Inventory Management 201:

Take the next steps with Jamf

We all have inventory: hardware, operating system versions, serial numbers, application licenses.

Keeping track of which devices are given to whom, and when, along with all the relevant details might be easy when your organization is small. But as an organization grows, this process becomes increasingly labor intensive, and the data itself risks becoming stale. (Did I remember to check which iPads got an OS upgrade?)

As businesses and schools increasingly turn to remote work/distanced learning, having physical access to each device to check and update inventory becomes even more difficult. Once you factor in the nature of remote work — and the corresponding need for a focus on security and compliance — you realize you have to do something more than tracking hardware, software and configuration inventory manually in a spreadsheet.

Enter Jamf Pro. Jamf Pro automatically collects hundreds of data points about your Apple devices – both “out of the box” info about the devices and what’s installed on them, as well as customized data with Jamf Pro’s extension attributes.

Inventory should start with enrollment

From the moment a user touches a device, your inventory software should be collecting information on the device and placing it into an easily accessible database by apps, device type, OS, permissions and packages.

The best way to do this for Apple devices is to pre-enroll your devices with Apple Business Manager, and ensure that Jamf Pro can continue to automate device tracking throughout the life of that device.

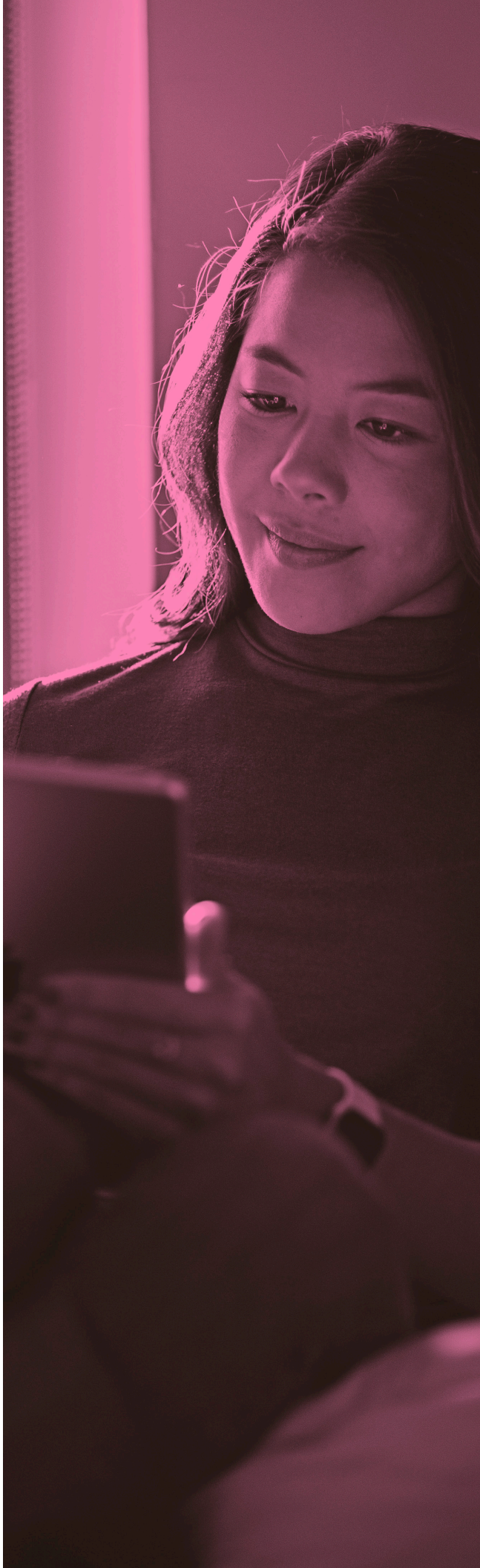
Once you have all of this information Jamf Pro has gathered, you can take action based on all manner of inventory data.

What is inventory management?

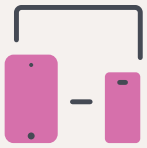
A brief recap of ideas and terms

Computer **inventory management** is a set of best practices and workflows that track an organization's IT devices and their contents. The best inventory management should answer these questions for you and more:

- How many devices do you actually have? What types of devices?
- Are they all in use, or are some simply stacked in a closet, depreciating?
- Are all of your organization's devices up to date?
- Which apps are on which devices?
- Who has access to what?
- Does anyone have an overloaded machine, hasn't updated their password or hasn't performed a backup?
- Is your fleet secure? Are you meeting all of your CIS benchmarks?
- Who has required protection software, such as Jamf Protect, and who has not?



Inventory management terms



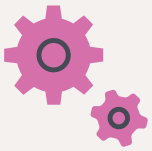
Fleet: all of the devices you're managing (macOS, iOS, iPadOS and tvOS devices).

Inventory: attributes of your fleet of devices, such as:

- Device Type: MacBook Pro, iPad, iPhone, Apple TVs
- FileVault 2 Partition Encryption State: Encrypted, Not Encrypted
- Last Inventory Update: (this will show the date/time the device last updated information)

Static Groups: devices in groups chosen manually by an administrator; the membership does not change unless the admin changes it intentionally.

Smart Groups: devices in Smart Groups change dynamically based on criteria pulled from inventory. For example, you could create a Smart Group for "Find all macOS devices that are FileVault encrypted" or "find iPads running any version of iOS 14.” As your fleet changes, your Smart Group memberships change based on how they fit into that criteria, automatically.



Extension attributes: additional inventory data populated manually or via a script. A few examples: “a date field reflecting the date a device was retired from inventory” (this could be manually entered as a part of the deprovisioning workflow) or “an integer field detailing the binary version of a tool/app that normally isn’t reflected in the Applications folder” (populated via script and dynamically changed whenever the app is updated).

Scope: defining which devices receive which management components (apps, configurations, policies, restrictions, etc.)

Configuration profiles: settings that use Apple's mobile device management (MDM) framework and cannot be changed by end users (i.e. "deploy a setting to require the macOS screen saver starts after 15 minutes of inactivity" or "deploy the office Wi-Fi settings to all iPads). You can manage iOS, iPadOS and tvOS entirely by profiles.

Policies: settings and application deployments for macOS devices that fall outside the MDM framework. The Jamf binary handles policies and accounts for the things that MDM doesn’t do for macOS (i.e. "run a script on macOS devices").

Supervised device: supervision of a device provides a higher level of MDM control. It’s not required for a device to be managed by Jamf Pro, but more options are available for control and restriction of supervised devices than those that are not supervised. In macOS 11 or later, a Mac computer is considered supervised when a user performs a device enrollment into MDM.

When the serial numbers of the devices appear in Apple School Manager, Apple Business Manager or via Apple’s Automated Device Enrollment, they are automatically supervised when enrolled in Jamf Pro:

- iPhone and iPod touch with iOS 13 or later
- iPad with iPadOS 13.1 or later
- Apple TV with tvOS 13 or later
- Mac computers with macOS 10.14.4 or later

Application Programming Interface (API): a programming language that allows apps to speak to each other to accomplish tasks. A script can use the Jamf Pro API to read and update information on a device record automatically without end-user interaction.

Webhooks: a way for one app to provide other apps with real-time information. APIs require an app or script to reach out for data very frequently in order to get timely information. By listening for events to happen, webhooks make sharing information between apps much more efficient.

If you can track it, you can take action on it!

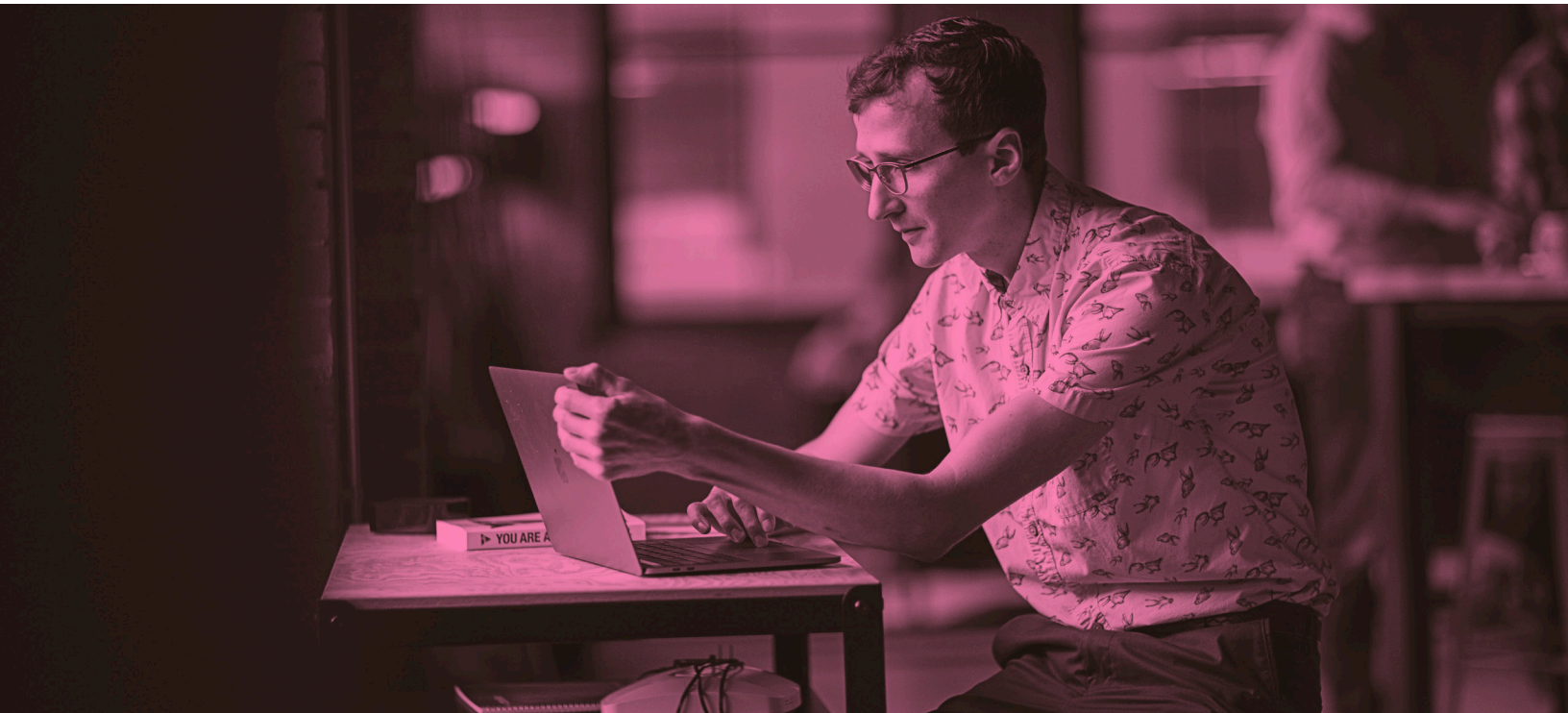
Tracking the status of your devices provides you all sorts of reporting capabilities:

- Report on devices that are coming off warranty to find out how many MacBooks you have that might be in need of replacement.
- A report sorted by version will show you which operating systems are most prevalent in your environment
- Concerned that folks might have a vulnerable version of a major application? Report on and prioritize your updating.

But say you didn't just want reports - what if you wanted to actually take action?

The same approach that allows you to report also allows you to remediate:

- If you find devices running older software, you can push out an update.
- Out-of-date operating systems? Serve up the update in Self Service, and notify users via the Notification Center.
- Want to force device compliance for your organization's security requirements? Pair Jamf Pro with Jamf Protect: endpoint protection built exclusively for Mac.



Security Posture: FileVault, aka "Using Smart Groups to solve a problem"

Imagine that your organization needs a better security posture, starting with enforcing encryption of their macOS devices via FileVault. All new Macs need to be encrypted, and you'd like to ensure that existing Macs are also encrypted.

Asking users to turn on a security setting is not the most trustworthy security strategy. IT needs to implement the new policy across its fleet without needing to touch each computer individually.

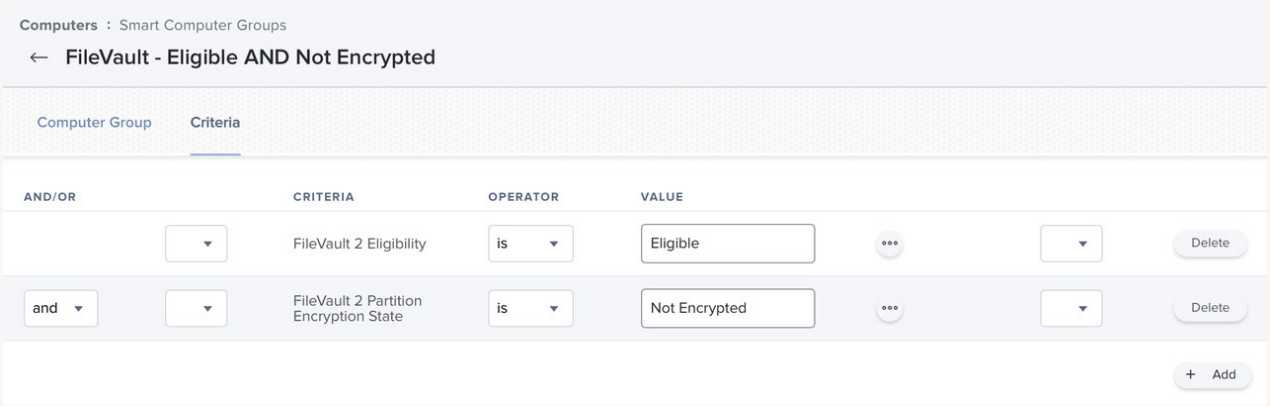
Forcing encryption on all new and existing Mac computers in your fleet

Jamf Pro can force a Mac to be encrypted. Once encryption has been implemented, Jamf Pro can report the Personal Recovery Key — a unique alphanumeric code that's tied to the Mac and can be used to decrypt the drive for everyday use — to be stored in the inventory database. It's the easiest way for IT administrators to enforce and keep track of encryption.

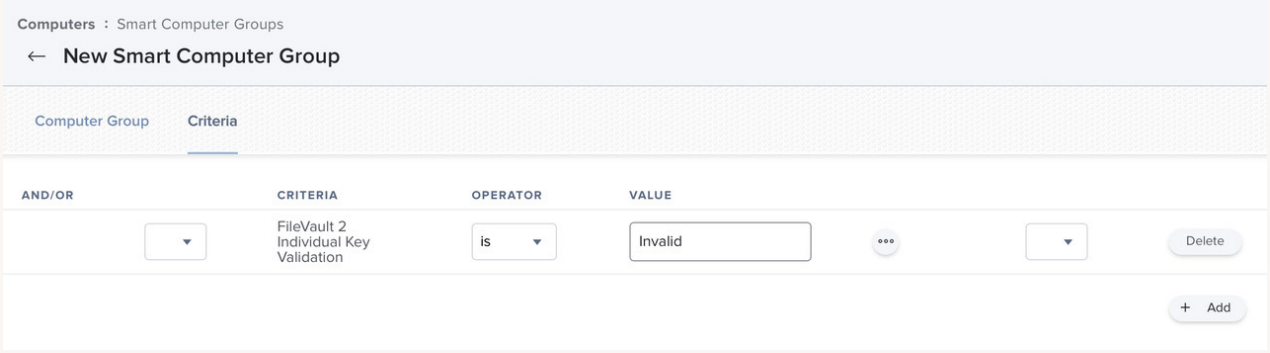
As new Mac devices will not yet have FileVault enabled, encrypting them is a simple matter. But for companies beginning management for an existing fleet, it's a three-pronged approach:

1. Find Macs that aren't encrypted and encrypt them
2. Find Macs that are encrypted but were done so manually
3. Get those Macs new encryption keys that jamf pro can store

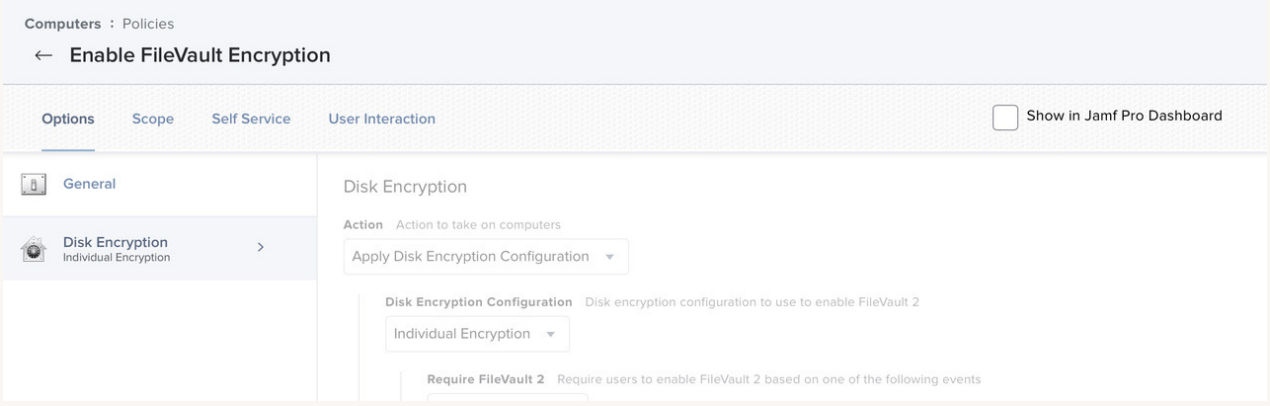
To find which macOS devices aren't encrypted, let's use a Smart Group to identify Macs that can be encrypted but currently aren't:



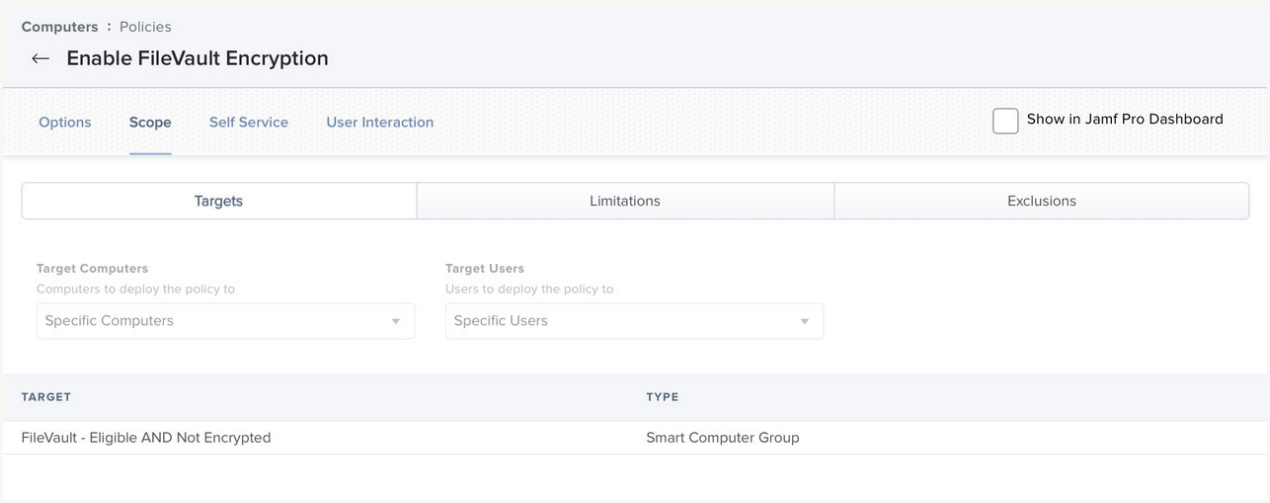
Let’s also create a Smart Group to look for enrolled Macs that are encrypted but do not have a valid Recovery Key stored in Jamf Pro:



Now that we have insight into the FileVault 2 status of the fleet, we can start the encryption process. We build a policy that starts the process:



And we limit the scope of this policy to the Smart Group we've just created for Macs that aren't encrypted:



Now, Macs that are not encrypted will funnel into the Smart Group and receive a policy that will get them all encrypted. And if you enroll a Mac next week that's brand new, Jamf Pro will automatically detect that FileVault encryption is not enabled, it will appear in the Smart Group and the policy can automatically enable FileVault.

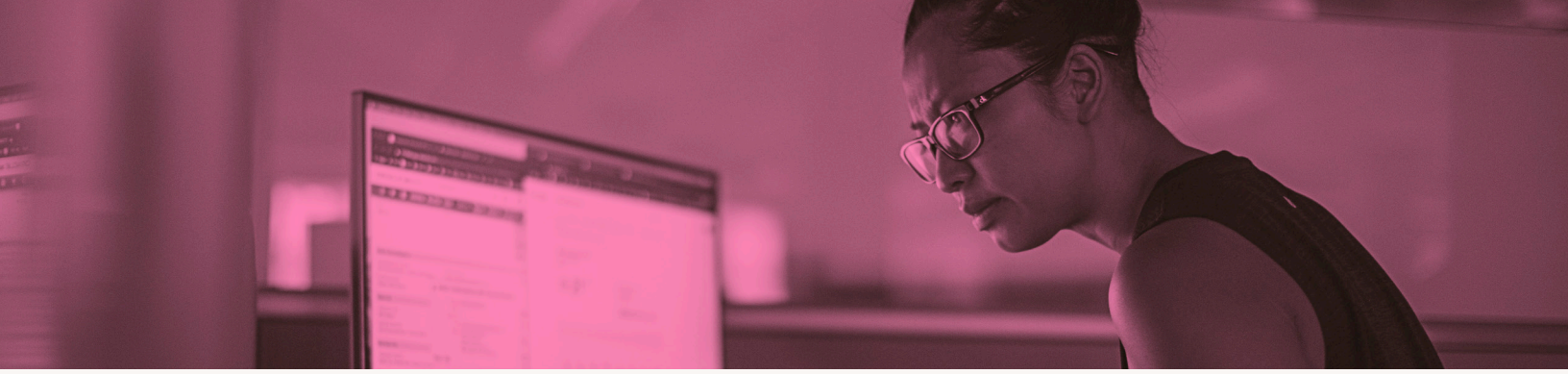
Extension attributes: adding in your own defaults

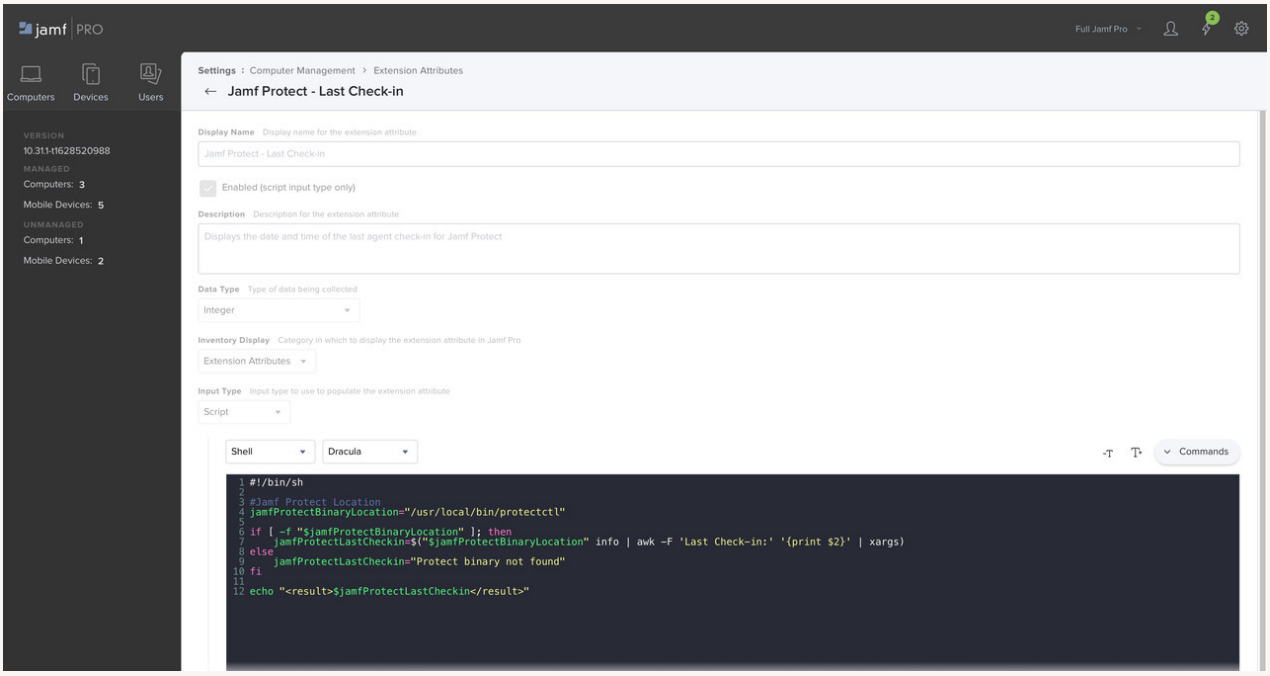
Jamf Pro collects more than 200 pieces of data about your Mac devices, but sometimes IT needs to collect information that's not on the list.

That's where extension attributes come in. For example, IT might need to periodically audit the date and time Jamf Protect last checked in to the Jamf Protect server. By default, Jamf Pro does not collect this information, but extension attributes allow IT to create a custom inventory field and run reports against that information.

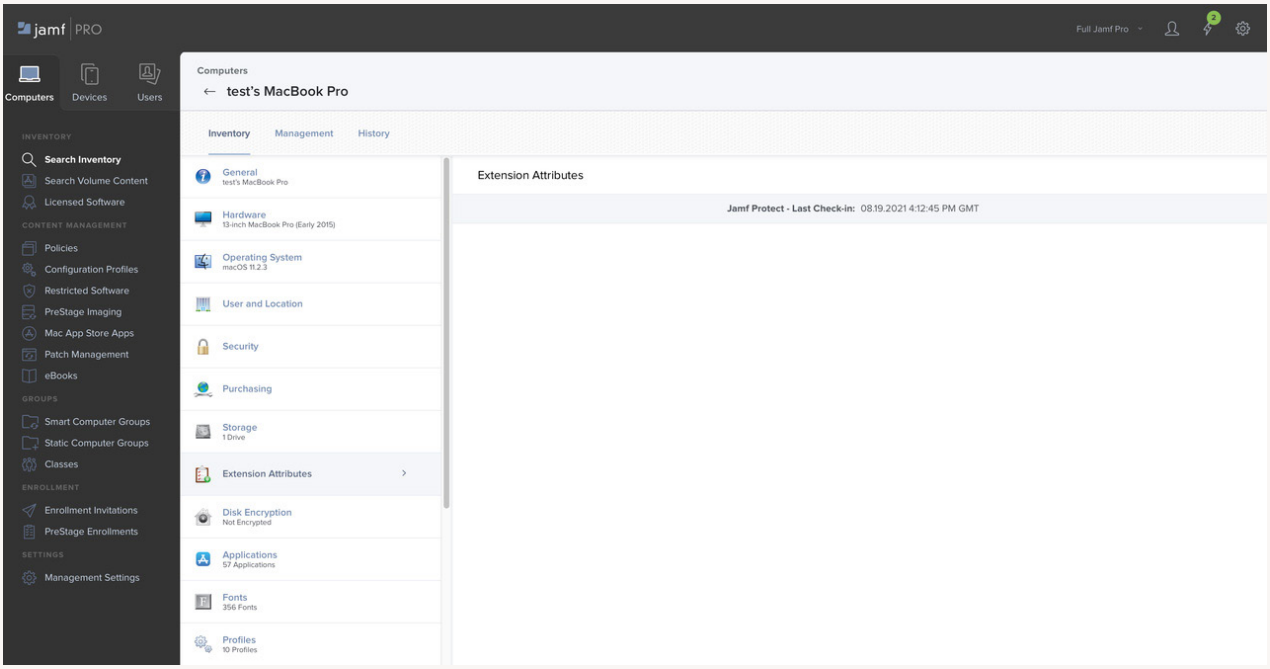
IT admins can write their own extension attributes, but to save time, Jamf Pro contains templates for some of the most popular scenarios. To get started, navigate to Settings > Computer Management > Extension Attributes, and click "+ New From Template" to look at existing templates.

