



Cloud adaptation and orchestration

Moving from the capacity cloud to the capability cloud

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There is a revolution taking place as we speak; a global revolution of a scale which promises to rival the last industrial revolution.

This time, however, the revolution will be powered by IT, and will change the way we work, our expectations and our behaviour, as well as effectiveness and efficiency throughout the physical world. Cloud services are one of the underlying forces enabling this change.

Maintaining, building and extending an organisation's capabilities is the goal of every IT department, but the IT delivery model has been stagnating for a long time. There are currently five very significant forces of change in the IT landscape: social, mobile, analytics, cloud, and cyber. These offer the promise of a paradigm shift in IT.

Areas that have been neglected for far too long in IT—holistic data management, enterprise architecture and service integration—cannot be left unattended anymore. They are becoming increasingly complex and are proving to be critical core disciplines in all IT departments.

However, cloud solutions come in various shapes and forms, which is why orchestration is increasingly considered to be a highly critical component for successful cloud implementation. Virtually every

organisation should be developing a strategy to integrate, aggregate and orchestrate its collection of cloud and on-premises assets.

Cloud orchestration does not necessarily cause disruption for the business, but it does change the IT service model, bringing with it wide-ranging implications for people, processes and technology.

Company-wide cloud adoption is fast becoming a reality, but much usage is in addition to on-premises systems rather than providing a replacement. As a result, these cloud services increasingly require integration back to internal core systems, such as legacy financials, order management, inventory, HR, manufacturing and other enterprise systems.

Companies are connecting clouds in strings, clusters, storms and more, and are cobbling together discrete services to create end-to-end business processes. Tactical adoption of cloud services is giving way to the need for a coordinated, orchestrated strategy—and for a new class of cloud offerings built around business outcomes as opposed to bits and bytes.

When thinking of cloud solutions, what often comes to mind these days are Infrastructure-as-a-Service or Software-as-a-Service solutions

What is the cloud and how will it develop?

The term 'cloud' is not new. Everyone may be talking about it, but not that many companies are actually doing it. In EMEA, there is an even larger gap in cloud adaptation than in the rest of the world. If we are to believe the research, cloud is the largest tech trend and enabler in the IT industry today. That begs the question: why are organisations—and more specifically Luxembourg-based organisations—not rushing to the cloud?

We should begin by clarifying what exactly is meant by the term 'cloud' and discussing how it is currently changing. It is also important to consider what the implications for incumbent CIOs may be, and how they should look at the principle of adopting the cloud and its integration from a serious standpoint.

'Cloud solution' is a commonly applied term, despite the fact that it often does not correspond to agreed characteristics. It is therefore worthwhile to set out our definition of 'cloud' for the purposes of this article. This diagram illustrates how NIST defines the cloud,

seeing it as being composed of five characteristics, three service types and four deployment models.

A cloud solution should therefore feature all of the characteristics listed, use one of the deployment models and offer one of the service types. It is worth considering whether your cloud solution(s) (should you already operate or use one) live(s) up to this and whether all of the characteristics are covered.

Cloud solutions are not standing still, and new examples are arriving with ever-increasing pace. Solutions in the SaaS category are particularly myriad. Moreover, older solutions (if 2006 can be considered old) are also maturing and make it likely that suitable solutions can be found.

But why should you go down the cloud route at all? Research indicates that this is currently for the most part to increase IT utilisation rates, change capitalisation models and further optimise operating models. Using the cloud model is not without issues or challenges, however.



- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service



- Software-as-a-service
- Platform-as-a-service
- Infrastructure-as-a-service



- Public cloud (external)
- Private cloud (internal)
- Hybrid cloud
- Community cloud

Challenges of the cloud

As it stands, there are numerous possible challenges related to taking the plunge and moving toward the cloud. However, condensing the latest research into a few areas provides us with four main categories: security concerns, data governance issues, management problems and integration challenges.

