



Start Here Guide

Intel® Active Management Technology (Intel® AMT)

Start Here Guide

Introduction

This document contains information that aids developers in getting started with implementing Intel® Active Management Technology (Intel® AMT). It provides an overview of the features in various versions of Intel® AMT, as well as information on minimum system requirements, configuration of an Intel® AMT client, and the various developer tools that are available to help program for Intel® AMT.

Intel® AMT supports remote applications running on Microsoft Windows* or Linux*. Intel® AMT Release 1.0 supports both Linux and Windows local applications. Intel® AMT Release 2.0 and higher support only Windows-based local applications. For a complete list of system requirements, please refer to the documentation in the latest [Intel® AMT Software Development Kit \(SDK\)](#).

The following paragraphs summarize what is new in Intel® AMT 7.0. For a full comparison of all features across Intel AMT, see [Appendix A](#):

Host-Based Setup and Configuration (New!)

The host-based configuration method allows an application running on the local host, with OS Administration privileges, to setup and configure Intel AMT. The two basic configuration modes are now referred to as Client Control Mode and Admin Control Mode. A system that has been configured on the local host is by default, in Client Control Mode and therefore has limitations. For example, System Defense is not available in Client Control Mode and User Consent for Redirection and KVM cannot be disabled.

Snippets Added to Intel AMT Feature Use Cases (New!)

The new [Implementation and Reference Guide](#) (in the Software Development Kit) now includes nearly 300 snippets – short samples of code that demonstrate a step or sequence of steps in a use case.

The snippets are written using PowerShell 2.0. They depend on a framework called the IntelVProModule located at <SDK_root>\Windows\Common\WS-Management\Scripting Framework.

A snippet can be exercised opposite a configured Intel AMT platform by copying the snippet into a supplied template.

The snippets support backward compatibility and demonstrate, where necessary, the difference between Intel AMT versions, back to Release 3.2. They were validated against Releases 3.2, 4, 5, 5.1, 6, 6.1 and 7.0.

KVM

A new version of the RealVNC library was added to the SDK. This version makes several protocol features available for Intel AMT applications. The SDK documentation includes a spreadsheet showing the features in the RealVNC library that Intel AMT supports.

Redirection Library

The Windows Redirection library now supports DVDs. The library is compatible with all versions of Intel AMT. The library supports the link preference feature, including an option for legacy behavior, used with earlier releases that do not support link preference.

Intel(R) vPro(TM) Gateway, also known as the Management Presence Server (MPS)

The SDK now includes the MPS source code. A new sample, the MPSInterFaceClient, demonstrates the MPS API.

Digest Master Password

The Intel AMT Digest Master Password (DMP) is a single password that is synchronized by the IT administrator among the various management software applications. The protocol described in the SDK defines a method for deriving the Intel AMT administrator password from the DMP that creates a unique password per device. Using this method, the software application does not need

to maintain the password database. It simplifies using multiple applications from multiple vendors to manage the Intel AMT device.

Deprecated EOI (SOAP) Samples Moved

The SOAP samples, documentation, Storage library, Crypt32Api and most associated files were moved to a ZIP archive in the SDK root directory.

The SDK general documentation was modified to reflect this change. Most references to SOAP commands were removed.

Certain samples that use SOAP (the sample setup and configuration application, the MPS notification sample, the redirection GUI sample and the AMTRedirection sample) remain in their respective directories.

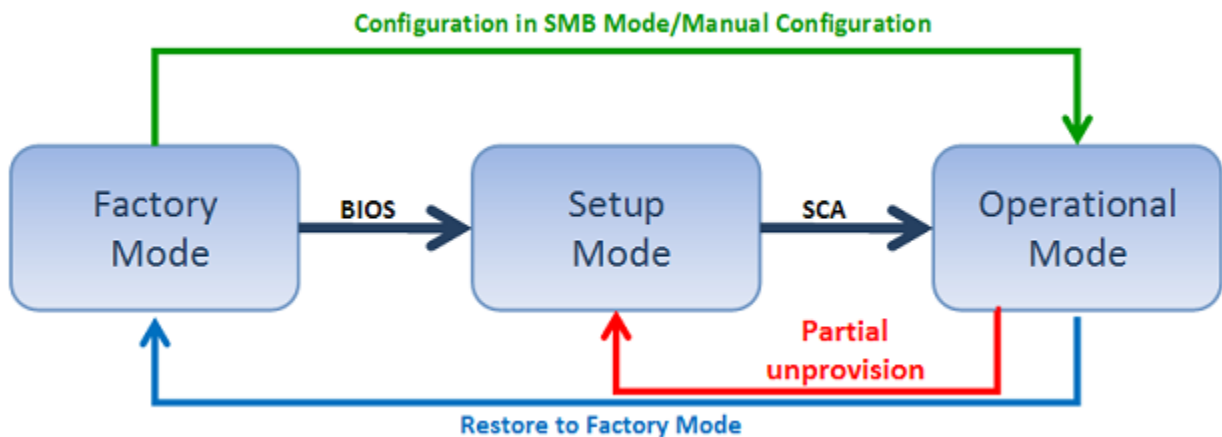
The WSDLs and other common files remain in place in support of these samples.

Getting Started

In order to begin compiling or running samples from the SDK, you will need a separate system to use as a management console for remotely managing your Intel® AMT client. For more detailed explanations, please refer to the *Intel® AMT Implementation and Reference Guide* located in the Docs folder of the [Intel® AMT SDK \(Release 7.0\)](#).

Preparing your Intel® AMT Client for use

The following diagram illustrates the modes or stages that an Intel® AMT device passes through before it becomes operational.



Before an Intel® AMT device can receive its configuration setting from the Setup and Configuration Application (SCA), it first must be prepared with initial setup information and placed into Setup Mode. The initial information will be different, depending on the available options in the Intel® AMT release and the settings performed by the platform OEM. The following table summarizes the methods you can use to perform setup and configuration on the different releases of Intel® AMT.

Setup Method	Applicable to Intel® AMT Releases	For More Information See...
Legacy	1.0; Releases 2.x and 3.x in legacy mode	Setup and Configuration in Legacy Mode
SMB	2.x, 3.x, 4.x, 5.x	Setup and Configuration in SMB Mode
PSK	2.0 and later	Setup and Configuration Using PSK
PKI	2.2, 2.6, 3.0 and later	Setup and Configuration Using PKI (Remote Configuration)
Manual	6.0 and later	Manual Setup and Configuration (from Release 6.0)
CCM, ACM	7.0 and later	Client Control Mode and Admin Control Mode Manually Configuring an Intel AMT 7 Client

Setup and Configuration in Legacy Mode (Release 1.0; 2.x and 3.x in legacy mode)

Intel® AMT release 1.0, (or releases 2.x/3.x operating in Legacy Mode making them compatible with Intel® AMT release 1.0), performs the configuration process by exchanging all data (including sensitive data) in an unsecure manner with a configuration server. Therefore, such Intel® AMT devices should be configured on an isolated network. Release 4.0 and later releases do not support the Legacy Mode method.

