Cloud Deployment Models

ACKNOWLEDGEMENTS

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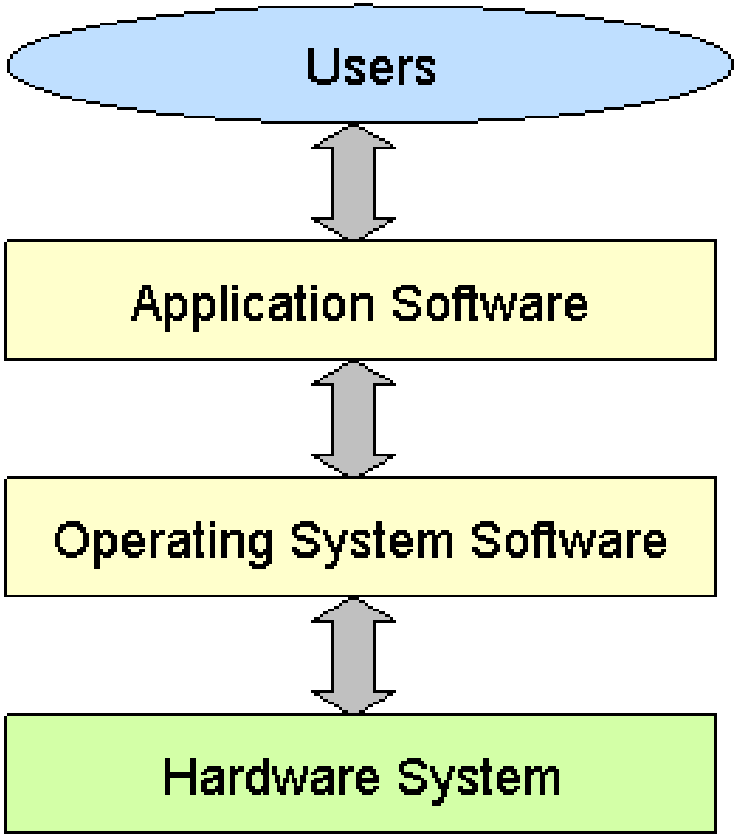
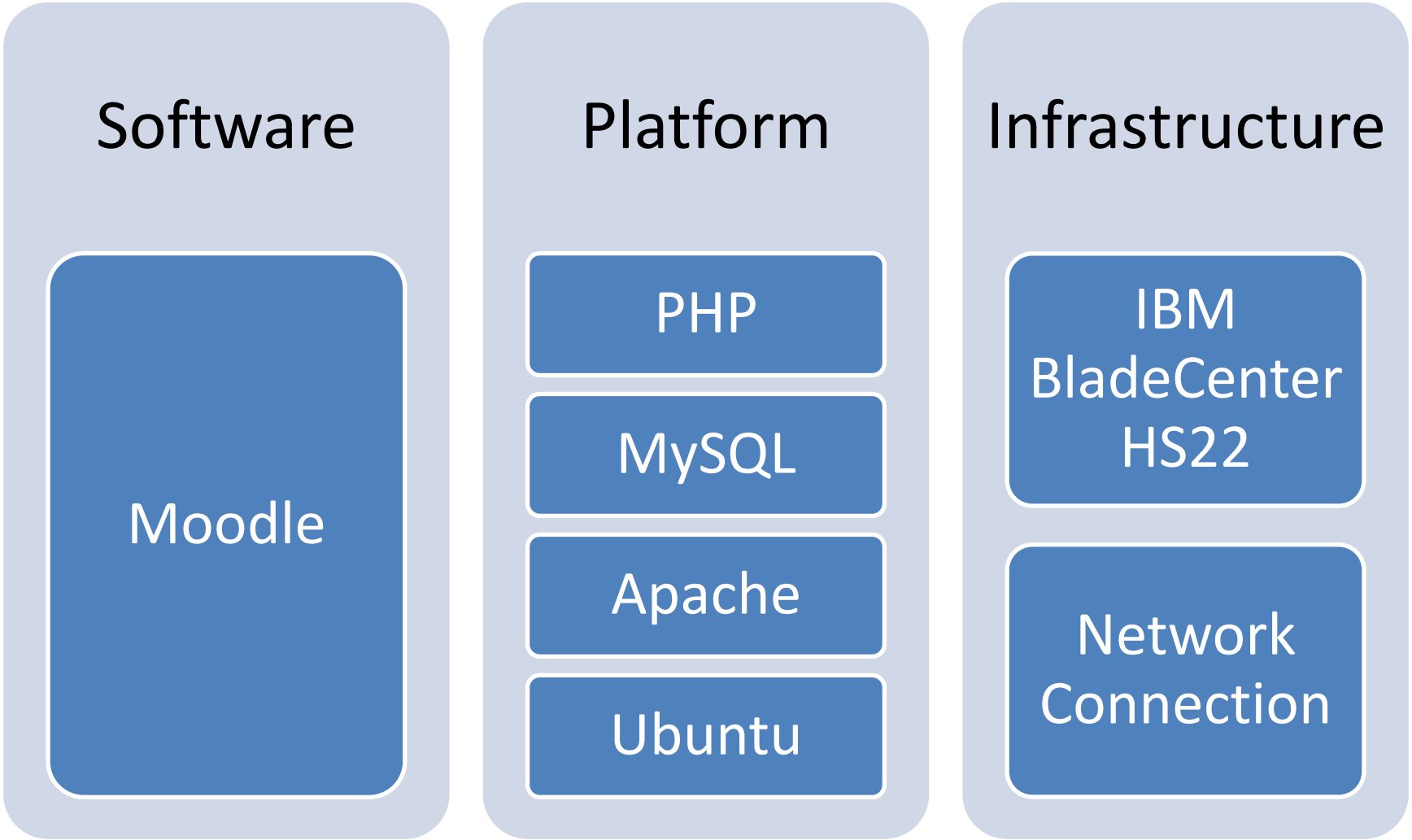
- The presenter is grateful to the authors of those various sources.
- The presenter acknowledge the efforts of those authors and thank them wholeheartedly.

DEFINING SYSTEMS

Software System



Describing a System



Problems with Systems

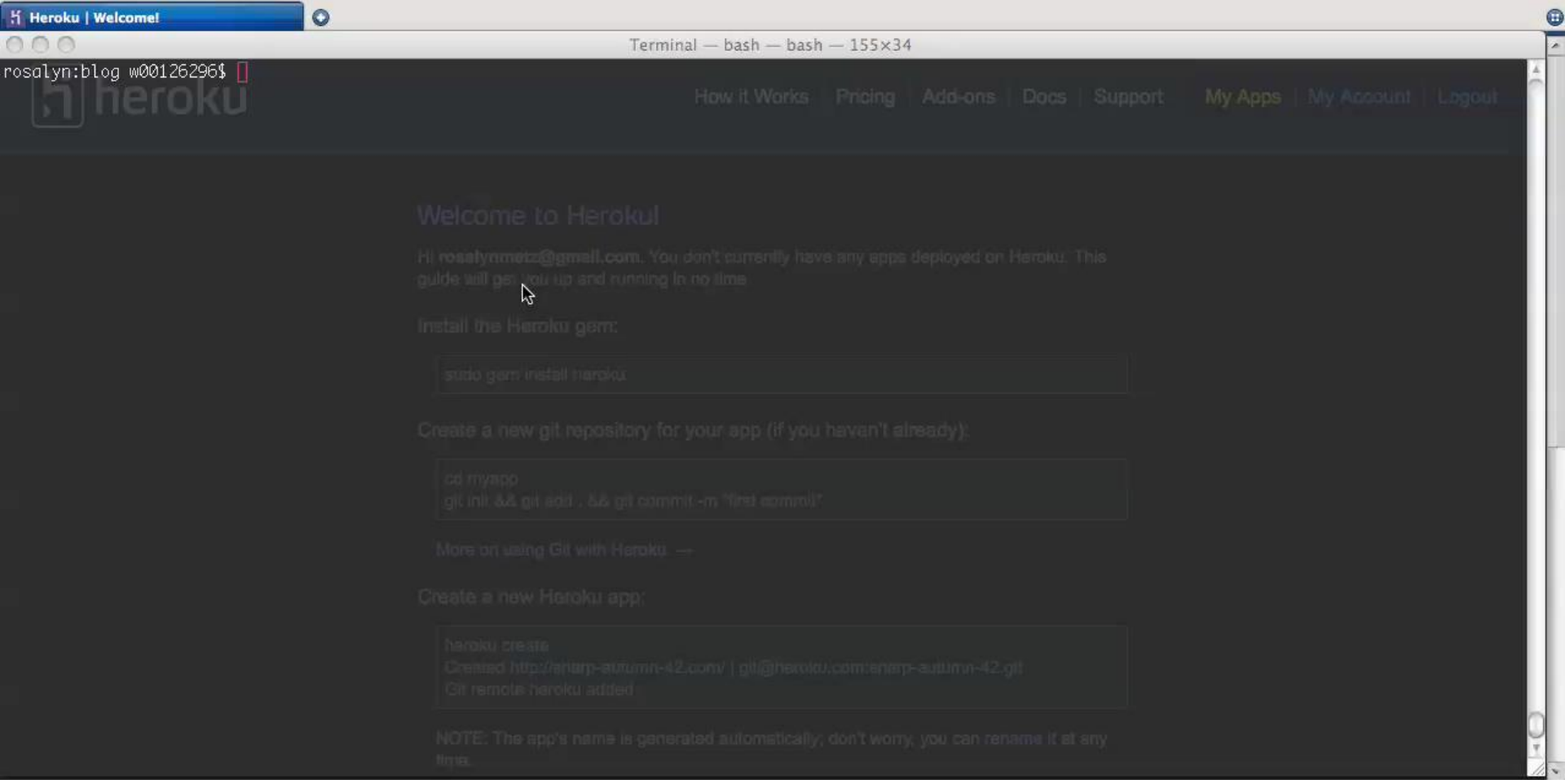
- Basic Assumptions When Creating Systems
  - Number of users
  - Amount of storage
  - Supporting requirements
  - Amount of compute power
- Issues Faced with Maintaining Systems
  - Cost of updating systems
  - Scaling systems

