



Technical Note

Simplifying eSIM Cellular Plan Activation with Jamf



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Introduction

eSIM and Apple Mobile Devices

Traditionally, cellular devices included a slot where a small Subscriber Identity Module ("SIM") card could be inserted. Most of the time, devices came with a card already installed to link the device to a cellular carrier and service plan. Most people never needed to touch it. Some more modern devices are switching to use an electronic SIM ("eSIM"). eSIMs don't take up any physical space inside the device (their information is saved on a hidden, encrypted partition in the iPad's memory) and they're more flexible since they work with any carrier that supports the standard. They eliminate the need to obtain a SIM card when setting up service with a new carrier, or when switching to a new carrier.

The following Apple reference lists the iPad models and countries/carriers that support eSIM: <https://www.apple.com/ipad/cellular/>.

Activating Cellular Service with eSIM without Jamf

eSIM devices don't know which carrier will be providing their cell service when they're first turned on. There are no icons at the top of the screen to indicate cell service has been set up like there are when a carrier-specific physical SIM is installed.



When a consumer purchases a device with an included cellular plan, the retailer may configure the device for them. Or they can go into the cellular settings page on the device and pick a plan to purchase for themselves. In cases where the device was purchased directly from the carrier, Apple may already know that the device has a carrier association and the device will provision its cell service automatically.

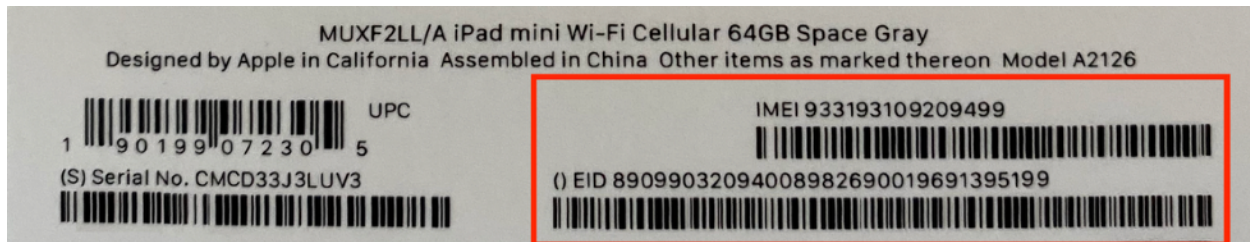
When an organization adds devices to its cellular plan, there are a number of manual methods available for setting up cell service with an eSIM. Most carriers have a web page with instructions for the methods they support. They may provide a URL and activation Code that you can enter manually, a QR code to scan, an Apple App Store app, etc.

But going through the cellular configuration process is a lot of extra work if you're setting up a large number of devices and requires that you have physical access to the device. In these cases, we can use a Jamf School or Jamf Pro MDM command to instruct the device (or many devices at once) to contact your carrier's eSIM servers and configure themselves. We'll show you how in the next section.

When an organization needs to add eSIM devices to their cellular account, they'll need to provide the Mobile Equipment Identity ("IMEI") number and eSIM ID Number ("EID"). If you don't already have a list of these, ask your Apple Rep to provide them. They can work with their SE team to create a list of this information as soon as your iPads have shipped and their serial numbers are known. You can pass the

list on to your cellular provider so they have the device information associated with your account and set up in their eSIM servers when you're ready to configure the devices. *Note that carriers may set an expiration date when they add devices to their eSIM servers so you should ask your carrier to explain their expiration policy and let them know when you're planning to configure the devices.*

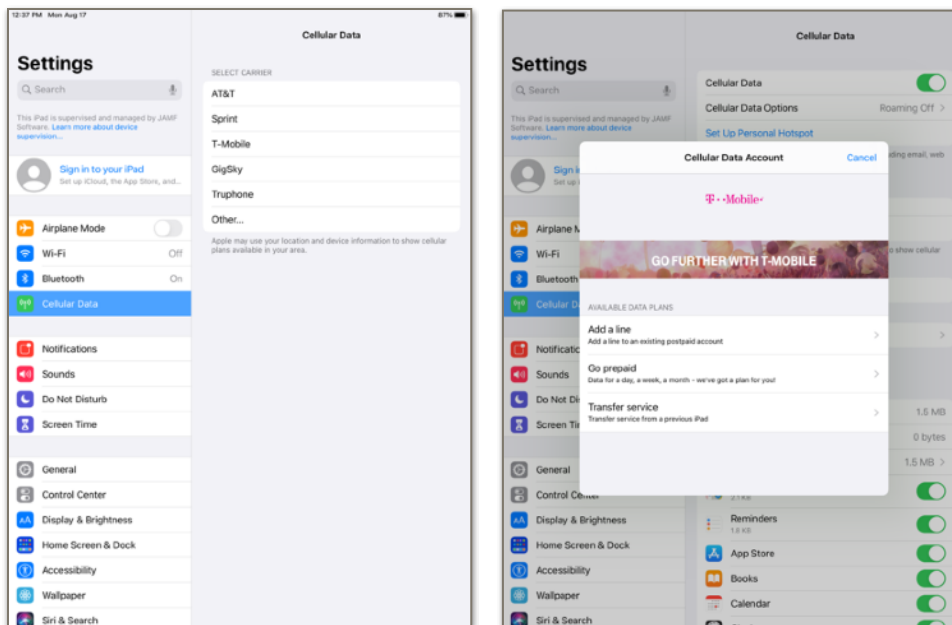
If you don't have a list of the cellular IDs for a device, you can find the IMEI and eSIM numbers on the outside of the iPad's box. You can read them in with a barcode scanner if one is available.



The same information is also available on the device itself under "Settings > General > About".

Apple's <https://support.apple.com/en-us/HT209044> page has detailed information on these provisioning methods as well as tips for using an eSIM on a dual-SIM phone as might be the case when a corporate device has a separate SIM for personal or international use. Note that while some iPad models offer both a physical SIM slot and eSIM, they do not have dual-radio capabilities -- only one SIM can be active at a time.

The images below show the Cellular Data pane as it appears on an eSIM iPad that doesn't yet have an activated cellular data plan. The image to the right shows the data plan purchase page for a carrier, in this example, T-Mobile.



Automated Cellular Activation for iPad

Manual configuration of cellular settings in Settings.app is practical for consumer devices but too time-consuming when setting up large numbers of devices. Two Jamf products offer support for automated eSIM activation. Jamf School is purpose-built for management of educational devices. Jamf Pro is often used in other organizations, or by schools with large or complex management requirements.

Typical Provisioning Workflow

In a common mass-deployment scenario, an organization is going to be distributing iPads to end-users for home use. They often want to configure the devices at a central location or service provider depot to make sure everything is correct before handing out or shipping the device. In education, the student may be young and not an expert troubleshooter. In business, IT may not want employees to have the trouble of shipping a device back to IT if there's something wrong.

Boxes of new devices have been delivered by Apple (or their reseller), cellular service has been purchased, and the cellular carrier has added the EID numbers for the device eSIMs to your organization's data plan account. To get the devices ready for the users, we'll first need to enroll them devices in a Mobile Device Manager ("MDM") like Jamf Pro or Jamf School. Once that's done, we can do a lot of setup on the devices from a central console without ever having to touch them, including the cellular connection.

There are a few ways to enroll devices in MDM when doing mass-deployment:

Automated Enrollment – In this method, Apple School Manager (or Business Manager) already knows your organization owns the devices so they'll tell them to connect to your MDM automatically the first time they're powered on.

Note: The MDM commands used to configure eSIM described in this document may not be needed if you are using Automated Enrollment. You may find that Apple and your carrier may have enabled automatic delivery of the eSIM profile so it occurs when a device connects to a WiFi network and completes the Setup Assistant process. But you'll still use MDM to make sure the eSIM isn't deleted.

Apple Configurator – This is a free program available on the Mac App Store. It allows you to connect many iOS or iPadOS devices to a Mac, potentially via a multi-port USB hub and can install the initial software and settings you want and it's fast since it doesn't all need to happen over a WiFi network.

Once the device is enrolled in Jamf Pro or Jamf School, it's easy to install more settings and software, or to push mobile device commands to large numbers of devices, for example, "Reset Cellular Plan". This command tells the iPads to connect to your carrier and active their eSIM so they start getting cellular data. That's a lot easier than setting up cell service on all your devices up by hand.

