SOGETI

Achieving Continuous Delivery with DevOps

Every Company is a Technology Company

By 2020, 50%[1] of enterprises will be implementing Continuous Testing as part of their DevOps initiatives, as they seek to achieve Continuous Delivery and gain competitive advantage in today's customer-driven application economy.

Software is no longer merely an enabler of business processes. Organisations that can deliver high quality software at speed are creating a competitive advantage that demonstrates creativity and technological innovation. It also promotes customer loyalty. As Forbes Magazine recently observed, *"every company is a technology company"* [2], and we only need to look to Uber, Lyft, iTunes, Capital One and Netflix to see why.

From DevOps to Continous Delivery to Continuous Deployment

DevOps is a methodology for helping organisations to build teams and software. It creates a set of processes and a culture where building, testing and releasing software can happen rapidly, frequently and more reliably. Successfully implementing DevOps in your organisation puts you one step closer to Continuous Delivery. Gartner summed up the distinction between DevOps and Continuous Delivery with a report that stated, "DevOps is not a market, but a tool-centric philosophy that supports a Continuous Delivery value chain."[3] We believe, however, that Continuous Delivery strongly relies on a people-centric philosophy as your employees will define processes which set the stage for the success of tools, and therefore the output of the value chain. With the right skills and experience, the Deployment Pipeline can be further optimised by leveraging Continuous Integration, Automation and Continuous Testing.

Continuous Testing at every stage of the pipeline significantly reduces the costs associated with investigating fixes, root cause analysis and ultimately rework [Fig. 1]. It is the only way to ensure you release high quality software continuously and smoothly without having to go back to fix issues. Beyond this is Continuous Deployment, whereby every change that passes the full range of tests, automatically goes onto the Production stage.

