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# AWS Certified Cloud Practitioner (CLF-C01)

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# AWS Certified Cloud Practitioner (CLF-C01) Cert Guide

Anthony Sequeira, CCIE No. 15626

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## AWS Certified Cloud Practitioner (CLF-C01) Cert Guide

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## About the Author

**Anthony Sequeira**, **CCIE No. 15626**, is a seasoned trainer and author regarding various levels and tracks of Cisco, Microsoft, and AWS certifications. Anthony formally began his career in the information technology industry in 1994 with IBM in Tampa, Florida. He quickly formed his own computer consultancy, Computer Solutions, and then discovered his true passion—teaching and writing about information technologies.

Anthony joined Mastering Computers in 1996 and lectured to massive audiences around the world about the latest in computer technologies. Mastering Computers became the revolutionary online training company, KnowledgeNet, and Anthony trained there for many years.

Anthony is currently pursuing his second CCIE in the area of Cisco Data Center. Anthony is a full-time instructor at CBT Nuggets.

# Dedication

*I would like to dedicate this book to the many students I have encountered in the last 25 years of my career. You have kept me learning and teaching to the very best of my abilities. Thank you!*

## Acknowledgments

This manuscript was made truly great by the incredible technical review of Ryan Dymek. Sometimes I think he might have invented AWS.

I would also like to express my gratitude to Chris Cleveland, development editor of this book. I was so incredibly lucky to work with him again on this text. Like Ryan, he made this book several cuts above the rest.

# About the Technical Reviewer

**Ryan Dymek** has been working with Amazon Web Services (AWS) for more than 9 years and holds all nine AWS certifications as well as various Google Cloud Platform (GCP) certifications. Ryan trains and advises some of the largest companies in the world on sound architectural practices in cloud strategy and DevOps principles. While working with business leaders, developers, and engineers, Ryan bridges the gap between business and technology, maintaining the understanding and skills required to be able to perform at a deep technical level. Ryan runs his own cloud consulting practice advising more than 20 companies on the Fortune 500 list and has helped many startups find their way in the cloud.

In addition to cloud and technical acumen, Ryan is a certified business coach personally trained by John Maxwell. He uses these professional skills not only to advise companies on best cloud practices but also on how to align with a business's needs and culture, making confident business and technical decisions and cultivating a transformation into DevOps.

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# Introduction

The Cloud Practitioner exam provides individuals with an overall understanding of the AWS Cloud to validate their knowledge with an industry-recognized credential. This exam provides individuals in a larger variety of cloud and technology roles with a way to validate their AWS Cloud knowledge and enhance their professional credibility. This exam covers four domains: Cloud Concepts, Security, Technology, and Billing and Pricing. The AWS Certified Cloud Practitioner is a recommended path to achieving further specialty certifications or an optional start toward associate certifications in various disciplines such as solutions architect, SysOps administrator, and developer.

## The Goals of the AWS Certified Cloud Practitioner Program

After a candidate studies this text carefully, they should be more than ready for their certification exam. Perhaps more importantly, however, these candidates should possess the following abilities:

- To define what is meant by the AWS Cloud
- To describe the basics of the AWS Global Infrastructure
- To describe basic AWS Cloud architecture principles
- To describe the value propositions of using AWS Cloud technologies
- To describe the key services of the AWS platform and the categories these services fall under
- To describe the AWS shared responsibility model
- To describe the basic security and compliance capabilities within AWS
- To define the billing, account management, and pricing models within AWS
- To identify sources of documentation and support for technical assistance
- To describe the basics of deploying and operating technologies in the AWS Cloud

## Ideal Candidates

While this text provides you with the information required to pass this exam, Amazon considers ideal candidates to be those that possess the following:

- Six months of experience with the AWS Cloud in any role, including technical, managerial, sales, purchasing, or financial
- A basic understanding of IT services and their uses in the AWS Cloud platform

### The Exam Objectives (Domains)

The AWS Certified Cloud Practitioner (CLF-C01) exam is broken down into four major domains. The contents of this book cover each of the domains and the subtopics included in them, as illustrated in the following descriptions.

The following table lists the breakdown of each of the domains represented in the exam.

| Domain | Percentage of Representation in Exam |
|---|---|
| 1: Cloud Concepts | 28% |
| 2: Security | 24% |
| 3: Technology | 36% |
| 4: Billing and Pricing | 12% |
| | Total 100% |

#### 1.0 Cloud Concepts

The Cloud Concepts domain is covered in Chapters 1 through 4. It covers critical topics such as the services and categories of services provided by AWS. This domain also covers important information on just how AWS can save your IT team large sums of money. It comprises 28% of the exam and includes the following topics:

- 1.1 Define the AWS Cloud and its value proposition
- 1.2 Identify aspects of AWS Cloud economics
- 1.3 List the different cloud architecture design principles

#### 2.0 Security

The Security domain is covered in Chapters 5 through 8. This domain covers security in general with AWS, but also provides details on the implementation of strong security with such AWS services as IAM and a wide variety of management tools. This domain makes up 24% of the exam and includes the following topics:

- 2.1 Define the AWS Shared Responsibility model
- 2.2 Define AWS Cloud security and compliance concepts
- 2.3 Identify AWS access management capabilities
- 2.4 Identify resources for security support

### 3.0 Technology

The Technology domain is covered in Chapters 9 through 11. This domain digs in to the "nuts and bolts" of AWS. The global infrastructure and core services of AWS are all detailed for you. It encompasses 36% of the exam and includes the following topics:

- 3.1 Define methods of deploying and operating in the AWS Cloud
- 3.2 Define the AWS global infrastructure
- 3.3 Identify the core AWS services
- 3.4 Identify resources for technology support

### 4.0 Billing and Pricing

The Billing and Pricing domain is covered in Chapters 12 through 15. Here, you learn of the tools and techniques for controlling costs inside of AWS as well as the resources that are available to assist you. This domain embodies 12% of the exam and includes the following topics:

- 4.1 Compare and contrast the various pricing models for AWS
- 4.2 Recognize the various account structures in relation to AWS billing and pricing
- 4.3 Identify resources available for billing support

## Steps to Becoming an AWS Certified Cloud Practitioner

To become an AWS Certified Cloud Practitioner, a test candidate should meet certain prerequisites and follow specific procedures. Once they deem themselves ready, test candidates must sign up for the exam.

### Signing Up for the Exam

The steps required to sign up for the AWS Certified Cloud Practitioner exam are as follows:

1. Create an AWS Certification account at https://www.aws.training/Certification and schedule your exam.
2. Complete the Examination Agreement, attesting to the truth of your assertions regarding professional experience and legally committing to the adherence of the testing policies.
3. Submit the examination fee.

