

One Gigabit or Bust TM Initiative: A Broadband Vision For California

As presented at the ***CENIC 2003 - On
the Road to a Gigabit*** annual
conference

Objectives of the Study

Gartner assessed the economic potential of an acceleration of Next-Generation-Broadband deployment in California. Our assessment included interviews of the top broadband thinkers, policy makers and consumer advocates within the State, the nation and the world.

The resulting report summarizes the economic benefit, key issues, and recommendations for next steps.

Study Methodology

- Evaluate the economic potential of an acceleration of broadband deployment in California based on a correlation of GDP and broadband utilization developed by Gartner.
- Interview many of the top broadband thinkers and participants within the State and the nation to understand the opportunities and challenges a broadband initiative might face. Gartner created three interview teams to explore: current social, political and technological issues and challenges to broadband deployment. One set of interviews focused on the technology issues, another on public policy and economic issues and the third on the regulatory environment.

Key Issues Reviewed	Key Interviews
Team 1—Regulatory Issues	
Current California regulatory environment	CPUC Commissioners/Advisors/Senior Staff
Rulings/legislation and case studies pertinent to the Next Generation Internet (NGI) project	Academia, Legislators/Advisors, Industry Associations
Assess regulatory and policy agendas	Industry participants (telecom, cable, wireless)
Evaluate benefits, issues, key barriers relative to the NGI Project	Consumer Advocates and Public Policy Advisors
Team 2—Policy Issues/Economic Impact	
Review/Assess economic models/case studies	Economists, policy leaders
Evaluate opportunities relative to NGI Project	Industry participants (telecom, cable, wireless)
Assess specific growth opportunities	Industry leaders (healthcare, finance, education)
Equity issues and solutions	Leaders from urban/rural development groups
Team 3—Technology and Competitive Environment	
Current communications environment	Technology leaders, academia
Current competitive environment	Industry participants
Comparative broadband projects	Leaders of broadband initiatives in other regions
Current and future user needs/requirements	
Technology and business trends	
Leadership models	

Key findings

- **California is a world leader in the deployment of today's broadband technology. However, other countries are eclipsing California's lead by deploying a Next Generation Broadband that is 100 - 1,000 times faster. We are at risk.**
- **Gartner estimates the State can obtain a \$376 Billion increase in the Gross State Product by 2010 with the implementation of a One Gigabit or Bust Broadband initiative.**
- **There is no new single killer application that will justify Broadband deployment. The killer app remains improved communications.**
- **We no longer agree on what broadband is, why we need it, and how to obtain it.**
- **To achieve ubiquitous Broadband we must rise above our individual agendas, establish common goals and objectives representative of the residents and businesses of California.**
- **WE NEED LEADERSHIP**

Key issues

- We have not yet gained agreement on the need for, and the benefits of, broadband deployment
- We have not yet established our next goal for broadband deployment
- We have not gained agreement on our objectives, strategy, and tactics for the deployment of broadband
- We have not yet taken coordinated action to accomplish a new broadband objective

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**The Broadband
Opportunity**

How California Compares

California has been a leader in broadband deployment. Our GDP is, in large part, the result of our leadership. But we are quickly loosing our leadership as Japan, South Korea and even China deploy Next Generation Broadband technologies

Ranking	Country	GDP in Billions	Broadband Penetration per 100 households 2001	Forecasted Broadband Penetration 2006 ²
1	U.S.	10,171,400	11.3	36.0
2	Japan	4,245,191	3.92	34
3	Germany	1,873,854	5.1	21.6
4	United Kingdom	1,406,310	1.4	21
	CALIFORNIA	1,341,000	14	37
5	France	1,302,793	2.5	20.7
6	China	1,159,017	0.03	3
7	Italy	1,090,910	1.8	13.7
8	Canada	677,178	21.3	43.6
9	Mexico	617,817	3.8	9.0
10	Brazil	502,509	2.9	7.1
11	India	477,555	.01	.06
12	South Korea	422,167	51	77

The Broadband Opportunity

Telephony and cable deployments are now effectively at *saturation*, with both industries eyeing each other for potential expansion. Voice revenue, a \$16 billion + California market in 2002, is experiencing aggressive competition from competitive service providers and cellular phone providers. Satellite and cable system “over-builders” are successfully competing for a share of the \$50 billion in total North American cable revenue. To survive in a competitive market California service providers must begin to offer the next generation products that are becoming available from broadband. The only long term solution is through the deployment of a Next Generation Broadband initiative.

The New Definition of Broadband

Broadband is currently defined as data service with a down-stream transmission speed exceeding 200Kbps. This definition is useless for anything other than fast Internet access.

