



IMPLEMENTING OUT-OF-BAND DESKTOP

MANAGEMENT WITH DASH

Using the Broadcom NetXtreme™ Gigabit Ethernet Plus Network Controller

November 2, 2009

Table of Contents:

Introduction	2
DASH Overview	2
A New Management Standard	3
Key Features	3
Management Profiles	3
Enabling DASH Support	7
Supported Platforms	7
System BIOS	8
Software Drivers	8
Deploying Software Updates	8
System BIOS Enablement	9
Setting the BIOS Administrator Password	9
Setting the Primary Management Controller	9
Setting the Management Mode	10
Management Controller Enablement	10
Enabling the Administrator account	10
Using Active Directory	11
Activating DASH Functionality	11
Using DASH Functions	11
HP Client Management Web View	13
Connecting to the HP Client Management Web View	14
Troubleshooting	16
Upgrading Management Software	16
PCIe Add-in Card Issues	16
Power-On Password	16
Appendix A: Broadcom NetXtreme™ Gigabit Ethernet Plus Network Controller ...	17

Product Description	17
Feature List	17
USB Cable and Headers	18
Appendix B: Enabling Management Functionality with Computer Setup	19
HP Compaq dc5850 Business PC	19
HP Compaq dc7900 Business PC	21
HP Z800 Workstation.....	22
Appendix C: Enabling Management Functionality with BMCC and BACS	23
DASH Enablement	23
Setting the Initial Administrator Account	25

Introduction

Desktop and mobile Architecture for System Hardware or DASH defines a set of interoperability standards for managing, monitoring and controlling PCs regardless of system power state (on, off, stand-by) or operating system capability. DASH builds upon previous standards-based management technologies for PC clients and datacenter servers in order to provide robust management capability previously unattainable. This paper describes the DASH capabilities available on HP business class desktops and workstations equipped with the Broadcom NetXtreme™ Gigabit Ethernet Plus network controller with Broadcom TruManage™ technology.

DASH Overview

In July 2008, the Distributed Management Task Force introduced the Desktop and mobile Architecture for Systems Hardware (DASH) specifications. Development of the DASH specification is an ongoing collaborative effort between computer system manufacturers, component and peripheral suppliers, and management software vendors. HP has played an important role in fostering the DASH ecosystem with our partners and suppliers and promoting both DASH capable PCs and management software that utilizes the DASH standard.

DASH is an industry standard that allows you to perform essential management tasks on PCs, regardless of their power state or operating system state. Achieve smarter, more efficient control of your business with DASH capable HP business class desktops and workstations.

The DASH standards are designed to assist in the remote management of common desktop infrastructure tasks, such as deploying new operating systems, monitoring of computer system health, power control and power state monitoring, and asset inventory collection. As new hardware technologies are introduced or additional requirements are placed on the IT infrastructure, DASH will continue to evolve to include new functionality.

A New Management Standard

Development of the DASH specifications is based on a history of preceding technologies and specifications. DASH has been designed to solve many of the pitfalls and constraints of previous management standards by leveraging well-proven technologies from the Service Oriented Architecture domain, advancements in security standards, and extensive modeling of management components, configuration data and relationships first introduced in the server management domain.

Alert Standard Format (ASF) was the previous industry-wide remote management standard. Unlike ASF, DASH is a web services-based management protocol and relies on security and network routing concepts familiar to web site and web services administrators. DASH consists of a richer set of features than ASF, with a broader set of vendor support than ASF had at launch time. DASH supports feature extensions (described as management profiles) in a standard manner which ensures multiple versions of the DASH standard can be deployed within an enterprise environment with support from a single console infrastructure.

Key Features

- Service availability without the requirement of an installed operating system
- Interoperability between various DASH-capable device implementations and management consoles
- Descriptive data model allowing for the discovery of iterative specification updates (new profiles) or vendor-specific extensions (custom profiles)
- Well understood transport level security (HTTPS basic and digest authentication models with optional TLS client/server certificate support)
- Support for multiple users and multiple access roles (administrator, operator, auditor)
- DASH ecosystem can coexist with legacy ASF infrastructure

Management Profiles

A management profile is a specification that defines a normative set of behaviors and characteristics for addressing a particular management domain.

A profile consists of the following information:

- A data model representing the problem domain that consists of objects, properties and methods exposed by the profile
- Use cases to be addressed by the profile
- Steps required to traverse the data model and derive results
- Required and optional components of the profile

DASH profile and specification requirements

Functionality	DASH 1.0	DASH 1.1
Base Desktop and Mobile Profile 1.0.0	Required	Required
WS-Management Specification 1.0.0	Required	Required

Functionality	DASH 1.0	DASH 1.1
WS-Management -- CIM Binding Specification 1.0.0	Required	Required
WS-CIM Mapping Specification 1.0.0	Required	Required
Profile Registration Profile 1.0.0	Required	Required
Role Based Authorization Profile 1.0.0	Required	Required
Simple Identity Management Profile 1.0.0	Required	Required
Boot Control Profile 1.0.0	Optional	Optional
CPU Profile 1.0.0	Optional	Optional
Fan Profile 1.0.0	Optional	Optional
Indications Profile 1.0.0	Optional	Optional
Physical Asset Profile 1.0.0	Optional	Optional
Power State Management Profile 1.0.0	Optional	Optional
Power Supply Profile 1.0.0	Optional	Optional
Sensors Profile 1.0.0	Optional	Optional
Software Inventory Profile 1.0.0	Optional	Optional
System Memory Profile 1.0.0	Optional	Optional
Battery Profile 1.0.0		Optional
BIOS Management Profile 1.0.0		Optional
DHCP Client Profile 1.0.0		Optional
DNS Client Profile 1.0.0		Optional
Ethernet Port Profile 1.0.0		Optional
Host LAN Network Port Profile 1.0.0		Optional
IP Interface Profile 1.0.0		Optional
KVM Redirection Profile 1.0.0		Optional
Media Redirection Profile 1.0.0		Optional
Opaque Management Data Profile 1.0.0		Optional
OS Status Profile 1.0.0		Optional
Software Update Profile 1.0.0		Optional
Text Console Redirection Profile 1.0.0		Optional
USB Redirection Profile 1.0.0		Optional

When a substantive block of new profiles become available, or fundamental changes are introduced to the DASH ecosystem, the DASH Implementation Requirements document is updated to reflect a new version of the standard. Profiles are continually being developed by the DMTF and DASH is designed to support them as they become available.

New to DASH?

Visit the DMTF Learning Center at:
<http://www.dmtf.org/education/>

HP and Broadcom have provided multiple software releases of the DASH components to assist in enabling the community. We are committed to the continued development of new manageability enablement functionality as profiles mature within the DMTF.

Software and firmware updates are routinely released and can be downloaded from www.hp.com/#support. Softpaqs that are released for a specific operating system only contain device driver and software updates. These softpaqs support SSM and can silently update all the software components (device driver, Broadcom Advance Control Suite, management agent, and CIM provider) needed to enable DASH on the system. For other advance tools that can be used in enabling DASH or troubleshooting, such as BMCC, download the Broadcom NetXtreme Gigabit Drivers for Multiple Operating Systems softpaq. Firmware updates can also be downloaded from the Support website. Follow instruction in the Upgrading System Software section to update firmware and software.

Broadcom's TruManage™ technology is built on the scalable NetXtreme™ Gigabit Ethernet controller architecture that combines highly optimized hardware, firmware and software to enable reliable, secure and energy efficient management functionality for in-band, out-of-band and out-of-service environment. Gigabit Ethernet controllers with TruManage™ technology integrate an on-chip application processor and memory to provide a single-chip solution for network connectivity and platform manageability at all times.

The following table outlines DASH profile level support that is available with the Broadcom NetXtreme™ Gigabit Ethernet Plus controller on HP platforms.

