Australian Government

Department of Education, Employment and Workplace Relations

ICTDRE4167A Integrate data delivery modes

Release: 1

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

ICTDRE4167A Integrate data delivery modes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to connect and configure a media centre that integrates signal for distribution.
	Received signals from radio frequency (RF) sources are combined with voice and data signals from other sources and the composite signal is distributed to a range of devices.
	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.

Application of the Unit

Application of the unit	The unit applies to an installer working in a digital reception sector integrating services from multiple sources and in multiple formats (RF, digital, data, and voice) for both inward and outbound signals into complex customer systems.
	Note: This unit builds on ICTDRE4166A Integrate customer digital reception equipment, and extends the concept of system integration by adding a new dimension - multiple services and multiple delivery modes.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluate existing customer equipment	1.1. Obtain *relevant legislation*, *codes*, *regulations and standards* for compliance when conducting work
	1.2. Notify customer to verify installation order and arrange for site access to comply with security arrangements
	1.3. Notify supervisor of identified *safety hazards* at the worksite and complete a job safety analysis (JSA) before commencing work
	1.4. Use *test equipment* to verify that *customer equipment* is operational prior to installation
	1.5. Assess equipment capabilities and connection types against customer requirements for suitability
	1.6. Assess *customer premises* against installation plan according to *client specifications* and *by-laws*, *standards and regulations*
	1.7. Produce an installation diagram using appropriate *drawing symbols* to indicate connection details of customer system
2. Design and build a multiple service customer system solution	2.1. Determine connection requirements and pathways for each *service* to be connected and locate a signal source for each service
	2.2. Confirm compatibility for proposed pathway options connections to existing system and for *optimal performance*
	2.3. Produce a preliminary connection plan with block diagrams and specifications to optimise system performance
	2.4. Evaluate connection plan design to determine any *local spectrum management issues* arising from multiple service
	2.5. Produce a final connection design with amendments to eliminate local spectrum management contentions if required
	2.6. Select and connect *cables* according to connection plan using appropriate *materials*
	2.7. Activate equipment to check for operation of the network
	2.8. Resolve connection issues that arise during the build phase and modify connection plan
3. Provide enterprise equipment with	3.1. Determine optimal method of connection to each

ELEMENT	PERFORMANCE CRITERIA
multiple services	service source according to **client** specifications
	3.2. Connect service to system following occupational health and safety (**OHS**) **and environmental requirements** and test to identify and rectify connection issues
	3.3. Notify **service provider** if problems cannot be rectified at the local level and escalate unresolvable connection issues accordingly
4. Configure services and optimise customer system across multiple services	4.1. Conduct client specific and **customer** set-up operations for each service
	4.2. Test performance of enterprise and customer equipment across a range of settings
	4.3. Test integrated performance of system across multiple services
	4.4. Record and evaluate test results to satisfy manufacturer's operational margins
	4.5. Tune customer equipment for optimal integrated performance across multiple services
	4.6. Restore site to original condition and customer satisfaction
5. Train customer and complete contract documentation	5.1. Conduct **customer training** appropriate to the equipment, services and vendor literature
	5.2. Complete **appropriate records** and update administration systems according to enterprise policy
	5.3. Record and store test results in the appropriate database, leaving copies on site according to enterprise policy
	5.4. Provide **warranties** to customer in required format where work and equipment are subject to warranty
	5.5. Prepare invoices and other financial documentation where required and present to customer
	5.6. Obtain authorised signatures on required documentation to confirm acceptance of completed work

Required Skills and Knowledge

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 with customer and colleagues and negotiate with site owner
- literacy skills to interpret technical documentation, specifications and service orders
- negotiation skills to interact with site owner
- numeracy skills to take measurements and interpret results
- planning and organisational skills to provide enterprise equipment
- problem solving skills to respond to typical integration challenges
- task management skills to:
    - adhere to all safety requirements
    - work systematically with required attention to detail
- technical skills to:
    - adjust performance by tuning, balancing and replacing components
    - configure network
    - perform digital home technology integration (DHTI) and troubleshooting
    - perform tests for continuity, ingress, egress, signal level and signal quality
    - use hand and power tools
    - use test equipment for signal measurement and other enterprise-specific tools

Required knowledge

- contemporary equipment and connection methods
- customer service principles, particularly dealing with customers face to face
- enterprise or service specific knowledge of products and services supplied
- equipment types:
    - amplifiers
    - couplers
    - taps
    - splitters
- home automation
- home theatre systems
- modulation techniques
- OHS general principles and enterprise specific JSA requirements
- performance adjustments for tuning, balancing and replacing components
- quality assurance of enterprise requirements
- security systems
- telephone service

REQUIRED SKILLS AND KNOWLEDGE

- test analysis and diagnosis (enterprise diagnosis methods)
- test equipment and signal measurement and other enterprise-specific tools
- video and audio fundamentals
- wireless local area networks (WLANs)
- wireless technology

