Mata Kuliah "Cloud Computing/ Komputasi diAwan"

Slide :1

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Dosen : Bambang S, S.Kom, MM, M.Kom
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BNSP : ICT Project Manager , IT Audit , IT Network Designer

Buku Panduan/ Referensi :

1. **Handbook of Cloud Computing (**Springer, Editor Borko Furht, Armando Escalante DOI 10.1007./978-1-4419-6524-0)
2. **Essential of Cloud Computing (K. Chandrasekaran)**.

Penunjang :

1. Buku-buku lain yang terkait dengan mata kuliah Komputasi Awan (cloud Computing) di Perpustakaan.
2. Majalah, artikel, jurnal-jurnal yang masih relevan dengan Komputasi Awan baik dalam bentuk cetakan maupun bersumber dari internet.

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Tujuan Umum :

- Agar Mahasiwa dapat mengetahui serta memahami konsep Cloud Computing (komputasi diawan) bekerja, manfaat serta jenis-2 nya

- Mengetahui & Menggunakan tools yang berhubungan dengan Cloud Computing

Sistem Penilaian

- Etika : 10 %
- Absensi : 15%
- Tugas : 20% (Kelompok & Pribadi)
- UTS : 25%
- UAS : 30%

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www.ecampus.ipem.ac.id

Ada pertanyaan ?

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Definiton of Cloud Computing?

◉ Cloud computing means storing and accessing data and programs over the Internet from a remote location or computer instead of our computer's hard drive (cloud computing can be done anywhere, anytime, and by any device.) (K. Chandrasekaran)

◉ Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (National Institute of Standards and Technology (NIST)
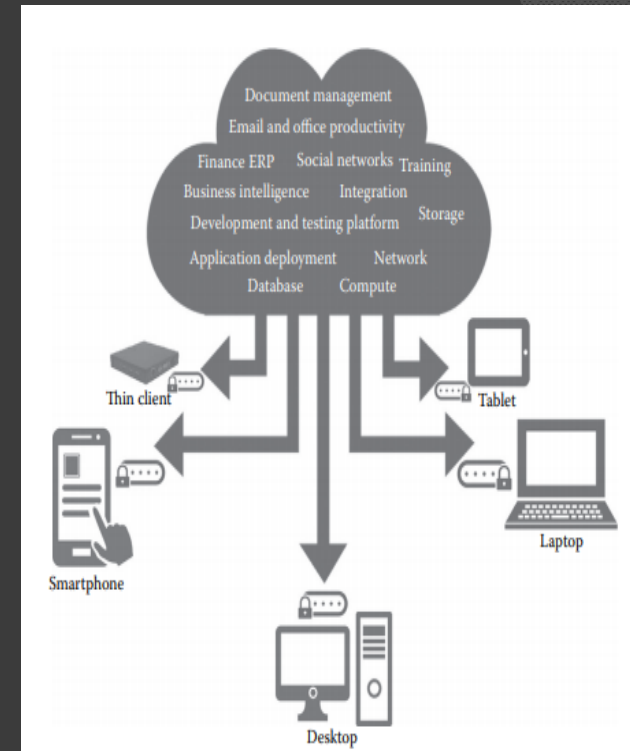
Motivation for Cloud Computing?

1. The users who are in need of computing are expected to invest money (high investment) on computing resources such as hardware, software, networking, and storage; (keep these (resources) in their premises, and maintain and make it operational)
2. This phenomenon can be viewed as capital expenditure (Capex)
3. Convenience and reliability (example : in the past, if we wanted to bring a file, we would have to save it to a Universal Serial Bus (USB) flash drive, external hard drive, or compact disc (CD) and bring that device to a different place)
4. It's easier to share a file

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Principles of Cloud computing ?

principles put forth by NIST describe :

1. the five essential characteristic features that promote cloud computing,
2. the four deployment models that are used to narrate the cloud computing opportunities for customers while looking at architectural models, and
3. the three important and basic service offering models of cloud computing.

