



# Intel® Active Management Technology

Quick Start Guide

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Intel® Active Management Technology requires activation and a system with a corporate network connection, an Intel® AMT-enabled chipset, network hardware and software. For notebooks, Intel AMT may be unavailable or limited over a host OS-based VPN, when connecting wirelessly, on battery power, sleeping, hibernating or powered off. Results dependent upon hardware, setup & configuration.

For more information, visit <http://www.intel.com/technology/platform-technology/intel-amt>.

Intel® vPro™ Technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software and IT environment.

To learn more visit: <http://www.intel.com/technology/vpro>.

Systems using Client Initiated Remote Access require wired LAN connectivity and may not be available in public hot spots or "click to accept" locations. For more information on CIRA, visit <http://software.intel.com/en-us/articles/fast-call-for-help-overview>.

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# 1 Introduction

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This quick start guide is an instructional document providing basic steps to enable the discovery and basic configuration of Intel® Active Management Technology (Intel® AMT) platforms using components of the Intel® Setup and Configuration Software (Intel® SCS).

Intel AMT operates independently of the CPU and the firmware is delivered in an un-configured state. Intel SCS is provided by Intel to support the setup and configuration of the firmware for the target environment and enable remote, out-of-band access to Intel AMT features.

Guidance is provided to enable a baseline implementation of Intel AMT and identifies basic configuration settings to support a simple deployment that takes advantage of the manageability and security features available on platforms that support Intel® vPro™ Processor technology and Intel® Standard Manageability<sup>1</sup>

After configuration, this guide details accessing Intel AMT systems using a browser and the RealVNC VNC® Viewer Plus application.

The guide compliments the Intel SCS Deployment Guide (<https://www-ssl.intel.com/content/www/us/en/software/scs-deployment-guide.html>) and the Intel® Setup and Configuration Software (Intel® SCS) User Guide, available in the Intel SCS download package: <http://www.intel.com/go/scs>

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<sup>1</sup> Intel® Standard Manageability (ISM) systems were introduced with Intel AMT Release 5.0 and have a subset of Intel AMT features i.e. no KVM, Alarm Clock, WLAN etc.

\* Other names and brands may be claimed as the property of others.



## 1.1 Intel® Setup and Configuration Software (Intel® SCS) Overview

Intel® Setup and Configuration Software (Intel® SCS) is a collection of software components and utilities developed by Intel and used to discover, configure and maintain Intel® Active Management Technology (Intel® AMT) platforms within your network. This guide only references the client-side tools.

## 1.2 Intel® Active Management Technology (Intel® AMT) Overview

Intel AMT is a component of the Intel® Management Engine (Intel® ME) and provides out-of-band (OOB) management within the physical chipset of Intel® vPro™ Processor technology and Intel® Standard Manageability platforms. Once the Intel AMT firmware has been configured using Intel SCS components computers can be remotely accessed when they are powered off or the operating system is unavailable. The only requirements are that the system is connected to a power supply and has a wired (LAN) and/or wireless (WLAN) network connection.

When using the wired LAN interface on a corporate network, Intel AMT traffic shares the same physical network interface as the host operating system. Network traffic (on ports 16992-16995) is directly intercepted by Intel AMT before being passed to the host operating system. Network traffic received on an Intel AMT enabled wireless interface goes to the host wireless driver which detects the destination port and sends the message to Intel AMT.

A configured Intel AMT environment contains hardware, firmware and software that controls AMT features and capabilities. These components include:

- The Intel® Management Engine (Intel® ME) firmware.
- The Intel® Management Engine BIOS Extension (Intel® MEBX) is a BIOS menu extension on the Intel AMT system that can be used to view and manually configure some of Intel AMT settings. The menu is only displayed if you press a special key combination (traditionally <Ctrl-P> during the system BIOS boot process).
- The Intel® Management Engine Interface<sup>2</sup> (Intel® MEI) driver, is the operating software interface to the Intel AMT device.
- The Intel® Local Manageability Service<sup>34</sup> (LMS.exe) provides OS-related Intel(R) ME functionality.
- The Intel Management and Security Status (IMSS) provides status information to the local user about Intel AMT including messages and an indication that Intel AMT is configured.

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<sup>2</sup> MEI and LMS installed by the OEM. If they're missing or need to be reinstalled, check the OEM's support site to locate the correct versions for your system.

<sup>3</sup> The LMS is installed on a platform that has Intel AMT Release 9.0 or greater.

<sup>4</sup> From Intel AMT Release 2.5 to 8.1, LMS functions were performed by the User Notification Service (UNS).



## 2 Prerequisites

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This section identifies the main requirements for enabling Intel AMT.

