cloud computing insights

expand your horizons

Business
Services

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cloud computing insights

everything you ever wanted to know about cloud computing but were too afraid to ask

contents

Today, when companies want to acquire a new IT application, they have to invest in new hardware, software and systems integration. The whole process can be long, expensive and exhausting – and measuring return on investment is often elusive. Cloud computing promises to change all this; it allows services – such as collaboration, office software, storage, online payment services or financial transfers – to be delivered online from resources centralized in powerful data centers. In addition, it gives companies considerable flexibility by allowing them to only pay for what they use.

How do businesses find the cloud computing services that help them achieve their growth and profitability targets? We are tackling the important issues in cloud computing, such as the availability and security of services, regulatory and legal restrictions, integration with existing information systems and modifications to internal processes. Above and beyond our own solutions, at Orange Business Services we see ourselves as an intermediary you can trust, a single point of contact for all of our clients' cloud computing services, including those operated by partners.

Cloud Computing Insights hopes to shed some light on the issues raised by the cloud. It takes an in-depth look into what impact it could have on the IT department, examines the security and performance management concerns, delves into the Orange Labs cloud vision, and describes how we are moving towards the cloud internally. It also includes opinions from leading analysts and an infographic that shows how cloud is affecting enterprise IT. We hope you enjoy reading it.

Didier Jaubert
Orange Business Services Director

gray skies or blue?

The IT department faces unprecedented challenges as cloud computing threatens to disrupt traditional computing models. How will it adapt?

Cloud computing has recast everything as a service. Software, infrastructure, security, networking, storage, computing power, and even platforms themselves are being reinvented as deliverables housed within a flexible service infrastructure, in which administrators can manage varying levels of demand dynamically. Virtualization, thin provisioning and server consolidation have led to an environment in which utility computing - the old concept of computing on demand - is finally gaining traction.

This has created the kind of scenario that only comes along every decade or two in the computing industry, in which technological and business models alike are shaken up, as the relationship between the two is redefined. "Essentially, cloud is a disruptive technology/service model that will change the role of the IT department," says Peter Glock, Managing Consultant at Orange Business Services.

The phrase "utility computing" has special resonance, because Glock sees the same future developments in computing for the coming century as happened in electricity during the last one. "There used to be a head of energy 100 years ago," he says. "Now it is standardized and delivered as a utility," he says. "Is IT going to go the same way?"

In the early days of electrical power, some companies used their own generators, such as coal boilers. This was delivered as a service to the company's internal facilities, such as factories. Over time, municipal and national electricity sources developed, which were able to provide these services as external partners, leveraging economies of scale and availability advantages to drive more efficiencies into the system. The provision of a service moved from an internal operation to an external one.

can IT be a utility?

How might IT mirror this development? We are already seeing the move to private clouds, in which a central "utility" within a company provides elastic services to a variety of internal customers.

Before this development, some departments were entirely in charge of their own server-connected storage, which might have been housed locally in a Windows Small Business Server box, for example. In other companies, all storage may have been provisioned centrally and accessed over a high-speed local area network. However, inflexibilities in non-virtualized data center environments made the process of procuring storage complex and arduous. This would be negotiated by the IT department in a process that might take weeks. When finally provisioned, the disks might sit largely unused by the department, with terabytes of excess capacity.

"Essentially, cloud is a disruptive technology/service model that will change the role of the IT department."

Peter Glock
Managing Consultant
Orange Business Services

Just as the modern electrical system is designed to manage demand elastically, so the elasticity of cloud computing means that IT resources can match business demands. "By focusing on a few common IT configurations (like software stacks, storage allocations and application options), and then automating the provisioning of these configurations, the amount of labor required to deliver that service is greatly reduced," says Ric Telford, Vice President of cloud services at IBM.

This makes it likely that the business unit will be responsible for buying IT services to match that demand. In an entirely plausible scenario, that could mean that the business unit would take control of the budget that IT used to manage.

IT departments facing this prospect are presented with three options: they can do nothing and adopt a head-in-the-sand approach; they can attempt to adopt a services culture in which the computing facilities that they had developed internally are presented to customers in new ways; or they can adopt an entirely outsourced approach, in which their treatment of computing facilities as services turns them into commodities that can be sourced from a variety of external providers.

As with the historic outsourcing of electrical generation, the economies of scale and the scope for demand management and availability increase exponentially when tasks are handed off to large third-party providers. "If you take an example like Microsoft BPOS, the cost of a single unit of SharePoint is far lower than doing it yourself," Glock explains.

business experience

To the internal customer, of course, service-oriented IT scenarios will look largely the same, regardless of whether the IT department provides those services itself or brokers them out. What will a customer's experience be like?

The business will treat the IT department as just another supplier. This will give those internal customers more power than they have traditionally had in the past. IT departments may well have to develop internal account managers to deal with line of business managers. They will have to understand what management wants and serve it to them, whether developed on an in-house basis, or commissioned externally, or both. "That's very different from the traditional model, in which IT departments give applications to the business, which is then expected to work with what it has," he says.

This presents the modern IT manager with significant challenges. "The IT manager would say that they are completely aligned with the business," Glock says. "In reality,

two-thirds of their effort involves just maintaining what they have now." Many IT departments are caught in an "engine room" mindset, in which they focus on running infrastructure and delivering applications for users. That is far different from being a service provider, in which account managers think their way into the customer's position and try to understand how their internal processes work, and how best to serve them.

Business departments themselves can also be ill-prepared for such conversations. Enticed by the "shininess" of IT, they can sometimes ask for new toys without thinking about the ramifications. The consumerization of IT, in which individuals crave the technologies that they have at home at the office, can be particularly pernicious. It is one thing to use function-heavy, insecure Web 2.0 technologies on a home desktop. It is quite another to expect them inside another organization, where security, data integrity and availability considerations are greater, and in which IT departments are also under pressure from legal and compliance departments to toe the line.

action for the IT department

How, then, can IT departments adapt to survive and prosper in this new environment? "They must realize first of all that things have to change," Glock warns. Inaction is not an option for operations that wish to stay relevant. "Secondly, you must be prepared to have grown-up conversations with business managers about what services they want, how they are prepared to pay for them, and how they want them delivered."

Of course, that implies a business that is prepared for such conversations. IT departments may find themselves taking the initiative, by offering different ways to frame the business model. For example, hospitality companies may charge IT out to hotels by simply dividing the IT expenditure by the number of hotel rooms in the group. Under the old model, each hotel may simply have paid based on the number of rooms it had. In a new model, services will be consumed on a more piecemeal basis, giving each hotel the opportunity to take advantage of technological innovation. These conversations will then develop into defining the types of service available.

In the most mature type of service provider relationship, the IT department – which is, after all, predicated on the effective implementation of systems – may be able to help the customer refine his own processes, consolidating and improving what is already done. That ability to analyze and to help reengineer is what will differentiate tomorrow's IT department from today's.

three possible futures for the IT department

do nothing: maintain the status quo

1 The first approach effectively dismisses the prospect of change, concentrating instead on a status quo, and looking at the past, rather than the future. "The IT department that doesn't embrace change will become a drag on the business and won't have the agility to execute," Glock says. "The business will find itself faced with high costs for IT."

In this scenario, businesses will view IT as a cost center, rather than as a strategic partner that can help drive the direction of the company.

outsource everything: become a broker

2 At the other end of the spectrum, the IT department outsources all of the services that it would normally provide itself, acting merely as a broker between third-party organizations and the business.

