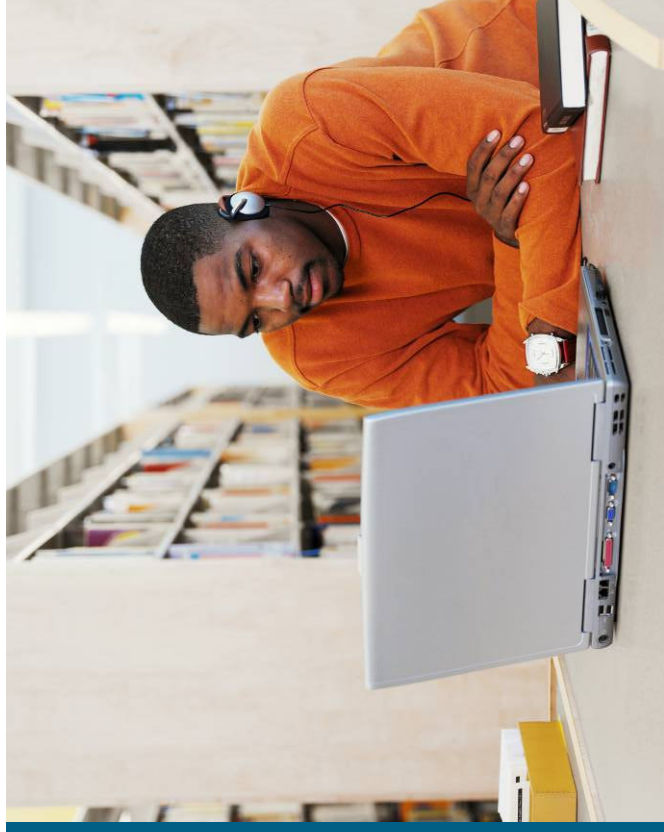


Cisco Expo
2008

Cisco Resilient Ethernet Protocol (REP)

Dubrovnik, 21.3.2008.



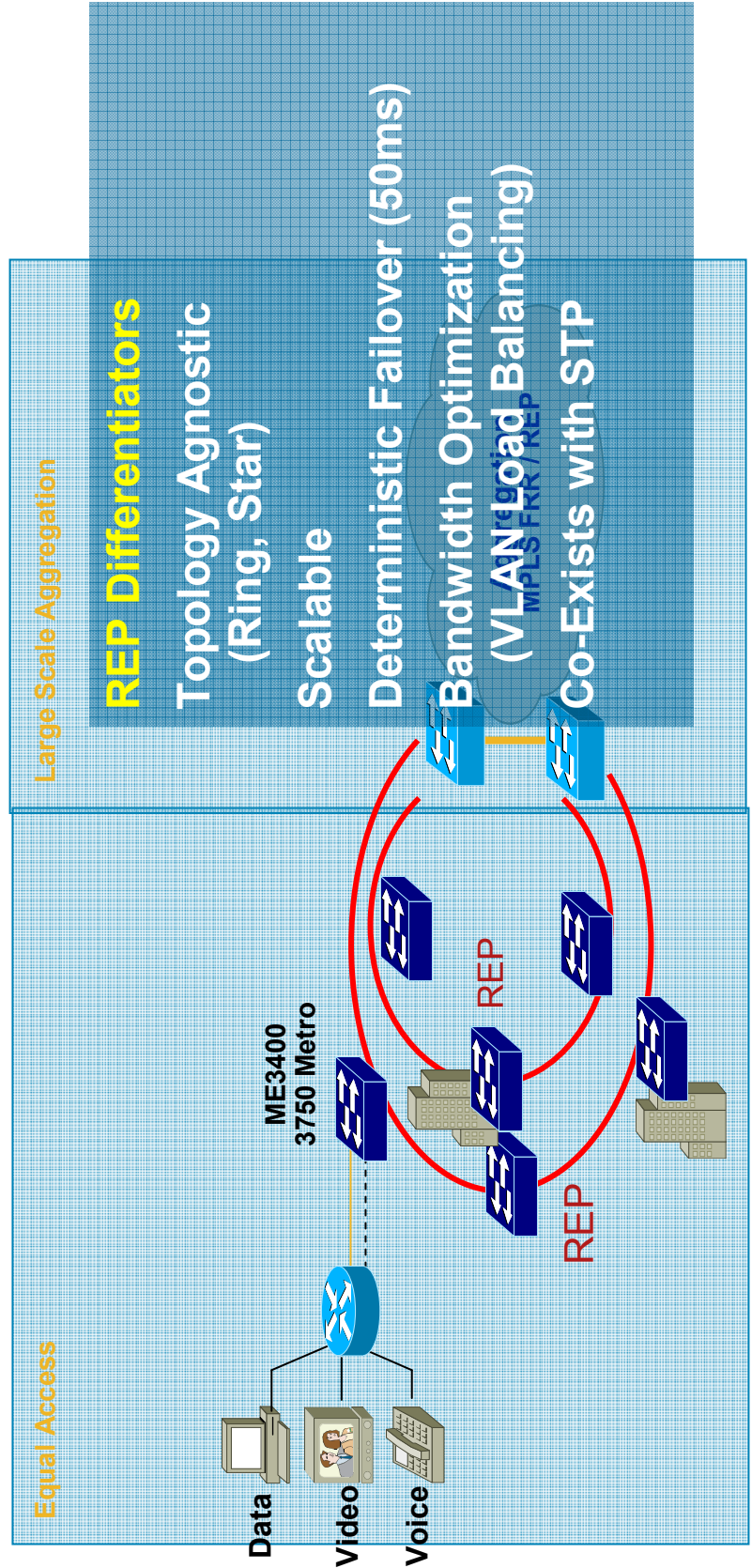
Dejan Jaksic,
Systems Engineer,
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Resilient Ethernet Protocol (REP)

