

# IP/Ethernet Backhauling for 3G and 4G Networks

**Course No.** 1435

**Duration:** 2 Days

## Course Overview:

The Backhaul in mobile networks is the portion of the network comprises the intermediate links between the Core-Network and the Radio-Access-Network (RAN).

Moving to 3G/4G mobile networks (like LTE) together with a wide range of new services that is offered, the Backhaul networks should accommodate an increased traffic volume created by cellular coverage areas and hence, the correct dimensioning is critical from the QoS and capacity point of view.

Thus, from being an almost forgotten portion of the network the backhaul becomes, in the last few years, a major challenging issue that takes a lot of attention from the mobile network

Operators/Carriers.

The course helps to find the way among the wide range of offered technologies and solutions provided by many vendors and supported by several specifications/standardization.

The Mobile Packet Backbone Network solutions are described and supported by case studies to help transport designers realize the diverse techniques. By mastering these techniques, participants will learn how to contribute to increased end-user throughput as well as increased and future-proof capacity.

This training course is also intended to provide an insight into Carrier Ethernet technologies, the Metro Ethernet Forum specifications for services and how these services can be delivered over different carrier core and access networks and transport platform along with other services deployed.

## Who Should Attend?

Backhaul Engineers, Transport Network Engineers, Transmission Engineers, Product Managers, Product Planners, Pre-Sales Managers, Sales Engineers, Engineers, Technical Solutions Architects, Business Solutions Engineers and Managers.

Individuals who design IP/Carrier Ethernet Switching solution for service providers or anyone interested in deploying of backhaul networks.

## Pre-requisites:

Understanding of principles of internetworking, IP, Ethernet, WAN design and concepts, IEEE802.1 standards, 3G networks architecture.

## Lecturer: Yuval Elgavish

Mr. Elgavish is a lecturer at LOGTEL having more than 25 years of extensive Hi-Tech experience working with worldwide telecom vendors, Operators and customers. Mr. Elgavish brings with him both technological as well as business extensive knowledge.

Mr. Elgavish is currently the Owner and GM of GaT-Tech, providing consultancy and project management services to Israeli companies.

Yuval held also executive management positions in several Israeli cellular, communications, Web and medical devices high tech companies.

Mr. Elgavish graduated the IDF academy of computer sciences (MAMRAM) and the Tel Aviv University School of Business Administration (Lahav program) and holds a B.Sc. in Computer Sciences from Bar-Ilan University.

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## Course Content:

### 1. Overview of 3G and Beyond Networks

- The 3G Network Architecture
- Network Evolution of the 3G Network
- 4G/LTE Network
  - Key characteristics and technology
  - Architecture
  - Capacity and throughput

### 2. Mobile Backhaul evolution

- Mobile Backhaul general description
- Transport technologies landscape
  - Various L1 and L2 protocols
- "Access Network" transport solutions (e.g., TDM, ATM, Cable, and MW)
- "Aggregation Network" transport solutions (e.g., SONET/SDH, MW and EPON)
- What is an IP/Ethernet backhaul network?

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### 3. 4G backhaul requirements

- LTE backhaul challenges
- Data Capacity planning
- Traffic Engineering, QoS and SLA assurance requirements
- Synchronization requirements

### 4. Solutions for the 3G/4G backhaul

- **MPLS Based Backhaul Solutions Overview**
  - IP routing and forwarding
  - MPLS fundamentals and terminology
  - The MPLS forum
  - MPLS solutions description
    - MPLS TE, MPLS TP, L2/L3 VPNs (Pseudowires, VPLS, H-VPLS)
- **Carrier Ethernet-Based Backhaul Solutions**
  - CE fundamentals and terminology
  - Metro Ethernet Forum (MEF)
    - The CE service attributes
  - Carrier Ethernet solutions briefing
    - MAC-in-MAC Provider Backbone Bridging (PBB), PBB-TE, Circuit Emulation (CE)
- Tools/methods for the evaluation and compare of the different solutions.

### 5. Backhaul Evolution Scenarios from existing solutions to tomorrow's IP/Carrier Ethernet based backhaul solution

- PBB-TE Vs MPLS TP comparison
  - Which should you choose?
  - When to use which technology- depending on scenarios
- TDM to Ethernet evolution scenarios

### 6. Mobile Backhaul Planning for Multimedia services

- Network planning considerations overview
- Capacity planning issues
- Traffic characterization
- Subscriber forecasting

### 7. Summary