

Mission critical cloud computing – the way forward

TechNet Europe

Bratislava, May 26, 2011

For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011

1



Combined strength in wireless and wireline communication

Nokia Siemens Networks

- Net sales in 2010: €12.7 bn
- Years of telecom experience: > 120
- Employees: > 65,000
- Service professionals incl. externals: > 45,000
- CSP customers: > 600
- Supplier to top-100 CSPs: ~ 75
- Countries: > 150
- Connections served: > 2.8 bn

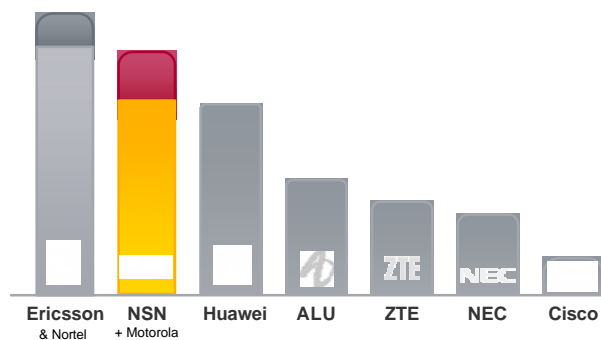
Acquisition of Motorola Solutions' wireless network assets closed on 29th April 2011:
Approximately 6,900 new expert employees

For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011

2

Clear #2 in global wireless market

CY 2010 Wireless infrastructure revenues



Wireless networks revenues include Radio, Core and MWR



Cloud is a new way of delivering computing, storage and application resources on demand

Different cloud types are changing the delivery

- Dynamic load sharing
- Illusion of infinite resources
- Resources available when needed

Process

BPaaS: Business Process as a Service
e.g. HR, accounting

Application

SaaS: Software as a Service
e.g. email, text processing

App Platform

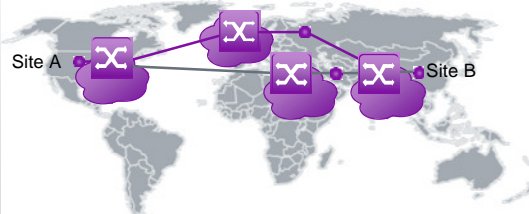
PaaS: Platform as a Service
e.g. Java runtime, databases

Computing

IaaS: Infrastructure as a Service
e.g. servers, data storage

NATO domain example: On-demand connectivity

- Carrier-grade cloud solutions across borders
- Virtualized on-demand network services
- Shared data centers



For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011

Nokia Siemens
Networks

Cloud computing is Internet-based computing, where shared computing, storage and application resources are provided to computers and other devices on demand. Cloud computing changes the traditional way of resource delivery in five ways:

- 1) IT resources are shared on demand basis i.e. resources are not allocated statically to the client. This gives opportunity to dynamic load sharing, any free resource can be given to the client.
- 2) IT resources in the cloud are virtualized. Clients see the virtual resources, not the physical ones. This gives in an illusion of infinite computing resources.
- 3) Physical resources can be shared between several users with the help of virtualization and dynamic allocation.
- 4) Cloud services are provisioned over the internet. With the help of web-based tools or applications users can access the resources as if it were installed locally on their own computer.
- 5) Cloud services (public) are sold with pay-per-use pricing model i.e. the client pays only for using the resources, not about owning them.

Cloud services are here classified into four main categories:

- 1) Infrastructure as a service (IaaS) provides virtualized infrastructure resources such as compute power and electronic storage resources.
- 2) Platform as a Service (PaaS) provides virtualized middleware tools and environments to build and operate cloud applications and services. Examples of PaaS resources are java runtime environment and databases.
- 3) Software as a service (SaaS) provides software resources like text processing, email, CRM etc. applications.
- 4) Business (process) as a Service (BPaaS or BaaS) includes application functionality coupled with physical and human resources required to perform a broader set of business activities. The process delivered is typically a major module of activity in a broader business process (e.g., a call center module, as part of the customer service process), in some cases even the complete business process itself.

Most common way to classify cloud types is the following:

- 1) Public clouds are owned and managed by a separate cloud service provider. The resources in the cloud are accessed by subscription.
- 2) Private clouds owned and managed by the company using it. Access to the resources is limited to company employees and partner network.
- 3) Hybrid cloud is a combination of public and private clouds i.e. part of the resources is bought from external cloud service providers and part is taken from company's own private cloud.