5 characteristics • 4 deployment models • 3 service models

DEFINING THE CLOUD

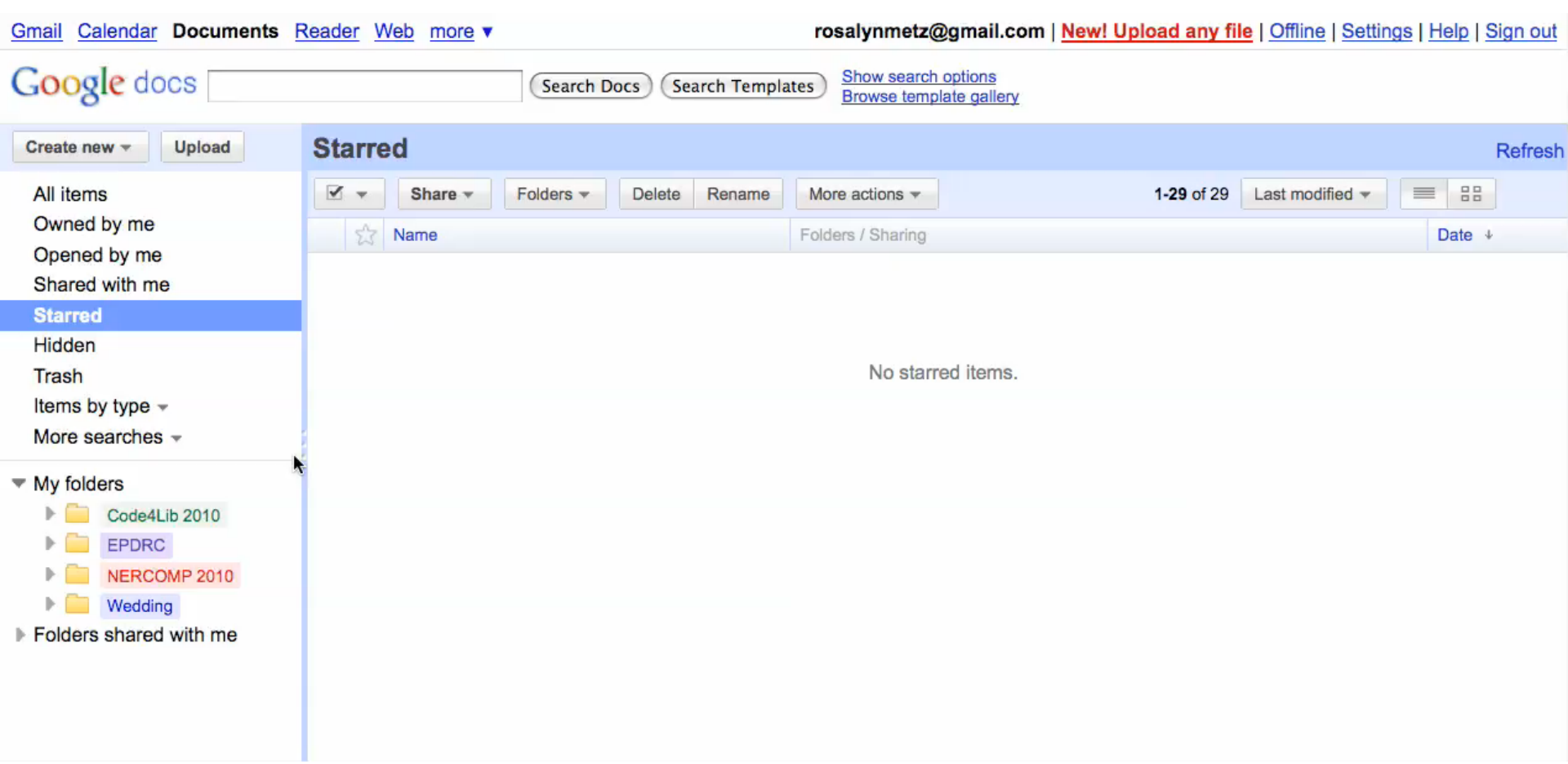
5 characteristics • 4 deployment models • 3 service models

