# **ICTNWK615 Design and configure desktop virtualisation**

# **Student Assessment Pack**

## **Student Details**

| **Student ID** |  |
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| **Student name** |  |
| **Contact number** |  |
| **Email address** |  |
| **Trainer/Assessor name** | . |

## **Course and Unit Details**

| **Unit code** | ICTNWK615 |
| --- | --- |
| **Unit name** | Design and configure desktop virtualisation |

## **Assessment Submission Method**

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| ☐ By hand to trainer/assessor | ☐ By email to trainer/assessor | ☐Online submission via Learning Management System (LMS) |
| ☐ By Australia Post to RTO | ☐ Any other method \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Please mention here) | |

**Student Declaration**

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| * I certify that the work submitted for this assessment pack is my own. I have clearly referenced any sources used in my submission. I understand that a false declaration is a form of malpractice; * I have kept a copy of this assessment pack and all relevant notes, attachments, and reference material that I used in the production of the assessment pack; * For the purposes of assessment, I give the trainer/assessor of this assessment the permission to:   + Reproduce this assessment and provide a copy to another member of staff; and   + Take steps to authenticate the assessment, including communicating a copy of this assessment to a checking service (which may retain a copy of the assessment on its database for future plagiarism checking).   Student signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Date: \_\_\_\_/\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

## **Assessment Plan**

To demonstrate competence in this unit, you must be assessed as satisfactory in each of the following assessment tasks.

| **Evidence recorded** | **Evidence Type/ Method of assessment** | | | **Sufficient evidence recorded/Outcome** |
| --- | --- | --- | --- | --- |
| **Unit Assessment Task 1** | Unit Knowledge Test (UKT) | | | S / NS (First Attempt)  S / NS (Second Attempt) |
| **Unit Assessment Task 2** | Unit Project (UP) | | | S / NS (First Attempt)  S / NS (Second Attempt) |
| **Unit Assessment Task 3** | Unit Project (UP) | | | S / NS (First Attempt)  S / NS (Second Attempt) |
| **Final result** | C/NYC | **Date assessed** |  | |
| **Trainer/Assessor Signature** |  | |

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# **Assessment Task**

## **Assessment Task 1 - Unit Knowledge Test (UKT)**

**Assessment type:**

* Written Questions

**Assessment task description:**

* This is the first (1) unit assessment task you have to successfully complete to be deemed competent in this unit of competency.
* The Unit Knowledge Test is comprised of fifteen (15)written questions
* You must respond to all questions and submit them to your Trainer/Assessor.
* You must answer all questions to the required level, e.g. provide the number of points, to be deemed satisfactory in this task
* You will receive your feedback within two weeks - you will be notified byyour Trainer/Assessor when results are available.

**Applicable conditions:**

* All knowledge tests are untimed and are conducted as open book tests (this means you are able to refer to your textbook during the test).
* You must read and respond to all questions.
* You may handwrite/use computers to answer the questions.
* You must complete the task independently.
* No marks or grades are allocated for this assessment task. The outcome of the task will be Satisfactory or Not Satisfactory.
* As you complete this assessment taskyou are predominately demonstrating your written skills and knowledge to yourtrainer/assessor.
* The trainer/assessor may ask you relevant questions on this assessment task to ensure that this is yourown work.

**Resubmissions and reattempts:**

* Where a student’s answers are deemed not satisfactory after the first attempt, a resubmission attempt will be allowed.
* You must speak to your Trainer/Assessor if you have any difficulty in completing this task and require reasonable adjustments (e.g. can be given as an oral assessment)
* For more information, please refer to your RTO Student Handbook.

**Location:**

* This assessment task may be completed in a learning management system (i.e. Moodle) or independent learning environment.
* Yourtrainer/assessor will provide you further information regarding the location for completing this assessment task.

**Instructions for answering written questions:**

* Complete a written assessment consisting of a series of questions.
* You will be required to correctly answer all the questions.
* Do not start answering questions without understanding what is required from you. Read the questions carefully and critically analyse them for a few seconds, this will help you to identify what is really needed.
* Your answers must demonstrate an understanding and application of relevant concepts, critical thinking, and good writing skills.
* Be concise to the point and write answers according to the given word-limit to each question and do not provide irrelevant information. Be careful, quantity is not quality.
* Be careful to use non-discriminatory language. The language used should not devalue, demean, or exclude individuals or groups on the basis of attributes such as gender, disability, culture, race, religion, sexual preference or age. Gender inclusive language should be used.
* When you quote, paraphrase, summarise or copy information from the sources you are using to write your answers/research yourwork, you must always acknowledge the source.

**How your trainer/assessor will assess your work?**

* This assessment task requires the student to answer all the questions.
* Answers must demonstrate the student’s understanding and knowledge of the unit.
* If all assessment tasks are deemed Satisfactory (S), then the unit outcome is Competent (C).
* If at least one of the assessment task is deemedNot Satisfactory (NS), then the unit outcome is Not Yet Competent (NYC).
* Once all assessment tasks allocated to this Unit of Competency have been undertaken, trainer/assessor will complete an Assessment plan to record the unit outcome. The outcome will be either Competent (C) or Not Yet Competent (NYC).
* The “Assessment Plan” is available with the Unit Assessment Pack (UAP) – Cover Sheet.

## **Assessment Task 1 - Unit Knowledge Test (UKT)**

**Instructions:**

* This is an individual assessment.

The purpose of this assessment task is to assess the students’ knowledge required to ensure secure file encryption is selected, implemented and monitored on a computer network or local environment.

* To make full and satisfactory responses you should consult a range of learning resources, other information such as handouts and textbooks, learners’ resources and slides.
* All questions must be answeredin order to gain competency for this assessment.
* You may attach a separate sheet if required.
* You must include the following particulars in the footer section of each page of the attached sheets:
  + Student ID or Student Name
  + Unit ID or Unit Code
  + Course ID or Course Code
  + Trainer and assessor name
  + Page numbers
* You must staple the loose sheets together along with the cover page.
* You must attach the loose sheets chronologically as per the page numbers.
* Correction fluid and tape are not permitted. Please do any corrections by striking through the incorrect words with one or two lines and rewriting the correct words.

Resources required to complete the assessment task:

* Learner guide
* PowerPoint presentation
* Unit Assessment Pack (UAP)
* Access to other learning materials such as textbooks
* Access to a computer, the Internet and word-processing system such as MS Word.

1. Answer the following questions:

A) Briefly explain latest five (5) policies of government and industry related to the development of efficient and reliable ICT environments? Write your response in 200-250 words.

B) Explain the three (3) current guidelines for government and industry to develop efficient and reliable ICT environment. Write your response in 130-180 words.

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| A) Government is committed to providing the best possible services to the community. Achieving this goal is dependent on maximizing the effectiveness of policy development and program delivery, planning and budgetary arrangements, decision making processes, organizational structures, workplace relations and people management.  Much reform has been undertaken in these areas and significant gains in performance have been achieved. Increasingly, information and communications technology (ICT) plays an important role in determining the quality and accessibility of services. The development of effective whole-of-government approaches to ICT is critical to achieving further significant gains in the delivery of government services.  The move towards e-Government-more responsive, comprehensive and integrated government operations and service delivery-requires a transformation of business processes to adopt and respond to new technologies. In this environment, the business case for a whole-of-government approach to ICT investment and governance is strengthened.  Policies of ICT governance to optimize the development of efficient and reliable ICT environments are as follows:   * Agencies will continue to manage their own information and communications technology in terms of strategy, development, implementation and support. * Agency management of ICT will be enhanced if there is improved information and knowledge sharing across government including 'better practice'. * The premise that information content may at some time be transferred across agency boundaries should underpin decisions when agencies are designing new systems. * Investment and funding models must accommodate the development of shared approaches to system development and Intellectual Property (IP). * The integrity of shared architecture and systems should be protected by an agreed Quality Assurance process.   Reference: https://www.apsc.gov.au/australian-government-use-information-and-communication-technology |
| 1. The ICT Guiding Principles are high level statements intended to guide all Geoscience Australia ICT activity and are complemented by the existing Science Principles and Data Stewardship Policy and Principles.   Government is committed to providing the best possible services to the community.  Achieving this goal is dependent on maximizing the effectiveness of policy development and program delivery, planning and budgetary arrangements, decision making processes, organizational structures, workplace relations and people management.  Much reform has been undertaken in these areas and significant gains in performance have been achieved. Increasingly, information and communications technology (ICT) plays an important role in determining the quality and accessibility of services. The development of effective whole-of-government approaches to ICT is critical to achieving further significant gains in the delivery of government services.  The move towards e-Government-more responsive, comprehensive and integrated government operations and service delivery-requires a transformation of business processes to adopt and respond to new technologies. In this environment, the business case for a whole-of-government approach to ICT investment and governance is strengthened.  This report outlines an appropriate framework to guide Commonwealth departments and agencies (referred to as agencies in this report) through this transformation and into the next stage of delivering better government. The report reflects the work of the IT Architecture and Governance (ITAG) Sub-Committee of the Management Advisory Committee (MAC). The recommendations of the report were endorsed at the 20 August 2002 meeting of the MAC.  Reference: 2020. [online] Available at: <https://www.apsc.gov.au/australian-government-use-information-and-communication-technology> [Accessed 11 November 2020]. |

1. Answer the following questions:
2. Explain the three (3) latest technologies to produce an efficient and reliable ICT environment. Write 50-100 words for each technology.
3. List any five (5) current processes designed to produce an efficient and reliable ICT environment.