Speed	Functionality
100 Kbps	Fast Internet and e-mail; games; voice
1 Mbps	Music
1.5 Mbps	Broadcast quality MPEG II video
10 Mbps	One (limited) HDTV channel and two basic channels
50 Mbps	Full HDTV support; off-site computing storage

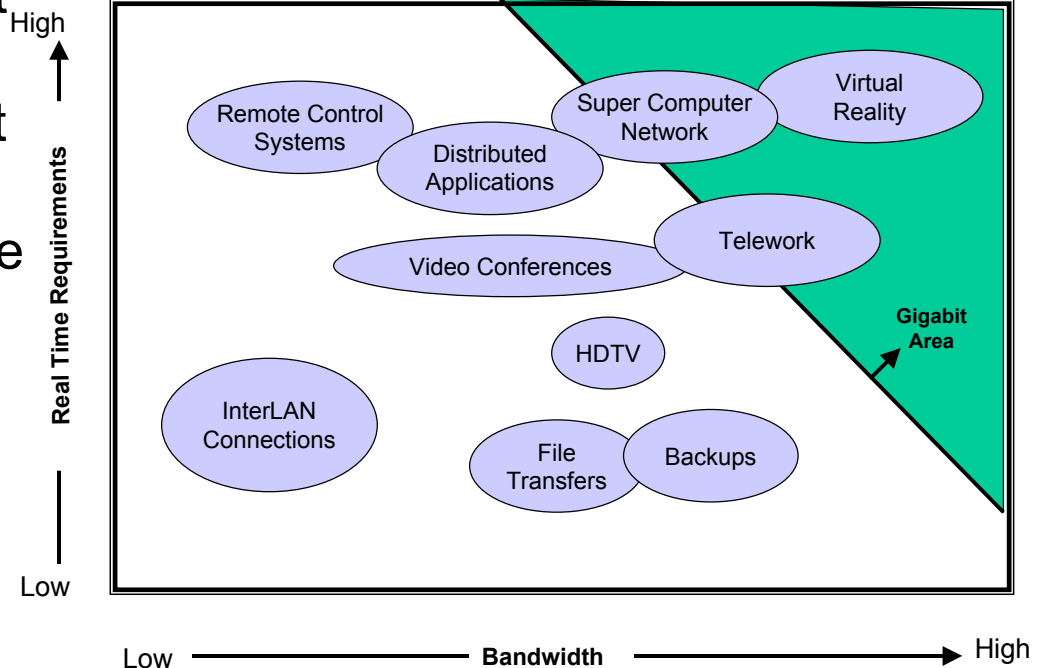
What is needed is a new definition of Broadband that accommodates our needs over the future. This new “Next Generation Broadband” should be our goal

*“It’s not about capacity. It’s about the capabilities made available by the capacity.”
Nitin Shah, Chief Strategy Officer,
ArrayComm*

Next Generation Broadband is 1 Gigabit per Second

Gartner advocates that true broadband does not begin until the network can deliver sustained 10-Mbps symmetrical data rates to the home, and requires at least 50 Mbps to deliver on the full promise of today's known applications. But that defines today's world. To meet the goals of a visionary Next Generation Broadband, 50 Mbps is not enough. Gartner asserts one Gigabit per second (Gigabit) of throughput per home will be required to support Next Generation Broadband applications.

Long term Infrastructures investments must be predicated on a capability to provide Gigabit



Next Generation Broadband must be Ubiquitous

Broadband will become ubiquitously available when it becomes a substitute for existing telecommunications and/or cable TV services.

Broadband must be integrated and utilized within the communications infrastructure - this means that broadband must be ubiquitously available.

We do not advocate:

- Field of Dream investments
- Massive government funding
- Waiting for a “killer app”