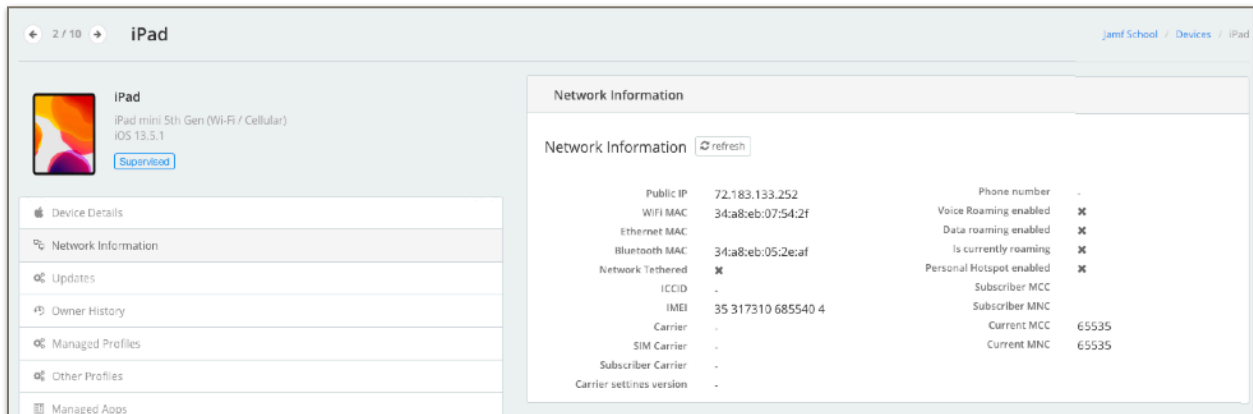
Some helpful references:

- [Apple School Manager Guide](#) / [Apple Business Manager Guide](#)
- [Jamf School Deployment Guide](#)
- [Deploying iOS and tvOS Devices Using Apple Configurator 2 and Jamf Pro](#)
- [Enrolling macOS, iOS, and tvOS Devices in Jamf Pro Using Automated MDM Enrollment](#)

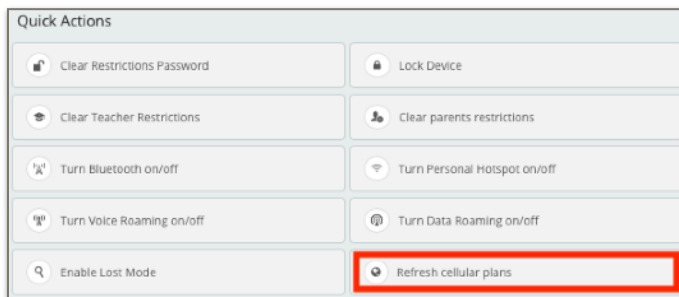
Activating eSIMs with Jamf School

Activating a Single Device

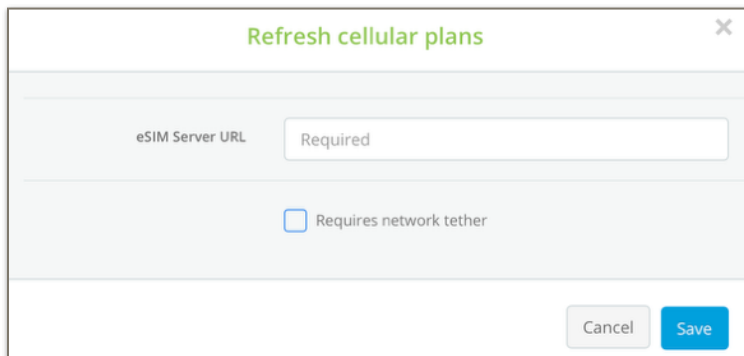
Once a set of devices have been enrolled Jamf School, we can view them under "Devices". If we click on a device to view its details then select "Network Information", we can see that the cellular plan information is blank because cell service hasn't been activated yet.



You can tell the device to contact your cellular carrier and activate its cell service by clicking the "Refresh cellular plans" button under "Quick Actions" in the lower-left of the detail page.



When this button is pressed, a dialog box will appear. Enter the eSim Server URL for your carrier. If you're using network tethering, select the "Requires network tether" checkbox. Ref: [Setting up a shared Internet connection for iPhone and iPad](#).



Activating Multiple Devices

To quickly activate the cellular data plan on multiple devices, open the device listing and click the checkboxes next to the devices you want to activate. Then select "Refresh Cellular Plans" from the "More" drop-down menu.

The screenshot shows the 'Devices' management interface. At the top, it says 'With 1 selected:' followed by buttons for 'Refresh details', 'Move to location', 'Add to group', 'Remove from group', 'More', and 'Advanced'. Below this is a '25 records per page' selector. The main table has columns for selection checkboxes, device icons, names, owners, connection times, and locations. One iPad is selected with a blue checkmark in its checkbox. A 'More' dropdown menu is open, showing various actions. The 'Refresh cellular plans' option is highlighted with a red rectangle.

		Name	Owner	Connected	Loca
<input type="checkbox"/>		Apple device van fullname Parallels VM	Do not change	5 months ago	Jamf S
<input checked="" type="checkbox"/>		iPad iPad (7th generation, Wi-Fi)	Do not change	7 days ago	Jamf S
<input type="checkbox"/>		iPad iPad (5th generation, Wi-Fi)	Do not change	5 months ago	Jamf S

- Change device name
- Change owner
- Change Dynamic Quota
- Clear Passcode
- Change EFI password
- Clear Teacher Restrictions
- Clear parents restrictions
- Refresh cellular plans**
- Bluetooth
- Personal Hotspot
- Voice Roaming

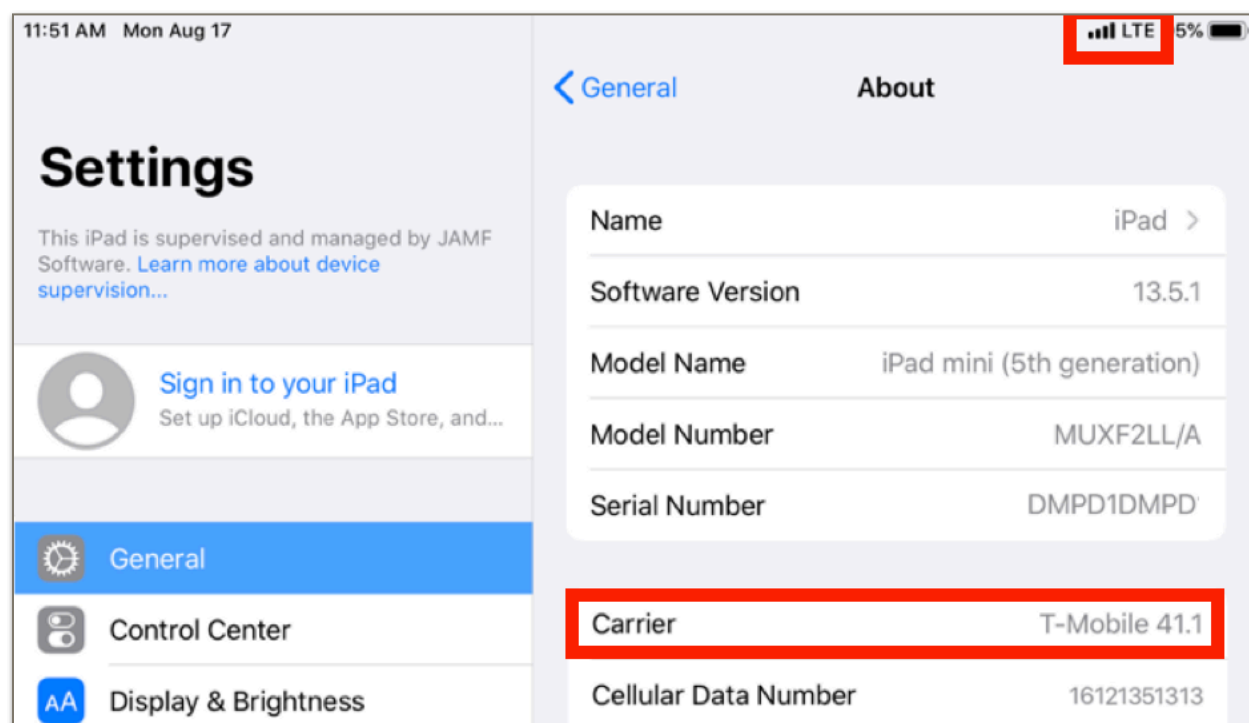
As with activations from the detail page for a single device, Jamf School will prompt you for your carrier's "eSIM Server URL". This will be provided by your carrier.

When this button is pressed, a dialog box will appear. Enter the eSim Server URL for your carrier. If you're using network tethering, select the "Requires network tether" checkbox. Ref: [Setting up a shared Internet connection for iPhone and iPad](#).

