

SESSION 2

CLOUD'S PROPERTIES AND ARCHITECTURE

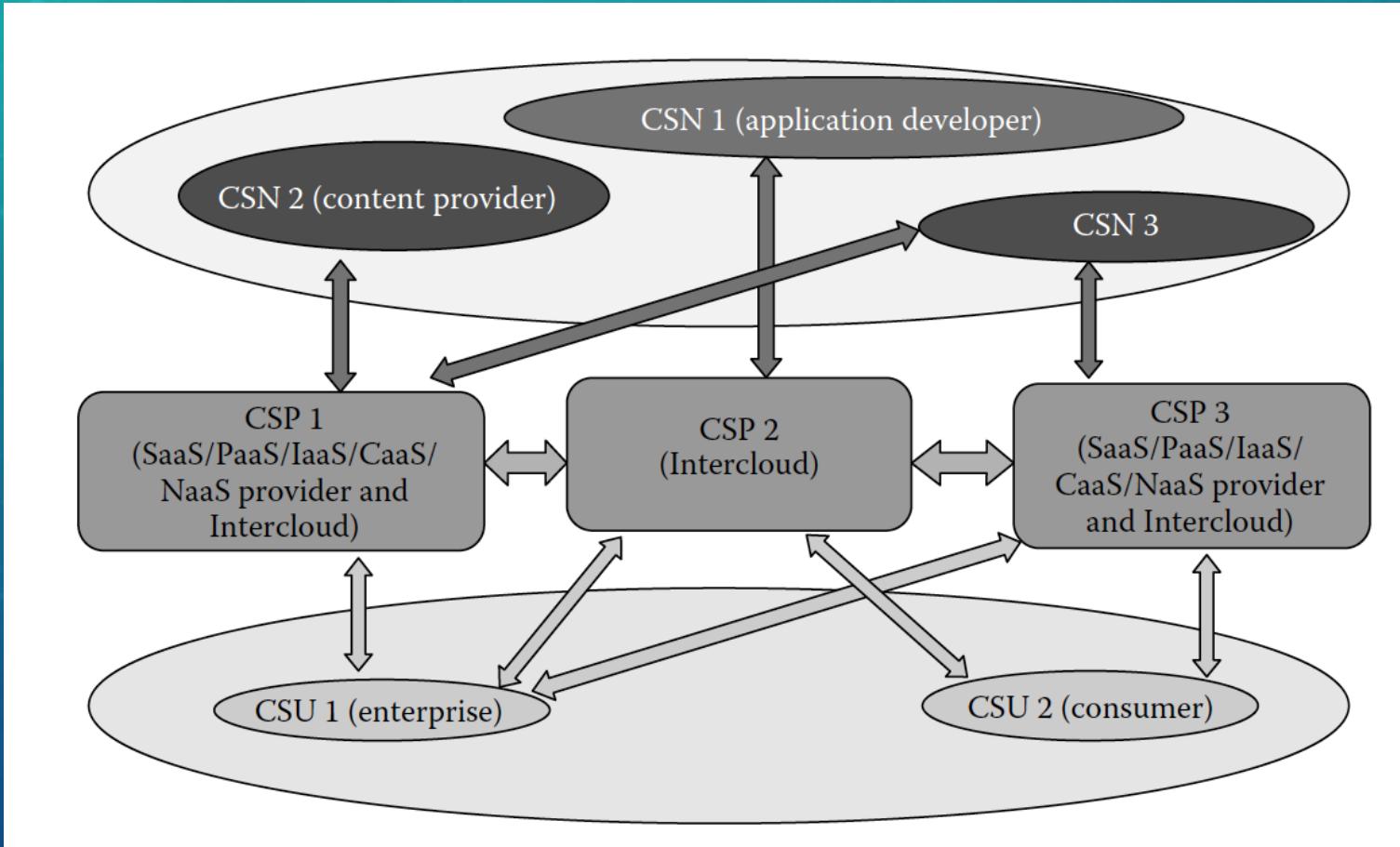
OBJECTIVES

- Cloud Ecosystem
- Requirements for Cloud Services
- Benefits and Drawbacks of cloud computing
- Cloud Architecture
- Applications on Cloud

