SMG Trunking Gateways Configuration (advanced level) v.1.1

Course Duration: 32 academic hours (4 days)

Target Audience:

- System administrators;
- Specialists of technical and engineering services;
- Maintenance and technical support engineers;
- Network software developers;
- Technical personnel of telephone network operation.

Course Pre-requisites:

- Basic understanding of construction and functioning of data transmission networks (DTN), TCP/IP protocol stack, principles of traditional time division multiplexing (TDM) and IP telephony;
- Basic knowledge of SIP, SIP-T, H.323, SS7, DSS-1 PRI signaling protocols;
- Be able to debug the operation of signaling protocols of telephony in order to obtain information about the stages of connection establishment, conversation phase, rebound or related errors at all stages of connection establishment; to perform basic configuration of subscribers and external interfaces (trunks) on IP telephony equipment using the manufacturer's documentation; to find necessary information about IP telephony devices functioning and functional features in documentation and/or on the Internet; to perform works on designing telephone communication schemes considering the given requirements and to justify the decisions;
- Basic skills of work with PC at the level of confident user (Linux, MS Windows), putting into operation of telephony devices, their basic configuration and providing remote access to devices, debugging and taking logs and traces at the level of station equipment, including at the level of debugging of signaling protocols, and also to receive network dumps with the subsequent analysis of diagrams of signaling protocols and media traffic; work with regular expressions and/or templates when operating with the dial range, setting up the Quality of Service (QoS) system, also on the network equipment.

Upon completion of the course, the participants will:

Be able to:

- confidently apply knowledge of signaling units of any telephone signaling protocol to debug basic call flow;
- obtain and analyze traffic snapshots containing signaling messages of a target signaling protocol;
- use measuring equipment and built-in debugging tools;
- perform basic configuration of station equipment (using documentation) and register the telephone set in the IP telephony network.

Have the knowledge of:

- basic principles of functioning of modern IP telephony networks
- structure and basic principles of traditional telephony networks operation.
- SIP protocol signaling structure (RFC 3261), main fields of signaling message header and their purpose
- list of service messages of SS7 and DSS1 PRI signaling protocols
- the principle of operation of the subscriber set (ST) of a digital PBX, the principle of operation of an analog telephone set.

Acquire the following skills:

- basic design of IP telephony networks in order to replace traditional PBXs in the corporate network using the equipment of Eltex Enterprise Ltd.
- analyzing problems occurring in the process of operation and other situations related to the necessity of debugging the equipment at the initial stage
- searching for necessary documentation on the equipment manufacturer website, localize obviously inoperable nodes in the telephony network.

Curriculum

"SMG Trunking Gateways Configuration (advanced level) v.1.1"

Activity	Description	Time
Topic:	**1. Device model range and main features.**	**1 hour**
Description:	1.1. Overview of the SMG trunking gateway product line manufactured by Eltex Enterprise Ltd. 1.2. Main device characteristics. 1.3. Protocols and available functionality. 1.4. List of available licenses. 1.5. Functional device diagrams. 1.6. Example of using the equipment on IP telephony network.	1 hour
Lab:	—	

Activity	Description	Time
Topic:	**2. Architecture and hardware structure.**	**3 hours**
Description:	2.1. Hardware structure of devices. 2.2. Submodular architecture, station composition calculation. 2.3. Technical characteristics and operation parameters. 2.4. Network architecture, use of OOB port (SMG3016 only).	3 hours
Lab:	—	

Activity	Description	Time
Topic:	**3. Network settings and management.**	**2 hours**
Description:	3.1. Use of static and dynamic (DHCP) addressing. 3.2. Use of different VLANs for signaling, voice, management. 3.3. Management and monitoring via SNMP protocol. 3.4. Consideration of device network security issues. 3.5. Synchronization with NTP server. 3.6. Configuring the built-in FTP server. 3.7. Routing table, adding routes. 3.8. Managing the device using web configurator. 3.9. Managing the device in console mode (CLI).	1 hour

