

HOW ENTERPRISE ARCHITECTURE MANAGEMENT PAVES THE WAY INTO THE CLOUD

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Today is about the 'how' not the 'if' of Cloud

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INTRODUCTION

"In 2020, a No-Cloud policy will be as rare as a No-Internet policy today"

As a part of digital transformation clouds offer a lot of business-enabling benefits and opportunities. Increased time to market due to shortened development cycles, ability to scale at a demand, dramatically increased assets utilization, reduced operational expenses and easier handling for IT staff. And these are only some benefits.

Cloud paves the way to the new service driven business models, which allow to create high business value and new level of customer satisfaction while reducing cost at the same time, all by leveraging software and data in a programed, automated manner. Infrastructure has become an enabling service, rather than an expensive asset. Cloud has therefore become a key determinant of IT and business strategy.

Crisp Research found that over 60% of companies are planning heavily intensify the usage of cloud solutions. However, complex business landscapes and fast changing infrastructure which includes legacy as well as modern state of the art systems may become a serious obstacle on your way. The purpose of this white paper is to propose clear steps how Enterprise Architecture might drive cloud transformations in Corporate IT.

TODAY IS ABOUT THE 'HOW' NOT THE 'IF' OF CLOUD

Gartner analysts believe that by 2020 a “no-cloud” policy will be just as rare as a “no-internet” policy is

today. Instead, they predict that the hybrid cloud (a mixture of internal and external cloud services) will be the most used solution. And according to a survey by the cloud platform provider RightScale, this solution is already preferred by the most companies today.

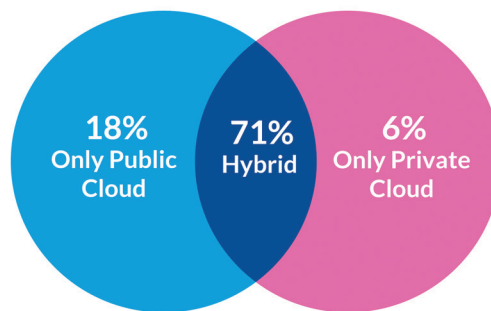


Figure 1: Different types of cloud adopted by business

If we talk about cloud transformation in this white paper, we refer to the process of migrating a company's IT infrastructure to an internet-based infrastructure which provides shared computing resources on demand, allowing to access and use them from anywhere, on any device. Long time ago big companies, such as Google, Microsoft or Apple started to provide the so called public clouds to offer their customers different services such as mailing or data storage and others. However, business sector rose a demand for private clouds, to have ability to launch their own services and provide secured access to their employees. The mixture of public and private cloud use is known as hybrid clouds.

Companies often tend to resist critical transformations, since dramatic investments in legacy systems have been made early. While trying to keep these systems in use and save money on reusing them, such approach may undermine the overall agility and flexibility that companies want to achieve. In addition, no one can

deny that the way to the cloud is tough, especially for large organizations. To successfully move to the cloud, enormous organizational, operational and technical modifications are required. A lot of influencing constrains occur along the way, such as budget limits, need of exponential scale, growing complexity in company policies and external regulations.

In the next part, we propose concrete steps and principles for cloud transformations.

The path to the cloud

Analyzing the cloud transformation experience of our clients, we have distilled a process with four main stages. Three steps are executed in a sequential manner,

which are complemented by ongoing measurement and improvement.

We give the most important architectural strategies and principles for every stage further in this paper.

