CLOUD COMPUTING

31 companies
describe their experiences

ROI

Challenges

CLOUD COMPUTING

Objectives

Organization

Applications

List of the contributors:

Contents

ipanema Technologies

The cloud can seem magic: with the IT system online, a simple internet connection is enough to access applications that are just waiting, ready to help company productivity. However, the major crash experienced by Amazon in April 2011 brings us back to reality by demonstrating that, as with any IT project, availability, security and performance all depend on setting up the right architecture. Cloud or not, companies must always choose the architecture based on their needs, limitations and budgets. As core elements of a cloud, the network and underlying architecture determine the quality delivered to users and applications. Far from becoming a commodity, the network is actually becoming richer, having to guarantee the performance of cloud applications through to the workstation, and ensure that applications in the cloud co-exist harmoniously with those that are, and will remain in, the company's data centers. Ipanema's mission is to make sure the network is at work for company productivity and to support the transition to the cloud.

Ipanema Technologies
Jean-Yves Leclerc
Chief Executive Officer

orange Business Services

At Orange Business Services we are convinced that cloud computing, if the security and performance needed by companies are guaranteed, can bring undeniable benefits to SMEs and multinational companies alike, whether by simplifying application management and access, increasing flexibility or even aligning costs with actual consumption, which has not been possible in IT until now. We are developing a comprehensive offering of IaaS and SaaS products and services. To better meet our customers' needs, it is crucial that we always fully understand both their needs and their concerns. This white paper builds on the real-life experiences of companies that already use clouds to provide new understanding. We can even take the recommendations for transitioning to the cloud and apply them to our own clients.

Orange Business Services
Nicolas Roy
Vice-President, Network Solutions Business Unit

5

Discover the cloud computing experiences of 31 members of the EBG (Electronic Business Group): their projects, benefits and key factors for success. Be inspired to take the leap!

Contact:
Eric Vibert
E-business director

Eric Vibert is the e-Business director for Akerys. He manages a team of three people, including one e-Business project leader and two webmasters. The e-Business group is part of the company's sales department, which supports its commercial networks. Its activities are organized around developing the web channel as a source of new contacts (multi-channel - e-contacts) and developing, deploying and maintaining web sites and services for the group. Eric has been at Akerys since September 2007, and was previously responsible for deploying comprehensive front-office tools on Système U's check-out systems. For the ten years leading up to 2005, he was a project leader in the Europe Retail Information Systems division of Toshiba.

Type of company
Mid-sized company

Description
A leader in rental investments and the new homes market, Akerys was formed in 2005 when 4M, ACTIF+ and IFB were combined to form one company. The company's strategy is based on integrating four complementary activities to provide a complete range of value-added products and services to its 110,000 clients:
- Marketing new homes
- Insurance brokering, credit and financial products
- Real estate development
- Real estate services

Akerys has 2,140 employees and works with 575 independent business partners. With a nationwide presence in France, Akerys is divided into 8 regional units.

The cloud project
❚ Launch labo-immo.org, a website for indexing and analyzing real estate listings

Main benefits
❚ Can process a large volume of real estate listings without significant infrastructure expenses
❚ Guarantee 24/7 service availability

Important lessons learned
❚ Importance of the preparation phase: more than one year of testing before going live
❚ The actual use of a cloud initiative may differ from what was originally planned (e.g. used more by internal company employees than by internet users)

Contact:
Thierry Picon
Chief Information Officer

Thierry Picon, 42 years old, graduated from the Université de Technologie de Compiègne in 1991 with a specialization in computer science. He began working with Jouve in 1992 as a project leader and has carried out numerous IT storage and retrieval assignments in France and abroad.

In 1997 he joined Encyclopedia Universalis, supporting the publisher as it moved from paper to digital editions. He went on to become the technical director for online games at Vivendi Universal, and then technical director at Editis (publishing group that includes houses such as Nathan, Bordas, Robert Laffont and First). He has been the CIO at Arvato Services France since 2008.

Type of company
Subsidiary of an international services company

Description

With 60,000 employees around the world, Arvato is a division of Bertelsmann, Europe's leading media and services company.

In addition to copying digital media (CDs/DVDs) and providing printing and IT services, Arvato is the leader in France in outsourced CRM services and provides the first offering integrating expertise in direct marketing, contact centers, logistics and services marketing.

With 10,000 employees in France, a market that represents €361 million in sales for the group, Arvato works with the largest companies in various industries, including telecommunications, energy and media.

The cloud project
❚ Virtualized servers
❚ Virtualize workstations

Main benefits
❚ Increased flexibility in a field where responsiveness is critical
❚ Elasticity
❚ Flexibility in organization of work
❚ Easier maintenance
❚ Work from anywhere, for any type of client, from any terminal

Important lessons learned
❚ Companies distrust cloud computing for sensitive data, but that will change
❚ Less serious players will be eliminated from the market
❚ The brakes on hybrid clouds will be lifted
❚ The future: on-the-fly migration of live environments

Contact:
Thomas Sarlandie
Co-founder, VP Software

Thomas Sarlandie is the co-founder of and a technical director at Backelite, the leading agency in mobile application development and ergonomics. He was one of the pioneers in iPhone development in France and, with his team, produced dozens of iPhone applications, including "le monde.fr". In 2008 his book on programming for iPhone OS3 was published by Eyrolles. Since 2010 he has dedicated his time to developing BkRender, Backelite's multi-platform development solution.

Type of company
High-growth SME

Description
Backelite was created in 2006, and specializes in developing services for mobiles, in particular applications for mobile devices (iPhone, Android, Windows Phone 7). The applications are designed for the screens on which they are viewed after users have downloaded and installed them.

Backelite develops the services with consultants, produces them with a team of designers, graphic artists and developers, then puts them online and hosts them for its clients.

In 2010 Backelite launched a software initiative to provide its clients with tools that would allow them to develop mobile services themselves.

Backelite has 65 employees and expects to grow another 50% in 2011, maintaining the same growth rate it has had since 2006.

The cloud project
❚ Host Backelite's flagship product, BkRender, on a cloud infrastructure to meet the needs of a fast-growing client base.

Main benefits
❚ Can start with low capacity then double that capacity on-demand as needed
❚ Costs that are based strictly on use and perfectly in-line with revenue
❚ Reduced financial risk because hosting is completely outsourced
❚ Offerings proposed by cloud service providers are mature and industrialized, and more competitive than handling it internally
❚ Can have servers located as close as possible to where the final client needs them, regardless of where the company is located

Important lessons learned
❚ Accelerated migration to the cloud: only needed one and a half months
❚ The trickiest aspect of migrating a traditional solution to the cloud is adapting it functionally, not technically
❚ Moving to the cloud does not necessarily require "cloud" experts, but it does call for senior IT specialists
❚ Being "locked in" to a cloud service provider is not really a problem as long as the provider is robust and the service is good

Contact:
Emmanuel Zimmer
Manager, SAP Competence Center

Emmanuel Zimmer currently manages the SAP Competence Center in Bel's IT department. This Competence Center is responsible for support, upgrade and corrective maintenance and projects on the group's SAP platform (Finance, Production, Purchasing, Sales, Supply Chain).

After starting out in micro-computing and then internal application development, he took on a project deploying the group's HR IS on SAP; some of the system's complementary modules were SaaS tools. He also managed a team in charge of the group's internet projects (new websites, technology watch) for one year.

Type of company
International food company

Description
Bel is a food company known primarily for its single-serving cheese brands (e.g. The Laughing Cow, Apericube, Mini Babybel). Bel has been a family owned company since it was first created in the 19th century by a cheese maker from Jura.

The group now does sales of nearly €2 billion and employs 12,000 people around the world. It has commercial subsidiaries in nearly every country in Europe, while its production facilities are concentrated in France, Poland, Spain, Portugal and the Czech Republic. Outside of Europe, the company also has industrial and commercial subsidiaries in Morocco and Algeria, and production sites in Egypt, Syria, Turkey, Iran and the United States.

The cloud project
❚ Manage HR and email system using a SaaS model
❚ Replace the data center with an outsourced private cloud

Main benefits
❚ Savings: hardware, licenses, training, maintenance

Important lessons learned
❚ It is difficult to estimate how much bandwidth will be needed
❚ Migrating to SaaS one scope at a time: training, people review then annual evaluations
❚ Cloud not ready for financial applications or real-time operations
❚ Reversibility: data is one thing, business logic is another
❚ The new role of the IT department: manage cloud services contracts
❚ One challenge: managing the relationship with publishers
❚ Users need to be more mature

Contact:
Jean-Christophe Lasvergnas
CIO

Jean-Christophe Lasvergnas is currently in charge of globally harmonizing Capgemini's system landscape. Previously, he spent four years as Chief Information Officer at Capgemini France after holding the same position for eight years at DDB France. He graduated from the École Polytechnique et Télécom Paris Tech, and began his career as a consultant with Accenture (formerly Andersen Consulting) and PricewaterhouseCoopers.

Type of company

Large international services company

Description

Capgemini has over 105,000 employees around the world, including more than 20,000 in France. Its offshore team is fairly large as well, totaling about 32,000 people in India, Poland, Morocco and Argentina. Capgemini was first created in Grenoble a little over 40 years ago.

It is now organized into 5 major areas of business:
- Consulting (strategy, organization and information systems)
- Technology services (e.g. system integration, ERP deployment)
- Outsourcing
- Local professional services (Sogeti): daily support for our clients' IT services
- Business process outsourcing. In this case we take on entire processes for companies, such as financing and accounting or procurement operations.

The cloud project
- Set up a private cloud (IaaS) for project teams
- Virtualize workstations for offshore developers

Main benefits
- Elasticity

Important lessons learned
- One technical challenge: migrating an existing system to a cloud architecture
- One psychological challenge: employee attachment to physical machines
- The more projects move to the cloud, the more costs decrease (pooling)
- Clients had reservations about security, which we had to overcome
- QoS and DoS are more critical with clouds: if a cloud crashes, dozens of projects will be disrupted
- The cloud is not suited for projects that require resources literally all the time

Contact:
Julien Coulon
CEO

Julien Coulon first entered the internet world in 1992 at France Telecom's hosting division, before moving on in 1996 to focus on strategic analysis for France Telecom New York. Two years later he returned to France and began managing France 98's internet and Minitel activities, then went on to develop the company's hosting service. In 2000 he contributed to the creation of Langages Virtuels, a web-conferencing start-up that was later bought by Genesys Conferencing. He joined Akamai in 2002, where he launched the e-commerce, media, telecom and social networking activities and successfully positioned the company as the indisputable leader in content delivery and application acceleration on the French market.
In mid-2009 he created Cedexis, "The Net Controllers", a community monitoring solution that can be paired with a fully-configurable real-time proprietary traffic management service. Cedexis reduces the display time, optimizes costs and improves SEO, and therefore sales, for content providers on all IP media.

Type of company

Start-up based in France and the United States

Description

Cedexis is to internet traffic what air traffic controllers are to air traffic.

Cedexis offers a cloud-computing service infrastructure to improve performance of IP applications and content (e.g. web, mobile).

As the sole community monitoring service, Cedexis collects 1 billion measures every day from real users over 32,000 networks around the world. These measures test, in real-time, the performance, throughput and availability of hosting service providers, CDNs and cloud computing platforms.

With its fully-configurable real-time proprietary traffic controlling service, Cedexis reduces the display time, optimizes costs and improves SEO, and therefore sales, for content providers on all IP media.

The cloud project
❚ Build the company on a cloud right from the start: SaaS, IaaS, PaaS and appliances

Main benefits
❚ Start-ups can get off the ground without substantial capital assets
❚ Usage-based billing significantly reduces operational costs and makes it possible to break even in a shorter amount of time
❚ PaaS facilitates telework in that developers do not have to be physically near the staging servers
❚ Immediate and unconstrained scalability
❚ Reliability due to automatic redundancy

Important lessons learned
❚ Cedexis is a pure cloud player: a start-up whose architecture is 100% cloud-based
❚ This organization has allowed the company to grow with employees located around the world and carrying out their work remotely (telework) using collaborative tools

Contact:
Thierry Martin
IT System Manager

Thierry Martin began his career as an independent consultant specialized in deployment of ERP solutions. He then joined ISTA, a services company, where he remained for nine years as project leader for network/security and collaborative IT. In 1999, he began working with Ceva Santé Animale, where he started as production manager then became system manager. In his current role, he is in charge of the entire company's infrastructure, and successfully completed a number of large projects including deploying a VPN internationally, outsourcing the JD Edwards ERP solution and, of particular importance, migrating Lotus Notes to the Google Apps suite.

Type of company
Multinational

Description
Ceva is the ninth largest animal health group in the world. In both of its fields of expertise, pharmaceutical products and biology, it is dedicated to reconciling animal health with human health and well-being. Its development strategy takes into account the three main branches of the veterinary sector, "poultry," "livestock" and "pets," focusing on: behavior, cardiology and locomotion, and pain in the pets branch; reproduction, injectable anti-infectious drugs and biology in the livestock branch; and biology and oral anti-infectious drugs in the poultry branch.

Ceva is present in 37 countries, with 7 sales offices, 9 research and development centers, 12 factories and about 2,600 employees worldwide, with sales of €460 million.

Its operational activities are based on research and development, manufacturing, sales and marketing, and administration.

The cloud project

❚ Switch from Lotus to Google Apps with migration of email, contacts and the calendar, and deployment of Google Talk

❚ Move to SaaS applications

❚ Each national subsidiary's CRM, using Intuit's Quickbase solution

❚ Customs management, using Sage Elite

❚ IT helpdesk, using EasyVista

Main benefits

❚ Increased teamwork

❚ Reduced maintenance costs

❚ Team efficiency from working together on documents

Important lessons learned

❚ Need to pay attention to new functionalities regularly added by Google

❚ Importance of reversibility

❚ Importance of security

Contact:
Julien Leroy
CIO

Julien Leroy has been the CIO at DDB France since 2007. At 36 years old, this ESIEA engineering graduate started as operations manager before taking on the role of technical director. His qualifications were further complemented with functional and organizational experience on projects driven by operational performance, financial efficiency and strategic objectives.

Type of company

French subsidiary of an international communication company

Description

DDB is one of the best-known communication and advertising agencies. Its ability to support clients through their business opportunities and challenges with high expectations for creativity and respect for consumers set it apart (Bouygues Télécom, Mini, Lipton, Voyages-sncf.com, Greenpeace)

The group has around 10,000 employees throughout the world, including 1,600 in France. It is part of the Omnicom Group, the 2nd largest company in its field to be listed on the NYSE. DDB France is headquartered in Paris, and has 10 sites around the country (e.g. Lyon, Lille, Nantes, Annecy).

The cloud project
❚ Migrate email from Lotus to Google Apps

Main benefits
❚ Quick deployment
❚ Contract term of only one year
❚ Easily reversible

Important lessons learned
❚ Support through change is key, even for a simple application like email, because it is crucial to daily professional life
❚ Moving to SaaS is like going from "customized" to "mass market"
❚ The CIO's role in the cloud era: provide business units with systems that meet their needs
❚ Workstation virtualization: of limited benefit for graphic disciplines
❚ Importance of establishing detailed contracts, especially for reversibility

Contact:
Benjamin Six
Director of research and innovation

Benjamin Six is the head of research and innovation at ESSEC Business School. An engineering graduate from EISTI, he helped set up portal solutions and solutions for working in teams for all of ESSEC's communities. Since 2009 he has been in charge of research and development, and leads educational and technological innovation projects.

Type of company

International-level educational institute

Background

MyESSEC is an online service for ESSEC students, faculty, alumni and administrative personnel. It was launched in August 2005 and now has 65,000 users. It was originally built on traditional architecture, meaning they used their own servers, software solutions available on the market and solutions developed in-house.

The cloud project
❚ Migrate community services (MyESSEC) to SaaS (Google)

Main benefits
❚ Services accessible anywhere, anytime and on any device, with the same QoS
❚ Success can be measured over time rather than having to develop a theoretical ROI

Important lessons learned
❚ It is a revolution similar to the arrival of office tools, empowering users
❚ Very high rate of adoption
❚ ESSEC is pursuing a community cloud initiative to not become dependent on a single vendor
❚ Strategic data do not have to go in the cloud or any other architecture that is not fully mature

The CIO's role: support a migration that will happen one way or another

Contact:
Pascal Charles
IT support manager

Pascal Charles has managed IT support for the international news station Euronews since 2009. Before that he was the CIO (2006-2008) and network and systems manager (1999-2006) for Matussière et Forest.

Type of company
International SME

Description
Euronews is a televised news station broadcast in 10 languages. It was founded in 1993, and is now available to 300 million homes in more than 150 countries. With 6.5 million viewers daily, it is the leading news station in Europe.

The cloud project
❚ SaaS: email and expense sheet management

Main benefits
❚ Email: costs reduced by 50% compared to an on-premise solution
❚ Email: storage volume much larger

Important lessons learned
❚ Difficult to find useful information for becoming proficient with the new solutions
❚ Service provider response times a bit slow

Out of the question to store HD videos (cost of storage and technical limitation of bandwidth)

Contact:
Florimond du Reau
Network and systems manager

Florimond du Reau has been the network and systems manager in GenerixGroup's SaaS department since 2008. Prior to taking on this position he was IT manager at Influe from 2003-2007. He created the "hosting" department to meet growing client demand for services instead of licenses.

Type of company
Large SME in software publishing (ERP)

Description
Generix specializes in publishing software, especially ERP applications. The group is the product of a multi-company merger. One of these companies, Influe, already offered SaaS ("hosting" or "ASP" at the time) solutions.

Generix is gradually offering fewer and fewer licensed software solutions and an increasing number of SaaS applications.

The cloud project
❚ Make ERP solutions available as SaaS
❚ Virtualize all internal infrastructures

Main benefits
❚ Can change hardware without interrupting service (virtualization)
❚ Flexibility
❚ Fast, secure deployment of new services and version upgrades
❚ Easy to set up BRPs

Important lessons learned
❚ Cloud = technology that makes it possible to automatically deploy and increase capacity on demand
❚ Generix retains ownership of the virtualized and outsourced physical infrastructures
❚ Plan for changes as needed to correctly size physical infrastructures
❚ Advantages and dangers of multiplying environments

Contact:
Jean-François Gaudy,
Microsoft Group Director
GFI Informatique

As the Microsoft Group Director at GFI Informatique, Jean-François Gaudy supports clients through projects involving deployment and integration of Microsoft solutions. He was the driving force behind the deployment of BPOS and collaborative IT at GFI in 2010. With more than 20 years of experience in IT, including seven at the head of his own computer services company, Jean-François was the Microsoft Alliance Manager at Logica before joining GFI Informatique in 2010 to manage the group's Microsoft activities. He has a masters in computer science from the Université Paris 13.

Type of company
Large services company

Description

GFI is a major player in the value-added services and software markets in southern Europe, and has grown considerably in recent years by building on its expertise and know-how in five areas: Consulting, Applications Services, Enterprise Solutions, Infrastructures Services and Software. In 2009 the company generated €663.9 million in sales with a team of more than 9,000 employees. It is present throughout France, with over 40 branches organized around three large regions. Internationally, GFI has subsidiaries in Belgium, Luxembourg, Switzerland, Spain, Portugal, Morocco and Canada.

The cloud project
❚ Migrate all French employees to a SaaS solution (email, office tools, teamwork)

Main benefits
❚ Savings
❚ Flexibility
❚ Better service guarantee
❚ Upgradability

Important lessons learned
❚ Divide the operation into two separate projects, each with its own goals: one design and deployment project, and one change management project
❚ Get top management to back the initiative
❚ Importance of documentation and training
❚ Segmenting users is crucial
❚ Anticipate key questions: How to segment users? What functionalities to implement? Which business model to use?

Contact:
Fabrice Benaut
IFR Global CIO

With over 25 years of experience in Marketing Research, Fabrice Benaut took on the role of CIO at IFR in January 2011 after heading the development and information systems department at GfK RT for 15 years (e.g. Data In, Production, Reporting Solutions, BI, IT, HRIS, CRM, Systems, Projects, International Group). He is efficient and innovative, creating relevant, high-performance solutions for his clients (2 awards from Informatica and SAP Business Objects), contributing to numerous works and papers (articles, CIO works), leading conferences on complex topics such as data integration and data quality (London, Las Vegas, Geneva, Paris) and participating in various active networks for CIOs and researchers or focused on business and marketing.

Type of company
International services company

Description
GfK is the world's leading market research institute. The company, which is made up of some 10,000 employees across 120 countries, is divided into three main business units. The two main branches are Custom Research, which is responsible for qualitative and quantitative research, and Media, which is similar to Médiamétrie but on a global scale. The third branch is GfK Retail and Technology, which provides information services on marketing, logistics and sales to industrial players and retail companies across the world. It focuses on technology-based products.

The cloud project
❚ Set up a private cloud for:
  - employee access to business applications on the intranet
  - client access to deliverables over the extranet

Main benefits
❚ Redundancy
❚ 24/7 availability

Important lessons learned
❚ The cloud constitutes a return to consolidating resources, with two innovations: virtualization and pooling
❚ Modern software designs based on modules that can be enabled or disabled is appropriate for clouds
❚ Private clouds are better for any company whose value relies on the quality and confidentiality of data

Contact:
Jean-Yves Leclere
Infrastructure & services manager

After completing his engineering degree, Jean-Yves Leclere joined IBM as a neural network specialist. In charge of multiple projects on artificial vision and neural networks at IBM's robotics center, he then spent two years at IBM Poughkeepsie, in New York, as the technical liaison between IBM France's and IBM USA's technological production lines. In 1998 he arrived at IBM's European benchmark center in Montpellier, and in 2003 began his management career at the head of the High Performance Computing benchmark center. He has been managing the cloud services delivery, services and infrastructure departments at IBM Montpellier's technical center since January 2010.

Type of company

Large international industry and services company

Description

The Product & Solutions Support Center in Montpellier provides technical pre-sales support for Europe and on a case-by-case basis for America and Asia. Its teams provide:
- Upstream consulting: dedicated workshops on client sites, recommendations and technical briefings
- Benchmark services: functional and performance testing to validate solutions for clients using technical means and client data in near-real situations

Two data centers covering 2,000m² with 3,500 servers and network and storage infrastructures are used for these projects.

The cloud project
❚ Virtualize the data center, automate the set-up of environments, apply to IBM's training activities

Main benefits
❚ All machines used for production instead of only 50% previously
❚ Costs reduced by 40% while services increased by 30%
❚ Better vision of cost breakdown (management audits)

Important lessons learned
❚ Key success factor: using standard products available on the market (Tivoli)
❚ Teams improved their knowledge
❚ Need to be stricter in the processes, especially for reserving services

Contact:
Denis Caromel
Scientific Leader of the OASIS Team

Denis Caromel is a full professor at the Université de Nice-Sophia Antipolis and CNRS-INRIA. He is also the founder of and scientific advisor at ActiveEon. He specializes in distributed, parallel and cloud computing.

He has presented at numerous conferences on object-oriented, parallel and distributed computing around the world (Jet Propulsion Laboratory, Berkeley, Stanford, ISI, USC, Tsukuba Electrotechnical Laboratory, Sydney, Oracle-BEA EMEA, Digital System Research Center in Palo Alto, NASA Langley, IBM Tom Watson and Zurich). He was also invited to talk at many major conferences (e.g. MDM, CCGrid) and at the 2010 World Expo in Shanghai.

Type of company

Start-up (ActiveEon) supported by a research group (INRIA)

Description

ActiveEon co-developed the open source solution Proactive Parallel Suite in collaboration with INRIA.

This application is used to manage grid and cloud platforms on three levels:
- Resource management
- Scheduling
- Parallel programming

It is currently used for private clouds but can leverage public resources (e.g. Amazon) on demand to create a hybrid cloud.

ActiveEon, founded in 2007, offers support and services for the Proactive Parallel Suite.

Services available include program installation and configuration, as well as cloud sizing.

