



Australian Government

Department of Education, Employment and Workplace Relations

ICAS4113C Identify and resolve common database performance problems

Release: 1

ICAS4113C Identify and resolve common database performance problems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	<p>This unit defines the competency required to identify and solve common database problems to improve performance.</p> <p>The following units are linked and form an appropriate cluster:</p> <ul style="list-style-type: none"> • ICAB4060B Identify physical database requirements • ICAB4061B Monitor physical database implementation • ICAB4136B Use structured query language to create database structures and manipulate • ICAS4108B Complete database back up and recovery • ICAS4125B Monitor and administer a database <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

Application of the unit	
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units	

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. Diagnose problems	1.1. Determine appropriate database performance <i>diagnostic tool</i> to use based on organisational <i>database</i> requirements and vendor recommendations 1.2. Run <i>diagnostic tool</i> to identify issues causing degradation of database <i>performance</i> 1.3. Determine and record where inappropriate use of <i>database</i> and temporary table spaces occurs 1.4. Carry out appropriate fixes based on diagnostic results
2. Configure database	2.1. Adopt a distributed files <i>architecture</i> to minimise I/O (input/output) contention 2.2. Ensure that <i>database</i> back-up procedures are appropriate for method of data storage 2.3. Reconfigure rollback segments 2.4. Configure the <i>database and</i> test its <i>performance</i>
3. Tune database	3.1. Track the module <i>performance</i> according to specifications 3.2. Monitor and tune the efficiency of <i>structured query language</i> , as required 3.3. Monitor and measure the <i>performance</i> of shared pool, blocks and buffers 3.4. Detect, identify and resolve contentions that may arise in the real-time operation of the <i>database</i> 3.5. Reconfigure the <i>database</i> according to specifications

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- Analysis capability in relation to normal routine and non-routine work processes
- Project planning skills in relation to set benchmarks and identified scope
- Report writing skills for business, requiring depth in some areas, analysis and evaluation of information in a defined range of areas
- Problem solving skills in non-routine work processes

REQUIRED SKILLS AND KNOWLEDGE**Required knowledge**

- Broad knowledge of SQL
- Detailed knowledge of database administration
- Detailed knowledge of tuning methodologies
- General knowledge of the principles of database design
- Detailed knowledge of diagnostic tools

Evidence Guide

EVIDENCE GUIDE	
<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>	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> • Assessment must confirm the ability to correctly identify and solve common database problems to improve database performance. <p>To demonstrate competency in this unit the following resources will be needed:</p> <ul style="list-style-type: none"> • Diagnostic tools • Database operating on a network
Context of and specific resources for assessment	<p>Resolving database issues can be complex and take considerable time. The core role in this competency is to take part in common database performance problem solving.</p> <p>All database applications can be performance enhanced with special care and code optimisations.</p> <p>This unit should be flexible enough to allow for the creation of specialised database programs that are poor in performance so that problem solving processes can be applied.</p> <p>There are many open source database offerings that may provide a suitable code base from which to work.</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</p>

EVIDENCE GUIDE	
	<p>contingency nature.</p> <p>Assessment must ensure:</p> <ul style="list-style-type: none"> • 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. • Applications may involve responsibility for, and limited organisation of, others.
Method of assessment	<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"> • 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. • 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.
Guidance information for assessment	<p>The interdependence of units for assessment purposes may vary with the particular project or scenario. Holistic assessment with other units relevant to the industry</p>

EVIDENCE GUIDE

	<p>sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> • ICAB4060B Identify physical database requirements • ICAB4061B Monitor physical database implementation • ICAB4136B Use structured query language to create database structures and manipulate • ICAS4108B Complete database back-up and recovery • ICAS4125B Monitor and administer a database <p>An individual demonstrating this competency would be able to:</p> <ul style="list-style-type: none"> • Determine performance benchmarks from a database code structure • Apply solutions to improve database performance • Interpret available information and request clarification where needed • Take responsibility for outputs in work and learning situations <p>Additionally, an individual demonstrating this competency would be able to:</p> <ul style="list-style-type: none"> • Demonstrate understanding of a broad knowledge base incorporating some theoretical concepts • Apply solutions to a defined range of unpredictable problems • Identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas • Identify, analyse and evaluate information from a variety of sources • Take responsibility for own outputs in relation to specified quality standards • Take limited responsibility for the quantity and quality of the output of others • Maintain knowledge of industry products and services
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Range Statement

RANGE STATEMENT	
<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><i>Diagnostic tools</i> may include:</p>	<ul style="list-style-type: none"> • software applications external to the database server • the server software or may be inbuilt to the server software
<p><i>Database</i> may include but is not limited to:</p>	<ul style="list-style-type: none"> • relational databases • object-relational databases • proprietary databases • commercial off the shelf (COTS) database packages
<p><i>Architecture</i> may include but is not limited to:</p>	<ul style="list-style-type: none"> • Operating system: Novell NetWare 5 or above or any operating system that has multi-user ability, Linux, Mac OS, Windows 2000 or above • Database software: Oracle, Sybase, Microsoft SQL server, Ingres, DB2, Informix, mSQL, MySQL, SQL server • Configuration: small memory model, large memory model, requests per second
<p><i>Performance</i> may include but is not limited to:</p>	<ul style="list-style-type: none"> • improvements to response time • simultaneous access • latch contention • record or table locking • compacting database files • repairing the database • splitting database files • archiving old records • creating indexes • preventing events causing waits
<p><i>Structured Query Language</i> may include:</p>	<ul style="list-style-type: none"> • proprietary extensions: AS/NZS 3968.0:1994 Information technology - database languages - SQL - definition of data structures and basic operations

Unit Sector(s)

Unit sector	Support
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Co-requisite units

Co-requisite units		

Competency field

Competency field	
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