

**Evaluating Virtualisation Platforms**

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# PART 1 - Virtualisation Evaluation

## 1. Evaluating Virtualisation Platforms

1. Explain the difference between Type 1 and Type 2 hypervisors and include two (2) examples of each of industry recognised commercial hypervisor products which would be suited to an SME.

* Type 1 Hypervisors

The type 1 hypervisors also known as bare-metal hypervisors, run directly on the hardware of the host machine, without any operating system in between. They have direct access to the server’s CPU, RAM and Storage resources. The type 1 hypervisors offer better performance, security, and scalability than type 2 hypervisors.

Example:

* VMware ESXi
* Microsoft Hyper-V Server
* Type 2 Hypervisors

The type 2 hypervisor, also known as hosted hypervisors, run on top of an operating system on the host machine, such as Windows or Linux. That means the type 2 hypervisors have lower performance and efficient performance than Type 1 hypervisors. However, the type 2 hypervisors are easier to setup and use than Type 1 hypervisors, and they can run on any hardware that supports the operating system.

Example:

* VMware Workstation
* Oracle VM VirtualBox

1. Compare information of the four (4) examples in a tabular format with at least three (3) categories, or factors, to show comparisons.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | VMware ESXi  (Type 1) | Microsoft Hyper-V Server  (Type 1) | VMware Workstation  (Type 2) | Oracle VM VirtualBox  (Type 2) |
| **Hardware Compatibility** | Supports a wide range of hardware platforms | Supports a wide range of hardware platforms | Support a wide of Windows and Linux operating systems. | Supports a wide range of Windows, Linux and MacOS operating systems. |
| **Features** | Wide range of features, including high availability, scalability, and disaster recovery. | High availability, scalability, and disaster recovery, and it free to use. | Good for development and testing for creating isolated environments | Free and open source, suitable for a wide range of tasks. |
| **Cost** | Paid License required | Free with Microsoft Windows Server | Paid License required | Free and Open source |

The table above provides a comparison of four popular hypervisors for SMEs based on three key categories. The best hypervisors for a particular SME will depend on their specific needs and budget. However, VMware ESXi and Microsoft Hyper-V Server are good options for SMEs that need a feature-rich hypervisor with extensive support options. For VMware Workstation and Oracle VM VirtualBox are good options for SMEs on a budget limited or need to create and test virtual machines for development or testing purposes.

## 2. Recommendation

1. How virtualisation works.

Virtualisation software creates a layer of abstraction between the physical hardware and the operating system. This allows multiple operating systems to run on a single physical server. Each operating system is called a virtual machine (VM). The hypervisor manages the VMs and allocates resources to them, such as CPU, memory, and storage.

1. How virtualised servers differ from physical servers.

Virtualised servers are software-based servers that run on top of a hypervisor. Physical servers are hardware-based servers that run directly on the physical hardware.

1. The three benefits of virtualisation.

* Cost savings: virtualisation can help businesses reduce IT costs for buying hardware by consolidating multiple physical servers onto a single physical server, also reduced energy consumption, and streamlined management.
* Improved efficiency: Virtualisation can help businesses improve performance, availability, and scalability and efficiency by optimizing the use of resources.
* Increased flexibility: Virtualisation can help businesses improve flexibility by making it easier to deploy and manage applications.

1. High availability of virtualisation.

High availability is a system’s ability to operate (uptime) and be accessible to users for a specified period without going down. Uptime is the time during which a server is operational without unplanned rebooting or being powered off.

Virtualisation can help improve high availability by providing features such as:

* Load balancing: Load balancing distributes traffic across multiple VMs, which can help to improve performance and reliability.
* Failover: Failover allows VMs to be automatically restarted on a different physical server in the event of a hardware failure.
* Replication: Replication allows VMs to be regularly copied to a secondary location, which can be used to recover from a disaster.

