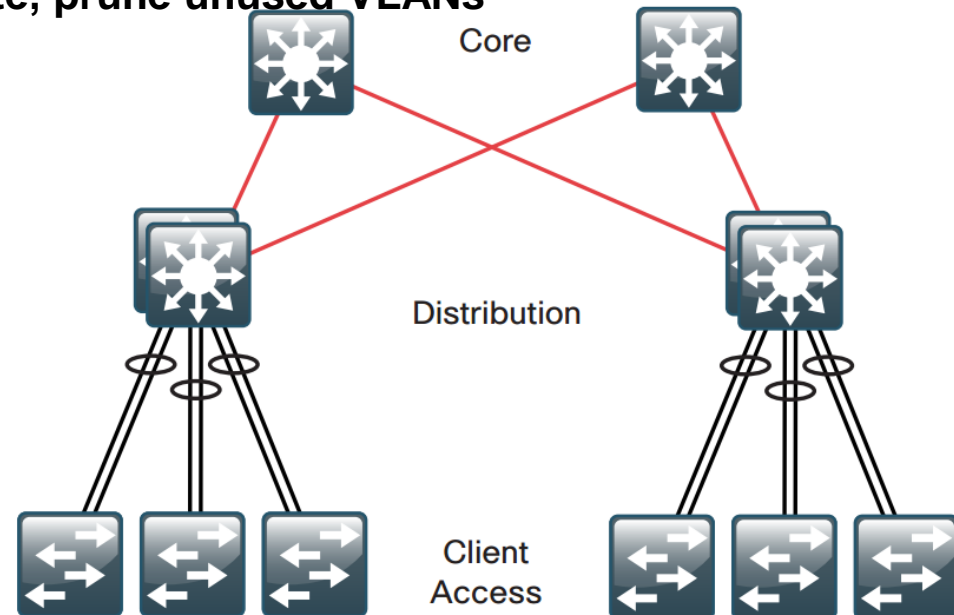


HA Deployment

Tuning the Access Layer

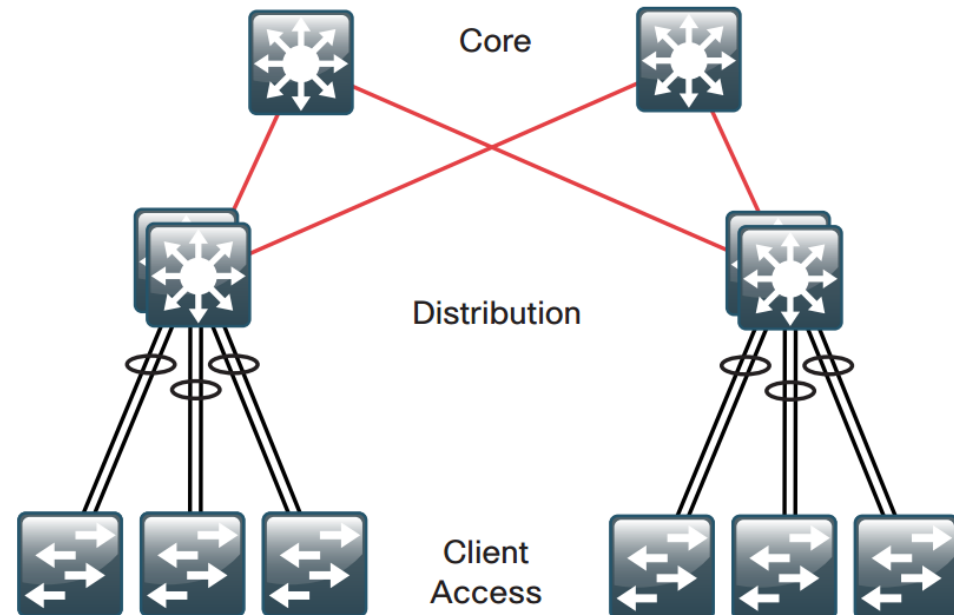
- Use Triangles not squares
- Limit VLANs to a single closet whenever possible
- Avoid STP
- If STP is required, use Rapid PVSTP+
- Set trunks to DTP on/on with no negotiate, prune unused VLANs
- Consider Routing in the Access layer



HA Deployment

Tuning the Distribution Layer

- Use Equal cost links
- Implement summarization when possible
- Use FHRP millisecond timers
- Tune FHRP Preempt timer to prevent Black Hole
- Tune Etherchannel LoadBalancing

