

Table of Contents

About the Author xi

About the Technical Reviewer xiii

Acknowledgmentsxv

Introductionxvii

Chapter 1: Installing Python 1

 1.1 OS Packages 1

 1.2 Using pyenv..... 2

 1.3 Building Python from Source 4

 1.4 PyPy 5

 1.5 Anaconda 5

 1.6 Summary..... 6

Chapter 2: Packaging 7

 2.1 Virtual Environments 7

 2.2 pip 9

 2.3 Setup and Wheels 12

 2.4 Binary Wheels 16

 2.5 manylinux Wheels..... 18

 2.5.1 Self-Contained Wheels 19

 2.5.2 Portable Wheels..... 19

 2.5.3 manylinux Containers 20

 2.5.4 Installing manylinux Wheels 20

 2.6 tox 21

 2.6.1 One Environment 22

 2.6.2 Multiple Environments..... 23

 2.6.3 Multiple Differently Configured Environments..... 23

2.7 Pip Tools	26
2.8 Poetry	28
2.8.1 Installing	28
2.8.2 Creating	29
2.8.3 Dependencies	31
2.8.4 Developing	32
2.8.5 Building	32
2.9 Pipenv	33
2.10 DevPI	34
2.11 pex and shiv	37
2.11.1 pex	38
2.11.2 shiv	40
2.12 Summary	40
Chapter 3: Interactive Usage	41
3.1 Native Console	42
3.2 The Code Module	43
3.3 ptpython	44
3.4 IPython	45
3.5 JupyterLab	47
3.6 Summary	51
Chapter 4: OS Automation	53
4.1 Files	53
4.2 Processes	58
4.3 Networking	61
4.4 Summary	65
Chapter 5: Testing	67
5.1 Unit Testing	67
5.2 Mocks, Stubs, and Fakes	72
5.3 Testing Files	73

5.3.1 Testing with Subdirectories	7
5.3.2 Accelerating Tests with eatmydata	7
5.3.3 Accelerating Tests with tmpfs	8
5.4 Testing Processes	8
5.5 Testing Networking	9
5.6 Testing HTTP Clients	9
Chapter 6: Text Manipulation	9
6.1 Bytes, Strings, and Unicode	9
6.2 Strings	9
6.3 Regular Expressions	10
6.4 JSON	10
6.5 CSV	10
6.6 Summary	11
Chapter 7: HTTPX	11
7.1 Clients	11
7.2 REST	11
7.3 Security	11
7.4 Authentication	11
7.5 Async client	12
7.6 Summary	12
Chapter 8: Cryptography	12
8.1 Fernet	12
8.2 PyNaCl	12
8.3 Passlib	13
8.4 TLS Certificates	13
8.5 Summary	13

Chapter 9: Paramiko	139
1 SSH Security	140
2 Client Keys	141
3 Host Identity	143
4 Connecting	143
5 Running Commands	145
6 Remote Files	146
9.6.1 Metadata Management	146
9.6.2 Upload	147
9.6.3 Download	148
7 Summary	148
Chapter 10: SaltStack	149
0.1 Salt Basics	149
0.2 Salt Concepts	154
0.3 Salt Formats	158
0.4 Salt Extensions	161
10.4.1 States	161
10.4.2 Execution	163
10.4.3 Utility	164
10.4.4 Extra Third-Party Dependencies	165
0.5 Summary	166
Chapter 11: Ansible	167
1 Ansible Basics	167
2 Ansible Concepts	170
3 Ansible Extensions	172
4 Summary	174

Chapter 12: Containers	17
12.1 Choosing a Base Image	17
12.1.1 GNU C Library Support	17
12.1.2 Long-Term Support	17
12.1.3 Avoiding Unexpected Changes	17
12.2 Installing the Python Interpreter	17
12.2.1 conda	17
12.2.2 Third-Party Repositories	17
12.2.3 Building Python in the Container	17
12.2.4 Python Base Image	17
12.3 Installing Python Applications	17
12.4 Optimizing Container Build Cache	182
12.5 Rebuilding Containers	184
12.6 Container Security	185
12.7 Summary	186
Chapter 13: Amazon Web Services	187
13.1 Security	188
13.1.1 Configuring Access Keys	188
13.1.2 Creating Short-Term Tokens	189
13.2 Elastic Computing Cloud (EC2)	191
13.2.1 Regions	191
13.2.2 Amazon Machine Images	191
13.2.3 SSH Keys	192
13.2.4 Bringing up Machines	193
13.2.5 Securely Logging In	194
13.2.6 Building Images	195
13.3 Simple Storage Service (S3)	196
13.3.1 Managing Buckets	197
13.4 Summary	200

TABLE OF CONTENTS

Chapter 14: Kubernetes	201
14.1 Pods	201
14.1.1 Liveness and Readiness	201
14.1.2 Configuration	205
14.1.3 Python Sidecars	211
14.2 REST API	212
14.3 Operators	213
14.3.1 Permissions	214
14.3.2 Custom Types	214
14.3.3 Retrieval	217
14.3.4 Goal State	219
14.3.5 Comparison	220
14.3.6 Reconciliation	222
14.3.7 Combining the Pieces	223
14.4 Summary	224
Chapter 15: Terraform	225
15.1 JSON Syntax	226
15.2 Generating Terraform Configurations	228
15.3 Summary	230
Index	231