Cloud Computing

Cloudlytics

Definition

- ## What is cloud ?
  - Defining it through industry standard terms

Essential Characteristics

- On demand self service
  - Comparison of traditional environment and cloud environment
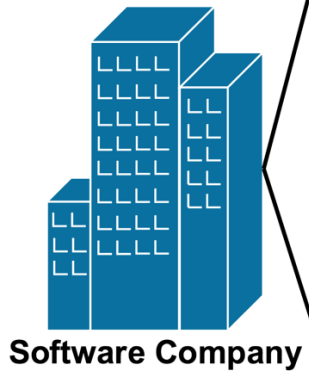
- Broad network access

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Essential Characteristics

- Resource pooling

- Rapid Elasticity

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Common **Enterprise**
Uses of Cloud Services

On-Premise

2016:
1000 Users

Software Company

Common **Enterprise** Uses of Cloud Services

On-Premise

2016:
1000 Users

2017:
5000 Users

Software Company

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Common **Enterprise**
Uses of Cloud Services

On-Premise

2016:
1000 Users

2017:
5000 Users

2018:
20,000 Users

Software Company

Common **Enterprise** Uses of Cloud Services

On-Premise

Software Company

| 2016: 1000 Users | 2017: 5000 Users | 2018: 7000 Users | ~~2018: 20,000 Users~~ |
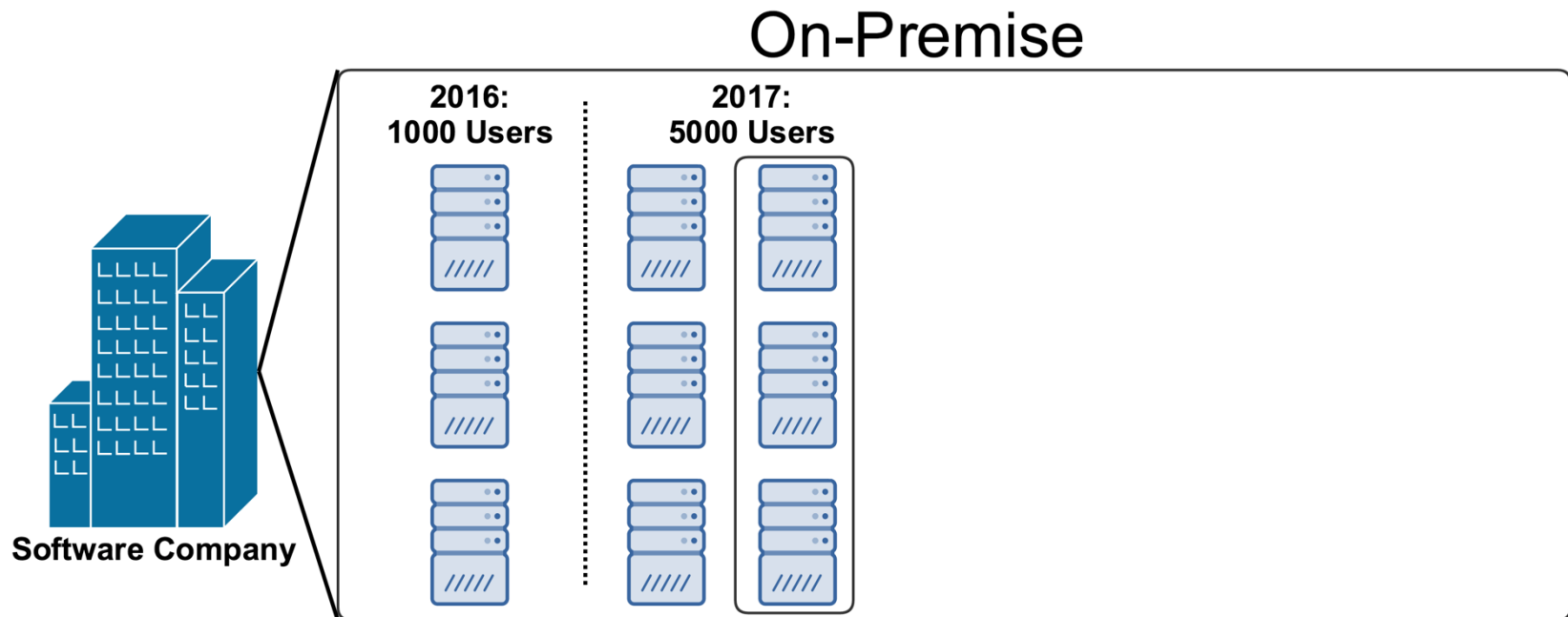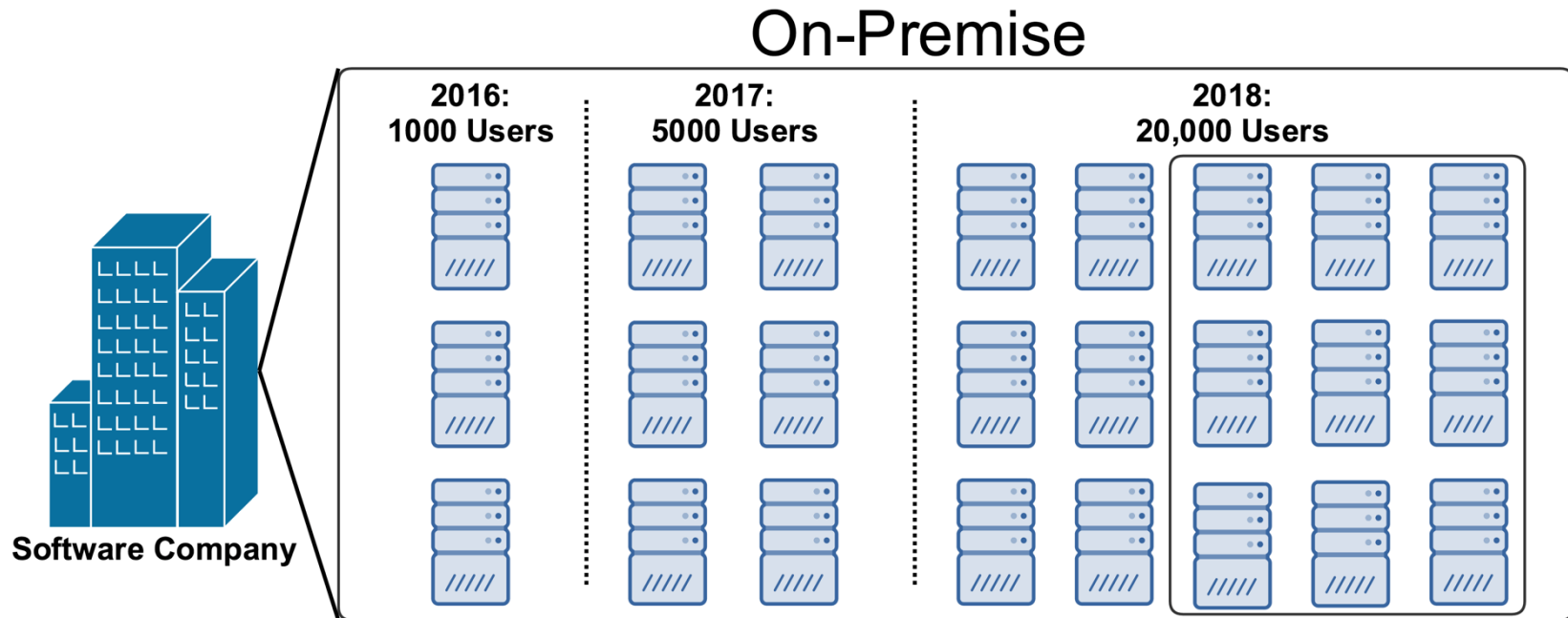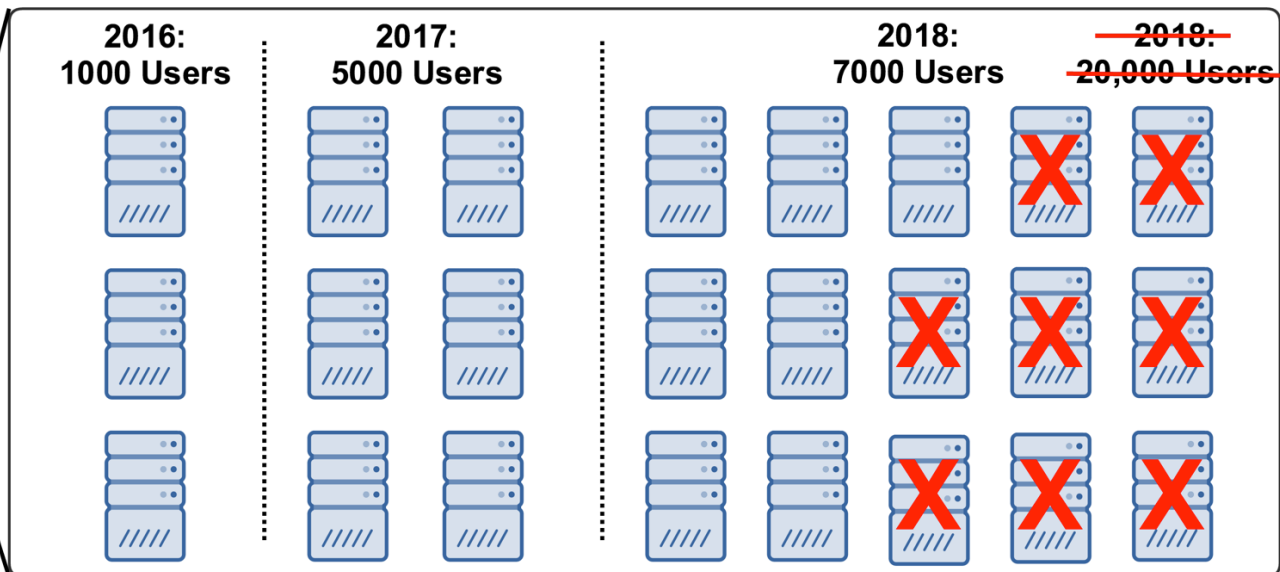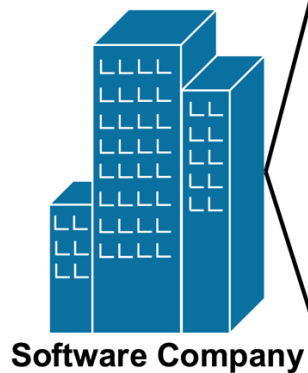
Common **Enterprise** Uses of Cloud Services

