

Disaster Recovery in the Data Center

Iaroslav Levkov, Solutions Architect
HP TS Consulting CIS, April 2013



Agenda

- **Problem Statement**
- **Network Design Considerations**
- **The DR Technology Toolkit**
- **Spotlight: EVI**
- **Q&A**



Problem Statement

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Disasters Cost Businesses Money

Problem Statement

**Hurricane Sandy is
estimated to have cost**

over \$50bn

\$235bn

**The earthquake and
tsunami in Japan is the
most expensive
natural disaster to
date**

over 70%
**of network downtime
caused by
misconfiguration**



DR Planning Jargon

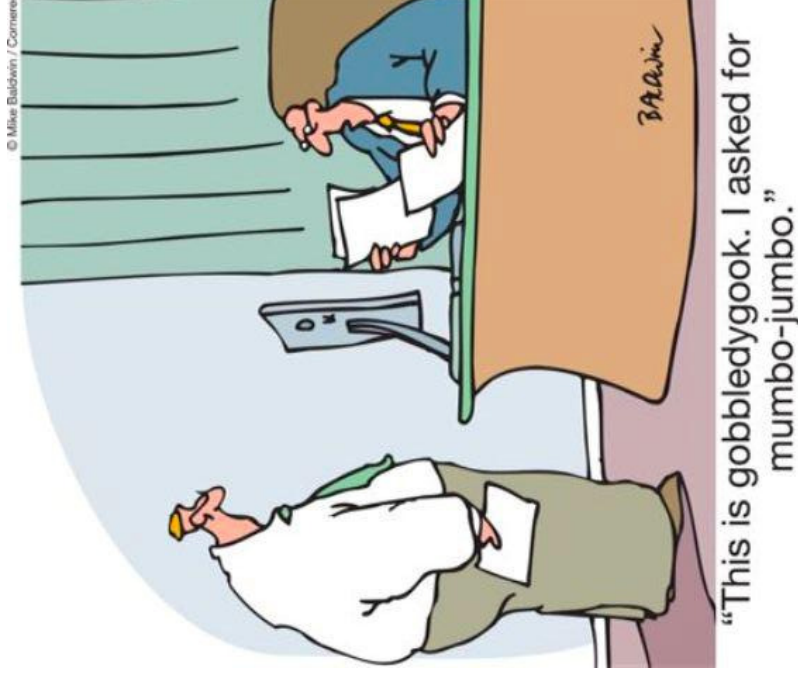
Problem Statement

MI = Major Incident

RT0 = Recovery Time Objective

RPO = Recovery Point Objective

The RPO and RT0 will influence the design on your DR solution.

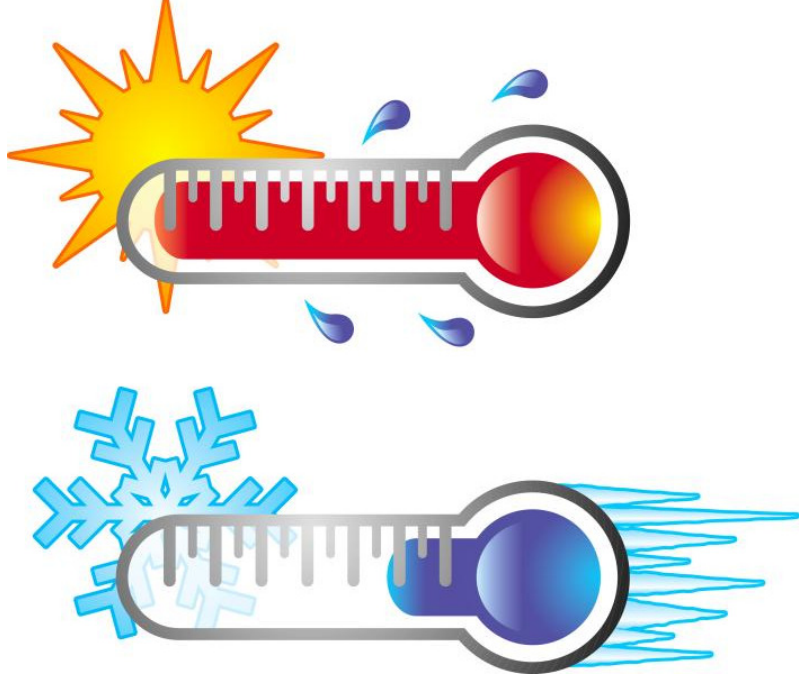


Data Center DR Strategies

Problem Statement

Deployment of multiple, geographically dispersed data centers

- **Hot Standby**
- **Warm Standby**
- **Cold Standby**



Surely all this DR stuff is simple! Right?

....I can just migrate my VMs....

....I'll just cluster everything across both sites....

Think again!!!



