

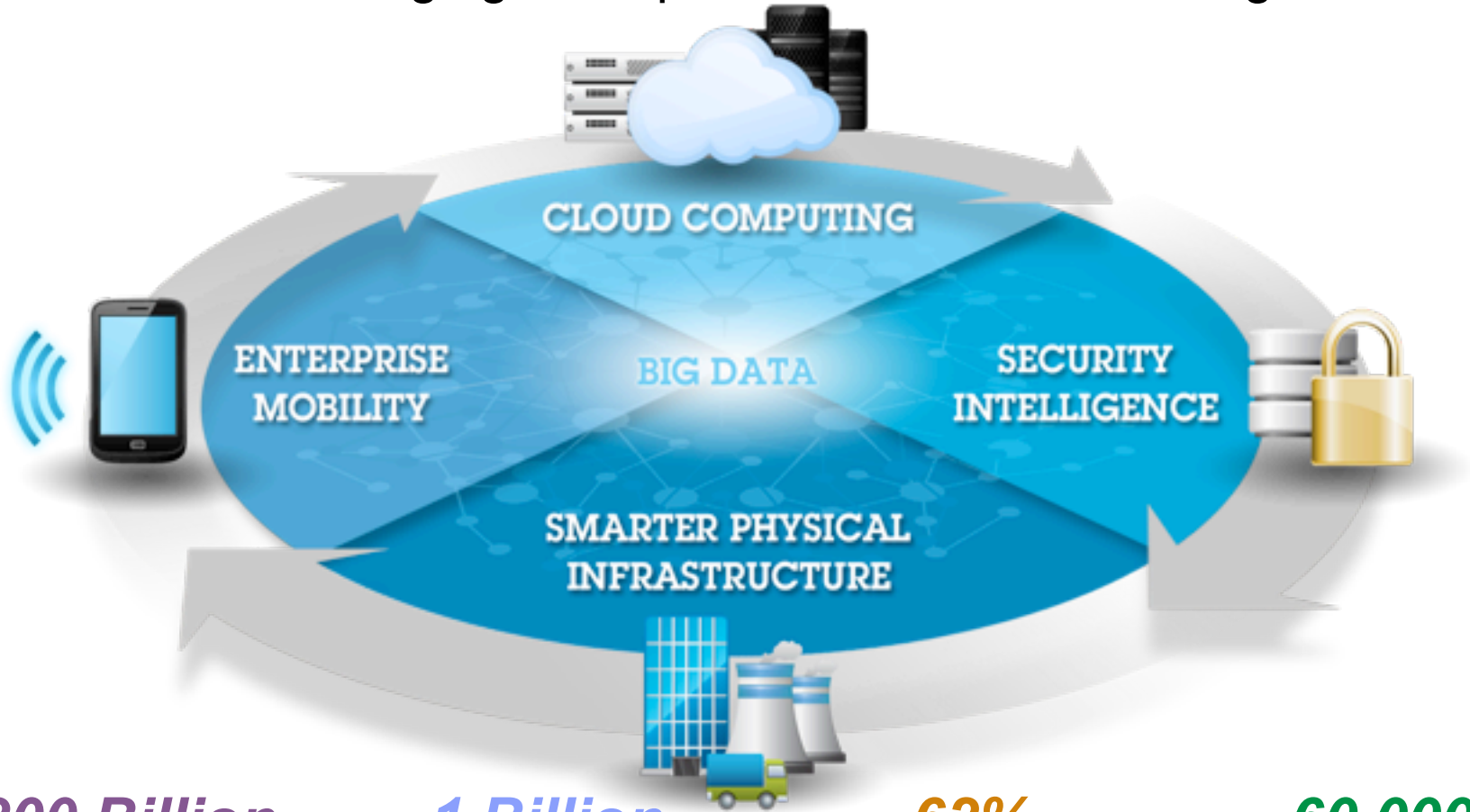
Dr. Matthias Kaiserswerth
Director and Vice President, IBM Research - Zurich

Why Cloud?

Secure. Private. Resilient. Open.



On today's Smarter Planet, businesses globally are challenged to innovate while managing an unprecedented rate of change.



