Cloud as a service

Gamut of cloud solutions

- PaaS
  - Provisioning of h/w and OS, frameworks and DBs, for app development
- SaaS
  - Special purpose s/w on top of hardware and OS is provisioned
- IaaS
  - Provisioning of h/w or virtual computers where the enterprise has control over the OS through which some s/w is executed
- Storage as a service
  - Provisioning of DB like services, billed based on utility like per gigabyte per month
- Desktop as service
  - Provisioning of desktop environment

PaaS

- Provides foundation to build scalable web based applications
- Reduces upfront s/w licensing and infrastructure costs
- Reduces operational costs for development, testing and hosting environments
- Removes challenges of integration with services such as db, middleware, web frameworks, and security
- s/w development and delivery times are shortened
- No need to maintain separate development and test environments
- Simplifies s/w project management

Challenges

- Tight binding of apps with the platform
  Makes portability across vendors difficult
- Still evolving
- Lacks the functionality needed to convert legacy applications into cloud services

SaaS

- Saves costs by eliminating the effort of development, maintenance and delivery of s/w
- Eliminates upfront software licensing and infrastructure costs
- Reduces ongoing operational costs for support and maintenance
- Time to build and deploy new service much less than traditional s/w development
- As the management and software support is shouldered by vendors, internal staff will focus on high-value activities

Challenges

- Apps requiring extensive customisation are not good candidates
- May require upgrades to local infrastructure to handle increase in bandwidth usage
- The local upgrades may have to be scheduled in agreement with the vendors.
- Compatibility problems may arise due to multiple vendor offering
- Suitable for apps which can have multiple app-servers
- May lead to bottleneck if data servers cannot scale
- Speed determined by internet connection speed and not internal n/w speed

IaaS

- Eliminates the need to over provision resources to handle peak times
- Resources dynamically scale up and down
- Reduced capital investment
- Reduced operational costs for support and maintenance
- Can scale up resources without increasing the people needed to support it
- Supports wide range of OS and frameworks and hence minimizes vendor lock-in

Challenges

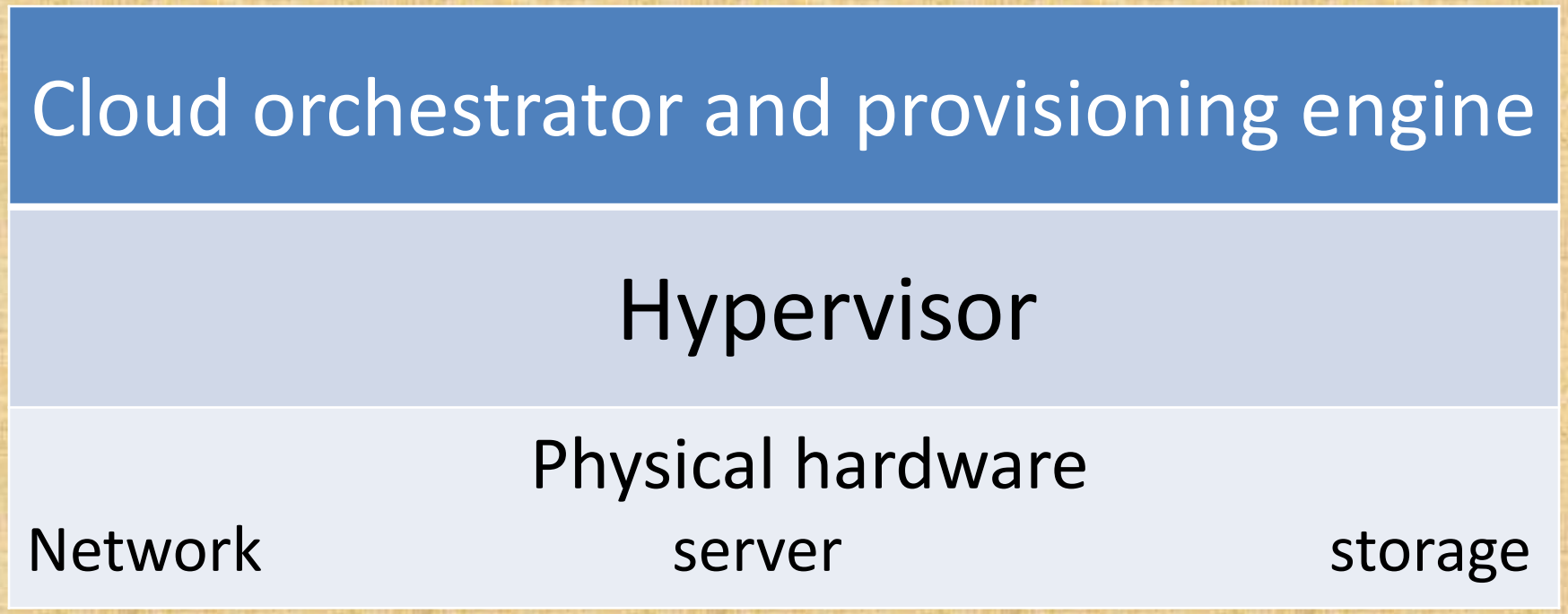
- Apps must be designed to scale and execute on vendor infrastructure
- There can be integration challenges because of third party s/w
- More suitable for small and medium scale businesses