DEFINING THE CLOUD: 5 CHARACTERISTICS



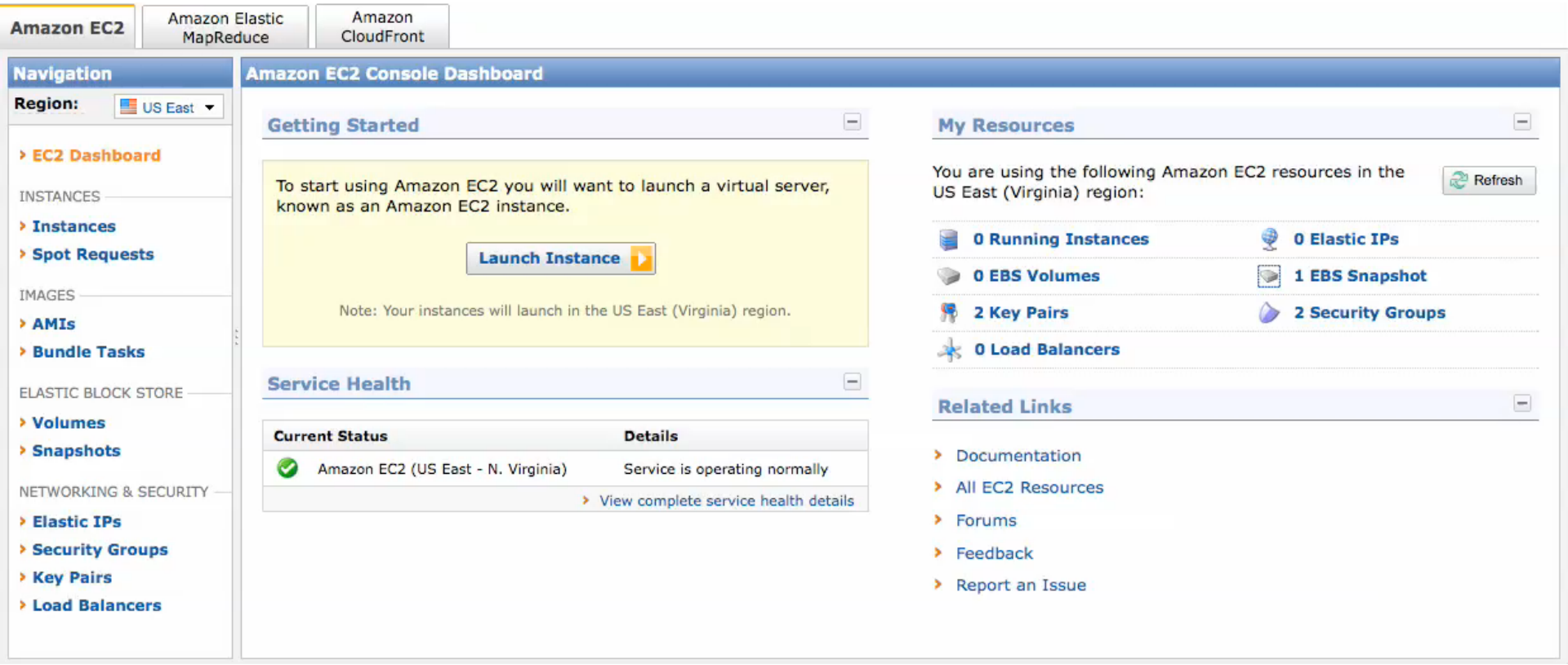
5 Characteristics

#1 On-demand self-service



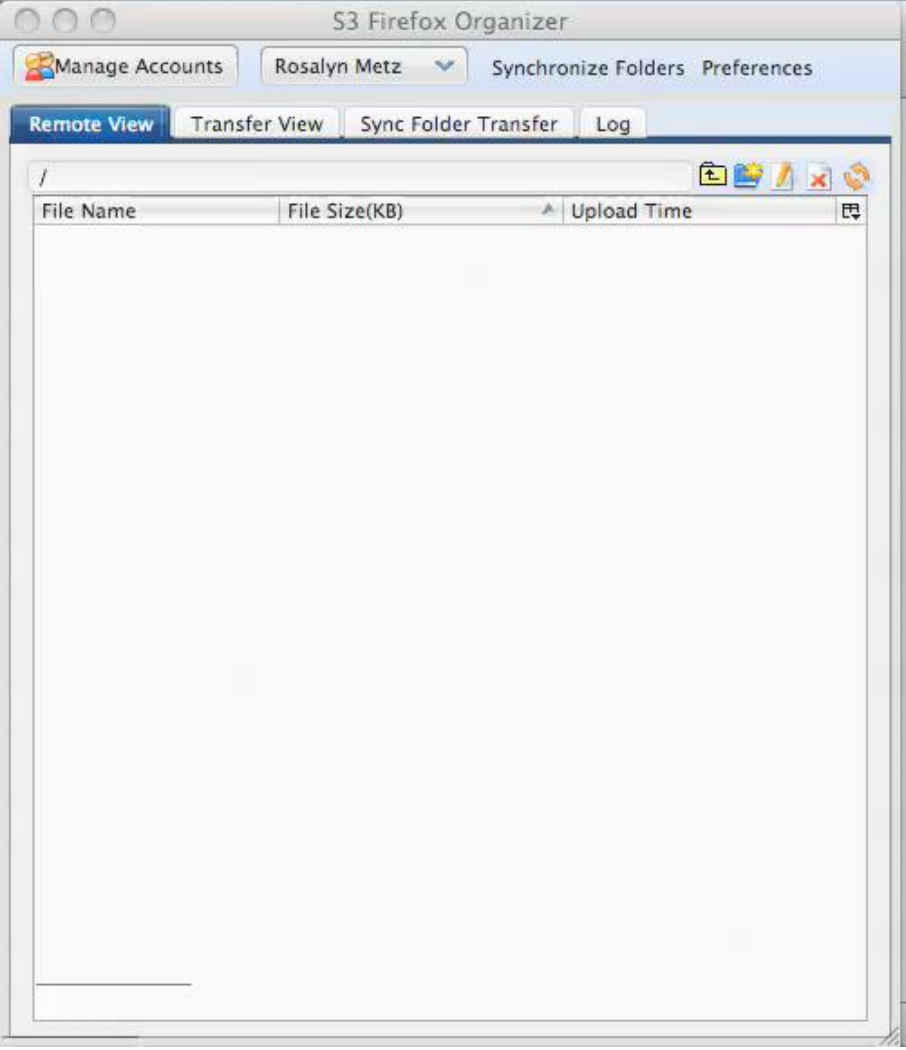
5 Characteristics

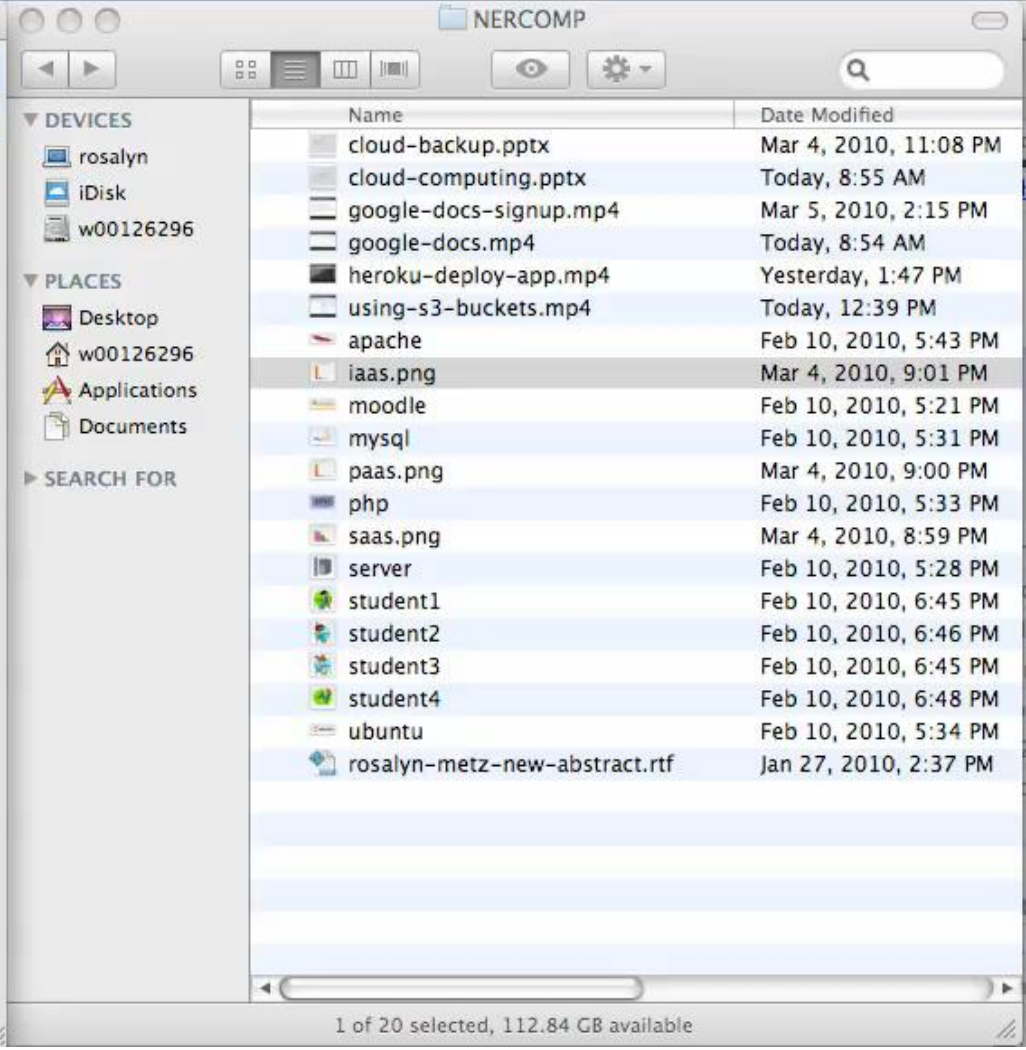
#2 Broad network access



5 Characteristics

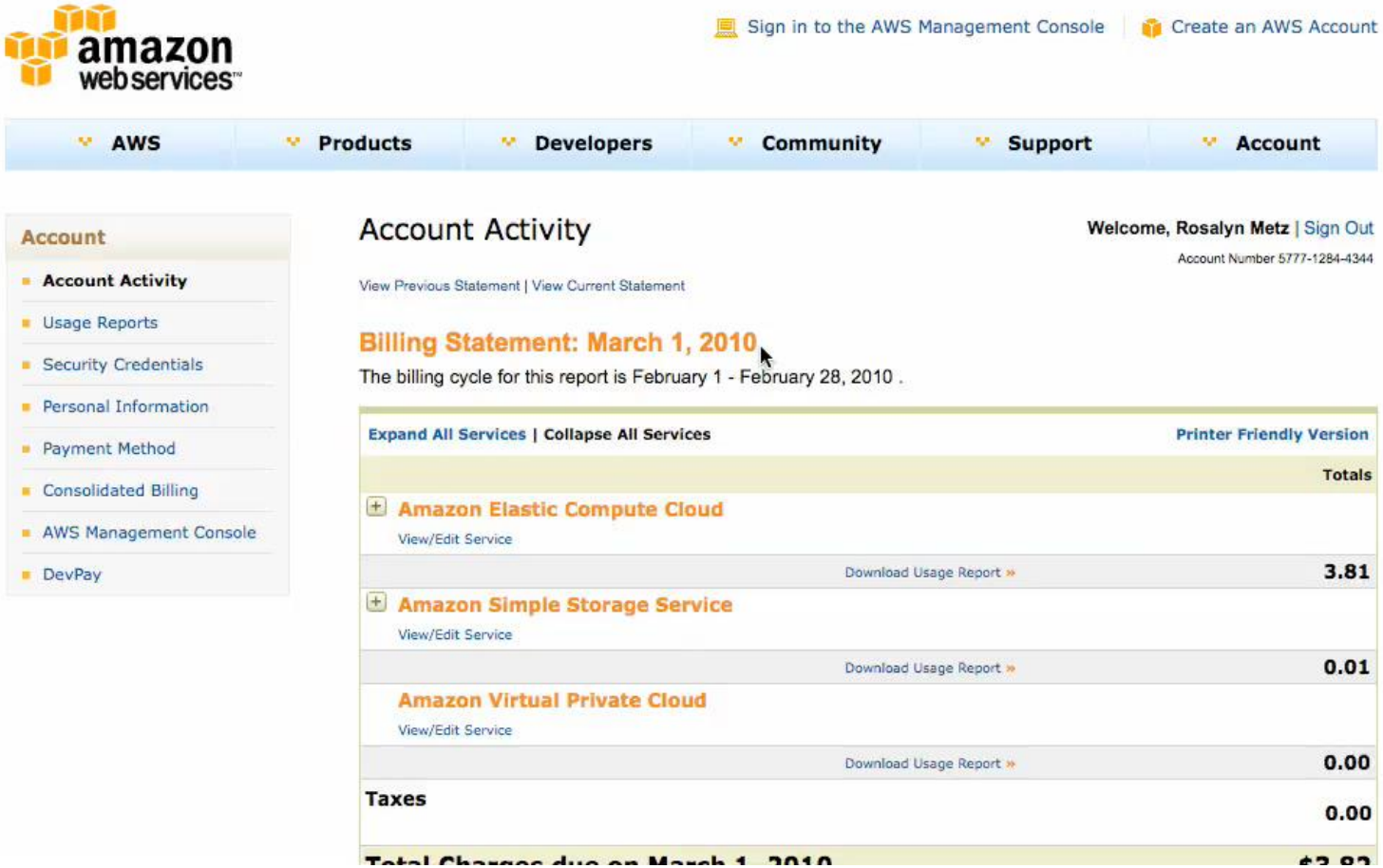
#3 Resource pooling





5 Characteristics

#4 Rapid elasticity



5 Characteristics

#5 Measured Service

5 characteristics • 4 deployment models • 3 service models

DEFINING THE CLOUD: 4 DEPLOYMENT MODELS

Deployment Models

Public cloud

- *Public cloud* (off-site and remote) describes cloud computing where resources are dynamically provisioned on an on-demand, self-service basis over the Internet, via web applications/web services, open API, from a **third-party provider** who bills on a utility computing basis.

Private cloud

