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Innovation Circle
INSIGHT AND INNOVATION ACROSS THE GLOBE

From the Infrastructure Services CTO Office

The Future of Storage

IoT and Mango Farms

Security and Compliance

Data Center Transformations

Agility and Containers

Around Infrastructure Services

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CTO

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Did You Know?

2015 DECEMBER Global Edition

A message from the Infrastructure Services CTO

David Blackwood

Chief Technology Officer, Capgemini Infrastructure Services

The Innovation Circle started life about two years ago as an internal publication for Capgemini Infrastructure Services in the UK. It then branched out to teams across Northern Europe and, most recently, to our global colleagues. I am very pleased to now share it with a wider, public audience – and I hope it will spark some interesting conversations.

This edition focuses on something we have been championing for a while: the evolving role of the CIO from Chief Information Officer to Chief Innovation Officer. This shift is becoming more necessary than ever as CIOs strive to maintain the right balance between their traditional IT estate and a more agile, service-driven way of working – we call this a **Hybrid IT** approach.

How can CIOs realize this balance?
There's little doubt that innovation is key, and applying innovation within the enterprise in a purposeful and meaningful way will be more important than ever before.

Enter the Applied Innovation Exchange (AIE), Capgemini's global framework that helps our clients turn technological disruption into business innovation. No longer is innovation about the next shiny new toy, it requires an industrialized process that adopts, applies and scales innovation throughout an organization.

The AIE takes an end-to-end approach to innovation, covering four key stages: discover, devise, deploy and sustain. And the key indicator of performance? The ability to apply innovation; this is what really matters in the long run.
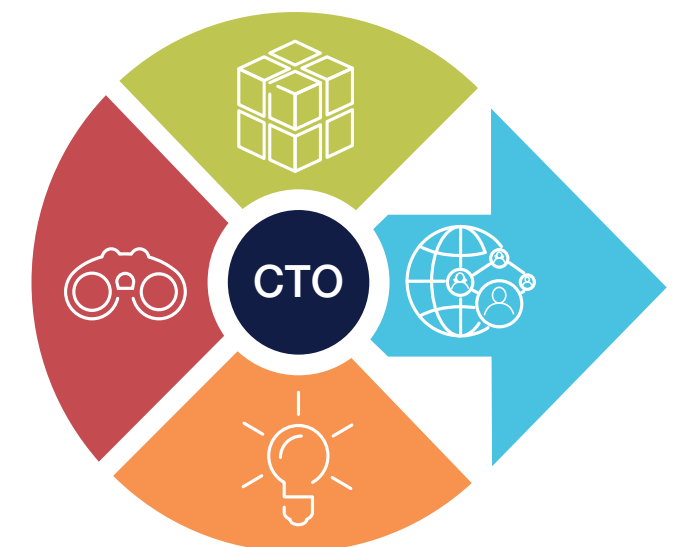
The number of new technologies, concepts and trends appearing every week continues to astound me. This issue of Innovation Circle puts the spotlight on real people across Infrastructure Services globally that are leveraging technology to solve real business challenges together as one.

More insights into Hybrid IT and the balancing act of two very different worlds can be found in our feature article. There are also pieces on:

- Lessons on the Internet of Things
- Data export compliance innovations
- The future of data center transformation
- New storage technology – keeping pace

We also have an update from the Chief Architect Office and some insights from around the market.

I hope you enjoy reading, and please do get in touch with me or any of the contributors if you'd like to comment on the topics discussed.

Destination digital

A practical methodology for tomorrow's hybrid CIO

The pace of change in technology today is astounding. Traditional IT infrastructures are no longer sufficient, on their own, to support the needs of the business. Digital technology is disrupting business models, mobile connectivity is transforming how we communicate and on-demand service delivery has changed customers' expectations. The Chief Information Officer must embrace this shift and also become the Chief *Innovation* Officer. But in practical terms, how should the CIO approach this hybrid role? David Blackwood, Chief Technology Officer, talks us through Capgemini's practical approach.

I recently published a detailed paper on the evolving role of the CIO, focusing on the need to balance traditional legacy systems with the growth of agile new digital technologies (see **Destination Digital: Exploring the Hybrid Role of Tomorrow's CIO**). We looked at the various drivers taking us towards Hybrid IT, and we speculated on the impact that further innovations such as Artificial Intelligence, Robotics and Ambient Computing might have on the CIO's future responsibilities.

In this period of massive disruption, with developments occurring at phenomenal pace, it's difficult to predict what's going to stick. The only surety is that businesses need to recognize and respond to the demands of the consumer, who is more in control than ever before. For CIOs, this requires a shift in mindset from "my role is to support the business with IT" to "I support new IT-driven business models that serve customers better." CIOs need a mechanism for viewing innovations through the lens of an end user, so they can develop investment cases that equate to business outcomes.

Similarly, the advent of the Cloud – which has enabled smaller companies, start-ups, and entrepreneurs to compete alongside established service providers – has put pressure on the CIO to roll out new services faster in order to stay competitive. Time to market is more pressing than ever, and CIOs need a method for accelerating projects.

Applied Innovation
With Capgemini's Applied Innovation Exchange, we help CIOs to proactively plan for and address these various technology and business shifts using real-world scenarios.

