The journey to DevOps

Driving value in the public sector

The case for the public sector to innovate around service delivery, whilst driving cost-savings and improving efficiency, has never been greater. This paper is written for technology managers within such organisations, who face the significant challenge of designing and delivering transformative digital services. It introduces the core concepts behind DevOps, considers the unique challenges faced by the sector, and suggests how such organisations can embrace the DevOps mindset and culture that is driving technical innovation in some of the world's biggest enterprises.

A white paper by Bartosz Jedrzejewski

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Introducing DevOps

What is DevOps and why does it matter?

The name DevOps comes from the amalgamation of Development and Operations. In essence, it's a software development methodology best defined by the "DevOps Mindset" which guides its implementation and management style, and the "DevOps Culture" it creates.

The "official beginning" of the DevOps movement can be traced back to 2009, when Patrick Debois organised the first devopsdays conference. The movement has grown in popularity ever since, as demonstrated by the increasing number of businesses now implementing or planning to implement DevOps.

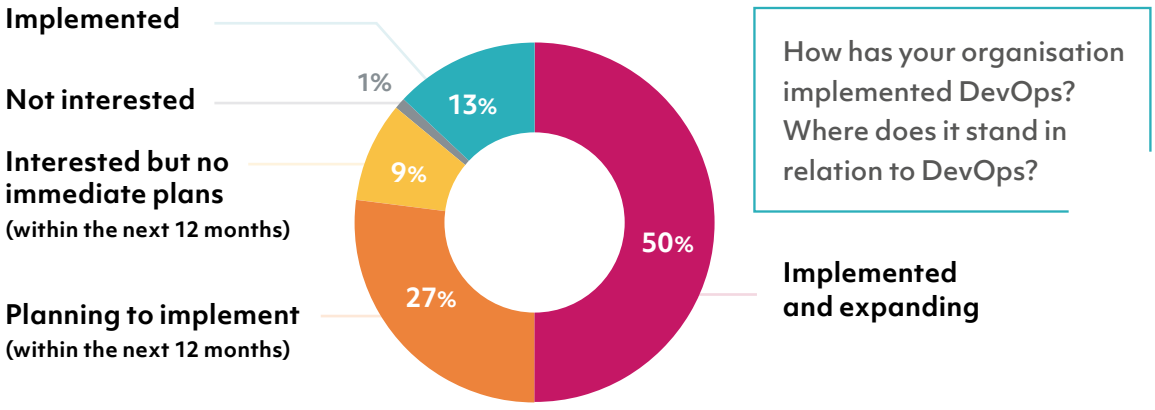
In 2016, Patrick Debois, Gene Kim and Jez Humble published The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, which became the de-facto reference text on DevOps and an international bestseller.

In practical terms, organisations have traditionally assured quality, security and compliance through post-development activities within their Operations department. The rigorous processes herein are designed to ensure services are production-ready, but these processes lengthen release cycles and delay time to market. This hinders workflow and stifles agile development practices.

The introduction of DevOps tooling (to automate the process of testing, integration and deployment) reduces the potential for error and shortens cycle times; but the full benefits can't be recognised until organisations embrace a true DevOps mindset and culture.

Within a true DevOps culture, responsibility for quality, service management, compliance and security does not rest solely with the Operations Department. Instead, it is collectively owned throughout the entire service delivery process. Activity gets "shifted left", such that developers build tool support into services, collaborating across teams to ensure they meet exacting service standards. Similarly, Operations collaborates with delivery to recognise that standards are met so that post-development activity can be reduced (or potentially eliminated).

In this way, DevOps is of increasing importance to public sector organisations, who face mounting pressures to deliver better, faster citizen-led services.



How has your organisation implemented DevOps? Where does it stand in relation to DevOps?

Base: 237 DevOps pros. Source: Forrester's Q1 2017 Global DevOps Benchmark Online Survey

DevOps mindset

DevOps, just like agile, is not simply a process to be followed. It is a way of thinking and a way of behaving or, as is now more commonly described, DevOps is a mindset and culture.

