



**Australian Government**

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

# **ICAA5045C Produce network architecture design**

**Release: 1**

## ICAA5045C Produce network architecture design

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit defines the competency required to specify the design of the required network architecture.</p> <p>The following units are linked to form an appropriate cluster:</p> <ul style="list-style-type: none"> <li>• ICAA5044C Develop system infrastructure design plan</li> <li>• ICAI5098C Install and manage complex networks</li> <li>• ICAS5123C Manage network security</li> <li>• ICAS5122C Identify and resolve network problems</li> <li>• ICAA5056B Prepare disaster recovery and contingency plans</li> </ul> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.</p>
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### Application of the Unit

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

Refer to Unit Descriptor

### Pre-Requisites

<b>Prerequisite units</b>			
	<table border="1"> <tr> <td>ICAD4217B</td> <td>Create technical documentation</td> </tr> </table>	ICAD4217B	Create technical documentation
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<b>Prerequisite units</b>		

## Employability Skills Information

<b>Employability skills</b>	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. Design network	1.1. Review <i>specifications</i> and identify <i>requirements</i> of the <i>network</i> 1.2. Develop physical <i>network</i> diagrams as a preface or adjunct to <i>architecture</i> blueprint 1.3. Establish the location of and types of terminals, processors and required protocols and <i>architecture</i> based on technical <i>specifications</i> and <i>requirements</i>
2. Evaluate design and likely performance using expected traffic volumes	2.1. Predict line traffic, policing and shaping protocols and the impact on <i>input/output devices</i> and processors from current and future demand <i>requirements</i> 2.2. Benchmark the design using expected volumes of traffic as a basis 2.3. Identify the likely performance profile (best/worst) and review the effect on other <i>systems</i>
3. Finalise network design and plan for implementation	3.1. Review the benchmarks and <i>requirements</i> and final design proposed 3.2. Determine the support and training <i>requirements</i> needed 3.3. Obtain the latest technical <i>specifications</i> and pricing by contacting possible vendors 3.4. Document the <i>network</i> design and present <i>documentation</i> to <i>appropriate person</i> for approval

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- Project planning skills in relation to scope, time, cost, quality, communications and risk management (e.g. when reviewing client user requirements and network requirements, and for documenting network design and presenting it to senior managers, client users and sponsors for approval)
- Research skills for specifying, analysing and evaluating broad features of current security issues and best practice in security devices, products and procedures (e.g. when obtaining latest technical specifications and pricing by contacting possible

**REQUIRED SKILLS AND KNOWLEDGE**

vendors, and for specifying the likely performance profile (best/worst) and for reviewing its effect on other systems)

- Financial modelling skills for specifying, analysing and evaluating a range of different solutions (e.g. when documenting network design and presenting it to senior managers, client users and sponsor for approval)
- Plain English literacy and communication skills in relation to analysis, evaluation and presentation of information (e.g. when documenting network design and presenting it to senior managers, client users and sponsor for approval)
- Problem solving skills for a defined range of unpredictable problems (e.g. when predicting line traffic and the impact on input/output devices and processors from current and future demand requirements)
- Group facilitation and presentation skills in relation to transferring and collecting information and gaining consensus on concepts (e.g. when documenting network design and presenting it to senior managers, client users and sponsor for approval)

**Required knowledge**

- Detailed knowledge of current industry-accepted network protocols for data and voice (e.g. when designing a network)
- Broad knowledge of current industry-accepted network hardware and software products, including broad knowledge of general features and capabilities and detailed knowledge in some areas (e.g. when evaluating network traffic and policing and shaping)
- Broad knowledge of current industry security products, devices and procedures, including broad knowledge of general features and capabilities and detailed knowledge in some areas (e.g. when finalising network design)
- Broad knowledge of three or more current industry network development and design methodologies (e.g. when designing a network)
- Detailed knowledge of the operating systems (e.g. when evaluating network traffic)
- Broad knowledge of the client business domain (e.g. when designing a network)
- Detailed knowledge of remote user issues (e.g. when establishing the location and types of terminals, voice communications and processors, required protocols and network architecture based on technical specifications and user requirements, and for predicting line traffic and the impact on input/output devices and processors from current and future demand requirements)