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| 1. Tech companies often gain competitive advantage by causing market disruption through their ability to understand and act on technology trends. Like waves in the ocean, it’s much easier to ride these trends if you can see them coming and read them right.   Some of the technologies to produce an efficient and reliable ICT environment are listed below:   1. Spreading Intelligence throughout the cloud   Connected smart machines, such as robots and autonomous vehicles, are fundamental to the evolving Networked Society. Enhanced cloud architecture that can distribute and share machine intelligence will enable smart connected machines to work on an increasingly higher level.  Supported by advancements in artificial intelligence (AI) – particularly in the areas of big data analytics, machine learning and knowledge management – rapid progress has been made in terms of what smart machines can do. Developments in connectivity and cloud technologies are making it possible to distribute and share machine intelligence more easily, at a lower cost, and on a much wider scale than before.  When connected to the cloud, smart machines will be able to use the powerful computational, storage and communication resources of state-of-the-art data centers. Today’s intelligent software robotics systems are capable of supporting repetitive administrative tasks with current development pushing toward advisory tasks. Cloudification shifts the capabilities of these systems into a new sphere that includes complex problem-solving and decision-making on a mass-market scale.   1. Self Managing Devices   Combining sensory data with AI techniques enables the data from massive numbers of sensors to be merged and processed to create a higher-level view of a system.  Connected smart devices will change our lives in many ways. These range from simple services that open your garage door as your car approaches, for example, to radically new business opportunities involving services yet to be invented and markets yet to be discovered. Combined with intelligent handling of data, smart devices can boost the productivity and profitability of any business. But to enable the deployment of billions of smart devices, the cost of managing and monitoring them needs to be low. Evolving software and communications technology are shifting toward the creation of autonomous and self-managing devices.  The Internet of Things (IoT) means automation and intelligence in everything that is connected. This implies that a collective intuitive behavior among a wide range of devices for a wide range of applications is possible in the future. The connectivity allows objects to be sensed and actuated remotely, creating a bridge between the physical and digital world.   1. Communication beyond sight and sound   Communication will evolve in a highly remarkable way over the coming years, as interaction between human beings and machines evolves to include additional experiences and senses. The internet you can feel is on the horizon.  Emerging technologies in the fields of the tactile internet, virtual reality and augmented reality – supported by 5G network evolution – are showing signs that the ability to experience an event virtually is no longer science fiction, but a feasible reality, and indicate a giant step forward in innovation.  Reference: 2020. [online] Available at: <https://www.ericsson.com/en/reports-and-papers/ericsson-technology-review/articles/technology-trends-2016> [Accessed 9 November 2020]. |
| 1. The staggering influence of 21st Century Information and Communication Technology (ICT) and its creation of a service-economy are comparable to highlights of 20th century urban design such as steel and automobiles. Today the pervasive power of the internet has led to a Fourth Utility revolution wherein the internet is as indispensable as our core utilities for survival in this modern day and age. This, is being leveraged by Governments and private sectors to provide a greater quality of life using lesser resources thereby reducing the environmental footprint of our species.  * Climate Change: ICT has the potential to effect significant energy savings through smart use. Arduous logistics of travel and transportation is easily solved by ICT through shrinking distances and increasing efficiency. ICT allows a strategic shift to core services through economic de-materialization Above all it can reduce, manage and monitor energy consumption and carbon footprint of buildings and infrastructure. * Global Warming: The focus of Pacific Controls is to promote the ICT sector in playing an important role in reducing CO2 and scale up existing solutions and deploying an e-strategy for CO2 reductions. This strategy should include target based implementation of ICT services, and M2M technology in buildings and infrastructure. * ICT for Energy Savings in Buildings * Smart Buildings * Remotely Managed Energy and Facilities Management Services for Buildings and Infrastructure   Reference: Pacificcontrols.net. 2020. *ICT - Information And Communications Technology - Top ICT Projects In The World*. [online] Available at: <https://www.pacificcontrols.net/solutions/ict.html> [Accessed 11 November 2020]. |

1. Answer the following questions:

A) List the five (5) tools along with their applications for the management of the virtual desktop environment. Write your response in 150-200 words.

B) Summarise three (3) software applications and their application to manage the virtual desktop environment. Write your response in 200-250 words.

