10. Notes on 802.1 Meeting Session on P802.1j, Managed Objects for MAC Bridges (Alan Chambers)

Thursday 12 July 1995, 09:00

The meeting considered the comments received on the ballot of P802.1j/D4, which had just closed successfully.

The editor, Alan Chambers. summarized the ballot responses received and proposed how to resolve the comments. With one exception, all the comments were in effect editorial (a few, from Hal Keen, were editorial but with technical impact, in that they involved mis-spellings of identifiers formally defined elsewhere, etc).

The one technical issue, highlighted by Hal Keen's comment item 5, was the need to reinstate the Entry Index attribute (deleted at a previous stage) in order to permit the Read Filtering Database Entry Range operation (802.1D, 6.7.5.4) to be mapped in the GDMO. Some alternative suggestions were made for identifying multiple filtering database entries. However, it was agreed that it was important to preserve the simple model implied by 6.7.5.4, in order to maximize freedom in FDB implementations and preserve simplicity in supporting FDB management, by avoiding imposing a particular structure for the FDB information returned. It was noted, as accepted during the development of 802.1D and 802.1G, that changes to the FDB during a sequence of Read Range operations could cause the results returned to have omissions or duplications, but this was at most a minor problem.

The meeting agreed to the changes recorded in the Instructions to Editor, P802.1-95/008 (which also contains a summary of voting and disposition of comments).

11. Proposed US comment on DTR 11802-2 second edition. (Alan Chambers)

Rationale

The intent in assigning an OUI to JTC 1, to be administered by SC 6, was to give SC 6 full rights to assign MAC addresses constructed from that OUI. In particular, SC 6 should be able to assign group MAC addresses for use by its own standards, as and when the need arises.

The US proposes that the list of organizations that may submit requests for standard group MAC addresses be extended to include technical committees and subcommittees of ISO and IEC (including of course SC 6 itself).

Proposed Text

(1) In 5.5.2, change lines 3 and 4 to read:

"SC6. Submissions can be made by members of the SC (that is, members as defined by the ISO/IEC directives -- currently P-, L-, O- and S-members), and by technical committees and subcommittees of ISO and IEC (including SC itself). A request for a reserved..."

(2) In annex A, change the start of the first paragraph to read:

"A request for assignment from an organization other than a Liaison Organization or a technical committee or subcommittee needs to be made ..."

12. Notes of the discussions on Traffic Class Expediting/Multicast Filtering (Tony Jeffree)

Two papers were presented at the meeting. The first (circulated via the exploder in late June and presented in paper form at the meeting) outlines the changes required to section 3 of the current 802.1D standard in order to introduce the concepts of traffic classes, multiple queues and dynamic multicast filters. The second, attached to these minutes, discusses some proposals for the description of filtering services in bridged LANs.

Points emerging from the two sessions included the following:

1. The proposed changes to section 3 appeared generally to be well received, and appeared to be a good starting point for developing the text of 802.1p.
2. Some discussion took place around the representation of information in the filtering database, and whether the structures proposed in the "Section 3" paper could be simplified. The Editor was instructed to look at possible simplifications.
3. Discussion of the Services document concluded that the more general material, describing the intent of providing filtering services, was probably candidate material for section 2 of 802.1D during the current revision of the text. The remainder, given that it isintroducing new mechanisms/ideas, will need more extensive work as part of the development of 802.1p.
4. It was very clear from the discussion of the Services document that the proposed filtering services are an underpinning mechanism for the support of the vLAN techniques discussed in other sessions at the meeting.
5. It would be desirable to include an annex in the standard which discusses performance issues relative to the number of traffic classes/queues and the technologies employed.

The following is the text of the "services" document discussed at the meeting:

Filtering Services in Bridged Local Area Networks

Tony Jeffree

17 July 1995

Preamble

This document discusses the services that are required in Bridged LANs in order to address the requirements of traffic class expediting/dynamic multicast filtering in bridges. The intention is that it will act as a starting point for developing a set of additions/changes to the current description of the MAC service; at present, this is documented partly in section 2 of 802.1D and partly in the MAC service definition (DIS 15802-1).

