

Installing and Configuring the Healthcare Listener

Technical Paper
Jamf Pro 10.14.0 or Later
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Jamf has made all efforts to ensure that this guide is accurate.

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Introduction

What's in This Guide

This guide explains how to install a Jamf Infrastructure Manager instance that hosts a Healthcare Listener and configure the Healthcare Listener to automatically send remote commands to mobile devices with Jamf Pro 10.14.0 or later.

Additional Resources

- [Jamf Pro Documentation](#)
Find more information about the Jamf Infrastructure Manager and mobile device management with Jamf Pro.

Overview

The Healthcare Listener is a service that receives ADT messages from a healthcare management system and allows traffic to pass securely from the healthcare management system to Jamf Pro.

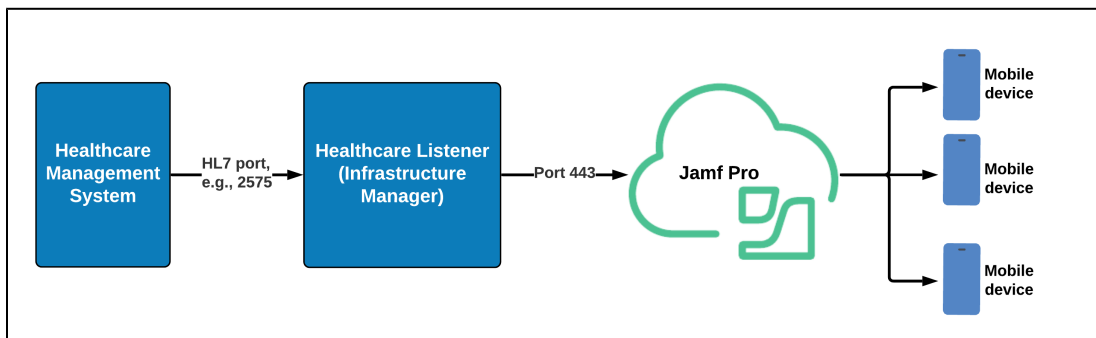
To use the Healthcare Listener, you must install a Jamf Infrastructure Manager instance that hosts the Healthcare Listener. When you install an instance of the Infrastructure Manager, Jamf Pro allows you to enable and configure the Healthcare Listener to receive ADT messages. When the Healthcare Listener receives an ADT message, Jamf Pro interprets the message to automatically send remote commands to mobile devices based on rules you configure. For example, you can create a rule that prompts Jamf Pro to send the Wipe Device command to the device assigned to the patient room when the Healthcare Listener receives a "Patient Discharge" ADT message. After a remote command is sent to a mobile device, you can view the date/time of the remote command for a specific mobile device in the device's inventory information.

Network Communication

The Healthcare Listener communicates with the healthcare management system using the port specified in the Healthcare Listener settings in Jamf Pro. When the Healthcare Listener hosted by an Infrastructure Manager instance receives an ADT message from the healthcare management system, this Infrastructure Manager instance checks in with Jamf Pro. If the Healthcare Listener has received an ADT message, Jamf Pro automatically sends a remote command to mobile devices that are mapped to the value for bed number in the healthcare management system.

Note: For Jamf Pro to send a remote command to mobile devices, you need a valid push certificate. For more information about creating a push certificate, see [Push Certificates](#) in the *Jamf Pro Documentation*.

The following diagram shows network communication with example ports between the healthcare management system and Jamf Pro with the Infrastructure Manager installed:



Additional Information

For more information, see the following section in the *Jamf Pro Documentation*:

- [Healthcare Listener](#)

For more information about network communication and the connections initiated between the Infrastructure Manager and Jamf Pro, see the [Network Ports Used by Jamf Pro](#) article.

General Requirements

To configure the Healthcare Listener and take full advantage of its latest features and enhancements available in Jamf Pro, Jamf recommends installing the latest version of the Jamf Infrastructure Manager that hosts the Healthcare Listener.