Within the Jamf Applications section of the extension attributes templates, select "Jamf Protect - Last Check-in." This is a script that queries the Jamf Protect command-line tool looking for the last check in and records that information within Jamf Pro..





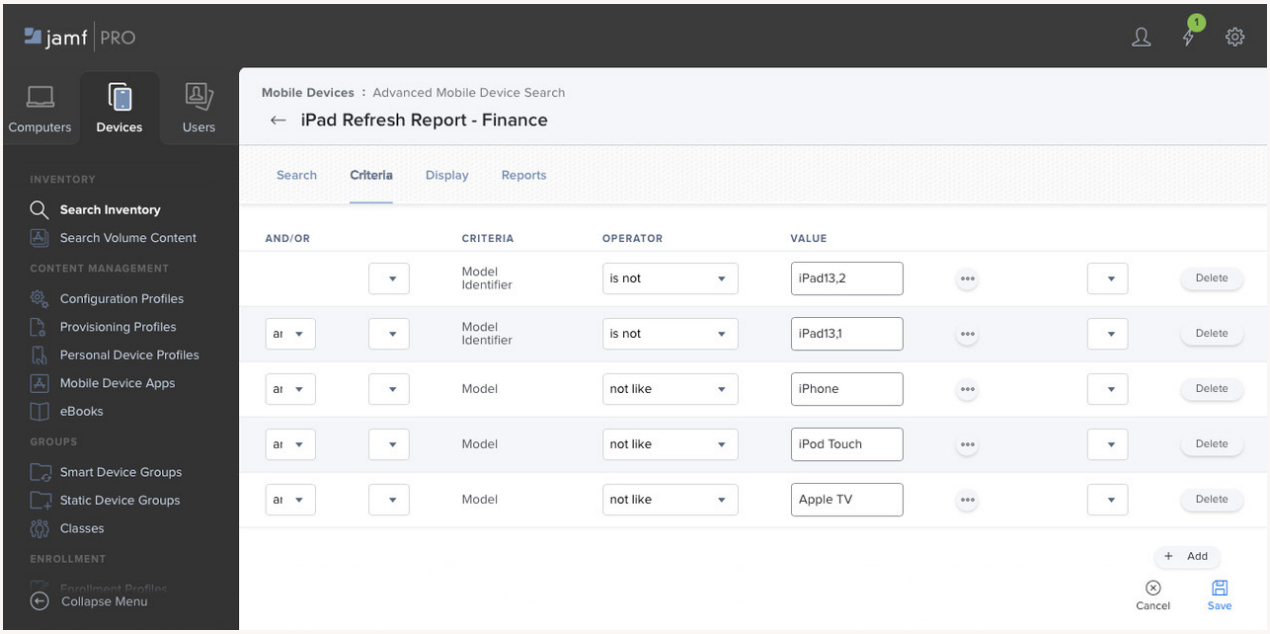
This extension attribute will now automatically report the last check-in date and store that information in the Mac computer's inventory record in Jamf Pro. From here, IT admins can run reports to get insight into when the Macs are checking in, and run remediation for Macs that haven't checked in recently.

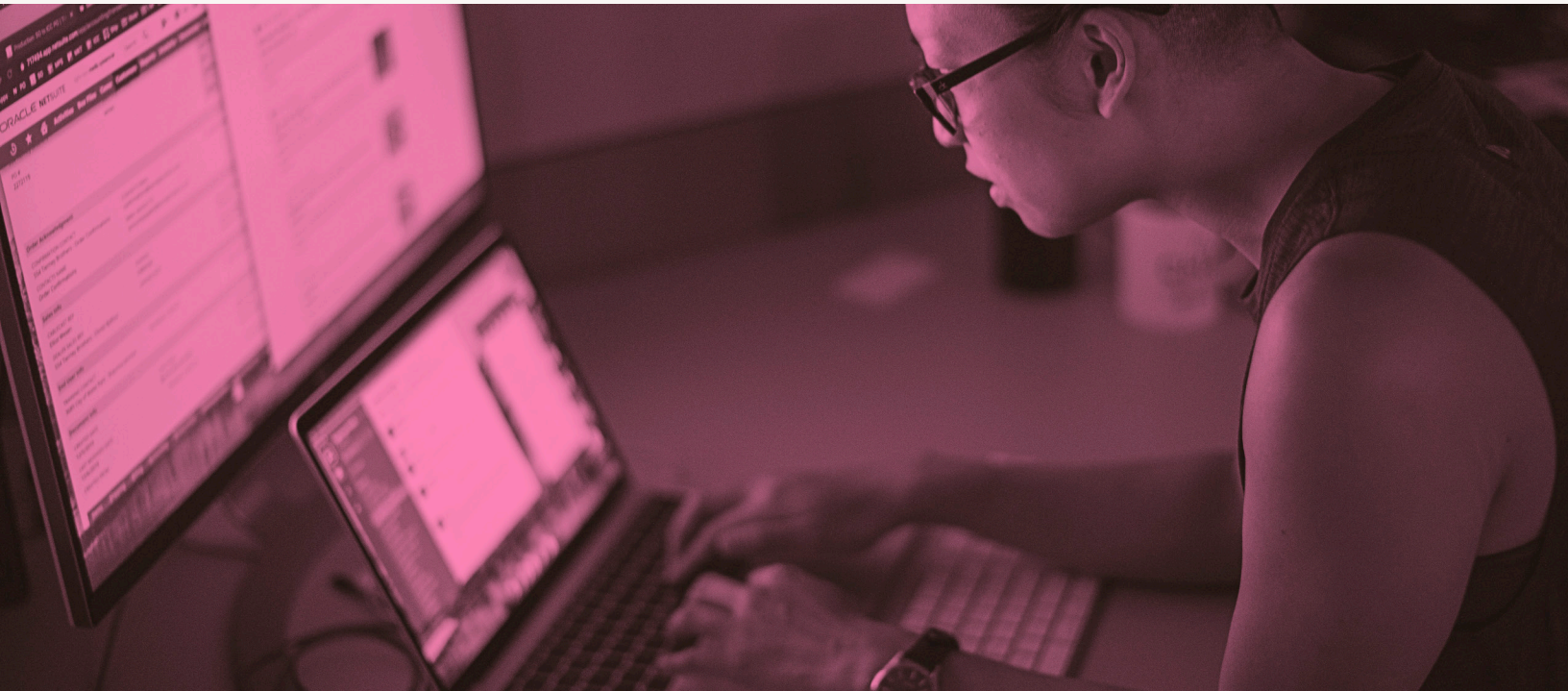


Hardware Refresh: iPad refresh + Unified Model Deployment (UDM)

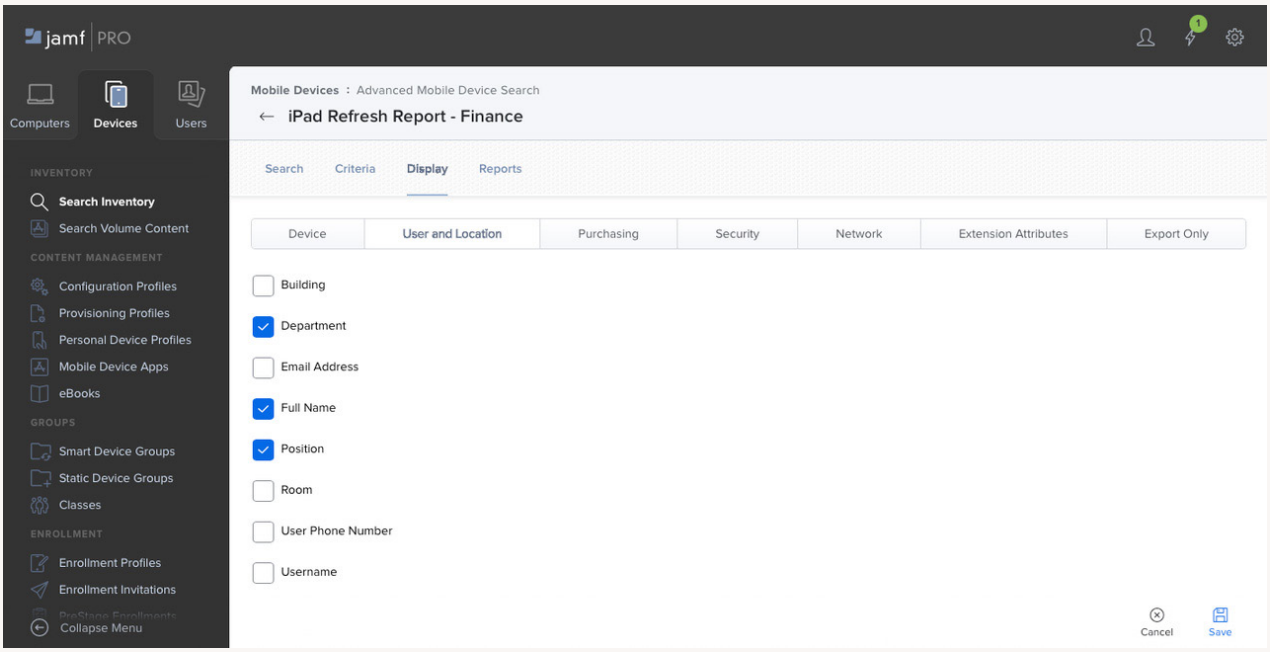
Say your organization has existing devices that are due to be refreshed. These devices are a few years old, and keeping track of inventory manually would mean working with your finance department to dig up purchase orders, putting that data into Excel and manually comparing. IT admins can use Jamf Pro to create a report of all eligible devices as well as to create a report for finance to have visibility on the devices that need to be refreshed.

