



Australian Government

Department of Education, Employment and Workplace Relations

ICTNPL6046A Undertake network performance analysis

Release: 1

ICTNPL6046A Undertake network performance analysis

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to undertake and manage the monitoring, analysis and improvement of network performance. It involves analysing problems and organising repairs as well as coordinating software and hardware upgrades. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.
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Application of the Unit

Application of the unit	Field officers, technicians or technical supervisors from telecommunications carriers, contractors or other service providers apply the skills and knowledge in this unit. They conduct network performance analysis routinely to monitor the health of the network and also following network upgrades and new installations. This unit applies to switching, transmission, wireless and optical telecommunications networks.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse network performance to determine service levels	1.1. Establish network type and quality of service (QoS) standards levels required, in conjunction with equipment suppliers and customer opinion, to determine the benchmark for network performance standards 1.2. Analyse trend analysis data and statistical data to assess the level and type of network degradation 1.3. Conduct performance tests according to established performance checklist to systematically evaluate the level of QoS using appropriate performance analysis tools 1.4. Analyse test results and determine the QoS levels and network problems 1.5. Establish restoration times in the event of service breakdown 1.6. Determine, organise and allocate resources necessary to monitor service levels
2. Monitor the integrity of the network	2.1. Monitor alarm panels and verify message retrieval system on an ongoing basis to maintain network integrity 2.2. Undertake real time analysis of data from all sources to determine network health
3. Manage the delivery of quality service	3.1. Conduct monitoring activities to maintain the quality of service level and integrity of the network 3.2. Analyse trouble reports and performance data including customer feedback on a regular basis as an indicator of network performance 3.3. Analyse drive test data as an input to performance and optimise the network to improve network level of service
4. Analyse problems and organise repair	4.1. Analyse performance results regularly and initiate investigations when performance levels are below specified standards and recommend network changes 4.2. Analyse causes of problems by testing specific network components 4.3. Isolate problems where possible and escalate repair according to enterprise policy 4.4. Undertake evaluation testing after repair to ensure that the problem has been rectified
5. Coordinate upgrade	5.1. Develop strategies to affect changes according to

ELEMENT	PERFORMANCE CRITERIA
of software and hardware	recommendations and produce a plan to coordinate activities 5.2. Produce a cost estimate of proposed change and submit a cost-benefit study for approval 5.3. Confirm shortcomings in hardware and software and negotiate with planners for network modifications 5.4. Evaluate the modifications to ensure network compatibility and use of appropriate protocols providing QoS in the network 5.5. Produce a plan for software and hardware changes to be initiated with minimum network downtime and customer impact 5.6. Undertake tests following upgrade to ensure the level of performance planned as a result of the upgrade has been achieved 5.7. Produce documentation including configuration details and tests results and submit to network planner

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- analytical skills to interpret performance tests and make recommendations
- communication skills to liaise with customers and technical staff to ensure requirements are known and can be met within timeframes
- literacy skills to interpret technical specifications and related documentation
- numeracy skills to make calculations on test data for evaluation of network performance
- planning and organisation skills to develop activity plans and strategies to monitor, repair or upgrade equipment, systems or software
- problem solving skills to account for unexpected faults or equipment configuration anomalies
- technical skills to correctly analyse network performance service levels and provide solutions

Required knowledge

- cost estimation
- customer:
 - customer policies
 - expectancies
 - service level agreements
- network:
 - alarms
 - compatibility and interoperability
 - operations
 - performance analysis methodologies
 - performance analysis tools
 - performance tests
 - planning and design principles
- protocols providing QoS
- QoS standard levels
- software and hardware upgrades
- technologies and architectures of:
 - switching network

REQUIRED SKILLS AND KNOWLEDGE

- transmission network
- technologies of customer network

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- interpret current network performance data
- monitor the integrity of the network
- manage the delivery of quality service
- conduct performance tests using appropriate performance analysis tools
- analyse problems and organise repair applying escalation procedures, if required, within service assurance guidelines
- coordinate upgrade of software and hardware.

