Cloud Computing Past Papers 2017

Short Questions

Q1: What is SLA? Also write the contents of this contract?

Ans: A service-level agreement (SLA) is a commitment between a service provider and a client. Particular aspects of the service ,quality, availability, responsibilities are agreed between the service provider and the service user.

Q2: Describe federated identify management?

Ans: A federated identity in information technology is the means of linking a person's electronic identity and attributes, stored across multiple distinct identity management systems. Federated identity is related to single sign-on (SSO), in which a user's single authentication ticket, or token, is trusted across multiple IT systems or even organizations.

Q3: What is the fundamental difference between the hosted and hypervisor virtual machine?

Ans: A hypervisor or virtual machine manager (VMM) is computer software, firmware or hardware that creates and runs virtual machines. A computer on which a hypervisor runs one or more virtual machines is called a host machine, and each virtual machine is called a guest machine. The hypervisor presents the guest operating systems with a virtual operating platform and manages the execution of the guest operating systems.

Q4: Define MSP model?

Ans: In managed service provider (MSP) model a company remotely manages a customer's IT infrastructure and/or end-user systems, typically on a proactive basis and under a subscription model.

Q5: What are the characteristics of fault tolerance system?

Ans: The basic characteristics of fault tolerance require:

No single point of failure

No single point of repair

Fault isolation to the failing component

Fault containment to prevent propagation of the failure Availability

In addition, fault tolerant systems are characterized in terms of both planned service outages and unplanned service outages. A five nines system would therefore statistically provide 99.999% availability. These are usually measured at the application level and not just at a hardware level.

Q6: How distributed management task force enables more effective management of IT systems worldwide?

Ans: The aim of DMTF is the exchange of management information in a platform-independent and technology-neutral way, streamlining integration and reducing costs by enabling end-to-end multi-vendor interoperability in management systems. The DMTF creates open manageability standards spanning cloud, virtualization, network, servers and storage.

Q7: Define open virtualization format?

Ans: Open Virtualization Format (OVF) is an open standard for packaging and distributing virtual appliances or, more generally, software to be run in virtual machines. The standard describes an "open, secure, portable, efficient and extensible format for the packaging and distribution of software to be run in virtual machines".

Q8: Differentiate between Zimbra and Zoho?

Ans: Zimbra is a software platform that allows you to share files and folders securely and communicate with team members all over the world. **Zoho** calendar allows you to schedule and manage your meetings and events across popular services such as Microsoft , outlook , or google calendar.

Q9: What is new NSSP?

Ans: The National Syndromic Surveillance Program (NSSP) promotes and advances development of a syndromic surveillance system for the timely exchange of syndromic data. These data are used to improve nationwide situational awareness and enhance responsiveness to hazardous events and disease outbreaks to protect America's health, safety, and security.

Q10: How the cloud services are measured?

Ans: Cloud technology is bringing in many benefits to the organizations and the services are measured in several ways. **Elasticity** cloud has the ability to create more resources to enhance performance for a single user or numerous users at a single point of time.

Q11: Why should one prefer public cloud over private cloud?

Ans: The main reason to choose public cloud is that you aren't responsible for any

of the management of a public cloud hosting solution. Your data is stored in the provider's data center and the provider is responsible for the management and maintenance of the data center. This type of cloud environment is appealing to many companies because it reduces lead times in testing and deploying new products.d

Q12: What is the difference between scalability and elasticity?

Ans: SCALABILITY is ability of a system to increase the workload on its current hardware resources (scale up).

ELASTICITY is ability of a system to increase the workload on its current and additional (dynamically added on demand) hardware resources (scale out).Elasticity is strongly related to deployed-on-cloud applications.

Q13: What are the different layers of cloud computing?

Ans: Cloud computing is composed of an assortment of layered components, beginning at the most basic physical layer of server infrastructure and storage and moving up through the network and application layers.

Q14: Define mobile platform virtualization?

Ans: Mobile virtualization uses a "hypervisor" as a central tool to run virtual devices. Multiple operating systems can be installed on the same mobile device to promote multi functionality. With mobile virtualization, the user's own personal device can run on one operating system and a company-issued device can run on another.

Q15: Write down the names of two SOAs?

