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Enterprise Cloud Computing

Standards, Innovation & Shifts

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Standards - the need & the way forward
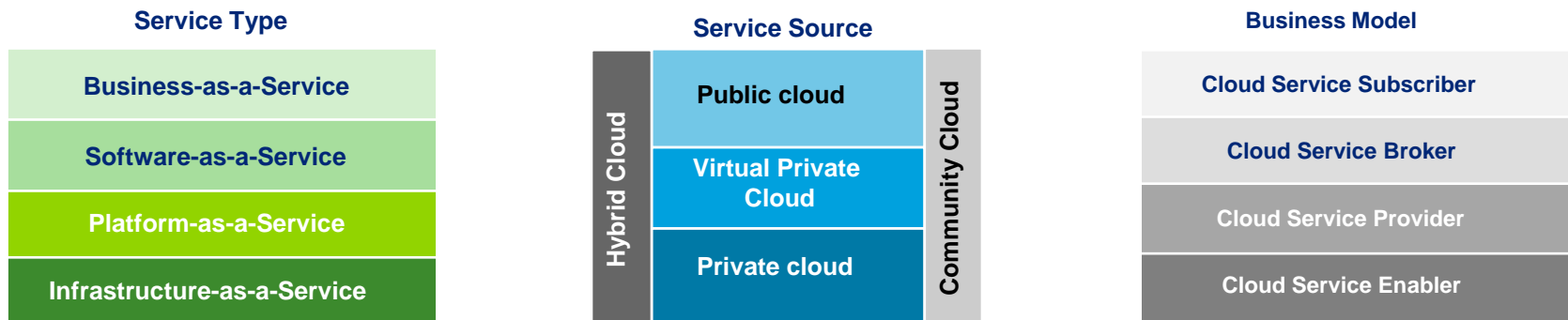
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Does every cloud have a silver lining ?

Cloud Computing is one choice in how businesses purchase, deploy, and support IT services. It's a complex topic. How do you get an actionable discussion?

I. Does the business problem or technology solution require all of the following?

1. **End-user self service – automating customer subscription and provisioning**
2. **Location independence and multi-tenancy for service provisioning and delivery**
3. **IP ubiquity – enabling access anytime and anyplace there is a network connection**
4. **Elastic performance and load – the ability to scale both up and down by period**
5. **Elastic pricing and contract terms – the ability to subscribe services "by the drink"**

II. What set (or sets) of the 3 dimensions of Cloud are required for the solution?

Service Type
Business-as-a-Service
Software-as-a-Service
Platform-as-a-Service
Infrastructure-as-a-Service

Service Source

Hybrid Cloud		Community Cloud
	Public cloud	
	Virtual Private Cloud	
	Private cloud	

Business Model
Cloud Service Subscriber
Cloud Service Broker
Cloud Service Provider
Cloud Service Enabler

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Cloud computing delivery models

Cloud computing technology is deployed in different ways, with varying internal or external ownership and technical architectures

Vendor cloud (External)	Cloud computing services from vendors that can be accessed across the Internet or a private network, using one or more data centers, shared among multiple customers, with varying degrees of data privacy control. Sometimes called "public" cloud computing.
Private cloud (Internal)	Computing architectures modeled after vendor clouds, yet built, managed, and used internally by an enterprise; uses a shared services model with variable usage of a common pool of virtualized computing resources. Data is controlled within the enterprise.
Hybrid cloud	A mix of vendor cloud services, internal cloud computing architectures, and classic IT infrastructure, forming a hybrid model that uses the best-of-breed technologies to meet specific needs.
Community cloud	Community clouds are used across organizations that have similar objectives and concerns, allowing for shared infrastructure and services. Community clouds can be deployed using any of the three methods outlined above, simplifying cross-functional IT governance.

