

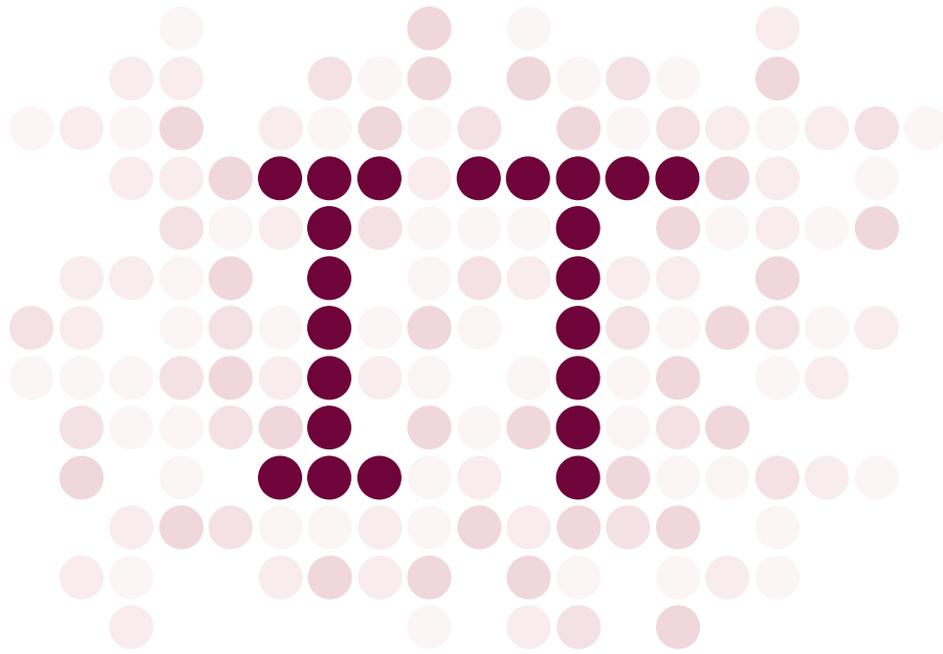


*from*  
BORING  
*to*  
**SEXY**



ENABLE YOUR BUSINESS DIGITIZATION





*from*  
BORING  
*to*  
**SEXY**



ENABLE YOUR BUSINESS DIGITIZATION





**“The IT industry is driven by two structural forces working in opposite directions: industrialization and innovation.”**

**BENJAMIN ALLEAU**  
SENIOR VICE PRESIDENT  
BUSINESS & TECHNOLOGY INNOVATION

**FRANÇOIS SONNTAG**  
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Paul Hermelin Capgemini Chairman and CEO at the Capgemini Infrastructure Summit last January highlighted the conflicting tensions within IT organizations, particularly in light of the fact that *IT system limitations are among the top three most significant barriers to business digitization*<sup>1</sup>.

To help CxOs and IT executives overcome these conflicting objectives, Capgemini Consulting provides perspectives and solutions, working hand in hand with executives to design and implement breakthrough value proposals for their IT transformation journeys.

Pierre Hessler, who leads our TechnoVision® research, says that there is no digital company without digital IT. He is right. IT organizations are not born digital. They become digital by adopting a cloud delivery model enabling service platforms.

IT departments have a short window to become “sexy” again in the eyes of their clients. To overcome challenges by shadow IT and the rapid pace of business change, CIOs must pull two triggers simultaneously—technological innovation and organizational transformation.

**Technological innovation** presents various challenges ranging from translating tools and services into IT platforms that deliver business use cases, accelerating time to market to keep pace with market speed on innovation and understanding that the separation between applications and their underlying infrastructures has disappeared. The Invisible Infostructure is here!

**Organizational transformation** aims to create momentum among employees to change from technical execution to business-centric value creation. Substantive transformation means empowering decision-making at all levels and implementing a new management culture using lean approaches.

To overcome those challenges this paper illustrates:

- The need for IT organizations to accelerate their move to the Cloud to deliver value in the digital age
- Use cases where IT can act as a business partner for digital innovation
- Principles to shape your next IT delivery model
- Key success factors on how to get there

<sup>1</sup>MIT Sloan Management Review and Capgemini Consulting, “Embracing Digital Technology: A New Strategic Imperative”



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- # IT Infrastructure is on the Path to Business Digitization.
- # Pressure on Fundamentals Explodes as IT Infrastructure Accelerates Business Digitization.
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DIGITAL BUSINESS  
**REQUIRES**  
DIGITAL IT



## IT Infrastructure is on the Path to Business Digitization

The first wave of digital transformation was app-centered. CIOs launched initiatives to leverage new tools and approaches to accelerate their time to market (TTM). Meanwhile, the IT infrastructure transformation was brushed aside.

The second wave of digital is happening now. It is platform-centered and relies in large part on cloud delivery models. Digital market leaders fully rely on digital IT platforms to deliver their value proposition. Those platforms are characterized by:

- In and out seamless data flows
- Global consistency and interoperability
- Faster TTM
- On-demand analytics capabilities and secured data gathering

## The Frontier is Vanishing Between Application Landscape and Infrastructure<sup>1</sup>

The days when companies had to meticulously design, construct and implement their own unique and dedicated IT infrastructure are nearly a thing of the past. We are on the cusp of an era of consumption, directly leveraging powerful, pre-defined services and workloads for support—a truly hassle-free service that satisfies any digital objective. Combine this with the incredible richness of information from sensors and mobile devices, and you start to see the creation of a powerful “Invisible Infostructure.”

But “Invisible” doesn’t mean we can ignore IT. The Infostructure is at the heart of the enterprise, and as such, it requires careful and appropriate consideration. It needs to provide secure and reliable access to application services and data that blends traditional and new deployment models, andw existing and innovative technologies alike. This will require nothing less than an orchestrated journey that must navigate this hybrid reality, for years to come. The Hybrid Cloud, where private on-premise and public off-premise services meet, also referred to internally as hybridity, clearly takes the lead in accelerating infrastructure innovation, in addition to the next generation of mobile, social, data, and process technologies. Together, they constitute a highly agile third platform, after the mainframe and PC platforms that we’re so familiar with. These bring with them several unprecedented opportunities for enterprises to grow without having to deal with the complexities of the underlying technology (server type, etc.). In the end, this is where we believe infostructure is at its best: invisible, yet relevant and incredibly insightful, focusing on what matters most — business outcomes.

<sup>1</sup>TechnoVision



## Pressure on Fundamentals Explodes as IT Infrastructure Accelerates Business Digitization

Historically, CIOs have been judged on cost efficiency, performance and agility. Today, cybersecurity is also a key objective for CIOs. These fundamentals remain stronger than ever, but are accompanied by new priorities.

**Cost efficiency** demands that IT demonstrate its ability to cut costs. IT departments are challenged by tech providers who continually manage to lower their prices. For example, Amazon Web Services cut its prices 50 times in the last 10 years. CIOs are also challenged to increase their service and price transparency, while clients continue to perceive them as a black box. IT departments cannot and will not be able to align to tech provider prices on basic offers. Therefore, value-added services and marketing approaches must be deployed to explain the value of these managed services. Our experience shows that a cost decrease of 20-50% within three years is achievable through a comprehensive transformation program combined with new governance and service orientations.

**Performance** is increasingly central, since most companies are now service-oriented with entire value chains relying on IT. Applications are now the face of business, and IT is accountable for the customer experience. Any downtime is directly linkable to operational loss. Pundits suggest that unplanned application downtime costs Fortune 1000 companies between \$1.25 and \$2.5 billion each year<sup>2</sup>.

**Agility** is about supporting TTM business requirements. App development approaches have evolved to meet this requirement, with notions such as minimal viable product (MVP), smaller releases (sprints) and DevOps. A recent CIO survey predicts that in 2017, 60% of digital transformation initiatives will not be able to scale because of a lack of strategic architecture<sup>3</sup>. For IT, accelerating automation and scalability via cloud delivery models is the answer. Finally, IT must fully support an open API structure through its middleware layer to enable data flows and enrich each element of the information system.

**Cybersecurity** is now considered a fourth fundamental. Data has become a crucial asset that must be protected as such. Two factors in particular make systems susceptible to hackers:

- The global digitalization of IT systems tends to increasingly open new hybrid infrastructures (multiplication of devices, open collaboration and identity management, mobility stakes, etc.).
- TTM speeds up the adoption of unsupported services from an IT security perspective.

The central role of IT cybersecurity is to secure the data lifecycle. It can no longer rely on a perimeter-centric approach against intrusions. IT must be agile enough to keep up with technological innovations and trends, while providing tools and policies to help businesses comply with new, constraining and expensive demands on critical infrastructure protection and nominative data management processes.

" Unplanned application downtime costs Fortune 1000 organizations from \$1.25 billion to \$2.5 billion each year "

<sup>2</sup> Reuters, "IDC Releases First-Ever DevOps and Application Performance Survey; Discovers Downtime Costs for Large Companies in the Billions", February 2015

<sup>3</sup> cio.com, "Digital transformation will shape 2016", November 2015

" CIOs have a 2 year window to achieve their digital transformation unless they will be cut short by tech providers "

**IT Organizations are not Born Digital. They Become Digital—Just Like Enterprises.**

CIOs must ensure that applications are up and running. They also have to coach fellow corporate executives on how technology can improve business processes and services. IT leaders have to earn the right to play this new role to qualify as business partners for digital innovation.

The digital enterprise cannot be built without IT capabilities. CIOs have a 2 year window to achieve their digital transformation unless they will be cut short by tech providers. In 2015, nearly a quarter of cloud spending came from outside the core IT function. This shadow IT is expected to grow 5 percentage points over the next 3 years<sup>4</sup>.

<sup>4</sup>cio.com, "Shadow Spending and Its Impact on the Cloud", June 2015

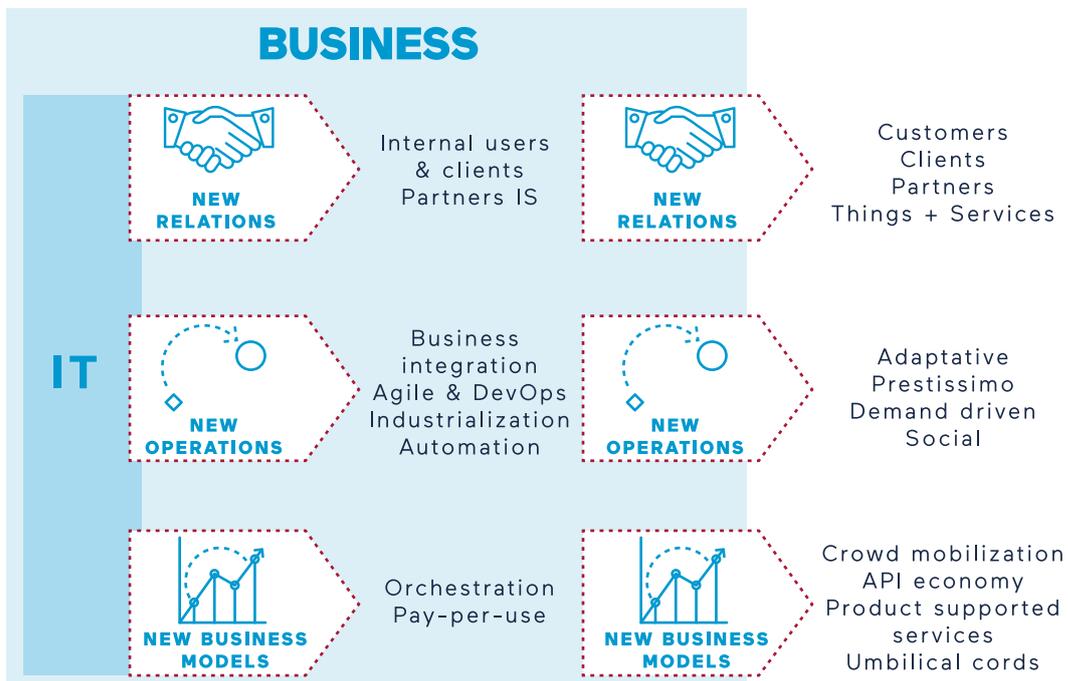
**Becoming Digital: IT Infrastructure Must Provide New Relations, Operations and Business Models—Just Like Enterprises**

Since it is now up to IT to embrace the critical path of digital transformation, IT departments realize the need to change along with digital enterprises. Drawing on our research with the Massachusetts Institute of Technology (MIT), we have demonstrated that the digital enterprise needs to deliver new relations, operations and business models as described on the digital IT framework<sup>5</sup>.

As an IT department under pressure from a business going digital, how can you address these interdependent, if not paradoxical, challenges of performance, agility and cost efficiency? The answer is simple: service platforms supported by a cloud-based delivery model.

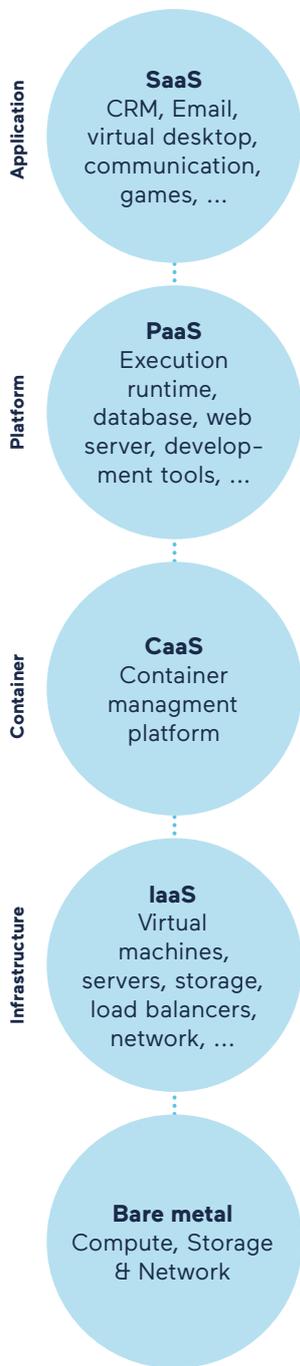
<sup>5</sup>Source: Capgemini internal studies

EVOLVING BUSINESS STAKES TRIGGER NEW IT NEEDS





**ROAD**  
TO SUCCESS  
**PAVED BY AN AUTOMATED**  
CLOUD DELIVERY MODEL



" Forget virtualization: it's all about automation "

The Cloud relies on a wide range of IT services defined by its service model (SaaS, PaaS, IaaS) and its sourcing model (public, private or on premise). In essence, the Cloud is a delivery model. Using it enables instant access to virtually unlimited resources, solving one of the most significant difficulties encountered by companies in recent years.