The cloud project
▌Develop a cloud and grid administration application: resource management, scheduling and parallel programming

Main benefits
▌The cloud resolves the problem of managing resources in distributed computing

Important lessons learned
▌Virtualization and multi-core processors are key to the success of cloud computing
▌Most clouds today: private or hybrid

Cloud computing can be compared to the industrial revolution: new concept + new technology + new socioeconomic context

Contact:
Brian Mcgeough
IT Engineering Manager

Brian Mcgeough lives in Ireland, where he is in charge of manageability engineering and developments for Intel's cloud services. He also plays a leadership role in managing Intel's global IS governance, standards and methods.

He joined Intel in 1994 and has held a number of positions dealing with data processing infrastructures. He previously managed IT systems for General Electric at their Aerospace site in East Windsor, New Jersey, USA.

Type of company
Industrial multinational

Description
Intel is a global provider of IT products and services. In particular, it is the world's leading producer of semi-conductors. Established in 1968, it employs 83,000 people around the world and generated sales of $43 billion in 2010.

The cloud project
❚ Private cloud to optimize the use of servers already virtualized for collaborative tools and office applications (80,000 users)

Main benefits
❚ Time required to allocate a resource to a user has gone from 3 weeks to 3 hours
❚ Electricity consumption reduced by 90%
❚ Saved $50 million in 2010
❚ Can absorb operational growth without investing in additional hardware

Important lessons learned
❚ Challenge: improving efficiency (server utilization ratio) and security at the same time
❚ The same teams cannot manage both physical and hardware infrastructures at the same time (workload is too heavy)

Public and hybrid clouds possible for non-critical applications

Contact:
Sébastien Monteil
Chief Technology Officer

After graduating from the École pour l'Informatique et les Technologies Avancées (EPITA), Sébastien Monteil launched his career in the R&D division of one of the leading French software publishers. He soon joined the expertise department of a consulting firm as an information systems architect and expert in application lifecycles. Early in 2010 he came on board as CTO at Kobojo, a start-up publisher of games for social networks.

Type of company
Start-up

Description
Kobojo, founded in 2008, is specialized in publishing and operating short video games (less than five minutes, casual gaming). With more than 1.5 million players, these games are available through social networks such as Facebook and Tchatche and are designed to be highly social, promoting exchanges between users.

The traditional business model, in which over 90% of financing comes from advertising, is gradually changing to a mixed micro-transactions/advertising model with a parallel mobile application development business.

The cloud project
"At first we weren't using a cloud architecture at all. When we started to get our name out there and bring enough traffic to our games we purchased 'traditional' hardware in data centers, namely OVH. Our flagship game, Goobox, for example, is currently run from the infrastructure in a classic data center.

Then we started to develop a tracking tool that we put on a cloud provided by Amazon. This tool measures user behavior on the gaming platform. Data collected include the average score in a game, whether scores are published on Facebook walls and potential bugs.

With 1.5 million users, the number of requests involved in one gaming session is enormous, and we end up with about 50-60 million tracking items per day. As a result we had to scale our resources very quickly to support the increasing load.

With new machines costing at least €2,000, without counting the installation costs, bandwidth costs, etc., we needed a different solution.

The second step in migrating to the cloud was installing the game Robotz on Microsoft's Azure cloud.

Any game added to Facebook has the potential to be a total flop or a huge success. The first few days of operation are all it takes to know. If you can't scale your resources quickly in the first two or three days it is all over: if the game doesn't respond, users will not come back.

For Robotz, we were counting on it being very successful and a high number of users appearing in a rush. But how many? And in how long? The only solution we had to support the predicted load without ordering new hardware - which always takes time to arrive - was to go with a cloud."

Main benefits
❚ Can test a game to determine its degree of success and locally size the future architecture
❚ Redundancy
❚ Elasticity

Important lessons learned
❚ Clouds are poorly suited to storing voluminous databases
❚ Kobojo is using the cloud as a temporary solution while evaluating the success of a game, before insourcing it to a local site
❚ Difficult to predict costs... Learning to optimize them is crucial
❚ Inter-cloud communication works well
❚ The future: hybrid clouds

41

Contact:
Jean-Luc Raffaëlli
Project Director

Jean-Luc Raffaëlli is a project director in La Poste's IT department, specifically in the IS efficiency and governance division headed by Chabane Debiche. He worked with the different disciplines to define the group's open source policy, and has been a spokesperson for the open source and cloud computing strategy for three years, in particular during CIGREF work sessions.

An expert in urban planning, Jean-Luc is currently describing the different IS versions of the group business strategy. He is working on developing a transversal movement towards using open source software and applying IS governance (e.g. data and MDM, cloud, business supervision) in the different entities.

Type of company
Services group

Description
La Poste is the second largest postal operator in Europe. Its postal service has 17,000 points of sale throughout France. It also provides banking services to nearly 12 million clients. It has 287,000 employees.

The cloud project
- Migrate CRM to SaaS (SalesForce)

Main benefits
- Elasticity
- Transparent provision of software upgrades

Important lessons learned
- Administrative tools limited
- Elasticity works better when it comes to increasing capacity, for contractual reasons
- Data can be insourced but what about process intelligence?
- The key IT qualification to have in the future will be the ability to understand functional challenges

Contact:
Joannès Vermorel
Founder

With a passion for cloud computing and statistical learning, Joannès Vermorel, a former student at the École Normale Supérieure de Paris, began his career with two internships in data mining, one at Polytechnic University in Brooklyn and the other at AT&T Labs in New Jersey. Upon returning to France, he began his doctorate in biocomputing interrupted in 2006 when he created Lokad. Joannès currently heads Lokad as its main shareholder. A member of the "Corps des Mines" (N.B. elite alumni network of the Ecole des Mines), he also teaches software engineering at the École Normale Supérieure de Paris. He was born in France in 1981.

Type of company
SME (sales forecasting)

Description
Lokad is a company of 10 people that provides sales forecasting services. Organizations send data on their past sales to Lokad, and Lokad sends back projections. It distinguishes itself from competitors by providing actual figures instead of simple forecasting tools or models. Lokad is also able to act on a large scale thanks to cloud computing, which enables it to deliver millions of forecasts within tight deadlines. It has completely redesigned its architecture around cloud computing.

The cloud project
❚ The company initially launched its offering using grid architecture before moving to a cloud.

Main benefits
❚ Considerable processing capacity at a lower cost
❚ Software layer and underlying physical infrastructure decoupled

Important lessons learned
❚ The company simply could not offer its service if the cloud didn't exist
❚ The grid never got going due to a lack of dynamic resource allocation and tools to help the administrator
❚ Developing on the cloud is more complicated than on a traditional client-server infrastructure, and requires experienced developers
❚ Interoperability is more important than reversibility

Contact:
Jean-Michel Mougeolle
Director of IT and Software Development

Jean-Michel Mougeolle started in development with Business Objects, with the task of developing for others and sharing the development. After working for various start-ups, he decided to enhance his profile in 2007 by joining Meilleurtaux. Since then, this ESIEA (1992) alumnus has been playing not only with Meilleurtaux's websites, but also everything related to the company's infrastructure, micro-computing, and fixed and mobile telephony.

Type of company
SME

Description

Meilleurtaux, established in 1999, is the pioneer in e-brokering. In 2001 the company expanded its range of delivery channels by opening its first agency. In 2006 it opened its first franchise. In 2009 it expanded its service offering to include loan repurchasing and credit insurance, for example. Meilleurtaux now has 270 franchise employees and 355 salaried employees.

The cloud project
❚ Outsource the email system and CRM as SaaS

Main benefits
❚ IT team can focus on business-related projects rather than infrastructure
❚ Lower maintenance costs that are easier to track
❚ Regular and transparent version upgrades
❚ E-mail expenditures reduced by 50%
❚ Easily integrated with the internal IS, using APIs

Important lessons learned
❚ A classic SaaS offer, which lacks elasticity, is not really a cloud
❚ Aside from industrial and banking secrecy, clouds can be used for everything

Contacts:
Stephan Hadinger
Chief Architect Cloud Computing

Stephan Hadinger is the Chief Architect Cloud Computing and the head of Orange API at Orange. He has worked in IT for more than 15 years. From 2002 to 2004 he was in charge of email and workstation infrastructure, and of Orange's IPTV platform from 2004 to 2007. Three years ago he launched the Orange API initiative for developer communities. He has now taken on responsibility for the Orange Cloud architecture for Orange Business Services clients and the group's internal uses.

Mark Wigington
Vice President – Orange Cloud

Based in London, Mark Wigington is the VP of Orange Cloud. After spending 12 years at Orange-France Telecom in the outsourcing and IT departments, Mark was named to the board in March 2010 to define and set up a cloud-based program for transforming the IT infrastructure. The goal is to build a new cloud operating model to use globally for both internal and external clients. The plan was approved in September, and the project is now entering the building phase.

Prior to this appointment, Mark was VP-Large Projects at Orange Business Services. He had previously worked at Computer Sciences Corporation (CSC) for several years.

Type of company
International telecommunications operator

Description
Orange is the key brand of France Telecom, one of the world's major telecommunications operators. On September 30, 2009 the group had nearly 190 million clients in 32 countries, including 128.8 million mobile clients and 13.4 ADSL clients. Orange is Europe's third largest mobile operator and second largest ADSL internet service provider, and one of the global leaders in telecommunication services for multinational companies, under the name Orange Business Services.

To reduce costs, a critical objective as the group was expanding its server resources by 20% each year, the company began working in 2006 on a large server virtualization project that succeeded in reducing the number of physical servers from over 17,000 to less than 2,000 and saved the company more than €17 million over three years.

Since then, Orange has continued to transform its internal IS to migrate to the cloud, and has already started using the cloud for many projects.

The cloud project
▌Private cloud for internal uses and applications for external use (e.g. 2424 actu)
▌General consideration of the use of clouds at Orange (CUBE project)

Main benefits
▌Able to adapt to variations in audience and peaks in traffic

Important lessons learned
▌Not a technical evolution, but a revolution in use: instant access to additional resources
▌Lots of support required through the transition
▌The quality of a cloud depends on the quality of the underlying network
▌No field is automatically excluded from migrating to cloud computing
▌Standardization bodies are appearing

Contact:
Jean-François Paccini
Internet & technical director

Jean-François Paccini is the technical director of the PagesJaunes internet division, which covers internet and fixed and mobile telephony services and activities: pagesjaunes.fr, annoncesjaunes.fr, mappy.com, pagespro.com, mobile services and the 118 008 information number. His mission is to develop online and mobile PagesJaunes services and to identify the synergies between these services to strengthen the company's position as leader on the local information market over the internet and for mobile devices.

Jean-François holds a master's in computer science, as well as a doctorate in science with a specialization in computer science from the Université de Genève.

He began his career in 1994 as technical director for FranceNet, where he managed the internet access infrastructure for clients and developed e-business sites (including La Redoute's site) and site hosting and data infrastructure offerings. In 2000, after spending one year at UUNet France as Director of Operations, he joined Egencia Europe, a global leader in online corporate travel services where, as Technical Director, he was responsible for both product development and the internal IT structure. He finally joined PagesJaunes Group in 2009.

Type of company

Large international services company

Description

Online business directory

The cloud project

❚ UrbanDive: map search service with 3-D immersive representations of the city (application and storage of terabytes of data)

Main benefits

❚ Elasticity
❚ Responsiveness
❚ Automation

Important lessons learned

❚ A specific mode of programming is required to get the most out of the advantages offered by the cloud (horizontal scalability)
❚ Going through a specialized company facilitates communication with pure cloud operators such as Amazon
❚ No cloud for the business core, sensitive information or CPU-intensive applications

Contact:
Philippe Plantive
GM

Philippe Plantive first started with Proginov when he was 21, working in sales. He then went on to become sales manager and, at 38, is now the general manager.

Type of company
SME, publisher of a SaaS software suite

Description
"Proginov's core business is publishing its eponymous ERP, ERP Proginov. It is designed for medium-sized industrial, business and market companies. We currently have 750 clients in France and abroad.

The company was created in 1996, and has adopted a modern social model: 0% of the 130 employees are shareholders, turnover is less than 1% and the average age is 33.

In 1999 some clients started expressing their desire to be free of IT constraints by having a large server hosted by Proginov that would integrate the constant evolution of technical models. We worked on R&D to define what was technically possible, then launched our hosting service in March 2001.

March 2011 will mark 10 years that Proginov has provided ERP solutions using a SaaS model. At the outset we called this service "ASP". It was the only term that existed, we were breaking new ground in France."

The cloud project
❚ Make ERP solutions available as SaaS

Main benefits
❚ Can move quickly from a test environment to a live environment

Important lessons learned
❚ Key success factor: quality of communication lines (SDSL, point-to-point)
❚ To provide redundancy and absorb peaks in traffic, the SaaS hosting infrastructure must not run at more than 50% of its capacity
❚ SaaS providers should not migrate their own infrastructure to a cloud
❚ CIOs are becoming CIOOs: Chief Information Organization Officers
❚ The SaaS challenge: support users on new terminals (e.g. smartphones and tablets)

Contact:
Pierre Foch
IT manager

Pierre Foch joined the IT division at Quilvest private bank in 2000. He began in the IT research and development department.
He was then appointed head of this department in 2004.
In 2007 he became the IT Manager, in charge of production, networks, the helpdesk and research.

Type of company
International SME

Description
Quilvest manages nearly $16 billion in assets under its two main activities, wealth management and private equity.

Established almost a century ago, this financial group is present in all major financial centers (e.g. London, Paris, Zurich, New York, Dubai).

The cloud project
❚ Outsource all IT applications and data to a cloud

Main benefits
❚ Elasticity
❚ Savings: €100,000/year
❚ Security: ISO 2007 certified

Important lessons learned
❚ The project may be driven for organizational reasons, for example the departure of a key employee (network and system administrator)
❚ Need to clearly define the contractual conditions and work with the cloud service provider to go live

Contact:
Christophe Marzio
Innovation and Foresight Director

With a background in computer science and 21 years of experience working in large software houses as a development engineer, consultant, project director and then director of offers, Christophe Marzio joined the Ricoh France group in 2006 to help it transform its business from building/distributing printing systems into providing printing and document services.

The technology services, innovation and R&D teams are responsible for adapting the group's offering for the French market and developing complementary services. This includes advanced services for large clients (Manage Document Services) and industrialized IT and cloud computing document services for the entire corporate market.

Type of company

French subsidiary of an industrial multinational

Description

"Ricoh France is the French subsidiary of Ricoh Group, the global leader in office printing (professional document printing, scanning and management systems). Our business is turning physical documents into electronic documents, and vice versa.

Ten years ago we were still using photocopiers and doing analog "scan to print" operations. Now, we use a gateway between digital and physical documents. It is connected to a computer network, which could be a local- or wide-area network.

Our engineers find themselves having to manage a digital UFO called "the digital document". I call this a UFO because the data are unstructured, which is absolutely terrifying for computer specialists. It's a data package that must comply with certain rules. Some of these rules are not "data processing" rules, as we computer experts would like, but instead rules, for example laws (e.g. on the location of servers storing the data), that are unique to every country and that change based on the type of document."

The cloud project
❚ Ricoh is using the cloud to provide a series of offers to its clients: virtualized information storage and retrieval: EDM, scan2fax, scan2mail, scan & store

Main benefits
❚ Deploy new services in a flash
❚ Easier tracking and invoicing

Important lessons learned
❚ Virtualization stops at the copier, for technical reasons and because of our business model
❚ Cloud terminology can be scary for certain Ricoh clients (e.g. craftsmen, independent professions). Result: despite trends, Ricoh does not use the cloud as a major selling point
❚ The cloud represents a breakthrough comparable to the mobile phone, the impact of which cannot be predicted yet

Contact:
Yann Jouveneaux
IT Director EMEA

Yann Jouveneaux is Sakata's IT director for Europe, the Middle East and Africa (EMEA).
At only 40 years old, he already has 15 years of international executive experience managing IT departments. After creating his own shared services center around virtualized internal data centers, he became one of the first IT directors in an SME to adopt public and private clouds on a large scale through Infrastructure as a Service (IaaS), Software as a Service (SaaS) and third-party application maintenance contracts. Almost all of his IS has been outsourced for a few years already, and he is now calmly managing state-of-the-art international services with a team of only 4 people.

With a management approach and organization inspired entirely by ITIL V3 best practices, he has proven that clouds, when properly used, can both significantly reduce the total cost of ownership (TCO) and bring a record rate of satisfaction. His innovative approach has earned him more than 20 articles in specialized media, as well as a nomination in 2007 by 01 magazine for "CIO of the Year". As a recognized expert he is regularly asked to attend various national events.

Type of company

French subsidiary of a large Japanese industrial company (seeds)

Description

Sakata, a Japanese company, is a leader in the fruit and vegetable seed market. It will celebrate 100 years of business in 2013. It is present in four main areas:
- Japan and Asia
- Europe, the Middle East and Africa
- North America
- South America
- It has 1,800 employees

The cloud project

❚ "We migrated to IaaS a year and a half ago. Our entire central server infrastructure for the EMEA zone is now outsourced and hosted in a professional data center in Montpellier, where 100% of the machines are virtualized. Our global ERP solution is hosted on Citrix farms. They enable us to provide standardized application packages to all our subsidiaries as SaaS. We also have access to a storage capacity that we can increase as much as we like. There are 13 sites in 8 countries that use the ERP solution provided in this way. Furthermore, this same infrastructure is used for global third-party application maintenance of our collaborative tools, for example tools used for purchasing consolidation and order tracking."

Main benefits

❚ Manage two complex services with a smaller team
❚ 24/7 maintenance
❚ Elasticity
❚ Switch from server status to client status

Important lessons learned

❚ SaaS providers are very cautious with their SLAs because QoS is harder to guarantee with software than with hardware
❚ "Negotiate reversibility first, then talk about the service itself."

59

Contact:
Pierre Van Wambeke
CEO

With a background in engineering and an MBA, Pierre Van Wambeke is a Net entrepreneur. Founder of SeeZam.com, the first online virtual safe based in Luxembourg, his career path has given him the opportunity to discover and understand the Luxembourg industrial and financial sectors. He was previously a consultant at PricewaterhouseCoopers, and then managed the IT division at the Kirchberg hospital for 6 years, which involved processing very sensitive medical data and required high availability. He then went on to Champ Cargosystems S.A., where he worked as Account Director Cargolux Services from 2007-2009, before leaving the aviation industry to build SeeZam.

Type of company
Start-up

Description
SeeZam, based in Luxembourg, launched its seezam.com service in April 2010. Designed primarily for individuals, by summer 2010 it was expanded to include a B2B2C offering. It is a unique virtual safe service in that SeeZam S.A. cannot decrypt the contents its clients wish to protect. Customers can store information (e.g. messages, passwords, PINs) and documents (e.g. pay slips, insurance documents), or use the safe to authorize communication with insurance companies or banks in conditions guaranteeing robust security and complete confidentiality.

The cloud project

❚ Launch an electronic safe service (IaaS) with P&T Luxembourg

Main benefits

❚ No need to invest in a data center
❚ 1:10 elasticity
❚ Can facilitate establishment in a foreign country without having to invest in infrastructure

Important lessons learned

❚ For a telecommunications operator offering a cloud service, the challenge is optimizing resources: applications, infrastructure and networks
❚ Private clouds can use virtual resources available to a single client, without pooling: virtual private cloud
❚ The operator's cloud offering makes it possible to create an application ecosystem with complementary communication functions (e.g. VoIP, email)
❚ An operator that is already using the cloud internally can offer more competitive prices because the infrastructure is already amortized

Contact:
Jean-François Marie
Enterprise Systems Engineer
Chairman France Committee

Trained as an electronics engineer and specialized in microprocessor design, Jean-François Marie began working in the world of embedded systems.

In 1996 he joined Sun Microsystems as a supercomputer expert before truly starting his career in storage. Then came EMC² and NetApp, where Jean-François is now in charge of technical development in southeastern France and of major clients in the area. He also coordinates blogs and other sources of institutional discussion, and is currently Chairman of SNIA France.

Type of company
Non-profit association

Description

The SNIA (Storage Networking Industry Association) is a non-profit association based in Europe and the United States. The American chapter, the actual SNIA, is the core of the association, which is divided into initiatives and technical workgroups organized around different aspects of storage. Examples include Ethernet, cloud, green storage, data management and storage management initiatives.

The United States chapter of the SNIA was founded in 1997, and the European branch in 2000. It is headquartered in San Francisco.

The cloud project
❚ Promote the establishment and widespread adoption of standards for cloud storage

Main benefits
❚ Storage capacity can be scaled
❚ Ubiquitous idea of "back-up"
❚ An interface to describe how to access data and to specify the quality of service

Important lessons learned
❚ Need to adapt the cloud for backup, for individuals and for SMEs
❚ Data localization challenge
❚ Difficulties related to bandwidth requirements

Contact:
Antoine Brière
CIO

Antoine Brière began his career as a project leader in a public works and civil engineering group. He then recruited some former classmates from École Centrale de Lyon and started a computer services company that catered to the health industry. When his company was acquired by Cegedim in 2000, he became the technical director for the HIS publisher. Antoine subsequently joined the certified joint collecting body (OPCA) for private hospitalization, where he took on the position of CIO. Finally, in 2007, he became the CIO at Texa, where he supports the growth of this 1 200-person group specialized in insurance adjustments and property inspections.

Type of company
SME

Description
Texa's core business is insurance adjustments for insurance companies. It works with 400 adjusters ready to evaluate every type of claim except automobile. It has 70 sites across France.

The cloud project
❚ Replace the data center with an outsourced private cloud

Main benefits
❚ Physical layer no longer a concern
❚ Can absorb the costs of upgrading infrastructure
❚ Reversibility is easier with virtualized architecture than traditional architecture

Important lessons learned
❚ For the same financial commitment, a shared infrastructure allows you to take advantage of more advanced services
❚ Clouds are poorly suited for managing databases
❚ The cloud service provider will not manage everything
❚ Do not underestimate the work required to migrate

Contact:
Philippe Vandevoorde
Head of IT department

Philippe Vandevoorde has headed UNICEF's IT department since early 2009.
After working in software publishing (ERP), he joined GFI Informatique as a project manager and then business unit manager.
He then got into managing IT services in the telecoms sector and then for the Vinci group.

Type of company

French branch of an NGO

Description

UNICEF International is organized into national committees. There are just over 100 people that work at the headquarters. Unicef France also has 80 committees across different parts of the country. These structures are mainly made up of volunteers who go out into the field to collect funds.

The cloud project
❚ Virtualize servers and applications

Main benefits
❚ 24/7 maintenance
❚ Easy to go live from development with virtual environments
❚ Absorb peaks in traffic

Important lessons learned
❚ Clouds are poorly suited to storing voluminous files
❚ Bonus: with a private cloud you can actually visit the infrastructure

The relationship with the cloud service provider is a key factor for success

Contact:
Serge Esposito
Innovation and Software Assets Director

Serge Esposito began his internet career in 2000 at Club Med, helping it sell packages online to an international audience. In 2003 he joined Voyages-SNCF.com, where he has contributed to many IT projects.

Type of company
SME subsidiary of a large group

Description
VSC Technologies, which was created in 2006 and currently employs about 150 people, is a technical subsidiary of the SNCF that acts as the IT division of Voyages-SNCF.com. It also develops tools and services for the group and for other players in e-business and rail distribution, as well as for travel agencies.

The cloud project
❚ Performance test for a new service

Main benefits
❚ Pre-phase test in real conditions without having to purchase the target infrastructure
❚ Avoid drawing out already long, complex IT projects

Important lessons learned
❚ Given the same sizing of resources, VSC Technologies has observed that cloud QoS varied over time
❚ It only makes sense to go live on a cloud if the need for resources goes through valleys and peaks, and for non-critical services

Cloud computing is unquestionably a fashionable term. It has even become a selling proposition for a number of suppliers and providers, who do not necessarily bother to define its precise scope. This white paper sets out to enlighten the reader on what exactly the "cloud" is, through lessons learned by EBG member companies.

To that end, we will endeavor in the first instance to define this new technological and economic model by differentiating it from similar concepts or offers that lack all the dimensions of the cloud. We will see that cloud computing is the latest outcome to date of a lengthy evolution in IT, and we will study the factors that have contributed to its rapid expansion. We will also show that there is not just "one" cloud but several clouds, both in terms of usage and in the scope of deployment.

