



BITS Pilani
Hyderabad Campus

Computer Networks: Introduction

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Why study Computer Networks?

- To learn how computer networks work (protocols, architecture, and applications)
 - To build a foundation for courses like distributed systems (grid/p2p/cloud), wireless networks, mobile computing, network security, network programming, network management etc.)
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Syllabus

- Physical Media: The Bandwidth Limited Signals, Maximum Data Rate of a Channel.
- Application Layer: HTTP, SMTP, DNS etc., a little socket programming.
- Transport Layer: TCP (Principles of Reliable Data Transfer : Go-Back-N, and Selective Repeat), UDP.
- Network Layer: Addressing and Routing in the Internet.
- Data Link Layer: Error detection, Multiple access, etc.
- Wireless Networks: Wi-Fi: 802.11, Cellular access.
- Mobile Networks: Mobility management, Mobile IP.
- Network Security: Overview of Cryptography, Key Exchange, Authentication, and Perimeter Security.

Tutorials/Labs

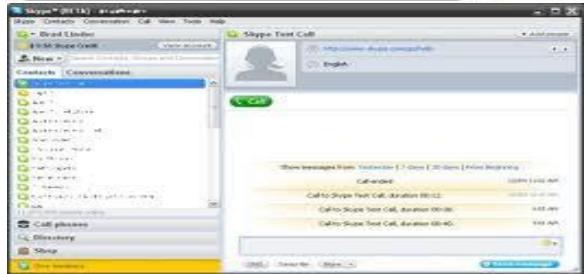
- Capturing packets using **Wireshark** and analyzing various protocols like TCP, UDP, ICMP, HTTP etc.
- Developing a Client/Server application using **Unix Sockets API**.
- **NetSim**: To investigate how a LAN performance is affected by various parameter values.
- To design a WAN and analyze the concepts of link utilization, Quality of Services etc.
- Study How TCP controls congestion in the network?
- Study how loss varies as the buffer size of Routers is increased
- Study the concept of shortest path in OSPF by varying the Link weight.

Uses of Computer Networks

innovate

achieve

lead



ShashiTharoor

Verified Account

Name: Shashi Tharoor
Saradhan Home Office & Thiruvananthapuram
With 1,404 posts
Bio: Author, humanist, peacekeeper, columnist, former UN Under-Secretary-General, Minister of State for External Affairs, Govt of India

Following: 32
Followers: 723,774
Tweets: 5,645
Favorites: 3,499
Actions: 31
Inbox/Messages: 1 report for spam

5

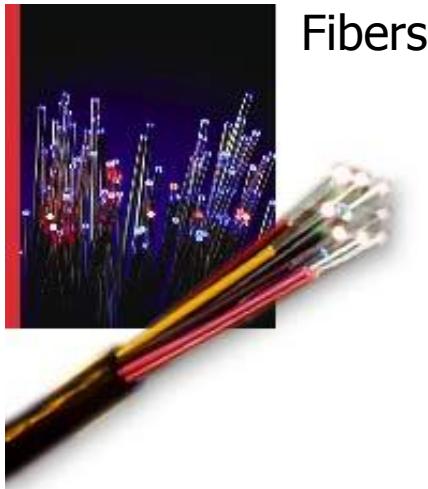
Thanks for all the support & good wishes.U folks are the new India.We will "be the change" we wish to see in our country. But not w/out pain!