### Facts About the Exam

The exam is a computer-based test. The exam consists of multiple-choice questions only. You must bring a government-issued identification card. No other forms of ID will be accepted.

**TIP** Refer to the AWS Certification site at https://aws.amazon.com/certification/ for more information regarding this, and other, AWS certifications. I am also in the process of building a simple hub site for everything AWS certification related at awscerthub.com. This site is made up of 100% AWS solutions, of course!

### How to Use this Book

This book maps directly to the topic areas of the exam and uses a number of features to help you understand the topics and prepare for the exam.

#### Objectives and Methods

This book uses several key methodologies to help you discover the exam topics on which you need more review, to help you fully understand and remember those details, and to help you prove to yourself that you have retained your knowledge of those topics. This book does not try to help you pass the exam only by memorization; it seeks to help you to truly learn and understand the topics. This book is designed to help you pass the AWS Certified Cloud Practitioner exam by using the following methods:

- Helping you discover which exam topics you have not mastered
- Providing explanations and information to fill in your knowledge gaps
- Supplying exercises that enhance your ability to recall and deduce the answers to test questions
- Providing practice exercises on the topics and the testing process via test questions on the companion website

#### Book Features

To help you customize your study time using this book, the core chapters have several features that help you make the best use of your time:

- **Foundation Topics:** These are the core sections of each chapter. They explain the concepts for the topics in that chapter.

- **Exam Preparation Tasks:** After the "Foundation Topics" section of each chapter, the "Exam Preparation Tasks" section lists a series of study activities that you should do at the end of the chapter:
  - **Review All Key Topics:** The Key Topic icon appears next to the most important items in the "Foundation Topics" section of the chapter. The "Review All Key Topics" activity lists the key topics from the chapter, along with their page numbers. Although the contents of the entire chapter could be on the exam, you should definitely know the information listed in each key topic, so you should review these.
  - **Define Key Terms:** Although the Cloud Practitioner exam may be unlikely to ask a question such as "Define this term," the exam does require that you learn and know a lot of AWS-related terminology. This section lists the most important terms from the chapter, asking you to write a short definition and compare your answer to the Glossary at the end of the book.
  - **Q&A Questions:** Confirm that you understand the content you just covered by answering these questions and reading the answer explanations.
- **Web-based practice exam:** The companion website includes the Pearson Cert Practice Test engine, which allows you to take practice exams. Use it to prepare with a sample exam and to pinpoint topics where you need more study.

### How This Book Is Organized

This book contains 15 core chapters—Chapters 1 through 15. Chapter 16 includes preparation tips and suggestions for how to approach the exam. The core chapters map to the AWS Certified Cloud Practitioner exam topic areas and cover the concepts and technologies you will encounter on the exam.

## Companion Website

Register this book to get access to the Pearson IT Certification test engine and other study materials, plus additional bonus content. Check this site regularly for new and updated postings written by the author that provide further insight into the more troublesome topics on the exam. Be sure to check the box that you would like to hear from us to receive updates and exclusive discounts on future editions of this product or related products.

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**Step 3.** Answer the challenge question as proof of purchase.

**Step 4.** Click the **Access Bonus Content** link in the "Registered Products" section of your account page to be taken to the page where your downloadable content is available.

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## Pearson Test Prep Practice Test Software

As noted previously, this book comes complete with the Pearson Test Prep practice test software containing two full exams. These practice tests are available to you either online or as an offline Windows application. To access the practice exams that were developed with this book, please see the instructions in the card inserted in the sleeve in the back of the book. This card includes a unique access code that enables you to activate your exams in the Pearson Test Prep software.

### Accessing the Pearson Test Prep Software Online

The online version of this software can be used on any device with a browser and connectivity to the Internet, including desktop machines, tablets, and smartphones. To start using your practice exams online, simply follow these steps:

**Step 1.** Go to https://www.PearsonTestPrep.com.

**Step 2.** Select **Pearson IT Certification** as your product group.

**Step 3.** Enter your email/password for your account. If you don't have an account on PearsonITCertification.com or CiscoPress.com, you will need to establish one by going to PearsonITCertification.com/join.

**Step 4.** In the **My Products** tab, click the **Activate New Product** button.

**Step 5.** Enter the access code printed on the insert card in the back of your book to activate your product.

**Step 6.** The product will now be listed in your "My Products" page. Click the **Exams** button to launch the exam settings screen and start your exam.

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http://www.pearsonitcertification.com/content/downloads/pcpt/engine.zip

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**Step 1.** Register your book by going to PearsonITCertification.com/register and entering the ISBN: **9780789760487**.

**Step 2.** Answer the challenge questions.

**Step 3.** Go to your account page and click the **Registered Products** tab.

**Step 4.** Click the **Access Bonus Content** link under the product listing.

**Step 5.** Click the **Install Pearson Test Prep Desktop Version** link under the "Practice Exams" section of the page to download the software.

**Step 6.** After the software finishes downloading, unzip all the files on your computer.

**Step 7.** Double-click the application file to start the installation, and follow the onscreen instructions to complete the registration.

**Step 8.** After the installation is complete, launch the application and click the **Activate Exam** button on the **My Products** tab.

**Step 9.** Click the **Activate a Product** button in the Activate Product Wizard.

**Step 10.** Enter the unique access code found on the card in the sleeve in the back of your book and click the **Activate** button.

**Step 11.** Click **Next** and then click **Finish** to download the exam data to your application.

**Step 12.** Start using the practice exams by selecting the product and clicking the **Open Exam** button to open the exam settings screen.

Note that the offline and online versions will synch together, so saved exams and grade results recorded on one version will be available to you on the other as well.

### Customizing Your Exams

Once you are in the exam settings screen, you can choose to take exams in one of three modes:

- **Study mode:** Allows you to fully customize your exam and review answers as you are taking the exam. This is typically the mode you would use first to assess your knowledge and identify information gaps.
- **Practice Exam mode:** Locks certain customization options, as it is presenting a realistic exam experience. Use this mode when you are preparing to test your exam readiness.
- **Flash Card mode:** Strips out the answers and presents you with only the question stem. This mode is great for late-stage preparation when you really want to challenge yourself to provide answers without the benefit of seeing multiple-choice options. This mode does not provide the detailed score reports that the other two modes do, so you should not use it if you are trying to identify knowledge gaps.

In addition to these three modes, you will be able to select the source of your questions. You can choose to take exams that cover all of the chapters or you can narrow your selection to just a single chapter or the chapters that make up a specific part in the book. All chapters are selected by default. If you want to narrow your focus to individual chapters, simply deselect all the chapters and then select only those on which you wish to focus in the "Objectives" area.

