Are You Neutral About Net Neutrality ?

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➢ **Disclaimer #2**

- ▪ The author uses Google
- ▪ The author uses Verizon FiOS for phone, TV, and internet service

- Net Neutrality—Through 2 Lenses
- Who Are the Players & What Are They Saying?
- Brief History & Relevant Trends
- Discriminatory Practices
- Quality of Service (QoS)
- Senate 2686 & House Rule 5252
- Impact on DoD Operations and Medical Treatment
- Mini-Case Studies
- Updates
- Closing Thoughts

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- "Network Neutrality" is the concept that last mile broadband telecommunications providers should not discriminate with regard to what applications an individual can use, or what content can be interacted with over the network. Individuals acquiring services from these providers should be able to use the applications and devices of their choice, and interact with the content of their choice anywhere on the Internet. [Public Knowledge] [Wu FAQ] [Google] [Free Press] [COMPTEL]

- Network neutrality (equivalently "net neutrality", "internet neutrality" or "NN") refers to a principle that is applied to residential broadband networks, and potentially to all networks. Precise definitions vary, but a broadband network free of restrictions on the kinds of equipment attached and the modes of communication allowed would be considered neutral by most advocates, provided it met additional tests relating to the degradation of various communication streams by others.

  » Wikipedia

➢ Net Neutrality—Lens 1:

- Networks that don't favor some destinations over others or classes of application such as WWW vs. Online Gaming vs. VOIP
- End-to-End Principle (1983)
    - Network protocols should generally be "dumb"
    - Route all packets equally
    - "End-to-End Neutral"

➢ Net Neutrality—Lens 2:

- Refers to the behavior those who actually run networks rather than those who designed them
- The implication is that ISPs could discriminate in the routing of packets they process

Source: Wikipedia

➢ **Who Are They?**

▪ Large Internet content companies and others
  ▫ Google, Yahoo, YouTube, eBay
  ▫ Consumers Union
  ▫ Liberal Blogs

source: Wikipedia

➢ **Who Are They?**

- Large communication carriers
  - Verizon, AT&T
  - http://www.joesapt.net/2007/01/17/15.49.44/
- Manufacturers of network equipment
  - Cisco
- Free Market advocacy organizations
  - Cato Institute (think tank)

source: Wikipedia

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➢ **Advocates of network neutrality claim that large telecommunication providers are attempting to unfairly profit from their investment in residential networks:**

   ▪ "[These companies] want to be Internet gatekeepers, deciding which Web sites go fast or slow and which won't load at all"..."tax content providers to guarantee speedy delivery of their data."..."to discriminate in favor of their own search engines, Internet phone services, and streaming video —while slowing down or blocking their competitors"..."to reserve express lanes for their own content and services.

   source: www.savetheinternet.com

➢ **Opponents of network neutrality regulations claim they're unnecessary and counter-productive:**

  ▪ "Sweeping and rigid net neutrality legislation could: hinder public safety and homeland security; complicate protecting Americans privacy; erode the quality and responsiveness of the Internet; limit consumers' competitive choices; and discourage investment in broadband deployment to all Americans."

source: netcompetition.org

➢ **SBC Head Ignites Access Debate**

- By Arshad Mohammed, Washington Post, Nov 4, 2005
- Quote by Edward E. Whitacre, Jr., Chairman, SBC:

  ▫ "Now what they [Google, MSN & Vonage] would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to get a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using."

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- ➢ **Telegraph 1860**
  - ▪ "messages received from any individual, company, or corporation, or from any telegraph lines connecting with this line at either of its termini, shall be impartially transmitted in the order of their reception, excepting that the dispatches of the government shall have priority."
    - – An act to facilitate communication between the Atlantic and Pacific states by the electric telegraph. June 16, 1860

- ➢ The Internet was created in 1969 as a United States-funded (hence publicly funded) research network, governed by an Acceptable Use Policy (AUP) prohibiting commercial activity. In the early 1990s, it was privatized and the AUP was lifted for commercial users.

- ➢ This controversy, which emerged following regulatory developments in the United States, is extremely complex, as it mixes technical, economic, ideological and legal arguments.

source: Wikipedia

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➢ Requirements of **VoIP** and online **games** for **low latency** bandwidth

➢ The increasing use of **high bandwidth** applications, such as online **games**, and **music** and **video** downloading

➢ Increasing use of traffic shaping by many or most broadband providers to control **P2P** and other services

➢ **Improvements** in networking technology, which make providing broadband service, on the aggregate, cheaper

➢ The trend of **governments funding** the construction of high-speed networks in countries like South Korea, France, and for **cities** to **build** their own **wireless networks**, and their more gradual deployment in many areas of the U.S.

source: Wikipedia

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➢ The increasing use of **wireless home networks**, which allow for neighbors to **share** an **Internet connection**, thereby **reducing revenues** for the service providers.

