

# OpenStack Service High Availability

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# Agenda

- OpenStack and its Services
- High Availability in Openstack: Overview
- Services HA
  - Keystone
  - Glance
  - Cinder
  - Nova
- HA deployment architecture (one type)

# High Availability in OpenStack

# High Availability Principles

- Designed to minimize two aspects
  - System downtime
  - Data loss

Both in the context of single-point-of-failure and cascading set of events

# Types of HA

- OpenStack Services HA (our focus now)
  - Architectural support
  - Important if a public cloud offering is part of ROI
- Application HA
  - Cloud native (scalable)
  - Legacy (pets)
    - Similar to Services HA
    - Load-balanced
    - Shared storage and hypervisor-based

# Stateless vs Stateful Services

and the impact on complexity

- Stateless
  - Provides a response to each individual request
  - nova-api, nova-conductor, glance-api, keystone-api, neutron-api and nova-scheduler
  - HA achieved via redundant instances & load-balancer
- Stateful
  - Provides a response to a request that is based on previous requests
  - OpenStack databases & message queue
  - HA requires more substantial configuration

# A/P and A/A HA Configuration

## Design choices

- Active/Passive brings additional resources online to replace those that have failed
  - Single master
- Active/Active has all resource being used concurrently
  - Multi-master

# Openstack Services HA

An illustrative example



# Two key components

- Pacemaker
  - Cluster management
  - Virtual IP (can also be done with *keepalived*)
  - STONITH
- HAProxy
  - Load balancing and service failure detection

# HA illustrated

Fullsuit edition!

