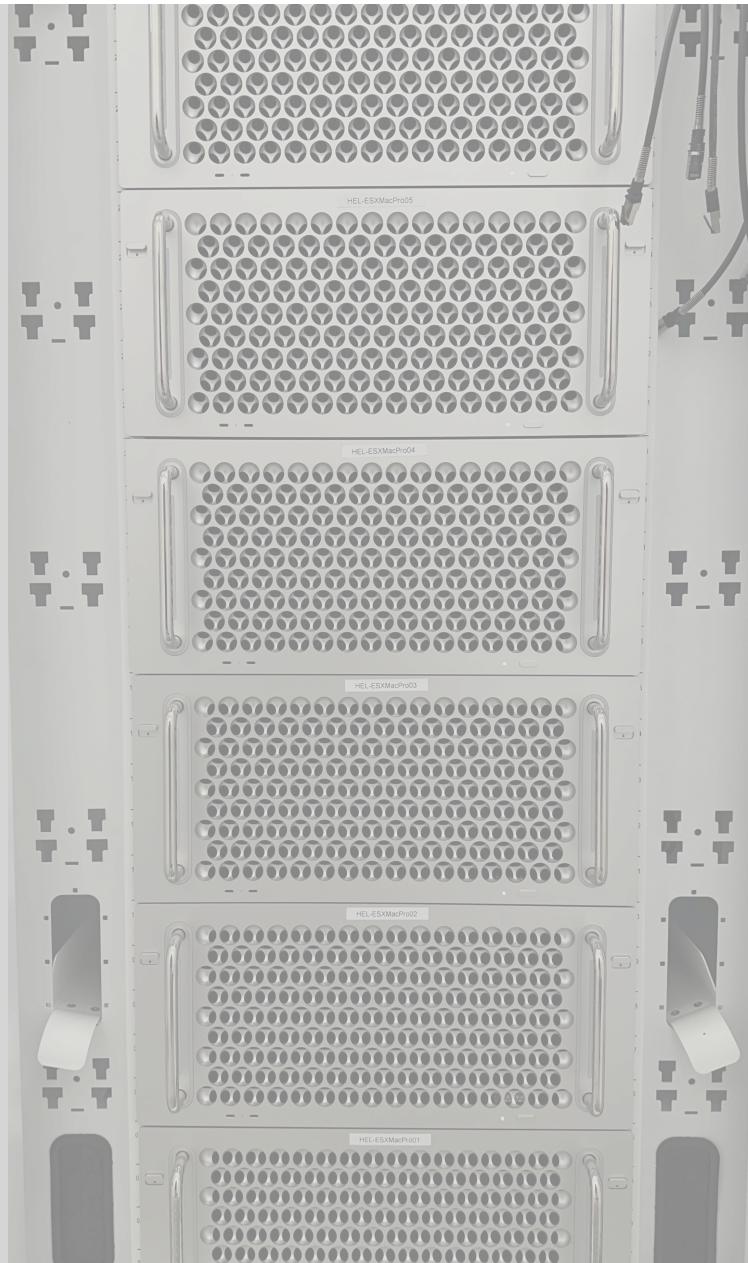


VIRTUAL SURREALITY

**Or: Varying degrees of success
with Mac virtualization**

Kalle Ronkainen // Supercell // May 30 2024



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“Virtualization is technology that you can use to create virtual representations of servers, storage, networks, and other physical machines. Virtual software mimics the functions of physical hardware to run **multiple virtual machines simultaneously on a single physical machine.**”