The Applied Innovation Exchange provides CIOs with a safe, immersive environment to explore, understand, and apply emerging technologies – such as the Internet of Things, Insights and Data, Cloud, Cybersecurity and Vanguard IT – within the context of their sector's specific challenges.

We bring in relevant experts, start-ups, designers, and technologists to experiment with the latest methodologies and tools, at pace. CIOs have valuable access to the innovation expertise they need to shorten innovation cycle times, reduce risk, and increase their innovation proficiency.
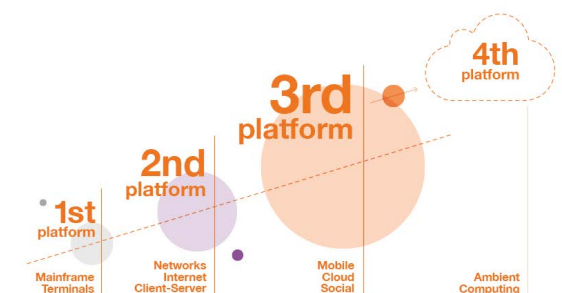
From discovery to application
Given that innovation is moving so quickly today, there's a definite gap for service providers to fill in helping CIOs effectively discover and respond to what's out there. We need to be more proactive in demonstrating how specific innovations can be applied for the benefit of specific business outcomes. And that's what the AIE is all about: helping CIOs absorb innovation, adopt it, consume it, scale it and leverage it for true business value.

We believe this is a unique approach, grounded in practical application and delivered by experienced people who understand the requirements enterprises have around security, speed and ROI.

Balancing the see-saw of hybrid IT
As we discovered in **Destination Digital**, tomorrow's CIO will be balancing the requirements of traditional legacy IT infrastructures and modern, agile IT services. In doing so, innovation must be applied to both sides of that see-saw. It cannot be viewed as something unique to agile IT; the CIO needs to uphold the value of the IT infrastructure by evolving it in line with the needs of the business. Tomorrow's CIO will be a Hybrid CIO managing Hybrid IT, with a dual focus on both information and innovation. IT with a dual focus on both information and innovation.

David Blackwood
Vice President, Chief Technology Officer, Infrastructure Services
David.Blackwood@capgemini.com

Five steps to innovation maturity

Today, there is a universal expectation that "innovation" is needed across both business and IT to address organizational imperatives. The development and delivery of new services and solutions is fundamental to achieving business value and outcomes. But what does innovation really mean? And how can you drive it into the culture of your business?

In its broadest sense, innovation is a new idea, technology, device, product, process, or commercial construct/vehicle. It can be viewed as the application of a better solution to an existing or new requirement, problem, or challenge. In IT, this could mean exploiting new or potentially disruptive technologies and introducing change into the core concept of the business.

It sounds simple, but over the years, I have seen many pitfalls and common challenges encountered by businesses as they look to innovate. Here are some of the key points to look out for:

Business Relationship:
- As the saying goes, "it takes two to tango." In the context of innovation, this is a typical challenge. Ideas are often proposed and never followed through to completion. Having a clear relationship between IT and the rest of the business is essential to driving those good ideas.

Expectations:
- While innovation is recognized as key to staying competitive, the focus for IT can remain on operational activities and "keeping the lights on." It is crucial to achieve a balance so that neither is neglected.

Lack of Funding
- It is true that innovation doesn't come for free and is often viewed as a risky, hit-or-miss endeavor. Therefore, it's important to have a clear innovation plan that articulates the anticipated business value.

