

AT&T VOIP
Nortel BCM 200/400 (Release 3.7 build 2.4f)
Configuration Guide
For Use with AT&T
IP Flexible Reach Service

Issue 2.3
3/02/2007



BCM400



BCM200

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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	10-12-2006; first general release
Issue 2.0	11-29-2006; 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	02-05-2007; 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

- 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 200/400 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.

3 Overview

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

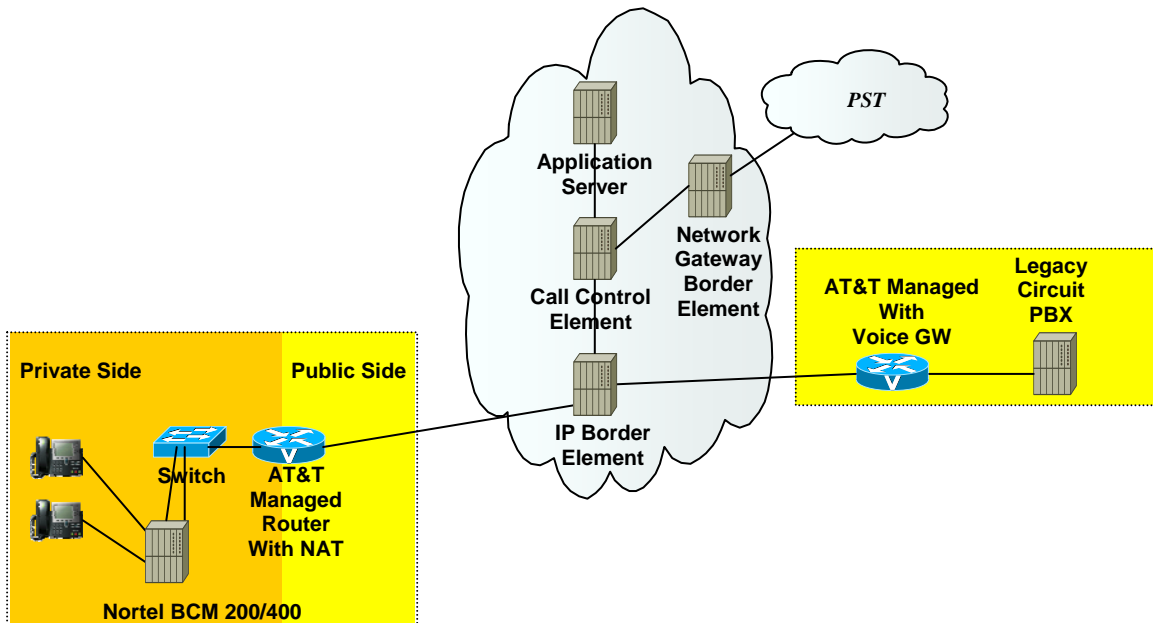


Figure 1: AT&T IP Flexible Reach Network

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

- Nortel IP 200x phones – These phones use the Nortel proprietary UNISTim signaling protocol to communicate to the Nortel BCM 200/400 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
- Nortel BCM 200/400 IP PBX – This unit consists of the following.
 - Media Service Card (MCS) Processor
 - Two ports Ethernet / IP card
 - Integrated CallPilot voice mail system
 - Analog station ports for connection to fax machines.
 - Digital station ports for Norstar digital phones
 - T1 voice card for connection to the local PSTN.
 - GATM-8 analog trunk to PSTN for inbound/outbound fax

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

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 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 200/400 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 3.7 Build 2.4f. You can check the version of BCM by viewing the following screen.

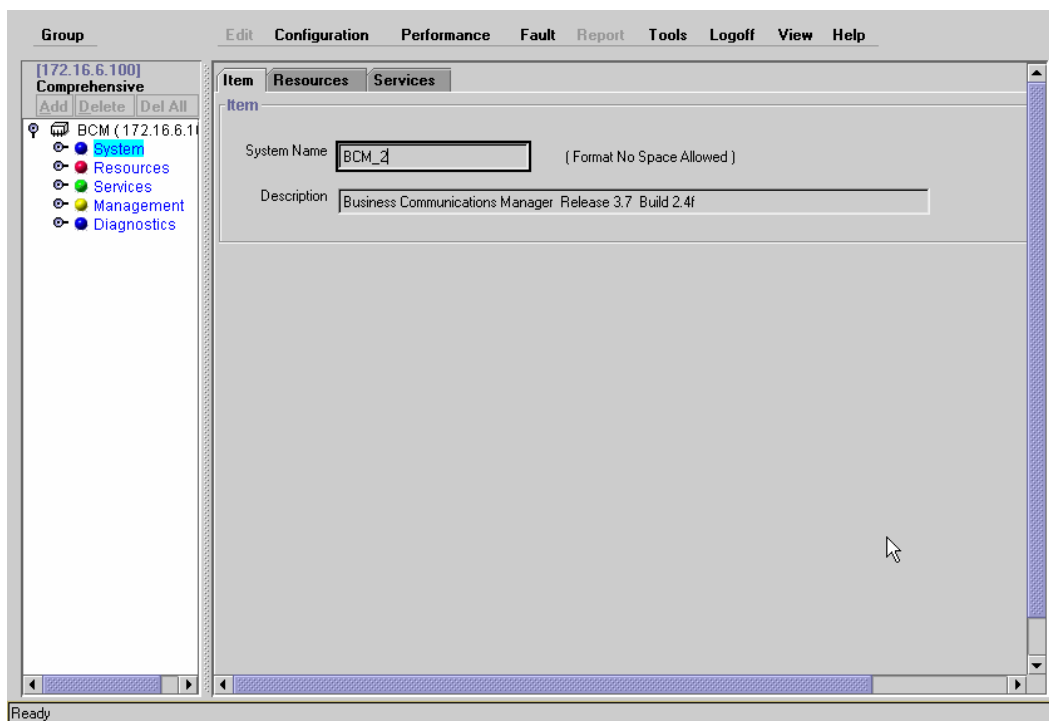


Figure 2: BCM 200/400 software version

Ensure that the description field specifies Business Communication Manager **Release 3.7 Build 2.4f**. This is the supported release that is required for AT&T IP Flexible Reach service.

