LTE & Wi-Fi Offloading

Course Description

Mobile communication technology evolved rapidly due to the increasing demands for higher data rates and higher quality mobile communication services and as a result many cellular networks are overloaded with mobile data traffic.

Data traffic levels in mobile networks are expected to almost double every year, thus far surpassing voice traffic.

Extrapolating this trend indicates that the amount of mobile data traffic can be expected to increase several orders of magnitude in the longer term.

To meet the requirements of future data-rich applications and terminals with improved multimedia, future wireless networks are expected to combine multiple access technologies and as a result mobile broadband operators are including WLANs like WiFi as an alternative access network technology.

This enables solutions to offload traffic from the primary access technology to the WiFi access when applicable so as to provide extra capacity and improve overall performance.

Other solutions as adding more cell sites and using smaller cells are very expensive and require extensive O&M. WiFi, one of the small cell technologies appeals to many operators as a cost-effective means of offloading large amounts of mobile data traffic while delivering a variety of new services.

In the course “WiFi offloading”, different solutions, their architecture, challenges and opportunities are discussed. Along the training, the technology and solutions are illuminated with exercises and traffic cases.

Content

ORGANIZATIONS AND STANDARDIZATIONS

- 3GPP & IETF
- Internet standardization bodies
- What’s an Internet standard?

THE NEED FOR OFFLOADING

- Traffic growth
- More cell sites
- Smaller cells
- Traffic Offloading with Wi-Fi
- What offloading means?
- Need for Wi-Fi
- Wi-Fi Features

- Typical traffic distribution
- Financial Dimension
- Challenges & Solutions
- Wi-Fi advantages
- Comparing Wi-Fi & 3G/LTE performance
- Techniques & Standards

MOBILE ACCESS NETWORKS

- 3GPP Releases
- GSM
- GPRS
- The split Architecture – R4
- UMTS
- LTE
- Encapsulation & Tunneling
- HSS
- IP-CAN Sessions, Bearers and SDFs
- Network Attach including Default Bearer Activation

WI-FI (WLAN)

- TCP/IP Introduction
- IPv4/Ipv6
- Introduction to WLAN
- Wireless Standards
- WiFi evolution
- Wireless Modes
- Security (SSId, MAC)
- WEP, WPA, EAP and TKIP
- Standard 802.1x
- PEAP
- Standard 802.11i
- WPA2
- Comparison table
- WLAN Vulnerabilities & Threats
- Hotspot 2.0
- WiMAX

LTE & WI-FI OFFLOADING (PART I)

- How it works
- Selective Traffic Offloading
- Security issues
- Interoperability
- Types of Wi-Fi Access
- Trusted Access
- Untrusted Access
- Mobility Management
- Client(host)-based Mobility
- Network-based Mobility
- Mobile IP
- Proxy Mobile IP
- MIPv4 Foreign Agent Mode
- PMIPv6/MIPv6: Usage scenarios
- New functions ANDSF, ANQP
- ISMP
- ISRP
- Signalling flow
- Policy

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- Discovery Information
- UE location & Profile
- Evolution of ANDSF
- A Traffic Case with ANDSF
- IPMS static and Dynamic configuration
- Summary of the mobility scheme protocols

POLICY AND CHARGING CONTROL PCC

- WM-MAP: PCC
- The Service Data Flow
- PCRF & PCEF
- Policy and Flow Based Charging in R6
- PCC – Policy and Charging Control in R7
- PCC – Architecture
- The PCC Rule
- Rx Procedures
- Gx Procedures
- S9 Procedures
- BBERF
- QoS

LTE & WI-FI OFFLOADING (PART II)

- Authentication and Carrier Wi-Fi
- Protocol Stack for EPS
- The control part of PMIPv6 specification
- Traffic Cases
- WM-MAP: Interworking with non-3GPP IP access
- Interworking WLAN
- UE to PDG Tunneling

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- The WLAN UE
- 3GPP AAA Server and HSS/HLR
- WLAN Access Gateway (WAG)
- Packet Data Gateway (PDG)
- WLAN Connected to other ISPs or PLMNs
- IWLAN – Roaming Architecture
- WLAN Access Authentication and Authorization
- W-APN Resolution and Tunnel Establishment
- Trusted Non-3GPP Access using; MIPv4 (FA mode), PMIPv6, DSMIPv6
- Untrusted Non-3GPP Access using; PMIPv6, GTP, DSMIPv6
- Trusted WLAN Access over S2a and with GTP-based S2a
- Initial Attach with Trusted WLAN on S2a

IP FLOW MOBILITY (IFOM)

- WLAN Offload
- Mobile IP
- Seamless WLAN Offload and IP Flow Mobility (IFOM)
- The EPS Requirements and IP Flow Mobility
- The EPS Network Requirements and IP Flow Mobility (Network-based) and (Host-based)
- Interworking Scenarios: Roaming (1) and (2)
- EPS and I-WLAN Service requirements
- Selective movement of IP flow
- MAPCON
- IPFM Use cases and Scenarios
- Handling multiple PDN connections
- DSMIPv6 Enhancements
- Binding Cache in PDNGW/HA supporting flow bindings

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- Policy and Charging Control (PCC) Enhancements
- Enhanced routing filter model
- Routing Filters enhancement in S2c (DSMIPv6) and S2a/S2b (PMIPv6)
- ANDSF enhancements
- Seamless WiFi offloading
- App-based switching
- DSMIP-based WiFi offload
- SIPTO

Target audience

The course targets Core Network engineers with the task of implementing the new functions and standards in the network.

Widermind communicates the knowledge you need to develop and implement new technologies for current and future network operations. Our clients are telecom operators, system integrators, system suppliers and consultancy firms.

Based in Stockholm, Sweden, we develop courses backed by a comprehensive network of associates. Our instructors employ technical and pedagogical skills that have made Widermind training well known and appreciated as one of the best services in the field.

You are warm welcome to contact our representatives at:

email: info@widermind.com or telephone: +46 8 410 757 11

Pre-requisites

It is advantageous for the participants to have a general understanding of mobile Core Networks.

Course Length

The course length is 2 days.

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