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• Assessment must confirm sufficient knowledge of communication hardware, protocols and legacy systems</li> <li>• Assessment must confirm the ability to design viable network solutions and to assess network performance</li> </ul> <p>To demonstrate competency in this unit the learner will need access to:</p> <ul style="list-style-type: none"> <li>• Client requirements</li> <li>• Technical specifications</li> <li>• Expected traffic volume</li> <li>• Vendors and vendor offerings/pricing</li> <li>• Information on a range of IT business solutions</li> <li>• Future organisational business processes</li> <li>• Budget for the scenarios</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>An individual who has this competency should display self-directed application of knowledge and skills, with substantial depth in network design and operations where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others.</p> <p>The breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination would be characteristic.</p> <p>The demonstration of competency may also require self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate</p>

<b>EVIDENCE GUIDE</b>	
	<p>equipment, services and techniques for self and others.</p> <p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned with planning and evaluation functions. Group or team coordination may also be involved.</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 to 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> <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. In the case of this unit, it could be assessed in a holistic manner with:</p>

<b>EVIDENCE GUIDE</b>	
	<ul style="list-style-type: none"> <li>• ICAA5044C Develop system infrastructure design plan</li> <li>• ICAI5098C Install and manage complex networks</li> <li>• ICAS5122C Identify and resolve network problems</li> <li>• ICAS5123C Manage network security</li> <li>• ICAA5056B Prepare disaster recovery and contingency plans</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 theoretical concepts, with substantial depth in some areas</li> <li>• Analyse and plan approaches to technical problems or management requirements</li> <li>• Transfer and apply theoretical concepts and/or technical or creative skills to a range of situations</li> <li>• Evaluate information, using it to forecast for planning or research purposes</li> <li>• Take responsibility for own outputs in relation to broad quantity and quality parameters</li> <li>• Take some responsibility for the achievement of group outcomes</li> <li>• Maintain knowledge of industry products and services</li> </ul>

## Range Statement

<b>RANGE STATEMENT</b>	
<p>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.</p>	
<p><b>Specifications</b> may include but is not limited to:</p>	<ul style="list-style-type: none"> <li>• technical requirements,</li> <li>• user problem statement</li> <li>• current system functionality</li> </ul>



<b>RANGE STATEMENT</b>	
<b>Requirements</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>Network</b> may include but is not limited to:	<ul style="list-style-type: none"> <li>• large and small LANs,</li> <li>• WANs,</li> <li>• the internet,</li> <li>• the use of the PSTN for dial-up modems only,</li> <li>• DSL lines,</li> <li>• VPNs,</li> <li>• private lines,</li> <li>• data and voice</li> </ul>
<b>Architecture</b> may include but is not limited to:	<ul style="list-style-type: none"> <li>• Operating system: Novell NetWare 5 or above or any operating system that has multi-user ability, Linux, Mac OS, Windows 2000 or above</li> <li>• Database software: Oracle, Sybase, Microsoft SQL server, Ingres, DB2, Informix, mSQL, MySQL, SQL server</li> <li>• Configuration: small memory model, large memory model, requests per second</li> </ul>
<b>Input/output devices</b> may include but is not limited to:	<ul style="list-style-type: none"> <li>• keyboard,</li> <li>• mouse,</li> <li>• printer,</li> <li>• scanner,</li> <li>• monitor</li> <li>• internet connections</li> </ul>
<b>Systems</b> may include but is not limited to:	<ul style="list-style-type: none"> <li>• hardware and software components that run a computer</li> </ul>
<b>Appropriate person</b> may include:	<ul style="list-style-type: none"> <li>• a supervisor,</li> <li>• teacher,</li> <li>• authorised business representative</li> <li>• client</li> </ul>
<b>Documentation</b> may follow:	<ul style="list-style-type: none"> <li>• ISO/IEC/IEEE/IETF/ITU/AS standards,</li> <li>• audit trails,</li> <li>• naming standards,</li> <li>• version control,</li> <li>• project management templates and report writing,</li> </ul>

**RANGE STATEMENT**

	<ul style="list-style-type: none"> <li>• maintaining equipment inventory,</li> <li>• client training and satisfaction reports</li> </ul>
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**Unit Sector(s)**

<b>Unit sector</b>	Analyse and Design
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**Co-requisite units**

<b>Co-requisite units</b>	

**Competency field**

<b>Competency field</b>	
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