Introduction to DevOps and the Interaction with Innovation Adoption and Hybrid Operations
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Companies face increasing pressure to adapt much more quickly thanks to new architectures and technologies, including the cloud. Adages such as “never touch a running system” are outdated. Successful cloud companies – including Amazon, Microsoft, and also SAP – demonstrate that it is possible to change and deploy continuously. The new trend is called DevOps, which is an artificial word built from “development” and “operations” to illustrate that they both grow together without a gap between them.
The purpose of this brochure is to describe how the DevOps principles are essential to any enterprise that wants to compete or survive in a digital era through an ongoing process of digital transformation. It describes on a high level what digital transformation is and how it is not the same as innovation, though they are related. And it shows how companies that successfully transform themselves do so using all or most of the DevOps principles.

The brochure will then describe the business value of DevOps and give a simple overview of what it is. We will also examine how DevOps influences SAP’s setup of innovation adoption, hybrid operations (operating solution landscapes consisting of cloud-based and on-premise solutions), and SAP® Mission Control Center. It has been a best practice to plan two or three releases of SAP software per year with the necessary changes for innovation. Now, SAP is pursuing a more continuous approach that favors continuous innovation, integration, and deployment, which can increase the innovation adoption speed. But to do so, companies need to change as well, not only in the tools they use but also in their company culture. Put succinctly, we need to rethink the current concepts of separated innovation centers and operations centers. This brochure describes how the current control center engagement principles need to be adopted accordingly to better support you – our customers – in your digital transformation journey and in practicing DevOps.
Objective

This brochure introduces DevOps to you from a general definition and then to the practical status and current challenges in the market. It will explain how we at SAP react to these challenges and what we plan for in the future. It will help you understand the current trends and challenges of moving development and operations into DevOps. We will explain why DevOps is a reasonable improvement of the business and what this requires. The brochure will conclude with a description of the best practices from SAP and how we support or plan to support you, our customers, with the right services and tools. After reading this brochure, you will understand the most important challenges on the digital transformation journey and how SAP and the premium engagements portfolio can support you.

This brochure does not cover the offerings and content planned for the new framework of SAP MaxAttention™ services in detail. It is just an introduction to the topic of DevOps and its impact on innovation adoption and hybrid operations. It gives a general overview of related tools and already-existing opportunities of the classic SAP MaxAttention services.
Companies continuously want to create innovative applications or services to overcome their business constraints. However, they need the capability to move fast to respond to shifting market conditions in a strategic way. It is no longer about making technology choices you’ll stick with for decades. Rather, it’s about having the ability to make technology changes quickly and gracefully.

Digital transformation is about maximizing newer digital technologies through the transformation of business and its underlying organizational capabilities. This gives businesses the capabilities they need to accelerate innovation, gain a strategic advantage over rival companies, or enter newer markets. In other words, companies need to be agile enough and have the right capabilities to innovate and recover from failure quickly.

However, it is challenging for IT to support this digital transformation in an era where businesses put pressure on their IT organizations to lower the overall cost of operations. The term DevOps was originally introduced nearly 10 years ago to describe the strategy for bringing together development and operations for increased speed. DevOps is an often-used term still without an exact definition, though there is a common cultural understanding of its meaning. However, it is vital that an organization transforms its teams’ capabilities to meet the challenges of digital transformation using DevOps.

DevOps is not a methodology nor a framework. It is a culture, a movement, and a philosophy that describes how to cooperate and shorten time to market while staying up to date with market trends. The four principles of culture, automation, measurement, and sharing summarize this approach. It is based on the willingness to break down silos. It is about transforming the organization by bringing cross-functional developers and operations together with an emphasis on better collaboration and tighter integration. But to transform an organization’s capabilities, this organizational change is also built on a foundation of agile processes, continuous integration, continuous delivery, higher levels of automation, and a move closer together in building and operating solutions. This allows development and operations teams to be more efficient, innovate more quickly, and deliver higher value to businesses and customers.

More and more companies are coming to SAP and asking how we can support them in their digital transformation. There are three aspects to consider in how SAP MaxAttention can better support companies in this engagement:

- Supporting companies as they transform their team’s capabilities and become DevOps companies
- Helping companies not only discover innovation but also steer the quicker implementation of innovation through managing continuous business planning and a delivery pipeline that is conducive to DevOps
- Enabling companies that want to digitally transform using DevOps with continuous integration, continuous planning, continuous monitoring, and continuous testing

This involves moving away from an engagement model that includes services that support only the waterfall approach. All major phases, from discovering innovation to bringing innovation to production, need to be agile, iterative, and repeatable. Some cycles can be executed at their own rhythm. For example, innovation acceleration needs to support the delivery of innovation to production from two times per year to, potentially, monthly.
Companies today are embracing digital transformation as they change their existing business models. However, what do we mean by digital transformation? The objective of this section is to describe what digital transformation is for businesses and how it disrupts their current business models. This section also explains the difference between innovation and digital transformation and the relationship between them.

UNDERSTANDING DIGITAL TRANSFORMATION

Often, digital transformation is seen as the application of digital capabilities to processes, products, and assets to improve efficiency, enhance customer value, manage risk, and uncover new monetization opportunities. It is about maximizing newer digital technologies through the transformation of businesses and the underlying organizational capabilities. This gives businesses the ability to accelerate innovation, gain a strategic advantage over rival companies, or enter newer markets.

Organizations want to create innovative applications to solve their business problems, and they want to move at an unprecedented pace. However, IT is unable to keep up with the level of speed required by business. To do so, IT needs to change the capabilities of its organization.

DIGITAL TRANSFORMATION VERSUS INNOVATION

Often, innovation and digital transformation are thought to mean the same thing. While they have a relationship, they are different. In a digital world, innovation can lead to transformation, but for a company, the opposite is true. A company can start a digital transformation that leads to innovation.

Digital transformation is a process that takes time, while innovation usually refers to a sudden spark of creativity followed by a set of steps implementing this innovation in a company’s strategy. Innovation requires encouragement, collaboration, and communication with clear steps to implementation. However, it requires a transformation effort after the initial idea and then through to the implementation. So, digital transformation is an ongoing process by which a company forms a strategy to implement technology to improve business and meet the challenges of the digital consumer.

Innovation promotes changes and makes them a reality. For example, new technology such as smartphones changed how we use the Internet. Then the Internet changed how we shop, moving from traditional stores to online ones. But innovation also changes our behavior while adopting the new technology. It changed how, when, and where we use the Internet. For a company, the adoption of new technology is a transformation, such as the move from selling in a brick-and-mortar store to selling online and developing a smartphone application. It also requires changes in the different dimensions of tools, processes, and cultural and organizational aspects of a company. If a company doesn’t make the transformation or transform on time, it loses the strategic advantage or, worse, the advantage no longer exists.

WHY DO COMPANIES NEED TO TRANSFORM THEIR ORGANIZATIONS’ CAPABILITIES?

