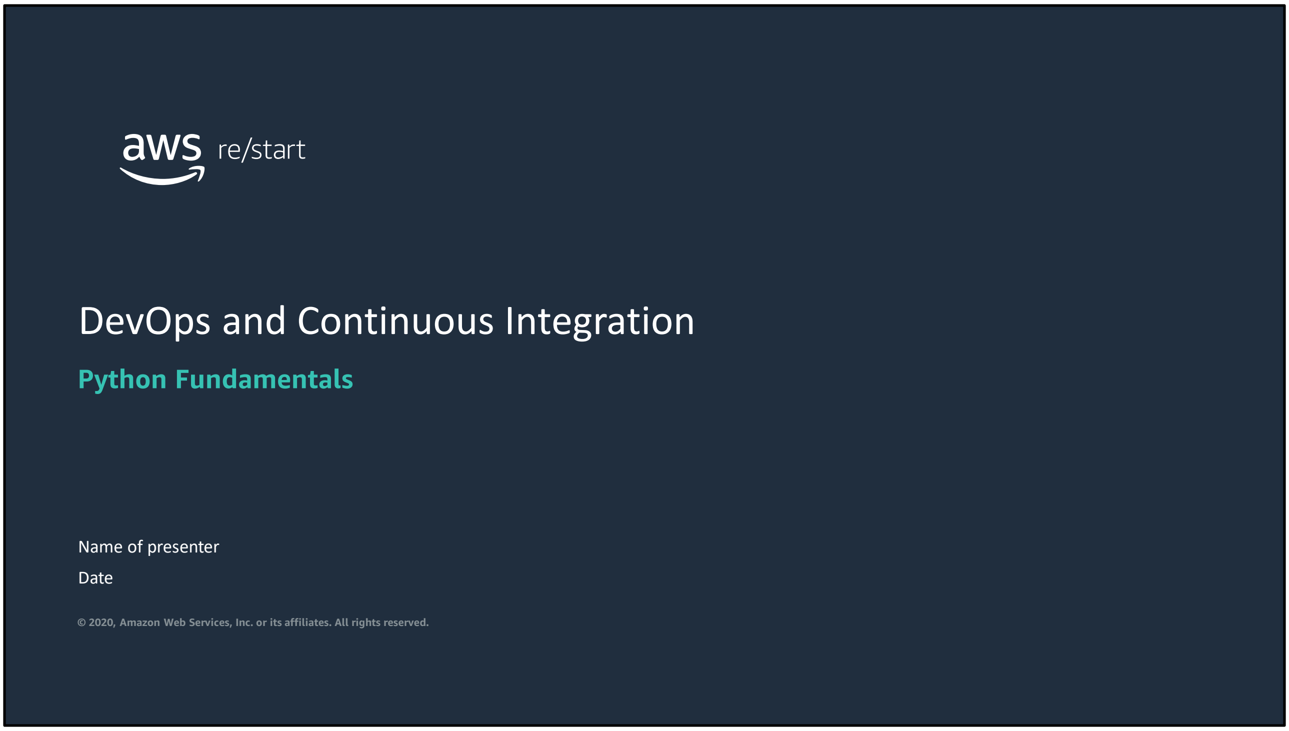

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DevOps and Continuous Integration

Python Fundamentals

Name of presenter

Date

Welcome to DevOps and Continuous Integration.

Introduction to DevOps

What you will learn

At the core of the lesson

You will learn how to:

- Define DevOps
- Identify the goals of DevOps
- Identify the challenges that DevOps solves
- Describe the culture of DevOps

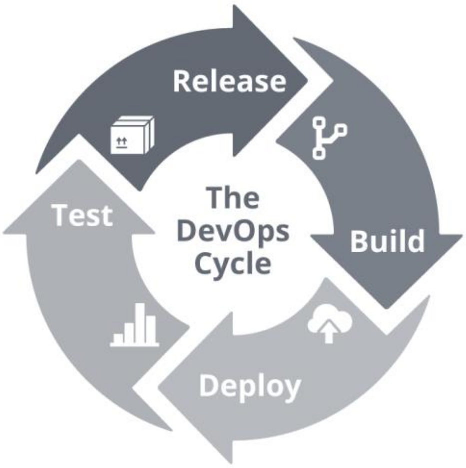
In this module, you will learn how to:

- Define DevOps
- Identify the goals of DevOps
- Identify the challenges that DevOps solves
- Describe the culture of DevOps

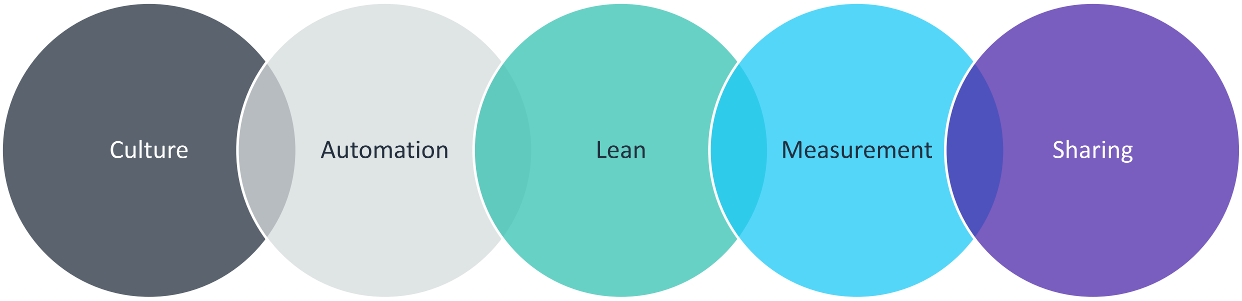
What is DevOps?

DevOps is a software engineering culture and practice that aims to unify software development (Dev) and software operation (Ops).

The main characteristic of the DevOps movement is to advocate for automation and monitoring at all steps of software construction. These steps range from integration, testing, and releasing to deployment and infrastructure management.



What is DevOps? continued



Culture

Automation

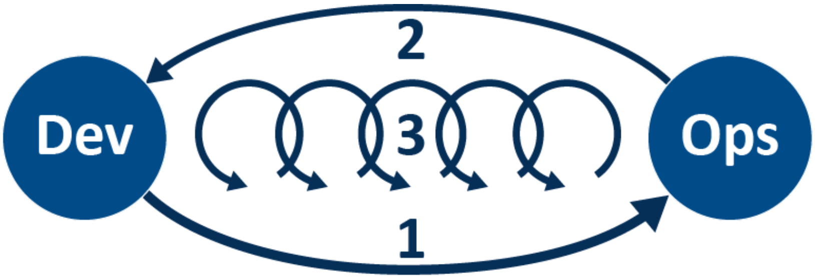
Lean

Measurement

Sharing

Culture of DevOps

1. Consider the performance of the **entire system – FLOW**
2. Create and amplify the right-to-left **feedback** loops
3. Create a culture that fosters:
   a. Continual experimentation, taking risks, and **learning**
   b. **Repetition and practice** – the prerequisite to proficiency



