

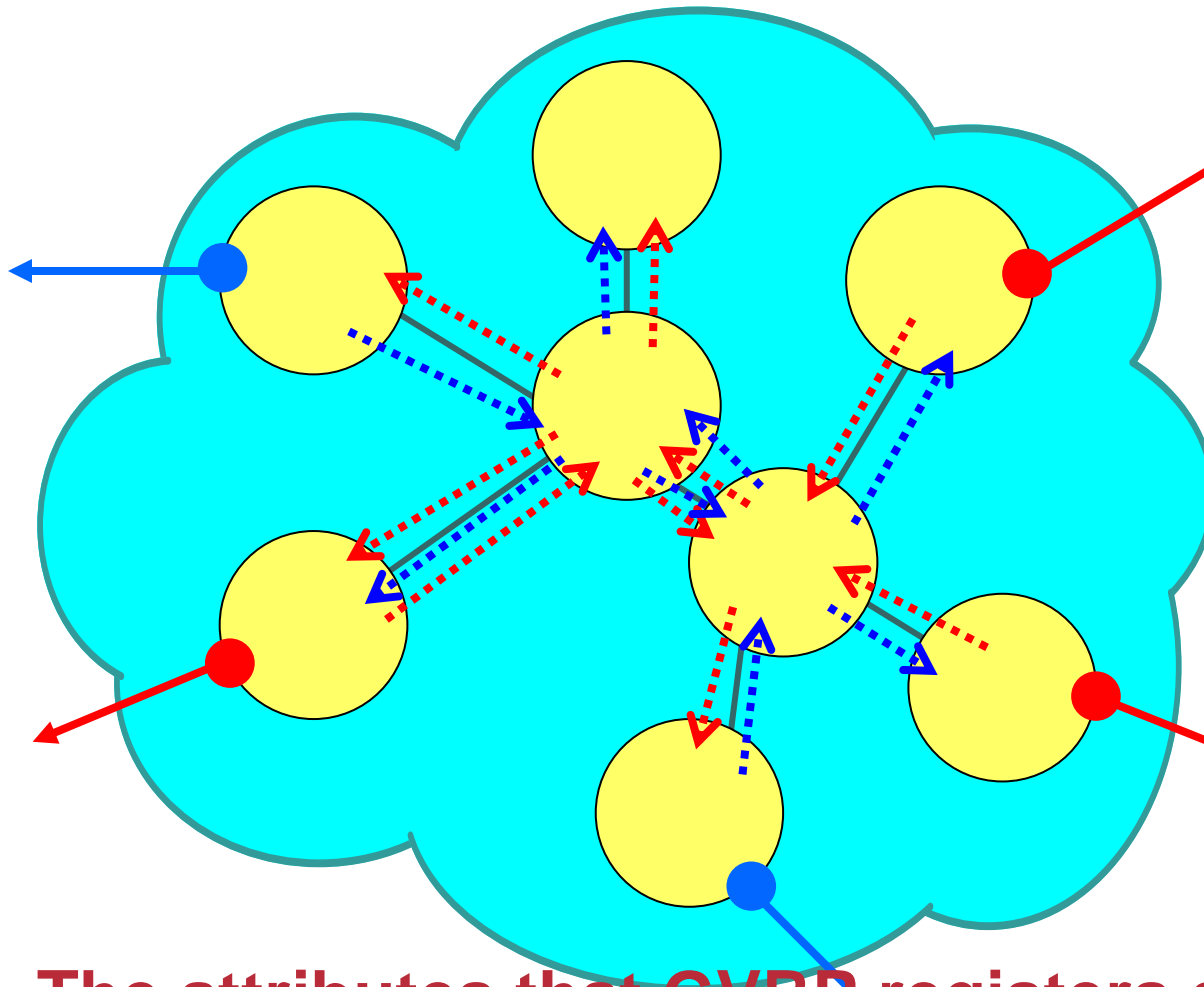
Vectorized GARP

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General Attribute Registration Protocol

GARP and **GVRP** (GARP VLAN Registration Protocol)