Companies want to move and innovate more quickly by using newer technologies, and it is no longer about making technology choices they’ll stick with for decades. The adoption of new technologies is key for the enablement of new business innovations. It is an ability to make technology changes in a timely and graceful way and to be agile when using newer technologies. Companies now need to be agile enough to respond to shifting market conditions in a strategic way.

Applications based on traditional software are often large systems that operate as systems of records, which contain massive amounts of data or transactions but are designed to be highly reliable and stable. As these applications don’t need to change often, organizations can satisfy their customers and their own business needs by delivering only one or two large-value releases per year.
On the other hand, innovation is driven primarily by emerging technology trends, such as cloud computing, mobile applications, Big Data, and social media, that customers can access directly and use to interact with the business. As they are used directly by the customers, they require intense focus on user experience, speed of delivery, and agility. The systems of engagement must be easy to use, high performing, and capable of rapid change to address customers’ changing needs and evolving market forces. These emerging technologies amplify the challenge to digitally transform, as it requires effort to move from one application type to the new type.

In the market, there is an increasing pressure on companies to become much faster in the adoption of new opportunities. The systems-of-records architecture and the related methodologies of change and innovation adoption are no longer able to fulfill those requirements.

Companies that successfully digitally transform do not focus on building and investing in applications to prevent failures, but they have a culture that allows and can handle failures. They instead focus on the ability to quickly react to change. That is, they focus on recovering from failure. They need to be agile enough to respond to shifting market conditions in a strategic way and can make technology changes in a timely and graceful way. That is critical to this agility.

The answer to those new requirements for development and operations is DevOps, and more and more managers are figuring this out. The digital transformation requires a much faster technology adoption, with a need for new management and organizational structures. DevOps is the philosophy that describes how to adopt. Organizations need cross-functional, agile teams that can also handle the risk of continuous delivery.

DevOps helps an organization become faster in deploying software as reaction and correction of a failure as well as in deploying new software for innovation purposes.
What Is DevOps?

The purpose of this section is to give a high-level overview of what DevOps is. It explains why it is more than just using another tool in development or enacting an organizational change, and why it is also a change in the capabilities of an organization.

AN OVERVIEW OF DEVOPS

DevOps is not a methodology nor a framework. It is a culture, a movement, and a philosophy built on the four principles of culture, automation, measurement, and sharing, as shown in Figure 1. The willingness to break down silos, such as project planning, development, and operations, is key for the collaboration.

It is bringing together cross-functional developers and cross-functional operations with an emphasis on a shift in mind-set, better collaboration, and tighter integration. DevOps is built on the foundation of agile processes, continuous delivery, automation, and much more to help development and operations teams be more efficient, innovate faster, and deliver higher value to businesses and customers.

In many organizations, units are completely separated. For example, development, quality assurance, and operations usually exist under different management structures. Even within the units, there are many silos. For example, in an operations unit, infrastructure and application support are separated. Furthermore, geo-location plays a role in creating natural silos for teams, but the biggest challenge is outsourcing or out-tasking within these units.

This leads to higher communication costs and creates silos that have no incentive to see beyond the atomic work they should deliver – that is, teams will rarely see the value or benefit they bring to the final product. Furthermore, processes are devised and implemented to ensure collaboration between units and teams, but they tend to be mostly dysfunctional.

Figure 1: Interaction of Development and Operations

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Figure 2 demonstrates by example the difference in the way a DevOps team should look. Ideally, a DevOps organization will bring the different development and operations teams under one team mantra, breaking down the silos.

The goal of DevOps is to overcome these challenges through the four principles of culture, automation, measurement, and sharing, as shown in Figure 3.

**Figure 2: DevOps Compared with a Non-DevOps Organization**

![Diagram showing the differences between DevOps and Non-DevOps teams]

*Developer working in the ABAP® programming language

**Figure 3: The Four Principles of DevOps**

**Culture**
- Shared ownership
- Collaboration

**Automation**
- Continuous integration
- Continuous delivery
- Automated testing
- Flexible landscape
- Repeatable processes

**Measurement**
- Business success performance
- Customer experiences
- End-user adoption
- Application performance
- Speed of development
- Software quality

**Sharing**
- Overlapping skill sets
- Issue resolution
- Amplifying feedback loops

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CULTURE
DevOps requires a change in attitude so shared ownership and collaboration are the common working practices, and everybody owns production. It is important to build a culture where all aspects of DevOps are adopted in everyday work. Dissent should not be tolerated, and the DevOps mantra should be respected by all.

A DevOps culture requires building a diverse team with people of many different strengths and disciplines, where all contributions should be equally respected. In building a product, there are many layers, and it is not possible for someone to be equally strong in all aspects. Allow individuals to take responsibility rather than micromanaging them, as this is counterproductive to DevOps culture. Trust in the individuals and respect their contributions, because through shared ownership and collaboration, all individuals’ competencies and strengths will grow.

Finally, there is a common trend in the industry to hire DevOps engineers, which seems like a contradiction to building a successful DevOps organization. The hiring company would look for software developers with experience in both application and infrastructure, coupled with knowledge of automation of continuous integration and testing. However, as described earlier, it is not possible for individual contributors to be strong in all areas. Second, in so-called DevOps companies, the development backlog is often so large that the DevOps engineer cannot focus on the other layers such as database or infrastructure. Also, when critical issues occur, the DevOps engineer must drop everything to focus on fast time to recovery. Whether intentional or not, this becomes DevOps with no operations, that is, NoOps.

A DevOps-oriented team is made of individual contributors wearing different hats to deliver measurable business value with increased ownership and collaboration. It’s not all individuals wearing the one hat that fits all.

AUTOMATION
DevOps is often described as either one or the other, a high level of automation or a change in an organization. It is in fact both. DevOps is a change in an organization to improve culture supported by a high level of automation that drastically improves the capabilities of an organization. A company can have implemented a high level of automation into the application lifecycle, but it does not mean it is a DevOps-practicing company.

Automation is the means to the end, which is about delivering measurable business value to the organization. Automation is a capability that causes all the elements of DevOps to be realized. Automation removes the manual, error-prone tasks, which allows a DevOps organization to focus on delivery, measure business value faster, and recover faster from failure.

Automation is essential in the areas of:
- Continuous integration
- Continuous delivery
- Testing
- Iterative and repeatable processes
- Flexible landscaping
- Security
- Infrastructure as a code

MEASUREMENT
DevOps culture is about increased collaboration, sharing, and learning from mistakes. To know if one is improving, one needs to be able to measure improvements. In measuring, it is important to link and balance how fast and often you deliver better-quality software to the goals of innovation and business success. Only through continuous monitoring of real-time measurement and historical data across the entire application layers, including customer experience and business metrics, can DevOps be successful. Companies need to do more than just technical measurement, such as the health of the technical systems and the quality of technical operations. Their focus must be extended to measuring KPIs, which help verify and improve the innovation and development processes and quality of products.
Metrics that are captured should be in a format that all business stakeholders can understand and use. They should not be captured in isolation, which brings no real meaning. Metrics need to be combined with corresponding metrics. For example, when measuring code quality, organizations should measure the build failure over time with code coverage of unit testing. If testing causes an increase in the amount of code executed, but the build failure over time stays static, then it indicates an issue in the quality of the unit tests.

