



Australian Government

Department of Education, Employment and Workplace Relations

UEENED114A Design and manage enterprise computer networks

Release: 1

UEENEED114A Design and manage enterprise computer networks

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers designing and managing enterprise computer networks. It encompasses safe working practices, the design and management of network and application services, core identity and access management components, directory services infrastructure components, designing physical and logical directory service topologies, designing a public key infrastructure (PKI), designing for business continuity and data availability, and documenting all design and management activities.

Note:

This unit applies to all aspects of Electrotechnology – engineering applications only. For general competencies related to Information Technologies refer to the latest endorsed IT Training Package.

Application of the Unit

Application of the Unit 2)

This unit applies to any recognised development program that leads to the acquisition of a formal award at AQF level 6.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not require a license to practice in the workplace. However,

License to practice**3)**

practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites**Prerequisite Unit(s)****4)****Competencies****4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE1 01A Apply Occupational Health Safety regulations, codes and practices in the workplace

Literacy and numeracy skills**4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy5

Employability Skills Information**Employability Skills****5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

- 6) Elements describe the essential outcomes of a competency standard unit. Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Develop design for an enterprise network.	<p>1.1 OHS processes and procedures for a given work area are identified, obtained and understood.</p> <p>1.2 The extent of the network to be designed is determined from design brief and/or in consultation with appropriate persons.</p> <p>1.3 Business requirements of the enterprise are analysed taking into account existing and projected business model, organisational and Information Technology management structures.</p> <p>1.4 Consideration is given to factors that will have an impact on the design such as business priorities, growth, growth strategy, regulatory framework, risk, and cost.</p> <p>1.5 Existing and planned technical and environment goals of the enterprise are evaluated and documented. (See Note 1)</p> <p>1.6 Consideration is given to technical factors that will have an impact on the design. (See Note 2)</p> <p>1.7 Client access and end-user needs and usage patterns and disaster recovery requirements are evaluated and documented.</p> <p>1.8 Design specification is written using information obtained from the analysis and evaluations of enterprise business and technical requirements.</p> <p>1.9 Network specification is presented and discussed with person(s) of higher authority.</p>

ELEMENT	PERFORMANCE CRITERIA
	1.10 Alterations to the network specification resulting from the presentation/discussion are negotiated with person(s) of higher authority within the constraints of organisation's policy.
2 Design an enterprise network.	2.1 Knowledge and complexities of alternative network infrastructures and currently available technologies are applied to network design. (See Note 3)
	2.2 Network design is developed to incorporate all required Wide Area Network (WAN) infrastructure, Internet connectivity and implementation and management strategies.
	2.3 Risk management strategies are sought and obtained for incorporating into the network design.
	2.4 Network design is reviewed against all inputs and adjusted to rectify any anomalies.
	2.5 Network design proposal is documented in accordance with organisation policies and procedures.
	2.6 Network design is presented and discussed with person(s) of higher authority.
	2.7 Alterations to the network design resulting from the presentation/discussion are negotiated with person(s) of higher authority within the constraints of organisation's policy.
	2.8 Final design is documented and approval obtained from appropriate person(s).
3 Implement and manage an enterprise network.	3.1 OHS risk control measures and procedures for carrying out the work are followed.
	3.2 Server and client computer hardware are installed and configures in compliance with design specifications and network industry standards. (See Note 4)
	3.3 User and Group objects are created and group

ELEMENT	PERFORMANCE CRITERIA
	policy implemented. (Notes 5 and 6)
	3.4 Directory services, data storage, shared resources Internet information services, remote access and network security are managed to ensure effective operation of the network. (Notes 7 to 11)
	3.5 Approaches to issues/problems are analysed to provide most effective solutions.
	3.6 Quality of work is monitored against personal performance agreement and/or established organisational or professional standards.
4 Diagnose network malfunctions.	4.1 OHS risk control measures and procedures for carrying out the work are followed.
	4.2 Network operation is monitored and malfunctions are diagnosed to ascertain their cause using network diagnostic tools. (Note 12)
	4.3 Network malfunctions are rectified using effective techniques and drawing knowledge of network topology and complexities of network interactivity.
	4.4 Approaches to issues/problems are analysed to provide most effective solutions.
	4.5 Quality of work is monitored against personal performance agreement and/or established organisational or professional standards.
5 Report network management activities.	5.1 Written justification is produced for enterprise network services solutions and forwarded to appropriate person/s in accordance with established procedures.
	5.2 Network service development records are maintained in accordance with established procedures.

Notes.

