon tree, the ISDN board must be defined in the appropriate slot as an E1-ISDN-30 or ISDN BRI-8 interface in the specific WebSwitch (EBG) Hardware tab as shown below.

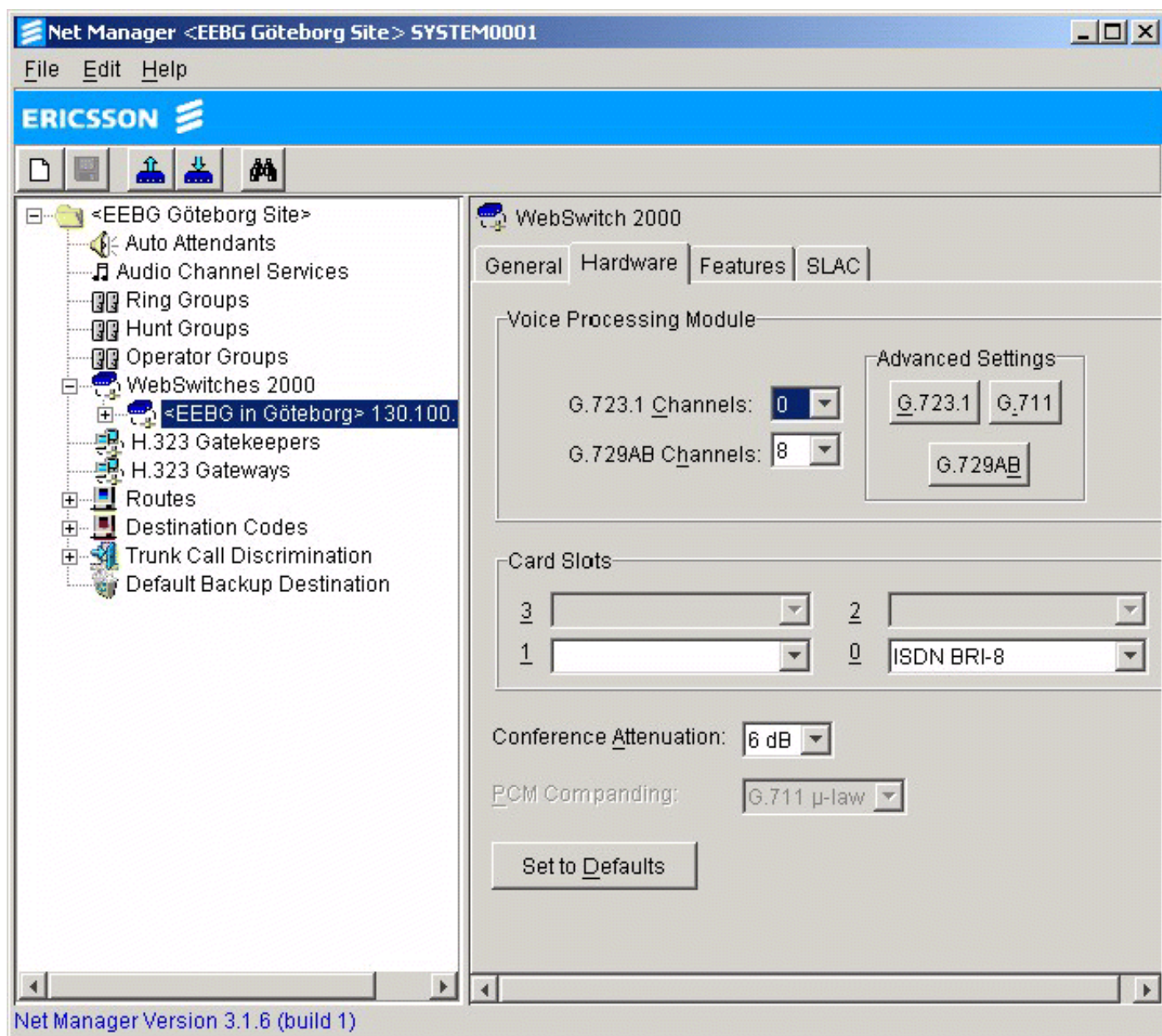


Figure 1: EBG PRI hardware setup

Also, in this tab it must be defined the number of VPM channels for each G.729 or G.723.1 codec type intended to be used with the IP terminals. G.711 will automatically be available when either of the other two are set up. Besides G.711, both G.729 and G.723.1 may be used with IP terminals. The total sum of the G.729 and G.723.1 channels should correspond to the available physical VPM channels delivered in the EBG. Codec order selection will be addressed in the H.323 extension section later in this section. Note that these VPMs may also be used for intra EBG and ITG traffic (G.729 and G.711).

Note: These VPMs may also be used for intra EBG traffic (G.729 and G.711).

4.2.2

CREATING ROUTES

As with previous releases, Route tables have to be set up in the Routes Icon, with corresponding routes for trunks to the public network as shown in the example below. In addition, destination code tables must be set up as the routes are only used as place markers for physical trunks. For survivability mode, route 0 can be used for accessing the local public network.

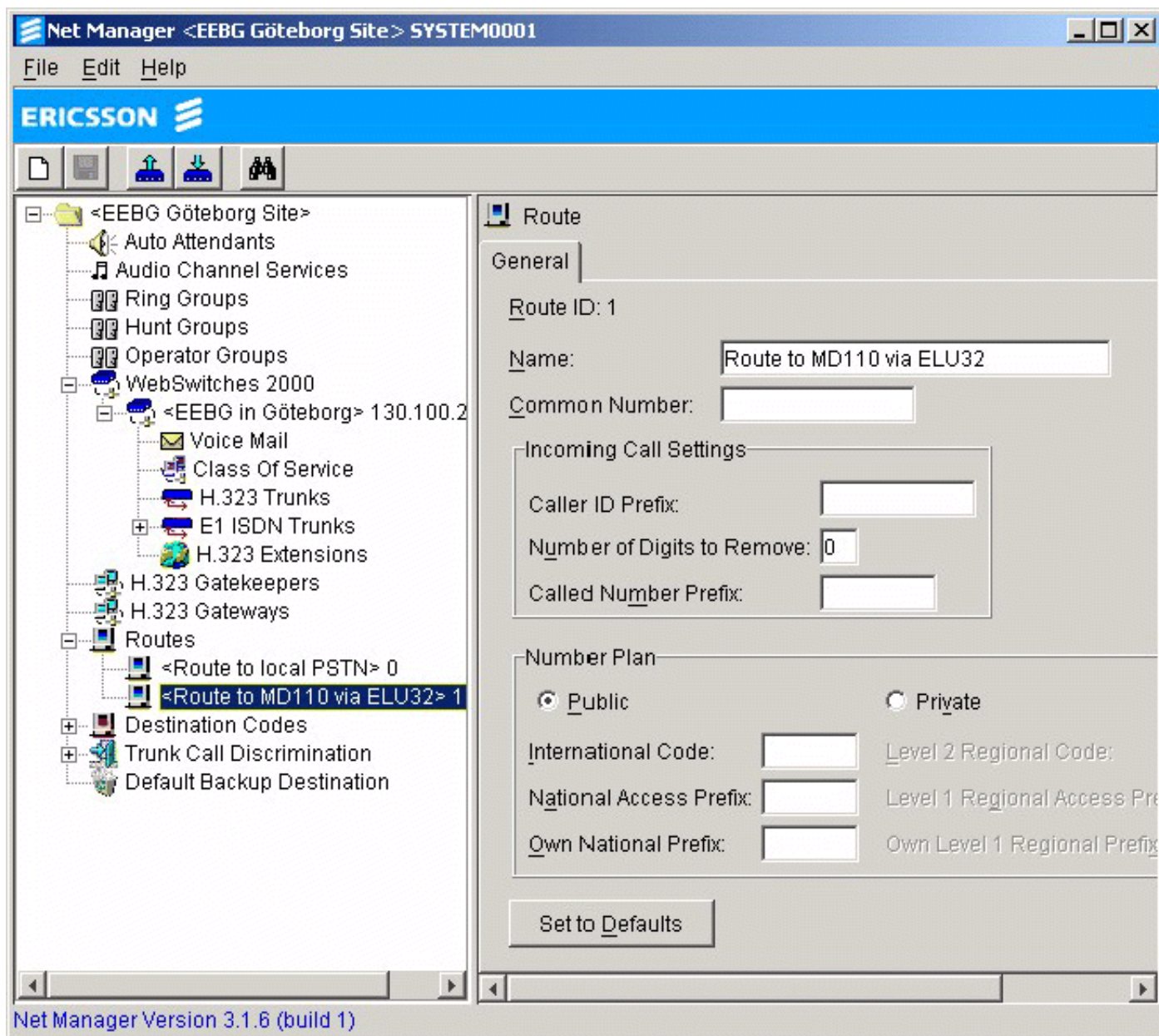


Figure 2: Creating routes

For normal operation a route 1 needs to be created to point to the H.323 trunks towards the MX-ONE IP networking board.

4.2.3 SET UP ISDN TRUNK SETTINGS

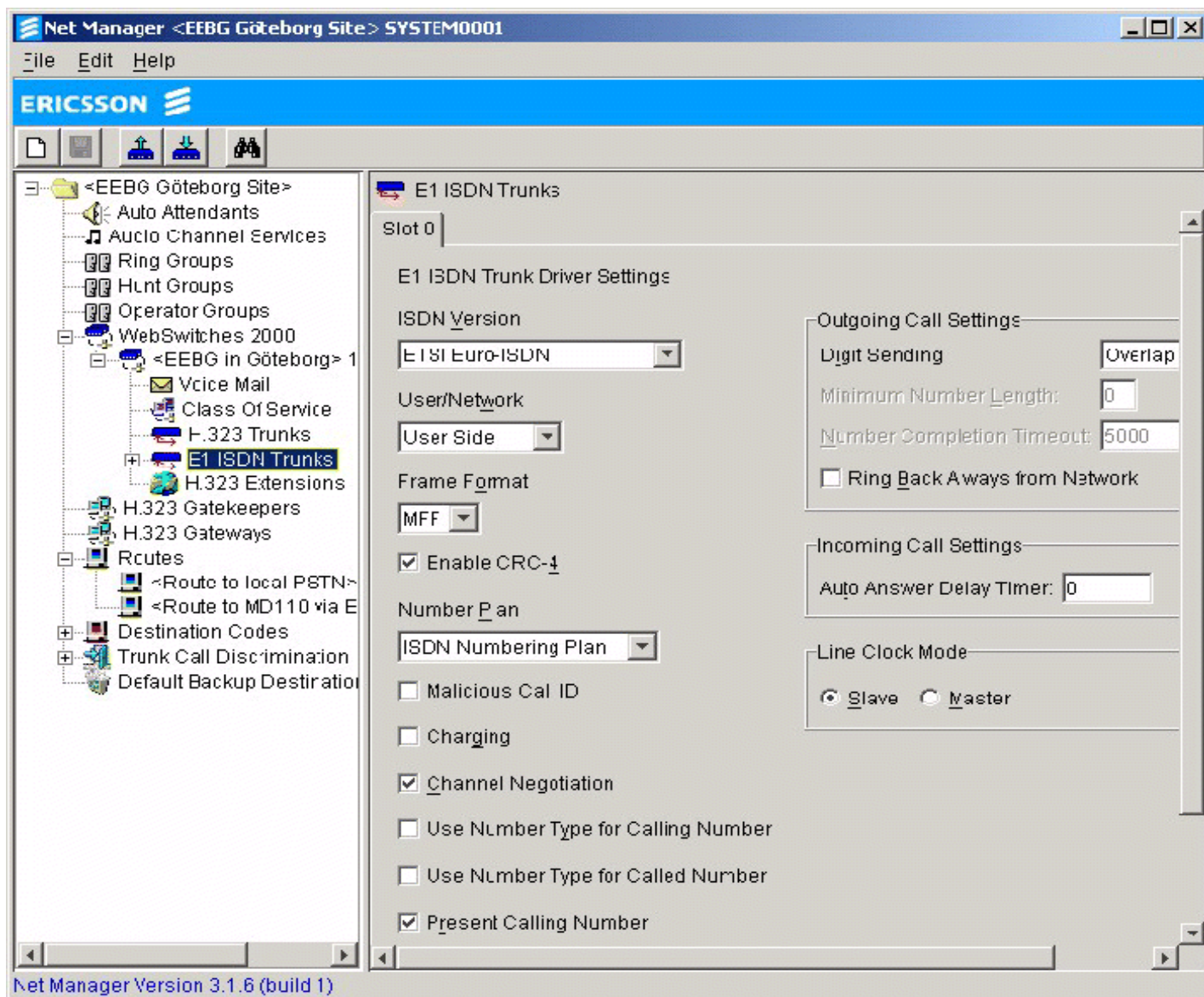


Figure 3: Define EBG E1 trunk parameter

With an E1-ISDN-30 set up, in the E1 ISDN trunks main tab the ISDN version should be set up for the local PSTN protocols and the *Public Numbering Plan* option should be selected. The *channel negotiation* and *present calling number* boxes should be checked. Line clock Mode will be set to slave and the User/Network shall be set to User side. Other parameters shall be set up to match the PSTN subscription.

In the case of an ISDN BRI-8 interface, the configuration is slightly different as shown below.

