ANALYZING CLOUD NETWORK ARCHITECTURES

(OpenStack and EC2)

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Cloud Architect

Know your presenter

Name: Naveen Joy

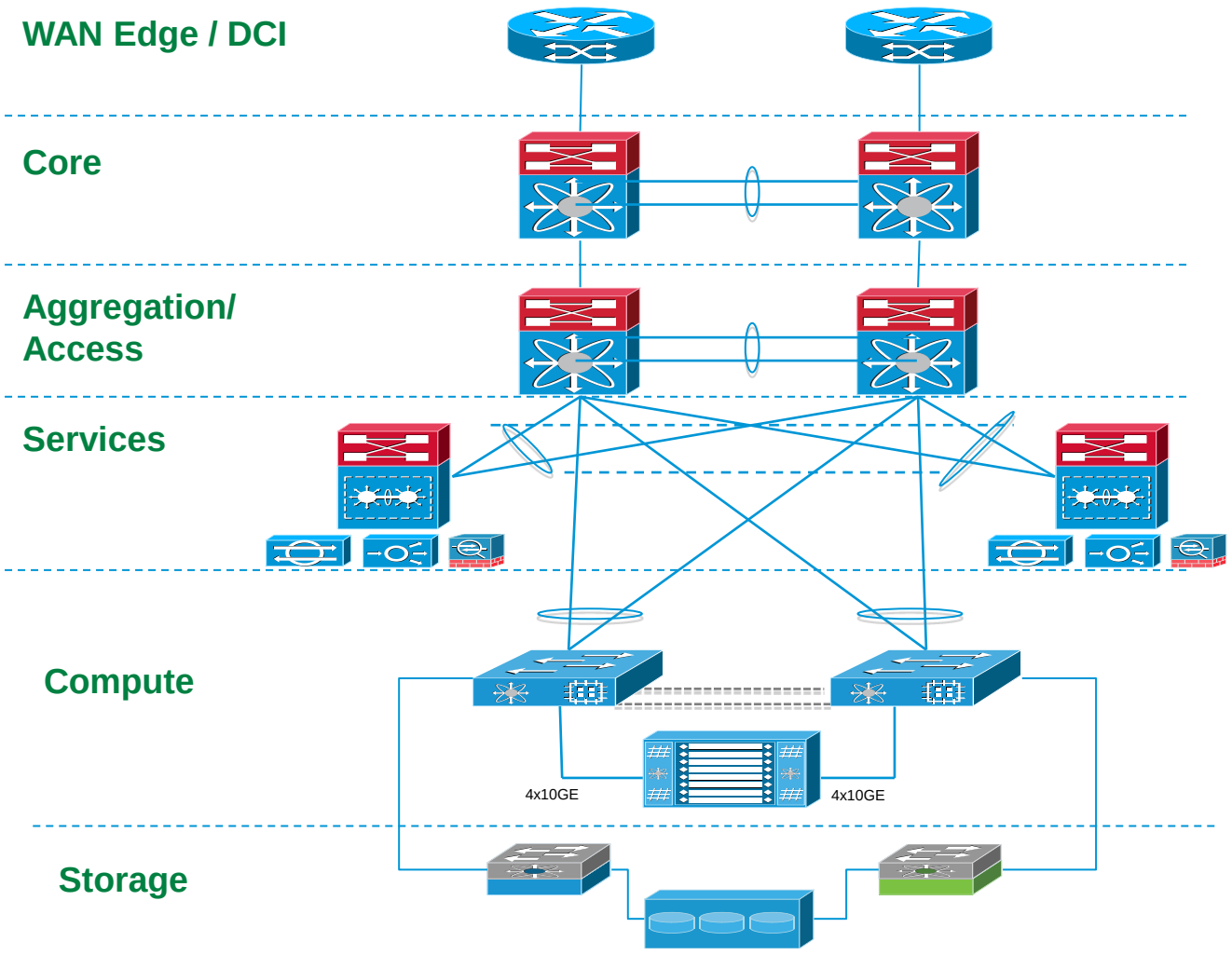
- 17+ years in IT
  - IT Operations (Networking & Sys Admin) - 15 yrs
  - Development/ Python hacking - 2+ yrs

What is most important thing to all of us?

Getting to know you

- How many are new to OpenStack networking (Quantum) ?
- How many are experts in Quantum?

Enterprise network architecture is evolving



TODAY

THE MOST DESIRABLE

CLOUD NETWORK FEATURES

- ELASTIC SCALING
- APIs FOR PROGRAMMABILITY
- REDUCED COMPLEXITY
- CONSISTENT POLICIES
- HIGH AVAILABILITY

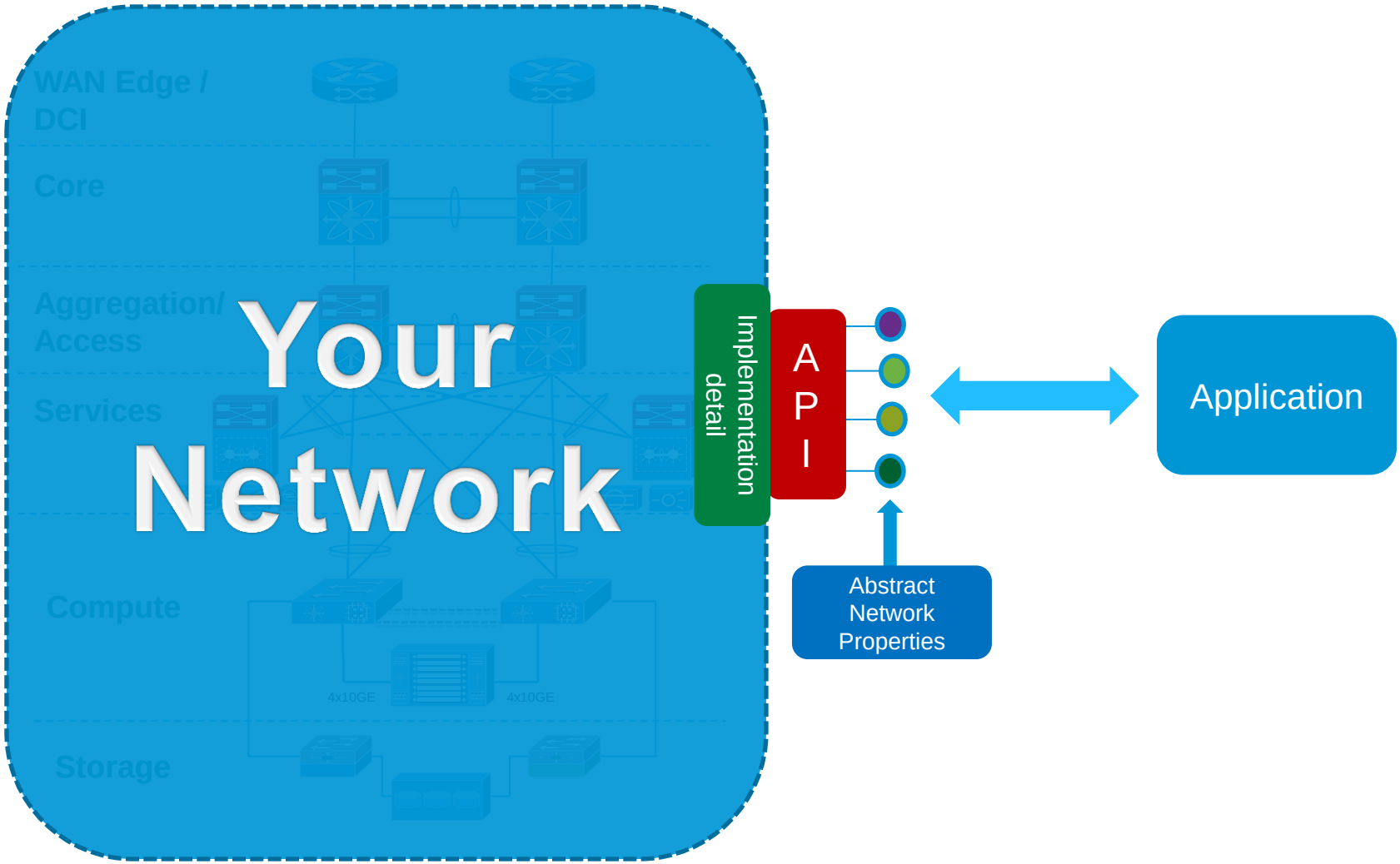
Challenges for an architect

What does the conceptual network architecture for a cloud look like?

