

DevOps

Bringing agility all the way up to Production



Editorial

According to Gartner, DevOps ranked no. 2 among CIO priorities this year. Do you know why? Because in a fast-changing world disrupted by digital transformation, IT organizations that innovate and quickly adapt to change are the ones that succeed.

DevOps is about adopting agile practices throughout the IT value chain, from business to development, up to IT operations. For IT organizations that have already implemented agile methods to accelerate code delivery, DevOps is clearly the next logical step. It is a path to deliver faster and more securely to the production environment. Eventually, the objective is to bring the final product to end-users as fast as possible.

It is a new paradigm within IT that completely transforms the way of working between Development and Operations teams. The DevOps transformation challenge is about simultaneously managing the various dimensions of the transformation: cultural change, build and run processes, software delivery tooling, Dev and Ops organizations, but also architecture and security.

At Capgemini Consulting, we have built a unique set of DevOps assets, as part of our Multi-Speed IT offering. It relies on our concrete experience of facilitating and supporting the DevOps transformation journeys of our clients and leverages the strengths of the Capgemini Group, which includes transformation consulting, application development and infrastructure management.

This point of view presents our vision and perspectives about the key aspects and challenges of DevOps transformations and our approach to assist you in your DevOps transformation journey.

Definition and origin

Capgemini Consulting defines DevOps as an IT team alignment process, starting with “Dev” (in charge of IT enhancements & changes) and “Ops” (in charge of operating existing applications and infrastructure)

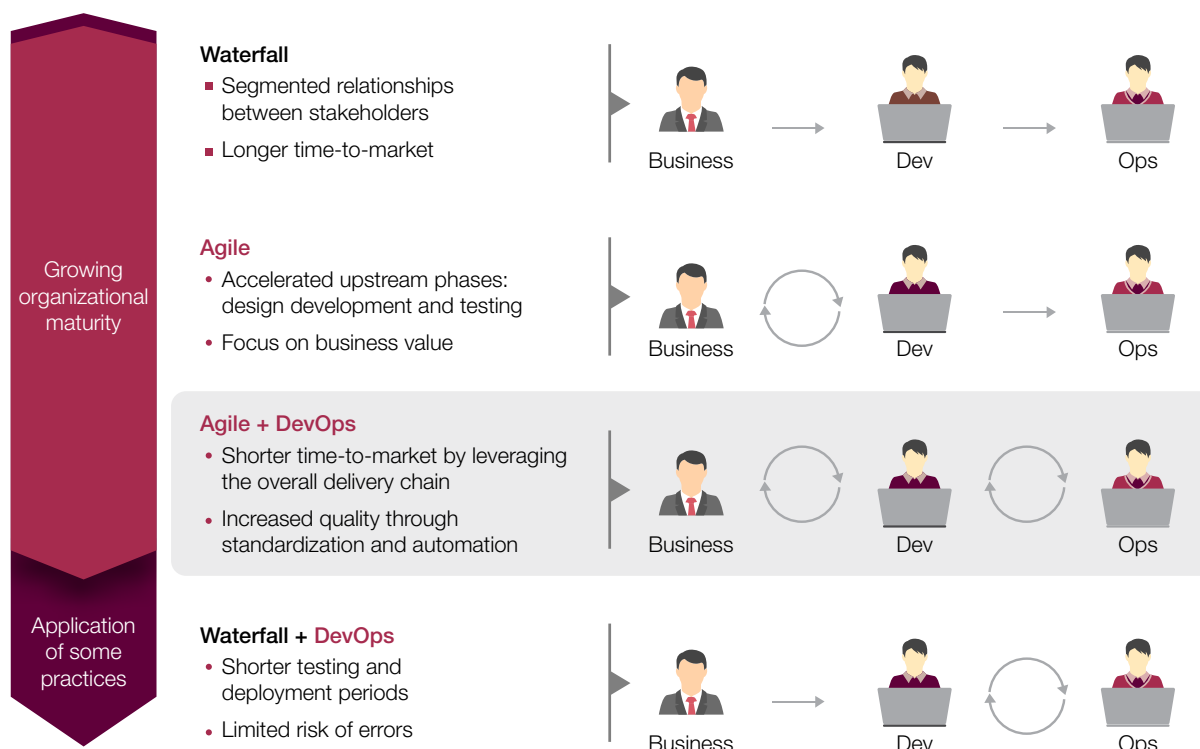
DevOps promotes collaboration between Dev and Ops teams as well as standardization, using highly automated approaches to deploy solutions that evolve as fast as your business needs it. By adopting DevOps, organizations stand to drastically improve the business value delivered.