Setup and Configuration in SMB Mode (Releases 2.x, 3.x, 4.x, 5.x) The SMB mode has the following limitations when compared to the PSK and PKI methods of the Enterprise mode (and the new Manual method of release 6.0):

- No support for TLS authentication
- Kerberos authentication is supported in SMB mode only from Intel® AMT release 2.1
- No Access Monitor feature
- In SMB mode, Intel® AMT uses the local platform clock to determine the time of day and updates the parameter based on the host clock setting each time the platform reboots. In Enterprise mode, configuration cannot complete until the configuration server sets the network time (assumed by Intel® AMT to be in UTC).

- In SMB, SOL, IDE-R, and WEBUI are enabled by default. Also, the redirection listener is enabled by default. In Enterprise mode all are disabled by default.
- In Enterprise mode, a platform must be configured via the network interface. In SMB mode, Setup and configuration must be performed locally from the MEBx .

Manual Configuration (Intel® AMT 6.0 and later)

From release 6.0 there are no feature limitations when configuring a platform manually, but there are some system behaviors to be noted:

- API methods will not return a PT_STATUS_INVALID_MODE status, as there is only one mode.
- TLS is disabled by default and should be explicitly enabled during configuration. This will always be the case with manual configuration, as there is no way to set TLS parameters locally.
- The local platform clock will be used until the network time is set remotely. Automatic configuration will not complete successfully unless network time was set, only when TLS or Kerberos was configured. Enabling TLS or Kerberos after configuration completion will not succeed if the network time was not set.
- WEBUI is enabled by default, unless a configuration server disables it.
- SOL and IDE-R are enabled by default, but the redirection listener is disabled by default.
- If KVM is enabled locally via the MEBx, it still will not be enabled until an administrator activates it over the network.

Performing Manual Setup (from Release 6.0)

During power up, the Intel® AMT platform first displays the BIOS startup screen, and then the BIOS Extensions are processed. Entry into the Intel® AMT BIOS Extension is BIOS vendor dependent. Some OEM platforms display a screen prompting you to press <Ctrl+P>. When you press <Ctrl+P> control passes to the Intel® Management Engine BIOS extension (MEBx) Main Menu. Some OEMs integrate the MEBx configuration inside the BIOS and some OEMs have an option in the BIOS to show/hide the <Ctrl+P> prompt.

Perform the following steps to perform manual setup:

1. Enter the MEBx default password ("admin")
2. Change the default password to a new value (this step is required in order to proceed). The new value must be a "strong" password: It should contain at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters. A management console application can change the Intel® AMT password without modifying the MEBx password.
3. Select **Intel® AMT Configuration**.
4. Select **Manageability Feature Selection**.
 - a. Select **Intel® AMT** (the older versions of Intel® AMT offer this as a selection)
 - b. Or Select "Enable" to enable Intel® AMT as the Manageability selection.
5. Exit to the Main Menu.
6. Select **Intel(R) ME General Settings**.
7. The default setting for IP address acquisition is to use a DHCP server. If you are setting the platform IP address manually perform the following steps:
 - a. Select **Network Setup**.
 - b. Select **TCP/IP Settings**.
 - c. Select **Wired LAN IPV4 Configuration**.

- d. Select **DHCP Mode**.
 - e. Set the mode to DISABLED or ENABLED (depending on your environment.)
 - f. If the DHCP mode is set to DISABLED, the static IPv4 options appear. Select **IPv4 Address** and enter an IP address.
 - g. Select **Subnet Mask Address** and enter a subnet mask.
 - h. Set other parameters as required.
 - i. Exit to the Main Menu.
8. Select the "Intel® AMT Configuration" menu and then Select **SOL/IDE-R**, select **Legacy Redirection Mode** and select Enable to enable the redirection listener. This can ensure compatibility with management consoles created to work with the legacy SMB mode and do not have a mechanism implemented to enable the listener.
 - a. Exit to Main Menu and then Select "Intel® AMT Configuration"
 9. Select **Activate Network Access**. Press <Y> in response to the confirmation message.
 10. The platform is now configured. You can set additional parameters using the web interface or a remote console (see [Accessing Intel® AMT via the WebUI Interface](#)).

Setup and Configuration Using PSK (Release 2.0 and later)

From Intel® AMT release 2.0 and later, you can ensure secure communications during setup and configuration by using a TLS-PSK configuration key. The same Provisioning ID (PID) and Provisioning Pre-Shared Key (PPS) pair must be entered in the Intel® AMT and the PSK repository of the SCA. The PID-PPS pair in the Intel® AMT device can be preloaded by a platform OEM, entered manually from the *Intel® ME General Settings* menu of the MEBx, or loaded using a USB storage device. These values must be maintained in a secure database as they could be used for gaining access to Intel® AMT devices during the setup and configuration process by a malicious party.

Setup and Configuration Using PKI (Remote Configuration) (Releases 2.2, 2.6, 3.0, and later)

Remote configuration is a feature added with Intel® AMT versions 2.2, 2.6, and 3.0 and later versions. It enables IT personnel to configure Intel® AMT "out-of-the-box" without requiring installing additional data to enable setup.

Client Control Mode and Admin Control Mode

When any method of setup completes, Intel AMT is placed into one of two control modes. The modes are:

- Client Control Mode - Intel AMT enters this mode after performing a basic host-based setup (see Host-Based (Local) Setup). This mode limits some of Intel AMT functionality, reflecting the lower level of trust required to complete a host-based setup.
- Admin Control Mode - After performing any of the existing setup and configuration methods - remote setup (TLS-PSK or remote configuration) or a manual setup via the MEBx - Intel AMT enters Admin Control Mode. Also, performing a host-based AdminSetup before any provisioning was done or an UpgradeClientToAdmin when Intel AMT is already in Client Control mode moves Intel AMT to Admin Control mode. In this mode, there are no

limitations to Intel AMT functionality. This reflects the higher level of trust associated with these setup methods.

Client Control Mode Limitations

When a simple host-based configuration completes, the platform enters Client Control Mode, which imposes the following limitations:

1. The System Defense feature is not available.
2. Redirection (IDE-R and KVM) actions (except initiation of an SOL session) and changes in boot options (including boot to SOL) require user consent in advance (see [User Consent](#)). This still enables IT support personnel to remotely resolve end-user problems using Intel AMT.
3. If an Auditor user is defined, the Auditor's permission is not required to perform unprovisioning.
4. A number of functions are blocked from execution to prevent an untrusted user from taking over control of the platform.

