Dell™ OptiPlex™ 745c Systems

Client Systems Management Administrator's Guide

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your computer.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.

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Introduction

Your Dell™ OptiPlex™ 745c system is designed to simplify system management and reduce IT-related expenditures.

The OptiPlex 745c allows information technology (IT) administrators to perform many remote tasks for their networked computing assets, regardless of the system's power state or the state of the operating system. This includes the ability to remotely inventory, monitor, maintain and update, boot, troubleshoot, and repair systems.

The OptiPlex 745c includes Intel® vPro technology which is comprised of Active Management Technology (AMT), an E6xx Core 2 Duo Processor, Intel GbE LOM, and the Intel Q965DO chipset. The advantage of the hardware-based capabilities of the Optiplex 745c over traditional software-based solutions is that it allows remote access to systems that have traditionally been unavailable to the management console. The OptiPlex 745c featuring AMT delivers management and security capabilities even when powered off, if the operating system is inoperative, or if software agents are missing. This out-of-band communication helps IT organizations streamline remote services, automate more tasks, and achieve a new level of service across the network.

Advantages of the OptiPlex 745c With iAMT Technology

Your Dell OptiPlex system is designed to help IT organizations:

- Improve security of systems, even if a system's power is off, its operating system is inoperative, or its management agent is disabled
- Improve compliance with government and other regulations
- Reduce deskside visits for both software and hardware problems
- Improve the effectiveness of remote diagnostics and repair even if the operating system crashes or hardware (such as a hard drive) has failed
- Increase the accuracy of inventories and software licensing
- Reduce total cost of ownership of technology

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Setup and Configuration

Table 2-1. Important Terms

Terms	Definition
Setup and Configuration	Is the process that populates the Intel AMT-managed platform with usernames, passwords, and network parameters that enable the platform to be administered remotely.
Provisioning	Is the act of setting up and configuring AMT.
Configuration Service	Is a third-party application that completes the AMT setup and configuration in Enterprise mode.
The Intel AMT WebGUI	Is a web browser-based interface for limited remote system management.

AMT must be setup and configured in a system before use. AMT setup readies the system for AMT mode and enables network connectivity. This setup is generally performed only once in the lifetime of a system. When AMT is enabled, it can be discovered by management software over a network.

Once Intel AMT is set up in the Enterprise mode, Intel AMT is ready to initiate configuration of its own capabilities. When all required network elements are available, the user simply connects the system to a power source and the network, and Intel AMT automatically initiates its own configuration. The configuration service (CS), a third-party application, completes the process for you. Intel AMT is then ready for remote management. This configuration typically takes only a few seconds. Once Intel AMT is setup and configured, the technology can be reconfigured as needed for your business environment.

Once AMT is set up in the SMB mode, the system does not have to initiate any configuration across the network as it is set up manually and it is ready to use with the Intel AMT Web GUI.

AMT Setup and Configuration States

The act of setting up and configuring AMT is also known as provisioning. An AMT system can be in one of three setup and configuration states:

- Factory-default state
- Setup state
- Provisioned state

Factory-default state is a fully unconfigured state, in which security credentials are not yet established, and Intel AMT capabilities are not yet available to management applications. In the factory-default state, Intel AMT has the factory-defined settings.

Setup state is a partially configured state, in which Intel AMT has been set up with initial networking and transport layer security (TLS) information: an initial administrator password, the provisioning passphrase (preshared key, or PPS), and the provisioning identifier (PID). When Intel AMT has been set up, Intel AMT is ready to receive enterprise configuration settings from a configuration service (CS).

Provisioned state is a fully configured state, in which the Intel Management Engine has been configured with power policies, and Intel AMT has been configured with its security settings and certificates, and the settings that activate the Intel AMT capabilities. When Intel AMT has been configured, the capabilities are ready to interact with management applications.

Operational Modes

Intel AMT can be set up for either enterprise or small-business operations (also called provisioning models). Both operational modes support dynamic and static IP addressing.

If dynamic IP addressing (DHCP) is used, the AMT hostname and the operating system hostname must match. The operating system and AMT must both be configured to use DHCP as well. If static IP addressing is used, the AMT IP address must be different from the operating system's IP address. Additionally, the AMT hostname must be different from the operating system's hostname.