The following BCM 3.7 patches must be applied. To verify installed patches; from the BCM Unified Manager's main menu, select "**Maintenance**" then:
System Information → ***Detailed Inventory*** → ***Applied Patches Inventory***



Figure 3: Unified Manager Main Menu

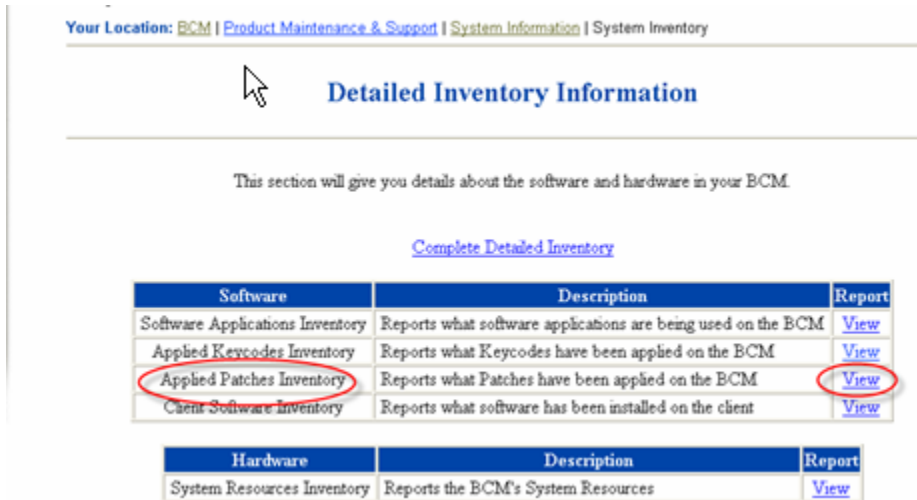


Figure 4: Detailed Inventory Screen

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BCM_360.259_CUMULATIVE.99.3	05/08/2006 5:40p
BCM_360.075_SRG.51.1011	5/8/06 5:18:42 PM
BCM_360.079_UM2.39.00	5/8/06 5:18:42 PM
BCM_360.084_SECURITY.00.999999	5/8/06 5:18:43 PM
BCM_360.090_UM-UTPS-MSM.39-12-26.00.16050.205	5/8/06 5:18:45 PM
BCM_360.096_CDR2.64.0	5/8/06 5:18:45 PM
BCM_360.121_CTI.01.2004	5/8/06 5:18:45 PM
BCM_360.131_IVR.02.20165	5/8/06 5:18:45 PM
BCM_360.132_QOS.70.36018	5/8/06 5:18:45 PM
BCM_360.140_UTPS.12.200000	5/8/06 5:18:46 PM
BCM_360.142_SETFW.56.75	5/8/06 5:18:50 PM
BCM_360.169_SSM.11.370205	5/8/06 5:18:50 PM
BCM_360.174_IPVSB.62.008	5/8/06 5:18:52 PM
BCM_360.180_WIN.00.999999	5/8/06 5:18:52 PM
BCM_360.183_DSPFW.09.5122	5/8/06 5:18:56 PM
BCM_360.184_UM.39.2000	5/8/06 5:18:56 PM
BCM_360.185_CDR.64.127	5/8/06 5:18:56 PM
BCM_360.187_IPSEC.71.3606	5/8/06 5:18:56 PM
BCM_360.198_WANDVR.17.250	5/8/06 5:18:57 PM
BCM_360.199_VP.41.001	5/8/06 5:18:57 PM
BCM_360.203_CTE.40.225	5/8/06 5:19:00 PM
BCM_360.206_ALRMMON.46.10	5/8/06 5:19:00 PM
BCM_360.207_SECURITY.00.999999	5/8/06 5:19:00 PM
BCM_360.210_FEPS.33.371500	5/8/06 5:19:00 PM
BCM_360.212_MSCDVR.21.372100	5/8/06 5:19:00 PM

Figure 5: Patch List

BCM_370.084_CDR.64.140	8/14/06 12:06:10 PM
BCM_370.097_ALRMMON.46.11	8/14/06 12:06:10 PM
BCM_370.102_DSPFW.09.5125	8/14/06 12:06:13 PM
BCM_370.105_CORE.08.0708	8/14/06 12:06:39 PM
BCM_370.116_IPSEC.71.3707	8/14/06 12:06:39 PM
BCM_370.119_VM.22.0104	8/14/06 12:06:44 PM
BCM_370.126_FEPS.33.371900	8/14/06 12:06:44 PM
BCM_370.127_BRU.10.020	8/14/06 12:06:44 PM
BCM_370.143_RCC.61.209	8/14/06 12:07:36 PM
BCM_370.148_OS.00.001	8/14/06 12:07:37 PM
BCM_370.175_FEPS.33.372200	08/14/2006 12:56p

Figure 6: Patch List (Continued)

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 WAN 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 060. These line records appear under Services, Telephony Services, Lines, and VoIP Lines. To access VoIP trunks, you need to enter software keycodes. Each keycode supports a specific number of trunks. The H.323 trunks start numbering up from 001. No entries appear in the Enabled VoIP lines field until you complete the IP Trunks Settings field, which displays when you click on IP Trunks under Services → IP Telephony.

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 **Services** -> **IP Telephony** -> **IP Trunks** to see if Trunks have been allocated (See Figure 7 below). You should have a number of H.323 trunks and a number of Trunk credits. The **Total Trunk Credits** correspond to the number of IP trunks licensed by Nortel for your BCM. This should correspond to the number of **VOIP enabled trunks** shown in a later screen.

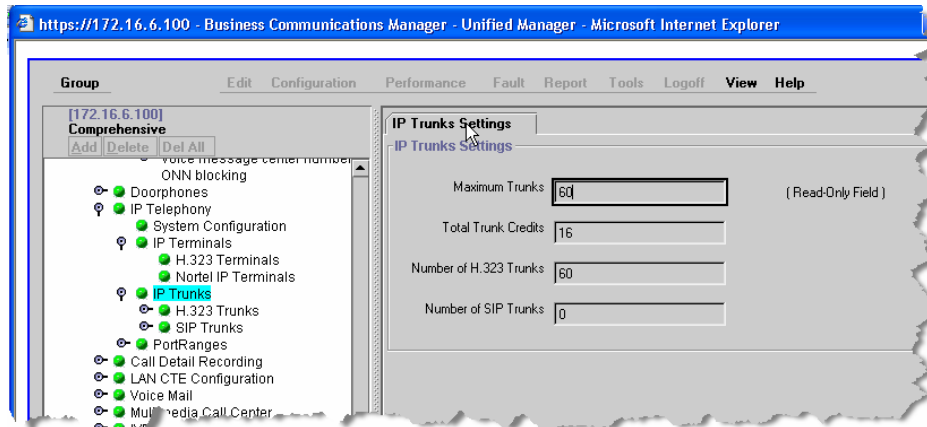


Figure 7: Available H.323 IP Trunks

Under **Services**→ **Telephony Services**→ **Access Codes**→ **Line Pool Codes**, select a Pool code (See Figure 8 below). Available Pool codes start at A to O. In this case we selected "**Pool O**." Configure this to access code "**9**" or to whatever code you want to access for outside (IP off-net) calls 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.

