

**ICT - Information and Communications Technology**

**ICT30120**

**Certificate III in  
Information Technology**

**Unit**

**ICTCLD301**

**Evaluate characteristics of cloud  
computing solutions and services**

**SAMPLE**

**Trainer/Teacher Manual**

**PASSING**

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## **STUDENT/TRAINEE DETAILS**

**Student/Trainee Name**

**Student/Trainee Email**

**Teacher / Trainer Name**

**School / Institution / Training Organisation / Employer**

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## INTRODUCTION

This manual is developed to provide training content that addresses the specific 'Unit of Competency' as outlined on the following pages.

It provides the teacher and/or trainer with a document that includes all that the student and/or trainee manual content plus guidance notes as well as answers to the learning activities in the student/trainee manual.

This manual can be packaged with various manuals addressing other 'Units of Competency' in order to meet the 'Packaging Rules' of a particular Australian Training Package Qualification.

This resource has been designed to be delivered in a form that is conducive to the learning environment including:

- ☆ Online delivery
- ☆ Classroom delivery
- ☆ On the job training

The documents are designed in a 'landscape' format in order to make reading on a computer screen easier as well as reduces the need to scroll down pages. Documents can be easily printed if the learning environment requires the student or trainee to have hard copies of the learning materials.

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## INTRODUCTION—CONT'D

### LEARNING ACTIVITIES

The learning activities in the student and/or trainee manuals are 'Form Enabled' so that if the resources delivered online, the activities can be filled in using the computer keyboard.

Each learning activity is identified with the following icon.

**Learning  
Activity**

Learning activities come in the following forms.

- ☆ Questions
- ☆ Research
- ☆ Tasks
- ☆ Interviews

#### **Questions**

Questions would relate to the information presented on previous pages.

#### **Research**

This type of learning activity would require the student or trainee to locate information by using research methods. The information they would be required to locate would be in line and/or support the information that the manual had outlined in previous pages.

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## INTRODUCTION—CONT'D

### **Tasks**

This learning activity type would require the student/trainee to actually do or undertake something and would be reinforcing the knowledge they have gained from reading the manual's previous pages.

### **Interviews**

This learning activity type would require the student/trainee to interview person(s) in an actual workplace environment or a person(s) who are experienced in the industry sector which the student/trainee is currently undergoing training.

The student/trainee is made aware of the type of learning activity by noting the learning activity type displayed under the learning activity icon.

**Learning  
Activity**

**Research**

### **SELF ASSESSMENT**

At the end of each manual is a series of questions that the student/trainee should review and answer.

This self assessment is to ensure in the student's or trainee's mind that they have reviewed and understood the information that was presented in their manual.

If they are unsure of their understanding in any of the topics reviewed, they are encouraged to go back and review the information again and/or seek the assistance of their teacher or trainer.

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**UNIT OF COMPETENCY OVERVIEW**

The following pages are extracts from Training.gov.au website and outlines this specific 'Unit of Competency' including the 'Elements' and the 'Performance Criteria'. The content within this manual has been developed to address this unit.

**ICTCLD301 EVALUATE CHARACTERISTICS OF CLOUD COMPUTING SOLUTIONS AND SERVICES**

ELEMENT	PERFORMANCE CRITERIA
<p><b>1. Prepare to review cloud technology solutions and services</b></p>	<ul style="list-style-type: none"> <li>1.1 Identify data handling organisational policies and procedures required for cloud computing solutions and services</li> <li>1.2 Identify cloud computing solutions and services according to organisational needs</li> <li>1.3 Identify and confirm business and industry technology terminology, characteristics and concepts</li> <li>1.4 Identify organisational roles affected by implementation of cloud services and solutions and their impact on cloud computing solutions and services</li> <li>1.5 Identify requirements to transferring to cloud computing solutions and services according to organisational policies and procedures</li> </ul>
<p><b>2. Review cloud delivery and deployment models</b></p>	<ul style="list-style-type: none"> <li>2.1 Identify and review capability and characteristics of different cloud service platforms and delivery models against business requirements</li> <li>2.2 Research and identify emerging cloud deployment models</li> <li>2.3 Discuss differences, advantages and disadvantages between cloud cost models and different hybrid deployment models</li> <li>2.4 Identify the most suitable cloud service and delivery platform according to organisational needs</li> </ul>
<p><b>3. Finalise evaluation</b></p>	<ul style="list-style-type: none"> <li>3.1 Identify and document benefits of adopting best cloud solutions and services according to business needs</li> <li>3.2 Identify and document challenges of adopting cloud solutions and services according to business needs</li> <li>3.3 Finalise cloud solutions and services evaluation and seek and respond to evaluation feedback according to organisational policies and procedures</li> <li>3.4 Communicate outcomes of evaluation to required personnel</li> <li>3.5 Save and lodge evaluation document to required personnel</li> </ul>

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# Section One

## Prepare to Review Cloud Technology Solutions and Services

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PLEASE NOTE

***This unit of training has assessment tasks and activities and goes through a number of steps and methods for evaluating and recommending a cloud computing solution for an organisation.***

***We are making some assumptions in this training manual.***

***First that you are employed in an organisation that you will be able to participate in or manage the research, evaluate and recommend appropriate cloud computing solutions for the organisation you work for.***

***If this is not the case, then your teacher or trainer will have to train and assess you for this unit of training in a simulated workplace.***

***We suggest that before moving forward with this unit of training, you confirm the above assumptions with your teacher or trainer and/or employer.***

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# EVALUATE CHARACTERISTICS OF CLOUD COMPUTING SOLUTIONS AND SERVICES

## SECTION ONE—PREPARE TO REVIEW CLOUD TECHNOLOGY SOLUTIONS AND SERVICES

### INTRODUCTION

Cloud computing has transformed how businesses operate.

Today, millions of organisations around the world rely on cloud services for everything from document creation and backup to social customer interaction and accounts and just about every application used in business.

In this training manual we look in some detail at what cloud computing is, as well as what services and solutions cloud computing offers.

### SECTION LEARNING OBJECTIVES

At the completion of this section you will learn information relating to:

- ☆ Identifying data handling organisational policies and procedures required for cloud computing solutions and services
- ☆ Identifying cloud computing solutions and services according to organisational needs
- ☆ Identifying and confirming business and industry technology terminology, characteristics and concepts
- ☆ Identifying organisational roles affected by implementation of cloud services and solutions and their impact on cloud computing solutions and services
- ☆ Identifying requirements to transferring to cloud computing solutions and services according to organisational policies and procedures

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## **IDENTIFY DATA HANDLING ORGANISATIONAL POLICIES AND PROCEDURES REQUIRED FOR CLOUD COMPUTING SOLUTIONS AND SERVICES**

Cloud computing is the on-demand availability of computer systems resources, particularly data storage and computing power, without direct active management by the user.

It is a term generally used to describe data centres available to users over the internet.

These clouds can be limited to a single organisation, called enterprise clouds, or be available to multiple organisations, called public clouds.

All cloud computing relies on sharing of resources to achieve coherence and economies of scale.

Cloud computing offers numerous advantages such as lower costs, higher performance and on demand delivery of services.

However, if these measures are not properly controlled, they can also expose organisations to a variety of online threats, including data loss or theft and unauthorised access to sensitive information.

Though often implemented to ensure the integrity and privacy of company data, cloud policies can also be used for financial management, cost optimisation, performance management and network security.

For all these reasons it's important for those running cloud services, most likely the IT department, to apply, control and enforce relevant policies and procedures for cloud services for all employees in all departments of an organisation to adhere to.

Policies are the guiding principles used to set direction in an organisation, they are designed to instill certain positive behaviours and attitudes.

Procedures are the series of steps to be followed as a consistent and repetitive approach in order to accomplish an end result.

## CLOUD COMPUTING SERVICE POLICIES

Here are some of the more common data handling cloud policies than an organisation may implement for employees accessing cloud services:

- ☆ ***The use of cloud services for work purposes must be formally authorised by IT management.***  
***The IT management will certify that security and privacy are adequately addressed by the cloud services vendor.***
- ☆ ***The IT management will ultimately decide on what data may or may not be stored on cloud services.***
- ☆ ***Employees must not share login credentials with co workers, or anyone else.***  
***The IT department is responsible for confidentiality, keeping all account information for business purposes.***
- ☆ ***Any terms and conditions that a cloud service requires users to agree to must be first reviewed and approved by IT management.***
- ☆ ***The use of such services must comply with the organisations existing acceptable use policies, computer use policies and internet use policies.***
- ☆ ***The use of cloud services must comply with all laws and regulations governing the handling of personally identifiable information and any business data owned or used by the organisation.***
- ☆ ***Personal cloud service account may not be used for the storage or exchange of company related material or data.***

It is common for the IT department to outline a list of preapproved cloud computing services along with instructions for accessing them and creating users accounts.

