SQA Advanced Unit specification

General information

Unit title: Private Cloud Virtualisation (SCQF level 8)

Unit code: HR9R 48

Superclass: CB

Publication date: August 2017

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is intended to give learners the knowledge and skills required to implement, configure and manage a type 1 virtualisation hypervisor environment to support a private cloud. It is primarily intended for learners who expect to work in an IT support role, but is also relevant to all those on any programme of study who require a deeper or more practical understanding of virtualisation and cloud technologies.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Describe the features, components and benefits of type 1 hypervisor virtual environments.
2 Implement a private cloud using type 1 hypervisor virtualisation technology.
3 Manage performance and reliability related features of type 1 hypervisors to provide fault tolerance.

Credit points and level

1 SQA Credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Access to this Unit will be at the discretion of the Centre. There are no specific requirements although learners would benefit from knowledge and fundamental skills of hardware and software, as well as the basic concept of computer networking and cloud computing fundamentals. Recommended Units for prior knowledge and skills include HP1Y 47 *Cloud Computing*, HR8G 47 *Network Concepts* and HP24 47 *Computing: PC Hardware and Operating System Essentials*.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe the features, components and benefits of type 1 hypervisor virtual environments.

Knowledge and/or Skills

- benefits of a private virtualised cloud
- type 1 hypervisor/bare metal hosts
- technological developments in processors, memory, storage, networking and hypervisors which enable virtualised environments

Outcome 2

Implement a private cloud using type 1 hypervisor virtualisation technology.

Knowledge and/or Skills

- type 1 hypervisor hosts
- servers to centrally manage a hosted virtual environment
- virtual servers and clients
- resource pools and high availability features to support fault tolerance

Outcome 3

Manage performance and reliability related features of type 1 hypervisors to provide fault tolerance.

Knowledge and/or Skills

- storage and networking features to support a virtualised environment
- VM installations, VM templates and VM cloning
- high availability features such as host migration, high availability, resource pools and alarms

Evidence Requirements for this Unit

Learners will need to provide evidence to demonstrate their Knowledge and/or skills across all Outcomes by showing that they can:

Demonstrate the setup of a type 1 hypervisor private cloud to support network services that will cover the following:

- Introduction on identifying virtualisation and benefits of a private virtualised cloud.
- Describing type 1 hypervisor/bare metal virtual hosts.
- Describing the technological developments in processors, memory, storage, networking and hypervisors which enable virtualised environments.
- Implementing type 1 hypervisor hosts.
- Implementing a server to centrally manage a hosted virtual environment.
- Installing virtual servers and clients.
- Configuring resource pools and high availability features to support fault tolerance.
- Managing storage and networking features to support a virtualised environment.
- Managing VM installations, VM templates and VM cloning.
- Managing high availability features such as host migration, high availability, resource pools and alarms.

Learners will be required to demonstrate the setup and configuration of a small virtualised environment to support the business services. The learner should be presented with a scenario that involves a small to medium sized company researching for and devising a strategy for moving services and managing roles to a private cloud. It is intended that the work is carried out in groups of 2−3, although individual contributions can be submitted.

Unit Support Notes

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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

The content of this Unit is aimed at providing the learner with a broad knowledge base in the essentials of Private Cloud Virtualisation along with the conceptual understanding of the elements associated with Private Cloud Virtualisation.

There are three Outcomes to this Unit each of which is design to introduce the learner to different aspects of Private Cloud Virtualisation.

Outcome 1 — Describe the features, components and benefits of virtualised type 1 hypervisor virtual environments:

- benefits of a private virtualised cloud
- type 1 hypervisor/bare metal hosts
- technological developments in processors, memory, storage, networking and hypervisors which enable virtualised environments

Outcome 2 — Implement a private cloud using type 1 hypervisor virtualisation technology:

- type 1 hypervisor hosts
- server to centrally manage a hosted virtual environment
- virtual servers and clients
- resource pools and high availability features to support fault tolerance

Outcome 3 — Manage performance and reliability related features of type 1 hypervisors to provide fault tolerance:

- storage and networking features to support a virtualised environment
- VM installations, VM templates and VM cloning
- high availability features such as host migration, high availability, resource pools and alarms

Guidance on approaches to delivery of this Unit

During the delivery of this Unit it is important that every opportunity is taken to introduce real-world examples, opportunities for whole-class and group discussion and practical demonstrations where possible.

