

Maximize the synergies between ITIL and DevOps

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EXECUTIVE SUMMARY

This white paper describes the synergies between **IT Infrastructure Library® (ITIL®)** best practices and the **DevOps** (development and operations) movement. ITIL focuses on the lifecycle of services, from inception to retirement, and provides best-practice guidance for **IT service management (ITSM)**. The ITIL service lifecycle includes the development and operation of services. DevOps is a movement, inspired by Lean methodology and Agile development practices, that aims to achieve seamless workflow for product synchronization between development and operations groups. A DevOps approach tries to reconcile the different priorities and processes of these two groups, all for the purpose of facilitating greater business agility and delivering more value to the end user. In some organizations, this work is often performed by virtual teams from both groups.

Most IT organizations are struggling to remove silos that hamper their ability to work collaboratively. Failure to collaborate interferes with the effective use of an organization's capabilities and resources, leading to inflexibility and inefficiency in the delivery and support of services. When that happens, the reputation of IT can suffer. Most companies, and even not-for-profit organizations, are entirely dependent on the Internet for their core businesses, and the speed of innovation there is staggering. That means the ability of a business to react to market dynamics is based to a large degree on the agility and flexibility of their IT department.

Since so many IT organizations rely on ITIL as the foundation of their service management processes, understanding the synergies between ITIL and DevOps is essential to improving organizational performance and business outcomes. As many recent examples have shown, IT organizations that fail to confront and reconcile the widening gap between their development and operations teams stand to lose their footing in today's competitive business environment.

INTRODUCTION

To get a complete perspective of the depth of best practices that **ITIL** addresses, organizations should understand the key frameworks and standards that apply to ITIL. These include practices such as the following: ISO/IEC 20000, ISO/IEC 27001, CMMI®, CoBIT®, PRINCE2®, PMBOK®, M_o_R®, eSCM-SP™, eTOM®, and Six Sigma™. For best-practice guidance, DevOps processes can turn to ITIL as the foundation architecture, referencing the other standards as needed to solve particular business issues. These proven practices can also be combined with organization-specific practices for competitive advantage and for improvement of the practices themselves. ITIL, because it is a nonproprietary and non-prescriptive approach, helps with the construction of enterprise-specific frameworks. ITIL guidance enables you to modify your own processes and address the DevOps gap based on IT service management best practices. See Figure 1.