200 Billion
physical assets
with IT intelligence

1 Billion
consumers will have
SmartPhones

62%
of workloads will
be Cloud-based

60,000
cyber attacks
every day

Organizations must balance optimization with innovation to enable new product and service models

Optimization



Next Generation
of Hybrid
Architectures

Innovation



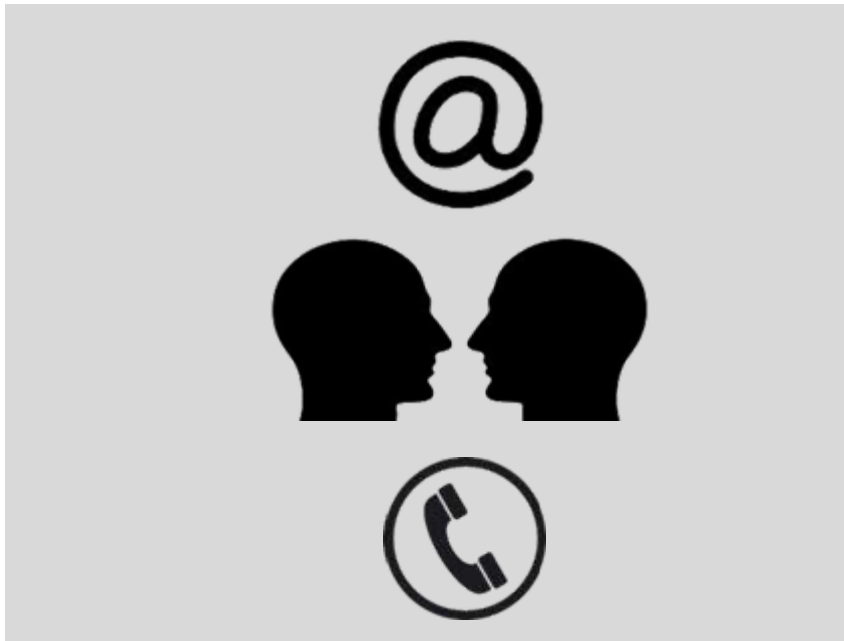
Innovation drives
need for continuous
IT **optimization**



New economics of IT
fuels investments in
innovation

Communication Between LB and LE

Traditional Operating Model



Various Channels

Public (IaaS-Operating Model)

```

43 "Instance": {
44   "Type": "AWS::EC2::Instance",
45   "Properties": {
46     "SecurityGroups": [{"Ref": "sgInternal"}, {"Ref": "sgExternal"}, {"Ref": "sgInstance"}],
47     "KeyName": "default",
48     "AvailabilityZone": {"Ref": "availabilityZone"},
49     "InstanceType": {"Ref": "instanceType"},
50     "ImageId": {"Ref": "amiid"},
51     "Tags": [
52       {"Key": "CFN", "Value": "cfn-std-instance.json"}
53     ],
54     "UserData": {"Fn::Base64": {"Fn::Join": ["", [
55       "#!/bin/bash\n",
56       "export PATH='/bin:/sbin:/usr/bin:/usr/sbin'\n",
57       "echo 'deb http://pkg.camptocamp.net/staging squeeze sysadmin' >>
58       /etc/apt/sources.list\n",
59       "apt-get update\n",
60       "apt-get install -y --force-yes python-aws-cfn-bootstrap\n",
61       "/usr/bin/curl --insecure https://get-
62       puppet:quooHae2zohy@dashboard.bgdi.admin.ch/scripts/install-puppet.bash | bash\n",
63       "/usr/bin/cfn-signal -e 0 -r 'Basic configuration completed' '", {"Ref": "WaitHandle"}], "\n"
64     ]}}
65   }
66 }

```

Code / API <
(Datacenter Abstraction)

Main differences between the Two Operating Models

Traditional Operating Model

- **Kundenspezifische** Infrastruktur
- Kunde kann/muss in der Regel zwischen versch. Hardware-Optionen wählen
- **Support** durch LE
- CapEx und OpEx
- Infrastruktur-Rollout **nicht vollständig automatisierbar**
- Infrastruktur **nicht revisionierbar** in SW-Repository
- **nicht reproduzierbar** (neuer Server up and running in Wochen bis Stunden)
- **Sicherheit und Verfügbarkeit leidet** unter manuellen Interaktionen
- **langsame Releasezyklen**
- **Klare Trennung zwischen Projekt und Betrieb**, sowohl inhaltlich wie organisatorisch

Public (IaaS-Operating Model)

