jamf

Upgrade to macOS Catalina

using Self Service

with Jamf Pro

Contents

This guide was created using the following:
- Jamf Pro 10.20
- Jamf Admin
- Composer

Requirements:
- Current macOS Catalina installer
- The macOSUpgrade.sh script. It's an open source project that many Mac administrators around the world have contributed to and improved. It is publicly available at https://github.com/kc9wwh, but for your convenience, you can download here: https://hcsonline.com/images/files/macOSupgradeScript.zip, or download it from the source.

Overview
The purpose of this document is to supply guidance and best practice solutions to facilitate the successful silent in-place upgrade of Mac computers to the latest-available version of macOS Catalina 10.15. This workflow is for organizations that have Jamf Pro and allows users to open Self Service and upgrade with one click. The workflow takes advantage of the "startosinstall" command located in the Install macOS Catalina app (also referred to as the macOS installer).

What is a silent, in-place upgrade?
A silent, in-place upgrade is a method of upgrading a Mac computer to a newer operating system with minimal user interaction with the installer app. By using the "startosinstall" command you can accomplish this using scripting tools and a solution such as Jamf Pro.

What's the best way to distribute the macOS installer to my Mac computers?
The answer depends on your situation. If your Mac computers are located on-premises near a Jamf file share distribution point (https://docs.jamf.com/jamf-pro/administrator-guide/File_Share_Distribution_Points.html), you can download the full macOS installer (the more general term "macOS installer" refers to the app that is currently called "Install macOS Catalina") from the App Store, use Composer to package it, and copy it to your jamf repository or repositories. This way when a policy downloads the packaged macOS installer from the local file share distribution point, the download is performed over LAN speeds instead of over WAN speeds (which generally saves time and bandwidth). However, with this method, each time a new update of macOS comes out, you have to download the new macOS installer from the App Store, create a package for it, and upload it to your Jamf repository or repositories. If your organization does not use managed distribution of Apps & Books with Apple Business Manager or Apple School Manager, you need to use the method of packaging the macOS installer.

If you have content caching service available on-premises (see https://hcsonline.com/support/white-papers/what-is-the-caching-service for more information) this can speed up downloads of the macOS installer from the App Store for Mac computers. After the first Mac downloads the macOS installer, the macOS installer becomes available from the local content caching service, and subsequent downloads from other Mac computers will be over LAN speeds instead of WAN speeds.

As an alternative to the full macOS Installer, when you use Apps & Books to assign "Install macOS Catalina" to a Mac, a "stub" macOS installer that's around 15MB (instead of multiple gigabytes) is installed in that Mac computer's Applications folder. One advantage of the stub installer is that when you run it, it will automatically download the full installer. The downloaded full installer will be the latest update for that major version of macOS. So if you packaged up the stub installer for macOS 10.15.0, then a client Mac run the stub installer when macOS 10.15.3 is the latest version available, the stub installer downloads the full installer for macOS 10.15.3. Additionally, a Mac that runs the stub installer will use a content caching service if there is one available. Finally, you don't have to repackage the stub installer every time a point update is available for macOS.

If your Mac computers don't have access to a local Jamf file share distribution point or Apple content caching service, packaging up the full installer won't save any time or bandwidth.

NOTE: If you use Jamf Pro to automatically install the App Store version of Install macOS Catalina, immediately after the stub installer is installed, the Install macOS Catalina app automatically opens, which is intrusive to the user. This is why this guide shows you how to install the stub installer on one Mac, then package it. When you use Jamf Pro to install the package ot the stub installer, the Install macOS Catalina app does not automatically open.

Additional information on the items discussed in this guide:

More information on macOS Catalina:
https://www.apple.com/macos/catalina/

macOS Catalina upgrade requirements:
https://support.apple.com/en-us/HT201475

How to install macOS at your organization:
https://support.apple.com/en-us/ht208020

More information on the 'startosinstall' option
https://www.jamf.com/blog/streamlining-your-macos-upgrade-process/

Flags for the startosinstall command:
Open Terminal and run the command below to see all the flags available for the startosinstall command:

```
/Applications/Install\ macOS\ Catalina.app/Contents/Resources/startosinstall --usage
```

The output displays information about the options:

Arguments

```
--license, prints the user license agreement only.
--agreetolicense, agree to the license you printed with --license.
--rebootdelay, how long to delay the reboot at the end of preparing. This delay is in
seconds and has a maximum of 300 (5 minutes).
--pidtosignal, Specify a PID to which to send SIGUSR1 upon completion of the prepare
phase. To bypass "rebootdelay" send SIGUSR1 back to startosinstall.
--installpackage, the path of a package (built with productbuild(1)) to install after the
OS installation is complete; this option can be specified multiple times.
--eraseinstall, (Requires APFS) Erase all volumes and install to a new one. Optionally
specify the name of the new volume with --newvolumename.
--newvolumename, the name of the volume to be created with --eraseinstall.
--preservecontainer, preserves other volumes in your APFS container when using
--eraseinstall.
--forcequitapps, on restart applications are forcefully quit. This is the default if no
users are logged in.
--usage, prints this message.
```

Section 1: Download a version of Install macOS Catalina
This section shows you how to download either the stub installer or the full installer.