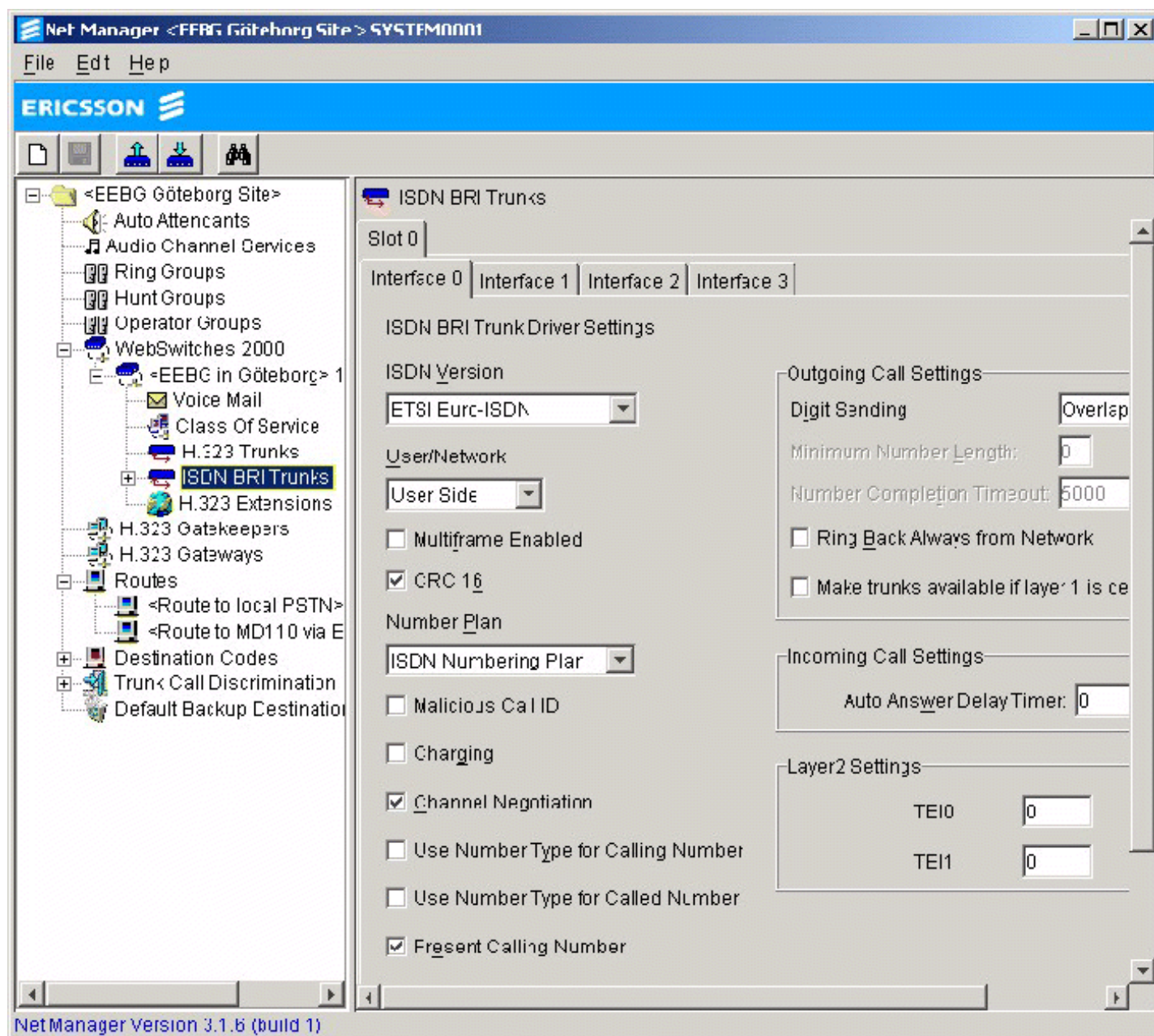


Figure 4: Define EBG BRI trunk parameter

In the ISDN BRI Trunks main tab, each 2B+D interface is set up to correspond to the 4 physical interfaces present on the board. It is only required to set up the interfaces that is going to be used. Also it is only needed to choose the appropriate ISDN protocol corresponding to the PSTN subscription. All other options are the same as for a PRI, except for layer 2 setting for TEI 0 and TEI 1 that should be left as 0.

8 individual channels are available, corresponding to 2 channels on each of the 4 interfaces present on the board. It is only needed to provide configuration for those that will be connected to the PSTN.

As shown below, route 0 needs to be associated to the ISDN channels in each EBG corresponding to the local PSTN. Also, as shown, each channel should be set up for Direct In-Dialing (DID) in order to direct inbound calls to extensions based on the called number information provided.

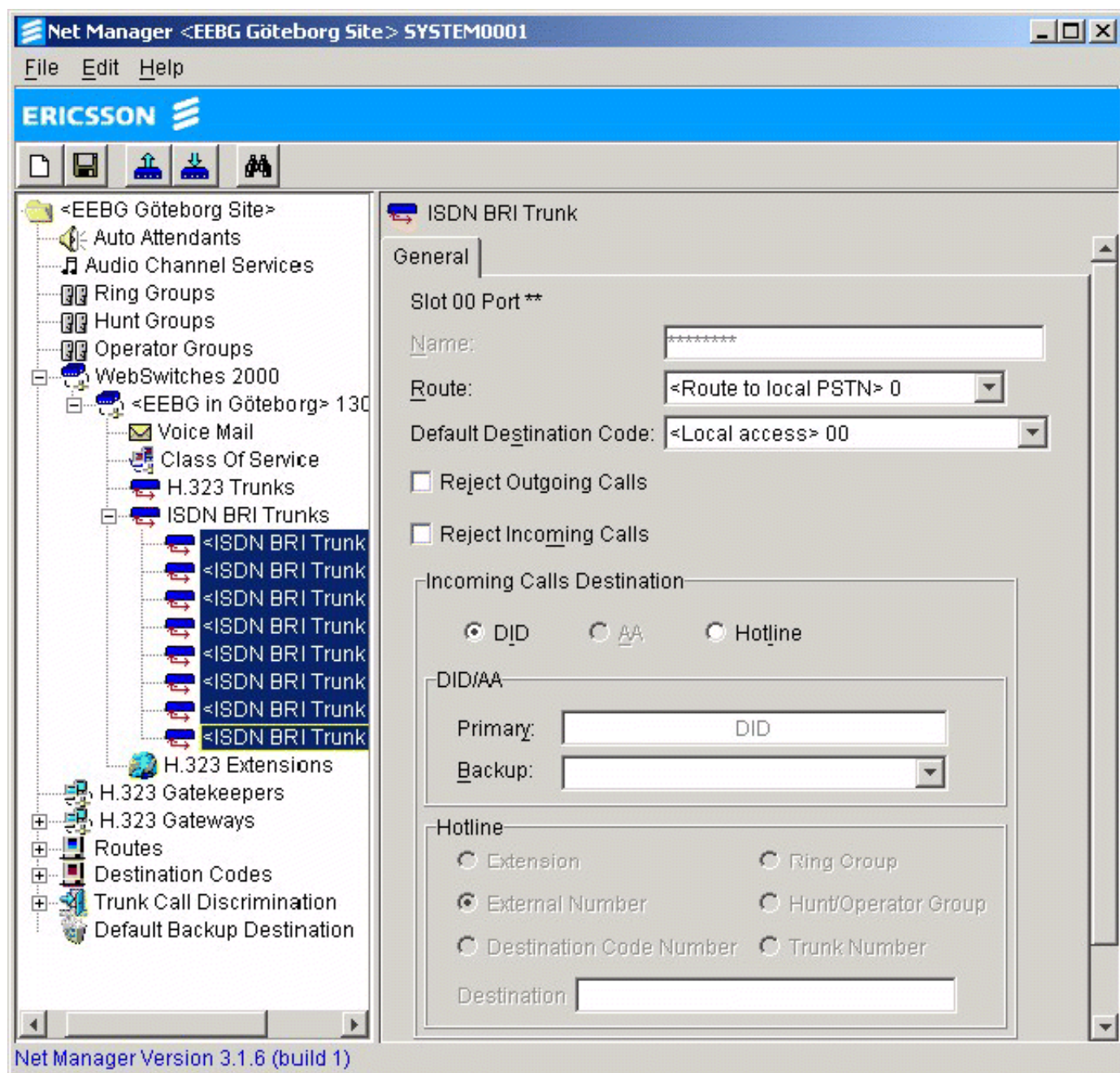


Figure 5: Associations of routes to physical channels

4.2.4

SET UP H.323 TRUNKS

Next, set up the H.323 trunks for IP networking with the MX-ONE. This is used mainly in the normal operational mode to route Local PSTN calls to and from the MX-ONE network.

First, however, it is needed to define the address of the MX-ONE IP networking board that these trunks will be associated with.

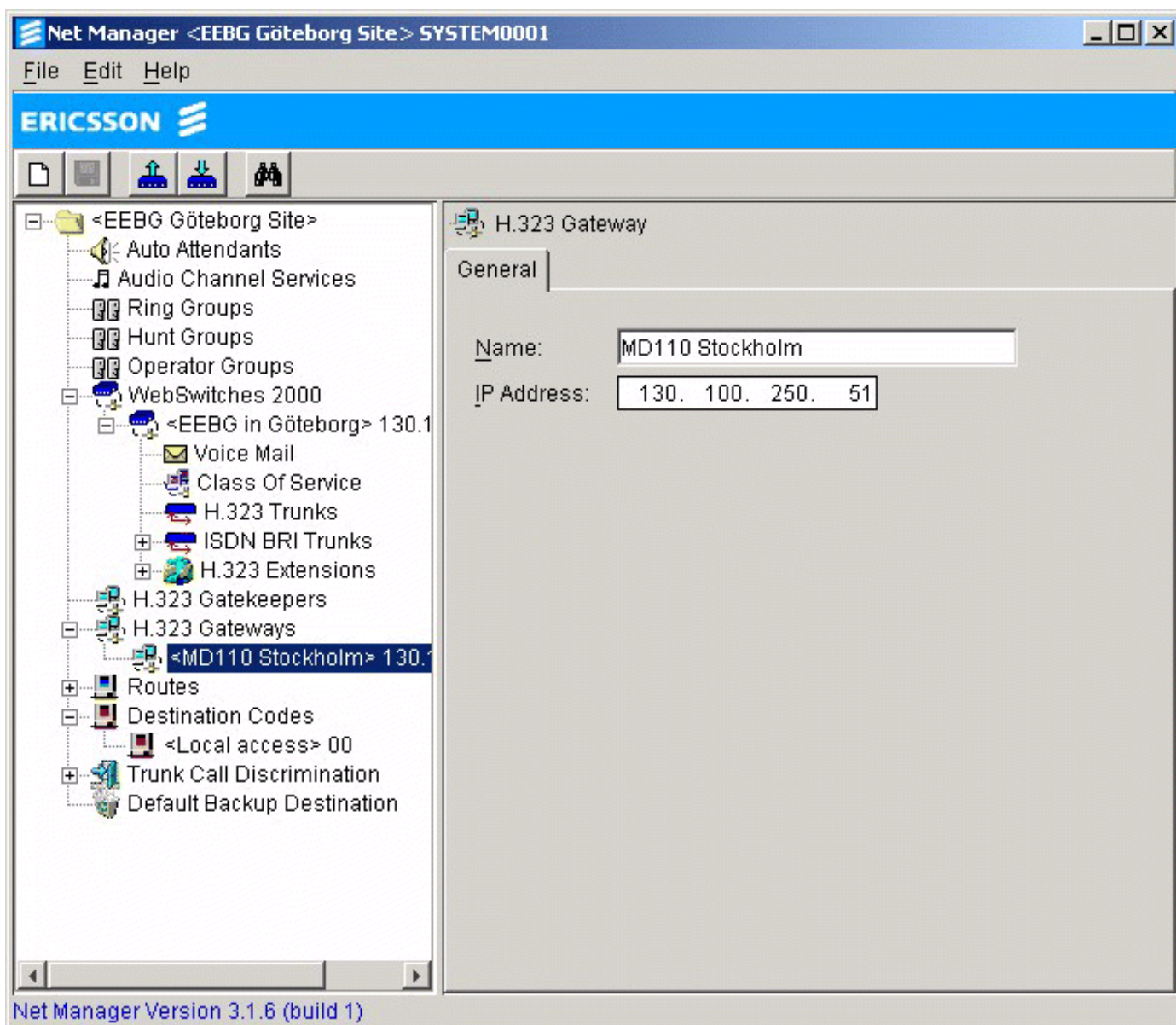


Figure 6: Set up H.323 gateway

Go to the H.323 Gateways icon and right click to *add an H.323 gateway*. Once this is created, fill in the name and IP address of the MX-ONE IP networking board that will be used. If multiple IP networking boards, belonging to the same route in the MX-ONE, are to be associated to the EBG, then the *Gateway Group* can be checked and additional IP addresses entered. An incoming call from any of the set up IP addresses on the list will be handled by an available H.323 trunk belonging to this gateway. For outgoing calls, the call will be established to the first IP address in the list, in the case of failure the next address on the list will be selected, etc.

Now go to the H.323 Trunks section in the EBG tree and right click to *add H.323 trunks*. It is presented with a dialog box where the number of trunks to create are specified. This is based on the maximum number of concurrent channels desired towards the main MX-ONE site or direct media channels to IP extensions in normal mode. Once created, do a group select of all the trunks.

The general tab for H.323 trunks closely resembles that of ISDN trunks as shown below. First select the route associated with this group of trunks (ex. Route 1, Route to MX-ONE IPLU)

The default destination code can be destination code 00 used for the PSTN network. Choose DID for inbound calls from the MX-ONE network.

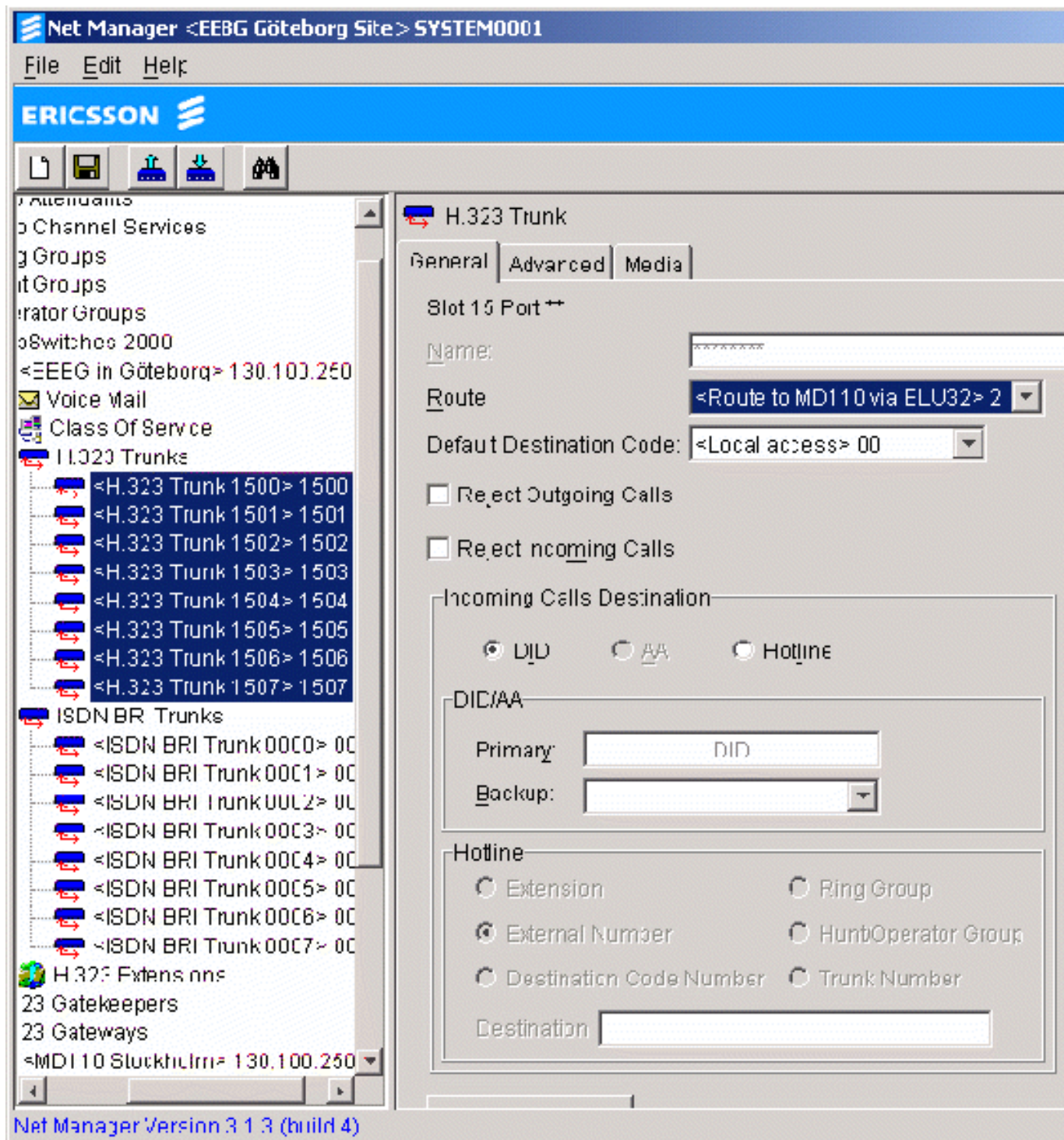


Figure 7: Set up H.323 trunks

Click on the *Advanced* tab and select the appropriate trunks type as being *Gateway routed call*, where the MX-ONE gateway entries appear in the drop down box. Select the appropriate gateway, if there are more than one defined. In the Remote Route Identifier field, an alphanumeric string must be entered if the LROUID parameter (RIANI or RODDI command) is set up in the MX-ONE for the corresponding route.

