CLOUD: ZERO TO SIXTY

DEPLOY A CLOUD IN 40 MINS

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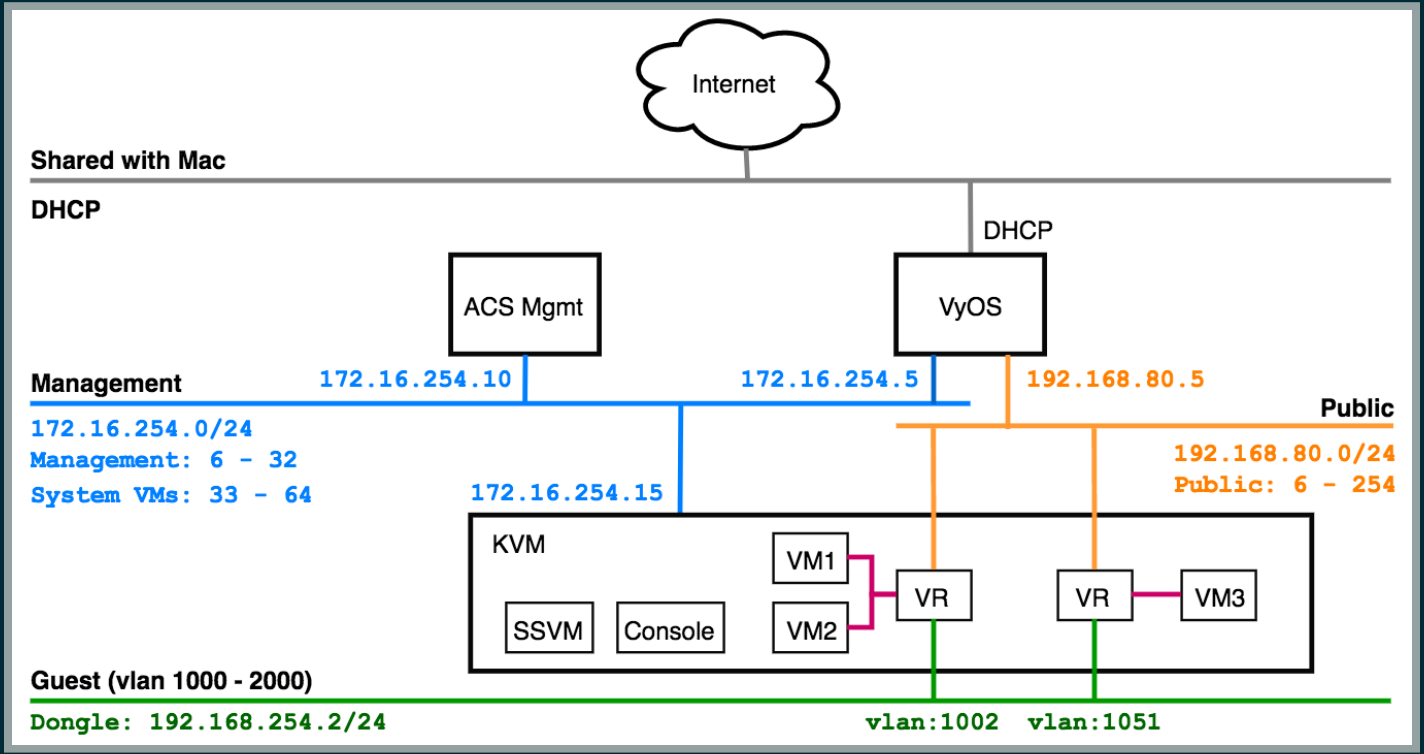
Lead Developer @ CloudOps

`github.com/swill/apachecon2016`

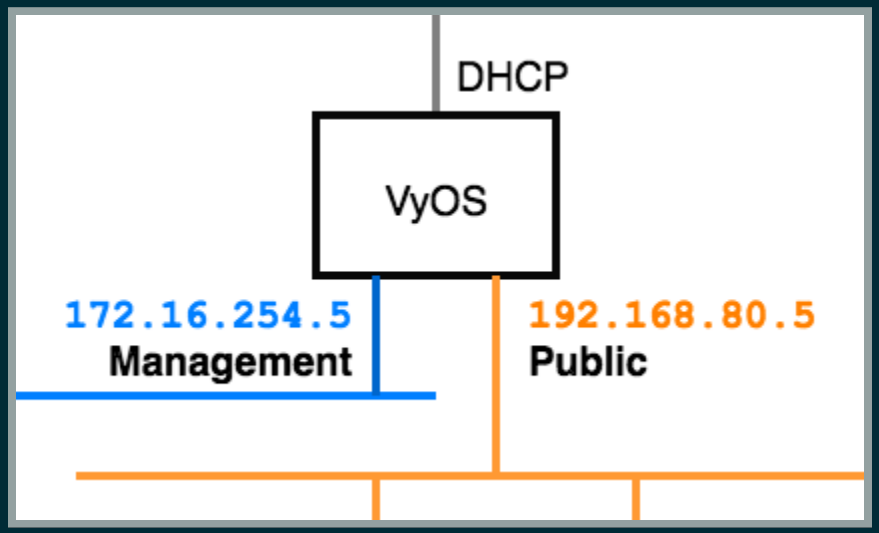
ON THE MENU

We will be configuring an Apache CloudStack (ACS) cloud on my laptop using VMware Fusion.



UPSTREAM NETWORKING

The ACS environment will be connected to my Mac's network through a VyOS router.



