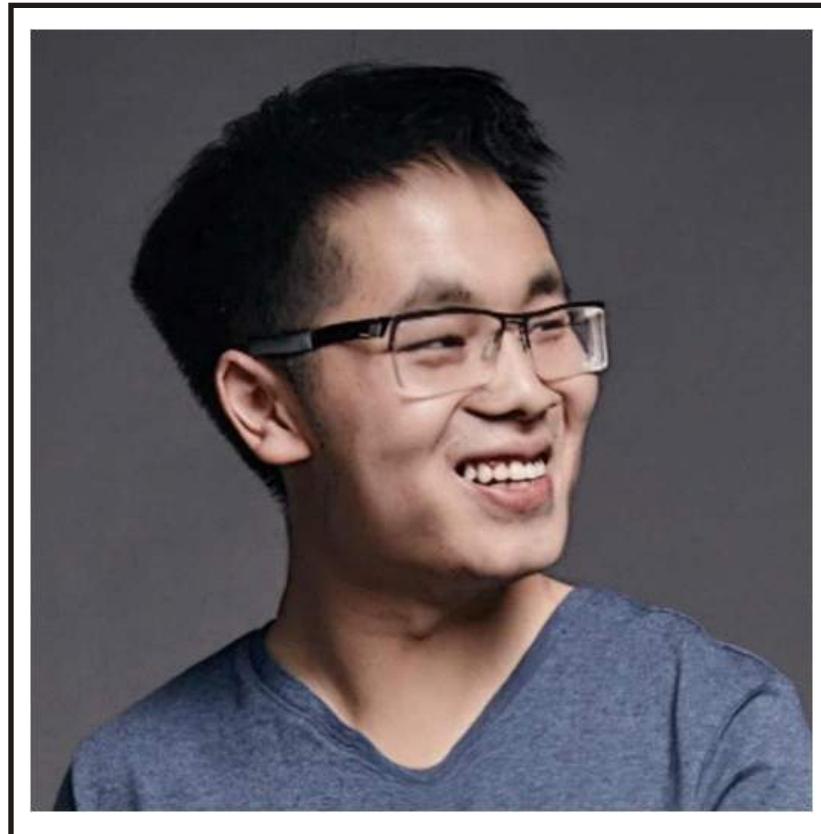


A Practical Guide to Getting Started with DevOps

ABOUT THE AUTHOR



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He is the author of several best-selling courses on Udemy with more than 39,000 students in 169 countries. You can see the list of all his DevOps and Big Data courses on this website.

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1.

What do DevOps engineers really do?

In its purest form, a DevOps engineer
bridges gap between software
development and operations teams
to increase the rate of software delivery.



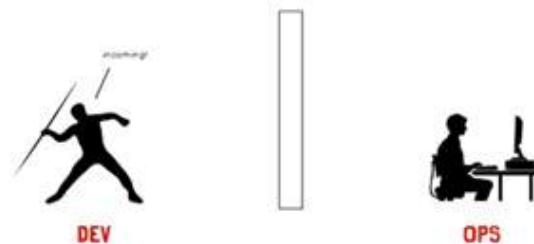
1.1

What do DevOps engineers bring to the table?

Traditionally what happens is that software developers write codes for weeks and months and hands over the code to QA team for testing which then hands over the final release to operations team for deployment. There is lack of collaboration between all these three phases i.e. development, testing, and Deployment.

Developers write the code and hands over to the deployment team.

Now it's up to deployment team to fix the problems that arise during deployment of code or hands over the code altogether back to the development team to fix the bugs. All this results in a slowing of software development process.



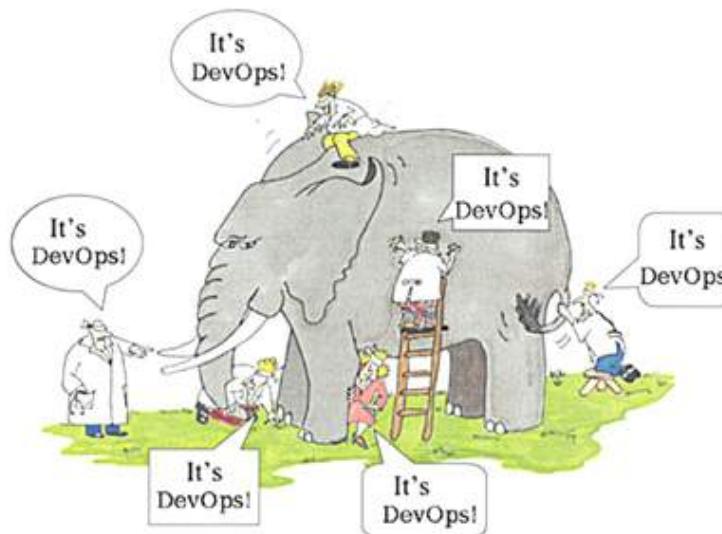
But under the umbrella of DevOps model, these three teams are no longer isolated from each other. Most of the times these three teams are merged into a single team where the engineers work across the entire application lifecycle, from development and test to deployment to operations, and develop a range of skills not limited to a single function. Security teams may also become more tightly integrated with development and operations and throughout the application lifecycle.

