

# EtherType

**EtherType** is a two-[octet](#) field in an [Ethernet frame](#). It is used to indicate which [protocol](#) is [encapsulated](#) in the payload of the frame and is used at the receiving end by the [data link layer](#) to determine how the payload is processed. The same field is also used to indicate the size of some Ethernet frames.

EtherType is also used as the basis of [802.1Q VLAN tagging](#), [encapsulating](#) packets from VLANs for transmission multiplexed with other VLAN traffic over an [Ethernet trunk](#).

EtherType was first defined by the [Ethernet II framing](#) standard and later adapted for the [IEEE 802.3](#) standard. EtherType values are assigned by the [IEEE Registration Authority](#).

## Overview[\[edit\]](#)

Preamble								Destination MAC						Source MAC						EtherType/Size		PayLoad				CRC			
1	2	3	4	5	6	7	8	1	2	3	4	5	6	1	2	3	4	5	6	1	2					1	2	3	4

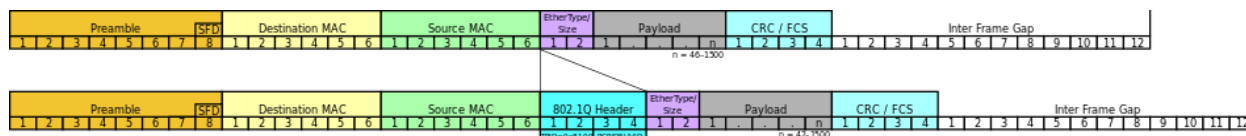
An Ethernet frame including the EtherType field. Each lower slot designates an octet; the EtherType is two octets long.

In modern implementations of Ethernet, the field within the Ethernet frame used to describe the EtherType can also be used to represent the size of the payload of the Ethernet Frame. Historically, depending on the type of Ethernet framing that was in use on an Ethernet segment, both interpretations were simultaneously valid, leading to potential ambiguity. [Ethernet II framing](#) considered these octets to represent EtherType while the original IEEE 802.3 framing considered these octets to represent the size of the payload in bytes.

In order to allow Ethernet II and IEEE 802.3 framing to be used on the same Ethernet segment, a unifying standard, IEEE 802.3x-1997, was introduced that required that EtherType values be greater than or equal to 1536. That value was chosen because the maximum length ([MTU](#)) of the data field of an Ethernet 802.3 frame is 1500 bytes and 1536 is equivalent to the number 600 in the [hexadecimal](#) numeral system. Thus, values of 1500 and below for this field indicate that the field is used as the size of the payload of the Ethernet frame while values of 1536 and above indicate that the field is used to represent an EtherType. The interpretation of values 1501–1535, inclusive, is undefined.<sup>[1]</sup>

The end of a frame is signaled by a valid [frame check sequence](#) followed by loss of carrier or by a special symbol or sequence in the [line coding scheme](#) for a particular [Ethernet physical layer](#), so the length of the frame does not always need to be encoded as a value in the Ethernet frame. However, as the minimum payload of an Ethernet frame is 46 bytes, a protocol that uses EtherType must include its own length field if that is necessary for the recipient of the frame to determine the length of short packets (if allowed) for that protocol.

## VLAN tagging[\[edit\]](#)



Insertion of the [802.1Q VLAN tag](#) (four octets) into an Ethernet-II frame, with a typical VLAN arrangement of a tag protocol identifier (TPID) EtherType value of 0x8100. A [QinQ](#) arrangement would add another four-octet tag containing a two-octet TPID using various EtherType values.

[802.1Q VLAN tagging](#) uses an 0x8100 EtherType value. The payload following includes a 16-bit tag control identifier (TCI) followed by an Ethernet frame beginning with a second (original) EtherType field for consumption by [end stations](#). [IEEE 802.1ad](#) extends this tagging with further nested EtherType and TCI pairs.

## Jumbo frames<sup>[edit]</sup>

The size of the payload of non-standard [jumbo frames](#), typically ~9000 Bytes long, collides with the range used by EtherType, and cannot be used for indicating the length of such a frame. The proposition to resolve this conflict was to substitute the special EtherType value 0x8870 when a length would otherwise be used.<sup>[2]</sup> However, the proposition (its use case was bigger packets for [IS-IS](#)) was not accepted and it is defunct. The chair of IEEE 802.3 at the time, Geoff Thompson, responded to the draft outlining IEEE 802.3's official position and the reasons behind the position. The draft authors also responded to the chair's letter, but no subsequent answer from the IEEE 802.3 has been recorded.<sup>[3]</sup>

While defunct, this draft was implemented and is used in Cisco routers in their IS-IS implementation (for IIH Hello packets padding).<sup>[4]</sup>

## Use beyond Ethernet<sup>[edit]</sup>

With the advent of the [IEEE 802](#) suite of standards, a [Subnetwork Access Protocol](#) (SNAP) header combined with an [IEEE 802.2 LLC](#) header is used to transmit the EtherType of a payload for IEEE 802 networks other than Ethernet, as well as for non-IEEE networks that use the IEEE 802.2 LLC header, such as [FDDI](#). However, for Ethernet, Ethernet II framing is still used.