While IaaS models remain the most deployed today, PaaS is predicted to gain market share in coming years, and is set to become the most used service by 2020.

While virtualization has been the original enabler of cloud it is now much more about standardization and automation. Though virtualization was a historic enabler of cloud computing, it is now not the only one. Today, containers and configuration management automation solutions such as Chef, Puppet and Ansible, which manipulate Infra as Code, are credible alternatives for fostering the Cloud: hence, these delivery models can also be deployed on "bare metal" servers (see Rackspace's "OnMetal Cloud Server" offering).

### Benefits

An IT cloud delivery model aims to maximize IT's value to business through infrastructure that is fast, flexible, cost effective, enables self service, and is billed by usage. The primary benefits for businesses include:

- **Accelerated time to market** with automated release management operations, an "off the shelf" development environment with an Agile framework, and DevOps development tools built in to accelerate the development cycle.
- **Dynamic scalability** without the capital investment required for legacy IT service models to sustain the tremendous growth of data (lake storage, IoT) and provisioning capacity buffers.
- **Financial performance** thanks to a volume-based, pay-per-use model, enabling Opex/Capex arbitration through IT capacity rentals over very short periods (e.g., for PoC or activity peaks). Operation costs are greatly improved in a state-of-the-art, standardized and highly-automated cloud platform (from 20% to 70% workload reduction).
- **Security and operational excellence** that guarantee short patching cycles embedded in cloud processes to prevent unpatched servers, one of the worst security issues today and responsible for a majority of recent breaches.

This being said, the Cloud's benefits also rely on a new kind of data security constraints which must be taken as prerequisites.

" Google, Amazon and Microsoft services are far more secure than all internal IT services that we audited in the past 3 years. "

## Global Data Security Must be Tackled in a Public Sourcing Model

Ensuring global data security can be broken down into three distinct components:

1. **Infrastructure Integrity:** public providers do offer "state-of-the-art" protection against cybercrime. Google, Amazon and Microsoft services (with high availability DRP and 99.999% infrastructure) are far more secure than all internal IT services that we audited in the past 3 years.
2. **Data Confidentiality, Privacy and Sovereignty:** fear of confidentiality breaches are the main barriers to public cloud adoption due to uncertainty over whether data can be accessed by international authorities. Data encryption technology—either on-the-fly or at rest (e.g., Vormetric, recently acquired by Thales)—is mitigating fears surrounding data sovereignty.
3. **Application Security:** focus should be on the applications and services hosted on the public cloud platform. This is where we observed a majority of recent security breaches (authentication process, poorly developed app, network configuration, end-user behavior).

*Ex: A global aeronautic and defense industry player's security officers now consider all applications that are not "top secret" (85% of its application landscape) to be eligible for a public cloud.*

Finally, Public cloud providers do not commit on service-level agreements regarding the Internet network on which services are accessed. Accessing public services via dedicated WAN such as Intercloud is an efficient way to solve this problem.

## A Delivery Model to Support Business and IT Digitization

Cloud computing enables bundling of IT services running on premise (under full IT control) and those running on external platforms (outside of IT control). The challenge is to design a new service model that orchestrates these two delivery models.

The future of cloud delivery models will be a mix of public and private cloud services from multiple cloud providers. On a private cloud, data is hosted within owned physical infrastructure or within third-party dedicated infrastructure. Data localization remains critical for many regulated enterprises such as banks and companies of national interest. A private cloud offers tailored solutions that may be required for network issues in some circumstances.

The decision to opt for a private or public cloud involves such factors as:

- Access to innovation
- Amount of workload
- Workload Uptime
- Security level acceptance

" A private cloud becomes a cost-effective solution starting at 2,000 workloads and an uptime over 60% "

For example, our experience shows that a private cloud becomes a cost-effective solution starting at 2,000 workloads and an uptime over 60%. Such volume enables the structure to maintain expertise on the full stack (network, OS and middleware).

There is a market move toward a public cloud, which sometimes requires tackling regulatory issues. For example, in 2013, the Netherlands banking regulator approved the use of a public cloud for all aspects of Dutch financial operations. The Dutch Asset Management firm Robeco migrated its 220,000 retail banking clients to the "Ohpen" SaaS banking platform, leading to cost savings of up to 40%. However, Robeco also needed to adapt to Ohpen's unique Bank as a Service platform.

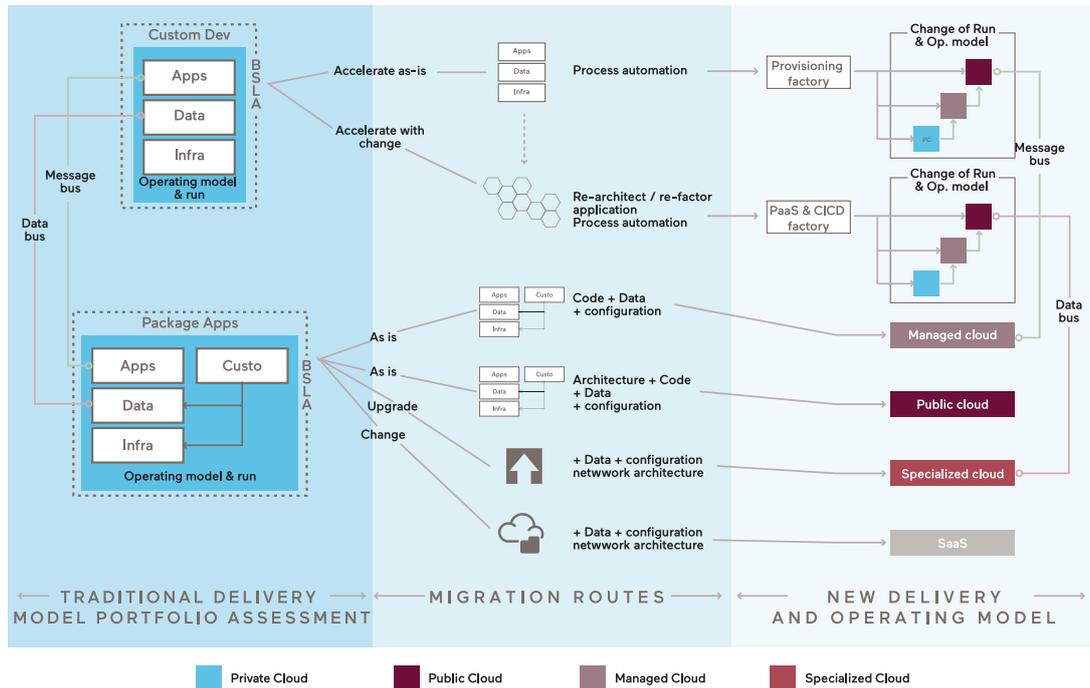
Cloud journeys do not always take companies to a public cloud. Even some digital natives are switching gears. Over 9 months, Dropbox migrated 90% of its data from a public cloud to a private infrastructure, aiming to fine-tune performance and data sovereignty. Dropbox also hoped to reach a critical size that would enable it to leverage its own scale and customize its cloud services for maximum performance.

### Designing orchestration: what kind of platform ?

Integrating cloud services from different providers while considering security aspects, hybrid deployment and varying service levels is no small feat. This is where service orchestration comes into play, providing the power of the Cloud through a platform of simple and relevant services. Such a platform provides organizations with a path toward leveraging the Cloud on their own terms.

A cloud orchestration platform organizes, provisions and integrates various cross-cloud services—public, private or hybrid—to provide business services that are easy to consume. Alongside this 'stitching' of horizontal services (SaaS, PaaS, IaaS), supporting functions and layers are part of the orchestration platform. Services from different clouds, vendors and providers are abstracted to a common level, making them executable by the orchestration platform. Integration and aggregation functions expose traditional data center services to the orchestration platform.

## THE NATURE OF THE APPLICATION DRIVES THE CLOUD-HOSTING STRATEGY



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### How can a CIO start delivering on the cloud promise?

Begin by segmenting the application landscape. Conduct a systematic, fact-driven approach on the portfolio of applications such as the Capgemini Cloud Assessment to categorize and make informed decisions about next steps for modernization.

Using automated tools, leverage higher-level application metadata to identify the applications with the best ROI in terms of transformation. Capgemini has developed an automated tool (LINKS) with topological insights to deep dive and roam application testing environments and identify dependencies that become critical factors in cloud suitability and placement decisions.

Finally, identify the extent of replatforming required for each application segment. This step must be aligned with the company's strategic IT direction while keeping options open to adapt to new IT developments such as software containers.

Application renewal is impacted in numerous ways when the target environment is a cloud platform:

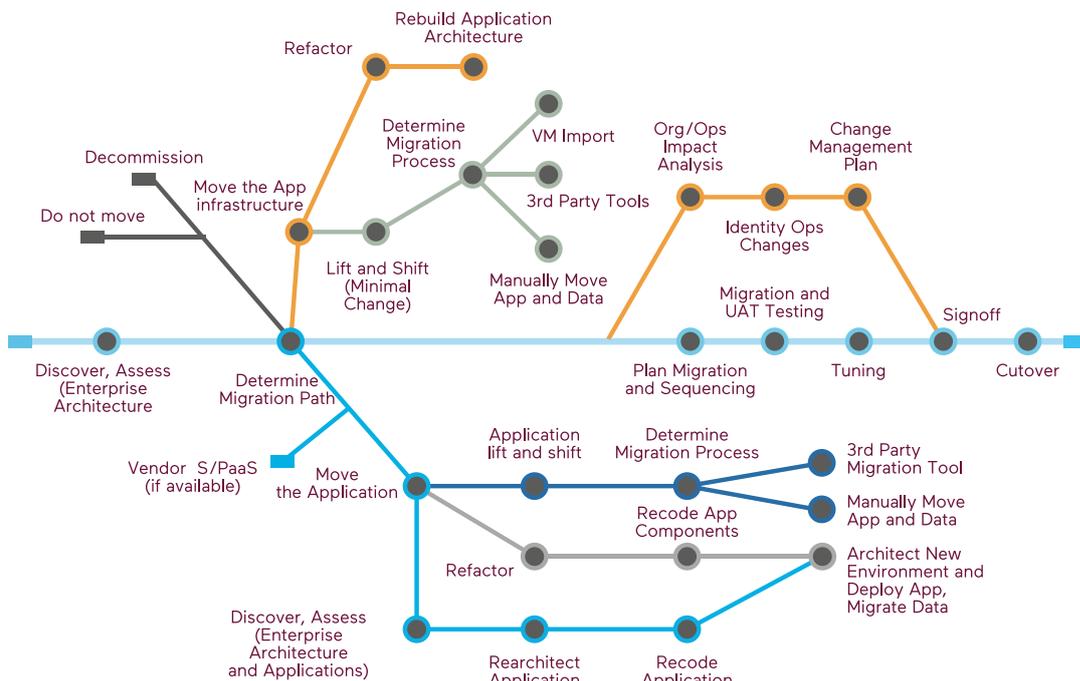
1. **Replatforming** makes use of the Cloud's highly scalable and cost-effective deployment options to run existing applications more effectively.
2. **Resurrecting** consists of adding cloud-based (possibly mobile) front ends to applications to improve functionality and user experience.
3. **Rebuilding** leverages the next generation of rapid development and deployment tools to quickly and effectively recreate applications.
4. **Rebonding** uses the considerable integration power of cloud platforms to eliminate redundant, overlapping or non-aligned functionalities.
5. **Refactoring** is about improving, or simply documenting, the structure of applications—a welcome byproduct of assessing applications for cloud-based modernization.

6. **Replacing** involves assessing the marketplace of cloud-based applications to find replacements for existing, typically custom-built applications.
7. **Retiring** relies on cost-effective cloud storage to archive core applications data so that the applications can be decommissioned.

Every organization needs to map out its own cloud journey. To reduce total cost of ownership and improve agility, Dutch PostNL chose a full cloud strategy. This involved replacing existing applications with SaaS and rebuilding cloud-native applications, rather than replatforming workloads on a cloud infrastructure. In this case, a public cloud (Microsoft Azure) was preferred to a private cloud, with certain workloads kept on premise only as a last resort. The entire IT landscape of 400 applications was systematically analyzed and made cloud ready. CIO PostNL Marcel Krom expects to reduce the IT budget by 30 percent<sup>1</sup>.

<sup>1</sup> <https://enterprise.microsoft.com/nl-nl/roles/it-leader/postnl/>

OVERALL TRANSFORMATION ROADMAP  
& POSSIBLE ROUTE



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**Too Good to be True?**

Getting to the Cloud is not an easy journey and may generate some frustration regarding the Cloud promise: unexpected costs, difficult integration with existing systems, long-overdue performance. 33% of questioned senior business and IT executives considered Cloud solutions did not achieve their initial goals and broke their promise<sup>2</sup>. The CIO of a leading insurance company even confess : “Not only Cloud did not bring all ‘quick-wins’ we expected, it opened-up a whole box of unplanned challenges, expenses”. Mid-term objectives such as Improved business agility or a rationalized legacy application estate claim for a transformational approach going beyond a simple cloud migration.

This is a transformation, so there are risks to mitigate. The primary risk is interrupting business services. Business stakeholders should therefore be involved from the start of any moder-

<sup>2</sup> Sungard Availability Services survey; “The Cloud Hangover”; 2015; survey of 400 senior business and IT executives (France, UK, Sweden, Ireland

nization program. Business will benefit most from the Cloud’s flexibility and agility, and if properly involved, will be an enthusiastic partner in the journey.