➢ **High bandwidth video** and **audio** telecommunications over the Internet (including Voice Over IP technology) which **threaten** the **land line revenues** of Telco Internet service providers

➢ Increasing **centralization of control** over internet physical infrastructure, and justifications including protection against gray market file sharing and search applications

source: Wikipedia

➢ In 2004, a small North Carolina telecom company, Madison River Communications, blocked their DSL customers from using the Vonage VoIP service. Service was restored after the FCC intervened and entered into a consent decree that had Madison River pay a fine of $15,000.

    ▫ Wikipedia

➢ In 2005, Canadian telephone giant Telus blocked access to voices-for-change.ca, a website supporting the company's labour union during a labour dispute, as well as over 600 other websites, for about sixteen hours.

    ▫ "Telus cuts subscriber access to pro-union website", *CBC News*, 2005-07-24. Retrieved on 2006-07-10.

➢ In April, Time Warner's AOL blocked all emails that mentioned www.dearaol.com, an advocacy campaign opposing the company's pay-to-send e-mail scheme. An AOL spokesman called the issue an unintentional "glitch."

    ▫ "AOL charged with blocking opponents' e-mail", *ZDNet News*, 2006-04-13. Retrieved on 2006-07-10.

source: Wikipedia

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➢ Early Internet routers typically forwarded packets on a best-efforts basis, without regard for application needs, but this is changing. Many private networks using Internet protocols now employ Quality of Service, and Network Service Providers frequently enter into Service Level Agreements with each other embracing some sort of QoS.

source: Wikipedia

➢ **Edward W. Fenton, Dept of Computer Science & Woodrow Wilson School of Public and International Affairs (July, 2006)**

- This is partly a fight to control innovation on the Internt (Middle Vs. Edges)
- Discrimination has harsher and milder forms. Blocking a packet is harsher than just lowering its priority
- Discrimination hurts some applications more than others. VoIP services are especially vulnerable to discrimination
- Anti-discrimination rules can be hard to write and hard to enforce
- Network discrimination will have unpredictable results
- Technical countermeasures, such as encryption, cannot fully shield users from discrimination
- Quality of Service (QoS) guarantees are less important than you might think

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➢ Residential broadband providers such as Verizon, Comcast, and AT&T propose tiered service offerings, which they claim allow them to recoup their investment in the last mile of the Internet, and encourage future network development. Some claim that as bandwidth-intensive peer-to-peer applications such as BitTorrent become commonplace, the traditional Internet congestion management system, which was not designed to handle continuous, high-bandwidth usage, may no longer be viable, so alternate methods may become necessary. These alternate methods include bandwidth limits and priority-based Quality of Service for voice and video. Proponents of tiered pricing include some large communication companies, manufacturers of network equipment, academics, Internet engineers, and business-oriented interest groups. They argue that the Internet is in the midst of tremendous change due to fiber to the home, peer-to-peer applications, VoIP, and IPTV, and regulations offered to date are potentially damaging to network operation and investment.

source: Wikipedia

➤ **In a speech at the Silicon Flatirons Symposium in February 2004, Powell stated that consumers must have the following four freedoms:**

- Freedom to access content.
- Freedom to run applications.
- Freedom to attach devices.
- Freedom to obtain service plan information

➤ **As remarked upon by David Isenberg, Chairman Kevin Martin later modified these four freedoms to read:**

- Consumers are entitled to access the lawful Internet content of their choice;
- Consumers are entitled to run applications and services of their choice, subject to the needs of law enforcement;
- Consumers are entitled to connect their choice of legal devices that do not harm the network; and
- Consumers are entitled to competition among network providers, application and service providers, and content providers.

