



# 3<sup>rd</sup> MSC Malaysia R&D Series & IP Connect 2010

## Security Challenges in Cloud Computing

Jason Yuen Chee Mun CISSP CISA  
Industry Advisor  
CyberSecurity Malaysia

5 July 2010



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## Agenda

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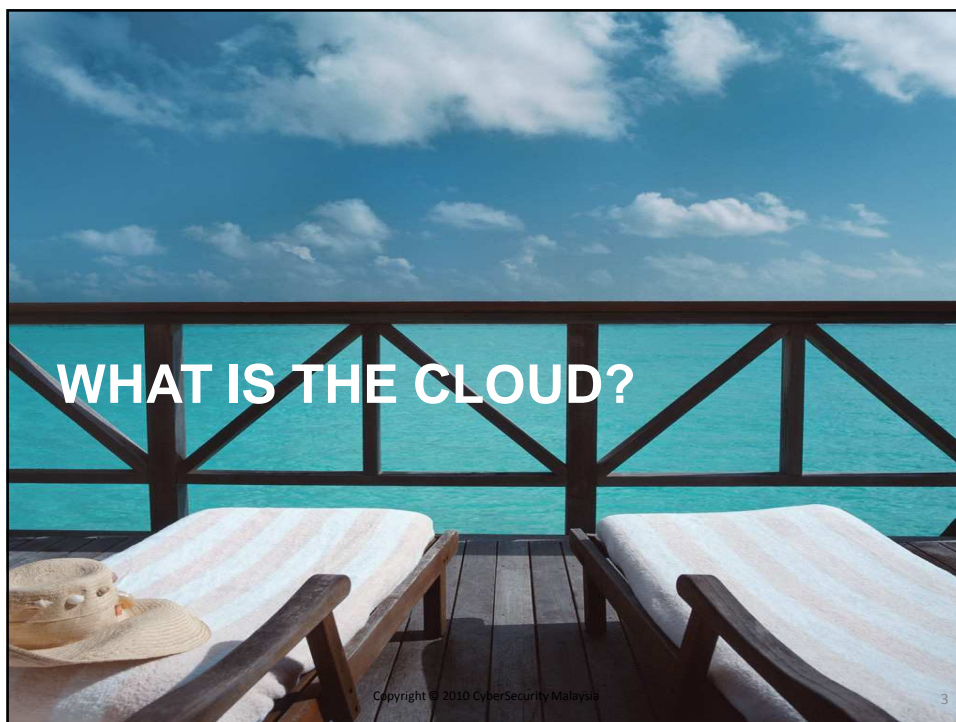


- What is the Cloud?
- Examples of Cloud Technology & Services Available Today
- Security Concerns



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# In the beginning...

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# The we had



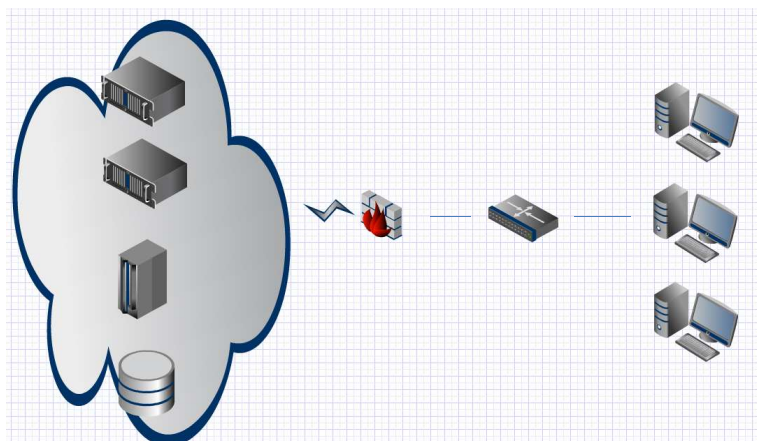
# And started having this...

