

How Apple Rolls



Adam Selby

Apple is a company of patterns.

Filesystems



1985

HFS is introduced



1998

HFS+ is introduced



2002

HFS+ adds journaling support



2009

HFS support is limited to read-only



2011

HFS+ adds support for logical volume encryption



2016

HFS support is ended



2016

“The HFS Standard filesystem is no longer supported”



2019

HFS support is removed



2016

APFS is debuted as a replacement to HFS+



2017

iOS devices are migrated to APFS



2017

macOS devices are migrated to APFS



2018

Apple File System Reference is released





64-bit apps



2003

The first 64-bit Mac ships



2005

Mac OS X Tiger adopts 64-bit processes



2007

Mac OS X Leopard adds support for 64-bit apps



2009

Mac OS X Snow Leopard brings full 64-bit support



2011

Mac OS X Snow Leopard receives final security update



2011

OS X Lion drops 32-bit boot support



2013

The first 64-bit iPhone is released



2015

App Store Apps must include 64-bit support



2017

macOS High Sierra is the last release to run 32-bit apps



2017

“without compromise”



2018

macOS High Sierra warns on first run of 32-bit software



2018

macOS Mojave warns when 32-bit software is run



2019

macOS Catalina drops support for any 32-bit software



2021

Security updates for macOS Mojave end





Device Management



1993

Apple releases At Ease for Workgroups



2003

MacAdmins image Macs using tools like DeployStudio



2008

Apple introduces iPhone Configuration Utility



2010

Apple publishes the initial MDM specifications



2011

MDM gains Software Update controls



2012

MDM comes to the Mac with OS X Mountain Lion



2013

Volume Purchasing Program for apps



2014

Device Enrollment Program for devices



2016

Apple School Manager



2017

User-approved kernel extensions



2017

User-approved MDM enrollment



2018

Apple Business Manager



2022

Declarative Device Management





