MPLS Basic

Course No. 1113 **Duration: 2 days**

Course Overview:
The course starts with the issues that drove the transition of packet networks towards MPLS, we describe the advantages of MPLS and the MPLS basic components and concepts. We then go into details regarding the handling of Label Switched Path (LSP), maintenance and protection issues and QoS models. We present various signaling protocols (LDP, RSVP-TE). We conclude presenting other MPLS related topics such as Pseudowire Emulation (PWE) and its use in VPLS applications, and the work being done on MPLS Transport Profile (MPLS-TP). During the course we present examples of networks using the MPLS tools.

Who should attend?
The seminar is built for Technical people of Telecom Service Providers as well as Manufacturers of packet switching equipment.

Prerequisites:
Basic knowledge of data communications and routing is expected from the participants.

Lecturer: Mr.Leon Bruckman
Mr.Leon Bruckman is a senior lecturer at Logtel. Simultaneously Mr. Bruckman is the VP System Engineering in IP Light. He has over 30 years of experience as an R&D manager and System Engineer in the telecommunications field. Prior to joining IP Light Mr. Bruckman was the CTO of Corrigent Systems, worked for Tadiran Telecommunications were his last position was of Director R&D for the Access division, and for HyNEX were he managed the R&D and the System Engineering groups. Mr. Bruckman is an expert in defining and developing Data and Voice transport systems and has vast experience in Hardware and Software development processes. Mr. Bruckman holds a BSc cum laude from the Technion Institute in Haifa and an MBA cum laude from the Bar-Ilan University in Ramat-Gan. He also holds over 25 patents in the telecom area and participated in various standard bodies.

Course Content:

1. Introduction
- From IP to MPLS
- Forward Equivalent Classes (FEC) E-LSR, LSR
- MPLS advantages
- The MPLS label
- Label Assignment and Distribution
- Label Retention modes
- Setting up Label Switched Path (LSP)

2. Labels Handling
- The label stack
- Scope of labels
- Time to Live (TTL) handling
- Penultimate Hop Pop (PHP)
- Aggregation
- Merging
- MPLS network example

3. MPLS Maintenance
- ICMP Handling
- LSP Ping

4. Label Distribution Protocol
- LDP sessions
- LDP messages
- Label distribution examples
- Graceful restart
- Point to Multipoint LSP
- BGP-4 label distribution

5. RSVP for Traffic Engineering (RSVP-TE)
- Traffic engineering and MPLS
- RSVP-TE objects
- LSP Protection
- Fast Re-Route (FRR) principles
- One to one and Facility backup models.

6. MPLS Support of Differentiated Services
- QoS models
- RSVP-TE extensions for QoS support

Continued ...

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Course Content:

7. Virtual Private Networks (VPN)
- VPN components
- VPN models
- Using MPLS for VPNs
- VPN Routing and Forwarding (VRF)
- Route Distinguishers and Route Target
- Building VPNs: Full mesh, Hub and spoke

8. MPLS Traffic Profile (MPLS-TP)
- The need for a traffic profile
- MPLS-TP path
- MPLS-TP protection

9. Pseudo Wire Emulation (PWE)
- PWE definition
- PWE types
- Setting up PWEs

10. Virtual Private LAN Service (VPLS)
- Layer 2 service advantages
- VPLS principles
- VPLS Components
- Virtual Switch Interface (VSI)
- Split horizon
- MAC learning
- Hierarchical VPLS
- BGP auto-discovery

11. Conclusion

12. Summary