Cloud Computing

Cloud Delivery Models

- SaaS – Software as a Service
- IaaS – Infrastructure as a Service
- PaaS – Platform as a Service

What is Software as a Service? (SaaS)

- SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service.
  - Usually billed based on usage
  - Usually multi tenant environment
  - Highly scalable architecture

What is Software as a Service? (SaaS)

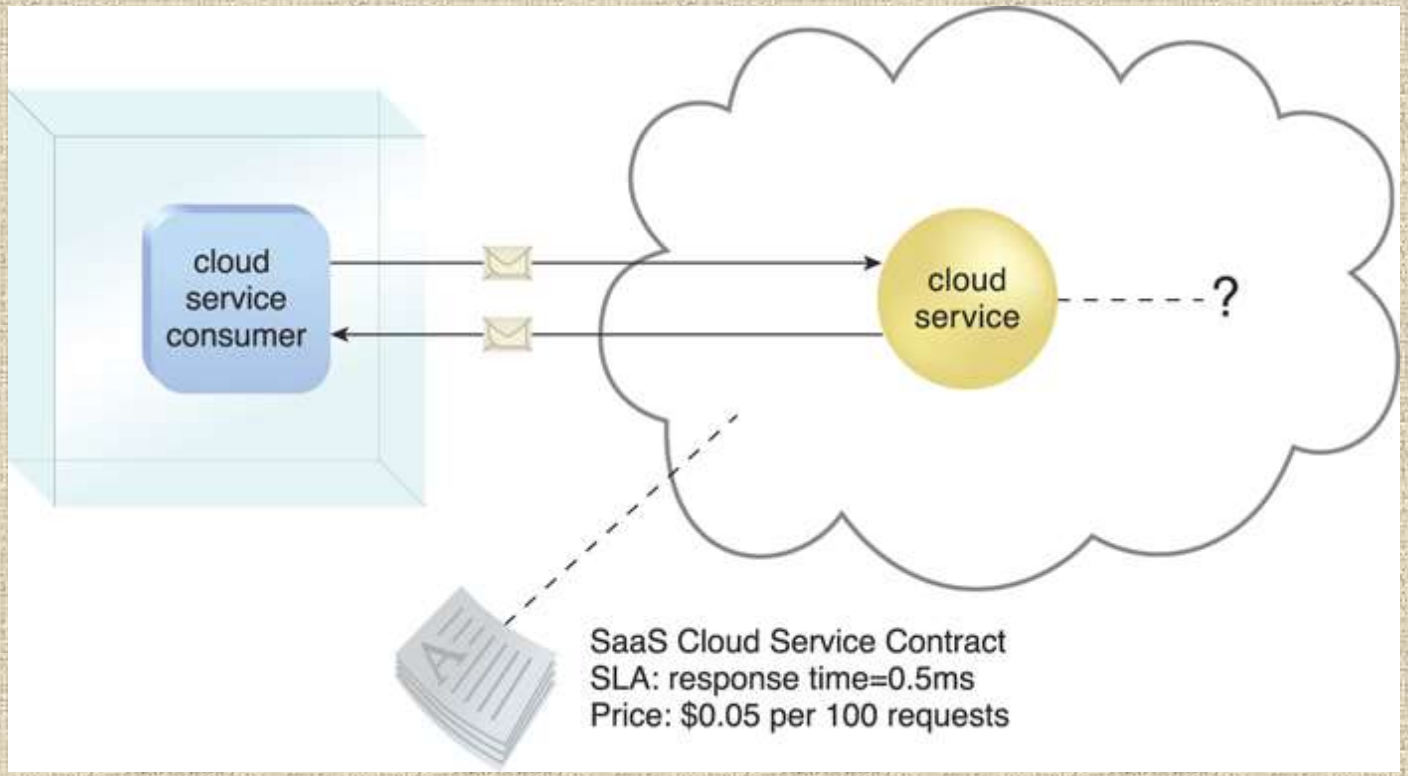

Figure 4.13. The cloud service consumer is given access the cloud service contract

SaaS Examples

salesforce.com
Success On Demand.

NETSUITE
ONE SYSTEM. NO LIMITS.

postini

facebook

Infrastructure as a Service (IaaS)

- IaaS is the delivery of technology infrastructure as an on demand scalable service
  - Usually billed based on usage
  - Usually multi tenant virtualized environment
  - Can be coupled with Managed Services for OS and application support

Infrastructure as a Service (IaaS)

- The IaaS delivery model represents a self-contained IT environment comprised of infrastructure-centric IT resources that can be accessed and managed via cloud service-based interfaces and tools.