Another risk is the so-called “futility of trying to stay current” with rapid technological advances, where innovations may appear ineffectual. Enterprises need to ask themselves whether or not they can afford to stand still. What is the competition doing, and how will that impact your future advantage?

Modernizing the application landscape through a cloud platform can help leverage technological advances while focusing on the IT agility needed to enable business needs. The increased pressure to modernize brings challenges, but also incredible opportunity to reimagine apps in the Cloud.

**Moving to the Cloud is Transformational**

The move to the Cloud implies a deep technical evolution. This first dimension of the transformation is best addressed by our clients. But too often, we see cloud deployment failures due to a purely technical approach. Cloud strategy must take into account new service catalogs, new competencies (see Chapter Transversal Digital IT Focus, Focus 4) and new processes. Our experts suggest a cloud program’s success is based on 70-80% non-technical elements.

In terms of mindset, the key objective of cloud transformation is to drive change from technical execution to business-centric value creation. This leads to IT platforms that deliver differentiating solutions to business. The journey begins by identifying the use cases the IT platforms need to deliver. In the next section, we outline three use cases that enable IT to return with a new, more relevant value proposition.



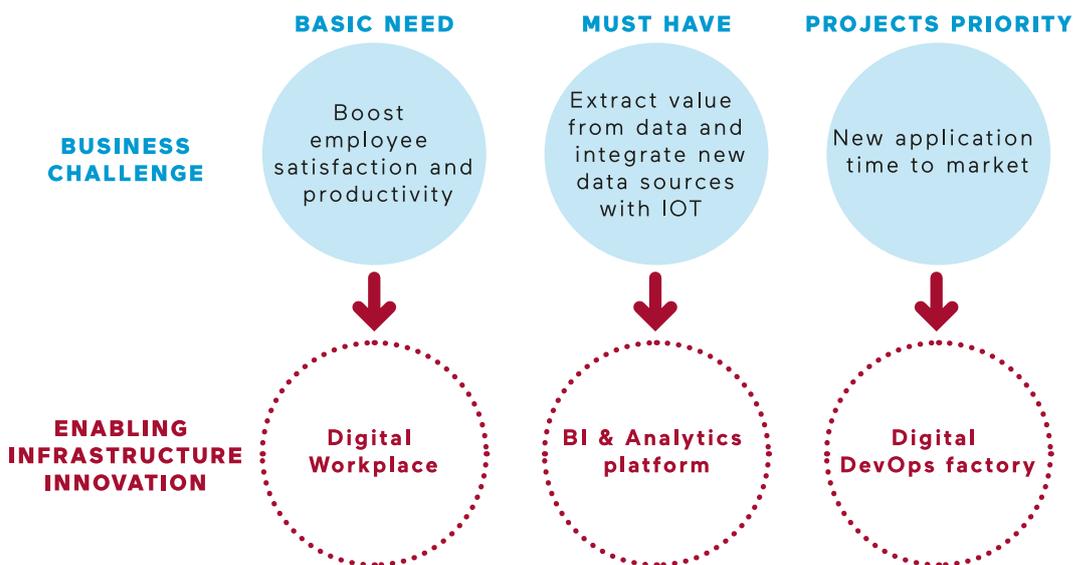
**THREE**

PILLARS

**FOR IT AS BUSINESS PARTNERS**

FOR DIGITAL INNOVATION

3 USE CASES ON WHICH IT QUALIFIES AS BUSINESS PARTNER FOR DIGITAL INNOVATION



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**1| Digital Workplace: From a Device-Based Strategy to a User-Centric Approach**

The workplace is becoming increasingly mobile and collaborative. The result? Employees now expect the same seamless digital experience and convenience in the office as they do at home. In this context, the business challenge is to boost employee satisfaction and productivity by enhancing office and workplace services. To attain end user satisfaction, IT must make the switch from device and technology centricity to usage and service centricity.

When technology is leveraged through usage, the digital workplace becomes a business processes disruptor. For example, global energy services leader Dalkia drastically enhanced power plant maintenance processes by leveraging Google for Work tools. Through root cause analysis of video meetings, maintenance experts can now remotely supervise on-site technician interventions, resulting in increased responsiveness and productivity.

By putting the end user at the heart of value creation, the digital workplace brings about a new working paradigm that extends the traditional scope to real estate and workspace layout.

**2| BI & Analytics Platform: Gain Power and Centralize Data**

Digital means massive production of customer, operational and external data. The resulting business challenge is clear: how to extract value from all that data? IT infrastructure has a key role to play in providing a BI and analytics platform that makes it possible to explore a scattered set of data across IS and secure industrialization. Data scientist masters analytics application parameters; they do not need a Development team to interact with. They just expect infrastructure. This gives IT infrastructure a new role and legitimacy to interact directly with business by providing ready-to-use computing power and storage capacity for Big Data use cases.

**3| Digital DevOps Factory: Speed Time to Market with Infra as Code, APIs, Containers and DevOps Methodologies**

Digital means businesses face increased need for faster time to market. At the infrastructure level, the solutions lies in tools that enable the Digital DevOps Factory. Leveraging the latest cloud technologies, such platforms consist of a deployment and execution platform that relies on infrastructure provisioning automation features and enables development teams to streamline the application lifecycle all the way to production.

# 1 | DIGITAL WORKPLACE: FROM A DEVICE-BASED STRATEGY TO A USER-CENTRIC APPROACH

## The 4 Pillars of the Digital Workplace

Transforming from a laptop and computer landscape to a digital workplace involves a holistic approach encompassing four main pillars:

### 1. Collaboration

This is a fundamental aspect for any company interested in employee efficiency, given a context of hyper task specialization, global teams and integration of partner ecosystems into the value chain. Collaboration is practically built into the DNA of the newer generations of employees, who have developed professionally through working in teams, using ever-evolving technology. They expect to work in a way that is both fun and efficient.

Today's collaboration needs to take into account new mobility usage and devices such as smartphones, tablets and hybrid laptops, which have been gradually incorporated into IT department catalogs to address business needs and technology enthusiasm.

### Collaboration takes shape through three practices: data sharing, co-creation and communication.

These use cases are presented to the employee in concentric circles via technical solutions that may vary according to targeted users and expected data security level.

### Value = {(Performance x Time) / Security} x Adoption

Laptops and tablets are certainly the most visible IT component for end users. With unending innovations and new tools regularly becoming available to users, these devices present a unique opportunity to bring about change and innovation across the enterprise. The workplace is now a transformation enabler, far beyond the technical project that often triggers the transformation.

Digital Workplace transformation must solve a complex equation to secure the promise of an enhanced employee productivity:

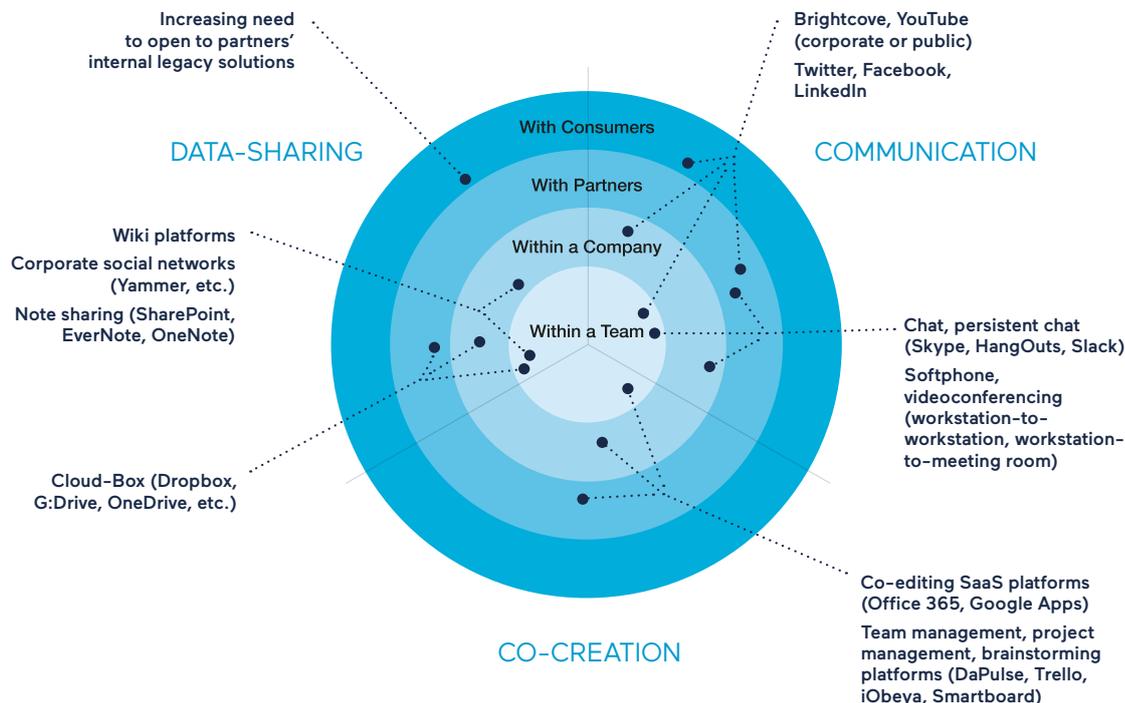
Value = {(Performance x Time) / Security} x Adoption. This formula illustrates that:

- It is key to invest in **Performing** solutions (fully integrated, easy to use, use-cases based) and maximize **Time** dedicated to value creation (e.g., foster usages in mobility)
- **Security** must be implemented with strong attention to its impact on performance and time (e.g., a best-class VPN solution where employees lose time authenticating with a hard-token)
- Adoption is crucial; avoid deploying shiny solutions with an adoption limited to basics functionalities

### The transformation must be driven by usage and no longer only by technologies.

This usage-centric model represents a radical shift from the traditional solution-centric one. The usage-based model implies a change in how CIOs address employee satisfaction, collaboration and productivity, particularly in a context where:

- Employees expect simple tools
- Mobile employees want their documents and tools accessible from the device they have, wherever they work
- IT tools contribute to the company's image, helping to attract and retain a young workforce



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Apart from technology solutions, collaboration is also strengthened when the workplace, from a real estate perspective, is designed as the continuation of the user’s workstation. A Digital Workplace therefore implies a Real Estate & Facilities department program for rethinking workspaces so they are less compartmentalized and more digitized.

A new kind of workspace will appear that promotes discussion, co-creation and innovative ideas through adapted furniture and innovative technological equipment. The workspace will also enable employees to access information systems from any location. This may include interactive terminals broadcasting information and providing access to various services (location, directory, room reservations, etc.).

## 2. Mobility

Mobility between sites or within a building based on a third-party network (home Internet, public WiFi or mobile network) is a fundamental aspect of the digital work environment.

### Mobility entails three imperatives: anytime, anywhere, and from any device.

These imperatives imply a rethinking of technological choices to meet a mobility use case. A dedicated network security should be connected to the IS, and support manageable IT terminals, through adequate enterprise mobile management. Finally, the structure of IS application must evolve to enable development of new services accessible in mobility situations.

IT must gradually implement a data-centric overhaul to enable data consumption through application services (i.e., web and mobile apps) connected via API. New application architecture standards, which impact CIO decision-making, should be defined to integrate underlying technologies such as HTML5 and mobile platforms (iOS, Android, etc.).

Faced with increasingly mobile users, business IT departments must engage in often costly applicative remediation projects to adapt their IT legacy or to migrate to solutions such as SaaS. If not, they risk seeing their users abandon official IT services in favor of shadow IT, which might be considered more adapted to business digitization challenges.

If these “app-itzation” challenges represent IT departments’ main battleground in the coming years, CIOs should be able to quickly meet mobile user expectations. This includes having access to the following “core” services from any location:

- Collaboration (e-mail, scheduling, contacts)
- Productivity (Office)
- Videoconferencing or soft-phone

Mobility also requires devices conceived specifically for VPN-less mobility. Target is for users to securely access SaaS or virtualized business applications. On their device, users can reconstitute a work environment adapted to their needs, accessing a catalog of mobile applications thanks to new architecture components such as “cloudified” authentication directories (e.g., Azure AD). This value chain of services provided by IT needs to be orchestrated end-to-end by ITSM industrial tools that manage asset lifecycles and services. This ensures quality services are provided at optimal cost effectiveness and managed by IT based on its contractual commitments.

### 3. Next-Generation Productivity

For decades, productivity has relied on the Office suite. The nearly exclusive use of this platform has fueled an exponential growth in the number of files to store and manage, while it has failed to meet data sharing and co-editing needs. Since document indexing is complex, it becomes nearly impossible to locate information lost in a myriad of documents. As a result, millions of files are stored but cannot be effectively used or deleted.

New productivity suites include pivot functionalities such as index, search, and suggestions. It is becoming easier to share documents (Microsoft Delve and Google SpringBoard).

Furthermore, new SaaS solutions help users answer specific personal productivity and team collaboration use cases. These tools include:

- Note taking and sharing (Evernote, OneNote)
- Task management and assignment, inspired directly by Agile methods (Wunderlist, Trello)
- Workflow signature and approval (Dochub, Docusign, Entrust)
- Time management (Toggl, Chronos)
- Project management (Asana, Dapulse)
- Presentation (Powtoon)

**Benefits:** Users become the agents of their own productivity, selecting their own tools and organizing work as they see fit. Users can access and download these tools—available via an app store—directly to their workstation.

**Constraints:** It’s necessary to monitor heterogeneity and interoperability between data formats that may not be compatible between solutions, making exchange impossible for users who have selected different solutions.

**Challenge:** IT departments need to industrialize “innovation labs” and detect user needs early on to package and promote new tools without imposing them on users. The driving philosophy should be “Choose your own tool!”

### 4. Social Support

No matter what efforts are taken by IT, users will always opt for technical assistance from an office neighbor who seems to know about IT before picking up the phone. Service centers must therefore reinvent their service model, taking inspiration from community support mechanisms now available across the web such as:

- Technology suppliers (e.g., Microsoft support forum)
- Software suppliers (e.g., Workday user community)
- Broader community (e.g., Google search)

Major suppliers of ITSM solutions have understood this fact and set up platforms enabling users to query free text knowledge bases, relying on innovative technologies such as machine learning and Big Data. At the same time, new collaboration tools such as Yammer, Slack and Wiki platforms have led to new user-to-user “transversal” support systems. Following the rise of shadow IT a few years ago, IT departments must now face “shadow support.”

