SONA
SDN based OpenStack/Kubernetes Network Management Solution

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2018. 10. 17
Why SONA?

- Limitation of Neutron network
  - Limited visibility of VM traffic
  - Limited scalability of network node
SONA (Simplified Overlay Networking Architecture)

- **SONA**: Overlay Network Management Solution for SDDC
  - ONOS based Virtual Network Management solution (support **VxLAN, VLAN, FLAT**)
  - Empowered by **SDN controller**, a better **replacement** of neutron, **scalable gateway**
  - Fully compatible with **OpenStack** (ocata, pike, queens, rocky)
SONA (Simplified Overlay Networking Architecture)

- Integration with OpenStack
  - OpenStack neutron
    - Plugin: modular layer 2 plugin
  - networking-onos
    - ONOS L3 plugin
    - Drivers for LBaaS, FWaaS, etc.
  - SONA
    - Northbound interacts with networking-onos
      - https://github.com/openstack/networking-onos
    - Southbound protocol
      - OpenFlow: install/uninstall flow rules
      - OVSDB: configure OpenvSwitch
        - Add/delete virtual port
        - Create/delete bridges (e.g., br-int, etc.)
SONA Features

- Direct East-West Communication
SONA Features

• Scalable Gateway
SONA Features

- UI based flow tracer
SONA Features

- vFlow Statistics
  - Collect VM to VM **real-time flow statistic**
  - Stats collection is realized using **OpenFlow** standards protocol (no extra overhead!)
  - **Seamless integration** with monitoring systems through various NBIs
    - REST, Kafka, gRPC, influxDB, etc.
  - Realized through **OpenstackTelemetry** app
  - **No additional software installations** are required at OpenStack side
  - **No additional hardware installations** are required at compute/control node
  - **Open source!**
SONA Features

• vFlow Statistics (Grafana UI)
SONA Features

• vTap
  – Mirror VM to VM **real-time traffic**
  – Leverage OVS’s traffic mirroring feature
  – Two traffic mirroring schemes
    • Port-based: specific to OVS
    • Flow-based: uses OpenFlow group table
  – Realized through **OpenstackTelemetry** app
  – **No additional software installations** are required at OpenStack side
  – Further **improve** the mirroring performance by leveraging data plane acceleration technology
  – **Open source!**
SONA Features

- Smart NIC Gateways
  - Replaces network node with Smart NIC

SmartNIC

East-West Traffic

North-South Traffic

OpenStack

Nova
Neutron

Provisions virtual machine

br-int (OVS)
nova-compute
Hypervisor
Compute-01

br-int (OVS)

SONA(ONOS)
OpenStackNode
OpenStackNetworking
OpenStackNetworking UI

Sets Switching/Routing flow rules
Sets NAT flow rules

Gateway Node Group

br-int (OVS)
br-int (OVS)

L2 Connection

Internet
SONA Features

- Smart NIC Gateways

<Liquid I/O Full Offloading Architecture>
SONA CI/CD

- Continuous Integration (CI)
  - Fetch latest SONA source
  - Build against stable ONOS
  - Run unit test
  - Package & deploy SONA
  - Run integration test
  - Notify the CI result via slack
  - Deliver SONA container

https://hub.docker.com/r/opensona/onos-sona-nightly-docker/
Deployment using Kubernetes

SONA Armada Chart

SONA helm Chart
ONOS yaml file
ONOS
ONOS
ONOS
yam file
Cluster manager

OVS helm Chart
yam file
OVS switch
OVS DB
Deployment using Kubernetes

Helm chart

SONA images

GitHub

schema: armada/Chart/v1
metadata:
schema: metadata/Document/v1
name: sona-chart
data:
......
values:
onos:
node_selector:
key: nodetype
value: control
hostNetwork: true
source:
type: git
location: https://tde.sktelecom.com/stash/scm/cloudvim/sona-helm
subpath: sona
reference: master
dependencies: []
Kubernetes Network Management

- Present
Kubernetes Network Management

- Future

- Ingress
- Service

- DPA

- SR-IOV
Open Source Contribution

• **Open Source Strategy**
  – 100% open source
  – 136 commits were upstreamed in 2018 (2018.01 ~ now)
    • [https://gerrit.onosproject.org/#/q/project:onos+branch:master+topic:sona](https://gerrit.onosproject.org/#/q/project:onos+branch:master+topic:sona)

• **Helps from Community**
  – More tests and feedback from community
  – Code contributions are always welcomed :)

• **Wiki**
  – [https://wiki.onosproject.org/display/ONOS/SONA%3A+DC+Network+Virtualization](https://wiki.onosproject.org/display/ONOS/SONA%3A+DC+Network+Virtualization)

• **Slack Channel**
  – #sonaproject @ onosproject.slack.com
Helion Openstack and SONA

SONA is available on Helion/SUSE OpenStack commercially.

- SKT driven SDN controller
  Years of Telco Experience melted in to SONA

- Production ready Helion Openstack
  Deployed to many customers

- Proven Management and Life Cycle
  HOS supporting all types of MNG workflow

- Stable HPE Hardware
  Stable performance with hardware support

Triangle of Solutions

< referenced from Helion/SONA materials from HPE >
SKT’s Use Case

- T-MANO & SONA

T-MANO

NFV Orchestrator

Generic VNF Manager

Cloud Native VIM

Cloud Network

Data Plane Acceleration

Monitoring

ETSI NFV Architecture
Conclusion

- SONA (Simplified Overlay Networking Architecture)
  - SDN based OpenStack & Kubernetes Network Management Solution
  - Direct East-West Communication
  - Scalable & Smart NIC Gateways
  - vStatistics
  - vTap
  - CI/CD pipeline
  - Deployment using Armada & Helm Chart
  - Now available on Helion/SUSE OpenStack commercially
  - But, 100% Open Source
THANK YOU