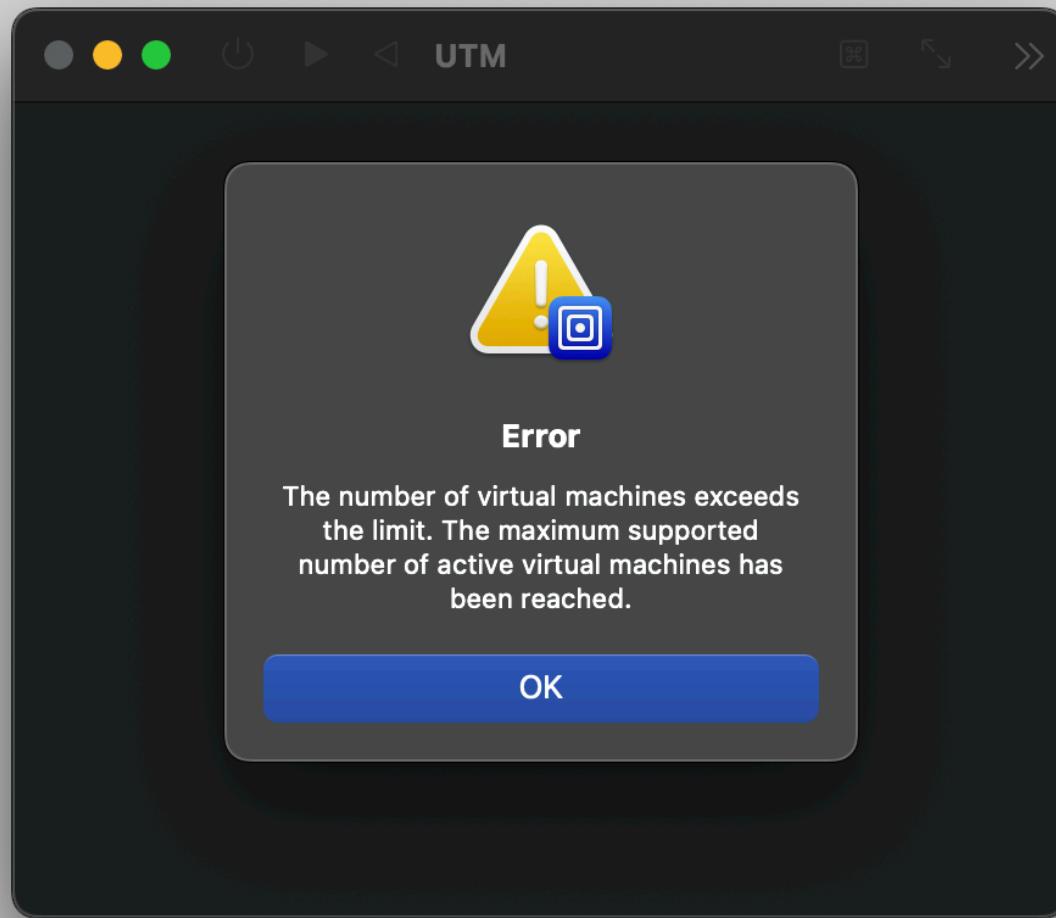
aws.amazon.com/what-is/virtualization

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www.apple.com/legal/sla/docs/macOSSonoma.pdf



Framework

Virtualization

Create virtual machines and run macOS



VIRTUALIZATION FRAMEWORK (MACOS 11+)

“The Virtualization framework provides high-level APIs for creating and managing virtual machines (VM) on Apple silicon and Intel-based Mac computers.”

developer.apple.com/documentation/virtualization

docs.macsyadmin.se/2023/video_h265/Day1Session2.mp4

Overview

The Virtualization framework provides high-level APIs for creating and managing virtual machines (VM) on Apple silicon and Intel-based Mac computers. Use this framework to create custom environments that you define. The framework defines standard interfaces for many device types, such as disk and balloon devices.

To set up a VM, configure a [VZVirtualMachineConfiguration](#), a [VZMacPlatformConfiguration](#), and then create a [VZVirtualMachineConfiguration](#). You can then start, pause, and resume the VM environment. You can also use the [VZVirtualMachine](#) object to display and interact with the VM.

Topics

Essentials

[Adding the Virtualization Entitlement to Your Application](#)

PARALLELS

- Available since June 2006
- Currently at version 19
- Unlimited guest OS's - 2 Macs can run at the same time
- For an older macOS (or Mac OS X) you need an older Parallels