Mobile devices must be enrolled with Jamf Pro 10.14.0 or later to ensure the following:

- Remote commands can be sent to mobile devices automatically
- Email notifications can be sent when a remote command fails to send or remains in a pending state

In addition, you need to ensure that your healthcare management system is compliant with Health Level Seven (HL7) messaging. For more information about HL7 messaging, see www.hl7.org.

Install a Jamf Infrastructure Manager Instance that Hosts a Healthcare Listener

Jamf Infrastructure Manager instances that host a Healthcare Listener can be installed on Linux and Windows. When you install an instance, it is enrolled with Jamf Pro. You can install as many instances as your organization requires.

Note: You can only install one Infrastructure Manager instance per computer.

After an Infrastructure Manager instance that hosts a Healthcare Listener is installed, you can edit the settings and view inventory information. For more information, see [Jamf Infrastructure Manager Instances](#) in the *Jamf Pro Documentation*.

Requirements

The Infrastructure Manager instance that hosts a Healthcare Listener requires a computer with the following:

- One of the following operating systems:
 - Windows Server 2019 (64-bit)
 - Windows Server 2016 (64-bit)
 - Windows Server 2012 (64-bit)
 - Ubuntu Server 18.04 LTS
 - Red Hat Enterprise Linux 7.x

Note: .NET Framework 4.0 or later is required.

- A 64-bit capable Intel processor
- 2 GB of RAM
- 300 MB of disk space available
- Java 11 (For more information, see the [Migrating to Java 11](#) and [Installing Java and MySQL for Jamf Pro 10.14.0 or Later](#) articles.)

On the Jamf Pro server, the built-in CA or a trusted third-party CA must be configured.

Installing a Jamf Infrastructure Manager Instance that Hosts a Healthcare Listener

Ubuntu

1. Log in to Jamf Account and go to the following page:
<https://account.jamf.com/products/other/infrastructure-manager>
2. Download the Healthcare Listener Installer Bundle for Ubuntu (version_hcl.deb) to the computer on which you plan to install it.

Note: In the installer filename, "version" is the version of the installer you are downloading. For example, "2.3.0-0_hcl.deb".

3. Log in to the server as a user with superuser privileges.
4. Initiate the installer by executing a command similar to the following:

```
sudo dpkg --install /path/to/2.3.0-0_hcl.deb
```

5. When prompted, enter the Jamf Pro URL. For example, "https://JAMF_PRO_URL.com:8443/".
6. When prompted, enter credentials for a Jamf Pro user account with the "Infrastructure Manager" privilege.
7. When prompted, enter the Jamf Pro password.
8. When prompted, enter the hostname of the computer on which the Infrastructure Manager is installed. For example, "computername.mycompany.com".

Note: The hostname must be entered as a fully qualified domain name.

9. Follow the onscreen instructions to complete the installation.

When the installation is complete, Jamf Pro allows you to enable the Healthcare Listener.

Red Hat Enterprise Linux

1. Log in to Jamf Account and go to the following page:
<https://account.jamf.com/products/other/infrastructure-manager>
2. Download the Healthcare Listener Installer Bundle for Red Hat Enterprise Linux (`jamf-im-HCL-version.rpm`) to the computer on which you plan to install it.

Note: In the installer filename, "version" is the version of the installer you are downloading. For example, "jamf-im-2.3.0_hcl-1.noarch.rpm".

3. Log in to the server as a user with superuser privileges.
4. Initiate the installer by executing a command similar to the following:

```
sudo rpm -i /path/to/jamf-im-2.3.0_hcl-1.noarch.rpm
```

5. When prompted, execute the following command:

```
sudo jamf-im enroll
```

6. When prompted, enter the Jamf Pro URL. For example, "https://JAMF_PRO_URL.com:8443/".
7. When prompted, enter credentials for a Jamf Pro user account with the "Infrastructure Manager" privilege.
8. When prompted, enter the Jamf Pro password.
9. When prompted, enter the hostname of the computer on which the Infrastructure Manager is installed. For example, "computername.mycompany.com".