- ✓ **“Take it or leave it” Infrastruktur (limited choice)**
- ✓ **Hardware-Ressourcen vollständig über API abstrahiert**
- ✓ **Support** durch LE und Community
- ✓ Innovationsfreundliches **Pay as you go-Modell**
- ✓ Infrastruktur-Rollout **vollständig automatisierbar**
- ✓ Infrastruktur **revisionierbar dokumentiert** in SW-Repository
- ✓ **reproduzierbar** (neuer Server up and running in Minuten)
- ✓ **Sicherheit und Verfügbarkeit** steigt dank hohem Automatisierungsgrad
- ✓ **schnelle Releasezyklen**
- ✓ Grenzen zwischen Projekt- und Betriebsteam lösen sich auf (**DevOps**)

Leveraging the transformational power of Cloud computing

Enable new business models and client relationships



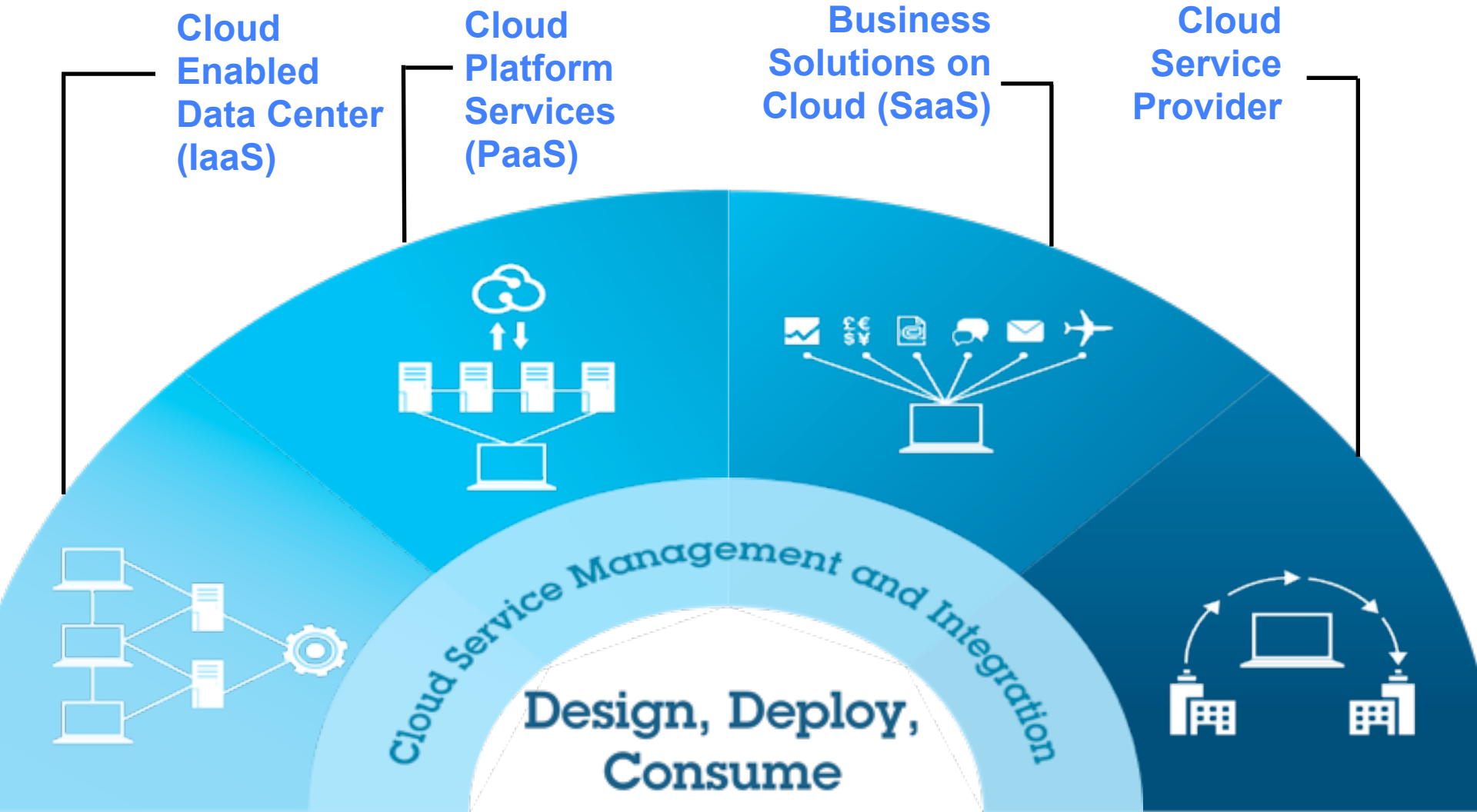
Deliver secure IT without boundaries

Improve the agility and dexterity of business

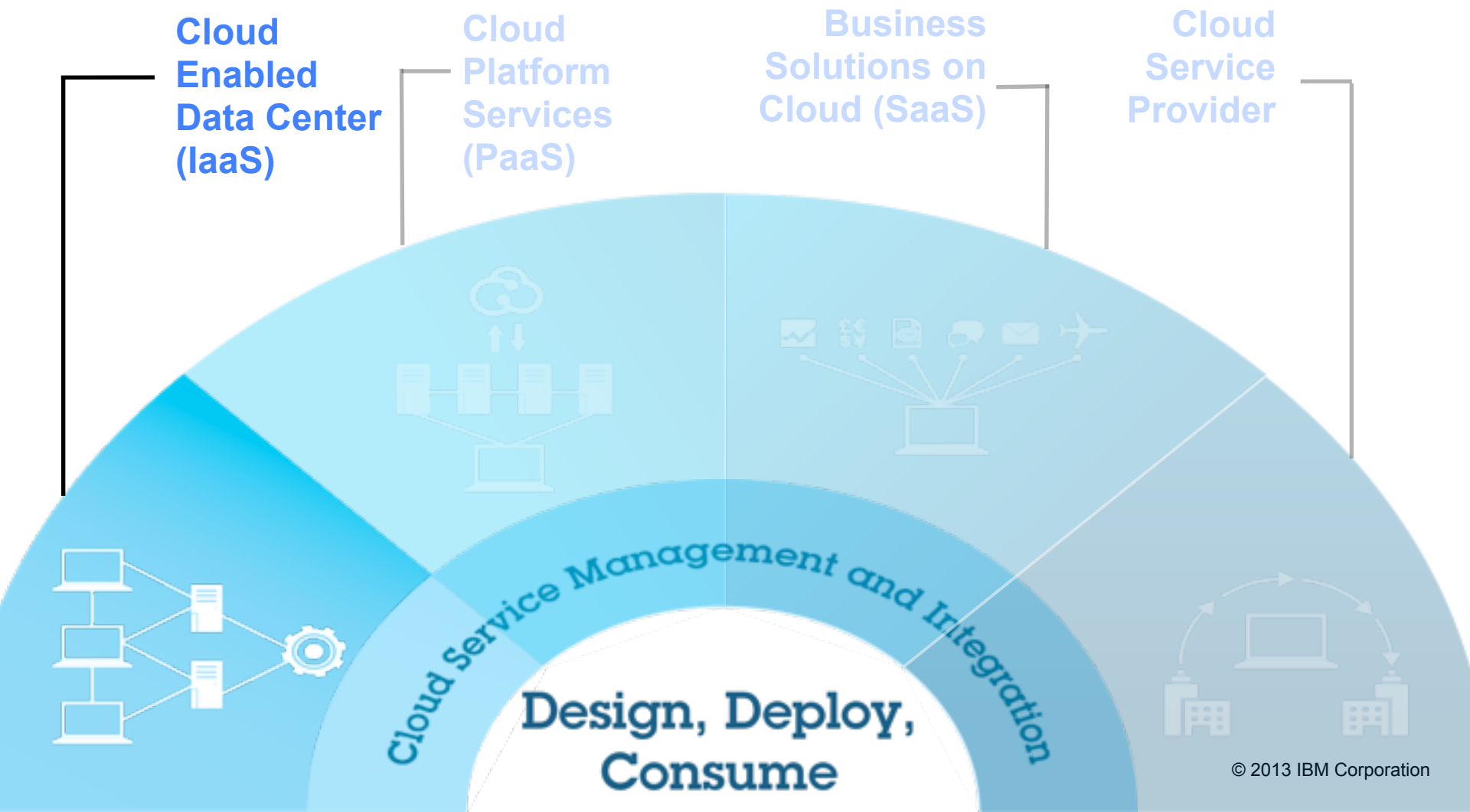
Speed delivery of product and service innovation

