# The Need for Speed: The Importance of Next-Generation Broadband Networks

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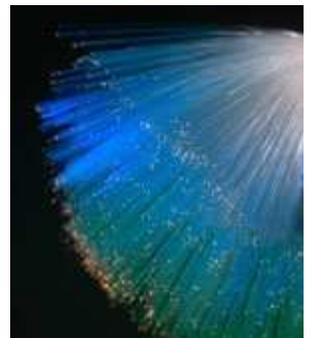
Summary of Findings

1. Deploying next-generation broadband Internet will enable the emergence of a whole host of online applications and services that will increase quality of life and boost economic growth.

2. The true potential of the next-generation broadband network lies in the transformative new functionalities it enables.

3. Applications running on next-generation broadband networks will be woven into the daily fabric of life and transform how we live, work, learn, and play.

4. The United States does not currently have sufficient speeds to make the vision of the next-generation Internet a reality.

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Next-Generation Broadband Networks and Applications Benefit

1. Consumers

2. Society
   - Healthcare
   - Universal Accessibility for Citizens
   - Arts, Humanities, and Sports
   - Government and Civic Life

3. Education and Academic Institutions/Universities

4. Businesses and the Economy

U.S. Broadband Speeds Trail Peers and the Technology Frontier

- Average U.S. broadband speeds are less than 5 Mbps downstream and 0.5 Mbps upstream

- Average broadband speeds in Japan, 63 Mbps, and South Korea, 49 Mbps, are ahead of the United States.

- With the power of telecommunications networks doubling every 20 months, the United States is behind the technological frontier, and risks falling further behind.
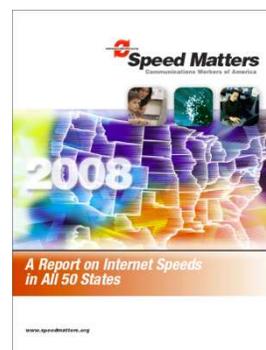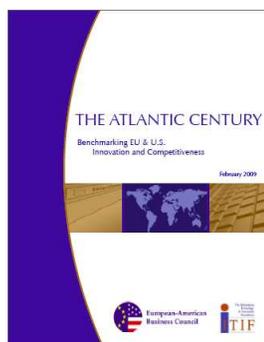
Comparison of International Broadband Speeds

Average advertised broadband speed, October 2007
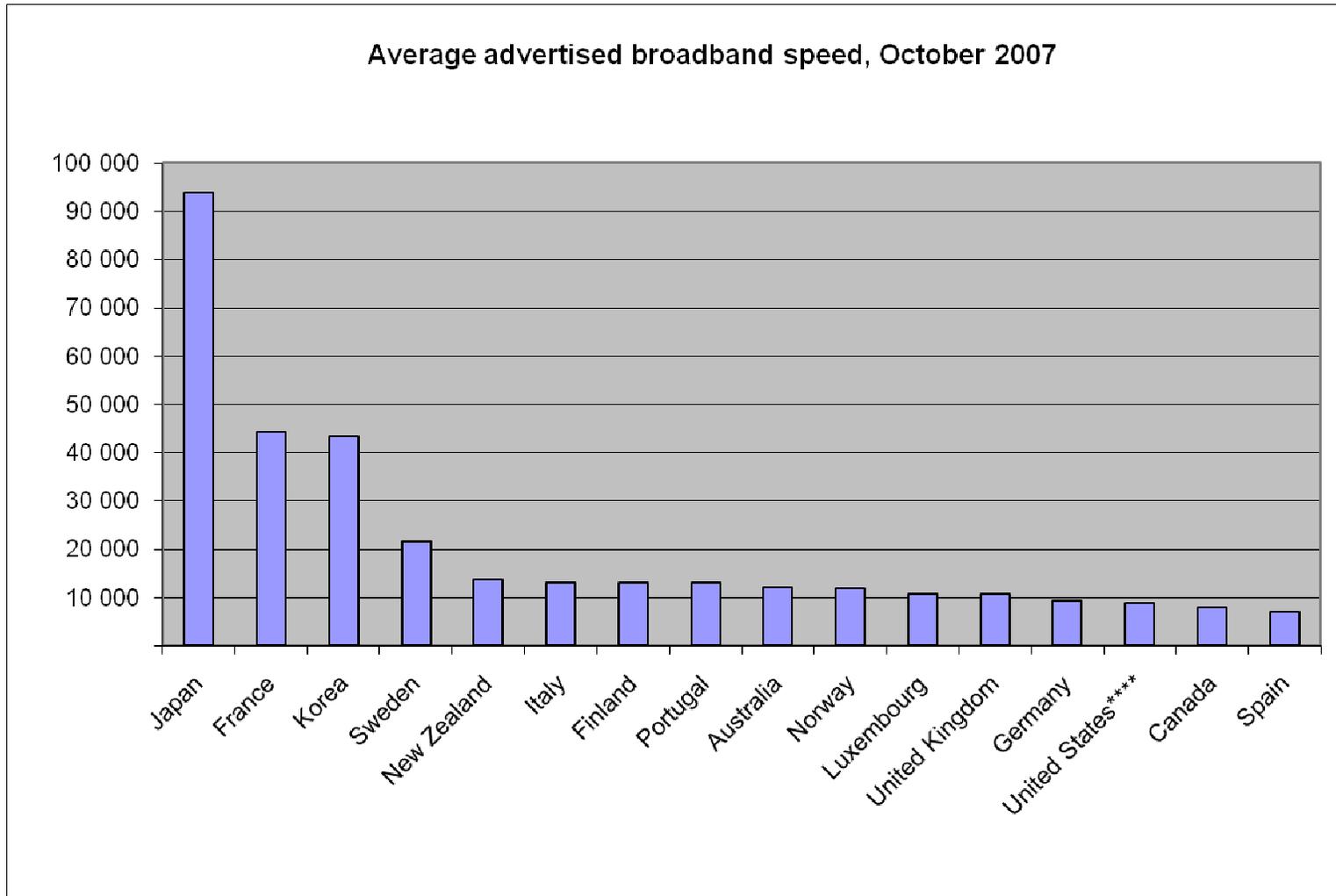
Why Do We Need Next-Generation Broadband Networks?

