OPENSTACK DAYS
CHINA

分布式DC面临的挑战及解决之道

How we meet the challenges brought by Distributed Data Center

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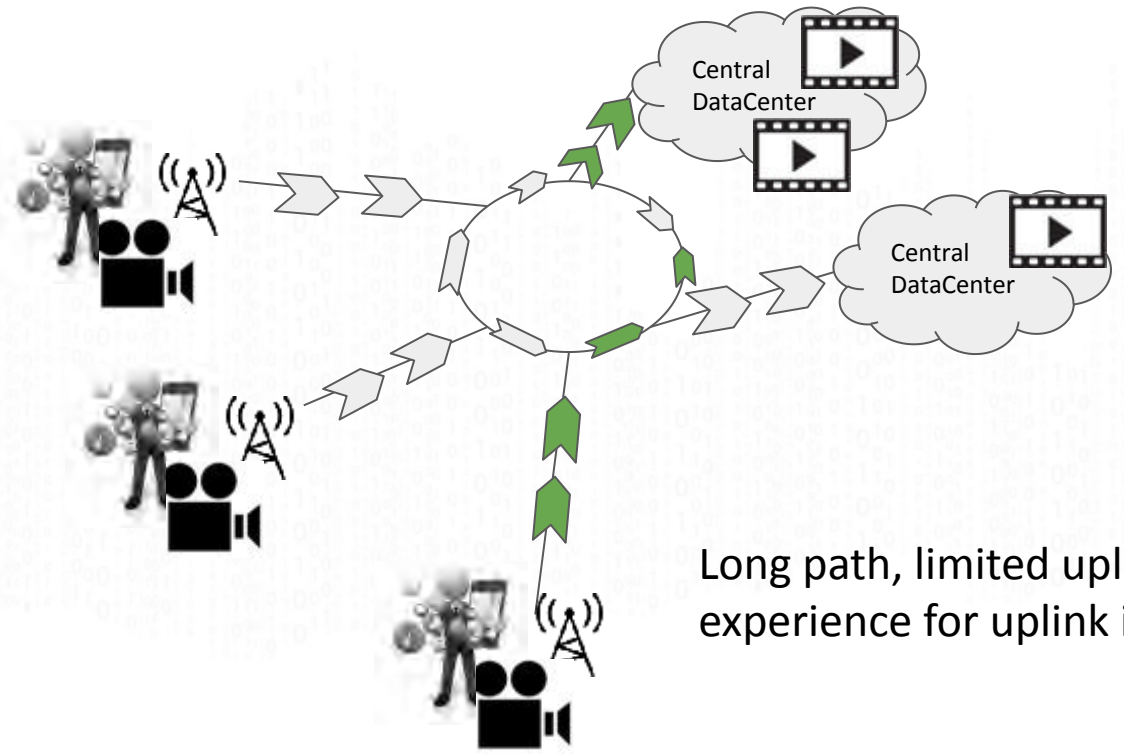
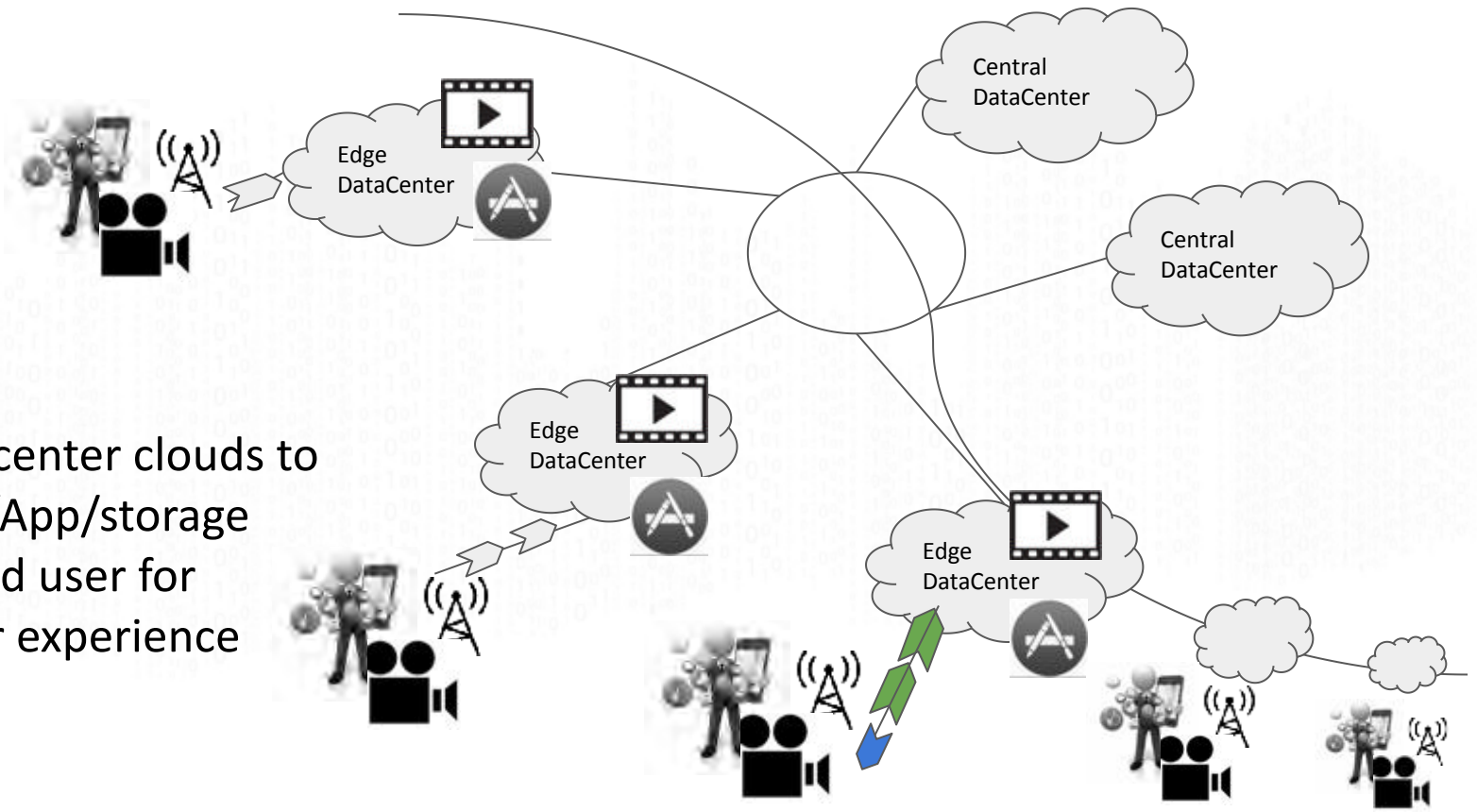
Original Central DC



Long path, limited uplink bandwidth, bad experience for uplink in centralized cloud

Distributed DC



Edge data center clouds to place VNF/App/storage close to end user for better user experience

Challenges

- Resource provision
  - How to schedule an OpenStack instance to create VM, volume
- Networking
  - How to connect VMs in different OpenStack instances
- Scaling
  - How to scale OpenStack cloud

Meet Tricircle

- **Tricircle** provides an **OpenStack API gateway** and **networking automation** to allow multiple OpenStack instances, spanning in one site or multiple sites or in hybrid cloud, to be managed as a single OpenStack cloud.