www.parallels.com

Limitations: kb.parallels.com/128867



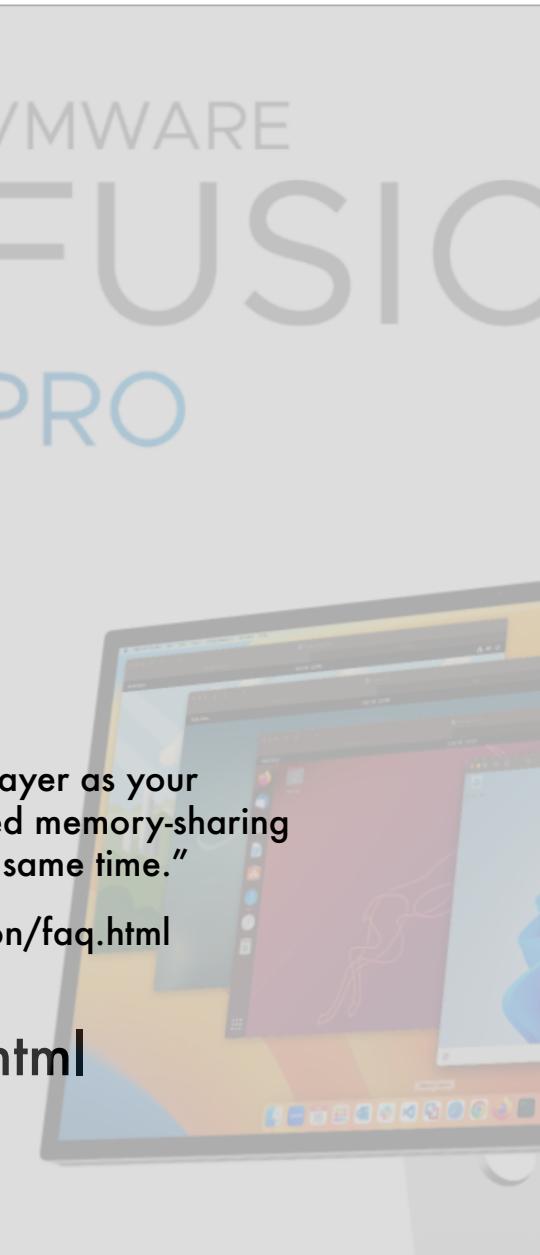
VMWARE FUSION

- Available since August 2007
- Currently at version 13
- Free for personal use
- Acquired recently by Broadcom

"Yes, you can run as many virtual machines concurrently with VMware Fusion 13 Pro and Player as your system's CPU, RAM and disk storage will support. In fact, VMware Fusion leverages patented memory-sharing techniques to drastically reduce the memory required to run multiple virtual machines at the same time."

www.vmware.com/products/fusion/faq.html

www.vmware.com/products/desktop-hypervisor.html



... WHAT IF YOU NEED SOMETHING MORE?

Hackintosh.com links to everything you need to build a Hackintosh and get macOS Sonoma (macOS 14) as well as many earlier versions of Mac OS X running on an unsupported computer -- [instructions](#), step-by-step "how to" guides, and tutorials -- in addition to installation [videos](#), [lists](#) of compatible computers and parts, and [communities](#) for support.

For Mac specs, prices, answers, side-by-side Mac comparison, a tool to [lookup Macs by serial number](#), and more, see [EveryMac.com](#), too. For iPod, iPhone and iPad info, hit [Everyi.com](#).

MACOS ON NON-APPLE HARDWARE

"Please note that Apple does not support Mac OS X on non-Apple hardware and installing Mac OS X on non-Apple hardware may be illegal in your country."

Hackintosh Instructions & Tutorials

Helpful individuals have provided step-by-step "how to" guides and tutorials as well as general advice on installing OS X on everything from self-built desktop systems and notebooks to netbooks, and more.

Installation guides for macOS Sonoma (macOS 14), macOS Ventura (macOS 13), macOS Monterey (macOS 12), macOS Big Sur (macOS 11), macOS Catalina (10.15), and older versions of Mac OS X, all the way back to Mac OS X Leopard (10.5). Newer BIOS and UEFI chipsets can make the process a bit trickier.

The current version of the Mac operating system is **macOS 14 "Sonoma"**. Helpful tutorials to install or upgrade this version of the macOS on Intel and AMD PCs include:

[macOS Sonoma USB Installation](#) - Originally for the Intel, this detailed guide from [tonymacx86](#) explains how to create a USB installation media for both Intel and AMD-based PCs using various bootloaders.

www.hackintosh.com

[macOS Sonoma Fresh Installation](#) - A detailed, step-by-step guide from [EliteMacx86](#) that covers a new installation of macOS Sonoma on a PC using [OpenCore](#).