CLOUD ECOSYSTEM

- The cloud ecosystem of interacting components and organizations with individuals, together known as the actors who could be responsible for either providing or consuming cloud services, can be categorized in the following manner
 - *Cloud service users (CSUs)*: A consumer (an individual/person), enterprise (including enterprise administrator), and/or government/public institution or organization that consumes delivered cloud services;
 - *CSPs*: An organization that provides or delivers and maintains or manages cloud services, that is, provider of SaaS, PaaS, IaaS, or any allied computing infrastructure
 - 3. *Cloud service partners (CSNs)*: A person or organization (e.g., application developer; content, software, hardware, and/or equipment provider; system integrator; and/or auditor) that provides support to the building of a service offered by a CSP (e.g., service integration).

ACTORS WITH SOME OF THEIR POSSIBLE ROLES IN A CLOUD ECOSYSTEM



REQUIREMENTS FOR CLOUD SERVICES

- *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
- *Service life cycle management*: Cloud services are paid as per usage and can be started and ended at any time
- *Security*: The security of each individual service needs to be protected in the multitenant cloud environment

REQUIREMENTS FOR CLOUD SERVICES

- *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.
- *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

REQUIREMENTS FOR CLOUD SERVICES

- More to discuss such as: *Interoperability, Regulatory aspects, Environmental sustainability, Service reliability, Service access, Flexibility, Accounting and charging, Massive data processing*