Fig. 1: Relative cost to fix, based on time of detection
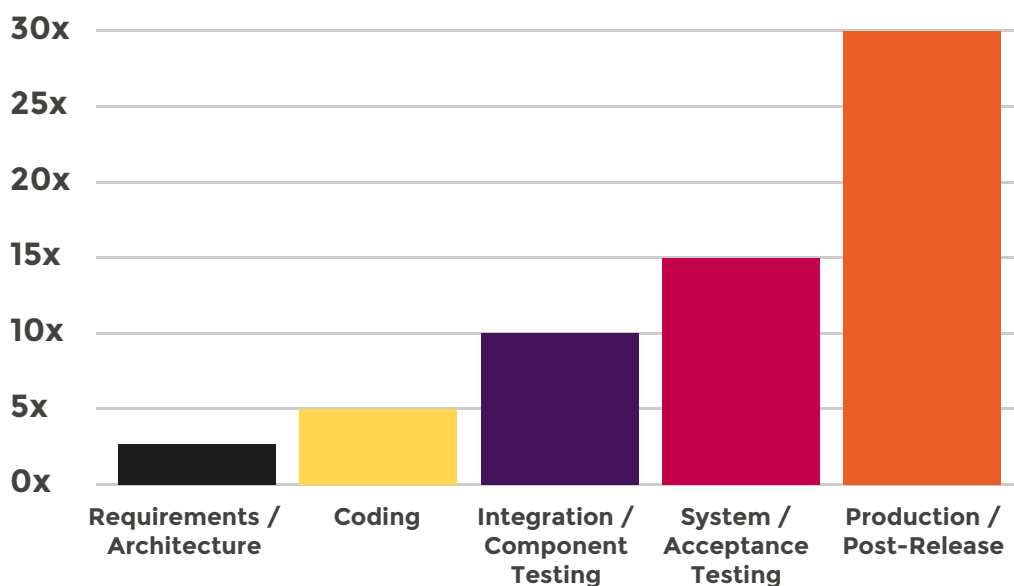
1. Gartner Magic Quadrant for Software Test Automation Published: 15 November 2016 ID: G00297494 Analyst(s): Joachim Herschmann, Thomas E. Murphy
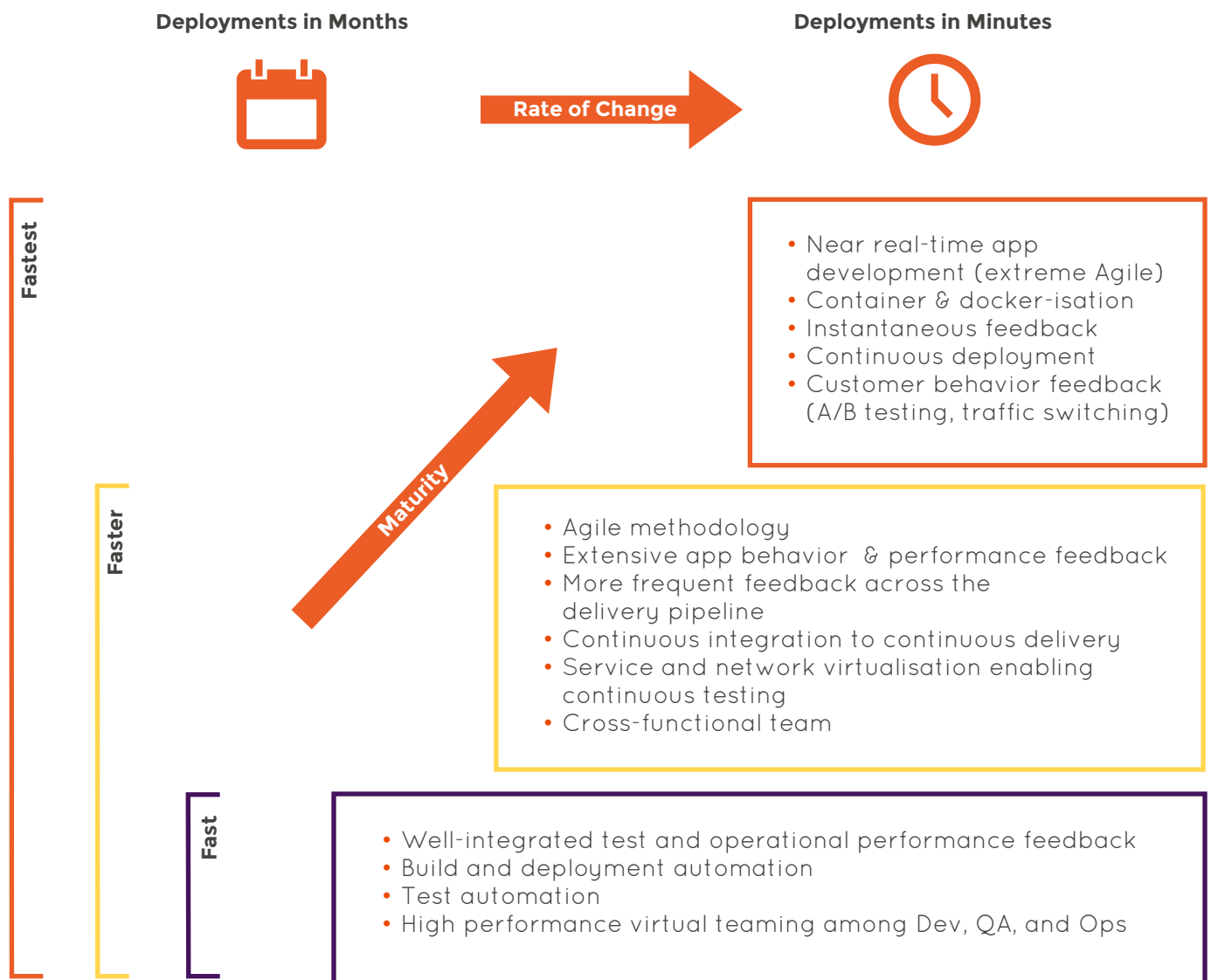2. https://www.forbes.com/sites/forbestechcouncil/2017/01/23/why-every-company-is-a-technology-company/#2ce1deaa57ae
3. Gartner Market Trends: DevOps — Not a Market, but a Tool-Centric Philosophy That Supports a Continuous Delivery Value Chain. Published: 18 October 2016 ID: G00315693

We typically see organisations moving at three different speeds of DevOps, or three levels of DevOps maturity [Fig 2.].

