

# **VNC® Viewer Plus**

## **User Guide**

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## **Contact**

RealVNC Limited  
Betjeman House  
104 Hills Road  
Cambridge  
CB2 1LQ  
United Kingdom  
[www.realvnc.com](http://www.realvnc.com)

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# About this Guide

This User Guide explains how to use *VNC Viewer Plus* to connect to and control a host computer with Intel® Core™ vPro™ technology meeting the requirements set out at [www.realvnc.com/products/viewerplus/hardware.html](http://www.realvnc.com/products/viewerplus/hardware.html).

## Intended audience

This User Guide has two audiences in mind:

- Chapter 1 through 4 are intended for *VNC Viewer Plus* users.
- Chapter 5 is intended for administrative users with sufficient privileges to configure the host computer running *AMT Server*.

## Conventions

Dialogs and other screen artifacts were captured under Windows XP unless otherwise stated.

## Contacting Technical Support

You can e-mail RealVNC Technical Support if you have a full or trial license to use *VNC Viewer Plus*. At the time of publication, this service is available from [www.realvnc.com/support](http://www.realvnc.com/support).

## Related information

Visit [www.realvnc.com](http://www.realvnc.com) for:

- Supported operating systems and hardware requirements.
- Instructions on how to install, license, and uninstall *VNC Viewer Plus*, and how to obtain a license key.
- Release Notes and FAQs.
- Information relating to other RealVNC products and solutions.

**Note:** Once *VNC Viewer Plus* is installed, you can go straight to the *VNC Viewer Plus* home page from the **Start** menu. Select **All Programs > RealVNC > Documentation > VNC Viewer Plus on the Web**.



# 1

## Introducing VNC Viewer Plus

This chapter introduces *VNC Viewer Plus*: what it is, how it works, and how it can help you.

It explains what you need to do to get *VNC Viewer Plus* ready to use in your environment, and suggests, for users with different requirements, what chapters of this User Guide to read next.

**Note:** The term *host computer* in this User Guide refers to the computer being controlled, running *AMT Server*. The term *client computer* refers to the computer you control from, running *VNC Viewer Plus*.

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## What is VNC Viewer Plus?

*VNC Viewer Plus* is a premium, dual-mode version of *VNC Viewer 4.6*.

You can use *VNC Viewer Plus* to connect to and control:

- A host computer running VNC-compatible Server technology, such as *VNC 5.x*, in exactly the same way as *VNC Viewer*. For more information, see *Establishing a VNC connection on page 8*.
- A supported host computer with Intel Core vPro technology running *AMT Server*, even if that computer is powered off, or has no functioning operating system. For more information, see *Establishing an Intel AMT KVM connection on page 8*.

### Establishing a VNC connection

You can use *VNC Viewer Plus* to establish a standard VNC connection in exactly the same way as *VNC Viewer*. Once connected, *VNC Viewer Plus* behaves identically to *VNC Viewer*; you see the desktop of the host computer in a new window, and can control it using your keyboard and mouse.

Providing the latest version of *VNC 5.x* with an Enterprise or a Personal license is installed on the host computer, connections are secure, and advanced features such as printing, file transfer, copy and paste, and instant chat are available.

For more information on VNC connections, see the *VNC User Guide*. Please note that the remainder of this User Guide describes Intel AMT KVM connections.

### Establishing an Intel AMT KVM connection

You can use *VNC Viewer Plus* to establish a connection to a host computer running *AMT Server*, a proprietary version of *VNC Server* embedded in certain Intel Core vPro processors. Note that, unlike *VNC Server*, only one *VNC Viewer Plus* user can connect to *AMT Server* at a time.

**Note:** *AMT Server* is a product from Intel Corporation. It is incorporated in Intel AMT major version 6 onwards. For information on supported computers, visit [www.realvnc.com/products/viewerplus/hardware.html](http://www.realvnc.com/products/viewerplus/hardware.html). Please note that RealVNC Limited has no control over, and can take no responsibility for, Intel AMT or *AMT Server* functionality or behavior.

Once connected, you see the video output of the host computer as though you were sitting in front of a monitor attached to that computer:

- If the computer has a functioning operating system, and that system is running, you see the desktop of the host computer, and can control it using your keyboard and mouse in exactly the same way as *VNC Viewer*. Note, however, that advanced features such as printing, file transfer, copy and paste, and instant chat are not available.
- If an operating system is not running, or is not functioning properly, you can restart the host computer, and observe and interact with the boot sequence, configuring the BIOS if necessary. Or you can mount an image stored on your client computer and boot the host computer from that image, perhaps to install a different operating system.
- If the host computer is powered off, or in hibernate mode, you see a blank screen. You can power the host computer on, or wake it from hibernation, and observe and interact with the boot sequence. When the operating system runs, you can control the host computer in exactly the same way as bullet one.

*VNC Viewer Plus* combines visual confirmation of remote control activity with an intuitive interface that makes performing key management operations such as power on, restart, and image mounting easier than using alternative applications, such as those listed in *Managing Intel AMT on page 45*.

## Getting VNC Viewer Plus ready to use

Before you can establish a connection, certain operations must be performed on both host and client computers.

This section addresses the client computer user and assumes the same person is able (that is, is physically present and has sufficient privileges) to configure the host computer as well. If not, contact a system administrator or a host computer user.

**Note:** Some operations need only be performed once. Others must be performed before each connection.

### Host computer

1. Ensure the host computer is connected to a power supply unless it has an independent power source (for example, a laptop). Note, however, that it need not be powered on, or have a functioning operating system.
2. Ensure the host computer is connected to a network to which the client computer can also connect. This User Guide assumes you are connecting over a private network such as a LAN or VPN, but if you are connecting over the Internet, see also *Connecting over the Internet on page 18*.
3. Ensure *AMT Server* is enabled on the host computer. For more information, see *Setting up Intel AMT on page 44*.
4. You need to know a network address for *AMT Server*. For more information, start with *Discovering a network address on page 46*.
5. You may need to know authentication credentials for *AMT Server*. For more information, start with *Discovering authentication credentials on page 46*.
6. Ensure the keyboard language of the host computer is mapped to the *type of keyboard* attached to your client computer. Note you can use *VNC Viewer Plus* to do this after you connect. For more information, see page 28.

### Client computer

1. Ensure the client computer is powered on, has a functioning operating system, and is connected to the same network as the host computer.
2. Install and license *VNC Viewer Plus*. To see how to do this, and for information on trial license keys, visit [www.realvnc.com/products/viewerplus](http://www.realvnc.com/products/viewerplus).

**Note:** *VNC Viewer Plus* need not be licensed to make a standard VNC connection.

3. If your client computer is protected by proxy servers, provide the appropriate information. For more information, see *Connecting via proxy servers on page 25*.

## Using VNC Viewer Plus with Fast Call for Help

Fast Call for Help is a service from Intel Corporation that enables a host computer user to obtain technical support over the Internet with a single key press or mouse click, regardless of the state of the host computer's operating system, or the location of the user. For more information, start with <http://software.intel.com/en-us/articles/fast-call-for-help-overview>.

With appropriate configuration of the Management Presence Server (MPS) middleware, *VNC Viewer Plus* can act as the management console in a Fast Call for Help session, automatically establishing a secure connection back out to the host computer, and enabling a technician or Customer Service Representative to take control.

**Note:** The procedure for registering *VNC Viewer Plus* as the management console depends upon the MPS, and is out of scope for this User Guide.

*VNC Viewer Plus* must be started in listening mode to await notification of a Fast Call for Help session. For more information, see *Starting Listening VNC Viewer Plus on page 23*.

## What to read next

To walk through establishing your first connection from a client computer running *VNC Viewer Plus* to a host computer running *AMT Server*, read *Chapter 2, Getting Connected on page 11*.

To learn how to use features of *VNC Viewer Plus* to enhance your experience of controlling a host computer running *AMT Server*, read *Chapter 3, Using VNC Viewer Plus on page 21*.

To see how to perform mission-critical operations such as powering on and mounting images, read *Chapter 4, Performing Management Operations on page 39*.

To learn how to configure a host computer for *AMT Server*, see *Chapter 5, Configuring the host computer on page 43*.

**Note:** For information about using *VNC Viewer Plus* to make a standard VNC connection to a host computer running *VNC 5.x*, read the *VNC User Guide*.



# Getting Connected

This chapter aims to help the majority of users get started establishing their first connection from a client computer running *VNC Viewer Plus* to a host computer running *AMT Server*. For more detailed connection information, read *Chapter 3, Using VNC Viewer Plus on page 21*.

**Note:** For information about using *VNC Viewer Plus* to make a standard VNC connection to a host computer running *VNC 5.x*, read the *VNC User Guide*.

This chapter assumes both host and client computers are set up correctly. For more information, see *Getting VNC Viewer Plus ready to use on page 9*.

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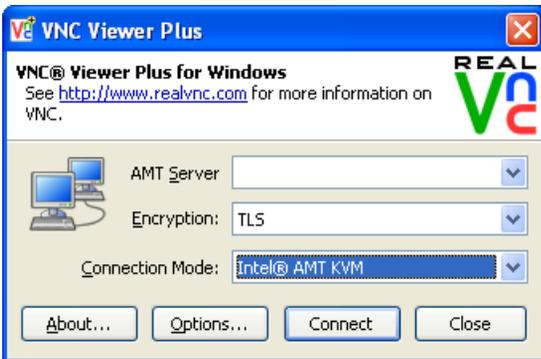
## Step 1: Start VNC Viewer Plus on the client computer

To start *VNC Viewer Plus* on the client computer, select **RealVNC > VNC Viewer Plus** from the **Start** menu. The **VNC Viewer Plus** dialog opens:



## Step 2: Specify an AMT Server connection

By default, *VNC Viewer Plus* makes a standard VNC connection. To connect to *AMT Server*, choose Intel® AMT KVM from the **Connection Mode** dropdown on the **VNC Viewer Plus** dialog:



## Step 3: Identify AMT Server on the host computer

You must specify a network address that uniquely identifies *AMT Server* running on the host computer.