**“Even the best DR plan is useless if
it isn’t regularly tested”**

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Network Design Considerations

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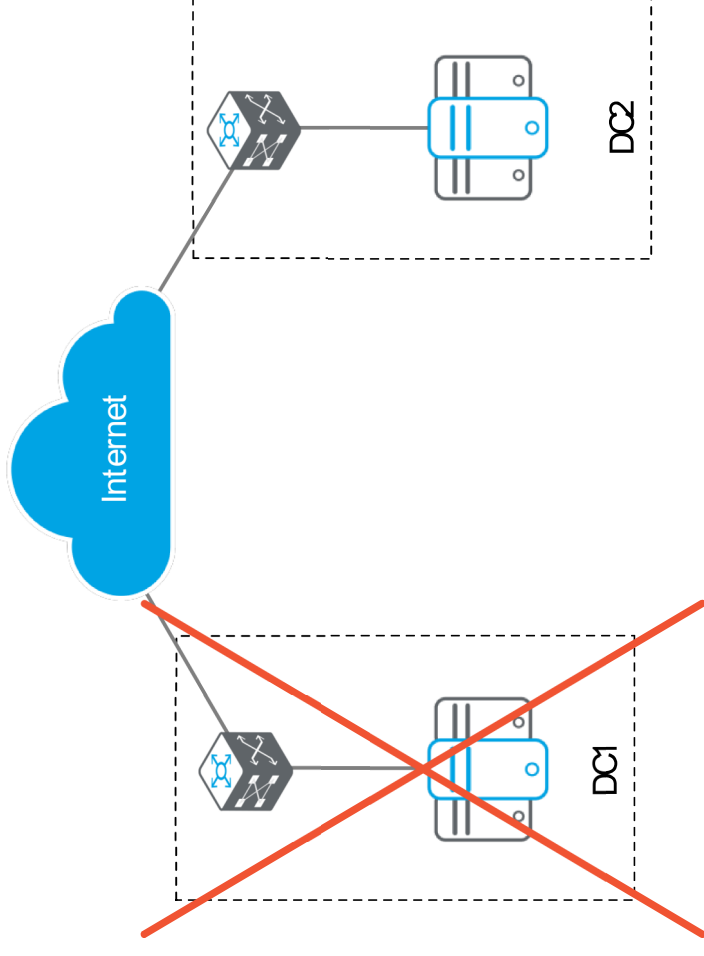


Warm Standby, Hot Standby or “Active/Passive”

Design Considerations

- **Network Requirements**
 - Advertised routes from the backup DC on occurrence of a MI
 - (Optional) DCI for storage replication
- **Solution?**
 - Traffic Engineering in the exterior routing protocol (i.e BGP)
 - VPLS, Dark Fiber, DWDM/CWDM, EVI

So what about Active/Active?

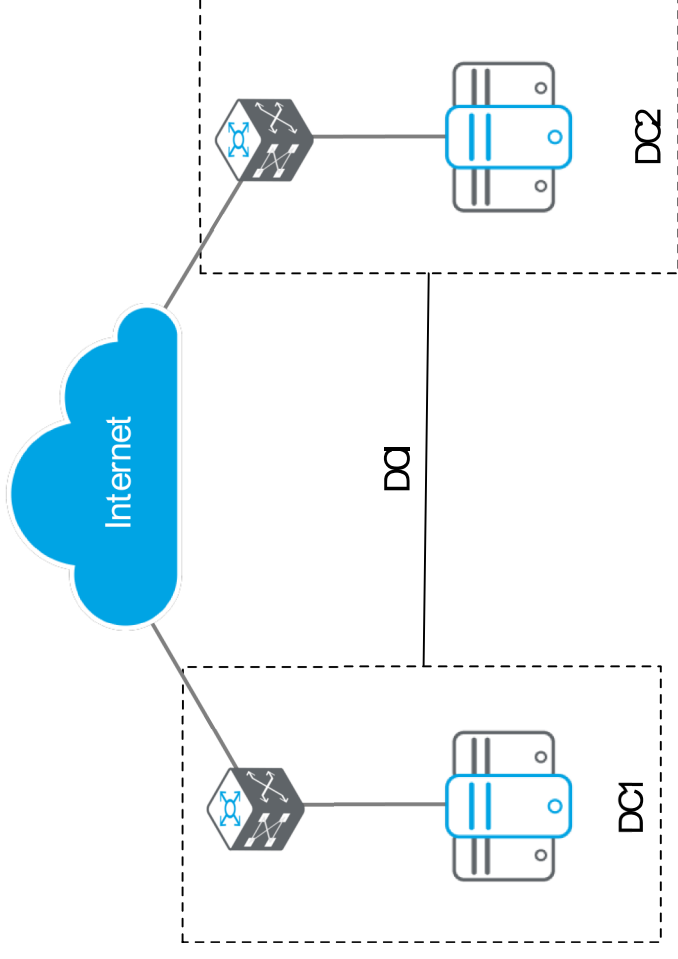


Active/Active Network Design Considerations

Each DC must advertise its own services, and only advertise backup services when the alternate DC is unreachable

A DCI is required for replication

Each DC should be self-contained



Additional Considerations

Should I collapse both DC's in to a single management domain?