Following are the major benefits implementing DevOps: shorter time-to-market, better quality of service and

decreased operating and testing costs thanks to automation and continuous improvement.

DevOps and Agile

Agile fosters collaboration between Business and Dev teams, while **DevOps focuses on Dev and Ops collaboration, bringing agility up to production.** DevOps gains can be maximized when combined with Agile practices, which drives companies to merge and embrace both these concepts. However, DevOps best practices can also be applied to waterfall projects.



DevOps Market

DevOps pioneers are Web giants and Digital natives who have succeeded in reaching uncommon deployment frequencies. **Nonetheless, almost all sectors and companies have benefited from.**

In 2016, the DevOps market stood at \$2.6 billion and is currently experiencing strong growth trends as it gets more and more popular due to the increased pressure for faster time-to-market and due to the emergence of new software engineering technologies.

DevOps has become a major feature of high-performing IT organizations of all sizes and sectors.

According to Gartner, **DevOps ranks second among CIO priorities for 2017**, who have already started prioritizing their DevOps deployments at a larger scale.

44% of French companies have either on-going or upcoming projects that include a DevOps dimension.



One roll-out every ten seconds



One roll-out per day



Two roll-outs per day



Average time-to-market down from 4 to 2.5 months



Two roll-outs a week

Timing



Shorter
"time-to-market"

- Lead times are decreased at every step of the software delivery cycle, from development to release through:
 - Manual task automation
 - Collaboration between teams that have historically worked in silos

< 1 hour*

Lead time for changes for high IT performers

+ 17%** Improvement in the deployment frequency

Quality



Better quality of service

- More stable and efficient services deployment through process standardization and automation
- Decreased risk of errors due to smaller changes
- Continuous improvement of the code deployed in production, thanks to more frequent releases allowing better integration of end-user feedback

+ 22%***

Improvement in the production quality

Cost Reduction



- Cost reduction should be an outcome rather than the initial objective of DevOps
- Reducing tasks related to manual testing and automating configuration management allows your resources to focus on more value-added activities
- Project management and coordination costs are also reduced

- 11%***

Reduction in test and run costs

(*) Source: Gartner

(**) Source: 2017 State of DevOps Report

(***) Source: White Paper CA technologies « What smart businesses know about DevOps ». Panel: 1300 IT Managers in 21 countries

Capgemini Consulting DevOps Framework

Security

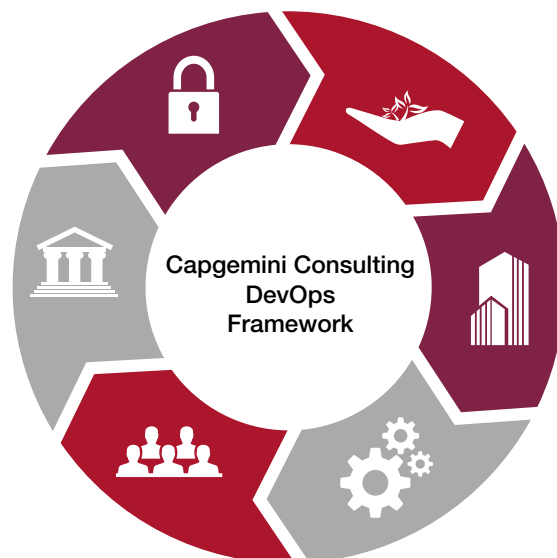
Integrate the DevOps approach into the security policy, processes and tools Automate the security tests before the production deployment

Architecture

Establish the required IT modularity to separate the change cycles from the rest of the architectural components

Organization

Set up Dev Ops teams organized by products or services, in charge of build and run activities of their respective application perimeters. Set up Ops support teams focused on delivery of IaaS and PaaS platforms



Culture

Create favorable conditions to foster Dev-Ops collaboration based on Agile and Lean principles

Delivery Process

Drive standardization and automation of IT delivery processes to shorten the lead time from code to production and implement DevOps best practices related to software engineering

Tool Chain

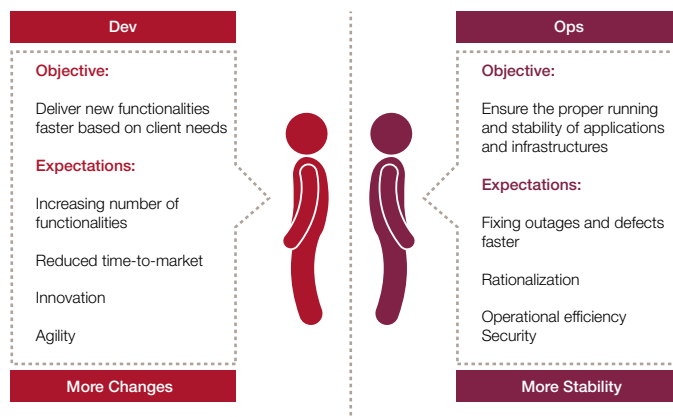
Provide an integrated toolchain to IT delivery teams to support software delivery, based on scalable environments that are available on demand