To start, we will create a saved advanced device search that looks for any iPads that are not the model your organization is moving to, along with other devices that will be replaced by the new iPads.

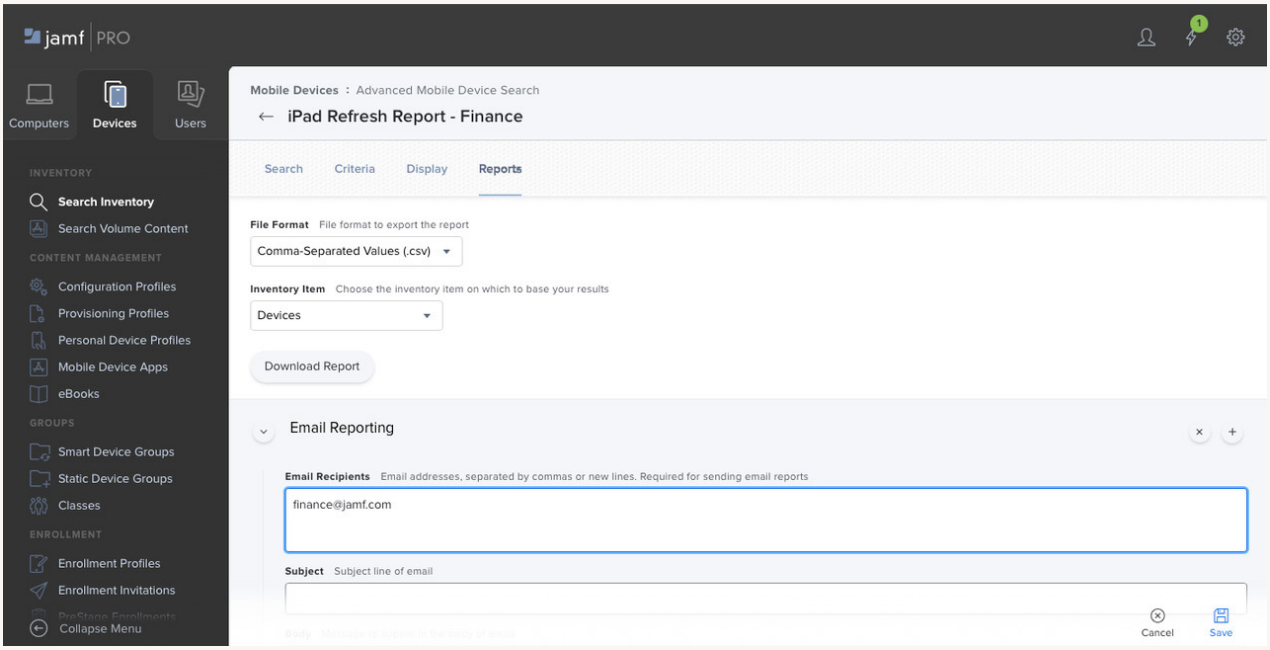


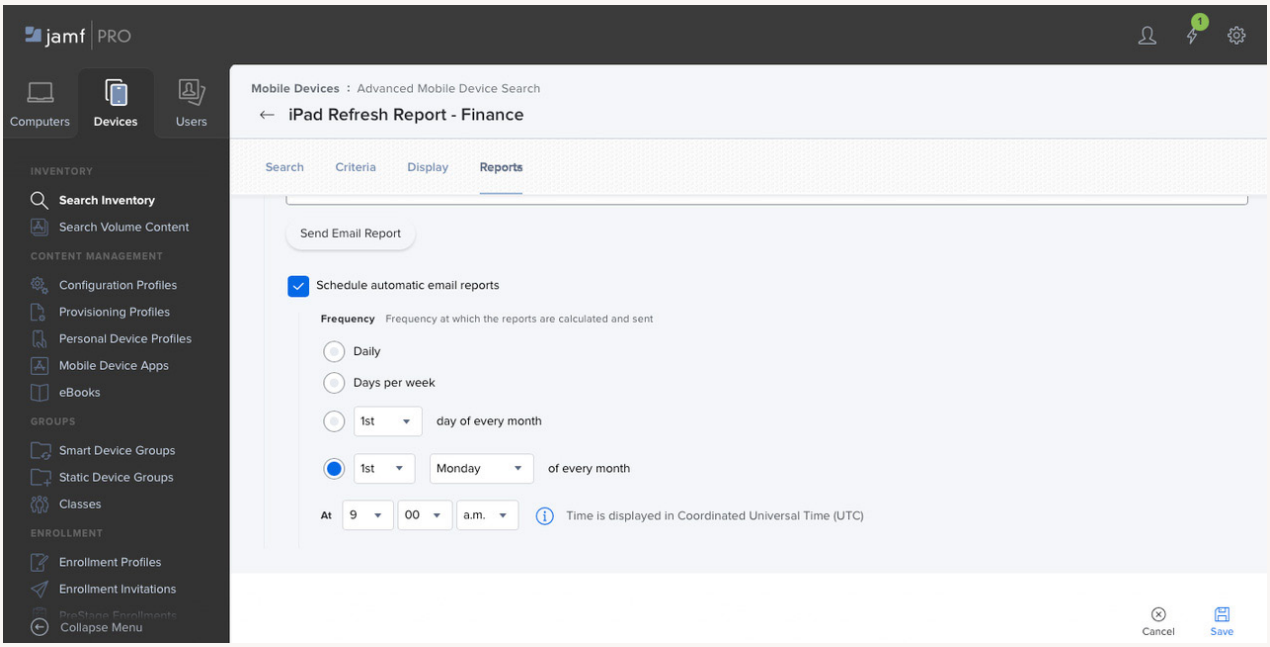


The report can be customized with information that finance will find helpful:



Here, the report is set to be delivered on the first of each month so that finance can space out the purchasing based on device age:





The report not only contains the list of devices but also the display information chosen when the saved advanced device search was created. Now IT and finance can coordinate the deployment of the new iPads as well as the retrieval of the old equipment.

58 Mobile Devices in iPad Refresh Report - Finance

Display Name	Model	Serial Number	Position	Full Name	Department
SalesDLX[redacted]	iPad mini 4 (Wi-Fi)	DLXQ4[redacted]	Account Executive	Johnny Appleseed	Sales
SalesDLX[redacted]	iPad Pro (12.9-inch Wi-Fi)	DLXS3[redacted]	Account Executive	Johnny Appleseed	Sales
SalesDLX[redacted]	iPad mini 4 (Wi-Fi)	DLXSJ[redacted]	Systems Engineer	Johnny Appleseed	Sales
SalesDMP[redacted]	iPad Pro (9.7-inch Wi-Fi)	DMPR[redacted]	Systems Engineer	Johnny Appleseed	Sales
SalesGCV[redacted]	iPad 5th Generation (Wi-Fi)	GCVV[redacted]	Manager	Johnny Appleseed	Sales
DevDLXM[redacted]	iPad Air (Wi-Fi)	DLXM[redacted]	Developer I	Johnny Appleseed	Developer
DevDMPV[redacted]	iPad Pro 2nd Generation (10.5-inch Wi-Fi)	DMPV[redacted]	Developer I	Johnny Appleseed	Developer
DevF9FV9[redacted]	iPad 5th Generation (Wi-Fi)	F9FV9[redacted]	Developer II	Johnny Appleseed	Developer
DevGCTV[redacted]	iPad 5th Generation (Wi-Fi)	GCTV[redacted]	Developer III	Johnny Appleseed	Developer
DevF9FT6[redacted]	iPad 5th Generation (Wi-Fi)	F9FT6[redacted]	Senior Developer	Johnny Appleseed	Developer
DevDMPR[redacted]	iPad Pro (9.7-inch Wi-Fi)	DMPR[redacted]	Manager	Johnny Appleseed	Developer
DevDMQS[redacted]	iPad Air 2 (Wi-Fi)	DMQS[redacted]	Manager	Johnny Appleseed	Developer
FinDMPSK[redacted]	iPad Pro (9.7-inch Wi-Fi)	DMPS[redacted]	Accountant	Johnny Appleseed	Finance
FinDMPRF[redacted]	iPad Pro (9.7-inch Wi-Fi)	DMPR[redacted]	Controller	Johnny Appleseed	Finance
FinDLXSJ[redacted]	iPad mini 4 (Wi-Fi)	DLXSJ[redacted]	CFO	Johnny Appleseed	Finance/Executive
ExecDMP[redacted]	iPad 6th Generation (Wi-Fi)	F9FW5[redacted]	CIO	Johnny Appleseed	Executive
ExecDMP[redacted]	iPad Air 2 (Wi-Fi)	DMPR[redacted]	CEO	Johnny Appleseed	Executive
ExecDLXS[redacted]	iPad mini 3 (Wi-Fi)	DLXN6[redacted]	CTO	Johnny Appleseed	Executive

Using these steps, your organization is able to save valuable time and potential communication headaches by automating your information-gathering. IT is able to plan for the new devices and ensure they are finding and assisting the correct users while finance receives regular reports from IT for their purchasing needs.