Lowers Complexity & Changes the Economics of IT

Clouds Come in All Shapes and Sizes



Clouds Come in All Shapes and Sizes



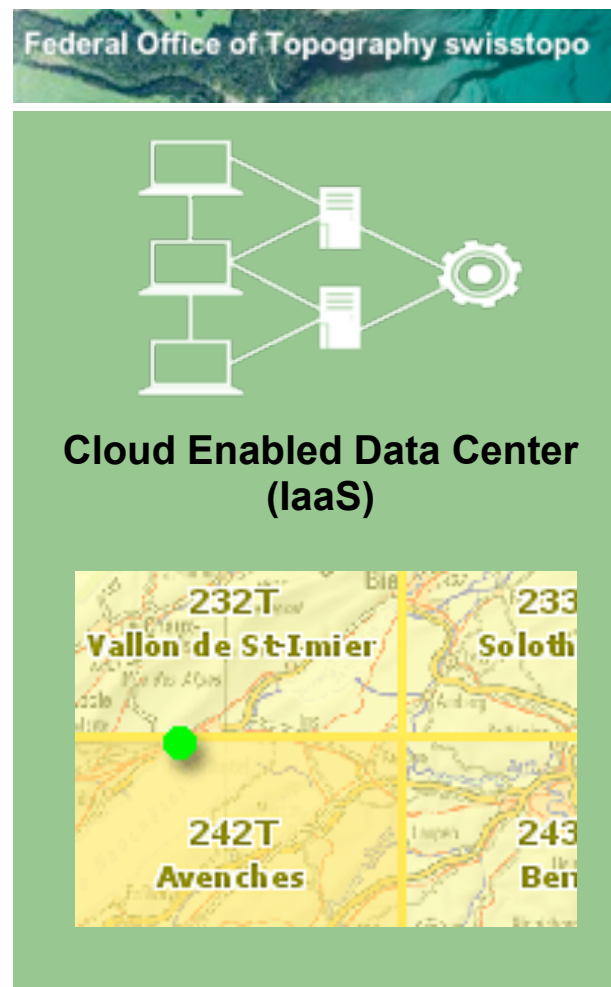
swisstopo: Cloud Computing in the Public Sector

Challenge

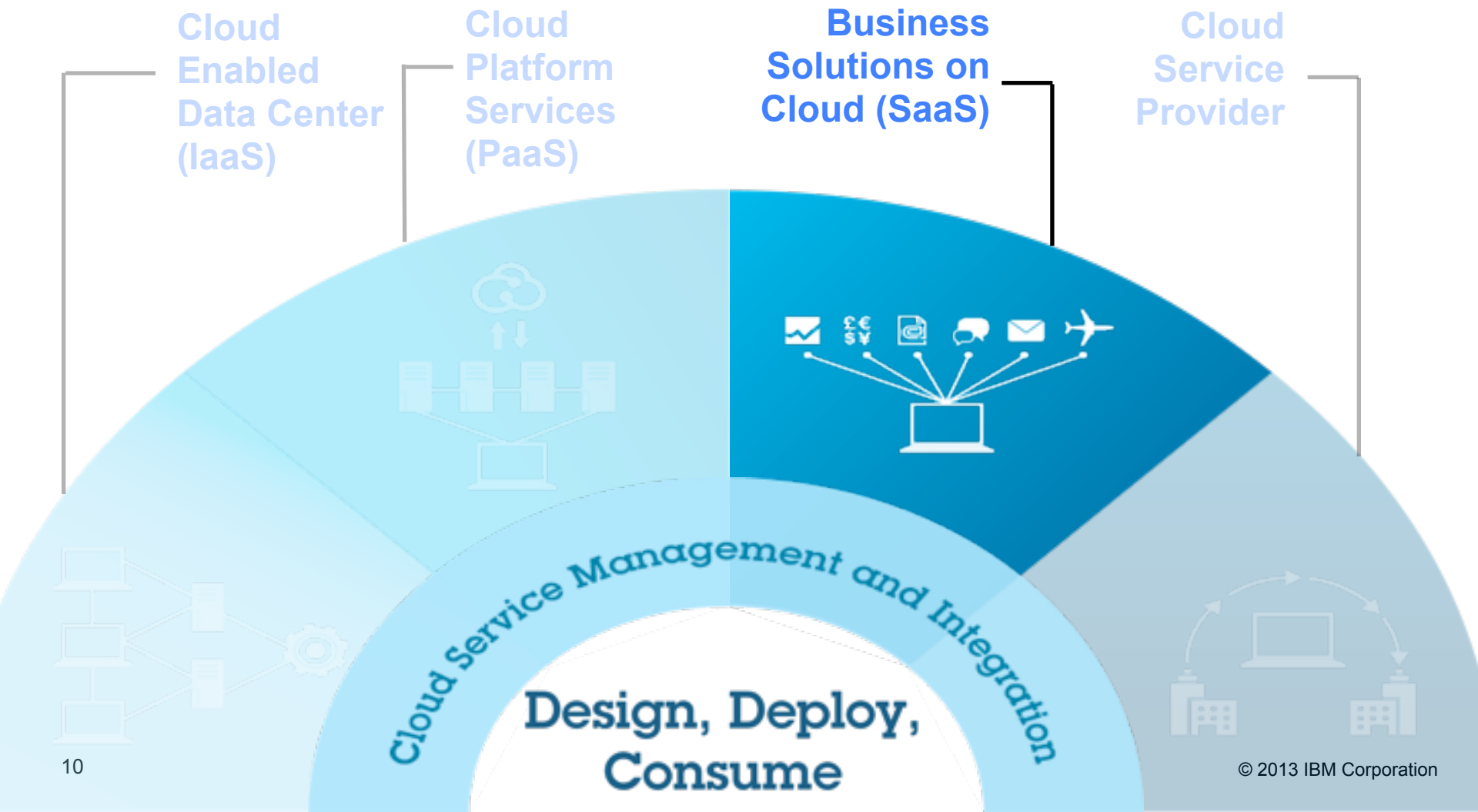
An efficient way to handle peak loads, which are triggered by Press Releases