1. Examples are company size, user and resource distribution, various site connectivity, bandwidth, service performance, availability and scalability, data and system

ELEMENT**PERFORMANCE CRITERIA**

access patterns, network roles and responsibilities and security considerations

2. Examples are currently available resources, services, network infrastructure, protocols and hosts, Transmission Control Protocol and Internet Protocol hardware, planned upgrades, support and network and systems management.

3. Examples of network infrastructure are topology, TCP/IP networking strategy, DHCP strategy, Design of name resolution services, Multi-protocol strategy and Distributed File Strategy

4. Hardware installation includes using qualified tools, driver signing options, digital signatures on driver files and systems support for legacy hardware devices.

5. Example of user and group objects are computer accounts, groups configuring accounts via a directory service, searching for objects, use of templates for creating user accounts and resetting accounts

6. Examples of group policy implementation are deploying software, updates and assigning and publishing applications.

7. Examples of directory services are publishing resources, performing searches and configuring printer objects

8. Examples of data storage are NTFS and FAT file systems such as New Technology File Systems (NTFS) and File Allocation Table (FAT), quotas, Encrypting File Systems, configuring volumes and basic and dynamic disks, file and folder permissions and compression and domain-based distributed file systems.

9. Examples of shared resources are folders, web sharing, folder permissions, printers and printer permissions.

10. Examples of Internet Information Services are virtual directories and servers, Internet and intranet browsing, authentication and Secure Sockets Layer (SSL), File Transfer Protocol (FTP) services and access permissions for intranet server

11. Examples of Network security are user account lockout settings, password management, Group Policy to run logon scripts and link objects, auditing and security log file.

12. Examples of network operations are routing TCP/IP, DHCP, Domain Name Service, name resolution, starting

ELEMENT

PERFORMANCE CRITERIA

servers, client computers, User and group objects, directory service replication problems, End-User Group Policy and remote access.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe work practices and designing and managing enterprise networks.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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Evidence shall show an understanding of enterprise computer network design and management processes to an extent indicated by the following aspects:

T1 Analyse business requirements:

- Existing and planned business model and organisational structure
- Factors impacting on design decisions

T2 Analyse technical requirements:

- Evaluation of the company's existing and planned technical and environmental goals
- Client access, end user work needs and usage patterns
- Disaster recovery options

T3 Plan for network and application services

- Name resolution
- IP addressing
- Network access policies
- Remote access strategies
- Support for legacy clients
- Application virtualisation
- Locally installed software
- Web based applications
- Terminal services licensing
- Remote desktop services infrastructure

T4 Design and manage directory service identity and management components

- Directory service logical components
- Directory service functional levels
- Intra-organisational authorisation and authentication
- Schema modifications
- Directory service physical topologies
 - Placement of servers

REQUIRED SKILLS AND KNOWLEDGE

- Definition of physical site boundaries
 - Site replication parameters
 - Printer location policies
 - Directory service administrative model
 - Delegation of administration
 - Group strategies
 - Compliance auditing
 - Group administration
 - Organisational structure
 - Enterprise level policy strategy
 - Directory service logical component migration strategies
 - Directory service upgrade and restructuring
 - Cross component authentication
 - Backwards compatibility
 - Implementation planning
 - Environmental preparation
 - Branch office deployment
 - Authentication strategies
 - Server security
 - Implement a public key infrastructure (PKI)
 - Plan for interoperability
 - Inter-organisational authorisation and authentication
 - Application authentication interoperability
 - Cross platform interoperability
- T5 Design and manage business continuity and data availability
- Plan for business continuity
 - Service availability
 - Directory service recovery
 - Software updates
 - Compliance management
 - Patch management strategies
 - Operating system virtualisation strategies
 - Server consolidation
 - Application compatibility
 - Virtualisation management
 - Placement of servers
 - Data management and data access
 - Data security

REQUIRED SKILLS AND KNOWLEDGE

- Data accessibility
- Redundancy
- Data collaboration

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing

on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

**Critical aspects
of evidence
required to
demonstrate
competency in
this unit** 9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
 - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Design and manage enterprise networks as described in 8)

and including:

- A Analysing business requirements.
- B Analysing technical requirements.
- C Obtaining approval for network design specification.
- D Designing a practical network in compliance with specifications and industry standards.
- E Implementing network design.
- F Diagnosing and rectifying the cause of network malfunctions effectively.
- G Documenting justification for network solutions.
- H Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment 9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to design and management of enterprise computer networks.

Method of assessment 9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units 9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement**RANGE STATEMENT**

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation design and management of any enterprise network consisting of multiple sites and users and is to provide users with email and Internet access, shared resources and security.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Computer Systems