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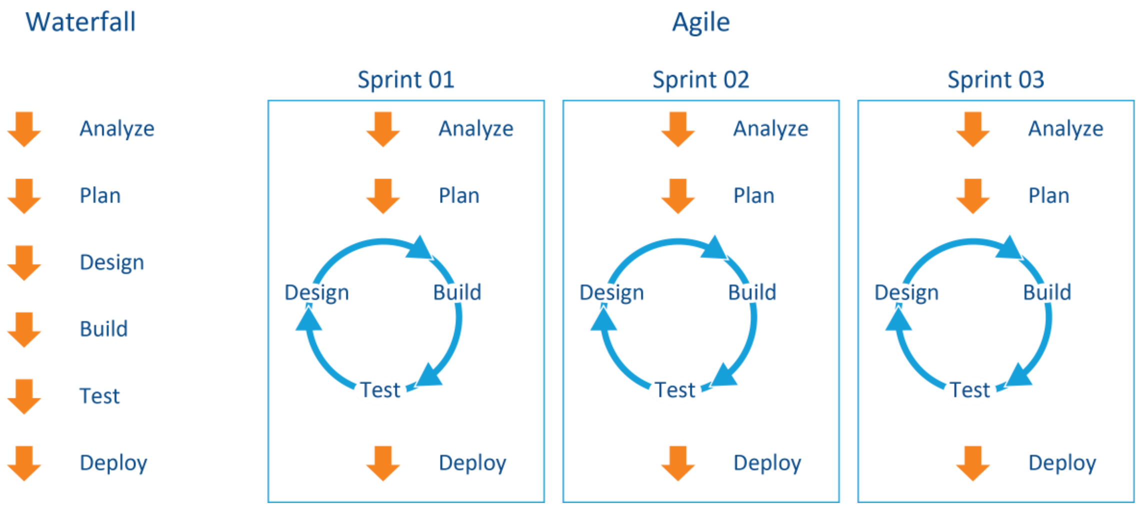
Waterfall versus agile



Waterfall

Analyze

Plan

Design

Build

Test

Deploy

Agile

Sprint 01

Analyze

Plan

Design

Build

Test

Deploy

Sprint 02

Analyze

Plan

Design

Build

Test

Deploy

Sprint 03

Analyze

Plan

Design

Build

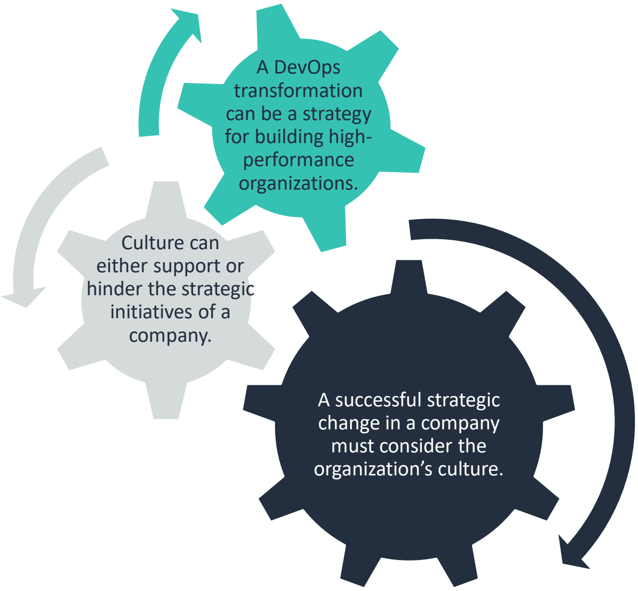
Test

Deploy

Goals of DevOps

- DevOps is meant to bridge the gaps between traditional IT, software development, and quality assurance (QA).
  - The most difficult part for beginners is the QA part. The appearance of your code is important.
- DevOps is meant to be faster and more flexible.
  - The challenge is better integration of QA and security in these quicker, shorter cycles (see the *Waterfall versus agile* diagram).
- DevOps is meant to bridge or reduce the need for specialized individual work.
  - When you begin to develop, you might notice that it is easy to become immersed in your own work. DevOps is meant to make it easier to do development work in a team.

Stakeholders: Organizational culture



A DevOps transformation can be a strategy for building high-performance organizations.

Culture can either support or hinder the strategic initiatives of a company.

A successful strategic change in a company must consider the organization's culture.