If you do not know the network address and you have access to the host computer, you may be able to discover it; see *Discovering a network address on page 46*. If you do not have access to the host computer, you will need to ask your system administrator or a host computer user.

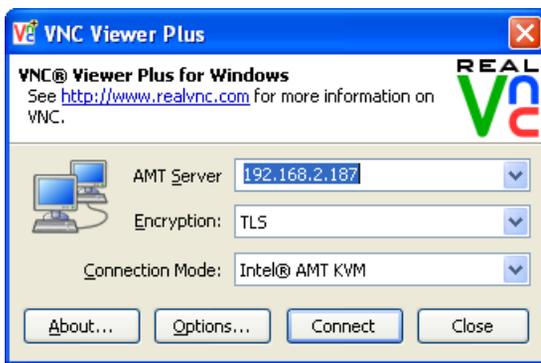
A network address can take the following forms:

- An IP address in IPv4 format, for example 192.168.2.187.
- A host name, for example johndoe.
- A fully-qualified domain name (FQDN), for example johndoe.acme.com.

**Note:** A FQDN may be required in a Kerberos network environment, or to establish an encrypted connection. You can configure *VNC Viewer Plus* to automatically look one up for you. See *Connecting using a FQDN on page 26* for more information.

Do not specify a port number. For information on ports, see *Making ports accessible on page 47*.

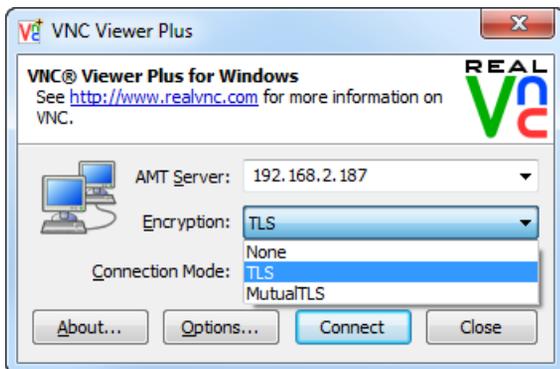
In the following picture, the host computer is identified by an IPv4 network address:



## Step 4: Select an encryption option

To encrypt a connection to *AMT Server*, make sure one of the following options is selected in the **Encryption** dropdown of the **VNC Viewer Plus** dialog:

- **TLS**  
The client computer verifies the host computer's identity before a connection can be established.
- **MutualTLS**  
The client computer verifies the host computer's identity and *vice versa* before a connection can be established.



Note that, for either option:

- The host computer must be configured to use Transport Layer Security (TLS).
- At least one security certificate must be installed on your client computer; see *Importing a security certificate on page 15*.
- It may be necessary to configure *VNC Viewer Plus* to look up a FQDN; see *Connecting using a FQDN on page 26*.

To leave the connection unencrypted, choose `None`. Note that:

- The host computer must *not* be configured to use TLS.
- Your user name and password, as well as data transferred between the computers while the connection is in progress, are potentially susceptible to discovery by third parties.

If you do not know whether the host computer is configured to use TLS and you have access to it, you may be able to find out; see *Setting up encrypted connections on page 48*. If you do not have access, you will need to ask your system administrator or a host computer user.

## Importing a security certificate

To establish an encrypted connection to a host computer, at least one security certificate must be imported to your client computer. Note you only need import certificate(s) once.

### Importing a certificate for TLS

If the `TLS` option is selected, a certificate from a Certification Authority (CA) verifying the identity of the host computer must be imported.

If you have access to the host computer, you can follow the instructions in *Setting up TLS on page 48* to obtain an appropriate CA certificate and transfer it to your client computer. If you do not have access, ask your system administrator or a host computer user.

To import a CA certificate:

1. In Control Panel, choose **Internet Options**.
2. On the **Content** tab of the **Internet Properties** dialog, click the **Certificates** button.
3. In the **Certificates** dialog, click the **Import** button.
4. Complete the **Certificate Import Wizard**. On the **Certificate Store** page, choose **Place all certificates in the following store** and browse to the `Trusted Root Certification Authorities` store.

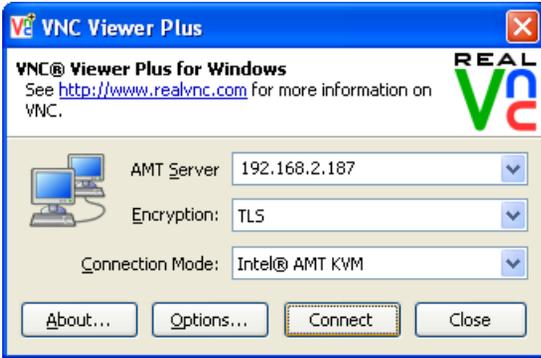
### Importing certificates for Mutual TLS

if the `MutualTLS` option is selected:

1. Follow all the instructions in *Importing a certificate for TLS on page 15*.
2. A client certificate for the client computer must be imported. If you have access to the host computer, you can follow the instructions in *Setting up Mutual TLS on page 48* to obtain a suitable certificate and transfer it to your client computer. If you do not have access, ask your system administrator or a host computer user. To import a client certificate:
  - a. In Control Panel, choose **Internet Options**.
  - b. On the **Content** tab of the **Internet Properties** dialog, click the **Certificates** button.
  - c. In the **Certificates** dialog, click the **Import** button.
  - d. Complete the **Certificate Import Wizard**. On the **Password** page, enter the password for the private key and turn on **Mark this key as exportable**. On the **Certificate Store** page, choose **Place all certificates in the following store** and browse to the `Personal` store.

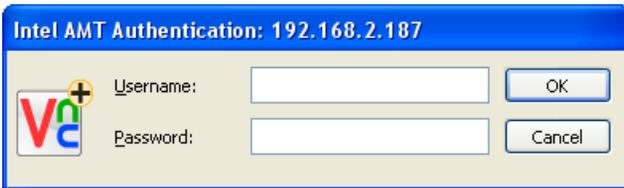
## Step 5: Connect to AMT Server

To connect to *AMT Server*, click the **Connect** button at the bottom of the **VNC Viewer Plus** dialog:



### Authenticating to AMT Server

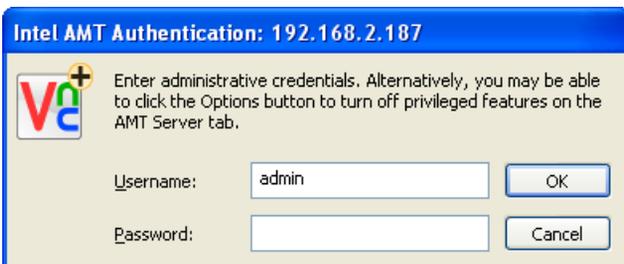
You may be prompted to enter authentication credentials:



If you are:

- And you do not know the correct credentials, but you do have access to the host computer, you may be able to discover them; see *Discovering authentication credentials on page 46*. If you do not have access to the host computer, you will need to ask your system administrator or a host computer user.
- But you were not *expecting* to, you may need to configure *VNC Viewer Plus* for single sign-on and then reconnect. See *Configuring VNC Viewer Plus for Kerberos on page 25* for more information.

If you enter authentication credentials but are then immediately prompted for more:



This is because your connection is set up to use privileged features and so you must further enter the credentials of an Intel AMT *administrative user*. For more information on what this means, see *Discovering authentication credentials on page 46*.

Enter the credentials of an Intel AMT administrative user if you know them. If you do not, you may be able to configure *VNC Viewer Plus* to turn privileged features off, and then reconnect. On the **AMT Server** tab of the **Options** dialog, make sure the following two options are selected:

- **The host computer can use its Wi-Fi network**
- **Contact host computer user for consent code**

For more information, see *Configuring VNC Viewer Plus before you connect on page 24*.

If when you reconnect you are *still* prompted for the credentials of an Intel AMT administrative user, you will need to ask your system administrator or a host computer user.

## Obtaining host computer user consent

You *may* be prompted to enter a six-digit code:



You must normally contact a host computer user in order to obtain this code. For more information on this feature, see *Requiring host computer user consent on page 49*.

If you cannot contact a host computer user (for example, no such user is present), you may be able to configure *VNC Viewer Plus* to override this feature, and then reconnect. See *Overriding host computer user consent on page 26* for more information.

Note that when you reconnect you may be prompted to enter the credentials of an Intel AMT administrative user. For more information on what this means, see *Discovering authentication credentials on page 46*.

## Completing the connection

If the connection is successful, *VNC Viewer Plus* displays the current video output of the host computer in a new window on the client computer. Carry on from *The VNC Viewer Plus user experience on page 27*. If the connection fails for any reason, start with *Troubleshooting connection on page 18*.

Once connected, you can save the connection so you can quickly reconnect in future without having to remember the network address and authentication credentials. For more information, see *Saving the current connection on page 38*.

## Troubleshooting connection

The following sections provide additional information to help you connect.

If after reading this you still cannot connect, or if you want more information, consult the RealVNC web site, or contact Support. For details of these resources, see *About this Guide on page 5*.

### Connecting over the Internet

This User Guide assumes you are connecting over a private network such as a LAN or VPN, and that it is not necessary to configure intermediate firewalls or routers in order to establish a connection.

If you are connecting over the Internet, it is very likely that firewalls and routers protecting the host computer will need to be configured to allow and forward network communications to it. We recommend you read the manufacturers' instructions. To see which ports must be accessible on the host computer, read *Making ports accessible on page 47*.