Concepts and terminology should be presented in context throughout the Unit. Video presentations should be used where appropriate for providing an alternative explanation of a difficult topic, or as a focus for class discussion or group work. Wherever possible, theoretical learning should be re-enforced using practical demonstrations, for example to demonstrate the use of particular applications and tools.

Given the practical nature of this Unit, it is intended that a proportionate amount of time will be made available as a central part of the course for revision, tutorials and formative assessment exercises. Opportunities for learners to research topics should be provided.

For practical purposes learners should be exposed to up-to-date private cloud virtualisation type 1 hypervisors, for example:

- Citrix Xenserver
- Microsoft Hyper-v
- VMware v-sphere

It is intended that the virtualised environments are installed and setup within a computer lab environment or suitable alternative. The labs should have the sufficient specification to run type 1 hypervisors such as multi core processors, 8GB RAM, 0.5TB hard disks or above. Where the lab is also used for other classes, booting from a second drive can provide a solution to the lab setup to minimise disruption.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Assessment for this Unit should take the form of an open-book 10−15 minute presentation based on a single case study including graphical evidence of setup, configuration and management of private cloud virtualisation. Learners can also make reference to notes, technical hand-outs, websites and other material during the presentation. The learner will be presented with a scenario that involves a small to medium sized company researching for and devising a strategy for moving services to a private cloud. Learners will be required to provide a presentation to explain and demonstrate the set up and configuration of a small virtualised environment to support the business services and the benefits of the technology used.

It is intended that the work is carried out in groups of 2-3, although individual contributions can be submitted. Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners. Learners may be asked to provide authenticity by explaining the setup and configuration.

Presentations can be in the form of a PowerPoint presentation, video recorded demonstration, digital movie recording, online podcast or any other valid method of presenting information. Where digital media such as podcasts has been submitted as evidence, learners may be asked to provide authenticity by explaining the setup using the media.

Outcome 1 is aimed at preparing learners with the knowledge to describe the benefits, roles and requirements of a virtualised private cloud environment. Learners should produce evidence as part of their presentation that they have carried out research into each of the areas listed in the knowledge/skills section for this Outcome.

Outcome 2 prepares learners with the knowledge and skill required to implement a virtualised private cloud. Learners should produce evidence as part of their presentation that they have installed virtual servers and clients within a virtualised private cloud.

Outcome 3 is aimed at the operational aspects of a virtualised private cloud and introduces learners to managing a virtual environment. Learners should produce evidence as part of their presentation that they have managed performance and reliability related features of type 1 hypervisors to provide fault tolerance.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

This Unit helps learners develop Core Skills in communication by presenting their evidence to an audience. The Unit also gives learners the opportunity to enhance their IT and Problem Solving skills within a complex setup environment while gaining experience of working with others and an awareness of sustainable green IT.

History of changes to Unit

Version	Description of change	Date

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

General information for learners

Unit title: Private Cloud Virtualisation

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

The Unit will provide you with the knowledge and skills necessary to implement, configure and manage a private virtualised private cloud to support services within an organisation.

Outcome 2 provides you with the practical skills required to install a virtual private cloud including bare metal hosts and virtual machines.

Outcome 3 prepares you with the knowledge and skills required to manage a virtualised private cloud to provide fault tolerance, reliability and increased performance.

The knowledge and skills you will gain will be assessed in the form of a presentation demonstrating the work conducted to setup and manage a private cloud for a small business.

The Unit therefore helps you develop your Core Skills in Communication which are necessary to give a presentation as well as the technical skills required to setup a private cloud network infrastructure. You will also develop your troubleshooting skills during the setup and may have the opportunity to develop employability skills through Working With Others.