Option A: Download the stub installer.
The Mac you're using to create the package needs to be enrolled with Jamf Pro, so you can use Jamf Pro to install the stub installer on your Mac. Directions to enroll are outside the scope of this guide.

1. Log into in to Apple Business Manager or Apple School Manager.

2. In the sidebar, select Apps & Books from the sidebar.
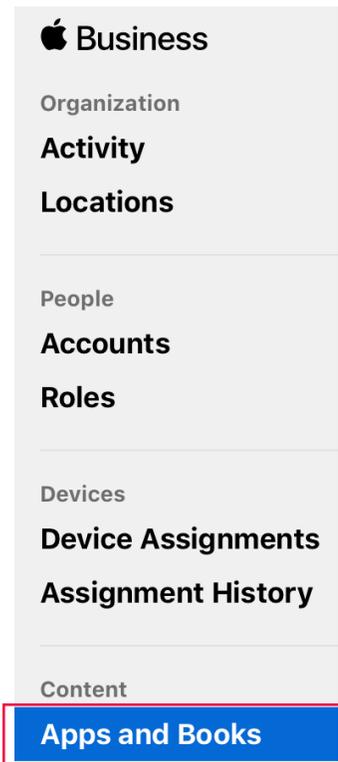
3. In the search field, enter **Catalina**. macOS Catalina will appear. Select it.

🔍 catalina	✕ | ☰

100 Total

Safe Haven
Nicholas Sparks · Book
★★★★⯪ $8.99

macOS Catalina
Apple · macOS App   100 Available
★★★★☆ $0.00
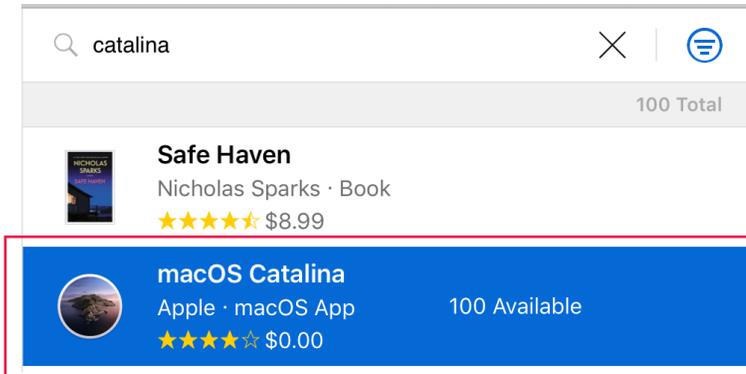
4. On the right side of the screen do the following:
    A. Assign to: Select your location.
    B. Quantity: Enter a quantity. If you're only going to use it on your Mac to download once, you
       can just enter 1.
    C. Click Get.
    D. After you click Get, the Get button changes to display the word "Purchasing." When the
       button displays the word Get again, but "Get" is unavailable to click, click your name in the
       upper-right corner of the browser and choose Sign Out.

macOS Catalina

Apple · macOS App

✓ Device Assignable

View Details ↗

Buy Licenses

Assign to

| Home Office | ⌄ | — A |

Price	Quantity	Payment Method	
$0.00	100	None	— B

Total Cost **$0.00**   **Get** — C
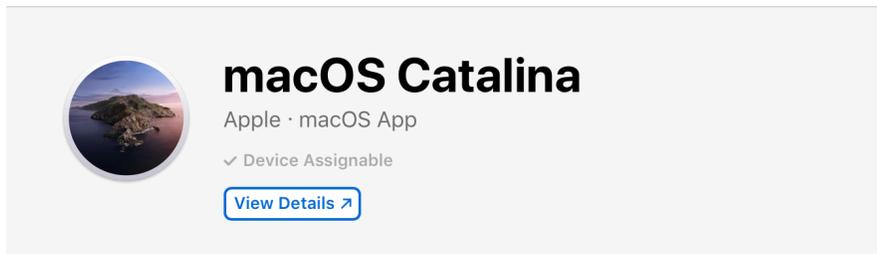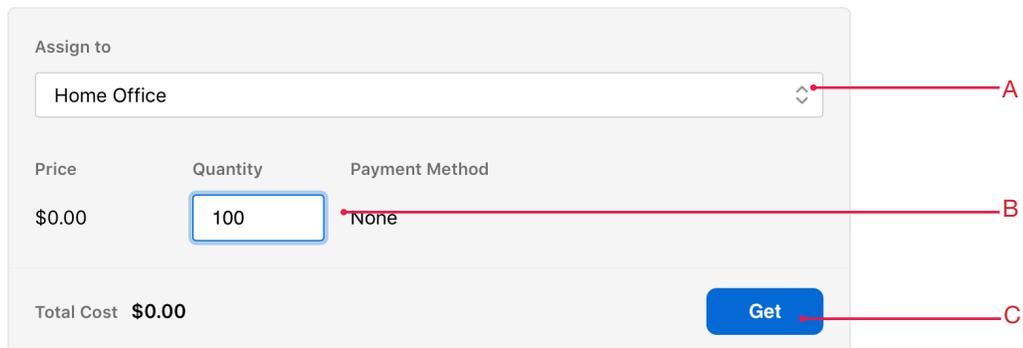
5. If necessary, log in to Jamf Pro.