Procuring and managing the outsourcer becomes a crucial role for IT, which still has to translate the needs of the business into technical capabilities. Business units have never been good at understanding the computing resources that they need. Instead, they are better able to describe business processes that must be fulfilled. It is then up to the IT department to act as a strategic partner, helping them to understand what is possible, and advising them on fulfillment strategies.

One of the key concerns among IT departments here will be the loss of control. Will they be able to adequately specify the types of service they require? Can they guarantee that a third-party provider will always offer them the capabilities that their internal business customers require?

hybrid option: best of both worlds

3 The third, hybrid option is the most realistic, Glock believes. The reason is that all companies have a core competency upon which revenues rely. Professional services companies produce intellectual property and manage billing. Financial services firms manage portfolios, facilitate online transactions, and deal with real-time investments. Systems such as these are unlikely to be handed off to a third party because they are too important to internal customers.

assess the risks
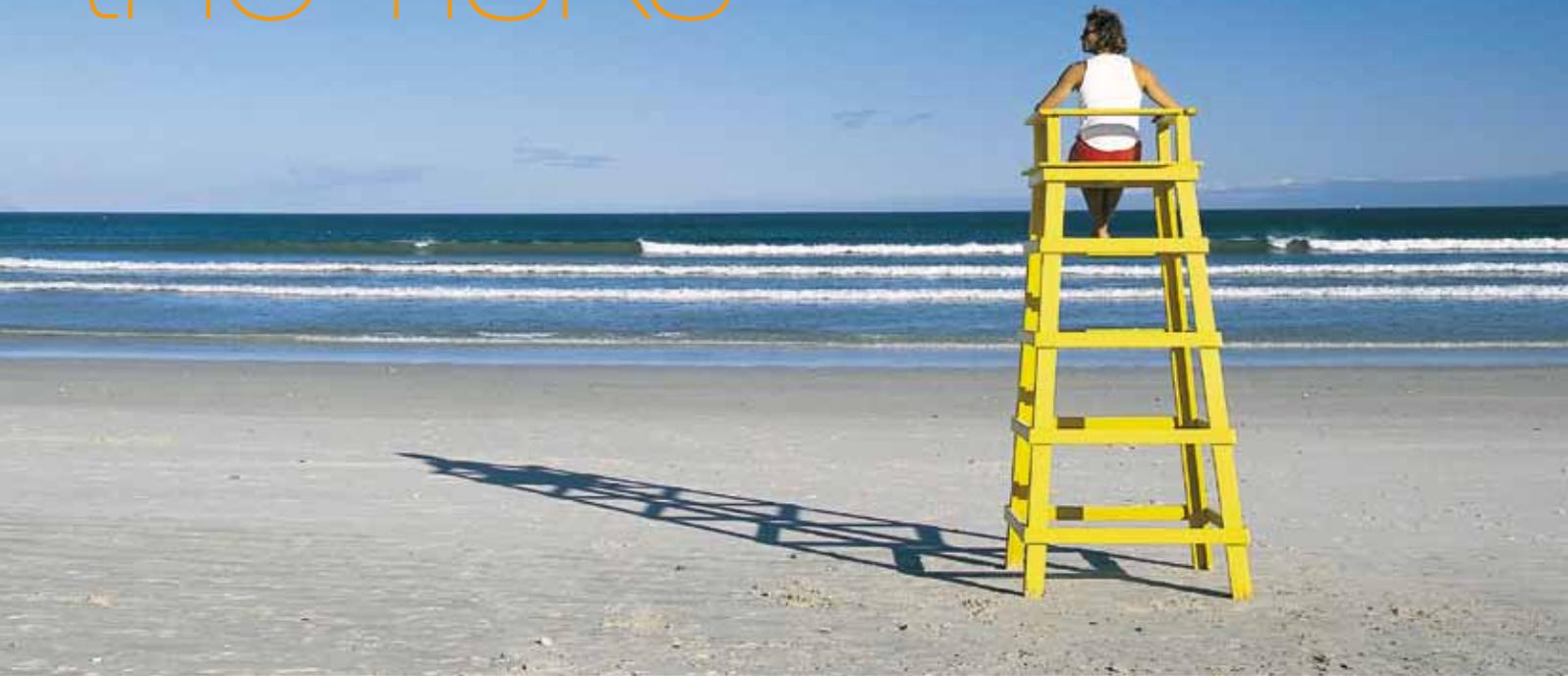
Enterprises should define the risks to their data and monitor how their cloud computing provider ensures its security and confidentiality.

How comfortable are you with your confidential information in another's hands? One of cloud computing's consequences could be a loss of control. When processing is transferred to a third party, some of the responsibility for security and compliance goes with it; no wonder security professionals are nervous. Trusting your cloud computing service provider to handle your data securely is therefore essential.

In February 2011, the International Information Systems Security Certification Consortium (ISC)[2] published its Global Information Security Workforce Study. It found that 92% of the 10,413 security professionals surveyed wanted to have a detailed understanding of cloud computing before being happy enough to implement it.

best practices

Industry bodies are already working hard on developing security best practices for cloud computing. Version 2.1 of the Cloud Security Alliance's guidance on governance and enterprise risk management in the cloud gives advice on how to tackle cloud security issues. It recommends that part of the cost savings from cloud-based contracts be reinvested in the continued scrutiny of a cloud provider's security.

"Information security governance should be a collaboration between customers and providers to achieve agreed-upon goals that support the business mission and information security program," the guidance says. The customer's responsibility includes defining risk tolerances for cloud-based services.

One of the first actions that enterprises need to take is to actually understand the nature of their organization's data. "If the traditional rule of thumb for confidentiality in data classification is applied, 85% will be public (and cloud ready), 10% will be internal (and therefore less suitable for public clouds), and only 5% will be secret and therefore entirely unsuitable for any open

(discretionary) security regime," says Rolf von Roessing, International Vice President of ISACA and member of the ISACA's Security Management Committee. The trick lies in understanding which data is which.

security at the outset

To help them do this, companies need to update their sourcing policies to ensure that security experts are part of every project team. They can perform a risk analysis to assess the security and privacy aspects of the cloud computing solution before engaging a service provider.

Once engaged, enterprises need to carefully define a set of security objectives to be delivered by the cloud provider. These objectives and associated metrics should be integrated in the service contract and regularly monitored during the whole service lifecycle. These IT security metrics should give enterprises the required level of confidence that the service provider is effectively protecting its information assets in a pre-defined and measurable manner.

"i heard that in the past, by the time new software had been installed on your PC, the next version had been released"

service quality guaranteed

Performance management has become a key issue in cloud computing; there is little point in choosing a cloud solution if end users' can no longer use their business-critical applications effectively. There are four key issues that you need to address when looking at application performance in the cloud.

1 build application performance into the business case

An assessment of application performance needs to happen at the very outset when you are building a business case for cloud computing. Application performance is a key factor in helping you choose what applications to move to the cloud. For example, if your main criteria for cloud adoption is costs savings, then any performance issues that slow your business processes or damage productivity could virtually eliminate any savings made.

2 determine how to judge success

To be able to effectively judge application performance you need to identify your key performance indicators (KPIs). These will also need to reflect the impact of different deployment approaches, such as public or private cloud. As a guide, a survey carried out by Orange in application performance KPIs found that application response time is the most common (93%), followed by availability (72%), transaction response time (68%), latency, jitter, packet loss (68%) and server response time (66%).

Monitoring KPIs should be an ongoing activity – even once the application has been deployed in the cloud – because they give you valuable information on how your applications are reacting to changing business and technical conditions, such as the impact on availability caused by a wider rollout, for example.

