

# Free Cloud Infrastructure for Everyone

**What You Can Get for US\$ 0  
in This After Pandemic Era**

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# # whoami

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# **Why talks about free infrastructure?**







*Winter, oh mean recession is coming*



**This talk will help you  
lowering the cost in this  
uncertain times**

# **Free Resources for Business**

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# Disclaimer

- However you still need credit card to subscribe
- Domain name (.com, [.co.id](#)) annual subscription
- Some of this services may be not sufficient for your requirements
- Some of this services may not be available
  - Partially available, try again later, or try in another region
- Their T&C may have been changed
- I'm not business reps, nor receiving any commission for this talk

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# Other side of Free Infrastructure

- There are lots of free resources in internet
- Especially on SaaS (Software as a Service)
- You can check here at <https://free-for.dev/>
- But we're are at IDNOG, our specialties are on infrastructure (IaaS)

# Building Blocks

Cloud  
Infrastructure

DNS & TLS  
Termination  
(or CDN)

Cloud VPN  
(or Zero Trust  
Security)

# Cloud Infrastructure

*The staple food for the Cloud*

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# Oracle Cloud Infrastructure (OCI) Always-Free

- By registering in OCI, you will get these (at one region):
- AMD (x86\_64) and ARM64 Compute VMs
- 200 GB total block storage
- 10 GB object storage
- 10 TB outbound data transfer per month
- 2 Autonomous Databases, 20 GB each
- 10+ more Always Free services

# OCI Regions



# OCI APAC Regions (that you cared for)

- Japan East (Tokyo)
- Japan Central (Osaka)
- South Korea Central (Seoul)
- South Korea North (Chuncheong)
- Australia East (Sydney)
- Australia Southeast (Melbourne)
- India West (Mumbai)
- India South (Hyderabad)
- Singapore (Singapore)



# VMs and Storage

## AMD (x84\_64) VM

- 1 vCPU, 1 GB RAM
- 50 GB storage

## Ampere (arm64) VM

- 1 – 4 vCPU, 6-24 GB RAM
- 50 GB storage

## Object storage

- 10 GB – Standard
- 10 GB – Infrequent Access
- 10 GB Archive Storage

## Block storage

- 200GB combined storage per region
- 1 VM consume 50GB
- So you can only create 4 VM

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# **Virtual Network & Security**

## **Networking**

- 10 TB outbound traffic
- 2 Virtual network (IPv4/v6)
- 1 instance Load Balancer (10Mbps)

## **Security**

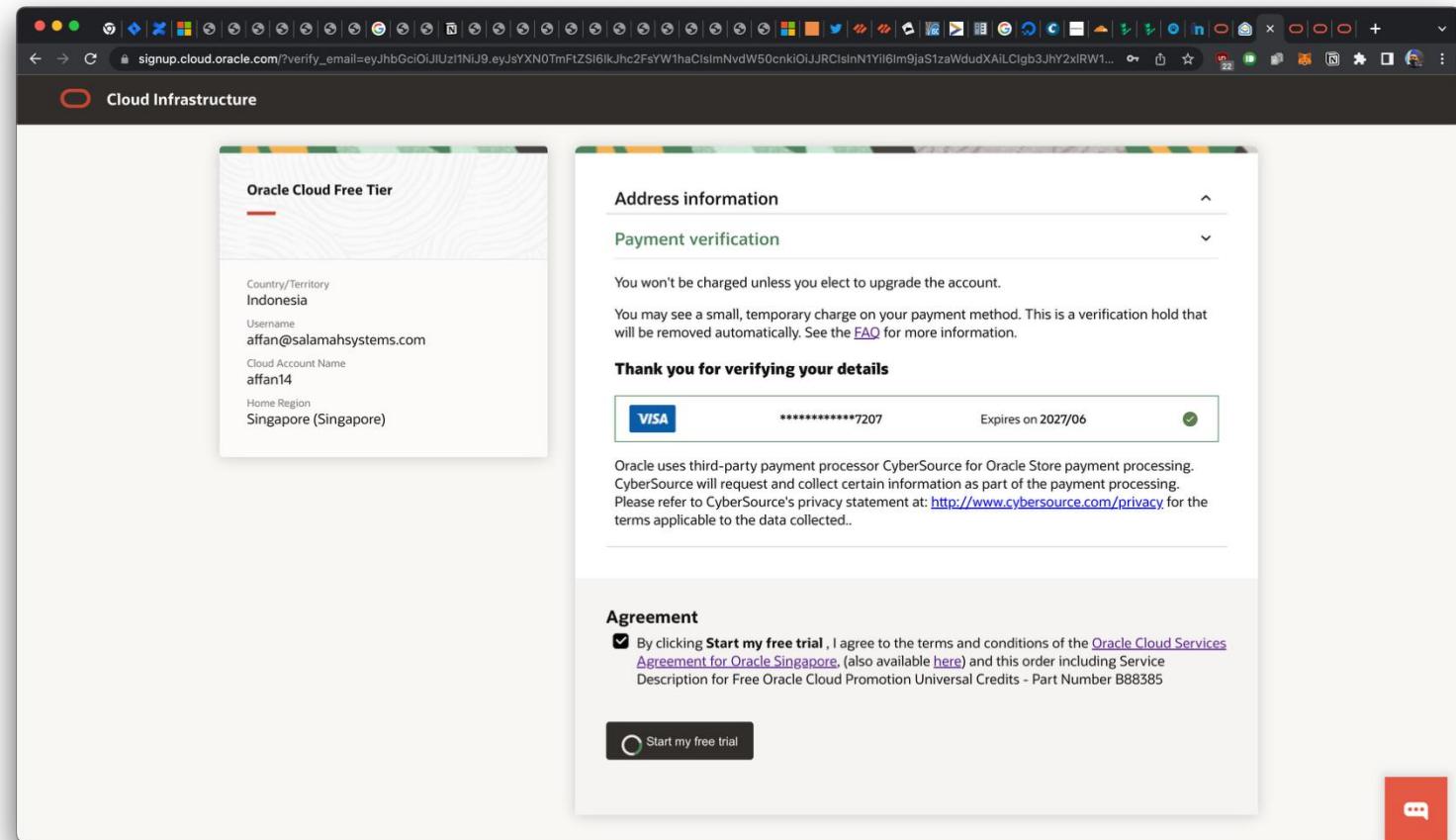
- Security Group
- Site-to-site IPSec VPN
- 5 private CA and 150 certificate
- Bastion Host

# Other Interesting Features

- 2 Oracle Database as a Service (1 CPU, 20GB)
- Low-code App Development with Oracle APEX
- NoSQL Database (25 GB per table)
- Managed by Terraform
- All of them you can check at  
<https://www.oracle.com/cloud/free/#always-free>

# Create your account

- Go to:  
<https://www.oracle.com/cloud/free/>
- Create account
- Enter your Credit Card information
- Usually works the first time



# Create your virtual cloud network

The screenshot shows the Oracle Cloud interface for managing Virtual Cloud Networks (VCNs). The main page displays a green hexagonal icon labeled "VCN" with the text "AVAILABLE" below it. To the right, detailed information about the VCN "affan24" is provided, including its OCID, DNS Resolver, Default Route Table, and DNS Domain Name. Below this, a table lists two subnets: "Private Subnet-affan24" and "Public Subnet-affan24". The left sidebar contains a navigation menu with links to Subnets (2), CIDR Blocks/Prefixes (1), Route Tables (2), Internet Gateways (1), Dynamic Routing Gateways, Attachments (0), and Network Security Groups (0).