**Note:** There is no need to configure firewalls and routers protecting a host computer set up to use Fast Call for Help. See *Using VNC Viewer Plus with Fast Call for Help on page 10* for more information.

### Error messages

If a connection fails, an error message is displayed. Some error messages are generated by *VNC Viewer Plus*, some by *AMT Server*.

**Note:** *AMT Server* is a product from Intel Corporation. RealVNC Limited has no control over, and can take no responsibility for, *AMT Server* functionality or behavior.

### Connecting to a disabled host computer

If you see the following message:

KVM is disabled in Intel AMT. Please enable it and try again.

then *AMT Server* is disabled on the host computer. If you have access to the host computer, you may be able to enable it; see *Setting up Intel AMT on page 44*. If you do not have access, you will need to ask your system administrator or a host computer user.

### Failing to supply the correct network address

If you see the following message:

Connection failed. Check you have entered the correct address/hostname. Check *AMT Server* is configured to allow TLS-secured connections.

then it may be that you have entered an incorrect IP address or host name in the **AMT Server** dropdown on the **VNC Viewer Plus** dialog. Note it is possible for *AMT Server* to be assigned a different network address to that of the host computer's operating system.

If you do not know a network address and you have access to the host computer, you may be able to discover it; see *Discovering a network address on page 46*. If you do not have access, you will need to ask your system administrator or a host computer user.

### Failing to specify an encrypted connection

If you see the following message:

```
Connection failed. Check you have entered the correct address/hostname. Check
AMT Server is configured to allow unsecured connections.
```

then it may be that you have chosen `None` in the **Encryption** dropdown on the **VNC Viewer Plus** dialog, yet the host computer is configured to use Transport Layer Security (TLS). You must choose `TLS` or `MutualTLS` from this dropdown instead.

If you do not know whether the host computer is configured to use TLS, and you have access to it, you may be able to find out; see *Setting up encrypted connections on page 48*. If you do not have access, you will need to ask your system administrator or a host computer user.

### Failing to provide a certificate for an encrypted connection

If you see the following message:

```
Security failure. The secure connection failed due to an invalid or missing
certificate (12175).
```

then you are connecting to a host computer configured to use Transport Layer Security (TLS), but your client computer either:

- Does not have a security certificate.
- Has a certificate but it is not in the correct certificate store.
- Has a certificate in the correct store but it is not valid for some reason.

For more information, start with *Importing a security certificate on page 15*.

### Failing to specify an unencrypted connection

If you see the following message:

```
Connection failed. Check you have entered the correct address/hostname. Check
AMT Server is configured to allow TLS-secured connections.
```

then it may be that you have chosen `TLS` or `MutualTLS` in the **Encryption** dropdown on the **VNC Viewer Plus** dialog, yet the host computer is *not* configured to use Transport Layer Security (TLS). You must choose `None` from this dropdown instead.

If you do not know whether the host computer is configured to use TLS, and you have access to it, you may be able to find out; see *Setting up encrypted connections on page 48*. If you do not have access, you will need to ask your system administrator or a host computer user.

### Failing to authenticate correctly

If you see the following message:

```
Either the user name was not recognised, or the password was incorrect.
```

then you have incorrectly entered authentication credentials. Note that both user name and password are case-sensitive.

If you do not know authentication credentials and you have access to the host computer, you may be able to find out; see *Discovering authentication credentials on page 46*. If you do not have access, you will need to ask your system administrator or a host computer user

### **Connecting while another VNC Viewer Plus user is connected**

If you see the following message:

```
AMT Server is currently busy serving a session to another viewer, please try again later.
```

then you cannot connect until another *VNC Viewer Plus* has disconnected. Only one *VNC Viewer Plus* user can connect to *AMT Server* at a time.

### **AMT Server errors**

It is possible that you might see error messages with `Wsmn` or `KVMLib` in the dialog title or text.

These errors are generated by *AMT Server*, and are complex to diagnose. The recommended procedure is to wait a few moments and attempt to reconnect.

# 3

## Using VNC Viewer Plus

This chapter explains how to connect to *AMT Server* and control a host computer using *VNC Viewer Plus*. It also explains how *VNC Viewer Plus* features can enhance your productivity while a connection is in progress.

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## Starting VNC Viewer Plus

To start *VNC Viewer Plus* on the client computer, select **RealVNC > VNC Viewer Plus** from the **Start** menu. The **VNC Viewer Plus** dialog opens:



**Note:** If the **Connection Mode** dropdown is not visible, *VNC Viewer Plus* is not licensed. You must enter a license key before you can connect to *AMT Server*. See *Getting VNC Viewer Plus ready to use on page 9* for more information.

*VNC Viewer Plus* is ready to connect to *AMT Server* out-of-the-box. However, in certain circumstances, you must configure it before you connect. See *Configuring VNC Viewer Plus before you connect on page 24* for more information.

## Starting VNC Viewer Plus programmatically

You can start *VNC Viewer Plus* programmatically, and connect to a host computer automatically, using the following URI scheme:

```
kvm://<username>:<password>@<host_computer> [/?<option>=<value>&...]
```

**Note:** *VNC Viewer Plus* must be installed and licensed on the computer on which the command runs.

An option/value pair can be any parameter from the **Expert** tab of the **Options** dialog. For more information on this, see *Using the Options dialog on page 32*.

For example, you could run the following command:

```
C:\Program Files\RealVNC\VNCViewerPlus\vncviewerplus.exe -uri kvm://  
adminusr:Pa55w0rd!@amt.acme.org/?AmtUseFQDN=false;AmtRequireConsent=false
```

Or enter the following command in the address bar of a web browser:

```
kvm://adminusr:Acm31ncPwd*@amt2/?AmtUseFQDN=true
```

Or click a hyperlink in a web page constructed from the following HTML:

```
<a href="kvm://stdusr:M1nPr1vs!@192.168.2.55/?ColourLevel=0">Connect!</a>
```

## Starting Listening VNC Viewer Plus

You can start *VNC Viewer Plus* in such a way that it does not connect to *AMT Server* but rather waits for *AMT Server* to connect to it. This is called a *reverse connection*.

**Note:** Only a host computer user participating in a Fast Call for Help session can initiate a reverse connection in this release. See *Using VNC Viewer Plus with Fast Call for Help* on page 10 for more information.

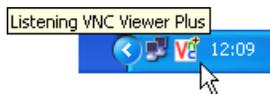
To start *Listening VNC Viewer Plus*, either:

- Select **RealVNC > Advanced > Start Listening VNC Viewer Plus** from the **Start** menu.
- Run the command `vncviewerplus.exe -listen`.

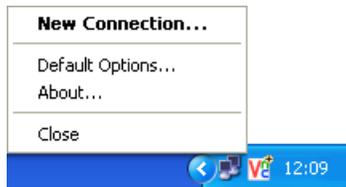
By default, *Listening VNC Viewer Plus* listens on port 9971. To:

- Permanently change this, append a space and the port number to the target for the **Start Listening VNC Viewer Plus** shortcut, for example `"C:\Program Files\RealVNC\VNCViewerPlus\vncviewerplus.exe" -listen 4567`
- Temporarily change this, append a space and the port number to the `vncviewerplus.exe -listen` command, for example `vncviewerplus.exe -listen 4567`.

When *Listening VNC Viewer Plus* starts, an icon  is displayed in the Notification area. Hover the mouse cursor over the icon to confirm that *Listening VNC Viewer Plus* is running:



*Listening VNC Viewer Plus* has a shortcut menu. To show it, right-click the icon:



Note that a Fast Call for Help session is likely to be routed via proxy servers. If these require authentication, you must specify the necessary credentials before a session starts. To do this, select **Default Options** to open the **Options** dialog, and follow the instructions in *Connecting via proxy servers* on page 25 to specify a user name and password for both an HTTP and a SOCKS 5 proxy server.

**Note:** There is no need to specify network addresses and ports for proxy servers. This information is provided by the MPS.

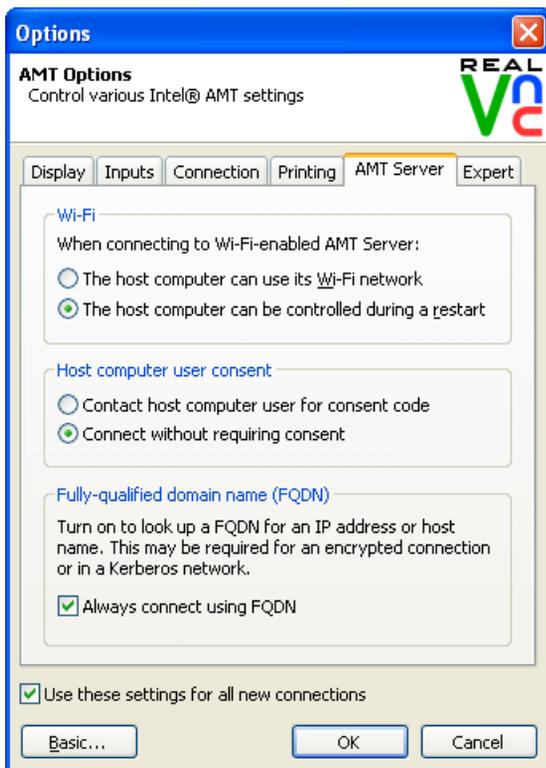
## Configuring VNC Viewer Plus before you connect

In most circumstances, *VNC Viewer Plus* is ready to connect to *AMT Server* out-of-the-box. You do not need to configure it. However, the following exceptions apply:

- Your client computer is protected by proxy servers. See *Connecting via proxy servers on page 25*.
- The host computer is Wi-Fi-enabled (for example, a laptop), and you want to remain connected while restarting it. See *Restarting a Wi-Fi-enabled host computer on page 25*.
- You want to connect without entering authentication credentials in a Kerberos network environment. See *Configuring VNC Viewer Plus for Kerberos on page 25*.
- You want to encrypt a connection. See *Connecting using a FQDN on page 26*.
- *AMT Server* is configured to require host computer user consent, and you want to override this feature. See *Overriding host computer user consent on page 26*.

