UDACITY

Cloud Architect using Microsoft Azure

Overview

This program will teach you how to become an cloud architect using Microsoft Azure, build a plan to migrate on-premises resources to the Azure Cloud and apply automation, high availability, and backup/recovery skills to the role of an Azure Cloud Architect, Cloud Server Engineer, Azure Security Engineer, DevOps Engineer and more.

The program consists of 3 courses and 3 projects. Each project you build will be an opportunity to demonstrate what you've learned in your lessons. Your completed projects will become part of a career portfolio that will demonstrate your mastery of Azure deployments, migration, setting up a highly-available infrastructure and securing your environment to potential employers.

Prerequisites

A well-prepared student should have:
- Familiarity with network concepts, such as IP addressing and routing
- Familiarity with network connectivity methods, such as VPN
- Familiar with Azure CLI commands
- Ability to read JSON
- Understanding of DevOps including container orchestration, CI/CD
- Azure application development and deployment
- 2+ years experience in developing apps or managing cloud infrastructure that have been deployed using Microsoft Azure

Educational Objectives

Graduates of this program will be able to:
- Design and deploy scalable, efficient and resilient cloud architecture with Azure.
- Execute a migration plan for on-premise servers and databases to Azure.
- Monitor availability and simulate and test failure scenarios and recovery.
- Optimize cloud service infrastructure for cost and performance.
- Evaluate a cloud environment's security vulnerabilities.
- Apply appropriate security controls that adhere to best practices in cloud security.

UDACITY

Estimated Time:
3 Months

Prerequisites:
2+ years experience
using Microsoft Azure
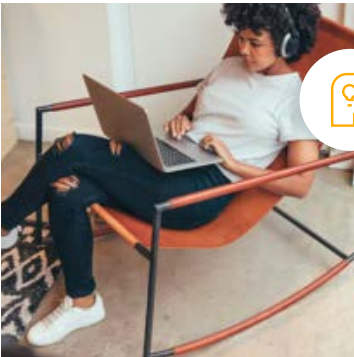
Flexible Learning:
Self-paced, so you
can learn on the
schedule that works
best for you.

Need Help?
udacity.com/advisor
Discuss this program
with an enrollment
advisor.

*The length of this program is an estimation of total hours the average student may take to complete all required coursework,
including lecture and project time. If you spend about 10 hours per week working through the program, you should finish within the
time provided. Actual hours may vary.

Course 1: Designing Infrastructure and Managing Migration

In this course, you will go over the best practices for implementing High Availability within the Microsoft Azure Cloud using different solutions. You will go through the process of creating a backup strategy/plan as well as discuss some of the components that will need to be included. You will also be exposed to the process of migrating on-premise resources into the Azure cloud by using built-in tools associated with Azure Migrate.

After successful migration, you will need to monitor the resources as well as optimize migrated resources to ensure they are running at their optimum level. You will be able to get information from Azure Advisor which will provide recommendations for existing resources as to what type of changes can be made to get the most cost-effective performance from our resources and the day-to-day monitoring will be done through Azure Monitor. Our final lesson will include the use of ARM Templates to automate the provisioning of resources using Infrastructure as code as well as enforcing an organization's policies and requirements automatically through Azure Policy and Azure Blueprint.

Course Project :
Moving from On-Prem
to the Azure Cloud

In this project, you will assume the role of a Cloud Architect working for Contoso, an online clothing merchandise company specializing in selling activewear. You will be given details about their infrastructure and start by creating a plan on how to migrate the current on-premises to similar infrastructure on Azure cloud services, including activities like finding matching services and resources or perhaps even adding or subtracting from existing infrastructure. From there, you'll plan for high availability and disaster recoverability. Your plan will also include security measures and backup policy and an opportunity to recommend any design improvements.

	LEARNING OUTCOMES	
LESSON ONE	**Azure Cloud Capabilities**	• Use Azure cloud design best practices to set up a highly available infrastructure • Use different architecture styles to and design principles to meet the organizations SLA requirements • Use a VPN Gateway to connect from an on-premise environment to a resource within Azure • Use a Network Security Group to secure the network resources by restricting inbound/outbound traffic
LESSON TWO	**Designing for Backup & Recovery**	• Create and implement a backup plan/strategy that will protect their environment against unexpected disasters using different tools within Azure • Backup on-premises and Azure Virtual Machines • Recover virtual machines/files in the event of data loss or a non-functional virtual machine • Determine the appropriate tool for site recovery
LESSON THREE	**Azure Migration**	• Evaluate the on-premises environment and identify what resources can be migrated and what order they should be migrated • Create a comprehensive strategy for the migration process • Use the appropriate tool to migrate resources into the Azure cloud as well as perform post migration procedures to ensure proper optimization after resources are migrated
LESSON FOUR	**Automation**	• Use ARM Templates to deploy Infrastructure as Code • Use DSC to automatically check for possible configuration issues and make the necessary corrections when needed • Create, publish and assign Blueprints that adhere to an organization's business requirements

Course 2: Provisioning for Cost Optimization and Monitoring

In this course, you will go over the best practices for understanding how cost management is an important aspect of a well architected-framework. For each lesson, you will learn the fundamental concepts, how experts think about the topic and then deep dive into the Azure offerings.