### 2.1 Client Software Components

The Intel Management Engine software is a requirement on all Intel AMT systems. This is either pre-installed or available via the OEM's support site and consists of the following components:

- The Management Engine Interface (MEI) driver provides the software interface to the Intel AMT device and is installed as a system device.
- The Intel Local Manageability Service (LMS.exe) is a Windows service installed on an Intel AMT system that has Intel AMT Release 9.0 or greater. LMS enables local applications to send requests and receive responses to and from the Intel Management Engine, via the Intel MEI.
- From Intel AMT Release 2.5 to 8.1, LMS functions were performed by the User Notification Service (UNS).
- The Intel Management and Security Status (IMSS) provides status information to the local user about Intel AMT including messages and an indication that Intel AMT is configured.
- Serial-Over-LAN (SOL) device installed as a COM port.

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**NOTE:** The Intel Management Engine software has a separate version for every Intel AMT generation (6.x, 7.x, 8.x, 9.x etc.). The Management Engine 11.x software also supports 10.x, 9.x and 8.x generations.

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### 2.2 Supported Operating Systems

The Configuration Utility is supported on these operating systems:

- Windows 10 Professional / Enterprise
- Windows 8.1 Professional / Enterprise
- Windows 7 Professional / Enterprise SP1)

Additionally version 3.5 of Microsoft .NET Framework (SP1) has to be installed on the computer. No Non-Latin or Extended Latin characters in filenames or values in XML files and a minimum screen resolution of 1024 x 768 (800 x 600 is not supported)

### 2.3 Network Access and Network Ports

Intel AMT supports two types of network access; local and remote. Intel AMT Releases 2.5, 2.6, 4.0, 6.0 and later support a wireless and wired network interface (remote) and a local interface (local applications running on the platform).

Port	Description	Details
16992	Intel(R) AMT HTTP	Used for WS-Management messages to and from Intel AMT. The port is always open locally and only open over the network only when Intel AMT is configured or during the configuration process.
16993	Intel(R) AMT HTTPS	Used for WS-Management messages to and from Intel AMT when TLS is enabled.
16994	Intel(R) AMT Redirection/TCP	Used for redirection traffic (SOL, IDER, and KVM using Intel AMT authentication).
16995	Intel(R) AMT Redirection/TLS	Used for redirection traffic (SOL, IDER, and KVM using Intel AMT authentication) when TLS is enabled.
623	ASF Remote Management and Control Protocol (ASF-RMCP)	Used for RMCP pings. This port is a standard DMTF port and accepts WS-Management traffic. It is always enabled.
664	DMTF out-of-band secure web services management protocol ASF Secure Remote Management and Control Protocol (ASF-RMCP)	Used for secure RMCP pings. This port is always enabled and is a standard DMTF port that accepts secure WS-Management traffic.
5900	VNC (Virtual Network Computing) - remote control program	Used for KVM viewers that do not use Intel AMT authentication but use the standard VNC port instead.

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**NOTE:** Dependent upon the configuration path chosen, the following infrastructure components may or may not be required.

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## 2.4 Domain Name System (DNS)

Intel SCS components configure the FQDN of the Intel AMT system and this is one of the most important configuration settings as these are shared with the host platform OS. As such DNS is highly recommended for IP resolution. The hostname is taken from the operating system, whilst the suffix is the “Primary DNS Suffix” provided by DHCP Option 15.

## 2.5 Dynamic Host Configuration Protocol (DHCP)

On an Intel AMT systems, the host platform and the Intel AMT device both have an IP address which are usually the same, however these can be different. Intel SCS components will configure the IP address of the Intel AMT device and by default configures the Intel AMT device to get the IP address from a DHCP server. IPv4 addresses are supported, with IPv6 being supported from Intel AMT Release 6.0.



## 3 Discovery

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### 3.1 Introduction

Discovery provides detailed information on current configuration states, specific firmware versions, features and capabilities for Intel AMT platforms systems within your environment and helps determine the most appropriate configuration approach. Using Intel SCS utilities, data can be gathered about Intel AMT and the host platform and saved to an XML file on the system and/or written to the registry.

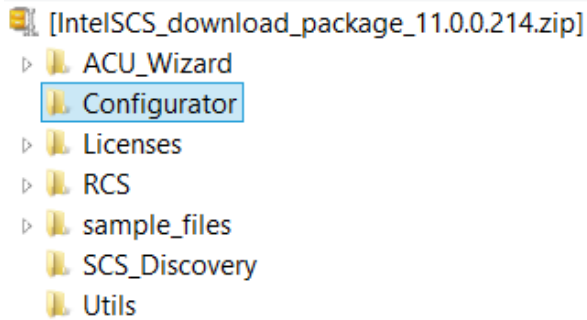
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**NOTE:** Information about Intel AMT Data is collected from all systems using the Intel Manageability Engine Interface (Intel MEI) driver. If this driver is not installed and/or enabled, data is taken from the BIOS. If the manufacturer has not installed the correct BIOS in the platform, this can cause incorrect values in the data collected.