**Note:** Intel AMT administrative privileges may be required to perform some of these operations. For more information on what this means, see *Discovering authentication credentials on page 46*.

To configure *VNC Viewer Plus* before you connect, click the **Options** button at the bottom of the **VNC Viewer Plus** dialog (see *Starting VNC Viewer Plus on page 22*). The **Options** dialog opens:



(In this picture, the dialog is in Advanced mode.)

For more information on this dialog, see *Using the Options dialog on page 32*. Note that the **Connection**, **Printing**, and **AMT Server** tabs are not available after you connect. In addition, some options on all tabs represent features that are not available for connections to *AMT Server*.

## Connecting via proxy servers

If your client computer is protected by proxy servers, you must specify the details of those proxy servers. Note that both an HTTP and a SOCKS 5 proxy server are required in order to route an Intel AMT KVM connection.

**Note:** Proxy server requirements are different for VNC connections. For more information, see the *VNC User Guide*.

On the **Connection** tab:

1. Choose **Use these proxy settings**.
2. From the **Proxy type** dropdown, choose *AMT Server*.
3. Click the **AMT Server Proxy Settings** button.
4. In the **AMT Server Proxy Settings** dialog, enter a network address, a colon, and a port for both an HTTP and a SOCKS 5 proxy server.
5. If a proxy server requires authentication, specify a user name and password in the appropriate fields.

## Restarting a Wi-Fi-enabled host computer

By default, the operating system of a Wi-Fi-enabled host computer has control of the network interface card while a connection is in progress. This means you are disconnected if you reset the host computer (power it off and on again, or restart the operating system), and cannot reconnect until the operating system restarts and re-establishes a connection to a Wireless Access Point.

If you want to remain connected and watch while a host computer restarts (a key *VNC Viewer Plus* feature), and you have the credentials of an Intel AMT administrative user, you can choose **The host computer can be controlled during a restart** on the **AMT Server** tab.

**Note:** Intel AMT must be enabled to support this operation. See *Enabling support for Wi-Fi management on page 49* for more information.

## Configuring VNC Viewer Plus for Kerberos

By default, *VNC Viewer Plus* permits single sign-on in a Kerberos network environment. This means you do not have to enter a user name and password in order to connect to *AMT Server*. Instead, the credentials with which you logged on to your client computer are used to authenticate.

To use this feature, make sure **Use single sign-on if VNC Server supports it** is turned on in the **Connection** tab. We recommend you also follow the instructions in *Connecting using a FQDN on page 26*.

## Connecting using a FQDN

A host computer can be identified by an IP address, a host name, or a fully-qualified domain name (FQDN). For more information on this, see *Step 3: Identify AMT Server on the host computer on page 12*.

Encrypted connections, and connections made in a Kerberos network environment, may require a FQDN. If you know a host name or IP address but not the FQDN for a host computer, then you may be able to configure *VNC Viewer Plus* to look one up for you. To do this, make sure **Always connect using FQDN** is turned on in the **AMT Server** tab.

## Overriding host computer user consent

*AMT Server* may be configured to require the entry of a code in order to complete a connection. This code is available only to a host computer user. Normally, you must contact the host computer user to obtain it.

If you know that no host computer user is present, and you have the credentials of an Intel AMT administrative user, you can override this feature and connect without obtaining and entering a code. To do this, turn on **Connect without requiring consent** in the **AMT Server** tab.

Intel AMT must be enabled to perform this operation. See *Requiring host computer user consent on page 49* for more information.

## Connecting to a host computer

This section summarizes how to connect from a client computer running *VNC Viewer Plus* to a host computer running *AMT Server*. For a step-by-step guide, read *Chapter 2, Getting Connected on page 11*.

1. Start *VNC Viewer Plus* on the client computer. The **VNC Viewer Plus** dialog opens.
2. From the **Connection Mode** dropdown, choose Intel® AMT KVM.
3. In the **AMT Server** dropdown, enter a network address for *AMT Server*.
4. From the **Encryption** dropdown, choose TLS if you want to secure the connection.
5. Click the **Connect** button. You may be prompted to enter authentication credentials.

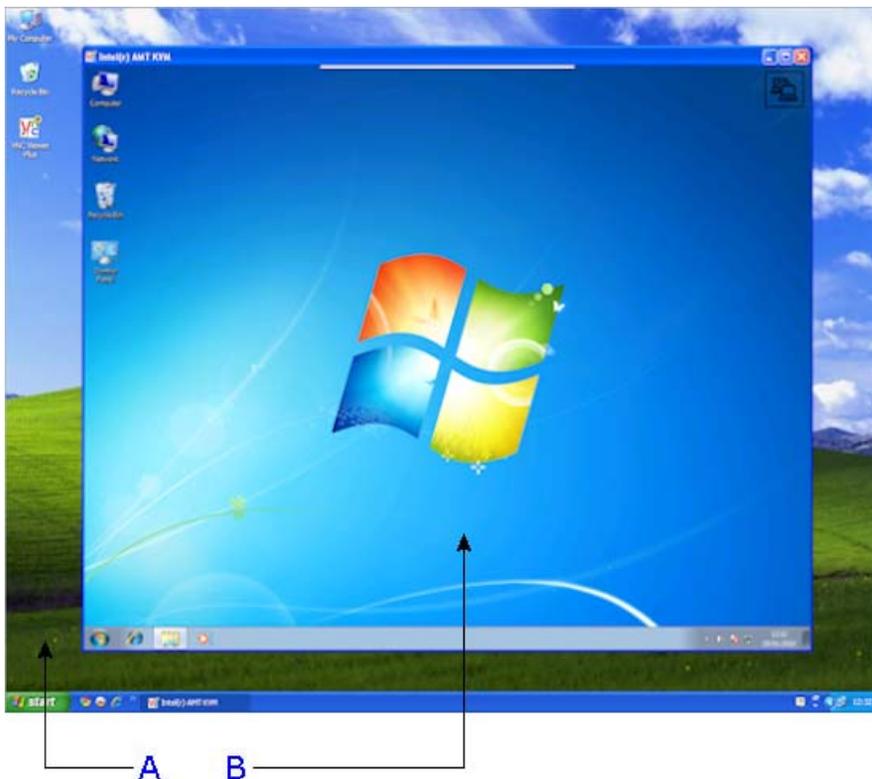
If the connection is successful, *VNC Viewer Plus* displays the current video output of the host computer in a new window on the client computer. Carry on from *The VNC Viewer Plus user experience on page 27*. If the connection fails for any reason, start with *Troubleshooting connection on page 18*.

Once connected, you can save the connection so you can quickly reconnect in future without having to remember the network address and authentication credentials. For more information, see *Saving the current connection on page 38*.

## The VNC Viewer Plus user experience

When a connection is established, *VNC Viewer Plus* displays a new window on the client computer displaying video output from the host computer running *AMT Server*:

- If the host computer is powered off, or in hibernate mode, or has no functioning operating system, the screen will likely be blank. To power the computer on, click the **Power**  *VNC Viewer Plus* toolbar button.
- If the host computer is powered on and has two monitors, a connection screen will likely be displayed prompting you to choose which monitor to remote. Press the F1 key to toggle between monitors, and then the ENTER key to continue. (Note you may be able to switch between monitors while a connection is in progress using the **Switch AMT Desktop** shortcut menu option.)
- If the host computer is powered on and an operating system is running, the desktop of the host computer will likely be shown, or a login screen if no host computer user is currently logged on.



**A.** Desktop of a client computer running Windows XP. **B.** VNC Viewer Plus displaying the desktop of a host computer running Windows 7.

**Note:** The  graphic in the top right corner of the *VNC Viewer Plus* window flashes to indicate that a *VNC Viewer Plus* user is connected.

## Controlling the host computer using your mouse

Your client computer's mouse is now shared with the host computer. This means that:

- Moving the mouse and clicking within the *VNC Viewer Plus* window affects the host computer and not the client.
- Moving the mouse and clicking outside the *VNC Viewer Plus* window, or on the *VNC Viewer Plus* title bar or window buttons (**Minimize**, **Maximize**, and **Close**), affects the client computer and not the host.

**Note:** If your mouse has no effect on the host computer, it may have been disabled. For more information, see *Restricting access to functionality on page 36*. Alternatively, it may be that the host computer is not currently accepting mouse input.

If client and host computers have different numbers of mouse buttons, you can configure *VNC Viewer Plus* to emulate those you do not have. See *Configuring your mouse on page 35* for more information.

## Controlling the host computer using your keyboard

Your client computer's keyboard is now shared with the host computer, with the exception of:

- The function key that opens the shortcut menu (F8 by default).
- The CTRL-ALT-DELETE key combination.

These commands are interpreted by your client computer. Alternative ways of sending them to the host computer are available; see *Using the shortcut menu on page 31* for more information. Note you can choose for certain other keys or key combinations to be interpreted by your client computer rather than the host. See *Configuring your keyboard on page 36* for more information.

**Note:** If your keyboard has no effect on the host computer, it may have been disabled. For more information, see *Restricting access to functionality on page 36*.

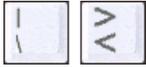
Note that *AMT Server* interprets keyboard keys slightly differently to *VNC Server*. For a connection to *VNC Server*, *VNC Viewer Plus* reproduces what you type exactly. For a connection to *AMT Server*, however, it is first necessary to ensure that the keyboard language of the host computer is mapped to the *type of keyboard* attached to your client computer (not its keyboard language).