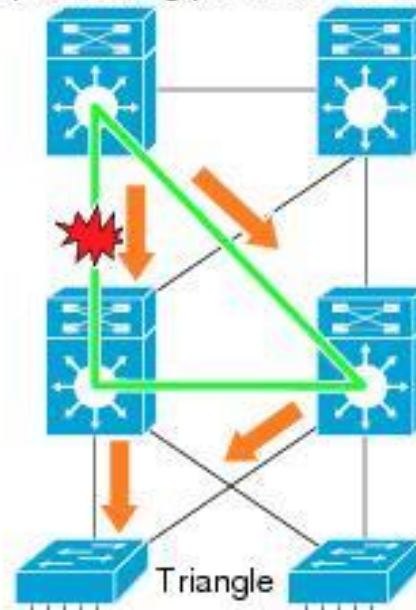


HA Deployment

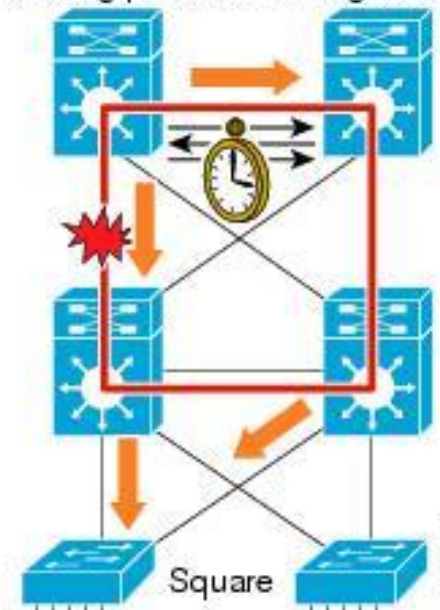
Using triangle Topologies

- Routing Protocols doesn't need to reconverge
- Equal cost paths

Triangles: Link/Box Failure does NOT require routing protocol convergence



Squares: Link/Box Failure requires routing protocol convergence



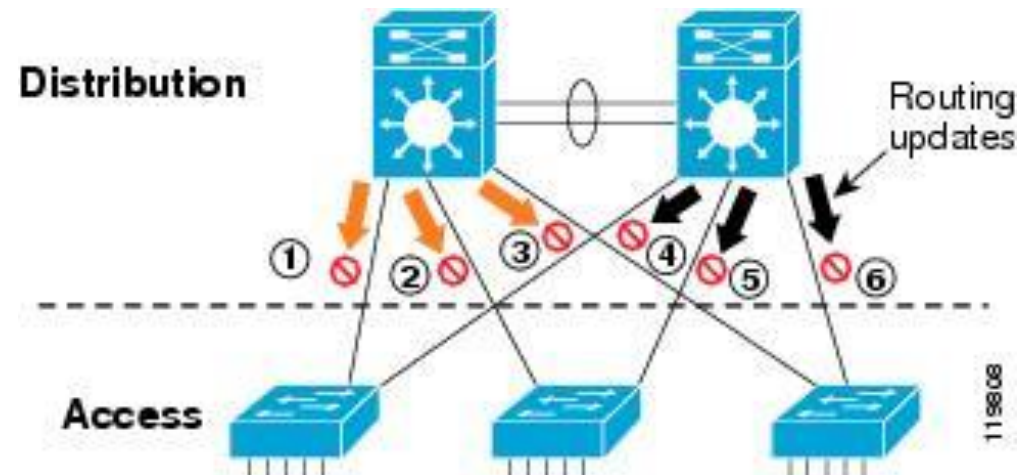
HA Deployment

Limit IGP Peering to the interconnect

- Use Passiv interfaces to the Access Layer
- Decreased CPU utilization
- Better security

```
router eigrp 1
```

```
passive-interface Vlan 99
```



HA Deployment

CEF Loadbalancing

- Make sure loadbalancing is done on as many bits as possible
- Most devices support different loadbalancing techniques
 - Ip-src/ip-dst/ip-src-dst
 - Mac-src/mac-dst/mac-src-dst
 - Port-src/port-dst/port-src-dst
- L2 Mac-Src
 - MAC address XXXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXX00 = Link 0
 - MAC address XXXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXX01 = Link 1
 - MAC address XXXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXX10 = Link 2
 - MAC address XXXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX-XXXXXX11 = Link 3
- L3 IP-dst-src
 - Source IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX0 XOR Destination IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX0 = link 0
 - Source IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX0 XOR Destination IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX1 = link 1
 - Source IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX1 XOR Destination IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX0 = link 1
 - Source IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX1 XOR Destination IP XXXXXXXX.XXXXXXX.XXXXXXX.XXXXXXX1 = link 0

HA Deployment

CEF Loadbalancing

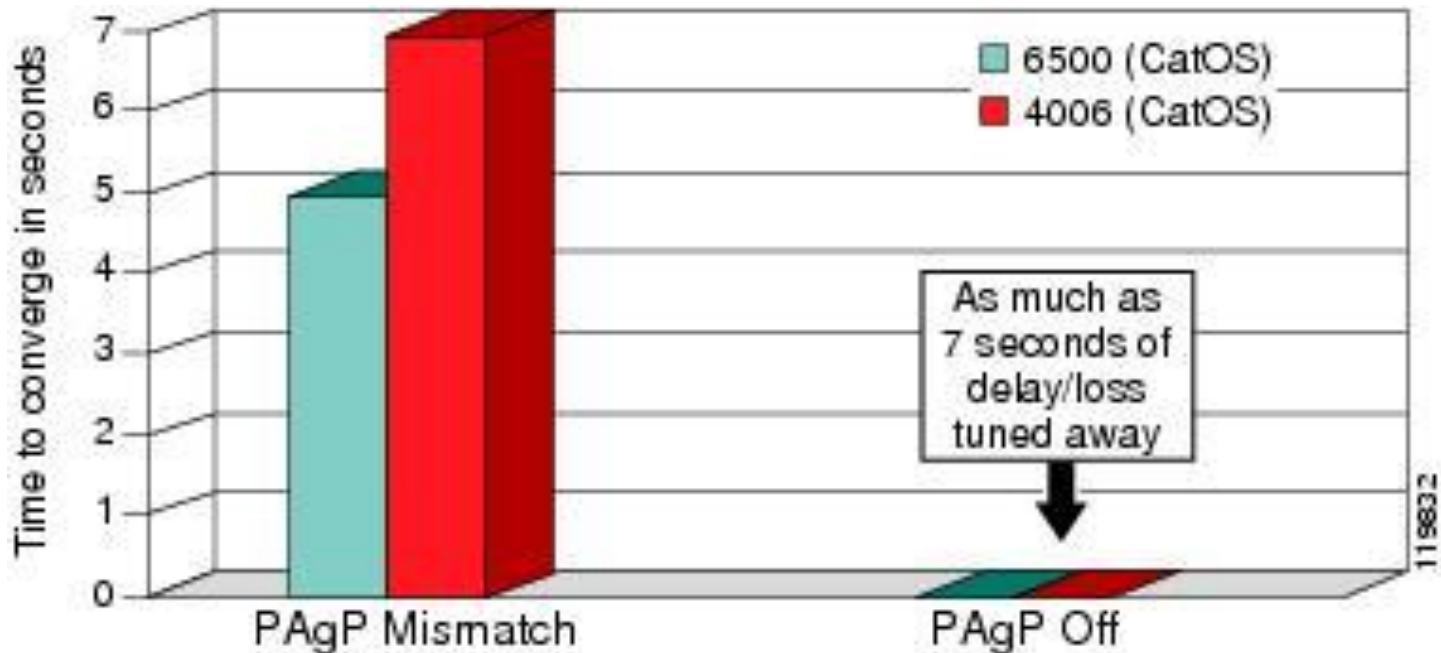
- Use load balancing across a multiply of 2

