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* MEF 10 * replaced MEF 1 and MEF 5
Introduction

**MEF 2 Requirements and Framework for Ethernet Service Protection**

| Purpose | Defines a broad framework 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**

**Ethernet Services “Eth” Layer**

Service Provider 1

Service Provider 2

**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
• **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 2 Defines a broad framework 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,
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
• Failure cannot be repaired by SONET/SDH (BLSR, UPSR) or RPR; it can be repaired by MPLS
• 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](http://www.metroethernetforum.org) to access the full specification.