

Assignment Project Exam Help

DevOps <https://powcoder.com>

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Originally prepared by James Snook for CSC301

Initial Questions

- How many changes do you think you will make to your product?
- How will you make sure your changes have not broken the product?
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- Who will deploy and test?
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- Is it fun/best use of your time?

Late 1990s to Early 2000s



● Testing

- Mostly manual
- Performed by a separate QA

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● Deployment & Operations

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- Ship CD/DVD to customer, or (later) provide download link
- Customer owns production

Late 2000s to Early 2010s



● Testing

- Partly automated (esp. unit tests)
- QA team for manual parts

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● Deployment & Operations



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- Software as a Service
- Deploy to in-house hardware, or third party hosted hardware
- Vendor's ops team owns prod

Late 2010s & 2020s (Mature Cloud)



• Testing

- Fully automated
- By dev team and/or SDETs

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• Deployment & Operations

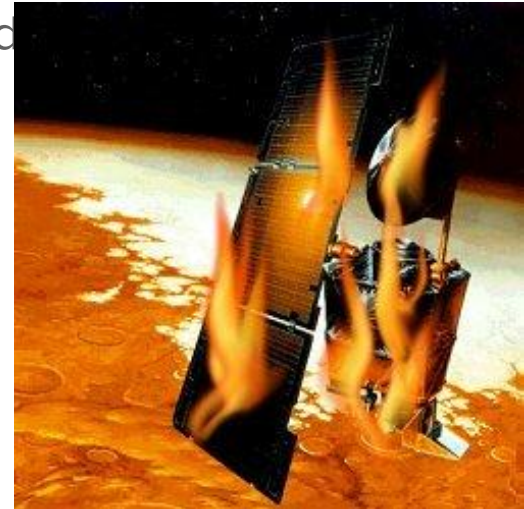
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- Hardware is virtual, like software
- Infrastructure as Code (IaC)
- Development+Operations = DevOps



1999: Mars Climate Orbiter

- Bad software can **destroy hardware**:
 - **Purpose of probe:**
 - Study the climate, atmosphere and surface changes on Mars
 - **Cost:** **Assignment Project Exam Help**
 - \$125 million
 - **Problem:** **<https://powcoder.com>**
 - Ground system sent commands in imperial (lbf*s)
 - Orbiter expected metric (N*s)
 - **Result:** **Add WeChat powcoder**
 - Failed orbital insertion: probe destroyed
 - **Cause:**
 - Poor integration testing



2012: Knight Capital

- Bad software can **destroy financial assets**:
 - **Knight Capital's business**:
 - Equity order routing & algorithmic trading
 - **Problem:** **Assignment Project Exam Help**
 - New equity order routing code was deployed to 7 servers
 - Unfortunately, Knight had 8 production servers
 - **Result:** **<https://powcoder.com>**
 - Knight lost **\$445M** and nearly went bankrupt
 - **Cause:** **Add WeChat powcoder**
 - errors during manual deployment process



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THE PRESENT DAY

Customer Expectations

- Customers expect:

- No installation
- No responsibility for production operations
 - And no production downtime
- Rapid feature delivery
- High quality: few bugs... ideally none

