



Practice
Tests



Flash
Cards



Review
Exercises



Study
Planner

Cert Guide

Advance your IT career with hands-on learning

AWS Certified Cloud Practitioner

CLF-C02



ANTHONY SEQUEIRA

FREE SAMPLE CHAPTER |



AWS Certified Cloud Practitioner CLF-C02 Cert Guide

Companion Website and Pearson Test Prep Access Code

Access interactive study tools on this book's companion website, including practice test software, review exercises, Key Term flash card application, a study planner, and more!

To access the companion website, simply follow these steps:

1. Go to **pearsonitcertification.com**.
2. Enter the **print book ISBN**: 9780138285999.
3. Answer the security question to validate your purchase.
4. Go to your account page.
5. Click on the **Registered Products** tab.
6. Under the book listing, click on the **Access Bonus Content** link.

When you register your book, your Pearson Test Prep practice test access code will automatically be populated with the book listing under the Registered Products tab. You will need this code to access the practice test that comes with this book. You can redeem the code at **PearsonTestPrep.com**. Simply choose Pearson IT Certification as your product group and log into the site with the same credentials you used to register your book. Click the **Activate New Product** button and enter the access code. More detailed instructions on how to redeem your access code for both the online and desktop versions can be found on the companion website.

If you have any issues accessing the companion website or obtaining your Pearson Test Prep practice test access code, you can contact our support team by going to **pearsonitp.echelp.org**.

This page intentionally left blank

AWS Certified Cloud Practitioner CLF-C02 Cert Guide

Anthony Sequeira, CCIE No. 15626



Pearson

Hoboken, New Jersey

AWS Certified Cloud Practitioner CLF-C02 Cert Guide

Copyright © 2025 by Pearson Education, Inc.

All rights reserved. This publication is protected by copyright, and permission must be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. For information regarding permissions, request forms, and the appropriate contacts within the Pearson Education Global Rights & Permissions Department, please visit www.pearson.com/permissions.

No patent liability is assumed with respect to the use of the information contained herein. Although every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein.

Microsoft and/or its respective suppliers make no representations about the suitability of the information contained in the documents and related graphics published as part of the services for any purpose all such documents and related graphics are provided “as is” without warranty of any kind. Microsoft and/or its respective suppliers hereby disclaim all warranties and conditions with regard to this information, including all warranties and conditions of merchantability, whether express, implied or statutory, fitness for a particular purpose, title and non-infringement. In no event shall Microsoft and/or its respective suppliers be liable for any special, indirect or consequential damages or any damages whatsoever resulting from loss of use, data or profits, whether in an action of contract, negligence or other tortious action, arising out of or in connection with the use or performance of information available from the services.

The documents and related graphics contained herein could include technical inaccuracies or typographical errors. Changes are periodically added to the information herein. Microsoft and/or its respective suppliers may make improvements and/or changes in the product(s) and/or the program(s) described herein at any time. Partial screen shots may be viewed in full within the software version specified.

Microsoft® Windows®, and Microsoft Office® are registered trademarks of the Microsoft Corporation in the U.S.A. and other countries. This book is not sponsored or endorsed by or affiliated with the Microsoft Corporation.

Please contact us with concerns about any potential bias at <https://www.pearson.com/report-bias.html>.

ISBN-13: 978-0-13-828599-9

ISBN-10: 0-13-828599-3

Library of Congress Cataloging-in-Publication Data: 2024906720

\$PrintCode

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. Pearson IT Certification cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

**GM K12, Early Career
and Professional**

Learning

Soo Kang

**Director, ITP Product
Management**

Brett Bartow

Executive Editor

Nancy Davis

Managing Editor

Sandra Schroeder

Development Editor

Christopher Cleveland

Senior Project Editor

Mandie Frank

Copy Editor

Kitty Wilson

Technical Editor

John Stuppi

Editorial Assistant

Cindy Teeters

Designer

Chuti Prasertsith

Composition

codeMantra

Indexer

Timothy Wright

Proofreader

Jennifer Hinchliffe

Warning and Disclaimer

This book is designed to provide information about the AWS Certified Cloud Practitioner CLF-C02 exam. Every effort has been made to make this book as complete and accurate as possible, but no warranty or fitness is implied. The information provided is on an “as is” basis. The author and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book or from the use of the supplemental online content or programs accompanying it.

Special Sales

For information about buying this title in bulk quantities, or for special sales opportunities (which may include electronic versions; custom cover designs; and content particular to your business, training goals, marketing focus, or branding interests), please contact our corporate sales department at corpsales@pearsoned.com or (800) 382-3419.

For government sales inquiries, please contact governmentsales@pearsoned.com.

For questions about sales outside the U.S., please contact intlcs@pearson.com.

Contents at a Glance

Introduction xxii

Part I: Domain 1: Cloud Concepts

- CHAPTER 1 The AWS Cloud Defined 3
- CHAPTER 2 Some Benefits of the AWS Cloud 23
- CHAPTER 3 Design Principles of the AWS Cloud 37
- CHAPTER 4 Strategies for Migration to the AWS Cloud 53
- CHAPTER 5 Concepts of Cloud Economics 65
- CHAPTER 6 Creating and Using an AWS Free Tier Account 75

Part II: Domain 2: Security and Compliance

- CHAPTER 7 The AWS Shared Responsibility Model 93
- CHAPTER 8 AWS Cloud Security, Governance, and Compliance 103
- CHAPTER 9 AWS Access Management 113
- CHAPTER 10 Components and Resources for Security 127

Part III: Domain 3: Cloud Technology and Services

- CHAPTER 11 Methods of Deploying and Operating in AWS 139
- CHAPTER 12 The AWS Global Infrastructure 151
- CHAPTER 13 AWS Compute Services 165
- CHAPTER 14 AWS Database Services 177
- CHAPTER 15 AWS Network Services 187
- CHAPTER 16 AWS Storage Services 197
- CHAPTER 17 AWS Artificial Intelligence and Data Analytics Services 211
- CHAPTER 18 Other AWS Services 223

Part IV: Domain 4: Billing, Pricing, and Support

- CHAPTER 19 AWS Pricing Models Compared 241
- CHAPTER 20 Resources for Billing, Budgets, and Cost Management 255
- CHAPTER 21 AWS Technical Resources and AWS Support Options 265

Part V: Final Preparation**CHAPTER 22** Final Preparation 279**Part VI: Appendixes**

Glossary of Key Terms 285

APPENDIX A Answers to the “Do I Know This Already?” Quizzes and Q&A Sections 299**APPENDIX B** AWS Certified Cloud Practitioner CLF-C02 Cert Guide Exam Updates 313

Index 315

APPENDIX C Online only

Table of Contents

Introduction xxii

Part I: Domain 1: Cloud Concepts

Chapter 1 The AWS Cloud Defined 3

“Do I Know This Already?” Quiz 3

Foundation Topics 5

Introduction to the Cloud 5

Introduction to the AWS Cloud 8

 Compute Service 8

 Storage Services 11

 Network Services 12

 Database Services 14

 Security Services 15

 Automation and Application Support 17

 Management Tools 17

 Monitoring 18

Exam Preparation Tasks 20

Review All Key Topics 20

Define Key Terms 20

Q&A 20

Chapter 2 Some Benefits of the AWS Cloud 23

“Do I Know This Already?” Quiz 23

Foundation Topics 25

Economic Benefits 25

The Benefits of the Global Infrastructure 26

High Availability, Elasticity, and Agility 28

 High Availability (HA) 29

 Elasticity 29

 Agility 30

	Exam Preparation Tasks	33
	Review All Key Topics	33
	Define Key Terms	33
	Q&A	33
Chapter 3	Design Principles of the AWS Cloud	37
	“Do I Know This Already?” Quiz	37
	Foundation Topics	41
	The AWS Well-Architected Framework	41
	Operational Excellence	43
	Security	44
	Reliability	46
	Performance Efficiency	47
	Cost Optimization	48
	Sustainability	49
	Exam Preparation Tasks	51
	Review All Key Topics	51
	Define Key Terms	51
	Q&A	51
Chapter 4	Strategies for Migration to the AWS Cloud	53
	“Do I Know This Already?” Quiz	53
	Foundation Topics	55
	The AWS Cloud Adoption Framework	55
	Foundational Capabilities	56
	Cloud Transformation Journey	58
	Resources for Migration Support	59
	Database Migration Service	59
	Snowball	61
	Exam Preparation Tasks	63
	Review All Key Topics	63
	Define Key Terms	63
	Q&A	63
Chapter 5	Concepts of Cloud Economics	65
	“Do I Know This Already?” Quiz	65
	Foundation Topics	67
	Cloud Economics	67