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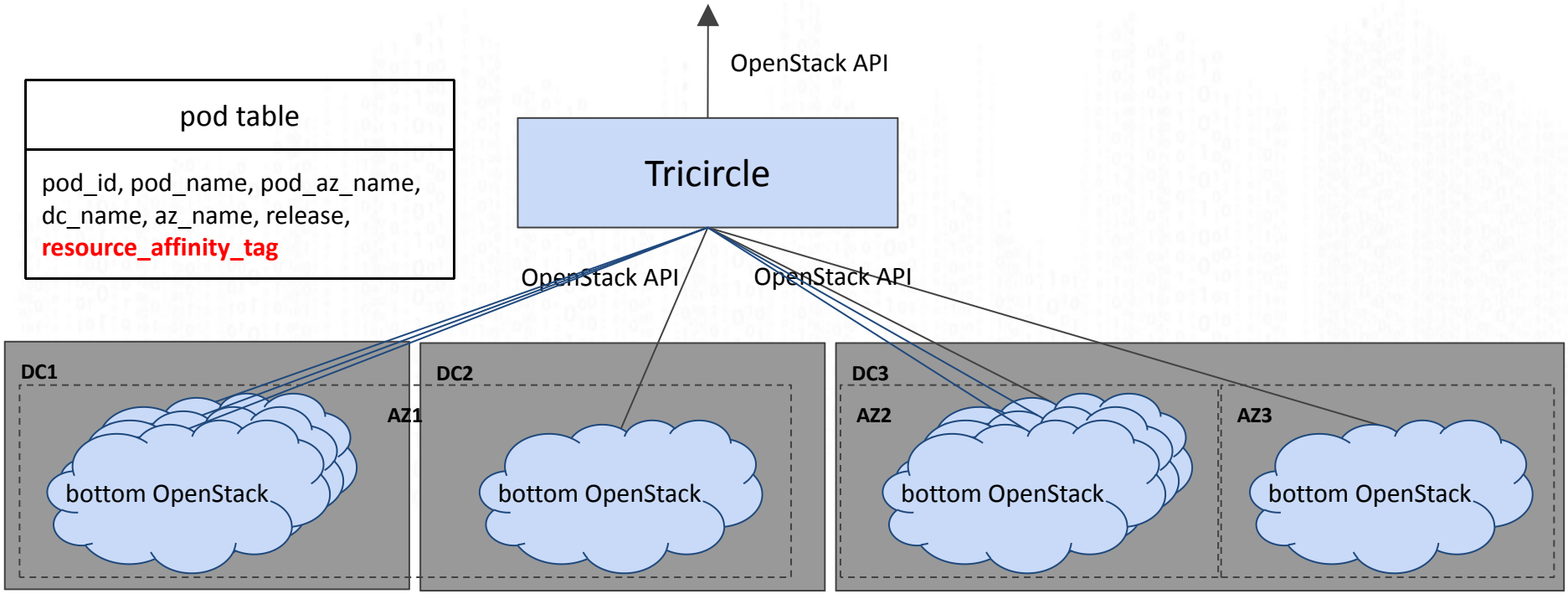
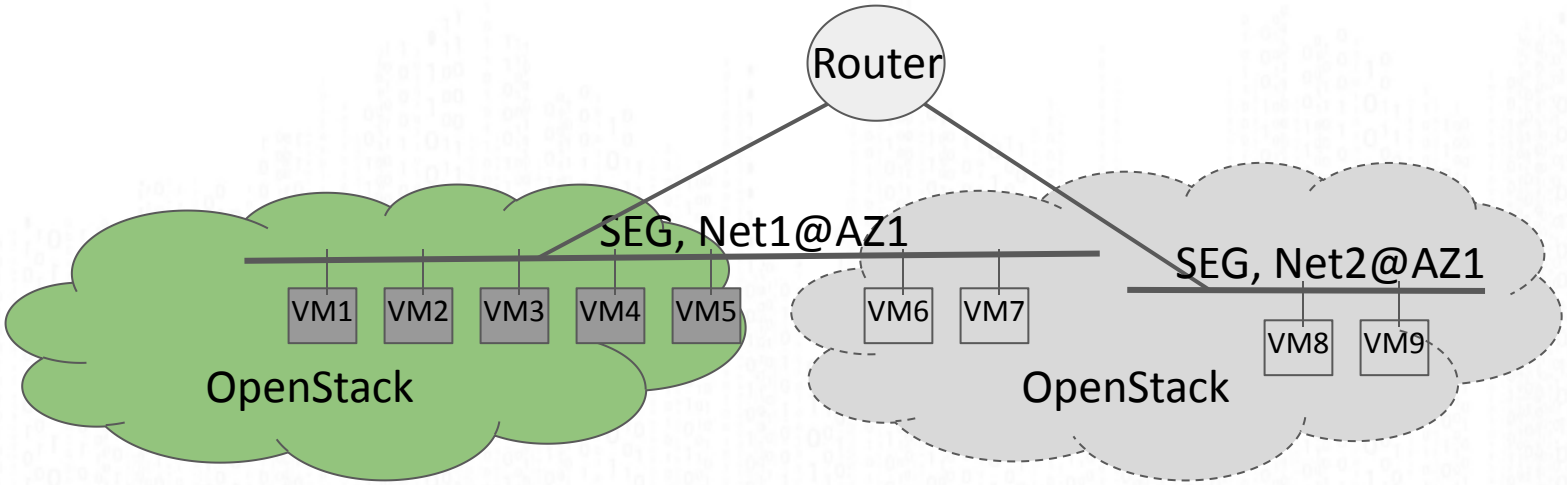
Tricircle provides OpenStack federation affinity