The core DevOps mindset is comprised of the three key elements: **"Flow", "Feedback"** and **"Continual Experimentation and Learning".** Nearly every adopted DevOps practice can be traced back to these elements.

Flow

You need a smooth flow of work through your value stream

Enabling flow means enabling work in the system to move quickly; it's the part of software development often compared to a factory floor. You could consider different "work stations" through which you want to quickly move "work items". Your stations could be "business story being written", "code being written", "code being tested", "code deployed to production".

Feedback

You need fast, tight feedback loops

It's an excellent achievement when "work items" move quickly through "work stations", but we can't forget the importance of quality. If work is of poor quality and must continuously be moved back to earlier steps in the process, there is a problem. To prevent this, it's essential to create fast, tight feedback loops in your system. Good feedback is enabled by quality control throughout the process, supported by automation.

Continual experimentation and learning

Nothing has an end!

Once you have high quality work items flowing quickly through your system, with effective feedback loops in place, you are well on your way to embracing a true DevOps mindset. The final element to be embraced is that of this journey being continual; without end. Even if you are doing everything efficiently, there are always new challenges, new people, new technology, new project realities, and this means that continual experimentation and learning is essential.

The DevOps mindset then is all about improving the speed and the quality of your outcomes while creating a lasting impact. In some ways, it's very similar to the agile movement, and just as with agile, it can be challenging to achieve full integration, particularly for those working within the uniquely challenging public sector environment.

> "An evolution that involves progressively adopting more agile development, increasing automation and continuous integration, simplifying structures and systems, and focusing on the flow of change over the stages it goes through.[1]"

Aaron Powell, chief digital officer at NHS Blood and Transplant (NHSBT) on the introduction of DevOps

[1]ComputerWeekly.com

Challenges to public sector adoption

Delivering technology projects in public sector organisations comes with a set of unique challenges. Often the scope, security considerations and ways of working differ from those in the private sector, as recognised and explored in a number of well-received articles by such sources as Computer Weekly[2] and CA Technologies.[3]

However, recent years have seen a growth in the popularity of the agile movement in the public sector, and an acceptance of the numerous benefits it brings. Embracing DevOps is the next logical step on this journey to further improve the quality, speed and cost of delivering public services.

But achieving high DevOps maturity is not an easy task. Knowing what problems you may face can help you tackle them proactively, rather than wait for them to derail your efforts in DevOps adoption. In our experience of working on DevOps projects with public sector clients, a number of challenges repeatedly present themselves:

Lack of in-house DevOps expertise

The obvious problem faced by many organisations is the lack of experience. DevOps is still a relatively new movement, and many professionals have not yet worked on DevOps at any meaningful scale.

Lack of management support for DevOps mindset and culture

It is not enough for DevOps to be embraced by developers and testers. It's important for the wider management to be supportive and aware of differences in mindset and culture that comes with DevOps. Public Sector organisations in the UK have a rich experience of agile working, which should make this transition easier.

Lack of technical experience

Adopting DevOps often brings some tools that help to streamline and accelerate development. These tools include continuous integration offerings, containerisation technologies (Kubernetes, Docker) as well as a whole array of Cloud tools. Again, there can be a lack of specific expertise around these technologies.

Concerns regarding security

With the speed of delivery increased and a strong push towards automation, it's natural for stakeholders to be worried about the security of this new approach. These concerns need to be fully understood and addressed before a successful DevOps journey can be undertaken.

Misconceptions around cost

There's a common misconception among some decision makers that adopting DevOps is costly. Time and time again, it is being proven that adopting DevOps, often coupled with a move towards the cloud, can drastically reduce costs and capital expenditure.

In the next section, we suggest a process through which to overcome such challenges and kick- start your DevOps journey.