Ans: A service can be implemented either in .Net or J2EE, and the application consuming the service can be on a different platform or language. Creative mash-ups like HousingMaps use two separate online services, GoogleMaps and www.craigslist.com, to display.

Q16: Name two collaboration applications used for mobile platforms?

Ans: Meebo IM , Box., Mango Suite Mobile. Yammer, Flowdock, GoToMeeting.

Q17: What is resilience?

Ans: resilience is the ability to provide and maintain an acceptable level of service in the face of faults and challenges to normal operation." Threats and challenges for services can range from simple misconfiguration over large scale natural disasters to targeted attacks.

Q18: What is the meaning of term "lack of global clock" in distributed computing?

Ans: Lack of global clock means:
I. No concept of global time
ii. It's difficult to reason about the temporal ordering of events
1. Cooperation between processes (e.g., producer/consumer, client/server)
2. Arrival of requests to the OS (e.g., for resources)
3. Collecting up to date global state.

Q19: What is meant by FDI?

Ans: Foreign Direct Investment (FDI) is fund flow between countries by which one can gain some benefit from their investment, while another can enhance the productivity and find a better position through performance. The effectiveness and efficiency depends upon the investor's perception: If an investment is long term, then it contributes positively towards the economy. If it is short term for the purpose of making profit, then its economic impact may be less significant.

Q20: Define risk awareness?

Ans: 20 Risk awareness is the recognition of the potential for hazards, risks, and incidents.

Q21: Define the term monolithic computing?

Ans: In monolitihic computing, a monolithic application describes a single-tiered software application in which the user interface and data access code are combined into a single program from a single platform. A monolithic application is self-contained, and independent from other computing applications. The design philosophy is that the application is responsible not just for a particular task, but can perform every step needed to complete a particular function.

Q22: Write down the two characteristics of distributed systems?

Ans: **Concurrency** the components of a distributed computation may run at the same time. **Independent failure modes** the components of a distributed computation and the network connecting them may fail independently of each other. **No global time.**

Q23: Differentiate replication transparency from failure transparency?

Ans: A distributed system often employs data replication to ensure a fast response from databases and to enable the system to be resilient to hardware errors. Replication transparency is the term used to describe the fact that the user should be unaware that data is replicated. failure transparency refers to the extent to which errors and subsequent recoveries of hosts and services within the system are invisible to users and applications.

Q24: Define simple message transfer protocol (SMTP)?

Ans: Simple Mail Transfer Protocol (SMTP) is an Internet standard for email transmission. Mail servers and other mail transfer agents use SMTP to send and receive mail messages on TCP port 25.

Q25: Define in brief how TLB helps MMU?

Ans: A translation look a side buffer (TLB) is a memory cache that is used to reduce the time taken to access a user memory location. It is a part of the chip's memory management unit (MMU). The TLB stores the recent translations of virtual memory to physical memory and can be called an address-translation cache.

Q26: What is Zimbra?

Ans: Zimbra is an enterprise-class email, calendar and collaboration solution built for the cloud, both public and private. With a redesigned browser-based interface, Zimbra offers the most innovative messaging experience available today, connecting end users to the information and activity in their personal clouds.

Q27: What is elastic IP addressing?

Ans: An Elastic IP address is a static IPv4 address designed for dynamic cloud computing. An Elastic IP address is associated with your AWS account. With an Elastic IP address, you can mask the failure of an instance or software by rapidly remapping the address to another instance in your account.

Subjective Part (16*13)

Q.2: Technology trends continue to increase the processing capabilities of mobile devices. The latest smartphones include up to 8 processing cores and often have fairly powerful GPUs as well. In spite of this, it may make sense to offload computation to the cloud or a cloudlet. Describe two circumstances under which it might be beneficial to offload application functionality from such a powerful smartphone?

Ans:

Q.3: Explain virtualization in detail and also discuss its various types along with pro and cons of each type?

