SOFTWARE-DEFINED DATA CENTER (SDDC) WORKSHOP

Can you afford to deploy new applications in days or weeks when your competitors can do it in minutes? Are your developers satisfied with the time it takes to move a new application from development through QA and CA to production? Are you able to deploy new releases daily? Are you happy that your development teams prefer public cloud services over internal IT? If you've answered NO to at least one of the questions, it's high time to put Software-Defined Data Center near the top of your priority list.

Now imagine you'd combine virtualized network services with programmable network elements – you'd get highly flexible infrastructure allowing you to deploy, configure and migrate application stacks in minutes, not days or weeks.

Excited? This workshop will tell you how to design a software-defined data center, describe leading products (VMware NSX and Cisco ACI) and document their benefits and shortcomings.

TOPICS COVERED

- The need for Software Defined Data Centers (SDDC)
- SDDC Explained
- Architectural approaches to software-defined networking
- Software-defined network services and virtual appliances
- Software-defined security and virtual firewalls
- Software-defined storage and distributed filesystems
- Product deep dive: Cisco ACI and VMware NSX

See Workshop Contents below for more details.

TARGET AUDIENCE

Network architects, designers and implementation engineers working in environments that are planning, designing or deploying public or private cloud infrastructure based on software-defined data center concepts or products (including VMware NSX and Cisco ACI).

AVAILABILITY

Software-defined Data Centers is a 2-day intensive instructor-led on-site workshop. The workshop can be extended by an extra day dedicated to customer's design challenges or SDDC deployment strategy.

ABOUT THE AUTHOR

Ivan Pepelnjak, CCIE#1354 (Emeritus), has been designing and implementing large-scale service provider and enterprise networks using advanced and emerging WAN and data center technologies since 1990.

Ivan focused on scalability challenges of multi-tenant data center architectures in early 2011, delivered first vendor-independent VXLAN webinar in 2012, presented overlay networking technologies at RIPE and other regional ISP meetings, ran SDDC workshops at Interop and Troopers, and created the first publicly available VMware NSX webinar for VMware in 2013.

Ivan published a book on Overlay Virtual Networking in 2014, and helped large multinational organizations evaluate their SDDC strategies, and plan and design SDDC pilots. He's also author of several Cisco Press books, prolific blogger at blog.ipspace.net and author of a series of highly successful webinars.

WORKSHOP CONTENTS

SOFTWARE DEFINED DATA CENTER

This section illustrates the concepts of Software Defined Data Centers (SDDC) with a real-life example using VMware NSX/VSAN and Nutanix Virtual Computing Platform and describes the following concepts:

- Software-defined Storage
- Software-defined Network Connectivity
- Software-defined Network Services

ARCHITECTURAL APPROACHES TO SDDC NETWORKING (NEW IN VERSION 2.0)

This section describes typical SDDC networking and network services architectures:

- Heavy orchestration of existing data center networking and network services components;
- Hardware network virtualization solutions with virtual appliances or network services insertion;
- Hypervisor-based network virtualization solutions with virtual appliances.

HARDWARE NETWORK VIRTUALIZATION SOLUTIONS (NEW IN VERSION 2.0)

This section describes network virtualization implemented with hardware data center fabrics, from large-scale L2 fabrics (TRILL, FabricPath, VCS Fabric) to overlay solution (VXLAN on Arista EOS, Cisco Nexus 9000) and policy-based architectures (Cisco ACI)

PRODUCT DEEP DIVE: CISCO ACI (NEW IN VERSION 2.0)

Cisco Application Centric Infrastructure is the leading example of hardware-based network virtualization. This section explains:

- Cisco ACI architecture;
- Packet forwarding across Cisco ACI fabric;
- Cisco ACI endpoint groups (EPG) and contracts;
- Service insertion in Cisco ACI.

OVERLAY VIRTUAL NETWORKING DEEP DIVE (UPDATED IN VERSION 2.0)

In the *Overlay Virtual Networking* section you'll discover the architecture and technical details of numerous overlay virtual networking solutions including:

- Multicast-based VXLAN (Cisco Nexus 1000V, VMware vCNS)
- Unicast VXLAN (Cisco Nexus 1000V, VMware NSX)
- VMware NSX for multiple hypervisors (including OpenStack)
- Hyper-V Network Virtualization (Microsoft)
- Contrail (Juniper)

The section covers these deep-dive topics (including detailed packet flows):

- Layer-2 MAC address learning and flooding in overlay virtual networks;
- Connecting overlay networks with the physical world using layer-2 gateways, layer-3 gateways, and virtual and physical appliances;
- Distributed layer-3 forwarding;
- Layer-3 overlay virtual networks.

PRODUCT DEEP DIVE: VMWARE NSX (NEW IN VERSION 2.0)

VMware NSX was the first commercial product implementing the *software defined data centers* paradigm in vSphere and multi-hypervisor environments, including OpenStack- and CloudStack-based deployments.

This section describes the architecture of VMware NSX and its components, NSX principles of operation, and services offered by VMware NSX in vSphere- and open source based clouds.

VIRTUALIZED NETWORK SERVICES (UPDATED IN VERSION 2.0)

After a brief refresher of Network Function Virtualization (NFV) concepts, this section focuses on typical virtual network services use cases, benefits and drawbacks of virtual appliances (as compared to their physical counterparts), performance limitations of virtual appliances, and deployment and management challenges in large-scale environments.

SOFTWARE-DEFINED SECURITY (UPDATED IN VERSION 2.0)

Firewalls inserted between VM Ethernet adapters and virtual switches can drastically change the typical security paradigms, and introduce centrally managed scale-out architectures.

This section describes the common VM NIC firewall architectures (including Cisco's VSG, VMware NSX and Hyper-V-based solutions) as well as service insertion and virtual network tapping solutions.