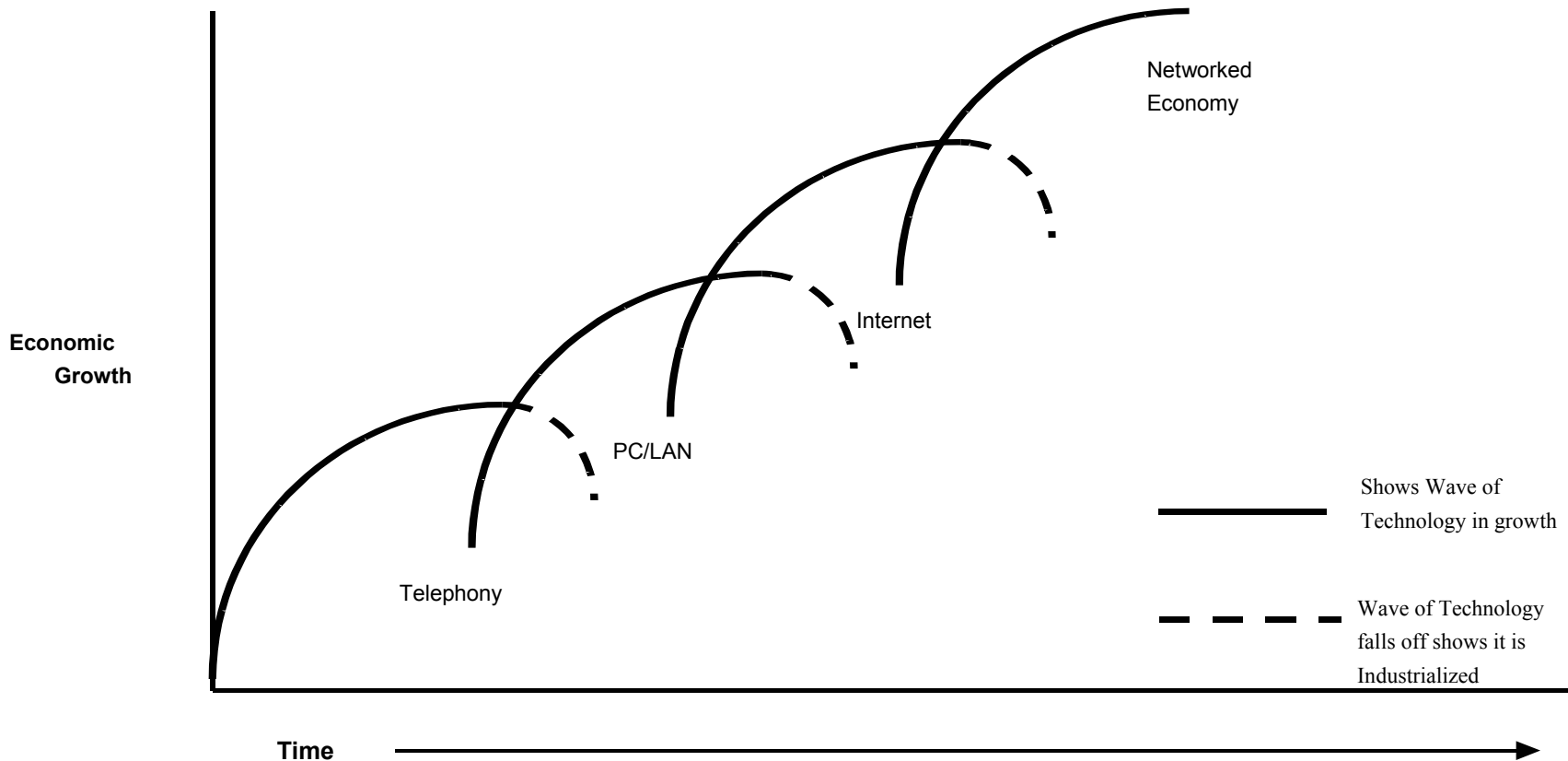
We advocate making NG Broadband a viable substitute

Estimating the Economic Benefits of Ubiquitous Broadband Deployment

- A consensus is developing that economic growth and prosperity can result from broadband deployment
- Results from the Gartner economic methodology have been used by the State of Michigan as part of a broadband initiative
- Having a view of the economic possibilities helps to engage people in creating the practical ideas