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| 1. ***Long ago, when servers still came one to a box, "sysadmins" spent all their time running from one machine to another, with boxes of tools and utilities designed to squeeze out every bit of performance and stability from physical servers.***   ***Now, virtual servers outnumber the physical in most data centers. And neither budgets nor toolboxes are over-provisioned with resources for fine-tuning virtual infrastructures.***  ***Companies expanding beyond the pilot phase and moving into large-scale server or desktop virtualization need to realize that utilities from third parties—not just the platform vendors—are what will help them make virtual infrastructures as stable as the real ones, some analysts say.***  ***It's impossible to say which utilities or ISVs offer the best tool for every environment, Shields says. But five specific types are particularly important to getting virtual infrastructures humming right now.***   1. ***Capacity Management***   ***"Virtualization is taking what became sort of an also-ran activity, capacity management, and showing why it's really a critical step," Shields says.***  ***Multi-processor, muti-core servers and acres of RAM made planning for server capacity almost moot, Shields says. With virtual servers, however, the question isn't the power of the server, it's how that capacity is doled out to specific workloads on specific virtual machines, and monitoring the performance of the VMs to make sure all the resource demands are satisfied.***  ***"It goes beyond not being able to automate anything until you know what you have," Wolf. "Without capacity management you don't know what a particular service is costing the organization and that makes it harder to build out your infrastructure as a service."***  ***VMware's vCenter CapacityIQ is effective at identifying utilization gaps, Shields says, but there are plenty of other options. These range from old-school IT favorites retooled to cover virtual as well as physical, such as BMC's Capacity Management and HP's Insight Dynamics, to purpose-built virtualization management tools from VKernel, VMTurbo and Embotics.***     1. ***Performance Management***   ***Performance problems in physical servers are relatively easy to spot because most functions are associated with a specific component. Swap it out and you're good to go.***  ***"On a virtual server a performance issue could be related to spindle contention in storage, an oversubscription of RAM, and undersubscription of RAM, under or over subscription of processors, bandwidth utilization—a whole series of dependencies that make it hard to put your finger on the problem without a deep analysis of what's going on inside," Shields says.***  ***Hyper9, for example, offers a set of tools called Hyper9 VEO (Virtual Environment Optimization) designed to discover all the VMs in an infrastructure, all the applications running on them, the relationships between the applications, VMs and physical servers and to collect data on performance, configuration and capacity.***  ***Those capabilities were de rigeur in the physical world, but are still uncommon in the virtual, Wolf says. ISVs such as Akorri, Netuitive and VMware's CapacityIQ are also making good progress on performance optimization tools, he says.***   1. ***Storage Management***   ***Storage continues to be one of the most consistent source of headaches for virtual-infrastructure managers, Wolf says.***  ***Converting physical servers to virtual requires more back-end storage space—a problem exacerbated by VM sprawl—and not even virtual storage systems are typically designed in ways that make it easy for virtual servers to run at their best, Wolf says.***  ***"Companies have been able to plan their CPU and memory density, anticipate boot storms that generate a lot of I/O, but they haven't always been able to optimize tiered storage for virtual servers, or do things like queue data locally so you aren't pushing as much data through the pipe," Wolf says.***  ***Three-year-old ISV Virsto tries to address VM storage problems by reducing the amount of disk space used for VMs by eliminating the need to store the same data for 100 golden images, and improve performance by reducing the number of data-packet collisions VMs generate at storage I/O busses by not coordinating their timing the way a single server would.***   1. ***Virtual Enterprise Management Suites***   ***Not surprisingly, a lot of the physical-IT-management vendors have been eager to expand their reach into the virtual world as well -- and have done so very effectively, Wolf says.***  ***VMware partners BMC, CA, HP and IBM have all been making creditable forays into virtual-enterprise management, even against VMware's claim that its vCloud Director is purpose-built for the environment, Wolf says.***  ***"You have a lot of very sophisticated capabilities coming in from these platforms, like the service automation suite HP got from OpsWare," Wolf says. "There's more pull there from that level of capability and because VMware knows it's not going to be a device-management company, so it's not reaching down where some of the enterprise ISVs already go."***   1. ***Desktop Virtualization Planning and Management***   ***"Virtual server environments are an order of magnitude more complex than physical server environments because of the additional ecosystem they add to the physical one," Shields says. "Desktop virtualization adds even one more ecosystem and a lot more."***  ***Virtual desktops can also be delivered in more ways than virtual servers—ranging from full-on VDI in which each user gets a dedicated VM with a single OS running on a backend server, to virtual applications that can be viewed from almost any machine, Shields says.***  ***Reference:*** Fogarty, K., 2020. *Virtualization Management: 5 Tools That Matter Most*. [online] CIO. Available at: <https://www.cio.com/article/2415009/virtualization-management--5-tools-that-matter-most.html> [Accessed 9 November 2020]. |
| 1. ***Implementing a virtual desktop infrastructure (VDI) requires careful planning for its implementation to be successful. And it all begins with choosing the right virtual desktop infrastructure software for your organization. At this stage, it is important to pay attention to the features, tools, and capabilities of various solutions.***   ***Some of the software related to virtual desktop environments are listed below as:***   1. ***V2 Cloud***   ***Through the software, businesses can use fully managed, scalable platform for deploying virtual desktops, which come in handy for remote teams and individuals who work outside the office.***  ***Using V2 Cloud, admins can add up to 250 users to a desktop, and users can have their own private folders and use public shared folders while using the same virtual machine. Programs and applications need to be installed only once, helping reduce hardware and licensing costs. Administrator permissions ensure full control over access to apps and files.***  ***V2 Cloud also provides full admin access, so admins have a full 360-degree view of all cloud desktops. With full access, admins can easily manage users, install applications remotely, and monitor remote connections as needed.***  ***V2 Cloud makes it easy to manage virtual desktops over remote connections. Admins have full access for managing cloud desktops, so installing remote applications is easier. Applications will also have to be installed only once for all users, reducing licensing costs. From V2 Cloud’s centralized dashboard, admins can also add up to 250 concurrent users to each workplace while controlling access levels for these users.***  ***V2 Cloud provides businesses with virtual desktops that are easy to use. These cloud desktops can be accessed through Web browsers and offer bidirectional copy-paste functions and printing. Built-in HTTPS encryption and two-step authentication ensures utmost network security and data protection. All these features allow users to work within a personalized cloud infrastructure.***  ***V2 Cloud can help businesses protect their data and desktops against ransomware attacks. The platform ensures that all communications within cloud desktops are encrypted and enables automatic daily backups for desktops. These features ensure that data can be easily recovered in the event of cybersecurity attacks.***   1. ***Amazon Workspaces***   ***Amazon WorkSpaces is a managed, secure cloud desktop service designed to improve user productivity while reducing overhead costs. You can use Amazon WorkSpaces to provision either Windows or Linux desktops in just a few minutes and quickly scale to provide thousands of desktops to workers across the globe. You can pay either monthly or hourly just for the WorkSpaces you launch. This helps you save money when compared to traditional desktops and on-premise VDI solutions.***  ***Among its most prominent features is the elimination of many administrative tasks associated with managing your desktop lifecycle, including provisioning, deployment, maintenance, and recycling of desktops. There is less hardware inventory to manage and no need for complex virtual desktop infrastructure deployments that don’t scale.***  ***Amazon WorkSpaces is a cost-efficient solution for cloud desktops as it has multiple pricing tiers that meet your most pressing requirements. It has five bundles depending on your focus: performance, power, graphics, value, and standard services. Aside from that, you can opt for hourly or monthly billing so you can better control your usage and expenses. Moreover, this gives you full control over your desktop resources to further cut operational costs.***  ***Rather than forcing you to spend time on creating a new directory, Amazon WorkSpaces lets you connect to your existing Active Directory. This way, you can easily manage and modify user access rights from a single interface and roll it throughout the organization with ease.***   1. ***IBM Cloud***   ***IBM Cloud is an accelerated virtual desktop infrastructure software that is integrated with industry-standard graphics and storage capabilities to eliminate productivity barriers. The platform empowers mobile workforces to gain workstation-like experience on any device. This gives them fast and convenient access to graphics-intensive applications and files anytime, and anywhere there is an internet connection.***  ***IBM Cloud reviews show that the platform’s robust VDI functionalities are backed by security safeguards to protect in-transit and at-rest content from loss and theft. The system configures and scales computing and storage options housed in different data centers worldwide. This is complemented by GPU technology that speeds up access to graphics-intensive materials.***  ***IBM Cloud allows organizations to switch from a capital expense (CAPEX) to operating expense (OPEX) model for their infrastructure, while also reducing total cost of ownership as users become less reliant on desktop workstations and standalone software licenses. The software is also easy to set up, with on-demand access to top compute services and desktop virtualization solutions.***  ***Teams can increase productivity with improved collaboration as IBM Cloud speeds up access to graphics files. The system can be quickly configured with high-performance NVIDIA GRID GPUs, which allow multiple users to access and share the graphics processing power of a single GPU.***  ***Reference:*** Financesonline.com. 2020. *20 Best Virtual Desktop Infrastructure Software In 2020 - Financesonline.Com*. [online] Available at: <https://financesonline.com/virtual-desktop-infrastructure/> [Accessed 9 November 2020]. |

1. Explain the configuration of the software applications for the management of the virtual desktop environment. Write your answer in 150-200 words.

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| ***Before deploying virtual machines to your end users, be sure they have the necessary operating system and software installed.***  ***If you created a new virtual machine and added it to the project, you must install a guest operating system in the virtual machine. The steps in this section describe how to install a Windows XP guest operating system from an installation CD. For notes on installing all supported guest operating systems, see the Guest Operating System Installation Guide, available from the VMware Web site or from the Help menu.***  ***If you added an existing virtual machine, it may already have a guest operating system installed. Be sure the guest operating system has the appropriate updates.***  ***If you are deploying a Windows virtual machine to multiple users, you must set up Sysprep in the guest operating system just as you would on a physical computer you intended to clone for a large deployment. Sysprep prepares the operating system for deployment by installing special software that reconfigures the operating system on the next boot.***  ***Reference:*** Vmware.com. 2020. *Configuring The Virtual Machines And Installing Software*. [online] Available at: <https://www.vmware.com/support/ace/doc/setpol\_vmconfig\_ace.html> [Accessed 11 November 2020]. |

1. Explain the factors to consider while formulating the configuration required to integrate virtual machines into the existing network design. Write your response in 200-250 words.

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| ***Without a well-designed physical and virtual networking architecture, as well as an appropriate amount of bandwidth, your virtual deployment can become inefficient and prone to outside attacks. Virtualization offers numerous benefits to data centers, but you can't realize these rewards unless your network can handle the requirements of virtual machine (VM) traffic.***  ***Steps for the configuration of software applications for the management of Virtual Desktop environment are as follows:***   1. ***Virtual Networking configuration***   ***This section on virtual network architecture basics covers how to plan your networking environment and how to properly configure physical and virtual networks to avoid performance bottlenecks. This section outlines how to integrate virtualization into your physical network as well as how to configure virtualized networks in Hyper-V and VMware ESX environments.***  ***The long-awaited VMware vNetwork Distributed Switch enables cluster-level networking and can ease the burdens of confiuring virtual machines individually in cluster configurations. Users weigh in on its possiblities for increasing virtual networking configuration and management.***  ***Introducing virtualization to your data center allows you to consolidate your physical servers, reduce hardware costs and ease network management.***  ***Virtualization challenges network managers with consolidation and latency considerations, in addition to placing a burden on the network infrastructure in each physical server. An expert examines network architectures and the capacity planning issues that come with constructing virtual networks.***   1. ***Virtual networking management***   ***As with other aspects of virtual deployments, networking is rife with problem areas. This section covers the management of virtualized networks, including performance concerns, virtualization's impact on network latency and advice on improving virtual network management in VMware environments.***  ***The virtual switch is the key to successful virtual networking. It's different from the virtual bridges that most server virtualization platforms use, because it has uplinks from physical switches via physical network interface cards (pNICs) and ports that attach to VMs.***   1. ***Virtual Network Security***   ***One of administrators' central concerns is network security. Virtualized environments can augment security problems because virtual servers can be easily created and moved within the environment dynamically. This section explains the process of securing virtual networks and how to prevent VMware networks from being compromised in DMZs.***  ***If you approach virtual environment security by viewing elements such as a hypervisor and management applications in isolation, you invite breaches and risk to areas such as your network.***  ***Reference:*** SearchServerVirtualization. 2020. *Virtual Networking Design, Configuration And Management Guide*. [online] Available at: <https://searchservervirtualization.techtarget.com/tutorial/Virtual-networking-design-configuration-and-management-guide> [Accessed 11 November 2020]. |

1. Answer the following questions:

A) Explain the structure and business organisation of the client virtualisation. Write your answer in 200-250 words.

