

رایانش ابری

آزمایشگاه سیستم های هوشمند

تهیه کننده: علی کمالی

ملیحه هاشمی

زیر نظر استاد احمد عبدالله زاده بارفروش

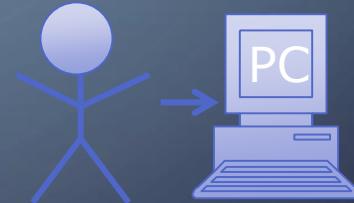
نسل های مختلف مدل های محاسباتی

Centralized Computing

1. Mainframe Computing



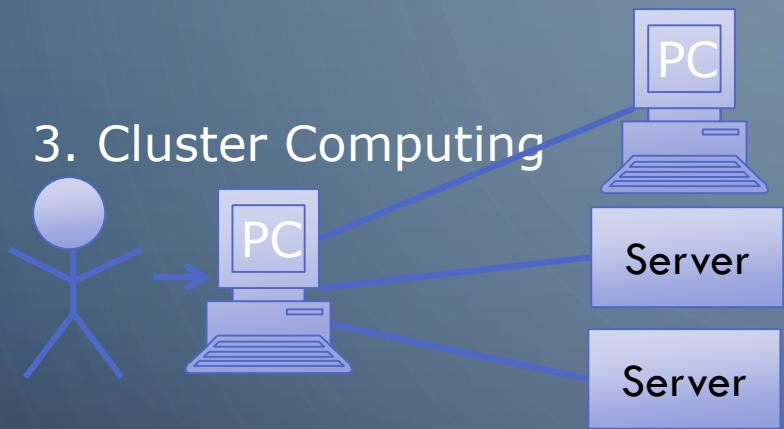
2. PC Computing



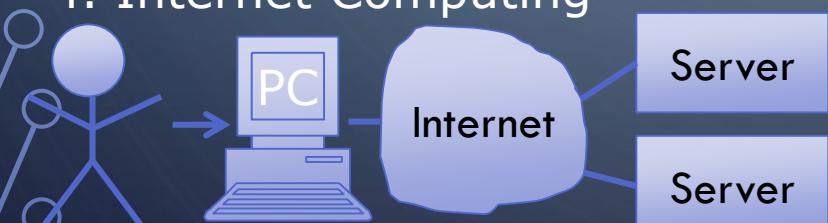
نسل های مختلف مدل های محاسباتی

Distributed Computing

3. Cluster Computing



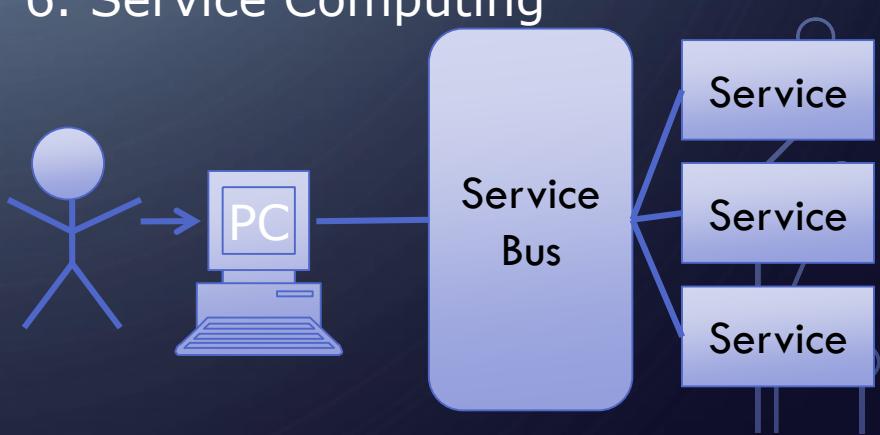
4. Internet Computing



5. Grid Computing



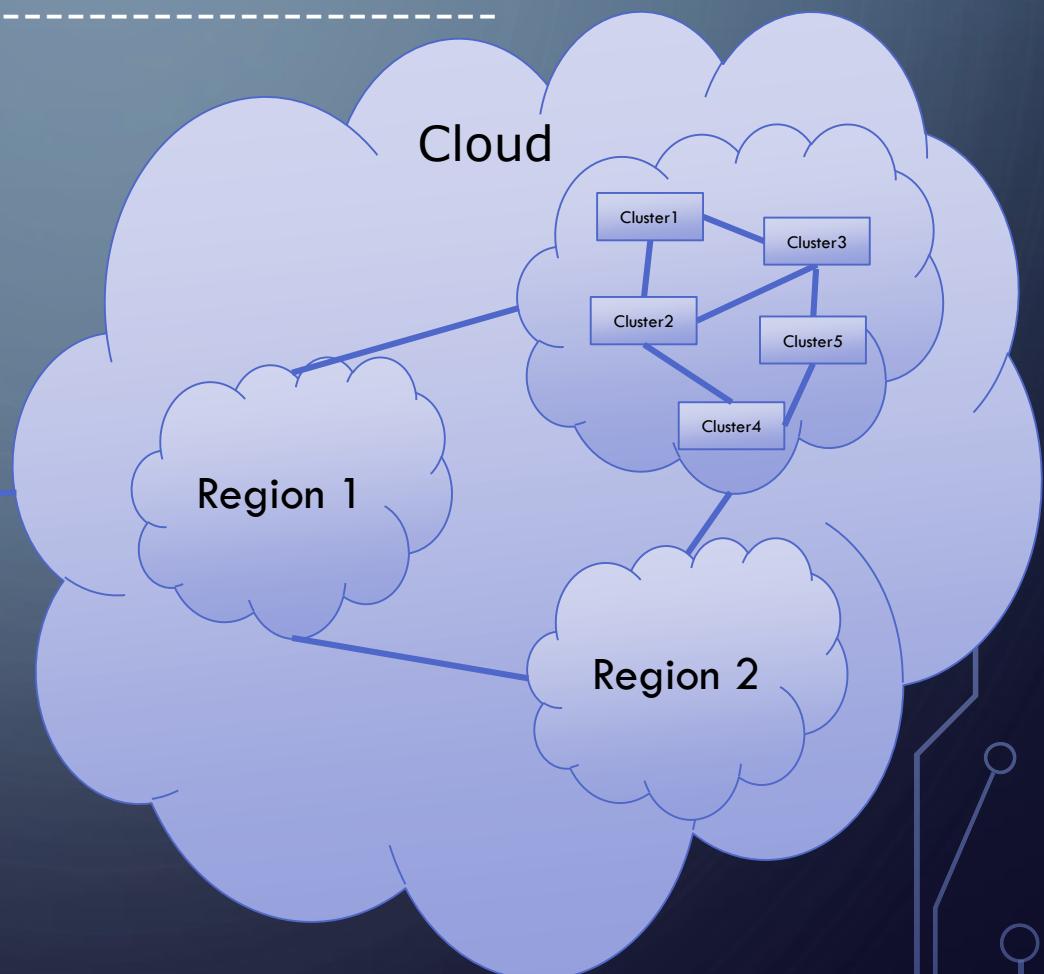
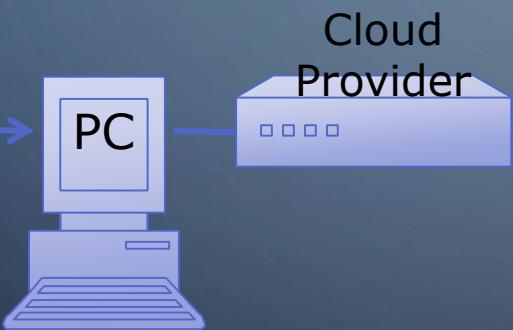
6. Service Computing