Is it possible to transform my current network while preserving my existing investment?

How can I implement Networking as a Service reliably using OpenStack Quantum?

Conceptual cloud network model

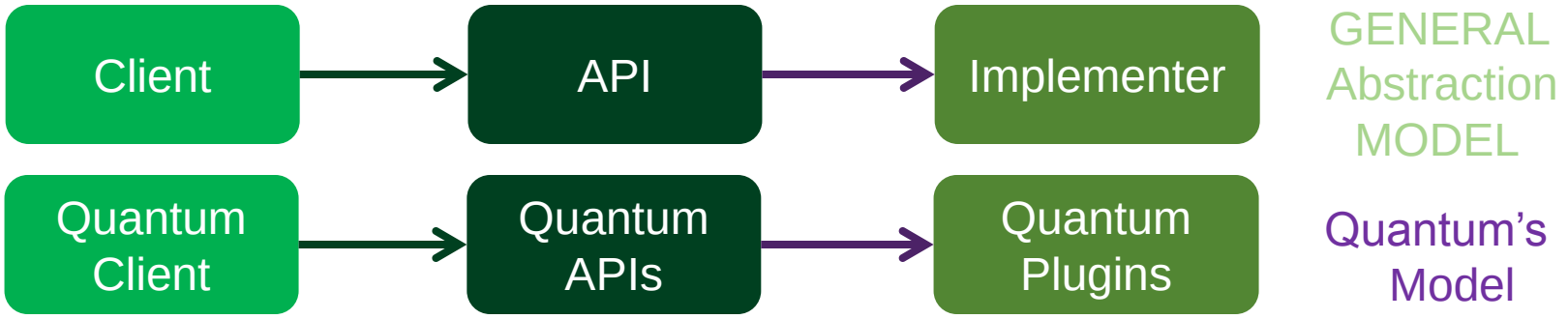


Network Abstraction

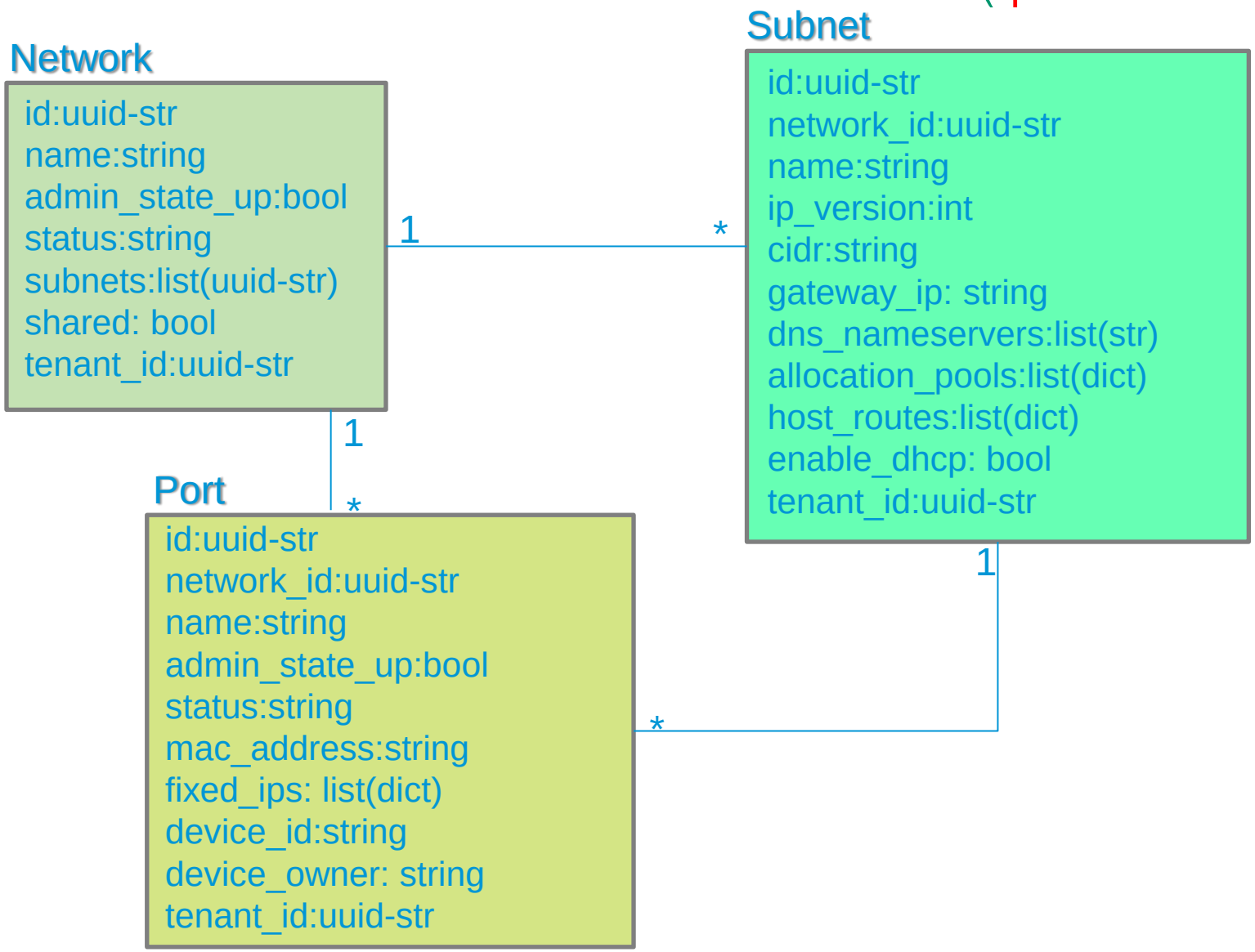
Network abstraction enables programmability

It's about

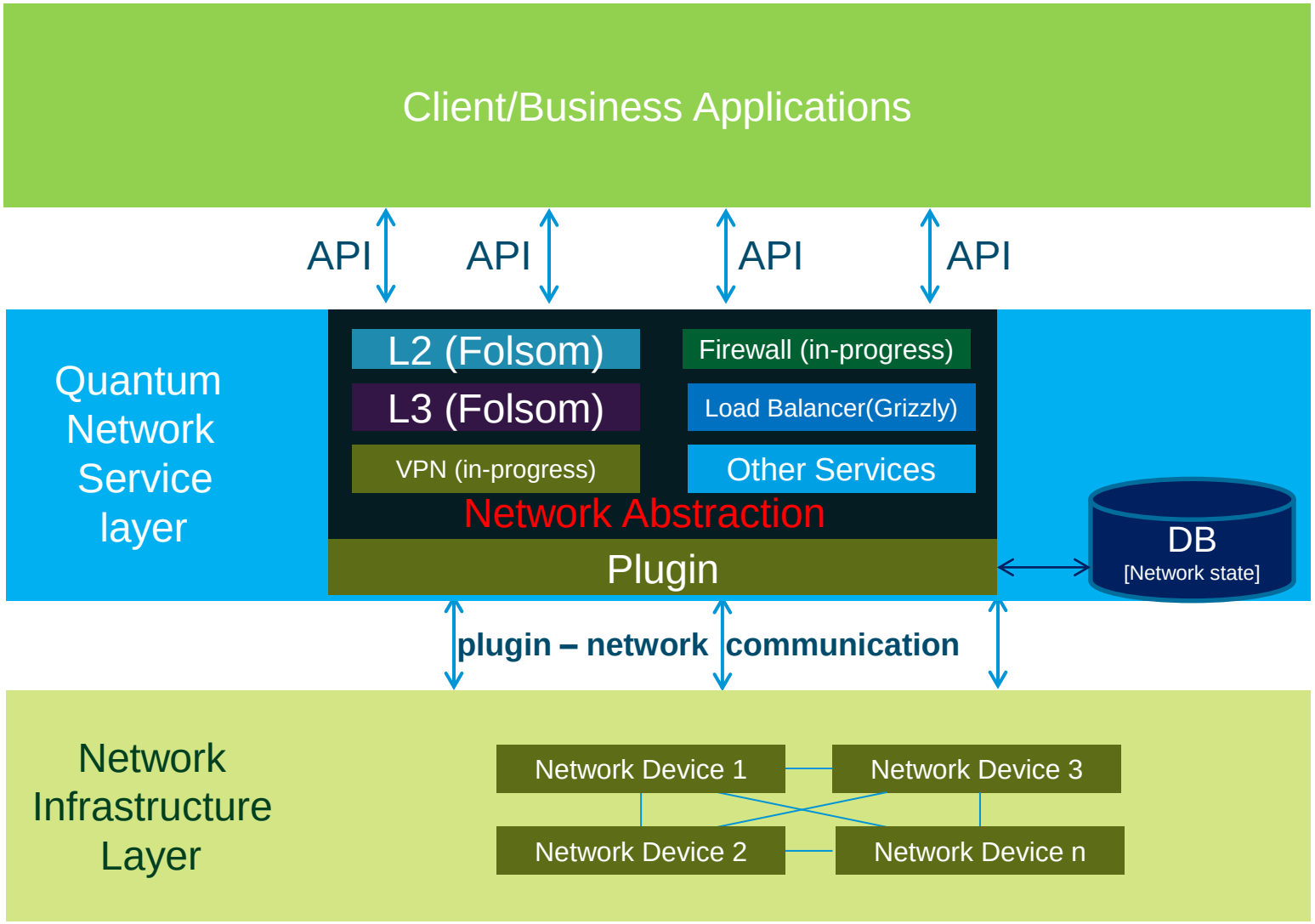
- Simplification – hiding unnecessary details
- Defining two roles – client + implementer
- Implementers can change without causing any changes in the client code