**Challenge:** IT departments must industrialize the systematic documentation of incidents and resolution procedures and set up document management platforms that do not lock up information, but keep it dynamically accessible.

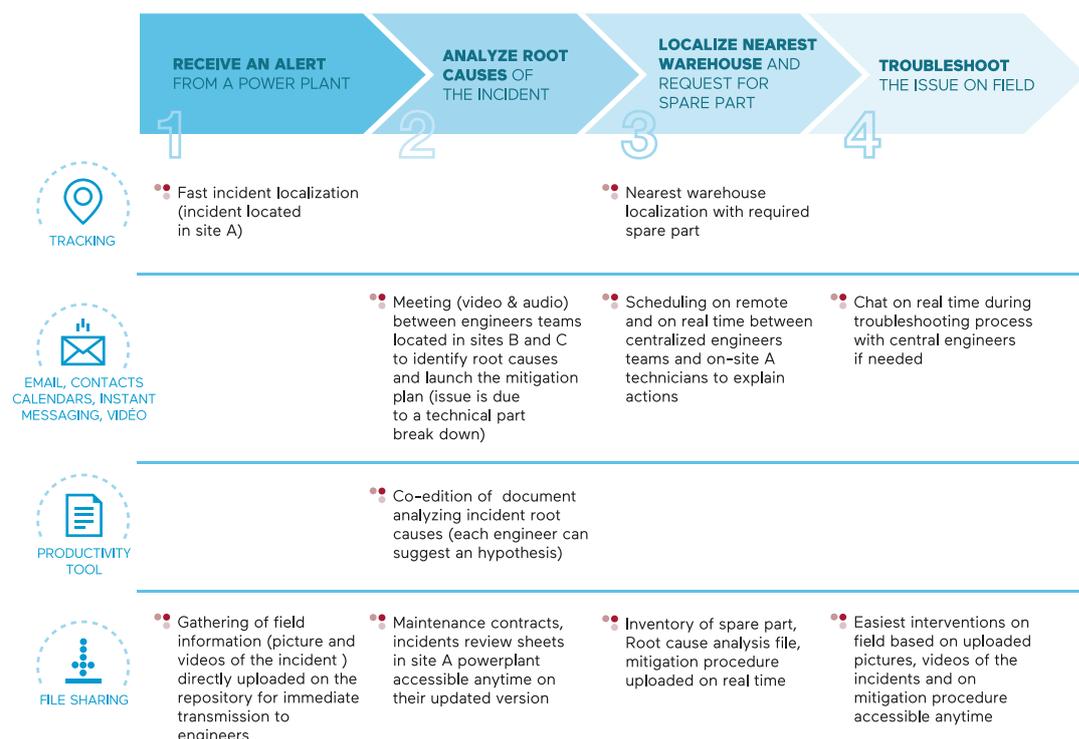
Next generation support will be “genius support,” meaning proactive support based on machine learning and genius bar approach to on-site support counters (e.g., on-site IT boutique).

### Digital Workplace: Part of a Wider Digital Working Strategy

**When technology is leveraged through usage, the digital workplace is a business processes disruptor.** For example, an energy service company was able to drastically improve power plant maintenance processes by leveraging SaaS productivity suite tools. Using root cause analysis by videoconferencing, maintenance experts can now remotely supervise on-site technician intervention, resulting in increased reactivity and productivity.

**Benefits:** Enable troubleshooting responsiveness by leveraging team coordination regardless of location. Reduce the number of interventions by improving common knowledge about maintenance issues (root cause analysis, real-time sharing, etc.). Increase productivity of on-site technicians and engineering teams, making their interventions simpler and more effective through real-time pictures, videos, etc.

## HOW DIGITAL WORKPLACE CAN DISRUPT BUSINESS PROCESSES, EXAMPLE



## 2 | BI & ANALYTICS PLATFORM: GAIN POWER AND CENTRALIZE DATA

### Redesigning the IT Operating Model to Become a Data-Driven Company

We are now well past the point of wondering whether Big Data's value is real. The main challenge to unlocking value from Big Data, according to 46% of respondents<sup>1</sup>, is access to scattered data lying in silos across various teams.

**With the Big Data phenomenon, a new type of business user has emerged: Data Scientists.** These business-oriented profiles are well educated in IT. They know what functionalities they want and how to parameter their software. Business teams now expect IT to provide the core infrastructure and platforms on which to plug and parameter this software, thus enabling data scientists to extract value from a huge amount of diverse data. **These expectations give IT infrastructure a new role and legitimacy to interact directly with business by providing ready-to-use computing power and storage capacity for Big Data use cases.**

<sup>1</sup>Source: Capgemini Consulting, "Cracking the Data Conundrum: How Successful Companies Make Big Data Operational," January 2015; Capgemini Consulting Analysis

IT infrastructure has transversal access to data and must make it available to business teams through a Big Data brokerage platform. IT departments should have a 'ready-to-use' service platform offer that corresponds to business maturity and level of ambition.

During the exploratory phase, IT departments should not try to be the driving force. Rather, they should capitalize on learning acquired during this phase to prepare for industrialization. IT infrastructure should orchestrate different internal services, providing unquestionable added value, innovation and acceleration. Success for CIOs means enabling the business to achieve industrialization while maintaining high-quality delivery standards without breaking up the information system.

"Unlocking value from Big Data is access to scattered data lying in silos"

## IT Infrastructure at the Heart of a Revolution

IT production is now legitimized and should seek to be at the forefront on Big Data topics alongside business teams. IT brings value as a:

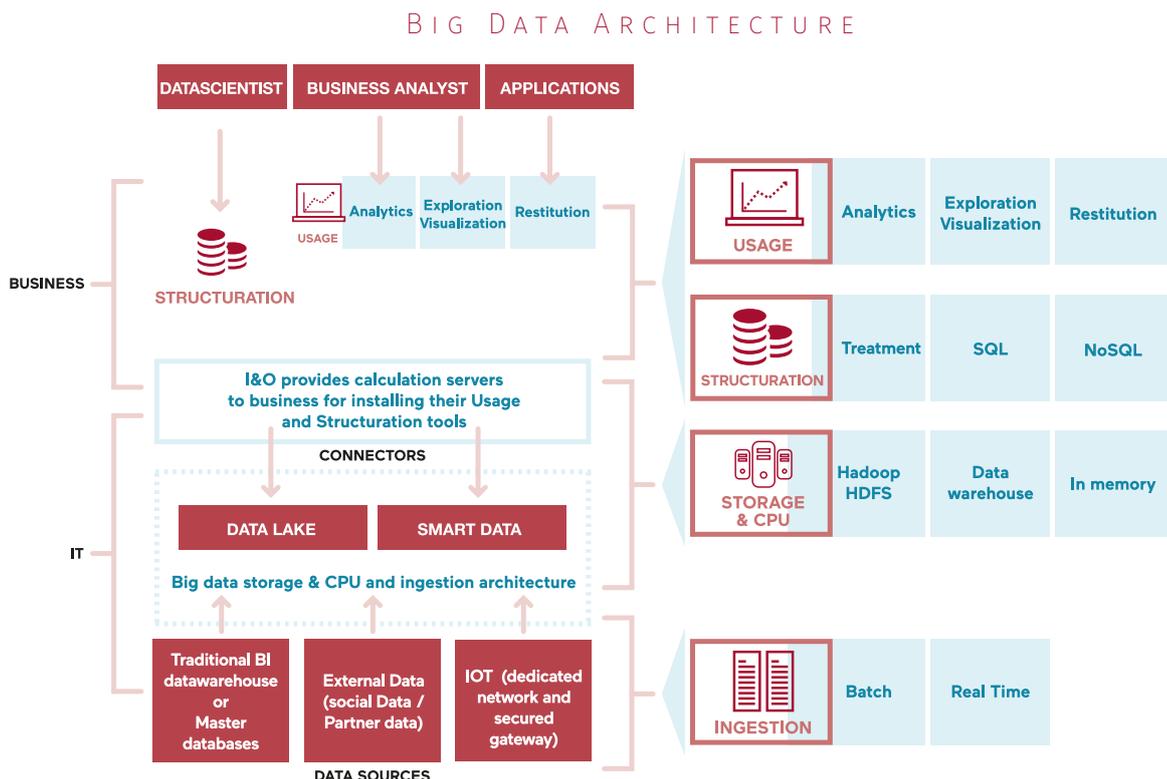
- **Facilitator** on data provision during the exploratory phase.
- **Source of proposals** on tool provision (e.g., installation modality, material configurations).
- **Main contributor** on target definition and build in terms of industrialized and data loading platform and data storage. This role should coincide with a consulting and monitoring role to merge studies on industrializable and perennial solutions.
- **Tools integrator** on the analytics layer.
- **Leader** on technical architecture, enabling IT production to be in charge of the RUN (standardization and performance/stability guarantee).
- **Proactive implementer** of compliance/conformity during implementation of regulatory requirements in coordination with the Chief Data Officer.

### Living on the edge: how to meet market expectation level

IT infrastructure must **develop strong convictions** on target solutions (Appliance versus Open Source versus Best of Breed). In addition, infrastructure will **co-invest** with the business during first use cases to get experience and strengthen its convictions. It is equally critical to **have a platform up and running** to meet business needs and **conduct technical experiments**, such as testing upgrades to the company level and security compliance. Big Data also represents **new skills** the I/O organization must integrate (an overview of these new I/O skills in a digital and cloud age is provided in a dedicated section four).

### Our View of Big Data Architecture

- **Usage layer** enables business users to enhance decision-making through exploration and data analysis
- **Structuration layer** translates and structures data into understandable language and forms for the usage layers
- **Storage layer** enables copying of all needed data into a low-cost storage architecture called the data lake
- **Ingestion layer** ensure all needed data are copied from data sources as required



### 3 | DIGITAL DEVOPS FACTORY:

SPEED TIME TO MARKET WITH INFRA AS CODE, APIS, CONTAINERS AND DEVOPS METHODOLOGIES

#### Challenge

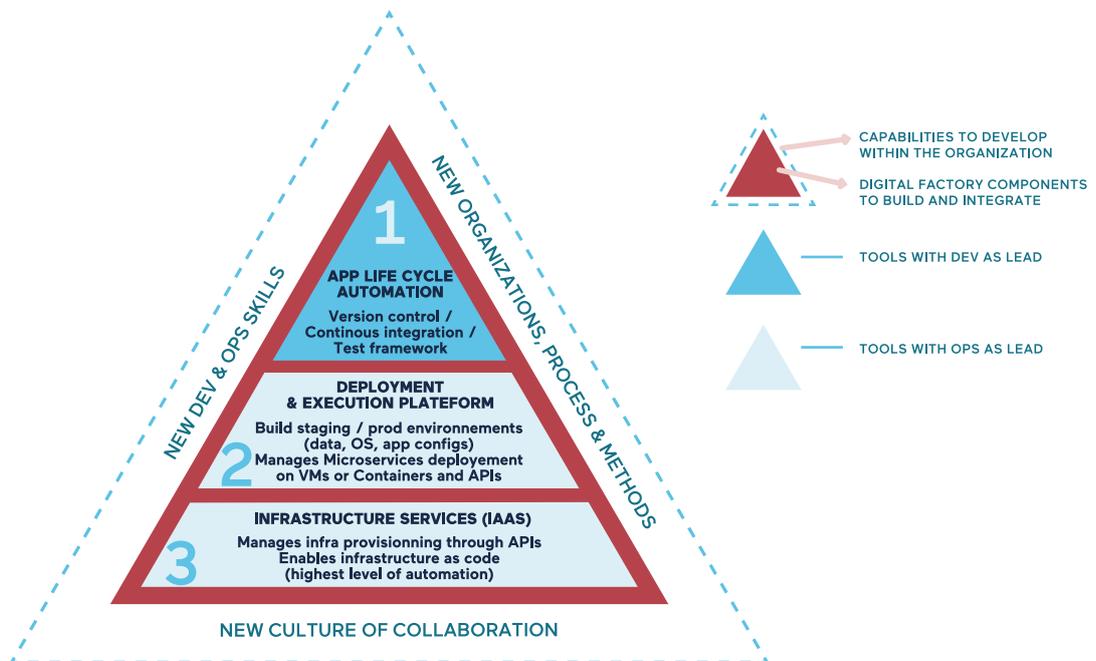
Today's companies are mainly software companies because all customers' first touch point is mobile and web software. Bringing new services to market is therefore a question of survival for businesses. Organizations must abandon the traditional mindset that development teams (Dev) add new features and operations (Ops) teams keep systems stable in favor of a business-enabling approach.

DevOps dramatically reduces deployment risk and time to market from coding through production, enabling change as often as needed. This represents both an opportunity and a threat for operations. While it enables a climb up the value chain, the threat is that agility expectations will not be met. Below, we outline key things to consider to make DevOps a success story from the operations point of view.

#### Value Proposition

IT infrastructure must drive change toward a culture of collaboration by mastering new skills and methodologies. This includes unifying app lifecycle automation tools for IT resource provisioning and workload deployments, greatly speeding up time to market.