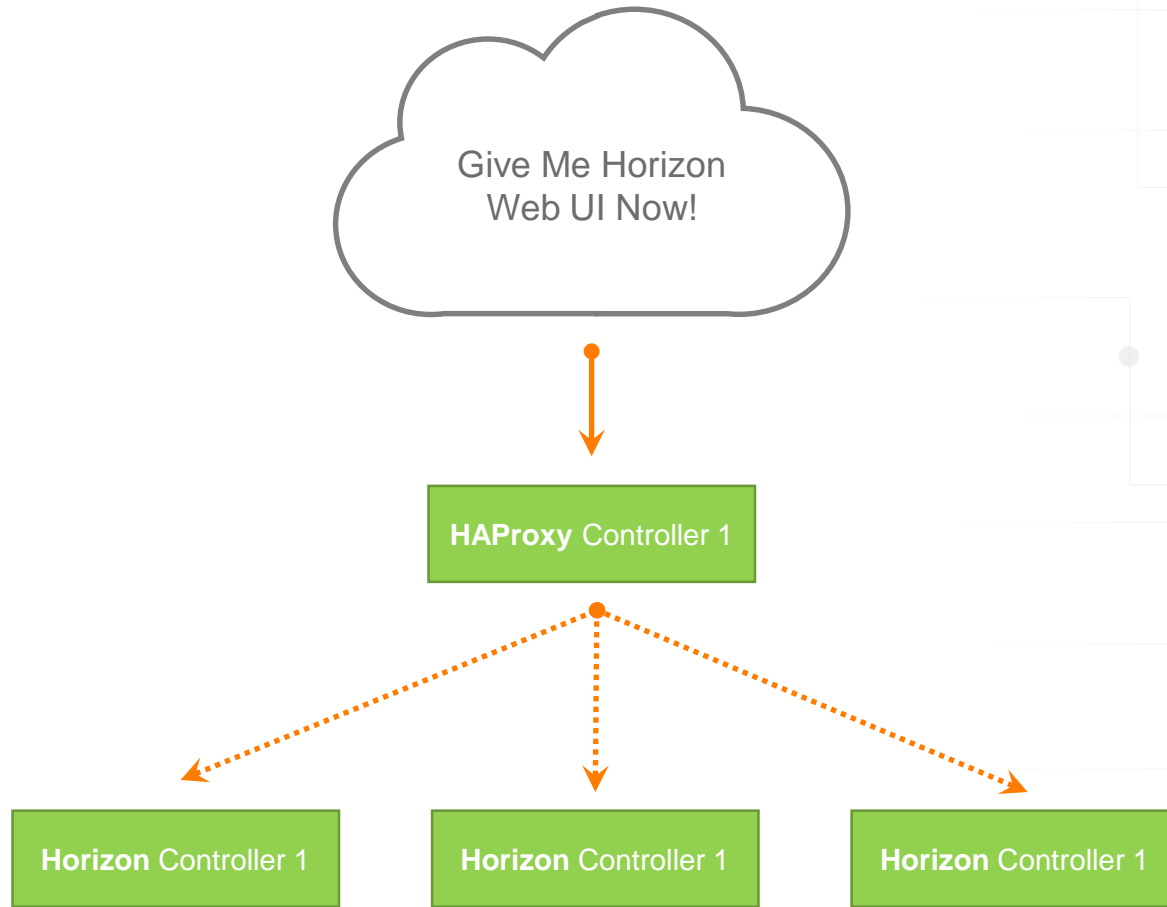


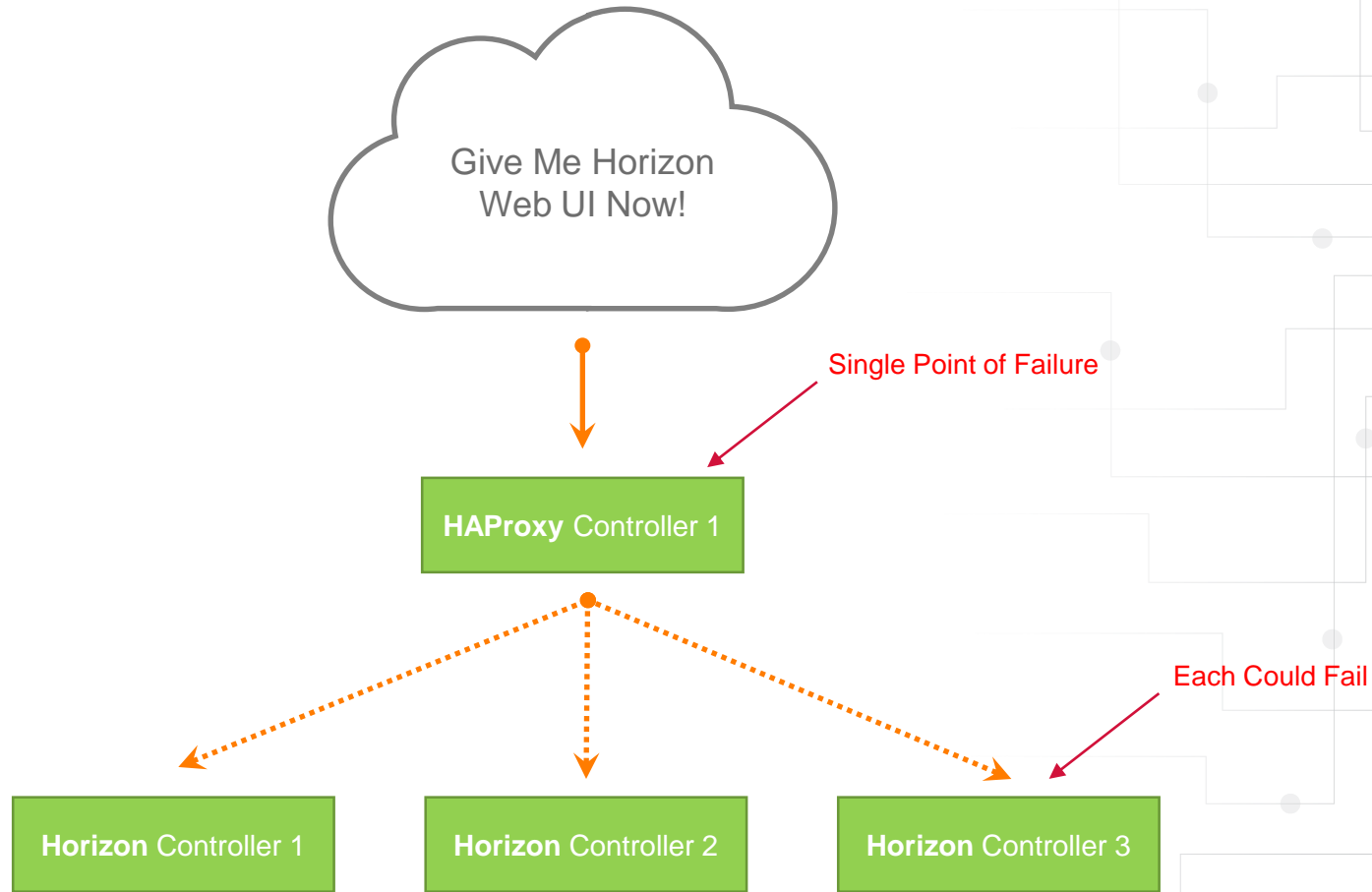
*Inspired by Arthur Berezin's talk : "Deep Dive into Highly Available OpenStack Architecture"*