Principle technologies

- Key to dynamic cloud infrastructure is the ***virtualization layer*** that is between the cloud instances and physical hardware .
- ***Hypervisor*** is the platform virtualization s/w to allow multiple OS to run on same server.
- Cloud infrastructure is built using ***cloud orchestrator and provisioning engine*** which is above the virtualisation layer working with n/w, server, and storage.
- ***C***loud orchestrator and provisioning engine is built on top of hypervisor
- This layer of s/w:
  - Interacts with multiple servers
  - Enables pooling of resources across servers
  - Defines standardized services called ***virtual compute centres***
- This layer helps to break the infrastructure pool to drive sharing

Cloud orchestrator and provisioning engine

- *Cloud orchestrator and provisioning engine* can define enterprises and users that can share the cloud infrastructure securely
- **Cloud Orchestrator** is a **cloud** management platform that automates provisioning of **cloud** services using policy-based tools. It enables you to configure, provision, deploy development environments, integrate service management—and add management, monitoring, back-up and security—in minutes.
- This allows them to create standardized collections of VMs
- It define the policies of how the users can access the VMs
- Users can login to orchestrator to self provision resources
- Allows writing workflows to automate creation of cloud infrastructure


Cloud orchestrator and provisioning engine
Hypervisor
Physical hardware
Network
server
storage

Cloud strategy

- High level guidance to define the cloud strategy
- **Implementation planning phase** of cloud enables to implement an app that lies b/w business strategy ***and*** design, development and implementation phases of app
- Takes care of linking the business strategy and the IT requirements for the app that supports the business strategy.
- Implementation planning translates the business intent to a set of IT requirement for cloud app.

The implementation planning phase

- Planning derives the high level structures of cloud app
- Planning define the roadmap to implement the app
- Input to the implementation planning phase is cloud strategy based on the business that is driving the implementation of apps on cloud

Key steps in cloud implementation planning

- Understand cloud strategy
- Define the cloud app requirements
- Access cloud readiness
- Define high level cloud architecture
- Identify requirements change management
- Develop roadmap and implementation plan

Infrastructure strategy and planning for cloud helps develop cloud strategy.

- Strategy and planning includes:
  - IT executive workshop to identify where and how cloud can help drive business value
  - Develop a value proposition (unique selling proposition) for cloud in an enterprise
  - Prioritize the apps or requirements to be migrated
  - Assess current environment to determine strengths, gaps, and readiness
  - Strategy and plan to implement the select cloud
  - Analyse the cloud opportunity
  - Analyse the IT environment and capability gap
  - Develop high level cloud roadmap and value proposition

Conceptual cloud model

Includes

- Standards
- Risk and compliance controls
- Governance and controls
- Identity and access management
- Access and intrusion management
- SLAs
- Service accounting
- Performance capacity and availability
- Configuration management
- Provisioning
- Data protection
- Infrastructure services

Service definitions

- **Service**: specific IT deliverable that provides customer value, it is measurable and basis of business
- **Services portfolio:** collection of services
- **Service component:** part of service that are logically grouped
- **Service owner:** The individual accountable for ensuring the customer receives the service.
- **Process:** collection of activities that take inputs, transforms them and gives o/p
- **Service level agreement:** specific delivery commitments and roles identified with the customer.