11:08 PM Apr 14 2013 via Twitter



Network Components

Links



Fibers

Interfaces

Ethernet card



Wireless card

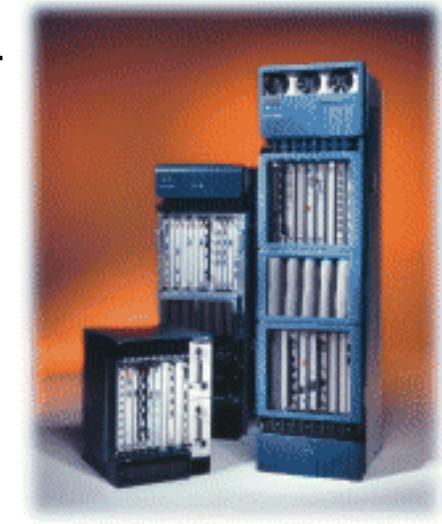


Coaxial Cable



Switches/routers

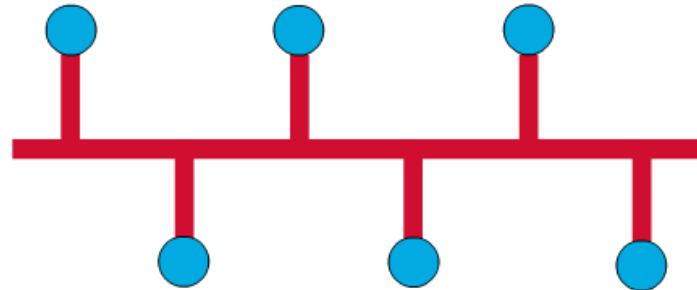
Large router



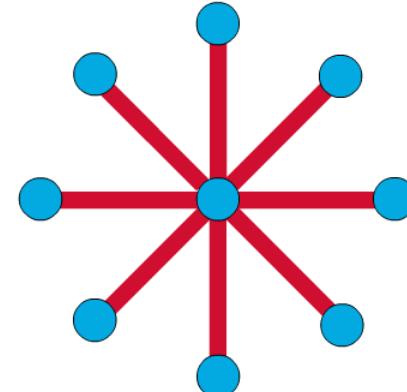
Switch