- A *private cloud* environment is often the **first step for a corporation** prior to adopting a public cloud initiative. Corporations have discovered the benefits of consolidating shared services on virtualized hardware deployed from a primary datacenter to serve local and remote users.

Hybrid cloud

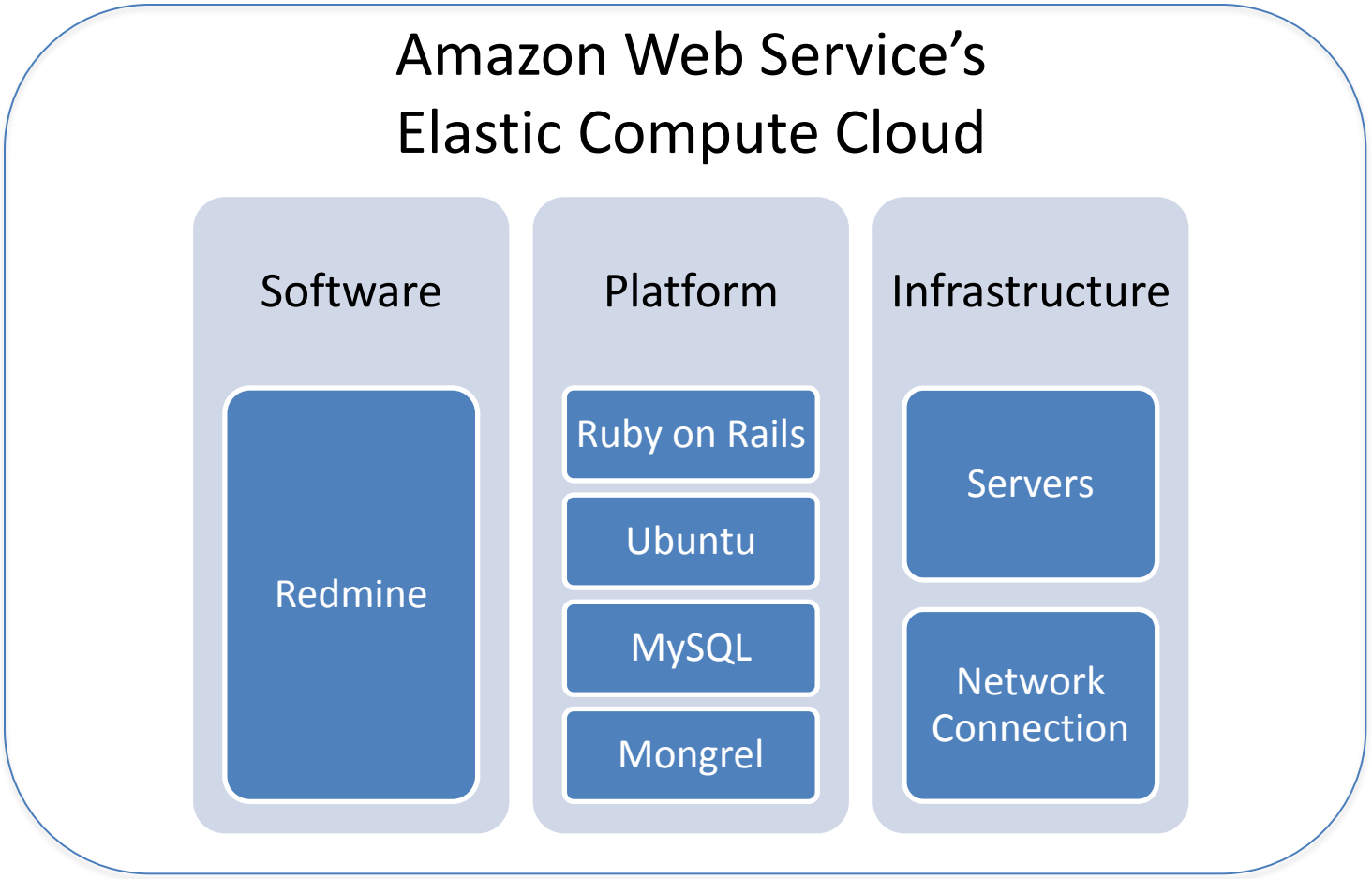
- A *hybrid cloud* environment consists of some portion of computing resources on-site (on premise) and off-site (*public cloud)*. By integrating public cloud services, users can leverage cloud solutions for specific functions that are too costly to maintain on-premise such as virtual server disaster recovery, backups and test/development environments.

Community cloud

- A *community cloud* is formed when several organizations with similar requirements share common infrastructure. Costs are spread over fewer users than a *public cloud* but more than a single tenant.