What about load-balancing?

What happens if the DCI fails?

What happens if the Internet lines fail?

What happens if both links fail?



The DR Technology Toolkit

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Spotlight: EVI

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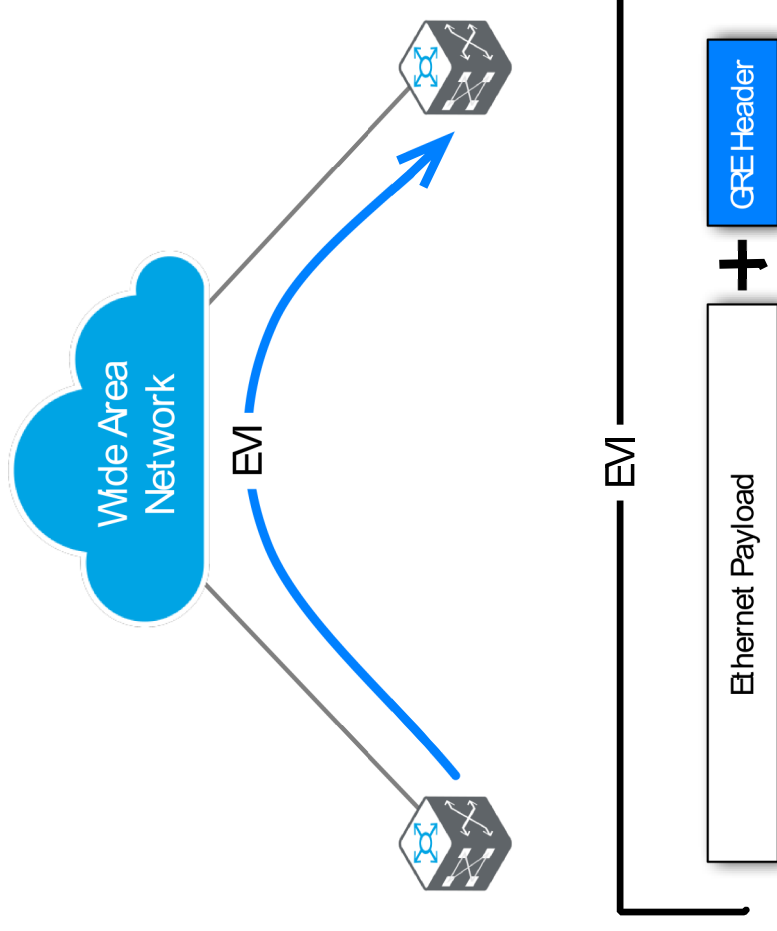


Ethernet Virtual Interconnect

Introducing EVI

EVI provides L2 DCI over an existing L3 WAN

- **Standards based MAC over GRE**
- **Transport Independent**
- **Supports up to 8 DCs**
- **No limitation on number of extended VLANs**
- Support 4K 802.1Q VLANs
- Supports both QinQ



Deploying EVI

Introducing EVI

EVI can be deployed in 5 simple steps

- 1) Enable EVI on WAN interfaces**
- 2) Configure EVI Tunnel**
- 3) Configure EVI Network ID**
- 4) Configure Extended VLANs**
- 5) Configure EVI Neighbor Discovery Protocol**