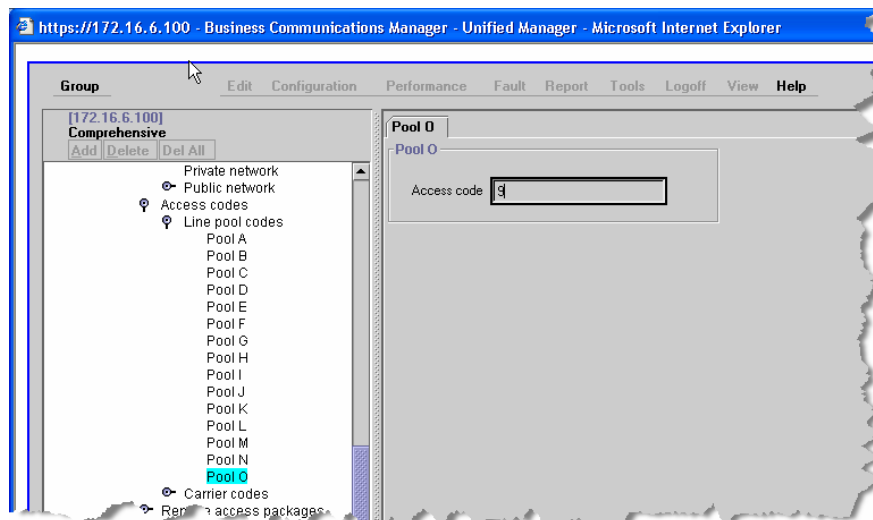


Figure 8: Access Code for IP Trunks

Under **Telephony Services** → **Lines** → **VOIP Lines** → **Enabled VOIP Lines** (See Figure 9 below) ; there should be a number of lines listed that should correspond to the number of “**Total Trunk Credits**” discussed in a previous screen. In this case there are 11 lines; **Line 001** through **Line 011**. Under each line we must configure the “**Trunk/line Data**” “**Line Type**” field; we need to select the “Line Type” associated with the desired access code. In our case we associated the access code “**9**” with Pool “**0**”. Use the drop down box to select Pool “**0**.”

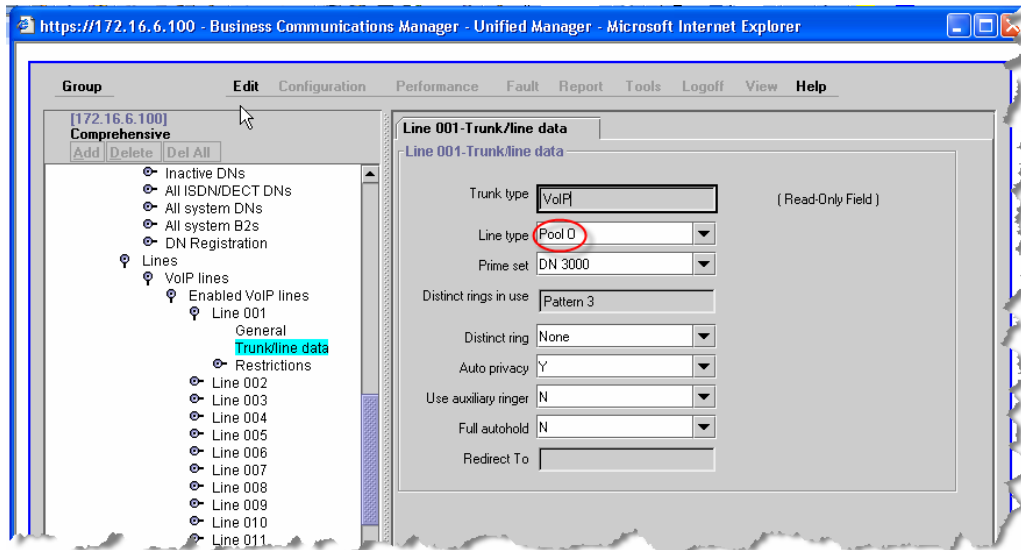


Figure 9: Assign Respected Trunk Type for VOIP

4.3 H.323 Gateway Parameters

Services → *IP Telephony* → *IP Trunks* → *H.323 Trunks*

- On this screen we need to populate the **Call Signaling** as **"GatekeeperRoutedNoRAS"**
- **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. This field must contain the string **"name:"** followed by a H.323 ID name.
- **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*