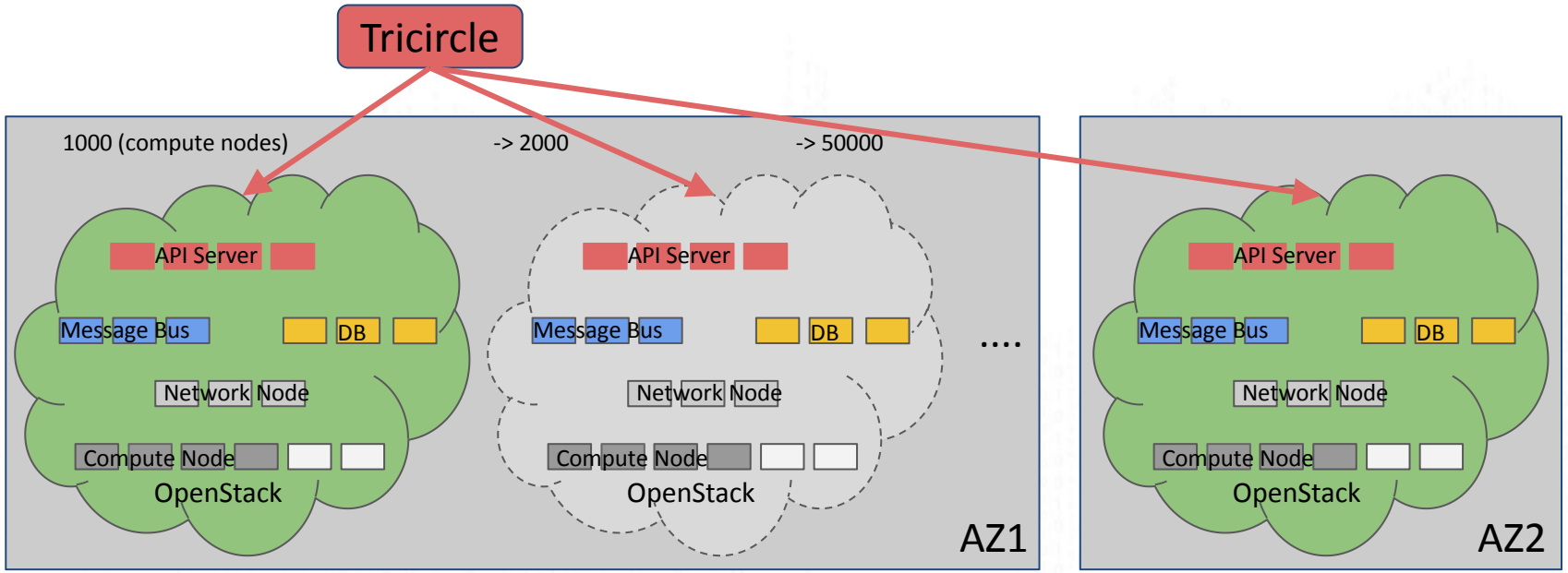


Tricircle provides cross OpenStack network automation



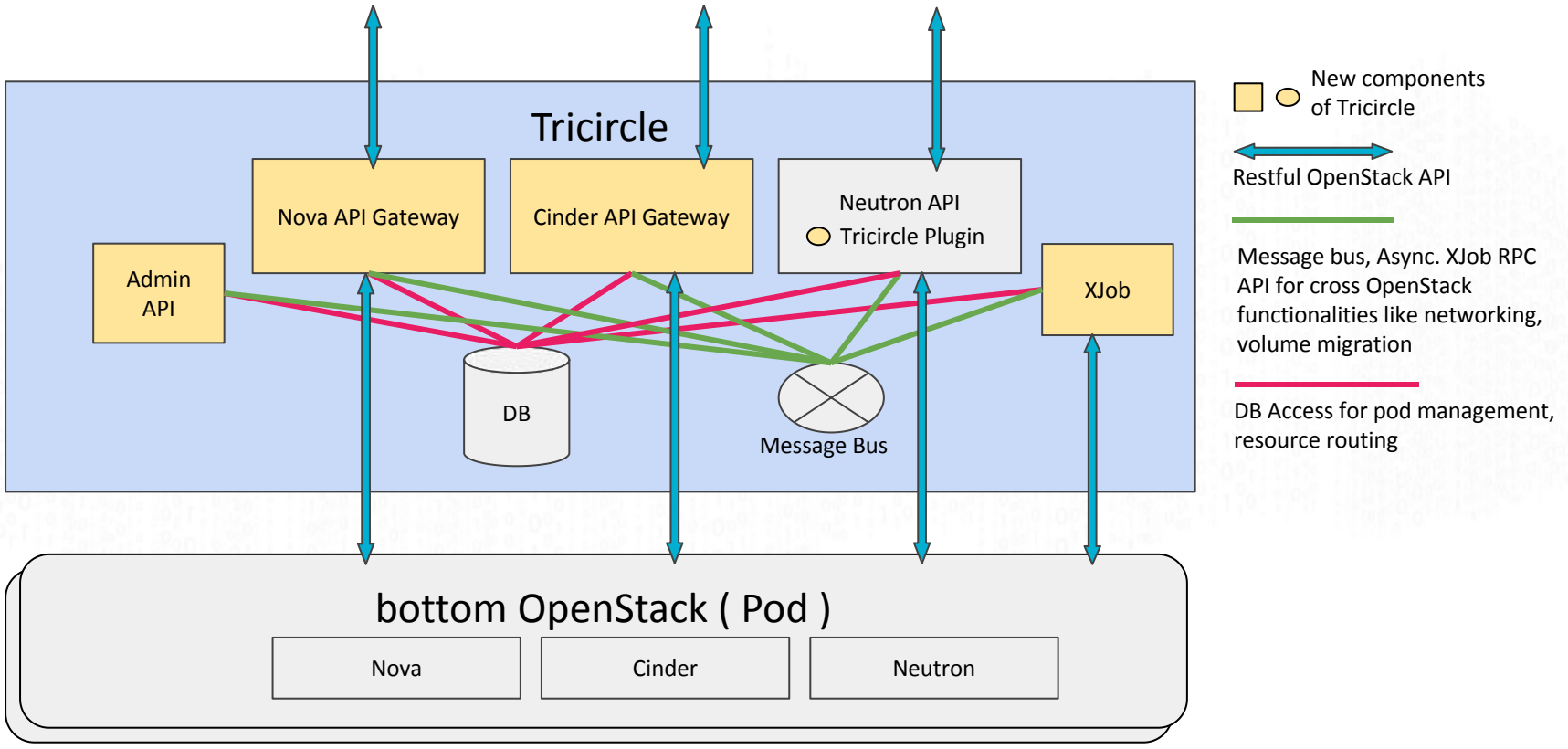
- One AZ may contain more than one OpenStack
- Networking should be taken good care of to not ruin user's expectation
  - VM1 and VM6 should be able to communicate with each other since they are both in Net1
  - VM1 and VM8 should be able to communicate with each other via Router