Stakeholders: Organizational culture types

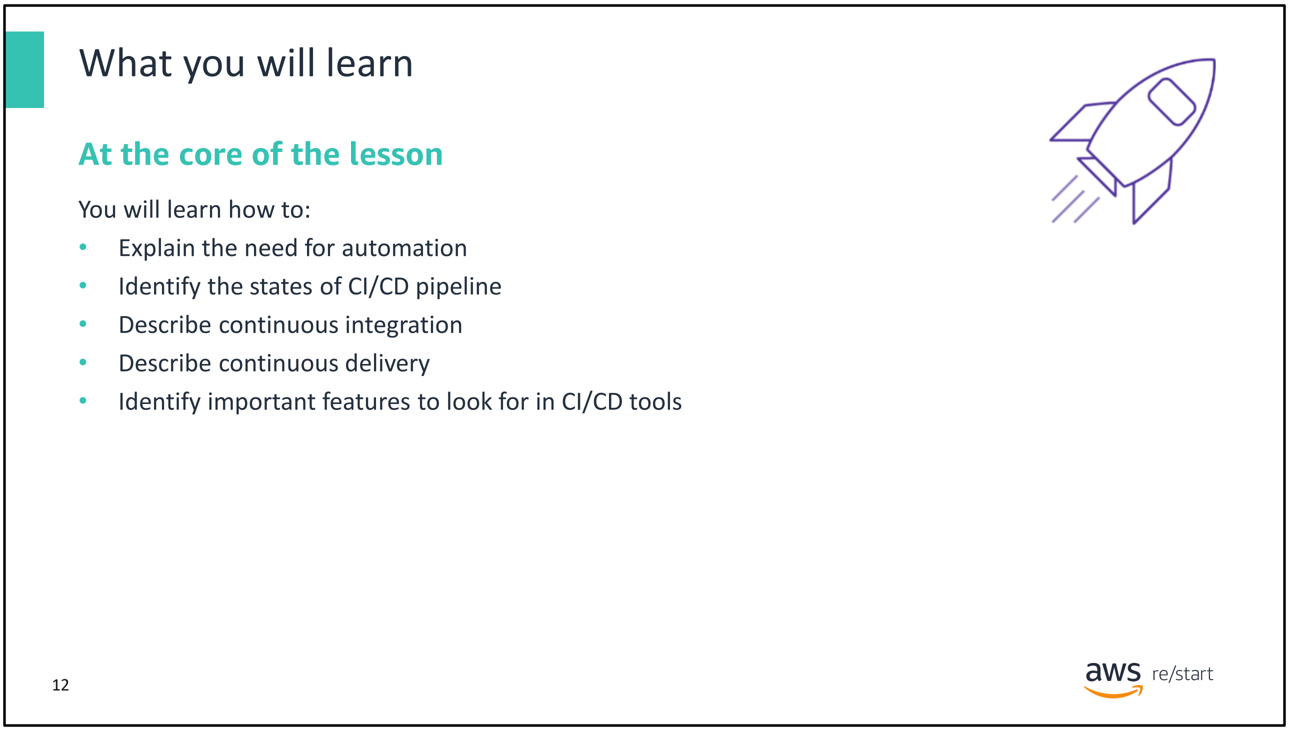
Collaborative culture revolves around collaboration.

Adhocratic culture is often associated with entrepreneurship and innovation.

Market culture pays attention to achieving goals, winning with the competition, and increasing measurable outcomes like market share or return on investment (ROI).

Hierarchical culture praises predictability, timeliness, and efficiency.

Continuous integration and continuous delivery (CI/CD)



What you will learn

At the core of the lesson

You will learn how to:

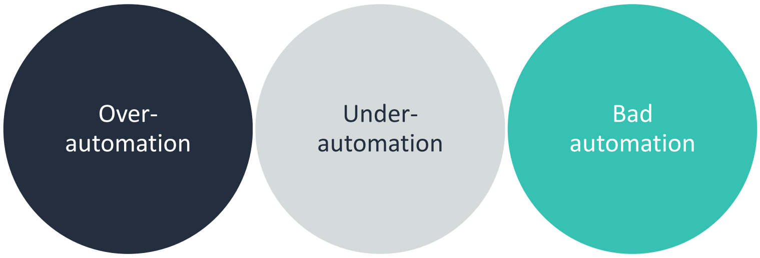
- Explain the need for automation
- Identify the states of CI/CD pipeline
- Describe continuous integration
- Describe continuous delivery
- Identify important features to look for in CI/CD tools

In this lesson, you will learn how to:

- Explain the need for automation
- Identify the states of CI/CD pipeline
- Describe continuous integration
- Describe continuous delivery
- Identify important features to look for in CI/CD tools

Automation

- When you develop software, it can be tedious and inefficient to perform the same tasks repeatedly. Automation can help solve this issue.
- The goal of automation is creative efficiency. However, automation has several risks that can undermine this goal:



- These concepts are explained in the next slide.