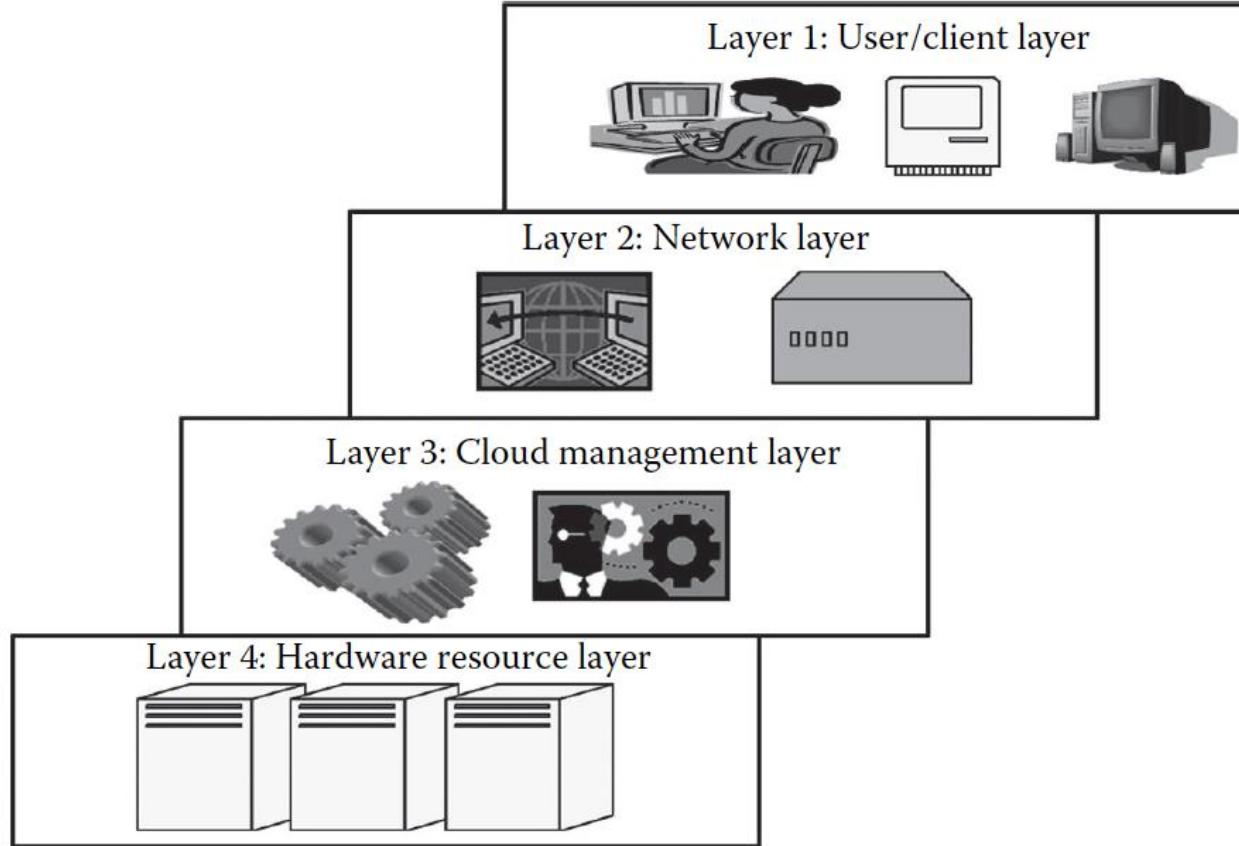
BENEFITS AND DRAWBACKS OF CLOUD COMPUTING

- Discussion in group about this, more hints can be found at page 23 of the book.
- More can be look at
<https://www.youtube.com/watch?v=KVydGQGR1Lo>

CLOUD ARCHITECTURE

- Cloud architecture is a collective

ents that



LAYER 1 (USER/CLIENT LAYER)

- This layer is the lowest layer in the cloud architecture. All the users or client belong to this layer.
- The client can be any device such as a thin client, thick client, or mobile or any handheld device that would support basic functionalities to access a web application

LAYER 2 (NETWORK LAYER)

- This layer allows the users to connect to the cloud
- This is primarily the Internet in the case of a public cloud
- In the case of a private cloud, the connectivity may be provided by a local area network (LAN).
- This layer does not come under the purview of service-level agreements (SLAs)

LAYER 3 (CLOUD MANAGEMENT LAYER)

- This layer consists of softwares that are used in managing the cloud
- The softwares can be a cloud operating system (OS), a software that acts as an interface between the data center (actual resources) and the user, or a management software that allows managing resources.
- This layer comes under the purview of SLAs

LAYER 4 (HARDWARE RESOURCE LAYER)