You can also select the exam banks on which to focus. Each exam bank comes complete with a full exam of questions that cover topics in every chapter. The two exams printed in the book are available to you as well as two additional exams of unique questions. You can have the test engine serve up exams from all four banks or just from one individual bank by selecting the desired banks in the exam bank area.

There are several other customizations you can make to your exam from the exam settings screen, such as the time of the exam, the number of questions served up, whether to randomize questions and answers, whether to show the number of correct answers for multiple-answer questions, and whether to serve up only specific types of questions. You can also create custom test banks by selecting only questions that you have marked or questions for which you have added notes.

### Updating Your Exams

If you are using the online version of the Pearson Test Prep software, you should always have access to the latest version of the software as well as the exam data. If you are using the Windows desktop version, every time you launch the software while

connected to the Internet, it checks if there are any updates to your exam data and automatically downloads any changes that were made since the last time you used the software.

Sometimes, due to many factors, the exam data may not fully download when you activate your exam. If you find that figures or exhibits are missing, you may need to manually update your exams. To update a particular exam you have already activated and downloaded, simply click the **Tools** tab and click the **Update Products** button. Again, this is only an issue with the desktop Windows application.

If you wish to check for updates to the Pearson Test Prep exam engine software, Windows desktop version, simply click the **Tools** tab and click the **Update Application** button. This ensures you are running the latest version of the software engine.

# Using the Free Tier to Build a Web Server

It is important for you to understand the options around the Free Tier account in AWS. This chapter educates you on this powerful starting option. It also ensures you can use this account to create a fully functional web server in AWS.

## "Do I Know This Already?" Quiz

The "Do I Know This Already?" quiz allows you to assess if you should read the entire chapter. Table 12-1 lists the major headings in this chapter and the "Do I Know This Already?" quiz questions covering the material in those headings so you can assess your knowledge of these specific areas. The answers to the "Do I Know This Already?" quiz appear in Appendix A, "Answers to the "Do I Know This Already?" Quizzes and Q&A Sections."

**Table 12-1** "Do I Know This Already?" Foundation Topics Section-to-Question Mapping

| Foundation Topics Section | Questions |
|---|---|
| Creating Your Free Tier Account | 1–2 |
| Building a Web Server with the Free Tier | 3–4 |

**CAUTION** The goal of self-assessment is to gauge your mastery of the topics in this chapter. If you do not know the answer to a question or are only partially sure of the answer, you should mark that question as wrong for purposes of the self-assessment. Giving yourself credit for an answer you correctly guess skews your self-assessment results and might provide you with a false sense of security.

1. How long is the Free Tier period by default?
   - **a.** 2 years
   - **b.** 1 year
   - **c.** 6 months
   - **d.** 3 months

2. Which is not an example of a service that remains free after the Free Tier expiration?
   a. SNS
   b. Glacier
   c. EC2
   d. CloudWatch

3. What component related to an EC2 instance do you modify in order to permit the correct traffic forms?
   a. Security group
   b. Container
   c. VPC
   d. Instance type

4. What is used to authenticate access to your EC2 instance?
   a. Lambda
   b. PPTP
   c. Key pairs
   d. Telnet

# Foundation Topics

## Creating Your Free Tier Account

Although the exact terms of the Free Tier account could change at any time, let's start by looking at the incredible amount of resources you receive for free for 1 year. We will follow this up with the components that remain free after the 1-year period.

Key Topic

Here are the "free for a year" components (notice for any services not covered elsewhere in this text, we provide some details on these services for you):

- **API Gateway**: One million API calls per month
- **Cloud Directory**: Fully managed, cloud-native directory-building service for data with multiple hierarchies; 1 GB of storage per month.
- **CloudFront**: 50 GB of data transfers out.
- **Comprehend**: Continuously trained and fully managed natural language processing (NLP); 50,000 units of text (5M characters) for each API per month.
- **Connect**: A simple-to-use, cloud-based contact center that scales to support any size business; 90 minutes per month of Amazon Connect usage.
- **EC2**: 750 hours per month.
- **EFS**: 5 GB of storage.
- **EBS**: 30 GB for any combination of general-purpose (SSD) or magnetic.
- **Elastic Container Registry**: 500 MB of storage per month.
- **Elastic Transcoder**: 20 minutes of audio transcoding.
- **ElastiCache**: 750 hours of cache.t2.micro Node usage.
- **Elastisearch**: 750 hours per month of a single-AZ t2.micro.elasticsearch or t2.small.elasticsearch instance.
- **GameLift**: Simple, fast, cost-effective dedicated game server hosting; 125 hours per month of Amazon GameLift c4.large.gamelift On-Demand instance usage, plus 50 GB EBS general-purpose (SSD) storage
- **Lex**: Build voice and chat text chatbots; 10,000 text requests per month.
- **MQ**: Amazon MQ is a managed message broker service for Apache ActiveMQ; 750 hours of a single-instance mq.t2.micro broker per month.
- **Pinpoint**: Targeted push notifications for mobile apps; 5,000 free targeted users per month.

- **Polly**: Turn text into speech; 5 million characters per month.
- **RDS**: 750 hours per month of db.t2.micro database usage (applicable DB engines).
- **Rekognition**: Deep learning–based image recognition service; 5,000 images per month.
- **S3**: 5 GB of standard storage.
- **Sumerian**: Build and run virtual reality, augmented reality, and 3D applications; 50 MB published scene that receives 100 views per month for free in the first year.
- **Transcribe**: Add speech-to-text capability to your applications with automatic speech recognition; 60 minutes per month.
- **Translate**: Fast, high-quality, and affordable neural machine translation; 2 million characters per month.
- **Data Pipeline**: Orchestration for data-driven workflows; three low-frequency preconditions
- **Greengrass**: Three devices for free.
- **IoT**: 250,000 messages published or delivered per month.
- **IoT Device Management**: 50 remote actions per month.
- **OpsWorks for Chef Automate**: 7,500 node hours.
- **OpsWorks for Puppet Enterprise**: 7,500 node hours.
- **Trusted Advisor**: Four checks on performance and security.
- **ELB**: 750 hours per month shared between Classic and Application Load Balancers.

Here are the services that will remain free for you after the 1 year is up:

- **Chime**: A modern unified communications (UC) service that offers frustration-free meetings with exceptional audio and video; unlimited usage of Amazon Chime Basic.
- **CloudWatch**: Ten custom metrics and ten alarms.
- **Cognito**: 50,000 MAUs each month.
- **DynamoDB**: 25 GB of storage.
- **Glacier**: 10 GB of storage retrievals.

