Exam Description: The Implementing Cisco LTE Packet Core Networks (600-212 SPLTE) exam is a 90-minute, 65–75 question assessment within Cisco’s Service Provider Specialist certification. This exam tests a candidate’s knowledge of the skills required to understand and implement technologies, components, architecture fundamentals and products that are found in common LTE networks. The exam includes information on the evolved packet core components and their role in the LTE Evolved Packet System (EPS) to include the Evolved Packet Core network as well as the Radio Access Network (RAN). The exam also includes information on standardized technologies that are implemented on the Mobile Management Entity (MME) Serving Gateway (SGW) and the Packet Data Network Gateway (PGW), and their interaction with authentication, charging, and billing components in the network of the mobile operator, as well as, configuration details of how these components are implemented on the Cisco ASR 5000 Series system. This exam is a requirement in order to attain either the Cisco Service Provider Mobility UMTS to LTE Specialist certification or the Cisco Service Provider Mobility CDMA to LTE Specialist certification. Candidates can prepare for this exam by taking the Implementing Cisco Service Provider Mobility LTE Networks (SPLTE) v1.0 training course.

The following topics are general guidelines for the content likely to be included on the exam. However, other related topics may also appear on any specific delivery of the exam. In order to better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

5% 1.0 LTE
1.1 Describe and differentiate LTE / SAE architecture
1.2 Explain attach procedure and call flow

16% 2.0 MME (4G LTE)
2.1 Network functions LTE –MME
   2.1.a Identify key functions of the MME and basic understanding of architecture and interfaces
   2.1.b Describe MME states of MM and CM management
   2.1.c Describe protocol stacks and procedures
   2.1.d Describe mobility management signaling and call flows
   2.1.e Describe session management signaling and call flows
   2.1.f Describe location management signaling and call flows
   2.1.g Describe SGS procedures and signaling call flows
   2.1.h Describe intra-MME handovers procedure
   2.1.i Describe intra-RAT handovers procedure
   2.1.j Describe inter-MME handover procedures

2.2 QOS architecture
   2.2.a Describe the overall QOS functionality in LTE for single and multi pdn
2.2.b Describe the QOS mapping from UMTS to LTE

2.3 Configurations
2.3.a Configure S1 interface with corresponding services and system parameters
2.3.b Configure S6a interface with corresponding services and system parameters
2.3.c Configure S11 interface with corresponding services and system parameters
2.3.d Configure S13 interface with corresponding services and system parameters
2.3.e Identify and implement gateway selection mechanisms
2.3.f Identify and implement MME operator policy and feature sets
2.3.g Troubleshoot configurations

2.4 Network sharing
2.4.a Describe MOCN architecture
2.4.b Describe GWCN architecture

2.5 Security
2.5.a Describe LTE security principles for MME network node
2.5.b Explain security functions for mobility management procedures

2.6 Idle mode signaling reduction
2.6.a Identify IDLE mode signaling reduction in an LTE network
2.6.b Describe IDLE mode signaling establishment
2.6.c Describe IDLE mode signaling reduction deactivation

2.7 CSFB
2.7.a Describe CSFB architecture in LTE network
2.7.b Describe CSFB call flow and signaling

2.8 IPv6 support
2.8.a Configure IPV6 and dual stack EPS bearer scenarios
2.8.b Configure and implement transport plane IPV6 support for MME

10% 3.0 SGW (4G LTE)

3.1 Network functions LTE-SGW
3.1.a Identify key functions of the SGW and basic understanding of architecture and interfaces
3.1.b Describe SGW attach procedures and call flows
3.1.c Configure S1-U interface with corresponding services and system parameters
3.1.d Configure S5/S8 using PMIP/GTP interface with corresponding services and system parameters
3.1.e Configure S11 interface with corresponding services and system parameters

3.2 Feature functionality and extended application
3.2.a Describe multi-PDN support for SGW
3.2.b Describe downlink delay notification for SGW
3.2.c Describe idle mode signaling reduction support for SGW
3.2.d Configure and implement IPV6 support for SGW
3.3 Internetworking between LTE and other technologies
3.3.a Describe interaction with CDMA/eHRPD internetworking
3.3.b Describe interaction with GSM/UMTS internetworking
3.3.c Configure S4 interface with corresponding services and system parameters
3.3.d Configure S12 interface with corresponding services and system parameters
3.3.e Configure S103 interface with corresponding services and system parameters

3.4 Charging
3.4.a Configure Gx interface with corresponding services and system parameters

3.5 QoS
3.5.a Describe QoS bearer management and marking for SGW
3.5.b Configure DSCP marking for SGW

15% 4.0 PGW (4G LTE/EHRPD)
4.1 Architecture overview
4.1.a Identify key functions of the PGW and basic understanding of architecture and interfaces

4.2 Implement S5/S8 and Gn/Gp interface
4.2.a Describe GTP protocol
4.2.b Describe mobility management/session management call flows
4.2.c Describe QoS in EPC
4.2.d Configure S5/S8 interface with corresponding services and system parameters
4.2.e Troubleshoot S5/S8 and Gn/Gp

4.3 APN
4.3.a Describe the various IP address allocation mechanisms
4.3.b Describe the concept of virtual APNs
4.3.c Configure APNs and virtual APNs with corresponding service and system parameters
4.3.d Configure IP source address validation and access control list
4.3.e Troubleshoot APN