Note: The hostname must be entered as a fully qualified domain name.

10. Follow the onscreen instructions to complete the installation.

When the installation is complete, Jamf Pro allows you to enable the Healthcare Listener.

Windows

1. Log in to Jamf Account and go to the following page:
<https://account.jamf.com/products/other/infrastructure-manager>
2. Download the Healthcare Listener Installer Bundle for Windows (Jamf-Infrastructure-Manager-healthcare-listener-version.msi) to the computer on which you plan to install it.

Note: In the installer filename, "version" is the version of the installer you are downloading. For example, "Jamf-Infrastructure-Manager-healthcare-listener-2.3.0.msi".

3. Run the installer.

Note: The installer must be run as an administrator.

4. When prompted, select setup type.
5. When prompted, enter the Jamf Pro URL. For example, "https://JAMF_PRO_URL.com:8443/".
6. When prompted, enter credentials for a Jamf Pro user account with the "Infrastructure Manager" privilege.
7. When prompted, enter the Jamf Pro password.
8. When prompted, enter the hostname of the computer on which the Infrastructure Manager is installed. For example, "computername.mycompany.com".

Note: The hostname must be entered as a fully qualified domain name.

9. Follow the onscreen instructions to complete the installation.

When the installation is complete, Jamf Pro allows you to enable the Healthcare Listener.

Configure the Healthcare Listener

After you install a Jamf Infrastructure Manager instance that hosts a Healthcare Listener, Jamf Pro allows you to enable and configure the Healthcare Listener.

When you configure the Healthcare Listener, you must do the following:

- Specify IP addresses or a range of IP addresses to accept incoming ADT messages from. The Healthcare Listener is compatible with IPv4 and IPv6 connection methods.
- Specify a port number.

Note: The default port value is 8080. This should be changed to the port number that the Healthcare Listener uses to receive healthcare management system communications.

- Add rules by configuring settings that enable Jamf Pro to send commands to devices. You can also enable email notifications in the event that a command is not sent.

Healthcare Listener Rules

Configuring a rule enables Jamf Pro to send remote commands to devices when the Healthcare Listener receives an ADT message. If you want to send more than one type of command or use more than one type of ADT message, you must configure a separate rule for each. You can configure as many rules as your organization requires.

The following table provides an overview of the settings you must configure for each rule:


Setting	Description
Operating System	<p>This setting allows you to apply the rule to either iOS devices or tvOS devices. For example, you can choose to wipe only the tvOS devices in your environment.</p> <p>Note: For tvOS, the Wipe Device remote command is the only option available.</p>
Remote Command	<p>This setting allows you to specify which command you want to be sent from Jamf Pro when the Healthcare Listener receives an ADT message. You can choose from the following commands:</p> <ul style="list-style-type: none">▪ App Refresh — Removes managed apps from iOS, iPadOS, and tvOS devices and in-house eBooks from iOS devices. Scoped apps and in-house eBooks are reinstalled for the next user . <p>Note: Jamf recommends testing each app you manage to ensure personal data has been removed from the device after it has been reinstalled.</p> <ul style="list-style-type: none">▪ Clear Passcode — Removes the passcode from the mobile device▪ Disable Lost Mode — Disables the Lost Mode on the device.