	Fixed Costs Versus Variable Costs	67
	Costs Associated with On-Premises Environments	69
	Other Benefits	70
	Benefits of Automation	70
	Benefits of Managed Services	71
	Exam Preparation Tasks	72
	Review All Key Topics	72
	Define Key Terms	72
	Q&A	72
Chapter 6	Creating and Using an AWS Free Tier Account	75
	“Do I Know This Already?” Quiz	75
	Foundation Topics	77
	Creating Your Free Tier Account	77
	Lab: Creating Your Free Tier Account	82
	Building a Web Server with the Free Tier	85
	Lab: Building a Web Server with the Free Tier	86
	Exam Preparation Tasks	91
	Review All Key Topics	91
	Define Key Term	91
	Q&A	91
Part II: Domain 2: Security and Compliance		
Chapter 7	The AWS Shared Responsibility Model	93
	“Do I Know This Already?” Quiz	93
	Foundation Topics	96
	Understanding the Shared Responsibility Model	96
	AWS Responsibilities	97
	Customer Responsibilities	98
	Exam Preparation Tasks	100
	Review All Key Topics	100
	Define Key Terms	100
	Q&A	100

Chapter 8 AWS Cloud Security, Governance, and Compliance 103

- “Do I Know This Already?” Quiz 103
- Foundation Topics 105
- An Introduction to AWS Security 105
- AWS Security Compliance Programs 108
- Exam Preparation Tasks 111
- Review All Key Topics 111
- Define Key Terms 111
- Q&A 111

Chapter 9 AWS Access Management 113

- “Do I Know This Already?” Quiz 113
- Foundation Topics 115
- Identity and Access Management 115
- Best Practices with IAM 118
- Other Access Management-Related AWS Services 122
- Exam Preparation Tasks 124
- Review All Key Topics 124
- Define Key Terms 124
- Q&A 124

Chapter 10 Components and Resources for Security 127

- “Do I Know This Already?” Quiz 127
- Foundation Topics 129
- Some AWS Security Features 129
 - Security Groups 129
 - Network ACLs (NACLs) 130
 - Web Application Firewall (WAF) 130
- Tools for Security Support 132
 - AWS Knowledge Center 132
 - AWS Security Center 132
 - AWS Security Blog 133
- Additional Security Support Resources 133
 - AWS Trusted Advisor 133
 - Lab: Using the Trusted Advisor 134
 - AWS Marketplace 135

Exam Preparation Tasks	136
Review All Key Topics	136
Define Key Terms	136
Q&A	136

Part III: Domain 3: Cloud Technology and Services

Chapter 11 Methods of Deploying and Operating in AWS 139

“Do I Know This Already?” Quiz	139
Foundation Topics	142
Automation	142
Orchestration	143
Management Options	145
Deployment and Connectivity Options	147
Exam Preparation Tasks	149
Review All Key Topics	149
Define Key Terms	149
Q&A	149

Chapter 12 The AWS Global Infrastructure 151

“Do I Know This Already?” Quiz	151
Foundation Topics	154
Regions	154
Availability Zones	156
Other Global Infrastructure Components	157
AWS Local Zones	157
AWS Wavelength Zones	157
AWS CloudFront	158
AWS Global Accelerator	159
AWS Direct Connect	160
VPC Endpoints	160
<i>Interface Endpoints</i>	161
<i>Gateway Endpoints</i>	161
VPC Peering	162
Exam Preparation Tasks	163

Review All Key Topics 163

Define Key Terms 163

Q&A 163

Chapter 13 AWS Compute Services 165

“Do I Know This Already?” Quiz 165

Foundation Topics 167

EC2 167

Container Options 170

 Elastic Container Service (ECS) 170

 Elastic Kubernetes Service (EKS) 171

Serverless Compute 172

 Lambda 172

 Elastic Beanstalk 173

Exam Preparation Tasks 175

Review All Key Topics 175

Define Key Terms 175

Q&A 175

Chapter 14 AWS Database Services 177

“Do I Know This Already?” Quiz 177

Foundation Topics 179

Relational Database Services 179

 Relational Database Service (RDS) 179

 Aurora 180

Other Database Services 181

 DynamoDB 181

 ElastiCache 183

 Redshift 184

Exam Preparation Tasks 185

Review All Key Topics 185

Define Key Terms 185

Q&A 185

Chapter 15 AWS Network Services 187

- “Do I Know This Already?” Quiz 187
- Foundation Topics 190
- Fundamental Network Services 190
 - Virtual Private Cloud (VPC) 190
- Other Network Services 192
 - Route 53 192
 - CloudFront 192
- Exam Preparation Tasks 194
- Review All Key Topics 194
- Define Key Terms 194
- Q&A 194

Chapter 16 AWS Storage Services 197

- “Do I Know This Already?” Quiz 197
- Foundation Topics 199
- Fundamental Storage Services 199
 - Simple Storage Service (S3) 199
 - S3 Storage Classes 201
 - S3 Lifecycles 202
 - Elastic Block Store (EBS) 203
 - Elastic File System (EFS) 205
- Other Storage Services 205
 - FSx 205
 - Storage Gateway 206
 - AWS Backup 207
- Exam Preparation Tasks 208
- Review All Key Topics 208
- Define Key Terms 208
- Q&A 208

Chapter 17 AWS Artificial Intelligence and Data Analytics Services 211

- “Do I Know This Already?” Quiz 211
- Foundation Topics 214
- Artificial Intelligence/Machine Learning Services 214

	SageMaker	214
	Lex	215
	Kendra	216
	Data Analytics Services	217
	Athena	217
	Glue	217
	QuickSight	218
	Kinesis	219
	Exam Preparation Tasks	221
	Review All Key Topics	221
	Define Key Terms	221
	Q&A	221
Chapter 18	Other AWS Services	223
	“Do I Know This Already?” Quiz	223
	Foundation Topics	226
	Business Application Services	226
	Amazon Connect	226
	Simple Email Service (SES)	227
	EventBridge	227
	Simple Notification Service (SNS)	227
	Simple Queue Service (SQS)	228
	Customer Engagement Services	228
	Activate for Startups	228
	AWS IQ	229
	AWS Managed Services	229
	Developer Services	230
	AppConfig	230
	Cloud9	230
	CloudShell	230
	CodeArtifact	231
	CodeBuild	232
	CodeCommit	232

CodeDeploy	232
CodePipeline	233
CodeStar	233
AWS X-Ray	233
AWS Amplify	234
AppSync	234
End-User Compute Services	234
AppStream 2.0	235
AWS WorkSpaces	235
WorkSpaces Web	236
IoT Services	236
IoT Core	237
IoT Greengrass	238
Exam Preparation Tasks	239
Review All Key Topics	239
Define Key Terms	239
Q&A	239

Part IV: Domain 4: Billing, Pricing, and Support

Chapter 19 AWS Pricing Models Compared 241

“Do I Know This Already?” Quiz	241
Foundation Topics	244
General AWS Pricing Practices	244
Fundamentals of Compute Pricing	245
On-Demand Instance Pricing	245
Reserved Instance Pricing	246
Savings Plan Pricing	246
Spot Instance Pricing	247
Dedicated Host Pricing	248
Dedicated Instance Pricing	249
On-Demand Capacity Reservation Pricing	250
Exam Preparation Tasks	252
Review All Key Topics	252

	Define Key Terms	252
	Q&A	252
Chapter 20	Resources for Billing, Budgets, and Cost Management	255
	“Do I Know This Already?” Quiz	255
	Foundation Topics	257
	AWS Billing and Cost Management	257
	Budgets	258
	Cost Explorer	258
	Billing Conductor	259
	Pricing Calculator	259
	Cost and Usage Reports	259
	Cost Allocation Tags	260
	AWS Organizations	260
	Exam Preparation Tasks	262
	Review All Key Topics	262
	Define Key Terms	262
	Q&A	262
Chapter 21	AWS Technical Resources and AWS Support Options	265
	“Do I Know This Already?” Quiz	265
	Foundation Topics	268
	AWS Technical Resources	268
	Documentation, Whitepapers, and Blogs	268
	Other AWS Technical Resources	272
	AWS Support Options	273
	Comparing the Plans	276
	Exam Preparation Tasks	277
	Review All Key Topics	277
	Define Key Terms	277
	Q&A	277

Part V: Final Preparation

Chapter 22 Final Preparation 279

- Exam Information 279
- Getting Ready 281
- Suggested Plan for Final Review/Study 282
- Summary 283

Part VI: Appendixes

- Glossary of Key Terms 285
- Appendix A Answers to the “Do I Know This Already?” Quizzes and Q&A Sections 299
- Appendix B AWS Certified Cloud Practitioner CLF-C02 Cert Guide Exam Updates 313
 - Index 315
- Appendix C Online only

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 a full-time instructor with ACI Learning. ACI Learning is a leader in audit, cybersecurity, and IT professional training.

Dedication

This book is dedicated to my dear friend Pierre Smith, who has provided many decades of advice, banter, and, of course, laughs. Pierre will most likely never certify in AWS, but he certainly could if he wanted to—in record time.

Acknowledgments

This update to the text was made possible by Nancy Davis of Pearson. Nancy, thank you so much for this opportunity!

Thank you, John Stuppi, for the intense technical review. Your work helped this text tremendously.