Links	Load
8	1:1:1:1:1:1:1:1
7	2:1:1:1:1:1:1
6	2:2:1:1:1:1
5	2:2:2:1:1
4	2:2:2:2
3	3:3:2
2	4:4

HA Deployment

Etherchannel

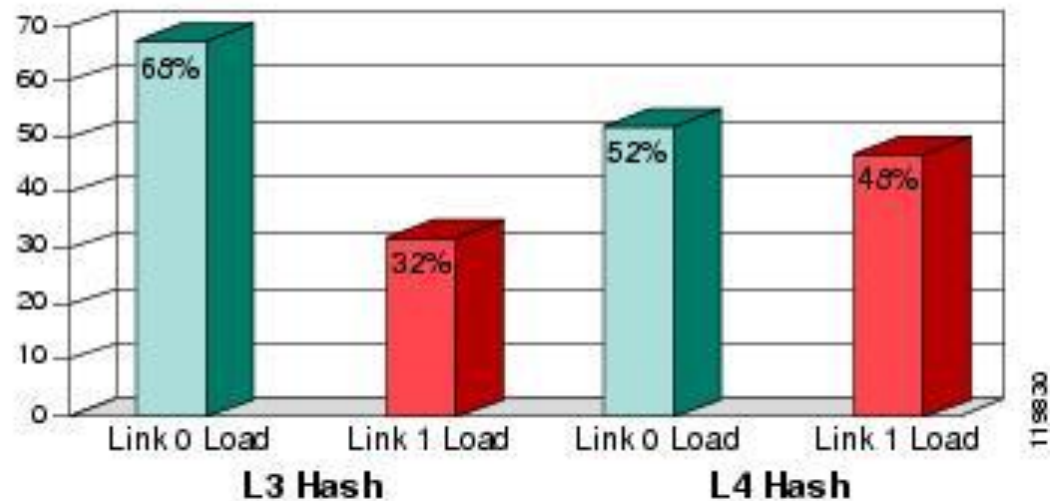
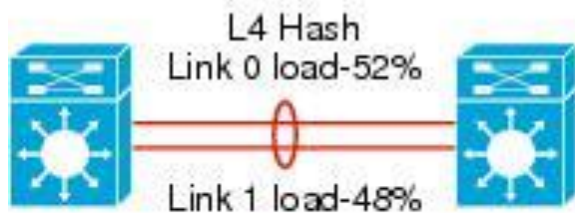
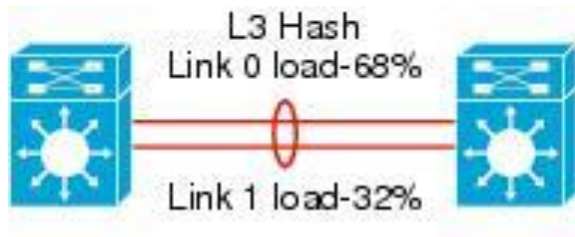
- Use a Channel protocol for link testing
 - PagP
 - LACL