Setting	Description
	<ul style="list-style-type: none"> ▪ Enable Lost Mode — Enables the Lost Mode on the device. Choosing Enable Lost Mode requires you to configure custom messaging. ▪ Lock Device — Locks the mobile device. ▪ Wipe Device — If a mobile device has Activation Lock enabled, the Activation Lock is cleared when the device is wiped. <div> Note: You can also choose to suppress Proximity Setup for mobile devices with iOS 11.3 or later. </div> <p>For more information, see Remote Commands for Mobile Devices in the <i>Jamf Pro Documentation</i>.</p>
ADT Message	<p>For Jamf Pro to send commands to devices, the Healthcare Listener must receive an ADT message. You can choose from the following ADT message types:</p> <ul style="list-style-type: none"> ▪ Admit/Visit Notification (ADT-A01) ▪ Patient Transfer (ADT-A02) ▪ Patient Discharge (ADT-A03) ▪ Cancel Admit/Visit Notification (ADT-A11) ▪ Cancel Transfer (ADT-A12) ▪ Cancel Discharge/End Visit (ADT-A13)
Mapping Fields	<p>ADT messages contain multiple fields of information that the Healthcare Listener can extract. You can choose which ADT message field to extract, and then map that field to an attribute from user and location information in device inventory. For example, you can choose the field that returns "bed number" and map that field to the "Room" attribute in a device's inventory information. The command you specify is then sent to devices that match the inventory attribute you select. You can choose from the following ADT message fields:</p> <ul style="list-style-type: none"> ▪ Patient Visit - Person Location - Bed (PV1-3-3) ▪ Patient Visit - Prior Person Location - Bed (PV1-3-6) <p>In addition, you can use an alternative field from the ADT message.</p> <p>You can also create an extension attribute for a specific inventory attribute that fits your environment. After you create the extension attribute, it is available as an option. For more information about creating an extension attribute for a mobile device, see Mobile Device Extension Attributes in the <i>Jamf Pro Documentation</i>.</p>
Email Notifications	<p>Email notifications can be sent from Jamf Pro to specified users for the following events:</p> <ul style="list-style-type: none"> ▪ A command fails to send or is in a pending state after a specified amount of time ▪ A command is sent to a device that does not meet the requirements for the command (For more information about mobile device remote command requirements, see Remote Commands for Mobile Devices in the <i>Jamf Pro Documentation</i>.) <p>To enable email notifications, you need an SMTP server set up in Jamf Pro. For more information, see Integrating with an SMTP Server in the <i>Jamf Pro Documentation</i>.</p>

Requirements


To configure the Healthcare Listener and take full advantage of its latest features and enhancements available in Jamf Pro, you must install the latest version of the Jamf Infrastructure Manager that hosts the Healthcare Listener. For more information, see [Install a Jamf Infrastructure Manager Instance that Hosts a Healthcare Listener](#).

Setting up the Healthcare Listener

1. Log in to Jamf Pro.
2. In the top-right corner of the page, click **Settings** .
3. Click **Server Infrastructure**.
4. Click **Infrastructure Manager Instances**.
5. Click the Infrastructure Manager instance with the Healthcare Listener that you want to configure.
6. Click **Edit**.
7. Select the **Enable Healthcare Listener** checkbox.
8. Enter a display name for the Healthcare Listener.
This is the name that is displayed for the Healthcare Listener on the Infrastructure Manager.
9. To specify the IP addresses to accept incoming ADT messages from, do one of the following:
 - Select **All IP Addresses** to accept incoming ADT messages from any IP address.
 - Select **Single IP Address or Range of IP Addresses** to specify the IP addresses to accept incoming ADT messages from, and do the following:
 - a. To specify a single IP address, click the **(+) Add** button for Single, and enter the IP address.
 - b. To specify a range of IP addresses, click the **(+) Add** button for Range, and enter the starting and ending IP addresses.
10. Enter the port number of your healthcare management system.
11. Click **Save**.

After the Healthcare Listener is set up, you can add rules. Adding a rule enables Jamf Pro to send remote commands to devices.

