Application Requirements for Support of Duplicate Addresses in VLANS

Contribution to IEEE 802.1Q

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Issues with FDB Models

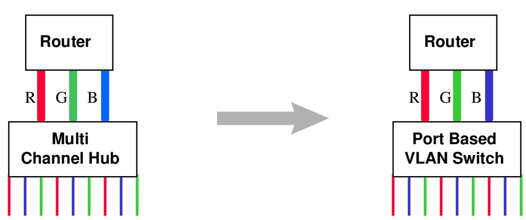
- Current Assumptions:
  - 1 Spanning Tree
  - Port based VLANs
- Do forwarding rules and FDB structure support instances of an address per VLAN?
  - Why is this important?
  - When is it not-desireable?

Application Requirements

- Migration from Multi-channel hubs to VLANs
- Litmus Test Application Examples
  1. Workstation with two adapters, single MAC
  2. Bridge/Router between VLANs
  3. DECnet P4 router
  4. Tagged end stations
- There are STP issues in example 2.

Migration from Multi-Channel Hub

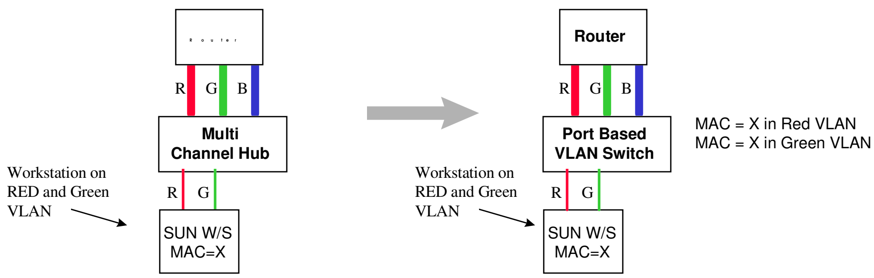
Consider the following migration (a common requirement in many user sites):



Support for duplicate addressing (by VLAN) in the FDB is required in at least 4 cases.

Multi-adapter - Single MAC

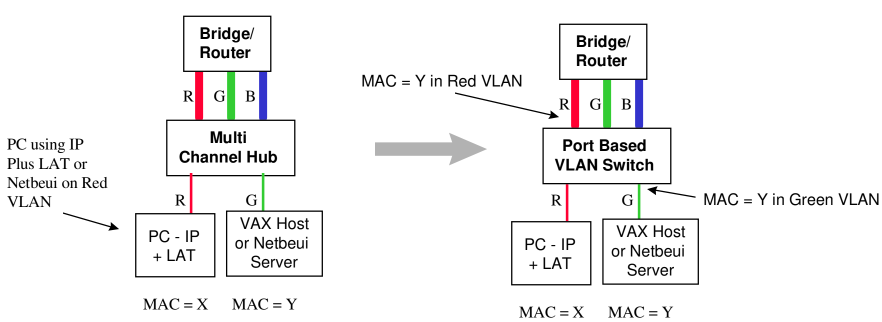
Multi-adapter, single MAC (Sun Workstation):



Potential Workaround if FDB does not support instance of MAC per VLAN = Create MAC unique addresses for W/S using ifconfig in Unix

Bridge/Router Between VLANs

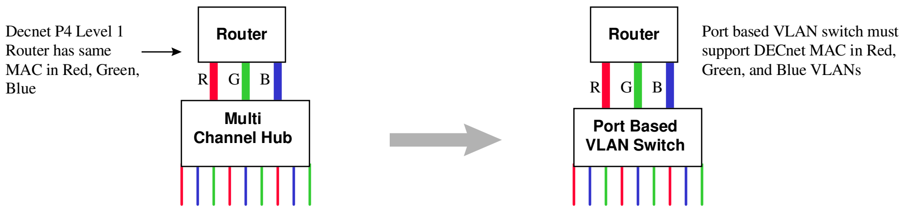
Bridge/Router Between VLANS (TCP/IP + LAT or NETBEUI)



Issue: Unless FDB supports instance of MAC per VLAN there is no workaround for non-routable protocols in the case where a bridge/router exists between VLANs (ignoring STP issues)

DECnet Router between VLANs

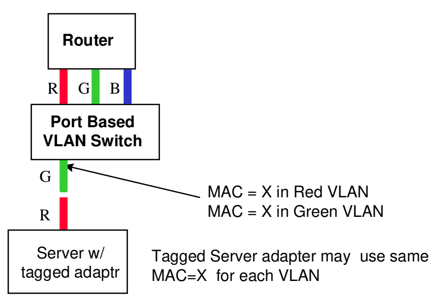
DECnet Phase IV Level 1 Router between VLANS



Issue: Unless FDB supports instance of MAC per VLAN there is no workaround for DECnet P4 Level 1router between VLANs for port based VLAN

Tagged End Station

Tagged End Station:



1. If tagged endstation uses one MAC, FDB must support multiple VLAN identities for the MAC (at least on one port)

2. Future multiple STP instances might forward RED VLAN on one trunk and GREEN VLAN on another….thus MAC=X would need multiple port identities as well.

Addressing by MAC/VLAN

- Needed: An FDB structure which works to solve these “litmus” tests:
  1. Need logically segmented address filtering data bases
  2. Potential implementations:
     - FDB per VLAN (48 bit lookup within VLAN)
     - Address entries (static and dynamic) include VLAN-ID
  3. Addresses learned and aged separately by VLAN

“Leaky” VLANs

- Should we allow direct forwarding between VLANs? Why?
  1. Separate “broadcast/flood domain” (=VLAN) from directly addressed reachability
  2. Allow schemes bypassing routing between VLANs
  3. Allow (multicast) groups spanning VLANs
- Problem: Previously described scheme doesn’t appear to allow this

Conclusion

- There are real application problems which need solution (litmus test cases) which should be applied to our FDB and forwarding processes
- MAC address per VLAN is solvable without complexity
- leaky VLAN solution is a separate issue