DASH profile availability on HP platforms

Functionality	TruManage™ Version		
	1.0	1.1	1.2
Base Desktop and Mobile Profile	1.0.0	1.0.0	1.0.0
WS-Management Specification	1.0.0	1.0.0	1.0.0
WS-Management -- CIM Binding Specification	1.0.0	1.0.0	1.0.0
WS-CIM Mapping Specification	1.0.0	1.0.0	1.0.1
Profile Registration Profile	1.0.0	1.0.0	1.0.0
Role Based Authorization Profile	1.0.0	1.0.0	1.0.0
Simple Identity Management Profile	1.0.0	1.0.0	1.0.0
Boot Control Profile	1.0.0	1.0.0	1.0.0
CPU Profile	1.0.0	1.0.0	1.0.0
Fan Profile	1.0.0	1.0.1	1.0.1
Indications Profile	1.0.0	1.0.0	1.0.0
Physical Asset Profile	1.0.0	1.0.1	1.0.2
Power State Management Profile	1.0.0	1.0.1	1.0.1
Power Supply Profile ⁽¹⁾	1.0.0	2.0.0	2.0.0
		1.1.0	1.1.0
Sensors Profile	1.0.0	1.0.1	1.0.1
Software Inventory Profile ⁽²⁾	1.0.0	1.0.0	1.0.0

Functionality	TruManage™ Version		
	1.0	1.1	1.2
System Memory Profile	1.0.0	1.0.0	1.0.0
Battery Profile			
BIOS Management Profile ⁽¹⁾	1.0.0	1.0.0	1.0.0
DHCP Client Profile			
DNS Client Profile			
Ethernet Port Profile	1.0.0	1.0.0	1.0.0
Host LAN Network Port Profile			
IP Interface Profile			
KVM Redirection Profile			
Media Redirection Profile			
Opaque Management Data Profile	1.0.0	1.0.0	1.0.0
OS Status Profile	1.0.0	1.0.0	1.0.0
Record Log ⁽³⁾			1.0.1
Software Update Profile ⁽⁴⁾		1.0.0	1.0.0
Text Console Redirection Profile	1.0.0	1.0.1	1.0.1
USB Redirection Profile		1.0.0	1.0.0

⁽¹⁾ Feature is not implemented on HP products.

⁽²⁾ Feature supports limited set of software inventory available absent of an operating system.

⁽³⁾ The Record Log profile was published after the DASH 1.1 update.

⁽⁴⁾ Feature supports out-of-band software update of management firmware.

More on DASH Profiles

DASH profile specification source material can be found at: <http://www.dmtf.org/standards/profiles/>

Additional functionality beyond the capabilities defined in the DASH specification is also available to enable the DASH ecosystem and promote usability extensions. The following table details additional capabilities that are available on HP platforms equipped with the Broadcom NetXtreme™ Gigabit Plus controller.

Manageability extensions available on HP platforms

Feature	TruManage™ Version		
	1.0	1.1	1.2
Certificate authority integration		•	•
Embedded management console	•	•	•
Event logs with auditing support			•
Graceful power control for Microsoft® Windows®		•	•
In-band NIC management support	•	•	•
Kerberos authentication support			•

Feature	TruManage™ Version		
	1.0	1.1	1.2
Microsoft® Active Directory integration			•
Out-of-band IPv6 phase I certification	•	•	•
Out-of-band IPv6 phase II certification		•	•
Out-of-band firmware update		•	•
WMI provider for Ethernet port modeling	•	•	•
WMI provider for opaque management data			•
WMI provider for software inventory	•	•	•
WMI provider for user account management		•	•
WMI provider for VLAN teaming extension		•	•
Zero-Touch Provisioning Model		•	•

Enabling DASH Support

HP does not typically ship platforms in a predefined management mode, unless the products are ordered through a custom configuration service where the customer can specify various parameters supporting their infrastructure and deployment model. In order to enable DASH support on HP platforms the following steps must be performed:

1. Ensure you have the latest system BIOS and software drivers for your platforms.
2. Set a BIOS administrator password to authorize access to configuration option.
3. Select and enable the appropriate management controller within the system BIOS.
4. Select the appropriate management mode for the controller (in this case DASH) within the system BIOS.
5. Enable management functions from the network device
6. Add user accounts to access the management interface on the network device.

The following sections discuss the steps to enable DASH functionality from a remote management standpoint without requiring physical access to the system; however it is possible to setup and configure DASH support manually. For instructions on how to complete this process using where you have local physical access to the system to be configured, please refer to [Appendix B: Enabling Management Functionality with Computer Setup](#) and [Appendix C: Enabling Management Functionality with BMCC and BACS](#) later in this document.

Supported Platforms

The Broadcom NetXtreme™ Gigabit Ethernet Plus is the default network controller option for the following platforms:

- HP Compaq 6005 Pro Business PC

Although the Broadcom NetXtreme™ Gigabit Ethernet Plus discrete PCI Express add-in card is available as an option for HP business class desktops and workstations, DASH functionality is only supported on the models defined below:

- HP Compaq 8000 Elite Business PC
- HP Compaq 6000 Pro Business PC
- HP Compaq dc7900 Business PC
- HP Compaq dc5850 Business PC
- HP Z800 Workstation
- HP Z600 Workstation
- HP Z400 Workstation

System BIOS

To ensure the best operating experience for your product and accessibility to all of the available DASH features, HP recommends that you update your system firmware as part of a DASH deployment strategy. The following table outlines minimum BIOS version requirements to enable DASH support for your platform.

BIOS version requirements by platform

Hardware Platform	BIOS Family	Version
HP Compaq 8000 Elite Business PC	786H1	1.00
HP Compaq 6005 Pro Business PC	786G6	1.03
HP Compaq 6000 Pro Business PC	786G2	1.09
HP Compaq dc7900 Business PC	786G1	1.08
HP Compaq dc5850 Business PC	786F6	2.06
HP Compaq dc5800 Business PC ⁽¹⁾	786F2	1.53
HP Z800 Workstation	786G5	1.14
HP Z600 Workstation	786G4	1.14
HP Z400 Workstation	786G3	1.14

⁽¹⁾ The HP Compaq dc5800 Business PC does not support DASH functionality. However, the Broadcom NetXtreme™ Gigabit Ethernet Plus controller will perform as an ASF management device in the platform. A BIOS update may be required to enable this support.

Software Drivers

The Broadcom NetXtreme™ Gigabit Ethernet Plus has driver support for Windows® XP and Windows Vista®.

- For Windows® XP, use driver version 10.85.0.0 or newer.
- For Windows Vista®, use driver version 10.100.0.0 or newer.

Deploying Software Updates

Software updates (including system BIOS) can be downloaded and deployed through HP Client Automation or HP Client Manager directly. If you are using another management console solution, HP provides software patch management support which can be delivered through your management consoles' task engine using HP System Software Manager.

HP System Software Manager

Information on how to use HP System Software Manager to deploy software updates can be found at:

<http://www.hp.com/go/ssm/>

System BIOS Enablement

In order to use DASH as our management protocol, we need to ensure that the system BIOS is prepared to communicate system management and health data with the Broadcom NetXtreme™ Gigabit Ethernet Plus controller.

HP provides a mechanism to remotely instrument and configure system BIOS settings called the HP Client Management Interface. This interface provides an easily scriptable environment for updating BIOS settings within your environment.

HP Client Management Interface

Information on how to use the HP Client Management Interface to configure BIOS settings can be found at:

<http://www.hp.com/go/hpcmi/>

The management tasks we will perform to prepare that platform for DASH management will be demonstrated using HP Client Management Interface samples which are included in the HP Client Management Interface Administrator Toolkit. The administrator toolkit can be used as is, or you can use it as a basis for creating your own custom script implementations.

All of these examples require access to WMI, they can be performed locally on a computer system, but the scripts are designed to run remotely as well. The examples will be from the point-of-view of an Administrator executing a task targeted at a remote PC named "remotePC". All of the scripts are designed to take a series of remote targets either as machine names or IP addresses separated by spaces.

Setting the BIOS Administrator Password

It is good practice and a requirement for management of some BIOS features to set the BIOS Administrator password. This password is separate from the user management associated with DASH.

Using Windows® Scripting Host, execute the following line from a Command Prompt:

```
cscript ChangeSetupPassword.wsf remotePC
```

You will be prompted to enter the current BIOS Administrator password and a new one.

Setting the Primary Management Controller

For systems where there are more than one network controller present, as is the case when adding the Broadcom NetXtreme™ Gigabit Ethernet Plus card to a

system, we must inform the system BIOS which device will act as the primary management controller. Only one network controller can act as the management interface for the platform. This allows the system BIOS to communicate system information and health status directly with the device.