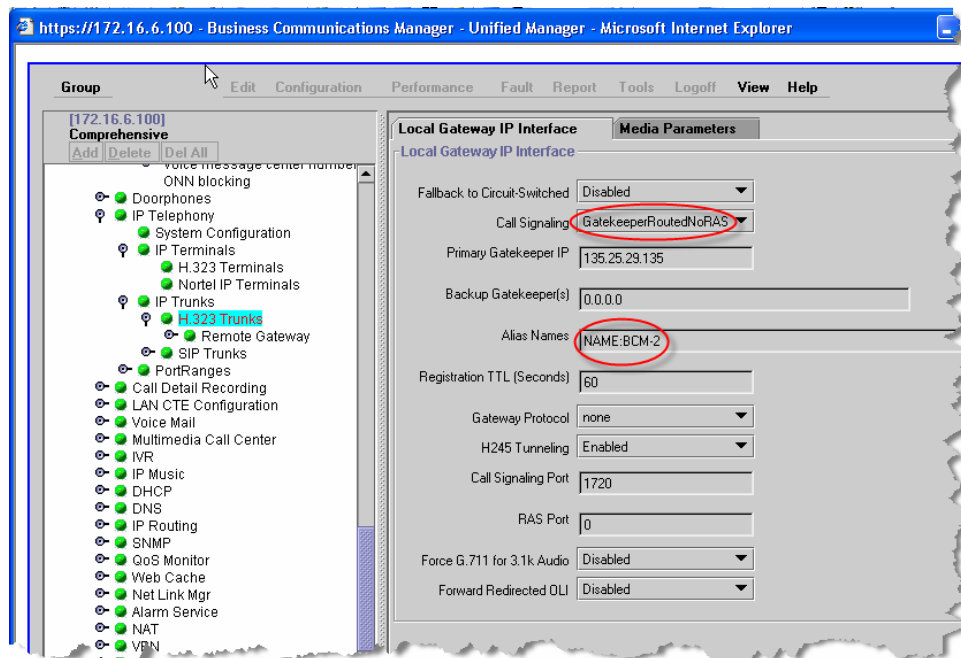


Figure 10: H.323 Gateway Parameters

*Note: the backup gatekeeper will not be support on the current BCM 200/400 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

Services → IP Telephony → IP Trunks → H.323 Trunks

Within the Media Parameters tab; 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

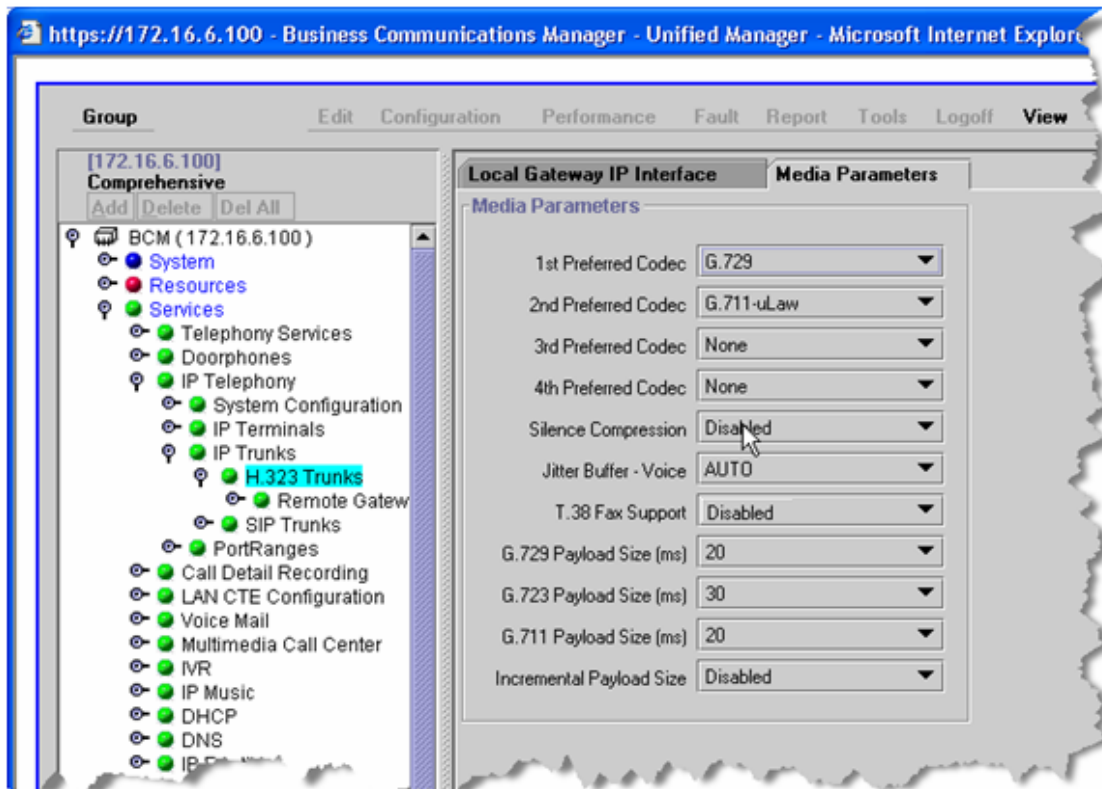


Figure 11: Media Parameters

4.5 Port Ranges

Services → IP Telephony → Port Ranges →

Use the values shown below. The default ranges are from 28000 to 28511. This range is used for fax (T.38), digital phones and analog phones. The media gateway port ranges are configurable.

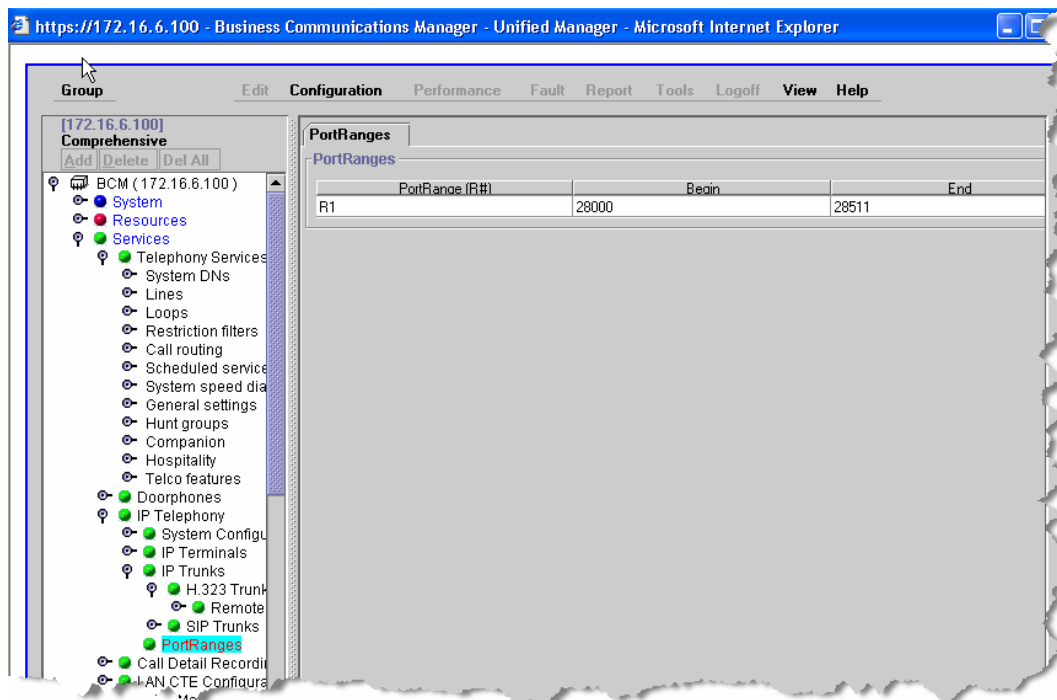


Figure 12: Media Gateway Port Range

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

Services → *Telephony Services* → *Active Set DN* →

First locate the desired private DN number that you want to assign the public DID number. In this case we have selected “**DN 3000**”. At this point, expand DN 3000 and locate “**Line Access.**” Under “Line Access” you should see the system line assignment. In the example below, “**Line 241**” has been assigned to DN 3000. Take note of this number, for we will need to associate the DID number to the line number in a later screen. Also note; Pool O is assigned here.