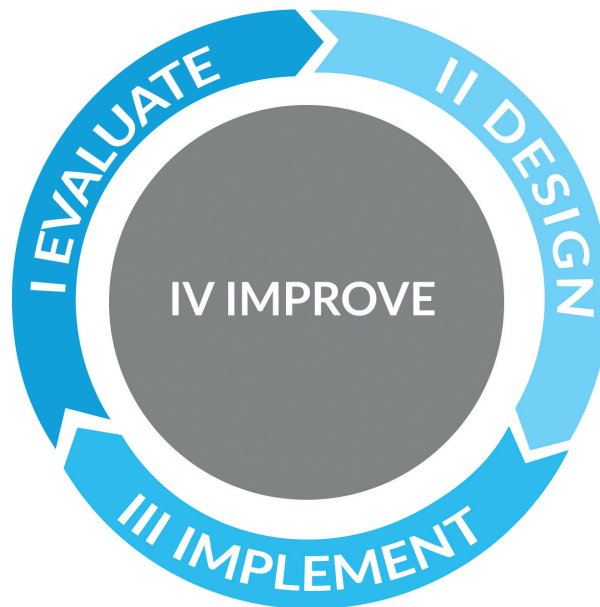


Figure 2: Cloud transformation steps

I- EVALUATE CLOUD READINESS

Cloud transformation is not only about the use of new platform and technologies, but rather about the transformation of the whole business model, a new way of working.

CLOUD MATURITY CONTINUUM		
	Industrial Traditional	Digital Agile
Value of IT	<ul style="list-style-type: none"> • Cost and risk reduction • Operations kept running • Preserve customers and assets 	<ul style="list-style-type: none"> • Revenue and brand value • Customer satisfaction • Business change and innovations
IT Organization	<ul style="list-style-type: none"> • ITIL • Waterfall • V-Model 	<ul style="list-style-type: none"> • DevOps • Scrum • Kanban
Culture	<ul style="list-style-type: none"> • IT-centric • Internal customers 	<ul style="list-style-type: none"> • Business-centric • Customer oriented
Cloud Focus	<ul style="list-style-type: none"> • Extend existing infrastructure and tools 	<ul style="list-style-type: none"> • Adopt native cloud tools
Cloud Opportunities	<ul style="list-style-type: none"> • Move commodity servers off site • Improved Capacity management • Cloud recovery 	<ul style="list-style-type: none"> • Quick and cheap provisioning • Delivery Empowerment • Higher infrastructure flexibility • Reduce operations requirements

Figure 3: Cloud maturity continuum. Based on Gartner 2016: How to achieve enterprise agility

Depending on the current company's position on a cloud maturity continuum, companies have different starting points when it comes to cloud transformations. They have a different culture and way of working. Therefore, also the cloud focus opportunities are different. Cloud beginners might first focus to extend existing infrastructure, more agile companies will have already maxed out these opportunities and look to move more and more to native cloud tools.

After the starting point on the cloud continuum is determined, it is time to understand the current company's cloud usage "as is" state. Some transformational milestones should be determined:

- **Stage 1:** An enterprise architecture managed practice is established, as well as operations, information and a technology portfolio. Mostly on-premise IT. Software-hardware abstraction may be established and prepared for partial cloud transformation.
- **Stage 2:** Third party's platforms are introduced to outsource some services. DevOps and lifecycle management for cloud platform in use.
- **Stage 3:** Enterprise architecture, service integration and management have capabilities to fully

manage third party as well as internal capabilities and services faced on different markets. In all forms of the cloud: private, public and hybrid clouds.

II- DESIGN THE TARGET CLOUD ARCHITECTURE

For a successful cloud transformation, a wide variety of factors need to be considered: current and future capabilities, the application portfolio strategy, operational and organizational questions related to people and processes, and costs metrics.

Target capabilities

As in any process of change, well grained target capabilities must be defined and ensured that they effectively align people, processes and technology to bring the organization to the desired level of maturity. Cloud promotes wide usage of "as service" capabilities and supports business across functional silos by eliminating and reducing software and hardware complexity, i.e. simplifying the whole IT infrastructure.