Virtual Cloud Networks | Oracle

You have SGD 400.00 left in your trial. When your trial is over, your account will be limited to Always Free resources. [Upgrade](#) at any time. [Learn more](#)

ORACLE Cloud  Singapore (Singapore) [View](#) [Bell](#) [Help](#) [Feedback](#)

Networking » Virtual Cloud Networks » Virtual Cloud Network Details

### affan24

Move resource Add Tags [Terminate](#)

[VCN Information](#) Tags

**Compartment:** affan24 (root)

**Created:** Wed, Jul 13, 2022, 13:46:19 UTC

**IPv4 CIDR Block:** 10.0.0.0/16

**IPv6 Prefix:** No Value

**OCID:** ...dkx6za [Show](#) [Copy](#)

**DNS Resolver:** [affan24](#)

**Default Route Table:** [Default Route Table for affan24](#)

**DNS Domain Name:** affan24.oraclevcn.com

**Resources**

#### Subnets in affan24 (root) Compartment

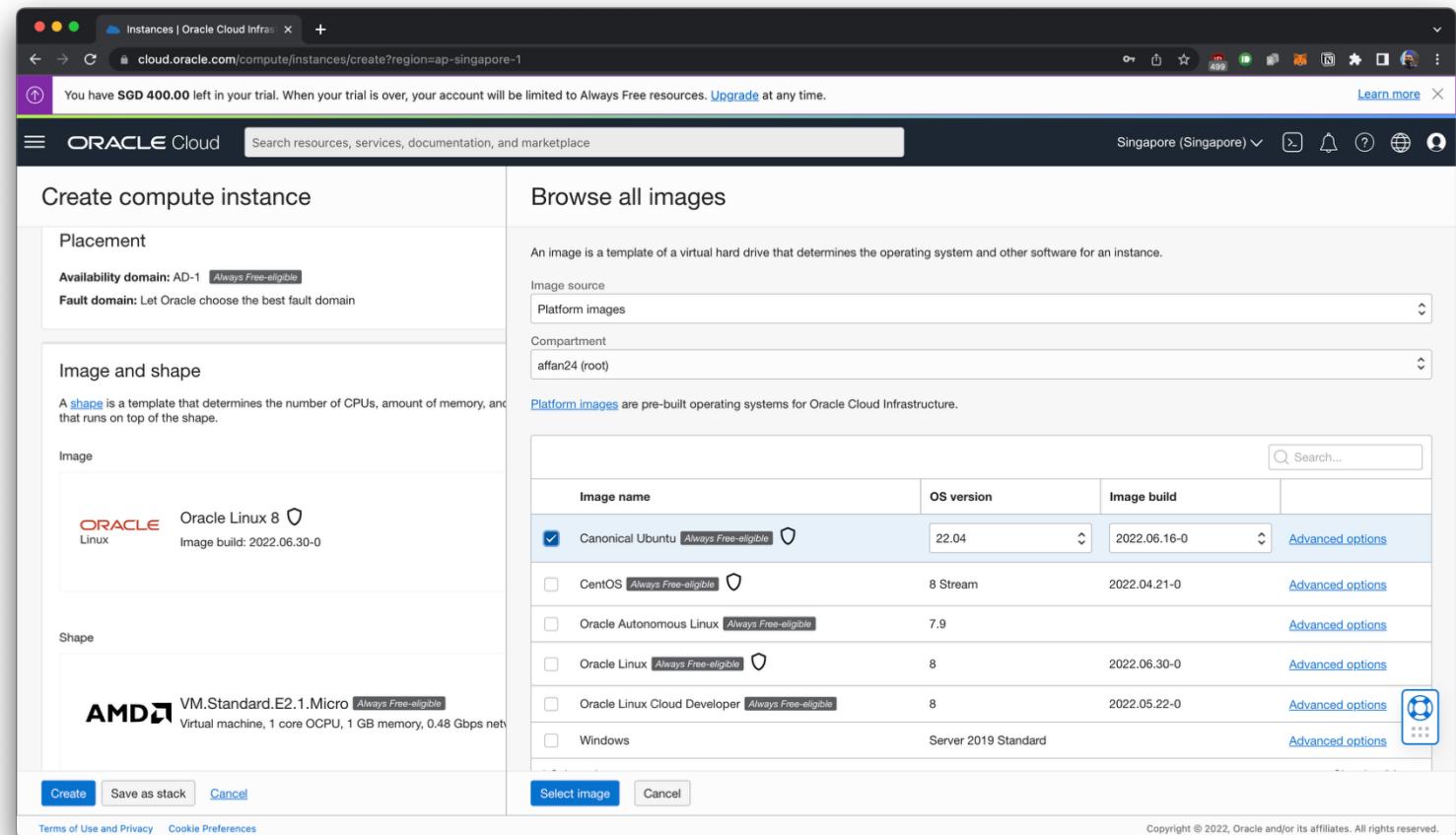
Name	State	IPv4 CIDR Block	IPv6 Prefix	Subnet Access	Created
<a href="#">Private Subnet-affan24</a>	Available	10.0.1.0/24	-	Private (Regional)	Wed, Jul 13, 2022, 13:46:20 UTC
<a href="#">Public Subnet-affan24</a>	Available	10.0.0.0/24	-	Public (Regional)	Wed, Jul 13, 2022, 13:46:20 UTC

