Network Security

Session 5C
DVR: Solutions to Count to Infinity

Mouli Sankaran

Session 5C: Focus

- Routing Information Protocol
  - RIP Network Diameter
  - RIP v1 and RIPv2
- Comparison of RIPv1 Vs RIPv2 Vs IGRP

Course page **where the course materials will be posted**
as the course progresses:

Routing Information Protocol (RIP)

Routing Information Protocol (RIP)

- The Routing Information Protocol (RIP) is one of the oldest distance-vector routing protocols used in computer networks to facilitate the exchange of routing information between routers.
- There are two versions RIP, RIP version 1 and RIP version 2.
  - RIP v1 and v2 both use **hops** as their distance value.
  - RIPv1 (1988) and RIPv2 (1993)
- Distance Vector networks such as RIP are limited in scope (**diameter**).

RIP: Network Diameter

- RIP is designed to work in small size networks, with the maximum hop count reaches 16, it is declared as unreachable

- RIP protocol was not designed to operate in medium to large internetworks with hundreds of links and routers connecting hundreds or thousands of hosts.

- The maximum network diameter specifies the distance a datagram may travel (for example, the maximum number of hops) before the destination is considered unreachable, causing the datagram to be discarded.

- This maximum distance is measured in hops from transmitter to receiver.

- You can think of the maximum rule as "No two devices can communicate through more than x hops."

RIP: Network Diameter: Explained
(Destination NW, Hop Distance)

- As datagrams traverse the network, routers forward them and increment the hop count by one before passing it on to the next hop router.

- Hop count is an element in the RIP packet
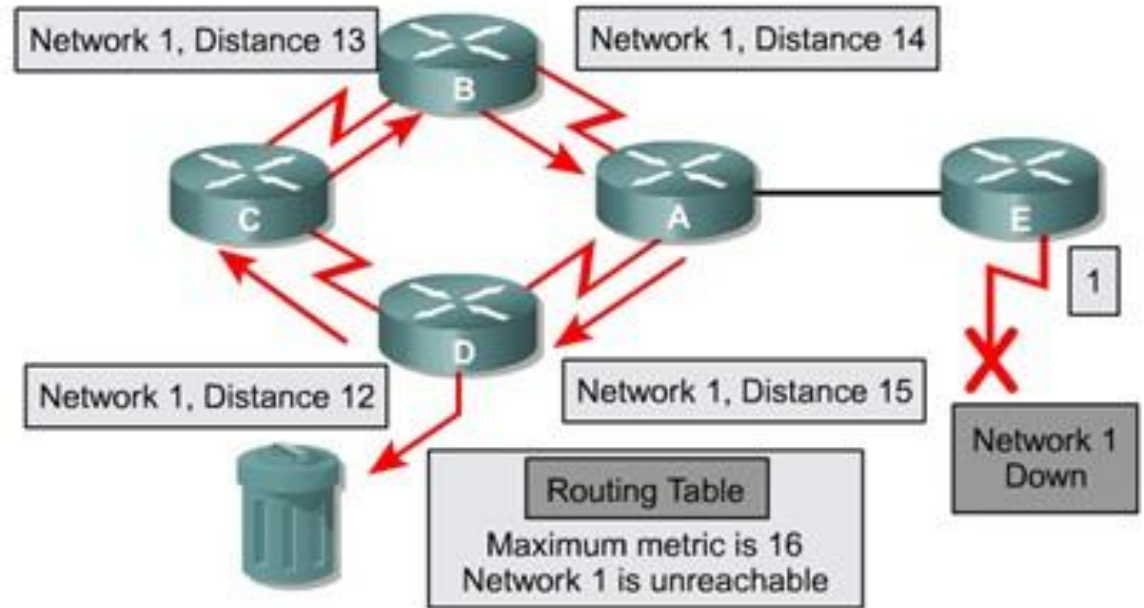
- Using RIP as an example, when a datagram reaches the 15th router, that router will not forward it further, instead it must discard the datagram because a value of 16 or greater is considered too far by RIP.

- The router discarding the datagram generates an ICMP message back to the source indicating that the destination is unreachable.

Max Routing Diameter: As Infinity Distance

- Routers also use this maximum hop count value to maintain their route tables.

- When a network link fails, the router sends news of this failure in its next route update.

- It relays this news by applying a hop count one higher than the maximum (16 for RIP and 256 for IGRP) to the failed link, which indicates the distance to this network as infinity (unreachable).