The second part of this white paper focuses on the motivations of businesses that have adopted the cloud and the benefits they have derived from it. Through the testimonials we have collected, we distinguish four types of benefits: gains in terms of agility, technical simplicity, savings and business perspectives.

In part three we will examine the impacts of cloud computing on the organization of a company. We will analyze what embarking on cloud computing involves in terms of approaches to project management and its repercussions on business management, working methods and the roles of the company's various stakeholders.

Lastly, part four will look beyond the cloud to discern the main developments and innovations we can expect to see in the years to come.

The cloud adventure is only just beginning...

Chapter 1

Cloud? What cloud?

1.1 **What exactly are we talking about?**

Gartner defines cloud computing as "a style of computing where scalable and elastic IT-related capabilities are provided 'as a service' to customers using Internet Technologies"[1].

The definition is clear and concise, and that is what we will adopt in this white paper. Each of these terms warrants closer attention.

1.1.1 IT capabilities
Cloud computing involves IT capabilities in the broad sense of the term: computing power, storage capacity, bandwidth, or even software.

1.1.2 ... through Internet technologies...
The Internet technologies we speak of here should be understood in the broadest sense of IP network technologies. A cloud is not necessarily accessed by the Internet in the strict sense, because other communication layers may be involved, such as MPLS or dedicated connections to a private data center, for instance.

1.1.3 … on demand...
The notion of provision "on demand" is probably the newest development in cloud computing, because it underpins the other characteristics: access via a network and elasticity. Because having a service or infrastructure on demand presupposes precisely that the service or infrastructure adapts to demand, hence the notion of elasticity; by the same token, this also presupposes virtually instantaneous access, even if the infrastructures are not nearby, hence access via a network.
The upshot of this is invoicing on a pay-as-you-go basis.

1.1.4 … and on an elastic mode
Elasticity goes beyond scalability. It implies that the company can scale its resources up or down in a very dynamic manner.

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[1] *"a style of computing where scalable and elastic IT-related capabilities are provided 'as a service' to customers using Internet Technologies", Gartner : Navigate the Next Opportunities and Threats Top Strategic Technologies for 2010*

What is Cloud Computing?

The cloud, a bundle of features (source : OCTO Technology)

WHAT THE CLOUD IS, AS SEEN BY OUR MEMBERS...

"Cloud Computing consists in providing IT infrastructures in the broad sense of the term (hardware, software, operating middleware and network layers, documentary management applications and business software packages) to offer end customers (private or business) IT services in a totally dynamic manner and on a pay-as-you-go basis."

CHRISTOPHE MARZIO,
INNOVATION AND FORESIGHT DIRECTOR

"The first dimension of cloud computing is access to a service on a licensing basis by masking totally the underlying software and infrastructure. Secondly, for this service to really qualify as a cloud, I believe that it must be combined with services that support change. Thirdly, the service must be infinitely scalable to the user's needs."

JEAN-MICHEL MOUGEOLLE,
DIRECTOR OF IT AND SOFTWARE DEVELOPMENT,

"By cloud computing we mean the fact of outsourcing our servers to a data center (on-demand). In this way, should we need a server for two or three months for a particular purpose, we could ask our facility manager to put a server at our disposal, which we could then use for a given period of time."

PHILIPPE VANDEVOORDE, HEAD OF IT DEPARTMENT

"Cloud computing is a process of providing IT services that is characterized by a very low barrier to entry for the consumer both in technical terms and in financial terms. The other key features that set cloud computing apart from traditional IT outsourcing are its dynamic scaling capacity and the versatility of the systems it offers to give the company the benefit of the service matching its business. This implies a degree of elasticity, the implementation of standards that allow interoperability and an easy opt-out option."

JULIEN LEROY, CIO, DDB

At this juncture one should note that the cloud does not just boil down to the online provision of software, as certain providers would have us believe. Jean-Michel Mougeolle from Meilleurtaux, is adamant in this respect.

BEWARE OF FAKE CLOUDS!
"To my mind, a traditional SaaS offer, which does not permit 'thousand-fold' scalability, can on no account be qualified as 'cloud computing'. Now, there are not many cloud offers on this market. Most of them are SaaS offers 'disguised' as clouds with marketing arguments."

JEAN-MICHEL MOUGEOLLE,
DIRECTOR OF IT AND SOFTWARE DEVELOPMENT

1.2 What has made the cloud possible

The cloud was born from the convergence of a variety of factors, relating to technical progress, the economy and changing mentalities.

1.2.1 Virtualization

Virtualization consists in building an abstract model of one or more IT configurations (CPU, RAM, disk storage, input/output interfaces, operating system, etc.) so as to create virtual machines. These virtual machines replicate the behavior of the equivalent physical machines in all respects.

Cloud? What cloud?
1.2 What has made the cloud possible

Chapter 1

While virtualization is older than the cloud, it remains the basic technological building block without which cloud computing could not have come into being, as Joannès Vermorel, CEO of Lokad, points out: "miscible hardware is one of the most important points of the cloud. The software layer is totally decoupled from its underlying physical infrastructure. If a computer crashes, the 'factory' allocates another machine elsewhere."

Virtualization as a foundation
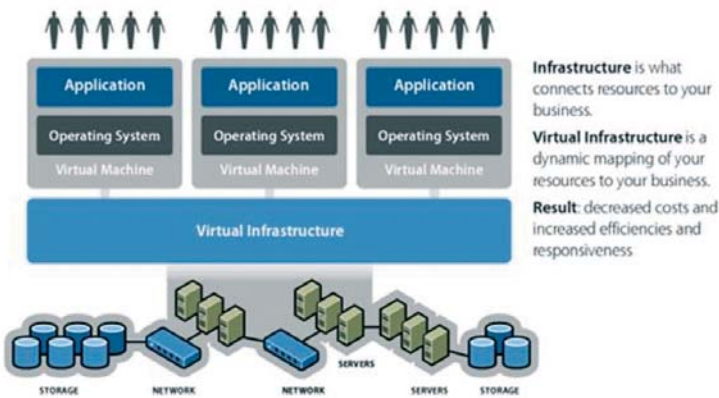
Virtualization, the basic building block of cloud computing (source : OCTO Technology)

1.2.2 Bandwidth growth
Bandwidth in businesses has soared, both on LANs and on WANs. This trend has been mirrored on the Internet. Company Telegeography gives an edifying view of international bandwidth growth between 2006 and 2010[2] :

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[2] *http://www.telegeography.com/product-info/gb/download/gb11-exec-sum.pdf*

Worldwide International Bandwidth Growth, 2006-2010
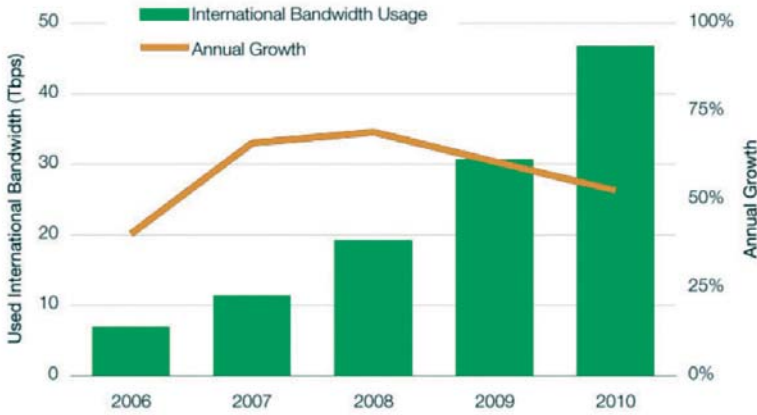
Source: TeleGeography Research   © 2011 PriMetrica, Inc.

The cloud has used this soaring bandwidth to good effect to carry high volumes of data and deliver the expected responsiveness for on-demand services. However, large corporations cannot rely solely on the Internet for their critical applications. But although they often make use of other connectivity technologies for their private clouds (type MPLS), they have also benefited from the widespread use of high bandwidth, as shown by[3] OECD's statistics on business use of broadband:

OECD Broadband statistics [oecd.org/sti/ict/broadband] 2d. Business use of broadband, 2009 or latest available year
Percentage of businesses with 10 or more employees

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[3] *http://www.oecd.org/dataoecd/20/62/39574066.xls*

78

Cloud? What cloud?
1.2 What has made the cloud possible

Chapter 1
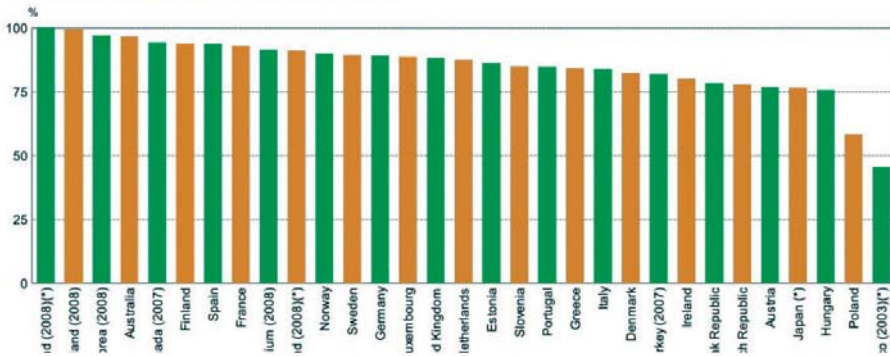
1.2.3 The drop in storage costs

Providers could never have offered storage in cloud mode without the drastic fall in the cost of disk storage space over the years. Providers of mail services in SaaS mode, to take but one example, now offer substantial storage capacities (in the region of several GB or tens of GB per user) to hundreds of thousands of customers. Even if not all the customers use all their storage space and even if resource pooling enables cloud providers to rationalize their real requirements, the fact remains that the latter's disk space capacities are colossal. Thankfully for them, the cost of storage has plummeted in recent years, as the graph below shows.
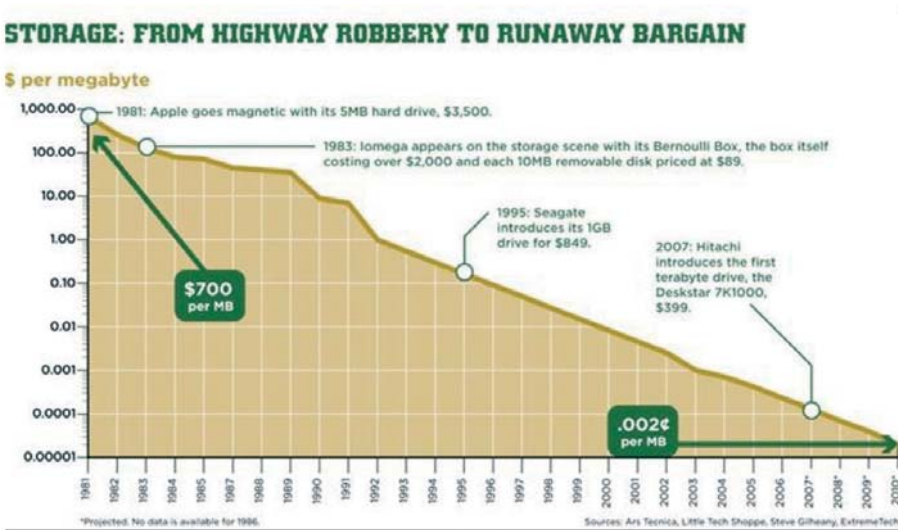
Sources : Ars Technica, Little Tech Shoppe, Steve Gilheany, Extreme Tech

1.2.4 New programming habits

As with most if not all new paradigms, the cloud came into being not only as a result of technological breakthroughs but rather from the meeting of these breakthroughs with a receptive frame of mind. New programming processes have thus played an important part in the development of the cloud.

That anyhow is the opinion of Fabrice Benaut, CIO, IFR Global (GfK group): "from a methods viewpoint, the very design of modern software, as a collection of components one can enable or disable on demand, has rendered the advent of the cloud possible for a much wider range of services. "

1.2.5 Changing mentalities and the economic climate

The financial crisis has dried up a good many sources of funding for businesses since 2008. Since they find it harder to borrow, they are more receptive to alternative models that limit their fixed assets.

Changes in mentalities have also played an important part. In the first decade of the twenty-first century, a generation for whom the Internet is a reflex took up positions of responsibility in companies. For many people, the cooperative rationales that Web 2.0 unveiled have also become standard practice. This state of mind makes them receptive to rationales in which access (to content, to a service) matters more than possession, in which ubiquity (the possibility of using a service anywhere in the same conditions) is second nature.

> **THE CLOUD, A REVOLUTION COMPARABLE TO THE INDUSTRIAL REVOLUTION**
>
> *"The scale of the phenomenon is comparable to the industrial revolution of the 1750s. At the time, three factors converged to bring out a new paradigm:*
> * *a new concept, that of manufacturing centralization and standardization,*
> * *a new technology, the machine tool,*
> * *a socio-economic context, with economic agents ready to consume.*
>
> *Today we are in a similar situation:*
> * *the concept is that of computing power regarded as a consumable,*
> * *the new technologies are virtualization, multicore architectures, large-scale distributed parallel programming and the increase in bandwidth,*
> * *the currently favorable socio-economic context, with considerable pressure to cut costs."*
>
> DENIS CAROMEL, SCIENTIFIC LEADER OF THE OASIS TEAM
> AT INRIA AND FOUNDER OF ACTIVEEON

1.3 History

With fifty years' hindsight, one can say that the history of computing has been obsessed with one question: where should intelligence reside? Each era has provided its own original answer, without negating the answers of previous eras for all that.

In the 1960s intelligence, in the sense of storage and processing, was concentrated. That was the age of the mainframes: computers were bulky, expensive and rare. Data processing was confined to a machine room and very few company staff ultimately had any access to computers.

In the field of IT too, the 1980s were marked by a movement of decentralization. The advent of Personal Computers popularized computers. In businesses, this resulted in a new way of working: office automation. Office staff began to have computers at their disposal that allowed them to perform a whole series of tasks locally: word processing, spreadsheets… Intelligence was boxed up: this was the age of development of software packages, which the first IT managers took it upon themselves to install on the machines of each member of staff.

In the 1990s, the wall separating mainframe computing from office computing crumbled. The buzzword was distributed work between PCs and central servers. The client-server architecture was born. Software packages were still installed on users' machines but these machines no longer did all the processing: they were connected to servers hosting databases that performed the most complex of calculations. This architecture paved the way for a new corporate concept, the networked company. Indeed that was the time that saw the development of corporate computer networks (LAN, WAN) and the beginnings of convergence between telecommunication and information system networks.

But the client-server architecture of the 90s was rigid: client software running on users' machines was unwieldy; it was difficult to install, and costly and perilous to upgrade. Things changed in the 2000s, in the first instance with the advent of thin (aka lean or slim) clients. These did little processing on users' workstations, mainly display tasks, the bulk of the calculations being performed on central servers. This situation would have been a regression to more centralization, had fat clients not appeared, which combined the benefits of centralization, distribution and decentralization. Fat customers installed on PCs could then do some of the work locally without necessarily hosting resource-hungry software packages. For instance that was when OWA appeared (Outlook Web Access in 2000) or Gmail in 2004, thanks to Ajax technology (Javascript + XML). In 2002 a complementary if not competing model appeared in the form of RIA, Rich Internet Applications, requiring a dedicated environment or framework (Flash, Java or Silverlight). IT entered the era of agility.

The shift of interfaces towards RIA
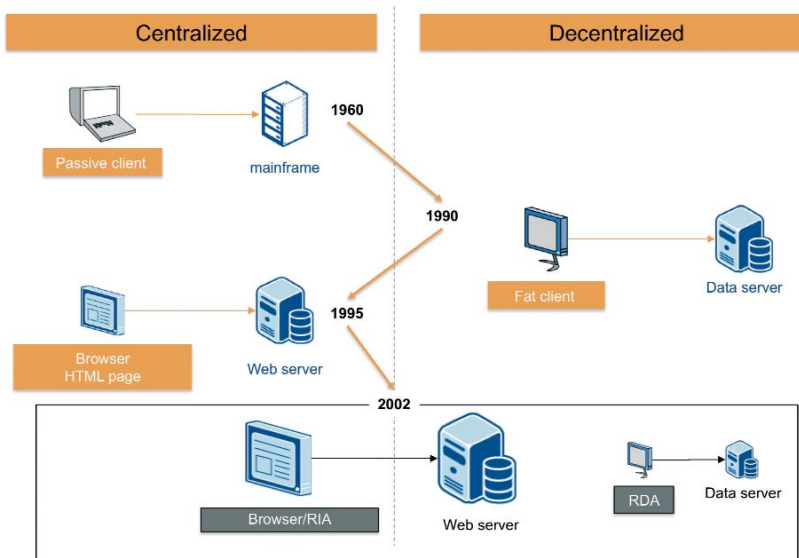
Source : OCTO Technology

How could one go further? By driving the previous rationales into a corner (agility, distribution, decentralization), without foregoing the benefits of centralization. This was the feat that Amazon pulled off in en 2008 by renting its colossal IT infrastructure in a virtualized and pooled manner to customers worldwide: cloud computing was born.

FROM THE MAINFRAME TO THE CLOUD OR COMING FULL CIRCLE PERPETUALLY… OR NOT QUITE

"The history of IT often seems like a pendulum. In the 60s and 70s, the centralized mainframe was the norm: all the processing was done centrally on powerful machines, with a rather inflexible form of organization. From the 80s onwards, the new watchword was the client/server model, decentralized and much more flexible. In certain ways, with cloud computing, we have returned to a trend towards concentration.

However, the image that best describes the progress of IT is a spiral rather than a circle: we take an old concept and add a contemporary paradigm to bring it up to date.

So with cloud computing we have revived a more centralized form of organization, but these concentrated resources are now pooled and virtualized, which is what makes the cloud flexible, elastic and service-oriented."

FABRICE BENAUT, CIO, IFR GLOBAL (GFK GROUP)

The swing of the pendulum between concentration and decentralization
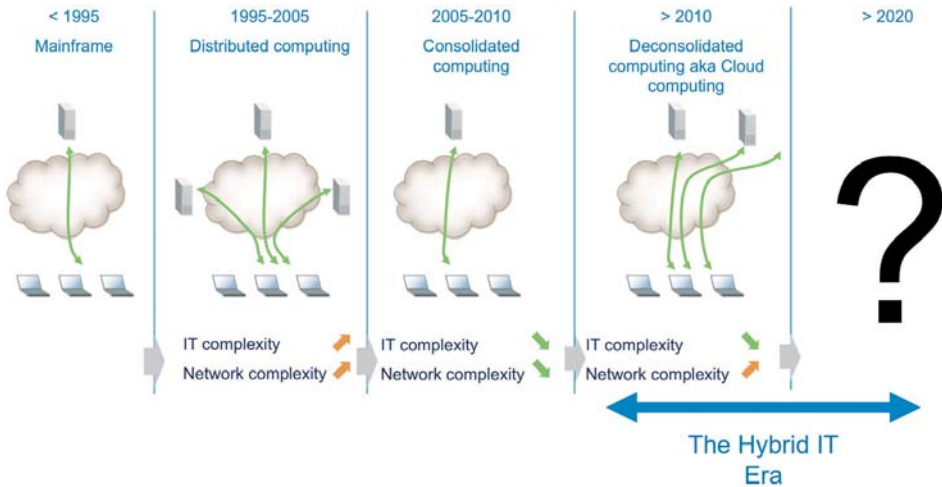
The long march towards device-independent IT
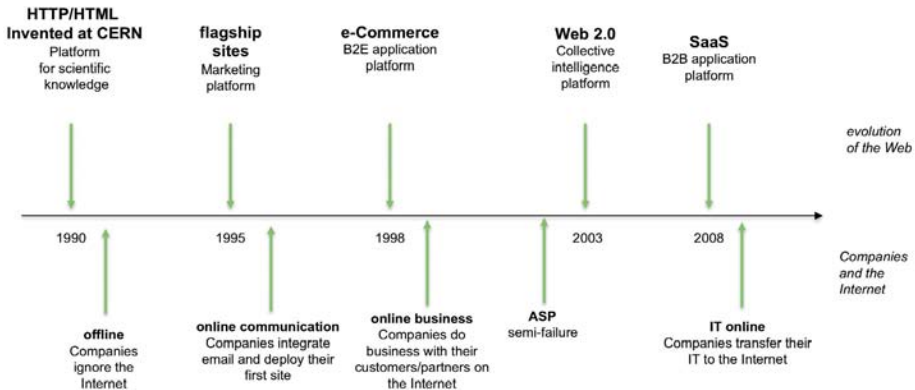
Cloud computing : « what's in a name ? »

The origin of the expression "cloud computing" is open to debate. The term "cloud" had been used for a long time in the field of information technologies, at the outset in telecommunications. It had been the custom to represent first the telephone network then the Internet as a cloud in technical diagrams.

It is only in 1997 that we find the first trace of the complete expression joining the words cloud and computing , in a trademark registration filed by NetCentric. Since that company could not demonstrate any commercial use of the term, it was not registered.

In April 2001, we find the expression "cloud of computers" in a New York Times article describing the .net technology:

"For Microsoft, the idea behind .Net is software programs that do not reside on any one computer but instead exist in the "cloud" of computers that make up the Internet."

But it was only on 9 August 2006 that the expression as we know it today was first used in public, by Google CEO Eric Schmidt during a conference on search engines:

"What's interesting [now] is that there is an emergent new model, and you all are here because you are part of that new model. I don't think people have really understood how big this opportunity really is. It starts with the premise that the data services and architecture should be on servers. We call it cloud computing – they should be in a "cloud" somewhere. And that if you have the right kind of browser or the right kind of access, it doesn't matter whether you have a PC or a Mac or a mobile phone or a BlackBerry or what have you – or new devices still to be developed – you can get access to the cloud."

At the time, the focus was on universal remote access, and the notions of elasticity and pay-as-you-go usage were not yet in the forefront. But the idea had been floated.

The term "cloud computing" then became very popular, so much so that Dell tried to monopolize it by attempting in turn to register the trademark in March 2007. Too late: the American administration rejected Dell's application on the grounds that the expression had already become common parlance (generic).

Sources:
http://www.johnmwillis.com/cloud-computing/who-coined-the-phrase-cloud-computing/
http://www.informationweek.com/news/services/business_process/showArticle.jhtml?articleID=210101628
http://franceterme.culture.fr/FranceTerme/recherche.html#COGE746_ouverture

1.4 Cloud typologies

Cloud infrastructures can be classified according to the layer they concern, from the infrastructure to the software, and according to their scope, from within the company to the Internet.

1.4.1 Typology by layer: IaaS, PaaS and SaaS

The first cloud typology concerns the layer on which it is deployed.

Cloud typologies
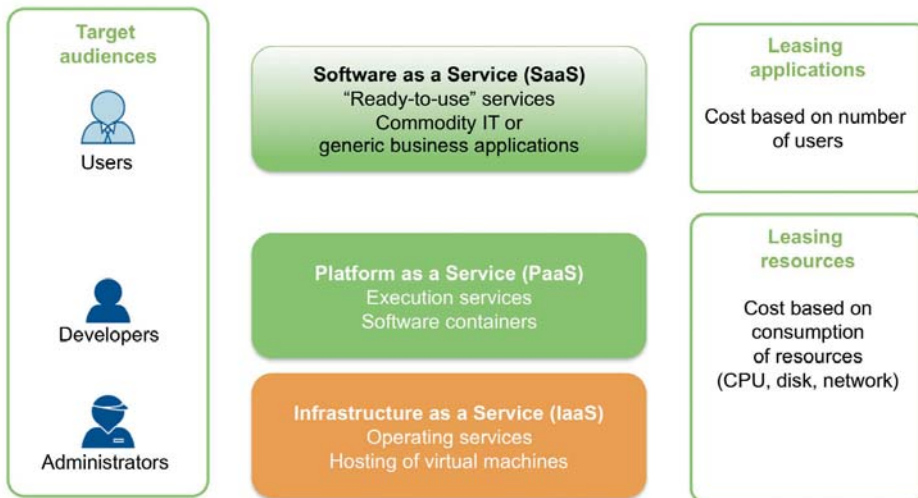
The three layers of Cloud Computing (source : OCTO Technology)

SaaS
The most widespread form of cloud is SaaS (Software as a Service). Nearly one third of companies in France today say they make use of it[4].