Showing 2 items < 1 of 1 >

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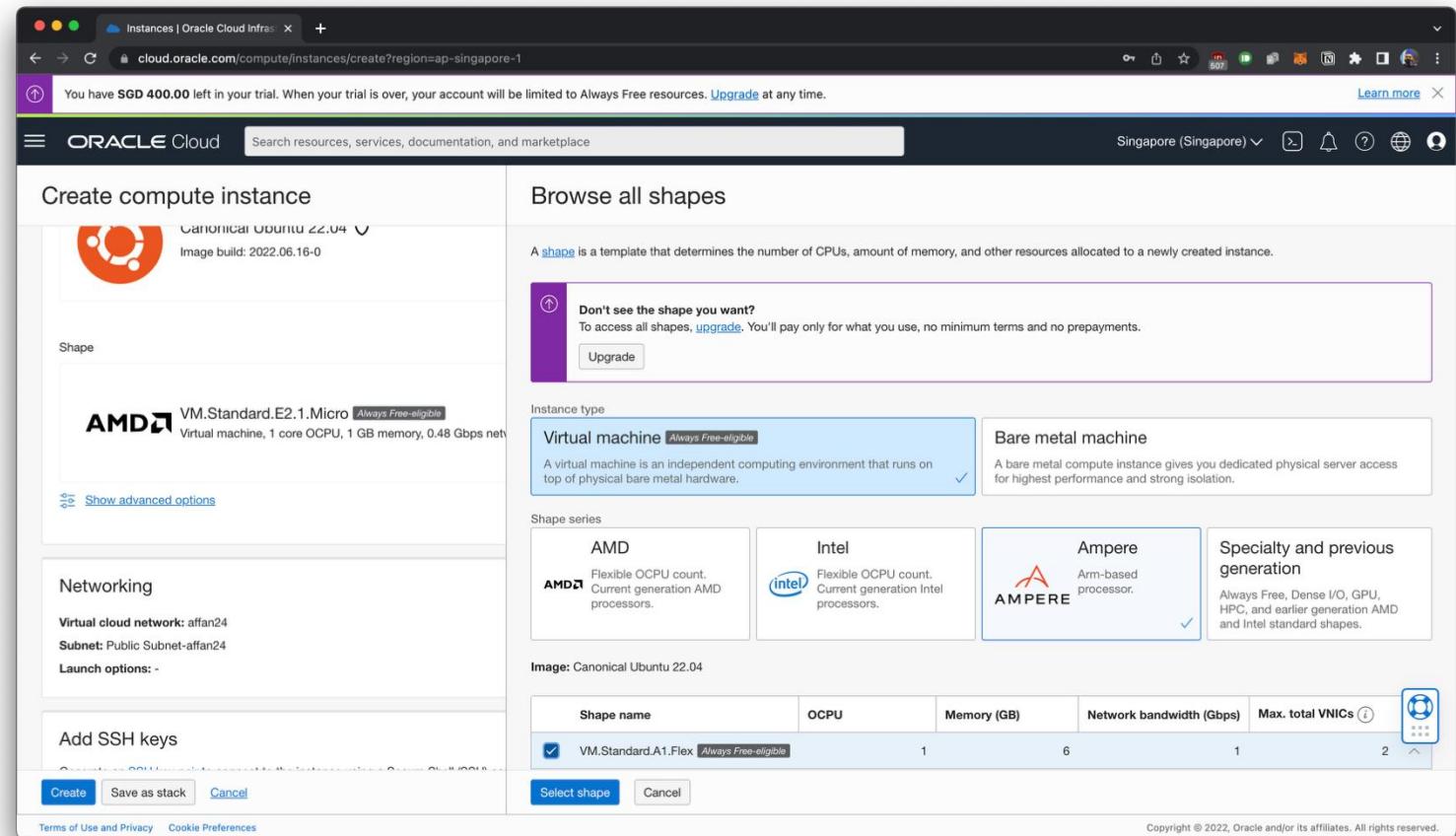
# Create VM – Choose your OS

- Ubuntu 22.04
- CentOS Stream
- Oracle Linux



# Create VM – Choose your shapes

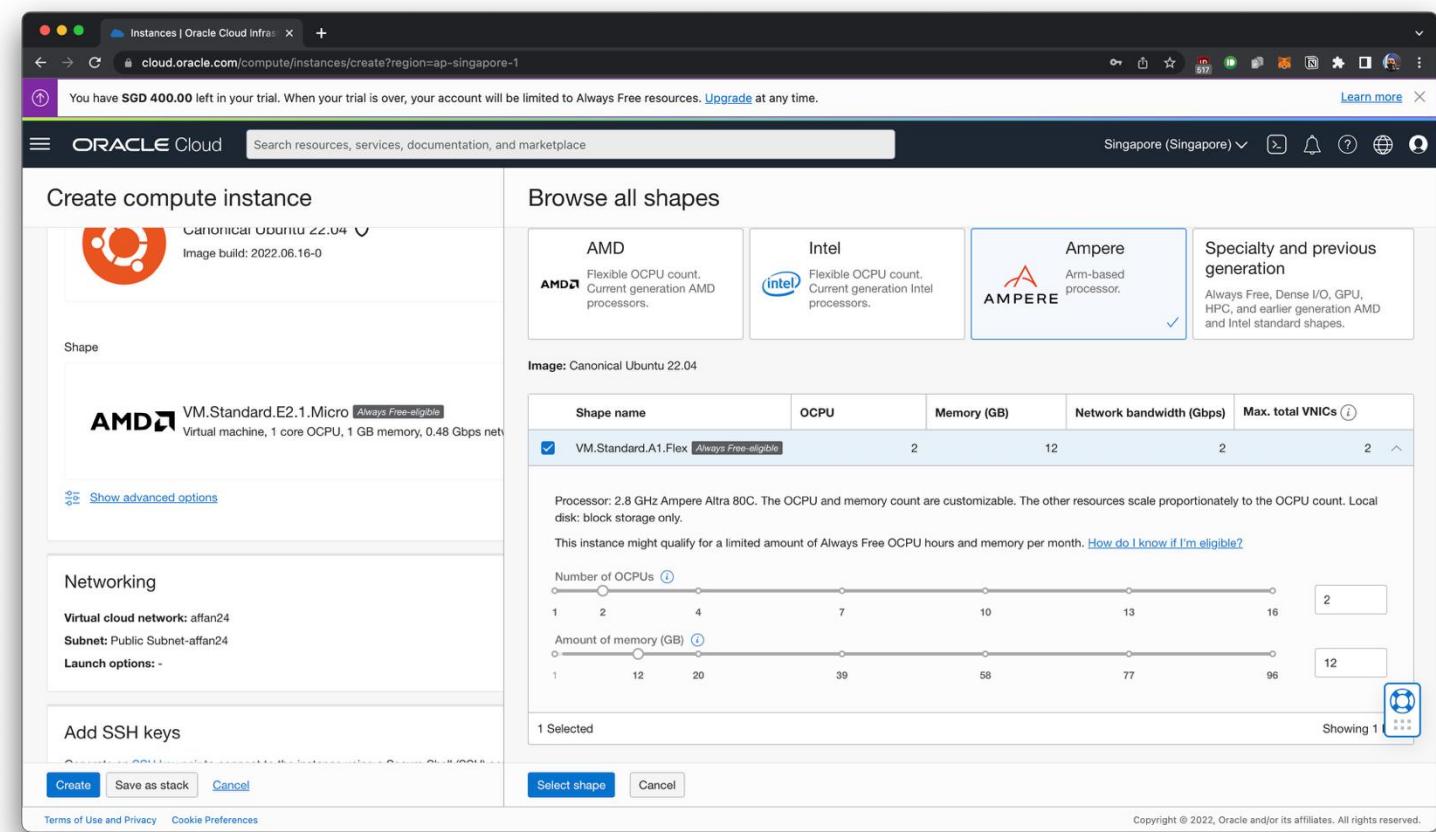
- AMD (x86\_64)
- Ampere (arm64)
- Other choices but not always free