**Note:** You can change the keyboard language of a host computer running Windows 7 by navigating to **Region and Language** in Control Panel. For other operating systems, consult the manufacturer's documentation.

For example, if your client computer has a UK keyboard attached, you should ensure that the host computer's keyboard language is set to `English (United Kingdom)`. In addition, when connected to a host computer running Intel AMT 7.0 or later, make sure the **Raw Keyboard Input** shortcut menu option is enabled (this is the default).

Note also the following issues, which apply when connected to a host computer running Intel AMT 6.0 or 6.1:

- If your client computer has a 102 key European-style keyboard attached, you may not be able to press the key next to the left SHIFT key. Depending on your keyboard, this may be one of the following keys:



Instead, to enter the characters on these keys, you must first change the host computer's keyboard language to *English (United States)*, and then press the key on your keyboard corresponding to the key that you would press were your client computer to have a 101 key US-style keyboard attached. For example:

- If your client computer has a UK keyboard attached, press # and ~ (SHIFT-#) to enter the \ and | characters respectively.
  - If your client computer has a French keyboard attached, press . (SHIFT-;) and / (SHIFT-:) to enter the < and > characters respectively.
- If your client computer has a 106 key Japanese-style keyboard attached, you cannot press the following keys:



Note that the last three of these keys are located either side of the space bar.

## Interacting with AMT Server

*AMT Server* is embedded in hardware so there is no Notification area icon or other facet in software to indicate status as there is with *VNC Server*. You cannot configure *AMT Server* over the network using *VNC Viewer Plus*.

If you have access to the host computer, or remote management or provisioning tools from Intel Corporation, you may be able to configure *AMT Server*. See *Chapter 5, Configuring the host computer on page 43* for more information.

## Using the toolbar

*VNC Viewer Plus* has a toolbar to facilitate common operations.

**Note:** If you cannot access the *VNC Viewer Plus* toolbar, it may have been disabled. For more information, see *Changing appearance and behavior on page 34*.

To see the toolbar, hover the mouse over the hot area at the top of the *VNC Viewer Plus* window:



The following table explains the effect of clicking each toolbar button.

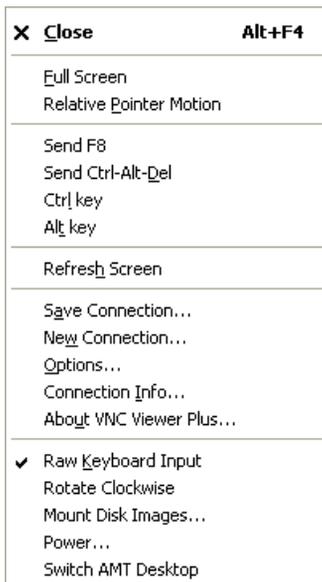
	Button name	Explanation
	New Connection	Opens the <b>VNC Viewer Plus</b> dialog. You can start a new Intel AMT KVM or VNC connection.
	Save Connection	You can save the current connection so you can quickly reconnect in future without having to remember the <i>AMT Server</i> network address and any authentication credentials. For more information, see <i>Saving the current connection on page 38</i> .
	Close Connection	Prompts you to close the current connection (and the <i>VNC Viewer Plus</i> window).
	Options	Opens the <b>Options</b> dialog. You can configure most aspects of <i>VNC Viewer Plus</i> while the current connection is in progress. For more information, see <i>Using the Options dialog on page 32</i> .
	Full Screen Mode	Toggles full screen mode on and off.
	Send Ctrl-Alt-Del	Sends the CTRL-ALT-DELETE command to the host computer. (Pressing this key combination would be interpreted by your client computer.) You could alternatively press SHIFT-CTRL-ALT-DELETE.
	Rotate Clockwise	Rotates the host computer desktop clockwise by 90°. For more information, see <i>Rotating the host computer's desktop on page 35</i> .
	Mount Disk Images	Opens the <b>Mount Disk Images</b> dialog. For more information, see <i>Mounting an image on the host computer on page 41</i> .
	Power	Opens the <b>Power</b> dialog. For more information, see <i>Powering the host computer on and off on page 40</i> .
	Connection Information	Opens a dialog displaying technical information about the current connection, such as the encryption method and compression format.
	<i>encryption</i>	The connection is encrypted/not encrypted (only one of these buttons is shown). For more information, start with <i>Step 4: Select an encryption option on page 14</i> .
	<i>connection speed/activity</i>	Hovering over this toolbar button reveals the current connection speed. For more information on performance, see <i>Changing appearance and behavior on page 34</i> .

## Using the shortcut menu

VNC Viewer Plus has a shortcut menu that facilitates many of the same operations as the VNC Viewer Plus toolbar.

**Note:** If you cannot access the VNC Viewer Plus shortcut menu, it may have been disabled. For more information, see *Changing appearance and behavior* on page 34.

By default, to open the shortcut menu, press the F8 key:



(Note that some standard Windows menu options have been omitted from this picture.)

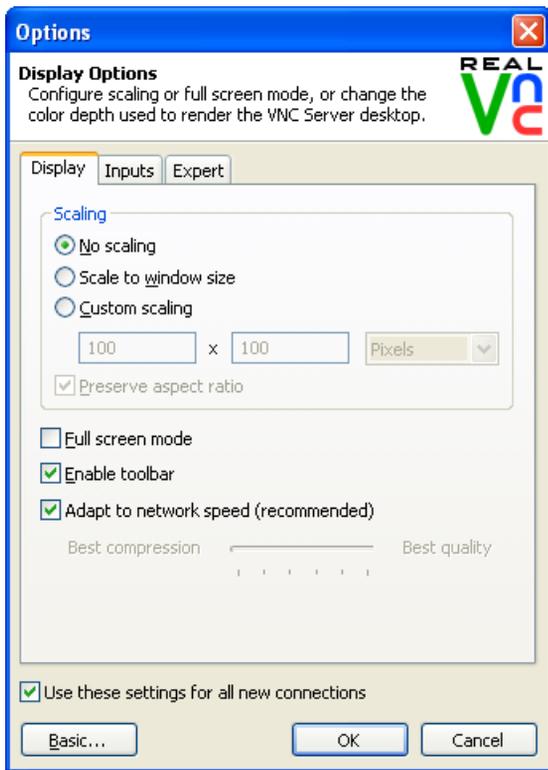
The following table explains the effect of selecting menu options that do not have equivalent toolbar buttons.

Shortcut menu option	Explanation
Relative Pointer Motion	Turn this option on if the host computer's mouse cursor appears to be behaving abnormally, for example by accelerating too fast.
Send F8	Sends an F8 command to the host computer. (By default, F8 opens the shortcut menu; see <i>Changing the shortcut menu key</i> on page 36 for how to choose a different key.) You could alternatively press F8 twice in quick succession.
Ctrl key	Turn this option on to simulate holding down the CTRL key.
Alt key	Turn this option on to simulate holding down the ALT key.
Refresh Screen	Refreshes the display of the host computer's desktop.
About VNC Viewer Plus	Displays version information. You may need this if you contact Support.
Raw Keyboard Input	Available only when connected to a host computer running Intel AMT 7.0 or later. Improves international keyboard support.

Shortcut menu option	Explanation
Switch AMT Desktop	Available only when connected to a host computer running Intel AMT 6.1 or later. Switches between two monitors.

## Using the Options dialog

The **Options** dialog enables you to configure *VNC Viewer Plus* while a connection is in progress.



(In this picture, the dialog is in Advanced mode.)

To open the **Options** dialog, click the **Options**  toolbar button, or select **Options** from the shortcut menu. (If the VNC Viewer toolbar or shortcut menu are not accessible, see *Changing appearance and behavior* on page 34.)

The first time you open this dialog, it opens in Basic mode, and only one tab is available, containing the most common options. Click the **Advanced** button in the bottom left corner to switch to Advanced mode and see all the tabs in the picture above. Note that the **Expert** tab is recommended for expert users only.

By default, any changes you make apply both to the current connection *and to all future connections to any host computer*. To apply changes just to the current connection, turn off **Use these settings for all new connections** first.

Note that options on the **Inputs** tab relating to the following features are not available for connections to *AMT Server*:

- File transfer
- Copy and paste text
- Instant chat

Note also that certain options must be configured before you connect. For more information, see *Configuring VNC Viewer Plus before you connect on page 24*.

## Managing the current connection

You can manage aspects of the current connection while it is in progress.

**Note:** The operations described in this section are facilitated by the *VNC Viewer Plus* toolbar. For more information on this, see *Using the toolbar on page 29*.

### Saving the current connection

You can save the current connection so you can quickly reconnect in future without having to remember the network address and any authentication credentials. In addition, your preferred *VNC Viewer Plus* environment for controlling the host computer is automatically recreated.

To save the current connection, click the **Save Connection**  toolbar button. Carry on from *Saving the current connection on page 38*.

### Starting a new connection

You can start a new connection to *AMT Server* running on a different host computer, or to a VNC-compatible Server running on any host computer. To do this, click the **New Connection**  toolbar button. The **VNC Viewer Plus** dialog opens. Carry on from *Starting VNC Viewer Plus on page 22*.

By default, any options you have configured are inherited by the new connection. To prevent this, open the **Options** dialog and turn off **Use these settings for all new connections** first. For more information on this dialog, see *Using the Options dialog on page 32*.

