Capgemini

CLOUD TRANSFORMATION

The keys to success

SUMMARY

From Application Heritage To Cloud Native: An Ongoing Challenge 4

Let Your Business Objectives Drive 5

Linking Business Objectives and Migration Methods 7

Understanding Public Cloud Economics 10

Plan for a Multi-Dimensional Migration Process 12

The Specific Case of ERP Migration 17

Deployment and Management of Platforms 20

An Aligned And Decentralized Operating Model 23

Going Further with Cloud Economics 28

AUTHORS:
Thomas de Vita, Sebastien Reister, Sylvain Roby and **Thomas Sarrazin.**

FROM APPLICATION HERITAGE TO CLOUD NATIVE : AN ONGOING CHALLENGE

When we published the first version of our guide to cloud migration in 2018, the world was a very different place.

Since then, both organizations and the market have matured. New technological advances have appeared. New offers have been created. And crucially, the COVID-19 crisis has pushed organizations to accelerate the transformation of their information systems, to become both more efficient and more agile.

To succeed, today's organizations must be better, be faster and do so much more – and they must do it with so much less.

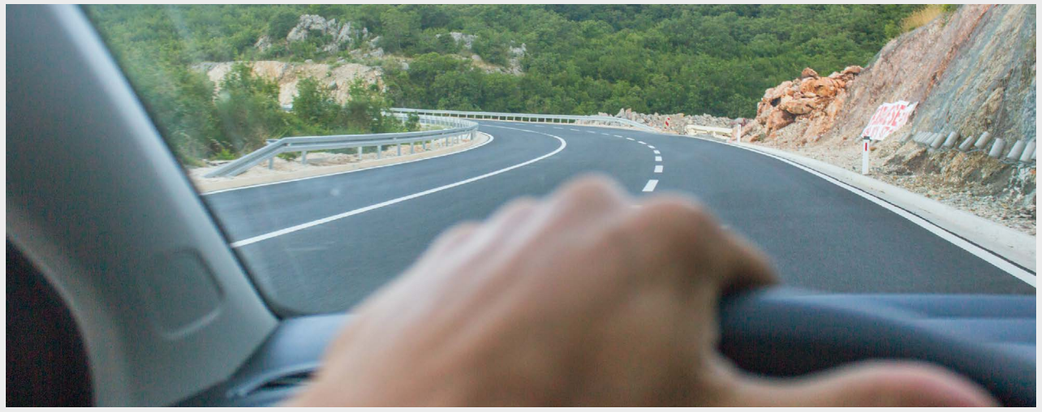
Under these circumstances, the subject of cloud migration is more relevant than ever.

That's why we knew we needed to publish a second edition of our guide.

In the following pages, we offer an overview of the main trends, outline the best practices, and answer key questions, such as:

- What does ever-increasing **application modernization** mean for the evolution of cloud migration?
- What's the best way to manage **cloud spend**?
- What do **cloud providers** have in store for us?

Armed with this information, we hope that you will be better able to define your organization's own path to cloud migration – and business – success.



LET YOUR BUSINESS OBJECTIVES DRIVE

The three principles of any successful migration

Why? And what for?

These are the two most important questions in any mass migration project. It is critical that organizations understand the true business reasons behind their desired move.

In fact, one of the most common mistakes that organizations make is to consider cloud migrations as pure infrastructure projects, merely replacing self-managed or outsourced data centers with resources hosted by a local cloud provider or hyperscaler.

These projects generally fail when it comes to execution, or do not allow organizations to realize the full business benefits of this transformational technology.

Cloud, container, Platform as a Service (PaaS), serverless, pay-per-use, API-driven – these "buzzwords" only represent different approaches, and cannot themselves be considered end-goals.

So what are some business needs and objectives that could drive a cloud migration project?

- The need for a **digital business strategy**, to increase deployment speed of new services and to capture market share.
- The need to **standardize IT** to become more flexible and facilitate the integration or carve out of activities.
- The need to **reducing operational costs** (infrastructure, operations, deployment, maintenance, etc.), in order to drive financial efficiency.
- The need to improve reliability to reduce technical debt, or to adopting an **"evergreen"** approach of constant updating to eliminate as much technical debt as possible.

Only once an organization has analyzed their business needs can they define their deployment strategy – which is the next phase of the migration project.

Which deployment strategy?

The deployment strategy itself is dictated by business issues and your organization's time, security and regulatory constraints. It can involve any combination of Private Cloud, Public Cloud, Compliance, Sovereignty, Reversibility, Native or Agnostic PaaS, Containerization or VM, mono or Multi-Cloud.

Ideally, you should strive for a strategy that successfully balances the following dimensions:

- **Commercially considerations,** by leveraging available discounts and competition between cloud providers.
- **Innovation and independence,** particularly in regions where there is no sovereign partner.
- **Speed of development,** taking into account the level of effort needed for any rollback or reversibility.
- **Rapid Return On Investment (ROI)** and reduction of **Total Cost of Ownership (TCO)**

The approach will of course also be influenced by the available ecosystem of partners and the current state of the application portfolio. This means that the establishment of detailed strategy, followed by an in-depth assessment of the portfolio, is critical.

An in-depth organizational change

The third pillar of a successful migration project is organizational. Cloud projects are not just about technology, and creating operational agility, innovation and efficiency requires a holistic shift that goes beyond just implementing a new platform.

The need for a "People / Process / Platform" transformation model applies:

- **People:** New platforms and new consumption models call for new ways of thinking from business and development teams.
- **Process:** Process automation requires increased specification to limit the need for manual adjustments that would otherwise negate the benefits of transformation.
- **Platforms:** New approaches to systematic automation, development, and cost and partner management must be implemented.

LINKING BUSINESS OBJECTIVES AND MIGRATION METHODS

When migrating applications to a public or private cloud, organizations have the choice between several methods with very different cost / value ratios. The choice you make will ultimately affect your ability to optimize operations increase agility. Let's take a look at the options.

Rehost

In nearly every migration process, there are two types of rehost. The first and most common is the "lift-and-shift" method – essentially copying the existing stack from the existing infrastructure and pasting it into a new one.

Post- installation activities are limited to a change in the addressing plan (new IP addresses) and some adaptations of the operating tools, such as backup and, monitoring. The successive accumulation of re-settings and all the patches migrate at the same time as the application.

While by far the simplest option, this method provides only weak opportunities for optimization. The migrated application will be identical to the source application with more or less synchronized and standardized versions of the OS.

The second type of rehosting consists of a complete reinstallation of the systems.

