

Computer Networks

Internetworking (§5.5, 5.6.1)



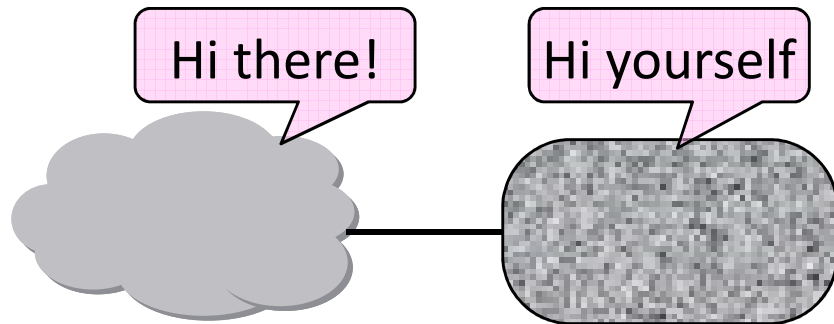
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Topic

- How do we connect different networks together?
 - This is called internetworking
- We'll look at how IP does it

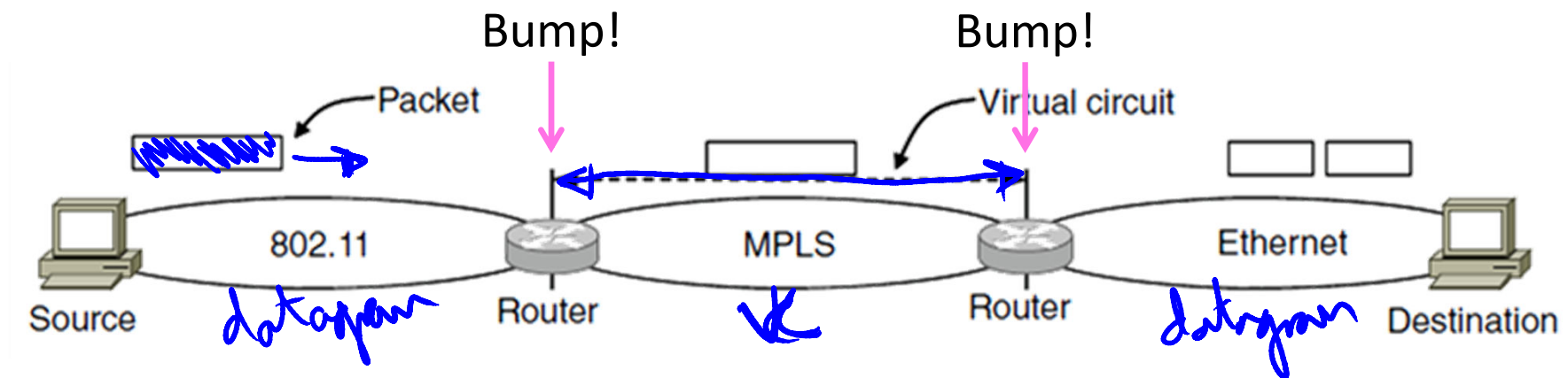


How Networks May Differ

- Basically, in a lot of ways:
 - Service model (datagrams, VCs)
 - Addressing (what kind)
 - QOS (priorities, no priorities)
 - Packet sizes
 - Security (whether encrypted)
- Internetworking hides the differences with a common protocol. (Uh oh.)

Connecting Datagram and VC networks

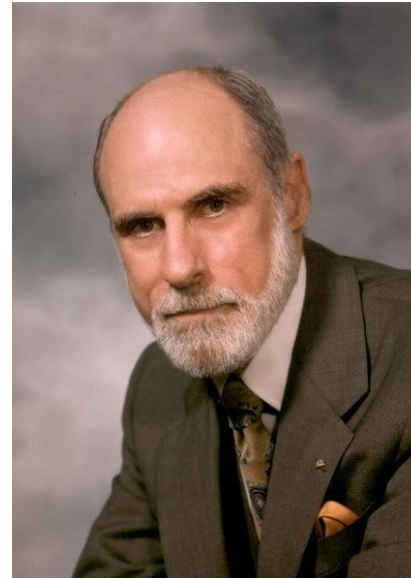
- An example to show that it's not so easy
 - Need to map destination address to a VC and vice-versa
 - A bit of a “road bump”, e.g., might have to set up a VC



Internetworking – Cerf and Kahn

- Pioneered by Cerf and Kahn, the “fathers of the Internet”
 - In 1974, later led to TCP/IP
- Tackled the problems of interconnecting networks
 - Instead of mandating a single network technology