HA Deployment

Etherchannel

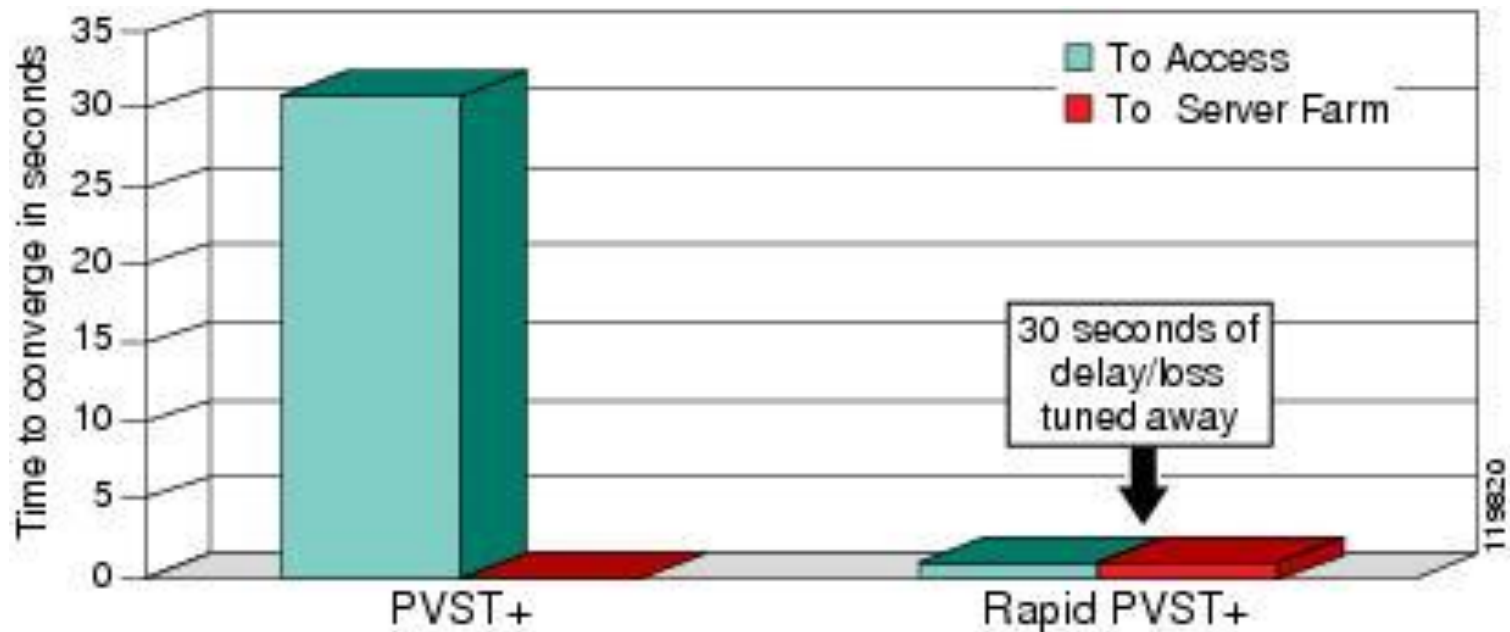
- Tune loadbalancing like with CEF



HA Deployment

Spanning-Tree

- Use Rapid STP when possible

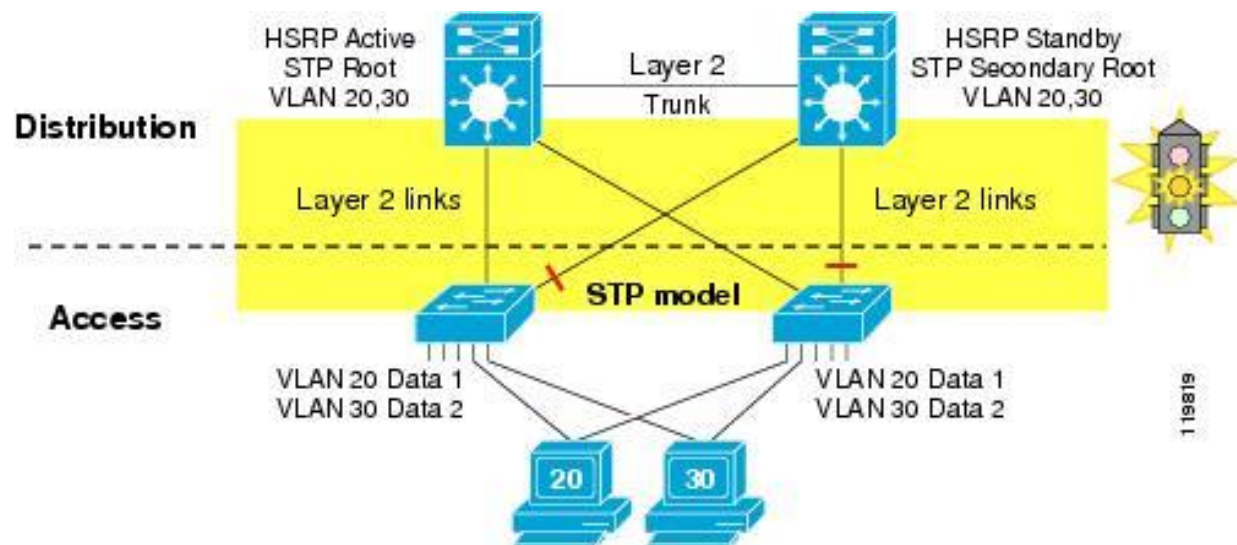


HA Deployment

Spanning-Tree

•Deploy STP Features when possible

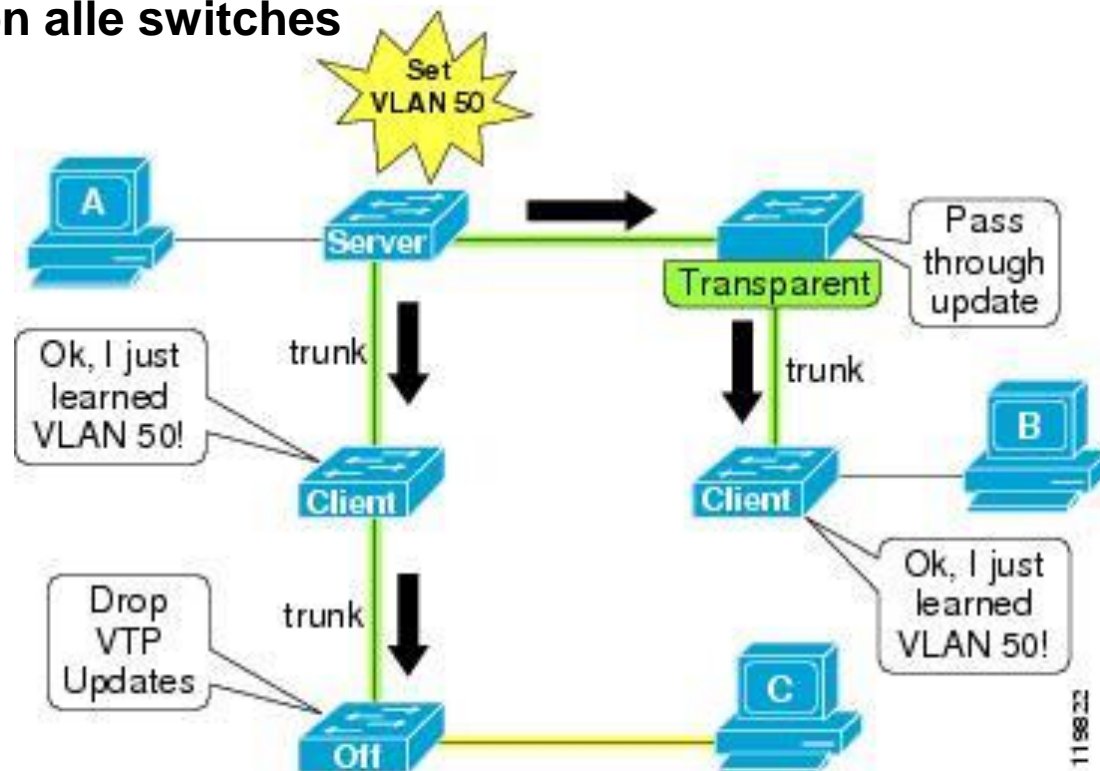
- PortFast**—Lets the access port bypass the listening and learning phases
- Loop Guard**—Prevents the alternate or root port from being elected unless Bridge Protocol Data Units (BPDUs) are present