1. the five essential characteristic features that promote cloud computing . Readers can note the word essential, which means that if any of these characteristics is missing, then it is not cloud computing :

   a. 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's provider)

   b. 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, laptops, and personal digital assistants [PDAs]).

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Principles of Cloud computing ?
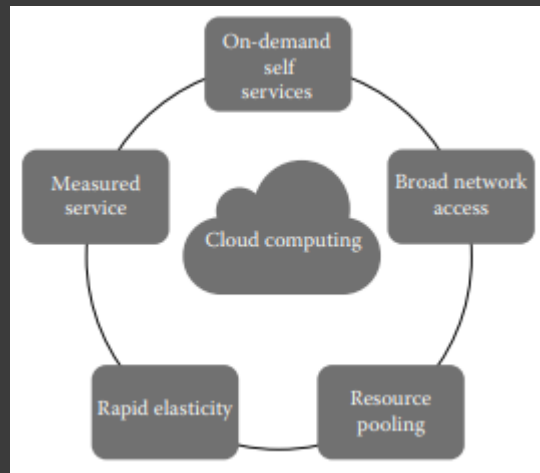
3. **Elastic resource pooling**: The provider's computing resources are pooled to serve multiple consumers using a multitenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.
4. **Rapid elasticity**: Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in.
5. **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).
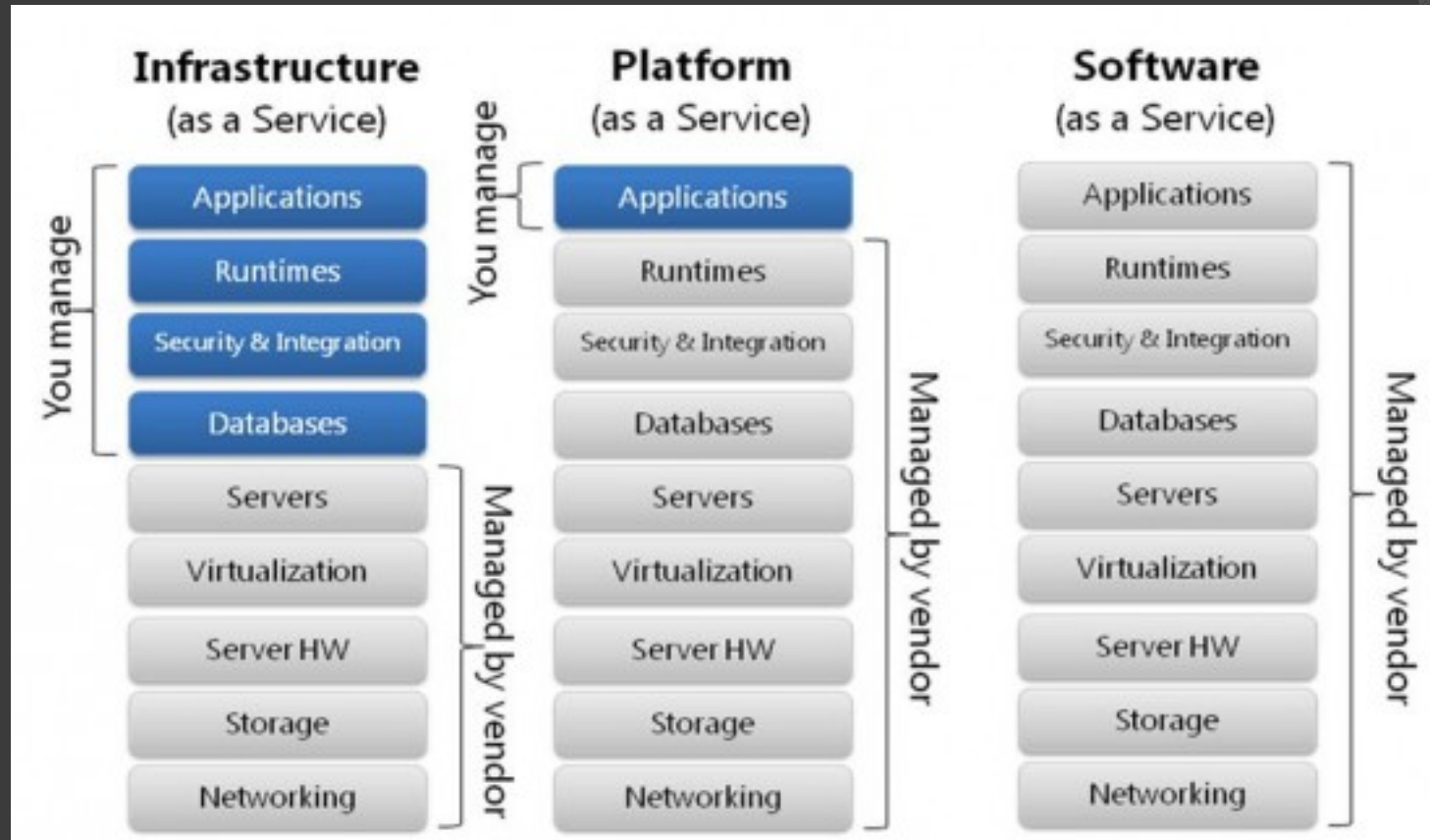
Three Service Offering Models