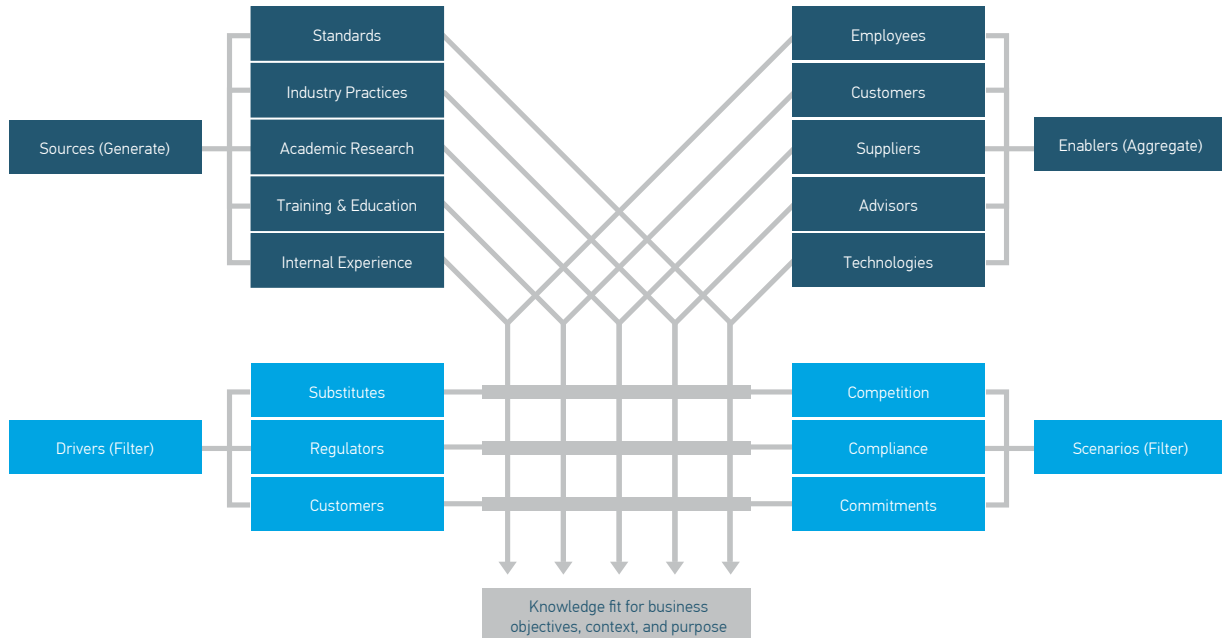


FIGURE 1. Sourcing of service management practice. © Crown Copyright 2011. Reproduced under licence from the Cabinet Office.

ITIL describes the standard development process — or the activities for the control of development — as follows: requirements development, design/development, system test, user acceptance, deployment, and operations/post-deployment support.

DevOps uses Agile and Lean methodologies to improve or expedite solutions from the development through operations stages for value realization. Agile methods depend on interactions and collaboration among people, processes, and technology. The specific process areas of configuration management, change management, and release and deployment are very important in an agile environment. Just as in ITIL, the process integrations help foster agility. The success of Agile methods (particularly when addressing the DevOps gap), while sometimes measured by the increased volume of deliveries, is best measured by customer satisfaction, given the continual delivery of needed solutions and services.

A DevOps strategy that facilitates continuous delivery and continuous integration should leverage technology that has integrated and **automated application-release** capabilities. This technology should provide the following major capabilities based on ITIL best practices:

- » A real-time, end-to-end, actionable view with comprehensive visibility of releases as they progress through their individual processes
- » Control over environment configurations to eliminate inconsistencies, unauthorized changes, and misconfigurations
- » Integration of automation and human-oriented workflows
- » Diagnostics and root-cause analysis
- » Seamless integration with change management to track changes during a release

ITIL ARCHITECTURE

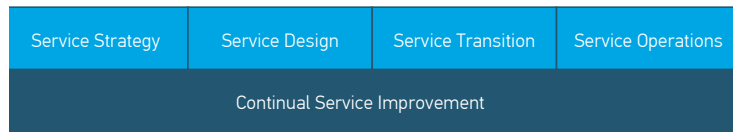


FIGURE 2. Simple ITIL process foundation architecture

This section reviews ITIL architecture and how it applies to DevOps. ITIL consists of five service lifecycle stages, described in five core publications: **Service Strategy**, **Service Design**, **Service Transition**, **Service Operation**, and **Continual Service Improvement** (see Figures 2 and 3). Each stage of the lifecycle is dynamic and supports the other stages. ITIL focuses on utilizing people, processes, products, and partners for the effective, efficient, and economic delivery and support of services. Each publication focuses on particular process areas to support the decisions that must be made within that stage of the service lifecycle. The entire service lifecycle is relevant for DevOps because it focuses on service delivery and defining the overall service relationship between the customer and supplier.



FIGURE 3. ITIL service lifecycle approach. Crown copyright 2011. Reproduced under licence from the Cabinet office.

SERVICE STRATEGY

The service structures in the value network¹ play a key role in service management and the stages of organizational development. IT service management is actually a value network within an organization and has patterns of collaborative exchanges. This exchange of information in an agile, collaborative manner between development and operations is in line with the spirit of DevOps.

The stages of organizational development are network, direction, delegation, coordination, and collaboration, and they are related to a management style. Network organizations, for example, often have no specific structure, specific governance, or defined processes. Collaborative groups, at the other end of the spectrum, have service governance and many defined processes and are highly skilled in teamwork. DevOps methodology functions best in a collaborative structure because of the increased responsiveness to changing customer needs.