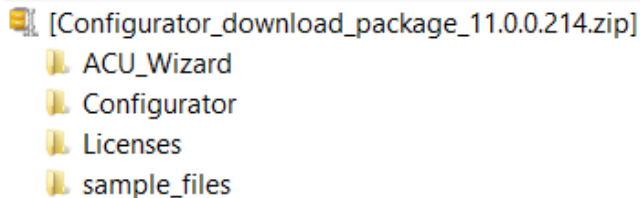
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### 3.2 Using the Configurator

Download the entire Intel SCS package from <http://intel.com/go/scs>.



Alternatively you can just download the required client configuration components from <https://downloadcenter.intel.com/download/25616>



If you've downloaded the entire package then extract the **Configurator** directory, as selected in the example above and copy this to the Intel AMT system. On the Intel AMT system, open a command prompt to the **Configurator** directory.

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**NOTE:** For systems running Microsoft Windows\* 8.1 or newer operating systems, this utility must be opened with elevated privileges due to interaction with a kernel level driver. This is done by right clicking on the executable and selecting "Run as administrator".

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The status command provides some basic information and determines the current Intel AMT configuration state:

**ACUconfig.exe /output console status**

```

Administrator: Command Prompt
C:\Intel\SCS\Configurator>ACUConfig.exe /output console status
Starting log 2016-02-18 15:12:49
ACUConfig 11.0.0.214
: Starting to retrieve machine status...

Host information -
  UUID - 4C4C4544-0038-5610-8044-CAC04F563332
  Intel(R) AMT version - 10.0.33
  The system is configured in Client Control mode.
  The system TLS setup is using PKI.
  The system supports host-based configuration.
  AMT state - Post-Provision(2)

*****
Exit with code 0 - Success.
  
```

In this example, the output of the ACUconfig.exe Status command shows that the Intel(R) AMT version is 10.0.33, the system is un-configured and supports Host-Based Configuration.

When additional information is required across multiple systems in the environment, the **SystemDiscovery** command may be preferred as it can optionally capture information to a local file, Windows registry or send data to the Remote Configuration Service (RCS).

At the same command prompt, run: **ACUconfig.exe SystemDiscovery**

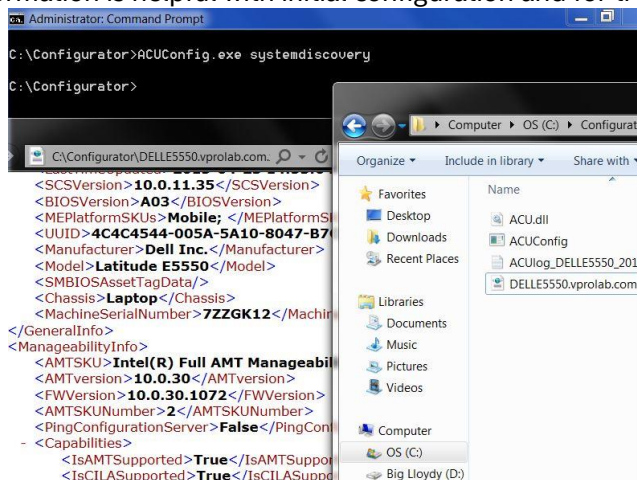
This creates a local XML file and saves the data to the registry. The location for 32-bit and 64-bit Windows operating systems is:

**HKLM\SOFTWARE\Intel\Setup and Configuration  
Software\SystemDiscovery**

In addition, on 64-bit operating systems:

**HKLM\SOFTWARE\Wow6432Node\Intel\Setup and Configuration  
Software\SystemDiscovery**

The resulting data provides an in-depth view of the Intel AMT platform in a format which can be centrally collected via custom inventory solutions. The image below shows the resulting XML file located in the Configurator directory and a preview of the file contents. Combined this information is helpful with initial configuration and for troubleshooting.