What is REP?

- Cisco Resilient Ethernet Protocol is a new technology that extends network resiliency across Cisco IP Next-Generation Network (NGN) Carrier Ethernet Design.
- Designed to meet fast convergence requirements in layer 2 domains, in particular for ring topologies.
- Implemented on Cisco Carrier Ethernet platforms as a software update. Requires no hardware upgrades.

Resilient Ethernet Protocol REP benefits

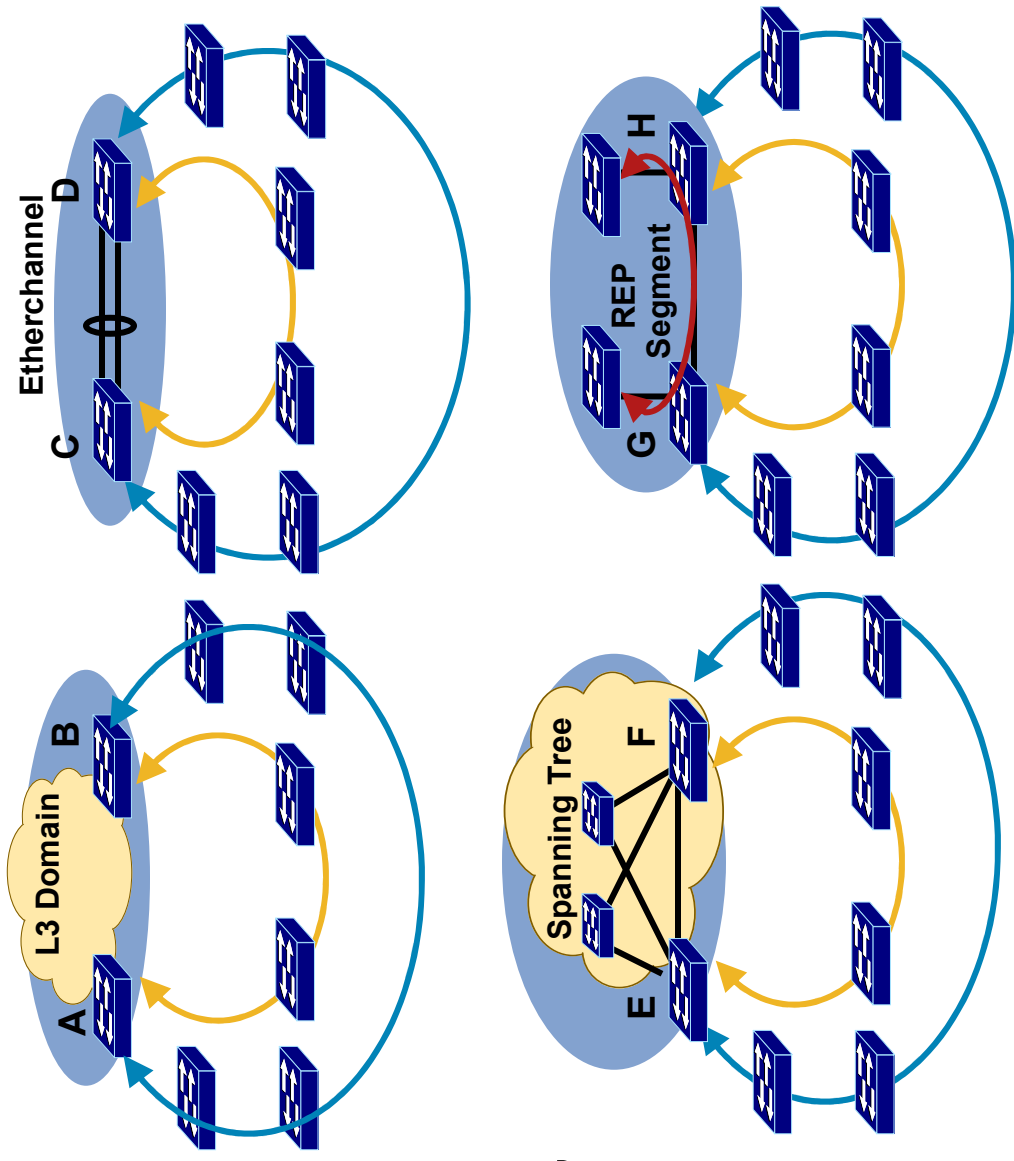


Resilient Ethernet Protocol (REP)

REP Benefits (More details)

- **Fast and predictable convergence in ring topology**
 - **Convergence time: 50ms in most conditions**
- **Deterministic and scalable**
 - **Fast failure notification even in large rings with high number of node**
 - **Alternate port Selection automatic or user configurable**