Hidden Success
- Innovation is most likely taking place in the workplace already, albeit unnoticed. Pockets of small teams will be driving new ideas from the ground up, without the business being involved. Find these innovators and recognize and champion them; these are your change agents to drive future innovations.
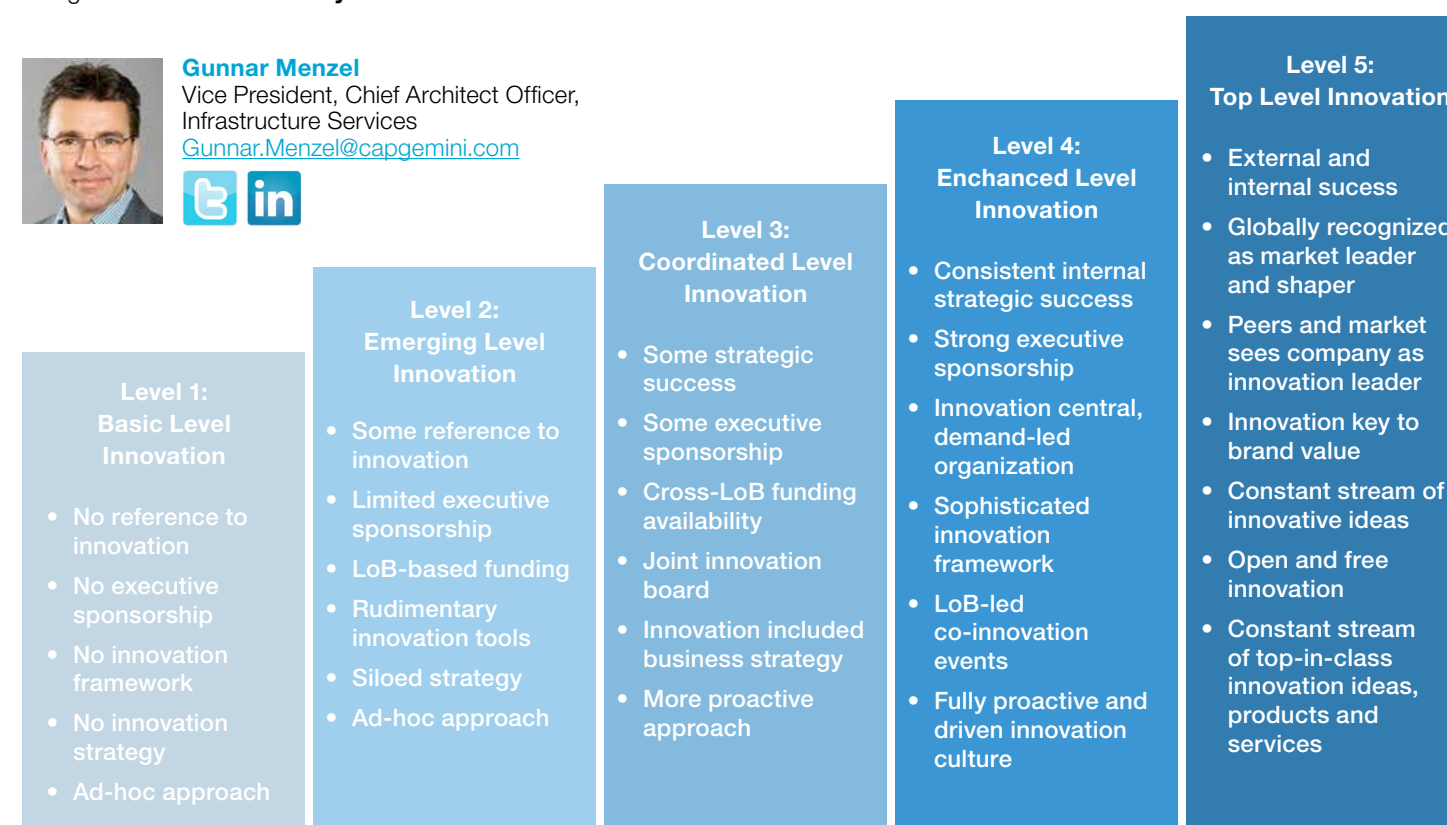
Many organizations approach the challenge of driving innovation by adopting an innovation process. This is typically represented as a funnel, where multiple ideas are created at the top, which then move through development and testing. At the end of the funnel, a small number of validated innovations are then rolled out to the business.

However, this is only part of the story. Successful innovation requires a continuous program that drives people and process along an **innovation maturity model.**

Gunnar Menzel
Vice President, Chief Architect Officer,
Infrastructure Services
Gunnar.Menzel@capgemini.com

Using this model as a guide, it is important to assess where you currently are in terms of business innovation and to define a clear goal. You then need to create a plan of how you will achieve it, outline a clear strategy, and gain buy-in and funding from the business. It's then a continuous process of making the necessary adjustments in terms of people, processes, and tools to ensure you reach the end goal.

Level 1: Basic Level Innovation
- No reference to innovation
- No executive sponsorship
- No innovation framework
- No innovation strategy
- Ad-hoc approach

Level 2: Emerging Level Innovation
- Some reference to innovation
- Limited executive sponsorship
- LoB-based funding
- Rudimentary innovation tools
- Siloed strategy
- Ad-hoc approach

Level 3: Coordinated Level Innovation
- Some strategic success
- Some executive sponsorship
- Cross-LoB funding availability
- Joint innovation board
- Innovation included business strategy
- More proactive approach

Level 4: Enchanced Level Innovation
- Consistent internal strategic success
- Strong executive sponsorship
- Innovation central, demand-led organization
- Sophisticated innovation framework
- LoB-led co-innovation events
- Fully proactive and driven innovation culture

Level 5: Top Level Innovation
- External and internal sucess
- Globally recognized as market leader and shaper
- Peers and market sees company as innovation leader
- Innovation key to brand value
- Constant stream of innovative ideas
- Open and free innovation
- Constant stream of top-in-class innovation ideas, products and services

A new lease of life

It may be a cliché, but when the children leave home, it often does give parents a new lease of life. It's time to reconsider those ties, commitments and routines built up over 20 years. There's an opportunity to let go of old commitments and enjoy a freer lifestyle.

It's the same when your data center reaches a certain age.

I work with many enterprises whose data centers are in some way holding them back. They may want to innovate and redesign their business models around agile digital services, but have too many legacy assets eating up management resource and operational expenditure. They may want to grow and expand into new markets, but are held back by the physical limitations of their data center.

There's a growing disconnect between traditional data centers, characterized by rows and rows of server and storage boxes, and modern business models that embrace Cloud, virtualization and as-a-service platforms. The old family home is no longer fit for purpose – businesses want to downsize, release assets, and explore new innovations. They want to consolidate, relocate, and transform their data centers in order to:

- Reduce costs in the production environment (e.g., energy consumption, management overheads)
- Streamline and optimize processes and contracts with suppliers and service providers
- Reduce business continuity risks by physically relocating or modernizing security protocols

Managing the move

Getting to this "target" state requires a phased approach, agreed by both the business and IT. It's analogous to a family sitting down to work out the logistics and timings of the child moving out. What possessions will be taken or left behind? What contracts need to be cancelled before they leave, etc.?

