To: IETF
From: IEEE 802.1
Subject: Use of IEEE 802.1Q VLAN tags
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802.1 has received enquiries from various sources about the following topics:

1) Compatibility and conformance of the use of a VLAN tag in conjunction with further encapsulating MAC addresses.
2) Uses of VLAN tag translation in conjunction with the tags define by 802.1Q that have 12-bit VLAN identifiers.
3) Possible use of two of the 802.1Q VLAN tags together to form a larger 24-bit VLAN identifier.

We have not examined the detailed architectural ramifications of MAC address encapsulation in conjunction with VLAN tagging, beyond the uses presently being standardized as P802.1ah Provider Backbone Bridging.

Translation of 802.1Q S-VLAN tags (with 12 bit VIDs) is supported at S-tagged service interfaces, as an option, by the IEEE Std 802.1ad Provider Bridging amendment to IEEE Std 802.1Q. Translation of C-VLAN tags (again with 12 bit-VIDs, but for use by ‘customer’ bridges) is expressly prohibited by currently approved standards.

The possible concatenation of two 802.1Q VLAN tags (to yield a 24-bit VLAN identifier) has been discussed, is of considerable concern, and is believed to be not just a violation of the 802.1Q standard but also of the architectural principles on which 802.1 standardization is based.

It is fundamental to Ethertype protocol identification, and is the guiding principle in all 802.1 standards published or under development, that an Ethertype is used to unambiguously identify the type of the protocol entity transmitting the protocol data unit (i.e. the MAC addresses, the type field itself, and the octets of the frame following the type field). Further, in the 802.1 architecture, protocol data entities are peers. The protocol identifier thus serves to unambiguously identify the type of the receiving protocol entity, and the Ethertype is used by such a peer entity to recognize such frames, or by a demultiplexer to direct frames of the appropriate type to that entity. These principles are enshrined in IEEE Std 802 by its adoption of the OSI Reference Model as its guiding principle, though of course the principles were well known to the original Ethernet pioneers and predate the OSI RM and Standard 802. The protocol entities that make use of a given Ethertype are characterized not just by the format of packets 'on the wire' and rules for their interchange, but also by their defined interfaces to adjacent entities in the interface stack and the MAC relay entity as well as by their local management interface interactions

The VLAN tagging and detagging functions specified by 802.1 in IEEE Std 802.1Q do not make use of two VLAN tags simultaneously, nor is it clear within the 802.1 architecture what possible meaning could be assigned to the use of two Ethertypes together to identify either a transmitting or receiving protocol entity. Very considerable and ongoing efforts have and are being undertaken by 802.1 to develop the functionality provided by interface stacks (bridge ports) by the use of combinations of stacked protocol entities. These include the now completed development of P802.1AE MAC Security and the anticipated early completion (by cooperation with the ITU) of P802.1ag Connectivity Fault Management. While it may be observed that by *local* convention in a single administrative domain no protocol stacks might be instantiated such that MAC Security or CFM or any other future functionality developed by 802.1 is interposed between two VLAN tagging/detagging protocol entities, this cannot be taken as the basis of interoperability or as a constraint on the future development of the individual VLAN tagging entities or of other entities within an interface stack.

While the formal control of the specification of the 802.1 VLAN tagging/detagging entities rests with 802.1 by virtue of its ownership of the associated Ethertype allocation, 802.1

requests that other SDOs not use other Ethertype allocations to develop protocol entities with wire protocol formats that intentionally replicate those of the 802.1Q specification. Such replication would likely cause users of standards to change the Ethertypes actually used in deployment, thus risking future practical interoperability problems including commercial constraints on successful standards development.