1. A recommended hypervisor solution for the Case Study and justify your recommendation.

The recommended hypervisor solution for the Case Study is VMware ESXi. VMware ESXi is a Type 1 hypervisor that is known for its reliability and performance. It is also relatively easy to use and manage.

VMware ESXi offers several features that would be beneficial to Albert & Allen Logistics (AA), such as:

* High availability: VMware ESXi supports a number of features to help improve high availability, such as load balancing, failover, and replication.
* Scalability: VMware ESXi is highly scalable, so Albert & Allen Logistics (AA) can easily add or remove VMs as needed.
* Security: VMware ESXi provides a number of security features to help protect Albert & Allen Logistics (AA) 's data and applications.

VMware ESXi is a good choice for Albert & Allen Logistics (AA) because it offers a reliable, scalable, secure, and easy-to-use virtualisation solution.

## 3. Sustainable Guidelines

1. What technologies and processes are available to support sustainable practice?

**Virtualisation**: Virtualisation allows multiple operating systems to run on a single physical server, which can help to reduce energy consumption and improve efficiency.

**Cloud computing**: Cloud computing can help to reduce energy consumption by consolidating workloads on shared servers.

**Data centre efficiency**: Data centre efficiency measures can be used to reduce energy consumption and improve the overall efficiency of data centres.

**Lifecycle management:** This is the process of managing the lifecycle of ICT equipment from procurement to disposal. Lifecycle management can help to reduce the environmental impact of ICT equipment by extending its lifespan, recycling, or reusing it when it is no longer needed, and disposing of it responsibly.

1. What industry technology and processes are designed into your new network to produce an efficient and reliable sustainable ICT environment?

**Software-defined networking (SDN)**: SDN is a new approach to network management that decouples the control plane from the data plane. It allows for more flexible and efficient network management, which can help to reduce energy consumption.

**Network function virtualisation (NFV)**: NFV is a technology that allows for the virtualisation of network functions and can help to reduce the amount of hardware that is needed, which can also help to reduce energy consumption.

**Cognitive radio**: Cognitive radio is a technology that allows for the opportunistic use of unlicensed spectrum. It also can help to improve network efficiency and reduce the need for new infrastructure.

**Green ICT standards**: There are several green ICT standards that have been developed to help organizations reduce the environmental impact of their ICT operations.

Sources and Links:

Australian Government ICT Sustainability Plan 2010-2015: <https://www.industry.gov.au/>

Sustainable ICT - Best Practice: <https://www.csu.edu.au/csugreen/life-framework/facilities-and-operations/sustainable-ict>

Sustainable Information and Communications Technology - Fujitsu: <https://www.fujitsu.com/au/Images/sust_solutions_Sustainable%20ICT.pdf>

Environmental Guidelines for the ICT Industry in Australia: <http://www.environment.gov.au/resource/australian-government-ict-sustainability-plan-contents>

Green IT Council of Australia. (2023). Sustainable ICT: A framework for Australian businesses. Retrieved from <https://contractingsite.com.au/wp-content/uploads/2015/02/A_Green_ICT_Framework_CR.pdf>

Australian Computer Society: Green computing guidelines <https://www.acs.org.au/governance/rules-and-regulations.h>

## 4. Client Approval

**To:** Thong Thao (Network technician)

**From:** Shawn Long (IT manager at AA Logistics)

**Subject:** Review and approval for server virtualisation plan

I have reviewed the evaluation document, and I would like to approve all the recommendations and documents contained herein. I would like to thank Thong for putting forward his evaluation for updating our existing physical server infrastructure and that we look forward to the planning of the recommended solution.

Signed: *Shawn Long* Date:14/01/2024

## 4. Reference

Amazon Web Services, Inc. (n.d.). *Type 1 vs Type 2 Hypervisors - Difference Between Hypervisor Types - AWS*. [online] Available at: <https://aws.amazon.com/compare/the-difference-between-type-1-and-type-2-hypervisors/>.

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