B) What are the four (4) functions of client virtualisation? Write 50-100 words for each function.

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| ***A) Not long ago server virtualization was IT's New World, inhabited by a relatively few courageous souls who dared to break the framework of one server per application and one application to server. The others stood faithfully by rooms filled to capacity with servers, cabling, cooling equipment and hotspots.***  ***Today, studies show that most businesses have moved to server virtualization at some level. CDW's Server Virtualization Life Cycle Report, released earlier this year, found that over 90% of respondents are implementing server virtualization, with the typical business reporting that 34% of their server infrastructure is virtual.***  ***Now that IT appears to have visited that particular New World, more and more stouthearted explorers are itching to move on again -- and client virtualization appears to be a logical destination. Quite a few are already there, telling the rest of us that virtualizing the client environment can and does boost user productivity, provide for a secure network and work environment, and reduce management and support costs.***  ***Just as server virtualization reduced the number of servers in the data center to improve performance, client virtualization reduces users' need to have their own dedicated software or hardware. Client virtualization deployments are often classified into three approaches:***   1. ***Presentation Virtualization: Nearly 15 years old, presentation viartualization began as a security measure with virtual private networks. Today, organizations are rethinking the use as a means to virtualize client environments and bring all the user applications into the data center. Presentation virtualization provides a Web-based portal for users to log in and interact with approved applications.*** 2. ***Desktop Virtualization: Though this takes more planning than presentation or application virtualization, because it brings the desktop OS and applications into the data center, there are many benefits to consider. First, all the processing power comes from the data center; as long as a user can access the Internet, he has access to the business's applications. Second, IT can customize software images for departments rather than individuals, boosting a group's productivity and reducing management costs. Third, desktop virtualization also makes that weekly (or even daily) security patch obsolete, or at least less burdensome.***   ***Reference:*** Network World. 2020. *Making Sense Of Client Virtualization*. [online] Available at: <https://www.networkworld.com/article/2213647/making-sense-of-client-virtualization.html> [Accessed 11 November 2020]. |
| 1. At its most basic level, client virtualization technologies enable IT to deploy both applications and desktops in a more efficient and secure manner to almost any endpoint over any network. Because client virtualization comes in a variety of flavors, the technology can sometimes be overwhelming, depending upon which vendor is promoting which flavor.   For IT professionals, endpoint management is becoming more and more challenging. Workers are more mobile, organizations more global and devices become both commonplace and more diverse. Yet, in the face of these mounting challenges, many IT departments are also facing declining budgets and growing pressure by corporate management to “move at the speed of business.”Client virtualization, in any of the available flavors, offers IT the opportunity to gain more control over their endpoint devices, which means they can dramatically reduce the costs of supporting these devices and users, while at the same time improve security, compliance and disaster readiness throughout the organization. What’s more, client virtualization offers a highly scalable solution that reduces IT overhead and simplifies IT management, enabling the organization to be more flexible when rolling out new applications and services as needs change.  The functions of Client Virtualization are listed below as:   * Patch Management: Think about the tasks involved in patch management. You have to update the firmware and software drivers frequently; you have to update the operating system; you have to update the utilities and plug-ins — for instance, Internet Explorer, Antivirus Client agents, Instant Messaging Client, WebEx client, Flash Plug-in, etc. That does not include the applications, which are also getting updates frequently. As each of these patches becomes available, you have to test application compatibility to ensure that all related applications will still work together. As an example, a CRM application may not work with Office 2010 and, at the same time, may only work with a particular version of the Flash player in Internet Explorer 7. And you have to run through this regression testing for hundreds of different applications. * Security: Endpoint security has become a nightmare, both figuratively and literally, for many IT professionals. The threats to security are becoming more complicated. Users can save mission-critical data on unsecured flash drives. They can burn that information to a DVD or upload it to a dropbox, Apple iDisk, Windows Live SkyDrive or other locations where data can easily be compromised. Users can also save documents on their notebooks or their broadband modem’s flash drive. Without encryption, any of this data could easily be extracted from any of these devices, even by a novice PC user. * Software Distribution Management: Software goes through major revisions every one or two years. For example, the progression from Office 2007 to Office 2010 took two years. Rolling out an application such as Office requires a great deal of testing and migration assistance. Many new versions of software not only conflict with certain operating system versions, they also conflict with application versions. For example, when Office 2007 came out, it was more than six months before it was supported to work with Adobe Acrobat. In addition, some versions of software require a new version of another software to enable it to work properly. Again, for Office 2007 to work with Adobe Acrobat, customers had to buy upgrades to Adobe Acrobat V8. Further complicating matters in managing and upgrading software, each operating system and application platform may have a completely different update method — for example, updating applications on Windows is completely different from updating applications on the Mac platform. * IT Help Desk/Desktop Staff: Physically sending staff to every office to repair or update devices is time-consuming, cumbersome and not very cost effective. If you have remote offices without local IT support, users may experience significant downtime before a technician can fix a problem. Also, it is inefficient and expensive to have more than a few people manning a help desk to typically solve the same problem for each user. For example: What happens when everyone gets the same virus or everyone has a problem with one application at the same time? There is typically no “rollback”mechanism, which can make troubleshooting very frustrating for the IT department.   Reference: Biztechmagazine.com. 2020. [online] Available at: <https://biztechmagazine.com/sites/default/files/10\_7\_10%20Client%20Virt\_0.pdf> [Accessed 11 November 2020]. |

Question 7: Explain the term “virtual desktop infrastructure”? Write 200-250 words in your response.

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| ***Virtual desktop infrastructure (VDI) is a desktop virtualization technology wherein a desktop operating system, typically Microsoft Windows, runs and is managed in a data center. The virtual desktop image is delivered over a network to an endpoint device, which allows the user to interact with the operating system and its applications as if they were running locally. The endpoint may be a traditional PC, thin client device or a mobile device.***  ***The concept of presenting virtualized applications and desktops to users falls under the umbrella of end-user computing (EUC). The term VDI was originally coined by VMware and has since become a de facto technology acronym. While Windows-based VDI is the most common workload, Linux virtual desktops are also an option.***  ***How the user accesses VDI depends on the organization's configuration, ranging from automatic presentation of the virtual desktop at logon to requiring the user to select the virtual desktop and then launching it. Once the user accesses the virtual desktop, it takes primary focus, and the look and feel are that of a local workstation. The user selects the appropriate applications and can perform their work.***  ***VDI may be based on a server or workstation operating system. Traditionally, the term VDI has most commonly referred to a virtualized workstation operating system allocated to a single user, but that definition is changing.***  ***Reference:*** SearchVirtualDesktop. 2020. *What Is Virtual Desktop Infrastructure? VDI Explained*. [online] Available at: <https://searchvirtualdesktop.techtarget.com/definition/virtual-desktop-infrastructure-VDI> [Accessed 9 November 2020]. |

Question 8: Answer the following questions:

1. Summarise the comparison between Citrix XEN Desktop and Microsoft Remote Desktop Services.
2. Explain the three (3) components of Virtual Desktop Infrastructure? Write your response in 50-100 words for each component.
3. List five features of virtual desktop infrastructure.

