

Building an Open, Adaptive & Responsive **Data Center using OpenDaylight**

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Agenda

Where does ODP (& SDN) fit in the bigger picture

Building an ODP-based SDN (SDI) product

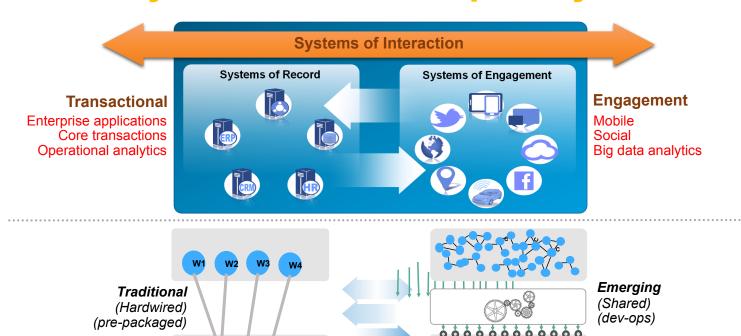
Benefits & Challenges of using ODP for your SDN**

As an End User
As a Software and | or Systems vendor

**Thanks to Dave Meyer for discussions and thoughts on this topic



New Systems & IT Complexity



Single function infrastructure

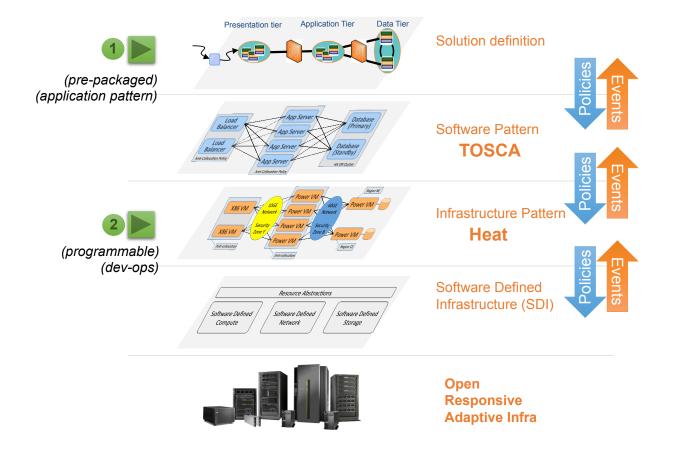
R1 R2 R3

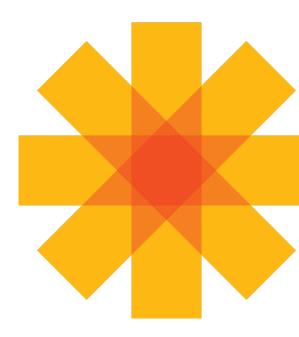
- In-elastic data center
- Simpler consumption model
- Simpler SLA & Security issues
- Highly shared infrastructure
- Agile and Elastic data center
- Complex consumption models
- Complex SLA & Security issues





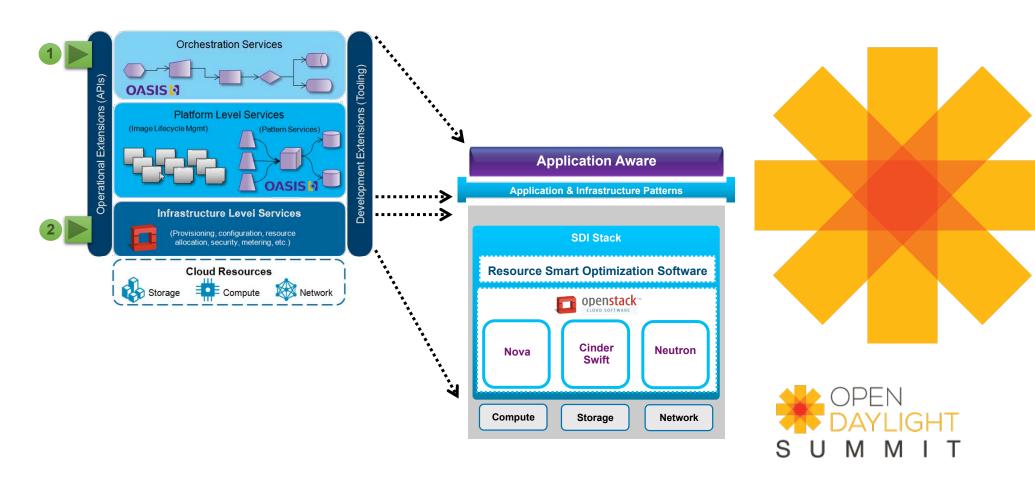
Application Patterns & Consumption Models



