Data Management in the Cloud

Service Models

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Objective

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Evaluate service models

Service Models: Infrastructure as a Service (IaaS)

Capability provided to consumer

- is to provision processing, storage, networks, and other fundamental computing resources
- is able to deploy and run arbitrary software, which can include operating systems and applications

Consumer does

- not manage or control the underlying cloud infrastructure
- has control over
  - Operating systems
  - Storage
  - Deployed applications

IaaS: E.g., Amazon EC2 instance types (Xen-based VMs)

Instance Type	vCPU	Memory (GIB)	Storage (GB)	Networking Performance	Physical Processor	Clock Speed (GHz)
t2.micro	1	1	EBS only	Low to Moderate	Intel Xeon family	2.5
t2.small	1	2	EBS only	Low to Moderate	Intel Xeon family	2.5
t2.medium	2	4	EBS only	Low to Moderate	Intel Xeon family	2.5
m3.medium	1	3.75	1 x 4 SSD	Moderate	Intel Xeon E5-2670 v2	2.5
m3.large	2	7.5	1 x 32 SSD	Moderate	Intel Xeon E5-2670 v2	2.5
m3.xlarge	4	15	2 x 40 SSD	High	Intel Xeon E5-2670 v2	2.5
m3.2xlarge	8	30	2 x 80 SSD	High	Intel Xeon E5-2670 v2	2.5
c4.large	2	3.75	EBS only	Moderate	Intel Xeon E5-2666 v3	2.5
c4.xlarge	4	7.5	EBS only	High	Intel Xeon E5-2666 v3	2.9
c4.2xlarge	8	15	EBS only	High	Intel Xeon E5-2666 v3	2.9
c4.4xlarge	16	30	EBS only	High	Intel Xeon E5-2666 v3	2.9
c4.8xlarge	36	60	EBS only	10 Gigabit	Intel Xeon E5-2666 v3	2.9
...	...	...	...	...	...	...

IaaS E.g., Google Compute Engine instance types (KVM-based VMs)

Machine name	Description	Virtual CPUs	Memory (GB)	GCUEs	Max number of persistent disks (PDs)3	Max total PD size (TB)
n1-standard-1	Standard 1 CPU machine type with 1 virtual CPU and 3.75 GB of memory.	1	3.75	2.75	16	10
n1-standard-2	Standard 2 CPU machine type with 2 virtual CPUs and 7.5 GB of memory.	2	7.50	5.50		
n1-standard-4	Standard 4 CPU machine type with 4 virtual CPUs and 15 GB of memory.	4	15	11		
n1-standard-8	Standard 8 CPU machine type with 8 virtual CPUs and 30 GB of memory.	8	30	22		
n1-standard-16	Standard 16 CPU machine type with 16 virtual CPUs and 60 GB of memory.	16	60	44		

Service Models: Platform as a Service (PaaS)

- Capability provided to the consumer is
  - to deploy onto the cloud infrastructure consumer-created
  - or acquired applications created using
    - programming languages
    - libraries services
    - tools supported by the provider
- Consumer does
  - not manage or control the underlying cloud infrastructure including
    - Network
    - Servers
    - Operating systems
    - Storage
  - has control
    - over the deployed applications

PaaS: E.g., Google App Engine

- Supports apps written in a variety of programming languages
  - Java, Python, PHP, Go
- Automatic scaling
  - Scale the number of instances of an app automatically in response to processing volume

PaaS: E.g., IBM Bluemix

- Built upon the Cloud Foundry, an open-source PaaS framwork
- Supports apps written in a variety of programming languages
  - Java, Ruby, PHP

Service Models: Software as a Service (SaaS)