[2] www.computerweekly.com/feature/DevOps-in-the-public-sector-Assessing-the-challenges-and-the-benefits
[3] www.ca.com/content/dam/ca/us/files/ebook/your-guide-to-devops-in-government.pdf

Making DevOps work for you

Assessing your DevOps maturity

Since DevOps is more than a simple framework, it's possible that some best practices may already be inherent in your current delivery practices. To best direct your efforts, however, and ensure control over your processes, it may be worth assessing your organisation's DevOps maturity against five key criteria:

1. Integration of development and operations

In an organisation with high DevOps maturity, development and operations work hand in hand, without friction, and with shared responsibility for quality.

Specific questions to ask:

- Do members of the respective teams know each other?
- Are developers empowered to provision their environments?
- Is there a long waiting period for any infrastructure change to happen?
- Can developers understand the operations work, and can they help?

> "For us, the scale of our organisation is the major issue – we transact more than £170bn every year and have one of Europe's largest IT estates, operating across 850 buildings and 90,000 desktops. That requires a lot of orchestration, and DevOps is key to this ... By adopting a DevOps approach, we're able to bring services to life more quickly and more reliably, respond more reactively to user needs, and benefit from cloud capabilities."[4]

Mayank Prakash, Chief Digital and Information Officer at the Department for Work and Pensions (DWP)

2. Release process maturity

Continuous Integration (CI) and Continuous Delivery (CD) are closely associated with DevOps. Using CI/CD vastly increases "the Flow" of work through the value stream. This means that to assess your DevOps maturity, you should asses the speed at which you can release your software.

Specific questions to ask:

- Do you have an automated release pipeline?
- Are you using Continuous Integration?
- Are you using Continuous Delivery?
- Do you have multiple environments for different stages of your release pipeline?
- How often are you releasing to your QA/UAT environments?
- How often are you releasing to production?

[1]ComputerWeekly.com

3. DevOps testing

An effective testing process is a key aspect of DevOps maturity. If done right, your testing should give everyone on your team greater confidence in your software once it passes through the release pipeline.

Specific questions to ask:

- Is automated testing part of your release pipeline?
- Do you employ different quality gates at various stages of your pipeline?
- How confident are you that your software is working once it passes through the release pipeline?
- Do you have adequate tooling support for testing?
- Do you have adequate monitoring support once the software is live?

4. Culture of automation

The culture of automation is a visible change that happens in organisations that are successfully adopting DevOps practices.

Specific questions to ask:

- Are your technical staff automating manual processes?
- Is automation your default approach for solving problems?
- Are slow, manual processes no longer accepted as long-term solutions?

5. Continual experimentation and learning

DevOps is not something that happens once, and is done. To deliver lasting change, you need to learn and improve continuously. One thing that is constant in software development is change, and your organisation needs to embrace this reality.

Specific questions to ask:

- Do you have a process in place that helps you identify areas for improvement?
- Do you monitor your development closely enough to see any decreases in flow or feedback?
- Do you give your employees time and resources to learn?
- Do you spend time experimenting to make your processes better?

Starting your DevOps journey

Most organisations have already made some progress on their DevOps journey, even if this hasn't previously been identified as a strategic aim. Conversely, few organisations have fully embraced a DevOps culture. Even where only small steps have been taken it will be possible to identify initial benefits, but the ultimate prize still awaits.

The above questions are a useful way to assess your current situation, but it is also important to remember that achieving full DevOps maturity is not a quick process. It is a journey that involves many people from across the organisation, and can take a long time. Within the public sector, the groundwork for this journey has already been set through the widespread adoption of agile practices, yet it is still useful to understand what this new DevOps journey looks like, so you can plan how to effectively embark upon this within your own organisation. The following page recommends a five-step process to follow to kick-start your DevOps journey, based on several examples that have worked well with our own public sector clients.

Starting your DevOps journey

Step one

Identify your specific problems

It's important to understand where your problems lie in order to ensure change efforts are focused accordingly.