# 4 Configuration

## 4.1 Introduction

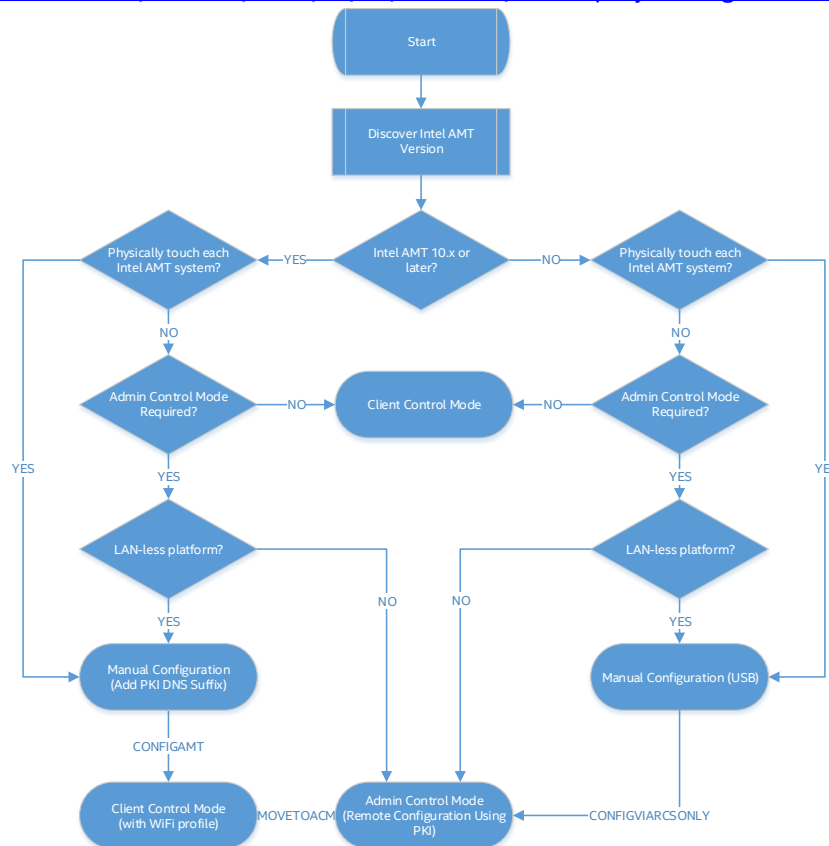
The factory default state for Intel AMT firmware is un-configured to ensure unauthorized users cannot access the manageability and security features of Intel AMT. The three main objectives of the setup and configuration process are:

- Securely deliver an encrypted profile to the target Intel AMT firmware.
- Enable Intel AMT features and specify behavior.
- Ensure that only authenticated and authorized users can access.

## 4.2 Configuration Methods

Host-Based Configuration (HBC) is the recommended method for enabling Intel AMT and is supported from Intel AMT Release 6.2. This document focusses on this configuration flow. However for completeness the decision tree below provides a simple flow to illustrate all available options.

For additional information on other Intel AMT configuration methods, please reference the Intel SCS Deployment Guide (<https://www-ssl.intel.com/content/www/us/en/software/scs-deployment-guide.html>)



## 4.3 Host-Based Configuration


Host-Based Configuration (HBC) requires Windows Administrator permissions and by default puts the device into Client Control mode (CCM). CCM disables sensitive capabilities such as network filtering and requires mandatory user consent for Intel AMT Redirection and Boot Device Control Operations. This means the user must provide a random hardware generated 6-digit code that is displayed on the Intel vPro system, before a remote Intel AMT session can be established.

## 4.4 Using the Intel AMT Configuration Utility Wizard

Below you'll find basic instructions for enabling Host-Based Configuration on your Intel AMT system using the Intel AMT Configuration Utility. This is a wizard based application that can be used to configure Intel AMT in two different ways:


- Run the Configuration Utility GUI on an Intel AMT system to configure AMT.
- Create XML profiles that can be used to configure Intel AMT on multiple systems using the Command Line Interface (CLI) of the Configurator. The Configurator will configure Intel AMT with the settings in the profile.

1. Download the entire Intel SCS package from <http://intel.com/go/scs>.

 [IntelSCS\_download\_package\_11.0.0.214.zip]

- ▷ ACU\_Wizard
- ▷ **Configurator**
- ▷ Licenses
- ▷ RCS
- ▷ sample\_files
- ▷ SCS\_Discovery
- ▷ Utils

2. Extract the **ACU\_Wizard** directory, as selected in the example below and copy to the Intel AMT client.
3. On the Intel AMT system, navigate to the ACU\_Wizard directory and select the executable **ACUWizard.exe**.
4. Alternatively you can just download the required client configuration components from <https://downloadcenter.intel.com/download/25616>

 [Configurator\_download\_package\_11.0.0.214.zip]

- ▷ ACU\_Wizard
- ▷ Configurator
- ▷ Licenses
- ▷ sample\_files

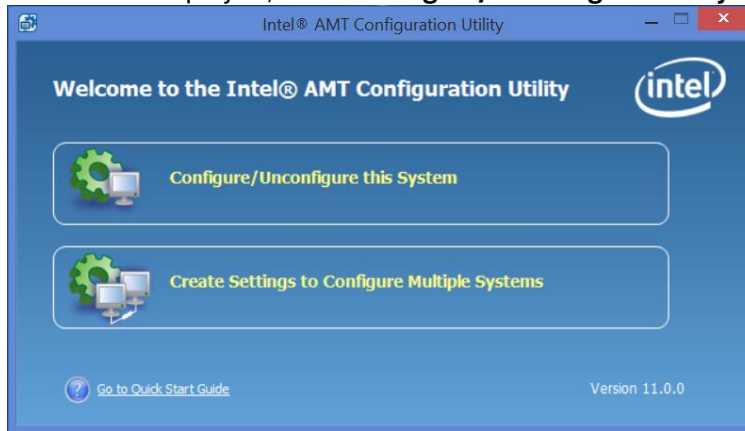
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**NOTE:** For systems running Microsoft Windows\* 8.1 or newer operating systems, this executable must be opened with elevated privileges due to interaction with a kernel level driver. This is done by right clicking on the executable and selecting "Run as administrator".