# Create VM – Choose your shape size (Ampere)

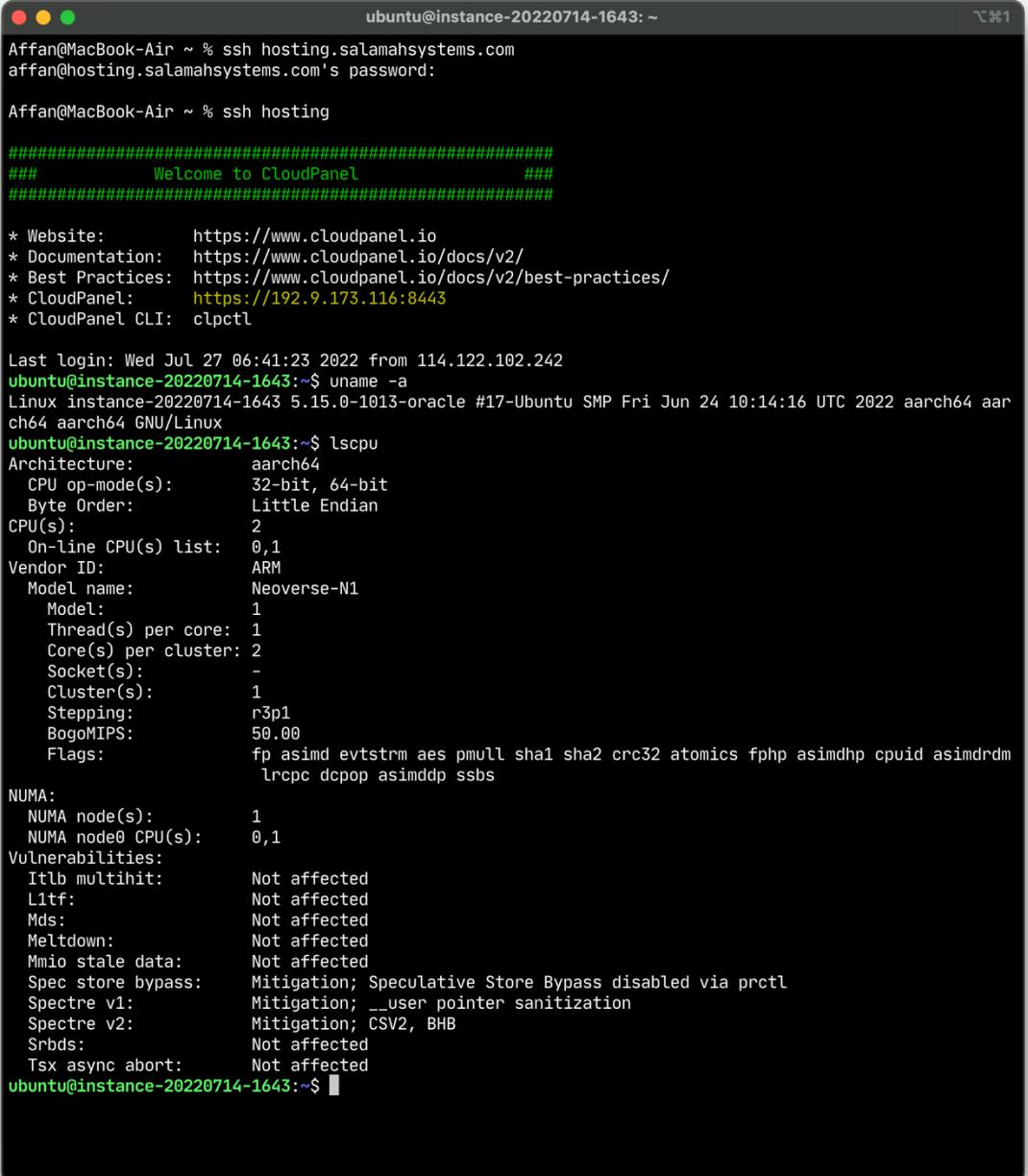
“Arm-based Ampere A1 cores and 24 GB of memory usable as 1 VM or up to 4 VMs with 3,000 OCPU hours and 18,000 GB hours per month”

- You can have ARM VM:
  - 4 x 1 vCPU / 6GB VM
  - 1 x 4 vCPU / 24GB VM
- But there are also 200GB limit on storage:
  - 1 VM consume 50GB
  - Limit to 4 VM on each region



# VM is there!

- You can have VM for free
- 2 vCPU, 12GB RAM
- 50GB storage
- Usually cost you US\$10-15 /mo



A screenshot of a macOS terminal window titled "ubuntu@instance-20220714-1643: ~". The window shows an SSH session to a host named "hosting.salamahsystems.com". The session starts with a password prompt and then displays a "Welcome to CloudPanel" message. Below this, it lists several URLs for documentation and best practices. The terminal then shows the last login information (Wed Jul 27 06:41:23 2022) and runs the "uname -a" command, which provides detailed system information including the kernel version (5.15.0-1013-oracle), architecture (aarch64), and various CPU and memory parameters. The terminal then runs the "lscpu" command, which provides extensive details about the CPU's architecture, including model name (Neoverse-N1), stepping (r3p1), and flags (fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdh dpuid asimdrdm lrcpc dcpop asimddp ssbs). Finally, the "numactl --show" command is run, showing NUMA node information (1 node, 0,1 CPU). The terminal ends with a "Vulnerabilities" section listing various security mitigations for known vulnerabilities like Meltdown, Spectre v1, and Spectre v2.

```
ubuntu@instance-20220714-1643: ~ % ssh hosting.salamahsystems.com
Affan@MacBook-Air ~ % ssh hosting.salamahsystems.com's password:

Affan@MacBook-Air ~ % ssh hosting

#####
###      Welcome to CloudPanel      ###
#####

* Website:      https://www.cloudpanel.io
* Documentation: https://www.cloudpanel.io/docs/v2/
* Best Practices: https://www.cloudpanel.io/docs/v2/best-practices/
* CloudPanel:   https://192.9.173.116:8443
* CloudPanel CLI: clpctl

Last login: Wed Jul 27 06:41:23 2022 from 114.122.102.242
ubuntu@instance-20220714-1643: ~$ uname -a
Linux instance-20220714-1643 5.15.0-1013-oracle #17-Ubuntu SMP Fri Jun 24 10:14:16 UTC 2022 aarch64 aarch64 aarch64 GNU/Linux
ubuntu@instance-20220714-1643: ~$ lscpu
Architecture:           aarch64
CPU op-mode(s):         32-bit, 64-bit
Byte Order:              Little Endian
CPU(s):                 2
On-line CPU(s) list:    0,1
Vendor ID:              ARM
Model name:             Neoverse-N1
Model:                  1
Thread(s) per core:     1
Core(s) per cluster:    2
Socket(s):              -
Cluster(s):             1
Stepping:               r3p1
BogoMIPS:               50.00
Flags:                  fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdh dpuid asimdrdm lrcpc dcpop asimddp ssbs
NUMA:
NUMA node(s):            1
NUMA node0 CPU(s):       0,1
Vulnerabilities:
Itlb multihit:          Not affected
L1tf:                   Not affected
Mds:                    Not affected
Meltdown:               Not affected
Mmio stale data:        Not affected
Spec store bypass:       Mitigation; Speculative Store Bypass disabled via prctl
Spectre v1:              Mitigation; __user pointer sanitization
Spectre v2:              Mitigation; CSV2, BHB
Srbd:                   Not affected
Tsx async abort:         Not affected
ubuntu@instance-20220714-1643: ~$ numactl --show
```