Manually Configuring an Intel AMT 7.0 Client

During power up, the Intel AMT platform first displays the BIOS startup screen, and then the BIOS Extensions are processed. Entry into the Intel AMT BIOS Extension is BIOS vendor dependent. Intel AMT reference platforms display a screen prompting you to press <Ctrl+P>. When you press <Ctrl+P> control passes to the Intel® Management Engine BIOS extension (MEBx) Main Menu.

Perform the following steps to perform manual setup:

1. Enter the MEBx default password ("admin")
2. Change the default password to a new value (this step is required in order to proceed). The new value must be a "strong" password: It should contain at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters. A management console application can change the Intel AMT password without modifying the MEBx password.
3. Select **Intel(R) AMT Configuration**.
4. Select **Manageability Feature Selection**.
5. Select **ENABLED** to enable Intel(R) AMT.
6. Exit to the Main Menu.
7. Select **Intel(R) ME General Settings**.

8. The default setting for IP address acquisition is to use a DHCP server. If you are setting the platform IP address manually perform the following steps:
 - a. Select **Network Setup**.
 - b. Select **TCP/IP Settings**.
 - c. Select **Wired LAN IPV4** Configuration.
 - d. Select **DHCP Mode**.
 - e. Set the mode to DISABLED.
 - f. Once the DHCP mode is set to DISABLED, the static IPv4 options appear. Select **IPv4 Address** and enter an IP address.
 - g. Select **Subnet Mask Address** and enter a subnet mask.
 - h. Set other parameters as required.
 - i. Exit to the ME General Settings menu.
9. Return to the **Intel(R) AMT Configuration** menu; Select **SOL/IDE-R**, select **Legacy Redirection Mode** and select ENABLED to enable the redirection listener. This can ensure compatibility with management consoles created to work with the legacy SMB mode and do not have a mechanism implemented to enable the listener.
10. Return to the **Intel(R) ME General Settings** menu. Select **Activate Network Access**. Press <Y> in response to the confirmation message.

The platform is now configured. You can set additional parameters using the web interface or a remote console.

Accessing Intel® AMT via the WebUI Interface

An administrator with user rights can remotely connect to the Intel® AMT device by entering the IP address and one of the following port numbers into the address bar of the web browser:

- 16992 - Use if TLS is NOT configured (use http)
- 16993 - Use if TLS is configured (use https)

For example: http://134.134.176.1:16992

The Intel® AMT device can also be addressed using the device's fully qualified domain name (FQDN). If using TLS, Intel recommends using the Intel® AMT FQDN rather than the IP.

For example: https://amtsystem.domain.com:16993

The following web browsers were validated and can be used remotely to connect to any configured Intel® AMT system.

- Microsoft* Internet Explorer 6.0 SP1 or later
- Netscape* 7.2 or later for Windows* and Linux*
- Mozilla* Firefox 1.0 or newer for Windows and Linux
- Mozilla* 1.7 or later for Windows and Linux

Intel® AMT Drivers and Services

In addition to having the BIOS and ME extensions set up correctly, there are also drivers and services to be installed and running in order to fully utilize Intel® AMT once it has been properly configured. In order to verify that the AMT drivers and services are loaded correctly, look for them in the host operating systems' Device Manager and Services. Note that there should be a CD included with every Intel® AMT system that includes all of the required Firmware and Drivers. Be sure to check the OEM's download site frequently for upgraded versions of the BIOS, Firmware and Drivers.

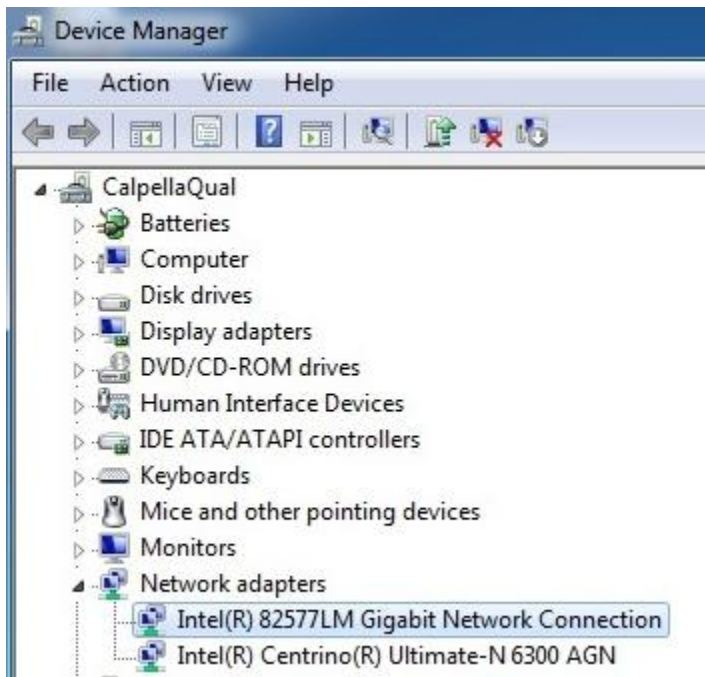
Here is a list of the latest drivers and services that should appear in the host operating system: (Note that the network controllers listed below are specific to AMT 6.0)

- Intel 82577LM Network Interface Controller*
- Intel® Centrino® Ultimate-N 6300 AGN (For Notebooks having AMT 6.0)*
- Intel Management Engine Interface (aka HECI driver)
- Serial-Over-LAN (SOL) Driver
- Intel® Active Management Technology LMS Service
- Intel® AMT System Status Service

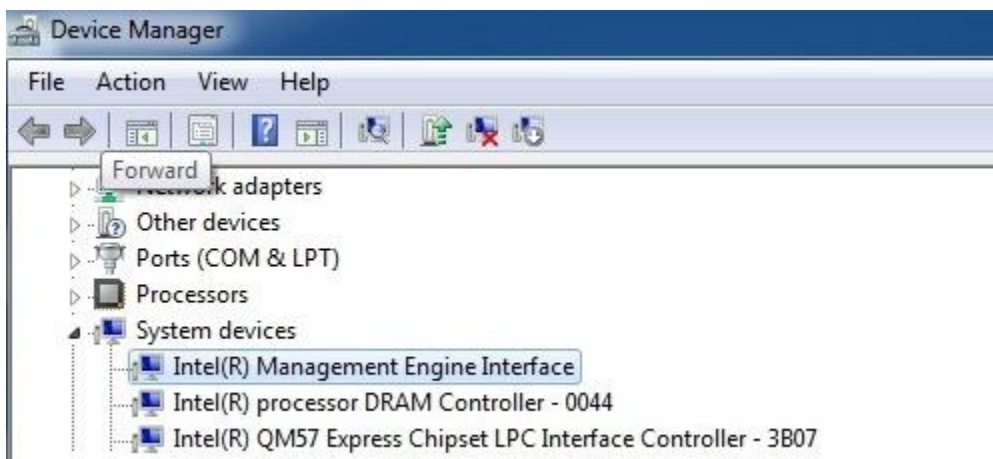
*Network controller may vary depending on the generation of Intel® vPro platform.

