Hewlett Packard Enterprise

HPE MyRoom

Connection Strategy, Security, and Network Performance

Executive summary

HPE MyRoom uses the connection and security methodology described below.

When an HPE MyRoom client tries to connect to an HPE MyRoom server, it uses multiple connection methods in parallel. It is *expected* that some of these connection methods may fail in any particular network. The methods currently used to connect to HPE servers are:

- Direct connection to ports 5228 and 443
- Web proxy server connection to port 443, using web proxy discovery and authentication as appropriate.
- Socks proxy server connection to port 5228

In certain circumstances, peer connections may be established between HPE MyRoom clients using negotiated ports.

Establishment of a client-server connection (or a peer client connection) includes an authenticated connection using 1024-bit asymmetric RSA keys with negotiated 256-bit symmetric AES keys.

The remainder of this paper describes these connection methods and security features in more detail.

Connection methods

The HPE MyRoom client has a number of different connection methods which may be used to connect to HPE MyRoom servers. These methods have been designed to permit access from the vast majority of networking environments. In order to minimize the time to establish a connection, all connection methods are tried at the same time. It is therefore expected that some of the connection methods will fail. The method which is used to complete the first full connection to the HPE MyRoom servers is considered to be the established method and will be used for connections to all servers during the current session. Subsequent sessions will, again, try all connection methods in parallel.

It is important to realize that only *one* of these methods needs to succeed in order for a session to be established.

The following sections describe each of these methods in detail.

Direct

The “Direct” method tries to establish a direct TCP/IP connection on port 443 and port 5228. Only one of these connections needs to succeed. Dedicated UDP ports are used to stream audio for optimal performance.

Web Proxy

The “Web Proxy” method uses a configured web proxy server to connect. On a Microsoft Windows platform, the currently configured web proxy settings are used to determine the proxy server to use. This may use the Web Proxy Auto Discovery (WPAD) protocol, an automatic configuration script or a specified web proxy server, as appropriate. Alternatively, the web proxy server may be manually configured (see below).

Once a web proxy server is identified, the HPE MyRoom client makes a connection to the proxy server on the identified port and attempts to use the CONNECT method of the HTTP protocol to connect to the HPE MyRoom server on port 443.

Some web proxy servers require authentication for use. The HPE MyRoom client supports the Basic, NTLM, and Negotiate authentication mechanisms. When a web proxy server requires authentication (returns a 407 HTTP message), the HPE MyRoom client sends credentials which depend on the mechanism:

- **Basic:** the user is prompted to enter username and password for the realm requested by the proxy server (the realm is displayed to the user)

- **NTLM, Negotiate:** the client first attempts to use the credentials with which the user is currently logged in to Microsoft Windows. If this attempt fails, the user is prompted to enter username, password and, optionally, domain and then a further connection attempt is made.

Socks

The “Socks” method uses a configured Socks server to connect to the HPE MyRoom server on port 5228. Both Socks 4 and Socks 5 are currently supported, although authentication is not supported when talking to a Socks 5 server.

The socks server may be manually configured (see below) or the default name of *socks-server* on port 1080 will be used for both Socks 4 and Socks 5 methods.

Manual configuration

Although most network configurations should be dealt with by the automatic strategy of trying all connections in parallel, there may be some which require manual intervention. This can be achieved in one of two ways. When abnormal conditions prevent connection to the HPE MyRoom server, the user will be left at the HPE MyRoom Sign In dialog, shown in **Error! Reference source not found.** and 2. Press the “MyRoom Settings” button to change the connection settings.

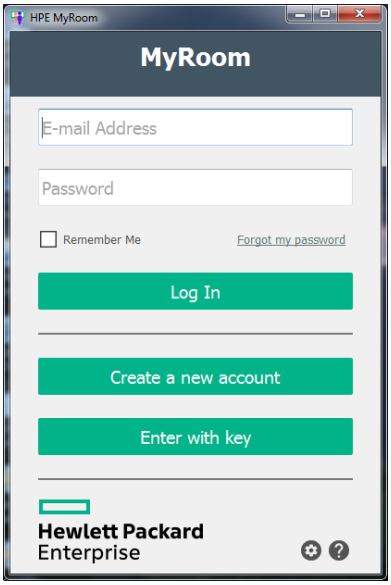


Figure 1: Log In dialog
HPE MyRoom version 10

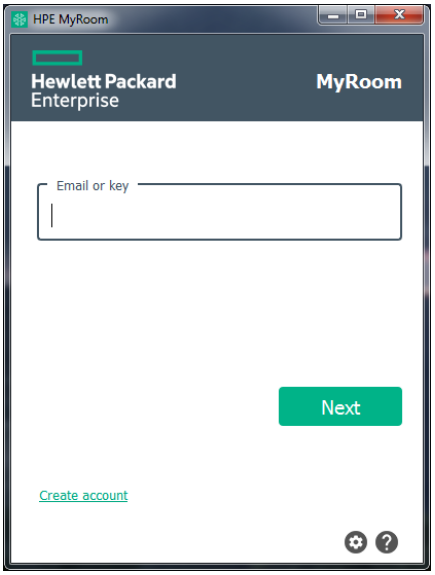


Figure 2: Log In dialog
HPE MyRoom version 11 or greater

Use the HPE MyRoom Settings button to see the connection settings dialog box when you are already connected to HPE MyRoom. In either case, the result will be the Settings dialog shown in Figure .

The following adjustments may be made in this dialog box:

- **HTTP Proxy Server:** If “auto detect settings” is checked, the client will attempt to automatically determine the correct proxy server to use. The result is shown in the dialog boxes that follow. The default is web-proxy:8088.