Single Point of Failure





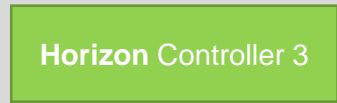
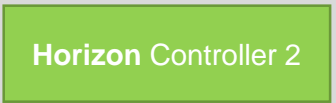
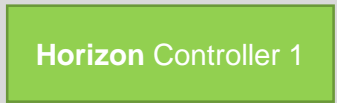
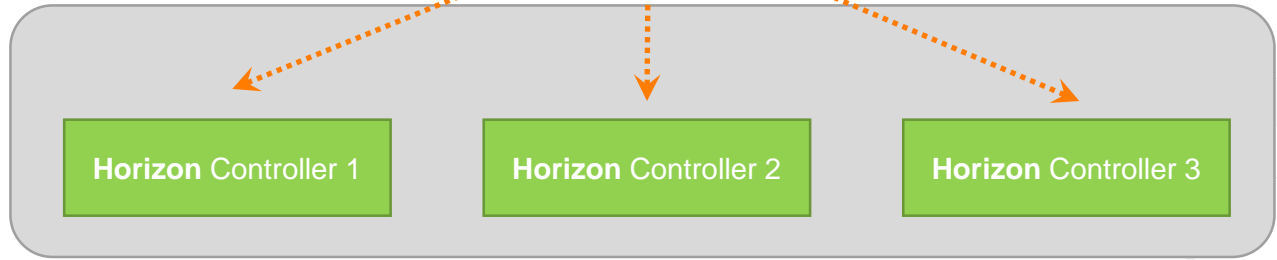
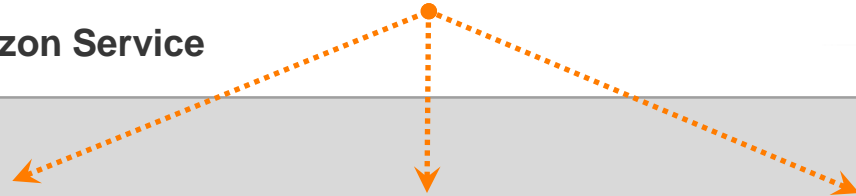




