# Introducing the Specifications of the Metro Ethernet Forum

# Introducing the Specifications of the Metro Ethernet Forum

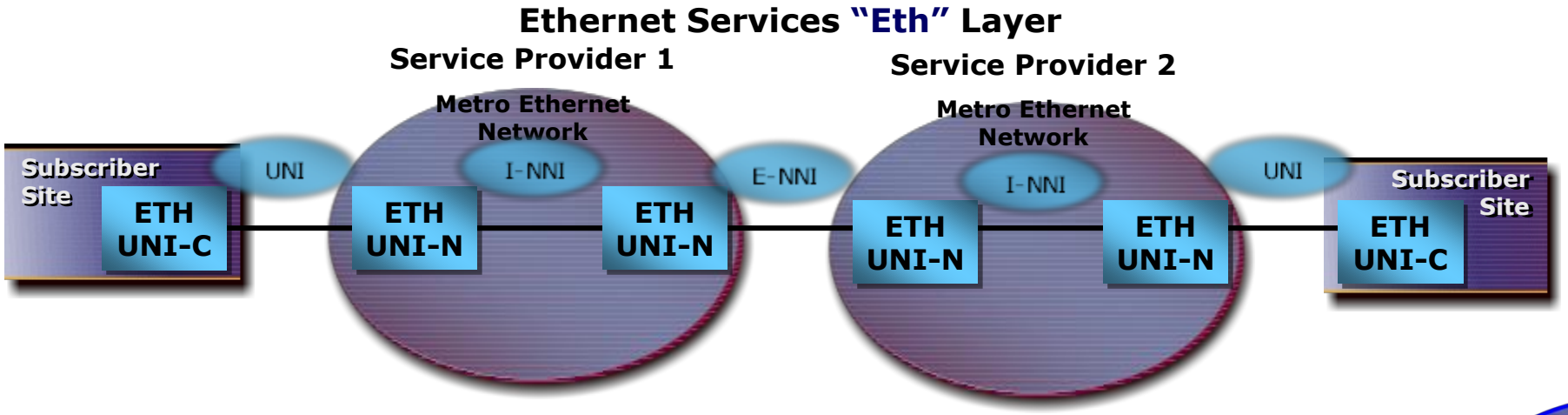
| | |
|---|---|
| **MEF 2** | **Requirements and Framework for Ethernet Service Protection** |
| MEF 3 | Circuit Emulation Service Definitions, Framework and Requirements in Metro Ethernet Networks |
| MEF 4 | Metro Ethernet Network Architecture Framework Part 1: Generic Framework |
| MEF 6 | Metro Ethernet Services Definitions Phase I |
| MEF 7 | EMS-NMS Information Model |
| MEF 8 | Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks |
| MEF 9 | Abstract Test Suite for Ethernet Services at the UNI |
| MEF 10 | Ethernet Services Attributes Phase I |
| MEF 11 | User Network Interface (UNI) Requirements and Framework |
| MEF 12 | Metro Ethernet Network Architecture Framework Part 2: Ethernet Services Layer |
| MEF 13 | User Network Interface (UNI) Type 1 Implementation Agreement |
| MEF 14 | Abstract Test Suite for Ethernet Services at the UNI |
| MEF 15 | Requirements for Management of Metro Ethernet Phase 1 Network Elements |
| MEF 16 | Ethernet Local Management Interface |

* MEF 10 * replaced MEF 1 and MEF 5

# Introduction

| MEF 2 | Requirements and Framework for Ethernet Service Protection |
|---|---|
| Purpose | Defines a broad frame work for hop-by-hop and end-to-end service level protection. |
| Audience | Equipment Manufacturers building devices that will carry Carrier Ethernet Services. Useful for Service Providers architecting their systems. |

Technical Committee Architecture Area




UNI: User Network Interface, UNI-C: UNI-customer side, UNI-N network side
NNI: Network to Network Interface, E-NNI: External NNI; I-NNI Internal NNI
EVC- Ethernet Virtual Circuit

# MEF 2: Ethernet Protection Framework & Requirements

- **Industry first Ethernet protection document**
- **A requirements document**
  - Comprehensive protection requirements for successful implementation of carrier-class Ethernet
  - Sub 50 ms resiliency is, among others, a critical requirement
- **A framework document**
  - Aggregated Line and Node Protection (ALNP)
  - End-to-End Path Protection (EEPP)
  - MP2MP protection service for ELAN services
  - Link Protection based on Link Aggregation

# MEF Protection Framework

- **MEF 2 Defines a broad frame work for hop by hop and end to end service level protection**
  - It defines a standardized list of terms to enable SLAs to be well defined around protection events
  - It allows the MEN to leverage any underlying transport layer protection type if it can enable end to end service protection

# Protection Types

- **The Protection Type 1+1**
  - uses the protection resources at all times for sending a replica of the traffic. The protection merge point, where both copies are expected to arrive, decides which of the two copies to select for forwarding.
  - The decision can be to switch from one resource to the other due to an event like resource up/down etc. or can be on a per frame/cell basis.

