

Cloud Computing

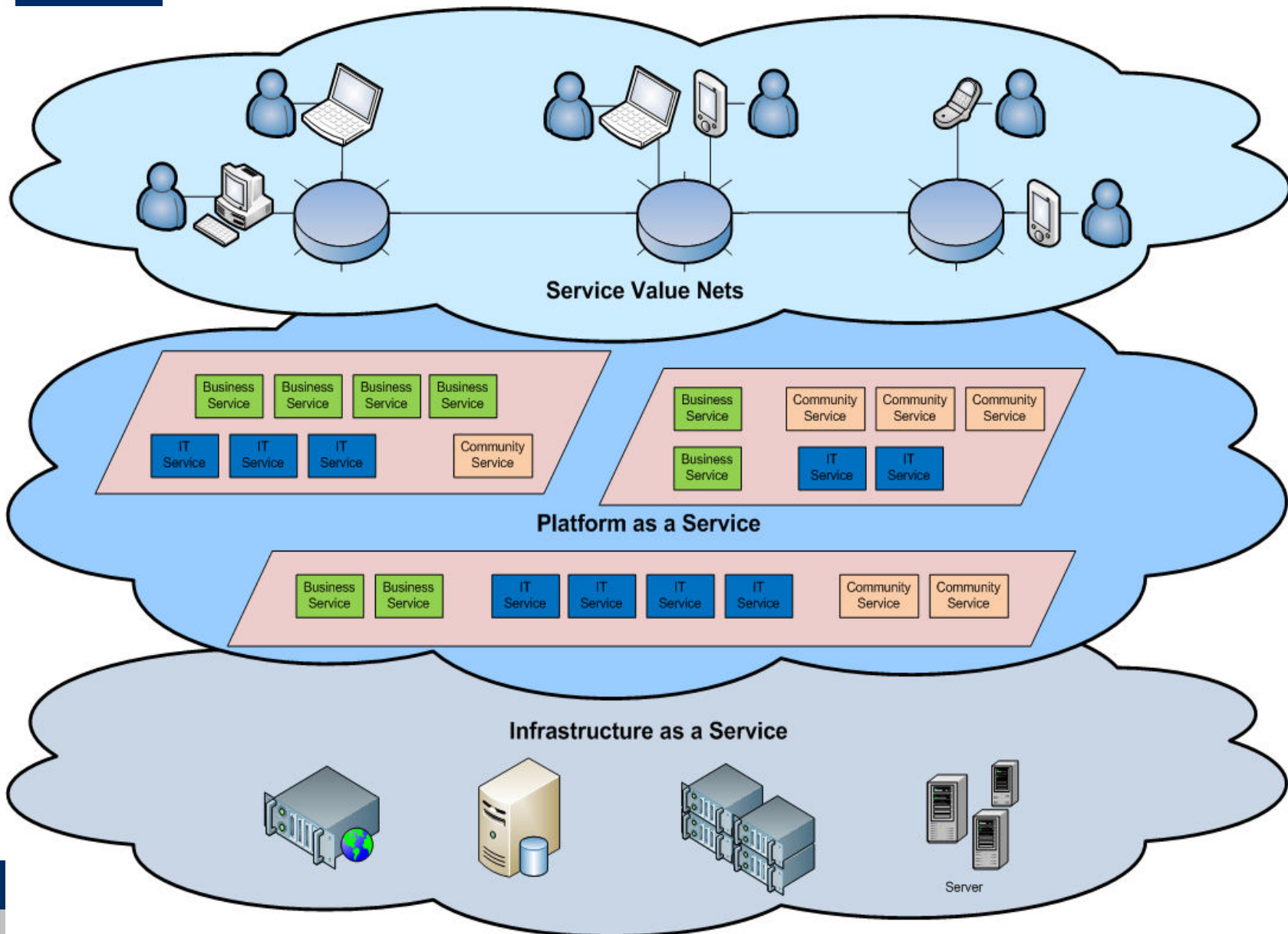


Narender Solanki

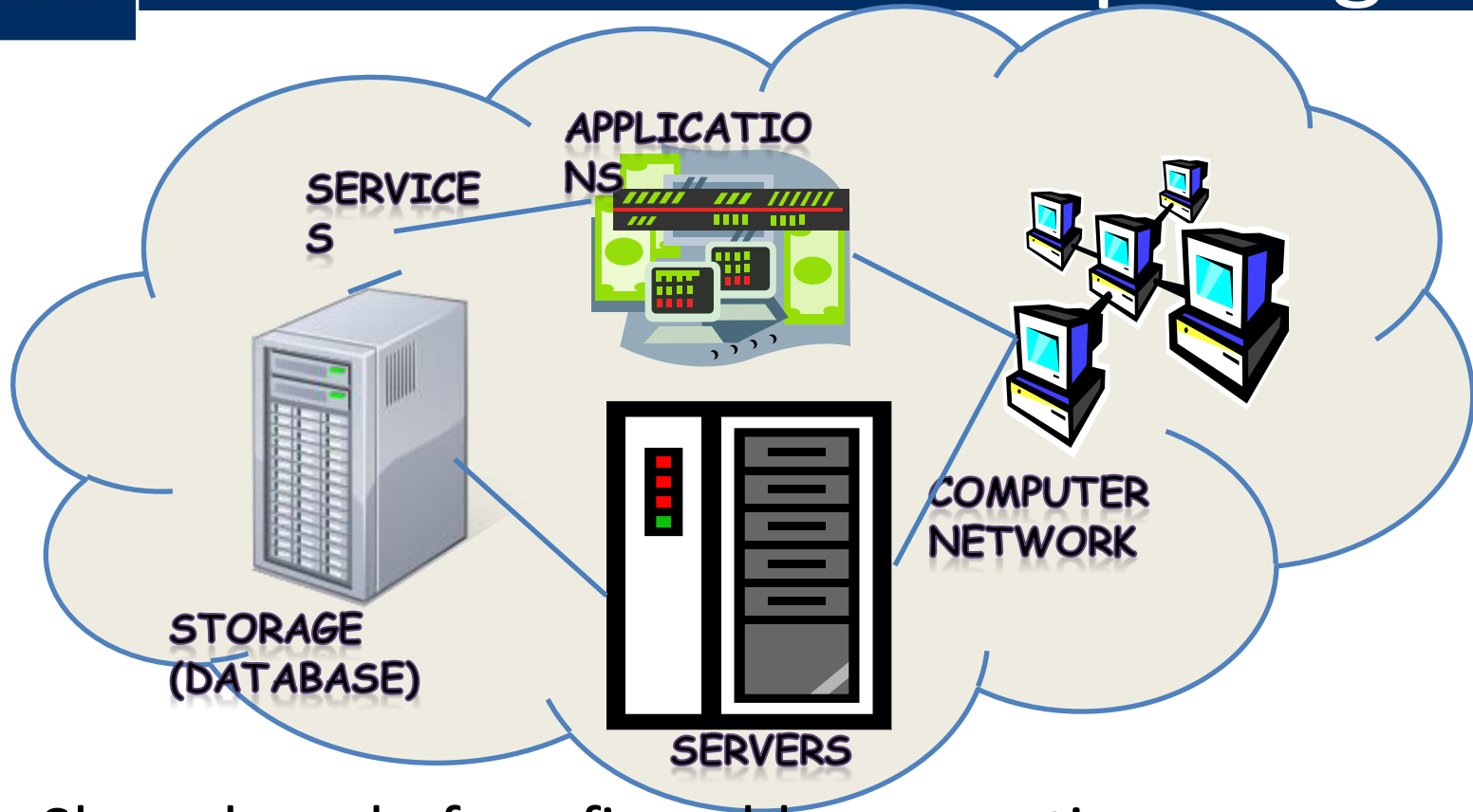
- **Cloud Computing** is a general term used to describe a new class of network based computing that takes place over the Internet,
 - basically a step on from Utility Computing
 - a collection/group of integrated and networked hardware, software and Internet infrastructure (called a platform).
 - Using the Internet for communication and transport provides hardware, software and networking services to clients
- These platforms hide the complexity and details of the underlying infrastructure from users and applications by providing very simple graphical interface or API (Applications Programming Interface).

