Cloud migration: a comprehensive guide for modern businesses

Contents

SII RZESZÓW TEAM

Who is the document addressed to?

Nowadays, many companies are moving their infrastructure to the cloud, due to its extraordinary scalability, security and performance. If you have already made this decision and are hesitant about how to optimize your solutions after your first migrations, this ebook is for you. You will read about how the cloud can further increase the efficiency of your company, streamline business processes and reduce costs. You will also learn what types of clouds are available on the market and what steps you need to take in order to carry out the milestones leading to full migration in a safe and effective way.

With our guide, you will gain a thorough understanding of the cloud migration process, as well as tips and best practices that will allow you to succeed.

Whether you are a small startup or a large enterprise, our ebook will give you the tools and knowledge you need to seamlessly migrate to the cloud.

Don't wait, read this ebook and see the benefits of migrating to the cloud for your business! Join millions of businesses that are already harnessing the power of the cloud to drive growth and innovation. You will also be able to verify, if you are overpaying for your cloud solutions.

Introduction

On-premise solutions put limitations on us

Why do companies decide to migrate to the cloud? Plain and simple - becasue on-premise infrastructure ages. Its expansion and modernization become more and more difficult, due to long delivery times, inability to purchase support for older devices and the growing costs of software support and support services.

In addition, difficulties arise also in maintaining a team of engineers, whose motivation to support outdated solutions is decreasing, because young administrators want to learn and work with modern technologies.

In addition, protection against growing threats in cyberspace requires the development of solutions to protect our infrastructure. These systems are becoming more and more complex, and their operation requires increasingly specialized knowledge.

We collect more and more information, and each month brings us more data sets that need to be stored and processed to have real benefits. In order to quickly draw conclusions from data, to implement predictions or other analytical models, we need efficient and scalable solutions – they are extremely expensive, and sometimes used inefficiently, because we use them irregularly.

The cloud can help mitigate it

In 2006, Amazon engineers presented a solution that they had been using for some time to help dynamically develop their key service – an online store. However, it turned out that this service was so innovative that not only it could help the creators of the solution, but also affect the business of other companies.

As a result, in November 2004, we gained access to AWS, the first global public cloud solution. Amazon was followed by other global service providers, Google in April 2008 presented Google App Engine, while Microsoft in February 2010 presented its approach to the cloud – Windows Azure Platform.

A special feature of these solutions was the ability to move their virtual machines (IaaS) from Data Centers to the cloud. This became an accelerator of changes in IT, where large companies quickly adopted a new solution and abandoned their infrastructure distri-

buted in many Data Centers, moving it to a new environment – in the cloud.

- IaaS – Infrastructure as a Service
  – services based mainly on virtual machines, networks and a warehouse, in which the customer independently manages the environment and a cloud provider provides the infrastructure

- PaaS – Platform as a Service
  – services in which the responsibility for the infrastructure, including the operating system, is taken over by the service provider – the customer uses ready-made services, e.g. databases for the construction of their solutions

- SaaS – Software as a Service
  – a service model in which the service provider takes all responsibility for the solution – providing the customer only with access to the application
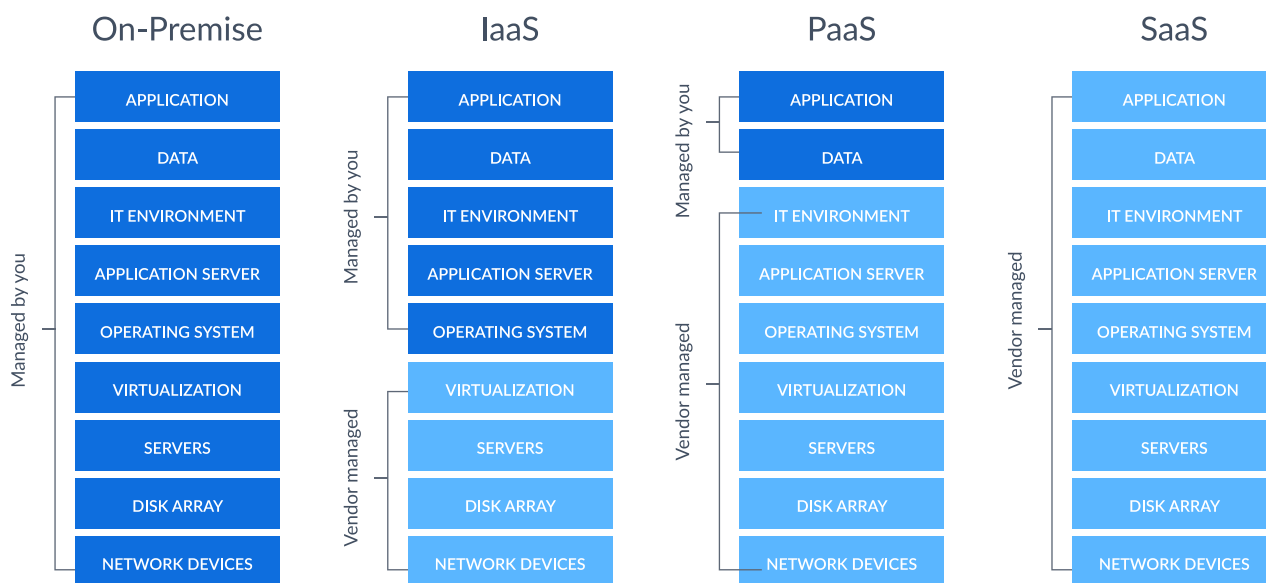
Fig. 1. Infrastructure management according to the service model

The next step in the evolution of the cloud was to prepare solutions that were to provide access to complex managed services such as: databases, environments for maintaining applications, data processing services, artificial intelligence, etc. These services were also to delegate the platform provider with responsibility for administrative work, the correctness of the configuration or its appropriate security. PaaS consists of hundreds of solutions that give us a chance to focus on developing our own application and expanding it with ready-made components. This approach, called cloud-native, allows you to quickly create solutions at a lower cost, while ensuring high efficiency and security.

Some of these solutions are so complex that their independent creation could be unprofitable for many entities, such as ready-made solutions for image processing and speech-based services based on artificial intelligence.

Some cloud users create their own solutions based on these services – often referred to as SaaS. These are the services for which we are the consumer (including social networks, streaming services for streaming videos and music or business applications). Most manufacturers have long offered their applications in a SaaS model, including SAP, Salesforce, Microsoft or ServiceNow, which make them available publicly in a subscription model.

In the further part of our study, you will find innovative examples of how the cloud can be used to carry out specific tasks.

Business advantages of using the cloud

Rafał Urbańczyk

What you can gain by migrating to Cloud

At first glance, the decision to migrate to cloud is purely a technical one. However, to a large extent, business motivations stand for a primary factor behind it.

Why do organizations decide to move ICT services from their own data centers to public cloud?

Because it pays off, and the benefits are greater the higher the level of cloud adoption. If we move resources from our data center to cloud 1:1, the savings will be limited and our level of cloud advancement will be relatively low. When deciding to move data and applications to the cloud, one must already have an outline of the strategy and business goals that migration should result in. One can use the experience of companies specializing in designing cloud environments, transferring and launching resources and implementing modern hybrid solutions. By increasing the level of cloud maturity through migration to managed solutions (PaaS) as well as optimization of cloud resources, greater savings can be achieved in many areas.

Reduction of infrastructure maintenance costs

All business decisions require a detailed analysis that allows you to determine a plan and scope of activities. It is no different when a company wants to migrate data to the cloud. Moving resources from your own Data Centers to the cloud without a plan and establishing key areas of migration usually brings small savings in infrastructure spending compared to the cost of maintaining this infrastructure at home. This argument is used by opponents of migration to the cloud defending the status quo of existence of their devices. Only the use of appropriate cloud optimizations brings the expected reduction in CAPEX expenditure.

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These objectives are pursued through migrations consisting of:

1 adjusting the amount and size of infrastructure resources to the actual needs of business application processing - usually there may be fewer of these resources

2 electing the most advantageous plans for the valuation of cloud resources

3 allocation of IT costs to business departments commissioning IT services

4 rebuilding the application architecture and using available managed services.

Increasing the efficiency of the IT team

Resource optimization is one of the key goals of companies operating in the global reality. This phenomenon mainly affects areas where companies are looking for their competitive advantages. One of them is digital transformation and accompanying technological changes. AWS (Amazon Web Services) has done research on the impact of the use of cloud solutions on the effectiveness of administrators' work. Two indicators were adopted: one is the number of virtual machines per administrator, and the other is the ratio of the administrator's working time devoted to conceptual work to standard repetitive activities related to IT administration. Even simple migration to the cloud (without optimization) allows you to double the number of managed virtual machines, and after optimization, one administrator is able to manage four times more servers in the cloud compared to an on-premise environment. The time for the administrator's conceptual work increases from 30% to 50% depending on the stage of cloud adoption[1]. Repeatable activities are taken over by the cloud provider, while providing advanced tools to streamline the administration of IT resources.

Ensuring high reliability and availability

In the case of cloud, professional computing centers are located in different geographical areas, but they are also connected by their own communication network, providing the highest reliability, availability and security of data that we are not able to provide in our own data centers within reasonable budgets. In this case, the benefits can be obtained almost immediately, as the time of unforeseen interruptions in the operation of business systems decreases by up to 80% on average when using the cloud[2]. Suppliers offer high availability of their services and guarantee minimum downtime, which ensures that data is always available and ready to use. What is more, many cloud providers offer better data security than most companies can provide on their own. The cloud also provides automatic backups and the ability to restore data in the event of a disaster or security incident.