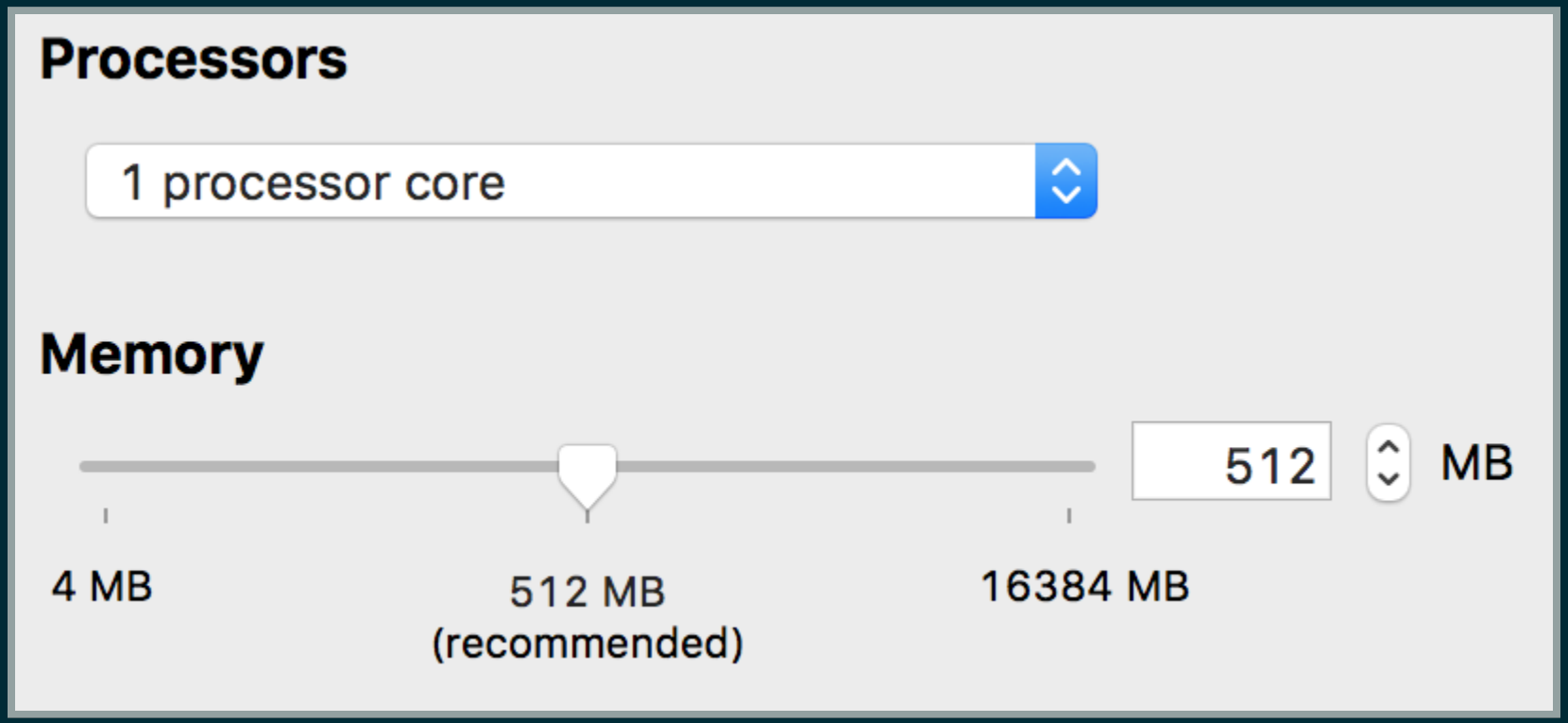
`./vyos/01_configure.sh`

VYOS DUTIES

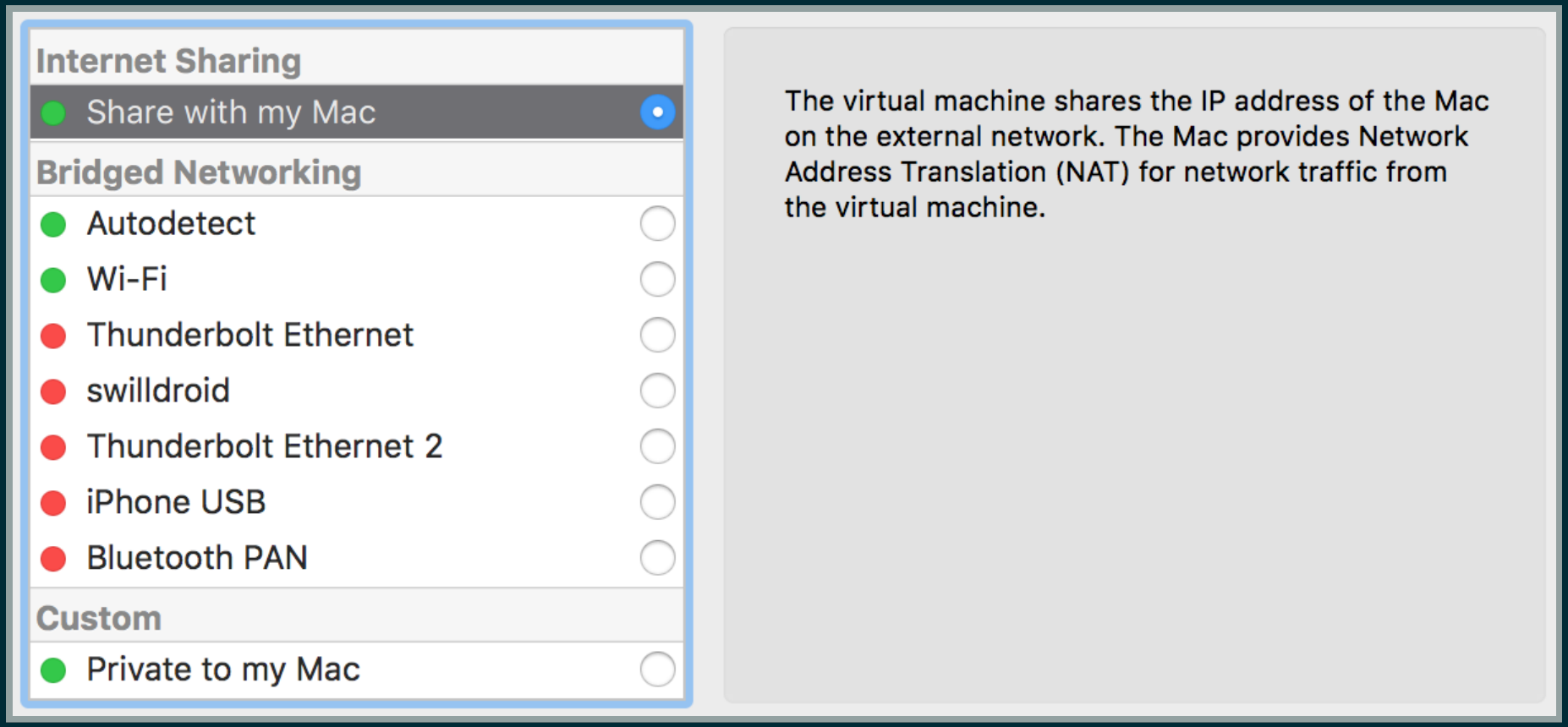
- The network uplink for the entire environment.
- Gateway for both Management and Public networks.
- Edge firewall. In this case just a pass through.
- Firewall to protect the Management network.

VYOS VM RESOURCES

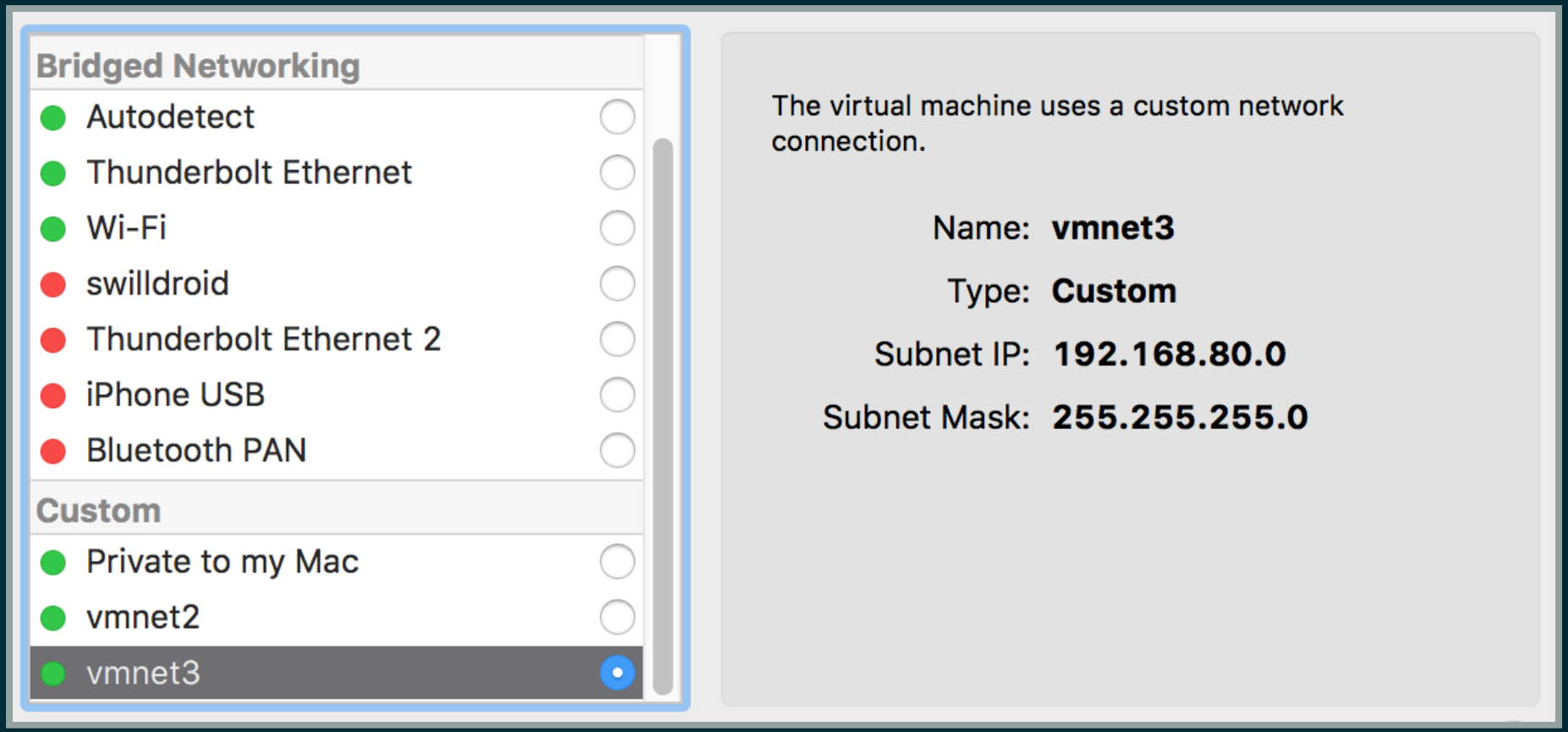
Small VM since we don't expect much load.