1. Because current speeds are inadequate to support individual next-generation online services.

Web application	Upstream Speed	Downstream Speed
Standard-Definition Digital Television		4 Mbps
Basic High-Definition Videoconferencing	1.2 – 4 Mbps	1.2 – 4 Mbps
High-Definition Digital Television		15 Mbps
Telepresence: Very High-Resolution HD	15 Mbps	15 Mbps

2. Because consumers will demand the ability to use a multiplicity of these applications simultaneously from their homes.

3. What we're really talking about is a transformative paradigm shift.

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What Makes Next-Generation Broadband Different

Four Transformative Functionalities Enabled by Next-Generation Broadband:

1. Dramatically faster file transfer speeds for both uploads and downloads

2. The ability to transmit streaming video

3. The means to engage in true real-time collaboration

4. The ability to use all of these functionalities simultaneously

How Next-Generation Broadband Benefits Consumers

1. By enabling faster file transfers:

   Faster upload speeds empower more consumers to be content producers and distributors.

   Download an 8GB DVD in under 15 minutes as opposed to 4 hours. Some Koreans can download feature-length movies to their cell phones before Americans can to their desktops.

   Cloud Computing

English: High scho...
(9th Grade - 12th Grade)
$5/question

6 reviews

Senguttuvan Marappan

Global Scholar

2. By enabling video streaming applications:

   Interactive Internet Protocol Television (IPTV)
   High-Definition and Ultra High-Definition Streaming
     Video
   Place-Shifted Video

IPTV

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How Next-Generation Broadband Benefits Consumers (ctd.)

3. By enabling real-time collaborations

Telecommuting

Doctors Learning in the OR via telepresence

Product Development via Telepresence

How Next-Generation Broadband Fosters Better Healthcare

- Instantaneous contact between health professionals and patients

- Remote diagnosis of illness/disease Japan: Remote cancer diagnosis

- Remote patient monitoring, especially benefitting rural patients without access to specialists or urban care

Health Care	Teleconsultations
	Telepathology
	Telesurgery
	Remote Patient Monitoring
	Remote Diagnosis
	Remote Medical Imaging
	Grid Computing for Medical Research

Medical teleconsultation
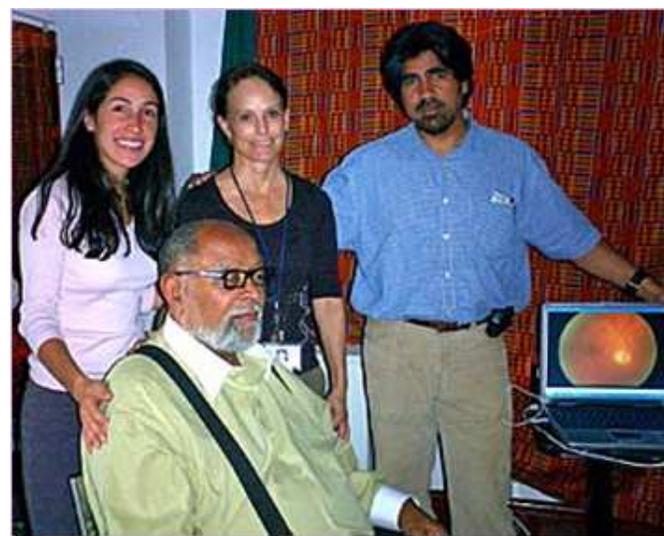
Retinal scanning for diabetics

How Next-Generation Broadband Improves Education Outcomes

- Transforms how education is delivered: distance education and digital content mgmt. (EDCAR)

- Enhances the ability to perform research; students → researchers

- Japan/South Korea: "Levels the playing field" for all students

Education and Research	Distance Education
	Virtual Classrooms/Rehearsals
	Remote Instrumentation
	Multi-Campus Collaboration
	Digital Content Repositories and Distribution
	Data Visualization
	Virtual Laboratories
	Grid Computing in Academic Research

**Cleveland Metroparks Live Interactive Zoo Experience**

High-School Students Learning from College Chemistry Professor

# How Next-Generation Broadband Supports Society & Government

- Delivery of public services

- Empowers citizens to engage in civic affairs and connect w/ gov.

