



Openness and neutrality in broadband networks - Norway

HØYKOM Report No. 1:2007

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Prepared by:

Kjell Hansteen and Kjell Arne Nielsen

Translated by: Walter Gibbs

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Responsible editor: Vemund Riiser
The Research Council of Norway
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The Research Council of Norway
P.O. Box 2700 St. Hanshaugen
N-0131 Oslo
Norway

Tel.: +47 22 03 70 00
www.forskningsradet.no

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The goal of the Government is for all households, private organizations and public-sector bodies to have access to an advanced high-speed network with pricing levels that are comparable across the country. To encourage faster network development, public authorities must contribute economically. The public sector should be out front in demanding new technological solutions. As various digital networks in Norway expand, the Government hopes to see a greater degree of cooperation.

The Government's goals:

- That the whole country have access to a high-speed network by the end of 2007
- That there be no unreasonable geographical price differences in connecting to a broadband network
- That public-sector resources be used to help realize broadband development in areas where it is commercially unsustainable

Soria Moria Declaration on broadband for all

Foreword

Høykom is part of the Government's effort to make broadband services available across all of Norway, as envisaged in the Soria Moria Declaration governing platform. In the 2006 revised national budget, NOK 50 million was allocated to help achieve this goal. Høykom advertised the availability of these funds and awarded support totalling nearly NOK 80 million to 19 projects. This amount included NOK 30 million advanced from next year's budget. Total expenditure by the projects receiving support will be about NOK 200 million, resulting in 30 000 new broadband access points.

In the 2007 national budget, Høykom has been allocated NOK 122 million. Of this, NOK 100 million has been earmarked for Høykom District, which has become more infrastructure-oriented than previously. Broadband expansion into "white spots" lacking coverage will thus be a central element in Høykom's work for 2007. Support will be given to establishing access networks and regional networks. In most cases the new infrastructure will be the only one of its kind in the area.

Høykom's other goal is to contribute to public-sector renewal. In addition to expanding broadband infrastructure we aim to create new services while helping the public sector become more efficient and user-oriented. To the degree possible, projects receiving support are expected to support the use and diversification of e-service and e-content.

Høykom believes that infrastructure developers can in many cases choose solutions and business models that enhance freedom of choice for end users, content providers and service providers. Whenever possible, such solutions are to be preferred. We sense a need to present basic information on this subject, and has asked Kjell Hansteen and Kjell Arne Nielsen to prepare this Høykom report on openness and neutrality. This is a translated version of the original report (Høykom report 2:2006) published in Norwegian in December 2006.

Kjell Hansteen has extensive experience with information and communication technology (ICT). He has been working for telecom and computer companies in Norway and abroad. Mr. Hansteen has worked in private industry as well as public services. He is currently assigned to the European Commission working for DG Information Society and Media, in Brussels.

Kjell Arne Nielsen is employed by Teleplan. He has broad experience in a variety of IT and telecommunications endeavours in Norway. In recent years he has been involved in several projects related to the rollout of broadband technology and the relationship between public agencies and commercial technology developers. *Kjell Arne Nielsen* is currently engaged by the Høykom programme as senior advisor.

Høykom would like to thank everyone who has contributed to this report. We hope it will add substance and context to the net neutrality debate.

Vemund Riiser

Programme Coordinator
Høykom

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1.1 A timely subject

The network neutrality conflicts have reached Norway. This summer it was revealed that NextGenTel, one of the Norwegian telecom operators, de-prioritized signals from NRK, the Norwegian Broadcasting Corporation, in order to favour own traffic.

In the autumn, the Internet newspaper ITavisen revealed that Canal Digital, a cable operator offering cable TV and cable Internet services was de-prioritizing file sharing traffic during the evenings.

The articles shown below are from ITavisen.

- Slutten på norsk nettnøytralitet

Av Ida Oftebro,
man 2. okt 2006 kl. 16:26

Forbrukerrådet er bekymret over at norske bredbåndsløyper vil bestemme hvilke tjenester kundene skal bruke.

Nylig kunne ITavisen avsløre at Canal Digital har bestemt seg for å nedprioritere fildeling i rushtiden. Det vil si at fildelere kan oppleve svært lave hastigheter i tidsrommet mellom kl. 17.00 og 23.00.