Tricircle provides modularized scaling

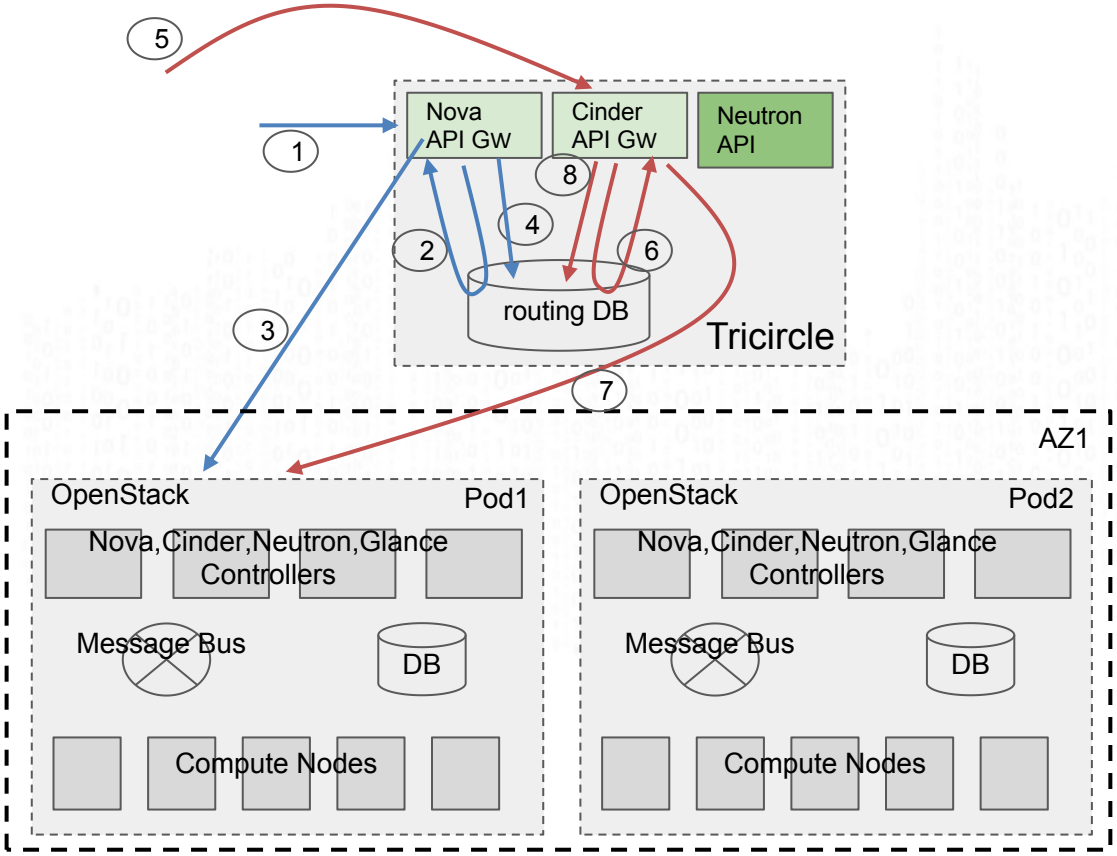


- Capability expansion is headache
- Utilize tested and verified building block for capacity expansion
- Treat one OpenStack as one building block
- Tricircle provides API to create a new pod(one OpenStack instance)

Architecture of Tricircle



Example – VM & volume colocation



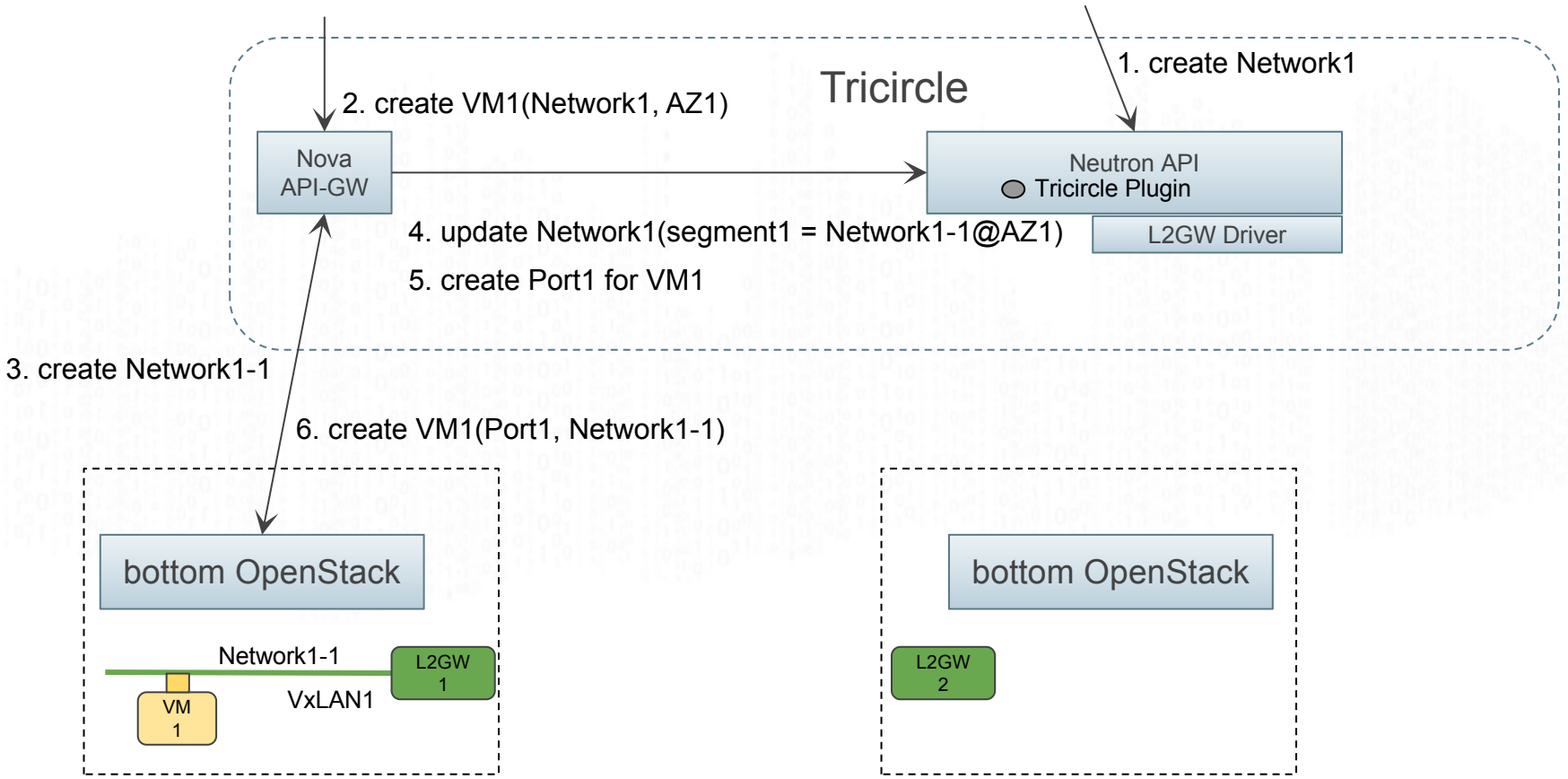
(1) User sends VM create request specifying availability zone parameter as AZ1
(2) AZ1 has two pods, Nova API gateway schedules one pod(Pod1) and bind this user to that pod in AZ1
(3) Nova API gateway sends request to Pod1
(4) Nova API gateway caches routing information