You may discover specific problems like:

- Deployments to production happening very rarely (only a few times a year)
- Testing happens months after the development finishes
- The operations team is continuously fire-fighting
- Developers find it nearly impossible to get any IT changes done
- Architecture is despairing about the state of the system
- Things only ever get worse

Key people needed for your journey would typically include:

- A working group with representation from different areas e.g. development, operations, testing, and architecture
- Try to choose people who understand what "good" looks like and who already understand basic DevOps principles
- Senior leaders are needed to help influence and speed up the adoption of new working practices across teams
- Provide these people with clear information and evidence of improvements so they can influence their teams
- Your "working group" should meet quite often and you must make yourself accessible to other partners

Step two

Assemble your working group

Change rarely happens by chance. Recruit key people from across your organisation, so you can work towards the common goal to work better together, work faster.

Step three

Connect multiple teams

With the involvement of senior leaders, it will be easier to start connecting teams. You want your developers, operations and testers to feel like they are part of one family, one overarching team.

Better collaboration across teams is essential, so you'll need to plan activities to encourage this. Here are some ideas you could try:

- Run team intro sessions, so that everyone at least knows each other's names
- Get a good communication channel such as Slack or Microsoft Teams
- Celebrate each other's achievements and try running joint sprint reviews
- Foster knowledge-sharing - teams that learn together, work better together
- Create a blame-free culture - encourage criticism of process, not people

For example, your goal could be the creation of a continuous integration pipeline, which you could define and deliver against as follows:

- The pipeline must satisfy testers, developers and the operations team
- You could form a dedicated team with the sole task of delivering that pipeline
- Measure savings in time and improvements in quality
- Report benefits to your working group
- With value created and the approach proven, it is then easier to take on more challenging goals

Step four

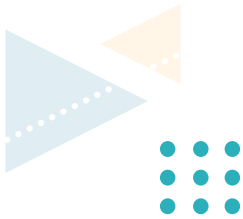
Set goals and deliver against them

Actions speak louder than words. If you want to achieve a broader buy-in in your DevOps adoption, you need to show results.

Step five

Start changing the culture

Specific goal-focused projects are a good way to start, but the change can't be isolated to these "special teams" and "special projects". You them need to switch to a higher level focus on Flow, Feedback, Continual Learning and Automation.



Specific activities to improve Flow:

- **Improve the quality of business stories and tasks** to stop tasks repeatedly going back to business for refinement
- **Improve the sign-off process** so that finished work items are be signed-off in weeks, not months
- **Make deployments automatic** so you can eliminate errors from manual activity
- **Make an Operations representative join Development stand-ups** to improve the speed of problem resolutions
- **Streamline processes** so your team is not slowed down

Specific activities to improve Feedback:

- **Review business stories quickly** and involve testers and developers early on
- **Automate testing as part of development** so you don't need to test the system manually with every new feature
- **Add different levels of testing across the deployment pipeline** with time-consuming tests later in the pipeline
- **Involve the business early,** for example, through quick feature mocks to test against business criteria
- **Insist on good code review and branching process:** merge/pull requests and code reviews are now standard
- **Agree clear definitions of 'Done'** so everyone understands what it takes to finish a task

Specific activities to encourage Continuous Integration, Delivery and Deployment:

- **Prioritise continuous integration** from the very start
- **Establish continuous delivery** by starting with connecting people rather than taking on difficult challenges straight away
- **Enable Continuous Deployment** so that automatic deployments to production are enabled after the code is merged

Enjoying the rewards of DevOps

By the end of step five, you may feel your DevOps journey is over, but unfortunately you'd be wrong! To enjoy the full benefits of DevOps, it's important to remember that all software projects involve a constant stream of change and challenge.

It's critical to build this realisation into your project expectations; to accept that you'll never stop learning, and to encourage your team to embrace and enjoy change, rather than resisting it. This is key to achieving a full DevOps mindset and culture throughout your organisation.

But it is definitely worth the effort! Our consultants have seen increasing numbers of our public and private sector clients commit to their own DevOps journeys, and realise significant, measurable benefits. In fact, the growing adoption of DevOps has transformed the way in which we deliver our software and consultancy services, in a number of really important ways:

- **We see much higher levels motivation and morale in all the teams**
- **Delivery speed across all aspects of projects drastically increases**
- **There is a tangible improvement in the quality of end product**
- **Automation is everywhere, meaning the removal of slow and tedious processes**
- **Projects are succeeding more speedily, against the doubt and challenges**

DevOps marks a new and exciting way in which we deliver software and it can have a truly transformative impact on any public sector organisations willing to embark upon the journey. We wish you luck as you plot and prepare for your own travels, and if we can help in any way, please don't hesitate get in touch.

At a glance benefits[5]

- **High-performing organisations decisively outperform their lower-performing peers.** They deploy 200 times more frequently, with 2,555 times faster lead times, recover 24 times faster, and have three times lower change failure rates
- **High performers have better employee loyalty,** as measured by employee Net Promoter Score (eNPS)
- **High-performing organizations spend 22 percent less time on unplanned work and rework.** They are able to spend 29 per cent more time on new work, such as new features or code
- **Taking an experimental approach** to product development can improve performance
- **Undertaking a technology transformation initiative can produce sizeable returns for any organisation.** Using key metrics, we've provided formulas to help you quantify potential cost savings

> "In this environment, the old service models and over-the-wall handovers don't work efficiently. DevOps provides us with an opportunity. We've had to adapt and develop tools, techniques and, most significantly, a culture that enables us to deliver securely, reliably, resiliently and quickly.[6]"

Mayank Prakash, Chief Digital and Information Officer at the Department for Work and Pensions (DWP)

[5] Puppet State of DevOps Report 2017 [6] ComputerWeekly.com

Scott Logic client stories

Read how Scott Logic helped Rabobank shape an effective DevOps culture.

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Helping shape an effective DevOps culture

Rabobank

When Rabobank wanted to ensure that its delivery teams were adopting DevOps methods effectively, it called on the experienced team at Scott Logic.

Rabobank's London IT Department was six months into its transformation to DevOps. However, the company felt the culture needed help to take root, and lacked uniformity within the various delivery teams across IT systems in London.

Scott Logic consultants provide bespoke solutions that fit in with a company's wider goals. Therefore, their first step was to travel to the company's head office in Utrecht to meet the DevOps coaches helping to shape delivery teams in The Netherlands. They had started their journey six months ahead of the London office and were able to advise on their strategy. Working with these coaches, Scott Logic identified a strong collaborative approach which would help the London teams transform, while maintaining the unique culture of the business itself.

Scott Logic shaped bespoke coaching sessions for six delivery teams, facilitating intense review and discussion of DevOps principles, and agreeing achievable goals. As a result, each team was able to demonstrate tangible progress toward adopting DevOps, in a way that was more positive and in-keeping with the values of the bank.

// Through their coaching style, Scott Logic's team has empowered individuals in their new DevOps roles which has encouraged greater collaboration within teams. This has resulted in the faster, more efficient delivery benefits of DevOps being realised across the whole IT Operation. //