It requires a much deeper knowledge of everything from architecture, application components, middleware components and infrastructure components to packages and deployed data. It also means taking into consideration all the integrations between the application's different components, and possibly externally with other applications. Additionally, it assumes understanding of the entire sequence that allows the application to be redeployed.

This type of redeployment requires longer preparation than the "lift-and-shift", but enables you to best adapt an application to its target environment and offers many more opportunities to optimize cost and operations.

Redeployment takes place in two stages:

- Centralizing all the packages, scripts, and data needed to deploy the application.
- Creating a design that will define how this application should be deployed from a process and infrastructure perspective.

It is during this stage that it is possible to make minor changes to take advantage of cloud services, either by optimizing the target architecture, or by testing a new configuration.

The design created is then reusable and can be integrated into a DevOps process to automatically deploy the application with each new version, or to perform tests on temporary infrastructure.

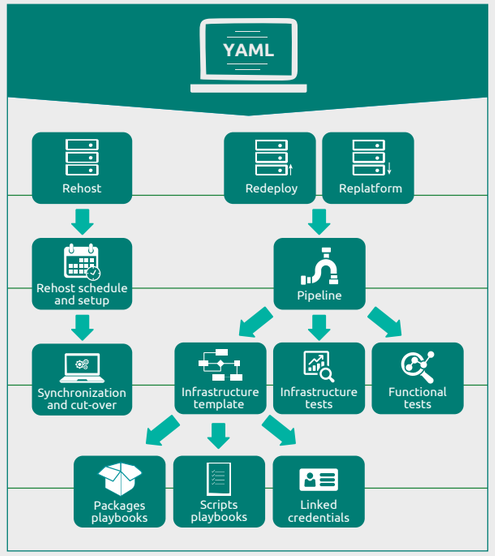
The Replatform

Replatform goes further than redeployment, with an additional step of changing one or more components underlying the application. It can be a simple platform change, like an operating system update, or something more complex, like the migration of a dedicated database to a PaaS service.

This method – coupled with redeployment – makes it possible to benefit from new technologies available or to resolve technical debt problems without risk, as it allows you to test and validate one or more new configurations while preserving the original architecture.

Like redeployment, replatforming takes more time than a "lift-and-shift" but offers more possibilities and opportunities for application optimization.

A significant advantage of this approach is that, after the transformation of the application, there is an opportunity to integrate the new design into a DevOps-like process to automate all future deployments.



CONTINUOUS DEPLOYMENT STACK

The Refactor

The Refactor goes even further in terms of transformation. It starts at the application level and consists of recoding all or part of the application to take advantage of the full potential of cloud technologies. It requires the most time because the application has to be partially or completely rewritten. This method makes it possible to leverage the widest range of services and innovations offered by suppliers, both in terms of performance and cost reduction.

The containerization of an application is a common example. We start from an application that can be monolithic or modular, and then adapt it to a micro-service architecture and use managed container services in the cloud. Of course, this is only possible through a complete Refactor of the application, which allows it to be integrated into this new ecosystem.

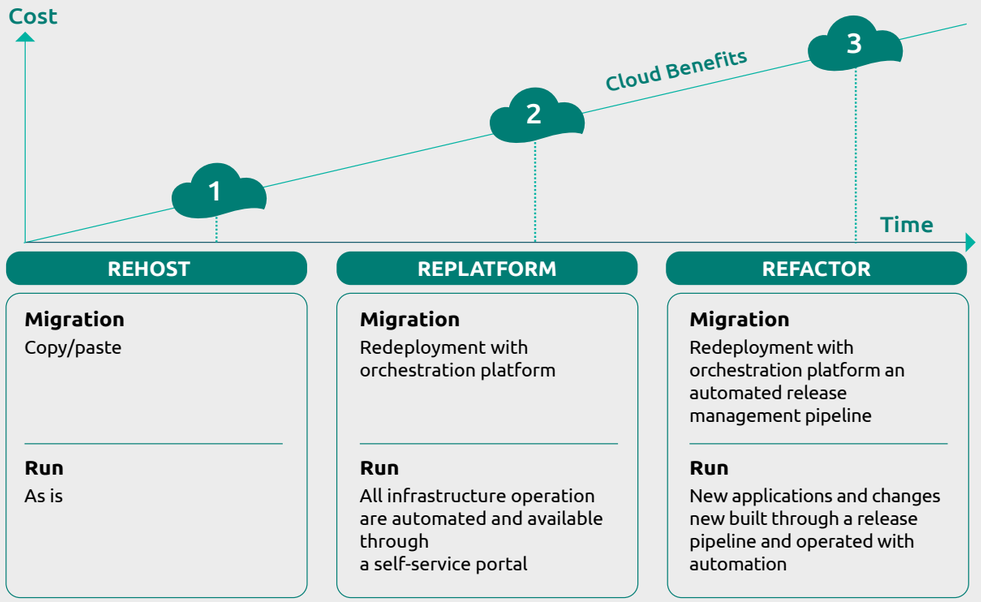
So how do you choose?

In practice, every situation, every system and every organization is different. There is no "one-size-fits-all" approach.

However, there are three considerations that can help guide your choice of method:

- **Time:** The more advanced the method, the more preparation time is required.
- **Expected ROI:** Your choice will dictate to what the application can be adapted in order to deliver reductions in execution and maintenance costs.
- **Existing compatibility with cloud standards:** Obviously, the less the effort is required to modify the application, the more eligible it is for migration or transformation to the cloud.

In most cases, a mixed approach makes the most sense. And as you can see, the perfect mix depends on your organization's specific circumstances and yes, business needs.



THE THREE MIGRATION APPROACH

UNDERSTANDING PUBLIC CLOUD ECONOMICS

Deploying applications and infrastructure in the cloud delivers flexibility, scalability and agility for any project. But the full advantages go way beyond the technical and operational. Cloud deployments are also financially efficient, enabling substantial savings while allowing organizations to benefit from new functionality in terms of innovation and time-to-market for services.

By applying a few simple principles, the target architecture can achieve substantial economic gains for your organization. And these gains can also be significantly increased by systematizing end-to-end automation of the application lifecycle, including the extensive use of APIs offered by cloud environments.