Single Point of Failure

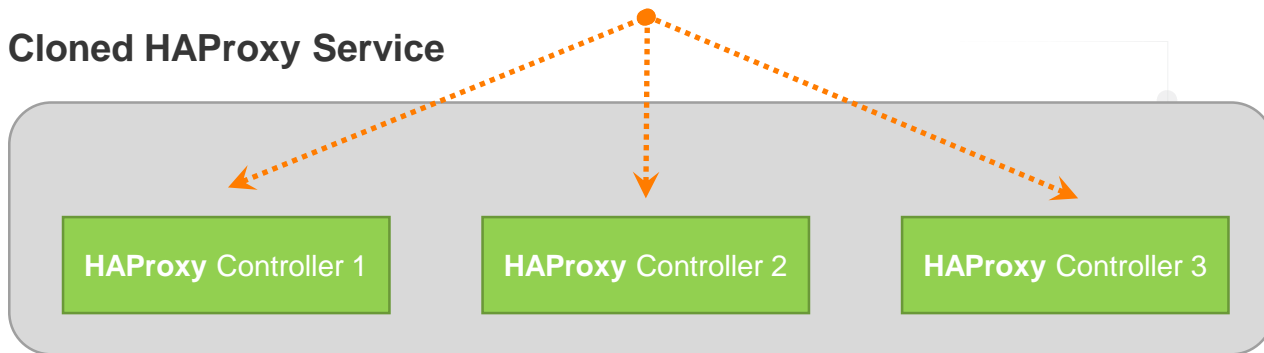


## Pacemaker Cloned Horizon Service

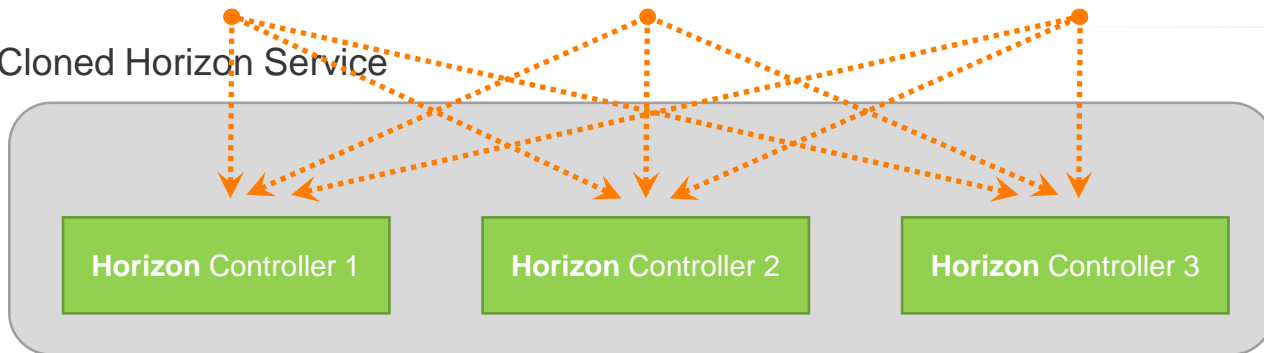


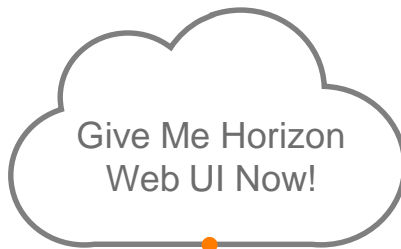


## Pacemaker Cloned HAProxy Service

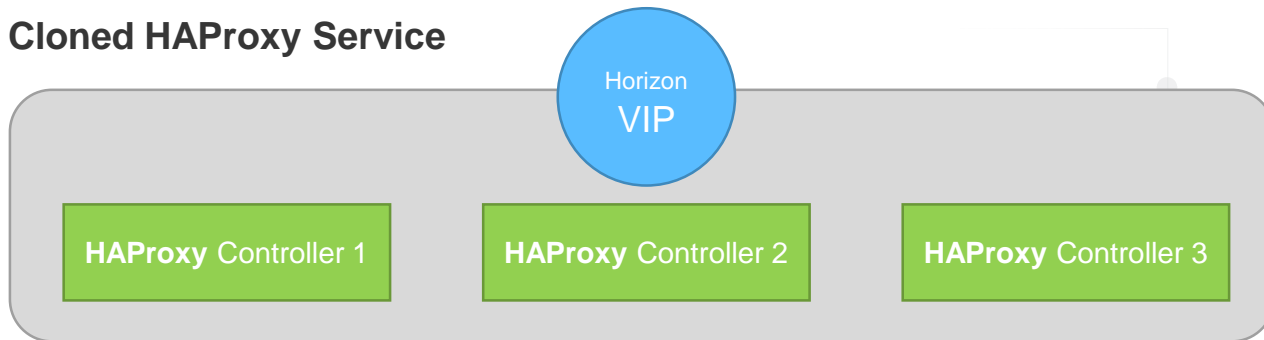