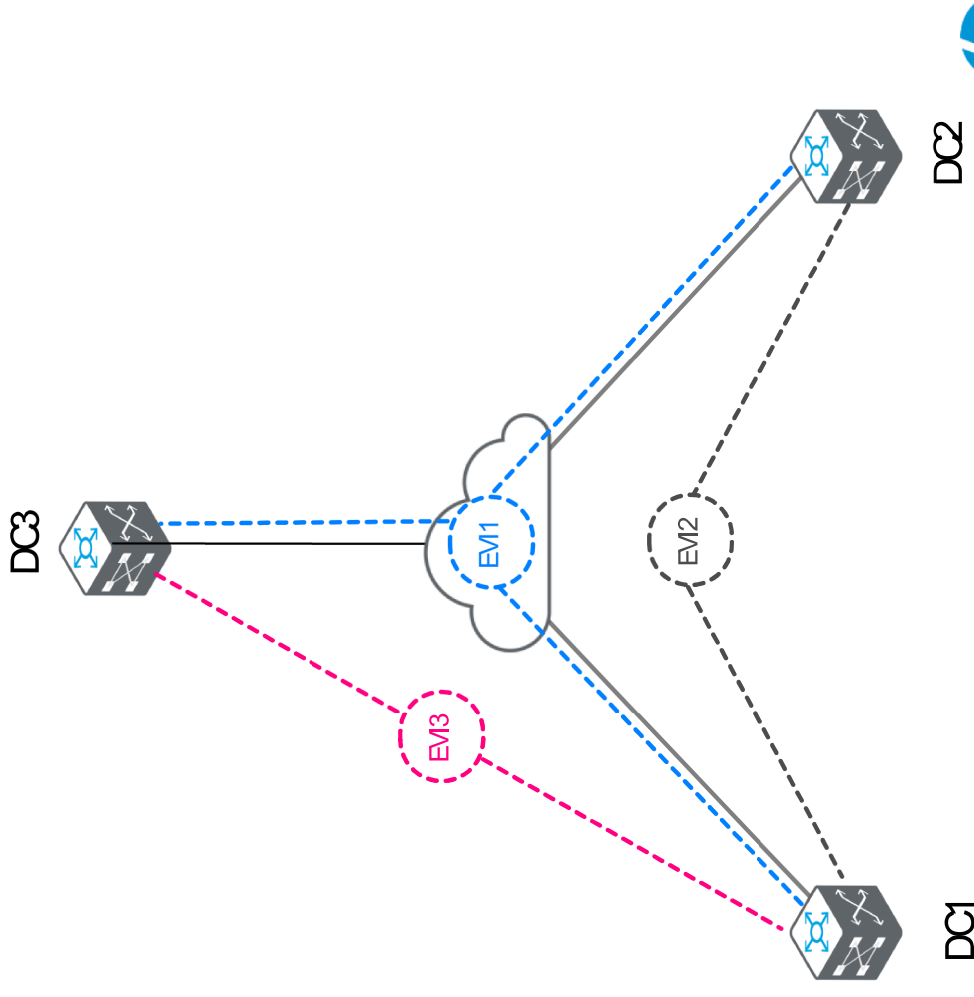
Advanced Deployment Options with EVI

Introducing EVI

Multiple EVI Networks can be used to constrain the extension of VLANs to specific Data Centers. For example :

EVI Network ID 1 = VLAN 100-150
EVI Network ID 2 = VLAN 200-250
EVI Network ID 3 = VLAN 300-350

DC 1 joins EVI networks 1,2 and 3
DC 2 joins EVI networks 1 and 2
DC 3 joins EVI networks 1 and 3

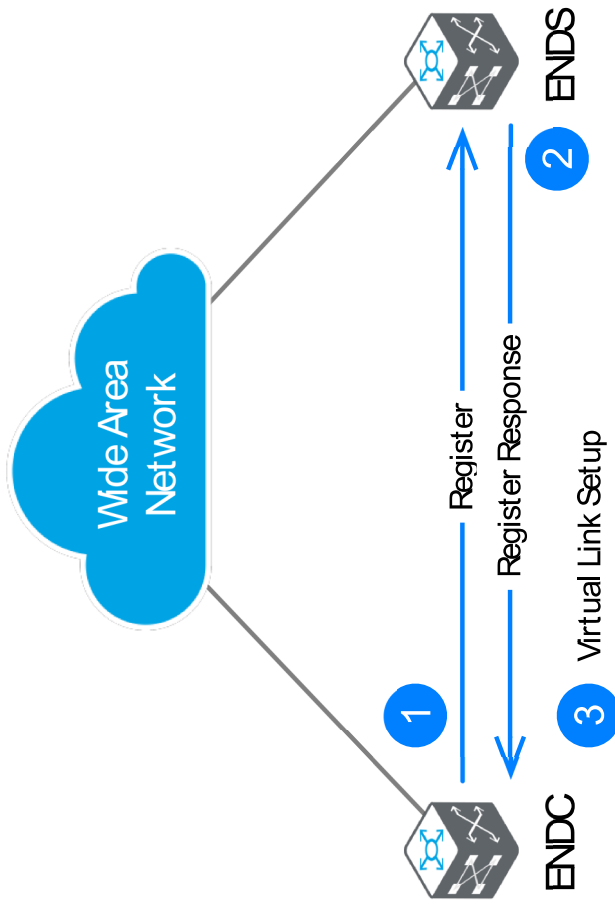


How does it work – Neighbor Discovery

Introducing EVI

EVI Neighbor Discovery Protocol (ENDP)