jamf PRO

USERNAME

ex. admin

PASSWORD

• • • • • • • • • • • •

6. Select Computers, then select Mac App Store Apps.

Computers   Devices   Users

INVENTORY
Q   Search Inventory
🔍   Search Volume Content
🔍   Licensed Software

CONTENT MANAGEMENT
🗐   Policies
⚙   Configuration Profiles
🛡   Restricted Software
🖥   PreStage Imaging
Ⓐ   **Mac App Store Apps**
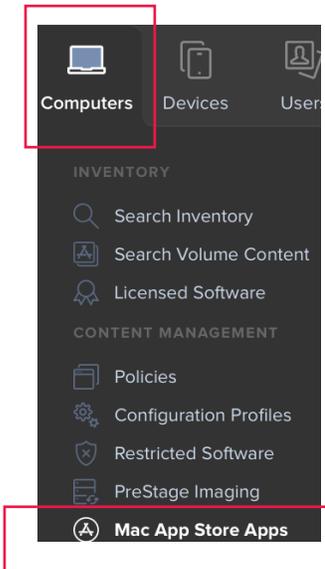
7. Select macOS Catalina.
   NOTE: If you just purchased macOS Catalina it make take a few minutes for Jamf Pro to display it.

macOS Catalina

8. Click Edit
9. Do the following:
      A. Select the General tab.
      B. Click the Category menu and choose a category.
      C. Click the Distribution Method menu and choose "Make available in Self Service"

10. Select the Scope tab
11. Near "Selected Deployment Targets", click Add.
[figure]

12. With the Computers tab selected, find the Mac you're working on now. If necessary, enter your
    Mac computer's name in the Filter Results tab.
[figure]

13. For the Mac you're using, click Add.
[figure]

14. Click Done.

15. Confirm that the Selected Deployment Targets section lists your Mac and your Mac only.
[figure]

16. Select the Managed Distribution tab.

17. Do the following:
     A. Select the checkbox for "Assign Content purchased in Volume".
     B. In the Location menu, confirm that the appropriate location for Apps & Books is selected.

18. Click Save.
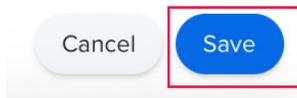
19. After the download is complete, Install macOS Catalina automatically opens. Press Command-Q
    to quit Install macOS Catalina.

Option B: Download the full installer.

1. Download the Install macOS Catalina.app from the App Store or the direct link below:

   https://apps.apple.com/us/app/macos-catalina/id1466841314?mt=12

2. After the download is complete, Install macOS Catalina automatically opens. Press Command-Q to quit Install macOS Catalina.

Section 2: Create a package of the macOS installer

1. Open Composer located in /Applications/Jamf Pro.

▼ 🔆 Jamf Pro
      🔆 **Composer**
      🔆 Jamf Admin
      🔆 Jamf Imaging
      🔆 Jamf Remote
      🔆 Recon

4. Authenticate with your administrator credentials when prompted, then click Install Helper.

Composer is trying to install a new helper tool.

Enter your password to allow this.

User Name: [   ]

Password: [   ]

Cancel   **Install Helper**
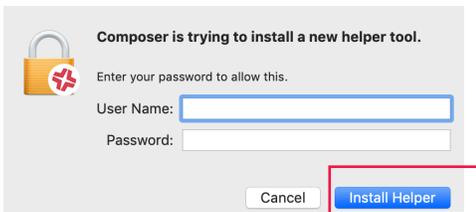
5. If prompted with the screen below, click System Preferences and allow full disk access to Composer under Security & Privacy > Privacy tab.

Composer requires full disk access

Some Composer functions require full disk access. To allow Composer full disk access, click "System Preferences", unlock system settings, and click the "+" button to add Composer.

☐ Don't display this message again

System Preferences   OK
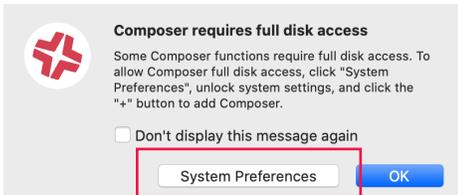
NOTE: If you haven't already used Composer, it defaults to opening a New & Modified Snapshot. If you see the "Choose a method to create your package" pane, Click Cancel.

Choose a method to create your package:

📷 Monitoring Installation
  Snapshot
💾 Operating System
  Build OS Package
🔆 Package Manifests
▶ Pre-Installed Software
  User Environment

New & Modified Snapshot   Monitor File System Changes   Normal Snapshot

Take a snapshot that watches for new files, as well as any files that are modified. A snapshot will be taken before and after the installation process, and then the two snapshots will be compared.