## Pacemaker Cloned Horizon Service

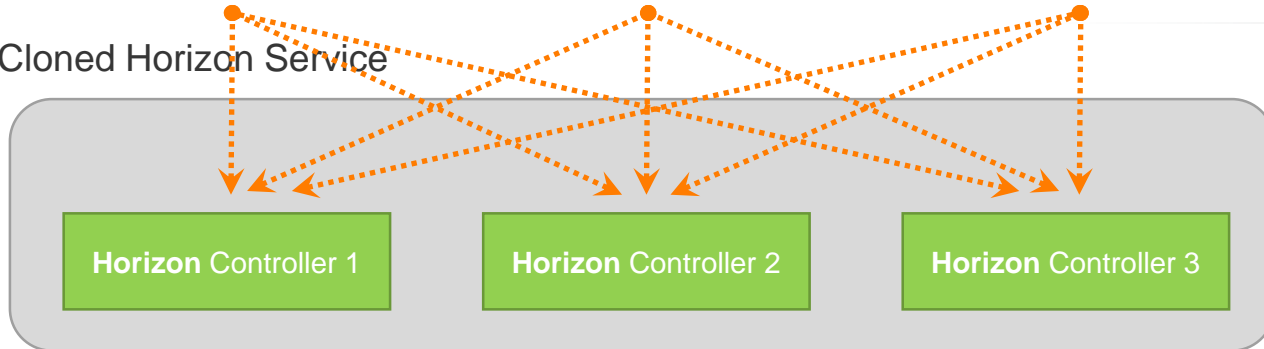




## Pacemaker Cloned HAProxy Service



## Pacemaker Cloned Horizon Service



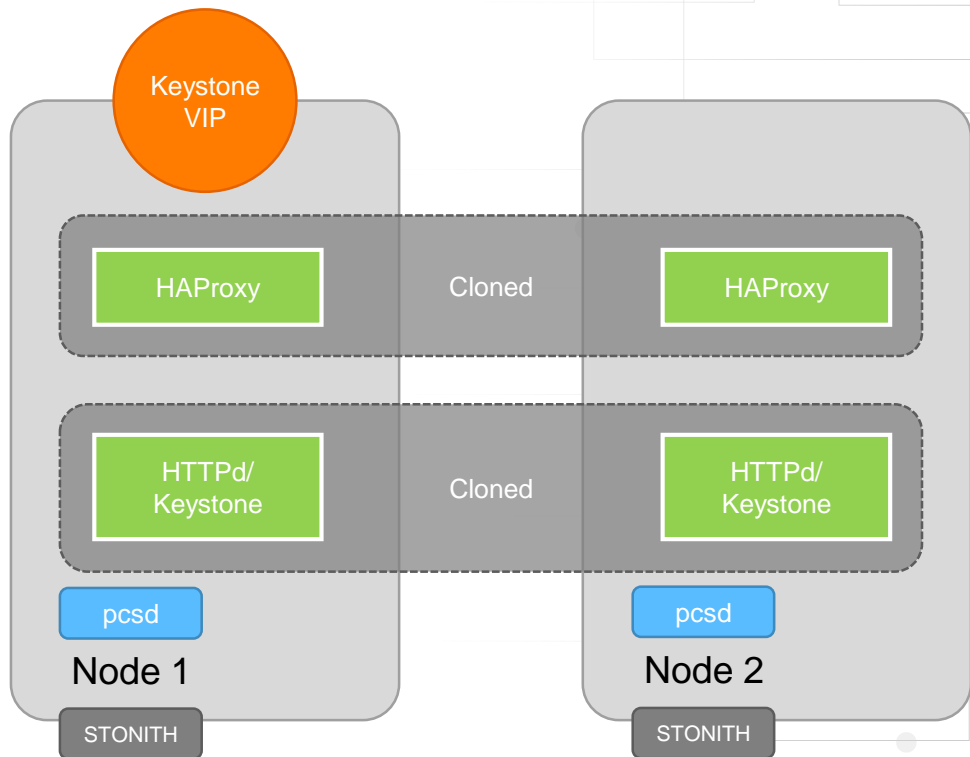


# Services HA

*All diagrams inspired from Arthur's talk!*

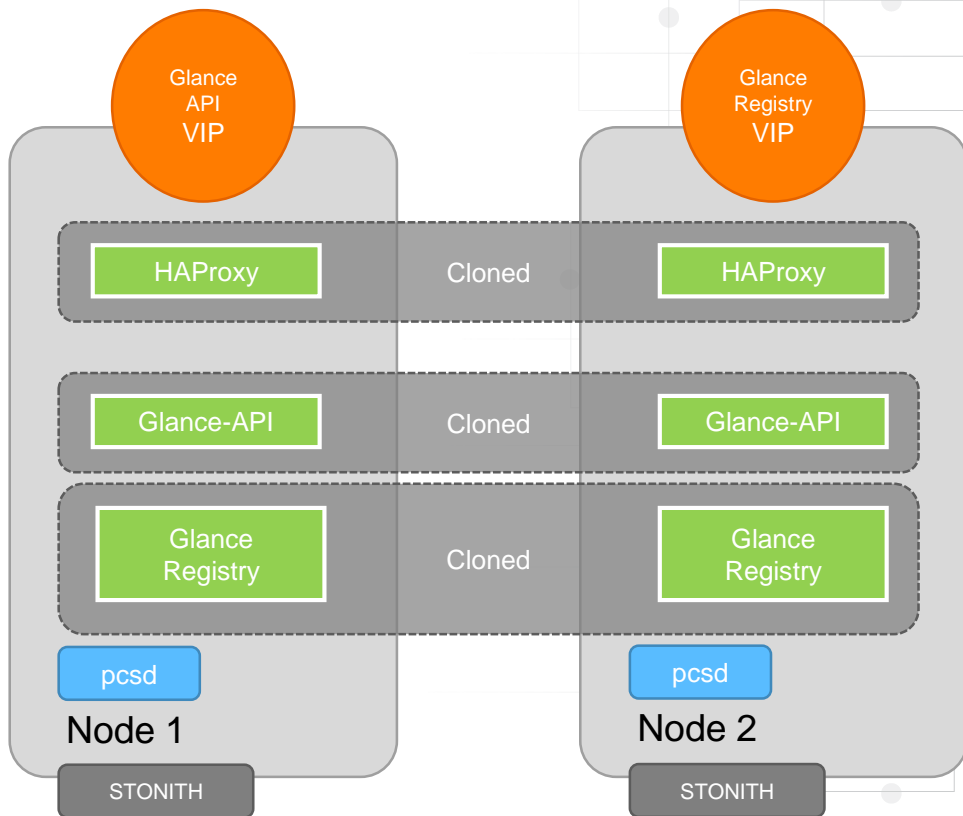