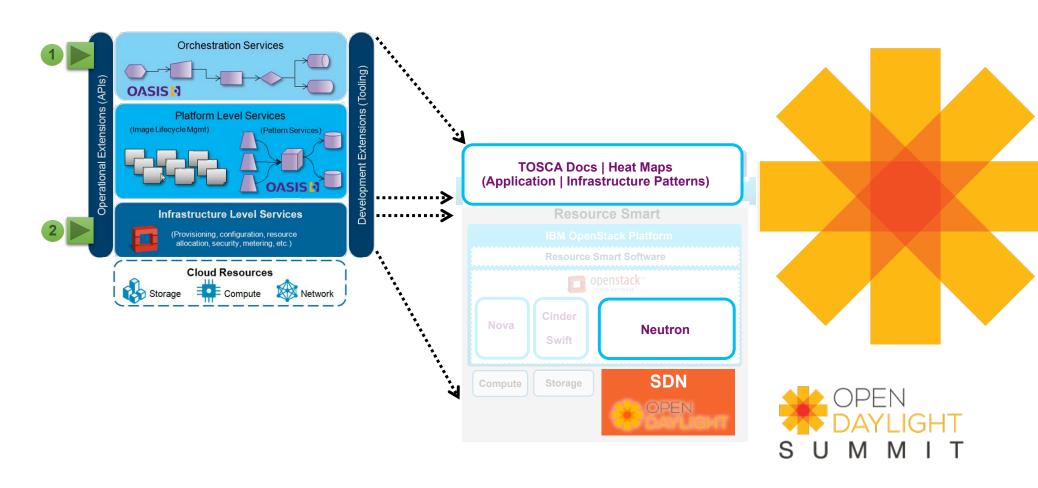




Complete Data Center Software Stack



Complete Data Center Software Stack



Open APIs, Open Standards, Open Source



Client value: Unified, open, interoperable SDN platform to create an ecosystem of automated network services

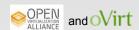
- IBM is a platinum member and active contributor
- Contributing DOVE & other technologies



Client value:

Interoperability, agility, and flexibility through a common cloud computing stack

- 250+ IBMers working on OpenStack
- 10% of Open Stack projects led by IBMers



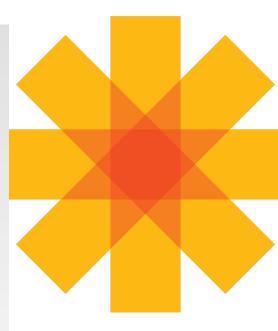
Client value: Enterprisegrade, cost effective, open virtualization alternative

- IBM founding and governing Board member
- OVA moving into Linux Foundation to target broader industry visibility



Client value: Provide cloud users freedom of choice, flexibility, and openness as they have with traditional IT

- 400+ organizations participate
- IBM founding sponsor





Benefits & Challenges: End Users

Benefit: Open Source -

Freedom of choice with no vendor lock-in Ability to build your own services and extensions Power to influence direction Typically less buggy and more secure (no backdoors!)