In both scenarios, the benefit of regular and transparent discussion and review cannot be underestimated. It's key to ensuring continual progress, avoiding conflict situations and reducing the likelihood of surprises. I like to apply a methodology known as the "Zone Concept" to ensure everything stays on track:

Red zone – Non-compliant

IT that fulfills **none of the criteria** of the "target" state can be held here to allow progress to continue in other areas.

Yellow zone – Compliant

IT that fulfills basic criteria of the "target" state is moved here. More work is needed to attain full approval.

Green zone – Approved

IT that fulfills all criteria of the "target" state is moved here. Resources can then be redirected to red and yellow zones to push overall progress.

Don't be afraid to set deadlines for closing down the red and yellow zones. In my view, everything should reach the green zone by 18 months – any longer and you risk losing all momentum and enthusiasm for the project. Another tip is to measure progress using just a small selection of KPIs, available to the project team on their own bespoke dashboard. This is a tangible way of sharing accountability across all stakeholders.

Picking a partner

Thinking back to our family scenario. If the home has too many unused rooms, creaky pipes, poor insulation, and escalating maintenance costs, there's a strong case for moving into a new, purpose-built property.

Choosing the right developer will be key. You could go with a housebuilder that only deals in off-the-shelf designs or you could work with an experienced architect and master builder who will design to your particular specifications. The same choice exists when transforming your data center. My advice is to choose a partner who:

- Can demonstrate they understand your unique business needs
- Has experience of modern data-center practices and uses proven methodologies
- Is committed to an asset-light approach, where everything is virtualized where possible
- Is vendor-agnostic, so they have access to the widest possible portfolio of solutions
- Can source and manage an ecosystem of suppliers, so you have assurance over timescales
- Applies innovation in a way that solves business problems

Transforming your data center can be an exciting and liberating time for both your IT and your business. It presents an opportunity to shed assets, reduce costs, embrace agile IT and redesign delivery models. It could be the new lease of life your business has been waiting for.

Magnus Manders
Head of Data Center Transformations,
Infrastructure Services
Magnus.Manders@capgemini.com

A lesson from the mango farm: get under the skin of problems early

The right amount of water, the optimum soil conditions, the perfect skin thickness – there are many variables when cultivating the perfect mango. Especially when you've got a whole farm to manage with over 20 varieties being grown. This may seem like a strange analogy for managing your data center, but not for Jothi Nagarajan.

From his home in Bangalore, Jothi manages the health of his mango farm, which is located in a village over 250km away. To help the farm's novice caretaker yield the best crop, Jothi has installed prototype automations that enable him to monitor the mango trees online. He can see which trees need watering and automatically pump in the right amount of water based on real-time analysis of humidity levels and other parameters measured by sensors in the trees. And he knows exactly when his mangos are ready for picking, because he can view them up-close and check their ripeness – from the comfort of his sofa – via a swarm of robotic bees!

A simple principle of prevention

This use of intelligent analytics, the Internet of Things, data pattern matching and next-generation robotics is helping the mango farm to thrive. Jothi is applying a fairly simple principle: understand the root cause of future problems and address them early, in the most effective way possible. Why walk around the entire farm checking each individual tree when your personal robotic bee can do the hard work?

In fact, Jothi's been applying this principle of using technology to make things easier throughout his professional life because he is not just a mango farmer. Jothi's worked in IT Infrastructure Management Services for over two decades.

His career highlights include the creation of a Service Automation Platform for a successful start-up company, which delivered 30%–40% improved efficiencies by automating routine tasks and processes. He's also created a "finishing school" that provides aspiring IT professionals with the equivalent of four years of knowledge in just four months of training! The school

uses automated production simulations of different IT service environments, and allows professionals to test themselves in over 100,000 exercises. You can see a trend here: using innovations in technology to simplify, educate and accelerate human endeavors.

Proactive insight to liberate staff

Today, as Vice President of IGO Data Services at Capgemini, Jothi is putting those principles to use at the heart of his engagements with corporate clients by helping them to address data center problems proactively.

Just like the health of a mango crop, there are many variable factors that impact on the performance of enterprise IT. Imagine if those variables could be managed in a similar way to the farm, with proactive insight that allows skilled personnel more time to focus on value-adding tasks.

Think about one of the main causes of inefficiency in the data center: staff battling to respond to IT failures (many of which happen again and again) and breaches in SLAs. Staff are often busy keeping systems up and running and fixing incidents, when they could be exploring new opportunities for the business. They could be preparing the ground for a new plantation instead of tending to parched soil and over-ripened fruit.

Problems are more than skin deep

Jothi believes that proactive problem management is needed to get under the skin of these repeated incidents. He is helping clients go beyond data analytics to get to the actual root cause of their problems. This will allow data center managers to permanently reduce errors and failures, and release their teams to focus on more valuable projects.

This is achieved via a unique algorithm developed for each client (based on analysis of their IT and Enterprise Service Management frameworks) that enables preventative workflows to be integrated into their infrastructure.

This is not a fully automated process. It requires the right mix of people, processes and technology to make it happen – just as Jothi's mango farm needs skilled farmers, pioneering technologists and a connected infrastructure.

And who knows where the future will take us? Perhaps Jothi's mango trees will able to proactively detect and fight fungal infections through new technologies. Perhaps the next phase of proactive problem management will bring us IT systems that heal themselves.