Typical areas for measuring the quality of DevOps are as follows:

- **Deployment frequency**: How often do you release changes into production?
- **Lead time**: How long does it take from development to production?
- **Ratio of planned and unplanned work**: How often do you need to stop working on new features to react to unplanned or planned incidents?
- **Mean time to recovery (MTTR)**: How long does it take to solve an incident raised by a change or to recover the former version of a changed object?
- **Ratio of manual and automated testing**: How much effort is the testing, including integration testing?
- **Number of outages**: How often are there outages? What are the costs?
- **Change success rate**: How often do failures occur that are related to changes? Failures are directly related to insufficient testing, deployment frequency, and quality of change delivery.
- **Customer experience**: Measuring customer behavior and experience is a critical element of a DevOps environment. This feedback allows different stakeholders to take the appropriate actions to improve the application and customer experience. This feedback can cause a shift in business goals and a change in business planning.
- **Employee satisfaction**: The more successful the team is, the more satisfied the employees are.
- **Number of high performers**: When you increase the amount of “new” work instead of working on failures, the motivation of employees increases.
- **Employee identification with the company**: Higher motivation and satisfaction increase the identification with the company.
- **Customer and user satisfaction**: How satisfied are the end users with the solution? What is the market acceptance of the solution?
SHARING
Organizations can better share information by creating and amplifying the feedback loops between all the levels of the organization as they react, so changes can be made more rapidly. Figure 4 provides insight into the cycle of continuous business planning present in a thriving DevOps-practicing organization. In software delivery, this goal requires an organization to get quick feedback and then learn rapidly from every action it takes. For example, user behavior and user challenges should be monitored, analyzed, and shared to improve functionality and usability. This feedback can shift business goals, which requires continuous business planning and other efforts, including the following.

Continuous business planning: Agile enough to react in a timely manner to feedback, such as user feedback, continuous business planning is the establishment of business goals based on user feedback.

Continuous monitoring: Continuous monitoring provides feedback to all major stakeholders in the project, such as lines of business, quality, and development, at different stages of the lifecycle. It also measures continuous customer feedback on user behavior and user challenges when using the application.

Development and testing: Collaborative development enables cross-functional teams to work together by providing common practices and a common development platform. Continuous integration is a core capability that allows developers to frequently integrate their work. Continuous testing earlier and across the lifecycle results in reduced risks and costs.

Continuous deployment: Continuous deployment and continuous release capabilities are the foundation of any DevOps organization and are essential to enabling continuous integration. Only through automation in continuous deployment, release, and integration is it possible to release software earlier to users.

DevOps is also about sharing skills and knowledge between people in different layers, such as development and operations, who often have different but overlapping skill sets. Sharing between different parts of the organization improves the overall knowledge base and strengthens individuals’ skills, which improves the overall quality of released software products. It is also about focusing on resolving issues together in collaboration.

In addition, DevOps is about having a culture of experimentation and not being afraid to fail. It is about recovering faster from mistakes and failure through continuous learning and improving. It is about creating a culture of sharing where knowledge is captured, analyzed, and shared collaboratively in a systematic, meaningful way.

If a company decides to start the journey for DevOps, this requires adoption of tools, processes, and people. For the people and their organization, it requires a mind shift. Very often, we still see silos at companies’ organizations – a siloed project team that is planning, designing, and developing a new application with less involvement from the operations team. Operations is often the other silo that can monitor the solution but that does not provide suitable information to the project team about how to improve the solution or about how it is used. The key question is the willingness of people to overcome the silos.

Figure 4: Continuous Business Development

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On the level of processes, it is necessary to adapt existing processes so there is room for this cooperation. Finally, you need the suitable tools for supporting those processes and the people. Can you technically support the defined processes, such as automation and measurement?

As stated, adopting the principles of DevOps is a journey that requires a step-by-step approach to reach certain levels of development. Figure 5 gives you some general criteria for the DevOps maturity.

**Figure 5: Milestones on the DevOps Journey**
There are different ways to implement DevOps. You can first start with the implementation of agile methodologies and extend this step-by-step to the teams, the workgroups, and the company. Or, you can go in the other direction by extending and improving the agile methodology to reach the next level of the DevOps journey. The goal is of course to reach the DevOps level across the whole company.

Figure 6 gives a more detailed overview of the different levels to reach along the DevOps lifecycle. Agile development is just a first step on the journey to DevOps and its continuous approach to integrate and deliver that which requires a much higher level of automation and collaboration between the teams. In practice, the DevOps lifecycle is a continuous cycle due to the feedback and collaboration by operations and development, which serve as an input channel to planning. That’s why more frequently the DevOps cycle is represented with the infinity symbol (see Figure 10) to represent the DevOps approach for a continuous, ongoing development and operations cycle.

Some experts say that two-thirds of software developers, managers, and executives have started the journey to DevOps. So, it is necessary to discuss this. In the next section, then, we discuss how you need to and plan to adopt the approach of innovation and operations management.

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**Figure 6: Stepwise Introduction of DevOps**

<table>
<thead>
<tr>
<th>Plan</th>
<th>Build</th>
<th>Test</th>
<th>Continuous integration</th>
<th>Continuous deployment</th>
<th>Operate</th>
<th>Monitor</th>
<th>Feedback</th>
</tr>
</thead>
</table>

Agile development

Continuous integration

Continuous deployment

DevOps
What Is the Business Value of DevOps?

The purpose of this section is to describe the business value of DevOps for an enterprise. It shows that with a higher deployment frequency, faster lead times, and faster MTTR, DevOps companies have the edge over non-DevOps companies.

DevOps improves the way business delivers value to its customers, suppliers, and partners. DevOps is not just an IT capability, but it becomes an essential business process in an organization that provides a significant return on investment in three areas:

• Enhanced customer experience
• Faster time to value
• Increased capacity to innovate

ENHANCED CUSTOMER EXPERIENCE
Delivering an enhanced customer experience, which is differentiated and engaging, builds customer loyalty and increases market share. To deliver this experience, a business must continuously obtain and respond to customer feedback, which requires mechanisms to get fast feedback from all the stakeholders in the software application that's being delivered. This includes customers, lines of business, users, suppliers, partners, and so on. In today's world of cloud computing, mobile applications, Big Data, and social media, this ability to react and adapt in an agile manner leads to enhanced customer experience and loyalty.

FASTER TIME TO VALUE
The goal of DevOps is to deliver this value faster and more efficiently, which is speeding time to value. This involves developing a culture, practices, and automation that allow for fast, efficient, and reliable software delivery through to production. DevOps, when adopted as a business capability, provides the tools and culture required to facilitate efficient release planning, predictability, and success.

INCREASED CAPACITY TO INNOVATE
Modern organizations use lean-thinking approaches to increase their capacity to innovate. Their goals are to reduce waste and shift resources to higher-value activities. This is achieved only with efficient and automated mechanisms as provided by DevOps. In one example, known as A-B testing, organizations ask a small group of users to test and rate two or more sets of software that have different capabilities. Then the better capability set is rolled out to all users, and the unsuccessful version is rolled back.

