

1. Role of Government :

- a. Some members of the task force see the role of the government limited to facilitating access to unserved and underserved areas. I believe that the government at local, state and federal levels has a much broader role in ensuring affordable broadband access for all Minnesotans in many ways including identification of unserved and underserved areas, setting appropriate policies and regulations, financial support , and facilitating public private partnerships as needed.
- b. Some private telecom companies are of the opinion that the local governments (cities, counties) should not compete with the private sector in providing broadband services to the residents and businesses. I believe that it is appropriate for the local governments to offer broadband access IF they are able to provide the comparable and more affordable service to all residents and businesses.
- c. Establishments of government service delivery such as city halls, county facilities, public utilities, educational, institutions and other “Anchors” such as medical centers can collaboratively provide the backbone (network of large pipes) that can serve the whole community.
- d. The role of local governments (cities and counties) in facilitating broadband access needs to be better defined. Local governments can be instrumental in 1) Identifying the unserved and underserved areas, 2) serving as the information clearinghouse for available resources and infrastructure , 3) developing collaborative partnerships among public, and private sector participants aimed at maximizing the use of existing infrastructure owned and operated by private and public partners, 4) helping to navigate through the regulatory process and 5) assisting with financial incentives and funding opportunities available at the local, regional, state and federal levels.

2. Establishment of goals for the Ultra High Speed Broadband Speed for different tiers of Service:

- a. Up to this point there is no consensus regarding the minimum threshold for broadband speeds. Suggested threshold speeds range from 1.544 Mbps to 1Gbps.
- b. The task force must recommend a high enough speed threshold for broadband connections that will serve the needs of all Minnesotans and allow Minnesota to compete in the global context by year 2015 and beyond. Based on the information presented so far the current available hardware in the marketplace has the ability to deliver 1Gbps and fiber is the technology that will deliver 1Gbps to the home or the business.
- c. The recommended connection speeds and capacities for the delivery of local government services must be able to accommodate anticipated consolidation and regionalization in the upcoming years.

3. How do we pay for it:

- a. There are varying opinions as to how we pay for achieving ubiquity in the delivery of ultra high speed broadband service for all Minnesotans. Some financial mechanisms mentioned include vouchers, tax credits, state and federal subsidies, stimulus package/economic recovery funds, universal service fund etc.
- b. Once the task force has established the goals for ultra high speed broadband service levels the associated costs and financing mechanisms need to be examined and recommended.
- c. In this time of dwindling resources for public infrastructure public/private financing partnerships must be pursued for underserved and unserved areas where it not cost effective for the private sector to provide ultra high speed broad band service.

4. Mapping:

- a. Some members of the task force, including myself , question the reliability of Connect Minnesota maps for broadband access due to speed and methodological assumptions used in the mapping process.
- b. The speed threshold applied for determining broadband access in Connect Minnesota Projects was 768Kbps. The task force must settle on significantly higher threshold for broadband speed if we are striving to achieve truly "Ultra" high speed broad access for all Minnesotans. Can Connect Minnesota maps/methodologies/contract etc. be adjusted to get a new or a modified product that addresses our definition of "Ultra" high speed broadband access? If not, the Task Force needs to recommend, other avenues for delineating and tracking underserved and unserved areas going forward.

John Gibbs

1. There is fundamental disagreement about the characterization and perspectives on "Where we Are Today" with respect to broadband availability, quality of existing broadband services, and affordability of existing broadband service. This schism cuts along the same lines as those who advocate for a more expansive government role in the broadband market vs. those who support a more limited role for government.
2. Proposing regulatory schemes that inhibit competition and investment and ignore recommendations for technology neutral deployments.
 - a. Key items: More regulation is not the answer; Government intervention will only slow the process and make innovation difficult.
3. Universal service funding for broadband.
 - a. Key Items: Non-broadband services should not subsidize deployment; Subsidies limit investment and lock in outdated technology.

JoAnne Johnson

- **The Role of Government** as in:
 - Could or should the Internet be regulated? Controlled? Mandated?
 - Should government entities sell services retail? Muni systems-state networks?
 - Are there rules and regulations that could be improved or discarded to ease innovation and deployment?
 - How much can the state decide without the FCC, etc.?
 - What are viable public/private partnerships?
 - Incentives and subsidies – to whom for what from where?