1. Cloud SaaS (Software as a Service) : The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure, including network, servers, operating systems, storage, and even individual application capabilities, with the possible exception of limited user-specific application configuration settings. (Example : customer relationship management (CRM), business intelligence analytics, and online accounting software)
2. Cloud PaaS (Platform as a services): The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. (Examples of PaaS providers include Google App Engine and Microsoft Azure Services, Facebook, AWS.)
3. Cloud IaaS (Infrastructure as a service) : The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources on a pay-per-use basis where he or she is able to deploy and run arbitrary software, which can include operating systems and applications. (Example : Amazon Web Services (AWS) is a popular example of a large IaaS provider)
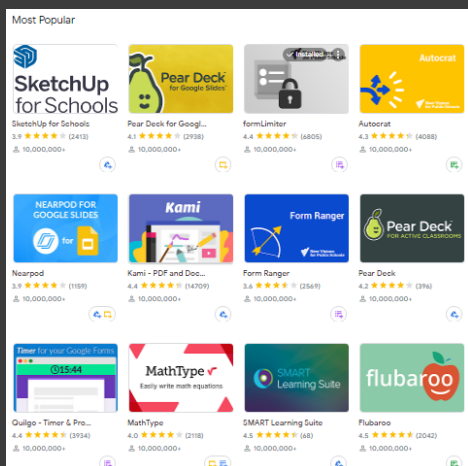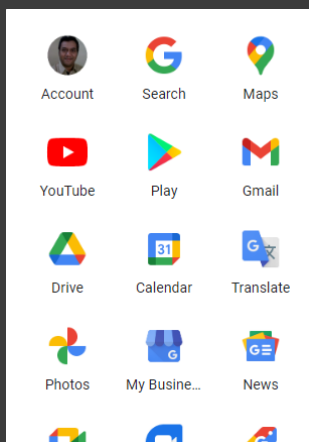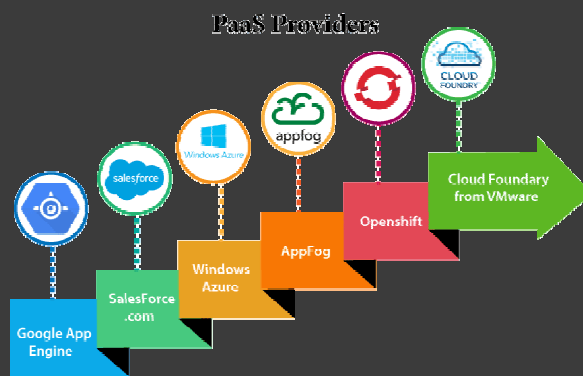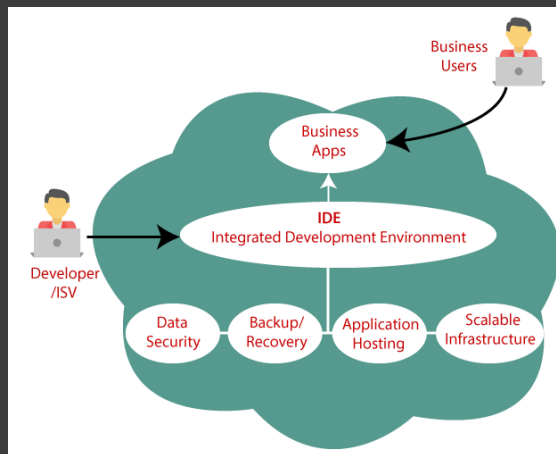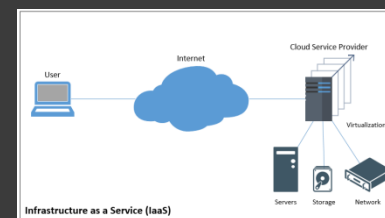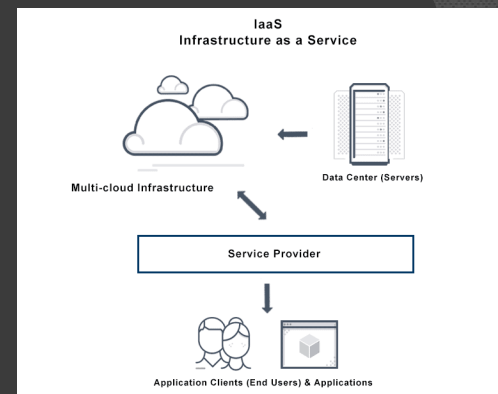
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Three Service Offering Models