Security



2007

File Quarantine is introduced with Mac OS X Leopard



2009

XProtect is introduced in Mac OS X Snow Leopard



2012

Gatekeeper is introduced in Mac OS X Mountain Lion



2012

Gatekeeper is introduced in Mac OS X Mountain Lion



2012

Gatekeeper is introduced in Mac OS X Mountain Lion and Lion



2015

System Integrity Protection is introduced in OS X El Capitan



2016

macOS Sierra hides the “anywhere” option in Gatekeeper



2017

User Data Protections are introduced in macOS Mojave



2018

User Data Protections expands to Screen Recording



2018

Notarization is introduced in macOS Mojave



2019

App Notarization is required in macOS Catalina



2022

macOS Ventura introduces XProtectRemediator



2022

Gatekeeper adds continuous notarization checks



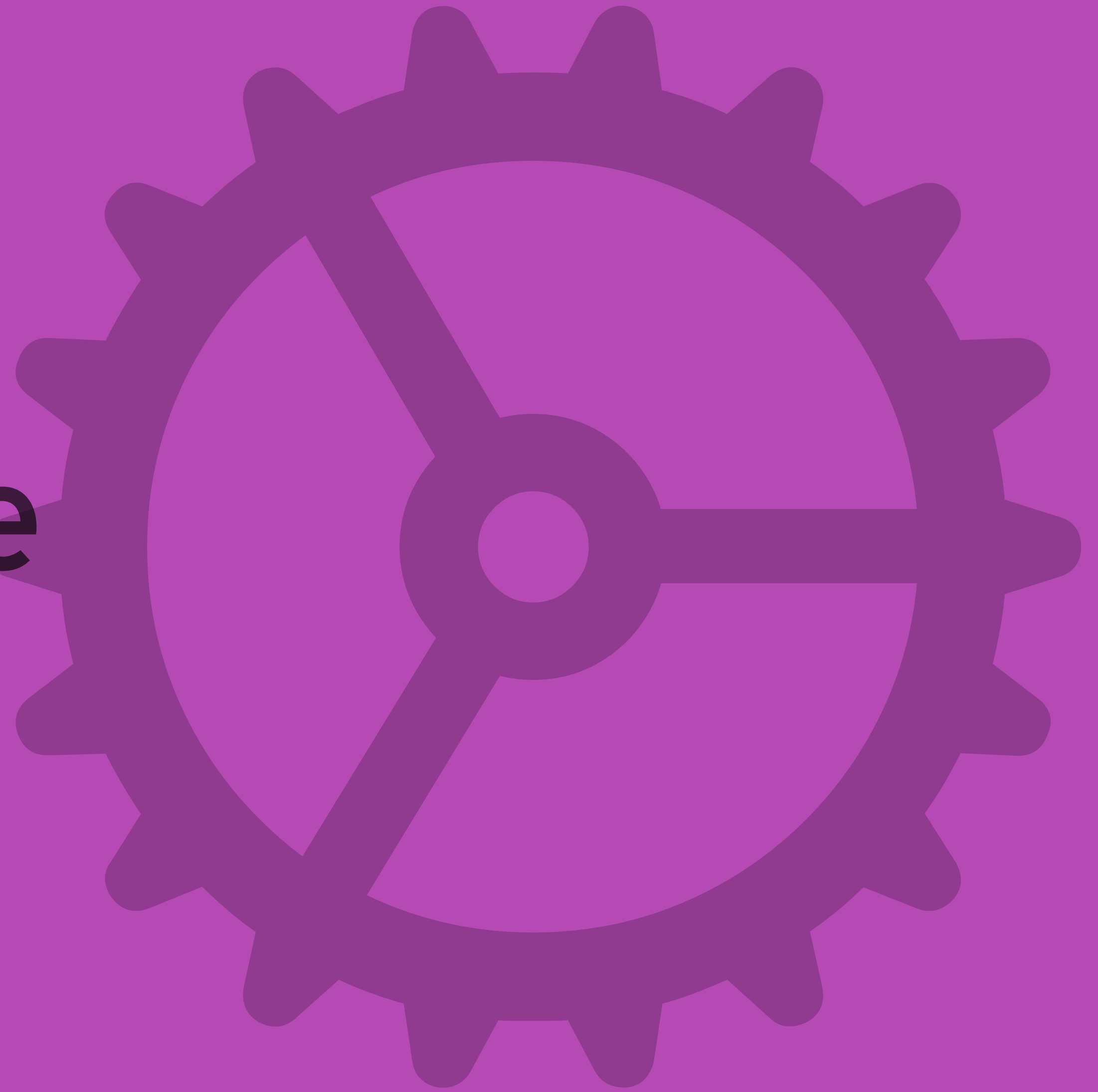
2024

macOS Sequoia changes Gatekeeper Override





Software Update



1999

Software Update is introduced in Mac OS 9



2001

Software Update Catalogs are introduced in Mac OS X Puma



2018

Deferrals are introduced in macOS High Sierra



2019

CatalogURL is deprecated in macOS Catalina



2020

CatalogURL is removed in macOS Big Sur



2020

--ignore is removed in macOS Big Sur



2021

Distinct deferrals are introduced in macOS Big Sur



2023

Declarative Software Update are introduced in macOS Sonoma



2023

seedutil is deprecated in macOS Ventura



2024

Apple announces Managed Beta Updates



Mid-Cycle Updates



2018

macOS High Sierra 10.13.4 warns about 32-bit apps



2019

macOS Mojave 10.14.4 warns about 32-bit apps



2020

macOS Catalina 10.15.4 warns users about deprecated KPIs



2021

macOS Big Sur 11.3 adds additional deferral controls



2022

macOS Monterey 12.3 removes System Python



2023

macOS Ventura 13.3 removed a legacy WebKit framework



2024

macOS Sonoma 14.4 and ScreenCaptureKit



2025

New Panes in Setup Assistant



2026

What's next?