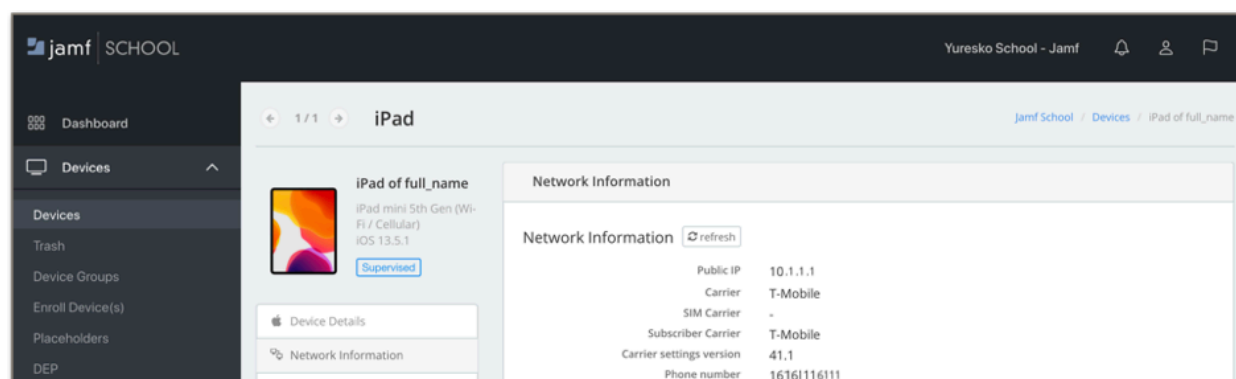
The dialog box is titled 'Refresh cellular plans'. It contains a text input field for 'eSIM Server URL' with a 'Required' label. Below this is a checkbox labeled 'Requires network tether'. At the bottom right are 'Cancel' and 'Save' buttons.

Click the "Save" button once you've filled in the information. Jamf school will send an MDM command to each of the selected devices. This command will direct the Apple OS to identify itself to the carrier's eSIM server. The carrier will match this to your account and reply to the device with its activation information (an "eSIM Profile"). The device will then connect to the cellular network without requiring any manual steps on the device.

There are a number of indications that the eSIM has been configured. On the iPad itself, the presence of cell service is indicated by the LTE and signal strength indicator at the top of the screen, and the cell carrier and details of your configuration are shown in Settings.app.



Much of the same data is also now available in the Network section of the device details page in Jamf School.



You can test out the cellular connection by turning off wifi on the iPad (if it's connected) and then opening a web page in Safari.

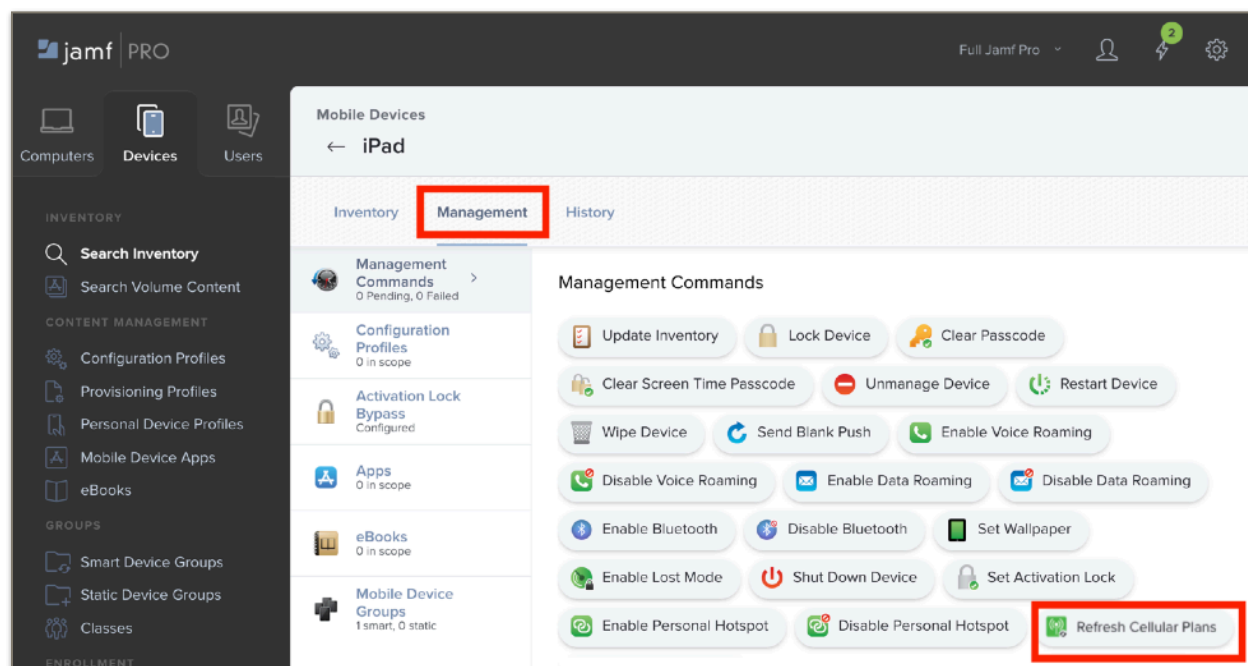
Activating eSIM Cellular Service with Jamf Pro

When a brand-new device is enrolled in Jamf Pro, we can open its inventory details ("Devices > Search Inventory" > click on the device item in the list > Network section) and see that it's a cellular device because it has values in for things like the IMEI number. Because the eSIM on this device hasn't been activated yet, the Carrier Network fields say, "iPad".

The screenshot displays the Jamf Pro interface for a specific device, an iPad. The left sidebar contains navigation menus for 'Computers', 'Devices', and 'Users', along with sections for 'INVENTORY', 'CONTENT MANAGEMENT', 'GROUPS', 'ENROLLMENT', and 'SETTINGS'. The main content area is titled 'Mobile Devices' and shows the 'iPad' details. The 'Network' section is selected, displaying various carrier and device information. Two fields are highlighted with red boxes: 'Current Carrier Network: iPad' and 'IMEI: 35 317'.

Category	Value
Home Carrier Network	iPad
Current Carrier Network	iPad
Carrier Settings Version	41.0
Cellular Technology	GSM
Phone Number	
IMEI	35 317
MEID	
ICCID	8901 3i
Current Mobile Country Code	65535
Current Mobile Network Code	65535
Home Mobile Country Code	310
Home Mobile Network Code	380
Voice Roaming Enabled	No
Data Roaming Enabled	No
Roaming Enabled	No
Personal Hotspot Enabled	No

The cellular fields will be blank for devices that don't have cellular capability. If we want to activate the cellular data services on this device, switch to the "Management" tab and click the "Refresh Cellular Plans" button.



You'll be prompted for the "eSIM Server URL". A few examples are listed in the Notes section at the end of this document but check with your carrier to make sure you have the right one.

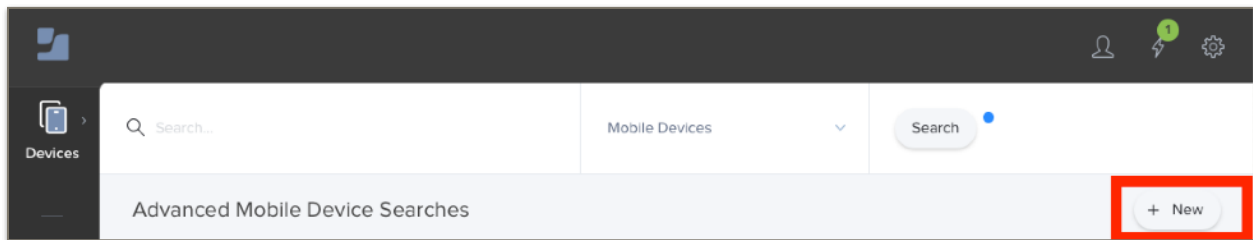
A screenshot of the 'Refresh Cellular Plans' dialog box. The title is 'Refresh Cellular Plans'. Below the title, there is a label 'ESIM Server URL' followed by a description 'The carrier's eSIM server URL to query'. A text input field is shown with the placeholder '[Required]'. At the bottom, there are two buttons: 'Cancel' and 'Refresh Cellular Plans'.

Upon completion, the device will be activated and show cellular bars in the upper corner of the home screen. You can view details about the cell service in "Settings.app > General" on the device and you'll see the carrier information filled in on the device's network inventory details page in Jamf Pro. If you don't, refresh the device's inventory information using the button in the Management tab.

