Leliwa Sp. z o.o.
PL-44 100 Gliwice,
Plebiscytowa 1/122, Polska
T +48 32 376 63 05
F +48 32 376 63 07
E info@leliwa.com
www.leliwa.com

Leliwa Telecom AB
SE-167 66 Bromma,
Orrspelsvägen 66, Sweden
T +46 707 42 3945
F +48 32 376 63 07
E info@leliwa.com
www.leliwa.com

Policy and Charging Control (PCC) Technology

'Policy and Charging Control Technology" course focuses on a new architecture that enables a precise control of packet traffic and charging based on individual services accessed by the users. During the course all components of the PCC solution are presented. Detailed functionality of each element is discussed. Protocols and signalling procedures on all interfaces (i.e. Gy, Gz, Gx, Gxx, Rx, Ud, Sy, Sp, Sd, Gzn, Gyn) within PCC system are presented in details. The course also describes overview of PCC architecture and system wide signalling procedures, including home and roaming scenarios.

Target audience

The course is intended for experienced network engineers, especially working in PS core network and charging domains, PCC protocol stack developers, and anyone with network experience, who needs deep technical knowledge on functionality of PCC.

Training contents

- **Introduction**
  (Evolution of charging in mobile networks, post-paid charging, pre-paid charging, difference between circuit-switched and packet-switched traffic, evolution of policy and charging control from independent solutions towards combined PCC system),
- **Architecture Evolution**
  (PCC architecture changes since release R7 until R12, home network and roaming interworking, new elements added to the PCC system: BBERF, UDR, TDF, ADC, latest reference points Gzn and Gyn added in R12),
- **Basic Concepts and General Requirements**
  (Explanation of basic concepts: policy control, QoS control, charging control, PCC rule, QoS rule, charging key, ADC rule, binding, Service Data Flow and others, general requirements put on PCC system, new functions introduced in R12: Presence Reporting Area notifications, Application-level charging, Time-based Usage Reporting and others),
- **Detailed Functions of PCC system**
  (Detailed description of PCC functions: binding mechanism, reporting, credit management, event triggers, policy control, SDF prioritization and conflict handling, and others, detailed description or extended Application-level charging and Presence Reporting Area mechanisms added in R12, additional Credit-reauthorization and Event Triggers added in R12, new Mission-critical QoS characteristics in R12,),
- **Detailed Functionality of Particular PCC Components**
  (Detailed functional description of PCC elements: PCRF, PCEF, SPR, AF, OFCS, OCS, BBERF, UDR, functions of particular elements, interaction among different elements, changes in R12 including: modifications of usage monitoring in PCEF, charging functionality in TDF),
- **Detailed Description of Policy and Charging Control Rule**
  (Detailed description of PCC rule content, PCC rule operations: activation, modification and deactivation, detailed discussion of PCC rules containing SDF template and PCC rules containing application identifier, new parameters added in R12),

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- **Detailed description of IP-CAN Bearer and IP-CAN Session Policy Related Information**
  (Detailed discussion of parameters describing particular IP-CAN bearer as well as the whole IP-CAN session, utilization of this information in interaction among PCEF, PCRF, OCS and OFCS, new parameters related to IP-CAN session added in R12),
- **Detailed Description of TDF Session Related Information**
  (Detailed discussion of parameters describing TDF session, utilization of this information in interaction between PCEF and TDF including new parameters added in R12),
- **Detailed Description of Quality of Service Control Rule**
  (Interaction between PCRF and BBERF, detailed description of QoS rule content, and QoS rule operations like activation, modification and deactivation, coordination of Gxx and Gx procedures),
- **Detailed Description of Usage Monitoring Control Specific Information**
  (Detailed description of usage monitoring mechanism focusing on parameters included in Usage Monitoring Report, interaction between PCRF and PCEF or TDF, new parameters added in R12),
- **Detailed Description of IP Flow Mobility Routing Rule**
  (Interaction among PCEF, PCRF and BBERF in IP Flow Mobility scenario. Detailed description of parameters included in IP Flow Mobility Routing Rule),
- **Detailed Description of Application Detection and Control Rule**
  (Detailed description of parameters included in ADC rule, interaction between PCRF and TDF during activation, modification and deactivation of ADC rule, including extended charging parameters added in R12),
- **Policy Decisions Based on Spending Limits**
  (Detailed discussion of interaction between PCRF and OCS that enables enhanced policy decision functionality, linkage of policy decision specific for PCRF with rating that is handled by OCS),
- **Traffic Cases**
  (IP-CAN session establishment, termination, modification, update of the subscription information in the PCRF, discovery and selection of the PCRF, gateway control session procedures, including new procedures via Gyn and Gzn reference points added in R12),
- **Access Specific Aspects**
  (Access specific requirements (e.g. GPRS, EPC), discussion of generic PCC functions enhancements for access-specific requirements),
- **Sponsored Data Connectivity**
  (New business models based on operator partnership with third-party providers supported in PCC architecture, detailed description of these solutions based on data transfer sponsored by the content provider),
- **PCRF Discovery**
  (Concept of single PCRF entity serving Diameter Realm, procedures for PCRF discovery with the use of Diameter Routing Agent, interactions between PCRF entity and other nodes: TDF, BBERF, PCEF, AF),
- **Detailed Discussion of Charging**
  (Online and Offline charging architecture, charging traffic cases, CDR content),
- **Monitoring Alternatives**
  (Usage monitoring with the use of OCS and Spending Limits via Sy interface, termination and re-establishment of monitoring for individual PCC/ADC rule),

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- **R13 Highlights**
  (Modifications planned in R13, including: new elements in PCC architecture: Radio Congestion Awareness Function, Service Capability Exposure Function, new reference points: Nt, Np, new functionalities including: RAN User Plane Congestion Information reporting, resource sharing for multiple AF sessions, negotiation for future background data traffic).

Prerequisites

The participants should have attended 'GPRS Technology", 'UMTS Technology" and 'LTE/EPS Technology" course or should have the equivalent knowledge.

Training method

Lectures and theoretical exercises.

Duration

3 days

Level

Advanced