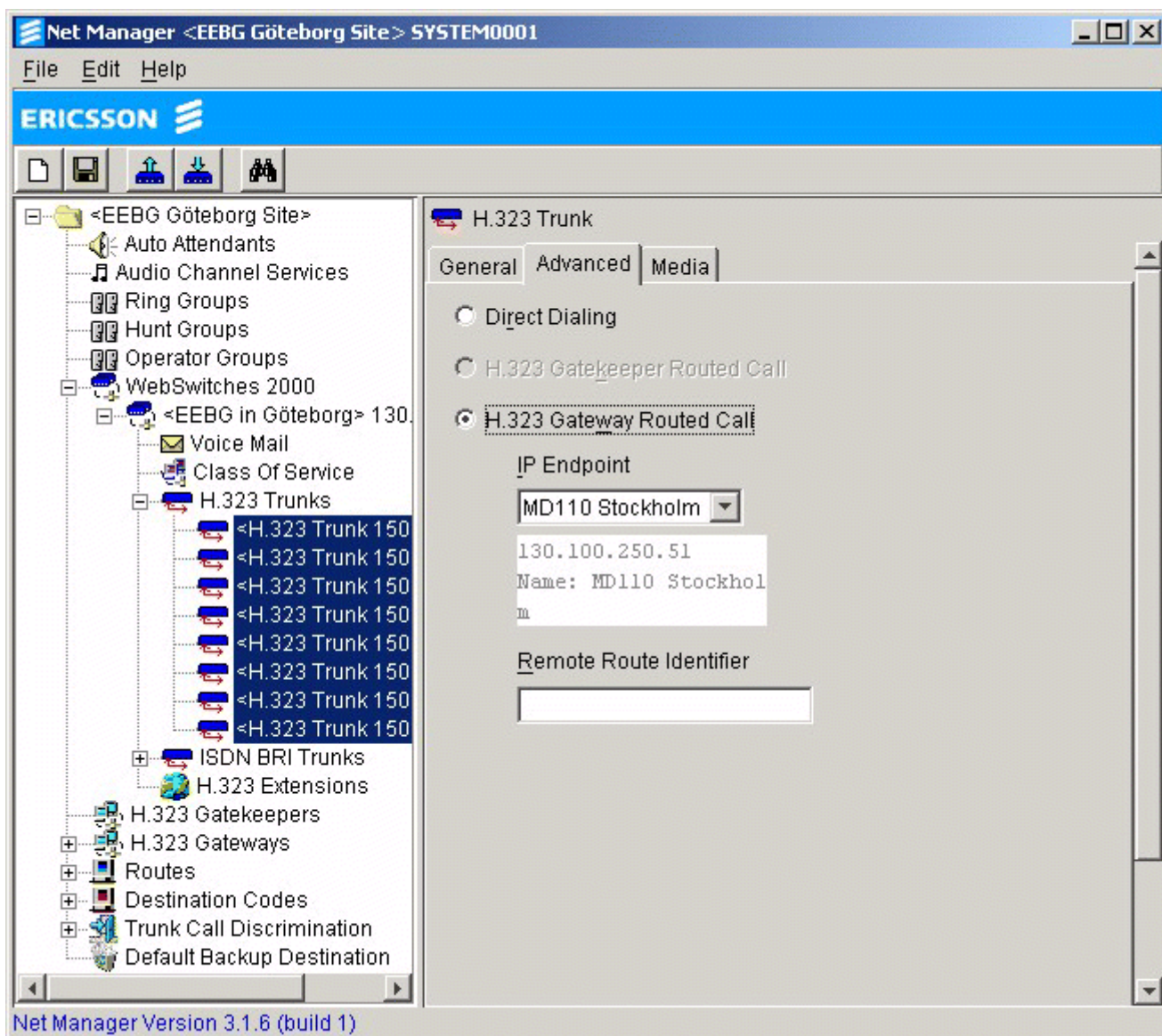


Figure 8: Set H.323 gateway parameters

Now go to the *Media* tab and select the *True Overlapped sending* radio button for *Behaviour on initial set-up*. This is mandatory when connecting to MX-ONE via IP networking.

Special considerations:

To enhance redundancy in the survivability case, it is always recommended that routes to both the PSTN and IP trunks are set up in the EBG. Then Destination codes towards extensions in the MX-ONE should use primary and secondary route options. This ensures that there is always two options available in the case the IP terminals lose contact with their primary GK in the MX-ONE. Remember, that even if contact to an IP extension board in the MX-ONE is lost and the IP terminals re-registers to the EBG, MX-ONE IP networking boards may still be accessible via the IP network. More detailed configuration guidelines for destination codes and routes are described further down in this section.

As local hop-off/Local presence is used, then for each EBG the Features Tab *Allow Trunk to Trunk Connections* must be checked, as shown below. If this option is not selected calls cannot be routed between the MX-ONE network via the H.323 trunks and the local PSTN connection on the EBG.

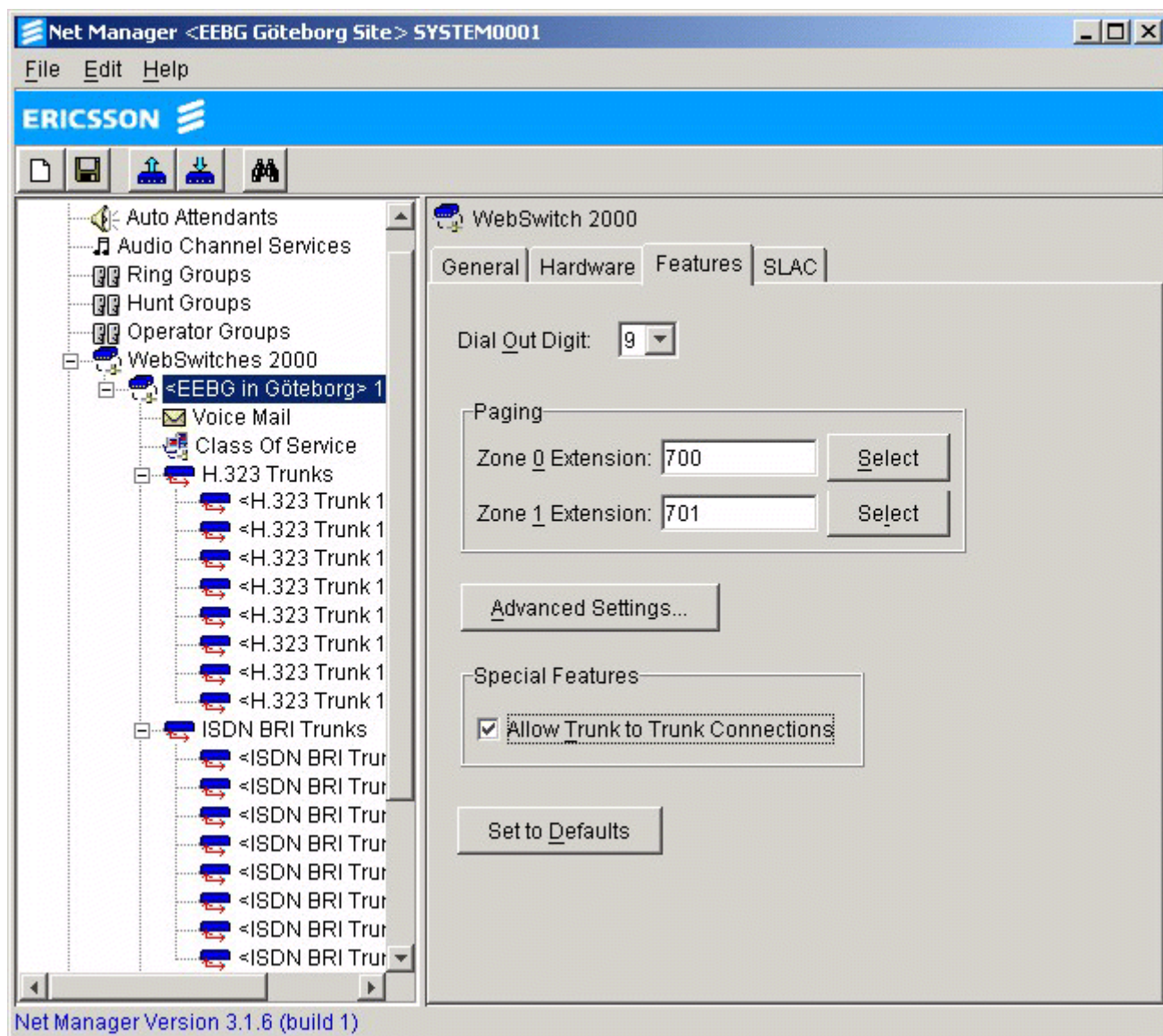


Figure 9: Set special parameter for Local presence

Additionally, to simplify the numbering plan, the default *Dial Out Digit* value should be changed to a *null* value. This will allow to use the destination code table to create any dial out prefix corresponding to the local area code for central site users or branch office users, see 4.3 EBG Route and Destination code table configuration with MX-ONE on page 19.

4.2.5

INSTALLING TRUNK CALL DISCRIMINATION

For each extension in the EBG system, trunk call discrimination (TCD) can be set up in order to prevent users in survivability mode from dialing certain external numbers. Up to 14 TCD categories can be set up, each category can be programmed with up to 200 number series that defines valid destinations. Each extension can then be associated with one of these categories. By default, all extensions are associated to category 15 which is a special non configurable category that allows calls to any destination.

To set up the trunk call discrimination data, click on the plus-sign by the trunk call discrimination icon and fill out the data. In this example, category 0 allows public calls within the Göteborg area only (area code 031).

Note: The destination code must be a part of the trunk call discrimination data. If a new destination code is defined, the trunk call discrimination data must be updated.

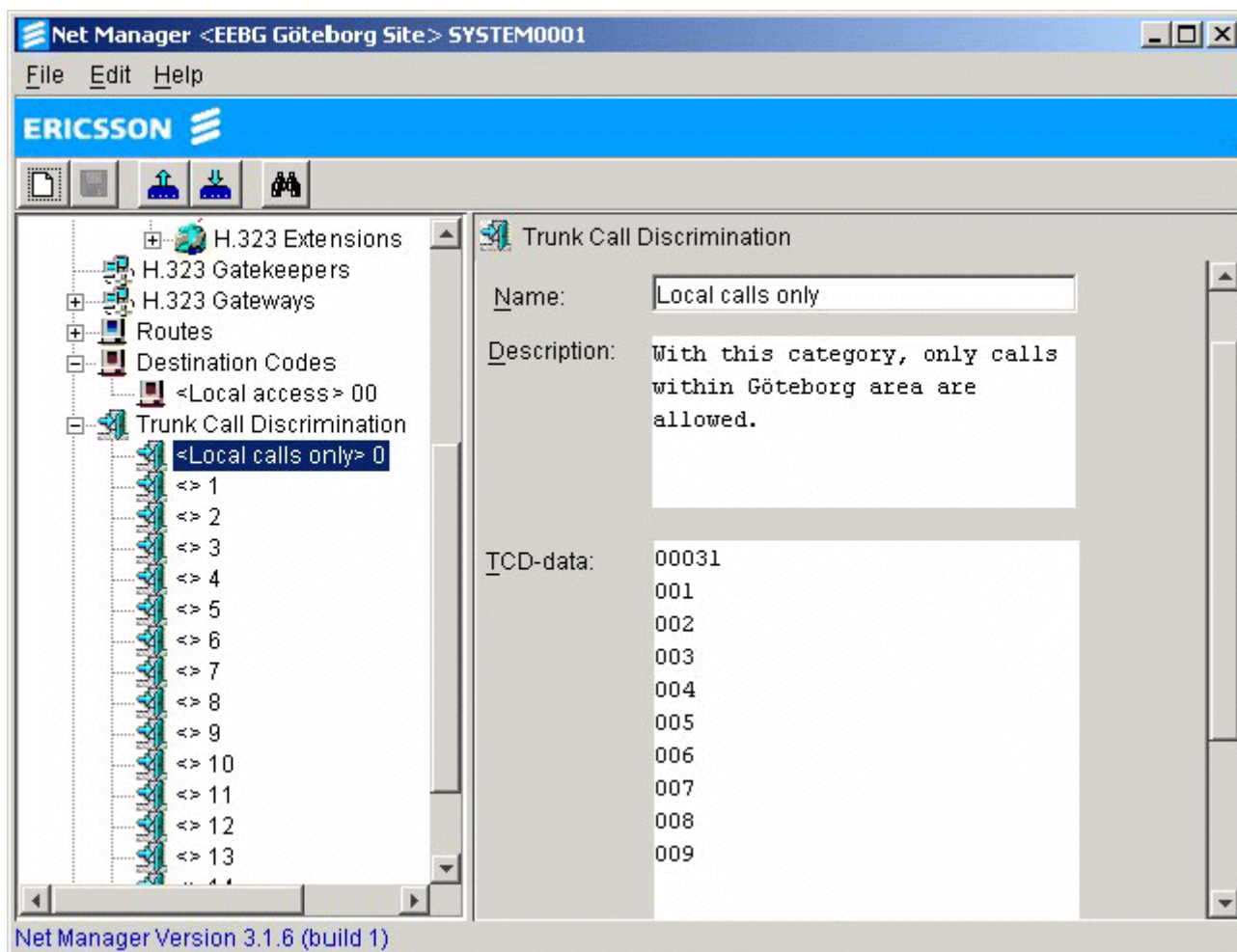


Figure 10: Set trunk call discrimination data

Each extension can be given one of these Trunk Call Discrimination categories (0-15). By default, all extensions are fully open for any outgoing external call (category 15), see 4.2.6 Defining Branch Office User Extensions on page 16 .