- Enterprise mode is for large organizations. This is an advanced networking mode that supports TLS and requires a configuration service. Enterprise mode allows IT administrators to setup and configure Intel AMT in a secure manner for remote management. Your Dell system is defaulted to Enterprise mode when leaving the factory. You can change the mode during the Setup and Configuration process.
- Small Medium Business (SMB) mode is a simplified operational mode that does not support TLS, does not require a setup application, and does not require DHCP or DNS. SMB mode is for customers who do not have independent software vendor (ISV) management consoles, or the necessary network and security infrastructures to use encrypted TLS. SMB mode AMT setup and configuration is a manual process done through the Intel Management Engine BIOS Extension (MEBx). SMB mode is the easiest to implement since it does not require much infrastructure, but is the least secure since network traffic is not encrypted.

AMT Configuration sets up all other AMT options not covered in AMT Setup, such as enabling the system for Serial-Over-LAN (SOL) or IDE-Redirect (IDE-R).

NOTE: IDE-R will only function with optical drives and optical drive images. Dell does not support floppy drives or floppy drive images with IDE-R.

Settings modified in the configuration phase can be changed many times over the course of a system's life span. Changes can be made to the system locally or through a management console.

Password Guidelines

MEBx passwords must meet minimum criteria. The following restrictions are enforced by the MEBx to reduce vulnerability:

- Password must be at least eight characters long. The characters " ' , and : are not allowed
- Password must have at least one digit character, for example 0, 1, 2, 9
- Password must have at least one non-alphanumeric character, for example !, @, $
- Password must contain both upper and lower case alphabetic characters, for example A, a, B, b

Enterprise Mode- AMT Setup and Configuration with MEBx

NOTE: The MEBx is an optional ROM module that is provided to Dell by Intel to be included in the Dell system BIOS. The MEBx is not Dell-specific and contains options that are not used by Dell. If an option is not used by Dell, ignore it and do not modify from its default state.

Enterprise mode (for large corporate customers) requires a setup and configuration server (S&CS). A S&CS runs an application over a network that performs AMT setup and configuration. The S&CS is also known as a Provisioning server as seen in the MEBx. An S&CS is typically provided by ISVs and is contained within the ISV management console product. Consult with your management console supplier for more information.

Follow the steps below to setup and configure AMT in the enterprise mode:

1. Press <Ctrl><P> during POST to enter Intel Management Engine BIOS Extension (MEBx) Setup. You can display this option only during POST if set in BIOS-Setup.
2. Type the default password, which is `admin`. Passwords are case-sensitive.

   NOTE: You must change the default password before making changes to the MEBx options.
3. Change the MEBx password. The new password must meet the password criteria. For more information on password criteria, see "Password Guidelines" on page 9. Type the password twice for verification.

   Change the password to establish AMT ownership. The system will go from the factory-default state to the setup state.

   NOTE: You must either complete the provisioning process or reset the jumper to return the MEBx password to its default password (`admin`).
4. Select **Intel ME Configuration**. A window displays indicating that the system resets after configuration.
5. Select **Y**. ME platform configuration allows IT personnel to configure ME features such as power options, firmware update capabilities, and so on.

NOTE: The **Intel ME State Control** option is the next option. The default setting for this option is **Enabled.** Do not change this setting to **Disabled.** If you wish to disable AMT, change the **Manageability Feature Selection** to **None** in step 8a.

6 Select **Intel ME Firmware Local Update Qualifier**. The default setting for this option is **Always Open**. The other settings that are available are **Never Open** and **Restricted**.

This option sets the policy on allowing the MEBx to be updated locally. **Always Open** qualifies the override counter and allows local ME firmware updates. The override counter is a value set in the factory that by default allows local ME firmware updates. Currently, **Never Open** and **Restricted** options behave the same way with AMT 2.1. These two options disqualify the override counter and do not allow local ME firmware updates unless explicitly permitted with the **Intel ME Firmware Local Update** option. Selecting **Never Open** or **Restricted** adds the **Intel ME Firmware Local Update** option, which can be set to **Enable** or **Disable.** By default it is **Disabled.**

7 Select **LAN Controller**. The default value for this option is **Enabled**. This option enables or disables the NIC. Disabling the NIC will cause the system to lose all remote management capabilities.

NOTE: The **LAN Controller** option is configurable only if the ME management mode is set to **None.**

8 Select **Intel ME Features Control**.

a Select **Manageability Feature Selection**. This feature sets the platform management mode. The default setting for this option is **Intel AMT**. The other options available are **None** and **ASF.**

NOTE: Selecting the **None** option will disable all remote management capabilities.