Capability provided to consumer

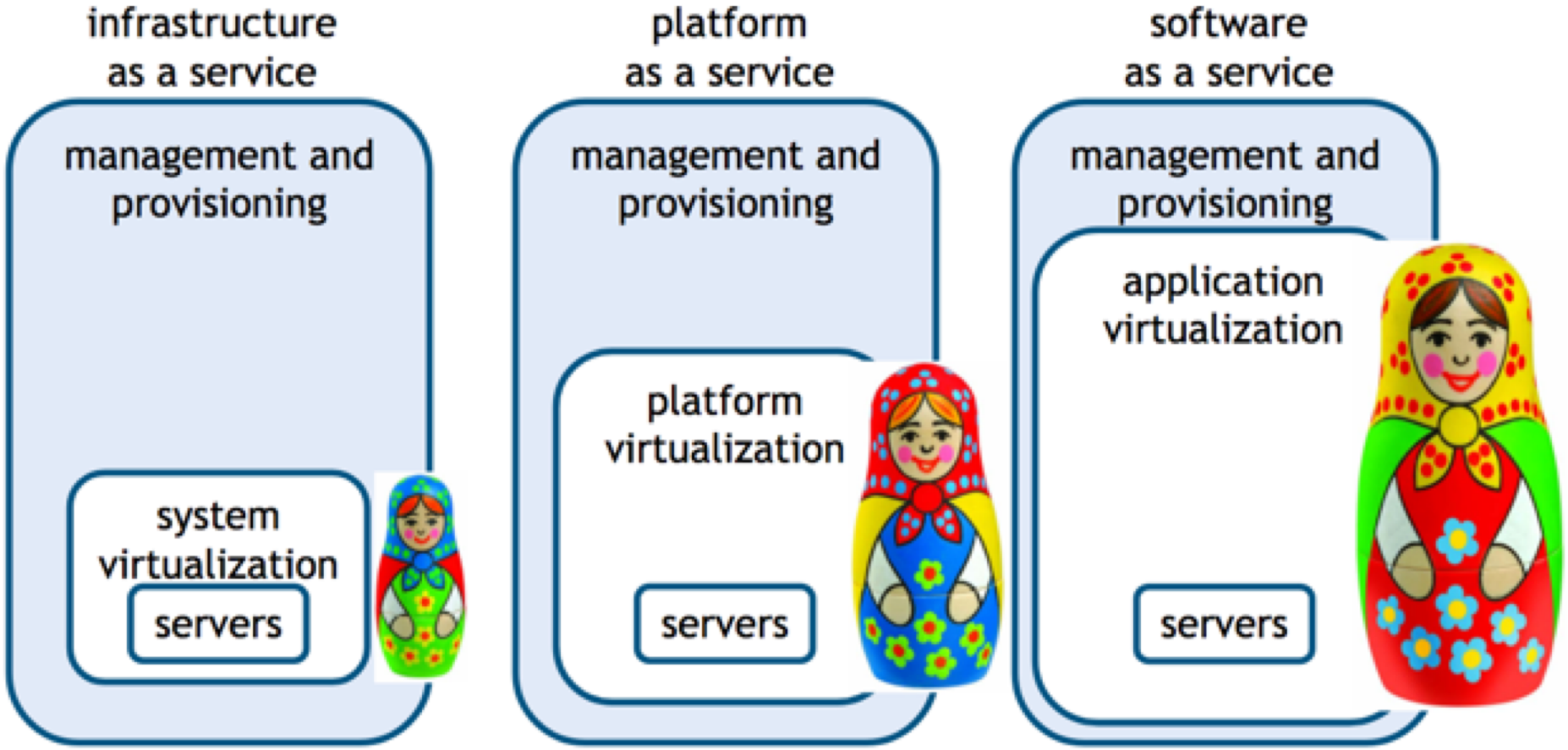
- is to use provider's applications running on a cloud infrastructure
- Applications are accessible from various client devices through
  - a thin client interface, such as a web browser
  - program interface

Consumer does

- not manage or control underlying cloud infrastructure including
  - Network
  - Servers
  - Operating systems
  - Storage
  - Individual application capabilities

Possible exception of limited user-specific application configuration settings

Service Models



- Amazon EC2
- Google Compute Engine

- Google App Engine
- Heroku

- Google Apps
- Workday

“X as a Service”

Storage as a Service

- Amazon S3, DropBox, Google drive, OneDrive

Database as a Service

- Amazon SimpleDB, Azure SQL Database

Big-data as a Service

- Amazon Elastic MapReduce

Bare-metal as a Service

- SoftLayer