Solution

- Infrastructure as a Service (Amazon S3)
- Open Source Software Stack
- Additional capacity is released immediately
- Existing virtualization technology enables a simple software testing on different platforms



Clouds Come in All Shapes and Sizes



Lucerne Festival: Cloud Based Load Testing and Granularity

Challenge

High peak immediately after the opening ticket sales (>10 times) resulting in highly variable performance of the online ticket shop.

Small IT operations team and few resources for in-house performance testing and resolution of the existing solution.

Solution

Outsourcing performance testing environment to the IBM SmartCloud Enterprise. Supports load simulation of 6000 virtual users and machines.

LUCERNE FESTIVAL



**Business Solutions on
Cloud (SaaS)**



IBM's Smarter approach to interoperability in the Cloud

Standards-based. Flexible. Secure. No Vendor Lock-In.



Open Services
for Lifecycle
Collaboration



IBM solutions are built on a comprehensive, open reference model for secure cloud computing

The Cloud Standards Customer Council's activities include:

Establishing the criteria for open, standards-based cloud computing, driven by customer use cases.

Providing guidance to the multiple cloud standards-defining bodies.

Defining best-practices and producing case studies, use cases, requirements, gap analysis and recommendations for cloud standards.

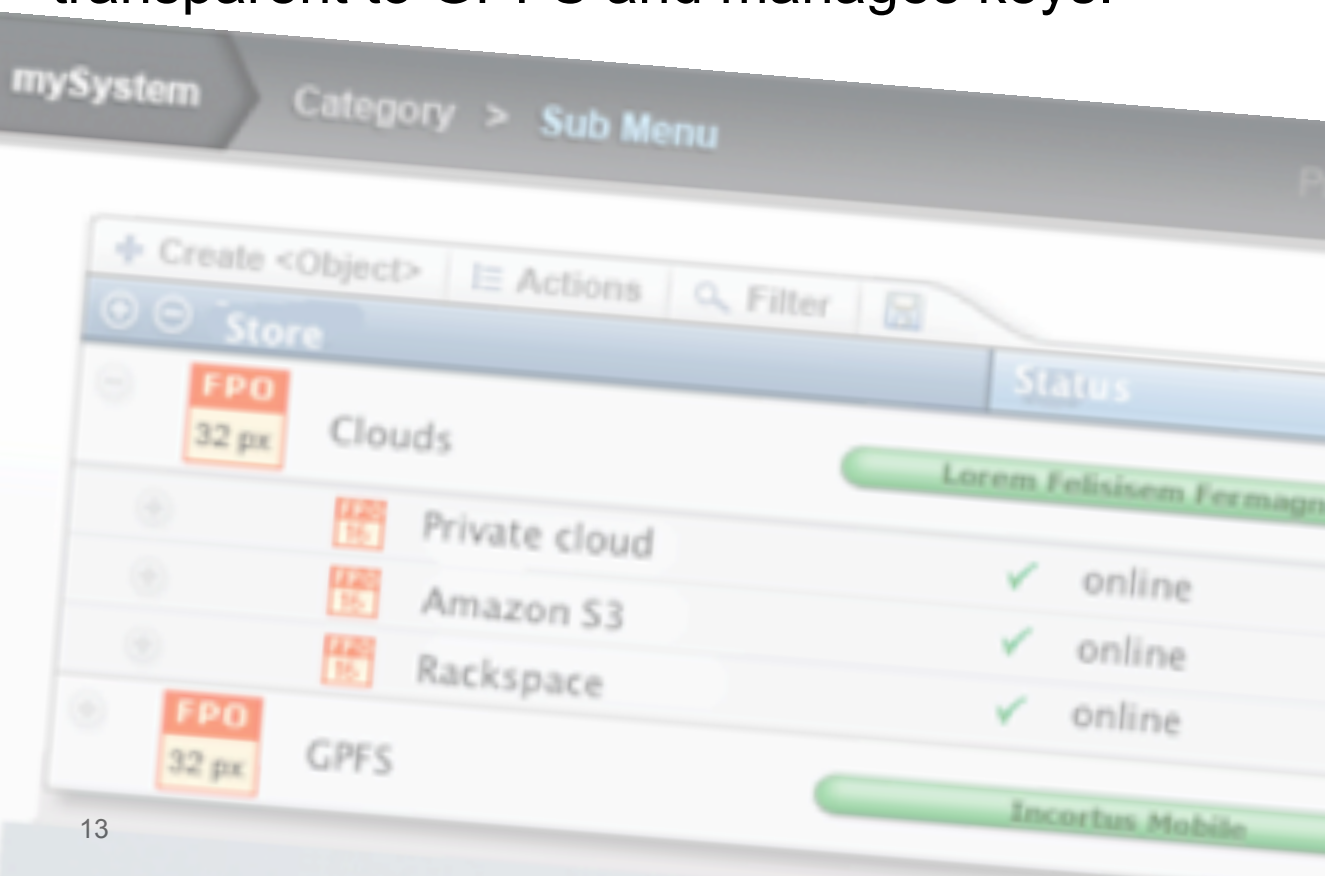
400+ participating companies

50% operate outside the IT realm

Intercloud Storage

Transparent Cloud Storage Gateway

Can be configured to connect to one or more clouds (public, private, or hybrid), adds encryption, integrity, and resiliency, it's transparent to GPFS and manages keys.



Inside IBM's Own Private Cloud



\$25 Million
over 5 years saved with
IBM's analytics cloud



45,000
IBM sellers now access IBM's
analytics cloud daily



70%
More IBMers now use
IBM's analytics cloud
supported by 500
analytics applications

The Power of Cloud:

Transforming healthcare with IBM SmartCloud and Watson



Medical knowledge is growing more quickly than doctors can keep up with

In the U.S. alone, **up to 15%** of medical diagnoses are inaccurate or incomplete.¹

Digitized medicine in North America alone will grow **400% by 2015**

Reaching a total of **14,000 terabytes** of data, or **7,500 times** the data in all U.S. libraries combined.²



Delivering improved care more quickly and confidently than ever before.

Watson, now available via the cloud to a personal computer, tablet or smartphone, allowing more access by more doctors and hospitals.

“...health care pros make accurate treatment decisions only 50% of the time (a shocker to me). Watson, once it is trained in a medical specialty, can make accurate decisions 90% of the time.”