# DNS, and TLS Termination

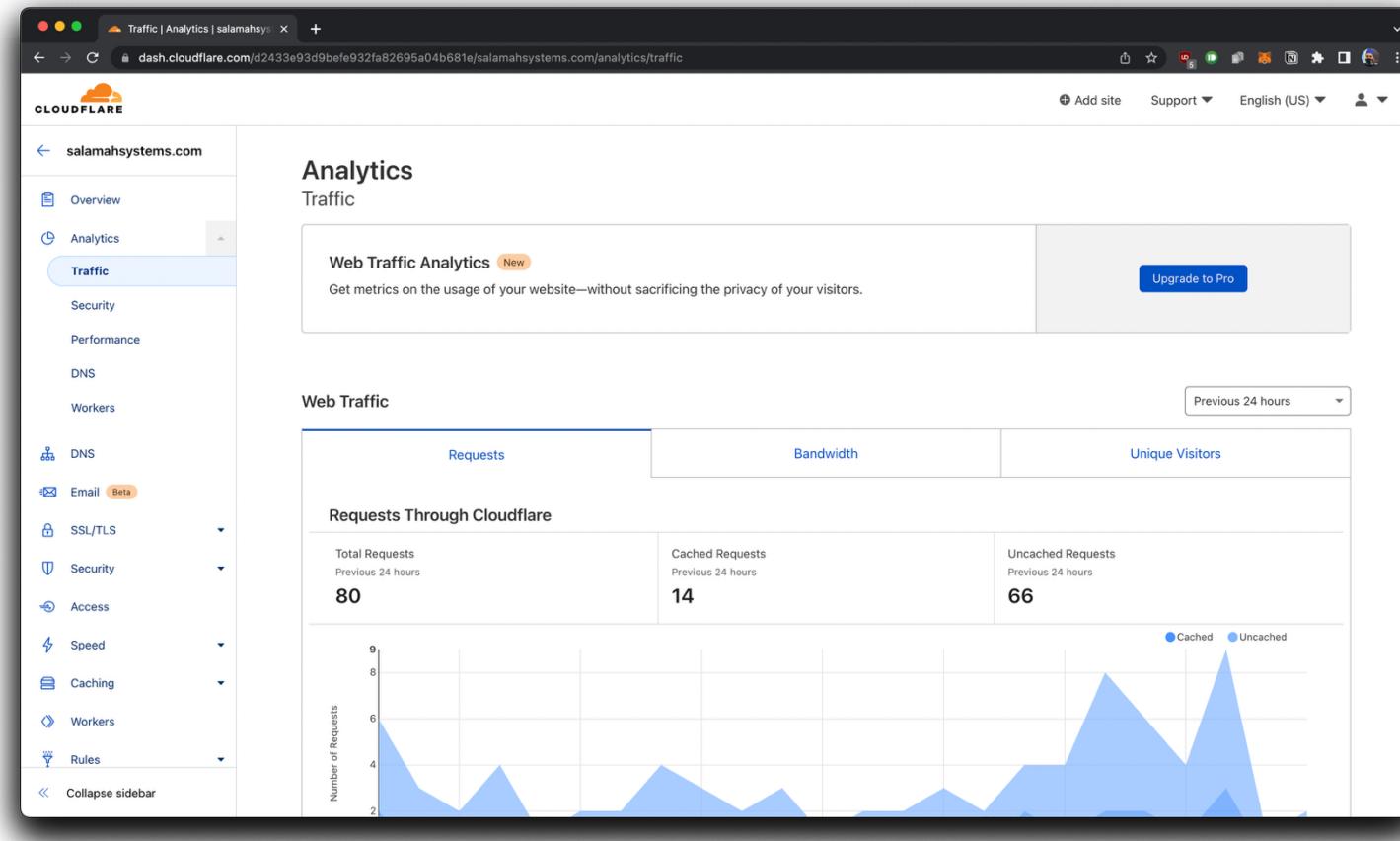
*Basically a CDN*

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# Cloudflare Free Tier

- CDN services
- DNS Authoritative for your domain
- TLS termination with free SSL certificate

# Register your domain



# Configure your domain

The screenshot shows the Cloudflare dashboard for the domain `salamahsystems.com`. The left sidebar contains navigation links for Overview, Analytics, DNS (selected), Email (Beta), SSL/TLS, Security, Access, Speed, Caching, Workers, Rules, Network, Traffic, Custom Pages, and Apps. A message at the top states: "A few more steps are required to complete your setup." Below this, the "DNS management for `salamahsystems.com`" section is displayed. It includes a search bar, an "Advanced" button, and a "Add record" button. A table lists existing DNS records:

Type	Name	Content	Proxy status	TTL	Actions
A	1vcpu-arm64-au	152.67.115.118	DNS only	Auto	Edit
A	1vcpu-arm64-au	152.67.115.118	DNS only	Auto	
A	2vcpu-arm64-au	192.9.173.116	DNS only	Auto	Edit
A	2vcpu-arm64-jp	138.2.0.211	DNS only	Auto	Edit
A	arm64-au	140.238.198.74	DNS only	2 min	Edit
A	cvp	172.16.132.240	DNS only - reserved IP	Auto	Edit
A	delicious	140.238.199.193	Proxied	Auto	Edit
A	delicious	140.238.199.193	Proxied	Auto	

Below the table, there are two "Add record" forms:

- For the first record: Name (required) is `1vcpu-arm64-au`, IPv4 address (required) is `152.67.115.118`, Proxy status is `DNS only`, TTL is `Auto`.
- For the second record: Name (required) is `delicious`, IPv4 address (required) is `140.238.199.193`, Proxy status is `Proxied`, TTL is `Auto`.

Buttons for "Delete", "Cancel", and "Save" are visible at the bottom of each form.

# Configure your domain

- Create DNS record
- For your website, simply switch the “Proxy Status” to Proxied to activate TLS
- For other record, keep it switch to “DNS only”

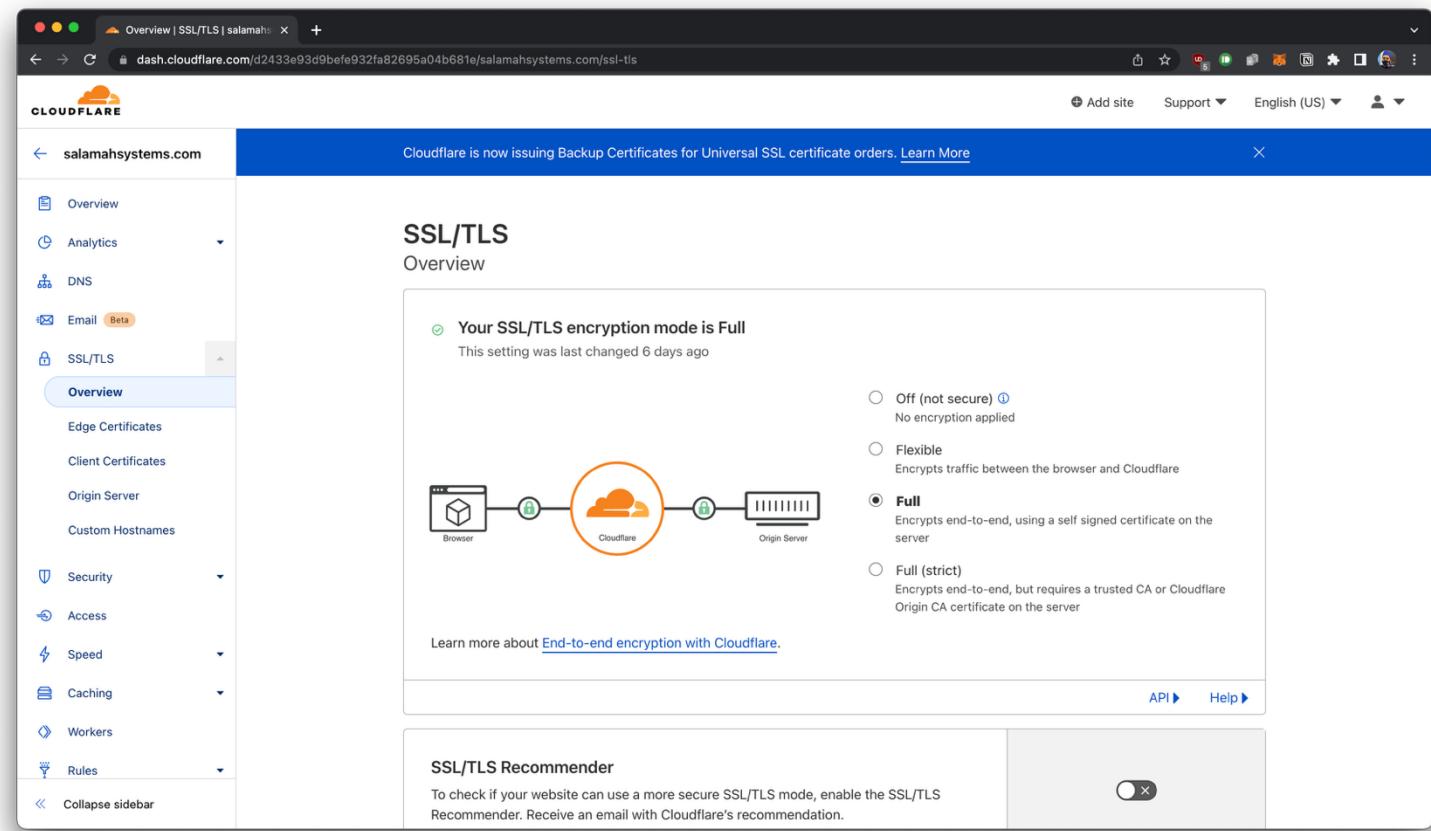
DNS management for **salamahsystems.com**