#### OUR DIGITAL DEVOPS FACTORY FRAMEWORK TO STRUCTURE THE LAUNCH OF A DEVOPS PROGRAM



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#### Myths about DevOps

- With DevOps, infrastructure performance and stability is still the responsibility of Ops, not Dev teams.
- A full DevOps model ("You build it, you run it") is not always relevant and depends on factors such as maturity, time to market pressure, regulatory context, level of industrialization and quality constraints.
- Not all applications require the same speed.
- DevOps does not necessarily

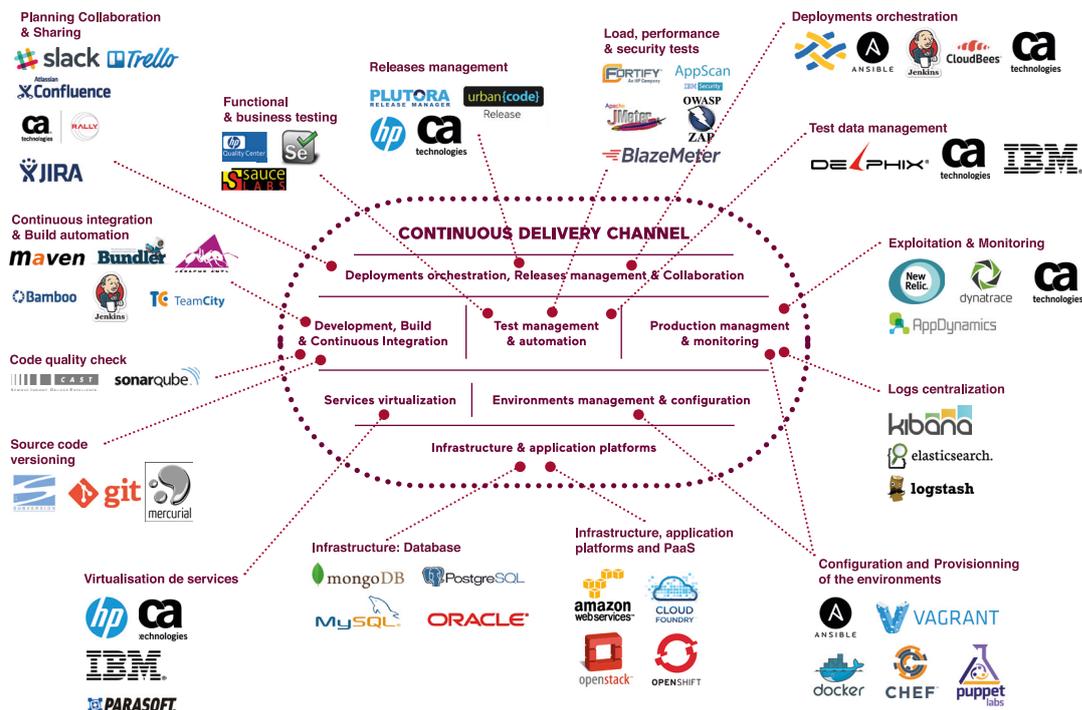
include end-to-end continuous deployment in production. Rather, the first step is to get "ready to deploy" code, followed by the actual deployment based on specific factors (i.e. legal timeframe to release new code).

#### A New Generation of Automation Tools

- **App Lifecycle Tools:** help Dev manage content produced (version control/continuous integration/test framework)

- **Deployment and Execution Platform (PaaS):** builds staging and production environments (data, OS, app configurations) and manages micro services deployment on VMs or containers and APIs
- **Infrastructure Services (IaaS):** manages infrastructure provisioning through APIs and enables Infra as Code, the highest level of configuration management automation

## AUTOMATION TOOLS LANDSCAPE FOR DEVOPS



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### Fostering a Culture of Collaboration, Transparency, and Fail Fast/Learn Fast

Trustful collaboration is among the key principles that drive change. Developers and operation teams require mutual trust to enable discussions on infrastructure change. Teams must also accept that failure is inevitable. Rather than working to prevent it from happening, teams should focus on their ability to react, speed up repair times and learn from mistakes. Transparency requires that all app lifecycle data is available and auditable, meaning that operations teams must provide developers with system access.

The greatest tool maturity for operations is Infra as NCode—the ability to manage infrastructure configurations using only templates. Dependencies between content and receptacle should be minimized. After code is reviewed, the content operating system becomes agnostic, enabling it to function from within a container (ex : Docker).

These containers can be deployed on any standard infrastructure in the same way that physical containers can be shipped on any standard shipping boat. Full infra agnostic code is not yet mature as the market is still tackling various technical issues, such as full network virtualization.

Collaboration methodologies such as Agile and Lean, along with cross-functional teams and organizations, drive cultural change within companies. DevOps offers productivity benefits and promotes a culture of collaboration by leveraging new skills, organizations, processes and methodologies.

### The Future of DevOps: DevSecOps

As release time for new code becomes more accelerated, security must be preserved without hindering the coding process. With 84% of all cyber attacks occurring on the application layer, Dev teams must account for security issues. However, traditional security is no longer an option. It slows down the design and release of a system built by iteration. DevSecOps is a journey to build security into the continuous delivery pipeline as part of the DevOps process.

Read the DevSecOps | Security as Code Manifesto: <http://www.devsecops.org/>



# **DELIVERING** DIGITAL IT

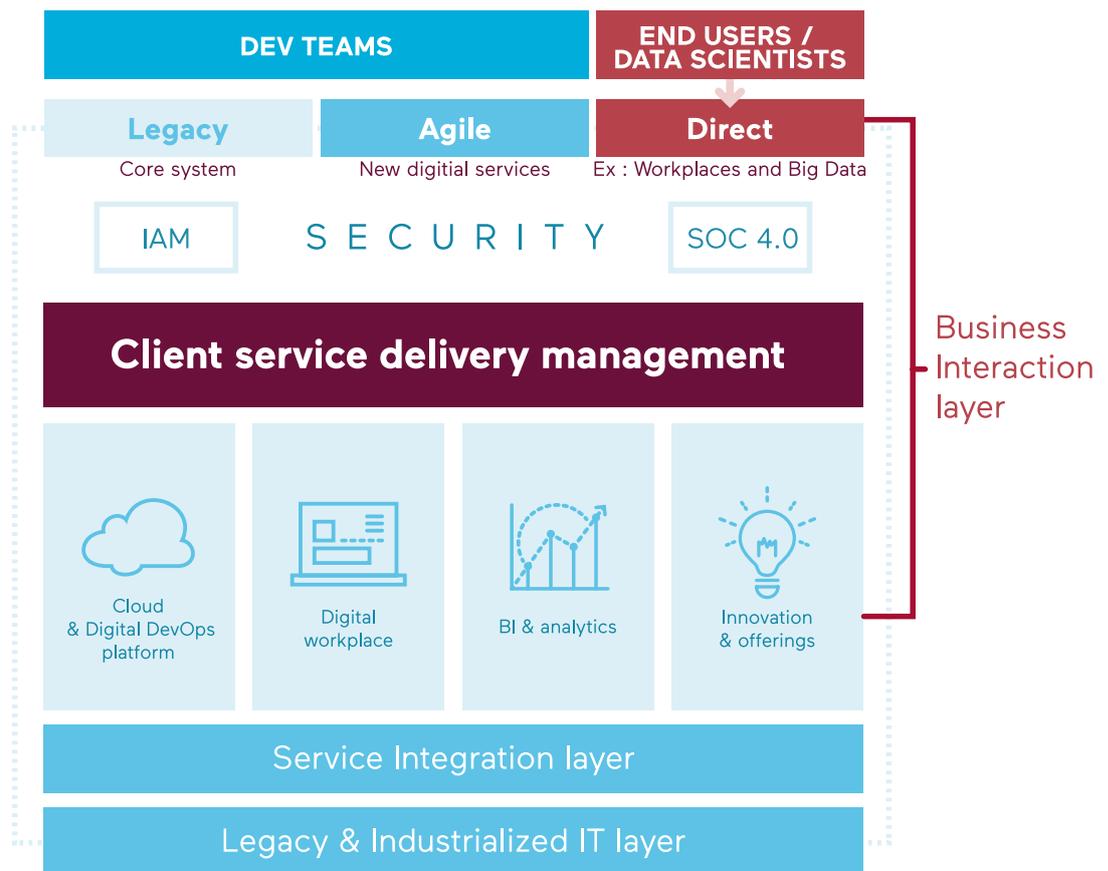


## 1 | HOW DOES A CLOUD DELIVERY MODEL TRANSLATE INTO AN ORGANIZATION?

Materializing the benefits of the Cloud involves deep delivery model transformation. IT infrastructure must be radically reorganized in order to deliver core high-value services (DevOps platforms, data brokerage, IoT, etc.), while keeping

the spotlight on legacy. All organizational models should of course be adapted to their specific business contexts, but our experience shows that the most advanced companies structure their IT in the following way:

### STANDARD IT ORGANIZATIONAL SCHEME



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#### Business Interaction:

this layer moves IT from a cost center to a business partner, focusing on client satisfaction, business value and client relationships. This organizational layer delivers services to clients in a multimodal manner: directly with end-users (i.e., workplace), directly with the business (i.e., Big Data), in a classical waterfall (i.e., legacy application), or using Agile methodologies for differentiating or innovative applications. This layer embeds verticals (design, build, expertise-L3) when subjects are new or require specific attention. When resources are scarce,

especially on innovative topics (e.g. cloud platforms) they are, by definition, not entitled to industrialisation and should thus be kept in the business layer. As soon as a given subject reaches the appropriate maturity, activities can be transferred to the Legacy & Industrialized IT layer for industrialization.

#### Service Integration:

this layer reconciles the technology-oriented towers and client-dedicated structures. It guarantees end-to-end service quality and coordinates ITIL processes through all service producers, both internal

and external. This organizational layer also manages cloud brokering—the provisioning of VM—either on-premise, or via the private or public cloud.

#### Industrialization:

the answer to industrialization and innovation pressure goes through specialization by technical tower: storage, system, network, etc. This layer is the most appropriate for outsourcing and/or Rightshoring.

## 2 | A BUSINESS INTERACTION LAYER TO DELIVER AGILE IT

IT infrastructure already interacts with various types of businesses, clients, customers and partners. In the digital age, IT infrastructure cannot remain in a single speed mode and should adapt to the speed of distinct customer expectations. Data scientists have different needs than application testers on the mainframe. Managing this complexity and intensity of interaction requires a dedicated organizational structure aligned to legacy, agile and direct modes of working.

### Legacy

The legacy mode should oversee historical core business systems. The high stability of such systems requires little supervision and only irregularly scheduled testing and upgrades. The waterfall delivery mode is relevant because it enables a high scheduling delivery rate and resource specialization. This traditional operation mode prioritises accuracy and predictability before speed.

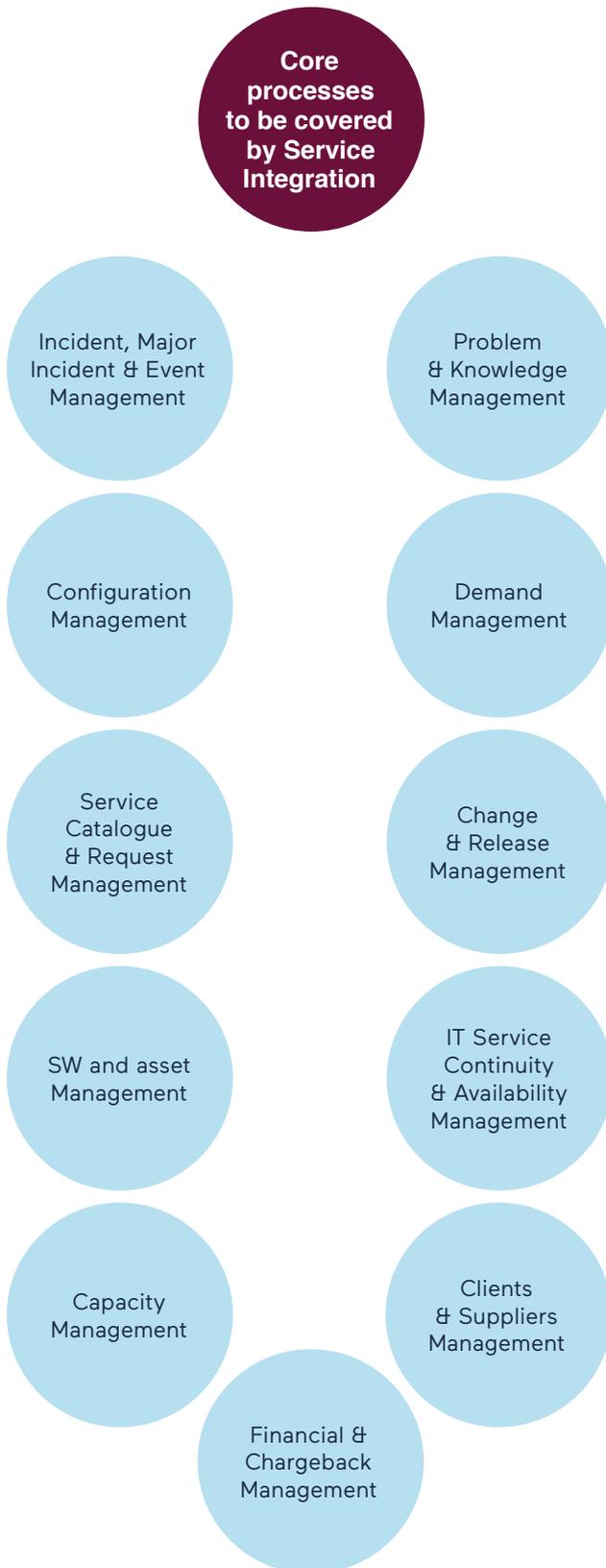
### Agile/DevOps

The agile mode achieves a faster time to market, calling for a more inquisitive way to perfect a digital product/service through rapid experimentation. The DevOps platform supports this approach with a full set of tools and methodologies. IT infrastructure should consider addressing this mode by detaching resources to work within development teams.

### Direct

For some offerings, IT infrastructure must serve clients directly, without the mediation of business IT or development experts. The direct mode covers business needs toward the digital workplace or Big Data applications. This mode is best enabled through a self-service portal to serve end users quickly and efficiently.

### 3 | A SERVICE INTEGRATION LAYER TO GUARANTEE END-TO-END SERVICE PERFORMANCE



#### A Full Set of Activities

Service Integration (SI) reconciles client and technological views. Its main objectives:

- Guarantee end-to-end performance of services delivered to the business by towers (internal towers or external providers)
- Ease cross-tower coordination
- Manage core ITIL processes
- Manage “hot” activities connected to production events: incident and event management, change and release management, etc.
- Manage “cold” activities aimed at delivering operational excellence over the long term: BPO (Business Process Owners), IT for IT, lean teams, problem management, SLA analysis, inventories (CMDB), etc.
- Integrate brokerage and orchestration capabilities into ITIL processes to guarantee the end-to-end performance of services.