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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.	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • identify service requirements of a range of contemporary products • design and build a multiple service customer system solution • install and integrate at least two services to a customer system comprised of at least three equipment components applying all related OHS requirements and work practices • activate and optimise customer equipment using two or more signal sources • configure services and optimise customer system across multiple services • conduct functionality tests and interpret results • provide customer training appropriate to the equipment.
Context of, and specific resources for assessment	Assessment must ensure: • site for data delivery modes integration • range of equipment currently used in industry • range of test equipment required for data delivery integration.
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 installing and integrating at least two services to a customer system comprised of at least three equipment components • direct observation of the candidate configuring services and optimising customer system across multiple services • oral or written questioning of the candidate 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:

EVIDENCE GUIDE

	• ICTDRE4166A Integrate customer digital reception equipment.
	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.

Relevant legislation, *codes*, *regulations and standards* may include:	• Australian Communications Industry Forum (ACIF) standards and codes • AS Communications Cabling Manual (CCM) Volume 1 • AS/NZS 3000:2007

RANGE STATEMENT	
	• AS/NZS 3080:2003 • AS/NZS 3084:2003 • AS/NZS 3085.1:2004 • AS/NZS IEC 61935.1:2006 • AS/NZS IEC 61935.2:2006 • AS/NZS ISO/IEC 14763.3:2007 • AS/NZS ISO/IEC 15018:2005 • AS/NZS ISO/IEC 24702:2007 • cabling security codes and regulations • Environmental Protection Acts • Trades Practices Act • ISO Draft 11801 • OHS • regulated or industry codes of practice including appropriate Australian Communications and Media Authority (ACMA) standards • Institute of Electrical and Electronics Engineers (IEEE) standards • technical standards AS/ACIF S008:2006 and AS/ACIF S009:2006.
Safety hazards may refer to:	• debris • excessive dust or noise • exposed electrical wiring • exposed machinery • industrial • spilled chemicals • unsafe spatial separation of cables • unsafe structures • wet areas.
Test equipment may include:	• multimeter • signal level meter • spectrum analyser.

Customer equipment may include:	• devices:
	    • antennas
	    • audio equipment (amplifiers and equalisers)
	    • recorders (disk and hard drive)
	    • speaker systems
	    • TV receivers

RANGE STATEMENT	
	• digital free to air (FTA)
	• hard disk recorder
	• high definition (HD) TV
	• home automation
	• LCD TV
	• media centre
	• plasma TV
	• security systems
	• simulation consoles
	• video player
	• video and audio distribution systems.
Customer premises are building types including:	• alternative construction types, such as mud brick
	• concrete construction
	• domestic brick or timber dwelling
	• multi-level construction.
Client specifications may include:	• equipment types
	• policy, procedures and practices
	• service level agreements (SLAs)
	• standards and quality requirements.
By-laws, *standards and regulations* may include:	• Australian and New Zealand standards and cabling regulations
	• council by-laws for siting equipment and cables
	• electrical safety factors.
Drawing symbols may include:	• audiovisual system features
	• common electrical circuit features.
Service may include:	• data services cable:
	• ADSL
	• ADSL2
	• ADSL2+
	• Internet protocol TV (IPTV)
	• other service delivery modes as they emerge
	• satellite telephony and data services
	• telephone services via cable
	• wireless services.
Optimal performance may include:	• antenna orientation
	• aspect ratio
	• contrast

RANGE STATEMENT	
	• picture quality • signal amplification adjustment.
Local spectrum management issues may include:	• bandwidth overlap for local wireless communication devices • bandwidth overlap for remote control devices.
Cables may include:	• coaxial • optical fibre.
Materials may include:	• antennas • cables • joiners • plugs and other connectors • support fittings.
Client may be:	• the organisation contracting the work • the organisation providing services.

OHS and environmental requirements may include:	• identifying other services, including power and gas
	• personal protective equipment:
	  • earmuffs
	  • gloves
	  • head protection
	  • masks
	  • protective suits
	  • safety boots
	  • safety glasses
	• safe working practices, such as the safe use and handling of:
	  • chemicals
	  • materials
	  • tools and equipment
	• safety equipment:
	  • flashing lights
	  • safety barriers
	  • warning signs and tapes
	  • witches hats
	• special access requirements
	• environmental considerations include:
	  • clean-up protection
	  • stormwater protection

RANGE STATEMENT	
	• waste management.
Service provider may be:	• an internet service provider (ISP) or a delegated organisation acting on their behalf • a registered telecommunications carrier.
Customer may include:	• an individual • entity who is the final recipient of the service.
Customer training may include:	• customer to operate equipment functions • demonstration to customer • explanation of operating functions as provided in vendor product literature • explanation of relevant equipment functions • feedback to customer on their operation of equipment functions.
Appropriate records may include:	• connection records • equipment user guides • invoices.
Warranties may include:	• support provided by network service provider • support specified by the equipment manufacturer or supplier.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

Competency field

Competency field	Digital reception technology