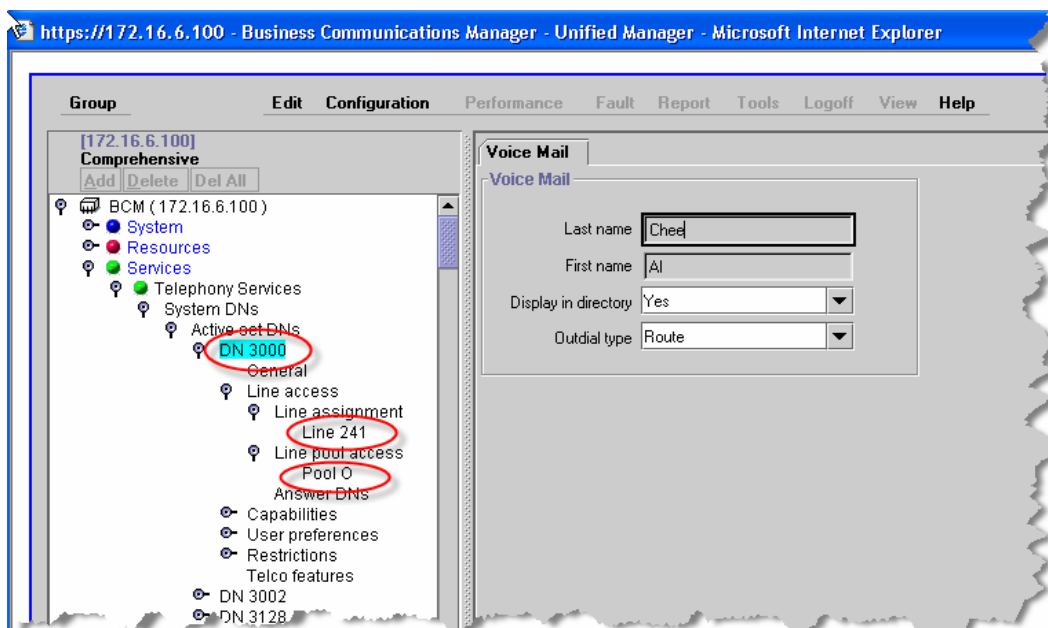


Figure 13: Assigning DID to DN and Line Number for Outgoing Calls

Services → *Telephony Services* → *Active Set DN* → *DN3000* → *Line Access*

We will now associate the private DN number with the DID number. In the example below; 3000 is entered in the “**Private OLI**” field and 7323680411 is entered in the “**Public OLI**” field. This example enables “calling number translation” (outgoing) for this particular DN number.

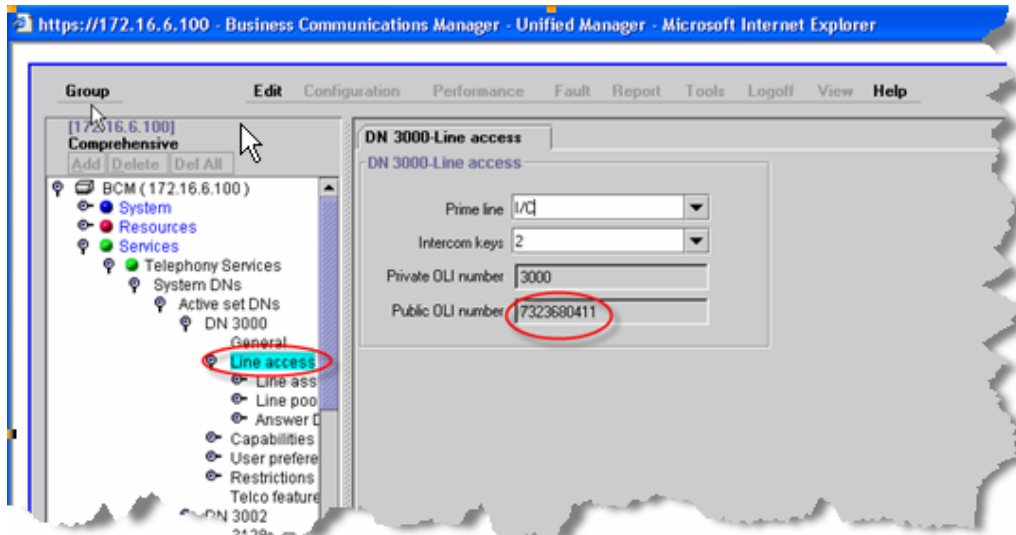


Figure 14: Configuring DID for Outgoing Calls

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

Services → *Telephony Services* → *Lines* → *Target Lines* → *Line 241* → *Trunkline Data*

We will now configure the “called number translation” (incoming) for the DN number. In our example, under “**Target Lines**” expand “Line 241” and select “**Received Numbers**.” Enter 3000 in the “Private” number field; then enter the 7 digit DID (Public number) in the “Public” number field. 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. 7323680411. The BCM will route the call using the last seven digits, e.g. 3680411.