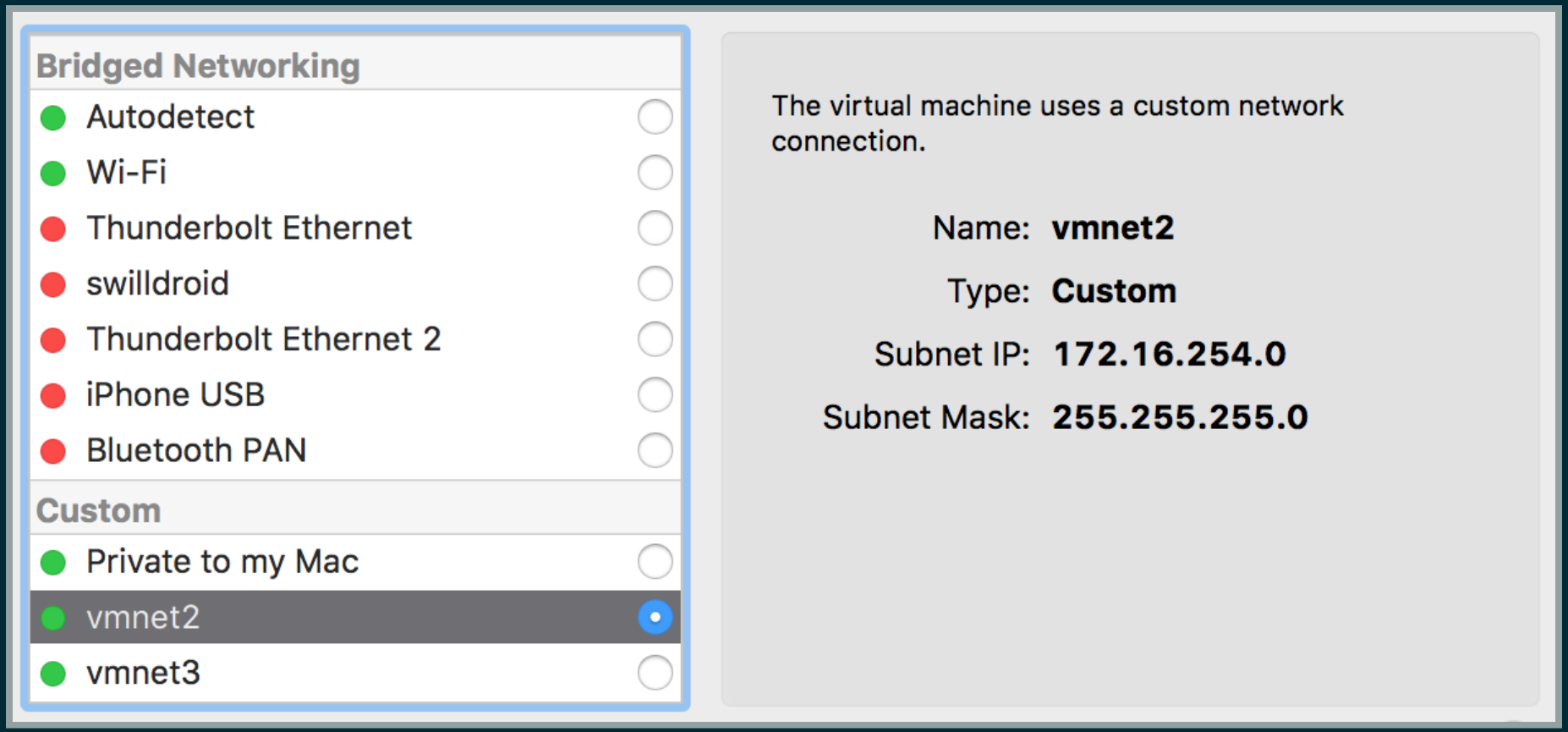
INTERNET NIC (ETH0)



ACS PUBLIC NIC (ETH1)

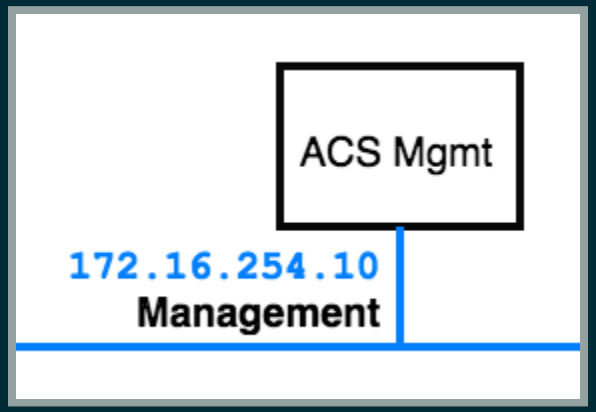


ACS MANAGEMENT NIC (ETH2)



ACS MANAGEMENT VM

ACS Management node, MySQL and NFS mounts.



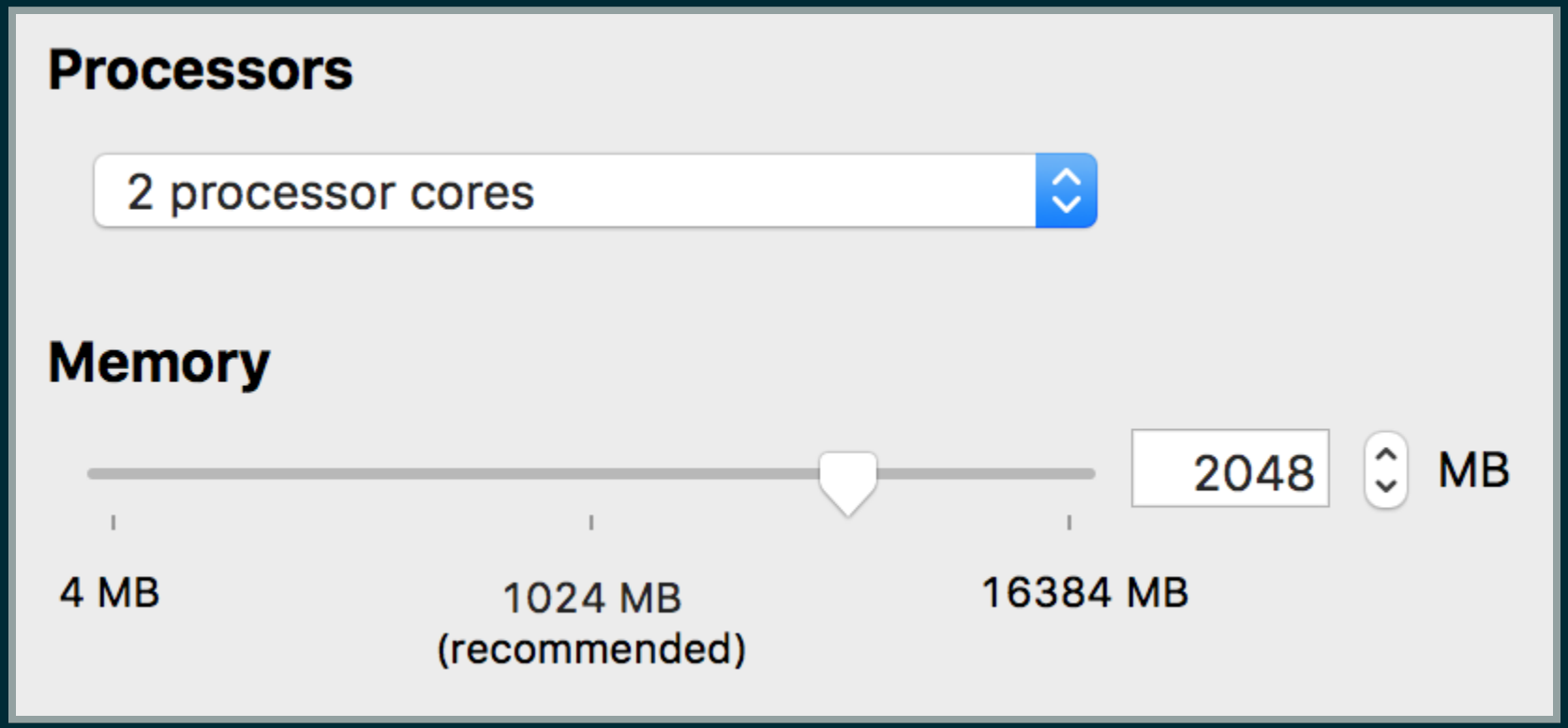

```
./acs/01_network_config.sh
./acs/02_install_acs.sh
```