If your business is one of the 40%[4] already using DevOps principles in more than 50% of projects, then you will soon be considering a Continuous Delivery strategy that can accelerate time-to-capability, improve software quality and optimise your cost of delivery.

Fig. 2: Different speeds of DevOps possible

Deployments in Months

Deployments in Minutes

Rate of Change

Maturity

Fastest
- Near real-time app development (extreme Agile)
- Container & docker-isation
- Instantaneous feedback
- Continuous deployment
- Customer behavior feedback (A/B testing, traffic switching)

Faster
- Agile methodology
- Extensive app behavior & performance feedback
- More frequent feedback across the delivery pipeline
- Continuous integration to continuous delivery
- Service and network virtualisation enabling continuous testing
- Cross-functional team

Fast
- Well-integrated test and operational performance feedback
- Build and deployment automation
- Test automation
- High performance virtual teaming among Dev, QA, and Ops

Business Benefits

Companies with a mature DevOps strategy are deploying code 30 times[5] more frequently than their competitors and getting their code into production 200 times faster, with 50% fewer failures. They are 11 times[6] more likely to see double-digit annual revenue growth than those who lack DevOps maturity.

Two major barriers to DevOps acceleration are Continuous Integration with insufficient automation, and using manual troubleshooting to address production problems. The first puts pressure on test, build and release teams, and the second enables bugs to slip into the production environment. Businesses using high levels of automation to streamline the Software Development Lifecycle (SDLC) into a single Continuous Delivery process can eliminate human error, and release software to production constantly. Small, frequent releases offer better visibility so process issues can be identified and fixed quickly.

The 6 business benefits of Continuous Delivery are:

1. Accelerated time to market with the right product

2. Reliable releases and higher quality

3. Improved productivity and cost efficiencies

4. A better Customer Experience (CX) and increased customer loyalty

5. Reduction in risk

6. Continuous Innovation

Capgemini Group recently worked on a Continuous Integration and Delivery project for one of the UK's largest document and parcel distribution companies. The client required Agile delivery with the ability to release new services every 4 weeks via 4 websites, 86 applications, 200 interfaces and 25 external systems, within an ecosystem of 18m partners. These services are delivered to 7 million registered users, with 200 million unique online visitors pcm and an average of 50,000 ecommerce orders per day. Their challenges were:

- People and process bottlenecks slowing delivery

- Inefficient environment provisioning

- Idle time in development and testing

- Reliance on manual processes causing environment defects

By implementing a Selenium-based test Automation framework connected to Jenkins and GIT we increased Automation levels, decreased manual dependency and implemented Continuous Integration, Testing and Delivery, enabling Behaviour Driven Development. The business benefits were impressive, with a 30% increase in change request throughput and a 50% decrease in development effort.

5. 2016 State of DevOps Report, Puppet Inc.
6. 2016 State of DevOps Report, Puppet Inc.

Requirements for Success

The success requirements of Continuous Delivery are found at the intersection of the three core elements: People, Processes and Tools. To achieve success here, we need to find the perfect balance of Automation; Environments; Service Virtualisation; Data and Analytics; Defect Management; Continuous Testing with democratisation of tools; built-in Security; and crucially, enterprise wide buy-in to a DevOps culture (Fig. 3).