4.2.6

DEFINING BRANCH OFFICE USER EXTENSIONS

Now that the trunks and route tables are set-up, the next step is to define the branch office IP terminals and Digital Residential Gateways (DRGs) that will be registered to the EBG during a network failure. For this, go to the H.323 extensions ICON in the Net Manager screen and verify the codec order which is wished to use in the general tab, as shown below. It is assumed that the necessary VPM channels have been set up in the WebSwitch hardware tab.

Next, to add the extensions, right click with the mouse. Select *Add H.323 extension* from the pull down menu as shown below. In the pop up window select the extension number range (corresponding to the MX-ONE existing extension numbers) and add the appropriate number of extensions corresponding to the IP terminals in the Branch office.

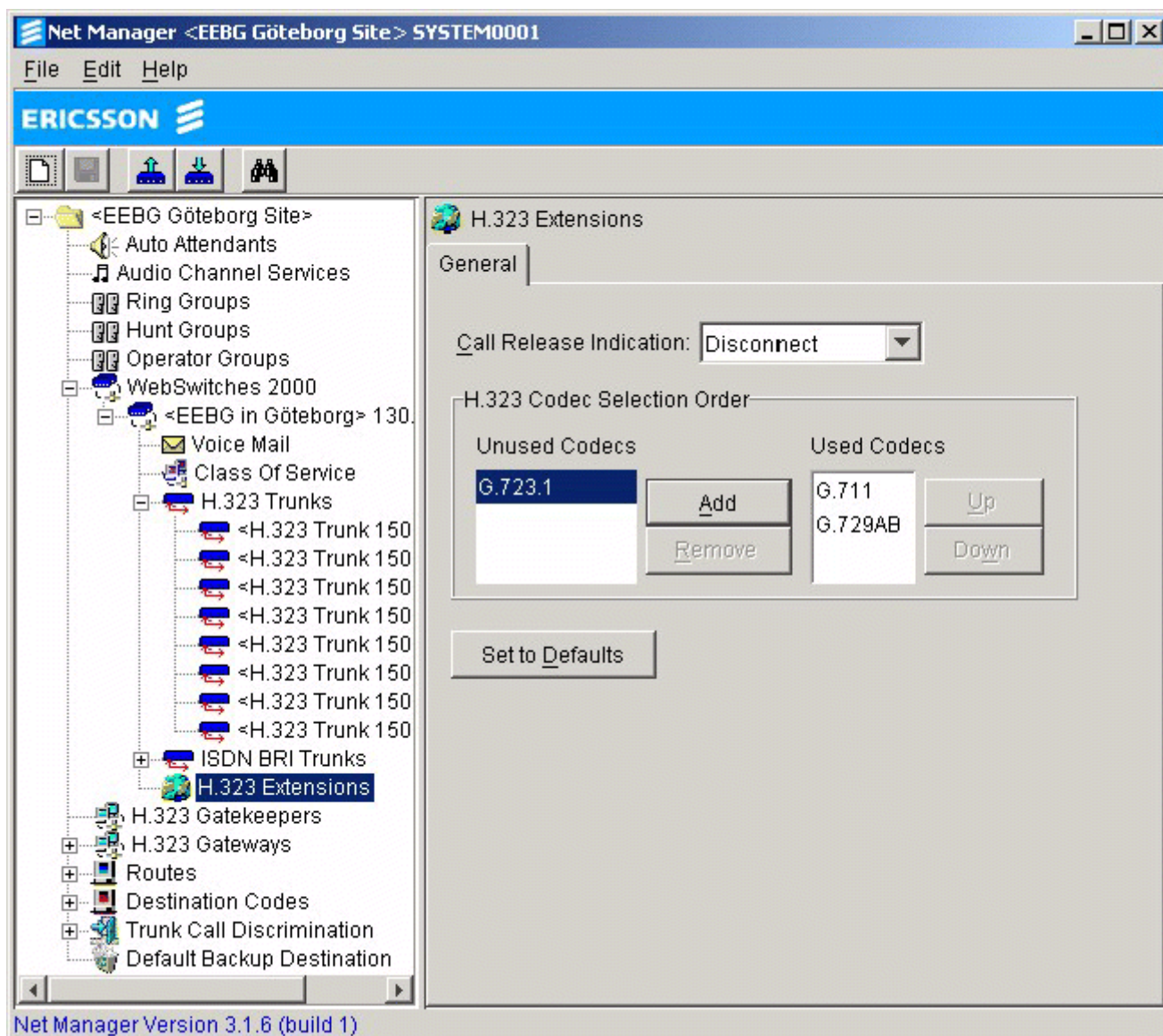


Figure 11: Add H.323 extensions

This operation will automatically define all the IP extensions that are needed for survivability via the EBG. The next operation is to customize each extension to correspond to the characteristics of each of the IP terminals in the branch office.

To do this, select the icon for each IP extension number as shown below and fill in the user's name. Then verify that the default destination code corresponds to the PSTN connection previously defined.

Be sure to define the Extension Type as Branch Office User. This allows the EBG to route inbound calls directly to the backup destination code for the PSTN trunk (MX-ONE IP-networking in this case), when users are registered to the MX-ONE. Optionally, the class of service (TCD) can be set for the terminal based on the Trunk Call Discrimination tables that are set up (4.2.5 Installing Trunk Call Discrimination on page 15). By default TCD table 15 (open) is set up.

Leave all other default settings on this page as they are.

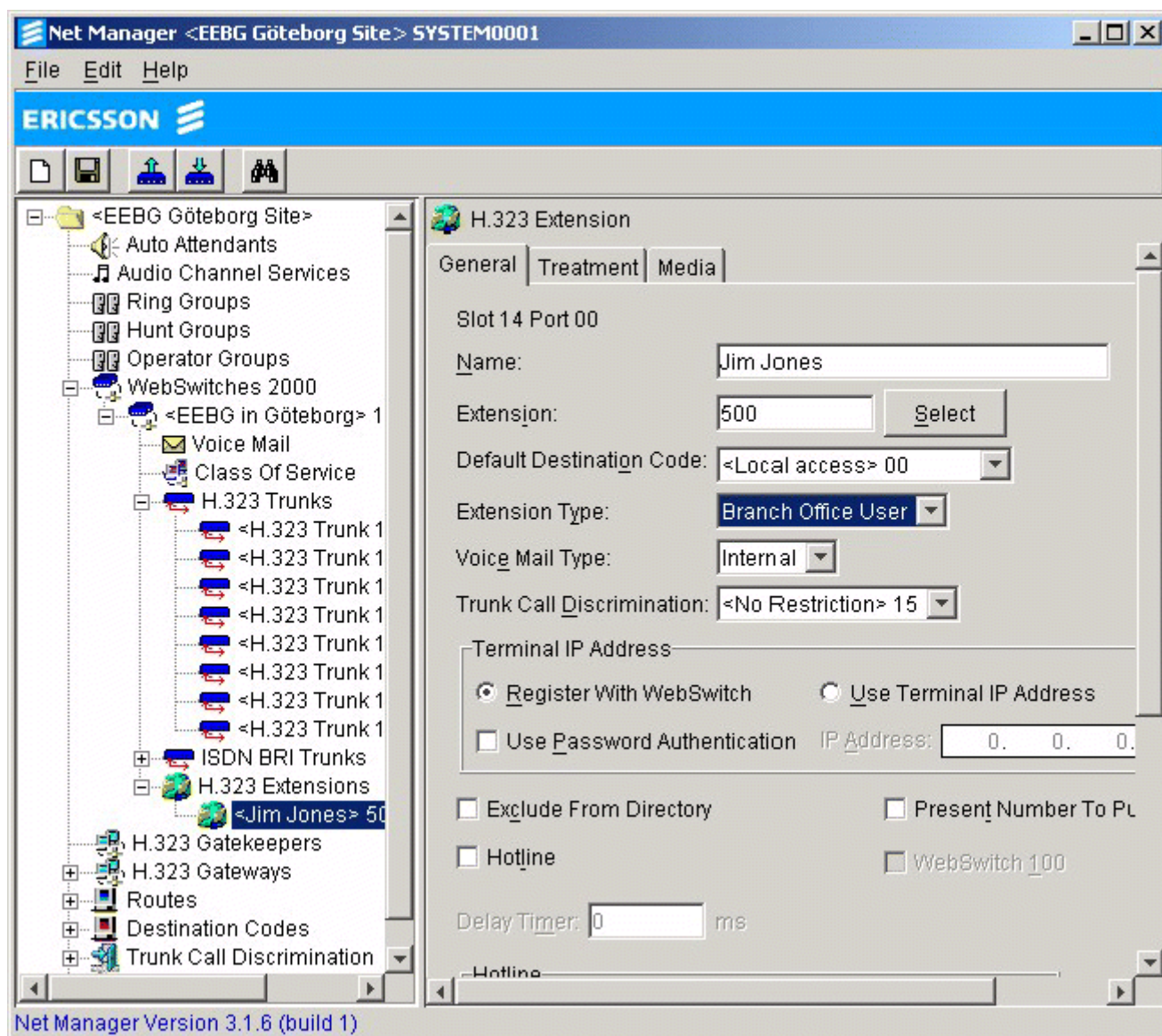


Figure 12: Set extension data

Then for each user, Select the *Treatment* tab to set-up default forwarding options for each user. As personal number and a central voice mail system are active in the MX-ONE, it is recommended to leave all forwarding options disabled, as shown below in order to allow the MX-ONE to manage this directly.

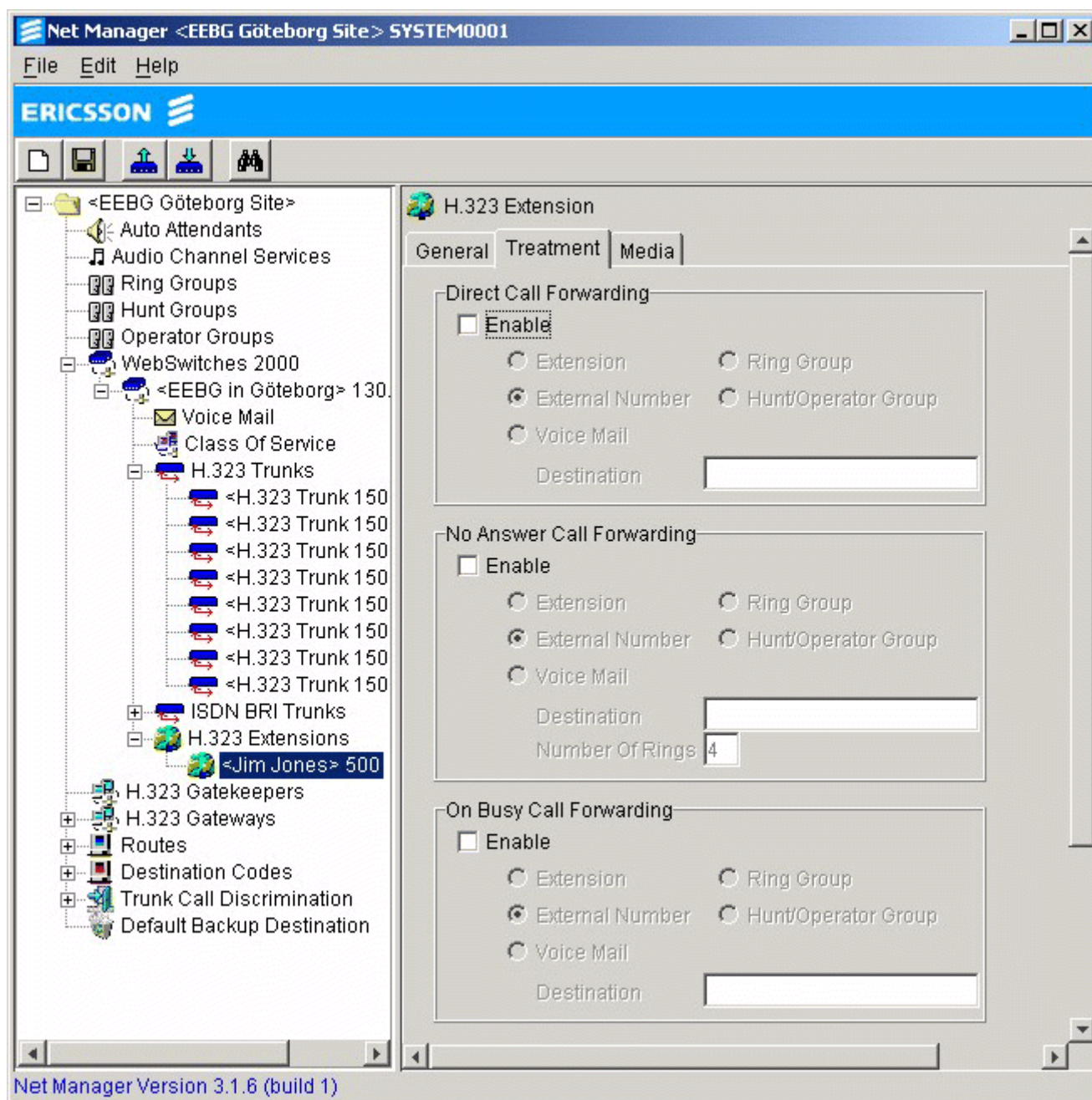


Figure 13: Set Call forwarding data

4.3

EBG ROUTE AND DESTINATION CODE TABLE CONFIGURATION WITH MX-ONE

To illustrate the EBG solution with MX-ONE, a simple network scenario between two EBGs and one MX-ONE with an IPLU set up for IP networking connected via a corporate WAN is shown. If local hop-off is required between the three regions, the following diagram applies:

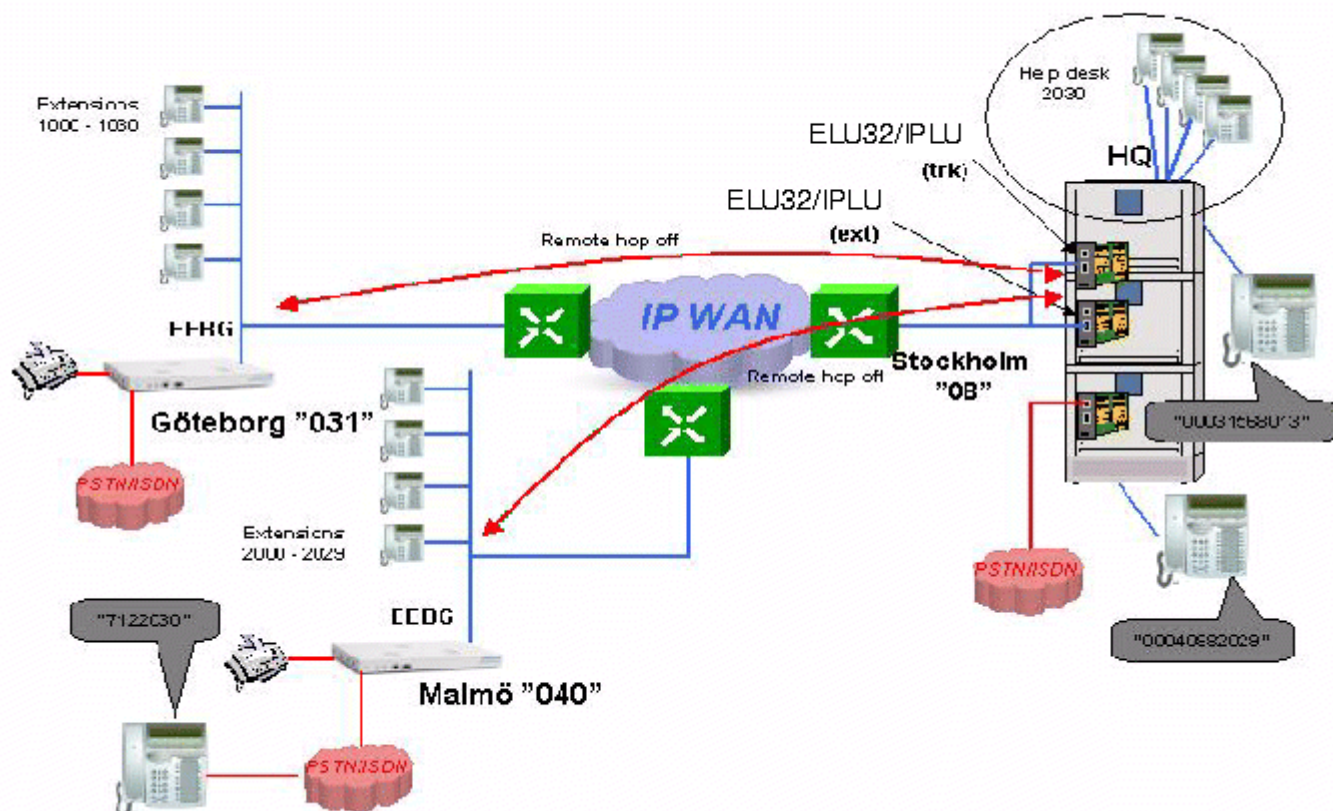


Figure 14: Simple branch node scenario

Using the example above, it must be considered that the routing of calls from Stockholm to Göteborg or Malmö must use destination codes 031 or 040 respectively. It is assumed that 00 indicates the external access code or dial-out digits. All calls from terminals connected to the MX-ONE beginning with (00)031xxx or (00)040xxx are first analyzed by the Least Cost Routing (LCR) tables and then switched via the IPLU using the IP network as primary route. Therefore, the LCR tables must be programmed in the MX-ONE so that numbers beginning with (00)031 are sent to the IPLU group trunks with a route to the EBG Göteborg and logically all numbers beginning with (00)040 are sent to the IPLU group trunks with a route to the EBG Malmö.

Logically, the 00 is stripped and the access code 031 or 040 would be passed to the appropriate EBG. The PSTN network should then be programmed as the alternate route, should the primary route should be unavailable

It is assumed the Branch Office extension series (1000-1030 and 2000-2029) are set up as IP extensions within the MX-ONE. The phones should be set up (using a configuration file) with the MX-ONE IP extension board as the primary GK and the associated EBG as the backup GK.

The EBG could receive calls beginning with 1xxx, 2xxx or 3xxx from the public network. Therefore, a destination code entry of 3 as well as, 1 or 2 should also be programmed in the EBGs, depending on its location, which shall be routed to the IPLU as the primary route and the PSTN as the secondary route (Survivability). However, to simplify this process, it is now also possible to set a default backup destination, whereby any dialed number (internal or external), not known to the EBG is automatically routed to the MX-ONE via the IP networking or PSTN trunks for number analysis. This will considerably reduce the need for specific Destination codes.

4.3.1 RECOMMENDED EBG ROUTE AND DESTINATION CODE CONFIGURATION IN AN EBG NETWORK

4.3.1.1 *General difference between R8 and R11/R12*

The big difference between R8 and R11/R12 is that, to route calls from the EBG to the MX-ONE, the ITG board is no longer used.

This means in the EBG, standard H.323 trunks must be initiated to communicate with the MX-ONE IP networking IPLU board. It is only needed to create one extra route for IP trunks to the MX-ONE IPLU. One destination code entry must be created for each destination or extension range in the MX-ONE network, but they will all point to the same route. This way the MX-ONE will handle the call signaling on a call by call basis, and then the media is switched between the two endpoints directly.

Another change is that, as the ITG is not required for local hop-off, all sites may be set up as separate EBG nodes. That is, they no longer need to be networked with the ITG, except in CAS extension cases where analog extensions are used in the EBG, as was the case with R8. This allows for a very flexible route and destination code configuration on a site-by-site basis.

Actually, once the first one is created, it can be copied for the other sites and minor changes applied to correspond to the needs of any particular site (IP address, dest. Code changes, H.323 extension ranges, etc.). Up to 1000 EBG configurations can be created in a single Net Manager.

4.3.1.2 *Basic Route settings for each EBG*

The recommended configuration steps are the following:

- Name route 0 to Route to local PSTN. This route shall be used both in normal operation and in survivability to route calls to the local PSTN.
- Right click on route 0 and choose the option add route to define a second route. This creates a route 1 for the H.323 trunks to the MX-ONE. This route shall be used for routing of inbound PSTN calls to the central MX-ONE for call handling.

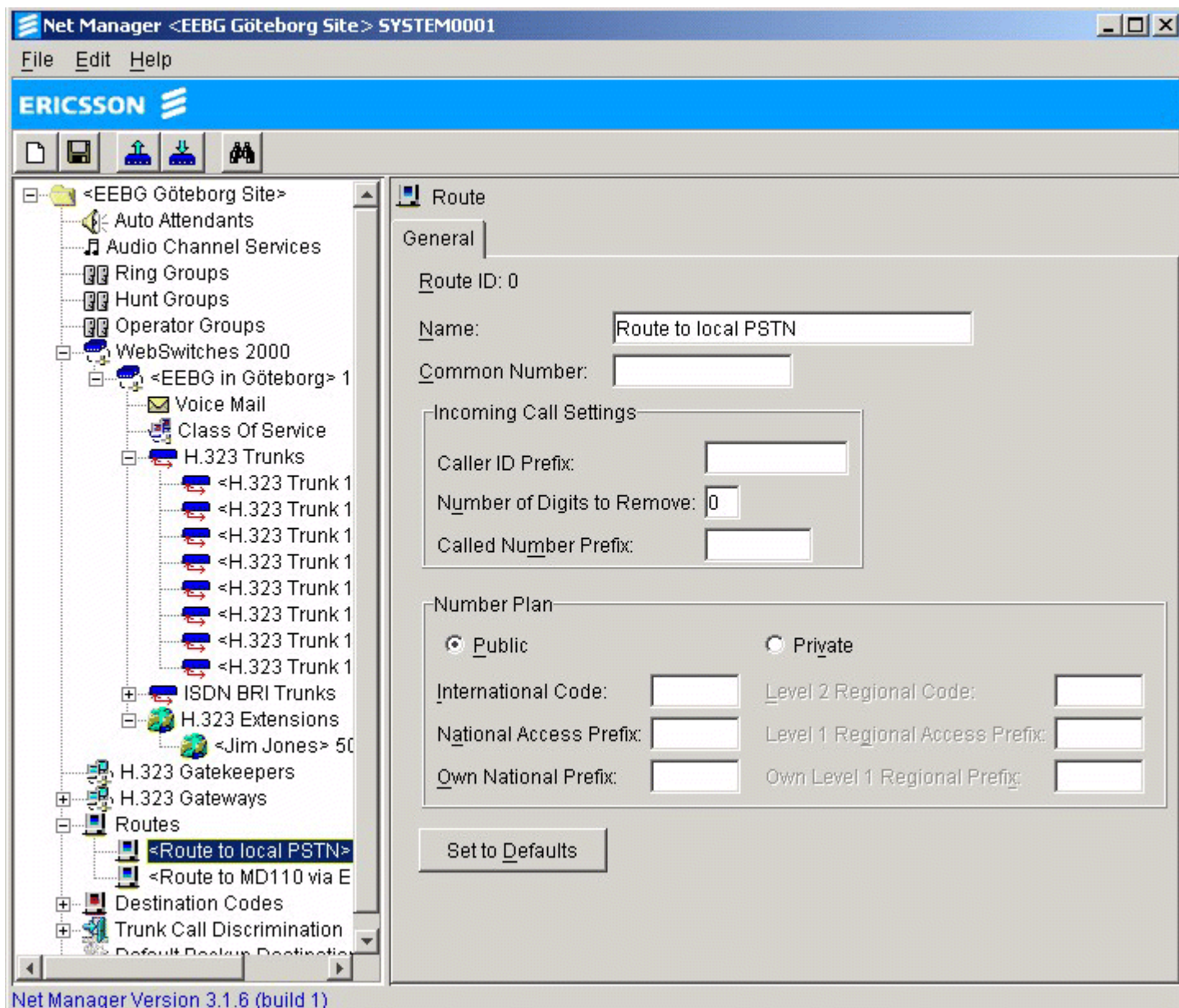


Figure 15: Route settings

4.3.1.3

Basic Destination code configuration for each EBG

1. There is a default destination code of 00. Point it to route 0 as it will be used for the local dial out for IP terminals in survivability mode. This will be common to all EBGs.
2. Route the inbound local extension calls to the MX-ONE for call handling. Right click on the default destination code 00 to create a new destination code, which will be defined as 99 (or any unused number series). Give it the name *Local presence route to Sthlm*.

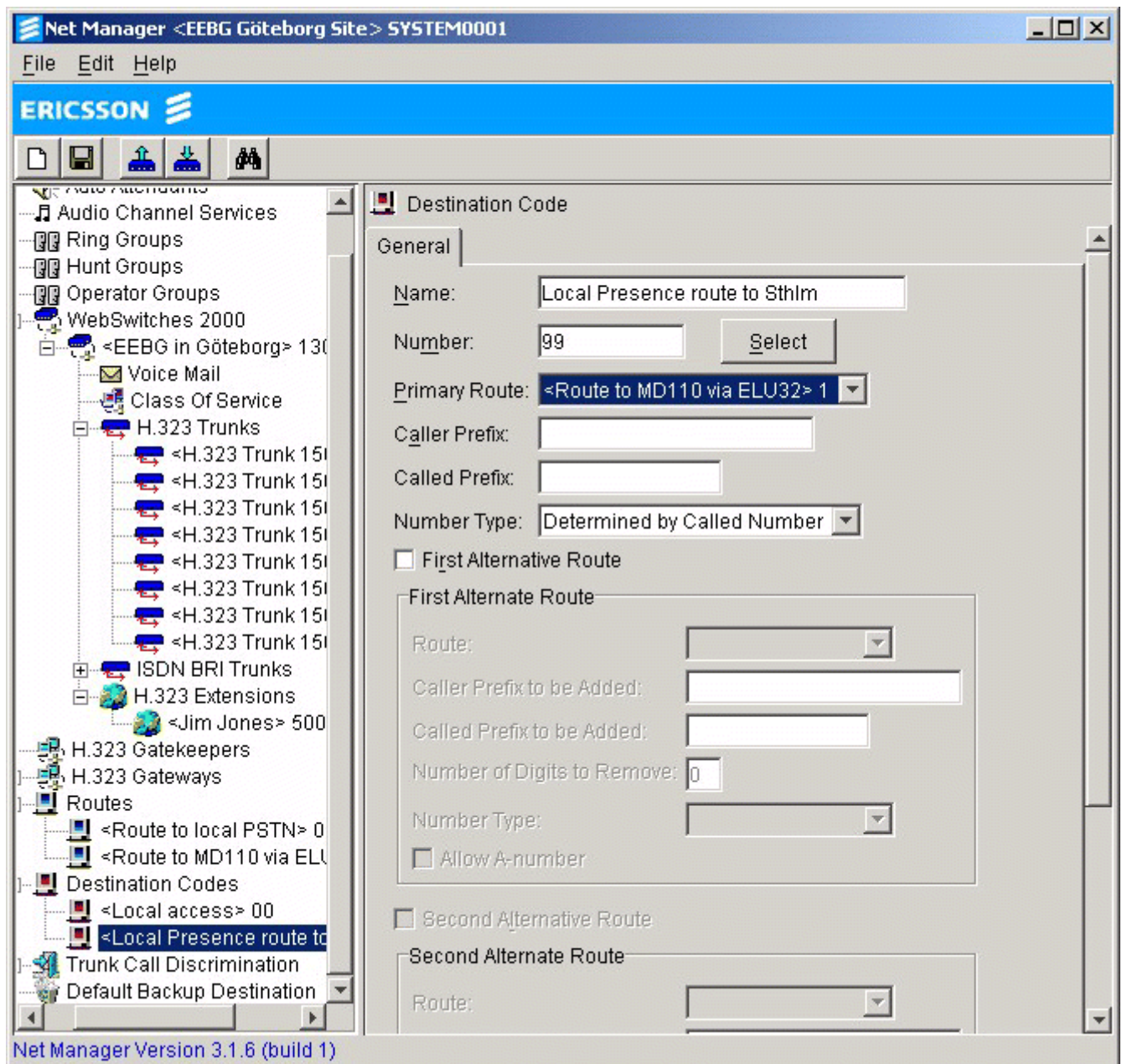


Figure 16: Local presence route to Sthlm

3. Set the Primary route for this destination code to route 1 which terminates in IPLU to MX-ONE in Sthlm.
4. Go to the PSTN trunks and set all trunks to use this destination code as the backup destination for the inbound calls.