ACS MANAGEMENT DUTIES

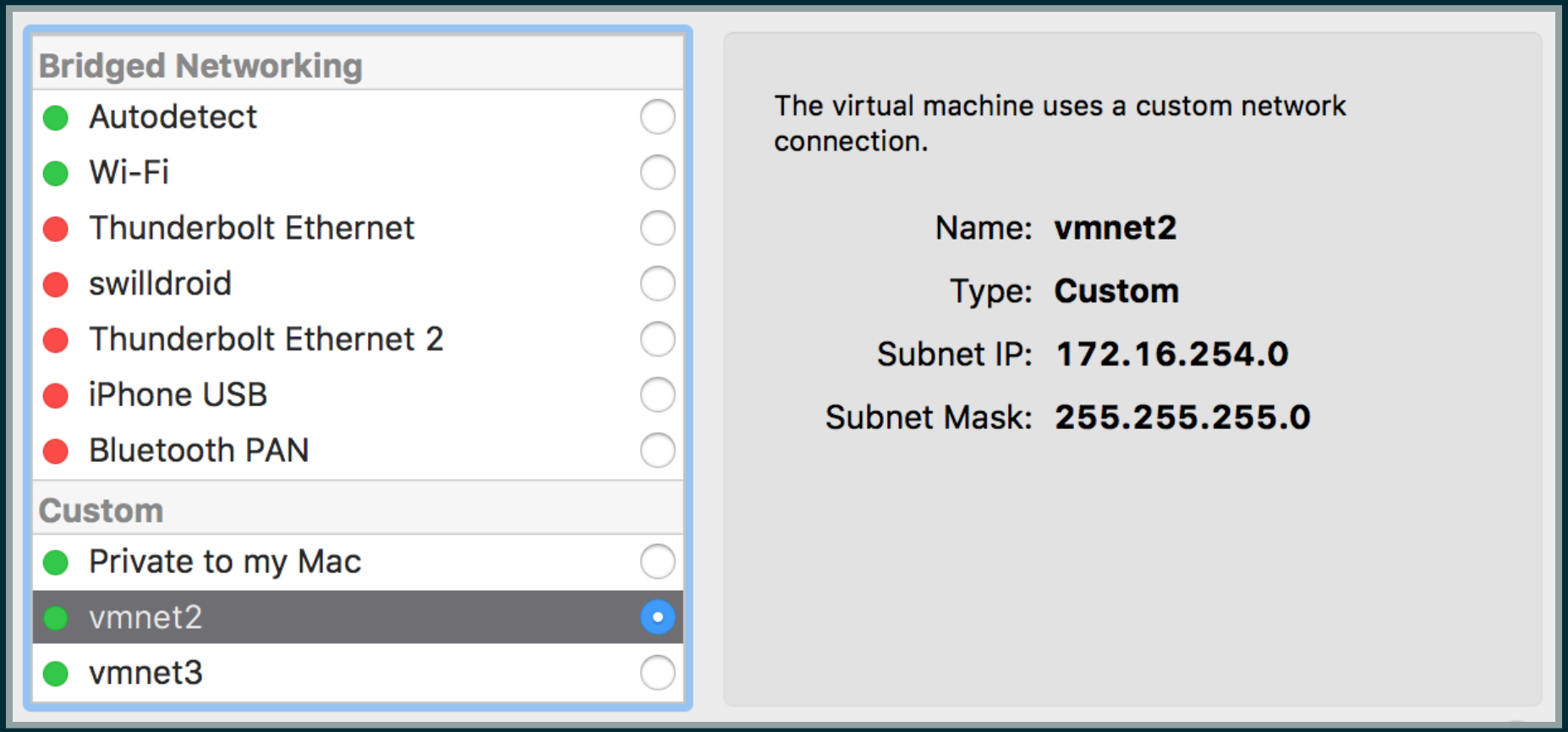
- Management entry point for both Web and API.
- Orchestrates all the host compute resources.
- Orchestrates the Guest and Public networks.
- Orchestrates VM storage (Root and Data).
- Our Case: MySQL database for ACS.
- Our Case: NFS mounts for storage.

ACS MANAGEMENT VM RESOURCES

Restricted by the size of my laptop obviously.

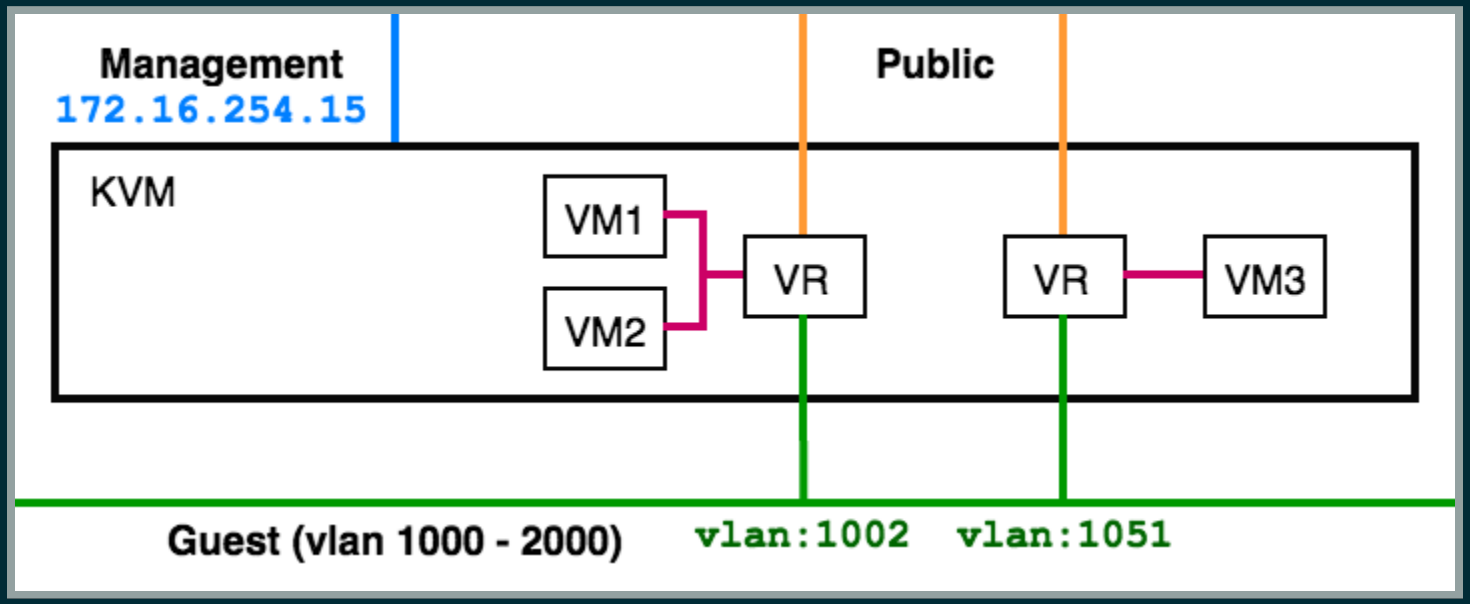


ACS MANAGEMENT NIC (ETH0)



KVM HYPERVISOR VM

KVM Hypervisor Host for ACS to orchestrate.



