مباحث پیشرفته در فناوری اطلاعات
جلسه دوم - رایانش ابری

مرتضی سرگلزایی جوان

مرکز تحقیقات رایانش

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- بخش دوم: وضعیت رایانش ابری در ایران
- بخش سوم: معماری رایانش ابری
- بخش چهارم: ملاحظات طراحی مرکز داده
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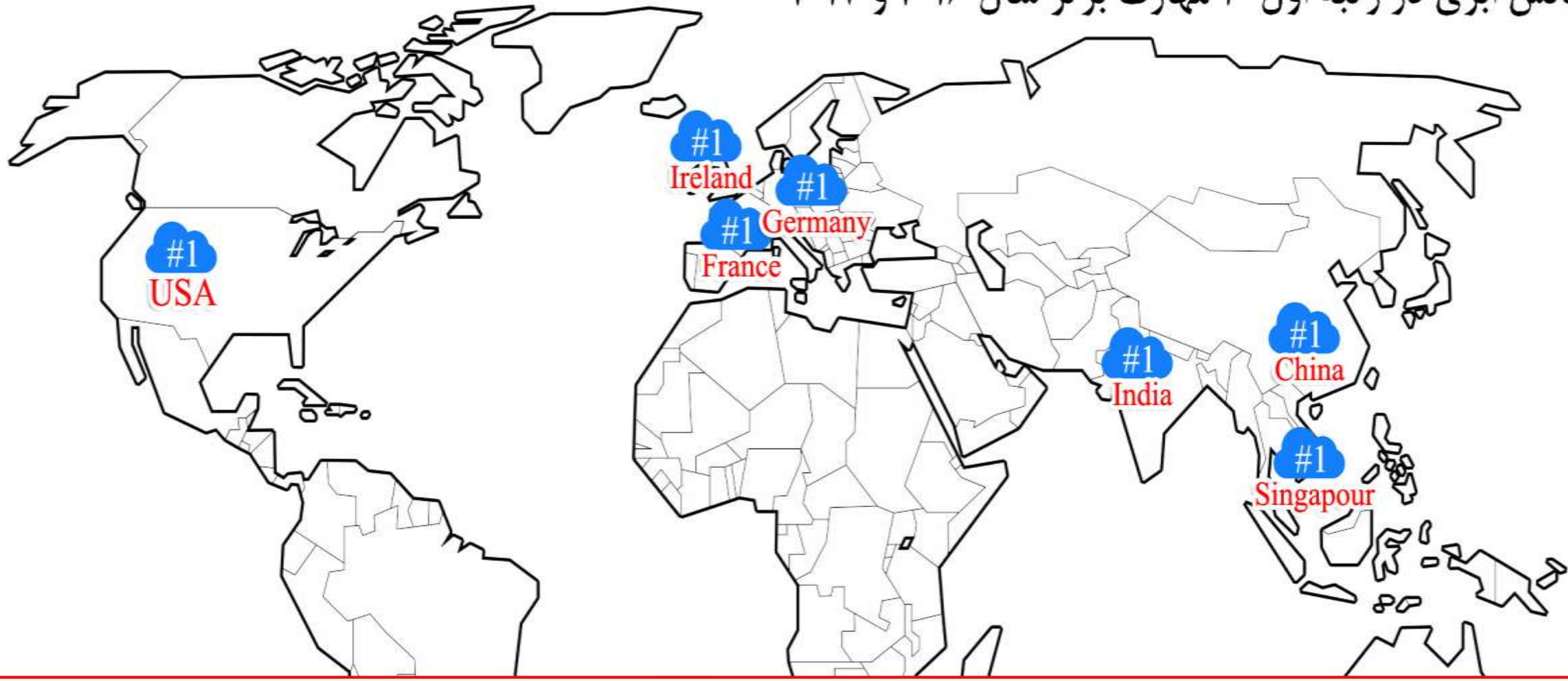
رایانش ابری در رتبه اول ۱۰ مهارت برتر سال ۲۰۱۶ و ۲۰۱۷



1. Cloud and Distributed Computing
2. Statistical Analysis and Data Mining
3. Web Architecture and Development Framework
4. Middleware and Integration Software
5. User Interface Design
6. Network and Information Security
7. Mobile Development
8. Data Presentation
9. SEO/SEM Marketing
10. Storage Systems and Management

منبع: LinkedIn Official Blog

@msjavan_ir http://msjavan.ir

مثال: بانک BBVA

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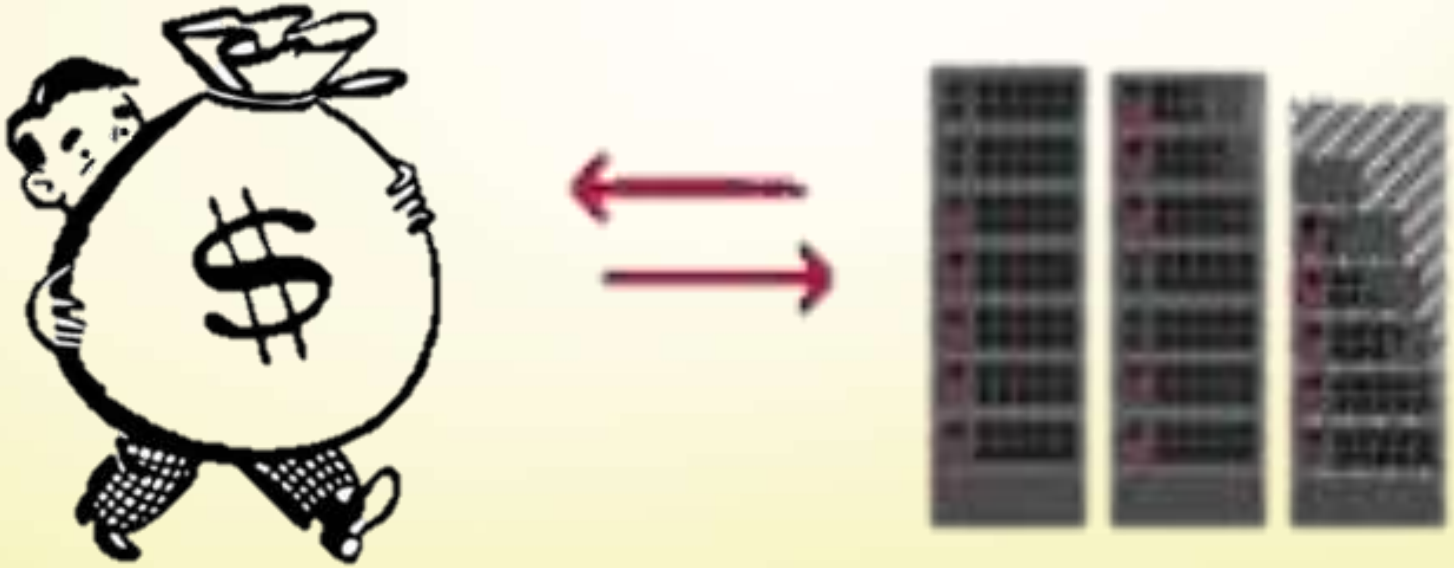
طرح مساله (۱): هزینه های سرمایه گذاری



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طرح مساله (۲): صرفه جویی در زمان

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طرح مساله (۳): هدر رفت منابع

ممکن است منابع زیادی در اختیار داشته باشید، ولی ندانید که چگونه می توانید از آنها استفاده کنید.

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الگوی بهینه مصرف

صرفه جویی در زمان

صرفه جویی در هزینه

صرفه جویی در هزینه ها با رایانش ابری
1 IT TOOLS
2 PROJECT MANAGEMENT
3 FINANCE
4 CRM
5 EMAIL
6 PRODUCTIVITY
7 COLLABORATION

خوب! پسرم.
میز کار شما، فایل، پرونده ها،
گل مصنوعی و ...
همه رو منتقل کردیم به ابر!
بعدش نوبت
خودته!
AL JOHNSON JR.

مثالی از بکارگیری رایانش ابری

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طی ۱۵ الی ۲۰ سال آینده، استفاده از فناوری اطلاعات آنچنان فراگیر خواهد شد که پردازش محلی مقرون به صرفه نخواهد بود!

هزینه راه اندازی ژنراتور
نسبت به استفاده از شبکه برق

هزینه احداث چاه و تامین آب
نسبت به استفاده از شبکه آب

هزینه ایجاد زیرساخت ارتباطی
نسبت به استفاده از شبکه تلفن و موبایل

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مصرف کننده

سرویس دهنده

Power (Public Utility)

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مصرف کننده

سرویس دهنده

Water (Public Utility)

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مصرف کننده

سرویس دهنده

Communication (Public Utility)

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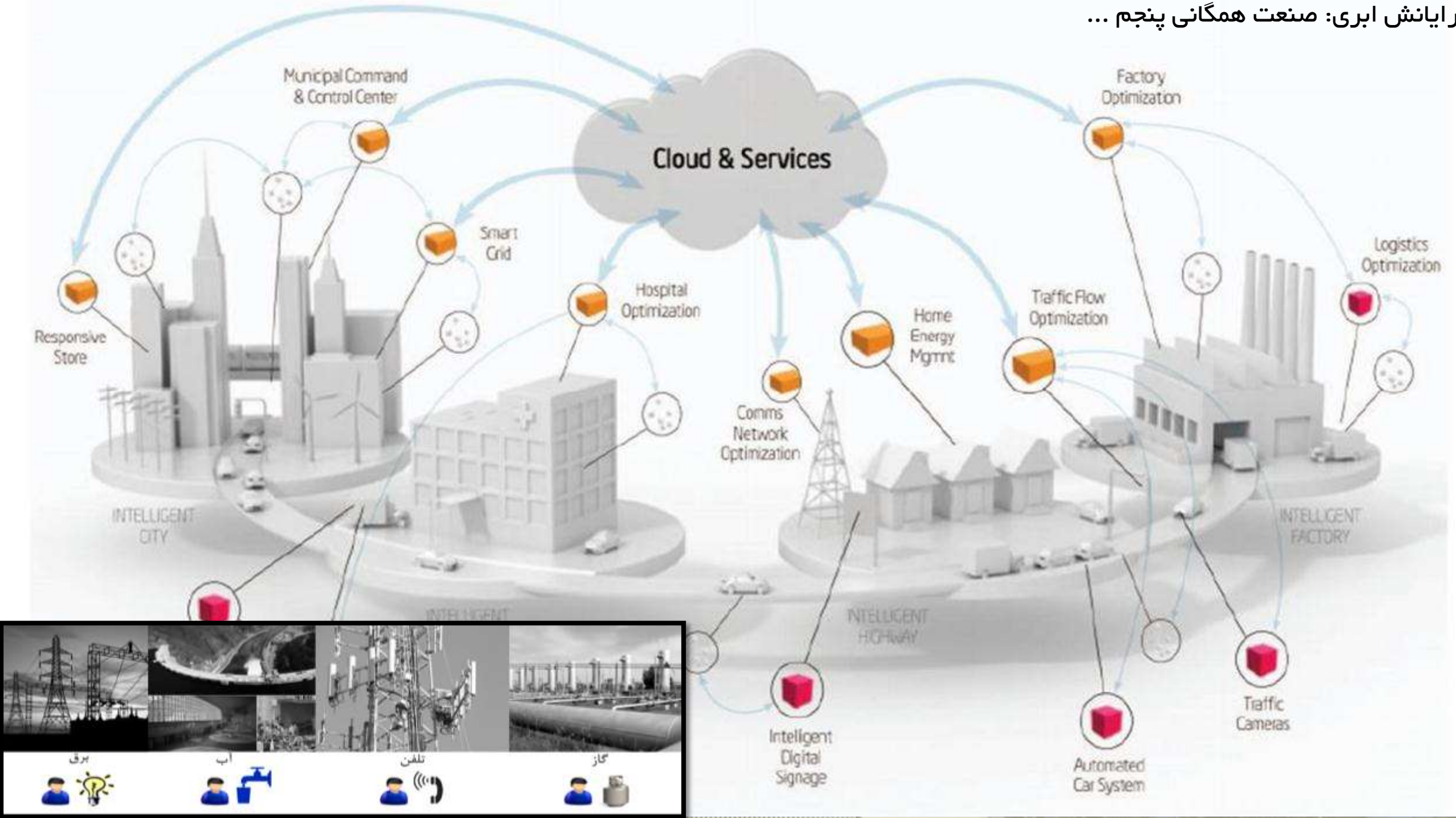
مصرف کننده

سرویس دهنده

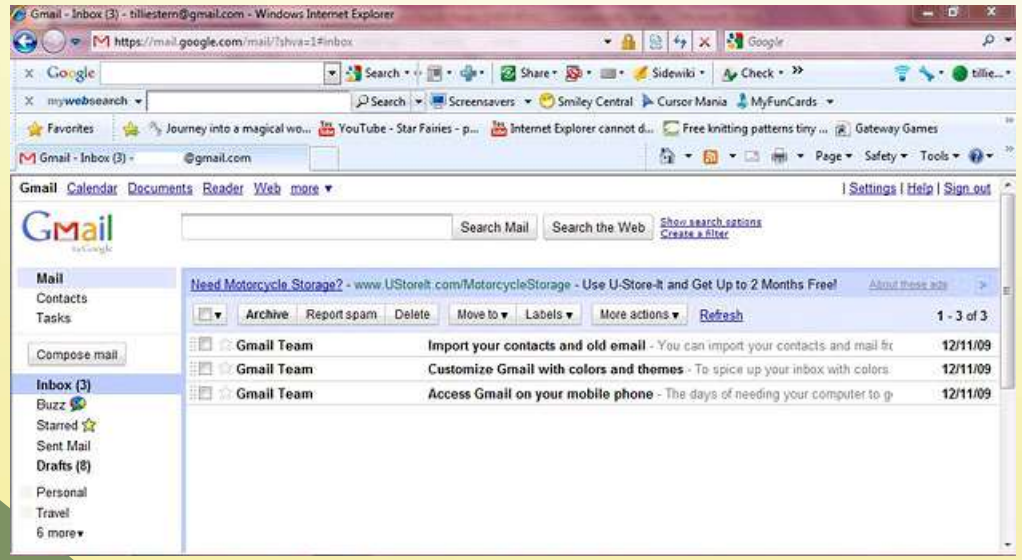
Oil & Gas (Public Utility)

رایانش ابری: صنعت همگانی پنجم ...



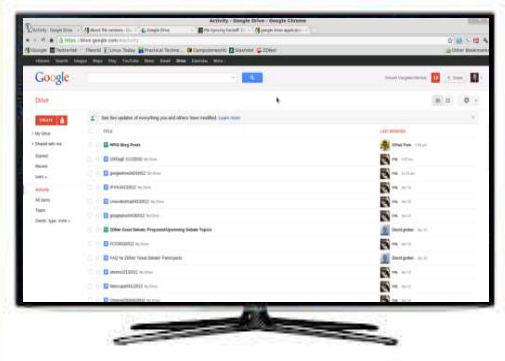
مثال موردی : Gmail

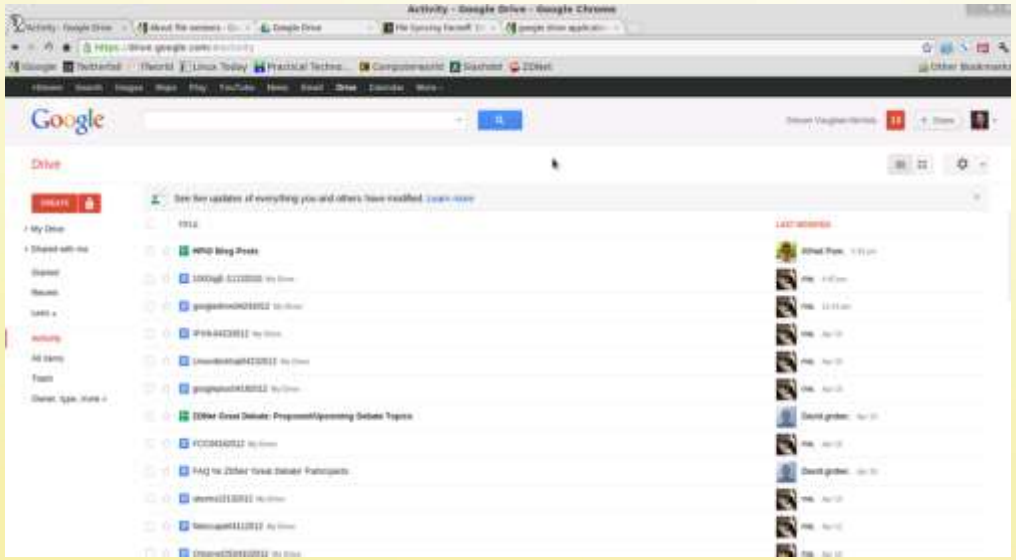
Gmail

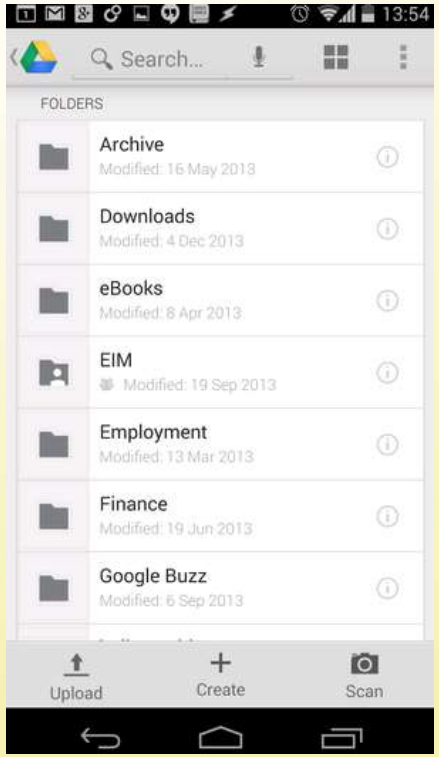


مثال موردی : Drive

Google Drive







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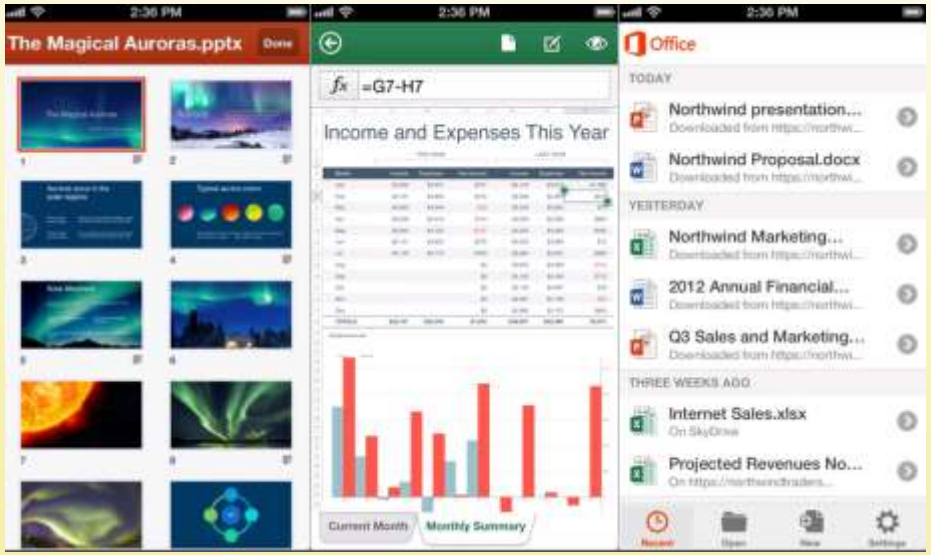
مثال موردی : Office



