



**Australian Government**

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

# **ICAGAM527A Integrate database with online game**

**Release: 1**

## ICAGAM527A Integrate database with online game

### Modification History

Release	Comments
Release 1	This Unit first released with <i>ICAI1 Information and Communications Technology Training Package version 1.0</i>

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to integrate a database with an online game, where the relationship between the game server and the database server is also considered a client-server relationship on a local area network.

### Application of the Unit

This unit applies to programmers, analyst programmers and game programmers responsible for the development of code to connect a computer game to a database.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

<b>Element</b>	<b>Performance Criteria</b>
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>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.</i>

## Elements and Performance Criteria

1. Install application programming interfaces (APIs) suitable to the game's data source provider	<p>1.1 Research appropriate APIs</p> <p>1.2 Identify specific APIs as suitable for the game architecture and <i>data source provider</i></p> <p>1.3 Install nominated APIs on game development computers</p>
2. Define and use a connection to the data source	<p>2.1 Define game data source connection parameters</p> <p>2.2 Store connection parameters in <i>external text-based configuration file</i></p> <p>2.3 Open and close connection to the game data source</p>
3. Configure and use connection pooling	<p>3.1 Configure connection pooling in the database management system</p> <p>3.2 Define connection pool parameters for minimum connections, maximum connections and idle connections</p> <p>3.3 Minimise use of database resources through the use of connection pooling</p> <p>3.4 Test and verify use of connection pooling</p>
4. Pass embedded structured query language (SQL) to the database	<p>4.1 Define database connection property</p> <p>4.2 Compose SQL statement or command to be passed to the database</p> <p>4.3 Test, debug and execute the SQL statement</p>
5. Execute a stored procedure on a database	<p>5.1 Call a stored procedure on the database using command callable statement</p> <p>5.2 Define and pass <i>parameters</i> to the stored procedure</p> <p>5.3 Test, debug and execute database stored procedure</p>
6. Modify database data	<p>6.1 Retrieve multi-row multi-column result sets from the database into the game application domain</p> <p>6.2 Insert new records into the database</p> <p>6.3 Update existing database records</p> <p>6.4 Delete existing database records</p>
7. Integrate data from the database with the game application domain	<p>7.1 Integrate data from a <i>forward-only and read-only cursor</i> into the game application domain</p> <p>7.2 Incorporate data from an <i>updateable cursor</i> into the game application domain</p>
8. Test and debug	<p>8.1 Test database integration code</p>

database integration code	8.2 Document test results 8.3 Determine errors and exceptions and document solutions 8.4 Debug all errors and exceptions 8.5 Assess all data modifications in the database and document any errors 8.6 Correct all causes to data modification errors
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## Required Skills and Knowledge

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

### Required skills

- analytical skills to:
  - analyse game application domain and game architecture and determine appropriate APIs as prescribed by the selected proprietary or database industry standards
  - determine appropriate connection pooling implementation requirements
  - determine appropriate development environments for the game architecture and database integration functionality
- communication skills to:
  - describe and evaluate data access and data modification architectures with game designers and game architects
  - negotiate game data requirements with project managers, game designers and game architects
  - propose data access and modify functionality to meet the needs of the online game
- initiative and enterprise skills to:
  - assess proposed database integration architectures within the context of existing game development technologies, development infrastructure and game industry standards
  - recommend solutions to difficulties or flaws identified with the integration of the database and the online game
- learning skills to:
  - acquire the skills and knowledge required to integrate a database with an online game
  - ensure the use of leading edge industry developments and industry standards
- literacy skills to:
  - delineate existing game architecture documentation
  - document database integration specifications for an online game
  - interpret and understand industry standards, game architecture standards, and database standards
- planning and organisational skills:
  - organise resources, documentation and infrastructure elements required for the integration of a database with an online game
  - plan the effective integration of a database with an online game
- problem-solving skills to:
  - debug code, identify code bugs and resolve all code exceptions
  - identify and implement solutions to problems with the integration of a database with an online game
  - identify problems with SQL and stored procedures and implement solutions
- research skills to:
  - enhance knowledge of industry standards and trends related to the integration of a database with an online game
  - identify and locate sources of information that provide solutions to technical problems

- identify sources of information and documentation required to plan and implement the integration of a database with an online game
- technical skills to:
  - implement complex code algorithms required for the integration of a database with an online game
  - implement exception handling routines in code
  - improve the efficiency of code by refactoring
  - use an integrated development environment to build database integration code
  - write code to integrate a database with an online game.

## Required knowledge

- relational database theory, including:
  - how to create and test stored procedures
  - how to create 'embedded' SQL and assign parameters in code for filtering
  - how and why tables are related and how relationships between tables are implemented
  - how SQL is used to retrieve data from multiple tables
  - how inserts to tables in parent/child relationships can be implemented using artificial (auto-generated) primary key values
  - how to implement cascading updates and deletes
- game development
- integrated development environments, including:
  - data access APIs and associated classes required for the integration of a database with an online game
  - online help and documentation required for research and debugging code
  - user authentication and authorisation management
- methodologies and techniques required for effective and well-factored object-oriented program (OOP) code, including:
  - class implementation
  - control of logic flow
  - use of collections and lists
  - use of OOP concepts, such as inheritance, encapsulation and overloading
- web development.

## 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.*

<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• add database functionality to an online game</li> <li>• display and modify the database data provided by game-play input.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> <li>• game design specification and requirements documentation</li> <li>• game server</li> <li>• database server</li> <li>• integrated development environment software and hardware</li> <li>• browsers for browser-based games</li> <li>• game consoles for console-based games</li> <li>• appropriate learning and assessment support when required</li> <li>• modified equipment for people with special needs.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• evaluation of an online game that can access, display and update game state data stored in a database</li> <li>• verbal and written questioning to assess the knowledge associated with the integration of a database with an online game.</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, where appropriate.</p> <p>Assessment processes and techniques must be culturally appropriate, and suitable to the communication skill level, language, literacy and numeracy capacity of the candidate and the work being performed.</p> <p>Indigenous people and other people from a non-English speaking background may need additional support.</p> <p>In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.</p>



## 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.*

<p><b><i>Data source provider</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• DB2</li> <li>• Infomix</li> <li>• Ingres</li> <li>• Microsoft Access</li> <li>• Microsoft SQL (MS SQL) server</li> <li>• Mini SQL (mSQL)</li> <li>• MySQL</li> <li>• Oracle</li> <li>• Sybase.</li> </ul>
<p><b><i>External text-based configuration file</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• any text-based file format that will not require re-compilation if properties of the connection to the database change</li> <li>• in ASP.Net, framework the web configuration (web.config) file and machine configuration (machine.config) file</li> <li>• files formatted as eXtensible markup language (XML) files or documents</li> <li>• traditional ASCII-based text files with file extension of .ini.</li> </ul>
<p><b><i>Parameters</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• data type property appropriate to the data source provider</li> <li>• direction property defining either input or output</li> <li>• value property derived from the actual game play.</li> </ul>
<p><b><i>Forward-only and read-only cursor</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• data-reader object</li> <li>• forward-only record set</li> <li>• Java forward-only result set.</li> </ul>
<p><b><i>Updateable cursor</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• data-set object</li> <li>• record-set object</li> <li>• result-set object.</li> </ul>

## Unit Sector(s)

Game development