➤ **On August 5, 2005, the FCC adopted a policy statement stating its adherence to these principles.**

source: Wikipedia

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➢ **S 2686**

- ▪ **Communications, Consumer's Choice, and Broadband Deployment Act of 2006**
- ▪ Sponsored by Commerce Committee Chair Ted Stevens (R), Alaska
    - ▫ War on Terrorism
    - ▫ Universal Service Reform
    - ▫ Streamlining Franchising Process
    - ▫ Video Content
    - ▫ Municipal Broadband
    - ▫ Wireless Innovation Networks
    - ▫ Digital Television
    - ▫ Protecting Children
    - ▫ Internet Neutrality
    - ▫ Miscellaneous
        - – Retrieved from http://140.147.249.9/cgi-bin/query/z?c109:S.2686: on 12 Oct 2006

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➢ **HR 5252—COPE Act**

 ▪ **Communications Opportunity, Promotion, and Enhancement Act of 2006**

 ▪ Sponsored by House Commerce Committee Chair, Joe Barton (R), Texas

 ▫ National Video Franchising

 ▫ Network Neutrality/Enforcement of Broadband Policy

 ▫ VoIP/E9ll

 ▫ Municipal Provision of Services

 ▫ Broadband Service

 ▫ Seamless Mobility

Retrieved from http://www.Net Neutrality\HR 5252 CRS summary.htm on 12 Oct 2006

➢ **First, Let Common Sense Prevail**

- ▪ How medical data is transmitted will depend on a number of factors:
  - ▫ Urgent vs. non-urgent
  - ▫ Command & Control
  - ▫ Bandwidth requirements—high vs. low
  - ▫ Patient vs. non-patient data
  - ▫ HIPAA implications? yes/no

➢ **Second, the Above Factors May Likely Outweigh outcome of Net Neutrality Debate**

- ▪ Operations take higher priority, healthcare is held to a higher standard

➢ **Predator flying in Iraq--flown by controllers at Nellis AFB**

▪ Target detected; cleared to engage under ROE

▪ Discussion

➢ **Considerations**

▪ Urgent vs. non-urgent

▪ Risk

▪ Bandwidth

▪ Accuracy

▪ Information assurance

➢ **Possible Solutions**

- ▪ Dedicated or on-demand satellite up and down links
- ▪ Pre-contracted SLA for on-demand use ground station to Nellis AAFB
- ▪ Ability to prioritize on the fly
- ▪ Wide bandwidth

➤ **Patient being seen in an out-patient clinic**
- Environment
  - Regional Health Information Organization (RHIO)
  - Spoke and hub arrangement
- Web-based, Electronic Health Record (EHR) application
- Discussion

➤ **Considerations:**
- Non-urgent
- Risk
- HIPAA
- Access to EHR needed for allergies, meds, Hx & previous Tx's
- Response & Retrieval time
- Information Assurance
- Accuracy
- High bandwidth (x-rays, MRIs, other scans)

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➢ **Possible Solutions**

- ▪ Contract for a point-to-point, leased line with a Service Level Agreement (always on, expensive)

- ▪ Circuit Switched: Permanent virtual circuit switched virtual circuit

- ▪ Packet Switched: Data divided into packets at sending station—reassembled at distant station—more efficient use of resources

➢ **Routine, non-sensitive, end-of-day aggregate logistics data being transmitted during non-duty hours**

  ▪ Discussion

➢ **Considerations**

  ▪ Low bandwidth

  ▪ Risk

  ▪ High reliability

  ▪ Response Time

  ▪ Accuracy

  ▪ Information Assurance

➢ **Possible solutions**

- Virtual Private Network with encryption
- Others?

➢ **IED Detonation Bagdad—Soldier has Life-threatening Wounds**

- Evacuated to Army Combat Support Hospital (CSH)
- Needs Immediate Surgery
- Video connection back to Walter Reed available and needed
- Discussion

➢ **Considerations**

- High bandwidth (streaming video)
- Risk
- HIPAA
- Access to EHR needed for allergies, meds, Hx & previous Tx's?
- High reliability
- Response Time
- Accuracy
- Information Assurance

➢ **Possible Solutions**

- ▪ Dedicated or on-demand satellite up and down links
- ▪ Pre-contracted SLA for on-demand use ground station to WRMC
- ▪ Ability to prioritize on the fly
- ▪ Wide bandwidth

➢ **Relevant recent updates**

➢ **Net Neutrality**

- Look for continuing efforts to shape the use and control of the Internet
- Do not underestimate the ability of business to influence public policy
- Ultimately some compromises will need to be made by both sides
- US must seriously consider assisting in or enabling the build out of broad band throughout the country
- DoD operators and medical information managers must remain agile to meet the demands of an increasingly IT-enabled operations & health environment

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