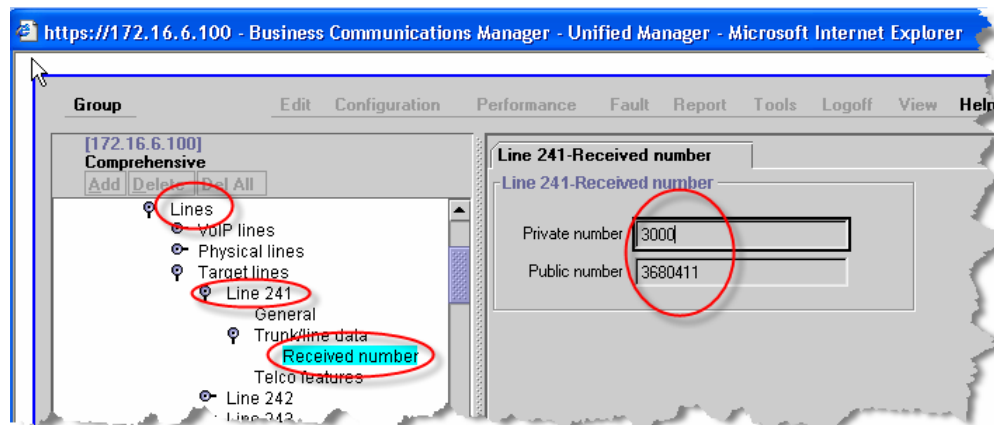


Figure 15: Configuring DID for Incoming Calls

Services → Telephony Services → Lines → Target Lines → Line 241 → General

To display the DID number on the IP phone LCD screen; in our example below, enter 3680411 in the “Name” field and then enter “DN 3000” for the “Control DN” field.

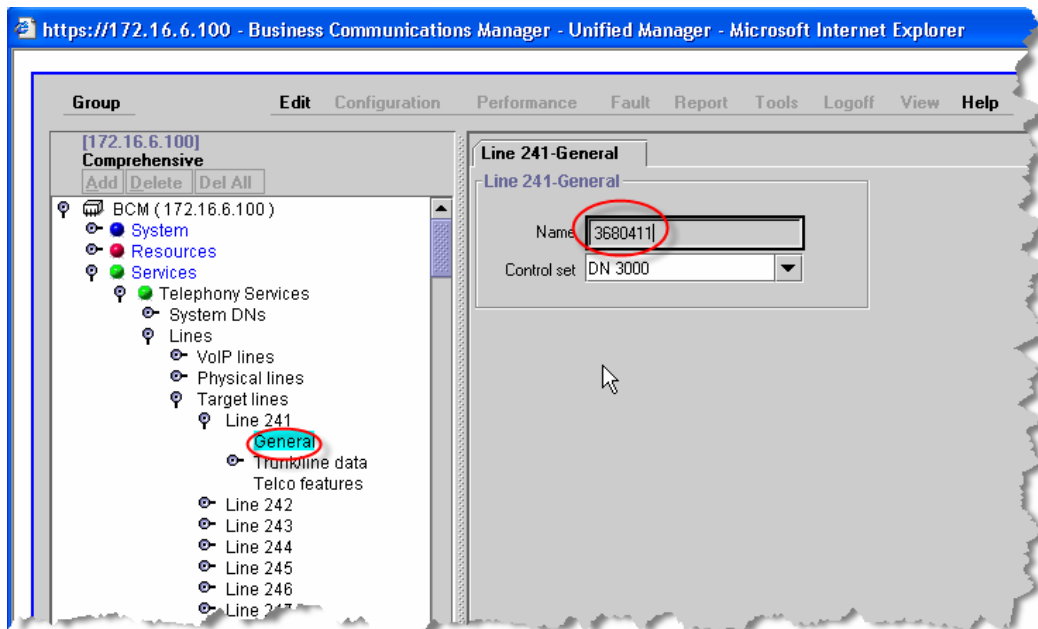


Figure 16: Displaying DID Number on IP Set LCD

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

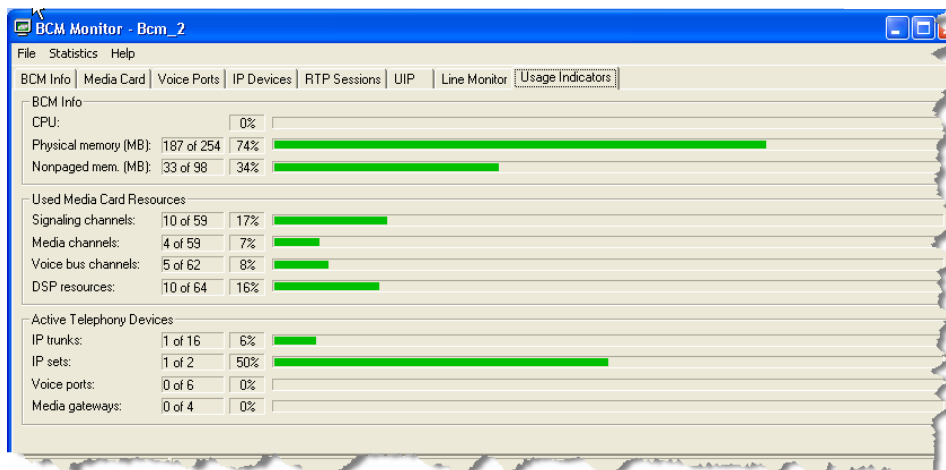


Figure 17: System Monitoring Example

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.

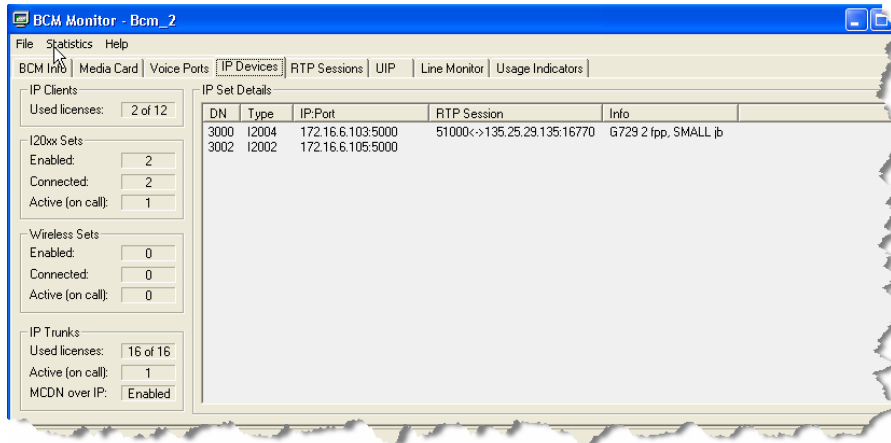


Figure 18: IP Device Listing

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.