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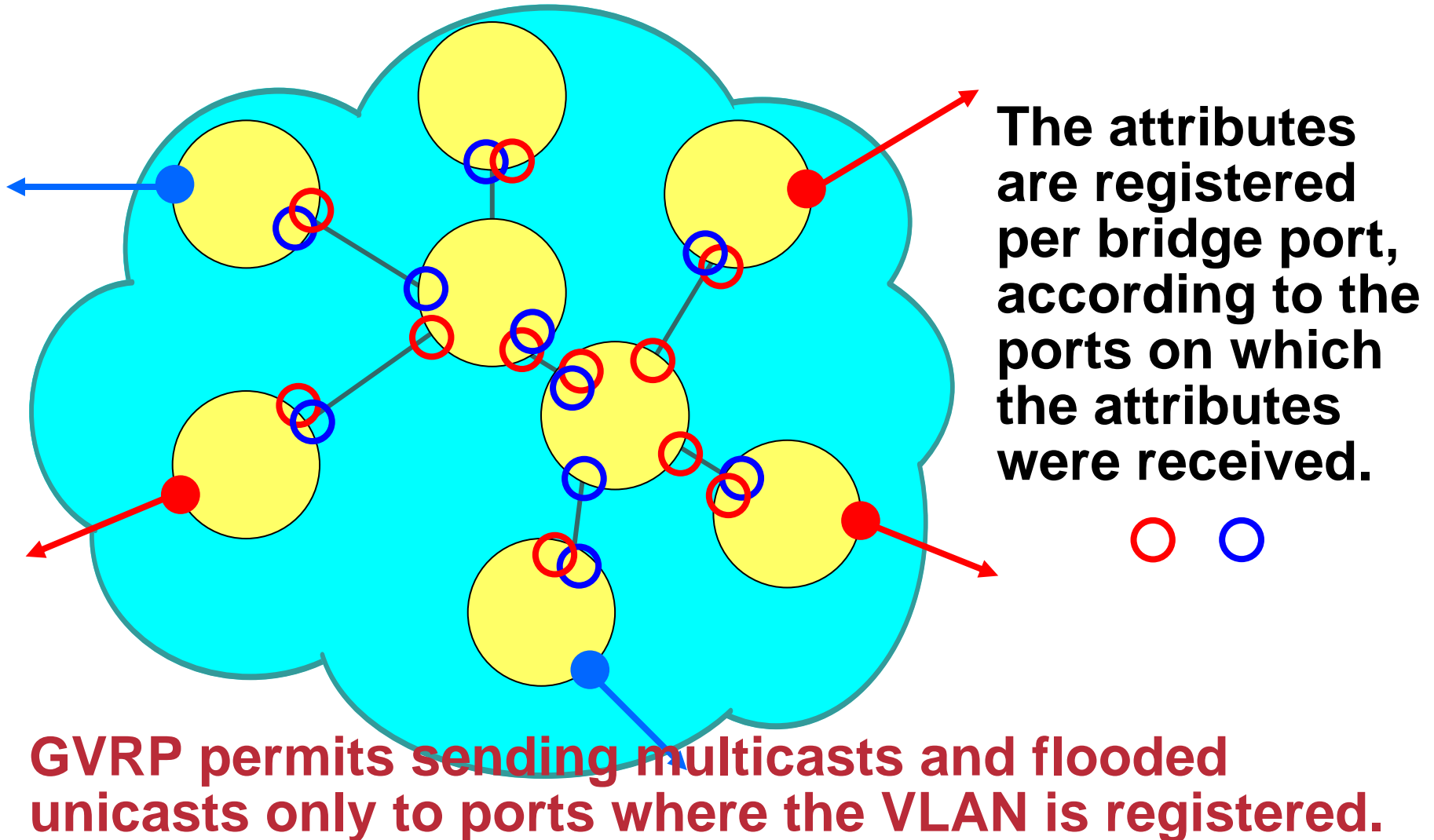


Certain bridges know through some means (such as configuration) that they possess some attribute. They advertise this to their peers, who propagate the registration information.

The attributes that GVRP registers are of the form, “I need to receive flooded traffic for VLAN *n*”.

GARP and **GVRP** (GARP VLAN Registration Protocol)

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What's wrong with GARP?

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General Attribute Registration Protocol

- **Each VLAN or MAC address is encoded as a 2-byte or 6-byte integer. It takes up to 11 frames to transmit 4094 GVRP states.**

The amount of state required to support GARP increases significantly if all attributes that can be propagated cannot fit into one frame.

Transmitting multiple frames risks overflowing received buffers, and magnifies the fragmentation of propagated information.

What's wrong with GARP?

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General Attribute Registration Protocol

- **A random timer must expire before GARP information can be propagated to any port. This slows convergence.**

This delay is necessary for shared media.

Changes to be made to GARP

Changes to be made to GARP

- **The state machines must be modified to operate more quickly on point-to-point media.**
- **Media with more than two GARP participants for the same application (GVRP, GMRP, etc.) must be detected, so that the timeout based shared medium behavior may be used.**
- **We may wish to restore point-to-point operation if all but two participants leave.**

Changes to be made to GARP

- **Applications that know that all possible attributes' states can be carried in one frame may be able to eliminate extra state and/or timers.**
- **We may wish to make provision for interoperability with existing GARP implementations.**