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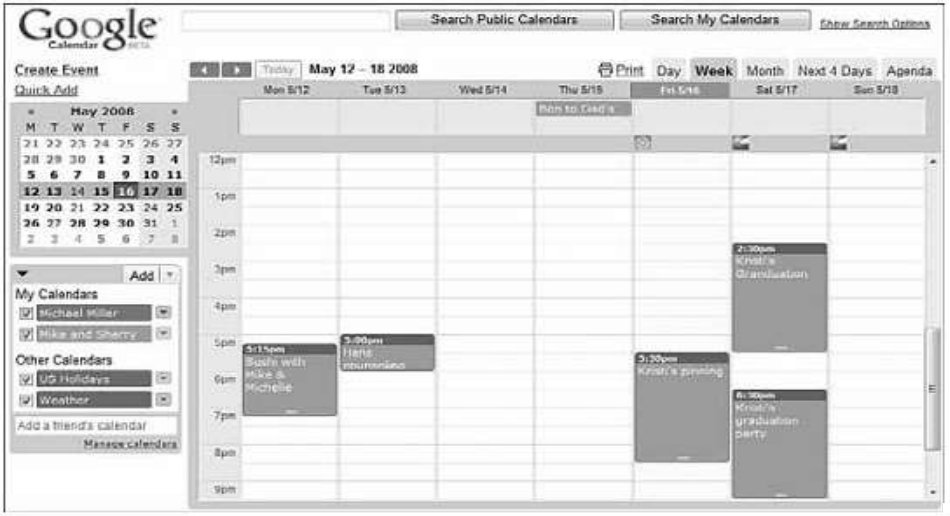
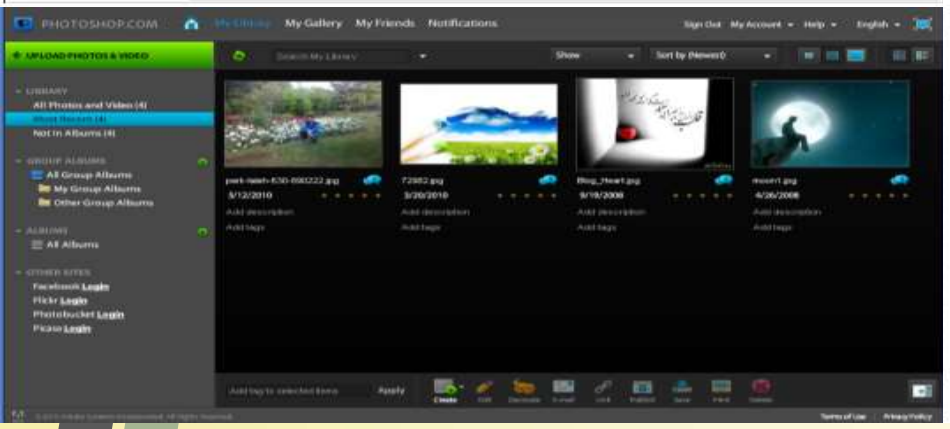
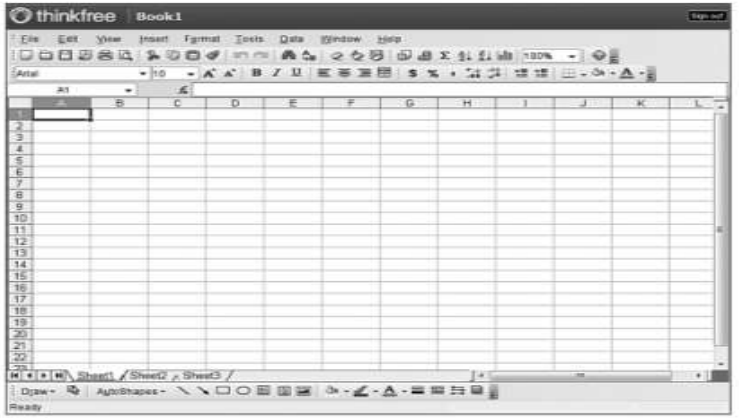
مثال موردی Watson :

IBM Watson

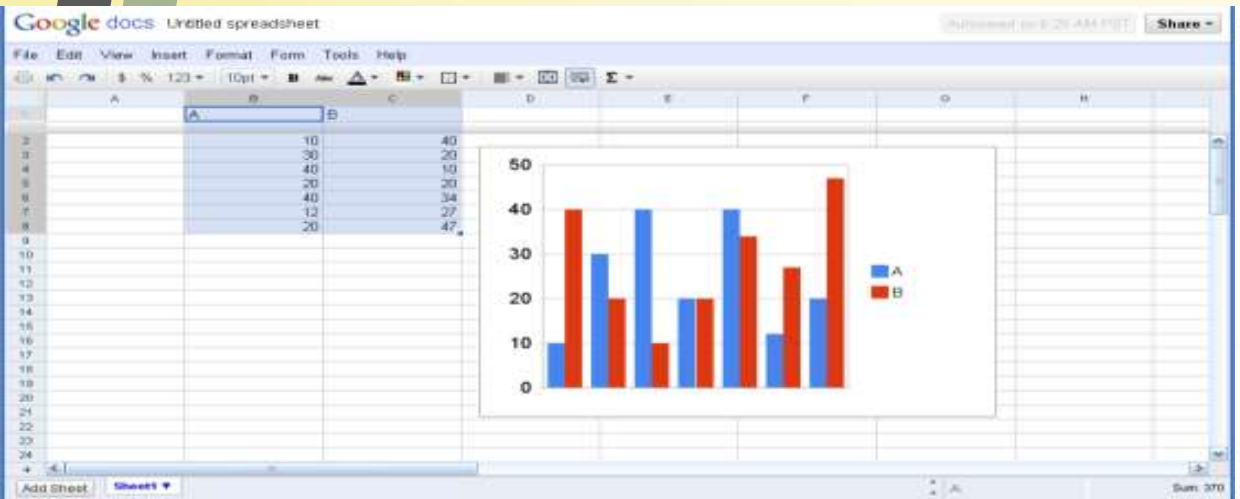

Google Calendar
Search Public Calendars
Search My Calendars
Create Event
Quick Add
May 12 – 18 2008
Print
Day
Week
Month
Next 4 Days
Agenda
My Calendars
Other Calendars
US Holidays
Weather

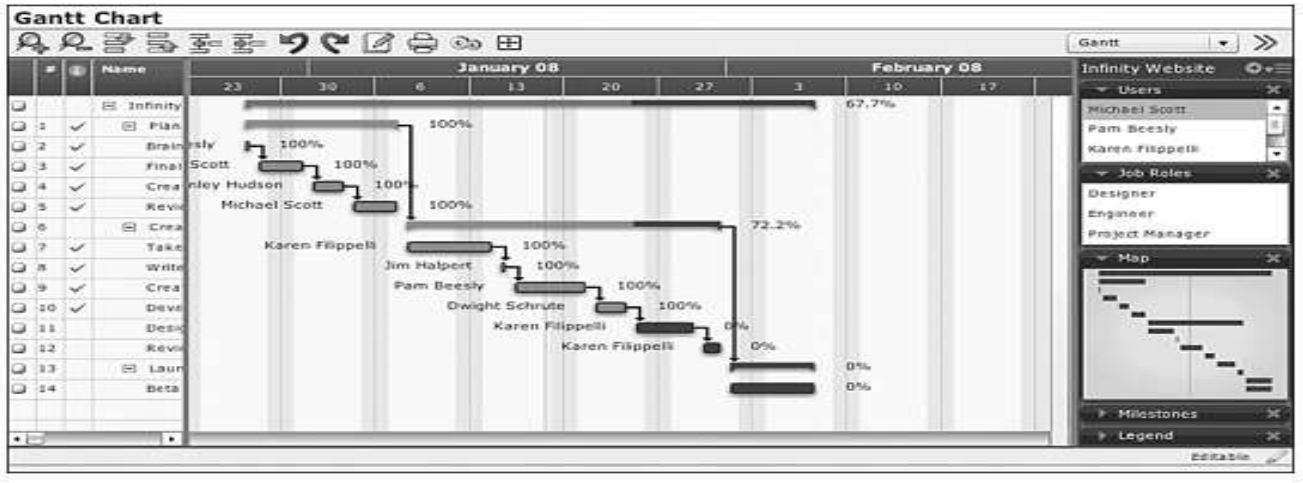
thinkfree
- This is a ThinkFree document


PHOTOSHOP.COM
My Gallery
My Friends
Notifications


thinkfree
Book1

Currently:
57°F
Thunderstorm

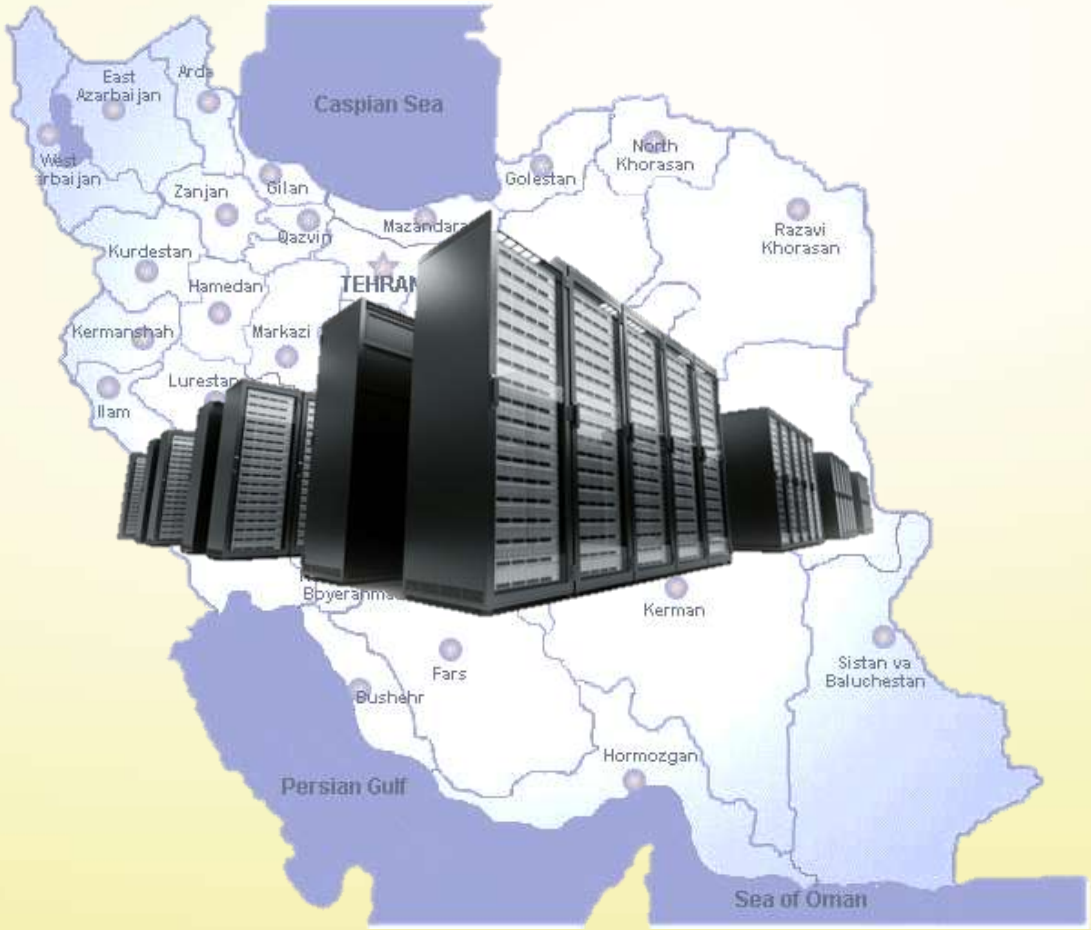

Google docs
Untitled spreadsheet
Share
File Edit View Insert Format Form Tools Help


Gantt Chart
January 08
February 08
Infinity Website
Users
Job Roles
Designer
Engineer
Project Manager
Map
Milestones
Legend

بخش دوم:
وضعیت رایانش ابری در **ایران**

مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

چند سرویس ابری داخلی را نام ببرید؟



Iran Cloud Computing Landscape V2.1 – July 2018

SaaS

MISC
چاپیروس, EVAND, OnTime, pinote, Kara2000, ابرسلامت, مینیت, آلونک, دکتر دکتر

EDUCATION
پرسشنامه آنلاین, TIK KHAN میکخوان, آزمون ۳۶

FINANCE
حساب و کتاب, STORM, Abrestan

STORAGE
سینکا, صندوق بیان bayanbox, ابرینو, sokeloud, ذرت, پشتیبان, pCloud.com

ENTERPRISE
SarvCRM اینبورد, راهکاران

NET/SEC
Wilens, انتی نت anti net, پادویش Padvish

EMAIL
النون, CHMAIL.IR

COLLABORATIO
تیم کمپ, پیگیر, تسکولو

COMMUNICATION
NIKSMS, alohi, CloudCall, raychat

PaaS

E-COMMERCE
یلوتو, کاموا, سپهر

SOCIAL
BLOGFA, پرشین بلاگ, رونگار

MESSAGING / BACK-END
AbarCloud, چشمک, u-v.ir, backtory, abrin BETA, یوشه, آپادانا

MAP
جاماسپ, سیدارمپ

DATA / ANALYTICS
CommentMiner, دیتابین, نظربین, recommender.ir, واکاویک

IaaS

SERVER / DATACENTER / STORAGE
Saina, سایو, micloud, گستر هاست, پارس پک ParsPack.com, ایران سرور, XaaS Cloud Computing, تارینو, جایگاه, CLOUDINO, پردیس, SHATEL, FANAVA, AFR@NET, parsonline, asiatech, حینداد, پارس نافع Pars Nafe, PG, تبیین

VDI
PDNSOFT, Deskbit, ATRIA, پتار

HPC
IPCC, NRTC, EURIN

CDN
وخلا, ابرآروان

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ITRC

Open Community of Cloud Computing
جامعه آزاد رایانش ابری ایران

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مثال موردی : فکس

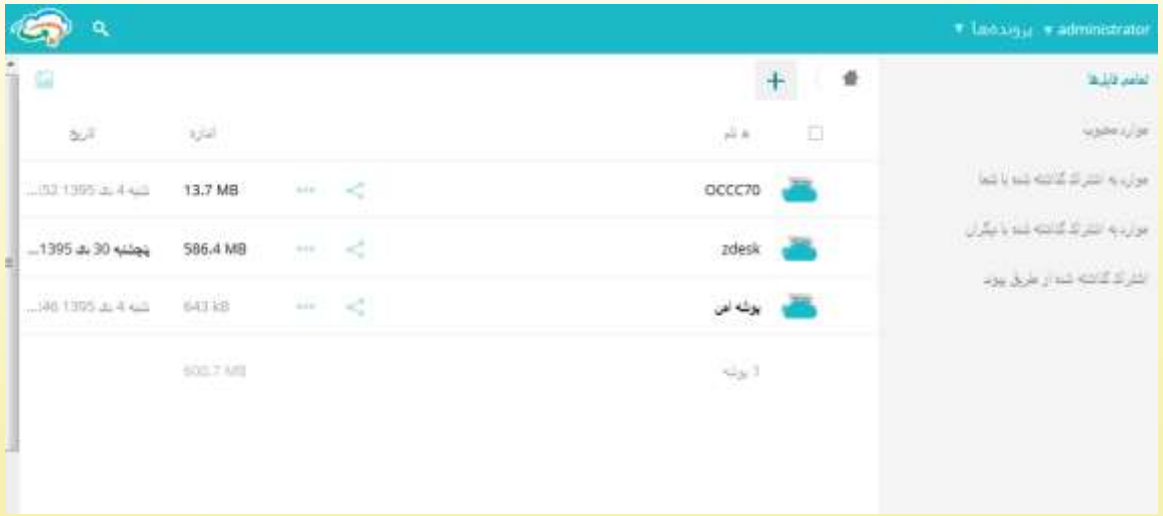
Fax

مثال موردی : برگزاری رویداد

Event

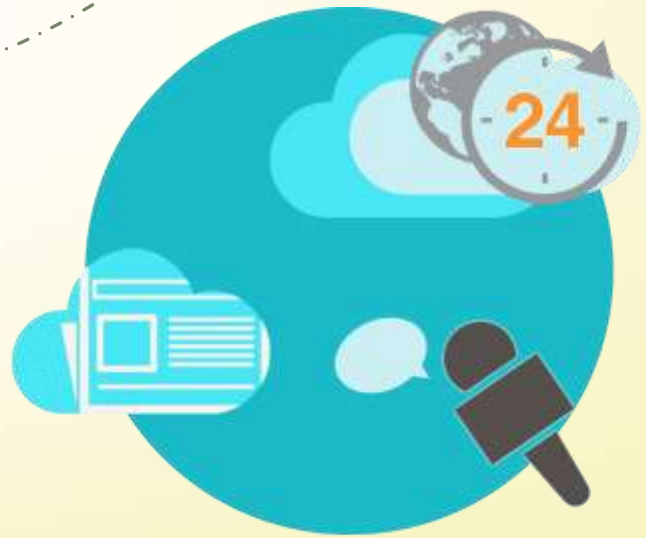
مثال موردی : ذخیره سازی داده

Drive



مثال موردی : برگزاری سمینار

Seminar



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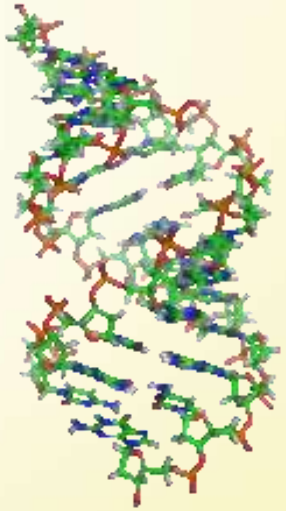
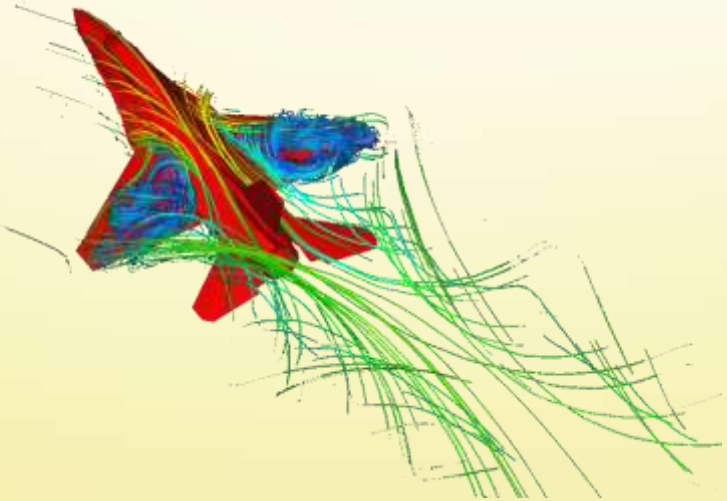
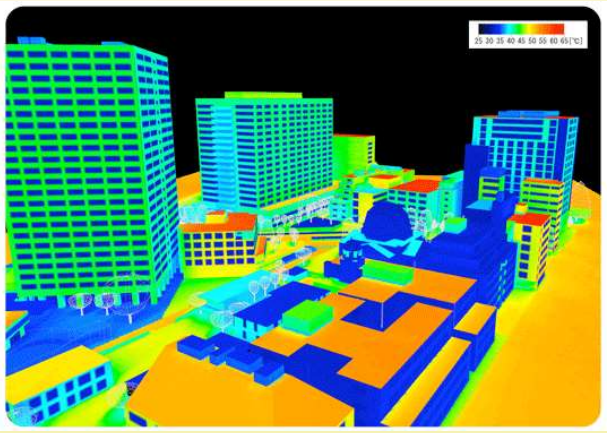
مثال موردی : پردازش فوق سریع







مثال موردی : داده پردازی

Data Science
Big Data

مثال موردی : داده کاوی

Recommendation

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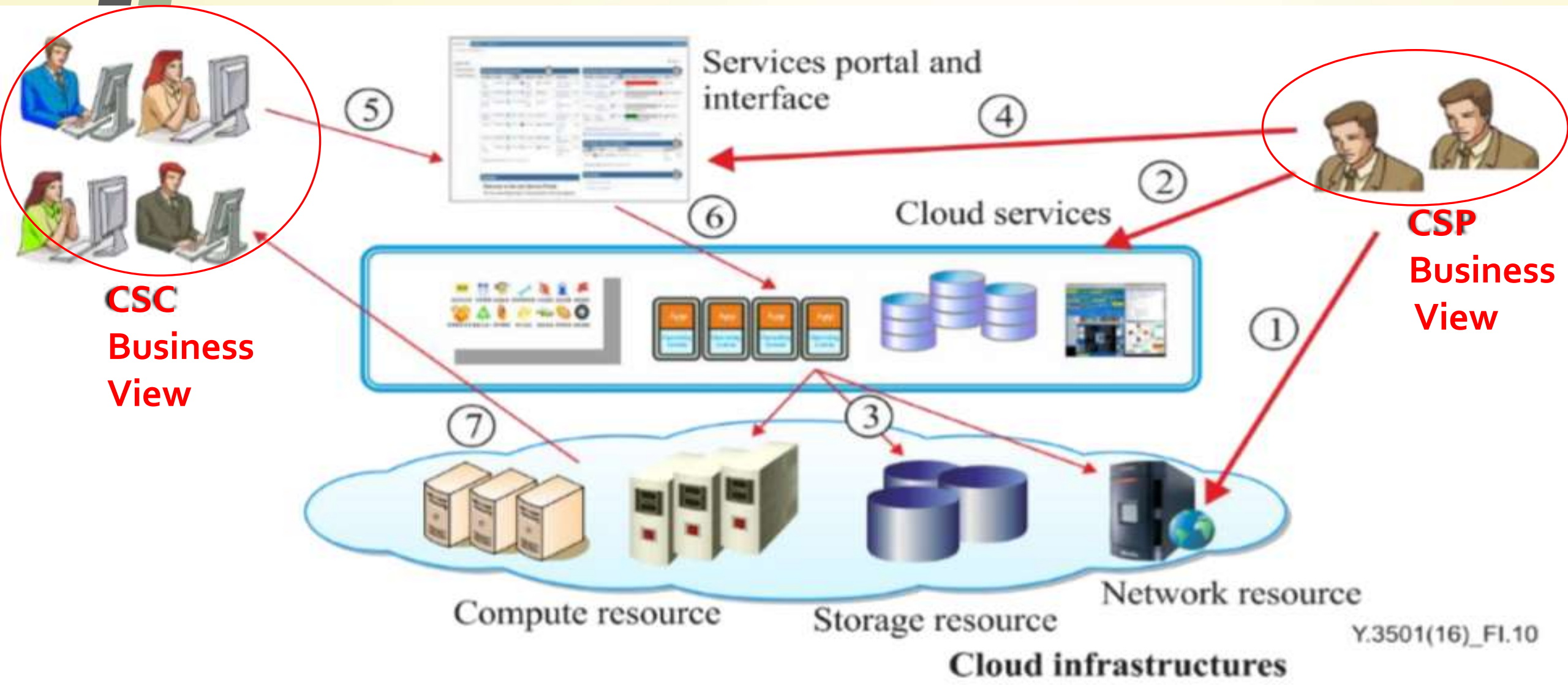
مزایای اصلی اتصال به شبکه رایانش

دو نمای مختلف رایانش ابری



بخش سوم:
معماری رایانش ابری

مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

ITU-T Y3500 (ISO/IEC 17788): Cloud Definition

- "Paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand"

Characteristics

- Resource pooling
- Broad network access
- Measured Service
- Multi-tenancy
- On-demand self-service
- Rapid elasticity and scalability

Resource pooling

- Physical or virtual resources can be aggregated in order to serve one or more cloud service customers; to support multi-tenancy while at the same time using abstraction to mask the complexity of the process from the customer. This offloads some of the customer's original workload, such as maintenance requirements, to the provider.