3 set your service level agreements

Your KPIs should also play a part in forming the service level agreements (SLAs) that you have with your service provider. Our survey found that application-oriented SLAs came in first place (69%), followed by managed network services (56%) and business service or systems management SLAs (27%).

The approach your service provider is taking to application deployment can have a big impact on how your applications will perform. Even the way the application is virtualized can make a big difference – by virtue of how customers are partitioned in the shared infrastructure. Because resources are not unlimited, the actions of another customer could have an impact on your own application's performance. This should be reflected in your SLAs.

4 don't do it all at once

Application performance in the cloud can suffer if you try to do too much at once. You need to take a phased approach to cloud computing, so that you can see how well your cloud application performs and work out the implications to your contingency plans and what it means to your business continuity planning (BCP). Once your application has been tested and is stabilized in a live environment, then you can look to add new applications to the cloud. Governance is a key part of this exercise. It gives you a framework for how applications are distributed, replaced and upgraded to prevent any changes having an impact on performance and availability.

"now, with cloud computing,
it's up and running in the time it takes
to get a coffee"

IT changes with Orange

To simplify your IT and ensure it constantly meets your evolving needs, change to cloud computing. Our global reach and local presence backed by our expertise means you can concentrate on running your business with total peace of mind. Find out how our capabilities can help your business: www.orange-business.com/en-cloud

business changes with **orange**™

are telcos in pole position?

Traditional IT players may still have the strongest reputation for cloud computing, but with their increasing experience in delivering managed IT services and control of enterprise-class networks, telcos are in a strong position to grab market share. **Peter Hall**, Principal Analyst at Ovum, explains why.

Over the past couple of years, cloud computing has grabbed the attention of the media and IT industry because of its potential to offer a new model for the provision of computing and applications to enterprises. More recently, leading global telcos have developed and launched their own cloud computing services, including infrastructure as a service (IaaS), as they plan to compete head-on with solutions from leading players in the IT industry.

For telcos, cloud computing can be seen as a progression from services, such as managed hosting, that they have been offering for many years. In fact, delivering business-grade cloud computing services makes similar demands on them to managed network services, such as quality of service (QoS), security and meeting strict service level agreements (SLAs).

busy market

Of course, telcos aren't alone in offering cloud computing services. They are up against a range of high-profile competitors like Amazon, IBM and Microsoft. A key selling point for telcos is the critical importance of the network in delivering high-performance cloud services.

Because they own the network, telcos can offer cloud computing services that don't rely on the unpredictable public Internet, which doesn't have the security and performance required for business-critical applications. The public Internet may be fine for

> **They already have a relationship with large enterprises for delivering critical business services.**

developers looking to test their applications, but enterprises will demand SLAs and QoS guarantees as they move business-critical applications to the cloud.

While other suppliers can resell network services along with their cloud services, telcos have a number of advantages over that approach. They have the experience of delivering IT services over the network, with the requisite security and performance guarantees. They understand how delays can affect real-time applications and how to prevent them. They already have a relationship with large enterprises for

delivering critical business services. And finally, they can bundle cloud computing with the network, wrap it up in an end-to-end SLA and deliver it (in some cases) globally.

In addition, cloud computing has an important role for delivering unified communications and collaboration (UC&C) applications, either as a pure cloud-based solution or as a hybrid model combining premises-based communications solutions with a rich set of applications delivered from the cloud. Communications as a service will become an increasingly important service strategy for telcos for business VoIP and UC&C.

deployment models

Telcos provide all of types of cloud computing deployment models, including public clouds, virtual private clouds, private clouds and hybrid clouds. The key advantage for telcos is that they are able to offer a wider range of networking options in addition to the public Internet for their cloud computing offers. In particular, enterprise cloud computing is well suited to MPLS IP VPNs, which are already widely deployed in enterprises. Public clouds are where cloud computing services are delivered over the public Internet. Virtual private clouds make public clouds more secure by providing customer segmentation and security. And a private cloud is where a company has its own dedicated cloud computing platform, accessed over a private network – possibly provided by a telco.

Private cloud has sparked some debate as to whether it is actually cloud computing but, in general, it has been accepted. For example, a group IT department could set up a private cloud and deliver IT resources to the constituent parts of the organization. This can work particularly well in government and larger conglomerates.

The final deployment model is hybrid cloud, which is essentially an enterprise strategy of using multiple deployment models, such as public and private clouds. For example, an enterprise could use a public cloud for application test and development and a private cloud for mission-critical business applications. In the future, it should be possible to easily transfer a cloud workload from one type of cloud or provider to another without having to reengineer it. However, this increased flexibility is not yet available, because the standards are not ready.

white label service

Another area where telcos could make a significant market impact is wholesaling white-label cloud computing services to

other network service providers. Establishing a cloud environment is very complex and requires a wide range of in-depth IT and network skills that may be beyond some telcos. In fact, telcos without adequate experience in delivering managed IT services should beware before launching their own cloud computing services. They need specific skills, and professional services capability and must be able to provide support to end users. Although some

> **For telcos, cloud computing can be seen as a progression from services, such as managed hosting, that they have been offering for many years.**

elements of the infrastructure are easy to obtain, such as the virtualized computing and storage platforms, it is not straightforward to deliver and deploy services, such as self service and billing. White label services would suit smaller telcos looking to launch their own cloud computing services and would allow a much faster time to market than building their own infrastructure.

reality check

However, it's important to remember that despite the media frenzy around cloud computing, it is still not currently high on the agenda of most CIOs and IT managers. Cloud computing is in an early adoption phase, especially in terms of infrastructure as a service, although some software-as-a-service (SaaS) applications such as Salesforce.com, are already widely used. But it is growing quickly and, in five years, most enterprises will use some element of cloud services.

We believe that early market entry by leading telcos will give them the opportunity to establish awareness and credibility before the cloud computing market steps up a gear to a higher adoption phase. However, cloud computing should not be seen as an easy route into IT services for telcos that have not yet developed a broader strategy and commitment to become more IT-centric in their enterprise portfolios and professional services skills.

Cloud computing is an evolution of IT managed services. It allows any IT resource to be consumed as a utility, from simple applications to a complete server infrastructure, and be delivered as on-demand services over a network. This lets enterprises benefit from advanced IT services without extensive capital investment, skilled staff and ongoing operational headaches. Computing resources become elastic, scaling up and down to suit seasonal demand, always with the latest upgrades, security and performance features. It can be implemented as "public cloud" open to any Internet users; as a "virtual private cloud," which is a shared service but delivered over a service provider's private network; or as a "private cloud," which utilizes resources dedicated to the enterprise.