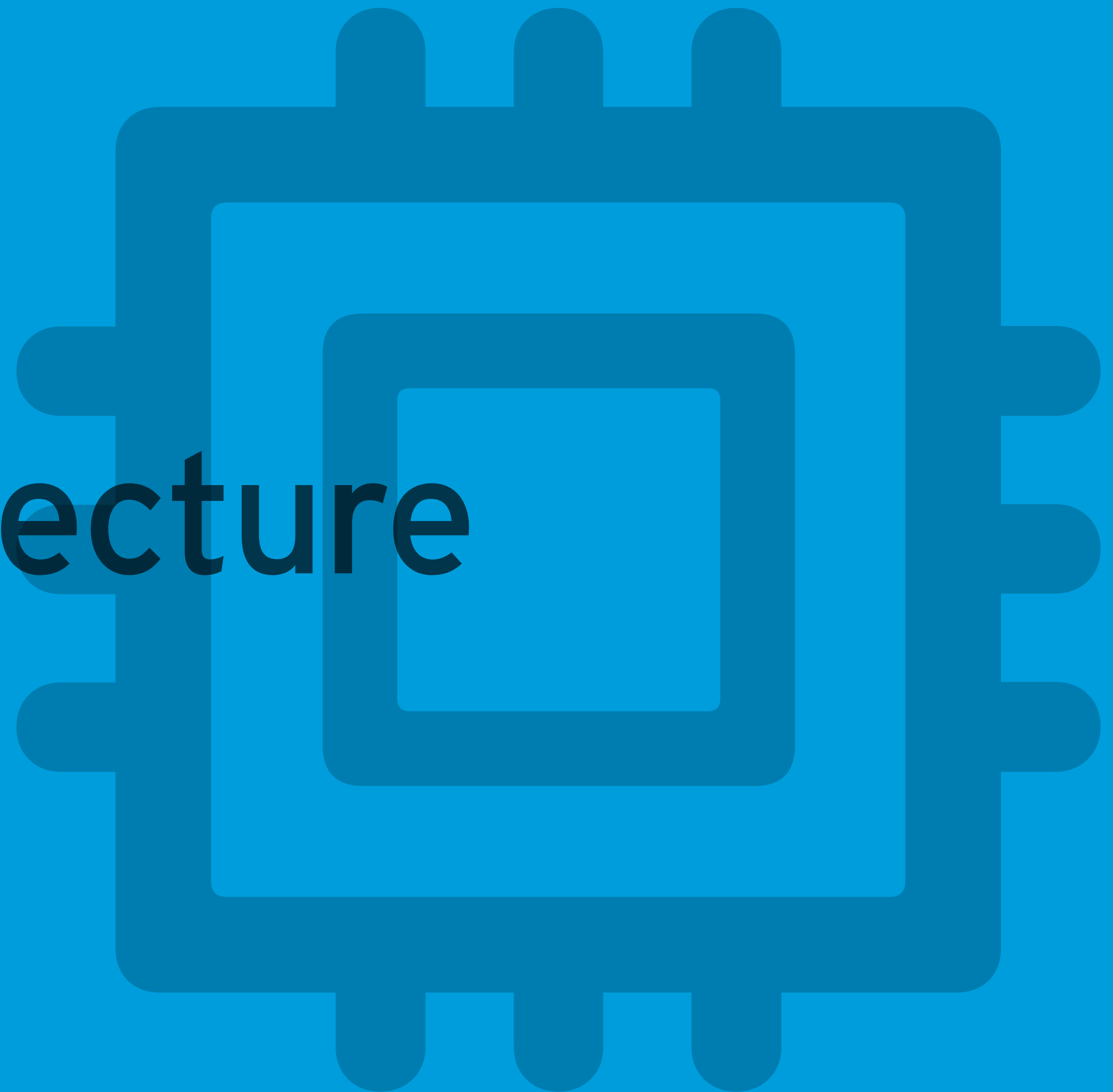
FB14264540

User-facing warning messages in mid-cycle macOS updates



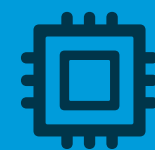


Hardware Architecture



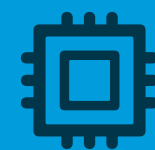
1984

Macintosh



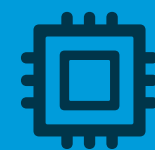
1991

System 7



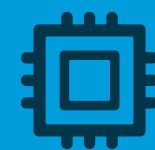
1992

Initial efforts to move to Intel begin



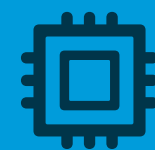
1994

Power Macintosh



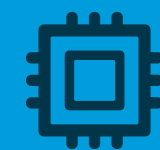
1995

PowerPC on Macintosh Performa



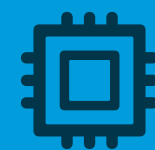
1997

NeXTSTEP → *Mac OS X*



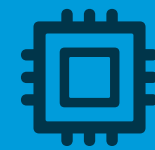
1998

iMac launches with USB



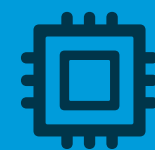
2002

Renewed efforts are underway



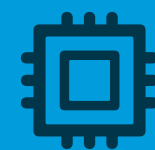
2005

Apple announces the Intel Transition



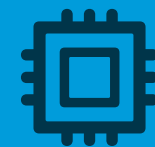
2005

Apple starts Project Purple



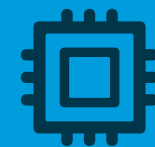
2006

Apple completes the Intel Transition



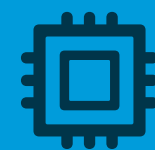
2007

Apple releases Mac OS X Leopard



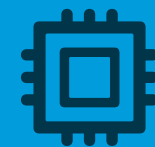
2009

Apple drops boot support for PowerPC



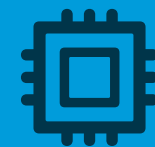
2011

Apple discontinues Rosetta



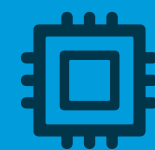
2013

All PowerPC-based Macs are marked obsolete



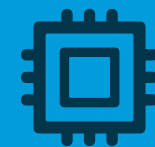
2005

“iPhone runs OS X”