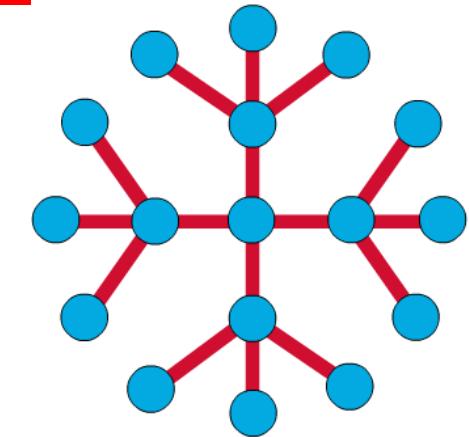
Network Topologies



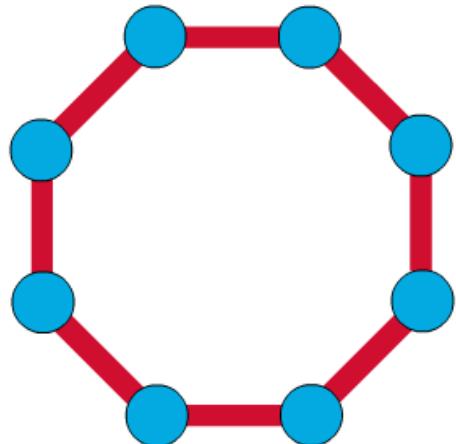
Bus



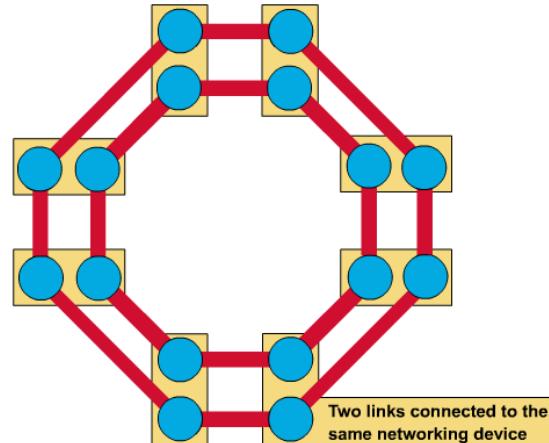
Star



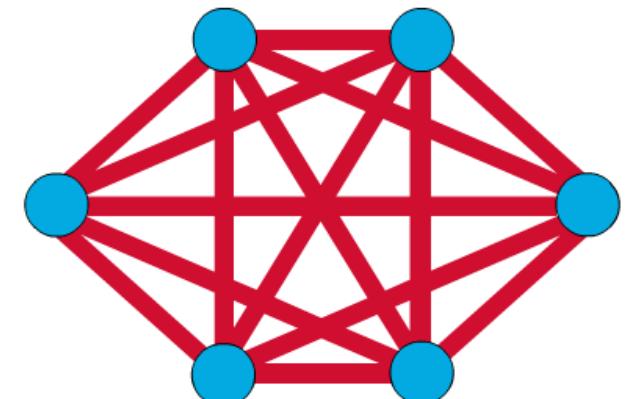
Tree



Single ring

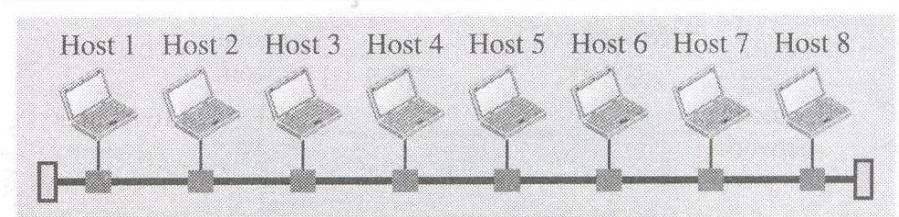
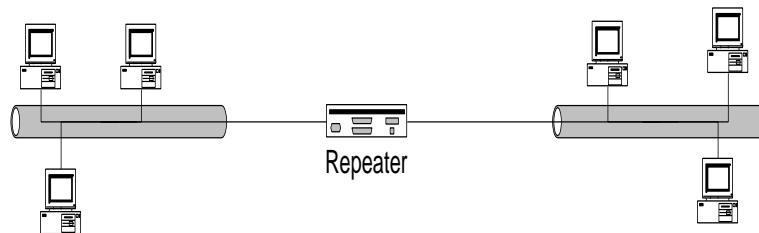


