

ADMISSION OPEN

CLOUD NATIVE WEB & MOBILE DEVELOPER

Classes Starting on June 24



AXIOM

Axiom Education

Cloud Native Specialist Program Cloud Native, Web & Mobile Developer Fast Track - 8 Months

This is the same program offered by the Presidential Initiative for Artificial Intelligence & Computing. However, instead of 15 months program duration, this fast track program is 8 months.

Module A - 2 Months

Cloud Native Computing

Module B - 3 Months

HTML, CSS, JavaScript

Module C - 3 Months

React & React Native

Module A

Description

Linux containers are poised to take over the world; we will start this module with an introduction of Linux and the command line. For many non-technical people, the command line (also referred to as CLI, Terminal, bash, or shell) is a place of mystery. However, you only have to know a handful of basic commands to start feeling comfortable. In this module, we will cover the basic commands to get you started. From the Linux command line we will move to learning core Docker technologies, including the Docker Engine, Images, Containers, Registries, Networking, Storage, and more. All of the behind the scenes theory will be explained, and all concepts are clearly demonstrated on the command line. After we have mastered the containers we will move towards learning Kubernetes. The Kubernetes container orchestration system safely manages the structure and flow of a distributed application, organizing containers and services for maximum efficiency. Kubernetes serves as an operating system for your clusters, eliminating the need to factor the underlying network and server infrastructure into your designs. In this course we will teach you to use Kubernetes to deploy container-based distributed applications. We will start with an overview of Docker and Kubernetes before building your first Kubernetes cluster. We'll gradually expand your initial application, adding features and deepening your knowledge of Kubernetes architecture and operation. We'll explore high-value topics like monitoring, tuning, and scaling. By the end of the module you will be able to appear in the Certified Kubernetes Application Developer (CKAD) exam.

Preparation for the Cloud Native Computing Foundation (CNCF) Kubernetes Application Developer Exam:

CNCF's Certified Kubernetes Application Developer (CKAD) Exam

Members: Google, AWS, Microsoft, IBM, Oracle, SAP, Intel, Cisco and all major technology companies

Textbooks:

1. Linux: Easy Linux for Beginners by Felix Alvaro
2. Docker Deep Dive by Nigel Poulton
3. Kubernetes in Action by Marko Luksa

Reference Books:

1. The Kubernetes Book by Nigel Poulton
2. Kubernetes for Application Developers by Mathew Palmer

Course Facebook Group:

<https://web.facebook.com/groups/369055357195837/>

Grading:

Students will be graded on Percentile

A-Grade: 78 - 99 Percentile

B-Grade: 41 - 77 Percentile

C-Grade: 23 - 40 Percentile

F-Grade: 1 - 22 Percentile

Anyone who is in the bottom 22th Percentile, i.e. F-Grade, will deem to have failed and will not be promoted to the next module and will be removed from the program.

Note: Anyone absent from an exam will be deemed to have received a score of zero.

Course Outline:

1. Cloud Native: The Modern Way to Develop Software (Class 1)

What is Cloud-Native? Is It Hype or The Future of Software Development?

<https://stackify.com/cloud-native/>

What is cloud-native? The modern way to develop software

<https://www.infoworld.com/article/3281046/what-is-cloud-native-the-modern-way-to-develop-software.html>

Cloud Native: A New Wave of Digital Disruption

https://www.accenture.com/t20181112T080927Z_w_us-en/_acnmedia/PDF-90/Accenture-Cloud-Native-POV-Final.pdf

The CNCF sees a surge in cloud-native adoption

<https://www.itopstimes.com/cloud/the-cncf-sees-a-surge-in-cloud-native-adoption/>

10 KEY ATTRIBUTES OF CLOUD-NATIVE APPLICATIONS

<https://thenewstack.io/10-key-attributes-of-cloud-native-applications/>

Why Developers And Business Leaders Are Going Cloud Native

<https://www.forbes.com/sites/forbestechcouncil/2018/07/16/why-developers-and-business-leaders-are-going-cloud-native/#21cd0a8327f3>

Cloud Native Case Study: Pinning its Past, Present, and Future on Cloud Native

<https://www.cncf.io/blog/2018/08/14/pinning-its-past-present-and-future-on-cloud-native/>