Culture

- A true cultural change is the most challenging dimension of a DevOps transformation and is absolutely indispensable to succeed
- People and collaboration are at the heart of the DevOps culture. The goal is to tear down the wall of confusion that often exists between the Dev and Ops worlds
- Multi-skilled Dev & Ops resources are required to work as one team sharing experiences both ways and ideally located at the same site
- Dev and Ops teams must share the same objectives, risks and KPIs to achieve business expectations
- The DevOps culture reviews failure at work, promotes the Test & Learn approach and encourages teams to capitalize on errors

This can only be achieved if the management drives the cultural change, adopting transformational leadership: a good leader affects a team's ability to deliver code, architect good systems, and apply agile and lean principles to how the team manages its work and develops products.





Delivery Process

The purpose of DevOps is to bring continuity wherever possible, which essentially calls for a complete overhaul of your software delivery process, pursuing two distinct objectives:

shorter lead time and better code quality. This involves 4 key pillars:

1. Eliminate the wait times between steps.

A Lean assessment helps you identify these wait times and find relevant solutions. Empower your delivery teams and give them greater responsibility, for example, by removing too many approval workflows or decision-making committees.

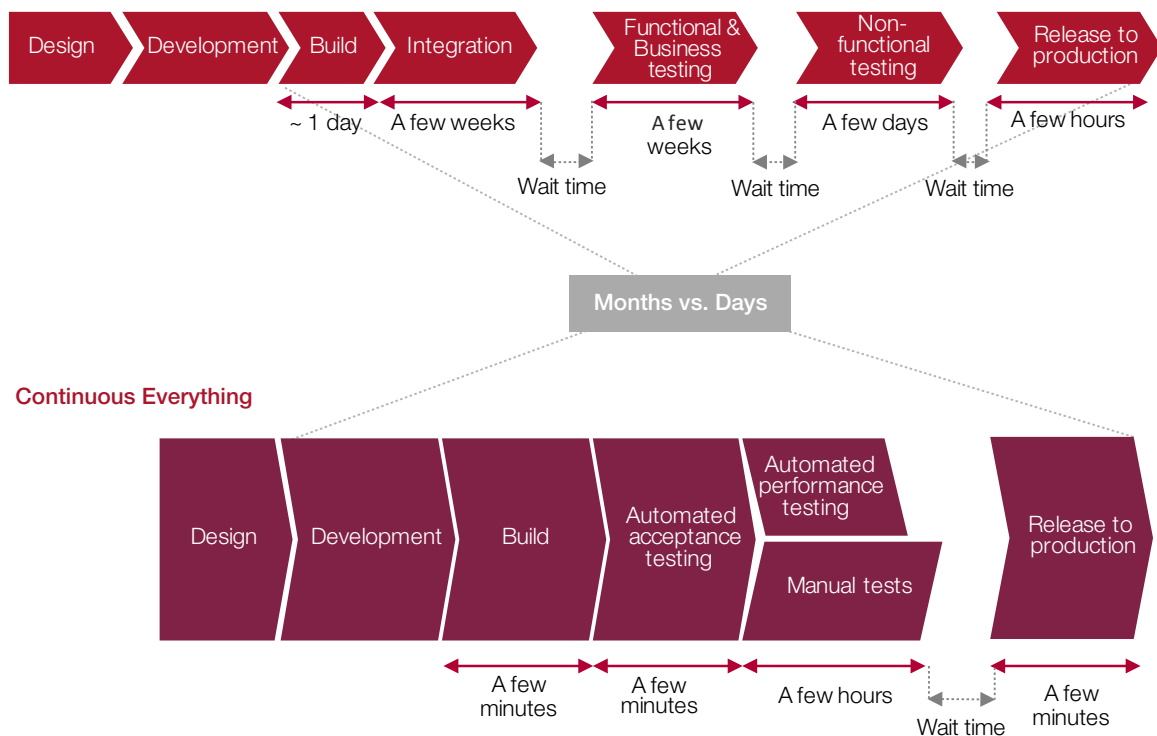
2. Automate tasks as much as possible. All non-value added tasks like test execution, environment configuration, deployment preparation should be standardized and scripted. Automation can only be achieved with proper tooling. Process changes need

to be carried out along with the implementation of an integrated toolchain.