HOW DOES THIS IMPROVE THE RETURN ON INVESTMENT?
While the above paragraphs give the three main areas where we see a return on investment (ROI) with the DevOps principles, how is this related to the context of business investment at companies? You need to focus and ask yourself:

• How do we deliver our products more quickly to our customers?
• How do we change our products more quickly to better satisfy our customers?
• How do we recover or correct after failing our customers?
• How do we get paid faster by our customers?

DevOps provides the answers to those questions.
How Do We Deliver Our Products More Quickly to Our Customers?
The product is doing nothing valuable until the customers are using it. It does not create an ROI until it is finalized and in production and used by the customer.

DevOps companies do this at a rate unparalleled by high levels of automation or facilitating an improved team collaboration. Studies show these DevOps companies have an almost supernatural advantage of much higher deployment frequency compared to their non-DevOps peers. In other words, if you compete against a company using DevOps, they are 30 times faster than you.

How Do We Change Our Products More Quickly to Better Satisfy Our Customers?
The best product features are the ones customers use, so you focus on the features they like or want based on their usage and fit. The basic question is this: How long does it take your organization to put a single line of code into production? For many companies we know of, the answer will be in units of months. For DevOps-practicing companies, the answer often is as long as a couple of weeks to as short as an hour: in short, months versus hours.

How Do We Recover or Correct After Failing Our Customers?
In the real world, you will fail. Your front systems will fail, and some failures will even be catastrophic. Embracing the notion that you will fail and that you should even practice failing is a key cultural notion embraced by DevOps-practicing companies.

Focus on the MTTR, which is how quickly you are back up and running after that failure has occurred. DevOps-practicing companies also do amazingly well here and realize a significant reduction in MTTR. They are much faster at recovery than their non-DevOps peers. Failures are also caused by changes, and DevOps-practicing companies also see a significant improvement in the change success rate.

Those DevOps-practicing companies are not only faster in executing, but they also make changes faster, more frequently, and with better recovery. They do so with a phenomenally better change record.

How Do We Get Paid Faster By Our Customers?
To get paid more quickly by your customer, the faster you can ship and bill, the faster you will get paid, as follows:
1. You get paid by the customer after you bill.
2. You bill after you deliver the product to the customer.
3. You deliver product only after you ship it.
4. You ship after you’ve made the product.
5. You get money to make the product.

DevOps-practicing companies iterate through steps 1 to 4 of this cycle each day at a pace that surpasses non-DevOps-practicing companies with extraordinary speed. The rates of change allowed by DevOps principles support such rapid acceleration in moving away from the old norm that it is startling.

Although there are different KPIs to measure DevOps success, a general improvement in different dimensions is seen across the board. Companies that want to embrace modern business and digital transformation to thrive must adopt DevOps to transform their teams’ capabilities.

The practice has shown that DevOps brings advantages. In the next section, we take a closer look at DevOps and what it means for our concepts of SAP Innovation Control Center, SAP Operations Control Center, and SAP Mission Control Center (internal at SAP). We will discuss how the innovation and operations centers have to change.
The Evolution of SAP Innovation Control Center and SAP Operations Control Center

The construction of the term DevOps as a combination of “development” and “operations” has already enabled three benefits: overcoming the borders between development and operations, bringing development and operations to collaborate more closely together, and gaining knowledge and experience from them both. The simplified target of the DevOps concept is the capability to react much faster to changes in the market. This will be reached through much stronger cooperation between the experts in development and operations, as well as a much higher level of agility in development, integration testing, and deployment. This is a major change to the frequently established waterfall approach in change management.

DevOps brings development and operations closer together. Development covers all of the build phases of a new software solution. At the same time, development is directly connected as a follow-up on innovation. The approach of continuity in development, integration, and, especially, continuous deployment requires similar changes in innovation creation and adoption. You need to plan for a continuous innovation process and therefore change the innovation adoption approach accordingly. It is a logical conclusion that you and SAP must follow the DevOps approach by strengthening the interaction between innovation adoption and hybrid operations. The purpose of this section is to describe why and how the innovation adoption and hybrid operations engagement could be modernized to support companies in their digital transformation journey.

THE CURRENT ENGAGEMENT WITH THE INNOVATION AND OPERATIONS CENTERS
If we have a closer look at the deployment strategy, we see a major change coming with DevOps. In the world of the ABAP® programming language, it was a best practice to recommend release bundling and a predefined deployment maybe once or a couple of times per year, or at least a project-oriented bundling of changes. DevOps comes with a continuous integration and delivery approach as illustrated in Figure 7.

Figure 7: Differences in Deployment Strategies

<table>
<thead>
<tr>
<th>Release management</th>
<th>Phase-driven deployment</th>
<th>Continuous deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Releases based on release planning according to the IT Infrastructure Library definition</td>
<td>All changes and transports of a cycle imported together (project – import all)</td>
<td>Development and imports, which may happen either individually or bundled (on demand, daily, and weekly)</td>
</tr>
<tr>
<td>Defined relationships and dependencies between each release</td>
<td>Deployment mostly relevant for project or wave-based transport – and change management</td>
<td>However: No phases, no gates – every single change can be handled independently for full flexibility</td>
</tr>
<tr>
<td>Import job for the entire release content</td>
<td>Additional flexibility options for preliminary or “no risk” changes</td>
<td></td>
</tr>
<tr>
<td>“No risk” changes that can also be imported bundled</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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DevOps pushes for a higher sequence of deployments to more quickly adopt applications. Ideally, the deployment of innovations is continuous. It is a logical conclusion that you must align your innovation and change planning accordingly. This means that you plan for smaller, ideally separated but frequent changes instead of only a few large change packages or releases for a time period. The approach of continuity in development, integration, and, especially, continuous deployment requires similar changes in innovation creation and adoption. You need to plan for a continuous innovation process and therefore adopt the innovation adoption approach accordingly.

Our current innovation and operations centers strategy is organized according to a release- or project-oriented deployment of innovations. The current engagement with the innovation and operations centers is firmly rooted in a software delivery process that follows the waterfall approach. This model is compatible with the “two value releases a year” methodology that is currently the mainstream best practice offered to our customers.

However, you need to innovate faster and develop business value more quickly to sustain innovation within your current market or to create new markets with disruptive innovation. As described previously, it requires a change in your organization’s abilities, and the current engagement model needs to be adapted to give you the capabilities you need.

Therefore, the concept of first defining all the business and IT requirements before doing a complete design of a solution is no longer relevant. Large cycles of developing, testing, and validating bug fix phases along a lengthy timeline are no longer acceptable. As a result, the operations group needs to be prepared for a continuous deployment instead of a long-term preparation phase for a new go-live of a new release of a solution. The notion of going live with a large scope of functionality – where operations are not prepared and the product is unstable – is unthinkable. You expect advice and best practices from SAP, and we see there is a clear need within the space of digital transformation for better support.
In hybrid operations, there is a need for end-to-end monitoring that covers much more than just technical measurement, such as hardware resources. End-to-end monitoring has to start with the end users and has to cover the complete business processes, as well as the lifecycle of solutions starting from the change request to the deployment of changes.