Accelerating the introduction of new business solutions to the market

In times of digital transformation, business requires IT to:

increase the speed of implementation of solutions

provide almost unlimited IT scalability

increase business flexibility

focus on the client and cooperation

At the same time, current IT solutions are becoming more and more complex. The number of data we have to use is also growing.

The use of the cloud allows for more than a fivefold increase in the frequency of releasing new software versions. According to research, time to market for new applications is reduced by 30% to more than 40% compared to traditional applications[3].

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The post-pandemic reality also shows that SME sector is increasing the number of projects in the cloud, although the issues to be addressed remain, i.e. security, cloud spending management and lack of resources or expertise[4]. Understanding current trends in cloud computing can help you make business decisions, choose suppliers and technologies, forecast costs and investment strategies to support next steps of your cloud migration.

As indicated by the McKinsey&Company report, many industries can benefit significantly from the adoption of cloud computing, among which, retail trade, FMCG product sector, as well as transport and logistics can be indicated in the first place. The share of these industries in the generation of added value through the cloud may amount to 28%.[5]

[2] Source: Migrating VMware to Microsoft Azure: Total cost of ownership guidance, November 2017.

[3] Source: Best Practices to Maximize the Business Value of the Cloud by Known, AWS.

[4] Source: Flexera 2022 State of the Cloud report.

[5] Source: Chmura 2030. Jak wykorzystać jej potencjał i przyspieszyć wzrost w Polsce. Raport McKinsey&Company.

Inspiration

Mariusz Krzemień

We already know that the cloud can be a solution to current problems with the local infrastructure and a way to increase innovation, flexibility and efficiency of the enterprise. A large number of companies are growing by creating new services for their customers.

The process of creating such solutions can be simplified into 4 stages:

- ✓ developing an idea in which we define what we would like to do, we define expectations and a business model

- ✓ determining the process related to the creation of the solution

- ✓ preparation of resources necessary for the implementation of the project – including the environment for the purpose of creating, maintaining and testing applications

- ✓ deciding whether the created solution and test results coincide with the assumptions set out at the beginning

This process requires the involvement of IT infrastructure, which often needs to be purchased. This entails additional costs, delays and increased risk of whether the investment will pay off.

IDEA   RESOURCE PREPARATION   MANUFACTURE AND TESTING   DECISION

Fig. 2 The process of shaping the decision regarding new services in the traditional model

It is different with the cloud. Owing to the fact that it provides us with almost unlimited amount of resources on demand, we can launch a test environment in a short time, conduct tests and make a decision about further involvement in the project much faster. And if the project does not bring the intended results, we remove resources and we stop paying for them.

Moreover, if we have the necessary number of developers, we can run several projects or versions of the solution in parallel, gaining significant advantage over the competition.

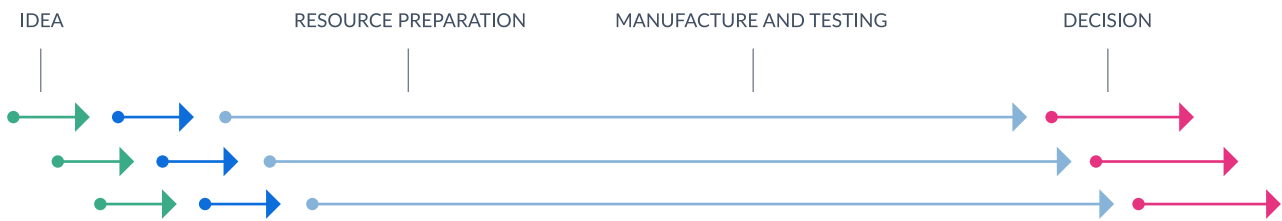IDEA   RESOURCE PREPARATION   MANUFACTURE AND TESTING   DECISION

Fig. 3 The process of shaping the decision regarding new services in cloud

The second example stands for companies creating solutions for consumers, where the use of computing power is uneven, such as in the case of online stores, where we have, for example, time-sensitive discounts requiring a significant increase in infrastructure resources. Here, too, the cloud is an attractive alternative.

In the traditional model, in order to be able to provide enough resources, we must purchase them in advance and at the scale that we anticipate we will need. This means that most of the time, when the load and traffic are less demanding, the equipment will be idle.

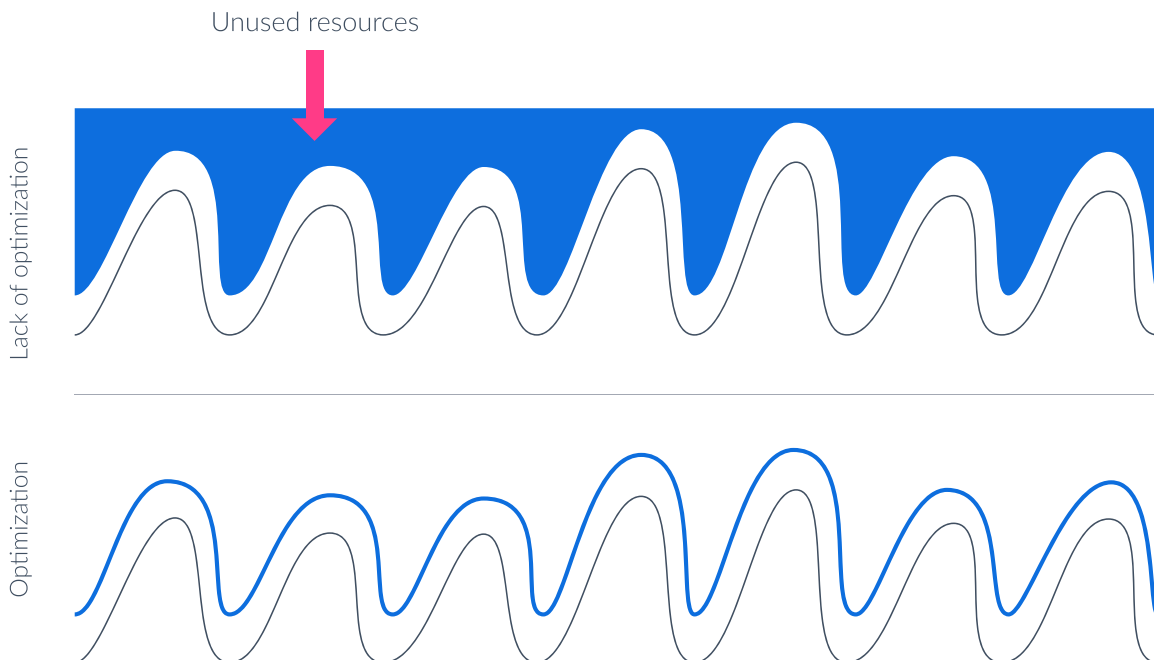Unused resources

Lack of optimization

Optimization

Fig. 4. Differences in resource utilization when optimizing through the cloud

Another benefit is the transfer of part of the responsibility for repetitive administrative activities to the cloud provider. Any hardware or software updates, implementation of high-availability clusters or scalability is implemented as a service. During this time, our IT team can take care of supporting business processes or automating tasks in the cloud. What's more, cloud security is ensured on the one hand by appropriate supplier standards verified by independent organizations and guaranteeing us a high level of

security. On the other hand, service providers equip us with a number of tools to protect our resources, and their implementation is much easier than installing and configuring traditional on-premise solutions.

In the further part of our study, you will find inspiring examples of utilizing cloud as an environment for applications.

Scalable, smart application

Mariusz Krzemień

Modernization of an application to microservices model with performance monitoring, scaling and automatic failure response using prediction, exemplified by Java-based application migration to the cloud.

Microservices model

By now, most of us are already familiar with the concept of microservices. Microservices are currently one of the leading and most frequently used architectural models in application design. Virtually in every project involving the migration of on-premises systems to the cloud, microservices have been one of the main target solutions from the very beginning, taken into account in variant and cost analysis. And very often this solution prevails – if not immediately, when we decide on the lift-and-shift model at the beginning, then certainly soon after migration.