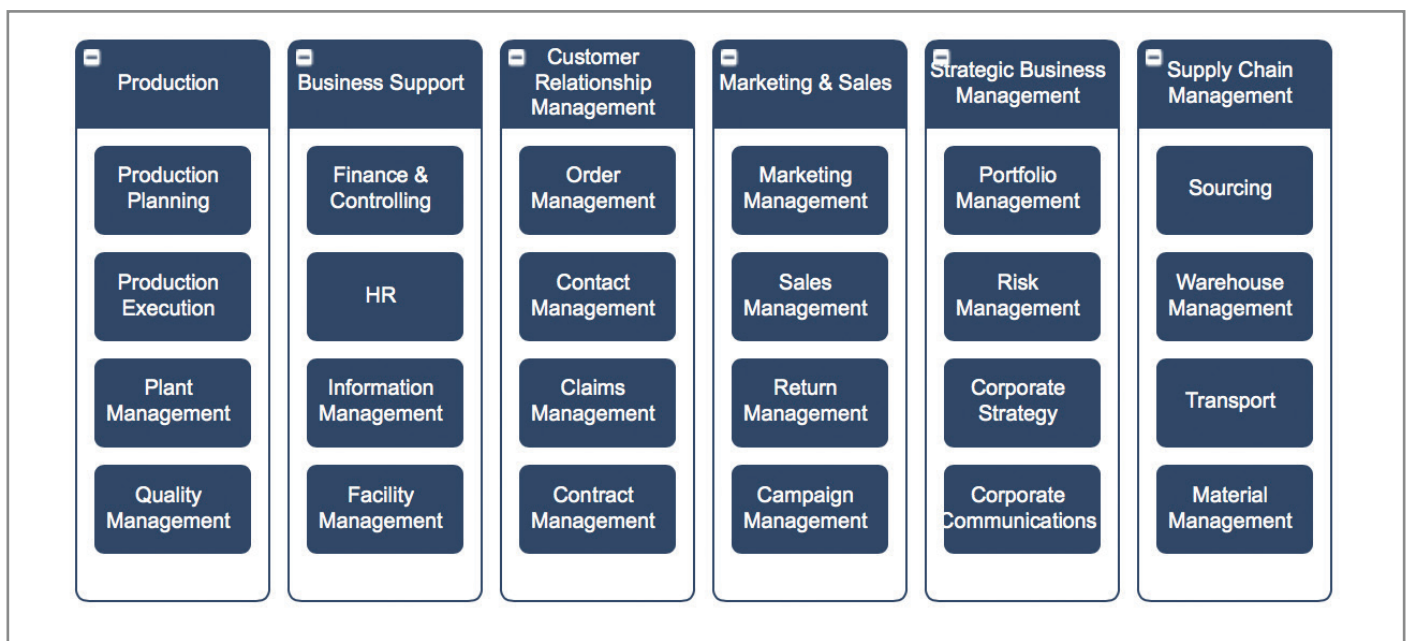


Figure 4: Example of a two-level business capability model of a multinational production company

Cooperation between a broad circle of stakeholders is crucial and may take time to agree. Some formal processes should be established to support decision making processes regarding whether to buy public cloud services or invest in private / hybrid one. Companies may define their “as service” business capability model in three steps: understand business needs, define and assess current and target capabilities, create links from the capabilities to responsible user groups, supporting processes and cloud applications.

The resulting capability model can be used to align IT investments to strategy, draw technology risk maps and consolidate IT applications. Best practices show that business capability models of companies with a lean philosophy have around 10 top level capabilities and two levels of depth.

Based on the defined target capabilities, a competition

will arise between internal and external service providers, thanks to the well understanding of costs and more extensive use of external service providers. This creates even more opportunities for internal quality improvements.

Which applications to move to the cloud?

After the resulting high level capability model is agreed (figure 4), every capability can be taken and further fragmented to ensure necessary level of details. A good idea is to create an Application Matrix showing the relation between business capabilities supported by cloud as well as by legacy on premise applications in relation to specific user groups or locations. As an example, we illustrate this on Figure 5. Colors indicate the functional fit: legacy applications waiting for replacement by cloud alternatives are indicated in red.