- Root Guard**—Prevents external switches from becoming the root
- BPDU Guard**—Disables a PortFast-enabled port if a BPDU is received
- BPDU Filter**—Prevents sending or receiving BPDUs on PortFast-enabled ports



HA Deployment

VLAN Trunking Protocol

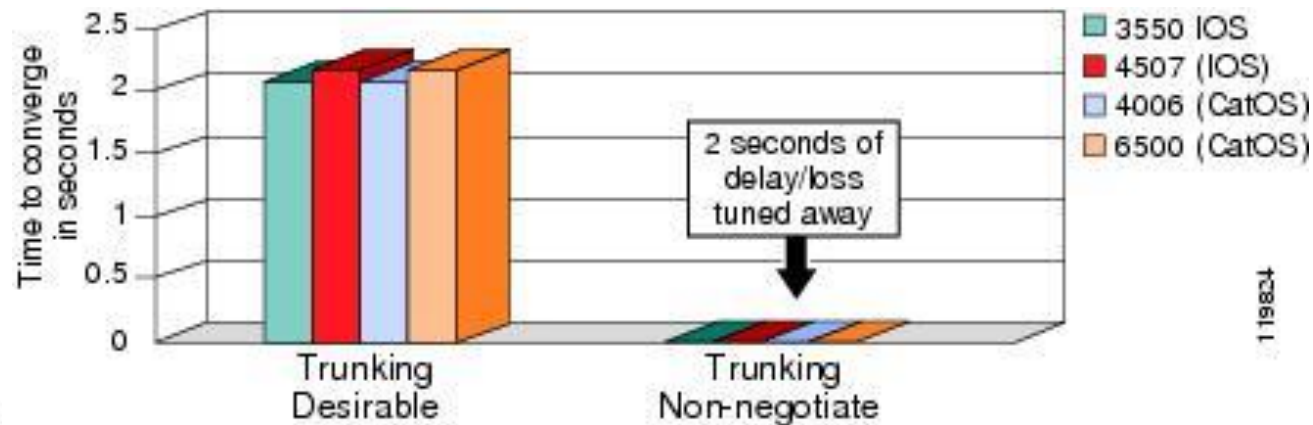
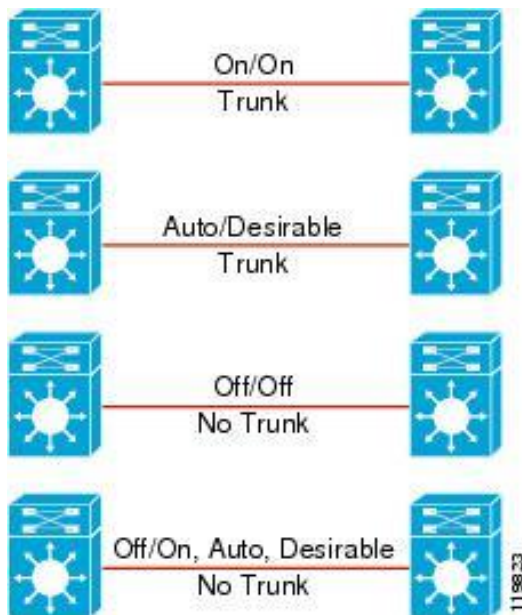
- Replicates VLANs to all switches
- Configure transparent mode on alle switches