Therefore, it is worth mentioning the most important advantages of this approach, resulting from the very essence of microservices, which we receive de facto from the machine. These include:

- ⊘ speed of operations

- ⊘ high efficiency

- ⊘ no dependence on the service provider of a system platform

- ⊘ resiliency

- ⊘ increased ease of modernization and, thus, more effective reduction of technological debt in the future
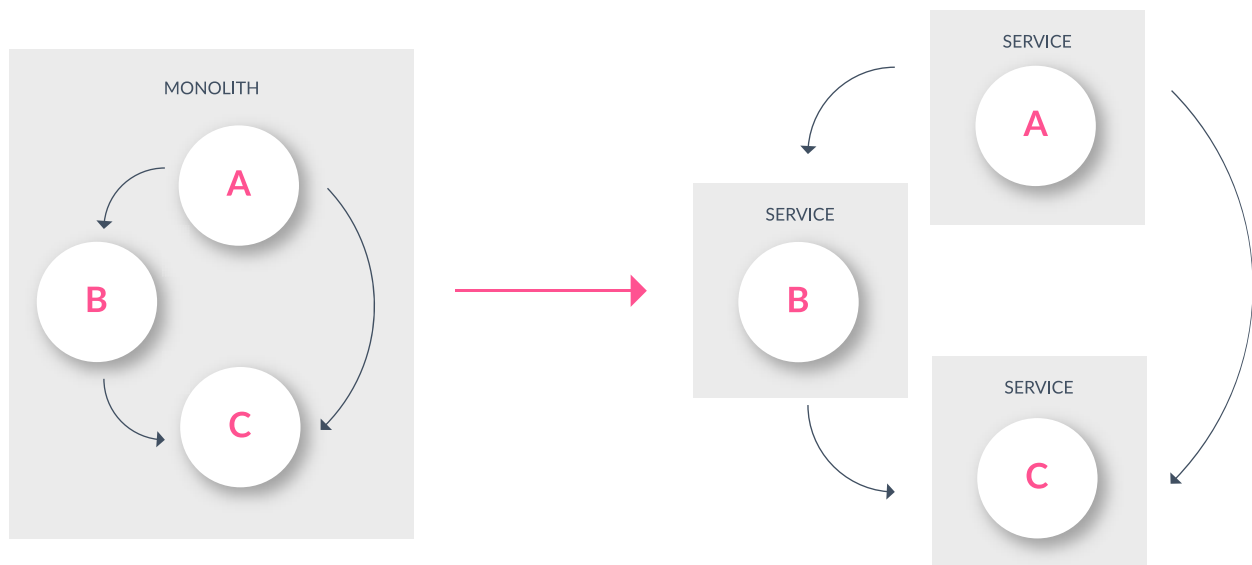

Fig. 5. Migration of monolithic on-premise systems to flexible microservices models

Does the application need to be prepared in any special way?

What is most important during the decision-making process? For most of us, this is an opportunity to choose from many available solutions. The wider the available portfolio, the better, of course. In this way, we can optimally respond to the needs and achieve set business goals. Of course, choosing a target solution is never easy and in most cases depends on numerous factors. In the case where our application does not use the microservice model, it is advisable to perform an analysis that will answer the question whether it is worth maintaining the existing architecture and opting for the lift-and-shift model, or whether it can be replaced with a more modern approach. Each case should be considered and analyzed individually at the stage of preparing the migration project. If you already have an application written in Java, one of the most popular platforms today, migration is much easier. Does the application need to be prepared in

any special way? To put things in a simple perspective: in addition to standard activities such as containerization and adaptation to the general requirements of the cloud, related primarily to the management and monitoring of applications – there is no need. The application may remain in the monolith architecture or it may be upgraded to microservice architecture.

If we decide to modify the application, a platform such as Google Cloud will offer us an environment consisting of many additional native mechanisms supporting this approach and an extended selection of platform types available for this language. The choice is simplified depending on whether and to what extent we want to minimize the effort needed for maintenance and what degree of control and management we want to maintain.

Mechanisms automating maintenance and management

One of key advantages of migrating to the cloud is a wide range of native tools in the area of application management and maintenance, such as mechanisms for monitoring, bug tracking or altering. These mechanisms provide continuous, real-time event-based tracking of

the state and condition of the application and visualization of this state using dashboards, creation of metrics and event-based alerts. All these mechanisms facilitate management and allow the maintenance team to react quickly to arising issues. Logs or current parameters of the condition of the application may stand for data source. This data can include both system parameters and be configured to monitor the correctness of processing use cases from a business perspective.

And is it possible to predict and react to a failure before it occurs?

When migrating an application to the cloud, we often wonder what the measurable benefits can we achieve. We can consider them not only from the perspective of savings – it is often one of the main factors determining the profitability of the migration project, but also from a perspective not so obvious at first glance, yet in a crucial long-term vision, guaranteeing not only reduced maintenance costs, but also ensuring business continuity and reduction of technical and organizational expenditures for its maintenance – the perspective of a potential failure. We can predict failures with the use of artificial intelligence, which allows us to maintain applications in a highly automated way. When using on-premises solutions, we cannot monitor and respond to the increased demand for resources 24/7 automatically, which causes a break in its operation.

In the case of cloud, this is radically different. Mechanisms of autoscaling and prediction – as we are talking about them - stand for one of the main added values of cloud platforms. These are native mechanisms that guarantee continuity and adequate performance in the event of changing conditions in which the application works. First of all, we are talking about a variable load and a variable number of transactions caused by increased client traffic. A cloud platform is able to independently adjust resources during the changing conditions in which the application operates and automatically corrects the parameters of containers – allocated resources or the performance of related services in real time. These mechanisms are also able to predict future demand, thus reacting in advance to potential failures, i.e. increasing resources, reducing possible window of unavailability or reduced performance to almost zero, in which the application will adapt to changed operating conditions, including

increased client traffic. The reasons for the decision to provide resources in the future are the history of use of the application in the past and current conditions. Behavioral models are created in such a way. In the absence of prediction mechanisms, autoscaler can only increase resources based on observed changes in the application load in real time and react to them. Mechanisms, whether this is autoscaling based on the current load or prediction mechanisms, are available and automatically managed accordingly, by selecting and matching our cloud environment at the virtual machine instance (MIG) or container (Kubernetes) level.

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Why the cloud is the only choice for advanced analytics

Krzysztof Saniak

What is advanced analytics?

Recently, the amount of data has been growing exponentially and there is no indication that this will change. In many markets, the leaders emerge among those companies that have access to more data and

- **Descriptive analytics**
  – historical knowledge, i.e. „What happened?"

- **Diagnostic analytics**
  – insight into data, i.e. „Why did it happen?"

The division into these levels also brings a different value – it is practically impossible to omit any of them. Diagnostic analytics requires historical knowledge, and predictive models require the ability

take advantage of it more efficiently. Analytics can be divided according to the advancement and business value it provides into the following levels:

- **Predictive analytics**
  – prediction, i.e. „What will happen?"

- **Prescriptive analytics**
  – optimization, or „What can we do to make it happen?"

to inspect detailed data. Processes implemented at earlier levels of analytics – such as data quality assurance or software deployment - are also useful.

This makes it necessary to take into account the following issues:

1 **Long-term investment** – investing in extensive analytics is a matter of company strategy, hence one should consider how to use data at each level of analytics to achieve the best return on investment.

2 **The need for data collection** – in order to build advanced analytics, one needs to collect a lot of detailed data, often without prior knowledge of what it will be used for. One cannot be certain what data will be useful in predictive and prescriptive analytics. Often it may be data that we do not collect yet, and we may need it, for example, to build loyalty systems or mobile applications.

3 **No guarantee of success** – Advanced AI and Machine Learning models do not guarantee success or a specific return on investment (ROI). Projects should be treated as research (R&D), and decisions on continuation or abandonment of the project should be made as next stages are implemented.

4 **The need to share data with employees and partners** – data brings the highest value when decisions based on it can be made by all colleagues, regardless of where they are located.

Technical challenges

From a technical perspective, this means:

- The need to provide space to store large amounts of data, even unused one.

- The need to provide large resources of computing power in a stepwise manner, for the purposes of training, building and maintaining machine learning models. Model training may require machines with graphics cards (GPUs) that are not required for the production operation of the model.

- In some cases, the need to enable real-time data processing.

- Implementation of software delivery processes and tuned Machine Learning models for continuous production (so-called MLOps). The process of fine-tuning models is critical, due to the emergence of new data, in order to maintain the quality of the model.

- Ensuring secure access to data inside and outside the company network (intranet and externet), while maintaining all security requirements and legal requirements resulting from the provisions of GDPR.

Meeting all these requirements from the technical point of view is not only an organizational challenge, but also a challenge for the company's budget. Maintaining such a powerful infrastructure in your own Data Center, although it is associated with undeniable benefits (e.g. full control over the platform, in particular in terms of security or free choice of technology), also requires a large investment at the initial stage of the project.

Cloud as a solution

The easiest way is to transfer the processes to the cloud, that require the most resources limited to a short period, where it is possible to rent a virtual machine with a GPU card charge for by hours. Such a solution is already known in the IT world, for example when rendering complex graphics for architectural projects. It is then possible to rent computers with appropriate software only for the time necessary to render images. The cloud also allows you to store data quite inexpensively and safely and, if necessary, make it available to analytical systems, even in the form of a data lake. Built-in mechanisms allow you to prevent data loss, archive it or transfer less frequently used data to cheaper services. The entire cloud environment means that the acquisition, processing and storage of data is enclosed in one, coherent ecosystem and takes place very simply. What is more, a company utilizing cloud has the ability to constantly control costs and, if necessary, reduce or increase expenditure on individual projects. It is also possible to set fixed limits for individual services, groups of services or particular works. This is especially important in research so that we can focus on most promising projects.

Building analytical solutions in the cloud also allows for „democratizing access to data". Sharing data inside and outside your organization is simple,

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scalable, and manageable. The flexibility of the cloud allows for experimentation, testing and ensures agile approach to building solutions. The cloud is also an ideal environment for building data-driven MVP services for external customers.

It is equally important to provide tools for developers and DevOps specialists in the cloud, which allows for software, testing and production implementation of solutions based on the CI/CD (Continuous Integration/Continuous Development) and Infrastructure as a Code philosophy.