This infographic charts how cloud computing technology has evolved and where it is heading.

cloud journey

how IT is evolving

Internet
- there were 100 million active Web sites on the Internet at the beginning of 2011

- smartphone sales increased 74% in 2010 to 295 million devices

mobility

Web 2.0

virtualization
- 80% of enterprises now have a virtualization program

- 177 million active Skype users
- 110 million tweets per day
- 156 million public blogs
- 500 million active Facebook users

you are here

cloud

business challenges
- inflexibility
- globilization
- emerging markets

top concerns for implementing public cloud services

security	37%
network availability	23%
service levels	19%
supplier lock-in	8%

0% 10% 20% 30%
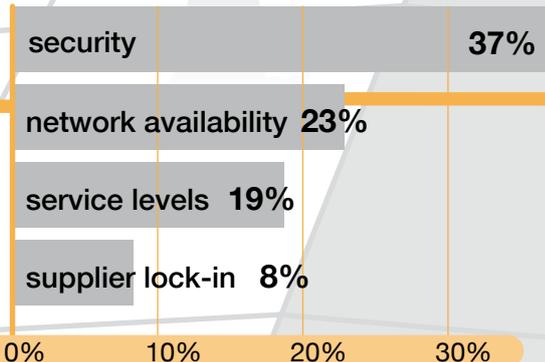
top reasons for adopting cloud computing

lower implementation costs	53%
lower ongoing costs	48%
new features faster	46%
better support for mobile workers	34%
per-use pricing matches volatility	30%

0% 10% 20% 30% 40% 50%

community clouds

inter clouds

vertical clouds

open clouds
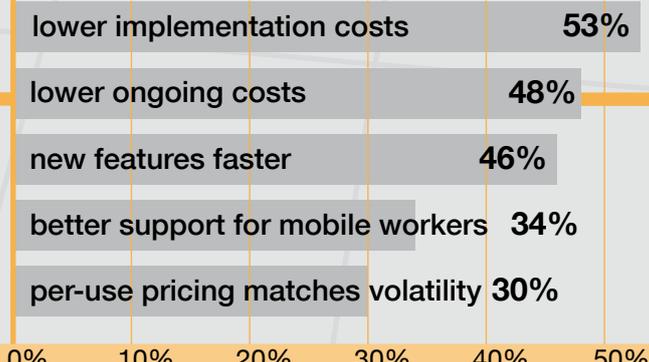
personal clouds
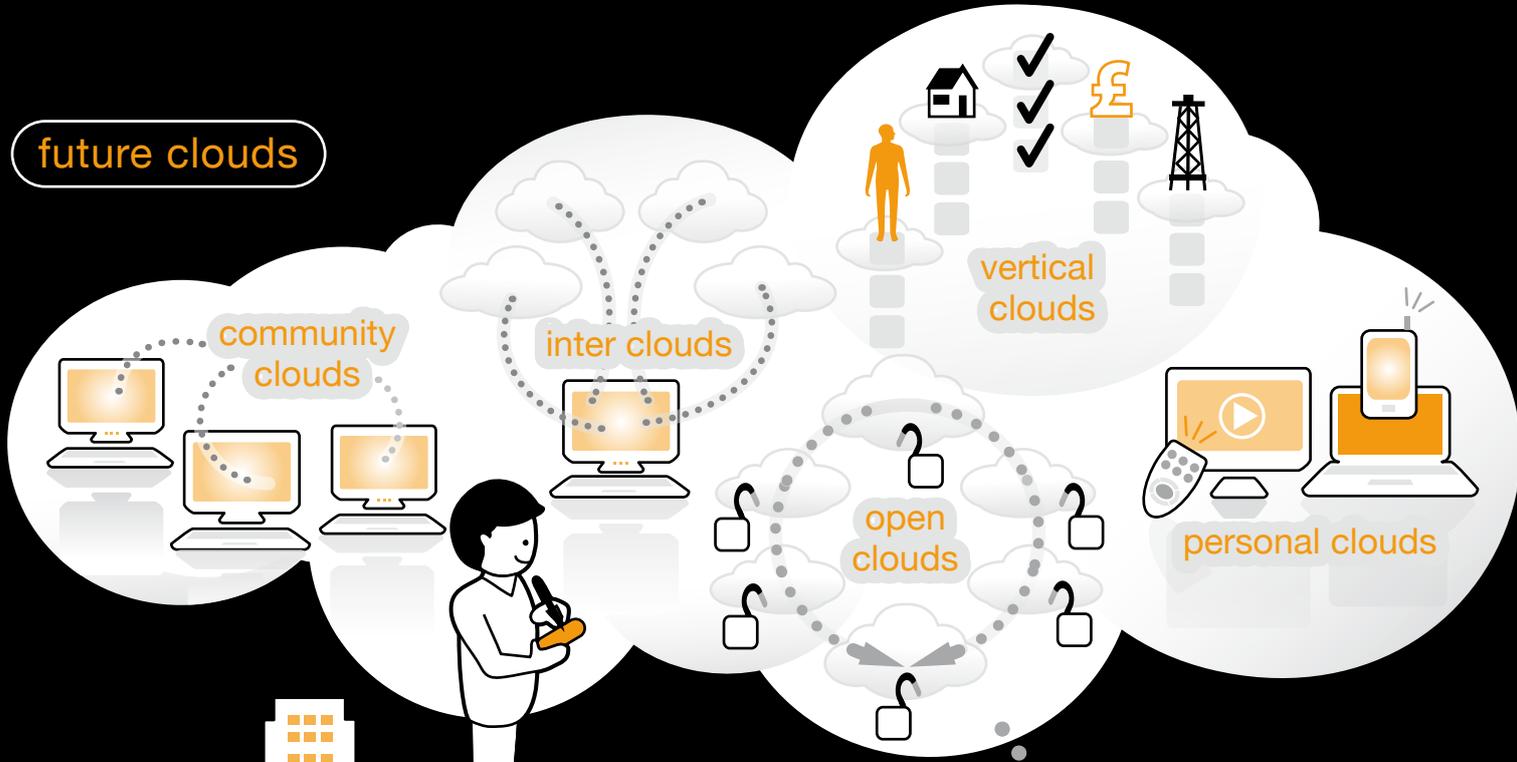
2013
- approximately 60% of server workloads will be virtualized
- 10% of total number of physical servers sold will be virtualized with an average of 10 virtual machines per physical server sold
- 10 virtual machines per physical host means 80-100 million VM per year

2014
- 90% of organizations will support corporate applications on personal devices
- per month: 5.1 exabytes of business Internet traffic, 2.3 exabytes business managed IP traffic, 0.7 exabytes business mobile data

2015
- Morgan Stanley estimates that the mobile Web will be bigger than desktop Internet

2010
- the number of physical servers in the world: 50 million
- one-third of Intel-based servers in enterprises are virtualized
- 300,000 Web sites hosted on Amazon EC2

2011
- mobile malware targeting Android and jailbroken iPhones; 48 million tablets sold

2012
- per month: 3.7 exabytes of business Internet traffic, 1.7 exabytes business managed IP traffic, 0.1 exabytes business mobile data

are you planning to build a private cloud infrastructure?

20% have no plans

50% yes

30% are thinking about it
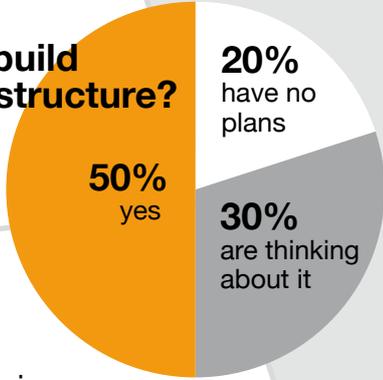
moving to cloud services

1 build a catalog of services
2 visualize future use
3 perform discovery and analysis
4 build a proof of concept
5 right-source the services
6 plan for transition
7 execute
8 optimize – and start again

Business Services

orange™
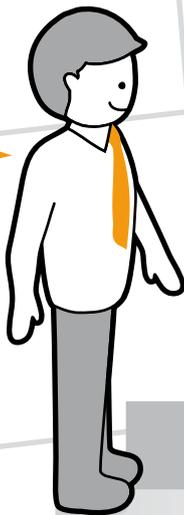
1

define business strategy

In order to define the cloud computing strategy at a high level, it is crucial to understand the business' IT requirements and objectives. This means evaluating what the organization needs in terms of criteria such as agility, cost, innovation and business continuity.