Ans: Virtualization

In computing, **virtualization** refers to the act of creating a virtual (rather than

actual) version of something, including virtual computer
Zardware platforms, storage devices, and computer network resources. Virtualization began in the 1960s, as a method of logically dividing the system resources provided by mainframe computers between different applications. Since then, the meaning of the term has broadened. Virtualization lets you easily outsource your hardware and eliminate any energy costs associated with its operation. Although it may not work for everyone, however the efficiency, security and cost advantages are considerable for you to consider employing it as part of your operations. But whatever type of virtualization you may need, always look for service providers that provide straightforward tools to manage your resources and monitor usage, so that you don't have to spend a lot of time managing your virtual servers and virtualization can indeed be efficient for you.

What types of virtualization are there?

Virtualization can take many forms depending on the type of application use and hardware utilization. **The main types are listed below:**

Hardware Virtualization

Hardware virtualization also known as hardware-assisted virtualization or server virtualization runs on the concept that an individual independent segment of hardware or a physical server, may be made up of multiple smaller hardware segments or servers, essentially consolidating multiple physical servers into **virtual servers** that run on a single primary physical server. Each small server can host a virtual machine, but the entire cluster of servers is treated as a single device by any process requesting the hardware. The hardware resource allotment is done by the hypervisor. The main advantages include increased processing power as a result of maximized hardware utilization and application uptime.

Subtypes:

Full Virtualization – Guest software does not require any modifications since the underlying hardware is fully simulated.

Emulation Virtualization – The virtual machine simulates the hardware and becomes independent of it. The guest operating system does not require any modifications.

Paravirtualization – the hardware is not simulated and the guest software run their own isolated domains.

Pros

Using Virtualization for Efficient Hardware Utilization. Virtualization decreases

costs by reducing the need for physical hardware systems. You can allocate memory, space and CPU in just a second making you more self-independent from hardware vendors.

Software Virtualization

Software Virtualization involves the creation of an operation of multiple virtual environments on the host machine. It creates a computer system complete with hardware that lets the guest operating system to run. For example, it lets you run Android OS on a host machine natively using a Microsoft Windows OS, utilizing the same hardware as the host machine does.

Subtypes:

Operating System Virtualization – hosting multiple OS on the native OS.
Application Virtualization – hosting individual applications in a virtual environment separate from the native OS.
Service Virtualization – hosting specific processes and services related to a particular application.

Memory Virtualization

Physical memory across different servers is aggregated into a single virtualized memory pool. It provides the benefit of an enlarged contiguous working memory. You may already be familiar with this, as some OS such as Microsoft Windows OS allows a portion of your storage disk to serve as an extension of your RAM.

Subtypes:

Application-level control – Applications access the memory pool directly.
Operating system level control – Access to the memory pool is provided through an operating system.

Storage Virtualization

Multiple physical storage devices are grouped together, which then appear as a single storage device. This provides various advantages such as homogenization of storage across storage devices of multiple capacity and speeds, reduced downtime, load balancing and better optimization of performance and speed. Partitioning your hard drive into multiple partitions is an example of this virtualization.

Subtypes:

Block Virtualization – Multiple storage devices are consolidated into one.
File Virtualization – Storage system grants access to files that are stored over

multiple hosts.

Data Virtualization

It lets you easily manipulate data, as the data is presented as an abstract layer completely independent of data structure and database systems. Decreases data input and formatting errors.

Network Virtualization

In network virtualization, multiple sub-networks can be created on the same physical network, which may or may not is authorized to communicate with each other. This enables restriction of file movement across networks and enhances security, and allows better monitoring and identification of data usage which lets the network administrator's scale up the network appropriately. It also increases reliability as a disruption in one network doesn't affect other networks, and the diagnosis is easier.

Subtypes:

Internal network: Enables a single system to function like a network.

External network: Consolidation of multiple networks into a single one, or segregation of a single network into multiple ones.

Desktop Virtualization

This is perhaps the most common form of virtualization for any regular IT employee. The user's desktop is stored on a remote server, allowing the user to access his desktop from any device or location. Employees can work conveniently from the comfort of their home. Since the data transfer takes place over secure protocols, any risk of data theft is minimized.

Server virtualization

Server virtualization is actually not as new as some people might think. It has by around for many years. The difference today is that server virtualization has increasingly gotten cheaper, easier to use, and the companies that provide the technology are offering more services. Essentially, server virtualization is in the name: making the server virtual. A better way of understanding this is it partitions a physical server "into a number of small, virtual servers with the help of virtualization software." In these virtual servers, there is the possibility of running multiple operating system instances at the same time, greatly reducing the cost of buying individual servers.