Waves of Technology Drive Windows of Economic Growth

As each technology is absorbed it becomes the basis for another subsequent wave

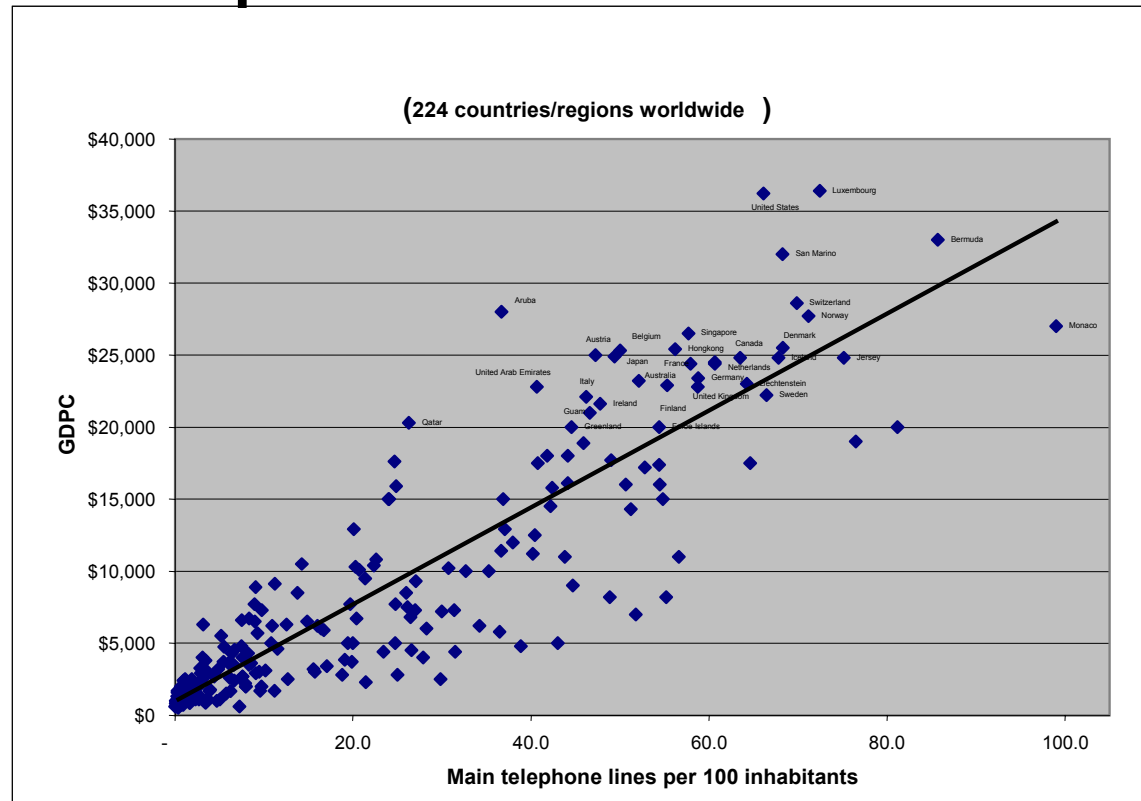


Source: Gartner, 2003

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The Correlation of GDP and Teledensity

In the early 80's a study by the ITU found a basis for a correlation between communications and Gross Domestic Product per Capita. Gartner has taken the correlation a step further.