[Upgrade Directly to macOS Sonoma](#) - Also from [EliteMacx86](#), how to upgrade an Intel or AMD PC running macOS Ventura (macOS 13) to macOS Sonoma.

[macOS Sonoma Installation \(VMWare\)](#) - A quick explanation how to install macOS Sonoma including Virtual Machine options from [TechsViewer](#).

[macOS Sonoma Broadcom Wi-Fi Fix](#) - How to instructions and kexts to get Broadcom Wi-Fi working with macOS Sonoma. Other posts to [enable Wi-Fi \(Fenvi T919\)](#) on macOS Sonoma and [USB Wireless adapters](#) for macOS Sonoma (as well as macOS Big Sur, Monterey, and Ventura) also may be helpful.

[macOS Sonoma on Gigabyte Z390 Aorus Elite](#) - Specific instructions to get macOS Sonoma working on this motherboard along with related components.

[macOS Sonoma on Gigabyte A520I AC](#) - Detailed component info and software configuration for macOS Sonoma on this motherboard. A [companion piece](#) on AMD Radeon Graphics also could be useful.

Note that [official hardware support for macOS Sonoma \(macOS 14\)](#) is notably more limited than its predecessor, [macOS Ventura \(macOS 13\)](#), and some features only work on proper Macs with recent Apple Silicon processors. There also are many reported issues with third-party Wi-Fi hardware in particular; be sure to verify specific hardware compatibility before upgrading an older Hackintosh to this version of the macOS or buying components for a new one.

AWS VDI

Providing secure access to anyone who already have access to an existing device

- Consultants
- Freelancers
- Suppliers
- Content creators
- Fixed term contracts
- Remote
- Or just all non-employees, really





Products Solutions Pricing Documentation Learn

Amazon EC2 Overview Features

AWS VDI

- Less a Virtual Mac than a Remote Mac
- Single Mac Mini provisioned and enrolled with limitations
- Price comparable to an actual physical Mac
- Provisioned through a terraforming script on GitHub.com
- Initial access and setup with VNC
- Regular access with Parsec

aws.amazon.com/ec2/instance-types/mac/

Amazon EC2 M

Develop, build, test, and sign Apple

[Get Started with Amazon EC2 Mac Inst](#)

Solutions on

Amazon Elastic Compute Cloud (Amazon workloads in the cloud for the first time, Apple developers. By using Amazon EC2 Vision Pro, Apple Watch, Apple TV, and Sa minutes, dynamically scale capacity as ne

Amazon EC2 M2 Pro Mac Instances are bu AWS Nitro system. M2 Pro Mac instances delivering up to 35% faster performance application build workloads. EC2 M2 Pro Machine Images (AMIs).

Amazon EC2 M2 Mac Instances are built o Nitro System. M2 Mac instances combine up to 10% faster performance compared

<https://aws.amazon.com/ec2/instance-types/mac/#> lac instances support

aws-vdi / workstations / users.yaml in main

Edit Preview

```
1 users:
2   [REDACTED]:
3     name: mac-[REDACTED]
4     type: mac2.metal
5     fullname: [REDACTED]
6   [REDACTED]:
7     name: mac-[REDACTED]
8     type: mac2.metal
9     fullname: [REDACTED]
10 kalle.ronkainen:
11   name: mac-kalle.ronkainen
12   type: mac2.metal
13   fullname: kalle.ronkainen
```

Commit changes

Commit message
Update users.yaml

Extended description
Added Kalle Ronkainen

Commit directly to the main branch
 Create a new branch for this commit and start a pull request
[Learn more about pull requests](#)

[Cancel](#) [Commit changes](#)

Manual approval required for workflow run 9255478144 #47

 Closed  github-actions (bot) opened this issue 4 minutes ago · 2 comments

  github-actions (bot) commented 4 minutes ago

Workflow is pending manual review.
URL: [https://github.com/\[REDACTED\]/workstations/pull/47](https://github.com/[REDACTED]/workstations/pull/47)

Required approvers: [REDACTED] kalle6r

Respond "approved", "approve", "lgtm", "yes" to continue workflow or "denied", "deny", "no" to cancel.

