

# WHAT IS...?

## Continuous Testing

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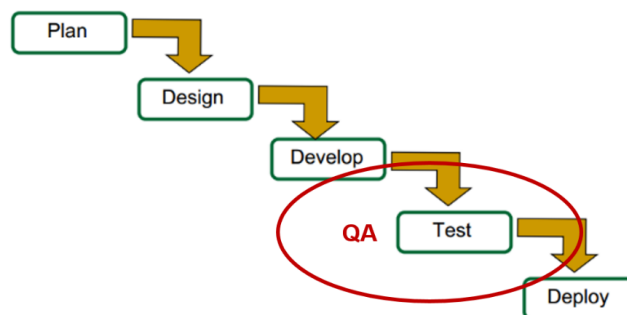


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## W Traditional Testing

Traditionally, software and application development projects were massive efforts that took months, if not years to complete. The 'waterfall' methodology – a sequential (non-iterative) set of activities in which progress is seen as flowing steadily downwards – was frequently used to manage these projects. With the waterfall methodology, one activity can't begin until the previous activity is complete and the majority of tests are concentrated near the end of the pipeline. These tests are often performed by a dedicated team of independent Quality Assurance (QA) professionals.



This linear approach means that customer feedback is delayed until the project is complete. It also means that bugs found late in the pipeline have a long find-to-fix period and may be released into production due to time pressures.

Enter...DevOps

In the early 2000s, development (Dev) organizations began using more agile methodologies that involved taking a more iterative, incremental approach to software design and development. These organizations quickly realized that it doesn't matter if Dev is moving more quickly, if IT Operations

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(Ops) and others in the IT value stream – such as quality assurance, security and infrastructure/tools teams – aren't speeding up as well. These organizations also recognized the need to automate many of the practices – such as testing practices – that have historically been performed manually. This recognition gave rise to the movement now known as 'DevOps.'

**DevOps** is an organizational and cultural movement that aims to increase software delivery velocity, improve service reliability, and build shared ownership among software stakeholders. The resulting improved workflow provides businesses the flexibility to change, and change quickly, without sacrificing the quality and reliability of their IT-based business services.

DevOps provides companies a competitive advantage by delivering better software, faster and by enabling sustained innovation.

## Continuous (DevOps) Testing

**Continuous Testing** – also known as DevOps testing – is a quality assessment strategy in which most tests are automated and integrated within a DevOps infrastructure.

With DevOps, testing tasks (assessments) are engineered to be completed in increments, end-to-end across the development to deployment pipeline. These assessments are performed 'continuously' on incremental product changes using a production-equivalent environment.

For DevOps, the timing of testing increments is very short. The combination of short increments and the spreading of tests across the end-to-end pipeline requires fast, automated tests and end-to-end test results coordination.

In a DevOps environment, particularly as organizations move towards creating platforms 'as code,' many roles (developers, QA, security, operations) must now understand testing strategies and acquire testing skills.

Everyone is a tester in a DevOps environment.

## The DevOps Pipeline

Simply put, DevOps testing is the portion of the DevOps pipeline that is responsible for continuous assessment of incremental changes. The **DevOps pipeline** is an automated series of processes for managing product changes.

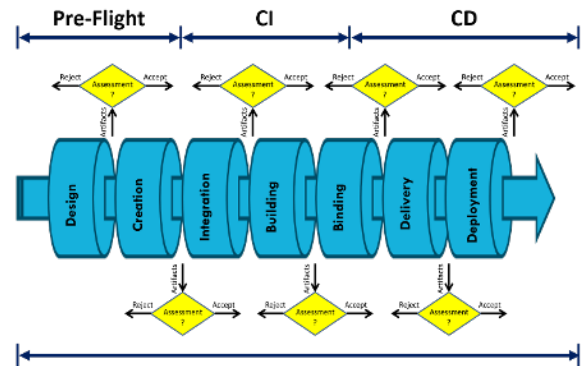
*The DevOps pipeline may also be called 'deployment pipeline' or 'continuous delivery pipeline'.*

A change is injected at the beginning of the DevOps pipeline. Each stage processes the artifacts from the prior stage. The last stage results in deployment to production.

## Pre-flight, CI and CD cover a subset of DevOps pipeline stages.

Pre-flight, continuous integration (CI) and continuous delivery and deployment (CD) cover a subset of DevOps pipeline stages.

- **Pre-flight testing** refers to the assessment of design and software code files resulting from the design and creation stages, prior to the integration stage of a DevOps pipeline.
- **Continuous integration** requires developers to commit code into a shared repository at least daily. Each check-in is validated by automated build and automated tests.
- **Continuous delivery** focuses on making sure software is always in a releasable state throughout its lifecycle.
- **Continuous deployment** enables every change that passes automated tests to be automatically deployed to production.



In some ways, continuous testing is the same as traditional testing. For example, tests are classified according to attributes of the system or product being tested (e.g., unit tests, static code analysis tests (which don't require executing code), dynamic analysis tests (which involve executing code), security tests, acceptance tests and so forth).

What's different is *how* these test types are implemented. DevOps tests are:

- Performed on incremental changes
- Performed continuously as changes occur, rather than as large phases
- Automated so that they can execute quickly

## Continuous Testing Culture

Organizational culture is the values and behaviors that contribute to the unique social and psychological environment of an organization. The social and psychological aspects of this definition relate to how people interact and feel about their workplace environment, both of which affect the quality of their work as well as their commitment and loyalty.