SERVICE DESIGN

ITIL positions the **application management** development function within operations as a function that works across the service lifecycle, collaborating with other functions throughout the process — which is very much in the spirit of DevOps. For example, in service design, this collaboration involves helping with build-or-buy decisions. If the decision is to build the solution, the service assets (including people) must work collaboratively as members of the service design team to coordinate efforts and produce a service design plan (SDP) or service requirements plan. The SDP describes application-related outcomes and the business relevance as well as the underpinning activities and capabilities needed.

SERVICE TRANSITION

Service transition enables a key capability needed within a DevOps environment: collaboration. The primary purpose of service transition is risk management and knowledge management. The specific process areas that enable service transition are change management, knowledge management, asset and configuration management, change evaluation, service validation, and testing. Service transition supports the service strategy organizational structure and development phases. Also crucial to service transition is building the appropriate service to support business outcomes. Development should ensure that any application updates delivered will provide value to the business customer and the service provider. (See the ITIL publications for more information about value creation and value realization.)

Application management works with the service transition release and deployment process areas to build, test, and implement a new service and to be available for early life support (ELS), helping IT achieve expectations and reduce incidents related to the service. The overall planning and coordination of services is accomplished through configuration, change, release, and deployment management.

Service transition can be reactive or proactive. Reactive service transition can implement a change to prevent an immediate risk. Proactive service transition focuses more on trends and future business needs. Both are relevant for DevOps. Understanding the relationship of service transition policies and processes to reactive and proactive behavior can enhance service agility and DevOps. Being proactive is helpful but usually not enough, since proactive behavior can still impact the quality of service, the service experience, and the service relationship. Sometimes, IT organizations adopt a DevOps approach because they need to improve overall customer satisfaction. IT must also ensure that the organization is service focused to mitigate service risk. The next step in maturity for an organization that adopts a DevOps approach and ITIL is to focus on service alignment.

In the service transition stage, application management and operations management meet. Best practices for service transition help enable agility and, therefore, help enable DevOps as a practice. Organizational maturity in service transition is the challenge that must be met for DevOps to become a reality for improved value.

¹ The ITIL glossary defines *value network* as “A complex set of relationships between two or more groups or organizations. Value is generated through exchange of knowledge, information, goods or services.” ITIL® Glossary and Abbreviations: English (London: The Cabinet Office, 2011), http://www.itil-officialsite.com/InternationalActivities/ITILGlossaries_2.aspx. © Crown copyright 2012. All rights reserved. Material is reproduced with the permission of the Cabinet Office under delegated authority from the Controller of HMSO.

SERVICE OPERATION

A key principle in ITIL service operations is managing stability versus responsiveness. Operations wants stability; development wants to produce features that are more responsive to customer needs. Business and IT requirements are constantly changing, requiring agility in producing application functionality while at the same time maintaining IT stability for application performance. ITIL's service lifecycle approach helps organizations agree to desired changes, take advantage of the existing infrastructure, and understand what it takes to deliver the changes for value realization in operations.

IT organizations sometimes need to transform their services and applications quickly to meet customers' needs or risk becoming optional and having more services outsourced. Adopting a DevOps approach and ITIL service operation best practices helps organizations be more responsive to business needs without affecting operational stability.

CONTINUAL SERVICE IMPROVEMENT

Every approach can always be improved to increase overall performance and business value. DevOps methodology is intended, among other things, to apply the principles of continuous delivery and continuous integration to improve the performance of application development effort. ITIL's Seven-Step Improvement Process can help facilitate this improvement. This process and its relationship to DevOps are described as follows:

1. **Identify the strategy for improvement.**
 - a. A DevOps approach should support a business outcome.
 - b. Strategy as well as tactical and operations goals need to be understood.
2. **Define what you will measure.**
 - a. Conduct a gap analysis for achieving DevOps methodology.
 - b. An example key measurement for DevOps could be customer satisfaction and end-user performance as related to number, quality, and frequency of releases.
 - c. Critical success factors (CSF) and key performance indicators (KPI) must be defined for DevOps.
3. **Gather the data.**
 - a. A DevOps approach should focus on gathering data from service transition and service operation.
4. **Process the data.**
 - a. DevOps CSF and KPI data are processed and turned into information.
5. **Analyze the data.**
 - a. Understand trends.
 - b. Transform information into knowledge for decision support to realize improvement.
6. **Present and use the data.**
 - a. Understand the business improvements of implementing a DevOps approach.
7. **Implement improvements.**
 - a. Implement Lean and Agile improvements.
 - b. Improve and correct the release process.