Vint Cerf



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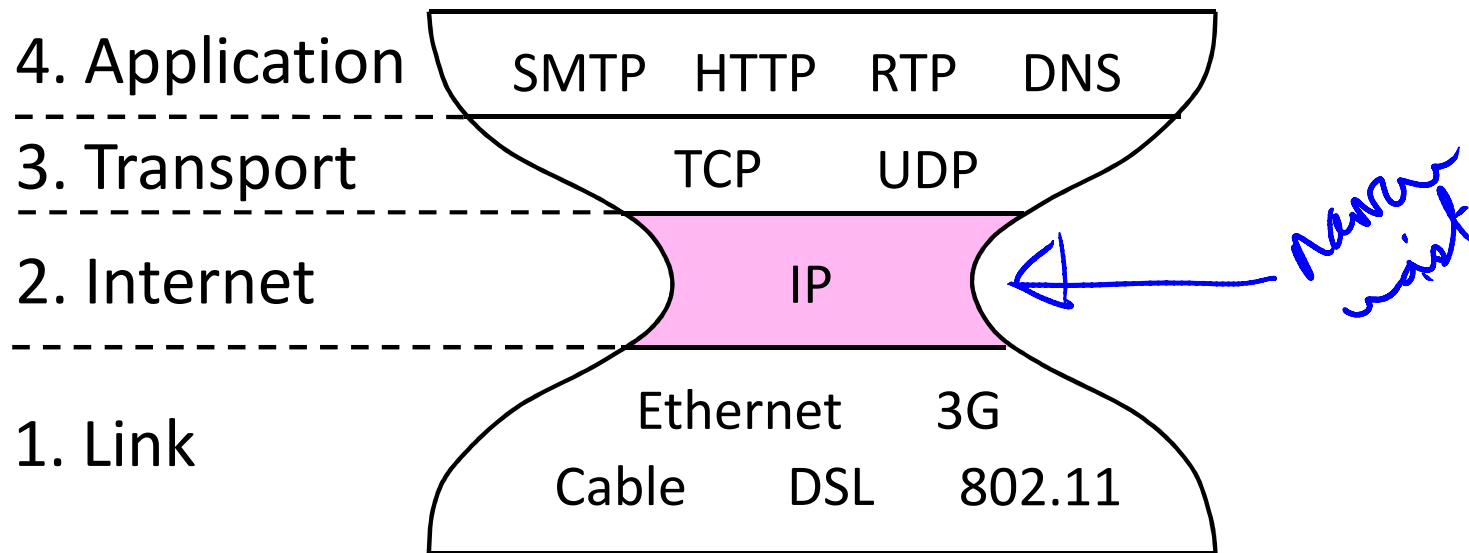
Bob Kahn




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Internet Reference Model

- IP is the “narrow waist” of the Internet
 - Supports many different links below and apps above