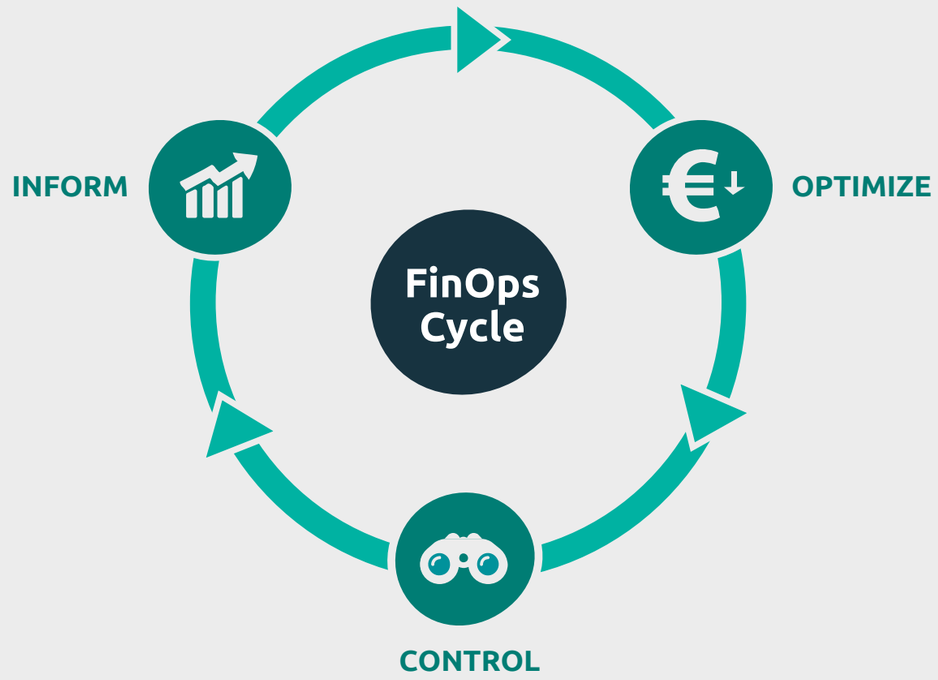
Organizations should:

- **Optimize** the volume of components or services used in the cloud architecture, such as server instances or storage, by focusing on obtaining the right target performance envelope sizing and the intelligent use of auto-scaling and elasticity functions.
- **Implement** rigorous planning, allowing the scheduled shutdown and restart of development, test, quality and other environments as needed.
- **Use native cloud services** where possible to avoid redeployment of less agile solutions used in legacy environments installed in data centers.

But organizations must be making these considerations at all stages of the application life cycle, from design to operation, if they want to maximize financial optimization.

This integrated approach to financial optimization is called FinOps (Financial Operations)– where cost optimization is seen as a recurring activity and an intrinsic part of the entire IT model, embedded in the culture of IT organizations.

It is the only way to realize the full economic benefits of a cloud migration project.



PLAN FOR A MULTI-DIMENSIONAL MIGRATION PROCESS

Now that you've analyzed the business drivers of migration, selected your methods, and have a clear vision of future costs, the destination is clear.

What you need now is to define, in detail, how to get there, taking into account the application portfolio, platform and operating model.

This will involve two interlinked steps: the Cloud Portfolio Analysis and the actual Cloud Application Transformation.

Cloud Portfolio Analysis

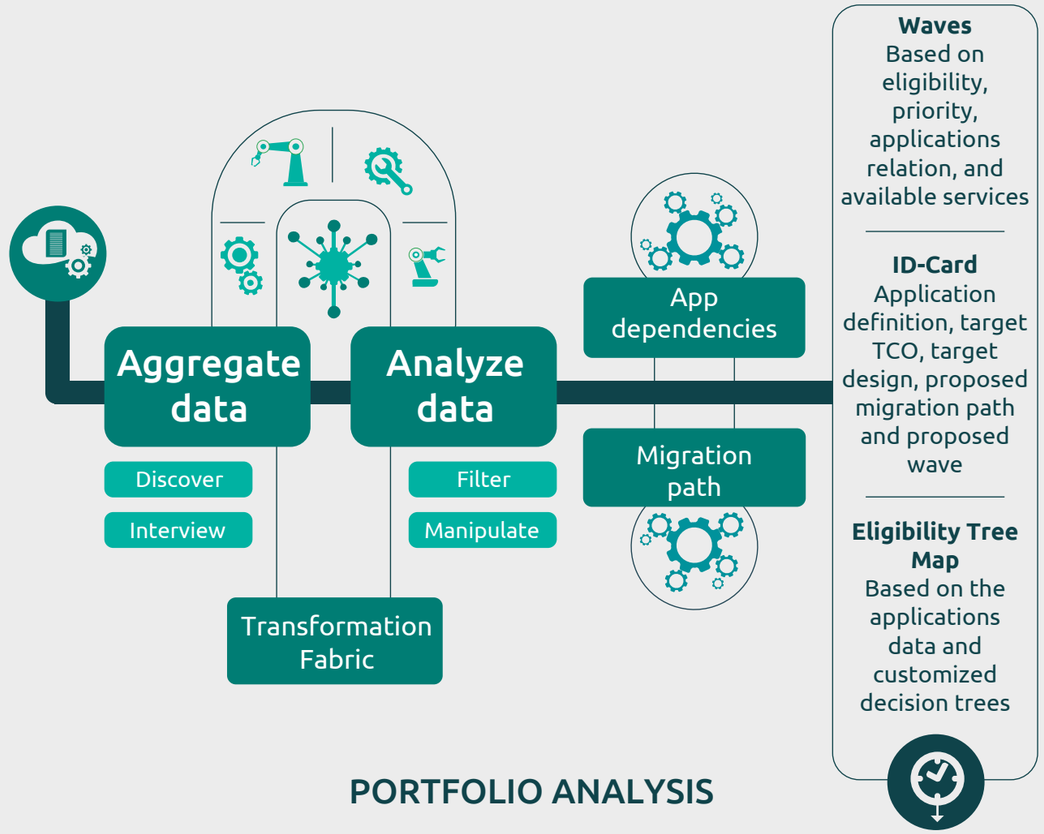
First, organizations must assess the current situation to define the transformation execution plan.

To do this, the application portfolio must be evaluated, leading, to a recommended architectural target and migration path for every single application. It also lays the foundations of the business case.

The target platforms will also need evaluation, in order to establish platform update recommendations, which often support critical systems, prior to execution.

Finally, the assessment of your organization's cloud maturity will identify projects that enable operational excellence.

As with the industrialization mentioned above, experimentation or "proof of concept" phases are rarely accompanied by the design and implementation of new operating models compatible with company ambitions.



Visualize: model your application portfolio

Recommending a target and a migration path requires a precise view of business, application and infrastructure.

This is the essential ingredient for a configurable rules engine, which simulates the rules dictated by technical teams (technological compatibility, regulations in force, etc.) and by strategy (preference for a type of target, for a migration method, for a cloud provider, for a security policy, etc.), in order to provide a detailed plan for the migration of each application.