 [REDACTED]

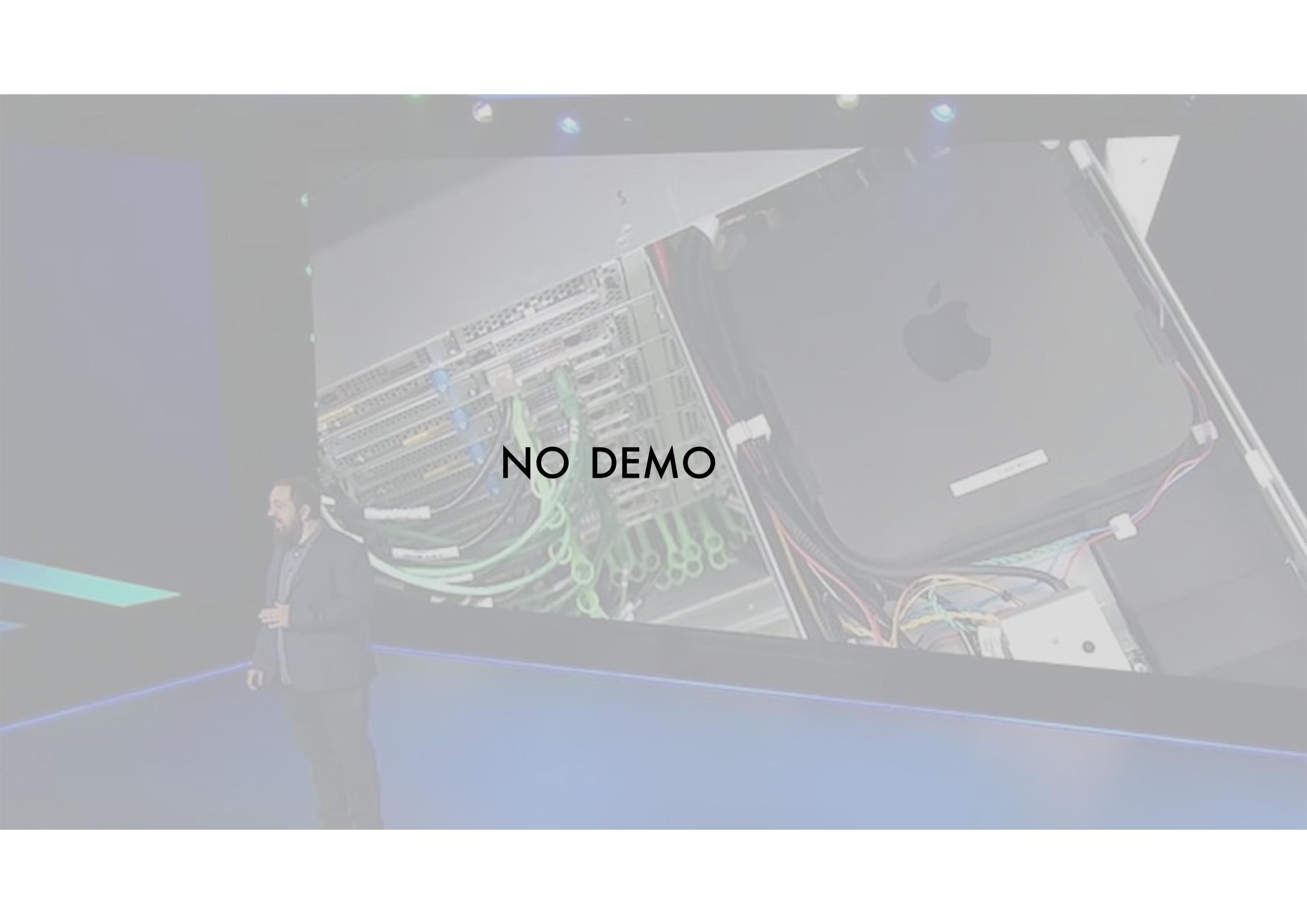
  github-actions (bot) assigned kalle6r, [REDACTED] and [REDACTED] 4 minutes ago