- **Speed Specifications** as in:
 - How would we reconcile setting a very high speed only attainable on fiber with our vow to be technology neutral?
 - Is there a place for a high minimum if our intent is to differentiate between application needs?
 - If symmetrical service is or could be available wherever broadband is available, does it make sense to somehow require it be delivered to all regardless of need?
 - How do you mandate the configuration of products and services sold in this state beyond standard business and contractual rules?

- **Net Neutrality** as in:
 - Who's going to define net neutrality in the first place?
 - What about the state and gambling, are the courts be the right place to decide some things like that, the FCC for others?
 - Should neutrality trump tiered service offerings or does that do away with a primary affordability tool? And kill the service tier approach?

Peg Werner

1. Private vs. municipal deployment of networks
 - a. Key items: some think private only, some think municipal as a last resort, and some think whatever the local situation warrants
 - b. Opinions seem to be deeply-rooted and firmly-held
2. Technology Neutrality
 - a. Key items: some think all current forms of provision of broadband should continue and be encouraged, others think the future is fiber in the ground only
 - b. Some to think that backbone or last mile provision makes a difference in method of transport
3. Goals of the Task Force

- a. Key items: are we to: recommend to the Legislature what the broadband network should be? Where it should go? Who should the providers should be? Who should pay for it? What it will offer (tiered-service)? Who will manage in the future?
- b. We have considered what the report should contain and how it should be laid out; perhaps we need to discuss what WE think should happen: what do we expect the Legislature/Governor to do next? How will that happen? What will be our role? What if there is no response?

Gopal Khanna

1. Role of local governments

- Local government position:
 - Must be able to provide own broadband infrastructure for citizens since private sector is unwilling or unable to do it in many instances.
 - A majority of the citizens should have the right, through their elected officials, to have the city deploy the broadband infrastructure to meet their needs
 - Broadband infrastructure should be considered the same as water, sewer, and streets as essential public infrastructure and should be handled the same way.
- Private sector position:
 - This amounts to the public sector competing with the private sector.
 - In many cases, this would be duplicating existing private sector infrastructure.
 - This is not the main function of city government.
 - The private sector has more expertise and can do it more efficiently than local government.
 - Many business cases developed to justify the deployment of broadband infrastructure by local governments are inaccurate and do not cover the total costs or the revenue projections are too optimistic.

2. Fiber To The Home (FTTH) as a recommendation

- FTTH proponents position:
 - Fiber is the only technology that will meet the bandwidth requirements of the future
 - Deployment of fiber is necessary now to have the bandwidth available when it is needed in the future.
- FTTH opponents position:
 - There are no applications currently identified or in the near future that cannot be met with fiber to the node, coax and copper to the home infrastructure.
 - The limits of the existing copper infrastructure are continually being raised

Broadband Task Force May 2009 Homework Assignment Most Contentious Issues

- Placement of FTTH is not required, would be an unnecessary cost, and duplicate existing infrastructure that is meeting the needs of the users at the present time.
- Users would not be willing to pay the additional cost at this time.
 - Without Net Neutrality, innovation would be stifled. Net Neutrality ensures that innovators can start small and dream big about being the next EBay or Google without facing insurmountable hurdles. Unless we preserve Net Neutrality, startups and entrepreneurs will be muscled out of the marketplace by big corporations that pay for a top spot on the Web.

Dick Sjoberg

1. There is an obvious, stark philosophical difference within the task force regarding the role government should play in the broadband industry going forward. This disagreement is evident in most of the critical sections of the draft report. Generally, one camp believes government's role should be limited to achieving the goal of providing broadband service to currently unserved areas, and not much more than that. The other camp believes government's role should be much more expansive: declaring broadband a "fundamental human right;" having the government establish speed standards for broadband; having government compete with the private sector in delivering broadband to consumers; having government subsidize broadband deployment through fees and/or higher taxes; and establishing a permanent state broadband agency.
2. Ubiquitous service at one universal level, e.g., one gig to every home
 - a. Key Items: Ignores practical solutions and innovation to address the hardest to serve areas
3. Favoring government ownership over private investment.