But it is also important to understand what impact moving to a cloud model will have on the business. As a result, consultants assess how far down the path a given enterprise is towards becoming an internal service provider, perhaps by using best practice service management methodologies such as ITIL, and whether its IT services comply with a suitable underlying architectural framework.

Such information, which is fed back to customers via a presentation, is critical, as it will inform the size and scope of the cloud project and clarify how much preparation work remains to be done.

2

undertake a cloud assessment

A cloud assessment involves taking the business strategy findings and using them to come up with a range of potential options for cloud business models. These include recommendations on possible application and service candidates.

The pros and cons of each option are evaluated following technical and security audits of existing IT platforms. This helps the business understand from which point initiatives would need to start and how easy it will be to migrate systems or services to the cloud. A return on investment analysis is likewise provided based on a range of criteria such as differing service levels.

Customers are then furnished with both a report and a presentation that can be shown internally to the board in order to help construct a suitable business case and decide in which direction they would like to go.

3

select candidates

After the business case for a given project has received the go-ahead, the next step is to categorize applications, data sets, infrastructure or services into groups and evaluate which would benefit most from being migrated to the cloud.

Good candidates usually include offerings that are subject to variable demand and fluctuating application peaks such as collaboration tools, applications with low data storage volumes, Web platforms, packages such as CRM and non-sensitive data analysis services. Customers at this point are provided with the necessary information to make the most appropriate choice based on where they want to go.

4

create a proof-of-concept

When pertinent migration candidates have been chosen, the next stage is to define the parameters of the project and agree on criteria for success. Such criteria is likely to include system response times and availability targets to ensure, for example, that mail servers never go down for more than 30 minutes.

A workshop is then set up with the customer to revisit and potentially modify goals set in the cloud assessment phase, before a high-level design in the shape of a proof of concept is created. The aim here is to prove that the ideas evaluated and discussed so far will both work in practice and meet customer expectations.

a lifecycle approach to cloud computing deployment

As demand for cloud computing continues to mount, the consultancy arm of Orange Business Services is adapting its well-established project methodology to help customers evaluate the cloud's potential and undertake any migration successfully.

Orange has developed a best-practice approach based on a systematic, eight-step process. Each step includes concrete deliverables that are signed off by customers at the end of each phase in order to ensure that objectives are met every step of the way. The goal is to avoid costly misunderstandings and ensure that initiatives are delivered on time and to budget. The methodology covers all types of cloud implementations, whether they be software, platform or infrastructure as a service.

5
migration planning

Once customers know that the proposed solution meets their success criteria and that the project is on the right track, a workshop is held between internal project managers and consultants in order to work out a migration path for each service under discussion. Options include leaving services alone, retiring them, or migrating them to a public or private cloud environment.

At the same time, workshop participants will also explore how any transition should take place, what possible constraints there may be in terms of performance, security and cost and what timescales are likely to be feasible.

6
transition

The next stage is to introduce one or more fully-functional pilot projects among a limited number of users. The aim here is to tackle any issues that arise at this early point in the transition phase so that they can be rectified before full roll out takes place. Any changes also need to be included in full and comprehensive documentation so that migration work can subsequently be undertaken quickly and systematically.

7
automation

The automation phase is unique to cloud computing and is intended to ensure that users can undertake everything they require for themselves without having to go back to the IT department – once the new system is in place. Such activities range from requesting, provisioning and decommissioning servers to obtaining and removing role-based system access rights, all of which is undertaken automatically via the careful orchestration of services.

An important consideration in this context, however, is that self-service is only possible if systems are not dependent on each other in order to ensure that project A does not damage project B in any way.

8
lifecycle management

Once systems are automated and set up to be easy to manage, it is time to evaluate users' experience of the new solution and how it might be improved. It is also a good opportunity to assess what lessons have been learned and how they could be reapplied in other areas of the business.
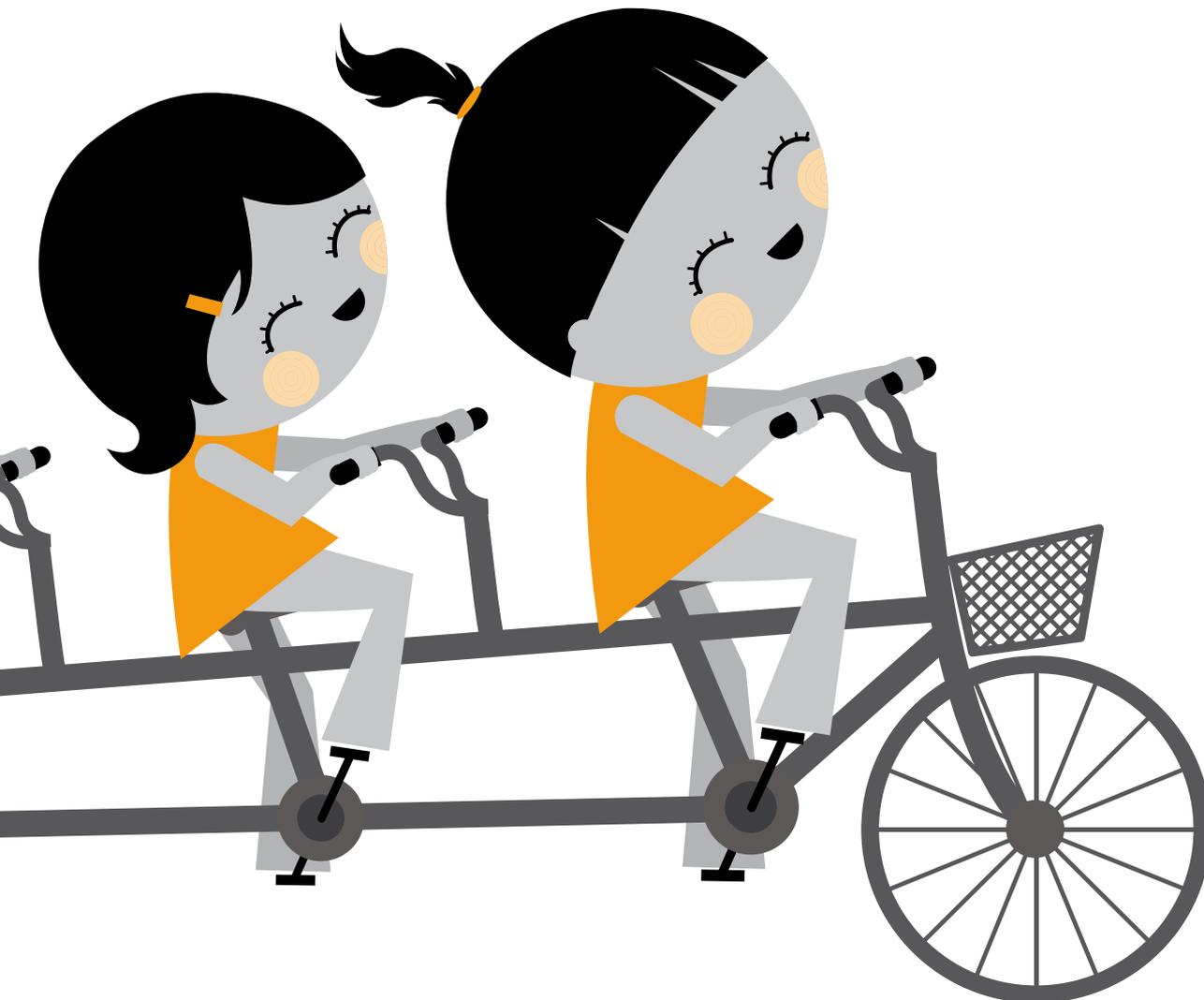
tomorrow's world

Cloud computing promises help in many different applications in the enterprise. We speak to **Thierry Coupaye** from Orange Labs about different visions of cloud computing and what impact he expects them to have in the future.