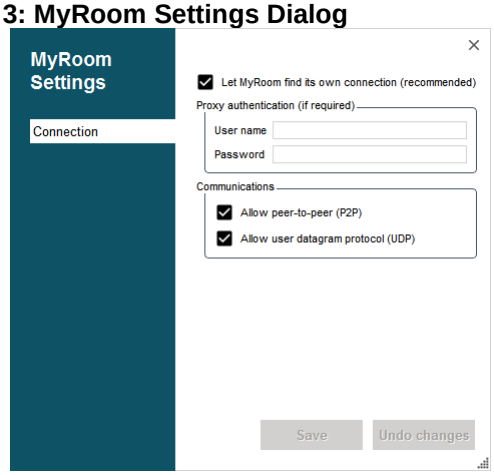
  To specify a custom proxy server place a check in the HTTPS box and enter the name of the proxy server (in a form that can be resolved on the client) with the appropriate port number. Note that some organizations mandate the use of different proxy servers at different physical or logical locations in their network. If in doubt, please contact a local network administrator

  Socks Server: Specify the names and port numbers of any Socks 4 or Socks 5 servers which are available. The default is socks-server: 1080.

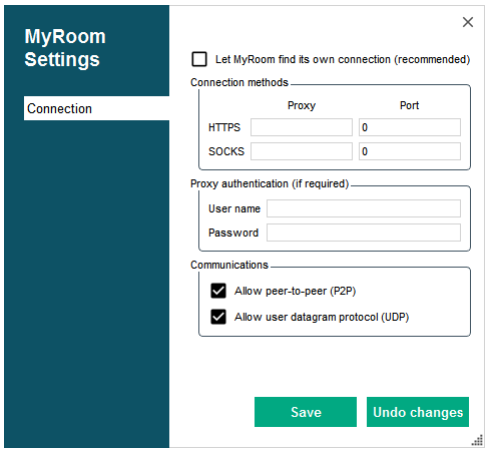
- **Proxy Authentication:** If the web proxy server in use requires authentication, it may be entered in the fields provided. Note that until an attempt has been made to contact a web proxy server and that server has requested authentication, these fields will be blank.

Once entered, the values from these fields are encrypted and stored in the system registry for future connection attempts.

Figure 3: MyRoom Settings Dialog



Default View



Extended view

Peer-to-peer connections

As an optimization when only two people are in a room, the HPE MyRoom clients will attempt to establish a peer connection for exchange of some messages. If successful, two connections will be established – one originated by each party. The ports used to communicate are random and are negotiated through the HPE MyRoom server.

Because of the presence of personal and other NAT firewalls, it is *expected* that this peer connection attempt will fail in many cases, in which case normal operation is not affected as all messages continue to be reflected through the HPE MyRoom server. When a third person enters the room, the peer connections are automatically dropped, and will be reestablished at a later time should the number of room users fall to two.

The connection security on each established peer connection is the same as described below.

Connection security

All the connection methods use the same underlying mechanism to secure the communication channel. Once a network connection has been established (either direct or through some proxy server), the HPE MyRoom client and server begin a handshake to establish this secure channel.

- The main servers have digital certificates with 1024-bit keys for an RSA asymmetric cryptosystem which have been issued by a private certification authority. These are validated by the HPE MyRoom client during an exchange in order to determine the authenticity and logical function of the target server. AES 256 bit keys are then negotiated and passed securely through to both the client and the target room server for further communication which will then be AES 256 bit encryption.

  NOTE: Inspection of the SSL traffic is not allowed.

- Once the initial secure channel is established, a shared 256-bit symmetric AES key is negotiated. This key is then used to secure an AES channel which is used for the remainder of all client-server communication.

The successful establishment of this secure channel is the point at which a particular connection method is considered to be established.

NOTE: HPE MyRoom version 11 or greater uses Certificate Authority (CA) signed certificates.

NOTE: HPE MyRoom version 10 uses **self-signed certificates**. Firewalls and proxy servers which scrutinize the certificates, will stop MyRoom traffic. The solution is to request MyRoom self-signed certificates and install the certificates on the firewall and or proxy servers to allow the servers to resolve the certificates.

Performance

HPE MyRoom data throughput is dependent on the speed of the user's network and the robustness of their connection via the Internet to the HPE MyRoom cloud. HPE MyRoom dynamically optimizes the data rates and flow to each client based on active client feedback on their ability to process and – 'keep up'. On slow networks and systems, data loading is reduced automatically by HPE MyRoom. HPE MyRoom audio has the highest priority and runs on its' own thread (approx. 15KB/sec, per stream). P2P connections are used to increase client performance when available. Performance can be increased by peer connections (dependent on the geographic location of users) by bypassing HPE MyRoom servers and taking a potentially shorter network route between two clients.

Bandwidth

HPE MyRoom clients will try and send no more than 2.5 Mbps. Average on most connections is 1.0 – 1.5Mbs. HPE MyRoom and HPE Visual Remote Guidance (HPE VRG) are network friendly and good network citizens. HPE MyRoom will monitor throughput and moderate bandwidth accordingly so as not to consume the entire network.

HPE VRG with RealWear HMT-1 and HMT-1Z: With the HMT-1 and HMT-1Z, the video is streamed using the H.265 codec whenever possible. H.265 codec (the latest codec) sends better video at a lower bandwidth consumption. So it is important to know the users who will be joining any session. If any user cannot process the H.265 video, then everyone receives H.264 which will increase the network load.

HPE MyRoom servers and IP addresses

Pease contact the HPE MyRoom service desk at www.myroom.hpe.com/support for additional details.

Conclusion

The successful establishment of a secured connection from HPE MyRoom client to HPE MyRoom server is a key success measure. This paper has outlined the many methods which the HPE MyRoom client attempts in order to achieve this.

For more information

www.myroom.hpe.com

www.myroom.hpe.com/support

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