AT&T VOIP
Nortel BCM 50 (Release 1.00.2.04j)
Configuration Guide
For Use with AT&T
IP Flexible Reach Service

Issue 2.3
3/02/2007

BCM50

TABLE OF CONTENTS

TABLE OF FIGURES

1 Introduction

This document provides a configuration guide to assist Nortel Networks BCM administrators in connecting to AT&T IP Flexible Reach service.

1.1 Document Change History

Issue 1.0	October 12, 2006; first general release
Issue 2.0	November 29, 2006; updated fax support via PSTN
Issue 2.1	01-11-2007; modified section 4.3 to reflect that Customer Care is to be contacted for IPBE IP addresses for customer IP PBX. Also indicated the specific software release on the title page.
Issue 2.2	02-12-2007; 1) modified section 4.2 for clarity of IP trunks and line pool configuration. 2) Added CCG disclaimer statement at end of document. 3) Modified cover page.

2 Special Notes

Emergency 911/E911 Services Limitations

While AT&T IP Flexible Reach services support E911/911 calling capabilities in certain circumstances, there are significant limitations on how these capabilities are delivered. Please review the AT&T IP Flexible Reach Service Guide in detail to understand these limitations and restrictions.

Failover to an Alternate AT&T Border Element Not Supported

BCM does not support failover to an alternate AT&T Border Element. BCM must be configured to send to one specific border element.

Unattended Call Transfers are not supported

An unattended transfer is one in which the recipient of the transfer has not answered the phone prior to the transfer. This type of transfer is not supported with BCM and the AT&T Network. For example, if a call with the AT&T network is transferred by BCM phone 1 to BCM phone 2, phone 2 must answer prior to the completion of the transfer by phone 1.

Fax Limitations

Fax limitations include the following:

- T.38 fax is not currently supported with the IP Flexible Reach service
- IP Flexible Reach service supports fax using G.711; however, this is not supported by the BCM 50 today when configured to use G.729 as the first preferred codec. There is an issue where the BCM does not automatically detect fax/modem tones and switching the call to G.711. This will be corrected in future releases.
- To work-around this limitation; the BCM supports fax by using analog/POTS lines to the PSTN. BCM-GATM-8 or BCM-GATM-4 media bay modules are required to interface with analog/POTS lines. **NOTE:** four analog lines are included on the base BCM 50 chassis.

3 Overview

This section provides a service overview of the Nortel Business Communication Manager 50 (BCM 50) IP PBX integration with AT&T IP Flexible Reach service. For an overview of Nortel BCM 200/400 for IP Flexible Reach; please reference a separate document named “Nortel BCM 200/400 Configuration Guide.”

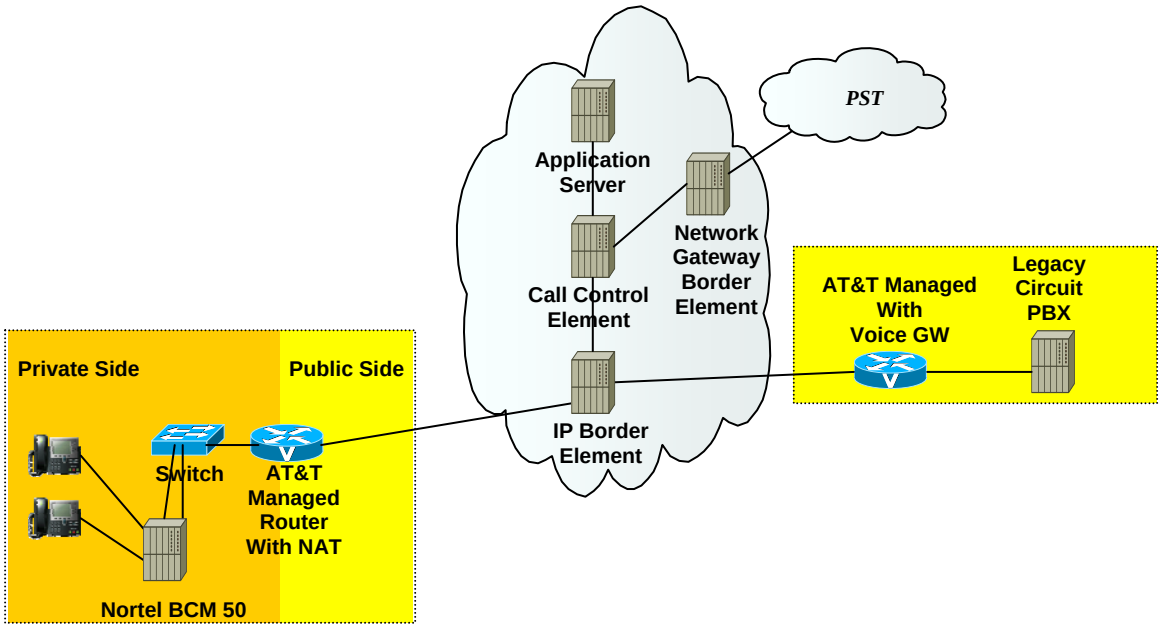

Figure 1: AT&T IP Flexible Reach Network

The Nortel BCM customer premises site shall consist of the following components.

- Nortel IP 200x and 11xx phones – These phones use the Nortel proprietary UNIStim signaling protocol to communicate to the Nortel BCM 50 IP PBX for call feature and routing support. These phones can be connected to a Nortel Ethernet switch (ES 470, ERS 5520, etc.) that supplies in-line power (IEEE 802.3af) to the phones.
- Nortel IP 2050 Software Phone – The IP 2050 is a soft phone client application that uses the Nortel proprietary UNIStim signaling protocol. The following are system requirements for the IP 2050 software phone:
  - Pentium-compatible CPU (200MHz or higher)
  - 128 MB of memory (Windows 2000, XP)

  - 64 MB of memory (Windows 98)
  - 55 MB of free hard drive space (all languages)
  - Monitor settings: 16-bit high color; 800x600 resolution or higher
  - USB port
  - Nortel USB audio kit
  - Supported OS; Windows 2000 Professional, Windows 2000 Professional Service pack 1 & 2, Windows 98, Windows XP Professional and Windows XP Home

- The following interfaces are provided on all three variants of the BCM 50 main module:
  - 12 digital station ports supporting digital phones.
  - 4 Analog Loop Supervised Trunks (NA networking standards).
  - 4 Analog Station interfaces with message waiting and CLID support.
  - 3 port 10/100 Ethernet switch with auto sensing and auto polarity. Two of these ports also support connection of optional expansion units.
  - 1 10/100 Ethernet port reserved for direct access management of the system
  - Integrated CallPilot voice mail system
  - T1 voice card for connection to the local PSTN.

The following routing scenarios are supported by the Nortel BCM IP PBX and **DO NOT** use the AT&T Call Control.

- Local Nortel BCM phone to other local Nortel BCM phone
- Local fax machine to other fax machine via PSTN

The following routing scenarios are supported by the Nortel Networks BCM IP PBX and **DO** use the AT&T Call Control. For voice calls, the G.729 codec shall be used.

- Nortel BCM phones to PSTN (domestic US and international).
- Nortel BCM phones to legacy PBX site with Cisco gateway.
- Legacy PBX site with Cisco gateway to Nortel BCM phones.
- Nortel BCM phones at one Nortel BCM IP PBX site to Nortel BCM phones at another Nortel BCM IP PBX site.

