



Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4229A Design, install and configure a customer smart grid network

Release: 1

ICTTEN4229A Design, install and configure a customer smart grid network

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to design, install and configure an enterprise smart grid network in a home or commercial environment. It involves testing and troubleshooting the smart grid network installation. Smart grid network changes the focus from the physical infrastructure to the new world of virtual infrastructure. It uses the internet protocol (IP) home network to provide applications that are scalable and sustainable from an energy conservation aspect. Scalability, cost savings, security, flexibility of infrastructure and energy consumption are significant factors when businesses considers smart grid network. Smart grid network solutions support the application of Next Generation Technologies (NGN). 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	This unit applies to the design, installation and configuration of a smart grid network suitable for domestic or industrial enterprises using IP networking technology. Relevant job roles include designer and installer of smart grid networks, IP networks, and sustainable networks. This includes maintaining and supporting smart grid 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. Prepare for the design and installation of a smart grid network	1.1. Prepare for given work according to occupational health and safety (OHS) and environmental requirements with appropriate personnel from the enterprise 1.2. Identify safety hazards and implement risk control measures in consultation with appropriate personnel 1.3. Determine nature and scope of the smart grid network from customer specifications and appropriate personnel 1.4. Obtain operating instructions, manuals, hardware and software testing methodologies 1.5. Consult appropriate personnel to ensure the task is coordinated effectively with others involved at the worksite
2. Design a customer smart grid network	2.1. Produce a smart grid network topology that is interoperable and scalable after considering customer requirements, technical specifications, physical and financial constraints and expansion projections 2.2. Determine network devices and network resources according to enterprise procedures 2.3. Produce the smart grid network design including network security and network element configurations to meet design specifications and enterprise procedures
3. Install and configure a designed smart grid network	3.1. Install smart grid network hardware to topology design plan according to enterprise procedures 3.2. Determine network addressing scheme for network connectivity and verify using calculations 3.3. Configure network elements to perform the logical connection of the smart grid network topology with the network security features required 3.4. Conduct connectivity and performance tests to verify that the network installation meets the design specification 3.5. Troubleshoot the smart grid network and internet connectivity according to manufacturer's specifications and enterprise procedures
4. Complete and document network design and installation	4.1. Restore worksite to safe condition according to established safety procedures 4.2. Record and store essential design and installation information according to enterprise procedures 4.3. Notify appropriate personnel about the completion of the task according to enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication skills to liaise and negotiate with customers and peers to achieve design specifications
- literacy skills to:
 - develop network documentation and maintain network records
 - read and interpret enterprise procedures, manuals and specifications
- numeracy skills to interpret technical data
- planning and organisational skills to plan and prioritise own work
- problem solving skills to:
 - deal with unexpected situations on the basis of safety and specified work outcomes
 - troubleshoot common network problems according to help desk procedures
- safety awareness skills to:
 - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
 - follow enterprise OHS procedures
 - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
 - analyse the impact of applications on traffic flow in the network
 - apply network design methodologies to design networks that provide a range of services and applications found in larger networks
 - conduct a wireless site survey
 - determine customer requirements and a design specification
 - determine the impact of upgrading hardware and software on network functionality
 - identify the technical requirements, constraints and manageability issues for a given customer network requirement
 - install a network design
 - use tools and equipment

Required knowledge

- enterprise OHS procedures

REQUIRED SKILLS AND KNOWLEDGE

- network design concepts:
 - business requirements
 - network topologies
 - physical and financial constraints
 - security
 - wired or wireless options
- network requirements:
 - applications
 - lifecycle
 - manageability
 - quality of service
- open systems interconnect (OSI) layered communication model
- tool and equipment use
- troubleshooting:
 - impact of network failure
 - maintenance
 - troubleshooting methodology

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:

- determine customer requirements
- design a smart grid network that uses advanced networking techniques
- install a smart grid network according to design specification
- configure network devices to meet design functionality
- document smart grid network design, installation and configuration.

Context of, and specific resources for assessment

Assessment must ensure:

- a site where design and installation of a smart grid network may be conducted
- use of tools, equipment and materials currently used in industry
- relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Methods of assessment

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

- direct observation of the candidate designing, installing and configuring a smart grid network
- review of documents prepared by the candidate detailing design and installation
- 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 with:

- ICTTEN2207A Install and configure a home or small office network
- ICTTEN2208A Install and configure a small to

EVIDENCE GUIDE

	medium business network • ICTTEN4210A Implement and troubleshoot enterprise routers and switches. 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.

<i>OHS</i> may include:	• hazardous substances and dangerous goods codes • legislation • local safe operation procedures • material safety management systems • protective equipment.
<i>Environmental requirements</i>	• dust

RANGE STATEMENT

may include:

- excessive energy and water use
- excessive noise
- fume
- gas
- liquid waste
- smoke emissions
- solid waste
- vapour.

RANGE STATEMENT	
<i>Appropriate personnel</i> may include:	• customer • manager • network manager • site engineer • supervisor.
<i>Smart grid network</i> may refer to:	• domestic: • home automation: • climate control • light switches • power • thermostats • window shade • wireless control • in-home patient monitoring • internet protocol TV (IPTV) • home computer network • home security • smart sprinkler • industrial: • building automation • commercial lighting (wireless control) • heating, ventilation and air conditioning (HVAC) energy management • industrial security • plant monitoring: • infrared • pressure settings • temperature control • smart sprinkler • warehousing.
<i>Smart grid network topology</i> may refer to:	• physical and logical interconnection between network devices: • bus • mesh • ring • star • tree.

RANGE STATEMENT	
Network devices may include:	• interface units • IP network • router • sensors • server • switch.
Network resources may include:	• files • printers • software.
Enterprise procedures may include:	• enterprise security specifications • instructions: • designs • drawings • job sheets • plans • manufacturer's specifications • operational procedures • reporting and communication • use of tools and equipment.
Network addressing scheme may include:	• dynamic • static • subnet.
Calculations may include:	• binary addition • binary conversion • binary division • binary multiplication • binary number system • binary subtraction.
Essential design and installation information may include:	• configuration • design • installation • installation software • IP addressing schemes • logical and physical diagrams • network administrator codes • passwords • security access codes • troubleshooting reports.

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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