Bringing DevOps to Networking With Ansible

Automate your network operations

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MANAGING NETWORKS HASN’T CHANGED IN 30 YEARS.
WHY HASN’T NETWORKING CHANGED?

PEOPLE
- Domain specific skillsets
- Vendor oriented experience
- Siloed organizations
- Legacy operational practices

PRODUCTS
- Infrastructure-focused features
- Baroque, CLI-only methodologies
- Siloed technologies
- Monolithic, proprietary platforms
Traditional Network Operations

- Legacy culture
- Risk averse
- Proprietary solutions
- Siloed from others
- “Paper” practices, MOPs
- “Artisanal” networks

Next-Gen Network Operations

- Community culture
- Risk aware
- Open solutions
- Teams of heros
- Infrastructure as code
- Virtual prototyping

COMMIT, VERIFY, CHECK
WHY AUTOMATE YOUR NETWORK?

It’s your single source of truth
• Backups/restores can be automated
• Changes can be incremental or wholesale
• Manage “golden” versions of configurations

Configuration management and verification

Ensure an on-going steady-state
• Daily, weekly, monthly scheduled tasks
• **Information / Inventory Retrieval and Configuration**
  – Ad hoc or bulk Iteration over specific network segments
  – Credential management with Tower Vault

• **State Checking and Validation**
  – Compare running configs to desired configs

• **Continuous Compliance**
  • Combining stateful validation with schedules
  • Logging and Aggregation
NETWORK CI WORKFLOW

1. Check Out Branch

2. Monitors repository for changes
   - Notifies of pass / fail
   - Notify of PR
   - Ansible Playbook

3. Make Changes
   - Check In Branch / Create PR
   - Pulls new Playbooks
   - Notifies of deployment

4. Merge Branch
   - Deploy Playbooks
NFV USE CASE

Classical Network Appliance Approach

- Message Router
- CDN
- Session Border Controller
- WAN Acceleration
- DPI
- Firewall
- Carrier Grade NAT
- Tester/QoE monitor
- SGSN/GGSN
- PE Router
- BRAS
- Radio/Fixed Access Network Nodes

- Fragmented non-commodity hardware.
- Physical install per appliance per site.
- Hardware development large barrier to entry for new vendors, constraining innovation & competition.

Independent Software Vendors

- Orchestrated, automatic & remote install.

- Standard High Volume Servers
- Standard High Volume Storage
- Standard High Volume Ethernet Switches

Network Functions Virtualisation Approach
JUNE 22

#ANSIBLEFEST
LONDON
2017
ANSIBLE @ ansible.com/summit

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ENSURING INTEROPERABILITY ACROSS RED HAT PRODUCTS

Managing your open hybrid cloud

Mike Amburn Dixon, Senior Principal Product Manager
Steven Huels, Senior Manager

April 3, 2017
Ensuring Interoperability

1. Consolidated funnel for defining interop requirements & test scenarios
2. Automated, continuous verification & reporting platform
3. Intuitive, trusted, up-to-date knowledge resources
Validating Product Interoperability

Continuous Integration Workflow

**Interop Requirements Definition**
Collect and categorize product interoperability requirements across multiple product releases

**Integration Scenario Definition**
Define product releases, product interoperability requirements, and architectures to validate

**Interop CI Execution**
Execute automated product deployment, configuration, and validation

**Integration Test Results**
Aggregate logs and results for analysis and report results back to stakeholders
Integration & Interoperability Testing Platform

- Interoperability Requirements
- Test Scripts

- Use Scenarios

- Interoperability Results
  - Test case results
  - Error logs
  - Console logs
  - Product logs
  - SOS reports

- Integration CI Testing Engine

What we expect to work together

What we have verified to work together
The Cloud Deployment Planner
A visual tool to determine compatibility across hybrid cloud products

Build your hybrid cloud solution

View interoperability information

View product lifecycles
LOG AGGREGATION

To better manage your Red Hat footprint

Miguel Pérez Colino
Strategic Design Team - ISBU
2017-05-03

@mmmmmmm
Agenda
Managing your Red Hat footprint with Log Aggregation

- The Situation
- The Challenge
- The Solution
THE SITUATION
Cloud Deployments

They do really scale ...

- Higher scalability
- More workloads per physical machine (multi-tenant)
- Network and Storage also Software Defined
- Containers and Microservices providing more granularity

Cloud Deployment

Act as one single thing ...

... and need to be managed and operated as one

Source: https://commons.wikimedia.org/wiki/File:Auklet_flock_Shumagins_1986.jpg
THE CHALLENGE
Data (What)

Data + Information flow in Log Aggregation

Derived from: [http://www.dataintensive.info/](http://www.dataintensive.info/)
Personas (Who)

That can use Log Aggregation

- **Developer**
  - App Analysis & Debug

- **User / Marketing**
  - Access to stats

- **Security Engineer**
  - Sec Analysis, Audits

- **IT Manager**
  - Access to aggregated data, i.e. SLA, usage

- **Log Aggregation**
  - Provides Events, Consumes Logs

- **Monitoring**
  - Root Cause Analysis

- **Cloud Ops**
  - Service Designer

- **Service Designer**
  - Access to aggregated data

- **Developer**
  - Monitoring

- **Security Engineer**
  - Cloud Ops

- **IT Manager**
  - Developer

- **User / Marketing**
  - Security Engineer

- **Cloud Ops**
  - User / Marketing

- **Service Designer**
  - Cloud Ops

- **Security Engineer**
  - Service Designer

- **User / Marketing**
  - Service Designer
Personas (Motivation)
That need Log Aggregation

“Application (multi-tiered) launched from CloudForms returns error”

Cloud Suite User

“User reports that their VM request failed and returned error”

Cloud Ops (OpenStack)

