

# **Presidential Advisory Committee's Initial Report to the President: Recommendations on NGI Initiative**



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The Presidential Advisory Committee on High Performance Computing and Communications, Information Technology, and the Next Generation Internet has made its initial recommendations on the proposed initiative in a letter to Dr. John E. Gibbons, Assistant to the President for Science and Technology, on May 30, 1997. These slides accompany those recommendations and provide some additional details and examples.

## Executive Summary

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- Enthusiastically support motivations, general goals and proposed investments behind NGI program
- The Internet's future looks fragile without strategic incentives
- The Government has a unique responsibility to invest in NGI
- Have four general recommendations
  - Make key investments NOW
  - Encourage stronger cooperation
  - Encourage all sectors to invest to realize benefits
  - Restate program goals to better match intended research objectives

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The Presidential Advisory Committee on High Performance Computing and Communications, Information Technology, and the Next Generation Internet has reviewed the plans for the Next Generation Internet (NGI). We enthusiastically support the motivation, general goals, and proposed investments embodied in the NGI program.

The U.S. Government's Internet investments have been incredibly successful. The Internet has grown at nearly 100% per year since 1988 and traffic has been growing at 400%/year rate recently. The Internet has created jobs and whole new industries. American business and government organizations are increasingly dependent on the Internet. However, we see signs of frailty and limitations in the Internet's current capabilities. This frailty will be exacerbated by high bandwidth access and multimedia applications. The solutions to these problems are beyond the scope of any single institution, company or industry. The NGI, with its broad agenda and ability to involve government, research institutions, and the business sector is a program whose time has come. There is urgency in all of this.

## Background

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- NGI Subcommittee held weekly telecons
- Participated in FNC Advisory Committee meeting and NGI workshop
- Interactive meetings to focus on most fundamental issues with Government and research community
- Circulated findings and recommendations throughout full Committee

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The Presidential Advisory Committee on High Performance Computing and Communications, Information Technology, and the Next Generation Internet established a Subcommittee to closely examine the plans for the Next Generation Internet (NGI) and understand agency programs. This Subcommittee held focused weekly telephone conference calls to discuss NGI and to learn more about agency participation in the initiative. In addition, some members of this Subcommittee participated in the Federal Networking Council Advisory Committee meeting April 14-15, 1997 and the NGI Workshop on R&D held on May 13-14, 1997. The Subcommittee held an executive meeting to finalize their initial recommendations which were then circulated to the full Presidential Advisory Committee.

## **Internet's Future Looks Fragile!**

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- The U.S. government's investment in Internet has paid off in many dimensions. It has grown at 100%/year since 1988 and traffic has grown at 400%/year, creating jobs and whole new industries. The U.S. economy is increasingly dependent on the Internet.
- Today's Internet is already showing signs of frailty and high bandwidth architectures and multimedia applications are stressing it for the future.
- The solutions to these problems are beyond the scope of any single institution, company or industry.

*The NGI is an initiative whose time has come.*

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The U.S. Government's Internet investments have been incredibly successful. The Internet has grown at nearly 100% per year since 1988 and traffic has been growing at 400%/year rate recently. The Internet has created jobs and whole new industries. American business and government organizations are increasingly dependent on the Internet. However, we see signs of frailty and limitations in the Internet's current capabilities. This frailty will be exacerbated by high bandwidth access and multimedia applications. The solutions to these problems are beyond the scope of any single institution, company or industry. The NGI, with its broad agenda and ability to involve government, research institutions, and the business sector is a program whose time has come. There is a very real sense of urgency.

## **Government Has a Unique Responsibility in NGI!**

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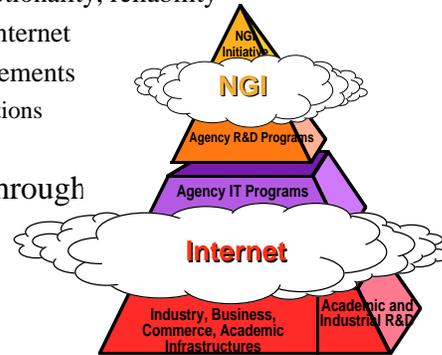
- Federal government has unique role to play
  - stimulate progress
  - further U.S. scientific and commercial leadership
  - sustain U.S. information technology leadership
  - only the U.S. government can create the framework for pre-competitive industrial cooperation
- NGI vision is beyond the scope of any one institution, company or industry sector

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We believe that the federal government has a unique role to play in stimulating progress in this area. The NGI program will provide enormous intellectual, social, and economic benefits to the nation and is the natural next step towards a global information infrastructure. This program is essential to sustain US technological leadership in computing and communications and enhance US economic competitiveness and commercial leadership.