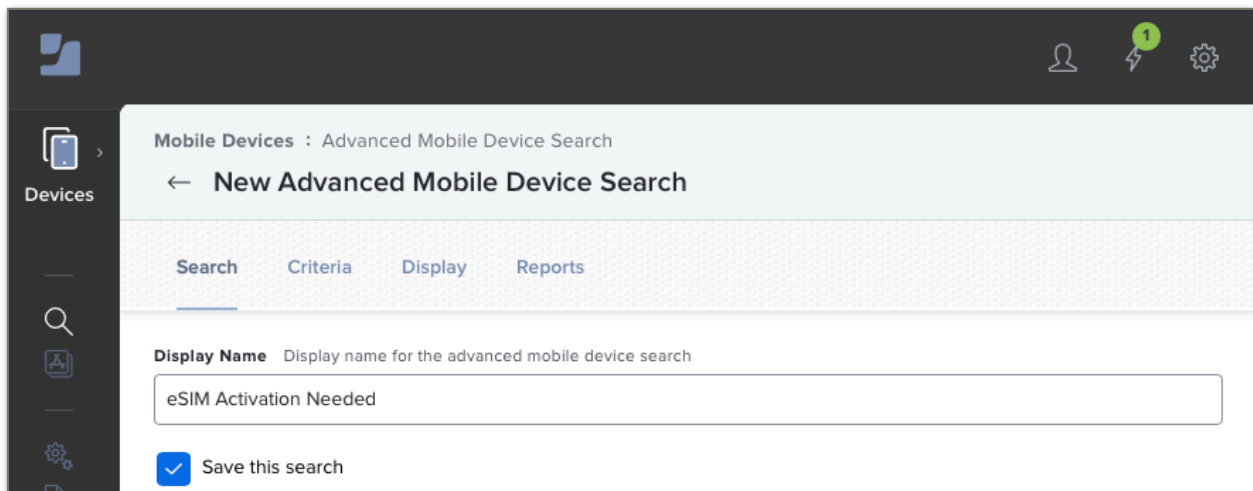
Listing the Devices that Need to have their Cell Service Activated

Suppose we spent a morning enrolling a large group of new iPads into Jamf Pro using either the Apple Automated Enrollment or Configurator methods and we want them to activate their cell service while we go to lunch. We can create a group of the devices to be activated and then tell Jamf Pro we want them to be setup for cell service all at once. It's a lot faster than clicking into each one individually and hitting the refresh cellular plans button in the management tab.

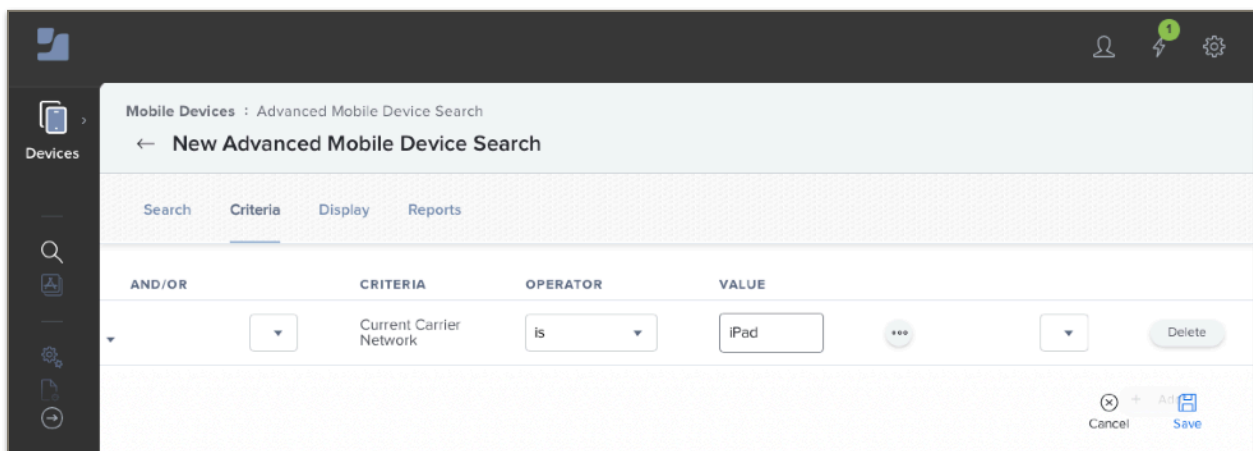
To begin, go to "Devices" and click the "+New" button for Advanced Mobile Device Searches.



If you're going to be doing some additional batches of device enrollments later, you can save the search for later re-use by clicking the "Save this search" checkbox and supplying a name.



Next we'll fill in the "criteria" tab. When we looked at the network inventory details for an iPad that had been enrolled with Jamf Pro but had not yet been configured for cell service, we noted that that the "Current Network Carrier" field was set to "iPad". We can use this behavior to quickly create a set of all devices that need to be setup with their cell service plan.



Once a device is activated with a carrier and inventory information has been updated, that field will change to the carrier's name and the devices will automatically drop out of the advanced search results.

Advanced Mobile Device Searches

In the preceding section, we created a simple advanced search to create a list of all iPads that still need to be activated. That would cover the majority of deployment scenarios, but there might be some more complicated cases. Jamf Pro has options to cover almost anything.

For example, if you're working over the course of a few days to set up lots of different iPads and only wanted to active a batch of "iPad Pros 11-inch (2nd generation)" that you enrolled today, your criteria might be:

AND/OR	CRITERIA	OPERATOR	VALUE	
	Model	is	iPad Pro 11-inch (2nd)	...
and	Last Enrollment	less than x days ago	1	

This strategy is helpful because there may be cases where a device have activated its cell service but has not yet reported an updated inventory to Jamf Pro. In this case, just filtering for carrier = "iPad" could capture devices that already have their cell service running. In the above example, we're filtering on date and if this is the first time we've pushed out a cell plan reset commands, we'll know we're only updating the devices that are ready for it.

Suppose there are a few iPads that will only be used in the office and you don't intend to activate their cellular data plan. We could add a few "is not equal to" lines to exclude them by name, user, or serial number. If there were many such devices, we could create a "No Cell Service Needed" static group and add an "is not a member of" line to our advanced search to exclude them.

What if we're deploying lots of different models and the setup work is happening at many different sites? That might be the case with a large education deployment with staff at each of a district's schools setting devices up at the same time. We could create a separate "Activation Needed" advanced search for each location and filter on external IP address (if every school had a different one). If we are including a school abbreviation somewhere in the device names that we're applying with Apple Configurator, we could add a "Device name/contains/<school code>" line.

If you're doing a 1:1 deployment and assigning the devices to specific users, you can even use information like department of group membership from a directory service like Active Directory.

Bulk Cell Plan Activation in Jamf Pro

Once you have your Advanced Search criteria the way you want, click the "Save" button and then the "View" button at the bottom of the page to show the list of all the devices that meet your "Activation Needed" criteria. From the device listing screen, click the "Actions" button. Jamf Pro will display a list of things you can do to a group of devices. Select "Send Remote Commands" and click the "Next" button.

Mobile Devices

Take Action on Devices

● Choose Action

● Complete

- ☐ Edit the Building and Department
- ☐ Send an Email
- ☐ Send a Notification to Mobile Devices with Jamf Self Service for iOS Installed
- ☐ Delete Mobile Devices
- ☒ Send Remote Commands
- ☐ Cancel Management Commands
- ☐ Remove restrictions set by Jamf Parent
- ☐ Remove Jamf Parent management capabilities

Cancel Next

Select "Refresh Cellular Plan" and enter the eSIM Server URL provided by your carrier. Then click "Next".

Mobile Devices

Take Action on Devices (38)

● Choose Action

● Send Remote Commands

● Complete

- ☐ Set Diagnostic and Usage Reporting and App Analytics
- ☐ Shut Down Device (iOS 10.3 or later, supervised only)
- ☐ Set Bluetooth (iOS 11.3 or later, supervised only)
- ☐ Set Activation Lock
- ☐ Set Personal Hotspot
- ☒ Refresh Cellular Plans