Finally, I would also like to express my gratitude to Chris Cleveland, development editor of this book and of the previous edition. I was so incredibly lucky to work with him again on this text. Like John, he helped make this book several cuts above the rest.

About the Technical Reviewer

John Stuppi, CCIE No. 11154, is an Engineering Program Manager in the Security & Trust Organization (S&TO) at Cisco, where he works with Cisco customers to investigate suspected compromises in their network environment as well as to protect their networks against existing and emerging cybersecurity threats, risks, and vulnerabilities. Current projects include working with newly acquired entities to integrate them into Cisco's PSIRT Vulnerability Management processes and advising some of Cisco's most strategic customers on vulnerability management and risk assessment.

John has presented multiple times on various network security topics at Cisco Live, Black Hat, and other customer-facing cyber security conferences. John is also the co-author of the *Official Certification Guide for CCNA Security 210-260*, published by Cisco Press. Additionally, John has contributed to the Cisco Security Portal through the publication of white papers, Security Blog posts, and Cyber Risk Report articles. Prior to joining Cisco, John worked as a network engineer for JPMorgan and then as a network security engineer at Time, Inc., with both positions based in New York City. John is also a CISSP (#25525) and holds AWS Cloud Practitioner and Information Systems Security (INFOSEC) professional certifications. In addition, John has a BSEE from Lehigh University and an MBA from Rutgers University. John splits his time between Eatontown, New Jersey, and Clemson, South Carolina, with his wife, son, and daughter.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that we cannot help you with technical problems related to the topic of this book.

When you write, please be sure to include this book's title and author as well as your name and email address. We will carefully review your comments and share them with the author and editors who worked on the book.

Email: community@informat.com

Reader Services

Register your copy of *AWS Certified Cloud Practitioner CLF-C02 Cert Guide* for convenient access to downloads, updates, and corrections as they become available. To start the registration process, go to www.pearsonitcertification.com/register and log in or create an account*. Enter the product ISBN 9780138285999 and click Submit. When the process is complete, you will find any available bonus content under Registered Products.

*Be sure to check the box that you would like to hear from us to receive exclusive discounts on future editions of this product.

Introduction

The AWS Certified Cloud Practitioner exam tests candidates' overall understanding of the AWS Cloud and many of its critical services. This certification also serves to validate candidates' knowledge with an industry-recognized credential. This exam covers four domains:

- Cloud Concepts
- Security and Compliance
- Cloud Technology and Services
- Billing, Pricing, and Support

Obtaining the AWS Certified Cloud Practitioner certification is a recommended path to achieving further specialty certifications or can be a 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. The exam validates a candidate's ability to do the following:

- Explain the value of the AWS Cloud.
- Understand and explain the AWS shared responsibility model.
- Understand security best practices.
- Understand AWS Cloud costs, economics, and billing practices.
- Describe and position the core AWS services, including compute, network, database, and storage services.
- Identify AWS services for common use cases.

Ideal Candidates

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

- Six months of exposure to AWS Cloud design, implementation, and/or operations
- AWS knowledge in the following areas:
 - AWS Cloud concepts
 - Security and compliance in the AWS Cloud

- Core AWS services
- Economics of the AWS Cloud

The Exam Objectives (Domains)

The AWS Certified Cloud Practitioner CLF-C02 exam is broken down into four major domains. The contents of this book cover each of the domains and the sub-topics included in them, as illustrated in the following descriptions.

The following table lists those domains and the percentage of the exam dedicated to each of them:

Domain	Percentage of Representation in Exam
1: Cloud Concepts	24%
2: Security and Compliance	30%
3: Cloud Technology and Services	34%
4: Billing, Pricing, and Support	12%
	Total 100%

Domain 1: Cloud Concepts

Chapters 1 through 6 of this book cover Domain 1: Cloud Concepts. This domain covers critical topics such as the services and categories of services provided by AWS. It also covers important information on how AWS can save your IT team large sums of money. It comprises 24% of the exam and includes the following topics:

- Task Statement 1.1: Define the benefits of the AWS Cloud.
- Task Statement 1.2: Identify design principles of the AWS Cloud.
- Task Statement 1.3: Understand the benefits of and strategies for migration to the AWS Cloud.
- Task Statement 1.4: Understand concepts of cloud economics.

Domain 2: Security and Compliance

Chapters 7 through 10 cover Domain 2: Security and Compliance. This domain covers security in general with AWS, and it also provides details on the implementation of

strong security with AWS services such as IAM and a wide variety of management tools. This domain makes up 30% of the exam and includes the following topics:

- Task Statement 2.1: Understand the AWS shared responsibility model.
- Task Statement 2.2: Understand AWS Cloud security, governance, and compliance concepts.
- Task Statement 2.3: Identify AWS access management capabilities.
- Task Statement 2.4: Identify components and resources for security.

Domain 3: Cloud Technology and Services

Chapters 11 through 18 cover Domain 3: Cloud Technology and Services. This domain digs into the “nuts and bolts” of AWS, such as the global infrastructure and core services of AWS. It encompasses 34% of the exam and includes the following topics:

- Task Statement 3.1: Define methods of deploying and operating in the AWS Cloud.
- Task Statement 3.2: Define the AWS global infrastructure.
- Task Statement 3.3: Identify AWS compute services.
- Task Statement 3.4: Identify AWS database services.
- Task Statement 3.5: Identify AWS network services.
- Task Statement 3.6: Identify AWS storage services.
- Task Statement 3.7: Identify AWS artificial intelligence and machine learning (AI/ML) services and analytics services.
- Task Statement 3.8: Identify services from other in-scope AWS service categories.

Domain 4: Billing, Pricing, and Support

Chapters 19 through 21 cover Domain 4: Billing, Pricing, and Support. In these chapters, you’ll learn about the tools and techniques for controlling costs inside AWS as well as the resources that are available to assist you. This domain accounts for 12% of the exam and includes the following topics:

- Task Statement 4.1: Compare AWS pricing models.
- Task Statement 4.2: Understand resources for billing, budget, and cost management.
- Task Statement 4.3: Identify AWS technical resources and AWS Support options.

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, a test candidate can 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:

- Step 1.** To schedule your exam, first create an AWS Certification account at <https://www.aws.training/certification>
- Step 2.** Complete the Examination Agreement, attesting to the truth of your assertions regarding professional experience and legally committing to adhering to the testing policies.
- Step 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 the AWS Certified Cloud Practitioner and other AWS certifications.

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 knowledge of those topics. This book does not try to help you pass the exam only by memorization; it seeks to help you 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 yet become proficient in
- 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 the page number for each one. 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 to Access the Companion Website

Register this book to get access to the Pearson IT Certification test engine and other study materials, as well as 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 indicating that you would like to hear from us to receive updates and exclusive discounts on future editions of this product or related products.

To access this companion website, follow these steps:

- Step 1.** Go to www.pearsonitcertification.com/register and log in or create a new account.
- Step 2.** Enter the ISBN: **9780138285999**.
- 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.

Please note that many of our companion content files can be very large, especially image and video files.

If you are unable to locate the files for this title by following the steps above, please visit www.pearsonITcertification.com/contact and select the Site Problems/Comments option. Our customer service representatives will assist you.

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 below.

How to Access the Pearson Test Prep (PTP) App

You have two options for installing and using the Pearson Test Prep application: a web app and a desktop app. To use the Pearson Test Prep application, start by finding the registration code that comes with the book. You can find the code in these ways:

- You can get your access code by registering the print ISBN (9780138285999) on pearsonitcertification.com/register. Make sure to use the print book ISBN regardless of whether you purchased an eBook or the print book. After you register the book, your access code will be populated on your account page under the Registered Products tab. Instructions for how to redeem the code

are available on the book's companion website by clicking the Access Bonus Content link.

- If you purchase the Premium Edition eBook and Practice Test directly from the Pearson IT Certification website, the code will be populated on your account page after purchase. Just log in at pearsonitcertification.com, click Account to see details of your account, and click the Digital Purchases tab.

NOTE After you register your book, your code can always be found in your account on the Registered Products tab.

Once you have the access code, to find instructions about both the Pearson Test Prep web app and the desktop app, follow these steps:

- Step 1.** Open this book's companion website, as shown earlier in this Introduction, under the heading, "How to Access the Companion Website."
- Step 2.** Click the **Practice Test Software** button.
- Step 3.** Follow the instructions listed there for both installing the desktop app and using the web app.

Note that if you want to use the web app only at this point, just navigate to pearsonstestprep.com, log in using the same credentials used to register your book or purchase the Premium Edition, and register this book's practice tests using the registration code you just found. The process should take only a couple of minutes.

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 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 are 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 that you are running the latest version of the software engine.