HA Deployment

Dynamic Trunking Protocol

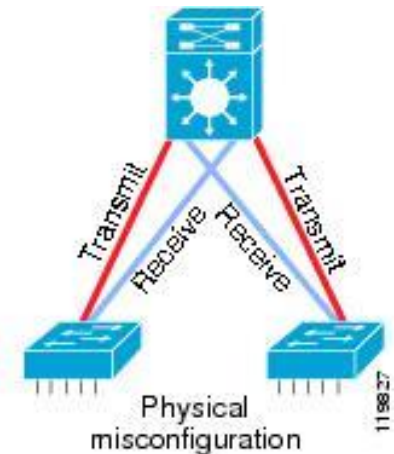
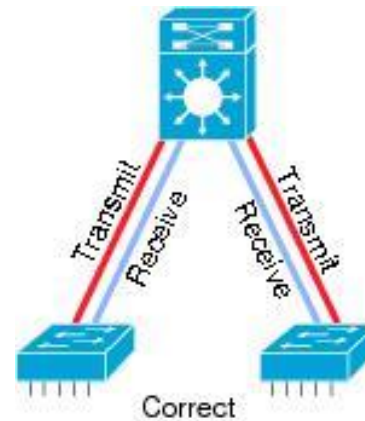
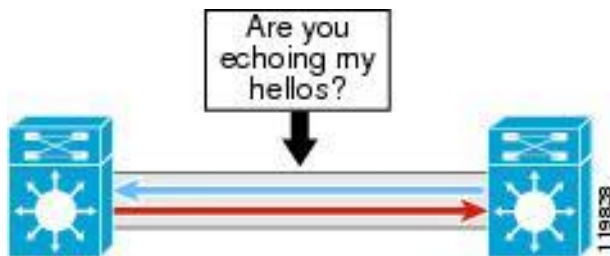
- Configures trunking dynamically between switches
- Turn DTP off and make a static trunk



HA Deployment

UniDirectional Link Detection

- Detects one-way connections
- Default enabled on Fiber ports
- Enable it on copper ports



HA Deployment

First Hop Redundancy Protocols

- Configure FHRPs
- Tune FHRPs
- Allign FHRPs with STP
- Tune Preempt
 - Boottime + 50%