Using Windows® Scripting Host, execute the following line from a Command Prompt:

```
cscript ChangeSetting.wsf /setting:"Broadcom Ethernet controller" /value:"Primary" remotePC
```

You will be prompted to enter the current BIOS Administrator password.

Setting the Management Mode

Once we have informed the system BIOS which management controller we wish to use, we can now select a management mode for the controller to operate in.

Using Windows® Scripting Host execute the following line from a Command Prompt:

```
cscript ChangeSetting.wsf /setting:"Management Mode" /value:"DASH" remotePC
```

Again, you will be prompted to enter the current BIOS Administrator password.

Management Controller Enablement

This section outlines the steps required to configure and enable DASH management from the Broadcom NetXtreme™ Gigabit Ethernet controller.

Broadcom provides a general-purpose tool for setting and configuring the Broadcom NetXtreme™ Gigabit Ethernet controller through Windows Management Instrumentation (WMI) as part of the TruManage™ 12.4 software package.

All of these examples require access to WMI. They can be performed locally on a computer system, but the scripts are designed to run remotely as well. The examples will be from the point-of-view of an Administrator executing a task targeted at a remote PC named "remotePC" specified using the syntax:

-remote:RemotePC from the command line. In addition the Broadcom script supports specification of the WMI connection user account with the following syntax: -user:<UserID> -password:<Password>.

Enabling the Administrator account

The following command will enable the default administrator account on the DASH management device and use the password specified via the command line. Once the administrator account is enabled, you can use any DASH management console to manage user accounts and roles.

```
WMIconfig.jse -remote:remotePC -user:Administrator  
-password:<password> account "?Name='Administrator'"  
.password=NewPassword .enabledstate=2
```

Using Active Directory

The DASH management device may be configured to use a Microsoft Active Directory infrastructure for authentication purposes. This alleviates the burden of managing passwords on each individual DASH device directly. To setup third-party authentication using Active Directory we need to enable support and set the Active Directory password.

```
WMIconfig.jse -remote:remotePC -user:Administrator  
-password:<password> ad .password=ADPassword  
.enabled=true
```

Now we need to associate the DASH management device's Administrator role with an SID.

```
WMIconfig.jse -remote:remotePC -user:Administrator  
-password:<password> adident  
"?ElementName='Administrator role AD Identity'" .sid=S-  
1-5-21-653784745-370644826-2676878800-512
```

Activating DASH Functionality

To finally enable the DASH management interface, execute the following command:

```
WMIconfig.jse -remote:remotePC -user:Administrator  
-password:<password> oob .enabledstate=2
```

Using DASH Functions

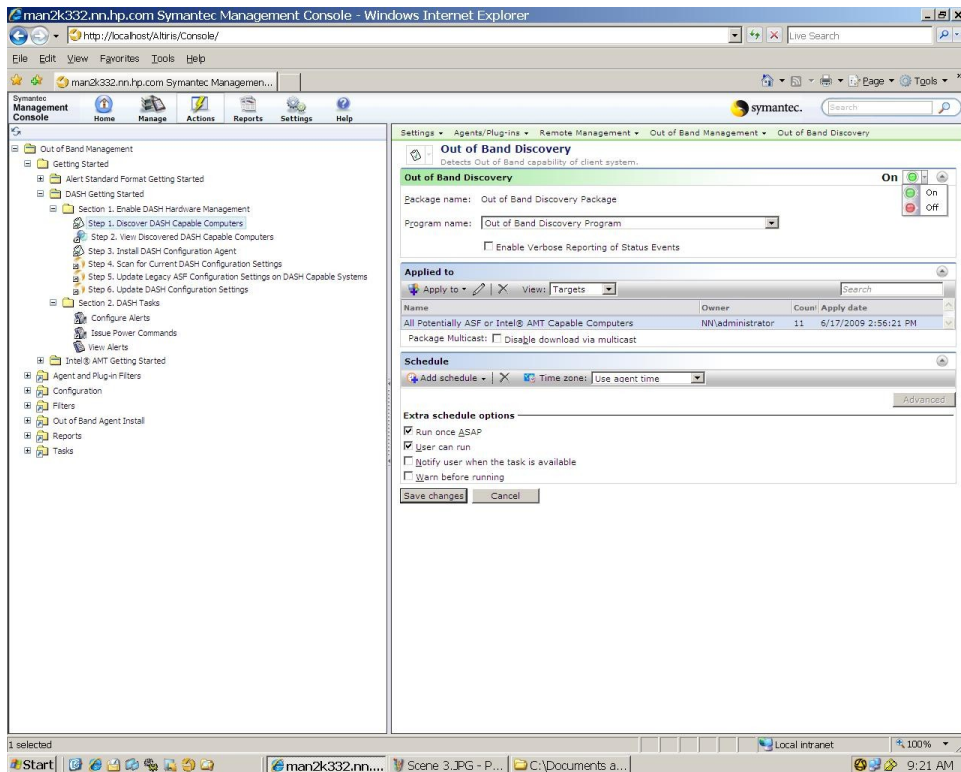
The power in DASH is in its support from management console vendors. The technology is of limited use if the management tools you rely on for day-to-day enterprise management do not understand or take advantage of the capabilities DASH provides.

HP works closely with management console vendors and partners to ensure an ecosystem of supporting products is available to help you realize the potential of DASH in your environment.

The following products have been tested by HP and tested and developed by our partners using HP business PC hardware:

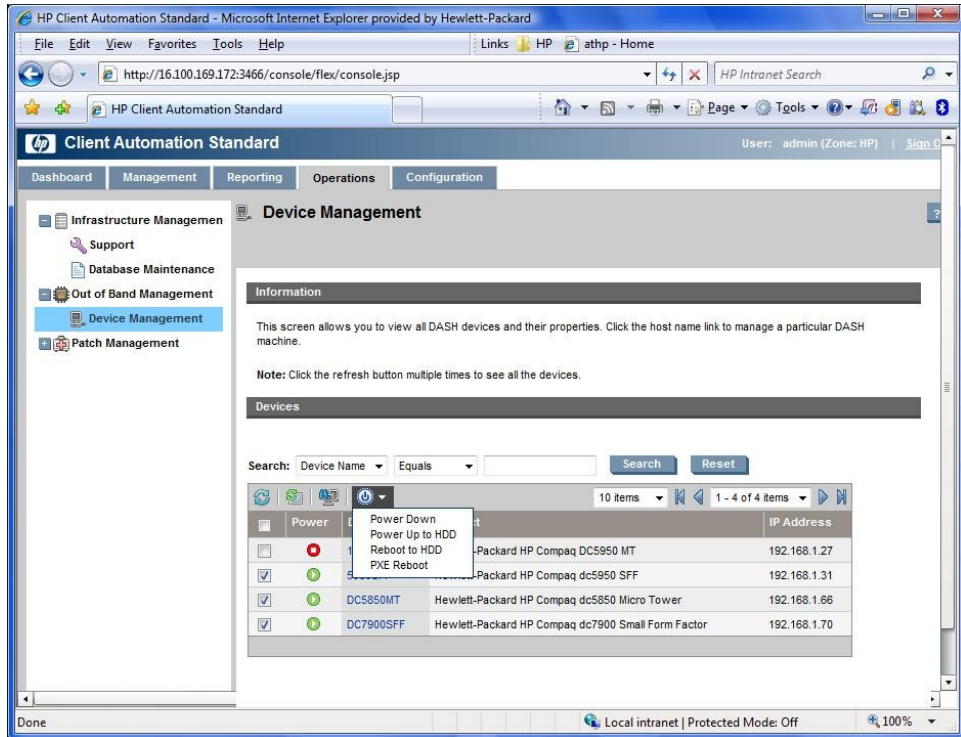
- HP Client Automation 7.5
- HP Out-of-Band Manager 4.0
- AMD DASH Plug-in for Microsoft Systems Center
- Symantec Real-Time Systems Manager 7.0
- Symantec Out-of-Band Management Console 7.0

Symantec Real-Time Systems Manager out-of-band device discovery



Most consoles integrate DASH functionality into the routine operations you already perform. Once your management console has discovered the DASH capability of your computer systems, operations such as scheduled remote patch management will use DASH technology to remotely boot or wake the systems using DASH, perform the desired operation and reset the systems to their previous power state. In addition, DASH provides a higher degree of visibility to the health of your enterprise computer systems and makes it easier to remotely diagnose and triage problems when they occur.

