ADMIN:DOCS

macOS 27 Golden Gate: Create a Bootable USB Installer

Step-by-step guide for Terminal and USB media: download the installer, prepare drives with diskutil, run createinstallmedia, and boot on Apple Silicon.

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A bootable USB installation medium is an indispensable cornerstone of solid system administration. In critical situations, it saves lengthy gigabyte downloads over Internet Recovery, enables reproducible clean installations across multiple systems, and serves as a reliable lifeline whenever the operating system fails to boot following a corrupted update or filesystem damage.

With <i class="fa-brands fa-apple"> macOS 27 („Golden Gate“), Apple marked a definitive architectural turning point: the operating system exclusively supports Apple Silicon hardware (M1 through M5). All legacy Intel architecture components have been completely stripped from the codebase. In practice, this means traditional startup shortcuts—such as holding the `Option` or `Alt` key during power-on or accessing the legacy T2 Startup Security Utility—no longer exist in macOS 27.

This tutorial guides you through the entire workflow step by step. We execute every single task directly via the command line, explain the technical mechanisms running under the hood, and safeguard each command so you never risk overwriting your primary system drive.

Prerequisites and Hardware Requirements

Before opening a Terminal window, let us establish the necessary technical prerequisites. Creating a 14-gigabyte installer imposes specific storage and permission requirements.

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Selecting the Right USB Flash Drive

Not every USB flash drive is equally suitable for creating installation media:

- **Capacity:** At least 16 GB of storage capacity is mandatory. Because the base system, recovery images, and shared package bundles in macOS 27 consume approximately 14.2 GB, a **32 GB flash drive** is strongly recommended in practice. This prevents write operations from failing at partition boundaries near completion.
- **Interface:** Always prioritize USB 3.2 or native USB-C flash drives. Legacy USB 2.0 drives often take over 45 minutes to transfer the installer payload and suffer from severe thermal throttling under sustained load, leading to elusive I/O errors.
- **Direct Connection:** Connect the drive directly to a USB-C or Thunderbolt port on your Mac. Avoid unpowered USB hubs or daisy-chained monitor pass-throughs during the imaging process.

> ⚠ **Warning: Risk of Irreversible Data Loss:** The entire contents of the selected USB drive will be completely erased during partitioning. Check the drive in Finder beforehand and back up any critical files or photos to an alternate storage device.

Permissions and the macOS Security Model

In earlier macOS releases, executing a command with `$ sudo` was sufficient to write raw blocks to an external disk. Under modern macOS, the Transparency, Consent, and Control (TCC) subsystem enforces strict kernel-level access controls over storage devices.

To allow Terminal to reformat and write directly to your external USB storage, you must grant it explicit **Full Disk Access**:

1. Open **System Settings** from the Apple menu at the top left.
2. Navigate to **Privacy & Security** $\rightarrow$ **Full Disk Access**.
3. Locate **Terminal** in the list of applications.
4. Enable the toggle switch next to Terminal. If prompted, authenticate using Touch ID or your administrator password.

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> **Why sudo alone is not enough:** While the Unix command `$ sudo` elevates a process to temporary root privileges (User ID 0), the macOS TCC security framework operates hierarchically above standard Unix permissions. Without TCC authorization, the kernel immediately rejects raw block writes to storage devices (`/dev/rdisk*`) with an `Operation not permitted` error. For more details on Unix permission concepts, see our guide on Permissions and chmod in Linux and macOS.

Workflow Overview

The preparation and creation process follows a strict sequential order. Each step builds directly upon the previous one:

1. **1. Download Installer** Fetch the full package bundle via Terminal or the Mac App Store
2. **2. Identify Drive** Determine the exact physical device identifier using diskutil
3. **3. Format Media** Apply GUID Partition Table (GPT) and Mac OS Extended filesystem
4. **4. Write Installer** createinstallmedia transfers system files and seals boot binaries
5. **5. Access Startup Options** Shut down Mac and trigger boot picker via the power button

Step 1: Download macOS 27 Golden Gate

The installation bundle must be placed as a complete application package named `Install macOS Golden Gate.app` inside the central `/Applications` directory. Two reliable methods are available for this task.

