



SNS COLLEGE OF ENGINEERING



Kurumbapalayam(Po), Coimbatore – 641 107

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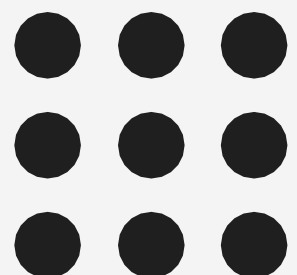
Department of Information Technology

Course Name – CS8791 Cloud Computing

IV Year / VII Semester

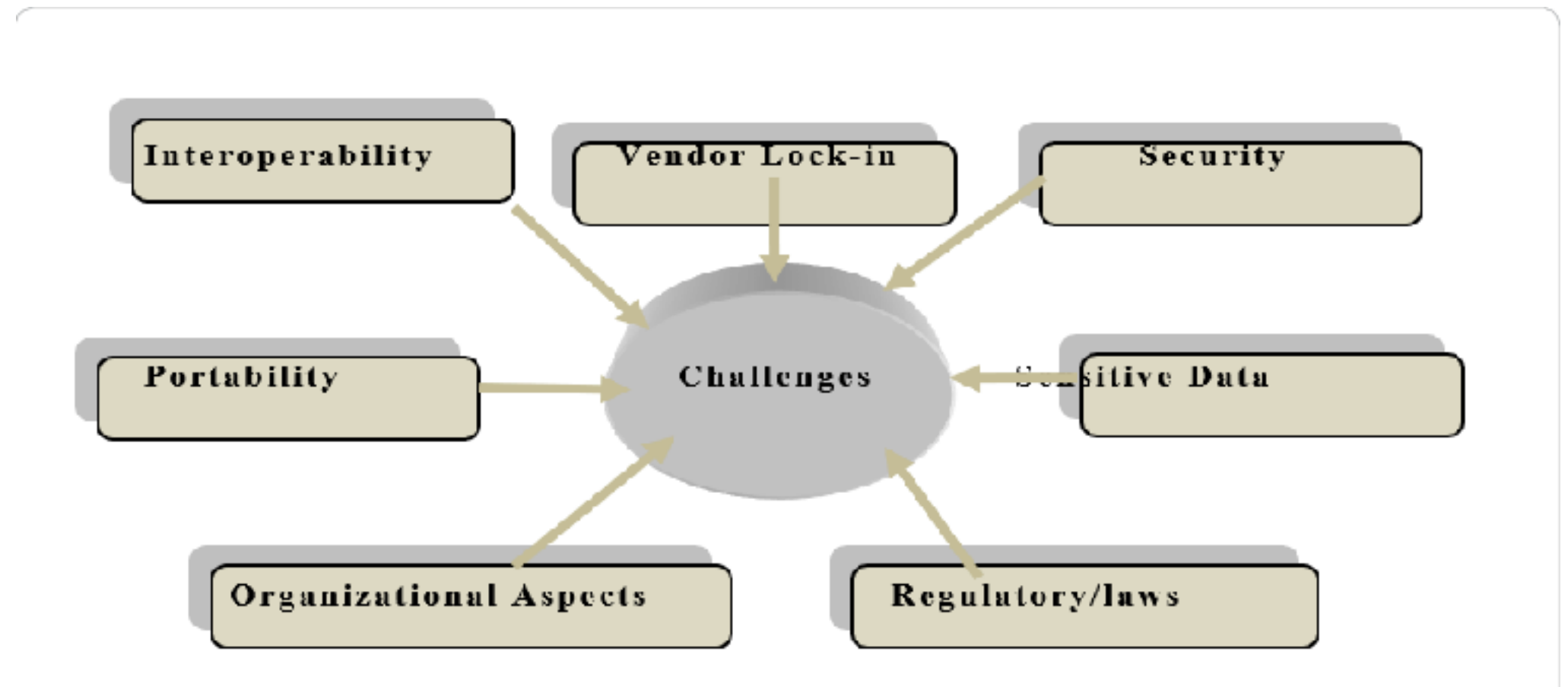
Unit 3 – Cloud Architecture, Services and Storage