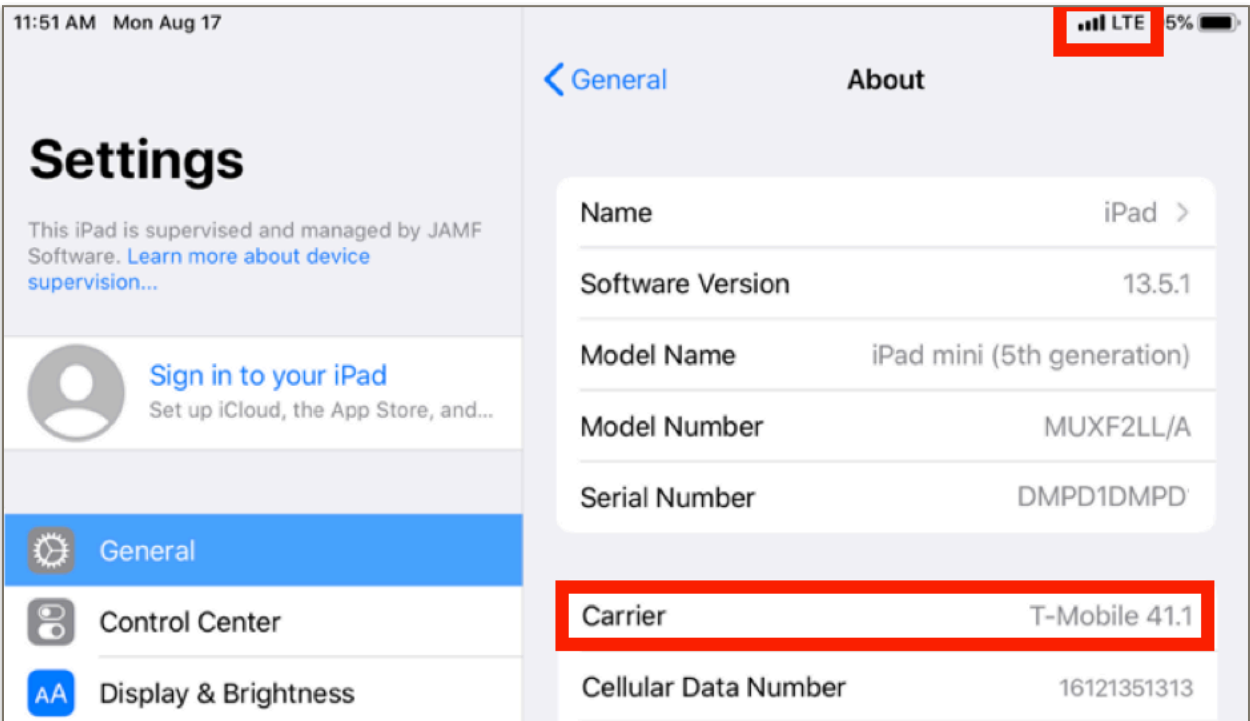
ESIM Server URL The carrier's eSIM server URL to query

[Required]

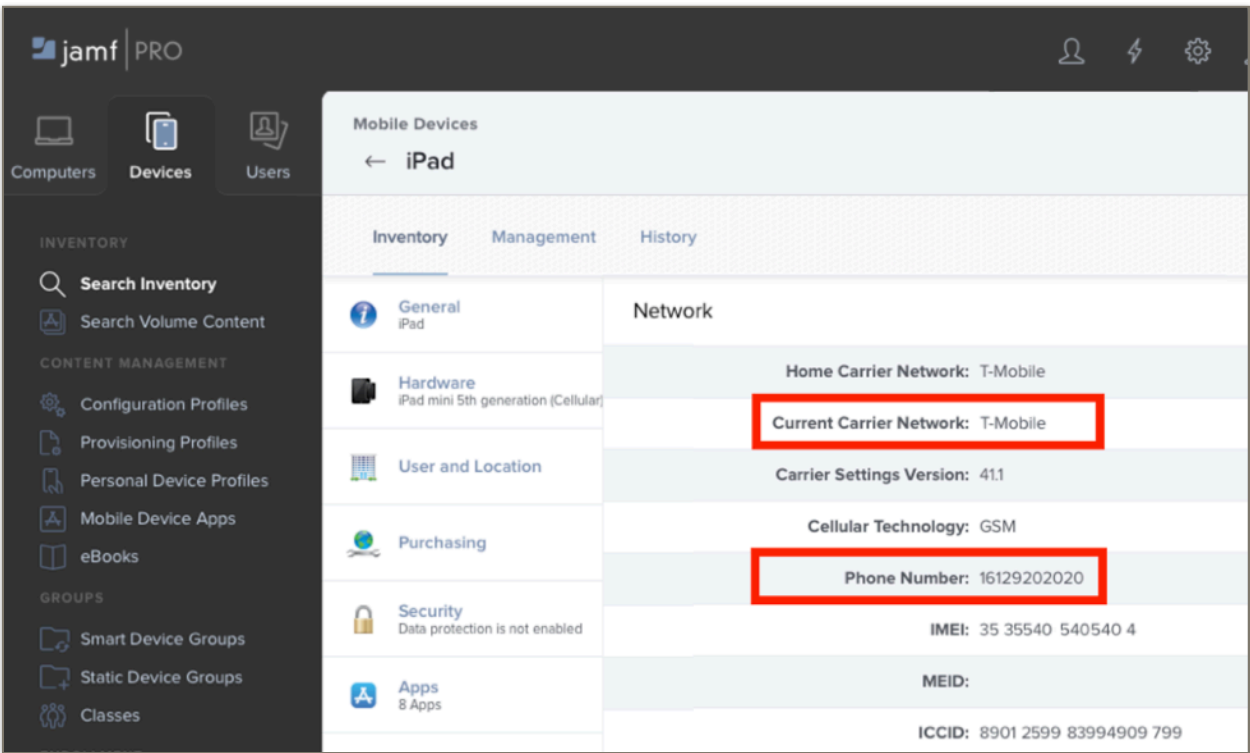
Cancel Previous Next

Jamf Pro will send the command to each device in the group. The devices will contact the carrier eSIM server you specified and retrieve their cell plan settings (the "eSIM Profile"). Then they can connect to the cellular network without requiring any manual steps on the device.

When checking the iPads, we'll see the cell service signal strength in the upper-right corner of the screen and the carrier will be listed if we go into Settings > About on the iPad.



Once the device has submitted its next inventory, the details for the cell service will appear in Jamf Pro's device details page, including Carrier and Phone Number information.



eSIM Implications for Device Reset and Plan Deletion

Device Reset and "Retain Cellular Plan" in iPadOS

Carriers may remove device information from their eSIM servers once a device has been provisioned so unless you're changing carriers, eSIM activation should be considered a one-time event. We can use mobile device management to:

1. Prevent users from altering their cell plan
2. Prevent the users from removing their eSIM if they use Settings.app to erase all content and settings on their iPad.

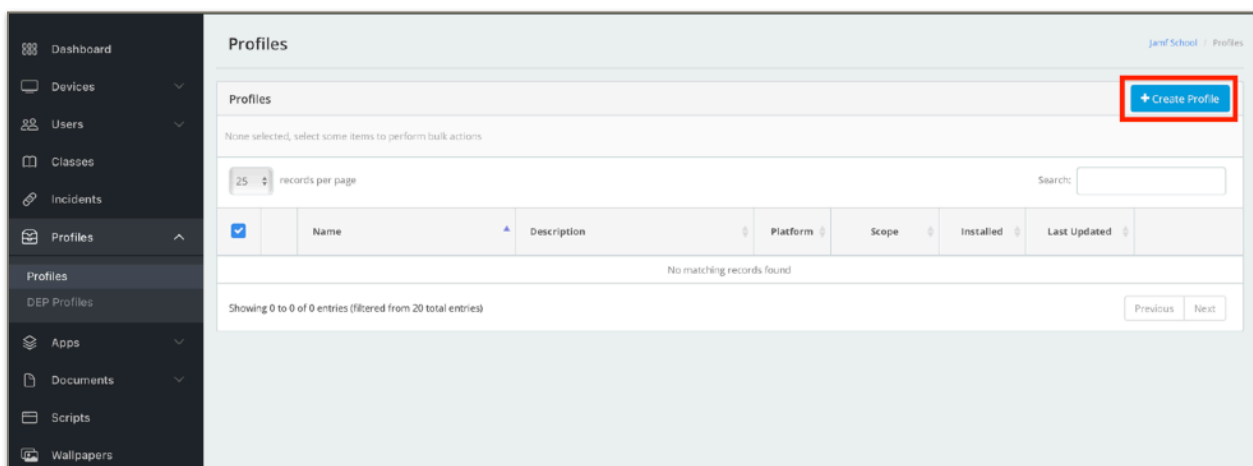
If cellular settings are unintentionally removed from a previously-activated eSIM device, either on the device itself in Settings.app, by sending a device wipe command via MDM, or by wiping the device with Apple Configurator, trying to reinstate it by sending the "Refresh cellular plan" MDM command probably won't work. The device is no longer in the carrier provisioning systems. The user will see a popup message on the iPad stating, *"Cellular Plan Cannot Be Added; This code is no longer valid. Contact your carrier for more information."* You'll need to contact your carrier and give them the device's IMEI and EID numbers so they can re-enable the device in their activation servers. Once that's done, they may instruct you to restart the device. Then you should be able to re-activate the device's cellular service.

Because of all the carrier intervention required to get cell services back onto a device, we need to take precautions to prevent users from removing their cell plan inadvertently.

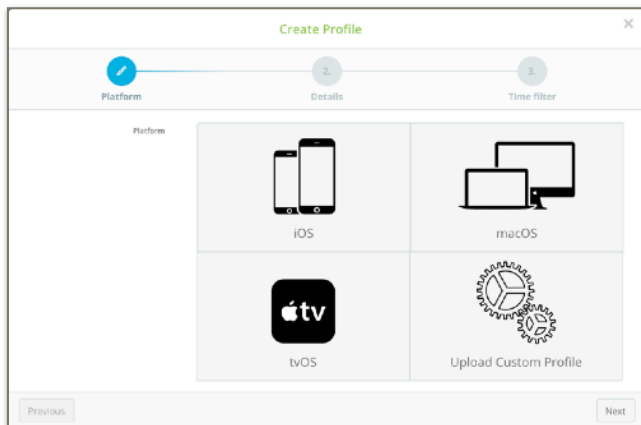
Restricting the user's ability to change cellular settings – Jamf School

We can create a restrictions configuration profile to ensure that users do not remove the cellular plan settings from their devices.