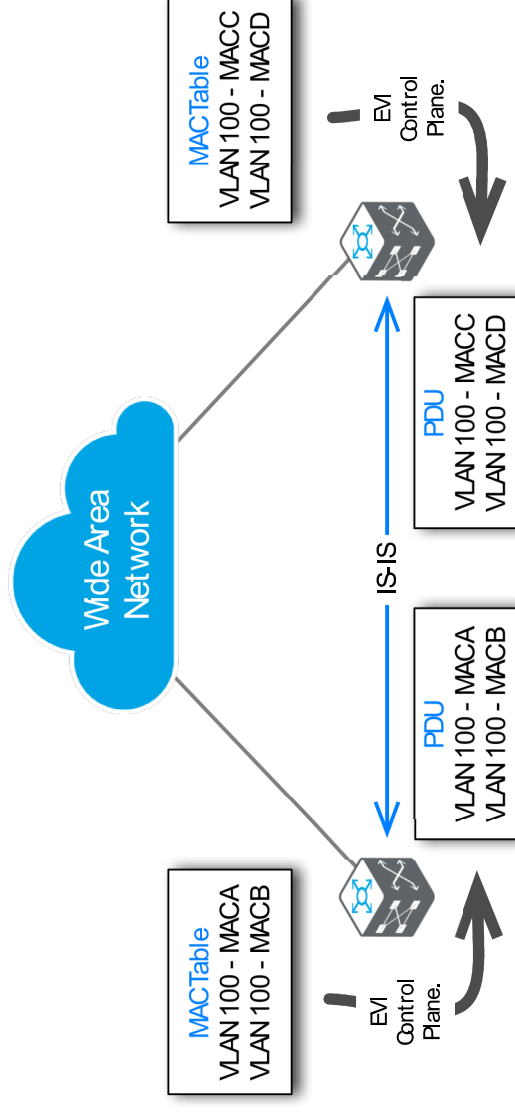
- **Client sends request to servers**
- **Server sends response with list of Edge devices in the EVI Network**
- **Client sets up a virtual link to each endpoint**



How does it work – MAC Propagation

Introducing EVI

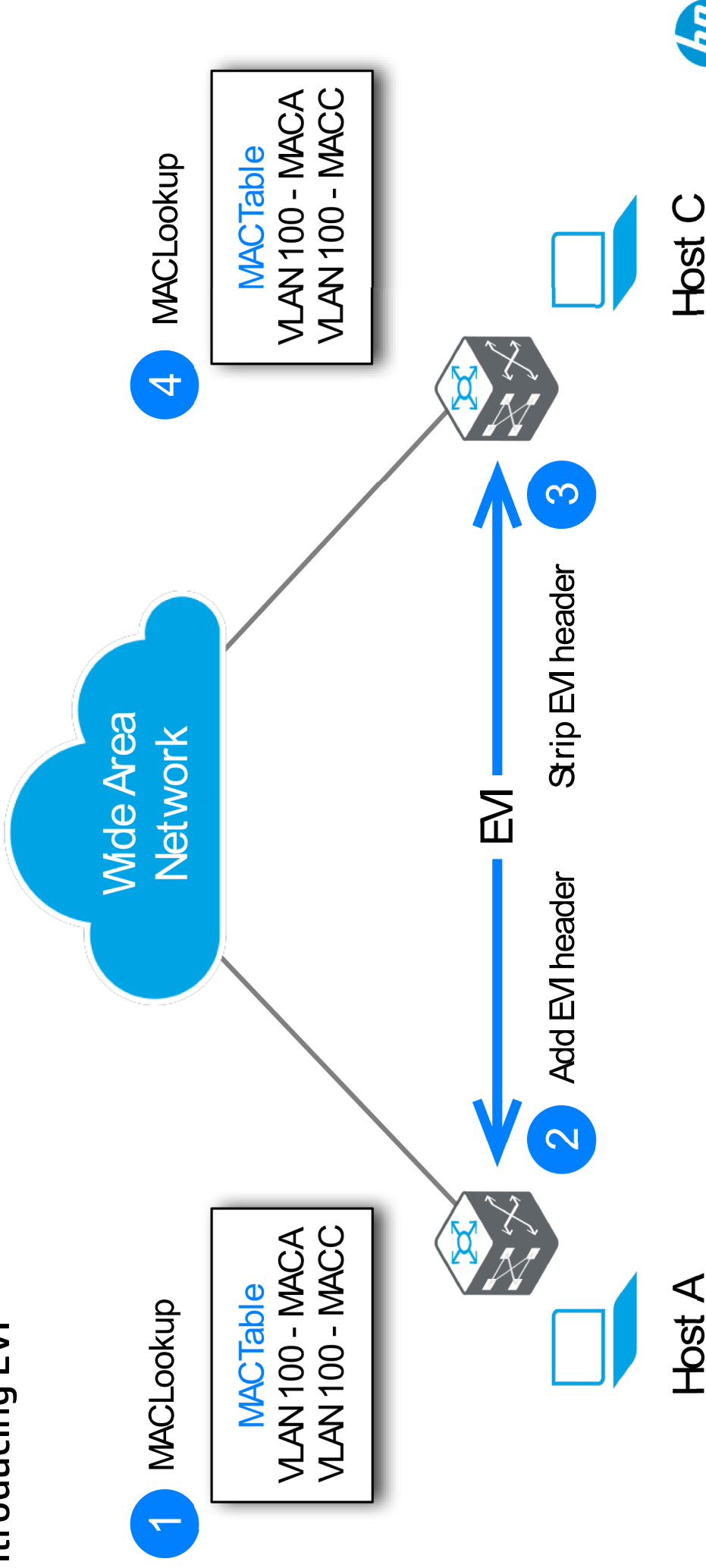
- **EVI takes all active MAC addresses and advertises in EVI IS-IS**
 - **EVI devices receive EVI IS-IS updates containing remote MAC addresses**
 - **EVI places MAC addresses in the FIB.**
- The egress port is the EVI Virtual Link**