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| 1. Microsoft Windows Remote Desktop Services (Terminal Services) is a component of the Windows Server operating systems. Citrix XenApp (Presentation Server) uses this system component and extends it or facilitates scalability and administration. However, Microsoft supplements and optimizes Remote Desktop Services with each new version of Windows Server. More and more the question comes up whether Citrix XenApp is still necessary.   Reference: FirstAttribute. 2020. *Microsoft Windows Remote Desktop Services Vs. Citrix Xenapp - Firstattribute AG*. [online] Available at: <https://www.firstattribute.com/en/news/microsoft-windows-remote-desktop-services-vs-citrix-xenapp/> [Accessed 9 November 2020]. |
| 1. The purpose of VDI is to enable a rich desktop experience for users through a central, virtualized back end that hosts virtual machines (VMs). Each user connects via RDP to a client OS such as Windows XP or Windows Vista running as a VM on a server. For this infrastructure to function, a VDI solution must have the following elements. 2. Virtualization Platform: The platform hosts VMs with the client operating systems. The platform must have the capacity to host enough VMs for all concurrently connected users. Examples of virtualization platforms include Hyper-V and VMware ESX Server. 3. Protocol for the users to connect to the virtualized OS: This protocol could be the RDP protocol that's part of XP and Vista or an add-on protocol. The protocol will also handle certain features such as device and printer redirection. Your decision about a protocol will depend on the device end users use to connect, such as a thin client or a remote client under a full OS. 4. Virtual Management Platform: This platform manages the servers and helps provision VMs quickly and efficiently. This platform not only creates VMs, but also uses templates and libraries of disk images to provision the client OSs in the VMs. The virtual management platform ensures there is always a pool of VMs available for new connections.   Reference: Savill, J., 2020. *Q. What Are The Main Components Of Virtual Desktop Infrastructure (VDI)?*. [online] IT Pro. Available at: <https://www.itprotoday.com/server-virtualization/q-what-are-main-components-virtual-desktop-infrastructure-vdi> [Accessed 11 November 2020]. |
| 1. The features of VDI are listed below: 2. Employee can work from anywhere   Mobility is inherent in the concept of hosted virtual desktop. Your desktop is completely hardware agnostic. All you and your workforce need is SOME kind of internet connected device. You can connect using smart phones, tablets, chrome books, laptops, desktops, thin clients, and it doesn’t matter if they are Windows, Macs, Linux, or Androids. You need only be able to run some version of the Citrix Receiver Application.   1. Hosted VDI increases Security   Your applications and data are run and stored in our secure community cloud platform. It reaches your virtual desktop via encrypted screen shots. Your interactions with the virtual desktop are then transmitted back to our data centers where then then send back the result of your commands over encrypted screen shots. That’s it. It’s that simple. The real beauty of this model is none of your actual data ever crosses the internet or gets stored on your machine. Even if some ambitious hacker decided they wanted to snag a screen shot out of the air, they are encrypted. When mobile equipment is lost or stolen you need only replace it, not worry about compromised data.   1. Management Portal   OGO’s Cirrus Control panel allows anybody at your organization to add or remove employees and applications. You retain complete control over your virtual desktop environment. From the control panel he/she can provision new accounts, create different account templates (accounting, sales, executive, etc) add or remove applications (Custom or standard), change/reset passwords, and add or remove other features.   1. Better Uptime and Redundancy   With mirrored cloud platforms in Tier 2/3 Datacenters in Phoenix, AZ and Hagerstown, MD and an amalgamation of 20Gb/s network connectivity we have the platform needed to keep your virtual desktops and applications running no matter the status of your physical locations. You need only be able to access an internet connection and we will handle the rest. In the case the internet is out at your location, the Virtual Desktop can operate effectively on even just a 3G cell phone connection on an iPad.   1. Improved Performance   Have you ever opened a huge Excel Spreadsheet or Access Database on your local machine and gone for a cup of coffee to kill time while it opened? Not on the Virtual Desktop. Virtual desktop environments dynamically assigns resources as needed, while most providers will assign you a set amount of resources (8 CPUs, 16Gb RAM, etc) There is no set amount of resources assigned to your company. Instead all of our hosted virtual desktop clients can pull compute, memory and storage needs from a huge pool of shared resources instantly and on demand allowing for fluid performance on even the largest of documents and tasks.  Reference: Ongoing Operations. 2020. *What Are The Key Features Of Hosted Virtual Desktop?*. [online] Available at: <https://ongoingoperations.com/2013/02/04/hosted-virtual-desktop-feature/#closemodal> [Accessed 11 November 2020]. |

Question 9: Explain the following:

1. Limitations of Virtual Development Infrastructure
2. Desktop specific design objectives of Virtual Desktop Infrastructure
3. Requirements for Virtual Desktop Infrastructure

Write 150-200 words for each in your response.

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| 1. ***Limitations of Virtual Development Infrastructure***   ***Many businesses are turning to a relatively new type of IT infrastructure – virtual desktop infrastructure (VDI). Desktop virtualisation is a relatively recent concept, whereby multiple people, using multiple PCs, can access desktop software, controlled from one main server or data centre.***  ***The limitations of VDI are listed below as :***   * ***If an individual requires different applications from the other users, they will require a completely different image, without changing the applications for other users.*** * ***A substantial initial outlay is required for the main server hardware, storage and network infrastructure. This might no be feasible for some smaller businesses.*** * ***Administrators, savvy to the limitations, problem solving and installation of VDIs will either have to be brought in or existing IT staff given the relevant training.*** * ***If a problem occurs, this will generally affect all users, rather than being able to isolate problems if operating systems run off individual PCs.***   ***Reference:*** TechSling Weblog. 2020. *Virtual Desktop Infrastructure: The Pros And Cons - Techsling Weblog*. [online] Available at: <https://www.techsling.com/virtual-desktop-infrastructure-the-pros-and-cons/> [Accessed 11 November 2020].   1. ***Desktop specific design objectives of virtual desktop infrastructure***   ***VDI Virtual DesktopVDI Virtual Desktop – Nowadays, the biggest challenge IT departments in many organizations face is to centralize all the different IT solutions in a new technological model. IaaS (Infrastructure as a Service), desktop and application virtualization, private and public cloud, and VDI are phrases we hear often.***  ***The purpose of VDI is to execute and distribute user desktop sessions from a centralized infrastructure—in one or many data centers—which can be either on-premises or in a cloud system. In a typical VDI setup, you will have a central server called a hypervisor, or a farm of servers on which the virtualization software runs, where virtual machines are created for users to use.***  ***Reference:*** Bonuccelli, G., 2020. *What Is A VDI Virtual Desktop And How Can It Help My Business In 2019?*. [online] Parallels Remote Application Server Blog - Application virtualization, mobility and VDI. Available at: <https://www.parallels.com/blogs/ras/vdi-virtual-desktop/> [Accessed 11 November 2020].   1. ***Requirements of Virtual Desktop Infrastructure***   ***Virtual Desktop Infrastructure is defined as “a virtualization technology that hosts a desktop operating system on a centralized server in a data center.”***  ***There are several main components that are needed to deploy this virtual technology and are listed below:***   * ***Server rack in a local data center*** * ***Virtualization platform such as Hyper-V or VMWare ESX Server*** * ***Protocol for connecting to the virtual OS, such as the RDP protocol that is native to the operating system or an add-on protocol. This protocol handles processes such as device and printer redirection.*** * ***Platform for managing the servers and helping provision virtual machines and quickly and efficiently.*** * ***Session broker – the session broker is responsible distributing sessions from the device to the virtual machine.*** * ***Application virtualization programs such as Microsoft Application Virtualization and VMWare Thin Apps*** * ***Profile and data redirection to enable users to customize their virtual environment and receive the same experience when they log on next.*** * ***End user devices, such as a laptop, desktop or thin client.***   ***Reference:*** Dincloud.com. 2020. [online] Available at: <https://www.dincloud.com/blog/requirements-for-successful-vdi> [Accessed 11 November 2020]. |

Question 10: What are the ten (10) factors to consider for planning the implementation and deployment of virtualisation?

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| ***Virtualization has become a necessity for all organizations irrespective of their size. Virtualization reduces costs and enables organizations to get more out of their technology investments. Because virtualization is such a vast area, proper knowledge of how to use it in the best possible way is the key to success.***  ***Keeping this in mind, let's take a look at what should be considered while implementing virtualization. Factors to consider for planning the implementation and deployment of virtualization are listed below:***   * ***Consider the hardware*** * ***Track the virtual machine life cycle*** * ***Avoid virtualizing everything*** * ***Monitor virtual and non-virtual traffic*** * ***Don’t Expect virtual resources to be free*** * ***Virtual machines can be a temporary service*** * ***Virtual machines templates make deployment easier*** * ***Allocate thick provisioning for virtual machines*** * ***User guest add-ones and virtualization tools to improve performance*** * ***Make sure the host machine’s patches are always up to date***   ***Reference:*** Pal, K., 2020. *10 Virtualization Tips Every Administrator Should Consider*. [online] Techopedia.com. Available at: <https://www.techopedia.com/2/30920/trends/virtualization/10-virtualization-tips-every-administrator-should-consider> [Accessed 11 November 2020]. |

Question 11: What are the hardware and software features of a Virtual machine? Write 250-300 words for each in your response.