Note: The version level of the drivers must match up to the version level of the Firmware and BIOS. If non-compatible versions are installed, Intel® AMT will not work with the features that require those interfaces.

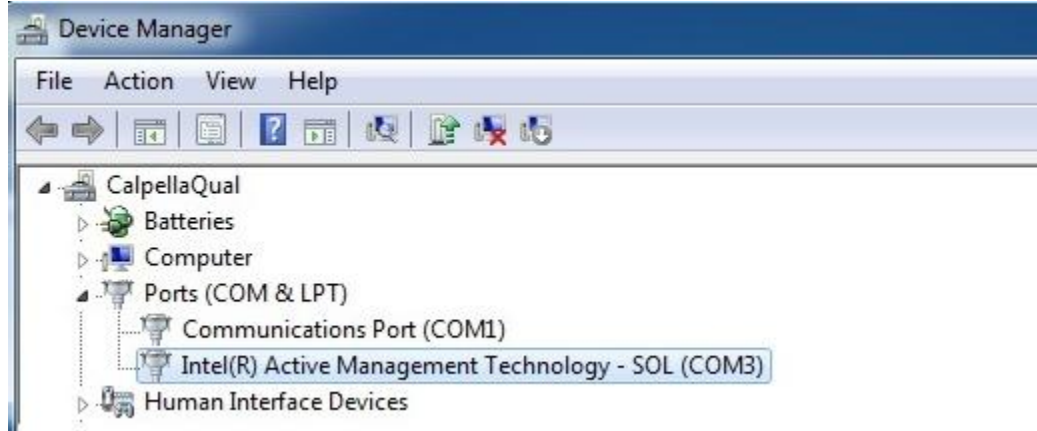
NIC: Intel 82577LM Network Interface Controller - Intel(r) AMT 7:



Intel® Management Engine Interface:



Serial-Over-LAN (SOL) Driver:



Intel® Active Management Technology LMS Service

(Local Manageability Service) This service runs locally in an Intel® AMT device and enables local management applications to send requests and receive responses to and from the device. The LMS listens for and intercepts requests directed to the Intel® AMT local host and routes them to the Management Engine via the Intel Management Engine Interface driver.

Name	Description
Function Discovery Provider Host	The f
Function Discovery Resource Publication	Publi
Group Policy Client	The s
Health Key and Certificate Management	Provi
HomeGroup Listener	Mak
HomeGroup Provider	Perfc
Human Interface Device Access	Enab
IKE and AuthIP IPsec Keying Modules	The I
Intel(R) Management & Security Application User Notification Service	Intel
Intel(R) Management and Security Application Local Management Service	Allow
Intel(R) PROSet/Wireless Event Log	Mani
Intel(R) PROSet/Wireless Registry Service	Provi
Interactive Services Detection	Enab
Internet Connection Sharing (ICS)	Provi

Intel® AMT User Notification Service

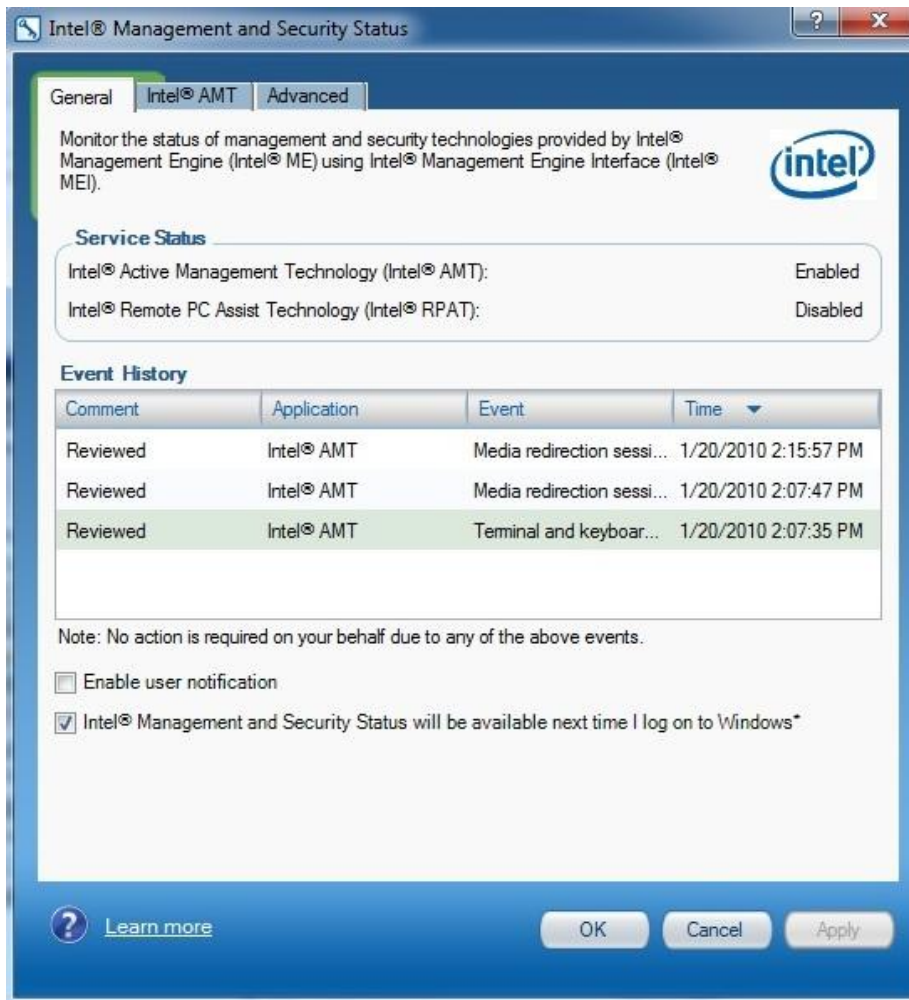
The User Notification Service (UNS) is a Windows service installed on the host on a platform that has Intel® AMT Release 2.5 or greater. The UNS registers with the Intel® AMT device to receive a set of alerts. When UNS receives an alert it logs the alert in the Windows "Application" event log. The Event Source will be "Intel(R) AMT".