- This environment can include hardware, network, connectivity, operating systems, and other “raw” IT resources.

- The general purpose of an IaaS environment is to provide cloud consumers with a high level of control and responsibility over its configuration and utilization.

Infrastructure as a Service (IaaS)

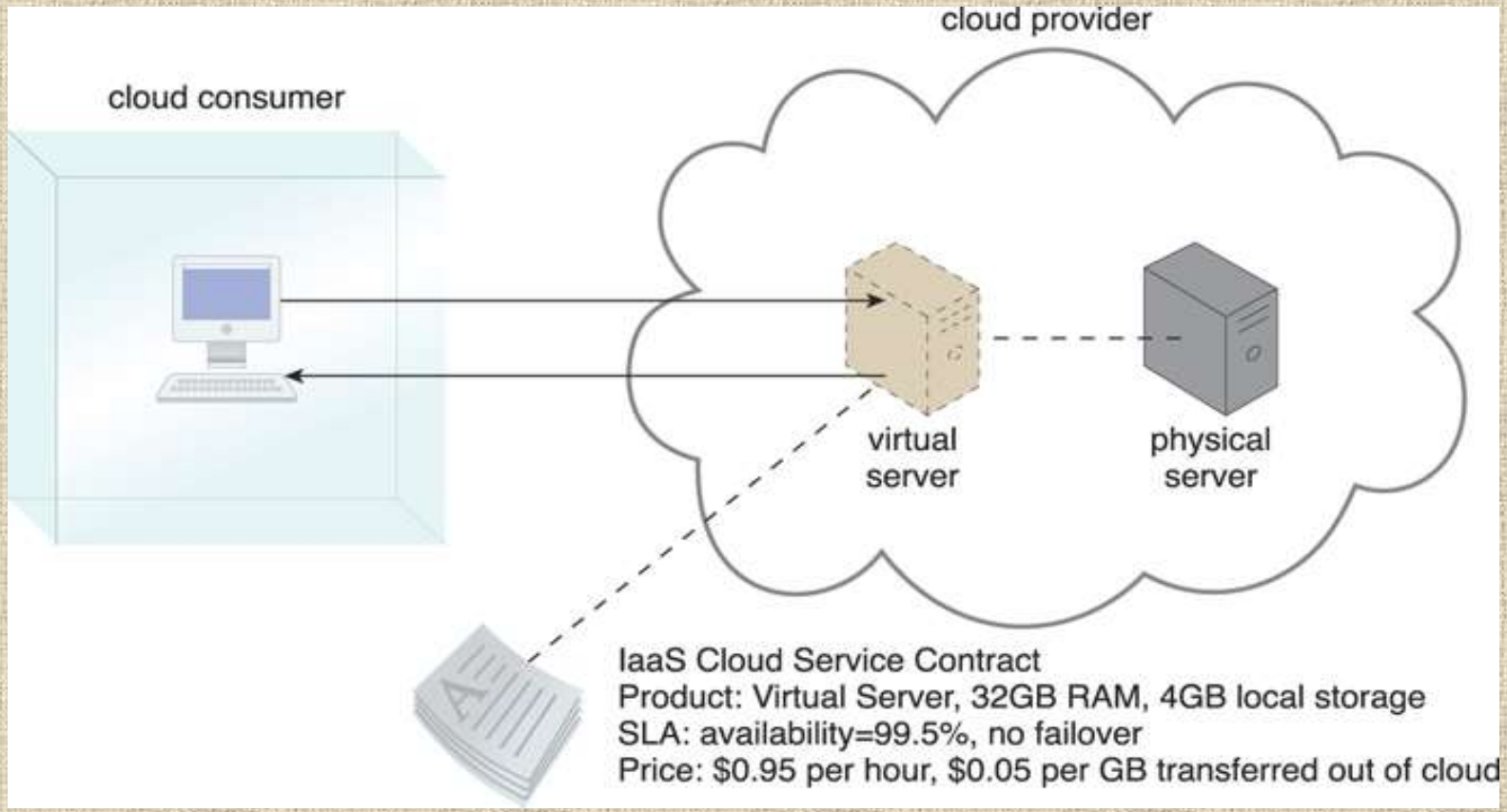

Figure 4.11. A cloud consumer is using a virtual server within an IaaS environment.