- **Macie**: Discover, classify, and protect data; 1 GB processed by the content classification engine.
- **SES**: Cost-effective email in the cloud; 62,000 outbound messages per month.
- **SNS**: One million publishes.
- **SQS**: One million requests.
- **SWF**: 10,000 activity tasks.
- **CodeBuild**: 100 build minutes.
- **CodeLimit**: Highly scalable, managed source control service; five active users per month.
- **CodePipeline**: One active pipeline per month.
- **Database Migration Service**: 750 hours of Amazon DMS Single-AZ dms.t2.micro instance usage.
- **Glue**: Simple, flexible, and cost-effective extract, transform, and load (ETL) service; one million objects stored in the AWS Glue Data Catalog.
- **Key Management Service**: 20,000 free requests per month.
- **Lambda**: One million free requests per month.
- **Step Functions**: Coordinate components of distributed applications; 4,000 state transitions per month.
- **Storage Gateway**: 100 GB free per account.
- **X-ray**: Analyze and debug your applications; 100,000 traces recorded per month.

### Lab: Creating Your Free Tier Account

Key Topic

If you do not already have a Free Tier account with AWS, it is time for you to create one! Follow these steps:

**Step 1.** Search Google for AWS Free Tier. Select the link from Amazon for the Free Tier account.

**Step 2.** Click the **Create a Free Account** button, as shown in Figure 12-1.

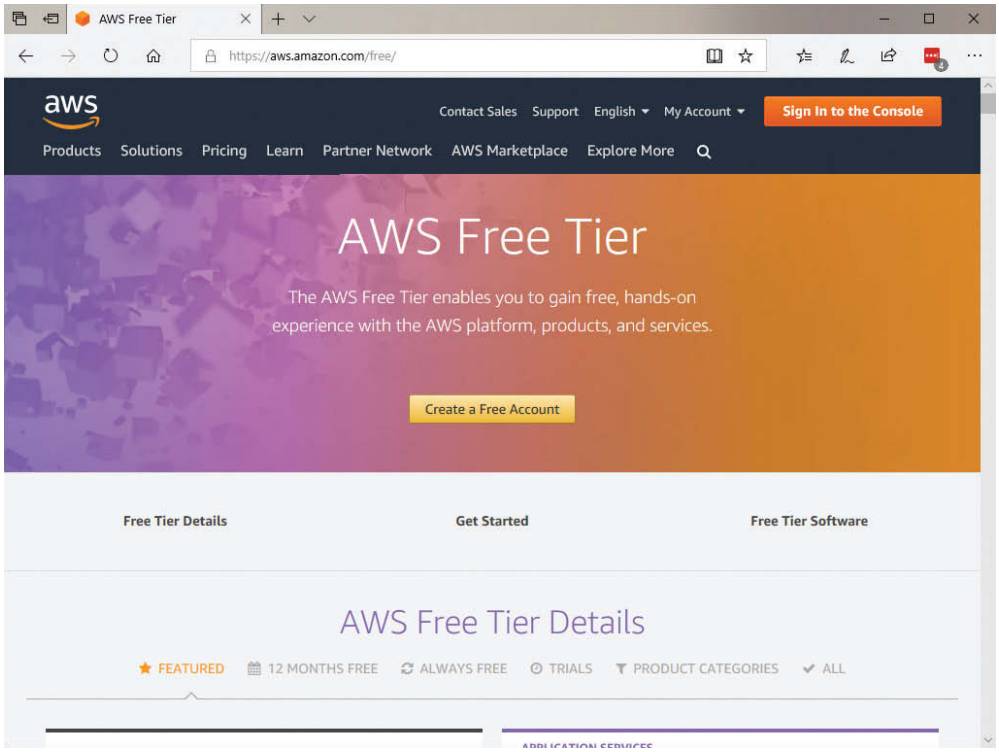


**Figure 12-1** The Create a Free Account Button on the AWS Free Tier Page

**Step 3.** On the **Create an AWS Account** page (shown in Figure 12-2), provide your email address, password, and account name. The email address is critical and will be the username entry when you log in to this all-powerful root account. The account name is how your account will display in AWS. This is not nearly as critical and can be changed at any time.