2016:
1000 Users

Software Company

Common **Enterprise** Uses of Cloud Services

Software Company
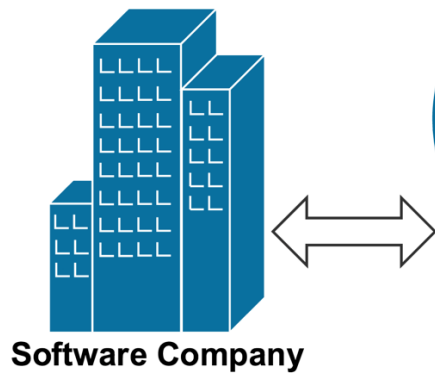
2016:
1000 Users

4000 Users
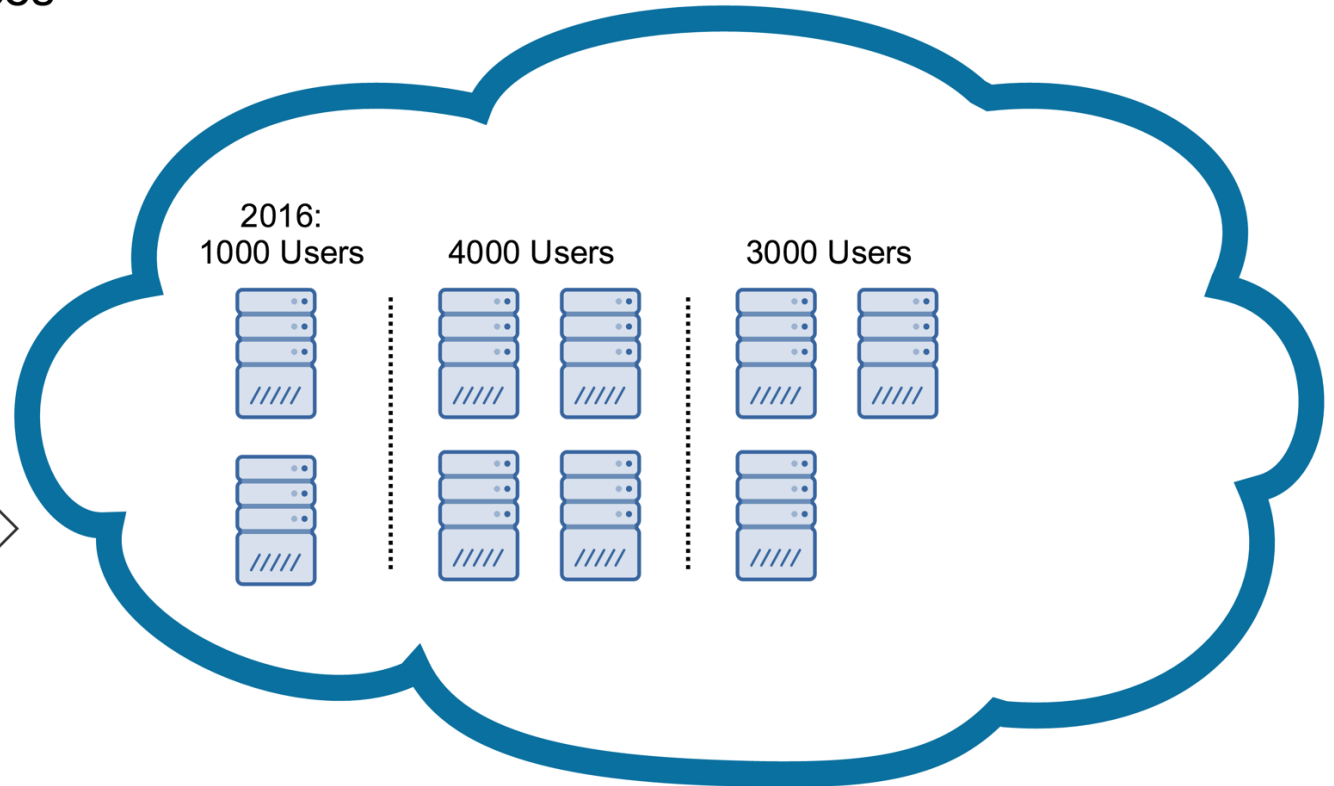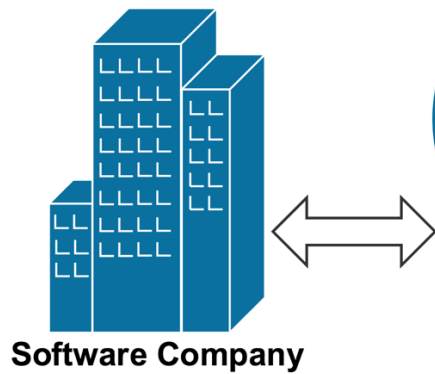
Cloud Elasticity

- Peak hours

- Cloud size can be increased and decreased on-demand

- We say here clouds are auto scalable

Interview point : Earlier we used to take care of peak hours, now we go for elastic services

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Why Cloud ?

- Business media says 73% of the companies are going for cloud

- Understanding the TCO

- 80 – 20 rule

- Direct cost-comparisons between the Cloud and on-premise are difficult, calculations of in-house costs fail to take into account:

    • The direct costs that accompany running a server: power, floor   space, storage, and IT operations to manage those resources.

    • The indirect costs of running a server: network and storage infrastructure and IT operations to manage the general   infrastructure.

    • The overhead costs of owning a server: procurement and accounting personnel, not to mention a critical resource in short supply: IT management and its attention.

