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MPLS Convergence Factors



In this lesson, we will focus on **MPLS Convergence Factors**. After the link failure in **MPLS network**, there are some actions need to be done orderly for **MPLS recovery**. This actions need to converge the MPLS network again. These MPLS Recovery steps are:

MPLS Recovery Failure Detection : Detecting the failure point.

MPLS Recovery Failure Propagation : Notifying other routers about the failure point.

MPLS Recovery Service Recovery : Recover the system on a preconfigured reserve path.

Let's check these steps detailly.

You can test you MPLS knowledge on [Network Questions Page!](#)

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MPLS Recovery Failure Detection

Firstly the failure tried to detect by **hardware**. If the failure can not detect by hardware, it is tried to detected by upper layers. **IGP**

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To overcome this disadvantages, this failure detection must be done in the lower layers. But in these layers there was no hello protocol. So, a **new protocol** was developed for this purpose. This is **BFD (Bidirectional Forwarding Detection)**.

There is also another mechanism that provide fast detection. This is **EFM(Ethernet in the First Mile)**.

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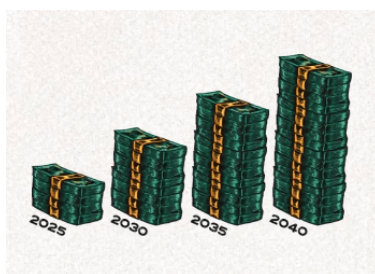
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Because of the fact that **BFD** is a very rapid protocol for detection problems, **BFD** is also used in MPLS fast protection and restoration.

MPLS Recovery Failure Propagation

In **IGPs (OSPF and IS-IS)**, the updates are event triggered. If a failure detected, this is propagated to the network via LSAs in LSU packets.

The propagation of the failure is different in MPLS. And this is differentlt done for both MPLS Secondary Paths and MPLS FRR (Fast Reroute).



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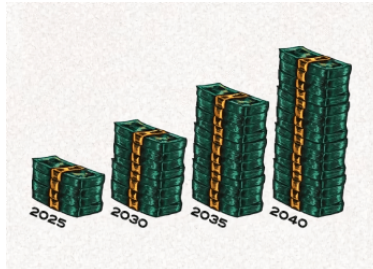
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For Secondary Paths, Head-End need to be informed about the failure on Primary Path. The router that detects the failure, send a

- **Cold (or NON) Standby Secondary Paths**
- **Hot Standby Secondary Paths**

Cold (or NON) Standby Secondary Paths must be informed by Head-End after the failure detection. Because it is **not operational** till failure time. It need to become operational by this notification.

Here, **Path Error reach time** and the **Secondary Path signalling time** is spent.



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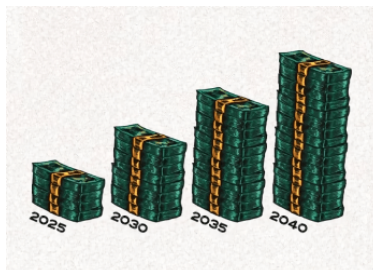
Hot Standby Secondary Paths do not need any information about the failure. Because it is also **operational** during the Primary Path is operational. Here, the only lost time is the time during the Path Error message reach to the head end. No time spent for Secondary Path signalling.

For **MPLS FRR (Fast Reroute)**, the router that detect the router, takes a local decision to recover the traffic. But an information in a **PATH Error** Message still send to the Head End. Because, this FRR is a temporary solution. Head-End need to be informed to decide a better path after the failure. And this decision can be a different path than the reroute path.

MPLS Recovery Service Recovery

In **IGPs (OSPF and IS-IS)**, for the service recovery, LSDBs are updated by the LSAs. New SPF calculations done and the new forwarding tables are built. According to the network size, the network convergence is done.

For the **MPLS Secondary Path** service recovery, the Head-End routes the traffic as soon as getting the PATH Error Message at the propagation step. Here, the PATH Error Message delivering time is important.



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MPLS Basics

☐ **MPSL Label Distribution**☐ **MPLS VPN Labelling**☐ **MPLS Label Switching**☐ **What is MPLS?**

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Label Distribution Protocol (LDP)

☐ **CR-LDP (Constraint-based Routing LDP)**☐ **T-LDP (Targeted Label Distribution Protocol)**☐ **ECMP Configuration on Nokia Routers**☐ **LDP Export and Import Policy, Prefix Aggregation**☐ **ECMP (Equal Cost Multi Path)**☐ **LDP Configuration on Nokia Routers**☐ **LDP Label Distribution**☐ **LDP Overview**

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Resource Reservation Protocol - Traffic Engineering (RSVP-TE)

☐ **RSVP-TE Path Manuplation and Constraints**☐ **MPLS RSVP-TE Configuration on Nokia Routers**☐ **RSVP-TE Overview**

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- ☐ **MPLS Fast Reroute Protection Types**
- ☒ **MPLS Convergence Factors**
- ☐ **MPLS Protection and Restoration Actions After the Failure**
- ☐ **MPLS Protection and Restoration Verification Commands**
- ☐ **RSVP Objects Used for MPLS Fast Reroute**
- ☐ **MPLS Local Protection, Fast Reroute**
- ☐ **Path Diversity in Secondary Paths**
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