- In addition, the platform provides on demand services, that are always on, anywhere, anytime and any place.
- Pay for use and as needed, elastic
 - scale up and down in capacity and functionalities
- The hardware and software services are available to
 - general public, enterprises, corporations and businesses markets

- Cloud computing is an umbrella term used to refer to Internet based development and services
- A number of characteristics define cloud data, applications services and infrastructure:
 - **Remotely hosted:** Services or data are hosted on remote infrastructure.
 - **Ubiquitous:** Services or data are available from anywhere.
 - **Commodified:** The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity - you pay for what you would want!



What is Cloud Computing



- Shared pool of configurable computing resources
- On-demand network access
- Provisioned by the Service Provider

Common Characteristics:

Massive Scale

Resilient Computing

Homogeneity

Geographic Distribution

Virtualization

Service Orientation

Low Cost Software

Advanced Security

Essential Characteristics:

On Demand Self-Service

Broad Network Access

Rapid Elasticity

Resource Pooling

Measured Service

Cloud Service Models

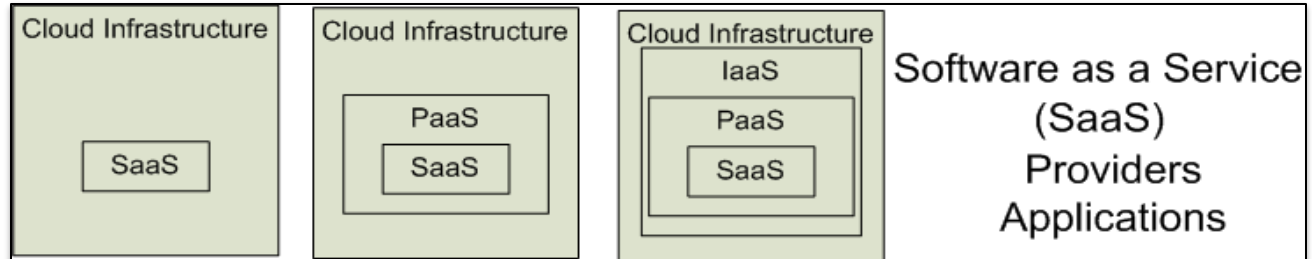
Software as a
Service (SaaS)

Platform as a
Service (PaaS)

Infrastructure as a
Service (IaaS)