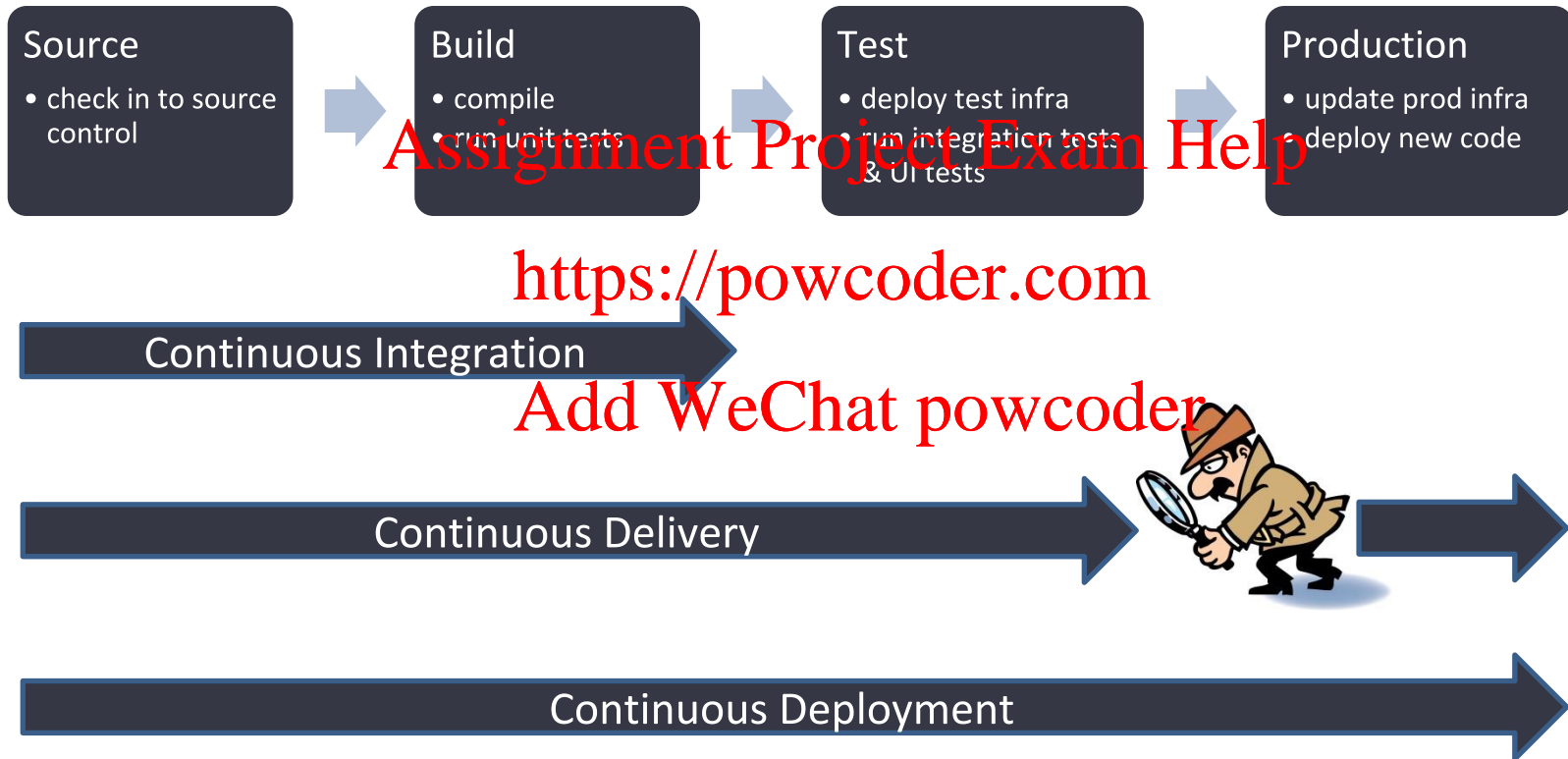
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