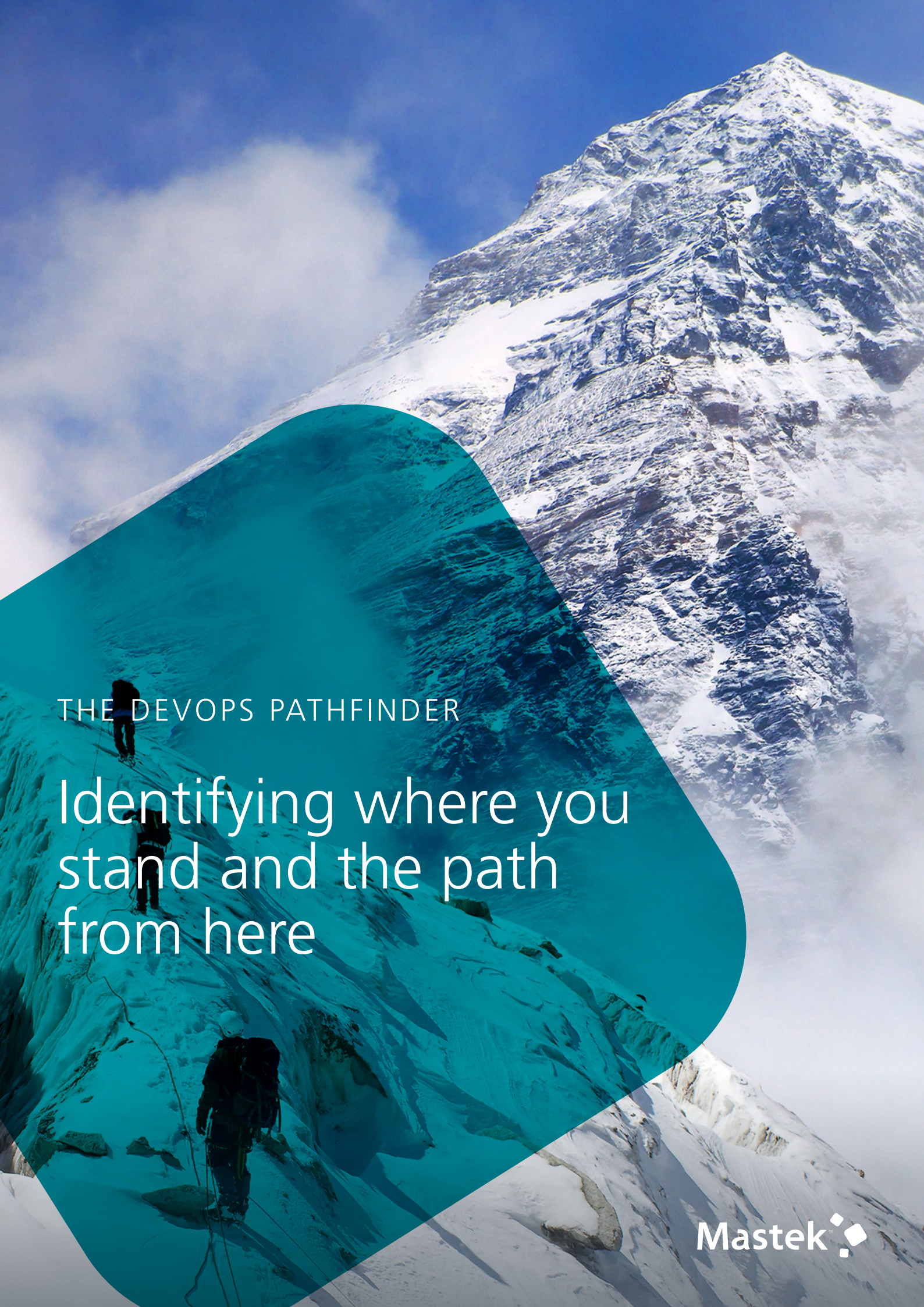


THE DEVOPS PATHFINDER

Identifying where you stand and the path from here

Mastek

Table of contents

How to use this document

The rest of this document describes the stages listed in the contents. Read through them, compare the challenges and goals of each stage to your own experience, and ask yourself the following questions:

- Is there a stage which broadly describes your organisation's current situation?
- Are you ready for the next steps? Perhaps there are important challenges in earlier stages that you have not yet addressed.
- How far along the path do you want to go?