Method A: Download via Terminal (Recommended)

For system administrators and anyone who prefers full visibility over background processes, the built-in `softwareupdate` CLI tool offers the cleanest approach:

```
softwareupdate --fetch-full-installer --full-installer-version 27.0
```

This command connects directly to Apple's Content Delivery Network (CDN), validates package chunk integrity, and downloads the ~14 GB payload directly to the Applications directory.

During the download, the Terminal displays an active progress indicator:

```
Scanning for 27.0 installer
Installing: 12.0%... 35.0%... 68.0%... 100.0%
Successfully downloaded: /Applications/Install macOS Golden Gate.app
```

> **Terminal Fundamentals:** If you are new to working with Unix shells, consult our foundational reference on Command Line Shells: Understanding Terminal and CLI. It covers argument parsing, output pipelines, and terminal shortcuts.

Method B: Download via the Mac App Store

If your network environment restricts direct Terminal connections to update servers, use the standard App Store interface:

1. Open the **App Store** app.
2. Search for `macOS Golden Gate` in the search field.

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3. Click **Get** or **Download** on the product page. The system automatically redirects the request to the Software Update preference pane.
4. Confirm the download.

> ⚠ **Important Intermediate Step:** When the download completes via the App Store, macOS automatically launches the graphical installation wizard. **Quit this wizard immediately** via the menu bar (**Quit Install macOS**) or by pressing `Cmd + Q`. Continuing with the wizard will upgrade your currently running operating system instead of preparing your USB drive!

Verifying the Installer Bundle

Before formatting the USB drive, verify that the application bundle is present and intact in the target directory:

```
ls -ld "/Applications/Install macOS Golden Gate.app"
```

The output should confirm the directory structure:

```
drwxr-xr-x@ 3 root wheel 96 Sep 14 18:22 /Applications/Install macOS Golden Gate.app
```

If the command returns `No such file or directory`, the download was interrupted or is still cached as an incomplete temporary file (`.download`).

Step 2: Identify and Format the USB Media

Now connect your USB flash drive to your Mac. In this step, we identify the exact raw disk device assigned by the kernel. macOS numbers storage devices using the Unix naming convention `/dev/disk0`, `/dev/disk1`, `/dev/disk2`, and so forth.

Listing Connected Storage Devices

Run the following command in Terminal:

```
diskutil list
```

This outputs a comprehensive list of all detected storage controllers, synthesized APFS containers, and physical storage devices.

Scroll down to the section labeled **external, physical**:

```
/dev/disk4 (external, physical):
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:     FDisk_partition_scheme                        *31.0 GB    disk4
   1:               Windows_FAT_32 USB-STICK                 31.0 GB    disk4s1
```

In this real-world example, the USB flash drive is clearly identified as `/dev/disk4`.

> ⚠ **Critical Danger Zone - Drive Selection:** Always verify your drive by its storage capacity (`SIZE`) and label (`NAME`). Under no circumstances select `/dev/disk0`, `/dev/disk1`, or `/dev/disk3` if they are marked as *internal, physical* or *synthesized*. Those represent the

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system partitions of your internal SSD.

What does synthesized mean? Apple utilizes the Apple File System (APFS), where a physical drive (such as `disk0`) hosts an APFS container. macOS dynamically synthesizes virtual storage devices from this container. For disk formatting tasks, we always target the top-level physical device node—in our case, the external drive `/dev/disk4`.

Partitioning and Formatting the Target Media

The `createinstallmedia` utility requires the destination volume to use a **GUID Partition Table (GPT)** and the **Mac OS Extended (Journaled)** filesystem format.

Execute the following command, replacing `disk4` with the specific device node of your USB drive:

```
diskutil eraseDisk JHFS+ "MyInstaller" /dev/disk4
```

Command parameters broken down:

- `diskutil eraseDisk`: Instructs the operating system to completely repartition and format the target disk.
- `JHFS+`: The filesystem identifier for Journaled HFS+ (Mac OS Extended Journaled).
- `"MyInstaller"`: The temporary mount volume name assigned during formatting.
- `/dev/disk4`: The physical device node of the destination USB drive.