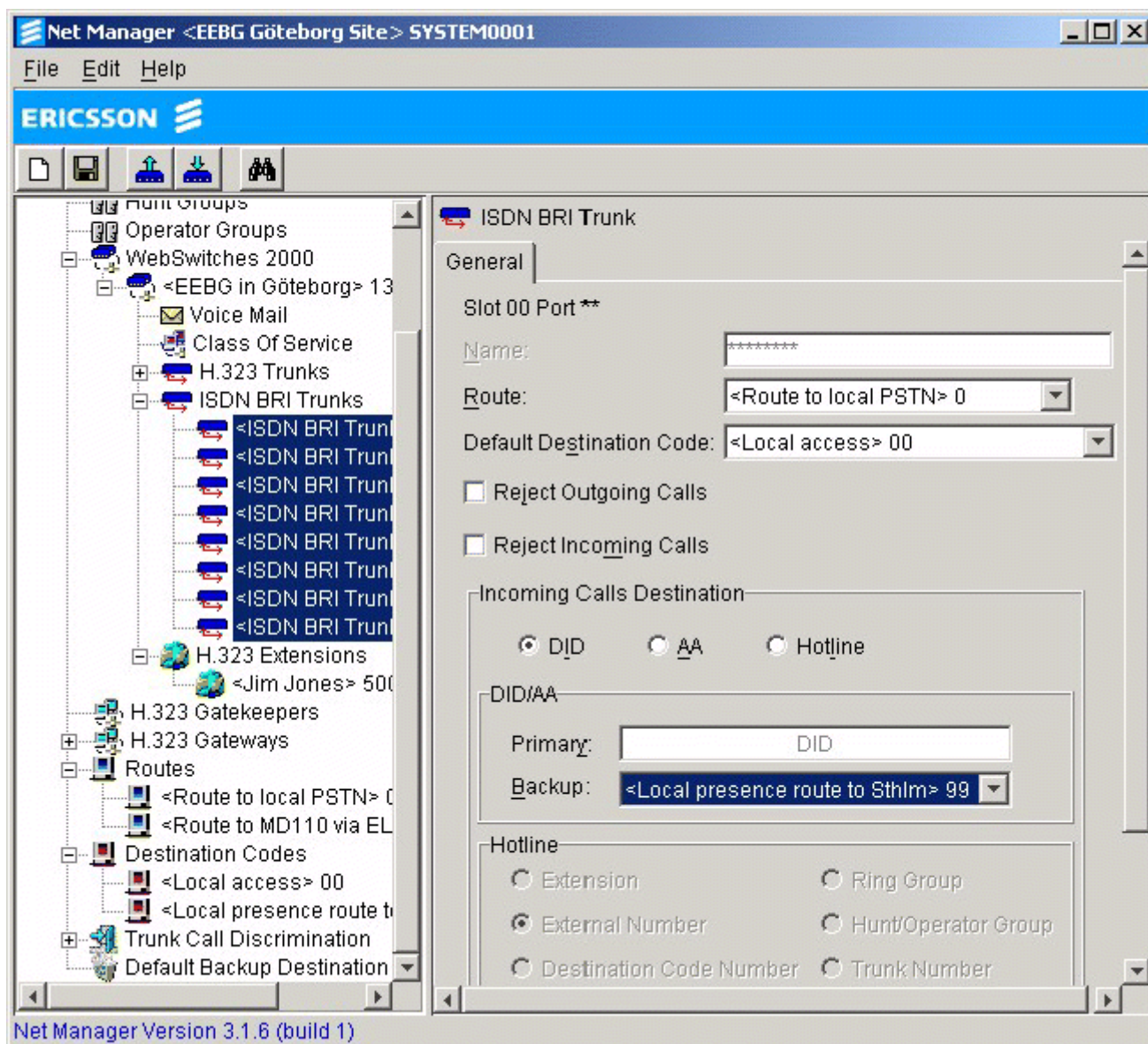


Figure 17: Set Backup destination

Note: In the example, the inbound PSTN trunk receives the local extension digits in the A-number (ex. 2004), as the PSTN common prefix is generally stripped. It is not needed to send the destination code 99, leave called number prefix field empty. In this case, the destination code is 99(2004), but as the Called Prefix field is empty, only the actual received number (2004) is transferred to the MX-ONE at the other end. This applies to any destination code where its own value should not be transferred to the other end.

Behaviour:

In normal operation, the IP extensions are registered in the MX-ONE, not the EBG, therefore, all incoming calls from the PSTN network with a local extension number will automatically be rerouted to one of the H.323 trunks associated with route 1 and the call will be presented to the MX-ONE directly. Then the call will be switched locally to the associated IP extension using direct media. If the IP extensions are in local survivability, then they are registered in the EBG and the call is presented directly to the terminal.

5. Now in the Malmö node, create a Destination code entry 01 (local PSTN access in Malmö) which would use route 0 as its Primary route. This destination would be for any inbound calls coming from the MX-ONE network via the H.323 trunks for local hop-off.

Note: Remember that if the 01 is to be passed to the PSTN network, the Called number prefix field must be filled in with 01.

6. If applicable, create any other destination codes for the remaining number series in the MX-ONE network (ex in this case: 1xxx, 3xxx). Examples are general ACD/customer care numbers (ex. 3000 in the example above is covered with 3xxx), 0800 numbers, remote MX-ONE site extension series, etc. Point them to the appropriate MX-ONE route.

Note: These destination codes are not necessary if a Default Backup Destination is used.

Now do the same in the Göteborg node keeping in mind the changes in destination codes that apply.

Note: In most cases, it is always possible to call the general number for any location. One possibility offered by the EBG is to route the call to an internal Automated Attendant (AA). In this case, create an AA with an extension number that corresponds to the common number for that location. Customers who dial in there can then be connected to any user in the MX-ONE network. The backup destination for the AA should be the operator group in the central MX-ONE node.

4.3.1.4

Destination codes for IP terminals calling internal MX-ONE extensions in survivability mode

To route internal calls from IP terminals in survivability mode to extensions in the central MX-ONE over the PSTN network, modify the Destination code corresponding to the central MX-ONE extension range. If this destination code was already created for use in normal operation for inbound PSTN traffic, the primary route is pointed towards the H.323 trunks. However, for survivability, activate the first alternate route and point it to the local PSTN. Then add the ISDN prefix for the MX-ONE PSTN connection in the Called prefix field, including the destination code digits.

(As an example: If there are central MX-ONE extensions that begin with 3xxx then it is most likely necessary to create a destination code of 3. The primary route selected (route 1, in the example above) is towards the IPLU board under normal operation. This allows call received locally for central site extensions in the MX-ONE to be routed over the IP network. If this link goes down and the local users are registered in the EBG, it is needed to activate the first alternate route and add the ISDN prefix plus the 3 in the called party field (086453). Point this destination code to route 0, which is the PSTN route for the EBG. The result is that if extension 3003 is dialed, and the IP network is down, the call will be sent as 086453003.

Note:

If a default backup destination is used, this can be set up by setting the local PSTN route as an alternative route for the default backup destination and set the called prefix to 08645.

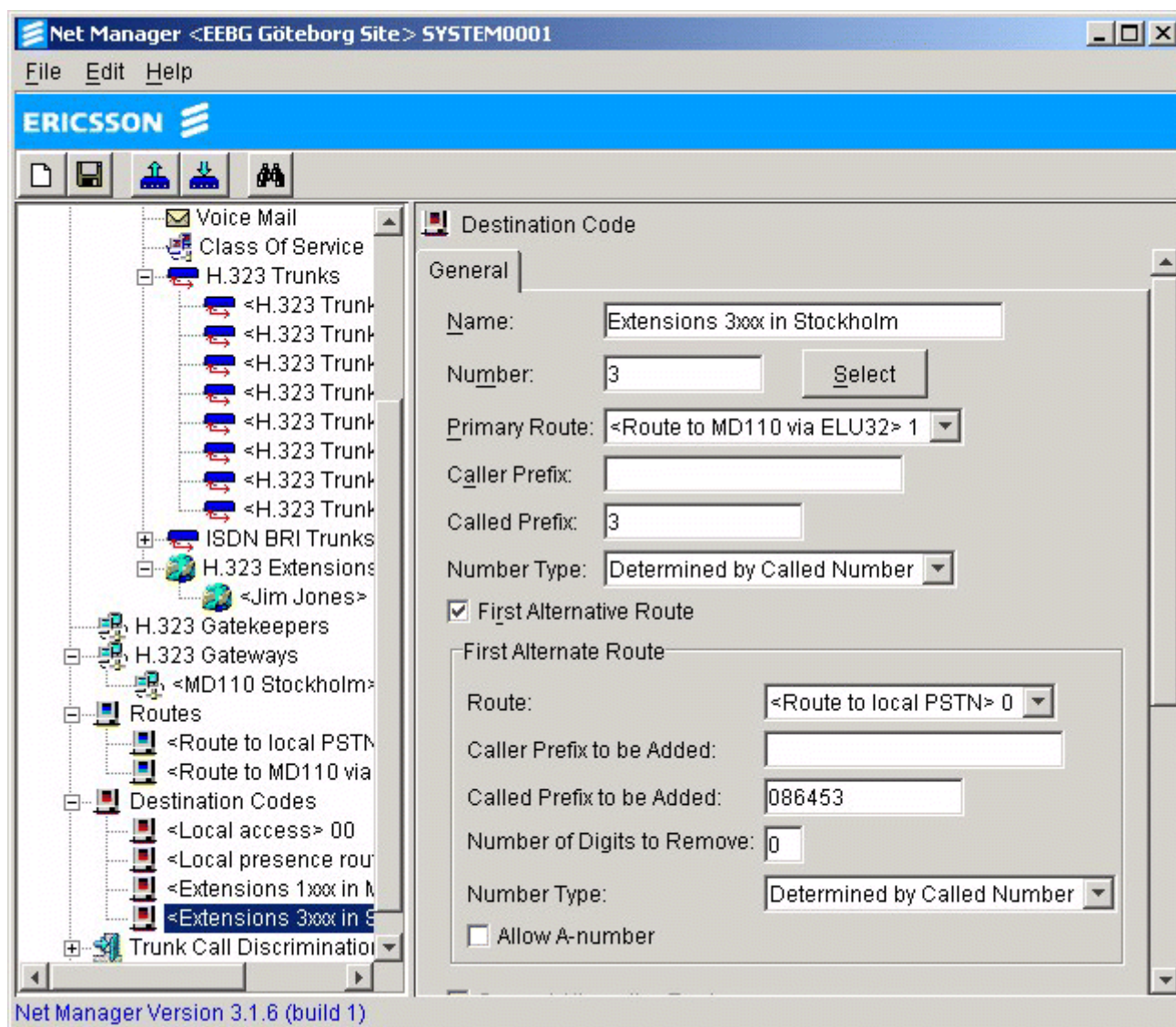


Figure 18: Set Alternative route data

Behaviour:

If for some reason, the IP terminals lose connection with the MX-ONE IP extension board, they will automatically re-register to the EBG. This does not necessarily mean that the connection to the IPLU IP networking board is lost. It could be a local failure in the MX-ONE IP extension board or the Switch it is connected to. So the EBG will first attempt to reach the MX-ONE via the IP networking interface using the normal route. Should this fail, then the call will be rerouted using the first alternate route defined for the destination code, in this case the PSTN network.

There are many options that can be used to manipulate the called and calling numbers, as well as, alternate route selection for backup purposes, but they are generally not needed in these scenarios. In most cases, the MX-ONE exchanges would be set up to reroute the calls over the normal PSTN network in case of a route failure.

4.3.2 SITUATION WHERE AN EBG IS USED WITH ITG FOR CAS EXTENSION

In a situation where extensions in one or more EBGs are to be *Hot-lined* to an ITG for CAS extension use, then these specific EBGs need to be set up as part of the same system (cluster) as the ITG. The same route/destination code rules will apply as long as the defined routes are associated to physical trunks consistently in all systems (that is, in each EBG, PSTN trunks are all associated to route 0 and H.323 trunks are all associated to route 1). In this case, the destination code rules are applied on the inbound call specific to each EBG. If the same route is used by trunks defined in 2 different nodes, the trunks in the local node where the call originates are always selected first.

As far as destination codes are concerned, the only difference in the EBG is that extension series for the other EBGs in a cluster will not have to be taken into account with destination codes as they already are defined as extensions in another EBG in the cluster.

From the MX-ONE perspective, all calls are routed via the IP networking board, not the ITG. So, even if the EBGs are clustered, the routes/destination codes are using the MX-ONE IP networking board and are pointing to a specific EBG, so outbound calls from the MX-ONE will be routed to the appropriate EBG and handled locally in that EBG.

Remember to download the configuration and reset the systems to activate the changes.

4.4 ITG CONFIGURATION FOR IP GATEWAY TOWARDS EBGs USING NET MANAGER FOR V3.1.6 OR HIGHER

In this section, it is not considered the ITG as an IP trunk gateway, but only as a CAS extension gateway for DRG with analog extensions and faxes. It is assumed that the appropriate TLU76/3 is connected to slot 0 or slot 1 of the ITG. It is also assumed that the TLU76/3 is set up with the necessary extension range and the recommended setting in the MX-ONE interface is **Mobility Server** to get the best feature level, 4.5 MX-ONE Configuration for EBG, ITG and DRG using CAS Extension on page 33 .

4.4.1 ITG CONFIGURATION AND DEFINING HARDWARE

As before, from a pure configuration perspective in Net Manager, the ITG corresponds to a WebSwitch 2000 M2. Therefore, to add an ITG to the NetManager configuration, right click on the WebSwitches main tab and choose *Add a WebSwitch* .