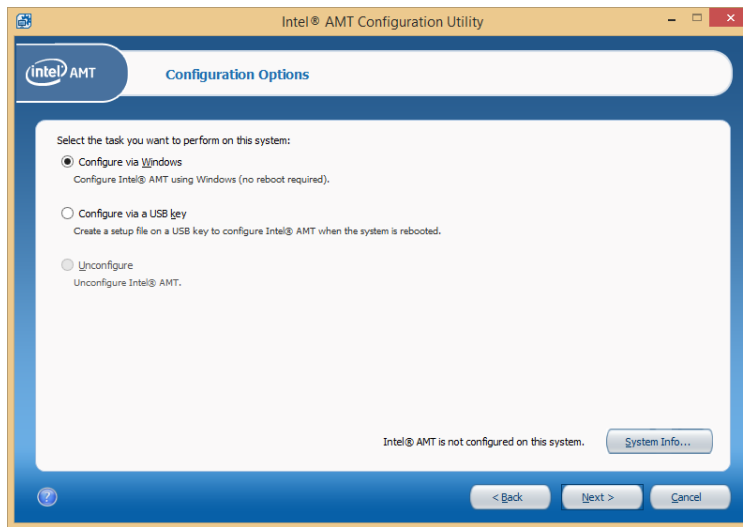
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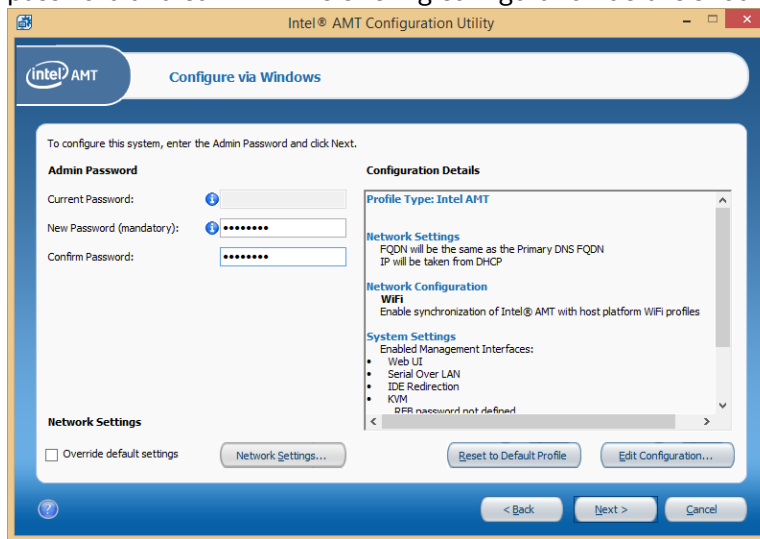
- When the GUI is displayed, select **Configure/Unconfigure this system**.



- Select **Configure via Windows**. In the bottom right hand corner you will see that Intel AMT is not configured on this system. Additional system details can be found by clicking the **System Info...** button.



- For new Intel AMT systems the current password is **Admin**. Enter a new password and confirm. The existing configuration details should suffice.

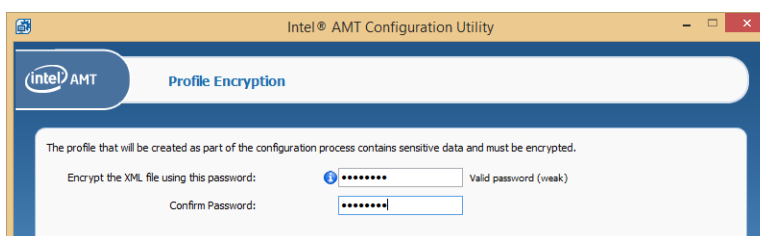



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**NOTE:** The password must be at least 8 and at most 32 characters long, must have at least 1 digit and 1 non-alphanumeric characters and both lowercase and uppercase Latin letters. The underscore ( `_` ) character is counted as alphanumeric.

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- The XML profile that is created as part of the configuration process contains sensitive data and the resulting file will be encrypted with a password using the following :
  - Encryption algorithm: AES128 using SHA-256 on the provided password to create the key
  - Encryption mode: CBC
  - Initialize Vector (IV) is the first 16 bytes of the Hash




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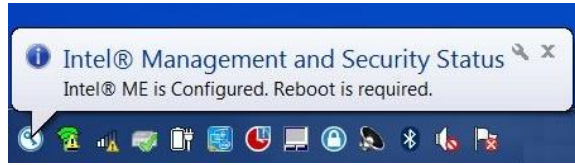
**NOTE:** You can use the **SCSEncryption.exe** utility located in the Utils folder of the Intel SCS download package to encrypt and decrypt files using the same format used by Intel SCS. For more information, refer to the CLI help of the **SCSEncryption.exe** utility.