At the same time, DevOps pushes for a stronger monitoring of deployment quality, which covers the pure technical quality of a change. But it also covers the user adoption quality in a change that fulfills the user expectation and need. Hybrid operations are to be extended and strengthened by such KPIs accordingly. Those figures are important as feedback by operations to the development and innovation lifecycle.

Figure 8 shows the current innovation and operations centers concepts, which cover innovation and project management as well as transition to operations. There is only a very restricted collaboration between the innovation and operations centers at companies, and similar restricted collaboration exists between SAP Innovation Control Center and SAP Operations Control Center. It is the DevOps approach that pushes for stronger collaboration and integration. The innovation center is setting up new innovative projects in alignment with the operations center. The operations center delivers essential information on the adoption of the new innovation.

The DevOps principles came out of new concepts of cloud applications and the cloud architecture. We can now transfer these principles to the on-premise world.
DevOps is the pressing philosophy for bringing closer together innovation adoption and hybrid operations. We will bring the innovation adoption process and the hybrid operations closer together so companies can get educated support on all innovation. This starts from the design of a new innovative solution, through to the development and deployment of that solution, and then to the daily monitoring of its operations and giving feedback to development for optimization. Monitoring the operations of deployed software that covers the operations’ ability and quality as well as user acceptance is essential for the implementation improvement and extension. It is a key input for a new, fast innovation cycle. This is the methodology to best prepare the solution to transition to operation. Moreover, you can benefit from real-time measurement of the user experience, which helps to optimize and improve the solution.

Only the closer collaboration between innovation adoption and hybrid operations can enable companies to adopt innovations quickly and operate hybrid landscapes smoothly. The DevOps approach requires that you intensify the interaction between the centers for innovation and hybrid operations, as we have done with SAP Mission Control Center, demonstrated in Figure 9. The roles of experts with the SAP MaxAttention engagement must be defined accordingly and have to cover the whole cycle from innovation discovery to operations and interaction, without gaps.

Setting up overarching innovation and operations centers does not mean only putting both centers together, including the involvement of the mission center. It is “Innovation Adoption + Hybrid Operations +,” where the “+” stands for additional communication and follow-up processes similar to the approach of DevOps.

Figure 9: Interaction Between Innovation Adoption and Hybrid Operations

INNOVATION ADOPTION AND HYBRID OPERATIONS

SAP® Mission Control Center
End-to-end engagement support
Complete SAP portfolio

Innovation adoption
Accelerate and optimize innovation adoption

Hybrid operations
Deploy hybrid scenarios for SAP MaxAttention™ services
DevOps also requires more than just putting together development and operations. The required changes in culture, collaboration, automation, and measurement are to be mapped into the DevOps framework as well.

In conclusion, SAP offers services in the New SAP MaxAttention that focus especially on the interaction and collaboration between innovation adoption and hybrid operation topics, as shown in Figure 10. This also requires suitable tools for supporting continuous processes and automation. The challenge of continuous integration and, furthermore, continuous delivery for increasing the innovation adoption push for an integrated approach of innovation adoption and hybrid operations, as well as mission control.

Moving away from the waterfall approach, all major phases – from discovering innovation to bringing innovation to production – need to be continuous, agile, iterative, and repeatable. Some cycles can be executed at their own rhythm, which means, for example, that innovation acceleration needs to support the delivering of innovation to production from hourly to monthly.

Instead of planning for a “big bang” innovation step, you should split an innovation into smaller, capsulated innovation steps according to change packages. Those packages will be continuously implemented and delivered as part of a continuous business planning effort. The operations center supports a continuous deployment and delivery of finalized packages by monitoring.

Figure 10: Collaboration of Innovation Adoption and Hybrid Operations
deployment quality and user acceptance and feedback. Operations have to be prepared for very fast reaction if the deployment does not run as expected or with a failure. The interaction between development and operations is close so that a fast reaction and correction of interruptions can be guaranteed. However, testing must be automated as much as possible to reduce the risk of a failure. The main difference of DevOps from the former waterfall approach is manifested in the continuous input into the next cycle of the innovation and operations, and their engagement with each other. The goal of the New SAP MaxAttention engagement is to support you on the way to and with DevOps. Therefore, it is necessary for us at SAP as well to bring more closely together the innovation adoption and the hybrid operations lifecycle in an all-in-one control center.

Figure 11 gives an overview of how the engagement from SAP can be broken into three agile and iterative repeatable processes:

- Continuous innovation discovery
- Continuous innovation acceleration
- Continuous deployment and operations

The continuous innovation discovery process will execute independent of the other two processes, and its primary focus is to discover sustainable or disruptive innovation using, for example, SAP Leonardo technologies and services for SAP Leonardo. The output of such a process could lead to new projects or new features that will become business requirements for the different lines of business. In theory, the delivery of innovation could function independently of the different lines of business and work as an independent factory. This concept could also support the possibility of SAP Model Company services, which might provide a large scope of the functionality to kick-start an implementation project from SAP.
Continuous innovation acceleration and the continuous development and operations processes are in fact intertwined processes and not independent of each other. Continuous innovation acceleration steers the continuous development and operations process, while, in turn, continuous development and operations will give continuous feedback that will shift the business goals.

Therefore, continuous innovation acceleration and continuous development and operations together embrace the DevOps principles of continuous business planning, continuous integration and deployment, and collaborative development along with closer cooperation in testing and operations. This will require that the current concepts of the innovation and operations centers, along with service offerings and best practices, come together as one concept.

The innovation adoption concept becomes more important in continuous business planning. Innovation adoption has to take into account, in a stronger manner, the operations requirements and feedback, while the hybrid operations control center needs to be extended to support the innovation adoption. In a DevOps setup, both development and operations tasks are also backlog items. The implementation of the operations center should start at the same time the landscape is being set up. This also applies for any tools to support continuous integration and deployment and testing. It isn’t necessary to have everything perfect from the beginning. It will be improved by continuous iterations.

In the following sections, the detailed explanation of these two processes is described separately, but they coexist as an infinite loop of continuous business planning and continuous feedback.
REFERENCE ARCHITECTURE FOR INNOVATION ADOPTION AND HYBRID OPERATIONS

By strengthening the collaboration of innovation adoption and hybrid operations, there will be a continuous flow and exchange between innovative and operational processes. Innovation adoption and hybrid operations grow together into an innovation-operations control center (InOpsCC). Transparency of the ongoing activities and results in each process loop are key for the management and improvement of the solution and user experience. Therefore, a continuous measurement for each continuous process loop is to set up innovation adoption and hybrid operations in an overarching cockpit. The InOpsCC will present the overall status for the solution landscape and all ongoing processes and activities along the lifecycle, from the innovation discovery along the innovation acceleration until development, deployment, and, last but not least, operations. By closing the feedback loop from operations to innovation, a short reaction cycle for improvement and extension of the solution are ensured.

