



Navigating Network Complexity: Next-generation routing with SDN, service virtualization, and service chaining

By Russ White, Jeff (Evgeny) Tantsura

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Design your networks to successfully manage their growing complexity

Network professionals have often been told that today's modern control planes would simplify their networks. The opposite has happened: Technologies like SDN and NFV, although immensely valuable, are exacerbating complexity instead of solving it. *Navigating Network Complexity* is the first comprehensive guide to managing this complexity in both deployment and day-to-day operations.

Russ White and Jeff Tantsura introduce modern complexity theory from the standpoint of the working network engineer, helping you apply it to the practical problems you face every day. Avoiding complex mathematical models, they show how to characterize network complexity, so you can understand it and control it.

The authors examine specific techniques and technologies associated with network control planes, including SDNs, fast reroute, segment routing, service chaining, and cloud computing. They reveal how each of these affects network design and complexity and help you anticipate causes of failure in highly complex systems.

Next, they turn to modern control planes, examining the fundamental operating principles of SDNs, such as OpenFlow and I2RS, network and other service function virtualization, content distribution networks, Layer 2 fabrics, and service chaining solutions. You'll learn how each of these might both resolve and increase complexity in network design and operations and what you can do about it.

Coverage includes:

- Defining complexity, understanding its components, and measuring it
- Mastering a straightforward “state, speed, and surface” model for analyzing complexity
- Controlling complexity in design, deployment, operations, protocols, and programmable networks
- Understanding how complex network systems begin to fail and how to prevent failure
- Recognizing complexity tradeoffs in service virtualization and service chaining
- Managing new challenges of complexity in virtualized and cloud environments
- Learning why constructs such as hierarchical design, aggregation, and protocol layering work and when they work best
- Choosing the right models to contain complexity as your network changes

From start to finish, *Navigating Network Complexity* helps you assess the true impact of new network technologies, so they can capture more value with fewer problems.

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Editorial Review

About the Author

Russ White began his network engineering career installing terminal emulation cards and inverse multiplexers in the United States Air Force. In 1996, he moved to Raleigh, N.C., to join Cisco Systems in the Technical Assistance Center (TAC) routing protocols team. From TAC, Russ moved to the global escalation team, and then into engineering, and finally into sales as a Distinguished Architect. He is currently a network architect working in the area of network complexity and large scale design, a member of the IETF Routing Area Directorate, an active speaker and writer, and active in the Internet Society.

He holds CCIE #2637, CCDE 2007:001, the CCAr, a Masters in Information Technology from Capella University, and a Masters in Christian Ministry from Shepherds Theological Seminary. He lives in Oak Island, N.C., with his wife and two children, and is currently a P.h.D student at Southeastern Baptist Theological Seminary.

Jeff Tantsura started his network engineering career in early 1990s at a small ISP as system/network administrator, later working for bigger ISPs where he was responsible for network design and architecture, vendor selection. Currently Jeff is heading Technology Strategy Routing at Ericsson as well as chairing IETF Routing Working Group. Jeff holds MSc in Computer Science and Systems Analysis from University of Georgia and Executive Certificate of Business Excellence from Haas School of Business, Berkeley.

He also holds CCIE R&S #11416 and Ericsson Certified Expert IP Networking #8.

Jeff lives in Palo Alto, CA, with his wife and youngest child.

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