NOTE: The **ASF** option is not supported on the Dell BIOS. If you select this option, your BIOS will show an error when you restart your system.

b Select the **Intel Quiet Systems Technology**. The default setting for this option is **Disabled**.

NOTE: **Intel Quiet System Technology** is used for fan speed control. It is not used on your Dell system because the Dell system BIOS already implements proper fan speed controls.

c Select **Return to Previous Menu.**

9 Select **Intel ME Power Control**.

a Do not change the **ME State upon Initial Power-On** from the default **OFF** setting as this may have a negative impact on the system boot behavior.

b Select **ME ON in Host Sleep States**. The default setting for this option is **Always**. The other states that are available are **Never, Standby(S3), Standby(S3) + Hibernate(S4).** This option sets the ME power policy when the system is in a sleep state (Sx).

NOTE: The Standby(S3) + Hibernate(S4) option is not supported on your Dell system. To enable AMT features in these states, use the **Always** setting. This will enable AMT in the S0, S1, S3, S4, and S5 states.

c Skip the **LAN Power Well** option. The default setting for this option is **WOL_EN Pin.** This option defines which power well is connected to the NIC.

NOTE: Do not change the settings for this option.

d Skip the **ME Visual LED Indicator**. The default setting for this option is **Off.**

NOTE: The **On** setting is not supported on your Dell system.

e Select **Return to previous menu.**

10 Return to the previous menu to exit the MEBx Setup and save AMT configuration. The system will display an Intel ME Configuration Complete message and restart. After the ME Configuration is complete, you can configure AMT.

11 Press <Ctrl><P> during POST to enter MEBx Setup again.

12 Type the MEBx password.

13 Select **Intel AMT Configuration.**

14 Select **Host Name**, and then type a host name.

NOTE: Spaces are not accepted in the host name. Make sure there is not a duplicate host name on the network. You can use host names in place of the system's IP for any applications requiring the IP address.

15 Select **TCP/IP.**

- **a** When prompted to **Disable Network Interface,** select **N**. If the network is disabled, then all remote AMT capabilities are disabled and TCP/IP settings are not necessary. If prompted to enable **Enable Network Interface**, select **Y**.
- **b** In the **DHCP Disable** setting select **N**, or select **Y** if the setting is **DHCP Enable**.
- **c** Select **Domain Name,** and then type the domain name.

16 Select **Provisioning Server**.

- **a** Type the Provisioning Server IP. The default setting is 0.0.0.0. The default setting of 0.0.0.0 will work only if the DNS server has an entry that will resolve the name *provisionserver* to the IP of the provisioning server.

  NOTE: DHCP and DNS must be available for the setup and configuration server search to automatically succeed. If DHCP and DNS are not available, then the setup and configuration server's IP address must be manually entered into the AMT system's MEBx.

- **b** Type the Port. The default setting is 0. If left at the default setting of 0, the AMT will attempt to contact the provisioning server on port 9971. If your provisioning server is listening on a different port, enter it here.

17 Select **Provision Model.**

- **a** When prompted to **Change to Intel AMT 1.0 Mode,** select **N** to enable Intel AMT 2.0 Mode.
- **b** When prompted to Change to **Small Business,** select **N** to enable Enterprise mode. If prompted to **Change to Enterprise**, select **Y instead.**
- **c** Select **Return to previous menu**.

18 Select **Set PID and PPS**. This option is for Provisioning ID (PID) and Provisioning Passphrase (PPS) entry. PIDs are 8 characters and PPS are 32 characters. There are dashes between every set of 4 characters, so including dashes, PIDs are 9 characters and PPS are 40 characters. An S&CS must generate these entries.

19 Skip **Un-Provision**. This option returns the system to factory defaults. For more information on unprovisioning, see "Return to Default" on page 17.

20 Select **VLAN**. The default setting for this option is **Disabled**.

21 Select **SOL/IDE-R**, and then select **Y**. A message window indicates that the system resets after configuration.

a Select **Username and Password**, and then select **Enabled**.

This option allows you to add users and passwords from the WebGUI. If the option is disabled, then only the administrator has MEBx remote access.

b Select **Serial Over LAN**, and then select **Enabled**.

c Select **IDE Redirection**, and then select **Enabled**.

NOTE: IDE-R will only function with optical drives and optical drive images. Dell does not support floppy drives or floppy drive images with IDE-R.

22 Skip **Remote Firmware Update**. The default setting is **Enabled**. However, this option is not supported.

23 Skip **Set PRTC**.

24 Select **Idle Timeout**. The default setting is 0x0. Do not change this setting from the default value as this may cause AMT to stop responding to remote requests.