Within two to three seconds, Terminal confirms successful execution:

```
Started erase on disk4
Unmounting disk
Creating the partition map
Waiting for partitions to activate
Formatting disk4s2 as Mac OS Extended (Journaled) with name MyInstaller
Mounting disk
Finished erase on disk4
```

Your USB drive is now formatted and mounted at `/Volumes/MyInstaller`.

Step 3: Write the Installer with createinstallmedia

Apple includes a dedicated administrative utility named `createinstallmedia` inside every full macOS installer bundle. This tool manages all low-level operations: wiping the target volume, extracting system packages, configuring the preboot environment, and cryptographically signing boot files for Apple Silicon hardware.

Launching the Media Creation Process

Initiate the write operation by executing the following command on a single line:

```
sudo "/Applications/Install macOS Golden Gate.app/Contents/Resources/createinstallmedia"
--volume /Volumes/MyInstaller --nointeraction
```

□□ Practical Parameter Tip:

The `--nointeraction` flag suppresses the manual confirmation prompt (`Type (Y) to continue:`), allowing the process to begin immediately after password authentication. If you prefer to review

the target drive one final time before writing, omit `--nointeraction`.

Understanding the Write Process

Because the command is prefixed with `sudo`, Terminal prompts for your administrator password:

```
Password:
```

Type your password and press Return.

> **Terminal Password Entry Security:** During password entry in Terminal, the cursor does not move and no placeholder dots or asterisks are displayed. This is intentional Unix security behavior to prevent shoulder surfing. Type your password steadily and press Return.

The tool then progresses through four distinct phases:

```
Erasing disk: 0%... 10%... 20%... 30%... 100%
Copying essential files...
Copying to disk: 0%... 10%... 20%... 30%... 40%... 50%... 60%... 70%... 80%... 90%... 100%
Making disk bootable...
Copying boot files...
Install media now available at "/Volumes/Install macOS Golden Gate"
```

□□ **The Apparent Pause at 99%:** Many users worry when the progress indicator pauses at 99% or during the `Making disk bootable...` phase for several minutes. This is normal system behavior: macOS buffers data in memory dirty pages before issuing an explicit `fsync` system call to flush and commit all writes to the physical flash cells. Do not disconnect the drive under any circumstances during this phase!

Once the confirmation line `Install media now available at "/Volumes/Install macOS Golden Gate"` appears, the write process is complete and the drive is safely remounted.

Step 4: Booting from the USB Installer on Apple Silicon

With macOS 27 Golden Gate, startup mechanics on Apple Silicon are fundamentally unified and distinct from legacy Intel architectures.

Apple Silicon (M1 through M5)

Startup Trigger
: Press and hold Power button (Touch ID) for 10 seconds

Boot Environment
: 1-Mac Startup Options screen

Security Policy
: Cryptographic hardware binding via Secure Enclave (SEP)

Legacy Intel Macs

Startup Trigger

Hold Option / Alt key at startup chime

Boot Environment

Grey boot volume picker menu

Security Policy

T2 Startup Security Utility configuration

Shared: The USB installer drive is selected as the external boot target

Step-by-Step Boot Procedure

1. **Shut Down Mac Completely** Select Apple Menu $\rightarrow$ Shut Down and wait until all display and port LEDs turn off
2. **Connect USB Drive Directly** Plug the installer flash drive directly into a native USB-C or Thunderbolt port
3. **Press and Hold Power Button** Keep the Touch ID / Power key pressed continuously for approximately 10 seconds
4. **Watch Display Prompt** Wait for the on-screen text: "Continue holding power button for startup options..."
5. **Release Power Button** Release your finger when the prompt changes to "Loading startup options..."
6. **Select Installer Drive** Click the yellow external disk icon labeled "Install macOS Golden Gate" and select Continue
7. **Authorize Device Ownership** Enter your local administrator password to authenticate the boot policy with the Secure Enclave

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> **Understanding Device Ownership Authentication:** Apple Silicon Macs bind bootable environments to a Local Boot Policy managed by the Secure Enclave Processor (SEP). When initiating startup from an external installation medium, macOS prompts for credentials from an existing administrator account on that Mac. Select your username and enter your standard login password to sign the boot policy for the external volume.