EVI Control Plane generates an update when a MAC is removed or ages out

How does it work – Unicast Forwarding

Introducing EVI



How does it work – Broadcast Forwarding

Introducing EVI

All broadcasts traffic is permitted by default.

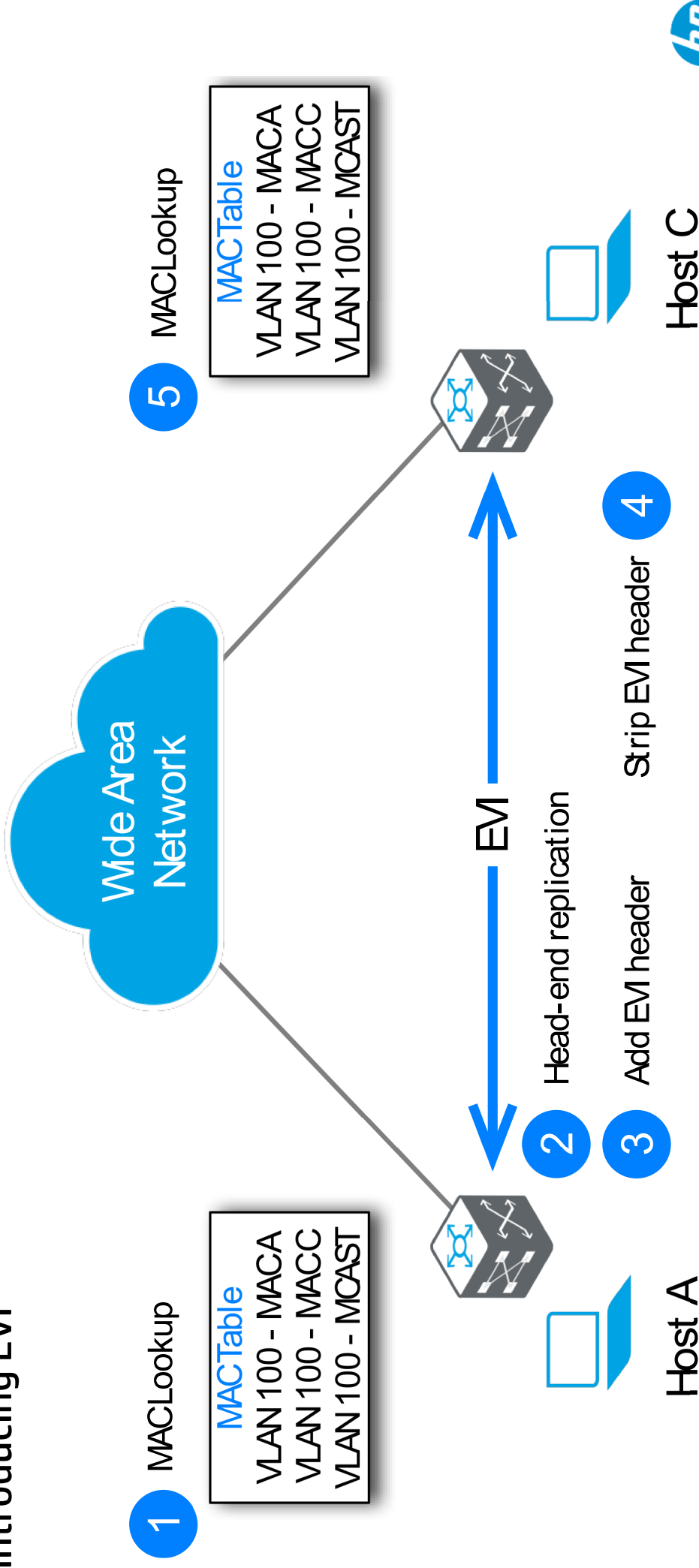
You can configure EVI selective flooding to permit/deny broadcast frames for specific applications.