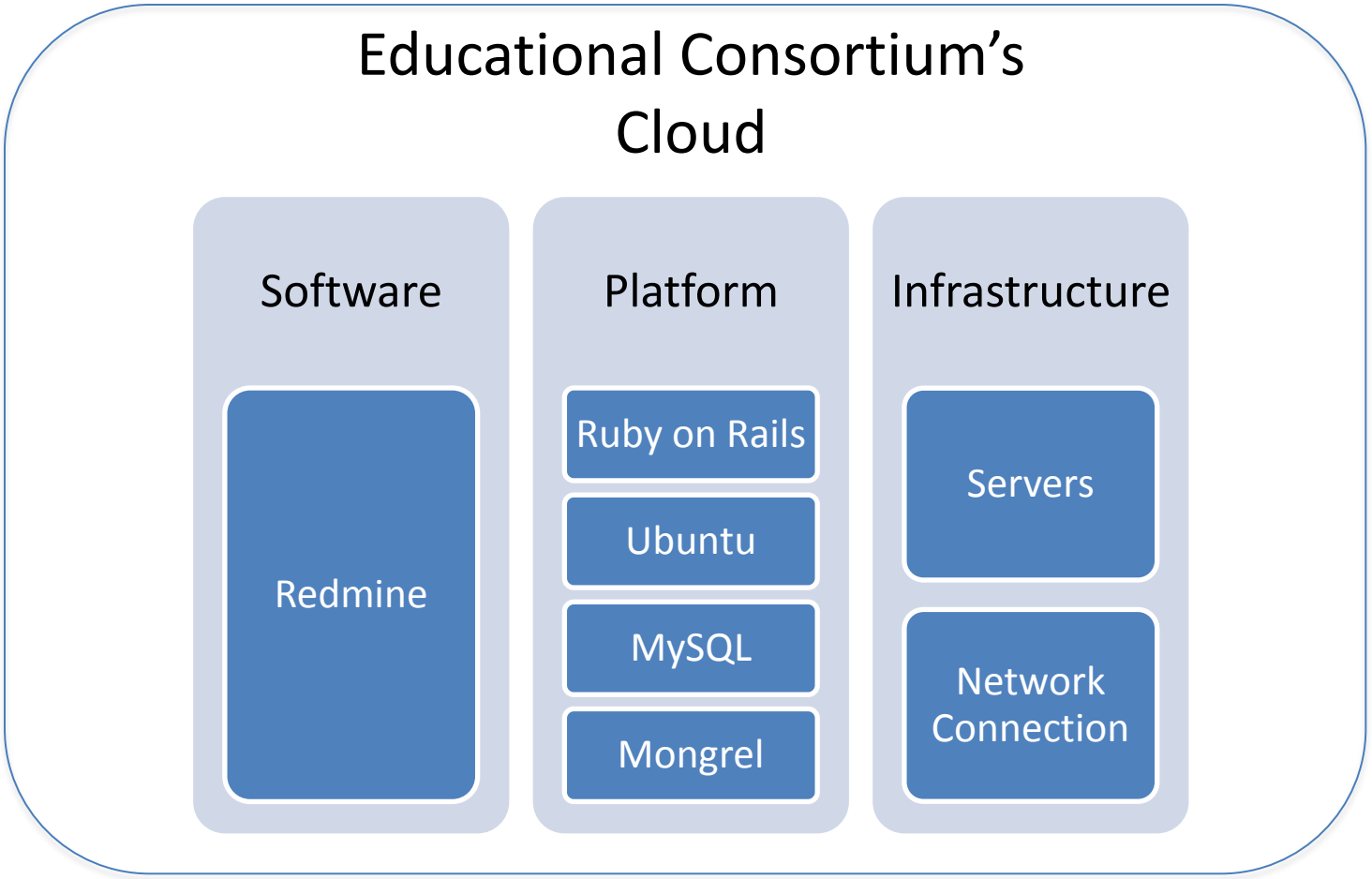
4 Deployment Models

- Public Cloud



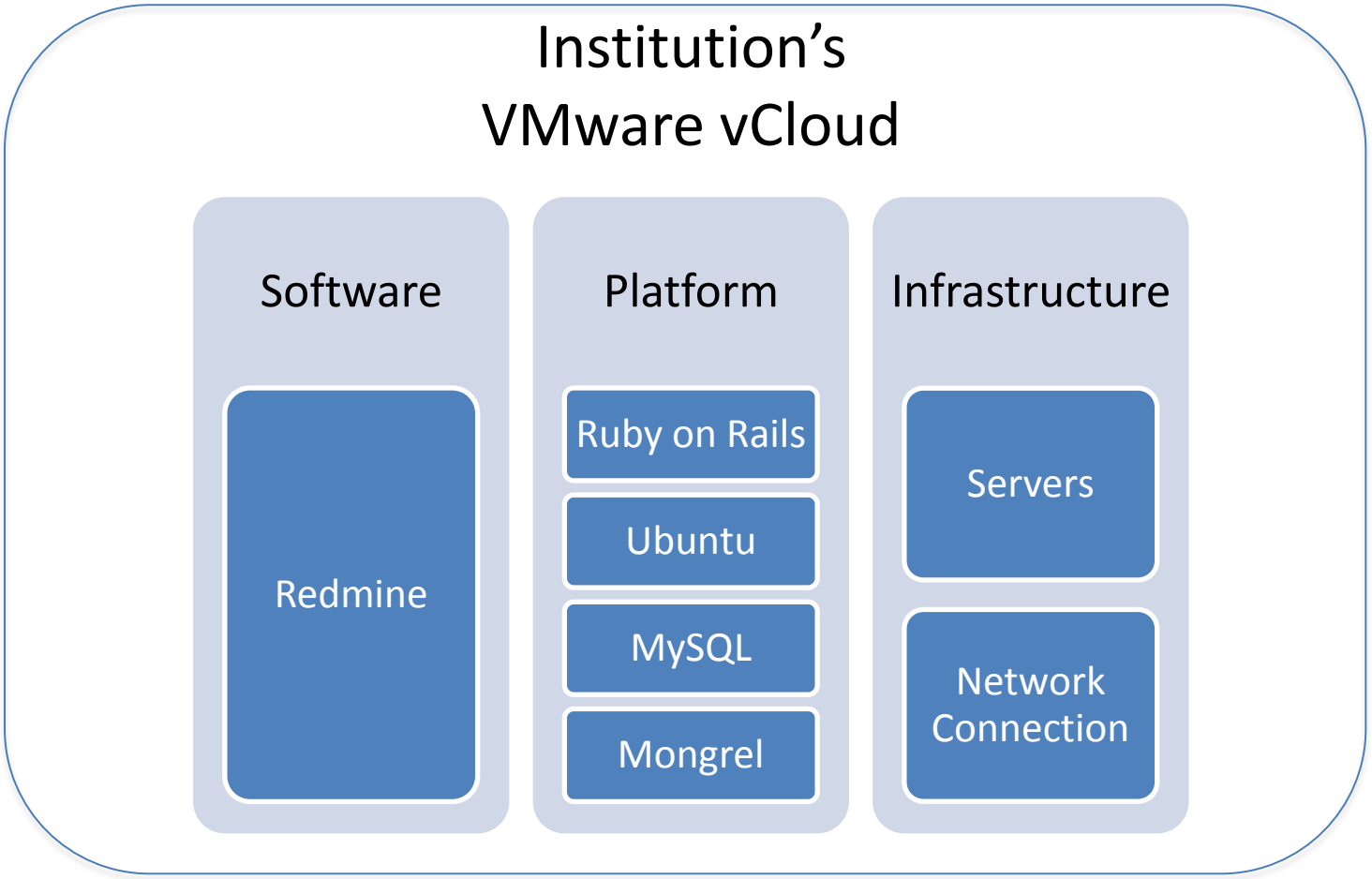
4 Deployment Models

- Community Cloud



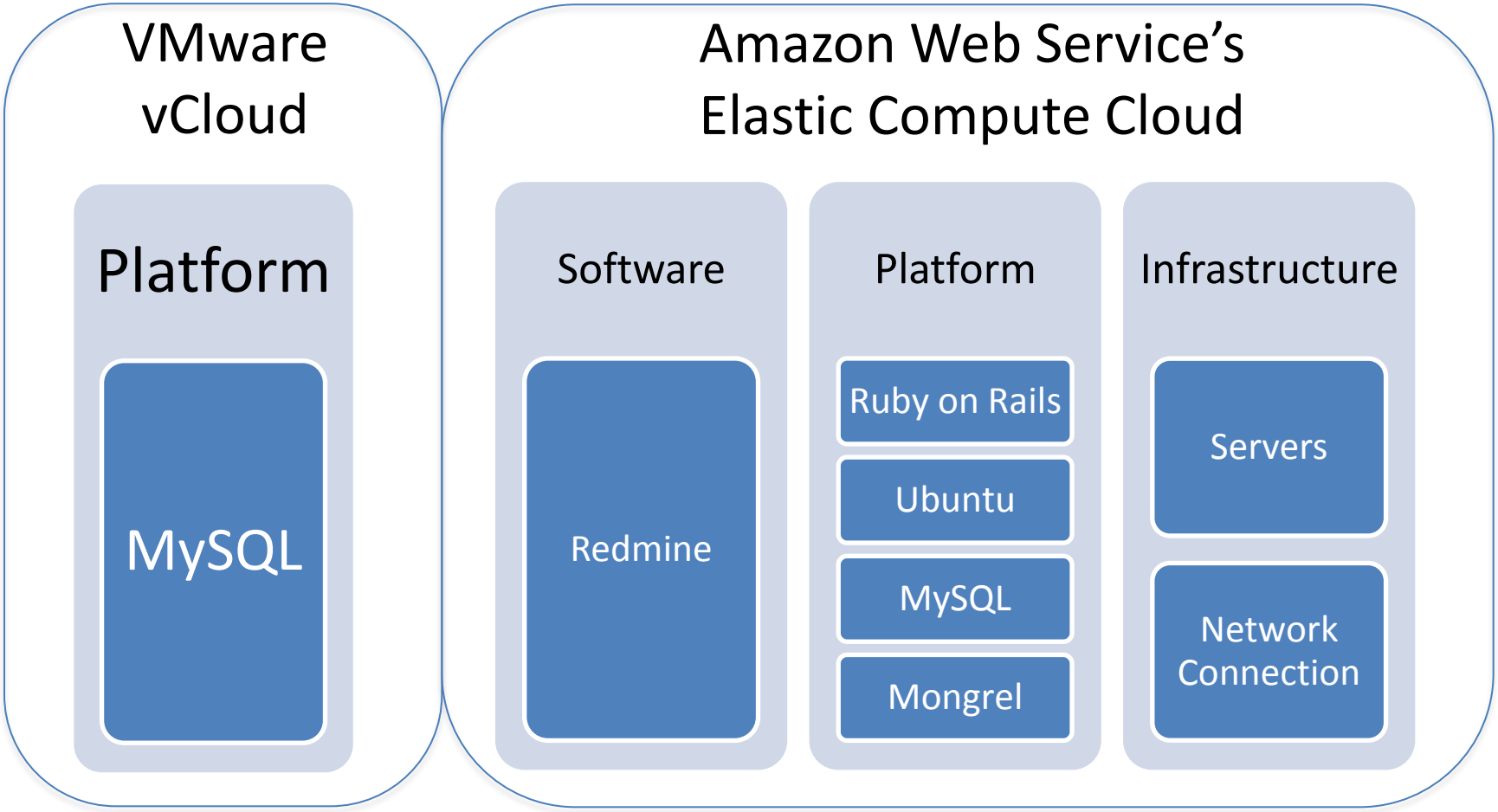
4 Deployment Models

- Private Cloud

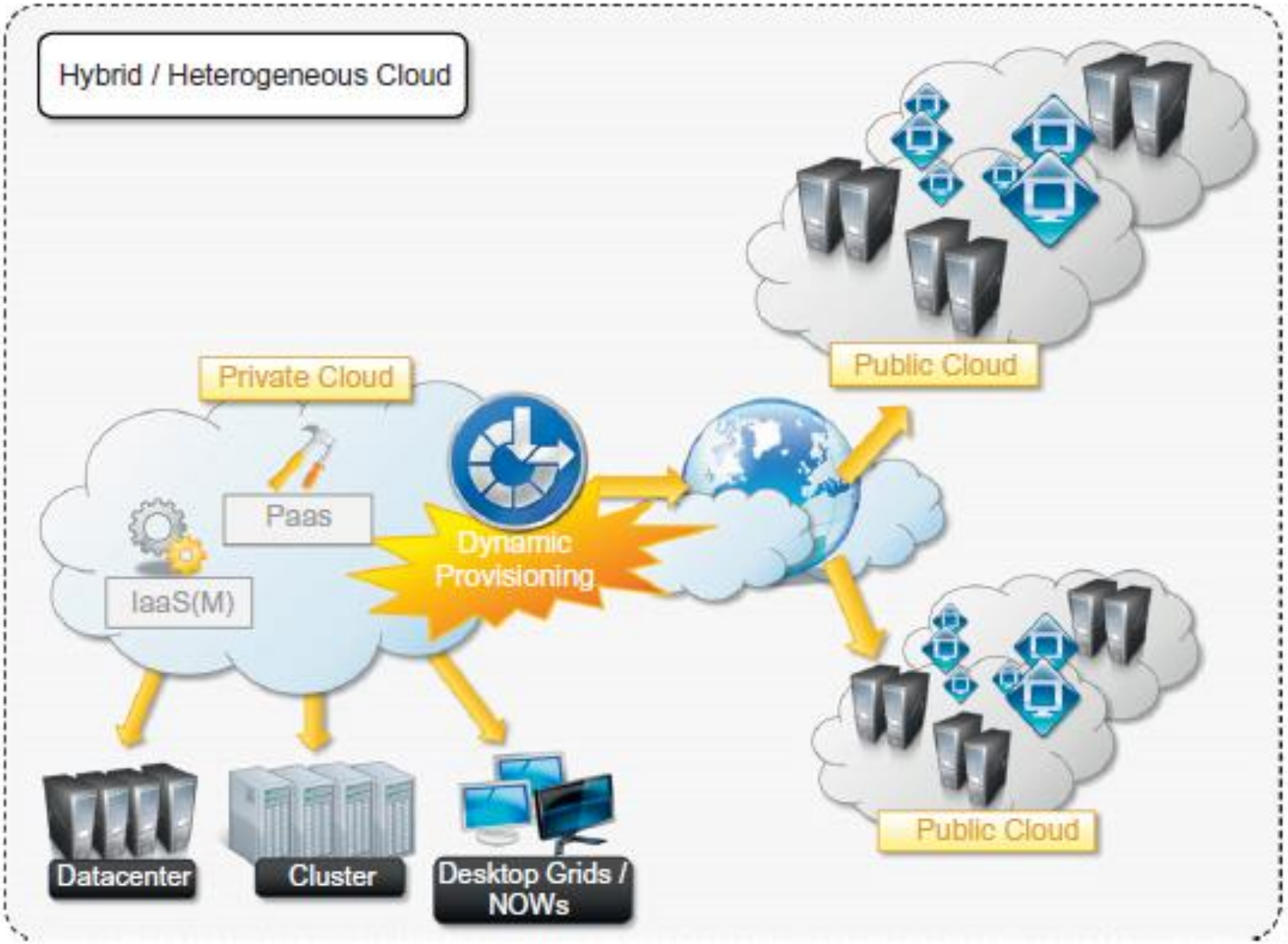


4 Deployment Models

- Hybrid Cloud