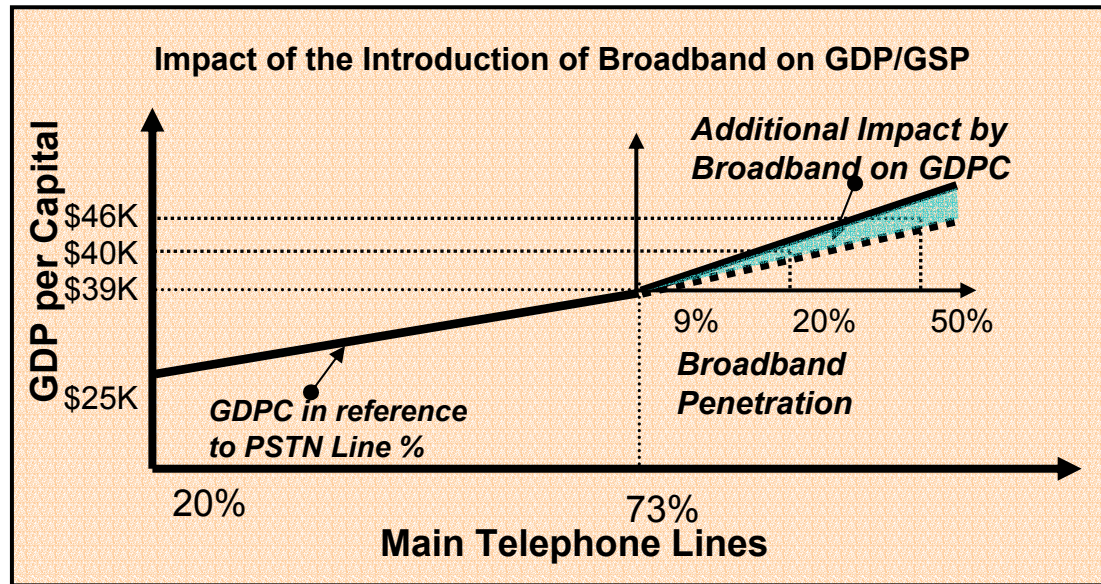


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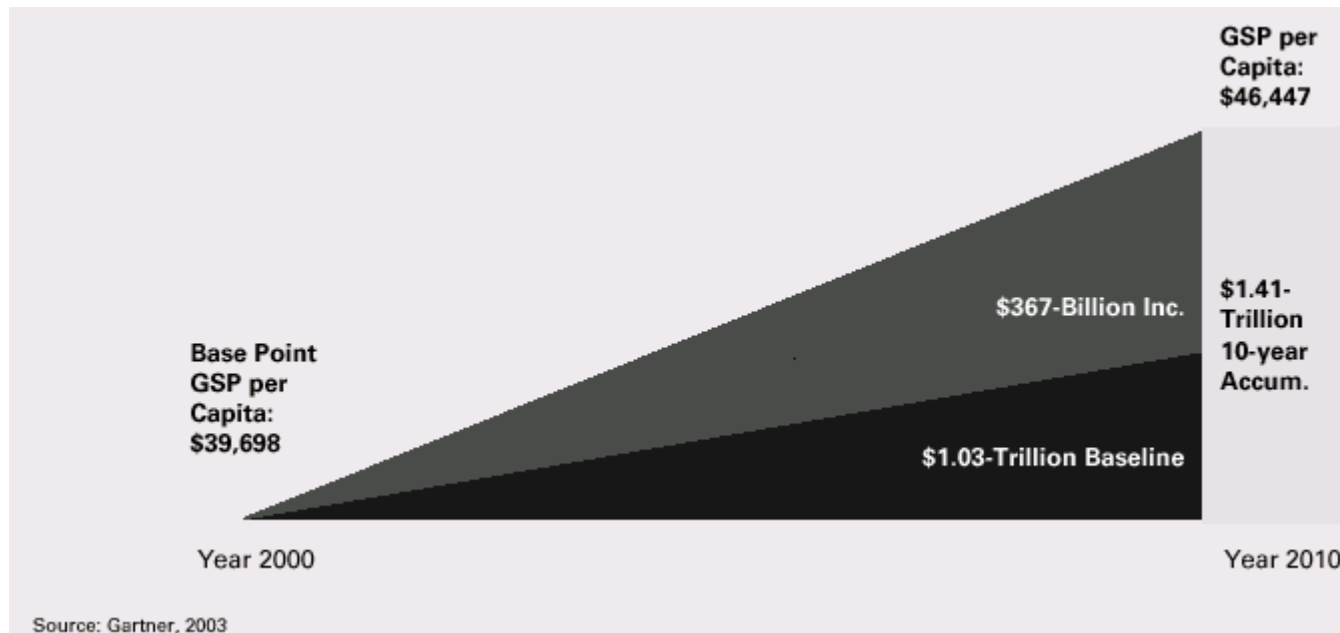
The utilization of Broadband can have a major impact on productivity

By taking steps such as a Broadband initiative, the State GSP will incrementally increase



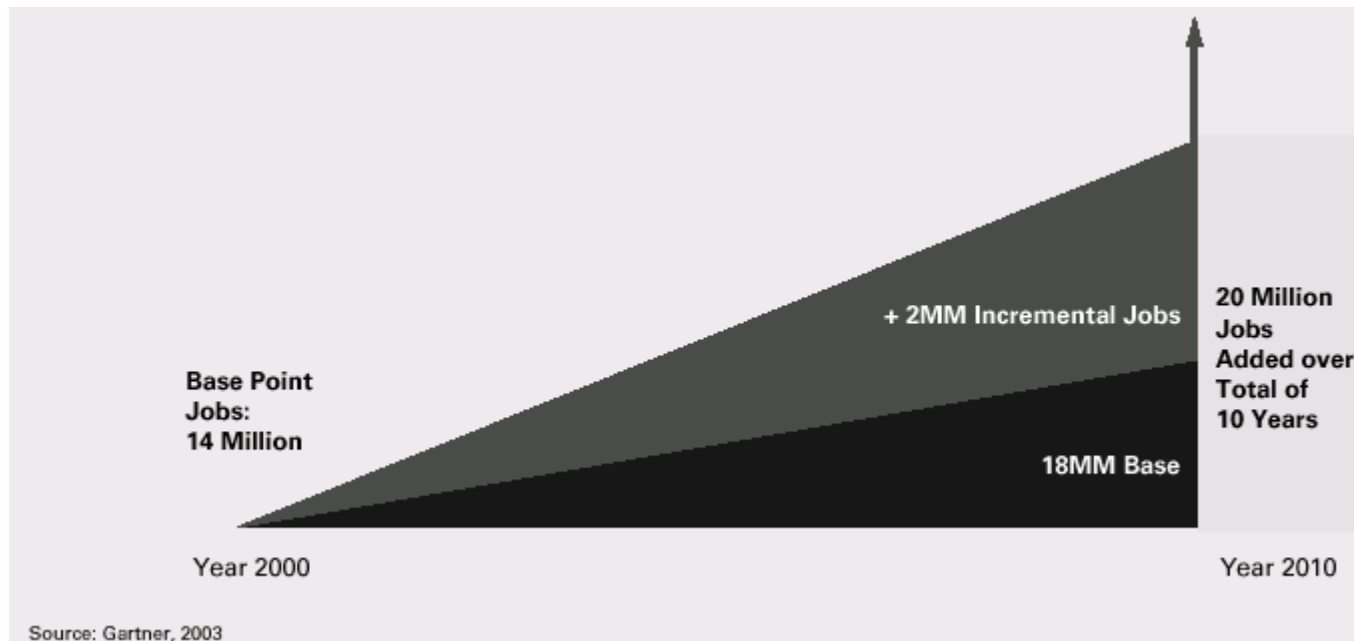
\$376 Billion Opportunity

Applying the methodology to a broadband penetration of 50% per capita produces a substantial opportunity to increase California's Gross State Product by 2010