Craig Taylor

1. Broadband is already available at an affordable cost for most of the Minnesota population.
 - a. Pro – Whether you are a business or a consumer the availability, choice and competition, and tiering of product/service ensure that you get what you pay for at a fair price. Providers need to make a profitable return on their investment. We can't have consumers subsidizing other consumers. We can't have businesses subsidizing other businesses.

- b. Con – The Task Force has heard feedback that both SMB and Consumers are paying too much for their broadband. They would like more affordable alternatives. Some people are not taking advantage of broadband all together, not because it is not available, but because it is not affordable or they lack the end point computing device and expertise to do so. Some subsidization should be available in the form of discounts (via vouchers or whatever the most efficient and effective form is) to those who would have to pay a significantly higher percentage of a minimum threshold of their net income. Broadband is a necessity, not a luxury to move ahead in this world in many different ways, economically, socially, environmentally, educationally, and medically.
2. Minimum speed threshold definitions are not necessary for broadband in Minnesota.
 - a. Pro – While today’s FCC minimum speed definition (768 kbps) for broadband are outdated, Minnesota is in a good speed position leadership in the United States with DOCSIS 3.0, Advanced DSL, and LTE implementations in progress across the state. There are many speed tiers available for consumption.
 - b. Con – Minimum speed thresholds are necessary to set the floor at a minimum for the lowest cost product/service that qualifies under Minnesota’s definition of broadband.
3. Public Ownership of broadband infrastructure should not be encouraged in Minnesota.
 - a. Pro – Private business is taking care of business for businesses and consumers alike in almost all instances. Public ownership is doomed to fail – consistently underestimate the build and operate cost, unrealistic take rate estimates, cannot afford to invest in the future, etc. See failed examples in Minnesota and across the United States.
 - b. Con – Some instances may require that public entities, counties, municipalities, cooperatives - not for profits take the lead in providing the necessary infrastructure. ROI too long for commercial interests or lack of real commercial interest. How do you explain the successful existing examples in Minnesota and across the United States? Sometimes it just takes a larger public interest anchor tenant(s) to make it feasible for others to join in.

Two others that I don’t believe are in our purview (charter), but I predict will get many minutes if not hours of discussion:

4. Net Neutrality
Should be a Federal issue
5. Broadband Consumption Caps
Should be a “market” issue

Brent Christensen

1. **COMPETITION:** One side of the issue believes that competition is required for the deployment of quality broadband. The other side (the one I agree with) is that while competition has its place in more urban areas, it does not make sense in smaller rural areas, particularly outside municipal boundaries.
2. **FIBER MUST BE DEPLOYED TO EVERY STRUCTURE IN THE STATE:** One side of the issue contends that we must spend the money now to deploy fiber to every premise in Minnesota. I contend that while fiber has its place, we must remain technology neutral and let the market place decide the rate at which fiber is deployed.
3. **WE MUST BUILD A NEW NETWORK:** There are those who believe the only way to deploy next generation broadband is to scrap the existing network and start over. I believe that does not make sense and we need to continue to invest in the continuing evolution of the existing network.

Mary Ellen Wells

1. **Regulated or Competitive:** Should the deployment and ongoing use of high speed communication be controlled by a government-sponsored agency or should the competitive market decide? **MY BELIEF:** There needs to be some oversight to ensure that at least minimum standards are met across the state and that companies are given incentives to provide services to less-profitable areas.
2. **Minimum standards:** Speed and reliability are important and there should be mandatory minimums for all parts of the state **OR** People who live in rural, sparsely populated areas just can't have some of the services that densely populated areas have and companies should be able to determine the speed they can provide. **MY BELIEF:** There should be minimum mandatory standards. If a company cannot meet those requirements, they should not be allowed in the market (e.g. Monticello?). Also, every area of the state should be covered, and those minimum standards should be high and the technology robust enough to grow with the demand.
3. **Method of delivery:** Fiber should be run to every driveway in the State **OR** There needs to be a flexible solution that allows for cost-effective delivery of the minimum service standards. **MY BELIEF:** There must be an upgrade to the technology available in rural areas. However, while it would be wonderful to provide fiber everywhere, it simply isn't practical from a geographic or cost perspective. Therefore, the methods used must be flexible (e.g. fiber, wireless, satellite) and supported to ensure minimum services.