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| ***Good software is often defined by its capabilities, its ease of use and stability. Virtualization software is no exception. Uses differ for the software from user to user. While one may use Windows only for gaming and another only for running MS Word, there may be someone who wants to do both of them and a little bit of systems and web programming, some animation, a little server stuff and more. Lists are endless for the demands and there are software for which its manufacturers cry out loud “my product can do everything”. Well, while having a lot is never bad if you need it all, it can certainly be bad if it turns out to be like the birthday gift you never wanted. You’ll probably lose your mind trying to figure out what to do with it and go mental in the process. That’s what extra features can do. They can cause instability, bloat your memory and slow down your system while running. We’ll tell you the different features general virtualization software would / should have and the uses of those features.***  ***Good virtualization software takes advantages of such hardware features. As a matter of fact, most popular ones do. Buy or download one that doesn’t blow a hole in your pocket. Oh, and yes, in case you don’t go in for Intel VT-X or AMD-V, you must also know whether your processor features those technologies or not. If your software supports them and the processor doesn’t, it’s once again a bad deal. In most cases, a software which supports virtualization features built into the modern processors would run on one which doesn’t but there are exceptions. The biggest and most famous known such exception is the “XEN Hypervisor” – it doesn’t work unless you have a processor featuring virtualization assistive technologies. So yeah, make sure that your hardware and software both have support for it. If you have the hardware support, go for software which utilises it. It’s a win-win situation.***  ***Feature of Virtualization hardware and software are listed below as:***   * ***Stability: What good would software be if it crashes when you push a button on its window? If it’s not stable enough to make you run the virtual machines the way you want it to, by all means avoid it and go for another version of the same software or another software altogether. Let’s say you’re running a Linux system and a virtual machine crashes when you try to take snapshots in VirtualBox (a famous virtualization software). In such cases it’s better to install KVM/Qemu than try to destroy things by running VirtualBox. Of course, we’re not saying by any means that VirtualBox is bad software.*** * ***Lower Resource Usage: Remember Windows Vista being a pathetic memory hog and the complaints that were shot at Microsoft for releasing it premature? Compare it to Windows 7. What was different if you look at the features? Hardly anything, but Windows 7 consumes a whole lot less memory and processor power than Vista did. Virtualization software consuming more memory would leave lesser headroom for the actual virtual machine you want to run. If you don’t have too much RAM and one hell of a powerful processor on your system, it won’t matter. The extra resource usage by the virtualization software will leave a lot lesser room for the actual virtual machine and things will begin to get slow! Because we used Windows 7 and Windows Vista as examples, it doesn’t mean that you have to wait for two years if the software you’re trying to use consumes more memory than what you’d like it to. It’s just that you should pick up the one which does the jobs you want it to and keeps it easy on your system.*** * ***Networking Facilities: Depending on the software in use, you just may be able to emulate an ethernet connection or wireless network connection. You would be allowed to emulate various networking interface types on different virtual network adapters, try out NAT (use this option, if available, to be able to browse internet on your guest OS), internal adapters, a bridging adapter and so on. Depending on your requirements, go ahead and select the best one. If you’re simply trying to be able to browse the net within the virtual machine, most virtualization software can facilitate that.***   ***Reference:*** Digit. 2020. *Virtualization Software Features To Look For | Chapter No. 3 | Fasttrack To Virtualization | Digit*. [online] Available at: <https://www.digit.in/technology-guides/fasttrack-to-virtualization/virtualization-software-features-to-look-for.html> [Accessed 11 November 2020]. |

Question 12: Explain the process involved in implementing and deploying the application virtualisation software. Write your response in 150-200 words

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| ***Process involved in implementing and deploying the application virtualisation software are as follows:***   1. ***Make Sure Virtualisation is right for you***   ***Not everybody needs to run out and virtualize just because it's the thing to do. So before sinking money and effort into going down the virtualized server path, be 100 percent sure you know all of the reasons why it's a good fit for your business.***  ***If you're jumping on the virtualization bandwagon just to jump on it, then odds are higher that you don't have a real plan, or even the right overall approach, and you're therefore more likely to fall into some of the pitfalls below and actually end up with your datacenter in worse shape than if you had just left it alone.***   1. ***Start with the understanding that virtualization isn't a "project," but a new way of doing things from here on***   ***More than one user stressed that a virtualization deployment is not an "IT project," with a fixed time horizon, budget, final deliverables, and so on. Rather, a virtualization rollout marks the beginning of a fundamental shift in how your datacenter operates.***   1. ***Find the right people, make sure they have thorough, product-specific training. (But don't train anybody and everybody.)***   ***A number of users stressed the damage that uninformed and/or untrained people, both inside and outside your IT department, can have on a virtualization deployment. So it pays to ensure that the people directly involved in the project aren't just enthusiastic bandwagon jumpers who want in on a hot datacenter trend, but that they're really well-trained on the specifics of the products that you're using. Otherwise, promises get made that can't be delivered on.***  ***And on the flip side, one user takes things a step further and advocates that you don't train non-admin stakeholders at all, on the theory that a little virtualization knowledge will just make key decision-makers dangerous.***   1. ***Put policies in place to prevent VM sprawl***   ***One of the most commonly cited virtualization pitfalls in the forum discussion was the problem of VM sprawl, wherein the number of virtual machines balloons unnecessarily, taxing both compute and human resources. User neilhwatson writes, "With this population explosion comes the over head of administration. Most organizations do not use sophisticated configuration management services resulting in a time deficit and neglected hosts."***  ***Reference:*** Stokes, J., 2020. *Six Steps To A Successful Virtualization Deployment*. [online] Ars Technica. Available at: <https://arstechnica.com/information-technology/2009/04/five-steps-to-a-successful-virtualization-deployment/> [Accessed 11 November 2020]. |

Question 13: What information should you include in a virtualisation plan? Write your response in 250-300 words.

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| ***Virtualization has become a necessity for companies of all sizes. From testing sandboxes to production services, virtualization helps businesses get more out of their hardware and do more for their companies than they ever could before. For many companies, this technology is quite new. For others, it's old hat. Regardless of where you fall, virtualization is a vast technology with numerous moving parts.***  ***Some of the plans that should be included in virtualization are listed below:***   1. ***Plan hardware for virtual capacity***   ***When you are in the early stages of planning your virtual environment, do not make the mistake of purchasing hardware that can't handle the strain virtualization will put on it. You need to think bigger than usual. Remember, this server might well be hosting numerous virtual machines, so it's going to need the raw horsepower and the space necessary for growth. The last thing you need is to have your host server choke and run out of space for virtual machines. Measure twice, cut once applies. Don't assume a virtual machine will take up little space on that server. And don't assume you'll be hosting only one virtual machine.***   1. ***Keep track of the entire lifecycle of every virtual machine***   ***You need to be keeping track of every one of your virtual machines from birth to death. You should always know how large those VMs have become, the status of their snapshots, how much traffic they are getting, and just about every other piece of information you can get your hands on. It's very tempting to "set and forget" virtual machines, but that is a grievous error and could land you in a world of trouble.***   1. ***Don’t virtualize everything***   ***Not everything should be virtualized. That FTP server that gets only internal traffic of maybe a half dozen users? Probably not. Printer server? Probably not. You need to make a specific plan and have sound reasons for everything that is virtualized. The first thing you should ask yourself is, "Why do we need to virtualize Server X?" When you can answer that question with a modicum of certainty, apply that same reasoning to every server you think might benefit from virtualization.***   1. ***Monitor virtual traffic as well as non-virtual traffic***   ***Make sure you monitor your virtual traffic as well as you do your non-virtual traffic. Don't be lulled into thinking the virtual hosts are safer simply because you can spin up a snapshot at a moment's notice. That is a false sense of security and should not be considered a substitute for security. But monitoring goes well beyond security. You need to keep abreast of both internal and external traffic to your virtual machines. After a certain period of time, you will know whether specific machines need to be given more resources and whether other virtual machines would be best served as stand-alone.***   1. ***Don’t give away virtual resources for free***   ***Virtual machines seem to take up so little space and are easily given over to the realm of "free." Don't do this. Don't even migrate a server from stand-alone to virtualized for free. The client needs to understand the benefit they gain from their server being virtualized -- and along with all that comes with virtualization, there is a price. Besides, the technology required for virtualization has a cost associated with it, and sometimes that cost is high. Your organization can't foot that bill alone.***   1. ***User virtual machines for disposable systems***   ***This might seem a bit strange to some, but there are times when you need a system or service temporarily. There's no better way to supply a temporary service than with virtual machines. Need a temporary FTP server? Virtual machine. Need a temporary print server or Web server? Virtual machine. The nice thing about virtual machines is that they don't cost you the resource of hardware, so bringing a machine to life is quite easy. You could even create specific virtual machines for specific "disposable tasks" and bring them up only as needed.***   1. ***Create virtual machine templates for easy deployment***   ***If you know you'll want to deploy numerous virtual machines based on specific configurations or needs, create a set of templates so that deployment of these machines is as efficient as possible. This can really save you time and effort if you sell a specific service -- say, Web servers -- and sell them often. There's no need for you to constantly reinvent the wheel. Create a template and use it as often as necessary. That time saved is money in the bank for both you and the client.***  ***Reference:*** TechRepublic. 2020. *10 Virtualization Tips Every Administrator Should Consider*. [online] Available at: <https://www.techrepublic.com/blog/10-things/10-virtualization-tips-every-administrator-should-consider/> [Accessed 11 November 2020]. |

Question 14: List the ten (10) steps involved for tuning the virtual environment.