Recommend: establish migration scenarios

For an optimal migration which delivers the maximum return on investment, it is important to identify a scenario, or a set of ideal migration scenarios, aligned with your needs. The analysis process allows you to establish both an overall eligibility matrix, but also an identity card for each application, which matches its cardinal characteristics with the most suitable migration scenario.

Based on this eligibility analysis and with full knowledge of all the elements of the migration (migration model, elements consumed from the cloud provider, such as the number of VMs, storage, etc.), the target cost of the migration is known and makes it possible to establish a TCO. The business case, with the potential ROI opportunities, is then built from the cost items.

A migration schedule can include several waves. Based on the recommendations drawn from the analysis phase, organizations then carry out their migration by defining, the batches of applications to be migrated at regular intervals (usually every month or every two months).

Economic Application Portfolio Management (eAPM) is a global approach by Capgemini dedicated to automating performance for the IT department.

Based on a proprietary SaaS solution, eAPM provides an analysis to build a transformation trajectory, from the collection of data describing the IS heritage.

For migration to the cloud, attributes specific to cloud analysis are collected (license portability, data sensitivity, bandwidth constraints, etc. as well as information from the CMDB and the collection of flows). From this information, eAPM calculates eligibility indexes to determine a target platform for each application (on-premises, private cloud to public, IaaS or PaaS, Lift & Shift, Re-platform, Re-deploy). This phase is followed by the migration programming, based on eAPM clustering (optimization of movement groups according to server dependencies) and capacity / complexity logics, to lead to detailed planning.

Definition and constitution of an application design

A design is created for each application using the migration information collected in the analysis phase. For a redeployment, this design contains all the infrastructure elements needed to deploy, including:

- Middleware and application packages
- Configuration data
- Data model
- Definition of the environments to be deployed
- Ochestration necessary to deploy each environment

It considers the relationships between applications as well as the sequencing and integration elements of their deployment. This enables templates and artifacts to be generated for use in a chain of continuous deployments. The next step is to perform the redeployment of each environment that is part of the application design.

Cloud Application Transformation

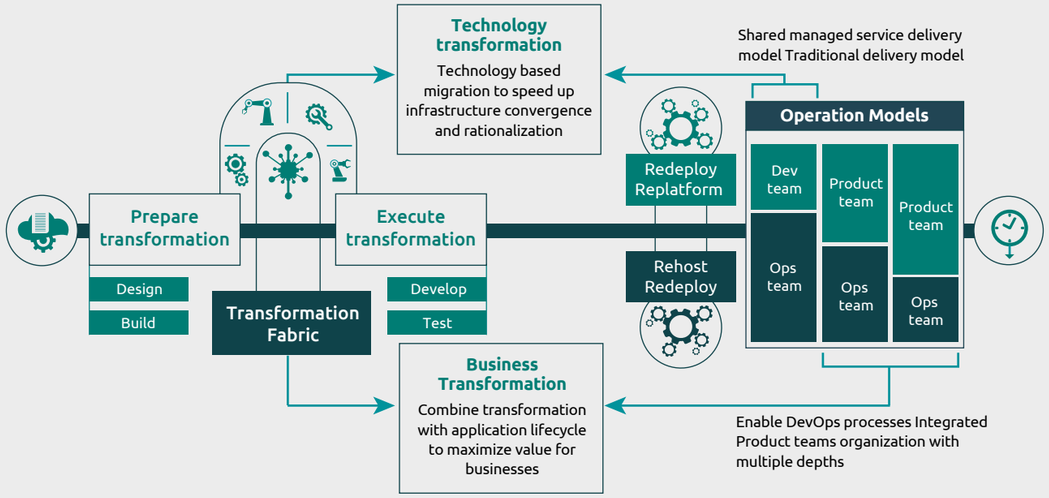
The second interlinked process is the execution of the plan constructed during the Cloud Portfolio Analysis. It brings together the transformation engine necessary for a successful outcome and an end-to-end automated solution for the migration itself, together with a global community of certified experts to support businesses across the globe.

There are three stages to the Cloud Application Transformation:

- Preparation
- Planning
- Transformation

The previous choice of transformation methodology will influence the time required and the actions needed for each stage, in addition to having an impact on outcomes.

For example, it will dictate the automation artifacts necessary for the deployment of new architectures during the replatforming or redeployment of an application.



APPLICATION CLOUD TRANSFORMATION

Deployment as a chain of continuous deployment operations

The deployment phase is fully automated and launched by a pipeline manager, ensuring the execution of the deployment, testing and synchronization steps.

Deployment

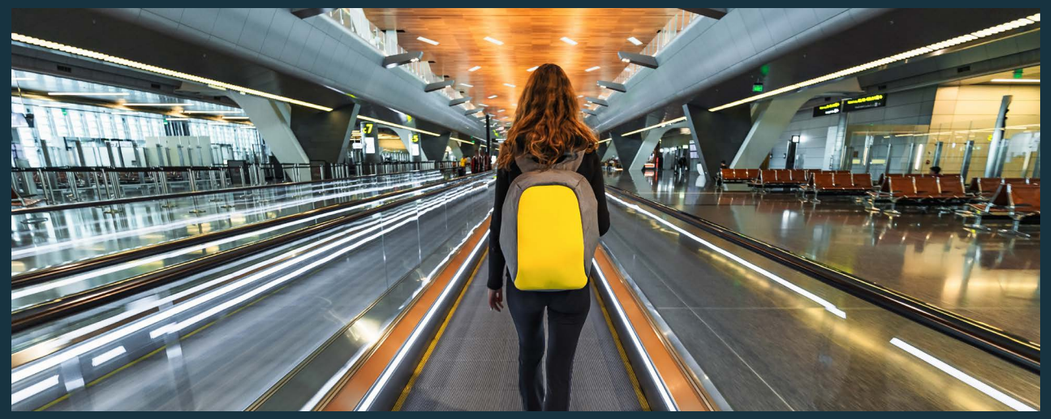
The complete deployment is managed by three tools, an **orchestration tool**, an **infrastructure deployment tool** and an **infrastructure configuration tool** which can migrate any application to any target. In the case of a redeployment, this also involves the implementation of resources, the installation of middleware, configuration and binaries with associated dependencies.

Test

There are two stages of testing: an **automated infrastructure test** and a **"user acceptance test"** performed by the users of the application. As part of a redeployment, application tests are also added to control the deployment. Automating the application test campaign saves time and minimizes errors.

Synchronization

This final step updates the target application by transferring the last operating data recorded on the source application to minimize service interruption. Finally, once the update is complete, the switch to the new system takes place for all users.



THE SPECIFIC CASE OF ERP MIGRATION

While ERP uses the same approach as any other application, it is even more demanding.