  kalle6r commented now

yes

  github-actions (bot) commented now

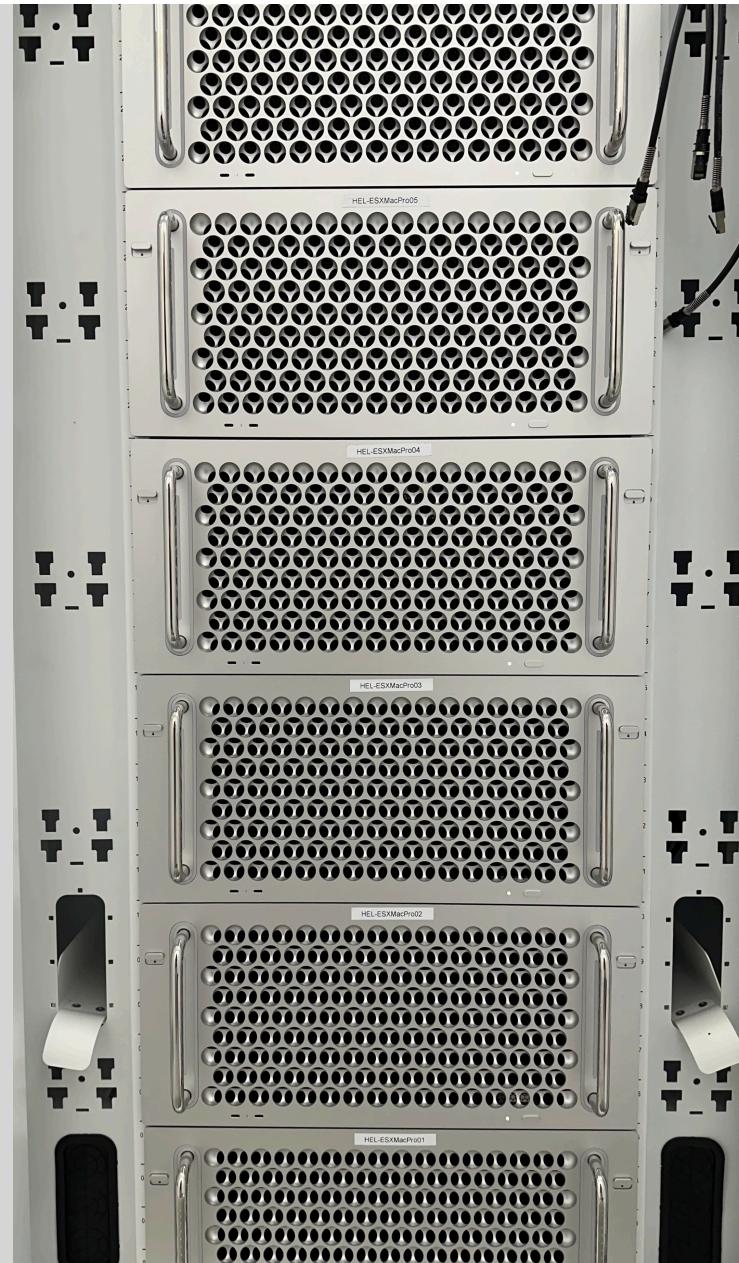
All approvers have approved, continuing workflow and closing this issue.

A man with a beard and dark hair, wearing a dark suit jacket, stands on a stage. A blue light beam projects from the bottom left towards him. In the background, there is a large server rack with multiple green and red cables. The Apple logo is visible on the right side of the image.