Cloud computing has many different potential end users and applications, and this has spawned a plethora of approaches to its delivery. "At Orange Labs, we have a vision of five different scenarios: the open cloud, the inter cloud, the vertical cloud, the community cloud and the personal cloud," says Thierry Coupaye, Head of the Cloud Computing & Networking Research Program at Orange Labs. "They cover everything from services designed to meet the specific requirements of individual markets to those focused on delivering users' applications and data to them wherever they are and on any device."

Read on to understand the potential of these differing yet connected visions of cloud computing.

open cloud

Standardization is essential in cloud computing because it allows enterprises, both cloud services' users and providers, to easily use multiple clouds or migrate from one cloud to another. The open cloud, which uses open source technology, is a key part of this standardization push, because vendor-independent standards bodies want to avoid proprietary code. In addition, many organizations – such as government and other public sector institutions – already demand open-source solutions, and the open cloud helps them move to cloud computing.

Open source technology is also important in the research and development of next-generation cloud computing services. "We see open source technology as essential in our research and development work," says Coupaye. "It allows us to experiment and innovate more freely because we have access to the source code. By using open source technology, we can also mobilize our technology partners more easily, because they don't want to be locked into a proprietary system."

"Mobilizing an ecosystem is very important in cloud development," adds Coupaye. "We are not a leader in software, so we need an ecosystem to get the resources and skills together and, conversely, software developers do not have the network expertise. Cloud computing development needs to be seen as a collaborative effort, which is why we need the open cloud."

Although standardization efforts are still ongoing, the industry is making tentative steps towards the open cloud with the development of open APIs progressively supported by proprietary technology vendors. These allow external developers to create applications that can run on different proprietary cloud technologies. In the long-term, Coupaye believes that open source will complement and even become an alternative to proprietary systems.

inter cloud

The inter cloud is best described as an online marketplace of cloud services from which users select what they need based on their requirements, such as price, security, service

> "Cloud computing development needs to be seen as a collaborative effort, which is why we need the open cloud."

level or CO_2 emissions. An important part of the inter cloud vision is "cloud bursting," which essentially is the ability to transfer the workload from one cloud service to another. This could be between different data centers of a same private cloud (one which is used by a single company internally), between a private cloud and an external public cloud to cope with additional workload for example, or even between two public clouds to support a short-term surge in demand.

Cloud brokers that help enterprises find the services they need feature quite highly in the inter cloud vision. "They could be either pure-play cloud brokers that offer no cloud services of their own, or cloud providers – such as Orange Business Services – who could provide third-party cloud services to complement their own," explains Coupaye. "Brokering is a natural fit for carriers, because they have experience of putting multiple networks together and offering them under a single SLA, along with a large customer base and technical expertise."

The emergence of pure play cloud brokers such as Zimory (a subsidiary of DT) or SpotCloud in 2010 is evidence of the movement towards inter cloud (although their offers are currently limited to only one cloud technology: VMware vCloud for Zimory and Enomaly ECP for SpotCloud). Standards are key in this vision, particularly to allow workloads to transfer across different clouds.

vertical cloud

The vertical cloud vision refers to cloud computing environments that address specific applications and domains. For example, cloud gaming refers to games played and streamed from servers instead of being bought or downloaded onto game consoles. "The most significant development we see in this domain is the emergence of vertical platform-as-a-service (PaaS) environments that are designed specifically for developers to test and develop vertical applications," says Coupaye. "Our own researchers are using, or are planning to

use, cloud platforms for VoIP, machine-to-machine (M2M), remote device management platforms or health services."

The key requirement for vertical clouds is that they meet the specific demands for their market, such as security, communications or specific tools used by each domain. Also important is that they incorporate search functionality so that users can find and compose the right applications. Vertical clouds make a lot of sense for both providers and consumers: they allow smaller enterprises to access expensive software and hardware resources that they could not afford by themselves and larger organizations to benefit by selling spare computing capacity.

"For example, video transcoding is very resource intensive and smaller video or animation production companies could access this application through the cloud," explains Coupaye. "The service could either be provided by a cloud provider that developed an offer for this vertical domain, a larger production house that sells its spare capacity, or by a group of smaller companies that club together in a community cloud model." Vertical clouds made an impact in 2010 with plenty of activity in video animation and gaming, such as OnLive.

community cloud

Community cloud is the creation of a standard cloud service by a community – typically a network of small organizations such as SMEs or schools – by bringing together distributed computing power. Most famously this approach has been used before to look for alien life in Seti@Home or test the accuracy of climate change models.

The benefit of this approach is the massive volume of computing power available at the edge of the network, which could be pressed into service. This could help data centers deal with peaks in computing demand. In addition, much of the information processed in data centers is actually created at the edge by users, so it would make sense to also use some of the computing power available at the edge.

"The difficulty with this model is that it is very difficult to predict computing resource availability at the network edge or offer any SLAs," says Coupaye. "And if there are any financial incentives for users to provide their devices' computing power, then this can create all manner of regulatory headaches."

"However," says Coupaye," 2010 saw the emergence of community cloud experiments that were limited to a single organization. In other words, they used their own edge devices to distribute processing throughout the organization, and Orange Labs is preparing such an experiment in 2011."

personal cloud

The essence of the personal cloud is to provide all personal content and services to the user irrespective of their location and the device they are using for accessing and hosting content and applications. The vision also includes having multiple personal clouds, so that users could access a work and leisure cloud from the same device, for example. This approach incorporates what is also sometimes called the mobile cloud.

Technologically the major initiative is adapting applications to mobile devices, in particular client software by way of a Web operating system, such as the mooted Google Chrome OS, or device virtualization. "Virtualization on the device allows users to mix access to different clouds and separate personal from work information, or even prevent some information from being uploaded to the cloud by using local processing," says Coupaye. "This is made possible by creating separate virtual machines on the device, much like hypervisors work in virtualized servers, through software from companies including VMware (Trango), Red Bend (VirtualLogix) or Open Kernel Labs (which supports an open source solution). The other major issue for the personal cloud is how it copes when the mobile device is offline."

However, Coupaye thinks that these technical issues are reasonably easy to overcome. For example, the emergence of HTML 5 will help solve the problem posed by the offline mode. The first generations of online personal storage and synchronization services already made an impact in 2010, such as Dropbox and SugarSync. And, in the future, the personal cloud will have a distributed view of data, combining data stored on the local device with that stored in the cloud.

> "An important part of the inter cloud vision is cloud bursting."

managing risk in the cloud: **a legal view**

Denis Beaulieu, a Member of the Board of the French legal firm Fidal, in charge of telecommunications and IT, and **Isabelle Gavanon**, Associate Director, Intellectual Property and Information Technology Department, explain the legal issues associated with cloud computing.