Service integration activities represent between 15% and 30% of IT workload. This includes a significant proportion of management time (e.g., assigning tasks, tracking, reporting), based on the cloud delivery model and automation-standardization level.

"A full Service Integration setup can translate into as much as 40% of savings on its scope"

### **Regrouped SI with Integrated Tools Can Achieve Savings**

Service integration activities can be regrouped in various proportions. A full regrouping can translate into as much as 40% in savings within the teams involved around those topics (which usually represent around 50% of total IS staff), as demonstrated by the state of Texas in the United States<sup>1</sup>. In other cases, where either the tooling (ITSM) or process scope did not cover the full ITIL processes spectrum, cost savings of 20% have been recorded.

To industrialize and coordinate core ITIL processes, service integration layers should leverage IT for IT tools. These include Service Management (ITSM) models and Configuration Management (CMDB) systems, reporting tools (operational or strategic for IT, providers and clients), Finance and Project Portfolio Management tools. For multi-sourced or fully outsourced environments, service integration will define a consistent SLA and OLA structure. This simplifies the integration and management of service providers by defining standard policies, processes, procedures, work instruction blueprints, and reporting mechanisms, making it easier to engage and disengage service providers.

On the ITSM market, three providers are competing: Service Now, BMC and HP. The newcomer, Service Now, has gained momentum within the past three years thanks to its innovative pay-per-use SaaS business model, user-friendly interface and faster deployment time. Competition on IT for IT tool markets is turning contract renewal and sourcing strategies into key levers to drive down costs associated with service integration activities.

<sup>1</sup>Capgemini SI deployment project

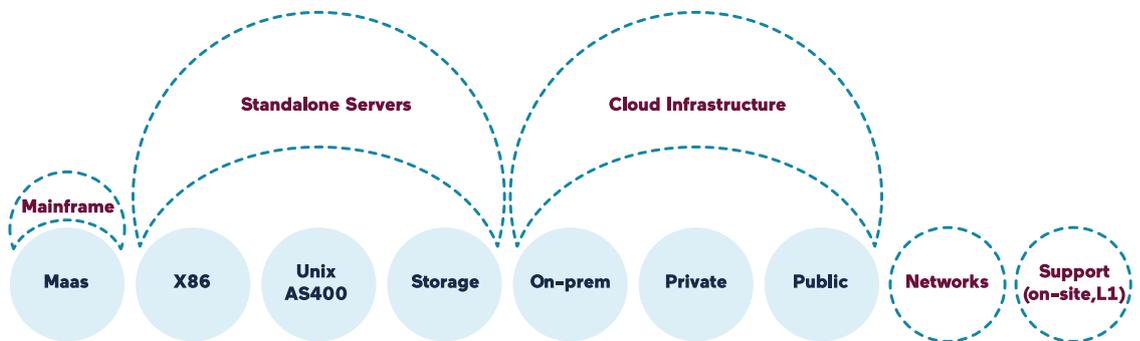
## 4 | AN INDUSTRIALIZATION LAYER TO ANSWER TO PRESSURE ON COST AND ACCELERATE INNOVATION

Best-in-class IT operations are organized by towers that specialize in technical domains. This provides key experts who are

focused on their specific area of expertise: storage, system, data, network, help desk, etc. It enables infrastructure to achieve

a cost-effective organization while attaining maximum industrialization and standardization.

INDUSTRIALIZED IT HAS SPECIALIZED ITS TEAM BY TOWERS AND SEPARATED THEIR ACTIVITIES BETWEEN DESIGN, BUILD AND RUN



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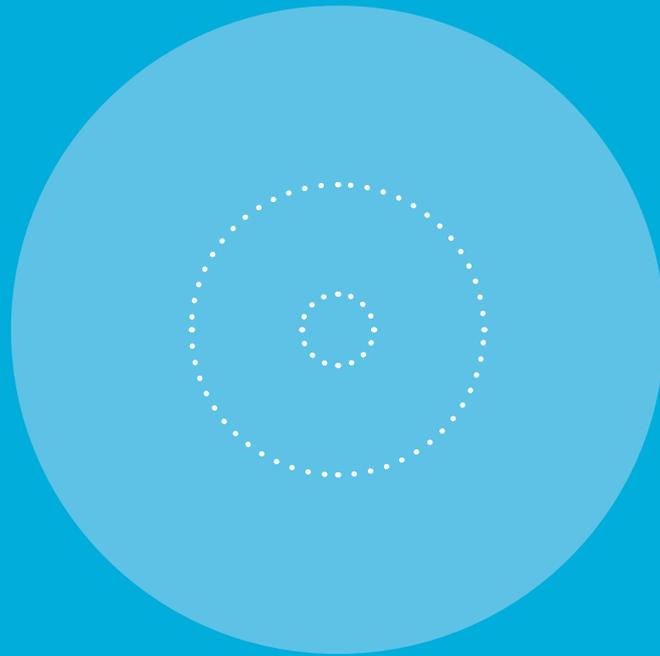
Traditionally, each tower operates the full spectrum of activities: plan, design, build and run activities. While higher-value project activities are kept internally, lower-value run activities are being outsourced to specialized partners (primarily L1, service desk and on-site support).

The first challenge is to ensure the tower organization functions effectively. Outsourcing calls for strong service integration roles, particularly coordination on quality (incident manager) and continuous improvement. Build activities should be carved out from run activities to keep watch over productivity efforts and to ensure

that modernization investments are not being wasted on low run efficiency. Internal staff must be repositioned, which applies to strictly outbound design, build and run activities.

IT infrastructure needs to secure a project management commitment. Project management capabilities should be professionalized and gathered in a structured pool of project managers. This service offer has to be formalized and modeled into ITSM in terms of demands and requests, and management must commit to respecting deadlines. The difficulties encountered during cultural change, from the daily routine

to planned and anticipated activities, is often underestimated. Finally, the need for technological expertise is soaring. Therefore, design and architecture teams must be reinforced, with design teams being essentially staffed by internal resources. The design teams can also host "L3 RUN" to keep IS-specific IT knowledge capitalized.



# TRANSVERSAL DIGITAL IT FOCUS

FOCUS 1

**CYBERSECURITY  
RELIES ON  
DATA-CENTRIC  
ORGANIZATION**

FOCUS 2

**MARKETING  
FOR IT: MAKING  
THE BUSINESS  
PARTNER STANCE  
HAPPEN**

FOCUS 3

**INNOVATION:  
ANSWERING  
BUSINESS NEEDS  
IS PARAMOUNT,  
ENHANCING  
SERVICES  
IS BETTER**

FOCUS 4

**WIN THE  
TALENT WAR  
TO PROVIDE  
THE RIGHT  
STAFFING**

FOCUS 1



**CYBERSECURITY RELIES ON DATA-CENTRIC ORGANIZATION**

The cornerstone of cybersecurity lies in the implementation of relevant security functions throughout the data lifecycle, from classification to archival processes. It relies first and foremost on a steerable, business-oriented organization that onboards Legal, Compliance, Operational Risk Management and Auditing departments.

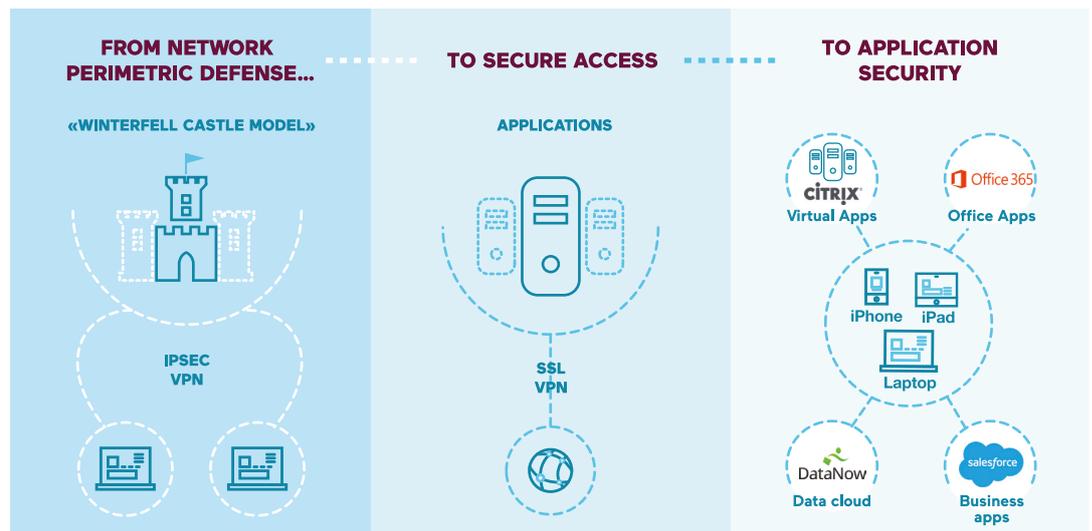
**Protecting Content means Access Control, Transverse Detection and Reaction Capabilities**

Identity and Access Management (IAM) solutions centralize user profile creation and embed relevant security controls to screen access to applica-

tions. User profiles are correlated upstream to authentication mechanisms. This feature needs to be integrated in all project design phases.

A Security Operations Center (SOC), equipped with Security Information and Event Management (SIEM) software, enables comprehensive analysis of security events to detect threats and anomalies. The SOC ensures a blanket control and alert function and coordinates responses with business entities, IT operational staff and dedicated Computer Security Incident Response Teams (CSIRTs). This should lead to new services for end users, such as alerts on suspicious activities within their perimeter.

THE SECURITY PARADIGM SHIFT IMPACTS NOMAD ACCESS USE CASES



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**Digital Workplace Security Must Address Daily User Experience**

The security policies for workstations and mobile devices must define relevant solutions such as USB encryption, heavy files transfer, antivirus software or hard token solutions, and modalities of distant access to business information systems. The selected solutions and features must comply with market best standards to mitigate risks of data leakage on site, and must be coupled with a strong patch management policy on the applicative layer.

But the key to effective risk mitigation is user adoption. To be efficient and frictionless, these solutions must be regularly incorporated into staffs' use cases. Furthermore, designing problem-solving training (rather than guilt-inducing policies) is crucial for users to grow accustomed to these different solutions.

**Access Control and Security Incident Management Processes must Equally Apply to Cloud-Hosted Applications**

Cloud solutions and technologies bring forth a new level of data management complexity. Data circulates in private and/or public applicative domains whose security measures depend on hosting solutions that may not be immediately compatible with infrastructure capabilities. Securing cloud solutions and technologies therefore consists of a due diligence upstream contract signature to ensure security prerequisites are embedded in the product. Risk analysis then becomes a crucial driver to provide compatibility between infrastructure legacy and hosting solutions. The key here is to apply and perpetuate access control and incident management processes to cloud solutions, regardless of their hosting solution.

## FOCUS 2



### MARKETING FOR IT: MAKING THE BUSINESS PARTNER STANCE HAPPEN

**CIOs need to change their positioning** to improve their relationships with their business's internal stakeholders. And the challenge is high: 50% of top business managers do not perceive CIOs as business partners and do not even understand their offering. Some of the key reasons for dissatisfaction include a lack of transparency and proactivity, rigidity, technical complexity and insufficient attentiveness. Even if CIOs are not purely in a commercial relationship with the business, they face the challenge to shift into a true "business partner" role. CIOs are competing with GAFA & digital leaders in terms of IT marketing. The old fashioned paper service catalog seems outdated in comparison with Bezos's keynotes or Apple product demonstration, etc.

CIOs sense the urgency: 40% of CIOs set business partnerships as a major focus for 2016. To support such initiatives, IT can apply marketing concepts such as price positioning, customer segmentation, service promotions, etc. The goal of this approach is to **improve short-term client satisfaction, and long-term value perception** of IT and relationships to the business. Key levers include:

- A service design and monitoring with a focus on client experience Service offering optimization through digitized and marketed service catalogs.
- Regular meetings between business and IT executives and operational teams to build business relationships, one-day workshops create more intimacy, solve more issues and achieve higher client satisfaction than extensive SLA reviews.
- Dedicated roles and governance to drive change on the long term

Finally, an IT marketing approach requires demultiplication. **All IT employees must be trained on the business partner stance**, including content and intensity depending on the client's exposure level. The goal is for all employees to know standard concepts regarding client relationship management (conducting meetings, facilitation, etc.), and be aware of the IT service offering and related business stakes.

"50% of top business managers do not perceive CIOs as business partners"

## FOCUS 3

## INNOVATION: ANSWERING BUSINESS NEEDS IS PARAMOUNT, ENHANCING SERVICES IS BETTER

### Innovation is Now Highly Specialized by Tower

What we see happening in the market in the upcoming months or years. Innovation has never accelerated at such a heightened pace. However, innovation is highly structured by technology cases. The CIO has to translate these into business benefits and advantages. This goes through the "platformization" of services and use case definition.

### Innovation Should be Processed to Unleash Potential

IT needs to accelerate time to market to keep pace with market speed on innovation. IT's great advantage is that resources have a natural appetite for technological innovation. The challenge is to transform technology cases into tangible business benefits. Most of them will trigger drivers to optimize the infrastructure department itself: internal processes, tooling, etc. For example, flash storage will mainly drive performance with few perspectives to derive business disruption. On the contrary, a containers approach will achieve easier code deployment and thus faster time to market.

To maximize business value, the objective of the innovation team is to always think about technology through such use cases and to help the business reinvent itself. IT must set up an Innovation Lab and allow resources to test ideas through POCs. However, proper innovation governance and energy to facilitate this are key. Innovation must stimulate the creation of optimization or transformation projects.

The open source approach is a tremendous source of innovation. Open source communities are leading the most innovative fields of IT, such as OpenAI, on deep machine learning. Digital natives such as Amazon, which sponsors Open AI, are relying extensively on such communities. Incumbents are following suit:

- Walmart developed its own application lifecycle management framework internally and released it internally as an open source project. In October 2015, Walmart revealed<sup>1</sup> that 3,000 IT engineers were using its product and 30,000 changes were being made per month on new or improved features. Walmart then released it publicly as an open source project to benefit from even more contributors.