Fig. 3: The dependencies for successful Automation
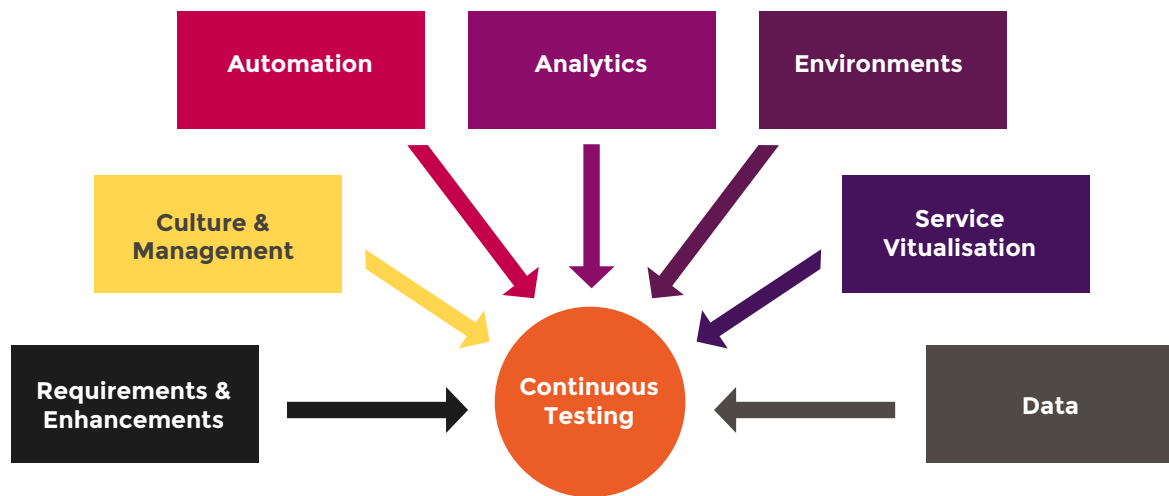
The Interdependency Between People, Process and Technology

People

People are at the heart of Digital Transformation because a collaborative, no-blame culture is critical to success. The push for DevOps and Continuous Delivery can come from the bottom up, led by external partners or small internal teams breaking down silos to work in a more collaborative way on a single project, which is then iterated in future projects. It can also be introduced as a top-down initiative. Either way it's essential for everyone to understand the benefits, buy into the culture and work towards common goals.
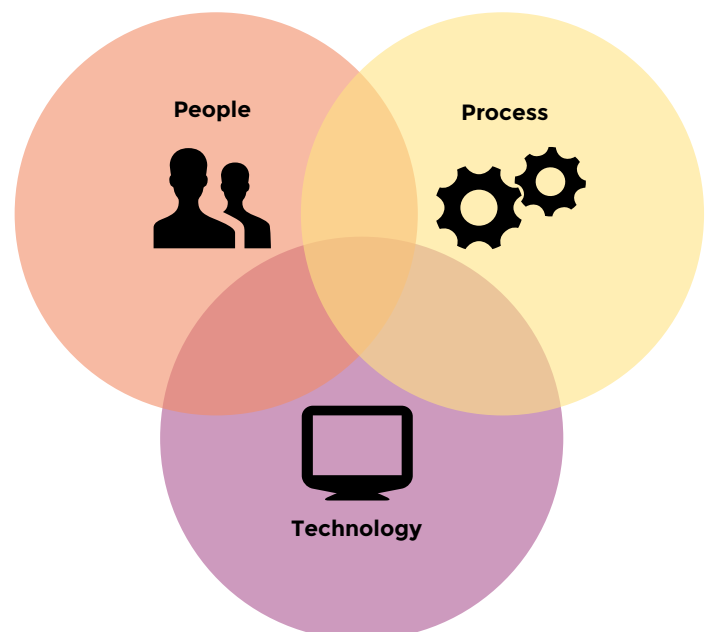
Processes

Continuous Delivery requires properly defined, lean, enforceable processes, because automating bad processes just accelerates the release of poor quality products.

Technology

It's important not to allow disruptive Technology to be a driver or a distractor. It is a facilitator that enables People and Processes to work more efficiently. Businesses need to be creative and make new digital technologies work for them to achieve their goals.

All three dependencies have to be in harmony for DevOps to work and Continuous Integration to become a reality.

Challenges

Each of the three brings its own challenges. People are resistant to change. Technological barriers to Continuous Delivery include legacy systems, scalability and vendor lock-in. Traditional silos and large teams cause unnecessary red tape and processes dictated by third parties can be hard to change. Two of the biggest challenges are therefore cultural change and a lack of maturity.