HP Client Automation Standard device management with DASH



HP Client Management Web View

In addition to managing the DASH-enabled PC through a management console, HP provides a convenient method to access out-of-band management functions through a web browser.

The HP Client management Web View is a web browser-based interface for limited remote system management. The web view is only functional once the management controller has been provisioned for DASH management and an Administrator account has been enabled,

The HP Client management Web View is accessible from the following web browsers:

- Microsoft Internet Explorer 6 SP1 or newer
- Netscape Navigator 7.1 or newer
- Mozilla Firefox 1.0 or newer
- Mozilla 1.7 or newer

Management functions accessible from the web-based user interface include:

- Access to hardware inventory information for system, processors, and memory
- Visibility to system power state and remote power control operations
- Network configuration settings
- Access to platform event and audit logs
- User and role management functions

Connecting to the HP Client Management Web View

The following steps outline connecting to the out-of-band management service from the embedded web server included on the Broadcom NetXtreme™ Ethernet Gigabit Plus controller. This interface provides an alternative control mechanism for utilizing the DASH functionality without requiring a DASH enabled management console.

These steps assume that both of the following preconditions have been met:

- The DASH management functionality has been enabled both in BIOS on the Broadcom NetXtreme™ Gigabit Ethernet Plus controller.
- The user account to connect as has been configured with a password for authentication.
- And the user account has been enabled for use.

Steps to enable and configure DASH in an automatable fashion via Windows® Management Instrumentation (WMI) are covered in the section [Enabling DASH Support](#). Additional discussions for configuring options manually are covered in [Appendix B: Enabling Management Functionality with Computer Setup](#) and [Appendix C: Enabling Management Functionality with BMCC and BACS](#).

1. Using your web browser of choice from a separate computer system, connect to the IP address and DASH management port of the remote system.

DASH Management Ports

TCP Port	Purpose	Example URL
623	WS-Man over HTTP	http://172.16.2.17:623
664	WS-Man over HTTPS	https://172.16.2.17:664

These are the well-known IANA ports reserved for DASH management traffic. By default the Broadcom NetXtreme™ Gigabit Ethernet Plus controller will use these ports for DASH traffic, but the device can be configured to either disallow HTTP traffic, or use other TCP ports for communication.

2. The web browser makes a connection to the HP Client management Web View, but will require authentication to grant access to the web page.

Logon screen



The server 172.16.2.17 at Broadcom Management Service requires a username and password.

User name:

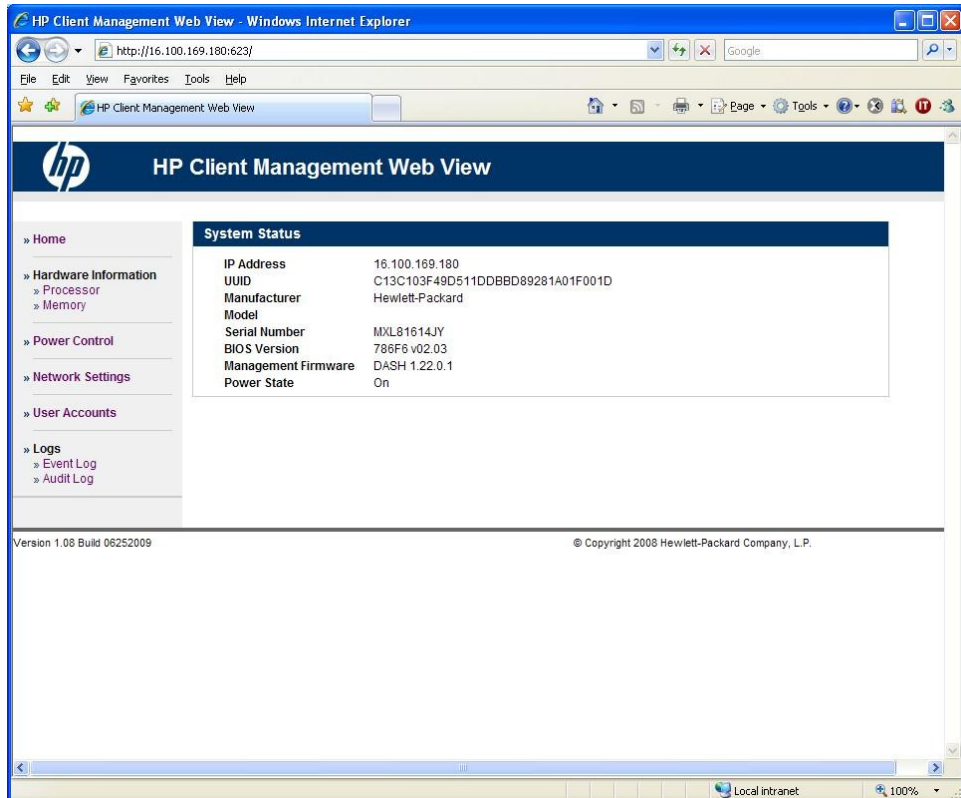
Password:

Remember my password

OK Cancel

3. Enter the user name and password to use for authentication. If you have not created any additional accounts, you can connect with either of the predefined accounts of "Administrator" or "Operator".
4. Once your access has been authenticated, you will have access to a management portal similar to the figure below:

Web management portal



HP Client Management Web View - Windows Internet Explorer

http://16.100.169.180:623/

HP Client Management Web View

System Status

IP Address	16.100.169.180
UUID	C13C103F49D511DD8BD89281A01F001D
Manufacturer	Hewlett-Packard
Model	
Serial Number	MXL81614JY
BIOS Version	788F6 v02.03
Management Firmware	DASH 1.22.0.1
Power State	On

Version 1.08 Build 06252009 © Copyright 2008 Hewlett-Packard Company, L.P.

Troubleshooting

Upgrading Management Software

The installation of management agent is required to support various DASH functions, such as gracefully shutting down the system, and is installed on factory system image. When building a custom image, management agent and CIM options can be selected during Broadcom Advance Control Suite (BACS) installation. The following command line can be used to silently install management agent with BACS similar to factory image. Please note, command and parameters must be entered on the same line. Refer to SilentMgmtAppsa.txt in MgmtApps directory for more information on silent installation.

```
Setup.exe /s /v" /qn  
ADDSOURCE=BACSi32,BASPi32,CIMi32,MgmtCfgi32,MgmtAgenti32"
```

Firmware updates are currently released as an image file with factory default settings. BMCC tool can be used to export current settings into a file that can be used to import the settings back after update. A sample batch file is included with the firmware update as an example to automate settings export, firmware update, and setting import. This example uses BMCC and firmware upgrade utility for Windows. Both are included in the firmware softpaq.

PCIe Add-in Card Issues

DASH functionality requires a communication channel between the hardware platform features, system BIOS, and the Broadcom NetXtreme™ Gigabit Ethernet Controller. The introduction of additional PCI Express cards into the platform can disrupt the communication channels utilized for DASH. This type of disruption can be manifested as the inability to issue requested power state changes to the DASH enabled platform for example.

In the event that you experience inconsistencies in DASH behavior, remove PCIe option cards one by one to determine the conflicting device. Once you have determined the PCIe option card that is interfering with DASH functionality, contact HP or the PCIe device manufacturer for firmware updates to correct the issue.

Power-On Password

The Broadcom NetXtreme™ Gigabit Ethernet Plus functions very similarly between a dc7900 and a dc5850. However, there is one important difference regarding remote wake and Power-On Password behavior.

A remote shutdown into a sleep state, S3 - S5, and subsequent remote wake of the dc5850 will bypass the Power-On Password as the system resumes from the sleep state. This is the expected behavior.

In the case of the dc7900, there is a hardware limitation that does not report the remote wake and wakes the system as a localized wake. Therefore, the BIOS reaction to the wake event is to process it as a localized wake and not bypass the Power-On Password.

Appendix A: Broadcom NetXtreme™ Gigabit Ethernet Plus Network Controller

The Broadcom NetXtreme™ Gigabit Ethernet Plus is the successor to the Broadcom NetXtreme™ Gigabit Ethernet network adapter. In addition to the standard network adapter functionality, the Broadcom NetXtreme™ Gigabit Ethernet Plus also features DASH support. HP offers the Broadcom NetXtreme™ Gigabit Ethernet Plus integrated and as a discrete PCI Express option.

