

1. What this talk is about?

- * What is Data Centre 3.0?
- * Why Do I Care?
- * Layer 2 Multi-path
- * Data Centre Bridging





2. What is Data Centre 3.0?



The Traditional 3-Tier Design



Virtualisation

- Converged Storage
 - Sensitive to Loss
- * Intra/Inter-Data Centre Failover at Layer 2
 - Extending VLANs across multiple sites
 - Strict latency and capacity requirements
- * Blur between Network and Server
 - * Virtual Switching and Appliances
 - * Blade and Chassis Network Interconnects



Why Do I Care?

- * Your customers will query or request it
- * Your engineers need to understand the new paradigm
- * How does your infrastructure support this?
- * Geek-value





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Spanning Tree

- * "Old Faithful"
- * "Simple" and Effective
- * Cause of much heartache
- * Loop Free Topology by blocking traffic



M-LAG

- * Multi-Chassis Link Aggregation
- * Vendor Specific Implementations
- * Works with your STP environment



Introduction to Data Centre 3.0 **M-LAG** Active Passive Control Plane RIB, OSPF, BGP, Control Plane Traditional "Stack" SNMP Sync Active / Passive Control Plane Optimised Optimised Forwarding Table Forwarding Table Active / Active Data Plane Data / Forwarding * Single Management Device Plane FIB Activ Active eintellego

Introduction to Data Centre 3.0 M-LAG Active Passive Control Plane RIB, OSPF, BGP, Control Plan Traditional "Stack" SNMP Sync Active / Passive Control Plane Optimised Optimised Forwarding Table Forwarding Table Active / Active Data Plane Data / Forwarding Single Management Device Plane FIB



New Style

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- * Active / Active Control Plane
- * Active / Active Data Plane
- * Separate Management Device

Inter Data Centre

- * Could be across the Room or Across the Globe
- * Try to limit Spanning Tree Domains
- * Solutions include:
 - Spanning Tree Tweaks (MST Regions etc)
 - * MPLS
 - * TRILL
 - * 802.1aq SPB
 - * FabricPath and OTV





Diagram Courtesy of Ivan Pepelnjak @ ioshints.info / NIL



Shortest Path Bridging (SPB)

- * IEEE Proposal
 - * 802.1aq
- * Two models
 - * Mac-in-Mac (802.1ah) <-- Recommended
 - * QinQ (802.1ad)
- * No Hop Count
- SPB Region must be contiguous
- Compatible with existing chipsets



FabricPath Support

- * Cisco Proprietary Solution
 - * Sound Familiar?
- * Fabric-Path is loosely based on TRILL
 - * Cisco will support TRILL when it is ratified
- * Has Hop Count
- Complimentary with Overlay Transport Virtualization (OTV)







What is Data Centre Bridging?

- * A series of proposed Layer 2 QoS Standards
- * Designed to address needs of converged networks
- * "Lossless Ethernet"
- Selective traffic control



802.3x - Pause Frames

* Introduced as part of Gigabit Ethernet Standard

* Allows any device to request a "PAUSE" of traffic

* "All or Nothing" approach



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* Priority Flow Control

* Extension of the 802.3X functionality

- * Priority mask and timer value sent with PAUSE Frame
- * Finer grain control of PAUSE requests
- * Watch out for Head of Line Blocking





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802.1Qaz - ETS

* Three QoS Standards

- Strict Priority Queuing (802.1p)
- * Credit-Based Queuing (802.1Qav)
- Enhanced Transmission Selection
- * Hardware must support the three classes to be "ETS Compliant"
- * Data Centre Bridging eXchange (DCBX) Protocol
 - * Control plane protocol
 - * QoS Negotiation across a bridging domain
 - * Bridges and Hosts supported



802.1Qau - QCN

* Quantized Congestion Notification Protocol

Congestion Notification Messages (CNM)

- Bridges monitor output Queues
- * If a queue exceeds a set threshold it sends a CNM
 - * Drop probability
 - * Severity Level to avoid congestion
- * 802.1p Priority Aware

* Fast Recovery to resume sending traffic



Advice?

* Keep an eye on the proposals

- * Carefully consider implications of Vendor Proprietary solutions
- Consider how your existing backbone is going to support these new protocols
- Investigate which product lines from your vendors are supporting (or planning to support) when they become "Standards"



Credits and Thanks

- Ivan Pepelnjak (@ioshints)
 - http://blog.ioshints.info
 - * Webinar series on "Data Centre 3.0 for Network Engineers"
- * Greg Ferro (@etherealmind)
 - * http://www.etherealmind.com
 - * Packet Pushers Podcast (http://www.packetpushers.net)
- * Ron Fuller (@ccie5851)
 - * http://ccie5851.blogspot.com/
 - "NX-OS and Cisco Nexus Switching"
 - * 2nd Edition coming this year!