As you chart your path

- This should be an iterative journey, taking achievable steps towards the greater goals.
- You do not have to climb the whole mountain at once. Not every organisation is ready for (or has the capacity for) the higher, tougher slopes
- A journey that stops short of the acclimatisation step isn't a DevOps journey.
- Your staff are the key. Consult and inform them.
- There is more than one route to the summit.

This document does not...

- Describe an exhaustive summary of all the possible stages of a DevOps transformation.
- Prescribe a fixed and inevitable sequence of steps for a DevOps transformation.
- List all the technologies currently associated with DevOps (you may notice there is little mention of cloud or containerisation).

What this document does is present an overview of typical stages that, in our experience, most organisations pass through as they adopt DevOps strategies in the attempt to improve their technology and processes. It can help you chart where you stand on the spectrum from no-DevOps to high-level DevOps mastery, to see what challenges may lie ahead and possibly to spot those areas of technical debt you haven't yet acknowledged.

The route to the summit

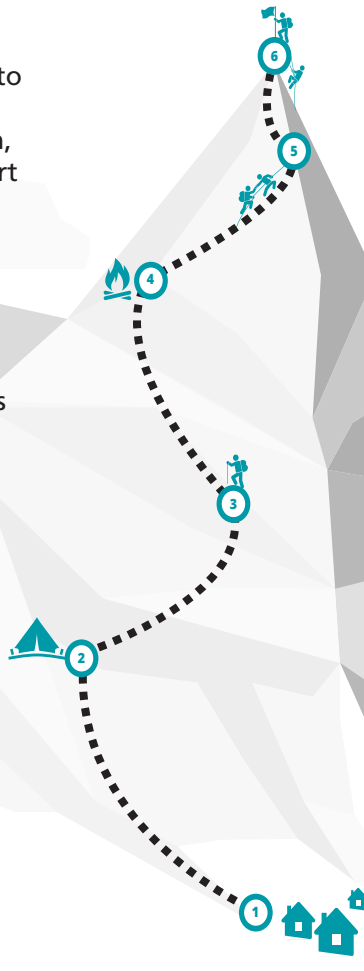
Where are you?

It is rare, these days, for an organisation not to have adopted any of the technologies and practices that have become part of DevOps. But whether you are contemplating a major DevOps transformation or a modest improvement to your current software delivery pipeline, it is important to assess where you stand, how far you have already progressed and what challenges remain. Without that perspective, there is a risk of progress being sabotaged by unacknowledged technical debt and poor prioritisation.

Though each organisation will have unique needs and challenges, there are recognisable stages common to most. If we compare the progress towards an ideal DevOps culture to a mountain-climbing expedition, the stages could be imagined as follows:

1. Pre-climb preparation
Are you ready?

Before setting out on a DevOps transformation, an organisation needs to be in a basic state of preparedness. At this stage, ensure that the goals of the transformation have been communicated across the organisation, that there is sufficient buy-in, that management are prepared to support staff in the challenges ahead and that the staff can see this.



2. Base camp
Checking your inventory

Basic readiness assured, the next step is for an organisation to review its current technology stack and products. This is the time to measure the complexity of your current technical portfolio and identify opportunities for simplification and standardisation. Low-hanging fruit can often be discovered.

3. Beginning the ascent
Consolidation

With a starting plan in place, it's time to act and remove unnecessary complexity. At this stage, an organisation should be reducing the number of technologies and processes to a standard set, clearing the way for the coming transformation. Dealing with low-hanging fruit can offer an important morale boost.