This will help employees as a reference and also reduce requests for common cloud services such as Google Drive, for example.

## CLOUD COMPUTING SERVICE PROCEDURES

Here are some common cloud service procedures that an organisation may want to evaluate, implement or enforce when making a decision on contracting a cloud computing service:

- ☆ ***The cost of ownership must be taken into consideration in the procurement or adoption of all cloud based services.***
  - The use of services may reduce the initial cost in comparison to implementing new systems, but the total cost of ownership must be considered when comparing cloud based services to internally hosted services.***
- ☆ ***The IT department or information systems owner must conduct a risk assessment when considering the use of cloud computing services.***
  - The extent of which must be in reason, with the security classification of the intended information and data to be stored on the cloud service.***
- ☆ ***An organisation's use of cloud based services must adhere to the relevant legislation associated with state or federal information management.***
  - This includes issues of privacy, records management, financial, and geo location of data.***
- ☆ ***System owners must refer to the intellectual property policies of the organisation to ensure that it's information or data is not stored in a facility where the organisation's intellectual property and sensitive information will be compromised.***
- ☆ ***Many cloud services are based interstate, or overseas.***
  - Any data that is stored outside of the organisation must be checked to ascertain where it will be, who will have access, who will be managing it and how.***
- ☆ ***All Australian organisations are subject to the Information Privacy Act 2009 which specifies conditions regarding the use and handling of personal information.***
  - Any such data collected by, or transferred to cloud services must be checked to assure it meets these requirements.***

**Learning  
Activity****Question****LEARNING ACTIVITY ONE**

In this first activity we want you to answer a few questions that generally describes your organisation, your role and the role that 'cloud computing' has in the organisation.

**1 - What industry does your organisation participate in? \_\_\_\_\_**

**2 - What is your role/job description in the organisation your work in?**

**3 - Does your organisation use any 'cloud computing services' today?**

**YES or NO \_\_\_\_\_**

**TEACHER/TRAINER GUIDANCE NOTES**

This activity is generally more for you as the teacher or trainer to get a picture of the environment in which the student or trainee works in.

SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY TWO**

# SAMPLE

To successfully complete this 'Unit of Competency' you will be required to demonstrate your ability to perform a number of tasks and activities relating to the research, evaluation and recommendation of a 'cloud computing solution' for the organisation.

Ideally these assessment tasks and activities should be done in a workplace environment with your employer or supervisor being the observer and reporting back to your teacher or trainer as to your competency to do certain assessment tasks, or activities.

This reporting will be done through assessment forms provided to your employer or supervisor in which they will fill in and sign and present back to your teacher or trainer.

If you are currently unemployed when undertaking this training unit, then your teacher or trainer will be your observer and assessor in a simulated workplace at your place of training.

To start the assessment process off, we want you to interview your employer/supervisor and ask them the following questions:

- ☆ What are the data handling policies and procedures in the organisation?
- ☆ Who develops those data handling policies and procedures in the organisation?
- ☆ How are these data handling policies and procedures communicated or accessed by the employees?

We have provided space on the following page for you to complete this task.

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' at times relates to specific 'Performance Criteria'.

In this case it is:

***“Identify data handling organisational policies and procedures required for cloud computing solutions and services”***

**What are the data handling policies and procedures in the organisation?**

**Who develops those data handling policies and procedures in the organisation?**

**How are these data handling policies and procedures communicated or accessed by the employees?**

SAMPLE



## IDENTIFY CLOUD COMPUTING SOLUTIONS AND SERVICES ACCORDING TO ORGANISATIONAL NEEDS

Cloud computing services offer a range of services to organisations and each service has their own unique benefits and limitations.

Deciding which cloud solution is right for an organisation will depend upon their needs against certain criteria.

As more cloud services become available, IT systems are becoming increasingly externalised and making sure an organisation picks the correct one can become critical to long term success.

Therefore, it's important for an organisation to establish a thorough and defined procurement process that is appropriately weighted against their unique needs.

However, understanding the organisation's needs is also critical for deciding on if and when cloud services are necessary.

But, by clarifying the specific requirements in advance of assessing cloud service providers, an organisation can ensure it is evaluating cloud services against their needs, rather than evaluating them against each other.

Though the criteria and evaluation requirements will be specific for each organisation, there are some common areas to focus on during any cloud service provider assessment:

- ☆ **Certification and standards** - The industry standards and certifications that services comply with demonstrate an adherence to best practices and standards.

Organisations should look for structured processes, effective data management and service status.

An understanding of how the service providers plan to continue to adhere to these standards is also beneficial.

- ☆ **Technologies** - It's important to ensure the provider's technological platform aligns with the organisation's current environment.

If the cloud architecture and services don't match the organisations there may be large amounts of re-coding and customisation necessary to make workloads suitable for their platforms.

- ☆ **Roadmap** - Knowing how the cloud service plans to innovate, grow and the direction they plan to take can influence the organisation's decision.

Commitments to technologies and vendors are important factors to consider.

- ☆ **Data governance** - Depending on the type of organisation, the data it keeps will have different governance.

It's vital that the necessary requirements and obligations are met by the cloud service.

They also need to match the organisations obligations on issues such as data loss and data breaches.

- ☆ **Partnerships** - Many service providers have vendor relationships that can be important to understand.

Assessing their relationships, their accreditations, technical capabilities and staff certifications is a worthwhile exercise.

- ☆ **Reliability** - The performance of the service provider can be checked, either by the information they publish, or by requesting it.

Though a period of downtime is possible, its more important to assess how these are dealt with.

- ☆ **Profile** - The capabilities of a potential provider are obviously an important consideration, but the reputation, financial status and profile is too.

Compatibility and affordability are immaterial if the provider does not have good standards, ethics and stability.

**Learning  
Activity****Question****LEARNING ACTIVITY THREE**

Though the criteria and evaluation requirements for cloud computing services will be specific for each organisation, there are some common areas to focus on during any cloud service provider assessment.

What were the six common areas we look at in this Section.


**TEACHER/TRAINER GUIDANCE NOTES**

- 1) Certification and standards
- 2) Roadmap
- 3) Data governance
- 4) Partnerships
- 5) Reliability
- 6) Profile

# SAMPLE

## Learning Activity

### Task

#### LEARNING ACTIVITY FOUR

As you are now aware, to successfully complete this 'Unit of Competency' you will be required to demonstrate your ability to perform a number of tasks and activities relating to the research, evaluation and recommendation of a 'cloud computing solution' for the organisation.

The assessment requirement for this unit of training states that you must determine at least **one** suitable cloud computing solution and associated services according to business needs.

This assessment requirement also requires you as the student or trainee to collate information on the business' need for cloud technology.

To start this assessment process off we want you to interview the most appropriate person(s) in your organisation and the purpose of this is to determine organisational needs that a 'cloud computing service' will satisfy those needs.

You will need to document those needs as this will be the basis of a number of future assessment tasks and activities.

Once you have documented those organisational needs that a 'cloud computing service' could satisfy, present them to your employer for review and comment.

He or she may want to add to or change your document. Make those changes and then resubmit to your employer for approval.

Once approved, provide a copy to your teacher or trainer for review and for their records.

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' states:

**Performance Evidence**

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, and to:

- ☆ determine at least one suitable cloud computing solution and associated services according to the business' needs.

In the course of the above, the candidate must:

- ☆ collate information on the business' need for cloud technology

SAMPLE



## IDENTIFY AND CONFIRM BUSINESS AND INDUSTRY TECHNOLOGY TERMINOLOGY, CHARACTERISTICS AND CONCEPTS

Though cloud services have become more popular over the last few years, the terminology used can sometimes create confusion.

With the different characteristics of cloud services and the use of the phrase 'as a service' added on to all of them, it's important to have an understanding of the main types of cloud services and the differences between them.