- Address transportation and environmental challenges

- Support first responder networks

Society	Virtual Sports (Sports at a Distance)
	Intelligent Transportation Applications
	First Responder Networks
	Emergency Dispatch and Coordination
	Agency Meetings (e.g. Congressional Hearings)

National Capital Area Network (NCRnet)
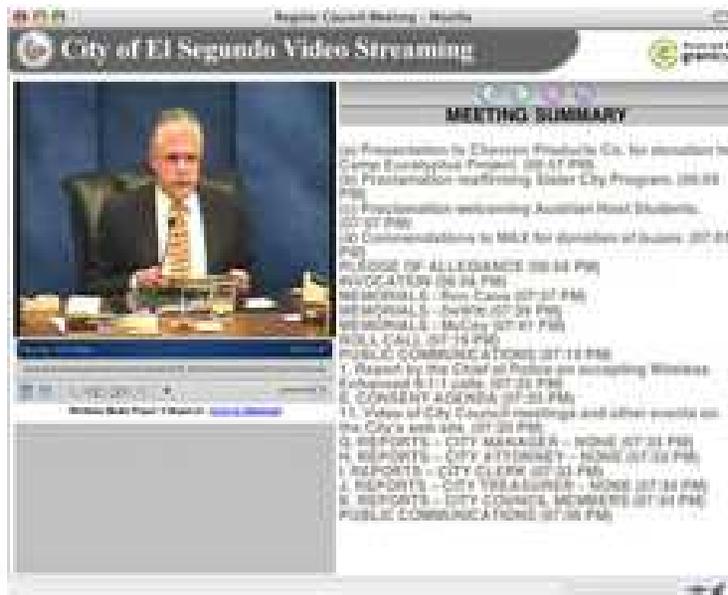
Webcast of a City Council Meeting
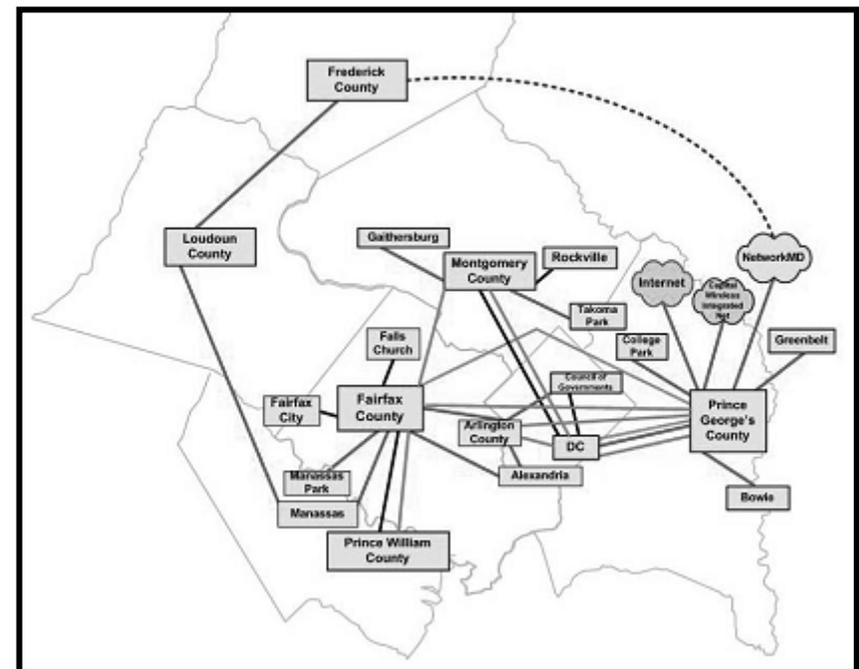
Differences Between Today's and Next-Generation Internet

Today's Internet	Next-Generation Internet
Independent: Downloading music from all over the world	Collaborative: Creating music with other musicians all over the world
Reactive: Websites	Interactive: Virtual worlds
Private resources: Online backups	Shared resources: Online file servers and remote devices
Centralized computing: Local data sets and computing	Cloud computing: Distributed data sets and computing
One-to-one or one-to-many communication: Webcam chats	Many-to-many communication: Virtual conferences (videoconferences & telepresence)
Low quality: Lower quality audio and video	High quality: High-definition audio and video

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