

SmartCloud Orchestrator 技术架构和 DevOps 实践

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Agenda

- History and Today
- 如何设计和开发云平台
- 技术架构
 - 部署架构
 - 多租户设计
 - 网络拓扑和 SDN
- DevOps 实践

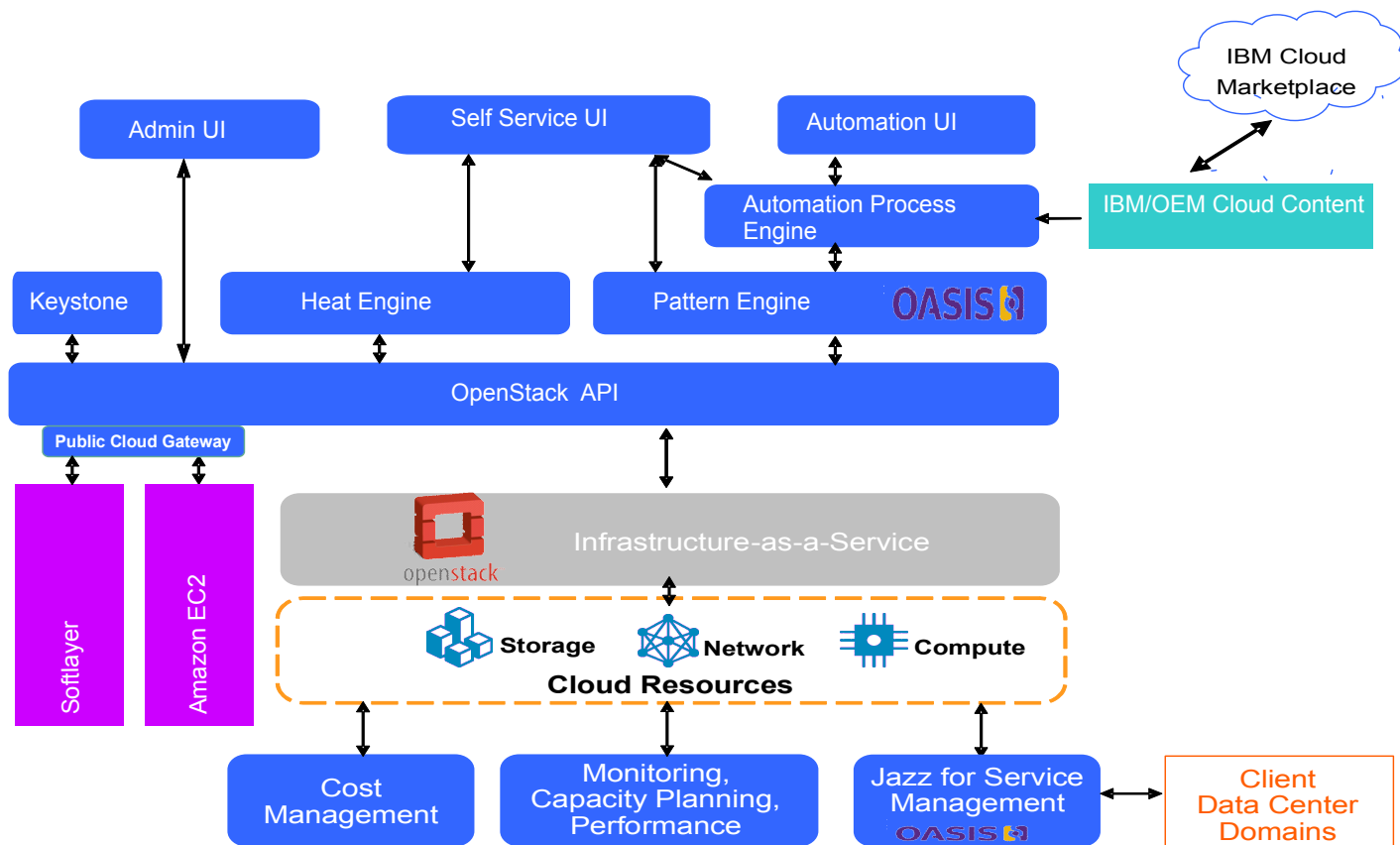
History and Today

- Start as innovation project in CDL from 2010
 - Use High Scale Low Touch from beginning
 - Moved to OpenStack from 2012
- 6 个月的发布周期，follow OpenStack Release Schedule
- 全球 6 个实验室，60+ developers
- 3 Datacenters for DevOps, China, Rome, Raleigh
- SaaS offering (OaaS) in SoftLayer

设计目标

- 企业云计算数据中心的管理平台
 - 整合已有的计算，网络，存储资源， Legacy Virtualization (VMware, Power,z/VM)， Legacy Enterprise Storage System and Existing network
 - 搭建新的私有云， KVM, SDN (OVS, OpenContrail), SDS (Ceph)
 - 利用公有云的服务， SoftLayer and AWS
 - 打造生态系统， Cloud Marketplace

软件架构图



新的软件开发方法

- 一切从用户的需求出发，重视客户体验
 - 使用用户能够理解的商业语言，着重在要解决的重大问题上
- 用户参与
 - 精准定位用户需求
- 回放，演示
 - 紧扣要实现的价值

遵循 Cloud Native 软件设计哲学

- 小而精服务而不是大而全组件
 - Highly distributed and resilient smaller services
- Failure is not a option
- 频繁更新，持续升级
- 不断尝试 new idea
 - 生产环境是一个可控的测试环境，A/B testing happened every day.