Cancel   Previous   Next

6. Drag the Install macOS Catalina.app from the Applications folder to the Sources section of the Composer window then click the "Build as PKG" button.
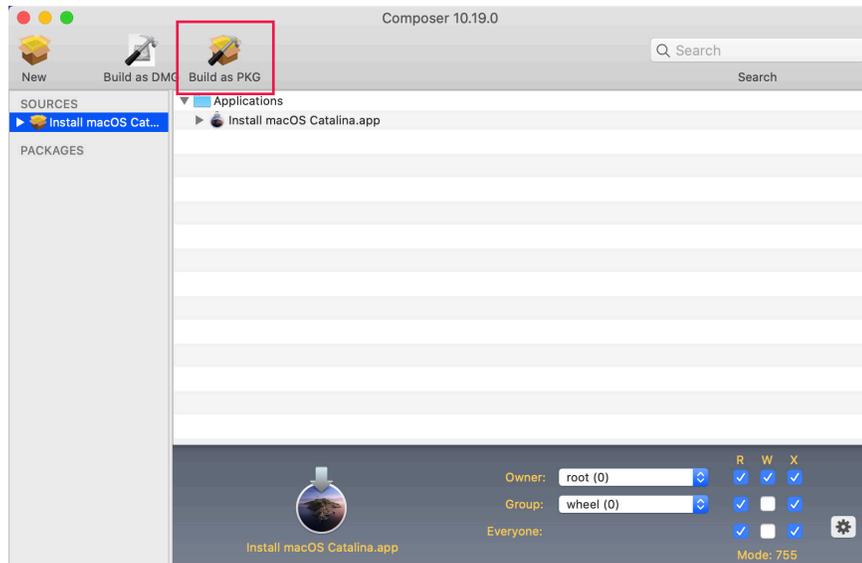
7. When prompted to save, click the menu at the top of the dialog, choose Desktop, then click Save.
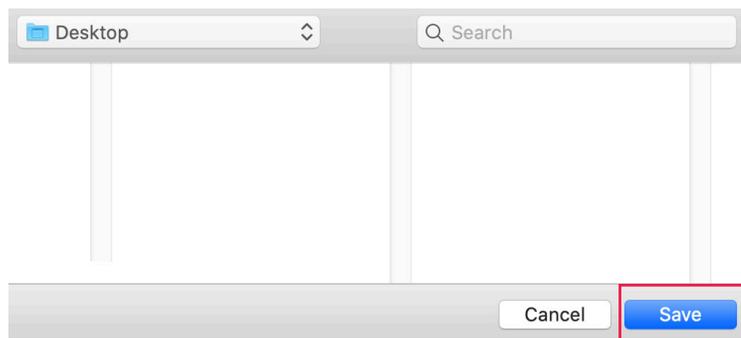
8. When Composer is done, use the Finder to confirm that you have the file below on your desktop.

Section 3: Download the macOSUpgrade script

1. In your browser open https:// github.com/kc9wwh/macOSUpgrade.

   https://github.com/kc9wwh/macOSUpgrade
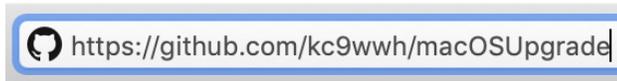
2. Control-click (or right-click) the macOSUpgrade.sh file then choose Download Linked File As

📁 helper-tools	Fix bug on building pkg and change output dir.
📁 imgs	Readme updates
📄 .travis.yml	CI Support
📄 LICENSE.md	Update year of copyright
📄 README.md	Add back High-Sierra-Compatibility-Checker link
📄 macOSUpgrade.s⁞	ut waiting to a log

   Open Link in New Tab
   Open Link in New Window

   Download Linked File
   Download Linked File As...
   Add Link to Bookmarks...
   Add Link to Reading List

   Copy Link

   Share ▶

   Inspect Element
   Services ▶

   macOS S⁞ade Process

   Workflow for doin⁞interaction.
   build passing

3. In the browser dialog leave the Save As file with its default value of macOSUpgrade.sh.

   Save As: macOSUpgrade.sh
   Tags:
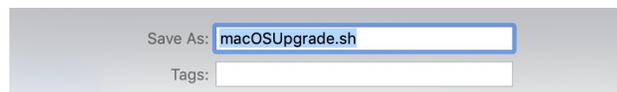
4. Set the location to save to a convenient location. This guide uses the Downloads folder as an example.

5. Click Save to save the file.

6. You can close the browser window.

Section 4: Upload the package of the macOS Installer and the upgrade script to your Jamf Pro repository

1. Open Jamf Admin located in /Applications/Jamf Pro.

▼ ❖ Jamf Pro
     ❖ Composer
     🔵 Jamf Admin
     ❖ Jamf Imaging
     ❖ Jamf Remote
     ❖ Recon
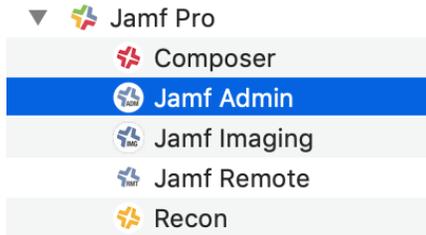
2. If necessary, Enter your Jamf Pro server address then click Save.
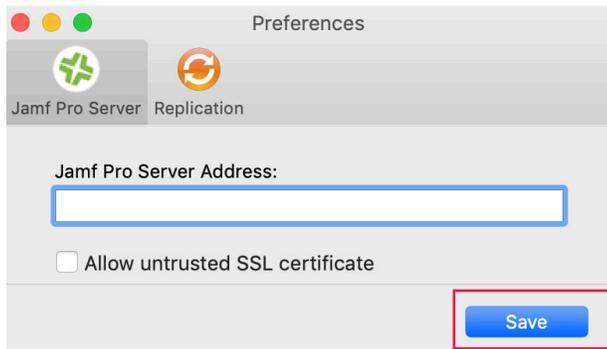
3. If necessary, Enter your Jamf Pro administrator credentials then click OK.