As organizations implement improvements, they usually are advancing their maturity to the next level or improving within a maturity level. As an organization matures, its focus should be on business outcomes, which are defined in the Seven-Step process. Adopting ITIL best practices will help organizations that are utilizing a DevOps approach become more service aligned with application releases.

The ultimate goal for application development is to take a Business Service Management (BSM) approach. BSM simplifies and automates IT processes, and prioritizes and orchestrates work according to business needs. Adopting a DevOps way of thinking helps achieve higher levels of BSM and provides greater service value (see Table 1).

Level	Maturity level	BSM value maturity level
5	Business management	Applications are developed based on consumerization, i.e., marketing and demand strategy. Application usage (utility) and warranty are controlled better in the design stage to reduce incidents, defects, and problems. No training is needed for people experienced in a vertical discipline. Application updates are controlled by the end user. IT pushes and pulls knowledge from stakeholders into the system for organizational decision support. Applications support service financial management cost and price expectations.
4	Service aligned	Applications are service oriented across various process areas. Applications are aligned to an application and service portfolio to support investment decisions. Services are understood and service decisions can be made based on information and knowledge. Application updates are coordinated by IT to avoid service interruptions.
3	Proactive	Applications are coordinated with related processes. Applications supply information, and knowledge is related to data sources, such as trends. The applications are IT oriented by the stakeholder process. Application updates are coordinated by IT to avoid service interruptions.
2	Reactive	Applications present data that must be interpreted by the end user to determine information and knowledge for IT decisions, which may not support overall business decisions. Application updates are pushed by IT, and early life support is provided for disruptions. Change, release, and deployment management are not coordinated, and application changes cause disruptions.
1	Undefined	Applications are delivered from an IT perspective. Extensive end-user training is needed to translate a job process to technology usage. Applications are not integrated; integration is manual. Multiple and separate data sources support applications. Application updates are pushed by IT and may cause business interruptions.

TABLE 1. Example of application maturity

ITIL's balanced approach to focusing on people, processes, partners, and products for efficiency and service effectiveness will help an organization create a holistic approach to DevOps. The people in the IT organization might need to change the way a DevOps approach is adopted. Process relationships between development and operations might need to be improved. Partners should be considered in the overall value network. Products should support processes with improved capabilities for automation of the coordination between development and operations.

ITIL provides architecture for ITSM and includes guidance for organizational functions and roles, processes, and activities within processes. ITIL also includes suggestions for technology capabilities that support processes and organizational roles.

ADOPTING DevOps

Adopting DevOps relies on the iterative approach of Agile development, as opposed to a waterfall method that has rarer, and extensive, handoffs to operations. Handovers should be collaborative and more iterative in order to quickly respond to customers. An environment lacking collaboration has few or no formal processes (as discussed earlier in "Service Strategy" and illustrated in Figure 4). Collaboration between development and operations must exist for this to work (see Figure 5).

In most organizations, the development and operations handoff is defined in some way, but support for an ongoing, agile, two-way relationship is not defined. This is why it's important to follow ITIL best practices for handing over work to operations. Failure to follow these processes can result in incidents and problems with deployments because of product changes. The concept of early life support, as defined by ITIL, helps bridge the capability gap between the supporting relationships of development and operations to achieve consumer value realization. Agile methods define an ongoing collaborative relationship at the earlier stage of the handover for a quick fix or turnaround of a consumer service for value or, in ITIL terms, for overall service utility. DevOps with ITIL best practices supports Agile development and consumer value.