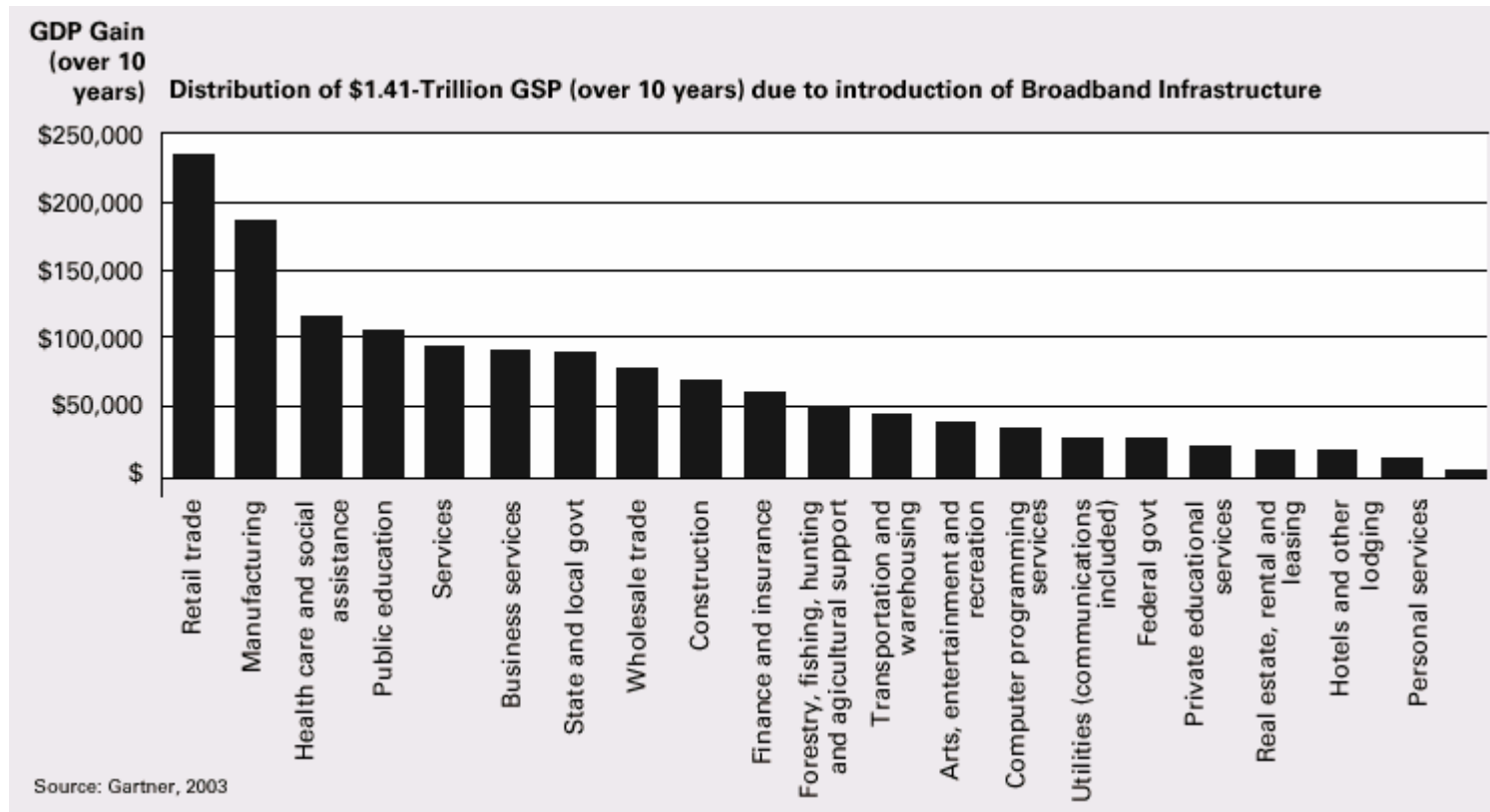
2 Million Incremental Jobs

Increases in jobs reflect new jobs created by reorganization of industries as well as retention of jobs within California industries



Distribution of \$1.41 Trillion GSP Gain (over 10 years)

