**DEVOPS**

**Assignment – 2**

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1. **Difference Between Hypervisor and Docker?**

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| **Hypervisor** | **Docker** |
| 1. Hypervisors can be made to work on software and hardware where it works on the operating system or on the CPU and storage services of the system. | 1. Dockers work only on software of the operating system and not on the hardware side. It takes the host kernel and works on the principle of virtualization. |
| 1. In a single system, we can use multiple operating systems with the help of Hypervisor. This makes the system to work with multiple users with different methods even for the same program. Hence the same operation is done by different operating systems. | 1. Docker does not allow user to create re instances of operating system in the same computer, but it makes virtualization by making containers in the same system. Containers help users to work separately on different or same applications. The same operations are carried out by containers in the system. |
| 1. More power and resources are required by the systems using hypervisor as different programs are being run on the same system with different operating systems. | 1. Resource requirement is low as containers are working on the same operating system and this makes the system to share resources within the containers. |
| 1. Boot time is high for hypervisors as different operating systems are used. It may take some minutes to start the system and users can resume their work only after booting the machine. | 1. Boot time is low for dockers as all the containers work on the same machine. User can start the system in seconds and can start working on the same machine. |
| 1. Hypervisor works with host OS and guest OS which creates layers that run the hardware. We cannot create different instances for the same application in the system, but we can control the hardware and make the system work with both OS. | 1. Docker does not have an OS for itself and thus it creates instances and parameters by sitting on top of OS. This helps in modifying the instances if needed. It works solely on the host OS and does not control the hardware of the system. |
| 1. We cannot test the same application with different parameters in hypervisor as there is no container method available. This application needs to be developed and tested in the system. If the parameters must be changed, it should be modified in the same operating system itself. | 1. If the same application needs to be tested in the system with different instances, we can use containers as different parameters can be given to the application in the same container and can be tested at the same time. Dockers support this method of working which is called an agile model. |

In summary, a hypervisor is a software program that allows multiple operating systems to run on a single physical machine, while Docker is a containerization platform that allows developers to package and deploy their applications in lightweight containers that run on top of a host operating system.

1. **Difference between Container and Virtual Machines?**

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| **VIRTUAL MACHINE** | **VIRTUAL MACHINE** |
| 1. The hardware is virtualized to execute several Operating system instances with VMs | 1. Containers facilitate a way for virtualizing the operating system so that several workloads can execute on an individual operating system instance |
| 1. VM is managed via hypervisor and uses VM hardware. | 1. Containers give services of OS from an underlying host and also separate the applications utilizing virtual-memory hardware. |
| 1. VM facilitates the abstract machine which utilizes device drivers addressing an abstract machine. | 1. Container facilitates the abstract operating system. |
| 1. VM technologies are well-known within various embedded communities. | 1. The container has been grown on several clouds and servers with organizations like Google and Facebook. For example, all services of Google Docs get a container/instance. |
| 1. Higher overhead | 1. Lower overhead |
| 1. VM permits us for installing other software so virtually we control it as disputed to install the software on a computer directly. | 1. The containers are software that permits distinct application's functionalities independently. |
| 1. Applications executing on virtual machine system can execute distinct OS. | 1. Applications executing within the container environment contribute to an individual OS. |
| 1. VM facilitates a way for virtualizing any computer system. | 1. Container only virtualizes the OS. |
| 1. VMs have a large size. | 1. Containers are very light (some megabytes). |
| 1. VM runs in minutes due to its large size. | 1. Containers run in seconds. |
| 1. It utilizes a lot of memory of the system. | 1. Containers utilize very less system memory. |
| 1. It is highly secured. | 1. It is less secure. |