Dual ring

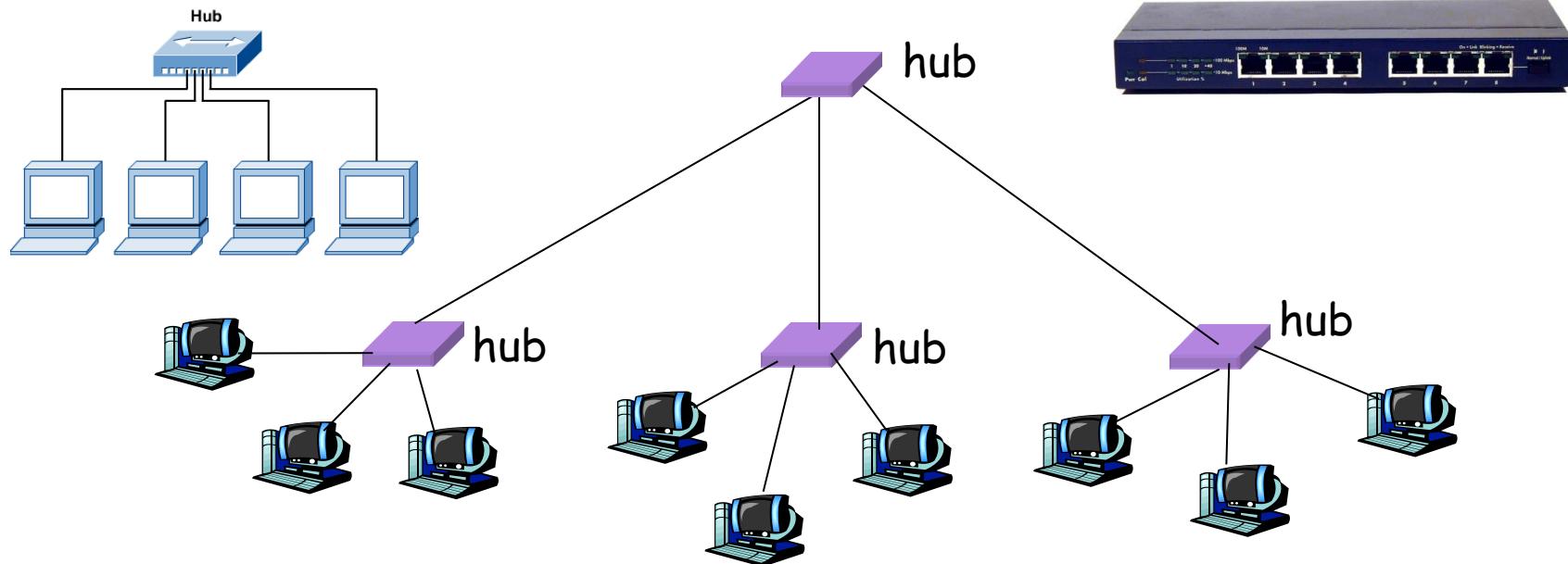


Mesh

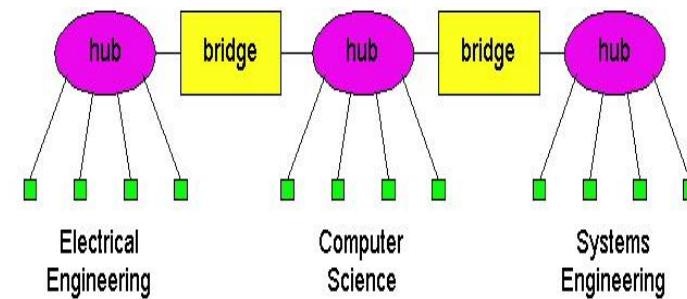
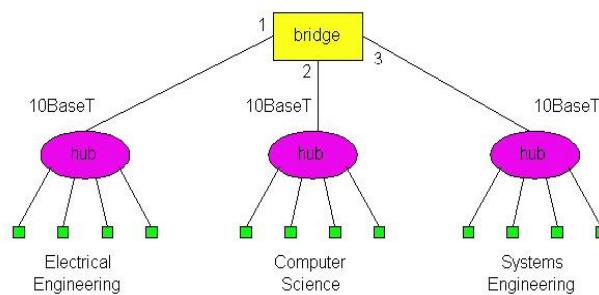
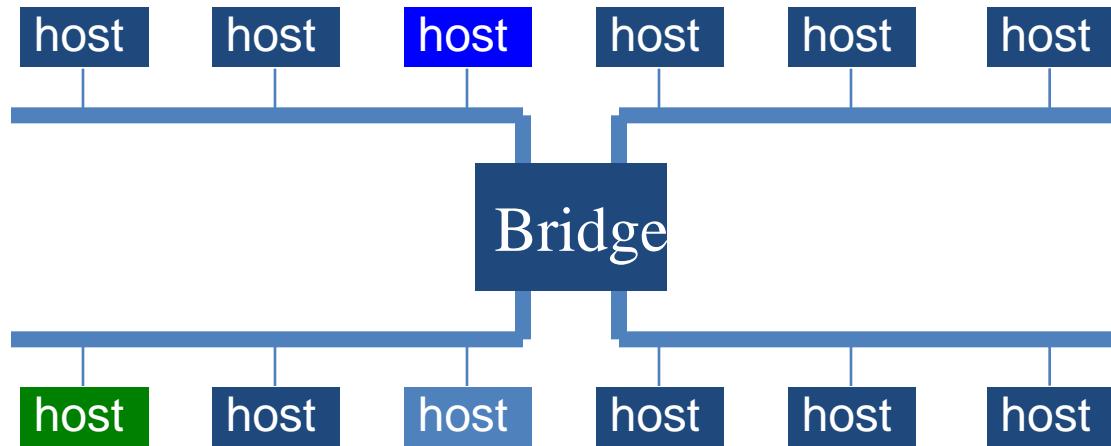
Physical Layer components



LAN with a common cable (past)