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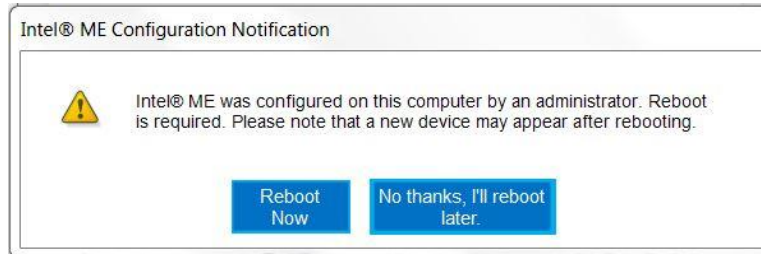
- Click the **Configure** button and Intel AMT will begin configuration.



10. When the Intel Management and Security (IMSS) system tray applet dialog appears, the Intel Management Engine (Intel ME) configuration is complete.



11. For systems with AMT Release 10.0 the following configuration notification will also be shown.



12. For troubleshooting purposes you can locate this operation located in the ACU\_Wizard directory. Additionally you'll find the encrypted file, **profile.xml** located in the same directory, which is protected with the password entered in step 7.

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**NOTE:** Once a single Intel AMT system has been configured and functionality validated, then the XML profile can be packaged up with the contents of the configuration directory (ACU.DLL, ACUConfig.exe) and using the simple command "**ACUconfig.exe ConfigAMT profile.xml /DecryptionPassword P@ssw0rd**" can be distributed to all Host-Based Configuration capable Intel AMT systems within the target environment.

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## 5 Connecting

1. From another PC, open a web browser and enter the URL for the Intel AMT System: <http://FQDN:16992>
2. If the Intel AMT on page displays, the managed client is configured.



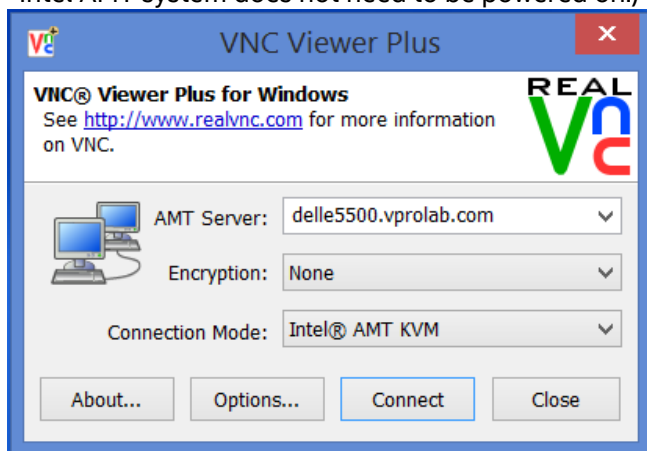
3. Log On using the user “admin” with password “P@sswOrd” to gain authorized access to Intel AMT.

**NOTE:** When testing against the Intel AMT WebUI using Microsoft Internet Explorer, a change to the Windows registry is required to enable Kerberos authentication over non-standard HTTP ports i.e. 16692/16993. More information is available in the Post-Hotfix section of Microsoft KB908209: <http://support.microsoft.com/kb/908209>

### 5.1 VNC Viewer Plus

VNC Viewer Plus from RealVNC is an excellent application that provides an easy to use GUI and supports access to Intel AMT capabilities including secure, remote KVM (Keyboard, Video, Mouse) access. Download a 60-day evaluation from: <https://www.realvnc.com/download/viewerplus/>

1. Ensure the Intel AMT system is connected to power and the network (the Intel AMT system does not need to be powered on.)

