Technical and Social Foundations

- **What is the Internet?**
  - According to Wikipedia
  - According to Jon Stewart and Ted Stevens

- **A collection of autonomous systems (ASs)**
  - Network of networks
  - How do these networks communicate?
  - Country level, company level, ...
  - Until 2007, 16-bit AS numbers, now 32 bits

Technical and Social Foundations

- **Why should you know something?**
  - Educated citizenry?
  - Informed consumer?
  - Fledgling entrepreneur?

- **Destinations and travel on the Internet**
  - What's being transmitted?
  - How does it know where to go?
  - Is it all numbers?

Communication on the Internet

- **AS level, communication between AS's**
  - Send email from Duke to Malaysia
  - visualroute.visualware.com
  - What names and numbers are involved?

- **Duke has ASN 13371**
  - what is an ASN for YouTube?
  - AS communicates with neighbors using BGP
  - Computers on the internet communicate with IP
  - Mail works because of SMTP

Communication on the Internet

- **Can the Internet break?**
  - Internet Glitch Can Strand You
    - Similar incidents in the past
    - What about this phrasing?
      The upstream carrier accepted the routing message, and passed it along to other carriers across the world, which started sending all requests for YouTube videos to Pakistan Telecom. Soon, even Internet users in the U.S. were deprived of videos of singing cats and skateboarding dogs for a few hours.
  - Did Pakistan hijack YouTube intentionally?
The internet protocol is specifically limited in scope to provide the functions necessary to deliver a package of bits (an internet datagram) from a source to a destination over an interconnected system of networks. There are no mechanisms to augment end-to-end data reliability, flow control, sequencing, or other services commonly found in host-to-host protocols. The internet protocol can capitalize on the services of its supporting networks to provide various types and qualities of service.

A distinction is made between names, addresses, and routes. A name indicates what we seek. An address indicates where it is. A route indicates how to get there. The internet protocol deals primarily with addresses.

An address indicates where it is

- IPv4 address: dotted quad
  - `dig www.cnn.com`: 157.166.224.25
  - Why do we use name and not address?
  - Quad part: 0-255, note that $2^8=256$
  - Why is this a 32-bit address? What’s a bit?
  - Limitations of 32 bits?

- DNS: map name to address
- Routers: map address to route

There’s no place like 127.0.0.1

Thinkgeek.com