Its popularity stems from the fact that another concept had already paved the way, namely ASP (Application Service Provider). In either case, a company no longer installs the software on its machines; it rents access to the software, which is installed on the remote servers of a service provider. ASP really developed at the end of the 1990s.

[4] *Source : Markess International*

85

But it was not yet a cloud. What SaaS adds to ASP is absolute elasticity: the possibility of adding users or services with just one click. Since then the number of applications and players has soared: CRM, with SalesForce in particular, collaborative workspaces (GoogleApps, Office 365, LotusLive), messaging...

SaaS collaboration
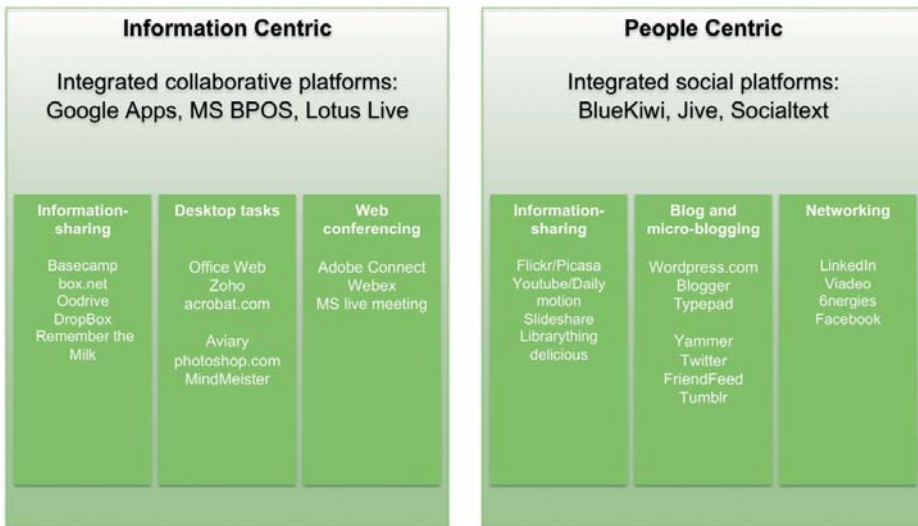
The different types of software available as SaaS (source : OCTO Technology)

IaaS

The next layer down is IaaS (Infrastructure as a Service). As its name implies, here a provider rents out the components of an IT infrastructure: storage space, bandwidth, central processing units and operating systems.

Customers can configure their environment remotely by assembling building blocks: they thus have remote virtual machines behaving in every respect like their physical equivalents. This rented IT infrastructure includes not just server capabilities but also the workstations. But one should bear in mind that virtualized servers or workstations do not necessarily make for a cloud. For that to be the case, a scalable capacity is required as well as an invoicing model based on the resources actually used by the customer.

Some well-known IaaS providers include: Amazon (EC2), Rackspace, Orange Business Services (Flexible Computing) …

How IaaS impacts the IT department
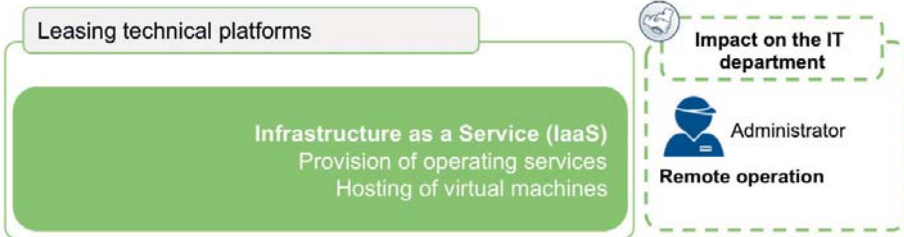
What IaaS changes for the IT department (source : OCTO Technology)

PaaS
There is also the special case of companies that rent a virtualized platform to develop, test and/or execute their applications online. This is known as PaaS (Platform as a Service).

Organizations using the cloud for their application development needs
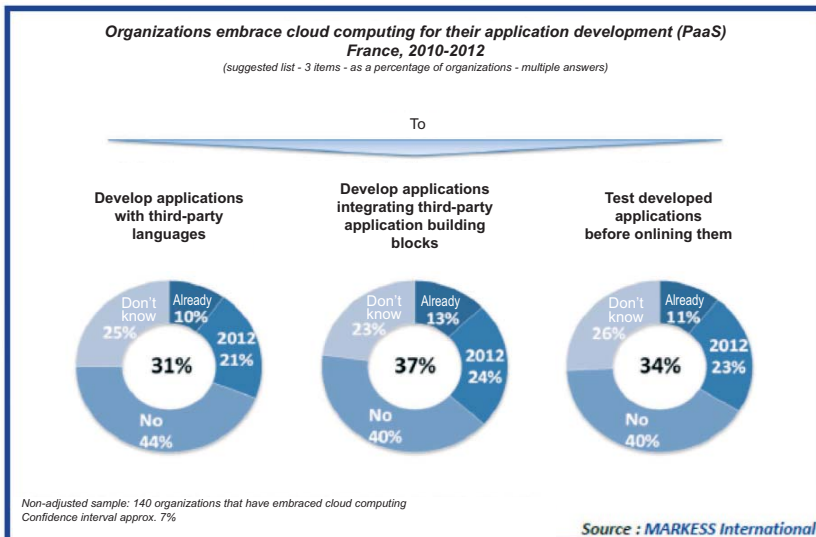
PaaS suppliers more particularly include: Microsoft (Azure), Google (Google App Engine), …

How IaaS impacts the IT department

What PaaS changes for the IT department (source : OCTO Technology)

Companies make much less use of the last two forms of cloud (IaaS and PaaS) than SaaS. Currently only 1% of businesses in France use PaaS and barely 2% use IaaS, according to a Markess International survey. This can be explained by their reluctance to outsource their infrastructure; their concerns more particularly revolve around quality of service and availability.

Application development or execution in PaaS mode also imply a certain state of mind, which has not yet become the norm. While start-ups use it without any qualms, most well-established companies have not yet taken the plunge. However, PaaS is steadily gaining ground. According to the aforementioned survey, the take-up rates for IaaS and PaaS are expected to reach 15% and 6% respectively by 2013.

Organizations using cloud computing for their infrastructures

Organizations embrace cloud computing for their infrastructures (IaaS) France, 2010-2012
(suggested list - 6 items - as a percentage of organizations - multiple answers)

	In 2010	End 2012
Storage	28%	51%
Server	28%	50%
Backup	25%	46%
Archiving	16%	42%
Network	19%	33%
Security	15%	29%

Non-adjusted sample: 140 organizations that have embraced cloud computing
Confidence interval approx. 7%

Source : MARKESS International

Cloud computing penetration rate trend (SaaS, PaaS, IaaS)

Cloud computing penetration rate trend (SaaS, PaaS, IaaS) In French organizations, 2009-2012 (year-end)

Projection beyond 2012

- 2009: 12%
- 2010: 24%
- 2011: 28%
- 2012: 31%

Extrapolated from a sample of more than 500 organizations in 2009 and 330 in 2010

Source : MARKESS International
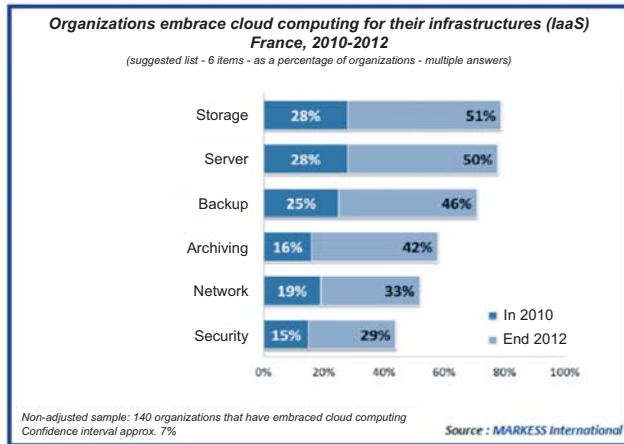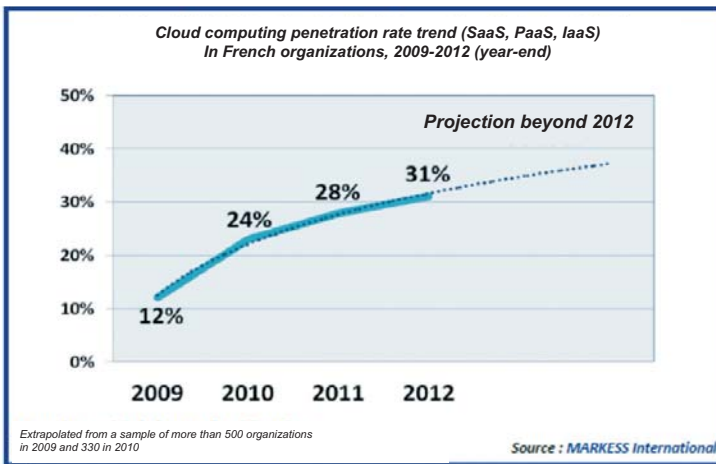
1.4.2 Cloud typology according to scope: private, public, community, hybrid

Private clouds
A private cloud is an infrastructure in which a range of resources is put at the exclusive disposal of a client.

Private clouds come in several forms. They can be run by the user company itself for its internal clients, as is the case for Cap Gemini or IBM.

CAP GEMINI: A PRIVATE CLOUD DEDICATED TO PROJECT TEAMS

"We have developed an in-house private cloud service for our client projects. It lets any project team control a virtual machine with a given capacity and lifetime, for development, testing, training, or pre-production purposes. This cloud architecture is reserved for the projects we conduct for our customers and is only available internally."

JEAN-CHRISTOPHE LASVERGNAS, CIO

IBM: A PRIVATE CLOUD FOR TRAINING PURPOSES

"Our data centers switched to cloud computing (private cloud) in stages.

Stage 1: virtualization
Five years ago, much thinking was devoted to how we could improve energy consumption in our data centers. To that end, we set up a virtualized and pooled infrastructure in record time.
Stage 2: automation
We realized that 80% of environment loading tasks were always the same. In order to make productivity gains, we managed to automate the loading of the virtual machines, operating systems, the microcode, middleware, the LANs, SANs, VLANs, etc.

Stage 3: extension of the project to the field of training
We have an entity called IBM training, which runs more than 3,500 training courses every year. On average, 1,000 to 5,000 users follow courses every week, depending on the time of year. Most of these training courses rely on practical work. We provide students with a practical task environment in a classroom or at home. The courses may be server-oriented, for instance how to create a partition, or solution-centric courses, for instance DB2, etc.

Previously, the courses were loaded manually on the machines, with the aid of scripts, in several data centers. In a given data center, the machines were dedicated to running the week's courses, while the others loaded the courses for the following week.

Two years ago we decided to transfer the delivery of all courses to a single data center in Montpellier. To that end we allocated 1,000 servers and storage devices, an environment provisioning infrastructure (Tivoli Provisioning Manager) and a scheduler to load courses on machines automatically on a given day. This project was put in place in the space of barely one year.

Now all the machines are devoted to training applications and content. Between the end of one week's courses on the West Coast of the United States at midnight on Friday and the start of the following week's courses in Asia at midday on Sunday, the scheduler provisions the virtual machines in barely twelve hours, tests the environments and automatically e-mails participants their login IDs."

JEAN-YVES LECLERE, INFRASTRUCTURE & SERVICES MANAGER

The private cloud can also take the form of providing a set of physical machines, which evolves dynamically according to the customer's needs, at an external provider's, facilities manager or pure cloud player.

One should bear in mind that a private cloud is not necessarily synonymous with dedicated physical infrastructures. In the case of Virtual Private Clouds, the infrastructure is shared by several customers. A private cloud can also take the form of providing a set of physical machines, which evolves dynamically according to the customer's needs, at an external provider's, facilities manager or pure cloud player.

Since all users get access via their private network, everything happens for them as if this infrastructure were dedicated to them, even if that is not materially the case.

THE PRIVATE CLOUD, A TOOL CENTRAL TO GFK'S CORE BUSINESS

"Our data center comprises a cluster of Citrix servers on which our applications run on virtualized machines. Scaling is managed elastically with load monitoring and balancing tools.
In concrete terms, we gather data from our panels, store it in our data warehouse and process it to produce the deliverables our customers expect. These deliverables are published in data marts, which our thousands of customers worldwide can access"

FABRICE BENAUT, CIO (GFK GROUP)

Private clouds are often preferred for strategic applications or sensitive data, as is the case with GfK: "As far as we are concerned, information is central to our business and our added value. That is why we pay very close attention to security. Which is why we prefer the private cloud approach", explains Fabrice Benaut.

Businesses also often prefer the private cloud because they feel they have more control, not least because they can access the underlying physical infrastructures more easily (except in a virtual private cloud). This point is emphasized by Philippe Vandevoorde from Unicef France: "we conduct repeated inspections of the center. This possibility of inspecting the data center on a regular basis is an undeniable advantage. It would be unthinkable for us to have our data hosted in another country, because that would distance us from it and make it much more difficult for us to supervise it. The problem in putting oneself in the hands of platforms several thousands of kilometers away is that the necessary controls become more complicated. They may be cheaper, but behind them lurks the risk of the company's entire business being jeopardized in the event of a sudden crash."

Different infrastructure models

public cloud
- shared infrastructure
- off premise, available through the Web
- owned and managed by a third party

virtual private cloud
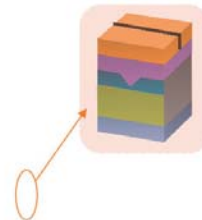- shared infrastructure
- off premise, reachable through a private network
- owned and managed by a service partner

private cloud
- dedicated infrastructure
- on or off premise, available through a private network
- owned/leased and managed by the organization or by the service partner (or co-managed)

Public, private and virtual private clouds (source: Orange Business Services)

Public clouds
Public clouds are offers granting access to software or infrastructures on demand via the public Internet. In this type of offer, customers do not know precisely where their data is hosted, or where the processing is executed. Software, virtual machines, databases and other resources may be hosted at any data center of the provider's and may even move from one to another, depending on how the provider has decided to optimize its capacities.

The main players on this market offer SaaS, IaaS and PaaS at one and the same time. As regards IaaS, there is Amazon for instance, with its EC2 and AWS offers, or Microsoft with Azure; at PaaS level, Azure is also represented, as is Google with Google App Engine; at SaaS level, there are any number of players: Google (Google Apps) for e-mail and office automation, SalesForce for CRM, Microsoft (Office 365) for collaborative tools, to name but a few.

Under the pressure of legal requirements, initiated more particularly by the European Union and by CNIL (data privacy regulator) in France, public cloud providers can now ensure more traceability of the location of provisioned resources, at least by large area: Europe, America, Asia. This means that customers can comply with their national legislations.

Hybrid clouds
Hybrid clouds are configurations combining private infrastructures, in cloud mode or not, and public or private clouds.

In such cases, part of the data or infrastructures is managed by the company itself, in-house or by a facilities manager, and this part also communicates with the cloud resources.

This type of organization lets one differentiate the location of the processing according to different criteria: strategic (for instance to keep sensitive data in-house), economic (for instance to use the cloud only when it is most cost-effective), performance … It also lets one use the cloud only for overspill purposes, when the company's private resources are exceeded, during peak periods of activity or traffic in particular.

Hybrid clouds are riding high: a Markess International survey published in 2011 shows that they are favored by 29% of French businesses who have moved or intend to move to the cloud[5] . Fabrice Benaut of the GfK group concurs: "at a time when collaborative work with the company's partners plays an increasingly important part, we are starting to consider hybrid cloud applications open to the Internet."

Community clouds
Community clouds may be established where several businesses organizations seek to share resources in cloud mode. Such resources are exclusively dedicated to these organizations, with resource allocation or load distribution devices spread over them. A community cloud can be run by the member organizations or by an external provider.

Community clouds can be a way of setting up a cloud having the characteristics of a private cloud in terms of security and dedicated resources at a lower cost. This can guarantee independence compared with a public cloud provider. That in any case is one of the arguments that drove ESSEC to participate in a community project with other educational institutions, as MyESSEC Project Manager Benjamin Six explains: "we are looking for ways to avoid total dependence on Google.

To that end, we have formed an association called 'Marguerite' in collaboration with Polytechnique and INT Télécom. The aim is to create a private cloud in the field of education."

Denis Caromel, Project Manager at INRIA and founder of company Activeeon, describes an alternative to this community organization, between two partners: "one can expect highly strategic applications always to remain in the private cloud. On the other hand, we are seeing a new type of usage emerge: a workflow distributed among two businesses wishing to work together on a project without disclosing proprietary information."

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[5] *http://www.cooperatique.com/2011/cloud-computing-iaas-et-paas-nen-sont-qua-leurs-balbutiements/*

Cloud deployment models
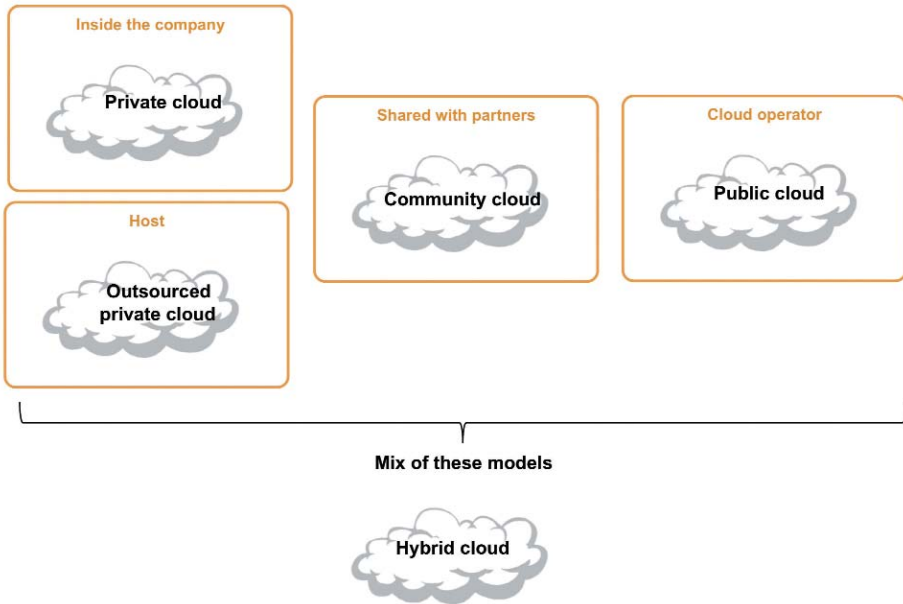
Various cloud deployment models (source : OCTO Technology)

Chapter 2

Motivations and benefits

The motivations behind the cloud approaches of the businesses we interviewed or the benefits they derive from them are fourfold: more agility, greater economic efficiency, better technical performance, and business opportunities.

2.1 Establish the company on a cloud for greater agility

Gartner defines agility as "the ability of an organization to sense environmental change and respond efficiently and effectively"[6]. If one accepts this definition, cloud computing contributes to the agility of businesses in four ways.

2.1.1 Elasticity

Unsurprisingly, elasticity is the most frequently cited benefit of cloud architectures. This is logical, as this notion is included in the very definition of cloud computing. It is strikingly evident in the field of SaaS: "one of the most obvious benefits of a SaaS solution like Salesforce is its scalability: it is very easy to add new users or functionalities", explain Sandrine Boisliveau and Jean-Luc Raffaëlli of the La Poste group. Eric Vibert from Akérys concurs: "the advantage of the cloud is that it enables us to process a large number of property ads, up to 1.5 million over time, without investing heavily in infrastructure."

But the effects of elasticity are also clearly felt on the IaaS layer. This is demonstrated in the pilot virtualization project in cloud mode of the workstations at Arvato: "we can create new positions very simply and swiftly", explains Arvato. This last example remains rooted in the world of software because the user's application environment is affected to a great extent by virtualizing the work station. But the benefit of elasticity is just as appreciable in the more technical layers of IaaS, as we see in the case of Sakata.

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[6] *http://www.gartner.com/it/page.jsp?id=535714*

SAKATA: THE BENEFITS OF AN ELASTIC INFRASTRUCTURE MADE POSSIBLE BY IAAS

"Our group is experiencing growth and potential new sites need to be planned for. Outgoing bandwidth requirements at the data center are therefore likely to increase considerably in the future. The cloud architecture lets us increase the bandwidth at our disposal virtually in one click.

Elasticity can also be measured in terms of power consumption. Today I have only one bay; tomorrow, if I need two or three, I can add them without worrying about power consumption. The same reasoning applies to storage space."

YANN JOUVENEAUX, IT DIRECTOR

Pages Jaunes, which uses IaaS to launch its new site Urban Dive, is even more radical:

PAGES JAUNES: USING THE CLOUD TO COPE WITH SUCCESS

"We view elasticity as one of the greatest benefits of the cloud", says Jean-François Paccini. "For instance, we need a platform that can handle all levels of traffic. Determining the number of servers to acquire before the launch is a complex task. We could be the victims of our own success. With a traditional infrastructure, it would be extremely difficult to avert such an eventuality without over-investing. Whereas a cloud type infrastructure offers the necessary elasticity to resolve this problem once and for all."

JEAN-FRANÇOIS PACCINI, TECHNICAL MANAGER, INTERNET CENTRE

An extreme example is that of online video game provider Kobojo, whose activity can vary on a scale of one to ten on the same day. The elasticity the cloud affords is therefore a decisive benefit.

KOBOJO: OR HOW TO FACTOR IN EXTREME VARIABILITY OF DEMAND

"For the new game we plan to release early in 2011, we are looking at how to handle the deployment and updates of a totally cloud-based application.

We are going to set up monitoring tools to allow us to gear our computational capacities in the cloud to actual user demand, given that demand varies enormously over time. For instance, we sometimes have 150,000 to 200,000 users connected early in the evening, compared with only 15,000 at dead of night."

SÉBASTIEN MONTEIL, CTO

2.1.2 Reactivity

Elasticity is fine, as long as amplitude is adjusted upwards or downwards swiftly. Fortunately, that is indeed the case with cloud computing, which allows businesses like Ricoh to develop then market new offers very quickly.

> **RICOH: DEPLOYING NEW SERVICES IN A FLASH WITH THE CLOUD**
>
> *"In the client-server architectures of old, one spent as much time setting up the IT infrastructure as in really developing the service. Thanks to the cloud, we can roll out new services dynamically with a very lightweight initial infrastructure. Our time-to-market is thus considerably shorter. After designing the service, our cloud architecture allows us to start up directly in prototype mode, without tying up extensive resources. Deployment is virtually immediate and above all we have far fewer scaling-up problems."*
>
> CHRISTOPHE MARZIO, INNOVATION AND FORESIGHT DIRECTOR

Gains in reactivity can be considerable compared with previous solutions. In the case of Intel, switching its infrastructure to the cloud "enabled us to save three to four weeks in allocating resources to a user requesting them", explains Brian McGeough.

This ability to adapt to requirements not only on demand but also extremely quickly can prove crucial during peak periods. The case of UNICEF at the time of the Haiti disaster provides a striking example of this.

> **UNICEF FRANCE: THE CLOUD COMING TO HAITI'S RESCUE**
>
> *"During the peak generated by the Haiti disaster, the cloud was able to absorb the shock. This was because we had two virtual machines acting as front ends, that is, handling user connections. In the space of a few hours, we were able to double our capacity. We cloned the two virtual machines and integrated two new machines. We achieved this in little more than one hour. Of course that was possible because we had anticipated the peak in traffic. In fact, we supervise all our infrastructures 24/7; so we receive alerts if predefined thresholds are exceeded.*
>
> *However, unexpected peaks can also be handled in a satisfactory manner. We have operating procedures that, above a given traffic threshold, allow us to increase capacity. If this happens, we are first contacted by the facilities manager."*
>
> PHILIPPE VANDEVOORDE, HEAD OF IT DEPARTMENT

In another sector, which requires just as much reactivity, the cloud architecture adopted by Orange for its 2424actu (news) service enabled it to absorb a peak in demand relating to a topical event. That is what Stephan Hadinger, Chief Architect Cloud Computing, describes: "the switchover to the cloud was one of the keys to the success of the application. Among other things it enabled us to monitor changing traffic levels and effectively handle peaks in demand."