Jothi Nagarajan
Vice President, IGO Data Services,
Infrastructure Services
Jothiganesh.Nagarajan@capgemini.com

Storage technology is changing fast. How can your business keep up?

The pace of innovation in the storage market is fast and increasing. Technology cycles that once played out over three to five years now take 18 to 24 months. A recent arrival is software defined storage (SDS), which presents opportunities for businesses to be more agile and grow quickly.

Storage technology is now in its third generation. The first was a direct relationship between the server and the storage. The second generation connected multiple servers to one storage environment. The third generation, software-defined storage, is a many-to-many solution. It makes better use of storage assets, increases agility and enables companies to deliver the modern products their customers want.

Paying the price
In the past, the CFO could follow a Capex strategy that involved buying technology and then depreciating it over three to five years before upgrading to the next wave. That strategy no longer works, which creates uncertainty. Further uncertainty has come from the shift to Cloud-based services, with a commensurate shift from Capex spending to an Opex model, involving regular payments rather than one-off equipment purchases.

CFOs have responded by looking to spend less and seeking more on-demand services, transferring more risk and responsibility onto the supplier. However, there is a limit to how cheap a service can be and still be powerful and flexible enough for the enterprise. CFOs must be wary of false economies, such as moving to a cheaper public Cloud service not suitable for their needs.

Think "hybrid IT"
It isn't just the CFO who is unsettled by the increasing speed of innovation. The CIO faces challenges too. The most significant is being able to reorganize the IT department to deliver products and services within the new cycles. It is no use being able to deliver a project in two years if the new technology is by then obsolete.

The problem is that the CIO cannot shift the entire team over to supporting Cloud services or working on short-cycle technology delivery because all of the other stuff still has to be supported. More data and applications will move to the Cloud, but it won't be suitable for everything. The CIO has to learn to live in a hybrid environment.

Focus on agility
SDS has really only developed as a product over the last year, which is why there is some nervousness around it. It puts software and hardware on different life cycles, which causes some of the CFO's uncertainty.

However, the CFO can still replace hardware on a traditional three- to five-year cycle while taking advantage of software innovations that keep the hardware working at its hardest for longer. Another advantage is that SDS benefits from real-time analytics that monitor storage usage and performance, offering constant scope for improvement. In an environment where budgets are tighter than ever, this alone can be a competitive advantage.

For the CIO, SDS inevitably brings some complexity. It pushes the IT department into a hybrid environment where multiple data solutions must be maintained, though in truth, Cloud storage has already put this pressure on many teams.

The increased complexity is offset by the on-demand nature of the service. With well-defined SLAs, the CIO can be confident that responsibility for the entire storage estate is shared. However, that makes finding the right partner absolutely imperative.

It is early in the life cycle for SDS but what is certain is that the next technology cycle will come around sooner. Businesses that continue to focus on technological agility, that don't allow uncertainty to paralyze them, are the ones that will thrive in the years ahead.

Hans van Heffen
Senior Vice President, Lead Global Data Services, Infrastructure Services
Hans.van.Heffen@capgemini.com

Neil Draper
Global Head for Storage & Data Protection Services, Infrastructure Services
Neil.Draper@capgemini.com

Marcel Kolkman
Storage SME,
Infrastructure Services
Marcel.Kolkman@capgemini.com

Is your data about to cost you a fortune?

It's an area of compliance that doesn't always grab the headlines, but it can result in million-dollar fines and even criminal charges. Export Control, and the failure to understand and respond to it, could cost your business massively. Theresa Youngblood, Senior Manager of Trade/Export Compliance at Capgemini America, explains more.

I often ask clients, "Do you know where your controlled data is located, right now?" It's a question that tends to get straight to the heart of the Export Control issue. Most people think about exports in physical terms, such as shipping a crate of PCs to another country, and therefore they can easily grasp how controls, trade restrictions, sanctions and embargoes could affect the passage of those goods.

However, export controls also exist for data. The enormous growth of offshored IT service provision – i.e., cloud computing, ADM, data analytics, server storage and backup – means that both tangible and intangible transfer or access to data is increasingly being regulated.

So if your business is moving data, software, IP and services around the globe, you need to be sure that these cost-saving measures are compliant with any regulations associated with those territories.

For example, in the US, we have the International Emergency Economic Powers Act, which regulates trade with countries deemed a threat to national security. Contravening this can result in considerable financial penalties, such as the recent case of an oil field services company that was fined $100 million for illegal transactions in Cuba, Iran, Syria and Sudan.

The global paradox

It's easier than ever to trade internationally and move people and operations across borders for efficiency gains. However, this global trading landscape can get very complicated due to the trade regulations that exist in different territories and countries. Your controlled data may be stored safely in a utility data center today, but if your service provider relocates tomorrow, will the relocation and control of such data still be compliant?

Imagine you're a supplier to the US and the UK defense departments for their next generation of missile systems, and you want to offshore part of the workflow – there will likely be controls over the export and re-export of that type of IP to prevent it being used in military programs that undermine US and EU security. Similarly, if you're a pharmaceutical company developing a toxin for medical use, there may be controls to prevent its use in biological weapons manufacture. There are so many scenarios to consider.