Patch Management

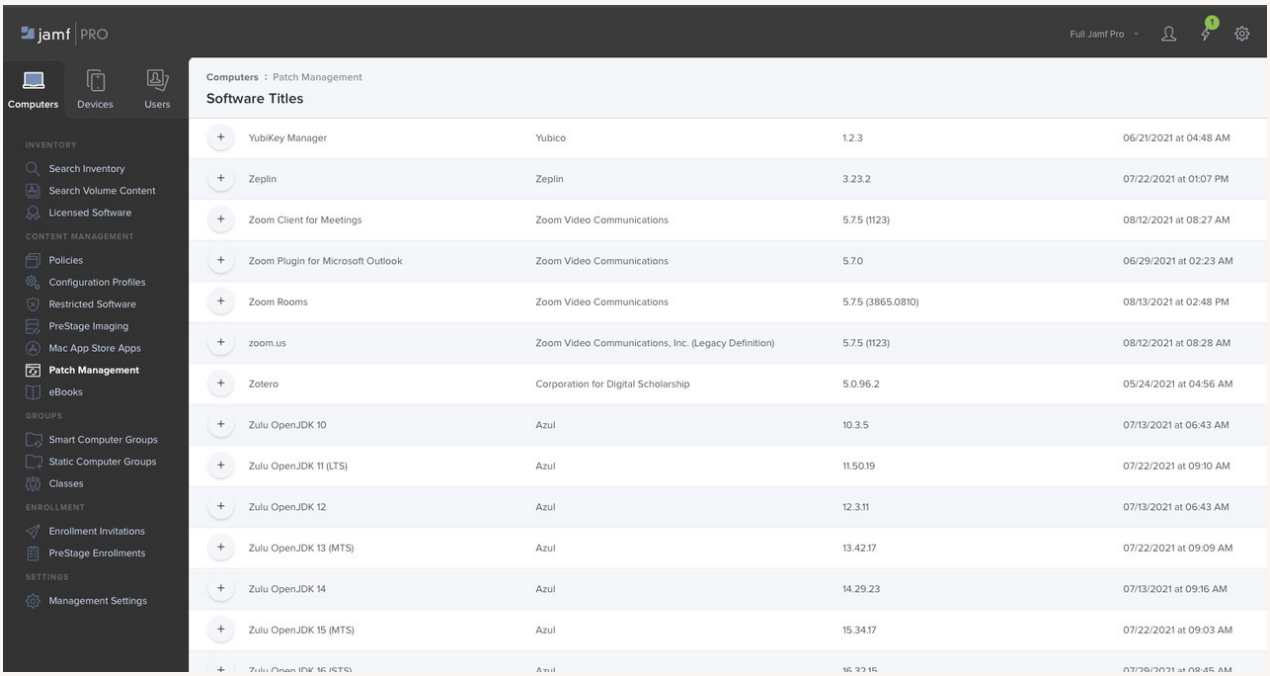
Keeping software up-to-date across the fleet is a key part of endpoint security. Maintaining a wide array of software titles and updates can be difficult for IT admins. Applications can often come from multiple sources and be installed over a wide range of computers. If your organization has increasing security and operational requirements to ensure endpoints are secure, you'll need to be up-to-date with patches. Additionally, with a growing remote workforce, IT admins need a flexible solution to enable and empower end users.

Enter Jamf Pro's Inventory and Patch Management.

Jamf Pro automatically inventories installed applications— those included with the macOS as well as third-party applications installed by users or an MDM.

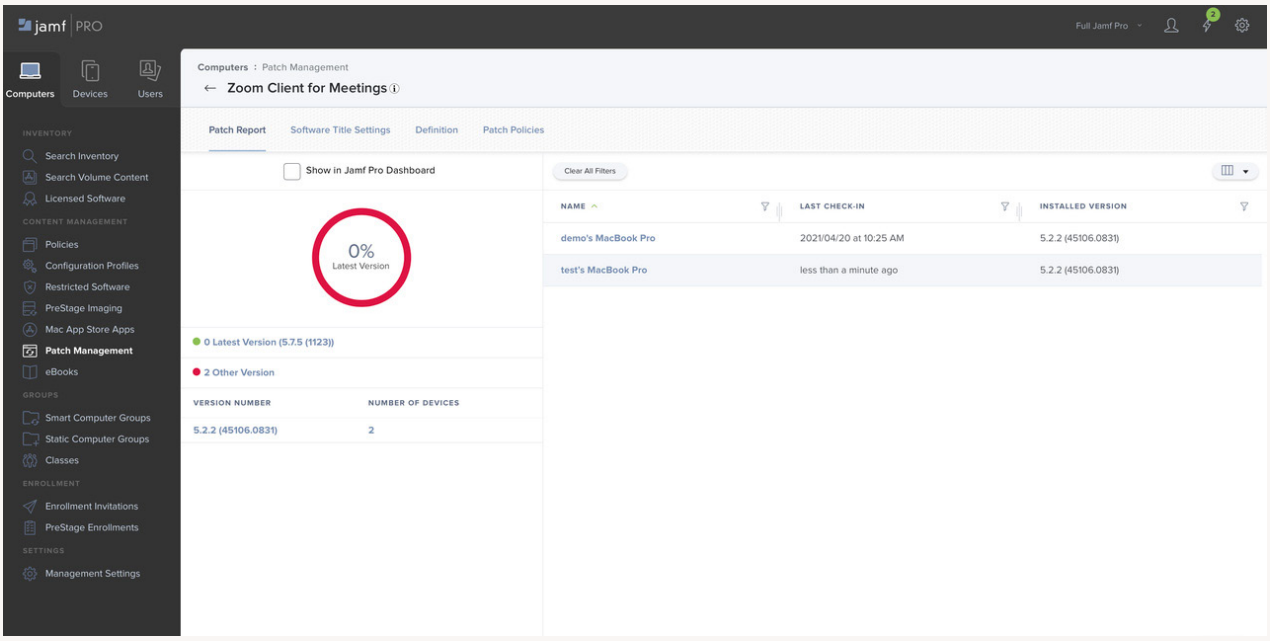
Self Service.app	10.31.1	/Applications/Self Service.app	No
Siri.app	1.0	/System/Applications/Siri.app	No
Stickies.app	10.2	/System/Applications/Stickies.app	No
Stocks.app	3.4	/System/Applications/Stocks.app	No
System Information.app	11.0	/System/Applications/Utilities/System Information.app	No
System Preferences.app	14.0	/System/Applications/System Preferences.app	No
Terminal.app	2.11	/System/Applications/Utilities/Terminal.app	No
TextEdit.app	1.16	/System/Applications/TextEdit.app	No
Time Machine.app	1.3	/System/Applications/Time Machine.app	No
TV.app	1.1.5	/System/Applications/TV.app	No
VoiceMemos.app	2.2	/System/Applications/VoiceMemos.app	No
VoiceOver Utility.app	10	/System/Applications/Utilities/VoiceOver Utility.app	No
zoom.us.app	5.4.7 (59780.1220)	/Applications/zoom.us.app	No

Say that you need to ensure Macs are running the latest version of Zoom. Jamf Pro's built-in patch management system can help IT make this happen.