3. Revisit the delivery sequence. Design and development will continue to be the starting point. The next step will be to conduct all automated tests in a row: unit, integration, functional, business, security, etc. Then, you will generally have to conduct some manual tests before launching one-click deployment in production.

4. Drastically reduce the size of changes released to production. Big releases generate high risks, whereas small releases create fewer incidents and make root cause analysis easier. Therefore, the demand management and change request process should be reviewed.

Process reviews should be done at a team level with a continuous improvement mindset. Starting with steps that can generate higher gains in terms of lead time is usually a key success factor.





Toolchain

DevOps can not reach its full potential without proper tooling. The IT Department has to provide an integrated and self-service DevOps toolchain to the project and application teams, supporting the whole delivery pipeline, from build to production deployment, and then run monitoring, in addition to collaboration tools.

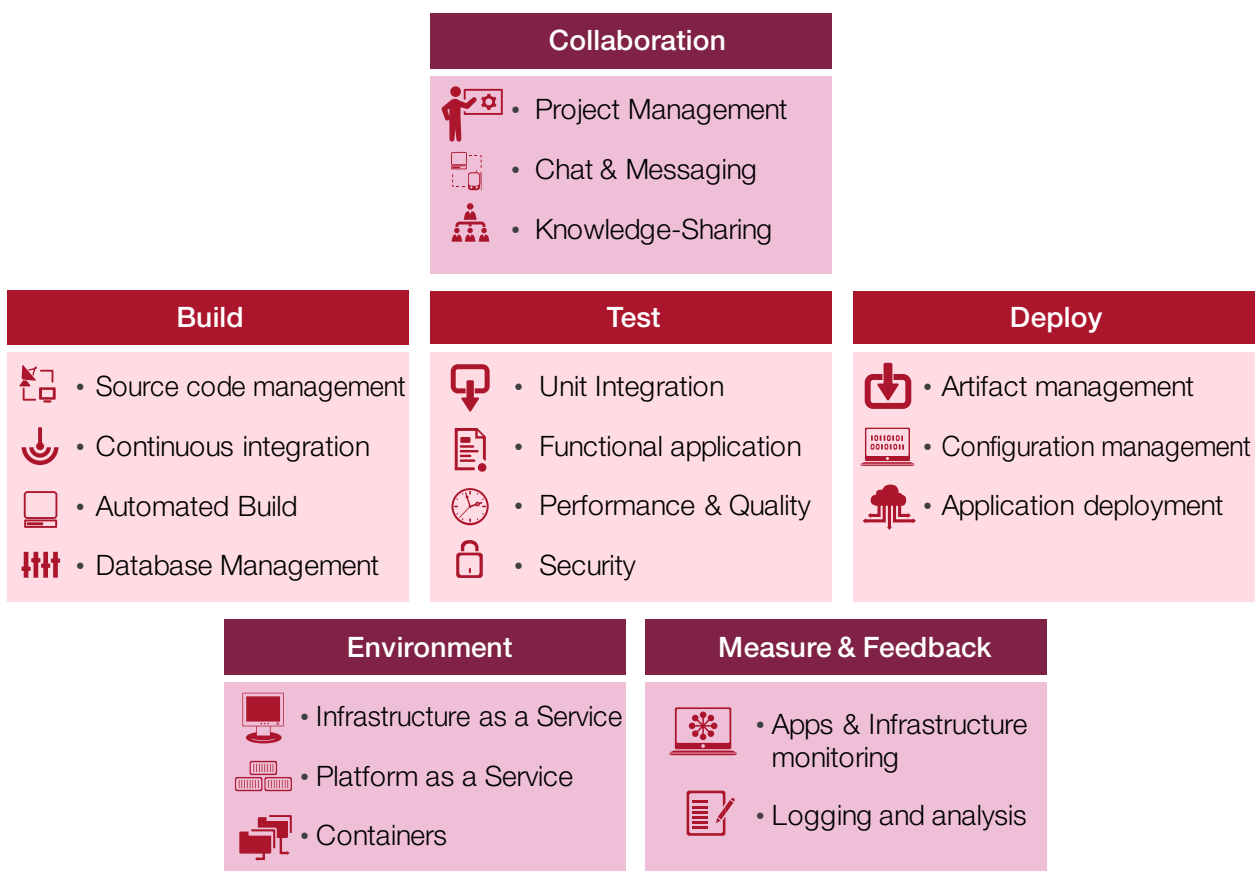
The implementation challenge resides in choosing the most appropriate solutions available in the market. Many solutions are open source and the technology is changing rapidly. **Choosing a Cloud-based toolchain is an implementation**

accelerator and facilitates scalability. Moreover, 'Platform as a Service' (PaaS) solutions offers a complete set of DevOps tools.