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The need for Cloud Computing Standards

Standards for Cloud Architecture	Standards for Cloud Applications
❑ Emerging ❑ Cloud Interfaces are the key ❑ Leverage autonomic computing, grid, virtualization	❑ Mature technologies but various approaches ❑ Service Oriented Architecture ❑ Web Services standards

Everyone's talking about building a cloud these days. But if the IT world is filled with computing clouds, will each one be treated like a separate island or will open standards allow all to interoperate with each other ?

Why do we need standards ?

- Ability to switch easily between external and internal clouds or amongst external providers
- Support development of open source software for cloud based computing
- Inherent risk in availability of service and data, when relying on single provider

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The Seven Standards of Service of Cloud Computing Platforms

Building blocks of the best practices every successful cloud computing platform tend to follow

1. **World-class security** – Provision world-class security at every level.

2. **Trust and transparency** – Provide transparent, real-time, accurate service performance and availability information.

3. **True multi-tenancy** – Deliver maximum scalability and performance to customers with a true multitenant architecture.

4. **Proven scale** – Support millions of users with proven scalability.

5. **High performance** – Deliver consistent, high-speed performance globally.

6. **Complete disaster recovery** – Protect customer data by running the service on multiple geographically dispersed data centers with extensive backup, data archive, and failover capabilities.

7. **High availability** – Equip world-class facilities with proven high-availability infrastructure and application software.

Source: salesforce.com

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Cloud Standard Groups

Which Organization doing what ?

- ☐ Cloud Security Alliance (CSA)
- ☐ Distributed Management Task Force (DMTF)
- ☐ Storage Networking Industry Association (SNIA)
- ☐ Open Grid Forum (OGF)
- ☐ Open Cloud Consortium (OCC)
- ☐ Organization for the Advancement of Structured Information Standards (OASIS)
- ☐ TM Forum
- ☐ Internet Engineering Task Force (IETF)
- ☐ International Telecommunications Union(ITU)
- ☐ European Telecommunications Standards Institute (ETSI)
- ☐ Object Management Group (OMG)

	SaaS	PaaS	IaaS
Provisioning	OMG	OMG	OGF / OMG / DMTF
Security			OGF / DMTF / CSA
Quality of Service			DMTF
Identity		OASIS	
Development Platform	OMG	OMG	OMG
Virtual Machine Interface			DMTF

Source: http://cloud-standards.org

Innovations – what in store

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Cloud Computing Innovations

Composite Cloud	**Skype** - A global mesh network of managed network elements that provisions a global VoIP network with voice endpoints **FortiusOne's GeoCommons -** Next-generation location intelligence platform by blending analysis capabilities of geographic information systems (GIS) with location-based information on the Web
Mobile surveillance	Iveda Solutions is leveraging the cloud to provide streaming mobile video surveillance at a price point well below the typical closed-circuit systems
Open Source platform	**OpenStack** – Open source cloud platform with the source code for the project provided by Rackspace **OpenNebula** - Fully open source toolkit to build any type of IaaS Cloud **Open Cirrus Project** (The HP/Intel/Yahoo! Open Cloud Computing Research Testbed) - Open cloud-computing research testbed designed to support research into the design, provisioning, and management of services at a global, multi-datacenter scale
Sky computing	This model takes resources from multiple cloud providers and pools them to create large-scale, distributed architectures. This is under research

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Cloud Computing Innovations…Contd.

Online gaming	By combining cloud computing, http delivery and client-side technology, <u>Pando Networks</u> is providing a highly scalable game delivery platform with network capacity that expands as demand increases <u>Ashima Arts</u> is building a Massively Multiplayer Online (MMO) OS based on virtualization and cloud concepts
Security and confidentiality	**Private Virtual Infrastructure (PVI)** – A new management and security model for cloud computing proposed by the University of Maryland, with the idea of sharing the responsibility of security in cloud computing between the service provider and the client **Trusted Cloud Computing Platform (TCCP)** – The Max-Planck-Institute addresses the problem of clients not having any means of verifying the confidentiality and integrity of their data
Cloud gateways	Cloud storage gateway devices by <u>StorSimple</u> deployed in data centers to enable the use of cloud storage as traditional storages