Security concerns still seem to be the main obstacle to adaptation, but governance challenges follow closely behind. It is worth considering how security is achieved in both the private corporate environment and the public cloud. Companies often believe that if they have not detected an actual breach of their security/defences, then they have been successful in keeping hackers out, and are also frequently of the opinion that a cloud provider is an open door for hostile attacks. Research points to this being a very misleading theory, and suggests that cloud providers are often better at providing up-to-date security and risk management solutions than many corporations' in-house equivalents.

It all comes back to one essential issue: your data management discipline. How well do you know your data and its attributes? How and where is it being used? And how are the associated risks being managed?

While all the above-mentioned challenges are certainly relevant, perhaps even critical, this will not stop cloud adaptation. It must therefore be the role of CIOs to pinpoint solutions to overcome these obstacles and find ways to make cloud adaptation happen. If they do not, someone else in their organisation will!

Cloud operators are also frequently considered to be operating at a lower level of maturity than the organisations themselves, which certainly does not improve the much-needed element of trust in providers. Most companies looking to use cloud solutions—even for private cloud deployment—therefore have difficulty selecting candidates for hosting.



The capacity cloud as we know it

When thinking of cloud solutions, what often comes to mind these days are Infrastructure-as-a-Service or Software-as-a-Service solutions. This tends to segregate our thinking and drive an all or nothing approach, as well as promote the IT agenda of favouring opex over capex, speed-to-solution and scalability. What it fails to do is consider business results or processes. IaaS, PaaS, and some SaaS are all IT solutions with IT benefits. This is what is now being called the capacity cloud, as solutions offer different characteristics but mainly the same services as existing ones, scaled to changing needs.

Allied Market Research recently estimated that the global cloud services market will grow with a CAGR of approximately 18% to reach US\$555 billion in 2020. During this period it is expected that the private cloud will grow at the fastest pace, but the community cloud is starting to catch on and is gathering momentum.

The Americas remain the early adaptor, with growth strongest in the private sector. The healthcare sector is among the first sectors adopting the cloud.

In the EMEA, spending on cloud infrastructure is expected to reach US\$4 billion by the end of 2014 and will continue growing with a CAGR of 19% through to 2018. 15% of total infrastructure spending is expected to be on cloud in 2014, increasing to 22% by 2018. Investments currently show a relatively even spread between private and public cloud solutions.

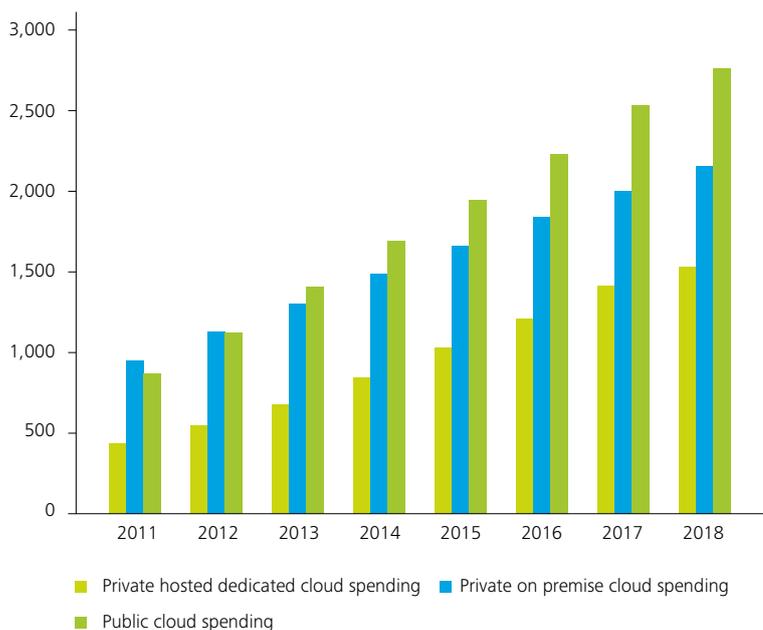
Capability cloud and cloud orchestration

The capability cloud promises to focus on the business and not on IT solutions. It promises to look at important business values, shifting the conversation to accelerating time-to-results, innovative functionality and business models. Instead of ‘cheaper and faster’, the debate moves to discussing better services and benefits, which are business related.