1.2

Why the role of DevOps engineer varies?

DevOps engineer is not a new thing. It's a set of engineers like system engineer, build automation engineer, software engineer, Linux engineer and so on.

However, DevOps engineer nature of work varies from organization to organization. In some cases, its role is automation of infrastructure and maintaining it. While some organizations span their role to the entire delivery chain.



Role of DevOps engineer varies as he has to collaborate with development and deployment personals by overcoming traditional collaboration barrier. And different organizations have different barriers.

1.3

The most important two aspects about DevOps engineers' daily work

Even though the role of DevOps engineer varies, there are two things which almost all DevOps engineers will touch on a daily basis - **automation and continuous integration**.

a) Automation

Most of the tasks related to maintenance of infrastructure are still manual. Companies prefer to use traditional proven methodologies rather than automating the same process, as they don't want to take any risk. But the fact is automated tasks will help in faster development and deployment of software's, which means fast cash transfer from the customer account to the company account.

To grasp this point, consider for instance if system engineer has been tasked to backup all servers twice a day manually, he will waste his time in doing this as same could have been easily achieved by writing a script to automatically backup your server at some cloud facility. By automating the backup process, you allow your system engineer to focus more on critical things like troubleshooting the servers who are down due to some VM problem. Doing the same thing manually will result in overburden on your system engineer whose efficiency will drastically be reduced. This is just a very simple example to elaborate the concept of resource wastage by not moving to automation.



DevOps can be taken as an extension of Agile, as it reduces the risks that may arise due to non-collaboration between developers, QA and the deployment team. DevOps expand the scope of Agile principles, by recognizing the fact that high-quality software development requires continual engagement and feedback of all stakeholders including QA and operations specialists.

There are many things which can be done in an automated manner like updating your Apache Web server with new patches as and when they are released, updating versions of open sources software's deployed on your servers.

DevOps Engineers can automate the process of configuring servers by creating scripting environment. You can run scripts on one node, but it will become impractical to run the same script on hundreds of nodes if not thousands. Scripting is not a scalable solution here.



So there is a need to automate software provisioning, configuration management, and application deployment across a large number of nodes in a scalable fashion. This is where the configuration management tools such as Chef, Puppet, and Ansible come into handy in the DevOps world.

b) Continuous Integration

Another import aspect about DevOps is Continuous Integration (CI) which is a software development practice, CI allows developers to continuously update changes to a single repository, from where automated builds and tests are made.

A continuous Integration system usually involves a tool that keeps monitoring your version control system. Whenever a change to version control system is detected, the system would automatically build and test your application. If the build or test is not green, the system immediately notifies the developers to fix the issue right away.

Continuous integration ensures continuous delivery, as all code changes are continuously deployed to testing and production environment that follows the build stage.

With continuous integration, Developers can improve their productivity as they are freed from manual tasks,

that are now done in an automated manner in CI; Errors and bugs are easier to find and mitigate as a result of frequent testing; Updates to end user can be delivered quickly and more frequently.

There are different products and tools which can help you implement Continuous Integration in your organization.

Some tools let you host the CI servers in your own network infrastructure. The most popular one is **Jenkins** which is rebranded from the Hudson project of Sun.

There are some other hosted CI products such as **CircleCI** and **Travis CI** which is completely hosted in the cloud. These hosted CI products are getting more and more popular especially for small organizations as it enables engineering teams to start the continuous integration as fast as possible.



1.4

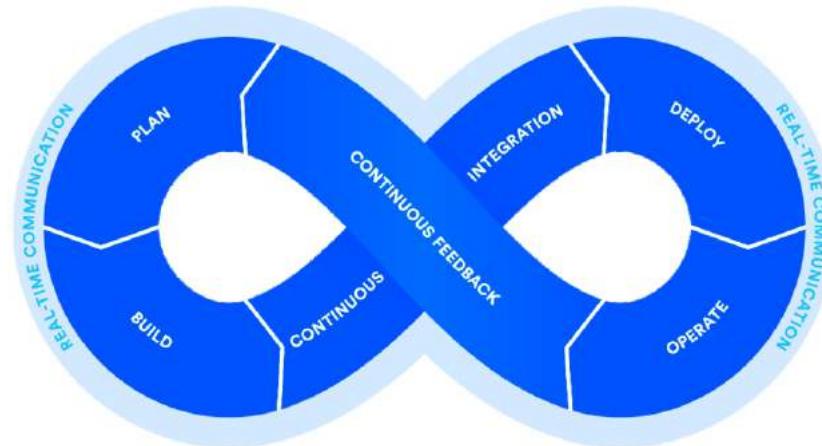
In Conclusion

The most critical role that DevOps engineers play is to **bridge the gap between software development and operations teams** to increase the rate of software delivery.