Examples of resources

- Servers
- Operating systems
- Networks
- Software
- Applications
- Storage

Broad network access

- Users can access physical and virtual resources from wherever they need to work, as long as it is network accessible, using a wide variety of clients including devices such as mobile phones, tablets, laptops, and workstations.

Measured service

- Usage can be monitored, controlled, reported, and billed. This is an important feature needed to optimize and validate the delivered cloud service. The customer may only pay for the resources that they use.

Multi-tenancy

- Within the context of multi-tenancy, the group of cloud service users that form a tenant will all belong to the same cloud service customer organization. Multiple tenants and their computations and data are isolated from and inaccessible to one another.

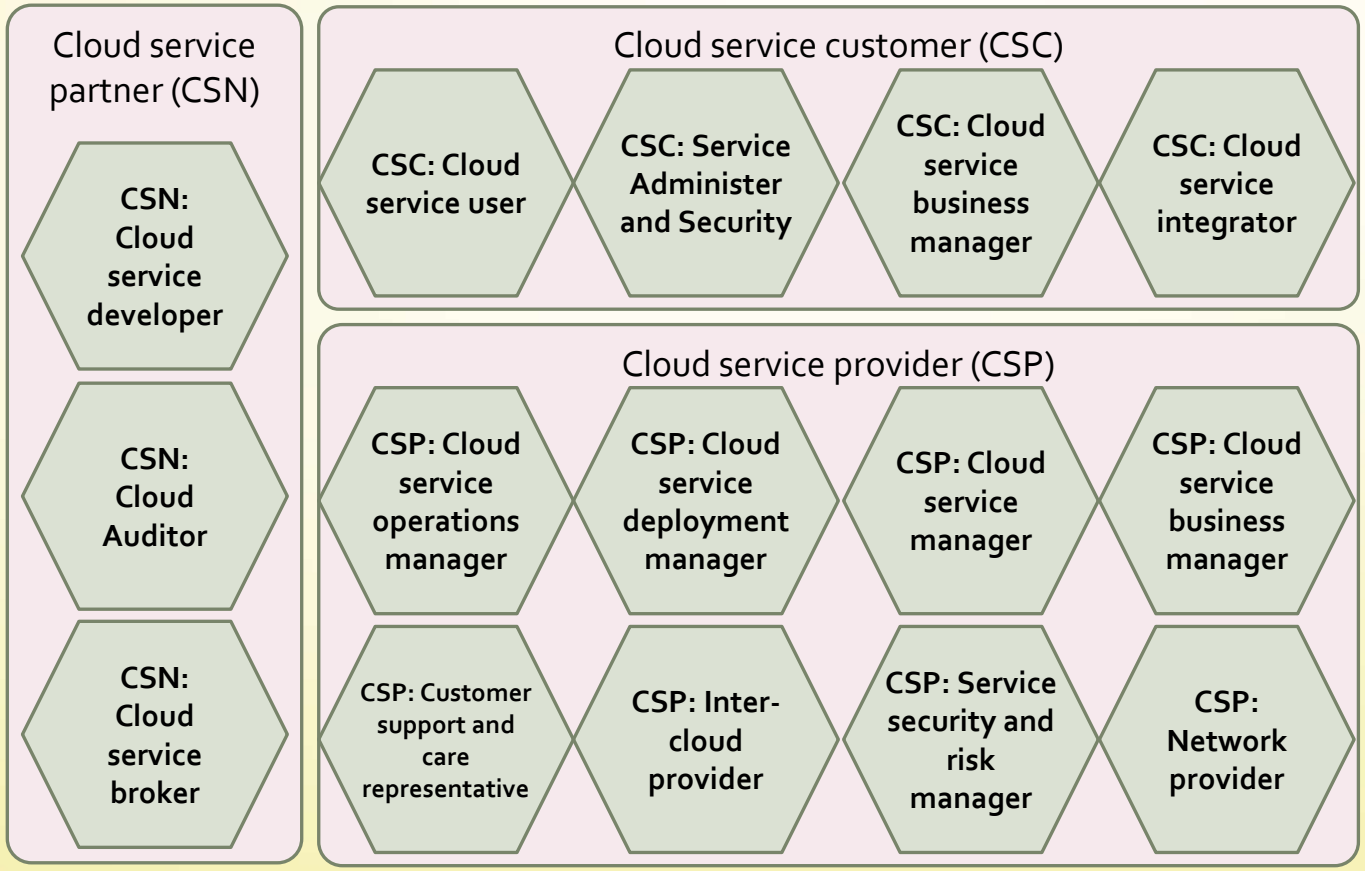
On-demand self-service

- Feature where a cloud service customer can provision computing capabilities, as needed, automatically or with minimal interaction with the cloud service provider

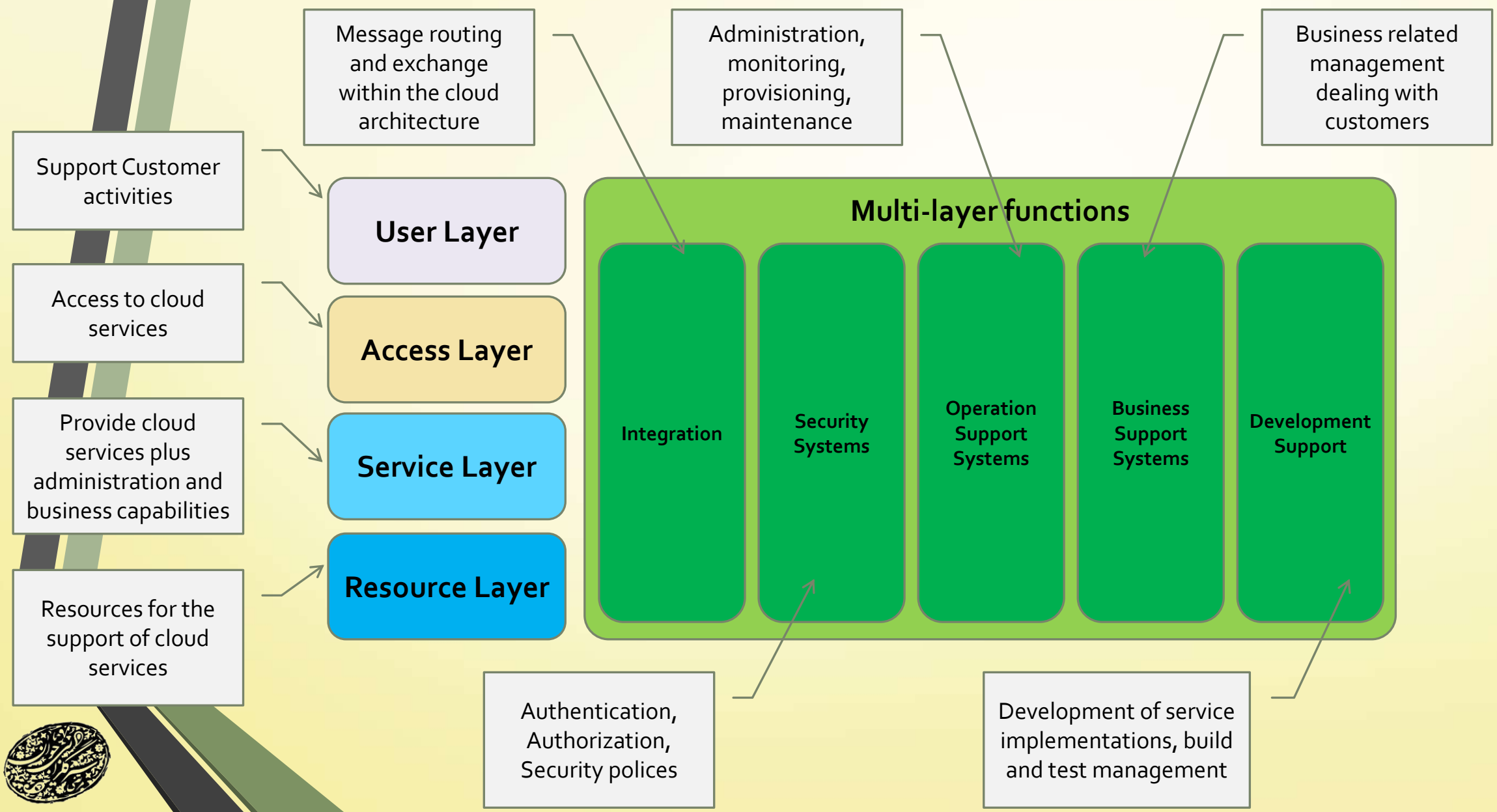
Rapid elasticity and scalability

- A feature where physical or virtual resources can be rapidly and elastically adjusted, in some cases automatically, to quickly increase or decrease resources.

Main Cloud Computing Roles & Sub-Roles



Functional Architecture



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User Layer

- User function
- Business function
- Administrator function

Access Layer

- Access Control
- Connection management

Service Layer

- Service capabilities
- Business capabilities
- Administration capabilities
- Service Orchestration

Resource Layer

- Resource abstraction and control
- Physical resources

Multi-layer functions

Integration

- Security Integration
- Monitoring Integration
- Service Integration
- Peer Service Integration

Security Systems

- Authentication and identity management
- Authorization and security policy management
- Encryption management

Operation Support Systems

- Service Catalog
- Provisioning
- Monitoring and Reporting
- Service policy management
- Service automation
- Service level management
- Incident and problem management
- Platform and virtualization management
- Peer service management

Business Support Systems

- Product catalogue
- Access management
- Subscription management
- Billing
- Accounts

Development Support

- Developer environment
- Build management
- Test management

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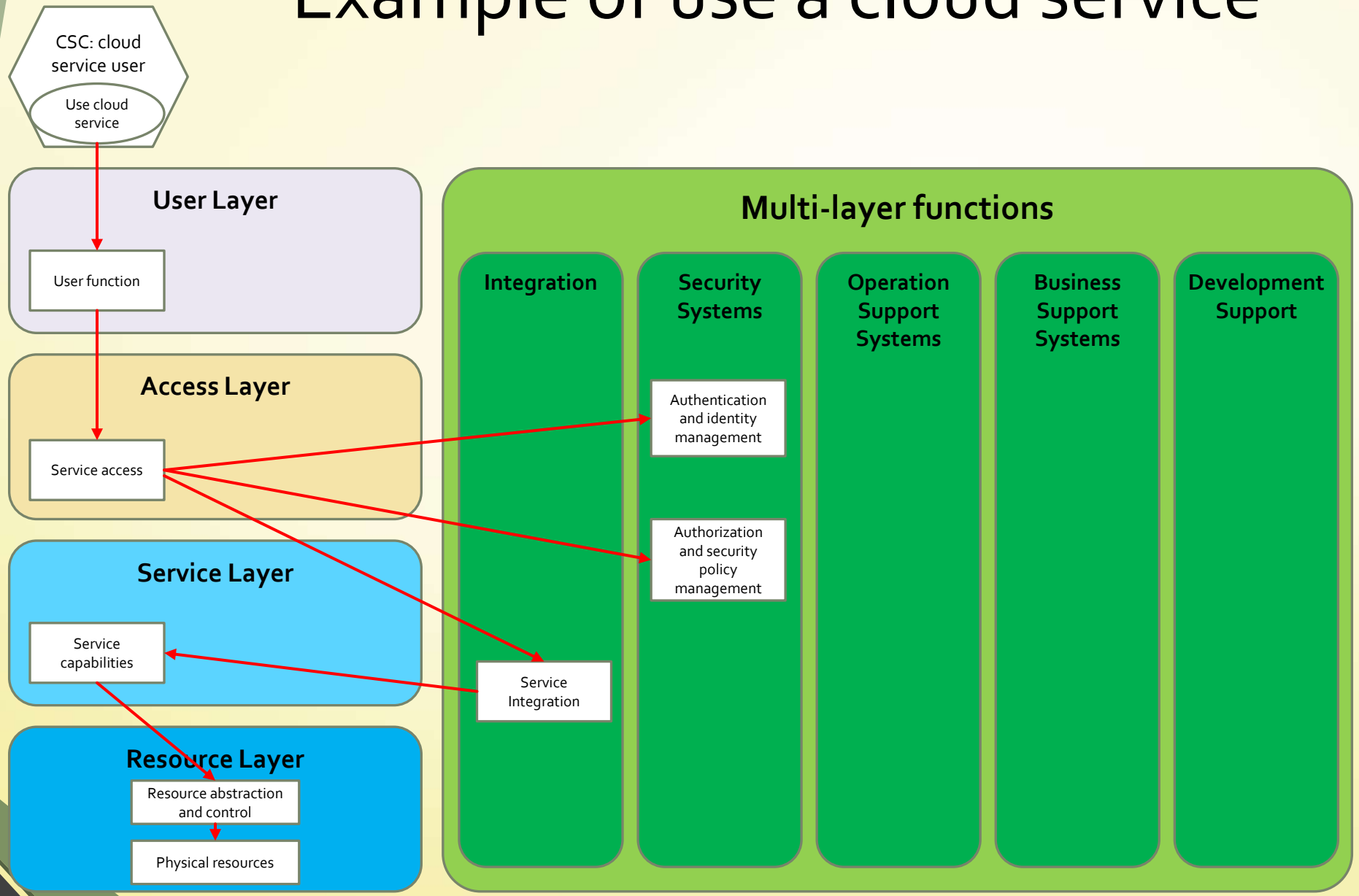
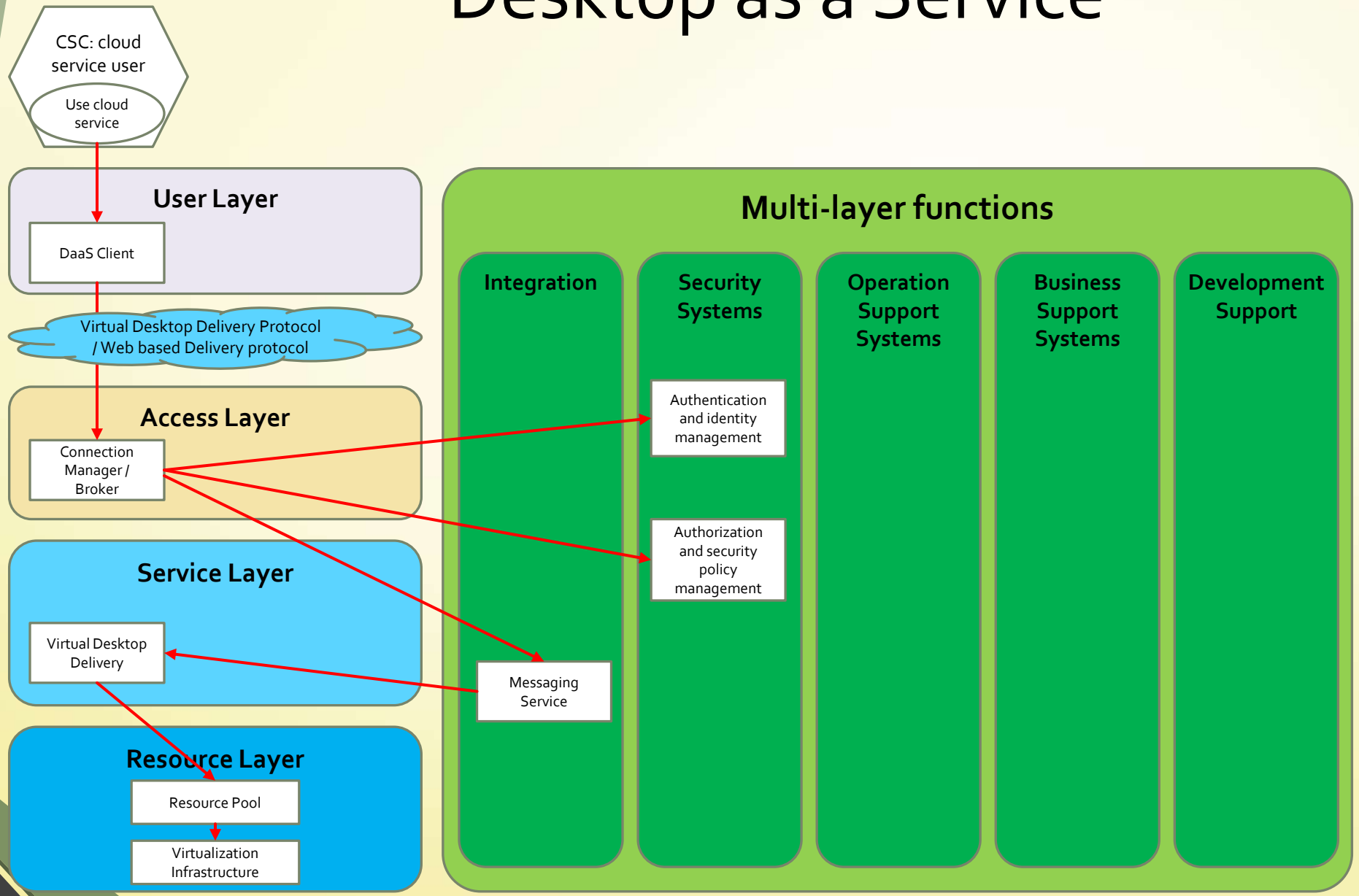
Example of use a cloud service