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| ***Steps involved for tuning the virtual environment are listed below:***   1. ***Update Virtual Host System***   ***You need to update your virtual host systems on a regular basis. What's regular? Check quarterly on the high side and monthly on the normal side. Remember that with Distributed Resource Scheduling, when you put a virtual host system in Maintenance mode, its VMs scatter like rats on a sinking ship, so you can perform these updates during normal business hours.***   1. ***Update firmware***   ***Yes, you need to keep firmware up to date on physical servers, blades, and enclosures. Some of these are critical so don't slack on them. Quarterly to twice yearly should be sufficient to keep new hardware features and fixes coming your way. The easiest way to maintain these updates is to place yourself on vendor mailing lists for them. Every vendor worth its salt has a list you can join to stay abreast of critical updates.***   1. ***Stay on top of operating system updates***   ***Yes, the dreaded OS patching rears its ugly head again. This necessary evil can drive you to the brink of homicide. There are new patches, security updates, service packs, and updates of some kind landing in my email on an almost daily basis. In larger environments, it's advisable to have a separate team to manage patching. Depending on the severity level of the patch, this could be a weekly exercise. Monthly is probably the correct frequency for most patching needs.***   1. ***Update VMware tools***   ***Do you see that exclamation mark in the system tray on top of your VMware Tools icon? That means you need to update the tools package. It requires a reboot on Windows operating systems, so plan accordingly. The update takes a few minutes per system to perform, but it's worth it for the enhanced drivers and new hardware. This update needs to be performed when updates become available.***   1. ***Update Virtual Machine hardware***   ***This one is a pain but necessary for better performance. When you update from an earlier version of VMware to vSphere, you'll have to do this. There's no easy way to do it, either. It's a lengthy process that requires multiple reboots and network reconfiguration on your VMs. If you're running vSphere 4.x, check your virtual machine's hardware by selecting a VM in VCenter and look at the Hardware version on the Summary tab. If it's 4, you need to update. If it's 7, you're cool.***   1. ***Remove orphanded VMDKs***   ***This is one of those pesky housekeeping items that you absolutely must do. Disk files sometimes stay behind, when you delete VMs from inventory. And, once you've deleted a system from inventory, there's no reason to keep any of its associated files around just burning up valuable space. Checking for orphaned VMs on a quarterly basis is sufficient to keep your LUNs clutter free.***   1. ***Adjust vCPUs***   ***As in The Late Great Virtual CPU Debate, you should inventory your VMs for multiple vCPU usage and do some serious pruning. Generally speaking, you should configure VMs with single vCPUs. Multiple vCPUs are for special cases and specific workloads.***   1. ***Adjust Virtual Memory***   ***Take an inventory of your VMs, determine how much memory you've allocated to each one, and adjust accordingly. You won't necessarily adjust them downward, but you probably will adjust a lot of them in the downward direction. Memory overcommitment is a big problem in virtual environments, but it's also a popular thing to do. A wiser solution is to use performance data to determine what your VM's memory needs are and adjust to best performance that doesn't waste resources. Why allocate 4GB of memory for a test Web server, when one or two is plenty?***   1. ***Change operating systems***   ***This recommendation won't make a lot of people happy, but it's a good practice. If you run a lot of Windows servers in your environment, you're also burning a lot of resources (memory, for one) that could be used for other workloads.***  ***For example, Windows 2008 R2 requires a minimum of 512MB RAM (okay, try running on that), but realistically needs at least 2GB of RAM out of the box for just the OS. Add another 2 to 4 GB for each standard workload. Add more for more intense workloads.***   1. ***Add Capacity***   ***If you're growing your virtual infrastructure, add capacity. Don't wait until you're experiencing outages, the DRS dance, or growth stoppage. Add capacity now and expand into it. You have to stay at least one step ahead of your growth expectations by adding capacity before you need it. Add memory to your hosts, add CPUs, or upgrade your CPUs and add disk space to resolve performance bottlenecks or growth slowdowns. "We're out of capacity," is an unacceptable excuse.***  ***Reference:*** TechRepublic. 2020. *10-Step Checklist For Tuning Up Your Virtual Environment*. [online] Available at: <https://www.techrepublic.com/blog/10-things/10-step-checklist-for-tuning-up-your-virtual-environment/> [Accessed 11 November 2020]. |

Question 15: How to deploy a virtual application package for testing? Write your response in 250-300 words.

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| ***Application performance testing is an essential part of any solid virtual application plan -- particularly for tier-one and mission-critical applications. By performing some quick load tests -- with some willing users enlisted as guinea pigs -- you can experiment with the hypervisor and the apps themselves to achieve the desired performance results.***  ***But as you tinker with virtual applications, don't forget about user experience. If a virtualized application runs as well as it did on physical hardware (or better), you shouldn't worry too much about users' expectations.***  ***In some cases, though, you might think twice about virtualizing an application if, as a result, it would no longer look the same on the users' end. For example, if an application is visually intensive and is not a true client-server app, but rather a simple Remote Desktop Protocol session-accessed application, a user's daily interactions with the application are most important. Virtualizing applications saves resources and space -- which is great for admins -- but it won't always benefit the user.***  ***Finally, remember that not everyone has the luxury of a full-blown testing lab or the available users for application performance testing. Thankfully, some software manufacturers produce load-testing software from application vendors themselves to third-party providers.***  ***The following are some important factors to consider and questions to ask before starting virtual application performance testing:***   * ***Host Affinity: Host affinity is a requirement in some infrastructures, and in others it just makes good sense.*** * ***Resource Affinity: It may be necessary to dedicate quantities of the core five resources -- CPU, RAM, disk, network interface cards and USB -- to ensure the best performance and support for virtual applications.*** * ***Shares and resource pools: these resources don't enter into the equation until the end of the process, but you should consider resource quantities up front. Determine the amount of resources your guest machine and its virtual applications will use. Don't necessarily leave the hypervisor's resource allocation at the default amount. You can fine-tune shares throughout the application performance testing process to see what's best for each virtualized application.*** * ***Dedicated clusters: To improve performance and management, try forming a cluster with an isolated set of servers that host common or interacting applications.*** * ***Application Stacking: With the ultrafast and capacity-heavy hosts that exist today, it's possible to stack two or three applications on one virtual server. Stacking can be a great thing, but it can also be a problem if virtual applications don't cooperate with one another.***   ***Reference:*** SearchServerVirtualization. 2020. *Virtual Application Performance Testing: An Art Form*. [online] Available at: <https://searchservervirtualization.techtarget.com/tip/Virtual-application-performance-testing-An-art-form> [Accessed 11 November 2020]. |

# **Unit Assessment Task (UAT)**

**Assessment Task 2 - Unit Project (UP)**

**Instructions to complete this assessment task**:

* Please write your responses in the template provided.
* You may attach a separate sheet if required.
* You must include the following particulars in the footer section of each page of the attached sheets:
  + Student ID or Student Name
  + Unit ID or Unit Code
  + Course ID or Course Code
  + Trainer and assessor name
  + Page numbers
* You must staple the loose sheets together along with the cover page.
* You must attach the loose sheets chronologically as per the page numbers.
* Correction fluid and tape are not permitted. Please do any corrections by striking through the incorrect words with one or two lines and rewriting the correct words.
* The premise of the project must be closely related to the previous assessment task.
* This submission must be well presented and follow the guidelines and instructions provided.
* Please follow the format as indicated in the template section below.
* One of the most important steps that you can take: proofread your project.
* Project must be of 500-800 words in length, using 11-point font, double-spaced, and must include a cover page, table of contents, introduction, body, summary or conclusion, and works cited.
* Appropriate citations are required.
* All RTO policies are in effect, including the plagiarism policy.

Resources required to complete the assessment task:

* Computer
* Internet
* MS Word
* A site desktop virtualisation may be conducted
* A live network
* Servers

**Scenario: -**

HUNE City Council is responsible for the welfare of the people and for managing a better lifestyle for its people. The council is responsible for emergency management, media, publications, welfare services, fines and infringements, legislation, town planning, leisure sports and recreation, libraries and learning, waste management, building and construction. The council has been transformed into a paperless organisation and all the services are handled on different information systems implemented at the council’s head office. The size of the data is immense and the information retrieval is also an ongoing process. Also, a team of developers is continuously working on development of different projects so that an efficient and effective system has to be implemented as per the requirements of the council. The data centre is also hosted in the building of the head office and all the computers, servers, printers, scanners and hand-held devices are connected to the network and an authorised and authenticated security setup has been implemented on the network to obtain the optimal performance of all the information systems.

The ICT environment implemented at the council is according to the guidelines, regulations and policies as per the government defined Occupational Health and Safety parameters. The OHS/WHS codes of practice followed by the council are as below:

Health and safety is the responsibility of everyone working in the council.

Each individual staff member must recognise their responsibility in regard to health and safety, whether they are working in the office.

The Council Safety Policy is directed by the policies of the Occupational Health and Safety Unit and includes the main concerns being focused on the care of staff in the engineering network and IT infrastructure. Each working area is unique in its safety requirements and as such, each work area will have variations in policy. The relevant safety requirements applicable to a work area will be displayed in a prominent position in the work area.

Individuals should understand the parameters of their workplace and be conscious of any constraints or limitations that apply in particular areas. It is also important that individuals are familiar with any other workplaces they may visit during their course of work or study. People should never become complacent with their surroundings.

Should any health and safety problems arise that cannot be resolved easily, the matter should be directed to the [Workplace Health and Safety Committee](http://www.itee.uq.edu.au/itee-workplace-health-safety-committee) for action.