Product Description

The Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter is a Broadcom BCM5761 10/100/1000 Base-T network controller with integrated transceiver, advanced security, and platform management capabilities including DASH support. The discrete adapter is a PCIe x1 card designed in accordance to the PCI Express v1.1 specification.

The card comes with a high profile bracket, but is also compatible with low profile brackets. A low profile bracket is available for this card.



Broadcom NetXtreme™ Gigabit Plus Network adapter PCI Express card

Feature List

- Integrated 10/100/1000BASE-T transceivers
- Automatic MDI crossover function
- PCI Express v1.1 host interface with multi-function support
- 10/100/1000BASE-T full/half-duplex MAC
- IPv4 and IPv6 Large Send Offload and Checksum Offload (LSO/TCO)
- Receive Side Scaling (RSS) for multicore client processors

- Wake-on-LAN (WOL) support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z, Clause 30)
- System Management Bus (SMBus) interface supporting Desktop and mobile Architecture for System Hardware (DASH) v1.1 or Alert Standard Format (ASF) v2.0
- Centralized Power Management Unit (CPMU)
- Serial NVRAM interface with Flash auto-sensing
- PCIe CLKREQ support
- DASH 1.0 and 1.1 support with additional HP value-add management features

USB Cable and Headers

The Broadcom NetXtreme™ Gigabit Ethernet Plus discrete PCIe option card comes with a double female-ended 10-pin USB cable. One end of this cable connects to the male USB header on the Broadcom NetXtreme™ Gigabit Ethernet Plus, and the other end connects to an identical header on the system board. On newer platforms the system board connector is labeled for DASH functionality.

PCIe Adapter Configuration:

The USB cable is only required to connect the PCIe network adapter option card with the system board and BIOS. With the introduction of the integrated solution, available on some systems, the cable is no longer required.

On some platforms the male USB header on the system board is reserved for two functions:

- Microsoft Windows® ReadyBoost performance cache
- DASH management protocol

Internal USB Connector

DASH and ReadyBoost are mutually exclusive options. Because there is only one internal USB connector dual-purposed for both functions, you will have to choose the option which fits best within your environment.

Additionally on certain systems there is a secondary internal USB connector. Although there is a similar male USB header on the system board reserved for the Media Card Reader, this header is not the same as the one for purposed for DASH or ReadyBoost. If the USB cable is connected to the Media Card Reader connection, DASH features will not function properly.

The USB cable serves two purposes and is critical for DASH functionality:

- Communication between the Management Controller and system BIOS
- Data transfer for USB-redirection

USB-redirection is the mechanism the Broadcom NetXtreme™ Gigabit Ethernet Plus controller uses to support the USB Redirection Profile. USB-redirection is a DASH 1.1 feature that allows the contents of a remote media source (ISO image) to be redirected to the remotely managed PC as a USB mass storage device.

Appendix B: Enabling Management Functionality with Computer Setup

When the Broadcom NetXtreme™ Gigabit Ethernet Plus add-in card is installed into a system, it will not be the default management controller (except on the dc5850 where the controller will be the default and will only support ASF management functions). For systems supporting the full management capabilities, the user may manually set the Broadcom NetXtreme™ Gigabit Ethernet Plus as the primary management controller in Computer Setup (F10) for the PCI Express network adapter to perform the role of DASH manageability. Multiple network adapters can function simultaneously, but only one management controller can be active at a given time.

Computer Setup Differences

The Computer Setup screens relating to management devices and modes differ slightly between various HP business desktops and workstations.

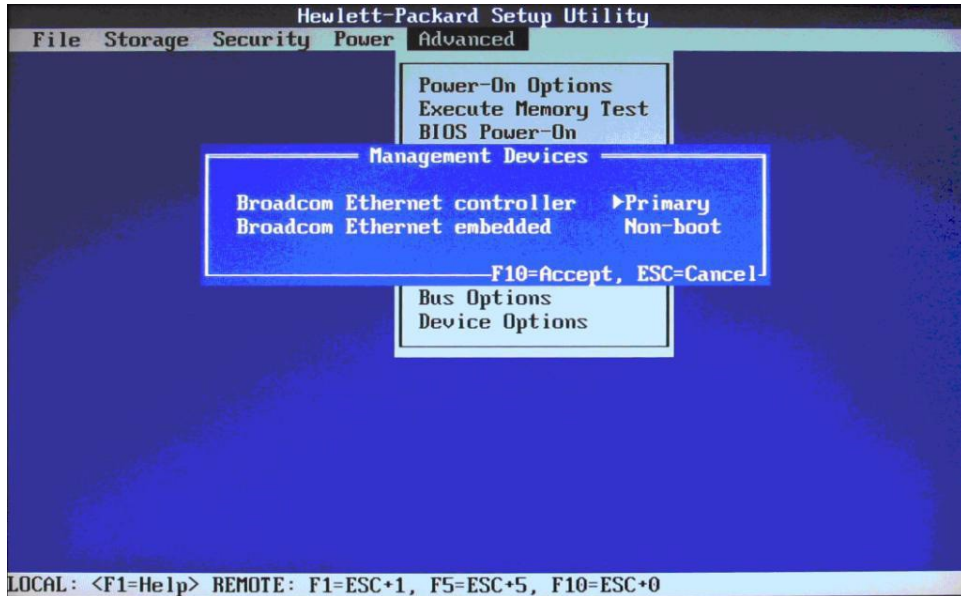
The primary management controller can be configured through: **Computer Setup > Advanced > Management Devices**.

The current management mode (ASF, AMT, or DASH) can be identified via **Computer Setup > File > System Information**.

HP Compaq dc5850 Business PC

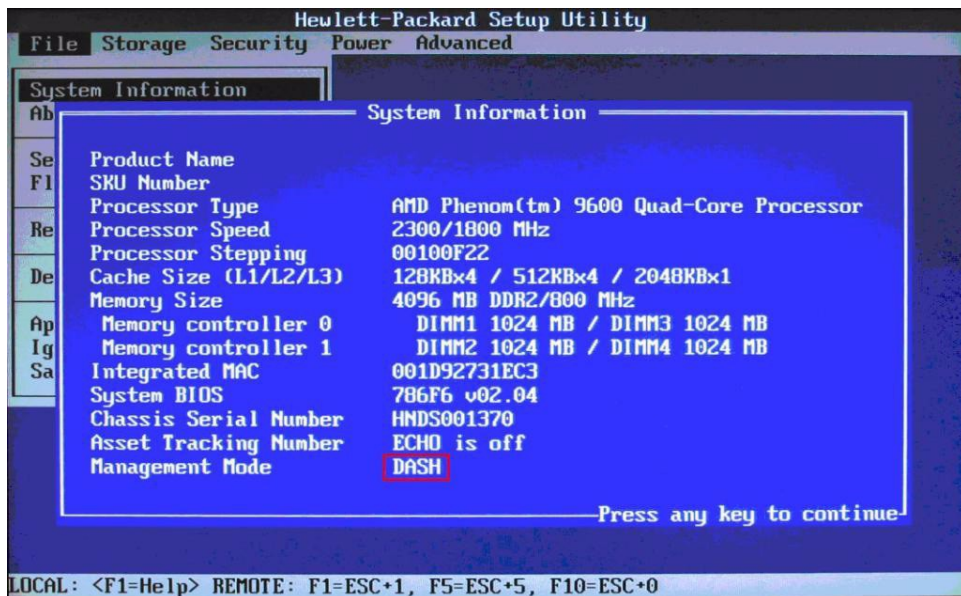
By default, the embedded Broadcom Ethernet controller is primary management controller. The Broadcom NetXtreme™ Gigabit Ethernet Plus must be changed to be the primary management controller for DASH to be enabled.

Management devices in the HP Compaq dc5850 Business PC



Once the Broadcom NetXtreme™ Gigabit Ethernet Plus is made the primary management controller and the system is rebooted, the Management Mode will change to DASH.

