EPAM University Programs

DevOps external course

Module 2 Virtualization and Cloud Basic

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**TASK 2.1**

1. Які найпопулярніші гіпервізори використовуються для віртуалізації інфраструктури.

2. Стисло опишіть основні відмінності найпопулярніших гіпервізорів.

1) Hyper-V, VMware ESX/ESXi, VirtualBox, Xen

2)**Microsoft Hyper-V** is a type 1 native hypervisor; it creates virtual machines on systems running Windows. Type 1 means that hypervisor runs directly on the physical hardware and doesn`t need operation system in between. Hyper-V isolates virtual machines in different logical partitions supported by the hypervisor. Host system in this situation also works in isolated logical partition named “parent partition”. The virtualization software works in this partition and has direct access to the hardware devices (child partitions don`t have access to the hardware and are isolated from each other). When we are talking about child partitions, they communicate with hardware through drivers, which are working inside the host operation system (parent partition). Each virtual machine has a set of virtual devices (network adapter, video adapter, etc.) that interact with the parent partition via VMBus (virtual device bus). So, drivers are stored in each virtual machine. There are also such features as:

* computing environment - virtual machine includes the same basic parts as a physical computer, such as memory, processor, storage, and networking. All these parts have features and options that you can configure different ways to meet different needs;
* disaster recovery and backup – copies of virtual machines can be created, intended to be stored in another physical location, so one can restore the virtual machine from the copy;
* portability - live migration, storage migration, and import/export make it easier to move or distribute a virtual machine;
* remote connectivity - Hyper-V includes Virtual Machine Connection, a remote connection tool for use with both Windows and Linux. Unlike Remote Desktop, this tool gives you console access, so you can see what's happening in the guest even when the operating system isn't booted yet;
* security - Secure boot and shielded virtual machines help protect against malware and other unauthorized access to a virtual machine and its data.

**VMware ESXi** — is also a type 1 hypervisor, developed by VMware; ESXi is not a software application that is installed on an operating system, it includes and integrates vital OS components, such as a kernel. Like Hyper-V, it divides system into different logical partitions – virtual machines, but in ESXi, device drivers are installed into the hypervisor itself (and not into virtual machine). That`s why only that hardware, drivers for which are available in the hypervisor, is supported.

**Oracle VM VirtualBox** is a free and open-source hosted hypervisor for x86 virtualization, developed by Oracle Corporation. VirtualBox may be installed on Windows, macOS, Linux, Solaris and OpenSolaris. It is a type 2 hypervisor, which means that it runs above the host OS, like any other application (so, virtual machines run as a process on the host and hypervisor separates them from the host and from each other). There are also such features as:

* Intuitive GUI;
* Convenient networking editor;
* Virtual machine disks that grow as they fill up with data (Thin Provisioning);
* Technology of snapshots;
* USB 2.0 devices in virtual machines;
* Play sound on host devices from a virtual machine;
* Clipboard between virtual machine and host OS.

**Xen** is a type 1 cross-platform hypervisor developed at the Cambridge University computer lab and distributed under the GPL license (free software license). It supports paravirtualization mode in addition to hardware virtualization, in which guests run a modified operating system. This technology can help to achieve very high perfomance due to the lack of emulation of the real hardware, the simplicity of interfaces, etc. In hardware virtualisation mode virtual machine “doesn`t know” about hypervisor`s existence – Xen emulates real hardware and allows to bootstrap the OS. Also, Xen runs in a more privileged CPU state than any other software on the machine.