- **Optimal bandwidth utilization with VLAN Load Balancing**
- **Spanning Tree Coexistence**
 - **Limit the scope of Spanning-tree**
 - **STP is deactivated on REP interfaces**
 - **Topology Changes notification forwarded to Spanning Tree**
- **Easy to configure and troubleshoot**
 - **Topology archiving for easy troubleshooting**
 - **Known fixed topology with preemption mechanisms**
 - **Simple mechanism to setup the Alternate Port (blocking port)**

Connecting the segment to the network.



- The segment edges can be connected to any network without creating bridging loops.
- The link between the edge nodes is the common link.
- Common options for Common Link HA are STP, Etherchannel or REP.

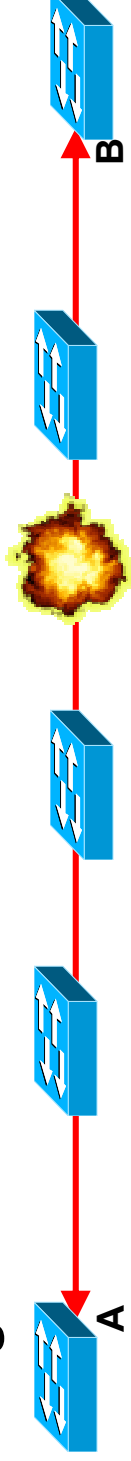
Resilient Ethernet Protocol

REP is a Segment Protocol



Ports are explicitly configured to be part of a segment.