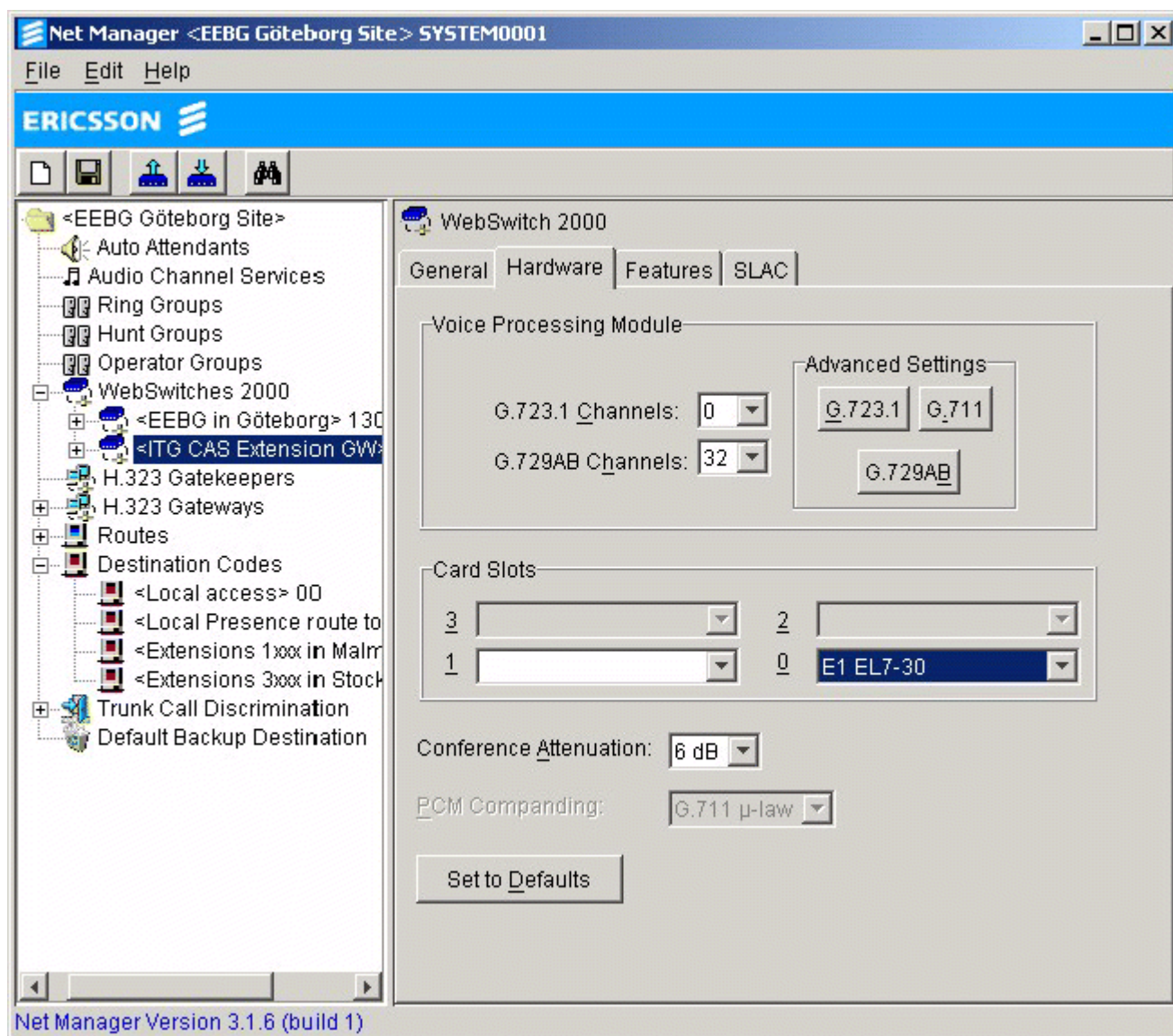


Figure 19: ITG PRI hardware setup

Then in the general tab choose WebSwitch M2 as the model name. After adding the WebSwitch in the main icon tree, the CAS-E1 board must be defined in the appropriate slot as an E1 EL7-30 interface in the specific ITG Hardware tab. The Upper E1 port on the physical board corresponds to slot 0 (right hand slot in Net Manager) and the lower one to slot 1. The VPMs channel selection should also be defined for 32 G.729 channels.

4.4.2

SET UP THE CAS EL7 INTERFACE

With an E1 EL7-30 set up, in the E1 EL7 trunks *Slot 0* tab leave the default settings, except for the flash type hook/R Button selection, which should match the MX-ONE configuration.

Line Clock Mode may be master or slave and the other parameters shall be set up to match the MX-ONE configuration.

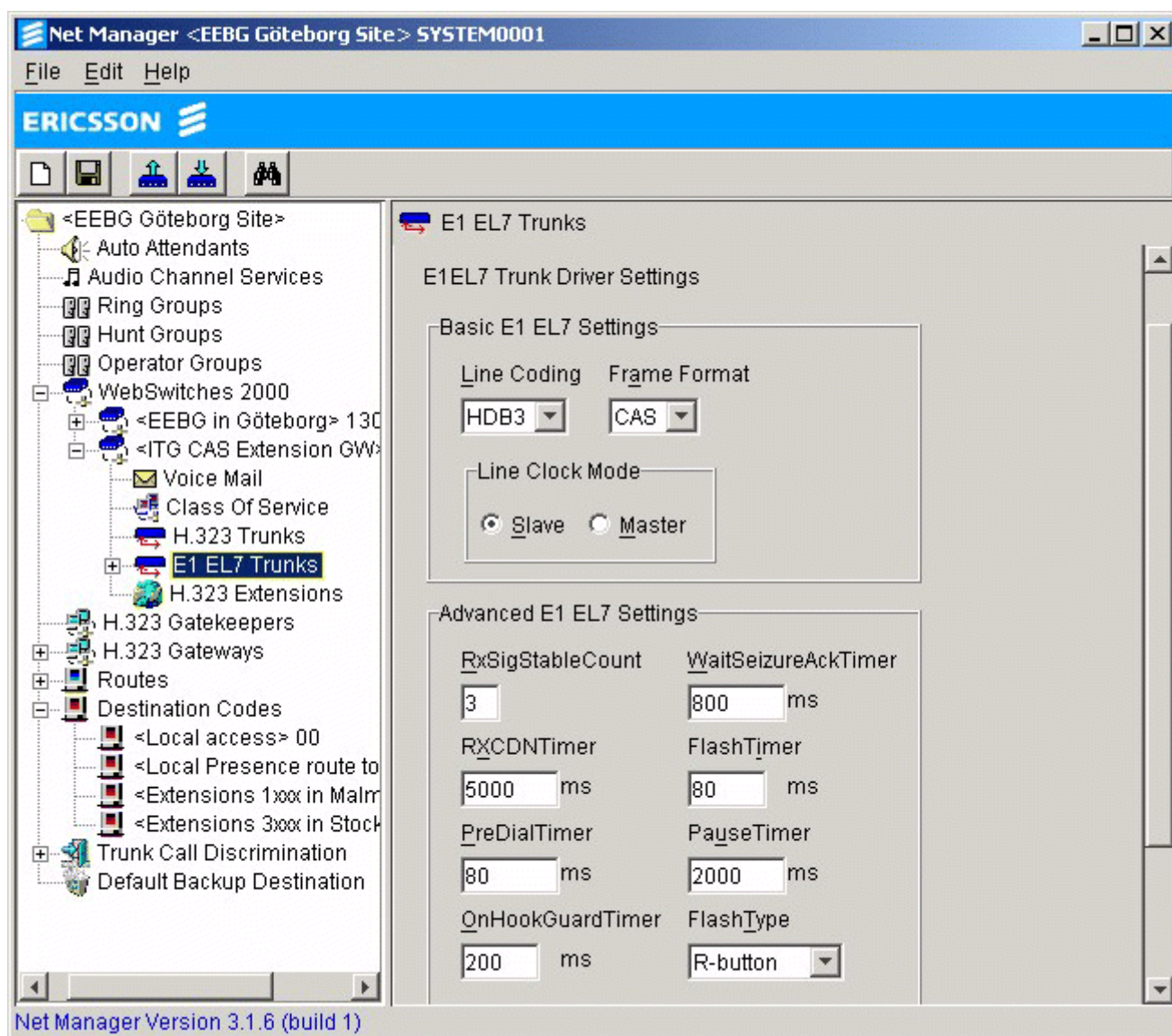


Figure 20: Set up CAS EL7 parameters

As with standard WebSwitch releases, a default route 0 and destination code 00 exist and will automatically be associated to the CAS EL7 trunks. In this configuration, they will not be used, so they are to be ignored.

4.4.3

SET UP H.323 EXTENSIONS FOR THE DRG OR WIRELESS LAN EXTENSION

The next step is to define the DRG extensions and optionally the Wireless LAN extensions that will be associated to CAS extensions in the MX-ONE. It is assumed that the number range in the MX-ONE is 5000-5029, then 30 extensions in the ITG are created with a range of 5000-5029. From the ITG perspective, the DRGs and Wireless LAN extension will be seen as H.323 extensions. The DRG will *register* each analog port as individual IP extensions. Each Wireless LAN extension will register as one H.323 extension.

Therefore, enough H.323 extensions must be defined to correspond to the total DRGs ports and Each Wireless LAN extension in the network as shown below. This can be done by right clicking on the H.323 extension Icon and selecting *add H.323 extensions*

. Fill in the first extension number in the range and the total number that are going to be defined.

Note: Any H.323v2 compliant Wireless LAN System will work against the ITG. However, it is strongly recommended to perform a thorough inter operability test before putting any system into service.

4.4.4

HOT-LINING EXTENSIONS TO CAS-EL7 CHANNELS

Each extension must be *hotlined* to an individual CAS EL7 trunk connected to the MX-ONE. This operation can be done on an extension-by-extension basis or as a group change as shown below.

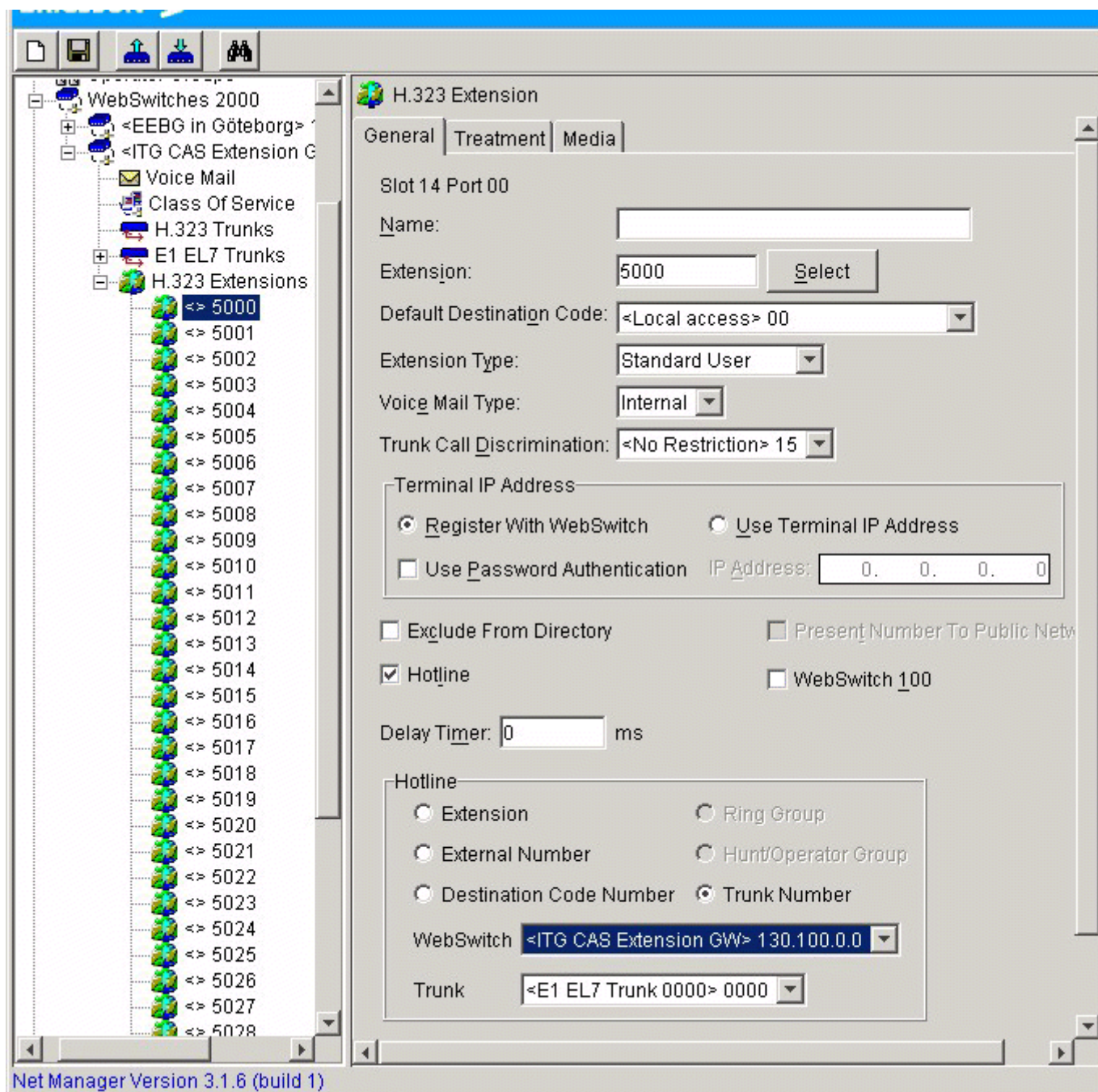


Figure 21: Hot Line of EL7 Channels

In this case, select the entire range and then check the hotline button. Then click on the *Trunk Number* radio button. The ITG in question will appear in the first drop down box and the list of trunks in the second. Select the first EL7 trunk in the range shown in the second drop down list. All the other extensions in the range will automatically be associated to the remaining EL7 trunk in order. This means that extension 5000 will be hot-lined to E1 EL7 trunk 0000, 5001 to 0001 and so on.

If some of the faxes and phones are connected to an EBG, then it is assumed that the EBG and ITG are part of the same *system* or cluster. It is necessary to go to the EBG and do this operation with each of the analog extensions to be hot-lined, rather than the H.323 extensions. The only difference is to select only the ITG system in the first drop down box after selecting *trunk numbers*, so that the E1 CAS EL7 trunk list will appear

4.4.5

HOT-LINING CAS-EL7 TRUNKS TO EXTENSIONS

The equivalent operation needs to be done in the other direction in order to make sure that each E1 CAS EL7 trunk is *hot-lined* to the extension it should be. This operation shall be done on a channel-by-channel basis, as multiple trunks may be hot-lined to the same extension or hunt group. Therefore, a group change is not possible in this case.

To do this, go to the first channel in the E1-EL7 list and the *hotline* radio button should already be selected, on page 32. Then in the hotline box, click on the extension radio button and choose the appropriate extension (5000, for example) from the drop down list.

This operation needs to be repeated for each channel.

