

Virtualization: A foundation of as-a-Service & Cloud

Virtualization technologies have been around since the 1970s, but it is only relatively recently that we have seen so much attention from Industry, Analysts and Client groups; most agreeing that we have yet to take full advantage of the broader potential benefits. This may be due to issues in set-up and maintenance that must be considered when migrating to virtualized infrastructure or some of the non-technical challenges that higher-benefit level focused virtualization presents around process, organization and governance. The benefits are, however, largely agreed upon and the issues are surmountable. The resulting highly efficient, extreme-virtualized environments offer numerous business benefits for the taker.

Data center technology has evolved considerably in recent years. We are now seeing significant improvements in power utilization inside the data center, cooling efficiency and an overall reduction in environmental impact. All this is good news for companies that wish to reduce their carbon footprint and reduce their electricity bill at the end of each month, but whilst important, this will not deliver the broader business benefits 'C'-suite demands.

There is a transformation underway, where virtualization and cloud will be significant enablers, driven by the dynamic and volatile business environment, following an 'innovation-fallow' period of steady growth with years of keeping the lights on. Elasticity for growth, flexibility for change and time-to-deploy are key attributes that must be

built into the modern infrastructure to meet demands of Business leaders for dynamic product innovation, aggressive customer acquisition or loyalty and geographic expansion; whilst all the time lowering the cost base of the business.

The evolution of virtualization

Everyone has virtualized something over the past few years. Many savvy CIOs have benefited from the reduction in capital expenditure that virtualization provides, but there really are many more benefits to be driven out of a thoroughly implemented, well-designed strategy for virtualization. Today we see a more severe challenge in reducing operational costs (bigger perhaps than IT capital costs) whilst increasingly enabling business relevant growth and agility.

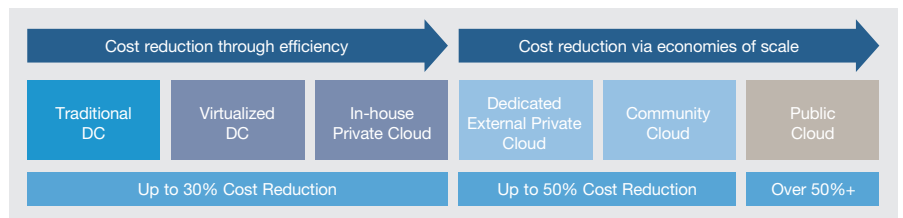
The challenge is now less about which technology to use and more about how to derive every last drop of top and bottom line benefit. Most transformations have taken a technology approach, often neglected the business user and failed to educate an organization about the broader benefits.

IT-as-a-Service enables IT organizations to operate in a more business-like fashion, moving beyond a siloed IT infrastructure towards an efficient pool of elastic, self-managed virtual infrastructure, consumed as a service, at the lowest possible cost. Best of all, IT-as-a-Service (ITaaS) delivers what the business needs — flexibility and agility — without compromising control.

Virtualization as the foundation

There are three main areas in which virtualization can bring benefits to organizations:

- **Capital Expenditure Reduction:** The outlay on new hardware is reduced because virtualization ensures that each piece of hardware purchased is utilized closer to full capacity. In turn, fewer servers reduce the space required in data centers.
- **Operating Expenditure Reduction:** These savings come in the form of power savings (cooling and powering less hardware, despite the fact that remaining machines will be drawing slightly more on a machine basis due to higher utilization) and staffing reductions enabled through increased automation and fewer servers to maintain. The power saving is also directly linked to an associated carbon saving for the business.
- **Increased (business) Flexibility & Responsiveness:** New services can be more quickly provisioned, as hardware does not need to be ordered and set-up, prior to delivering the business run-time environments for new or changed business product or service deliveries.



Transformation towards IT-as-a-Service is a series of steps. The first step for an agile, efficient infrastructure is virtualization, which has emerged as a powerful, game-changing technology in the past decade, transforming countless data centers and IT environments along the way. Its significant technological achievements, however, shouldn't obscure its ability to drive real business value for organizations. Virtualization accomplishes this by providing a foundation for cloud computing, a revolutionary new way to efficiently deliver IT-as-a-Service.

A service-based approach enables organizations to more nimbly respond to challenges and opportunities in the marketplace, providing an important competitive advantage — and virtualization is at the heart of much of that.

A highly virtualized infrastructure creates an IT environment with the following characteristics:

- **Scalability:** application performance is the same whether there's one user or one thousand users and provides consistent service-level

characteristics — creating the impression of infinite capacity.