If the customer has subscribed to Calling Plans B and C (Local), then the following routing scenarios are supported by the BCM IP PBX and **DO** use the

AT&T Call Control. For voice calls, the G.729 or G.711 codec may be used. BCM selects G.729 as the highest priority codec.

- Inbound PSTN to BCM phone
- Outbound local PSTN calls from the BCM phones.
- Outbound local N11 (i.e. 411, 911) calls from the BCM phones

4 Configuration Guide

This configuration guide specifies the Nortel BCM 50 screens that must be configured and updated to support the AT&T IP Flexible Reach service.

4.1 Nortel BCM Version and Feature Requirements

The Nortel Networks BCM must be running release 1.00.2.04j. You can check the version of BCM by viewing the following screen.

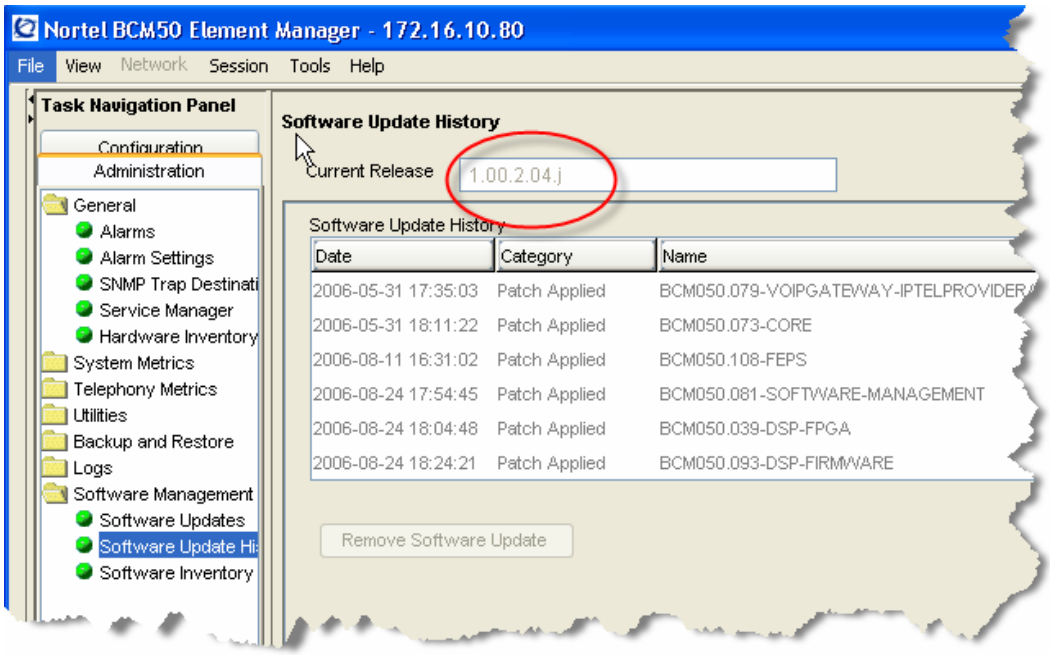

Figure 2: BCM 50 Software Version Number

Ensure that the current release field specifies **1.00.2.04j**. This is the supported release that is required for AT&T IP Flexible Reach service.

The following BCM 50 patches must be applied. To verify installed patches: under the BCM Unified Manager's "**Administration**" tab, click on "**Software Management**" and select "**Software Update History**."

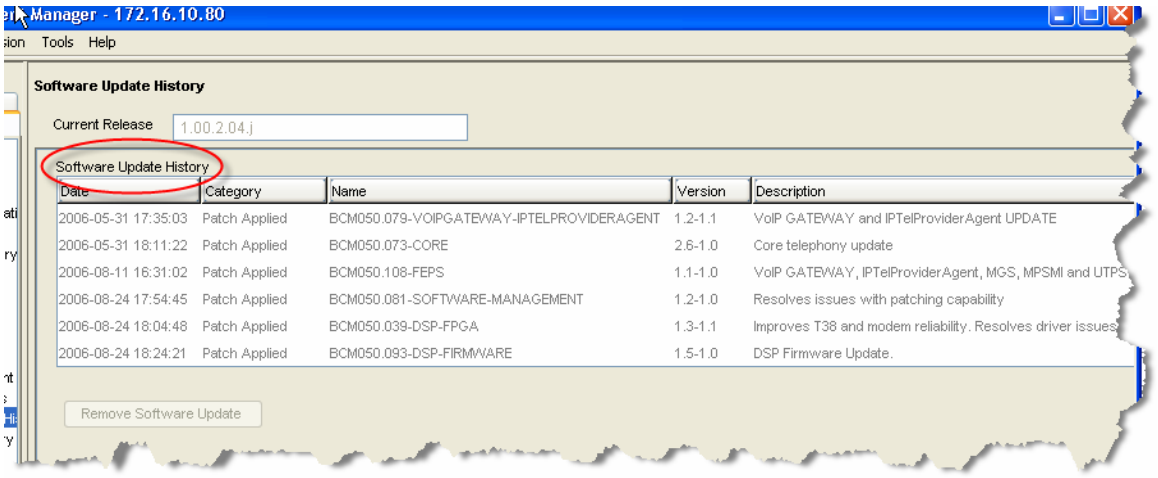

Figure 3: BCM 50 Lists of Applied Patches

4.2 IP Trunks

Voice over IP (VoIP) trunks are signaling channels that simulate how CO lines work. However, VoIP trunks transmit data to the IP network over a LAN or IP network rather than over physical lines. Once the VoIP trunks are set up, you can assign them to line pools, and program their behavior in the same way you would PRI lines.

VoIP trunks use line numbers 001 to 012. These line records appear under Configuration -->Telephony -->Lines -->Active VoIP Lines. To access VoIP lines, you need to enter software keycodes. Each keycode supports a specific number of Trunks. No entries appear in the Enabled VoIP lines field until you complete the IP Trunks Settings field, which displays when you click IP Trunks under Configuration -->Resources -->Telephony Resources -->IP trunks.

VoIP trunks should be configured to use a single line pool, per VoIP trunk type. Do not mix other trunk types on the same line pool. The VoIP line pools are assigned to routes, which, in turn, are configured with destination codes that route calls to the AT&T IP Flex Reach network.

You can also create a fallback for the trunk. This is a situation where the system reroutes the call to a PSTN line pool if the primary route is not available or the

call quality is not suitable. If you do not configure your network for fallback and the call quality is below threshold, the IP call fails.

Check under ***Configuration*** -> ***Telephony*** -> ***Active VOIP Lines*** to see if Trunks have been allocated (See Figure 4 below). You should have a number of H.323 trunks displayed. The total number of lines indicated corresponds to the number of IP trunks licensed by Nortel for your BCM.