4. Drag the Install macOS Catalina.pkg from your Desktop to the All Items Repository section of the Jamf Admin window.

NOTE: This will take a few minutes to copy based on your network connection.
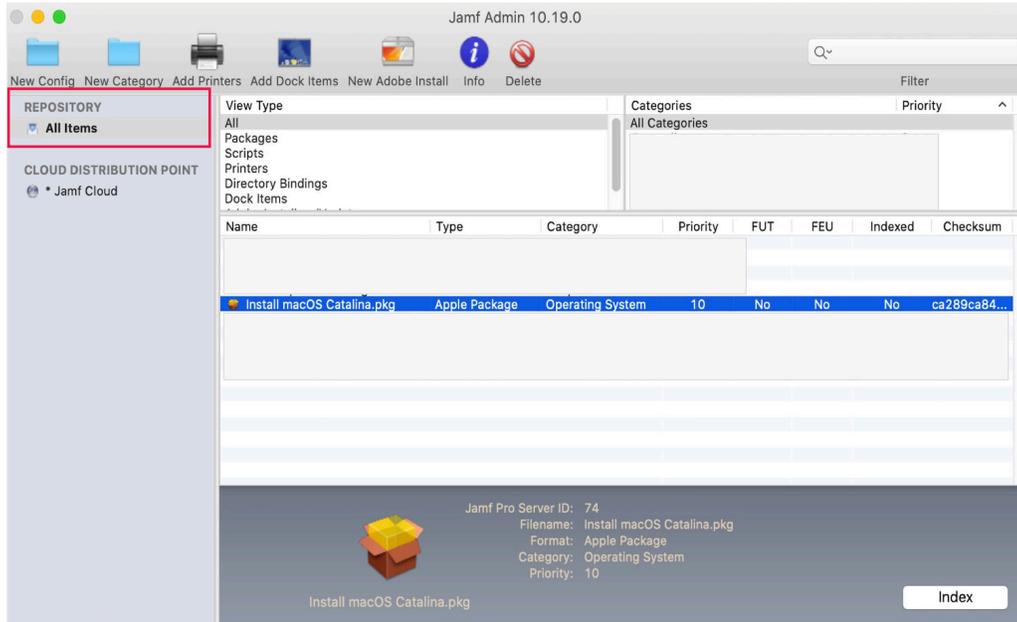
5. You should have downloaded the macOSUpgrade.sh script at the beginning of this guide. That file should be in your Downloads folder. Drag the Install macOSUpgrade.sh file from your Downloads folder to the All Items Repository section of the Jamf Admin window.
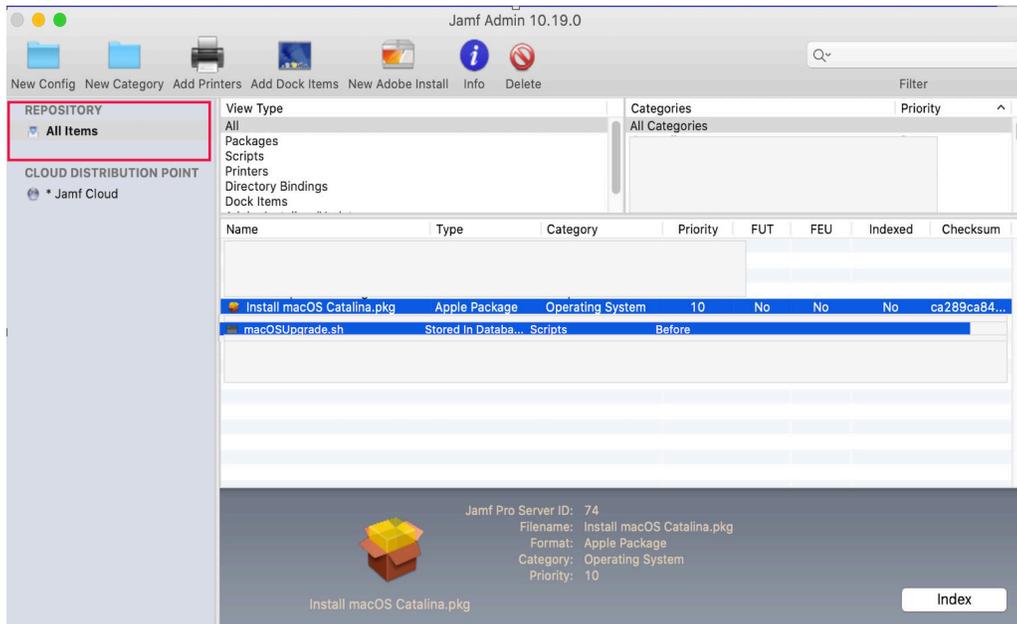
6. In Jamf Admin select macOSUpgrade.shsh then click the Info button in the toolbar.
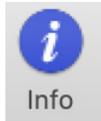
7. Optional: Click the General tab, then click the Category menu and choose an appropriate category.