نسل های مختلف مدل های محاسباتی

Distributed Computing

7. Cloud Computing



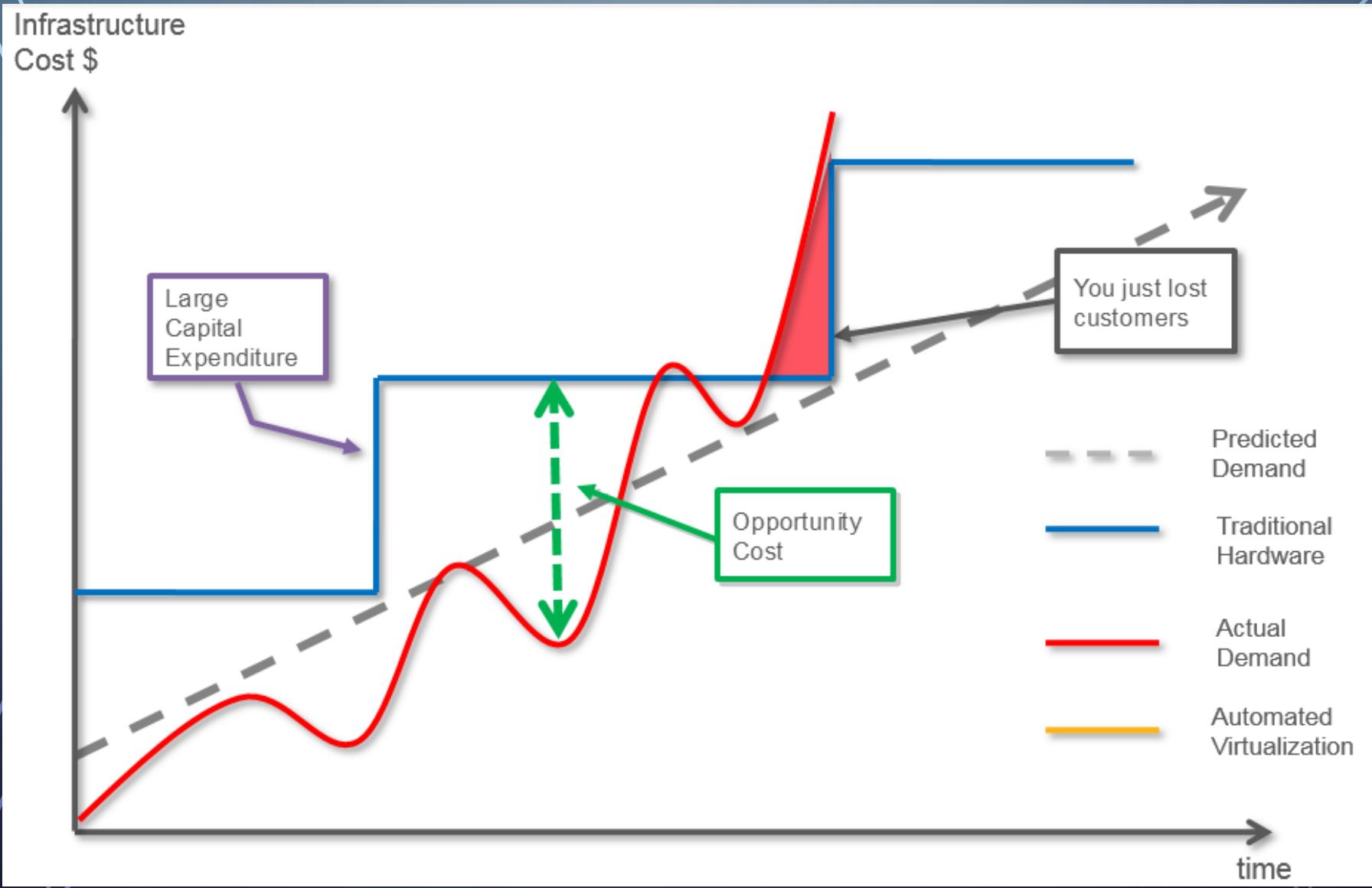
MAINFRAME VS. CLOUD COMPUTING

- Cloud is a return to mainframe computing
- Mainframe
 - Offers finite computing power
 - Dummy terminals as user interface devices
- Cloud
 - Provides almost infinite power and capacity
 - PCs can provide local computing and cashing

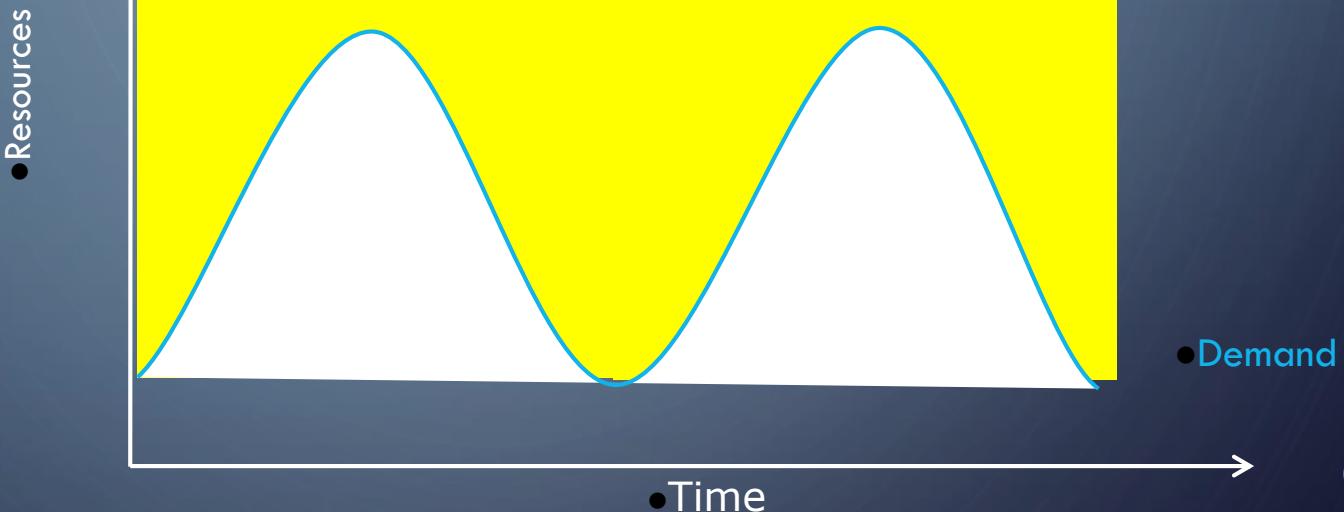
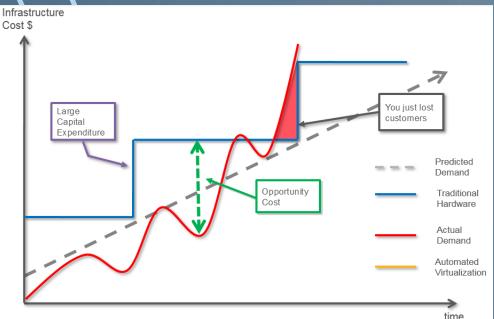
مقایسه مدل ابر با رایانش توری و خوشه‌ای

	Cluster	Grid	Cloud
Resource Handling	Centralized	Distributed	Both
Loose coupling / Scalable	No	Both	Yes
Reliability/ User friendliness	No	Half	Full
Network type	Private	Private	Public Internet
Virtualization	Half	Half	Yes
Business Model	No	No	Yes
Task Size	Single large	Single large	Small, medium & large
Heterogeneity	No	Yes	Yes
Security	High	Medium / High	Low / Medium
Value Added Service	No	Both	Yes
Cost	Very High	High	Low