Reactivity should not be understood just in the technical sense. The cloud also makes users of information systems more reactive because they are more autonomous. In the end, the company in its entirety benefits.

ESSEC: WHEN THE USER TAKES POWER WITH THE CLOUD

"The introduction of Google Apps Education was a revolution of the same order as the arrival of Microsoft Office in companies: people realized that they could do all sorts of things on their own.

Henceforth, any teacher at ESSEC who wants to set up a new site for his course no longer needs to seek permission from a supreme authority. He can do it on his own authority, as ESSEC has opted for post-moderation."

BENJAMIN SIX, DIRECTOR OF RESEARCH AND INNOVATION

2.1.3 Flexibility

Elasticity combined with reactivity results in unparalleled flexibility of use. The cloud puts things back the right way round: the company no longer needs to contort itself to make changes in its organization without jeopardizing its information system; it is the latter that submits to its demands. This is particularly clear in the case of Arvato.

ARVATO: HOW THE CLOUD INJECTED FLEXIBILITY IN THE WORK OF ITS CALL CENTER STAFF

"One advantage we have seen in our cloud desktop organization[7] is greater flexibility in work organization. Our customer advisers can now work from anywhere, for any customer and with any terminal.

They can work from anywhere, even in areas with low bandwidth, because the applications and data reside in the cloud. We only transmit the display to operators' stations, which is inexpensive in terms of bandwidth: a data transfer speed of roughly 40 Kbps suffices.

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[7] *Workstation in the cloud*

They can work with any type of terminal: the only requirement is a web browser or a "small" connection program on the machine. In concrete terms, we have made use of old PCs from which we removed the hard disk or installed low-speed terminals.

Finally, they can work for any customer, or even switch from one customer to another virtually instantaneously. Indeed, where we once had to configure the call center agent's PC according to his customer, now we only need to "stream" the application system and the requisite application from our private cloud."

<div align="right">

THIERRY PICON, CIO
</div>

Software provider Generix is in the same situation, even though Systems & Networks Manager Florimond du Reau has a specific and more restrictive definition of the cloud and prefers to talk of virtualization[8].

GENERIX: THE FLEXIBILITY BENEFITS OF THE CLOUD

"What really drove us to adopt virtualization is above all flexible use, rapid deployment of new services and easy setup of a "business recovery plan" in a second data center. Nowadays, when we enter into a contract with a new customer, we know we will need a certain amount of processing power. With virtualization, this can be achieved with just a few clicks. In the past, we had to come to terms with hardware selection processes, scaling, requests for quotes, validation, purchase, delivery lead time, physical installation, software installation…All this could take between one and two months."

<div align="right">

FLORIMOND DU REAU, SYSTEMS & NETWORKS MANAGER
</div>

The flexibility afforded by the cloud also means that the company is less bound by the need for traditional ROI calculations and prior authorization. This is especially true for SaaS: the company can afford to experiment, switching over gradually to the cloud, because the capital expenditure and the commitment remain moderate. According to Benjamin Six of ESSEC: "unlike a traditional IT project, with a cloud computing project success and ROI do not need to be estimated before kick-off. The success of the project is measured as time goes by, as usage progresses."

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[8] *"Whereas the cloud notion equates to automated deployment of resources according to demand, we have retained the manual mode. However, if one defines the cloud as a series of technologies delivered via the network, such as on-demand services, and factoring in the notion of elasticity – and if we exclude automatic scaling from this definition – then yes, we have definitely entered the realm of cloud computing."*

2.1.4 Ubiquity

A few years ago, a computer manufacturer boasted about its mobility solutions with this slogan: "work anywhere so as not to work all the time". Nowadays this promise has come true thanks to the total separation between the user layer and the technical layer. In this respect, according to Benjamin Six, cloud computing has ushered in a new paradigm.

> **THE SWITCHOVER TO SAAS FOR THE MYESSEC PROJECT[9]: A NEW USER PARADIGM**
>
> *"This project, which was completed very quickly, added a whole new dimension to MyESSEC, through the Anywhere, any device, any time paradigm.*
>
> *Anywhere*
> *When MyESSEC was hosted in our data center at Cergy (France), the degree of user-friendliness varied enormously according to where users were located. Owing to latency, the service worked much less well for a user of our campus in Singapore than for a student at Cergy. That is now a thing of the past. Google Apps works just as well wherever the user may be in the world.*
>
> *Any device*
> *Formerly, the service was not optimized for all types of devices. Nowadays it works just as well on all operating systems, including the mobile. This is all the more important as students increasingly come to the campus with their own devices and don't necessarily use standardized equipment imposed by the IT department.*
>
> *By way of example, by using Google Apps, MyESSEC was optimized from the outset for the iPad, without this incurring any development costs for ESSEC.*
>
> *Any time*
> *We have 24/7 availability, within the limits of our provider's SLA. Such a level of availability would have been unattainable for an organization like ESSEC with a traditional architecture."*
>
> BENJAMIN SIX, DIRECTOR OF RESEARCH AND INNOVATION
> AND MANAGER OF MYESSEC PROJECT

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[9] *"MyESSEC is an online service aimed at the student community, teachers, graduates and ESSEC administrative staff".*

2.2 Cloud computing means easier IT

A whole series of advantages make cloud computing a choice solution for an IT decision-maker.

2.2.1 Easier and permanent maintenance

The cloud makes the maintenance of an information system easier and less costly. But its overriding merit can be to make it quite simply possible. In many cases a small organization does not have the wherewithal to ensure supervision or maintenance of its services 24/7. The cost of having personnel on call would quickly become prohibitive. Sometimes it quite simply does not have any team available for the task.

Entrusting its infrastructure to a cloud provider may then be a solution: "an organization like ours cannot set up a perpetual management center to handle notifications, potential incidents, etc. The cloud lets one rely on shared infrastructures that are monitored continuously. The costs are shared too, which makes them affordable", says Philippe Vandevoorde from UNICEF France.

Maintenance thus becomes possible continuously; but it is also easier. Virtualization in the cloud of the workstations at Arvato has for instance eased the maintenance of the call center agent's machines: "every day, we reinitialize our staff's operating systems and session data", explains Thierry Picon. "They thus have a 'clean' configuration every morning. Hard disk size, fragmentation and slowdown problems are now a thing of the past."

2.2.2 Using an optimized set of machines

For a large company, reorganizing its machines as a private cloud is a way of optimizing their use. Intel is an excellent example of this.

INTEL: A SUPER-CHARGED CLOUD

"Following on from a previous virtualization program launched in 2008, in 2009 Intel took the initiative to manage a number of its resources in a cloud: office automation applications, business applications and collaborative tools in particular. The main aims were to optimize machine usage through greater consolidation of tasks and improved agility thanks to automated resource allocation.

They decided to roll out a self-service portal on the Intranet on which users in each business unit (BU) could order the calculating capacity they needed. An automated workflow was established for the purpose, combined with human validation procedures for each request. Once approved, a request is then sent to a provisioning engine that configures computing capacity for the BU.

This portal has proved to be a success. Intel has more than tripled the number of its virtualized servers in its corporate services, which now make up 42% of the total. By consolidating the workload of the oldest and least efficient servers on a small number of new servers, Intel has achieved consolidated virtualization ratios of up to 20 to 1. In other words, we have managed to install up to 20 virtual machines on a single physical platform."

BRIAN MCGEOUGH, IT ENGINEERING MANAGER

MORE VIRTUAL MACHINES OR MORE POWERFUL VIRTUAL MACHINES?

"Microsoft offers several server configurations, ranging from 2 to 8 cores[10]. For us the cost is the same. We pay the same price, whether we take 4 machines with 2 cores or one machine with 8. But we believe it is better to spread the load horizontally by acquiring more machines rather than vertically by acquiring more powerful machines.

4-core machines perform better, offer higher levels of security and availability, because we spread the traffic over more machines."

Pages Jaunes: boosting automated resource allocation

"We work with Amazon Web Services (AWS) and pay particular attention to automated machine deployment. With AWS, we can script (i.e. automate) the creation, start-up, shutdown or destruction of virtual machines through Web services. Therefore one can conceivably have a number of servers that varies dynamically according to load. We have not yet reached the automatic scaling stage. On the other hand, we are in a position to order a machine with one hour's notice and get the benefit of automatic machine setup. One could even imagine complete automation, which would consist on stopping virtual machines when traffic is light or adding machines if the load increases."

JEAN-FRANÇOIS PACCINI,
TECHNICAL MANAGER OF THE INTERNET CENTRE

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[10] *Arithmetic units*

2.2.3 Higher availability

By freeing the company of its dependence on a particular physical infrastructure, the cloud increases guarantees in terms of redundancy and reduces the risk of service disconnection.

KOBOJO: SERVICE AVAILABILITY IS NOT TO BE TREATED LIGHTLY

" With a traditional data center, cutover is impossible in the event of a failure. On one occasion a severed optical fiber in Germany caused a service disconnection for half a day, which represents a huge shortfall in earnings for a company like ours.

The first advantage of the cloud compared with a traditional architecture is thus redundancy, that is, availability of several data centers dotted all over the world. This considerably reduces the risk of losing applications, since they will certainly be available in another data center in the event of an incident. For instance, when an Amazon data center goes down in Ireland, we simply switch over to the American data center."

SÉBASTIEN MONTEIL, CTO

What is good for a start-up can also be good for a more established business. GfK for instance also banks on the redundancy afforded by the cloud: "GfK is in the process of changing its organization with a single data center to one with three data centers spread over the world, near our customers, to boost performance and access times. To that end, we are putting in place infrastructures as standard as possible, redundant, to guarantee availability of the service 24 hours a day, seven days a week", says Fabrice Benaut.

2.2.4 Easier software upgrades

Access to Software as a Service (SaaS) instead of purchasing it then installing it on machines means that one always has the latest versions without needing to upgrade. For La Poste and Meilleurtaux, both of which have migrated their CRM to SaaS, this is a key benefit.

LA POSTE, MEILLEURTAUX: THE BENEFIT OF SOFTWARE UPGRADES ON AN ONGOING BASIS

"The cloud computing offer allows us to always be at the cutting edge in functional and technical terms, since the SaaS provider releases software upgrades on a regular and frequent basis. New functions are thus made available in real time. We can then choose whether or not to implement them. In-house we could not have achieved the same degree of upgradeability."

JEAN-MICHEL MOUGEOLLE,
DIRECTOR OF IT AND SOFTWARE DEVELOPMENT

> *"The advantage is that we always benefit from the latest versions of the software in a totally transparent manner: No need for updates, new releases are issued by the software vendor without any intervention on our part."*
>
> SANDRINE BOISLIVEAU & JEAN-LUC RAFFAËLLI,
> STRATEGIC PROJECTS

Software upgrades are thus easier for SaaS customers as well as for software vendors. The testimonial of Generix, an ERP provider, is very interesting.

GENERIX: SOFTWARE UPGRADES WITH LESS FUSS

> *"Existing software upgrade solutions work for both the physical environment and the virtual environment. On the other hand, a virtual environment makes them much more secure. We thus benefit from a great number of tools that let us proceed with software upgrades with much less fuss. In concrete terms, before a software upgrade, we clone a production machine without shutting it down.*
>
> *We then upgrade the version on the copy. If everything goes according to plan, we then upgrade in the production environment. This software upgrade is made more secure with prior snapshots of the production machine, which we keep until all the operations have been completed and validated once and for all. If a problem arises, we can easily and swiftly roll back."*
>
> FLORIMOND DU REAU, HEAD OF SYSTEMS & NETWORKS

2.2.5 More streamlined development

The main advantage of the PaaS (platform as a service) aspect of cloud computing in terms of development is the virtualization of environments. This makes moving from one environment to another much more flexible, whether it is a design, test or production environment.

UNICEF AND PROGINOV: THE CLOUD, A DEVELOPMENT-FRIENDLY ENVIRONMENT

> *"We sometimes develop bespoke applications on virtual machines. We always choose a virtual machine dedicated to the development environment. After the test phase, we release it on the virtual machine set aside for the purpose. This is yet another undeniable advantage of virtualization: we can roll out an environment and use this same environment for production."*
>
> PHILIPPE VANDEVOORDE, HEAD OF IT DEPARTMENT

"When we issue a major release of our software, we provide our customers with a test environment parallel to the live environment, with their actual data. After validation, we just switch the customer's environment to the test environment, which then becomes the production environment. This is done at night and the following day the customer can access the new version. If the new version no longer suits the customer, we can instantaneously roll him back to the previous version. So the customer is not at all affected in terms of maintenance operations."

<div align="right">

PHILIPPE PLANTIVE, CEO

</div>

2.3 Making savings with the cloud

A study carried out in 2010-2011 by economic studies consultancy CEBR[11] reveals that cloud computing should generate savings of nearly 163 billion for French companies by 2015.

Europe: cumulative economic benefits 2010-2015

Europe: Cumulative economic benefits 2010-2015						
Industry	**France** *In millions of €*	**Germany** *In millions of €*	**Italy** *In millions of €*	**Spain** *In millions of €*	**UK** *In millions of €*	**Europe** *In millions of €*	**Jobs** *(thousands)*
Banking & Finance	43 949	**58 503**	32 073	18 836	30 204	183 566	207
Public sector, Education and Healthcare	25 783	31 838	20 759	14 704	19 455	112 539	801
Retail/Tourism	**45 901**	55 540	**51 688**	**40 125**	**40 162**	**233 418**	355
Manufacturing, Energy	16 013	39 305	19 735	12 093	11 358	98 504	514
Other	31 103	36 052	26 515	24 792	16 810	135 271	519
Total benefits	162 749	221 239	150 770	110 550	117 989	763 297	2 396
Direct and indirect jobs (in thousands)	469	789	456	392	289	2 396	

Source : Cloud Dividend, EMC – CEBR, 2011

This macro-economic analysis is also shared by a good number of the businesses we interviewed.

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[11] *Centre for Economics and Business Research , http://www.cebr.com*

2.3.1 A cheaper cloud

The area in which financial gains are assuredly the quickest and most obvious is mail in SaaS. All the companies that use it have noted significant savings. Let us be the judge of that:

> **"YOU'VE GOT MAIL": THE CLOUD IS A SOURCE OF SAVINGS**
>
> *"To begin with we had a messaging system called Alinto, which was very consumer-centric in terms of functionalities. We thus lacked a convincing professional solution in terms of collaboration, which was becoming a real problem for us. So we considered a variety of options and asked ourselves whether it would be better to opt for an internal server.*
>
> *Installing an in-house Exchange solution was unwise, quite simply due to the cost. We had a budget of roughly 80 to 90,000 euros for in-sourcing the service. But by outsourcing it we managed to cut the cost by 50%."*
>
> *PASCAL CHARLES, IT SUPPORT MANAGER*
>
> *"By switching from SaaS mode to the cloud mode, we halved the cost of our mail."*
>
> *JEAN-MICHEL MOUGEOLLE,*
> *DIRECTOR OF IT AND SOFTWARE DEVELOPMENT*

But IaaS is also a source of substantial savings. In moving its already virtualized architecture to cloud mode, Intel made "47.6 million dollars' savings in 2010 alone", says Brian McGeough. As for IBM, it managed to increase the use of its training data center in a private cloud while spending less: "in 2010, this new organization enabled us to cut costs by 40%. At the same time, we also provisioned 30% more services", explains Jean-Yves Leclere, Infrastructure & Services Manager.

2.3.2 A more detailed cost breakdown

Not only does the cloud generate savings, it also clarifies the costs, enabling one to estimate or allocate them better. When Meilleurtaux moved its mail to SaaS, "the billing basis is clear and transparent: by mailbox and by month", says Jean-Michel Mougeolle.

This clear cost breakdown also entails anticipating the costs based on knowledge of the resources actually used: " SeeZam has indicators that make it possible to scale the infrastructure and anticipate costs", explains Pierre Van Wambeke. "Alerts are set on each of the servers, to report CPU or disk space usage."

At Cap Gemini, cost tracking has transformed IT services into a commodity that the IT department invoices Project teams for according to a very precise fee schedule.

CLOUD INVOICING AT CAPGEMINI

"We drew up an invoicing schedule. We worked with one of our consultants – who had already done this with several corporate accounts – to allocate our costs and set our prices as intelligently as possible. In concrete terms, at the pre-sales stage the consultants use our services catalog to include technical environments in their proposals. We issue a bill for the project that itemizes the allocated costs.

A number of factors can significantly influence the bill depending on the option one has chosen, such as the database hosting method (dedicated database or use of a shared database).
We should point out that the more we manage to transfer project to the cloud model, the more the costs fall. The pooling effect is very important."

<div align="right">

JEAN-CHRISTOPHE LASVERGNAS, CIO
</div>

A clearer understanding of costs goes hand in hand with better in-house cost allocation as well as more pertinent pricing vis-à-vis external customers. This is what Ricoh France is experimenting with:

PAY-AS-YOU-GO BILLING AT RICOH

"Our cloud services are managed and operated from start to finish, which enables us to provide our customers much more easily with user statistics and service and performance indicators, and itemized billing based on actual usage and measurable units (number of documents stored, number of faxes sent, number of color pages printed, etc.)."

<div align="right">

CHRISTOPHE MARZIO, INNOVATION AND FORESIGHT DIRECTOR
</div>

2.3.3 Doing more with less

The economic benefits of the cloud are also measured through its capacity to offer businesses a better quality of service than they could have otherwise afforded. For instance, by optimizing its servers, Intel has managed to "absorb the growth it has experienced in the last two years without needing to expand our physical infrastructure", explains Brian McGeough.

2.4 The cloud is good for business

2.4.1 Testing a new service

Businesses can use the cloud to good effect to test a new service cheaply. It can be a way for them to get an idea of the potential of the service without needing to invest in their own infrastructure straight away. The company is then free to leave its service in the cloud or return it to its data center, or even to combine the cloud and a traditional data center, like Kobojo.

> *THE CLOUD AS A STARTING POINT: THE EXAMPLE OF KOBOJO*
>
> *"The applications of our future games are rolled out in the cloud and if the kick-off goes according to plan , they remain there for three to four months, time enough to stabilize the progression. On the other hand, we host databases in our traditional data center for reasons of cost and performance. With our hybrid approach, we can gradually repatriate the game to our data center. For a while, it runs both in the cloud and in the data center. We then gradually shut down the virtual machines at Amazon."*
>
> *SÉBASTIEN MONTEIL, CTO*

This possibility of working in real-world conditions without having to possess the infrastructures from the outset is an undeniable asset for large-scale projects covering a long period of time. This is what the VSC Technologies project perfectly illustrates:

> *VSC TECHNOLOGIES: USING THE CLOUD TO AVOID THE TUNNEL EFFECT ON A LARGE-SCALE PROJECT*
>
> *"At the end of 2009, we launched a major innovation project. This arduous and long-term project brought into play a datawarehouse in a transactional context (ticket sales). It required a complex business model with real-time data refreshing, and very high stakes in terms of volumes. We tackled it with an incremental approach. very early on, we wanted to run application performance tests, even though the online date was still far off, and the live infrastructure was not yet available.*
>
> *We didn't want to acquire this infrastructure in advance solely to run our performance tests, since the platform would only really be used in production several months later. That is why the best solution as far as we were concerned was to hire the virtual machines in an IaaS approach. In total, our application took seven months to stabilize itself. After this test period, we migrated our application to a traditional production infrastructure.*

Had we not run our performance tests very early on, our innovation project would have failed. The tunnel effect would have lasted too long between the development start-up date and the release date. Thanks to the cloud, we were able to have a test infrastructure at a lower cost, detect the points that needed finetuning in our application beforehand and make the necessary fixes very early on."

SERGE ESPOSITO, R&D & INNOVATION MANAGER

Some businesses go as far as to say that they could not have started up without the cloud. That is the case for Cedexis:

CEDEXIS: A PURE PLAYER IN THE CLOUD THAT COULD NOT HAVE EXISTED WITHOUT IT

" In terms of cost, the cloud bears no comparison with the acquisition of physical machines. I believe that we could never have started up Cedexis without the cloud. We would have had to issue much more capital stock solely to acquire hardware assets (servers). In addition, at cruising speed, the cloud enables us to cut our IT expenditure considerably and achieve financial equilibrium much more quickly. "

JULIEN COULON, CEO

2.4.2 Freedom is in the cloud

By not weighing itself down with physical infrastructures it owns, the company gives itself more freedom of action. That is what Julien Leroy, CIO of DDB, particularly appreciated in their switchover to SaaS: "it let us conduct a very concrete Cloud experiment with a very rapid roll-out, contracts of only one year and easier opt-out if we so wished."

For a company calling on a provider to move to the cloud, and for which cloud computing is thus synonymous with outsourcing, the fear may be that it finds itself tied to the provider, for better or for worse. While this is indeed a risk and requires one to make the right choice of provider, the cloud can nonetheless mitigate the effects of such outsourcing compared with other forms thereof. That is the opinion of Antoine Brière, CIO of Texa:

TEXA: THE CLOUD, OUTSOURCING THAT FACILITATES OPT-OUT

"Reversibility is written into the contract. In practice, it is even easier to set up a virtualized infrastructure that a traditional one. This is because the environments and applications are much less bound to the physical machines. Should the need arise, we would "only" have to repatriate the data along with the virtual machines and their documentation."

ANTOINE BRIERE, DIRECTOR OF INFORMATION SYSTEMS

But the freedom the cloud affords also fosters independence of mind: the ability to focus on one's core business without wasting time on purely technical considerations without any real added value. That is what Euronews experienced when it moved its mail to SaaS:

EURONEWS: WITH THE CLOUD, ALL MATERIAL SUPPORT WILL BE PROVIDED

"Our mailbox capacities have grown very substantially; we now benefited from a capacity of 25 GB per user. Thanks to this increased capacity, we were able to resolve a thorny problem at Euronews, namely the archiving of .pst (Outlook) files: until then these files resided on users' workstations and cluttered up their e-mail. These files, which could grow to several gigabytes in size, had to be backed up on a regular basis.

The fact that we now have mailboxes of that size enables us simply to 'push' all these files towards Microsoft, and we no longer have to worry about managing the backup process or potentially losing data."

PASCAL CHARLES, IT SUPPORT MANAGER

2.4.3 The transmutation of CAPEX into OPEX

One of the benefits of cloud computing is that it replaces the capital expenditures (CAPEX) that weigh businesses down with services, which can be charged to operating expenses (OPEX).

GENERIX: MOVING FROM SELF-OWNED MACHINES TO MACHINES LEASED IN A PRIVATE CLOUD

"As far as I'm concerned, I am urging the company to no longer purchase the hardware but rather to content ourselves with leasing it, which would give us the benefit of better performance on a permanent basis at a constant price. That was impossible in physical environments due to the numerous technical constraints of reinstalling. In a virtual environment by contrast, one can change hardware without interrupting the service. Given that the price of virtualization software licenses is linked to the number of processors, irrespective of processor power, it is in our interests to have servers with the most powerful processors possible. A server purchased three years ago costs as much under license as one purchased today, except that it lets one run two to three times fewer virtual machines."

FLORIMOND DU REAU, HEAD OF SYSTEMS & NETWORKS

2.4.4 Enhanced running of multinationals

The flexibility afforded by the cloud in terms of server and workstation virtualization can prove to be a decisive benefit for companies with multiple sites, above all those operating on the international market. Capgemini saw in it a way of really fostering a feeling of unity and belonging among its thousands of employees worldwide.