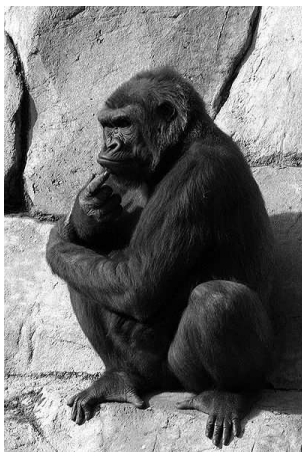


# And now...



# To put it one way...



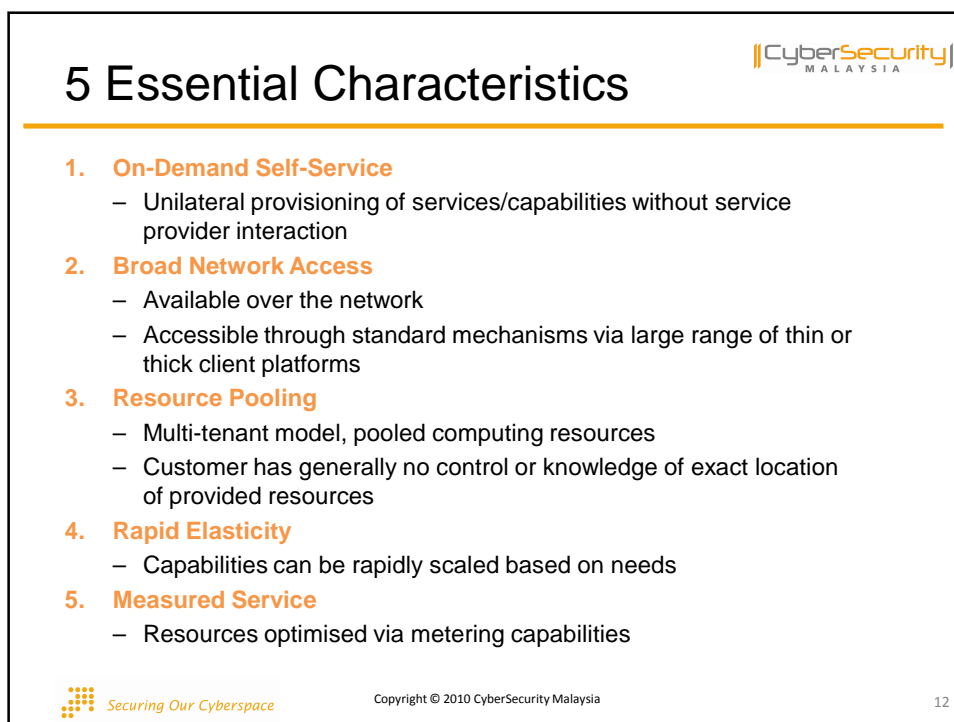
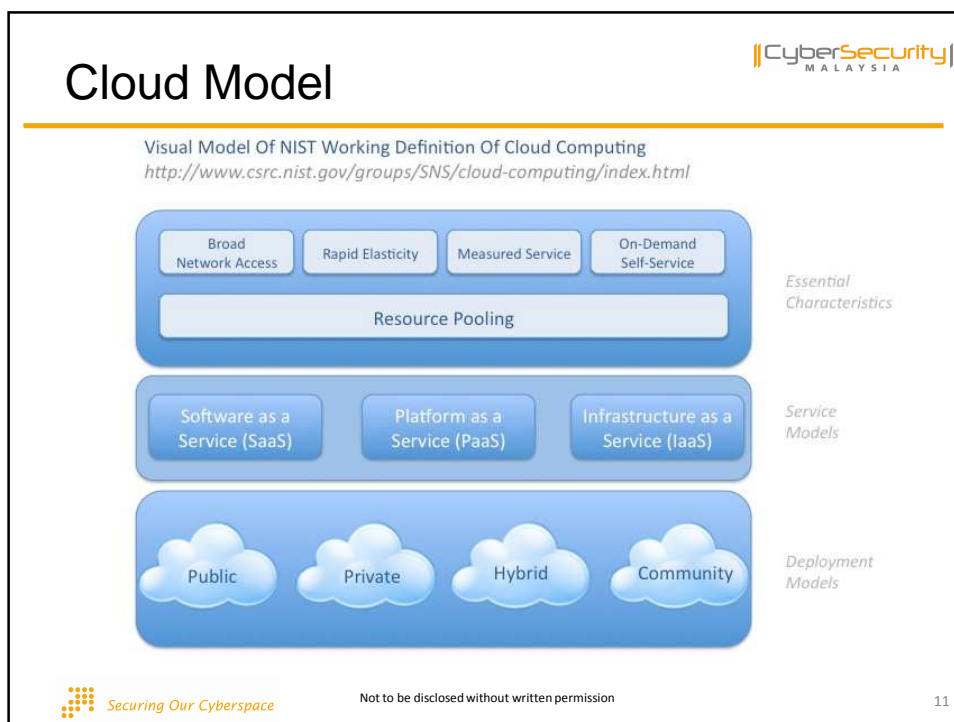