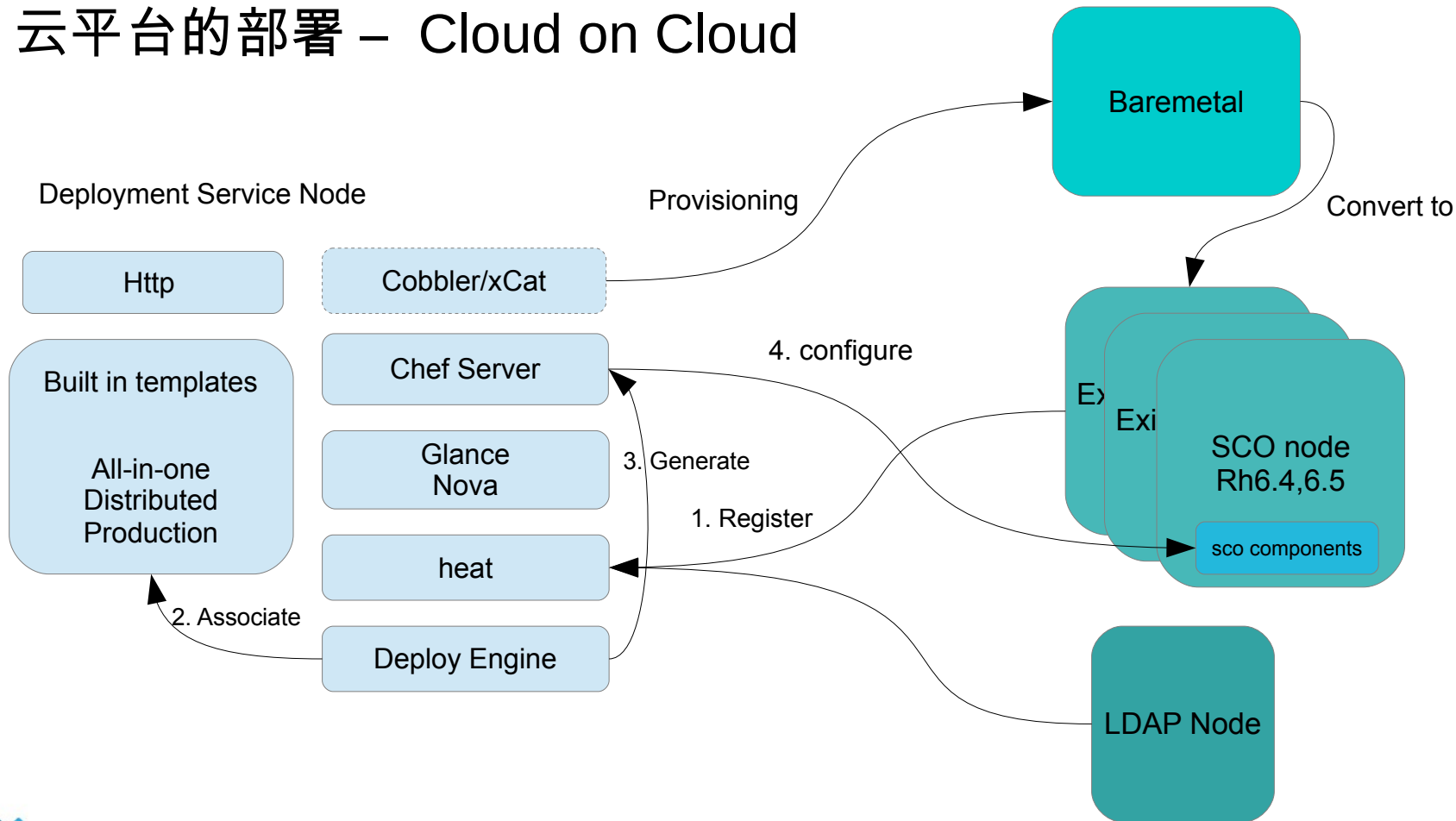
挑战：云平台的部署

- 如何在客户的数据中心搭建云
 - Complex customer datacenter
 - Customize topology
 - Baremetal requirement and mixed virtualization environment
 - High available and large scale cloud