The services described are services in the most general sense; i.e., they are descriptions of the functionality that the MAC service user may need to make use of in order to control and access filtering capabilities in LANs. The description makes no assumptions in terms of how those services might be realised; clearly, there are at least the following possibilities:

- development of specific 802.1 standard protocols to support the service;
- use of existing protocols and mechanisms, defined in 802 standards and elsewhere;
- management functionality, either locally defined or implemented via remote management protocols;
- other means, proprietary or otherwise.

This document is best read in conjunction with the proposed changes to 802.1D section 3 to support traffic expediting/multicast filtering.

Purpose(s) of filtering service provision

[Note: This is essentially what is said in the proposed replacement text for section 3.9 (Filtering Database) of 802.1D, as circulated to the 802.1 exploder in mid June ‘95 and at the Maui meeting in July ‘95.]

Filtering services are provided in Bridged LANs for the following purposes:

(1) Administrative.

Filtering services provide for administrative control over the use of particular source and destination addresses in designated parts of the network. Such control allows network administrators to limit the extent of operation of network layer and other protocols that make use of individual and group MAC addresses by establishing administrative boundaries across which specific MAC addresses may not be forwarded.

(2) Traffic Reduction.

Filtering services increase the overall throughput of the network. They achieve this end by:

a) limiting frames destined for specific MAC addresses to parts of the network which, to a high probability, lie along a path between the source MAC address and the destination MAC address;
b) reducing the extent of group addressed traffic to those parts of the network which contain end stations that are recipients of that traffic.

(3) Traffic Prioritization.

Filtering services provide a means whereby time-critical classes of traffic can be identified in order that their passage through the network may be expedited.

Goal(s) of filtering service provision

The filtering services provided in Bridged LANs offer a set of capabilities that protocol designers and system developers can use in order to:

a) allow end systems to dynamically indicate to the MAC service provider which destination MAC addresses they wish to receive;

b) allow server systems to dynamically indicate to the MAC service provider which MAC address(es) they will be using in order to provide their services to end systems, and to associate a user_priority with such addresses;
c) allow network managers to exercise administrative control over the user_prioroty and extent of propogation of specific MAC addresses.

Users of Filtering Services

The filtering services provided in Bridged LANs are available to the following users:

a) Network management, for the purposes of applying administrative control. Interactions between administrators of the network and the filtering service provider may be achieved by local means or by means of explicit management mechanisms;
b) End stations and servers. Interactions between end stations/servers and the filtering service provider may be implicit (as is the case with the existing 802.1D filtering services), or explicit, by use of the service primitives defined below.
c) Application & protocol designers, who are responsible for defining how particular applications and devices will make use of the available filtering services.

Basis of Service

All filtering services in Bridged LANs rely on the establishment of filtering rules, and subsequently carrying out filtering decisions, that are based on the value(s) contained in the Source or Destination MAC Address fields in MAC frames propagated in the Bridged LAN.

Service Configuration

Each port may be in one of the following states:

(1) Forward All. This is the default state of all ports in existing bridges; i.e., filtering/forwarding decisions are applied as currently defined in 802.1D.

(2) Forward All except 'REGISTER_TO_SEND' without "REGISTER_TO_RECEIVE'. This is the default state of new bridges implementing all service primitives as shown above. In addition to the addresses explicitly registered, the Forwarding Process will also forward those group MAC addresses for which the Filtering Database has no explicit filtering information.

(3) Forward 'REGISTER_TO_RECEIVE_ONLY'. This is the state of new bridges implementing all service primitives. May be configured statically by network managers, or dynamically by MAC service users. [Note that this state may have application to the unicast address case as well - the Bridge might not know where the station is, but it is not on this port. This cuts down on unknown destination forwarding across a link.]

Service Primitives

The following service primitives define particular types of interaction between MAC service users (server systems and end stations) and the MAC service provider accross the MAC service boundary. As these interactions are not defined between peer entities, they are described simply in terms of service requests sent from the MAC service user to the MAC service provider.

Recipient (end system) registration/de-registration

Intent: Allows potential recipients to control the set of MAC Addresses that they receive. Indirectly, the use of this service may affect the contents of Dynamic Group Recipient entries in the Filtering Database of the bridge(s) that serve the receipients (see proposed changes to 802.1D section 3), and the Port states as described above.