# Keystone HA

- Cloned Stateless HTTPD Service
- Same SSL Certs on all nodes
- Cache is local on each host



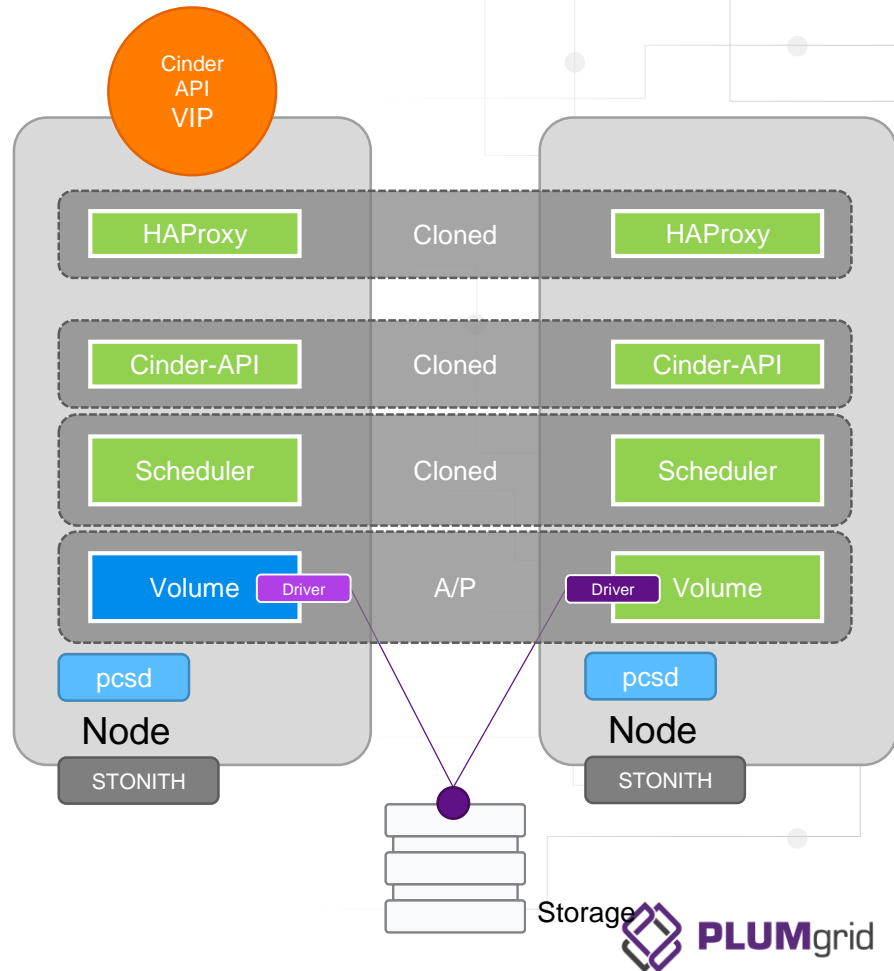
# Glance HA

- Both services (API and Registry) are Cloned Active/Active
  - Both are load balanced and VIP-ed
  - Active VIP on different nodes