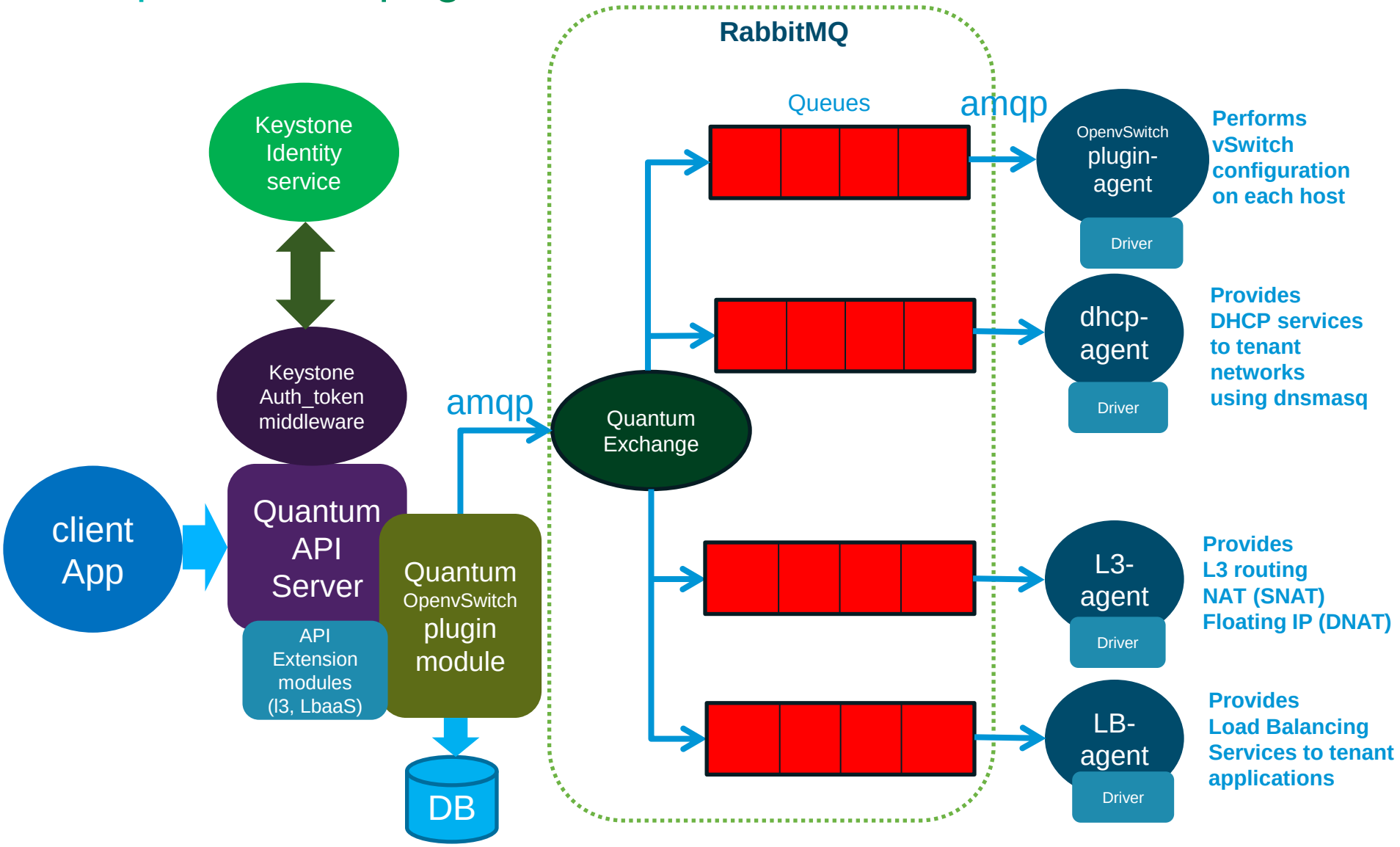
Let's peek into it!
Quantum network abstraction model (tip of the iceberg)