Cloud deployment is a term used to describe the way in which a cloud platform is used, how it's hosted, how it is implemented, and who has access to it.

Let's look at some of the differences between types of cloud deployment.

### PUBLIC CLOUD

A public cloud service provider makes resources available to the public via the internet. Industry giants such as Microsoft, Amazon and Google all offer public clouds, providing services and infrastructure which are shared by their customers.

These resources can vary, but usually include storage capabilities, the use of application or virtual machines.

This can be very useful to some organisations as it enables scalability and resource sharing for those who otherwise would not be able to achieve it.

This also means that public cloud sharing can be an excellent tool for software development and collaborative projects where programs and information need to be used, accessed and shared among many users.

Some public cloud services are completely virtualised infrastructure that basically provide only raw processing power and storage, these are known as 'Infrastructure as a Service' (IaaS).

Other cloud services provide specialised software programs which are easier to use called 'Software as a Service' (SaaS).

Cloud services can also be used to develop software without needing the underlying infrastructure and these are known as 'Platform as a Service' (PaaS).

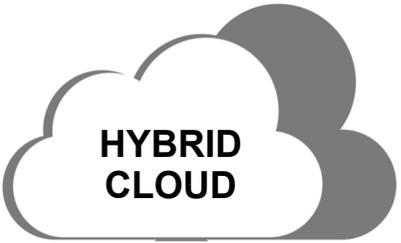


### **PRIVATE CLOUD**

Private clouds are cloud environments solely dedicated to the end user, usually residing within the users firewall.

Authorised users can access and store data in the private cloud from anywhere, just as with a public cloud.

The difference between public and private clouds being that no one can access private clouds without the necessary access.



### **HYBRID CLOUD**

A hybrid cloud combines the advantages of both public and private clouds together by combining the scalability of public clouds with the security of private clouds.

They are designed to allow the two platforms to interact seamlessly, with data and applications moving from one to the other.

One type of hybrid cloud architecture is known as 'Cloudbusting'.

This uses a private cloud as it's primary device, storing data and application in a secure environment.

However, when it cannot keep up with the service demands, it uses public cloud infrastructure to supplement the private cloud.

The other type of hybrid cloud model also runs the majority of application and data in private clouds, but outsources it's non-critical application to a public cloud provider.



### **COMMUNITY CLOUD**

Community clouds are multi tenant platforms that enable different organisations to work on a shared platform.

Its concept is to allow multiple customers to work on joint projects and applications that belong to the community, where it's necessary to have centralised cloud infrastructure.

Community cloud computing facilitates its users to identify and analyse their business demands better.

Community cloud may be hosted in a data centre, either owned by one of the tenants or by a third party cloud service provider and can be either on, or off site.

**Learning  
Activity****Question****LEARNING ACTIVITY FOUR**

Below are three acronyms.

What does each stands for?

**PaaS** \_\_\_\_\_

**IaaS** \_\_\_\_\_

**SaaS** \_\_\_\_\_

***TEACHER/TRAINER GUIDANCE NOTES***

'Platform as a Service' (PaaS)

'Infrastructure as a Service' (IaaS)

'Software as a Service' (SaaS)

SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY FIVE**

Below and on the next page is each type of 'cloud deployment' that we reviewed in this Section.

As a ***brief summary*** and in ***your own words*** tell us what each is.

***Public Cloud******Private Cloud******Hybrid Cloud***

SAMPLE

## ***Community Cloud***

### ***TEACHER/TRAINER GUIDANCE NOTES***

The summary for each will vary.

You as the teacher or trainer can use the information on the previous pages to determine if they have captured the meaning of each type of 'cloud deployment'.

SAMPLE



## **IDENTIFY ORGANISATIONAL ROLES AFFECTED BY IMPLEMENTATION OF CLOUD SERVICES AND SOLUTIONS AND THEIR IMPACT ON CLOUD COMPUTING SOLUTIONS AND SERVICES**

When implementing cloud services the effects on an organisation extend far beyond the technical undertaking of the transition.

Though this is a challenge in itself, the impacts on how ongoing, day to day operations such as how data is accessed, governed, and managed are all things the organisation has to consider and be ready for.

Depending on the type of cloud service the organisation is migrating to there are some personnel, most commonly IT professionals, who may potentially have to switch roles, retrain, or ultimately be let go.

With public cloud services the data and applications are managed by those service providers.

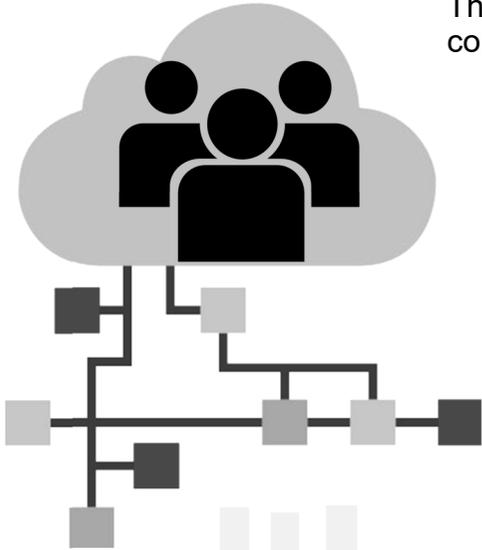
Though there is a need for those employees with technical knowledge to establish and maintain relationships with the cloud service provider, the day to day management is done through them.

However, within private cloud environments, the cloud data and services are managed by internal IT and with the transition to a cloud service there are a few job roles that will need to be filled.

Whether an organisation decides to retain, retrain and transition roles internally will depend largely on the personnel, their skills, and ultimately their willingness or cooperation.

Implementing a cloud will require that allocation of roles and responsibilities to things such as access management, incident management, provisioning, and other functions.

These roles can be given to existing IT and administrative personnel, but may also require the addition of new staff.



Though the roles fall into either the creation and management of cloud services, there are other factors to consider:

- ☆ **Security** - There must be personnel responsible for assessing security risks associated with cloud services and then implementing and monitoring these systems.

The current security policies may be inadequate and incompatible with cloud services, so these must be reassessed and changed as necessary.

- ☆ **Procurement** - The organisation will have to decide whether each aspect of the business is responsible for procurement of cloud services or whether a centralised resource is more applicable.

Either way, personnel will need to be appointed to manage and make decisions regarding pricing of services, dispute resolution and purchasing.

- ☆ **User management** - There needs to be a decision made on which personnel have access and at what level.

As well as making these decisions, the authorisation and maintenance of user accounts must be done by a cloud service administrator.

The administrator will also be required to offer user support and control 'incident tickets' management.

- ☆ **Integration** - The integration of current IT systems and software with cloud service is not a straightforward task.

Firstly, the proper analysis of requirements for both systems and security must be conducted.

A transition manager and security personnel should be involved in these tasks to help minimise any teething problems which might occur.

The management and minimisation of these issues of the utmost importance as any downtime will likely have consequences for the organisation.

By building user cases and exploring roles an organisation will enable itself to transition smoothly to cloud services.

The above factors should help an organisation identify the areas where human resources are needed.

**Learning  
Activity****Task****LEARNING ACTIVITY SIX**

Over the previous pages we have learned that the use of cloud computing services will have an impact on certain staff members in the organisation.

Using the information on the previous pages, tell us in your own words how the use of cloud computing services can affect staff in many organisations.

Then tell us how the use of cloud computing services will, or has affected staff in your organisation.

We have provided space on the next page for you to complete this activity.

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' at times relates to specific 'Performance Criteria'.

In this case it is:

***“Identify organisational roles affected by implementation of cloud services and solutions and their impact on cloud computing solutions and services”***

The answers to this activity will vary and it will be up to you the teacher or trainer to determine whether the student or trainee has adequately satisfied this activity and as a result the addressing of the assessment requirements.