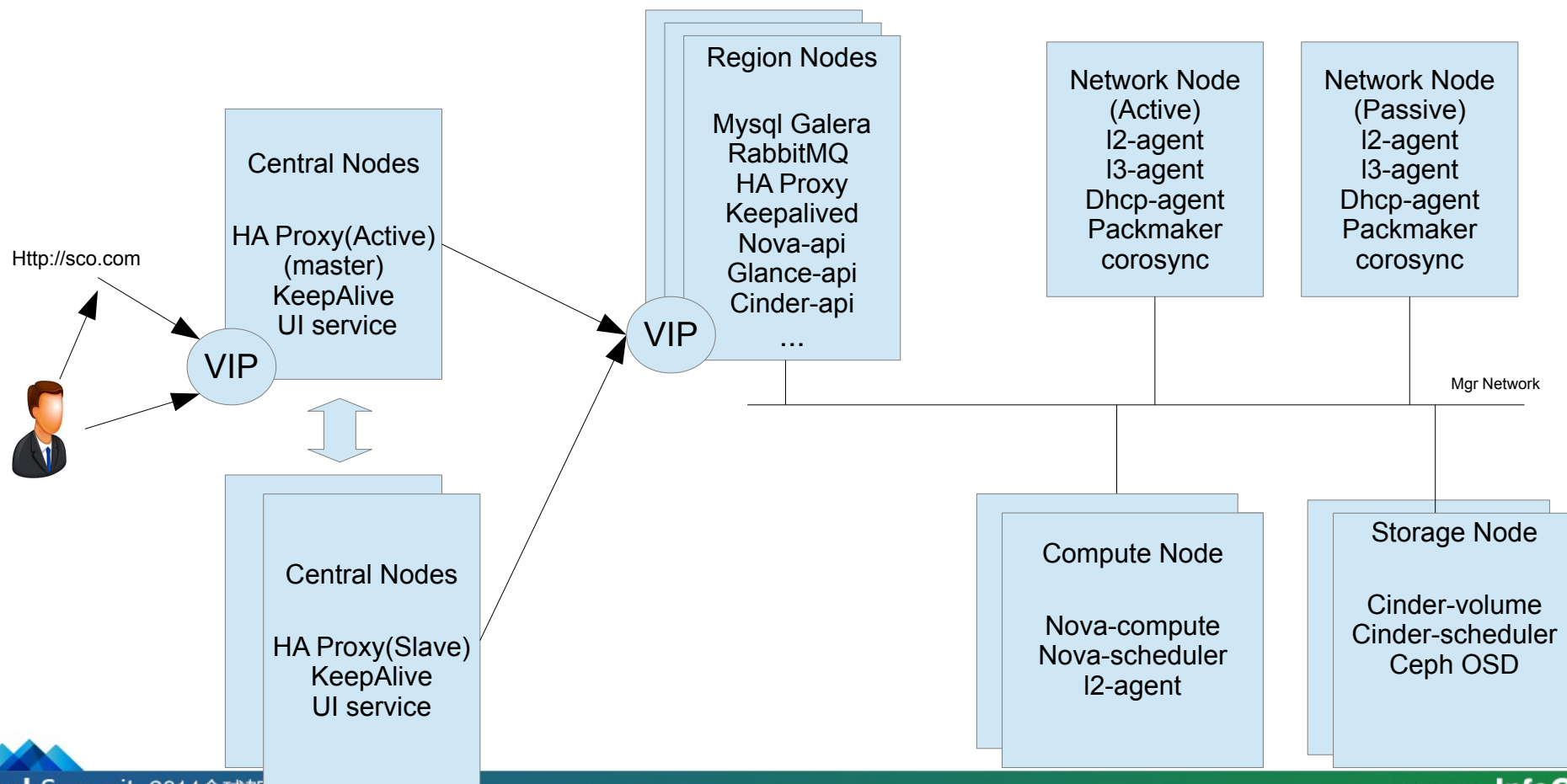
云平台的部署 – Cloud on Cloud

- Bootstrap a small cloud in 5 minutes
 - Just in enough services like chef, http, glance, nova, heat
- Use heat to define the topology
 - Extend heat api and engine to support existing node, configuration node (like db2, ldap, VMware vCenter), reference node
 - Extend heat template to support chef better
 - Output to chef environment, resource role mapping
 - Provide new deployment tasks based on heat engine
 - Can be nested to support cascade deployment like multiple region