Example implementation use case:

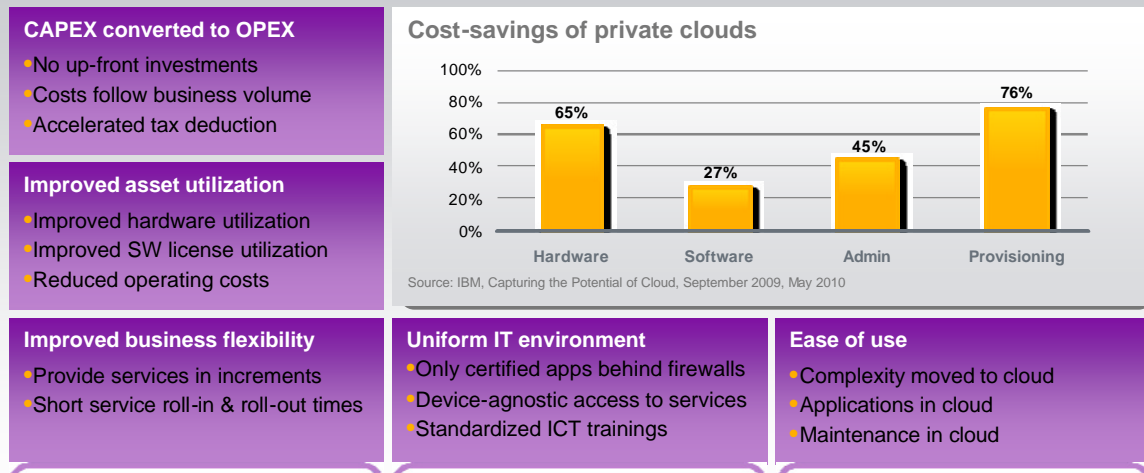
Case: Open capacity trading marketplace

Customer issue: Operators have dimensioned their networks for the estimated usage behavior of their customers. However, the end-customers can be un-predictable and furthermore special occasions can cause issues in quality of experience when the traffic grows above beyond the capacity available.

Our solution: Buy and sell connectivity on-demand

Imagine the next Olympic Games in London; an event that will attract a large number of sports enthusiasts who would prefer to stay up-to-date through an online medium of their choice. Moreover, the local capacity need might also vary drastically from one nation to the other, depending on the sport being broadcast at a particular point in time. Consider a situation wherein an operator could dynamically transfer his spare capacity to an interested counterpart whose country is more inclined towards one particular sporting event, like cricket as an example!. Simplifying the process of trading capacity near real time, would assure a "win-win" situation for both the parties; the operator catering to cricket fans stands to gain the double benefit of incremental revenue as well as delivering a superior customer experience through the enhanced capacity, while his counterpart can also enhance his revenue by offloading spare capacity.

There are several benefits of cloud computing...



For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011



There are several drivers behind cloud computing. Economic recession has emphasized the importance of these drivers and accelerated the adoption of cloud services.

1) CAPEX converted to OPEX. Public cloud clients are buying services instead of owning the resources. On the other hands public cloud services are typically sold in small increments so that client do not need to make up-front investments. This ability is important especially for start-up companies which often have challenges with investment budgets. The other benefit of buying services instead of fixed investments is that costs may follow the business volume small delay. Ability to move CAPEX to OPEX brings also a small financial benefit via accelerated tax reduction: OPEX can be reduced from taxes in the same year whereas CAPEX reductions has to be scattered over several years.

2) Improved asset utilization. Cloud computing technology allows resource sharing and load balancing. This leads to improved hardware and software utilization which in turn reduces operational (administration and provisioning) costs. Shared resources also reduce investment costs per client. For example one globally shared resource unit can be roughly used by three clients in different time zones (8h + 8h +8h = 24h).