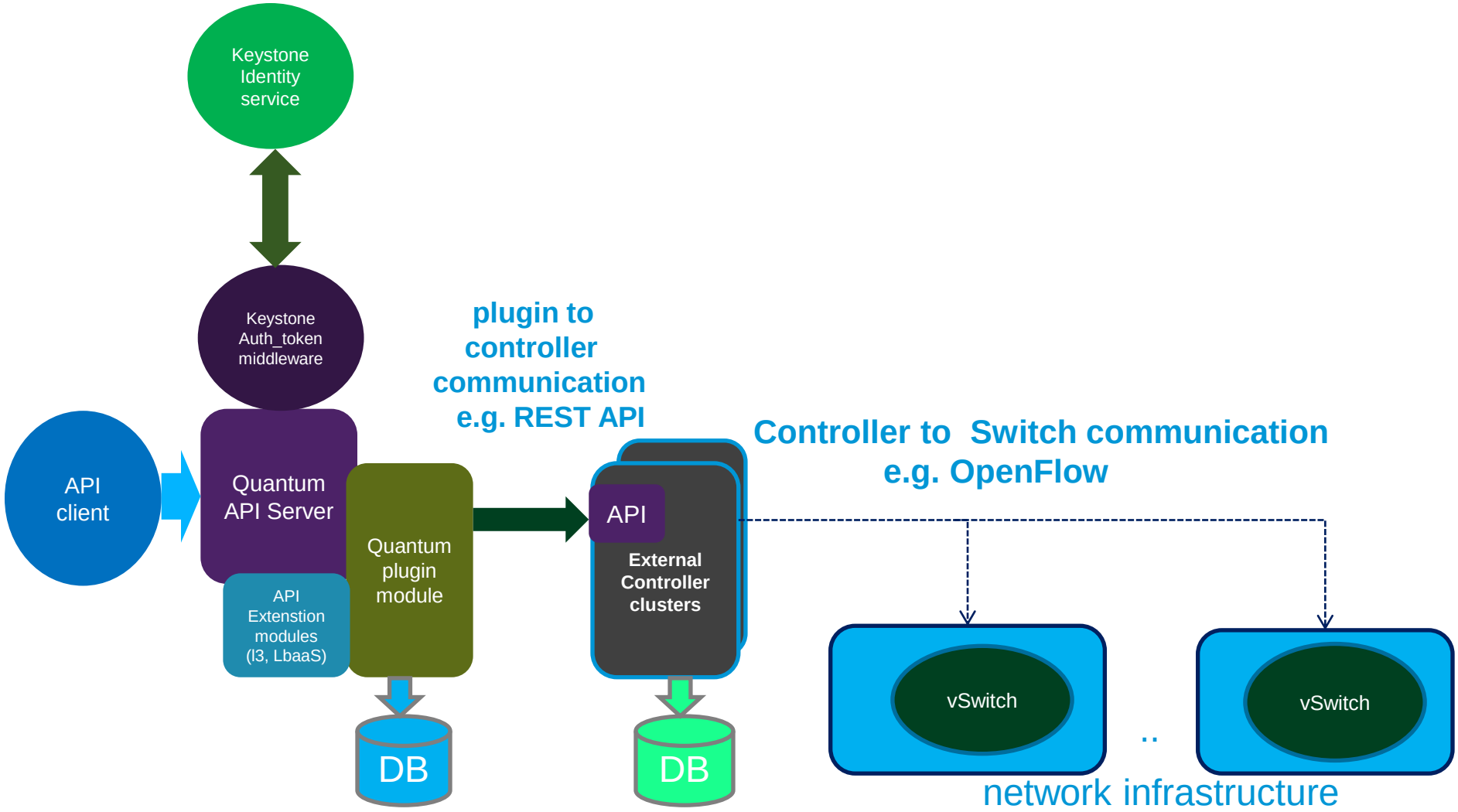
Quantum - logical architecture view



Quantum Software Architecture
Open vSwitch plugin



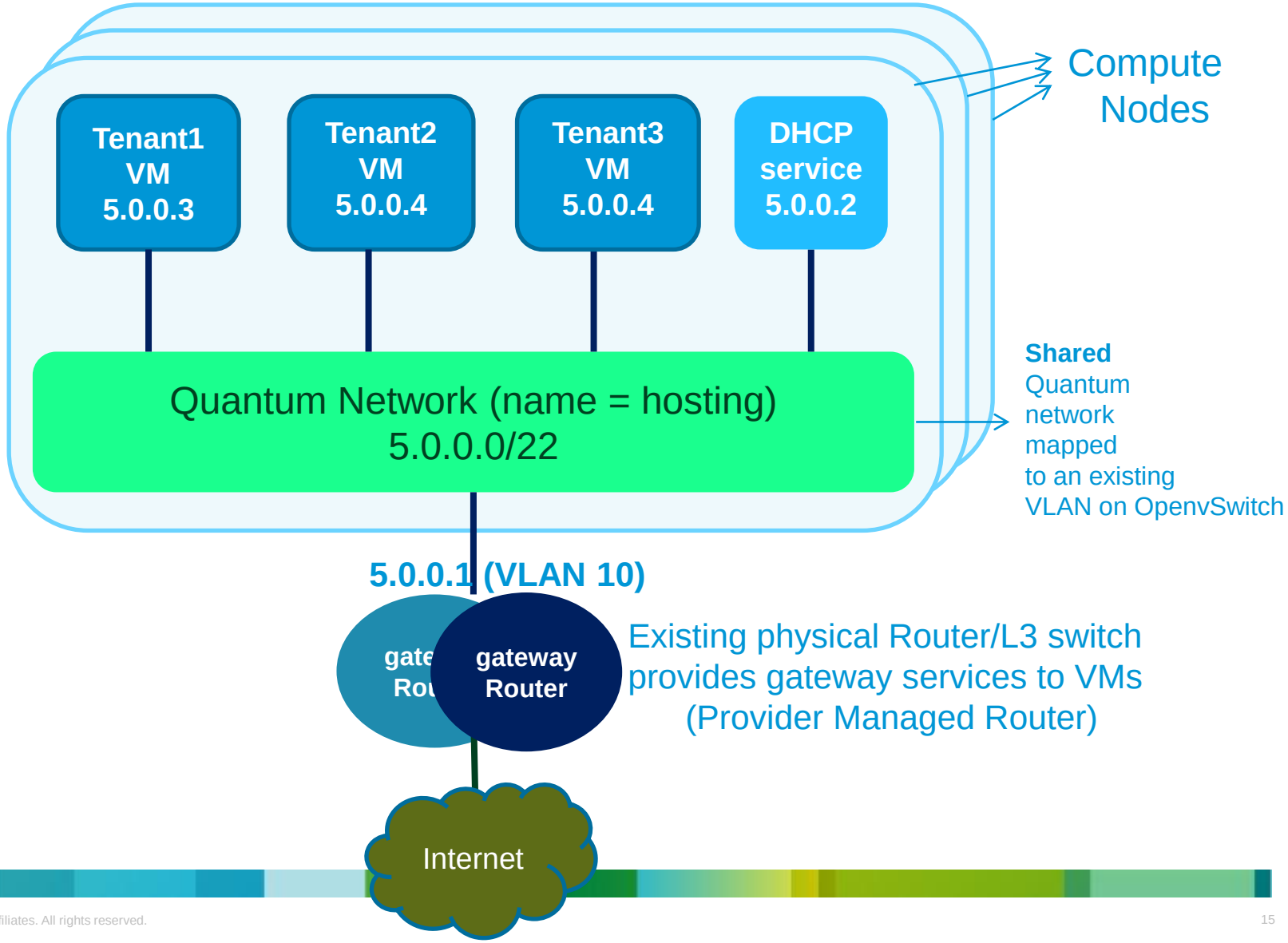
Quantum Software Architecture
SDN model



How can Quantum be used to deliver reliable Network-as-a-Service using your existing network infrastructure?

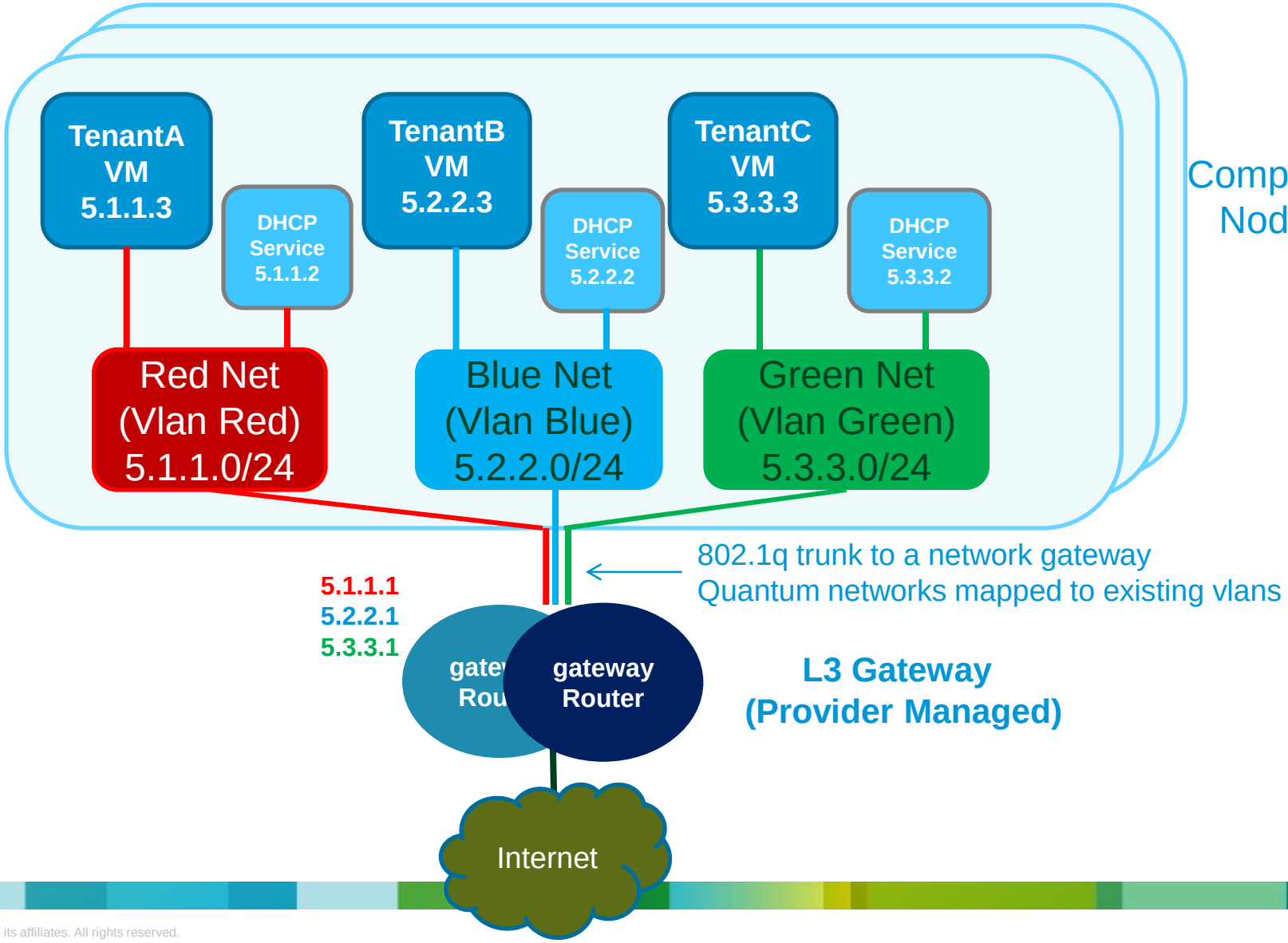
Network deployment Models

1: Single Flat Network (Simple & stable deployment for folsom Good option if you are starting off with Quantum)