Throughout the course, you will deep dive into how to design for a cloud optimized architecture instead of trying to apply the traditional on-premises architecture principles, how monitoring for cloud efficiency helps an organization bring transparency and visibility into cloud costs, and how to leverage automation of infrastructure autoscale as well as Azure available APIs for cost analysis to ensure cost transparency and savings.

Course Project : Cost Optimization and Monitoring for Your Engineering Company

In this project, you will take on the role of Azure Architect, wherein you will present to the CIO of your engineering company that has offices in both the U.S. East and West Coast a comprehensive plan to explain how Azure can not only provide resiliency but also has multiple controls to keep costs low if architected properly. You will also explain to the CIO of the company why moving the production workloads to Azure is beneficial in managing provisioned hardware effectively through tools available such as right sized VM.

		LEARNING OUTCOMES
LESSON ONE	**Design for Cost Optimization**	• Apply the Azure Pricing Calculator to estimate required VM Elasticity, given a scenario • Estimate costs (on-prem or Cloud-based) using the appropriate Azure Calculator in a given scenario • Compare and contrast the benefits and uses of the Azure Pricing Calculator and the Azure Total Cost of Ownership Calculator • Azure Cost Management + Billing to run a report, given a set of parameters
LESSON TWO	**Monitoring Cost Efficiency**	• Identify the benefits of Azure Cost Management + Billing • Set limitations on spending across single and multiple resources • Use Azure policies to establish conventions for Azure resources with regards to policies and tagging Azure resources
LESSON THREE	**Monitoring Operational Efficiency**	• Create Azure dashboards and workbooks to monitor Azure resources • Choose the appropriate Azure monitoring tool to diagnose and troubleshoot issues within an Azure workload • Create policies to trigger alerts and automated actions in response to Azure workloads meeting specific budget thresholds
LESSON FOUR	**Automation**	• Deploy automation to autoscale in or out based on the number of user per CPU • Create and analyze results of an event to ensure automation executes • Use APIs to leverage Cost Management + Billing for automated budgeting, cost tracking and cost optimization

Course 3: Azure Security

In this course, you will go over the best practices for understanding the role of security in an Azure environment. In each lesson, we introduce fundamental concepts, share how experts think about the topic, and then deep dive into the Azure offerings with a series of demonstrations and practice exercises. Our focus is security: the Zero Trust Model will be our mantra.

The first lesson will give you a sense of how the course is designed, but also take a high-level look at security, take a look back at the history behind cloud computing and Azure, consider the major stakeholders you will interact within your new role, and introduce the workspace simulation environment we use to provide access to the Azure portal. In the next lesson, we will discuss the foundational level of security, (I)dentity (A)ccess (M)anagement. You will learn how to apply the tenets of Zero Trust by validating identities and granting least privilege.

In our discussion of infrastructure design, we will lay the foundational borders and gates of our digital environment. We will discuss how segmenting our resources determined by our company's organization, insulates and protects us in the case of eventual intrusion.

Finally, we will discuss the ongoing battle to maintain our security long after we have implemented our design. We will discuss how tools such as Security Center and Azure Sentinel can be used proactively and reactively to audit, monitor and alert us to possible attack or malevolent behavior.

Course Project :
Securing, Protecting, and Monitoring your Azure Environment

In a simulated real-world project, you are acting in the role of an Azure Cloud Architect for AKMade Enterprises. The company is a medium-size business and is recently seeing tremendous growth in its online presence. The leadership team has expressed a desire to start to utilize the cloud for most of their I.T. infrastructure. In this capacity, you have been asked to apply your newly acquired skills and understanding of the key areas of security, including IAM, network and security infrastructure, data security protection, and monitoring.