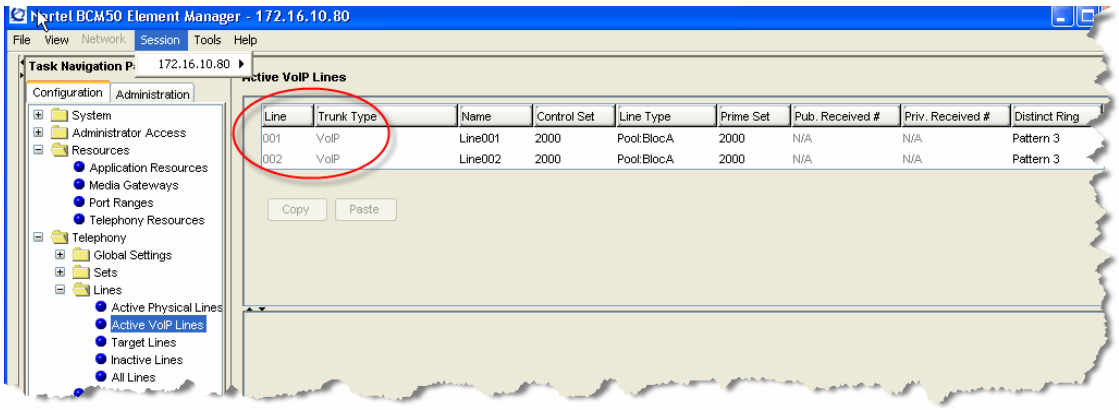

Figure 4: Available H.323 IP Trunks

Under ***Configuration*** -> ***Telephony*** -> ***Dialing Plan***; (See Figures 5 & 6 below) select "**Line Pools.**" In this case we selected "**BlocA**" under the "**Pool**" tab. We will use this line pool to access the VOIP trunks. Additionally, all DN numbers that need to access the VOIP trunks must be added to this pool. Please see the following screen shots for an example configuration.

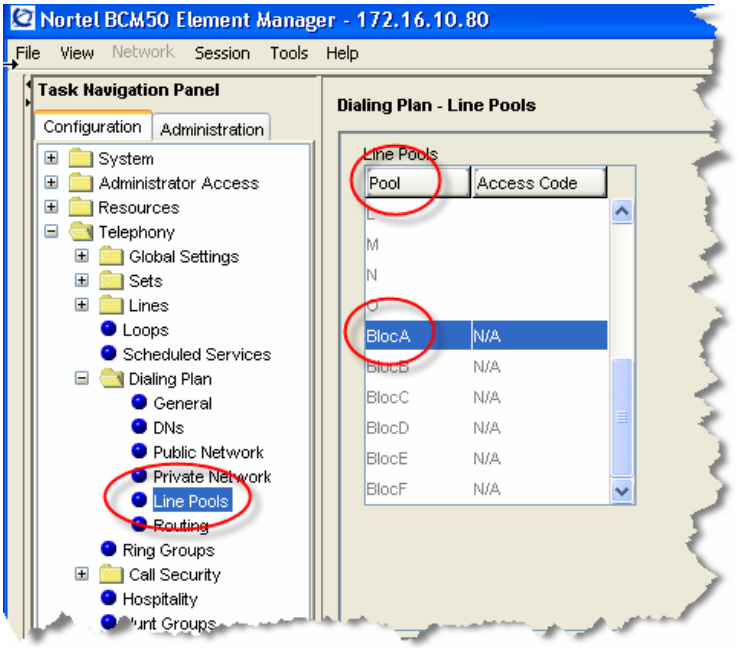

Figure 5: Assigning Line Pool to IP Trunks

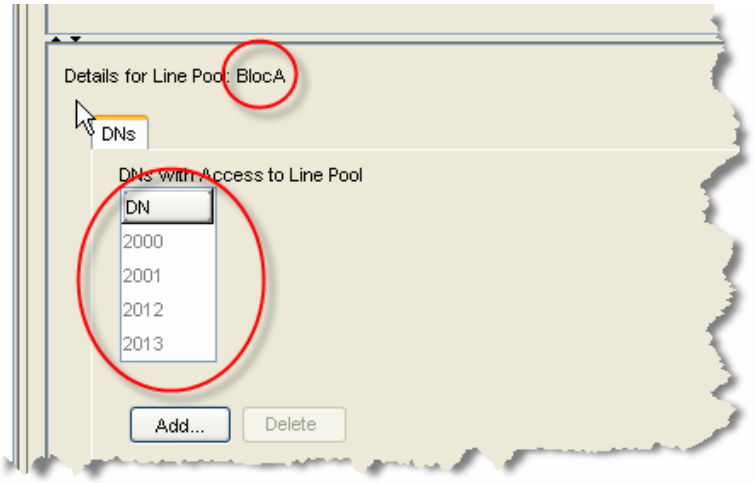

Figure 6: Assigning DN to Line Pool

Under ***Configuration → Telephony → Dialing Plan→*** **Routing** (See Figure 7 below)**:** Select the "**routes**" tab and ensure there is an entry for "**BlocA**." In this case "**001**" is the route number and the DN type is specified as "National."

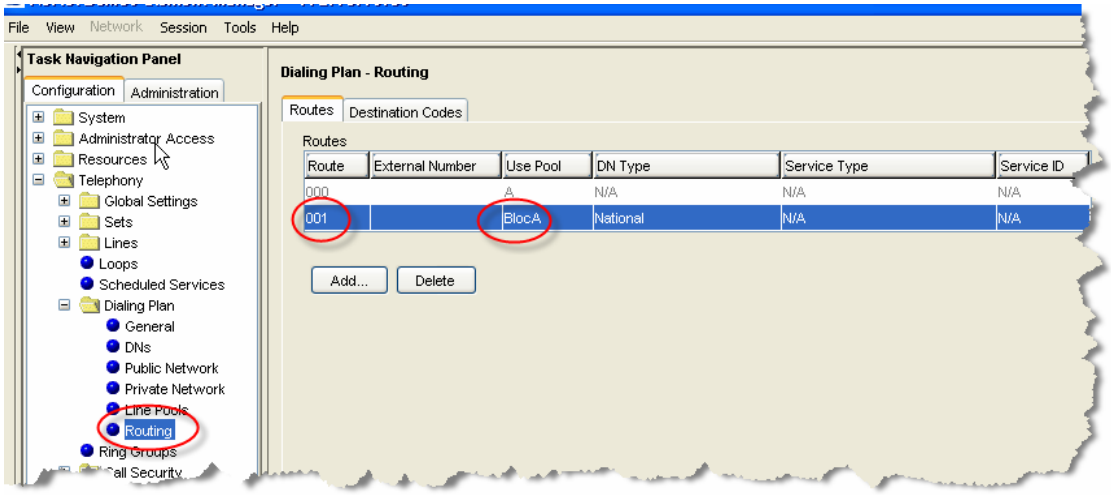

Figure 7: Assigning a Route for IP Trunks

Under ***Configuration → Telephony → Dialing Plan→*** **Routing** (See Figure 8 below)**:** This time select the "**Destination**" tab to assign an access code for the IP trunks. Configure a destination code "**9**" or to whatever code you want to access for outside (IP off-net) call that will be presented to the AT&T service for routing. In this case, when "**9**" is dialed we wish to push the dialed string to the IP trunk for routing.

