



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **ICAI4175C Select and install a router**

**Release: 1**

## ICAI4175C Select and install a router

### Modification History

Not Applicable

### Unit Descriptor

|                        |                                                                                                                                                                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit descriptor</b> | <p>This unit defines the competency required to select and install a router to meet technical requirements.</p> <p>The following unit is linked and forms an appropriate cluster:</p> <ul style="list-style-type: none"><li>• ICAA4047B Determine project specifications and secure client agreement</li></ul> |
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### Application of the Unit

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| <b>Application of the unit</b> |  |
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### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

|                           |           |                                      |
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| <b>Prerequisite units</b> |           |                                      |
|                           | ICAI3101B | Install and manage network protocols |
|                           |           |                                      |

## Employability Skills Information

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| <b>Employability skills</b> | This unit contains employability skills. |
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## Elements and Performance Criteria Pre-Content

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| 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. Determine router specification        | 1.1. Determine current and future <b>network</b> capacity, taking into account current and future <b>business requirements</b><br>1.2. Identify <b>network</b> topology from technical requirements<br>1.3. Determine throughput <b>requirements</b> of <b>router</b><br>1.4. Determine media access <b>requirements</b> , with reference to current and future <b>requirements</b><br>1.5. Determine the actual addressing scheme<br>1.6. Identify data link layer technologies with reference to current and future <b>requirements</b><br>1.7. Determine network management and security <b>requirements</b> , with reference to current and future <b>requirements</b> |
| 2. Select and install appropriate router | 2.1. Select a <b>router</b> with appropriate features according to technical <b>requirements</b><br>2.2. Choose cable, WAP, WAN connectors and other <b>peripherals</b> according to <b>network</b> and <b>router</b> specification, and WAN <b>protocols</b><br>2.3. Install and configure the <b>router</b> , using predetermined configuration<br>2.4. Test the <b>router</b> for connectivity across the <b>network</b> and for <b>routing protocol</b> functions<br>2.5. Adapt or modify the predetermined <b>router</b> configuration, depending on outcome of tests<br>2.6. Review <b>router</b> in line with organisational requirements                           |

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- Installing peripheral devices
- Remote access skills using Telnet

**REQUIRED SKILLS AND KNOWLEDGE****Required knowledge**

- Basic router commands
- Router configuration, clock rate, routing protocol, password protection of router
- Router-based network architectures
- Effect of a router on delimiting broadcast traffic and on conserving bandwidth
- Providing the network with redundant paths for reliability and the way routers manage these paths
- How dynamic routing algorithms or protocols create and maintain routing tables
- Use of routing tables in intelligent packet routing and switching
- Router firewalls

## 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 following is essential:

- Assessment must confirm the ability to select and install a router using predetermined configuration and tests. Basic configuration capability is essential in demonstrating competency.

To demonstrate competency in this unit the person will require access to:

- Router specifications
- Technical requirements for a network
- Router
- Cabling
- Networked (LAN) computers
- WAN service point of presence (or simulated)

#### Context of and specific resources for assessment

A router connects networks together, controlling the routing of packets from source to destination and providing alternate paths when necessary. Routers are more sophisticated than bridges, connecting networks of different types and making logical routing decisions on the basis of available data. Typically a router hands off packets to another router along the path until the destination is reached.

In the context of the Internet, a router is a device or, in some cases, software in a computer, that directs information packets to the next point toward their destination. A router is located at any juncture of networks, including each Internet point-of-presence. As such, routers are key to the operation of the Internet.

It is essential that this unit covers a broad variety routers ranging from simple SOHO ADSL/CABLE routers, to complex fibre channel multi-routing units designed for

**EVIDENCE GUIDE**

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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|                             | <p>backbone capability. Additionally, it is imperative that routers are provided for hands-on experience, particularly SOHO and Fibre channel routers.</p> <p>The breadth, depth and complexity of knowledge and skills in this competency would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance would be involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.</p> <p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• Performance of a broad range of skilled applications including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills would be characteristic.</li> <li>• Applications may involve responsibility for, and limited organisation of, others.</li> </ul> |
| <b>Method of assessment</b> | <p>The purpose of this unit is to define the standard of performance to be achieved in the workplace. In undertaking training and assessment activities related to this unit, consideration should be given to the implementation of appropriate diversity and accessibility practices in order to accommodate people who may have special needs. Additional guidance on these and related matters is provided in ICA05 Section 1.</p> <ul style="list-style-type: none"> <li>• Competency in this unit should be assessed using summative assessment to ensure consistency of performance in a range of contexts. This unit can be assessed either in the workplace or in a simulated environment. However, simulated activities must closely reflect the workplace to enable full demonstration of competency.</li> </ul>                                                                                                                                                                                                                                                         |