Automation: Risks

Over-automation

- Over-automation happens when you automate steps in the development process so that it reduces creativity. If you must think about and consider specific steps in a different way each time that you do them, you probably should not automate them—for example, analyzing, planning, and designing.

Under-automation

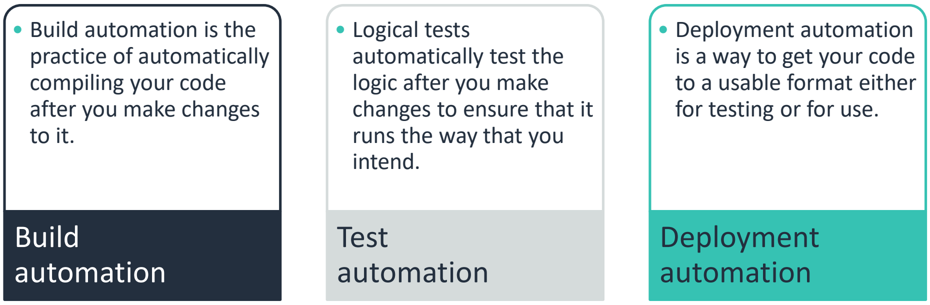
- Under-automation occurs when you avoid automation to make sure that things are handled correctly, or because it is helpful to find exactly where code stops working. Processes that are good to automate include building, testing, and deploying.

Bad automation

- Bad automation happens when you automate a process that does not work well. Bad automation can be fixed by revisiting the planning stage of development.

Tools for DevOps: Automation

Automation has many tools:



- Build automation is the practice of automatically compiling your code after you make changes to it.

Build automation

- Logical tests automatically test the logic after you make changes to ensure that it runs the way that you intend.

Test automation

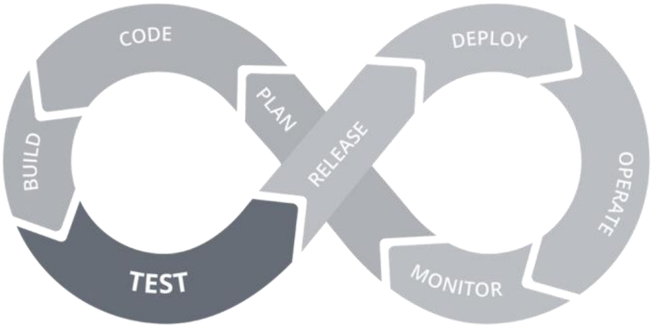
- Deployment automation is a way to get your code to a usable format either for testing or for use.

Deployment automation

Automation encompasses many different methods and tools, but you are encouraged to focus on these three tools.

CI/CD pipeline

- The CI/CD pipeline is another tool for automation. The two parts are –
  - Continuous integration (CI)
  - Continuous delivery (CD)
- The next two slides cover CI and CD in detail.