	3.10. Device factory reset, password recovery. 3.11. Work with configuration files, licenses and firmware upgrades.	
Lab:	3.1. Configuring network interfaces, resetting part of the device configuration.	1 hour

Activity	Description	Time
Topic:	**4. Transport configuration.**	**5 hours**
Description:	4.1. Physical stream parameters. 4.2. Configuring the stream to work with the SS7 signaling system. 4.3. Configuring the stream to work with DSS-1 PRI (Q.931) signaling. 4.4. Trunk groups, trunk directions, SS line groups. 4.5. Backup, setting the parameters for switching to standby (Q.850). 4.6. E1 streams monitoring. 4.7. Configuring interfaces in SIP, SIP-I, SIP-T, SIP-Q modes. 4.8. General configuration of the SIP protocol. 4.9. Codecs setting, parameters of signal amplification on reception and on transmission. 4.10. Configuring data and fax transmission. 4.11. Creating and configuring SIP profiles. 4.12. SIP subscribers. Configuring and creating static and dynamic (RADIUS) accounts. 4.13. Subscriber authorization parameters.	3 hours
Lab:	4.1. Transport configuration. E1 streams. 4.2. Transport configuration. SIP interfaces. 4.3. Creating a subscriber SIP profile. Working with subscriber card.	2 hours

Activity	Description	Time
Topic:	**5. Telephone call routing.**	**6 hours**
Description:	5.1. Configuring prefixes for dial plans. 5.2 Creating masks for the called party number (CdPN) and the calling party number (CgPN). 5.3. Disassembling the principles of operation of telephone call routing on SMG. 5.4. Other prefix types.	3 hours
Lab:	5.1. Study of trunk group settings. Task performance. 5.2. Routing of telephone calls. Task solving. Configuring prefixes on the network with SMG. 5.3. Backup of trunk groups. Modeling of E1 stream failure and switching to backup.	3 hours

Activity	Description	Time

Topic:	**6. Logging and traicing.**	**2 hours**
Description:	6.1. Interception and analysis of traffic from network interfaces using tcp- dump throat. 6.2. Interception and analysis of signaling traffic on E1 streams using pcmdump. 6.3. Switch port mirroring (SMG-1016M only). 6.4. Connecting to the Syslog server.	1 hour
Lab:	6.1. Study the procedure of dumping and analyzing logs and traces.	1 hour

Activity	Description	Time
Topic:	**7. Number modifiers.**	**4 hours**
Description:	7.1. Syntax of number modifiers. 7.2. Creation of number modifier for incoming and outgoing communication. 7.3. Specifics of number conversion issues solving on the network.	2 hours
Lab:	7.1. Number modifiers. Task performance. Applying modifiers on a network with SMG.	2 hours

Activity	Description	Time
Topic:	**8. Services access restriction.**	**2 hours**
Description:	8.1. Configuring access categories and subscriber service mode. 8.2. Long-distance and international direction access restriction. 8.3. Access restrictions between different SMG subscribers.	1 hour
Lab:	8.1. Access restriction using access categories. Changing a category using modifiers.	1 hour

Activity	Description	Time
Topic:	**9. Value Added Services (VAS).**	**2 hours**
Description:	9.1. List of supported services. 9.2. Specifics of VAS configuration. 9.3. Access group and pickup group configuration. 9.4. IVR and call recording.	1 hour
Lab:	9.1. Study of Value Added Services (VAS).	1 hour

Activity	Description	Time
Topic:	**10. Security and routine maintenance.**	**1.5**

		hours
Description:	10.1. Device access configuration. 10.2. Dynamic and static firewall configuration. 10.3. Recommendations for routine maintenance performance.	1.5 hours
Lab:	—	

Intermediate testing and final exam: 3.5 hours
One free-of-charge attempt of certification test is provided within the frameworks of this course. The participant may use this attempt on the last day of the course.
In case the test attempt is unsuccessful, the participant may contact the Commercial Department for purchasing the additional attempt.
The participant may use the paid attempt within one calendar month starting from the data of course completion.