What is a DevOps engineer and what does a DevOps engineer do?

A DevOps engineer optimizes an organization's software delivery process to enable collaboration and innovation. Keep reading to learn more about what DevOps engineers do and what skills they rely on.

Overview   Responsibilities   Skills   Tools   FAQs

What is a DevOps engineer?

A DevOps engineer is an IT professional that that manages an organization's developer operations (DevOps), which includes all the practices and tools that the organization uses to create and manage software.

DevOps engineers play a crucial role in bridging the gap between traditionally siloed departments to enable more consistency and effective collaboration. They often serve as the link between development teams and IT operations teams to help unify, optimize, and automate processes within the software development lifecycle. Because teams have different skillsets and goals, a DevOps engineer's job is to balance the needs and goals of all teams and find solutions that enable everyone to do their best work.

What does a DevOps engineer do?

A DevOps engineer's role may vary from organization to organization, but the responsibilities of a DevOps engineer typically involve using various DevOps tools and strategies to provision and manage infrastructure, automate processes, perform system administration, and manage security. Other duties of a DevOps engineer may include coding, automation, security, and infrastructure management.

Common responsibilities of a DevOps engineer include:

- **Communication and collaboration:** A DevOps engineer often serves as the main collaborator between multiple teams, including development and operations teams. The DevOps engineer's responsibility is to make sure that each team communicates what is needed to implement changes to applications quickly and seamlessly without creating reliability and

security issues.

- **Infrastructure management:** DevOps engineers focus on provisioning and managing system administration and deploying and maintaining the servers that host applications. They also maintain storage and network resources like physical servers, storage devices, switches, and virtualization software. In a hybrid setting, a DevOps engineer may also manage the virtual instances of these on-premises and cloud-based components together.

- **Automation:** Most DevOps engineers have a strong understanding of automation and how to implement it as part of their continuous integration/continuous delivery (CI/CD) tooling. DevOps engineers are often responsible for developing automation processes for their development and IT operations teams or for modifying existing automation processes.

- **Data management:** Along with building infrastructures and automation processes for their departments, DevOps engineers are also responsible for the actual content and data in these structures. DevOps engineers design the process for how data is gathered, stored, and used. They also manage how it is accessed and who has access to it.

- **Continuous integration:** DevOps engineers perform continuous integrations to their organization's software that involve making sure new code changes are regularly built, tested, and validated before being merged to a shared repository like GitHub for the rest of the organization to use. This process ensures that the new code is automatically tested for bugs through unit and integration tests before it is sent to production under the continuous delivery phase.

- **Continuous delivery:** DevOps engineers are also responsible for continuous delivery—a process that automates the release of tested and validated code for production. This validated and tested code is usually sent to a repository that all development and operations teams can access to deploy an app to production with relative ease.

- **Continuous deployment:** DevOps engineers are also responsible for the final phase of the CI/CD pipeline known as continuous deployment. This process is an extension of the continuous delivery process, where the validated code is automated directly into app production instead of into a repository. This process can allow new code to be released to the public in minutes if it clears all tests for bugs and security vulnerabilities.

- **Quality assurance:** DevOps engineers may be responsible for overseeing the quality assurance (QA) team to make sure new code isn't flawed. The QA team mostly focuses on smoke testing, regression testing, and integration testing. Smoke testing makes sure the application code doesn't cause immediate problems, while regression and integration testing makes sure new code doesn't break existing functionality or conflict with other existing features.

- **Monitoring and logging:** A DevOps engineer may be responsible for monitoring and logging the performance of each iteration of code that gets deployed to the public. The information that is monitored and logged creates instant feedback for the CI/CD process to inform the creation of newer iterations and improvements to the apps.

- **Security:** A DevOps engineer must incorporate security into their organization's IT lifecycle. The practice of implementing security measures is often known as development security operations and is focused on finding software vulnerabilities that can affect the app users as well as the organization. A good DevOps engineer finds ways to automate security throughout all development phases and delivery.
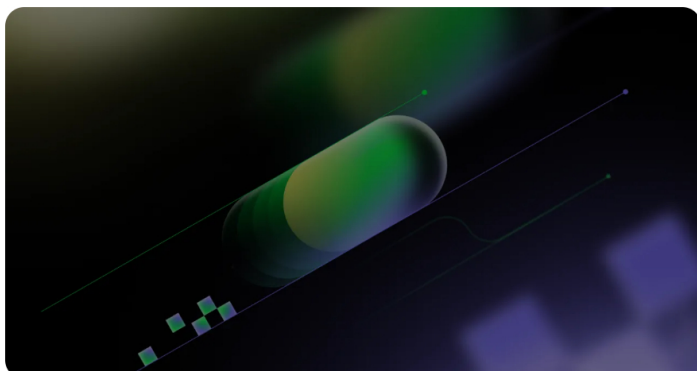
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What skills are required to be a DevOps

engineer?