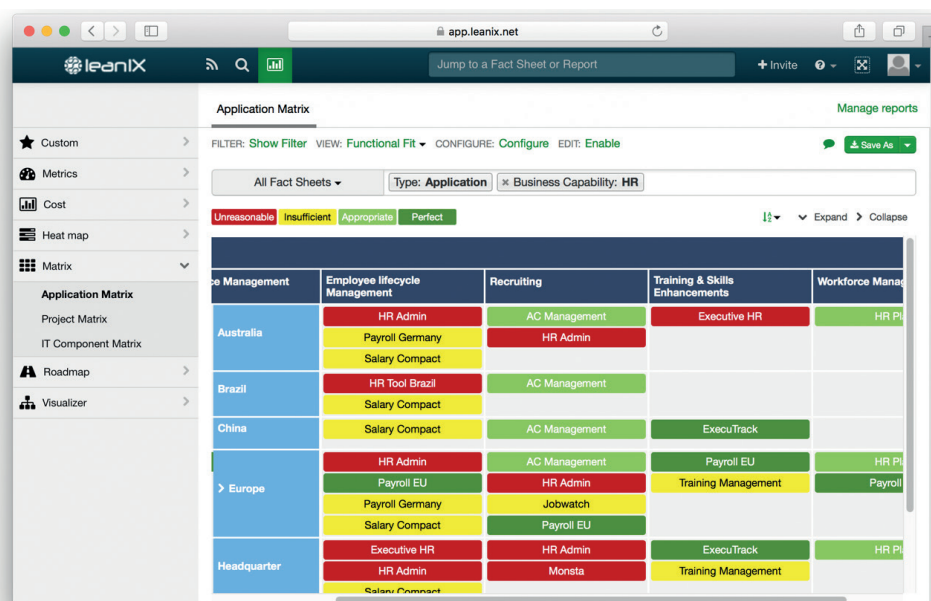


Figure 5: Business Capability to User Group and Application Matrix revealing the “Unreasonable” applications which should be replaced by cloud solutions

A modern enterprise architecture management tool may perfectly support you in assessing how ready your application portfolio is for the cloud and whether a particular application is well aligned with the overall business mission.

To find out if and which applications you should or should not migrate to the cloud, you need to define the

principle determinants for answering two questions:

A: What are the criteria to decide that an application goes to the cloud?

B: What are the criteria that prevent an application from going to the the cloud?

This is a catalogue you can apply to define the criteria that apply best to your company’s individual situation:

Business Considerations

- Will cloud solutions be accepted by the business owner?
- What is the risk tolerance level of the business towards a cloud migration?
- What is the business criticality of the application?

Application Lifecycle Considerations

- Is it still in the planning phase?
- Does the application need a technical refresh?
- Rather than migrating the application to cloud infrastructure (IaaS or PaaS), would it make sense to replace it with a SaaS solution?

Application Architecture Considerations

- Is the application web-based or built with a service oriented architecture?
- Can it be split into modular services? What is the level of effort required to modularize it out?
- What are the demand fluctuations for the application? What demand impact will moving to the cloud have?

Data Considerations

- Is there any confidentiality, privacy regulations that prevent moving to the cloud?
- Are the privacy or confidentiality concerns

by the business?

- What is the level of data transfer between the application and the end user? Are there high load and lag considerations?

Technology Considerations

- How resilient does the network infrastructure need to be?
- Are there requirements such as network isolation, virtual private networks, elastic addressing and network segmentation?
- Is there a requirement for high availability and disaster recovery?

Security Considerations

- Who is responsible for authentication and authorization? Is there a SSO requirement?
- Which security controls are in place at the cloud vendor?
- Is continuous monitoring required?

Integration Considerations

- What are dependencies of migrated applications to other applications
- Is the migrated application a system of record for key data in the master data management scheme?
- Does the application rely on common directories, such as user directories?
- Applications used by mobile workers managing time and activity, contributing limited information

Suitable for Cloud	Less Suitable for Cloud
<ul style="list-style-type: none"> • Applications used by remote working employees (e.g. time tracking). Limited integration to the company's systems of record • Applications run infrequently but requiring significant resources • Applications that run in a different time zone than where your Company's IT personnel is • Development, testing and prototyping of application changes • Service Oriented Architecture (SOA) applications 	<ul style="list-style-type: none"> • Applications involving highly sensitive data. These require special treatment to be run in a Cloud Service • Applications running on the company's private network and are very performance-sensitive • Applications that require frequent/voluminous transactions against an on-premises database which cannot be migrated to Cloud Computing • Applications that run on legacy platforms not supported now or in the future by Cloud Providers

Based on your individual criteria and assessments, heat maps can be created for the whole application landscape. They give you a full overview with regards to the readiness to move to the cloud based on proper context, like business capabilities.