(5) User sends volume create request specifying availability zone parameter as AZ1
(6) Query DB to get user-pod binding information
(7) Cinder API gateway sends request to Pod1
(8) Cinder API gateway caches routing information

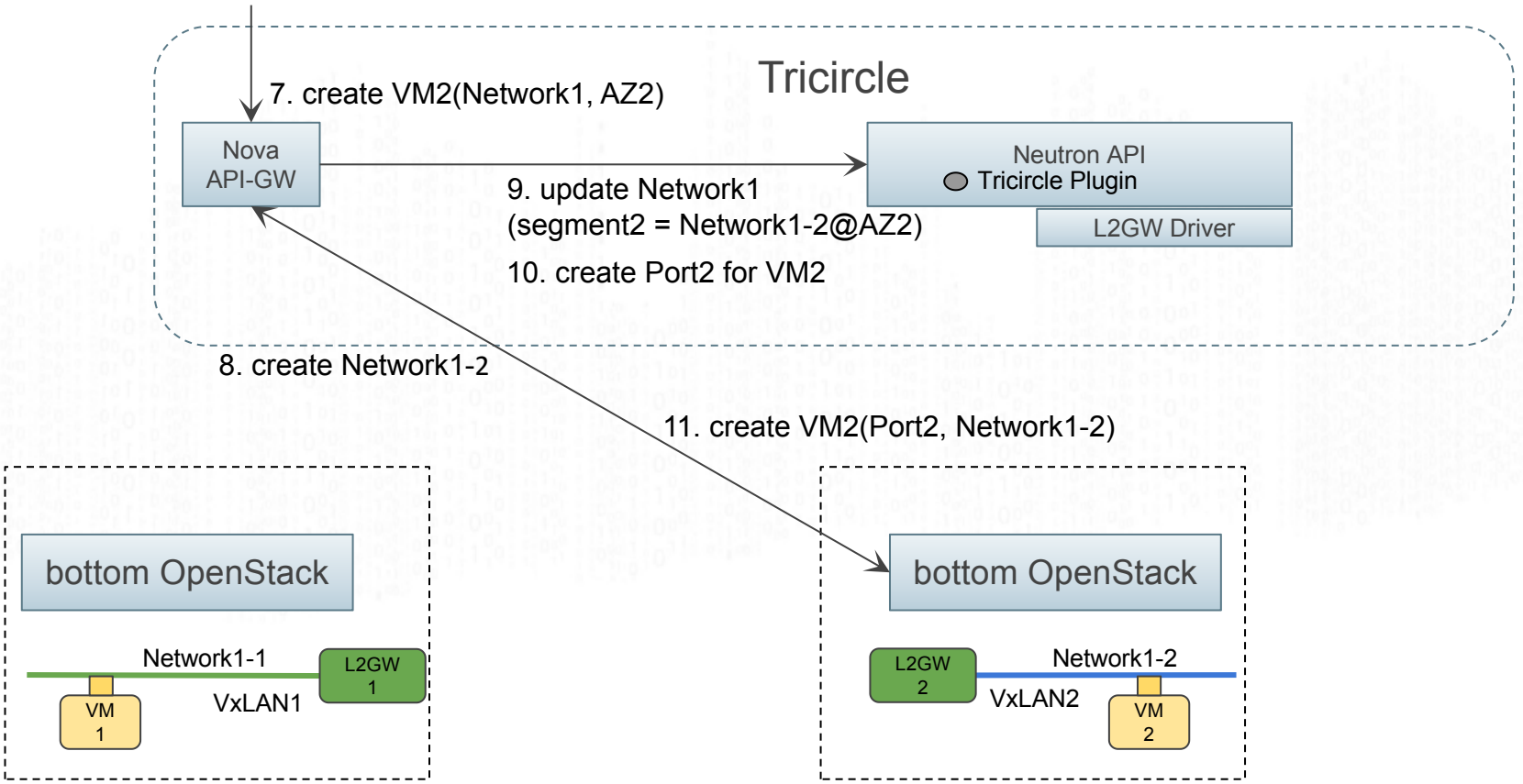
resource routing table
Id, top_id, bottom_id, pod_id, project_id, resource_type