Search DNS Records

Type	Name	Content	Proxy status	TTL	Actions
A	1vcpu-arm64-au	152.67.115.118	DNS only	Auto	<a href="#">Edit</a>
Type	Name (required)	IPv4 address (required)	Proxy status	TTL	
A	1vcpu-arm64-au	152.67.115.118	DNS only	Auto	
Use @ for root					
<a href="#">Delete</a>			<a href="#">Cancel</a> <a href="#">Save</a>		
A	2vcpu-arm64-au	192.9.173.116	DNS only	Auto	<a href="#">Edit</a>
A	2vcpu-arm64-jp	138.2.0.211	DNS only	Auto	<a href="#">Edit</a>
A	arm64-au	140.238.198.74	DNS only	2 min	<a href="#">Edit</a>
A	cvp	172.16.132.240	DNS only - reserved IP	Auto	<a href="#">Edit</a>
A	delicious	140.238.199.193	Proxied	Auto	<a href="#">Edit</a>
Type	Name (required)	IPv4 address (required)	Proxy status	TTL	
A	delicious	140.238.199.193	Proxied	Auto	
Use @ for root			<a href="#">Cancel</a> <a href="#">Save</a>		

# SSL/TLS Configuration

- Tiga macam TLS:
- Flexible: TLS with insecure HTTP origin
- Full: TLS with self-signed HTTPS origin
- Strict: Full with Cloudflare certificate



# Easy win – one click DNSSEC

The screenshot shows the Cloudflare DNS interface for the domain `salamahsystems.com`. At the top, there's a browser window showing the Cloudflare dashboard with the URL `dash.cloudflare.com/d2433e93d9befc932fa82695a04b681e/salamahsystems.com/dns`. Below it, the main interface displays two NS records:

NS	Value
aria.ns.cloudflare.com	
elmo.ns.cloudflare.com	

In the main content area, there's a section titled "DNSSEC" with the following text:

DNSSEC protects against forged DNS answers. DNSSEC protected zones are cryptographically signed to ensure the DNS records received are identical to the DNS records published by the domain owner.

A blue button labeled "Disable DNSSEC" is visible. Below this, a success message says: "Success! salamahsystems.com is protected with DNSSEC." At the bottom right, there are links for "DS Record" and "Help".

The sidebar on the left includes links for "Custom Pages", "Apps", and "Collapse sidebar". A note in the center states: "Cloudflare will follow a CNAME to where it points and return that IP address instead of the CNAME record. By default, Cloudflare will only flatten the CNAME at the root of your domain, which is salamahsystems.com." There's also a dropdown menu set to "Flatten CNAME at root" and a "Help" link.

# Easy win – one click HTTP2 and QUIC

## HTTP/2

Accelerates your website with HTTP/2



[Help ▶](#)

## HTTP/2 to Origin

Allow HTTP/2 requests between Cloudflare's edge and your origin



[Help ▶](#)

## HTTP/3 (with QUIC)

Accelerates HTTP requests by using QUIC, which provides encryption and performance improvements compared to TCP and TLS.



[Help ▶](#)

# Easy win – IPv6 enabled

**IPv6 Compatibility**

Enable IPv6 support and gateway.

This setting was last changed a year ago

[API ▶](#) [Help▼](#)

**What is IPv6?**

As the Internet runs low on IPv4 address space, there's been a rapid increase in the deployment of IPv6 technologies. This shift is critical to the long-term growth and health of the Internet. At Cloudflare, we are [doing our part](#) to make it free and easy for all websites to be available on network.ipv6.

**What does enabling IPv6 compatibility do?**

The IPv6 gateway setting enables IPv6 on all subdomains that are on Cloudflare (marked by an orange cloud in your DNS settings). If your host provides IPv6 support, the gateway will proxy IPv6 connections through Cloudflare. When both IPv4 and IPv6 connections are available, Cloudflare prefers IPv4. We recommend keeping IPv6 Compatibility set to "On" for greater availability for your website.

**Note:** If you already have IPv6 records on your origin server, you must enable Cloudflare for your AAAA records on the DNS settings page.

**Why can't I turn off IPv6?**

At Cloudflare we believe in being good to the Internet and good to our customers. By moving on from the legacy world of IPv4-only to the modern-day world where IPv4 and IPv6 are treated equally, we believe we are doing exactly that. In the Cloudflare dashboard, IPv6 is no longer something you can toggle on and off, it's always just on.