### Closing the current connection

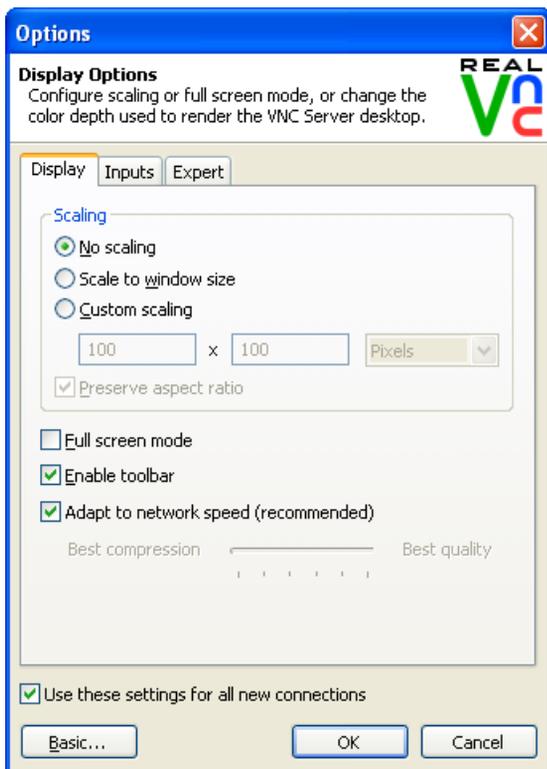
You can quickly close the current connection. To do this, click the **Close Connection**  toolbar button. You are prompted to confirm the operation before the *VNC Viewer Plus* window closes.

## Changing appearance and behavior

By default, when a connection is established:

- *VNC Viewer Plus* does not scale the host computer's desktop. Instead, scroll bars are added to the *VNC Viewer Plus* window if the desktop is too large.
- The *VNC Viewer Plus* window is set to a particular size, and is resizable.
- *VNC Viewer Plus* reflects the desktop orientation of the host computer. Typically this is landscape (0°), but it might alternatively be portrait (90°), inverted landscape (180°), or inverted portrait (270°).
- *VNC Viewer Plus* displays the host computer's desktop at a color quality appropriate to the network connection speed.
- Your mouse and keyboard are set to interact with the client and host computers in particular ways.
- The *VNC Viewer Plus* toolbar is available (from the top center hot area).
- The *VNC Viewer Plus* shortcut menu is available (by pressing F8).

You can change many of these defaults on the **Display** tab of the **Options** dialog. For more information on this dialog, see *Using the Options dialog on page 32*.



## Scaling the host computer's desktop

You can scale the host computer's desktop, which might make it easier to navigate and to use.

To scale the desktop to the size of the *VNC Viewer Plus* window, choose **Scale to window size**.

To scale the desktop to a custom size, choose **Custom scaling**, and specify a width and height. Turn on **Preserve aspect ratio** to automatically calculate a height for a given width, and *vice versa*. Note that the *VNC Viewer Plus* window inherits these dimensions and cannot be resized larger using the mouse (only smaller).

## Changing the size of the VNC Viewer Plus window

You can use the mouse to resize the *VNC Viewer Plus* window in the expected way for the platform of the client computer. The window's Application buttons (**Minimize**, **Maximize**, and **Close**) also work in the expected way.

To fix the size of the *VNC Viewer Plus* window, set the value of the **Scaling** parameter in the **Expert** tab to:

- `FixedWindow` to inherit the current dimensions of the host computer's desktop. Note that if the desktop's resolution is decreased while the connection is in progress, black borders are displayed.
- `F<width>x<height>` to specify a particular width and height in pixels. Note that if the desktop's resolution is smaller, black borders are displayed.

**Note:** Specifying either of these values prevents the *VNC Viewer Plus* window automatically resizing when the host computer is restarted.

To toggle full screen mode on and off, click the **Full Screen Mode**  *VNC Viewer Plus* toolbar button.

## Rotating the host computer's desktop

You can use the **Rotate Clockwise**  *VNC Viewer Plus* toolbar button to rotate the display of the host computer's desktop clockwise in 90° increments.

This might be useful if, for example, your client computer has a standard landscape monitor, but the host computer's display settings orientate its desktop to portrait (90°). Click the **Rotate Clockwise** toolbar button three times to rotate the display back to landscape (0°).

## Trading performance for picture quality

You may be able to enhance the performance of *VNC Viewer Plus* by reducing the number of colors used to display the host computer's desktop. To do this, turn off **Adapt to network speed (recommended)**, and move the slider towards **Best compression**.

Conversely, you may be able to improve the picture quality by increasing the number of colors. To do this, move the slider towards **Best quality**. Note that sending more pixel information across the network may have an adverse effect on performance.

## Configuring your mouse

You can emulate buttons missing because your mouse has fewer buttons than the host computer's mouse.

To do this, turn on **Enable 3-button mouse emulation**. To emulate the missing middle button, click the left and right mouse buttons simultaneously. Note this option is on the **Inputs** tab.

## Configuring your keyboard

By default, and with the exception of CTRL-ALT-DELETE and the function key used to open the shortcut menu, key presses affect the host computer and not the client. To reverse this behavior for the application-level keys listed below, turn off **Pass special keys directly to VNC Server**. Note this option is on the **Inputs** tab.

Affected keys/combinations: WINDOWS (also known as START), PRINT SCREEN, ALT-TAB, ALT-ESCAPE, CTRL-ESCAPE.

## Disabling the toolbar

You can disable the *VNC Viewer Plus* toolbar. (For more information, see *Using the toolbar on page 29*.) To do this, turn off **Enable toolbar**.

Note that if you disable the *VNC Viewer Plus* shortcut menu as well you will not be able to access the *VNC Viewer Plus* toolbar again while the current connection is in progress.

## Disabling the shortcut menu

You can disable the *VNC Viewer Plus* shortcut menu. (For more information, see *Using the shortcut menu on page 31*.) To do this, select `none` from the **Menu key** dropdown. Note this option is on the **Inputs** tab.

Note that if you disable the *VNC Viewer Plus* toolbar as well you will not be able to access the *VNC Viewer Plus* shortcut menu again while the current connection is in progress.

## Changing the shortcut menu key

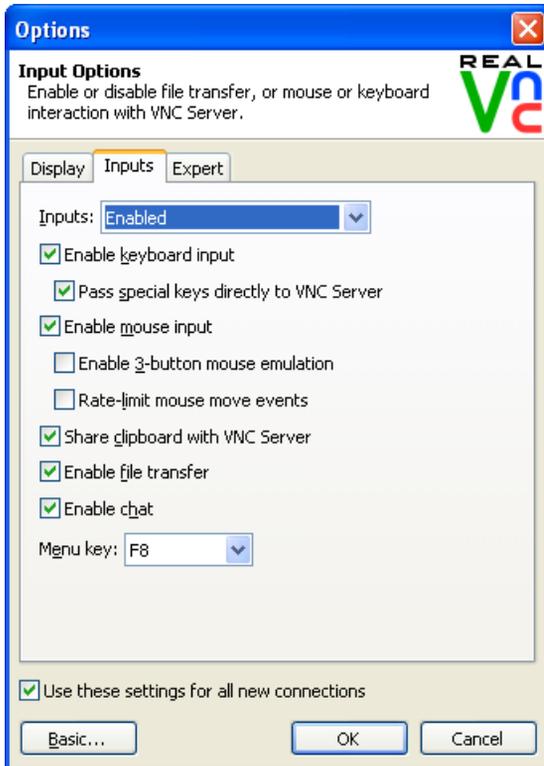
You can change the function key used to open the shortcut menu. To do this, select a function key from the **Menu key** dropdown. Note this option is on the **Inputs** tab. The shortcut menu updates to reflect the fact that you can no longer press the chosen key to send that command to the host computer.

## Restricting access to functionality

By default, while a connection is in progress, and assuming the host computer is in a state to accept keyboard and mouse input, you should be able to control the host computer using the client computer's keyboard and mouse.

You can restrict access to *VNC Viewer Plus* functionality while the connection is in progress on the **Inputs** tab of the **Options** dialog. For more information on this dialog, see *Using the Options dialog on page 32*. You might want to do this if you are watching a demonstration on the host computer, for example, and want to prevent inadvertent interruption.

**Note:** You can enable functionality again at any time. To prevent this for the current connection only, disable the *VNC Viewer Plus* toolbar and shortcut menu. For more information, see *Changing appearance and behavior on page 34*.



## Making VNC Viewer Plus ‘view only’

You can quickly prevent all interchange with the host computer, making *VNC Viewer Plus* ‘view only’. To do this, select *Disabled (view-only mode)* from the **Inputs** dropdown.

## Disabling your keyboard

You can disable the client computer’s keyboard. To do this, turn off **Enable keyboard input**.

## Disabling your mouse

You can disable the client computer’s mouse. To do this, turn off **Enable mouse input**.

## Saving the current connection

You can save the current connection to a desktop icon on the client computer:



A desktop icon provides an extremely quick and convenient way of reconnecting to a host computer. Simply double-click the icon to connect. The *AMT Server* network address and any authentication credentials are remembered, so you do not have to, and your preferred *VNC Viewer Plus* environment for controlling the host computer is automatically recreated each time.

To save the current connection to a desktop icon:

1. In *VNC Viewer Plus*, click the **Save Connection**  toolbar button.
2. If you entered a password in order to connect to *AMT Server*, you are prompted to save it. Note that doing so may constitute a security risk, since the password is saved in obfuscated, though not encrypted, form. If you do not save the password, you must enter it each time you connect.
3. Choose a location to save the icon file to (for example, the desktop), and an intuitive name.



# Performing Management Operations

This chapter explains how to use *VNC Viewer Plus* to perform key management operations on the host computer.