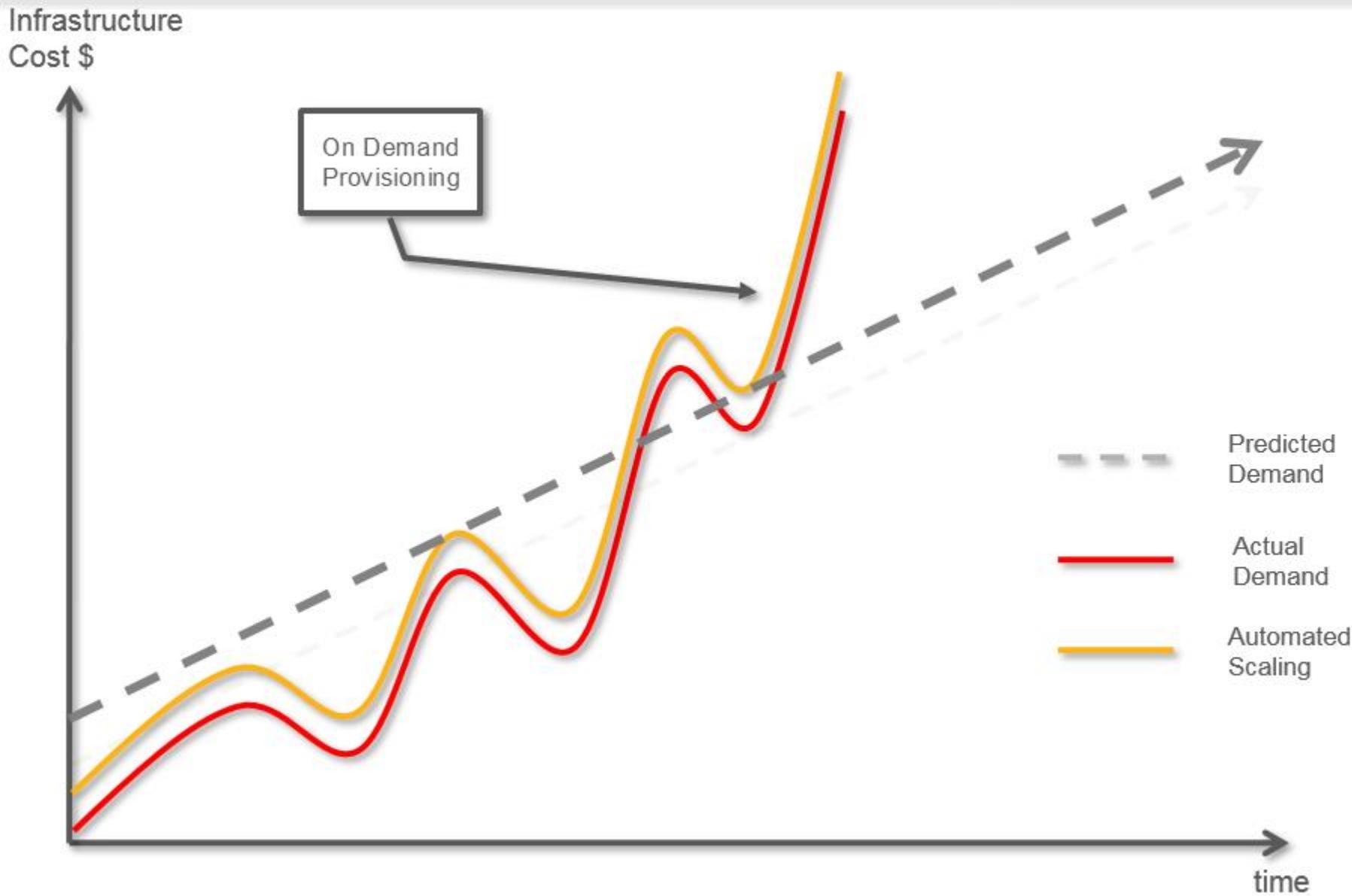
مسئله کلاسیک سیستم های تجاری



مسئله کلاسیک سیستم ها



راه حل ایده آآل برای حل این مسئله



رایانش ابری

ساختار محاسباتی و داده‌ای است که با کمک مجازی سازی امکان دسترسی به منابع فیزیک را به صورت مدیریت شده فراهم می‌کند.

استفاده از مجازی سازی امکان استفاده از منابع فیزیکی کاملاً غیر همگن را به همراه ارائه منابع مجازی کاملاً همگن را فراهم می‌کند.