<sup>1</sup>Source : <http://www.walmartlabs.com/2015/10/walmartlabs-oneops-open-source/>

## TECH TRENDS

	 <b>Technology cases</b>	 <b>Business benefits</b>	 <b>Product or company to follow in 2016</b>
 <b>Application</b>	<ul style="list-style-type: none"> <li>• Serverless application architecture</li> </ul>	<ul style="list-style-type: none"> <li>• Cost reduction</li> <li>• Agility</li> </ul>	<ul style="list-style-type: none"> <li>• AWS lambda</li> <li>• Google Cloud, IBM</li> <li>• Openwhisk, Iron.io</li> </ul>
 <b>Workplace</b>	<ul style="list-style-type: none"> <li>• Personal assistant powered by Artificial Intelligence</li> </ul>	<ul style="list-style-type: none"> <li>• Employee productivity</li> </ul>	<ul style="list-style-type: none"> <li>• x.ia,</li> <li>• Amy</li> <li>• M by facebook</li> <li>• Viv</li> </ul>
 <b>Servers</b>	<ul style="list-style-type: none"> <li>• Container-first OS, bare metal containers</li> </ul>	<ul style="list-style-type: none"> <li>• Cost reduction</li> <li>• Agility</li> <li>• Operational efficiency</li> </ul>	<p style="text-align: center;"><b>Containers OS:</b></p> <ul style="list-style-type: none"> <li>• Core OS, Photon, Atomic, Alpine Linux</li> </ul>
	<ul style="list-style-type: none"> <li>• Unikernel and immutable infrastructure</li> </ul>		<p style="text-align: center;"><b>Unikernel focus:</b></p> <ul style="list-style-type: none"> <li>• Mirage OS, Galois, NEC ClickOS</li> </ul>
	<ul style="list-style-type: none"> <li>• Fully virtualized stack(including network)</li> </ul>		<p style="text-align: center;"><b>Datacenter:</b></p> <ul style="list-style-type: none"> <li>• OSv, Mesos</li> </ul>
			<p style="text-align: center;"><b>Containers Orchestration Platform:</b></p> <ul style="list-style-type: none"> <li>• Kubernetes, Marathon, Rancher, Nomad, Docker Swarm, Fleet, Titus, Deis</li> </ul>
 <b>Mainframe</b>	<ul style="list-style-type: none"> <li>• Offloading</li> <li>• Re-hosting</li> </ul>	<ul style="list-style-type: none"> <li>• Cost reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Microfocus</li> <li>• Hercules</li> </ul>
 <b>Storage</b>	<ul style="list-style-type: none"> <li>• Flash storage</li> <li>• Software Defined Storage</li> <li>• Build your own storage</li> </ul>	<ul style="list-style-type: none"> <li>• Cost reduction</li> <li>• Agility</li> <li>• Performance</li> </ul>	<ul style="list-style-type: none"> <li>• Infinidat ; StorTrends, PureStorage, Tegile, Violin</li> <li>• ARM based distributed storage</li> <li>• Container Storage: ClusterHQ Flocker, Blockbridge</li> </ul>
 <b>Network</b>	<ul style="list-style-type: none"> <li>• Mainstream virtualization</li> <li>• Hybrid and software defined networks</li> <li>• Containers virtualization</li> <li>• B2B VPN automated setup</li> </ul>	<ul style="list-style-type: none"> <li>• Agility</li> <li>• Security</li> </ul>	<ul style="list-style-type: none"> <li>• Barefoot Networks</li> <li>• Big Switch Networks</li> <li>• Cumulus Networks</li> <li>• Ipanema</li> <li>• CoreOS Flannel</li> <li>• Weave</li> <li>• Project Calico</li> <li>• Docker libnetwork</li> <li>• OpenContrail</li> </ul>
 <b>Supervision</b>	<ul style="list-style-type: none"> <li>• From technical to business hyper vision</li> </ul>	<ul style="list-style-type: none"> <li>• Operation excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Nexthink</li> <li>• Uila</li> <li>• AppFormix</li> <li>• Prometheus</li> </ul>
 <b>Security</b>	<ul style="list-style-type: none"> <li>• Threat intelligence BI</li> <li>• Blockchain to ensure IT components integrity</li> </ul>	<ul style="list-style-type: none"> <li>• Operation excellence in cyber security</li> </ul>	<ul style="list-style-type: none"> <li>• Darktrace</li> <li>• Lookout</li> <li>• Cylance</li> <li>• Anomali</li> <li>• Guardtime</li> </ul>
 <b>Service desk</b>	<ul style="list-style-type: none"> <li>• Artificial Intelligence to manage entering flows (email, calls)</li> <li>• Lean approaches</li> <li>• Robotics Process Automation</li> </ul>	<ul style="list-style-type: none"> <li>• Operation excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Openspan</li> <li>• UiPath</li> <li>• NICE</li> <li>• Blueprism</li> </ul>

## Three Key Innovation Topics for IT

### MAINFRAME OPTIMIZATION LEVERS TO REDUCE YOUR IT OPERATIONAL COSTS AND MAKE IT AGILE

#### WHY SO SERIOUS ?

Digital has paradoxically enhanced the pressure on legacy systems. Mobile banking makes customers solicit legacy mainframe several times a week while it hardly used to be solicited once a month for editing account report beforehand. Mainframe still represents approximately 20% of total IT costs in transactional industries such as banking, insurance and retail.

#### LEVERS

##### PERFORMANCE

Not the subject as mainframe is natively scalable. Subject is to maintain cost down.

##### COST EFFICIENCY (IN ASCENDING ORDER OF RUPTURE... AND RISK)

- **Offloading:** Quick Win: mainframe resource optimization through APIs. Big Win: Offload on data access through smart data layer leveraging BigData technologies.
- **Hosting:** at datacenter level, that depending on volume of usage, security and regulatory stakes you want to consider keep owning the infra or mutualizing it with peers.
- **Rehosting:** Recompiled code running on OPEN infrastructure (Leader: Microfocus) or mainframe OS emulation (Hercules)

#### BEFORE LAUNCHING

- Mainframe optimization is a joint Dev and Ops teams effort.
- For rehosting, complete b-case including maintenance cost has to be assessed

#### SOLUTIONS AND START-UP TO FOLLOW IN 2016



Microfocus provides mainframe code recompiling solutions



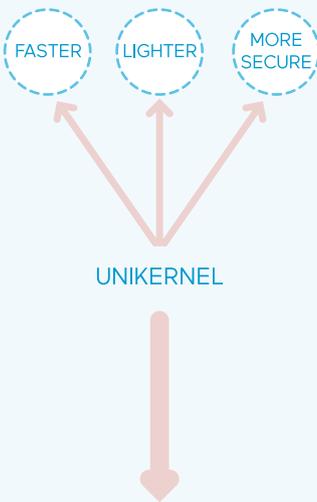
Hercules is an open source software implementation of the mainframe System

#### WHY DON'T WE SEE IT EVERYWHERE ?

- **Off loading:** high functional risks on data synchronization issues
- **Hosting:** mutualization with external is based on security level and sensitivity of data and operations hosted in mainframe (usually companies' most sensitive information)
- **Rehosting:** best approach to date thanks to mature technical solutions
- **Complete re conception:** it requires a significant investment for which there is no IT return on investment.

FASTER, LIGHTER AND MORE SECURE, UNIKERNEL AND IMMUTABLE INFRASTRUCTURE PROVIDE THE AGILITY REQUIRED FOR A CONTINUOUS IT PRODUCTION

• TOWARD LEAN INFRA



Just what is necessary to deploy an application on a bare-metal hypervisor

- A minimal size of <500Ko stored, <10Mo RAM
- An extremely fast **boot-up**: <100ms activation time.
- Supports thousands **apps support** per host (vs tens containers max)
- A **limited attack surface** as only what is necessary for the OS is compiled with the application
- A concept extension from micro services to **nano services**

In the long term, no need for generalist OS in datacenter anymore  
 → moving to a “just-in time” workload

• IMMUTABLE

Deployment model, defined by:

- No modification in production
- If needed, the service will be rebuilt, put in production and the old service will be eliminated.

SOLUTIONS AND START-UP TO FOLLOW IN 2016

-  **MIRAGE OS**  
Xen et Linux Fondation
-  **HaLVM**  
Haskell Lightweight Virtual Machine
-  **ClickOS** NEC
-  **OSV** - Open Source operating system  
designed for the cloud Beta
-  **RUMP KERNELS**

• WHY DON'T WE SEE IT EVERYWHERE ?

- Companies' global maturity on continuous IT production remaining medium or low
- Companies' maturity on concepts & technologies still low to implement them through continuous IT production

«SERVERLESS» APPLICATIVE ARCHITECTURE ENABLES A CONCRETE EVENT-DRIVEN LEAN INFRASTRUCTURE APPROACH: FOCUS ON CODE ONLY & PAY WHAT YOU RUN

FORGET SERVERS

“SERVERLESS APPLICATIONS” PRINCIPLE



- Run code without having to activate or manage servers
- AWS Lambda automatically resizes the application's resources by running the code in response to each trigger

FOR THE DEVELOPER:



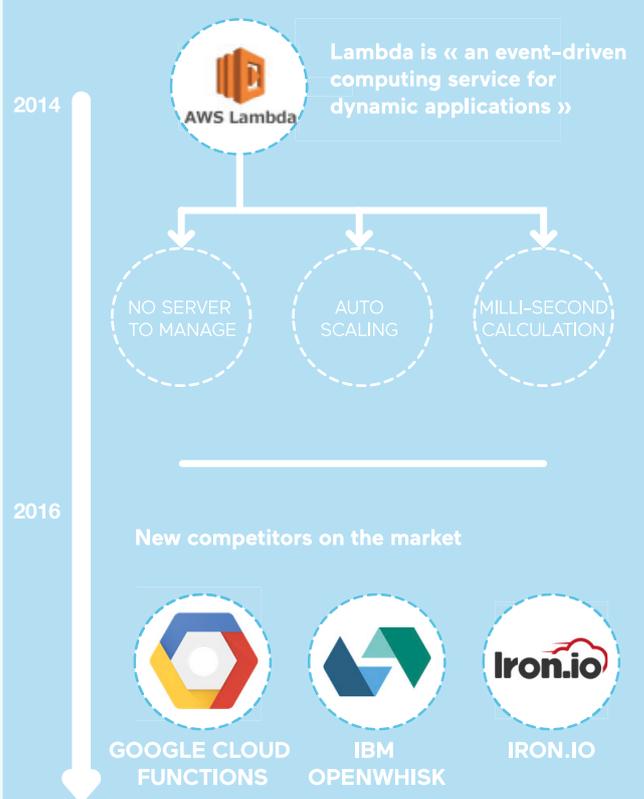
- No server
- A code who run in response to defined events
- No IT resources management

PRICING MODEL



- Depending on the number of times the code runs combined with the execution time
- No cost if the code is not executed

“SERVERLESS COMPUTING” MARKET



WHY DON'T WE SEE IT EVERYWHERE ?

- It's coming! Developers have started to embrace it as AWS Lambda release was on October 2015
- It's now a matter of months before having Google or IBM proposing their competitive new products in 2016

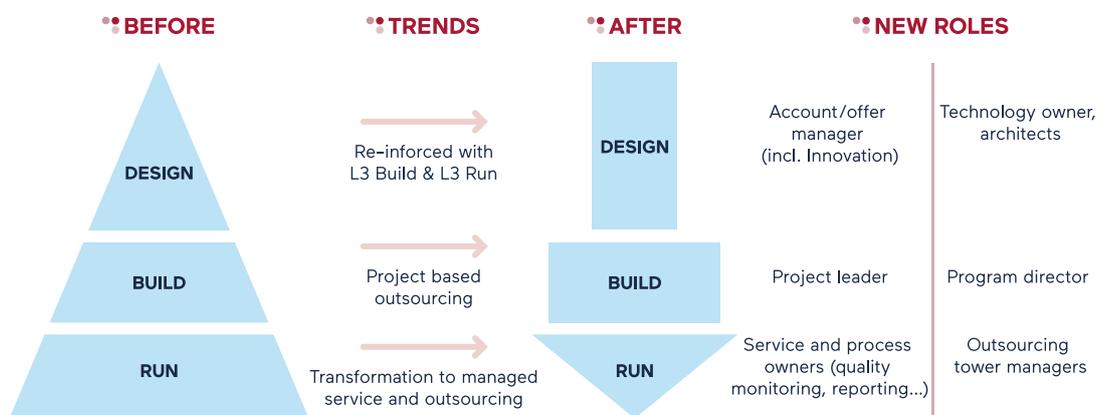
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## FOCUS 4

### WIN THE TALENT WAR TO PROVIDE THE RIGHT STAFFING

The journey towards a cloud delivery model showcasing automation, IT-as-a-Service or outsourcing has a massive impact on required skills, with an overall **increase of technical expertise**.

#### IMPACTS OF CLOUD DELIVERY MODEL ON REQUIRED SKILLS



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### IT Infrastructure Needs to Recruit New “High-Range” Profiles

When shifting towards a service-oriented organization, IT infrastructure requires business-oriented profiles such as program directors who can manage a portfolio of projects and optimize investments in terms of business impact.

To provide greater service orchestration in the context of the move to the hybrid cloud, service-oriented profiles such as service owners must be staffed to ensure end-to-end service quality across providers and continuous improvement. The service owner’s roles and responsibilities should be defined to work efficiently with service delivery managers and incident managers.

Greater outsourcing requires the profile to be able to manage contracts and service-level agreements such as outsourcing a tower manager. At the opposite end of the spectrum, there are some profiles for which staffing needs are decreasing. These people must be re-skilled, and recruitment in those areas should be frozen.