It is critical that the required tools are selected in a collaborative manner, involving Dev architects, Ops architects and Security experts and that a pilot implementation is carried out as soon as possible.

Although project teams can build their own toolchain, **we recommend asset sharing to reduce costs, along with the implementation of common software delivery best practices.**

Functional scope of the DevOps Toolchain





Organization

A DevOps transformation requires an organizational shift from teams working in silos to integrated teams managing applications end-to-end. Several organizational patterns are available and can co-exist in your organization.

The one-team DevOps model: a multidisciplinary and autonomous team in charge of building and running the application. It includes all skills required to develop, test, deploy and run an application. Team roles need to be clearly defined. Like in an Agile organization, the product owner is in charge of the business vision. The quality analyst is in charge of carrying out test automation and the release manager is in charge of defining the criteria for 'moving the code into production'.

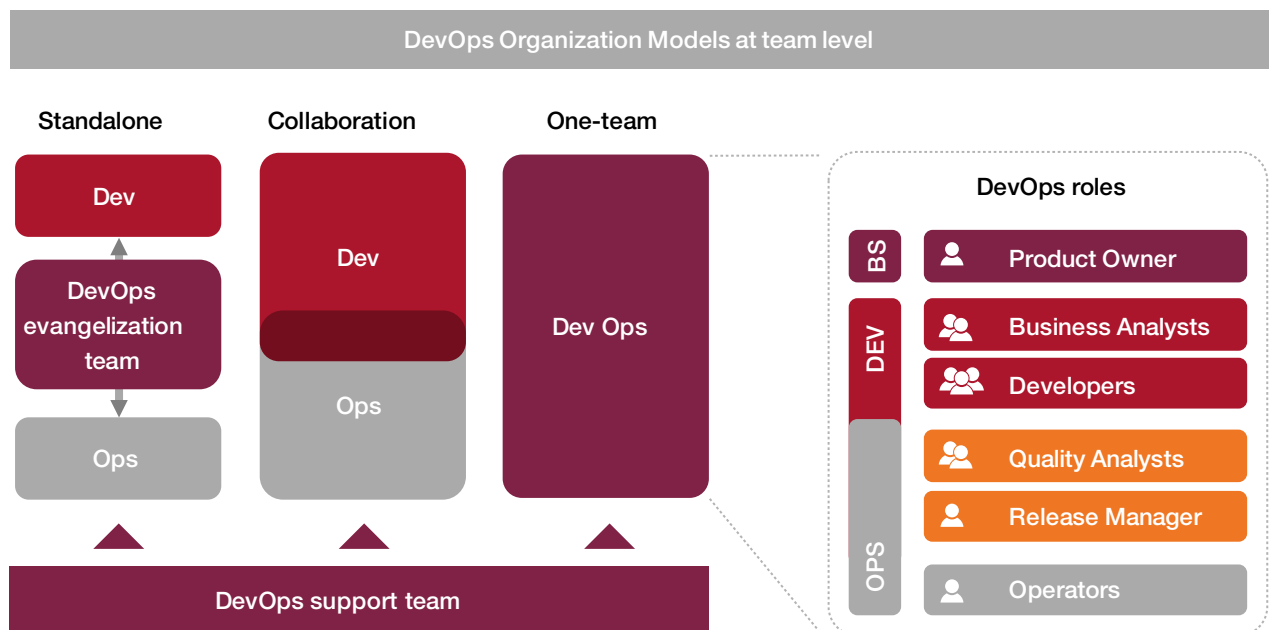
In the collaboration model, the Dev and Ops teams remain separate, but with a high level of collaboration. They work closely together, share the same tools and have common

objectives and KPIs. They also adopt practices that help reduce silos, like contribution of Ops resources to design aspects or the participation of Dev teams in incident analysis.

During the transition phase, you can set up a “DevOps evangelization” team, serving as a coach to implement collaboration practices. This model is generally a transitory one before moving to the collaboration or one-team model.

You also need to set up a DevOps support team, which cuts across the Dev and Ops organizations, in charge of managing the DevOps toolchain, ensuring DevOps evangelization and deployment. They also own DevOps best practices and can provide coaches to the project or application teams moving to DevOps.

In terms of transformation approach, it is much easier to transform Agile teams into DevOps teams.