Figure 12 depicts the high-level reference architecture of how these three processes coming together is supported by SAP Mission Control Center. Consider that this engagement is supported by SAP MaxAttention, which also provides the necessary roles, enterprise architect, and focus technical quality manager.

Figure 12: High-Level Reference Architecture of Processes
The enterprise architect has the necessary knowledge and experience to support and advise the customer in the continuous innovation discovery and continuous innovation acceleration processes. Of course, SAP also wants to discuss the role of the enterprise architect in the innovation discovery phase. You have to advance the innovation discovery process accordingly to your market. The enterprise architect can be the trusted advisor in choosing the suitable opportunity or technology, which can fulfill the expectations. The role requires a good understanding of the DevOps principles. The technical quality manager has a more operational role but also needs to focus on areas in which they are experts, such as operations or continuous testing.

The collaboration of innovation, development, and operations is to be reflected in the overarching control center. You and we at SAP need to extend the measurement of those KPIs, which provide additional value for continuous innovation, deployment, and operations. Just a technical measurement will not be sufficient in the future. For DevOps implementation, it is key to provide information on user behavior and acceptance, integration, and deployment quality. On the other hand, operations have to be prepared for innovations. A smooth transition to the operations process becomes more important.

The following sections go into more detail on the different aspects of the high-level reference architecture.

Innovation Factory
The innovation factory is a thought room for observing and discussing things such as development in the market and upcoming changes in requirements, necessary adoption of existing solutions, and opportunities for extension and renewal. It is the incubator for innovation. Due to the increasing development speed of the market, the speed of innovation has to become faster as well. However, the innovation factory is to be advanced by you. SAP can support it by providing insight into opportunities for and capabilities of SAP products, best how-to practices, and common experiences from similar customer cases. Ideally, there is a continuous innovation discovery process. Once the target is set, the challenge is to plan for the acceleration of the business implementation of the innovation.

Continuous Business Planning
The goal of continuous business planning is to accelerate the implementation of the project by taking the business requirements and creating a DevOps-conducive pipeline focused on the implementation of features.

Today, the innovation acceleration phase of innovation adoption provides services and best practices from SAP for reviewing the design and for perceived gap validation. These services are still valid but need to become more agile as we support implementation of functionality in the multiple sprints and as requests can come in waves. Therefore, design reviews and the validation of perceived gaps should be part of the backlog. New SAP MaxAttention services support the implementation or extension of the hybrid operations control center as standardized tasks at the beginning of a project. This needs to be supported by the mission control at SAP, as the requests can be atomic.

Best practices from SAP need to be provided on how to do continuous business planning based on shifting business goals. They also need to be provided on how to manage the delivery pipeline according to standards in supporting the implementation based on the DevOps principles. The continuous development and operations process should provide the continuous feedback that will shift the business goals and be agile enough to react sufficiently to this feedback.

This process doesn’t have a strong dependency on tools but more on processes, roles, and responsibilities, which makes it easier to adopt the former innovation control center approach.
Continuous Development and Operations
The goal of the continuous development and operations process is to support the acceleration of innovation through faster and more frequent deployment of better-quality code. It focuses on recovering more quickly from failure.

It needs to support collaborative development, which enables cross-functional teams to work together by providing common practices and a common development platform. Continuous integration is a core capability that allows developers to frequently integrate their work. Continuous testing earlier and across the lifecycle results in reduced risks and costs.

Continuous deployment and continuous release capabilities are the foundation of any DevOps organization and are essential to enable continuous integration. Only through automation in continuous deployment, release, and integration is it possible to release earlier solutions to customers or users.

Continuous monitoring provides feedback to all major stakeholders in the project, such as lines of business, quality, and development at different stages of the lifecycle. Operations should now also measure the continuous customer feedback on user behavior and user challenges when using the application. The role of operations will change, in that it will analyze the different measurement points and feed them back to the continuous innovation adoption process.

Although the approach of DevOps is more common in cloud-based and Java-based solutions, we know that most of our customers have other technologies in place such as ABAP-based and on-premise solutions. As a result, we have these challenges:
• Establish DevOps principles for all technologies as much as possible
• Integrate different technologies to cover the whole solution landscape (hybrid)

The architecture and technology of solutions – be they on premise, outsourced, or cloud based – have an impact on available tools and maybe even in technical capabilities. However, the cultural and organizational aspects of DevOps are independent of the technology and architecture. In practice, our customers have and will have business processes across technologies, architectures, different operation models, and different vendors. At the same time, as the level of heterogeneity is increasing, the need for a central operations and monitoring cockpit alongside business processes is increasing. There is a tremendous and increasing need for end-to-end operations.

End-to-End Operations
Hybrid operations is the term used to describe the challenge of operating solution landscapes consisting of cloud-based and on-premise solutions.

The traditional operations control center should be extended to cover all types of technology, especially cloud-based solutions. Due to the pressure of the DevOps approach, it has to be adapted in two additional dimensions:
• Closer collaboration with innovative processes to better prepare the transition to operations
• Measured quality criteria as feedback and input for further innovation cycles

Operations needs to continuously monitor not just technical measurement points but also functional points, such as user experience and behavior, as well as monitor the development and testing cycles (delivery pipelines). With the implementation and operations of more and more cloud-based solutions, monitoring necessities will shift. In the traditional world, the SAP customers are in charge of the technical and business operations. That is why SAP customers often monitor their systems from the very hardware-oriented KPIs to the business-oriented
KPIs. The first shift SAP experienced was with more and more outsourcing activities, where an outsourcing partner began taking responsibility for the technical and infrastructure operations, monitoring up to a certain and agreed-upon level. With the implementation of cloud-based solutions, you will be freed from any necessity to observe hardware usage and performance, as shown in Figure 13. However, you are still and will be in charge of your own business processes.

As a result, SAP sees a stronger need for business-oriented monitoring. For example, in the on-premise world, it was typical to monitor the growth of the data amount in the database and the disk-filling level. This was done by an outsourcing partner or by you yourself. In the cloud-based world, there is no need for you to do so or to assign an outsourcing partner. This is completely out of scope, because the cloud provider takes the full responsibility. Moreover, you will not have any transparency of hardware and setup, nor is there need for that. However, it is of interest to monitor the growth of the amount of data, such as sales orders or customer cases data. This enables you to be prepared for an extension of the data cloud, for a renewal of a contract, or for observing user behavior and acceptance.

In a hybrid world, there is an increasing requirement for centralized and integrated overall monitoring with a stronger emphasis on processes in the application landscape. On the other hand, clear technical KPIs are of less interest, such as CPU or hardware usage.

Those technical measurements and the responsibility for technical operational correctness and performance are on the cloud provider. You are no longer in charge of them. However, you are in charge of the overall business processes. That is why there is an increasing demand for end-to-end monitoring of the user experience and usage behavior on your side.

