Upgrading SUSE OpenStack Cloud?
Let SUSE Take the Strain…

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AGENDA

• Why Upgrade?
• Challenges with Clouds
• Some Technical Details
• Steps
• Summary
• Questions

Roadmap Information is forward looking and subject to change at any time.
Why Upgrade a Cloud?
You have to with Software

- Things wear out!
- All software is flawed
- All software is weak
- Only way to get advanced features
- Vendors have to move customers to new versions
SUSE: Underpinning Digital Transformation

- **Business-critical Applications**
- **Machine Learning**
- **Internet of Things**
- **Business Analytics**
- **High Performance Computing**
- **Traditional IT & Applications**

**Application Delivery**

- **Container Management**
  - SUSE CaaS Platform
- **Platform as a Service**
  - SUSE Cloud Application Platform

**Software-defined Infrastructure**

- **Private Cloud / IaaS**
  - SUSE OpenStack Cloud
- **Compute**
  - Virtual Machine & Container
- **Storage**
  - SUSE Enterprise Storage
- **Networking**
  - SDN and NFV
- **Multimodal Operating System**
  - SUSE Linux Enterprise Server

**Physical Infrastructure**: Multi-platform Servers, Switches, Storage

**Services**

- SUSE Global Services
- Consulting Services
- Select Services
- Premium Support Services

**Open, Secure, Proven**
### SUSE OpenStack Cloud Lifecycles

<table>
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<tr>
<th></th>
<th>Newton 10/2016</th>
<th>Ocata 02/2017</th>
<th>Pike 8/2017</th>
<th>Queens 2/2018</th>
<th>Rocky 8/2018</th>
<th>Stein</th>
<th>Train</th>
<th>U</th>
<th>V</th>
<th>X</th>
<th>Y</th>
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- **SUSE OpenStack Cloud 7 (Newton)**
  - GA 3/2017 - EOS 12/2019

- **SUSE OpenStack Cloud 8 (Pike)**
  - GA 05/2018 - EOS 05/2021

- **SUSE OpenStack Cloud 9 (Rocky)**
  - GA 04/2019 - EOS 04/2022

- **SUSE OpenStack Cloud 10 (Train)**
  - GA 1H/2020 - EOS 1H/2023

**Upstream**

- Newton 10/2016
- Ocata 02/2017
- Pike 8/2017
- Queens 2/2018
- Rocky 8/2018
- Stein
- Train
- U
- V
- X
- Y
- Z
SUSE OpenStack Cloud + Enterprise Storage Lifecycle

**2017**
- **SUSE Enterprise Storage 4**
  - GA 12/2016 – EOS 09/2019
- **SUSE OpenStack Cloud 7 (Newton)**
  - GA 3/2017 - EOS 12/2019

**2018**
- **SUSE Enterprise Storage 5**
  - GA 10/2017 – EOS 09/2020
- **SUSE OpenStack Cloud 8 (Pike)**
  - GA 05/2018 - EOS 05/2021

**2019**
- **SUSE Enterprise Storage 6**
  - GA 05/2019 – EOS 09/2021
- **SUSE OpenStack Cloud 9 (Rocky)**
  - GA 03/2019 - EOS 03/2022

**2020**
- **SUSE Enterprise Storage 7**
  - GA Q2 2020 – EOS Q3 2023
- **SUSE OpenStack Cloud 10 (T)**
  - GA 1H/2020 - EOS 1H/2023

**2021**

**2022**

**OpenStack Releases Qualified with Storage Versions during Lifecycle**

- Works with SES 3,4
- Works with SES 4,5,6
- Works with SES 5,6,7
- Works with SES 5,6,7
- Works with SES 5,6,7
Futures – Themes for SUSE OpenStack Cloud

- Simplify Day 2 Operations
- Add more Networking Capabilities
- Containerized Components
- Standardized Monitoring Capabilities
- Support for Emerging Technologies
SUSE OpenStack Cloud

### 2018
- **Built On**
  - OpenStack Pike Release
  - SUSE Linux Enterprise Server 12 SP3
- **New or Expanded Services**
  - SUSE CAP Integration
  - Physical Server as a Service (Ironic)
  - SDN Support for NSX-V
  - Dual lifecycle manager options
- **Operational Enhancements**
  - Non-disruptive Upgrade to Cloud 8
  - Planning and Pre-install Validation
  - Simple Deployment UI
  - Scale Testing 200 nodes
  - Monitor Capacity and Performance
  - 3-year support
- **8 Updates**

### 2019
- **Built On**
  - OpenStack Pike Release
  - SUSE Linux Enterprise Server 12 SP3
- **New or Expanded Services**
  - SDN Support for Juniper
- **Operational Enhancements**
  - Lifecycle Tools Improvements
  - mkcloud support
  - SES Integration
- **9 Updates**