With the skills gained through this course and the project, you will be better equipped to make informed decisions while architecting Azure and have proper controls and monitoring in place to tackle issues as an Azure Security Engineer and/or Azure Architect.

|	LEARNING OUTCOMES	
LESSON ONE	**Identity and Access Management**	• Identify what IAM is • Use RBAC and PIM to enforce the principles of Zero Trust • Secure Authentication with Multi-Factor Authentication • Configure Conditional Access
LESSON TWO	**Infrastructure and Network Security**	• Explain how Zero Trust relates to Infrastructure and Networking • Design Network resources to provide security borders • Configure Azure Bastion • Configure Just in Time • Configure Azure Firewall
LESSON THREE	**Introduction to Data Security and Protection**	• Configure Key Vaults to secure secrets, keys, and certificates • Use Key Vaults to encrypt both virtual machines and databases • Secure virtual machines from malware and internet attacks • Configure auditing on SQL resources to understand who and what is accessing data • Enable Azure AD authentication on SQL providing additional protection over traditional SQL level authentication and threat protection
LESSON FOUR	**Protect and Monitor your Azure Environment**	• Use the Security Center to understand your current security posture • Configure recommended best practice settings from within the Security Center • Configure Azure Defender for endpoint protection of resources • Configure Log Analytics Workspace for Azure Sentinel • Configure Data Connectors to provide logs for Azure Sentinel

# Our Classroom Experience
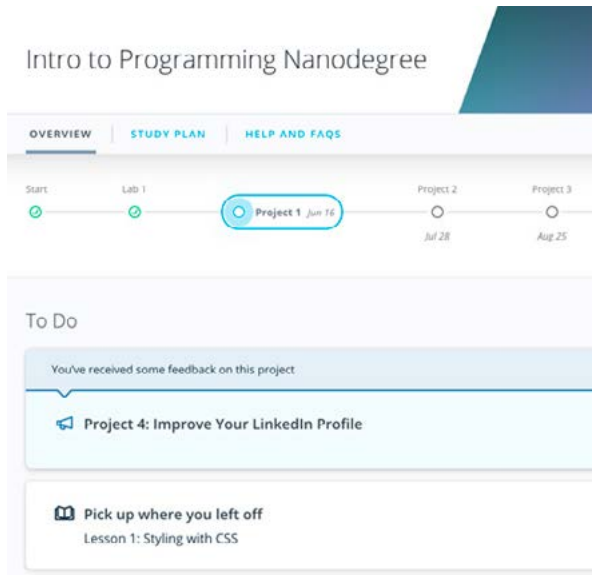
REAL-WORLD PROJECTS
Build your skills through industry-relevant projects. Get personalized feedback from our network of 900+ project reviewers. Our simple interface makes it easy to submit your projects as often as you need and receive unlimited feedback on your work.

KNOWLEDGE
Find answers to your questions with Knowledge, our proprietary wiki. Search questions asked by other students, connect with technical mentors, and discover in real-time how to solve the challenges that you encounter.

WORKSPACES
See your code in action. Check the output and quality of your code by running them on workspaces that are a part of our classroom.
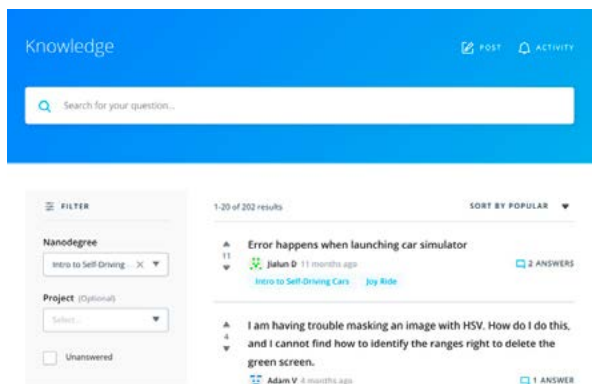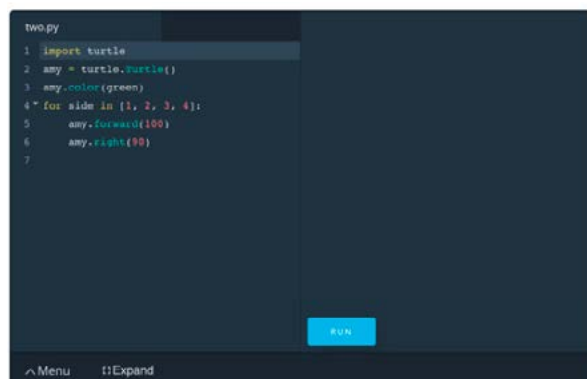
QUIZZES
Check your understanding of concepts learned in the program by answering simple and auto-graded quizzes. Easily go back to the lessons to brush up on concepts anytime you get an answer wrong.

CUSTOM STUDY PLANS
Create a custom study plan to suit your personal needs and use this plan to keep track of your progress toward your goal.

PROGRESS TRACKER
Stay on track to complete your Nanodegree program with useful milestone reminders.