IaaS Examples

IaaS Examples

Platform as a Service (PaaS)

- PaaS provides all of the facilities required to support the complete life cycle of building and delivering web applications and services entirely from the Internet.
  - Typically applications must be developed with a particular platform in mind
  - Multi tenant environments
  - Highly scalable multi tier architecture

Common reasons a cloud consumer would use and invest in a PaaS environment include:

- The cloud consumer wants to extend on-premise environments into the cloud for scalability and economic purposes.
- The cloud consumer uses the ready-made environment to entirely substitute an on-premise environment.
- The cloud consumer wants to become a cloud provider and deploys its own cloud services to be made available to other external cloud consumers.

Platform as a Service (PaaS)

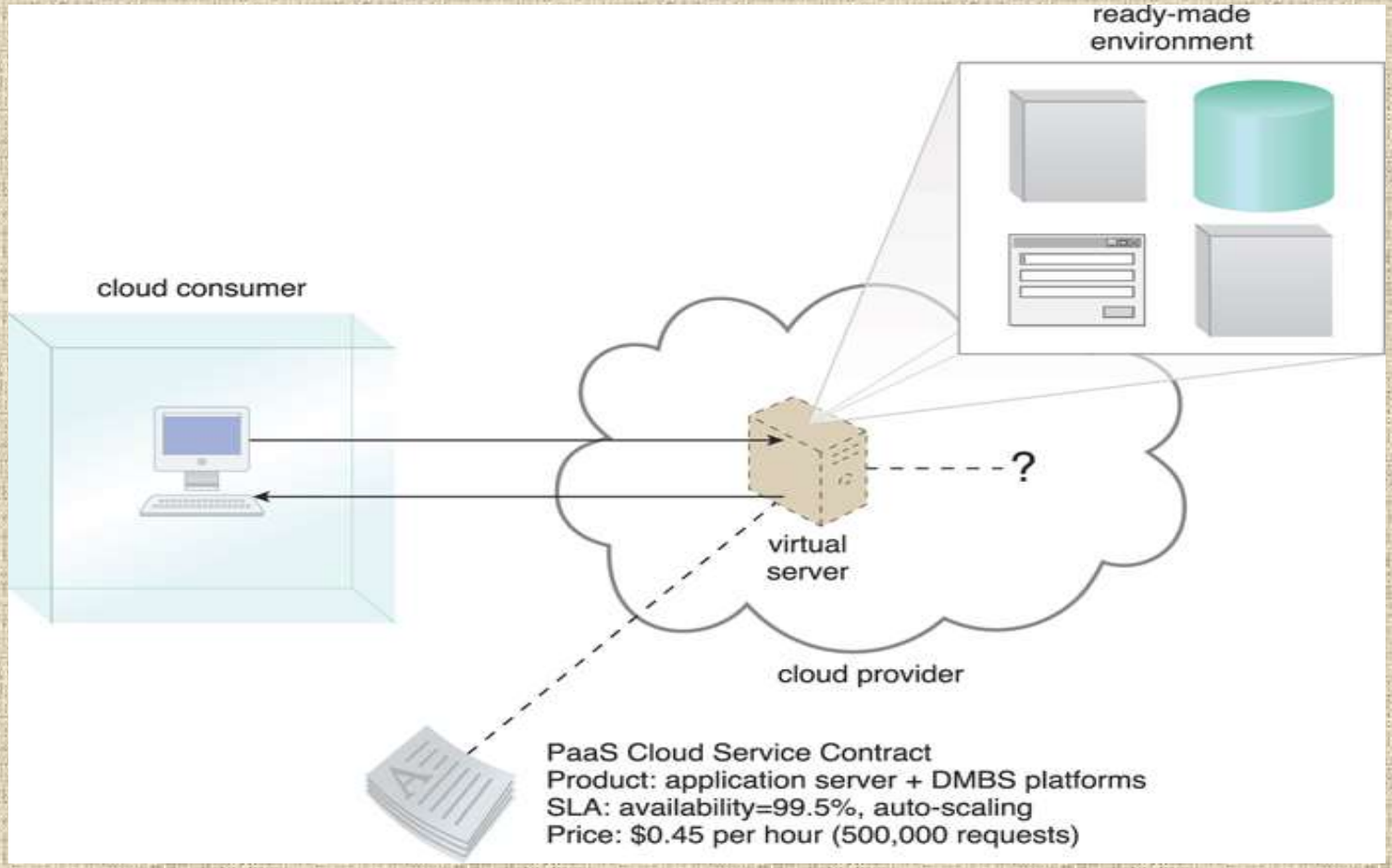

Figure 4.12. A cloud consumer is accessing a ready-made PaaS environment.