Information for macOSUpgrade.sh

Summary   General   Options

Display Name
macOSUpgrade.sh

Category
Scripts

Filename
macOSUpgrade.sh

☐ Item is a DMG with an macOS Installer, or Adobe Updater/Installer for CS3 or CS4

Info

Notes

Previous   Next   Cancel   OK

8. Configure the following settings:

    A. Select the Options tab.

    B. Click the Priority menu and choose Before.

    C. In Parameter Label 4, enter the following: **The path to the Install macOS Catalina app**.

    D. In Parameter Label 5, enter the following: **Version of the Install macOS Catalina app you wish to use**.

       (NOTE: For reasons that are outside the scope of this guide, there is a limit to the number of characters you can enter in each Parameter field.)

    E. In Parameter Label 6, enter the following: **Custom policy trigger to download macOS**.

    F. Click OK.

Information for macOSUpgrade.sh

| Summary | General | **Options** | — A |

Script Options

Priority: Before — B

Parameter Labels

Parameter 4: The path to the Insta   Parameter 8: — C

Parameter 5: Minimum version of t   Parameter 9: — D

Parameter 6: Custom policy trigge   Parameter 10: — E

Parameter 7:   Parameter 11:

Script Limitations

OS Requirement:

Previous   Next   Cancel   **OK** — F
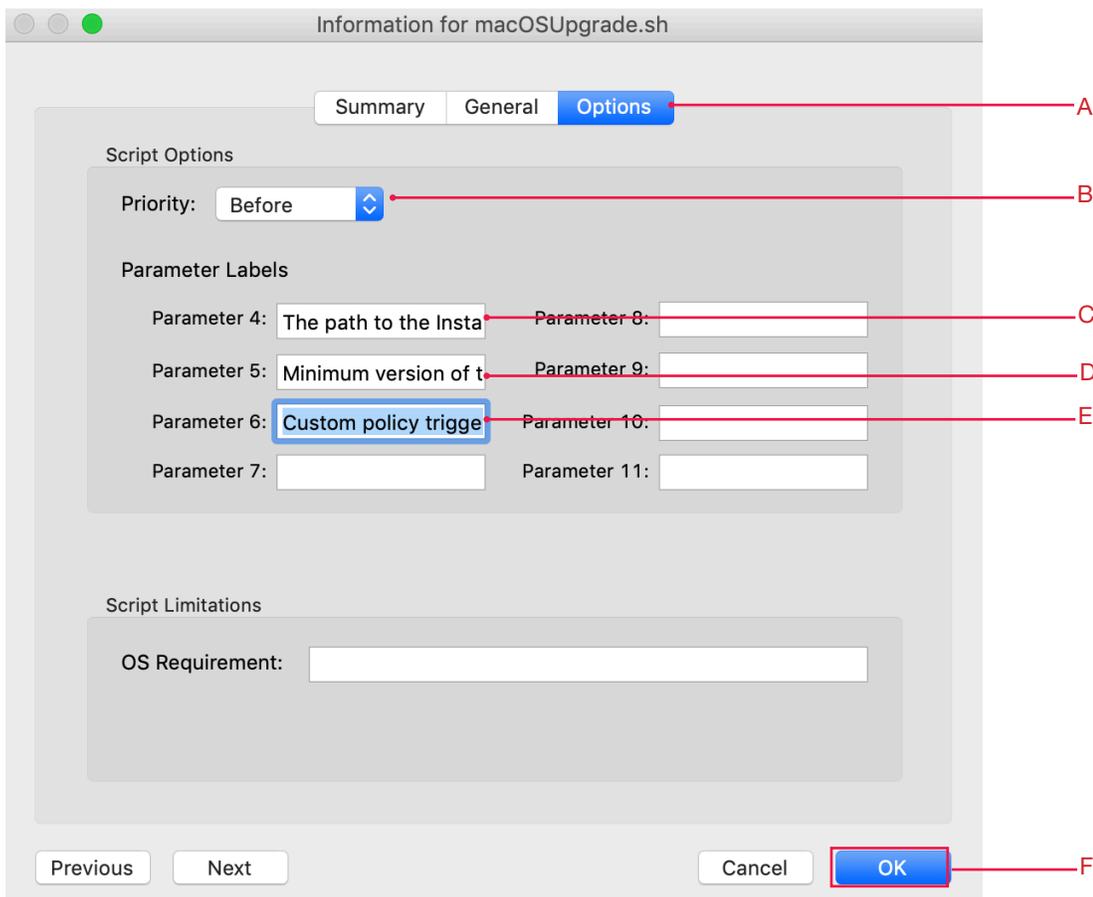
9. Go to the File menu, then choose Save. If you have multiple distribution points, you should replicate them at this time.

Jamf Admin   File   Edit   View

Save   ⌘S

Close Window   ⌘W

Show All   ⌘L

New Config   New Cate

New Configuration...   ⌘N

REPOSITORY

New Category...   ⇧⌘N

All Items
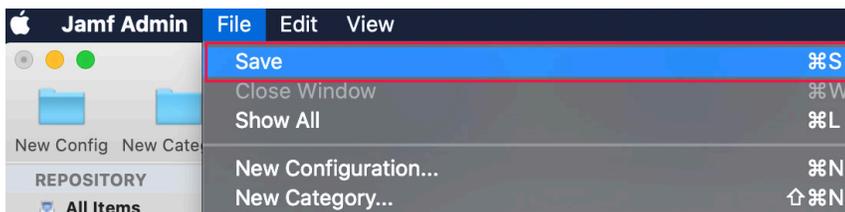
10. Quit Jamf Admin.