Architecture

Limiting dependencies between applications through new architectural patterns is a key success factor for a successful DevOps implementation.

Microservice architecture is designed to solve complex integration and maintenance issues and can bring significant benefits:

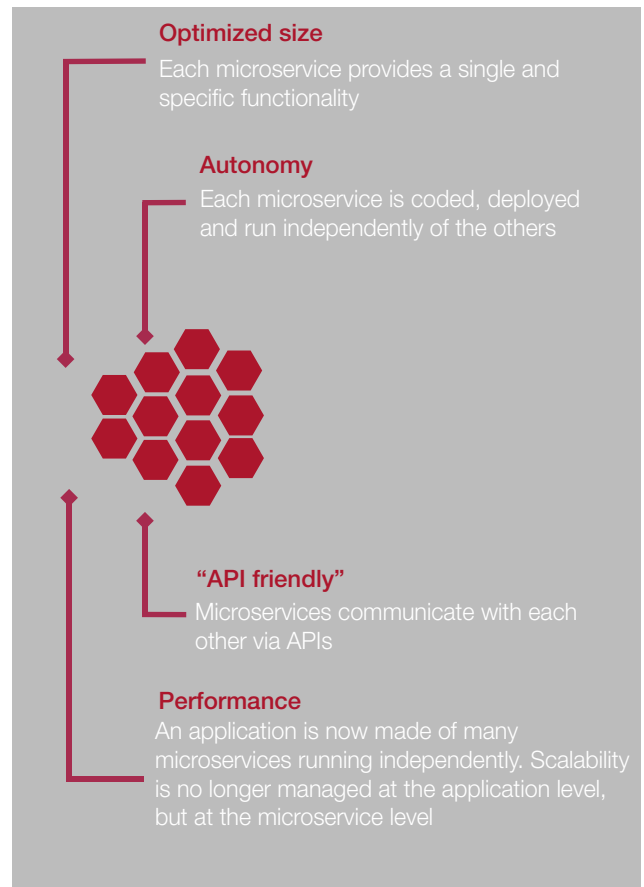
- **Accelerated ramp-up for DevOps teams:** with smaller microservices, the coding team can quickly develop skills to be operational on an optimized functional perimeter
- **High frequency releases:** DevOps teams can update a single microservice without having to update the rest of them and managing any side effects
- **Shortened application downtime:** it is quicker to kill and then restore one defective microservice than having to localize the failure and trying to solve it within one monolithic application



Security

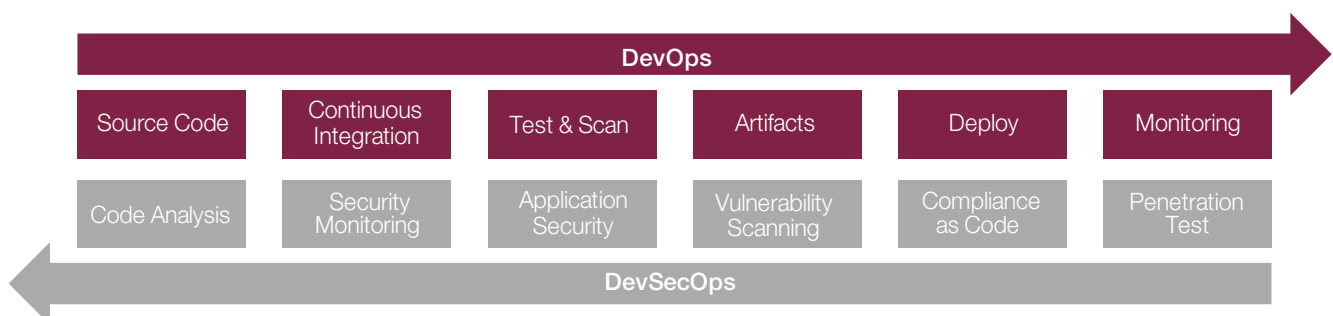
The security policy and practices must be aligned with the new DevOps practices to keep up with the service level agreements of the business. It is thus strongly advised to address this topic right from the very beginning of the DevOps transformation.

You should first focus on spreading the security culture and training teams on how to work together in a DevSecOps organization. This will strengthen team autonomy as they become responsible for software security.