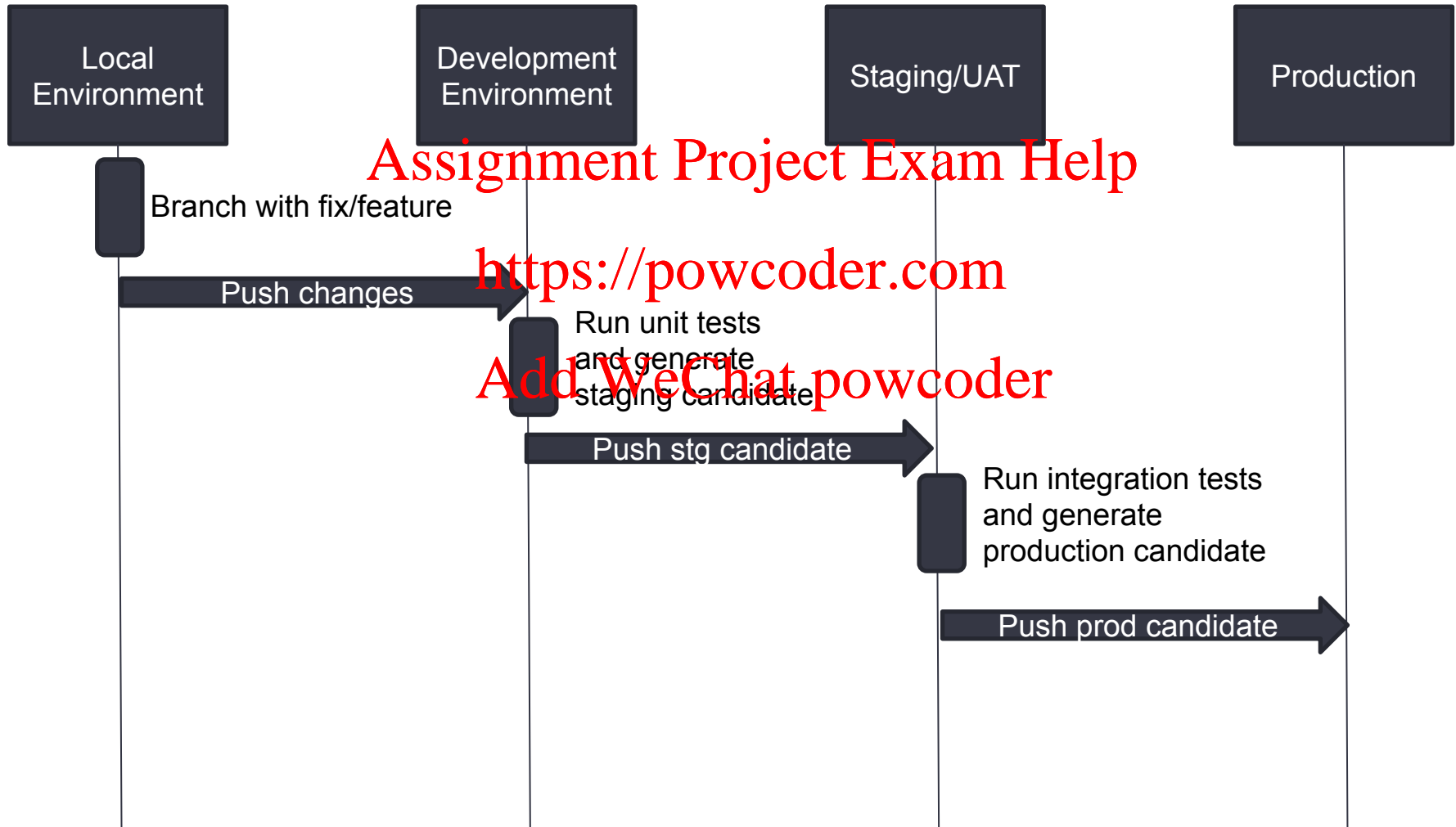
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How Code Gets to Production