Don't let it happen to you

So how do you mitigate against these external risks to your business? Well, I'm certainly not suggesting you need to become an export compliance expert overnight. But it is important to keep the issue front of mind whenever embarking on an outsourcing initiative and explore any innovations available to assist you.

Here are few things to consider:

- Has your Export Compliance team been invited into the initial and ongoing plans to offshore?
- Do you know whether the data in your legacy system has been classified for export control?
- Has your Export Compliance team assessed your IT landscape ahead of time?
- Does your Service Provider have experience in export compliance in your particular industry, and are you working with such Service Providers to develop a practical, strategic, and compliant approach?

Try to build an SLA into your outsourcing contract whereby the "data owner" (which is typically not the IT Service Provider) takes responsibility for identifying and addressing relevant control requirements. If you have a specific compliance process (e.g., applying for export and/or re-export authorizations and permits/licenses to employ overseas workers), talk to your Service Provider about how they can deliver that for you.

Innovations in compliance

I've been working in Export Control for over 20 years, and it is one of those areas where return on investment can seem almost impossible to calculate. Yet when clients hear about massive criminal and civil fines imposed on their competitors or peers, they certainly appreciate the value of people who can offer export compliance expertise for their industry. We are fast becoming recognized as a key service in the outsourcing supply chain.

So what about the future? Well, my team is focusing on innovative ways to connect the language of IT with the language of compliance. We're helping clients segregate and manage their data objects with a variety of global trade compliance service offerings, and such offerings are addressed according to control risk to prevent export violations.

It's an approach that requires extensive client engagement to really understand their business models and identify individual risks. I often describe us as their eyes and ears of compliance – we remove the burden of having to understand and keep pace with a constantly changing landscape. And we're potentially saving them a fortune in the process.

Theresa Youngblood
Senior Manager of Export Compliance, Infrastructure Services
Theresa.Youngblood@capgemini.com

Getting inside containerization

Venture capitalist and entrepreneur Marc Andreessen famously declared that "software is eating the world" when explaining that start-ups will disrupt all major industries for the next 10 years. Enterprises certainly need to move fast to get new ideas to market, before the opportunity is grasped by more agile competitors. Could the solution lie in "software containerization?"

It can be a challenge for large enterprises to embed agility and speed, given their legacy systems, complex internal structures and established cultures. Progress has been made with cloud technology, providing on-demand access to innovative services that disrupt established business models. But taking this to the next level requires the ability to run those services from any environment, without dependency on particular hardware or platforms. In other words: software containerization.

While the concept is not new as software containers first emerged from open source technology in the mid-2000s, the start-up company Docker has brought about a resurgence by making the technology far easier to implement. In fact, their runtime technology is now considered **the de facto standard** in the software container industry.

You could say that the vision Java described in the mid-1990s of "write once, run anywhere" has finally been realized. Docker is enabling developers to build and move applications between environments, and even between Clouds, without modifying the application code.

That's not to say software containers will replace Virtual Machines (VM); if anything, the two technologies will work together and complement each other. However, containers do offer some key benefits over VMs:

- Denser server consolidation
- Fewer inconsistencies in the application environment
- Lightweight and more portable transport of workloads
- Greater utilization of infrastructure resources
- Shorter software time to value

Balancing Dev and Ops

In November 2015, Capgemini was a Gold sponsor of **DockerCon Europe**, an event that showcased Docker's growing ecosystem, community and new product offerings. Their vision to "build a software layer to make the internet programmable" is a clear indicator that there's a lot more to Docker (the company) than Docker (the product).

To date, there has been caution among large enterprises to embrace containers, primarily due to operational and security concerns. In an effort to allay these fears, Docker recently announced a **new set of products** targeted at the production environment. It's clear that the company is switching its focus from development to operations. And with industry experts, such as Adrian Cockcroft (**the Netflix systems architect**), lauding the Docker ecosystem as the future for large enterprises, CIOs would be wise to begin investigating it today.