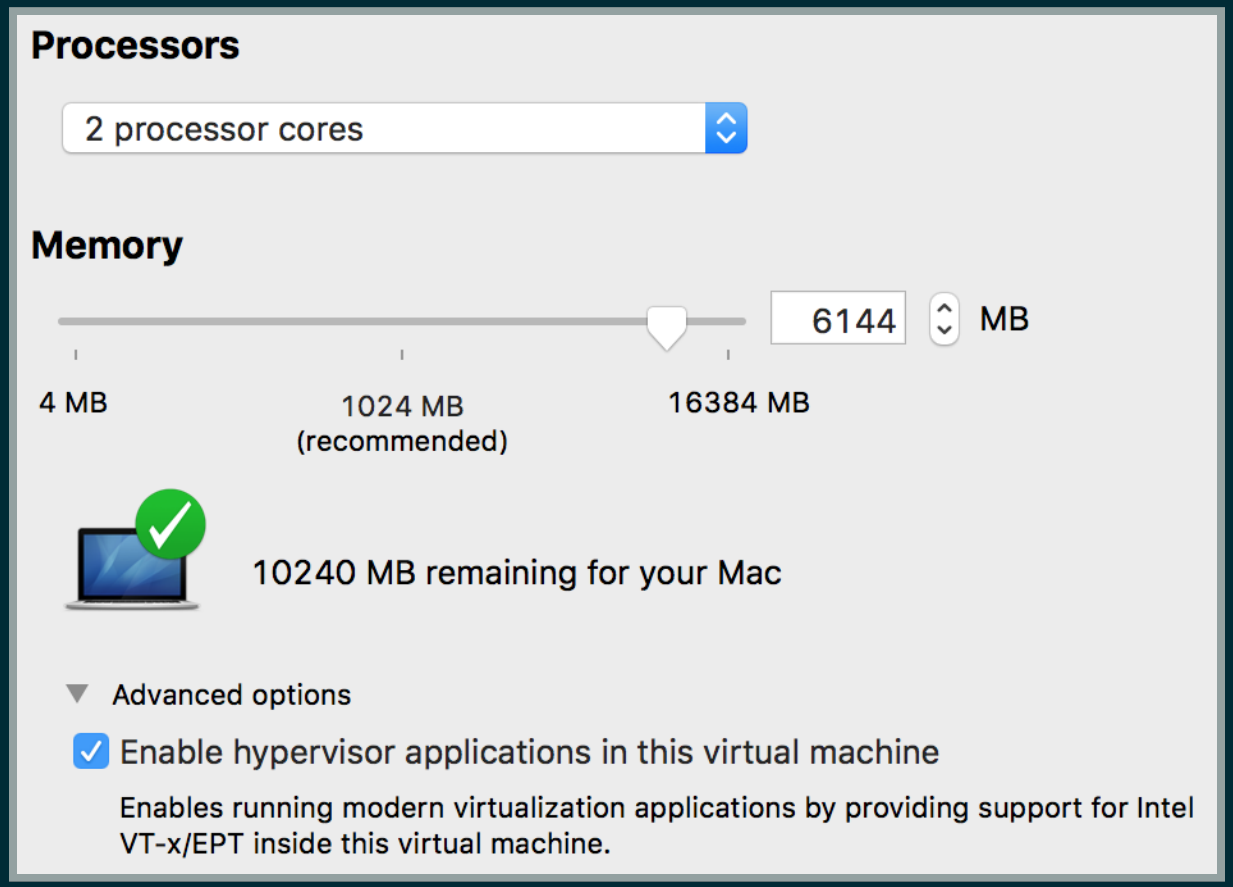

```
./kvm/01_network_config.sh
./kvm/02_install_kvm.sh
```

KVM DUTIES

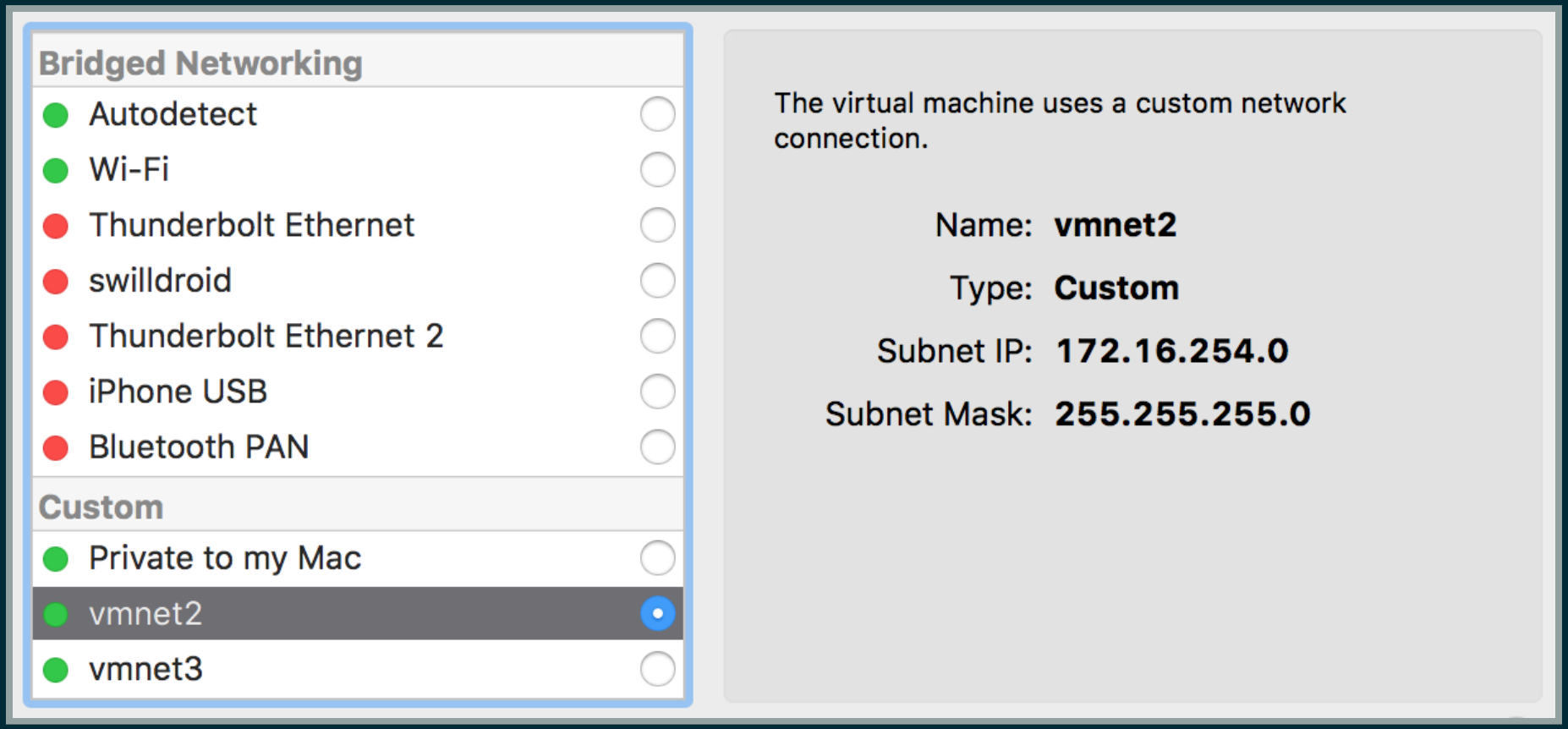
- Provide compute resources to be orchestrated.
- Hosts the System VMs (more on this later).
- Guest network isolation and hosts the Guest VRs.
- Implements the snapshotting functionality.
- Implements the VM recovery point feature.

KVM HOST VM RESOURCES

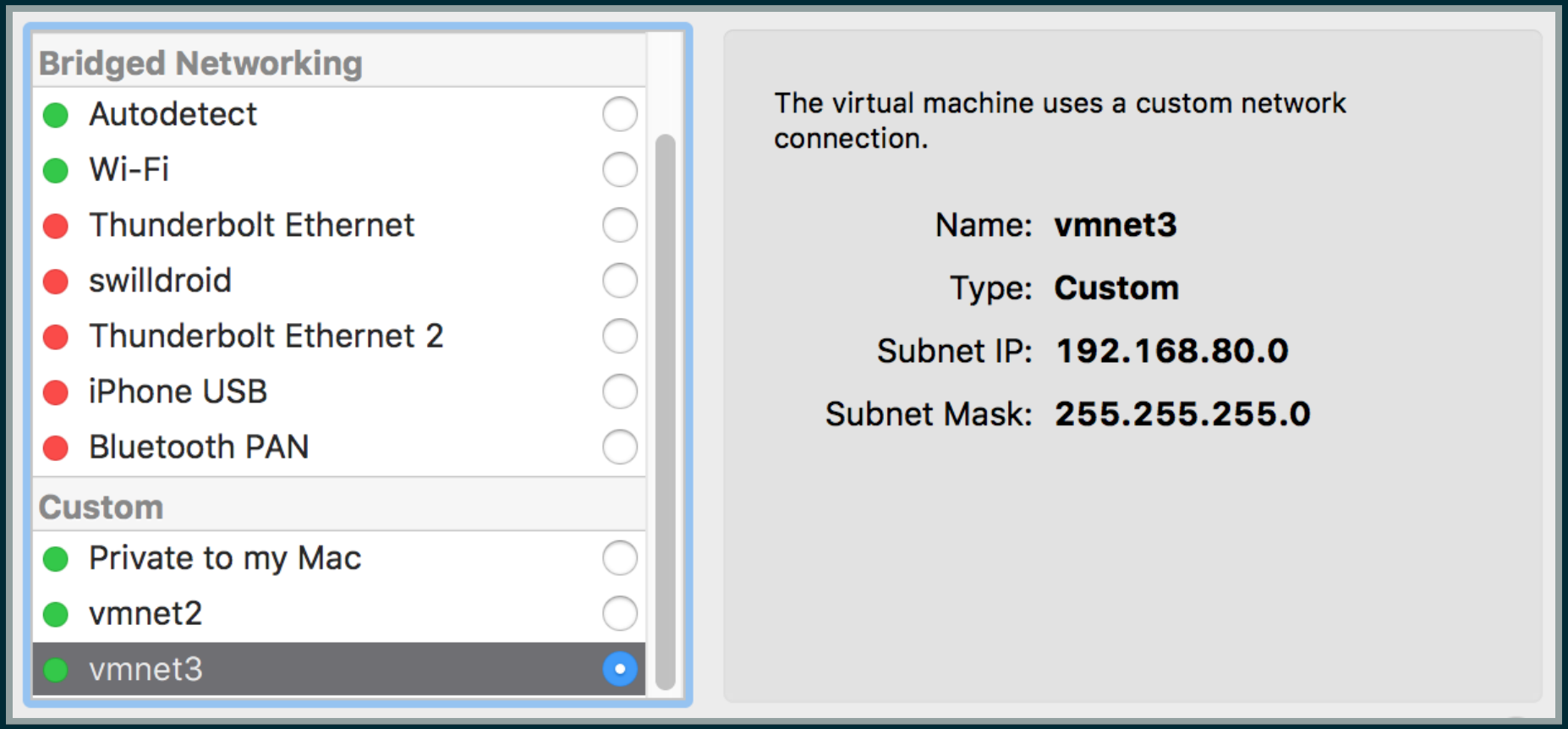
Again, very limited due to the size of my Mac.