## Contents

Powering the host computer on and off	40
Mounting an image on the host computer	41

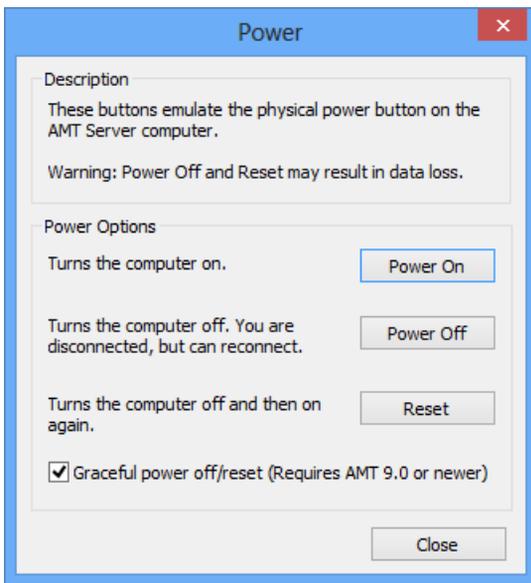
## Powering the host computer on and off

You can use *VNC Viewer Plus* to power the host computer on, power it off, and power cycle it.

**Note:** For power on and power cycle, you can choose to boot to BIOS configuration, to an operating system, or to a mounted image. For more information on the last of these, see *Mounting an image on the host computer on page 41*.

To perform a power operation:

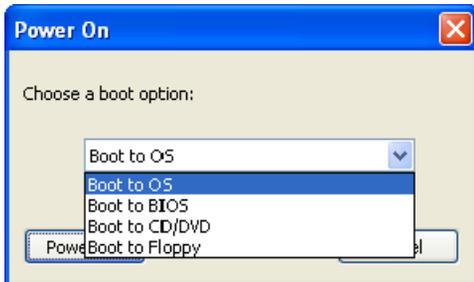
1. Click the **Power**  toolbar button. The **Power** dialog opens:



2. To:
  - Power the host computer on, click **Power On**. Note this also wakes the host computer from hibernate, but not sleep, mode.
  - Power the host computer off, click **Power Off**. Note that unsaved data may be lost (turn on **Graceful power off/reset** to prevent this for connections to *AMT Server* version 9 or later). You are disconnected, but are immediately prompted to reconnect without having to authenticate (actually *establishing* the connection, however, may take several moments).
  - Power cycle the host computer, click **Reset**. Note that unsaved data may be lost (turn on **Graceful power off/reset** to prevent this for connections to *AMT Server* version 9 or later). You *should* remain connected. If not, configure *VNC Viewer Plus* for Wi-Fi and then reconnect; see *Restarting a Wi-Fi-enabled host computer on page 25* for more information.

**Note:** Power cycling is not the same as restarting an operating system. An operating system may subsequently complain that it was not shut down properly when the host computer powers back on.

3. For **Power On** or **Reset**, choose a boot option:



(The last two options require appropriate images to be mounted.)

Click the **Power On** button to perform the chosen operation. Click the **Cancel** button to return to the **Power** dialog.

## Mounting an image on the host computer

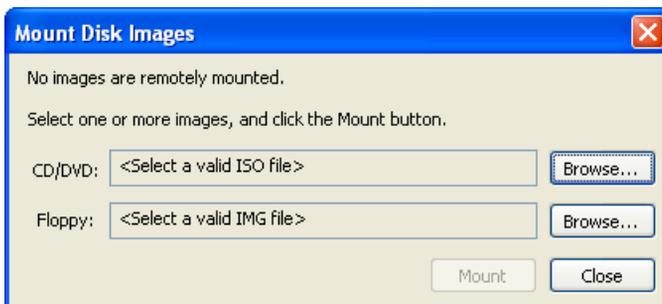
You can use *VNC Viewer Plus* to mount an image representing a CD/DVD or a floppy disk on to the host computer. This means you can:

- Boot from that image, perhaps in order to install an operating system or a driver. Note if the image is not bootable, it is ignored.
- Register the image as a drive, and navigate it using File Explorer or similar. Note the host computer must have an operating system for this to work.

**Note:** Intel AMT must be enabled to support this operation. See *Enabling support for mounting images on page 49* for more information.

To mount an image:

1. Click the **Mount Disk Images**  toolbar button. The **Mount Disk Images** dialog opens:



2. To mount a:
  - CD/DVD image, browse to a valid `.iso` file on your client computer.
  - Floppy disk image, browse to a valid `.img` file on your client computer.

3. Click the **Mount** button. Note the dialog automatically closes.

If you want to:

- Boot to the image, click the **Power**  toolbar button, then either **Power On** or **Reset** (depending on the state of the host computer), and choose an appropriate boot option.
- Register the image as a drive, click the **Power**  toolbar button, then either **Power On** or **Reset** (depending on the state of the host computer), and choose the `Boot to OS` option.

Note that you only need power on or cycle in order to register a drive the first time in a *VNC Viewer Plus* session. Subsequent times, you can remove the current image and mount a new one without having to power cycle. This means you can (for example) install a program that is distributed over multiple CDs.

**Note:** You may need to use a program such as Device Manager—accessible from **System** in Control Panel under Windows 7—to scan for hardware changes in order to actually see the new drive in File Explorer or similar.

For more information on power operations, see *Powering the host computer on and off* on page 40.

An image remains mounted until you explicitly remove it. To do this, click the **Mount Disk Images**  toolbar button to open the **Mount Disk Images** dialog, and then click the **Remove** button.

**Note:** If you disconnect (or are disconnected due to inactivity) and an image is still mounted, another newly-connected *VNC Viewer Plus* user cannot mount an image until you have acknowledged the disconnection warning dialogs.

# 5

## Configuring the host computer

This chapter explains how to configure the host computer running *AMT Server* to best work with *VNC Viewer Plus*, and assumes you have sufficient privileges to do so.

**Note:** *AMT Server* is a product from Intel Corporation. RealVNC Limited has no control over, and can take no responsibility for, *AMT Server* functionality or behavior.

You cannot configure *AMT Server* over a network using *VNC Viewer Plus*. You must either have access to the host computer, or remote management or provisioning tools from Intel Corporation.

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## Setting up Intel AMT

*AMT Server* is managed by Intel Active Management Technology (Intel AMT), through Intel Management Engine (Intel ME). You must set up Intel AMT for KVM (Keyboard, Video, Mouse) operations before you can enable *AMT Server*.

The following sections explain setup out-of-the-box for tested versions of Intel AMT. Note that instructions may differ for different hardware, and also for different BIOS versions. For hardware requirements, visit [www.realvnc.com/products/viewerplus/hardware.html](http://www.realvnc.com/products/viewerplus/hardware.html).

### Intel AMT 6.0

The following operations are valid for a Toshiba Tecra A11 laptop running Intel AMT version 6.0.2.1194:

1. Connect the host computer to a *wired* network, and power it on.
2. At the appropriate moment, press the appropriate key to enter BIOS configuration, for example F2.
3. On the **Main** page, set **AMT Setup Prompt** to `Enabled`.
4. Exit and save your settings to continue booting.
5. At the appropriate moment, press the CTRL-P key combination to enter Intel ME Setup.
6. Enter the default Intel ME account password: `admin`.
7. Change this default password to one consisting of at least eight upper and lowercase letters, numbers, and the following characters: `! @ # $ % ^ & * ( )`

**Note:** This password (and the Intel ME account user name, which is `admin`) can be distributed to a *VNC Viewer Plus* user in order to connect. For more information, see *Discovering authentication credentials on page 46*.

8. Choose **Intel ME General Settings > Network Setup > Intel ME Network Name Settings**.
9. Specify a **Host Name** and a **Domain Name**.
10. Exit two menu levels and choose **Active Network Access**, pressing the Y key to acknowledge the warning.
11. Exit a menu level and choose **Exit** to save your settings and continue booting.

**Note:** Image mounting (IDER) is not enabled by default. For more information, see *Enabling support for mounting images on page 49*.

### Intel AMT 6.1

The following operations are valid for a PC with an Intel Desktop Board DQ57TM running Intel AMT version 6.1.0.1042:

1. Connect the host computer to a wired network, and power it on.
2. At the appropriate moment, press the appropriate key to enter BIOS configuration, for example F2.
3. On the **Intel ME** page, enter the default Intel ME account password: `admin`.

4. Change this default password in order to access Intel AMT configuration settings.

**Note:** The password you choose (and the Intel ME account user name, which is `admin`) can be distributed to a *VNC Viewer Plus* user in order to connect. For more information, see *Discovering authentication credentials on page 46*.

5. Choose **Intel Active Management Technology Configuration**.
6. Set **Setup and Configuration Mode** to `Local`.
7. Choose **Local Setup and Configuration**.
8. Specify a **Computer Name** and a **Domain Name**.
9. Exit and save your settings to continue booting.

## Intel AMT 7.0

The following operations are valid for a PC with an Intel Desktop Board DQ67SW running Intel AMT version 7.0.0.1057:

1. Connect the host computer to a wired network, and power it on.
2. At the appropriate moment, press the CTRL-P key combination to enter Intel ME Setup.
3. Enter the default Intel ME account password: `admin`.
4. Change this default password to one consisting of at least eight upper and lowercase letters, numbers, and the following characters: `! @ # $ % ^ & * ( )`

**Note:** This password (and the Intel ME account user name, which is `admin`) can be distributed to a *VNC Viewer Plus* user in order to connect. For more information, see *Discovering authentication credentials on page 46*.

5. Set **Intel AMT Configuration > Manageability Feature Selection** to `Enabled`. More menu options appear.
6. Choose **Network Setup > Intel ME Network Name Settings**.
7. Specify a **Host Name** and a **Domain Name**.
8. Exit two menu levels and choose **Active Network Access**, pressing the Y key to acknowledge the warning.
9. Exit a menu level and choose **Exit** to save your settings and continue booting.