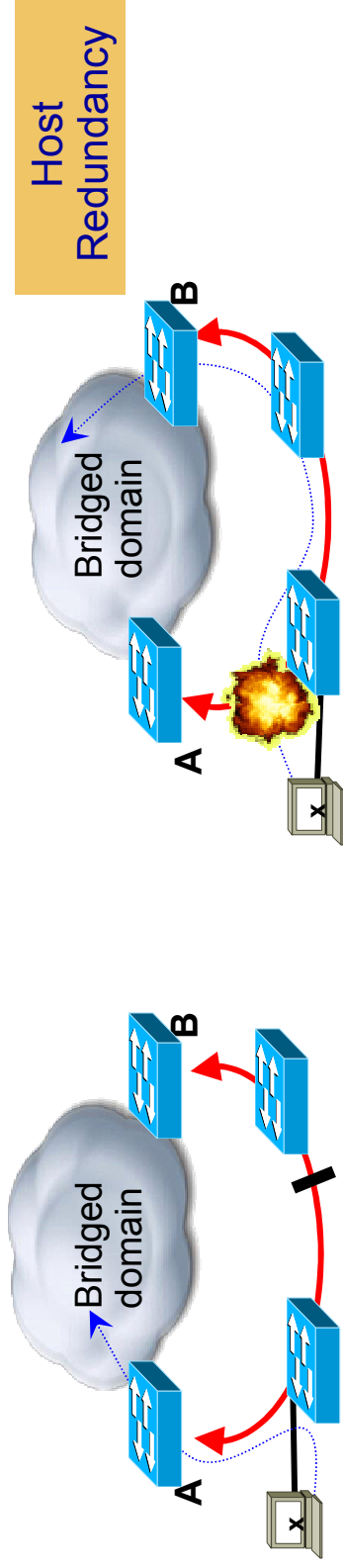
When all the links in the segment are operational, a blocked port is determined so that there is no connectivity between the edges A,B through the segment



If a failure occurs within the segment, the blocked port goes forwarding

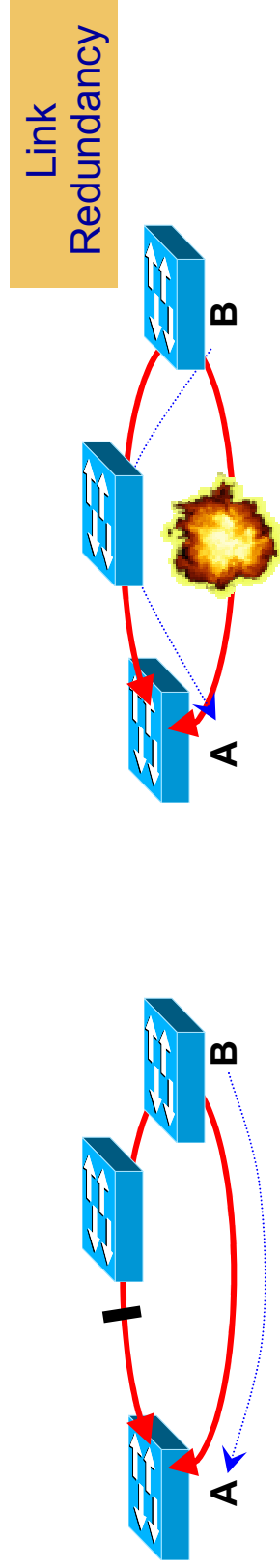
Resilient Ethernet Protocol

REP Redundancy Options



The segment provides redundancy to the hosts within its boundaries: they can reach the rest of the network through either A or B.

The segment will *not* unblock to cover a failure outside of its boundaries.