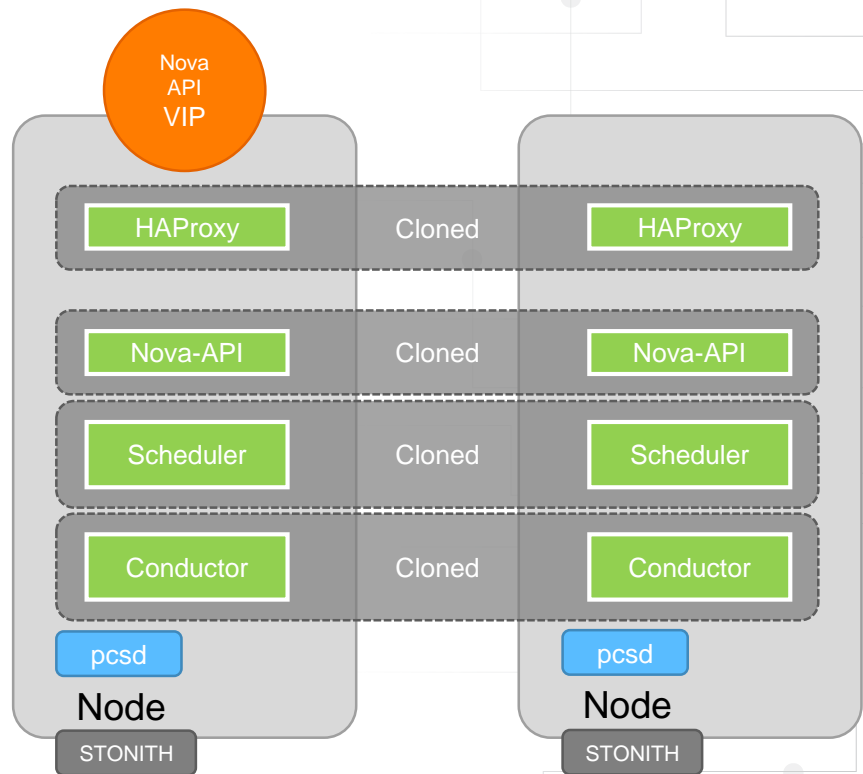
# Cinder HA

- Cinder-API, scheduler are Stateless
  - Cloned, LB and VIP
- Cinder-Volume is A/P due to potential race conditions



# Nova Controller HA

- Nova-API configured with LB and VIP
- Nova-API, Nova-Scheduler and Nova-Conductor are Stateless A/A cloned services