Pros of server virtualization

Reduced costs

Automation

Backup and recovery

Cons of server virtualization
High upfront costs
Security
Time spent learning

Q.4: Discuss key characteristics of cloud computing with appropriate examples, also elaborate main challenges for the cloud?

Ans: The special publication includes the five essential **characteristics of cloud computing:**

On-demand self-service: A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access: Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., **mobile** phones, tablets, laptops and workstations).

Resource pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state or datacenter). Examples of resources include storage, processing, memory and network bandwidth.

Rapid elasticity: Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth and active user accounts). Resource usage can be monitored, controlled and reported, providing transparency for the provider and consumer.

Cloud Computing Challenges

1: Security

Since the advent of the public cloud, enterprises have worried about potential security risks, and that hasn't changed. In the Right Scale survey, it was the number one challenge cited by respondents, with 77 percent saying that cloud security is a challenge, including 29 percent who called it a significant challenge.

2: Managing Cloud spending

As previously mentioned, the Right Scale report found that for some organizations managing cloud spending has overtaken security as the top cloud computing challenge. By their own estimates, companies are wasting about 30 percent of the money they spend on the cloud. Organizations make a number of mistakes that can help drive up their costs. Often, developers or other IT workers spin up a cloud instance meant to be used for a short period of time and forget to turn it back off. And many organizations find themselves stymied by the inscrutable cloud pricing schemes that offer multiple opportunities for discounts that organizations might not be utilizing. Multiple technological solutions can help companies with cloud cost management challenges. For example cloud cost management solutions, automation, containers, serverless services, autoscaling features and the many management tools offered by the cloud vendors may help reduce the scope of the problem. Some organizations have also found success by creating a central cloud team to manage usage and expenses.

3: Lack of Resources/Expertise

Lack of resources and expertise ranked just behind security and cost management among the top cloud implementation challenges in the RightScale survey. Nearly three-quarters (73 percent) of respondent listed it as a challenge with 27 percent saying it was a significant challenge.

While many IT workers have been taking steps to boost their cloud computing expertise, employers continue to find it difficult to find workers with the skills they need. And that trend seems likely to continue. The Robert Half Technology 2018 Salary Guide noted, "Technology workers with knowledge of the latest developments in cloud, open source, mobile, big data, security and other technologies will only become more valuable to businesses in the years ahead. Many companies are hoping to overcome this challenge by hiring more workers with cloud computing certifications or skills. Experts also recommend providing training to existing staff to help get them up to speed with the technology.

4: Governance

Governance and control were fourth in the list of cloud computing challenges in the Right Scale survey with 71 percent of respondents calling it a challenge, including 25 percent who see it as a significant challenge. In this case, one of the greatest benefits of cloud computing — the speed and ease of deploying new computing resources — can become a potential downfall. Many organizations lack visibility into the "shadow IT" used by their employees, and governance becomes particularly challenging in hybrid cloud and multi-cloud environments.

Experts say organizations can alleviate some of these cloud computing management issues by following best practices, including establishing and enforcing standards and policies. And multiple vendors offer cloud management software to simplify and automate the process.

5: Compliance

The recent flurry of activity surrounding the EU General Data Protection Regulation (GDPR) has returned compliance to the forefront for many enterprise IT teams. Among those surveyed by Right Scale, 68 percent cited compliance as a top cloud computing challenge, and 21 percent called it a significant challenge. Interestingly, one aspect of the GDPR law may make compliance easier in the future. The law requires many organizations to appoint a data protection officer who oversees data privacy and security. Assuming these individuals are well-versed in the compliance needs for the organizations where they work, centralizing responsibility for compliance should help companies meet any legal or statutory obligations.

6: Managing Multi-Cloud Environments

Most organizations aren't using just one cloud. According to the Right Scale findings, 81 percent of enterprises are pursuing a multi-cloud strategy, and 51 percent have a hybrid cloud strategy (public and private clouds integrated together). In fact, on average, companies are using 4.8 different public and private clouds. Multi-cloud environments add to the complexity faced by the IT team. To overcome this challenge, experts recommend best practices like doing research, training employees, actively managing vendor relationships and re-thinking processes and tooling.