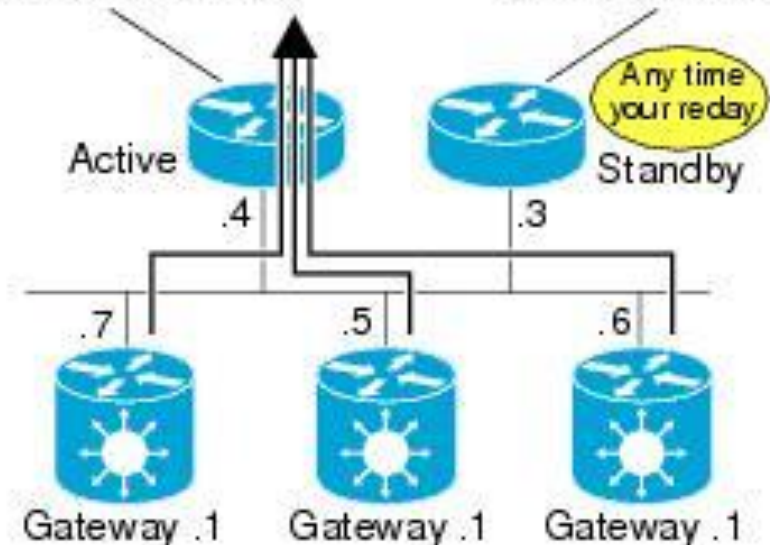
VIP: 10.88.1.1

MAC: 0000.0c123.3456

VMAC: 0000.0c07ac00

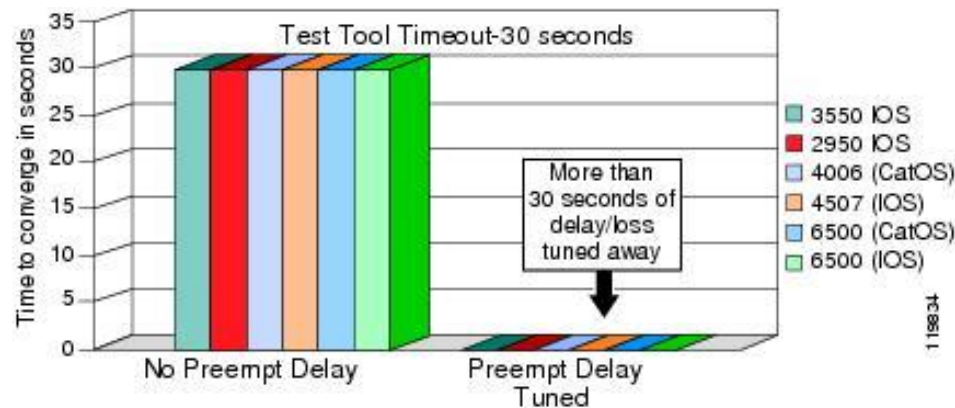
VIP: 10.88.1.1

MAC: 0000.0c78.9abc



119833

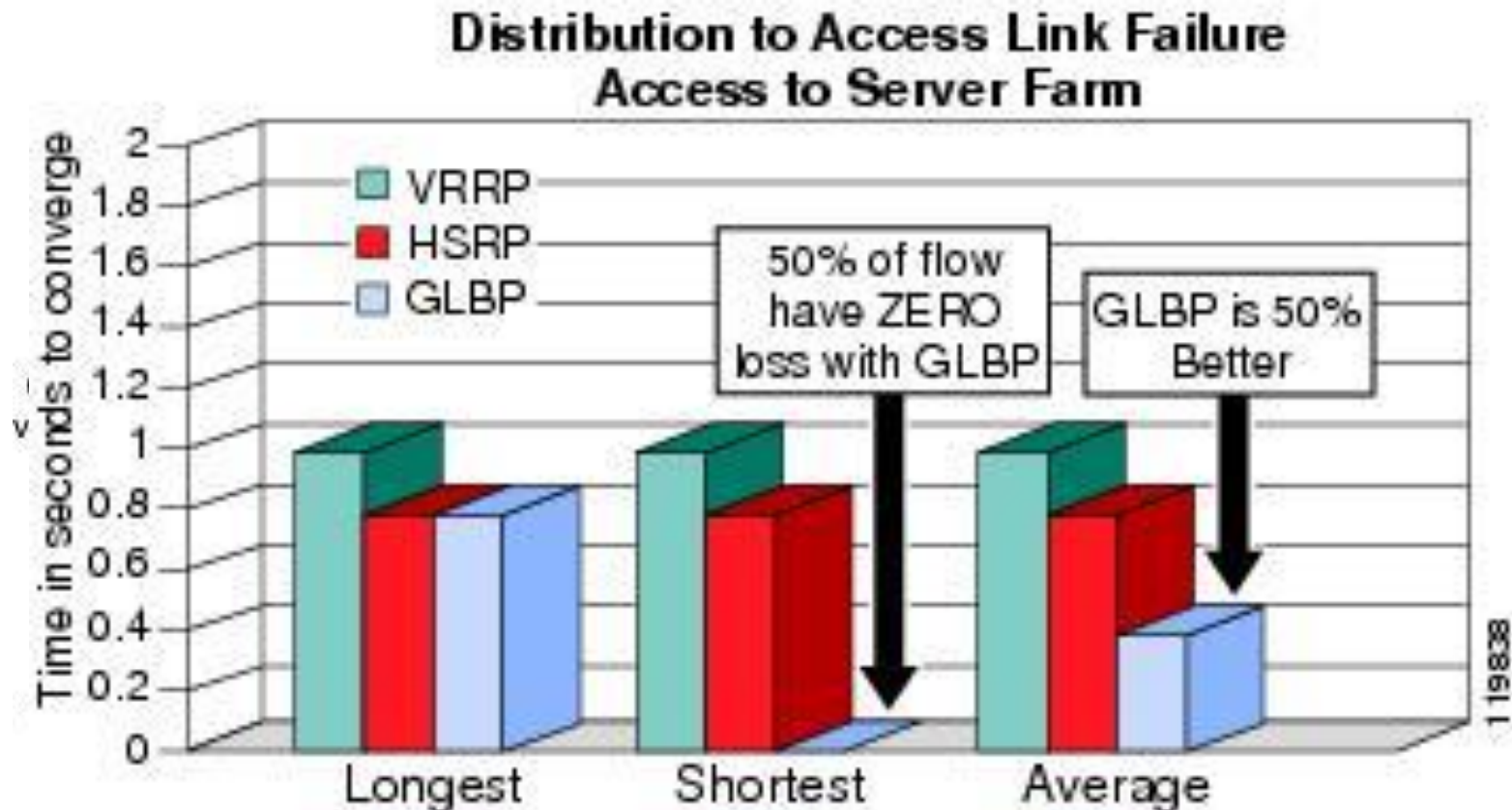
119833



HA Deployment

First Hop Redundancy Protocols

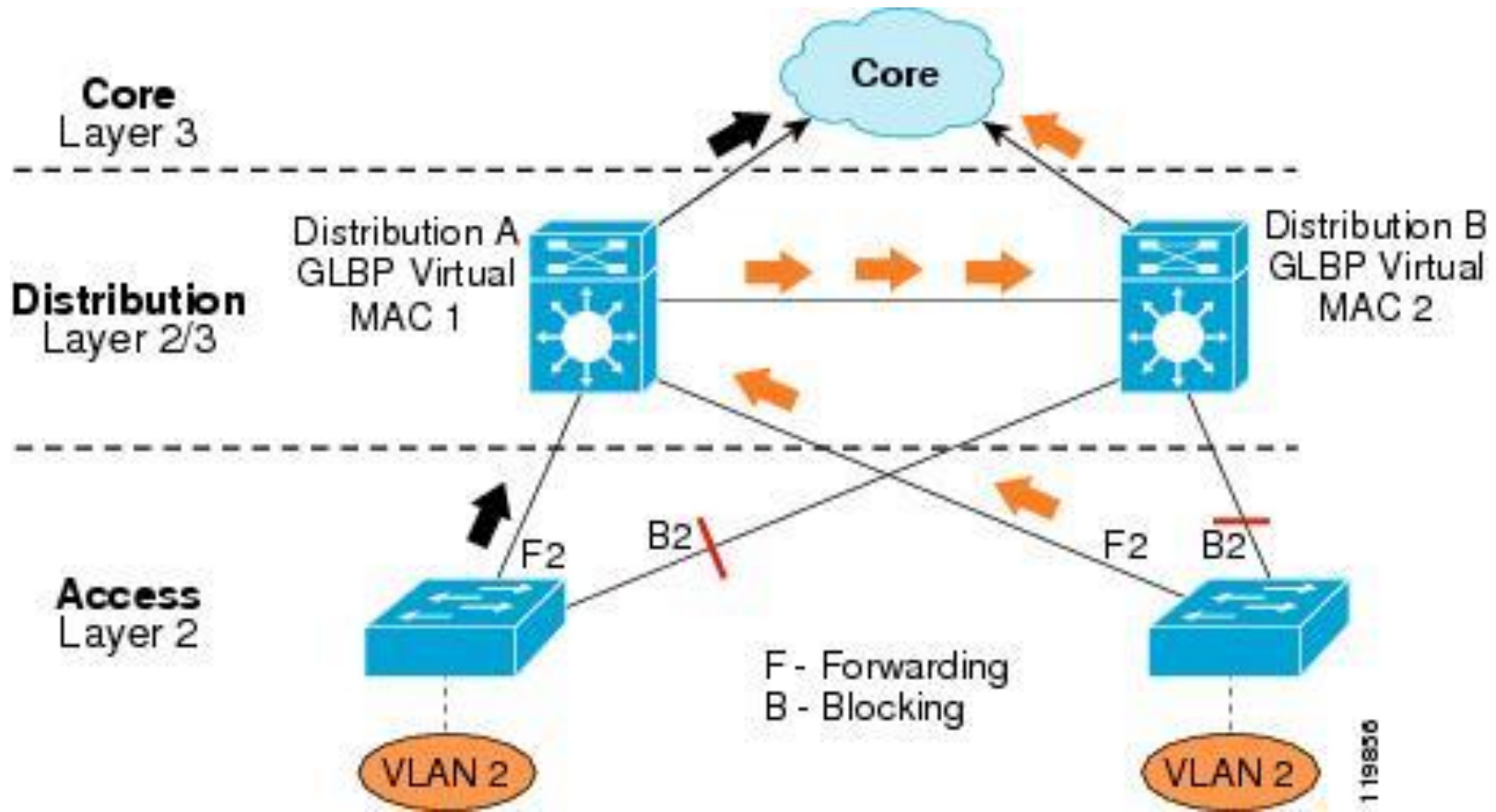