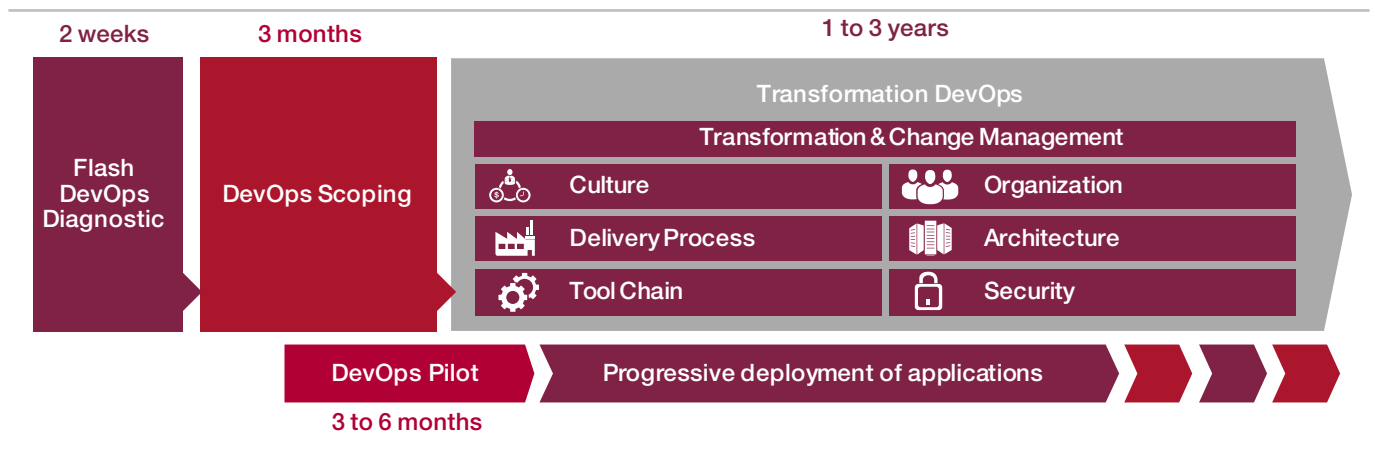


Security engineering should leverage the set-up and automation of continuous integration and delivery platforms so as to include new generation security tools. This will enable all teams to test security compliance more efficiently, and therefore, boost their productivity.

Implementation of security metrics should include best practices to steer the security strategy and identify risks and threats. Transparency should be guaranteed with “security scorecard” monitoring applications and infrastructures.



The Capgemini DevOps Approach



The main challenge of a DevOps transformation is to concurrently manage the various aspects of the transformation: culture, process, organization, tooling, architecture and security. This requires that you invest significant time and effort in the scoping phase to define ambition and targets, set up the right competencies and identify the applications eligible for DevOps.

Another key success factor is the early implementation of a pilot team that participates in defining targets and helps you to fine tune your implementation approach. Then, you can start progressively implementing DevOps across eligible applications. At the team level, implementing DevOps, while continuing with existing Agile practices, helps reduce risks and makes it easier to overcome the cultural challenge.

It is advisable to have a top management sponsor, who can look beyond Dev & Ops perspectives and facilitate alignment of Dev and Ops management teams around a shared ambition. You need to set an ambitious target shared between the business,

Dev and Ops teams, and make sure that your objectives are measurable with simple and meaningful metrics, like reduced deployment frequency or faster mean time to recover.

The DevOps transformation team should include several DevOps coaches combining agile coaching skills, knowledge of DevOps practices and tooling expertise. They can intervene on a part-time basis for a duration of 1-3 months to help teams transition to the new DevOps way of working.

To help you get started, we have developed a detailed maturity model to evaluate the maturity levels of your team or your company within a matter of a few weeks. It consists of:

- 5 maturity levels
- 150 best practices
- 4 analysis dimensions around development & tests, release & deployment, monitoring & optimization and culture & organization

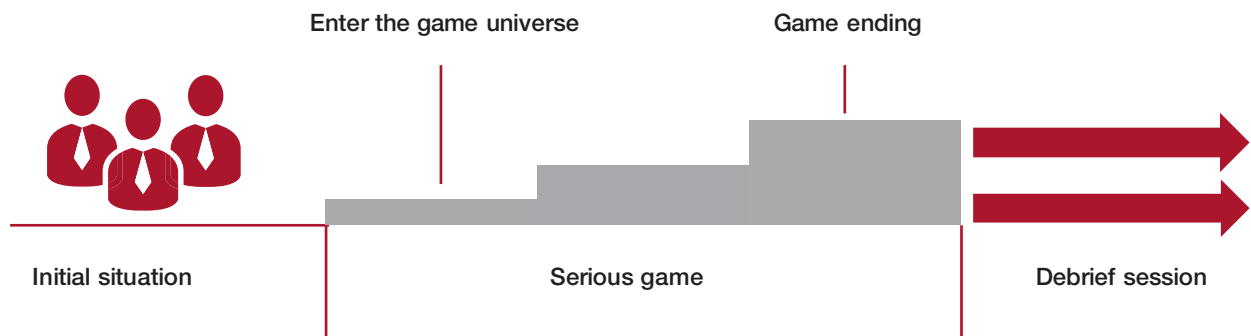


DevOps serious game

We will leverage one of our partner companies that has developed a DevOps serious game that makes it easier to understand DevOps challenges faster and facilitates the cultural change. It can also be used for team building to start a DevOps transformation at an application level.