> CAPGEMINI: A SINGLE COMPANY UNDER THE CLOUD
>
> *"With regard to workstation virtualization, the cloud offers especially useful possibilities for our company, which relies greatly on offshore and which at the same time strives to maintain a strong sense of unity around a corporate approach baptized 'one team'. This approach consists in saying that, no matter where our staff are located, we are capable of giving our customers an integrated and unified offering.*
>
> *Technically, this is made possible through cloud solutions, even for our staff who are a long way away: our employees in India or Morocco benefit from good performance despite the long latency time between their workstations and our data center (in the region of 200 ms). To achieve this, we use the VID (Virtual Device Infrastructure) mode. A great number of our staff in India have a local virtual PC in France on which the applications run. Only the display is handled locally on the work station in India, which is extremely rapid for accessing the servers that are located in France too."*
>
> JEAN-CHRISTOPHE LASVERGNAS, CIO

Cloud computing could even help you establish your subsidiary in a foreign country!

> WHEN THE CLOUD HELPS COMPANIES SET UP IN BUSINESS BEYOND THEIR NATIONAL BOUNDARIES
>
> *"A customer who wants to set up in business in Luxembourg without any capital outlay could benefit from an operational IT structure with just one line and a few terminals (mobile phones, laptop computers, etc.) at its disposal, and a switch managed by the operator. This dematerialization system is of particular interest to small organizations that would have no interest in having a server in their basement, doctors' practices for instance. A private link with a cloud infrastructure is all they need."*
>
> MOHAMED OURDANE, CTO CLOUD

The cloud also enhances international management by teleworking and makes it possible to hire the best talents, wherever they are on the planet. As Julien Coulon de Cedexis says: "All the tools our developers use are in the cloud. This organization lets us recruit on a global scale. For instance, if we need a developer highly specialized in a particular technology, we can hire him and put him to work, whatever country he is in. "

Chapter 3

Business in the cloud

Transferring one's IT systems to the cloud is a project that requires planning, and one that in due course changes a number of the company's characteristics, both in technical terms and in terms of common practice, organization and human resources. In this part, we will look at how a business can best prepare for it.

3.1 Conducting a cloud project

Switching to cloud mode is a project that should be managed as such. Here we examine the three key dimensions of such a project: the switchover methodology, management of the project through time and re-using what already exists.

3.1.1 Moving to the cloud, a question of method

There is no single right way of migrating all or part of one's IT to the cloud. However, the companies we interviewed provided us with several examples that you can draw inspiration from.

While a start-up can immediately switch to the cloud, the same does not apply to a well-established business. That is why businesses mostly prefer a gradual rather than a "big bang" approach. Fromageries Bel for instance successively deployed the cloud, area by area.

FROMAGERIES BEL: A 3-STAGE MOVE TO THE CLOUD
"Neither our HR department nor our IT department had the will, time or budget to provoke a big bang on all the applications.

We started in 2007 with our training obligations. You should know that France has a quite unique system for managing statutory training declarations: the obligation to file an annual declaration of the number of hours and euros spent on training in each field is a French specificity. Our ERP package was unable to handle this in any detail, so we were looking to replace it.

We benchmarked various solutions more specialized in this field, which I would qualify as 'niche'. We eventually chose a SaaS solution, which in addition had the advantage of being more user-friendly, with its Web style interface.

When the time came to find a solution for our people reviews (to estimate staff potential for instance), our HR department had already been won over by SaaS. Since they had helped choose the first solution and had seen all its benefits, they were easily convinced by this new outsourcing.

We have a third project ongoing, which is scheduled to go live early in 2012. This concerns the annual appraisal review. "

EMMANUEL ZIMMER, MANAGER OF THE SAP COMPETENCE CENTER AND
FORMER HEAD OF THE HR & NICT DOMAINS

Still in this gradual approach, some companies have opted to decentralize the decision-making in this respect, allowing each business unit to decide if and when they should move to the cloud. That is the case for the La Poste group:

LA POSTE: WHEN THE CLOUD GRADUALLY PENETRATES THE COMPANY

"Asphéria, a subsidiary of the La Poste Group specializing in Desktop Publishing (DTP) and document digitizing, was the first group subsidiary to put Salesforce in place. Gradually, it was rolled out to other subsidiaries, each one retaining its decision-making power: the move to Salesforce is not a top-down decision imposed by the Group. On the other hand, in the light of these successive projects, the Group's IT department decided to form a Salesforce user club at Group level to capitalize on lessons learned and heighten awareness of the new approach that Cloud Computing represented. In parallel, a Salesforce skills center was created within La Poste's central IT department.

Progressively, Salesforce is proving to be increasingly successful for CRM solutions in SaaS mode in the Group."

SANDRINE BOISLIVEAU & JEAN-LUC RAFFAËLLI,
STRATEGIC PROJECTS

Deployment cycle on the cloud platform
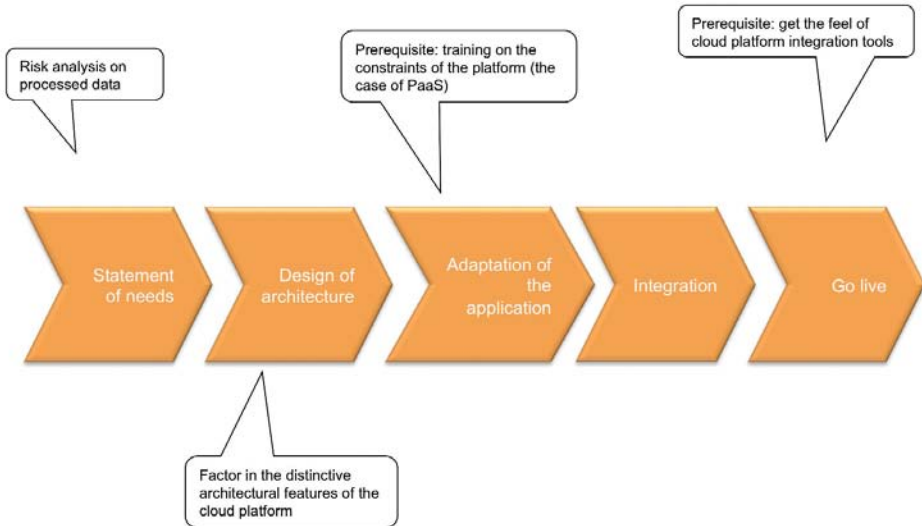
The main stages of a cloud project (source : OCTO Technology)

3.1.2 The length of the project

The speed with which a cloud project is conducted can vary according to the company's business specifics and the required degree of integration with existing IS. In the case of Backelite, it was conducted quickly and efficiently:

> **BACKELITE: A SPEEDY MOVE OVER TO THE CLOUD**
> *"We started considering the move to the cloud in March 2010. After several talks with Microsoft, we started working on it in September. One day's work of our developers with them sufficed to come up with a working prototype. We then spent about one and a half months industrializing this process and preparing to roll it out on a larger scale. We will roll the offer out during the course of January."*
> *THOMAS SARLANDIE, VP OF SOFTWARE*

Owing to a functional adaptation that was harder than expected, the effort for Meilleurtaux proved to be greater: "this project monopolized 1,000 man days in terms of development and integration", explains Jean-Michel Mougeolle.

3.1.3 To what extent should one re-use what already exists?

In order not to hold up the project, it is important to measure properly the need to re-use what already exists. There again, the situation can vary according to the business demands of each company. Meilleurtaux for instance had to recover data from its former CRM solution:

> **MEILLEURTAUX: DATA RETRIEVAL, A PREREQUISITE IN THE CLOUD PROJECT**
> *"We thought that the functional part was going to be the hardest part to migrate to Salesforce, but in the end it was data retrieval that proved to be the toughest task. You should know that Meilleurtaux handles a huge amount of data: 1,000 to 2,000 loan applications are filed with us every day, not counting the 13 million visits to our site every year. It was especially important for us to successfully recover the data because the CRM is Meilleurtaux's 'reactor core'. The CRM is our staff's main tool."*
>
> *JEAN-MICHEL MOUGEOLLE,*
> *DIRECTOR OF IT AND SOFTWARE DEVELOPMENT*

DDB made a quite different choice: that of limiting history retrieval as much as possible. The old data and applications were kept, but in the old system.

> **DDB:** *A PURPOSEFUL INTENTION TO MARK A CHANGE OF DIRECTION*
> *"From 2009, none of the Group's departments were using Lotus e-mail. I should point out that we chose to break with the past by not recovering the history of the messages. We left it at the disposal of users on the existing infrastructures.*
> *With Notes we also managed supplier databases, prospects and a few management databases, copyright for instance. When we switched over, we kept certain applications in Lotus Notes while others were transferred to Google Apps, without any specific developments."*
>
> *JULIEN LEROY, CIO*

One cannot always be so radical, above all in IaaS: often, a company will not relinquish its existing infrastructure but will adapt it in cloud mode by setting up a private cloud. Such adaptation can represent a not inconsiderable task, which should not be underestimated. That is what the case of Capgemini illustrates:

"The complexity arose from the fact that we did not start up a service from scratch. We took an existing set of machines we had and then the question arose as to how to reallocate all these resources to the various different projects. We needed to clearly identify what machines were still running, which took a bit of time. This switchover also enabled us to shut down 30% of servers that were no longer being used."

JEAN-CHRISTOPHE LASVERGNAS, CIO

3.2 The key success factors for a cloud project

All the businesses we interviewed laid great stress on a series of important key success factors that should be considered in any cloud project. These success criteria can be divided into six main categories.

3.2.1 Start by asking the right questions

The first indicator of whether a cloud project will be crowned with success is whether the company has devoted some serious thinking to the balance between this operating mode and its requirements. Cloud computing has a lot of advantages but it is not necessarily the answer to all problems.

MEILLEURTAUX: THREE QUESTIONS CRUCIAL TO SUCCESS

"One should first ask oneself: 'is cloud computing really suitable for my project? For instance, does the fact that my data resides elsewhere suit me?' Indeed, some types of data should not reside outside the company, for example, everything relating to industrial or banking secrets: I think it is unwise to store such sensitive data on platforms beyond one's control.

The second question we should ask ourselves is: 'what economic model suits us best?' For example, a company that has bought ten or so servers for tests and developments and under-utilizes them would probably not derive much benefit from cloud computing, but would do better to optimize the use of its existing machines.

The third question is: 'what happens if I change my mind, how can I repatriate my data?' But one should not be unduly scared by this issue. Even when one develops in-house, on a given framework, one should in any case always envisage an exit strategy should the said

framework no longer be maintained. To mitigate such risks, one should take every precaution in choosing one's provider, and one should be wary of those who content themselves with dressing up their existing offer in cloud terminology."

JEAN-MICHEL MOUGEOLLE,
DIRECTOR OF IT AND SOFTWARE DEVELOPMENT

As part of its CUBE (Core Cloud Computing services for the Group) program, Orange adopts the same rationale: what part of its own infrastructure at international level should it transfer to private cloud mode?

ORANGE: CUBE, *A STRATEGIC ACTION PLAN FOR MOVING TO A WELL THOUGHT-OUT CLOUD*

"With CUBE, Orange wants to address a series of issues:
- Can the applications or services Orange uses in-house be adapted to a cloud-type organization? In other words, is there any benefit in migrating them from a dedicated physical infrastructure to a virtualized cloud infrastructure?
- Does this migration to the cloud entail redeveloping them?
- Is it feasible in the short, medium or long term?
- What development standards should one adopt for the future applications in cloud mode?

In the end, one of the key motivations for moving an application to the cloud is to optimize our resources. For instance, if a particular application only uses 10% of a server's capacity, on an occasional basis, it may be worth your while to migrate it to a cloud infrastructure."

MARK WIGINGTON, VP-ORANGE CLOUD

3.2.2 Knowing how to adapt functionally as much as technically
Technical aspects are not the main stumbling block in cloud projects. In many cases success ultimately depends on mastery of the functional dimension: "the bulk of the work in terms of adaptation was to make changes in our software to adapt it to the business model in which we were going to sell it on the cloud", explains Thomas Sarlandie de Backelite in this respect. "In most cases, that is the most complicated point: making changes in the solution from a more functional than technical point of view."

3.2.3 Managing relations with the providers
Choosing the right provider(s) is a difficult art but the ability to manage relations with them is still more so. The success of the project however can often hinge on this ability.

EURONEWS OR HOW TO SPUR ON ONE'S PROVIDER

"Microsoft is gradually expanding its offer. But initially we were astonished at the length of time they took to respond to requests for support. Some effort has been made to remedy things since then. The real problem we came up against, despite the fact that we called in a firm to assist us in the migration process, was to find the relevant information on certain functionalities. Granted, we received a lot of information, but at times we had difficulty getting hold of the really relevant information at a given point in time. This can be put down to the abundance of information and to the way it is disseminated."

PASCAL CHARLES, IT SUPPORT MANAGER

Many companies feel they need support in their relationship with the cloud provider. That can be a real facilitator. Among the points that should be closely monitored: the contract.

CAPGEMINI: WITH AN ALLY, ONE IS STRONGER…TO MAKE THE CONTRACT WATERTIGHT

"Among the key success factors for a cloud computing project, the choice of a reliable provider able to honor its commitments is of paramount importance. From that point of view, we were not disappointed, even if the presence of a partner who had a long-standing and close relationship with Google turned out to be of great help. In any event, a watertight contractual framework is very important, in order to ensure that the cloud's promises, including the ability to opt out of it, are kept."

JEAN-CHRISTOPHE LASVERGNAS, CIO

Pierre Foch from Quilvest shares the same point of view: managing the relationship with the provider is a key issue throughout the cloud project, from the time the contract is signed to going live:

QUILVEST: THE CLOUD, A PROJECT THAT NEEDS TO BE PACED OVER TIME

"Now that the project is online, and now that the QoS, deadlines, responsibilities and reversibility aspects have been thoroughly defined in the contract, we now work with the cloud provider in a spirit of partnership. In practical terms, we have arranged monthly steering committee meetings, a good opportunity for exchanging views, at which our provider presents and comments on a series of indicators on our spending."

PIERRE FOCH, IT MANAGER

Business in the cloud
3.2 The key success factors for a cloud project
Chapter 3

3.2.4 Managing security

The businesses we interviewed did not have any worries regarding the security of their cloud-based data or applications because they worried about it long beforehand. That is a criterion of the utmost importance, as Generix, Capgemini and Ceva say.

> **GENERIX: THINK "PHYSICAL" TO ENSURE "VIRTUAL" SECURITY**
>
> *"An element we watch closely is network security, between the virtual machines. We had already greatly compartmentalized our network with firewalls in our physical environments. We decided to retain exactly the same configuration in the virtual environment. our various network areas are thus always protected by firewalls, as if they were in a physical environment.*
>
> *So network communications between two VMs are systematically routed through a firewall, even if they reside on the same physical server. The security aspect is thus highlighted in a very efficient manner. This also spared us the need to make a clean sweep of our architecture principles to do something else, conceived differently for virtualization.*
>
> *In this way, we remain in a known set-up and retain a reasoning that in another context has proved convincing. We retain the processes designed in a physical environment in the virtual world."*
>
> FLORIMOND DU REAU, HEAD OF SYSTEMS & NETWORKS

In the case of Capgemini, security was an absolute requirement dictated by its customers.

> **CAPGEMINI: SECURITY, A PARAMOUNT OBLIGATION**
>
> *"For a secure cloud, the network is the most important part. That is why public clouds pose so many questions in terms of data compartmentalization.*
>
> *By contrast, in our private cloud, we can host virtual machines on the same physical machine in a totally watertight manner.*
>
> *Our customers impose extremely demanding security constraints on us, which we have to observe, let alone the statutory restrictions in certain sectors, defense for instance.*

On our sites in India, security levels are very high: all incoming and outgoing devices are controlled, all computers are referenced. The workstations don't have CD drives or USB ports and the hard disks are not removable, so that all the data remains in the building, which is a secure compound. Internet access is extremely restricted. I dwell on the Indian example because that was one of the main restraints in deploying the cloud. At the outset, businesses had misgivings about having their data available in the four corners of the earth. We had to take our prospects to our development centers to reassure them."

JEAN-CHRISTOPHE LASVERGNAS, CIO

Ceva for its part cautions us against the risks of losing control of certain security levers, such as user management, within the framework of SaaS, and points out the means to guard against them.

CEVA: IN THE CLOUD BUT NOT RECKLESS

"With regard to security, we embarked on two projects. Firstly, identity management. For example, it is our Human Relations department that creates user accounts in the system for our newly-hired staff, along with their access rights. When an employee leaves, the account is deactivated straight away. This is important, because in SaaS mode the degree of decentralization can be so extreme that one no longer knows who is in responsible for what. The second project was strong authentication with the aid of certificates. But this method only works for applications one controls because it consists in depositing certificates on one's servers. Having said this, Google Apps offers a two-factor authentication mode called OTP (one-time password). With OTP for instance, users receive a password by SMS before they can use the application. But setting up this kind of solution is still fairly restricting."

THIERRY MARTIN, IT SYSTEM MANAGER

3.2.5 Paying attention to quality of service

Quality of service is also becoming a crucial factor given the concentration and pooling of one's own resources in a cloud architecture. Capgemini is fully aware of how important this is:

"Cloud architecture poses the problem of ensuring a much more secure environment. When the cloud crashes, it is not just one machine that breaks down but 800!

And even without a crash, when a project temporarily overloads a database, we notice that other projects suffer.

For all these reasons, the architecture must be much more robust than a traditional architecture.

Fortunately, there are more and more tools on the market to monitor and improve QoS. For instance, the VMware administration environment helps a lot in managing quality."

JEAN-CHRISTOPHE LASVERGNAS, CIO

3.2.6 Being mindful of network quality

The cloud is synonymous with network access to resources and services. But whether or not the network is equal to the situation is another matter. For professional purposes, the traditional Internet does not guarantee the quality of service most businesses require. They will be more inclined to look at specialized network solutions. Bjarne Munch, senior analyst at Gartner Australia, bears this out:

FOR GARTNER, THE NETWORK INFRASTRUCTURE IS A KEY ELEMENT OF CLOUD COMPUTING

"As cloud computing, virtualization, mobility, unified communications and video drive more application traffic to the network, traditional network design practices will become increasingly significant constraints on the functioning of the business." The Enterprise Network of the Future Will Be Hyperconverged, Gartner 18 November 2010

"Enterprises should evaluate how externally hosted cloud services can deliver acceptable application performance. This should be done by ensuring appropriate network design, as well as how the service supports application acceleration."

OPTIMIZING APPLICATIONS FROM CLOUD SERVICES: THE OLD ISSUES, BUT MORE CHALLENGING TO SOLVE, GARTNER 17 NOVEMBER 2010

Cloud computing is the new step towards convergence of the network and IT.
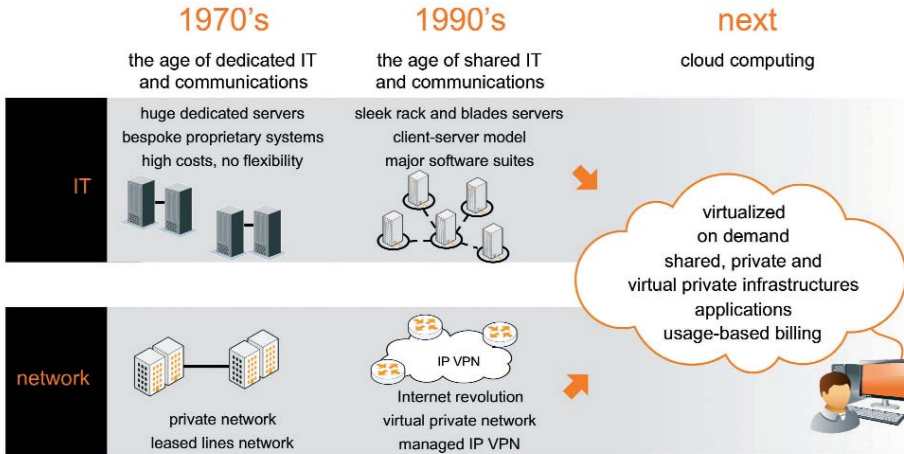
The cloud, the culmination of convergence between the network and IT
(source : Orange Business Services)

3.2.7 Supporting change
The switchover to cloud mode necessarily implies some changes to work patterns. User information and training are thus essential, even for the apparently simplest applications, like e-mail.

DDB: E-MAIL IN SAAS OR THE OBLIGATION OF PERFORMANCE
"Digital agencies have adopted this new solution very quickly, whereas more traditional support functions like legal affairs, which by tradition are more conservative, have lagged behind a little. But in general, adoption has not been a problem. Having said this, we have not overlooked the need to support change. E-mail is so much a part of our staff's everyday life and plays such a central role in their work patterns that we had to guarantee its efficiency with Google Apps. To help us manage this change, we called in Revevol, a partner of Google's"

JULIEN LEROY, *CIO*

One way of successfully supporting users is to get back to the fundamentals of the business. That is what La Poste did when it switched to Salesforce.

LA POSTE: SUPPORTING CHANGE, A QUESTION OF PROCESSES

"Whatever the product, it can only perform well if the processes have been clearly defined beforehand. Salesforce was rolled out in our subsidiaries in a very short space of time, and what's more against a backdrop of changing organizational structures. Its success can be put down to the fact that we constantly bore in mind the good practices of the CRM in general and the use of Salesforce in particular, so that no knowledge would be lost by not being documented."

SANDRINE BOISLIVEAU & JEAN-LUC RAFFAËLLI,
STRATEGIC PROJECTS

The knock-on effect, not necessarily expected at the outset, is that the move to the cloud can alter mentalities and trigger behavioral changes in the company. That was the welcome outcome for Ceva.

CEVA: A MORE COOPERATIVE CLOUD

"Supporting change is indispensable. We worked with the communication department to circulate articles on our Intranet and our in-house reviews…

In France, in order to support change on Google Apps, we trained all the users, for example on the notions of rules, conversations, diaries,…. Had we delivered the application "as is", it would have been rejected.

Work habits have changed for the better and become more collaborative. Whereas our former tool Quickplace had never really caught on, collaborative work is now re-emerging with Google Apps."

THIERRY MARTIN, IT SYSTEM MANAGER

Vision Planning
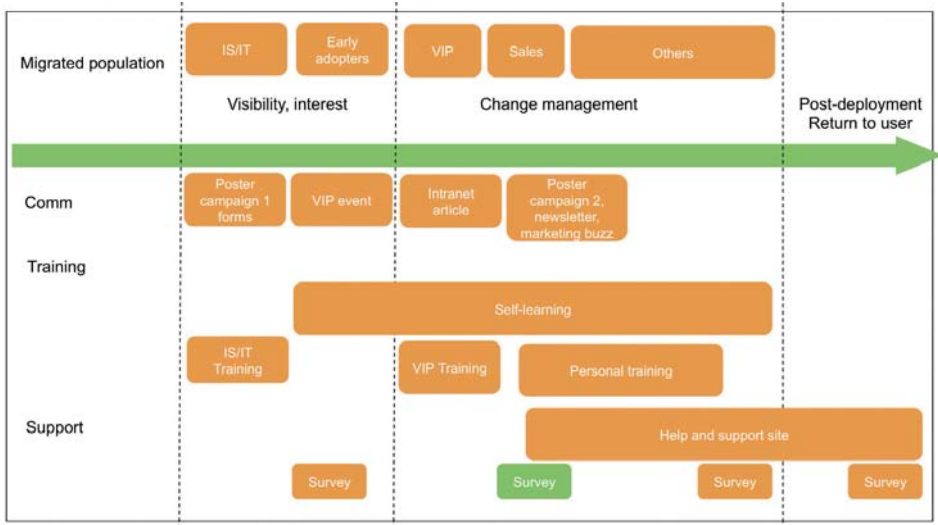
An example of change management (source : CEVA)

3.3 Consequences on company organization

3.3.1 The impact on HR

A company in the cloud is not run quite in the same way as a company equipped with traditional information systems. When one moves to the cloud, this alters the working conditions and profiles of the staff. In most cases, the companies we polled stress that IT staff tasks have become more varied and intellectually rewarding.

