# Lecture 11 – Automating with DevOps



Automation is certainly one of the key aspects of DevOps but it certainly is not the primary key for a successful operation. The real gains from cloud infrastructure comes when all the moving pieces are choreographed to work in a cohesive environment. These pieces are configurations, data security, application deployments, monitoring and scaling. Sure, all of these can be automated but it’s crucial to be cognizant of how much automation is too much automation or when enough is simply enough.

While moving business infrastructure to the cloud is likely an ideal solution to reduce costs and help improve scalability, it doesn’t necessarily ensure that your business processes are going to be any more efficient than if you went for an in-house solution consisting of hardware and server racks.

Experienced engineers know how to leverage the power of automation without going overboard. With intelligently designed scripts, common infrastructure demands can be automated but with great caution. We’ll look at some case studies that have been made available to the public. With these effective and ineffective implementations, there will be something to take away and learn from.

Let’s dive in to some common examples of where DevOps automation makes sense.

Logically Automating with DevOps

Looking at some of the low hanging fruit for automation and common practices when working with the automation of tasks will give us an obvious idea of where it makes sense to automate.

* A new virtual environment is needed, having infrastructure as code for quick provisioning to get the environment set up.
* Automating scaling policies to ensure adequate resources are available for the application to consume
* Certain applications should be designed in a way where new versions can be rolled out automatically without accruing downtime
* Patching a large number of instances with updates

All the above shout “Infrastructure as Code” so we’ll be unpacking some of these common tasks in the context of IaC. Getting applications onto infrastructure as we’ve learned can be a rather tedious process where missed steps can result in disastrous consequences during the deployment phase. Thus, automating the deployment process with a continuous deployment strategy makes sense.

Aligning the development and operations teams so that the reliability of releases is one that can be counted on, is a crucial component to the DevOps automation process. This in theory should decrease the number of software issues one would typically have to deal with when using a manual process for deploys.

The true benefit of DevOps automation is in the numbers. It’s a fact that companies are looking to do more with less in terms of IT budgets. This has been covered in an IT spending forecast report from Gartner which you’ll find in this week's labs supplementary resources. It also means there is a very high demand for DevOps engineers as the cost benefit is an obvious one as the report from Gartner pointed out a very small IT spending increase of 1.4% for 2017. While IT spending remains conservative, there is still a huge emphasis on digital transformation to see that business needs are met in an ever-growing and ever-changing competitive market.

Constant improvements and quick deployments are essential for digital transformation which at the end of the day, is any companies objective when working in the online domain. A recent article published on itbusiness.ca provides insight of two companies that have perfected the art of digital transformation, which has, in turn, allowed them to dominate and thrive in their market. These two companies are Netflix and Panera.

Having reinvented itself numerous times, Netflix has a history of adapting to the times and understanding the ebb and flow of their marketspace. Starting out as a mail-order DVD company founded in 1997, Netflix transformed themselves into a full-fledged one of a kind streaming platform in 2007 and is now considered to be a world-class production company. Netflix is responsible for many innovations in IT offering a wide-array of internally-produced turned open-sourced projects which have enable and empowered digital businesses around the world. We’ll look at some of their products but first let’s examine a very interesting case study they published on how they were able to streamline many of their workflows using DevOps procedures.

We’ll see firsthand how Netflix leveraged automation for an increase in lead time and a reduction in cost all while producing greater development efficiency. They are one company that has plenty of confidence in their fast and agile code releases which are fundamental to foster an efficient development environment. Looking at the case study, the benefits of cloud-based services, containerization and how building for failure will become very apparent.

## Overdoing DevOps automation

When approaching problems in the IT world, it is usually under a management paradigm like the waterfall or agile methodologies where confusion can occur. Agile being the new flashy methodologies of the two, is most commonly employed in newer workplace environments. One problematic approach is that companies can miss the point when taking Agile to an extreme. When a company is overdoing, they’re Agile process, chances are they’re overusing automation of agile and DevOps.