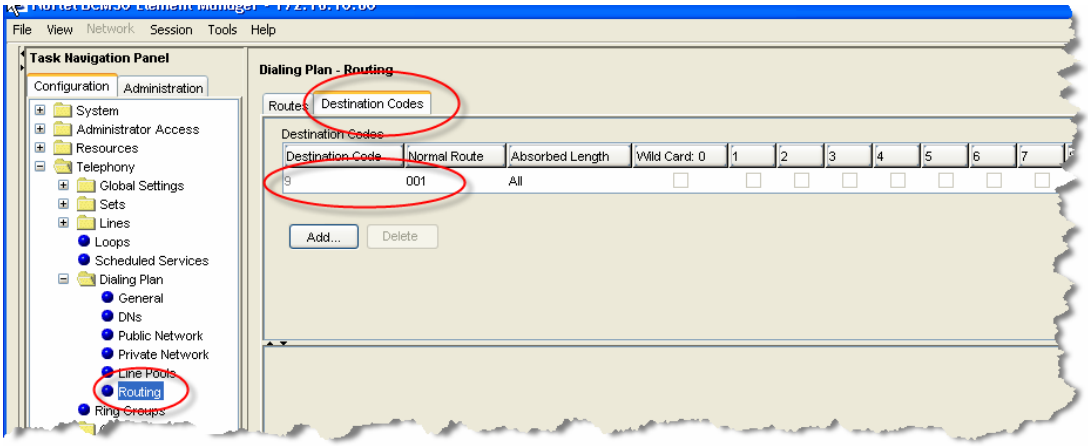

Figure 8: Assign Code to Access IP Trunk Routes

4.3 H.323 Gateway Parameters

Configuration→ Resources→ Telephony Resources:

Select module type "**IP Trunks**" and click on the "**Local Gateway**" tab:

- On this screen we need to populate the **Call Signaling** as "**Gatekeeper Routed no RAS**"
- **Alias Name**: The AT&T IP Flexible Reach service does not require a H.323 ID name. However, the BCM was tested with a H.323 ID name and Nortel recommends that the customer provides a name in this field.
- **H.245 tunneling** must be enabled.
- For the **Call Signaling Port** use **1720** as a value.
- Make sure the **Primary Gatekeeper IP** is populated with the correct AT&T IPBE IP address. Sample IP addresses are shown next.
  - Primary Gatekeeper - **(please contact your Customer Care Representative for the AT&T IP border element IP address**)
  - Backup Gatekeeper – 0.0.0.0*****

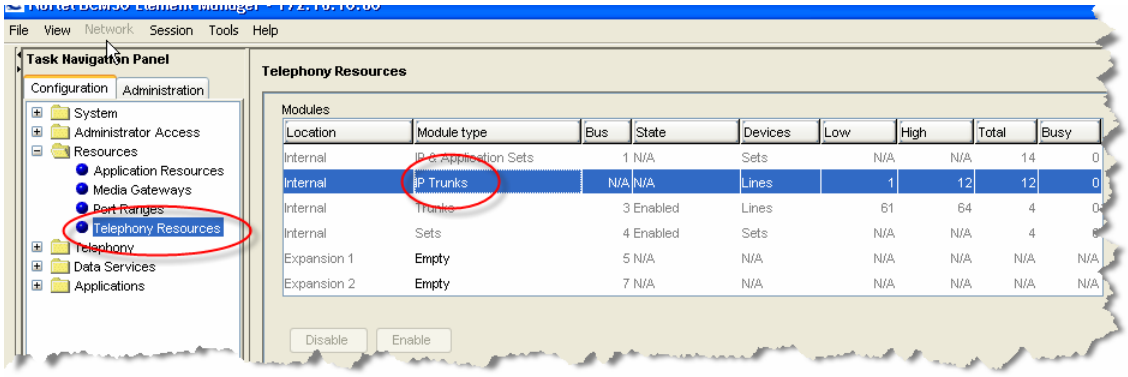

Figure 9: Selecting IP Trunk Module for H.323 Gateway

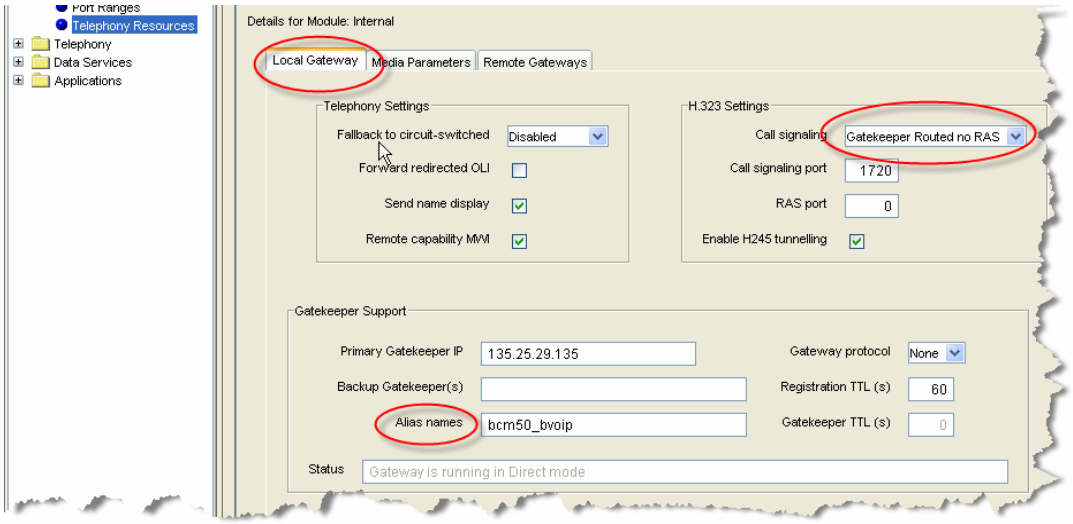

Figure 10: H.323 Gateway Parameters

*Note: the backup gatekeeper will not be support on the current BCM 50 release. The Nortel implementation is not compatible with the IP Flexible Reach service today. Nortel will provide support in a future release. In case of failure to the primary gatekeeper; the BCM will not be able to place any outgoing calls to the AT&T IP Flexible Reach service. The backup gatekeeper IP address (Please contact your Customer Care representative) must be manually configured in the "**Primary Gatekeeper IP**" field to restore outgoing calls. Additionally, the AT&T IP Flexible Reach service will send incoming calls to the BCM from multiple IP border elements. The BCM will accept calls from any border elements without additional configuration.

4.4 Media Parameters

Configuration→ Resources→ Telephony Resources:
Select module type "**IP Trunks**" and click on the "**Media Parameters**" tab: Within this screen; ensure that all values are exactly as the sample screen shot shown below:

- **1st Preferred Codec: G.729**
- **Silence Compression: Disabled**
- **Jitter Buffer – Voice: Auto**
- **T.38 Fax Support: Disabled**
- **G.729 Payload Size: 20**