pod binding table
id, project_id, pod_id

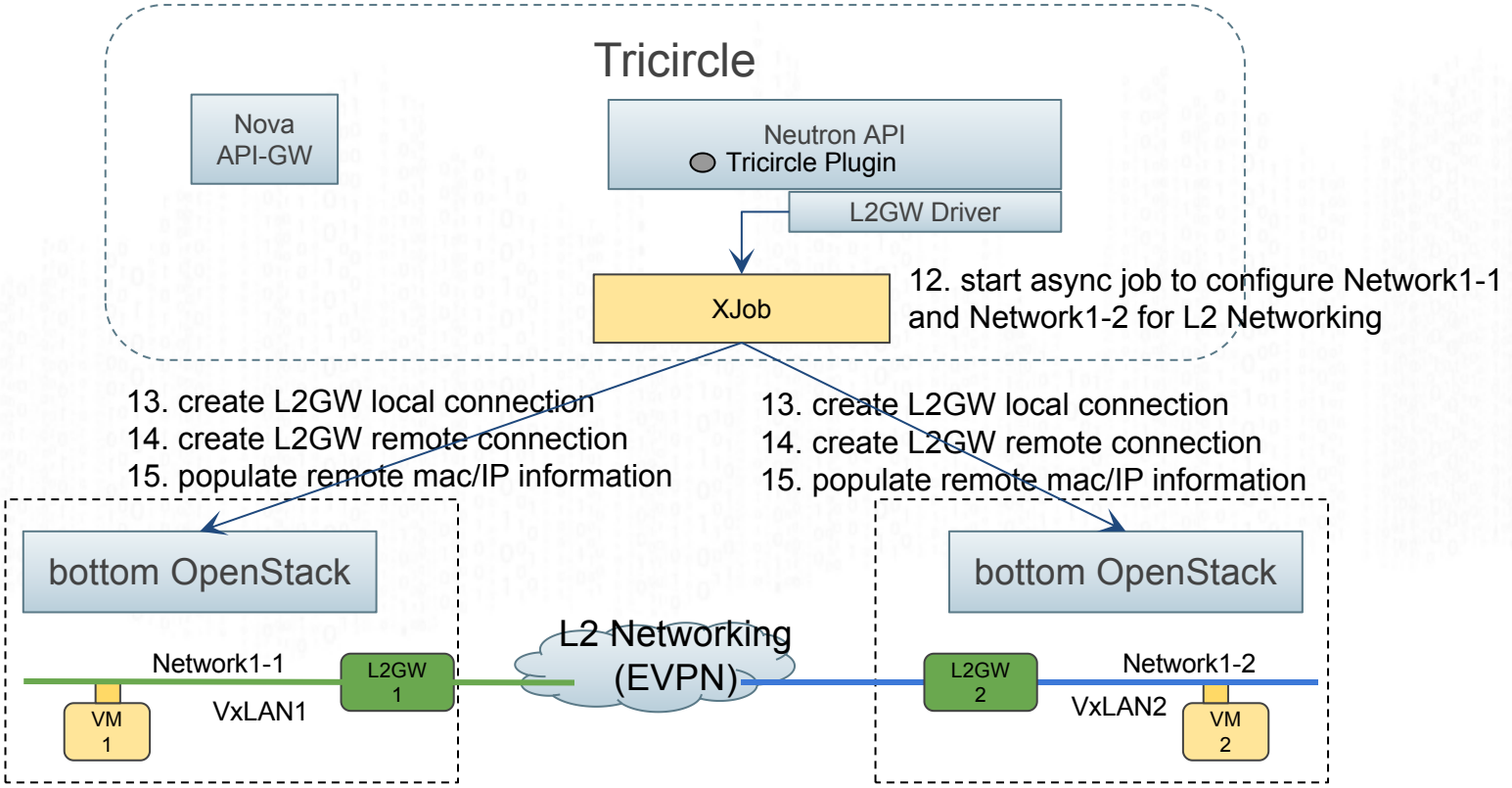
Example - network automation



Example - network automation

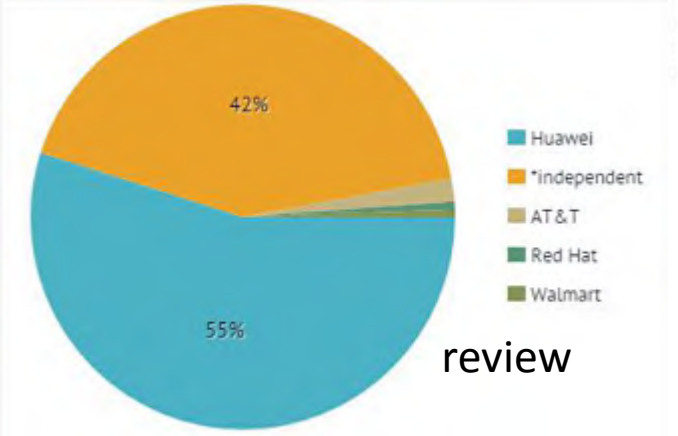


Example - network automation

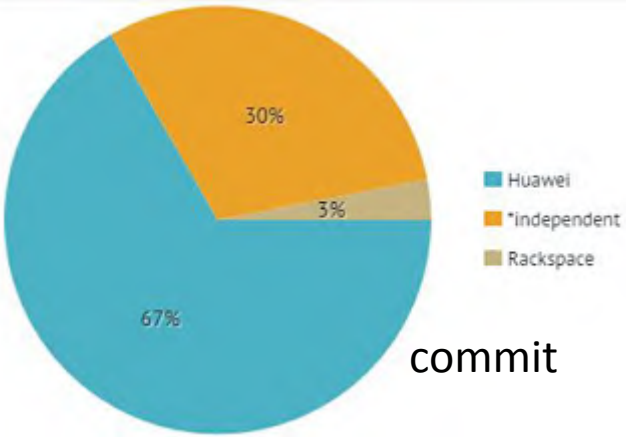


Welcome to join us

- Wiki of Tricircle:
  - https://wiki.openstack.org/wiki/Tricircle
- Play and contribute:
  - https://github.com/openstack/tricircle
- Design document:
  - https://docs.google.com/document/d/18kZZ1snMOCD9IQvUKI5NVDzSASpw-QKj7l2zNqMEd3g



review



commit

from http://stackalytics.com/

Cloud Native OpenStack

- Cloud Native applications:
  - Applications or Services that are *container-packaged*, dynamically scheduled and *micro-services* oriented
- Container on OpenStack Challenges
  - Network
  - Storage

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Popular Cloud Providers

	Amazon	Google	Microsoft	Rackspace	Redhat
VM + Container Network	All VPC Network	Overlay	Overlay	Overlay	Overlay
Container Storage	Host Mount Volumns/ EBS volume	GCE provide Persistent volume		hostPath	Ceph，Gluster，NFS（iscsi）
Orchestration of (Mix use of PM/VM/Container Cluster)	No	No	No	No	No