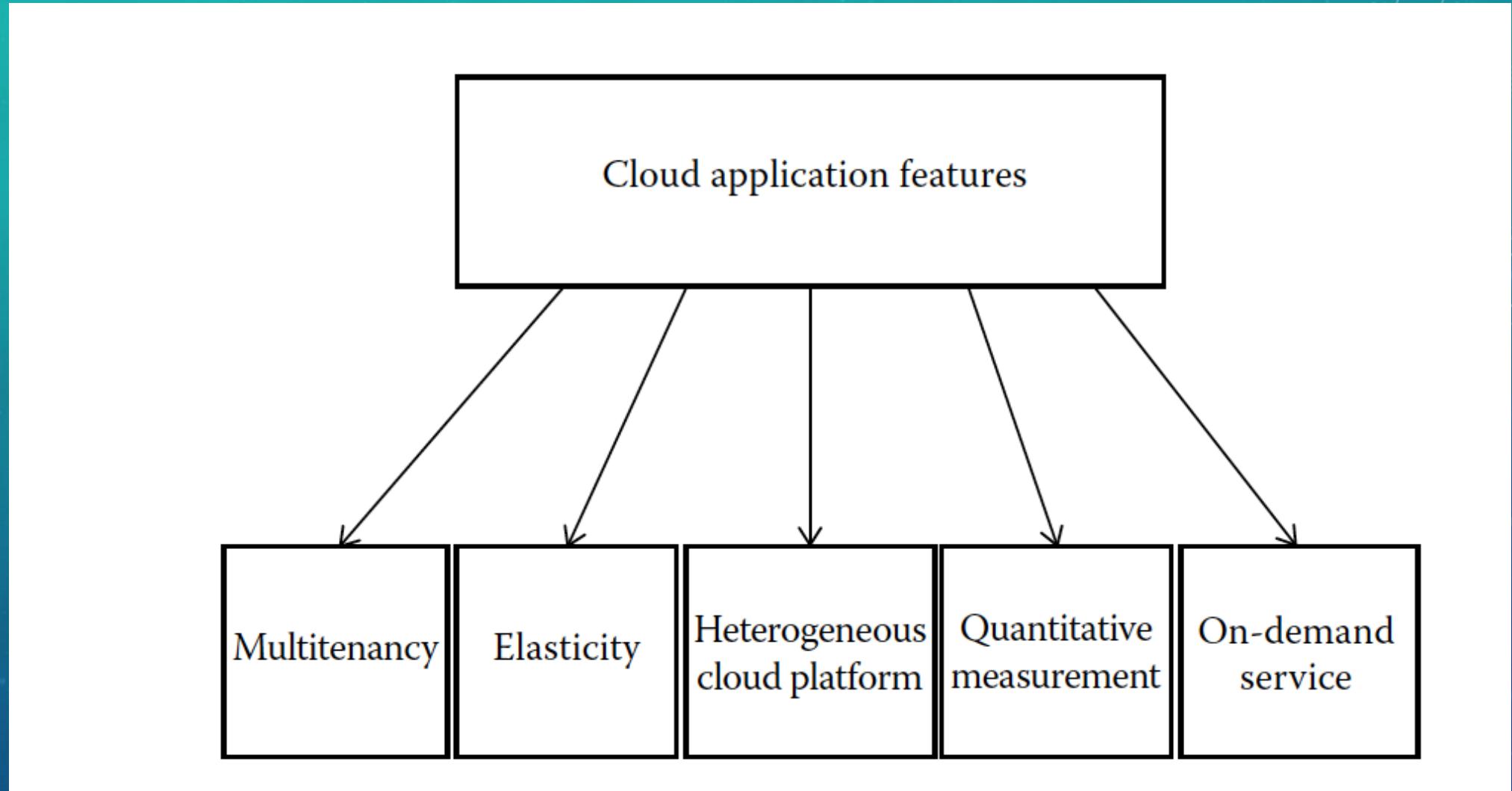
- Layer 4 consists of provisions for actual hardware resources.
- In the case of a public/private cloud, a data center is used in the back end
- This layer comes under the purview of SLAs.
- Whenever a user accesses the cloud, it should be available to the users as quickly as possible and should be within the time that is defined by the SLAs

APPLICATIONS ON THE CLOUD

- The first type of application was stand-alone applications.
 - A stand-alone application does not use network.
 - The web application is used in many aspects.
 - The main characteristic of the web application is that it is connected to the network.
 - Unlike stand-alone applications, these systems were totally dependent on the network for its working.
- The diagram illustrates the evolution of application types. It features three rounded rectangular boxes arranged horizontally. The leftmost box is labeled 'Stand-alone applications'. The middle box is labeled 'Web applications'. The rightmost box is labeled 'Cloud applications'. A curved arrow starts at the bottom of the 'Stand-alone applications' box and points upwards and to the right, passing over the 'Web applications' box and ending at the bottom of the 'Cloud applications' box. Another curved arrow starts at the bottom of the 'Cloud applications' box and points upwards and to the left, passing over the 'Web applications' box and ending at the bottom of the 'Stand-alone applications' box, creating a circular flow between the three categories.