Even though the role of DevOps engineer varies across organizations, there are two common aspects: **automation and continuous integration.**

2.

Important Skills that DevOps engineers should have



In DevOps, the combination of hard and soft skills is important as well as mandatory. So let us have a quick look at these important DevOps skills.

2.1

Important hard skills for every DevOps engineer

(1) An expert as a SysAdmin



A DevOps engineer should be proficient at Windows/Linux administration. The reason for having such an experience is that a DevOps engineer has to build as well as administer servers. There is also a huge need for automating server deployments as it has always been a problem with most IT shops. Administrator experience would especially matter a lot during difficult scenarios and system breakdowns.

(2) Experience in virtualization

A DevOps engineer should be experienced when it comes to virtualization techniques and using related tools such as VMware, KVM and Hyper-V. One must doubt that why this experience of virtualization is necessary because such tools are never used in day-to-day support! The reason is that most public clouds run on different or various flavours of virtualization and this is why having a virtualization experience is necessary.



(3) Having a sound as well as a varied technical background



The previous skill regarding virtualization is certainly important, but it is not enough. One must also know networking and storage.

While some companies

have dedicated employees for it, a DevOps engineer still needs to know about it. Why? A DevOps engineer is expected to be good at solving problems and coming up with high availability uptime solutions. A DevOps engineer must understand issues like fault tolerance, failure domains, etc. Now this skill can be developed by being updated and noticing issues around you.

(4) Good with the scripts



Yes, the era is of automation even in the field of programming. But, a DevOps engineer should be able

to write scripts. It could be Bash, Powershell, Python, JavaScript, or anything else. Why is this needed? It is needed because this is how one can automate repeatable processes. Also, a DevOps engineer should be able to code when it comes to RESTFUL APIs. For example, replacing basic manual processes like assigning IP addresses or DNS reservation will only be automated by writing code. So someone has to script it right? At least for the first time.

(5) Security Training

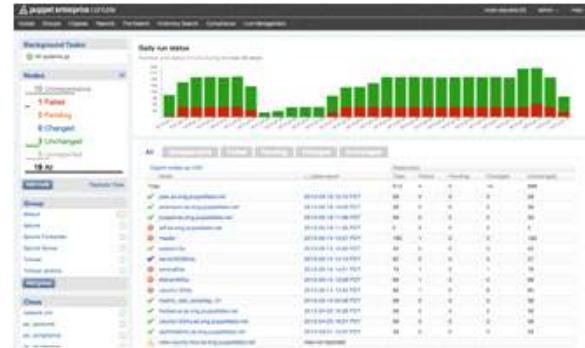
We mentioned the point that having knowledge of scripting is necessary.

But, this scripting knowledge should also provide security.

Writing a secure code is a must which would further protect the applications from attack. It will also help to defend against vulnerabilities. Writing a secure script is actually a blessing in disguise because the earlier any security issue is addressed, the cheaper it becomes to fix problems. It is not expected from a DevOps engineer to be an expert at security, but by just scripting securely, a developer would prove to be of great help!



(6) Experience in automation tools



Automation tools like Chef, Puppet, Ansible, Fabric, etc all play a vital role when it comes to automation. Most of us know how important automation itself is! The plus point as a DevOps engineer is that IT companies would love to hire you with a good salary if you know these automation tools. The knowledge of these tools is actually a plus point! So one must definitely know how to use such automation tools.

(7) Testing

What follows automation? Once the things are automated, the next step is testing! A DevOps engineer must possess good testing skills. This is because it is the only way how loopholes can be found. Coming up with numerous test cases and implementing them is important. So knowing and being assured that whatever function has been coded is perfectly doing its job is important. If the testing is not carried out perfectly, the effect of it will be directly on the end-users. So better be good at testing!