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Continuous integration (CI)

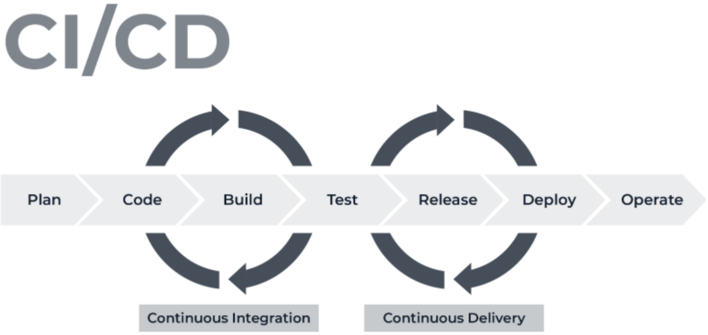
- CI is the automation of making your code available to your teammates.
- It generally includes the build automation and quality assurance automation that were discussed earlier.
- CI has two main purposes:

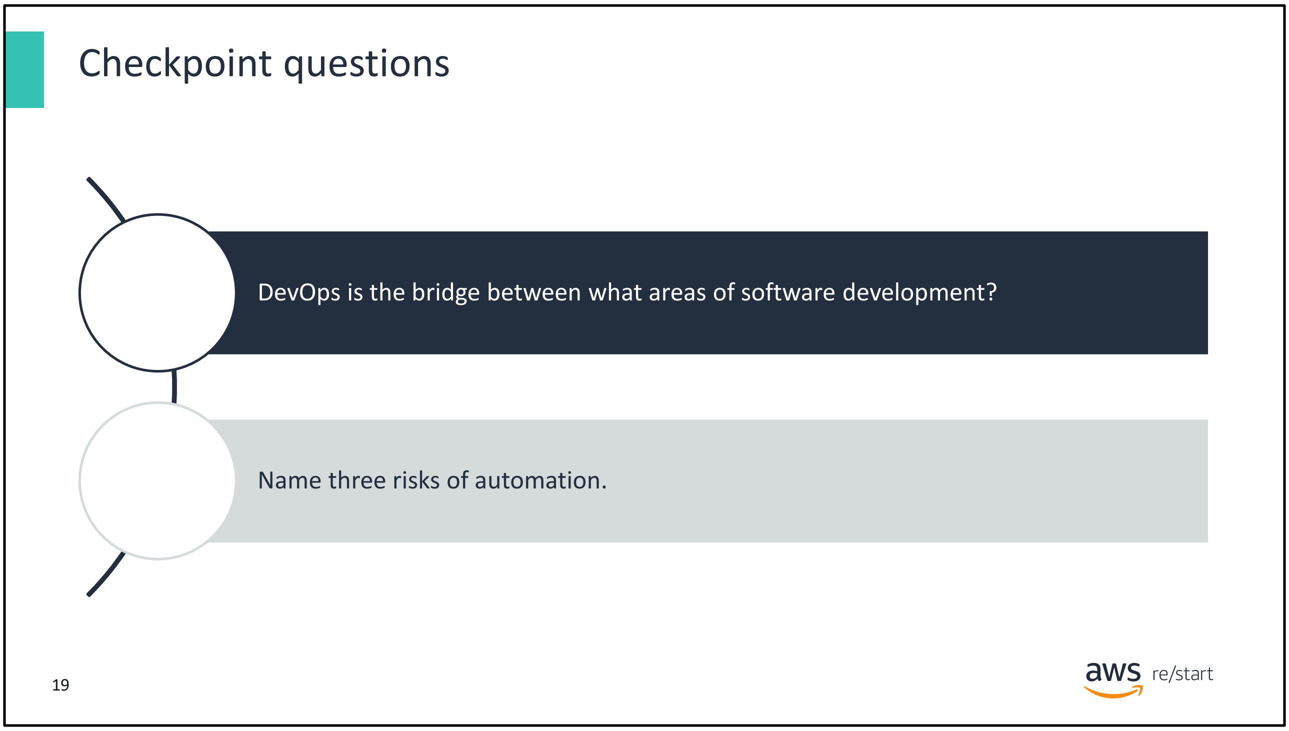
Making sure that your code works with what has already been done

Making sure that the code is readable for those who will work on it after you

Continuous delivery (CD)

- CD is the extension of CI.
- CD includes a test automation for all code that is submitted. Its purpose is to ensure that the code works –
  - In the way that it was intended.
  - In a way that makes sense.
- CD also ensures that at any point in the development process, a working version of the code can be produced immediately.
  - This part is the deployment automation.