Typical production CI/CD workflow



Continuous Integration

- Whenever code is submitted to source control:
 - Build it
 - Run unit tests
 - Reject commit if unit tests fail
- Why do regressive defects happen?
 - Refactoring
 - Chaos theory

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CODESHIP



Your Deployment Process

- How will you automate your tests?
- How will you automate your deployments?
 - GitHub Actions
 - CircleCI
 - Travis
 - Jenkins
 - ...

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CI/CD Overview

- CI Tools help you automate tasks within your software development life cycle.
- GitHub Actions uses an Yml file
(.github/workflows/ci.yml)
- Create custom CI workflows
 - Run shell commands
 - Marketplace action
 - Code coverage
 - Tests
 - Build

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Workflow

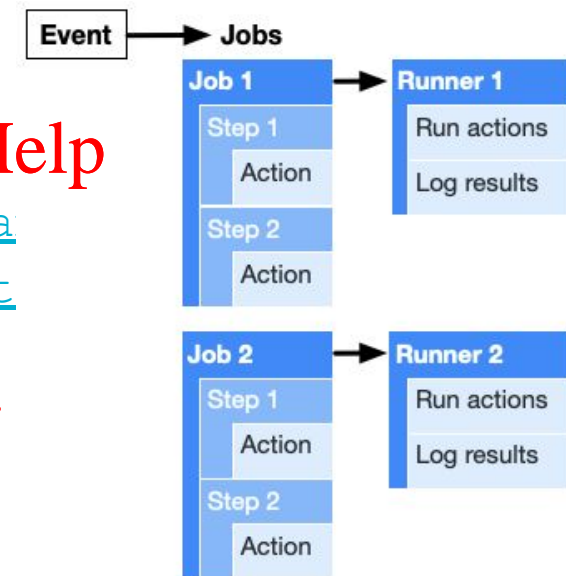
- Each workflow contains a job
 - Each job runs steps
 - Each step have actions

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- <https://docs.github.com/en/free-pro-team@latest/reference/workflows-syntax-on-git>

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How to configure your CI/CD

1. Track your project's metadata
 - a. [Package.json](#)
 - b. [Requirements.txt](#)
2. Continuously write tests (we'll talk more about it)
3. Choose your CI/CD tool and configure it
 - a. [GitHub Actions](#)
 - i. [QuickStart](#)
 - ii. [Starter Workflows](#)
 - b. [CircleCI](#)

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NOTE: Add a time limit to your jobs because CI tools provide limited minutes

Sample package.json

```
{
  "main": "node_modules/expo/AppEntry.js",
  "scripts": {
    "start": "expo start",
    "android": "expo start --android",
    "ios": "expo start --ios",
    "web": "expo start --web",
    "eject": "expo eject",
    "test": "jest --watchAll"
  },
  "jest": {
    "preset": "jest-expo"
  },
  "dependencies": {
    "@expo/vector-icons": "~10.0.0",
  },
  "devDependencies": {
    "@babel/core": "^7.0.0",
    "babel-preset-expo": "~8.0.0",
    "jest-expo": "~36.0.1"
  },
  "private": true
}
```

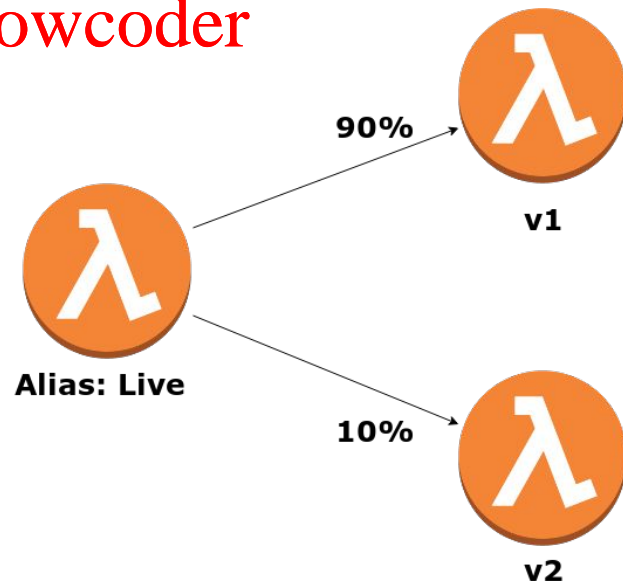
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Finally... Testing in Production?

- It is important to be able to revert a bad build quickly, cleanly and as automatically as possible
- **Canary Deployments** and/or **Traffic Shifting** are helpful techniques
 - Can prevent major problems early on
- Initially, direct only a subset of users/requests to the new code



Production Monitoring

- So, you are the proud owner of a SaaS application in production... now what?
 - Is the application responsive?
 - Is it returning valid responses?
- You need **Monitoring & Logging**

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Summary

- Test thoroughly
- Automate your tests
- Automate your deployment process
- Dev + Test + Ops = DevOps!
- Don't forget logging – you'll need it in production!
- Infrastructure is part of the code

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Note on teamwork

- Choose team members with complementary skills and expectations
 - Technical experience (have people with CSC343/CSC309) on your team
 - Expectations (have people who want to lead and people who want to pass)
 - Personalities (detail oriented vs big picture, introverts and extroverts)
- Similar interests in the project

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