? -To Shift or Not to Shift

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Treading back …

Cloud

Grid
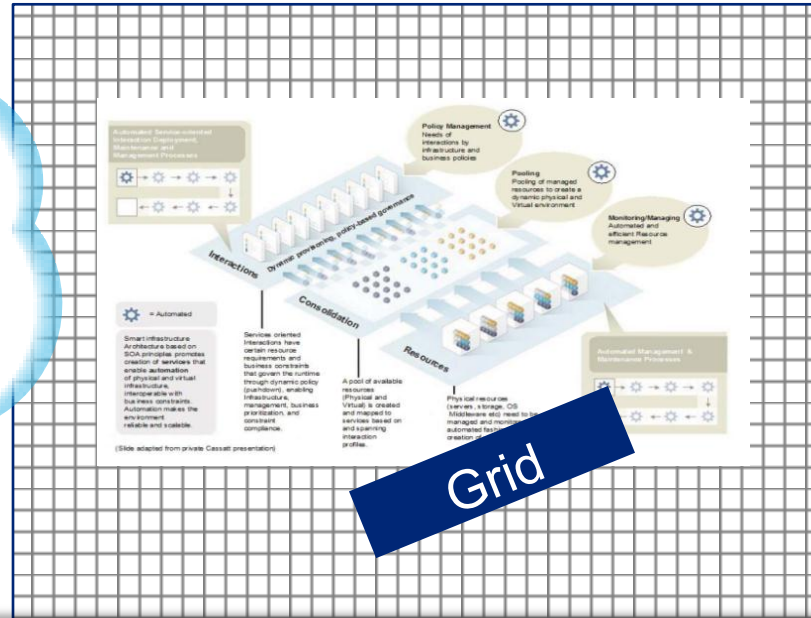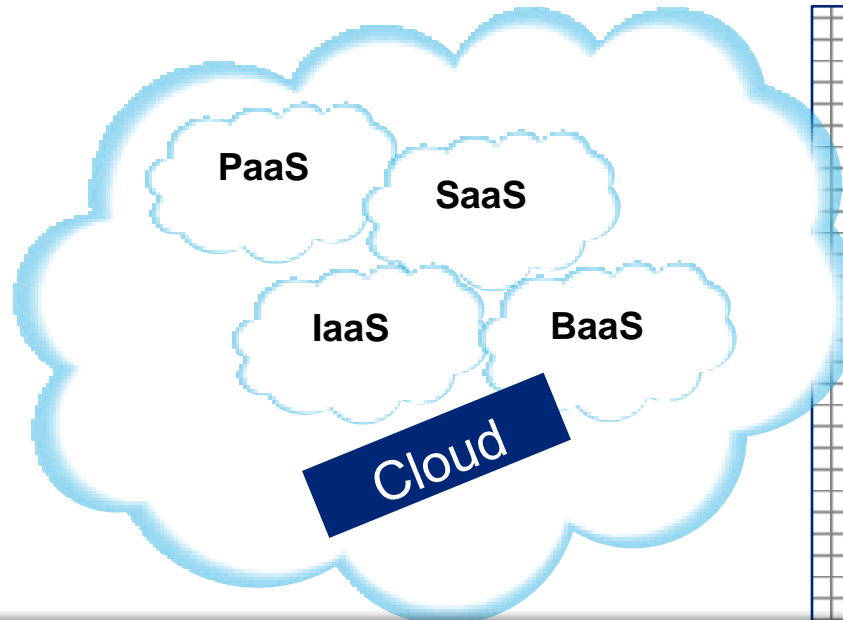
Autonomic Computing – a set of architectural characteristics to manage systems where complexity is increasing but must be managed without increasing costs or the size of the management team, where a system must be quickly adaptable to new technologies integrated to it, and where a system must be extensible from within corporation out to the broader ecosystem and vice versa.