NO DEMO

MAC PRO BUILDER CLUSTER

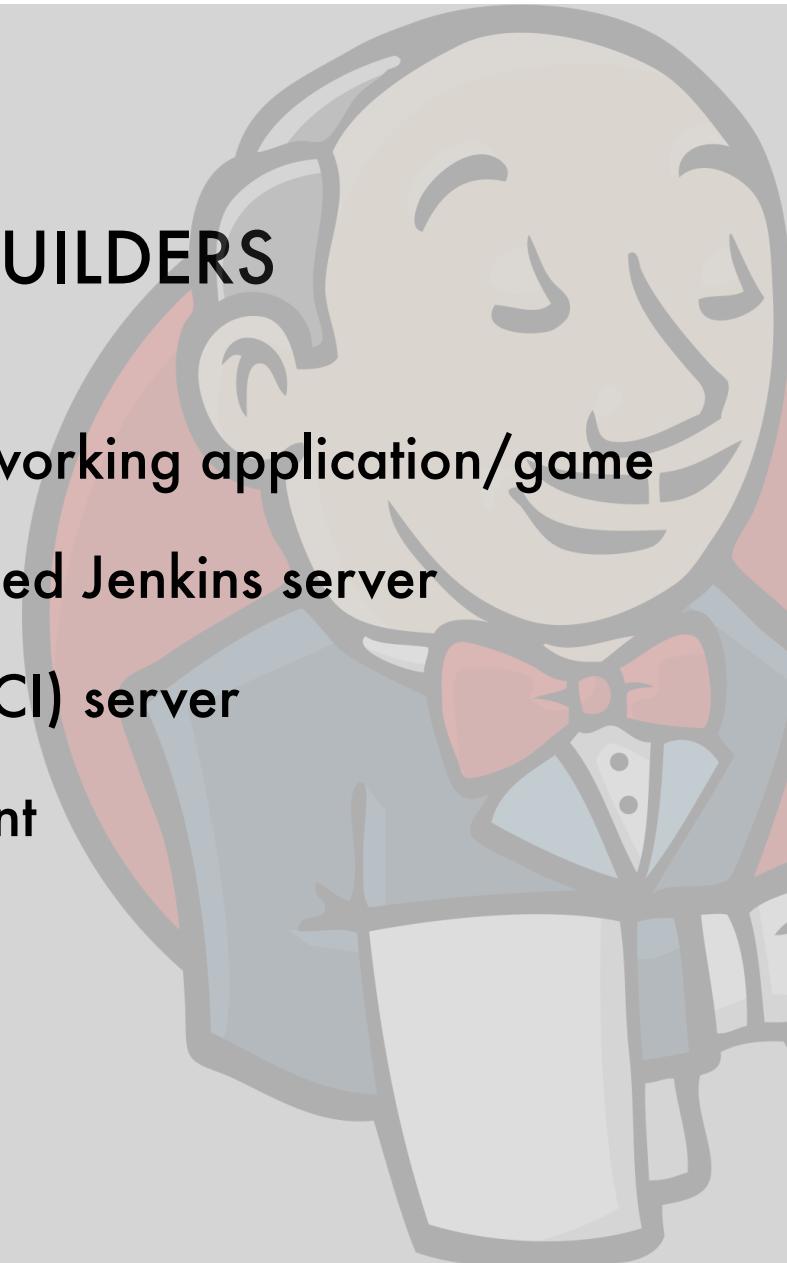
- 8 Intel Mac Pros for production
- 1 Similar Intel Mac Pro for testing
- Uses Dell PowerStore T1000 using fibre
- 39 virtual machines (some currently off)
- VMWare ESXi 8.0.0, 20513097



A WORD OR TWO ABOUT BUILDERS

- Builder essentially digests code and assets into a working application/game
- Each virtual builder machine is a project's dedicated Jenkins server
- Jenkins is an open source continuous integration (CI) server
- Jenkins automates testing, building and deployment

jenkins.io



MORE WORDS ABOUT BUILDERS

2. Internal Use License and Restrictions

2.6 No Other Permitted Uses

"...You agree not to install, use or run the Apple SDKs on any non-Apple-branded computer, and not to install, use or run iOS, iPadOS, macOS, tvOS, visionOS, watchOS, and Provisioning Profiles on or in connection with devices other than Apple-branded products, or to enable others to do so. ..."

developer.apple.com/support/terms/apple-developer-program-license-agreement

...BUT HOW DOES IT WORK?

As ESXi doesn't run on Apple hardware natively, an Unlocker script is required to get ESXi to run.

“...enables support for macOS that is disabled in the VMware products that do not run on Apple hardware.”