ES_REGISTER_FOR_RECEIVE (MAC_ADDRESS)

Indicates to the MAC service provider that the end system wishes to receive packets containing the MAC_ADDRESS value as the destination address.

ES_DEREGISTER_FOR_RECEIVE (MAC_ADDRESS)

Indicates to the MAC service provider that the end system wishes to receive packets containing the MAC_ADDRESS value as the destination address.

ES_ENABLE_RECEIVE_DEFAULTS

Indicates to the service provider that the end system wishes to receive group MAC Addresses that do not appear in either staic filtering entries or dynamic group entries in the Filtering Database. This sets the associated Port to state (2) as described above.

ES_DISABLE_RECEIVE_DEFAULTS

Indicates to the service provider that the end system should receive only those MAC Addresses that it has explicitly registerd to receive. This sets the associated Port to state (3) as described above.

Server registration/deregistration

Intent: Allows servers to announce that particular MAC Addresses require registration on the part of potential recipients. The use of this service may result in the propagation of the address/priority information across the spanning tree, affecting the contents of group entries in the Filtering Database.

SERVER_REGISTER_TO_SEND (MAC_ADDRESS, USER_PRIORITY)

Identifies to the MAC service provider a MAC address for which potential recipients are required to register their intent to receive, and indicates the USER_PRIORITY which should be used for frames destined to that address.

SERVER_DEREGISTER_TO_SEND (MAC_ADDRESS)

Identifies to the MAC service provider a MAC address for which registration by potential recipients is no longer required.

Static registration/deregistration

Intent: These services allow administration of static entries in the Filtering Database.

DESIGNER_ALLOCATE _TO_ALWAYS_REGISTER (MAC_ADDRESS, PORT_MAP, USER_PRIORITY)

Indicates to the service provider that a given MAC_ADDRESS is one for which registration for reception is always required. This may result in the creation or modification of a static filtering entry in the filtering database.

DESIGNER_DEALLOCATE _TO_ALWAYS_REGISTER (MAC_ADDRESS)

Indicates to the service provider that a given MAC_ADDRESS is no longer one for which registration for reception is always required. This may result in the modification of a static filtering entry in the filtering database.

MANAGER_ALLOCATE_REGISTERED_RECIPIENT (MAC_ADDRESS, PORT_SET)

Indicates to the service provider that, for a given MAC_ADDRESS, there are potential recipients reachable via the set of Ports. This may result in the creation or modification of a static group recipient entry in the filtering database.

MANAGER_DEALLOCATE_REGISTERED_RECIPIENT (MAC_ADDRESS)

Indicates to the service provider that, for a given MAC_ADDRESS, there are no potential recipients. This may result in the removal of a static group recipient entry from the filtering database.

Default Port state configuration

Intent: This service allows administration of the default Port state (as defined above) that will apply on (re)-initialisation of a Bridge.

MANAGER_DEFINE_DEFAULT_PORT_STATE (PORT, STATE)

Indicates to the service provider the default state of the specified Port, i.e., the state (as defined above) that the Port should adopt.

Associated Protocol (optional)

In the case of dynamic allocation of group MAC Addresses, there may be a requirement for a Server to Client protocol exchange, described by the service primitive:

Please_Register_For (MAC_ADDRESS)

13. List of documents distributed at the meeting (provided by R. Slager)

VLAN Ad Hoc Meeting (distributed by Karl Shimada, Rising Star)

IEEE 802 Virtual LANs (VLANs), Proposed Definition and Requirements from John Hart/Floyd Backes (distributed by John Hart)

"Some VLAN Requirements & Considerations", by Henry Yang & Anil Rijsinghani, DEC (distributed by Henry Yang - see above)

Tutorial, sponsored by 802.1 (one hand-out)
"1995 - The Year of the Virtual LAN" presented by mmcnealis (CISCO)
& "ATM LAN-Emulation" - Keith McCloghrie (CISCO)

"Issues Underlying Supporting Multimedia Applications in IEEE 802.1 by Fouad A. Tobagi -Stanford University and Starlight Networks

"Multi-Media Communications Quality of Service" - handed out by Richard Brand