- Routers receiving this news know to remove this route from their route table

Comparison: RIPv1 Vs RIPv2 Vs IGRP

Characteristic	Routing Protocol		
	RIP v1	RIP v2	IGRP
Route Updates:			
Broadcasts	X		X
Multicasts		X	
Includes entire route table	X	X	X
Periodic timer	30 seconds	30 seconds	90 seconds
Metrics:			
Hops	X	X	
Combined Metrics:			
Bandwidth and Delay			X
VLSM (updates include subnet mask also)		X	
Maximum network diameter	15 hops	15 hops	255 hops*
Authentication		X	

X means it is supported or present

Router updates include the **entire RT** and not only the modified entries.
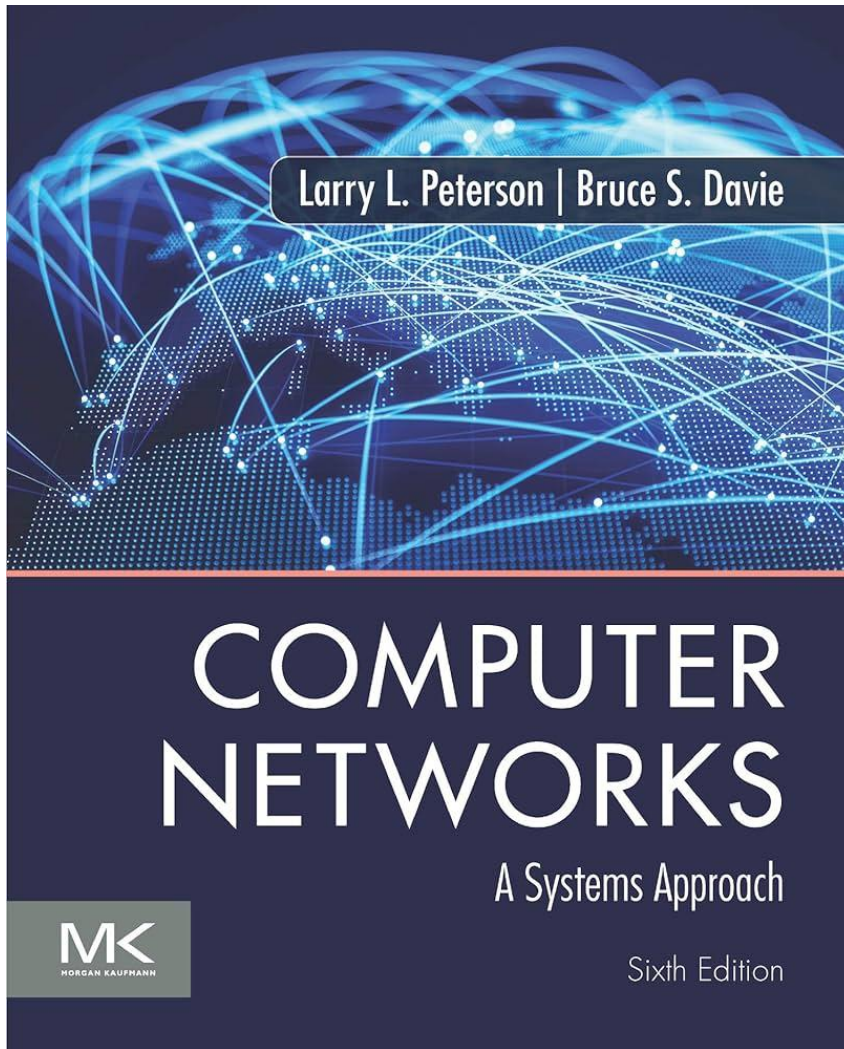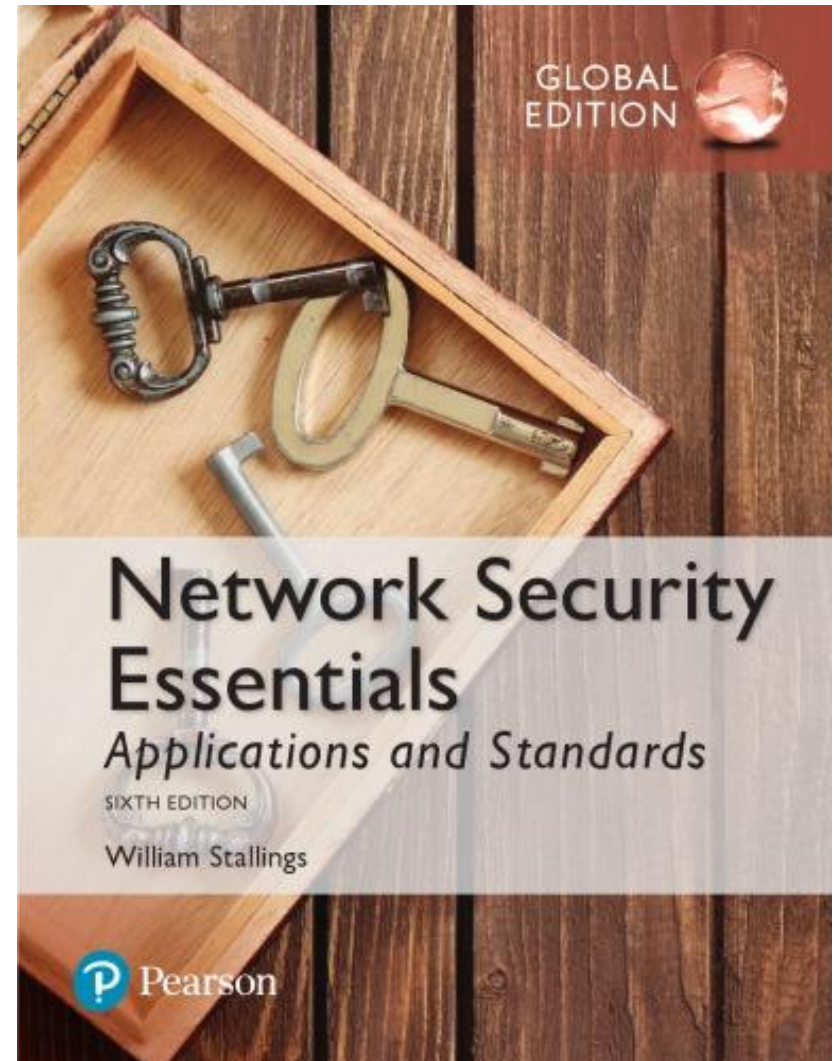
Session 5C: Summary