Topic 8 – Design Challenges, STaaS



Design Challenges

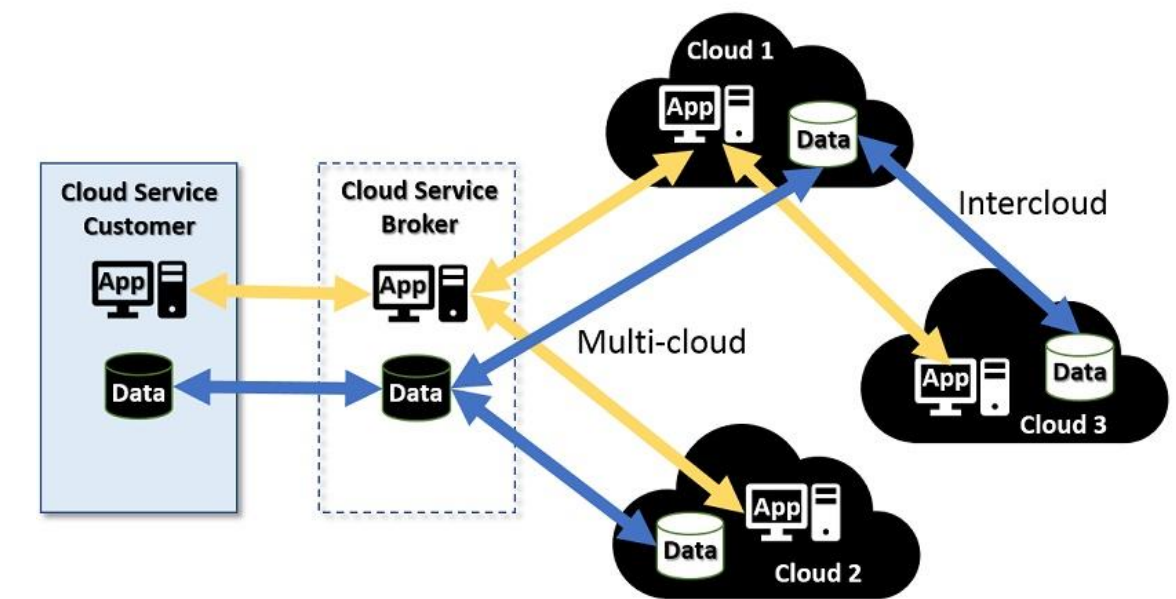
- Cloud computing presents many challenges for industry and academia.
- The interoperation between different clouds,
- the creation of standards,
- security,
- scalability,
- fault tolerance, and
- organizational aspects.