It is worth using these solutions taking into account both their pros and cons. Undoubtedly, many companies will be afraid of dependence on services provided by cloud and potential security issues. Companies such as Microsoft or Amazon are a guarantee of data non-volatility and compliance with both industry and legal standards. When moving a solution between suppliers, the most important thing is to approach the architecture of the entire solution responsibly so

as to ensure that it matches the needs and business goals.

There is a belief that the use of public cloud computing is the only way to implement advanced analytics based on Big Data and Artificial Intelligence for most enterprises – at least in the form of hybrid architecture.

How to move your business to the cloud

Radosław Dudyk

Easier communication in the company? The ability to edit Word or Excel files by the whole team at the same time? All useful apps available in one place? Now it is possible thanks to the state-of-the-art Modern Work tools from Microsoft.

Nowadays, companies limit data collection on servers by migrating resources to cloud solutions. All major software providers make it clear that the future of IT development rests in the cloud. They prove this by directing the investment stream towards cloud solutions and new licensing policies that encourage recipients to consider cloud as an alternative to on-premise solutions.

An example of an organization that keeps up with the times is Sii Poland, which is gradually introducing the latest Microsoft Office 365 services in the cloud, bringing tangible benefits to all employees. Among the novelties, an application changing means of communication within the organization emerged – Microsoft Teams, which replaced previously used Skype for Business.

MS Teams – what is it and why is it worth it?

MS Teams is used for collaborative work. The solution significantly accelerates the exchange of knowledge and allows one to monitor progress. It is a modern cloud-based service, combining the functionality of instant messaging, teleconferencing with high image fidelity. Integration with MS Office means that files can be edited by many people at the same time. The conversation history and the ability to create teams and threads allows users to limit e-mail correspondence and relieve mailboxes – all files are stored in user's OneDrive or on a dedicated team site.

MS Teams means an array of advantages. First of all – more effective communication. The tool allows you to create any number of teams and thematic channels for departments, projects and interest groups. Owing to this, knowledge exchange process is well-arranged thematically. Cooperation with people from outside the organization is also not an obstacle, as it is possible to invite them over.

MS Teams also includes live events such as workshops or webinars. In addition, as part of a focal solution, users have access to, among others, built-in Office 365 applications, such as: Word, Excel, PowerPoint, Polly Quick Surveys, and many, many more.

What is crucial, the application and all its resources can be accessed from both the browser, desktop application and mobile devices.

The implementation of the latest features of Office 365 in the cloud was associated with a number of benefits for Sii Poland's employees. All mailboxes have been migrated to Microsoft Exchange Online, and each user's online storage has been increased to 1 TB by implementing new OneDrive service.

MS Teams – a solution for everyone, regardless of the location

The implementation of MS Teams in Sii Poland was a response to the needs of employees. The idea of a tool combining both communication and teamwork was submitted as an idea during annual reviews and improvement meetings. The solution unifies communication tools available to almost 8,000 employees, regardless of whether they work in offices, at customers' sites or in their own homes on a daily basis.

„Our employees value working with Teams primarily owing to speed and practicality. The solution has all the functionalities of instant messaging tool and replaces Skype for Business in our organization, because it offers much more. You no longer need to use email to exchange files, which, in addition, many users can conveniently edit at the same time. The application is also appreciated for the introduction of solutions and products that completely change the way of communication and affect the entire organization".

– explains Aleksandra Malinowska, Corporate Projects Manager at Sii Polska.

MS Teams – a tool constantly adapted to the needs of users

Ultimately, the advantage of this tool is that the solution is constantly being dynamically developed by Microsoft to adapt to the needs of users. New functionalities are created gradually reducing the number of applications necessary for daily functioning of large organizations. It is worth mentioning that other plugins and add-ons, such as Trello or Asana, will be available in the near future.

SOC-as-a-Service - organization security as a service

Dawid Jankowski

Security Operations Center

Every company, regardless of its size, should prioritize the security of data and systems. Clients always rely on the confidentiality of sensitive data, contracts, and any other information that could be harmful if disclosed. A data breach can have catastrophic consequences both in terms of reputation and finances. It can lead to loss of credibility, contracts, production disruptions, and potential bankruptcy.

Since the outbreak of the COVID-19 pandemic, when most companies transitioned to remote work, cyberattacks have significantly intensified. According to purplesec.us, this increase is estimated at 600%, with annual losses from cyberattacks reaching 6 trillion USD. Moreover, this trend continues to accelerate,

and is expected to double by 2025. Ransomware attacks (encrypting computer systems and demanding ransom for data recovery) alone are approximately 57 times more damaging than in 2015. Small and medium-sized enterprises are the most frequent targets due to the lack or insufficient security measures.

Effective defense against attacks requires the establishment of a Security Operations Center (SOC). It consists of cybersecurity experts who continuously monitor the organization's IT environment, update attack signatures and defense systems, and stay aware of new attack possibilities and trends.

What exactly SOC-a-a-Service is

Creating your own SOC team is not only time-consuming but also costly. The constant competition for top IT specialists and ongoing training require significant investments. Thanks to modern cloud-based solutions, an excellent remedy to this problem has emerged in the market. SOC-as-a-Service is a service that acts as support in detecting and responding to threats targeted at the enterprise. The client's systems are secured by experts who continuously update their knowledge in the field of cybersecurity.

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Why choose SOC-as-a-Service instead of building your own SOC team?

SOC-as-a-Service is a natural evolution in the realm of company cybersecurity. It is a response to the increasing risks associated with attacks on small and medium-sized enterprises.

There are four main areas of benefits associated with SOCaaS solutions:

1   **Significantly reduced risk of attack:** We have cybersecurity experts in our corner who continuously monitor security systems, greatly minimizing the risk of data breaches or production disruptions.

2   **Faster detection and preventive actions:** Time plays a crucial role during an attack. For instance, when a machine is infected, it needs to be immediately isolated from the rest, and when a user account is compromised, the password needs to be reset promptly. Professional SOC teams have proven predefined automations for rapid and precise response to cyber threats. Production can be restored so quickly that users won't even notice any interruption in service.

3   **Scalability:** As your company grows, SOCaaS grows with it. Experienced SOCaaS partners and providers can easily double SOC resources without any issues. These companies have a vast number of experts ready to work 24/7.

4   **Cost-effectiveness:** SOCaaS eliminates the need for maintaining an in-house unit, including staff, continuous training, office space, equipment, and licenses. For example, to ensure 24/7 monitoring, a small team is required, but the actual workload may be much less. SOCaaS providers have specialists who work more efficiently by dividing their time between different projects. It is estimated that SOCaaS can cost up to 90% less than a traditional in-house SOC unit.

Therefore, it is crucial to ask ourselves whether our defense systems are keeping pace with the increasing number of attacks each year, or even surpassing them.

I already have cloud services - what next?

Michał Furmankiewicz

Having set up cloud services, what's the next objective?

Successful migration to the cloud is half the battle, the other half is gaining experience to use the new tool effectively.

Rising energy costs, security challenges as well as new business needs motivate more and more customers to increase the use of the cloud, but also to focus on optimizing existing solutions. On the one hand, customers are looking for new solutions that increase quality, high availability and safety, on the other – they are wondering how to do it cheaper.

Savings trends are confirmed, among others, by Flexera reports, according to which cloud customers now see greater importance in optimizing existing cloud environments, moving the migration of subsequent applications to the background.

Optimize legacy cloud costs	59%
Migrating more applications to the cloud	57%
Transition from on-prem to SaaS model	42%

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Source: Flexera 2022 of the Cloud Report

Source:
https://info.flexera.com/CM-REPORT-State-of-the-Cloud

Fig. 6. The goals of companies in the context of migration to the cloud (as of 2022)

So what steps should you take to optimize your cloud solutions and control the costs of subsequent solutions?

How to use the cloud more effectively as a destination for new solutions that can be simpler and cheaper than on-premise solutions?

In the further part of our study, you will find practical examples of the use of platform solutions to build modern tools that will reduce the costs associated with maintaining the environment, and allow access to greater capabilities, speed of solution creation, security and cost optimization.

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Recommendations for the architecture of cloud environments

Cloud adoption is not just about adopting technology. It is a change of approach (mind-shift) at many levels of the organization, from business and innovation, through procurement, compliance, development, maintenance and security teams. Changing technology is simple, but trying to change our habits – that's a challenge! What is more, nowadays, cloud adoption is actually a hybrid approach, in which we adopt a model of delivering environments based on the cloud, rather than on a specific technology or data processing location.

As a provider of hybrid solutions, Microsoft offers a number of concepts or processes that can be used during the implementation of the cloud at various stages. These processes were born inside Microsoft itself, which itself has undergone a transformation towards cloud environments, but they are also the result of cooperation of product groups with many customers around the world, who implement solutions.

One such approach is CAF, or Cloud Adoption Framework. It is a general framework that describes the process of adopting cloud environments. CAF refers to the entire cycle, from the company's strategy, which results in the strategy of the IT department, through planning, readiness for migration, approach to innovation in the field of applications, to the management and organization of CcoE and its cooperation with other parts of the organization.

Define strategy
Understand motivations
Business outcomes
Business justification
Prioritize project

Plan
Digital estate
Initial organization alignment
Skills readiness plan
Cloud adoption plan

Ready
Operating model
landing zone concepts
Design area guidance
Implementation options

Adopt
Migrate
Modernize
Innovate

Secure
Risk insights
Business resilience
Asset protection

Manage
Business commitments
Operations baseline
Operations maturity

Govern
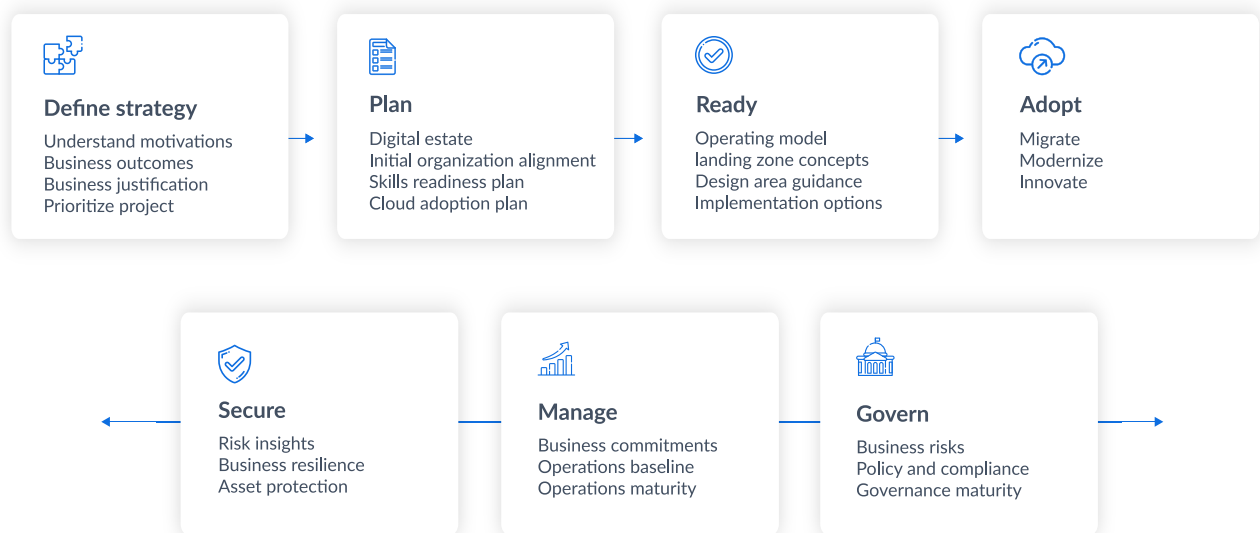Business risks
Policy and compliance
Governance maturity

Fig. 7. Stages of the CAF process

CAF is a holistic, yet a very detailed process, for which each company must come up with a new way of implementation – e.g. decide on the team size, structure or goals to be assigned to teams. This is due to the fact that CAF itself does not look into the details of the implementation of solutions or the application migration process. And yet these discussions will arise when we come to the practical use of the cloud as

a catalyst for innovation. Therefore, an irreplaceable support will be a good partner or a leader who has already gone through this process and made some mistakes from which he could draw conclusions. Two more elements should be added to the CAF itself: Azure Well-Architected Framework and Azure Architecture Center. If someone has heard that there is no cloud, but instead someone else's computer, I hope that after reviewing the abovementioned frameworks, they already know that this is not true. Yes, beyond cloud we actually have physical servers scattered around the world, but designing solutions for cloud environments is another category of engineering.

WAF describes the principles of application design, as well as all solutions in cloud environments, emphasizing key design decisions. The rules may be the same as in on-premises environments, but their implementation is completely different. Especially if we want to utilize all advantages of cloud environments!

Azure Architecture Center, a set of exemplary architecture that can be used when designing your own solutions or accepting ready-made solutions from partners, brings the issues of solution design even closer. Architecture Center is the result of many

discussions with partners and customers about the architecture of solutions in Microsoft itself. It is also the result of many projects that have failed.

Finally, let us ask ourselves a rhetorical question – why do we need all this? If the cloud is someone's server room, is it necessary to learn all these processes, architectures and approaches?

To be brief, no. However, if you want to do it in such a way that the solution is properly managed, accessible, scalable, secure and uses all benefits of the cloud, you have no choice.

I have participated in many projects at very different stages of cloud maturity, both process-related and technical. „Back to basics" approach allowed us to get back on track and focus on achieving the goals we set for ourselves!

I strongly recommend that you familiarize yourself with the materials and then make an appointment to talk to a specialist who has participated in the implementation of the solution live, preferably in a company from a related industry. Stimulating experience!

EWA
CONSULTANT

How to keep things in order

Maciej Poborca

Cloud Adoption Framework

In order to help us properly configure cloud services and allow for its efficient adoption, recommended operating models and sets of best practices began to be developed. One such model is Cloud Adoption Framework created by Microsoft. It is a document spanning over almost three thousand pages, which contains not only information on how to set up services, but also what to avoid and how to prepare management staff for transformation in the company.

Start with ‚why'?

The first step, before we even start talking about technical topics, is to answer the question – Why do we want to use the cloud at all? This is important because architectural decisions may change in relation to our priorities or motivations. There are many reasons why we may want to use the cloud. Starting from the simplest ones, such as saving or the desire to use new technologies, to the need to increase business flexibility or geographic scaling.

The process of creating a cloud-based business strategy should be as follows:

1 **Define and document motivation:** meet with key stakeholders and management to document the rationale behind your decision to deploy the cloud.

3 **Evaluate financial issues:** learn how to leverage the cloud to increase IT cost structure flexibility. Then create a business case to deploy the cloud.

2 **Documentation of business results:** together with motivated project participants and management representatives, document specific business objectives.

4 **Discussion of technical issues:** explore the possibilities of the public cloud, its flexibility, efficiency, but also limitations. Understanding technical issues will make it easier to create a business case to implement the cloud.

Such an evaluation of business strategy and a list of motivations for migration to the cloud should be an important point in its adoption and should be fully documented. Documenting the strategy and being aware of our motivations and limitations allows you to maximize profits resulting from the use of public cloud services.

Have we matured to implement cloud as an organization?

One of the most important, if not the most important step is to plan our transformation. The use of the public cloud is not only a huge volume of technological innovations, but also a complete change in the view of IT infrastructure. As an example, we can look at topics related to finance. In the world before cloud adoption, most costs related to infrastructure in our organization were CAPEX costs, while in the case of cloud we have to adapt to a completely different approach. When using cloud services, CAPEX costs will be negligible and most of the expenditure will constitute OPEX costs. We will also look at

infrastructure or development environments in a completely different way. In the cloud model, the infrastructure is a logical entity, mapped physically in a data center of our cloud provider. The above differences in relation to on-premises infrastructure lead to a number of possibilities, but also risks that need to be identified and then addressed. In order to take full advantage of these opportunities and mini-mize risks, it is necessary to build competences in our organization that go far beyond purely technical skills.

Migration planning

Planning the process of migrating our services to the cloud is another important step that we should develop in a way that fits into our business strategy.
If one of our motivations is the ease of scaling services, which we will achieve with serverless solutions, then „Rehost" migration will not be the right approach for us. That is why, we should answer the question in which direction we want to go and plan the process of adapting the application to the new environment.

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Consider the five most common types of migration:

1 **Rehost**
– also known as "Lift and Shift" migration. It is based on minimizing changes in the solution architecture and moving the current resource directly to the public cloud.

2 **Refactor**
– Platform as a Service (PaaS) options can reduce operating costs associated with multiple applications. It is a good idea to refactor the application in order to fit it to the model based on the PaaS model. In such a migration model, we change the application runtime from IaaS to PaaS.

3 **Rearchitect**
- some legacy apps are not compatible with cloud service providers. This inconsistency stems from the architecture-level decisions that were made when the application was created. In such cases, the application may need to change its architecture before moving it to the cloud.

4 **Rebuild**
– rebuild the application code to adapt it to work in the cloud and meet business requirements.

5 **Replace**
– solutions are typically implemented using the best technology and approach available at a particular time. Sometimes it may turn out that there are already solutions on the market that provide the same functions, but work in SaaS model. Replacing our solution with another one is a „Replace" migration.