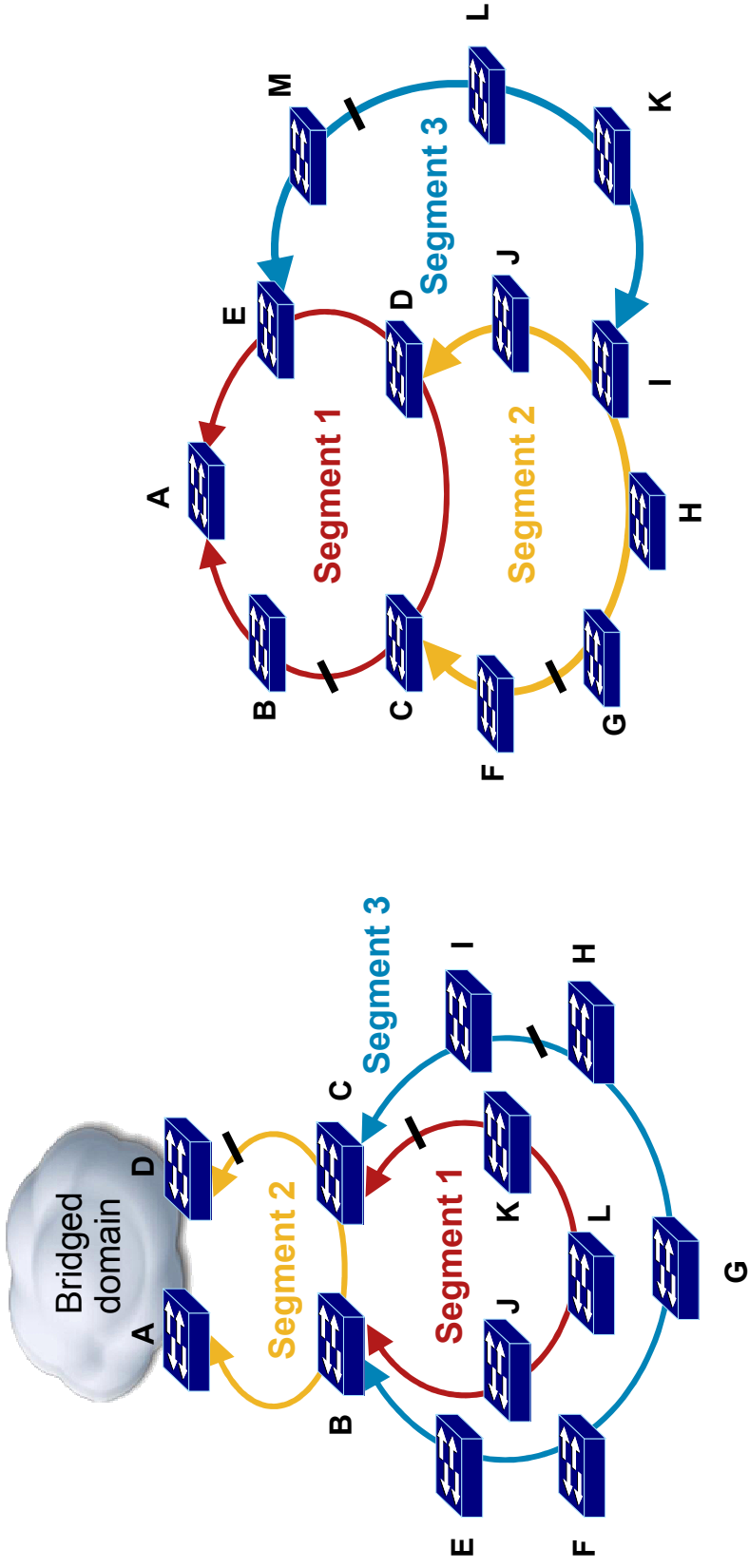


When wrapped into a ring, the REP segment can also provide redundant connectivity between any two switches

A combination of rings and segments allows creating almost any kind of network.