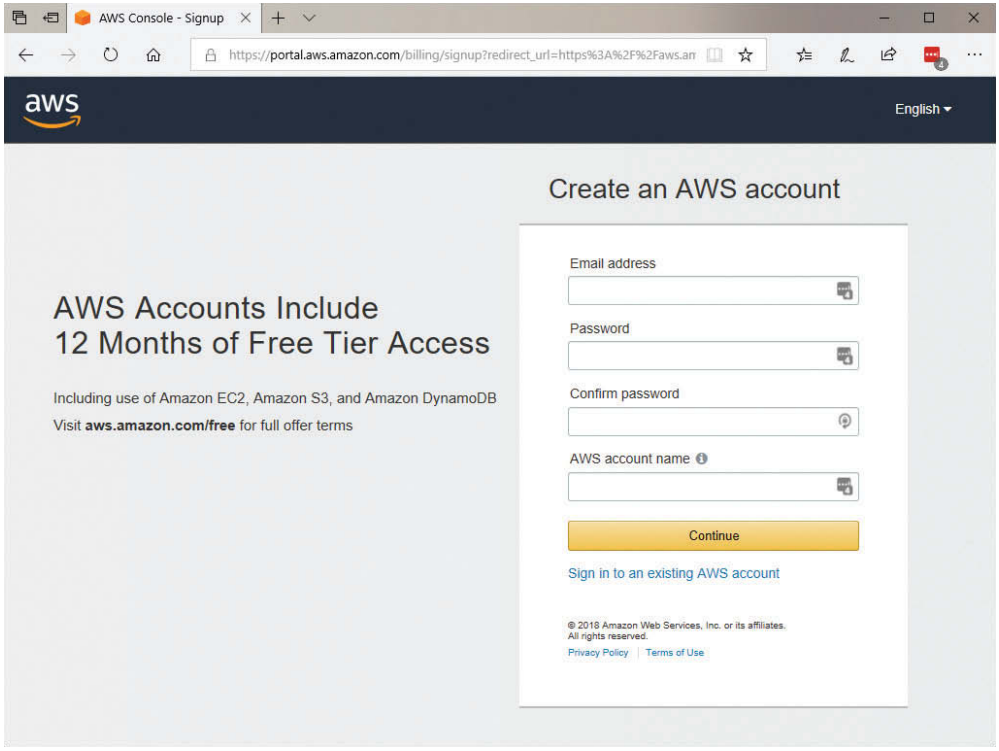


**Figure 12-2** The Create an AWS Account Page

**Step 4.** Complete your basic contact information, as shown in Figure 12-3.

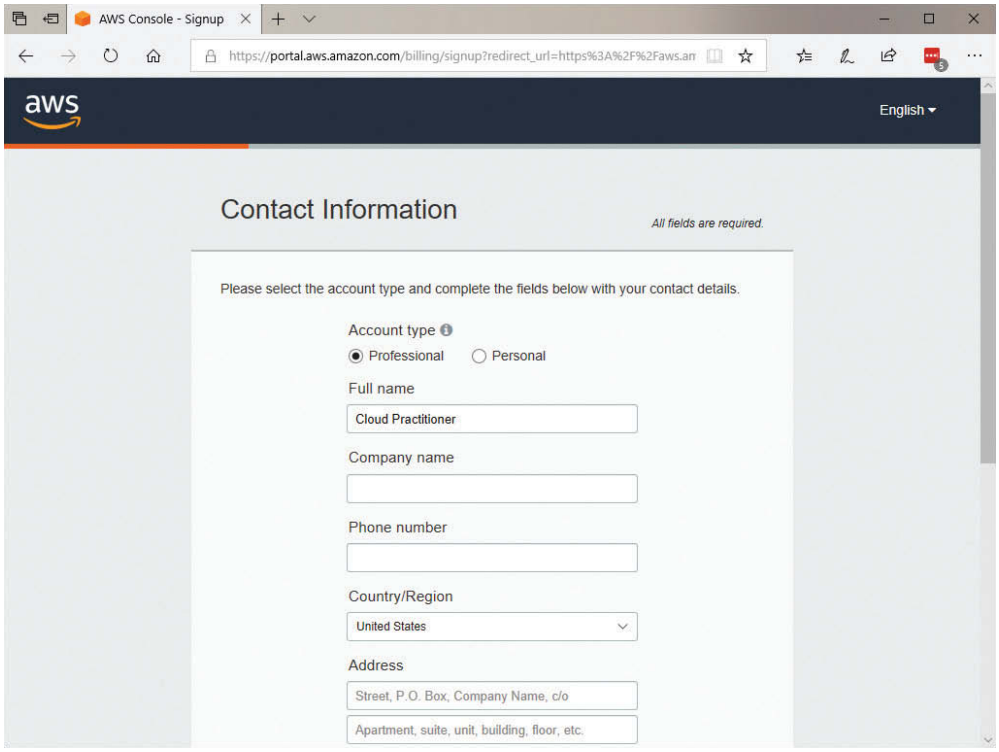


**Figure 12-3** Providing Contact Information During Free Tier Signup

**Step 5.** Provide your payment information, as shown in Figure 12-4. Note that you are not charged anything in the first year, as long as you do not exceed your Free Tier limits.