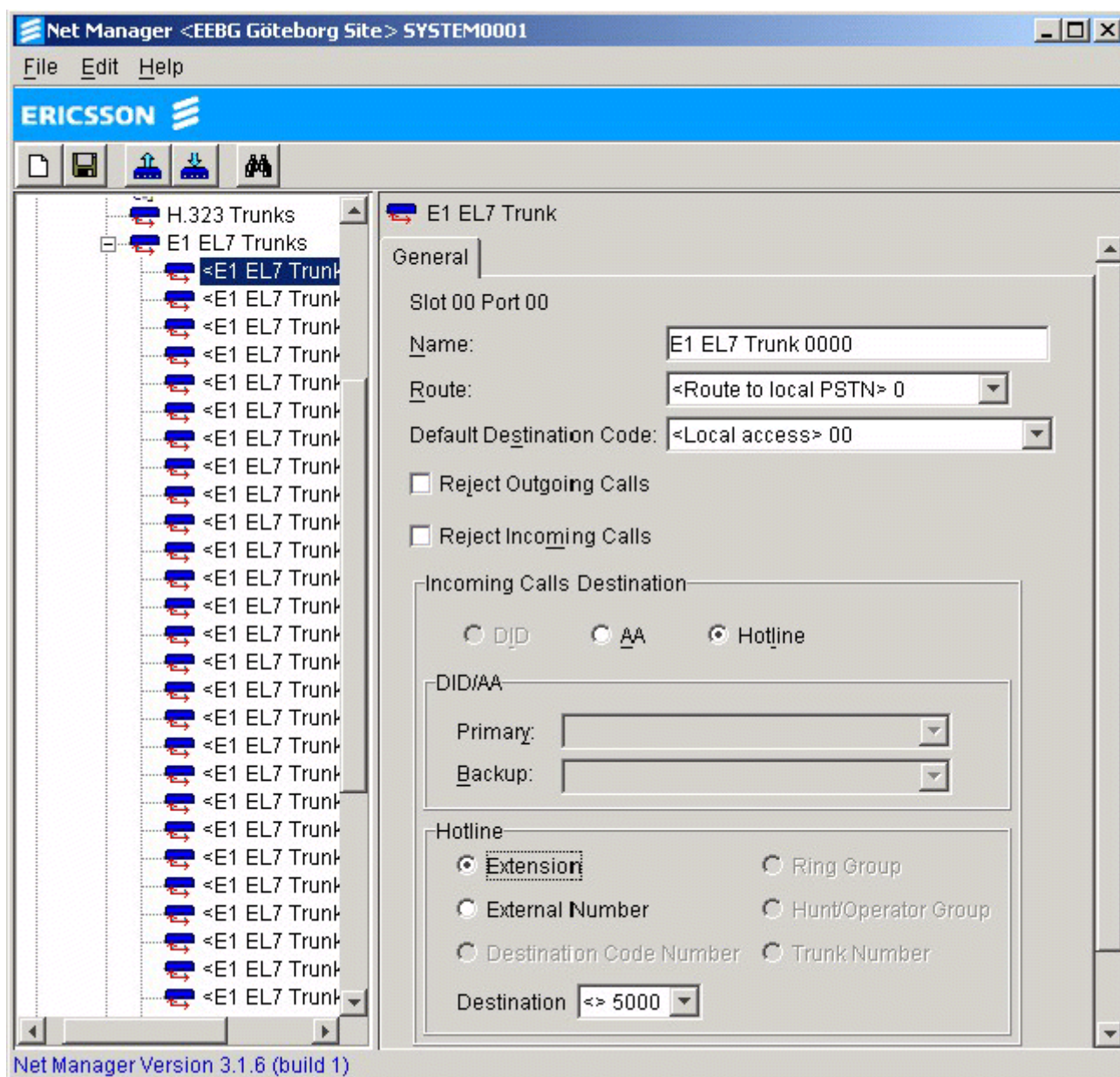


Figure 22: Hot line of EL7 trunk to extensions

Should some of the CAS channels be reserved for faxes or phones connected to the EBG, then the only difference is that the selection of extension must correspond to an analog extension on the EBG, instead of an H.323 extension in the ITG. As the EBG is in the same cluster as the ITG, the EBG's analog extensions will also appear in the list.

Download the configuration to the ITG (and EBG) and reset the systems for these changes to be taken into account.

The result of this operation will mean that faxes or phones that go off hook in the DRG or EBG will be automatically connected to a specific CAS trunk in the MX-ONE and receive dial tone from the MX-ONE. The Wireless LAN phones will also work in the same way, so that when the send button is pressed, the connection is established directly with MX-ONE CAS channel and they will receive dial tone from the MX-ONE. If a number was keyed in first, the number is buffered until the dial tone is detected and then passed to the MX-ONE. In the case of an incoming call on a CAS channel from the MX-ONE to the terminal, the call will be automatically connected to the *hotline* extension in the ITG or EBG and the extension will ring.

All extensions will be treated like a normal extension by the MX-ONE. Therefore, these terminals have access to the same functions as normal extensions on the MX-ONE and may invoke a large variety of MX-ONE features. For DRG terminals, these functions are invoked using hook flash (or R button) and DTMF commands similar to an analog extension (for example, *21*3500#). The same applies for Wireless LAN phones, except features can be stored in the function keys and invoked directly by pressing the function key.

4.4.6 INSTALLING WIRELESS LAN TERMINALS

The installation and configuration procedure of wireless LAN terminals and Access Points are not covered in this document. It is recommended that an authorized partner for the specific vendor equipment shall conduct or assist with this procedure.

4.5 MX-ONE CONFIGURATION FOR EBG, ITG AND DRG USING CAS EXTENSION

4.5.1 EBG

Each branch node shall be tied to a specific Domain within the IP-extension, for more details see the command `ip_domain`.

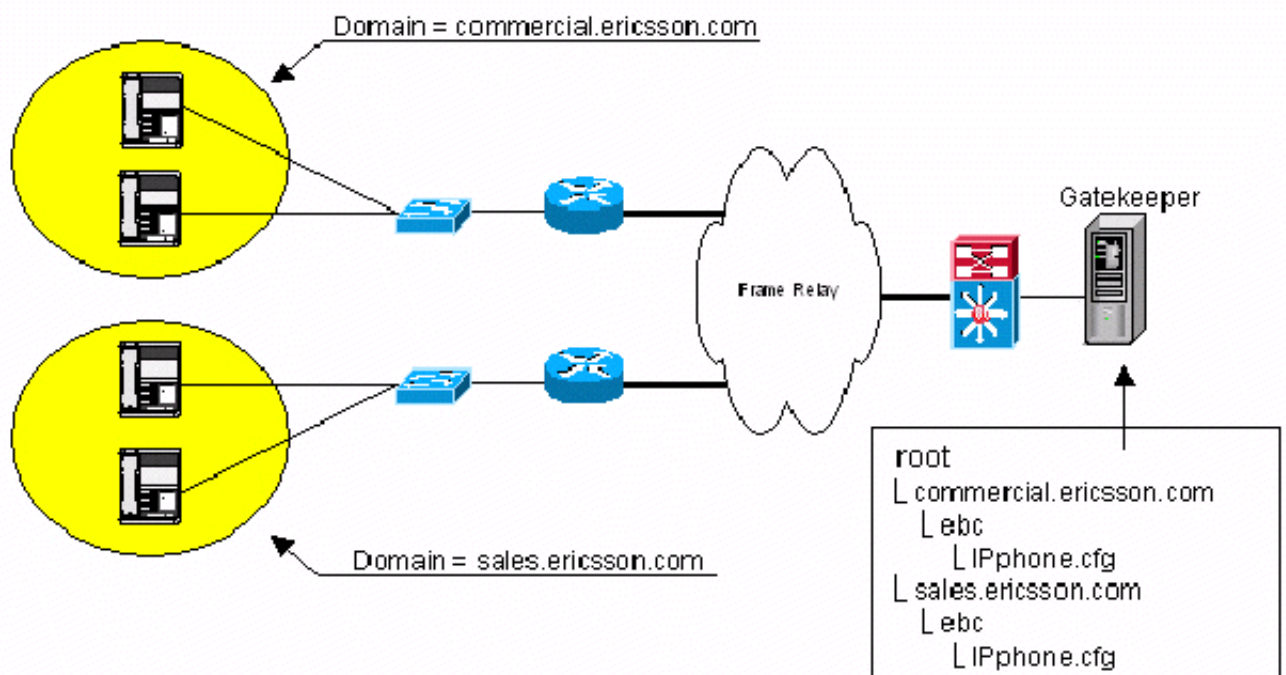


Figure 23: Example of domain usage

The IP phone will address the Internet Information Server (IIS) with a unique Domain name in order to fetch a specific configuration file containing the IP-address of the EBG.

If the bandwidth between the branch node and the main office is limited it is recommended to use the Call Admission Control (CAC) feature, for more details see the command *ip_domain* .

The branch node extensions shall be initiated as normal IP-extensions in the main site.

4.5.2

LOCAL PRESENCE

The local presence feature is, in MX-ONE point of view, an ordinary IP Networking access using an IPLU/SPU4, which is directly connected to LAN/WAN.

It is recommended that all EBGs are reached via the same route.

The route towards an EBG shall be programmed as a public route without net services. For more details regarding configuration of public access see the command description for *ROUTE DATA*, *RO* and command description for *IP NETWORKING*, *RI* and parameter description for *TL65*.

In order to distinguish between the different branch offices one of the following alternatives can be followed:

- Each branch node can be given a unique customer number.
Then, when a branch node extension is making an outgoing public call, the customer number is used to determine the local EBG which is going to be used for the local PSTN call, this is done with the destination data in the *RO*-commands. For more details see the command description for *ROUTE DATA*, *RO*. The same customer number is tied to both the extension number and the external destination code.
- An area code can be associated to the domain that the branch node is tied to. Then, when a branch node extension is making an outgoing public call, it is possible to add the area code to the dialled number by means of LCR tables, in order to take the destination towards the local EBG which is going to be used for the local PSTN call. For more details, see the command *ip_domain* and see the description for *LEAST COST ROUTING*, *LCR*.

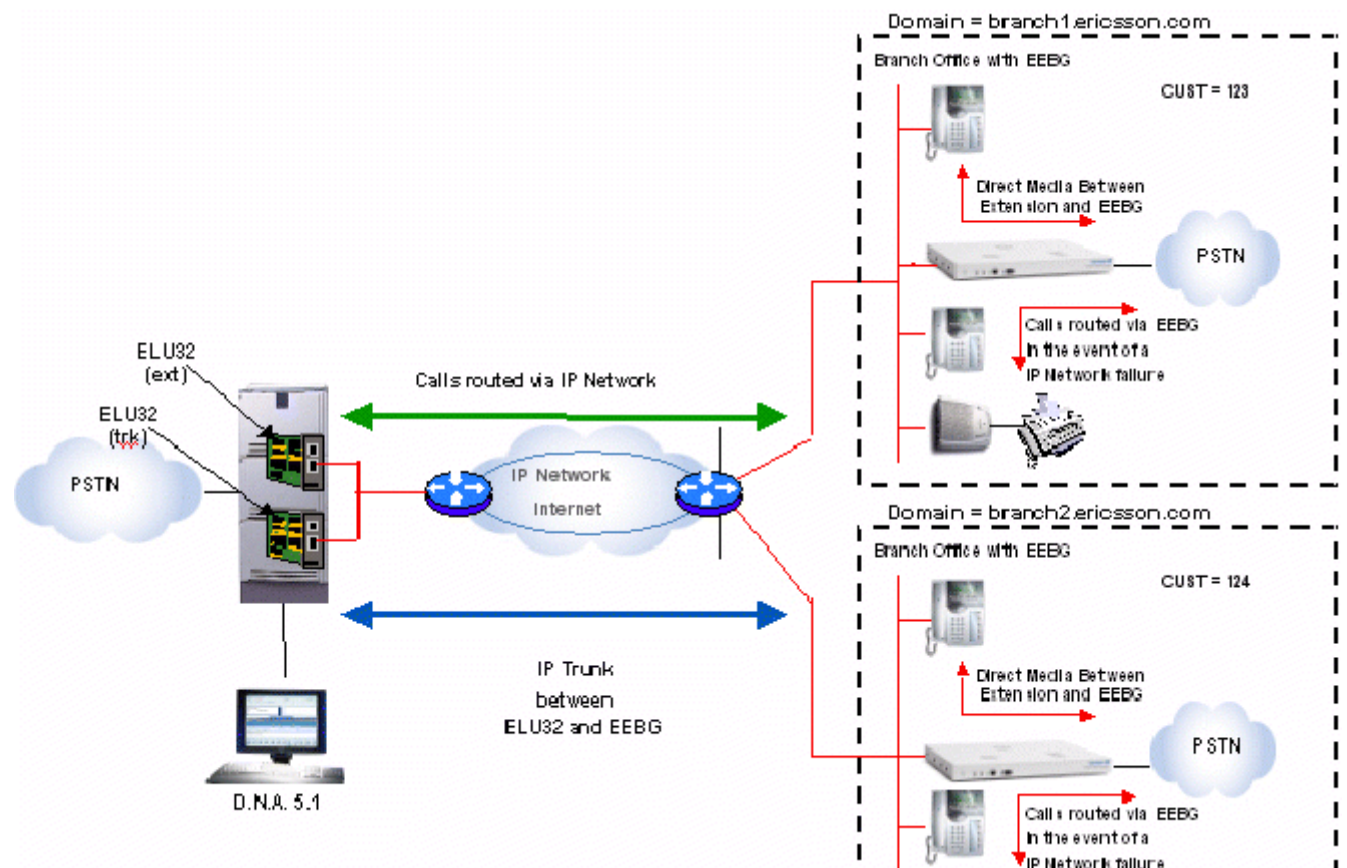


Figure 24: Branch nodes with domain names and customer number

Another benefit with local presence is the ability for users in the main site or other branch nodes as well to use the IP-network for local hop-off call see the description for *LEAST COST ROUTING, LCR*. This will utilize the local PSTN connection at the EBG more efficiently.

4.5.3

CAS EXTENSION

The CAS extension feature is used for fax calls and for analog phones connected to the DRG, the DRG is registered at the ITG which has a hotline function activated to the CAS extension interface (4.4 ITG configuration for IP gateway towards EBGs using Net Manager for V3.1.6 or higher on page 27)

If a the DRG is intended for fax calls it is absolutely required that in the codec selection menu (in the DRG) that the G.729 codec is not selected.

The CAS extension in MX-ONE must have the following parameter setup:

- Use Mobility Server (TYPE-parameter)
- Define each extension with a customer number that the extension (branch/domain) belongs to (CUST-parameter)

For more details regarding configuration of CAS Extension see the command description for *ANALOG EXTENSION*.

5

TERMINATION

The following steps shall be followed when the configuration of the EBG and/or ITG have been altered:

- Download the configuration to the EBG and/or ITG via the Net Manager.
- Do a reset of the EBG and/or ITG.