The DevOps serious game allows participants to see for themselves the business benefits of embracing DevOps best practices, such as reducing costs and driving the ROI.

It simulates a real DevOps environment and allows participants to collaborate and try out actual practices. By working as a team in a three-round game, participants have to deliver a maximum of applications commissioned by the business within the best possible time and conditions.

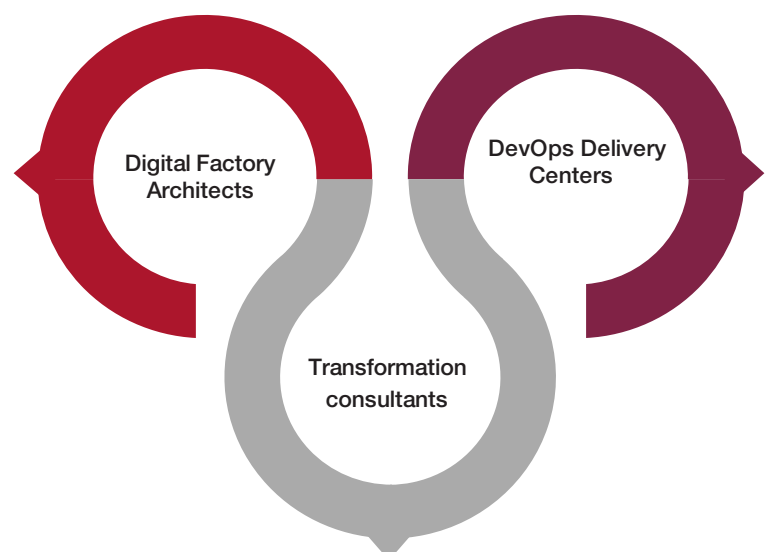


Mobilizing Capgemini's Expertise

The Capgemini Group has been involved in implementing several DevOps projects over the last several years, thereby acquiring a significant amount of experience covering different types of expertise.

- **DevOps architects from our Digital factories** who have implemented DevOps toolchains and whose experience can be leveraged to your benefit
- **Capgemini IT delivery centers** working in DevOps mode that have successfully carried out their own DevOps transformation in the past
- **Capgemini Consulting's** expertise to define an overall vision, driving the overall approach and leading the culture, organization and process streams in a collaborative manner

Our strength lies in our ability to bring all this expertise together as and when needed during your DevOps transformation journey.



Capgemini Consulting – Key Credentials



Designing a 2-year Agile & DevOps roadmap for a major player of the oil & gas industry

- DevOps maturity assessment for each business unit
- Detailed 2-year roadmap, including the scoping of 5 DevOps work streams: new solutions for environment provisioning, setting up a continuous integration platform, test automation, implementation of new processes and tools, governance and monitoring (KPIs)
- Identifying applications eligible for DevOps based on a defined set of criteria



Scoping a DevOps program for a French public player

- Implementation of 5 work streams: Tests, Environments, Development and Deployment Tools, Way of Working and DevOps Roadmap
- Defining DevOps transformation KPIs to monitor continuous improvement
- Implementation of new collaboration practices for DevOps teams



Setting up a DevSecOps Software Factory for a player from the payment solutions industry

- Defining the ambition, scope and mission of the Software Factory
- Identifying 15 use cases of the Software Factory to prepare for the implementation
- Defining the functional scope of the target toolchain



For the IT production unit of a large French bank, designing a new service offering: an in-house PaaS CloudFoundry for mobile & web app development using the DevOps approach

- Defining PaaS services and benchmarking CloudFoundry solutions
- Creating a DevOps community including IT production and Dev entities
- Scoping experiments
- Organizing a Hackathon and a DevOps day
- Studying the impact on the organization and skills



For a major transport company, defining their target DevOps toolchain and helping them choose their Cloud provider

- Reviewing the existing continuous integration platforms within the IT department
- Interviewing providers and benchmarking Cloud-based DevOps platforms for continuous integration and deployment
- Creating a business case for the new platform, carrying out an impact assessment, and constructing the implementation roadmap

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