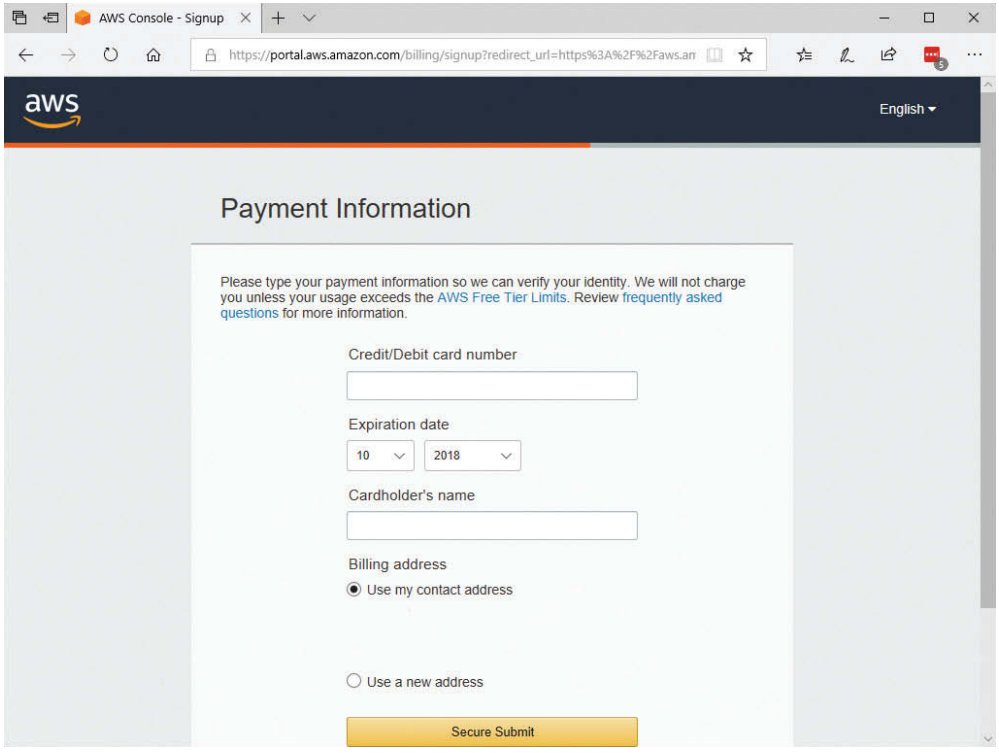


**Figure 12-4** Payment Information Screen in Free Tier Signup

**Step 6.** Provide the phone number for your phone verification and input the security check, as shown in Figure 12-5.

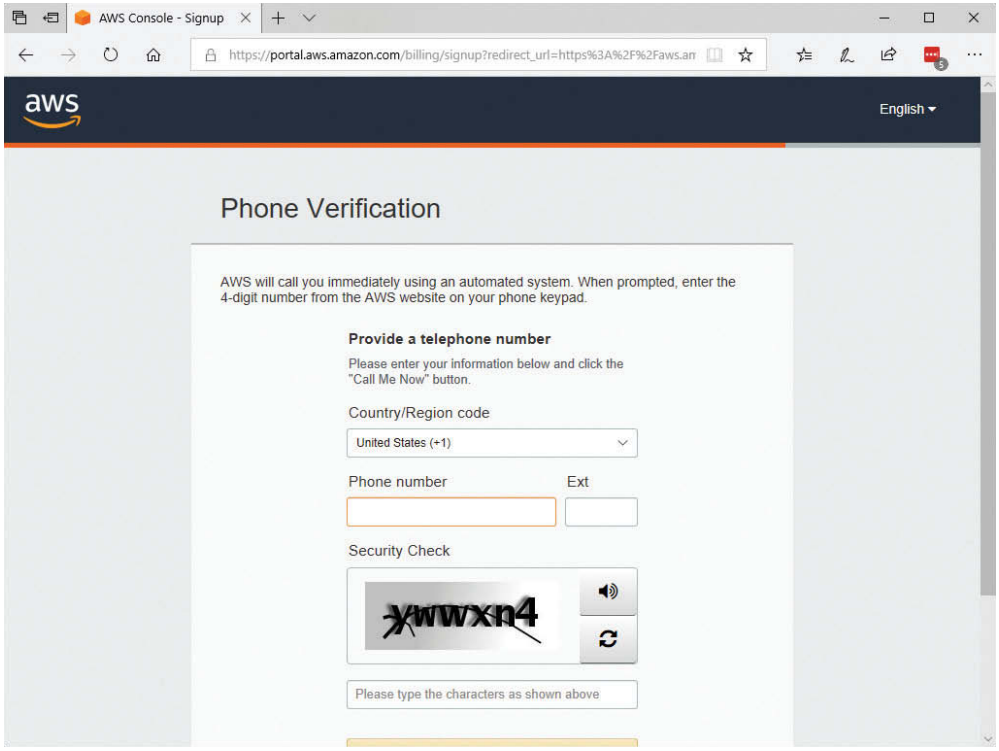


**Figure 12-5** Phone Verification During Signup

**Step 7.** In the **Select a Support Plan** window, choose your support options, as shown in Figure 12-6. Note that there is only one free plan.

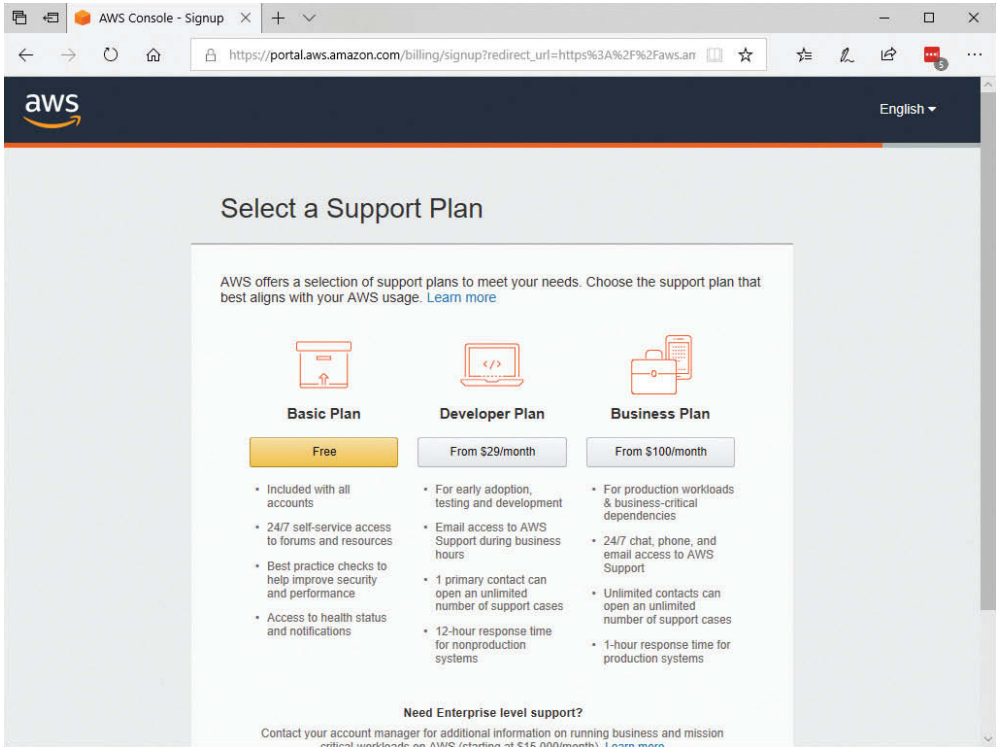


**Figure 12-6** Selecting a Support Plan in the AWS Free Tier Signup

**Step 8.** Sign in to your new AWS account! Use the email address that you used for the account creation. Remember, this is your root AWS account. You should use this account to create "normal" admin accounts for management of AWS. You should very rarely need to log in as this powerful root account. Figure 12-7 shows the sign in page.

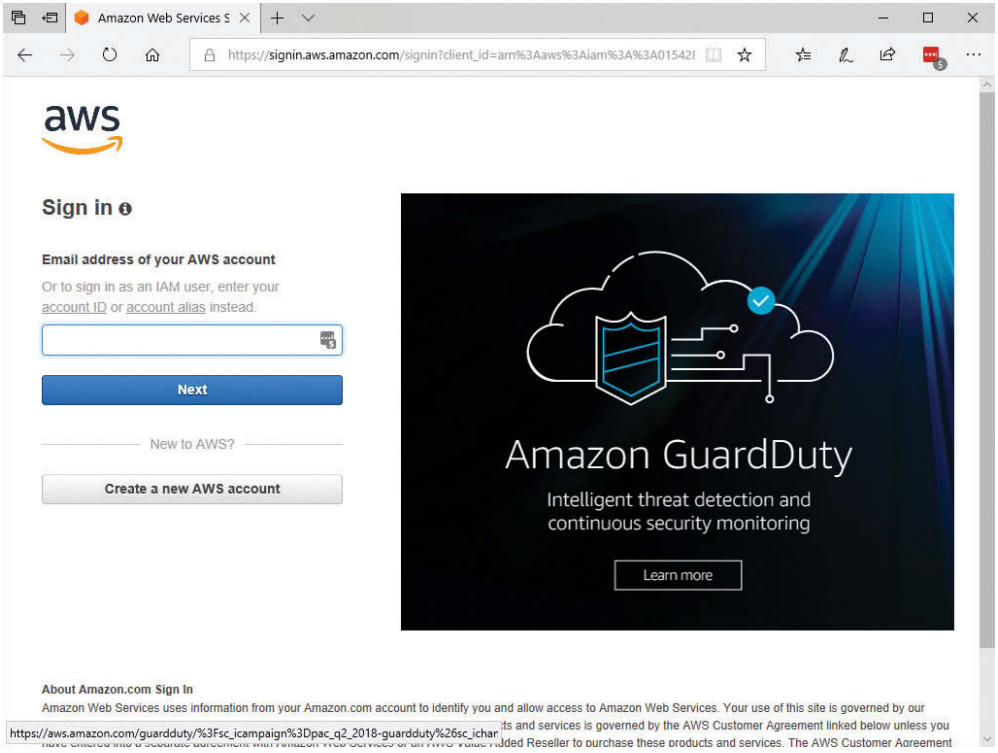


**Figure 12-7** Time to Sign in to Your New Account!

**Step 9.** You are now ready to explore the wonders of AWS! Figure 12-8 shows the welcome screen for the AWS Management Console.