- Routing Information Protocol
  - RIP Network Diameter
  - RIP v1 and RIPv2
- Comparison of RIPv1 Vs RIPv2 Vs IGRP

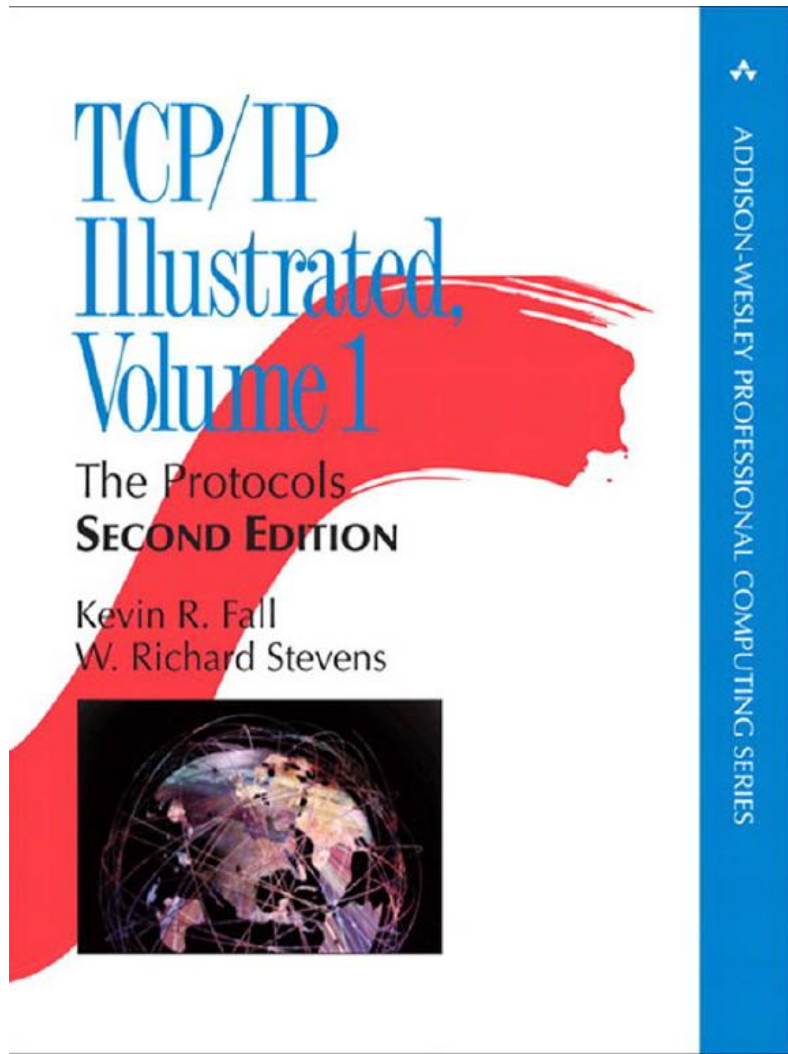# Textbooks

Textbook 1

Textbook 2

Larry L. Peterson | Bruce S. Davie

COMPUTER NETWORKS

A Systems Approach

Sixth Edition

GLOBAL EDITION

Network Security Essentials

Applications and Standards

SIXTH EDITION

William Stallings

Pearson

References

Ref 1

TCP/IP Illustrated, Volume 1
The Protocols
SECOND EDITION

Kevin R. Fall
W. Richard Stevens

ADDISON-WESLEY PROFESSIONAL COMPUTING SERIES

Ref 2

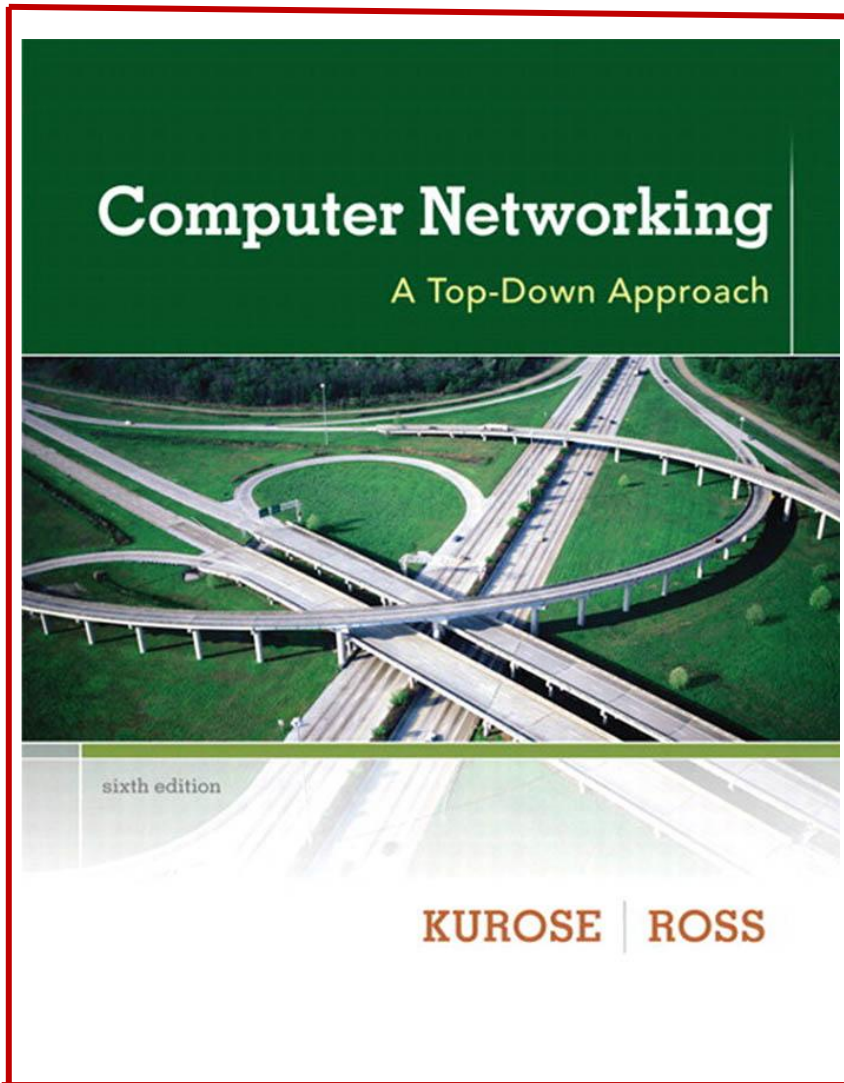**TCP Congestion Control: A Systems Approach**

HTTPS://SYSTEMSAPPROACH.ORG

TCP Congestion Control: A Systems Approach

Peterson, Brakmo, and Davie

References

Ref 3

Ref 4

Computer Networking
A Top-Down Approach

sixth edition

KUROSE | ROSS

Completely Updated for the New Exam!

Includes Real-World Scenarios, Hands-on Exercises and Labs, and Leading-Edge Exam Prep Software Featuring:

- Custom Test Engine
- Hundreds of Sample Questions
- Video and Audio Instruction from Todd Lammle
- Electronic Flashcards for PCs, Pocket PCs, and Palm Handhelds
- Entire Book in PDF

CCNA

Cisco® Certified Network Associate
STUDY GUIDE

Sixth Edition   Exam 640-802   Todd Lammle, CCSI

SYBEX   SERIOUS SKILLS.

References

Ref 5