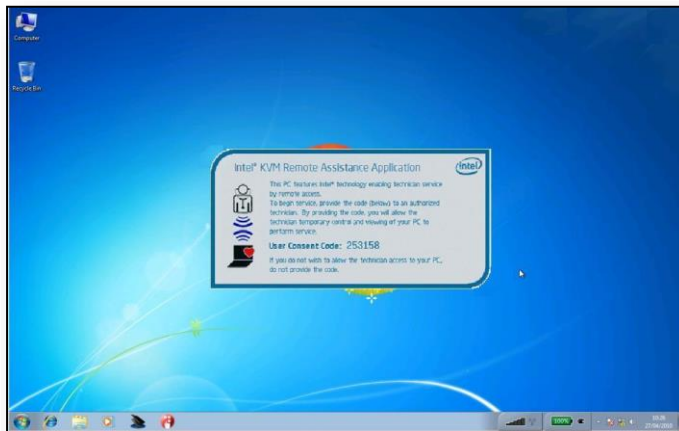




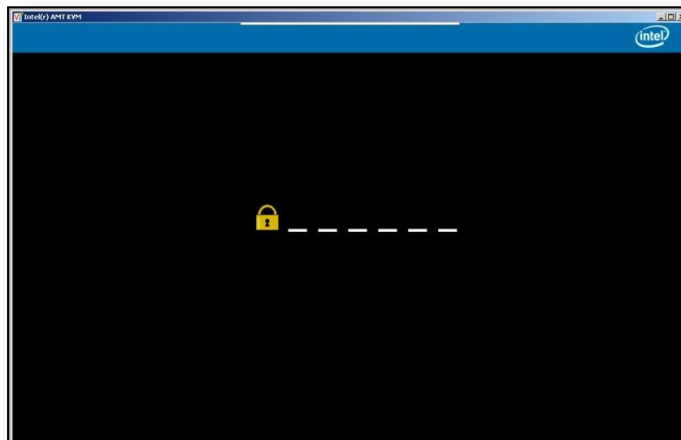
2. Connect to the Intel AMT system using the Fully Qualified Domain Name (FQDN) and Log On using the username “admin” and password “P@ssw0rd” to gain authorized access to Intel AMT.



3. VNC Viewer Plus requests a consent code from the Intel AMT system being accessed and the screen below is displayed.



4. The remote Intel AMT system hardware generates a 6-digit consent code and displays this as a sprite to the end-user. These are both generated in graphics hardware and Intel AMT firmware and cannot be suppressed from the Operating System.

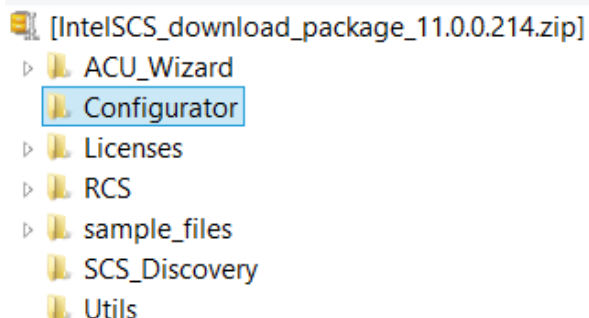


5. The remote user reads out the 6-digit consent code which is entered into the VNC Viewer Plus application and a KVM session is created (using either Intel AMT ports 16992 or 16993, NOT the traditional VNC port 5900)

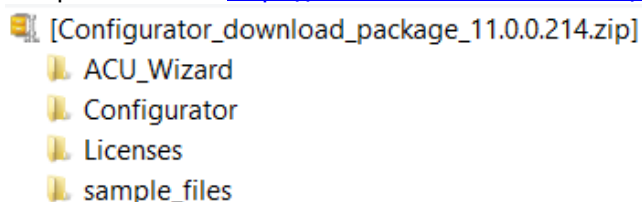


## 6 Unconfigure

This simplest method to unconfigure or un-provision AMT is to utilize the Intel AMT Configuration Utility Wizard.



1. Extract the **ACU\_Wizard** directory, as selected in the example below and copy to the Intel AMT system.
2. On the Intel AMT system, navigate to the ACU\_Wizard directory and select the executable **ACUWizard.exe**.
3. Alternatively you can just download the required client configuration components from <https://downloadcenter.intel.com/download/25616>

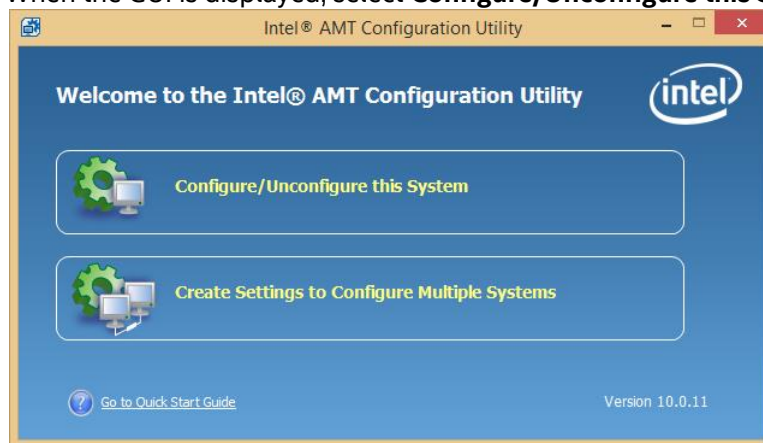


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**NOTE:** For systems running Microsoft Windows\* 8.1 or newer operating systems, this executable must be opened with elevated privileges due to interaction with a kernel level driver. This is done by right clicking on the executable and selecting “Run as administrator”.