Desktop as a Service



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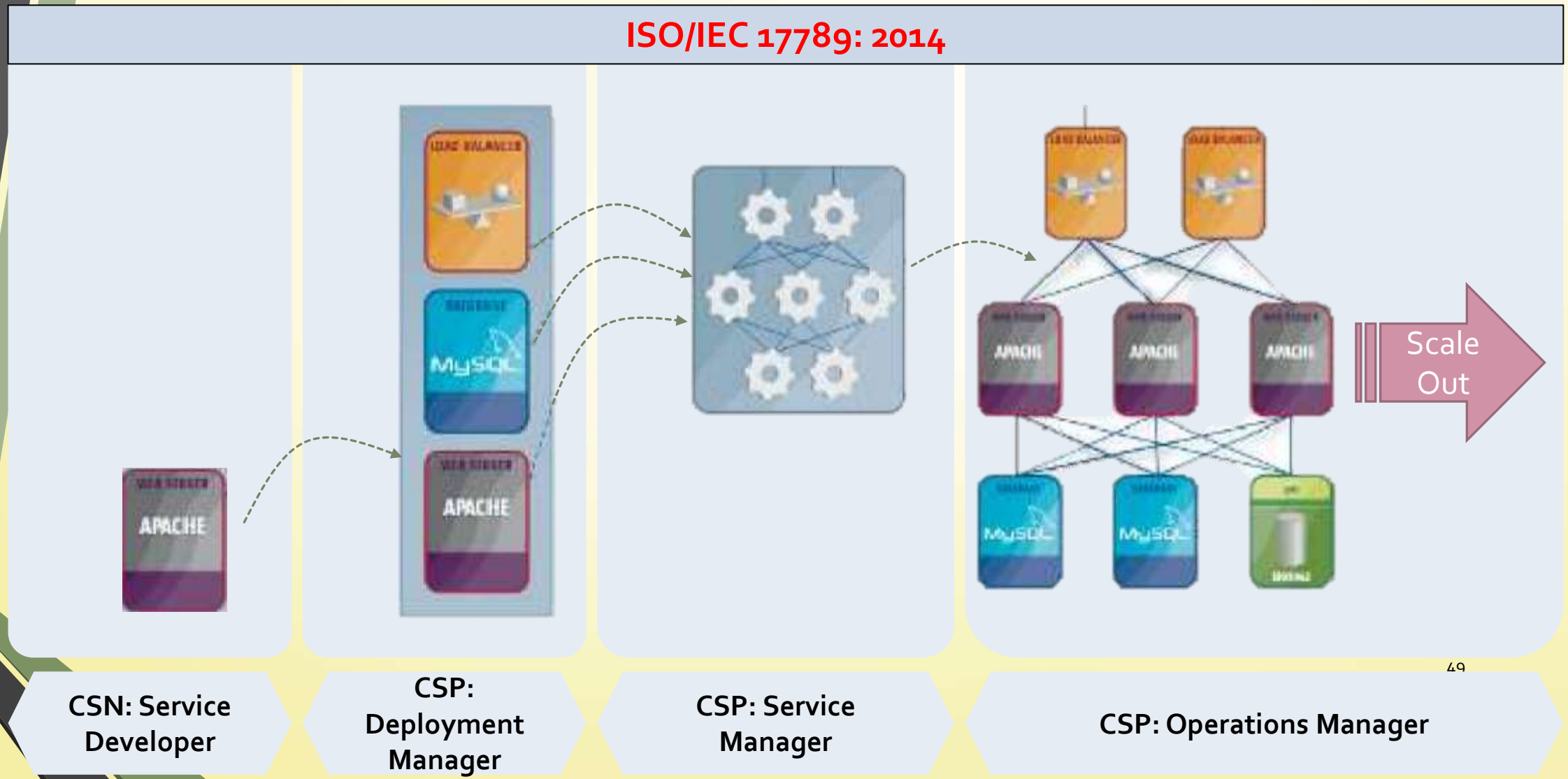
Sub-Roles Example



بخش چهارم:
ملاحظات طراحی مراکز داده

مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

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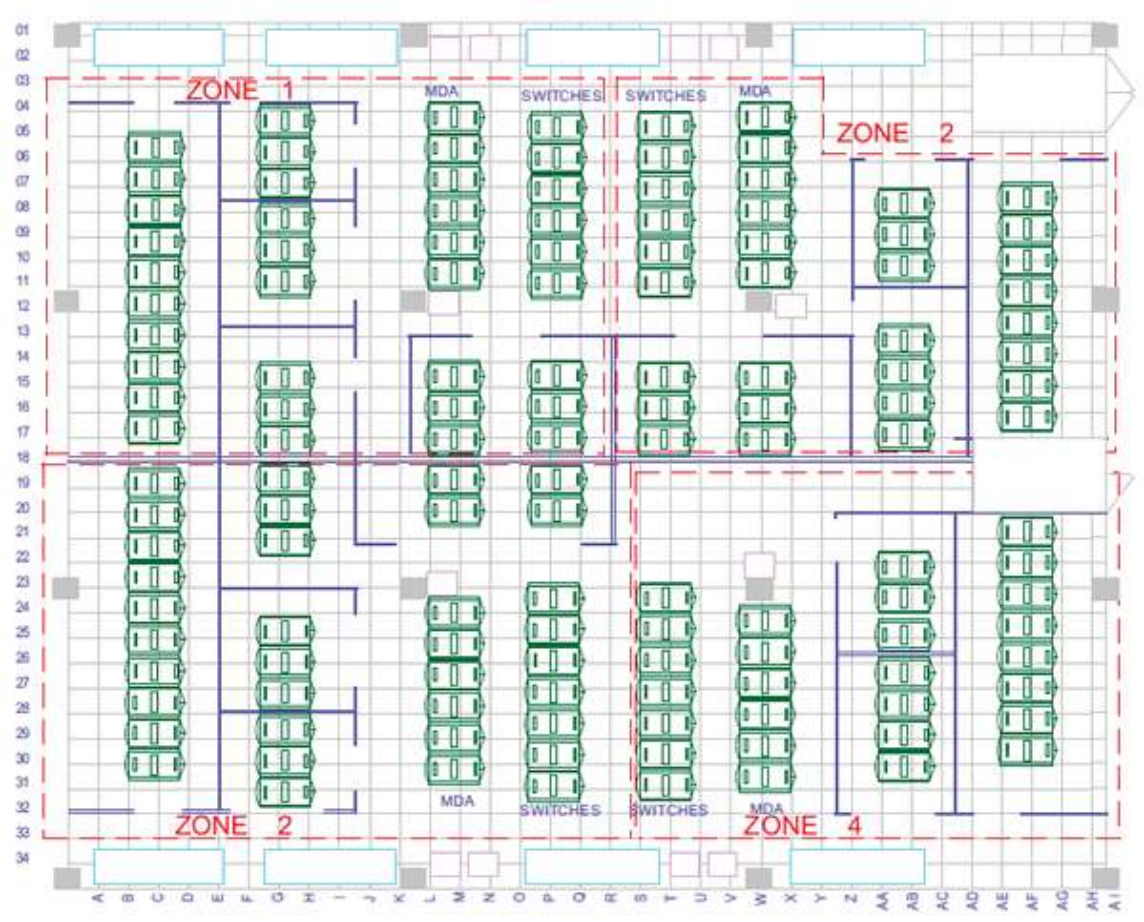
طی ۱۵ الی ۲۰ سال آینده، استفاده از فناوری اطلاعات آنچنان فراگیر خواهد شد که **پردازش محلی** مقرون به صرفه نخواهد بود!

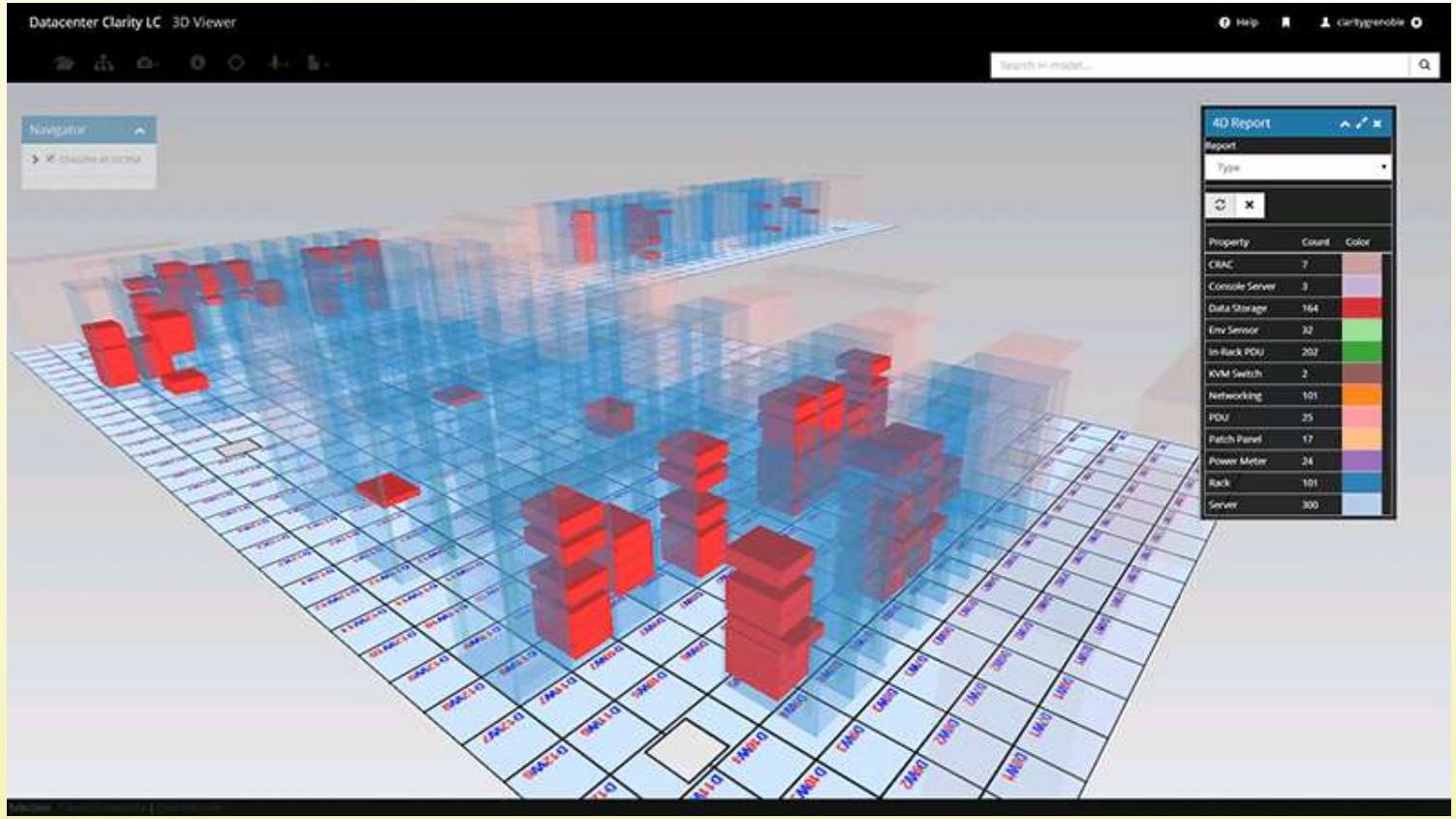
مراکز داده، جزء اصلی صنعت رایانش

مراکز داده، جزء اصلی صنعت رایانش

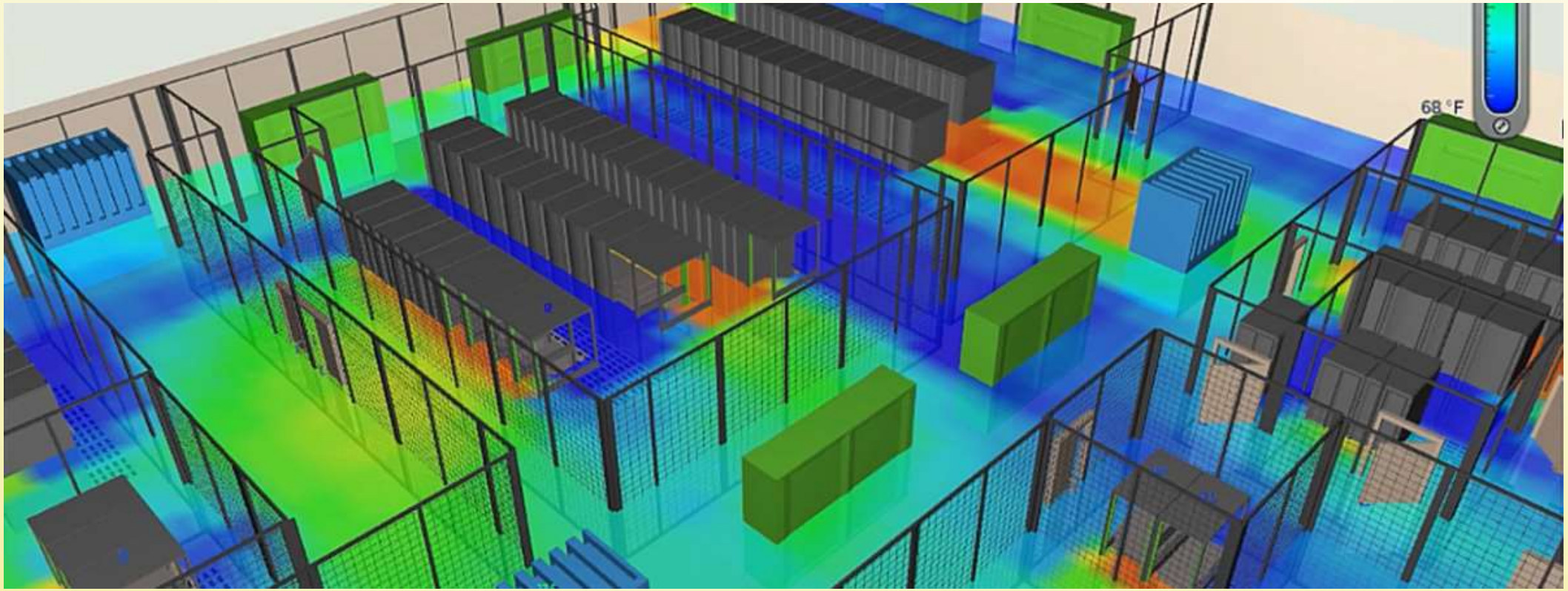
ملاحظات طراحی مرکز داده: چیدمان رک ها



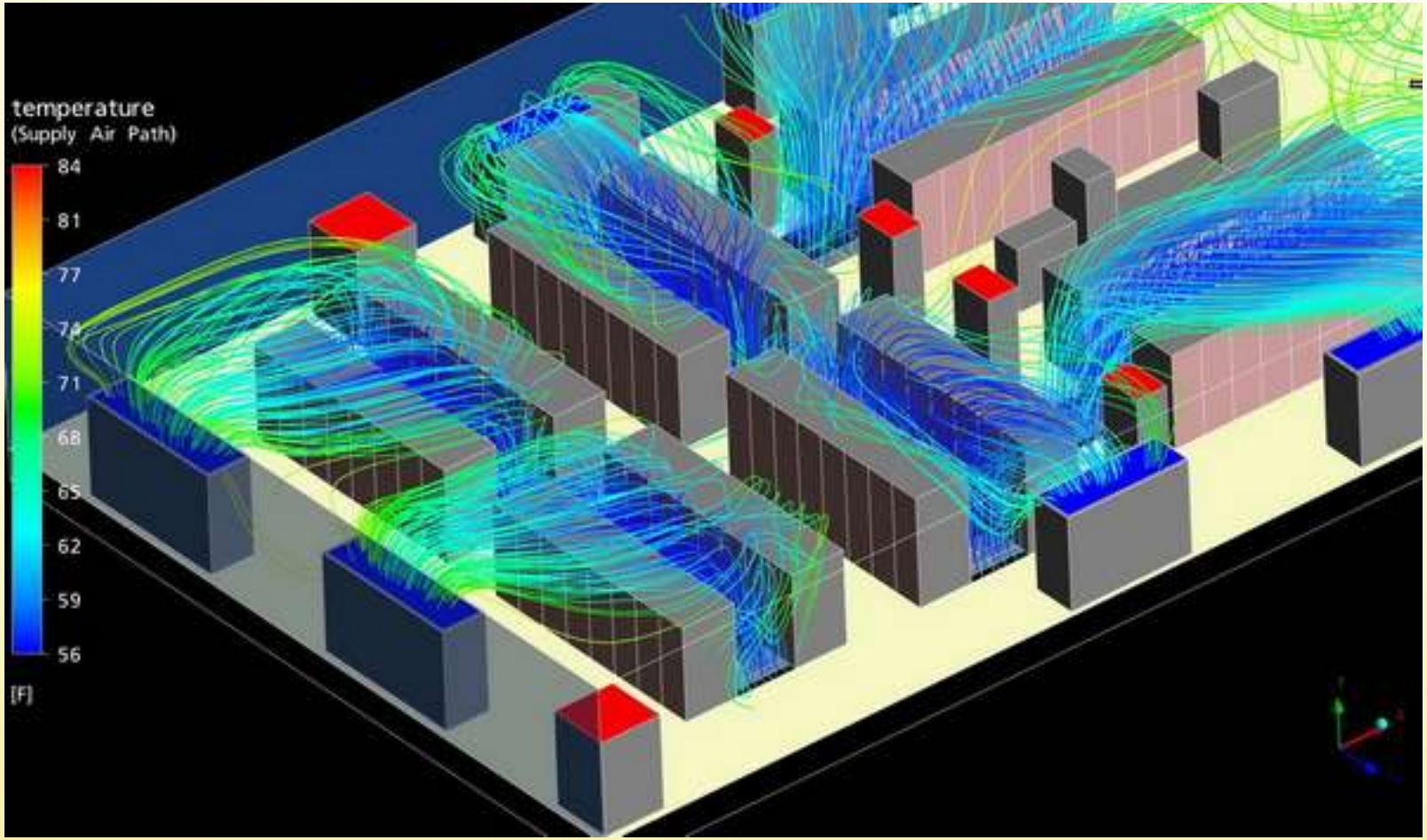
ملاحظات طراحی مرکز داده: چیدمان تجهیزات



ملاحظات طراحی مرکز داده: نقشه حرارتی



ملاحظات طراحی مرکز داده: الگوی گردش هوا

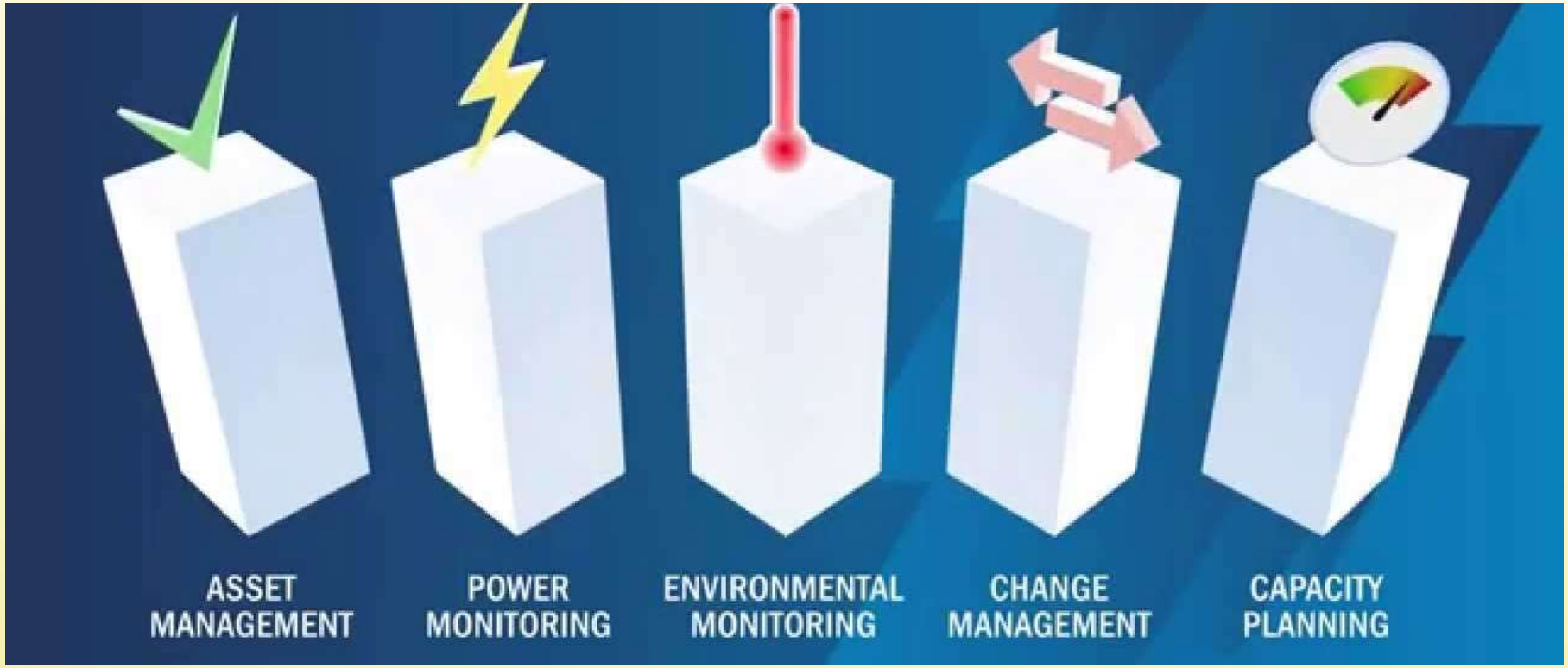


طراحی راهروهای گرم و سرد

ملاحظات طراحی مرکز داده: کابل کشی (شبکه/برق)