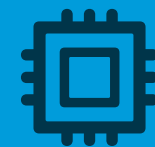
1985

Apple invests in Acorn Computers



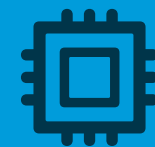
1993

Apple introduces the Newton MessagePad, with an ARM processor



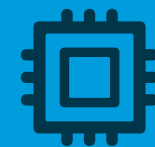
1997

Apple introduces the eMate, with an ARM processor



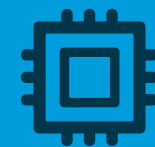
2001

Apple introduces iPod, with an ARM processor



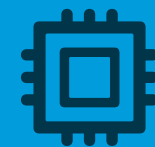
2007

Apple introduces iPhone, with an ARM processor



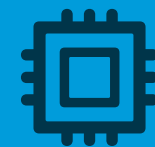
2010

Apple introduces iPad, with an ARM processor



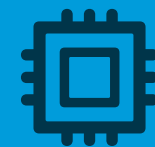
2010

Apple introduces iPhone 4, with an ARM SoC



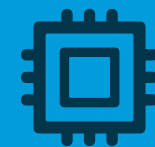
2014

Apple introduces Apple Watch



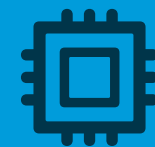
2014

Apple introduces Apple Watch, with an ARM SiP



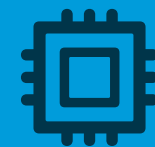
2008

Apple acquires P.A. Semi



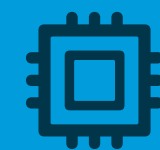
2010

Apple introduces the first SoC designed in-house by Apple



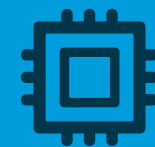
2017

Apple introduces a second-generation iPad Pro, with an ARM SoC



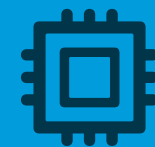
2017

Apple adds the T2 chip to Macs, which runs bridgeOS and sepOS



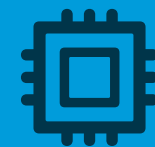
2020

Apple announces Apple silicon



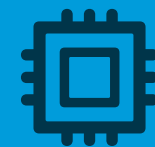
2020

Apple releases the M1, introducing Macs with Apple silicon



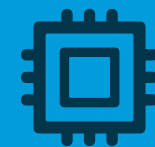
2021

Apple releases a redesigned iMac



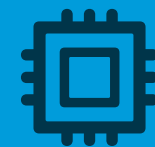
2021

Apple releases the M1 Pro and M1 Pro Max



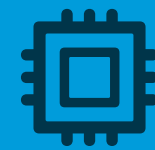
2022

Apple releases the M1 Ultra & Mac Studio



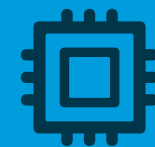
2022

Apple releases the M2