5 ویژگی اصلی در رایانش ابری

On-demand self-service

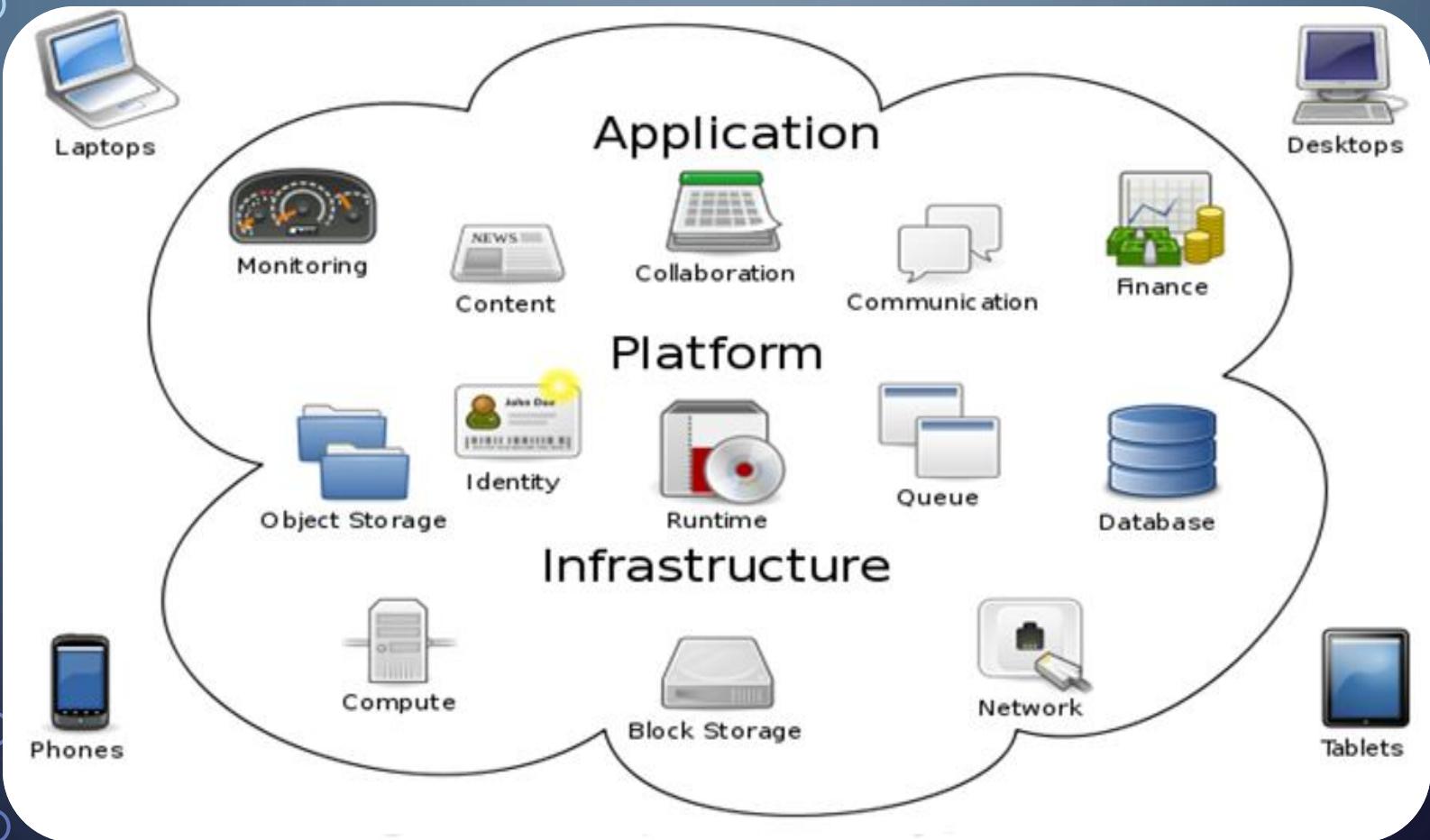
Broad network access

Elastic resource pooling

Rapid elasticity

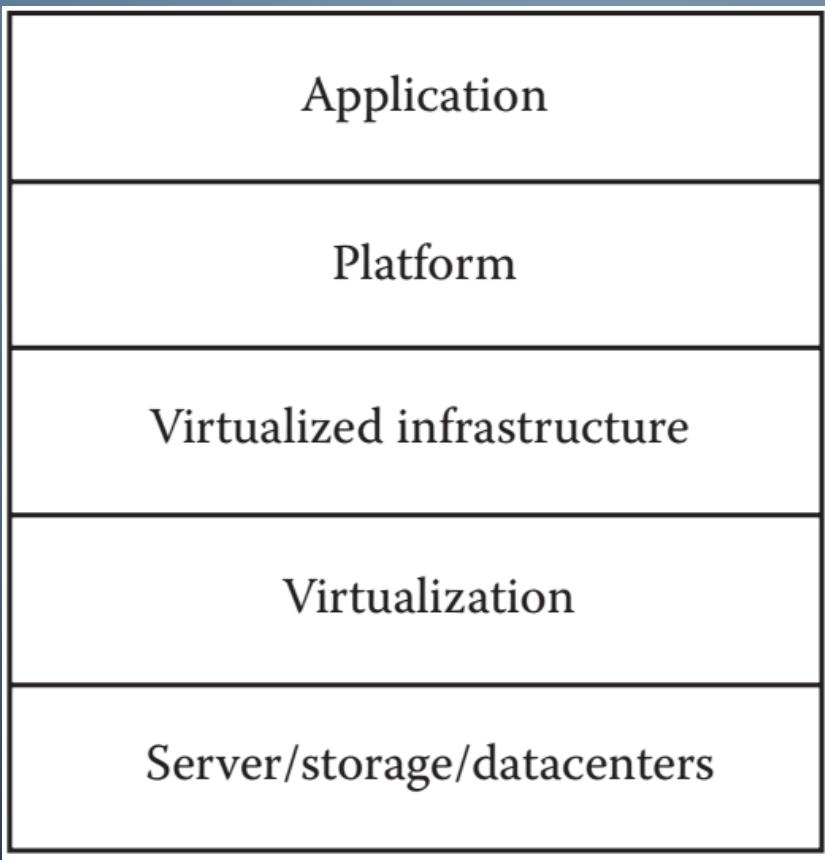
Measured service

رایانش ابری شامل چه اجزایی می تواند باشد؟



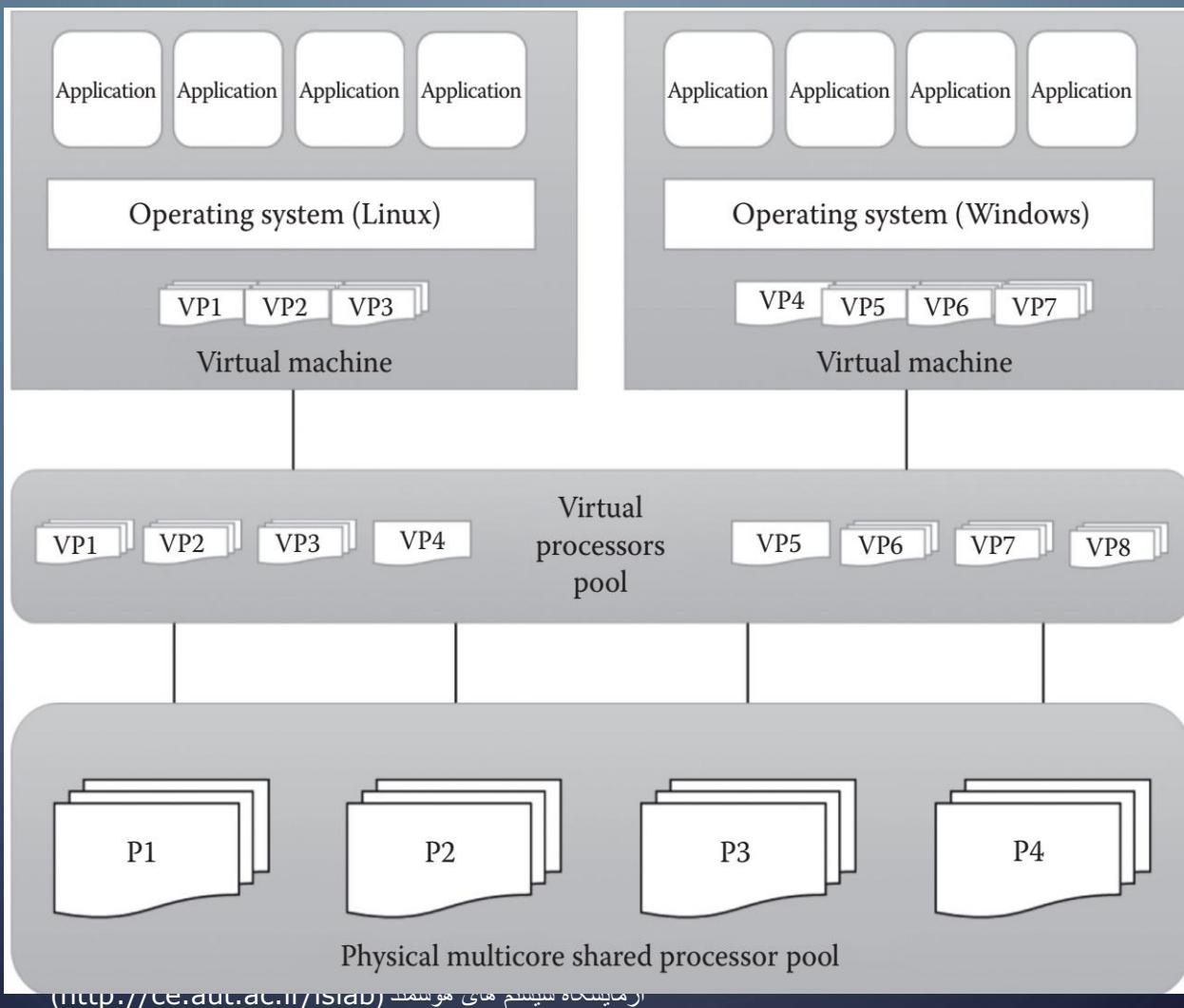
آزمایشگاه سیستم های هوشمند (<http://ce.aut.ac.ir/islab>)

ساختار CLOUD

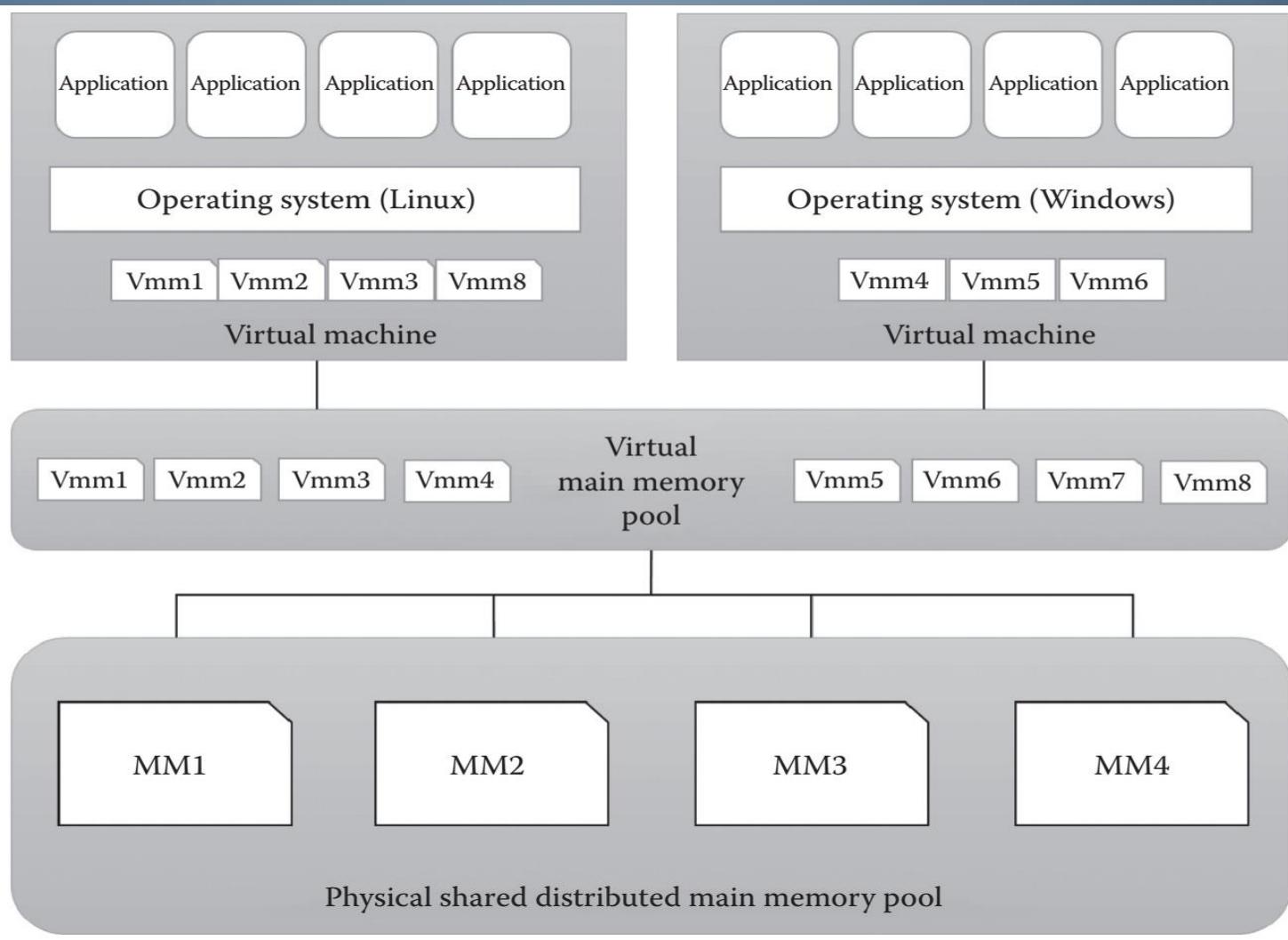


آزمایشگاه سیستم های هوشمند (<http://ce.aut.ac.ir/islab>)