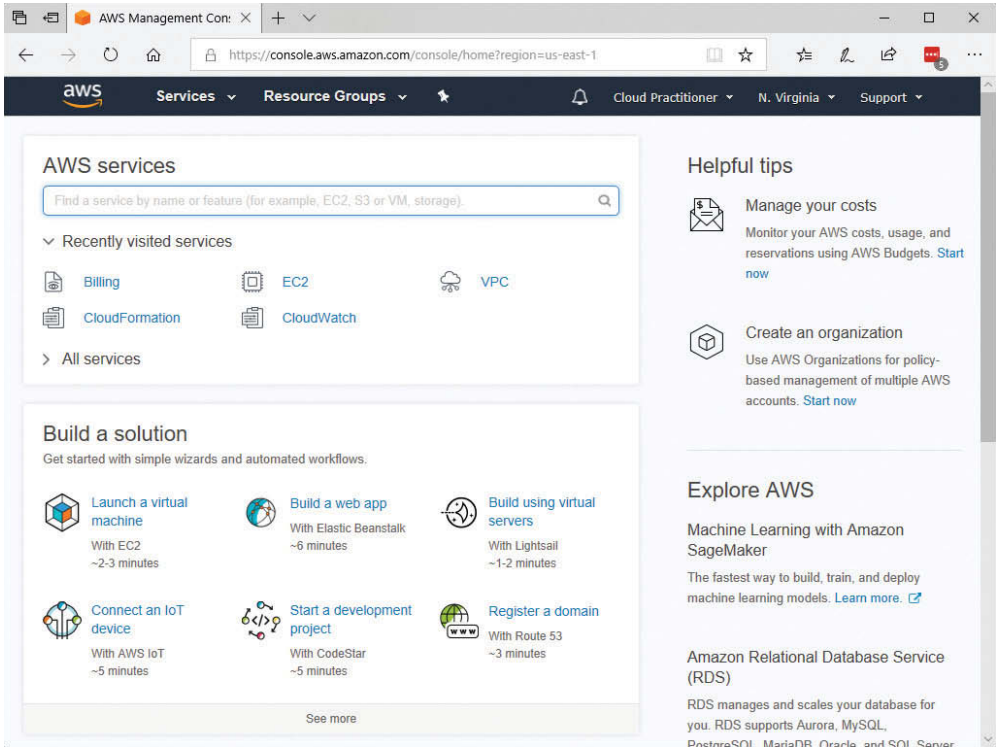


**Figure 12-8** The AWS Management Console

## Building a Web Server with the Free Tier

Now that you have your Free Tier account, it is time to have some fun and learn a bunch in the process! In this section, we build a fully functional web server in AWS using some simple steps. This lab demonstrates many of the technologies you are now familiar with thanks (in part) to this book. The lab builds a "LAMP" web server, which stands for an Apache web server with PHP and MariaDB (a community-developed fork of MySQL) support on an Amazon Linux 2 instance.

### Lab: Building a Web Server with the Free Tier

Key Topic

Let's walk through the steps required to build a free web server using AWS EC2:

**Step 1.** Search the AWS services for **EC2** and select the link to enter the **EC2 Dashboard**.

**Step 2.** Select **Launch Instance** to create a new EC2 instance for your cool web server.

**Step 3.** The **Choose an Amazon Machine Image (AMI)** page displays a list of basic configurations, called Amazon Machine Images (AMIs), that serve as templates for your instance. Select an HVM version of Amazon Linux 2. Notice that these AMIs are marked "Free Tier eligible."

**Step 4.** On the **Choose an Instance Type** page, you can select the hardware configuration of your instance. Select the **t2.micro** type, which is selected by default. Notice that this instance type is eligible for the Free Tier. Figure 12-9 shows this step.

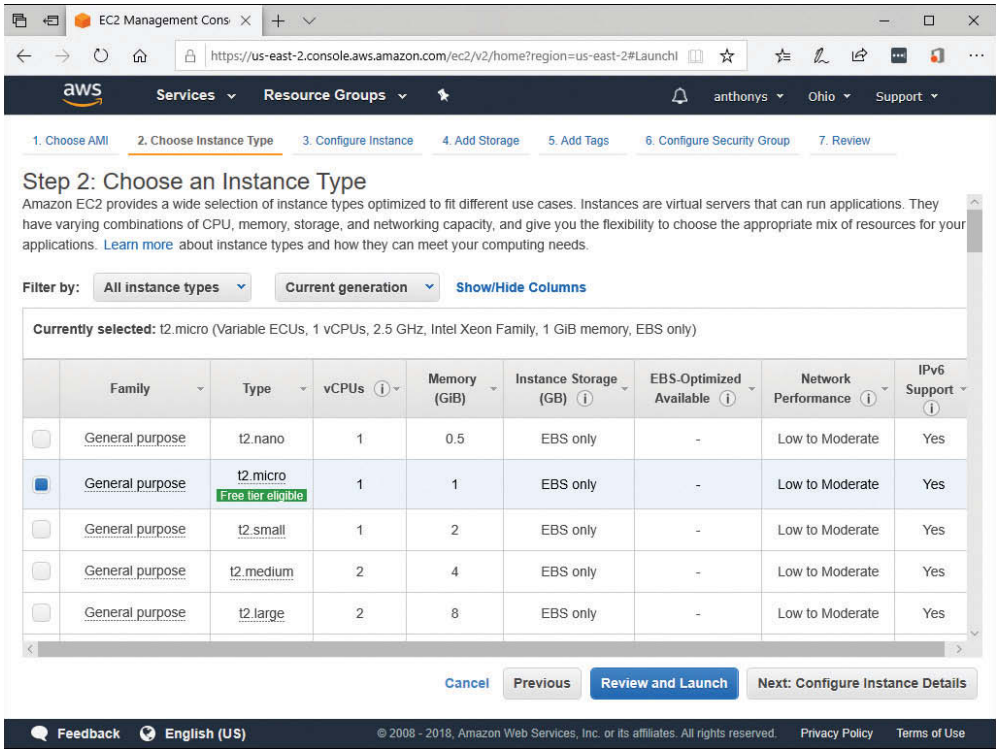


**Figure 12-9** Choosing an Instance Type

**Step 5.** Choose **Review and Launch** to let the wizard complete the other configuration settings for you.

**Step 6.** On the **Review Instance Launch** page, under **Security Groups**, you'll see that the wizard created and selected a security group for you. You can use this security group, or you can select the security group you created during setup using the following steps.

**Step 7.** Choose **Edit security groups**.

**Step 8.** Ensure your security group allows SSH (port 22), HTTP (port 80), and HTTPS (port 443) connections, as shown in Figure 12-10.