Benefit: Community-backed Project –

Large vendor community – enough said Large user base – fluid experience sharing Large developer base – easier to find skills

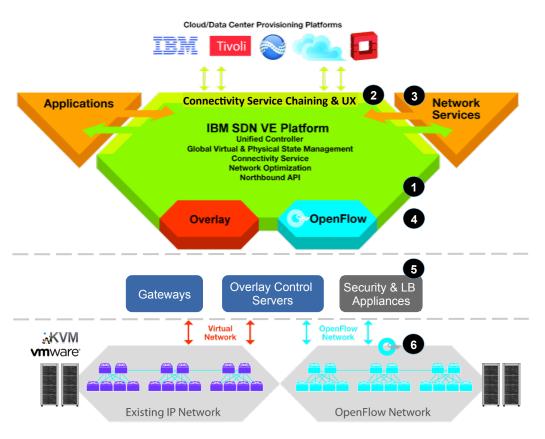






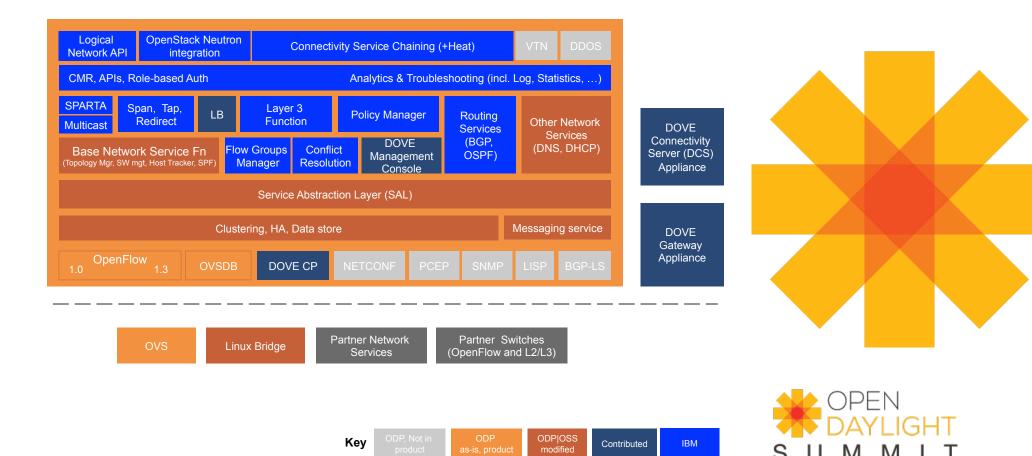


IBM SDN-VE Product Suite

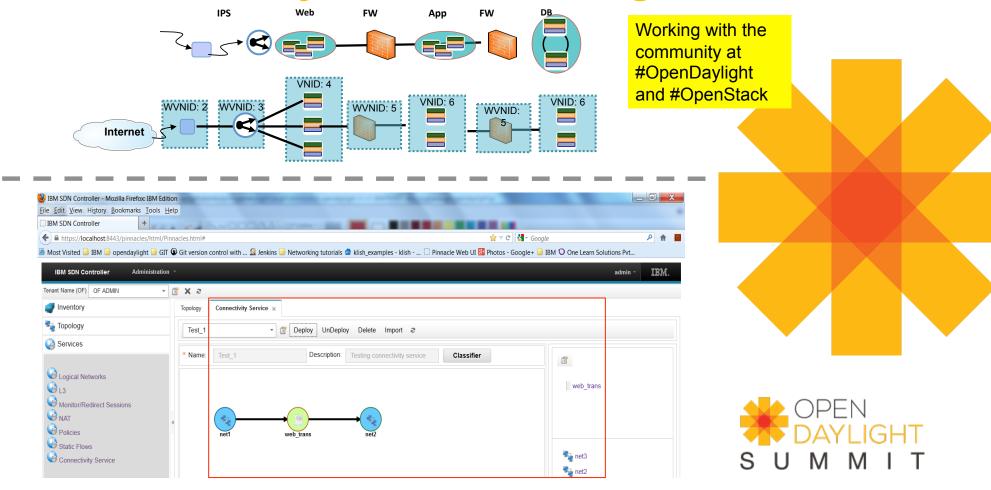


- 1. IBM SDN-VE Platform: Unified SDN controller based on OpenDaylight
- 2. Connectivity Service Chaining & UX: A service chaining framework that eases deployment of application patterns over the networking tier in data centers.
- **3. Network Services:** Routing, OpenFlow, Security and LB services running on the controller
- **4. Network Drivers:** Plug-ins or drivers specific to network technologies
- **5. Virtual Appliances:** Virtual-Physical Gateways; Overlay control servers for end-point mgmt; Security & LB Virtual Appliances that are distributed for scalability.
- **6. Data Plane:** Virtual switches for data forwarding/ routing, as well as agents for HW elements to enable forwarding control via the SDN controller.

Block Architecture & ODP

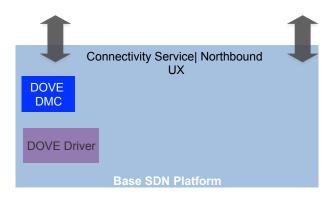


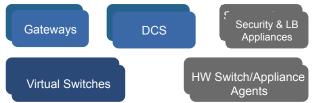
UX: Connectivity Service Chaining



Network Virtualization with Open DOVE

DOVE (Distributed Overlay Virtual Ethernet) is an overlay based network virtualization service that uses VXLAN for the data plane, and OVSDB for interfaces to the physical network. DOVE has 5 main components -





- **DMC**: The DOVE Management Console enable configuration and management of tenants and logical networks and is service running on the controller.
- DCS: The DOVE Connectivity Server is a scale out cluster of virtual appliances that provide address dissemination and management of tunnel end points
- DOVE Gateways: Gateways are either physical HW switches or virtual appliances that enable physical networks/end points to participate in logical networks, or allow for access to the internet.

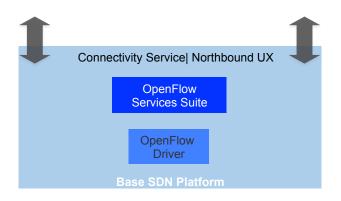
There is ecosystem support for 3rd party security and LB virtual or physical appliances.