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Cloud Computing is changing the sourcing and business models of IT companies and enterprise buyers

Significant industry changes are coming with cloud computing and adoption of alternate business models and types of information services
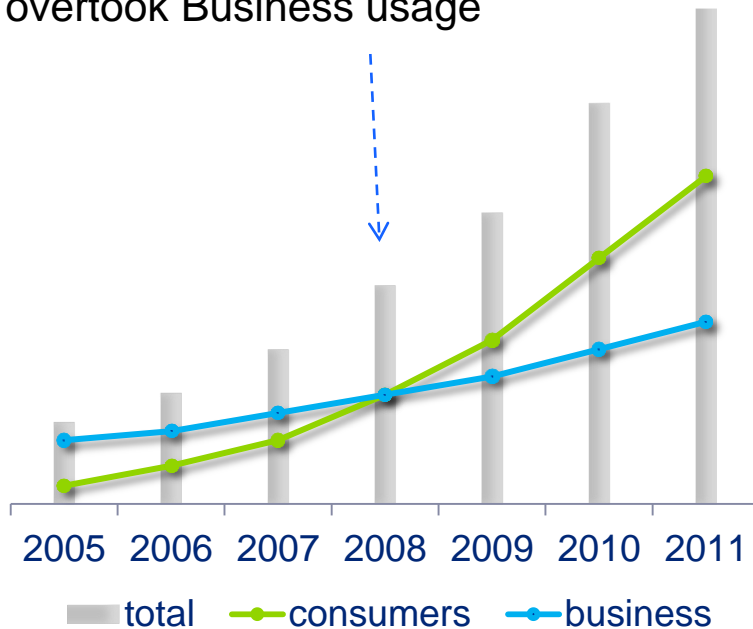
- Enterprises are now buying Cloud Computing services which align with their needs and risk tolerance

- For many IT vendors and services providers, Cloud Computing is the new focus of competition, putting great pressure on incumbents

- Tech, Telecom, and Media companies are investing heavily, competing to establish cloud computing market share.

- The IT industry is changing by the need to supply flexible cloud- based services to a both consumers and enterprises

Enterprises and services providers that adopt cloud computing delivery models have the potential to fundamentally re-shape the broader business landscape.

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Enterprises are moving into the market for cloud services

Consumers and Enterprises are now both heavy users of Cloud services and blurring the distinction with enterprise usage patterns.

In 2008, Consumer use of the Internet overtook Business usage

2005 2006 2007 2008 2009 2010 2011

total — consumers — business

Consumers | Enterprises

source: Cisco Systems, Global IP Traffic Forecast and Methodology; Mobility segment (0.1% of traffic in 2007)

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Enterprises are adopting Cloud Computing service models following different paths of awareness and acceptance

Software as a Service and Infrastructure as a Service are the easiest to use and adopt, and are leading the market for enterprise services