7: Migration

While launching a new application in the cloud is a fairly straightforward process, moving an existing application to a cloud computing environment is far more difficult. A Dimensional Research study sponsored by Velostrata found that 62 percent of those surveyed said their cloud migration projects were more difficult than expected. In addition, 64 percent of migration projects took longer than expected, and 55 percent exceeded their budgets. More specifically, many of the companies migrating applications to the cloud reported time-consuming trouble-shooting (47 percent), difficulty configuring security (46 percent), slow data migration (44 percent), trouble getting migration tools to work properly (40 percent), difficulty syncing data before cutover (38 percent) and downtime during migration (37 percent). To overcome those challenges the IT leaders surveyed said they wished they had performed more pre-migration testing (56 percent), set

a longer project timeline (50 percent), hired an in-house expert (45 percent) and increased their budgets (42 percent).

8: Vendor Lock-In

Currently, a few vendors, namely Amazon Web Services, Microsoft Azure, Google Cloud Platform and IBM Cloud, dominate the public cloud market. For both analysts and enterprise IT leaders, this raises the specter of vendor lock-in. In a Strato scale Hybrid Cloud Survey, more than 80 percent of those surveyed expressed moderate to high levels of concern about the problem. "The increasing dominance of the hyperscale IaaS providers creates both enormous opportunities and challenges for end users and other market participants," said Sid Nag, research director at Gartner. "While it enables efficiencies and cost benefits, organizations need to be cautious about IaaS providers potentially gaining unchecked influence over customers and the market. In response to multi cloud adoption trends, organizations will increasingly demand a simpler way to move workloads, applications and data across cloud providers' IaaS offerings without penalties." Experts recommend that before organizations adopt a particular cloud service they consider how easy it will be to move those workloads to another cloud should future circumstances warrant.

9: Immature Technology

Many cloud computing services are on the cutting edge of technologies like artificial intelligence, machine learning, augmented reality, virtual reality and advanced big data analytics. The potential downside to access to this new and exciting technology is that the services don't always live up to enterprise expectations in terms of performance, usability and reliability. In the Teradata survey, 83 percent of the large enterprises surveyed said that the cloud was the best place to run analytics, but 91 percent said analytics workloads weren't moving to the cloud as quickly as they should. Part of the problem, cited by 49 percent of respondents, was immature or low-performing technology. And unfortunately, the only potential cures for the problem are to adjust expectations, try to build your own solution or wait for the vendors to improve their offerings.

10: Integration

Lastly, many organizations, particularly those with hybrid cloud environments report challenges related to getting their public cloud and on-premise tools and applications to work together. In the Teradata survey, 30 percent of respondents said connecting legacy systems with cloud applications was a barrier to adoption. Similarly, in a Software One report on cloud spending, 39 percent of those surveyed said connecting legacy systems was one of their biggest concerns when

using the cloud. This challenge, like the others mentioned in this article, is unlikely to disappear any time in the near future. Integrating legacy systems and new cloud-based applications requires time, skill and resources. But many organizations are finding that the benefits of cloud computing outweigh the potential downside of the technology. Look for the trend toward cloud adoption to continue, despite the potential cloud computing challenges.

Q.5: Differentiate among CaaS, SaaS, IaaS, and PaaS with suitable example or case study?

Ans:

Q.6: Why it is necessary to have standards of application development and security? Explain in light of common standards in cloud computing?

Ans:

Q.7: Operating systems use privileged instructions to manage hardware resources like page tables and I/O devices. When executed with a VM on a modern hypervisor providing full hardware virtualization, what happens when a guest OS executes a privileged instruction of this sort? Explain your answer with suitable example.

Ans:

Q.8: Explain privacy in cloud in detail moreover elaborate encrypted federation vs trusted federation?

Ans:

Q.9: Write a brief note on web services delivered from the cloud with appropriate examples.

Ans:

Q.10: What techniques are used for handling sensitive and privileged instructions to virtualize the CPU on the *86 architecture?

Ans:

Q.11: Highlight main features of MSP model to cloud, Cloud datacenters and role of open source software in datacenters?

Ans: