



# **Public Cloud**

## **The Key to a Successful Digital Transformation**

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A Strategy Paper Created on Behalf of 1&1 IONOS Cloud GmbH

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## Executive Summary

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- Within the framework of the digital agenda, IT infrastructure is of central importance. More than two thirds (68 percent) of companies regard digital infrastructure as the most important building block and the key to the successful digitization of their business models and processes.
- The Public Cloud is one of the most important vehicles of the digital evolution. Only by means of dynamically acting and globally scalable infrastructure are companies able to adapt their IT strategies to continuously changing market situations. Hence, they can strongly support the technical aspects of their company strategy.
- With a Digital Infrastructure Fabric, companies are mapping the technological image of their “Digital Enterprise“, defining all necessary players and drivers within their digital evolution.
- Public Cloud infrastructure services represent a solid base, to support the digitization strategies of companies regardless of their size, predominantly however, companies with very scalable IT workloads. For example, startups are allowed to grow slowly without having to invest massively in IT resources from the very beginning. In this way, companies get a hold on one of the most important features, to have a say in the digital evolution: speed.
- Today for IT departments, there is more at stake than just preserving the status quo. IT must position itself as a strategic partner and business enabler and be capable of satisfying the individual needs of specialized departments. They need to pursue the goal of creating a competitive edge for the company on the basis of digital technologies. In this context, public cloud infrastructure support the proactive measures of the IT departments.

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# Public Cloud:

## Positioning and Relevance

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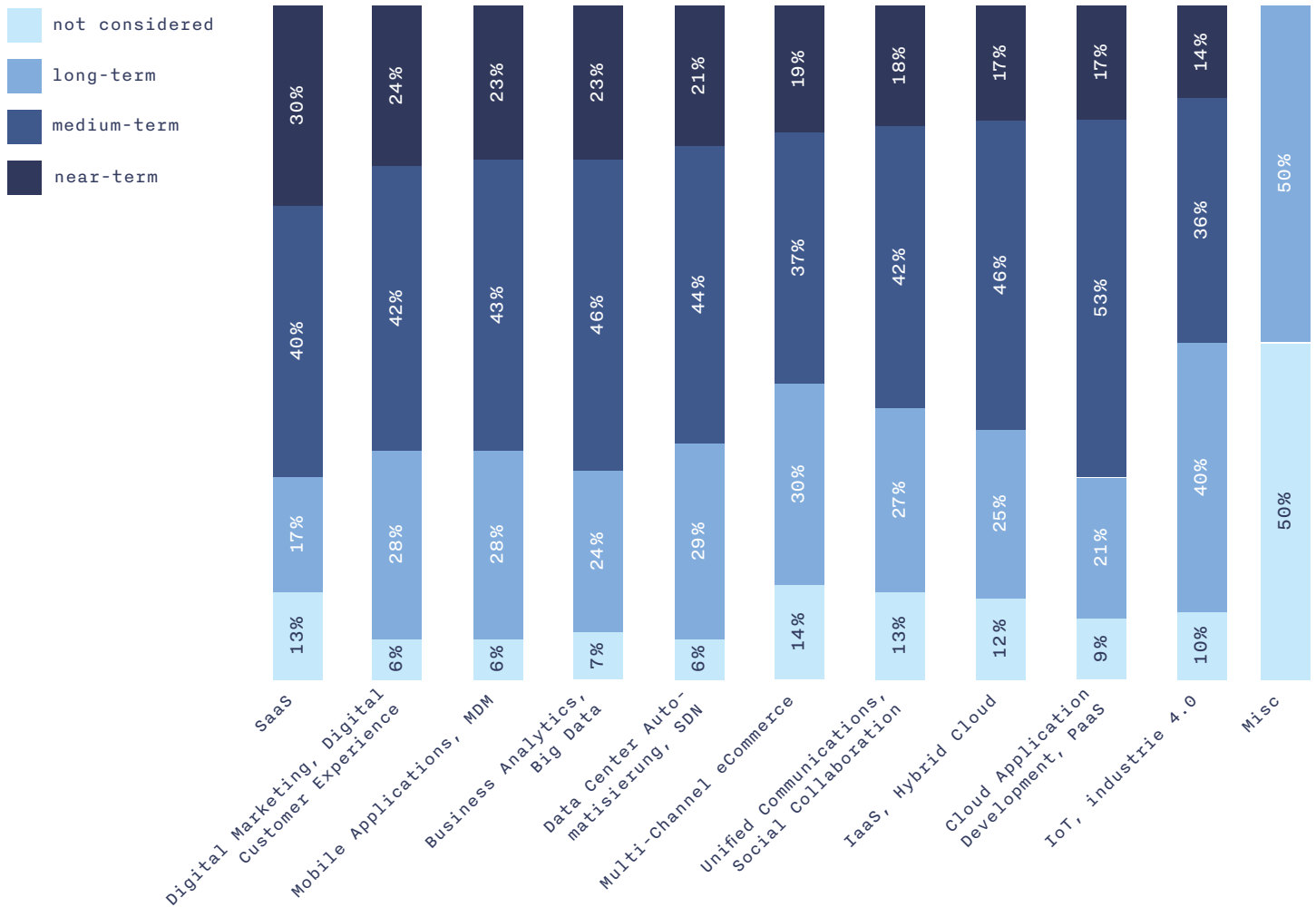
Digital transformation has undoubtedly taken a hold in today's business world. What took off in the early 1980s with a slow start is now nearing its first heyday, forcing CEOs and IT decision-makers to get to grips with new challenges. Companies are required to realign their business models and all associated processes and to drive their individual digital agenda within the framework of their IT strategy.

### **The Public Cloud is an Essential Part of the Digital Evolution**

Public Cloud environments provide ideal conditions to support the digitization strategies of companies regardless of their size. One of the advantages of startups is the fact, that they can be created from scratch, as they do not need to take any legacy IT into consideration. They can grow slowly without having to invest massively in IT from the very beginning. In regard to their digital evolution, companies need one thing most of all: Speed; in order to keep up with rapidly changing market conditions. In most cases, a fast go-to-market however fails due to the technical implementation, because of insufficient IT resources, as well as the lack of modern tools and services..

Among those companies that want to be part of the digital evolution, cloud platforms and cloud infrastructure have a central position within the IT strategy, supporting digitization efforts. It has been shown, for example, that Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) are ranked high on the agenda of CIOs, as 63% respectively 70% grant them high priority; in addition, these services are used as a fundamental basis for the development and operation of new applications. Another 65 percent explicitly drive the issues of Software-defined Network (SDN) and Data Center Automation, in order to create more flexibility on the infrastructure level.

What topics/programs/projects are an essential part within the digital transformation and are primarily driven by your IT organization?



**SOURCE:**  
Crisp Research AG, 2015

Study „Digital Business Readiness“  
n = 100

Companies hope to gain this kind of flexibility, especially through IaaS, which 82 percent of IT decision-makers regard as a characteristic feature of a next-generation IT infrastructure. The reason is obvious. The pressure on a company, due to the needs of specialized departments for more flexibility and a shorter time to market of new applications, is constantly growing. Therefore, CIOs are well advised to consequently focus on the use of public cloud infrastructures that help them create the basic prerequisites for a digital enterprise and to provide the necessary enablement platforms for their specialized departments.

Being part of a digitization strategy, the impact of public cloud infrastructure is gaining pace. It offers an ideal basis for convenient access to IT resources, and enables the so-called old economy to act in an agile way which more and more frequently turn out to be birthplace of new and partly disruptive business models.

### Complexity as a Significant Challenge

Despite their very promising possibilities, most public cloud infrastructure is complex. This applies to the structure and operation, as well as to the administration of the virtual infrastructure. This also has

an impact on the development and maintenance of web applications and backend services alike. Here, complexity is hidden within the architecture of the application. It is the responsibility of the customer to make sure that, if required, an application by itself initiates the scaling of the cloud infrastructure. In the case of failure of a cloud infrastructure component, the application must consider that a backup component (for example a virtual machine) is started accordingly, hence replacing the failed unit. This means that the application itself ensures the scalability and high availability of the virtual cloud infrastructure used, so that the web application itself is scaled and failsafe, using the characteristics of the specific cloud of a provider.

IT administrators are seeing a massive change with the tasks required for infrastructure automation. Public cloud infrastructure in most cases are structured and controlled by APIs (Application Programming Interface) and configuration management tools. The challenge lies in the fact that many administrators lack the developer and cloud expertise required, which needs to be set up initially, in order to design complex cloud infrastructure environments without common tools in an entirely automated setting.

### **The Public Cloud Within the Digital Infrastructure Fabric**

With digitization strategies, the role of the IT infrastructure is increasingly growing. Two thirds (68 percent) of companies see digital infrastructure as the most important building block within their IT strategies.

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The Digital Infrastructure Fabric (DIF) represents the technical blueprint of an individual digitalization strategy for the structure and the design of a “Digital Enterprise”. On the infrastructure level, it entails all of the necessary actors and drivers, in this way building the basis for the overlying layers. These include the “Digital Platform Fabric (DPF)” and the “Digital Service Fabric (DSF)”, by which the requirements on the higher levels of the digital technology stacks can be defined.

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To support their planning and structuring activities on an infrastructure level, IT decision-makers have the Digital Infrastructure Fabric (DIF) at their disposition. With the help of this tool, they are able to keep track of the most important actors in their infrastructure strategy and design the individual blueprint of their digital enterprises.

Among other things, a DIF helps users of the public cloud to exactly identify:

- Where and in which country their public cloud resources are located, in order to comply with legal requirements, if necessary
  - Which frameworks provide support, in order to adhere to compliance and governance relevant processes - for example ITIL
  - What kind of connectivity is required to maintain stable data transmission towards the public cloud
  - The type of management and the supporting tools, by which the public cloud infrastructure is operated
  - The kind of virtualization technologies that are supported by the public cloud provider and which may have an impact on present or future workloads
  - Necessary storage types (Object-Storage, Block-Storage, NAS), that need to be supported by the provider
-

By means of a DIF, the detailed overall view of a digital infrastructure landscape can be created, continuously modified and expanded.

As a result, companies make sure, that the most important drivers:

→ Ability to innovate

→ Scalability

→ Agility

are included in their plan.

# Digital Enterprise: Bound to Fail Without the Public Cloud

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During the past decades, IT departments have developed, launched, updated and replaced a huge number of IT systems. In doing so, they have positioned themselves as maintainers of the data center or server closet(s). In the digital age however, IT departments are required to contribute their share to the success of a product or service and to support its development and enhancement, as well as process optimization. By merely setting up and operating the IT environments and infrastructure, CIOs are not able to create added value for their companies. In this case, they only act as a supporting element in the background without impacting the business model or business success.

## **Innovation: Keeping Things Running is a Matter of the Past**

So, meanwhile for IT departments, it is about much more than only maintaining the status quo. IT must see itself as a strategic partner and business enabler and needs to cooperate closely with the different specialized departments, in order to help gain a strategic competitive advantage.

Public cloud infrastructure supports IT departments when it comes to delivering the required enablement, which in turn improves a company's ability to innovate. CIOs thereby offer their internal clients:

- ➔ Permanent access to state-of-the-art technologies
- ➔ Higher level services that allow for a more efficient development of new digital products
- ➔ Cost efficient trials and development of PoCs
- ➔ Improvement of the customer experience with the new "Customer-Facing" solutions to strengthen customer relations
- ➔ A closer interconnection of entire process and supply chains within the company, as well as with partners and suppliers

## **Scalability: Elasticity and Reach are Critical Success Factors**

In the digital age, it is all about products and services that, once developed, can be offered to an unlimited number of customers. As a consequence, a wide number of customers are addressed. Instead, the expected customer numbers cannot be properly estimated. Especially viral and social marketing should not be underestimated today, as it has brought quite a few enterprise infrastructure deployments to their limits. Modern IT infrastructure must be ready to cope with such situations and be able to respond flexibly.

Today, however, only a few enterprises are focused exclusively on their local market. Driven by globalization, which is in the wake of our society's digitization reaching its heyday, scalability, as well, must be assessed from a global perspective. Public cloud providers enable their customers to run their infrastructure flexibly and support the expansion of IT organizations by:



- Flexible access to resources without limitations
- Flexibility to utilize infrastructure resources as required
- Tackling technical challenges, like the prevention of high latency networks
- Compliance with the legal regulations in the respective target market
- Reduction of costs and investments
- Worldwide availability of customers

### **Agility: The Pressure of the Customers Keeps Growing**

In the digital economy, the customer is a central factor of influence. Because of the vast number of cloud services and digital products, customers are in a comfortable position, as they can choose a solution that is most appropriate for their specific needs. Hence, companies not only find themselves continuously confronted with customer demands, but they are also under constant pressure to fulfill expanding expectations with for a better user experience. The same expectations are brought into the organization by internal customers, thus challenging their own IT department. Their historical and existing structures (decision-making processes and purchase processes, etc.) are usually too slow and not capable of keeping up with progress and the new requirements of their own colleagues.

The result is shadow IT, where employees without supervision from the IT department use cloud services and create external infrastructure, in order to map their business applications and processes on their own. Whether internal or external customers - the pressure keeps growing. Public cloud infrastructure provide an opportunity for IT departments to actively counteract this trend. For this purpose, they offer:

- Faster access to required resources if needed
- Increase of productivity and speed during planning and realization of projects
- Faster Go-to-Market
- Quick response to market or customer requirements
- Increase in releases and shortening of release cycles (Continuous Development and Deployment)

# Digital Strategy:

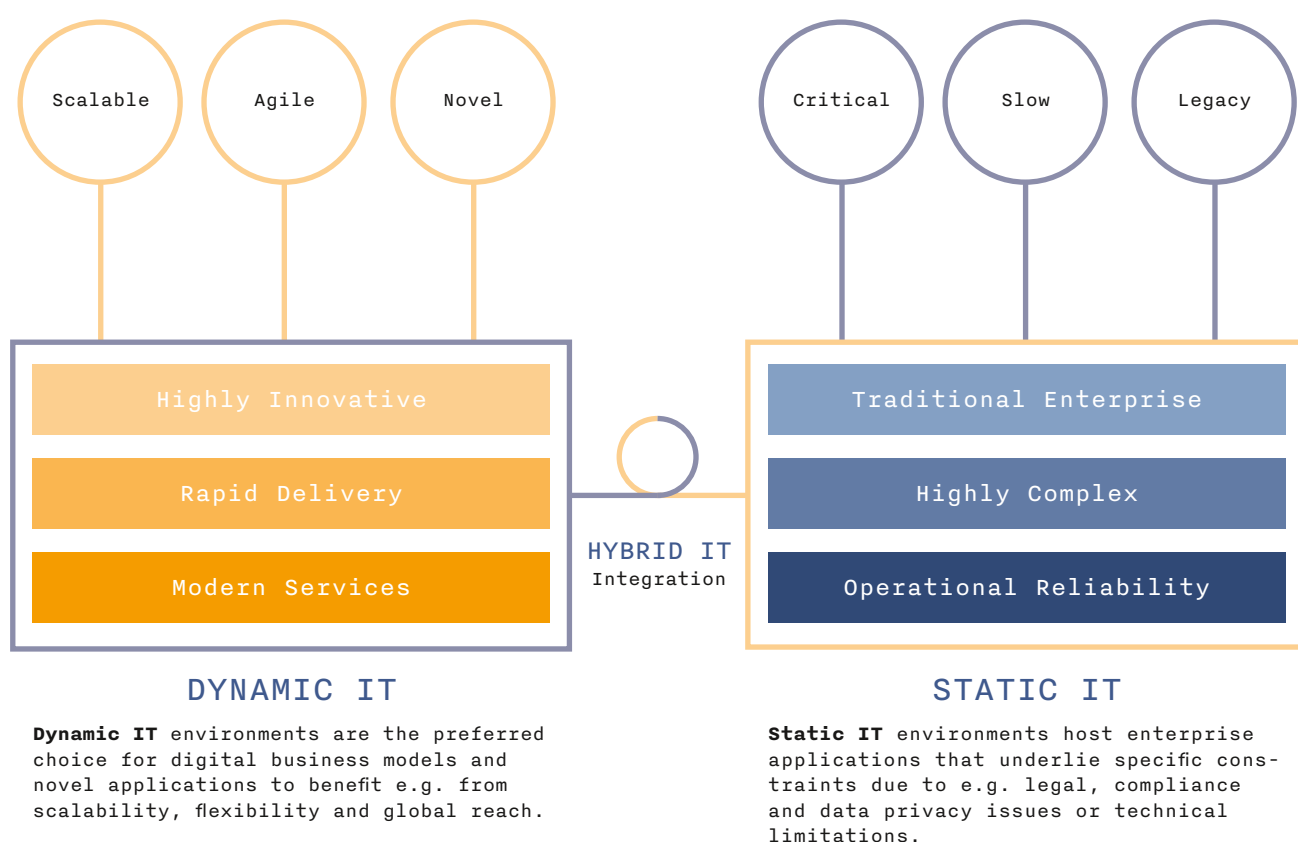
## The Public Cloud as Part of Digital Excellence

In this era of digitization, the IT organization takes the central role of the initiator and enabler. Furthermore, it must lay the technological foundations, which in the digital age, the enterprise can use for its continuous development.

### Modern IT Infrastructures Show Dynamic as well as Static Behavior

One lesson taught by digitization is the fact that enterprises no longer include only a single IT type in their planning. Instead, more and more IT organizations are starting to build two parallel IT worlds, Dynamic IT and Static IT. The reason for this are the different requirements that they have to meet. On the one hand, IT organizations need scalability and agility, to run modern applications. On the other hand, the operation of legacy applications as well as the supervision and compliance of legal requirements still play an essential role. In terms of the holistic support of a digitization strategy, modern IT infrastructure needs to be assessed independently from each other in the beginning.

### Do IT, fast and slow: Dynamic IT vs. Static IT



Dynamic IT infrastructure today is mainly employed for the development and the operation of the digital business models and new applications, in order to profit from scalability, flexibility and global reach. For this purpose, dynamic IT infrastructure is usually operated as public cloud infrastructure that are characterized by the following features:

- Innovations are in the center of interest
- Speed and faster time to market
- High agility and flexibility
- Continuous expansion and enhancements (Continuous Development)
- Direct added value for the enterprise

Static IT infrastructure, however, is mainly used for enterprise and backend applications, which due to specific legal regulations, and/or privacy and compliance policies, or technical restrictions, are still operated on tried and tested physical or virtual IT infrastructure or private clouds that are not multi-tenant. Static IT infrastructure has the following characteristics:

- Stability, status quo and large planning horizon
- High complexity and additional costs for modifications
- Operation and management of legacy applications
- Long development cycles and high administrative workload
- Only requirements / expectations of the enterprise are being taken care of

### Hybrid Cloud: The Best of Both Worlds

Regardless of their different spheres of activity, modern IT infrastructure reveal their full potential only when dynamic IT is linked to static IT. Through this approach, all necessary legal regulations and compliance guidelines can be fulfilled, while at the same time the innovation capability of an enterprise can be actively promoted. In this scenario, the primary goal is to flexibly expand static IT (in the form of a private cloud infrastructure) using the resources from dynamic IT (on the basis of a public cloud infrastructure) and ideally to merge each other seamlessly. Among other things, the benefits of this hybrid IT integration are:

- Faster adaption of new technologies
- Better agility through faster provisioning of additional resources

- ➔ Seamless expansion of the private cloud infrastructure (Static IT)
- ➔ Relocation of Workloads to the public cloud infrastructure (Dynamic IT) as required
- ➔ Control: Data remains within the private cloud (Static IT); services of the public cloud (Dynamic IT) access data for processing purposes only

### Backup and Disaster Recovery

For enterprises that are seeking fast success in the public cloud, the three following workloads have emerged in recent years:

#### ➔ Test and Development Environments

Public cloud infrastructure allows for quick and easy setup of test and development environments. The required resources can be provided within minutes and then utilized directly. One of the benefits is the easy replication of real application cases within a relevant environment, in order to be able to respond to problems quickly. In addition, clones of the respective infrastructure environment can be generated by means of snapshots, to either implement them directly in a production environment or to use them as a blueprint for future projects.

#### ➔ Backup- und Disaster Recovery

Public cloud infrastructure is an ideal candidate for the development of backup and disaster recovery strategies. With it enterprises have an opportunity of implementing flexible standby environments, which in a short time enable an automatic fail over and ensure smooth operation in the case of a failure. Large companies, hence, do not require their own backup data center and are able to use their investment budget more effectively. As a result, small and medium-sized enterprises have a chance to pursue serious backup and disaster recovery strategies in the first place.

#### ➔ Websites and eCommerce Solutions

For operators of highly frequented websites and e-commerce solutions, like ecommerce sites, the underlying infrastructure has become a business-critical asset. An outage of only a few minutes or poor response times of the website cause revenue losses of several thousands of dollars per minute or hour - depending on the size and frequency of the web shop. Public cloud infrastructure can handle customer peak times and offer the performance which is required for a state-of-the-art user experience. Scalability and stability belong to the fundamental principles of a cloud infrastructure and enable enterprises to smoothly operate their websites and e-commerce solutions.

# Public Cloud Best-Practices: Recommendations for the CIO

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The public cloud plays a vital role and is a vehicle of the digital evolution. Only by utilizing dynamically acting and globally scalable infrastructure can the IT strategy be adapted to the continuously changing market situation, so that from a technical point of view, the company strategy is effectively supported. Within the context of their cloud strategies, CIOs in particular need to consider the following issues:

## „Low Hanging Fruit“

Start with obvious application scenarios. For this purpose, test and development environments are ideal candidates. They are perfect testbeds to get an understanding of the respective public cloud infrastructure and quickly deliver substantial results. Later, other applications and services can be migrated step-by-step.

## Capacity Planning and Global Scalability

Prior to the deployment of public cloud infrastructure, the fundamental questions “how and for what purpose will the environment be used” need to be answered. In this context, capacity planning plays an important role. You will probably know the majority of your applications and workloads, so you can estimate accurately, how scalable the infrastructure needs to be in terms of performance and availability.

However, you also need to assess scalability from a global point of view. If your business focuses predominantly on a specific market, then a local provider with a data center in that market is sufficient to serve the customers. If you are planning a medium-term expansion into other markets, you need to check if a provider with existing data centers is able to serve these markets with regard to the technical challenges and legal circumstances.

## Developer Skills: “Infrastructure as Code“

Public cloud infrastructure is mainly controlled by APIs and are set up and controlled by automation and applications. For your existing IT team, particularly for the administrators, this means there is a necessity to gain and further develop programming skills. It is true that today public cloud infrastructure can be easily administered through WYSIWYG editors. However, for a higher degree of automation script and programming languages have become very popular, by which the program code can be integrated into applications, in order to directly control the infrastructure and to include the specific characteristics of the application.

