JUNIPER SDN/NFV

UBS – State of SDN Conf Call

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ANKUR SINGLA, VP/GM – CLOUD SOFTWARE
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<th>CONFIGURED, MANAGED</th>
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JUNIPER SDN SOLUTION BY DOMAINS

Orchestration, Automation (APIs) and Policy Management

SP IaaS, VPC (CONTRAIL)
- Managed Cloud Services
- L3VPN extension into DC’s
- Intra, Inter-Domain Orchestration
- Multi-tenancy

CORE (NORTHSTAR)
- Global Optimization for TE (WANDL)
- Policy-based BW Allocation
- Traffic Analytics

EDGE NFV (CONTRAIL OPENSTACK)
- Virtualized Network Functions
  - Juniper Services ...
  - 3rd Party/Best of Breed
- Service Chaining
- MX/vMX Service Control GW

PRIVATE CLOUD (CONTRAIL)
- Network Virtualization
- Multi Hypervisor/Orchestrator
- Agility in Service Insertion
- MX & QFX – SDN Gateway

2013
2014
2014
2013
**NORTHSTAR FOR CORE TRAFFIC ENGINEERING**

**SOFTWARE-DRIVEN POLICY**

**ANALYZE**
- Topology Discovery
  - Routing
    - IGP-TE: (ISIS, OSPF)
    - BGP-LS
      - One session per AS
    - PCEP – LSP discovery

**OPTIMIZE**
- Path Computation
  - Algorithms
  - Custom Algorithms
    - PCEP
      - Install traffic engineered LSP
      - One session per head node

**PROVISION**
- Path Installation
  - PCEP
  - Netconf/YANG
    - May include: BGP, DMI, I2RS
    - Other state injection methods

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**RSVP Signaling**

**REST API**
CONTRAIL – NETWORK VIRTUALIZATION & NFV

AUTOMATION & ANALYTICS

NETWORK PROGRAMMABILITY

NETWORK FUNCTION VIRTUALIZATION (Multi-vendor Services/HW)

NETWORK VIRTUALIZATION (Multi-vendor Hardware)
CONTRAIL COMPONENTS

- **vRouter**: Virtualized routing element handles localized control plane and forwarding plane work on the compute node.
- **Gateway**: MX Series (or other router) as gateway eliminating need for SW gateway & improving scale & performance.
- **VM**: Virtual Machine
- **Physical Host with Hypervisor**

Accepts and converts orchestrator requests for VM creation, translates requests, and assigns network.

Interacts with network elements for VM network provisioning and ensures uptime.

Real-time analytics engine collects, stores and analyzes network elements.

2013

CloudStack

OpenStack

Microsoft System Center

VMware

2014+

Physical Network (no changes)
KEY FEATURES

- Multi-tenant Routing Switching
- IPAM, Virtual DNS
- Load Balancing
- Security
- 3rd Party Network Services
- Gateway Services
- Rich Analytics
- Service Chaining
- High Availability
- API Services
CONTRAIL ORCHESTRATION CHOICES ...

- Amdocs
- IBM: SmartCloud Orchestrator
- Redhat Openstack (RHOS)
- Canonical Openstack
- cloudscaling: OCS Openstack
- Mirantis: Mirantis Openstack, Fuel
- Enovance
- Piston Openstack

2014: VMware
2015+: Microsoft System Center 2012
WHAT MAKES CONTRAIL UNIQUE …

1. **PERFORMANCE:** vRouter provides Multi-tenant Routing, Switching, Firewall, and Load Balancing

2. **SCALABILITY:** No Shared State or Per Flow Computation

3. **AVAILABILITY:** vRouter connects with Multiple Control Plane without Shared Database

4. **INTEROPERABILITY:** with multi-vendor physical infrastructure for investment protection

5. **INTER-CLOUD:** Virtual Network across DC, AWS VPC API Compatibility for Hybrid Cloud

6. **ANALYTICS:** Application and Network state for Rich Diagnostics, Reporting …
USE-CASE 1 – LARGE SAAS VENDOR
Secure, Distributed, Multi-tenant Private Cloud

Customer Needs
- Production & Test-Dev on Common Infrastructure
- Legacy Data-store & Bare Metal Hardware Integration
- On-demand service creation and dynamic resource scaling
- Automated & Auditable Security Service Insertion
- Distributed Cloud for Resilience, DR, Data-locality, and Latency

Solution Description
Contrail enabling a private cloud infrastructure for Big Data application development and deployment

1. Network Virtualization using Contrail Overlay & QFX GW
   - L3 routing in underlay to the top of rack switch
   - Virtualized (Compute) and bare metal (Hadoop) servers

2. Juniper MX / SRX, F5 Load Balancer
   - MX as DC Interconnect & Inter-cluster or Internet Gateway
   - Physical SRX used as a Perimeter Firewall

3. Centralized security policy definition, distributed enforcement
   - Centralized policy definition using FWaaS APIs
   - Security policy enforcement at vRouter and/or vSRX

4. Self-provisioned service / app deployment
   - Controlled migration of apps from test/dev to production
   - Seamless integration of new features / apps
USE-CASE 2 – LARGE MOBILE SP

Virtualized Evolved Packet Core

**Customer Needs**
- Reduce operational and capital costs to run services in mobile core
- Simplify management of mobile packet core functions
- Independent scale-out of 2G and 3G data path
- Reduce operational expenses in customizing network

**Solution Description**
Contrail SW offers a robust & resilient NFV platform for the mobile packet core functions

1. **NFV Platform (Contrail Openstack)**
   - Overlay Integration with MX Router for HW Offload
   - Virtualized Best of Breed 3rd party SGSN/MME VNF

2. **Reduced TCO**
   - Standard X86/COTS Hardware with KVM + Openstack
   - Automated Scale-out of Service

3. **Simplified Management**
   - API Driven Integration to OSS/BSS – Contrail and Space to centrally service chain network functions

4. **Integration with MX**
   - Programmatic traffic steering on MX from the VNF
   - MX as anchor-point for service chain