OpenNebula Conference 2014

Bootstrapping a virtual infrastructure using OpenNebula from scratch

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Berlin, 04.12.14
About Arnold Bechtoldt

- IT Systems Engineer at inovex GmbH (Germany)
- Small to large Open Source datacenter management solutions
- High available web-based applications
- Contributing to various Open Source projects
Concept

Requirements

Goal:
- Setup a lightweight hosting platform to run web applications
- Virtual machines (VMs) instead of plain bare-metal
- Infrastructure should be easy to maintain

Outlines:
- Create a new infrastructure from scratch
- Individual VM deployment (Preseed/ Kickstart)
- No shared storage available (yet)
- Small network bandwidth (2 x 1 GigE per node)
Concept

Network Topology
Concept
VM Deployment

OpenNebula
(VM Management)

1. VM Creation

OpenNebula
(VM Management)

Foreman
(Provisioning + ENC)

2. „Host“ Creation

3. DHCP/ Preseed

4. VM Netinstall

5. Software Install

6. Orchestration

SaltStack
(Cfg Mgmt + Orchestration)

(7. Scaling)
Concept

Challenges

Storage:
- HW-RAID 10
- QCOW2 VM disk images
- Creation of disk during VM deployment (custom TM driver)

Networking:
- „Ethernet“ address range in ONE, IPAM by Foreman/ SaltStack
- Open vSwitch (custom VNM driver)
- STP management via VNM driver
- IPSec/ GRE tunneling between compute nodes (MTU 9000)
Pros:
  + Low (cloud) infrastructure requirements
  + High degree of automation (Automate everything!)
  + „Cloud“-like feature set

Cons:
  - No VM live migration due to non-shared storage
  - No experiences in Open vSwitch (GRE) scaling
  - VM deployment takes ~ 10 minutes (deployment + software install)

‣ VM Images vs. individual deployment/ netinstall
‣ DHCP vs. OpenNebula contextualization
‣ IPAM in OpenNebula vs. Foreman vs. Salt
‣ Pets vs. cattles
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