Welcome to

Web Ping-Pong
Introduction

- What
  - Solution to slow web syndrome

- Why
  - Information needs to reach destination
  - Accuracy
    - Time
    - Connection
A Short History of the WEB: PREHISTORY

• The development of hypertext, or the computer-aided reading of electronic documents
• The development of the Internet protocols which made the global network possible
1957- USSR launched the first artificial earth satellite Sputnik

- 1965-Douglas Engelbart produces 1st hypertext system
- 1975-Alan Kay produces the 1st personal computer (later Apple Macintosh)
- 1979-Charles Goldfarb invents SGML, as we know today HTML is the mark-up language of the Web, curiously HTML is an SGML application
1986-OSI protocols are introduced

• 1987-CERN and US Laboratories connect to the Internet as the main means of exchanging data between laboratories
• 1989-Tim Berners-Lee proposes a “networked” Hypertext system for CERN
• 1990-the name “World-Wide-Web” is born
• 1991-SLAC, Stanford Linear Accelerator Center in California becomes the 1st Web server in the USA
• 1992- world has 50 servers
• 1993- world has 250 servers
1994-Jim Clark founds MCC (later Netscape)--2500 servers

- 1995-at one point 700 servers per day are registered, to date 73500 servers
- 1996-various ISP’s suffer outages, bringing into question whether they will be able to handle the growing number of users
- 1997-early morning July 17, human error at Network Solutions causes DNS. table for .com and .net to become corrupted
SUMMARY

- by the end of 1991, the Internet has grown to include:
  - 5,000 networks in 36 countries
  - serving 700,000 host computers used by over 4 million people
TODAY, the Internet has grown to include:

- approximately 135,000 networks
- in over 170 countries
- serving approximately 30 million host computers
- used by over 148 million people
- the world now has approximately 2.2 million servers
People Care!!!
People Use!!
Current Connection Map
Current Network Issues

- Age
- Modernization
  - Cost
  - Time
- Rural vs. Urban
- Responsibility
- Future Forecast
  - Better, Faster, Cheaper!
Possible Improvements

• Smart Hardware
• Smart Software
  – Less Data Transferred
  – Pre-Pinging Paths

Pre-Pinging
  – How Used Today
  – How it works
Web Usage

- There are approximately 184 million people using the Internet (84.4% in the USA)
- 32.7% use it 10-20 hours a week while 26.4% use it more than 20
- Wisconsin accounts for about 1.5% of the web usage worldwide
Where Used

- Over half of the Web access is done in homes. This is an increase of 2% from last year.
- 37% of access is from an office.
- 6% is from a portable computer (i.e. laptop).
Modem speeds

- 75% have a connection speed of 28.8 to 56K
- Only 16% have a T1 connection or better
Growth

• In 1991 NSFNET switched from a T1 connection installed 3 years earlier to a T3. This was before the Internet was introduced to the general public.

• Only 39% of the population have been hooked up to the Web for more then 3 years. 45% for 1-3
Controlled Map
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<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
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</tbody>
</table>

U0 – v5 – v4 – v3 :  
U0 – v2 – v3.
Path Results
Menomonie to Neenah

- Typical Traffic
- Total Weight 64
- Quickest Path
  - Eau Claire-La Crosse
  - Madison-Milwaukee
  - Neenah*

- Pinging Included
- Total Weight 81
- Quickest Path
  - Eau Claire-La Crosse
  - Madison-Neenah*

Note: Shortest Path!!
Conclusions from Data

• Shift away from Big Cities/Hubs
• # vertices down VS length increase
  – More direct path
  – heavier traffic
• Less Hubs = less smart hardware
• Traffic increase is a given with Pinging, but there are so many more path options with total weight lower in the current network that these paths are a better solution then with pinging included in the network.
• Amount of traffic increases too high to offer benefits in overall global network!
Conclusion

• Pre-Pinging Not Cure
  – Not efficient in Small or Big

• Cost Issues
  – Hardware
  – Software
  – Size, Time Issues

• Politics
  – Government
  – Telecommunications World
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• Graph Theory Book

• Dr. Wu

• ADC Instructional Resource Material