## DEFINITION & DETAILS

## NIST says

- Cloud computing is a model for enabling **convenient, on-demand network access** to a **shared pool of configurable** computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of **five essential characteristics, three service models, and four deployment models.**

*National Institute of Standards and Technology (v15 2009)*



## 3 Service Models - SPI

### 1. Software as a Service (SaaS)

- Use service provider's applications
- Accessible via thin client interface
- No customer control over underlying infrastructure

### 2. Platform as a Service (PaaS)

- Deploy own applications to service provider's platform
- Control over applications, related configurations
- No control over underlying infrastructure

### 3. Infrastructure as a Service (IaaS)

- Deploy processing, storage, networks and other resources
- Control over platform. O/S, storage, applications, limited network components

## 4 Deployment Models

### 1. Private cloud

- Single organisation
- Internally managed or by a 3<sup>rd</sup> party
- On or off premises

### 2. Community cloud

- Shared by several organisations (community, shared concerns)
- Jointly managed or by a 3<sup>rd</sup> party
- On or off premises

### 3. Public cloud

- General public or large industry group
- Owned and operated by service provider

### 4. Hybrid cloud


- Composition between two or more clouds with common technologies

## Business Benefits

- Cost
- Immediacy
- Availability
- Scalability
- Efficiency
- Resiliency



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## Pricing

Pay only for what you use. There is no minimum fee. Estimate your monthly bill using [AWS Simple Monthly Calculator](#). The prices listed are based on the Region in which your instance is running. For a detailed comparison between On-Demand Instances, Reserved Instances and Spot Instances, see [Amazon EC2 Instance Purchasing Options](#).

**On-Demand Instances**

On-Demand Instances let you pay for compute capacity by the hour with no long-term commitments. This frees you from the costs and complexities of planning, purchasing, and maintaining hardware and transforms what are commonly large fixed costs into much smaller variable costs.

The pricing below includes the cost to run private and public AMIs on the specified operating system ("Windows Usage" prices apply to both Windows Server® 2003 and 2008). Amazon also provides you with additional instances with other option for [Amazon EC2 running Microsoft](#) and [Amazon EC2 running IBM](#) that are priced differently.

	US – N. Virginia	US – N. California	EU – Ireland	APAC – Singapore
<b>Standard On-Demand Instances</b>				
Small (Default)	\$0.095 per hour	\$0.12 per hour		
Large	\$0.38 per hour	\$0.48 per hour		
Extra Large	\$0.76 per hour	\$0.96 per hour		
<b>High-Memory On-Demand Instances</b>				
Extra Large	\$0.57 per hour	\$0.62 per hour		
Double Extra Large	\$1.34 per hour	\$1.44 per hour		
Quadruple Extra Large	\$2.68 per hour	\$2.88 per hour		
<b>High-CPU On-Demand Instances</b>				
Medium	\$0.19 per hour	\$0.29 per hour		
Extra Large	\$0.76 per hour	\$1.16 per hour		
<b>Cluster Compute Instances</b>				
Quadruple Extra Large	N/A	N/A		
* Cluster Compute Instances are currently only available in the US – N. Virginia Region.				

Pricing is per instance-hour consumed for each instance type, from the time an instance is launched until it is terminated. Each partial instance-hour consumed will be billed as a full hour.