The capability clouds are not simple capacity building blocks, but rather offer finished services addressing business objectives, with the wording typically changing to ‘analytics cloud’, ‘sales cloud’ or ‘marketing cloud’, etc. This is where flexibility, adaptability and business processes can be streamlined and/or revised. Here business can be thought through end-to-end, providing a breeding ground for change, innovation and business development.

These cloud solutions and types have matured over the past few years and many enterprise-ready offerings are now available. A look at Salesforce’s latest annual report shows US\$4.1 billion in revenue, up 33% from the previous year, providing companies with an average of 1.5 billion transactions a day.

EMEA cloud hardware forecast by cloud type, 2011-2018¹
Revenue in US\$M



The complexity of future cloud environments becomes clear when you consider the variety of different services already available. Many services are rapidly approaching enterprise maturity level, and some have already reached this level and are now developing the ability to interface, integrate and interoperate with other services. Organisations are developing their private cloud services while still operating their core back-end solutions, and must integrate all these cloud solutions together to deliver coherent technical services for the business.

However, without orchestration of these different services it quickly becomes difficult for cloud computing to live up to its full potential and to rapidly deliver new services. Orchestration coordinates system resources, workloads and services by aligning a business request with applications, data and infrastructure.

¹ Source: <http://www.cloudcomputing-news.net/news/2014/jul/21/cloud-hardware-spending-passed-4bn-across-emea-2014-idc-asserts/>



Additionally, cloud orchestration has the potential to significantly reduce the resources required to operate solutions with manual intervention and management. Some key traits of cloud orchestration include:

- Integration of cloud capabilities across heterogeneous environments and infrastructures to simplify, automate and optimise service deployment
- Self-service portal for selection of cloud services, including storage and networking, from a predefined menu of offerings
- Reduced need for human intervention to allow lower ratio of administrators to physical and virtual servers
- Automated large-scale provisioning and de-provisioning of resources with policy-based tools to manage virtual machine sprawl by reclaiming resources automatically
- Ability to integrate workflows and approval chains across technology silos to improve collaboration and reduce delays
- Real-time monitoring of physical and virtual cloud resources, as well as usage and accounting chargeback capabilities to track and optimise system usage
- Pre-packaged automation templates and workflows for most common resource types to ease adoption of best practices and minimise transition time

When considering the quantity of financial, human and technical resources that can be re-assigned to higher-value-adding activities within the organisation, it quickly becomes clear that the role of internal IT organisations will change.

It is not a mistake to continue discussing the capacity cloud and solutions—and therefore ‘cheaper and faster’—as these are low-hanging fruit on the cloud-roadmap. But it is time to move the discussion into the business sphere and away from bits and bytes. This can only be done by using terms businesses can relate to and by discussing the outcomes from cloud adaptation as opposed to technical challenges.

Software-Defined Network

Another technology with the potential to impact cloud adaptation that is gaining momentum is Software-Defined-Network (SDN). It promises to abstract network services from the lower technical levels by decoupling the control plane from the network hardware. Such architecture will enable network services to be directly programmable from the application layer, while keeping the technical layer unaffected.

Company trials to prove this technology have already begun, aiming to find the sweet-spot for where and how it could be deployed. Research shows that 87% of firms currently testing SFN plan to have the technology live in production within the next two years.

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There is a lot that needs to be finalised before SDN can enter the mainstream, but work is progressing fast. One of the critical components is the OpenFlow protocol, which has gained support from most network vendors, making interoperability possible.