| <b>EVIDENCE GUIDE</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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|                                            | <ul style="list-style-type: none"> <li>• The assessment of this unit of competency will usually include observation of router selection and configuration for a variety of scenarios</li> <li>• Assessment will usually include observation of real or simulated work processes and procedures and/or performance in a project context as well as questioning on underpinning knowledge and skills. The questioning of team members, supervisors, subordinates, peers and clients where appropriate may provide valuable input to the assessment process. The interdependence of units for assessment purposes may vary with the particular project or scenario.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Guidance information for assessment</b> | <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• ICAA4047B Determine project specifications and secure client agreement</li> </ul> <p>An individual demonstrating this competency would be able to:</p> <ul style="list-style-type: none"> <li>• Demonstrate understanding of a broad knowledge base incorporating some theoretical concepts</li> <li>• Apply solutions to a defined range of unpredictable problems</li> <li>• Identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas</li> <li>• Identify, analyse and evaluate information from a variety of sources</li> <li>• Take responsibility for own outputs in relation to specified quality standards</li> <li>• Take limited responsibility for the quantity and quality of the output of others</li> <li>• Maintain knowledge of industry products and services</li> </ul> <p>Additionally, an individual demonstrating this competency would be able to:</p> <ul style="list-style-type: none"> <li>• Configure and debug routers and routing tables</li> </ul> |

**EVIDENCE GUIDE**

|  |                                                                                                                                                                                                                                             |
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|  | <ul style="list-style-type: none"> <li>• Select a router for a particular task</li> <li>• Interpret available information and request clarification where needed</li> <li>• Take responsibility for outputs in work and learning</li> </ul> |
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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.

***Network*** may include but not limited to:

- large and small LANs
- national WANs
- the internet
- VPNs
- the use of the PSTN for dial-up modems only
- private lines
- data
- voice

***Router*** may include:

- Cisco 800 and ISR Series routers
- Linksys routers
- Cisco wireless access points
- Cisco uBR7200 universal broadband routers
- 3Com OfficeConnect Remote 810 ADSL
- 3Com SuperStack 400
- Netopia routers
- D-Link routers
- Motorola Vanguard series
- Intel Express series

***Peripherals*** may include but are not limited to:

- Printers, scanners, tape cartridges
- Speakers, multimedia kits
- Personal computer fax, modems
- Input equipment may include mouse, touch pad, keyboard, pens
- Mobile phones, palmtops and personal digital

| <b>RANGE STATEMENT</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                              | assistants (PDAs), laptops and desktop computers <ul style="list-style-type: none"> <li>• Bluetooth devices, universal serial bus (USB), Firewire (IEEE 1394)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b><i>Routing protocol</i></b> may include static and dynamic routing:       | <ul style="list-style-type: none"> <li>• Cisco discovery protocol (CDP)</li> <li>• Enhanced interior gateway routing protocol (EIGRP)</li> <li>• Routing information protocol (RIP)</li> <li>• NetWare link state protocol (NLSP)</li> <li>• Open shortest-path first interior gateway protocol (OSPF)</li> <li>• Exterior gateway protocol and border gateway protocol (superseded by BGP)</li> </ul>                                                                                                                                                                                                            |
| <b><i>Organisational requirements</i></b> may include but is not limited to: | <ul style="list-style-type: none"> <li>• how and what the organisation wants in regard to work environment</li> <li>• problem solution processes</li> <li>• preventative maintenance and diagnostic policy</li> <li>• roles and technical responsibilities in the IT department</li> <li>• vendor</li> <li>• product service-level support agreements</li> </ul>                                                                                                                                                                                                                                                  |
| <b><i>Requirements</i></b> may be in reference to:                           | <ul style="list-style-type: none"> <li>• business</li> <li>• system</li> <li>• application</li> <li>• network</li> <li>• people in the organisation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b><i>WAN protocols</i></b> may include:                                     | <ul style="list-style-type: none"> <li>• Transmission of IP datagrams over X.25, Frame Relay or ATM. (X.25 now superseded by such technologies as Frame Relay and Asynchronous Transfer Mode.)</li> <li>• Point to point protocol (PPP)</li> <li>• Synchronous data link control (SDLC)</li> <li>• Binary synchronous control (BSC)</li> <li>• High-level data link control (HDLC)</li> <li>• Advanced data communications protocol (ADCP)</li> </ul> <p>Several of these may now be considered as legacy protocols, but, even though they may not be in current use, there is still a need to keep knowledge</p> |

**RANGE STATEMENT**

|  |                                            |
|--|--------------------------------------------|
|  | of the protocols for legacy installations. |
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**Unit Sector(s)**

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| <b>Unit sector</b> | Implement |
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**Co-requisite units**

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| <b>Co-requisite units</b> |  |  |
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**Competency field**

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| <b>Competency field</b> |  |
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