云平台的部署 – Cloud on Cloud

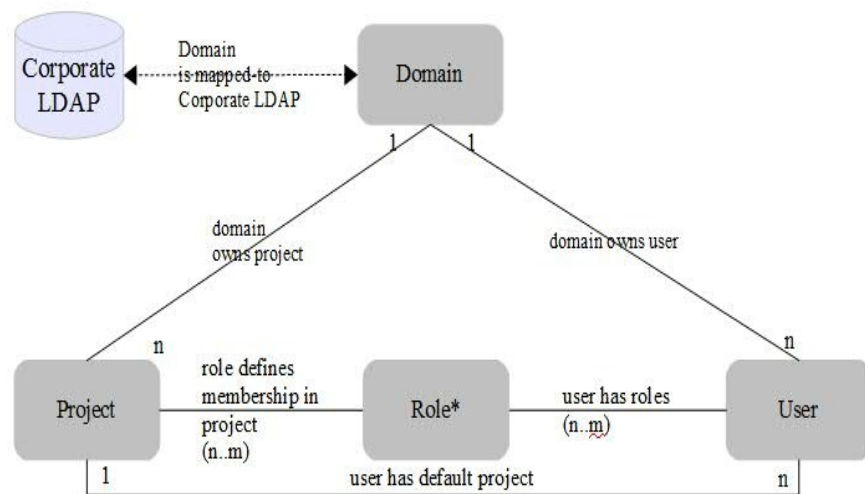


High Available , High Scale Cloud Deployment

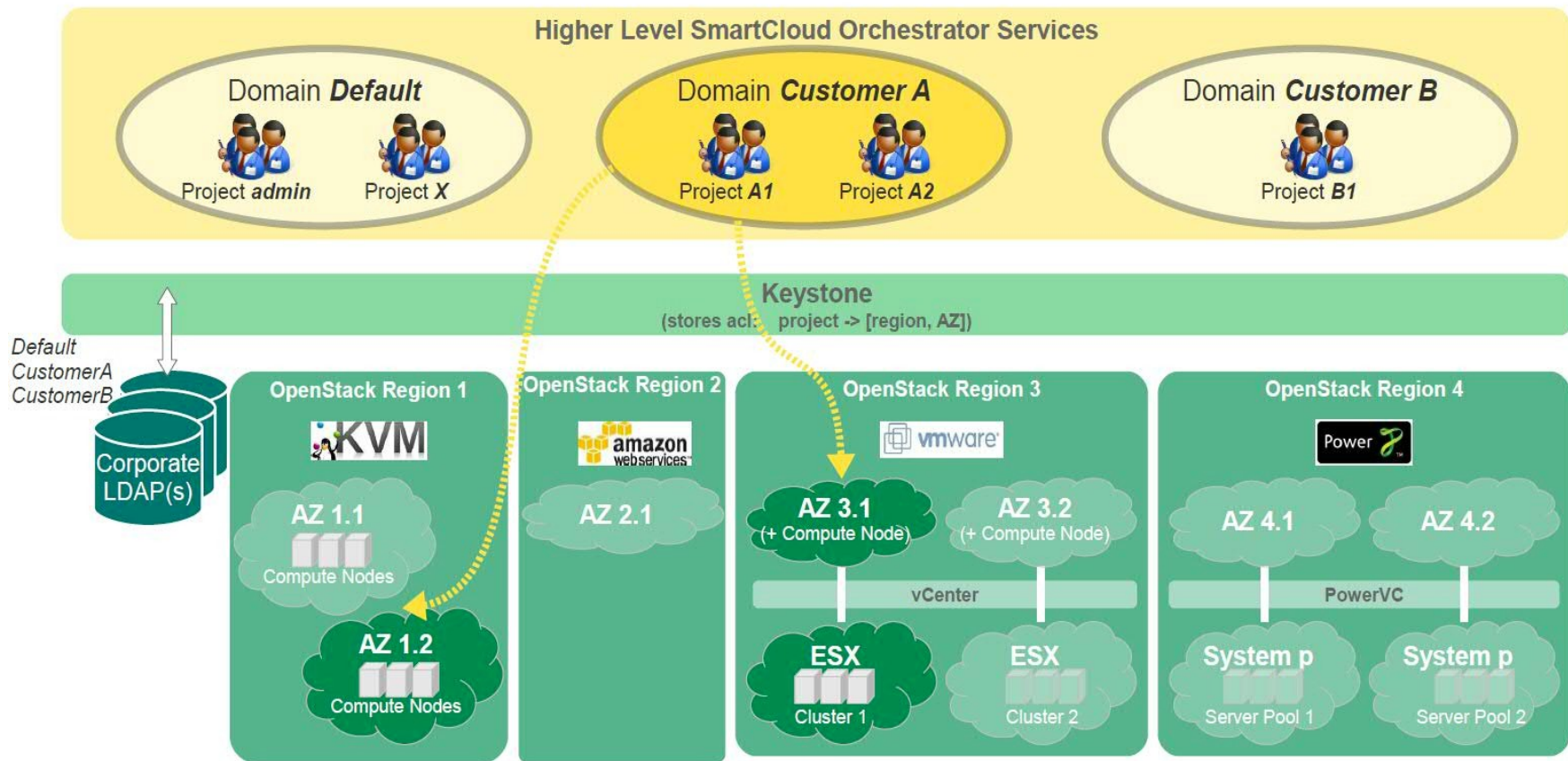


Multiple Tenant Design

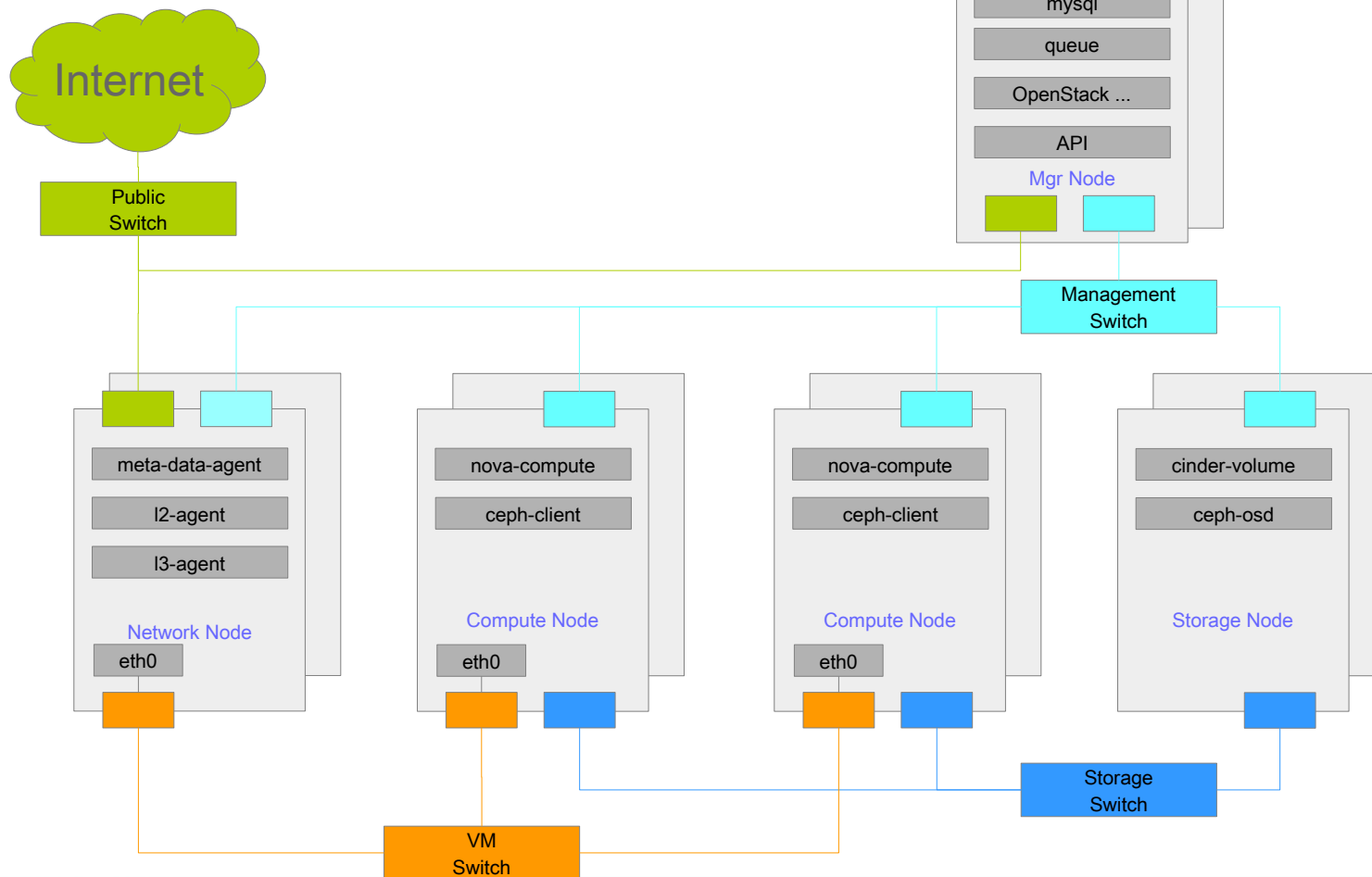
- Resource Isolation
 - Network segment is the most important
- Administration delegation
 - Allowed to delegate responsibility
- Use keystone v3
 - Integrated with LDAP
 - Domain, Project, Role, User
 - New Added project admin role