# Cloud VPN

*Or people like to call “Zero Trust Security”*

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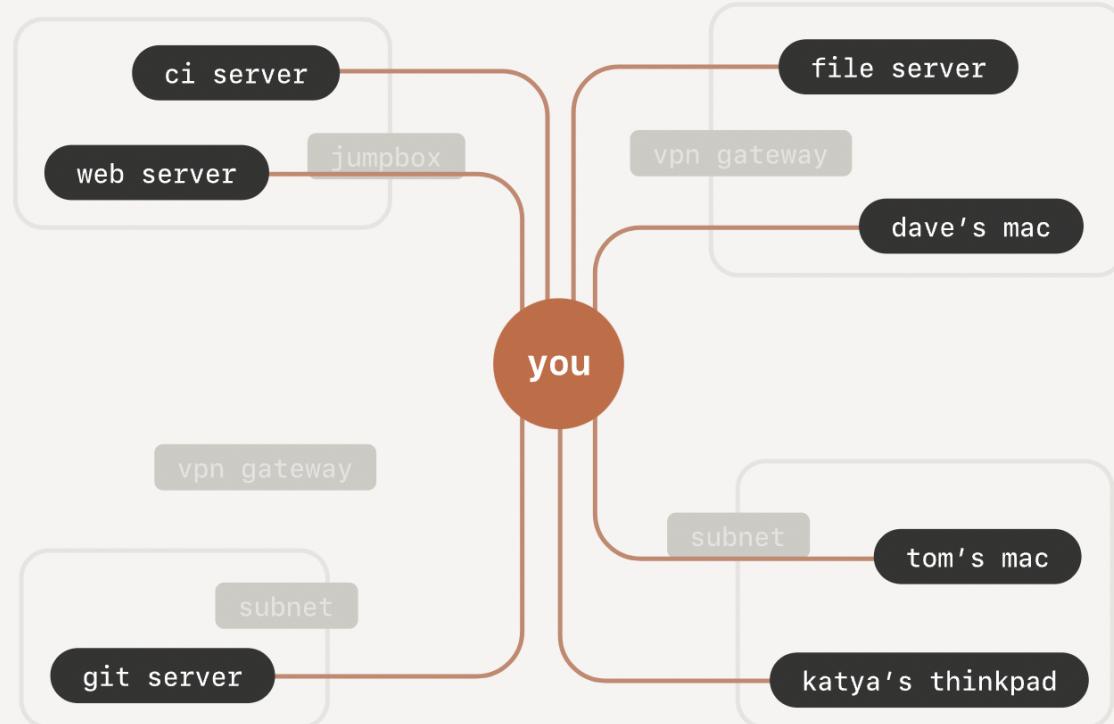
# Tailscale Free Tier

- Zero configuration VPN
- Use your SSO (Google, Microsoft, GitHub, etc.)
- Connecting any resources from anywhere

# What is the Tailscale?

## Without Tailscale

A frustratingly complex and brittle collection of firewalls, rules, and holes while wondering if your network is secure enough.



## With Tailscale

Rolls out in minutes. Devices connect directly, working from any physical location or networking environment. All without poking holes in your firewall.

# Tailscale can do this:

Connecting resources anywhere to anyone:

- Windows desktop
- Windows Server
- macOS
- Linux
- iOS/iPadOS
- Android

Resources in:

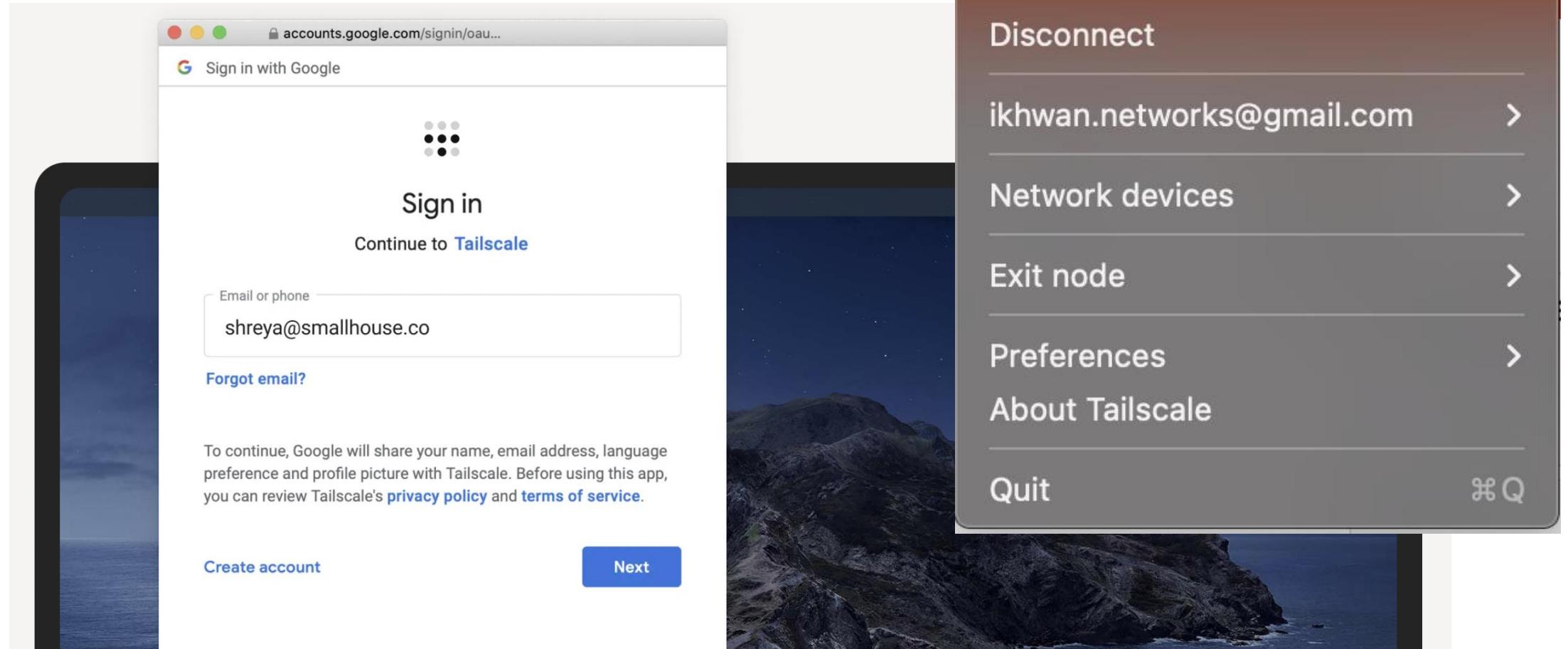
- The cloud (VM):
  - AWS, Azure, GCP, OCI
  - Any VMs on the VPS
- On premises DC:
  - vSphere, Proxmox, KVM
- On your home:
  - Raspberry Pi, NAS, PC under your desk
- Serverless:
  - GitHub Action, Google Cloud Run, etc.,

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# Alternatives

- Cloudflare Zero Trust
- Nebula (from Slack)
- ZeroTier
- OpenVPN
- DIY WireGuard VPN
- But why Tailscale: It's the easiest solution!

# Tailscale client (on macOS)



# List of Machines Connected

## Machines

All

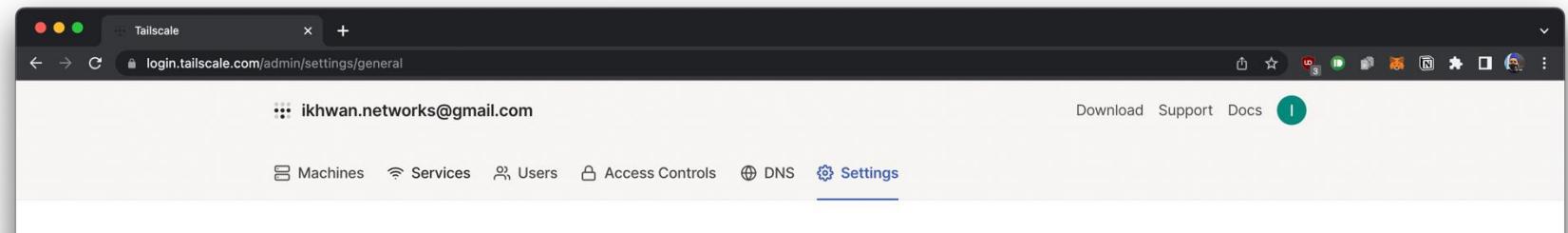
External

Search by name, owner, tag, version...

