

Eric Chou

Foreword by:

Rich Groves

Director of R&D at A10 Networks

Mastering Python Networking

Advanced networking with Python



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Mastering Python Networking

This book begins with a review of the TCP/IP protocol suite and a refresher of the core elements of the Python language. Next, you will start using Python and supported libraries to automate network tasks from the current major network vendors. We will look at automating traditional network devices based on the command-line interface, as well as newer devices with API support, with hands-on labs. We will then learn the concepts and practical use cases of the Ansible framework in order to achieve your network goals.

We will then move on to using Python for DevOps, starting with using open source tools to test, secure, and analyze your network. Then, we will focus on network monitoring and visualization. We will learn how to retrieve network information using a polling mechanism, flow-based monitoring, and visualizing the data programmatically. Next, we will learn how to use the Python framework to build your own customized network web services.

In the last module, you will use Python for SDN, where you will use a Python-based controller with OpenFlow in a hands-on lab to learn its concepts and applications. We will compare and contrast OpenFlow, OpenStack, OpenDaylight, and NFV. Finally, you will use everything you've learned in the book to construct a migration plan to go from a legacy to a scalable SDN-based network.

Things you will learn:

- Review all the fundamentals of Python and the TCP/IP suite
- Use Python to execute commands when the device does not support the API or programmatic interaction with the device
- Implement automation techniques by integrating Python with Cisco, Juniper, and Arista eAPI
- Integrate Ansible using Python to control Cisco, Juniper, and Arista networks
- Achieve network security with Python
- Build Flask-based web-service APIs with Python
- Construct a Python-based migration plan from a legacy to scalable SDN-based network.

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BIRMINGHAM - MUMBAI

Mastering Python Networking

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Foreword

Over my 20 years in computer networking, I have been lucky to work on a handful of popular, large-scale systems. If you had asked me in 2001, I would have told you my favorite project was AOL Instant Messenger. To scale to the size that we did in the early days, we had to create our own APIs for provisioning, security, and control over all aspects of the service--all aspects save the physical network, that is. This was a pain, but we lived with it as compute and storage needs were dynamic while network needs stayed reasonably static. In 2010, while working on what would become Microsoft Azure, it was clear that usage patterns have changed. Compute and storage have now been disaggregated, so it is more important than ever to have non-blocking connectivity and the ability to utilize any overlay technology required by the workload.

Within the last few years, we have seen quite a shift in thinking, from network device vendors adding APIs and Python scripting environments to their devices in the hope of them being driven programmatically. In this book, Eric Chou helps us gain a thorough understanding of interfacing with networks and network devices using Python, from interacting with a single device to large numbers of devices with complex automation using Ansible. Then, he takes us to my favorite topics of network monitoring and security, as well as an array of OpenFlow projects controlled through the Python-based Ryu SDN controller.

Eric and I worked together at Microsoft, where we built *Microsoft DEMon*, an Openflow-based network packet broker. Eric's deep understanding of Python and his love for automation show in every project we work on together. I have had the pleasure to see many of Eric's examples from this book used in real life and proven in actual projects. In *Mastering Python Networking*, Eric is adding some theory and a set of practical examples taken from real problems that he has solved.

Rich Groves

Director of R&D at A10 Networks

About the Author

Eric Chou is a seasoned technologist with over 16 years of experience. He has managed some of the largest networks in the industry while working at Amazon and Microsoft and is passionate about network automation and Python. He shares this deep interest in these fields through his teachings as a Python instructor, blogger, and active contributor to some of the popular Python open source projects. Currently, Eric holds two patents in IP Telephony and is a principal engineer at A10 Networks with a focus on product research and development in the field of security.

I would like to thank members of the Packt Publishing team--Meeta Rajani, Prashant Chaudhari, and Sweeny Dias--and my technical reviewer, Allen Su, for making my dream of writing this book a reality. Thank you for the opportunity to work with you and for your tireless effort and support.

I would also like to thank the open source and Python community members for generously sharing their knowledge and code with the public. Without their contributions, many of the projects referenced in this book would not have been possible.

I'm also grateful for the people who have helped me in my career and shaped my professional path. I'd like to thank all who have been part of my professional growth, especially my mentors at each stage of my career: Hup Chen, Monika Machado, and Rich Groves. Thank you for inspiring me to be the best I can be.

Finally, I would like to thank my wife and my two beautiful daughters for their support. They provided me the freedom and understanding I needed to focus on and complete the book.

About the Reviewer

Allen Su, CCIE no. 13871 (Routing and Switching, Service Provider, Security), is currently a senior network and cloud security engineer at Microsoft, where he is driving innovative design and engineering of secure edge services and automation capabilities.

Allen is a networking industry veteran, having spent the last 15 years in various engineering and architectural roles. Prior to Microsoft, Allen was at Arista Networks, where he worked with and helped some marquee cloud providers build their cloud-scale networks and define and develop their network automation framework and strategy. Before his tenure at Arista, Allen spent a significant portion of his career at Cisco, learning the intricacies of networking, which he leveraged to design, architect, and build some of the world's largest networks.

I would like to thank Eric Chou for giving me the opportunity and privilege to review his hard work. It was a great learning journey for me personally, and I think I've gained way more from this journey than what I could give. Eric is the one who inspired me to begin into the network automation journey five years ago, and he continues to be an inspiration for me in this regard.

I would also like to thank my wife, Cindy, for the support and love she has always given me, no matter what I set out to do. It would have been a lot tougher to review this book without her support and understanding.

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