Identifying an ERP trajectory

ERP requires significant investment and effort, often including the creation of a set of specific tools, skills and know-how. Given the unique context of each ERP implementation, it is essential to define the criteria for choosing between a new SaaS implementation or a rehosting on an IaaS / PaaS platform.

These are:

- **Functional** adequacy
- The ability to return to **standard**
- **Implementation** for all or part of the solution
- The complexity of **integration** with the rest of the application ecosystem
- The need for improved **business agility**.

Replatforming: Only under certain conditions

If a SaaS implementation involves a high level of complexity at the business level, replatforming may turn out to be more judicious in the short term, but it is advisable to clearly define the outcomes and to assess them with regard to:

- **Economic gains**
- **Operational improvements** in terms of agility and capacity
- **Impact** on the operating model
- A **hybrid model** with maintenance of a production environment on site and the rest of the cloud environment.

The impact of this approach will generate savings that can be fed back into a larger transformation. That being said, it is important to find the right balance between ROI and modification of the operating and governance model. There is a risk of squandering the potential gains if changes are needed at a later date.

Establish migration scenarios

It is important to identify an ideal migration scenario, or set of scenarios, adapted to business needs.

Beyond simple definition of eligibility criteria, organizations should ask questions about which new developments or innovations can be integrated to deliver more than just operational and economic efficiency. This can be accomplished by positioning a trajectory in terms of business constraints, while accounting for the ecosystem and the evolution of licenses and contracts.

Define a specific application design for the deployment of ERP

For each ERP solution or package with its own release model, the automation application design should be adapted according to the context defined during the discovery phase. Tools are often specific to each platform (such as automation). Migration sequencing must make it possible to ease automation and the adaptation of the migration pack, and account for the specificity of some environments (such as production).

In particular, it's important to consider connectivity with the rest of the ecosystem.

The challenges of the **transformation** around the **SAP ecosystem** are of great interest to hyperscalers who have each launched a joint support program with **SAP** & **Capgemini** (**Embrace** & **MAP** among others). The good news is that this enables organizations to confirm **ROI** optimization, and provides a view of the associated **PaaS services** and, a validated roadmap between all ecosystem players.

Treat some stages with extra care

Certain stages are more important than others when it comes to realizing the ROI identified in the first phase. As such, organizations should aim, to improve and support these in detail.

More specifically, the focus should be on:

- **Refreshing** so-called dev/test instances
- The release chain for **customizations** and other specific functionality.

In both instances, it's clear how the involvement of development teams in the management of hosting operations will provide strong operational insight.

Leave an opening for the future

Once the process of rehosting and improving the recurring operations has been kickstarted, it's worth taking time to address more fundamental issues, such as:

- The decoupling of **customizations** and specific **functionality** to support a return to standard and facilitate the implementation of a future SaaS model.
- The **integration** of **SaaS** solutions in all or part of the existing or peripheral application scope.

The detailed management of integration with the rest of the **IS** takes place by setting up an **API** layer which will expose services and data mainly via **SCP (SAP Cloud Platform)**.

Setting up this integration component is critical because it allows you to go beyond rehosting and integrate both **PaaS** components of hyperscalers and **SAP**, bringing both value and **business flexibility**.

The hyperscalers have all launched programs in this direction (**Embrace** & **MAP**) to accelerate this transition, offering best practices and blueprints.

DEPLOYMENT AND MANAGEMENT OF PLATFORMS

The target of a transformation is generally not mono cloud. For strategic, financial and compliance reasons, most organizations are moving towards a hybrid and multi-cloud solution. In this case, you must clearly define the sourcing, deployment and operation strategy of these platforms.

Public and private

Private cloud is not dead. While the market has adopted a "Public Cloud First" approach, private cloud remains a necessary component of the environment to meet regulatory requirements and minimize the effort to transform application portfolios. The different support limitations of cloud providers can put a heavy strain on IT transformation with high technical debt.

Private cloud no longer necessarily means on-premises. The emergence of solutions such as VMC on AWS and VMWare on Azure make it possible to offer solutions similar to a private cloud while benefiting from a deployment model without investment or own hosting.

Multi public but with a "Prime"

Cloud providers have three main key performance indicators (KPIs):

- Deployed **volume**, measured as annual revenue
- Deployment **speed**, measuring account growth over the year
- Adherence, **guaranteeing** that the customer will stay for the duration, measured by the variety of services used

Obviously, the discount and financing models of cloud providers favor these indicators, meaning that organizations should use them with caution. One of the most popular approaches is to have at least two public cloud partners, one defined as "Prime" on which to build volume and financial efficiency, and a "Competitor" to be used on targeted verticals to maintain a certain level of supplier independence.

Reversibility as a key factor of the deployment strategy

Using a cloud provider's most advanced services is certainly the best way to get the most benefit, such as speeding up development and reducing accommodation and operating costs.

On the other hand, this also creates reliance on a single provider and increased reversibility effort.

It is therefore necessary to plan several deployment models according to specific KPIs (dimensions or issues) for each application area (speed, innovation, security, portability, risk):

- **IaaS:** Extremely portable with an advanced level of automation to guarantee an attractive economic model
- **Native services of suppliers:** To accelerate the time-to-market and the creation of innovative platforms
- **CaaS platforms:** To promote in-house development in an efficient and portable way.

An operating model to support new use cases

The operating model must cover all platforms and extend the flexibility of the cloud model (pay-per-use, self-service, API driven, etc.).

But the complexity of operating such a platform implies a significant effort around integration, automation, asset management and invoicing and creates the following needs:

- The need for developers to **access** APIs from cloud providers as part of a CI/ CD process, which limits the use of CMP (Cloud Management Platform) but reinforces the need to integrate operations tools into a DevOps approach
- The need to **ensure** that certain processes are not obscured, such as Disaster Recovery Planning, still very relevant in the cloud. Also, SLA issues, which reinforce the need for maintaining redundant application architecture to overcome the limited commitments of cloud providers.
- **Transparent** and unified multi-cloud management: the "single pane of glass" notion of a single layer managing different public or private platforms in the same portal is common. However, this must be combined with alternative modes allowing direct access to the platform (see the first point) while guaranteeing uniform management of operational processes.

Increased security

Migration to the cloud provides an incredible opportunity to completely overhaul security management, thanks to the level of automation and data made available.

To do this, organizations must take a proactive and measured approach based on process and collection automation, and data analysis, and involve security departments early on to define the security principles of landing zones, provisioning processes and recurring operations.

Taking the chance to redefine all elements means they can be applied systematically during migration, allowing the following principles of "security by design" to come into play:

- **Attack surface minimization:** Restricting access modes during deployment
- **Least privilege:** Systematically applying rights and access policies
- **Defense in depth:** Combining the different tools available and applying validated patterns.