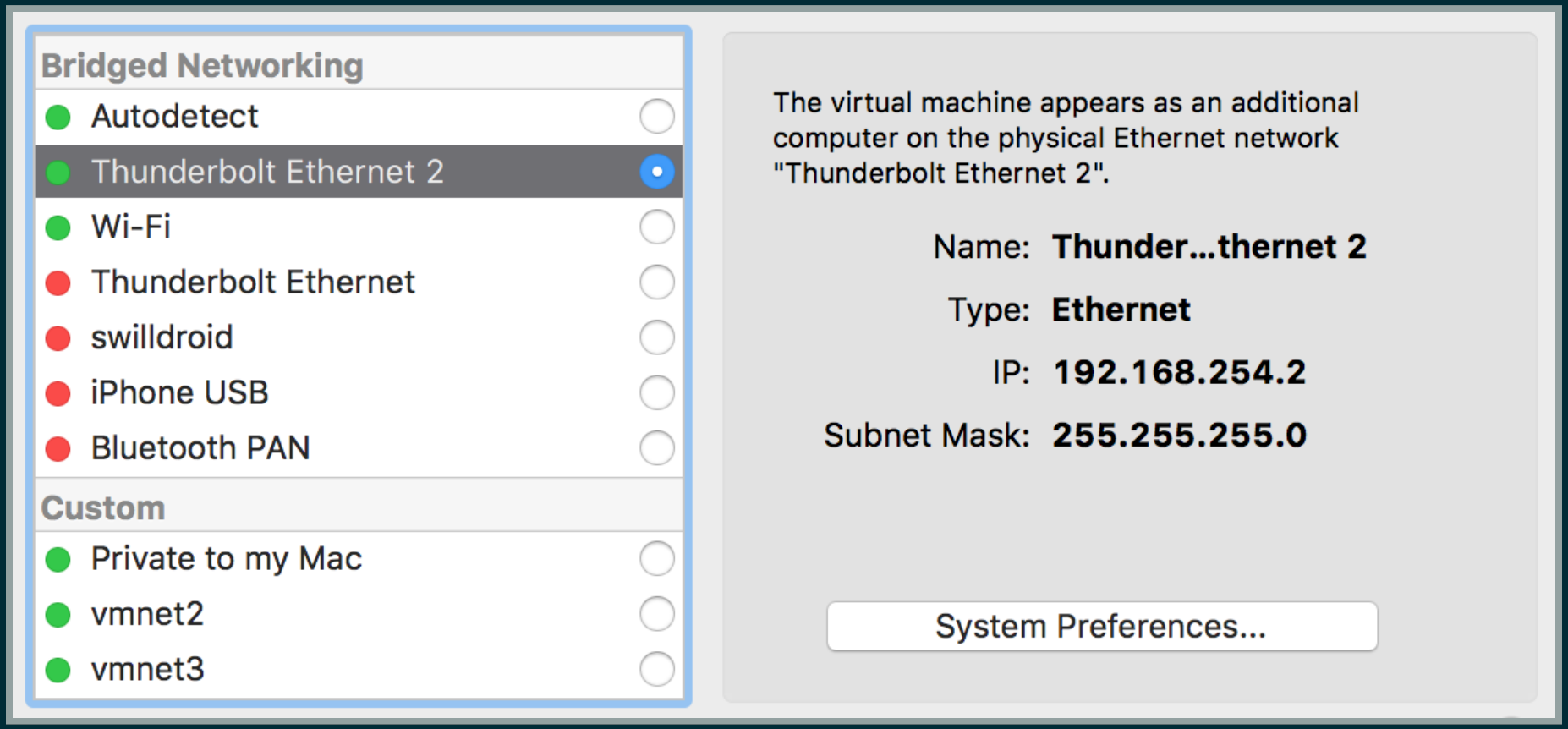
ACS MANAGEMENT NIC (ETHO / CLOUDBRO)



ACS PUBLIC NIC (ETH1 / CLOUDBR1)



ACS GUEST NIC (ETH2 / CLOUDBR2)