## Managing Intel AMT

There are numerous ways to subsequently manage Intel AMT. Sections in this chapter use:

- Intel ME Setup (as above).
- Manageability Commander Tool, a remote provisioning application provided with Manageability Developer Tool Kit. See <http://software.intel.com/en-us/articles/download-the-latest-version-of-manageability-developer-tool-kit/> for more information, and <http://opentools.homeip.net/open-manageability/> for the latest versions.

- A web site built-in to the host computer. Navigate to:
  - `https://<network_address>:16993/index.htm` to access a host computer configured to use Transport Layer Security (TLS). For more information on TLS, see *Setting up encrypted connections on page 48*.
  - `http://<network_address>:16992/index.htm` to access a host computer that is *not* configured to use TLS.

**Note:** These third party tools are subject to change. There may be other tools.

## Discovering a network address

A *VNC Viewer Plus* user must enter a network address that uniquely identifies *AMT Server* running on the host computer in order to connect.

A network address can be an IPv4 address, a host name, or a fully-qualified domain name (FQDN). You may be able to discover:

- A host name and/or FQDN by following the instructions in *Setting up Intel AMT on page 44*.
- An IP address by booting an operating system and using a tool such as `ipconfig` (Windows) or `ifconfig` (UNIX). Note it is common for *AMT Server* to share the same IP address as the host computer's operating system, but not compulsory. If the host computer does not have an operating system, consult your system administrator.

**Note:** For some connections, a FQDN is required. A *VNC Viewer Plus* user may be able to configure *VNC Viewer Plus* to automatically look up a FQDN from an IP address or host name. For more information, see *Connecting using a FQDN on page 26*.

## Discovering authentication credentials

A *VNC Viewer Plus* user may be required to enter a user name and password in order to connect to *AMT Server*.

**Note:** In a Kerberos network environment, authentication credentials supplied by a *VNC Viewer Plus* user in order to log on to their client computer are automatically used to connect to *AMT Server*. However, a Kerberos-authenticated user must still be an Intel AMT user with sufficient permissions, as described below.

A *VNC Viewer Plus* user can enter the credentials of an Intel AMT *standard user*. This is defined as an Intel AMT account with the following permissions:

General Info	Redirection	Remote Control
--------------	-------------	----------------

In most circumstances, a *VNC Viewer Plus* user entering the credentials of an Intel AMT standard user can connect to and control a host computer, and perform management operations such as powering on and mounting images.

In some circumstances, it may be necessary for a *VNC Viewer Plus* user to enter the credentials of an Intel AMT *administrative user*. This is defined as an Intel AMT account with the following permissions:

General Info	Redirection	Remote Control
Agent Presence Remote	Circuit Breaker	Disk Encryption
Endpoint Access Control Admin	Event Log Reader	Event Manager
Hardware Asset	Network Time	Storage
Storage Admin	User Access Administration	User Access Control

A *VNC Viewer Plus* user must enter the credentials of an Intel AMT administrative user in order to:

- Remain connected while restarting a Wi-Fi-enabled host computer.
- Override host computer user consent.
- Connect if the **Redirection Port** and **Remote KVM Settings** Intel AMT settings are currently disabled.

To create an:

- Intel AMT standard user, use Manageability Commander Tool. See *Managing Intel AMT on page 45* for more information. Set the required permissions, and specify a user name and password, on the **Intel Management Engine** page.
- Intel AMT administrative user, either:
  - Use Manageability Commander Tool (as above).
  - Navigate to the built-in web site on the host computer. See *Managing Intel AMT on page 45* for more information. Create a new **Administrator** user on the **User Accounts** page, and specify a user name and password. Note that choosing **Grant access to** does not even create an Intel AMT user with sufficient permissions to connect.

Alternatively, you can distribute the Intel ME account user name and password to a *VNC Viewer Plus* user. This account is automatically set up as an Intel AMT administrative user. For more information, see *Setting up Intel AMT on page 44*.

## Making ports accessible

Intel AMT requires the following ports to be accessible on the host computer:

- 16993 and 16995 (for encrypted connections)
- 16992 and 16994 (for unencrypted connections)

Note that firewalls or routers protecting the host computer (if applicable) must be configured to allow and forward network communications to it on these ports in order for a *VNC Viewer Plus* user to connect.

## Setting up encrypted connections

To encrypt communications between a client computer running *VNC Viewer Plus* and a host computer running *AMT Server*, Transport Layer Security (TLS) must be enabled on the host computer.

To do this, connect to the host computer using the latest version of Manageability Commander Tool. For more information on this utility, see *Managing Intel AMT on page 45*.

### Setting up TLS

You can set up TLS so that a client computer running *VNC Viewer Plus* must verify the identity of the host computer before a connection can be established. To do this:

1. Generate a server certificate for the host computer using preferred tools. Sign it with the certificate of a trusted root Certificate Authority (CA).
2. On the **Security** tab of Manageability Commander Tool, click next to **Certificate & CRL Store** to open the **Intel AMT Certificate Store** dialog, click **Import**, navigate to the server certificate, then click **Close**.
3. On the **Security** tab, click next to **Transport Layer Security (TLS)** to open the **Edit TLS Settings** dialog, turn on **Use Transport Layer Security (TLS)**, click next to **Intel AMT Certificate** to open the **Network Security Certificate** dialog, make sure the server certificate is selected in the dropdown, then click **OK** twice.
4. Ensure the client computer user follows the instructions in *Importing a certificate for TLS on page 15* to deploy the CA certificate to the client computer.

### Setting up Mutual TLS

You can set up TLS for ultimate security so that, in addition to the client computer verifying the identity of the host computer, the host must verify the identity of the client before a connection can be established. To do this:

1. Follow all the instructions in *Setting up TLS on page 48*.
2. Generate a client certificate for the client computer in p12 format using preferred tools. This certificate must have an Object Identifier (OID) value of 1.3.6.1.5.5.7.3.2, a Common Name (CN) equivalent to the fully-qualified domain name (FQDN) of the client computer, and be signed by the same CA certificate as the server certificate.
3. On the **Security** tab of Manageability Commander Tool, click next to **Transport Layer Security (TLS)** to open the **Edit TLS Settings** dialog, turn on **Include Remote Authentication (Console)**, click next to **Trusted Root Certificates** to open the **Intel AMT Certificate Store** dialog, navigate to the **Trusted Roots** tab, click **Import**, navigate to the CA certificate, click **Add**, and then **Close**.
4. In the **Edit TLS Settings** dialog, click next to **Trusted Certificate Names** to open the **Trusted Certificate Common Names** dialog, enter the CN (FQDN) of the client computer, click **Add**, and then **OK** twice.
5. Ensure the client computer user follows the instructions in *Importing certificates for Mutual TLS on page 15* to deploy the client certificate to the client computer.

## Enabling support for mounting images

You must configure Intel AMT version 6.0 in order that a *VNC Viewer Plus* user may mount images.

**Note:** This feature is automatically enabled in Intel AMT version 6.1 and later.

1. Enter Intel ME Setup. For more information, read *Intel AMT 6.0 on page 44*.
2. Choose **Intel AMT Configuration**, and press the ENTER key to dismiss the `Update network settings` in the `General Settings` menu warning.
3. Make sure **SOL/IDER > IDER** is set to `Enabled`.
4. Exit and save your settings.

## Enabling support for Wi-Fi management

If the host computer is Wi-Fi-enabled (for example, a laptop), and the *VNC Viewer Plus* user will perform management operations such as mounting an image or restarting the host computer, you must enable Intel AMT to manage Wi-Fi connectivity (rather than the host computer's operating system).

To do this:

1. Navigate to the built-in web site. For more information, see *Managing Intel AMT on page 45*.
2. On the **Wireless Settings** page, set **Wireless Management** to `Enabled` in `S0, Sx/AC`.

## Requiring host computer user consent

You can require a *VNC Viewer Plus* user to enter a six-digit access code in order to complete a connection. This code is available to a host computer user but not to a *VNC Viewer Plus* user. The *VNC Viewer Plus* user must communicate out-of-band with the host computer user in order to obtain the code.

**Note:** A *VNC Viewer Plus* user with the credentials of an Intel AMT administrative user can choose to override this feature, and connect without obtaining consent. See *Overriding host computer user consent on page 26* for more information. See also the sections below for information on setting up Intel AMT to permit this override.

Follow the instructions below appropriate to the version of Intel AMT on the host computer.

### Intel AMT 6.0

1. Enter Intel ME Setup. For more information, see *Intel AMT 6.0 on page 44*.
2. Choose **Intel AMT Configuration**, and press the ENTER key to dismiss the `Update network settings` in the `General Settings` menu warning.
3. Choose **KVM Configuration**.
4. Make sure **User Opt-in** is set to `User Consent is required for KVM Session`.

5. To enable a *VNC Viewer Plus* user with administrative credentials to override this feature, make sure **Opt-in Configurable from remote IT** is set to `Enable Remote Control of KVM Opt-In Policy`.
6. Exit and save your settings.

## Intel AMT 6.1

1. Access Intel ME in the BIOS configuration. For more information, see *Intel AMT 6.1 on page 44*.
2. Choose **Intel Active Management Technology Configuration**.
3. Choose **User Consent**.
4. Make sure **User Consent** is set to `KVM`.
5. To enable a *VNC Viewer Plus* user with administrative credentials to override this feature, make sure **Remote Control of Opt-in Policy** is set to `Enabled`.
6. Exit and save your settings.

## Intel AMT 7.0

1. Enter Intel ME Setup. For more information, see *Intel AMT 7.0 on page 45*.
2. Choose **Intel AMT Configuration**.
3. Choose **User Consent**.
4. Make sure **User Opt-in** is set to `KVM`.
5. To enable a *VNC Viewer Plus* user with administrative credentials to override this feature, make sure **Opt-in Configurable from Remote IT** is set to `Enable Remote Control of KVM Opt-In Policy`.
6. Exit and save your settings.