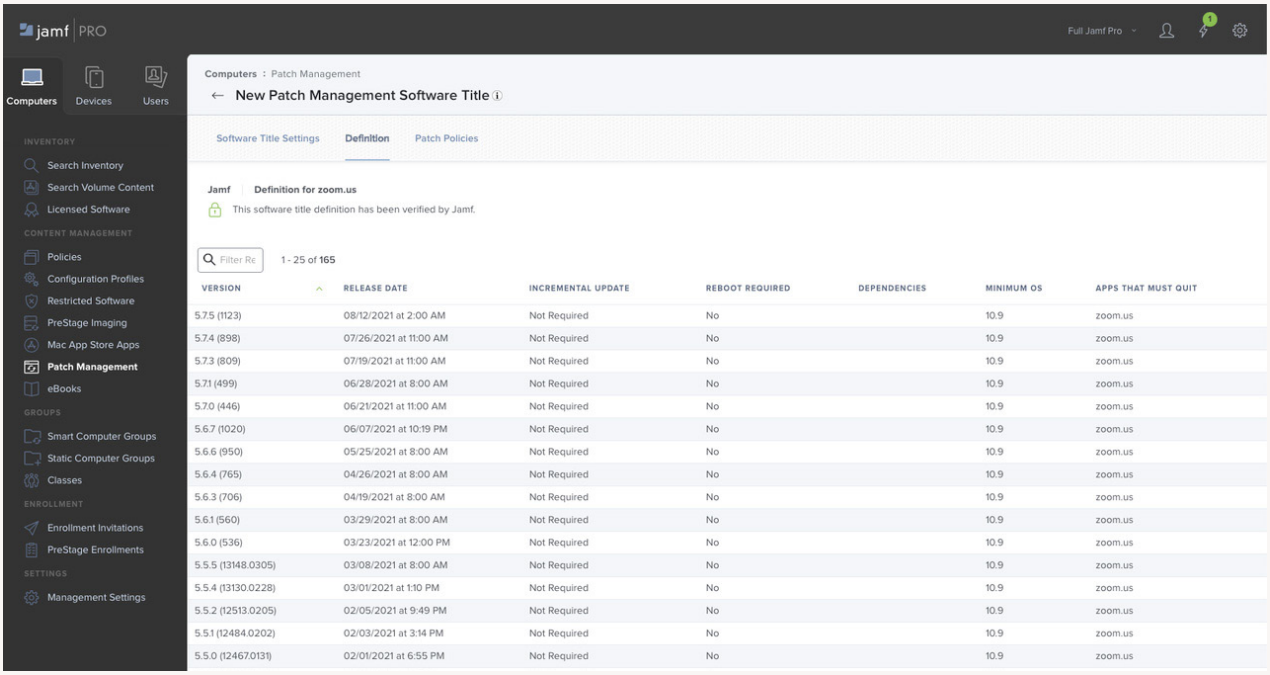


YubiKey Manager	Yubico	1.2.3	06/21/2021 at 04:48 AM
Zeplin	Zeplin	3.23.2	07/22/2021 at 01:07 PM
Zoom Client for Meetings	Zoom Video Communications	5.7.5 (1123)	08/12/2021 at 08:27 AM
Zoom Plugin for Microsoft Outlook	Zoom Video Communications	5.7.0	06/29/2021 at 02:23 AM
Zoom Rooms	Zoom Video Communications	5.7.5 (3865.0810)	08/13/2021 at 02:48 PM
zoom.us	Zoom Video Communications, Inc. (Legacy Definition)	5.7.5 (1123)	08/12/2021 at 08:28 AM
Zotero	Corporation for Digital Scholarship	5.0.96.2	05/24/2021 at 04:56 AM
Zulu OpenJDK 10	Azul	10.3.5	07/13/2021 at 06:43 AM
Zulu OpenJDK 11 (LTS)	Azul	11.50.19	07/22/2021 at 09:10 AM
Zulu OpenJDK 12	Azul	12.3.11	07/13/2021 at 06:43 AM
Zulu OpenJDK 13 (MTS)	Azul	13.42.17	07/22/2021 at 09:09 AM
Zulu OpenJDK 14	Azul	14.29.23	07/13/2021 at 09:16 AM
Zulu OpenJDK 15 (MTS)	Azul	15.34.17	07/22/2021 at 09:03 AM
Zulu OpenJDK 16 (STS)	Azul	16.32.15	07/29/2021 at 08:45 AM

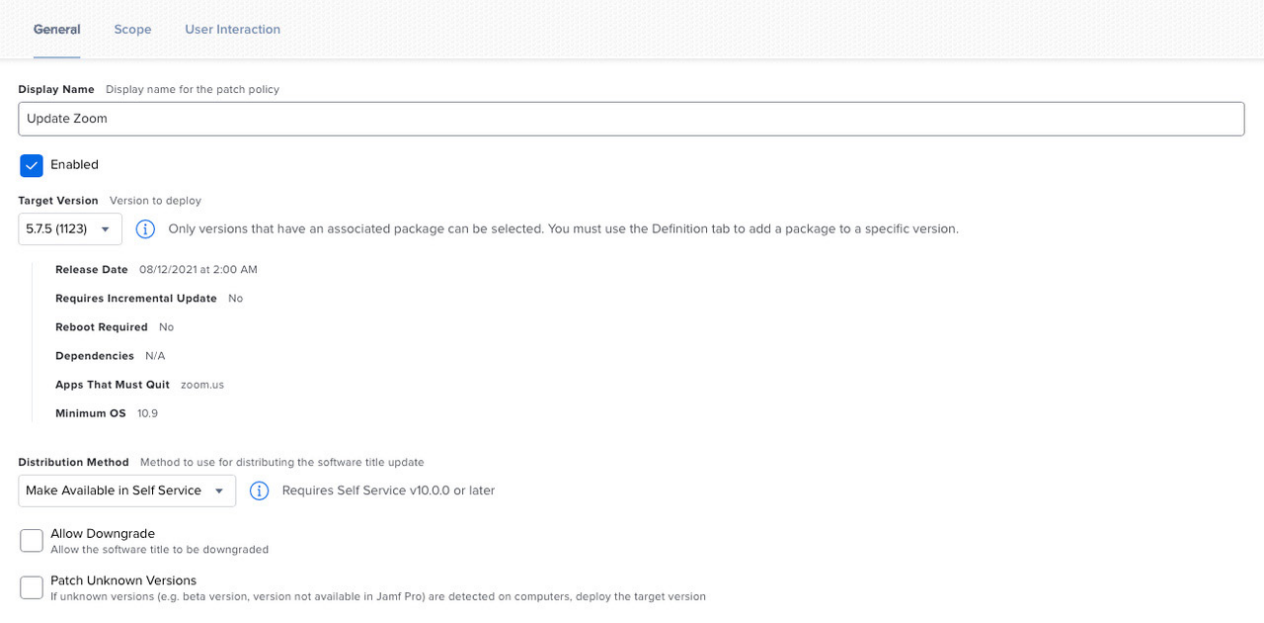
Let's choose Zoom Client for Meetings from the built-in list. Now we have a report showing which Macs have Zoom, and which version is installed on each.



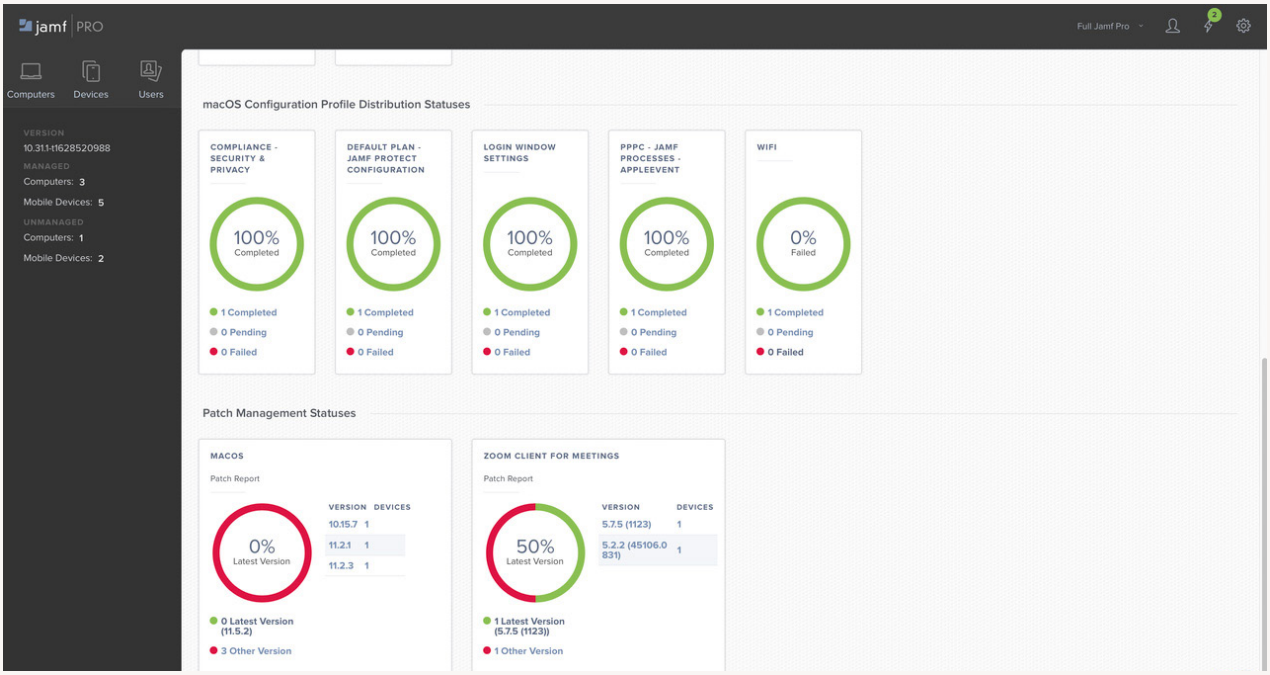
Jamf Pro keeps a list of known version definitions for applications in the Patch Management library. In this case, we see all the recent versions of Zoom, as well as information about the app (OS requirements, etc).

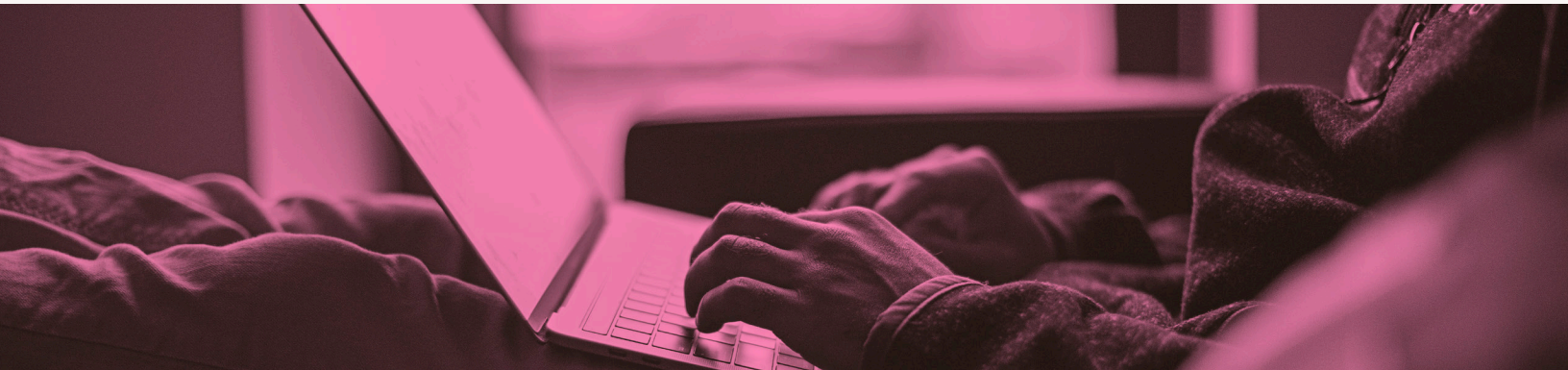


Since we identified Macs running the non-latest version of Zoom, we can create a patch policy to remediate this.



