1. The fundamentals of cloud computing

What is cloud computing ?

“Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of config-urable computing resources (e.g., networks, servers, storage, applications, andservices) that can be rapidly provisioned and released with minimal manage-ment effort or service provider interaction.

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.

The potential for cost saving is the major reason of cloud services adoption by many organizations. Cloud computing gives the freedom to use services as per the requirement and pay only for what you use. Due to cloud computing it has become possible to run IT operations as a outsourced unit without much in-house resources.

Following are the benefits of cloud computing:

-Lower IT infrastructure and computer costs for users

-Improved performance

-Fewer Maintenance issues

-Instant software updates

-Improved compatibility between Operating systems

-Backup and recovery

-Performance and Scalability

-Increased storage capacity

-Increase data safety

Cloud Computing Deployment Models

Cloud deployment models indicate how the cloud services are made available to users. The four deployment models associated with cloud computing are as follows:

* Public cloud As the name suggests, this type of cloud deployment model supports all users who want to make use of a computing resource, such as hardware (OS, CPU, memory, storage) or software (application server, database) on a subscription basis. Most common uses of public clouds are for application development and testing, non-mission-critical tasks such as file-sharing, and e-mail service.
* Private cloud True to its name, a private cloud is typically infrastructure used by a single organization. Such infrastructure may be managed by the organization itself to support various user groups, or it could be managed by a service provider that takes care of it either on-site or off-site. Private clouds are more expensive than public clouds due to the capital expenditure involved in acquiring and maintaining them. However, private clouds are better able to address the security and privacy concerns of organizations today.
* Hybrid cloud In a hybrid cloud, an organization makes use of interconnected private and public cloud infrastructure. Many organizations make use of this model when they need to scale up their IT infrastructure rapidly, such as when leveraging public clouds to supplement the capacity available within a private cloud. For example, if an online retailer needs more computing resources to run its Web applications during the holiday season it may attain those resources via public clouds.
* Community cloud This deployment model supports multiple organizations sharing computing resources that are part of a community; examples include universities cooperating in certain areas of research, or police departments within a county or state sharing computing resources. Access to a community cloud environment is typically restricted to the members of the community.

How it is popular nowadays

Data and services become far more flexible when used with cloud computing. That yields powerful advantages — such as these excellent examples:

* Cost savings: In many cases, the cost of buying hardware for storage, or single user licenses for software downloads, is significantly higher than getting the same features through cloud computing. Businesses have saved a lot of money by switching to virtual setups — although it isn’t always guaranteed.
* Moving tasks offsite: A reliable cloud provider will take care of server maintenance and data management, which means local IT teams don’t have to worry about it (as much).
* Speed: Cloud speeds depend a lot on internet connections and server uptime, but accessing cloud services is generally a lot easier for companies, especially if their local devices might struggle to run that software all on their own. This leads to more efficient work around the office or at home.
* Security: For smaller companies in particularly, cloud computing allows them to use more secure services and storage than they would be able to manage on their own — as long as they pick a reliable provider that provides up-to-date patches. And even consumers can appreciate the security benefits of being able to back up data to the cloud whenever they want.
* Scalability: It’s relatively simple to purchase more cloud capabilities as needed, or downside when necessary. This allows businesses to grow with their customer base or update their tech without investing money in all-new hardware and local systems. It also allows companies to offer services more easily to their customers, like Apple and iCloud, or Microsoft and Xbox Live.

Cloud Service model

SaaS

SaaS or Software as a Service is a model that gives quick access to cloud-based web applications. The vendor controls the entire computing stack, which you can access using a web browser. These applications run on the cloud and you can use them by a paid licensed subscription or for free with limited access.

SaaS does not require any installations or downloads in your existing computing infrastructure. This eliminates the need for installing applications on each of your computers with the maintenance and support taken over by the vendor. Some known example of SaaS includes Google G Suite, Microsoft Office 365, Dropbox etc.

IaaS

IaaS or Infrastructure as a Service is basically a virtual provision of computing resources over the cloud. An IaaS cloud provider can give you the entire range of computing infrastructures such as storage, servers, networking hardware alongside maintenance and support.

Businesses can opt for computing resources of their requirement without the need to install hardware on their premises. Amazon Web Services, Microsoft Azure, and Google Compute Engine are some of the leading IaaS cloud service providers.

PaaS

Platform as a Service or PaaS is essentially a cloud base where you can develop, test and organize the different applications for your business. Implementing PaaS simplifies the process of enterprise software development. The virtual runtime environment provided by PaaS gives a favorable space for developing and testing applications.

The entire resources offered in the form of servers, storage and networking are manageable either by the company or a platform provider. Google App Engine and AWS Elastic Beanstalk are two typical examples of PaaS. PaaS is also subscription based that gives you flexible pricing options depending on your business requirements.

Order management application

Phases of migrating

Valuation

* + Current infrastructure? Modules/Components
  + OS(computer system) Windows OS, PHP, MySQL
  + Storage
  + Financial
  + Risks
  + Security

Migration strategy

* + Hotplug strategy(once)
  + Fusion strategy(patial)

Prototyping

Provisioning

* All internal and extenal integration points are properly configured.
* Web services, batch job and
* Operation and management software are set up in the new environment

Testing

Test the environment

1. propose solution

• ATN system

• advantages and disadvantages for ATN System

• solution for ATN with Cloud computing

cloud environment

design a database for order management System of ATN

implement website with several

create order management system for ATN

ERD:

 Supplier(SupplierID(PK),Name, Address)

 Category

 Product(ProductID,ProductName,…,SupplierID(FK))

 Customer

 Order

 OrderDetail

 Agency(agency quản lý nhiều order)

Web app:

Agency login page

(Optional) Registration page

(Optional) Agency can change personal information>>>Agency page

After login successfully

List of available products>>> product list page

List all of order(paging)>>>Order list page

View the details of an specific order (ID)>>> Order detail page

Create an order form >>> Create new order page

Report- Monthly

Web application for online shopping cart:

Guest:

Insert, delete, update, view products (by category name),

choose the product to shopping cart.

Customer-register an account to become member of ATN online system.

Agency members