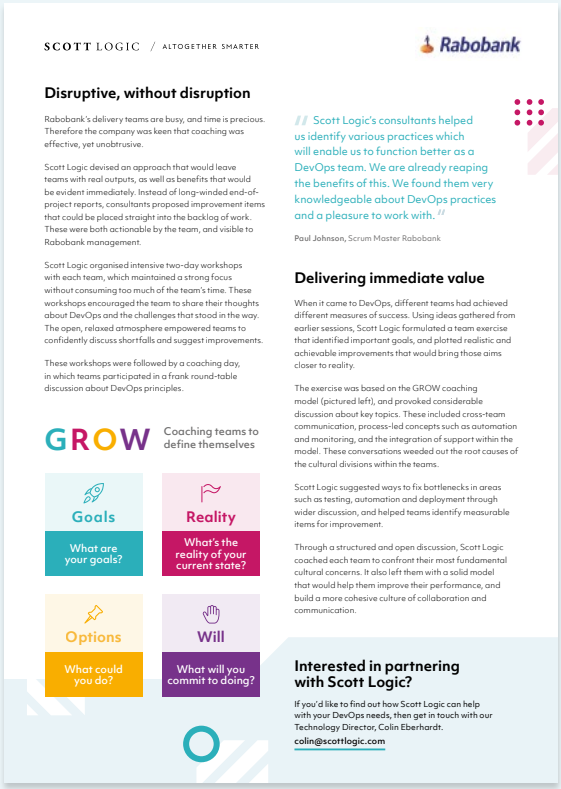
John Hinks, Head of IT Systems Rabobank

Rabobank

Rabobank is an international financial services provider operating on the basis of cooperative principles. It offers retail banking, wholesale banking, private banking, leasing and real estate services. It serves approximately 8.7 million clients around the world.

As one of the oldest branches in the Rabobank international network, the London office is strategically aligned with one of the world's most important and dynamic financial centres, and offers a number of products and services within corporate banking, corporate finance and global financial markets.

scottlogic.com/our-work



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Rabobank

Disruptive, without disruption

Rabobank's delivery teams are busy, and time is precious. Therefore the company was keen that coaching was effective, yet unobtrusive.

Scott Logic devised an approach that would leave teams with real outputs, as well as benefits that would be evident immediately. Instead of long-winded end-of-project reports, consultants proposed improvement items that could be placed straight into the backlog of work. These were both actionable by the team, and visible to Rabobank management.

Scott Logic organised intensive two-day workshops with each team, which maintained a strong focus without consuming too much of the team's time. These workshops encouraged the team to share their thoughts about DevOps and the challenges that stood in the way. The open, relaxed atmosphere empowered teams to confidently discuss shortfalls and suggest improvements.

These workshops were followed by a coaching day, in which teams participated in a frank round-table discussion about DevOps principles.

GROW Coaching teams to define themselves

Goals — What are your goals?

Reality — What's the reality of your current state?

Options — What could you do?

Will — What will you commit to doing?

// Scott Logic's consultants helped us identify various practices which will enable us to function better as a DevOps team. We are already reaping the benefits of this. We found them very knowledgeable about DevOps practices and a pleasure to work with. //

Paul Johnson, Scrum Master Rabobank

Delivering immediate value

When it came to DevOps, different teams had achieved different measures of success. Using ideas gathered from earlier sessions, Scott Logic formulated a team exercise that identified important goals, and plotted realistic and achievable improvements that would bring those aims closer to reality.

The exercise was based on the GROW coaching model (pictured left), and provoked considerable discussion about key topics. These included cross-team communication, process-led concepts such as automation and monitoring, and the integration of support within the model. These conversations weeded out the root causes of the cultural divisions within the teams.

Scott Logic suggested ways to fix bottlenecks in areas such as testing, automation and deployment through wider discussion, and helped teams identify measurable items for improvement.

Through a structured and open discussion, Scott Logic coached each team to confront their most fundamental cultural concerns. It also left them with a solid model that would help them improve their performance, and build a more cohesive culture of collaboration and communication.

Interested in partnering with Scott Logic?

If you'd like to find out how Scott Logic can help with your DevOps needs, then get in touch with our Technology Director, Colin Eberhardt.
colin@scottlogic.com

Rabobank client story

Rabobank is an international financial services provider serving approximately 8.7 million clients around the world. When the organisation wanted to ensure that its delivery teams were adopting DevOps methods effectively, it called on the experienced team at Scott Logic.

scottlogic.com/our-work/case-study-rabobank

Want to discuss the impact of DevOps in your organisation?

At Scott Logic, we design and build software that transforms the performance of some of the world's biggest and most complex organisations.
This means truly understanding current and emerging technologies, and helping our clients make the right choices.

If you'd like to discuss your own DevOps journey, or any other technology challenges that face your organisation right now, we're always happy to chat.

To arrange a free consultation contact Bartosz Jedrzejewski on:

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