



Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4087A Undertake remote diagnosis and repair of network faults

Release: 1

ICTTEN4087A Undertake remote diagnosis and repair of network faults

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to undertake remote diagnosis and repair of network faults. It includes fault diagnostic and repair strategies for working with remote network equipment. 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 carriers, contractors or other service providers apply the skills and knowledge in this unit. It is particularly relevant to field technicians remotely accessing the network and the network operation centre (NOC) which controls the coordination of remote network activities.
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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. Diagnose remote faults	1.1. Install remote access software on notebook computers 1.2. Verify network fault by analysing relevant data 1.3. Investigate context and background information relevant to network fault 1.4. Source appropriate documentation and test equipment relevant to the network fault 1.5. Conduct appropriate tests and analyse results 1.6. Diagnose network faults using established methodical strategies in a timely fashion without disruption to other services
2. Plan remote repair	2.1. Assess the level of involvement of the NOC in planning the repair 2.2. Plan for any necessary outages and notify customers 2.3. Develop repair strategies to clear fault 2.4. Develop a strategy for the rerouting of customer traffic if applicable 2.5. Advise on site personnel of required work and clearly communicate the repair strategy
3. Repair fault	3.1. Initiate remote repair strategies to reconfigure or repair remote equipment in a manner safe to self, fellow workers network equipment and public 3.2. Inform customers of repair progress where fault has caused degradation of service or outage 3.3. Escalate unresolved faults according to established enterprise procedure 3.4. Test the remote repair for required performance 3.5. Assess ongoing network performance and the likelihood of further problems
4. Report remote diagnosis and repair and document results	4.1. Notify all relevant parties of the results of the remote diagnosis and repair 4.2. Record details relating to any outage according to enterprise procedures 4.3. Complete all relevant documentation and recommend any changes required by the enterprise quality assurance system

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- analytical skills to review alarm information and make judgments to inform operational decisions
- communication skills to:
 - liaise with technical personnel working across different levels and in different contexts
 - provide advice and guidance to others
- initiative and enterprise skills to identify improvements to alarm resolution and troubleshooting
- learning skills to keep up to date with new technology
- literacy skills to read complex technical data, procedures, equipment and system manuals and specifications
- numeracy skills to interpret levels, readings and numerical data
- problem solving skills to address complex problems from a remote location
- research skills to source technical information from enterprise website or manufacturer's technical documentation
- technical skills to:
 - interpret and use equipment and system manuals and specifications
 - undertake diagnosis and repairs on a range of networks

Required knowledge

- installed telecommunications systems and equipment
- path protection
- telecommunications networks
- test equipment and test procedures
- typical problems and challenges that arise in NOCs and in the field
- typical systems and procedures

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:

- diagnose and identify faults including using fault history and ranking likely causes
- plan and coordinate repair of network faults
- apply enterprise escalation and outage procedures following related OHS requirements and work practices.

Context of and specific resources for assessment

Assessment must ensure:

- sites on which remote diagnosis and repair of network may be conducted
- use of test equipment currently used in industry
- manufacturer's technical documentation.

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:

- observation of the candidate performing remote diagnosis of network faults
- observation of the candidate giving clear and precise instructions to staff engaged in on site repair
- observation of the candidate repairing network faults
- review of documentation completed by the candidate
- oral or written questioning to assess required knowledge.

Guidance information for assessment

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

- ICTCBL4099A Remotely locate and identify cable network faults
- ICTTEN4081A Locate, diagnose and rectify faults
- ICTTEN4085A Monitor, analyse and action telecommunications network alarms
- ICTTEN4086A Undertake routine maintenance of the telecommunications network.

EVIDENCE GUIDE

	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.
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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.

Relevant data may include:

- alarm conditions
- customer reports
- event history
- event log
- service level degradation
- test results from remote interrogation.

RANGE STATEMENT	
<i>Context and background information</i> may include:	• customer reports • environmental factors • fault history • previous reports.
<i>Appropriate documentation</i> may include:	• manufacturer's technical documentation • test procedures • trouble clearing and alarm reference guide.
<i>Test equipment</i> may include:	• bit error rate tester • communication system analyser • digital analyser • laser source • magnetic error reduction meter • microwave link analyser • modulation analyser • multimeter • optical attenuator • optical fibre power meter • optical loss test set • oscillator • oscilloscope • optical time domain reflectometer (OTDR) • pattern generator • personal computer loaded with diagnostic routines • power meter • radio frequency (RF) microwave test set • RF sweep tester • signal level meter • spectrum analyses • transmission measuring set • voltage standing wave ratio (VSWR) meter.
<i>Appropriate tests</i> may include:	• bandwidth • blocking • call rate • congestion • distortion • drop out rate • functionality • interference • latency

RANGE STATEMENT	
	• network tests • optical transmission • packet loss rate • quality of service (QoS) • radio transmission • recovery rate • redundancy • signal to noise ratio • transmitted power measurements • upload and download rates.
Network faults may include:	• out of specification faults • dynamic loops • intermittent performance problems • latency • network dropout • severe cable or transmission path damage • system configuration problems • system equipment failure or partial failure • traffic congestion.
Network operation centre may include:	• engineering unit within an enterprise responsible for: • coordinating repairs or changes to the network • monitoring the network • performing diagnostic tests.
Outages may include:	• loss of service to customers due to a network fault or upgrade • planned, in the case of network upgrades • unplanned in relation to faults.
Repair strategies may include:	• force traffic to alternate path • isolate faulty unit • switch to redundant equipment.
Customer traffic may include:	• analogue or digital forms of: • data • image • voice.
Escalate may include:	• greater involvement from the NOC • progressive shifting of network restoration responsibility to more capable areas.

RANGE STATEMENT	
Enterprise procedure may include:	• installation • maintenance • reporting.
Relevant parties may include:	• contractors • customers • equipment vendors and manufacturers • fault centre • individual reporting the fault • network administrator • network manager • network operations centre staff • on site technical staff • site manager.
Quality assurance may include:	• acting on logs, reports and other data to guide ongoing quality improvements • updating logs and reporting on installation or maintenance activities.

Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering
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