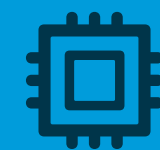
2023

Apple releases the M2 Pro and M2 Max



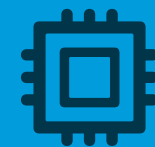
2023

Apple release the M2 Ultra and completes the transition



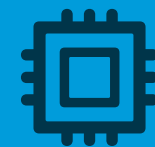
2023

Apple releases the M3, M3 Pro, and M3 Max



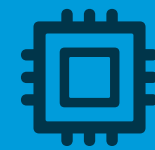
2024

Apple releases the M4... in an iPad



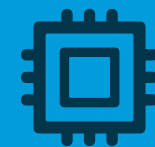
2024

Apple announces macOS Sequoia



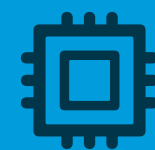
2024

Apple releases the M4 Pro and M4 Max



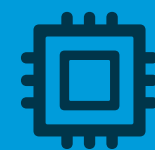
2025

Apple releases the M3 Ultra



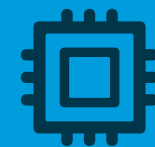
2025

Apple releases the C1



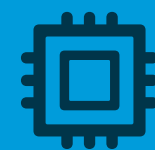
2028

Intel-based Macs reach Vintage status



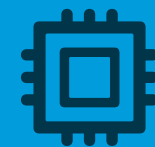
2030

Intel-based Macs reach Obsolete status



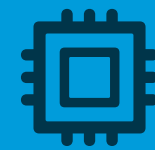
2025

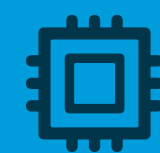
Apple may drop boot support for Intel with new OS releases





Apple discontinues Rosetta 2?





Technology Deprecations

A short list of deprecated technology in macOS

includes technology removed in macOS Sequoia Beta

AFP

airport

audit subsystem

Bundle Packages

CGDisplayStream

CGImageCreate

CGWindowList

CGWindowListCreateImage

com.apple.alf.plist

cron

CUPS

DirectoryService plug-in

DisabledPreferencePanels

FDERecoveryKeyRedirection

IOAudioFamily

IOBluetoothHIDDriver

IOCSIParallelFamily

Kernel Extensions

launchctl (un)load

MediaManagementAllowedMedia

ParentalControlsApplicationRestrictions

qtkit

Quick Look Generator plugins

ShareKit payload

Socket KPIs

SystemPreferences payload

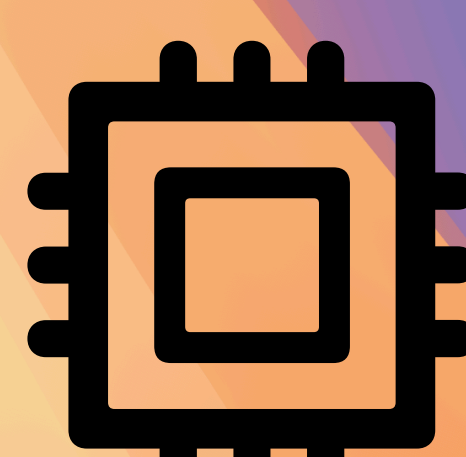
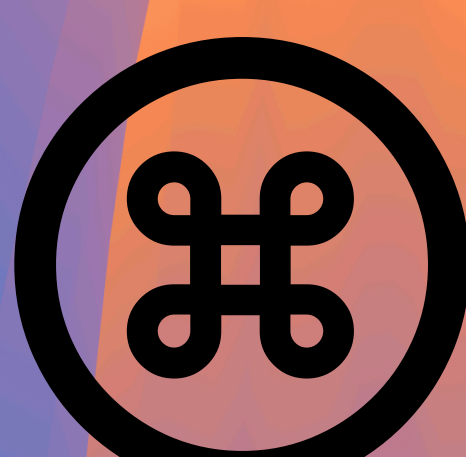
TVMLKit for tvOS