Learn with the Best

Gary McLeary

AZURE ARCHITECT / CLOUD ENGINEER

Gary is a Microsoft Certified Trainer and holds multiple Azure Certifications. He has multi-layered experience which includes working as a computer science professor at multiple colleges and universities for 6 years. His experience in the field includes working as a Cloud Server Engineer at Applied Innovations, and he also leads corporate training for small businesses.

Pratik Shah

CLOUD SOLUTIONS ARCHITECT

Pratik Shah is a Cloud Solutions Architect with experience over 10+ years in designing, developing and architecting various applications in both AWS and Azure. He also has teaching experience and has given many sessions at various NYC local meets. He is very passionate about upcoming new technologies including AI/ML.

Ed Clausen

MULTI CLOUD ENGINEER

Ed started working in the Azure cloud space in its early days at Microsoft as a member of the team working on what became Microsoft 365. He has never left. He has held many roles from support to manager of a support team. He is currently a Multi Cloud Engineer, but his focus is on Azure Active Directory.

All Our Nanodegree Programs Include:

EXPERIENCED PROJECT REVIEWERS

REVIEWER SERVICES

- Personalized feedback & line by line code reviews
- 1600+ Reviewers with a 4.85/5 average rating
- 3 hour average project review turnaround time
- Unlimited submissions and feedback loops
- Practical tips and industry best practices
- Additional suggested resources to improve

TECHNICAL MENTOR SUPPORT

MENTORSHIP SERVICES

- Questions answered quickly by our team of technical mentors
- 1000+ Mentors with a 4.7/5 average rating
- Support for all your technical questions

PERSONAL CAREER SERVICES

CAREER SUPPORT

- Resume support
- Github portfolio review
- LinkedIn profile optimization

Frequently Asked Questions

PROGRAM OVERVIEW

WHY SHOULD I ENROLL?
This program was designed to help you take advantage of the growing need for skilled Microsoft Azure cloud architects. Prepare to meet the demand for qualified professionals who can build reliable, scalable and secure cloud infrastructure using Microsoft Azure.

WHAT JOBS WILL THIS PROGRAM PREPARE ME FOR?
The need for strong Azure cloud architecture skills is greater than ever. The skills you will gain from this Nanodegree program will qualify you for jobs in several industries, as countless companies are trying to keep up with digital transformation.

HOW DO I KNOW IF THIS PROGRAM IS RIGHT FOR ME?
The course is for Cloud developers or DevOps professionals who want to learn how to design and architect large-scale systems on Azure.

ENROLLMENT AND ADMISSION

DO I NEED TO APPLY? WHAT ARE THE ADMISSION CRITERIA?
No. This Nanodegree program accepts all applicants regardless of experience or specific background.

WHAT ARE THE PREREQUISITES FOR ENROLLMENT?
A well-prepared learner has:
• Familiarity with network concepts, such as IP addressing and routing
• Familiarity with network connectivity methods, such as VPN
• Familiar with Azure CLI commands
• Ability to read JSON
• Understanding of DevOps including container orchestration, CI/CD
• Azure application development and deployment
• 2+ years experience in developing apps or managing cloud infrastructure that have been deployed using Microsoft Azure

IF I DO NOT MEET THE REQUIREMENTS TO ENROLL, WHAT SHOULD I DO?
Gain 2+ years experience in developing apps or managing cloud infrastructure that have been deployed using Microsoft Azure.

FAQs Continued

TUITION AND TERM OF PROGRAM

HOW IS THIS NANODEGREE PROGRAM STRUCTURED?
The Cloud Architect using Microsoft Azure Nanodegree program is comprised of content and curriculum to support 3 projects. We estimate that students can complete the program in 3 months working 10 hours per week.

Each project will be reviewed by the Udacity reviewer network. Feedback will be provided and if you do not pass the project, you will be asked to resubmit the project until it passes.

HOW LONG IS THIS NANODEGREE PROGRAM?
Access to this Nanodegree program runs for the length of time specified above. If you do not graduate within that time period, you will continue learning with month to month payments. See the **Terms of Use** and **FAQs** for other policies regarding the terms of access to our Nanodegree programs.

CAN I SWITCH MY START DATE? CAN I GET A REFUND?
Please see the Udacity Nanodegree program **FAQs** for policies on enrollment in our programs.

SOFTWARE AND HARDWARE

WHAT SOFTWARE AND VERSIONS WILL I NEED IN THIS PROGRAM?
There are no software and version requirements to complete this Nanodegree program, other than Udacity's basic tech requirements, which can be found at **https://www.udacity.com/tech/requirements**. All coursework and projects can be completed via Student Workspaces in the Udacity online classroom.