All of these principles must obviously extend to development methods and practices in the context of application modernization.

Cost control

Cost measurement and optimization models are an integral part of the management of platforms and operations, mainly in the piloting and measurement phases described above.

The main elements are:

- **Consumption measurement** and categorization to associate each element with its business use, using the segregation and tagging mechanisms available and by setting up a charge-back / show back
- **Using recommendation** tools to diagnose the use of services and propose optimization in terms of sizing or commitment over time
- **Maintaining** a clear view of the resources used in increasingly dynamic environments.

AN ALIGNED AND DECENTRALIZED OPERATING MODEL:

Creating an aligned operating model

The cloud offers unprecedented potential in terms of innovation and cost optimization, but it is disruptive and complex. The IT department must equip itself with the right skills and the right methods to use it effectively. Pre-migration work should include an organizational and process study to identify potential impact, both negative and positive. This, plus a commitment to continuous optimization, is essential to ensuring that organizations can experience the true promise of cloud technologies.

What is an IT operating model?

The operating model of an IT department describes how that organization delivers its products and services. It is an internal view of the enterprise architecture, and provides a high level description of the inner workings and interdependencies of the system. Organization, processes and technologies form an interdependent whole which must be cohesive to meet objectives.

Impact of the transformation on the operating model

It's unavoidable - migration will have an impact on the operation of IT services (system administration, supervision, backup, etc.).

The transition from a "tailor-made" service, manually maintained and built in-house, to a service built from reusable, ready-to-use components supplied off-the-shelf is a major change.

This new IT landscape also translates to certain new needs for IT teams, including:

- **Skills** that go beyond technology, to understand and manage the services provided by the public cloud.
- **Agile** processes to continuously adapt and take advantage of the level of automation of public cloud services.

This is imperative to ensure the success of any transformation project. While the move to the cloud will not change requirements in terms of quality of service, the IT department must be ready to adapt to the changes brought about by this new approach.

That being said, quality of service alone does not cover all the objectives of a migration to the cloud.

There are three other dimensions:

- **Customer refocusing:** Eliminating the management of any IT infrastructure layers considered commodities to focus on the value brought to the business
- **Speed:** Taking advantage of off-the-shelf services to accelerate the entire value production chain
- **Agility:** Combining acceleration and customer refocusing with the constant innovation of the public cloud to experiment and align IS with business challenges

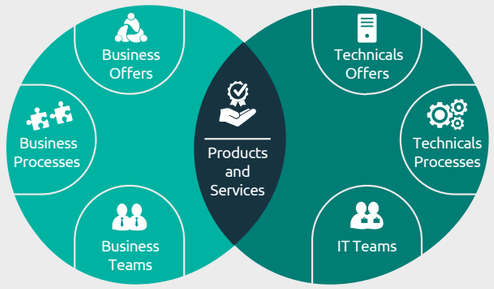
Today, we see a lack of alignment between business operating models and those of IT departments. The first evolves in response to market expectations, while the second manages technological developments and associated technical debt. Some seek high-speed value creation for customers; others operational excellence. It is necessary to find the common points between these two models. As a minimum, they both need to break silos and enable an "activity" approach.

Migration to the cloud adds another dimension: that of the continuous adaptation and alignment between these two models. It also addresses the following questions:

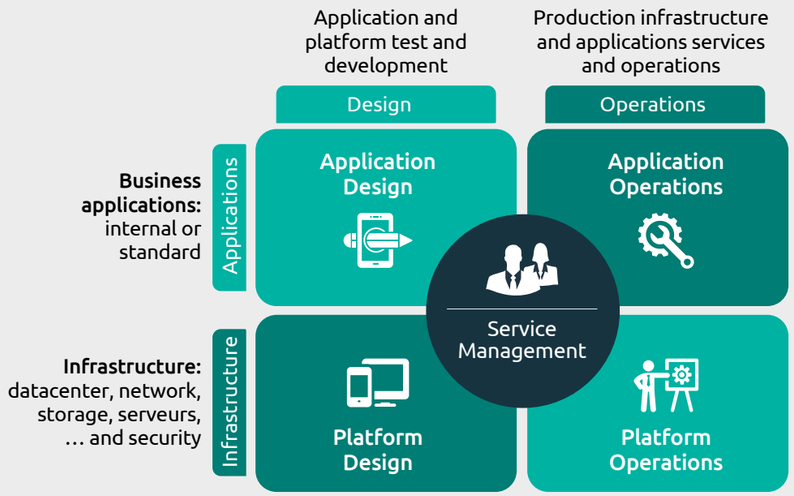
- How is it possible to guarantee the stability of an application during its migration and once instantiated in a new cloud model?
- Can we answer the previous question while taking full advantage of the new capacities offered?

The answer is it's completely for cloud migration to align the needs of both the business and the IT department, simply through the creation of end-to-end service offers centered on defined management and common objectives.

This creates a practical problem of how to move from a traditional model to a totally decentralized model based on these service offers.



Find a convergence



A CLASSIC DIAGRAM OF AN OPERATING MODEL. SILOED AND ACTIVITIES ORIENTED

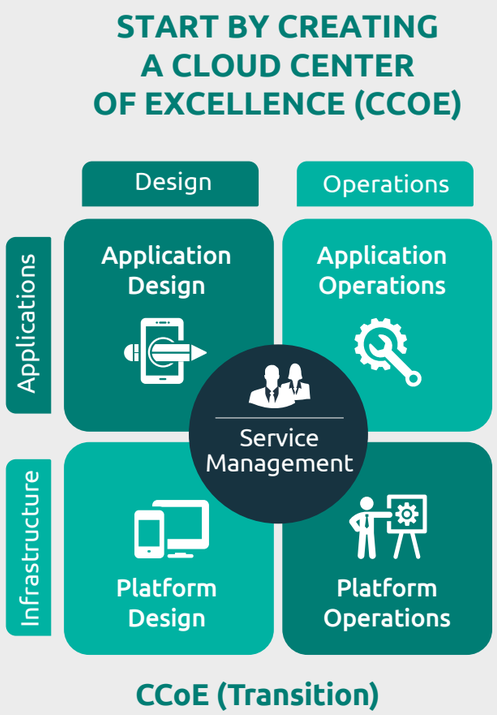
Deploying a Decentralized Operating Model

The implementation of a Target Operating Model (TOM) requires going beyond the strict framework of IT department teams and answering questions about the entire IT value chain, including:

- How to take **advantage** of the level of automation of the public cloud to respond more quickly to business demands
- How to **optimize** your service portfolio through the reuse and integration of public cloud services
- How to **speed up** application production cycles without compromising the quality of service
- How to **benefit** from public cloud services while maintaining a good level of security.