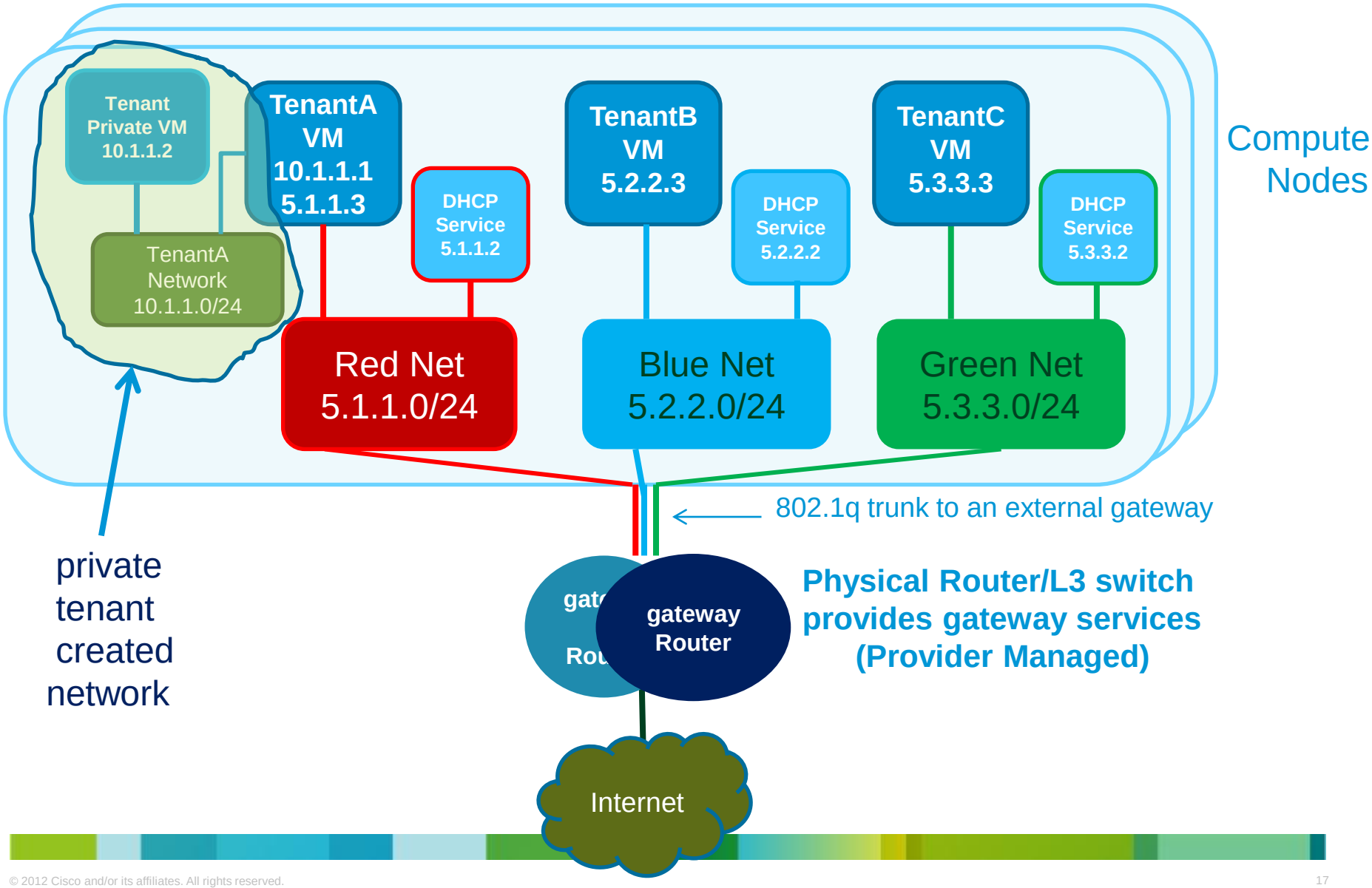
Network Deployment

2: Multiple Flat Networks (scale out of the previous model)



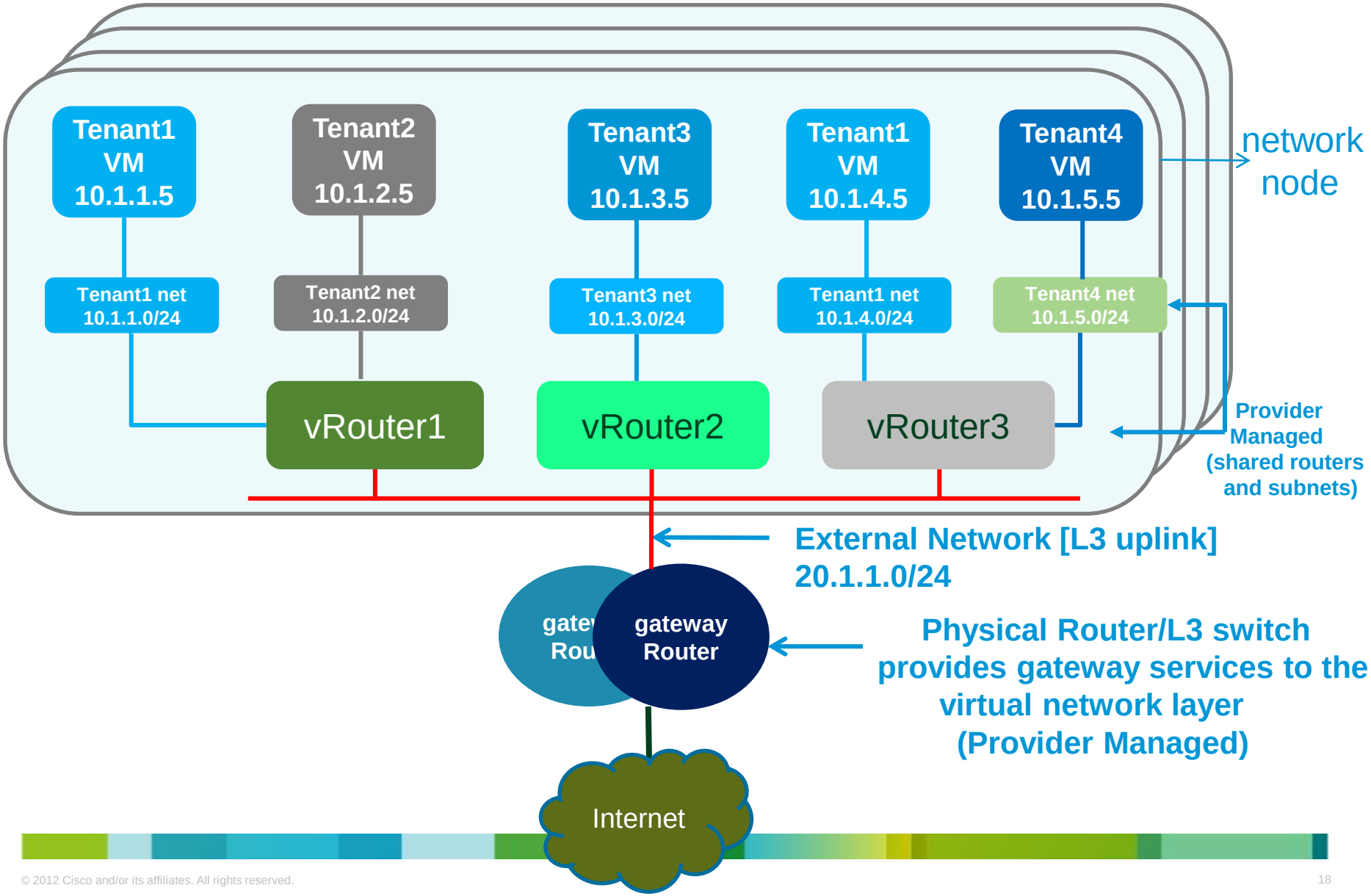
Network Deployment

3: Mixed Flat and tenant created networks (scale out network model with some tenant control)

