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Paper No. 45
New Generation Internet

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Key technology trends

- Convergence of data, voice and video
- Boundary between Enterprise Resource Planning (ERP) and electronic commerce blurring
- Internet is becoming a critical driver of business

IT Dynamics

Business is going to change more in the next 10 years than it has in the last 50”
- Bill Gates

Dynamics of Change

Time to technology acceptance

“Technological Change is Rapid and many of these are Disruptive”
The Networked Economy will Drive New Business Models

Thriving in a Wired Economy

Consumers

Web Lifestyle

Knowledge Workers

Web Workstyle

Business

Digital Nervous System

Virtual Business...
One Global Internetworked System

Technology is reshaping this economy and transforming business and consumers. This is about more than E-Commerce or E-mail or E-traders or E-files. It is about the "E" in economic opportunity.

- William Daley, U.S. Commerce Secretary

Impact of E-Commerce on Industry Restructuring

E-Commerce will restructure the entire industry

Information as a percent of the total offering
Internet – it's evolution

- Support from academic community
- Funding by Govt. agencies
- Involvement & Interaction of industry

Issues of today's Internet

- Large Bandwidth
- IP address space
- Quality of service
- Technology for the reach of common man
- Demand for new services

Issues of today's Internet (contd.)

- The Internet was not designed for:
  - Millions of users
  - Multimedia, Real time interaction
- yet ... we need the Internet to:
  - Accommodate explosive growth
  - Enable convergence of information work, mass media, and human collaboration

Initiatives taken to address these issues

- Next Generation Internet
- Internet2

Next Generation Internet: A Glimpse into the Future

Next Generation Internet: Foundation for the Future
Dynamic Virtual Networks are the future
Joint Industry, Government and Academic R&D collaborations are essential for success

Next Generation Network Technologies
- RSVP
- IPv6
- Routing / Switching
- Multicast
- Real Time protocols
- Admission control
- Accounting / Costing
- Scheduling
- Prioritization

IPv6: Next Generation Internet Protocol
IPv6, also known as IPng, is a new version of the Internet Protocol, designed as a successor to IP version 4 (IPv4). Major changes from IPv4 to IPv6 are intended to correct some of the limitations of IPv4 and include:
- Scale—the IP address size is increased from 32 bits to 128 bits to support a much larger address space and more addressing flexibility
- Ease of configuration—Allows hosts to auto configure its IP address(es) and network parameters
- Performance—Simplified header format and option handling, plus proper alignment of all fields in the headers to allow more efficient processing
- Extensibility—Supports extension headers and expandable header options to allow additions of new capabilities

Applications
- Medicine
- Crises Management
- Basic Sciences
- Education
- Environment
- Manufacturing
- Federal Services

Characteristics
- Distributed Computing
- Remote Operation
- Digital Libraries
- Collaboratories
- Privacy / Security

Internet2
What Is Internet2?

A project of the university community working with corporate colleagues and government to close the gap between the potential and reality of the Internet

- 150+ U.S. universities
- Industry
  - Partners contribute over $50M in goods and services
- Engaged in technology transfer goals
- Other research organizations
  - Federal government laboratories
  - Medical laboratories, etc.

Internet2 at INET

The Internet2 project is focused on US, but:
- Internet is global
- Next generation of Internet technologies and applications needs to be globally interoperable

Internet2 Goals

- Recreate leading edge R&E network capability
- Enable new generation of applications, such as:
  - Interactive, network-based research collaboration and instruction
  - Real-time, sensor-based modeling and simulation
  - Large-scale, multi-site computation and database processing
  - Shared virtual reality - tele-immersion

What is tele-immersion?

- Tele-immersion is the effective combination of:
  - Cave-style immersion technology such as that today associated with MUDs and MOOs,
  - Advanced high-speed telecommunications systems to support collaboration applications, and
  - Significant extensions to cave technology to recognize the presence and movement of individuals within a cave, track that presence and movement, and then permit it to be projected in realistic multiple geographically distributed immersive environments where those individuals may be interacting with computer generated models.

Internet2 Applications

- Collaboration
- Virtual Laboratories
- Visualization and Virtual Reality
- Digital Libraries
- All of the above in combination
**Advanced Internet Benefits**

- Richer content through higher bandwidth
  - Video, audio
  - Virtual reality
  - Dynamic not static
- More interactivity via minimal delay
- Reliable content delivery through quality of service model

**Technology Scope**

- QoS
- Digital video/audio
- Security
- Collaboration
- Directories
- Multicast
- File systems
- Measurement
- Remote instruments
- IMS
- Transaction systems
- Meta-computing
- Management
- IP telephony
- Accounting/billing
- E-commerce
- Object brokers
- Search mechanisms
- Printing

**Anticipating success**

- Over the past decade, federal government and R&D agencies, the university community & private companies have worked together to develop many of today’s Internet technologies. That partnership created a multi-billion-dollar industry.
- By renewing this partnership, I2 & NGI will develop and diffuse new technology needed by all network users, helping to ensure the effectiveness of new technologies in providing Next generation communications infrastructure

**Thank you..!**