Several avenues to develop your operating model

There is no perfect operating model, but organizations should consider taking an enterprise architecture approach, using cloud migration as an opportunity to achieve it. Reference frameworks (e.g.: SAFe, IT4IT, etc.), combined with IT department culture and a focus on priority projects provide the other necessary components.



We have identified four best practices, common among our clients who have successfully completed their transformation.

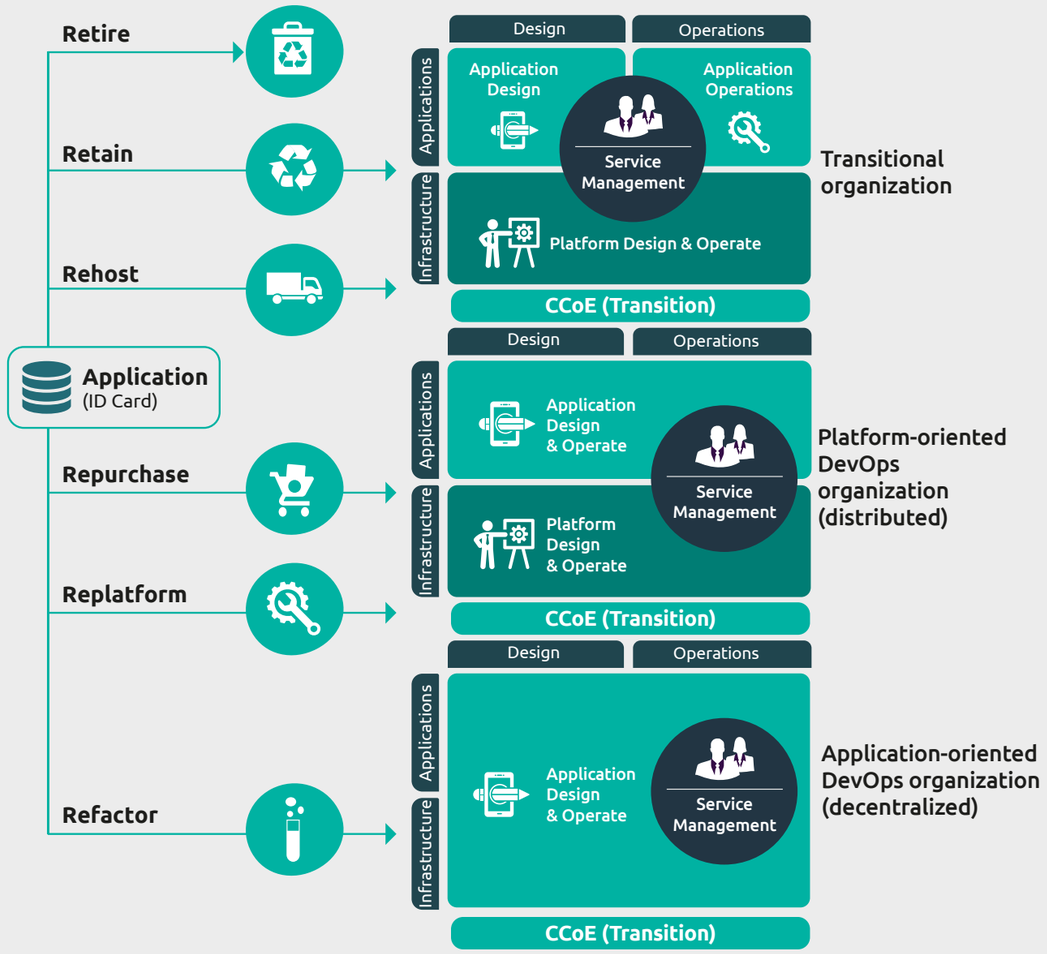
- **Build the value chain.** It is about considering the evolution of the operating model through interactions with customers, rather than focusing on individual capabilities of the IT department. This approach models the main functions of the ISD, in order to optimize these functions rather than unit components.
- **Build product management.** Integrate the idea of driving by value rather than by traditional costs / quality / deadline to increase agility. This means evolving the IT department towards a product organization.
- **Focus on customer experience.** It is about formalizing and improving, the journey of IT department customers from end to end.
- **Drive agility at scale.** This means structuring the organization to be agile, align with best practices, and ensure continuous improvement.

Unified and transversal CCoE

A CCoE's mission is "transition" oriented, and consists of developing a cloud capability to accelerate the migration and adoption of the cloud in all branches of a company. This concentration of expertise makes it possible to achieve the defined objectives.

The choice of transformation paths defines the starting point and the extent of model adaption. Whether you're going from a "traditional" operating model with Rehost, to a "platform-oriented DevOps" model with "replatform and repurchase", or to "application-oriented DevOps" with Refactor the role of the CCoE should evolve in response.

Quickly creating a CCoE and relying on service management tools makes it possible to manage a multi-speed, modular, iterative operating model. There is no need to deploy a complicated organization, which risks being unsuited to the needs and contexts of the migration planning in "big bang" mode.to the needs and contexts of the migration planning in "big bang" mode.



GOING FURTHER WITH CLOUD ECONOMICS

We can’t end this guide to cloud transformation without further addressing cloud economics.

Despite financial optimization being one of the predominant drivers of cloud migration, many organizations still struggle to manage costs and meet their cost reduction goals.

The reality is that organizations must take “cloud economics” approach at the very inception of the cloud migration project. It must influence all transformation activities, and feed into a continuous improvement approach. It is the only way organizations will ever achieve the long-awaited cost reductions.

So what exactly is a “cloud economics approach”?

It involves four things:

- The **implementation** of FinOps governance
- **Consumption** measurement of subscribed services from cloud providers
- **Cost** analysis and optimization
- **Communication** of cost trends

FinOps governance

An effective cloud cost management approach must be in line with your organization’s holistic cloud strategy – it cannot be an isolated process, involving only a few individuals with the ability to make an impact.

Making it a company-wide initiative, will help put in place the foundations of FinOps governance, which include:

- An **empowered organizatio**n, combining the ability to measure consumption in the cloud, identify areas for optimization, communicate them and crucially, to take actions that ensure economic objectives are achieved.
- **Alignment** with business processes to preserve the agility offered by cloud solutions while ensuring consistency in the use of services and their economic impact.
- The **definition** of consumer and budget representatives to ensure user empowerment.
- A **traceability** of consumption costs and their breakdown within the organization.
- Clearly **defined** responsibilities for each area department (finance, business functions, applications head, architects, operations, purchasing) in cost management governance in the cloud.
- **Architectural** patterns of subscription models for services consumed, and a matching sourcing strategy.
- The **definition** of budget targets aligned with the cloud transformation strategy, and dashboards making it possible to communicate on both consumption and key indicators of **“FinOps”** governance.