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Four main areas in which Cloud Computing allows businesses to break from the past:

- Virtualization – The ability to increase computing efficiency

- Democratization of Computing – Bringing enterprise scale infrastructure to small and medium businesses

- Scalability and fast provisioning – Bringing web scale IT at a rapid pace

- Commoditization of infrastructure – Enabling IT to focus on the strategic aspects of its role

Service models or Cloud Stack
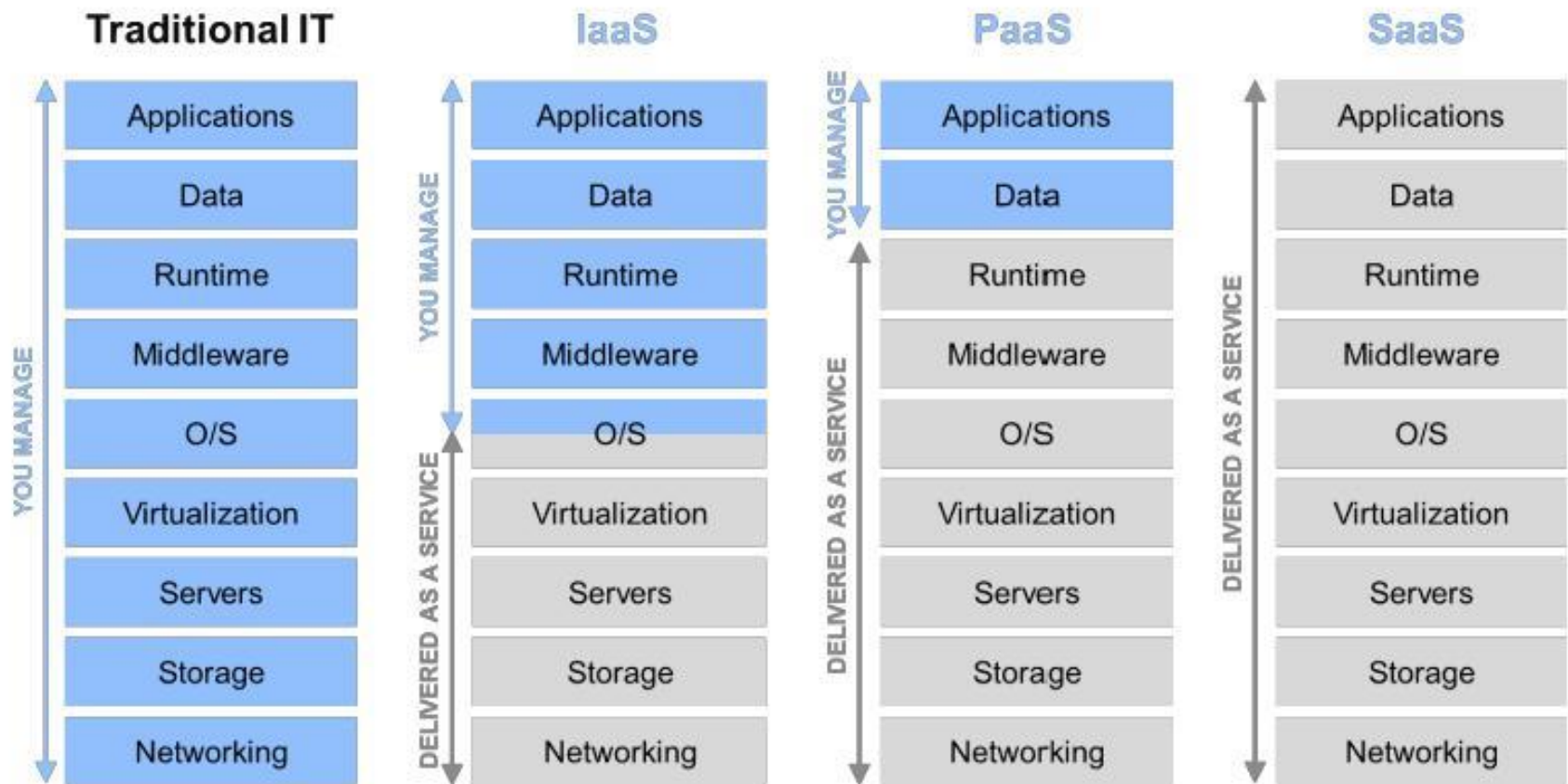
Source: Microsoft.

Deployment Models

- Private Cloud

- Community Cloud

- Public Cloud

- Hybrid Cloud
  - Virtual private cloud
  - Cloud Burst

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Why learn AWS ?