Context of and specific resources for assessment

Assessment must ensure:

- site where network performance analysis may be conducted
- data from organisations involved in planning initiatives
- range of software currently used in industry
- relevant regulations, specifications that impact on service measures and forecasting activities.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- review of proposed upgrade strategy prepared by the candidate, outlining cost-benefit analysis, equipment compatibility study and proposed testing routine
- direct observation of the candidate undertaking a practical monitoring, testing or planning exercise
- oral or written questioning to assess knowledge of monitoring and testing procedures and types of systems.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplaces and job role is recommended, for example:

- ICTTEN6043A Undertake network traffic

EVIDENCE GUIDE

management

- ICTTEN6045A Implement planned network changes with minimal impact to the customer
- ICTTEN6047A Manage a common channel signalling network.

Aboriginal people and other people from a non-English speaking background may have second language issues.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed.

In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.

Where applicable, physical resources should include equipment modified for people with special needs.

Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

RANGE STATEMENT	
Network type may refer to:	- internet protocol (IP) networks: - internet protocol TV (IPTV) - mesh - multiprotocol label switching (MPLS) - online games - video conferencing (VTC) - voice over internet protocol (VoIP) - web - packet switched networks - frame relay (FR) <u>asynchronous transfer mode</u> (ATM) - optical networks: - dense wavelength division multiplexing (DWDM) networks - optical Ethernet - wireless networks: - world interoperability for microwave access (WiMAX) - cellular mobile - general packet radio service (GPRS) - long term evolution (LTE).
Quality of service (QoS) is a measurement of:	- customer satisfaction - level of performance - level of quality of service - quality of service by the network - service response times.
Customer may include:	- communications consultant - contractor to a major supplier - end users - other divisions of the company - small, medium or large organisations - wholesale service providers.
Network degradation may refer to:	- blockages - call drop out - congestion - connection drop out - latency - lockouts - packet loss

RANGE STATEMENT	
	• poor data transfer rate • poor quality of service • server performance.
Performance tests may include:	• grade of service (GoS) • IP systems: • bit rate • data throughput • delay • error probability • jitter • out of order packet delivery • packet dropping • mean opinion score (MOS) • mean time between failures (MTBF) • packet switched network: • cross-talk • echo • frequency response • interrupts • loss • loudness levels • service response time • signal-to-noise ratio • quality of experience (QoE).
Performance check list may include:	• compression: • disable • firewalls: • disable software types • hardware: • central processing unit (CPU) • modems • routers • network service provider: • port blocking • compression • software: • applications • operating system (OS)

RANGE STATEMENT	
	• test: • use test tools • trace: • use commands • tunneling: • virtual private network (VPN) • verify: • connectivity • data transfer rate • timings.
Performance analysis tools may include:	• network management system • protocol analyser • software: • Linux advanced routing and traffic control • bandwidth arbitrator • Zeroshell.
Monitoring activities may include:	• customer perception surveys • feedback from marketing personnel • live tests via alarms • network alarms • network repair • performance levels • periodic updates from network management systems • real-time performance indicators • service levels • temporarily connected test equipment • trend data.
Protocols providing QoS may include:	• ATM • FR • next generation home network (<u>G.hn</u>) standard • home phoneline networking alliance (Home PNA) - home networking over coax and phone wires • Institute of Electrical and Electronics Engineers (IEEE) standards: • <u>IEEE 802.11e</u> • <u>IEEE 802.11p</u> • <u>IEEE 802.1p</u>

RANGE STATEMENT

	• <u>IEEE 802.1Q</u> • <u>IP differentiated services</u> (DiffServ) • <u>IP integrated services</u> (IntServ) • <u>multiprotocol label switching</u> (MPLS) • <u>Resource reSerVation Protocol</u> (RSVP) • RSVP traffic engineering (<u>RSVP-TE</u>) • type of service (TOS) field in the IP header (now superseded by Diffserv).
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Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units	

Competency field

Competency field	Network planning
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