4. Acclimatisation
Improving the DevOps process

The organisation will often find itself the victim of early success. Efficiency improvements can put new levels of stress on staff, processes and infrastructure. A focus on the improvement of DevOps culture is important to reduce the stresses and preserve momentum.

5. The push for the summit
Infrastructure as code

An organisation that has successfully completed the earlier stages is now likely to find that their productive software delivery pipeline is now placing increasing strain on their infrastructure. Advanced automation practices are needed to address this.

6. At the summit
Self-service infrastructure

With a well functioning pipeline and comprehensive infrastructure automation in place, the crowning challenge is to provide the tooling so that teams can trigger the automated provisioning of resources on demand.

Pre-climb preparation
Are you ready?

The challenge

A successful DevOps transformation relies on your most valuable resource: your staff. Organisational and technical change is going to place significant demands on them. They will have concerns, questions and fears. They may worry that key governance and controls will not be addressed by the new processes, that technology they have invested time and effort in will be discarded, even that their technical knowledge will become obsolete and that they may lose their jobs.

For the transformation to succeed, you need their confidence and their willingness to change old processes and attitudes.

Before you set out on the transformation path, you should talk to your staff, address these concerns, clearly communicate the goals of the process and show that they have a role in the transformation.

What you can do

- Clearly define and document the goals of the reorganisation process.
- Define your understanding of the new practices that are to be adopted.
- Communicate these things to your staff.
- Include your compliance/security people and your primary stakeholders in the conversation.
- Hear their concerns.
- Give them confidence that they will have management support to cope with the demands of the transformation.
- On the basis of these assurances, ask for their buy-in and willingness to embrace innovation.

It is particularly important to document the new, collaborative processes that you aim to adopt and the principles behind them. They may only be aspirations at the beginning and progress may require many small iterations, but those goals should be clear from the start.

How we can help

- We have engineers with significant experience of DevOps transformations. They can answer your staff's concerns with stories of how they have seen these challenges successfully met.
- We run DevOps simulation workshops that offer experiential learning designed to increase your staff's understanding of DevOps practice and give them some experience of co-operating on the improvement of a software delivery pipeline.
- We have documentation on how DevOps processes meet security/ compliance issues and other stakeholder concerns.

Base camp
Checking your inventory

The challenge

Before you can start the process of change, you need a clear picture of your estate. You need a comprehensive list of the technologies and an assessment of their complexity. From this should emerge a plan that identifies opportunities to remove unnecessary complication by:

- eliminating duplication where different tools or processes do the same thing.
- moving to standard technologies, tool sets and configuration methods across the organisation.
- identifying in-house products that do not directly address your business case, so that they can be replaced by off-the-shelf or industry-standard tools.

What you can do

- Encourage the wider use of version control for both code and configuration if it is not yet universal. This is a discipline that should be reinforced early, before the more disruptive transformation begins.
- Encourage operations/infrastructure staff to begin testing infrastructure changes before applying them to production or development systems. This is another discipline which should be in place in advance of disruption.
- Help create clear schedules for the review and consolidation of technologies.
- Let your teams take the initiative in choosing which technologies to keep and how to manage the migration.
- Support the honest assessment of the cost of these changes, so that deadlines are realistic.
- Be prepared to set priorities when the teams need them.
- Make those migration goals into milestones and prepare to celebrate their success.

Early wins have a crucial role in improving morale and gaining buy-in to the transformation. It can often be worth prioritising some low-hanging fruit even if the technical reward is not great; the boost to team confidence can pay rich dividends.

How we can help

- We have a portfolio of technical solutions to migration problems and experience of putting them into effect.
- We can show you how to redirect the energies of engineers who have invested time and commitment in technologies that are abandoned in the consolidation. This is a particular morale issue where those technologies were developed in-house.
- Our Agile practitioners can assist you with scheduling and prioritisation.
- Our DevOps and Agile practitioners can guide you in the clear assessment of technical debt.

