Novatta Data
Center
Revitalization
Plan

Tralah M
Brian

Novatta Data Center Revitalization Plan

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DataCenter Project Implementation

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People

- Principle Cloud Solutions Architect
- Enterprise Architect
- Network Architect
- Head of R&D

Software Defined Data Center

An architecture that is independent of the hardware present

- Compute,Storage,Networking,Environmental
- Virtualized storage,networking
- Automated Operations
- SDDC is hardware agnostic

Physical Hardware

- Compute
- Networking
- Storage

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What a SDDC provides to us:

- Agility (auto-scaling)
- Resilience (proper design - near zero-downtime)
- Standardization (great ease of management and scalability)

OpenStack as SDDC (Software Defined Data Center)

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- Cloud Operating System
- Basic Components(neutron,....)
- Future Data Center - API based

Project Methodology

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1. Delivery Framework

- Discover
- Design
- Deploy

2. Sprints:

- Hardware assurance/Infrastructure validation with Redhat EL
- Basic Deployment Basic OpenStack API
- Adding Ceph,Swift,SSL,etc. For object storage
- Adding post-deployment automatic tasks Custom Scripts
- Running post-deployment tests Creating a basic tenant

Sample Architecture

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1. 3 Controllers,

2. 12 Computes,

3. 5 Ceph OSD

4. 3 Swift Object Storage Nodes

5. VLAN/VXLAN Networks

Other Aspects

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1 Centralized Logging - **fluentd**, **ElasticSearch**, **Kibana**

2 Performance Monitoring - **collectd**, **Graphite**,**Grafana**

3 Ceph Monitoring and Administration - **Calamari**

4 Cloud Management Platforms - **Red Hat CloudForms**

- Manage multiple clouds from a single view
- Self-Service Portal
- Utilize HOT(Heat Orchestration Templates)
- Reporting, Dashboards
- Chargeback
- Scale OpenStack from a dashboard

End-To-End Software Defined

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1. Why RedHat OpenStack? **Biggest and mostly experienced contributor to the community**

2. RedHat is the market standard

3. With Novatta you get: Wide Infrastructure Knowledge and skills, Professional services and support.

- Tenants (Line of Business)
- App Developers
- IT operations
- Private Cloud

Load Balancer as a Service Requirements and Challenges

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Full-featured Load Balancer with Operational Simplicity

1. Self-service,fully automated provisioning through *Horizon*, *REST API*, CLI

2. Enterprise scale features:

- HA,SSL,multi-tenancy integrated with **Keystone**

3. Per-tenant isolation of load balancer instances

4. Integration with automation tools(*Puppet*, *Ansible*, *Heat*)

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Cumulus OS that runs on switches

1. Can we Quicky deploy the compute nodes?
2. Can we Prototype the entire pod virtually first
3. Can The entire pod be entirely Layer 3 with VXLAN
4. Can **Ansible** and **Git** be the common language between Network Engineers and System Administrators
5. Can RHOSP Director Handle the Bulk deployment
6. Can we Do the entire project remotely with ease

Step 0 : Find a Lab/Center

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Project Inventory

1. Overcloud
   - 303 Dell R220 1U servers (compute,controllers) 16 GB RAM, 2 Gigabit ethernet Ports,Quad core processors
   - One Dell R360 server (undercloud)
   - 9 Physical Racks
2. Network
   - 6 Dell S6000 switches (spine)
   - 18 Dell s4048 switches (leaf)
   - Cumulus Linux OS
   - Cumulus Quagga Linux Package
3. **OpenStack Distro** : Red Hat OpenStack Platform

Step 1: Design the Network (Cumulus)

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1. Layer 3 networking throughout with Cumulus Liux

2. Scalability using Ansible and Git - Linux all the way down

3. Compute deployment simplicity with Cumulus Quagga Linux Package

4. Dell Open networking Switches with ONIE bootloader

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- Build and provision spine/leafs using Cumulus VX and Ansible
- Deploy 5 Compute Nodes using Redhat OSP-d
- Build Ansible Inventory file from nova list bash script
- Bootstrap compute nodes by building management network
- Run Ansible site playbooks to install Cumulus Quagga and configure nodes to join L3 fabric

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- Reuse all Ansible scripts from virtual and apply to physical
- Deploy Overcloud on 60 Dell R220 node *batches* due to undercloud and controller hardware configuration
- Stop at 300 compute nodes, and 3 controllers
- Create 1000 tenant networks across compute nodes

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- 1000% Linux in the entire rack
- Built and provisioned the network in 15 minutes without proprietary APIs or controllers All Layer 3 network using BBGP Unnumbered, no VLANS(VXLAN), and reduced IP address bookkeeping
- Built overcloud in less than 6 hours with hardware provided
- Network and overcloud deployed only with Ansible,Git,ZTP and RedHat OpenStack Project Director
- Stress test with Rally and analyze with Browbeat

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Worth Pursuing

Moving Forward

The END

References

https://github.com/TralahM
https://twitter.com/TralahM
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