- Fastest growing cloud computing platform on the planet

- Largest public cloud computing platform on the planet

- More and more organizations are outsourcing their IT to AWS

- The AWS certifications are the most popular certifications right now

- The safest place to be in IT right now

- Gartner report

AWS Platform

Enterprise Applications		Internet Of Things	
Application Services	Developer Tools	Mobile Services	
Analytics	Security & Identity	Management Tools	
Compute	Storage	Databases	
Networking			
AWS Global Infrastructure			

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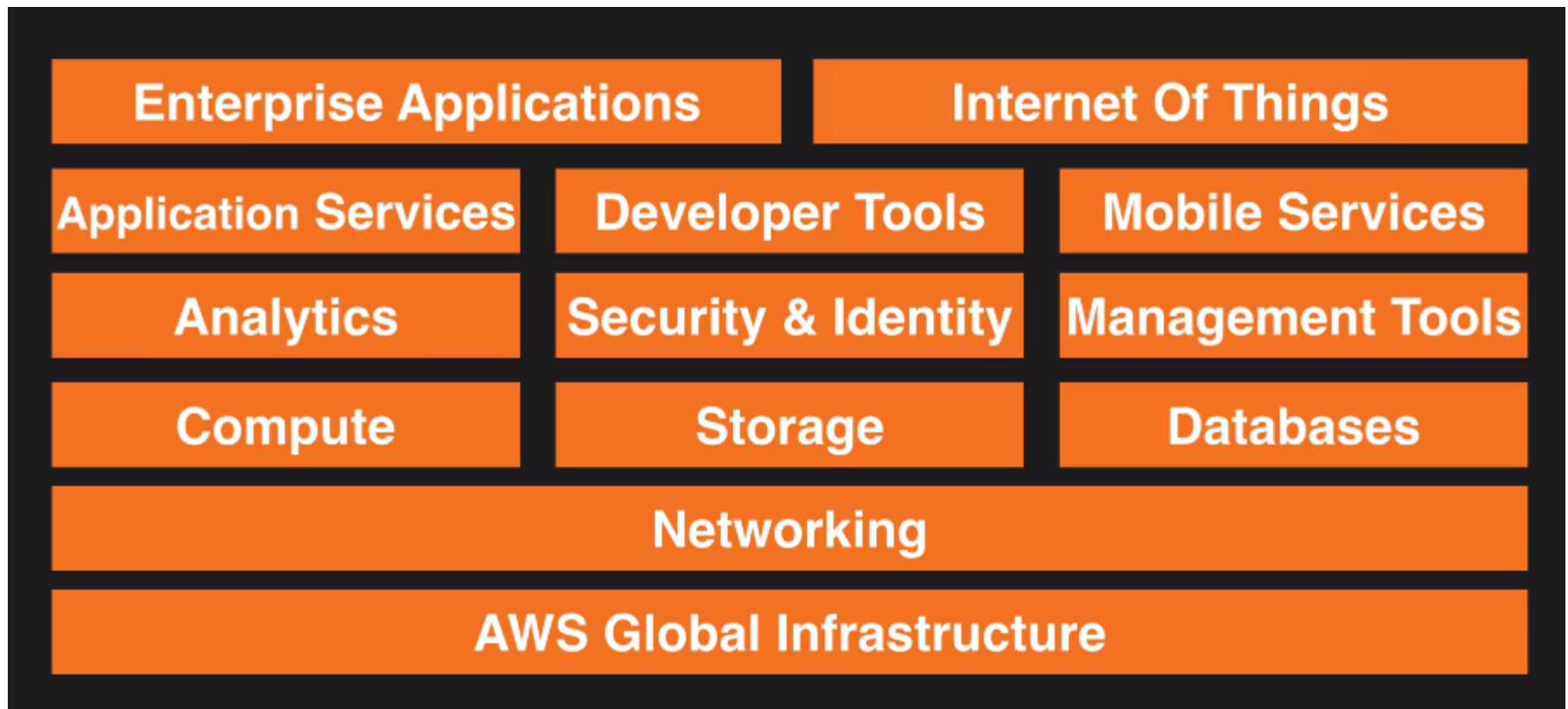
S3 – Simple Storage Service