Beginning the ascent
Consolidation

The challenge

After all the planning, this is the stage where your teams begin to make real changes. Because the aim is the consolidation of existing tech rather than radical changes to tooling or process, the experience should not be too disruptive. However, that makes it all the more important to deliver early wins and to use this less-pressured stage to build collaborative and constructive processes. An organisation that does not begin the development of those processes now will lose momentum as soon as the more ambitious transformation begins.

If you get this right:

- your teams will go into the next stage with a permanent increase in confidence and ability.
- improved organisational efficiency will increase your capacity to deal with the coming stages.
- you should already be seeing cost and time savings (very reassuring to senior stakeholders).

If focus is lost, there's a risk that the process may stall.

What you can do

- Make sure the milestones are celebrated.
- Encourage inter-team support.
- Show how you (management) will also be changing your practices.
- Create multidisciplinary teams to handle the more difficult challenges.
- Start building a portfolio of successful patterns so that they can be shared and reused.
- Spread awareness of the business needs driving the changes. Show how this work is helping the business progress and reinforce that when milestones are celebrated.
- Share team success stories across the organisation.
- Start looking for ways to measure team collaboration and process efficiency.
- Don't lose track of technical debt. If you are not using a configuration management tool like Ansible, Chef or Puppet, start investigating them.

How we can help

- Our practitioners can assist with prioritisation and scheduling.
- Our DevOps practitioners are experienced in identifying reusable patterns.
- We can provide skilled engineers to augment the strength of your teams.

Acclimatisation
Improving the DevOps process

The challenge

The success of the consolidation and standardisation process typically causes a range of problems that are often a surprise to the organisation.

- Increased efficiency can place unprecedented strain on parts of the organisation, its processes, on the application architecture and on the infrastructure.
- Clearing of known bottlenecks can reveal previously unknown inefficiencies.
- If improvement is uneven (as is quite likely), morale and collaboration may flag and stress between teams increase as the finger of blame is pointed.

To address these issues – while maintaining morale, momentum and stakeholder confidence – requires diligent improvement of DevOps processes and culture. It is also important that the incremental spread across the organisation of DevOps culture and collaboration continues apace; many staff are still likely, at this stage, to see technical remedies as much more important than culture improvements, so it is vital to show them that cultural improvement enables technical improvement.

What you can do

- Reduce bureaucracy, giving teams more autonomy to decide on solutions.
- Encourage a blame-free culture in which information about problems can be shared and reviewed without fear of finger-pointing.
- Don't forget that cultural change has to happen from the top down.
- Push the adoption of Continuous Integration and configuration management tools.
- Steer development and operations teams to use the same core practices for version control and automation.
- Increase the use of multi-disciplinary teams.
- Make maintenance and release without service downtime a high priority goal.
- If you are not already using virtualisation or containerisation, consider adopting them at least for your development and testing pipeline, even if you aren't ready to use the technology in production.

How we can help

- Ops staff are often unused to applying development discipline to their own code, even when they have experience helping developers apply such discipline. We can guide operations staff in the adoption of these practices.
- Our practitioners are experienced in addressing cultural issues around collaboration.
- We can supply skilled engineers to help reduce pressure on your staff.

The push for the summit
Infrastructure as code

The challenge

As efficiency and productivity continue to increase, the infrastructure sees increasing strain. For a variety of reasons, not least that the application of development good practice to infrastructure code is a relatively young and immature discipline, the infrastructure problem is usually the trickiest to address and the hardest to make scalable. Even moving to the cloud does little to help if infrastructure provisioning is not sufficiently automated.

To progress further, a high level of automation must be developed and applied to infrastructure configuration and provisioning. In addition, the infrastructure needs pervasive monitoring and logging, with automated responses to alerts about significant state changes and good data analysis to reveal trends. Without good monitoring and metrics, automation can cost you a lot of money through inefficiency and inappropriate scaling.

This is also the stage at which an organisation should consider moving beyond Continuous Integration to Continuous Delivery (a concept many organisations find intimidating).