SAMPLE

***In your own words tell us how the use of cloud computing services can affect staff in many organisations.***

***Tell us how the use of cloud computing services can or has affected staff in the organisation you work in.***

SAMPLE



## IDENTIFY REQUIREMENTS TO TRANSFERRING TO CLOUD COMPUTING SOLUTIONS AND SERVICES ACCORDING TO ORGANISATIONAL POLICIES AND PROCEDURES

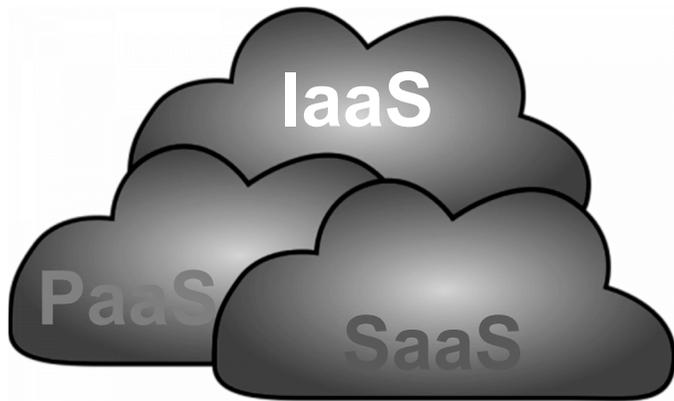
When migrating to any type of cloud solution there are many considerations for an organisation to make regarding the requirements for an efficient, cost effective transition.

As well as the necessary hardware and technology required for the service to operate on, there are also numerous personnel needed to manage and maintain the service.

These hardware and manpower resources may differ in standard and size depending on the type and scope of the cloud service being used, but will always be required to some capacity.

For an organisation constructing a strategy to analyse the requirements for transferring to cloud services, here are some considerations:

- ☆ **Service and resource management** - The management of cloud services is the control of the applications and services that end users utilise and deploy via public and private clouds.  
  
There must be appropriate tools available for the administrators to outline and gauge the services in order to manage users, monitor performance and administer actions for the services required.  
  
The service management must simply be able to manage and deploy resources effectively across the cloud and enforce these regulations through the creation of policies and procedures.
- ☆ **Integration** - An organisation will already have IT systems that manage security, provisions, customer care, billing, directories and other services.  
  
When transferring to a cloud service there needs to be a level of interoperability to support the existing data, infrastructure and systems.
- ☆ **Visibility** - Data often needs high levels of reporting and visibility in order to guarantee compliance, security and billing. Any organisation would need assurances that the cloud service would offer these as without visibility managing systems, performance and customer service is nearly impossible.
- ☆ **Reliability** - To be completely reliable, cloud services need to operate whether one or more components fail or have any sort of issue. There needs to be safeguard measures in place to ensure that data and services are secure and only providing access to those with authorisation.



Depending on the type of service required for an organisation, they may require upgrades or changes of systems and hardware when transferring systems to cloud computer solutions.

However, the same may also be true for an organisation's personnel.

Though most of their technical skills will be relevant for cloud solutions, there are some new skills that they may need to train and develop in order to meet the demands of cloud based services.

Some of the key skills associated with the types of service offerings made possible by cloud solutions are;

### **INFRASTRUCTURE AS A SERVICE**

IaaS has the capabilities for providing essential resources, such as processing power and both storage and network solutions.

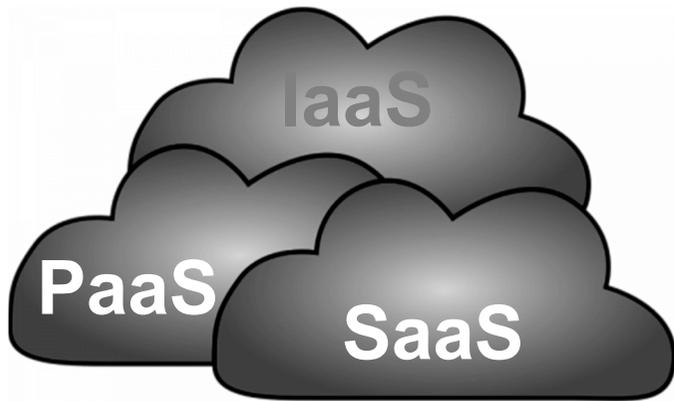
This infrastructure always needs to be available and provides self service capabilities.

To take advantage of IaaS IT personnel must know how to pool resources into single structures in order to service multiple end users.

Knowledge areas include:

- ☆ Provisioning and management
- ☆ Monitoring
- ☆ Service management
- ☆ Virtualisation
- ☆ Security and compliance
- ☆ Performance optimisation

SAMPLE



### PLATFORM AS A SERVICE

PaaS models contain the software and hardware infrastructure to run applications.

IT personnel are able to use existing skills such as Microsoft.NET to build applications and services hosted in the cloud and will be less constrained by resources, such as memory or processing power.

Key skills to invest in are:

- ☆ **Identity management** - Addressing security issues
- ☆ **Connects** - Working with hosted virtual machines
- ☆ **Middleware** - Handling access controls, integration, caching services
- ☆ **Architecting** - Optimise pricing by understanding data storage and partitioning

### SOFTWARE AS A SERVICE

SaaS is an efficient way for managed service providers to give organisations value for their end customers via the cloud.

With SaaS, managed service providers only manage the applications and user data without having any control of the underlying resources.

Therefore personnel must focus on learning skills associated with specific software.

Take Office 365 as an example, it allows the capability to move collaborative efforts to cloud models.

An Office 365 administrator would need the following skills;

- ☆ Understanding of Office 365 and related software
- ☆ Infrastructure skills to determine basic requirements
- ☆ Security skills to determine policies and legal requirements
- ☆ Migration and integration skills to manage users

**Learning  
Activity****Question****LEARNING ACTIVITY SEVEN**

For an organisation constructing a strategy to analyse the requirements for transferring to cloud services, what are the four considerations we mentioned in this Section?

**TEACHER/TRAINER GUIDANCE NOTES**

- 1) Service and resource management
- 2) Integration
- 3) Visibility
- 4) Reliability

# SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY EIGHT**

Earlier in this Section, we learned briefly what the acronyms of IaaS, PaaS and SaaS stood for.

We have now learned more details about each of those.

Below are each listed. In the space provided give us a **one** sentence description of what each is.

**IaaS****PaaS****SaaS**

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' states:

**Knowledge Evidence**

The candidate must demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit. This includes knowledge of:

- ☆ principles and functions of cloud computing solutions, models and technologies, including:
  - ◆ Infrastructure as a Service (IaaS)
  - ◆ Platforms as a Service (PaaS)
  - ◆ Software as a Service (SaaS)

This activity assists in addressing the above assessment requirement.

Answers will vary for this activity.

It will be up to you the teacher or trainer to determine if the student or trainee has adequately addressed this activity.

SAMPLE

# Section Two

## Review Cloud Delivery and Deployment Models

SAMPLE

# EVALUATE CHARACTERISTICS OF CLOUD COMPUTING SOLUTIONS AND SERVICES

## SECTION TWO—REVIEW CLOUD DELIVERY AND DEPLOYMENT MODELS

### INTRODUCTION

In the previous section we learned broadly about cloud computing, as well as the models and services of various types of cloud computing platforms.

In this section we get into more detail about each service and how to evaluate each to determine which would be the best for satisfying the organisational needs.

### SECTION LEARNING OBJECTIVES

At the completion of this section you will learn information relating to:

- ☆ Identifying and reviewing capability and characteristics of different cloud service platforms and delivery models against business requirements
- ☆ Researching and identifying emerging cloud deployment models
- ☆ Discussing differences, advantages and disadvantages between cloud cost models and different hybrid deployment models
- ☆ Identifying the most suitable cloud service and delivery platform according to organisational needs

SAMPLE



## **IDENTIFY AND REVIEW CAPABILITY AND CHARACTERISTICS OF DIFFERENT CLOUD SERVICE PLATFORMS AND DELIVERY MODELS AGAINST BUSINESS REQUIREMENTS**

Cloud platforms are a broad concept and cover a range of services all designed to provide resources to businesses, organisations and other end users through the internet.

However, the type of resources offered by different cloud service platforms have distinct capabilities and characteristics.

Though these have been touched on briefly in previous sections, explaining terminology and how employees technical skills can be transferred to the various cloud service platforms, there are more detailed characteristics to review.

To review, there are typically three types of cloud service platforms which provide software (SaaS), applications (PaaS) and Infrastructure (IaaS), each of which provides different services to an organization, depending on what resources they lack or require.

On the next few pages is an overview of their key characteristics and the capabilities each possess.



### SOFTWARE AS A SERVICE (SAAS)

Software as a service is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted by the cloud.