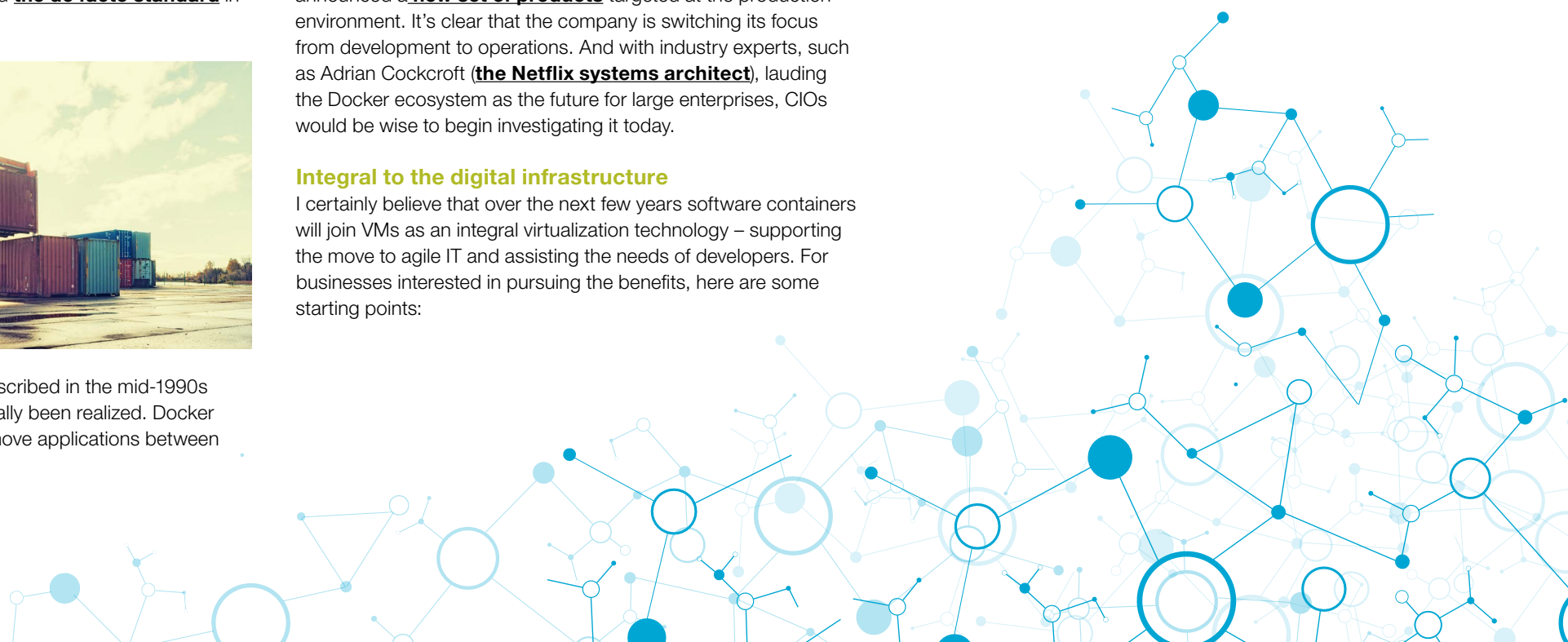### Integral to the digital infrastructure

I certainly believe that over the next few years software containers will join VMs as an integral virtualization technology – supporting the move to agile IT and assisting the needs of developers. For businesses interested in pursuing the benefits, here are some starting points:

- Assess how container technology could be introduced through developer tools in sandbox environments
- Explore a DevOps approach and how you could introduce this to your organization
- Challenge the status quo; determine how flexible your IT operations are to accommodating new technology
- Keep up to speed with the growing ecosystem of containers – assess what this disruption means for your infrastructure and operations

We expect containers to become a driving force for enterprises as they move toward a **digital infrastructure**. And they will play a vital role in balancing a **Hybrid IT approach** that supports faster time to market for new products and solutions. It's time to start thinking inside the container.

Leo Daniel Kennedy
Consultant, Infra CTO Office
Leo.Kennedy@capgemini.com

What's happening in the market?

According to IDC, the industry is 12 months away from mass adoption of the Internet of Things (IoT), with 73% of decision-makers having already deployed an IoT system of some kind within their business, or planning to within the next 12 months.

The number of connected "things" is set to rise from 4.9 billion in 2015 to **25 billion by 2020** (according to Gartner), with an explosion in the number of devices, connectivity and IT services. While wearable tech is the consumer face of the Internet of Things – and typically what most people associate with IoT – the real opportunity lies in the enterprise and public sector markets.

The ripple effect of IoT is transforming traditional business models from IT-enabled business processes to IT-enabled services and finally to IT-enabled products, which is beginning to disrupt the IT status quo.

Public Cloud battlefield

Despite the public Cloud market growing dramatically in 2015 (Gartner states worldwide **Infrastructure-as-a-Service spending is up 32.8%)**, the share of that market continues to become more heavily concentrated. It is dominated by only a few global providers – most notably Amazon Web Services (AWS), but increasingly also Microsoft Azure and Google Compute Engine.

The **recent Accenture-AWS deal** is an important signpost on the journey to the Cloud, as firms are realizing they can operate more securely on the public Cloud than they can in their own data centers. Enterprises should get started with Cloud and IaaS deployments wherever possible, and evaluate a hybrid Cloud management strategy from suppliers instead of building new data centers or developing infrastructure services that offer no additional value to what can be found in the public Cloud. Many legacy IT vendors have bowed out of the public Cloud market, such as HP, or are moving to a managed Cloud services approach, such as Rackspace, rather than pursue a race to the bottom on Cloud pricing for IaaS.

AWS and Microsoft have both made a commitment to open new data centers in the UK in 2016. These will enable users of Azure, Office 365 and AWS Cloud services to keep their data in the UK at all times. This highlights the dominance these two firms have in the market, as they continue to invest and innovate in cloud technology. However, following its acquisition of EMC, Dell will now be making a strong claim to be the only IT vendor with a full set of products from the PC to the data center.
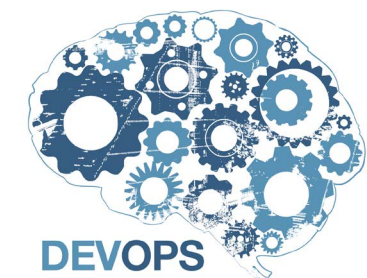
Machine learning continues to grow

Tech giants, like Google, Facebook and Amazon, are all working with machine learning to improve the services they offer, like smart search, ad targeting and product recommendations. Machine learning is now shifting into a complex realm where researchers are creating computer models that can see and even understand what they are looking at. Amazon recently introduced "Amazon Machine Learning Services," which utilizes **predictive analytics** using statistical and machine learning algorithms to find patterns in data that might predict similar outcomes in the future, much like Google's "Tensor Flow." Gartner predicts that **smart machines will have widespread and deep business impact by 2020**.

