



Australian Government

Department of Education, Employment and Workplace Relations

ICAWEB515A Implement and use web services

Release: 1

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Modification History

Release	Comments
Release 1	This Unit first released with <i>ICA11 Information and Communications Technology Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to implement and use web services.

Application of the Unit

This unit applies to software developers responsible for implementing and supporting web services for building distributed applications.

It relates to the specialist skills and knowledge specific to the implementation and consumption of web services, the related communications protocols and the associated XML technologies used in web services. This unit does not address the specialist programming skills or knowledge required for web services, these are addressed in other units of competency.

Licensing/Regulatory Information

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.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
<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. Use eXtensible markup language (XML) to provide information	1.1 Create XML data structures from various data sources 1.2 Manipulate XML data structures using a common application programming interface (API) 1.3 Use namespaces to scope elements from multiple XML documents 1.4 Validate XML data structures using a schema 1.5 Map and transform an XML document from one schema to another
2. Use the web service description language (WSDL) to promote a web service	2.1 Understand the purpose of the WSDL 2.2 Identify the three main elements that comprise the web service description language 2.3 Build a WSDL file 2.4 Provide web access to a WSDL file via a uniform resource locator (URL)
3. Use universal description, discovery, and integration (UDDI) to locate and retrieve information about a public web service	3.1 Identify the purpose of UDDI 3.2 Understand the differences between public, extra-enterprise and intra-enterprise UDDI registry deployments 3.3 Locate and retrieve information about a public web service using UDDI 3.4 Identify the relationship between WSDL and UDDI
4. Access web services using the simple object access protocol (SOAP)	4.1 Identify the purpose of SOAP 4.2 Determine the relationship between UDDI and SOAP 4.3 Identify the basic structure and processing of a SOAP message 4.4 Retrieve an XML document from a public web service using SOAP
5. Implement a web service	5.1 Outline a basic web service architecture 5.2 Implement, test and publish a web service 5.3 Incorporate and test a web service into an application

Required Skills and Knowledge

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

Required skills

- analytical skills to:
 - analyse functional requirements
 - assess proposed web service architectures within the context of existing enterprise technologies, infrastructure and industry standards
 - determine appropriate enabling technologies required to implement a web service's functional requirements
 - determine appropriate web service architectures as prescribed by the selected proprietary or industry standards
 - determine development environments appropriate to planned web service architectures and functionality
- communication skills to:
 - describe and evaluate web service architectures with system analysts and enterprise architects
 - negotiate enterprise web service requirements with clients
 - negotiate resource requirements, project timeframes and project deliverables
 - propose web service functionality to meet the business needs of clients
- learning skills to:
 - acquire the skills and knowledge required for the implementation of web services
 - stay at the cutting edge of industry developments and industry standards
- literacy skills to:
 - interpret associated industry and web service standards
 - interpret existing enterprise technology infrastructure documentation
 - write functional requirement specifications for a web service
- planning and organising skills to:
 - plan an effective solution for a web service
 - organise resources, documentation and infrastructure elements required for the implementation of a web service
- problem-solving skills to:
 - debug code, identify code bugs and resolve all code exceptions
 - identify and implement solutions to problems with web service architecture and functionality
 - identify problems with XML document schemas and implement solutions
 - recommend solutions to problems or deficiencies associated with the implementation of web services
- research skills to:
 - enhance knowledge of industry standards and trends related to web service architectures and enabling technologies
 - identify and locate sources of information that provide solutions to technical problems

- identify sources of information and documentation required to plan and implement a web service
- technical skills to:
 - implement complex code algorithms required for web service functionality
 - implement exception handling routines in code
 - re-factor code to improve the efficiency of the code
 - use an integrated development environment to build web service components
 - write code to implement a web service.

Required knowledge

- integrated-development environments
- web development technologies
- web-service architecture.

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 ability to: - transform data from relational or other native data sources into XML - validate an XML document using a predefined schema - provide access to business functionality via a WSDL file - locate a public web service business function and include it in a website using UDDI and SOAP - implement a web service: - according to business requirement specifications - that adheres to industry standards.
Context of and specific resources for assessment	Assessment must ensure access to: - web service business requirement specifications - industry standards published by the W3C - platform-specific documentation and help files describing the syntax and use of proprietary technologies - a simulated development environment incorporating the following elements: - relational database server - integrated development environment (IDE), including related frameworks, APIs and associated proprietary classes required to implement web services and their enabling technologies - web server - web browsers - XML editors - XPath testing utilities - appropriate learning and assessment support when required - modified equipment for people with special needs.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: - written or verbal questioning to assess candidate's knowledge of XML data structures, syntax and validation techniques - observation of candidate demonstrating:

	• data transformation from relational data to validated XML • the use of XPath queries to extract information from XML or transform XML data structures • evaluation of candidate's project incorporating all elements of this unit of competency, including both web service publication and web service consumption.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, where appropriate. 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. Indigenous people and other people from a non-English speaking background may need additional support. In cases where practical assessment is used it should be combined with targeted questioning to assess required knowledge.

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.

<i>XML data structures</i> may include:	• electronic business XML (ebXML) • XML 1.0 specification produced by the world wide web consortium (W3C).
<i>Various data sources</i> may include:	• comma separated value files • native data sources, such as ASCII or the Java-type system • object linking and embedding (OLE) DB data sources, such as spreadsheet files • relational database management systems, such as: • IBM DB2 • Microsoft Structured Query Language (MS SQL) server • Microsoft Access • MySQL • Oracle • Ingres.
<i>Common application programming interface</i> may include:	• ASP.Net and MSXML and associated APIs • Java XML API (JAXP) • simple API for XML (SAX) • document object model as described by W3C recommendation.
<i>Schema</i> may include:	• document type definition (DTD) schema file • XML schema definition (XSD) file as described by W3C recommendation • XML-data reduced (XDR) schema definition file.
<i>Map and transform</i> may include:	• eXtensible stylesheet language transformations (XSLT) • XLink • XPath 1.0 and XPath 2.0 queries • XPointer • XQuery.
<i>Three main elements</i> may include identifying:	• contents and data types of web service messages • operations of web service messages • protocols of web service messages.
<i>Public web service</i> may include:	• public web services located through UDDI registries.

Publish may include:	• limiting access to the web service to a local intranet • making the web service available to the internet via a public UDDI registry • simulating the publication of the web service through a virtual machine infrastructure.
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Unit Sector(s)

Web