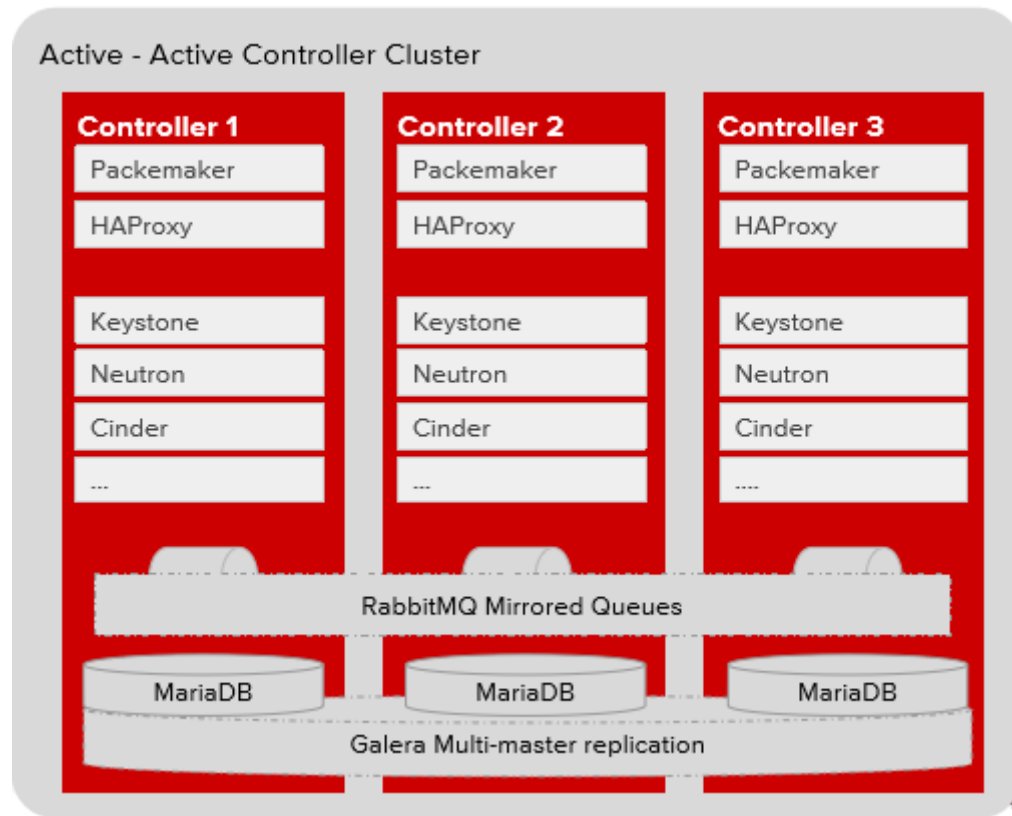


# Neutron HA

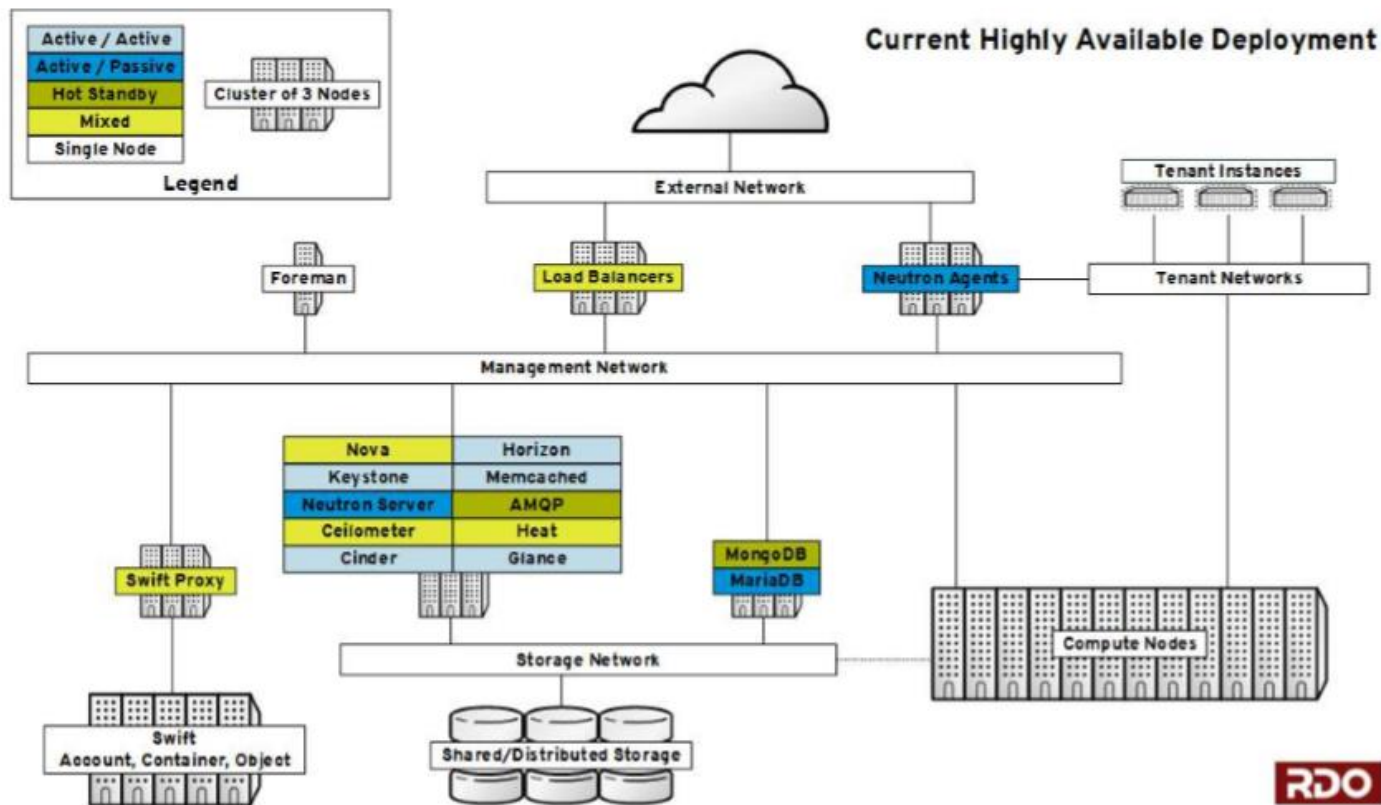
- Provider specific, and typically a SDN solution
- PLUMgrid most scalable solution out there
  - Fully replicated Control Plane and
  - a fully distributed Data Plane

# A full Services HA deployment

Red Hat reference Architecture



# A full DCN deployment the above HA Architecture







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# THANK YOU!

7 Keep in Touch and Contact Us

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