ملاحظات طراحی مرکز داده: نگهداری و پشتیبانی

سایر موارد


ASSET MANAGEMENT
POWER MONITORING
ENVIRONMENTAL MONITORING
CHANGE MANAGEMENT
CAPACITY PLANNING

بخش پنجم:
رایانش ابری و کسب و کار

مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

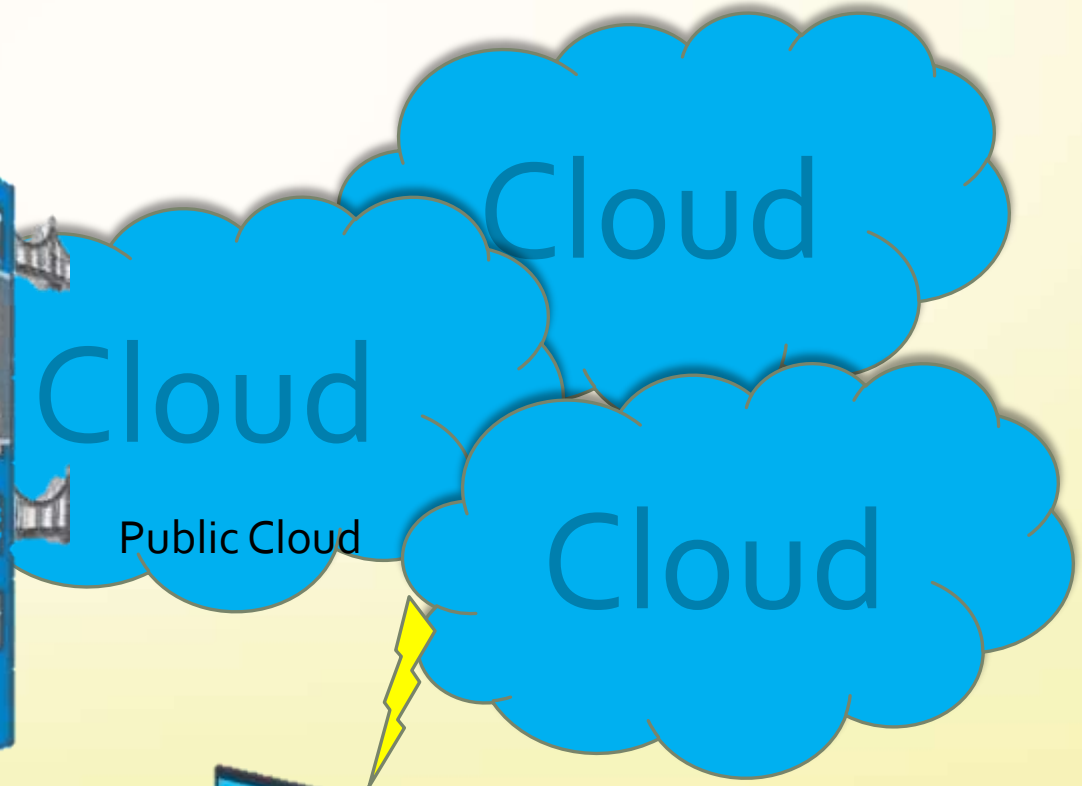
Cloud Deployment Models

Community Cloud

Mobile Cloud

Private Cloud

Hybrid Cloud



Public Cloud

Federated Cloud

Mobile Cloud Computing

CSC Business View

- CAPEX to OPEX
- Economies of Scale
- Business Value Measurements (TCO, NPV & ROI & IRR)

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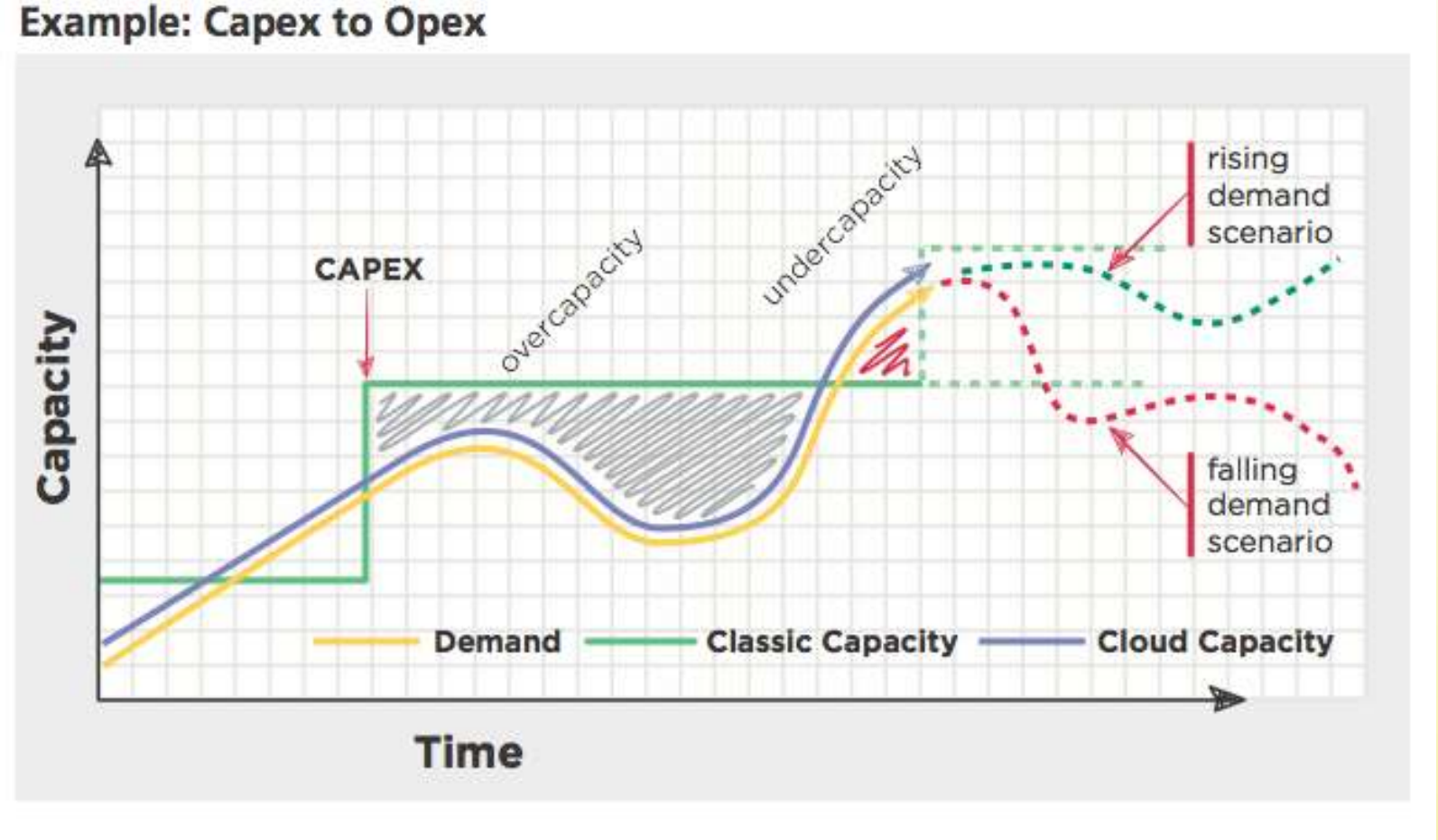
Capex to Opex



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مدل قیمت گذاری منابع

- Spot
- On-Demand
- Reserved
  - Light
  - Medium
  - Heavy

US – N. Virginia | US – N. California | EU – Ireland | APAC – Singapore

	One-time Fee			
Standard Reserved Instances	**1 yr Term**	**3 yr Term**	**Linux/UNIX Usage**	**Windows Usage**
Small (Default)	$227.50	$350	$0.03 per hour	$0.05 per hour
Large	$910	$1400	$0.12 per hour	$0.20 per hour
Extra Large	$1820	$2800	$0.24 per hour	$0.40 per hour
High-Memory Reserved Instances				
Extra Large	$1325	$2000	$0.17 per hour	$0.24 per hour
		900	$0.42 per hour	$0.55 per hour
		300	$0.84 per hour	$1.10 per hour
		00	$0.06 per hour	$0.125 per hour
		300	$0.24 per hour	$0.50 per hour

US – N. Virginia | US – N. California | EU – Ireland | APAC – Singapore

Standard Spot Instances	**Linux/UNIX Usage**	**Windows Usage**
Small (Default)	$0.031 per hour	$0.086 per hour
Large	$0.116 per hour	$0.205 per hour
Extra Large	$0.232 per hour	$0.413 per hour
High-Memory Spot Instances	**Linux/UNIX Usage**	**Windows Usage**
Extra Large	$0.171 per hour	$0.233 per hour
Double Extra Large	$0.6 per hour	$0.542 per hour
Quadruple Extra Large	$0.814 per hour	$1.111 per hour
High-CPU Spot Instances	**Linux/UNIX Usage**	**Windows Usage**
Medium	$0.058 per hour	$0.127 per hour
Extra Large	$0.238 per hour	$0.522 per hour

CRC
Computing Research Center
مرکز تحقیقات رایانش
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مثالی ساده از مقایسه دو مدل دریافت سرویس

- Traditional Model
  - 100 servers * $1,500 + 3 years * $13,140 electricity/year +
    3 years * 2 staff * $100,000 salary/year = **$789,420**

- Pay as you go Model
  - 100 servers * $0.40 instance-hour * 3 years * 8,760 hours/year = **$1,051,200**

$1,051,200 * 0.75% = $788,400

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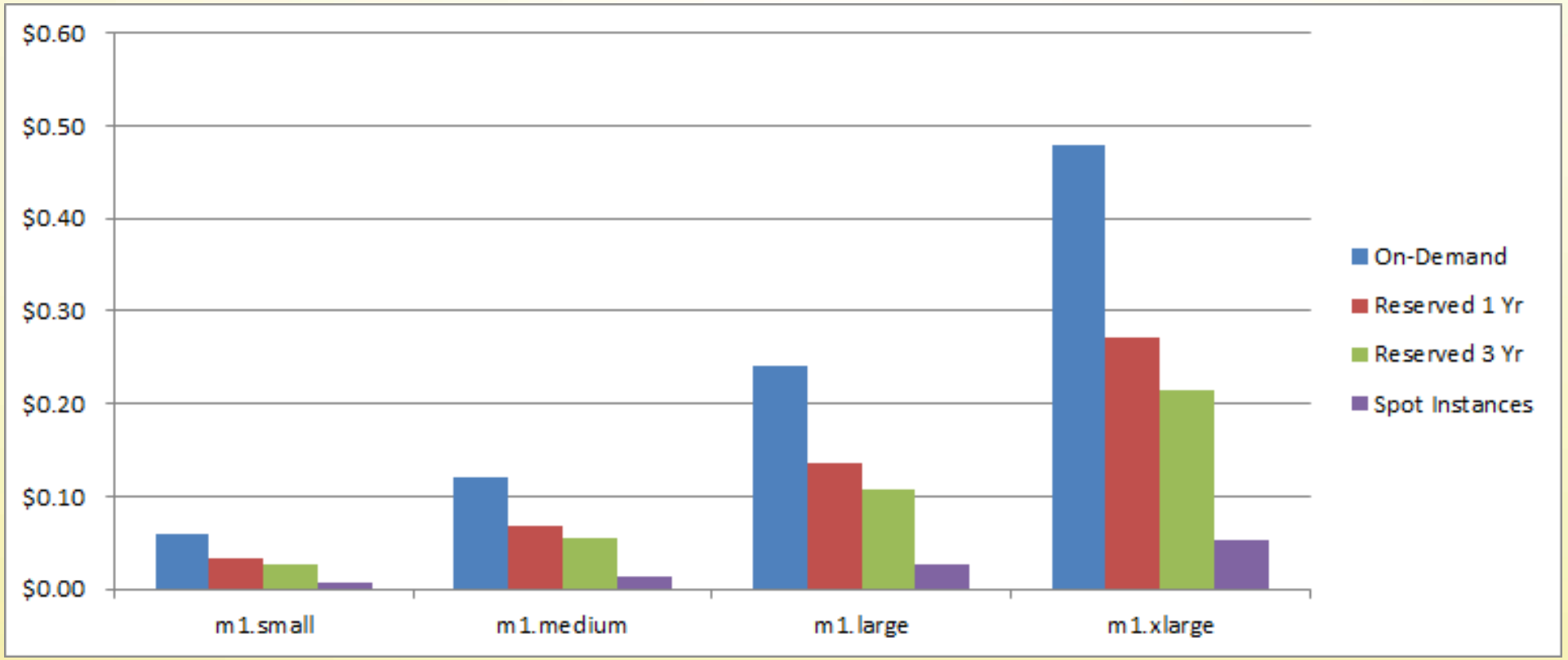
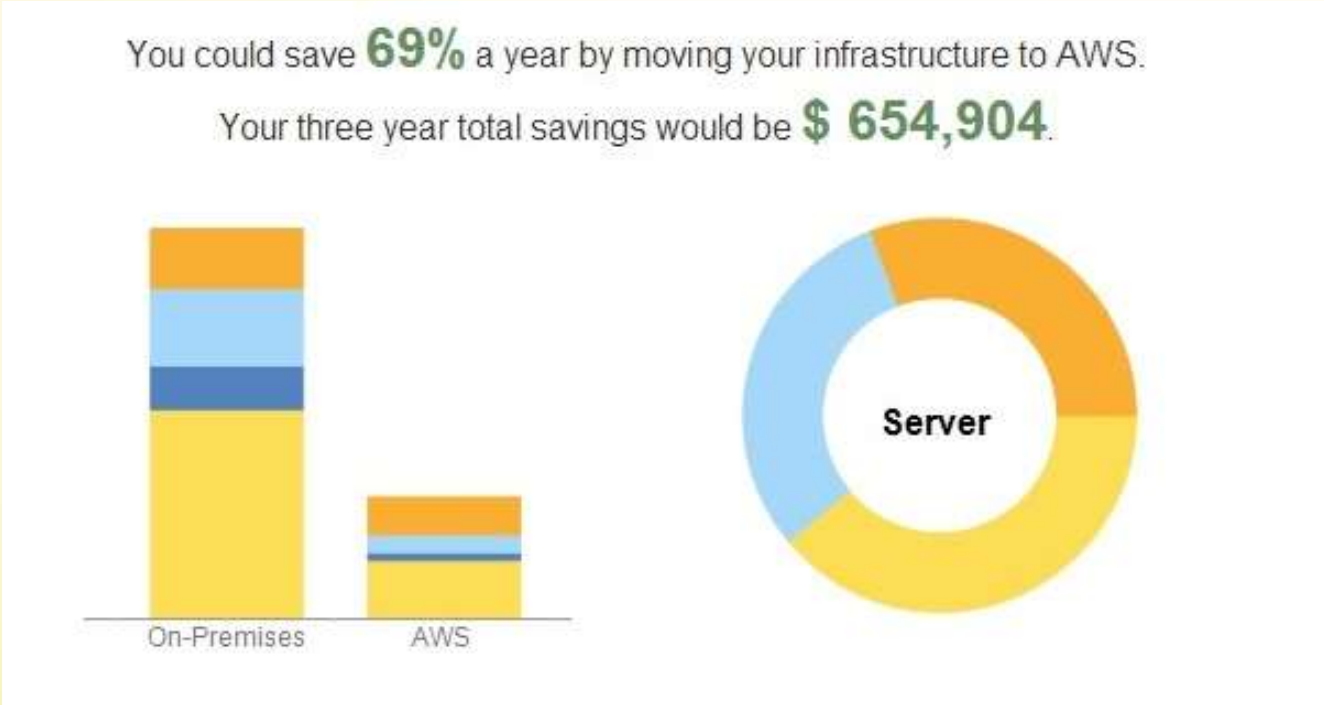
مثالی از تحلیل هزینه برای چهار روش دریافت سرویس



AWS TCO Calculator



https://awstcocalculator.com

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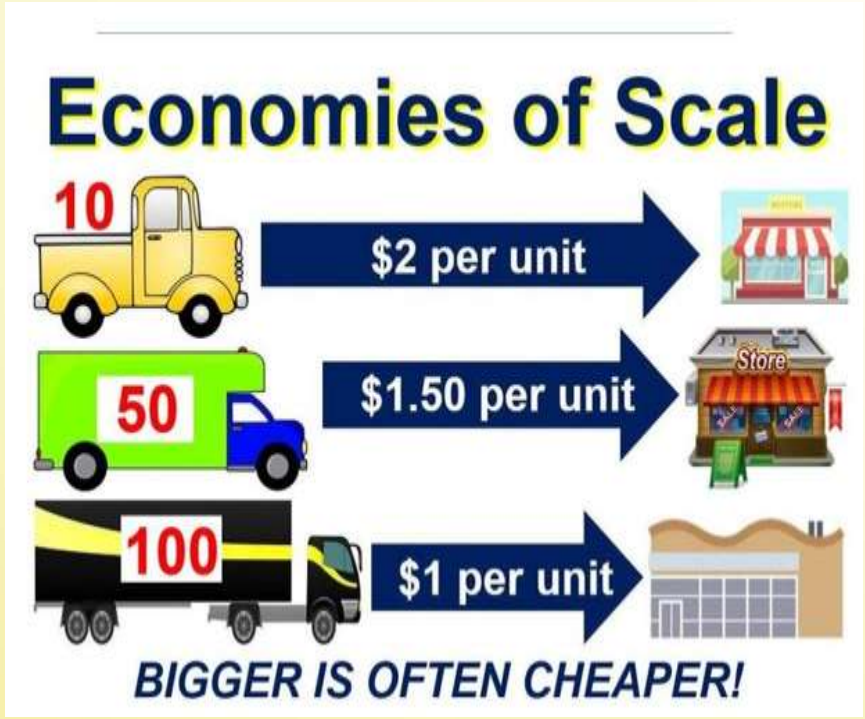
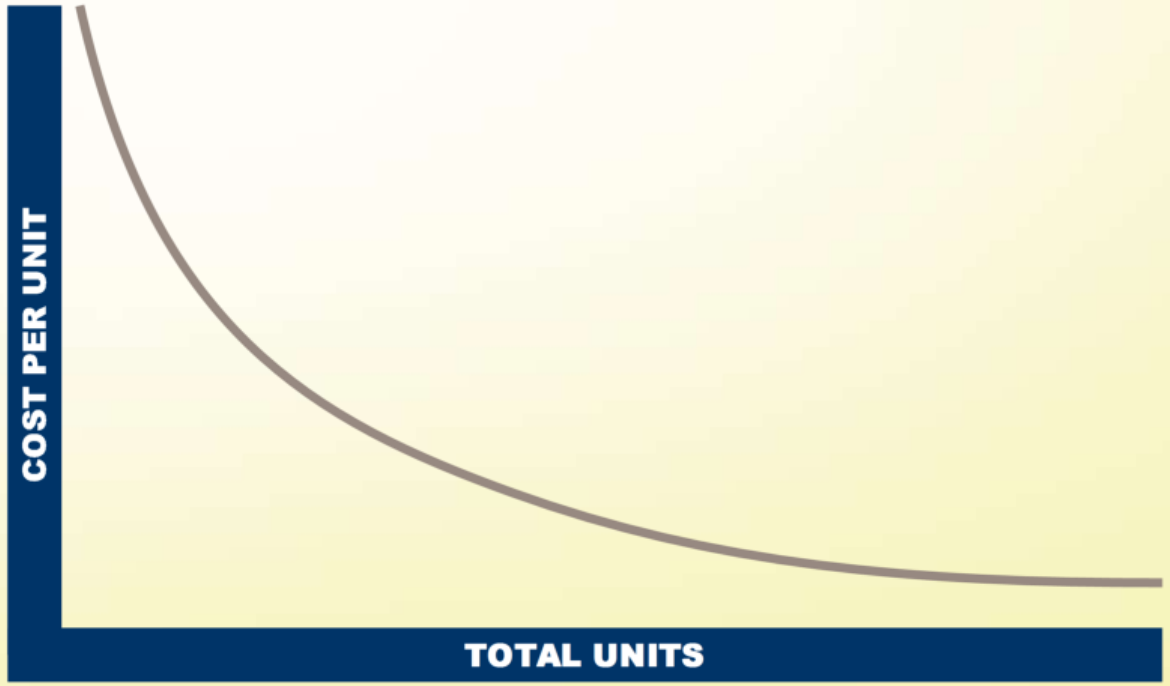
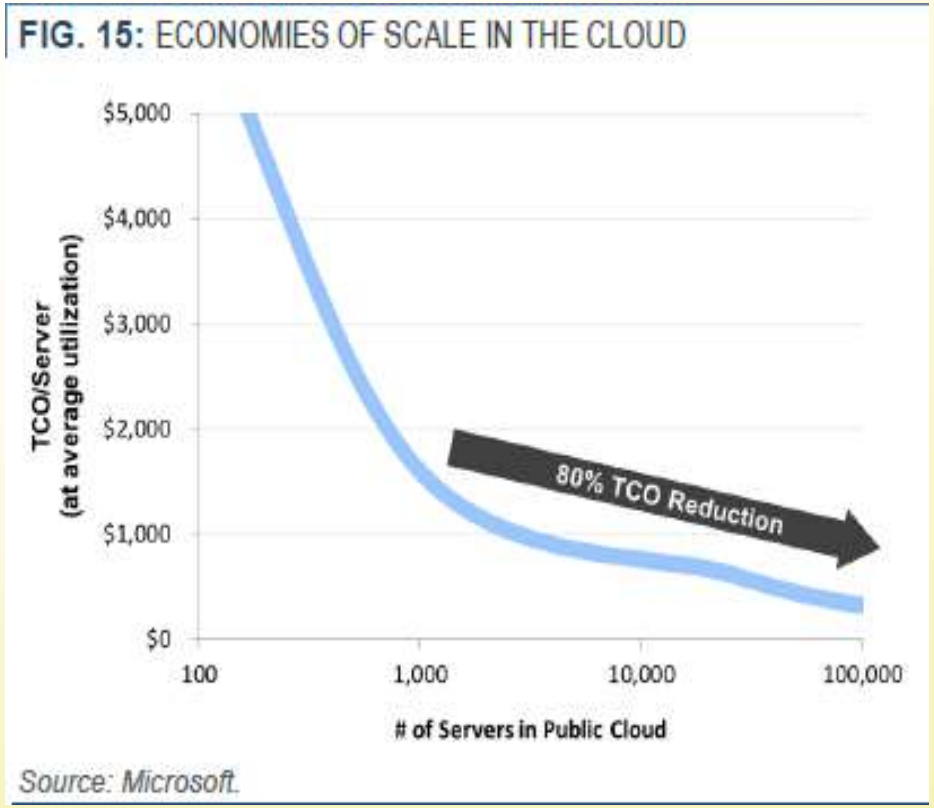
Economies of Scale





CSC Business View

- **TCO (Total Cost of Ownership)**
  - … is simply the sum total of all associated costs relating to the purchase, ownership, usage, and maintenance of a particular product. Including hardware / software / maintenance (support, bug fixes, upgrade) / power / etc.
- **NPV (Net Present Value)**
  - … time value of money
- **ROI (Return of Investment)**
  - … justify (or deny) capital investments for IT.
- **IRR (Internal Rate of Return)**
  - is the interest rate at which the net present value of all the cash flows (both positive and negative) from a project or investment equal zero.