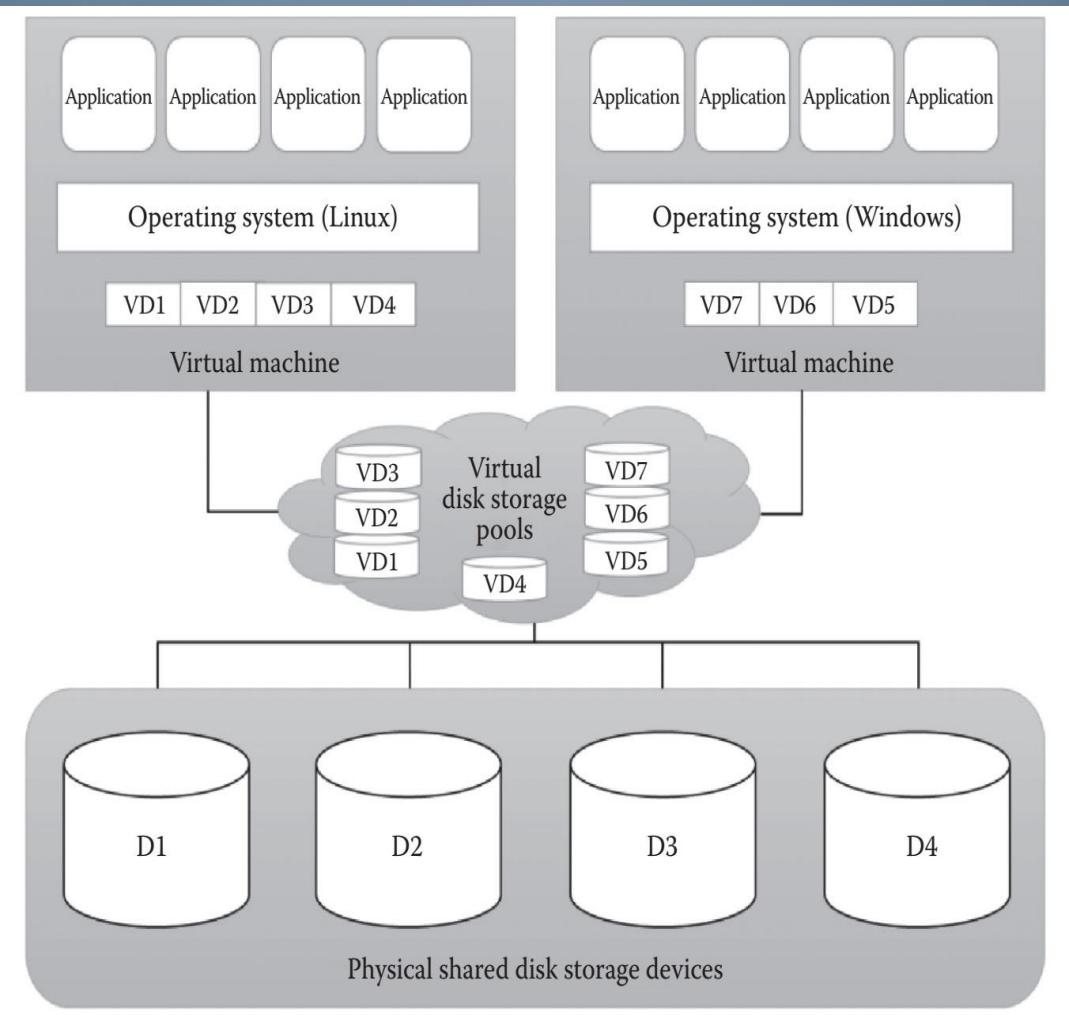
VIRTUALIZATION



VIRTUALIZATION



VIRTUALIZATION



مدل استاندارد رایانش ابری

تحمل پذیری قوی
خطاهای

قابلیت اندازه گیری و
قیمت گذاری مناسب

انعطاف پذیری کارا

دسترسی گسترده در
نقاط مختلف جهان

ارائه سرویس لحظه‌ای
خودکار

استخراج از منابع

خصوصیات
مهم ابر

زیرساخت به عنوان سرویس (IaaS)

پلتفرم به عنوان سرویس (PaaS)

نرم افزار به عنوان سرویس (SaaS)

مدل های
سرویس

ابر ترکیبی

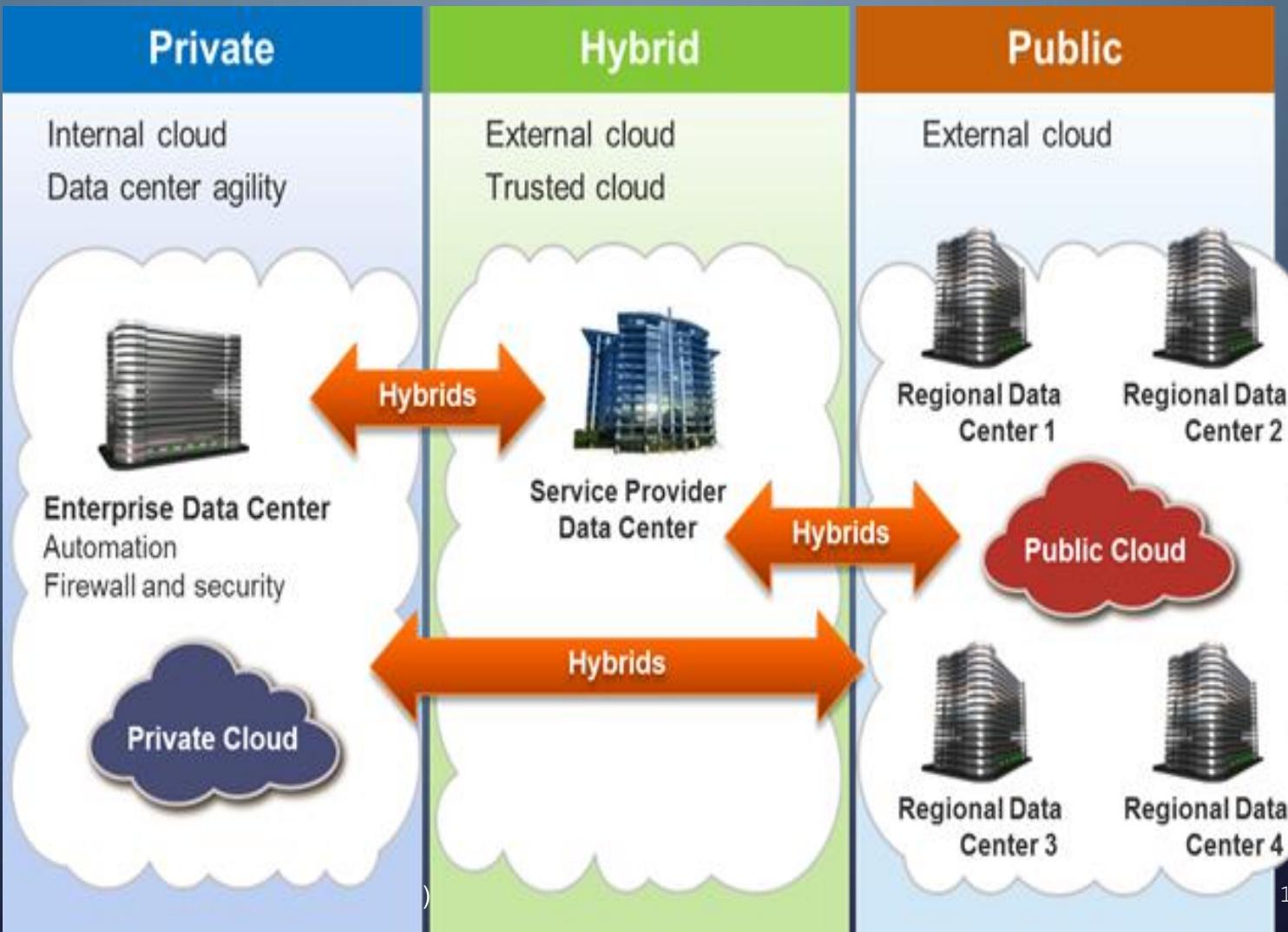
ابر ارتباطی

ابر خصوصی

ابر عمومی

مدل های
محاسبات
ابری

مدل های مختلف رایانش ابری



مدل های مختلف رایانش ابری

Public cloud •

• ویژگی ها

Highly scalable •

Less secure •

Highly available •

Stringent SLAs •

شرایط استفاده •

The requirement for resources is large, that is, there is large user base. •

The requirement for resources is varying. •

There is no physical infrastructure available. •

An organization has financial constraints •

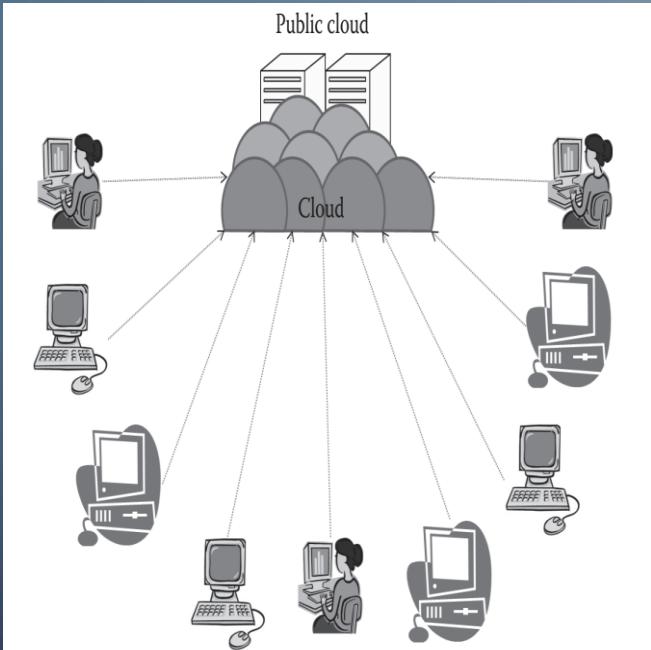
شرایط عدم استفاده •

Security is very important. •

Organization expects autonomy. •

Third-party reliability is not preferred •

مدل های مختلف رایانش ابری



Public cloud •

issues •

SLA •

Network •

Performance •

Security and data privacy •

Laws and conflicts •

Cloud management •

Maintenance •

Migration •

مدل های مختلف رایانش ابری

Public cloud

• مزایا

There is no need of establishing infrastructure for setting up a cloud.