Karen Smith

1. Competitive Neutrality (Role of Government and Private Industry). This issue should not be confused with “Net Neutrality”:

Verizon Wireless’ position: OPPOSED:

- ✓ Municipalities should not use public funds to build, maintain and operate broadband networks that compete with private investment
 - Private investment would be discouraged from investing in areas where public-owned networks were constructed or may be constructed.
 - The residents would not see newer technologies rolled-out of the networks were publicly built.
- ✓ Limits/hinders competition
 - Private firms would see hurdles put in place to protect publicly owned networks
 - Return on investment would dissuade carriers from entering markets that were funded publicly

Opposition’s position: SUPPORT:

- ✓ Build out in unserved areas where private investors may be unwilling to recoup investment due to low populations, rural areas or take rates

2. Affordability/Creation of State Universal Service Fund

Verizon Wireless’ position: OPPOSED:

- ✓ The creation of a state USF fund to build and maintain a broadband network (whether publicly or privately maintained) would put an unfair burden on those providers (and its customers) who choose to use their own capital investment dollars to build and maintain their own network

Opposition’s position: SUPPORT:

- ✓ Allow for funding stream for underserved areas where private investors cannot recoup investment due to low populations, rural areas or minimal “take rates”

3. Regulation of Service Quality Standards

Verizon Wireless’ position: OPPOSED:

- ✓ With respect to regulation of service quality minimums and maximums for broadband speeds and technology is best left to federal regulatory entities.

- Minimum standards and benchmarks cannot keep up with the faster pace of technology development
- Verizon Wireless has initiated its “Open Development Initiative” that encourages partnership with content providers
- Costly service quality standards would discourage development and divert capital investment dollars to compliance in outdated technologies
- Minimum standards would not ensure better service

Opposition’s position: SUPPORT:

- ✓ Service quality standards would guarantee minimum upload and download speeds and ensure that all users get minimum level of service

Chris Swanson

1. Speed to define Ultra High Speed Internet

Setting a speed that is higher than the current capable speeds by existing copper infrastructure and internet companies (DSL) would force them to spend more money in upgrading their technologies than they would see a 3 year ROI on. This would put them at a disadvantage to other competitors who have not invested in the infrastructure that has limited capabilities for the future.

Preparing Minnesota for 2015 and the growth of the internet that we have seen is the mission of the Minnesota Ultra High-Speed task force. By definition Ultra is not status quo or even close. Ultra means going beyond what is usual or ordinary excessive extreme. It has been demonstrated that there are technologies which can easily deliver 100Mbps to consumers and businesses. It has been suggested that we deliver 100Mbps to each home and business in Minnesota. Our goal as a task force should be to establish a floor speed. Ultra high-speed in my mind is 1Gbps to each home and business in Minnesota.

2. Symmetric Speeds

Consumers don’t use as much upload as they use download. Just the word “consumers” proves that. We do not need symmetrical speeds for consumers because they just don’t produce as much as they use.

Business and business ideas often start in the home. Economic diversity is the ability to have large businesses and small businesses all in one economy. The small business today is often left out by only being able to get an affordable consumer grade internet connection even when they depend on the internet for the production and shipment of goods and services (which is uploading). Even when they can afford the business class connection the speeds

are still a limiting factor for uploading large files. Bandwidth caps are already starting to be put into place on consumer connections which limits a business's ability to grow and employ more people. Upload speeds are often far less than the download speeds and force the movement of files to go very slow. As the internet has started to grow up the need for symmetrical upload and download is increasing.

3. Role of Government

Government is taxpayer's dollars. Government is slow, unreliable, expensive and spends the money it makes in profit not to improve things but to cover other expenses somewhere else. Government does a terrible job keeping the roads fixed let alone running a highly complex business such as a data network or phone company. Often they are not competitive in price and often they don't allow competition once they are the local provider. (electricity, gas, water, sewer, etc.)

Government has increasingly taken on the role of economic developers. At bare minimum they are being forced to recognize that the Internet is one of the first big questions businesses ask when looking to move to a community. Smaller businesses may not be as vocal until you sit and talk to them. Often the phone, internet, and electricity are the biggest utility issues that a small business requires to operate. In a good economy or bad we want to encourage people to start businesses and we want the starting of those businesses to be as easy as possible. Internet needs to be readily available to do this. As the government speaks to their constituencies the Internet is one of the biggest issues on people's minds, because no matter whom you are the Internet impacts you on a daily basis.