Now that we have our patch policy defined and properly scoped, the last step will be to audit the patch upgrading process. We can easily do this with the Jamf Pro dashboard.





Targeted Hardware Updates (aka Rosetta 2)

Let's say as a precursor for moving your fleet to M1-enabled Mac devices you need to know how many M1 and Intel Macs there are currently in your fleet. Jamf Pro inventory allows IT admins to build smart groups based on architecture type.

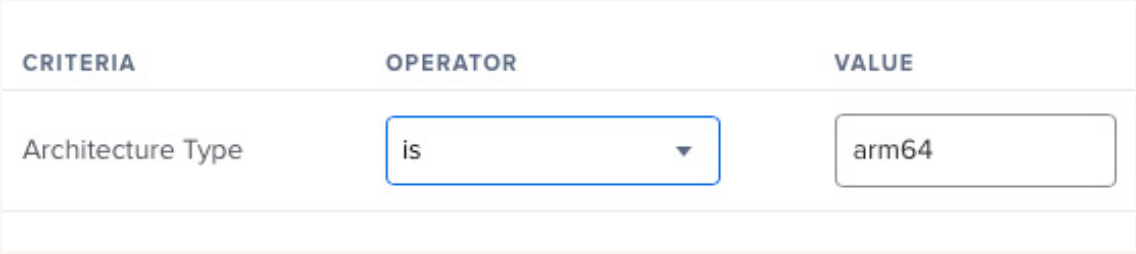
Jamf Pro automatically collects the architecture type of Macs enrolled and displays them in the individual computer inventory record as, for example,

Processor Type: Apple M1

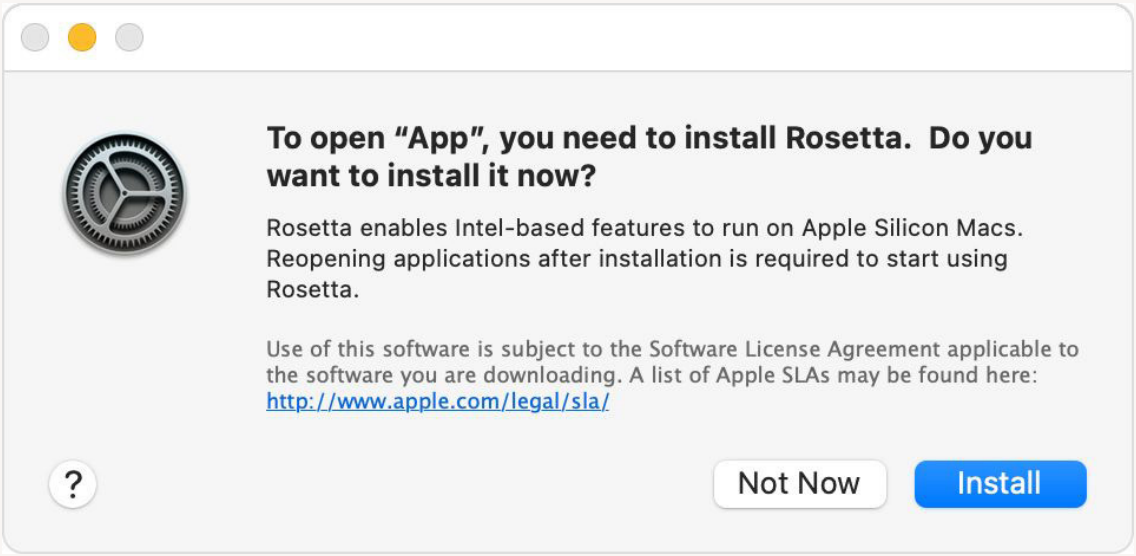
Architecture Type: arm64

You can automate reporting and deployments to Apple Silicon Macs using Smart Groups.

You can create a Smart Group targeting Apple Silicon in your organization's environment. Simply create a Smart Group titled 'Apple Silicon' that uses the advanced criteria or 'Architecture Type' and use the ellipses to choose arm64:



Now IT can install Rosetta 2 on these Macs. Rosetta 2 is a utility needed to run Intel applications on M1 and future Apple Silicon Macs. It's not installed by default.



This process is similar to the FileVault example above – build out a policy that installs Rosetta 2, and scope it to the Smart Group we just created. We can also use this same inventory information and Smart Group to make Apple Silicon-specific versions of applications available to end users in Self Service.

Automate tedious workflows with APIs and Webhooks

Now, what if you wanted to dynamically rename all your iOS devices using the same format, such as a combination of the end user's surname and department or building, or a teacher's surname and grade level? While Jamf Pro's interface allows you to change a device's name and even set device names en masse, it would be time-consuming to uniquely set each device name.

Here's where Jamf Pro API and webhooks come in. The combination of these two powerful tools built into Jamf Pro can automate this task for you.

First, webhooks can 'listen' for any time a new iOS device enrolls.

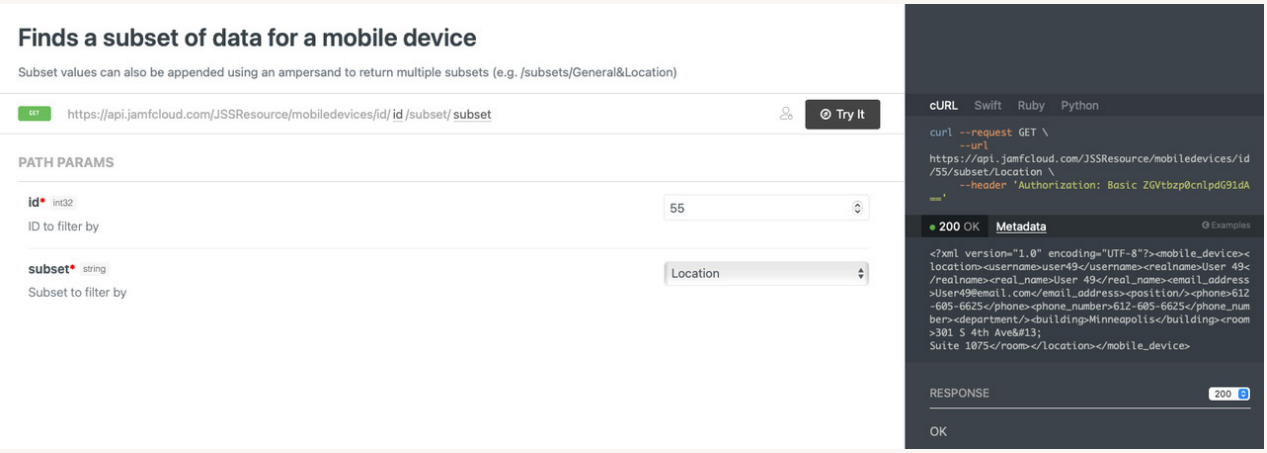
MobileDeviceEnrolled

This event is triggered when a mobile device is enrolled or re-enrolled into Jamf Pro. For more information on mobile device enrollment, see the Administrator's Guide.

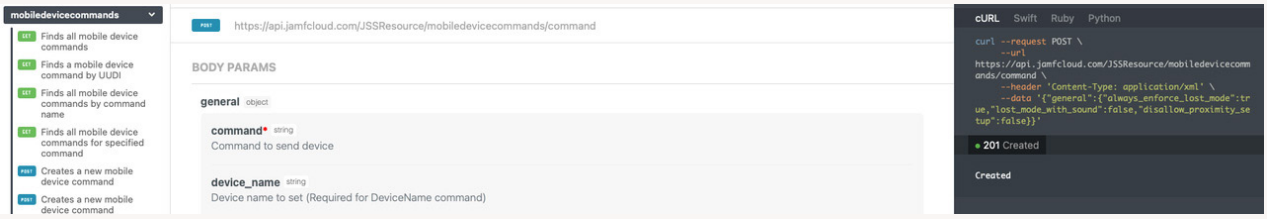
JSON XML


```
{
  "event": {
    "bluetoothMacAddress": "string",
    "deviceName": "string",
    "icciID": "string",
    "imei": "string",
    "ipAddress": "string",
    "jssID": integer,
    "model": "string",
    "modelDisplay": "string",
    "osBuild": "string",
    "osVersion": "string",
    "product": "string",
    "room": "string",
    "serialNumber": "string",
    "udid": "string",
    "userDirectoryID": "string",
    "username": "string",
    "version": "string",
    "wifiMacAddress": "string"
  },
  "webhook": {
    "eventTimestamp": integer,
    "id": integer,
    "name": "string",
    "webhookEvent": "MobileDeviceEnrolled"
  }
}
```

Once the enrollment event occurs, the webhook payload is sent to a callback URL, which can then process the event and use the API to first get the currently-assigned username and building/department.



Once you find the necessary information, the API can send an ‘update mobile device’ command to set the device name automatically.



Using these tools, we can fully automate the unique naming convention for each device whenever they enroll or re-enroll into Jamf Pro. [Learn more about Jamf Pro APIs and webhooks.]

You can’t fix what you can’t see

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