Most DevOps engineers possess a strong software development or IT operations background, along with a mix of other technical skills and soft skills from other disciplines. These skillsets may include knowledge of programming languages, proficiency with automation tools, interpersonal skills, and analytical problem solving.

Skills recommended for DevOps engineers include:

Soft skills

- **Communication and collaboration:** One of the most important skills for DevOps engineers is knowing how to ensure consistent communication and collaboration across all departments. Their interpersonal skills help them steer production into a steady, automated pipeline with strong feedback loops.

- **Interpersonal and management skills:** Good DevOps engineers know how to delegate tasks across all teams for efficient production and performance. They provide consistent and clear feedback that helps developers produce code more effectively and efficiently. They also use their extensive knowledge of different disciplines and testing methodologies to serve as a coach to their team.

- **Analytical and problem-solving skills:** DevOps engineers must know how to solve problems as they arise. Since they straddle the processes of both development and operations teams, they need to know how to resolve issues like security vulnerabilities in real time and they must be able to find ways to automate repetitive, routine tasks for timely production in all departments.

Technical skills

- **Programming languages:** DevOps engineers are usually proficient in at least one or more programming languages for coding and scripting, like PHP, Java, Ruby, Python, C++, PowerShell, or Bash. DevOps engineers should know how to write automation scripts with any of these programming languages, but they should also know how to implement agile development practices—like code reviews and source control—into their processes.

- **Automation tools:** DevOps engineers should have experience with maintaining automated test suites or with using automation tools like GitHub Actions to help automate process workflows in the CI/CD pipeline. Although some organizations may also have an automation engineer to fulfill their automation needs, DevOps engineers that know how to work in conjunction with an automation expert can help strengthen the automation process even more.

- **Cloud computing platforms:** DevOps engineers often have experience working with cloud computing platforms like Microsoft Azure, Amazon Web Services, and Google Cloud Platform. They should also know how to balance and automate processes for work done in an on-premises or hybrid work model situation.

- **Containerization:** DevOps engineers usually have experience with containerization services like Docker and Kubernetes to bundle the application code and its runtime environment into the same image. This helps cut down on the necessity for traditional configuration management tools that slow down overall production and efficiency.

- **System architecture and provisioning:** DevOps engineers should understand how to design, provision, and manage system architectures and infrastructures, including cloud-based and on-premises structures. DevOps engineers should also have knowledge of infrastructure as code—an IT management process that applies best practices from DevOps software development to the management of cloud infrastructures.

What tools do DevOps engineers use?

DevOps engineers use a variety of tools from all disciplines and methodologies to help maintain a consistent workflow between development and operations teams. These tools help them resolve issues as they arise and help prevent certain issues with simple

automations.

Types of DevOps engineer tools:

- **Configuration management:** Most DevOps engineers have experience with configuration management tools like Chef or Puppet to help them automate system administration tasks like applying security patches or deploying new systems.

- **CI/CD:** As discussed earlier, CI/CD involves the continuous integration, continuous delivery, and continuous deployment pipeline. Many DevOps engineers have experience working in programs like GitHub Actions to help them automate the processes of building, testing, and deploying application software in a CI/CD pipeline.

- **Infrastructure automation and monitoring:** DevOps engineers use a variety of automation tools for infrastructure provisioning, system administration, and infrastructure monitoring. Some tools DevOps engineers use for these processes include Terraform, Pulumi, and Vagrant.

- **Container orchestration:** DevOps engineers often must package and ship application code throughout the organization. They normally work in programs like Docker, Podman, Buildah, and Kubernetes to containerize and transport this code. Each tool varies in scalability, security, and ease of deployment or maintenance, so it's common for DevOps engineers to be familiar with more than one container orchestration tool and to use different tools according to a project's needs.

Becoming a DevOps engineer

Organizations rely on their DevOps engineers for guidance and leadership across their entire app development lifecycle. Although many DevOps engineers begin their careers as software developers or as IT management professionals, they usually also pick up new skills, methodologies, and strategies from other similar disciplines along the way. Because of this, DevOps engineers are often some of the most seasoned professionals in their organization and it can take many years for DevOps engineers to acquire all the skills they need to be successful.

Aspiring DevOps engineers can access resources online for learning how to become a DevOps engineer or exploring paths for DevOps engineers. Organizations that are interested in bringing a DevOps engineer onto their teams can also find resources on how to onboard a DevOps engineer.

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Does a DevOps engineer do coding? +

What skills does a DevOps engineer need? +

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