There is no need for maintaining the cloud.

They are comparatively less costly than other cloud models.

Strict SLAs are followed.

There is no limit for the number of users.

The public cloud is highly scalable.

• معایب

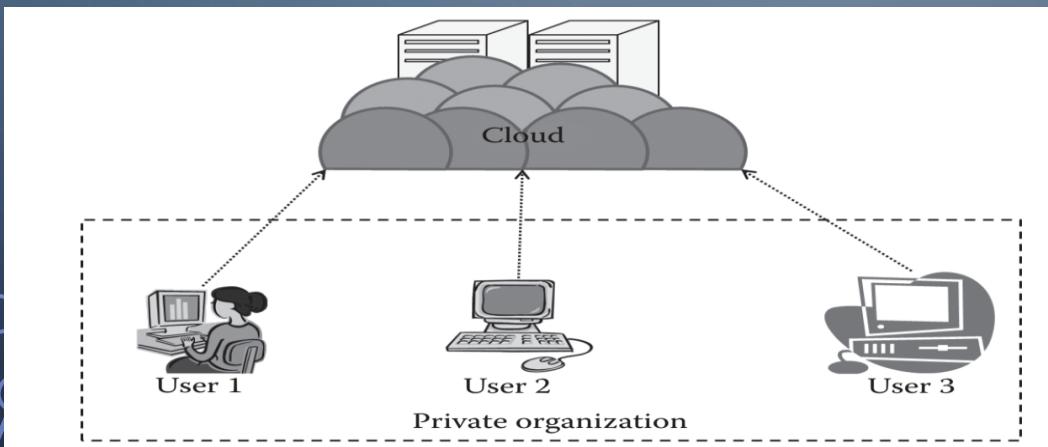
Security is an issue.

Privacy and organizational autonomy are not possible

مدل های مختلف رایانش ابری

Private Cloud

The private cloud is small in size as compared to other cloud models. Here, the cloud is deployed and maintained by the organizations itself.



- ویژگی ها
- Secure
- Central control
- Weak SLAs

مدل های مختلف رایانش ابری

Private Cloud

شرایط استفاده

- The organizations or enterprises that require a separate cloud for their personal or official use.
- The organizations or enterprises that have a sufficient amount of funds as managing and maintaining a cloud is a costly affair.
- The organizations or enterprises that consider data security to be important.
- The organizations that want autonomy and complete control over the cloud.
- The organizations that have a less number of users.
- The organizations that have prebuilt infrastructure for deploying the cloud and are ready for timely maintenance of the cloud for efficient functioning.

مدل های مختلف رایانش ابری

Private Cloud •

• شرایط عدم استفاده

- The organizations that have high user base
- The organizations that have financial constraints
- The organizations that do not have prebuilt infrastructure
- The organizations that do not have sufficient manpower to maintain and manage the cloud

مدل های مختلف رایانش ابری

Private Cloud •

- حالات مختلف

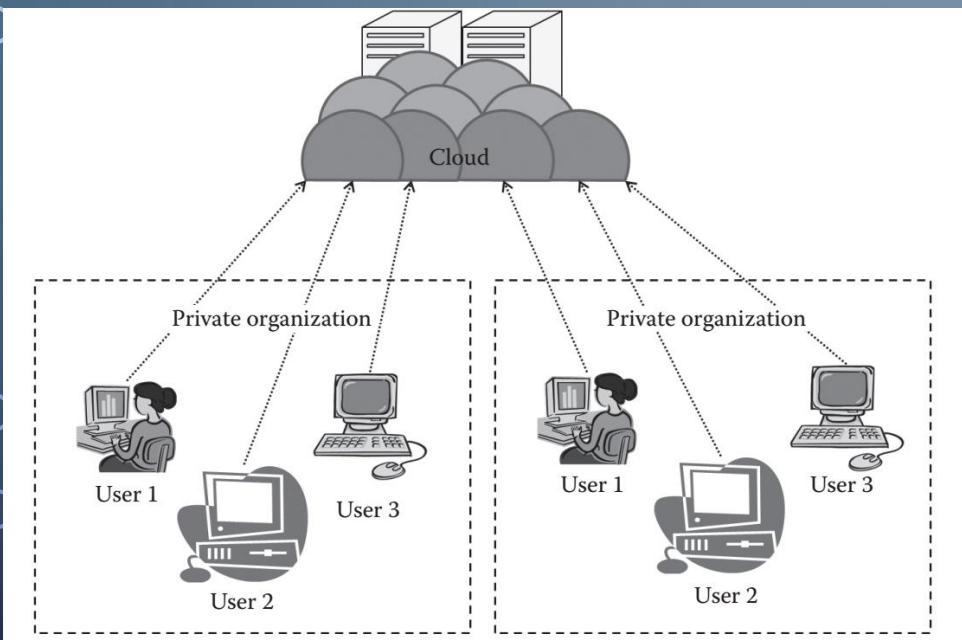
- private cloud

- managed private cloud

- hosted private cloud

- Virtual Private Cloud (VPC).

مدل های مختلف رایانش ابری



Community Cloud •

- ویژگی ها

- Collaborative and distributive maintenance

- Partially secure

- Cost effective

مدل های مختلف رایانش ابری

Community Cloud •

• شرایط استفاده •

- Want to establish a private cloud but have financial constraint
- Do not want to complete maintenance responsibility of the cloud
- Want to establish the cloud in order to collaborate with other clouds
- Want to have a collaborative cloud with more security features than the public cloud

• شرایط عدم استفاده •

- Prefer autonomy and control over the cloud
- Does not want to collaborate with other organization

مدل های سرویس در رایانش ابری

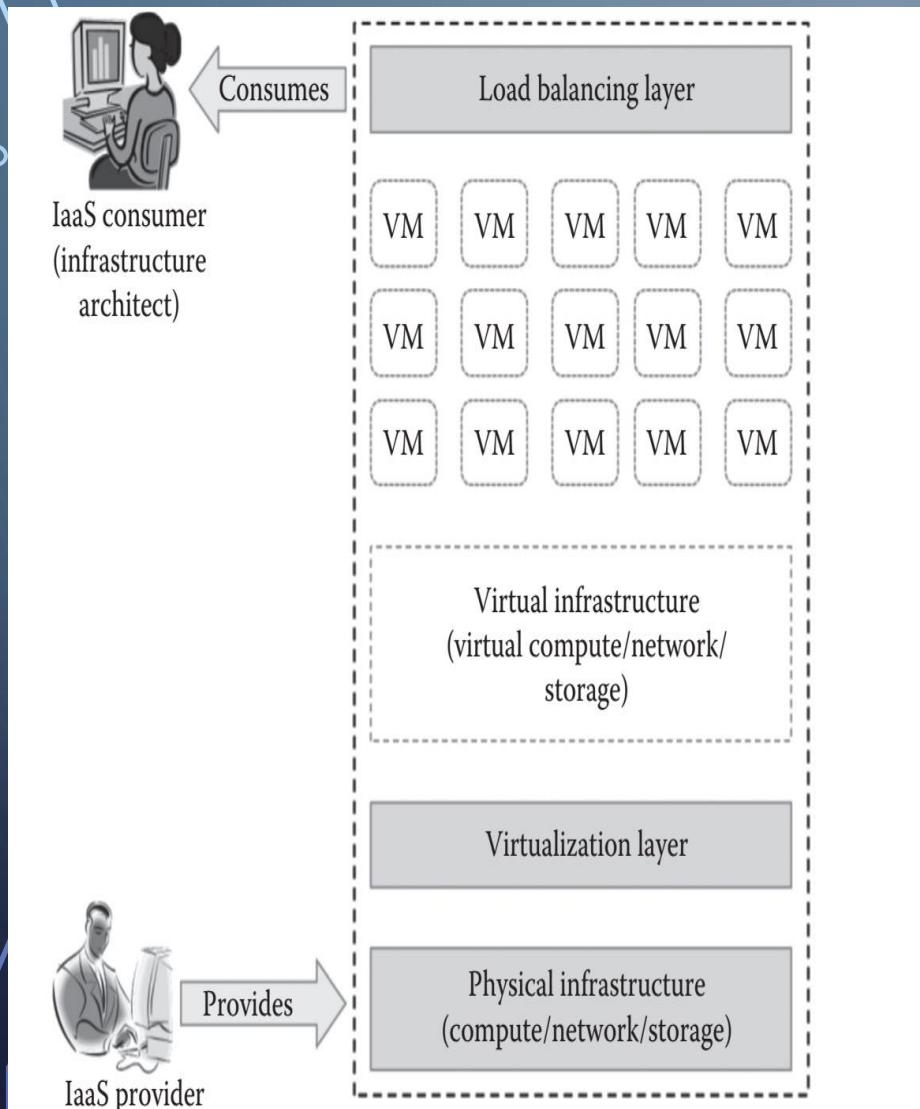
Software as a Service
(SaaS)