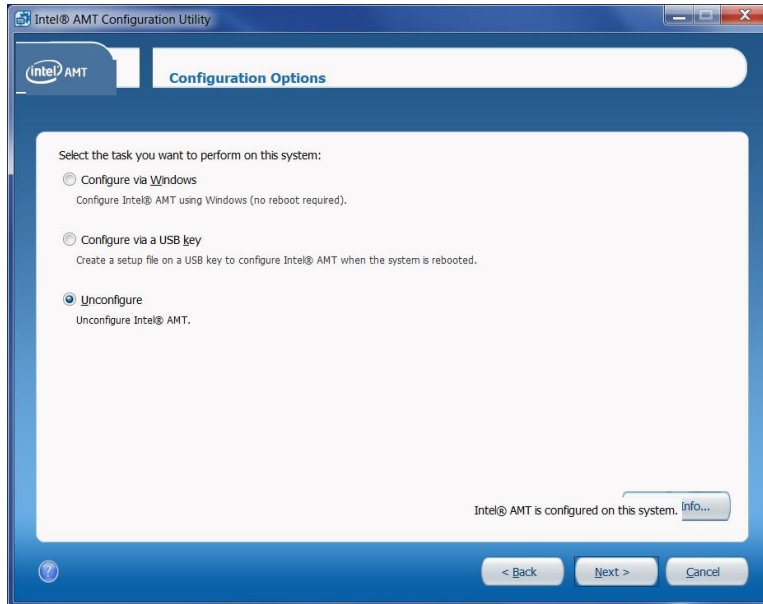
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4. When the GUI is displayed, select **Configure/Unconfigure this System**.

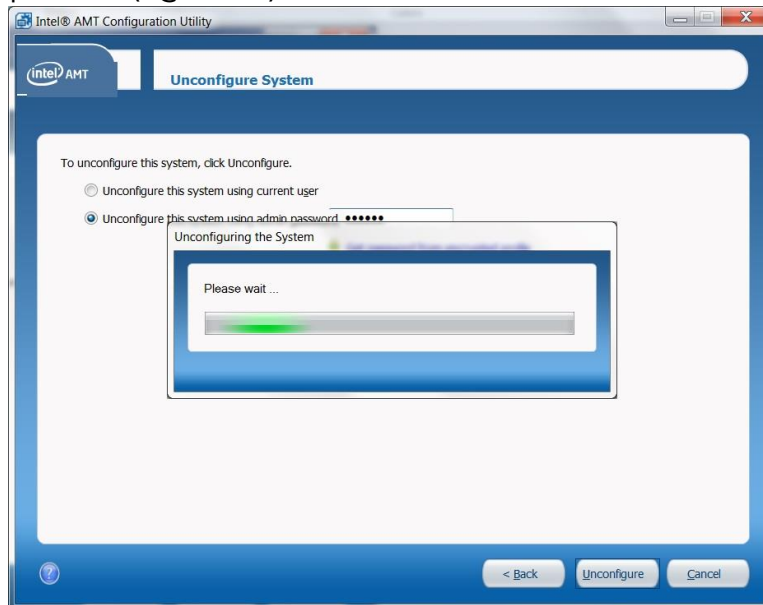




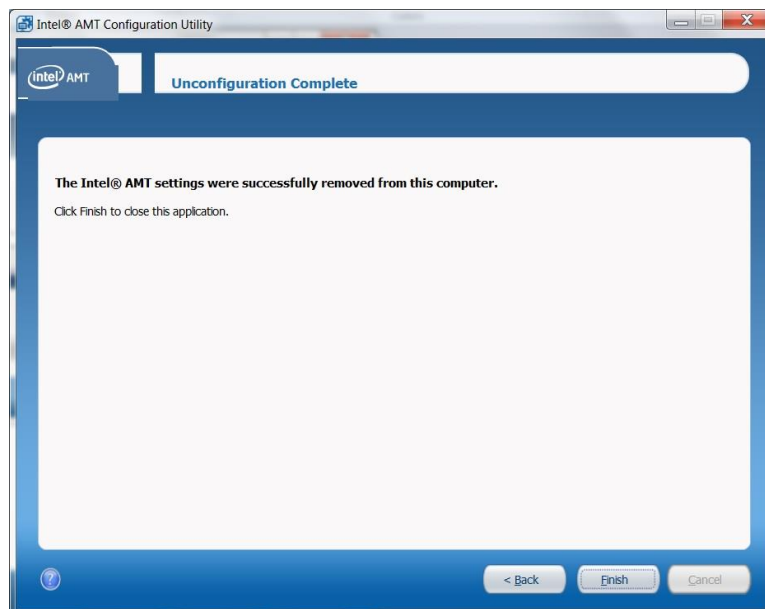
5. Select **Unconfigure** and click the **Next** button.



6. Select **Unconfigure this system using admin password**, enter the admin password (P@ssw0rd) and click the **Next** button.



7. Once complete AMT will be un-configured and un-provisioned. Click the **Finish** button.



8. The Intel Management and Security Status displays that the **Intel ME is Unconfigured**.