What you can do

- Have a thorough review of technical debt and give priority to the reduction of complications that hinder infrastructure standardisation and automation.
- Give the automation engineers proper time and resources to address this vital task.
- If you aren't already tracking deployment metrics, start now.
- Keep a close eye on the complexity of any new automation tech. It's easy, at this stage, to overspend on tooling and frameworks that turn out to be much more complicated than anticipated.
- Don't allow your application architecture to evolve complexities that your infrastructure isn't yet ready to support. Architectural patterns like microservices and CQRS depend upon a high level of robust infrastructure automation. If you are still struggling with Continuous Integration, you aren't ready for them.
- Bring your security team into the DevOps conversation now if they aren't already active participants.
- Make your automation code available to developers so that they can spin up test environments on their own workstations.
- Virtualisation/containerisation is essential for at least some parts of the pipeline at this stage.

How we can help

- Our practitioners have a portfolio of solutions to address these challenges.
- We can train your engineers in the use of automation tools to promote collaboration across the pipeline and thus improve productivity.
- We can provide skilled engineers to augment the strength of your team.

At the summit
Self-service

The challenge

If an organisation feels it has solved all of its regular automation and monitoring challenges, it should put that to the test by seeing how capable it is of providing its teams with self-service capabilities in things like:

- provisioning of Development Environments
- provisioning of Test Environments
- push-button deployment

Self-service infrastructure automation increases the productivity of your teams while (eventually) freeing your operations staff to spend a yet higher proportion of their time on developing their automation solutions.

This level of automation will require a significant upskilling of some of your staff (or recruitment of the relevant skills).

What you can do

- If you haven't already adopted the disciplines of immutable infrastructure, do so now.
- Your security team need to be involved in this project from the start.
- Re-evaluate your infrastructure automation and configuration patterns, looking for things that are no longer appropriate or necessary on immutable infrastructure.
- Enforce a discipline of no manual intervention for maintenance of servers/virtual machines/network infrastructure. Keep pushing that as far as you can.
- Review your automated testing and your monitoring. You need to be very confident in them both.

How we can help

- We have experience in (and documentation on) the design and creation of self-service systems.
- We can provide skilled engineers to augment the strength of your team.

Where next?

The challenge

As with mountaineering, so in software engineering: climbing to the top of one mountain simply reveals the taller peaks beyond.

Whatever new problems or opportunities arise, your biggest challenge after completing a DevOps transformation is keeping what you have won. Technical innovation and market growth will eventually force more technical change on you, but the cultural changes should be long lasting and a permanent gain – if you act to preserve them. Maintaining a DevOps culture is not the same as creating one; you need to put in place processes that maintain and reinforce the new attitudes and behaviours.

One difficult challenge is to make those processes lightweight. Show your staff that the sustained period of change they went through ends with more space to think and use their initiative.

An important question to ask yourself is this: how far across – and up – the organisation did the culture shift really go? Start at the top: do your planning and prioritisation mechanisms now reward DevOps practices or place stress on them? Do you support and reward work that removes technical debt or are you still prioritising feature delivery over everything else? Do metrics on DevOps culture and process feature in your board reports?

What you can do

- Celebrate in a big way: make an event out of reaching your final milestones.
- Keep on celebrating in a small way: find ways to reward staff/teams that make significant new contributions to DevOps improvement.
- Make continuous improvement an organisation-wide activity, not a ceremony enacted by a committee.
- Make DevOps metrics a permanent feature of board reports.
- Don’t leave technical debt out of those metrics.

How we can help

- An independent eye can provide much-needed perspective at this critical review stage.
- We can share the experiences of other clients that have reached this point.
- We can provide skilled engineers to augment the strength of your team.

About **Mastek**

Mastek is an enterprise digital transformation specialist that engineers excellence for customers in the UK, US and India. We enable large-scale business change programmes through our service offerings, which include application development, support and testing, BI and analytics, agile consulting and digital commerce.

Whether it is creating new applications, modernising existing ones or recovering failing projects, we help enterprises to navigate the digital landscape and stay competitive.

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