Platform as a Service
(PaaS)

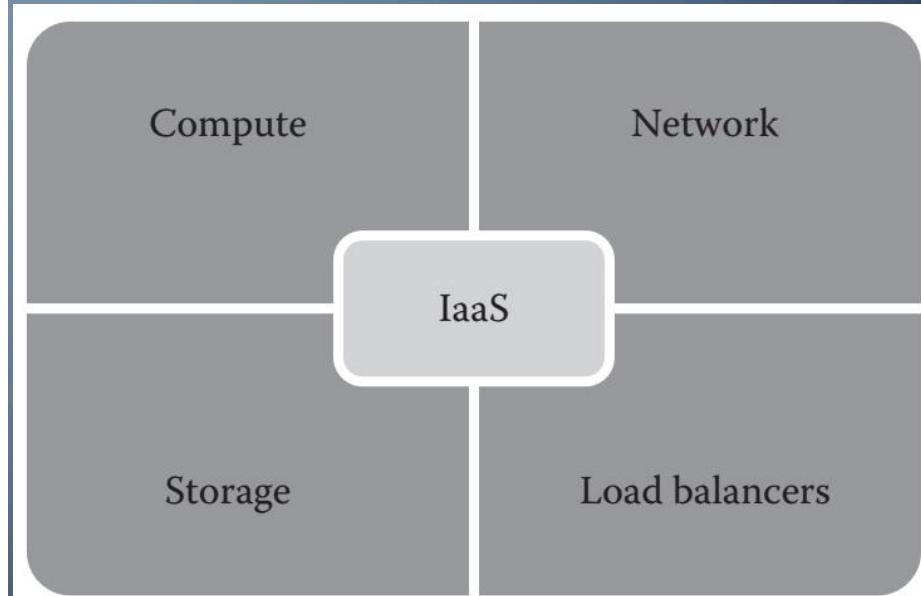
Infrastructure as a
Service (IaaS)

Who Uses It	What Services are available	Why use it?
Business Users	E-Mail, Office Automation, CRM, Website Testing, Wiki, Blog, Virtual Desktop ...	To complete business tasks
Developers and Deployers	Service and application test, development, integration and deployment	Create or deploy applications and services for users
System Managers	Virtual machines, operating systems, message queues, networks, storage, CPU, memory, backup services	Create platforms for service and application test, development, integration and deployment

مدل های سرویس در رایانش ابری



IaaS



مدل های سرویس در رایانش ابری

Infrastructure as a Service •

- changes the way that the compute, storage, and networking resources are consumed
- IaaS changes the computing from a physical infrastructure to a virtual infrastructure
- IaaS provides virtual computing, storage, and network resources by abstracting the physical resources. Technology **virtualization** is used to provide the virtual resources.

مدل های سرویس در رایانش ابری

Infrastructure as a Service

- ویژگی ها

- Web access to the resources

- Centralized management

- Elasticity and dynamic scaling

- Shared infrastructure

- Preconfigured VMs

- Metered services

مدل های سرویس در رایانش ابری

Infrastructure as a Service

- شرایط استفاده

Unpredictable spikes in usage

Limited capital investment

Infrastructure on demand

- شرایط عدم استفاده

When regulatory compliance does not allow off-premise hosting

When usage is minimal

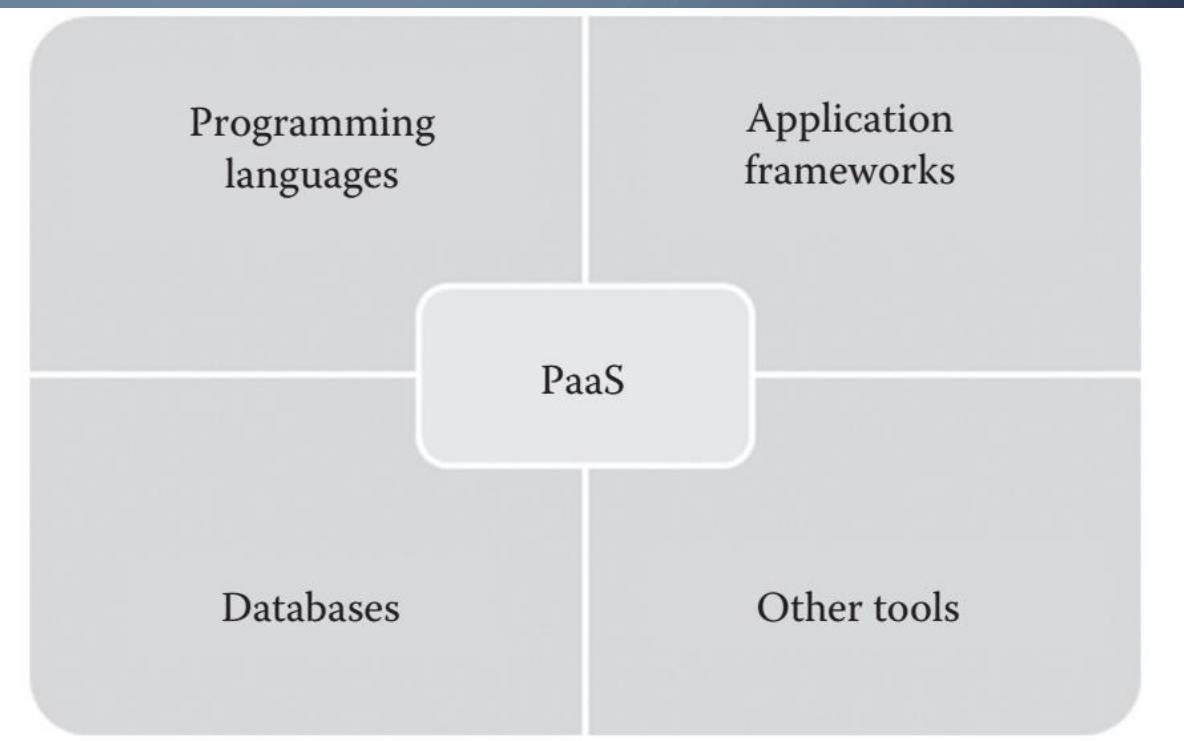
When better performance is required

When there is a need for more control on physical infrastructure

مدل های سرویس در رایانش ابری

Platform as a Service •

- PaaS changes the way that the software is developed and deployed.