Multiple Domain, Multiple Tenants, Multiple Resource Pool



Software Defined Network - Neutron



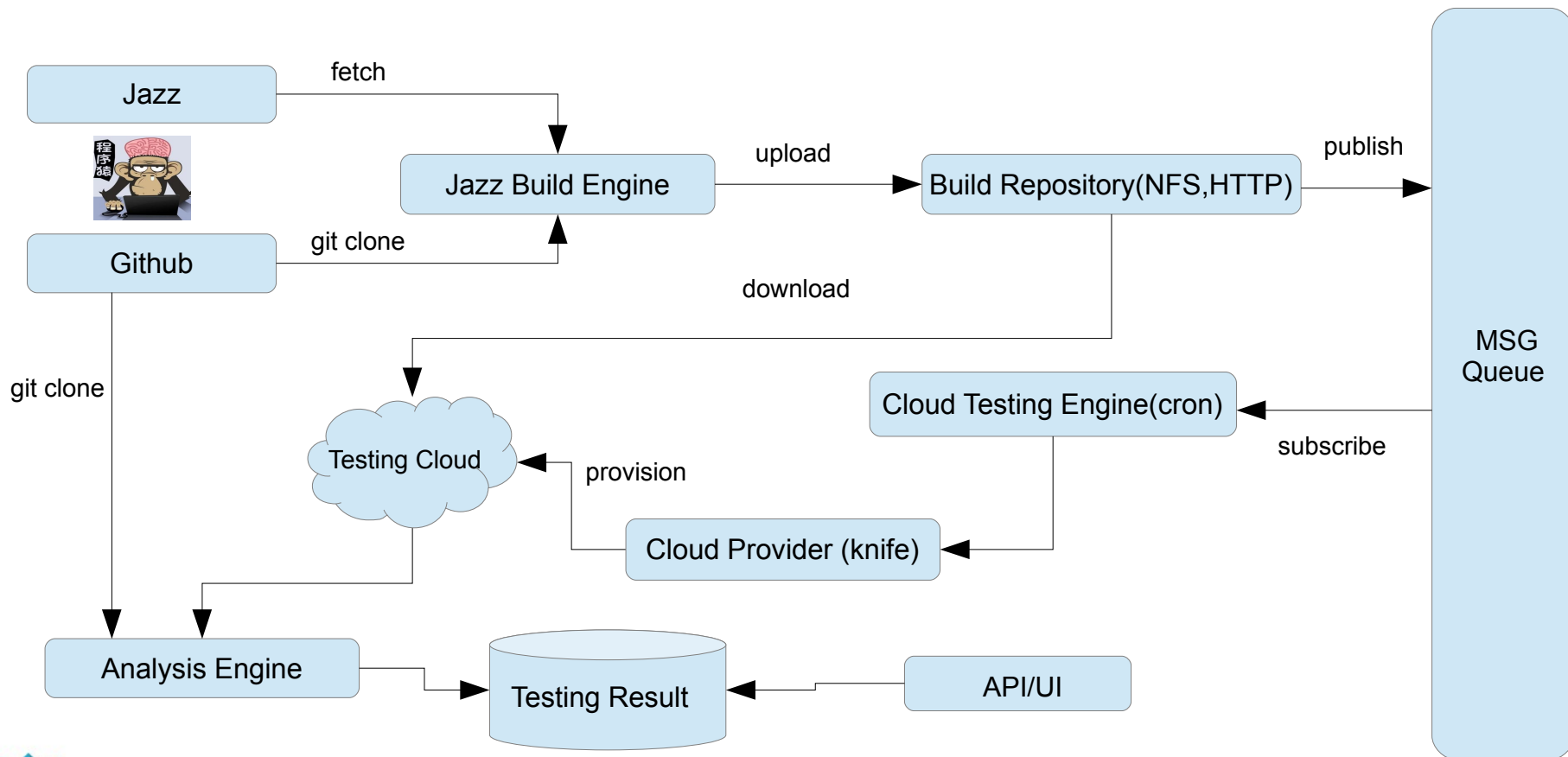
Software Defined Network - Summary

- Vanilla Neutron is not production ready for large scale cloud deployment
 - For KVM, Linux Bridge + VxLan (>4k tenants) or Vlan(<4k tenants) can serve small scale environment (up to 100 physical nodes)
 - For VMware, Power, z/VM neutron + vlan matches the most existing deployment
- OpenContrail is a new promising opensource SDN project
 - Try to solve network virtualization and NFV
 - Consists of SDN controller and vRouter
 - Control plane uses BGP, netconf and XMPP
 - Data plane supports MPLS over GRE

Cloud Orchestrator DevOps Overview

- Process and Methodologies
 - Agile and Test Driven Development
- Develop
 - Blueprint (Wiki), Sprint, User Story, Tasks
 - Git, Jazz , Girret review , Jenkins, Jazz Build Engine
 - Cloud is used every where when there is VM required
 - Chef is used every where when there is requiriement to install and configure component
- Operation
 - Maintain Continuous Delivery Infrastructure
 - Uses NodeJS, LogStash, MongoDB, Squid