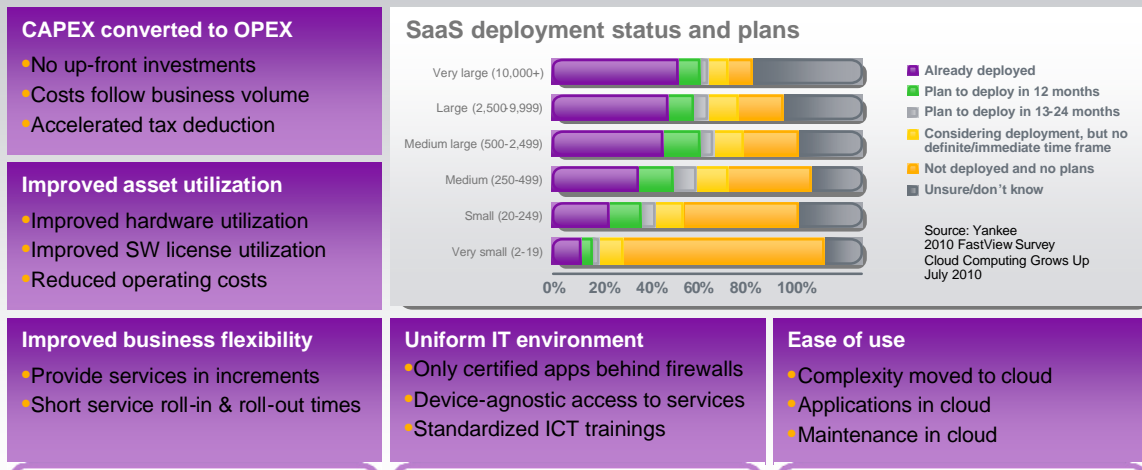
3) Improved business flexibility. Pay-as-you-go pricing model is one of the fundamental cloud services' feature. Pricing model allows clients to buy services in small increments. This allows clients to quickly change services and service amounts according to business circumstances. Service roll-in & service roll-out times are short and traditional slow IT acquisition processes can be bypassed.

4) Uniform IT environment. Cloud computing makes it possible to provide uniform infrastructure and applications regardless of the geographical location. From users' point of view there is exactly the same IT environment everywhere. With the help of web-interfaces the access to the services is basically device agnostic. Uniform IT environment is important especially fro global enterprises.

5) Ease of use. Cloud computing moves the technical complexity from PCs to cloud. Applications will be located inside the cloud, user does not need to worry about application installations and local settings. Also application maintenance tasks like upgrades, fixes etc. can be hidden from the end-user.

The right-side diagram shows IBM estimations from possible cost savings in comparison to traditional IT solutions. (<http://www.ibm.com/ibm/cloud/resources.html>)

... and cloud computing adoption is on the rise



Cloud computing already commands \$60 billion global market, and is growing at a rapid pace. It provides major opportunities for telecommunications service providers (hereafter called operators) to reduce cost; generate new revenues and differentiate in the cloud ecosystem with the network services. Applications business through cloud is estimated to grow from USD 5.79 B to USD 20.72 B between 2009 and 2014. (Gartner: Forecast Public Cloud Services, Worldwide and Regions, 2009-2014).

Enterprises spend money on a variety of cloud services. A major share of cloud revenue comes from Business Processes as a Service (BPaaS), wherein advertisement automation happens to be one of the largest areas. Other typical cloud offers include Software as a Service (SaaS), such as office tools or CRM as well as Infrastructure and Platform Solutions (IaaS/PaaS) providing computing and data storage resources. (Yankee, July 2010 FastView Survey: Cloud Computing Grows Up)

For example Google Apps being used by more than 3 million enterprises in 2010, taking into account both the paying enterprises, as well as those who use Google Apps for free. Another example is salesforce.com, which offers CRM in a Software-as-a-Service (SaaS) model managing customer information for approximately 87.200 customers (Salesforce.com statistic by October 31st 2010).

Moreover, it seems that consumers can't get enough of services such as Facebook, YouTube and Microsoft Live which are based on cloud approaches. The user experience is further heightened by the fact that these do not require any upfront commitment or expenses by the consumer, nor are limited by the device used.

In the Machine-to-Machine area, the connectivity and Smart Object Enablement Services (SOES) provide operators with new revenue sources from adjacent industry verticals, where cloud computing enables risk free experiment of new businesses.

