

Chapter 20

Fog vs. Cloud Computing Architecture

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ABSTRACT

Cloud computing has emerged as a new technology that allows the users to acquire resources at anytime, anywhere by connecting with internet. It provides the options to users for renting of infrastructure, storage space, and services. One service issue that affects the QoS of cloud computing is network latency while dealing with real-time application. In this, the user interacts directly with application but delays in receiving the services, and jitter delay will encourage the user to think about this. In today's world, clients are moving towards the IoT techniques, enabling them to connect all things with internet and get their services from cloud. This advancement requires introduction of new technology termed as "fog computing." Fog computing is an extension of cloud computing that provides the service at the edge of the network. Its proximity to end users, mobility support, and dense distribution reduces the service latency and improves QoS. This fog model provides the prosperity for advertisement and entertainment and is well suited for distributed data model.

INTRODUCTION

Cloud Architecture

Cloud computing enables the user to access their required resources on demand with lower cost at any-time by just connecting with internet. Depending upon the types of services it offered and its existence, along with different entities involvement, cloud architecture is defined under two categories as – 1) Deployment model and 2) Development model, as shown in Figure 1.

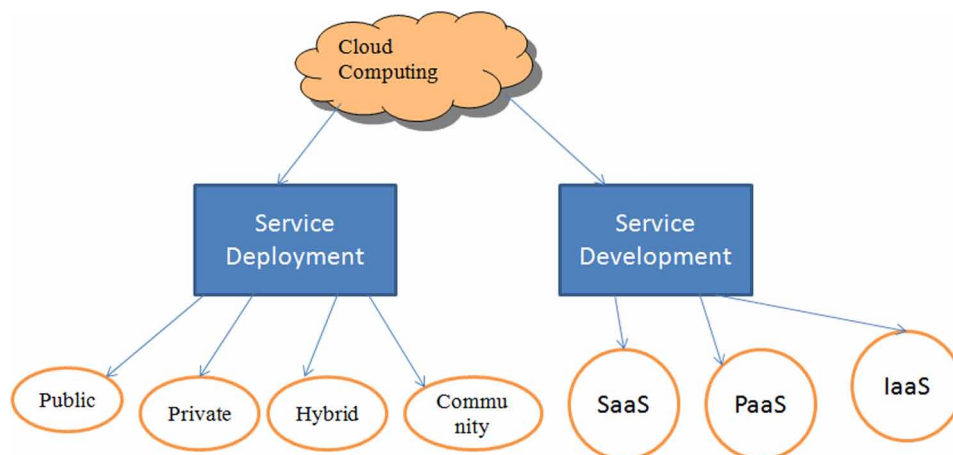
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Deployment Model

In deployment model, cloud can be categorized into public, private, hybrid and community cloud. These all deployment model are differing on the basis of availability of the resources to the user.

1. **Public Cloud:** This cloud is one which allows the general public to access the cloud computing data or resources and infrastructure over a public network. It is generally owned by the organization which serves a diverse pool of clients by selling their cloud services. A public cloud allows all the users to access the data provided by it without any firewall implementation. For example- Amazon Elastic Compute Cloud (EC2), Windows Azure etc. for end users, the public cloud provide best economic of scale i.e., inexpensive as all the hardware, bandwidth costs and application are covered by the provider.
2. **Private Cloud:** A private cloud is owned by a particular organization and only the users belong to that organization is allowed to access the resources under the firewall maintenance. It is generally managed either by a third party or the cloud consumer organization. It can be hosted either outside organization (outsourced private cloud) or under the organization's premises (on- site private cloud). These can be little expensive which includes moderate economic scale. Thus, it is not usually a good option for small to medium scale organization, only applicable for large organization.
3. **Community Cloud:** A community cloud provide resources to a group of users which share a common features such as their policy, mission, security requirement etc. a user is allowed to access the resources situated at local cloud as well as other participating organization through the connection established between them. As similar to the private cloud, a community cloud may be managed either by a third party or organization itself, and can be implemented on customer premises (i.e., on site community cloud) or outsources to a hosting company (i.e., outsourced community cloud) (Charlton, 2008).
4. **Hybrid Cloud:** A hybrid cloud is a combination of two or more distinct cloud community which is bound together based on some proprietary technology or standardization for enable the data application portability.

Figure 1. Cloud Computing Reference Architecture



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