DevOps - Jerney of the code

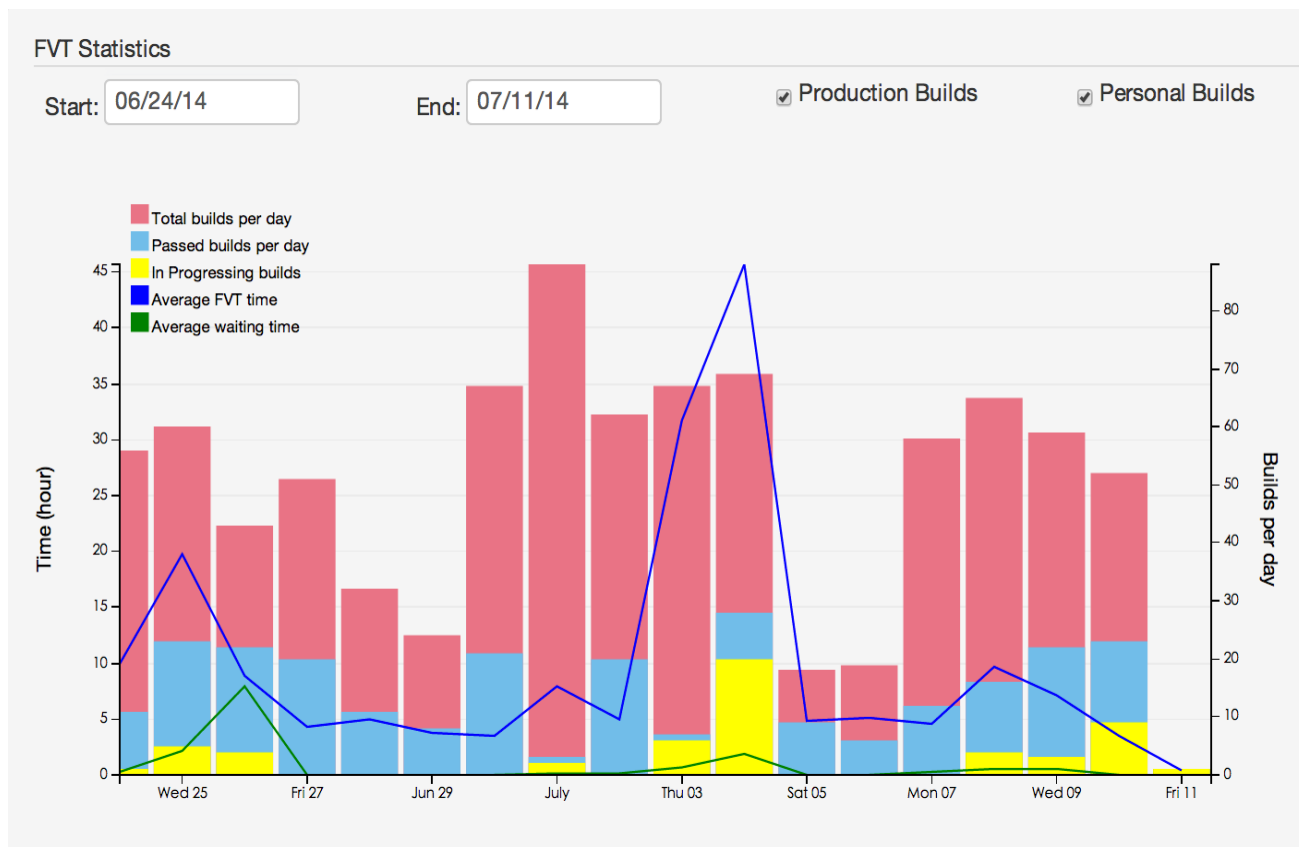


DevOps – Continuous Improvement

- Agility
 - Reduce the package and download time
 - Reduce the installation time
 - Concurrent running the testcases
- Quality
 - Log analysis to find hidden error and warnings
 - Elastic re-check to skip transient error

