

DESIGNING LEAF-AND-SPINE FABRICS

(1/2 DAY)

Every data center switching vendor is telling you that leaf-and-spine fabrics are the way to go, and the sales process often focuses only on the required bandwidth and port counts... but unless you're buying a fully integrated black box (example: Cisco ACI), someone has to design the layer-2 and layer-3 aspects of the fabric.

This vendor-independent workshop will:

- Explain the basics of leaf-and-spine fabrics, including ECMP load balancing and oversubscription ratios;
- Help you design your data center fabric regardless of whether you need a layer-2 (VLAN) or layer-3 (routed) solution;
- Give you design guidelines ranging from small (two switches) to very large (hundreds of switches) fabrics.

TOPICS COVERED

The workshop covers these topics:

- Introduction to leaf-and-spine architectures;
- Layer-3 designs;
- Layer-2 designs;
- Mixed layer-2 + layer-3 designs.

INTRODUCTION TO LEAF-AND-SPINE ARCHITECTURES

- Leaf-Spine (or Clos) architectures
- Multi-stage leaf-and-spine fabrics
- Leaf-and-spine design process
- Deployment considerations

LAYER-3 DESIGNS

- Non-redundant and redundant layer-3-only designs
- Routing protocol selection
- Core (leaf-to-spine) link addressing and unnumbered interfaces
- BGP and OSPF design and implementation details

LAYER-2 DESIGNS

- Simple layer-2-only designs using either MLAG or layer-2 fabric technologies
- Layer-2 designs with redundant server connectivity
- Implementation of layer-2 fabrics with overlay virtual networking

MIXED LAYER-2 + LAYER-3 DESIGNS

This section builds on the principles introduced in layer-2 designs and layer-3 designs and describes these typical scenarios:

- Routing on a single spine switch
- Routing on multiple spine switches (multiple active default gateways)
- Anycast spine routing implementation in SPB or TRILL
- Anycast leaf gateways
- Anycast leaf gateways using overlay transport across fabric core
- Layer-3-only fabrics implemented with routed core or overlay transport.

TECHNICAL DEEP DIVES

Workshop attendees get access to *Leaf-and-Spine Fabric Architectures* webinar which includes nine hours of downloadable videos covering the topics described in the workshop as well as:

- BGP enhancements in data center fabrics by Dinesh Dutt (Cumulus Networks);
- Layer-3-only data centers with host routing (Dinesh Dutt)
- Routing on hosts (Dinesh Dutt)
- Shortest Path Bridging technology deep dive by Roger Lapuh (Avaya)
- VXLAN with EVPN control plane by Lukas Krattiger (Cisco Systems)

TAKEAWAYS

After attending this workshop you'll be able to:

- Design physical connectivity in leaf-and-spine fabric;
- Select the hardware used for leaf and spine switches;
- Design IP addressing and select the best IP routing protocol for your fabric;
- Design layer-2 transport across the fabric using layer-2 technologies (MLAG, TRILL or SPB) or VXLAN encapsulation;
- Create mixed layer-2 / layer-3 fabrics.

AVAILABILITY

- Designing Leaf-and-Spine Fabrics is a half-day on-site workshop;
- Detailed version of the same workshop is available as a one-day on-site workshop;
- The workshop can be combined with overlay virtual networking, vendor-specific details, or network automation topics resulting in 2-3 day on-site event tailored to your specific needs.

WHO SHOULD ATTEND

This workshop targets architects and designers who are planning, designing or building next-generation data center fabrics.

ABOUT THE AUTHOR

Ivan Pepelnjak, CCIE#1354 Emeritus, is an independent network architect, book author, blogger and regular speaker at industry events like Interop, RIPE and regional NOG meetings. He has been designing and implementing large-scale service provider and enterprise networks since 1990, and is currently using his expertise to help multinational enterprises and large cloud- and service providers design next-generation data center and cloud infrastructure using Software-Defined Networking (SDN) and Network Function Virtualization (NFV) approaches and technologies.

Ivan is the author of [several books covering data center technologies](#), highly praised [webinars](#), and dozens of [data center](#) and [cloud](#)-related technical articles published on [his blog](#).