25 Select **Return to previous menu**.

26 Select **Exit**, and then select **Y** to exit the MEBx Setup and save settings. The system displays an Intel ME Configuration Complete message and restarts.

27 Turn off the system and remove power. The system is now in setup state and is ready for deployment.

28 Plug the system into a power source and connect the network. Use the integrated Intel 82566DM NIC. Intel AMT does not work with any other NIC solution.

When power is reapplied to the system, the system immediately looks for a setup and configuration server. If the system finds this server, the AMT system will send a *Hello* message to the server.

DHCP and DNS must be available for the setup and configuration server search to automatically succeed. If DHCP and DNS are not available, then the setup and configuration server's IP address must be manually entered into the AMT system's MEBx.

The *Hello* message contains the following information:

- PID
- Universally Unique Identifier(UUID)
- IP address
- ROM and FW version numbers

The *Hello* message is transparent to the end-user. There is no feedback mechanism to tell the user the system is broadcasting the message. The setup and configuration server uses the information in the *Hello* message to initiate a transport layer security (TLS) connection to the AMT system using a TLS Pre-Shared-Key (PSK) cipher suite if TLS is supported.

The setup and configuration server uses the PID to lookup PPS in provisioning server database and uses the PPS and PID to generate TLS Pre-Master Secret. TLS is optional. For secure and encrypted

transactions, use TLS if the infrastructure is available. If you do not use TLS, then HTTP Digest will be used for mutual authentication. HTTP Digest is not as secure as TLS. The Setup and configuration server logs into the AMT system with the user name and password and provisions the following required data items:

- New PPS and PID (for future setup and configuration)
- TLS certificates
- Private keys
- Current date and time
- HTTP Digest credentials
- HTTP Negotiate credentials

The system goes from setup state to provisioned state, and AMT is fully operational. Once in the provisioned state you can remotely manage the system.

SMB Mode- AMT Setup and Configuration With MEBx

NOTE: Dell also supports setup and configuration of AMT in the SMB mode. The only settings that is not required in the SMB mode is the **Set PID and PPS** option. Also, the **Provision Model** option should be set to **Small Business** instead of **Enterprise**. For more information, see step 17.

AMT Setup and Configuration Using a USB Storage Device

You can set up and locally configure password, PID, and PPS information with a USB drive key. This is also called USB provisioning. USB provisioning allows an IT technician to manually setup and configure systems without the problems associated with manually typing in entries.

NOTE: USB provisioning will only work if the MEBx password is set to the factory default (admin). If the password has been changed, it can be reset to the factory default by clearing the CMOS.

The following is a typical USB drive key setup and configuration procedure:

1. An IT technician inserts a USB drive key into a system with a management console.
2. The technician request local setup and configuration records from an S&CS through the console.
3. The S&CS:
   a. Generates the appropriate passwords, PID, and PPS sets.
   b. Stores this information in its database.
   c. Returns the information to the management console.
4. The management console writes the password, PID, and PPS sets to a **Setup.bin** file in the USB drive key.
5. The technician takes the USB drive key to the staging area where new AMT platforms are located. The technician:
   a. Unpacks and connects platforms, if necessary.

b Inserts the USB drive key into a platform.

c Turns on that platform.

6 The system BIOS detects the USB drive key.

- If found, the BIOS looks for a **Setup.bin** file at the beginning of the drive key. Go to step 7.
- If no USB drive key or **Setup.bin** file is found, then restart your system. Ignore the remaining steps.

7 The system BIOS displays the message **Found USB key for provisioning Intel® AMT, Continue with Auto Provisioning (Y/N).** Select **Y.**

a The first available record in the **Setup.bin** is read into memory. The process:

- Validates the file header record.
- Locates the next available record.
- Invalidates current record so it cannot be used again.

b The process places the memory address into the MEBx parameter block.

c The process calls MEBx.

8 MEBx processes the record.

The message **Intel® AMT Provisioning complete** is displayed.

9 The IT technician powers down the system. The system is now in setup state and is ready to be distributed to users in an Enterprise mode environment.

10 Repeat step 5 if necessary (more than one system).

Refer to your management console supplier for more information on USB drive key set up and configuration.

USB Drive Key Requirements

The USB drive key must meet the following requirements to be able to setup and configure AMT:

- It must be greater than 16MB.
- It must be formatted with the FAT16 file system.
- The sector size must be 1KB.
- The USB drive key is not bootable.
- The **Setup.bin** file must be the first file landed on the USB drive key.