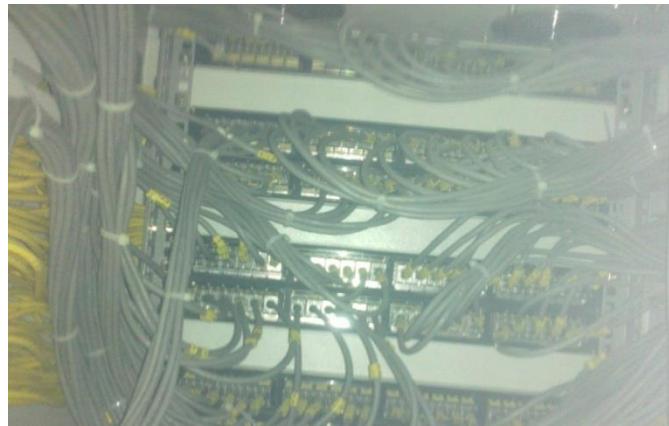
Link layer components



Structured Cabling Infrastructure



I/O and Faceplates



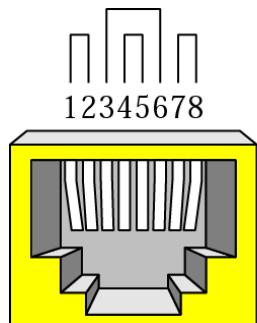
Patch Panels



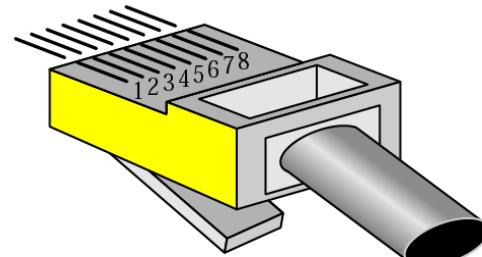
Wire testers



Pigtails



RJ-45 Female



RJ-45 Male

UTP connectors