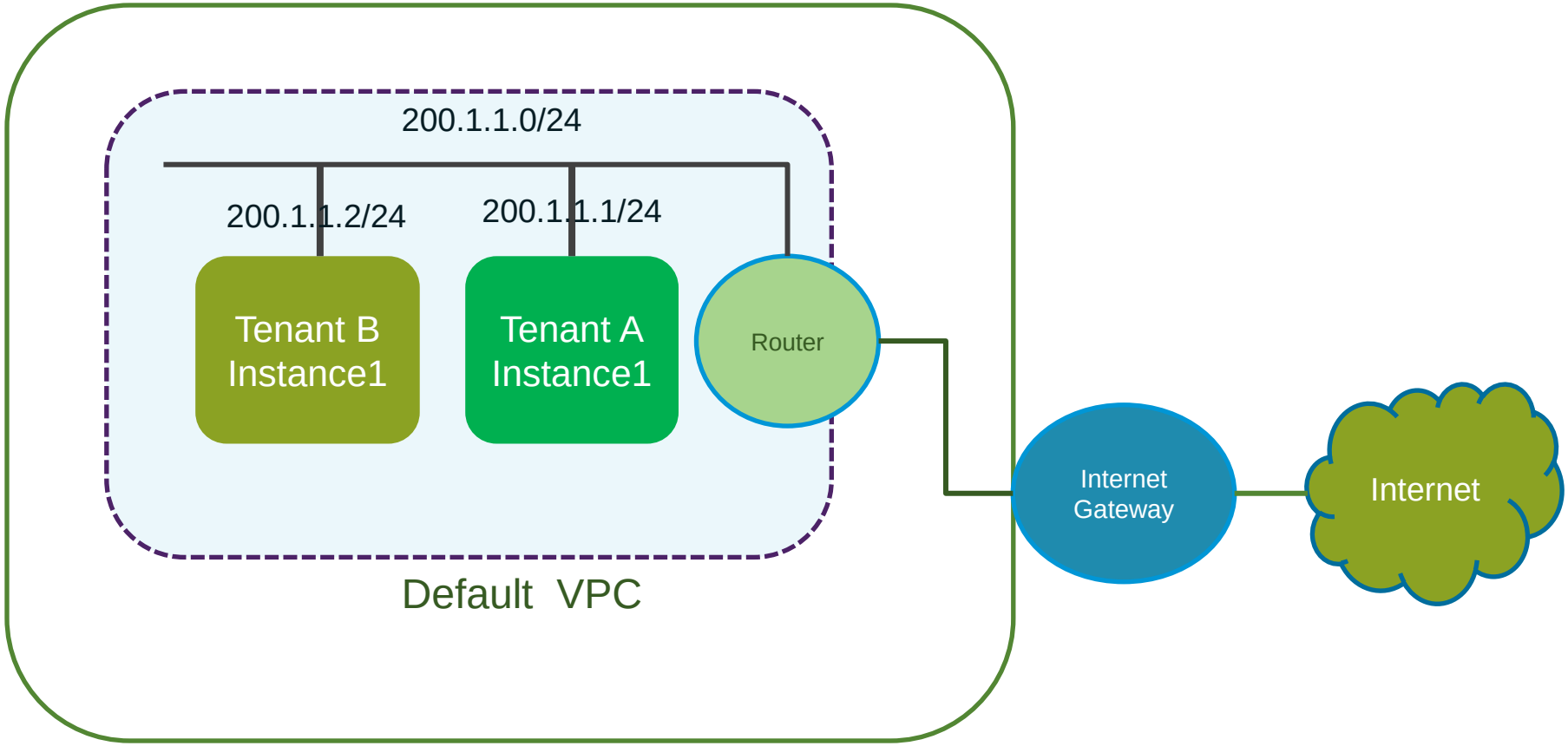


Network Deployment

4: Shared provider L3 Routers (Has scalability and availability issues in Folsom)



So, how do the previous Quantum network models compare with networking in EC2?