PaaS Examples

Comparing Cloud Delivery Models

Cloud Delivery Model	Typical Level of Control Granted to Cloud Consumer	Typical Functionality Made Available to Cloud Consumer
SaaS	usage and usage-related configuration	access to front-end user-interface
PaaS	limited administrative	moderate level of administrative control over IT resources relevant to cloud consumer's usage of platform
IaaS	full administrative	full access to virtualized infra-structure-related IT resources and, possibly, to underlying physical IT resources

Comparing Cloud Delivery Models

Cloud Delivery Model	Common Cloud Consumer Activities	Common Cloud Provider Activities
SaaS	uses and configures cloud service	implements, manages, and maintains cloud service monitors usage by cloud consumers
PaaS	develops, tests, deploys, and manages cloud services and cloud-based solutions	pre-configures platform and provisions underlying infrastructure, middleware, and other needed IT resources, as necessary monitors usage by cloud consumers
IaaS	sets up and configures bare infrastructure, and installs, manages, and monitors any needed software	provisions and manages the physical processing, storage, networking, and hosting required monitors usage by cloud consumers

Combining IaaS + PaaS

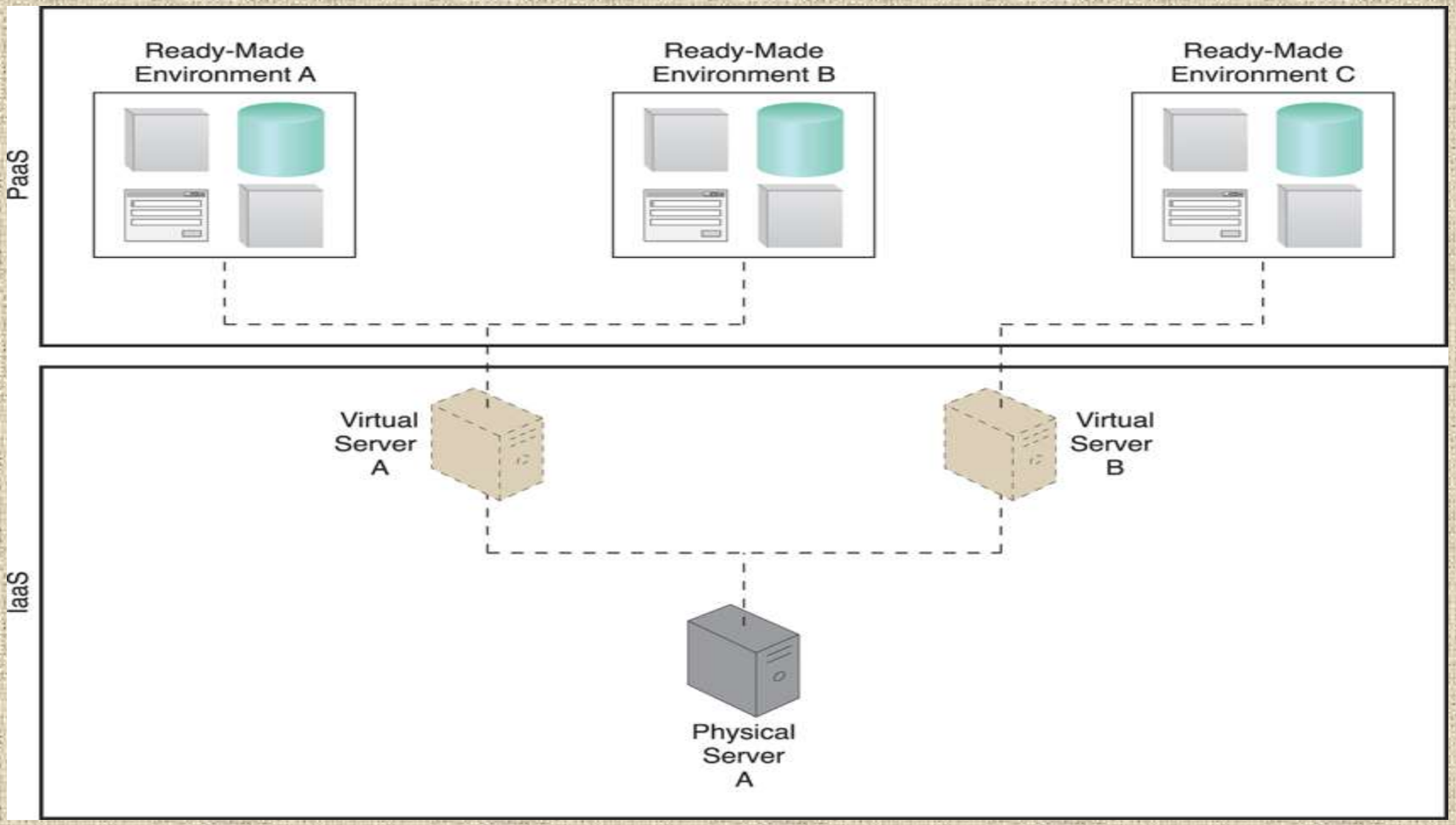

Figure 4.14. A PaaS environment based on the IT resources provided by an underlying IaaS environment.