Changes to be made to the GVRP GARP Application

Changes to be made to GARP

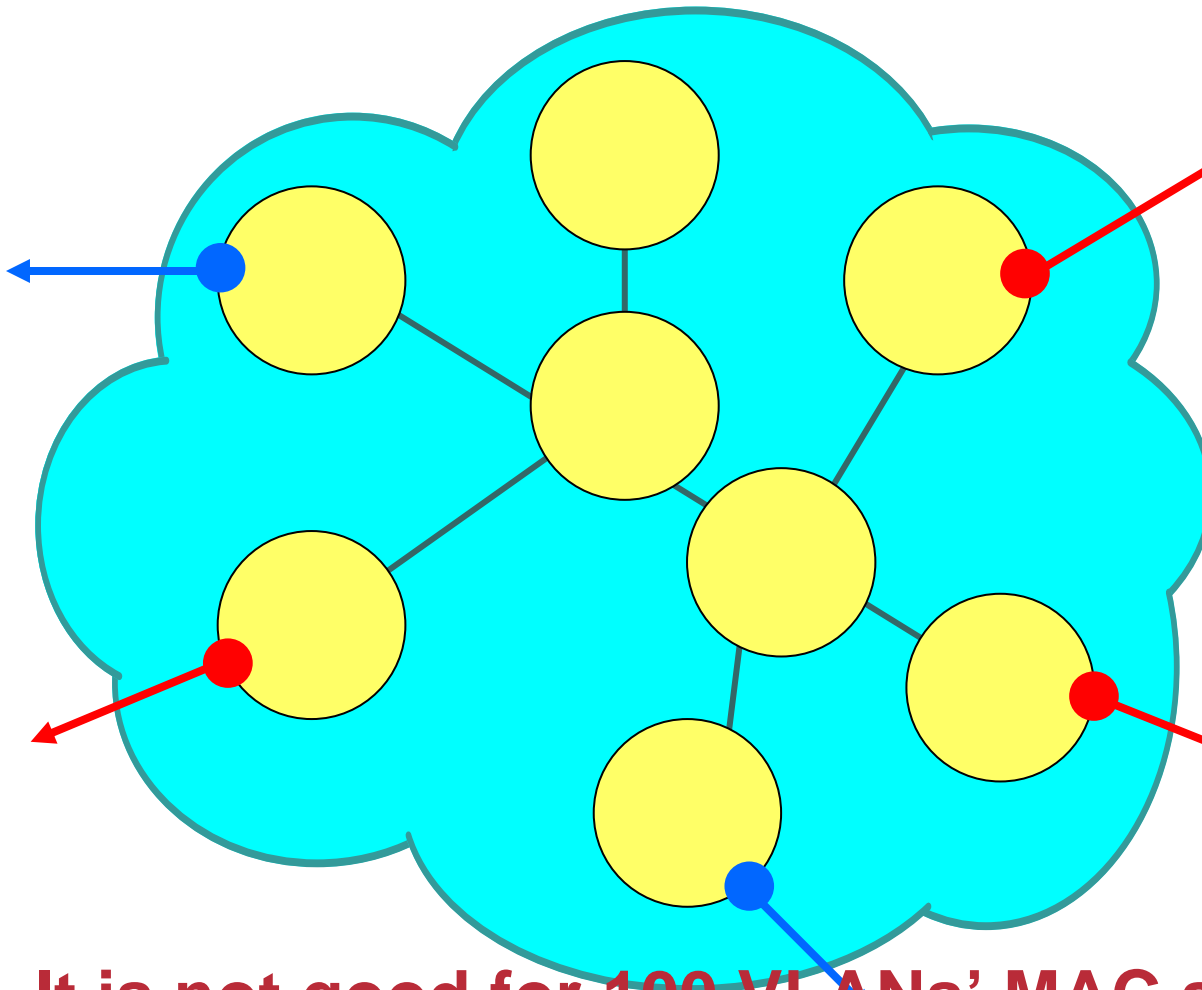
- **GARP state machines need to convey 5 states per registered Attribute: JoinIn, JoinEmpty, Leave, In, and Empty.**
- **$(5 \text{ states}) \times (4094 \text{ VLANs}) = 1189 \text{ bytes}$, which fit easily into one frame.**
- **An encoding scheme that takes advantage of this must be defined.**

Changes to be made to GVRP

- **GVRP handles only 4094 VLANs; it needs to handle the full range of the I-Tag, at least 2^{20} .**
- **GVRP can improve the operation of MSTP in the Provider environment.**

GVRP and Customer Spanning Trees

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If the “C-VLAN aware component of a Provider Bridge” (a C-Bridge) detects a Topology Change in one Customer’s spanning tree, the Provider Network must react.

It is not good for 100 VLANs’ MAC addresses to be forgotten because one VLAN had a Topology Change.

Changes to be made to GVRP

- **By adding two new states to the five, TCNJoinIn and TCNJoinEmpty, we can encode Topology Change Notices in an extended GVRP.**
- **7 states for 4094 VLANs can be encoded in approximately 1440 bytes, which (barely) fits into one frame.**

Changes to be made to the GMRP GARP Application

Changes to be made to GMRP

- **If the multicast MAC addresses of interest to a network tend to be clumped in narrow numeric ranges, then a starting MAC address and a vector of states for that and subsequent addresses can be an efficient way to encode GMRP states.**

We can anticipate uses for clumps of multicast MAC addresses in Core Networks for restricting the ranges of specific Service Instances.

Changes to be made to GMRP

- **There must be some means for specifying the ranges of these “clumps”, so that multicast MAC addresses outside the “clumps” can be propagated promiscuously.**

This means may be configuration, or may involve GMRP. This is to be determined.

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