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# SECURITY CONCERNS

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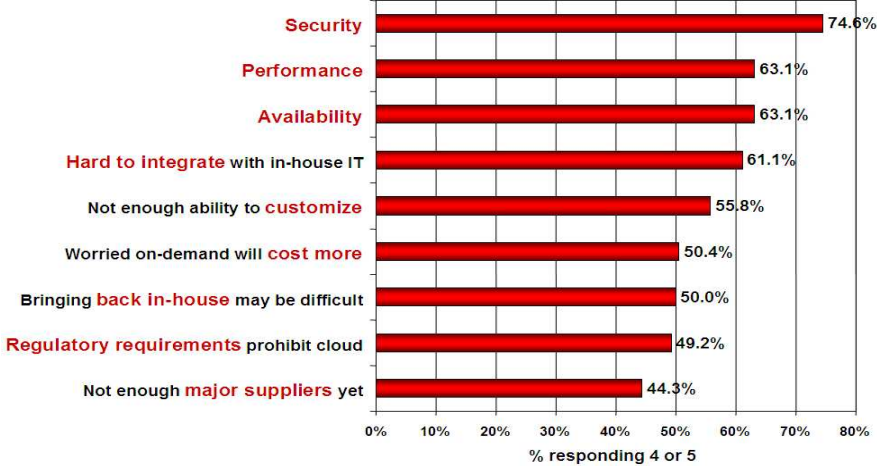
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## Security remains the biggest concern

**Q: Rate the challenges/issues ascribed to the 'cloud'/on-demand model**  
(1=not significant, 5=very significant)



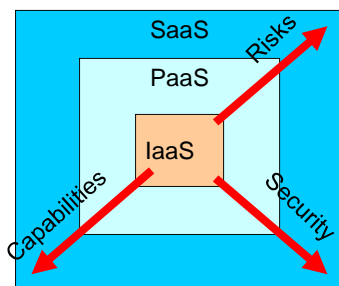
Challenge/Issue	% responding 4 or 5
Security	74.6%
Performance	63.1%
Availability	63.1%
Hard to integrate with in-house IT	61.1%
Not enough ability to customize	55.8%
Worried on-demand will cost more	50.4%
Bringing back in-house may be difficult	50.0%
Regulatory requirements prohibit cloud	49.2%
Not enough major suppliers yet	44.3%

Source: IDC Enterprise Panel, August 2008 n=244  
Securing Our Cyberspace

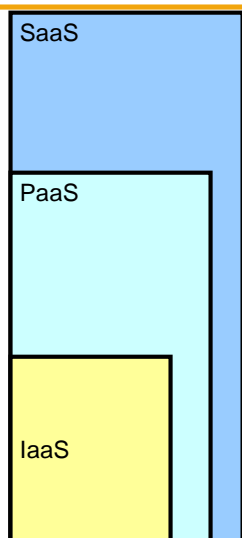
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## Understanding the Model

- IaaS is the foundation for all cloud services
- PaaS is built upon IaaS, SaaS is built upon PaaS
- Capabilities, risks and security issues are inherited



## 3 Service Models - SPI



• Less Flexibility & Control

• High-level of Security managed by provider

FLEXIBILITY & CONTROL

Level of Security that is Outsourced

• More Flexibility & Control

• Low-level of Security managed by provider

## Security Controls Provided

- IaaS
  - Physical security
  - Environmental security
  - Virtualisation security
  
- PaaS
  - Platform security
  
- SaaS
  - Application security
  - Database security

## Overall Concerns

- As in any outsourcing model, you cannot outsource **accountability**
- Not all service providers are created equal!
- What sort of service levels am I getting? Who do I call if something goes wrong?
- Where does all my information reside?
- Who can access my information?
- What sort of Security does the service provider have?
- SAS 70 Type 2, ISO 27001 Compliance...

## Operational Issues

- Trusting vendor's security model
- Ability to respond to audit concerns
- Obtaining support for investigations
- Indirect administrator accountability
- Proprietary implementations can't be examined
- Loss of physical control

## Security Risks

- Confidentiality
  - Online/external network transmission
  - Exposure/breaches at Service Provider (3<sup>rd</sup> party access)
  - Data storage, backups
  - Other connected customers
- Integrity
  - Right to audit & auditability
  - SDLC and program integrity
- Availability
  - Failures and disruptions at Service Provider
  - Service Provider going out of business

## Governance & Legal Risks

### Governance

- Consistency and compliance of practices between service provider and customer
- Structure and practices of information security function
- Audit, auditability and scope of audit

### Legal

- Regulations and compliance requirements
- Customer legal rights in event of errors, disasters, etc

## Conclusion



- Cloud computing offers incredible opportunity to rollout, scale and use computing resources
- BUT... not all clouds are created equal
- Do you homework!



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**CyberSecurity Malaysia,**  
Level 8, Block A,  
Mines Waterfront Business Park,  
No 3 Jalan Tasik, The Mines Resort City,  
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