Session 3

Managing and migrating application to the Cloud

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Managing the Cloud

- Cloud management is aimed at efficiently managing the cloud so as to maintain the QoS
- Cloud management can be divided into two parts
  - Managing the infrastructure of the cloud
  - Managing the cloud application

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Managing the Cloud Infrastructure

- The infrastructure of the cloud is considered to be the backbone of the cloud
- If the infrastructure is not properly managed, then the whole cloud can fail and QoS would be adversely affected
- The core of cloud management is resource management such as
  - resource scheduling
  - provisioning
  - load balancing.

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Resources scheduling

- Deciding how to allocate resources of a system, such as CPU cycles, memory, secondary storage space, I/O and network bandwidth, between users and tasks.

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Provisioning

- In resource provisioning for cloud computing, an important issue is how resources may be allocated to an application mix such that the service level agreements (SLAs) of all applications are met.

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Load balancing

- Google Cloud Platformm offers server-side load balancing so you can distribute incoming traffic across multiple virtual machine instances. Load balancing provides the following benefits
  - Scale your application
  - Support heavy traffic
  - Detect and automatically remove unhealthy virtual machine instances. Instances that become healthy again are automatically re-added
  - Route traffic to the closest virtual machine

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Managing the Cloud Application

- The shift or moving the applications to the cloud environment brings new complexities.
- Applications become more composite and complex, which requires leveraging not only capabilities like storage and database offered by the cloud providers but also third-party SaaS capabilities like e-mail and messaging
- These cloud-based monitoring and management services can collect a multitude of events, analyze them, and identify critical information that requires additional remedial actions like adjusting capacity or provisioning new services

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Migrating Application to Cloud

- Cloud migration encompasses moving one or more enterprise applications and their IT environments from the traditional hosting type to the cloud environment, either public, private, or hybrid
- This activity comprises, of different phases like evaluation, migration strategy, prototyping, provisioning, and testing

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Evaluation

- Evaluation is carried out for all the components like current infrastructure and application architecture, environment in terms of compute, storage, monitoring, and management, SLAs, operational processes, financial considerations, risk, security, compliance, and licensing needs are identified to build a business case for moving to the cloud

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Migration strategy

- Based on the evaluation, a migration strategy is drawn
  - A hotplug strategy is used where the applications and their data and interface dependencies are isolated and these applications can be operationalized all at once.
  - A fusion strategy is used where the applications can be partially migrated; but for a portion of it, there are dependencies based on existing licenses, specialized server requirements like mainframes, or extensive interconnections with other applications.

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Prototyping

- Migration activity is preceded by a prototyping activity to validate and ensure that a small portion of the applications are tested on the cloud environment with test data setup

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Provisioning

- Pre migration optimizations identified are implemented. Cloud servers are provisioned for all the identified environments, necessary platform softwares and applications are deployed, configurations are tuned to match the new environment sizing, and databases and files are replicated. All internal and external integration points are properly configured. Web services, batch jobs, and operation and management software are set up in the new environments.

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Testing

- Post migration tests are conducted to ensure that migration has been successful. Performance and load testing, failure and recovery testing, and scale-out testing are conducted against the expected traffic load and resource utilization levels

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Approaches for Cloud Migration

- The following are the four broad approaches for cloud migration that have been adopted effectively by vendors:
  - *Migrate existing applications*
  - *Start from scratch*
  - *Separate company*
  - *Buy an existing cloud vendor*

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Migrate existing applications

- Rebuild or rearchitect some or all the applications, taking advantage of some of the virtualization technologies around to accelerate the work
- It requires top engineers to develop new functionality
- This can be achieved over the course of several releases with the timing determined by customer demand

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Start from scratch

- Rather than cannibalize sales, confuse customers with choice, and tie up engineers trying to rebuild existing application, **it may be easier to start again**.

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Separate company

- One may want to create a whole new company with separate brand, management, R&D, and sales
- The separate company may even be a subsidiary of the existing company
- What is important is that the new company can act, operate, and behave like a cloud-based start-up

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Buy an existing cloud vendor

- For a large established vendor, buying a cloud-based competitor achieves two things
  - Firstly, it removes a competitor
  - Secondly, it enables the vendor to hit the ground running in the cloud space
- The risk of course is that the innovation, drive, and operational approach of the cloud-based company are destroyed as it is merged into the larger acquirer