Analysis of 5G/4G and VoIP Networks with Wireshark

- 3 Days
- Lecture and Hands-on Labs

Course Overview

This course aims to equip participants with comprehensive skills in network analysis and troubleshooting for 5G, including examples from 4G LTE and VoIP networks. Learn the fundamentals of Wireshark, including installation, configuration, and basic packet capturing techniques, then, power-up your ability to understand 5G protocols including NAS, NGAP, HTTP2, SIP, RTP and more. By the end of the course, students will be proficient in capturing, analyzing, and interpreting 5G network traffic, enabling them to effectively troubleshoot and optimize modern communication networks. Review this course online at https://www.alta3.com/courses/wireshark-5g

Who Should Attend

- 4G and 5G Network Professionals
- VoIP Engineers
- Network Engineers and Developers
- Cloud Engineers
- Software Developers
- Technical Managers and Leads

What You'll Learn

- Wireshark Fundamentals
- 4G and 5G Protocol Analysis
- Specialized Protocols and VoIP Analysis
- Advanced Analysis Techniques
- Troubleshooting Network Issues ## Outline

AI LLM Toolkit

- 💻 Lecture + Lab: Large Language Model toolkit for AI Solution Assistance

Introduction to Network Analysis

- 💬 Lecture: Overview of Network Analysis
- 💬 Lecture: Introduction to TCP IP Terms

Getting Started with Wireshark

- 💻 Lecture + Lab: Introduction to Using Wireshark

Capturing Packets

- 💬 Lecture: Starting and Stopping Captures with Wireshark
- 💻 Lecture + Lab: Using TCPdump to make pcap Files for Wireshark
- 💻 Lecture + Lab: Introduction to Termshark

Basic Analysis Techniques

- 💻 Lecture + Lab: Ethernet Analysis - ARP Broadcast
- 💻 Lecture + Lab: Ethernet Analysis - Unicast
- 💬 Lecture: Encoding
- 💻 Lecture + Lab: Using the Packet Bytes Window
- 💻 Lecture + Lab: Wireshark - tshark

Filtering Techniques

- 💬 Lecture: Display Filters in Wireshark
- 💻 Lecture + Lab: Working with Display Filters
- 💬 Lecture: Wireshark Colorization Rules
- 💻 Lecture + Lab: Find packet
- 💻 Lecture + Lab: Flow and IO Graphs
- 💻 Lecture + Lab: PCAPs to Text, CSV, JSON, XML, and PDF
- 💻 Lecture + Lab: Display Macros
- 💬 Lecture: Decoding SSL Traffic with Wireshark

5G Captures

- 💻 Lecture + Lab: 5G Registration Analysis with Wireshark
- 💻 Lecture + Lab: Analysis of NGAP and the N2 Interface with Wireshark
- 💻 Lecture + Lab: 5G NAS and Wireshark
- 💻 Lecture + Lab: GTP in 5G

Advanced Analysis Techniques

- 💻 Lecture + Lab: Resolve Network Addresses with Wireshark

Specialized Protocol Analysis and Wireshark for VoIP

Diameter

- 💬 Lecture: Diameter and SCTP
- 💻 Lecture + Lab: Diameter Analysis

SIP Stack

- 💻 Lecture + Lab: Introduction to Wireshark for VoIP
- 💻 Lecture + Lab: Successful REGISTER by a User Agent
- 💻 Lecture + Lab: Packet Analysis with Wireshark
- 💻 Lecture + Lab: Troubleshooting a 404

Filters

- 💬 Lecture: Wireshark Filters to Know

5G Emulation (OPTIONAL)

Start your 5G network (OPTIONAL)

- 💻 Lecture + Lab: Start the 5G core
- 💻 Lecture + Lab: Start the gNB RAN
- 💻 Lecture + Lab: Start Web Console

Adding Subscribers (OPTIONAL)

- 💻 Lecture + Lab: Configuring the UE SIM Card
- 💻 Lecture + Lab: UE 5G Core Configuration
- 💻 Lecture + Lab: Start UE plus Network Slicing Analysis
- 💻 Lecture + Lab: Analyzing UE Status

Creating 5G Packet Captures (OPTIONAL)

- 💬 Lecture: Lecture-LAB 5G Reg Capture
- 💻 Lecture + Lab: 5G PDU Session Capture