- **The m:n Protection Type**
  - provides protection for n working resources using m protection resources. The protection resources are only used at the time of the failure.
  - The protection resources are not dedicated for the protection of the working resources,

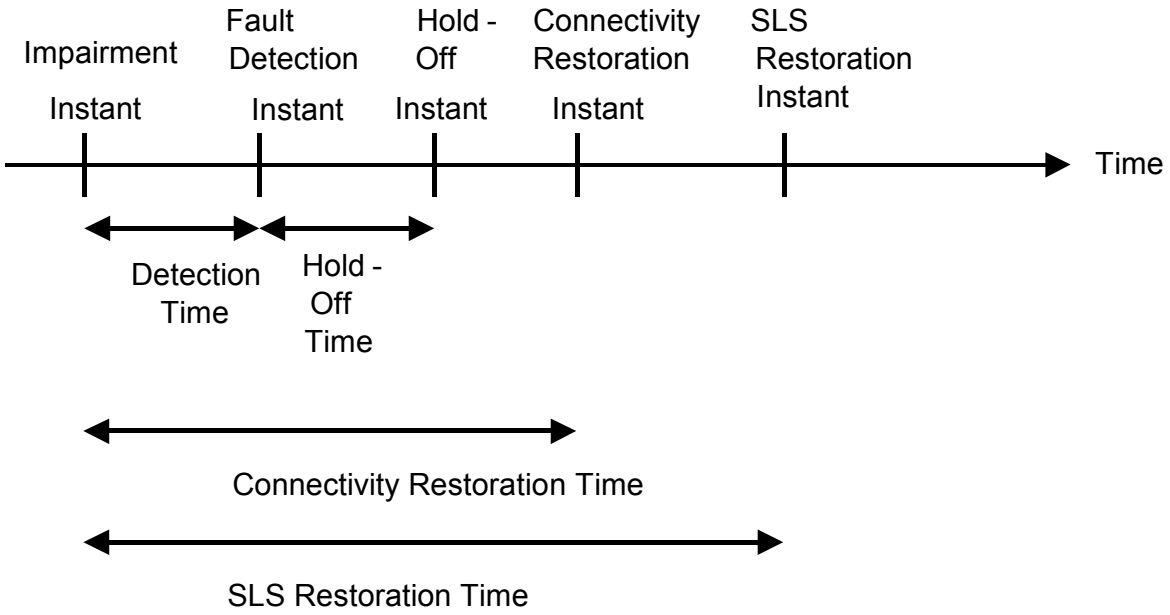
# MEF Protection Mechanisms

**4 Defined:**

- **Aggregated Line and Node Protection (ALNP) service**
  - provides protection against local link and nodal failure by using local path detour mechanisms
- **End-to-End Path Protection (EEPP) service**
  - ability to provide a redundant end-to-end path for the primary path.
- **MP2MP protection service for ELAN services**
  - Split Horizon bridging with full mesh connectivity.
  - Spanning Tree or Rapid Spanning Tree.
  - Link Redundancy.
- **Link Protection based on Link Aggregation**
  - allows one or more Ethernet links connecting the same two nodes to be aggregated into a Link Aggregation Group (LAG )

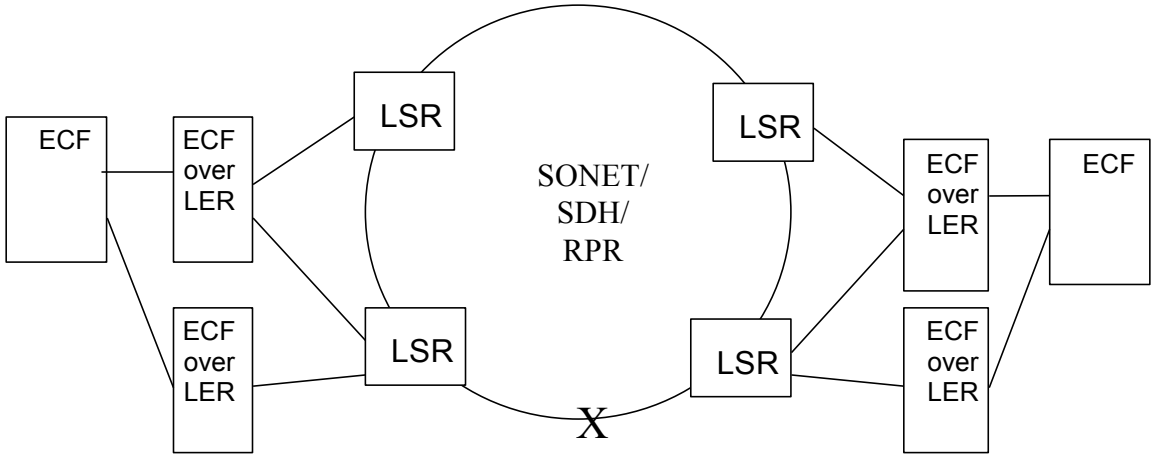
# Illustration of event timing

- **Timing is critical – as SLAs are based on SLS restoral times**
  - Detection time has to be a small fraction of this to be effective
  - The bar is set at 50ms by today's legacy services
  - Ethernet needs to match or beat to be effective.



