Network Security (NetSec)

Summer 2015
Chapter 06: Link Level Security
Module 01: Intro to Link Level Security

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Learning Objectives & Outline

Learn fundamental objectives of link level security mechanisms

- Why link level security
- Scope of Protection

Outline

(1) Motivation
(2) Recap: the link layer
(3) What can (and what cannot) be protected on link layer

Chapter 06, Module 01

Layer 2 – Link Layer Security

Question: What is the role of the link layer?

Question: Which link layer technologies do you know? Do they have security mechansims?

Source: www.sxc.hu

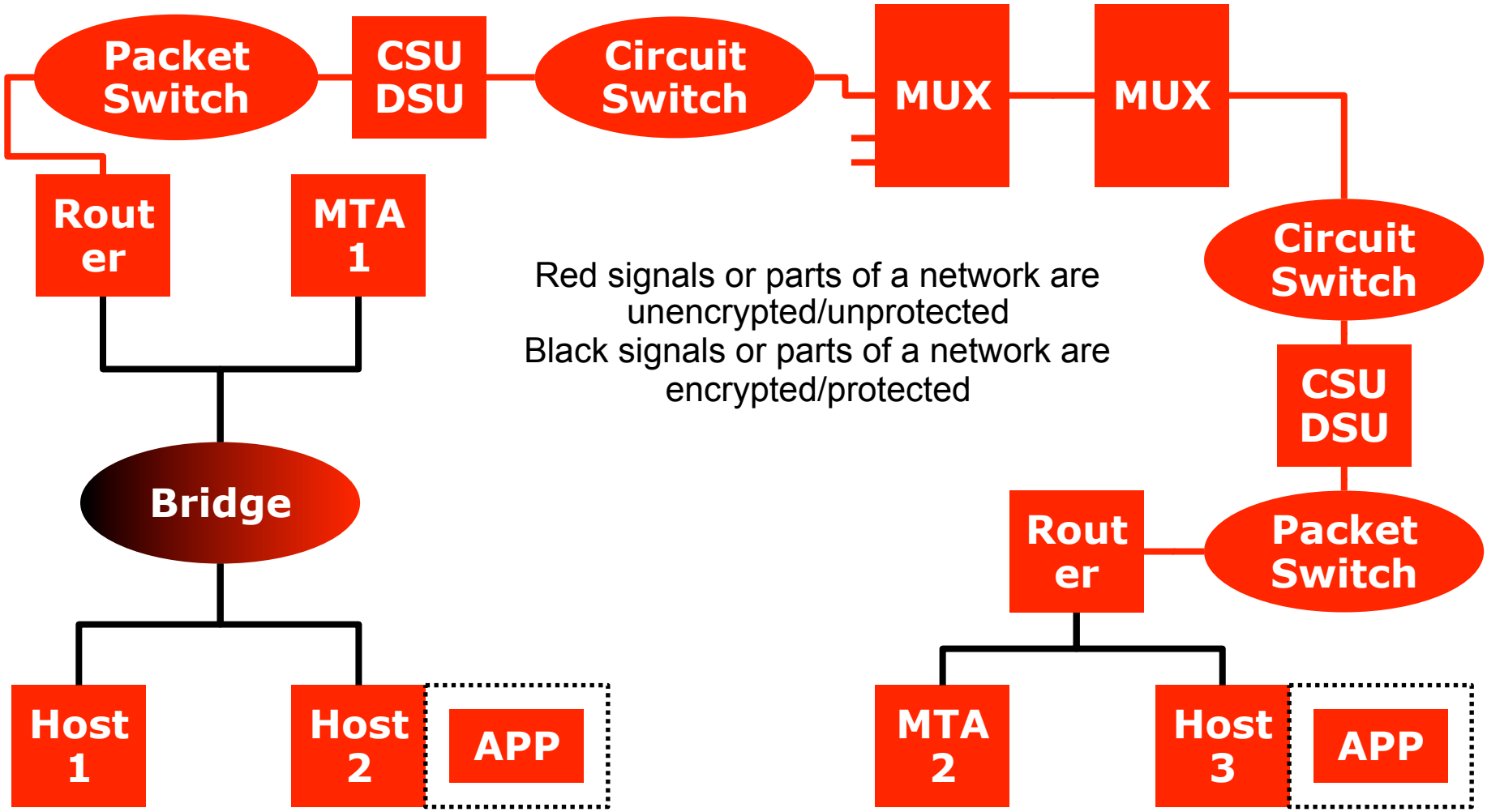
Data Link Layer – Goals

The goal of the data link layer is to provide reliable, efficient communication between adjacent machines connected by a single communication channel.

Which mechanisms do we typically have to achieve these goals?

Why would we want to secure the link layer?

L2 - Scope of Protection



Layer 2 Security

Little network technology dependence (IEEE LANs)

Little protocol suite dependence

Protection

- Red circuits, circuit switches & muxes; black or red LAN segments
- Black or red bridges
- Red packet switches, routers, hosts and MTAs

Protection granularity: individual hosts, LAN segments

Security services:

- confidentiality
- data origin authentication
- connectionless integrity
- access control

Acks & Recommended Reading

Selected slides of this chapter courtesy of

- Some other slides courtesy of G. Schäfer (TU Ilmenau) with changes of J. Schmitt (TU Kaiserslautern) and myself incorporated
- Yet some other slides courtesy of S. Kent, R. Perlman, K. Ross, Y. Chen, W. Stallings (L. Brown); changes of myself incorporated

Recommended reading

- [KaPeSp2002] Charlie Kaufman, Radia Perlman, Mike Speciner: Network Security – Private Communication in a Public World, 2nd Edition, Prentice Hall, 2002, ISBN: 978-0-13-046019-6
- [Stallings2015] William Stallings, Network Security Essentials, 4th Edition, Prentice Hall, 2015, ISBN: 978-0-136-10805-4
- [Schäfer2003] G. Schäfer. Netzsicherheit - Algorithmische Grundlagen und Protokolle. dpunkt.verlag, 2003.

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