Coping with technical obsolescence

Many organizations already have a large variety of

technologic assets, as well as real estate assets to deploy them, as well as wired communication channels. Large amount of infrastructure investments has been made to provide the best services to the customers. Because of that, a lot of decision conflicts must be resolved while transforming to the cloud and reach digital agility.

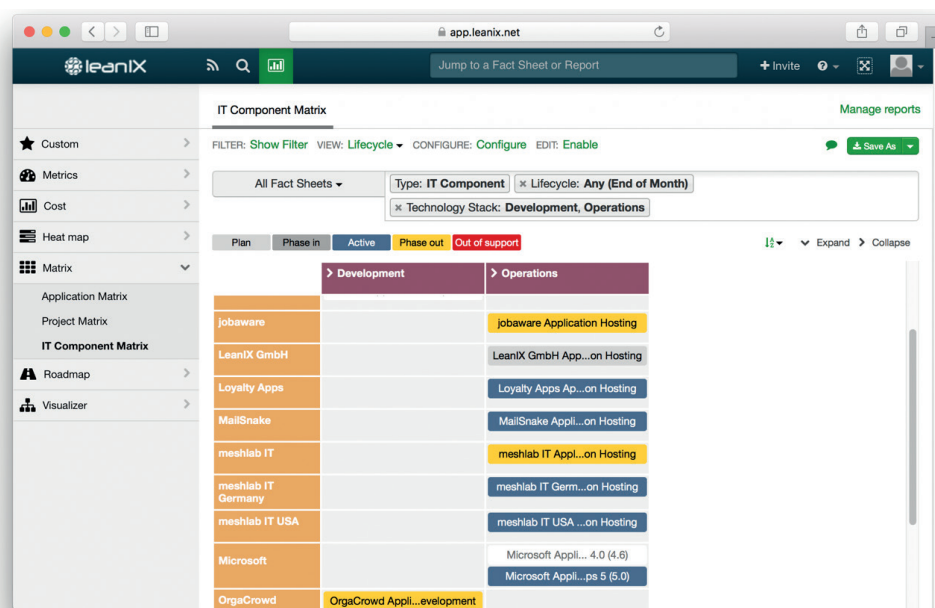


Figure 6: Mapping applications to cloud providers helps eliminate redundancies and estimate the impact of provider change

Digital agility requires software-defined data centers to support extensive virtualization and automation of services, provided by data centers. Software-defined data centers enable computer virtualization to provide software implementation of computing instances, as well as software-defined networking, storage, hardware and automated administration. Taken all together, this provides corresponding services while abstracting from lower level systems.

Cutting through technical and organizational silos

The next important question to consider is to investigate technical and organizational silos. This work should be focused not only on people, but on technology as well. The goal is to transform the silos into high value reusable services, what in turn contributes to overall

agility and allows to reduce costs.

The Development and Operations (DevOps) practice promotes reusability and breaks down the silo's walls. Previously, the Dev side was seen as the "makers" and the Ops side as the "people who deal with the creation after its birth". Overcoming this silo mentality is the main driver behind DevOps. Other features of successful DevOps are a culture of cross organizational services sharing, open feedback, automation, and constant metering of performance and processes. Cloud can help to cut through these silos by replacing infrastructure that is set up differently for each department. And of course by replacing locally different instances of business applications through on demand cloud solutions.