# Invest in NGI NOW!

- By the year 2000, more than 50% of the U.S. population will have access to the Internet, as will a significant fraction of the rest of the world.
- Only key government R&D investments NOW can
  - address critical scaling, robustness, functionality, reliability and security challenges facing today's Internet
  - accelerate needed technological improvements
    - in computers, software, and communications
    - in advanced applications
- Create environment in which breakthrough research results are possible

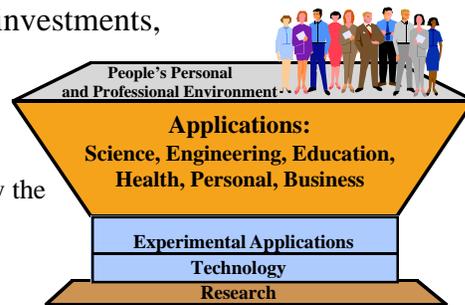


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By the year 2000, more than 50% of the US population will have access to Internet, as will a significant fraction of the world. The US Government can accelerate the process of bringing the full power of the expected exponential improvement in computing and communications to the public by making a few key strategic investments in research and development *now*, and by creating an environment in which breakthrough results are possible. Ultimately, the success of NGI will depend on the creation of break through applications that depend on it.

# Closer Cooperation Will Have Results!

- Combined efforts will surpass what any one group could achieve alone
- Encourage even closer coordination with the complementary academic Internet 2 program
  - NGI should focus on wide area infrastructure
  - Internet 2 focuses on campus connectivity
- Identify opportunities to leverage investments, interests, and activities
  - through a periodic National Forum on NGI
  - through update briefings requested by the Advisory Committee on specific coordination activities



We strongly encourage even closer coordination between the federal NGI Initiative, the academic community's complementary program known as Internet 2, and related federal and industrial efforts. By carefully identifying and coordinating each community's interests and activities in furthering the development of the Internet for the next century, and by providing subsidization to stimulate research and development as well as investments by others, the NGI initiative can develop a collaborative venture that will greatly surpass in effectiveness and integration what any single community could have achieved on its own.

It is important to identify opportunities to leverage investments, interests, and activities related to this initiative. This may be accomplished through a periodic National Forum on NGI and through periodic update briefings requested by the Presidential Advisory Committee on specific coordination activities.

## **All Sectors Must Invest to Benefit from Future Generations of the Internet**

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- Public will benefit from and should support investment in NGI research, enabling break-through applications that exploit these new technologies
- All institutions (notably health care and education) will need to adapt their facilities, procedures, and practices to take advantage of the results of NGI research
- Provide framework to involve other sectors in cooperative research
- Facilitate information technology industry participation in NGI through pre-competitive cooperative research

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Ultimately, all sectors must invest to benefit from future generations of the Internet. All institutions (notably health care and education) will need to adapt their facilities, procedures, and practices to take advantage of the results of NGI research (e.g. upgrading campus networks, implementing digital libraries, networking of health care systems). The program should provide a framework to involve industry in NGI through pre-competitive cooperative research.

## **Restate Program Goals To Better Match Intended Research Objectives**

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- NGI initiative should be focused on research results but closely coupled to applications and advanced infrastructures
- Clarify controversy and confusion by restating Goal 1 to be “Develop the next generation network fabric and connect universities and federal research institutions at rates that are sufficient to stress underlying technology and support future research”

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The NGI initiatives should not only be focused on research results, but also be closely coupled to applications and advanced infrastructures. One way to ensure this is to clarify the controversy and confusion that has arisen with respect to Goal 1 of the initiatives. This goal should be restated : “Develop the next generation network fabric and connect universities and federal research institutions at rates that are sufficient to stress underlying technology and support future research.”