By implementing DevOps, monitoring is also extended by looking to KPIs that are helpful for the innovation and development process. The monitoring of the development and testing cycle covers development, build, and deployment quality as well as the quality and coverage of the code through testing. Operations can analyze technical issues such as performance, exceptions, and functional issues related to the business processes to feed back to the continuous innovation adoption.
Ideally, there is seamless monitoring from the design to the operations of a solution, with direct feedback and improvement cycles. This is key to improve the quality of what is delivered. It reduces the risk of instability when going live and helps you to more quickly deploy a solution.

In conclusion, it is reasonable to bring the innovation and operations control centers together into an InOpsCC. For example, bring the following processes together:

- Technical monitoring related to processes across the landscape, especially end-user experience monitoring
- Business-process and object-oriented monitoring
- Application user behavior
- Monitoring that the user experience is positive and productive
- Delivery pipeline metrics such as the status of projects, tools, artifacts, and work being delivered such as:
  - Delivery pipeline health
  - Number of commits or transports
  - Number of deployments
  - Failed transports
  - Build times
  - Times from commit to production
  - Testing execution
  - Testing code coverage

The digital transformation leads to a number of encapsulated microservices represented by different technologies such as cloud based or on premise. At the same time, this increases the need for a central cockpit to monitor and manage the lifecycle of solutions. That is why we need a control center bringing together innovation adoption and hybrid operations to mitigate the new approach of DevOps.
DevOps Enablement

DevOps principles were developed along with cloud technology and are used in the innovation, development, and operations of cloud applications. The challenge is now to adapt those principles for on-premise solutions as well as hybrid landscapes. As explained, DevOps is based on the four components of culture, automation, measurement, and sharing. Therefore, DevOps is not only a question of suitable tools and their implementation and introduction to an existing IT organization. It also requires discussions on strategy and changes in behavior, processes, and organization. Aligned with this, SAP offers services accordingly.

ENABLING TOOLS

However, if you want to establish DevOps principles, you have to plan for suitable tools related to technology and approach. We want to emphasize clearly that setting up a tool does not mean that DevOps is in place. Suitable tools are a prerequisite. In most cases, there is more than just one tool. You need to plan for tools suitable to the planned processes, roles, and responsibilities. Most likely, you expect this for complex project support from SAP. But there are also consulting companies focused on DevOps in general.

You will need services that are helpful in deciding about the suitable tools in your landscape for your approach. This covers the planning of the tool landscape as well as the suitable setup and implementation and training for usage. The suitable tool also depends in most cases on the phase in the lifecycle of a solution. SAP Solution Manager 7.2, a central, integrated platform, is “Pink Elephant” approved and certified with IT Infrastructure Library (ITIL) alignment, defined below. It can also cover hybrid solutions as described, for example, on the SAP Service Marketplace extranet on SAP Solution Manager 7.2. SAP Solution Manager 7.2 can also help in implementing and running DevOps.
At the same time, there is a large variety of open-source tools with a main focus on Java and cloud development for continuous integration and delivery. Figure 14 shows typical third-party tools in DevOps and gives an overview of the most common tools when it comes to DevOps in the world beyond ABAP.

In the formerly ABAP-centric world, there were SAP standards and tools based on SAP software, such as the transport management system or monitoring alert infrastructure in SAP Solution Manager. You then needed to integrate third-party tools and systems. With the new variety in solutions and technology with DevOps, you now have a higher variety of tools. You can build an SAP software-centric, managed DevOps tool landscape and integrate ABAP and non-ABAP landscapes. This depends on your needs and should be discussed with SAP.

Figure 14 presents a collection of common tools, either open source or license based, related to various phases of DevOps. The landscape of available tools is very heterogeneous.

SAP itself uses a couple of those tools, such as in Java development. You can find best practices for that in Wolfram Kramer’s tutorial “Continuous Integration (CI). Best Practices with SAP – Java Web on SAP Cloud Platform.” In Java development, SAP uses Git and Jenkins, but this is not a must for you. The first challenge for you is to decide on the suitable tools for your needs.

Most of our customers operate a hybrid landscape with business processes across this landscape. Similar to the extension of the operations control center to a hybrid operations control center, the development lifecycle needs to cover the non-ABAP and ABAP world. Therefore, non-ABAP and ABAP DevOps processes have to be integrated and synchronized. From the point of view of SAP, SAP Solution Manager is still our integration platform.

Due to the complexity of available tools and integration requirements aside from the challenges of the DevOps approach, it is to be expected that you will need consulting and guidance in planning and implementation.

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**Figure 14: Typical Third-Party Tools in DevOps for Continuous Integration and Continuous Delivery**
The following questions should be asked to gain more clarity:

- Which tools are the suitable ones in which phase of DevOps?
- How can we integrate the ABAP landscape with the non-ABAP landscape, which must be integrated into SAP Solution Manager?
- Is SAP Solution Manager the most suitable platform?

These questions are related to project management, change management, testing, documentation, automation, monitoring, and more.

Service Software Change Management
The service for software change management (SWCM) can introduce, discuss, and plan the best practice for an integrated landscape for your change management. Independent of the used technology and tools, the process of change management has to be implemented as described in the best practices of ITIL by the Office of Governance Commerce. SAP Solution Manager provides the ChaRM tool for the implementation of this process and possible integration, such as with test management and documentation. In addition to change process management, the execution of changes through transport management and the change and transport system extension (CTS+) is supported. SAP Solution Manager offers the opportunity to also integrate typical non-ABAP tools, including Jenkins and Git, so that SAP Solution Manager can be implemented as the central change management cockpit.

The SWCM service helps to set up an integrated change management and implementation landscape, as shown on a high level in Figure 15. Figure 15 shows how a hybrid change management process can be implemented on a high level by combining Git, Jenkins, and transport management system tools in the world of ABAP.

SAP Solution Manager 7.2 is again the integrating platform and the leading central system for the management including the documentation and reporting of changes. SAP Solution Manager supports also in the area of integration and testing.

Figure 15: Integrated Lifecycle Management for Non-ABAP and ABAP

Focused Build Solution for SAP Solution Manager

SAP Solution Manager 7.2 is a fully integrated system and can be customized to cover everything described in the ITIL processes. However, depending on the customer situation and processes, this customizing can require essential effort. The Focused Build solution for SAP Solution Manager is an add-on that provides a blueprint for prethought and predefined agile integrated processes, roles, and workflows for all build phases in development, including project management and dashboards for monitoring the project status, as shown in Figure 16. It is especially useful for the implementation of SAP S/4HANA®, with the integrated support of the SAP Activate innovation adoption framework and SAP Model Company services.

SAP Solution Manager 7.2 and Focused Build can also help run DevOps with a main focus on ABAP-centric solutions, although it was not originally developed to support DevOps and especially the best practices of SAFe, which stands for “scaled agile framework” and provides useful practices on how to get started with DevOps. The SAP-specific terms are not aligned with SAFe. Until now, there was no tool certification for SAFe. (See the section “Enablement for Organizational and Process Adoption” for more information on SAFe.)

Focused Build enables you to jump-start with SAP Solution Manager for your innovation project. It provides best-practice content, workflow-supported methodology for all project phases, and project transparency for all activities through monitoring.