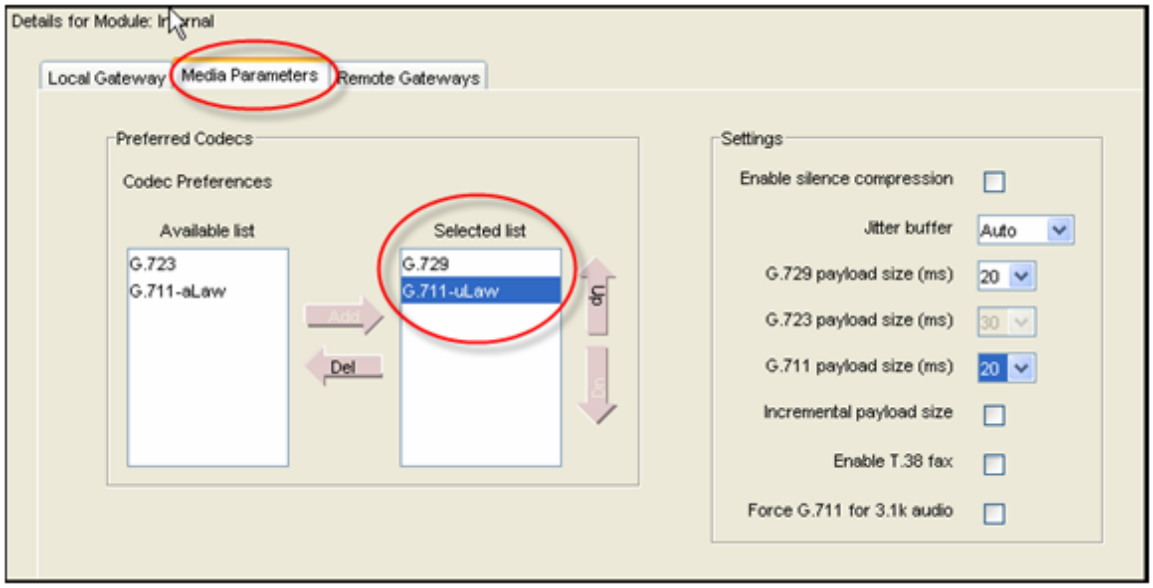

Figure 11: Media Parameters

4.5 Port Ranges

Configuration→ Resources→ Telephony Resources:

Select "**Port Ranges**" and use the values shown below. The default RTP ranges are from 28000 to 28255. This range is used for fax (T.38), digital phones and analog phones. The media gateway port ranges are configurable.

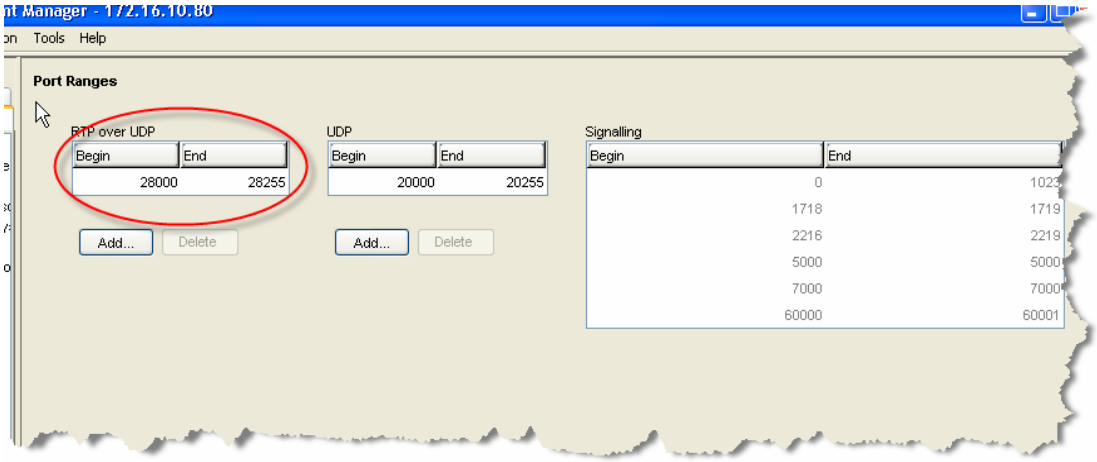

Figure 12: Media Gateway Port Ranges

The BCM IP phone's RTP and RTCP port range are 51000-51399. Each IP phone call uses two ports. The default port range for RTP and RTCP are not configurable.

4.6 Configuring Outgoing Calls from BCM to AT&T IP Flex Reach

Configuration→ Telephony→ Sets → Active Sets

We will now associate the private DN number with the DID number. In the example below; 2000 is entered in the "**Private OLI**" field and 7323680459 is entered in the "**Public OLI**" field. This example enables "calling number translation" (outgoing) for this particular DN number.

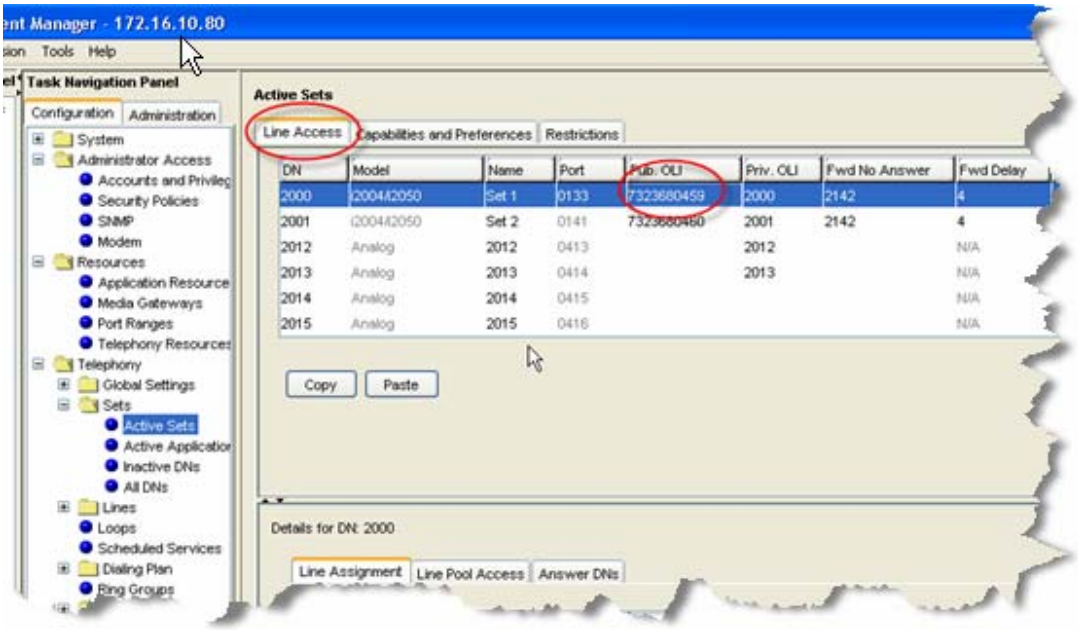

Figure 13: Configuring DID for Outgoing Calls

4.7 Configuring Incoming Calls from AT&T IP Flex Reach to BCM

Configuration→ Telephony→ Sets → Active Sets

We will now configure the "called number translation" (incoming) for the DN number. In our example, go to the "**Line Assignment**" tab located at the bottom of the "**Line Access**" page. Enter 2000 in the "Private" received number field; then enter the 7 digit DID (Public number) in the "public" received number. Incoming DID calls will be routed to telephones, based on the trailing portion of the digits received by the network. For example, Incoming calls from the AT&T IP Flexible Reach network will deliver a ten digit DID number, e.g. 7323680459. The BCM will route the call using the last seven digits, e.g. 3680459.

