CE644 Cloud Computing and Applications

Cloud management

- The cloud management is responsible for **managing the infrastructure** of the cloud.
- The term cloud management is the name given to the **collection of software and technologies** that is used to **govern and monitor** the various cloud applications.
- Cloud management ensures that the cloud services are **running optimally** and that it interacts with its co-applications.
- There are various cloud management interfaces available such as the **enStratus Enterprise Cloud Management Solution**, which provides the **provisioning, management, and automation of application in major private and public clouds**.
- One of the **cloud management reference architecture** introduced by the Distributed Management Task Force (DMTF) is shown in Figure 14.4.

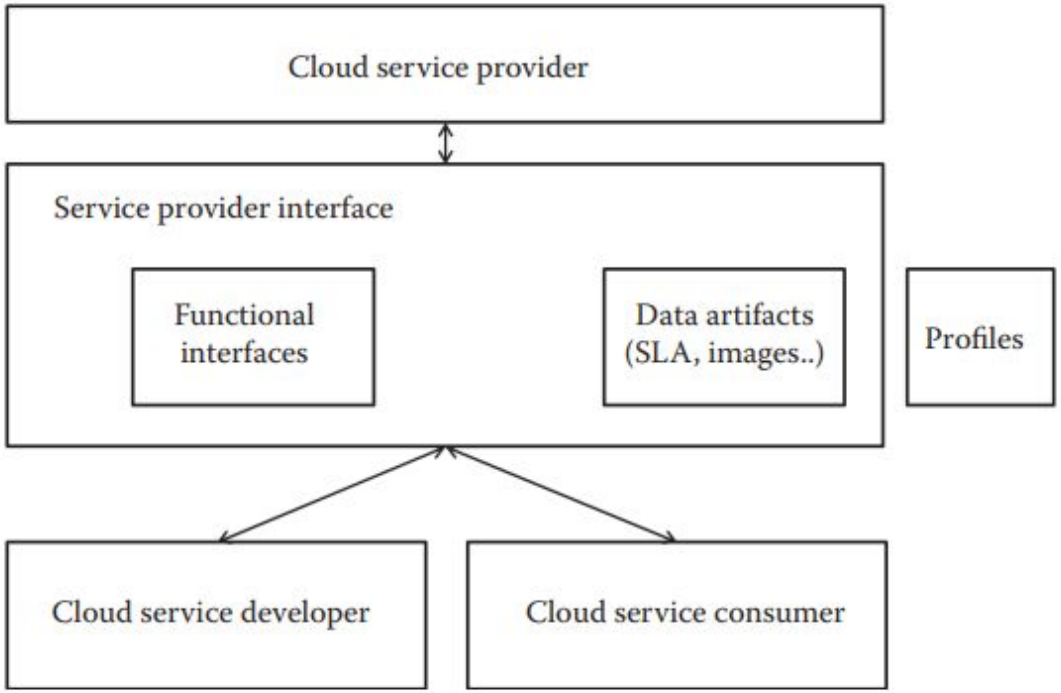

FIGURE 14.4
Cloud service reference architecture.

The functional components of the architecture are as follows:

1. Cloud service developer: Designs, implements, and maintains service templates.
2. Cloud service consumer: Provides access to services for service users.
3. Cloud service provider: Supplies cloud services to internal or external consumers.
4. Data artifacts: Control and status elements exchanged across the provider interface.
5. Provider interface: Interface that allows consumers to access and monitor the contracted services.
6. Profiles: Specification that defines the associations, methods, and properties for a management domain.

Cloud management can be divided into two parts:

1. Managing the infrastructure of the cloud
2. Managing the cloud application

Managing the Cloud Infrastructure

- The core of cloud management is **resource management**.
- Resource management involves several internal tasks such as **resource scheduling, provisioning, and load balancing.**
- Poor resource management may lead to several inefficiencies in terms of i)**performance, ii)functionality, and iii) cost (ISSUES)**.
- If a resource is not efficiently managed, the **performance** of the whole system is affected.
- **Performance** is the most important aspect of the cloud, because everything in the cloud is dependent on the SLAs and the SLAs can be satisfied only if performance is good.
- Similarly, the basic **functionality** of the cloud should always be provided and considered at any cost.
- The **cost** is a very important criterion as far as the business prospects of the cloud are concerned.
- On the part of the service providers, if they incur **less cost for managing the cloud**, then they would try to **reduce the cost** so as **to get a strong user base**. Hence, a **lot of users would use the services, improving their profit margin.**

- Other higher level issues are **power consumption and optimization of multiple objectives** to further reduce the cost.
- Approaches such as **consolidation of server and storage workloads**. Consolidation would **reduce the energy consumption and in some cases would increase the performance of the cloud**. ***Server consolidation*** *by definition is an approach to the* ***efficient usage of computer server resources in order to reduce the total number of servers or server locations that an organization requires.***
- The previously discussed prospects are mostly suitable for IaaS. Similarly, there are **different management methods that are followed for different types of service delivery models**.

- All the management methodologies are based on **load fluctuations**.
- **Load fluctuation** is the point where the workload of the system changes continuously.
- Load fluctuation can be divided into **two types**: **predictable and unpredictable**. Predictable load fluctuations are easy to handle. The **cloud can be preconfigured** for handling such kind of fluctuations. Whereas unpredictable load fluctuations are difficult to handle, ironically this is one of the reasons why cloud is preferred by several users.

- **Cloud governance** is different from cloud management. Governance in general is a term in the corporate world that generally involves the ***process of creating value to an organization by creating strategic objectives that will lead to the growth of the company and would maintain a certain level of control over the company***. Similar to that, here cloud organization is involved.
- There are several aspects of cloud governance out of which **SLAs** are one of the important aspects.

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.
- Cloud application management is to **address these issues and propose solutions** to make it possible to have insight into the application that runs in the cloud, as well as implement or enforce enterprise policies like governance and auditing and environment management while the application is deployed in the cloud.

Managing the Cloud Application

- **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.**

- Additionally, application management has to be supported with tools and processes required **for managing other environments that might coexist, enabling efficient operations.**

MIGRATING APPLICATION TO CLOUD

- Traditional hosting to cloud hosting
- Opportunity to reduce costs incurred on applications
- Different phases

PHASES OF CLOUD MIGRATION

- EVALUATION
- MIGRATION STRATEGY
- PROTOTYPING
- PROVISIONING
- TESTING

APPROACHES FOR CLOUD MIGRATION

- MIGRATE EXISTING APPLICATIONS
- START FROM SCRATCH
- SEPARATE COMPANY
- BUY AN EXISTING CLOUD VENDOR