Name	Des
Health Key and Certificate Management	Pro
HomeGroup Listener	Ma
HomeGroup Provider	Per
Human Interface Device Access	Ena
IKE and AuthIP IPsec Keying Modules	The
Intel(R) Management & Security Application User Notification Service	Inte
Intel(R) Management and Security Application Local Management Service	Allc
Intel(R) PROSet/Wireless Event Log	Ma

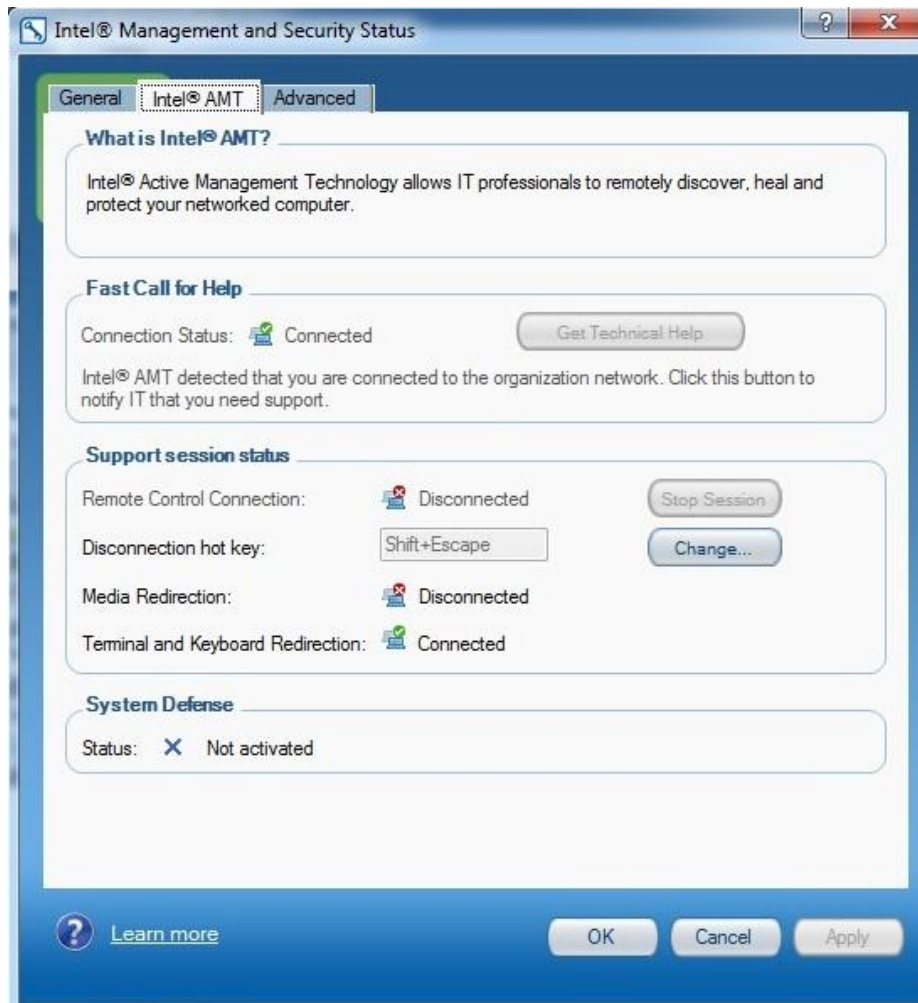
The Intel Management and Security Status (IMSS) tool can be accessed by the “blue key” icon in the Windows tray.



The General tab of the IMSS tool shows the status of vPro services available on the platform and an event history. There are tabs for additional details of each.



The Intel® AMT tab of the IMSS tool shows more detailed information on the configuration of AMT and its features.



For more information on how to set up an AMT 7.0 client, take a look at this [video](#).

Intel® AMT Software Development Kit (SDK)

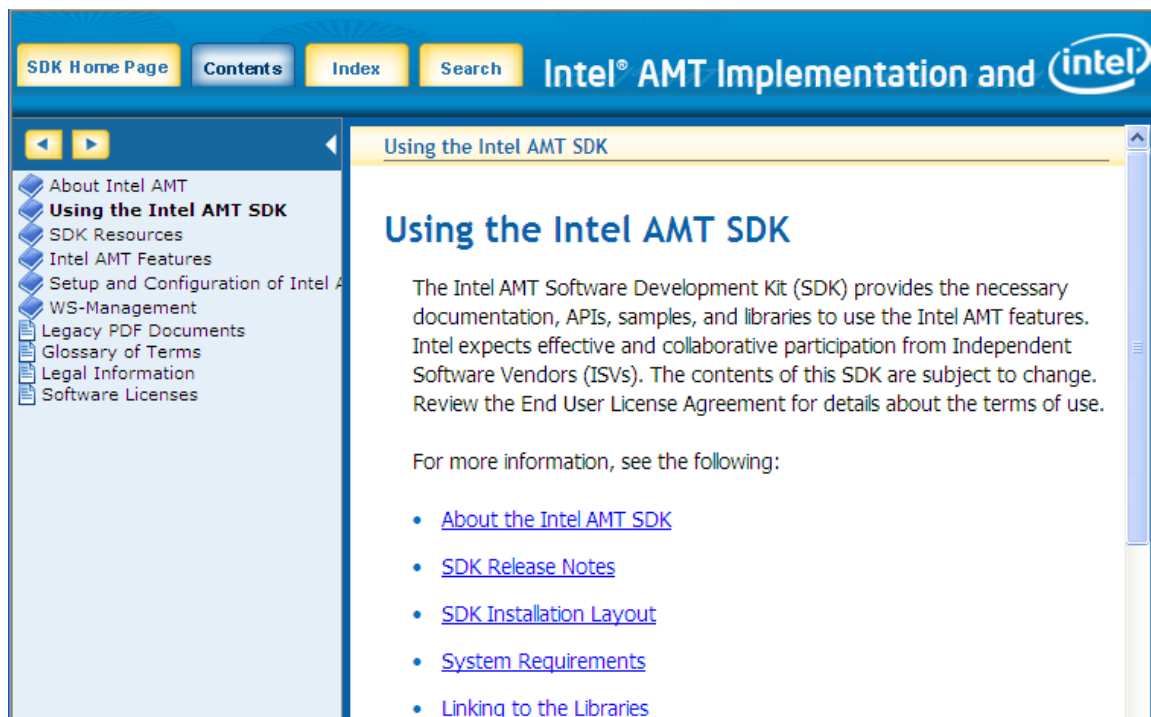
The [Intel® AMT Software Development Kit \(SDK\)](#) provides the low-level programming capabilities to enable developers to build manageability applications that take full advantage of Intel® AMT. Inside the SDK is a full set of documentation, sample code, and APIs needed for implementing Intel® AMT.

The Intel® AMT SDK provides sample code and a set of application programming interfaces (APIs) that let developers easily and quickly incorporate Intel® AMT support into their applications. The

SDK supports C++ and C# on Microsoft Windows and Linux operating systems. Refer to the User Guide and the Readme files in each directory for important information on building the samples. Also see the video tutorials [Introduction to Intel® AMT SDK](#) and [How to compile Intel® AMT SDK sample code](#)

The SDK is delivered as a set of directories that can be copied to a location of the developer's choice on the development system. Because of interdependencies between components, the directory structure should be copied in its entirety. There are three folders at the top level: one called DOCS (which contains SDK documentation), and one each for Linux and Windows (which contain all of the sample code.) For more information regarding how to get started and how use the SDK, see the "Intel® AMT Implementation and Reference Guide."

Below is a screen shot of the Intel® AMT Implementation and Reference Guide – for more information on system requirements and how to build the sample code, read through the "Using the Intel® AMT SDK" section.



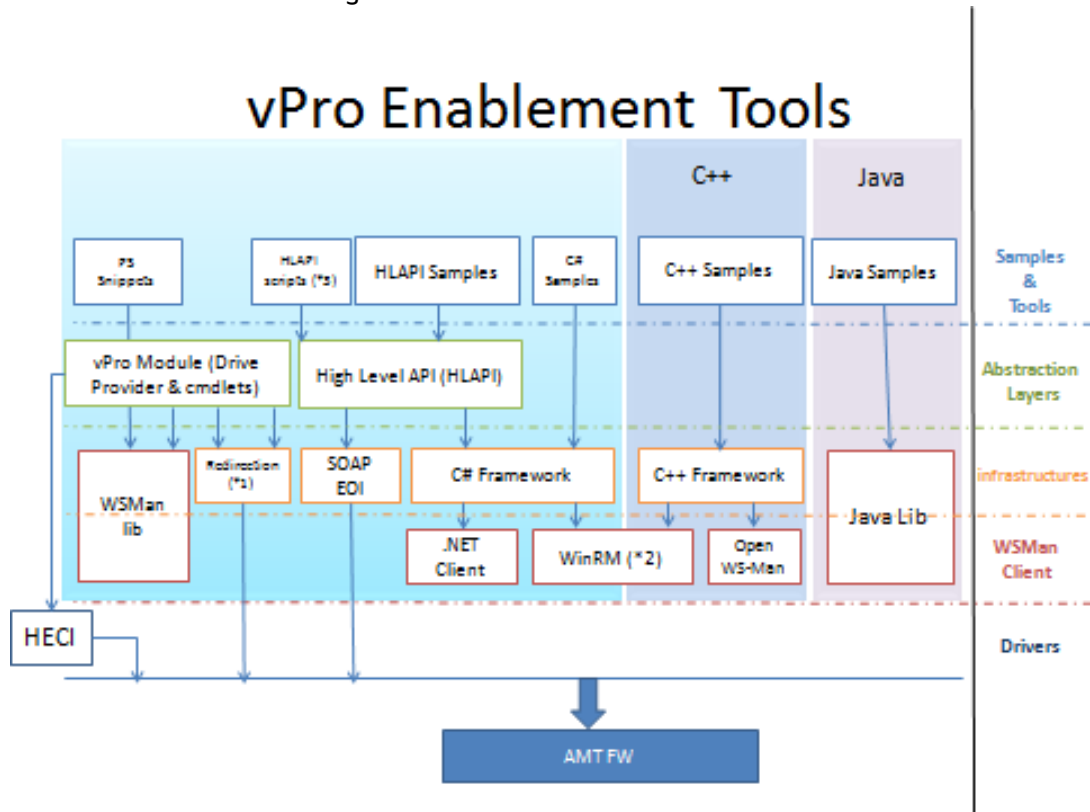
Other SDK Resources

The Intel® AMT SDK provides frameworks and samples that simplify WS-Management development and demonstrate how to take advantage of the advanced product features. For more information, see the following:

- KVM Application Developer's Guide
- Redirection Library
- C++ CIM Framework API
- C# CIM Framework API
- WS-Management Clients Supporting C# and C++ Development

- Intel ME WMI Provider
- Management Presence Server Sample
- Posture Validation (NAC)
- System Health Validation (NAP)
- Remote Encryption Management
- User Consent Tool

There are a variety of development environments for which to write software that supports Intel® AMT. Please see the figure below for more details.



- *1) Available only in C++, (C# wrapper in SDK)
- *2) COM object by MSFT
- *3) Not just .NET

Appendix A:

The following table provides a snapshot of features supported by prior all versions of Intel® AMT.

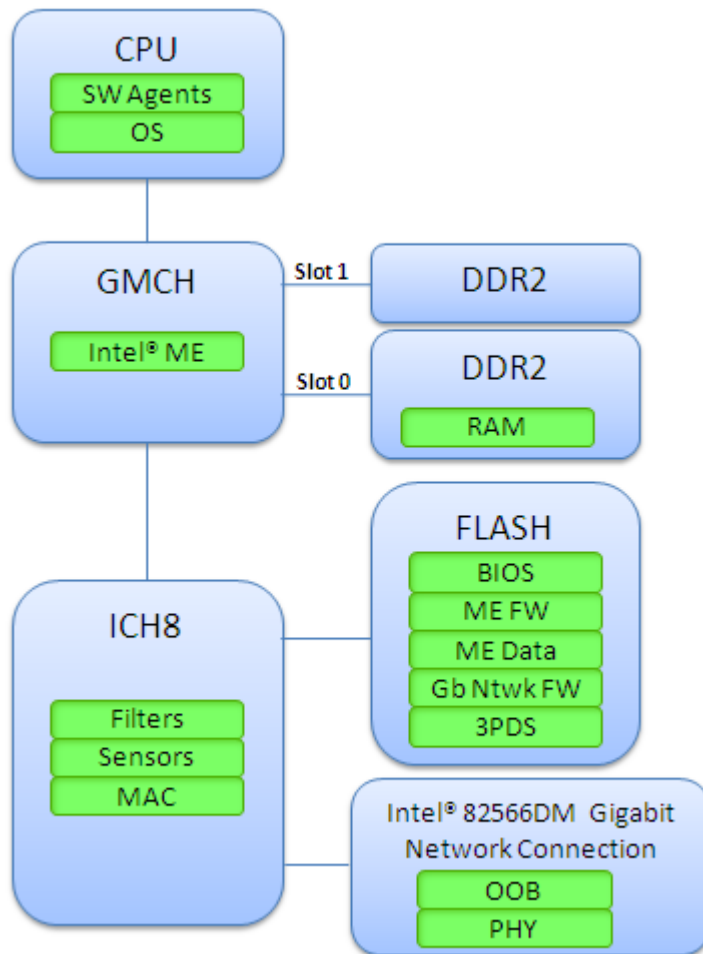
	Intel® AMT 1.0 Desktop	Intel AMT 2.0/2.1 Desktop	Intel AMT 2.5/2.6 Mobile	Intel AMT 3.0 Desktop	Intel AMT 4.0 Mobile	Intel AMT 5.0 Desktop	Intel AMT 6.0 Desktop and Mobile	Intel AMT 7.0 (Desktop and Mobile)
Hardware Inventory	X	X	X	X	X	X	X	X
Persistent ID	X	X	X	X	X	X	X	X
Remote Power On/Off	X	X	X	X	X	X	X	X
SOL/IDER	X	X	X	X	X	X	X	X
Event Management	X	X	X	X	X	X	X	X
3 rd Party Data Storage	X	X	X	X	X	X	X	X
Built-in Web Server	X	X	X	X	X	X	X	X
Flash Protection	X	X	X	X	X	X	X	X
Firmware Update	X	X	X	X	X	X	X	X
TCP/IP, SOAP XML/EOI	X	X	X	X	X	X	X	
HTTP Digest/TLS	X	X	X	X	X	X	X	X
Static and Dynamic IP	X	X	X	X	X	X	X	X
System Defense		X	X	X	X	X	X	X
Agent Presence		X	X	X	X	X	X	X
Power Policies		X	X	X	X	X	X	X
Mutual Authentication		X	X	X	X	X	X	X
Kerberos		X	X	X	X	X	X	X
TLS-PSK		X	X	X	X	X	X	X
Privacy Icon		2.1	X	X	X	X	X	X
ME Wake-on-LAN		2.1	X	X	X	X	X	X
Remote Configuration		2.2	2.6	X	X	X	X	X
Wireless Configuration			X		X		X	X

Endpoint Access Control (EAC) 802.1			X	X	X	X	X	X
Power Packages			X		X		X	X
Environment Detection			X		X		X	X
Event Log Reader Realm			2.6	X	X	X	X	X
System Defense Heuristics				X		X	X	X
WS-MAN Interface				X	X	X	X	X
VLAN settings for Intel® AMT network interfaces				X		X	X	X
Fast Call For Help (CIRA)					X	X	X	X
Access Monitor					X	X	X	X
MS NAP* Support					X	X	X	X
Virtualization Support for Agent Presence						X	X	X
PC Alarm Clock						5.1	X	X
KVM Remote Control							X	X
Wireless Profile Synchronization							X	X
Support for Internet Protocol Version 6							X	X
Host Based Provisioning								X

The architecture of each Intel® AMT Release (2.0 and later) is shown below.

Intel® AMT Release 2.0/2.1/2.2 Architecture

Intel® AMT Release 2.0 is a component of the Intel vPro workstation platform. It uses a number of elements in the Intel vPro platform architecture. The following figure shows the relationship between these elements.



The Intel® AMT functionality is contained in the firmware (**ME FW**).

- The firmware image is stored in the Flash memory.
- The Intel® AMT capability is enabled using the Intel® Management Engine (Intel® ME) BIOS extension as implemented by an OEM platform provider. A remote application can perform enterprise setup and configuration.
- On power-up, the firmware image is copied into the Double Data Rate (DDR) random-access memory (RAM).
- The firmware executes on the Intel ME processor and uses a small portion of the DDR RAM (Slot 0) for storage during execution. RAM slot 0 must be populated and powered on for the firmware to run.

Intel® AMT stores the following information in the Flash (**ME Data**):

- OEM-configurable parameters
- Setup and configuration parameters such as passwords, network configuration, certificates, and access control lists (ACLs)
- Other configuration information, such as lists of alerts and System Defense policies
- The hardware configuration captured by the BIOS at startup

Intel® AMT also manages third-party data storage (**3PDS**). The storage area can be allocated by independent software vendor (ISVs) for local storage of information critical to their applications.

The Flash also contains the BIOS executable code (**BIOS**), as well as the executable code for the Intel® 82566DM Gigabit Network Connection (**GbE Ntwk Fw**).

The Flash is protected against unauthorized host access by a hardware mechanism activated by the OEM during manufacturing.

The **ICH8 interface controller** holds the filter definitions that are applied to incoming and outgoing in-band network traffic (the message traffic to and from the CPU). These include both internally-defined filters and the application filters defined by ISVs using the System Defense and Agent Presence capabilities.

The Intel® 82566 Gigabit **Network Connection** identifies out-of-band (OOB) network traffic (traffic targeted to Intel® AMT) and routes it to the Intel ME instead of to the CPU. Intel® AMT traffic is identified by dedicated IANA-registered port numbers.

The following elements interact with Intel® AMT:

- The **BIOS** can be used to initialize Intel® AMT or to reset it to its initial state. It captures platform hardware configuration information and stores it in NVM so that Intel® AMT can make the information available out of band.
- The **ICH8** sensor capability detects the state of various platform sensors, such as temperatures, fan status, and chassis integrity. Intel® AMT can be configured to store and/or forward an alert when the state of any selected sensor changes or crosses a threshold.
- **Software Agents** (typically written by management ISVs) executing on the CPU can register with Intel® AMT and report their presence to Intel® AMT and to a management console using “heartbeats”. Intel® AMT monitors the heartbeats and can take action when there is a problem with Agent execution.
- **ISV Applications** on the CPU can communicate locally with Intel® AMT using dedicated drivers that are compatible with the host operating system.

Intel® AMT Release 2.1

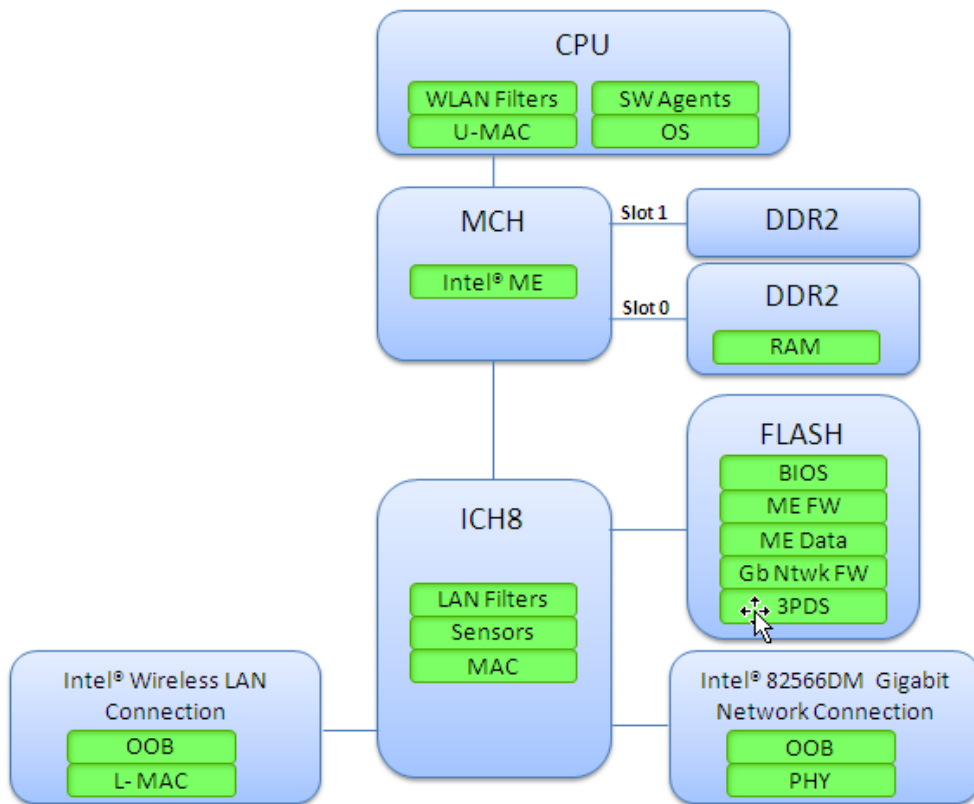
Intel® AMT Release 2.1 enhances the Intel® AMT power savings option by enabling waking the Intel® AMT device on receipt of a message on the network interface when the device is asleep in an Sx power state.