SII GDAŃSK TEAM

Landing Zones

Azure Landing Zone is a multi-subscription platform that is responsible for scaling, security oversight, networking, and identity. Landing Zones enable migration, modernization and innovation of applications on Azure platform at the scale of a large enterprise. This approach takes into account all platform resources required to support client's application portfolio.
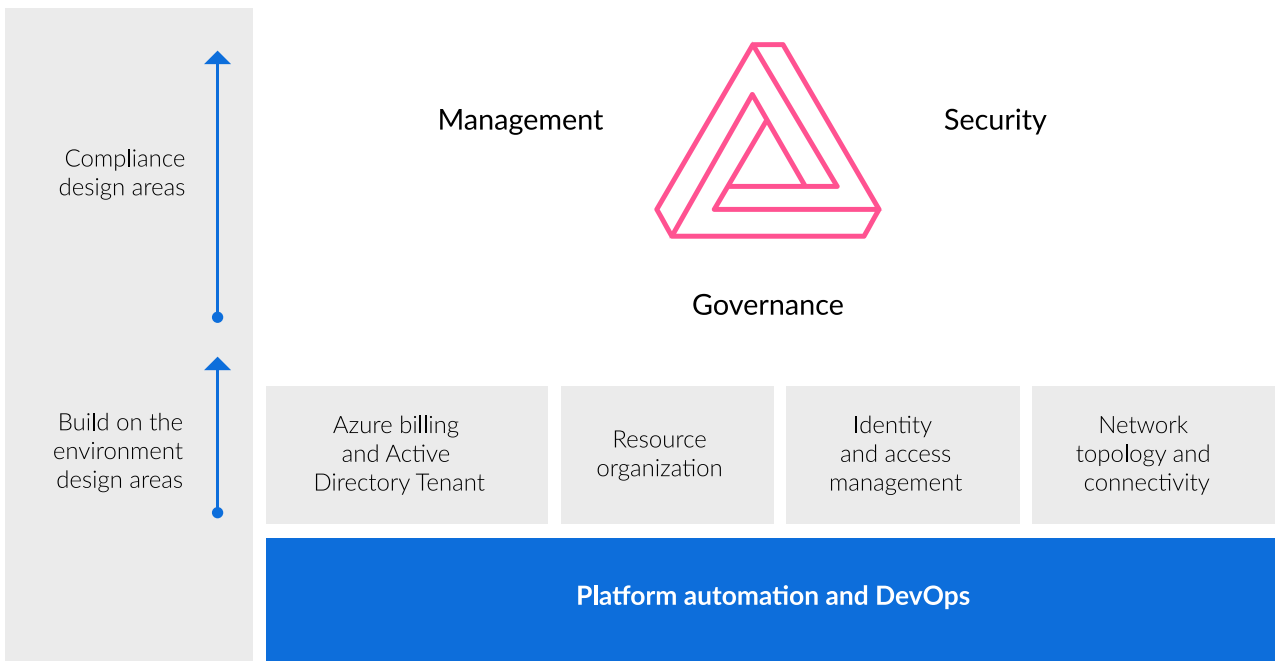
Fig. 8. Azure Landing Zone

Management

The first area we deal with during the implementation of Cloud Adoption Framework is management. In this area, we deal with services and policies that are worth considering to make it easier for us to manage cloud infrastructure on a larger scale. This area can be considered the basis for cloud implementation. It is here that we touch upon topics such as naming rules, forcing tags or configuring policies to force the use of specific machine sizes or geographical areas. Such operations allow us to increase order in our environment, but also to reduce costs.

Security

In today's world, the security of our data and applications is one of the most important aspects when designing solutions. Therefore, when adopting a public cloud, security is an important area. As in the case of the management area, here, too, we have a number of tools that we can use. In order to ensure a high level of security, we implement a number of policies that enforce the configuration of our resources in accordance with the standards adopted in our organization. An additional aspect worth considering is the use of security tools provided directly by the cloud service provider. For example, in Microsoft ' cloud, Defender for Cloud or Sentinel can be very interesting tools.

Monitoring

As you probably already know, public cloud is a machine for generating logs. From the platform itself, we receive a large number of metrics and logs, describing operations performed by the user or changes in service statuses. In addition, we can integrate logs from applications in public or on-premises cloud with monitoring solutions based on public cloud. In this way, we can build a central solution for monitoring our infrastructure, which will significantly facilitate control over applications and help identify problems.

Automation

The last of the key areas is automation. It is thanks to it that we will take full advantage of the cloud. Automation allows for a modular approach to infrastructure and minimizes the time needed to test or deliver applications. Moreover, the creation of predefined automation modules will allow for standardization of solutions in our environment.

Scalability

One of the challenges when preparing Landing Zones is to create them in a way that ensures scalability. The real trick is to prepare the environment in such a way that it is easy to add further applications and workloads to it. For this purpose, the aforementioned policies or monitoring solutions are to help us. In this case, scalability is provided through the correct configuration of policies and monitoring services. The prepared set of policies enforcing and monitoring the configuration of our services, will allow for a logarithmic increase in cloud workloads, while ensuring that all services are still compliant with our security requirements. This approach allows you to add more applications and solutions in a modular way. An equally important aspect in the public cloud is network infrastructure. Again, in order to ensure scalability, we should consider its implementation in the Hub'n ,Spoke model.

Summary

In conclusion, the use of public cloud in any organization should be based on well-thought-out and implemented foundations. Such foundations allow to avoid unnecessary costs or security gaps. On the other hand, the lack of well-implemented foundations will sooner or later cause trouble for any organization. That is why any organization that already uses the public cloud, and has not implemented a foundation before, should review its infrastructure as soon as possible and adapt it to the challenges arising from the limitations and capabilities of the cloud.

DevOps Cloud

Kamil Miszel, Krzysztof Polewiak

DevOps - a combination of the words „development" and „operations" - is not just an acronym, it is a revolutionary methodology that changes the IT world. By seamlessly connecting people, processes, and technology, DevOps enables continuous delivery of high-value products to customers. Software development, infrastructure maintenance and security are no longer separate resources, but parts of the entire solution that work together to achieve a common goal of creating refined and robust solutions.

DevOps Methodology Description

In DevOps methodology, application lifecycle phases are divided and dependent on each other, and the teams are not assigned to specific stages. Instead, each team is involved in each phase to some degree, which means that not only does it create the software, but also participates in testing, deploying and maintaining the systems. Such a holistic approach allows each team member to understand the whole process and act more effectively, which, on the one hand, leads to integration of teams, but also reduces the delivery time of the product.
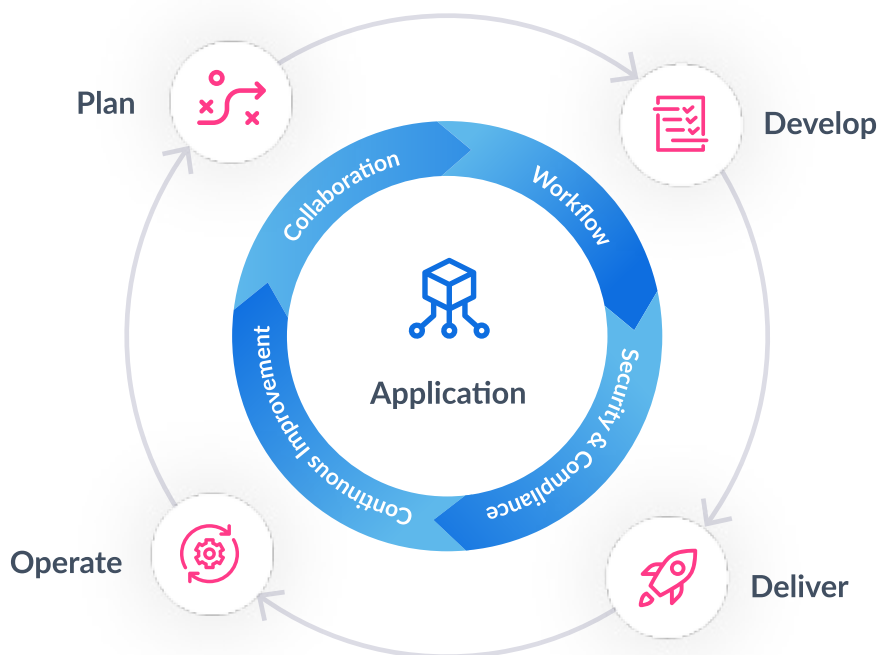
Application life cycle

Fig. 9. Application lifecycle according to DevOps approach

Source:
What is DevOps? DevOps Explained | Microsoft Azure

Planning

The planning phase in DevOps is where it all starts. It is here that the basics of the project are created, goals are set, requirements are defined and means of achieving them are agreed. It resembles planning a trip - you decide where you want to go, how you will get there, what do you need to take with you, and what do you want to do once you get there. DevOps engineers use tools and methodologies such as Scrum or visual management using Kanban boards to prepare the basics of the project.

Delivery

The delivery phase is the stage where code that has been developed, tested and validated in earlier phases is implemented into production. Automation of this process makes changes scalable, repeatable and controlled. This phase is critical, as it involves the actual delivery of the product to end users.

Develop

The Develop phase in DevOps is the stage where the actual work on building the solution takes place. This is where developers write code, build and test applications, and create necessary infrastructure to maintain applications. DevOps teams strive to accelerate innovation while maintaining a high standard of quality and stability. They achieve this by using tools and technologies that allow them to work faster and in a more agile manner. By automating repetitive and manual tasks, they free up time for developers. DevOps teams perform iteration incrementally ensuring that any changes are thoroughly tested and approved before they are put into production.

Operations

The Operations phase in the DevOps methodology is the stage where the application is in production, monitored, maintained and supported to ensure optimal performance and availability. It is important to have tools that help monitor and track its performance. This includes being able to collect data about how the software works, setting alerts to notify of any potential problems, and having a clear picture of how the software and the systems it relies on work.

Benefits of implementing DevOps methodology

DevOps brings together skills, processes, and tools from both development and operations teams. DevOps emphasizes automation and collaboration, leading to faster and more frequent delivery of software updates and features. Through continuous testing and monitoring, DevOps helps you quickly identify and troubleshoot issues, leading to improved software quality and reliability. Better collaboration and productivity are key to achieving business goals such as:

- **Reduced Time-To-Market**

  DevOps emphasizes continuous feedback, which allows teams to quickly adapt to changing customer needs and market conditions. DORA "2019 State of DevOps" report found that elite teams deploy 208 times more often and 106 times faster than low-scoring teams[6]. Through automated testing cycles, teams can identify and resolve issues early in the development process, resulting in shorter time-to-market, as well as helping to avoid costly delays and ensuring that features and updates are delivered to customers quickly and reliably.