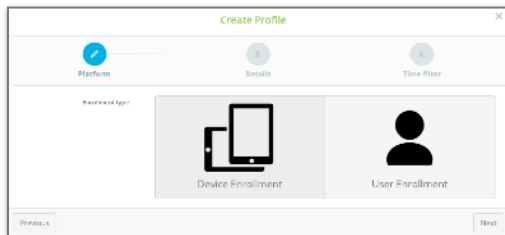
If you already have a standard restrictions profile for your devices, you can elect to edit it to add the cellular restrictions. Or, to create a new profile, go to "Profiles > Profiles > Create Profile".



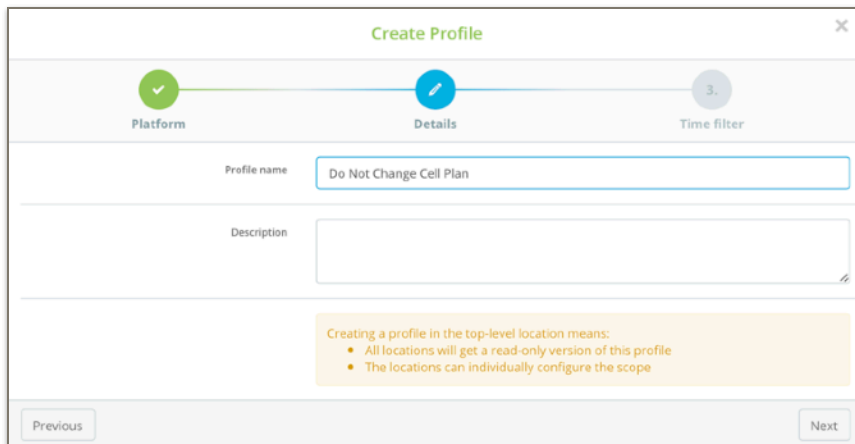
Select "iOS"



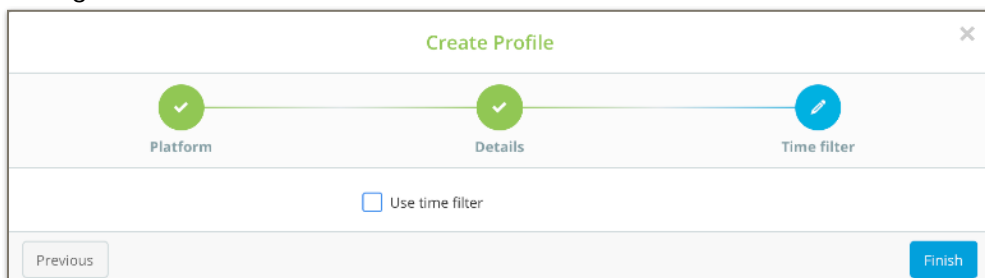
Select Device Enrollment, click "Next"



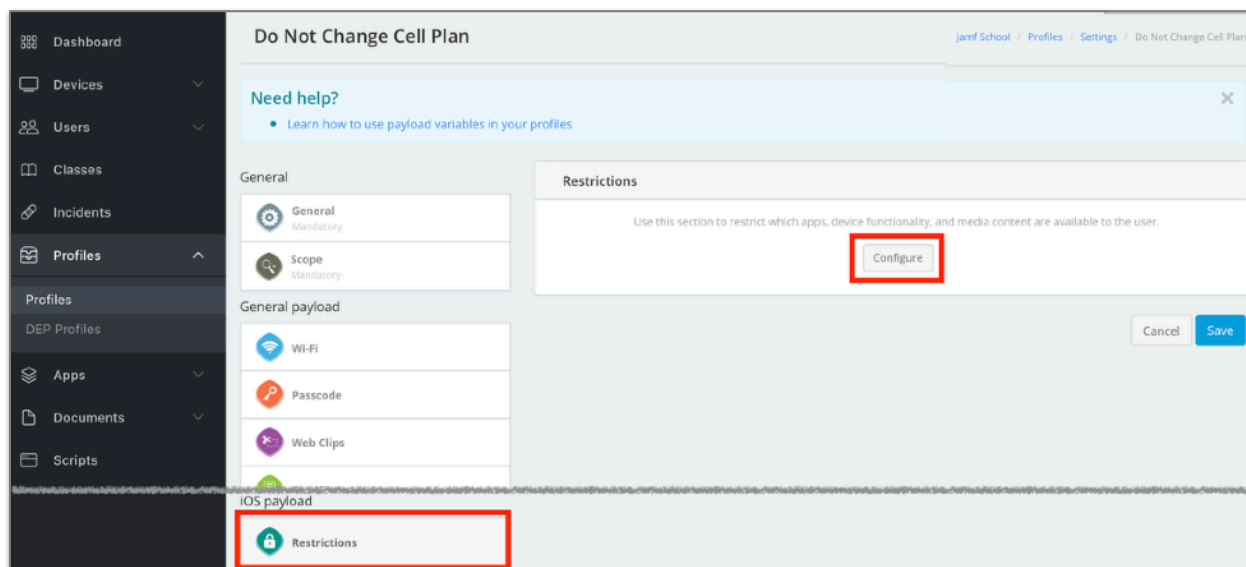
On the Details screen, provide a name for the Configuration Profile; you can also choose to add a description. Click "Next"



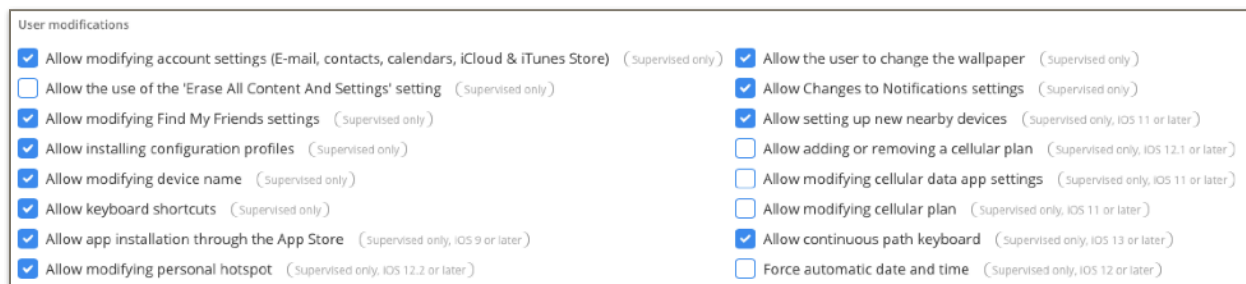
The final configuration step in the New Profile wizard is "Time Filter". We will not use this option when setting cellular restrictions. Click "Finish".



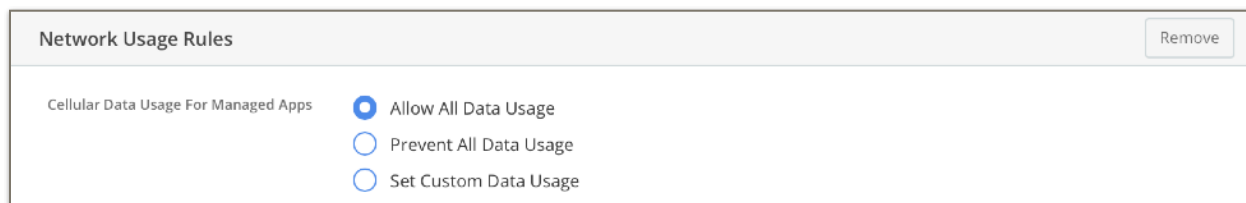
The newly created profile will now be in view. Click the "Restrictions" payload and then click "Configure".



