EPAM University Programs

DevOps external course

Module 2 Virtualization and Cloud Basic

**TASK 2.1**

1. Які найпопулярніші гіпервізори використовуються для віртуалізації інфраструктури.

2. Стисло опишіть основні відмінності найпопулярніших гіпервізорів.

There are two types of hypervisors: Type 1 and Type 2.

Type 1 hypervisors work directly on the host's hardware to control it and control guest machines. Examples: Xen, Oracle VM Server for SPARC, Oracle VM Server for x86, Microsoft Hyper-V and VMware's ESX/ESXi.

Type 2 hypervisors, sometimes referred to as guest OS, work on a regular OS, as do other applications in the system. In this case, the guest OS works as a host process, while hypervisors separate the guest OS from the virtual machine operating system. Examples: VMware Workstation, VMware Player, VirtualBox and Parallels Desktop for Mac.

*Features of hypervisors 1 type:*

**Xen** – supports for the paravirtualization mode in addition to hardware virtualization, the minimum code of the hypervisor itself by taking the maximum number of components beyond the hypervisor.

**Oracle VM Server for SPARC** –creates a virtual computer environment abstracted from all physical devices of the server. Each logical domain is a full-fledged virtual machine with a set of hardware resources.

**Oracle VM Server for x86** – includes a free and open-source Solution Xen hypervisor, supports Windows, Linux and Solaris (as a guest OS), and includes an integrated web management console.

**Microsoft Hyper-V** –virtualized partitions have neither access to the physical processor nor the ability to control its real interrupts. Instead, they have a virtual representation of the processor and a guest virtual address, depending on the configuration of the hypervisor, which does not necessarily take up the entire virtual address space. The hypervisor can define a subset of processors for each partition. The hypervisor manages processor interrupts and redirects them to the appropriate section using the Synthetic Interrupt Controller or SynIC. Hyper-V can hardware accelerate address translation between different guest virtual address spaces using the IOMMU (I/O Memory Management Unit), which works regardless of the hardware memory management used by the processor.

**VMware’s ESX/ESXi** – allows you to divide physical computer resources into logical sections called virtual machines.

*Features of hypervisors of type 2:*

**VMware Workstation** – allows the user to install one or more virtual machines on a single physical computer and run them side-by-side with it.

VMware Workstation supports bridges with a real computer network adapter, as well as creating shared folders with a virtual machine. The program can mount real CDs or DVDs or ISO images into virtual optical drives, with the virtual machine believing that the drives are real. Virtual hard drives are stored in .vmdk files.

VMware Workstation can keep the current state of the virtual machine (pictured) at any time. These images can later be recovered, which returns the virtual machine to a stored state.

VMware Workstation includes the ability to combine multiple virtual machines into a group that can be turned on, switched off, suspended, or renewed as a single object, which is useful for testing client-server technologies.

**VMware Player** – can run existing virtual appliances and create its own virtual machines (which require an operating system to be installed to be functional). It uses the same virtualization core as VMware Workstation, a similar program with more features, which is not free of charge.

**Virtualbox**

* Cross-platform;
* Modularity;
* USB 2.0 support when host machine devices become available to guest operating systems (only in the proprietary version);
* Support for VMDK (VMware) and VHD (Microsoft Virtual PC) images, including snapshots;
* Audio virtualization support (AC97 or SoundBlaster 16 or Intel HD Audio to choose from)
* Support for different types of network interaction (NAT, Host Networking via Bridged, Internal);
* Support for the chain of saved virtual machine states (snapshots) to which can be rolled back from any state of the guest system;
* Shared Folders support for simple file sharing between host and guest systems (for Windows NT 4.0 guest systems and newer, Linux and Solaris);
* Support for the integration of desktops (seamless mode) by the host and guest operating system;
* The basic version is fully open under the GNU GPL license, so there are no restrictions on use.

**Parallels Desktop** **for Mac –** is a big part of the fact that the virtual machine is launched under macOS as a normal application, the user does not need to run another operating system or software for it to reboot the computer, unlike Apple's proposed technology Boot Camp.