PRINCIPLES OF DEVOPS

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Annotation. The common processes and principles of DevOps are observed and what DevOps really means is explained in the thesis. The steps of software development are mentioned. Recent changes in DevOps sphere are examined in the paper. The importance of the methodology for business is emphasized.

Keywords. Development, operations, testing, deployment, automation, Continuous Deployment, Continuous Delivery.

Today, many people use information technologies and find them very useful and convenient. Since many things in our lives are connected with the Internet, most applications are already there and people get a lot of benefits from this. Web apps can be updated many times a day and the changes are delivered to users instantly. Web applications are managed properly without much effort, and software development methodologies facilitate the process.

The most suitable methodology for this kind of work is DevOps.

Nowadays, companies like Netflix and Amazon deploy apps thousands of times a day. It would not be possible without having great management and tasks being divided among people, who are good at solving them. Many companies use such a methodology as DevOps, which makes system development and release cycle much faster and convenient.

DevOps is a set of tools and practices that helps organizations build, test and deploy software more reliably and at a faster rate.

DevOps methodology enables organizations to evolve and deliver their products faster than methodologies with a traditional development and release cycle, which can provide a competitive edge. Rather than issuing a release once a fortnight or longer, new features can be delivered to the user daily, and bugfixes can be deployed in hours, all following the same repeatable automated pipeline.

Common development activities include the following stages: analysis, design, implementation, testing and deployment. Using waterfall methodology everything is done in huge phases with a single deployment and mistakes are discovered too late. Agile development model can be used here.

Agile refers to the iterative approach with a focus on collaboration, customer feedback and small releases. And developers still must deal with end-to-end processes for development and operations. Development and Operations and everything in between is DevOps.

Everything in between is Security, Quality Assurance, Governance, Network and all the teams that are involved in these processes.

A good definition for DevOps is made by Donovan Brow from Microsoft: «DevOps *is the union of people, processes and products to enable continuous delivery of value to our end users*» [2].

A very common representation of a DevOps process is the Infinity Loop. It is represented in Figure 1.
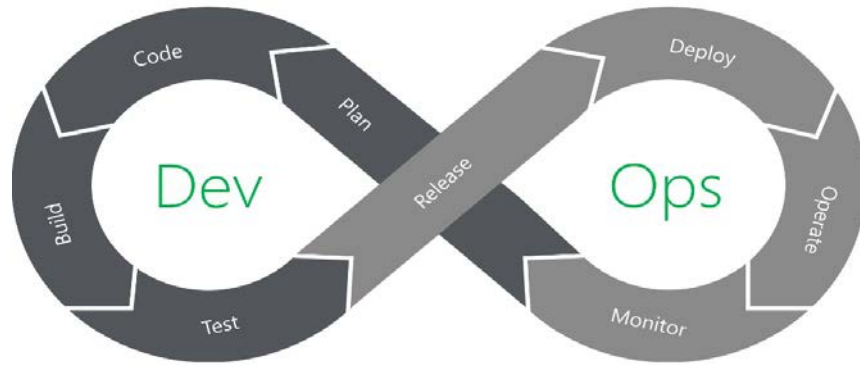
Figure 1 – Infinity Loop – representation of a DevOps process [1]

The main goal of DevOps is to activate consistent deliveries with defined steps on each phase, with the required approvals and automation wherever it is possible. To achieve their goals, companies rely on their ability to deliver and operate the software. The main benefit of DevOps originates from the fact that automated processes can do repetitive actions faster and more reliably than people. It is neither affordable nor productive for an organization to have developers or other staff building and deploying a code all day long.

First, developers finish writing the code for a new feature of their application. Then they send their code to a development machine, where some lightweight tests are performed and some new security vulnerabilities are disclosed. The developer submits a request to merge the code into the code repository where the code is located.

It is automatically merged into the development branch if another developer finds no issues in the code. So, the build process begins. The build server creates a backup, installs all package dependencies and builds the application. The build server runs tests to make sure the new feature does not cause any faults in other parts of the application. After the tests are passed, the application is deployed by creating a special cloud environment where all application dependencies are presented.

At this point, an organization has two options. They can automatically release the updated application and make the feature available to all users or to a selected group of users. Automated deployment into production is called Continuous Deployment.

Alternatively, the organization may release the feature into a User Acceptance Testing environment and manually approve a release into production based on a pre-defined schedule. It is commonly referred to as Continuous Delivery.

Once the application is successfully deployed into production, automated testing is always performed. Further, tools collect metrics on performance and user behavior which are presented to IT operations and development teams to provide live feedback, highlighting potential bugs and helping to shape new features.

The latest State of DevOps Report presents some statistics in Figure 2.
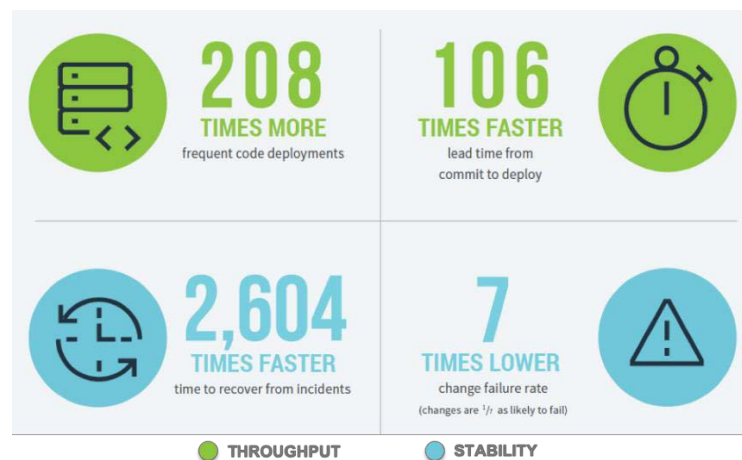
State of DevOps 2019 Report

Figure 2 – DevOps changes in 2019. For reference, Flicker, an image hosting website, was handling 10 deployments per day in 2009 [3].

Experienced and certified DevOps professionals have both technical and non-technical skills. These specialists use the options available to them to apply DevOps methodology in their work. Coding is a huge part of DevOps, so professionals working with DevOps need to possess at least minimal coding skills.

There are different tools that are required to cover different areas of the system development life cycle while implementing DevOps, such as:

Infrastructure as Code;

Continuous Integration/Continuous Deployment;

test automation;

software deployment;

software measurement.

So, we come to the conclusion, that it takes a lot of time to build, test and deploy an information system, but with DevOps the speed of development is boosted by automating some steps in the system development life cycle. DevOps already helps many businesses all around the world by implementing efficient solutions in the process of creating and deploying applications.

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