How to ensure efficient provision of secure information and communication services

Challenges of NATO networks

- Secure communication with allied partners
- Increasing cost pressure
- Ensure efficient & reliable cooperation
- Integration in NCSA network concept
- Fast & flexible ICT support of NATO missions

NCSA supports

- Over 200 sites
- Over 100k users
- 10 different security levels
- 6 major operations

Cloud computing offers large economies of scale and reduced redundancy

For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011

NCSA ensures the provision of secure end-to-end information exchange services and information processing services

Supporting:

- Over 200 sites
- Over 100k users
- 10 different security levels
- 6 major operations

Source: 101115_NCSA Introduction_(NSN).ppt -> Lieutenant General Kurt Herrmann, Director NCSA

An industry-based community cloud is a cloud environment that is built for and targeted exclusively to companies in a particular industry. This is currently the most common model and is a major theme in the **government sector**. The greater maturity of government community cloud efforts stems from previous efforts in government to create shared-service environments prior to the emergence of cloud computing. The initial focus for community cloud computing is limiting membership to known and trusted entities (e.g., **defense agencies**) to address common security needs...

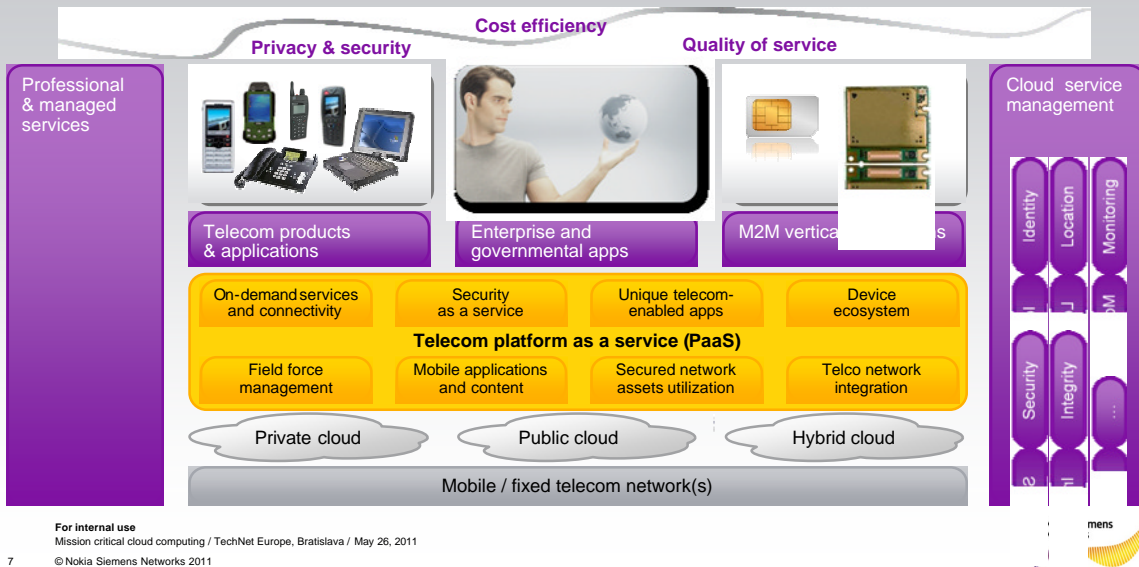
A community cloud service provider may organize in several ways. In the case of government community cloud computing, **an agency is often specifically tasked with providing shared cloud-computing services to other government agencies**. Commercial third parties (e.g., Google, Amazon, Microsoft and HP) will also establish community cloud environments to provide services to community members. In other cases, the members of the community may appoint one or more members, or may **establish a jointly owned entity, to implement, run and manage the community cloud environment**.

The leading **concerns** expressed by those considering the use of public cloud-computing services are **security, privacy and compliance**. These concerns stem from the fact that public cloud-computing services are provided via an open Internet/Web-based model to the general public, and that the workloads and data of all consumers run in a common, shared environment. A community cloud model is one way to begin addressing these concerns, by **limiting access and by focusing the types of services delivered**. Although interest in community cloud computing is growing, its full scope and benefits are not yet well-understood. While there are more-mature examples of government community cloud computing, its use for other communities is embryonic or experimental. We expect substantial growth in the interest and popularity of community cloud computing during the next one to three years.