Struper NRK

Denne gangen er det brukere av NextGenTel som forteller at de har problemer med å se streamet innhold på NRK. På NRKs hjemmesider er det lagt ut følgende forklaring:

Medling til kunder hos NextGenTel

I juni 2006 reduserte NextGenTel overføringskapasiteten betraktelig fra NRK.no til NextGenTel sine kunder. Dette medfører at du som NGT-kunde vil oppleve en helt annen kvalitet av for eksempel NRK Nett-TV, enn hva NRK faktisk tilbyr sine brukere. Dette er utenfor NRK sin kontroll og eventuelle henvendelser rundt dette må tas direkte med NGT.



NEKTET ADGANG: Forbrukerrådet er bekymret over at norske nettleverandører vil styre brukernes surfeføner. Ill: ITavisen/Per Ervland

Canal Digital struper fildelingstrafikk

Av Ida Oftebro,
fre 22. sep 2006 kl. 15:45

Internettleverandøren Canal Digital nedprioriterer P2P-trafikk i rushtiden. Dette for at de få ikke skal få ødelegge for de mange, sier talsmann Thomas André Larsen.

Det Telenor-eide kabel-TV-selskapet Canal Digital er også i ferd med å bli store som nettleverandør. Nå kutter de hastighetene på fildelingstrafikk i rushtiden.

Ingen fildeling etter Dagsrevyen

80 prosent av trafikken i Canal Digital sitt nett er fildelingstrafikk. Nå ser selskapet seg nødt til, som det første i Norge, til å strupe P2P-trafikken i tidsrommet der bruken av internett er størst.

I tidsrommet mellom 17 og 23 vil fildelingstrafikk bli nedprioritert i forhold til vanlig surfing, web-TV og IP-telefoni. Canal Digital anslår at bare 0,2 prosent av deres kunder vil få problemer som følge av dette.

- Fildeling er greit om natta

Foreløpig har hastighetsreduksjonen kun blitt gjennomført som en prøve i enkelte nett, men Canal Digital sier at den positive responsen fra kundene er så entydig at de mest sannsynlig vil videreføre prosjektet til hele sitt nett.

- Vi tar gjerne imot fildelere som kunder, men de må legge denne aktiviteten til nettene og formiddagen. Vi har som mål å ha så mange fornøyde kunder som mulig, og dette sikrer de resterende 99,8% en best mulig tjeneste. Aktiviteten er ubegrenset resten av døgnet, sier Systemansvarlig for Internett, Thomas André Larsen i Canal Digital til ITavisen.

Oppdatert 22/9-2006 kl. 17.50



STRUPER FILDILING: Canal Digital stenger fildelingstrafikken mellom kl. 19 og 23.

Relaterte artikler

- » Dieseltørke ga svensk nettkaos
- » Telenor sorterer kunder
- » 18 000 uten bredbånd
- » 120 Mb i TV-kabelen
- » - Slutten på norsk nettnøytralitet

Tips en venn om denne saken

Abonner på vårt daglige nyhetsbrev



ITavisen online newspaper:

“The end of Norwegian network neutrality”

By Ida Oftebro

Monday, 2 Oct. 2006 4:26 p.m.

The Norwegian Consumer Council is worried that Norwegian broadband service providers will begin deciding what services their customers get to use.

ITavisen recently revealed that Canal Digital has decided to de-prioritize file sharing during busy periods. File sharing, in other words, may be assigned very low-speed transmission rates between 5 p.m. and 11 p.m.

Squeezing NRK

Now it is NextGenTel whose users are telling of problems viewing streamed content from NRK.

On the NRK website, the following explanation has been given:

Notice to customers of NextGenTel

In June 2006 NextGenTel reduced its transmission capacity significantly from NRK.no to NextGenTel's customers. This means that NGT customers will experience a far different level of quality when viewing, for example, NRK Nett-TV than is actually being provided by NRK. This is beyond NRK's control, and any questions or comments must be directed to NGT.

Picture caption: Admission denied: The Norwegian Consumer Council is worried that Norwegian network providers will control their customers' surfing habits. Illustration: ITavisen/Per Ervland

ITavisen online newspaper:

Canal Digital squeezes file sharing traffic

By Ida Oftebro

Friday, 22 Sept. 2006 3:45 p.m.