Potential Distribution within Key California Industries



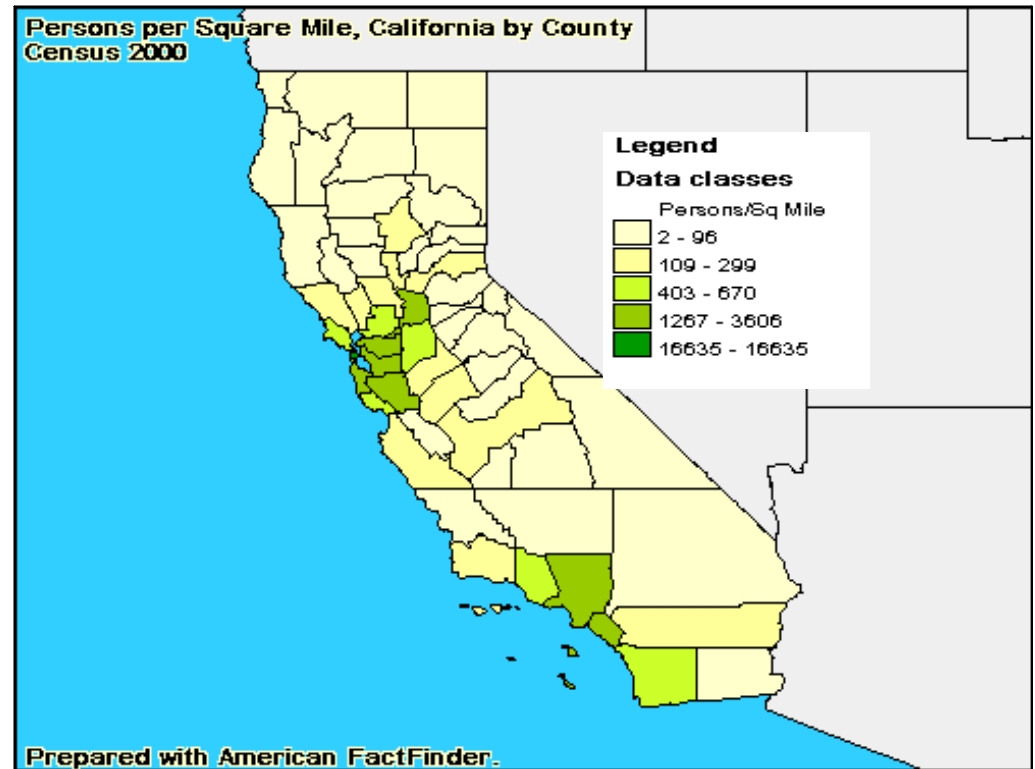
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Broadband Obstacles

Developing a Clear Vision on How to Drive Ubiquity

We don't have the density of South Korea or Japan. This is often cited as a key barrier to NG Broadband. We have economic divides, education divides, social divides.....

We don't lack divides. Market forces alone will not bridge these divides.



Dichotomy of Interests

Although we found the leading thinkers to be strong proponents of broadband deployment, our interviews repeatedly revealed conflicts of goals and objectives.

Gartner asserts it will be impossible to deploy ubiquitous next-generation Broadband without exceptionally strong leadership capable of; reaching a consensus of goals and objectives, identifying roles and responsibilities, and the development of an action plan.

Group	Agenda
Service Providers	Both cable and telcos want change only in the context of current business models and some use regulation as an excuse or delaying tactic. Both cable and telcos are struggling with changes to their business models and competition from alternate providers and technologies.
State Legislators	Have the willingness to advance a popular broadband agenda but many may not understand what broadband is or what it means. They may lack the technical knowledge to create a long-term vision. Legislation is often reactionary to a perceived need.
State Regulators	View that they've dealt with broadband in previous proceedings. They're concerned about the utility—and are focused on identifying the cost versus the benefits.
Consumer Advocates	Understand that their constituents may not recognize the specific value of these issues. They say that broadband access is not a luxury and providers overstate costs.
Economic Development Groups	Face an uphill battle especially outside the first tier markets getting providers to invest. Must deal with issues beyond the technology itself such as technical literacy.
Municipalities	Are frustrated and view broadband as an economic development necessity and are looking for ways to protect existing revenues and create new revenue sources. Some are taking matters into their own hands.

Other Obstacles

The cost-per-bit for high speed currently increases linearly, it needs to substantially diminish - *Is Passive Optical Networking and Ethernet access the answer?*

We must find cost-effective solutions for the “First Mile” - *Can we start by including fiber in our new communities?*

We must address issues surrounding the protection of intellectual property- *We must overcome the stalemate between broadband and our entertainment industries*

Mythological Obstacles

- We must wait for the killer application
- We must wait for a new technological solution
- There is a glut of bandwidth, we don't need more
- We must wait for funding
- We must wait for new regulations that will lead the way.

Gartner believes, and our interviews confirmed, that fiber provides the only proven method of providing a Gigabit of bandwidth per user. Fiber has the advantage of being capable of deployment today using today's networking technologies, and then being upgraded over the course of a 30-year functional life. It can immediately be deployed with no concerns of technological obsolescence. Fiber is the only technology with these assurances.

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What is Required?

Broadband Vision and Leadership

California needs leadership that can:

- Understand the interests of all stakeholders and bridge differences in objectives to forge a common goal
- Understand the complex technology issues that must be resolved, knowing which issues must be addressed, and those that are red herrings
- Develop partnerships and collaboration between the hundreds, possibly thousands, of stakeholders
- Navigate the treacherous political waters and survive the boom or bust funding cycles.