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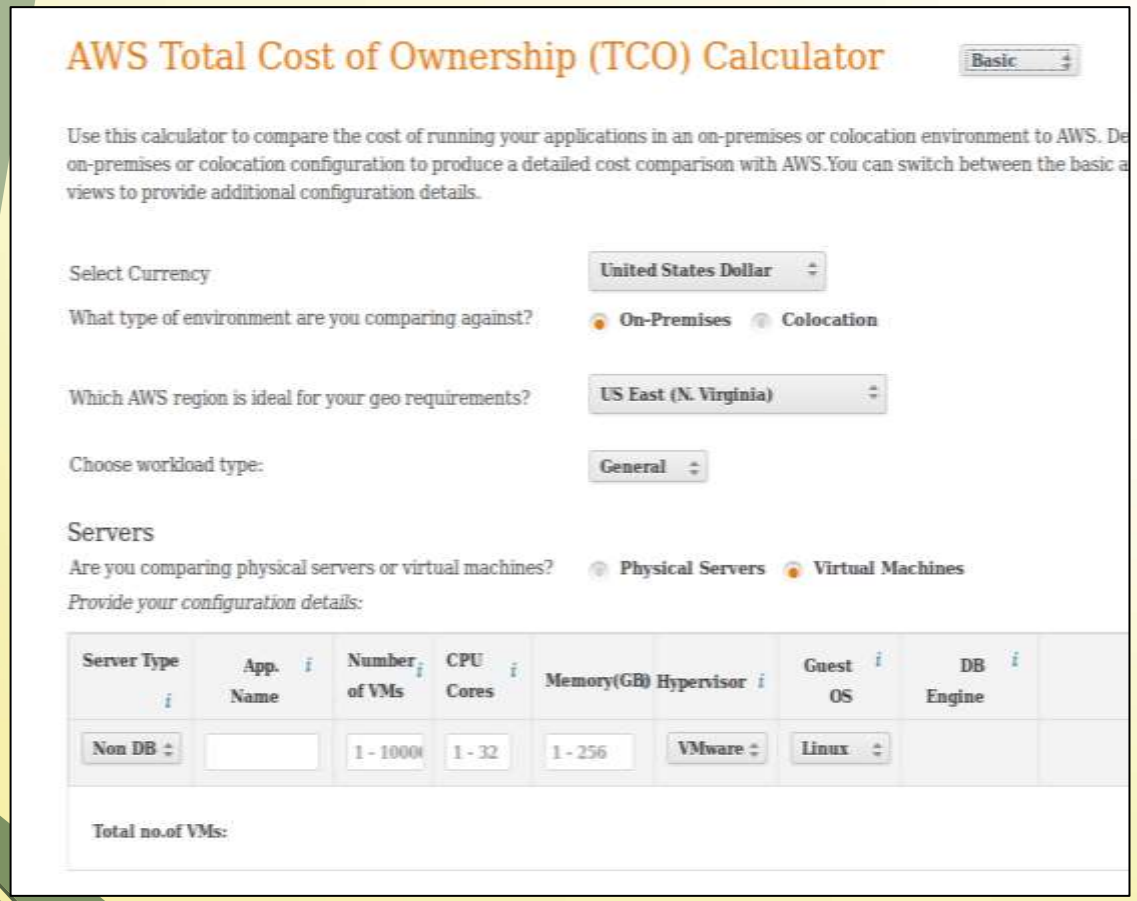
Basic Example of TCO Analysis
(Annual Total Cost of Ownership for a Single Disk Storage Unit)

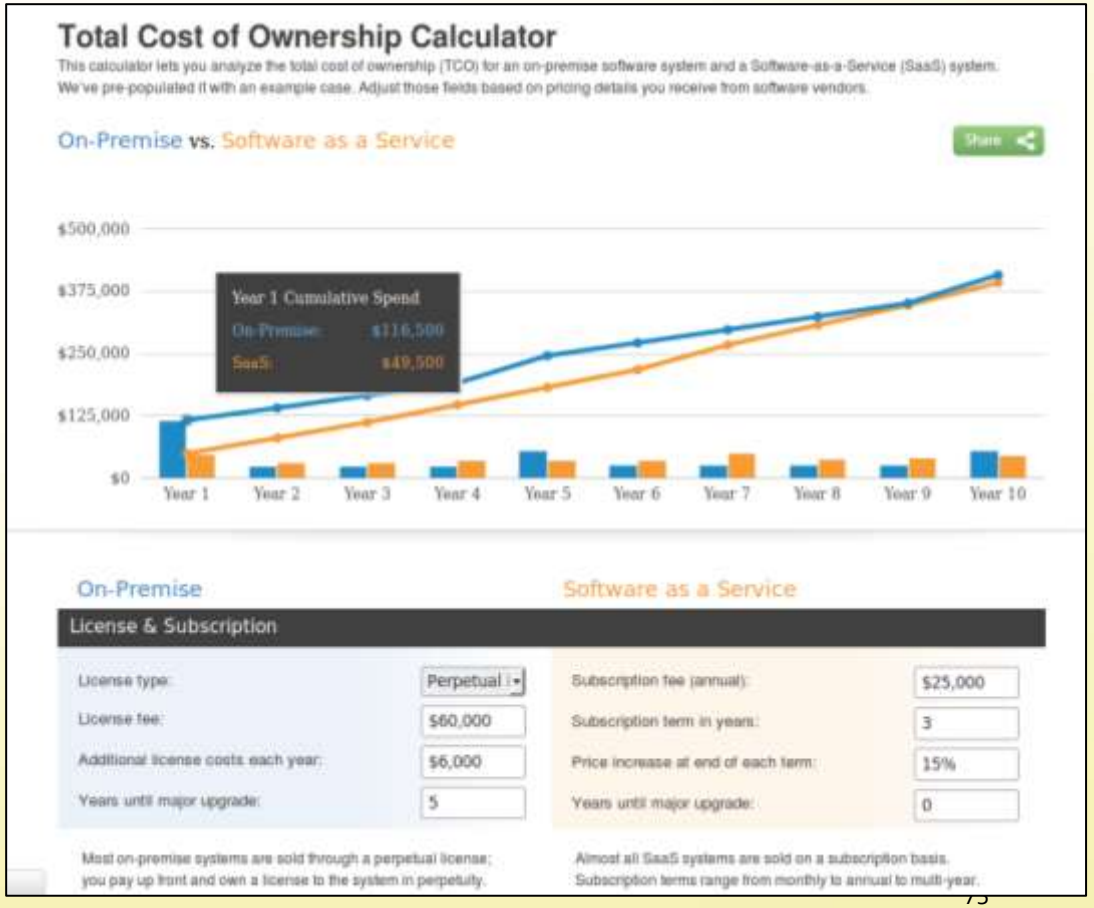
Item	Annual Charge	Three-Year Charge
Disk storage	$333,333.333	$1,000,000.00
Maintenance	$100,000.00	$300,000.00
Facilities	$10,000.00	$30,000.00
FTE labor	$150,000.00	$450,000.00
Total	$593,333.33	$1,780,000.00

Source: Cisco, The Economics of Cloud Computing, 2012

TCO Calculators

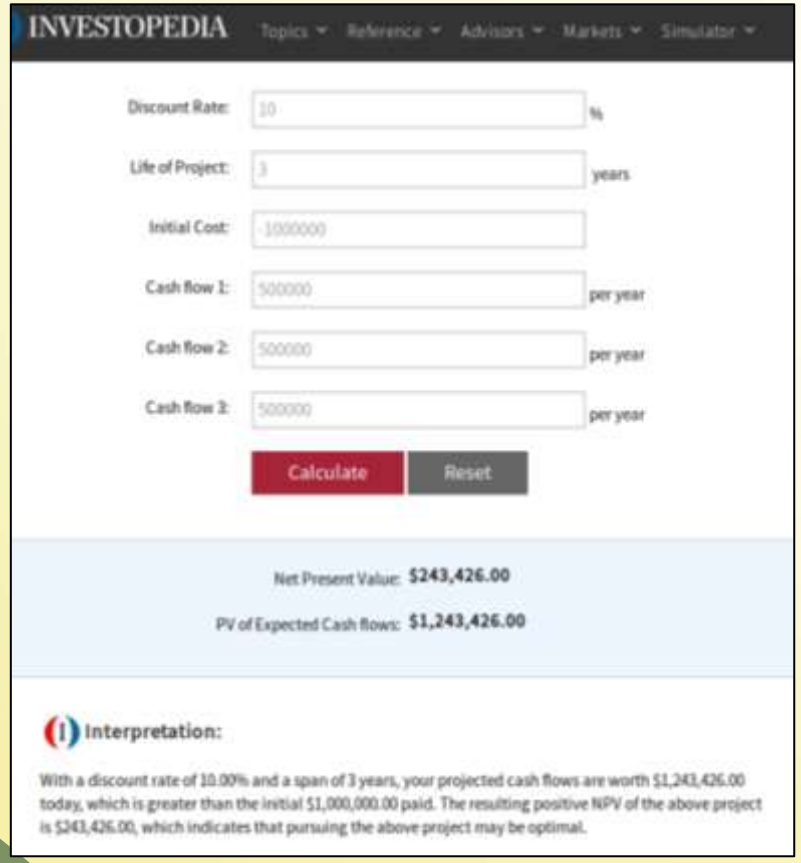


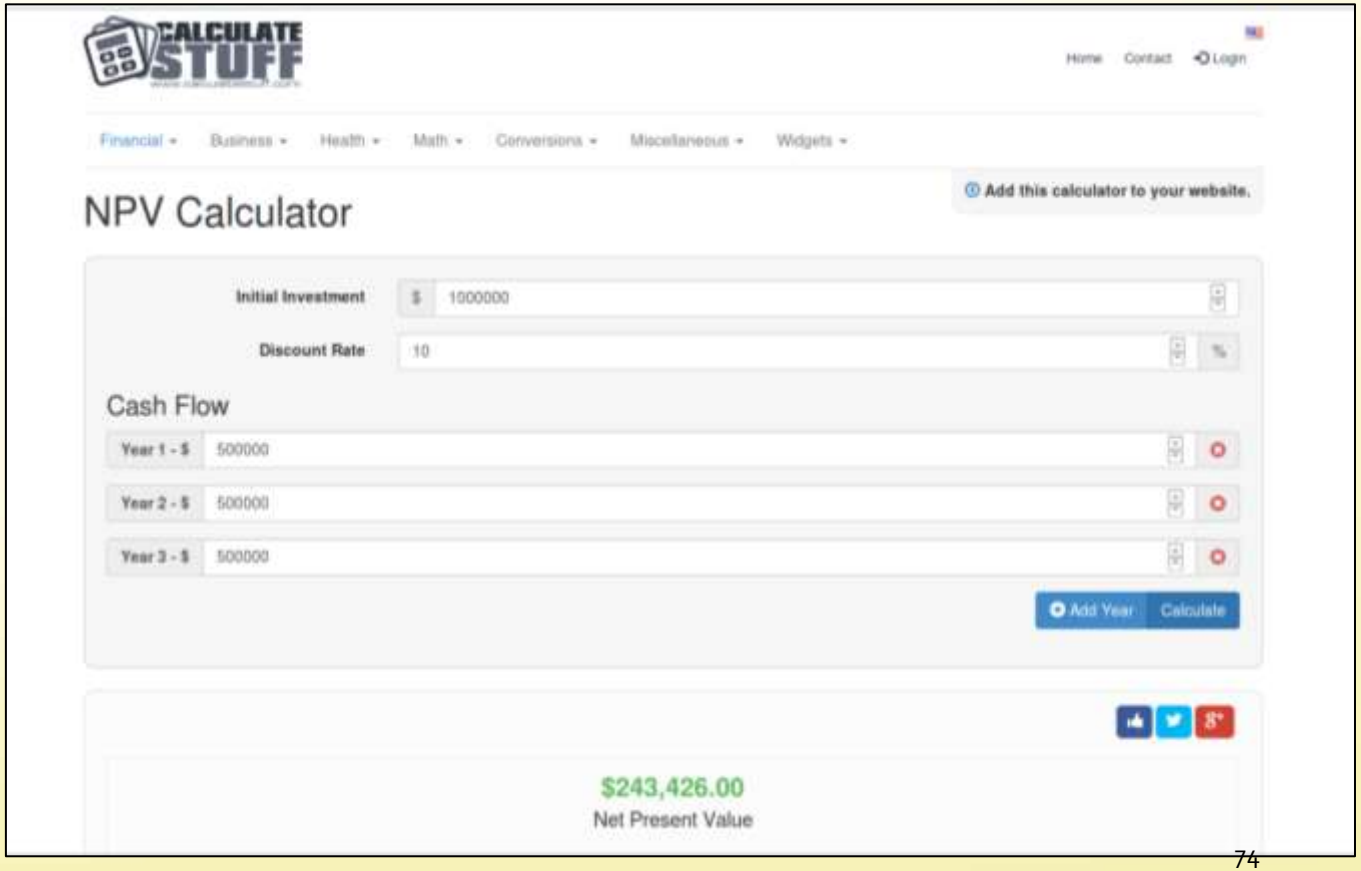
awstcocalculator.com



softwareadvice.com/tco

NPV Calculator





Investopedia.com/calculator

Calculatorstuff.com/financial/npv-calculator

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ROI

- ROI = $\frac{Benefits - Costs}{Costs} * 100\%$
- For the Previous Example
  - ROI = ($1,500,000 – $1,000,000) / $1,000,000
  - ROI = 50%
- How to fine Tune ROI?

ROI Calculator

http://calculator.net/roi-calculator.html

Case Study

- ***Company XY,*** a fictional biotechnology company with a proven track record of helping its customers reduce their time to market for new drugs. XY began life as a research firm processing large clinical data sets for companies. With the addition of new partners, XY began adding research and development as well as marketing and branding services.

- XY is now a full-service clinical research organization with an employee base of 100 individuals (including IT, sales, research, and design). XY has a small data center today where it hosts its customer databases, research libraries, and sales and finance applications.

- XY has signed two major contracts in the past three years, contributing to 100 percent revenue growth year over year. The company currently hosts customer data in excess of 500 TB, supported by a relatively small IT staff of 20 engineers and developers. Traffic on XY's online portal (where the company shares data with development teams at partner firms) has grown 60 percent in the last two quarters.

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Case Study

- To account for the servers and applications, I have added server hardware and maintenance and customer relationship management (CRM) software licenses. I have also included basic switching, routing, and load-balancing hardware for network access. Finally, I have increased the engineering FTE charges—six individuals at $150,000 per year—to cover administration of the storage, network, server, and software plat- forms.

- The total annual run rate is $1.97 million for the depreciation of all hardware and software (using straight-line depreciation over three years) and for facilities and labor expenses. XY's total cost of ownership over three years is $5.91 million.

TCO Analysis: Traditional vs SaaS

Annual Total Cost of Ownership for Company X's IT Supply Chain

Item	Annual Charge	Three-Year Charge
Disk storage	$666,666.67	$2,000,000.00
Disk maintenance	$100,000.00	$300,000.00
Facilities	$30,000.00	$90,000.00
Full-time equivalent (FTE) labor	$900,000.00	$2,700,000.00
Firewalls and load balancers	$10,000.00	$30,000.00
Network switches	$10,000.00	$30,000.00
Server hardware	$166,666.67	$500,000.00
Server maintenance	$20,000.00	$60,000.00
Software licenses	$66,666.67	$200,000.00
Total	**$1,970,000.01**	**$5,910,000.00**

Annual Total Cost of Ownership for Company X's IT Supply Chain (SaaS)

Item	Annual Charge	Three-Year Charge
Disk storage	$333,333.33	$1,000,000.00
Disk maintenance	$50,000.00	$150,000.00
Facilities	$15,000.00	$45,000.00
Full-time equivalent (FTE) labor	$900,000.00	$2,700,000.00
Firewalls and load balancers	$10,000.00	$30,000.00
Network switches	$10,000.00	$30,000.00
Server hardware	$83,333.33	$250,000.00
Server maintenance	$10,000.00	$30,000.00
Software licenses	$70,833.33	$212,500.00
Total	**$1,482,499.99**	**$4,447,500.00**

Source: Cisco, The Economics of Cloud Computing, 2012

ROI Analysis: Traditional vs SaaS

Software as a Service Cost Comparison		
Item	**Annual Cost/Savings**	**Three-Year Charge**
Legacy-model TCO	$1,970,000.01	$5,910,000.00
SaaS-model TCO	$1,482,499.99	$4,447,500.00
Savings	$487,500.02	$1,462,500.00

$212,500 Investment for New license

ROI = (Gains from investment – Costs of investment) / (Costs of investment)
ROI = ($487,500.02 – $212,500.00) / $212,500.00
ROI = 129.41%

NPV = –$212,500 + ($487,500.02/1.1) + [$487,500.02/(1.1 2)] + [$487,500.02/ (1.1 3)]
NPV = –$212,500 + $443,181.84 + $402,892.58 + $366,265.98
NPV = $999,840.40

SaaS CRM upgrade Summarizes

Software as a Service Analysis Summary			
Method	**Payback**	**ROI**	**NPV**
Value	5.23 months	129.41%	$999,840.40

Tip: $212,500 / $487,500.02 = 0.43
0.43 * 12 months = 5.23 months

بخش ششم:
نظام ارزیابی خدمات

مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

On-premise Environment

Infrastructure (as a Service)

Platform (as a Service)

Software (as a Service)

YOU MANAGE

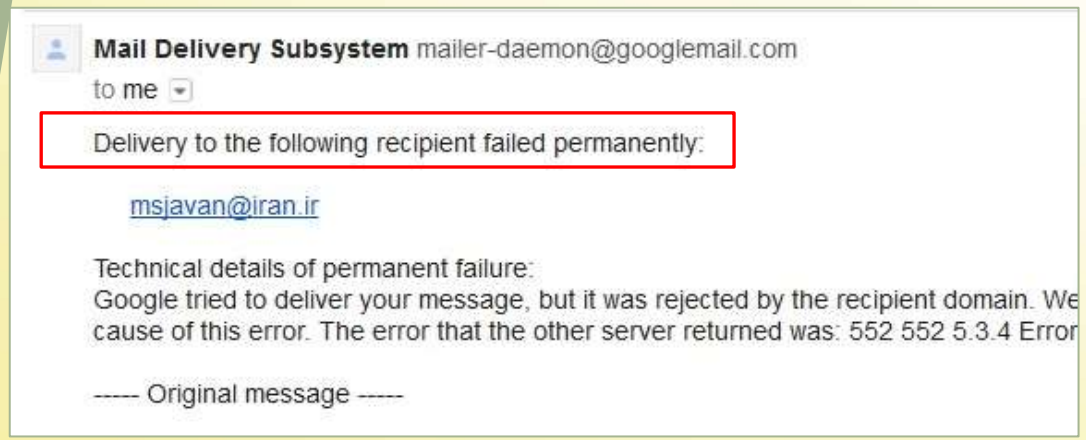
On-premise Environment	Infrastructure (as a Service)	Platform (as a Service)	Software (as a Service)
Business / Process	Business / Process	Business / Process	Business / Process
Application	Application	Application	Application
Data	Data	Data	Data
Runtime / API	Runtime / API	Runtime / API	Runtime / API
Middleware	Middleware	Middleware	Middleware
OS	OS	OS	OS
Virtualization	Virtualization	Virtualization	Virtualization
Hypervisor	Hypervisor	Hypervisor	Hypervisor
Server	Server	Server	Server
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

MANAGED BY PROVIDER

کیفیت سرویس

لطفا پس از چند دقیقه مجددا تلاش نمایید ...
صفحه مورد نظر شما به علت ترافیک سنگین و بار زیاد بر روی سرور ها قابل نمایش نمی باشد.