- **Reduced „Time-To-Recovery"**

  Shorter recovery time means that the system can be quickly restored to operation, minimizing downtime and reducing the impact on end users. By automating the deployment process, leveraging Continuous Integration and Continuous Delivery (CI/CD) pipelines, DevOps teams can respond quickly to issues and reduce the time it takes to recover from a disaster.
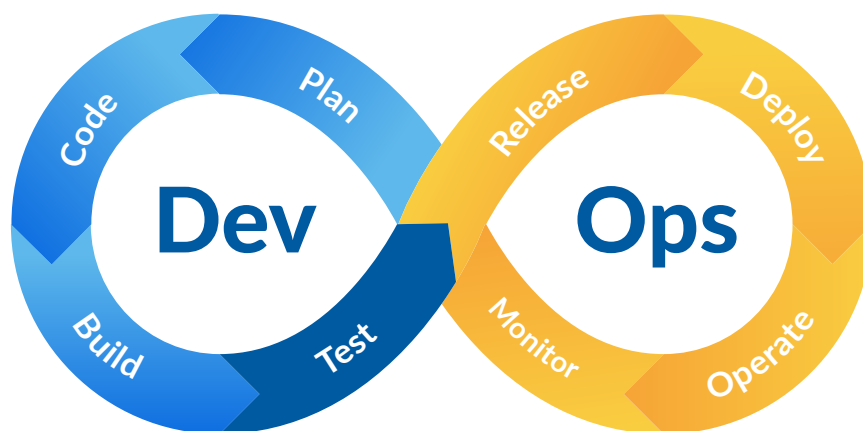
DevOps Practices

Fig. 10. DevOps practices - elements

Continuous Integration and Continuous Delivery (CI/CD)

Configuration management is controlling the state of resources in the system, such as servers, virtual machines and databases. With configuration management tools, teams can make changes in a controlled and systematic way, minimizing risks. The idea of continuous „everything" is based on continuous and repetitive software improvement. This means that the development work is divided into small parts, which allows for better and faster production. Engineers add code often and in small amounts to make it easy to test. Code building and testing are also automated. The code that passes the tests is added to shared repository on the server.

Continuous delivery is an approach that combines the stages of development, testing and implementation into a single, streamlined process. In this way, code updates can be automatically delivered to production environment.

Version Control

Version Control is a fundamental practice in modern software development, facilitating effective collaboration, ensuring code quality and stability, as well as supporting continuous integration and delivery. Its principle is code management in versions - tracking corrections and changing history to allow easy review of the code and its recovery. Version control is typically performed using specialized tools called version control systems (VCS), such as Git. These systems track changes made to the code by multiple users, enable collaboration on the same code base, and provide mechanisms for linking, branching, and rolling back to previous versions of the code, regardless of location.

Agile Software Development

Agile and DevOps are closely related and often used together in software development. Agile emphasizes collaboration and iterative development, while DevOps focuses on automation and continuous delivery. By combining these methodologies, development teams can streamline their processes, improve communication, and deliver high-quality development products faster and more efficiently. Kanban and Scrum are two popular tools related to Agile methodology.

Infrastructure as a Code

Infrastructure as a Code is an approach that enables easy and reliable management of system resources, just as in the case of source code. Owing to it, teams are able to implement infrastructure elements in a controlled and repeatable way, which translates into a reduction of risk of human errors and greater work efficiency. The code allows you to automate processes, store and version definitions, so one can easily monitor changes and undo them if necessary. This practice also allows to create identical development and test environments reflecting production environment.

With the environment configured as a code, one can:

- test them in the same way as you test the source code itself,

- use a copy of infrastructure that behaves just like a production environment to test changes.

This practice can be used in different phases of DevOps, and developers can deploy code from their existing development tools such as Docker, Kubernetes, or OpenShift, allowing for easy testing and scaling of environments.

Containerization

Containerization stands for placing a software component together with its environment in an isolated unit called a container. Containers are lightweight and packaged with all components (e.g. files, libraries) except the operating system. Containers are used in DevOps to immediately deploy applications in a variety of environments and combine seamlessly with the Infrastructure as a Code approach described above. Containerization, therefore, allows for consistent implementation of applications in any computing environment, both in cloud and at the company's headquarters.

SII KATOWICE TEAM

Microservices

The architectural approach of microservices assumes the creation of software, systems and processes by dividing them into smaller, simpler and independent parts. Building an application will therefore be a set of independent services that communicate with each other, but are configured individually. This allows one to isolate emerging problems without compromising the stability of the entire application. Microservices solution is most often based on the containers discussed in the previous point.

Configuration Management

Configuration Management refers to the process in which all environments where the software resides are configured and maintained. It comes down to managing the state of resources in the system, including servers, virtual machines and databases. Automation in this area allows DevOps teams to free up time for actual programming and increases the agility of the organization. Configuration management, along with the Infrastructure as a Code approach, make it easy to create templates to help teams handle complex environments on a large scale.

Continual monitoring

Continuous monitoring is an automated process that allows DevOps teams to detect compliance and security threats throughout the lifecycle of software and infrastructure development. It provides with full real-time insight into the performance and health of the entire solution based on telemetry and metadata collections, as well as setting alerts for predefined conditions.

Experienced DevOps teams effectively use alerts to collect information based on large amounts of data. As a result, they can eliminate problems in real time and infer how to improve the application in future development cycles.

Benefits of implementing DevOps methodology

DevOps Engineer's responsibilities

The main task of a DevOps engineer is to introduce continuous delivery and continuous integration, which requires an understanding of these tools and knowledge of the basics of programming. Depending on the organization, job descriptions vary. Collaborative skills are required to bridge the gaps between traditionally isolated teams. Smaller companies are looking for engineers with a broader set of skills and responsibilities. The job description may require building the product together with the developers. Larger companies may be looking for an engineer for a specific stage of DevOps lifecycle who will work with a specific automation tool.

Planning methods

There are numerous DevOps methods that organizations can use to accelerate product development. They take the form of software development methodologies and practices. The most popular include:

Scrum

Scrum defines how team members should work together to accelerate solution's development. Scrum practices include key workflows and specific terminology (sprint, time box, scrum) and designated roles (Scrum Master, Product Owner).

Kanban

Kanban derives from the efficiency achieved in Toyota factory floor. Kanban mandates tracking the status of work in progress (WIP) on the Kanban board.
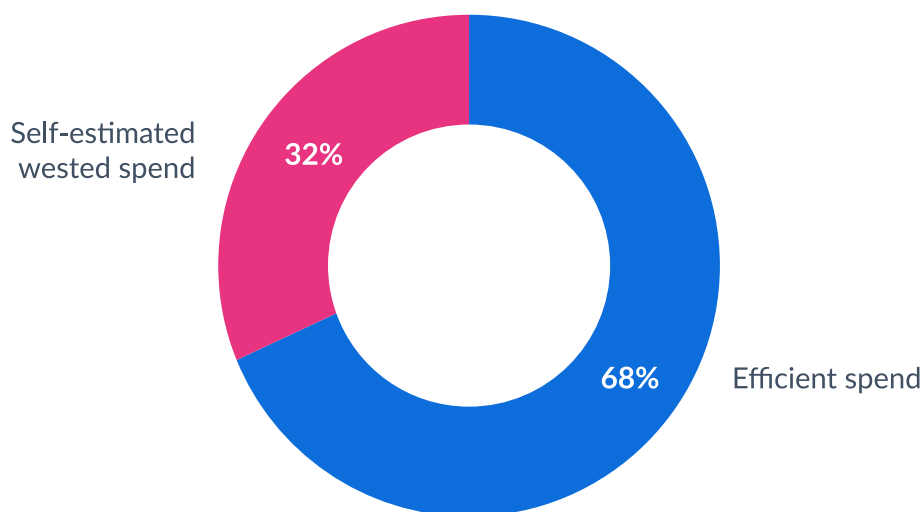
Agile

DevOps methodology, which focuses on delivering value to customers by responding to changes appearing in the solution and the expectations of end users. Agile also recommends shorter software development cycles, as shorter cycles allow for faster error detection and bugfixing, which in turn contribute to better product quality and increases customer satisfaction.

Don't overpay

Krzysztof Polewiak

Did you know that 32% of cloud users say they realize they overpay for the cloud? Thus, it can be assumed that among the remaining 68% there are professionals who do not know that they pay more than they need to...

Self-estimated wested spend

32%

68%

Efficient spend

FLEXERA

N=753
Source: Flexera 2022 of the Cloud Report

Source:
https://www.flexera.com/blog/cloud/
cloud-computing-trends-2022-state-of-the-cloud-report/

Fig. 11. Respondents' assessment of wasteful cloud spending in organizations

Are your servers matched correctly to your needs?

Choosing the wrong size of a virtual machine and using too many servers are among common mistakes while migrating to cloud. Cloud machine configurations offer many possibilities and sometimes it is difficult to choose the right one. At first glance, machines differ in the number of processors and memory size, but there are also other – no less important parameters, such as:

- **Single processor performance:** there are processors of the latest (most efficient) and older models, there are processors from different manufacturers

(Intel, AMD), but also with a different architecture (e.g. ARM64) – each solution has its own specificity and solves different needs.

- **Number of supported resources** – e.g. number of disks, network interfaces.