Adding a Healthcare Listener Rule

1. Log in to Jamf Pro.
2. In the top-right corner of the page, click **Settings** .


3. Click **Server Infrastructure**.
4. Click **Infrastructure Manager Instances**.
5. Click the Infrastructure Manager instance with the Healthcare Listener that you want to add a rule to.
6. Click **Edit**, and then click the **Add (+)** button.
7. Select the operating system you want to apply the rule to.
8. Enter a display name for the rule.
9. Choose the remote command you want Jamf Pro to send to devices when the Healthcare Listener receives an ADT message.
10. Choose which ADT message the Healthcare Listener can receive.
11. Use the **Field Mapping** options to map a field from the ADT message to an attribute of inventory information.
If you want to use an alternative field from the ADT message, choose "Other" from the ADT Message Field pop-up menu, and then type the field
12. (Optional) To enable email notifications, click the **Notifications** tab, and do the following:
 - a. Select the events that you want to send an email notification for.
 - b. Enter an email address or multiple email addresses separated by a line break or a comma.
 - c. Use the **Email Delay** pop-up menu to choose how many minutes to wait when a command is pending before sending an email to specified email addresses.
13. Click **Save**.

When the Healthcare Listener receives an ADT message, Jamf Pro automatically sends the specified command to devices that are mapped to the field in the ADT message.

You can view the date/time of when the remote command was sent to a specific mobile device in the device's inventory information. For more information, see [View when a Mobile Device Receives a Remote Command](#).

View when a Mobile Device Receives a Remote Command

The audit logs in Jamf Pro allow you to view the date and time that a remote command was automatically sent to a mobile device. "Healthcare Listener" is displayed as the value in the Username column for the remote command. For more information about other events that can be viewed in the audit logs, see "Viewing Audit Logs for a Mobile Device" in the [Viewing the History for a Mobile Device](#) section of the *Jamf Pro Documentation*.

1. Log in to Jamf Pro.
2. Click **Mobile Devices** at the top of the page.
3. Perform a simple or advanced mobile device search.
For more information, see [Simple Mobile Device Searches](#) or [Advanced Mobile Device Searches](#) in the *Jamf Pro Documentation*.
4. Click the mobile device you want to view audit logs for.
If you performed a simple search for an item other than mobile devices, you must click **Expand**  next to an item to view the mobile devices related to that item.
5. Click the **History** tab, and then click the **Audit Logs** category.
Audit logs for the mobile device are displayed.

Revision History

Revision Date	Changes
06 April 2022	<p>Updated Spring Boot to version 2.6.6 to remediate a security vulnerability (CVE-2022-22965).</p> <p>Note: Healthcare Listener was not vulnerable; this update was made out of an abundance of caution. Your organization may choose to upgrade to the latest version at your convenience.</p>
02 March 2022	<p>Updated Apache Log4j 2 to version 2.17.2.</p> <p>Note: Healthcare Listener was not vulnerable; this update was made out of an abundance of caution. Your organization may choose to upgrade to the latest version at your convenience.</p>
21 December 2021	<p>Updated Apache Log4j 2 to version 2.17.0 to remediate a security vulnerability (CVE-2021-44228).</p> <p>Note: Healthcare Listener was not vulnerable; this update was made out of an abundance of caution. Your organization may choose to upgrade to the latest version at your convenience.</p>
12 December 2021	<p>Updated Apache Log4j 2 to version 2.15.0 to remediate a security vulnerability (CVE-2021-44228).</p> <p>Note: Healthcare Listener was not vulnerable; this update was made out of an abundance of caution. Your organization may choose to upgrade at your convenience.</p>
23 February 2021	<p>Updated to reflect changes in the Jamf Infrastructure Manager 2.2.0 for Healthcare Listener:</p> <ul style="list-style-type: none"> ▪ Network Address Translation (NAT) is now natively supported. ▪ Improved logging mechanism for Infrastructure Manager instances hosted on Red Hat Enterprise Linux servers. ▪ [PI-003764] Fixed an issue that sometimes caused Jamf Pro to incorrectly report an Infrastructure Manager instance as successfully re-enrolled. ▪ [PI-007325] Fixed an issue that caused the Infrastructure Manager installer to incorrectly prompt for an IP address of a computer instead of its hostname. ▪ [PI-008005] Fixed an issue that prevented the Infrastructure Manager from installing on Red Hat Enterprise Linux with Java 11 installed.