4.4 Implement Gx interface
4.4.a Describe the important diameter AVPs needed for Gx
4.4.b Describe basic Gx call flows
4.4.c Configure Gx interface with corresponding services and system parameters
4.4.d Troubleshoot Gx interface
4.4.e Describe the common policy use cases
4.4.f Configure failure handling modes
4.4.g Configure usage monitoring over Gx

4.5 Implement Gy interface
4.5.a Describe the important diameter AVPs needed for Gy
4.5.b Describe the basic Gy call flows
4.5.c Configure Gy interface with corresponding services and system parameters
4.5.d Troubleshoot Gy interface
4.5.e Configure failure handling modes
4.5.f Describe OCS selection based on static configuration
4.5.g Describe RADIUS attributes and PCRF out-of-quota redirection handling

4.6 Implement AAA Interface
4.6.a Describe the basic AAA authentication and accounting call flows
4.6.b Describe the important RADIUS attributes for authentication and accounting
4.6.c Configure RADIUS interface with corresponding services and system parameters
4.6.d Troubleshoot RADIUS interface

4.7 Implement S6b interface
4.7.a Describe the important diameter AVPs needed for S6b
4.7.b Describe the basic S6b call flows
4.7.c Configure S6b interface with corresponding services and system parameters
4.7.d Troubleshoot S6b interface

4.8 Interworking with non-3GPP access networks
4.8.a Configure S2a interface with corresponding services and system parameters
4.8.b Configure S2b interface with corresponding services and system parameters
4.8.c Configure S2c interface with corresponding services and system parameters
4.8.d Configure LMA functionality on a PGW
4.8.e Configure non-3GPP IRAT handovers
4.8.f Troubleshoot S2b and S2c interfaces

4.9 SGi Interface
4.9.a Configure and implement various IP transport types
4.9.b Configure and implement static and dynamic routing protocols

20% 5.0 Voice Over LTE
5.1 VoLTE application messages/protocols
5.1.a Describe VoLTE specific diameter interface
5.1.b Describe XCAP, LDAP, SPML
5.1.c Describe CAMEL, CAP, INAP, SOAP, MSML

5.2 Voice over LTE architecture
5.2.a Describe voice evolution in mobile network
5.2.b Identify VoLTE system architecture and functions of network elements

5.3 Network elements in voice over LTE
5.3.a Describe CSCF
5.3.b Describe ENUM
5.3.c Describe MNP — mobile number portability/database
5.3.d Describe telephony application server
5.3.e Describe DRA/DEA
5.3.f Describe HSS
5.3.g Describe PCRF
5.3.h Describe ATCF,ATGW
5.3.i Describe MRF
5.3 Describe understand OSS and BSS

5.4 QoS
5.4.a Describe QoS in EPS
5.4.b Describe end-to-end QoS in VoLTE

5.5 Interfaces and signaling messages
5.5.a Configure Gx interface and signaling
5.5.b Design Rx interface and signaling
5.5.c Implement Cx interface and signaling
5.5.d Describe ISC interface and signaling
5.5.e Describe Ut interface

5.6 End-to-end call flow
5.6.a Describe IMS client attach to EPC
5.6.b Describe P-CSCF discovery
5.6.c Describe IMS registration, re-registration and de-registration
5.6.d Describe mobile-originated VoLTE call
5.6.e Describe mobile-terminated VoLTE call
5.6.f Describe emergency VoLTE call

5.7 Supplementary services
5.7.a Describe IR.92 supplementary service overview
5.7.b Describe IR.94 supplementary service overview
5.7.c Describe Important services call flows

5.8 VoLTE Interworking
5.8.a Describe PSTN interworking
5.8.b Describe IMS/SIP interworking
5.8.c Describe e-SRVCC

6.0 Other Interfaces
6.1 AAA/diameter related interfaces
6.1.a Describe SWx interface
6.1.b Describe S9 interface
6.1.c Describe Sp interface

6.2 HRPD related interfaces
6.2.a Describe S101
6.2.b Describe S103

7.0 Charging
7.1 Offline charging service
7.1.a Describe offline charging architecture
7.1.b Explain the GTPP protocol header and messages
7.1.c Explain charging data record transport through GTP'
7.1.d Compare and contrast GTPP transfer scenarios
7.1.e Describe and differentiate mobility records generated by MPC nodes
7.1.f Identify and list conditions for record closure and generation
7.1.g Explain Rf offline charging scenarios
7.1.h Identify and list offline charging error cases
7.1.i Configure for offline billing
7.1.j Troubleshoot for offline billing

5% 8.0 Lawful Intercept
8.1 Describe lawful intercept architecture and events
8.2 Configure lawful interception
8.3 Describe lawful intercept trigger element

11% 9.0 Management Protocols
9.1 TACACS
  9.1.a Describe admin authentication and command authorization methods
  9.1.b Configure Local administration levels
  9.1.c Configure external authentication TACACS servers

9.2 Performance counters/statistics
  9.2.a Describe the various performance counters
  9.2.b Describe the collection and processing of performance counters
  9.2.c Describe the common KPIs for various MPC nodes
  9.2.d Configure counters and KPIs

9.3 Fault management
  9.3.a Describe SNMP protocols, alarms, notification and MIBs
  9.3.b Configure SNMP traps, filters and thresholds

9.4 syslog/events Log
  9.4.a Describe system log formats and filters
  9.4.b Configure syslog servers and event logs

9.5 Security
  9.5.a Describe user access control

9.6 NTP
  9.6.a Describe system timing
  9.6.b Configure NTP servers, system clock, time zone and timestamps