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# **Computer Networks: A Systems Approach**

*Release Version 6.1*

**Peterson and Davie**

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## PREFACE

It has been nearly ten years since the 5th Edition of *Computer Networks: A Systems Approach* was published. Much has changed in that time, most notably, the explosion of the cloud and smartphone apps onto the scene. In many ways, this is reminiscent of the dramatic affect the Web was having on the Internet when we published the 1st Edition of the book in 1996.

The 6th Edition adapts to the times, but keeps the *Systems Approach* as its north star. In broad strokes, we update and improve this new edition in four main ways:

- We refresh the examples to reflect the current state of the world. This includes deleting anachronisms (e.g., dial-up modem), using popular applications (e.g., Netflix, Spotify) to motivate the problems being addressed, and updating the numbers to represent the state-of-the-art technology (e.g., 10-Gbps Ethernet).
- We connect the dots between the original research that led to the development of technologies like multicast, real-time video streaming, and quality-of-service, and the now-familiar cloud applications like GoToMeeting, Netflix, and Spotify. This is in keeping with our emphasis on the design process and not just the end result, which is especially important today since so much the Internet is primarily available in proprietary commercial services.
- We place the Internet in the broader context of the Cloud, and just as importantly, in the context of the commercial forces that are shaping the Cloud. This has minimal impact on the technical details presented throughout the book, but it is discussed in a new *Perspective* section at the end of each chapter. We hope one side-effect of this discussion is to foster an appreciation for the Internet's continuous evolution, and the opportunity for innovation this represents.
- We distill the important principles of network design in a series of *Key Takeaways* throughout the book. Each takeaway is a concise statement of either a general system design rule or a fundamental networking concept, drawing on the examples presented in the surrounding text. Pedagogically, these takeaways correspond to the high-level *learning objectives* for the book.

More specifically, the 6th Edition includes the following major changes:

- New Perspective Section in Chapter 1 introduces the recurring *Cloudification* theme.
- New Section 2.8 describes the *Access Network*, including Passive Optical Networks (PON) and 5G's Radio Access Networks (RAN).
- Refactored topics across Sections 3.1 (*Switching Basics*) and 3.2 (*Switched Ethernet*), including expanded coverage of VLANs.

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