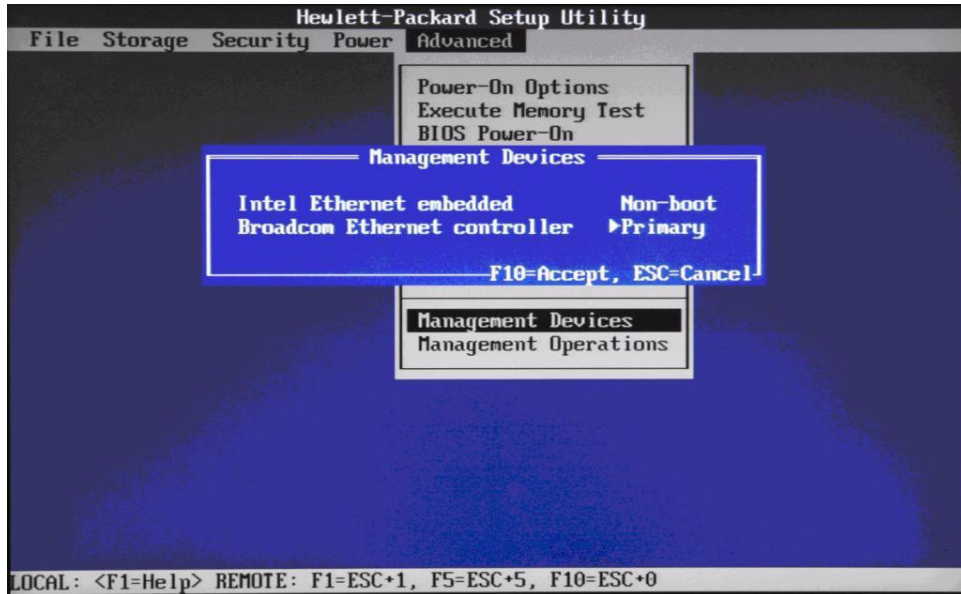
Management Mode (DASH highlighted) in the HP Compaq dc5850 Business PC



HP Compaq dc7900 Business PC

By default, the embedded Intel Ethernet controller is primary management controller. The Broadcom NetXtreme™ Gigabit Ethernet Plus must be changed to be the primary management controller for DASH to be enabled.

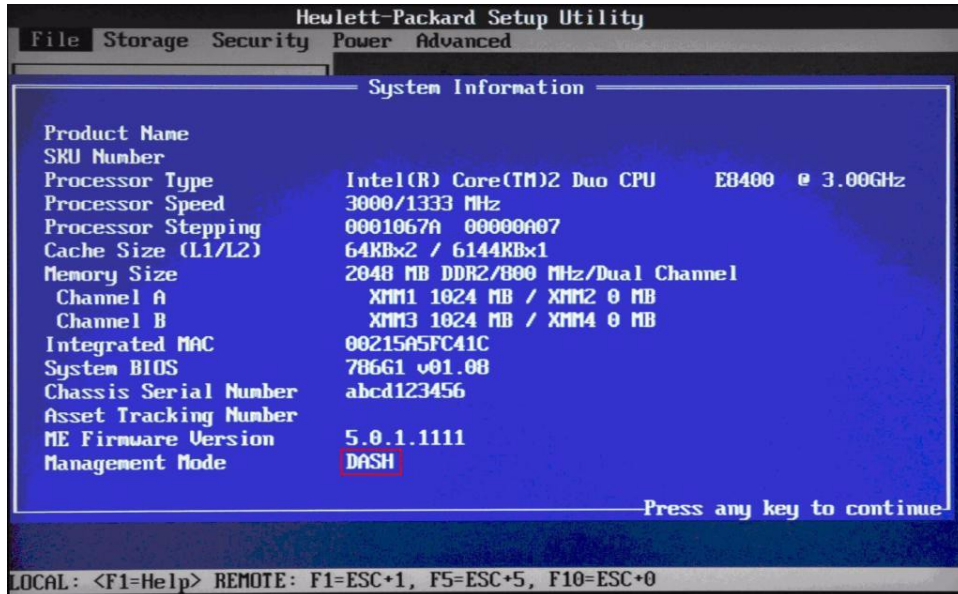
Management controller in the HP Compaq dc7900 Business PC



The HP Compaq dc7900 Business PC is an Intel Q45-based system which has an integrated management controller (often referred to as the Management Engine or ME) within the chipset for management control.

The ME firmware version is displayed in the Computer Setup System Information page right above the management mode. The placement of the ME firmware version and the management mode is in close proximity, but there is no correlation between the two lines.

Management Mode (DASH highlighted) in the HP Compaq dc7900 Business PC



The following chart shows the correlation between the management controller and management mode for the HP Compaq dc7900.

Correlation between management controller and management modes

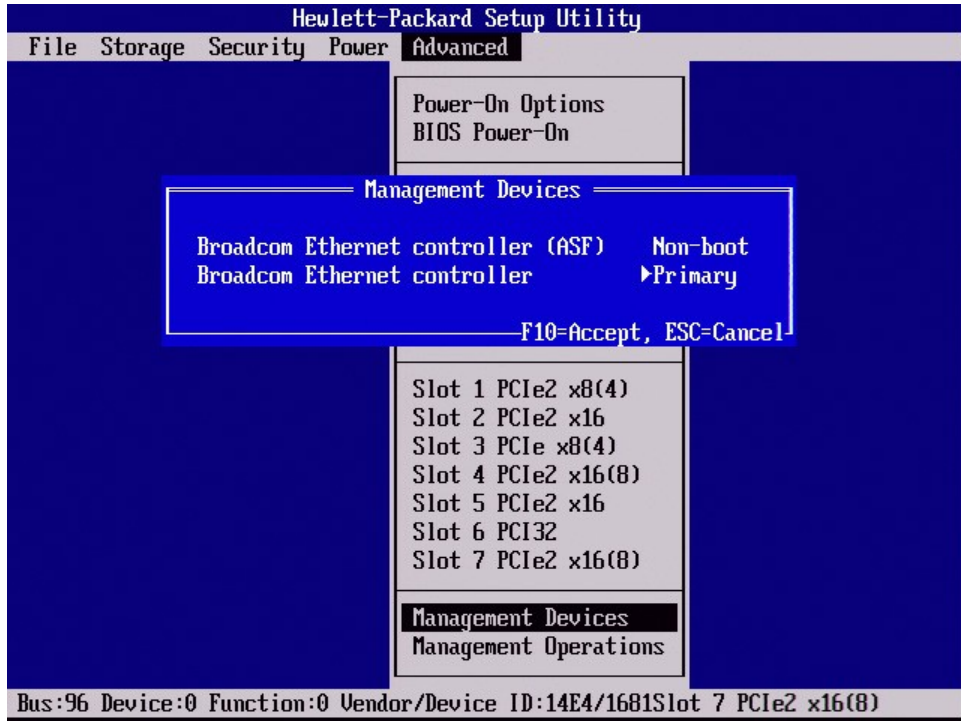
Primary Management Controller	Management Modes Supported
Intel® Management Engine	AMT, ASF, None
Broadcom TruManage™	DASH, ASF

In the case of ASF, both management controllers can be in this mode. However, only the primary management controller will actually be in control.

HP Z800 Workstation

Identifying the primary management controller differs slightly on the HP Z800 Workstation. The figure below illustrates the selection of management device between the multiple Broadcom controllers within the platform.

Management controller in the HP Z800 Workstation



Appendix C: Enabling Management Functionality with BMCC and BACS

Manageability features such as DASH and ASF are disabled by default on the Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter. This section provides information on additional configuration tools available for setting up DASH functionality on the Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter. Enabling DASH in this manner is an alternative to the WMI deployment methods discussed earlier, and still requires that the Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter is set as the primary management device within the system BIOS in order to function properly.

DASH Enablement

DASH can be enabled in one of two methods:

- Broadcom Manageability Configuration and Control application (BMCC)
- Broadcom Advanced Control Suite (BACS)

BMCC is not pre-installed in the system image. It requires the Broadcom NetXtreme™ Gigabit Drivers for Multiple Operating Systems Softpaq to be downloaded. BACS is included in the system image.

The following steps will enable DASH with BMCC:

Download the Broadcom NetXtreme™ Gigabit Drivers for Multiple Operating Systems Softpaq from www.hp.com.