Business Impact: Community cloud computing offers a blend of public and private cloud benefits and challenges, and is likely to serve as an intermediary stage between private and public cloud computing. Like the public cloud, the cost of the cloud service environment is spread across multiple organizations, allowing economies of scale, higher utilization rates and reduced cost versus a single-enterprise private cloud. In addition, the community cloud offers a more controlled and limited environment where members are known, which reduces risk, versus an open, public cloud-computing environment. In the future, we expect industry-based community clouds to provide not only a common set of shared infrastructure services, but also specialized application, information and business process services of unique value and interest to the target industry. Emergence of community clouds based on a pooling of member resources will also provide the basis for a hybrid private-and-community cloud model.

Source: Hype Cycle for Cloud Computing, 2010_201557.pdf

Nokia Siemens Networks offers dedicated cloud solutions



We provide applications in 4 domains:

Telecom products and applications such as Value Added Service as a Service (VaaS) and Customer Experience Management as a Service.

SME/Enterprise segment where we provide for example Security as a Service and new IVR and voice mail systems for operators to offer to their SME segments.

Consumer applications where we for example enable operators expose telco assets to bridge the developers and operators for enriched end-customer service innovations.

Machine-to-Machine where operators can leverage the platform as a service to enter new adjacent industries. We provide complementary infrastructure and professional services solutions for quality of service assurance.

ASMONIA: Attack analysis and security concepts for mobile network infrastructures, supported by collaborative information exchange

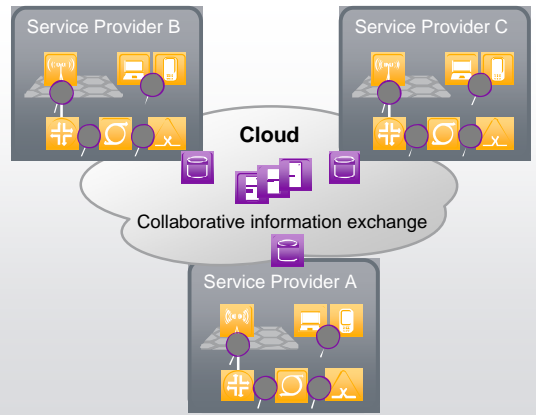
Goals of the research project

- Significantly improve the safety level of ICT networks
- Develop a comprehensive security strategy for mobile network infrastructure and applications
- Extend approaches for early warning and protection
- Integrate solutions for integrity protection and attack detection
- Exploit properties of elastic cloud computing systems
- Enable cooperative information exchange
- Focus on 4G networks (e.g. LTE/SAE) and their backbone infrastructure



Project lead:
Nokia Siemens Networks

Approach



Leading in advanced telecommunications solutions for defense organizations and other governmental departments

Working with the Department of Defense (DoD) towards a new global AS-SIP* standard

1996-2009+

Defense Information Systems Network – Europe (DISN-E, 66 sites, support ongoing)

2009-2011

JITC interoperability testing and certification



Defense Information Systems Agency



Joint Interoperability Test Command

60-year track record of working with over 50 customers, including the governments of



U.S.A.



NATO



Germany



Finland



Sweden



Portugal



Italy



Romania



Turkey



India

For internal use

Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011

9

© Nokia Siemens Networks 2011



The US-led Mil NGN program sets a new global standard for military voice and data communications within a flatter, more integrated IP network environment.

The US Department of Defense sponsorship system enables cooperation such as the detailed consultancy and development work on the US Government VoIP Studies project (2003-2007) that fostered the official technical specifications for the current Mil NGN infrastructure modernization program.

Our dedicated Mil NGN R&D unit has since been developing customized systems that measure up to these specifications, with a view to meeting JITC's stated testing and certification deadline in late 2010.

Nokia Siemens Networks is a **leading global provider** of telecommunication and data equipment for public customers. We

- Deliver **turnkey solutions** to governmental authorities
- Offer a unique E2E product range comprising wireline, wireless, and Ethernet technologies
- Have successfully supported and cooperated with military forces worldwide for over **60 years**
- Have customer teams (CT) in place around the globe
- Run lab infrastructure devoted to supporting and maintaining governmental networks around the clock
- Employ **cleared personnel** at all levels

Serving over 50 customers in this sector, we have delivered a wide range of full-fledged turnkey solutions using both in-house and third-party technology, as well as our market-leading Managed Services organization.

Thank you

Pedro Schmid

**Head of Business Development, Government
Europe**



For internal use
Mission critical cloud computing / TechNet Europe, Bratislava / May 26, 2011
© Nokia Siemens Networks 2011

10