It is also the most commonly utilised option for businesses in the cloud market and SaaS applications are a popular delivery model for many business applications for things such as:

- ☆ Office software
- ☆ Messaging software
- ☆ Payroll processing software
- ☆ Computer Aided Design software
- ☆ Customer Relationship Management
- ☆ Enterprise Resource Planning
- ☆ Human Resource Management
- ☆ Service Desk Management

One of the key characteristics of the SaaS model is that applications can be run directly through a web browser.

This means that they do not require any downloads or installation on the client using them, negating the necessity for IT staff to do so.

Any technical issues, such as data, middleware, servers and storage, are managed by the vendor which again reduces the need for IT personnel.

The advantage of greatly reducing the time, money and resources spent on tedious and time consuming tasks such as installing and upgrading software can be hugely beneficial.

Technical staff are often a precious resource to an organisation and having them free to spend time on other tasks can be advantageous.

There are several situations where the SaaS platform can be the most suitable option for an organisation.

It provides access to applications that can often be costly, but get used quite irregularly such as taxation software which may only be used once a year.

By using it on a 'pay as you go' basis it can be an affordable solution for many businesses.

The SaaS model can be extremely beneficial to most organisations, but especially so to small businesses and startups.

These companies often need to launch ecommerce rapidly, but don't have the time or resources to deal with any potential technical issues with servers and software.

By using the SaaS platform the lack of IT resources is no longer an issue.

Examples of SaaS are services such as Google Workspace and Dropbox.

SAMPLE



## PLATFORM AS A SERVICE

PaaS, or Application as a Service (aPaaS), is a type of cloud computing service that provides a platform allowing end users to develop, run and manage applications without the complexity of building and maintaining the infrastructure typically needed for developing and launching an application.

With PaaS all the servers, storage and networking can be managed by the vendor while the developers maintain the management of the application.

Rather than providing software over the internet as SaaS does, PaaS provides the platform for software creation.

It is still delivered over the internet though, which gives the developers the ability to concentrate on creating the software, without having to be concerned about operating systems, updates, storage, or infrastructure.

Because PaaS offers companies scalability, cost effective development of applications, and is highly available, it has many advantages for certain organisations.

For example, when multiple developers are working on a singular project it can increase the speed and flexibility required as they are all able to access the application simultaneously and from different locations.

Many video games are made as a collaborative effort by studios and developers and PaaS gives them the ability to work together with ease, without the need to maintain software and also reducing the amount of coding needed.

SAMPLE



## INFRASTRUCTURE AS A SERVICE

IaaS, or cloud infrastructure services, provides virtualised computing resources.

The cloud vendor manages IT infrastructure such as storage, servers and networking resources and then delivers them to subscribers via virtual machines through the internet.

The IaaS clients, however, are responsible for managing the applications, operating systems and data, unlike with SaaS or PaaS platforms.

There are numerous advantages to using IaaS, especially as it is the most flexible of all the cloud computing models, but the ease of deployment for computing resources is the primary benefit.

For startups and small organisations they are able to avoid the large costs involved with purchasing hardware and software and can invest that precious resource elsewhere.

It also benefits larger organisations who may want to retain their control over applications but only want to pay for what they actually consume with regards to storage or networking capabilities.

Any organisation who experiences rapid growth would benefit from the use of IaaS and its scalability as they can chop and change hardware and software as their requirements evolve rapidly.

SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY ONE****SAMPLE**

We go on in more detail into each of IaaS, PaaS and SaaS.

Further on from your description of each in an earlier activity, we want you to now summarise in your own words, what are the benefits to an organisation of each.

Below are each listed. In the space provided give us a summary of those benefits.

**IaaS****PaaS****SaaS**

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' states:

**Knowledge Evidence**

The candidate must demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit. This includes knowledge of:

- ☆ principles and functions of cloud computing solutions, models and technologies, including:
  - ◆ Infrastructure as a Service (IaaS)
  - ◆ Platforms as a Service (PaaS)
  - ◆ Software as a Service (SaaS)

This activity assists in addressing the above assessment requirement.

Answers will vary for this activity.

It will be up to you the teacher or trainer to determine if the student or trainee has adequately addressed this activity.

SAMPLE

## RESEARCH AND IDENTIFY EMERGING CLOUD DEPLOYMENT MODELS

The cloud computing industry has seen a rise in the use of hybrid clouds, becoming the default choice for many organisations.

For many organisations, their initial uses of cloud services are through public cloud.

However, there are certain challenges which organisations have to deal with when using public clouds, such as:

- ☆ **Cost overruns** - Some research into cloud uses reports that many organisations are wasting up to 45% of expenditure in regard to what they use, or rather don't use, for their cloud service.  
  
A lot of organisations do not have the expertise to understand the structure of public cloud services and the knowledge to control it properly.
- ☆ **Security concerns** - Security remains the primary issue for organisations using public clouds, even as concerns decline with increased deployment.
- ☆ **Lack of expertise** - IT departments are continually blighted by their inability to find and retain employees with the required skill set for the relatively new, rapidly developing cloud market.

As well as these challenges with cloud services, many organisations also face difficulties in keeping their ageing and expensive IT infrastructure up to date in order to match the demands of the modern business environment.





Hybrid cloud deployment models provide a solution to the challenges associated with managing public clouds and the difficulties and costs involved with upgrading IT infrastructure.

The hybrid cloud is an environment that makes use of a mixture of on-premises private clouds and third-party public clouds.

By allowing workloads to transition between public and private cloud environments due to ever changing costs and computing requirements, it allows for a high level of flexibility.

The on-premises private clouds can host critical and sensitive data, while the use of public clouds provides necessary computing resources. Hybrid clouds offer:

- ☆ **Control** - One of the primary concerns with public cloud services is the amount of security and regulatory compliance available.

For some industries, the compliance requirements limits the ability to use public cloud services at all. Hybrid cloud negates these issues, giving greater control that minimizes the risks.

IT experts can exert more control and offer company approved services to different departments.

- ☆ **Affordability** - Hybrid clouds give the IT department the same ability to purchase resources as and when they are needed.

However, they can continue to optimise existing infrastructure and take advantage of other alternatives, such as PaaS, IaaS and private cloud services.

- ☆ **Scalability** - The flexibility to offer limitless scalability is hugely beneficial to organisations, especially those that see spikes in business.

In those situations, public cloud services can be procured when needed to support existing resources, as necessary and required.

- ☆ **Simplicity** - Public clouds generally tend to be more affordable than private clouds when executing workloads.

By adopting hybrid clouds organisations can balance the need for cost efficiency against the required security of keeping critical and sensitive information on the on-premises private cloud.

Hybrid clouds combine the best of public and private resources. It can help maximise cost savings and productivity through the delivery of resources when required, but also substantially reduce issues regarding privacy and security.

**Learning  
Activity****Question****LEARNING ACTIVITY TWO**

- 1) We learned that a number of organisations would initially use 'Public' cloud computing services. We also learned that there are certain challenges which organisations have to deal with when using public clouds.

We mentioned three of those challenges. What were those three challenges?

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- 2) Hybrid cloud deployment models provide a solution to the challenges associated with managing public clouds and the difficulties and costs involved with upgrading IT infrastructure.

We mentioned four 'flexibility' examples in this Section associated with the use of a hybrid cloud computing services. What were those four examples?


# SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

- 1)
  1. Cost overruns
  2. Security concerns
  3. Lack of expertise
- 2)
  1. Control
  2. Affordability
  3. Scalability
  4. Simplicity

SAMPLE

## DISCUSS DIFFERENCES, ADVANTAGES AND DISADVANTAGES BETWEEN CLOUD COST MODELS AND DIFFERENT HYBRID DEPLOYMENT MODELS

The pricing and cost models for different cloud solutions will vary depending on factors such as the type of service offered and the length of contract, or amount of cloud resource usage a client has.

As many of the services of cloud computing are similar and being offered by a large number of providers, it can often be quite competitive.

As a general rule, pricing is influenced by some of the following:

- ☆ Cost of resource
- ☆ Lease period
- ☆ Rate of use
- ☆ Quality of service
- ☆ Age of resources
- ☆ Cost of maintenance

Though there are several different pricing models used by cloud services, they can be classified into one of two groups, fixed and dynamic pricing.

We look at both classifications over the next few pages.



# SAMPLE

## FIXED PRICING MODELS



### Pay Per Use

Fixed pricing models, also known as static pricing models due to their stability for predetermined periods, make the user aware of the costs of business and the prices involved in consuming certain resources.