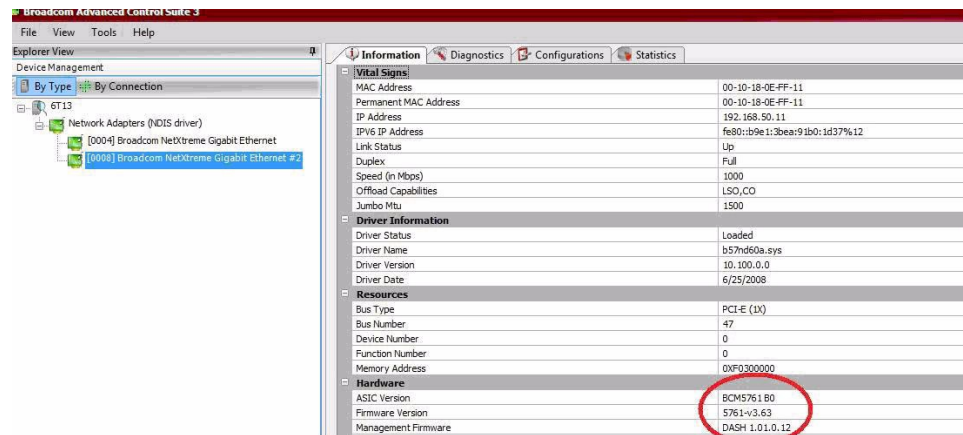
1. Install the Softpaq.
2. Open a Command Prompt as Administrator.
3. Go to the directory where the Broadcom application is installed.
4. Execute the command: `bmcc enable`.

The following steps will enable DASH with BACS:

1. Execute BACS.
2. Choose the Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter.

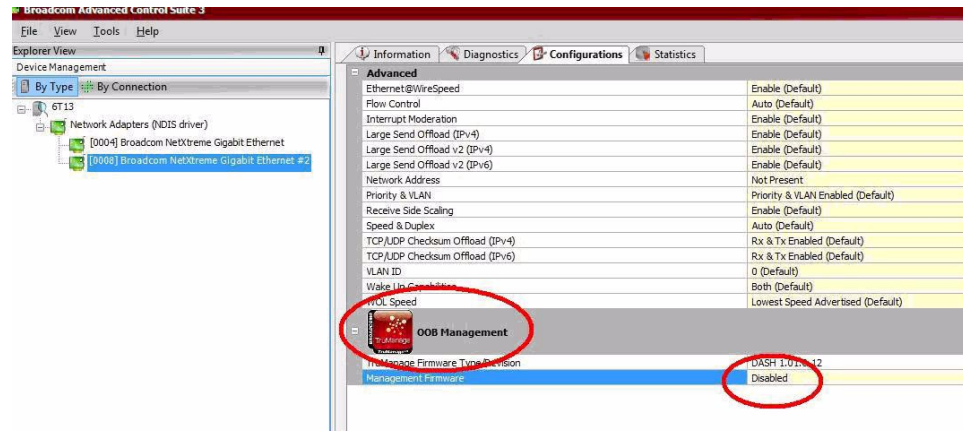
Note that all network adapters will be displayed by BACS. The Broadcom NetXtreme™ Gigabit Ethernet Plus can be identified through the **Information** tab. Look for the ASIC and Firmware of 5761.

Broadcom NetXtreme™ Gigabit Ethernet Plus network adapter - Information tab



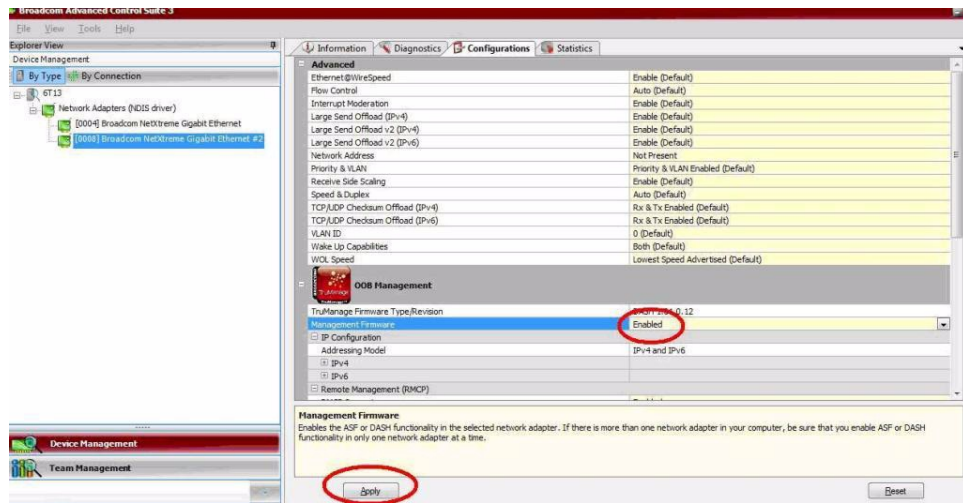
3. Go to the **Configuration** tab.
4. Expand the **OOB Management** list to determine if DASH is enabled or disabled. By default DASH is disabled.

OOB Management list



5. Enable DASH and click the **Apply** button.

Enabling DASH



Setting the Initial Administrator Account

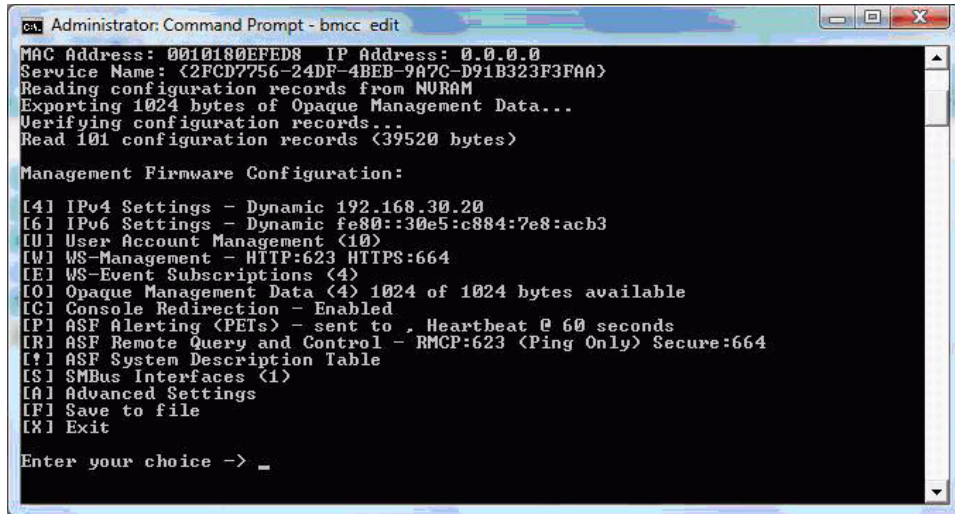
Setting up an Administrator account for DASH requires the use of the Broadcom NetXtreme™ Gigabit Drivers for Multiple Operating Systems Softpaq. This is available at www.hp.com.

Execute the Softpaq, and then open a Command Prompt as Administrator.

Use the following steps to create an Administrator account:

1. Go to the directory where the Broadcom application is installed.
2. Execute the command: `bmcc edit`. This will execute the Broadcom Manageability Configuration and Control application and will bring up a list of Management Firmware Configuration options.