The Project Management Institute released surveys over the last two years which shed some light on where traditional and agile methodologies are in action. While more organizations realize the benefits of agile, the servey reveals some companies aren’t doing a good job of managing projects correctly or using standard practices across projects. Here are some highlights from the survey which you can find in the supplementary-material folder in this week's lab:

* 38 percent of organizations report frequent use of agile
* High-performing organizations are three times likely to have organizational agility
* 77 percent of high-performing organizations attend ongoing project management training
* 46 percent of organizations report they don’t fully understand the value of project management
* Only 25% of organizations report using standardized project management practices

Jay Lyman who is a senior analyst with 451 Research also noticed a similar trend:

"I think there is a tendency to think that large enterprise organizations, with all their divisions and teams and silos, are capable of doing what Facebook or Netflix have done with their cutting-edge implementations of configuration management tools. In reality, all of the legacy technology and process has to be taken into account as well."

While DevOps-centric software providers may sell automation products that promise to make you the next Facebook or Netflix through the use of their tooling, the reality is that your business most likely faces different challenges than a Netflix or Facebook would face. If an engineer goes in trying to replicate what Netflix is doing due to the efficacy their implementation brought the organization, doesn’t necessarily mean the same value will be derived of their copied strategy. It’s a slippery slope when replicating automation solutions. The investment in DevOps and automation can potentially have disastrous consequences. Just because it worked for Facebook, doesn’t necessarily mean it will work for your future organization.

## How to find your own balance?

Some enterprises are clearly over-automation DevOps, while some aren't operating at all. To prevent over-automation from occurring, it’s crucial to understand how automation in the context of DevOps is intended to be used. Automation in DevOps is about taking a once manual process and placing technology around them so they’re inherently repeatable. If a manual process in not first qualified to ensure that it’s working correctly, when automated, you're just taking a bad or flawed process and make it happen faster.

Any effort for automation should be focused on what processes occur during development. Once you have all steps vetted and locked down, it’s just a matter of backing the process with the appropriate tooling. However, as pointed out several times not all processes should be automated. It’s also important that your role in the field will always be unique as you’ll never find yourself in an identical environment where a specific paradigm may have been successfully implemented.

One thing to remain aware of when selecting tools, especially enterprise grade products, is that they are trained to sell their products. Sometimes this could have negative implications if one is sold on technology rather than utilizing their own capabilities. Vendors have a habit of getting potential clients excited about what they’re doing at a video streaming or social media provider. It wouldn’t necessarily translate to a DevOps engineer’s duties at a non-profit organization helping build sustainable power alternatives.

Best thing to do is take an inventory of all applications, data stores and current development processes before making decisions. This will lead to your meta development process, which in theory should highlight the work involved with how things are designed, developed, tested, provisioned and deployed.

## Breaking down processes

For your meta development process, break down components of the process into sub-processes. These sub-processes are what will be the candidates for DevOps automation. It’s important to set time aside for this phase and approach it with care as it’ll be the method for how development is conducted for teams in the years to come.

After you’ve created the sub-processes of each task in the development phase, combine any fixed or corrected processes that will include DevOps-related concepts such as CI/CD, testing and deployment strategies. Once the sub-processes have been categorized, it’s time to evaluate each process with the correct procedure or product to optimize the processes.

It is now time to select the right tool for the job. It’s during this phase where things can get carried away or over-thought if caution is not taken into consideration. One indication of over-automation is if the model being defined is focused more on the tools than the process itself. If technology is chosen based upon what other companies have signaled for successful implementations, an engineer can be left with not only too many tools to manage but an unnecessarily complex automation process.

Peace in DevOps is found with the knowledge obtained from an organization's agile development process. One should not be focusing on how others are doing it but rather the processes in place and the problems within the environment that need solving. Each problem is unique and with that, a unique solution is required. Know your tools and the knowledge required to use them but only apply as needed. Again, if the focus is on the tools, most likely over-automation is occurring.