Figure 16: The Delta Edition of Focused Build Compared to SAP Solution Manager 7.2 Standard

Powerful, flexible, and configurable engines of SAP Solution Manager
Solutions provided by Focused Build turning the standard engines into a best-practice use case
The related services in SAP MaxAttention help in the implementation of Focused Build and the necessary knowledge transfer in using the add-on. An introduction and recorded demonstration of SAP Solution Manager 7.2 and Focused Build can be found in the media center.

Monitoring

SAP Solution Manager 7.2 also comes with integrated technical and business process monitoring and operations capabilities for SAP and third-party solutions. Figure 17 gives an overview of how SAP Solution Manager 7.2 was extended to support typical cloud-based solutions from SAP. If you are interested in further details, visit us online.

Figure 17: Hybrid Monitoring of SAP Solution Manager 7.2

Focused Run for SAP Solution Manager

Focused Run for SAP Solution Manager is the name of a technical monitoring solution with a focus on service providers who have to ensure the technical operation of hundreds of technical systems, maybe by different customers. Focused Run is optimized for high-volume technical monitoring by using the full power of the underlying database system of the SAP HANA® database.

SAP Solution Manager 7.2 continues to be the preferred tool to build the central platform for our control centers.

Integration monitoring
To help ensure reliable data exchange between on-premise and cloud components and vice versa

Exception management
To forward relevant application exceptions from components for SAP Cloud to on-premise customer operations

Data consistency management
To help ensure the consistency of data stored in the SAP® Cloud portfolio and on-premise customer operations

User monitoring and user tracing
To help ensure the availability and performance of SAP Cloud from the end-user perspective

Business process monitoring
To provide business process KPIs for scenarios for SAP Cloud
ENABLEMENT FOR ORGANIZATIONAL AND PROCESS ADOPTION

Tools are necessary to successfully implement DevOps, and the adoption of culture and collaboration are necessary to live DevOps. Much more, tools are a “nice to have,” but it is a “must” for your organization to live DevOps. Furthermore, companies first need to prepare to adopt the culture and the organizational setup before planning the suitable tools.

Related to Figure 5 and the four levels of the DevOps governance, it seems to be worth helping you with an assessment of your current status and in planning how to further develop in DevOps. At the introductory level, a service for knowledge and experience transfer to you and alignment with you is useful.

A useful framework that includes best practices on how to begin with DevOps is SAFe. It seems that SAFe almost becomes a standard when it comes to the DevOps approach, as it was and is ITIL. SAFe describes activities, roles and responsibilities, processes, and interactions for agile lifecycle management from the team level to the enterprise level. It provides a detailed road map with a step-by-step description of how to develop teams and enterprises to be DevOps enabled. For certain roles, there are also training and certifications. The described roles in the lifecycle can be supported by roles in SAP Solution Manager and its processes. Especially in the U.S. market, SAFe has a penetration of about 70% in the top 100 enterprises. However, a common best practice is to adopt the SAFe pattern once you are familiar with SAFe. SAFe is not in contradiction to ITIL. It is based on ITIL best practices and comes with a pattern for the approach to be agile and how to implement and live DevOps on a team level to a whole enterprise level.
SERVICE BUILDING MAP
A high-level structured plan of service offerings from SAP is shown in Figure 18. Going step-by-step, you see along the lines from left to right the different building blocks according to the main emphasis. This helps to plan the stepwise transformation in a phased approach.

Each track delivers elements to the overarching InOps cockpit and serves as input for a new cycle in innovation and optimization. The nodes in those tracks mark essential services or service packages to reach the next step in the road map. As described in the above sections, it is not just a question of having suitable technical systems in place and tools available. People and processes have to grow along the road map supported by suitable tools.

This road map is to set up the suitable technical infrastructure for agile teams to live DevOps and an InOpsCC. You can roughly distinguish between tracks for setting up the technical systems and prepare for their operations, which of course depends on which type of solution you plan (on premise or cloud based). In most cases, our customers choose hybrid landscapes. The necessary tool landscape for live DevOps with continuous integration and deployment comes along the application lifecycle management track. Finally, a security track is required to prepare and answer all the security-related topics, especially if you choose a hybrid systems landscape with multiple connections to the outside and back into a local network.

All those tracks deliver parts to the InOpsCC and will be observed by the InOpsCC.

**Figure 18: Service Road Map**

<table>
<thead>
<tr>
<th>Track</th>
<th>Description</th>
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<tr>
<td>Next generation</td>
<td>SAP Leonardo Innovation services</td>
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<td>Cloud integration architecture workshop</td>
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<td>IT planning and sizing workshop</td>
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<td>Architecture and landscape guidance</td>
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<td>Discovery workshop</td>
<td>for SAP Cloud Platform</td>
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<td>Gap validation</td>
<td>Transport execution analysis</td>
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<td></td>
<td>Cloud integration architecture workshop</td>
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<td>ESRV custom code management</td>
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<td>Security architect</td>
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<td>Expertise on demand</td>
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<td>Prototyping</td>
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<td>Application lifecycle management (ALM) road map service</td>
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<td>ALM rapid deployment services – waves for process-document change-control management</td>
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<td>Interface management for cloud integration</td>
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<td>Technical feasibility check</td>
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<td>Technology integration check</td>
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<td>Simple hybrid integration architecture</td>
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<td>Cloud platform safeguarding services</td>
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<td>Continuous security improvement</td>
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<td>Security planning workshop</td>
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<td>Run road map</td>
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<td>Setup services</td>
<td>Security design support</td>
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<td>Security optimization service</td>
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<td></td>
<td>Wave test management</td>
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<td>ALM rapid deployment service – wave IT service management</td>
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Summary and Outlook

The process of digital transformation is already ongoing and unstoppable. This brochure discussed the new approach of continuous innovation, development, and deployment and how to collaborate and interact with operations. The term for this new methodology – maybe philosophy – is DevOps. It will overwhelm our current setup of nearly separated innovation centers and operations centers. If we want to better handle the DevOps approach, it is a must to grow innovation adoption and hybrid operations together into an InOpsCC with an overarching cockpit supporting the interaction between continuous innovative changes and its continuous integration, deployment, and operations.

DevOps is a movement bringing development and operations closer together to speed up the deployment of innovative changes. DevOps was developed and pos-tulated along with cloud-based solutions. You now have the chance to either bring DevOps to your company and proactively prepare and push for the journey, or the market and its development will bring the challenge to you. It is not a question of “if.” It is a question of “when.” The effectiveness of DevOps has already been proven by numerous companies and, especially, their cloud solutions. There is a need to help companies in the transformation of on-premise solutions into the new technology and the new best practices to deploy innovation.

In conclusion, we need to bring innovation adoption and hybrid operations closer together so that you and SAP can benefit from each other.
USEFUL LINKS

SAP Solution Manager
Focused Build

GLOSSARY

CAMS  Principles of DevOps: culture, automation, measurement, sharing
CD    Continuous delivery
ChaRM Change request management in SAP Solution Manager
CI    Continuous integration
ITIL  IT Infrastructure Library
MTTR  Mean time to recovery
SWCM  Service for software change management