While the user will know the fees in advance of the use of services and resources, there can be certain disadvantages.

Users find they can often overpay for services as they may not use that service and its resources to its full capacity and also, pricing is not affected with the demand or lack thereof.



### Subscription

Within the fixed pricing model there are different types of subscription services, such as:

- ☆ **Pay Per Use Model** - With the pay per use model the client only needs to pay for what they use in either the function of time or quantity that they consume on a specific service.

The customer is aware of the exact price they will pay and the resources are reserved for the client. However, these resources may be reserved for a longer time than the client can utilise and the price is not affected by demand.

- ☆ **Subscription** - With subscription based models the client pays on a recurring basis to access software and other resources.

Here, the subscribers can select a combination of services for a fixed, and usually longer frame, like monthly or yearly.

The benefits of this are that if a client uses a certain service substantially they can get incredible value for money. However, this can obviously work against them if they do not use resources extensively.

Clients can also become committed to services that may become unnecessary to them.

- ☆ **Hybrid** - The Hybrid model combines aspects of the pay per use and subscription pricing models.

The service prices are set up using the subscription model but contain limitations in the quotas that the client can use. If they exceed these levels, they then are billed using the pay per use model.

This model can be fair for both the vendor and the client as it offers the maximum utilisation of the vendors resources but can be hard to implement and plan costs.



### Hybrid



### Cost based



### Value based



### Competition based



### Customer based

## DYNAMIC PRICING MODELS

Dynamic pricing models are designed to be flexible and take into consideration factors such as the cost, time, location and perceived value.

The pricing is calculated as per the request and reflects the real time supply and demand relationship.

As an example, Amazon uses dynamic pricing models and changes their prices based on these factors every 10 minutes.

Dynamic pricing models can be based on the following:

- ☆ **Cost based** - With this model the pricing is structured by the vendor adding a profit element on top of the costs.

Although it offers simplicity in price calculations to a client, it is unfair on them as their requirements and needs are not really taken into consideration and tends to ignore the role of the customer completely.

- ☆ **Value based** - With the value based model, vendors base their pricing according to the value perceived by the customer.

This model leaves the client satisfied as they believe they have been given value for money but is solely based on the data the vendor obtains from the client. Though an organisation may feel they have got good value, the reality may be quite different.

- ☆ **Competition based** - The prices in this model are based solely around what competitors are doing.

This option can be fairer for clients and the pricing is easier to implement than with most hybrid pricing models. However, again, they do not take into consideration the clients particular needs or requirements.

- ☆ **Customer based** - These prices are set according to what the customer is willing to pay.

Unlike other hybrid based pricing models, it does take into consideration the customers perspective and can be more fair on the customer.

However, this is largely dependent on the information the customer provides and often organisations are unwilling to indicate to vendors what they are prepared to pay.



## OVERVIEW

Fixed pricing models will be consistent for long periods of time and the client will be clearly aware of what services and resources are available to them as well as how much and for how long.

This gives assurances to the client and enables them to make simpler cost estimations.

However, there is no leeway to amend pricing in accordance to the necessity the customer may have regarding their demand for usage.

Also, not all consumers have the same needs and requirements so it won't necessarily always be of the best value to some.

Dynamic pricing models offer real time pricing models where setting the cost of a service can be flexible, matching the varying demands and requirements an organisation may have for certain resources and services.

However, certain models can lead to alienating the consumers as their needs are not always the foremost consideration.

It can also be difficult to calculate costs when the pricing can fluctuate so much, making budgeting for cloud services very difficult.

# SAMPLE

**Learning  
Activity****Question****LEARNING ACTIVITY THREE**

- 1) We learned that pricing of cloud computing services can often be quite competitive. As a general rule, pricing is influenced by six things as we outlined in this Section. What are they?

- 2) We learned that there are two pricing models generally used in cloud computer services. The first is 'fixed pricing'. Fixed pricing uses three different types of subscription services. What are those three types of subscription services?

# SAMPLE

- 3) We learned that there are two pricing models generally used in cloud computer services. The first is 'dynamic pricing'. Dynamic pricing is based on four pricing categories. What are they?

- 4) What are the advantages and disadvantages of both fixed pricing and dynamic pricing?

**Advantages - Fixed pricing**

**Disadvantages - Fixed pricing**

SAMPLE

**Advantages - Dynamic pricing**

**Disadvantages - Dynamic pricing**

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

- 1)
  1. Cost of resource
  2. Lease period
  3. Rate of use
  4. Quality of service
  5. Age of resources
  6. Cost of maintenance
- 2)
  1. Pay per Use
  2. Subscription
  3. Hybrid
- 3)
  1. Cost based
  2. Value based
  3. Competition based
  4. Customer based
- 4)

***Advantages - Fixed pricing***

Fixed pricing models will be consistent for long periods of time and the client will be clearly aware of what services and resources are available to them as well as how much and for how long.

This gives assurances to the client and enables them to make simpler cost estimations.

***Disadvantages - Fixed pricing***

However, there is no leeway to amend pricing in accordance to the necessity the customer may have regarding their demand for usage.

***Advantages - Dynamic pricing***

Dynamic pricing models offer real time pricing models where setting the cost of a service can be flexible, matching the varying demands and requirements an organisation may have for certain resources and services.

***Disadvantages - Dynamic pricing***

Certain models can lead to alienating the consumers as their needs are not always the foremost consideration.



### **IDENTIFY THE MOST SUITABLE CLOUD SERVICE AND DELIVERY PLATFORM ACCORDING TO ORGANISATIONAL NEEDS**

We have seen that there are numerous types of cloud services across several cloud platforms, each with their own unique benefits and limitations regarding their functions, such as the resources, costing models and flexibility they offer.

Through research, analysis, and input from IT personnel with certain expertise, an organisation can develop an understanding of the cloud market and the different services that each one offers.

Building this knowledge is vital for an organisation in order for them to identify the most suitable cloud service for their needs.

However, for an organisation to fully understand what it is they need they must have some understanding of their own position in their market and a plan of where they want to be in both the short and long term.

By doing this they can identify their strengths and weaknesses.

By understanding what they lack, they can identify what it is they require in order to grow.

With sound knowledge of the cloud market and an understanding of their own requirements an organisation is then in a good position to make a judgement on which cloud service best suits their needs.

The priorities and requirements for different organisations can vary greatly and this is reflected in the range of services on offer from different cloud vendors and platforms.

# SAMPLE

# SAMPLE



For some organisations, it may be clear that they simply lack resources in certain IT infrastructure such as processing power, storage capacity, or networking capabilities.

In such situations, 'Infrastructure as a Service' would be the suitable and obvious choice.

Other organisations may simply lack certain software, or use them so infrequently that purchasing them outright may not be a viable option.

In these cases 'Software as a Service' is the appropriate cloud solution for an organisation.

For small startups and collaborative development projects, 'Platform as a Service' provides clients with the necessary software and hardware tools to develop applications.

These public cloud computing solutions provide organisations with many of the tools and resources they require, however some organisations may need the extra levels of security provided by private and hybrid clouds.

These models enable the client to store their private and sensitive data with more peace of mind as they are managed internally by their own IT personnel.

Organisations are able to alleviate any worries they may have about public clouds, such as the lack of security, data regulations and compliance.

By managing their own data on their own on-premises private cloud they have more control and assurance that the necessary policies and procedures regarding security and compliance are followed.

For some organisations their primary concern may be costs, getting the best perceived value, limiting or predicting costs because of a constrained budget, or simply wanting fixed pricing.

In these cases there are also an array of payment models for the different cloud solutions.

While certain cost models may only apply to certain types of cloud platforms and services, there is still a range of options available to clients, whatever their pricing requirements are.

**Learning  
Activity****Task****LEARNING ACTIVITY FOUR**

You are now at the point where to successfully complete this 'Unit of Competency' you will be required to determine at least **one** suitable cloud computing solution and associated services according to the business needs or the organisation you work for.

During this training unit you would have researched cloud computing service options and evaluated those with the needs of the business/organisation in mind.

Tell us below what cloud computing service you have chosen.

***TEACHER/TRAINER GUIDANCE NOTES***

The assessment requirements for this 'Unit of Competency' states:

***Performance Evidence***

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, and to:

- ☆ determine at least one suitable cloud computing solution and associated services according to business needs.