The governmental entities that I see getting into the business are doing so out of necessity to build out the needed infrastructure or encourage the incumbents to build out the necessary infrastructure so that business can flourish and grow in these communities. Also, government can finance projects over a longer period of time because of the financial tools they have available. A private business needs to show a return on investment in 18 months to 3 years. For rural communities the internet can make or break them and today that is a strong recognition. I personally have had people tell me that "this is like the railroad if we don't get it we are going to lose our business base." Although I agree that private businesses are often better suited to run these networks I do not see competition from government entities as a bad thing. Public and Private partnerships especially for rural areas are critically important.

Tom Garrison

- 1) Connection Speeds Needed by 2015**
- 2) Role of Government & Industry**

3) How to Pay for the Broadband Improvements We Want

Regarding **Connection Speeds**, the legislation establishing the task force *requires* us to identify: *“the level of broadband service, including connection speeds for sending and receiving data that is reasonably needed by all citizens by 2015.”*

Key questions:

1. The Legislature enacted the MN *Ultra* High Speed Broadband Task Force. What is ultra?
2. What will *reasonably* be needed by 2015? Various speed alternatives have been suggested by members, some as a floor and some as a ceiling. Some still want only what the market provides (they would say demands) and others want Minnesota to be fastest in the world. It is essential we come to some kind of consensus, because if we cannot agree on the goal, how will legislators?
3. If we can settle on a speed goal or target, (or perhaps speed goals and targets for different tiers of service) are we going to recommend all means necessary to achieve those goals, or merely a private sector only approach?
4. What will it take to accomplish or make significant headway toward our goal(s)?

Various Speed Proposals (Could be placed in matrix.)

- Page 2, Comments A:1-3 –100 mbps – 1Gbps (high) to 10-100 Mbps low
- Page 19, Sjoberg, “Demand should drive investment”
- Pages 22-23, Gibbs, no speed proposed. Minnesota already has “higher than any other state studied.”
- Page 25, O’Connor, 50 mbps – “faster than anything currently available.”
- Page 26, Gervais, “Think ahead and beyond what is available today.”
- Page 27, Swanson, “Minnesota needs to be the leader.”
- Page 27, Werner, 3 Mbps, 10 Mbps, 100 Mbps to start as tiers
- Page 28, Sjoberg, unserved is 3 Mbps down and 768 kbps up
- Page 29, Sethi, “Quite a bit higher than the 756Kbps suggested by Connected Nation”
- Page 29, Joanne Johnson recommended the California speed tiers.
- Pages 29 & 30, King, various tiers, 100 MB Power User – 5-10 Lite, Casual User
- Page 30, Cawley, 100 Mbps by 2015 for all users
- Page 30, Garrison, “to position our state as a center of innovation and employment, Minnesota’s should adopt a goal of always being in the top three states nationwide and among the top five locations in the world in average available Internet speeds.”
- Page 30, Gibbs, “must be based on evidence of demand . . .”
- Page 31, Swanson, 1 Gbps, must “think beyond the present.”
- Page 33, Ries, 100 Mbps – 10 Gig for government connections of various kinds
- Page 37, O’Connor, scalable in “sudden, very high-demand situations”

- Page 40, Ross, minimum school connections of 10 Mbps per 1,000 students, internal and external network connections of at least 100 Mbps, and wide area network of 1 Gbps per 1,000 students
- Page 46, O'Connor, speeds must be defined as symmetrical. Others agreed.

Role of Government & Industry Discussion

Key Questions:

1. Is there a compelling public interest for government to be involved in broadband policy?
2. If so, what role(s) can state government best play to help Minnesota accomplish its broadband goals?
3. If so, how can municipal government (state and county) help achieve Minnesota's broadband goals?
4. Will changes to regulations, tax laws or codes allow more extensive broadband deployment? Or must there also be subsidies?
5. Are their barriers to investment in broadband infrastructure, are they legitimate, or should they be removed for everyone?
6. Could public/private partnerships help achieve state broadband goals?
7. Should the private sector have the first bite at the apple to provide broadband solutions or should all players be welcome?
8. If private sector solutions are sought, and a community feels its needs are unmet, what is the definition of market failure?
9. How do we limit a legal environment where any party seems capable of preventing broadband progress by suing and tying the matter up in court?
10. Ultimately, does MN want status quo or something different? Is there a compelling interest at stake?
11. Is broadband a utility?
12. Should public investments and grants be in open infrastructure?