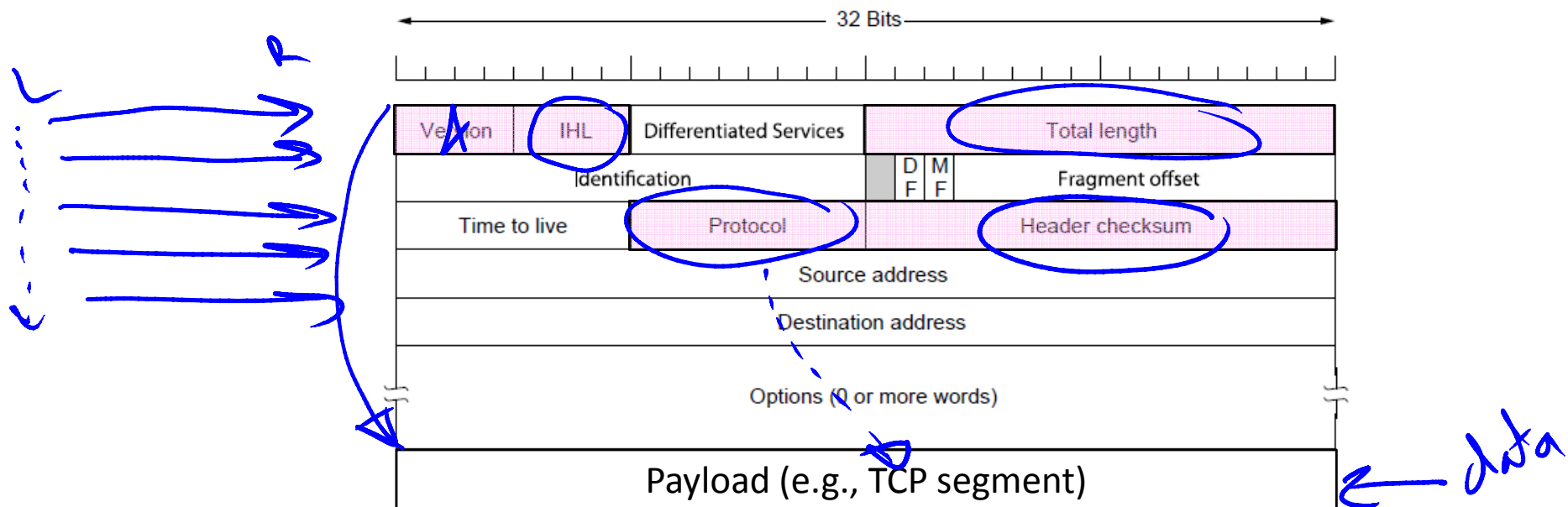


IP as a Lowest Common Denominator

-  Suppose only some networks support QOS or security etc.
 - Difficult for internetwork to support
- Pushes IP to be a “lowest common denominator” protocol
 - Asks little of lower-layer networks
 - Gives little as a higher layer service

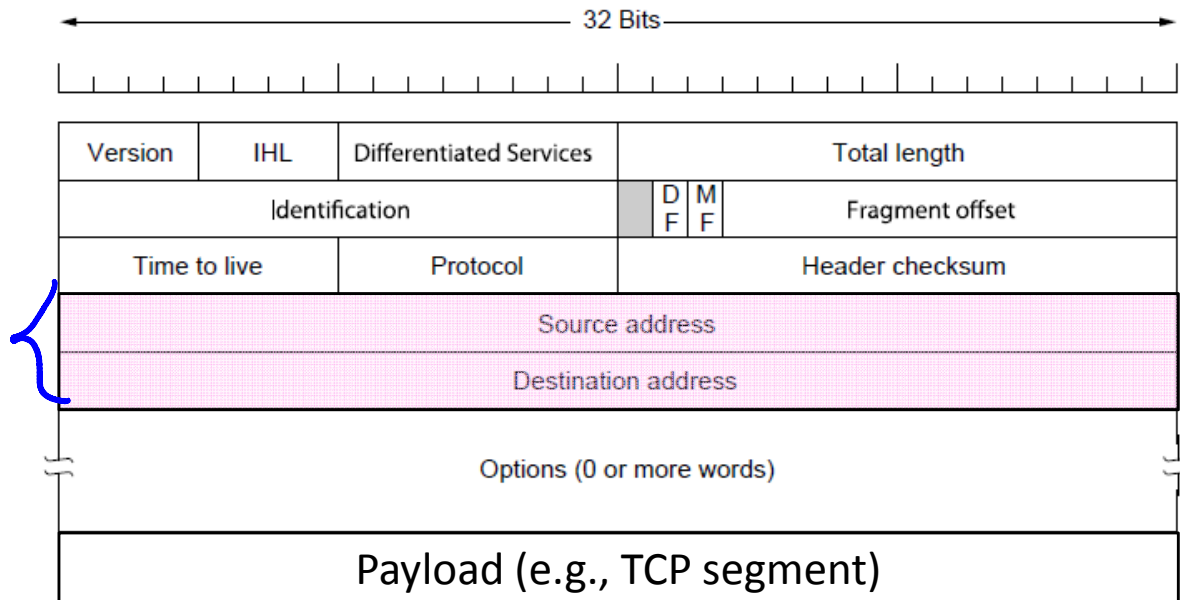
IPv4 (Internet Protocol)

- Various fields to meet straightforward needs
 - Version, Header (IHL) and Total length, Protocol, and Header Checksum