# SAMPLE

# Section Three

## Finalise Evaluation

SAMPLE

# EVALUATE CHARACTERISTICS OF CLOUD COMPUTING SOLUTIONS AND SERVICES

## SECTION THREE—FINALISE EVALUATION

### INTRODUCTION

In this final section we look at how a person would finalise an evaluation of a suitable cloud computing service for an organisation.

This will include compiling all the evaluation information, creating and distributing a report and seeking feedback.

### SECTION LEARNING OBJECTIVES

At the completion of this section you will learn information relating to:

- ☆ Identifying and documenting benefits of adopting best cloud solutions and services according to business needs
- ☆ Identifying and documenting challenges of adopting cloud solutions and services according to business needs
- ☆ Finalising cloud solutions and services evaluation and seeking and responding to evaluation feedback according to organisational policies and procedures
- ☆ Communicating outcomes of evaluation to required personnel
- ☆ Saving and lodging evaluation document to required personnel

SAMPLE

# SAMPLE



## **IDENTIFY AND DOCUMENT BENEFITS OF ADOPTING BEST CLOUD SOLUTIONS AND SERVICES ACCORDING TO BUSINESS NEEDS AND IDENTIFY AND DOCUMENT CHALLENGES OF ADOPTING CLOUD SOLUTIONS AND SERVICES ACCORDING TO BUSINESS NEEDS**

*(Over the next few pages we cover two 'Performance Criteria' points at the same time to avoid repetition)*

Once an organisation has identified the most appropriate cloud solution for their requirements, they need to begin the process of documentation.

Documenting evidence to support claims is an important procedure for any type of project, acquisition, or evaluation.

It helps to present an analytical approach towards the subject, outlining the benefits and expectations clearly and concisely.

It also helps to establish a consistent reference point for any party involved in a decision making process where opinions, facts and findings can be continually referred to by anyone involved.

The range of cloud solutions available to organisations is substantial and therefore there is always likely to be a service to benefit any type of organisation, regardless of their industry, market, or any specific requirement they may have due to resources in which they are lacking.

For example, emerging companies may have a great idea in practice, but not only lack the IT infrastructure to work on a project, but also have no concept of how much of those resources they'll require in the long term.

For organisations like these, taking advantage of the versatility and 'pay as you go' structure of public clouds would allow them to add more capacity on demand, expanding as and when they need it.

By documenting these points in an evaluation it provides insight to the reader, shows an understanding of the subject and that proper thought and analysis has gone into the research.



Though we have already reviewed all the different types of cloud services and their unique benefits to specific types of organisations, this highlights another aspect in regard to the importance in documenting them.

The benefits of adopting the right cloud solution also extend far beyond meeting an organisation's needs in infrastructure and resources, and again, including this information in an evaluation will also help all those involved in the decision making process reach the most appropriate conclusion.

With the amount of technical terminology involved in cloud computing it may be difficult for some of those involved in decision making at more senior levels to understand the concepts and the benefits of adopting a cloud based computing solution.

By documenting the advantages in cost savings through the various cloud cost models these individuals can be presented with data that provides statistical benefits in terms of financials.

Certain cloud cost models provide this through aspects such as negating any initial outlay, lowering running costs, reducing manpower and providing consistent monthly billing.

Highlighting these benefits in clear, concise supporting documentation will help to provide further evidence of the advantages that the organisation will gain and they will be adopting the right cloud computing solution.

# SAMPLE



## CHALLENGES OF ADOPTING CLOUD SOLUTIONS

It is absolutely necessary to provide information that highlights the benefits of cloud computing to the organisation so that senior personnel can be informed and make the most appropriate choices.

However, it's also vital that any potential issues involved with adopting any cloud solution is also highlighted and documented so that those personnel are made aware of any problems that may arise.

Not only is it best practice to be completely transparent and impartial, but highlighting these issues will also mean that personnel can discuss ways to best combat any problems that might occur and offer potential solutions, rather than being caught out by them.

One of the biggest challenges of adopting cloud services can revolve around security.

Though security isn't necessarily a cloud specific challenge, it's still something that has to be reviewed when adopting cloud solutions.

Though some of the issues can be reduced by using private clouds, there is still the requirement to develop and enforce a comprehensive security policy which is time and resource consuming.

There are also numerous system challenges that involve integration, interoperability and systems, each of which presents its own concerns.

Integration is also not just a cloud specific problem and can be addressed using the resources available through 'Software as a Service' providers, but the approach to cloud integration is still much different to on-premise.

There is so much due diligence to undertake when looking at interoperability and systems and selecting the right cloud provider.

The key is to make sure thorough research is done ahead of time but again, this costs time, money and resources, which all need to be factored into the equation.



Although many cloud solutions can offer affordable solutions to organisations depending on their circumstances and infrastructure, there are still details that need to be looked at over the long term.

Though the initial costing may look attractive at first, the lifetime costs of cloud solutions need to be considered and compared to other options.

Onsite solutions usually involve large upfront investments but are a one time cost, whereas some cloud models are based on recurring costs and these need to be compared and the lifetime investment considered.

When moving to cloud based solutions there are also numerous legal and compliance challenges to overcome.

In highly regulated industries meeting factors such as data compliance and security can be challenging.

This again requires a huge amount of due diligence to overcome and to protect the organisation in regard to any industry regulations.

It will be necessary to create risk strategies and engage with regulatory authorities to discuss cloud adoption policies.

Finally, there are also the common issues organisations face when adopting any new system, policy or routine in that many personnel are fearful and resistant to change.

Having to retrain staff, teach new procedures and install a different ethos and approach to issues such as security, can be challenging.

As we said earlier, documenting the benefits of a chosen cloud computing service is one thing, but a true picture can only be shown when the challenges of adopting a cloud computing service is also highlighted.

SAMPLE

## Learning Activity

### Task

#### LEARNING ACTIVITY ONE

In the previous Section, you evaluated a number of cloud computing services and chose one to recommend that you deemed would satisfy the needs of the organisation.

There is yet another assessment task required to successfully complete this 'Unit of Competency' where you will be required to create an evaluation document where you will outline how the chosen cloud computing service satisfies the organisational needs and highlight the benefits of this cloud computing service.

The document must include:

- ☆ Reference to the organisational needs for a cloud computing service
- ☆ Estimates as to the total cost of ownership for cloud computing solution as it applies to business needs

In the same evaluation document you will also need to outline the disadvantages and challenges of the cloud computing service.

This assessment requirements do not specify the format of the document, so you will need to consult your employer, as well as your teacher or trainer to settle on the format of the cloud computing service evaluation document.

Once you have drafted the document, present it to your employer for review and comments.

He or she may want additional information included and/or some changes made.

Make those changes and resubmit the document to your employer for review and approval.

Once approved, provide a copy to your teacher or trainer for their records.

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' states:

**Performance Evidence**

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, and to:

- ☆ determine at least one suitable cloud computing solution and associated services according to business needs.

In the course of the above, the candidate must:

- ☆ collate information on the business' need for cloud technology
- ☆ articulate total cost of ownership for cloud computing solution as it applies to business needs
- ☆ document finalised evaluation findings

SAMPLE



## **FINALISE CLOUD SOLUTIONS AND SERVICES EVALUATION AND SEEK AND RESPOND TO EVALUATION FEEDBACK ACCORDING TO ORGANISATIONAL POLICIES AND PROCEDURES**

Once the best choice option of cloud based solutions has been decided on and the findings and supporting evidence has been documented in the form of an evaluation, it is time to seek feedback on that evaluation.

Each organisation will have their own procedures for evaluations and the decision making processes regarding important business decisions, such as the large infrastructure and system changes involved with adopting a cloud based computing service.

One of these procedures would likely involve having personnel with expertise in the given area review the evaluation to make sure that the facts involved are correct.

This would especially be true regarding something as technical and 'jargon' filled as cloud computing.

It would be expected that those carrying out the evaluation would have some technical knowledge and have conducted the evaluation thoroughly with research and analysis.

However, this doesn't change the fact that receiving feedback from individuals with industry expertise and also those with financial knowledge would be beneficial.

When conducting any type of evaluation, regardless of the impartiality and open mindedness someone thinks they have adopted, it's always best to seek second opinions.