Resilient Ethernet Protocol

Flexibility in supporting various topologies

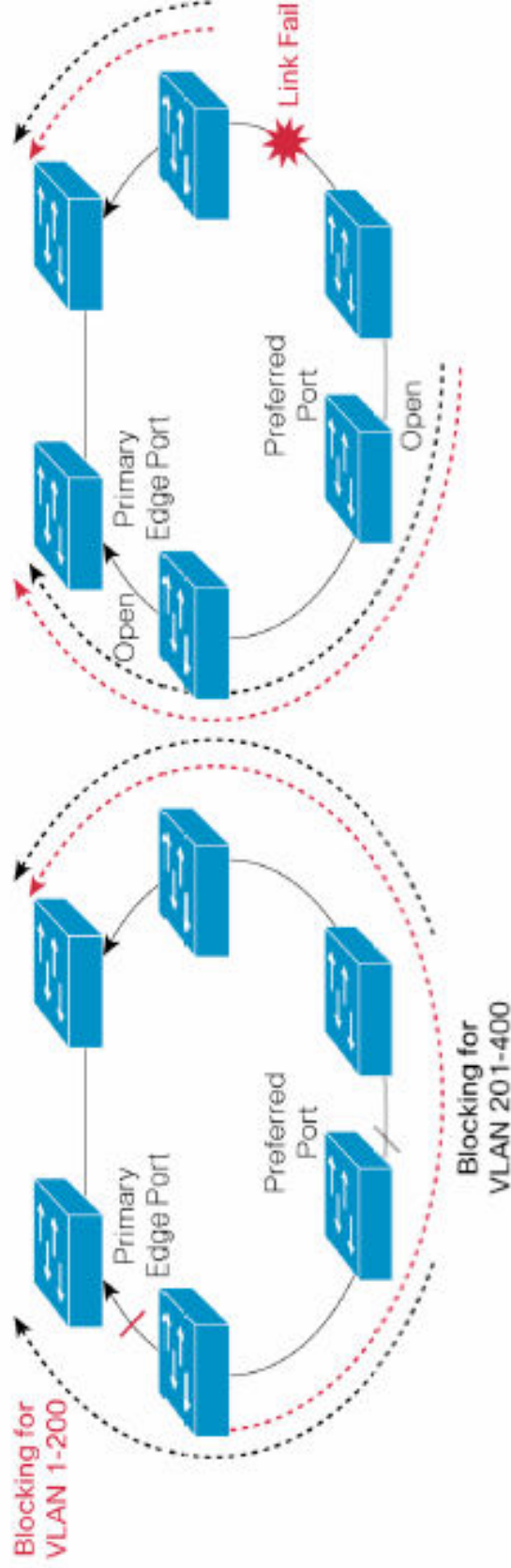


Access and Aggregation rings

Sub-terminating rings terminated on different rings

Resilient Ethernet Protocol – Optimized bandwidth Utilization with Vlan Load Balancing

- As for Spanning Tree MST, VLAN load balancing per VLAN instances
- VLANs grouped into two instances
- **Load balance** traffic across the segment per VLAN groups.
- First group of VLAN blocked at the **Preferred port**. Preferred Port user selectable.
- Second group of VLAN blocked at the **primary edge port**.
- Both ports unblock when a link fails in the segment.



Resilient Ethernet Protocol

Ease of Use and troubleshooting

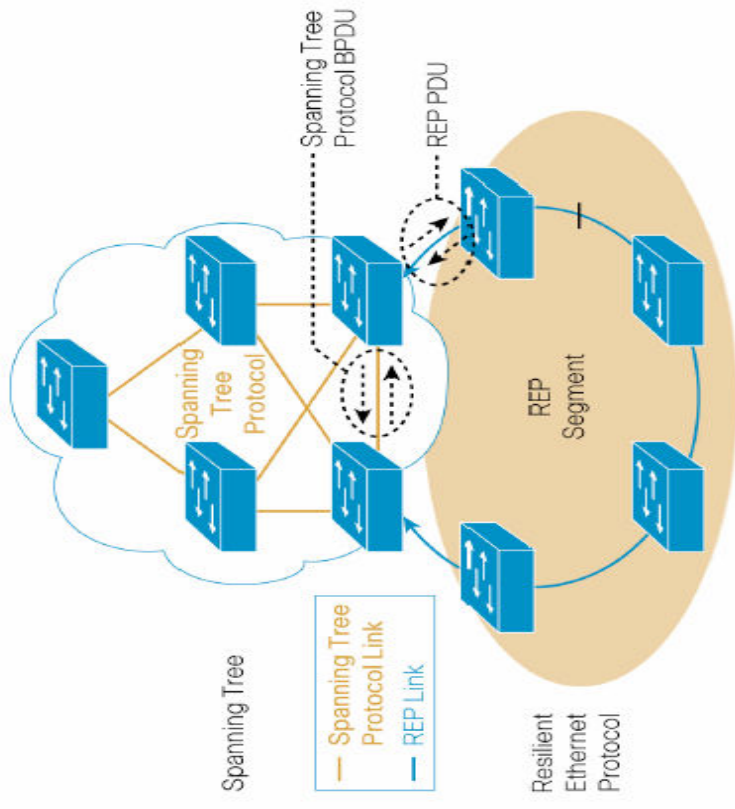
- Topology Collection protocol to collect Topology information
- Topology archiving option to report previous state in the ring.
- Restoration to a well known state with preemption delay
- Resilient Ethernet protocol MIB for SNMP management

```
3750-ME# show rep topology
REP Segment 1
BridgeName PortName Edge Role
-----
3750-E Gi1/1/1 Pri Open
3400-3 Gi0/2 Open
3400-3 Gi0/11 Open
3400-2 Gi0/2 Open
3400-2 Gi0/1 Open
3400-1 Gi0/2 Open
3400-1 Gi0/1 Alt
3750-E Gi1/1/2 Sec Open
```