- S3 is object based storage i.e. it allows you to upload files

- Files can be from 1B to 5TB

- There is unlimited storage

- Files are stored in buckets

- Bucket names are unique globally

- Versioning

- Encryption

Amazon S3

S3

- S3 is simple key value store
  - Key (name of the object)
  - Value (data)

- Amazon guarantees 99.99% availability for

  S3

- Amazon guarantees 11 9's of durability for S3

- S3 provides Lifecycle management

- Secure data using ACL and Bucket policies

Amazon S3

S3 - Storage Tiers/Classes

- S3 (Standard) – 99.99% availability and 11 9's durability, stored redundantly across multiple devices in multiple facilities and is design to sustain loss of 2 facilities concurrently

- S3 IA (Infrequently accessed) – For data that is accessed less frequently , but requires rapid access when needed. Lower cost than S3, but requires a retrieval cost

- Reduced Redundancy Storage – Designed to provide 99.99% availability and 99.99% durability of objects over a year

- Glacier – Very cheap. Used for archival only. It takes 3-5 hours to retrieve from glaciers

S3 - Storage Tiers/Classes

	Standard	Standard - Infrequent Access	Reduced Redundancy Storage
Durability	99.999999999%	99.999999999%	99.99%
Availability	99.99%	99.9%	99.99%
Concurrent facility fault tolerance	2	2	1
SSL support	Yes	Yes	Yes
First byte latency	Milliseconds	Milliseconds	Milliseconds
Lifecycle Management Policies	Yes	Yes	Yes

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Glaciers

- Glacier is extremely low cost storage for archival

- Amazon Glacier stores data for as little as $0.01 per GB per month, and is optimized for data that is infrequently accessed and for retrieval times of 3-5 hours are suitable

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Getting data on S3

- Upload to website

- Data Import/export

- Data pipeline

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EC2 – Elastic Compute Cloud

- Backbone of AWS

- Provides resizable compute capability in cloud

- You pay for the capacity you use

Amazon EC2

EC2 labs

- Web server on EC2

- Bootstrapping

- Load Balancer

- AWS CLI

- Using roles to access S3

- Auto scaling

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Family	Speciality	Use case
T2	Lowest Cost, General Purpose	Web Servers/Small DBs
M4	General Purpose	Application Servers
M3	General Purpose	Application Servers
C4	Compute Optimized	CPU Intensive Apps/DBs
C3	Compute Optimized	CPU Intensive Apps/DBs
R3	Memory Optimized	Memory Intensive Apps/DBs
G2	Graphics/General Purpose GPU	Video Encoding/Machine Learning/3D Application Streaming
I2	High Speed Storage	NoSQL DBs, Data Warehousing etc
D2	Dense Storage	Fileservers/Data Warehousing/Hadoop

IAM – Identity and Access Management

- IAM allows you to manage users and their level of access to the AWS console

- Provides centralized control for your AWS account

- Granular permissions

- Identity federation

- Multifactor authentication

- Allows to set up password rotation policies

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Volumes and Snapshots

- Volumes exist on EBS (Virtual HDD)