Various Member Perspectives (could be placed in matrix)

- Page 2, comments 2-12 under how we are going to get there.
- Page 2, comments 1-3 under opportunities to cooperate
- Page 3, 44, 45, 47, and 56 on creation of an ongoing broadband advisory council
- Page 7, Werner, local governments may be providers
- Page 8, Geller, increase demand
- Pages 8, O'Connor, essential infrastructure,
- Page 10, Swanson, public funds should require competition
- Page 20, Sjoberg, quotes study suggesting providing "computers to low-income populations through public libraries or community technology centers."
- Page 21, Stanoch, recommends 2nd phase of mapping to refine the data.
- Page 26, Garrison, MN should "establish a data-driven Affordability Index and annually publish the results. . ." Consider vouchers

Broadband Task Force May 2009 Homework Assignment Most Contentious Issues

- Page 26, Stanoch, cites Idaho's \$5 million in state grants to providers reaching unserved areas
- Page 29, Sethi, need another methodology for mapping beyond Connected Nation if refinements to get an accurate delineation of unserved and underserved cannot be accomplished through existing vendor.
- Pages 32-33, Ries, on various requirements for state government
- Page 34, Sethi, need for redundancy
- Page 34, Cawley, State policy on peering
- Page 36, Wells, controlling cost of health care
- Page 37, O'Connor, Disaster Recovery, distributed workplace, elderly services
- Page 37, Sethi, E-government services and government consolidation, efficiency
- Pages 38, 39, 40, Ross, school issues
- Page 42, Robyn West and commenter on roles of government and access
- Page 43, O'Connor, on needed middle mile policies
- Page 43, Sethi, on roles of state and local government
- Page 44, King, on municipal ownership
- Page 44, Garrison, on role of government, critical infrastructure and spreading cost of broadband improvements
- Page 46, O'Connor, electrical grid
- Page 47, O'Connor or mapping needs beyond current
- Page 48, O'Connor on common carriage requirements needed and universal service fund
- Pages 50-52, O'Connor, true cost of services, eliminating cross subsidies, local ownership and developing metrics
- Page 51, Stanoch, market demand and barriers to deployment
- Page 52, Garrison, incentives for ultra high speed, open infrastructure, broadband adoption, and tax breaks for deployment.
- Page 53, Johnson, 9 states recommend appropriations
- Page 54, Gervais, open access critical for the last mile
- Pages 54 & 55, Gibbs, free market enterprise but public funding to stimulate demand
- Page 55, Christensen, analogy to 1934 Telecomm Act to provide basic service and make affordable
- Pages 55&56, Johnson, grants and tax credits, Idaho, WI, CA; review policies and ordinances
- Page 56, Gibbs, non-interference.
- Page 57, O'Connor, bandwidth divide
- Page 58, Sjoberg, underserved.

How to Pay for Broadband Improvements

Running out of time to complete this one, and many are outlined in the policies and grant ideas outlined above in the role of government discussion. Suffice it to say, we must come to some common agreement as to the strategies and tactics to achieve the goals.

Mike O'Connor

For the sake of simplicity let us reduce the assignment to just one most controversial issue since there really is only one.

Short form: Broadband is essential infrastructure.

Long form: High-speed data communication is an essential human need critical to the basic functioning of our society and indispensable to our advancement as a civilization. The fact that it is not yet treated as such is inconsistent with the way we treat all other forms of electronic communications.

This is the one critical policy shift that this task force must address. All else flows from this. Here is how and why:

During the 1950s, a new force in psychology, humanistic psychology, arose that was in contrast to the other forces of psychology at the time, behaviorism and psychoanalysis. This new force focused on uniquely human issues of the majority of people. Abraham Maslow's conceptualization of a hierarchy of human needs and development is considered a founding basis of this area of study. Many expanded on Maslow's basic tenets so that applications in organizational psychology, management training and work team dynamics followed.

Maslow's hierarchy of needs is:

1. Physiological: air, food, water, sleep, body temperature
2. Safety and security
3. Love, affection and belongingness
4. Esteem: self-respect and respect from others
5. Self-actualization: to create, to accomplish.