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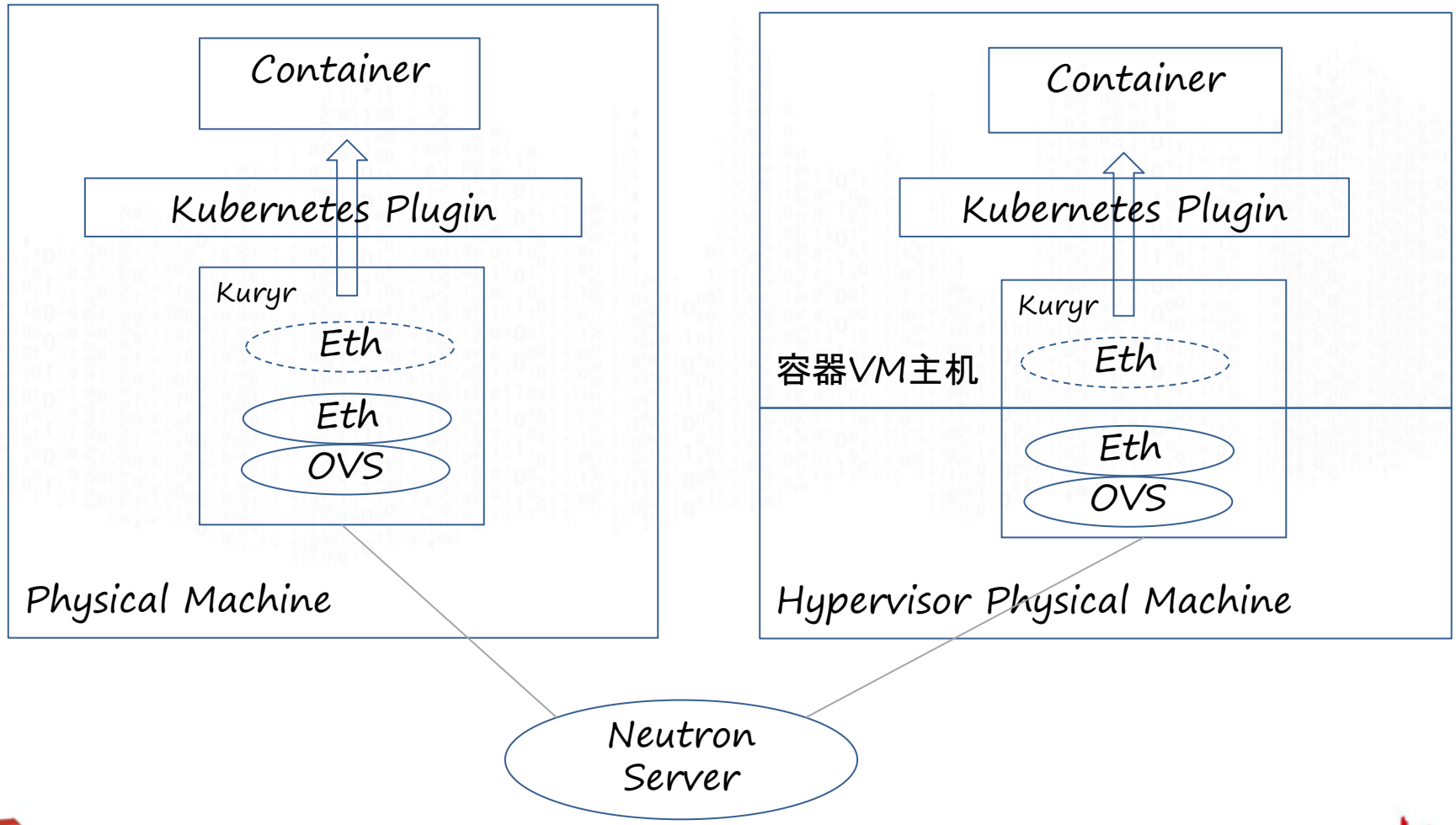
Our Approach

- Kuryr:
  - One Network Management:

    VM + Container

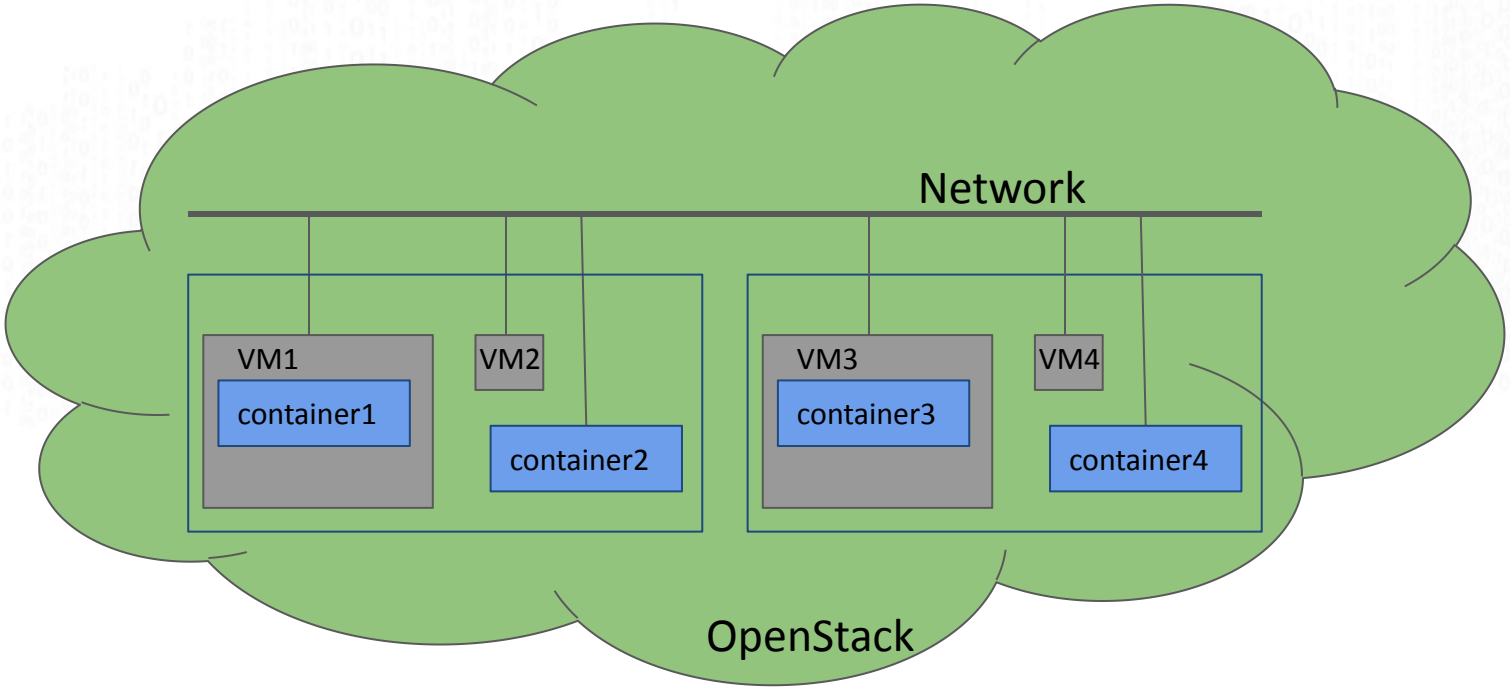
- Fuxi:
  - Connect containers with OpenStack Cinder