Combining IaaS + PaaS + SaaS

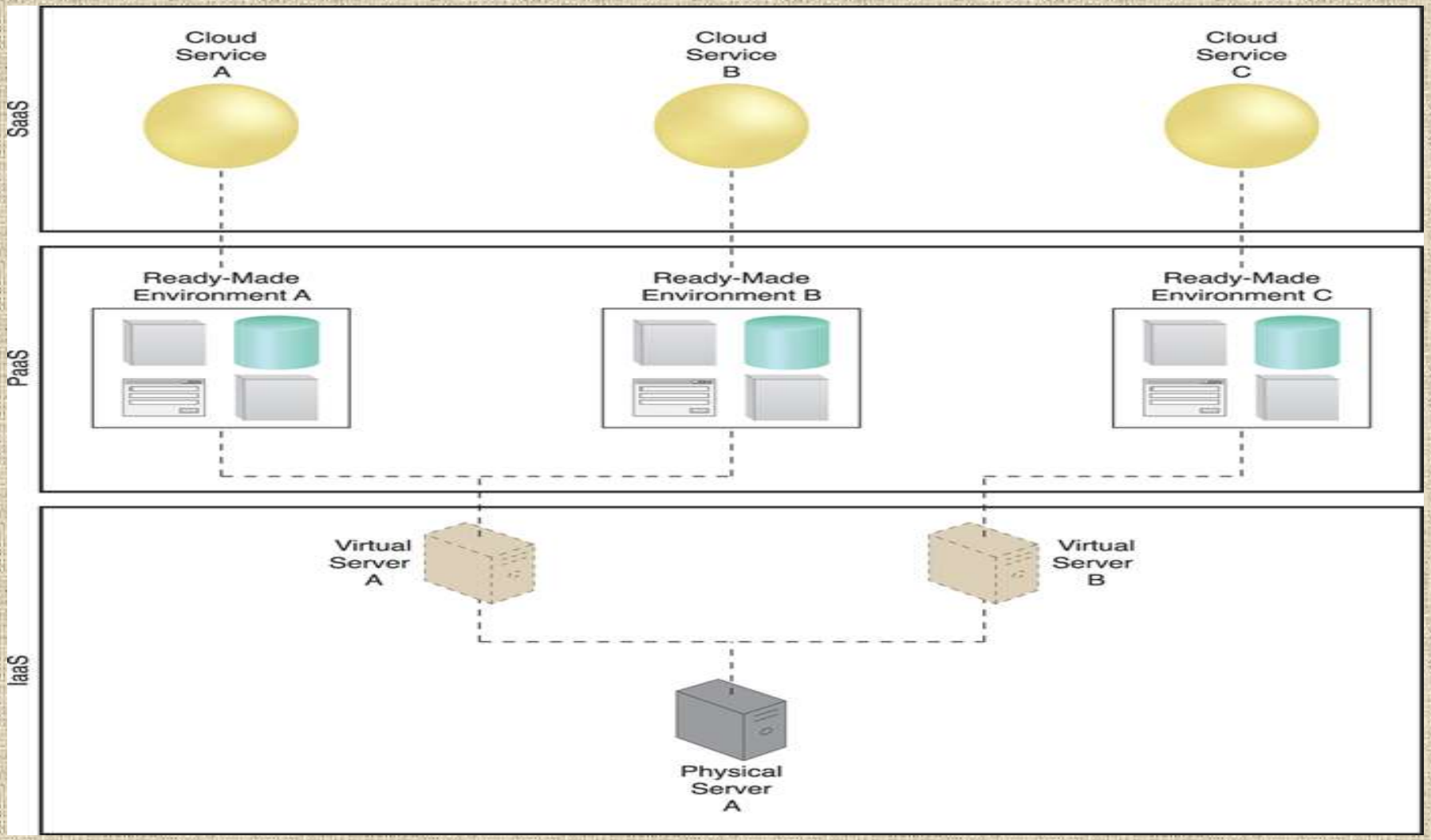

Figure 4.16. A simple layered view of an architecture comprised of IaaS and PaaS environments hosting three SaaS cloud service implementations.