2.2

Important soft skills for every DevOps engineer

(8) Following team-first mindset



A DevOps engineer should practice team-first mindset because DevOps combines development as well as operations. It is important to adopt a team-first mindset by a DevOps engineer. The old strategy was to pass on things to the next operations team but it is not the case anymore. Nowadays, an application is simply a team effort. So it certainly needs a lot of empathy from everyone. Whenever conflicts happen, they should simply be dealt with maturity and calmness. Then and only then, the team shall be able to deliver a service/product of great value to the customer.

(9) Good communication

There are times when conflicts happen, but a transparent and a progressive communication would help in solving it. Good communication would not just help in solving issues, but will also help in testing. Verbal messages are something that can easily be modified or misconstrued in the times of stress. Now, stress is the most common thing that the team will come across. During such difficult times, communicating in such a way that leads to minimum misinterpretation is important. It also needs a lot of self-introspection. So communicating in a precise, short, and sweet way is a must!



(10) Making the infrastructure resilient

HOW RESILIENT
ARE YOU?



With regular updates, deadlines, and competition, having a resilient infrastructure is needed. For this, a DevOps engineer should yearn to find ways how he/she can make the infrastructure more and more resilient. In this case, a passive approach is dangerous and one needs to be aggressive in making decisions (with team approvals). Repeating the same processes blindly or in a hope to find some solution won't work. You will have to break it at some point in time and develop again. This is the most basic solution for making an infrastructure resilient.

2.3

Conclusion



The importance of DevOps engineer is immense. These are the people who will break the barriers of traditional or mechanical concepts and take the business into the era of autonomous delivery. This is why a DevOps engineer should continuously challenge himself/herself to achieve better than the previous result. So start developing these skills if you aren't equipped with them and if you are well equipped, this chapter is a good checklist for you! So be good, develop good, and attain great!

3.

Switching a career from Software Engineer to DevOps

As an experienced software engineer switching your job to some other company is a trivial thing, but switching your role to some new technology should always be followed by careful analysis and planning, no matter how diverse your profile is.

In this chapter, we will be looking at some key points that can help software engineer in switching his role to DevOps engineer.

3.1

Is DevOps for me?

The main dilemma or beauty of DevOps is that there is no clear boundary between software developer, QA and system admin.

They all are considered as a single unit.

Being a software engineer requires applying principles of engineering to software development process. The role is challenging and many people after years of tedious work want to make a transition to job of some lesser intensity, where using their previous experience they can have a. One option available to them is to switch to DevOps.

Jumping into the DevOps, just because it's a popular technology of current time is just a suicide to your career. The first and foremost thing you need to consider before switching your career is to check whether you have necessary skills to match the roles and responsibilities of DevOps engineer.

DevOps is a hybrid role, it's an interesting concept. Remember that DevOps is only for you if you have the ability to work and collaborate in team environment. In DevOps there is no concept of separate departments, it's about one single unit. It's important point, as some software engineers are very good in their sole work but worse when working in a team. Make sure you have this capability.

The next thing is follow the check list about what DevOps engineer can and can't do. You can match your skills with this list to check your compatibility with DevOps.

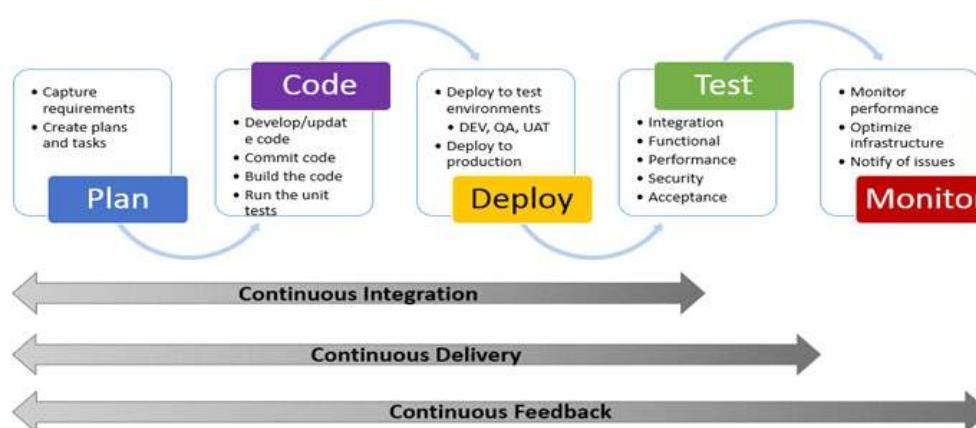
What a DevOps engineer role is?

Following are roles of DevOps engineer.

- DevOps engineer write codes.
- Building an infrastructure that accelerate development process and subsequently deploy the developed product.
- Automation is key ingredient of DevOps environment.
- Configuration management.
- CI/CD/CF is an important role of DevOps engineer.
- Managing cloud environment.