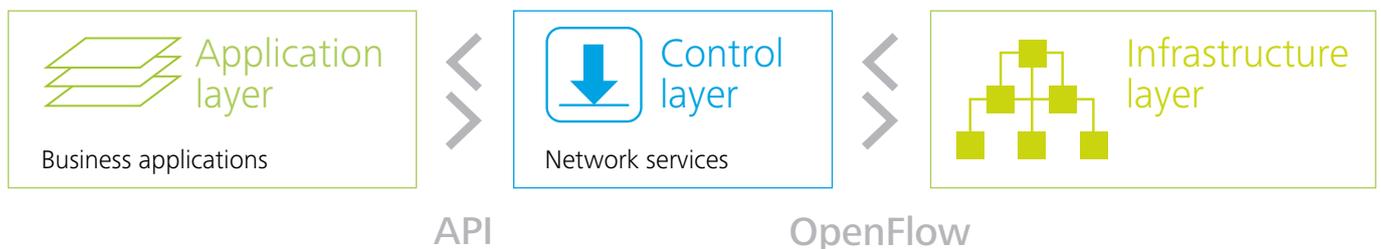
There are also security implications for this technology, however, as it opens up potential control benefits but also new potential network risks. Benefits include the ability to clearly define all allowed and disallowed data flows, based on applications and identification. On the other hand, it poses a considerable risk as any attacker who successfully compromises the SDN controller (appliance service as controller for switches, routers, etc.) could control the entire network.

The drivers for implementing SDN are to improve network management capabilities, enhancing application performance and enabling hybrid cloud architecture solutions. Applications will be able to allocate the necessary resources from an elastic network services layer, which typically is a critical component of a hybrid cloud solution.

Implications for CIOs (and beyond)

Lower costs for IT operations is a primary IT objective, but is no longer the main or only driver for cloud adaptation. Business strategies offering agility and innovation are often seen as a driver. The rise of cloud computing has already caused many enterprise IT resources to be moved out of IT’s control, as many businesspeople have gone directly to ‘easy-to-order’ cloud services, bypassing IT completely. This trend is not sustainable as businesspeople are not generally equipped to orchestrate, secure and operate complex cloud solutions, let alone cloud orchestration.

The business outcomes offered by cloud adaptation include the ability to enter new markets, reduce complexity, increase employee productivity and reduce overall business costs. The IT benefits from current cloud deployments include the simplification of internal operations, better delivery of internal resources and new ways for employees to work, connect, and collaborate.



So where does this leave CIOs? What should they focus on and what changes must be made? What is IT's mission going to be after cloud adaptation? In this new emerging world of the orchestrated capability cloud, companies must ensure integration, data management and enterprise architecture become core IT disciplines. This provides the ability to ensure effective service orchestration and efficient service delivery.

Keeping security and compliance at the forefront of any integration process in order to deliver reliable, portable and extendable services is also critical. Moving away from pure technology tasks and activities and toward managing business focus and priorities—as well as risks—must be at the very heart of a CIO's agenda.