The retail industry is well positioned to take advantage of machine learning developments given the huge volumes of customer data being created every second. Understanding the hidden patterns in that data will be extremely valuable to retailers as they seek to further personalize the buying experience.

Ready for DevOps

Gartner says that by 2016 **DevOps** will evolve from a niche to a mainstream strategy employed by 25% of Global 2000 organizations.

The DevOps trend goes beyond implementation and technology management, to focus on how people, processes, technology and information can all affect positive organizational change. Predictably, DevOps-ready tools – which are specifically designed and built with out-of-the-box functionality in mind – have seen and will continue to see the largest growth potential.

DEVOPS

Did You Know

Leading Digital
Turning Technology into Business Transformationy

George Westerman,
Didier Bonnet,
Andrew McAffee

Become a digital master – no matter what business you're in. If you think the phrase "going digital" is only relevant for industries like tech, media and entertainment – think again. In fact, mobile, analytics, social media, sensors and cloud computing have already fundamentally changed the entire business landscape as we know it – including your industry. The problem is that most accounts of digital transformations in business focus on Silicon Valley stars and tech start-ups, but what about the other 90-plus percent of the economy? In *Leading Digital*, George Westerman, Didier Bonnet and Andrew McAfee highlight how large companies in traditional industries – from finance through manufacturing to pharmaceuticals – are using digital to gain strategic advantage. They illuminate the principles and practices that lead to successful digital transformation. Read more about the book **here.**

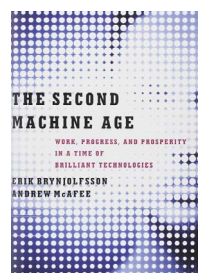## Disrupting Digital Business
Create an Authentic Experience in the Peer-to-Peer Economy

R "Ray" Wang

We are no longer an economy of products and services. The digital transformation demands that we focus our attention on experiences and outcomes. Business leaders and their organizations must shift to keeping promises no matter how their customers interact with them. But organizations no longer control the conversation. In this era of social and mobile technology, customers, employees, suppliers and partners are in direct communication with one another. Organizations must pivot with and ahead of these social, organizational and technological shifts or risk being left behind. Technology guru Ray Wang shows how organizations can surf the waves of change – how they can keep their promises. Read more about the book **here.**

The Second Machine Age
Work, Progress, and Prosperity in a Time of Brilliant Technologies

Erik Brynjolfsson,
Andrew McAfee

In recent years, Google's autonomous cars have logged thousands of miles on American highways and IBM's Watson trounced the best human Jeopardy! players. Digital technologies with hardware, software and networks at their core will in the near future diagnose diseases more accurately than doctors can, apply enormous data sets to transform retailing and accomplish many tasks once considered uniquely human. In *The Second Machine Age* MIT's Erik Brynjolfsson and Andrew McAfee – two thinkers at the forefront of their field – reveal the forces driving the reinvention of our lives and our economy. As the full impact of digital technologies is felt, we will realize immense bounty in the form of dazzling personal technology, advanced infrastructure and near-boundless access to the cultural items that enrich our lives. Amid this bounty will also be wrenching change. Professions of all kinds – from lawyers to truck drivers – will be forever upended. Companies will be forced to transform or die. Read more about the book **here.**

TED
Ideas worth spreading*
Playlist

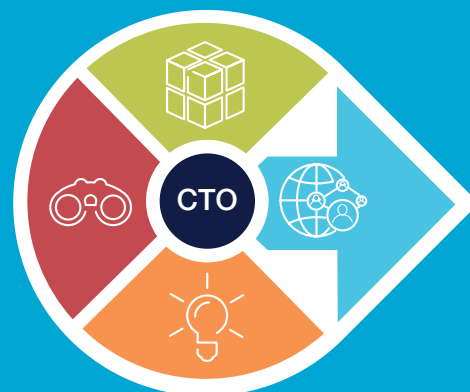|	
Get ready for hybrid thinking — From: **Ray Kurzweil**	The wonderful and terrifying implications of computers that can learn — From: **Jeremy Howard**
The future of news? Virtual reality — From: **Nonny de la Pena**	Forget Wi-Fi. Meet the new Li-Fi Internet — From: **Harald Haas**

About the Infra CTO

The power of technology is all around us. It touches everything we do in our increasingly connected business and personal lives. It informs our strategies, determines our futures and drives our present. It has the power to disrupt markets and businesses.

For CIOs and CTOS, the single greatest challenge is how to harness that power most effectively. Knowing what to invest in, where to prioritize spending and how to build consensus around those decisions is what defines their career.

But how can they best approach that challenge? How can they stay on top of the latest developments? How can they tell what's a fad and what's the future?

The Infra CTO Office exists to equip CTOs and CIOs with that knowledge. As an integral member of Capgemini's 12,500 strong Infrastructure Services team, we generate and expound knowledge of the technologies that will be powering businesses through the next few years and beyond.

We are excited by future technology and how it can benefit our clients. We are passionate about how it can be applied in different markets. We are striving to help businesses plan, grow and know what's next.

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