کلمه عبور
خطا در ارتباط با سیستم آنلاین
ورود
کلمه عبور خود را فراموش کرده ام
اگر پس از ثبت نام، برای شما ایمیل فعال سازی ارسال نشده است برای ارسال مجدداینجارا کلیک کنید
مقررات رزرو بلیت اینترنتی
ارتباط با ما


Mail Delivery Subsystem mailer-daemon@googlemail.com
to me
Delivery to the following recipient failed permanently:
msjavan@iran.ir
Technical details of permanent failure:
Google tried to deliver your message, but it was rejected by the recipient domain. We
cause of this error. The error that the other server returned was: 552 552 5.3.4 Error
----- Original message -----

اطلاعات کارت مقصد عملیات انتقال
کد خطا 8002 :در حال حاضر امکان انتقال به کارتهای عضو شتاب فعال نمی باشد
613930
613930
متن تصویر را وارد نمایید:

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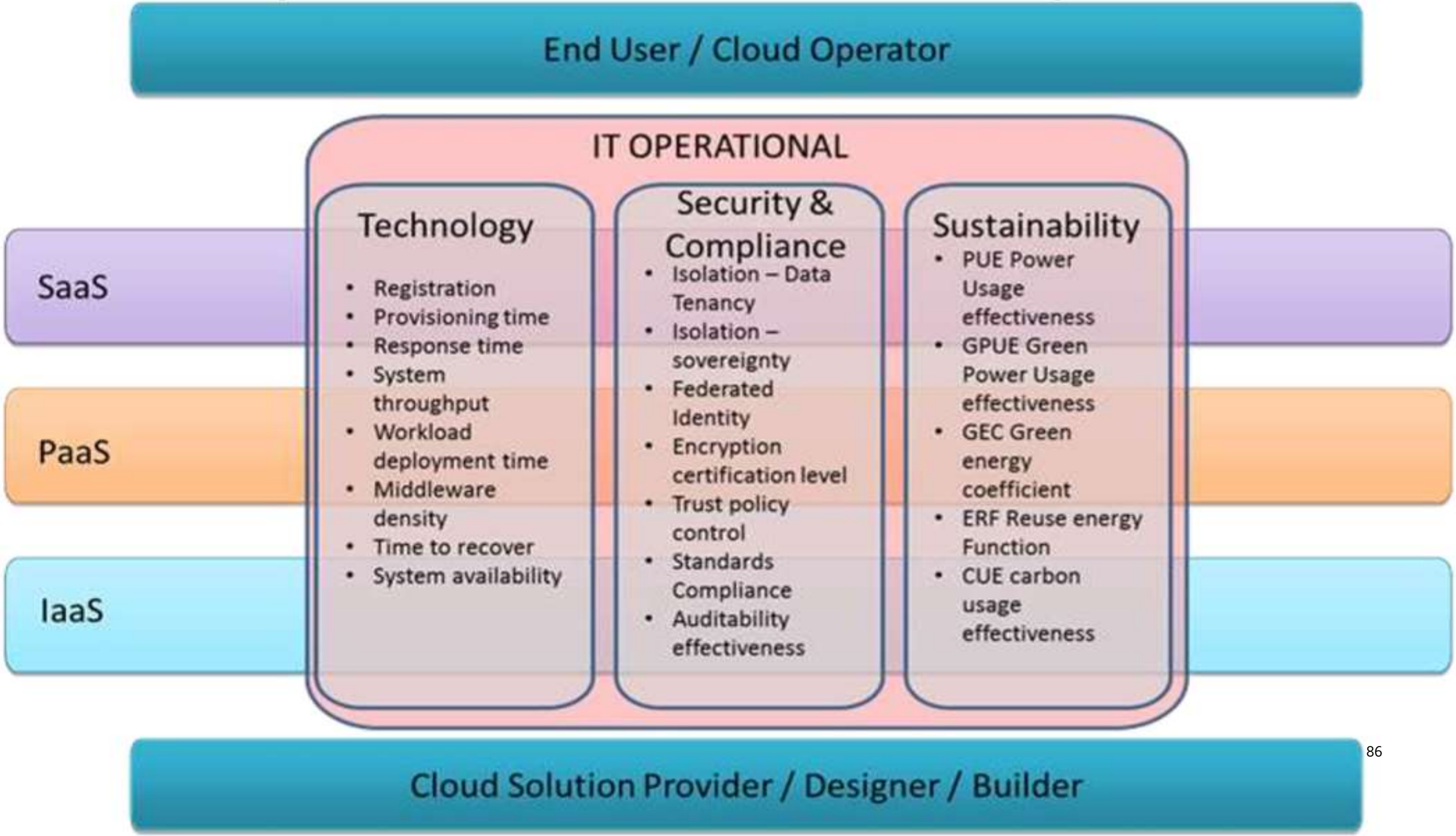
دسته بندی شاخص های ارزیابی (۱)

Metric Type	Metrics
Technology metrics	11
Security and Compliance metrics	7
Sustainability metrics	5
Service Integration and Orchestration metrics	10
Development DevOps metrics	9
People and Organization metrics	6
Financial metrics	16
Market metrics	11
Legal and Contract Management metrics	7
Total	**82**


End User / Cloud Operator
IT OPERATIONAL
Technology
Registration
Provisioning time
Response time
System throughput
Workload deployment time
Middleware density
Time to recover
System availability
Security & Compliance
Isolation – Data Tenancy
Isolation – sovereignty
Federated Identity
Encryption certification level
Trust policy control
Standards Compliance
Auditability effectiveness
Sustainability
PUE Power Usage effectiveness
GPUE Green Power Usage effectiveness
GEC Green energy coefficient
ERF Reuse energy Function
CUE carbon usage effectiveness
SaaS
PaaS
IaaS
Cloud Solution Provider / Designer / Builder

Registration Time

- $Average\ Registration\ Time = \frac{\sum User\ Registration\ Time}{Number\ of\ Users}$
- $Average\ versus\ Planned\ Registration\ Time = \frac{Average\ Registration\ Time}{Planned\ Registration\ Time}$
- UoM: Time, Ratio, Percent

Provisioning Time

- $$Average\ Provisioning\ Time = \frac{\sum \begin{matrix} Average\ Worklod \\ Provisioning \\ Transaction\ Time \end{matrix}}{\begin{matrix} Number\ of \\ Provisioning \\ Transactions \end{matrix}}$$

- $$Average\ versus\ Planned\ Provisiong\ Time = \frac{Average\ Provisiong\ Time}{Planned\ Provisiong\ Time}$$

- UoM: Time, Ratio, Percent

Response Time

- $$Average\ Response\ Time = \frac{\sum Input\ Transaction\ Response\ Time}{Number\ of\ Transactions}$$

- $$Average\ versus\ Planned\ Response\ Time = \frac{Average\ Response\ Time}{PlannedResponseTime}$$

- UoM: Time, Ratio, Percent

System Throughput

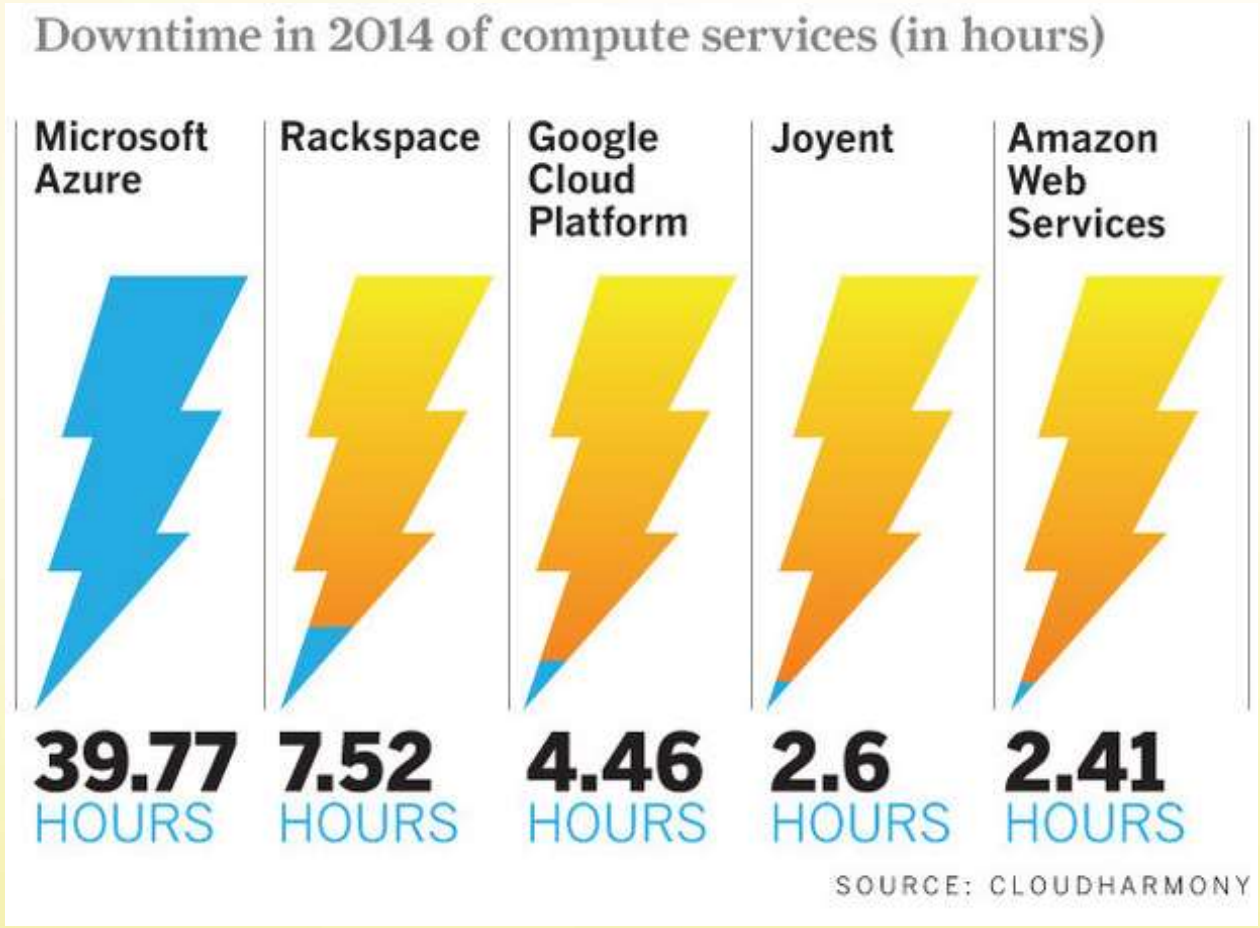
- $Throughput = \frac{Number\ of\ Transactions\ Proceed}{Elapsed\ Processing\ Time}$
- $Throughput\ against\ Capacity = \frac{Actual\ Throuput}{Planned\ Maximum\ Throuput}$
- UoM: Transactions/time, Ratio, Percent

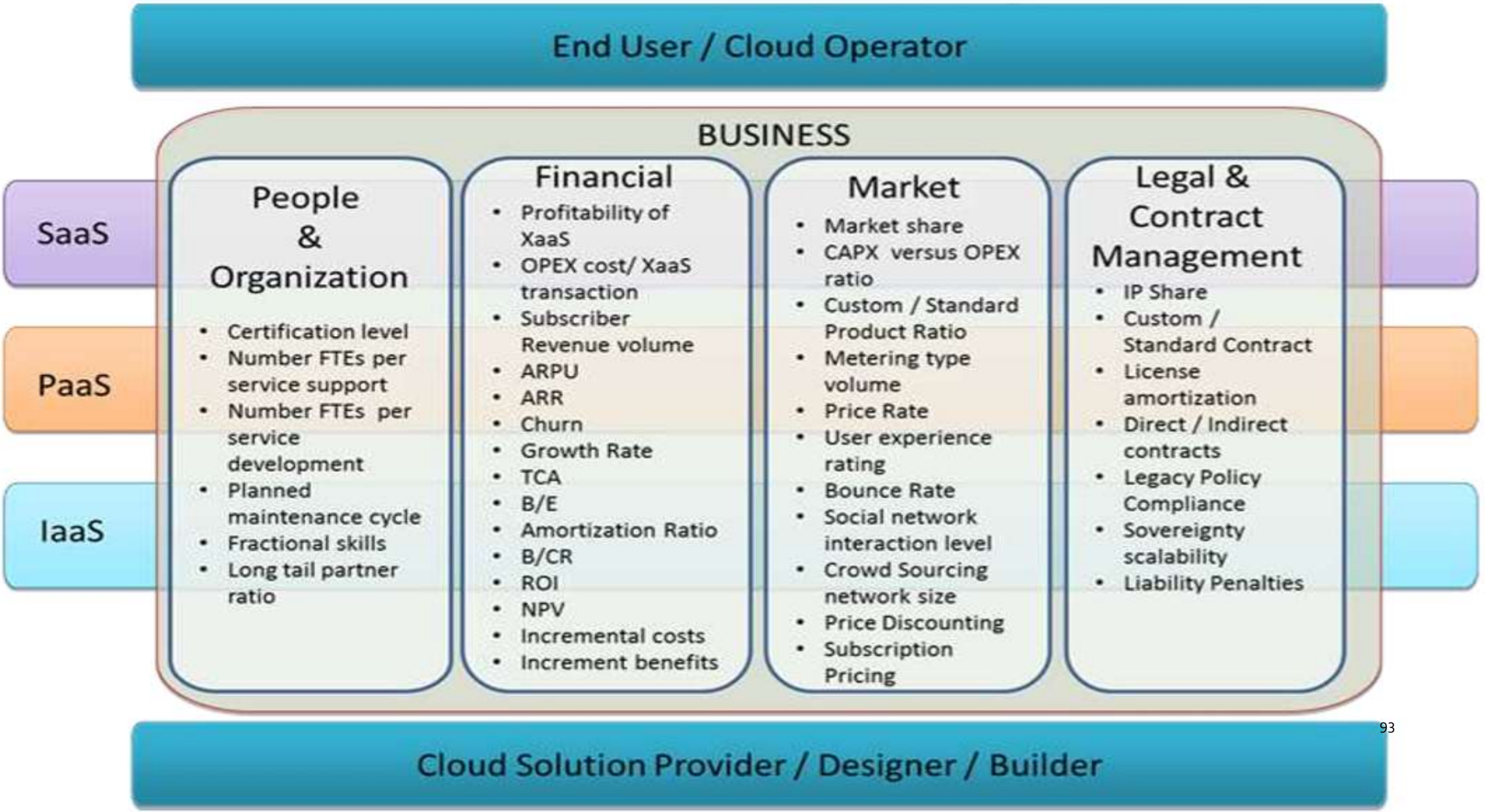
System Availability

- $Availability = \frac{Actual\ Available\ Time}{Total\ Time}$
- $Availability = \frac{MTBF}{MTBF+MTTR}$
- UoM: Ratio, Percent

Availability	Down Time Annually
90.00%	36.5 days
95.00%	18.25 days
99.00%	3.65 days
99.90%	8.76 hours
99.99%	52.6 minutes
99.999%	5.26 minutes
99.9999%	31.5 seconds

System Availability




End User / Cloud Operator
BUSINESS
SaaS
PaaS
IaaS
People & Organization
Certification level
Number FTEs per service support
Number FTEs per service development
Planned maintenance cycle
Fractional skills
Long tail partner ratio
Financial
Profitability of XaaS
OPEX cost/ XaaS transaction
Subscriber Revenue volume
ARPU
ARR
Churn
Growth Rate
TCA
B/E
Amortization Ratio
B/CR
ROI
NPV
Incremental costs
Increment benefits
Market
Market share
CAPX versus OPEX ratio
Custom / Standard Product Ratio
Metering type volume
Price Rate
User experience rating
Bounce Rate
Social network interaction level
Crowd Sourcing network size
Price Discounting
Subscription Pricing
Legal & Contract Management
IP Share
Custom / Standard Contract
License amortization
Direct / Indirect contracts
Legacy Policy Compliance
Sovereignty scalability
Liability Penalties
Cloud Solution Provider / Designer / Builder

Churn Rate

- Churn Rate = $\frac{Number\ of\ Cancellation\ and\ Changes}{Number\ of\ Customers * Months}$ *100%

- UoM: Ratio per unit time, Percent per unit time, revenue loss per service

Legal Policy Compliance

- Policy Compliance Ratio = $\frac{Number\ of\ Services\ that\ Must\ Comply\ with\ External\ Standards}{Total\ Number\ of\ Services}$ *100%

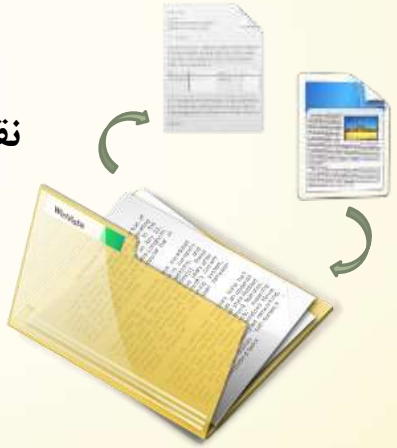
- UoM: Ratio, Percent, Currency Value

بخش هفتم:
امنیت در رایانش ابری

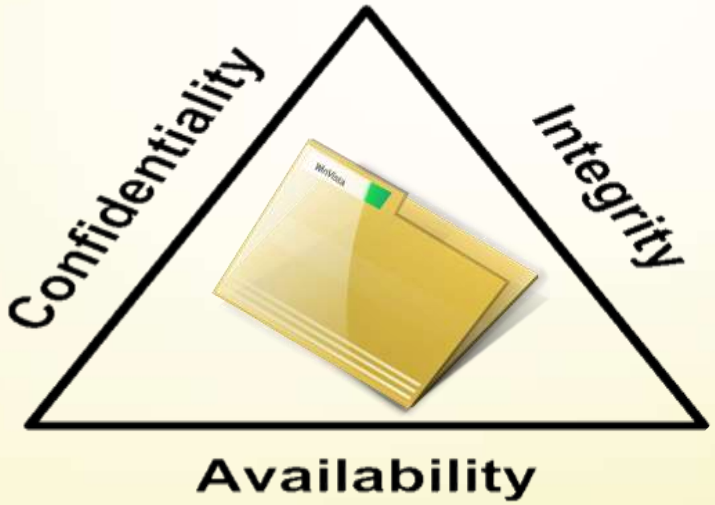
مرتضی سرگلزایی جوان
مرکز تحقیقات رایانش ابری

مقدمه

نقض صحت داده



نقض محرمانگی داده

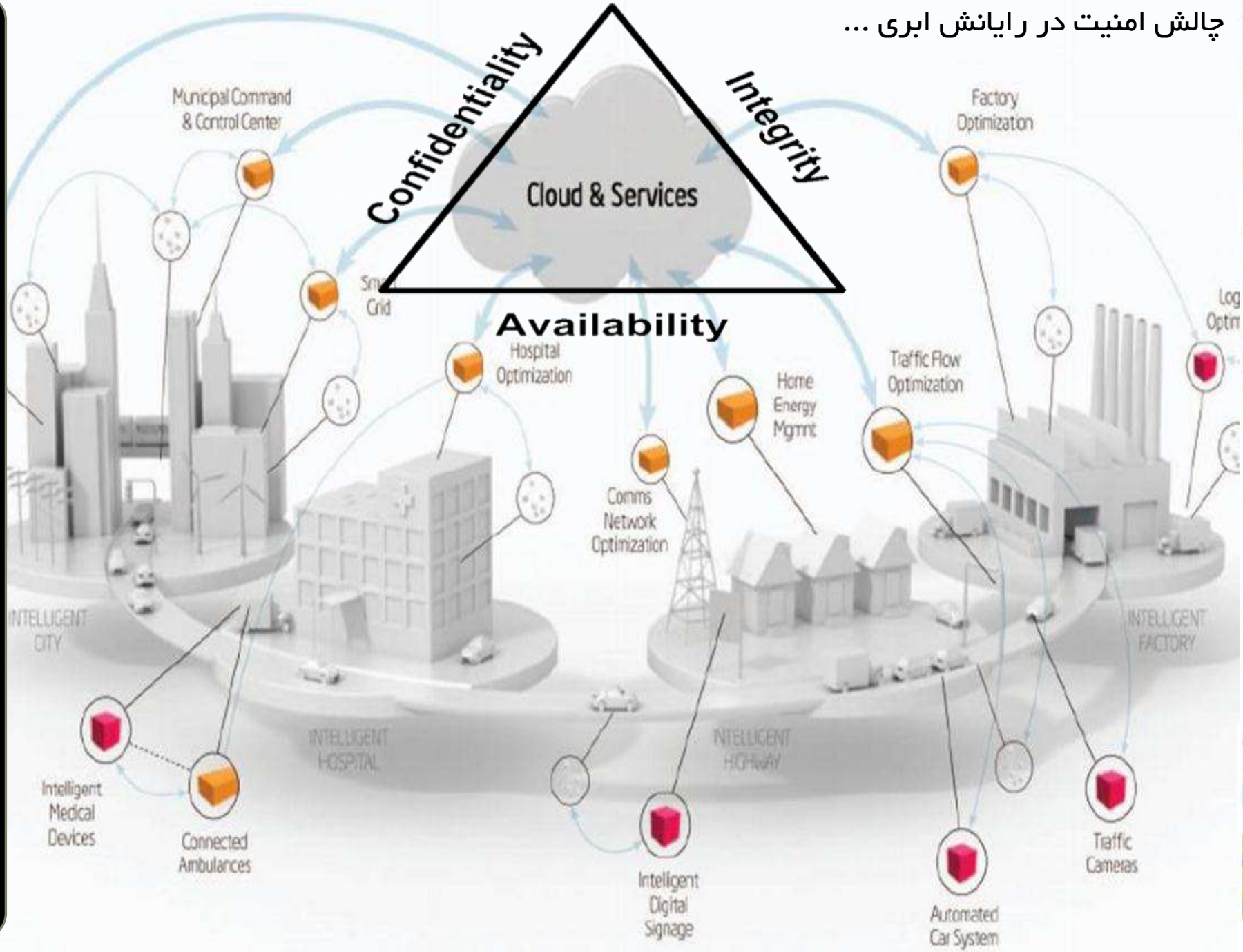


از دسترس خارج شدن داده

چالش امنیت در رایانش ابری ...