Intel® AMT Release 2.2

Intel® AMT Release 2.2 adds Remote Configuration (also known as Zero-Touch Configuration, or ZTC), which simplifies the setup and configuration process while maintaining the security of the Intel® AMT device.

Intel® AMT Release 2.5/2.6 Architecture

Intel® AMT Release 2.5 extends active management to enterprise wireless mobile computing. As shown in the following figure, the architecture has a mobile version of ICH8, the Crestline MCH and a wireless NIC.



Intel® AMT Release 3.0 Architecture

The Intel® AMT Release 3.0 architecture is similar to the Release 2.0 architecture. The MCH has been upgraded to the GMCH and the ICH8 has been upgraded to ICH9. These changes, combined with a new version of firmware, support all the features of Intel® AMT Releases 2.5

and 2.6 (except for the wireless and mobile features) and provide the following additional capabilities:

- Heuristic System Defense: a basic capability for catching and blocking worm attacks emanating from the host platform before they spread widely across the enterprise network.
- Support for WS-Management: This emerging standard is available as a method for managing the Intel® AMT platform, in addition to the SOAP based API in previous versions.

Intel® AMT Release 4.0 Architecture

Release 4.0 extends the capabilities of mobile platforms (Releases 2.5/2.6) with the following features:

- Access Monitor – Provides a means for an auditor independent of the administrator to track events of interest. The events are logged locally in an Audit Log. This log captures critical Intel® AMT auditable events that only a user with auditor privileges can review. It provides an audit trail in case there is a “rogue administrator” attempting to damage or take over Intel® AMT-based systems, and it serves as a deterrent to such attempts.
- WS-Management – Support for DASH 1.0 included in Release 3.0 is extended to mobile platforms.
- Fast Call for Help – A User can request help via a keystroke from inside or outside the enterprise network from IT support or from a remote service provider.
- Remote Scheduled Maintenance – Platforms can be checked or updated, for example, inventoried, or updated with patches or new versions of software, by connecting with an IT console or service provider from inside or outside the enterprise, when it is convenient.
- Remote Alerts – Platforms can automatically connect to the enterprise IT console or service provider even from outside the enterprise network when potential issues arise. This can speed support and lead to faster solutions.
- In support of the above three features, the SDK includes a Management Presence Server (MPS) that emulates a vPro enabled gateway used to mediate between Intel vPro platforms and enterprise management consoles.
- Support for Microsoft NAP – the endpoint access control feature has been extended to support Microsoft* Network Access Protection (NAP).

Intel® AMT Release 5.x Architecture

Release 5.0 includes the features in Release 4.0 except for wireless features.

Intel® AMT Release 5.1 Architecture

Release 5.1 complies with the DASH 1.0 standard, as approved in February 2009. The release also adds an alarm clock feature. A remote console can configure Intel® AMT to “wake up”

the host processor periodically (for example, the same time every day, or once a month), without additional remote intervention.

Intel® AMT Release 6.0 Architecture

Release 6.0 is a major architecture change: The MCH and ICH chipset has been replaced by the PCH, which contains the ME processor and other logic to support ME-based applications.

Release 6.0 adds the remote KVM (Keyboard, Video and Mouse) feature, which provides the ability to view the client screen and control the platform remotely via a keyboard and mouse. KVM is useful when the host processor is or will be active and a remote IT operator wants to control the client platform.

The SMB (small and medium business) configuration mode has been replaced with a manual configuration option. Unlike the SMB mode, it is now possible to configure an Intel® AMT platform via the MEBx without losing any Intel® AMT capabilities, such as support for TLS.

The product now has an optional dynamic DNS (DDNS) update client. When the client is enabled, Intel® AMT will periodically re-register the platform with a DNS server. It is possible to configure a resource record time-to-live and a periodic DNS update.

Other added features include support for SHA-2 hashes and full support for IPv6.

Note:

- The SOAP API is deprecated in this release. New features are supported only via the WS-Management interface.
- Local applications can no longer subscribe for and receive SOAP alerts.
- Support for mutual authentication on the local interface is deprecated. This capability will be removed in a future release.

Intel AMT Release 7.0 Architecture

Release 7.0 adds the following modifications to the Intel AMT architecture:

Host-based setup and configuration capability: This feature allows users to easily configure Intel AMT out of the box with an application running on the local host without any special additional information or parameters. The feature adds the concept of Client Control mode and Admin Control mode. The SDK includes descriptions of new API functions, description of the key use cases that implement the feature and samples that demonstrate how to work with host-based setup and configuration.

The user consent mechanism has been extended so that it may be required not only for KVM, but also for IDE redirection (IDE-R) and certain other features.

The AMT_GeneralSettings object now has a read-only PrivacyLevel property that determines whether SOL, IDE-R and KVM are initially enabled and whether user consent can or cannot be disabled. OEMs can select from among three options when defining their platforms.

A user with GeneralInfo privileges now has access to much more information. Get methods for most of the system objects are accessible. Using the local admin user, an application running on the local host with OS admin privileges can see the status of many Intel AMT settings.

 **Note:**

Certain power control commands that can be performed locally in Release 6.1 are blocked in Release 7.0. Do not create applications that depend on this capability:

- The WS-Management method CIM_PowerManagementService.RequestPowerStateChange is blocked on the local interface.
- The SOAP RemoteControl command options Reset, PowerUp, PowerDown and PowerCycleReset also are blocked on the local interface.
- The WebUI power control operations are blocked on the local interface.

Intel AMT can now synchronize to a host static IP address.

Intel vPro desktop platforms now support manageability over wireless interfaces.

The Intel AMT firmware update mechanism (both WS-Management and SOAP) were removed in Release 7.0. The Firmware Update Realm is deprecated in this release and will be removed in a future release.

About the Author:



Lance Atencio received his MSCS & BSEE from the University of New Mexico and has over 20 years of engineering experience starting as a civil servant working on missile systems for the U.S. Navy and spending the last 9 years at Intel. He is currently working as an Application Engineer on the Enterprise Manageability Enabling team helping ISVs adopt Intel® vPro™ technologies.

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