What a DevOps role is not?

- He is not a software engineer.
- Who never writes code.
- Only works on Linux operating system.
- Most importantly, an easier role than being a software engineer.



3.2

Software developer skills transferable to DevOps environment

- **Programming and scripting languages.**

In DevOps, there is need for writing code as well, as software engineer your programming skills are valid for DevOps environment. Apart from that, if you have experience with scripting languages that will be a big plus, since DevOps is focused in automation and for that nothing comes in handy other the scripting. Having knowledge of programming languages makes it easy to get familiar with tools like Chef, Puppet and Ansible. Don't think that your programming language knowledge has zero scope in DevOps.

- **Continuous Integration (CI).**

CI is a concept bought from software engineering industry, in which programmers frequently merge all their work to a shared mainline several times a day. If you have knowledge of CI tools like Jenkins, Bamboo and VSTS, it will help you in making a successful switch.

- **Cloud Concept.**

Clouds are everywhere, even over DevOps. Many of DevOps related projects are in cloud. Your experience in cloud services like IaaS, PaaS and SaaS are fully transferable to DevOps.

3.3

What do I need to do to make the shift?

Good news for software engineers is that companies looking for DevOps engineer are welcoming software engineers more than system admin, as it's easier to teach developer to do ops level work than to train a system admin how to do programming. Even if you have zero knowledge of ops level getting basic knowledge and experience of system administration is just one certification away.

You need to learn tools like Jenkins, Ansible, Chef and Puppet. As DevOps engineer you need to have hands on experience on these tools, just a college degree or certification won't help you achieving a successful switch.

Choose one specific platform Linux, Windows or BSD and once you have selected a platform, master it. For instance, if you have chosen, Linux you should know its file system, it's command line, bash shell scripting, how to configure a Linux server and things like that. As a developer if you have an understanding of underlying platform, it will easier to write applications that can be successfully deployed.

Cutting it short, in order to make a successful switch you need things as we mentioned in 'What a DevOps engineer role is?' If you have experience working with automation tools, comfortable with containers and have acceptance for cloud then DevOps is a perfect place for you to start sailing.

3.4

How about being a DevOps oriented engineer instead of shifting to DevOps engineer.

There is a misconception about DevOps, people consider it as a career path where Dev and Ops are combined as a single role, but it's actually not. DevOps is more focused on collaboration between dev and ops, breaking the walls of communication where dev and ops are only responsible for their jobs. DevOps unites them both, in order to accelerate and increase efficiency of software development process.

DevOps will eliminate servers with serverless infrastructures, thanks to DevOps automation tools like Ansible, chef and puppet, that automates processes like software provisioning, configuration management, and application deployment.

A living example is Amazon Echo Dot (smart device) that is running on serverless infrastructure. With this serverless environment role of system admin will have lesser role or some says it will completely extinct in coming years.

As a software engineer, instead of look for being a dedicated DevOps engineer, you can be an agile developer, and be DevOps oriented. Familiarize yourself with latest skills like Docker, Git, Jenkins, sonarqube, a little bit on Puppet and Chef for application deployment. That will be a great asset for you.

As last word, although DevOps is popular yet its new concept in the market and will take time when people will have full understanding of what DevOps engineer is. Many software engineers right now are hesitating in switching to it, in fear of getting label of DevOps and not hired as software engineer in the future. Although new, this technology is developed to remain in use for days to come. Switching to this technology, with proper planning will guarantee a safe future.

4.

A Transition Guide from System Admin to DevOps Engineer

Be it a system admin or any other professional who can work in software development process has its place in DevOps. But before you make a switch, it's vital to analyze yourself that as a system admin or QA professional your skills are fully compliance with needs of DevOps industry.

During my past few years, I have worked with quite a few excellent system admins in various projects and I understand that some of them would like to transition to DevOps roles. In this chapter, I will try to explain what attributes a system admin should have in order to make a successful switch towards DevOps.

4.1

Difference between system admin and DevOps engineer

Traditionally system admin job is limited to configuring, keeping up and maintaining servers and computer systems. Usually, system admin has no role in the development process of software and there is a huge fence separating system administrator and developer. System admin role has been around for quite a while now, with tasks and responsibilities well defined.



sysadmin

DevOps is a different approach, it's creating a pipeline of development, QA and system admin to overcome the lack of coordination. In DevOps, the whole team has an overlapping role throughout the product development lifecycle, a developer will perform tasks in production, while a system admin will look after things during the design phase of the product.

There is no formal definition of DevOps engineer, it's a complex role and is believed to be one of hardest role to be filled and kept with success.