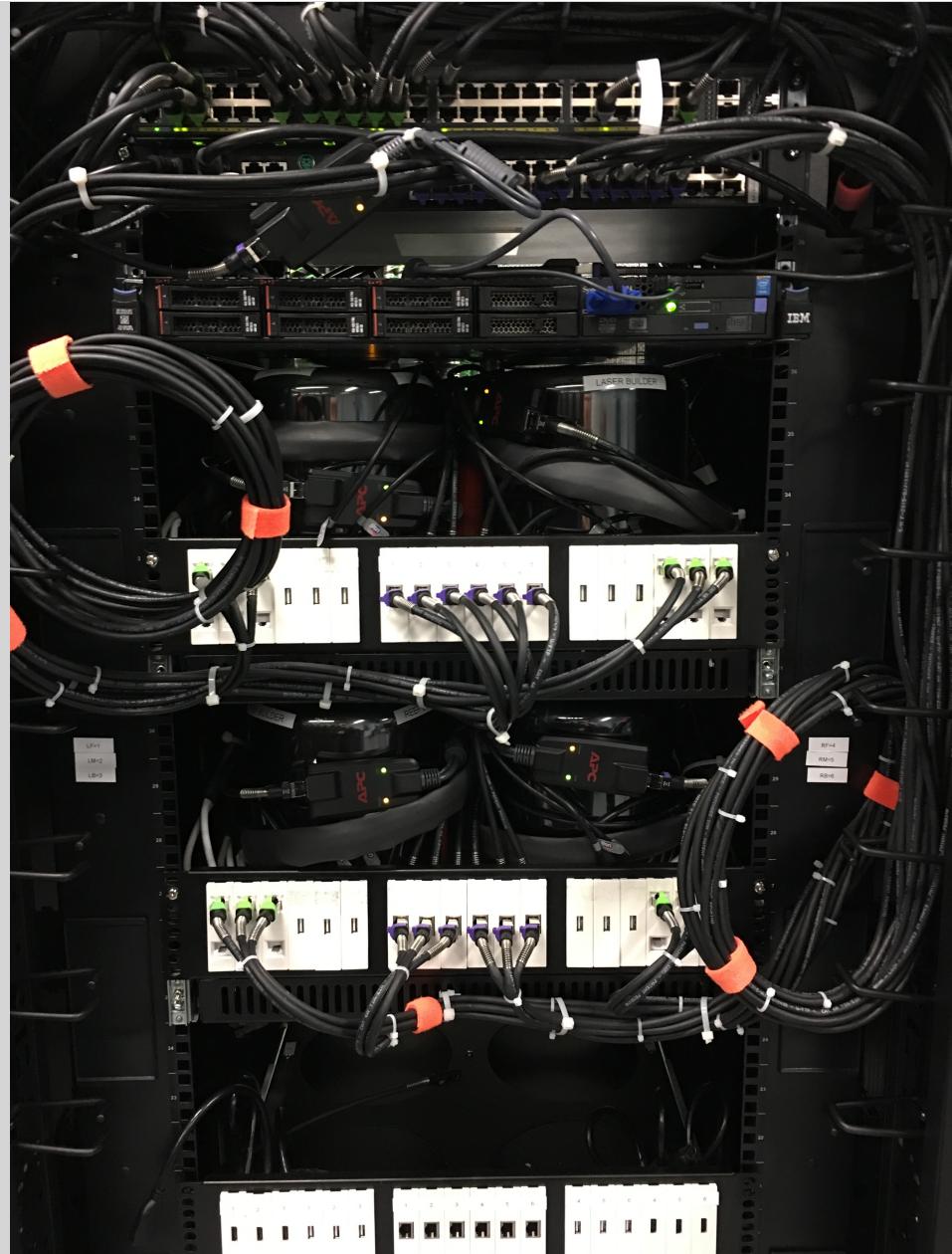
github.com/DrDonk/unlocker

ISSUES

- Not officially supported by, well, anyone
- An untested update can (and has) render(ed) the solution unusable
- Every new macOS or ESXi update requires thorough testing
- Xcode updates will eventually make this obsolete

STILL BETTER THAN OUR PREVIOUS SOLUTION

- (At least) one Mac Pro (2013) per game
- External HD for Time Machine backups
- Custom built rack
- KVM solution that was never reliable
- OS updates would often cause issue



CONCLUSIONS (IF ANY)

- Solutions are short-term and fragile
- Community help available
- Apple support not expected
- Consider your life choices before taking this road

THANK YOU

kalle.ronkainen@supercell.com

www.linkedin.com/in/kalleronkainen

PS - AFK until September 2nd