Credits

Figures 1.1-1.8, 2.1-2.5, 3.1, 4.1-4.4, 5.1, 6.1-6.7, 7.2, 8.2, 8.3, 9.1-9.5, 10.1-10.3, 11.1, 11.2, 12.1-12.3, 13.1-13.4, 14.1-14.3, 15.1, 15.2, 16.1-16.4, 17.1-17.3, 18.1-18.4, 19.1-19.3, 20.1-20.3, 21.1-21.5-Amazon Web Services, Inc

Figures 6.8 & 11.3-Microsoft Corporation

This page intentionally left blank

AWS Artificial Intelligence and Data Analytics Services

In this chapter, we'll delve into the exciting realm of artificial intelligence (AI)/machine learning (ML) services in AWS. In addition, we will explore some amazing data analytics services offered by AWS. This is an important chapter as it addresses some of the most popular and hyped up topics in IT today.

AWS, as you would expect, does a fantastic job of making what might be very complex technologies quite simple to implement. This chapter covers the AWS services available in these areas.

“Do I Know This Already?” Quiz

The “Do I Know This Already?” quiz allows you to assess whether you should read the entire chapter. Table 17-1 lists the major headings in this chapter and the “Do I Know This Already?” quiz questions covering the material in those sections so you can assess your knowledge of these specific areas. The answers to the “Do I Know This Already?” quiz questions appear in Appendix A, “Answers to the ‘Do I Know This Already?’ Quizzes and Q&A Sections.”

Table 17-1 “Do I Know This Already?” Foundation Topics Section-to-Question Mapping

Foundation Topics Section	Questions
Artificial Intelligence/Machine Learning Services	1–3
Data Analytics Services	4–6

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. You have been tasked with training a machine-learning model for a project in your organization. What AWS service can assist you with this?
 - a. Kendra
 - b. Athena
 - c. SageMaker
 - d. Lex

2. What AWS service helps you offer intelligent natural language searching in your solutions?
 - a. Lex
 - b. Kendra
 - c. SageMaker
 - d. QuickSight

3. You are interested in adding AI to your customer service chat. What AWS service should you investigate?
 - a. Kendra
 - b. SageMaker
 - c. Athena
 - d. Lex

4. What AWS service permits SQL queries against data stored in S3 buckets?
 - a. Athena
 - b. QuickSight
 - c. Kinesis
 - d. Glue

5. What is an option for ETL data services in AWS?
 - a. Glue
 - b. Athena
 - c. SageMaker
 - d. Neptune

- 6.** What service of AWS can assist you in creating powerful data visualizations such as charts and graphs?
- a.** Athena
 - b.** QuickSight
 - c.** Glue
 - d.** Kinesis

Foundation Topics

Artificial Intelligence/Machine Learning Services

I don't want to take anything for granted in this section, so let's begin by defining AI and ML. Artificial intelligence (AI) refers to computer systems or machines that are designed to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making. A subset of this exciting discipline is machine learning (ML), which involves the algorithms and models that enable computers to learn patterns from data and make predictions or decisions without explicit programming.

AI and ML are lofty disciplines that typically require the latest and greatest technologies and lots of available resources (like CPU, memory, and storage). AWS is perfectly positioned to help companies take advantage of these cutting-edge technologies.

SageMaker

AWS *SageMaker* is a smart assistant that you can use to build and train machine learning models without needing to be a coding expert. It provides easy-to-use tools to help you gather and prepare data, pick the right algorithm, and then train and deploy your model, all in one convenient place on the AWS Cloud platform. Figure 17-1 shows AWS SageMaker in the AWS Management Console.

Key Topic

AWS SageMaker offers several features that simplify the ML lifecycle. Here are just some of them:

- **Built-in algorithms:** SageMaker comes with a variety of prebuilt algorithms for common ML tasks—such as classification, regression, and clustering—which means you don't need to create models from scratch.
- **Notebook instances:** SageMaker provides Jupyter notebook instances, which allow you to create and share documents that contain live code, equations, visualizations, and narrative text.
- **Training jobs:** You can use SageMaker to easily train your ML models at scale, distributing the training process across multiple instances.
- **Model hosting:** Once your model is trained, SageMaker makes it simple to deploy, host, and integrate it with your applications.

- **Managed endpoints:** SageMaker provides managed endpoints for deploying models, making it easy to handle real-time predictions and batch processing.
- **Autopilot:** SageMaker enables you to automate the end-to-end process of building, training, and deploying ML models with minimal effort, making it suitable for users with limited ML expertise.

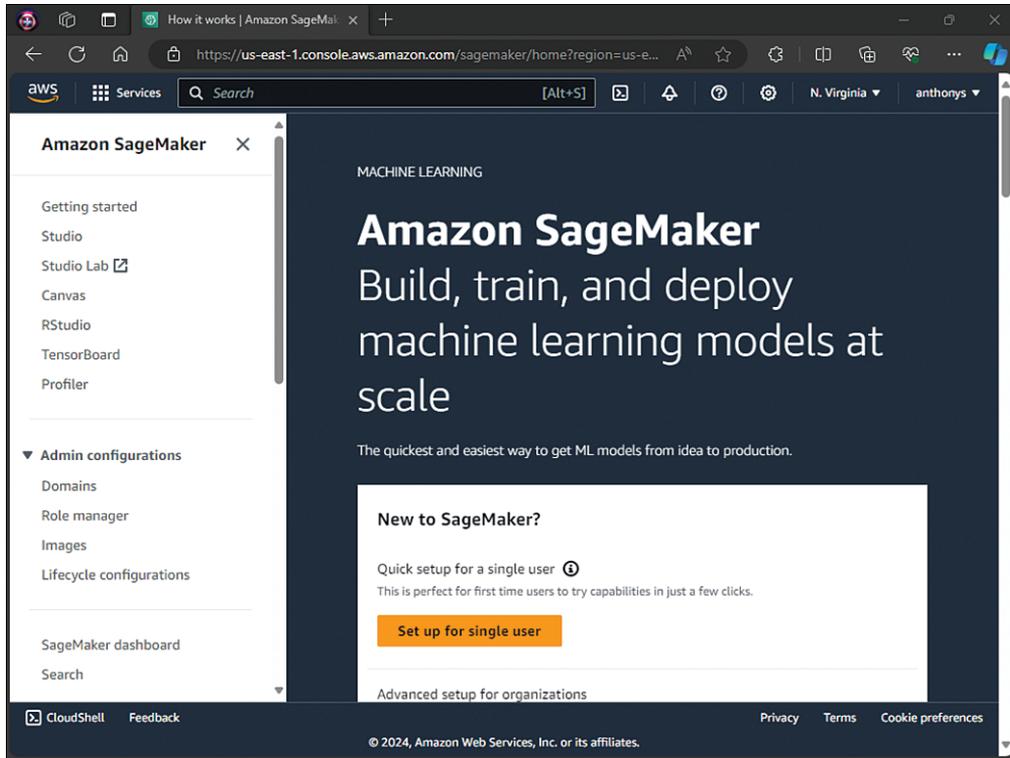


Figure 17-1 AWS SageMaker

Lex

Key Topic

AWS *Lex* makes it easy to create virtual assistants for your applications. It's a service that helps you build chatbots and conversational interfaces using natural language understanding. Think of it as the brain behind a chatbot. Lex understands user inputs, extracts key information, and can respond in a way that makes sense.

This service is handy for creating interactive experiences in your applications, whether for answering customer queries, handling reservations, or guiding users through processes. You can integrate Lex into various platforms, such as mobile apps or websites, to make it easier for users to interact with your applications using just

their words. Plus, Lex is powered by the same technology as Amazon Alexa, so it's got some serious language smarts under the hood.

Kendra

AWS *Kendra* is a super-smart search engine that is designed to help you find information effortlessly. It's a powerful search service that uses ML to understand the context and meaning behind your queries. Instead of just matching keywords, Kendra comprehends natural language, making it feel like you're having a conversation with your search engine. It's great for handling complex searches across vast amounts of data in documents, FAQs, or other sources. Figure 17-2 shows the Kendra service in the AWS Management Console.