Section 5: Create a Jamf Pro policy to download the macOS installer

1. Log in to Jamf Pro.

2. Do the following:
   A. Create a new policy.
   B. In the Display Name field enter a descriptive name such as "Download macOS Catalina".
   C. In the Trigger section, select the checkbox Custom.
   D. In the Custom event field, enter a custom trigger name (without any whitespace). This guide uses download-catalina as an example.
   E. Click the Execution Frequency pop-up menu and choose Ongoing.

3. Select Packages, then select Configure.
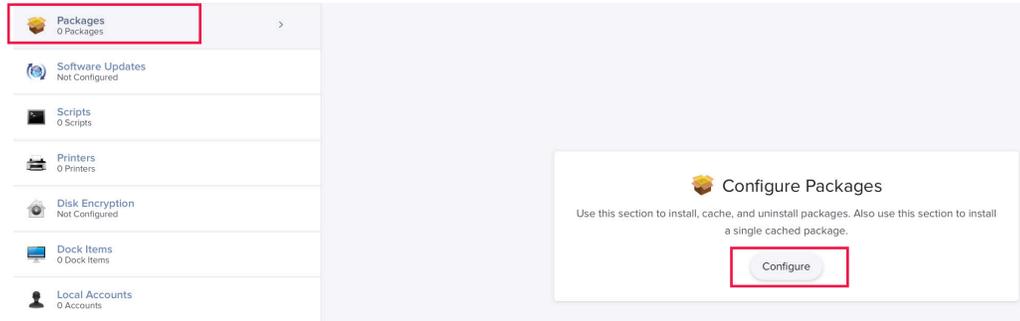
4. Select the Install macOS Catalina.pkg. If necessary, select your desired Distribution point.
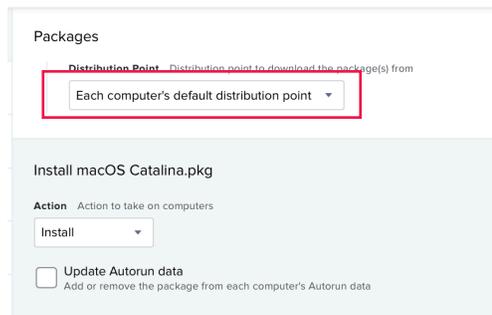
5. Select Scope. In general, we recommend that you set the scope to a test group of Mac computers and validate the workflow before you set the scope to All Computers. However, this policy will be run only from a policy that you should initially scope only to a test group (or manually in the command line environment with the Jamf command and -event flag).

6. Click Save.
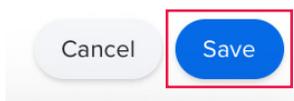
NOTE: When the policy which you will create next runs the installation script, if the macOS Installer is not already in the Applications folder, then the installation script uses the custom trigger to call this policy. In step 3 of the next section, ensure that you specify the exact trigger name from step 2 above, otherwise the installation script will not trigger the policy that downloads the macOS Installer.

Section 6: Create a Jamf Pro policy to upgrade to macOS Catalina with Self Service

1. Do the following:
   A. Create a new policy.
   B. In the Display Name field enter a descriptive name such as "Upgrade to macOS Catalina".
   C. DO NOT select any triggers. This policy will be triggered by Self Service.
   D. Click the Execution Frequency menu and choose Ongoing.

General

Display Name   Display name for the policy

Upgrade to macOS Catalina   B

☑ Enabled

Category   Category to add the policy to

Operating System   ▾

Trigger   Event(s) to use to initiate the policy

☐ **Startup**
When a computer starts up. A startup script that checks for policies must be configured in Jamf Pro for this to work

☐ **Login**
When a user logs in to a computer. A login hook that checks for policies must be configured in Jamf Pro for this to work

☐ **Logout**
When a user logs out of a computer. A logout hook that checks for policies must be configured in Jamf Pro for this to work

C ———

☐ **Network State Change**
When a computer's network state changes (e.g., when the network connection changes, when the computer name changes, when the IP address changes)

☐ **Enrollment Complete**
Immediately after a computer completes the enrollment process

☐ **Recurring Check-in**
At the recurring check-in frequency configured in Jamf Pro

☐ **Custom**
At a custom event

Execution Frequency   Frequency at which to run the policy

Ongoing   ▾   D

☐ **Make Available Offline**
Cache the policy to ensure it runs when Jamf Pro is unavailable

2. Select Scripts, then select Configure.

Scripts	
🖥 Scripts 0 Scripts	›
🖨 Printers 0 Printers	
💿 Disk Encryption Not Configured	
🖥 Dock Items 0 Dock Items	
👤 Local Accounts	

🖥 Configure Scripts

Use this section to run scripts.