REP and Spanning Tree

Easy migration and Co-existence

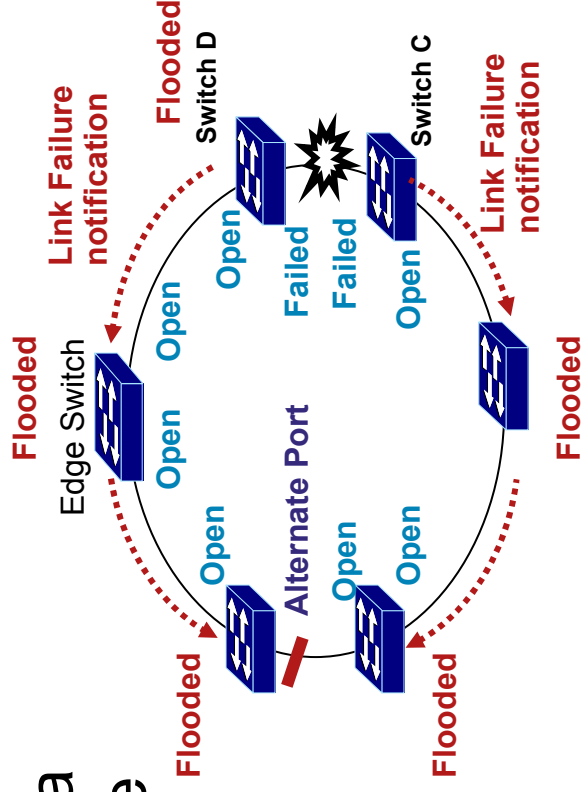
- Compatible and complementary with standard IEEE 802.1 spanning-tree protocols
- Cisco REP and Spanning Tree Protocol can coexist on the same switch.
- REP can notify the Spanning Tree Protocol about potential topology changes (TCNs).



Resilient Ethernet Protocol

Efficient Link failure Notification

- Distributed Protocol: Any REP port can initiate a switchover as long as it has previously acquired a secure key to unblock the alternate port.
- Using a Cisco Multicast address, the notification is forwarded in hardware so that each node in the segment is notified immediately without software involvement from any node.





Resilient Ethernet Protocol (REP)

What REP is not meant to do:

- REP Does not**
- **Does not protect against dual failure in the ring**

Questions?



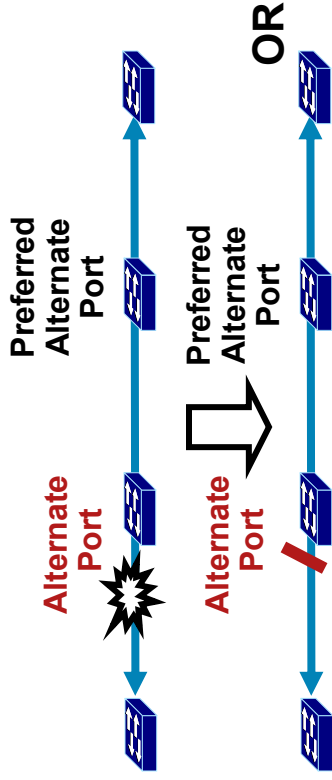
Resilient Ethernet Protocol Pre-emption

For automatic restoration to a well known state

After failure repair

With pre-emption delay

Switch(config-if)# rep preempt delay 1



Pre-emption delay:
15 sec. to 300 sec.

Manually

Manual Trigger

3750-1#rep preempt segment 1
The command will cause a momentary traffic disruption.
Do you still want to continue? [confirm]

Proceeding with Manual Preemption