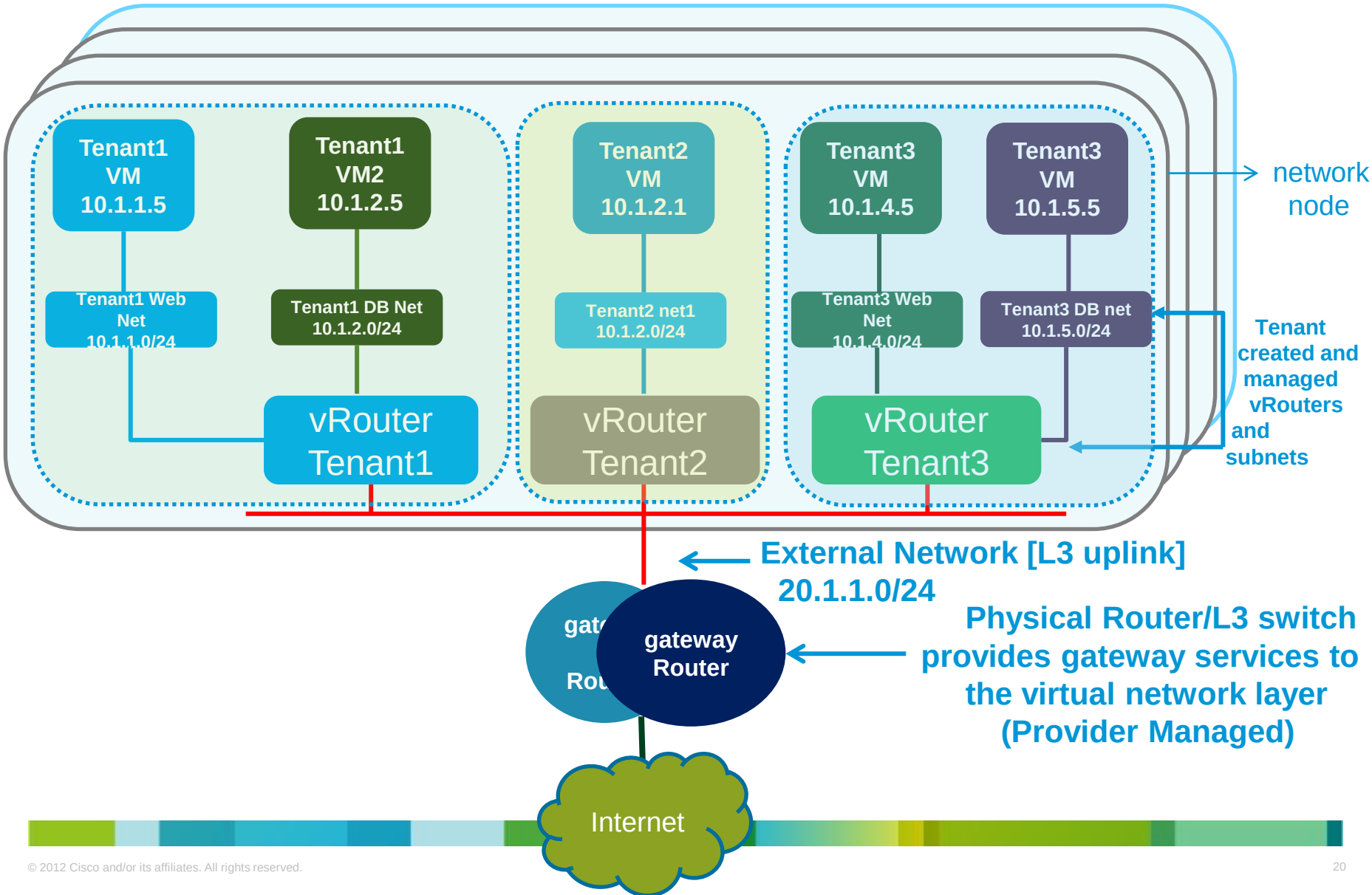


Short Answer: They are similar.
Key Idea: Networking is abstracted from tenants

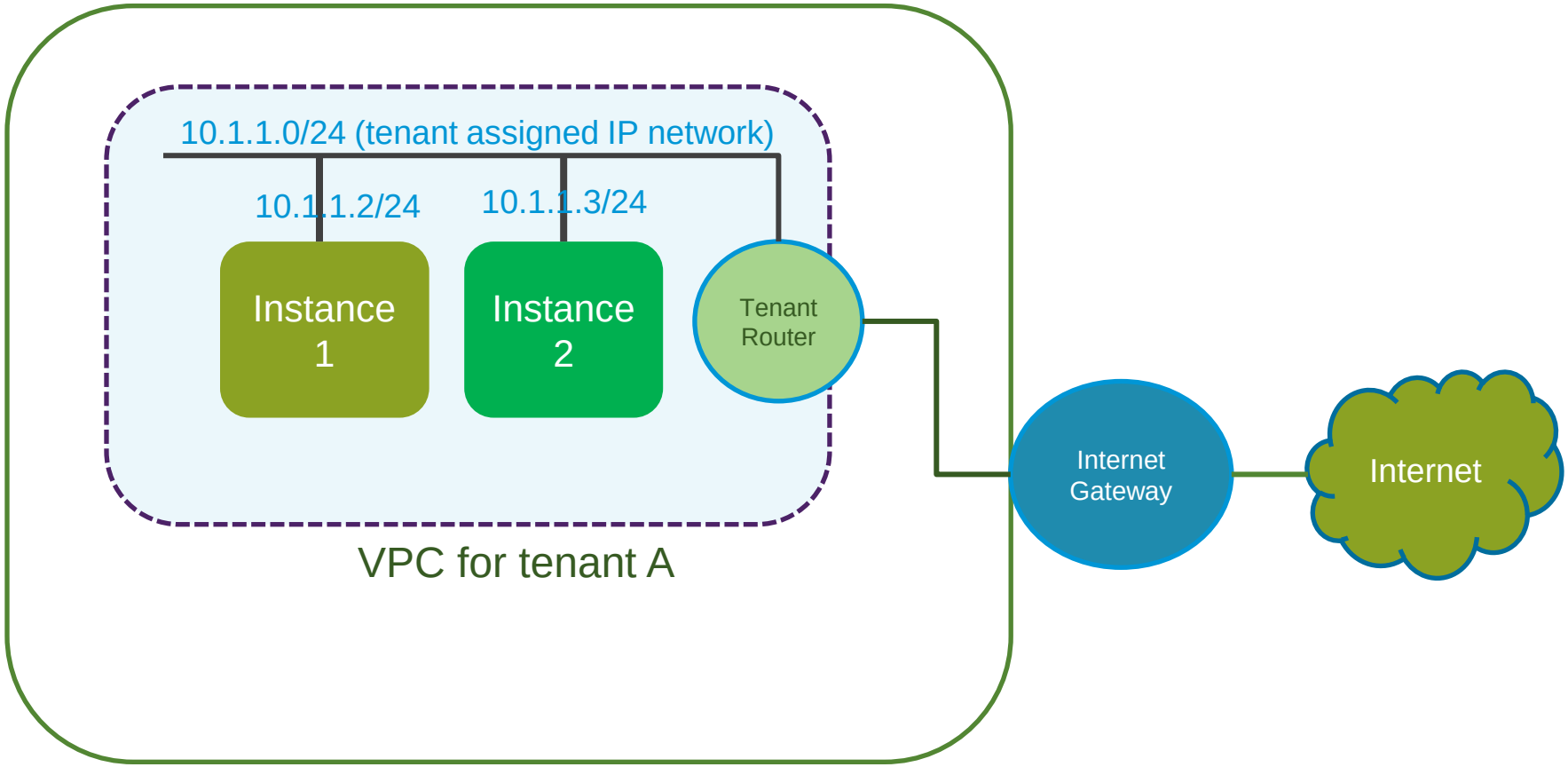
Network Deployment

5: Per Tenant Routers (Has scalability and availability issues in Folsom)

Tenants have the power to create and manage their routers, subnets and IPs



Is the per tenant router model similar to an Amazon VPC? Yes

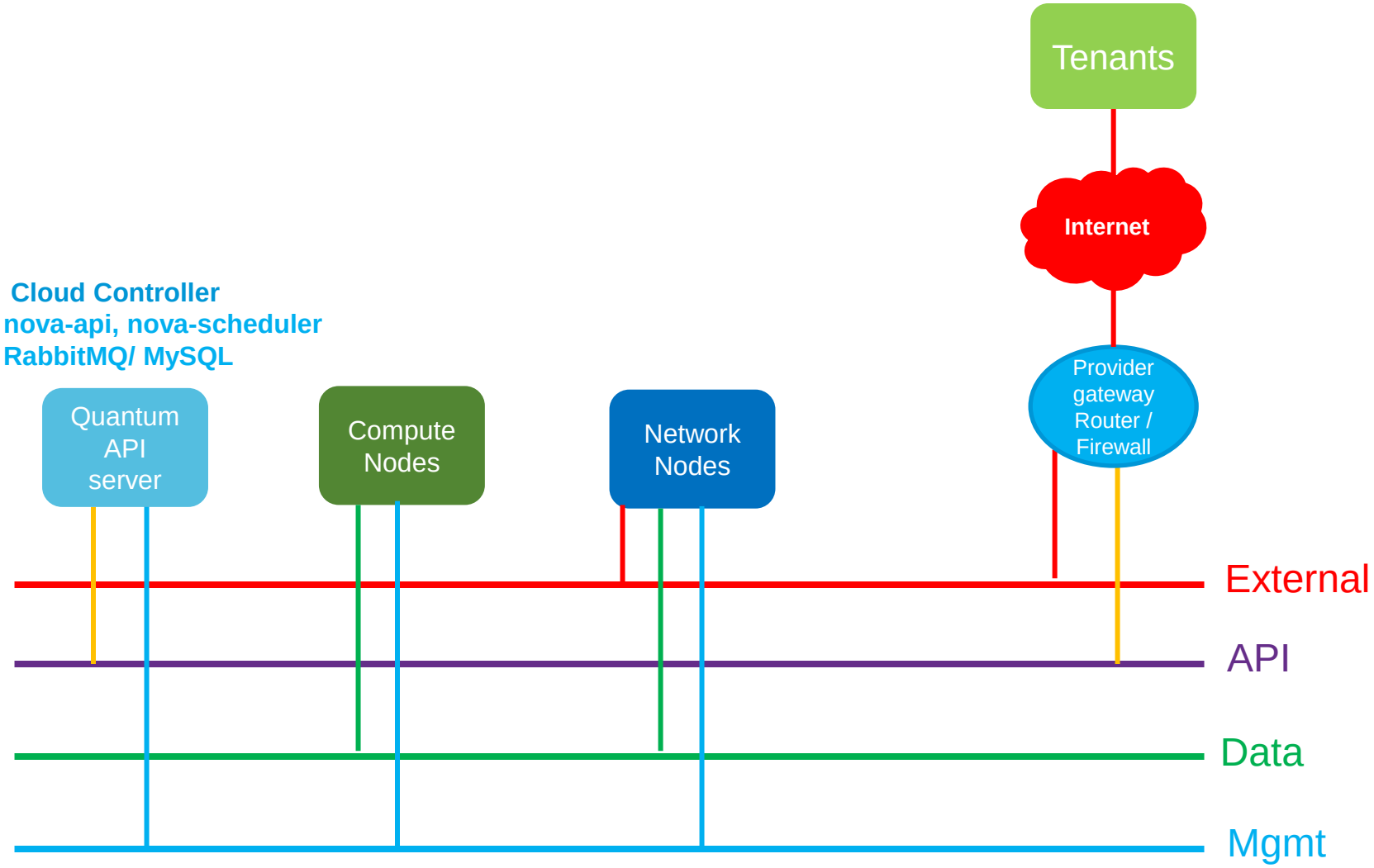


Tenant has control over networking
- Network isolation, subnets, elastic IPs and routing