## DevOps: Continuous Delivery in Focus

One fundamental ability of a successful enterprise of the digital economy is the rapid adaptation of new technologies and features. Only when your enterprise is capable of expanding applications by means of new functions and services in a short period of time (Continuous Delivery), will it remain competitive in the long run. For this purpose, public cloud infrastructure provide ideal conditions. With the help of the DevOps approach, you can intertwine the areas “development” and “operations”, which used to be strictly separated in the past, laying the foundations for the required speed on the organizational level. Automation tools like Puppet, Chef, Ansible or SaltStack help with the technical implementation.

## About 1&1 IONOS

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With more than eight million customer contracts, 1&1 IONOS is the leading European provider of cloud infrastructure, cloud services, and hosting services. From VPS and bare-metal servers all the way to high-end IaaS solutions: 1&1 IONOS offers SMEs and large companies all the products they need to set up their hybrid or multi-cloud environment and is the only IaaS cloud computing provider that has its own code stack in Germany. 1&1 IONOS operates one of the world's largest and highest-quality IT infrastructures with over 90,000 servers. In the Cloud Vendor Universe from Crisp Research, 1&1 IONOS has repeatedly been named one of the leading providers of cloud platforms.

The Enterprise Cloud by 1&1 IONOS is the “Cloud – Made in Germany” with a data protection-compliant IaaS platform developed in-house for companies, system vendors/integrators, and managed service providers. It is flexibly scalable and provides free 24/7 support by qualified system administrators. During operation, the capacity of all components can be adapted to current requirements through live vertical upscaling.

1&1 IONOS was established in 2018 after the merger of 1&1 Internet and Berlin-based IaaS provider ProfitBricks and is part of the listed United Internet AG.



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**Rene Buest is Senior Analyst and Cloud Practice Lead at Crisp Research, covering cloud computing, IT infrastructure, open source and Internet of Things. Prior to that he was Principal Analyst at New Age Disruption and member of the worldwide Gigaom Research Analyst Network. Rene Buest is top cloud computing blogger in Germany and one of the worldwide top 50 bloggers in this area. In addition, he is one of the world's top cloud computing influencers and belongs to the top 100 cloud computing experts on Twitter and Google+. Since the mid-90s he is focused on the strategic use of information technology in businesses and the IT impact on our society as well as disruptive technologies.**

Rene Buest is the author of numerous professional cloud computing and technology articles. He regularly writes for well-known IT publications like Computerwoche, CIO Magazin, LANline as well as Silicon.de and is cited in German and international media – including New York Times, Forbes Magazin, Handelsblatt, Frankfurter Allgemeine Zeitung, Wirtschaftswoche, Computerwoche, CIO, Manager Magazin and Harvard Business Manager. Furthermore Rene Buest is speaker and participant of experts rounds. He is founder of CloudUser.de and writes about cloud computing, IT infrastructure, technologies, management and strategies. He holds a diploma in computer engineering from the Hochschule Bremen (Dipl.-Informatiker (FH)) as well as a M.Sc. in IT-Management and Information Systems from the FHDW Paderborn.

## About Crisp Research AG

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**Crisp Research AG is an independent IT research and consulting company.** Backed by a team of experienced analysts, consultants and software developers, Crisp Research analyzes current and future technology and market trends. Crisp Research supports companies with the digital transformation of their IT and business processes.

The assessments and comments by Crisp Research are published and discussed by numerous financial magazines, specialized journals for the IT business and social media. As contributing editors for leading IT publications (Computerwoche, CIO, Silicon et al.), BITKOM enthusiasts and sought-after keynote speakers, our analysts not only actively contribute to the debates about new technologies, standards and market trends, they are also among the relevant influencers of the industry.

Crisp Research was founded in 2013 by Steve Janata and Dr. Carlo Velten. The company focuses its research and consulting services on “Emerging Technologies” such as Cloud, Analytics or Digital Marketing and their strategic and operational implications for CIOs and decision-makers in companies.



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