Too often governance is implemented too late during a transformation or migration process. The absence of governance can generate additional consumption costs and deviations from good cloud management practices, requiring tedious and costly corrective actions.

Measure consumption

Once the foundations of the cloud economics approach have been implemented, it is a question of measuring the consumption of services as closely as possible and analyzing usage.

This means deploying the right tools. The use of native tools provided by each of the cloud providers makes sense in a mono-cloud logic. In the case of a multi-cloud logic, third-party solutions offer unified analysis regardless of the cloud providers used. Of course, in the name of cost effectiveness, these paid solutions must undergo a detailed needs analysis before being subscribed to.

Whatever the choice of tools, they make it possible to highlight the breakdown of service costs. Sometimes, companies can implement a labeling strategy (tags) that aligns with previous organizational setup. In other cases, it is possible to break down the costs to the application and organizational level.

Analyze and optimize consumption

The finer the breakdown of consumption, the easier it will be to analyze the use of services and identify deviations from indicators and areas for improvement.

It is possible to define areas for optimizing consumption, such as:

- **Deleting** unused resources
- **Resizing** of certain resources or services
- **Change** to more economically advantageous subscription models.

Although helpful, these only represent a small percentage of optimization possibilities. Organizations must call upon a dedicated cloud architects and specialists.

This team will be able to tackle other areas, such as:

- **Reconsidering** the architectural principles implemented and propose necessary adjustments
- **Identification** of serverless services
- The **opportunity** to switch to DBaaS services
- **Optimizing** the data model

This team, which we generally call the "Design Authority", must work hand-in-hand with FinOps governance so that proposed recommendations are implemented at all levels of the organization and that the impact on costs is measured in all cloud projects.

Communicate cost trends

For cost optimization to be everyone's business, and for everyone to be accountable for the impact of their actions on cloud costs, FinOps governance must communicate proactively and effectively about:

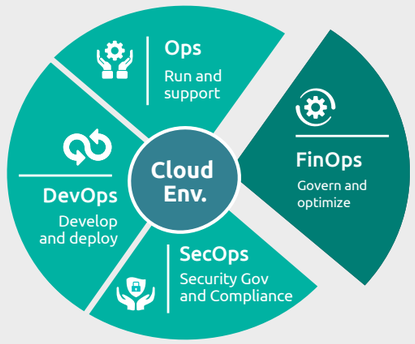
- The state of **consumption**
- The distribution of **costs**
- Changes in **indicators**
- Impact of **optimization** actions

FinOps governance will be able to go further in the empowerment of individuals if they offer total transparency about the actions of each individual on the economic health of the cloud, or even by launching a gamification process around FinOps.

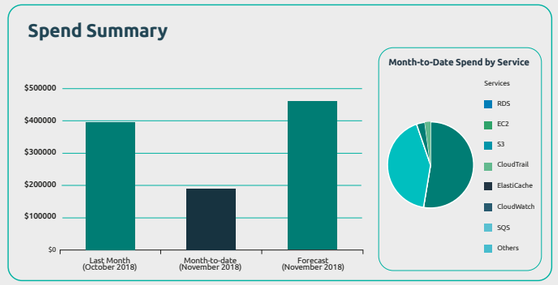
We once again return to the concept of "continuous improvement", something inherent to the cloud transformation process.

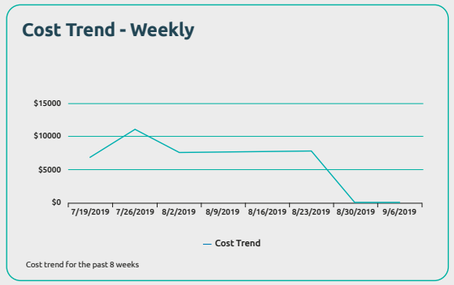
As part of this, FinOps governance must operate in conjunction with other contributors such as the "design authority". It must take place over time and its impact must be measured over time, hence the importance of monitoring dashboards and communication.

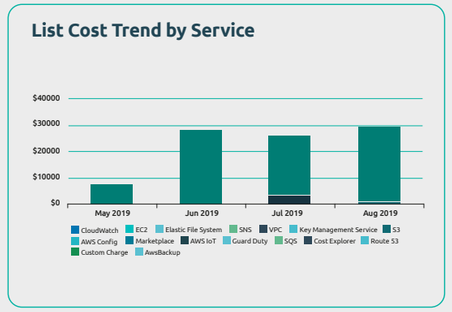
The FinOps approach requires transformation of the operating model and becomes a new essential part of IT, with its own processes, tools and skills, all connected to the rest of the company.



The positioning of FinOps governance in the Ops organization







Cost by Group

Environment	Total	Service	Cost
prod	$14.103.16		
		EC2	$7.392.92
		RDS	$6.364.82
		S3	$302.38
		VPC	$36.21
		Route 53	$4.00
		CloudWatch	$2.84
test	$2.16		
		EC2	$2.16

Conclusion

There is no denying that the process of cloud migration can be a disruptive and complex one, riddled with endless weighty considerations and decisions.

It's also increasingly necessary, as cloud technologies become more and more essential to an organization's ability to remain competitive in an ever-evolving, fast-paced, digital-first environment.

However, as seen in this paper, we're confident that if organizations allow themselves to be guided by a few key principles, particularly the need for strong business drivers, cloud economics and continuous optimization, they can realize the full potential of the public cloud.

And what an amazing potential it is – promising everything from unprecedented innovation, speed and agility to cost optimization.

To know more about the Cloud Transformation Guide, and to find out how Capgemini can help in your transformation journey connect with our experts:

Thomas de Vita
Head of Cloud Solutioning
Cloud Infrastructure Services, Capgemini

Sébastien Reister
Head of Apps Migration to Cloud
Cloud Infrastructure Services, Capgemini

About Capgemini

Capgemini is a global leader in partnering with companies to transform and manage their business by harnessing the power of technology. The Group is guided everyday by its purpose of unleashing human energy through technology for an inclusive and sustainable future. It is a responsible and diverse organization of 270,000 team members in nearly 50 countries. With its strong 50 year heritage and deep industry expertise, Capgemini is trusted by its clients to address the entire breadth of their business needs, from strategy and design to operations, fueled by the fast evolving and innovative world of cloud, data, AI, connectivity, software, digital engineering and platforms. The Group reported in 2020 global revenues of €16 billion.

Get the Future You Want | www.capgemini.com

Copyright © 2021 Capgemini. All rights reserved.