Design Challenges

Cloud interoperability and standards

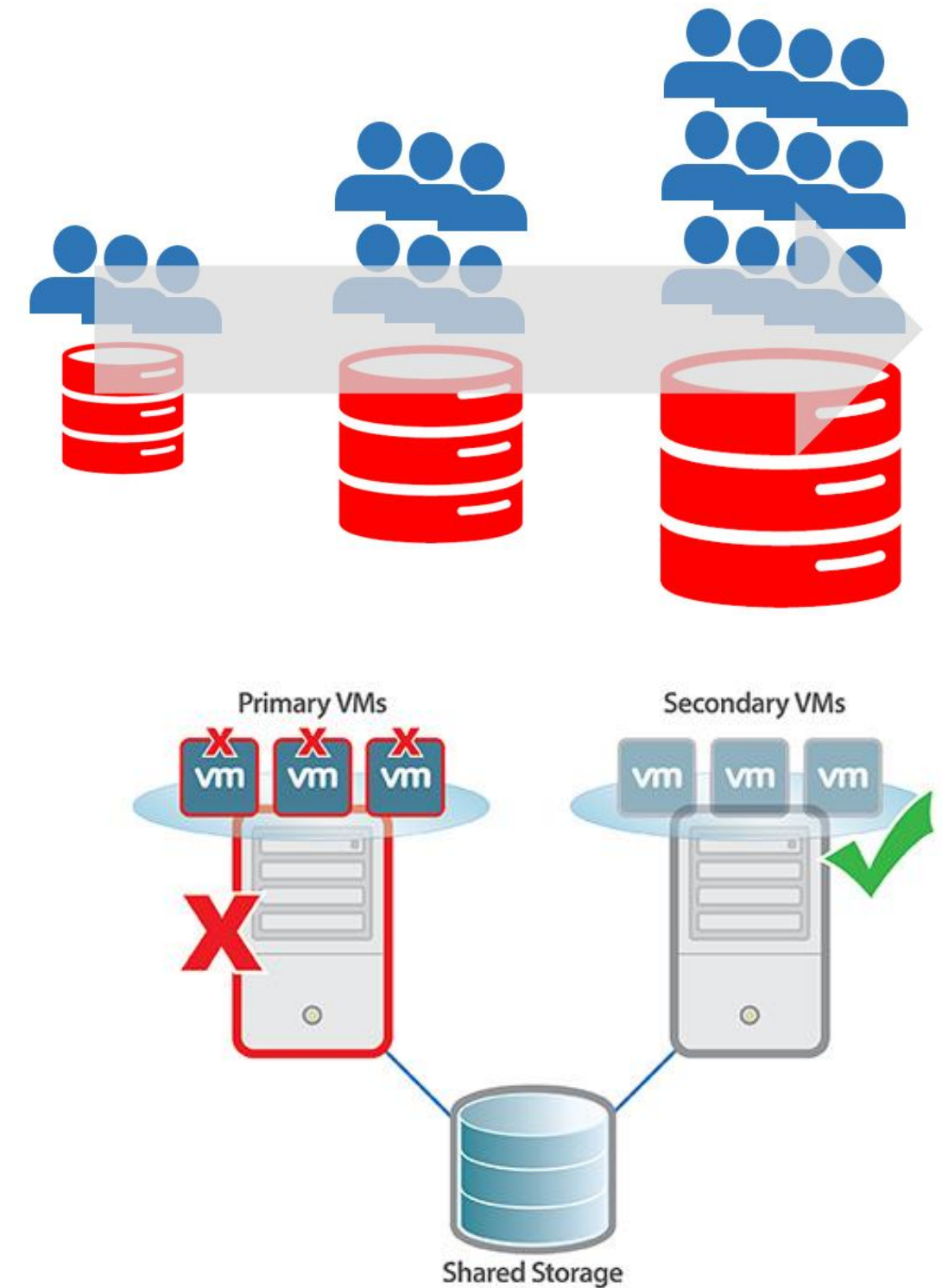
- Introducing standards and allowing interoperability between solutions are objectives of fundamental importance.
- Vendor lock-in constitutes one of the major strategic barriers.
- Vendor lock-in can prevent a customer from switching to another competitor's solution.
- The presence of standards that are actually implemented could give room for interoperability and then lessen the risks resulting from vendor lock-in.
- The Open Virtualization Format (OVF) is an attempt to provide a common format for storing the information and metadata describing a virtual machine image.



Design Challenges

Scalability and Fault Tolerance

- The ability to scale on demand constitutes one of the most attractive features of cloud computing.
- Clouds allow scaling beyond the limits of the existing in-house IT resources,
- To implement such a capability, the cloud middleware has to be designed with the principle of scalability along different dimensions in mind—for example, performance, size, and load.
- The ability to tolerate failure becomes is more important than providing an extremely efficient and optimized system.
- The challenge in this case is designing highly scalable and fault-tolerant systems



Design Challenges

Security, Trust, and Privacy

- Security, trust, and privacy issues are major obstacles for massive adoption of cloud computing.
- The traditional cryptographic technologies are used to prevent data tampering and access to sensitive information.
- The massive use of virtualization technologies exposes the existing system to new threats, which previously were not considered applicable.
- The lack of control over their own data and processes also poses severe problems for the trust
- The challenges in this area are, then, mostly concerned with devising secure and trustable systems from different perspectives: technical, social, and legal.