Having input from other personnel can help in numerous ways, others will often see things from a different standpoint, have different ideas and could potentially offer solutions to certain issues that you may not have considered.

It also demonstrates to those that will be making the decision that you are not suffering from any bias, through seeking the opinions of others it shows an openness and a will to accept ideas different from your own, all of which help to validate the information presented in the evaluation.

**Learning  
Activity****Task****LEARNING ACTIVITY TWO**

In the previous activity, you had created an evaluation document for a chosen cloud computing service using the organisational needs as the basis of your choice.

While creating this evaluation documentation, you would have had the input of your employer during its development.

This in effect, is 'feedback'.

However, your employer may not be the only one that should have a look at the evaluation documentation and offer some feedback.

Others could include:

- ☆ Vendors of any hardware or software
- ☆ IT personnel or consultants
- ☆ Accountants or financial personnel
- ☆ Legal personnel

As this unit requires you to seek and receive as much feedback as required, we suggest that you consult with your employer as well as your teacher or trainer and settle on other appropriate persons who should offer feedback on the evaluation document for the chosen cloud computing service.

If there are others, then expect some additional changes or additions required to the evaluation document.

If this is the case, redraft the document and resubmit the revised document to your employer for review and approval.

Once approved, provide a revised copy to your teacher or trainer for their records.

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' at times relates to specific 'Performance Criteria'.

In this case it is:

***“Finalise cloud solutions and services evaluation and seek and respond to evaluation feedback according to organisational policies and procedures”***

SAMPLE



## COMMUNICATE OUTCOMES OF EVALUATION TO REQUIRED PERSONNEL

When the evaluation has been completed and the feedback from financial and industry experts has been received, then actioned, the outcomes of which can then be communicated to the required personnel.

Who this personnel is will largely depend on the organization, but may involve those from senior IT positions, high level management like directors, or any other stakeholders in the organisation.

We have highlighted the importance of documenting the evaluation so that those involved in the ultimate decision making process can review it at their leisure, though there are often other supporting exercises involved with communicating the outcomes.

These can come in the form of presentations and can be a helpful tool in supporting the evaluation.

It gives those personnel the opportunity to ask questions on anything included in the evaluation they find concerning, or difficult to understand.

It can also provide those who have conducted the evaluation an opportunity to explain certain aspects in greater detail, with tools that provide better insight than just letters and numbers on a page.

Finally, as all aspects, both good and bad, that have been discovered must be included in the evaluation, it can provide one final opportunity to provide assurances on the project.

People's passions and enthusiasm for something can often be difficult to express on paper and having a physical audience can be the deciding factor to demonstrate the belief and confidence in something, which could ultimately sway their decisions.

# SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY THREE**

As this training manual has pointed out, the implementation of a cloud computing service will have an effect on certain stakeholders of an organisation.

These could include:

- ☆ Managers/supervisors
- ☆ Staff
- ☆ External professional service providers such as accountants, lawyers, IT service providers

...just to name a few examples.

Another assessment requirement for this unit of training is that you communicate the 'outcomes or findings' of the chosen cloud computing service evaluations.

This communication could be by way of presentations at meetings, creating slideshow presentations and so on.

The method of communication will be up to you and with the approval of your employer and the assistance of your teacher or trainer.

Below, tell us what method or methods of communication were chosen to communicate the 'outcomes or findings' of the chosen cloud computing service evaluations and why.

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' at times relates to specific 'Performance Criteria'.

In this case it is:

***“Communicate outcomes of evaluation to required personnel”***

SAMPLE



### SAVE AND LODGE EVALUATION DOCUMENT TO REQUIRED PERSONNEL

Once the evaluation and any supporting presentations have concluded, the evaluation document can be submitted for official review.

It may be, in some cases, that the evaluation must be first made to internal management who then need to pass on their own beliefs and conclusions to stakeholders.

Even if the proposal is not actioned in the immediate future, the evaluation must be lodged and stored for future use.

It is not necessarily an indictment on the validity of the claims in the evaluation, as there are lots of mitigating factors involved in making important decisions on such subjects which could shape the future of an organisation.

However, by keeping the findings on file, the organisation has a record on hand to refer back to in the future if necessary, as and when the appropriate time comes.

The methods of distribution of the evaluation documentation is often based on the preferred method of the recipient.

Some recipients may want a bound hardcopy, while others are happy to have a digital document such as a PDF copy.

Digital copies could be emailed to recipients as an attachment, or a link to a folder on the organisation's computer information system.

# SAMPLE

**Learning  
Activity****Task****LEARNING ACTIVITY FOUR**

In this final activity we want you to tell us who in your organisation (internally and externally) was to receive a copy of the cloud computing evaluation document.

This list should not include names, just descriptions of their roles such as 'my supervisor', 'the bookkeeper' and so on.

SAMPLE

**TEACHER/TRAINER GUIDANCE NOTES**

The assessment requirements for this 'Unit of Competency' at times relates to specific 'Performance Criteria'.

In this case it is:

***“Save and lodge evaluation document to required personnel”***

## SELF ASSESSMENT

Self assessment is where you ask yourself certain questions to ensure you have understood what you have learned while reading this manual and completing the learning activities. This unit requires you the student or trainee at the completion of your training to have a certain level of 'Required Knowledge' in which you would need to have acquired and in which you will be assessed on. This self assessment section reviews this required knowledge by way of questions and if you are able to say YES to all of them you can be confident your assessment will be satisfactory.

- ☆ This training unit had three sections each having training information on cloud computing services. After reviewing the information in Section One, are you confident that you understand and could:
  - 1) Identify data handling organisational policies and procedures required for cloud computing solutions and services?
  - 2) Identify cloud computing solutions and services according to organisational needs?
  - 3) Identify and confirm business and industry technology terminology, characteristics and concepts?
  - 4) Identify organisational roles affected by implementation of cloud services and solutions and their impact on cloud computing solutions and services?
  - 5) Identify requirements to transferring to cloud computing solutions and services according to organisational policies and procedures?
- ☆ After reviewing the information in Section Two, are you confident that you understand and could:
  - 1) Identify and review capability and characteristics of different cloud service platforms and delivery models against business requirements?
  - 2) Research and identify emerging cloud deployment models?
  - 3) Discuss differences, advantages and disadvantages between cloud cost models and different hybrid deployment models?
  - 4) Identify the most suitable cloud service and delivery platform according to organisational needs?
- ☆ After reviewing the information in Section Three, are you confident that you understand and could:
  - 1) Identify and document benefits of adopting best cloud solutions and services according to business needs?
  - 2) Identify and document challenges of adopting cloud solutions and services according to business needs?
  - 3) Finalise cloud solutions and services evaluation and seek and respond to evaluation feedback according to organisational policies and procedures?
  - 4) Communicate outcomes of evaluation to required personnel?
  - 5) Save and lodge evaluation document to required personnel?

If there were any questions that you were unable to confidently say YES to, we encourage you to review the information again in this manual and if needed seek the assistance of your teacher or trainer.

## POWERPOINT SLIDE PRESENTATION MAPPING

This training manual is accompanied with a PowerPoint slide presentation, titled the same as this training manual.

The following listing is a 'mapping cross-reference' between the Slide Number and the corresponding page number in the 'Student Manual'.

<b><i>Slide Numbers</i></b>	<b><i>Student Manual Page Number</i></b>	<b><i>Slide Numbers</i></b>	<b><i>Student Manual Page Number</i></b>
Slide Number 4	Page 12	Slide Number 20	Page 39-40
Slide Number 5	Page 13	Slide Number 21	Page 41
Slide Number 6	Page 14	Slide Number 22	Page 42
Slide Number 7	Page 18-19	Slide Number 23	Page 44.45
Slide Number 8	Page 22	Slide Number 24	Page 47
Slide Number 9	Page 22	Slide Number 25	Page 48
Slide Number 10	Page 23	Slide Number 26	Page 49
Slide Number 11	Page 23	Slide Number 27	Page 50
Slide Number 12	Page 23	Slide Number 28	Page 54-55
Slide Number 13	Page 27-28	Slide Number 30	Page 59-60
Slide Number 14	Page 31	Slide Number 31	Page 61-62
Slide Number 15	Page 32	Slide Number 32	Page 64
Slide Number 16	Page 33	Slide Number 33	Page 66
Slide Number 17	Page 33	Slide Number 34	Page 68
Slide Number 19	Page 38		