- **Abstraction:** applications are not constrained to hardware or locations due to abstraction of the infrastructure.
- **Elasticity:** no forward planning or forecasting is required to rapidly scale up and down with near instant availability.
- **Accessibility:** access to applications and information is available from the network and on any device.
- **Pay-as-you-consume pricing:** a pay-as-you-go usage model for IT service allows you to only pay for what you use with minimal up-front investment costs.

These technological-focused characteristics translate into clear business advantages: they provide a more efficient, flexible and cost-effective model for computing and enable IT to operate much more efficiently whilst responding faster to business demands and better supporting new business initiatives or opportunities.



*Merlin — Capgemini's world-leading sustainable data center. [Click to read more](#)

Virtualization is applicable in many areas of the IT environment:

- **Network:** By applying virtualization in a network the available resources, for instance bandwidth or connection, are hidden from the service using it. In this way, multiple services share the same bandwidth.
- **Storage:** The virtualization of storage means that the available storage (and the location of this storage) is hidden from the service that requires it. For example, a single physical disk can flexibly run multiple file-systems to support different operating systems without the need to fix partitions or file systems up front, or many disks can be banded together to provide this functionality as requirements grow.
- **Server:** Services running on a server are interacting with the resources available in the server hardware (CPU, memory, network card, etc). By placing a virtualization layer on top of the server

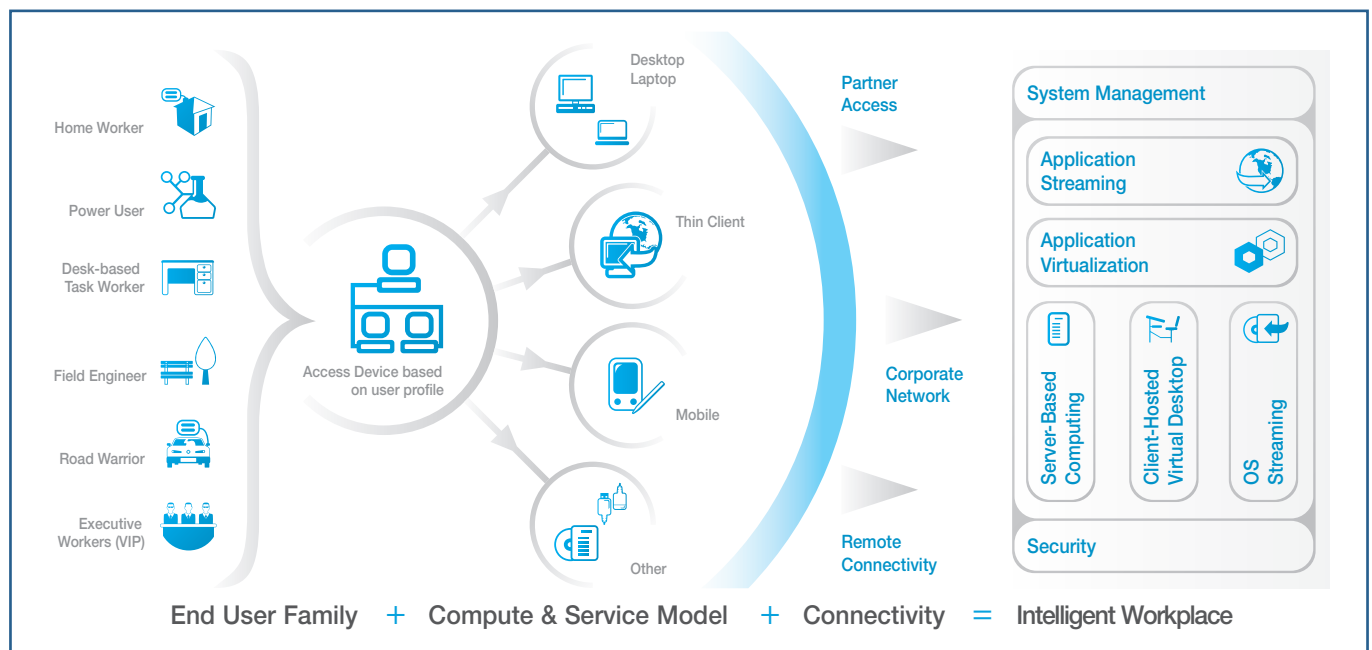
storage and processing hardware to run multiple desktops, or a 'thin' terminal containing only bare-bone hardware to access more powerful shared system resources at a server. **Intelligent Workplace**, Capgemini's innovative, end-to-end approach to workplace platforms (which includes Desktop Virtualization) helps you improve end user productivity, boost business agility and address environmental objectives, all while reducing IT costs. [Click to read more](#)

- **Application Virtualization:** This term describes software technologies that improve portability, manageability and compatibility of applications by encapsulating them from the underlying operating system on which they are executed. Capgemini's Intelligent Workplace delivers application virtualization as one of its key service components.

as you increase the percentage of virtual infrastructure relative to legacy solutions.