- **Support for dedicated graphics cards.**

Choosing the right machine size guarantees significant savings, e.g. a machine with a faster processor will provide us with the opportunity to reduce the number of assigned processors and savings on licenses.

Does your business work at night?

If your employees do not use applications at night and on weekends, you can turn on the servers only when they are needed and turn them off after the work is done. A non-stop server runs about 730 hours per month, the same server running only on weekdays for 8 hours will run for about 170 hours per month. That's more than 75% savings. When you implement server management automation, they will simply be turned on only when you need them. The same mechanism can be applied to other services, even if they cannot be disabled, they can be scaled down and up as needed.

Alternatively, if your applications must be available at all times, savings can be achieved for example, through machine reservations (obligation to use them for a certain period of time). Here, too, you can count on significant savings reaching up to several dozen percent. What's more, resource reservations do not have to apply only to virtual machines, as you can, for example, book database environments, Kubernetes clusters or even a data warehouse.
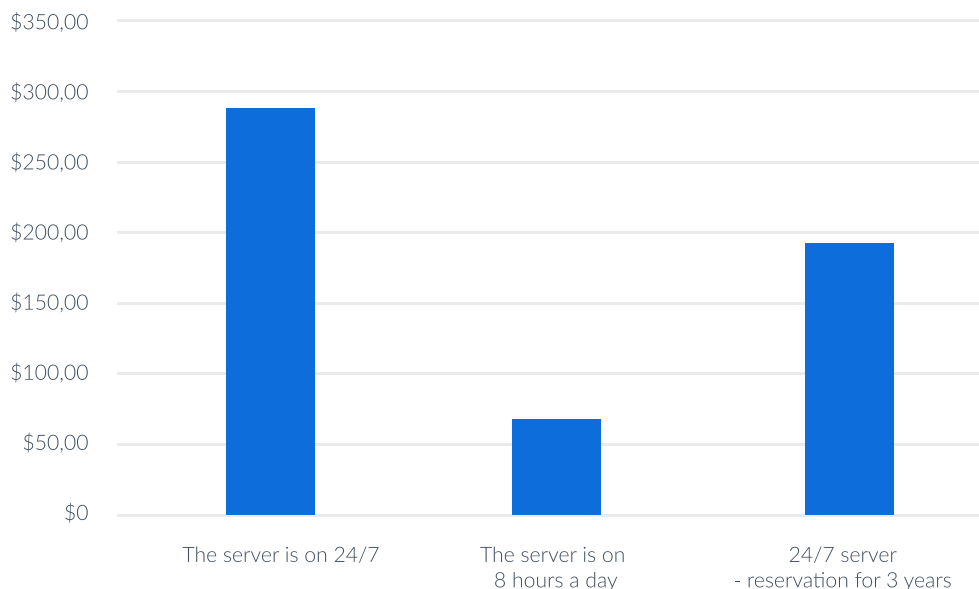

Fig. 12. Example of D2v5 server costs in Azure in the North Europe region

Do you create test environments?

Another „money eater" are services set up temporarily or for testing purposes. Very often, we test solutions in the cloud, since, after all, we have unlimited infrastructure. And there's nothing wrong with that, the cloud is the perfect place to conduct tests. With one caveat, that is maintaining control over what we create and when we have to remove it.

There are many solutions on how to proceed with the resources to be tested, e.g. separating a dedicated subscription or resource group for each test solution or appropriately tagging these resources (metadata with tags) and marking the end date of testing so that all unnecessary items can be removed.

Network communication

You cannot use the cloud without a network connection. We can access resources via the Internet or VPN - it all depends on the required level of security and the implemented solution. If our communication with the cloud is carried out from one place and we download a large amount of data, then it is worth considering investing in a dedicated connection between our on-prem network and cloud resources. Such a combination will allow us to optimize costs and additionally will have a positive impact on security.

The second interesting aspect in the subject of network communication is related to security. The more applications we have in the cloud, the more complex the assumptions about ensuring security and performance become. We are starting to multiply services that provide network communication and security. The solution will be a network based on a central communication hub, which will be the heart of the network infrastructure. It is through the hub that communication between the Internet, on-prem and our applications will take place. There are also filtering and traffic protection services.

Fig. 13. Network based on a central communication hub

Storage vault

The cloud is largely a data warehouse, regardless of whether it is current financial data, document libraries, copies of data or log archives. Each of the above mentioned data types may have a better or worse storage location.

It used to be a regular practice to store files in a relational database. This made management easier, but at the same time increased the size of files in the data-
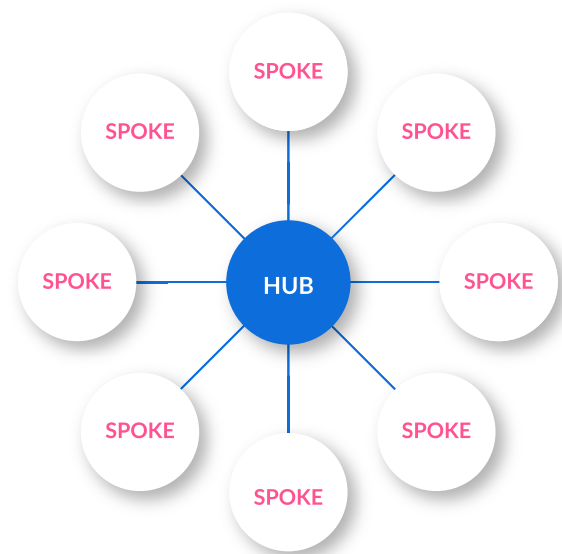
base and, thus, negatively affected performance. In the cloud, this approach generates additional costs, since database storage is much more expensive than, for example, file storage.

Thus, we should store the data in a dedicated service, leaving at most a reference to the place where the relevant file is located in the database.

The second common mistake is to use SQL databases everywhere, even where we do not have relational data. The cloud gives us access to noSQL services that will not only ensure high performance at low cost, but also allow us to implement new scenarios – such as data replication between geographical regions.

Data storage services also allow us to divide the data according to the frequency of access to the data.

We can divide them, for example, into „hot" data needed on an ongoing basis, but requiring a more expensive service with higher efficiency, and „cool" data, which we need less often, so they will be in a cheaper warehouse. It is worth noting that the cloud has solutions that will allow for automatic management of this data – i.e. transferring it between warehouses, additionally providing the application with the same type of access.

TCO

One of the key parameters taken into account when migrating to the cloud is TCO – the total cost of the solution. It allows us to compare the total cost of a cloud solution over a specified number of years to the cost of a traditional environment. Did you know

that TCO analysis can also be applied by comparing the costs of cloud solutions?
Example – MySQL database. It can be run on a virtual machine, or you can use a ready-made managed solution (Azure Database for MySQL).

Example:

- Database on a virtual machine

Service	D2as v4 Virtual Machine	$78,11
Storage vault	1 x 64GB Standard SSD	$2,40
	Total	$80,51

- Database as a managed service

Service	Flexible General Purpose D2as v4	$137,97
Storage vault	LRS 10GB	$1,27
	Total	$139,23

At first glance, the managed solution is much more expensive – but is it for certain? A managed solution has certain features that increase its cost:

1   Azure gives us an SLA for access to a managed database. In order to be able to guarantee the same level of service for MySQL on a virtual machine – we need to make a cluster – thus doubling the cost.

2   The price of the managed service includes the cost of backups. In the case of the machine, additional costs will have to be added.

3   The virtual machine requires additional work from us, even related to updates. The managed service is taken care of by the cloud provider.

If we were to improve our calculation for the virtual machine, it should look as follows:

Service	D2as v4 Virtual Machine	2 x $78,11
Storage vault	1 x 64GB Standard SSD	2 x $2,40
Backup	Azure Backup for VM	$10
	Total	**$171,02**

As you can see in the example above – sometimes the method for savings is to change the service model – switching to managed services will reduce our workload and at the same time provide additional savings.

Expense monitoring

Each public cloud provider provides us with additional tools to help us analyze expenses. We can view costs, compare their amount between months, as well as divide costs into types of environments or services. However, this is a check after calculating the costs. In order to avoid unexpected expenses and be able to react quickly, we should use services that track expenses on an ongoing basis and inform us, for example, about exceeding the budget.

One of the most interesting services recently added to Azure is the detection of cost anomalies. The service allows you to detect sudden changes in the daily cost of the cloud and notify the right people in the company. The sooner we react – the sooner we will avoid potential problems at the end of the settlement period.

Summary

We hope that the ideas and solutions mentioned in this document will inspire you to further experiment with the cloud, as well as strive to optimize your existing solutions.

Our suggestions are just the beginning, your organization may have other – more complex needs that are worth considering.

We encourage you to contact us – we will be happy to help you both at the stage of the first migration and also in organizing what you already have in the cloud.

Our team supports the implementation of solutions for customers from all over Europe, for any public cloud providers. Within the scope of our competencies, you will find services related to cloud management, modernization and migration of applications, analytics, and artificial intelligence, as well as security.

Looking for a cloud migration partner? Get in touch with Sii!

Our team of cloud migration specialists has prepared this eBook to provide the latest knowledge and bring you closer to possible strategies. We understand that migrating to the cloud can seem like an overwhelming task. However, by using our eBook, you will gain a clear vision of the potential challenges that may await you and tips on how to overcome them. We share best practices, proven industry methodologies, and practical advice that will ensure you have a smooth and successful migration experience.

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