FULL STACK SECURITY

- Business / Process
- Application
- Data
- Runtime / API
- Middleware
- OS
- Virtualization
- Hypervisor
- Server
- Storage
- Networking



Smart Oil

Smart logistics

Smart consumer products

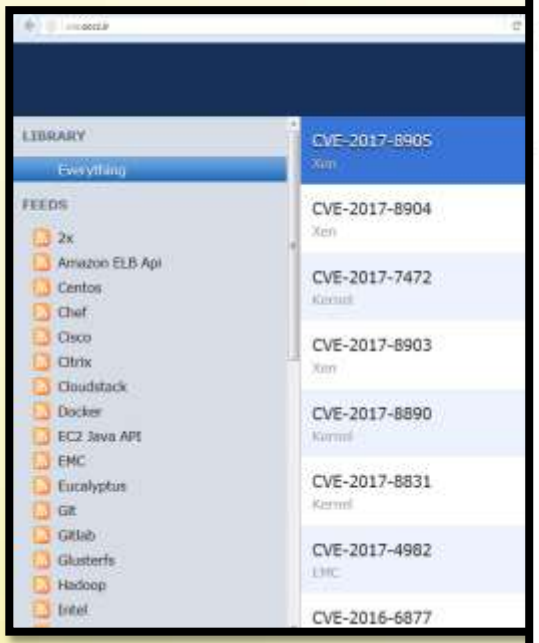
Smart agriculture

Smart banking

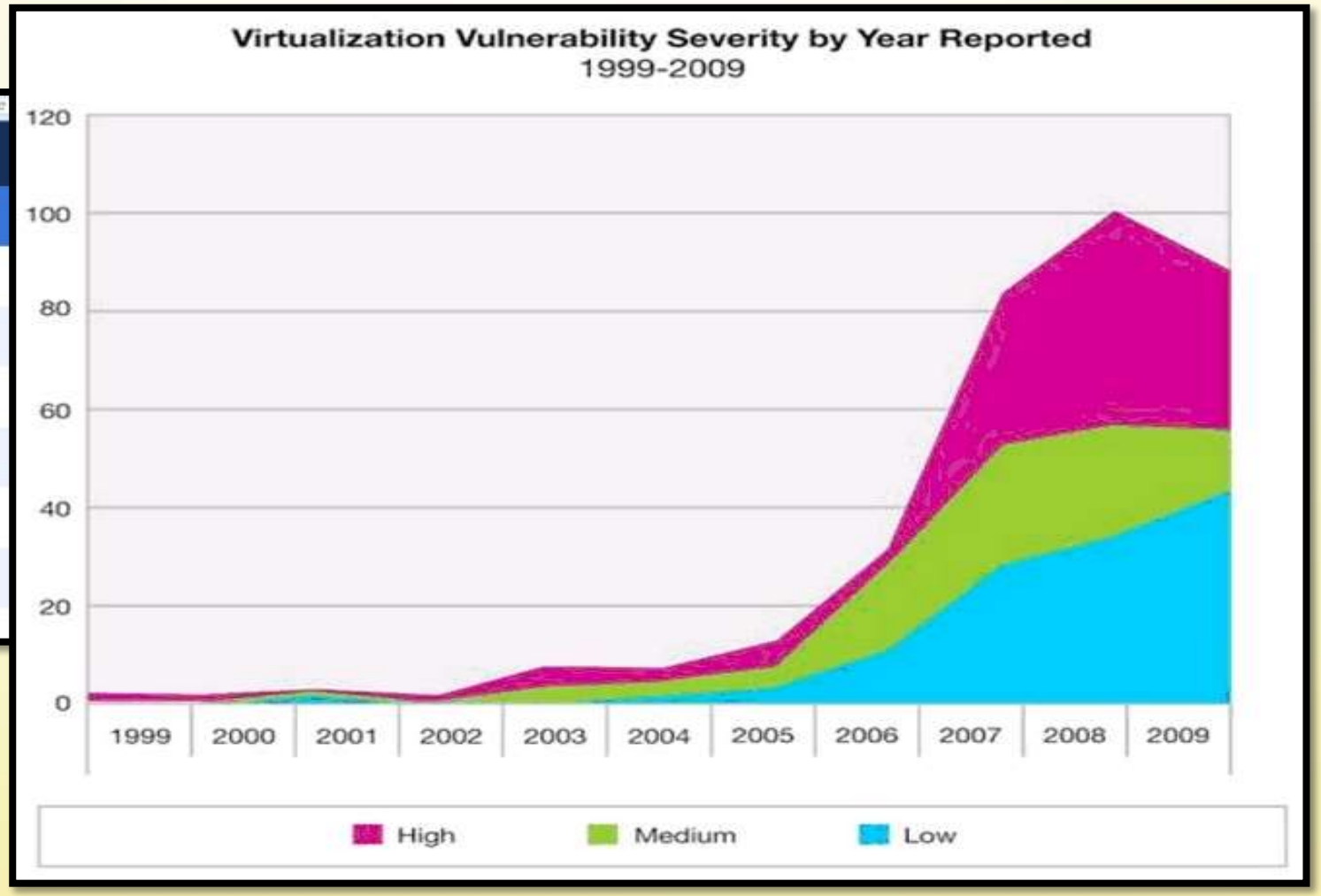
FULL STACK SECURITY

- Business / Process
- Application
- Data
- Runtime / API
- Middleware
- OS
- Virtualization
- Hypervisor
- Server
- Storage
- Networking

آسیب پذیری های امنیتی، با افزایش گرایش به مجازی سازی افزایش یافته است

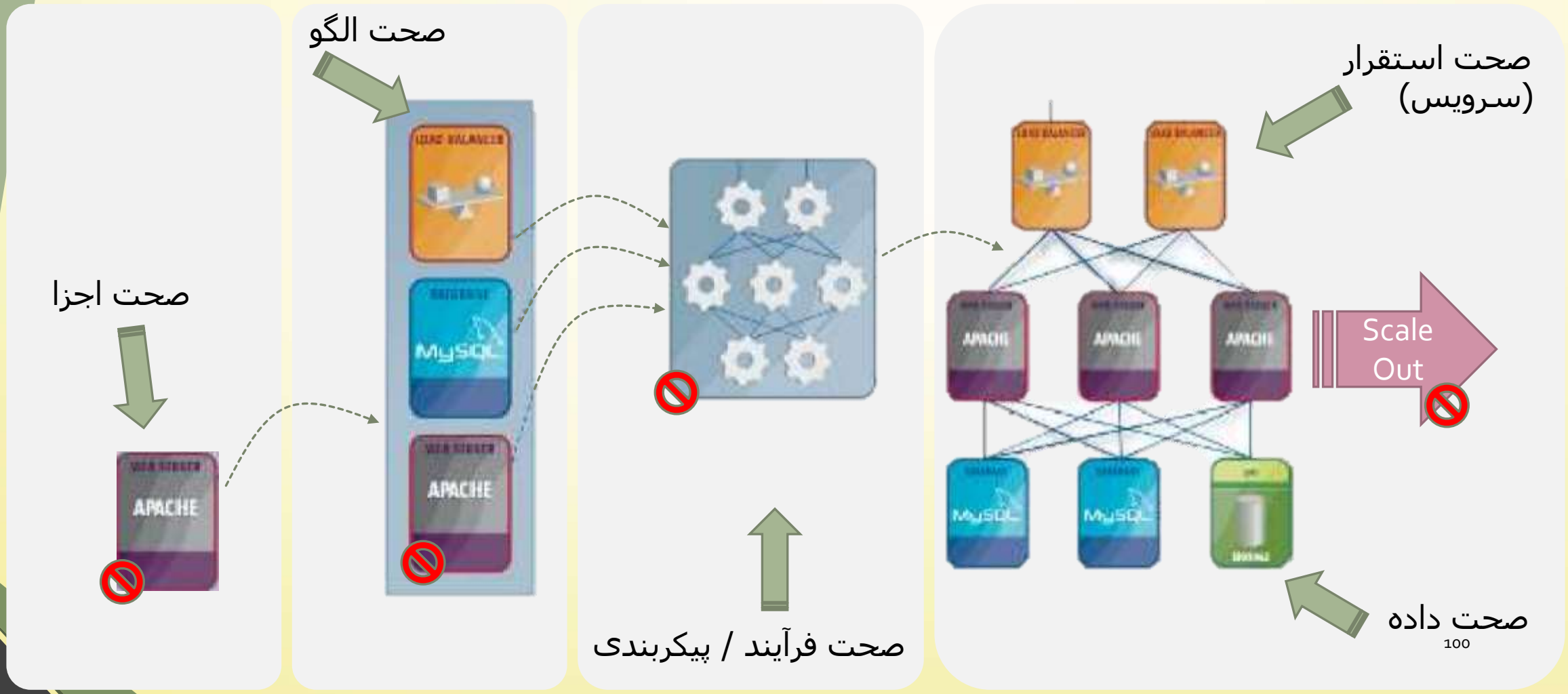


http://cve.occc.ir



Smart banking

سناریوهایی از صحت داده / صحت سرویس / تداوم کسب و کار



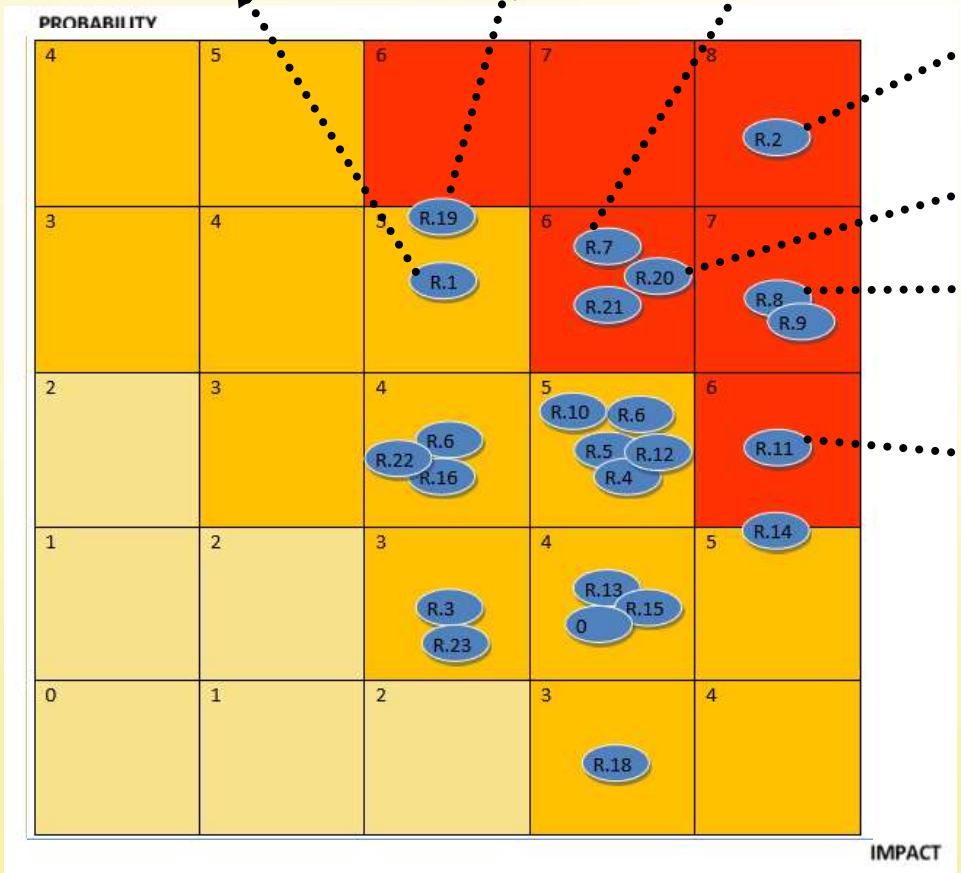
crc.aut.ac.ir

مدیریت مخاطرات (گزارش نسخه ۲۰۱۲)

قفل شدن در فروشنده
(Vendor Lock-in)

احضاریه
(Subpoena)

شکست جداسازی
(Isolation Failure)



از دست دادن کنترل
(Loss of Governance)

خطر تغییر حوزه قضایی
(Change of jurisdiction)

کاربر داخلی بدخواه
(Malicious Insider)

حذف داده به صورت غیر امن
(Insecure deletion of data)

Iran Data Sovereignty Map v1.0 – Jun 2018

Open Community of Cloud Computing
جامعه آزاد رایانش ابری ایران

CLOUD RESEARCH CENTER
مرکز تحقیقات رایانش ابری

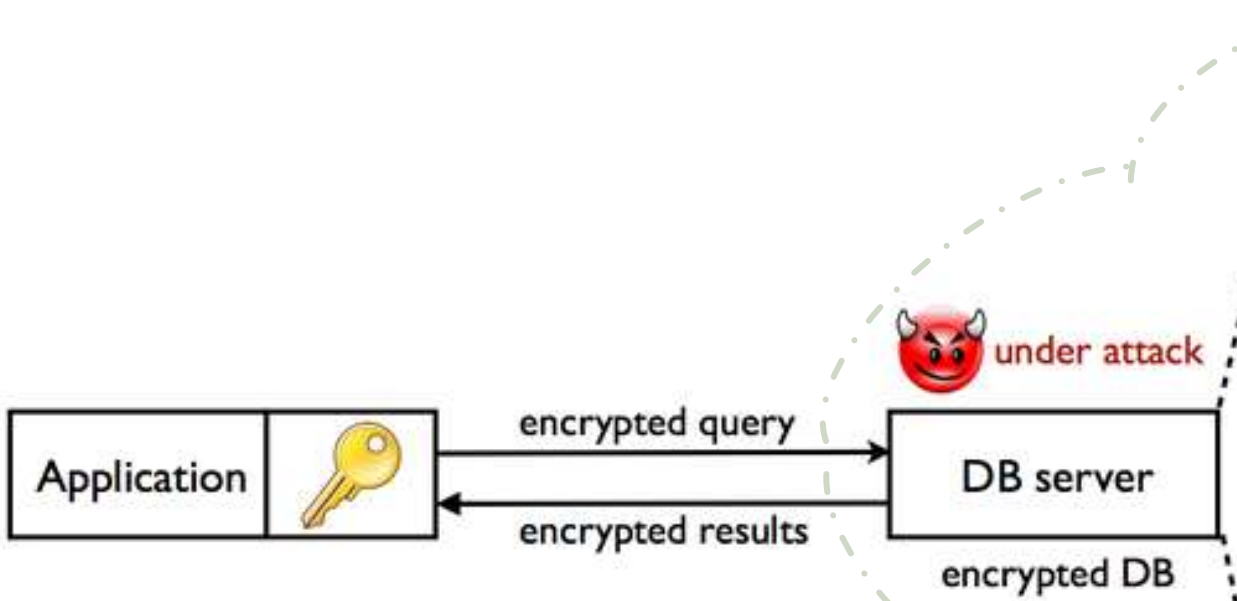
ITRC

سازمان تنظیم مقررات و ارتباطات رادیویی

حکمرانی قلمروی داده به این موضوع اشاره دارد که داده ها تحت قوانین و مقررات کشوری قرار می گیرند که در آن تولید یا پردازش می شوند.
در این تصویر نمایی از پراکندگی جغرافیایی داده های ایران که در سرویس های مختلف ابری ایرانی میزبانی می شود نشان داده شده است.

http://occc.ir
@oCCc_news

رمز نگاری



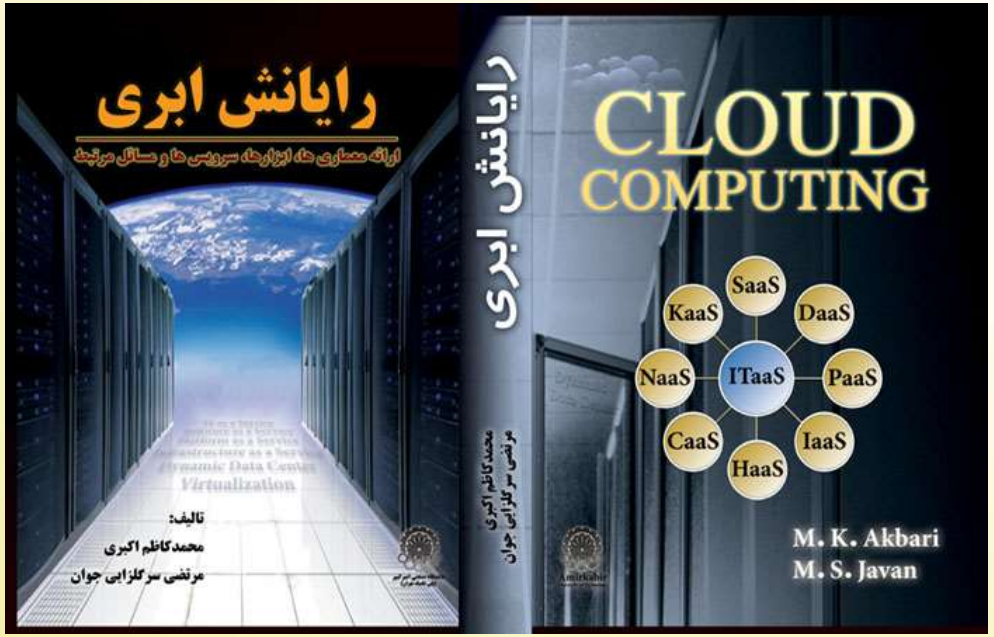
database content for attacker with root access

```
mysql> select * from table_YYAXXURGXH;
+----------------------+----------------------+----------------------+
| CKEWNNKTJVoDET       | WIWWHTQZBQoOPE       | ISKNOMNOYSoAGG       |
+----------------------+----------------------+----------------------+
| 12350108222818996780 | 14614281758989003640 | ;[illegible]e@b(T 5[illegible]
| 15753844592636354766 | 16607196790268127689 | R P-@i[illegible]8@][illegible]}f Ea]
| 13411675538537145840 | 12454649889312668381 | ???pK^v????????[illegible]l}[illegible]
```

جمع بندی

- فلسفه و اهمیت رایانش ابری
- وضعیت رایانش ابری در ایران
- معماری رایانش ابری از دو نمای کاربری و کارکردی
- ملاحظات فنی در طراحی مرکز داده
- محاسبات اقتصادی رایانش ابری
- روش های ارزیابی خدمات ابری
- مسائل و مخاطرات امنیتی رایانش ابری

منابع تکمیلی



http://crc.aut.ac.ir

https://www.itu.int/rec/T-REC-Y