- Snapshots exists on S3

- You can take a snapshot of a volume, this will store that on S3

- Snapshots are point in time copies of volumes

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VPC

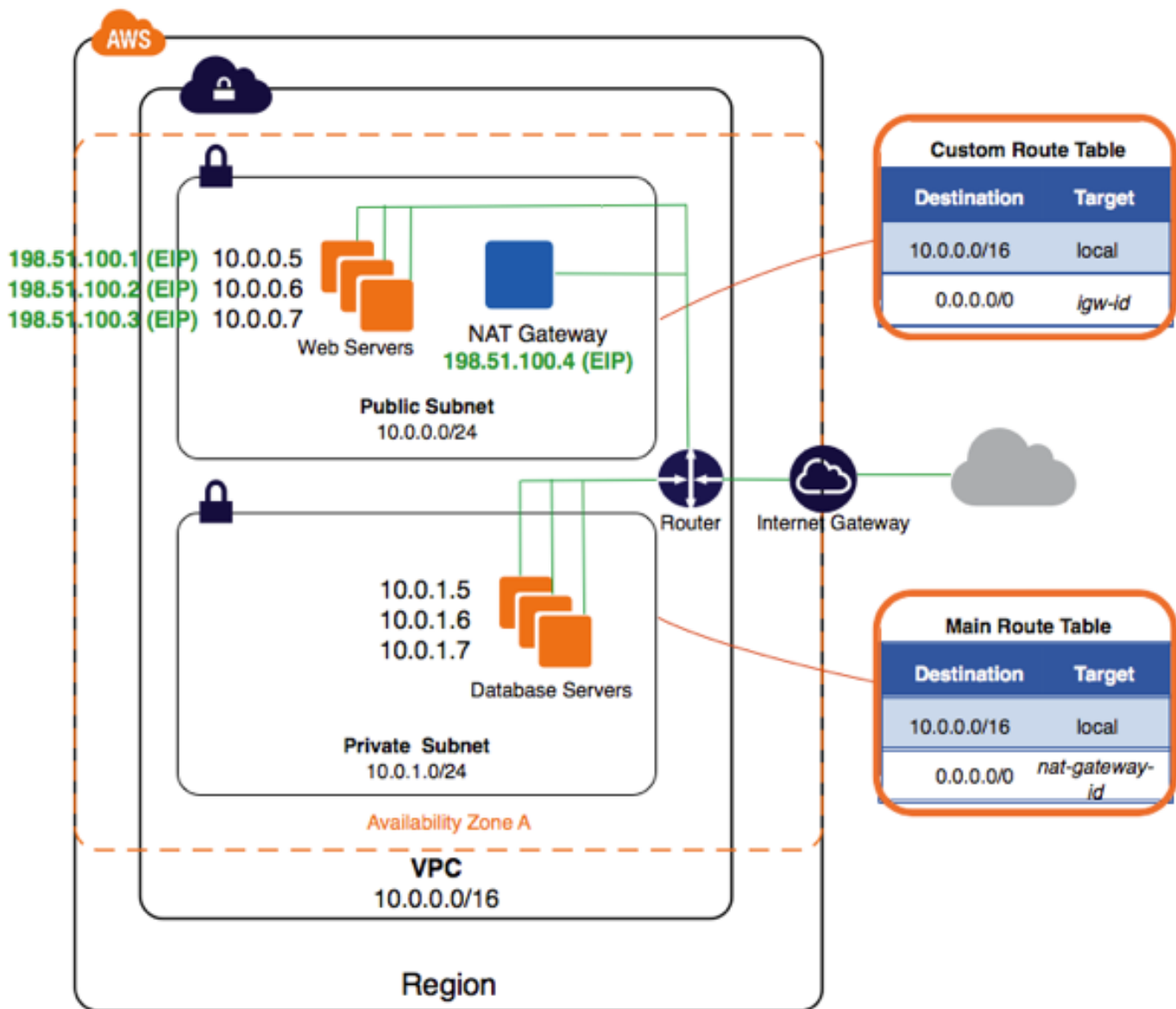- Amazon Virtual Private cloud (VPC) lets you provision a logically isolated section of AWS cloud where you can launch AWS resources in a virtual network that you define

- You have complete control over virtual networking environment, including selection of your IP range, creation of subnet, configuration of route tables and network gateways

- Think of VPC as a logical datacentre in AWS

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What can you do with a VPC

- Launch instances in a subnet of your choice

- Assign custom IP addresses

- Configure route tables between each subnet

- Create Internet Gateway and attach it to our VPC

- Much better security control over your AWS resources

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AWS

198.51.100.1 (EIP) 10.0.0.5
198.51.100.2 (EIP) 10.0.0.6
198.51.100.3 (EIP) 10.0.0.7

Web Servers

NAT Gateway
198.51.100.4 (EIP)

Public Subnet
10.0.0.0/24

10.0.1.5
10.0.1.6
10.0.1.7

Database Servers

Private Subnet
10.0.1.0/24

Availability Zone A

Router

Internet Gateway

VPC
10.0.0.0/16

Region

Custom Route Table

Destination	Target
10.0.0.0/16	local
0.0.0.0/0	*igw-id*

Main Route Table

Destination	Target
10.0.0.0/16	local
0.0.0.0/0	*nat-gateway-id*

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