Hybrid Cloud



Advantages of Hybrid Cloud

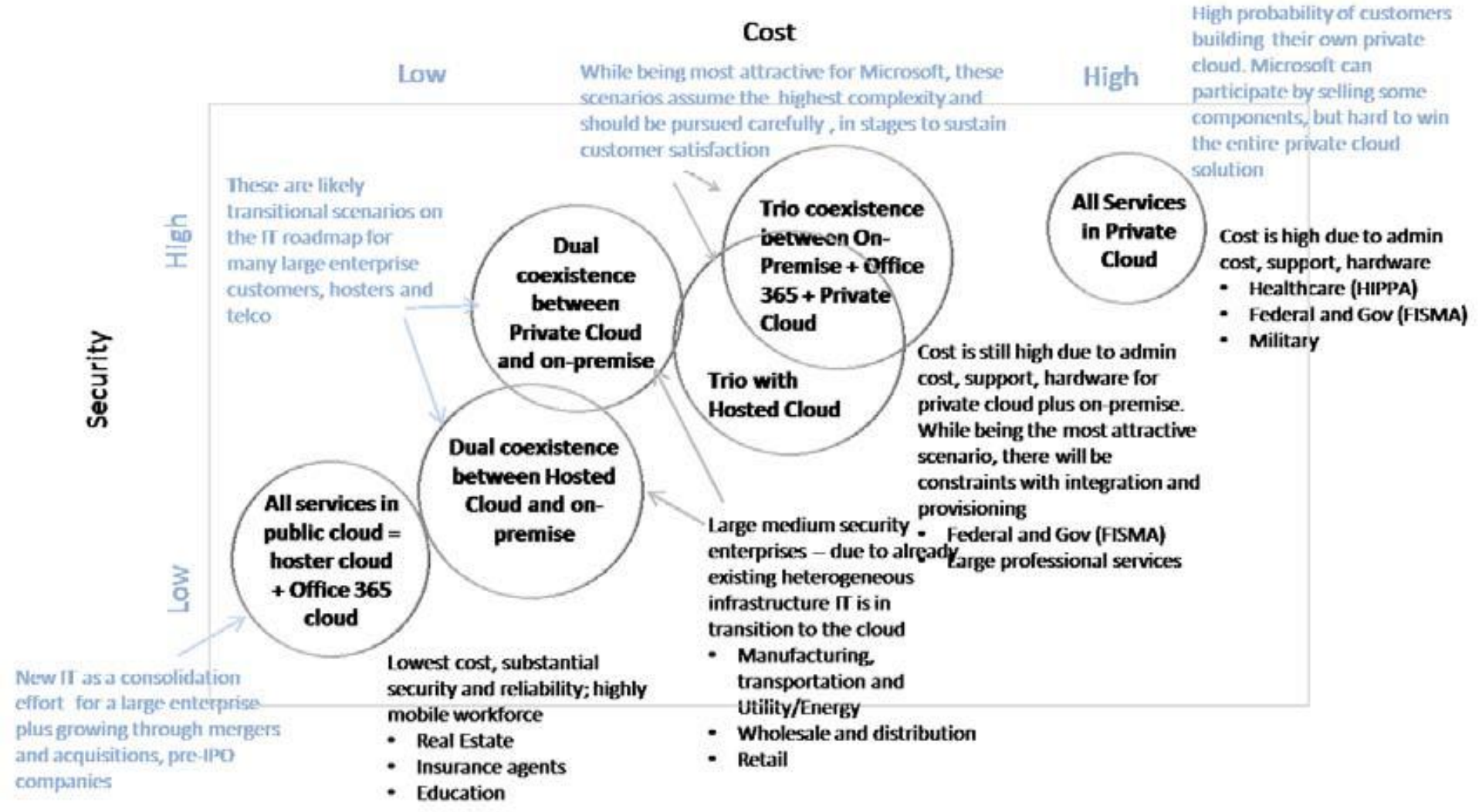
- Secure data in private cloud, general data in public
- Cloud bursting
  - Borrow resources from public cloud as needed to handle high demands – efficient and economical.
  - Brings in scalability for private cloud operator.