DevOps professionals are programmers who get interested in deployment and operations over time, or system administrator who also knows the coding, and move into the development phase where they can improve the planning of test and deployment. DevOps engineers are people, who have pushed beyond their defined areas of competence and who have a more holistic view of their technical environments.

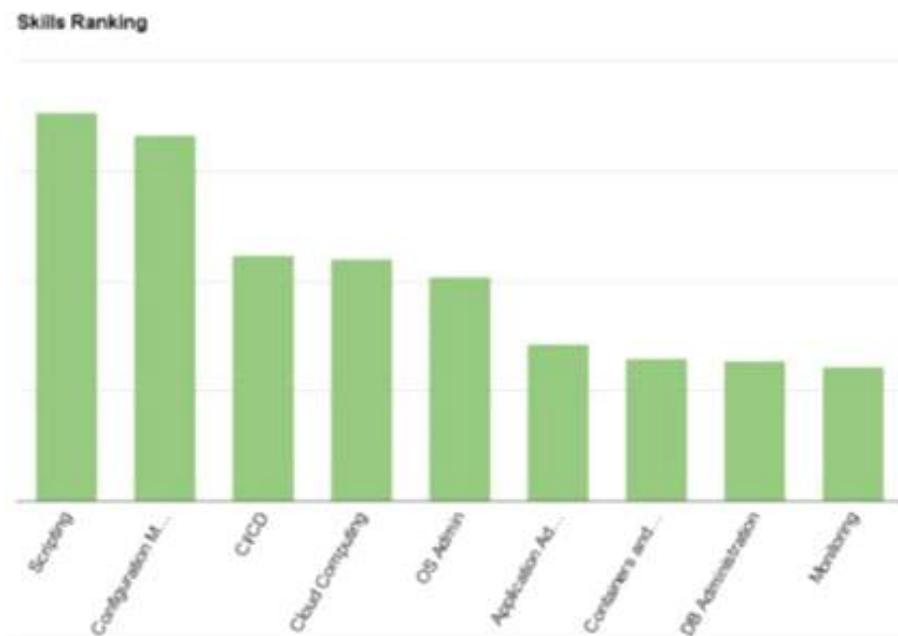
4.2

System admin skills which are transferable to DevOps engineer

DevOps negates the "throw it over the wall mindset", where developers do their job, and system admins do their sole job. DevOps breaks teams and departments into one single unit, with the overlapping role. It's important to understand that nothing beats the experience, adopting "DevOps" to reduce staff and save money to increase revenue will have a negative impact.

There is an overlap of skills between system admin and DevOps Engineer. A report from School of DevOps lists top 9 skills which companies are looking for these days.

It can be easily seen that some of these skills such as scripting, OS admin, and monitoring are already possessed by system admin, some are not.



4.3

New technical skills needed for system admins to get into DevOps

System admin traditional approaches (with some changes) are still valid for DevOps. A DevOps engineer needs to apply his skills to entire life cycle of product development. He must be familiar with cloud services and the state of the art automated tools and finally, he must be able to collaborate with other members as well.

Following are some key things which a system admin should have in order to become a DevOps engineer

- **Continuous integration**

The most important aspect about DevOps is Continuous Integration (CI) which is a software development practice, CI allows developers to continuously update changes to a single repository, from where automated builds and tests are made.

Usually, traditional system admins roles do not involve developing continuous integration pipelines, but if you are looking to dive into DevOps, getting hands-on experience with continuous integration tools is a must.

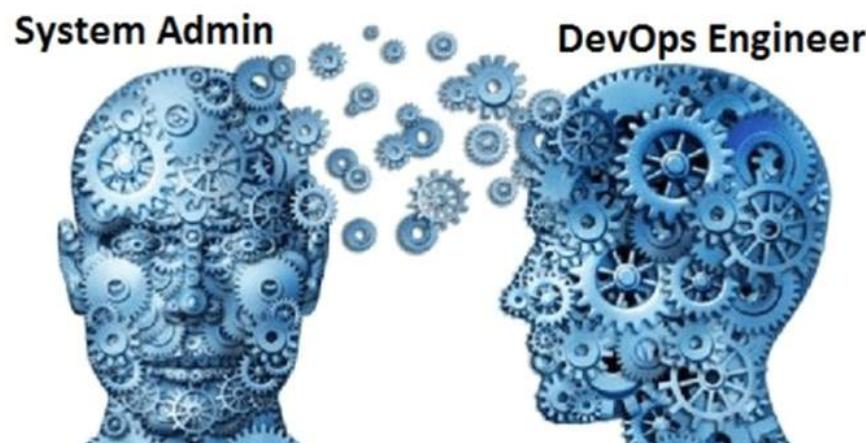
There are different products and tools which can help you implement Continuous Integration in your organization. Some tools let you host the CI servers in your own network infrastructure. The most popular one is Jenkins which is rebranded from the Hudson project of Sun. There are some other hosted CI products such as CircleCI and Travis CI which is completely hosted in the cloud.