vsdbutil

audit subsystem

“The audit (4) subsystem has been deprecated since macOS 11.0, disabled since macOS 14.0, and WILL BE REMOVED in a future version of macOS. Applications that require a security event stream should use the EndpointSecurity(7) API instead.”

man audit





https://daringfireball.net/2010/05/this_is_how_apple_rolls

https://daringfireball.net/2010/05/nack_control

<https://eclecticlight.co/2022/04/01/a-brief-history-of-apfs-in-honour-of-its-fifth-birthday/>

<https://registerspill.thorstenball.com/p/a-feat-of-engineering>

<https://vimeo.com/220770851>

<https://www.apple.com/newsroom/2003/06/23Apple-Unleashes-the-Worlds-Fastest-Personal-Computer-the-Power-Mac-G5/>

<https://pilky.me/apples-technology-transitions/>

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<https://resources.jamf.com/documents/products/documentation/Casper-Suite-8.3-Release-Notes.pdf>

<https://eclecticlight.co/2023/06/12/malware-detection-and-remediation-by-xprotect-remediator/>

<https://nwstrauss.com/posts/2023-05-18-seedutil-beta-programs/>

<https://panic.com/blog/the-lightning-digital-av-adapter-surprise/>

<https://www.apple.com/newsroom/2020/06/apple-announces-mac-transition-to-apple-silicon/>

<https://eclecticlight.co/2023/06/30/deprecation/>

<https://rd.springer.com/book/10.1007/978-1-4842-9156-6>

John Siracusa's reviews of Mac OS X:

<https://arstechnica.com/gadgets/2001/04/macos-x/>

<https://arstechnica.com/gadgets/2001/10/macosx-10-1/>

<https://arstechnica.com/gadgets/2002/09/macosx-10-2/>

<https://arstechnica.com/gadgets/2003/11/macosx-10-3/>

<https://arstechnica.com/gadgets/2005/04/macosx-10-4/>

<https://arstechnica.com/gadgets/2007/10/mac-os-x-10-5/>

<https://arstechnica.com/gadgets/2009/08/mac-os-x-10-6/>

<https://arstechnica.com/gadgets/2011/07/mac-os-x-10-7/>

<https://arstechnica.com/gadgets/2012/07/os-x-10-8/>

<https://arstechnica.com/gadgets/2013/10/os-x-10-9/>

<https://arstechnica.com/gadgets/2014/10/os-x-10-10/>

Apple Documentation:

<https://developer.apple.com/library/archive/technotes/tn/tn1150.html>

<https://developer.apple.com/library/archive/releasenotes/MacOSX/WhatsNewInOSX/Articles/OSXv10.html>

<https://support.apple.com/en-us/118277>

<https://support.apple.com/en-us/103076>

<https://support.apple.com/guide/deployment/welcome/web>

<https://developer.apple.com/library/archive/documentation/Darwin/Conceptual/64bitPorting/intro/intro.html>

<https://developer.apple.com/documentation/devicemanagement/privacypreferencespolicycontrol/services>

<https://support.apple.com/en-us/102771>

<https://support.apple.com/en-us/103273>

<https://developer.apple.com/support/kernel-extensions/>

<https://github.com/apple/device-management>

<https://developer.apple.com/documentation/macos-release-notes>

<https://developer.apple.com/documentation/safari-release-notes/>