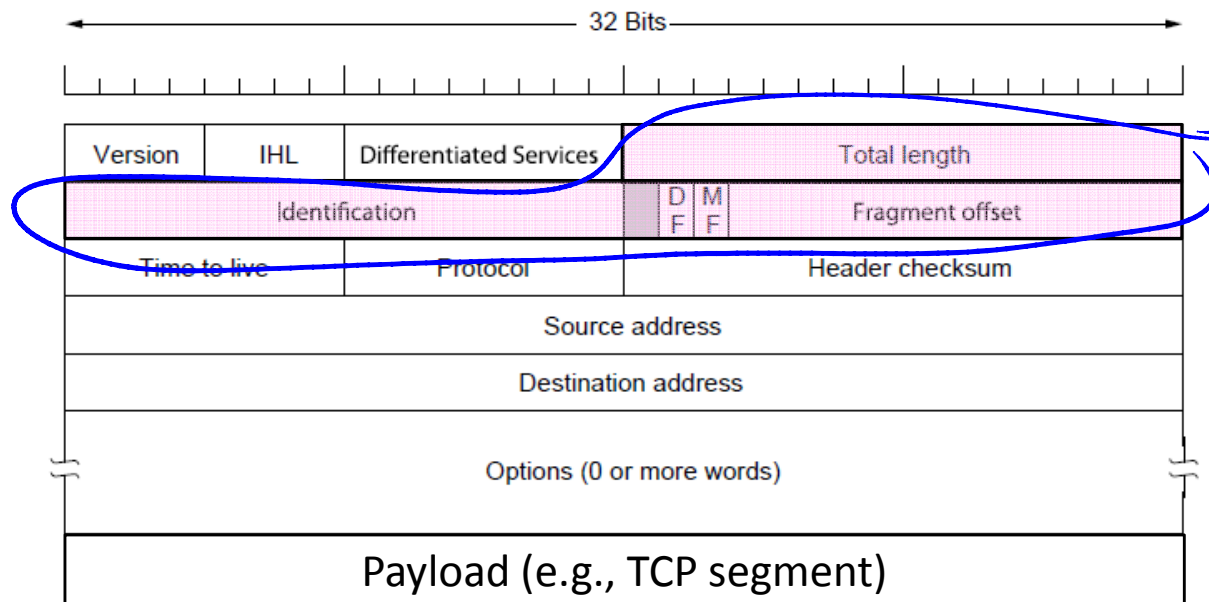
IPv4 (2)

- Network layer of the Internet, uses datagrams
 - Provides a layer of addressing above link addresses (next)



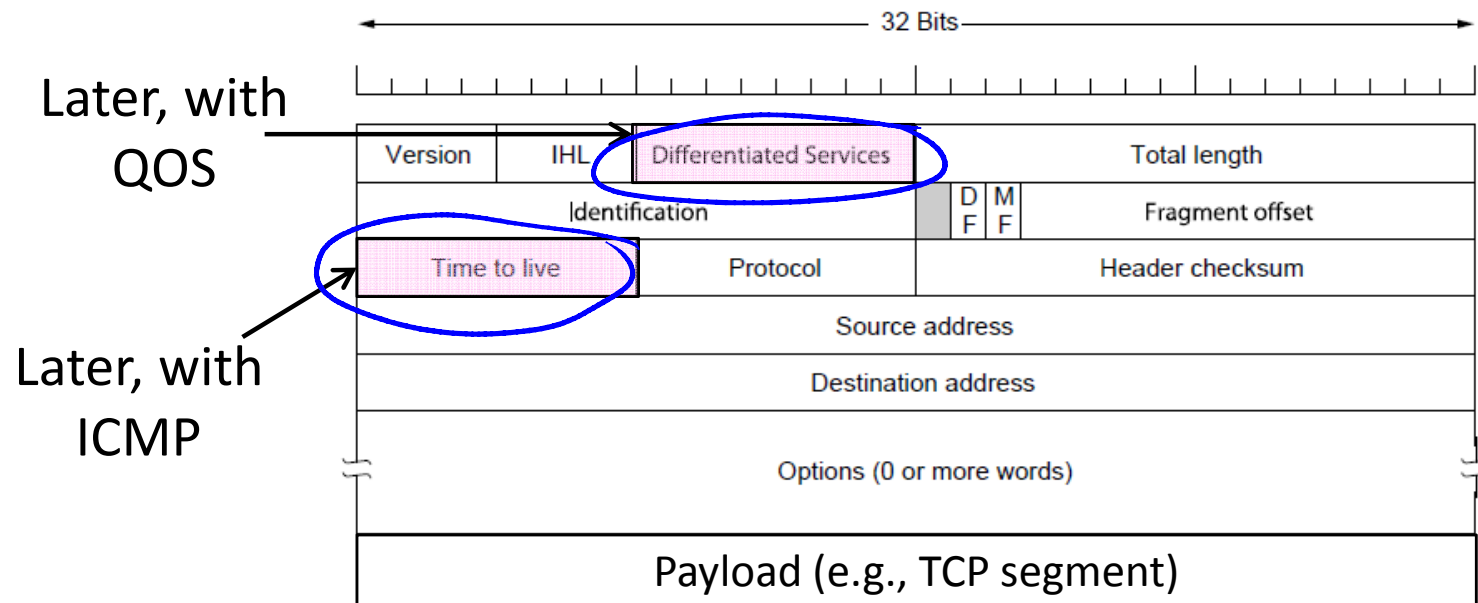
IPv4 (3)

- Some fields to handle packet size differences (later)
 - Identification, Fragment offset, Fragment control bits



IPv4 (4)

- Other fields to meet other needs (later, later)
 - Differentiated Services, Time to live (TTL)



END

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