Other Delivery Models

- Storage-as-a-Service
- Database-as-a-Service
- Security-as-a-Service
- Communication-as-a-Service
- Integration-as-a-Service
- Testing-as-a-Service
- Process-as-a-Service

Deployment Models

Public cloud

- *Public cloud* (off-site and remote) describes cloud computing where resources are dynamically provisioned on an on-demand, self-service basis over the Internet, via web applications/web services, open API, from a third-party provider who bills on a utility computing basis.

Private cloud

- A *private cloud* environment is often the first step for a corporation prior to adopting a public cloud initiative. Corporations have discovered the benefits of consolidating shared services on virtualized hardware deployed from a primary datacenter to serve local and remote users.

Hybrid cloud

- A *hybrid cloud* environment consists of some portion of computing resources on-site (on premise) and off-site (*public cloud)*. By integrating public cloud services, users can leverage cloud solutions for specific functions that are too costly to maintain on-premise such as virtual server disaster recovery, backups and test/development environments.

Community cloud

- A *community cloud* is formed when several organizations with similar requirements share common infrastructure. Costs are spread over fewer users than a *public cloud* but more than a single tenant.

Deployment Models: Public Cloud

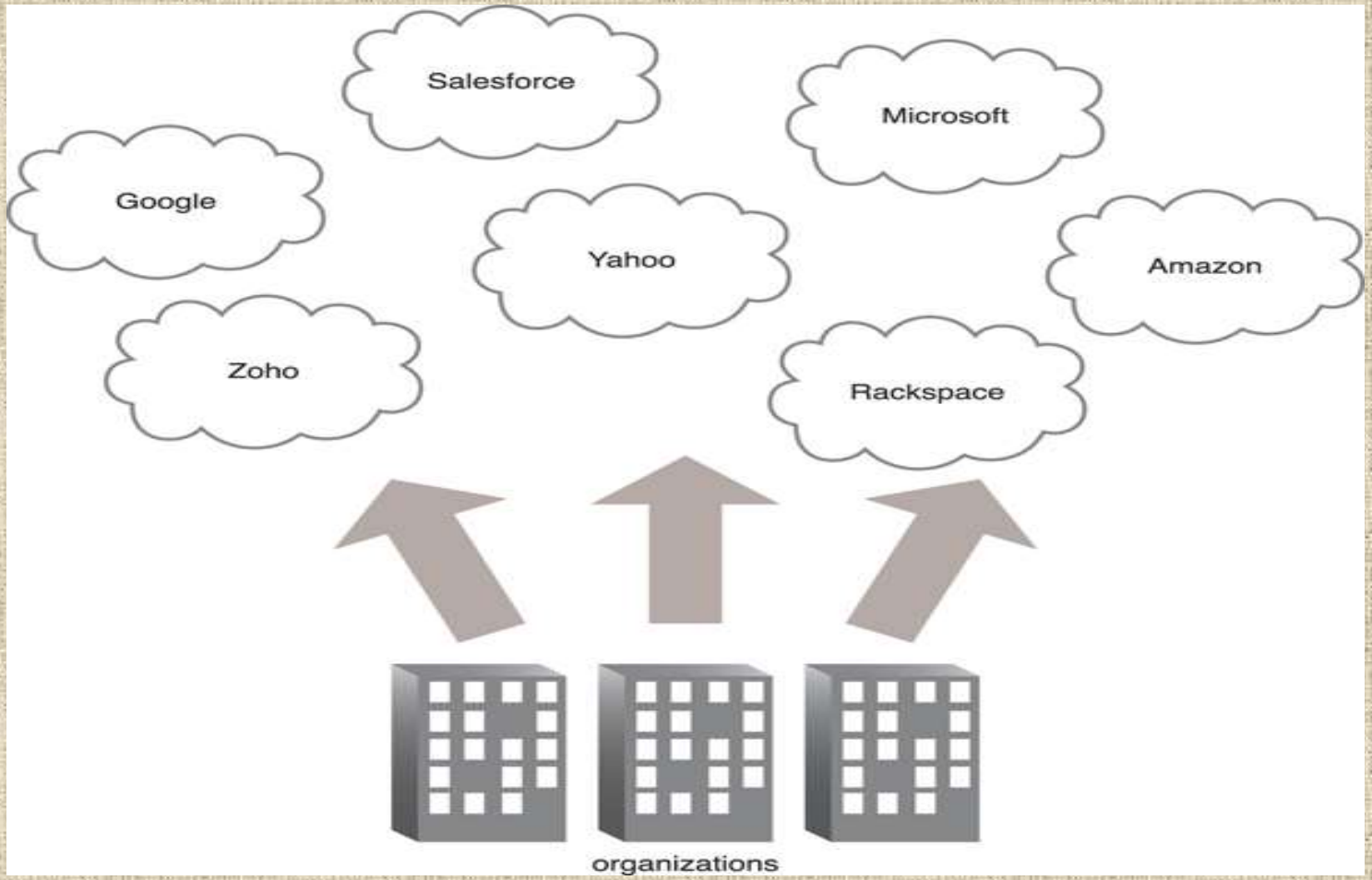

Figure 4.17. Organizations act as cloud consumers when accessing cloud services and IT resources made available by different cloud providers.

