



Australian Government

ICTTEN620 Produce and evaluate architecture designs for convergent cellular mobile networks

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Application

This unit describes the skills and knowledge required to specify design of the required mobile cellular general packet radio service (GPRS) and the latest two generations of network architectures.

It applies to individuals with high-level technical skills who design and operate mobile wireless systems that meet the industry implementation of wireless convergence in networks.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Telecommunications Networks Engineering

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan to design convergent cellular mobile networks	1.1 Obtain work details and scope from relevant personnel and arrange for site access in compliance with required security arrangements, legislation, codes, regulations and standards 1.2 Examine technical characteristics of the GPRS systems 1.3 Develop network architecture for a GPRS network, in addition to the circuit-switched domain of 2G (Generation) 1.4 Review 3G structure and identify network requirements to provide required services 1.5 Examine technical characteristics, data rates, operating frequencies and multiplexing schemes of the 3G system 1.6 Establish positioning and types of antennas, terminals, processors,

ELEMENT	PERFORMANCE CRITERIA
	required protocols and architecture, based on technical specifications and requirements
2. Design a GPRS (2.5G) cellular network	2.1 Investigate how 2.5G GPRS overlays the GSM network to transmit and receive transmission control protocol (TCP) and/or internet protocol (IP) based data to and from GPRS mobile devices
3. Design a 3G cellular network	3.1 Develop network architecture for a 3G network and explain functions of the network elements to relevant personnel 3.2 Integrate a 3G network with a wireless local area network (WLAN)
4. Research and evaluate design features of proposed 4G cellular network	4.1 Investigate how a fully IP-based 4G system can provide an end-to-end IP integrated solution for voice, data and streamed multimedia to end-users roaming anytime and anywhere 4.2 Investigate access schemes and assess design features of a 4G network according to organisational requirements 4.3 Investigate the implication for Internet Protocol version 6 (IPv6) in relation to 4G support of a greater number of IP-based wireless devices with applications for improved multicast, security and route minimisation capabilities 4.4 Investigate use of advanced antenna systems to enable 4G with high rate, high reliability and long-range communications
5. Produce reports for architectural design for cellular networks	5.1 Present a report on the impact of competing technologies and gain consensus on concepts from relevant personnel 5.2 Investigate potential interoperability and global roaming issues that may be faced by the latest, required cellular technologies

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	Extracts and evaluates technical data, including equipment specifications during testing phase
Oral communication	Uses specific and relevant language to articulate technological issues
Reading	Comprehends and evaluates technical specifications to plan and prepare for complex cellular design work
Writing	Prepares workplace documentation, including reports and

SKILL	DESCRIPTION
	recommendations, incorporating technical language to communicate complex information clearly and effectively
Planning and organising	- Plans strategic priorities and outcomes within a flexible, efficient and effective context in a diverse environment exposed to competing demands - Uses systematic, analytical processes in complex, non-routine situations, setting goals, gathering required information, and identifying and evaluating options against agreed criteria
Problem solving	Uses formal, analytical and lateral thinking techniques for diagnosing problems and generating and evaluating possible solutions
Technology	Considers strategic and operational potential of digital trends to achieve work goals, enhance work processes and create opportunities

Unit Mapping Information

Supersedes and is equivalent to ICTTEN609 Produce and evaluate architecture designs for convergent cellular mobile networks.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>

Assessment Requirements for ICTTEN620 Produce and evaluate architecture designs for convergent cellular mobile networks

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- produce and evaluate at least two architecture designs for at least two convergent cellular mobile networks.

In the course of the above, the candidate must:

- provide detailed summaries of the client's business domain when designing network
- provide detailed summaries of industry-accepted network hardware and software products and their general features and capabilities, when designing a general packet radio service (GPRS) for the latest, required networks
- design viable GPRS network solutions to meet business needs
- research design features of the latest two cellular networks.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- required legislation, codes, company work practices, regulations and standards, workplace health and safety (WHS) requirements for scoped work
- features and capabilities of industry security products, devices and procedures
- global systems for the latest mobile network designs
- industry-accepted cellular mobile network protocols
- technical characteristics of GPRS systems, including:
 - capability classes and multi-slot classes
 - coding schemes
 - data rates
 - management systems when evaluating roaming features
 - operating frequencies and modulation schemes

- remote user issues when establishing siting and types of antennas, terminals, processors, required protocols and the latest network architecture, based on technical specifications and user requirements
- concepts of three or more industry network developments and design methodologies used when designing networks
- requirements of workplace documentation, including reports.

Assessment Conditions

Skills in this unit must be demonstrated in a workplace or simulated environment where the conditions are typical of those in a working environment in this industry.

This includes access to:

- cellular mobile network structures
- client requirements
- expected traffic volume
- information on a range of IT business solutions
- technical specifications
- vendors and vendor offerings and pricing.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

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