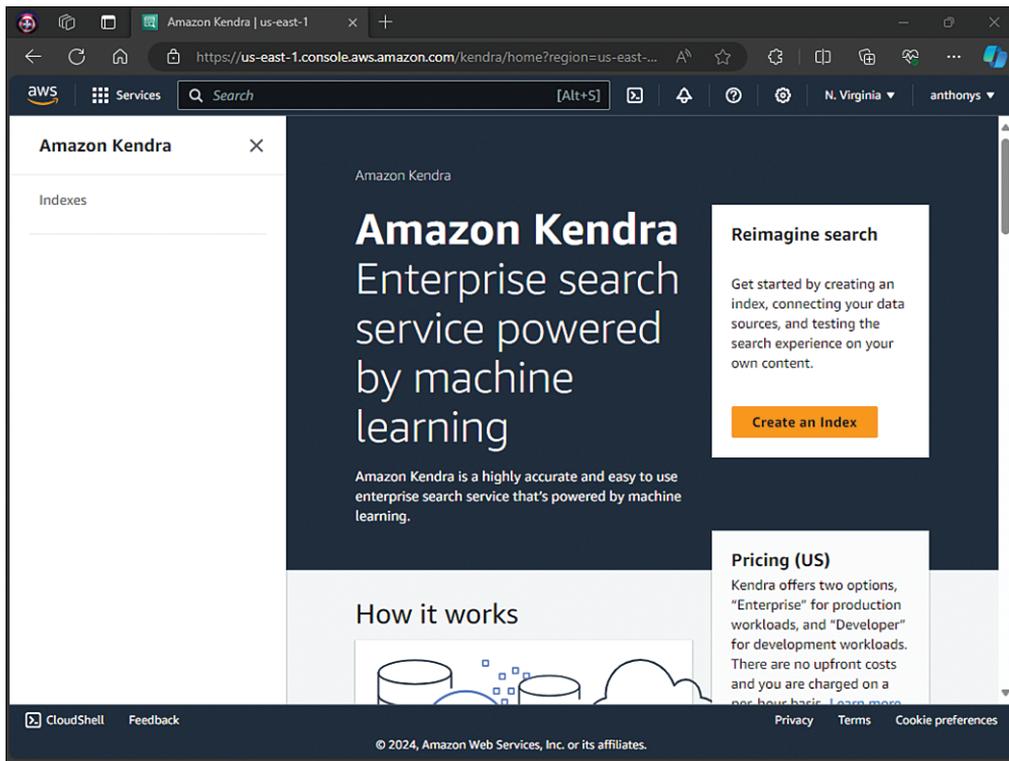


Figure 17-2 AWS Kendra

AWS Kendra includes the following features:

- **Semantic search:** Kendra uses machine learning algorithms to understand the semantics of the content and improve the accuracy of search results by recognizing nuances of and relationships between words.

- **Relevance tuning:** Kendra allows you to fine-tune search results to prioritize certain documents or sources based on your preferences. It enables you to ensure that the most important information is surfaced first.
- **Rich document support:** Kendra can handle a variety of document types, including PDFs, Word documents, HTML, and more, making it versatile for different types of content.
- **Query suggestions:** Kendra provides query suggestions to guide users and help them refine their search queries for better results.
- **Natural language query enhancement:** Kendra assists users in constructing more effective queries by suggesting natural language improvements, making the search process more intuitive.

Data Analytics Services

AWS offers a suite of data analytics services that can help a small startup or a large enterprise make informed decisions by extracting meaningful patterns from data. AWS provides scalable and flexible solutions to analyze data efficiently. With services like AWS Athena, and AWS Glue, you can turn raw data into actionable intelligence. The AWS Cloud makes data analytics accessible, allowing you to focus on uncovering valuable insights without the hassle of managing complex infrastructure.

Athena

Key Topic

When I first tried the AWS *Athena* service, I thought it was pure magic. Athena is a serverless, interactive query service that makes it possible to analyze data residing in AWS S3 buckets using standard SQL expressions. With Athena, you don't need complex data transformation or loading processes. You dump the data into S3, and you are ready to directly query the data in its raw, native format.

Athena uses Trino and Presto, which are open-source distributed SQL query engines that enable you to execute SQL queries across your data stored in S3. Athena supports various data formats, including Avro, Parquet, ORC, JSON, and CSV, ensuring compatibility with a wide range of data structures. In addition, Athena integrates with the AWS Glue Data Catalog (discussed next) to streamline the metadata management process and enhance query efficiency.

Glue

The AWS *Glue* service provides ETL (extract, transform, and load) services for your data analytics. An ETL system in data analytics is like an automated data organizer that collects information from different places, cleans it up, and arranges it neatly

so that your analysts can easily make sense of it. It's basically the behind-the-scenes work that ensures your data is ready and polished for analysis.

The Glue Data Catalog acts as a central repository for metadata about your data sources, transformations, and targets. AWS Glue crawlers automatically scan and catalog data in various formats across different storage systems, creating a searchable and organized metadata store.

The ETL process is handled by Glue Jobs, which allows you to define and execute Python or Scala code for data transformation. Glue provides a serverless execution environment and allows you to scale your ETL jobs based on demand without managing the underlying infrastructure.

Glue features tight integration with other AWS services and supports a variety of potential data sources and destinations, including S3, Redshift, and RDS.

QuickSight

AWS *QuickSight* is a business intelligence service that makes it easy to visualize and explore your data. It allows you to create interactive dashboards and reports, providing insights from various data sources with just a few clicks.

QuickSight is designed to be user friendly, enabling both technical and nontechnical users to derive meaningful insights from their data through intuitive and customizable visualizations.

AWS QuickSight offers several key features that make it a powerful and user-friendly business intelligence service:

- **Easy data integration:** QuickSight seamlessly connects to various data sources, including AWS services, databases, and third-party applications, making it convenient to analyze data from different platforms.
- **Intuitive visualizations:** QuickSight provides a wide range of customizable and interactive visualizations, such as charts, graphs, and maps, to allow users to represent data in ways that best communicate insights.
- **Insights:** QuickSight's Auto Insights feature uses machine learning to automatically discover hidden trends, patterns, and anomalies in data, saving users time in the analysis process.
- **Smart recommendations:** QuickSight offers intelligent recommendations for the most suitable visualizations based on the type of data and the analysis performed, enhancing the user experience and aiding in data exploration.
- **SPICE:** QuickSight uses the Super-fast, Parallel, In-memory Calculation Engine (SPICE), which provides high-performance data processing for quick and responsive analytics, even with large datasets.

- **Ad hoc analysis:** Users can perform ad hoc analysis by dragging and dropping fields to create new visualizations on the fly, enabling quick exploration and understanding of data.
- **Dashboard storytelling:** QuickSight supports the creation of interactive dashboards and stories that allow users to present and share insights in a narrative format and enhance the communication of data-driven stories.

Kinesis

Key Topic

AWS *Kinesis* is a fully managed platform designed for real-time processing of streaming data at scale. It enables an organization to ingest, process, and analyze large volumes of real-time data from diverse sources, such as Internet of Things (IoT) devices, applications, and logs. Figure 17-3 shows AWS Kinesis in the AWS Management Console.

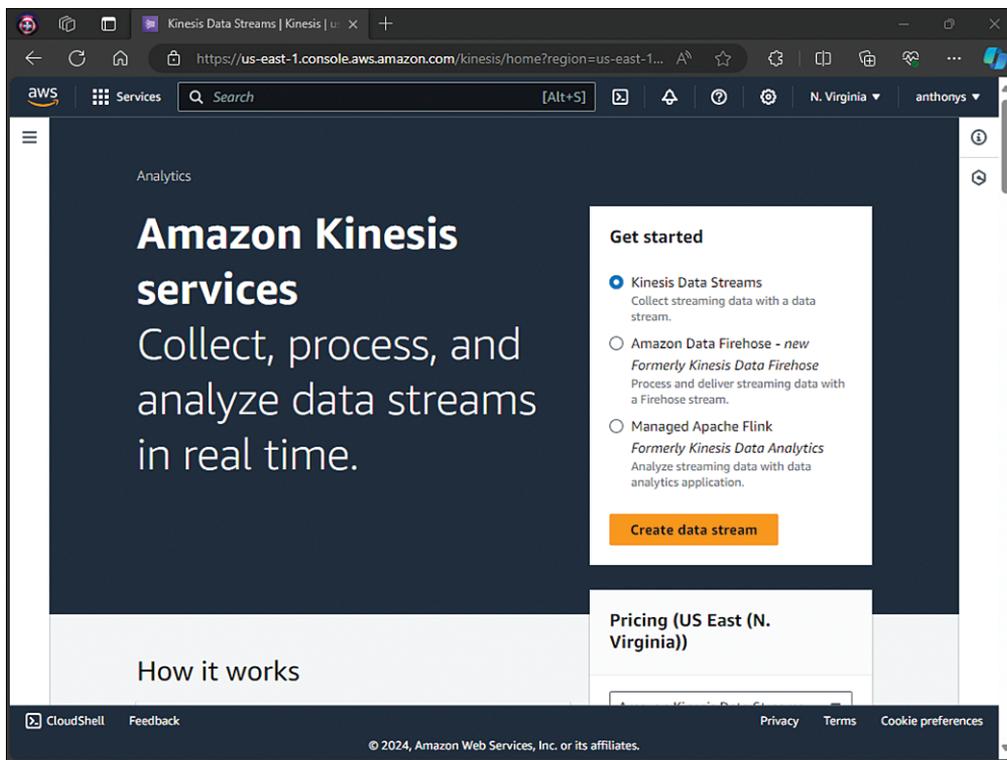


Figure 17-3 AWS Kinesis

Kinesis offers a suite of services that cater to specific aspects of streaming data workflows:

- **Kinesis Data Streams:** This service allows you to collect and process real-time data streams. It enables you to scale the number of streaming data shards based on the volume of data, ensuring efficient handling of varying workloads. With Data Streams, developers can build applications that rapidly respond to changing data and extract valuable insights in real time.
- **Kinesis Data Firehose:** This service simplifies the process of loading streaming data into other AWS services or external destinations and eliminates the need for manual intervention. It automates data delivery, transformation, and compression, streamlining the data pipeline and reducing management overhead.
- **Kinesis Data Analytics:** This service facilitates the real-time analysis of streaming data. It enables you to run SQL queries on streaming data, extract meaningful information, and derive insights on the fly. Kinesis Data Analytics enables an organization to gain actionable intelligence from its streaming data in order to make informed decisions and drive innovation.

As you can see, AWS Kinesis is a comprehensive and scalable solution for managing the entire lifecycle of your streaming data, from ingestion and processing to analysis and delivery.

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 22, “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 17-2 lists these key topics and the page number on which each is found.



Table 17-2 Key Topics for Chapter 17

Key Topic Element	Description	Page Number
List	SageMaker features	214
Overview	Lex	215
Overview	Athena	217
Overview	Kinesis	219

Define Key Terms

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

SageMaker, Lex, Kendra, Athena, Glue, QuickSight, Kinesis

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. Name and briefly describe the AWS AI/ML service that is powered by the same technology as Amazon Alexa.
2. Name and briefly describe the AWS technology that aims to manage your data streaming lifecycle from ingestion to analysis.



This chapter covers the following subjects:

- **Business Application Services:** This section of the chapter describes several services that provide key business needs, like email and customer service. It also covers AWS tools that foster integration between services.
- **Customer Engagement Services:** In this section of the chapter, you will learn about several different services that aim to improve the AWS customer experience.
- **Developer Services:** AWS has many tools and services designed to thrill your developers. In this section of the chapter, you will learn about many important developer services.
- **End-User Compute Services:** In this section of the chapter, you will learn about methods of making applications and even entire desktops available via remote access.
- **IoT Services:** IoT is a growing trend in modern compute. In this section of the chapter, you'll learn about two fundamental IoT services of AWS.

Index

A

- accessibility options, IAM (Identity and Access Management), 117
- Activate for Startups, 228, 285
- agility, 30–33, 285
- AI (artificial intelligence), 214
- AI/ML services
 - Kendra, 216–217
 - Lex, 215–216
 - SageMaker, 214–215
- align phase, cloud transformation journey, 59
- Amazon Connect, 226
- Amazon GuardDuty, 107, 285
- Amazon Inspector, 106, 285
- Amplify, 234, 285
- AMS (AWS Managed Services), 229
- anycast IP addressing, 159
- API (application programming interface), 147, 285
 - automation, 142
 - Health, 292
- API Gateway, 14, 285
- AppConfig, 230, 285
- AppStream 2.0, 235, 285
- AppSync, 234, 285
- Artifact, 286
- Athena, 217, 286
- Aurora, 180–181, 286
- authentication, multifactor, 115, 121
- Auto Scaling, 29, 46–47, 70, 286
- automation, 42, 45, 46, 47, 70–71, 142, 286
 - API, 142
 - CloudFormation, 17
 - CodeDeploy, 17
 - OpsWorks, 17
 - versus orchestration, 143
 - script, 142
- availability, 286
- Availability Zones, 156
- AWS. *See also* service/s
 - Artifact, 109
 - Audit Manager, 110, 286
 - Auditor Learning Path, 286
 - Aurora, 180–181
 - automation, 17, 42, 142
 - API, 142
 - script, 142
 - AZ (availability zone), 27
 - Backup, 286
 - benefits of using
 - agility, 30–33
 - automation, 70–71
 - economic, 25
 - elasticity, 29–30
 - global infrastructure, 26–28
 - HA (high availability), 29
 - managed services, 71–72
 - Billing and Cost Management, 257
 - Billing Conductor, 259
 - Budgets, 258
 - Cost Allocation Tags, 260
 - Cost and Usage Reports, 259
 - Cost Explorer, 258–259
 - Pricing Calculator, 259
 - CAF (Cloud Adoption Framework), 55–56
 - CLI (command-line interface), 47, 146–147
 - Cloud Adoption Framework, 59
 - cloud transformation journey, 58–59
 - perspectives, 57
 - cloud transformation value chain, 55–56
 - CloudFormation, 17
 - CloudFront, 158–159
 - CloudTrail, 18
 - CodeDeploy, 17, 143–144
 - compliance support, 105
 - compute service, 8
 - EC2 (Elastic Compute Cloud), 8–9, 167–170
 - ECS (Elastic Container Service), 10–11
 - Elastic Beanstalk, 10
 - Lambda, 8–9
 - Config, 110
 - connectivity options, 148–149
 - container management
 - ECS (Elastic Container Service), 170–171
 - EKS (Elastic Kubernetes Service), 171–172
 - cost dashboard, 25–26

- database service
 - DynamoDB, 14
 - ElasticCache, 15
 - RDS (Relational Database Service), 14–15
 - Redshift, 15
 - deployment models, 147–148
 - Direct Connect, 148, 159–160
 - DMS (Database Migration Service), 59–60
 - documentation. *See* documentation
 - Edge Location, 27
 - experimentation, 31, 47
 - Fargate, 171
 - foundational capabilities, 56
 - Free Tier account
 - building a web server with, 85–91
 - components, 77–79
 - creating, 82–85
 - services, 79–82
 - Global Accelerator, 159
 - global infrastructure, 31, 286
 - Availability Zones, 156
 - Edge Location, 156
 - Local Zones, 157
 - Regions, 154–156
 - Wavelength Zones, 157–158
 - IAM Identity Center, 122
 - infrastructure, 105
 - innovation, 105
 - IQ, 229
 - IT controls, 97
 - Knowledge Center, 132, 286
 - Lambda, 47, 172–173
 - managed services, 50
 - Management Console, 85, 146
 - Marketplace, 106, 135, 287
 - NACL (network access control list), 130–131
 - network service, 12
 - API Gateway, 14
 - CloudFront, 13–14
 - Direct Connect, 14
 - Route 53, 13
 - VPC (Virtual Private Cloud), 12–13
 - OpsWorks, 17, 146
 - orchestration, 143–144
 - Organizations, 260–262
 - Partner Network, 287
 - pay-as-you-go pricing, 25–26, 105
 - Professional Services, 287
 - Regions, 26–28
 - root account, 118
 - Secrets Manager, 122, 287
 - Security Blog, 133, 287
 - Security Center, 132–133, 287
 - security groups, 129–130
 - Security Hub, 107, 287
 - Service Catalog, 17–18
 - shared responsibility model, 96–97, 105–106, 287
 - AWS responsibilities, 97
 - customer responsibilities, 98–100, 109
 - IT controls, 97
 - Shield, 108, 287
 - Snowball, 61–63
 - Support
 - goals, 274–275
 - plans, 276–277
 - Systems Manager, 18, 122, 287
 - technical resources, 272–273
 - Trusted Advisor, 18, 133–135
 - Well-Architected Framework, 41, 287. *See also*
 - Well-Architected Framework
 - design recommendations, 41–42
 - goals, 41
 - pillars, 41
 - Well-Architected Tool, 42
 - Whitepapers & Guides, 271
 - AZ (availability zone), 27, 286
- ## B
- backup and recovery. *See also* storage service
 - AWS Backup, 207
 - testing, 46
 - basic support plan, 288
 - benefits of using AWS
 - agility, 30–33
 - automation, 70–71
 - economic, 25
 - elasticity, 29–30
 - global infrastructure, 26–28
 - HA (high availability), 29
 - managed services, 71–72
 - Billing Conductor, 259, 288
 - Budgets, 258, 288
 - business application services
 - Amazon Connect, 226
 - EventBridge, 227
 - SES (Simple Email Service), 227
 - SNS (Simple Notification Service), 227
 - SQS (Simple Queue Service), 228
 - business perspective, 57
 - Business Support Plan, 288
- ## C
- CAF (Cloud Adoption Framework), 55–56, 288
 - capacity, estimation, 46–47
 - CapEx (capital expenditures), 25, 31, 67, 288
 - CDN (content delivery network), 47. *See also*
 - CloudFront
 - CFM (cloud financial management), 48, 288
 - CIA (confidentiality, integrity, and availability), 57, 105

- CLF-C02 exam
 - exam information, 279–281
 - getting ready, 281–282
 - suggested plan for final review/study, 282–283
 - updates, 313–314
 - CLI (command-line interface), 47, 146–147
 - cloud. *See also* AWS
 - community, 7
 - connectivity options, 148–149
 - definition, 5–6
 - on-demand self service, 5
 - deployment models, 7–8, 147–148
 - economics, 67
 - CapEx (capital expenditures), 67
 - costs associated with on-premises environments, 69–70
 - OpEx (operating expenses), 67
 - pay-as-you-go pricing, 67–68
 - hybrid, 7–8
 - IaaS (infrastructure as a service), 7
 - metering, 6
 - orchestration, 143–144
 - PaaS (platform as a service), 6–7
 - on-premises, 147
 - private, 7
 - public, 7
 - SaaS (software as a service), 6
 - transformation value chain, 55–56
 - workload, minimizing downstream impact, 50
 - Cloud Adoption Framework
 - cloud transformation journey, 58–59
 - perspectives, 57
 - Cloud9, 230, 288
 - CloudFormation, 17, 145, 288
 - CloudFront, 13–14, 47, 158–159, 192–194, 288
 - CloudShell, 230–231, 288
 - CloudTrail, 18, 109, 116, 288
 - CloudWatch, 18–19, 109, 145, 288
 - cluster, ECS (Elastic Container Service), 171
 - code, 8, 31, 44
 - CodeArtifact, 231–232, 289
 - CodeBuild, 232, 289
 - CodeCommit, 232, 289
 - CodeDeploy, 17, 143–144, 232, 289
 - CodePipeline, 233, 289
 - CodeStar, 233, 289
 - command, sudo, 88–90
 - community cloud, 7, 289
 - compliance, 289
 - PCI DSS, 116
 - security, 105, 108–110
 - tools, 109–110
 - compute service, 8. *See also* serverless compute
 - EC2 (Elastic Compute Cloud), 8–9, 167
 - benefits, 167–168
 - instance types, 168–169
 - pricing models, 169–170
 - ECS (Elastic Container Service), 10–11
 - Elastic Beanstalk, 10
 - end-user
 - AppStream 2.0, 235
 - AWS WorkSpaces, 235–236
 - Workspaces Web, 236
 - Lambda, 8–9
 - pricing
 - Dedicated Hosts, 248–249
 - Dedicated Instance, 249–250
 - On-Demand Capacity Reservation, 250–252
 - on-demand instance, 245
 - reserved instance, 246
 - savings plan, 246–247
 - Spot Instance, 247
 - confidentiality, 289
 - configuration, template, 17
 - connectivity options, 148–149, 159–160
 - consumption model, 48
 - container management, 10–11, 170
 - ECS (Elastic Container Service), 170–171
 - EKS (Elastic Kubernetes Service), 171–172
 - Cost Allocation Tags, 260, 289
 - Cost and Usage Reports, 259, 289
 - Cost Explorer, 258–259, 289
 - cost optimization pillar, Well-Architected
 - Framework, 48–49, 290
 - creating, Free Tier account, 82–85
 - credentials, IAM (Identity and Access Management), 121
 - customer
 - engagement services
 - Activate for Startups, 228
 - AWS IQ, 229
 - shared responsibility model, 96–97, 109
 - specific controls, 97
- ## D
- dashboard, cost, 25–26
 - data, 45
 - data analytics services, 217
 - Athena, 217
 - Glue, 217–218
 - Kinesis, 219–220
 - QuickSight, 218–219
 - data lake, 11
 - data warehouse, Redshift, 15
 - database migration service, 59–60
 - database service
 - DynamoDB, 14, 181–183
 - ElasticCache, 15, 183–184

- RDS (Relational Database Service), 14–15, 179–181
- Redshift, 15, 184–185
- Dedicated Host pricing, 248–249, 290
- Dedicated Instance pricing, 249–250, 290
- defense in depth, 45
- On-Demand Capacity Reservation pricing, 250–252
- on-demand instance
 - EC2 (Elastic Compute Cloud), 169–170
 - pricing, 245
- on-demand self service, 5
- deployment models, cloud, 7–8, 147–148
- design principles
 - cost optimization pillar, 48–49
 - operational excellence pillar, 44
 - performance efficiency pillar, 47–48
 - reliability pillar, 46–47
 - security pillar, 44–45
 - sustainability pillar, 49–50
- developer services
 - Amplify, 234
 - AppConfig, 230
 - AppSync, 234
 - Cloud9, 230
 - CloudShell, 230–231
 - CodeArtifact, 231–232
 - CodeBuild, 232
 - CodeCommit, 232
 - CodeDeploy, 232
 - CodePipeline, 233
 - CodeStar, 233
 - X-Ray, 233–234
- DevOps, 71, 144
- Direct Connect, 14, 148, 159–160, 290
- DMS (Database Migration Service), 59–60, 290
- DNS (Domain Name Service), Route 53, 13, 192
- Docker, 10–11
- documentation
 - AWS Whitepapers & Guides, 271
 - EC2 (Elastic Compute Cloud), 269–270
 - FAQs, 270–271
 - technical resources, 272–273
- DynamoDB, 14, 181–183, 290

E

- EBS (Elastic Block Store), 12, 203–204, 290
- EC2 (Elastic Compute Cloud), 8–9, 167, 290
 - benefits, 167–168
 - Capacity Blocks for ML pricing plan, 251
 - documentation, 269–270
 - instance types, 168–169
 - pricing models, 169–170
- economies of scale, 290

- ECS (Elastic Container Service), 10–11, 170–171, 290
- Edge Location, 27, 156, 290
- EFS (Elastic File System), 12, 205, 290
- EKS (Elastic Kubernetes Service), 10–11, 171–172, 290
- Elastic Beanstalk, 10, 173–175, 291
- Elastic Load Balancing, 291
- ElastiCache, 15, 183–184, 291
- elasticity, 6, 8, 70, 291
- ELB (Elastic Load Balancing), 29–30
- endpoint
 - gateway, 161–162
 - interface, 161
 - VPC (Virtual Private Cloud), 160
- end-user compute service
 - AppStream 2.0, 235
 - AWS WorkSpaces, 235–236
 - Workspaces Web, 236
- Enterprise Support Plan, 291
- envision phase, cloud transformation journey, 58
- estimation, capacity, 46–47
- EventBridge, 227, 291
- exam. *See* CLF-C02 exam
- experimentation, 31, 47

F

- FAQs, 270–271
- Fargate, 10–11, 171, 291
- federation, 116, 291
- firewall, web application, 130–131
- foundational capabilities, 56
- Free Tier account, 291
 - building a web server with, 85–86, 89
 - EC2 instance, 87–88
 - Launch an Instance page, 86–87
 - shutting down your web server, 90
 - testing the web server, 89–90
- components, 77–79
- creating, 82–85
- FSx, 205–206, 291

G

- “game day” simulation, 42
- gateway endpoint, 161–162, 291
- Glacier, 12, 292
- Global Accelerator, 159, 292
- global infrastructure
 - Availability Zones, 156
 - Edge Location, 156
 - Regions, 154–156
 - Wavelength Zones, 157–158
- Glue, 217–218, 292
- governance perspective, 57

group/s, 292

IAM (Identity and Access Management), 117, 119
security, 129–130

H

HA (high availability), 29, 190, 292
Health API, 292
horizontal scaling, 46
hybrid cloud, 7–8, 148, 292

I

IaaS (infrastructure as a service), 7, 292
IaC (infrastructure as code), 292
IAM (Identity and Access Management), 16, 44–45, 115, 292
accessibility options, 117
best practices
create individual users, 119
credentials, 121
do not share access keys, 121
enable MFA, 121
grant the least privileges possible, 119–120
limited use of root account, 118
review permissions, 120
store root user access keys properly, 119
use AWS-defined policies for permissions, 119
use groups to assign permissions to users, 119
use roles, 121
use strong passwords, 120
features, 115–117
group/s, 117
identity federation, 116
MFA (multifactor authentication), 115
roles, 117
service-to-service access in AWS, 115
user, 117
IAM Identity Center, 122
IGW (Internet gateway), 191
infrastructure. *See also* global infrastructure
AWS, 105
as code, 44
global, 31
as a service, 7
inherited controls, 97
innovation, 32, 105
integrity, 292
interface endpoint, 161, 292
Internet Gateway, 293
IoT service, 236–237
IoT Core, 237
IoT Greengrass, 238
IP address, anycast, 159
IT controls, AWS, 97

J-K

Kendra, 216–217, 293
Kinesis, 219–220, 293
Knowledge Center, 132, 293
KPI (key performance indicator), 49
Kubernetes, 10–11

L

Lambda, 8–9, 47, 172–173, 293
launch phase, cloud transformation journey, 59
Lex, 215–216, 293
licensing, software, 69
lifecycle, S3 (Simple Storage Service), 202
lifecycle management, 71
Linux, sudo command, 88–90
Local Zone, 157, 293
logs and logging, 45, 145

M

managed service, 50, 71–72, 146, 293
management tools
Service Catalog, 17–18
Systems Manager, 18, 145
Trusted Advisor, 18
Marketplace. *See* AWS, Marketplace
mechanical sympathy, 48, 293
Memcached, 184
memory caching, ElasticCache, 184
metering, cloud service, 6
MFA (multifactor authentication), 115, 121, 293
migration to AWS. *See also* Cloud Adoption Framework
cloud transformation journey, 58–59
DMS (Database Migration Service), 59–60
Snowball, 61–63
ML (machine learning), 214
monitoring, 18–20, 45, 121–122, 145

N

NACL (network access control list), 17, 130–131, 190, 191, 294
NAT gateway, 191, 294
network service, 12
API Gateway, 14
CloudFront, 13–14, 192–194
Direct Connect, 14
Route 53, 13, 192
VPC (Virtual Private Cloud), 12–13, 190–191
NIST (National Institute for Standards and Technology), definition of the “cloud”, 5–6

O

operational excellence pillar, 43–44, 294
 operations perspective, 57
 OpEx (operating expenses), 25, 67, 294
 OpsWorks, 17, 146, 294
 orchestration, 143–144, 171, 294
 Organizations, 294