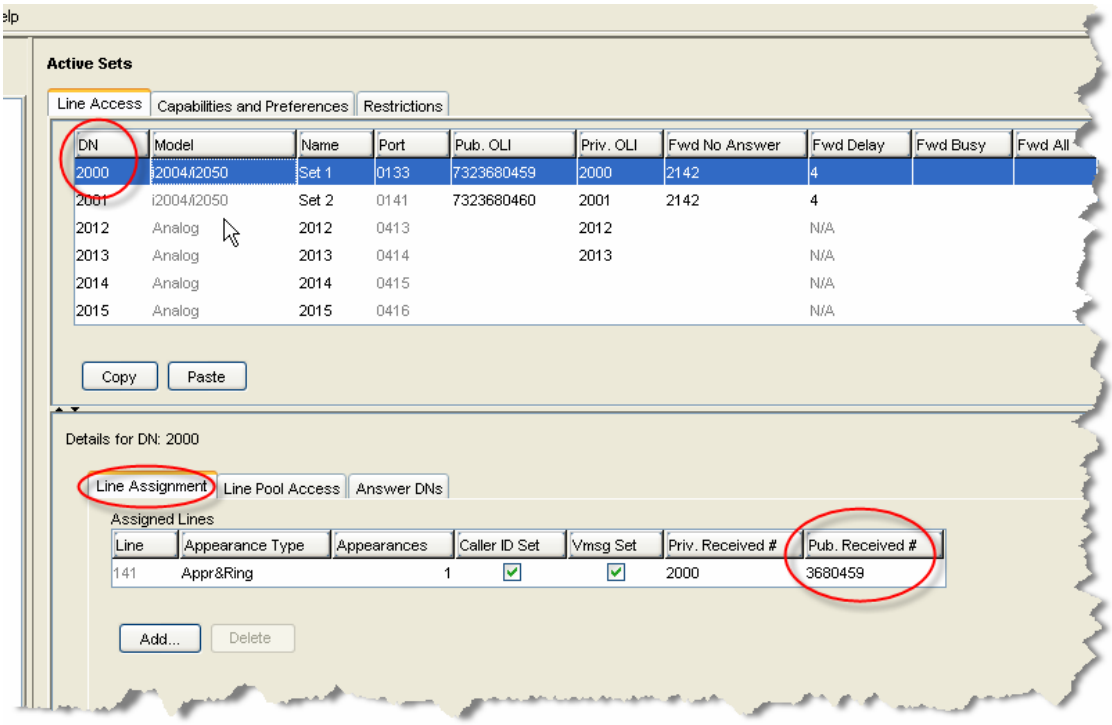

Figure 14: Configuring DID for Incoming Calls

Configuration→ Telephony→ Lines → Target Lines

To display the DID number on the IP phone LCD screen; under the "Target Lines" tab click on the assigned "Line" number of the DN you want to program. In our example below we click on "**Line 141**"; enter 3680459 in the "Name" field and then enter "DN 2000" for the "Control DN" field.

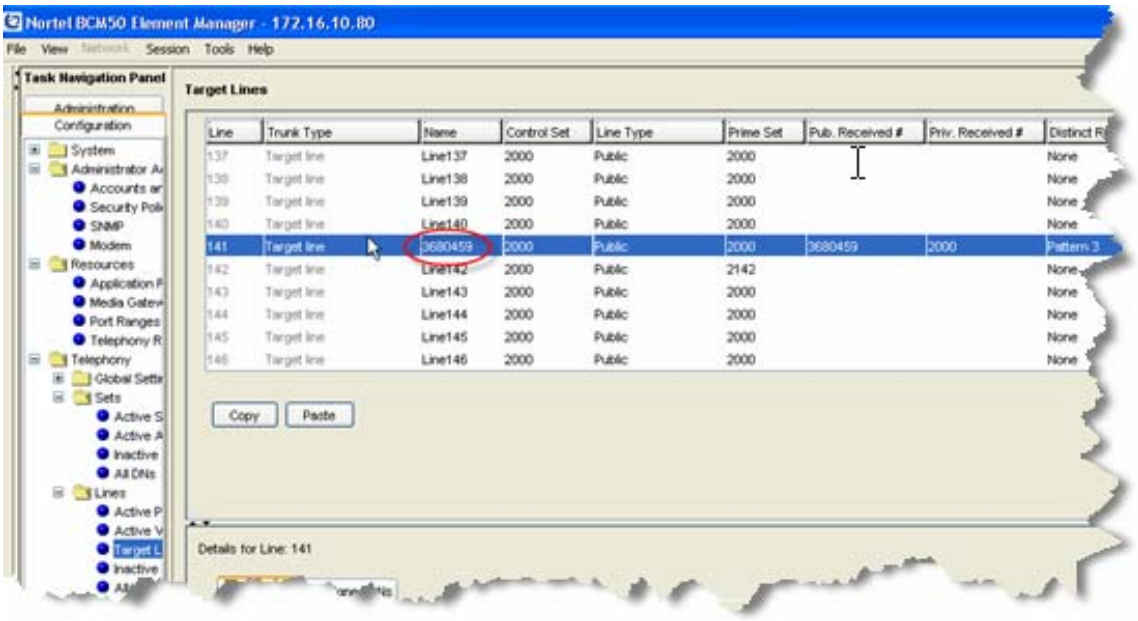

Figure 15: Display DID on IP Set LCD

Additionally, all telephone sets that need to access the VOIP trunks needs to be configured with the designated "**Line Pool" code**. In our example we defined "**BlocA**" as the code to access the VOIP trunks.

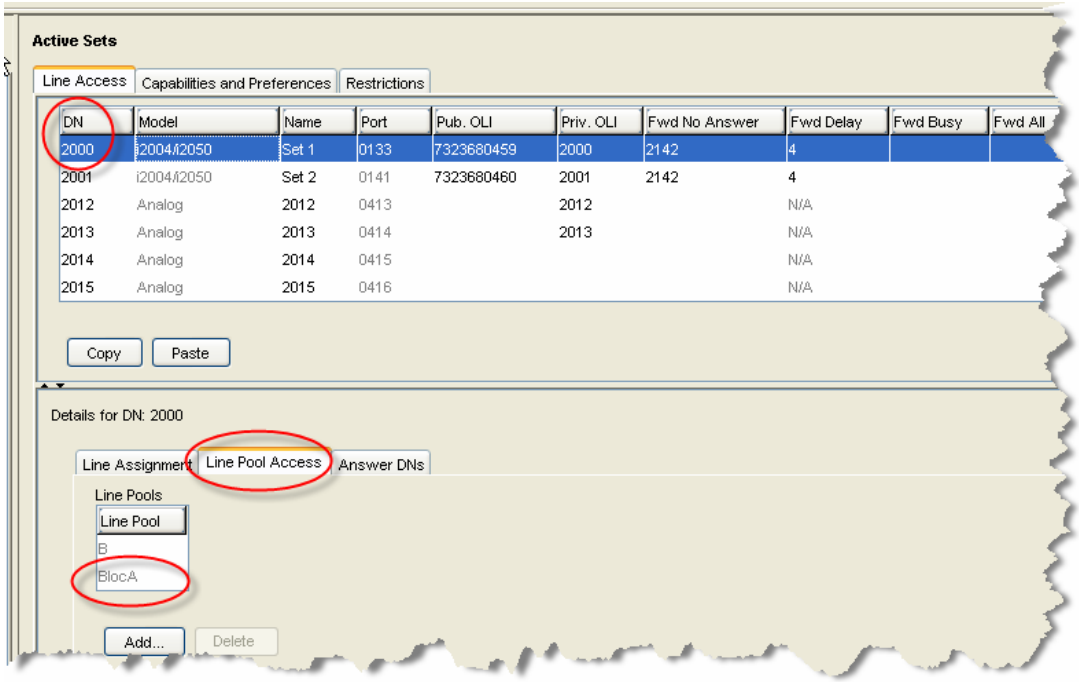

Figure 16: Assign Line Pool to IP Sets

5 Troubleshooting

This section provides some tips about troubleshooting problems

5.1 System Monitoring with BCM Monitor

A valuable application for performance monitoring is the BCM Monitor. It allows the BCM administrator to see the current status of various parts of the BCM system. Statistical information is provided on system throughput and other performance-related information, including system CPU usage (graph or table format) and memory usage (graph or table format).