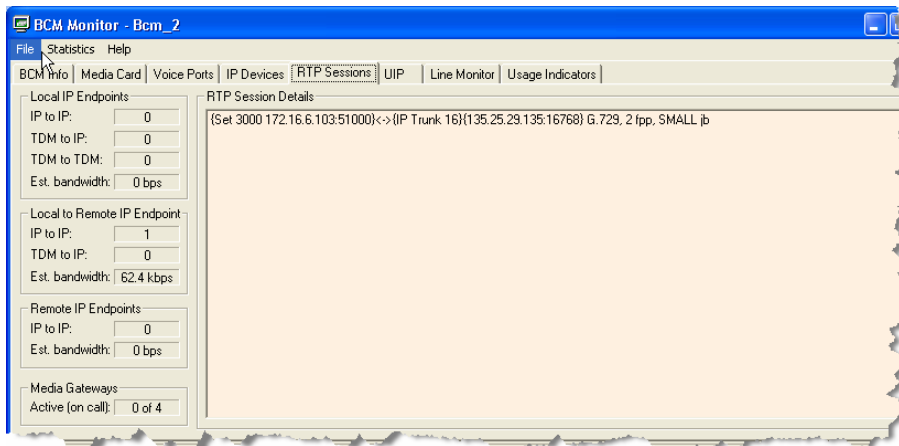


Figure 19: RTP Session Information

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.

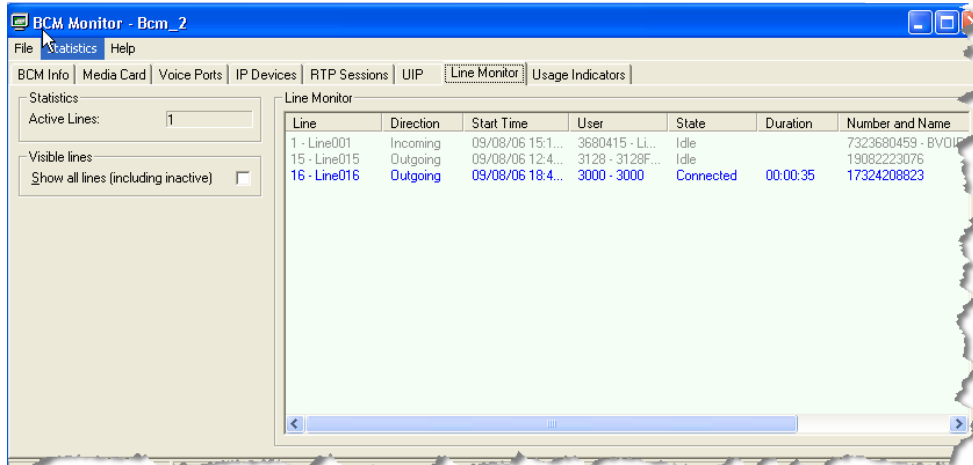


Figure 20: Line Monitor Information

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

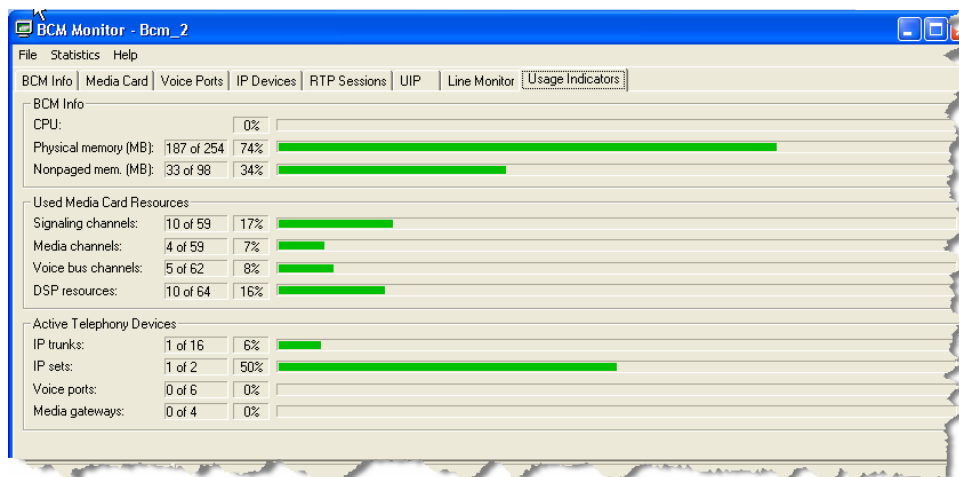


Figure 21: System Resources

5.2 Real-time display of the BCM 200/400 LED Displays

Diagnostics → *System Status Monitor* →

The BCM 200/400 front panel LED displays can be viewed remotely to determine certain critical components. The following are some LED indications that can be viewed remotely with the NCM Unified Manager:

- Power
- Hard drive (HDD)
- Multi-service Card (MSC)
- Modem
- Ethernet ports (NIC)
- System temperature
- Fan indications

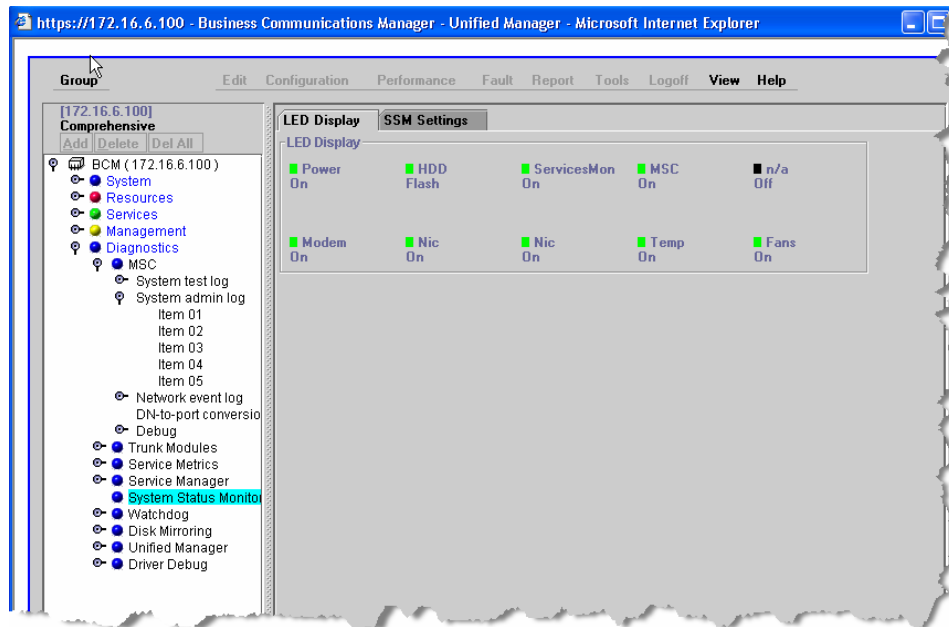


Figure 22: Front Panel LED Display

5.3 Current System Monitor Report

A complete system status report can be generated for viewing. From the main BCM browser page; under the **“Services”** page select **“Maintenance Tools.”** From the pull-down menu, select **“All Services Status.”**