Broadcast forwarding operates in a similar fashion to...



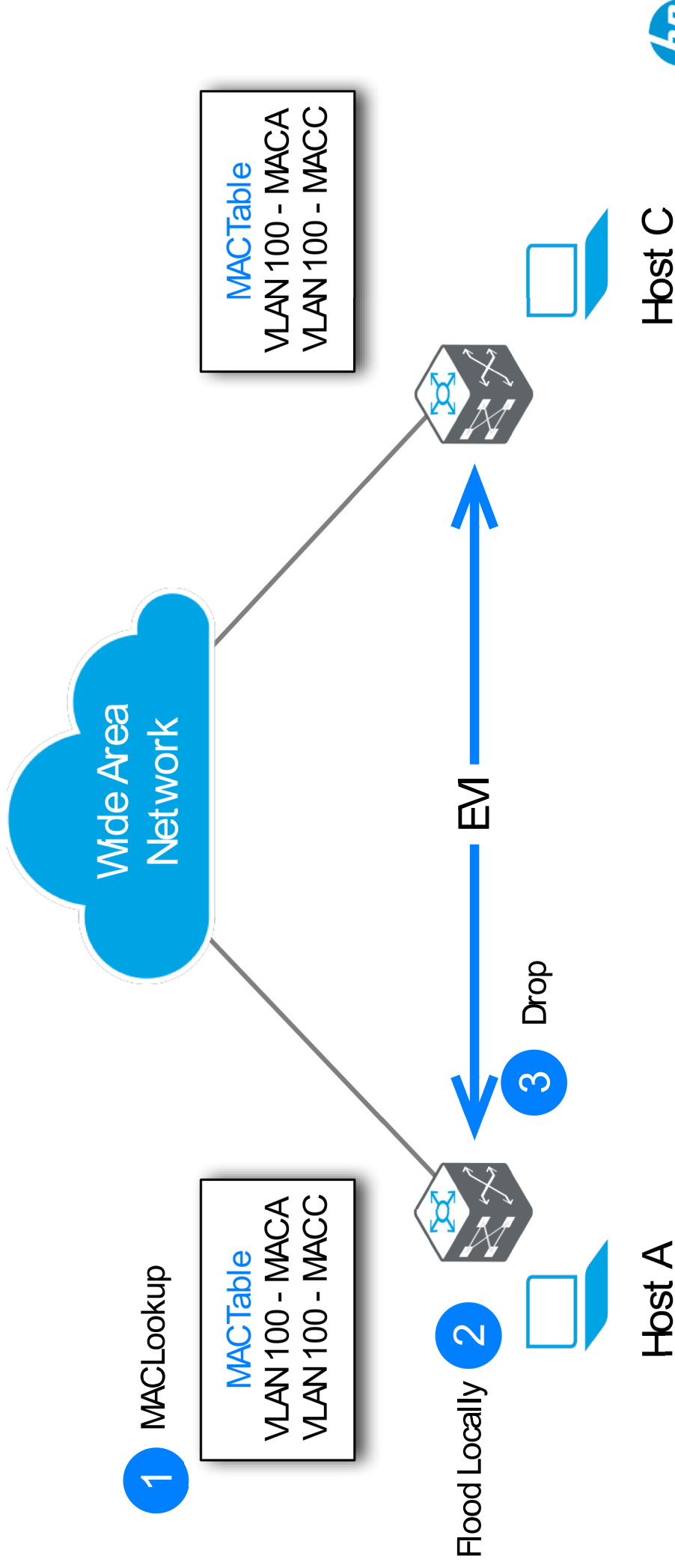
How does it work – Multicast Forwarding

Introducing EVI



How does it work – Unknown Unicast Forwarding

Introducing EVI



Additional Features

Introducing EVI

Split Horizon

STP Domain Boundary

ARP Caching



Better Together: EVI, MDC & IRF

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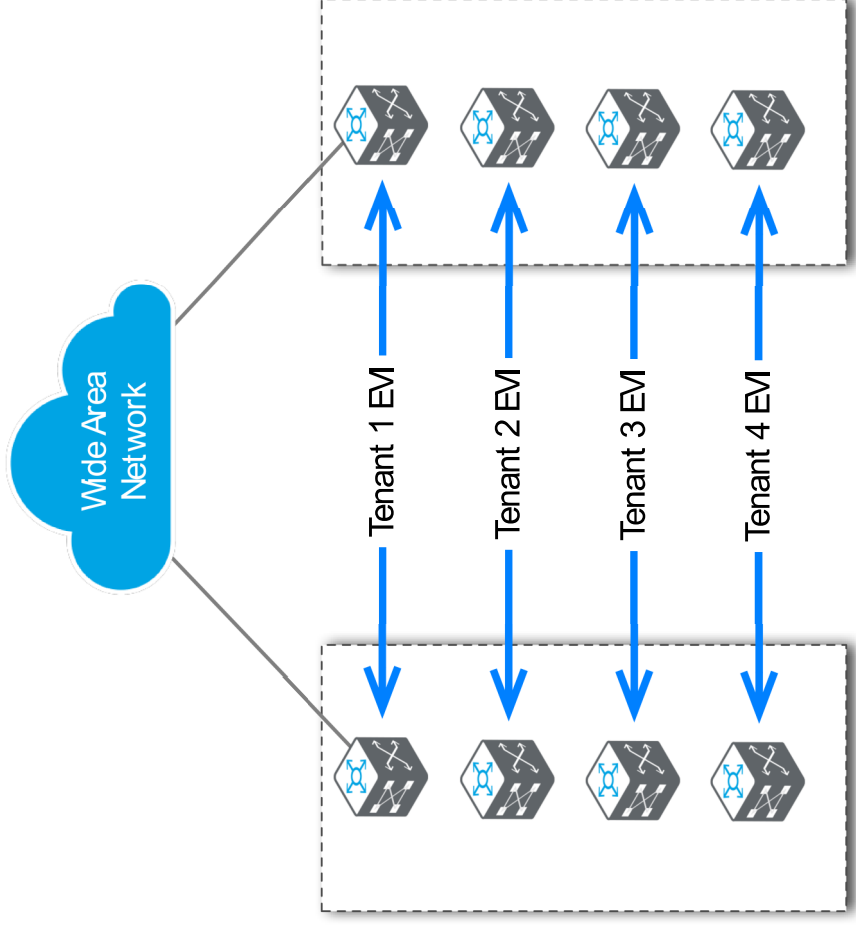
Multi-Tenant Enabled DCI