We all have roles in establishing the vision and demonstrating leadership

Role of Policy Makers and Legislators

More than one interviewee referenced the work done by NSF and DARPA when framing the type of vision that is needed. Nothing today was seen as having a similar vision.

Policy makers should:

- Establish standards and guidelines for Next Generation Broadband infrastructure deployment
- Encourage collaborative efforts of the State, counties and municipalities
- Establish a clearinghouse for best practices in today's broadband deployment
- Create "regulatory free" zones to entice investment by incumbents
- Participate in finding a solution to intellectual property issues
- Eliminate right-of-way barriers
- Require new developments to include fiber or conduits for fiber
- Become an anchor tenant for the broadband network
- Require broadband be capable of replacing existing telephony services

These actions do not require direct government funding

Role of Regulators

The California Public Utilities Commission (CPUC) must be a partner in a Next Generation Broadband initiative in California. The CPUC can help create a public policy agenda that will focus on how to establish creative programs to bolster broadband deployment and utilization.

<u>Goal</u>	<u>Action</u>	<u>Outcome</u>
Work for a Broadband Vision	<i>Look beyond current applications and services</i>	<i>Lightwave Friendly Lightweight regulator Local Initiatives Logical Layers of Unbundling</i>
Bring the Converged Industry Together	<i>Involve the "converged" industry (tech companies and media owners)</i>	<i>Unified Agenda focused on Broadband vision</i>
Develop Flexible Regulatory Model	<i>Let the market dictate the level of regulation</i>	<i>Access: Interconnection: -Urban Negotiated -Suburban Agreements -Rural Svcs/Apps Focus on: Deregulated Awareness Applications Access</i>

Role of Municipalities

We believe Municipalities is where the NG Broadband deployment action is at

Loudoun County is only the tip of the iceberg. According to a new study released during the FTTH Conference 2002, FTTH installations are expected to leap by 330 percent in 2003 from 72,100 homes passed to 315,000 homes passed, ultimately reaching between 800,000 and 1.4 million homes by 2004!

Role of Entertainment

Rather than concede that the emergence of digital distribution has eliminated the profits previously obtained through the packaging and distribution of music and videos, content producers are fighting hard to shut down any element of the information infrastructure that enables copying of unauthorized copyrighted material. Witness the Recording Industry Association of America (RIAA) lawsuit against four college students who were running file-swapping servers.

Content providers must find a way to view the Internet as an opportunity instead of the Internet as a threat.

Robert Zitter, SVP of HBO, “We need to find a way to accommodate the unrestricted peer-to-peer sharing of non-copyrighted material while protecting the interests of intellectual property owners. Government could have a large impact on the successful deployment of Next Generation Broadband by focusing on the copyright issue.”

Role of Service Providers

They must fight to deploy infrastructure capable of provisioning the next 30 years of communications services - FIBER

To survive—and thrive—Gartner believes wireline carriers must use the current investment opportunity to deploy an unassailable competitive advantage. Now is the time to make an investment wireless providers cannot match because of wireless technology limitations. Now is the time to exchange today's survival strategy of high-speed services for a success strategy based on Next Generation Broadband service platforms. Clearly, we believe enabling integrated Next Generation Broadband services is the key to survival for wireline providers.

Role of CENIC

Universities are a key to developing a collaborative joint use effort. Most of our technology has its roots in California Universities. We must go back to our roots to further the NG Broadband initiatives. Gartner recommends CENIC facilitate the process of establishing a NG Broadband Roundtable. The Roundtable will define the goal for NG Broadband and establishing an action plan. This plan will become the basis for the Next Generation Broadband vision.

- A vision that will lead California to the next level of economic growth
- A vision that will keep California a world leader
- A vision that all interested parties can enthusiastically support.

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Recommendations

NGI Roundtable Next Steps

Based on the interviews, Gartner has identified the following action steps that the NGI Roundtable should undertake:

- **Identification of a leader or leadership team**
- **Development of a business plan that includes a specific definition of broadband, a description of the deployment goal and a timeline for completion**
- **Construction of implementation scenarios**
- **Development of specific costs**
- **Demand aggregation and anchor tenancy**
- **Coordination of regulatory/legislative policy between federal, state and local entities**
- **Public and private partnerships for all aspects of the project**
- **Continued formation and utilization of commercial broadband market test beds**

Conclusion

California Has a Choice—Lead, Follow or Get Out of the Way

Today, high technology, entertainment, biotechnology, agriculture and many more industries call California home. California has the most to gain from action and the most to lose from inaction. Other regions will welcome these industries and are taking steps to attract them. Now is the time to choose California's future.