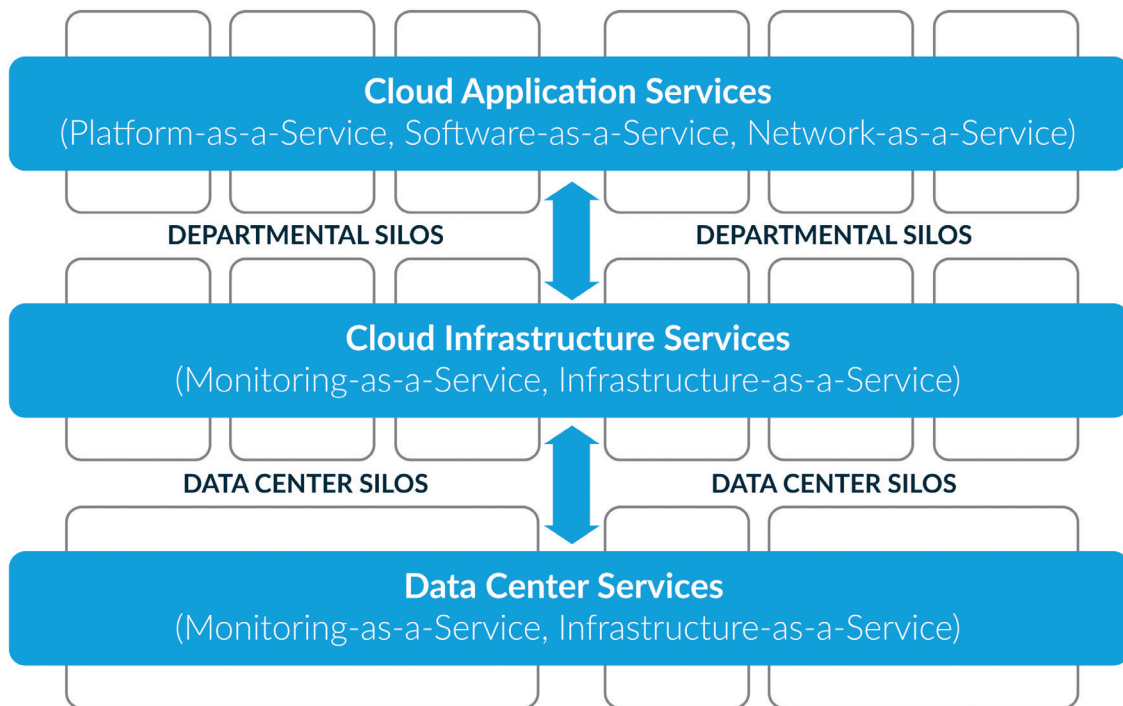


Figure 6: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor.

Some things to keep in mind

While we are strong believer in the cloud, you should also not forget some problems that may arise. Your infrastructure service providers may not be your best friends when moving to the cloud, as cloud undermines their business model. Make them adhere to your strategy anyways. Try to find a good balance between the amount of providers, products and people required to deliver each service. Promote reusability in company's services and capability landscape by firmly implanting this attitude in the teams. Wherever possible, delivery teams should reuse existing data sources, services, IT components, and other assets. You can support this reuse by compiling information on the available technologies in a central enterprise and IT architecture repository where all the teams have access to. The use

of Enterprise Architecture tools is implicitly useful to succeed in developing your cloud strategy. Another important principle – applications and services must be almost independent from technology supporting them. All-in-all, these principles provide a good soil for further cloud transformation initiatives.

III- IMPLEMENT THE CLOUD TRANSFORMATION

Enterprise or IT architects define, support and develop technology roadmaps. This supports the development of a shared and standardized technology infrastructure in your production environment and enables DevOps practices such as continuous deployment, automation, and operational monitoring.