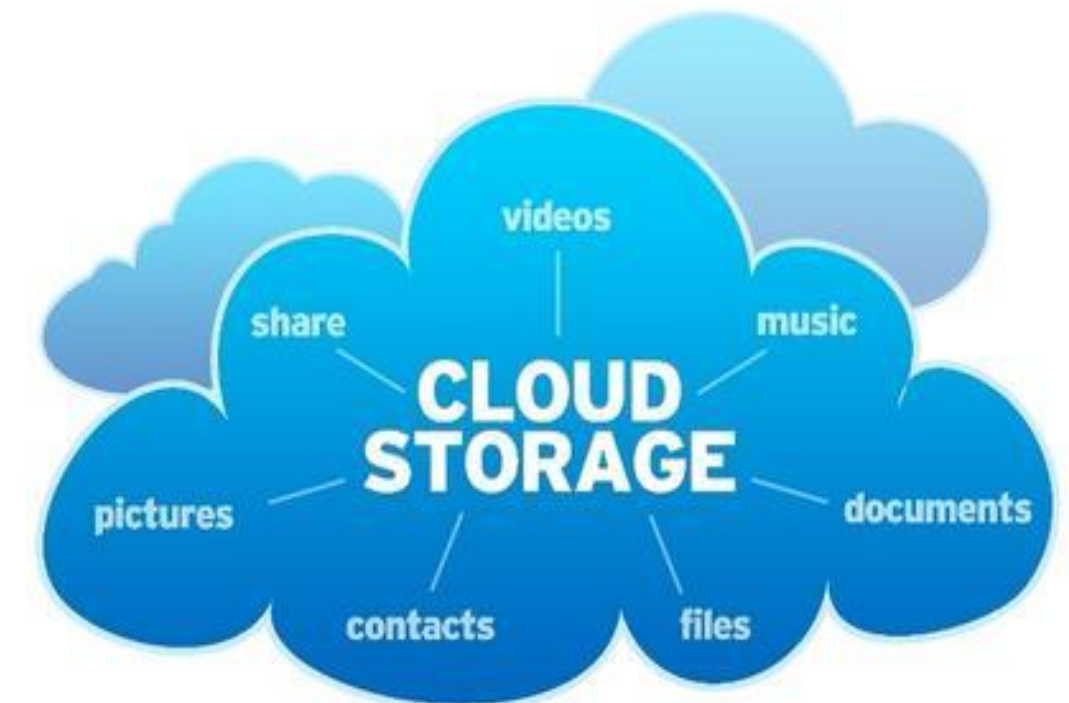
Design Challenges

Organizational aspects

- Cloud computing introduces a significant change in the way IT services are consumed and managed.
- More precisely, storage, compute power, network infrastructure, and applications are delivered as metered services over the Internet.
- This introduces a billing model that is new within typical enterprise IT departments, which requires a certain level of cultural and organizational process maturity.
- From an organizational point of view, the lack of control over the management of data and processes poses not only security threats but also new problems that previously did not exist