Configure
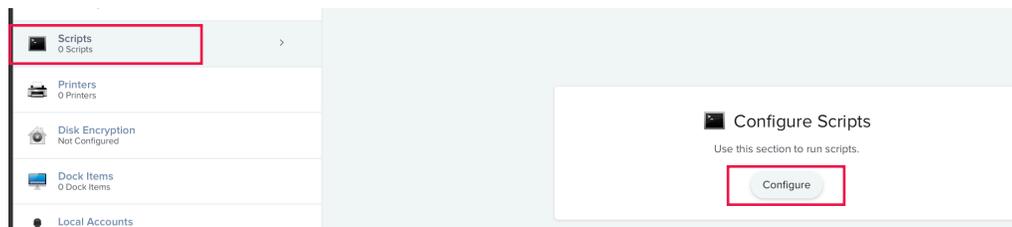
3. Select the macOSUpgrade.sh script.
4. Do the following:
    Complete labeled parameters with the appropriate values:
    A. Install macOS Catalina app path: Enter the path the script should use for the installer
        application; if you have followed this guide enter
        /Applications/Install macOS Catalina.app.
    B. macOS version supported: Enter the minimum version of the "Install macOS Catalina" that
        the script will check for to determine if a download is needed. As an example, this guide uses
        10.15.3.
    C. Custom Policy trigger to download macOS: Enter the custom policy trigger that you entered
        in the policy to download the installer app. The script triggers the custom policy only if the
        Mac does not already have the Install macOS Catalina app downloaded. If you have followed
        this guide the trigger is **download-catalina**.

Scripts

macOSUpgrade.sh

Priority   Priority to use for running the script in relation to other actions

Before ▼

Parameter Values   Values for script parameters. Parameters 1–3 are

The path to the Install macOS Catalina app.

/Applications/Install macOS Catalina.app ————————————— A

Minimum version of the Install macOS Catalina app

10.15.3 ——————————————————————————————— B

Custom policy trigger to download macOS.

download-catalina ——————————————————————— C

4. Select Scope. We recommend that you set the scope to a test group of Mac computers and
    validate the workflow before you set the scope to All Computers.

| Options | Scope | Self Service | User Interaction |

Targets

Target Computers
Computers to deploy the policy to

All Computers   ▼

5. Select Self Service, then do the following:
   A. Select "Make the policy available in Self Service."
   B. In the Self Service Display Name field, enter **Upgrade to macOS Catalina**.
   C. In the Description field, enter a relevant description for your organization. An example follows:
      macOS Catalina is a critical upgrade. The Technology Department recommends that you install this to keep your Mac on the latest version of the Mac operating system. Should you have any questions about this upgrade please contact the Technology Department directly.
      *** PLEASE CLOSE ALL APPLICATIONS BEFORE UPGRADING ***
      important: This process will take ~ 45 minutes, depending on network speed and your Mac needs to be connected to power.
   D. Select the checkbox for " Ensure that users view the description".
   E. Upload an icon if you have one for macOS Catalina.
   F. Select a category to display this policy in.
   G. Click Save.

6. On an enrolled Mac, Open Self Service (you can use Spotlight, or find it in /Applications/Jamf Pro).
   Select the category that you put the Upgrade to macOS Catalina in. Confirm that it's now available
   in Self Service for all to use.
   NOTE: Please use a test Mac computer if you want to test things out to make sure all is working in
   your environment.
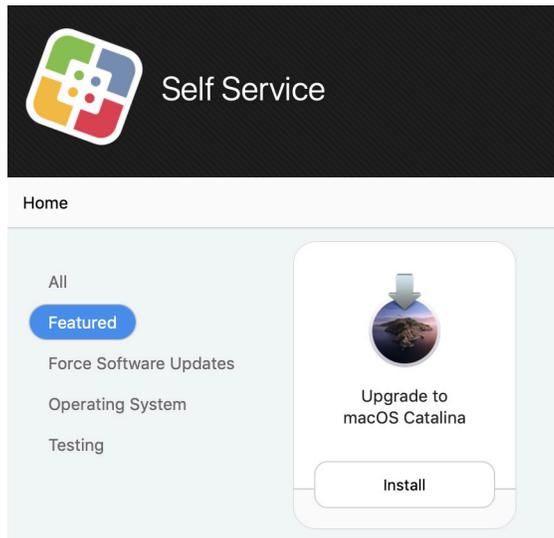
Section 7: Test the workflow

1. Open Self Service.

2. Select the category that assigned to "Upgrade to macOS Catalina". You will see it's now available in Self Service.
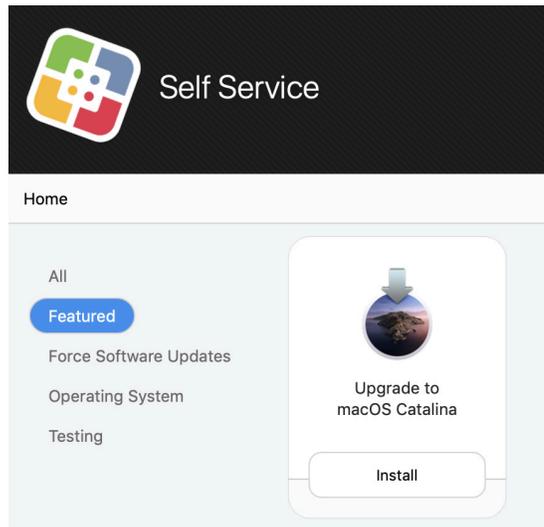
3. Click Install, and confirm that the upgrade works as expected. If the process stops for some reason, fix the issue, then in Self Service click Reinstall.

This completes the guide.