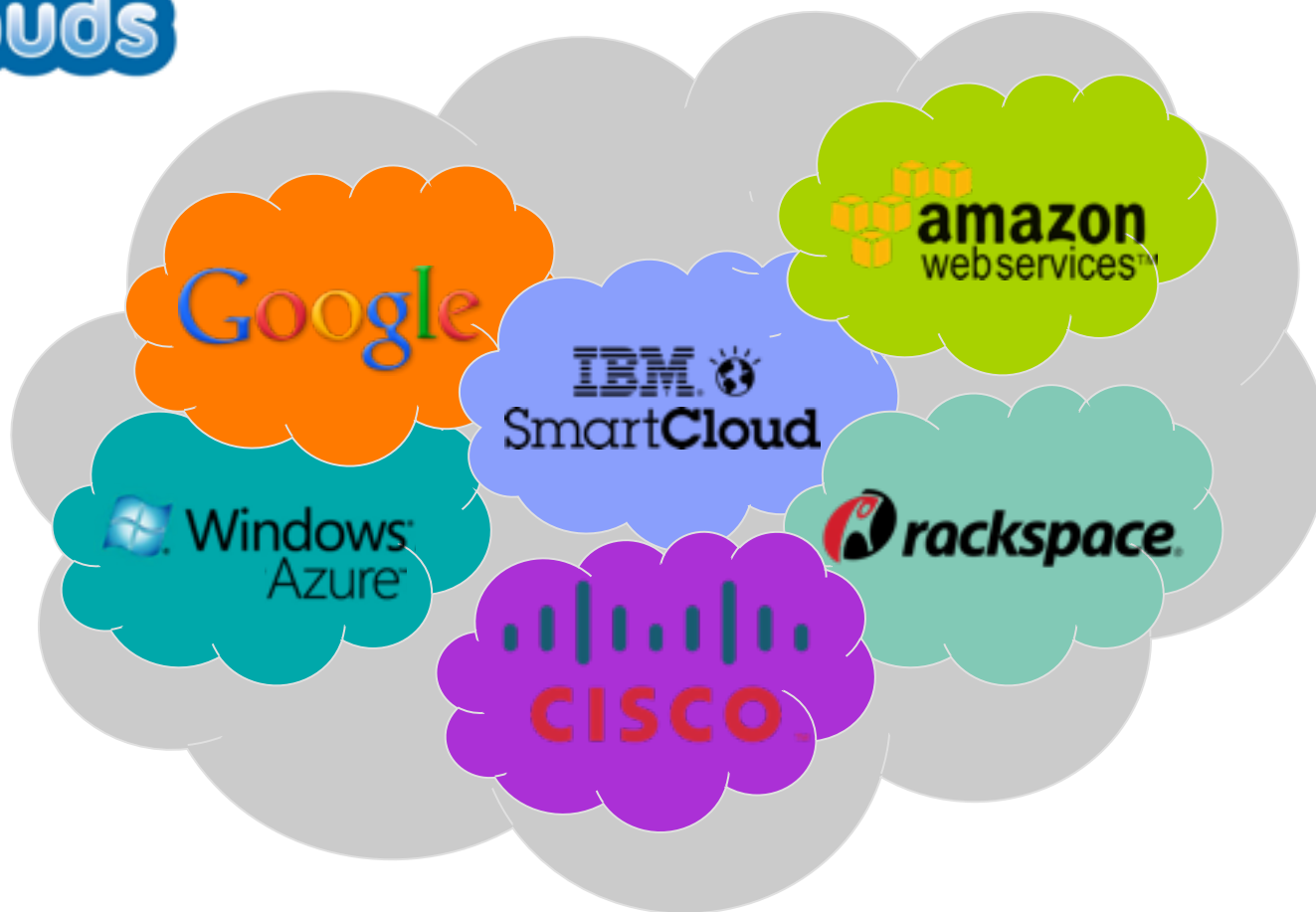
- **Samuel Nussbaum, WellPoint Inc. Chief Medical Officer**

Types of Clouds



Hybrid/Community

TClouds



European consortium to prototype an advanced cloud infrastructure that can deliver a new level of secure, private and resilient computing and storage that is cost-efficient, simple and scalable using an Italian hospital and electricity grid in Portugal.

4 June: IBM to Acquire SoftLayer: Enabling clients to securely mix and match public and private cloud services

SOFTLAYER®



LEGEND: Multiple Data Centers Single Data Center Point of Presence (PoP) Connected by 20 Gbps Network

Popular Clients



Risks of Cloud Computing

Control

Many companies and governments are uncomfortable with the idea of their information located on systems they do not control.

Providers must offer a high degree of security transparency to help put customers at ease.

Data

Migrating workloads to a shared network and compute infrastructure increases the potential for unauthorized exposure.

Authentication and access technologies become increasingly important.

Reliability

High availability will be a key concern. IT departments will worry about a loss of service should outages occur.

Mission critical applications may not run in the cloud without strong availability guarantees.

Compliance

Complying with SOX, HIPAA and other regulations may prohibit the use of clouds for some applications.

Comprehensive auditing capabilities are essential.

Security Management

Even the simplest of tasks may be behind layers of abstraction or performed by someone else.

Providers must supply easy controls to manage security settings for application and runtime environments.



ibm.com/whycloud