Cloud Storage

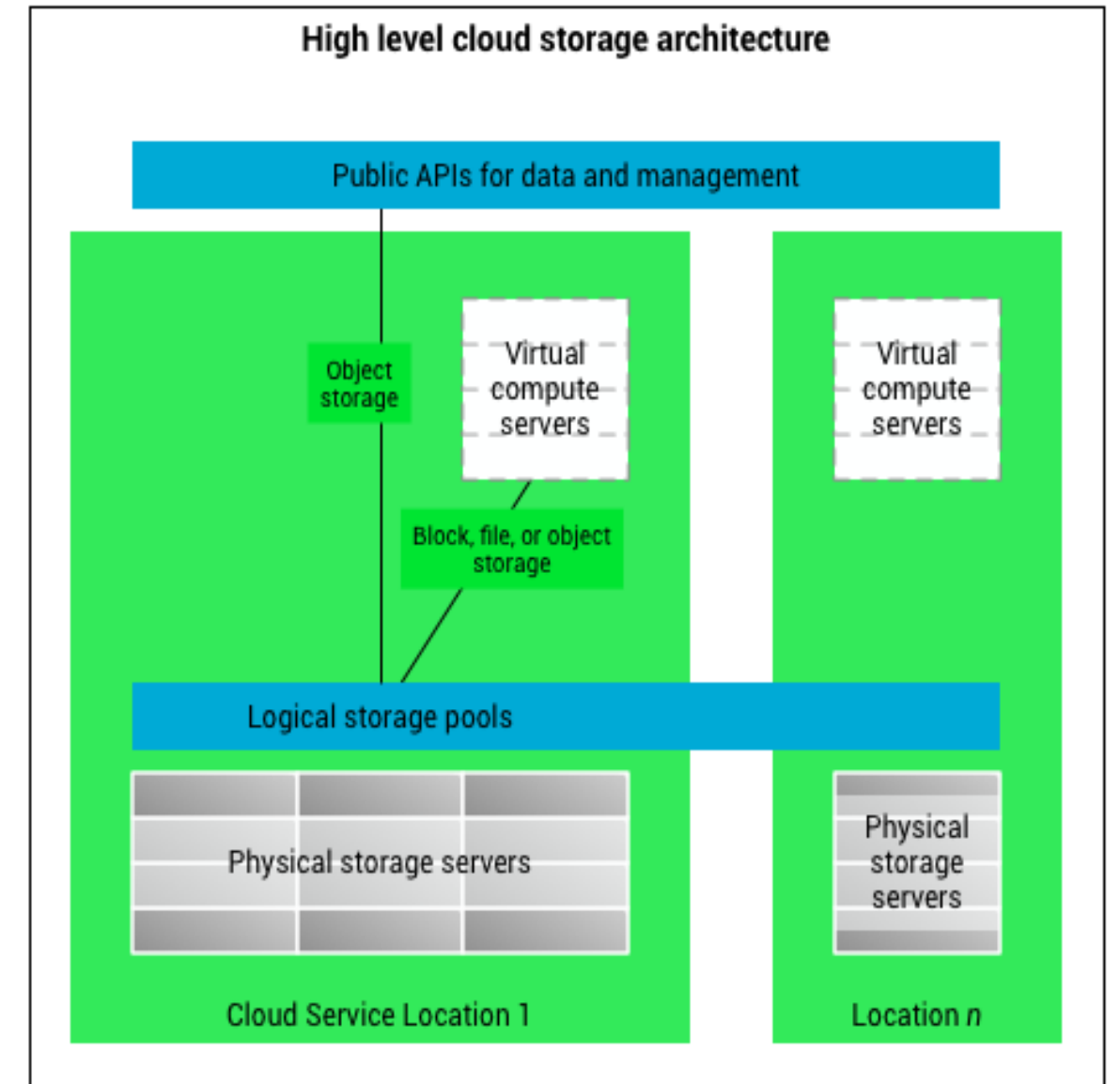
- Cloud storage is a service model in which data is transmitted and stored on remote storage systems
- Users generally pay for their cloud data storage on a per-consumption, monthly rate.
- The physical storage spans multiple servers (sometimes in multiple locations), and the physical environment is typically owned and managed by a hosting company.
- These cloud storage providers are responsible for keeping the data available and accessible, and the physical environment protected and running.
- People and organizations buy or lease storage capacity from the providers to store user, organization, or application data.



Cloud Storage

Architecture

- Cloud storage is based on highly virtualized infrastructure and is like broader cloud computing in terms of interfaces, near-instant elasticity and scalability, multi-tenancy, and metered resources.
- Cloud storage services can be utilized from an off-premises service (Amazon S3) or deployed on-premises (ViON Capacity Services).
- Cloud storage typically refers to a hosted object storage service.
- Using the RESTful API, an object storage protocol stores a file and its associated metadata as a single object and assigns it an ID number.



Cloud Storage

Potential Concerns

- Data Security
- Longevity
- Accessibility
- Privacy

Storage As a Service (STaaS)

- Storage as a Service is a business model in which a large company re space in their storage infrastructure to a smaller company or individual.
- The key advantage to STaaS in the enterprise is in cost savings . personnel, in hardware and in physical storage space.
- It can be delivered as on-premises or off-premises as public cloud as a shared service.





THANK YOU