Networking with Kuryr

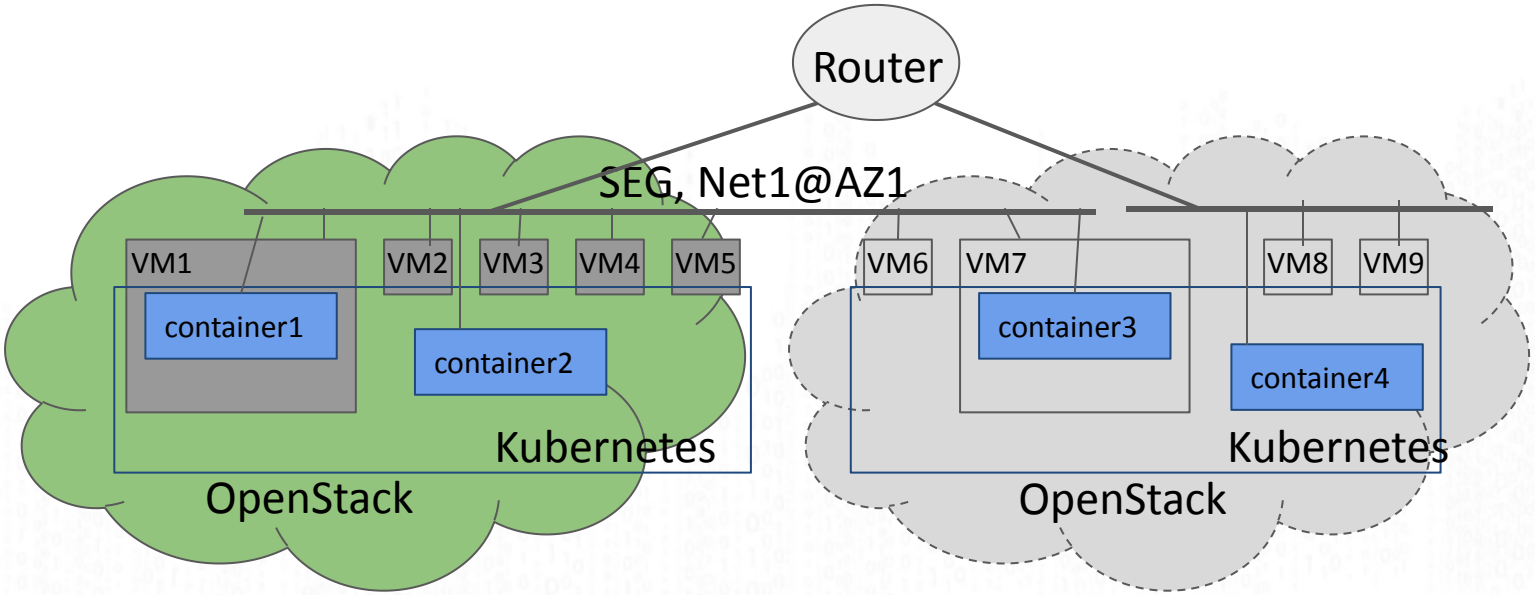


Network

- create VM, Container on the same Network no matter Containers in VM or Bare Metal



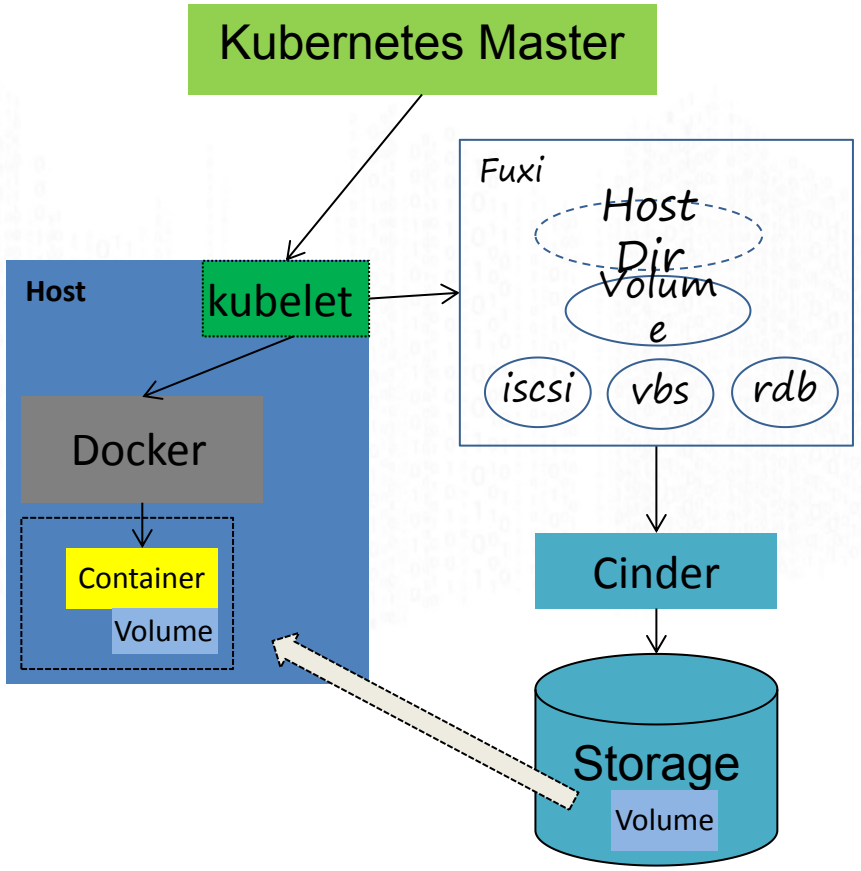
With TriCircle Network Automation



- Networking has be taken good care of
  - Container1, container2 and container3 should be able to communicate with each other since they are both in Net1
  - Container3 and Container4 should be able to communicate with each other via Router

Storage

- In OpenStack, a Kubernetes volume
  - uses hostPath volume mounts a file or directory from the host node's file system.
- With Fuxi
  - Simply mounts Cinder volume to the host for kubelet



What we achieve

- Bring Container as the First-Class resource in OpenStack
- One network management
- Stateful Container with persistent storage in OpenStack

Q&A

Thanks