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Section : F

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Tutorial - 1

Unit - 1

- 1) Write a list of features on what you liked from these reference points

1. Redundancy and load balancing : The use of redundant instances across multiple availability zones and load balancing to distribute traffic helps ensure high availability and scalability.
2. Database Replication: Implementing a distributed database system with multi-region replication ensures data availability and disaster recovery capabilities.
3. Geographical distribution: Distributing components across multiple cloud regions and utilising global CDN.
4. Monitoring and alerting : Setting up comprehensive monitoring and automated alerts ensures timely detection & resolution of issues.
5. Regular testing & maintenance: conducting regular tests & drills, along with continuous refinement, helps validate & improve the effectiveness of high availability.

27) Do you want to add any more points to the given question? If yes, please mention them along with reference URL that you would have explored

1. Security measure: Implementing security audits / measures such as encryption, identity and access management to protect data from threats.
2. Disaster recovery planning: Developing a comprehensive disaster recovery plan including data backups, restoration procedures and failover strategies to ensure business continuity in the event of major disruption.
3. Scalability: Designing the architecture to scale dynamically based on demand, utilizing auto scaling groups and elastic load balancing to handle fluctuation in workload effectively.

References

1. aws.amazon.com / whitepapers / disaster-recovery - workload
2. cloud.google.com / architecture / planning-guide
3. learn.microsoft.com / azure / architecture / planning

3)

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25/25/2023
Date: _____ / ___ / ___

3) How would you propose to apply this idea and set of keywords : to suggest a solution for cloud computing lab tasks - auto evaluation through a cloud hosted submissions portal

1. Cloud based Submission portal : Develop a cloud hosted submission portal where students can upload their lab tasks or assignments
2. Redundancy and Load balancing : Deploy redundant instances of submission portal across multiple availability zones and establish reliability. Implement load balancing to distribute incoming submissions
3. Failover mechanisms : configure automated failover mechanisms for the submission portals such as auto recovery of failed instances and DNS failover to direct traffic to healthy instances
4. Automated Evaluation : Integrate automatic evaluation with system portal to provide instant feedback to students

Question -2

- a) What are full virtualization and para virtualization technologies with reference to cloud computing? Mention the example architectures for both these technologies.

Full virtualization:

- Uses a hypervisor to abstract and virtualize h/w
- allows multiple VMs to run independent OS
- ex: VMware ESXi, Microsoft Hyper-V, KVM

para Virtualization

- Guest OS interacts with hypervisor to improve performance
- Uses special API calls for communications
- ex: Xen, Oracle VM

- c) Is WSL a required dependency for Docker on Windows? Explain why/why not?

WSL is not a VM or container on windows. It's just a compatibility layer for running Linux binaries natively.

WSL provides Linux kernel interface through windows

WSL is not a required dependency for Docker on Windows

Docker for windows uses different components like Hyper-V and Windows containers to run containers natively on windows.

can be used for additional compatibility and development scenarios, but it's not mandatory for Docker functionality on windows.

b

- b> Linux Subsystem for windows - is it VM or a container running on windows?
- No, windows Subsystem for Linux (WSL) is not a VM but rather WSL is a compatibility layer for running linux binary executables natively on windows.
- Not a container either.
- It doesn't create a separate isolated environment in the same way containers do.

d>

why doesn't MacOS need any extra layer to run linux containers despite having differing kernel & recently CPU architectures?

MacOS uses the Hypervisor Framework specifically Hypervisor for Virtualization

Docker for Mac leverages this framework to create a lightweight Linux VM.

- VM abstracts differences in kernels & CPU architecture
- Linux containers run seamlessly on MacOS within this isolated virtualised environment

Shared Unix foundation: MacOS, Linux share core concepts

- system calls, functionality
- Docker containers are platform independent, encapsulating applications & dependencies, designed to run seamlessly on Mac OS
- Cross platform Compatibility

1. Write a list of features on what you liked

→ Full virtualization:

enables execution of guest OS but guests aren't aware that they are running in a virtual environment

- this raises many security concerns

→ WSL2 through offering compatibility & performance has disadvantages

→ Resource Intensive

→ Limited GUI support

WSL doesn't provide an isolated environment and hence is resource intensive

→ One disadvantage in macOS is it doesn't have separate virtualization like windows (WSL2)

2) Do you want to add any points? Mention them along with reference

→ Full virtualization isn't portable & compatible. But it's slow & less secure

Hence, can be used for simpler & smaller orgs (geekforgeeks.org)

→ WSL2 has faster performance and 100% system compatibility. But WSL1 can be used in the following scenarios

↳ WSL1 offers faster access to files on windows

↳ If we use cross computation of windows tools (learn.microsoft.com)

3. Compare WSL2 & KVM, write a short paragraph on relevant points

→ WSL2 and KVM are both virtualization technologies used to run linux based environments on host systems with different OS.

→ WSL2:

- provides a seamless integration of windows & linux kernels
- uses a lightweight virtualization to provide improved performance and compatibility.

→ KVM:

It's a full virtualization solution for linux based systems each user runs multiple guest vms with different OSs

It uses h/w virtualization extensions to provide isolation.
WSL2 improves performance by integrating a real Linux kernel with windows through Hyper technology