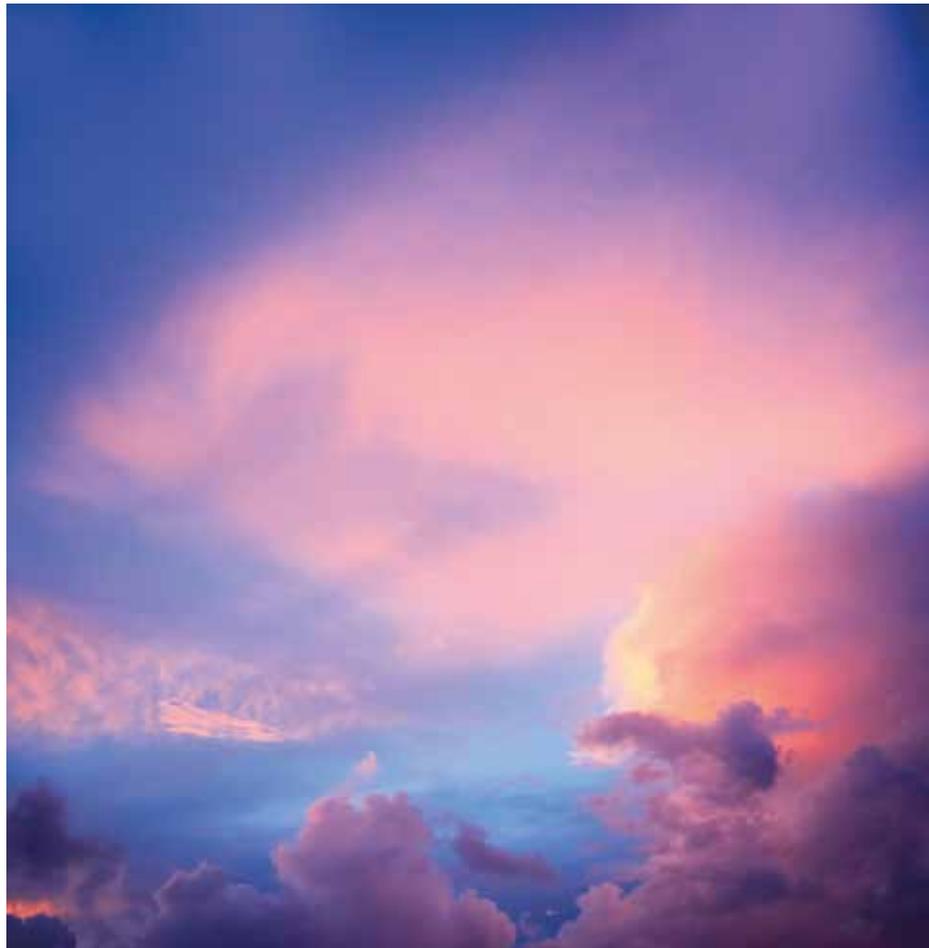
Companies must develop a strategy centred on integration, aggregation and orchestration to ensure the collection of internal and external services are providing effective and efficient value.

So, where to start?

The big cloud question is 'how', not 'if'. As with most emerging technology there are potential pitfalls and dead-ends to avoid. Many cloud vendors are making exaggerated claims concerning what their solutions can deliver as well as what their service roadmap looks like. However, the future looks likely to feature a large element of cloud usage and orchestration, with the capabilities discussed above as the secret to success.