> **ARVATO: THE CLOUD, AN OPPORTUNITY TO ENRICH THE WORK OF STAFF**
> *"From a work organization perspective, the move to the cloud led us to conduct two concomitant initiatives. On the one hand, we are in the process of reconverting some of our technicians into system administrators. And in parallel the other technicians have moved on from their very tedious role of deploying applications on physical workstations and "re-configuring" them to customers' specific requirements to one with much more added value, one of supervising a virtualized infrastructure combined with much more thorough user support. In a period of high growth for our company, we have also hired people with specialized profiles."*
>
> *THIERRY PICON, CIO*

This enrichment of the work does not come without certain quid pro quos. Both at IBM and at Fromageries Bel, the cloud project has led them to further industrialize the processes. Although this heightened formalism may initially have disconcerted certain members of staff, in the end this has benefited the company as a whole in terms of efficiency gains.

IBM: MORE PROCESSES, A HABIT TO GET USED TO

"The private cloud project led us to modify the skills and duties of our teams. Previously, we made use of many low-skilled staff, whose job primarily consisted in installing operating systems and applications on machines and managing connections, by moving physically around the data center. These days our teams' role is much more one of supervising an automated and virtualized infrastructure.

Changing work habits:
Previously, users had the habit of calling so-and-so or such-and such to reserve a server; in a way they felt they owned the machines, as part of a silo-type process. Now we offer them a catalog of services that they have to reserve via an Intranet portal. Requests for support, which in times past were informal, are now made through a call center. The degree of formalism and organization of processes has therefore increased.

Although at the outset some may have had misgivings, after a few months most people embraced it, quite simply because support has become more efficient and flexible."

JEAN-YVES LECLERE,
INFRASTRUCTURE & SERVICES MANAGER

FROMAGERIES BEL: THE CLOUD, AN OPPORTUNITY TO STANDARDIZE THE PROCESSES

"The move to SaaS was also an opportunity for us to standardize our practices. The new people review process had the advantage of being accessible to all at the same time, without the need for any installation or functional specifications to be drafted by the HR teams. In return, they had to agree to submit to a more comprehensive and standardized process.
The users had to adapt to the solution, instead of a custom solution."

EMMANUEL ZIMMER, MANAGER of the SAP COMPETENCE CENTER
AND FORMER HEAD OF THE HR & NICT DOMAINS

These transformations require suitable profiles. The move to the cloud may require staff refresher programs, or even new recruits.

BACKELITE: NEW PROFILES OF COMPUTER EXPERTS

"To adapt BkRender to an infrastructure in the cloud, Backelite needs senior staff to see through delicate tasks such as replicating sessions between several servers and deploying applications on remote servers they do not directly control. These profiles are not 'cloud-specific' but resolutely those of senior staff.

Another advantage of the cloud is that one does not need to hire 4 or 5 system administrators to manage a set of 30 machines that do the same thing."

THOMAS SARLANDIE, VP OF SOFTWARE

3.3.2 The new role of the IT department

The transformations brought about by the cloud at company staff level also affect IT departments. They are moving away from strictly technical tasks and play much more of a support role for the business in an advisory and supervisory capacity.

FROMAGERIES BEL: THE IT DEPARTMENT IN A SUPERVISORY CAPACITY

"When they needed an in-house application, users would go and see the development teams for their upgrade or patching requirements. Now they log a ticket with the software vendor and hope they will get a response!

The nature of the IT department's work has changed: now we manage contracts and follow up tickets, but we don't really control them. As a result, we find ourselves between the devil and the deep blue sea, between moaning users on the one hand and the provider on the other. We now have an in-house ticketing tool for all our incidents, which are compounded by those of each software vendor! This makes for a lot of shuttling to and fro, which one must be able to handle.

The SaaS mode of operation requires a great deal of maturity on the part of the users. This is less of an issue when one manages applications in-house. In that case, the IS knows its application and can directly patch the bugs.

In the IT department team, this change in role has not had a significant impact. It mainly concerned two people who dealt with the HR applications. They were stakeholders in the SaaS migration projects from the outset and I have not had to make any changes in the team for the time being. Indirectly, we also had to develop skills regarding all the notions of architecture, because SaaS introduces new issues at that level."

EMMANUEL ZIMMER, MANAGER OF THE SAP COMPETENCE CENTER
AND FORMER HEAD OF THE HR & NICT DOMAINS

The cloud was born in a context of new user independence with respect to the information systems. This trend first appeared in the private sphere and employees expect to have the same degree of autonomy in their organizations. That is why IT departments have no choice but to adapt to this groundswell, to take on new duties more oriented towards the organization.

ESSEC: THE CLOUD, A REVOLUTION THAT WILL TAKE PLACE WITH OR WITHOUT THE IT DEPARTMENTS

"New forms of cloud-centric computing are becoming so popular with the public at large that the IT departments of companies or organizations have no choice but to factor in this new dimension. If they don't, users will make the choice themselves.

For instance, we noticed that for some years our students were no longer asking us to increase the size of their mailboxes, as they used to do. Why? Quite simply because two thirds of our students had already rerouted their ESSEC mail to their personal e-mail without asking us. Indeed, some of our administrative staff had done likewise!

The new role of IT departments in this age of cloud computing is above all an organizational one, a decision support one. It has to understand business needs and suggest relevant technologies serving user scenarios. Indeed, one of the better merits of cloud projects is that they place in the limelight the main added value of the company, which is not primarily engaged in administering IT systems but in its core business."

BENJAMIN SIX, DIRECTOR OF RESEARCH AND INNOVATION,
MANAGER OF THE MYESSEC PROJECT

Far from casting doubt on the role of the IT department, this transformation can even be a chance for it to raise its profile in the company, on missions with more added value. That at any rate is what Philippe Plantive, CEO of Proginov is convinced of:

PROGINOV: FROM IS TO OIS

"Above all one should not equate the cloud with the immediate or imminent demise of CIOs and IT managers. These functions are undergoing radical change. Tomorrow, CIOs and IT managers will be CIOOs or ITO managers, i.e. Chief Information Organization Officers or Information Technology Organization managers. They will be important enough to sit on their company's management committee because the notion of organization is essential in any company.

The IT departments of tomorrow will be there to see to the needs of their internal clients, analyze and satisfy them by initiating procurement inquiries on the market. Their new role is to support change in SMEs towards a more modern and pertinent organization, therefore towards more earning power."

<div align="right">PHILIPPE PLANTIVE, CEO</div>

3.4 The ROI of the project

The ROI of a cloud project can be very easy to calculate in certain cases. Typically, outsourcing e-mail in SaaS mode can easily halve its costs. In other more business-related SaaS projects, and all the more so for IaaS or PaaS projects, it can be more difficult to calculate. One has to factor in the total cost of ownership over the long term, comparing the cost of a traditional solution with that of a cloud solution. That is what Sabine de Leissègues of GFI explains:

GFI: ROI MUST FACTOR IN TCO (TOTAL COST OF OWNERSHIP)

"ROI must include an assessment of the current TCO, an estimate of the target TCO and consequently determining the financial difference between the two. This financial difference is used to calculate return on investment.

Previously, TCO would rise constantly and was impossible to control. This was because our in-house servers were rather old and we would spend our time fixing servers that were down.

According to our calculations, the cost price of a mailbox managed in-house is seldom under 10 dollars per user per month. With the cloud, this is now much lower (2 to 2.5 times lower)."

SABINE DE LEISSEGUES,
CORPORATE COMMUNICATION MANAGER

But the gains from the cloud project are not solely quantitative. To a great extent, they relate to improved processes in the company. That too needs to be taken into account, as Jean-Michel Mougeolle from Meilleurtaux explains in detail.

MEILLEURTAUX: ROI ON THE CLOUD, AS MUCH A QUALITATIVE GAIN AS A FINANCIAL ONE

"ROI is a bit more complicated to calculate for CRM purposes. We have to compare the TCO of our former Java solution, the cost of licenses we would have had with an "on-premises" solution and lastly the cost of leasing the cloud computing Salesforce service. Our calculations show that the cost price of an "on-premises" solution and a cloud computing solution are virtually identical.

On the other hand, for roughly the same price, the cloud has a distinct advantage: very frequent software upgrades. In the case in point, Salesforce offers us three major releases every year. Internally, this would be dreadfully expensive on all counts (staffing, number of servers mobilized or mobilizing business services to carry out acceptance procedures on these software upgrades). In "on-premises" mode, we would not have benefited from the same support. The gain from the cloud should thus be analyzed as an investment in regular upgrades. We would never have been able to make such an investment in any other way.

In addition, where our teams once spent 20% of their time maintaining our proprietary Java code, now we spend half as much time. This is a quite appreciable gain. That indeed was one of our goals: spend less time on maintenance and allocate the time thus saved to development. These days this time saving lets our developers code new functionalities on the force.com platform, without needing to reinvent the wheel of generic CRM functions that are already available as standard from the software vendor."

JEAN-MICHEL MOUGEOLLE,
DIRECTOR OF IT AND SOFTWARE DEVELOPMENT

3.5 Leaving the cloud: the reversibility issue

As in any outsourcing project, the ability to break off relations with a provider is just as important as the quality of service the latter can offer. And yet, this requirement is not always perceived as a pressing need. Backelite, which has optimized its developments for the cloud, is all too aware of the high degree of dependency this brings with it. But the quality of service of its provider is so high that it is prepared to live with this risk for the time being.

BACKELITE: HAPPY PRISONERS OF THE CLOUD

"We have adapted our developments to manage the specifics of cloud operation. Were we to decide to repatriate the BkRender hosting service, we would have to backtrack. That would be rather complicated and I think we would try to avoid going down that route.

On the other hand, we could keep the optimized developments in a cloud process but with another cloud provider. The adaptation time would be much shorter than if we wanted to repatriate the entire system. However, since cloud solution offerings vary so much, they are not easily interchangeable.

In a way, we are captives of our cloud provider. But if we are captives of a provider that delivers service, competitiveness and economic gains, that does not bother me. Now, as far as we are concerned, the return on investment is perfectly clear with our cloud solution."

THOMAS SARLANDIE, VP OF SOFTWARE

The problem most often reported by businesses is not the technical difficulty of opting out of a cloud computing service. It is rather the lack of standard contracts offered by the providers. Very often, the businesses we interviewed had to negotiate their contracts point by point to obtain acceptable clauses. But not all companies necessarily have the same bargaining power to obtain acceptable reversibility terms.

LA POSTE: REVERSIBILITY, AN ESSENTIAL FACTOR IN THE CONTRACT

"Reversibility, that is in-sourcing the CRM again, is theoretically possible…but in practice, in order for it to be achievable, it is important to pay the closest attention to all the details of the contract with the SaaS provider.

Even if one takes this precaution, reversibility is not easily guaranteed. This is because repatriating outsourced data storage is one thing but repatriating the application logic is quite another. Moving to SaaS is not just a matter of outsourcing data storage: it also involves outsourcing the intelligence of the business processes. That is undoubtedly where the risk of being captive of a provider is the highest.

On the other hand, the advantage of moving to Salesforce (although it would have been the same with any other SaaS application) is that it forced us to reflect in advance on the right decision for the processes."

<div align="right">

SANDRINE BOISLIVEAU & JEAN-LUC RAFFAËLLI,
STRATEGIC PROJECTS

</div>

Finally, while reversibility is theoretically possible, in practice it can prove to be fraught with difficulty. This is because not only is the data storage outsourced, but so is part of the intelligence of the processes.

BEL: REPATRIATING ONE'S DATA IS NOT ENOUGH

"Officially, our contracts include the option of repatriating all our data in-house but we have not tested it. In any case, data reversibility is one thing but that of the entire application logic is much more complex. It would involve implementing a new deployment project for the tool, including integration of the data repatriated from SaaS."

<div align="right">

EMMANUEL ZIMMER, MANAGER OF THE SAP COMPETENCE CENTER AND
FORMER HEAD OF THE HR & NICT DOMAIN

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What emerges from these few examples is that businesses have not yet really needed to exercise these reversibility clauses, at times won after a brave fight with their providers. But most of them are fairly mindful of the issue and recommend lending great importance to it before taking the plunge.

Chapter 4

The cloud is dead, long live the cloud!

Notwithstanding all its benefits, cloud computing also raises issues, misgivings, or even outright rejection. Those we interviewed imparted them to us while also indicating how they managed to surmount them. It is as if the cloud, still a young technology, were on the brink of exceeding its own contradictions. Interesting innovations are beginning to see the light of day, which we shall look at in more detail later, clearly pointing to the fact that the revolution of mass use of the cloud is only just beginning.

4.1 Misgivings and curbs

Cloud computing generates a series of changes that can raise misgivings. Here are a few of them that the people we interviewed had.

4.1.1 No more access to physical machines

According to Jean-Christophe Lasvergnas, IT managers are sometimes reluctant to forgo the possibility of going to see "their" machines.

> **CAPGEMINI: IT ENGINEERS, A SENTIMENTAL CROWD?**
> *"Previously, our teams greatly appreciated that fact that they could access the physical machine, and see how they were running. It was almost an emotional bond! Habits have indeed changed: the development teams are at Suresnes, Toulouse, Rennes, Nantes, Grenoble, Mumbai, Casablanca… quite a distance from the physical servers, which may also be at Toulouse, Grenoble, Nantes, Paris… Distance no longer poses any problems: this is now part of their culture."*
>
> *JEAN-CHRISTOPHE LASVERGNAS, CIO*

4.1.2 Security and confidentiality

While concerns of security and confidentiality are legitimate, the cloud sometimes raises them in a rather irrational manner. That is what Benjamin Six from ESSEC experienced, and he points out that a clear explanation is required when faced with such a reaction.

ESSEC: *THE CLOUD, AN OPPORTUNITY TO EDUCATE PEOPLE ON SECURITY ISSUES*

"There were few misgivings, and they mainly centered on questions of security and confidentiality. In this respect, the project was an opportunity for us to educate our users. We got across to them the message that the need for security should be weighed up according to the strategic nature of the information. Strategic data should not reside in a cloud, nor on any system the ins and outs of which are beyond one's control. On the other hand, non-strategic or non-sensitive data can quite readily be managed outside the company."

BENJAMIN SIX, DIRECTOR OF RESEARCH AND INNOVATION, MANAGER OF MYESSEC PROJECT

4.1.3 The disappearance of functionalities

SaaS in particular forces users to swap their home-made tools for software that albeit flexible, upgradeable and elastic, is nonetheless standard. This does not always happen without a skirmish: "the requests we received mainly centered on the disappearance of small functionalities", states for instance Pascal Charles of Euronews, regarding the move of e-mail to SaaS. More often than not, such reactions are soon forgotten, given the evident benefits for users. As Jean-Michel Mougeolle from Meilleurtaux says: "obviously, the Salesforce application is more generic than an on-premises application. But the range of functionalities on offer and the great efforts made in improving the Salesforce user interface mean that our users came to terms with it very quickly." All the same: users must accept a degree of formalism that does not always fully fit their needs.

DDB: *FROM CUSTOM-MADE TO THE "MASS MARKET"*

"Support for change also consisted in getting our users to understand that Google Apps was a standardized offer, with standard built-in functions, and without any possibility for custom developments (as had been possible with Lotus). The tools are easy to use, inexpensive and cover a vast range of functionalities. For all that, regarding this type of 'critical yet non-strategic' application, one has to accept that a 'custom-made' approach has to give way to a more 'mass market' rationale."

JULIEN LEROY, CIO

141

4.2 Limits

4.2.1 The cloud is not suitable for all purposes

The technical limitations of the cloud, in terms of storage or bandwidth, more particularly as far as public clouds are concerned, make the cloud unsuitable for certain purposes. On top of the technical restrictions, there are pricing limitations that make cloud solutions not economically viable, albeit technically possible. This is more particularly the case when the volumes of data to be processed or transferred become too high. That is what the people we met at Kobojo explain.

> *KOBOJO: DON'T OVERLOAD THE CLOUD*
>
> *"We store tracking data in local databases in our data center. We didn't want to transfer this data to the cloud. Indeed, our database exceeds 300 GB and Azure is incapable of handling such a volume in satisfactory conditions of quality of service and availability.*
>
> *In addition, at the time the cloud was an emerging technology and we didn't want to host the database and the proprietary information it contained on technologies yet to be mastered.*
>
> *On the other hand, the entire front end part of our new games is in Azure. The three building blocks of our architecture thus communicate: our databases in our data center at OVH, our game application at Azure and the tracking tool at Amazon."*
>
> *SÉBASTIEN MONTEIL, CTO AND RONNY KWON,*
> *DESIGN & DEVELOPMENT ENGINEER*

For the same reasons of storage, the cloud is not well suited to Euronews's core business, the production and broadcasting of images. Euronews uses the cloud but not for this critical side of its activity.

> *EURONEWS: A CORE BUSINESS THAT IS HARD TO RECONCILE WITH CLOUD COMPUTING*
>
> *"For the storage dimension, it would be inconceivable to use the cloud for all the data we need to store. The network technologies do not allow it. Their performance limits rule out this course of action. Even on a local network, one needs the benefit of a very extensive infrastructure. The cost of connections means that such an approach would not be cost-effective.*

Today we cannot do without the data stream. And each workstation can easily attain very high bandwidth speeds. Taking that on would amount to expending exorbitant sums of money on pipes to successfully transfer all the storage.

The fact of the matter is that the cloud is currently not pertinent to our core business. So, for these operations we are still equipped in-house with very high-speed lines.

We only have one site, which simplifies things somewhat. However, we are sending a team of journalists to Brussels. So in terms of storage we are thinking of a way to have asynchronous copies between our storage and this entity in Brussels. We won't be able to enjoy a permanent and direct link. In this particular case, if the cloud were feasible, that would resolve a good number of problems. But again, for reasons of performance, that is still unthinkable."

PASCAL CHARLES, IT SUPPORT MANAGER

4.2.2 The limits of elasticity

For essentially contractual reasons, the cloud's elasticity can leave something to be desired when one has recourse to fewer resources. This is what Sandrine Boisliveau and Jean-Luc Raffaëlli from La Poste noticed when they moved to SalesForce.

LA POSTE: THE CLOUD, ONE-SIDED ELASTICITY?

"The promise of elasticity with SaaS is delivered when one wants to scale up, but it is a bit more problematic when one reduces one's area of activity. What we experienced was that we could not contractually, as standard, reduce the number of licenses we ordered or allocate licenses not used by one subsidiary to another subsidiary. This led us to keep a watchful eye on this aspect of the matter for our future roll-outs: this scenario must really be factored in before one commits oneself, all the more so as the commitment can be for as long as three years.

The administrative tools on offer are not very sophisticated. Consequently, it is important to give someone in the organization the responsibility for operating and supervising the tool's dashboards."

SANDRINE BOISLIVEAU & JEAN-LUC RAFFAËLLI,
STRATEGIC PROJECTS

4.3 Points to watch

In addition to users' misgivings and the cloud's limitations, the people we interviewed wished to draw the reader's attention to a number of points to bear in mind if one wants to make a successful move to the cloud.

4.3.1 Deploying updates

Benefiting from the latest software enhancements permanently, in real time and without any effort is unquestionably one of the strengths of SaaS. All the same, Thierry Martin from Ceva strongly recommends testing everything oneself, to avoid unpleasant surprises:

> *CEVA: AUTOMATIC UPDATES, AN ADVANTAGE THAT CUTS BOTH WAYS*
> *"One should all the same keep a constant watch over the software upgrades and functionalities that Google adds on an ongoing basis. They are not always thoroughly tested or may not meet our needs. For this reasons and whenever we can, we test all new functionalities before putting them at the disposal of users."*
> *THIERRY MARTIN, IT SYSTEM MANAGER*

4.3.2 More and more environments

The cloud multiplies possibilities for virtualization. This has a good many advantages: among other things it facilitates transitions between development, test and production environments. For instance it may suffice to clone a test environment to put it into production, or a development environment to create another family of software applications derived from a core software package.

But virtual environment does not mean a free environment. Virtual machines have a cost, linked more particularly to the cost of OS licenses. An uncontrolled inflation in the number of environments induced by the cloud could very quickly prove to be financially disastrous. Generix had to get to grips with this issue and came up with some original solutions.

GENERIX: THE APPEAL AND THE DANGER OF A MULTIPLICITY OF ENVIRONMENTS

"Virtualization has affected our work methods: henceforth, for our pre-production, development, acceptance and load testing requirements we can very easily deploy copies of the production environment.

This has had numerous beneficial effects but also some pernicious ones: it is easier and apparently less costly to have more and more environments, but one should not be taken in by appearances because one can find oneself switching from 50 physical machines to more than 200 virtual machines.

This generates additional expenditure, among other things on OS licenses, as well as congestion of the virtualization systems, which can turn out to be very cumbersome and expensive, more particularly due to storage costs. The cost of a test VM essentially depends on storage which, unlike memory and the CPU, is not shared.

That is the main pitfall that one must take care to avoid. It can be the other side of the coin of technical easiness: users, who are not immersed in those infrastructures, are easily taken in and ask for more and more environments to "simplify" their work."

Procedures for avoiding this pitfall

"To try and curb this, we came up with a fairly basic solution: we maintained an approval cycle similar to the purchasing procedure for a physical machine, but a much speedier version thereof (because there is no need for all the physical part). The process of creating an environment starts with a request/justification/validation cycle that has to be approved by one's superiors.

Approval is granted or withheld on the basis of the calculated cost of a virtual environment. This breaks down as follows: cost of the OS license and, where relevant, that of other software programs, cost per gigabyte of disk space, cost per gigabyte of memory, and possibly the cost of a CPU (more difficult to estimate).

Apprising users of this cost has the added benefit of making them aware of the cost of virtualization. We had no choice but to go down that route, otherwise virtual infrastructure is consumed at breakneck speed."

FLORIMOND DU REAU, HEAD OF SYSTEMS & NETWORKS

4.3.3 Estimating the costs

Another pitfall to avoid is underestimating the costs. While certain pricing items are easy to grasp (storage, machine time), others are subtler and harder to evaluate at the start of the project, when we don't yet know how we will be using the cloud. Bandwidth for instance is one such item. The explanations of Sébastien Monteil from Kobojo are edifying in this respect:

> *KOBOJO: DON'T OVERLOOK THE COST OF BANDWIDTH*
>
> *"The main pitfall to avoid is underestimating the price of the cloud. If we had hosted Goobox on Amazon, it would now be costing us $30,000 a month in bandwidth.*
>
> *You instinctively tell yourself that you are bound to make savings with the cloud while forgetting the "bandwidth" component, which can quickly bump up the bill. What the cloud currently lacks is a cost projection tool."*
>
> *SÉBASTIEN MONTEIL, CTO*

4.4 Breakthrough innovations for a new cloud

Cloud computing is now booming, even if the adoption curve is still fairly flat, as outlined by Gartner. We have seen some particularly interesting innovations emerge recently, offering greater user-friendliness and a better perception of quality of service on the cloud.

Hyde Cycle for Cloud Computing 2010
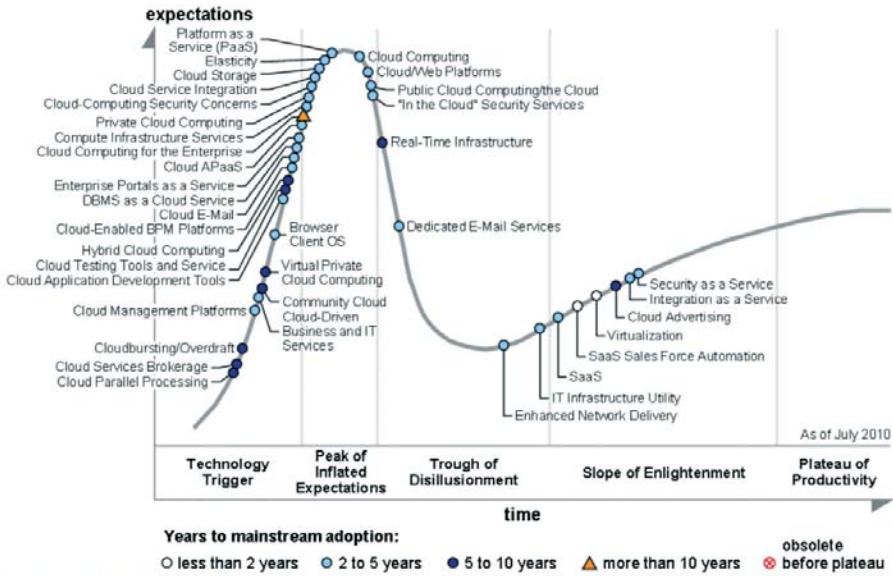
Priority Matrix for Cloud Computing, 2010

Cloud computing adoption: the outlook (source : Gartner - July 2010)

These innovations notably relate to optimization of the network layer of cloud infrastructures, a key factor for their smooth running.