We are noticing a great deal of interest in cloud computing among our clients. It is very important to be vigilant when signing a contract with a supplier, as risk management is something everyone really needs to think about. It is only natural for companies offering cloud services to encourage their clients to choose their solutions. Standard contracts can, however, be detrimental to clients, as the reality of the technical solution offered involves a certain level of risk. Issues include the involvement of subcontractors, the decentralization of storage space and data security. Users must therefore identify potential problems, review the responses provided by current legislation and question their limits.

law favors clients

It should be noted that the law is changing in the client's favor. Indeed, if there are disputes, judges are deciding that the obligation of means supersedes the obligation of result. Operators may therefore need to demonstrate that they have the means to fulfill their commitments. They need to provide clear information about their data storage and hosting solutions and make sure they offer a consulting process. To this end, the creation of a certification for storage space and/or a quality label could be useful, even essential, for the development of this kind of service.

cloud computing takes center stage

How Orange Business Services customers are using cloud computing to better manage costs, improve flexibility and work from any location.

e-Santé Alsace

Gaston Steiner
Director of the Healthcare Cooperation Group

- the healthcare cooperation group e-Santé Alsace develops electronic healthcare applications across a region of eastern France

- 35 members (healthcare, medical and social establishments, regional union of private healthcare professionals)

At the request of our regional health agency, we are setting up a digital platform for healthcare professionals and the general public in Alsace, France. From March, it will introduce around twenty online services for healthcare establishments, professionals and patients: information about treatment services, an extranet for healthcare professionals, collaborative tools for healthcare networks and practice communities, a Web conference service, a directory of healthcare professionals and an operational register of resources to name but a few.

We decided to host this platform through Orange Business Services, thereby guaranteeing a flexible process and management. We will be able to order virtual servers as and when we need them and according to the level of availability that the applications demand. Ultimately, we will only pay for what we use, which will make it easier to manage our costs. It was crucial for us to be able to combine this flexibility with a high level of security to guarantee the total confidentiality of the personal medical data hosted on the virtual servers. This is exactly what we get from the solution that we have chosen – and one that is approved by the Ministry of Health in France.

"guaranteeing the total confidentiality of medical data"

Arkema

Jean-Charles Hardouin
Director of Information Systems

- major international chemicals company

- turnover of 6 billion

- 14,000 employees

- 80 factories around the world

During the first half of 2011, we will be rolling out a cloud back–up solution developed by Orange Business Services using an EMC Avamar system on all of our 11,000 workstations around the world.

Managing a back-up system for our own physical infrastructures internally would not add very much value, and it makes more sense for us to have this managed as a service by an external supplier. It will help boost both our flexibility and our reactivity and with powerful encryption and security systems, the confidentiality of our data will be protected on the network that hosts them. Everything will be totally transparent for our end users, because the solution has been deployed to look like the Arkema portal.

"safe and reactive management of our back-ups"

lessons from the coalface: the FT experience

Executive sponsorship, strong governance, the introduction of robust processes and a proactive communication program are four of the critical success factors when moving to cloud computing.

The France Telecom Orange Group is in the process of implementing an ambitious company-wide cloud computing program covering infrastructure, applications and market growth. The infrastructure elements are known as Project CUBE, which will enable each of the business units (or countries) to use standardized, out-of-the-box services such as virtual servers, storage and network infrastructure, from an IT service catalog. The program will leverage the group's existing investment in data centers, virtualization and global IT operations.

The aim of Project CUBE is to consolidate, optimize and standardize the France Telecom IT infrastructure into a cohesive whole. This will facilitate management, boost efficiency and exploit economies of scale, with the ultimate goal of reducing costs and increasing overall group profitability.

Mark Wigington is one of the key leaders in the Orange FT group–wide cloud computing

development and transformation program. With a couple of years of work under his belt and at the half-way point in the program, Wigington believes that the time is now right to share some key learnings.

1 executive sponsorship

Building and using cloud computing services at scale is hard and requires coordination and teamwork among groups of people and divisions that never usually work together. It takes courage to adopt a new approach to design and architecture, therefore it is vital to have top-level sponsorship in support of any cloud computing program.

2 the importance of strong governance

One of the key notions behind cloud computing is to provide customers with basic services in as cost-effective a fashion as possible. This means that services need to operate in a common way and be governed in a consistent manner in order to ensure that

the integrity of the technology and supporting business processes can be maintained.

"Governance is key; otherwise you could end up with 32 clouds, each with their own standards and loose cohesion, but not able to scale or have the right capabilities and leverage," explains Wigington. The Group is looking to introduce a governance board, which will include corporate representatives as well as members from each of the Group's operating units who will be tasked with making key decisions, managing the program lifecycle and monitoring progress.

Such activity includes putting together a cloud reference model taxonomy in order to create and define consistent cloud components, management processes and personnel roles and responsibilities across all IT cloud factories. It also entails creating the IT services catalog by defining what individual offerings will comprise, how much they will cost and how they will be charged.
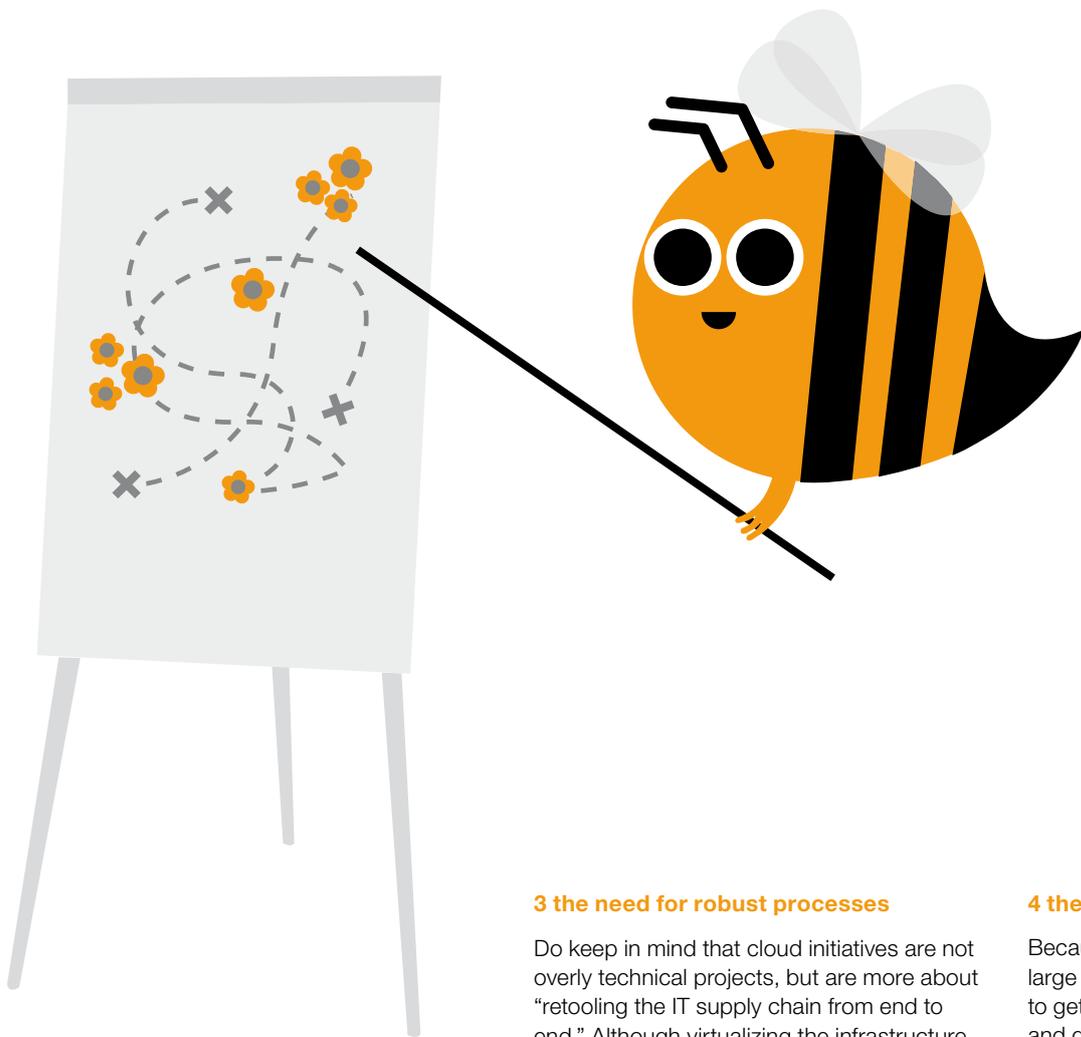
> **The aim of Project CUBE is to consolidate, optimize and standardize.**

3 the need for robust processes

Do keep in mind that cloud initiatives are not overly technical projects, but are more about "retooling the IT supply chain from end to end." Although virtualizing the infrastructure will get organizations a good way down the path, it is only really one step towards a more service-based approach to IT delivery and consumption.