If a performance display is active, it is automatically updated with real-time performance information in user-selectable time increments.

The focus of the real-time monitoring capabilities is:

- Overall system status
- Utilization of resources on the Media Services Card (e.g. signaling channel usage)
- Operation of telephony applications (e.g., Messaging, Call Center, etc.).
- IP telephony activity
- D-channel monitoring for PRI, BRI and VoIP trunks

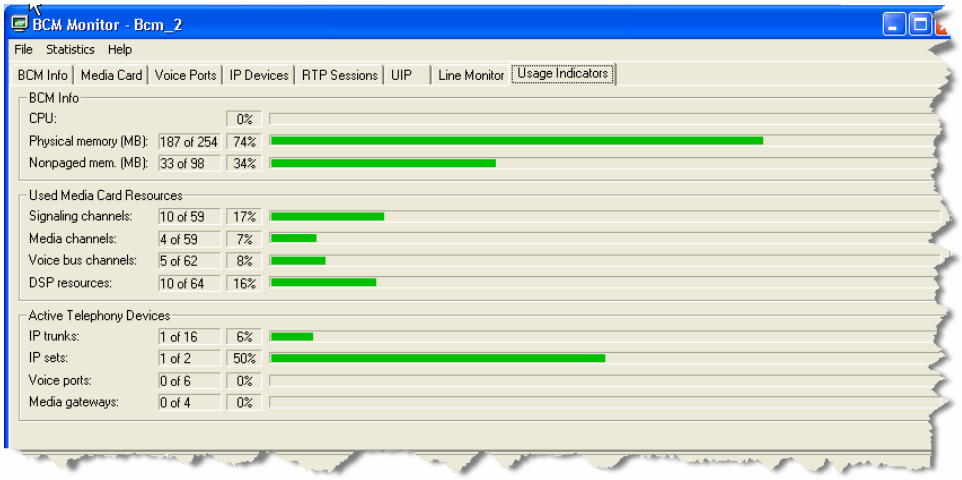

Figure 17: System Monitoring Example

The BCM Monitor application can be downloaded to an administrator's PC from the BCM and pointed at a specific BCM's IP address for monitoring. Multiple

instances of the BCM Monitor application can be used on a single PC to monitor several remote BCM systems at the same time.
Backward version compatibility is supported.

All of the registered IP devices can be viewed with the BCM Monitor. The screen shot below depicts IP Phone type, DN number and IP address of each registered IP phone. Additionally, if the device is active on a call the RTP session information is also displayed.

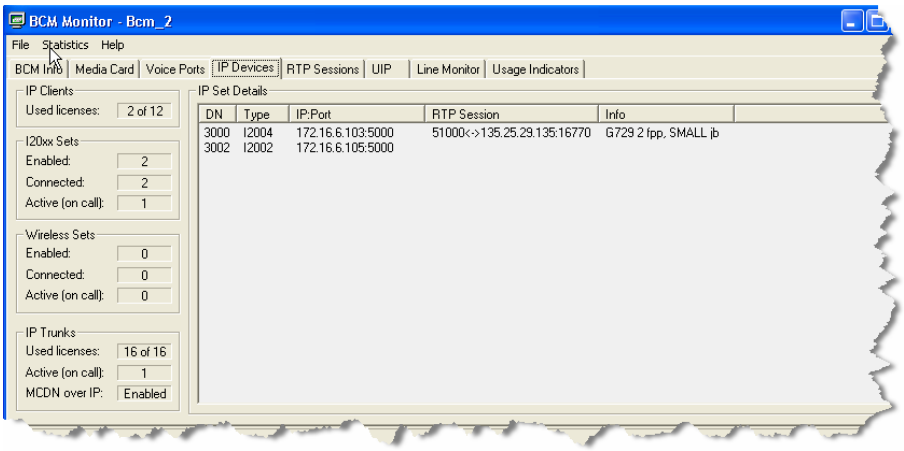

Figure 18: IP Device Listing

The end-to-end RTP sessions per IP call can also be displayed with the BCM Manager. The example below depicts an end-to-end call.

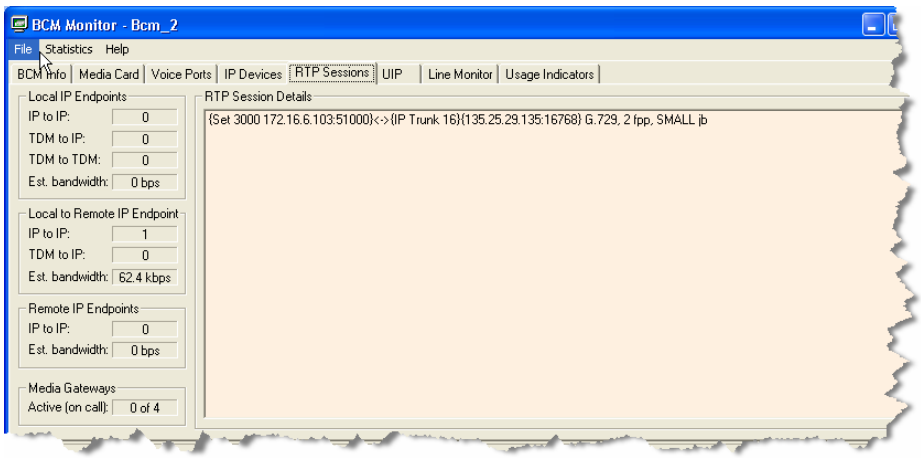

Figure 19: RTP Session Information

The BCM Monitor can be used to monitor incoming and outgoing trunks to determine if trunks are being busy or if they are idle. The example below depicts utilized lines used by local and remote telephone/DN numbers.

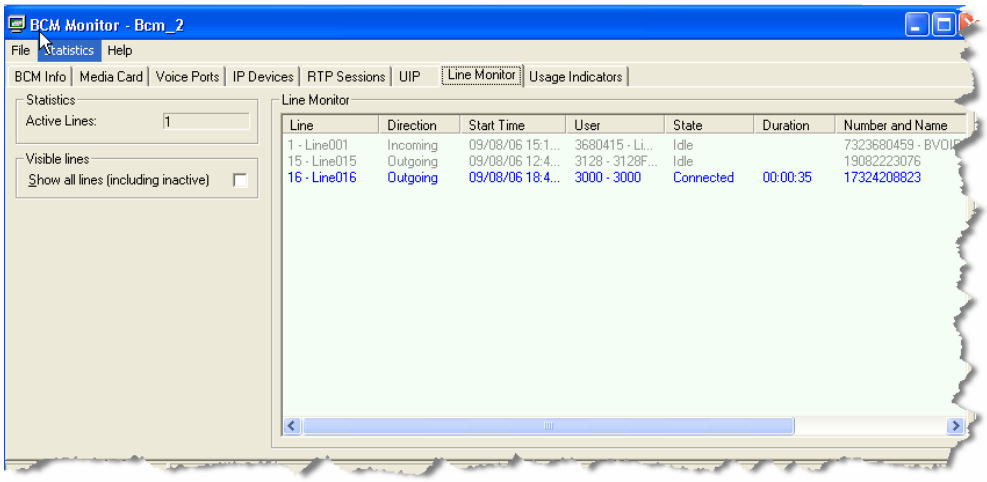

Figure 20: Line Monitor Information

The BCM Monitor can also be used to monitor all types of system usages. The following are some parameters that can be monitored:

- CPU utilization
- Physical memory
- Media card DSP utilization
- IP sets and IP Trunks
- Voice ports and media gateway usage

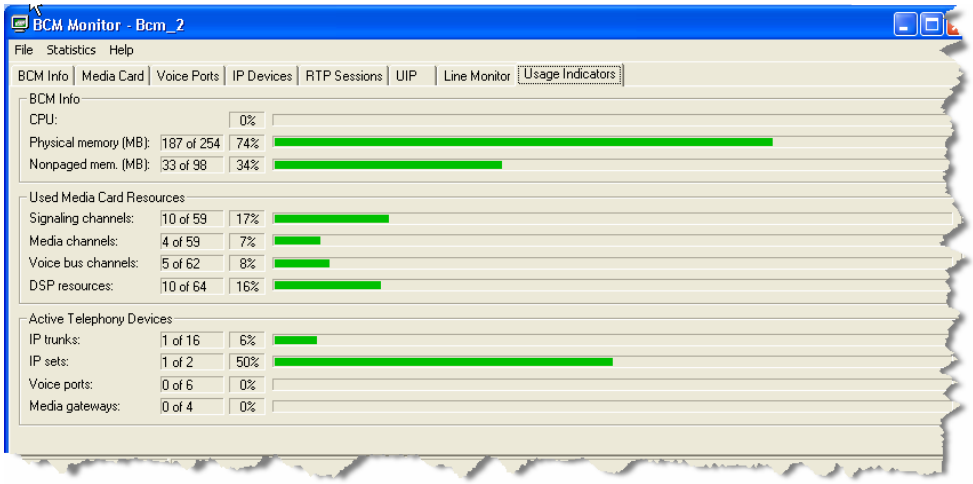

Figure 21: System Resources

5.2 Real-time display of BCM 50 Alarms

Administration→ General →Alarms

The BCM 50 provides extensive alarm logs along with severity and problem descriptions. The following is an example screen shot of the "Alarms" display:

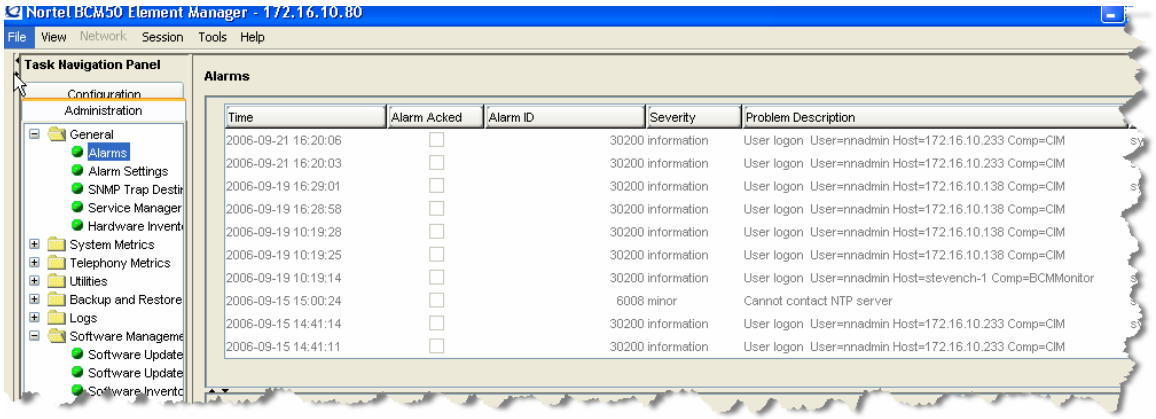

Figure 22: BCM 50 Alarms Page

5.3 Log Management

Another extremely useful tool is the “Log Management.” This allows you to quickly and easily collect all relevant logs files and other information to help the various support teams debug any problems you may have with your BCM 50. The entire log files required to diagnose a problem is consolidated into a single file.

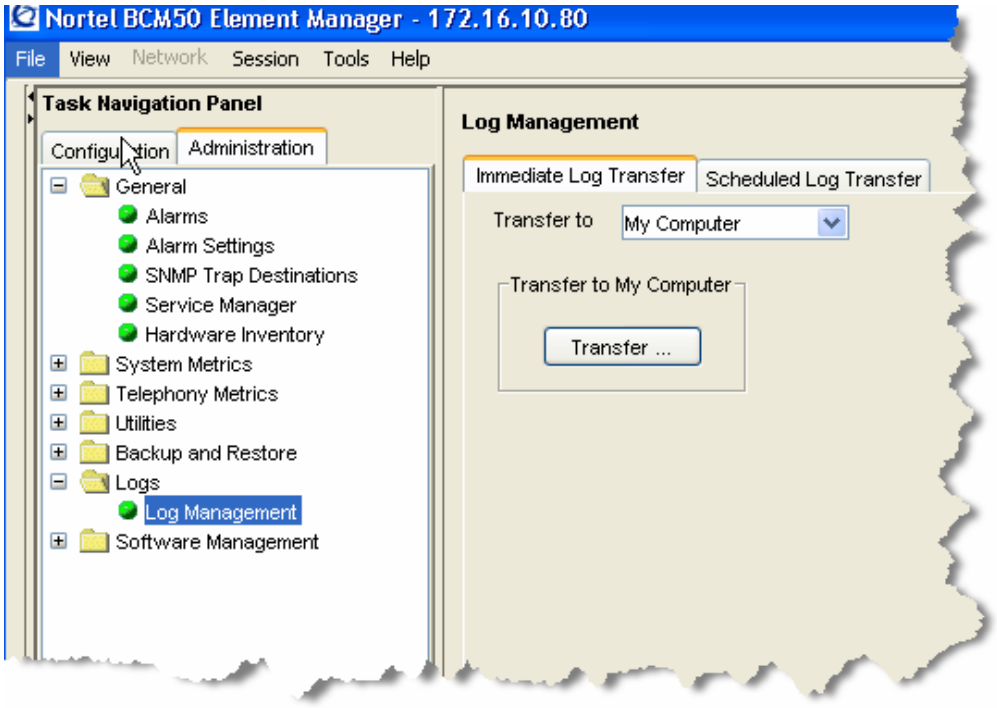

Figure 23: Log Management

When you first suspect a problem with your BCM, it is important that you go into the “Log Management” screen and download the log file to your PC. Even if you end up resolving the issue, it is good to know that this information has been captured if it does end up being required.

This Customer Configuration Guide ("CCG") is offered as a convenience to AT&T's customers. The specifications and information regarding the product in this CCG are subject to change without notice. All statements, information, and recommendations in this CCG are believed to be accurate but are presented without warranty of any kind, express or implied, and are provided “AS IS”. Users must take full responsibility for the application of the specifications and information in this CCG.

In no event shall AT&T or its suppliers be liable for any indirect, special, consequential, or incidental damages, including, without limitation, lost profits or loss or damage arising out of the use or inability to use this CCG, even if AT&T or its suppliers have been advised of the possibility of such damage.

- End of Document -