Deployment Models: Community Cloud

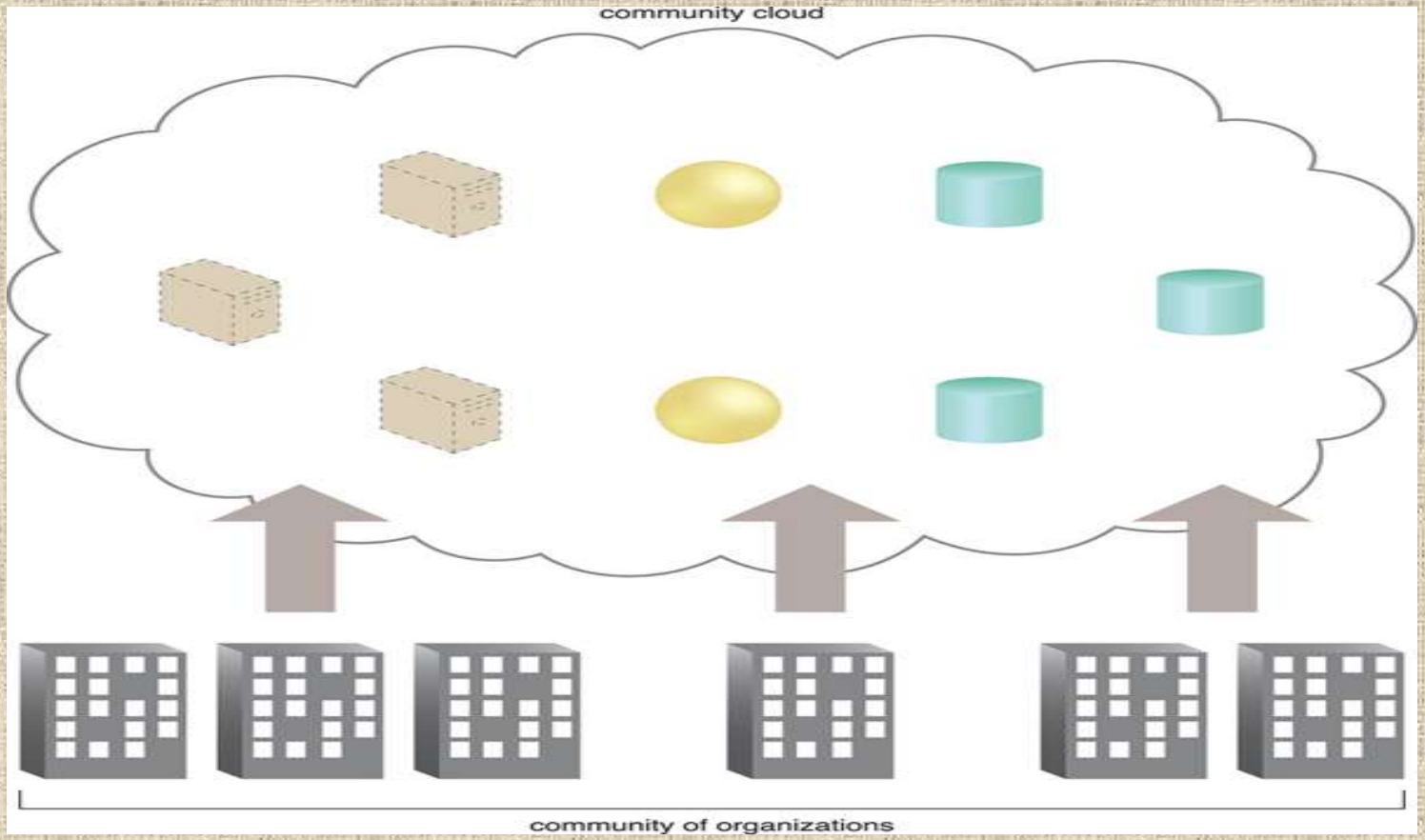

Figure 4.18. An example of a “community” of organizations accessing IT resources from a community cloud.