"The whole build and run environment has to be articulated and managed, so you can't just make this a project about wires and tin," says Wigington. "It's about the transformation and re-engineering of IT provision to a more service-driven supply chain environment, and the effects can be profound. It changes the way you deliver and finance IT as well as the way you do business."

As a result, it is vital to build strong and robust processes into any program in order to deal with issues ranging from how quickly services can be provisioned to the cloud to end-to-end metering, billing and payment activities.

4 the value of good communications

Because migration to cloud is introducing large amounts of change, it is necessary to get people to buy into a common vision and goal to ensure success. Once upon a time, these employees were excited by new technology and finding better ways of doing things. But now they're comfortable with the systems they've built and are wary of change.

Among the Project CUBE team's first activities was to identify key stakeholders to ensure that they were involved in decision-making from the outset. They were also provided with concrete deliverables to approve at each stage of the project and were informed of any developments on an ongoing basis.

"We run programs of communication every two weeks to a wide audience, to discuss topics related to cloud computing initiatives within Orange Group. A key cloud premise is trust built on solid information and reliability, and if you don't have that, you don't have a cloud," Wigington concludes.

looking for a simple, standardized cloud

One of cloud computing's promises is simpler computing. How is it delivering on standardization?

In the challenging world of IT, complexity begets cost. In many organizations, the development of various computing architectures over time by many different teams has led to a confusion of infrastructures and platforms. This makes it difficult and costly enough simply to keep the engine running, let alone provide new innovations. Can cloud computing help simplify and standardize services?

Stephan Hadinger, Chief Architect for Cloud Computing at Orange Business Services believes so. He says that cloud computing effectively puts standardized services on a shared platform. "If you build your own data center, then you need many different experts in varied domains. That creates cost issues. With cloud computing, we're simplifying this work," he says, adding that providers design their cloud services to sufficiently serve 80% of the applications. "If you stick to this standard model, you get rid of a whole range of problems."

understanding the technology stack

Generally, services further down the technology stack will be more standardized than those at higher levels. Email interfaces are decades old, while security is relatively easy to provide as a standard service in the cloud. However, more mission-critical applications can be trickier, warns Intel's Enterprise Channel Director Richard George, who says that while they can still be run as cloud services, it is likely that the clouds will need to be private.

"Most of this is down to the customization and complexity that companies employ when modifying their application stacks," says George. "If these were vanilla out-of-the-box applications, then cloud computing may happen faster. These might very well be CRM, database, or supply chain applications."

Software-as-a-service companies, such as Salesforce and NetSuite, already host these types of applications remotely. In some cases, they are providing independent software vendors with platforms to build applications for their customers. Ideally, such applications will appeal to multiple customers, but as cloud deployments move further into the application layer, the more functionality companies must sacrifice to gain the benefits of cloud-based technologies.

open cloud opportunities

As these services become more standardized, we will see the evolution of cloud interoperability, in which services and cloud technologies become so standard that they can be used to transfer data and applications between different cloud environments. This will open up new opportunities for customers, including the ability to port their cloud-based services between different providers more easily, says Hadinger from Orange Business Services.

We are already seeing interoperability initiatives such as the Open Cloud Consortium and the Open Nebula open source effort. Surely the future will only bring different clouds even closer together?

Orange partners with the world's four leading networking, virtualization, storage and software providers to deliver a best-in-class solution for enterprise customers. Here are their views on the potential of cloud computing.

Jean-Yves Pronier
VP Marketing, EMC France

"In a few years' time, businesses will design their information systems around the hybrid cloud model. They will transparently combine services from both public and private clouds to deliver a seamless service for their end users.

"They will draw on online services from providers such as Google or Amazon for applications like virtual office environments. But security and confidentiality concerns mean that some businesses will be cautious about using public cloud services initially. Ten years down the line, public cloud use will have become totally natural, especially as the range of applications on offer are going to be further strengthened and structured to meet the specific requirements of industry sectors.

"In private clouds, businesses will manage catalogs of application services, the levels of quality of service for their information systems and IT projects with maximum responsiveness and flexibility. Over the next few years, project cycles are set to come down from five or six weeks to just a few days. In this way, CIOs will be able to set aside a much bigger percentage of their budget for innovation, creating more value for their business."

EMC is a global leader for information infrastructure solutions, with $17 billion in annual revenues and 48,000 employees worldwide.

Gwenaël Fourré
Partner and SME Marketing Director, Microsoft France

"Over the next few years, cloud computing is going to represent a major shift for the software industry, particularly for Microsoft. With Office applications made available in the public cloud, this is going to have a major impact on our business model. Much more than private cloud – which has a certain level of continuity – public cloud represents a genuine shift. Looking beyond the technological aspects, we have had to make major infrastructure investments and develop new sales and marketing skills.

"An increasing number of businesses are looking to migrate some applications over to the cloud, and this demand extends well beyond SMEs. In fact, some very large firms have already taken this step. In the cloud, applications are updated on an ongoing basis, meaning users will always have the latest version, features and innovations, optimizing their experience.

"At Microsoft, while we believe that our future will involve cloud, we also firmly believe that the change within businesses will not take place overnight. Rather than moving towards a 100% cloud model, the cloud and traditional models will continue to co-exist over the next few years."

Microsoft is the world's largest software vendor with 750 million Office users worldwide and 40 million subscribers to business SaaS.

Bruno Dutriaux
Partner PSS, Cisco Systems France Data Center

"Cloud computing requires networks to interconnect enterprise data centers with one another and with suppliers. But removing the technical boundaries between IT resources requires very high levels of security, reliability and performance on virtual networks.

"As is already the case in physical networks, cloud computing service providers will need to continue to develop protection tools, such as virtual firewalls, and offer dedicated services for virtual networks. The issues at stake are strategic, because security represents the main obstacle for businesses today in a market that has not yet reached full maturity.

"Cloud computing has paved the way for instant consumption of IT resources. Previously, a business bought a physical server with a view to depreciating it over three years. Now, if it wishes, it can lease a virtual server for three months or even three days."

Cisco is the world's leading network company, with $40 billion in revenues and 63,000 employees worldwide.

Stéphane Broquère
Senior Cloud Business Developer, VMware

"Virtualization is the catalyst for cloud computing, and the market is booming. Since 2009, more virtualized than physical servers have been deployed around the world, according to Gartner. If cloud computing continues to develop, the IT market looks set for a far-reaching transformation. Everything that is managed in-house could be delivered by cloud computing, with major gains in flexibility and cost savings.

"In order to capitalize on the market's potential and facilitate cloud's adoption, it will be necessary to offer businesses global solutions that are in line with their industry's specific needs. They will also need to be backed by reliable, secure and efficient networks.

VMware is the global leader for cloud infrastructure and virtualization with over 250,000 business customers and, according to Gartner, accounts for 84% of the virtualization market share.