- **Clouds computing**

Majority of DevOps projects are cloud hosted. As a DevOps engineer, you must be able to configure servers and services relating to Amazon Web Service, MS Azure, Google Cloud and other cloud hosts. Apart from that you should also be familiar with cloud services like Software as a Service (SAAS), Platform as a Service (PAAS), Infrastructure as a Service (IAAS).

- **Configuration management**

As DevOps engineers, you must be familiar with configuration management tools like Puppet, Chef, Salt or Ansible. They all are built to make it easier to automatically configure and maintain hundreds, or even thousands of servers. These all tools helps in automating various process, which is one of main feature of DevOps.



4.4

In Summary

System admin role is around for quite a while with tasks and responsibilities well defined. DevOps is a different approach, it's creating a pipeline of development, QA and system admin to overcome the lack of coordination.

Some of DevOps skills such as scripting, OS admin, and monitoring are already possessed by system admins. But there are still a few key skills which a system admin should have in order to become a DevOps engineer such as hands-on experience with some popular continuous integration tools, cloud computing, and configuration management tools.

5.

The career path of a DevOps Engineer

DevOps is an emerging technology that has fully transformed the software development process, to cater modern need of quick software delivery to end user.

In this chapter, we will look at DevOps from the perspective of choosing it as a career path without getting into deep technicalities, so you can have a clear understanding of what DevOps is and its impact on software development methodology. This will be a great guide for fresh graduates and for professionals who want to adopt DevOps as a career.

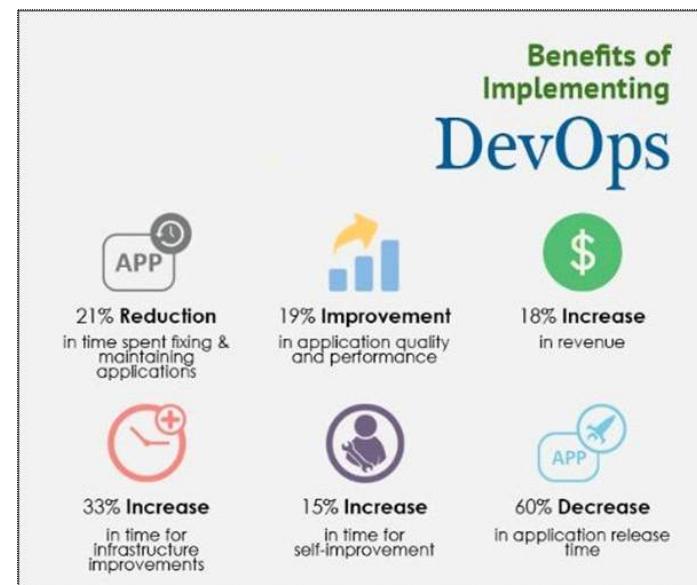
5.1

Is DevOps a sustainable career path?

Being a newbie in industry, there are some concerns about DevOps that whether or not it's a good career to choose. Main reason for this is because most of people don't have clear understanding of what DevOps engineer is and what he can and cannot do, having a clear understanding of this can clarify many doubts. When a company advertise for a DevOps engineer they are looking for someone

- Who has experience with DevOps tools
- Can implement automated deployment
- Implement DevOps solutions for team collaboration
- Achieve continuous integration and continuous delivery

Those days are now part of history when user can wait for months for receipt of his software. Today time is critical and user need products in no time and will work with vendors who can cater this need. Business has to adopt strategies that can answer these new demands, DevOps is the name of this transformation. It's a need that is rapidly becoming a reality and there should be no ambiguity solid foundation of DevOps.



Fast application development require collaboration and DevOps is launched with this core value in mind, as it's focuses on collaboration between all members of software development lifecycle. The individual role and responsibilities like developers, designer, application tester and database administrators are becoming extinct. Team under DevOps has to collaborate, communicate and integrate with each other.

DevOps is mostly about changing the traditional mindset,[]a shift in approach that can help break down work in isolation approach with a collaborative environment. Technical skills alone do not make an effective DevOps engineer and neither DevOps is just a combination of tools, they are people who sit between development and deployment with great Interpersonal skills.

DevOps is now everywhere, it's methodology used by Amazon, Facebook, Adobe, Walmart, Netflix and many more. If you don't know about this technology you are already too late.

5.2

Is DevOps a good career for fresh grad?