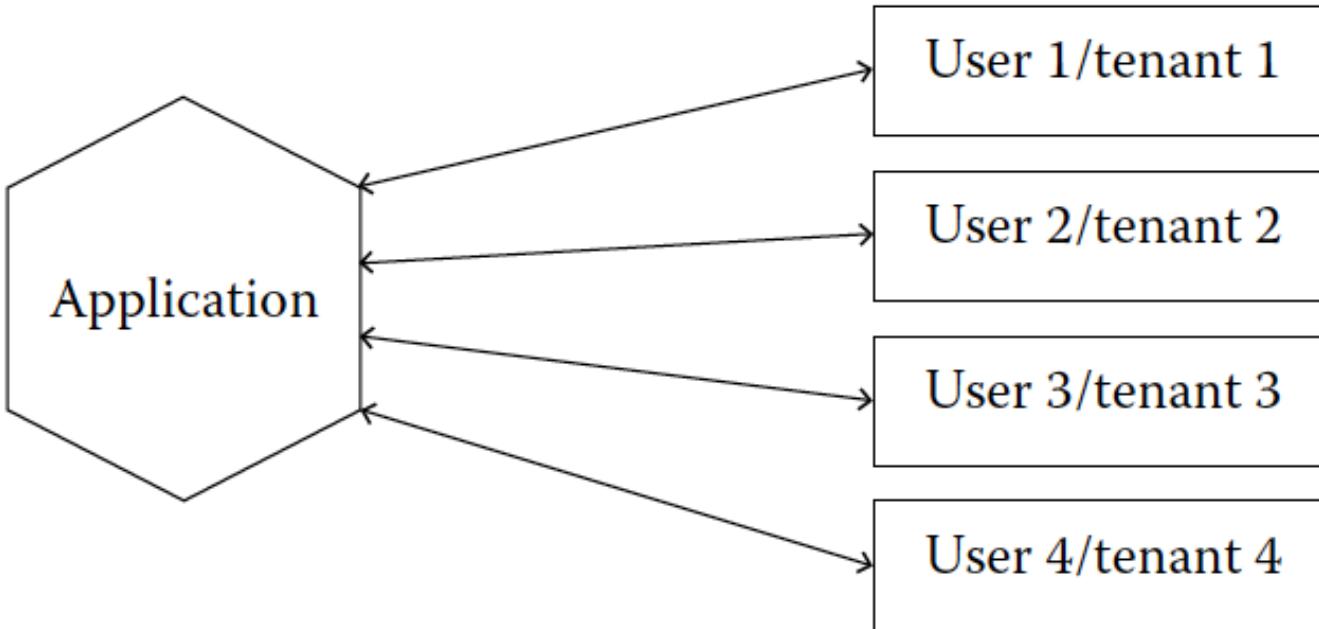
SHORTCOMINGS OF WEB APPLICATION

- The web application is not elastic and cannot handle very heavy loads
- The web application is not multitenant
- The web application does not provide a quantitative measurement of the services that are given to the users, though they can monitor the user
- The web applications are usually in one particular platform
- The web applications are not provided on a pay-as-you-go basis
- Due to its nonelastic nature, peak load transactions cannot be handled



MULTITENANCY

- Software can run independently
- Each user views one application
- Physically, the



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MULTITENANCY DISCUSSION

- Look at the video and discuss why mutitenancy is not always the best
- <https://www.youtube.com/watch?v=WY1CWROPAU8>

ELASTICITY

- Elasticity can be defined as the degree to which a system is able to adapt to workload changes by provisioning and deprovisioning resources in an autonomic manner such that at each point in time
- Elasticity allows the cloud providers to efficiently handle the number of users, from one to several hundreds of users at a time

ELASTICITY DISCUSSION

- Discuss what Amazon's E2C can offer interm of Elastic by watching the video
- <https://www.youtube.com/watch?v=TsRBftzZsQo>

HETEROGENEOUS CLOUD PLATFORM

- The cloud platform supports heterogeneity, wherein any type of application can be deployed in the cloud
- The applications that are usually deployed can be accessed by the users using a web browser

QUANTITATIVE MEASUREMENT

- The services provided can be quantitatively measured
- The user is usually offered se
- Not only the services are measureable, but also the link usage and several other parameters that support cloud applications can be measured prices based on certain charges

ON-DEMAND SERVICE

- The cloud applications offer service to the user, on demand, that is, whenever the user requires it.
- The cloud service would allow the users to access web applications usually without any restrictions on time, duration, and type of device used

SUMMARIES

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- Cloud Architecture
- Applications on Cloud