Why the Adoption of Kubernetes Will Explode

<https://www.upwork.com/hiring/for-clients/adoption-kubernetes-will-explode>

Indeed Report Finds Kubernetes Job Market Hot

<https://containerjournal.com/2018/12/10/indeed-report-finds-kubernetes-job-market-hot/>

Chapter 1 of Kubernetes in Action

2. Linux for Beginners (Class 1, 2, 3)

Chapters 1, 2, 4, 5, 7, 8, and 9 from Linux: Easy Linux for Beginners by Felix Alvaro

We will use Ubuntu:

<https://tutorials.ubuntu.com/tutorial/tutorial-ubuntu-on-windows#0>

Or

<https://www.lifewire.com/run-ubuntu-within-windows-virtualbox-2202098>

Linux for Beginners Quiz

3. Docker Deep Dive (Class 4 and 5)

Chapters 1 to 8 of Docker Deep Dive book by Nigel Poulton

You will also need to learn the mounting of host directories in the containers. To learn how to mount local directory with -v flag read from here:

<https://docs.docker.com/engine/admin/volumes/bind-mounts/#choosing-the--v-or-mount-flag>

Homework Videos:

<https://www.youtube.com/watch?v=EnJ7qX9fkU>

<https://www.youtube.com/watch?v=cCTLjAdlQho>

<https://www.youtube.com/watch?v=76rX4s73MrM>

Docker Quiz

4. Kubernetes in Practice Part 1 (Class 6 and 7)

Chapter 2 and 3 of Kubernetes in Action

Appendix A: Using kubectl with multiple clusters from Kubernetes in Action

Kubernetes in Practice Quiz 1

5. Kubernetes in Practice Part 2 (Class 8 and 9)

ReplicaSets and just the basic introduction to DaemonSets, Jobs, and CronJobs
Sections 4.2 (all subsections), 4.3 (all subsections), 4.4 (no subsections), 4.5, 4.5.1, 4.5.2, 4.6 (no subsections) of Kubernetes in Action

Note: ReplicaSet are now part of v1 api after 1.9

<https://kubernetes.io/docs/concepts/workloads/controllers/replicaset/>

Services and Ingress

Sections 5.1 (all subsections), 5.2.3, 5.3.2, 5.4, 5.4.1, 5.4.2, 5.4.3, and 5.7

Probes

Section 4.1 (all subsections) and 5.5 (all subsections)

Volumes

6, 6.1, 6.2.1, 6.3 (no subsections), 6.4 and only 6.4.1 (no other subsections), 6.5 and only 6.5.1 (no other subsection)

Configuring applications 7.1, 7.3.1, 7.4.1, 7.4.2, 7.4.3, 7.4.4, 7.5, 7.5.1

Accessing pod metadata 8.1, 8.1.1, 8.1.2, 8.2.4

Kubernetes in Practice Quiz 2

6. Kubernetes in Practice Part 3 (Class 10 and 11)

Deployments

Section 9 (no subsections), 9.2.1 (only the section on page 255 --- RUNNING THE APP AND EXPOSING IT THROUGH A SERVICE USING A SINGLE YAML FILE),

9.3 and only subsection 9.3.1, 9.3.2, 9.3.3,

StatefulSets

6.5 (all subsections)

10, 10.1, 10.2, 10.3, and 10.4

Making your apps easy to run and manage in Kubernetes

17.4

Best practices for development and testing

17.5

Kubernetes in Practice Quiz 3

7. The Ultimate Kubernetes Exam Final Projects - 7 Exam Projects (Class 12)

Once the students have appeared in all three Kubernetes in Practice MCQ Exams they will appear in the following seven exam projects. These are the ultimate practice exam projects designed to help you prepare for the CKAD exam. It's a collection of sample questions around the topics in the CKAD exam curriculum.

The Exam Project Preparation

We have to review this <https://github.com/cncf/curriculum>

We will follow the following resources to learn

<https://github.com/walidshaari/Kubernetes-Certified-Administrator/blob/master/README-ckad.md>

https://medium.com/@elliott_f/my-notes-for-certified-kubernetes-application-developer-part-1-core-concepts-d1bab7bc2446

The exam project itself is made up of 7 distinct sections.