Public	Private	Hybrid	Community
Multiple Tenants	Service Over the Internet	Bridges Two or more public, private or community clouds.	Public, Private or Hybrid Clouds.
Service over the Internet	Grid-Computing Model	Manipulation of Capex and Opex to reduce costs.	Sharing of Capex and Opex
Utility Computing Model	Leverages existing CAPEX, reduces OpEx	Resource Portability – Data and Apps	Resource Portability
Shifts Capex to OpEx	Single Tenant	Virta-Core	Groups of Organizations with common goal.
Amazon EC2	Audi.		

Comparison

Feature	Public Cloud	Private Cloud	Community Cloud	Hybrid Cloud
Ownership	Multi-Tenant	Single Tenant	Related tenants	Mix of the three types
Cost	Least cost compared to other options	Most costly	More than public but less than Hybrid	More than community but less than Private
Control	Minimal	Maximum	Medium	Depends on the cloud location
Security	Least secure	Most secure	More than public but less than Hybrid	More than community but less than Private
Flexibilty	Minimal	Maximum	More than public but less than Hybrid	More than community but less than Private
Possible Users	General public, most corporations using common functions like email, ERP, HR services.	Organizations dealing with strict security and data privacy like Military, Bank's internal systems	Shared mandate organizations like State and federal agencies, educational instituions.	General non-secure functions of Organizations dealing with strict security and data privacy
Oversight	Least Oversight	Complete Oversight	Shared Oversight	More than community but less than Private

Private cloud Vs Public Cloud: MS365

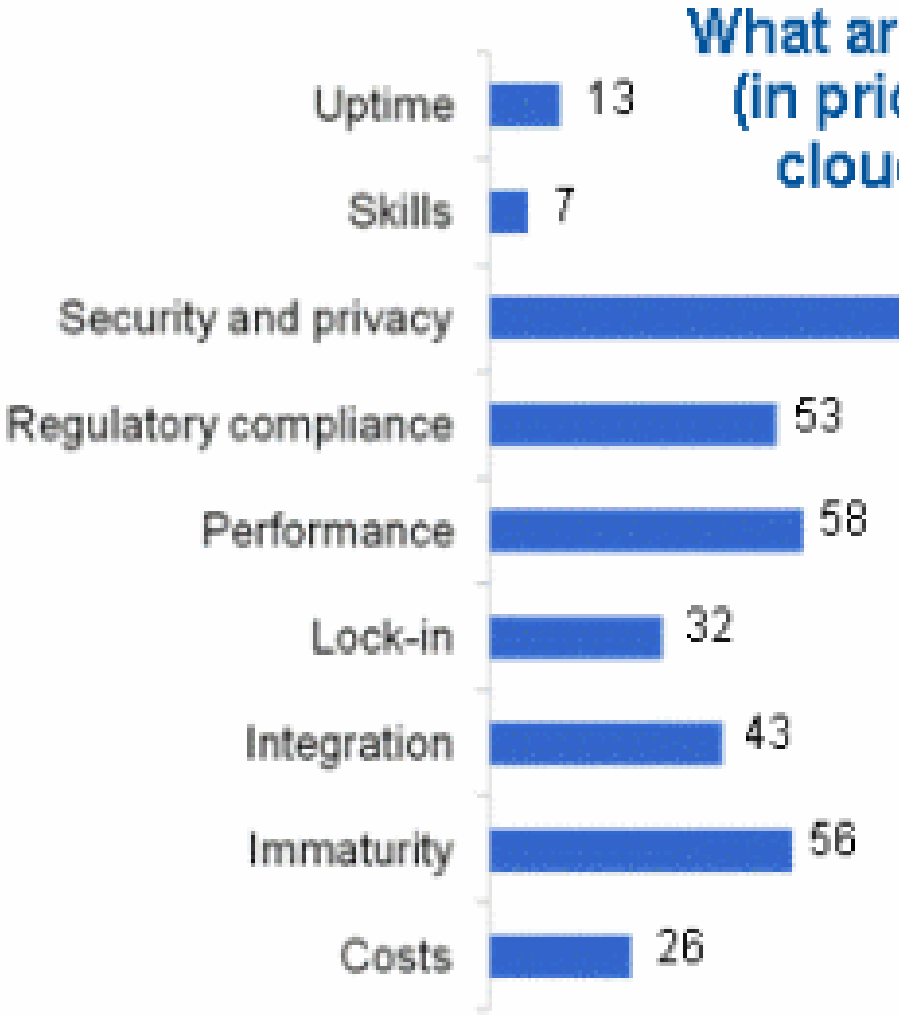


PUBLIC CLOUD CONCERNS

Case-Studies

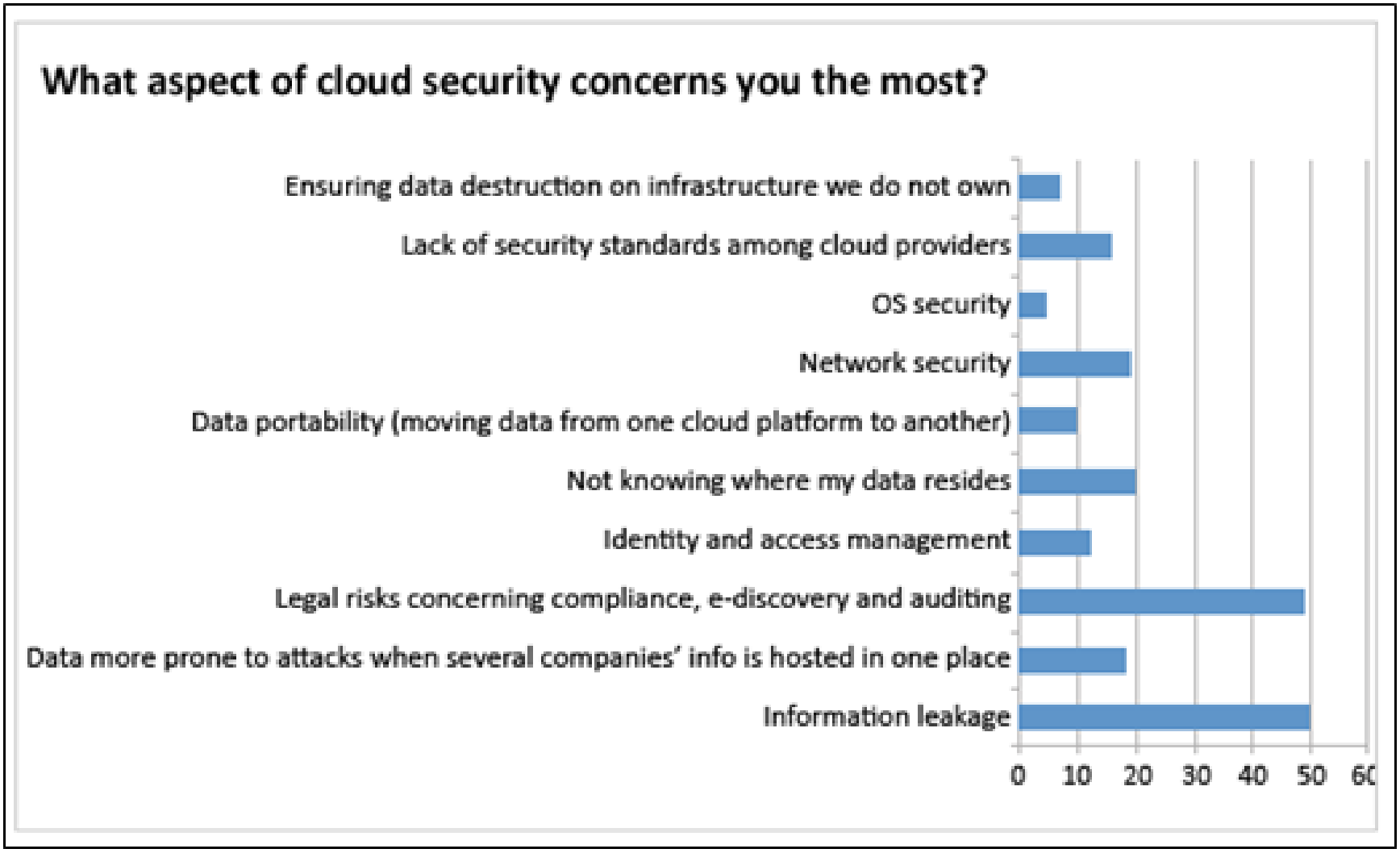
- http://www.crn.com/news/security/300073885/celebrity-icloud-security-intrusion-prompts-apple-response.htm
- http://appleinsider.com/articles/14/09/15/paypal-questions-apple-pay-security-in-new-ad-uses-icloud-celebrity-photo-debacle-as-ammunition
- http://www.wired.com/2012/08/apple-amazon-mat-honan-hacking/all/