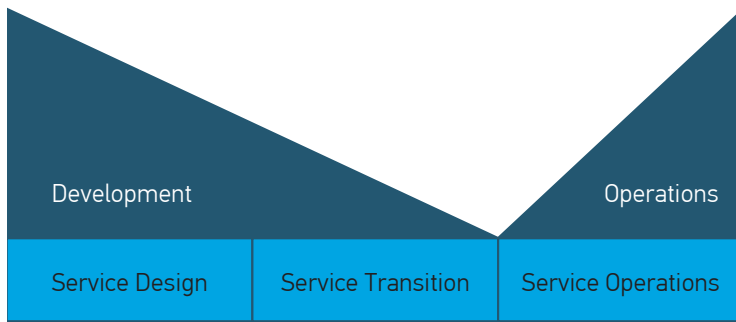


FIGURE 4. Development and operations

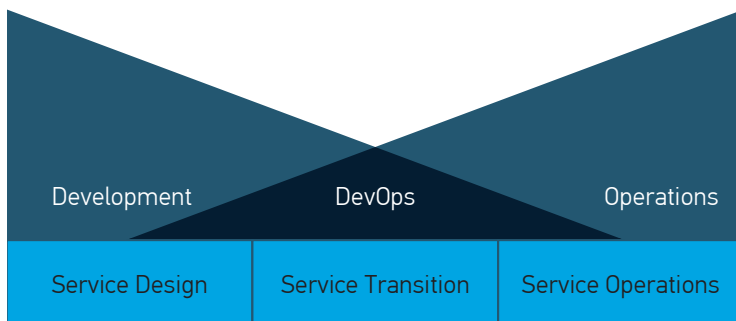


FIGURE 5. The DevOps approach of collaboration

ITIL AND DevOps — A POWERFUL COMBINATION

Both ITIL and a DevOps approach are intended to support the delivery of quality services to consumers. A DevOps approach should not be implemented without reference to ITIL best practices, and maturity improvements should be coordinated and collaborative to realize value. Organizations need to understand that services are defined relationships between the customer and the supplier of the service.

Figure 6 shows more detail related to ITIL encompassing DevOps as a discipline. The figure also illustrates that DevOps can take advantage of ITIL for service management. Each discipline working together helps with continual service improvement and organizational performance.

DevOps, and an infrastructure as code (IaC) approach, can be supported within the asset and configuration management process. Tools such as the configuration management database (CMDB), which maps the IT infrastructure, can help influence and support DevOps application designs. The infrastructure architecture knowledge can help with DevOps decisions related to designing and implementing the most efficient, agile, and effective DevOps-style release processes. This knowledge can support infrastructure as a service (IaaS) cloud development and the deployment of DevOps software as a service (SaaS) solutions.

Service design processes should be coordinated with DevOps-oriented release management processes. This effort includes design coordination, change management, release and deployment, and service validation and testing (SVT). It also includes service transition policies, such as the creation of service design packages (SDP) and early life support (ELS). This coordination and collaboration during service transition help ensure value realization and an enhanced user experience for developed products or services.

Service operation processes help ensure overall support for developed solutions. Since ITIL is dynamic in its relationship with other service lifecycle stages, feedback to service transition will occur — including supporting a DevOps approach to continual service improvement.