مدل های سرویس در رایانش ابری

Platform as a Service

- ویژگی ها
- All in one
- Web access to the development platform
- Offline access
- Built-in scalability
- Collaborative platform
-

مدل های سرویس در رایانش ابری

Platform as a Service •

- شرایط استفاده
 - Collaborative development
 - Automated testing and deployment
 - Time to market
- شرایط عدم استفاده
 - Frequent application migration
 - Customization at the infrastructure level
 - Flexibility at the platform level
 - Integration with on premise application

مدل های سرویس در رایانش ابری

Software as a Service •

- SaaS changes the way the software is delivered to the customers



مدل های سرویس در رایانش ابری

Software as a Service •

- ویژگی ها
- One to many
- Web access
- Centralized management
- Multi device support
- Better scalability
- High availability

مدل های سرویس در رایانش ابری

Software as a Service •

• شرایط استفاده

• On-demand software

• Software for start-up companies

• Software compatible with multiple devices

• Software with varying loads

• شرایط عدم استفاده

• Real-time applications

• Applications with confidential data

• Better on premise application

مدل های سرویس در رایانش ابری

Software as a Service

مزایا

- No client-side installation

- Cost savings

- Less maintenance

- Ease of access

- Dynamic scaling

- Multitenancy

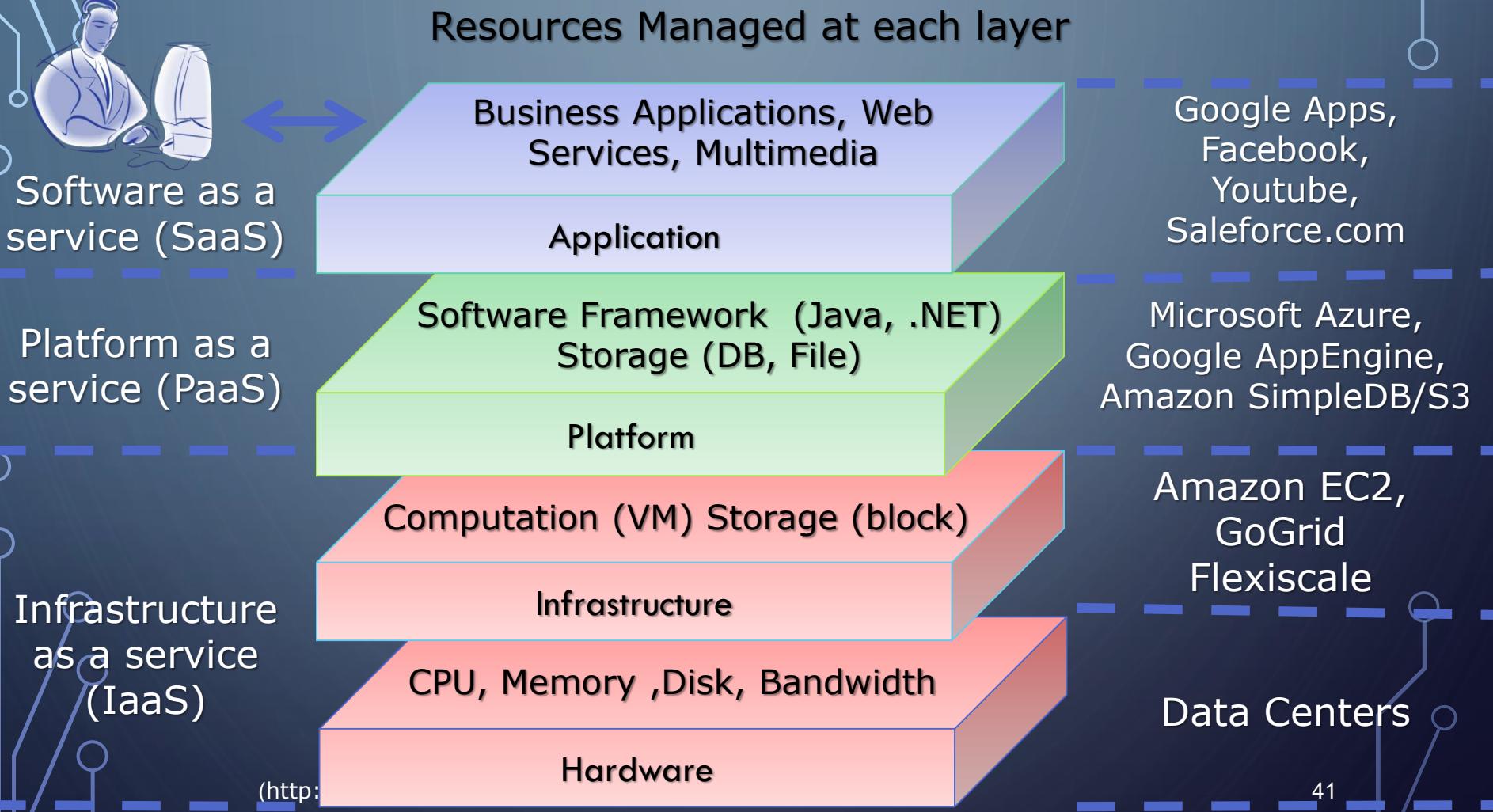
معایب

- Security

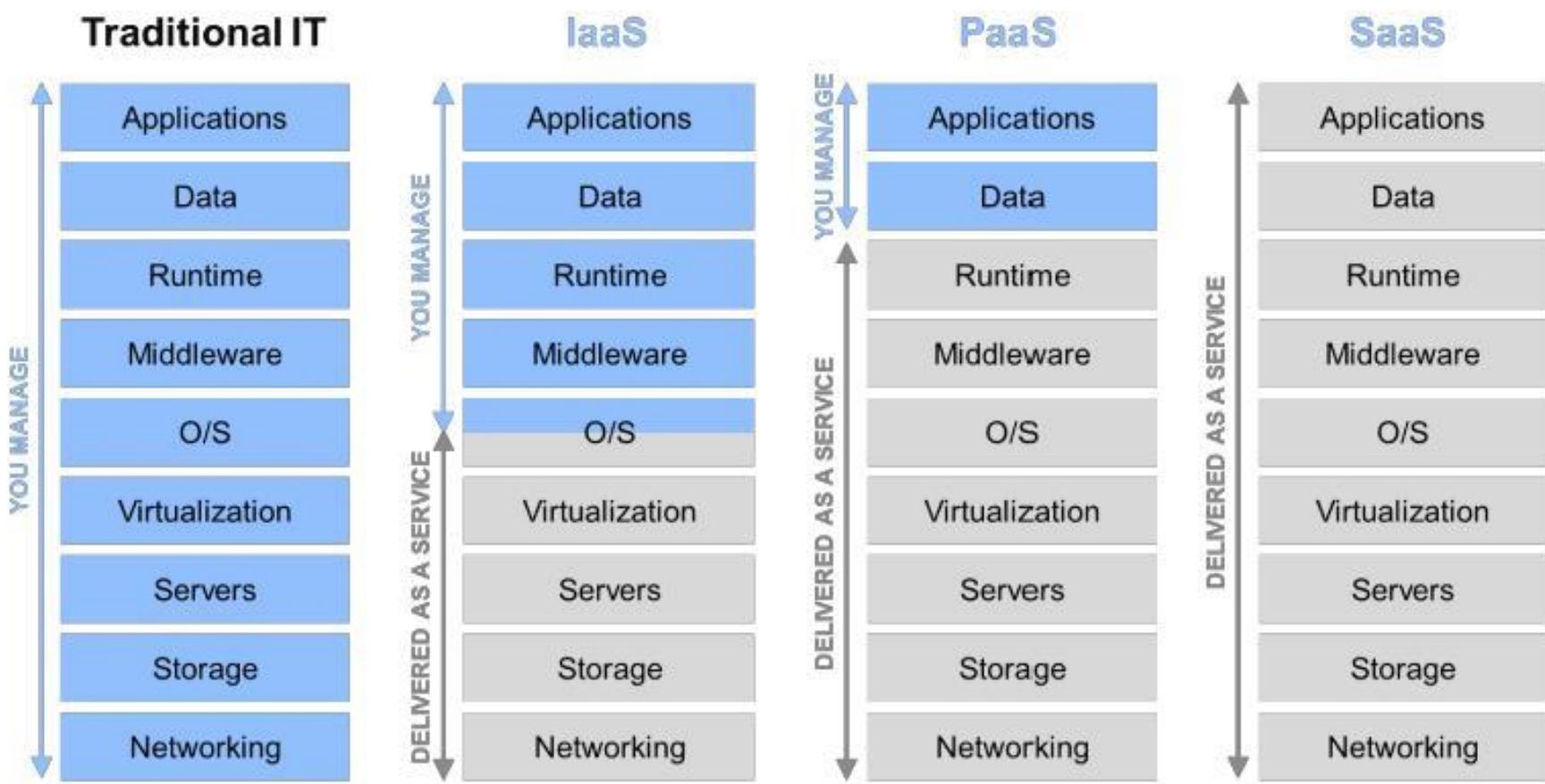
- Connectivity requirements

- Loss of control

مدل های سرویس در رایانش ابری



مدل های سرویس دهی در رایانش ابری



Source: Microsoft.

Source: Microsoft.

ارائه دهندگان رایانش ابری

Software as a Service
(SaaS)

Platform as a Service
(PaaS)

Infrastructure as a
Service (IaaS)

(<http://ce.aut.ac.ir/islab>) آزمایشگاه سیستم های هوشمند



ارائه دهندگان مشهور رایانش ابری



- Windows Azure (PaaS)
 - Hosting service for .NET applications and SQL databases
- Google AppEngine (PaaS)
 - Automatic scaling and reliability at the price of a highly constrained application structure (3-tier Web application)
- Amazon Web Services (IaaS)
 - Includes Scalable Storage Service (S3), Elastic Computing Cloud (EC2), Elastic Block Store (EBS)
 - Comes with many secondary tools: e-commerce, Content-Distribution Network (CDN), etc.

