Ethernet Metadata Services

Call-for-interest Opening Report

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What is Metadata?

- Metadata is data about data!

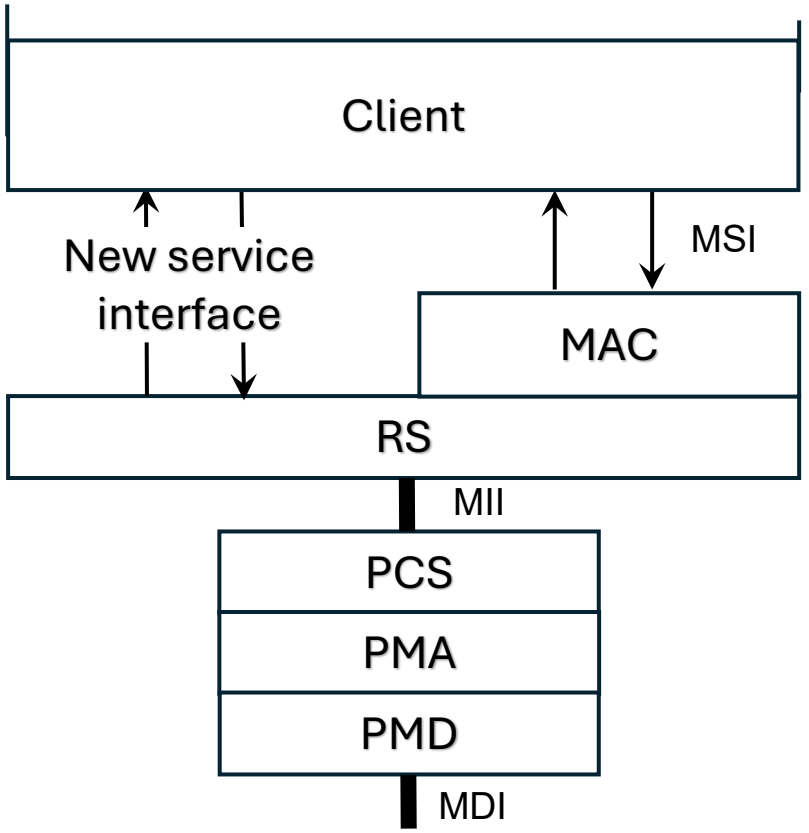
- Example: EXIF information attached to digital photos
  - Not the picture itself
  - But information about where the picture was taken, exposure, etc

- For Ethernet-
  - Can be information associated with a packet
  - Can be information associated with the Ethernet link

- For Ethernet, new applications such as AI/ML networking can see utility in defining and using some Ethernet Metadata Service

Proposal

- Add support for Metadata Services with new service interfaces
  - IEEE 802.3 Ethernet MAC unchanged
  - MAC Service Interface unchanged
- Add support for Metadata Services to appropriate PHYs
  - Client can provide per-packet metadata
  - Client can provide packet-independent metadata channel
- PHY type (data rate and media) specific
  - Management entity queries the PHY type
    - Certain PHY types cannot support this service
  - Can be optional in all supported PHY types
  - Both ends need to support
  - Use can be negotiated with LLDP



MSI: MAC abstract service interface
MII: Media Independent Interfaces
MDI: Medium Dependent Interfaces

CFI Consensus Presentation

A consensus building presentation was held in the New Ethernet Applications Ad hoc on Tue July 22, 2025

- CFI consensus presentation: https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/25_0722/index.html

Straw poll Summary:

- Should a study group be formed to develop a PAR, CSD responses, and objectives for “Ethernet Metadata Services”?
  - Y/N/A : 49/0/5
- If formed, will you participate in this Study Group?
  - Tally: 40
- Unique affiliations in those who said they’ll participate? (post processed)
  - Tally: 26

I would be happy to speak with anybody who didn't attend the consensus-building meeting who has questions

- In person or remote; please contact me at ofelt@ieee.org for remote

I would also be happy to speak with anybody (in person or remote) who attended the meeting, but has questions

I would be happy to add anybody who wishes to be listed as a supporter

- You must ask to be a supporter before the motion to form the Study Group is considered

Supporters

- Shawn Nicholl (AMD)
- Arthur Marris (Cadence)
- Xiang He (Huawei)
- David Estes (Spirent)
- Yan Zhuang (Huawei)
- Jeffery Maki (Juniper Networks/HPE)
- Mabud Choudhury (Lightera)
- Adee Ran (Cisco)
- David Law (HPE)
- Eugene Opsanick (Broadcom)
- Gary Nicholl (Cisco)
- John D'Ambrosia (Futurewei, US Subsidiary of Huawei)
- Kent Lusted (Synopsys)
- Kapil Shrikhande (Marvell)
- Mark Nowell (Cisco)
- David Ofelt (Juniper Networks/HPE)
- David Malicoat (Malicoat Networking Solutions)
- James Weaver (Arista Networks)
- Weiqiang Chen (China Mobile)
- Jieyu Li (China Mobile)
- Eric Maniloff (Ciena)
- Nathan Tracy (TE)

Supporters (2)

- Stephan Kehrer (Belden)
- Tom Huber (Nokia)
- Howard Heck (TE Connectivity)
- Li Xu (Huawei)
- Marco Mascitto (Nokia)
- Shimon Muller (Enfabrica)
- John Calvin (KeySight Technologies)
- Ed Nakamoto (Spirent)
- Mike Dudek (Marvell)
- Marcel Kiebling (Beckhoff Automation)
- Rick Rabinovich (Keysight Technologies)
- Yuki Murakmai (1Finity)
- Scott Sommers (Molex)
- Andy Moorwood (Keysight Technologies)
- Toshiaki Sakai (Socionext)
- Sam Kocsis (Amphenol)
- Jose Castro (Panduit)
- Ray Nering (Cisco)
- Michael He (Terahop)
- Sam Sambasivan (AT&T) *

* Supporter added after CFI tutorial call

Call For Interest

One can view IEEE 802.3 Ethernet's primary function to be exchanging Ethernet frames between endpoints. It can be useful in many applications to augment those frames with additional control information to provide extra functionality between endpoints. This control information is considered metadata and can be associated with the frame or communicated as information that is independent of the frames.

There have been proprietary implementations in the industry that use metadata to provide features such as channelized Ethernet. Recently the AI/ML/HPC market has been identifying new extensions that provide capabilities such as retry for lost frames and new, richer, flow control functionality. Many of these are considering different mechanisms to provide very similar functionality.

Historically, there are several amendments to the Ethernet standard that provide extensions to allow transmission of metadata such as EPON, Packet Preemption, and Link Degrade signaling as examples.

There is an opportunity for 802.3 to provide the industry with a set of clean, extensible, per-frame and frame-independent multi-vendor interoperable mechanisms for metadata exchange which should facilitate future innovations using a common approach. This will allow extensions to ethernet to be defined by other SDOs for new or unforeseen features to meet evolving industry needs while maintaining the interoperability that makes ethernet ubiquitous.

This Call for Interest is to assess the support for formation of an "Ethernet Metadata Services" study group in IEEE 802.3 to consider the development of a PAR and CSD to address adding a common approach to support per-frame and frame-independent metadata services to IEEE 802.3 Ethernet.

Thank You!