AMT WebGUI

The Intel AMT WebGUI is a web browser-based interface for limited remote system management. The WebGUI is often used as a test to determine if AMT setup and configuration was performed properly on a system. A successful remote connection between a remote system and the host system running the WebGUI indicates proper AMT setup and configuration on the remote system.

The AMT WebGUI is accessible from any web browser, such as Internet Explorer or Netscape.

Limited remote system management includes:

- Hardware inventory
- Event logging
- Remote system reset
- Changing of network settings
- Addition of new users

NOTE: WebGUI support is enabled by default for SMB setup and configured systems. WebGUI support for Enterprise setup and configured systems is determined by the setup and configuration server.

Follow the steps below to connect to the Intel AMT WebGUI on a system that has been configured and setup:

1. Power on an AMT system that has completed AMT Setup and Configuration.
2. Launch a web browser from a separate system - a Management computer on the same subnet as the AMT computer.
3. Connect to the IP address specified in the MEBx and port of the AMT system.
   - By default, the port is 16992.

   NOTE: Use port 16993 and https:// to connect to the Intel AMT WebGUI on a system that has been configured and setup in the Enterprise mode.

   - If DNS is used, then the Fully Qualified Domain Name (FQDN) for the ME can be used instead of the IP address. The FQDN is the combination of the hostname and domain.

   The Management computer makes a TCP connection to the AMT system and accesses the top level AMT-embedded web page within the Management Engine of the AMT system.
4. Type the user name and password. The default username is **admin** and the password is what you set during AMT Setup in the MEBx.
5. Review system information and/or make any necessary changes.

NOTE: You can change the MEBx password for the remote system in the WebGUI. Changing the password in the WebGUI or a remote console results in two passwords. The new password, known as the remote MEBx password, only works remotely with the WebGUI or remote console. The local MEBx password used to locally access the MEBx is not changed. The user has to remember both local and remote MEBx passwords to access the system MEBx locally and remotely. When the MEBx password is initially set in AMT Setup, the password serves as both the local and remote password. If the remote password is changed, then the passwords are out of sync.

6. Select **Exit**.

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Unprovisioning

Unprovisioning is when Intel® AMT has been returned to its default settings.

Return to Default

Return to Default is also know as Unprovisioning. An AMT setup and configured system can be unprovisioned using the AMT Configuration screen and the **Un-Provision** option.

Follow the steps below to unprovision your system:

1. Select **Un-Provision** and then select **Full Unprovision**.

   Full unprovisioning is available for SMB mode provisioned systems. This option returns all AMT configuration settings to factory defaults, and does not reset ME configuration settings or passwords. Full and partial unprovisioning is available for Enterprise mode provisioned systems. Partial unprovisioning returns all AMT configuration settings to factory defaults with the exception of the PID and PPS. Partial unprovisioning does not reset ME configuration settings or passwords.

   An unprovisioning message displays after about one minute. After unprovisioning completes, control is passed back to the AMT Configuration screen. **Provisioning Server**, **Set PID and PPS**, and **Set PRTC** options are available again because the system is set to the default Enterprise mode.

2. Select **Return to previous menu**.
3. Select **Exit**, and then select **Y**. The system restarts.

Full Return to Factory Defaults

You can return all AMT to factory default by clearing the CMOS. This includes resetting the password to the default **admin**. However, settings in the ME, such as the ME Power Settings, are not reset. You must manually reset those settings to the default for the system to be in a true factory-default state. Table 3-2 lists the default MEBx settings. You cannot remotely manage the system until it is setup and configured again.

Table 3-2. MEBx Default Settings

MEBx Settings	Default Setting
Intel ME State Control	Enabled
Intel ME Firmware Local Update Qualifier	Always Open

Table 3-2. MEBx Default Settings

MEBx Settings	Default Setting
LAN Controller	Enabled
Intel ME Features Control	
• Manageability Feature Selection	Intel AMT
• Intel Quiet System Technology	Disabled
Intel ME Power Control	
• Intel ME State upon Initial Power-On	Off
• Intel ME ON in Host Sleep States	Always
• LAN Power Well	WOL_EN Pin
• Intel ME Visual LED Indicator	Off
SOL/IDE-R	
• Username and Password	Enabled
• Serial Over LAN	Enabled
• IDE Redirection	Enabled
Remote Firmware Update	Enabled