Culture very much affects an organization's ability to adopt a continuous testing strategy. Organizational friction can occur between business leaders, developers, testers, operations staff and infrastructure/tools staff when continuous testing roles and responsibilities are not clear and the culture is not collaborative.

Characteristics of a preferred continuous testing culture include:

- Leaders advocate and reward continuous testing best practices and collaboration
- Leaders sponsor continuous testing resources
- Silos between Dev, Test and Ops teams are broken down and there is shared responsibility for quality
- Measurement-based decision making, learning from results instead of blame
- End-to-end test automation tools, training and support

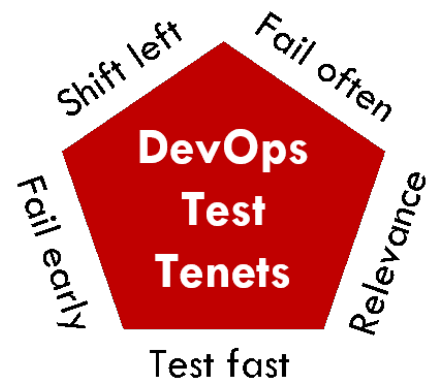
## Continuous Testing Implementation Strategies

The implementation of continuous (DevOps) testing requires that organizations adopt:

- The five tenets of DevOps testing
- A culture for DevOps testing
- DevOps testing process and workflow practices
- An integrated DevOps testing infrastructure
- DevOps test environment orchestration and test automation practices

The five tenets of DevOps testing are:

- **Shift left** – conduct each test as early in the pipeline as possible
- **Fail early** – arrange tests so that the most likely problems are found in the earliest possible stage in the DevOps pipeline
- **Fail often** – run tests frequently and with many different conditions
- **Test fast** – arrange tests to run in quick cycles
- **Relevance** – focus on the most important tests and results



Implementations of DevOps testing processes and workflows need to be arranged to support the five DevOps Test Tenets.

## Integrated Continuous Testing Infrastructure

Continuous testing is integrated into the DevOps infrastructure. The **DevOps infrastructure** is the entire set of tools and facilities that make up the DevOps system. The DevOps infrastructure includes continuous integration, continuous testing, continuous monitoring, and continuous delivery and deployment tools and integrates with orchestration and automation tools as needed to process all changes and prepare delivery packages.

These tools include the:

- **DevOps Master Framework (also known as Application Release Automation(ARA)** – represents solutions that include capabilities in automation, environment modeling, and release coordination without reliance on other tools (for those capabilities)
- **DevOps Framework (also known as a DevOps tool chain)** – Represents the tools needed to support a DevOps continuous integration, continuous deployment, and continuous release and operations initiative
- **DevOps test framework** – specific to the testing aspects of the pipeline

A common DevOps practice is to integrate a collection of task-specific tools (or tool chain), vs. a single-vendor solution.

## Continuous Test Planning

With DevOps, product-level test plans are particularly important as they provide overall guidance for product test strategies and policies and indicate the strategy/contract for measuring test coverage.

A **test strategy** is documented, reviewed and approved by key stakeholders for each product or major product feature. A test strategy describes in broad terms the requirements and approach for testing and overall goals.

### *Yes, test plans are needed for DevOps!*

A DevOps test plan is required for each product. A **test plan** describes test objectives and the approach for testing a product using a DevOps pipeline.

Each organization will have its own test types that span the DevOps pipeline. Developers and testers decide which tests need to be automated prior to integration, to maximize the probability that tests performed after integration will be successful.

## Summary

DevOps benefits the business by improving communication, collaboration and the integration of people, processes and technologies across the IT value stream.

Continuous testing benefits the business by enabling:

- Reduced time-to-market
- Improved quality
- Reduced costs
- Improved innovation
- More interesting and creative work
- Reduced stress and pride of workmanship

Testing is a vital part of DevOps.

Many organizations automate integrations, builds and delivery processes but have trouble with the subtleness of test automation and orchestration. Without the knowledge of proper testing, software can – sometimes very publicly – fail, causing unnecessary downtime, loss of customer trust, and decreased revenues, not to mention a negative perception of a company's reliability.

## Get Involved!

DevOps practices will continue to evolve through communities of practice. Seek out opportunities to collaborate with others and to share what you've learned.

Change related to DevOps initiatives will affect organizational culture. Effective communication plans, training, and clear policies and procedures are all needed to achieve the desired performance outcomes and enable collaboration between the many stakeholders involved in DevOps.

### **BE A CHANGE CHAMPION!**

Culture change and progress cannot happen without the support of people like you. **Take action!**

## Take action!

Contribute to your organization's DevOps effort by expanding your knowledge of DevOps principles and practices and by using what you learn to lead improvement activities.

## Want to Learn More?

Training helps organizations build and maintain their capabilities. Training also provides individuals the knowledge, skills and information needed to fill their role(s) in an organization or achieve their career goals, along with a place to test and develop the confidence to use these skills in the workplace.

ITSM Academy's **DevOps Campus** provides the courses you need to build a solid foundation and sharpen your skills as a DevOps practitioner.



Our **Continuous Testing Foundation (CTF)** course specifically addresses testing in a DevOps environment. It describes culture and team aspects for team engineers, test strategies, test infrastructures, test tools, test automation, best practices, test management and analysis.

[Click here to register for CTF and any of ITSM Academy's DevOps-related classes today](#)

Contact us to schedule time with a subject matter expert.

+1-954-491-3442

<http://itsmacademy.com>

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*...educate and inspire* is not just our corporate slogan, it speaks to our core mission and goal.



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