 Virtual Switches: These are the data plane forwarding elements that create and terminate tunnel end points and provide the overlay data functionality. They are implemented as part of a hypervisor vSwitch.





Suite of OpenFlow Services



Virtual Switches

HW Switch Agents

The OpenFlow apps will work with any industry-standard OpenFlow implementation on virtual or physical switches.

- Flow Rep. | Span and Tap: To efficiently tap and mirror traffic from points within the network for debugging and troubleshooting large scale networks.
- SPARTA: A scalable per destination multi path service for deployment in L2 Clos topologies that doesn't require new tunnel support in HW.
- Load Balancer: A datacenter wide layer 4 stateless load balancer which works at line rate along with traffic steering capabilities for scaling software appliances such as security, compliance etc. [not in product yet, contributed to ODP]
- Logical Networks: Visually define and deploy multi-tenant virtual networks on an OpenFlow fabric
- Static Flow Pusher: Programming APIs for deploying userdefined OpenFlow rules
- Policy Manager: unified policy framework for managing security rules, ACL, QoS, and service chain policies
- OpenStack Neutron: Plug-in for integration with OpenStack Networking using standard Neutron APIs including extensions for L3 and security groups.
- **Service Chaining:** basic service chaining to support application patterns on OpenFlow networks





Benefits & Challenges: Vendor

Challenge: Productization –

User Experience (UX): Deployment | Usage | Verticals

Test: Interoperability, Scale, Availability

Sync: synchronization issues with upstream code

Benefit: Community-backed Project –

Large user base – fluid experience sharing Large developer base – easier to find skills, solutions

Benefit: Raises the bar –

Large vendor community – competitiveness
Agile developer community – internal process agility
Pushes innovation via community
Improves organizational culture

Benefit: Better Focus –

Focus on customer-driven value Flexible architecture retains corporate value







Thank You

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