“I want to proactively know about active or potential degradation of service”

Cloud Ops (Apps)

“My recent commit resulted in Jenkins test failure”

Developer (OpenShift)
Situational Awareness (Why)
Or the need of it

Source: https://en.wikipedia.org/wiki/Situation_awareness
THE SOLUTION
Architecture

Proposed General Architecture

- **Host**
- **Collector**
- **Message Client**
- **Normalizer**

Legend:
- **C**: Collector
- **M**: Message
- **C**: Collector
- **N**: Normalizer

Real Time Analytics and Response

Data Store

General Visualization

Archive

Slide Credit: Tushar Katarki
[@tkatarki]
Implementation

Introduction to EFK

Log Source → Fluentd → ElasticSearch → Kibana

- TCP/UDP
- HTTP
- File: Text
- Stdout: CSV, JSON, MessagePack
- syslog/journal

- Parsing
- Filtering
- Enriching
- Deleting
- Output Buffering

Index and store data and metadata making search fast and reliable

User Interface for:
- Search
- Graph
- Dashboard

Slide Credit: Tushar Katarki
[@tkatarki]
Current Status

Being delivered and supported

**OpenShift Container Platform 3.5**
- Full EFK stack provided as containers

**OpenStack Platform 10**
- Fluentd as log collector

**Red Hat Virtualization**
- Coming Soon!

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Diagram Credit: Tushar Katarki [@tkatarki]
BEYOND ...
Common Data Model
To ensure integration and interoperability

What Is It?
● A Data Model for Logs (and other data) to identify and tag data (i.e. log fields)

Why?
● Alignment/Correlation with different RH products
● Improved maintainability of Data
● Better presentation/data consumption
● Enables 3rd party ecosystem
● Facilitates deep learning analysis of data
Common Data Model

Example ...

Data extracted:
- Container name
- Pod name
- Namespace name
- Docker container ID

K8S data queried:
- Pod UID
- Pod labels
- Pod host
- Namespace UID.

All merged into output log in JSON Format

Images Credit: Anton Sherkhonenov [@PEATZ]
User Experience

Prototyping and validating dashboards for users

Slide Credits: Peter Portante & Vince Conzola
Exploring different approaches
Prototyping with alternative toolsets with partners

Slide Credits: Luca Rosellini (Keedio)
ACTION!
Do you want to know more?
See a demo of EFK ...

Red Hat booth @ Expo Center
DevSecOps Zone
Security Pod

Tushar Katarki
User Experience
Tell us your use cases ...

Vince Conzola

Are you a Red Hat Cloud Infrastructure customer interested in improving operations with log aggregation? If so, we'd love to talk with you about your environment and use cases.

Visit the User Experience Design booth located in:
Partner Pavilion
Exhibit Hall A

Pair up with us + share your feedback with
Vince
to receive a gift!

Learn about the Red Hat UXD team at redhat.com/uxd
How are you doing it?
Please, provide your feedback ...

Red Hat Virtualization Analytics - Transitioning to Metrics Store

Yaniv Dary
Senior Technical Product Manager, Red Hat

Shirly Radco
BI Software Engineer, Red Hat

May 2017
RED HAT VIRTUALIZATION OVERVIEW

DATA CENTER 1

CLUSTER A

VM
VM
VM

Hypervisor
Hypervisor

Storage
Network W

DATA CENTER 2

CLUSTER B

VM
VM
VM

Hypervisor
Hypervisor

Storage
Network X

DATA CENTER 2

CLUSTER C

VM
VM
VM

Hypervisor
Hypervisor

Network Y
Network Z
DATA ANALYTICS IS MOVING FORWARD

NEXT-GENERATION ANALYTICS
New ways for real-time metrics and Logs data collection and storage

ADVANCED MONITORING PLATFORM
Modern visualization and alerting for time series data and logs

SMART MANAGEMENT
Trigger actions according to metrics and logs roles and thresholds
METRICS AND LOGS - COLLECTION FLOW
RHV DATA COLLECTION - ARCHITECTURE

Red Hat Virtualization

- RHV Manager
- RHV-H(1)
- RHV-H(2)
- RHV-H(3)
- RHV-H(n)

Collectd → Fluentd → Metrics Store

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**RHV DATA COLLECTION - ARCHITECTURE**

- **collectd**
  - Simple and powerful daemon that gathers metrics from various sources

- RHV Manager

- RHV-H(1)
- RHV-H(2)
- RHV-H(3)
- RHV-H(n)

- Host Statistics
- VM Statistics
- PostgreSQL Statistics
RHV DATA COLLECTION - ARCHITECTURE

**collectd**
Simple and powerful daemon that gathers **metrics** from various sources

**fluentd**
Data collector that unifies the **metrics** and **logs** data

RHV Manager

**RHV-H(1)** **RHV-H(2)** **RHV-H(3)** ... **RHV-H(n)**
RHV DATA COLLECTION - ARCHITECTURE

Simple and powerful daemon that gathers metrics from various sources.

`collectd`

Data collector that unifies the metrics and logs data.

`fluentd`

Metrics Store

Visualize trends in real time, slice and dice your data on the fly.

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RHV DATA COLLECTION - ARCHITECTURE

RHV Manager

RHV-H(1)  RHV-H(2)  RHV-H(3)  ...  RHV-H(n)

ANSIBLE

by Red Hat®
RHV DATA COLLECTION - ARCHITECTURE

RHV Manager

RHV-H(1)  RHV-H(2)  RHV-H(3)  ...  RHV-H(n)

fluentd  fluentd  fluentd

elasticsearch  kibana

Metrics Store

RED HAT
VIRTUALIZATION

OPENSHIFT
THANK YOU

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LEARN. NETWORK. EXPERIENCE OPEN SOURCE.