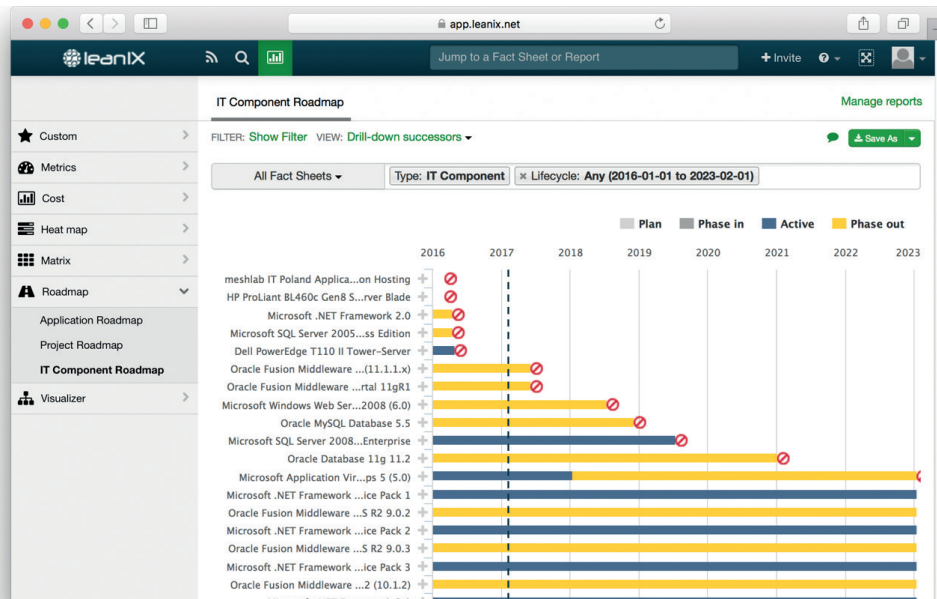


Figure 9: Cloud transformation roadmaps allow you to see how your technology portfolio develops over time. Ensure that this development is suited to your DevOps strategy.

Creating cloud transformation roadmaps is the main architectural responsibility and task during the implementation stage as well as on previous stages. Further, enterprise architects coordinate the various projects of the developer and system administrator teams to execute the migration work.

IV- GOVERN AND IMPROVE

This is the last stage we describe; however, it is executed not at the end of the transformation process,

but rather in parallel to all the previous steps.

Risks related to time losses, new technology use, as well as external factors, such as cloud providers must be estimated. Overall costs of the cloud transformation project should be budgeted and regularly monitored. We recommend to focus KPIs and costs metrics not only on the cloud platform itself as it can be hard to estimate agility and new operational models. However, what may become the main point of interest is the new organizational performance, determined in produced output and innovations per unit of time and costs.

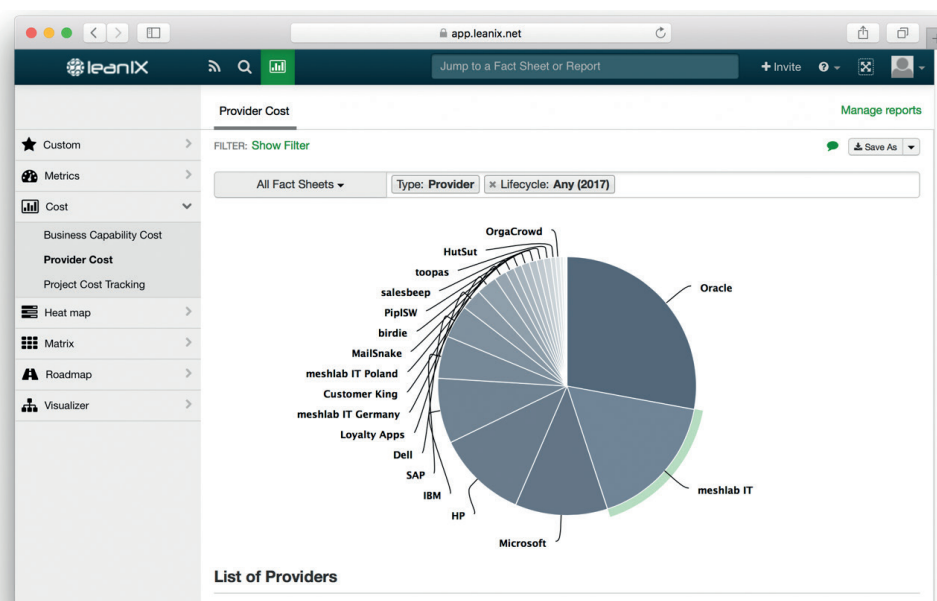


Figure 10: What is the spend per provider?

SUMMARY

Cloud transformation creates an opportunity for new business models, innovations and increased level of customer satisfaction. Cloud is not just an IT related buzzy word anymore, it becomes the determinant of the business strategy. Cloud transformations are not easy to lead – it requires big and timely efforts spent on redefining the business vision, needs and culture.

Every organization has its own cloud readiness level, which determines the first steps and benefits from the cloud journey. After that you want carefully consider which applications and infrastructure to move to the cloud. We offer a catalogue around business, application lifecycle, application architecture, data and technology considerations.

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