Three Service Offering Models

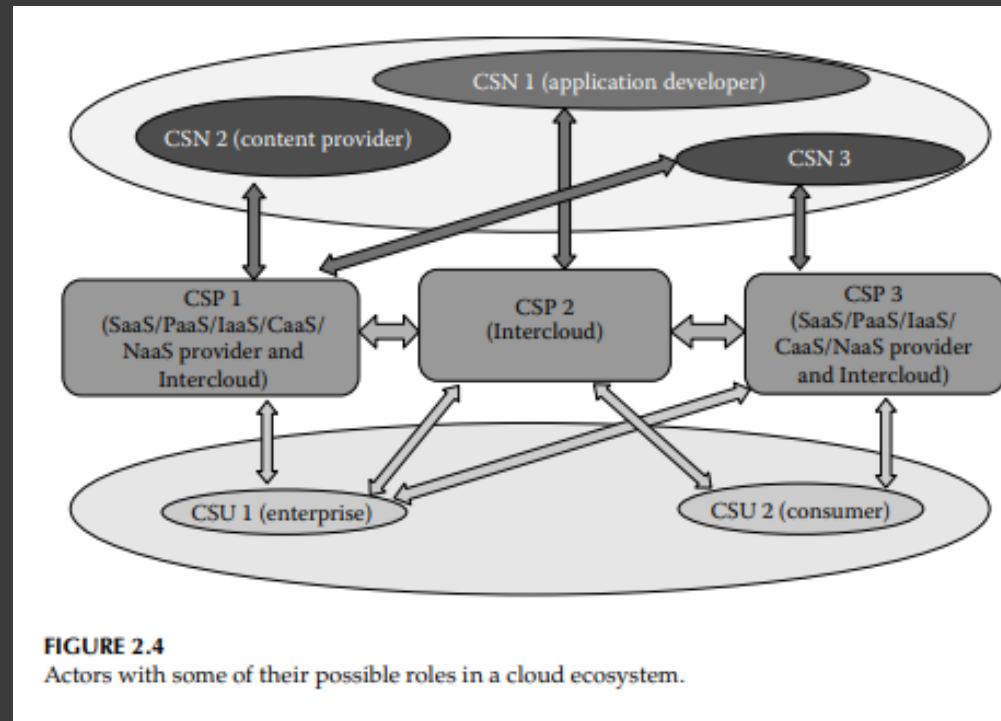Software as a service (SaaS)