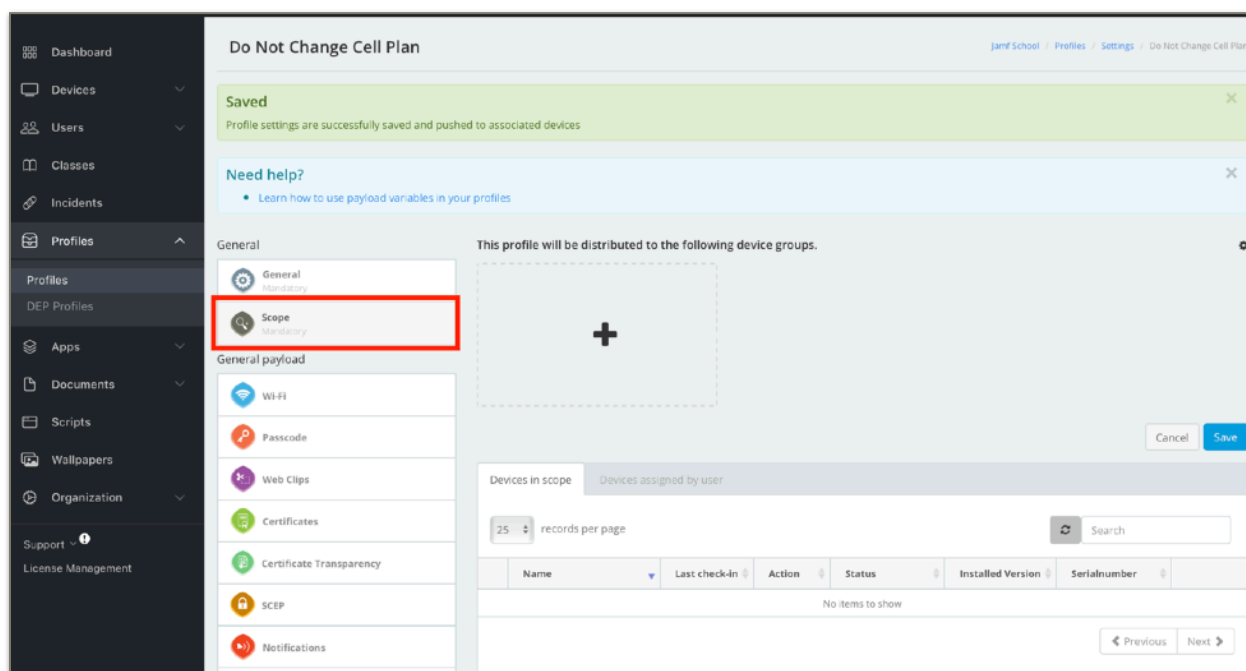
On the Functionality options page, scroll down to the "User modifications" section and uncheck "Allow adding or removing a cellular plan", "Allow modifying cellular plan", and "Allow the use of the 'Erase All Content and Settings' setting". Blocking the user from erasing their iPad is a good idea because they might do it incorrectly and remove their eSIM. It's safer to have an admin use Jamf School to erase the device if it's ever required. That way the admin can decide if the eSIM should be retained or not.



In the example above, the administrator has also unchecked the "Allow modifying cellular data app setting" option. This prevents the user from making changes to the apps that can use cellular data. Any app that can't use cellular data would have to run over WiFi. The Network Usage Rules payload will be used to determine which apps can use cellular data. The admin may elect to allow all apps to use cellular data as in the example below, or can set "Custom Data Usage" to allow only specific apps. For example, they might allow all apps to use cellular data except the YouTube app since a video app might consume a great deal of bandwidth.



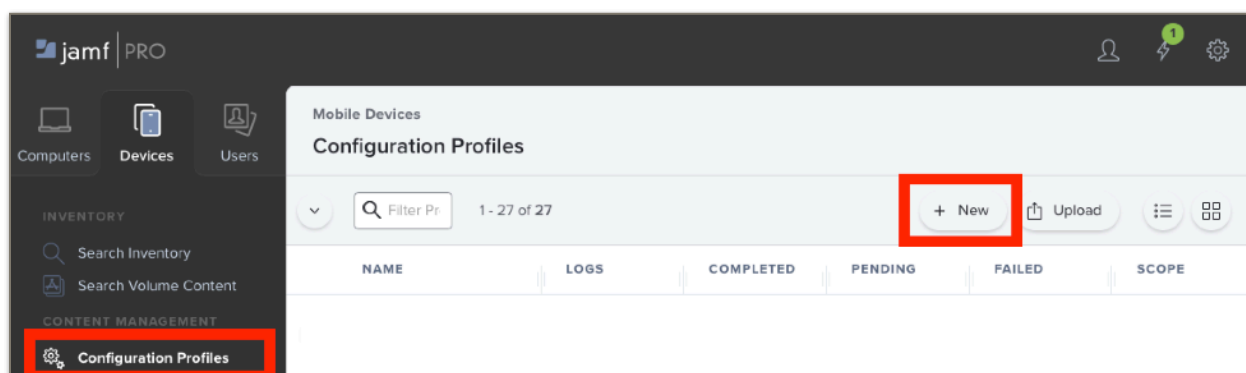
Click on the "Scope" option to choose the devices that need these settings. This profile could be scoped to the device models that are cellular-capable, but if you accidentally push it to others there will be no issue as it will have no effect on devices that do not have a cellular plan. Also, it's safe to push this profile to devices even before the cellular service has been activated because the "Refresh Cellular Plan" MDM command is not affected by these restriction settings. Save the profile once you've set your desired device scope.



Restricting the user's ability to change cellular settings — Jamf Pro

We can create a restrictions configuration profile to ensure that users do not remove the cellular plan settings from their devices.

If you already have a standard restrictions profile for your devices, you may elect to edit it to add the cellular restrictions. Or, to create a new profile, go to "Devices > Configuration Profiles > New".



Give the profile a name in the General pane.

The screenshot shows the 'New Mobile Device Configuration Profile' screen in Jamf. The 'General' pane is selected, and the 'Name' field is highlighted with a red box. The 'Name' field contains the text 'Do not change cell plan'. Other fields include 'Description', 'Category', and 'Distribution Method'.

Next, switch to the "Restrictions > Functionality" pane and restrict "Modify cellular plan" and "Modify eSIM settings".

The screenshot shows the 'New Mobile Device Configuration Profile' screen in Jamf, with the 'Restrictions: Functionality' pane selected. The 'Restrict' buttons for 'Modify cellular plan' and 'Modify eSIM settings' are highlighted with red boxes. The 'Restrict' button for 'Erase all content and settings' is also highlighted with a red box. The 'Restrict' button for 'Modifying personal hotspot settings' is not highlighted.

In the example shown, we are also preventing the user from erasing the device because if not done correctly, the eSIM can be deleted as well.

Because cellular data app settings are not restricted, users will be able to decide which apps can use cellular data because we are not managing the "Modifying cellular data app settings". This might be a good approach on a corporate device where we are allowing users to install things like YouTube or Netflix but encouraging them to turn off cellular data for these apps in favor of using WiFi. In education, we might restrict a student's ability to install their own apps from the App Store and then we can specify which of the apps we're installing for them can use cellular data and which cannot. These settings are managed in the "Network Usage Rules" payload. In this case we might want to restrict user modifications on the app cellular data settings.

The Hotspot restriction is another cellular-related option, though not specific to eSIM. This is usually unnecessary because the availability of this feature is typically managed by the carrier based on the cellular service plan purchased for the device.

Switch to the scope tab to select the devices that need these settings. This profile can be scoped to all mobile devices... it will have no effect on devices that do not have a cellular plan, or to a smart group with criteria of Mobile Carrier is not equal to "iPad" and is not equal to (no value). Save the profile once when you've completed the setup. The users will not be able to alter their cellular settings. It's safe to push this profile to devices even before the cellular service has been activated. The "Reset Cellular Plan" MDM command is not affected by this setting.

Avoid auto-erase after a number of incorrect passcode attempts

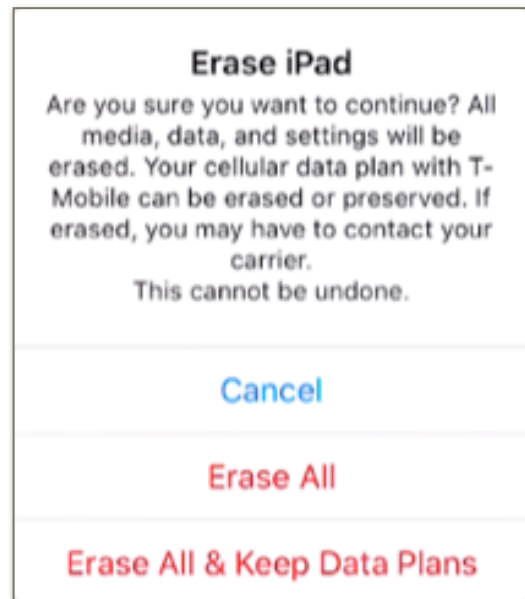
Unless your organization has a information security policy that requires it, do not set the option in the passcode payload that will wipe a device after a certain number of failed passcode attempts as this will also delete the eSIM settings.