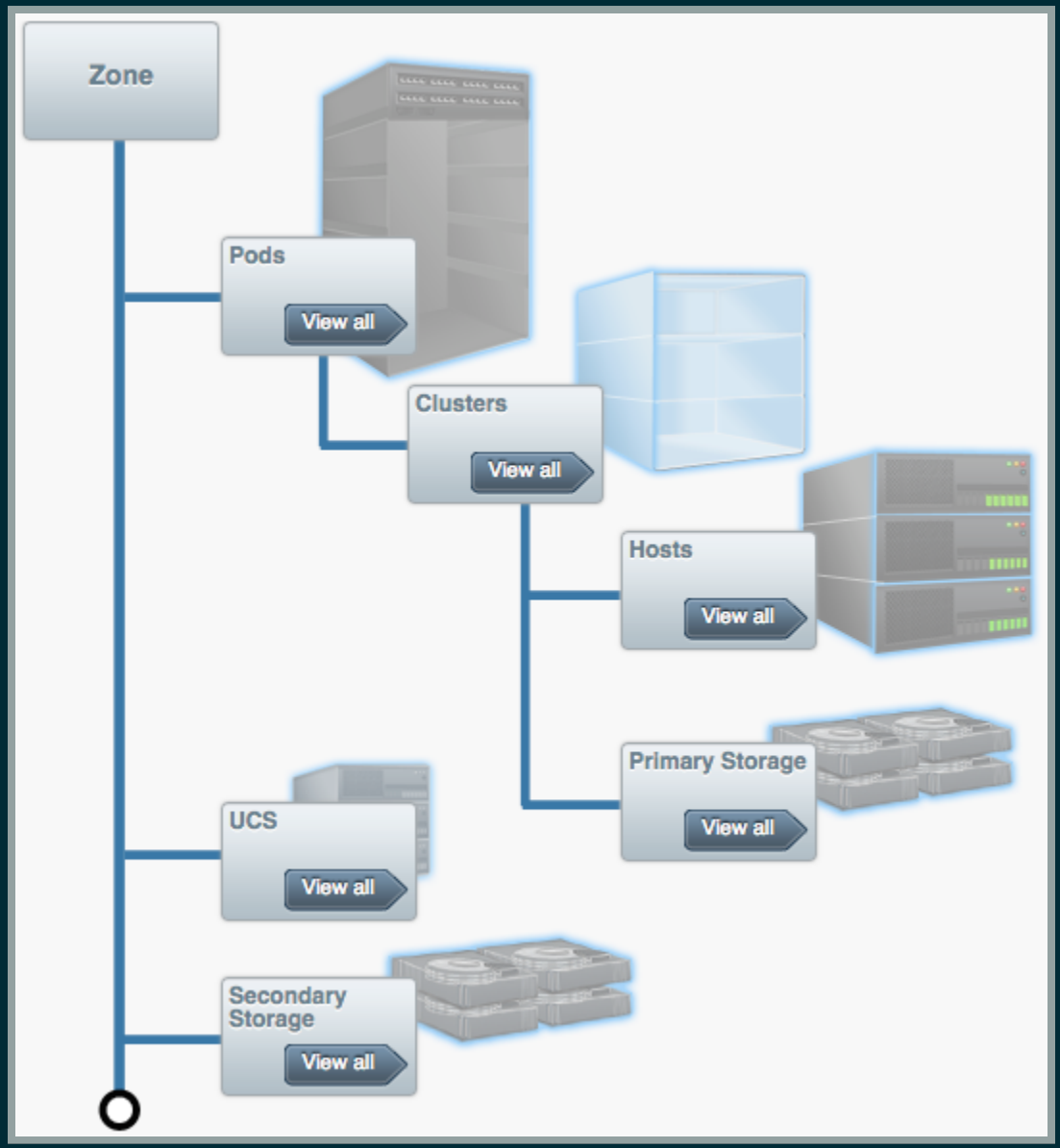


DEPLOY DATACENTER

ACS and KVM are both ready to go now, but not configured...

- Setup Zone, Pod, Cluster and KVM Host.
- Configure the orchestrated network ranges.
- Start System VMs (SSVM + Console)

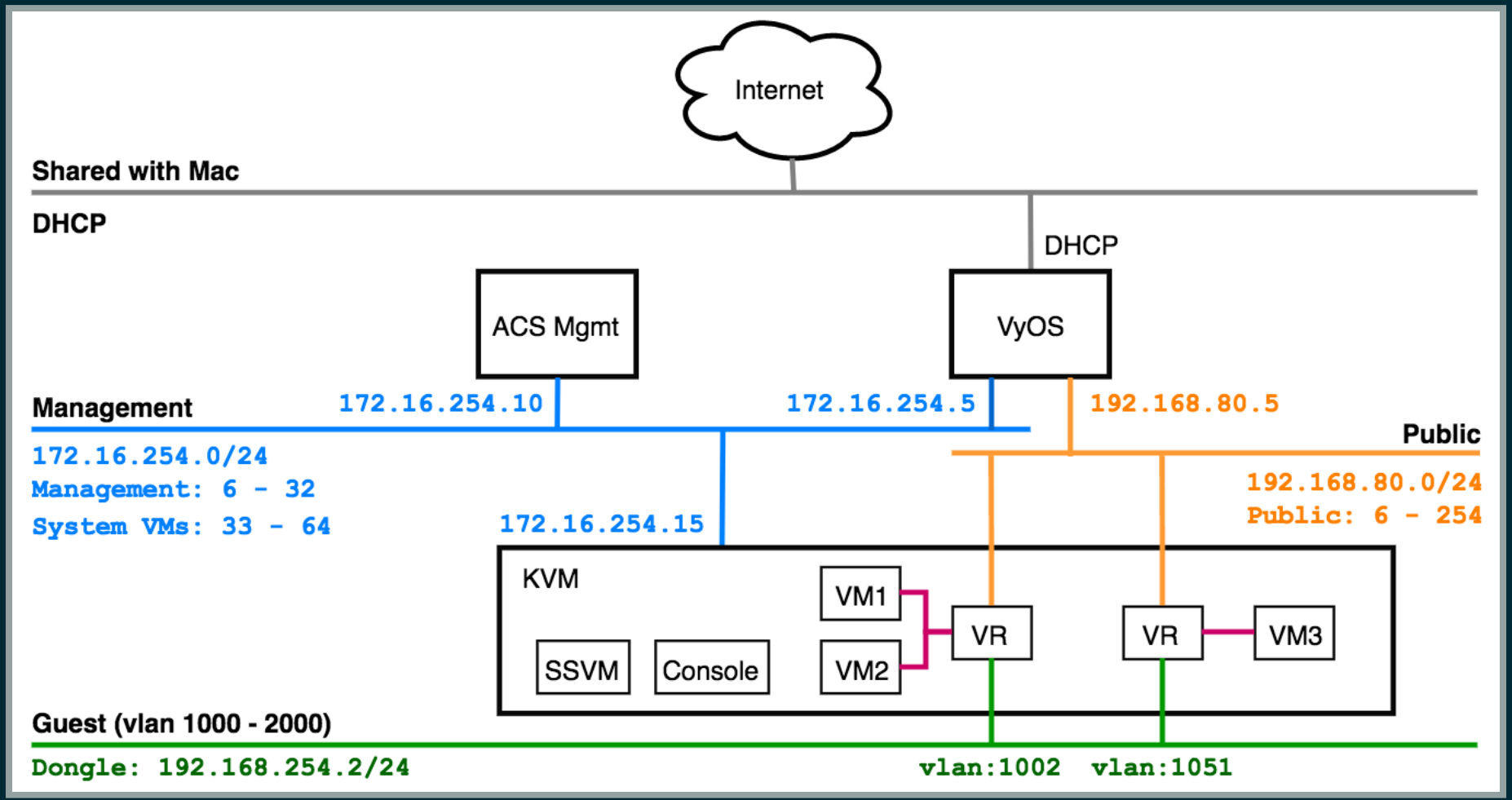
```
./acs/03_configure_zone.sh
```


Zone
Pods
View all
Clusters
View all
Hosts
View all
Primary Storage
View all
UCS
View all
Secondary Storage
View all

FUNCTIONAL GROUPINGS

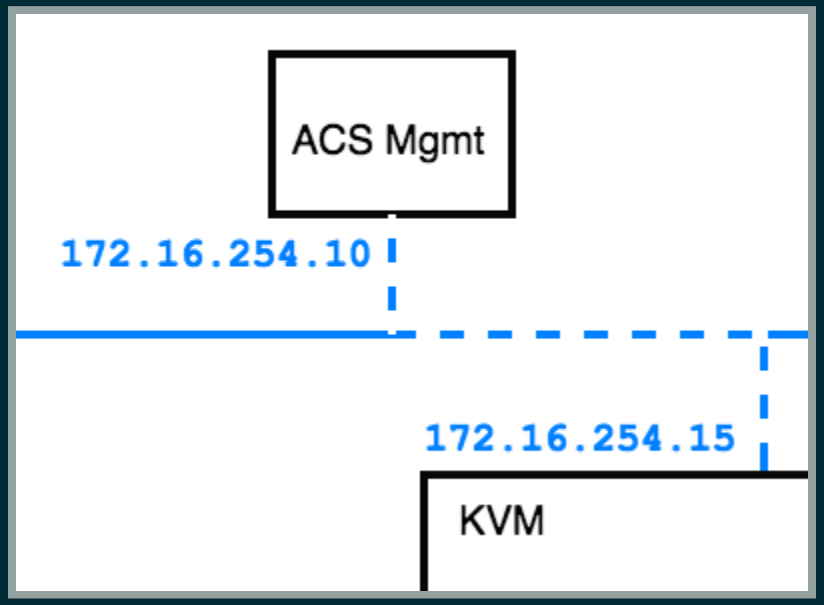
- Region: A grouping of Zones.
- Zone: Usually a single data center.
  - Secondary Storage, Guest & Public IP Ranges
- Pod: Usually a rack with one or more Clusters.
  - Management Network, Cluster connectivity
- Cluster: A group of hosts of the same hypervisor type.
  - Primary Storage
- Host: The actual hypervisor host being orchestrated.
  - VMware, XenServer, KVM, HyperV

ARCHITECTURE REVIEW



ACS & KVM

ACS orchestrates the resources on the KVM Host.



MORE DETAILS

- ACS Mgmt is exposing Primary Storage over NFS.
- ACS Mgmt is exposing Secondary Storage over NFS.
- KVM hosts the guest VMs provisioned by ACS.
- KVM hosts the Guest networks provisioned by ACS.
- KVM hosts the System VMs (SSVM + Console VM).