Management Firmware Configuration options



```
Administrator: Command Prompt - bmcc edit
MAC Address: 0010180EFED8 IP Address: 0.0.0.0
Service Name: <2FCD7756-24DF-4BEB-9A7C-D91B323F3FAA>
Reading configuration records from NURAM
Exporting 1024 bytes of Opaque Management Data...
Verifying configuration records...
Read 101 configuration records <39520 bytes>

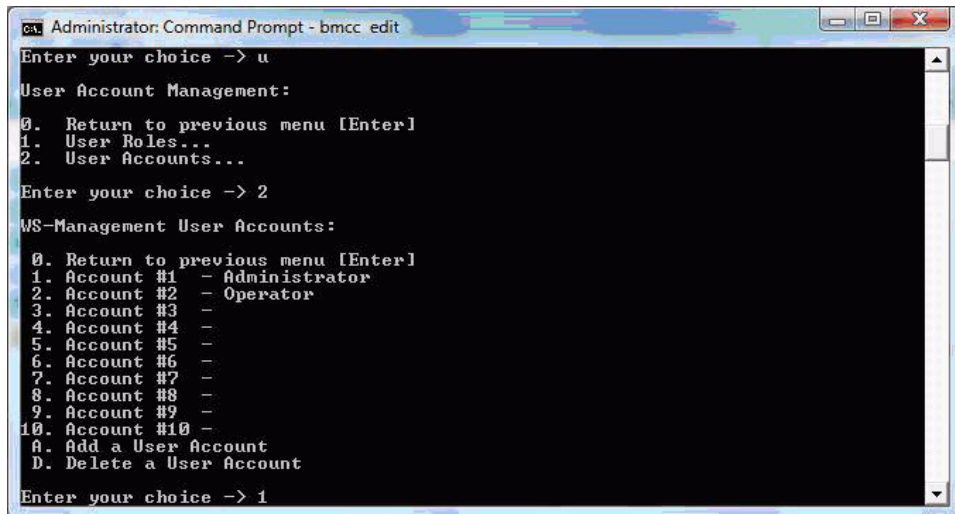
Management Firmware Configuration:

[4] IPv4 Settings - Dynamic 192.168.30.20
[6] IPv6 Settings - Dynamic fe80::30e5:c884:7e8:acb3
[U] User Account Management <10>
[W] WS-Management - HTTP:623 HTTPS:664
[E] WS-Event Subscriptions <4>
[O] Opaque Management Data <4> 1024 of 1024 bytes available
[CG] Console Redirection - Enabled
[IP] ASF Alerting (PEIs) - sent to , Heartbeat @ 60 seconds
[RP] ASF Remote Query and Control - RMCP:623 <Ping Only> Secure:664
[IT] ASF System Description Table
[IS] SMBus Interfaces <1>
[A] Advanced Settings
[F] Save to file
[X] Exit

Enter your choice -> _
```

3. Enter **U** for User Account Management
4. Enter **2** to access User Accounts
5. Enter **1** to select Administrator Account

Management options



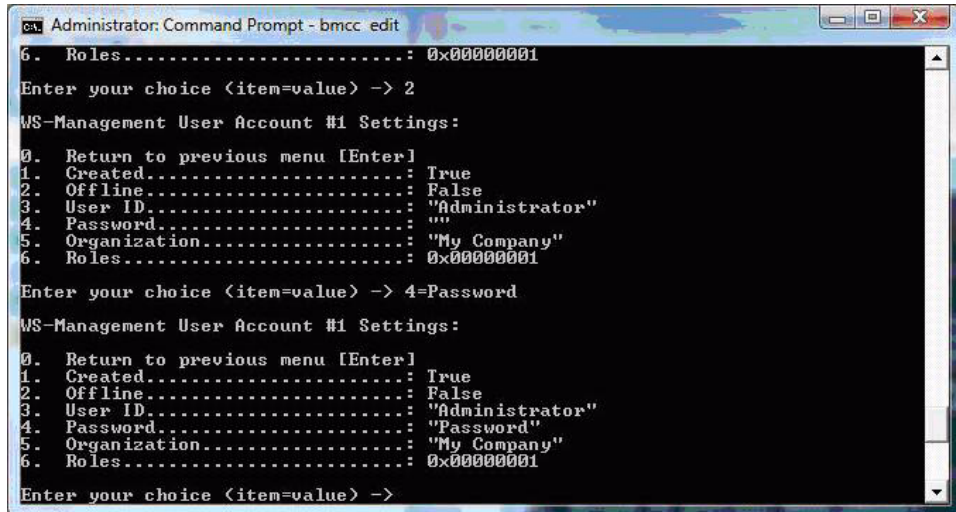
```
Administrator: Command Prompt - bmcc edit
Enter your choice -> u
User Account Management:
0. Return to previous menu [Enter]
1. User Roles...
2. User Accounts...

Enter your choice -> 2
WS-Management User Accounts:
0. Return to previous menu [Enter]
1. Account #1 - Administrator
2. Account #2 - Operator
3. Account #3 -
4. Account #4 -
5. Account #5 -
6. Account #6 -
7. Account #7 -
8. Account #8 -
9. Account #9 -
10. Account #10 -
A. Add a User Account
D. Delete a User Account

Enter your choice -> 1
```

6. Enter **2** to change the account status from Offline = True to Offline = False.
7. Enter **4=XXXX** where XXXX is the new Administrator password. By default, the password is blank.

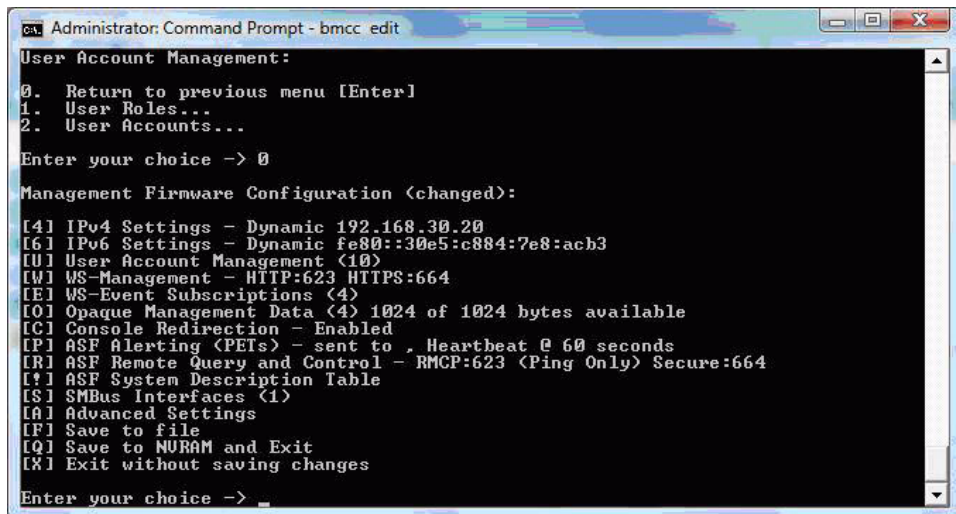
Management options



```
Administrator: Command Prompt - bmcc edit
6. Roles.....: 0x00000001
Enter your choice <item=value> -> 2
WS-Management User Account #1 Settings:
0. Return to previous menu [Enter]
1. Created.....: True
2. Offline.....: False
3. User ID.....: "Administrator"
4. Password.....: ""
5. Organization.....: "My Company"
6. Roles.....: 0x00000001
Enter your choice <item=value> -> 4=Password
WS-Management User Account #1 Settings:
0. Return to previous menu [Enter]
1. Created.....: True
2. Offline.....: False
3. User ID.....: "Administrator"
4. Password.....: "Password"
5. Organization.....: "My Company"
6. Roles.....: 0x00000001
Enter your choice <item=value> ->
```

8. Enter **0** twice to navigate back to the main menu.
9. Enter **Q** to Save and Exit.

Save and exit



```
Administrator: Command Prompt - bmcc edit
User Account Management:
0. Return to previous menu [Enter]
1. User Roles...
2. User Accounts...
Enter your choice -> 0
Management Firmware Configuration (changed):
[I4] IPv4 Settings - Dynamic 192.168.30.20
[I6] IPv6 Settings - Dynamic fe80::30e5:c884:7e8:ach3
[U] User Account Management <10>
[W] WS-Management - HTTP:623 HTTPS:664
[E] WS-Event Subscriptions <4>
[O] Opaque Management Data <4> 1024 of 1024 bytes available
[C] Console Redirection - Enabled
[P] ASF Alerting <PETs> - sent to , Heartbeat @ 60 seconds
[R] ASF Remote Query and Control - RMCP:623 <Ping Only> Secure:664
[*] ASF System Description Table
[S] SMBus Interfaces <1>
[A] Advanced Settings
[F] Save to file
[Q] Save to NVRAM and Exit
[X] Exit without saving changes
Enter your choice -> _
```

After saving to NVRAM and exiting, the Administrator account along with the password has been created.

© 2009 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Microsoft, Windows, and Windows Vista are trademarks of the Microsoft group of companies.

NetXtreme™ and TruManage™ are trademarks of Broadcom Corporation. Intel is a trademark of Intel Corporation in the U.S. and other countries.

512666-002 November 2009