### 2020
- **Built On**
  - OpenStack Rocky Release
  - SUSE Linux Enterprise Server 12 SP4
- **New or Expanded Services**
  - Containerized Control Plane**
  - Contrail
  - SDN Support for NSX-T
  - SDN Support for Cisco ACI
- **Operational Enhancements**
  - IPV6 Support
  - Policy-based Optimization**
- **9 Updates**

### 2021
- **Built On**
  - OpenStack Train Release
  - SUSE Linux Enterprise Server 15
- **New or Expanded Services**
  - Containerized Control Plane
  - Accelerator Engine Support
- **Operational Enhancements**
  - Multiple Site Enhancements
  - DR Enhancements
  - Root Cause Detection/Analysis/Repair
  - Kubernetes Networking Configurations
  - Workflow Automation
- **10 Updates**

**Items are tech preview
* Information is forward looking and subject to change at any time.
Challenges with Cloud?
BUT Upgrades = DANGER!

- OpenStack is notoriously difficult to upgrade
- Involves hardware, Linux, Hypervisors and Cloud
- With SUSE, this is EVEN more complex
  - Account for storage
  - Account for networking
- Support for Emerging Technologies, services on top?
- Clouds can become Huge!
Never Fear: SUSE Is Here!

- We simplify complexity
- SUSE can support the whole STACK!
- SUSE has experience with supporting upgrades
- SUSE commits to making the process as supportable as possible
- SUSE provides automation were possible
Some Technical Details
SUSE OpenStack Cloud Upgrades

- SUSE Linux Enterprise Server upgrade (already automated ;0)
- SUSE OpenStack Cloud "leaps" upstream Spring Release
- SUSE works for Non Disruptive upgrade:
  - What is the definition?
  - Some core technologies will change
    - Database from Postgresql => MariaDB Galera cluster
  - Some conditions mandatory
Upgrading SOC: 10,000 Foot View

- HA Setup
  - Pacemaker clusters for services in control plane
  - While a control node is being upgraded, API is provided by rest of cluster
  - Still some elemental downtime while switching to new versions

- Uses Nova live-migrate
  - Clears VM’s from hosts
  - Stops new VM’s being spawned on host
  - Then upgrade packages, reboot, reconfigure and start services
  - And repeat

- SUSE commits to making the process as supportable as possible
- SUSE provides automation were possible
Devil’s in the Detail

- During versions update stage, upgrade procedure defined by SUSE (Please follow!)
- During upgrade, users cannot “manage VM’s”
- Database upgrade SOC7 to 8, so separate step
- Code deals with networking challenge
- Apply latest maintenance update to old version
  - As we leap upstream, some new features mandatory for Live-Migration, so SOC7 needs maintenance update pack to port this
  - Similar issue with cinder online data migration
Home and Dry?

- Well, yes for the control plane
- VM’s are running and they are managed
- Compute nodes need Linux, hypervisor and Nova upgrades
- This can be delayed:
  - Postpone upgrade available
  - You can group hosts
  - Some caveats*

*Some caveats:
Stairway to Heaven (or at least Pike)

1) Apply updates for SOC and SLES 12 sp2
2) All cloud nodes need to be up and ready
3) All proposals applied
4) Database at MariaDB (HA is healthy) see next slide
5) Run “crowbarctl upgrade prechecks” or use web UI
6) Manage cinder or ceph if highlighted as issue by pre-checks
7) Remember to purge db’s nova, cinder and heat
8) Run upgrade again via UI or CLI
Database Migration…

1) SUSE Created python tool: python-psql2mysql
2) Run script: /opt/dell/bin/prepare-mariadb
   (Installed with latest SOC7 maintenance update)
3) psql2mysql --batch /etc/pg2mysql/databases.yaml precheck
4) Run “crowbarctl upgrade prechecks” or use web UI
5) knife ssh roles:dns-client systemctl stop
6) Stop services that hit OpenStack DB’s
7) psql2mysql --batch /etc/pg2mysql/databases.yaml migrate
8) In Crowbar, move db to use mysql backend
9) Start chef-client and kill psql
Lifecycle Upgrade Paths / Unification Plan

- SUSE OpenStack Cloud 10 Containerized Control Plane requires Lifecycle Manager conversion
- Provide migration path in Cloud 9 for both flavors
- Allows single customer conversion to CCP in Cloud 10
- Lifecycle Manager is more aligned with upstream

Cloud 8
- Cloud 8 Crowbar
- Cloud 8 CLM
- HOS 8 CLM

Cloud 9
- Cloud 9 Crowbar
- Cloud 9 CLM
- Cloud 9 CCP Tech PR

Cloud 10
- Cloud 10 CCP
Upgrading SOC

✓ It needs to happen (to get those sexy new features ;0)
✓ SUSE helps with the complexity and danger
✓ Please follow our guides
  (They are detailed and we test against them!)
✓ Do all the preparation asked of you
✓ Running pre-checks and purges will save time and pain!
✓ SUSE treats DB and storage issues separately
✓ You can break up the compute nodes upgrade
Questions??
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