

Use of the IEEE Assigned EtherType™

Abstract

This tutorial summarizes EtherType™ identifiers assigned by the IEEE Registration Authority (IEEE RA), primarily for use as protocols identifiers. It addresses formats, assignment, guidelines, and policies relevant to assignees as well as to standards developers.

Status and History

This tutorial supersedes the IEEE RA tutorial document “Use of the IEEE Assigned Ethertype with IEEE Std 802.3 Local and Metropolitan Area Networks.”

Tutorial

An EtherType™ provides context (typically by protocol identification) for interpretation of the data that follows within a frame.

IEEE Std 802.3 specifies a Length/Type field in an Ethernet frame¹. This field, as described in IEEE Std 802.3 Clause 3.2.6, is two octets long and has one of two interpretations – Length interpretation or Type interpretation – depending on its numeric value. For numeric evaluation, the first octet is the most significant octet of this field. When the value of this field is greater than or equal to 1536 decimal (0600 hexadecimal), the Type interpretation applies, and the Length/Type field contains an EtherType that indicates (or provides a mechanism to indicate) the MAC client’s protocol. Consequently, all EtherTypes fall in the range 0600 to FFFF hexadecimal. The Length and Type interpretations of this field are mutually exclusive; note, however that the LLC encapsulation EtherType 8870 (hex), like a Length, is followed by an LLC-encapsulated protocol identifier.

Many standards represent the EtherType in the format WX-YZ, indicating WXYZ hexadecimal.

Unique EtherType assignments are available from the IEEE Registration Authority.

EtherType has been adopted as a protocol identifier by standards other than IEEE Std 802.3, including other media access control methods. Some uses include encapsulation of EtherType encoding within an ISO/IEC 8802-2 specified SNAP SAP, or encapsulation of EtherType encoding within a different EtherType contained within an Ethernet Length/Type field.

Since EtherType assignments are constrained to a small numeric space, new assignments are carefully controlled. It is incumbent upon an applicant to ensure that requests for EtherType assignments are very limited and made only as needed. Requests for multiple EtherType assignments by the same applicant will not be granted unless the applicant certifies that they are for unrelated purposes. In particular, only one new EtherType is necessary to limit reception of a new protocol or protocol family to the intended class of devices. New protocols and protocol families should have provision for a subtype field within the new specification to handle different aspects of the application (e.g., control vs. data) and future upgrades.

The following should be considered before requesting a new EtherType assignment:

- Use of an existing protocol with its currently allocated EtherType.
- Use of further, as yet unexhausted, protocol identification capabilities (sub-types) within an existing protocol or protocol family.

¹ A field in the same location within the frame as the Length/Type field was known as the Type field in the pre-standard Ethernet specification and the Length field in early IEEE 802.3 standards.

- Specification of additional protocol identification subtypes within a new protocol to allow similar or related uses without the need for more than one EtherType Field assignment.
- Use of Local Experimental EtherType (see IEEE Std 802), intended for use with experimental protocol development within a privately administered development network.
- Use of the OUI Extended EtherType (see IEEE Std 802), which allows an organization to specify many globally-unique protocol identifiers based on its own Organizational Unique Identifier (OUI) or Company Identifier (CID) assignment.

It is expected that, in the design of new protocols to be identified by an EtherType, fields are specified to provide for subtyping. The format used for subtyping in a protocol described in IEEE Std 802-2014, sub-clause 9.2.3 is recommended.

Each request for an EtherType assignment sent to the IEEE Registration Authority will be forwarded to the IEEE Registration Authority Committee for review and approval upon receiving all information necessary to process the application. This review process will consider detailed responses to the questions on the application form and is expected to complete in less than 90 days.

All information provided by the applicant will be kept confidential by the IEEE Registration Authority until the request is approved.

The EtherType assignee (registrant/owner of the assignment) may be identified as an organization or company in the public listing.

The IEEE Registration Authority does not grant requests for applicant-specified EtherType values.

The EtherType should not be requested for the sole purpose of resale.