1. Core Concepts (13%) — This covers the API primitives and how to create and configure basic Pods
2. Multi-Container Pods (10%) — This tests your knowledge of the multi-container design patterns such as ambassador, adapter, and sidecar)
3. Pod Design (20%) — This is things like how to use Labels, Selectors, and Annotations as well as how deployments work and how to perform rollbacks. Finally, it covers Jobs and CronJobs
4. State Persistence (8%) — This requires knowledge of Persistent Volume Claims for storage
5. Configuration (18%) — This involves understanding ConfigMaps, SecurityContexts, defining an applications resource requirements, creating and consuming secrets and understanding Service Accounts
6. Observability (18%) — This is for understanding Liveness and Readiness Probes, understanding container logging, as well as how to monitor applications in K8s and understanding debugging
7. Services and Networking (13%) — The final section involves understanding services and demonstrating a basic understanding of Network Policies

We will learn and study the section from the above resources, then give an exam project. We will do it for all the seven sections one by one.

The Exam Projects Details

Each Kubernetes Exam Project consists of many questions. You will be given only one exam at a time, and will be only given the next exam after you have passed the current exam project. If you fail in the project exam you will have appear in it again, but in the second attempt you will have 50% less time.

These exam projects are designed to help you prepare for the CKAD exam.

It's a collection of questions around the topics in the CKAD exam curriculum.

You will appear in the following exam projects:

1. Exam Project 1 - Core Concepts (120 minutes) - Question 1-4
2. Exam Project 2 - Configuration (120 minutes) - Question 5-9
3. Exam Project 3 - Multi-Container Pods (120 minutes) - Question 10-12
4. Exam Project 4 - Observability (120 minutes) - Question 13-17
5. Exam Project 5 - Pod Design (120 minutes) - Question 18-23
6. Exam Project 6 - Services & Networking (120 minutes) - Question 24-27
7. Exam Project 7 - State Persistence (60 minutes) - Question 28

In the real CKAD exam you can seek help, but cheating is out of bounds, we will follow the same rules. The real exam console will be loaded in one Chrome browser tab, and you will be allowed to open new tabs to search the official kubernetes.io documentation.

<https://kubernetes.io/docs/home/?path=users&persona=app-developer&level=foundational>

The documentation is quite elaborate and covers everything you may need during the exam.

For detailed formal requirements and rules check the official Kubernetes Candidate Handbook.

<https://www.cncf.io/certification/candidate-handbook>

Module B

Objectives

Pass Google's Mobile Web Specialist Certification

<https://developers.google.com/training/certification/mobile-web-specialist/>

Module B1: Web Development with HTML5, CSS, and Responsive Design

This course is designed for absolute beginners in web development and builds a solid foundation in HTML5 and CSS3. Assuming no prior programming experience on the part of the participant, this module focuses on the fundamentals of composing professional websites. This module ends with a detailed introduction to responsive website development.

Prerequisite: Module A

Module B2: Functional and Object-Oriented Programming with JavaScript

This module builds a solid foundation in Functional and Object-Oriented Programming using JavaScript. Assuming no prior programming experience on the part of the student this module starts by focusing on the fundamentals of composing code with JavaScript. Introduction to both client and server based JavaScript is covered. You'll learn about the syntax and structure of the language including operators and expressions, control structures, methods, and arrays. Then we will shift to learning object oriented programming using ES 2015. In this module we will also learn Git, the distributed version control system. We will also review Git based GitHub and BitBucket services.

Module C

Objectives

Pass React and React Native Nanodegree

<https://www.udacity.com/course/react-nanodegree--nd019>

Module C1: Android, iPhone and Web Application Development using React and React Native

In this module students will start by learning advanced JavaScript and then we will learn how to develop single-page web and hybrid mobile applications using React and React Native. React extends HTML with new attributes and is perfect for Single Page Applications (SPAs) and Mobile Apps. React/React Native is easy to learn and is widely being used in the international market. React Native is built on top of React and allows you to build incredible iPhone and Android apps with web technologies.

Module C2: Cloud, Serverless, and Real-time Application Development using Firebase, Node.js, and MongoDB

In this module students will learn to develop cloud and real-time web applications using Node.js, MongoDB and Firebase. We will explore how to develop cloud based web applications using Node.js on AWS, Heroku, and other cloud platforms. We will also explore NoSQL concepts using MongoDB. We will also study real-time databases using Google's Firebase. It is a real-time database which provides an API that allows developers to store and sync data across multiple clients.