Better Together: EVI, IRF & MDC

EVI can be run in Multi-Tenant Device Contexts

Scales up to 8 DC's per MDC

Each MDC can support 4K 802.1Q VLANs or more using QinQ

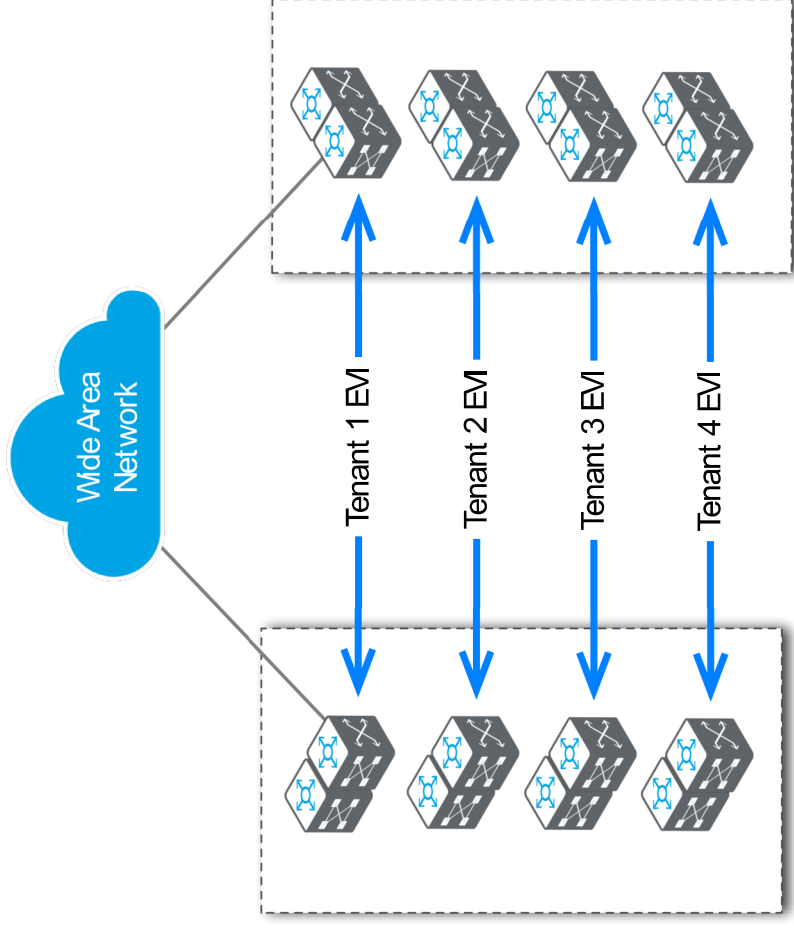


Best in class HA with IRF

Better Together: EVI, IRF & MDC

IRF can be used to provide High Availability to both MDC and IRF

Less than 40msec failover



Q&A

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Thank you

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