Cultural Change

Probably the greatest challenge for large non-agile enterprises is People's fear around changing established business processes, disbanding legacy systems and altering organisational culture. For example, it's common for employees to worry that Automation will render them redundant. Sourcing talent with the right mix of development and testing skills, such as Quality Engineers as opposed to traditional testers, is another major challenge.

Businesses like Intuit, which has achieved Agile, DevOps and Continuous Delivery despite its size, prove that focus on collaboration and experimentation with incremental changes equals success.

In 2015 Volkswagen's CEO was determined it would become the world's largest car manufacturer. By the end of Q1 they'd sold 5.04m cars and it seemed their Continuous Delivery was paying off. Then the scandal broke that they had installed defeat device software in their vehicles with the explicit goal of allowing them to appear to pass emissions tests.[7] VW became a prime example of how an intolerant blame culture can lead to a company's downfall no matter how fast it can deliver products to market.

Lack of Maturity

The journey to Continuous Delivery requires applying Automation to the right build, test and deployment processes to achieve acceleration in every element of the SDLC. This increased velocity exposes bottlenecks and immaturity in process, infrastructure, technology and skills. The speed of development reduces to that of the slowest moving part. In order to mature, organisations need to focus on CX and continuous feedback and align their development strategy to the outcomes and risks defined by the business.

7. http://www.bbc.co.uk/news/business-34324772

The Impact on Testing

Shift Left, Look Right

One of the secrets to achieving Continuous Delivery is to shift testing left while looking right. The strategy for testing should be extended to include requirements gathering, bringing them forward from operations, non-functional testing and user acceptance testing into the first stage of the SDLC. This ensures much better alignment with business goals and enables the creation of more accurate test data scenarios. Then you can build out your continuous testing, environment virtualisation, cloud and predictive analytics capabilities.

Business Benefits

Continuous Testing enables a quantitative, actionable risk assessment. It also enables better decision-making and results in faster, higher quality releases and the creation of feedback loops for Continuous Improvement.

Test Challenges

A key challenge of Automation is that it combines testing and development activities, so resources and expertise can be hard to find. In addition to automation specialists, data, environment and test strategy experts need to be involved. Similarly, functional automation testing alone is not sufficient, a test strategy includes test and behaviour driven development, white box testing and service virtualisation.

It's interesting to note that the number of organisations using Continuous Testing in their DevOps initiatives dropped from 50% in 2015 to 41% last year[8]. This is actually a good sign, indicating a more mature approach and a better understanding of "zero-touch" testing.

Success Checklist

In conclusion, for a successful Continuous Delivery strategy:

- Ensure your DevOps strategy is sufficiently mature

- Shift testing left to requirements

- Ensure everyone knows the definition of "done"

- Find the optimal intersection of people, processes and tools

- Ensure you have Continuous Delivery evangelists to achieve enterprise-wide buy-in

- Integrate test and performance feedback

- Automate build, test and deployment processes

- Democratise tools

- Implement service and network virtualisation

- Hire Quality Engineers, Data Scientists and environment experts

- Focus on CX and business outcomes

Once you've mastered Continuous Delivery, you can aim for near real-time app development, containerisation and instantaneous feedback required for Continuous Deployment and leave your competitors standing.

8. 2016-17 World Quality Report 8th Edition. Capgemini, HPE, Sogeti

About Sogeti

Sogeti is a leading provider of technology and engineering services. Sogeti delivers solutions that enable digital transformation and offers cutting-edge expertise in Cloud, Cybersecurity, Digital Manufacturing, Digital Assurance & Testing, and emerging technologies. Sogeti combines agility and speed of implementation with strong technology supplier partnerships, world class methodologies and its global delivery model, Rightshore®. Sogeti brings together more than 25,000 professionals in 15 countries, based in over 100 locations in Europe, USA and India. Sogeti is a wholly-owned subsidiary of Cap Gemini S.A., listed on the Paris Stock Exchange.

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