15 machines

MACHINE	IP	OS	LAST SEEN
<b>hello</b> ⓘ services@tailscale.com  <span>External</span> No expiry	100.101.102.103	Linux 1.26.1	● Connected
<b>kvm-ubuntu</b> ikhwan.networks@gmail.com  <span>No expiry</span> <span>Subnets</span>	100.107.204.89 172.16.132.0/24	↑ Linux 1.24.2	● Connected
<b>ikhwanmart</b> ikhwan.networks@gmail.com  <span>No expiry</span>	100.123.206.13	↑ Linux 1.26.1	● Connected
<b>kasir-ghc</b> ikhwan.networks@gmail.com  <span>No expiry</span>	100.94.182.76	↑ Windows 1.22.2	● Connected
<b>laptop-mf5ooue5</b> ikhwan.networks@gmail.com  <span>No expiry</span>	100.84.106.59	↑ Windows 1.22.2	● 7:37 AM
<b>affan-jet-black</b> ikhwan.networks@gmail.com	100.105.99.78	iOS 1.28.0	● Jul 24, 9:11 PM

# Identity Provider – I choose Google ID

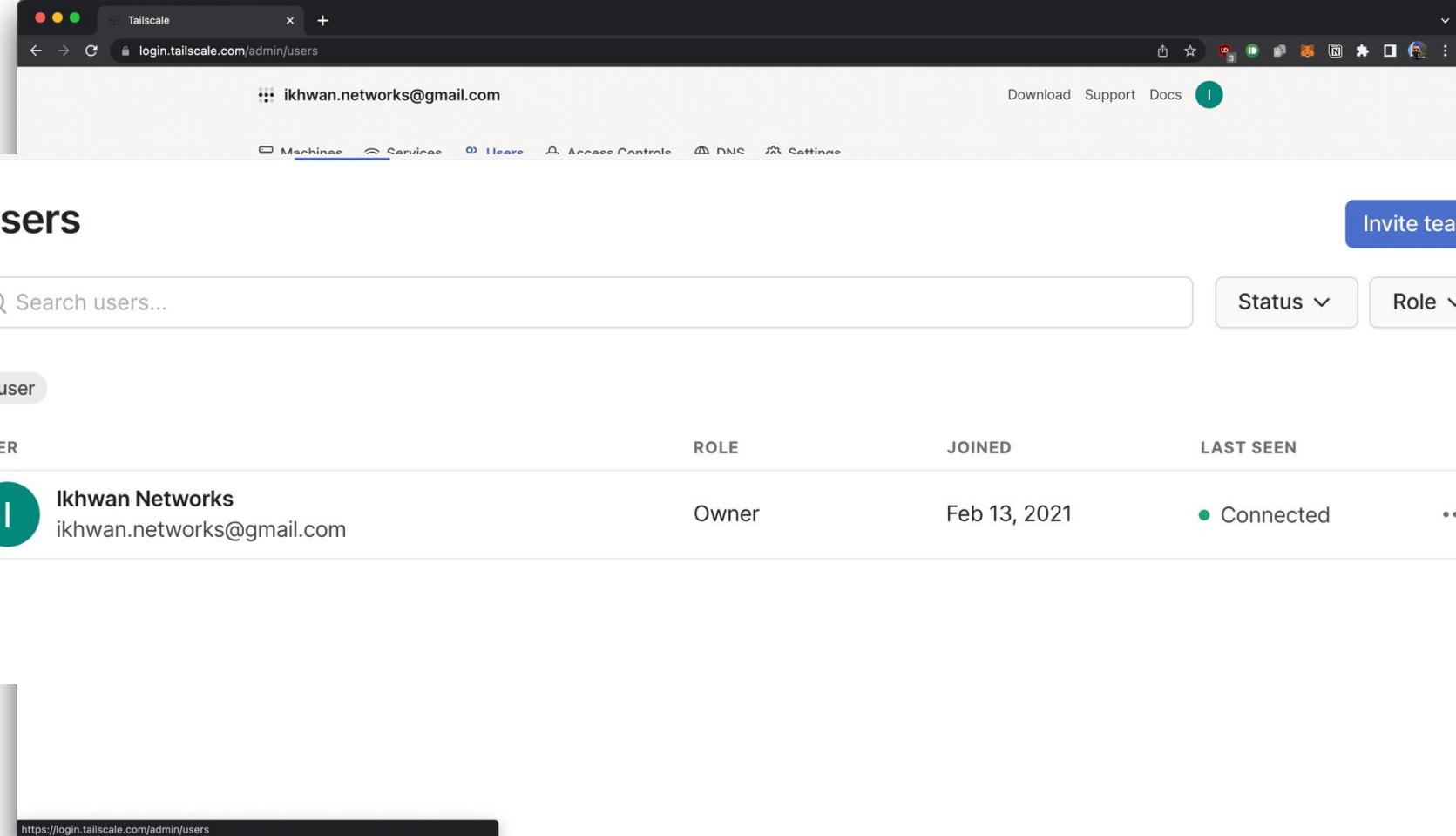


## Identity Provider

How users log in to your tailnet. [Contact support](#) to change this.

A screenshot of the "Identity Provider" settings page. At the top, there is a large button with the Google logo and the word "Google". Below this, there is a text input field containing the value "180", with a tooltip message "Must be between 1 and 180 days." To the right of the input field are two buttons: "Save" and "Reset". At the bottom of the page, there is a link "Delete tailnet" and a note about the tailnet being in the process of being deleted.

# Users – for Free Tier I just need one user



A screenshot of a web browser window titled "Tailscale" displaying the URL "login.tailscale.com/admin/users". The page shows a single user entry in a table:

USER	ROLE	JOINED	LAST SEEN	...
Ikhwan Networks ikhwan.networks@gmail.com	Owner	Feb 13, 2021	Connected	...

The browser's address bar at the bottom shows the URL "https://login.tailscale.com/admin/users".

# **So what you can do with them?**

*Solution, not a bunch of products*

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# Use case – Hybrid Company (1)

- Company of 5 distributed IT workers
- Someone called for a new IT project
- It's their first project, so they need to create “company”
- Setup a company:
  - Get new domain name: company.com (pay annually)
  - Get corporate email: [developer@company.com](mailto:developer@company.com) using Zoho Mail
    - Free! (for 5 account)
  - Get a collaboration system: Atlassian Confluence & JIRA Software
    - Free! (for 10 account)

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# Use case – Hybrid Company (2)

- Create resources on the cloud
  - AMD x86\_64 VM for small workload
    - Imagine Raspberry Pi 3 on the cloud
    - Maybe VPN server? Small web server?
  - ARM VM for medium workload
    - 6-12GB on VM will give you medium webhosting server
    - Also can run small k8s cluster
- Setup DNS and TLS termination
  - Present workload to the public internet

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# Use case – Hybrid Company (3)

- Client sometimes usually provide resources
  - Cloud VMs
  - VMs or baremetal from on premises DC
- Sometimes there are resources inside your home or office
  - Raspberry Pi lying around
  - Server with GPU under the desk
  - Prebuilt NAS
- Everything can be connected just like in single LAN

# **End Result**

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# What we can have

- Company can have infrastructure at US\$ 0
  - VMs, storage, network, security
  - CDN, DNS, and TLS
  - VPN to access any resources from any devices
- Upgrade to paid infrastructure to scale up
  - But at least you can have basic infrastructure when you cannot scale
- I hope this talk useful for you

# **Wassalam!**