Enterprise adoption path of cloud computing

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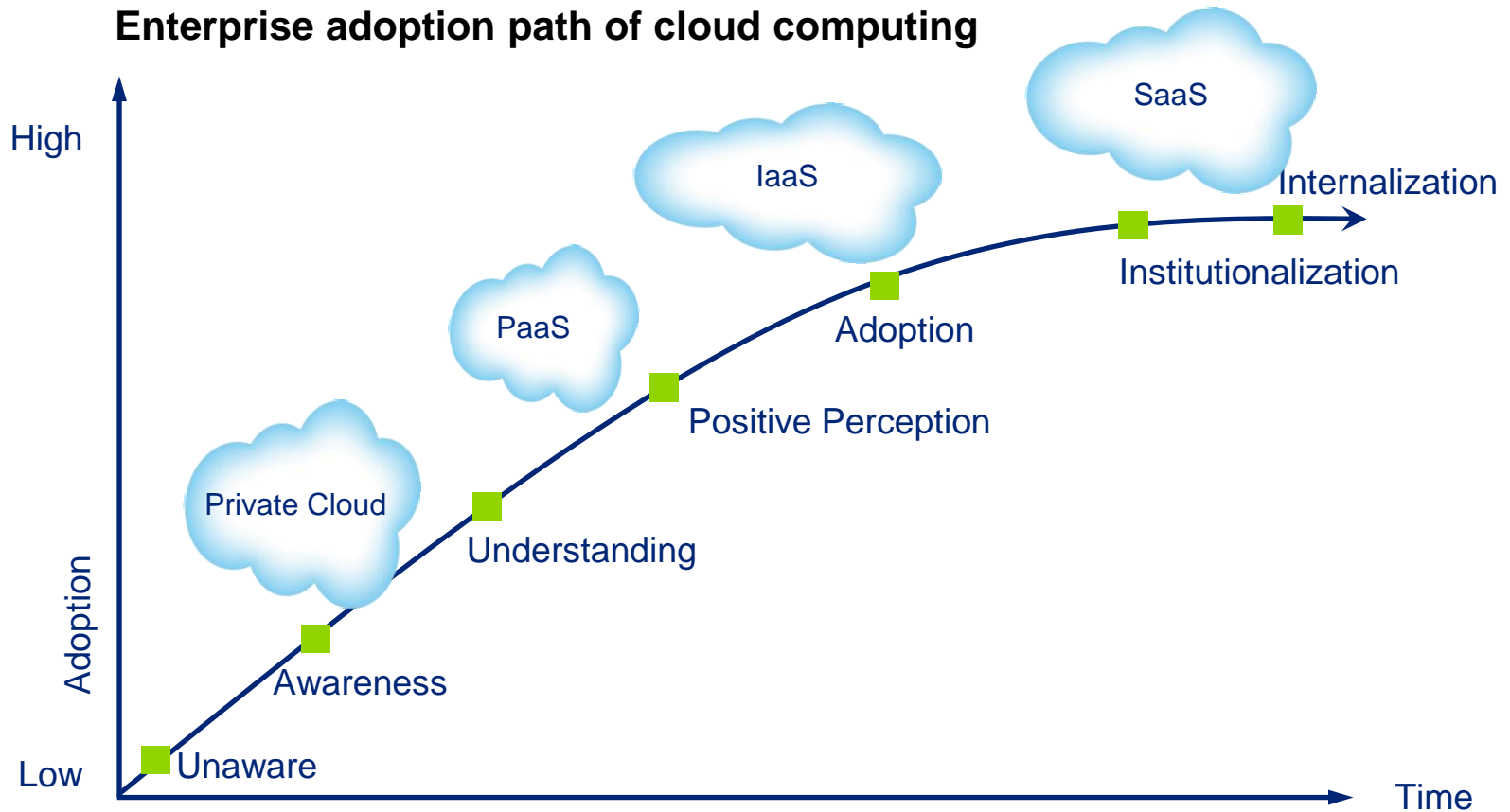
Operational, Risk and Governance issues must be properly balanced for Enterprises Cloud Computing adoption:

Key operational and governance issues must be resolved – for both enterprises and services providers

Data controls	Who owns the data? How is it being used? Are controls in place?
Security and Privacy	How is security achieved? What is the level of privacy protection?
Audit & Assurance	Are there risk management controls to applications and data?
Tax and Legal	Can you meet needs for legal compliance and tax issues?
Backup and DR	Are data backup, retention, disaster recovery practices sufficient?
Vendor "lock-in"	Is the vendor limiting interoperability or access to your data?
IT Operations	What IT services and applications are best suited for the cloud?
IT Readiness	Are internal IT architecture and organization structures "ready"?