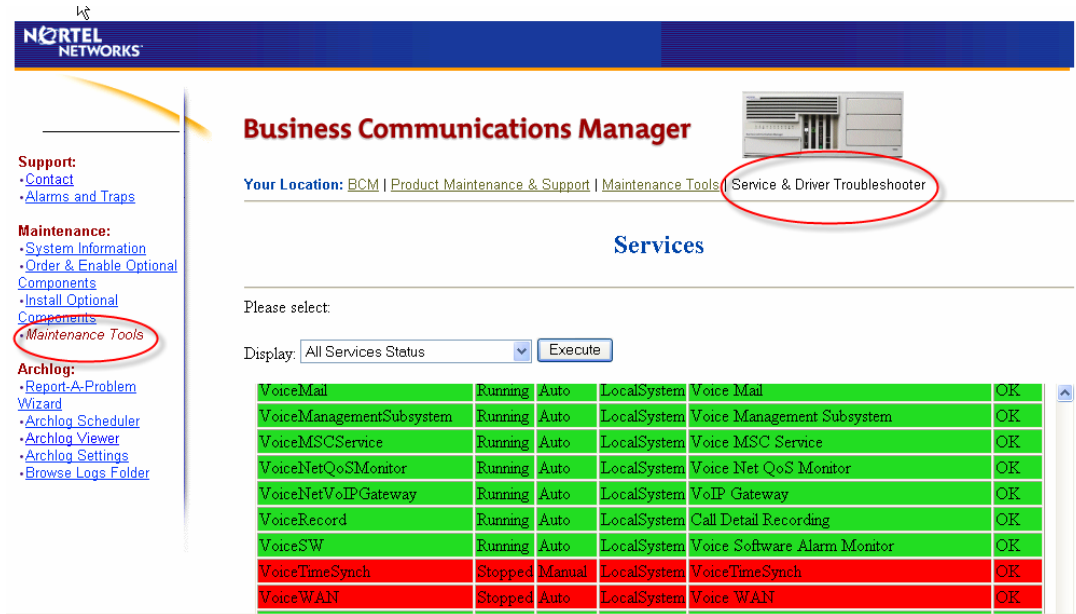


Figure 23: Maintenance Tools Menu

Below is a sample system status report after pressing the “Execute” button from the Maintenance Tools menu. The generated report can be sent to a printer for a hard copy output.

[Print This Report](#)
[Close This Window](#)

Current System Status Monitor

PCI Device Information

Client Application Name	Value
Total PCI's Devices Failures	0
Total PCI's Drivers Failures	0

Hardware Information

Client Application Name	Value
Total SSM Board Communication Failures	0
Total Temperature Failures	0
Total CPU Fan Failures	0
Total Fan1 Failures	0
Total Fan2 Failures	0
Total Power Failures	0
Total Power Supply Fan1 Failures	0
Total Power Supply Fan2 Failures	0
Total CPU load Failures	0
Total Physical Memory near/on its capacity Failures	0
Total Virtual Memory near/on its capacity Failures	0

Hard Drive Information

Client Application Name	Value
Total Mirror Master HDD Failures	0
Total Primary Master HDD Failures	0
Total C: HDD near/on its capacity Failures	0
Total D: HDD near/on its capacity Failures	0
Total E: HDD near/on its capacity Failures	0
Total F: HDD near/on its capacity Failures	0

Network Information

Client Application Name	Value
Total Bytes Sent per Second Failures	0
Total Bytes Received per Second Failures	0
Total Bytes Sent/Received per Second Failures	0
Total Packets Received Error	0
Total Packets Received Discarded	0
Total Packets Sent Error	0
Total Packets Sent Discarded	0

[Print This Report](#)
[Close This Window](#)

Figure 24: Sample System Status Report

5.4 Report a Problem Wizard

Another extremely useful tool is the “Report a Problem” wizard under the “Maintenance” heading. This simple-to-use wizard 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. In the past it would sometimes take days to obtain all the log files required to diagnose a problem, where now all of this information is collected in a matter of minutes by a fool-proof wizard.

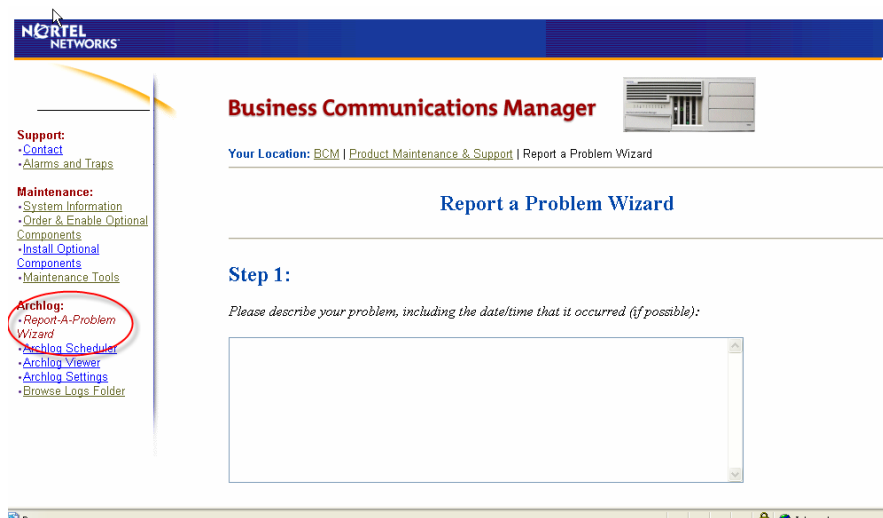


Figure 25: Report a Problem Wizard

When you first suspect a problem with your BCM, it is important that you go into the “Report a Problem” wizard and package up the log files and such. 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. The wizard itself is completely self-explanatory, so there is no need to go any further into it.

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