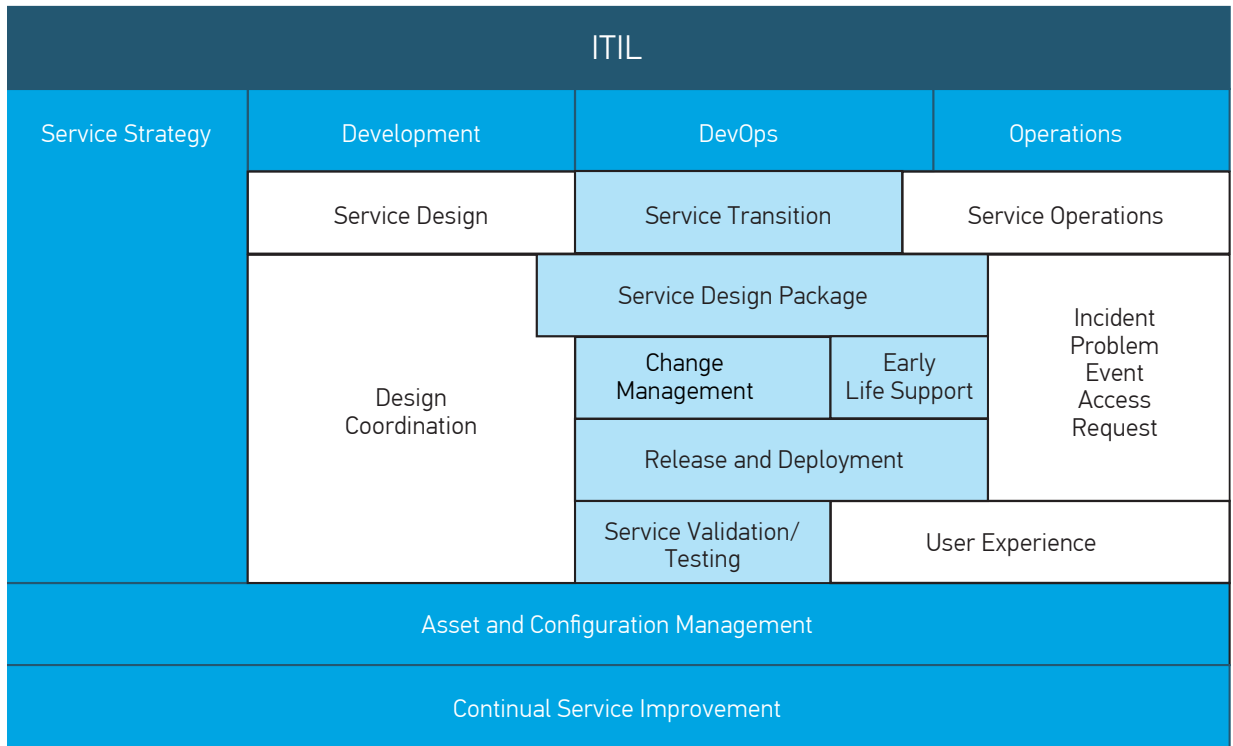


FIGURE 6. DevOps and ITIL synergies

CONCLUSION

ITIL and other best practices can help you increase the value of your DevOps initiatives and avoid DevOps becoming siloed within your organization. Lean methodology, foundational to DevOps and Agile development, says that increasing the delivery volume of application updates to your users is not enough. Users don't want just a lot of updates; they want updates that are responsive to their needs and increase the value of the production application. Application updates should enhance the user experience, increase service utility, and add value to the service provider. Organizations are adopting DevOps to improve the delivery, and the delivered value, of application solutions to the end consumer while lowering the organizational stresses involved in that delivery.

ITIL establishes the best practices for IT service management that have been adopted by organizations all over the world to help improve performance focused on needed service outcomes. The combination of the two disciplines will help you improve your service relationships and your service outcome, as well as help you provide agile service delivery.

For more information about ITIL, visit www.bmc.com/solutions/itil/itil.html. For more information about DevOps, visit https://communities.bmc.com/communities/community/bsm_initiatives/devops.

About the author

Anthony Orr is director of service management for the Office of the CTO and a member of the Thought Leadership Council at BMC Software. Orr has worked for BMC for more than 15 years in various managerial, consulting, marketing, and technical positions. He is an author of the ITIL v3 2011 publication update and a senior examiner for APMG with responsibilities for the ITIL v3 certification examinations. Orr is currently a board member of itSMF Houston Local Interest Group (LIG) and former vice chair of the 2005 itSMF USA Certification Committee. He participates regularly as a speaker and expert panel member for itSMF LIGs. Orr has more than 30 years of IT experience and has held various roles in other companies prior to joining BMC. In these roles, he has been responsible for strategy, architecture, implementation, and management of numerous service management disciplines and processes. Orr is a frequent speaker on best practices at industry events and BMC customer forums. He has authored numerous white papers, pamphlets, podcasts, videos, and blog posts on service management topics.

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