IPANEMA TECHNOLOGIES: WAN GOVERNANCE FOR CLOUD COMPUTING

Cloud computing simplifies enterprise application delivery with resource flexibility, investment-less OPEX models, and no need for specialized in-house support resources. However, it creates additional pressure on classically shared infrastructure - the WAN (the actual "cloud").

In the view of Zeus Kerravala, Senior Vice President at Yankee Group, "Cloud computing has a very profound impact on the wide area network. When we move to cloud computing, the WAN actually becomes in many ways the backplane of virtual, cloud-based data centers."[12]

The WAN's traffic matrix becomes much more complicated with cloud computing: Internet and MPLS must jointly deliver applications to users, while performance and reliability remain absolute necessities for an efficient business. As the core of this application delivery infrastructure, the WAN must be viewed as a crucial business resource requiring full attention from IT managers. WAN usage must be understood. WAN performance must be controlled, optimized and continually aligned with business goals. WAN costs, including bandwidth and deployment of new applications, must be controlled.

WAN Governance, a method of IT management developed by Ipanema Technologies, enables enterprises to manage their WANs as "cloud-ready networks" - able to understand, control and optimize traffic between branch offices and public and private data centers, with capabilities to automatically adapt to new traffic schemes.

Ipanema provides the only all-in-one solution able to control global networks and deliver WAN Governance. Ipanema's Autonomic Networking System (ANS™) automatically understands application traffic and performance, controls each user's application flow according to need, optimizes response times and dynamically selects the best route for applications across hybrid networks. Multi-tenant by design, ANS scales to the largest enterprise network and the installed bases of the world's leading telecom operators.

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[12] *Zeus Kerravala, "How does cloud computing affect WAN bandwidth?," SearchEnterpriseWAN.com, 22 juillet 2010*

Powered by ANS, WAN Governance from Ipanema enables any large organization to gain full control and optimization of all applications over its global networks, including evolutions to private and public cloud computing. With WAN Governance, applications delivery and performance adapt to ongoing infrastructure transformations, so enterprises can perform today while taking control of tomorrow.

Fanny Millet of Orange Business Services confirms that the network layer requires careful attention:

ORANGE BUSINESS SERVICES: THE CLOUD AS A GALLERY OF SERVICES ON A VPN

"Online services are not a worry when they are used for e-mail or temporary test or development environments. They are much more so when the quality and security of the service could jeopardize the performance of the company as a whole. The network, and above all the uncontrollable public Internet, is specifically considered the critical point of cloud computing.

And yet, the benefits of cloud computing (flexibility, rapid elasticity, pay-as-you-go) will be all the more appreciable as they affect key parts of a company's information system. There now is a solution that guarantees the security and performance of networks accessing a variety of services offered in cloud mode: Orange Business Services's Business VPN Galerie.

Business VPN Galerie allows any company to log on via its Orange private network (VPN) to an on-demand service offered by Orange Business Services or one of its partners. This VPN connection affords numerous advantages essential to the smooth running of cloud computing services:

- prioritization of network applications according to their business criticality to ensure the highest possible level of availability for critical applications
- an optimal user experience, Orange Business Services commits to a given transmission time for application data streams on the network
- access to applications and data with the same degree of comfort as with a direct connection to the data center where the services are hosted, without the costs generated by a dedicated line
- a watertight network with no Internet access guaranteeing the integrity of data entrusted to Orange Business Services or one of its partners
- a single point of entry for incident management for all services provided by Orange Business Services

149

As for cloud computing service providers, Business VPN Galerie lets them deliver their applications with just as remarkable a user experience, but in 'as a service' mode. They can concentrate on their core business while Orange handles the complexity of the connections for them.

Business VPN Galerie currently provides access to both Orange cloud services and applications (IT package, Flexible Computing, smartphone management) as well as those of external partners like Ingenico (payment solutions), Swift (cash management), Cegid (management solutions) and Paybox (payment solutions)."

FANNY MILLET, SOLUTION MARKETING MANAGER

Cloud computing is undoubtedly a major evolution in corporate IT practices. From a technical point of view, it is more the culmination of underlying trends observed for several years than a real revolution. On the other hand, from an economic and organizational viewpoint, cloud computing marks a real break with the past in many respects: pay-as-you-go, elastic scaling, etc. While the cloud has already established itself widely in the field of software (SaaS), it still has some way to go in the other layers, namely infrastructure (IaaS) and development platforms (PaaS). Current innovations and lessons learned, such as those presented in this white paper, should be likely to convince companies to turn the corner.

Legal focus: the cloud, evolution or revolution?

IT outsourcing is a common practice among IT specialists: office service, outsourcing, ASP. Cloud computing is a new form of IT outsourcing that has developed with the Internet and is characterized by: elasticity, accessibility, simplicity and lower costs for the customer and the pooling of geographically scattered IT resources for the provider. On account of these characteristics that we find in a variety of forms in cloud computing (SaaS, PaaS, IaaS), cloud computing raises legal issues already encountered in the field of IT outsourcing.

The location of personal data is manifestly the most hotly debated issue as regards cloud computing (1). But there are other questions relating to the cloud computing model that induce one to take a fresh look at certain clauses in IT contracts (2).

1.1 The location of personal data

In the context of cloud computing, the fact that data can reside in or pass through several countries, through successive transfers from one processing center to another, without the customer being able to track it closely, poses the question of the due observance of rules governing personal information. Many countries have brought in regulations to protect individuals that restrict the use that can be made of their personal information.

In France, the law called "Informatique et Libertés" (French data protection law) of 6 January 1978 is now well known.
In the European Union, a directive lays down the rules governing the processing of personal data[13], which has been transposed in the various Member States[14]. The Directive also applies in the European Economic Area (EEA)[15].

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[13] *European Parliament and Council Directive 95/46/EC dated 24 October 1995, on the protection of individuals with regard to the processing of personal data and on the free movement of such data (the "Directive").*

[14] *For a comprehensive overview of implementing legislation in EEA countries: http://ec.europa.eu/justice/policies/privacy/law/implementation_en.htm*

[15] *Decision no. 83/1999 of the joint committee of the European Economic Area dated 25 June 1999 stipulates that the provisions of the Directive apply to Iceland, Liechtenstein and Norway. These countries have a degree of protection equivalent to that of the European Union as regards personal information.*

But there are also laws on the protection of personal data in many other countries[16], which are also liable to apply to data processed by cloud computing agents.

We will now present the rules laid down by the Directive, which are among the most restrictive, on the understanding that other regulations may apply different principles.

1.1.1 Application of the Directive to cloud computing

The ambit of the Directive is extremely wide. The Directive applies to all personal data processing connected to the territory of a Member State.

Firstly, the Directive broadly defines personal data as "any information relating to an identified or identifiable natural person ('data subject'); an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity". Therefore telephone or bank card numbers are deemed personal data.

Then it defines processing (an impressive enumeration) as: "operation or set of operations which is performed upon personal data, whether or not by automatic means, such as collection, recording, organization, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, blocking, erasure or destruction".

Finally, the controller[17] , namely the company that processes or has processed the person's data, only has to be established on the territory of a Member State or make use of equipment situated on the territory of a Member State for the Directive to apply to its processing.

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[16] *By way of example: Andorra, Argentina, Australia, Canada, Guernsey, Hong Kong, Faroe Islands, Isle of Man, Israel, Jersey, Morocco, Russia, Switzerland, Tunisia, Ukraine, Uruguay.*

[17] *The Directive gives the following definition of the person responsible for the processing (the "controller"): "the natural or legal person, public authority, agency or any other body which alone or jointly with others determines the purposes and means of the processing of personal data".*

In other words:
- a company established in the EEA that processes personal data in the cloud must observe the Directive-implementing legislation of the State in which it is established,
- a company established outside the EEA that processes personal data in the cloud using its provider's processing equipment situated on the territory of an EEA member state must observe the Directive-implementing legislation of that State.

Lastly, the Directive stipulates that with regard to subcontracting (for instance when having recourse to a cloud computing provider), not only must the controller comply with the technical security measures and organizational measures designed to protect data as provided for in its country, but the processor established in another country must also comply with the data protection security measures of the law of the country in which it is established.

1.1.2 Transfers of personal data

We shall not dwell on transfers of data within the EEA. Inasmuch as the Directive has established a first-rate area of equivalent protection within the EEA, personal data can logically circulate there freely and without any restrictions. Therefore cloud computing carried out by processing centers established in those countries poses no problems as far as transfers of personal data are concerned.

The situation is quite different as far as transfers of personal data outside the EEA ("third countries") are concerned: the principle is to prohibit the transfer if the country of destination does not ensure an adequate level of protection, subject to very restrictive exceptions.

Countries ensuring an adequate level of protection

To date, The European Union recognizes that the following territories provide an adequate level of protection: Andorra, Argentina, Australia, Canada, Faroe Islands, Guernsey, Israel, Isle of Man, Jersey, Switzerland.

In addition, American companies that have adhered to the Safe Harbor program, stemming from the agreement entered into by the European Union and the United States federal government, are deemed to be situated in an area that ensures an adequate level of protection (the "security sphere"). Such companies can therefore freely receive personal data originating from the EEA on American territory. The list of American companies that have adhered to Safe Harbor is available for consultation on a web site dedicated to this program[18].

Countries ranked according to their level of protection:
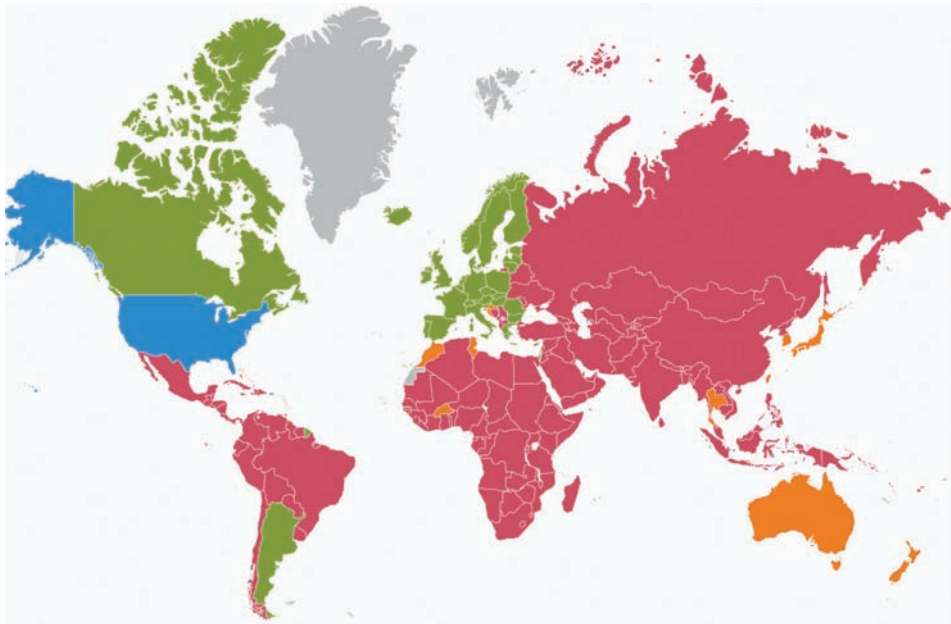
■ *Adequate level of data protection.*

■ *Adequate level of data protection under certain conditions.*

■ *Inadequate level of data protection (countries that nonetheless have a supervisory authority).*

■ *Inadequate level of data protection .*

Source : cnil.fr

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[18] *https://safeharbor.export.gov/list.aspx*

1.1.3 Exceptions

The Directive provides for exceptions allowing transfers of personal data outside the EEA in very specific circumstances: either the data subject, that is, the person whose personal data is transferred, has "the data subject has unambiguously given his consent to the transfer", or the transfer is "necessary" to carry out certain actions[19] that are not generally relevant in the context of cloud computing because it is the provider, not the customer, who arranges the transfers. Moreover, national authorities in charge of data protection interpret these exceptions in a very restrictive manner.

To facilitate transfers of personal data outside the EEA, and to countries or areas having an adequate level of protection, the European Commission has drawn up data transfer contract templates, in particular a template for a transfer contract (i) between a controller established in the EEA and (ii) a processor situated outside the EEA. Nevertheless, this template is not suitable for all situations, and it is complicated to implement for multiple transfers of data, as is the case with cloud computing. It should moreover be pointed out that use of a European Commission transfer contract template does not exempt the controller from certain restrictive formalities, such as filing a request for transfer with the CNIL (data privacy regulator) in France for instance.

Finally, we should recall the existence of BCRs ("Binding Corporate Rules"), which constitute a professional code of good conduct of a group of companies with regard to the protection of personal data. However, BCRs only apply to intercompany transfers, which makes them unsuitable in the context of cloud computing. To be followed up: the work of certain national authorities in charge of data protection, including CNIL, which sets out to extend BCRs to outsourcing.

For instance, in order to ensure its customer can comply with the Directive, the cloud computing service provider must use processing equipment situated in the EEA, in a country ensuring an adequate level of protection, in the USA if it has adhered to Safe Harbor, or it must use with its customer a data transfer contract template of the European Commission for other countries. Failing which, the customer may be sanctioned.

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[19] *For instance: the transfer is "necessary" for the performance of a contract between the data subject and the controller, for the implementation of pre-contractual measures taken at the request of the data subject, for the conclusion or performance of an existing or future contract, in the interest of the data subject, between the controller and a third party.*

At the end of 2010, the European Commission launched a consultation concerning the revision of European rules applying to the protection of personal data[20]. Aware of the difficulties raised by the text of the Directive and its necessary adaptation, the European Commission notably set itself the goal of i) clarifying rules on the governing law, and ii) improving and rationalizing international data transfer procedures.

2.1 The contractualization of cloud computing

Other questions arise as regards cloud computing, which the contractual technique can help understand.

As in any form of outsourcing, the setting-up of cloud computing services presents risks from the viewpoint of the customer losing control of data entrusted to a third party: and more specifically the security and availability of the data. The problem is more acute as regards cloud computing on account of the geographical dispersion of the data in numerous processing centers. Beyond questions relating to data security and availability, we will present some questions of a more general nature.

2.1.1 Data security
Concerns about the security of cloud computing are obviously very much in the forefront: the risk of unwanted dissemination of data, interception or intrusion by a third party, access by foreign authorities in States where the processing centers are based. Certain States like the United States with the "Patriot Act" even have instruments specifically intended for the purpose.

The solution in the first instance is technical in nature:
 • secure connections,
 • authentication of those who access the data,
 • data encryption,
 • traceability of data access and actions performed on it.

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[20] *http://ec.europa.eu/justice/news/consulting_public/0006/com_2010_609_fr.pdf*

In addition, in traditional outsourcing scenarios the customer generally reserves the right to audit the provider's processing center. In cloud computing it would be inconceivable to go and audit tens of processing centers all over the world, the number and location of which for that matter can change very quickly during the contract.

In addition to the aforesaid technical measures, it is therefore recommended that contracts should include:
- a certification (SAS 70 or other) of the provider's organization and security procedures,
- the provider's reinforced duty to inform in respect of security incidents.

One should remember that cloud computing also has its virtues as regards security. The provider has numerous IT resources at its disposal in remote locations to store and retain data in sustainable conditions. In addition, the geographical dispersion of data is also a form of protection against its being totally and instantaneously apprehended by a third-party, be it a hacker or a State.

2.1.2 Data availability
During the contract, the data must be permanently available to the customer at its convenience, whether for in-house organizational purposes or to respond to official inquiries. in such cases, the provider must be able to extract the required items from its cloud at any time and put them at the customer's disposal in a usable format.

This question also arises at the end of the contract, or if the provider defaults, when the customer wishes to repatriate the processing or entrust it to another provider under a reversibility clause.

Depending on the types of cloud computing services, it is not so much data access that is delicate as the customer's ability to use it independently of the provider. The customer's total dependency on its provider would affect the cost/effectiveness goal of a cloud computing service.

To perpetuate the processing, it is therefore advisable to include:
- data access and reversibility clauses, and more particularly provider commitments on the formats in which the data is retrieved and on the interoperability of the service, and where appropriate provision by the provider of the tools required to use the data, even at the end of the contract,
- a procedure for regular provisioning of backup copies to the customer, inasmuch as the customer has a tool to use the data,
- regular tests of data retrieval procedures, and stand-by procedures in the event of interruption of service.

In response to these questions of data availability, cloud computing players have taken several initiatives relating to the establishment of interoperability standards.

2.1.3 Miscellaneous questions

The provision of cloud computing services should allow the customer to pay only for the service actually used, and also enable the customer to adjust its capacity upwards very quickly as and when its requirements increase. In contracts one should not neglect clauses that provide for downward adjustments that are just as efficient, since elasticity should cut both ways.

When the customer collaborates with its provider to develop processing routines, one would be well advised to ascertain that the intellectual property clauses do not reserve the benefit of such adaptations and improvements solely for the provider. In addition, when the customer entrusts data or programs with high intellectual added value to its provider, it may wish to ascertain that the provider's processing centers are not situated in countries that do not adequately protect intellectual property.

Since many providers of cloud computing services are of foreign nationality, it is essential to include in the contract a clause specifying the governing law as well as a clause specifying the competent courts (including an arbitral tribunal where appropriate) to settle any future disputes, avoiding any excessively foreign laws and distant jurisdictions.

Cloud computing providers are often criticized for imposing a standard contract on their customers. One can understand the preference for a standardized service, even as far as SLAs are concerned, in pursuing a cost/efficiency objective. On the other hand, standardization is not imperative when negotiating the terms of the contract. A customer with only a small volume of business may find it difficult to impose its conditions, but negotiation of a few fundamental points is always a possibility, and if not one would be well advised to compare different offers.

To date, the courts have not rendered any specific decisions relating to cloud computing. The lack of such legal precedents should not however preclude application to cloud computing of the main solutions that judges have already come up with for other types of IT subcontracts.

Business Services

Orange Business Services, a France Telecom-Orange entity dedicated to B2B communication services for businesses worldwide, is a world leader in integrating communication solutions for multinationals. With the most extensive seamless network in the world for voice and data, Orange Business Services operates in 220 countries and territories, with local assistance services in 166 countries.

Cloud computing is one of the priority growth vectors for Orange Business Services between now and 2015. In our capacity as an operator-integrator, we offer a comprehensive portfolio of cloud computing services including:

- A "cloud-ready" network: with Business VPN Galerie, we launched the first hub in the world linking our VPN customers and cloud computing services via secure network gateways.
- IT infrastructure as a Service: our Flexible Computing Services range offers flexible infrastructure solutions on demand, in public cloud mode to satisfy SMEs, but also in private cloud mode to meet the security and customization requirement of multinationals.
- Security as a Service: our URL filtering and e-mail protection solutions delivered from centralized and managed platforms bring you maximum security and let you apply your security policies instantaneously to all your users, even travelling users.
- Collaboration and unified communications as a Service: combine all the advantage of collaborative work services and those of cloud computing. Our comprehensive range of unified communications (telephone, unified and instantaneous e-mail, presence, audio, video or web conferencing), hosted and managed in our data centers, is available on the PCs, IP or mobile telephones of the company's staff.
- Real-time applications as a Service: with our workstation virtualization solutions, or Private Applications Store, your employees can access their working environment and all their desktop or business applications at any time from any device.
- Support services: this new model of consumption of IT services can have a far-reaching impact on customers' organizations and environments: adherence/integration with what already exists, acceleration of processes, optimized scenario of transition, thoughts on economic models, etc. We

offer a starter kit, the cloud readiness assessment, to anticipate such changes. We also support our customers from their migration to the cloud up to the day-to-day management of their IT resources "as a service".

Cloud computing has revealed the need for more agility in professional IT, which is why Orange Business Services meets the needs of all businesses from SMEs to multinationals both in France and around the world, with packaged offers, but also with tailor-made offers that adapt to the existing IT infrastructure. These offers give customers the benefit of the promises of cloud computing (self-service, flexibility, pay-as-you-go, scalability, etc.), not forgetting security, performance and quality of service. Whether it is for our offers or those of our partners, Orange Business Services is the trustworthy intermediary that can guarantee unique quality of service guaranteed by strong commitments (SLAs), from start to finish, thanks to its global network.

For more information, please contact your sales representative or visit *www.orange-business.com*

ipanema
Technologies

Ipanema develops next-generation solutions for enabling large enterprises to have full control over their global network. Ipanema's unique patented technology aligns WAN performance with business objectives and guarantees optimal business application availability and response times for each user, no matter where or when. Ipanema is used extensively by many large telecom providers as well as by enterprises across business and public sectors.

Beyond MPLS technology
Ipanema enables any large enterprise to institute WAN Governance for aligning and automatically managing WAN performance according to business objectives. Ipanema solutions guarantee business application performance and continuity in a cloud computing world—anytime, anywhere. Using Ipanema, enterprises:
  • Guarantee user experience
  • Accelerate business applications
  • Unify hybrid networks
  • Save on IT costs

Ipanema enables Telcos and Managed Service Providers to market, sell and deliver Business-Aware, Application-Centric VPN services to enterprise customers. With Ipanema's technology and simplified, finely-tuned, engagement model to quickly deploy value-added VPN services, telecom providers:
  • Serve enterprise customers' real-time business needs
  • Capture more of enterprise customers' IT budgets
  • Increase VPN profitability
  • Refocus sales strategies away from MPLS commoditization and margin erosion to higher value network services
  • Change customer perceptions from costly vendor to true business partner for improving financial performance
  • Reduce churn and win new customers

For further information: *www.ipanematech.com*
www.wan-governance.com

The EBG is the largest professional community in France, bringing together decision-makers from companies active in various sectors, including industry, services and media, to work towards the common goal of promoting innovation and development.

The board of directors is made up of the following members:
• Didier Quillot, CEO of Lagardère Active, Chairman of the EBG
• Jean-Bernard Levy, CEO of Vivendi
• Steve Ballmer, CEO of Microsoft
• François-Henri Pinault, CEO of PPR
• Gerhard Zeiler, CEO of RTL Group
• Pierre Louette, CFO of France Telecom
• Patrick Le Lay, CEO of Serendipity Investment
• Grégoire Olivier, Executive Vice President, Asia of PSA Peugeot Citroën
• Sir Martin Sorrell, CEO of WPP
• Jean-Daniel Tordjman, Ambassador at large, Inspection générale des finances
• Wu Janmin, President of the Beijing Institute of Diplomacy, President of the Bureau International des Expositions
• Philippe Rodriguez, Treasurer
• Pierre Reboul, Secretary General

Activities:
The EBG coordinates a network of experts by organizing round tables to provide executives an opportunity to share their experience. There are currently ten communities active within the EBG: CEOs/GMs, CIOs, BI managers, purchasing managers, CFOs, legal and HR managers, marketing and web marketing/e-commerce directors, and directors of communication.
Each community meets once a month to discuss new practices specific to their role. These sessions are filmed and broadcast live on EBG.net.

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An electronic version of this document is available at ebg.net

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Acknowledgements

This paper is intended to use the real experiences of EBG members to shed some light on cloud computing.

The heads of 31 companies from diverse sectors describe their cloud projects and their reasons for making the move.

They explain the benefits they have derived and offer new advice for successfully transitioning to the cloud. With a wealth of experience behind them, they share their opinions on the future of this technology and its uses.

About the author

Jérôme Delacroix has written several books and owns SmartWords, an editorial consulting firm. A graduate from HEC and École Centrale Paris, he has also been coordinating cooperatique.com, a blog on innovative technologies and uses, since 2004.

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