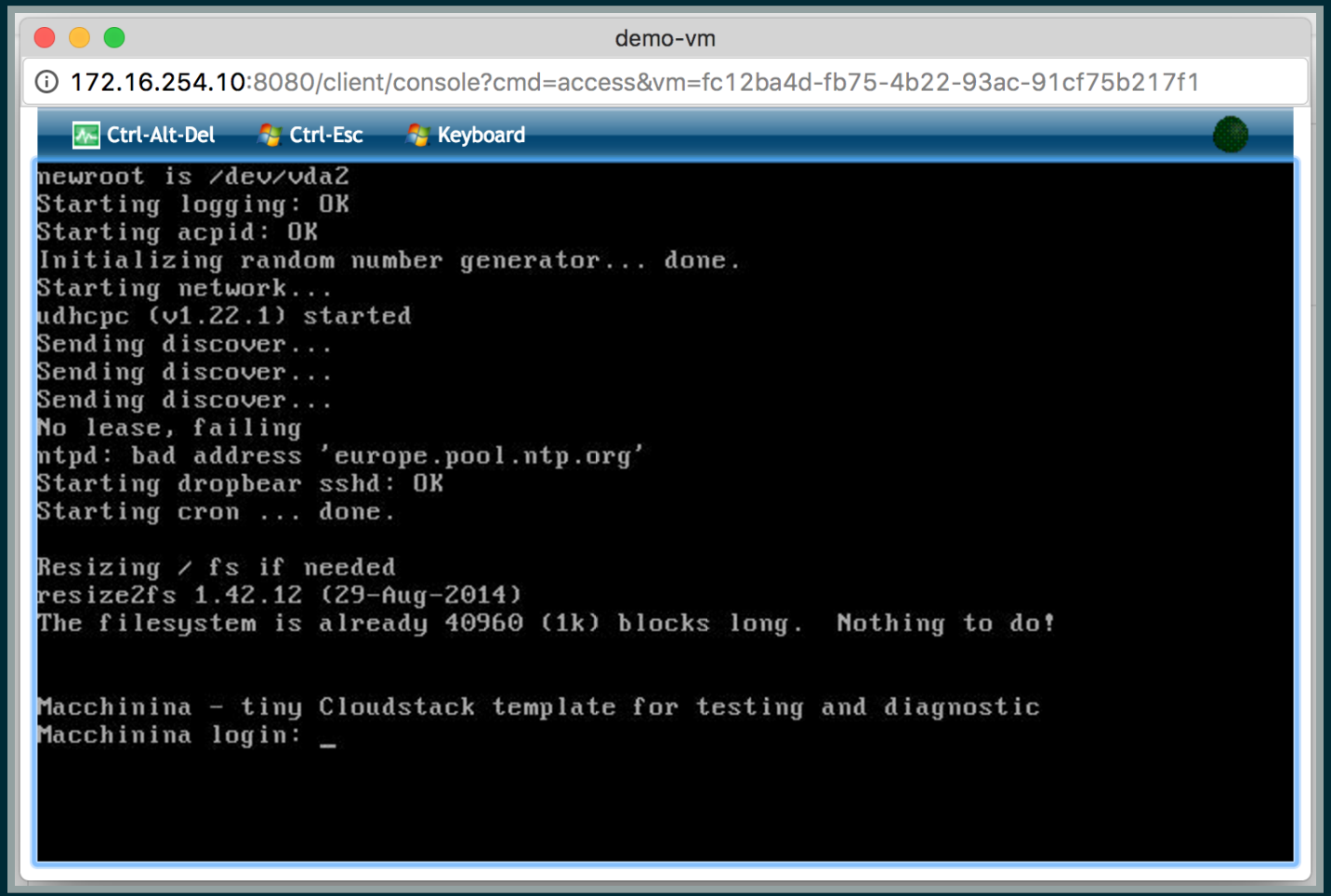
SECONDARY STORAGE VM (SSVM)

Handles everything related to templates and snapshots.

- Transfer snapshots from Primary to Secondary storage.
- Converting snapshots to templates to launch VMs.
- Uploading and exposing templates to launch guest VMs.

CONSOLE PROXY VM

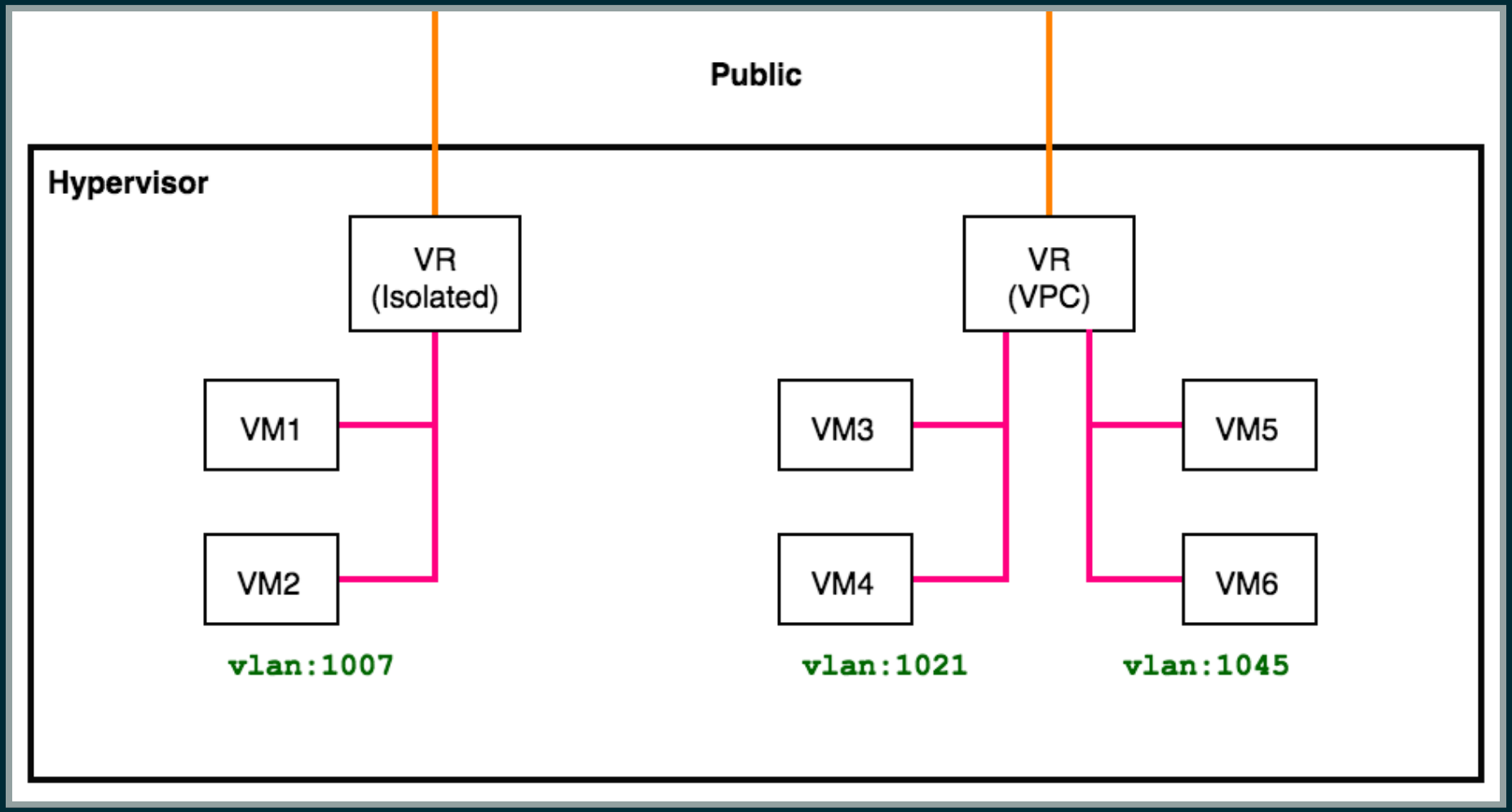
Exposes VM consoles through a web UI.



LET'S GO EXPLORE...

172.16.254.10:8080/client

CLOUDSTACK ADVANCED NETWORKING



ISOLATED GUEST NETWORKS

- Single tier network.
- Network Features:
  - Source Nat
  - Static Nat
  - Port Forwarding
  - Load Balancing
  - Firewall Rules (Ingress & Egress)
  - DHCP & DNS
  - Remote Access VPN

VPC NETWORKS

- Multi-tier network.
- Network Features:
  - Source Nat
  - Static Nat
  - Port Forwarding
  - Load Balancing
  - Network ACLs (like Firewall Rules)
  - DHCP & DNS
  - Remote Access VPN
  - Site-to-Site VPN
  - Private Gateways (datacenter connect)
    - Static Routes