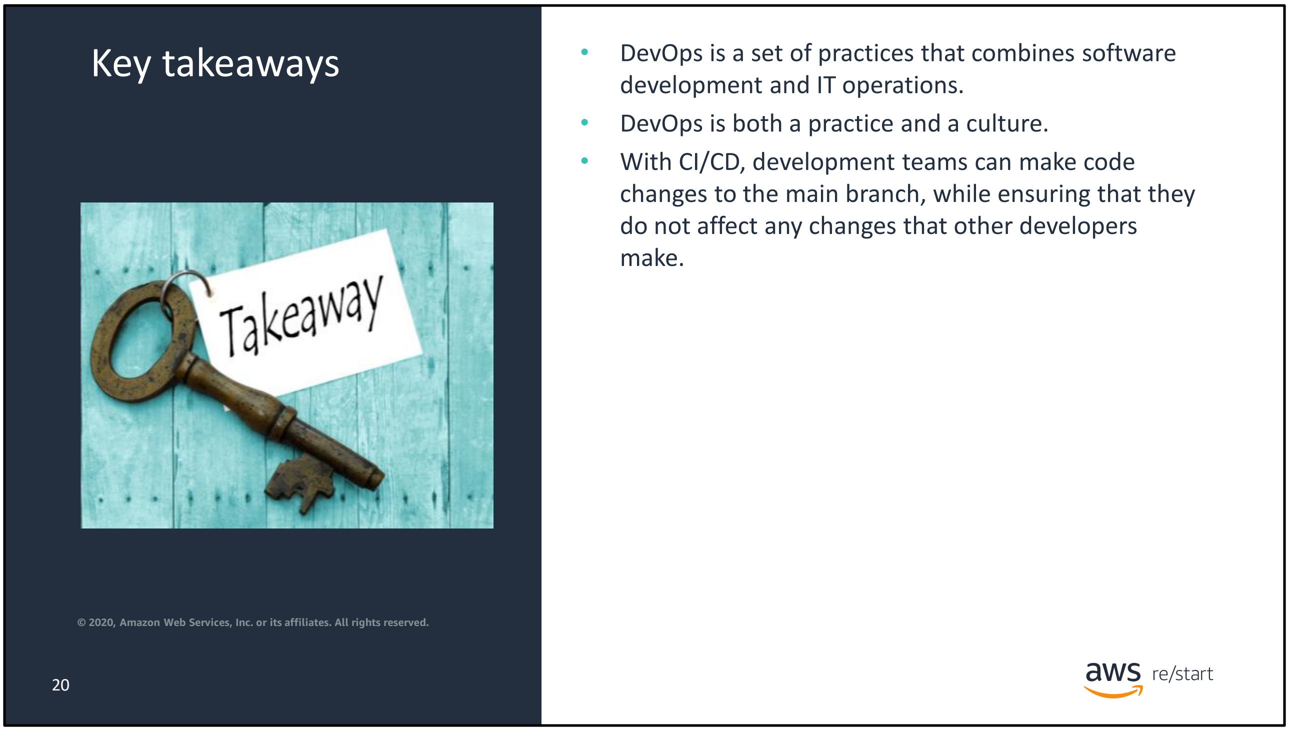
Checkpoint questions

DevOps is the bridge between what areas of software development?

Name three risks of automation.

Answers:

1. DevOps bridges the gap between traditional IT, software development, and QA
2. Three risks of automation are:
   - Over-automation
   - Under-automation
   - Bad automation



Key takeaways

- DevOps is a set of practices that combines software development and IT operations.
- DevOps is both a practice and a culture.
- With CI/CD, development teams can make code changes to the main branch, while ensuring that they do not affect any changes that other developers make.

Some key takeaways from this lesson include:

- DevOps is a set of practices that combines software development and IT operations.

- DevOps is both a practice and a culture.

- With CI/CD, development teams can make code changes to the main branch, while ensuring that they do not affect any changes that other developers make.