Platform as a service (Paas)

Infrastructure as a service (Iaas)

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Cloud Ecosystem

Cloud ecosystem is a term used to describe the complete environment or system of interdependent components or entities that work together to enable and support the cloud services

FIGURE 2.4
Actors with some of their possible roles in a cloud ecosystem.

Requirements for Cloud Services

1. **Multitenancy:** Multitenancy is an essential characteristic of cloud systems aiming to provide isolation of the different users of the cloud system (tenants) while maximizing resource sharing (Example : a feature that allows a single instance of an application (say, database system) and leverages the economy of scale to satisfy several users at the same time)

2. **Service life cycle management:** Cloud services are paid as per usage and can be started and ended at any time. (Example : charging or billing statement needs to be provided for services that are dynamically created)

3. **Security:** The security of each individual service needs to be protected in the multitenant cloud environment; the users (tenants) also support the needed secured services, meaning that a cloud provides strict control for tenants' service access to different resources to avoid the abuse of cloud resources and to facilitate the management of CSUs by CSPs

4. **Responsiveness:** The cloud ecosystem is expected to enable early detection, diagnosis, and fixing of service-related problems in order to help the customers use the services faithfully

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Requirements for Cloud Services

5. **Intelligent service deployment:** It is expected that the cloud enables efficient use of resources in service deployment, that is, maximizing the number of deployed services while minimizing the usage of resources and still respecting the SLAs. For example, the specific application characteristics (e.g., central processing unit [CPU]-intensive, input/ output [IO]-intensive) that can be provided by developers or via application monitoring may help CSPs in making efficient use of resources

6. **Interoperability:** It is expected to have available well-documented and well-tested specifications that allow heterogeneous systems in cloud environments to work together

7. **Portability:** It is expected that a cloud service supports the portability of its features over various underlying resources and that CSPs should be able to accommodate cloud workload portability (e.g., VM portability) with limited service disruption.

8. **Regulatory aspects:** All applicable regulations shall be respected, including privacy protection

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Requirements for Cloud Services

9. **Environmental sustainability:** A key characteristic of cloud computing is the capability to access, through a broad network and thin clients, on-demand shared pools of configurable resources that can be rapidly provisioned and released

10. **Service reliability, service availability, and quality assurance:** CSUs demand for their services end-to-end quality of service (QoS) assurance, high levels of reliability, and continued availability to their CSPs

11. **Service access:** A cloud infrastructure is expected to provide CSUs with access to cloud services from any user device.

12. **Flexibility:** It is expected that the cloud service be capable of supporting multiple cloud deployment models and cloud service categories

13. **Accounting and charging:** It is expected that a cloud service be capable to support various accounting and charging models and policies

14. **Massive data processing:** It is expected that a cloud supports mechanisms for massive data processing (e.g., extracting, transforming, and loading data).

The expected requirements for services in the IaaS category include the following:
1. Computing hardware requirements (including processing, memory, disk, network interfaces, and virtual machines)
2. Computing software requirements (including OS and other preinstalled software)
3. Storage requirements (including storage capacity)
4. Network requirements (including QoS specifications, such as bandwidth and traffic volumes) • Availability requirements (including protection/backup plan for computing, storage, and network resources)

The expected service requirements for services in the PaaS category include the following:
1. Requirements similar to those of the IaaS category
2. Deployment options of user-created applications (e.g., scale-out options)

The expected service requirements for services in the SaaS category include the following:
1. Application-specific requirements (including licensing options)
2. Network requirements (including QoS specifications such as bandwidth and traffic volumes

Terima Kasih,
Wassalam,
Thanks,
Matur Nuwun,
Tse-se,
Arigato