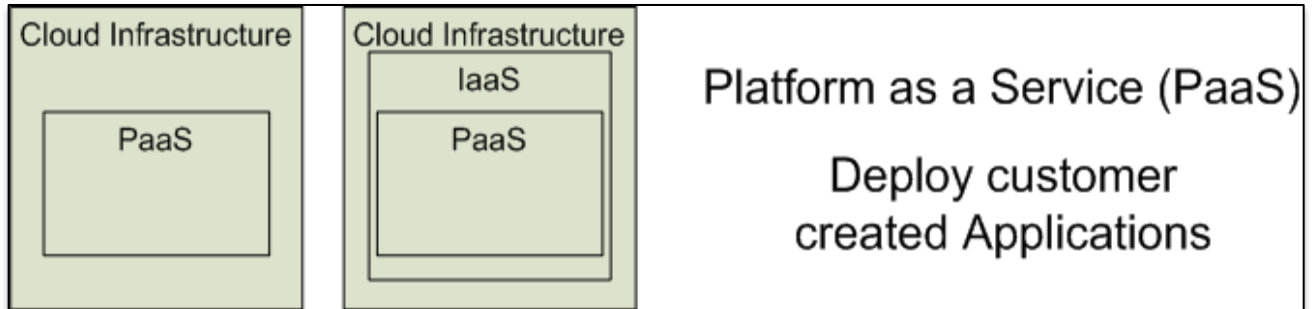
SalesForce CRM

LotusLive



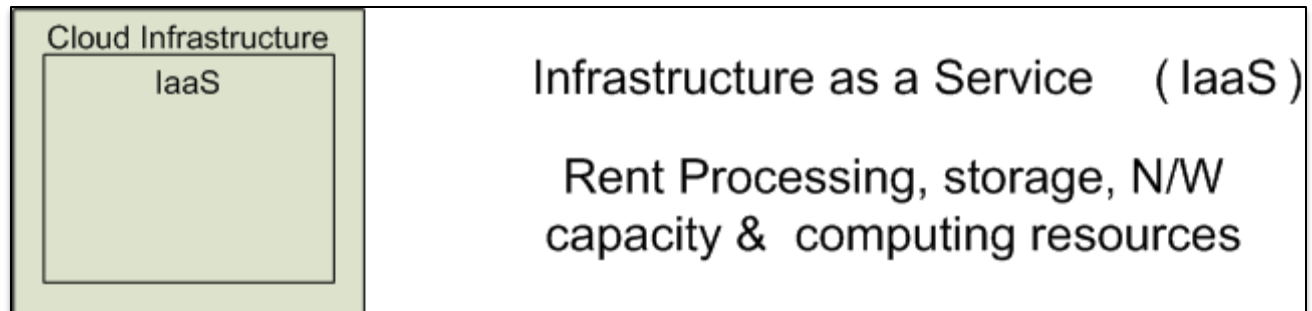
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Application Service (SaaS)	MS Live/ExchangeLabs, IBM, Google Apps; Salesforce.com Quicken Online, Zoho, Cisco
Application Platform	Google App Engine, Mosso, Force.com, Engine Yard, Facebook, Heroku, AWS
Server Platform	3Tera, EC2, SliceHost, GoGrid, RightScale, Linode
Storage Platform	Amazon S3, Dell, Apple, ...

- The “**no-need-to-know**” in terms of the underlying details of infrastructure, applications interface with the infrastructure via the APIs.
- The “**flexibility and elasticity**” allows these systems to scale up and down at will
 - utilising the resources of all kinds
 - CPU, storage, server capacity, load balancing, and databases
- The “**pay as much as used and needed**” type of utility computing and the “**always on!, anywhere and any place**” type of network-based computing.

- Cloud are transparent to users and applications, they can be built in multiple ways
 - branded products, proprietary open source, hardware or software, or just off-the-shelf PCs.
- In general, they are built on clusters of PC servers and off-the-shelf components plus Open Source software combined with in-house applications and/or system software.

- Why is it becoming a Big Deal:
 - Using high-scale/low-cost providers,
 - Any time/place access via web browser,
 - Rapid scalability; incremental cost and load sharing,
 - Can forget need to focus on local IT.
- Concerns:
 - Performance, reliability, and SLAs,
 - Control of data, and service parameters,
 - Application features and choices,
 - Interaction between Cloud providers,
 - No standard API – mix of SOAP and REST!
 - Privacy, security, compliance, trust...

Some Commercial Cloud Offerings



Amazon Elastic Compute Cloud (Amazon EC2) - Beta



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Cloud Computing

Cloudware - Cloud Computing Without Compromise

Overview



MOSSO
the hosting cloud



VERIO
An NTT Communications Company

Cloud Taxonomy

Infrastructure Services

Storage

- Amazon S3
- Amazon EBS
- CTERA Portal
- Mosso Cloud Files
- Nirvanix

Compute

- Amazon EC2
- Serve Path GoGrid
- Elastra
- Mosso Cloud Servers
- Joyent Accelerators
- AppNexus
- Flexiscale
- ElasticHosts
- Hosting.com CloudNine
- Terramark
- GridLayer
- ITRICITY
- LayeredTech

Services Management

- RightScale
- enStratus
- Scalr
- CohesiveFT
- Kaavo
- CloudStatus
- Ylastic
- Dynect
- CloudFoundry
- NewRelic
- Cloud42

Cloud Software

Data

- 10Gen MongoDB
- Oracle Coherence
- Gemstone Gemfire
- Apache CouchDb
- Apache HBase
- Hypertable
- TerraCotta
- Tokyo Cabinet
- Cassandra
- memcached

Compute

- Globus Toolkit
- Xeround
- Beowulf
- Sun Grid Engine
- Hadoop
- OpenCloud
- Gigaspace
- DataSynapse
- Xeround