### Cloud-Related Expertise

Below are some key profiles to create or strengthen as identified in our cloud delivery competency model:

	 Roles	 Description	 Activities
 Innovation & Offer	Product owner	Define the service requirements and financial model, monitor the service execution and ensure compliance with requirements	<ul style="list-style-type: none"> <li>Define KPIs to monitor service quality</li> <li>Monitor performance and usage level</li> <li>Promote the service and raise awareness among companies</li> <li>Define the billing process and model</li> <li>Report on billings</li> </ul>
 Service Integration	Services manager	Manage subscriptions and run the service on a daily basis	<ul style="list-style-type: none"> <li>Validate or reject subscription requests for services</li> <li>Send requests for resource extension</li> <li>Report errors or incidents to cloud operators</li> </ul>
 Brokering & Orchestration	Supplier relations manager	Manage partner and IT supplier relationships, monitor contracts, pricing and quality of service delivery	<ul style="list-style-type: none"> <li>Ensure continued close collaboration with IT partners, while reviewing performance and service quality</li> <li>Negotiate contracts with new suppliers</li> <li>Develop a view on current main suppliers' offers in the global marketplace</li> <li>Anticipate resource needs and define provisioning policy with cloud partners</li> </ul>
 Cloud Operations	Cloud manager	Manage global cloud infrastructure and monitor any required cloud integration or development	<ul style="list-style-type: none"> <li>Review and validate demands to expand</li> <li>Monitor new equipment's integration and infrastructure's evolution</li> <li>Manage infrastructure's pattern and secure its consistency</li> </ul>
 Private Cloud	Cloud architect	Define infrastructure's global architecture and secure both availability and consistency with clients' needs	<ul style="list-style-type: none"> <li>Define cloud architecture's policy and standards and oversee implementation</li> <li>Monitor infrastructure's performance and adapt it according to evolving needs</li> <li>Provide cloud requirements for new service's integration or existing service's development</li> <li>Act as expert during escalation processes</li> </ul>
 Security	Permissions & security manager	Define and implement permissions & security policies for cloud services	<ul style="list-style-type: none"> <li>Define end-to-end security policies</li> <li>Apply access rights to cloud services</li> <li>Ensure data protection and defense against security vulnerabilities</li> <li>Establish recovery plan for data loss or service loss</li> </ul>

" 56% of CIOs believe they will experience a skills shortage for 2016 "

### Attract and Recruit Required Talent

The IT talent war marches on, and as such, 56% of CIOs believe they will experience a skills shortage for 2016<sup>1</sup>. Reinvent your IT brand image to focus on innovation and technology. HR should truly promote IT, since millennials are extremely eager for technology.

IT is also a matter of executive focus. It has become a management domain which high-potential and future executives need to experience to validate their executive track.

<sup>1</sup>State of the CIO, CIO m 15



# HOW TO GET THERE

## Save to Reinvest

IT organizations are struggling to industrialize and to innovate. Industrialization is necessary to achieve savings, while innovation requires investment. What to do? A "save to reinvest" approach is the key to launching a transformation program. Once transformation begins to take hold within an organization, the aim is to lock savings that are generated by the industrialization levers. A portion of these savings is then reinvested in innovations that support IT and business in their digitization. This approach lowers funding requirements, which can be difficult to obtain.

The transformation roadmap should also include visible quick wins to secure business buy-in. To handle the complexity of such an approach, the transformation should be started as a unique, large-scale program.

**IT experts tend to focus where they excel: technical innovation. But the road to success is a full transformation, starting from a DNA revolution.**

## Launch a Comprehensive Transformation

A comprehensive transformation program includes technical foundations, innovation drivers and cultural change:

- **Transform infrastructure:** build the technical foundations to leverage technology in terms of the fundamentals: agility, performance, cost-efficiency and cybersecurity. After putting extreme pressure on sourcing, obtain additional savings through server virtualization and move applications to the relevant cloud. Depending on your hybrid cloud strategy, build the technical foundations for your orchestration platform.

- **Industrialize the delivery model:** review your sourcing policy to outsource commodity-run activities, expand your center of excellence footprint, and refocus key internal resources on business-differentiating activities.
- **Transform your organization:** though often disregarded by IT executives, organizational transformation is fundamental in order to benefit from a cloud delivery model. Start by designing a target organizational model, then drill down to processes, tools, and ways of working and managing. Heavy investment is required to build key business use cases and drive profound cultural changes such as multimodal IT.

A traditional pitfall for large infrastructure transformation is lack of alignment with business stakeholders who may not understand the benefits of many technical projects. Concerted efforts must be made to secure buy-in by explaining the benefits and objectives of transformation from a business point of view.

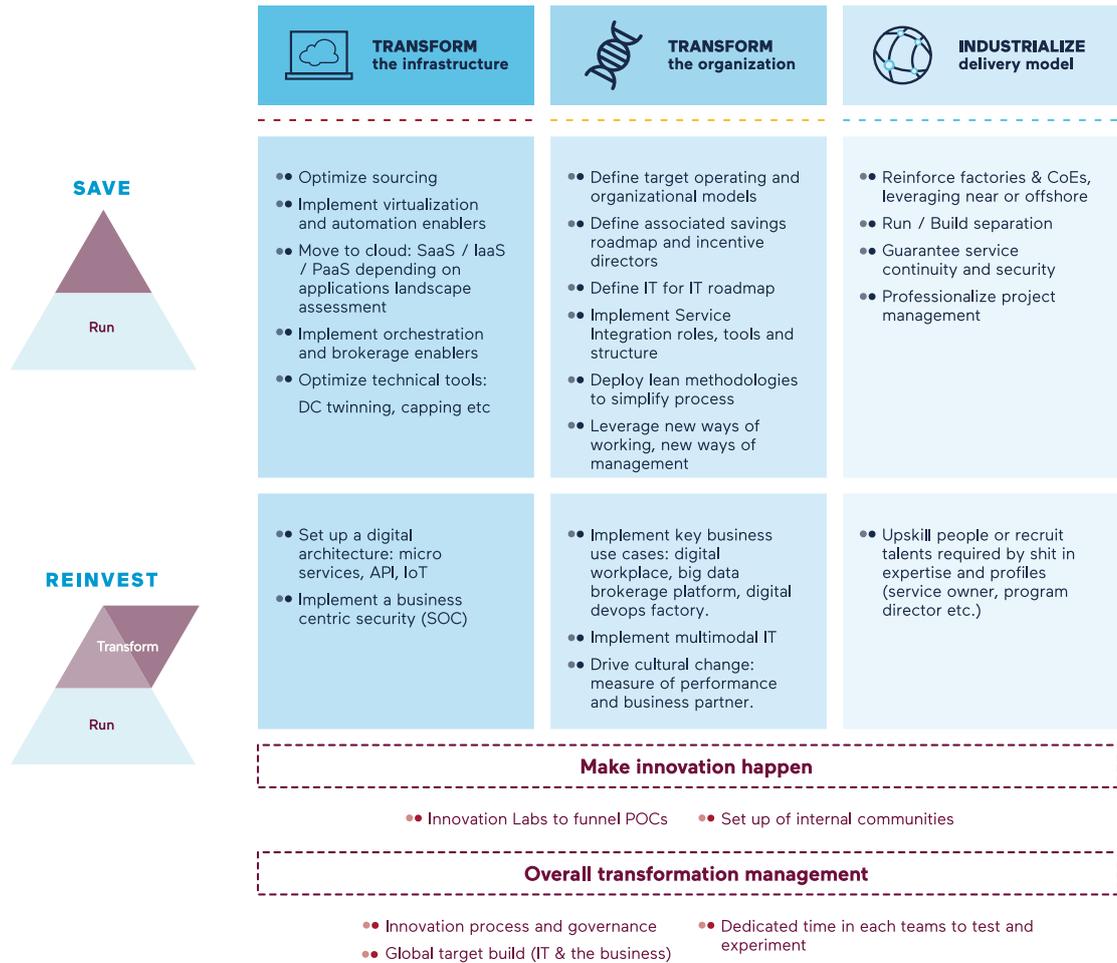
Additionally, such a transformational approach requires an overall transformation management stream, one whose project management office is accountable for project risk, benefit tracking and change management. A move to a cloud delivery model means reallocating resources that are traditionally less accustomed to changes. Employees need to be explained of these changes to maintain a momentum to further drive that shift.

Streams and associated levers are different depending on outsourcing and cloud maturity. For example, a second generation outsourcee will need to work with development teams to unlock further savings.

"The transformation roadmap should also include visible quick wins to secure business buy-in"

## Major Stream to Launch

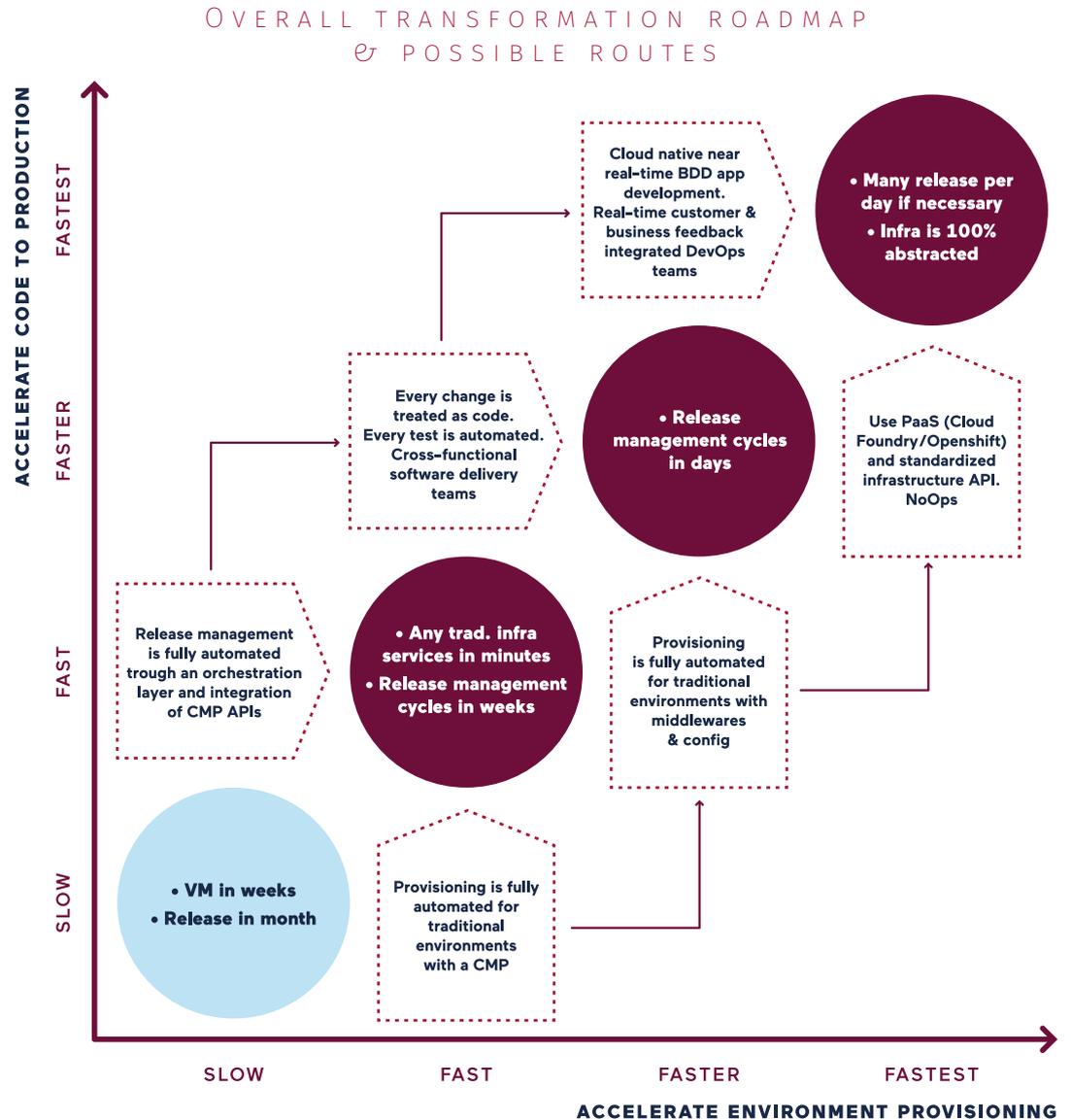
### TRANSFORMATION STREAMS TO LAUNCH



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"While offshore labor enables cost reductions of 60% compared to onshore, automation promises to cut costs by nearly 90% "

## Possible Routes for the Cloud Journey



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## Automation is the Next Generation Transformation Lever

Finally, robotic process automation could be a game changer for IT operations. Cognitive computing systems are highly applicable for run operations such as:

- Monitoring operations (e.g., events or security monitoring) through application log analysis
- Service desk (e.g., robot chat, deep learning)

A simple price equation highlights the potential savings:





CONCLUSION:

**LAUNCH YOUR**  
OWN AUTOMATION  
**JOURNEY**

" HACK  
YOUR  
OWN IT! "

**With so many challenges to address within a pressure-filled environment, the time has come to hack your own IT! Undertaking a disruptive transformation journey to a cloud-based platform delivery model is the way forward, saving time for innovation through full automation. It's time to change the game in favor of your client relationships.**

As CIO, you remain the most credible go-to technology expert. You are pragmatic and know your information system inside out. You enjoy a strong track record of "keeping the lights on." You know how to filter and manage technical partners and providers. And you will no doubt also secure the technological dimension of transformation from the Cloud, API-fication, and platform orchestration.

If there's one thing you should take away from this document, it's to think globally. This is an enterprise transformation program for which all governance and technological aspects are closely linked. To recap:

- Stick to your client's main expectations by **delivering value propositions quickly**, such as Digital Workplace, Digital DevOps Factory and Analytics Platform.
- Shape your target delivery model on fundamentals—**security, cost efficiency, performance and agility**—while leveraging technology partners for selected activities.
- **Instill innovation into everyone's minds**, whether to improve your RUN or enhance business processes.

Our clients undertaking this path to transformation prove there is real value in delivering IT to internal clients, with CIOs remaining the key stakeholders in business digitization.





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