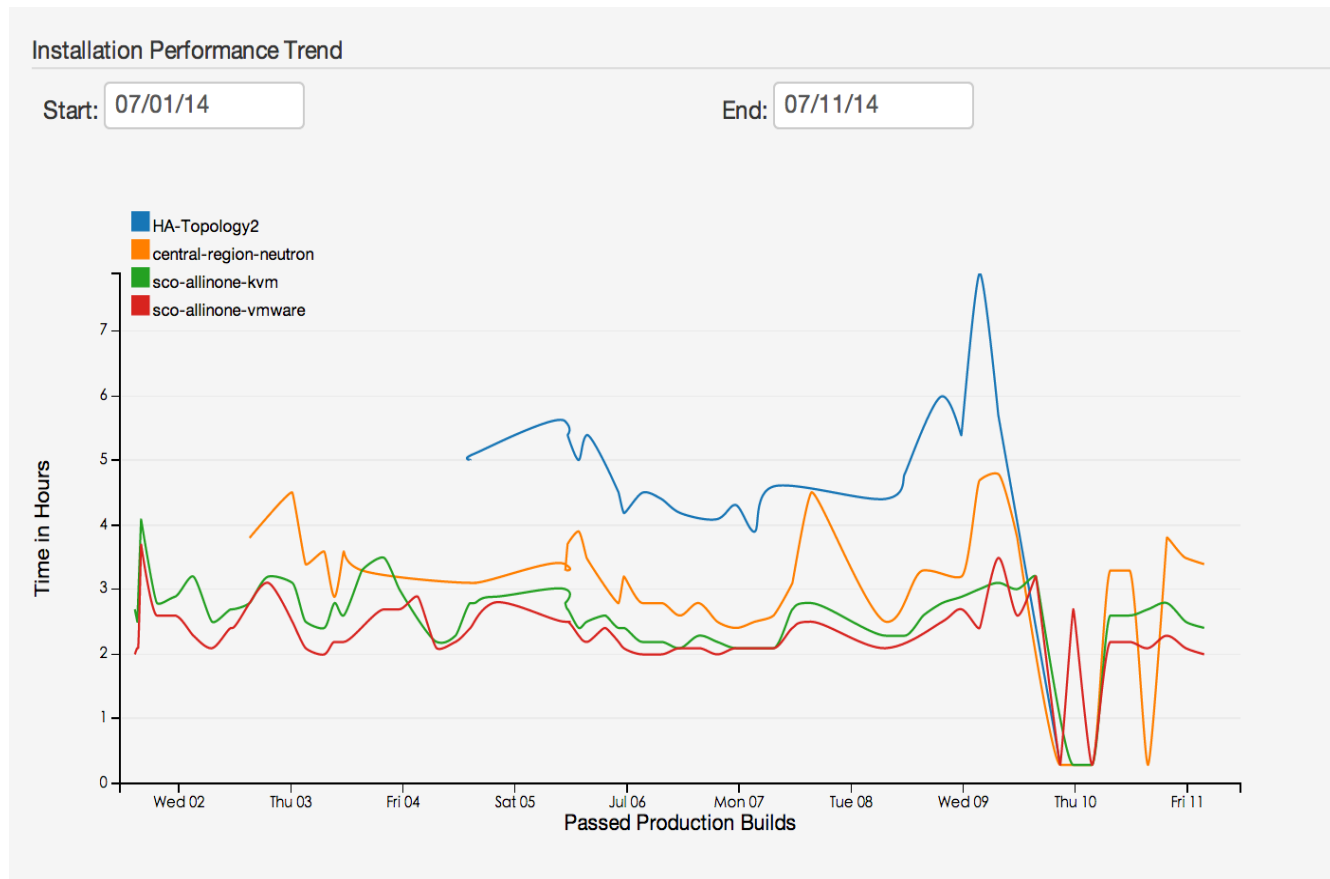
DevOps – Data and Analysis

- 50+ builds working day
- 30 VMs per build
- 3 Production clouds
 - One VMware(10 nodes)
 - Two KVM(30 nodes)
- 5G logs per day
- 2.5 Devs, 0.5 Ops



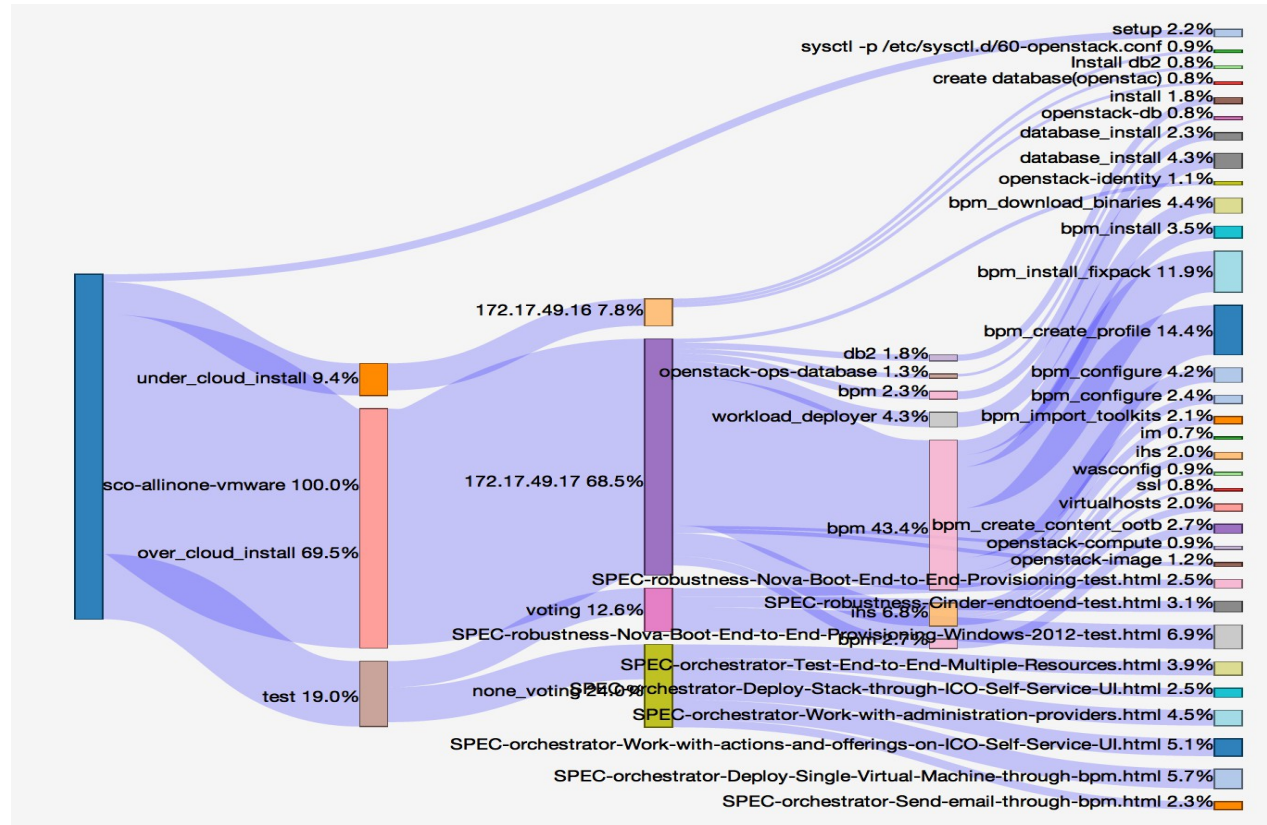
DevOps – Execution Performance Trend

- I/O competition impacted the performance
- CPU can be overcommitted more
- Memory overcommitted impacted the performance



DevOps – End to end testing time analysis

- Installation took 70% time
 - Parse data according to chef log
 - Generated the tree from node to recipe
 - CDN can reduce the download time



Thanks!