Cloud Management

- 3Tera App Logic
- OpenNebula
- Open.ControlTier
- Enomaly Enomalism
- Altor Networks
- VMware vSphere
- OnPathTech
- CohesiveFT VPN Cubed
- Hyperic
- Eucalyptus
- Reductive Lbs Puppet
- OpenQRM
- Appistry

File Storage

- EMC Atmos
- ParaScale
- Zmamba
- CTERA

Appliances

- PingIdentity
- Symplified
- rPath
- Vordel

CLOUD TAXONOMY

Platform Services

General Purpose

- Force.com
- Etelos
- LongJump
- AppJet
- Rollbase
- Bungee Labs Connect
- Google App Engine
- Engine Yard
- Caspio
- Qrimp
- MS Azure Services Platform
- Mosso Cloud Sites

Business Intelligence

- Aster DB
- Quantivo
- Cloud9 Analytics
- Blink Logic
- K2 Analytics
- LogiXML
- Oco
- Panorama
- PivotLink
- Sterna
- ColdLight Neuron
- Infobright
- Vertica

Integration

- Amazon SQS
- MuleSource Mule OnDemand
- Boomi
- SnapLogic
- OpSource Connect
- Cast Iron
- Microsoft BizTalk Services
- gnip
- SnapLogic SaaS Solution Packs
- Applan Anywhere
- HubSpan
- Informatica On-Demand

Development & Testing

- Keynote Systems
- Mercury
- SOASTA
- SkyTap
- Aptana
- LoadStorm
- Collabnet
- Dynamsoft

Database

- Google BigTable
- Amazon SimpleDB
- FathomDB
- Microsoft SDS

Software Services

Desktop Productivity

- Zoho
- IBM Lotus Live
- Google Apps
- Desktwo
- Parallels
- ClusterSeven

Sales

- Xactly
- LucidEra
- StreetSmarts
- Success Metrics

Legal

- DirectLaw
- Advologix
- Fios
- Sertifi

Financials

- Concur
- Xero
- Workday
- Beam4d

Billing

- Aria Systems
- eVapt
- OpSource
- RediZ
- Zuora

Document Management

- NetDocuments
- Questys
- DocLanding
- Aconex
- Xythes
- Knowledge TreeLive
- SpringCM

CRM

- NetSuite
- Parature
- Responsys
- Rightnow
- Salesforce.com
- LiveOps
- MSDynamics
- Oracle On Demand

Backup & Recovery

- JungleDisk
- Mozy
- Zmamba Cloud Backup
- OpenRSM
- Synclplicity

Content Management

- Clickability
- SpringCM
- CrownPoint

Human Resources

- Taleo
- Workday
- ICIMS

Social Networks

- Ning
- Zemby
- Amitive

Collaboration

- Box.net
- DropBox

- Several large Web companies are now exploiting the fact that they have data storage capacity that can be hired out to others.
 - allows data stored remotely to be temporarily cached on desktop computers, mobile phones or other Internet-linked devices.
- Amazon's Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are well known examples
 - Mechanical Turk

- The use of the cloud provides a number of opportunities:
 - It enables services to be used without any understanding of their infrastructure.
 - Cloud computing works using economies of scale:
 - It potentially lowers the outlay expense for start up companies, as they would no longer need to buy their own software or servers.
 - Cost would be by on-demand pricing.
 - Vendors and Service providers claim costs by establishing an ongoing revenue stream.
 - Data and services are stored remotely but accessible from “anywhere”.

- In parallel there has been backlash against cloud computing:
 - Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation:
 - The others are likely become the bigger Internet companies like Google and IBM, who may monopolise the market.
 - Some argue that this use of supercomputers is a return to the time of mainframe computing that the PC was a reaction against.
 - Security could prove to be a big issue:
 - It is still unclear how safe out-sourced data is and when using these services ownership of data is not always clear.
 - There are also issues relating to policy and access:
 - If your data is stored abroad whose policy do you adhere to?
 - What happens if the remote server goes down?
 - How will you then access files?
 - There have been cases of users being locked out of accounts and losing access to data.