Concerns With Public Cloud Computing



Gartner

What Are Your Top Three Issues With Public Cloud Computing in Rank Order?


What aspect of cloud security concerns you the most?
Ensuring data destruction on infrastructure we do not own
Lack of security standards among cloud providers
OS security
Network security
Data portability (moving data from one cloud platform to another)
Not knowing where my data resides
Identity and access management
Legal risks concerning compliance, e-discovery and auditing
Data more prone to attacks when several companies' info is hosted in one place
Information leakage
0
10
20
30
40
50
60

Key Security and Privacy Issues

Cloud Security : Challenges

Cloud Security Upside	Cloud Security Downside
Staff Skills and Specialization	System Complexity
Platform Strength	Shared Multi-tenant Environment
Resource Availability	Internet-facing Services
Backup and Recovery	Loss of Control
Mobile Endpoints	Botnet of hackers
Cross Data Center and Cloud	Mechanism Cracking

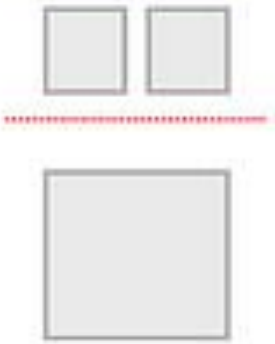
Source: Guidelines on Security and Privacy in Public Cloud Computing / by NIST

What customers should check with vendors

- Regulatory compliance
- Privileged user access.
- Data location
- Data segregation.
- Recovery.
- Investigative support
- Long-term viability.

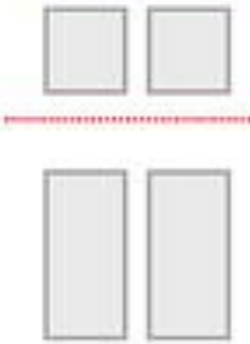
ROAD TO CLOUD COMPUTING

Stage 1:
Server Virtualization



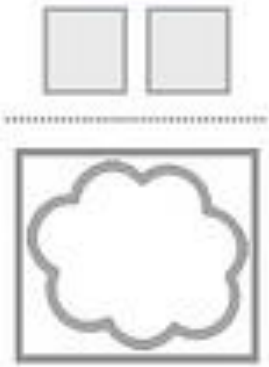
- Consolidation
- Capital expense

Stage 2:
Distributed Virtualization



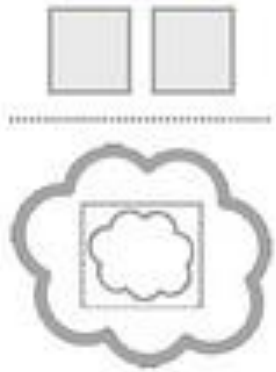
- Flexibility and speed
- Operational expense, automation
- Less downtime

Stage 3:
Private Cloud



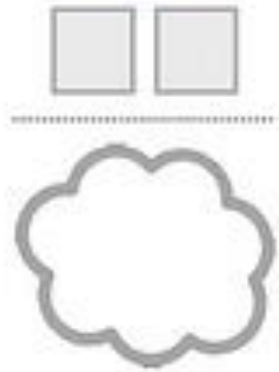
- Self-serve agility
- Standardization
- IT as a business
- Usage metering

Stage 4:
Hybrid Cloud



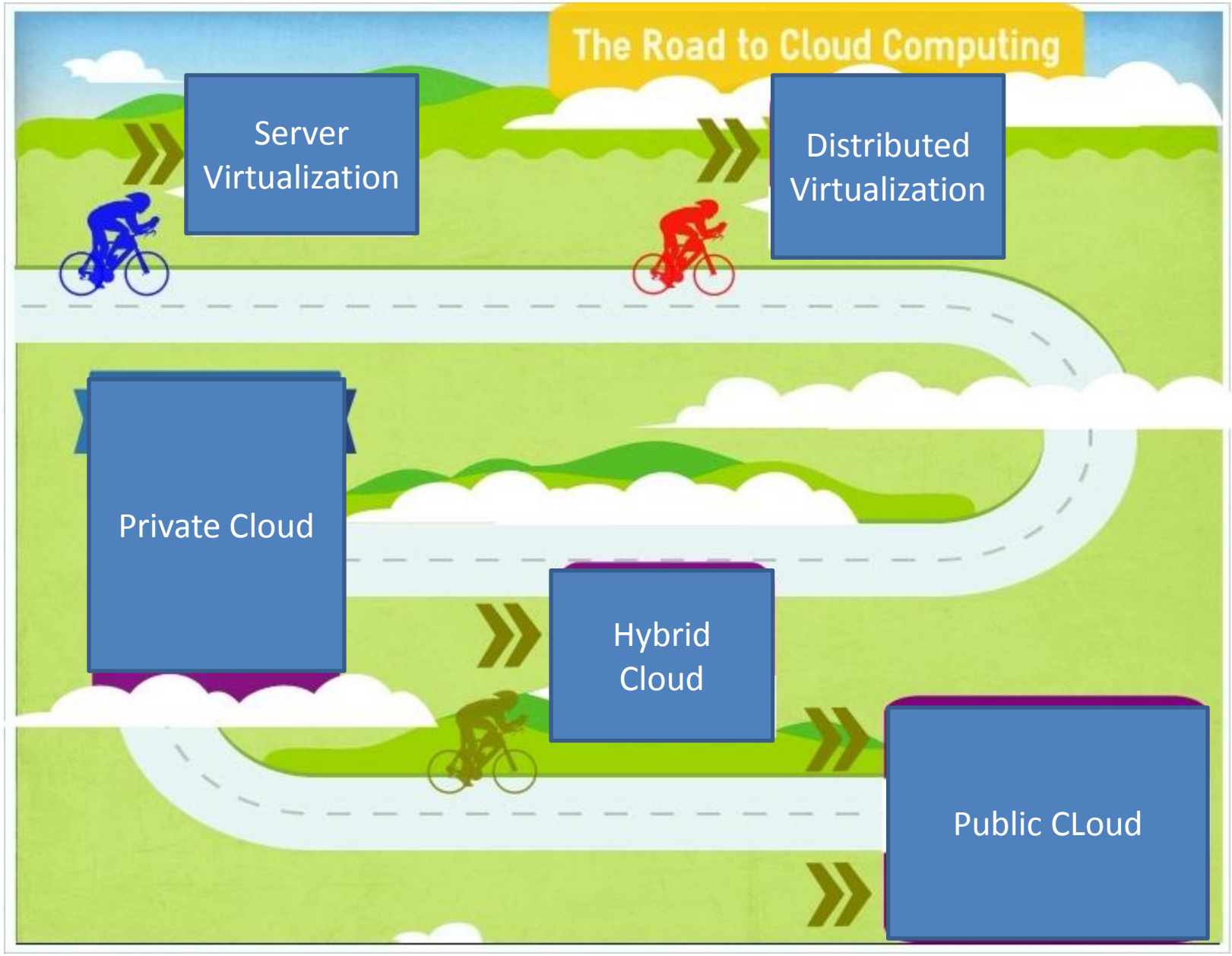
- Cost for peak loads
- Flexibility for peak loads

Stage 5:
Public Cloud



- Capital expense elimination
- Increased flexibility (up and down)

Source: Gartner (February 2012)


The Road to Cloud Computing
Server Virtualization
Distributed Virtualization
Private Cloud
Hybrid Cloud
Public CLoud

THANKS