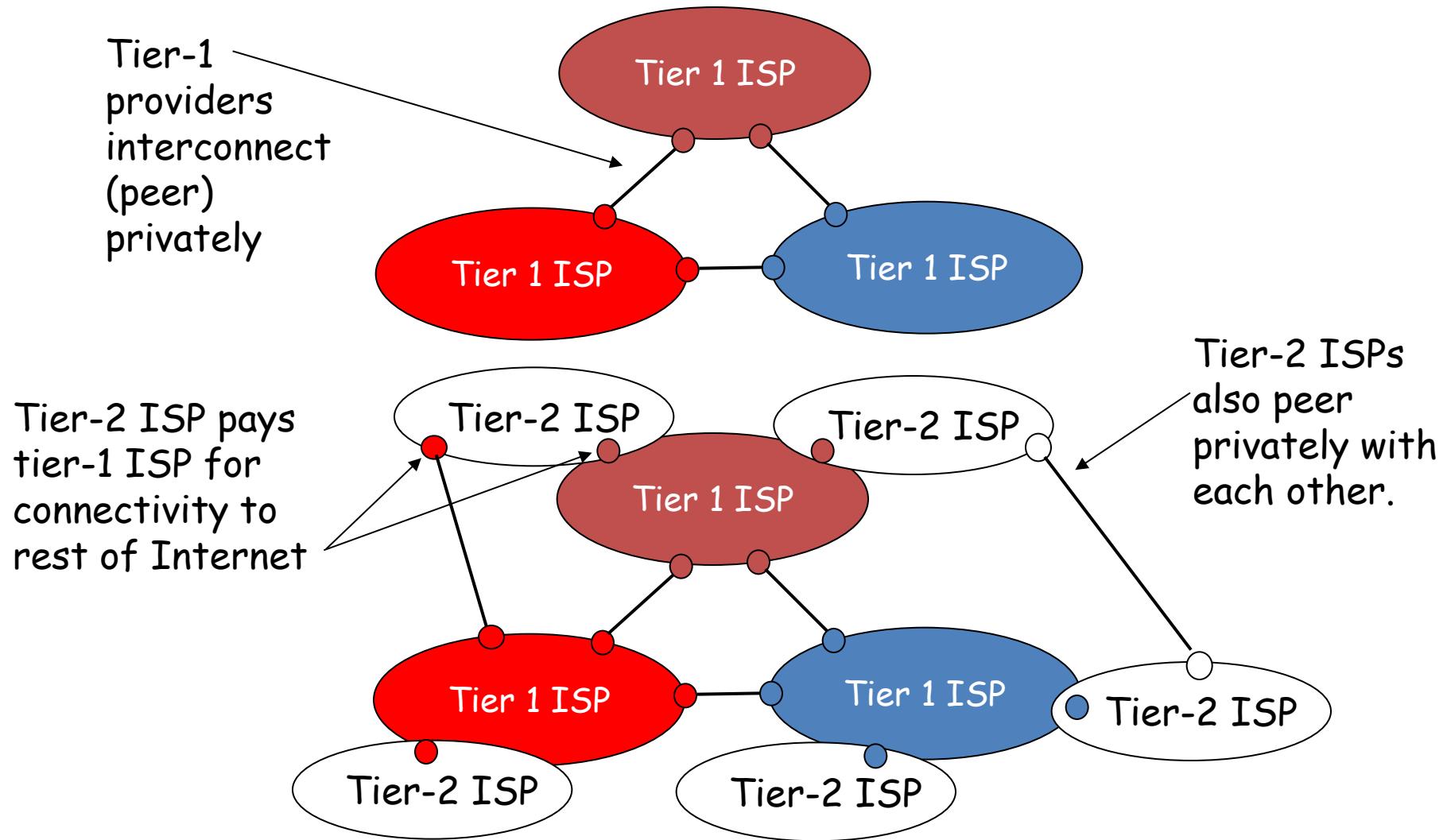
Patch cord



30-496

Crimping tool

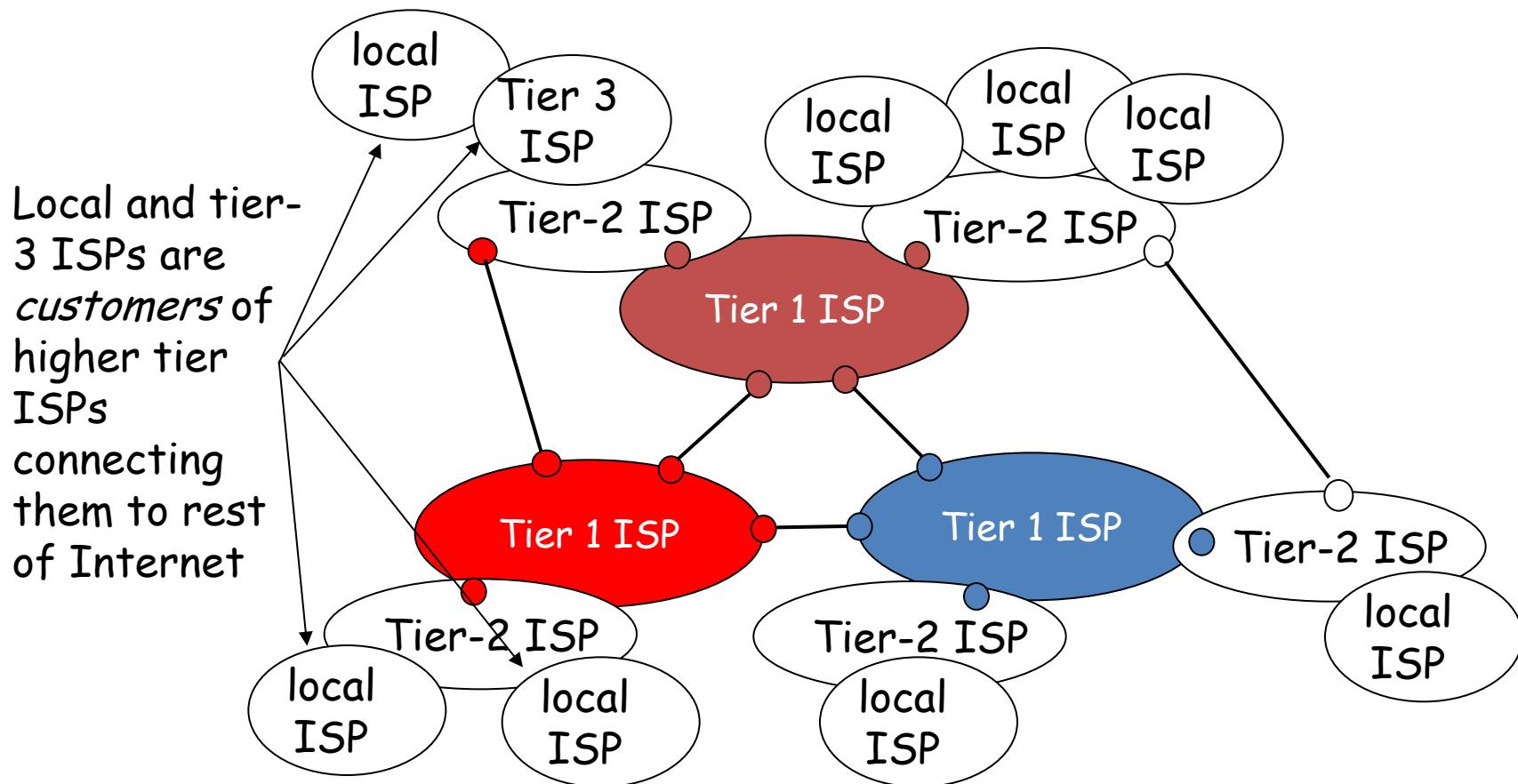
Internet Structure



Continued...

“Tier-3” ISPs and local ISPs

- last hop (“access”) network (closest to end systems)



Continued...

- a packet passes through many networks!