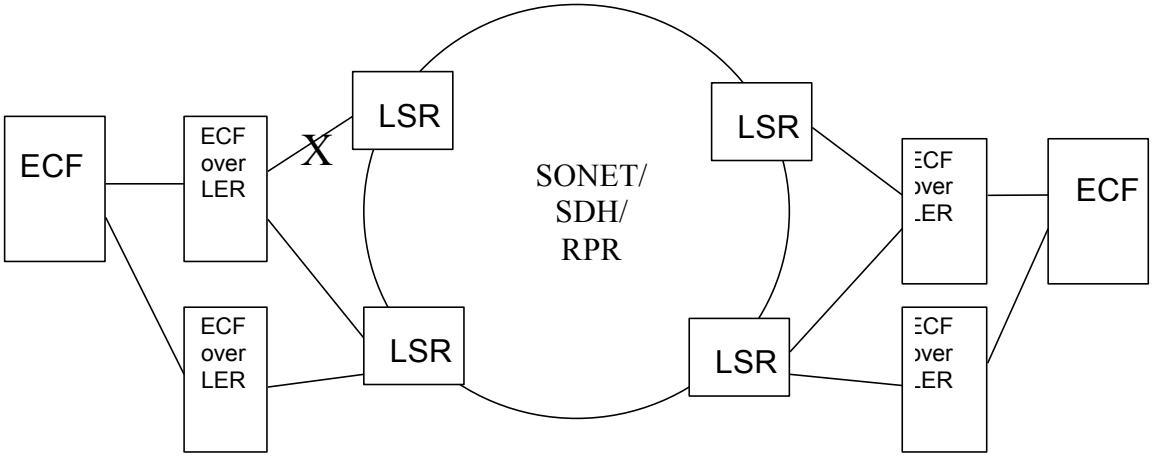
# SONET etc…Protection Comparison

- **Works on Ring – not outside**

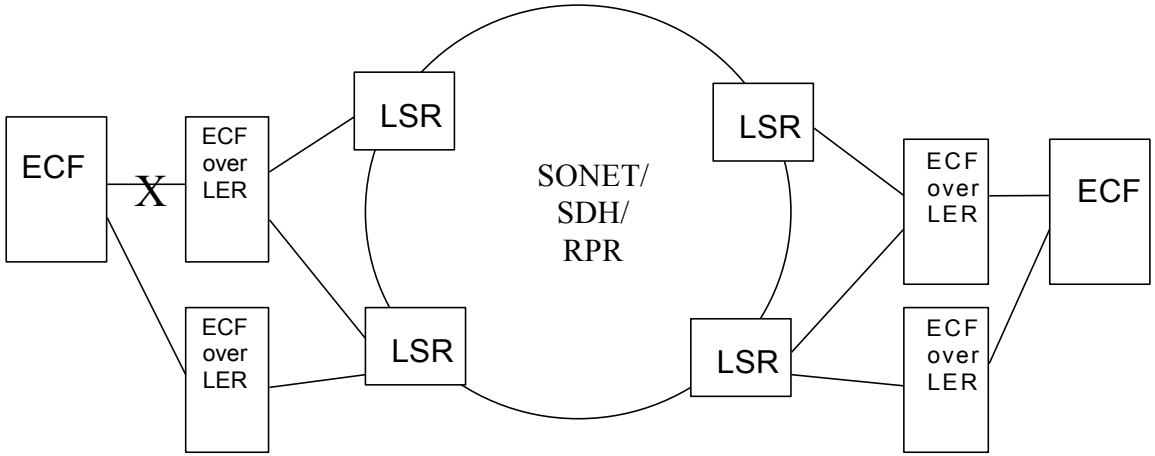


# MPLS…Protection Comparison

- **Failure cannot be repaired by SONET/SDH (BLSR, UPSR) or RPR; it can be repaired by MPLS**



# ETH Layer…Protection Comparison




- **Failure can be restored by the ETH layer**
  - not by MPLS, SONET/SDH/RPR

# Key Protection Requirements

1. **MUST be possible for a subscriber to request different protection parameters for Ethernet services.**
2. **An EVC** MUST **be protected along all ETH-trails**
3. **Protection parameters** MUST **be defined on the level of per-service or a group**
4. **An upper layer protection mechanism** SHOULD **be designed to work in conjunction with lower layer transport protection mechanisms**
5. **Restoration times that** SHOULD **be supported**
   - Sub 50ms restoration time.
   - Sub 200ms restoration time.
   - Sub 2 seconds restoration time.
   - Sub 5 seconds restoration time.
6. **MEF Defines a list of Protection Control Parameters**
   1. Hold-Off Time.
   2. Revertive/non revertive mode.
   3. Reversion (Wait To Restore) Time.
   4. Manual switch
   5. Forced switch
   6. Lockout

# For Full Details …

**… visit www.metroethernetforum.org**

**to access the full specification**