First, of course, there are the physical survival needs. Safety and security from harm or illness frees our mind from anxiety, enabling rational thought. Love, affection and belongingness are the mental survival needs. We are social beings and social interaction is not possible without the ability to move around (transportation systems) and speak to each other (communications systems).

The individual must achieve and fulfill the needs of one level before being able to move up to the next. A hungry person isn't concentrating on safety or social interaction and a fearful person isn't ready to engage with others.

You can easily observe through 200,000 years of human history how we have advanced, moving through the levels of need from basic survival, to small social units, to larger communities and

to cultural and scientific achievements. We move through these levels still today though it is more applicable to individual growth rather than whole societies.

So where is this going and what does it have to do with high-speed data communications?

Well, as we've increased our numbers and living density, you'll notice that items on the lower levels (1, 2, 3) are now achieved or enabled by common action. We organize ourselves and set governing institutions in place to support and assure our basic lower-level needs so that we are individually free to concentrate on the higher-levels (4,5) of social intercourse, individual or group achievement and self-actualization. The lower-level needs are accomplished by direct government provision or by varying levels of regulation of private-sector players. The level of regulation is proportional to the scarcity of or limit on certain facilities or resources that may require rationing. The regulation can range from sanctioned private monopolies or sets of rules and guidelines.

Where there is wide availability and choice in place, we have our government set rules to assure fairness, stability and quality (FDA oversight of food and medicine, registration of deeds, building codes). Where there is a limited facility or resource, we either have our government provide the service directly (water, waste disposal, roads), regulate a private monopoly (gas, electric, airports, railroad rights of way, analog voice telephony) or license limited numbers of players (TV, radio and cellular spectrum).

Focusing on communications, where it requires a restricted resource (public rights of way, lines into buildings, radio spectrum), regulated monopolies or limited licensing is the norm. Where there are no limited facilities (newspapers, periodicals) only limited interventions are used to assure fairness, accuracy and consumer protection.

That brings us to data communications and the Internet; the whole reason for this broadband debate. Communication systems have been a critical linchpin in the advancement of civilization from the first cuneiform tablets around 6000 BCE that birthed the first widespread trade and commerce, to Gutenberg's moveable type press that birthed the renaissance, and finally to modern electronic communications that spread information and knowledge everywhere, allowing us to see and hear all corners of the world. It is eroding the existing centers of power and influence and shifting the balance of power back to the citizens.

Previous generations of mass electronic communication evolved at a pace that was slow enough to allow us to properly regulate them. (Radio, TV, Telephones). They were developed mostly by larger businesses and it was easy to track progress. Packet data network technology was different. It advanced rapidly (about 15 years of laboratory prototype and only 6 years from initial deployment to full commercialization) and came from out of nowhere (obscure government labs and university research projects). It blasted into existence and spread far and wide before we knew what was happening. It was everywhere at once, highly diverse and fully decentralized, just the opposite of what is necessary to get it under control and to determine the appropriate levels of regulation.

IP packet-switch data networks are now becoming the only electronic communications system necessary, carrying voice, video and data over multi-operator networks of wires, optical fiber and airwaves. Vint Cerf has described it as "IP over everything and everything over IP." This is a critical and important communications system that is transforming our world civilization even more so than cuneiform writing and moveable type printing.

In spite of this, high-performance packet data network connectivity to homes and businesses is the only electronic communications technology that is not controlled and regulated for public benefit in the United States today. This is inconsistent with all previous electronic communications systems. We did not decide on a policy level that it should be this way; we just never got the chance to deal with it. Until now.

It is possible to view all the other controversial issues that will be submitted in this assignment as simply implementation details of one sort or another. Those details are certainly important and necessary, but they may just be small pieces dancing around the real main issue: treating broadband packet networks as essential infrastructure. It is like sending a random gang of all-stars out on the field. Without the surrounding and supporting container of management, coaches, playbooks and signals, they may not accomplish much.

It is imperative that we rapidly correct our lack of public investment in and oversight of this essential utility if we are to reap its benefits sometime within the next decade. If we hesitate under some excessively purist principle of laissez-faire in free markets, we will waste time and opportunity, continuing in our mediocrity of the status quo while falling farther behind those nations that recognize their stewardship role.