Staff should be aware of the correct work practices that apply to individual work areas they encounter. The [Work Health and Safety Act 2011](http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/W/WorkHSA11.pdf) sets very clear guidelines as to what the employers responsibilities are in relation to health and safety.

Responsibilities

* Supervisors are responsible for ensuring that risk analyses are performed by or on behalf of staff operating in areas for which they are responsible
* Network manager and high risk environments have been risk assessed
* A risk assessment should be carried out on computer network to ensure the layout of computers does not contribute to eye strain, bad posture etc
* The Information Technology Manager is responsible for conducting risk assessments of IT infrastructure

Electrical Safety

Electrical safety regulations require that regular inspection and testing of specified electrical equipment is carried out in accordance with the relevant Australian Standard.

It is the IT staff responsibility to:

* Visually inspect any equipment prior to use
* Ensure that it is fit for the intended purpose
* The test and tag label is current
* That cords and leads are run in such a way as to be protected from harm and not present a risk to others

Environmental guidelines:

Information Management & Technology Services believes that sustainability should be built into each of our IT services and solutions. We're currently undertaking a number of initiatives to reduce our environmental impact and have even more in the pipeline for the coming months.

Some of these changes will have direct measurable data to support them, such as electricity consumption, while others will meet sustainability objectives over time.

* Encouraging staff to turn off their monitors when they leave their desk for an extended period.
* Recycling waste both at our desks and the product packaging we deploy.
* Promoting sustainability initiatives.
* Encouraging the integration of sustainability into decision making.
* Data centre optimised to increase efficiency of air flow and reduce air conditioning requirements.
* Continuing to invest into virtualisation technologies to support services.
* Continuing to replace older less energy efficient hardware.
* Selecting products by integrating sustainability into the procurement process. During the next tender process for server equipment a sustainability component will be built in.

Mark is the IT Manager and is the team lead of all the developers, IT personnel, and network and system administrators. While, Steve is working as the System Administrator and is responsible for the smooth and efficient working of the information systems across the organisation. The job details of IT Manager and System Administrator as follow:

IT Manager Job description:

* Supports team manager and performs management duties when manager is absent or out of office
* Manages inventories and stock, including keeping detailed records of inventory use and sales, and advising management on ordering where necessary
* Provides encouragement to team members, including communicating team goals and identifying areas for new training or skill checks
* Assists management with hiring processes and new team member training
* Answers team member questions, helps with team member problems, and oversees team member work for quality and guideline compliance
* Communicates deadlines and sales goals to team members
* Develops strategies to promote team member adherence to company regulations and performance goals
* Managing information technology and computer systems
* Controlling and evaluating IT and electronic data operations
* Managing IT staff

System Administrator Job Description:

* Install and configure software and hardware
* Manage network servers and technology tools
* Set up accounts and workstations
* Monitor performance and maintain systems according to requirements
* Troubleshoot issues and outages
* Ensure security through access controls, backups and firewalls
* Upgrade systems with new releases and models
* Develop expertise to train staff on new technologies
* Build an internal wiki with technical documentation, manuals and IT policies
* Installing and configuring software, hardware and networks
* Monitoring system performance and troubleshooting issues
* Ensuring security and efficiency of IT infrastructure

Due to financial constraints and increasing amount of data along with the fact of continuous development of different applications for the use of council, it has been decided by the management and the IT department to implement the desktop virtualisation solution for the optimal performance and also for the testing of different applications as virtualisation not only help to save the costs of the hardware but also provide the facility of multiple platforms across the same machine which can be very beneficial for implementation of different applications along with their testing. Steve being the System administrator will be responsible for the implementation of the desktop virtualisation environment, while Mark IT manager will supervise and manage all the virtualisation process.

**Activity 1: (Planning of the desktop virtualisation environment)**

So, in this activity you need to research and analyse for different available Virtualisation solutions available optimal for the organisation. You will act as Steve, the System Administrator and will plan the implementation of the desktop virtualisation environment under the supervision of Mark, the IT manager which will be acted by the trainer/assessor. The planning phase will help to ensure the designing and implementation of the virtualisation environment as per the requirements of the organisation. The planning phase also includes the documentation process that can help to understand the design, implementation and configuration of the desktop virtualisation environment.

So, for the planning phase you need to perform the following task:

* Analyse different desktop virtualisation software vendors.

Note: You need to research different virtualisation software over internet

* Analysis of the desktop virtualisation environment and ensure that your analysis is based on Windows platform has been used across the IT infrastructure.
* Analysis of the features and functions of the desktop virtualisation environment.
* Analysis objectives, hardware requirements and limitations of the desktop virtualisation environment
* Document the design infrastructure, the document includes the planning phase for the implementation and deployment of the desktop virtualisation environment.
* Also, complete the given template for the documentation of the VDI including the analysis and planning of the desktop virtualisation environment.

**Template 1 to Document the Desktop Virtualisation Environment**

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| **Purpose**  **What should the Project Plan cover?**  **Key considerations in developing the Plan**  ***Analysis of the Desktop Virtualisation Software:***  ***Analysis of the Desktop Virtualisation Software:***  ***Features and functions of Desktop Virtualisation Solution:***  **Analysis objectives, hardware requirements and limitations *Virtualisation software*:**    **How to use this template**  **Individual project data**  **Text styles**    **Executive Summary** |

## **Assessment Task 3 - Unit Project (UP)**

**Instructions to complete this assessment task**:

* Please write your responses in the template provided.
* You may attach a separate sheet if required.
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  + Trainer and assessor name
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* The premise of the project must be closely related to the previous assessment task.
* This submission must be well presented and follow the guidelines and instructions provided.
* Please follow the format as indicated in the template section below.
* One of the most important steps that you can take: proofread your project.
* Project must be of 500-800 words in length, using 11-point font, double-spaced, and must include a cover page, table of contents, introduction, body, summary or conclusion, and works cited.
* Appropriate citations are required.
* All RTO policies are in effect, including the plagiarism policy.

Resources required to complete the assessment task:

* Computer
* Internet
* MS Word
* A site where desktop virtualisation may be conducted
* A live network (LAN)
* Servers and computers
* Switches and routers
* Workplace health and safety (WHS) standards, environmental guidelines (Provided in scenario)

**Activity 1 (Implementation of the Desktop virtualisation environment)**

This activity is continuation of assessment task 2. You are required to participate in a practical demonstration task. You need to complete this activity in 2 to 3 hours. Additional time will be provided for analysis and preparing documentation.

Note: For This activity ATIC Assessor will provide you the following:

* **A site where desktop virtualisation may be conducted**
* **A live network (LAN)**
* **Servers and computers**
* **Switches and routers**

Now, considering yourself as the System Administrator Steve, you need to implement and configure the desktop virtualisation environment and the devices. You need to work as per the instructions of the IT Manager which will be acted by the trainer/assessor and he will be responsible to provide stimulated environment for the implementation of the virtualisation. For this activity you need to perform the following tasks,

* Obtain the Desktop virtualisation software and that is to be provided by the trainer. As discussed in the plan as the Windows platform has been used across the council office and data centre so VMware workstation is the appropriate one. You also need to implement the desktop virtualisation technologies as per the given scenario.
* Install and configure the Virtual desktop environment. The following must be done:
  + Select Deployment Type
  + Review of role Services
  + Specify which server to act as the RD Connection Broker Server
  + Specify which server to act as the RD Web Access Server
  + Specify the RD Virtualisation Host
* Implement the specific features and function of Virtual desktop infrastructure
* Manage and implement the testing process on the desktop virtualised setup
  + View performance charts
  + Check physical performance
  + Check antivirus is up to date
  + Check system is up to date

You trainer will observe your performance and complete the following checklist.

**Activity 2: (Implementation of the application virtualisation software)**

This activity is continuation of previous task. You are required to participate in a practical demonstration task. You need to complete this activity in 2 to 3 hours. Additional time will be provided for analysis and preparing documentation.

Note: For This activity RTO/Assessor will provide you the following:

* A site where desktop virtualisation may be conducted
* A live network (LAN)
* Servers and computers
* Switches and routers

After the implementation of the desktop virtualisation environment, as a System Administrator, you need to implement the application virtualisation software. You will perform the implementation as per the instructions and under the supervision of the trainer/assessor. For this activity you need to perform the following tasks:

* Prepare an implementation plan for the application virtualisation software and complete the given template 2 for planning of the application feature.
  + Analyses of the Application Software
  + Identify the software, hardware and tools required for implementation of application virtualisation
  + Implementation of Application Software
* Configure/install the application virtual software
* Test the application virtual software
* Manage, update and tune the system components

You trainer will observe your performance and complete the following checklist.

**Template 2 for planning of Application virtualisation**

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| **Project Goals****Organisation****Analysis of the Application Software** **Identify the software, hardware and tools required for implementation of application virtualisation** **Implementation of Application Software** |