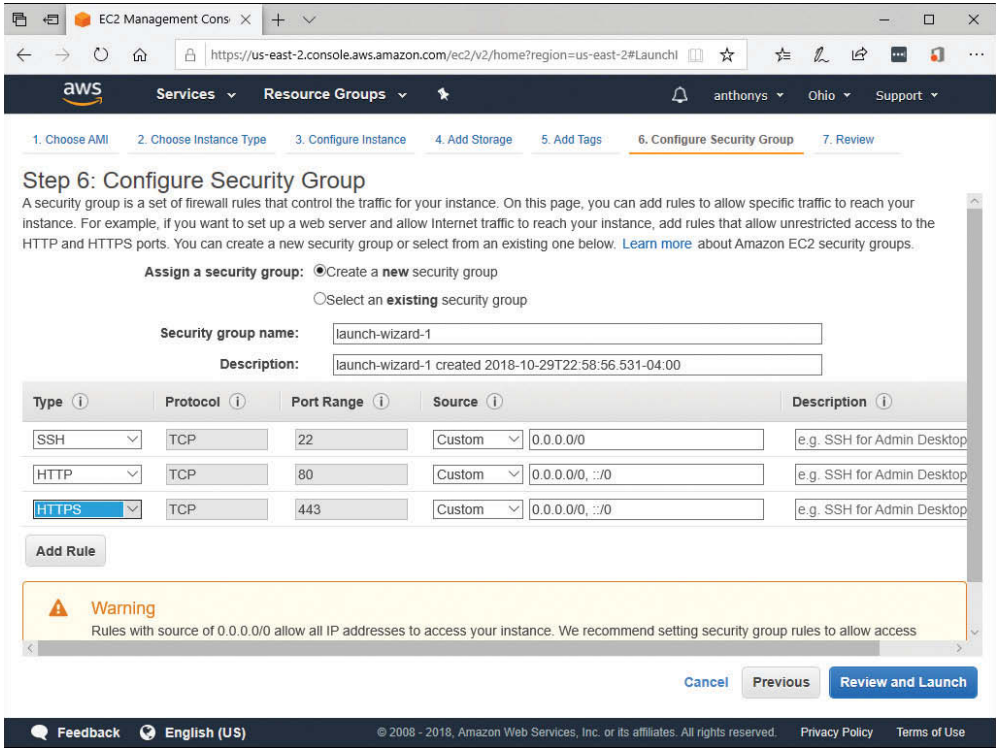


**Figure 12-10** Ensuring Your Security Group Permits the Correct Traffic

**Step 9.** Choose **Review and Launch**.

**Step 10.** On the **Review Instance Launch** page, choose **Launch**.

**Step 11.** When prompted for a key pair, select **Choose an existing key pair**, then select the key pair that you created previously. Alternatively, you can create a new key pair. Select **Create a new key pair**, enter a name for the key pair, and then choose **Download Key Pair**. This is the only chance for you to save the private key file, so be sure to download it. Save the private key file in a safe place. You'll need to provide the name of your key pair when you launch an instance and the corresponding private key each time you connect to the instance.

**Step 12.** When you are ready, select the acknowledgement check box and then choose **Launch Instances**.

**Step 13.** A confirmation page lets you know that your instance is launching. Choose **View Instances** to close the confirmation page and return to the console.

**Step 14.** Connect to your instance once it is ready—its status in the console will be **Running**. Use the **Connect** button for instructions on making your SSH connection.

**Step 15.** After logging in to your instance as the user account **ec2-user**, ensure that all of your software packages are up to date by performing a quick software update on your instance. This process may take a few minutes, but it is important to make sure that you have the latest security updates and bug fixes. Use the following command:

[ec2-user ~]$ **sudo yum update –y**

**Step 16.** Install the lamp-mariadb10.2-php7.2 and php7.2 Amazon Linux Extras repositories to get the latest versions of the LAMP MariaDB and PHP packages for Amazon Linux 2. Use the following command:

[ec2-user ~]$ **sudo amazon-linux-extras install -y lamp-mariadb10.2-php7.2 php7.2**

**Step 17.** Now that your instance is current, you can install the Apache web server, MariaDB, and PHP software packages. Use the **yum install** command to install multiple software packages and all related dependencies at the same time:

[ec2-user ~]$ **sudo yum install -y httpd mariadb-server**

**Step 18.** Start the Apache web server:

[ec2-user ~]$ **sudo systemctl start httpd**

**Step 19.** Use the **systemctl** command to configure the Apache web server to start at each system boot:

[ec2-user ~]$ **sudo systemctl enable httpd**

**Step 20.** Test your web server. In a web browser, type the public DNS address (or the public IP address) of your instance. If there is no content in /var/www/html, you should see the Apache test page. You can get the public DNS for your instance using the Amazon EC2 console (check the Public DNS column; if this column is hidden, choose **Show/Hide Columns** [the gear-shaped icon] and choose **Public DNS**).

**Step 21.** It's time to shut down your handy LAMP web server. Issue the following command:

[ec2-user ~]$ **sudo shutdown -h now**

**NOTE** You can also shut down instances using the AWS Management Console with the EC2 Dashboard. I always prefer to shut systems down from their own interface when I am working within them.

# Exam Preparation Tasks

As mentioned in the section "How to Use This Book" in the Introduction, you have a few choices for exam preparation: the exercises here, Chapter 16, "Final Preparation," and the exam simulation questions in the Pearson Test Prep Software Online.

## Review All Key Topics

Review the most important topics in this chapter, noted with the Key Topics icon in the outer margin of the page. Table 12-2 lists these key topics and the page numbers on which each is found.

Key Topic

**Table 12-2** Key Topics for Chapter 12

| Key Topic Element | Description | Page Number |
|---|---|---|
| List | Free Tier components | 137 |
| Lab | Creating a Free Tier account | 139 |
| Lab | Creating a web server with the Free Tier | 147 |

## Define Key Terms

Define the following key terms from this chapter and check your answers in the Glossary:

Free Tier

## Q&A

The answers to these questions appear in Appendix A. For more practice with exam format questions, use the Pearson Test Prep Software Online.

1. Provide at least three examples of Free Tier services that can remain forever free.
2. Why might you shut down your EC2 instances in AWS when practicing with the Free Tier account?

**This chapter covers the following subjects:**

- **Fundamentals of Pricing**: This section describes how pricing works in AWS in general. It educates you on the fundamental types of costs associated with using AWS.
- **Pricing Details**: This section ensures you understand the various factors that go into pricing for a given service. This section is critical for you to be able to control your costs in AWS.

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