Alignment with Enterprise Risk and Governance strategy will help organizations address the operational hurdles to cloud adoption

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The longer-term impact of Cloud Computing will be felt in four waves of disruption in the IT marketplace

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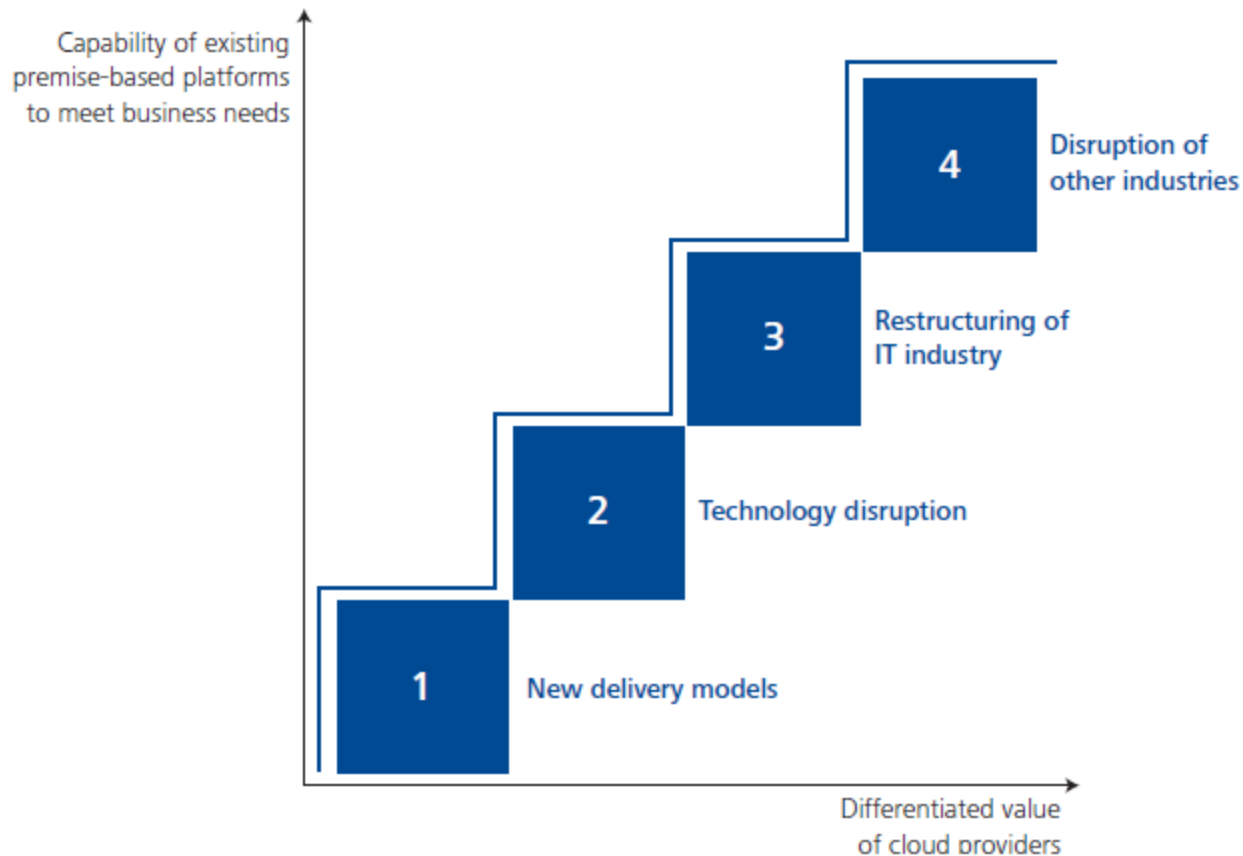
Case Study – G2C portal staging environment in Cloud

Staging environment setup in Amazon EC2 Cloud for the G2C portal of a Government Department in a neighbouring country

Driving factors	On the downside
❑ Cost benefits ❑ Low maintenance overhead ❑ Easy backup and recovery	❑ Developer training and learning curve to adopt cloud ❑ High network bandwidth usage ❑ Periodic backup of cloud image

What would be the impact if the production environment is not on cloud?

Q & A

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