For fresh graduates which career path to choose is a dilemma, which almost all fresher's undergo. It's a decision that will impact your whole life. By choosing you first profession, you are deciding which career you are opting for rest of your life. Though many switch their role later but majority continuous on initial path chosen.



DevOps is one of many options available to graduates coming out from universities these days. Currently most of DevOps engineers are one who started their career as system admin and later switched to this field. There is clear shortage of core DevOps engineer, who understand its culture. This leave a great room for professionals to jump in this area for better future.

DevOps is an interesting field to choose among other options, you don't have to work continuously on software engineering or system admin related tasks all the time, there are many things which as DevOps engineer you have to look for like Cloud platform deployment, Docker, continuous integration, automation and many more.

DevOps engineers are always integrating new technologies and solving new challenges. This technology has incorporated technologies of future and spans across multiple domains.

If you think you can comply with all challenges of fast product development and have good interpersonal skills, then DevOps is for you.

5.3

How to be a better DevOps engineer

Today market is competitive for every professional, you need to keep yourself updated with latest trends in order to remain in business. Those who will not update them, will have a death to their career very soon.

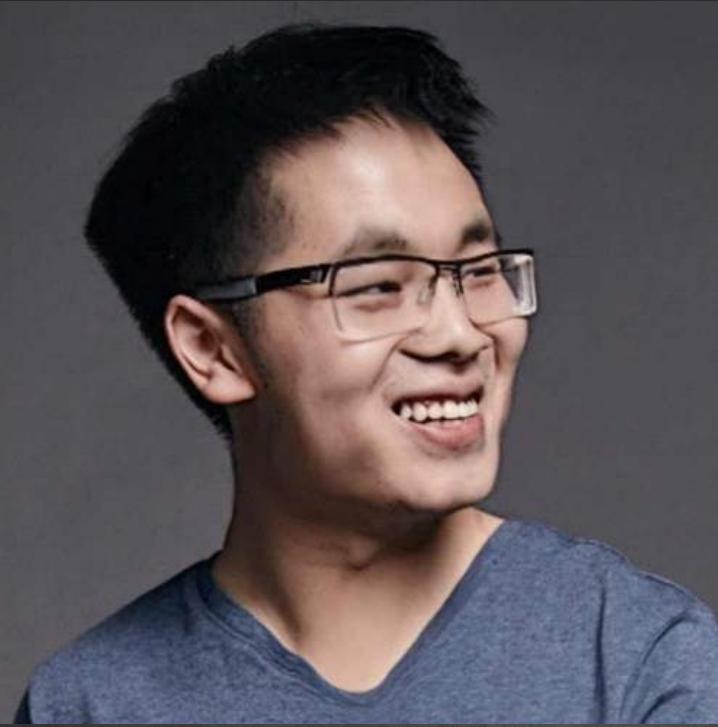
One of the best way to enhance your skills as DevOps engineer is to acquire certifications and keep them updated. They are proof that apart from practical experience you are continuously learning new trends that are emerging in DevOps. You can either choose AWS certified DevOps, puppet certification or any other path that suits your skill and interest.

Future is in Cloud and since many of DevOps related activities are already in cloud, make sure you have sound knowledge of cloud computing in order to remain in DevOps industry.

As DevOps engineer you must be dynamic. Unlike a software developer, where you learn a language and constantly have to do programming in that particular language. For instance, Docker was not in use few years back but today its widely used and accepted technology. As DevOps engineer you need to keep an eye on current tools and also ready to master new tools as and when they are released.

Use of DevOps tools like Chef, Puppet, GIT, Ansible, Jenkins, Vagrant and Docker are on rise, learn these to live in DevOps or exit DevOps if you can't master them.

DevOps is a job category that has a promising future and also provides a sustainable career path, especially for fresh and middle-age engineers as they have immense potential to unleash.

A portrait of a young man with dark hair and glasses, smiling broadly. He is wearing a blue t-shirt.

Here's to you and your DevOps journey.

I'd like to thank you again for taking the time to check out this quick reference guide! I hope you've found some value in it and can use it as a guide to help you plan your DevOps career in the future.

And if you enjoyed this quick reference guide, please let me know how it's helped you, you can reach me by

-  <https://www.level-up.one/contactus/>
-  <https://twitter.com/jamestopcoder>
-  <https://www.facebook.com/jamesleecoder/>

If you are infested in learning more about DevOps, check out our blogs

<https://www.level-up.one/blogs/>

If you want to get the latest update from us such as launches of new course or stay updated about the latest trend in the DevOps world and practical tips/tricks? Simply join our email list if you haven't yet.

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Cheers, best of luck, and I look forward to serving you again soon!

James Lee