## Registration<sup>[edit]</sup>

EtherTypes are assigned by the IEEE Registration Authority,<sup>[5]</sup> which publishes them in list format.<sup>[6]</sup> The [Internet Assigned Numbers Authority](#) has a separate list of some EtherType registrations, compiled from several sources, including the IEEE Registration Authority's list and some other lists.<sup>[7]</sup>

## Values<sup>[edit]</sup>

**EtherType values for some notable protocols<sup>[7]</sup>**

<b>EtherType (<a href="#">hexadecimal</a>)</b>	<b>Protocol</b>
0x0800	<a href="#">Internet Protocol version 4</a> (IPv4)
0x0806	<a href="#">Address Resolution Protocol</a> (ARP)
0x0842	<a href="#">Wake-on-LAN</a> <sup>[8]</sup>
0x2000	<a href="#">Cisco Discovery Protocol</a> <sup>[9]</sup>
0x22EA	<a href="#">Stream Reservation Protocol</a>
0x22F0	<a href="#">Audio Video Transport Protocol</a> (AVTP)
0x22F3	<a href="#">IETF TRILL Protocol</a>
0x6002	<a href="#">DEC MOP</a> RC
0x6003	<a href="#">DECnet</a> Phase IV, DNA Routing
0x6004	<a href="#">DEC LAT</a>
0x8035	<a href="#">Reverse Address Resolution Protocol</a> (RARP)
0x809B	<a href="#">AppleTalk</a> (EtherTalk)
0x80F3	<a href="#">AppleTalk</a> Address Resolution Protocol (AARP)
0x8100	VLAN-tagged frame ( <a href="#">IEEE 802.1Q</a> ) and Shortest Path Bridging <a href="#">IEEE 802.1aq</a> with <a href="#">NNI</a> compatibility <sup>[10]</sup>

0x8102	<a href="#">Simple Loop Prevention Protocol</a> (SLPP)
0x8103	<a href="#">Virtual Link Aggregation Control Protocol</a> (VLACP)
0x8137	<a href="#">IPX</a>
0x8204	<a href="#">QNX Qnet</a>
0x86DD	<a href="#">Internet Protocol Version 6</a> (IPv6)
0x8808	<a href="#">Ethernet flow control</a>
0x8809	Ethernet Slow Protocols <sup>[11]</sup> such as the <a href="#">Link Aggregation Control Protocol</a> (LACP)
0x8819	<a href="#">CobraNet</a>
0x8847	<a href="#">MPLS</a> unicast
0x8848	<a href="#">MPLS</a> multicast
0x8863	<a href="#">PPPoE</a> Discovery Stage
0x8864	<a href="#">PPPoE</a> Session Stage
0x887B	<a href="#">HomePlug 1.0 MME</a>
0x888E	EAP over LAN ( <a href="#">IEEE 802.1X</a> )
0x8892	<a href="#">PROFINET</a> Protocol

0x889A	<a href="#">HyperSCSI</a> (SCSI over Ethernet)
0x88A2	<a href="#">ATA over Ethernet</a>
0x88A4	<a href="#">EtherCAT</a> Protocol
0x88A8	<a href="#">Service VLAN tag identifier (S-Tag) on Q-in-Q tunnel</a>
0x88AB	<a href="#">Ethernet Powerlink</a> <sup>[<i>citation needed</i>]</sup>
0x88B8	<a href="#">GOOSE</a> (Generic Object Oriented Substation event)
0x88B9	GSE ( <a href="#">Generic Substation Events</a> ) Management Services
0x88BA	<a href="#">SV (Sampled Value Transmission)</a>
0x88BF	<a href="#">MikroTik RoMON</a> (unofficial)
0x88CC	<a href="#">Link Layer Discovery Protocol</a> (LLDP)
0x88CD	<a href="#">SERCOS III</a>
0x88E1	<a href="#">HomePlug Green PHY</a>
0x88E3	<a href="#">Media Redundancy Protocol</a> (IEC62439-2)
0x88E5	<a href="#">IEEE 802.1AE</a> MAC security (MACsec)
0x88E7	Provider Backbone Bridges (PBB) ( <a href="#">IEEE 802.1ah</a> )

0x88F7	<a href="#">Precision Time Protocol</a> (PTP) over IEEE 802.3 Ethernet
0x88F8	<a href="#">NC-SI</a>
0x88FB	<a href="#">Parallel Redundancy Protocol</a> (PRP)
0x8902	<a href="#">IEEE 802.1ag Connectivity Fault Management</a> (CFM) Protocol / <a href="#">ITU-T Recommendation Y.1731</a> (OAM)
0x8906	<a href="#">Fibre Channel over Ethernet</a> (FCoE)
0x8914	<a href="#">FCoE</a> Initialization Protocol
0x8915	<a href="#">RDMA over Converged Ethernet</a> (RoCE)
0x891D	<a href="#">TTEthernet</a> Protocol Control Frame (TTE)
0x893a	<a href="#">1905.1</a> IEEE Protocol
0x892F	<a href="#">High-availability Seamless Redundancy</a> (HSR)
0x9000	<a href="#">Ethernet Configuration Testing Protocol</a> <sup>[12]</sup>
0xF1C1	Redundancy Tag ( <a href="#">IEEE 802.1CB Frame Replication and Elimination for Reliability</a> )

See also<sup>[[edit](#)]</sup>

- [Port \(computer networking\)](#)