Deployment Models: Hybrid Cloud

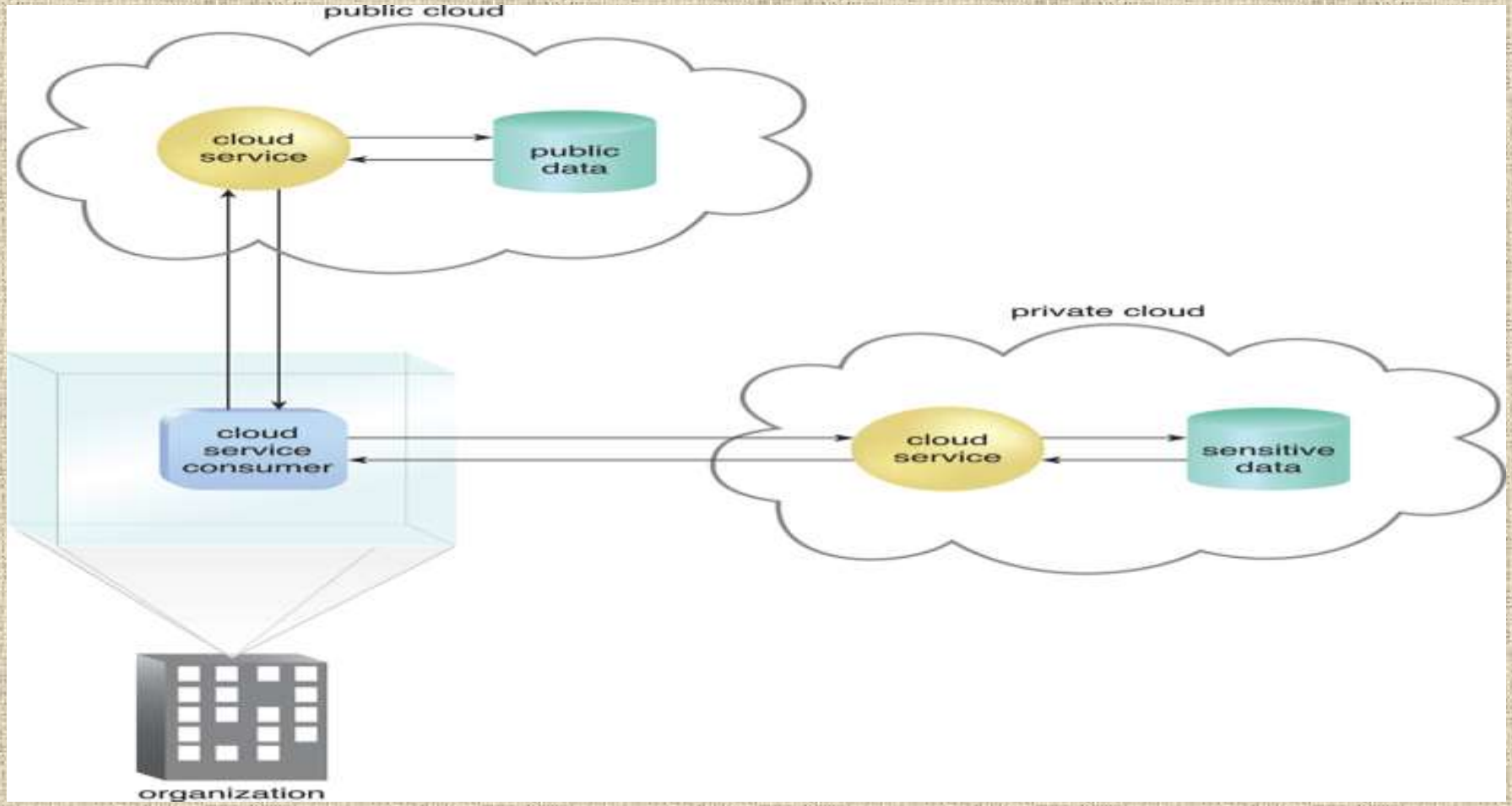

Figure 4.20. An organization using a hybrid cloud architecture that utilizes both a private and public cloud.

Other Cloud Deployment Models

Additional variations of the four base cloud deployment models can exist. Examples include:

• Virtual Private Cloud – Also known as a “dedicated cloud” or “hosted cloud,” this model results in a self-contained cloud environment hosted and managed by a public cloud provider, and made available to a cloud consumer.

• Inter-Cloud – This model is based on an architecture comprised of two or more inter-connected clouds.