Many CIOs have found themselves with a blockage at the point they reach 30% of their environment in a virtualized model, preventing them from capitalizing on the total benefits of virtualization. The virtualization journey can get blocked for a number of reasons, including:

- Last minute engagement of business users within virtualization projects
- Lack of strong benefits messaging within projects
- Poor project governance and quality controls
- Conflicting agendas within a large organization, e.g. infrastructure ownership distributed within a large corporation
- Pure technology physical-to-virtual (P2V) projects that lack holistic transformation of operations



storage hardware, the available resources become invisible to the service and can even be shared; An example of this is Capgemini's **Infrastructure-as-a-Service (IaaS)** which is virtualization delivered from the Cloud. [Click to read more](#)

- **Desktop:** The operating system environment can be completely or partially virtualized, allowing either a single 'fat' terminal containing high-spec

Regardless of the specific virtualization delivery model, the net result is the same: a more efficient way for the business to consume IT services or "IT-as-a-Service".

Learning from experience; plan around the potential pitfalls!

The strategy for any virtualization transformation is not about technology virtualization, but defining a path to "IT-as-a-Service". The latter requires a holistic approach to transformation

- Too much focus on Proof of Concepts (POCs) and discovery of infrastructure
- Lack of budget for transformations due to short-term cost reduction strategy

For many CIOs the key reason has not been technology understanding or readiness, but the juggling of priorities in severe economic turmoil, where business leaders focus on day-to-day needs, rather

than the development of a long term business growth, IT enabled strategy. Virtualization may have been seen as a short-term capital expenditure reduction rather than a platform that can provide the basis for agile, dynamic IT enabled business transformation.

This essential operational focus over the past three years may have stifled innovative thinking between IT and the Business. Many IT organizations spend 70% or more of their resources on simply “keeping the lights on” — leaving little time for innovation or strategic business transformation projects.

Even those companies that take a strategic, long-term view of virtualization can be hindered in their efforts if they fail to align the business internally to support this new IT model. If there is a lack of focus on servicing the business in an agile pay-as-you-go manner, efforts to move forward will stall.

Best practices for continuing the journey

There is growing desire on the part of organizations to continue their journey, and increasing the use of broad-focus virtualization remains a leading IT priority among mid-size and large organizations. The issue, then, is one of being unsure where to start or how to further reap the bigger benefits and strategic potential that are offered with Virtualization and Cloud.

The IT organizations that will be most successful in transitioning to the cloud will be those that approach the task strategically and systematically. The journey to the cloud requires customers to think holistically about any transformation of infrastructure. It's not just about converting physical machines to virtual machines — there are other transformations that need to occur in parallel to effect meaningful business change.

Achieving this type of highly automated, low touch infrastructure requires virtual infrastructure, as virtualization provides the foundation for agility and automation within cloud computing. Customers must achieve a high level of virtualization —

more than 70% to fully adopt a service-orientated cloud infrastructure.

As mentioned earlier, many customers find their virtualization efforts stalled at the 20-30% level. Like any journey, virtualization needs to be carefully planned ahead of time, to avoid becoming lost, delayed, or otherwise sidetracked.

Capgemini takes a refreshing approach for customers who are at any stage of their virtualization journey — from those who have started and currently find themselves stuck, to those that are looking to undertake the journey as a whole.

With its “V2B: Virtualization to Business” approach, Capgemini provides the insight, roadmap and resources, enabling clients to transform their IT environments into a flexible, automated cloud infrastructure and derive maximum value from existing virtualization efforts. [Click to read more](#)

In summary, a highly virtualized environment simplifies the infrastructure by moving from discrete, siloed infrastructure components to pooled infrastructure that can be managed holistically and flexibly delivered to meet and anticipate the needs of the business. By establishing this bridge to agile IT services, companies are poised to better align IT investment with business value, paving the way to IT-as-a-Service

At Capgemini, we offer a range of services to support our clients in their virtualization journey. These include Virtualization to Business (V2B) supporting strategy from design and implementation to persistent and robust global operations; Infrastructure-as-a-Service (IaaS) for server & storage virtualized environments and Intelligent Workplace for the desktop.



About Capgemini

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