Internet Future
CRA Biennial Conference
Snowbird, Utah

Vint Cerf
MCI
July 11, 2004
30th Anniversary of TCP/IP

- A copy of this was auctioned for $3,000 in 2002!
Internet - Global Statistics

22.5 Million Hosts
(Bellcore June 1997)

50 Million Users
(NUA Jul 1997)

250 Million Hosts
(ISC Apr 2004)

745.3 Million Users
(InternetWorldStats.com April 2004)
[Other estimates range from 850M-950M]

(approx. 2.3 Billion Telephone Terminations, 750 Million PCs)
Internet Penetration May 2004

- Asia/Pac - 235.1M
- No. Amer. - 216.1M
- Europe - 204.6M
- Latin Am - 49.5M
- Africa - 10.1M
- Mid-east - 14.5M
- Oceania - 15.7M

Total - 745 M

(Source: www.internetstats.com)
Internet expansion
The Power of IP

- Layering of Protocols
- IP decouples application from transmission/transport
  - IP does not care what transport is used (satellite, fiber, twisted pair, radio, ATM…)
  - IP does not care what application it is carrying (video, audio, web, email…)
- Profound impact on regulatory models
- Integration of all communication modes under IP control.
Dr. Vinton Cerf and Internet MCI Leading the Way to a Bigger, Badder Internet

Also: Controlling Access to Your Web Pages

How to Crack Encrypted Files & Passwords

BSD/OS and Apache - A Killer Combination
Internet-enabled Appliances
Presence

- Instant messaging
  - First “presence” application
  - Smooth spectrum of communication (text, voice, video, shared applications, group collaboration)

- Presence may vary by application and by community
  - Apparent presence can be tailored
  - Alternative communication media a function of requesting party and medium requested
SIP Telephony

- Session Initiation Protocol Telephones
- Cisco Systems, Pingtel, etc.
- “email” addressing
- ENUM:

1.1.9.3.0.6.5.3.0.7.1.e164.arpa = sip:vinton.g.cerf@mci.com

(any domain name) NAPTR (naming authority pointer)

The power of SIP
Videoconferencing is a reality.

High speed access is preferable but it can be made to work at dial up speeds (jerkily)

Microsoft Messenger; Santa Cruz Networks Viditel
RFID

- Toll-Road passive transponder
- Consumer product identifier (like UPC)
- Drug/Food shelf-life and identification
- Patient identification
Internet-enabled Devices

- Programmable – Java, Python, etc.
- Examples:
  - WebTV, Palm-Pilot, Mobiles, Video games, Picture Frames, Washing Machines, Surf Board!
  - Refrigerator (and the bathroom scales)
  - Automobiles (Japan, Germany)
  - Internet-enabled wine corks (also note new quantum theory of wine: Schrödinger’s wine bottle)
- Internet-enabled socks
- Universal Remote Control
IPv6

- 128 bit address space \( (10^{38}) \)
- IPSEC requirement
- Eliminates need for Network Address Translation
- Consumer electronics IPv6 enabled
- Dual-stack migration strategy
Remote diagnosis/detection

- Astronauts – as far back as the Mercury Program
- Telemetry by radio back to ground data collection systems
Indexing of unstructured data

- The standardization of information representation (HTML, XML)
- The creation of web crawlers/search engines (alta-vista, google…)
- Association of media with text (indexing of images, video, audio, etc.)
- Powerful tools for finding otherwise unstructured information (cf. weblogs)
Future look
2003-2004 Missions to Mars

- **Spirit**
  - launched 6/10/2003
  - arrived Jan 4, 2004
  - Gusev Crater in Gusev Plain

- **Opportunity**
  - Launched 7/7/2003
  - arrived Jan 25, 2004
  - Meridiani Planum
Interplanetary Internet: “InterPlaNet”

◆ Planetary internets
◆ Interplanetary Gateways
◆ Interplanetary Channel Protocol
  ◆ “bundles” encapsulated in CCSDS link and higher layer transport (Licklider Transport Protocol)
  ◆ .earth.sol.int, .mars.sol.int
◆ Functional Layers of Protocol
◆ Interplanetary Network and Information Systems Directorate (old DSN)
◆ Project supports Mars mission plans
Mars Network
Gateway to the Mars Frontier

Next Generation Internet (NGI) Initiative
Cerf’s slides and other Internet information can be found at:

- www.mci.com/cerfsup
- www.isoc.org/internet
- livinginternet.com
- www.ipnsig.org