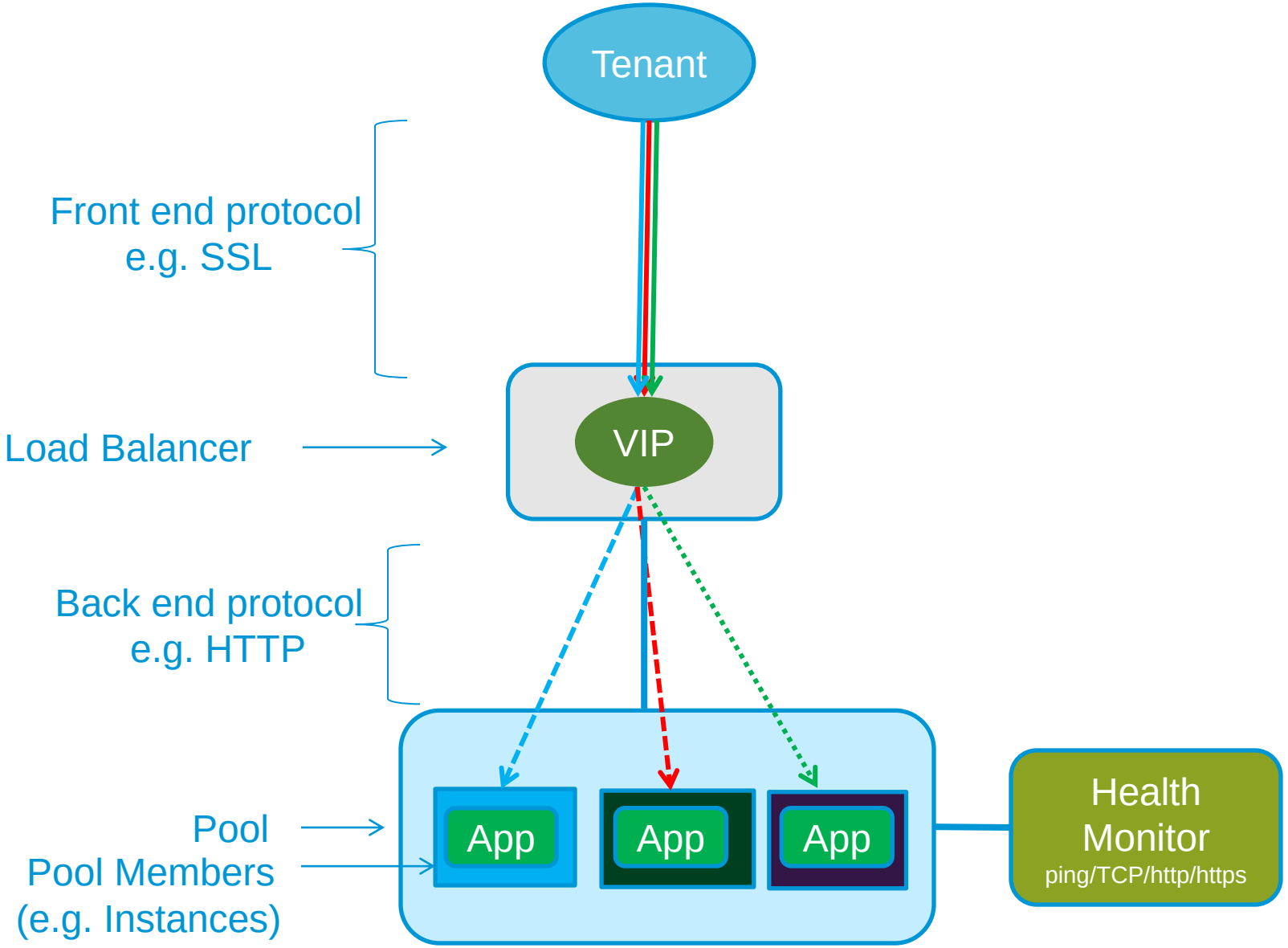
Network Design

- How many networks do we need for deploying Quantum?
  - Traffic generated by OpenStack components
    - AMQP and MySQL traffic, Nova to Quantum API calls etc.
  - Cloud Management traffic
    - ssh, monitoring, logging, puppet/chef etc.
  - Application Traffic between VMs
    - via overlay tunnels or vlans
  - VM communication with the Internet, floating IPs
  - Traffic generated by tenants interacting directly with Quantum API

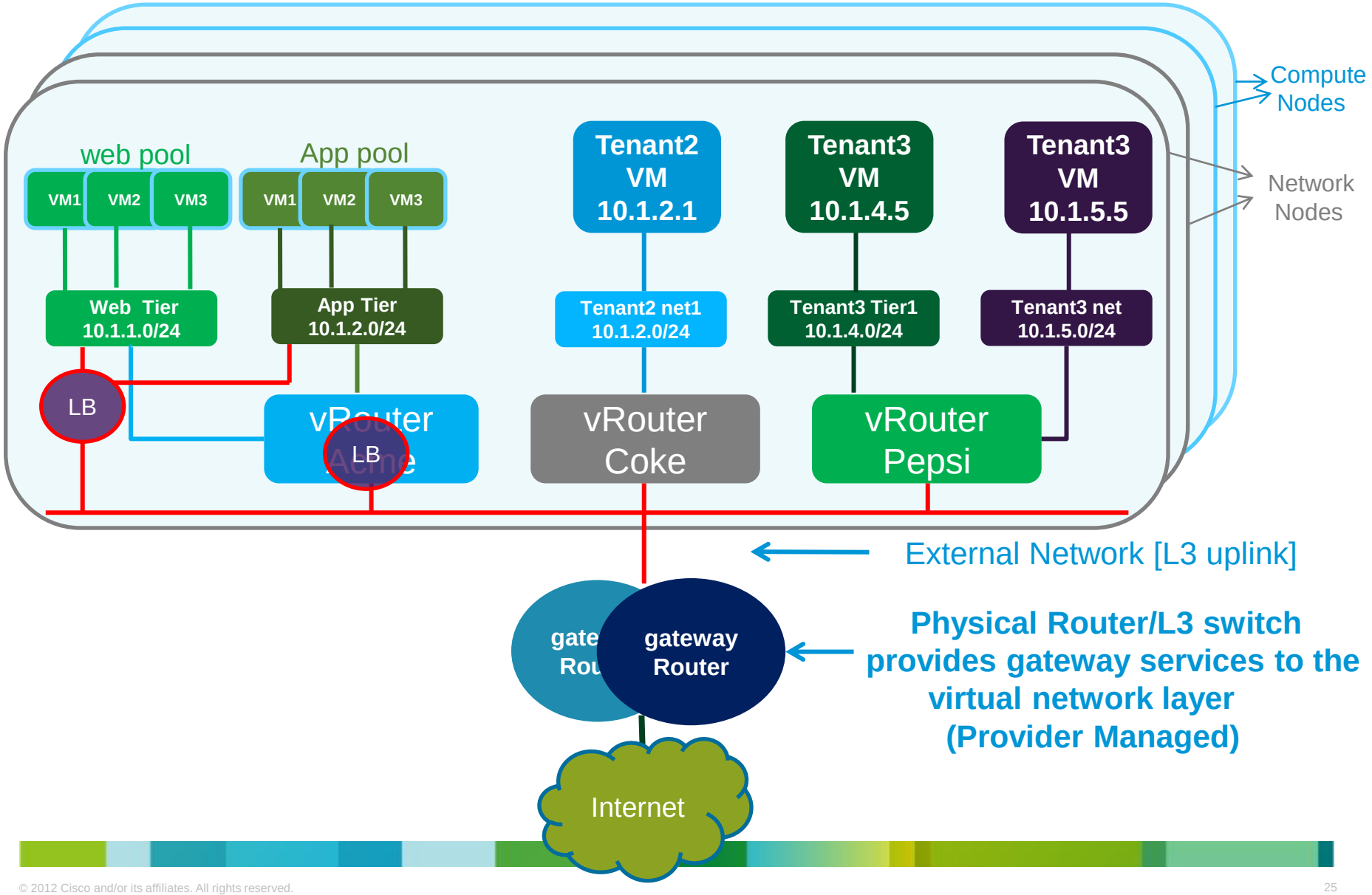
Network Diagram



What about LBaaS?



LBaaS Service Insertion (available in Grizzly)



Architecting a service for the cloud

These three features are mandatory!

- Design to handle failures
- Loosely couple your components
- Implement elasticity

Closing thoughts

- Quantum is evolving
  - Production deployment and operations is hard
  - Plugins must be architected for the cloud
  - Be aware of L3 scalability and reliability issues in Folsom
- Start slowly and do your research
  - Environments and requirements differ

  e.g. Start off with the basic networking model shown in this deck
- Document your work
- Contribute to the community

Thank You