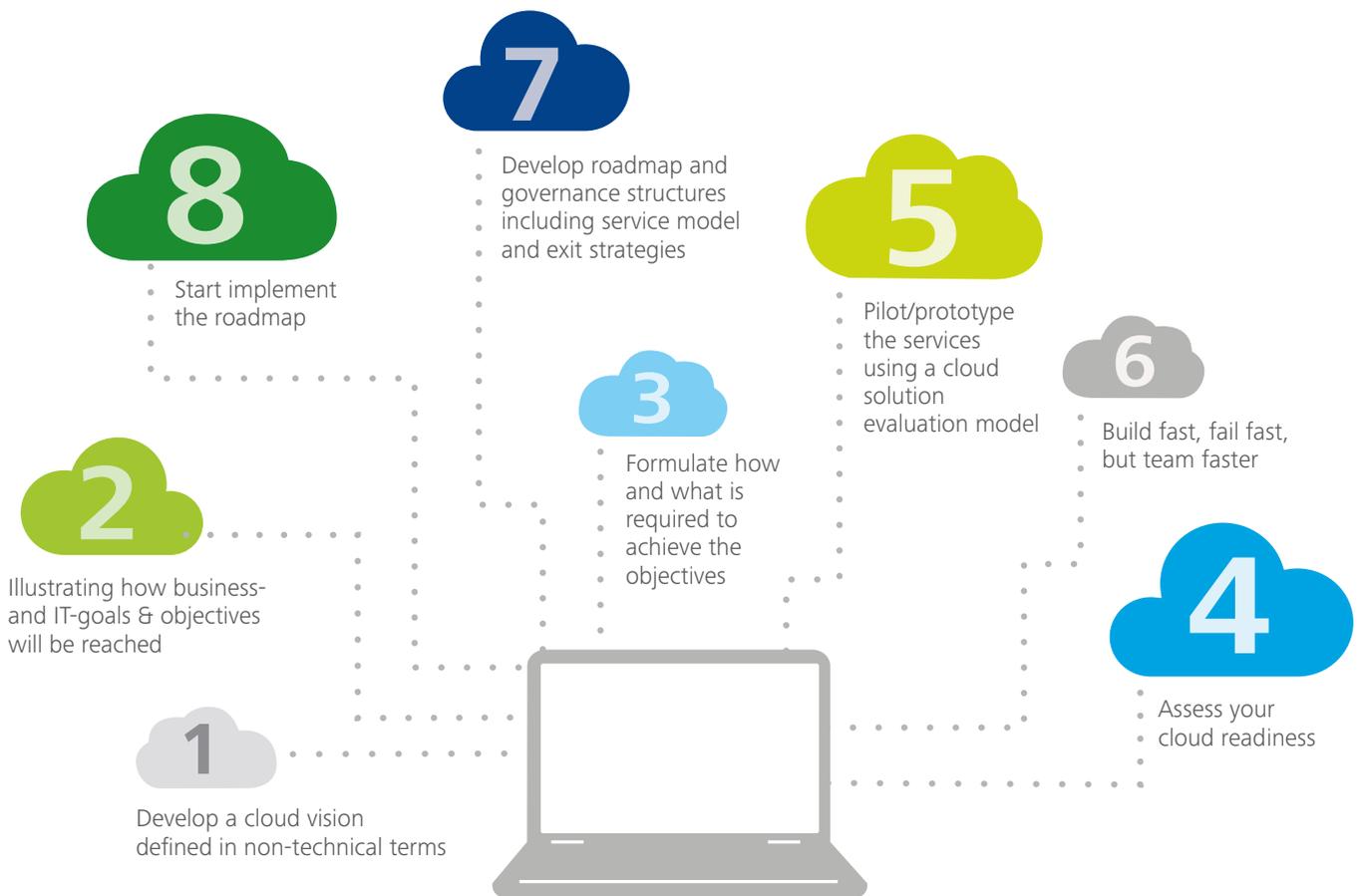
More sophisticated models based on a Cloud-to-Cloud-to-Core concept require CIOs to make deliberate changes and new kinds of investment. Taking bold steps will be necessary, which will in turn produce winners and losers.

Much advice exists for how to start reaping the benefits of the cloud. There are varying suggestions on steps to be taken, phases, and even objectives and goals, which is why many CIOs are still struggling to select an approach.



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In line with the above challenges and changes, as well as drawing upon many of the existing published guides, the below illustrates a proposal for how to approach moving into the cloud:



1. Develop a cloud vision, defined in non-technical terms
2. Illustrate how the vision will reach business and IT goals and objectives
3. Formulate how and what is required to achieve the objectives, including the service type and delivery model, covering business impact assessments, cost benchmarking and supplier review processes
4. Assess your cloud readiness and plan how to overcome critical gaps (orchestration, service organisation, skills equation, risk management, compliance, data management, enterprise architecture, business process reengineering, etc.)
5. Pilot/prototype selected services using a cloud solution evaluation model
6. Build fast, fail fast, but learn faster! Gain experience and knowledge of the pitfalls and select a cloud provider or providers
7. Develop roadmap and governance structures including a service model and exit strategies
8. Start to implement the roadmap while continuing ongoing supplier review and business case follow-ups