Common Troubleshooting Scenarios

Even when following standard procedures, specific operational hurdles can arise in production environments. Here are verified solutions:

Error 1: Operation not permitted

- **Symptom:** Immediately upon executing `createinstallmedia`, Terminal aborts with `Operation not permitted`.
- **Root Cause:** Terminal has not been granted Full Disk Access in macOS System Settings (TCC policy restriction).
- **Resolution:** Navigate to System Settings $\rightarrow$ **Privacy & Security** $\rightarrow$ **Full Disk Access**. Enable the toggle switch next to **Terminal**. Fully quit Terminal (`Cmd + Q`) and relaunch it to apply the updated permission profile.

Error 2: createinstallmedia: command not found

- **Symptom:** The shell reports that the executable path cannot be located.
- **Root Cause:** The application name in `/Applications` differs from the specified command, or the download was incomplete.
- **Resolution:** Run `ls -la /Applications/Install*` to inspect the exact package name on your disk. If an item named `Install macOS Golden Gate.app.download` is listed, the download is still in progress.

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Error 3: USB Flash Drive Does Not Appear in Startup Options

- **Symptom:** Holding the power button displays only the internal Macintosh HD volume; the external yellow USB disk icon is missing.
- **Root Cause:** The partition table was not initialized as GUID Partition Table (GPT), or an unpowered intermediate hub blocks early device discovery.
- **Resolution:** Move the flash drive directly to a built-in chassis port. If necessary, re-run Step 2 (`diskutil eraseDisk JHFS+ ...`) to ensure a compliant GPT partition structure.

Command Reference (Cheatsheet)

1. Download Full Installer Fetches the 14 GB installer package directly from Apple servers

```
$ softwareupdate --fetch-full-installer --full-installer-version 27.0
```

2. List Storage Devices Identifies the physical device identifier (/dev/diskX) of the USB drive

```
$ diskutil list
```

3. Format Target Media Initializes the drive with GUID Partition Table (GPT) and Mac OS Extended

```
$ diskutil eraseDisk JHFS+ "MyInstaller" /dev/diskX
```

4. Write Installer Media Extracts system packages, sets up preboot files, and signs boot binaries

```
$ sudo "/Applications/Install macOS Golden Gate.app/Contents/Resources/createinstallmedia" --volume /Volumes/MyInstaller --nointeraction
```

5. Safely Unmount Drive Unmounts all partitions before physically disconnecting from the Mac

```
$ diskutil unmountDisk /dev/diskX
```

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External Resources

Apple Support: Create a Bootable Installer for macOS Official documentation for createinstallmedia commands and syntax

Apple Support: Options available at startup on a Mac with Apple Silicon Comprehensive overview of Startup Options, recovery environments, and DFU mode

Apple Platform Security Guide Architectural details on Secure Enclave (SEP), Local Boot Policies, and volume ownership

Related Documentation

Command Line Shells: Understanding Terminal and CLI Foundations of shell execution, syntax, parameters, and command pipelines

Permissions and chmod in Linux and macOS Deep dive into Unix permissions, ownership, and sudo privileges

macOS Administration Category Overview of all administrative guides and operating system workflows on admindocs.de

Conclusion

With macOS 27 („Golden Gate“), creating bootable installation media on Apple Silicon hardware has become streamlined and reliable. The synergy between Apple's established `createinstallmedia` tool and the modern security architecture of M-series processors provides a solid, repeatable baseline without legacy BIOS or Intel-specific key combinations.

Once the write process is finished, you hold a self-contained disaster recovery and administrative tool capable of performing clean operating system deployments on any Apple Silicon Mac completely independent of network connectivity.

> □□ **Sysadmin Tip:** Attach a small physical label reading `macOS 27.0` to the drive and store it alongside a compact USB-A to USB-C adapter in your field toolkit. When troubleshooting boot failures or provisioning new workstations, having immediate local installation media saves hours of download time.

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