- Use GLBP in HA environments



HA Deployment

First Hop Redundancy Protocols

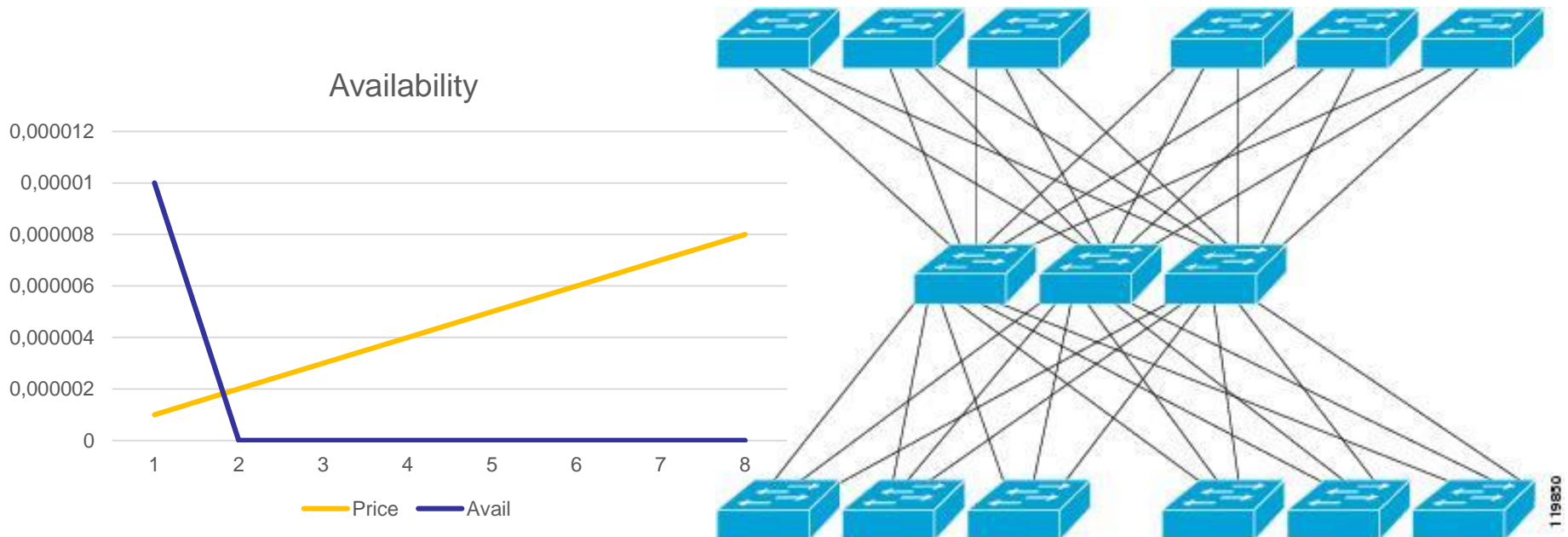
- But don't use GLBP in non-HA environments



HA Deployment

Availability

- Don't overdo redundancy



HA Deployment



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