Erasing Content and Settings

Removing Content and settings from an eSIM device

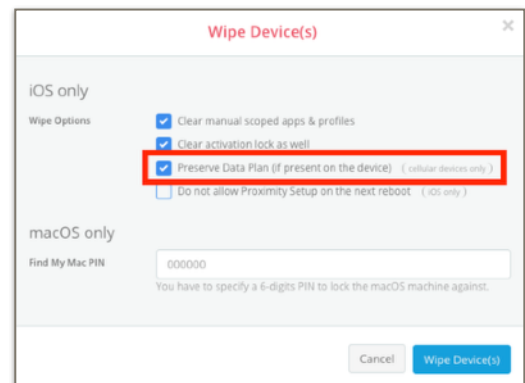
iPad OS allows users to erase content and settings. If an eSIM is present on the device, iPadOS will offer two options. If the device is going to a new user but it will be on the same cellular plan, select the "Erase All & Keep Cellular Plans" option. If you're going to be disposing of the device, transferring ownership, no longer want the device to have cellular service, or need to switch to a new cellular account, select the "Erase All" option.

By default, end-users have access to the erase command on their iPad and may not understand that they may need to retain their cellular plan. For this reason, consider using a restrictions profile to prevent an end user from erasing their own device. If a device erase is ever needed, an administrator can use the MDM command instead.



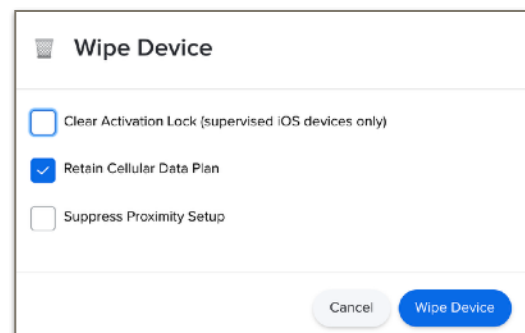
Sending the Device Wipe command to an eSIM device in Jamf School

To send a remote wipe command to a device (or to a series of devices) in Jamf School, check its box in the device listing and select Wipe Devices from the Advanced menu. In the resulting options menu, be sure to select "Preserve Data Plan" if you want the device to remain on your account.



Sending the Device Wipe command to an eSIM device in Jamf Pro

If you're using Jamf Pro to wipe a device with a remote action, be sure to check the "Retain Cellular Data Plan" option unless you no longer want the device to have cell service with your carrier. This command can be sent to an individual device from the Management tab in its inventory detail page or as a mass-action to a group of devices in an Advanced Search or Mobile Device Group.



Cellular-related Popup Notifications

The following message may be seen in iPadOS.

“Carrier Settings Update”

Carriers may occasionally ask Apple to add some cellular radio and network settings to cellular-capable devices after they've been purchased. You might see a prompt informing you that such an update is available when you're activating your iPads. Select the “Update” option if you see this prompt.

Ref: <https://support.apple.com/en-us/HT201270>

“Cellular Plan is Ready to be Installed”

Once your carrier has entered the IMEI and EIDs for your devices into their system, you might see a prompt on an iPad saying that it's ready to set up cellular data. You can activate the cellular plan on these devices if you're doing manual setups. But if you're configuring lots of devices and don't want to tap the activation by hand, disregard this message and instead use the “Refreshing Cellular Plan” mass-action command in Jamf School or Jamf Pro.

“No SIM Card Installed”

It's OK if you see this message on an eSIM device. It just means that in addition to the eSIM, there's also a slot for a physical SIM card and it's empty. You can see that the device has cellular service via the eSIM in "Settings->General->About" or by looking for the vertical signal-strength bars at the top of the home screen once the eSIM has been activated.

“Unable to Complete Cellular Plan Change”

This occurs when the MDM has sent the Refresh Cellular Plans to a device that is already activated. It won't hurt anything on the device if you accidentally send the command, but you should avoid doing so if a user already has the device so they aren't confused by the message.

“Cellular Plan Cannot Be Added; This code is no longer valid.”

This happens if you send a "Reset cellular plan" MDM command after removing the cellular settings on a previously activated eSIM device. The device's information is no longer active in the carrier's automated systems. You'll need to contact your carrier and give them the device's IMEI and EID numbers so they can re-enable the device in their eSIM servers. Once that's done, they may instruct you to restart the device. Then you should be able to re-activate the device's cellular service.

Bulk Activation Considerations

Apple's enrollment and app delivery systems can scale to handle huge demand surges, as can the cell carriers' device activation infrastructure. Your organization's wifi network and internet connection are more limited however, and so is the capacity of the cell tower covering your site. We should give some thought to what we're asking our networks to do when considering a device setup workflow.

Even if you're enrolling very large numbers of devices, they're typically being configured in batches. So in most real-world workflows, network demand required for MDM enrollment and cellular service activation is distributed over time. We won't expect to see too many problems. But downloading iPadOS updates and apps can require significant bandwidth, and an MDM will be busy negotiating device check-ins and Apple Push/App Store transactions during this period. We might have some issues if we try to activate cell service on too many devices at once, or while the devices are busy doing other things.

Examples:

- A school sent the refresh cellular command to 500 devices that had been enrolled via Automated Enrollment. It took an hour for the devices to activate their cell service. In this case, the network admin noticed that the wifi network and the school's connection to the Internet was saturated. The devices were downloading the many apps that the admin had scoped to the devices so they were competing for bandwidth.
- A Jamf admin pushed new versions of their company's in-house apps to 30,000 devices at the same time. A few cubes over, another admin was pushing the Reset Cellular Plan command to some new devices she was setting up. She didn't know about the app installs and couldn't tell why her commands didn't seem to be going through. The admins found that both their management tasks and the app installations went much better when they broke their app installs into 5,000-device chunks with a few minutes break in-between.
- A group of IT staff members reserved a large conference room to use for their device setup project and recruited a team of assistants. Things went well at first but they ran into trouble after turning on a couple dozen devices. They discovered that the network administrator had placed a limit on the number of devices that could be connected to the conference room's wifi access point.
- An organization decided to switch cellular providers and sent the Refresh Cellular Plan command to all their devices at once so they would activate with the new carrier. The switchover took longer than expected and failed on some devices.

The main point here is that a setup workflow for hundreds of devices may need to include some extra time for downloads and processing. It's best to wait until data-intensive activities like OS/app updates are completed before sending the reset cellular plan command and we shouldn't try to activate 1,000 devices all at once on the first try. We may have better success if we activate a few devices to start and then increase the device count on subsequent batches as we observe success.

The use of Apple Caching Service can dramatically reduce the load on your organization's internet connection when Apple OS and App installations are needed. Ref: <https://support.apple.com/guide/mac-help/what-is-content-caching-on-mac-mchl9388ba1b/mac>

Troubleshooting

Cell Service is not activating after sending the Refresh Cellular Plan command

1. Check for a typo in the eSIM Server URL you sent to the device(s).
2. Ensure the device IMEI and EID numbers have been sent to carrier for activation
3. Ensure device is turned on/charged
4. Check that the device is on Wifi or has a tethered data connection so that it can communicate with Apple, Jamf, and your cell carrier.
5. Perform the activation in a location where cellular service is available from your carrier.
6. Verify that there aren't any backlogged/pending MDM commands, macOS updates, or app installs.

Notes

Example eSIM Server URLs ("SM-DP+" Servers) for use with "Reset Cellular Plan"

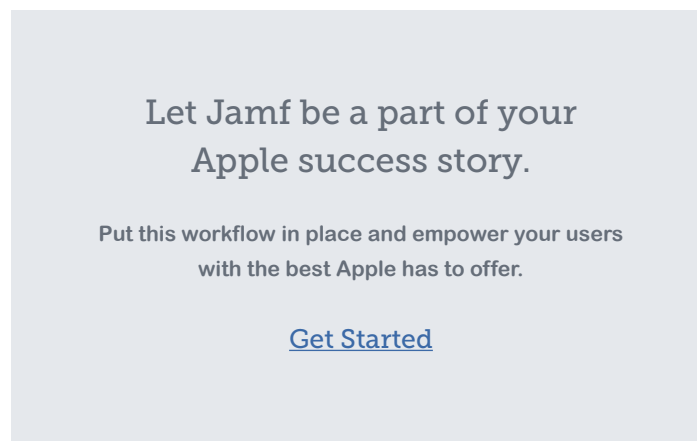
Note that these are only examples. Carriers may change their eSIM Server URLs from time to time and may have different servers for different eSIM versions. You should use the URL provided by your carrier.

Note that these URLs should not have a trailing "/".

Carrier	URL
Verizon	https://2.vzw.otgeuicc.com
AT&T	https://cust-001-v4-prod-atl2.gdsb.net
T-Mobile	https://t-mobile.gdsb.net

Switching Carriers

An iPad can have many eSIMs. When an iPad initializes its cellular radio, it will default to the most recently-provisioned eSIM. So if you wish to switch to a new carrier for a device, you can use the same Settings.app or MDM Reset Cellular Plan workflows that we previously discussed in the context of setting up a brand-new device.



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