P

PaaS (platform as a service), 6–7, 295
 passwords, strong, 120
 pay-as-you-go pricing, 25–26, 67–68, 105
 PCI DSS compliance, 116
 peering, VPC (Virtual Private Cloud), 162
 penetration test, 109
 people perspective, 57
 performance efficiency pillar, Well-Architected Framework, 47–48, 295
 permissions, IAM (Identity and Access Management), 120
 perspectives, Cloud Adoption Framework, 57
 policy, 119

- conditions, 121
- password, 120

 on-premises environment, 69–70, 147
 prescriptive guidance, 295
 pricing. *See also* AWS, Billing and Cost Management

- compute
 - Dedicated Hosts, 248–249
 - Dedicated Instance, 249–250
 - On-Demand Capacity Reservation, 250–252
 - on-demand instance, 245
 - reserved instance, 246
 - savings plan, 246–247
 - Spot Instance, 247
- EC2 (Elastic Compute Cloud), 169–170, 251
 - general practices, 244–245
 - pay-as-you-go, 67–68, 105
 - variables, 245

 Pricing Calculator, 259, 295
 private cloud, 7, 295
 provisioning, CloudFormation, 145
 public cloud, 7, 295
 public Internet, 148

Q-R

QuickSight, 218–219, 295
 RDS (Relational Database Service), 14–15, 59, 70, 179–180, 295
 recovery. *See* backup and recovery
 Redis, 184
 Redshift, 15, 184–185, 295

region, 26–28, 154–156, 296
 reliability pillar, Well-Architected Framework, 46–47, 296
 reports, billing, 259
 re:Post, 295
 reserved instance pricing, 246, 296
 resource

- elasticity, 6
- pooling, 5
- provisioning, 145

 ROI (return on investment), 49
 role, 117, 121, 296
 root account, 118
 Route 53, 13, 192, 296
 route table, 191

S

S3 (Simple Storage Service), 11, 199–201, 296

- lifecycles, 202
- storage classes, 201–202

 SaaS (software as a service), 6, 296
 SageMaker, 214–215, 296
 savings plan, EC2 (Elastic Compute Cloud), 170
 Savings Plan pricing, 246–247, 296
 scale phase, cloud transformation journey, 59
 scaling, horizontal, 46
 script, automation, 47, 142
 SDK (software development kit), 147
 Secrets Manager, 122
 security, 296. *See also* IAM (Identity and Access Management)

- CIA (confidentiality, integrity, and availability), 105
- in the cloud, 96
- of the cloud, 96
- compliance programs, 108–110
- compliance support, 105
- group, 16, 129–130, 190, 297
- perspective, 57
- pillar, Well-Architected Framework, 44–45
- service
 - IAM (Identity and Access Management), 16
 - NACL (network access control list), 17
- shared responsibility model, 96–97
 - AWS responsibilities, 97
 - customer responsibilities, 98–100
 - IT controls, 97
 - tools, 106–108
 - WAF (Web Application Firewall), 130–131

 Security Blog, 133
 Security Center, 132–133
 serverless compute, 8, 47, 172

- Elastic Beanstalk, 173–175
- Lambda, 166–173

 Service Catalog, 17–18, 297

- service/s. *See also* DMS (Database Migration Service)
- AI/ML
 - Kendra, 216–217
 - Lex, 215–216
 - SageMaker, 214–215
- AWS Artifact, 109
- AWS Organizations, 260–262
- Billing and Cost Management, 257
 - Billing Conductor, 259
 - Budgets, 258
 - Cost Allocation Tags, 260
 - Cost and Usage Reports, 259
 - Cost Explorer, 258–259
 - Pricing Calculator, 259
- business application
 - Amazon Connect, 226
 - EventBridge, 227
 - SES (Simple Email Service), 227
 - SNS (Simple Notification Service), 227
 - SQS (Simple Queue Service), 228
- compute, 8. *See also* compute service
 - EC2 (Elastic Compute Cloud), 8–9, 167–170
 - ECS (Elastic Container Service), 10–11
 - Elastic Beanstalk, 10
 - Lambda, 8–9
- customer engagement
 - Activate for Startups, 228
 - AWS IQ, 229
- data analytics, 217
 - Athena, 217
 - Glue, 217–218
 - Kinesis, 219–220
 - QuickSight, 218–219
- database. *See also* database service
 - DynamoDB, 14, 181–183
 - ElasticCache, 15, 183–184
 - RDS (Relational Database Service), 14–15, 179–180
 - Redshift, 15, 184–185
- developer
 - Amplify, 234
 - AppConfig, 230
 - AppSync, 234
 - Cloud9, 230
 - CloudShell, 230–231
 - CodeArtifact, 231–232
 - CodeBuild, 232
 - CodeCommit, 232
 - CodeDeploy, 232
 - CodePipeline, 233
 - CodeStar, 233
 - X-Ray, 233–234
- end-user compute
 - AppStream 2.0, 235
 - AWS WorkSpaces, 235–236
 - Workspaces Web, 236
- Free Tier account, 79–82
- infrastructure as a, 7
- IoT, 236–237
 - IoT Core, 237
 - IoT Greengrass, 238
- managed, 50, 71–72, 146, 229
- network, 12
 - API Gateway, 14
 - CloudFront, 13–14, 192–194
 - Direct Connect, 14
 - Route 53, 13, 192
 - VPC (Virtual Private Cloud), 12–13, 190–191
- platform as a, 6–7
- security
 - IAM (Identity and Access Management), 16
 - NACL (network access control list), 17
 - security groups, 16
- shared responsibility model, 99
- software as a, 6
- storage, 11
 - AWS Backup, 207
 - EBS (Elastic Block Store), 12, 203–204
 - EFS (Elastic File System), 12, 205
 - FSx, 205–206
 - Glacier, 12
 - S3 (Simple Storage Service), 11, 199–203
 - Storage Gateway, 207
 - WAF (Web Application Firewall), 130–131
- SES (Simple Email Service), 227, 297
- shared controls, 97
- shared responsibility model, 96–97, 105–106
 - AWS responsibilities, 97
 - customer responsibilities, 98–100, 109
 - IT controls, 97
- Simple Monthly Calendar, 297
- Snowball, 61–63, 297
- SNS (Simple Notification Service), 227, 297
- software
 - licensing, 69
 - as a service, 6
- spot instance
 - EC2 (Elastic Compute Cloud), 170
 - pricing, 247, 297
- SQS (Simple Queue Service), 228, 297
- Storage Gateway, 206–207, 297
- storage service, 11
 - AWS Backup, 207
 - EBS (Elastic Block Store), 12, 203–204
 - EFS (Elastic File System), 12, 205
 - FSx, 205–206
 - Glacier, 12
 - S3 (Simple Storage Service), 11, 199–201

- lifecycles, 202
 - storage classes, 201–202
 - Storage Gateway, 207
- strong passwords, 120
- subnet, 190, 297
- sudo command, 88–90
- sustainability pillar, Well-Architected Framework, 49–51, 297
- Systems Manager, 18, 122, 145, 287, 297

T

- technical resources, 272–273
- technological obsolescence, 67
- template, configuration, 17, 144
- testing, 42, 44
 - penetration, 109
 - recovery, 46
 - web server, 89–90
- tool/s. *See also* service/s
 - Auto Scaling, 29
 - compliance management, 109–110
 - ELB (Elastic Load Balancing), 29–30
 - management
 - Service Catalog, 17–18
 - Systems Manager, 18, 145
 - Trusted Advisor, 18
 - monitoring, 18–20
 - CloudWatch, 145
 - orchestration, 143–144
 - provisioning, CloudFormation, 145
 - security, 106–108
 - Well-Architected, 42
- Trust and Safety team, 298
- Trusted Advisor, 18, 133–135

U

- updates, CLF-C02 exam, 313–314
- user account

- automating creation of, 47
- IAM (Identity and Access Management), 117

V

- value chain, cloud transformation, 55–56
- variable cost model, 67–68
- VM (virtual machine), horizontal scaling, 46
- VPC (Virtual Private Cloud), 12–13, 190–191
 - endpoint, 160
 - peering, 162
- VPN (virtual private network), 148

W

- WAF (Web Application Firewall), 130–131, 298
- Wavelength Zone, 157–158, 298
- web server
 - building with your Free Tier account, 85–86, 89
 - EC2 instance, 87–88
 - Launch an Instance page, 86–87
 - shutting down, 90
 - testing, 89–90
- Well-Architected Framework, 41, 287
 - cost optimization pillar, 48–49
 - design recommendations, 41–42
 - goals, 41
 - operational excellence pillar, 43–44
 - performance efficiency pillar, 47–48
 - pillars, 41
 - reliability pillar, 46–47
 - security pillar, 44–45
 - sustainability pillar, 49–51
- Whitepapers & Guides, 271
- workload, minimize downstream impact, 50
- Workspaces Web, 236, 298

X-Y-Z

- X-Ray, 233–234, 298