Internet service provider Canal Digital is de-prioritizing P2P traffic during rush periods. The reason, according to company spokesman Thomas André, is that Canal Digital does not want to let the few ruin things for the many.

The Telenor-owned cable TV company is also in the process of becoming a big Internet provider. Now it is cutting the transmission speed of file sharing traffic during rush periods.

No file sharing after the evening news

Eighty percent of the traffic on Canal Digital's network is associated with file sharing. Now the company has become the first in Norway to throttle down on P2P traffic during periods when Internet usage is at a peak.

Between 5 p.m. and 11 p.m. file sharing traffic will be de-prioritized in relation to regular surfing, web TV and IP telephony. Canal Digital estimates that only 0.2% of its customers will have problems as a result of the new policy.

“File sharing is OK at night”

So far the transmission rate reduction has only been introduced as a test in certain networks, but Canal Digital says the positive response from its customers is so clear that it will probably expand the project to its entire network.

“We will gladly take in file sharers as customers, but they must confine this activity to nights and mornings. Our goal is to have as many satisfied customers as possible, and for 99.8 percent of them this guarantees the best possible service. File sharing activity is unrestricted during the rest of the day,” says Thomas André Larsen, Internet systems director at Canal Digital.

1.2 Background

The expression “network neutrality” has been attributed to Professor Tim Wu at Columbia University. He came up with it to describe communication networks that are neutral in the sense that they do not favour certain applications or traffic types over others – surfing, for example, over IP telephony.

1.2.1 Technological neutrality

Tim Wu pointed out that the Internet is not a neutral network. Internet technology has a number of inherent characteristics that give an advantage to certain kinds of communication. File transmissions are relatively insensitive to delays and detours as long as content is not

The Wikipedia says ...

A major argument in favour of network neutrality is that discriminatory networks distort market forces depending on those networks, and ultimately may slow national economic growth. For example, if a network provides different qualities of service for some application layer protocols than for others, it may slow innovation by raising the entry threshold for new network software applications. <http://en.wikipedia.org>

distorted. The Internet has been designed for this type of traffic – and not, for example, for telephony. Variations in the transmission rate create distortions in speech that can be very irritating. Significant time delays in the speech transmission may lead to the loss of synchronisation in the conversation and makes it difficult to maintain a dialogue.

The neutrality debate also extends to the question of traffic control and prioritization. Shall certain types of traffic be given priority over others? The Internet has shown itself to be an incredibly robust communication network. However, it was not constructed with today’s enormous traffic in mind. Experience from local networks are that they may suddenly “collapse” when traffic exceed a certain level. Many observers have expressed fear that the same could

happen to the Internet as a whole. This calls for countermeasures like traffic monitoring and traffic regulation.

1.2.2 Business neutrality

The debate over network neutrality has a business dimension. This was highlighted recently when NextGenTel stifled NRK.no’s web streaming service, favouring instead the transmission of NRK within its own TV service package.

Shall network operators be allowed to choke off capacity used by others in order to maintain the quality of its own products? Many network operators block traffic on certain ports to hinder the spread of junk mail and the sharing of music files between individuals (peer-to-peer). Shall network operators be allowed to choose according to private judgements which traffic to block and deny service?

Technological developments have pushed forward a fundamental

change in the business model of the telecommunication companies. Operators used to base their business on the connection and disconnection of calls between unintelligent terminals (telephones). The value-added was created by processes taking place deep within the network. At the periphery of the network subscribers were connects through a dumb terminal, the telephone.

With the growth of the Internet, complexity and value moved from the core of the network to its edges. The Internet is unintelligent, dumb and neutral compared to the switching networks of the telecom industry. On the Internet packets of information are passed on to the next link without concern for connectivity or and delay. At the edges of the Internet one finds innovative new applications and sources of value. There, service

and content providers have deployed a multitude of applications and computing power. The net is thus becoming a “commons”¹ that everyone exploits but no one wants to pay for. This change is a fundamental challenge to the business models of established telecommunications companies.

Shall network operators be permitted to sell guaranteed passage and service quality to those who can and will pay for it in order to maintain profitability? Would it be unfair if organizations with money, like Google, could buy dedicated express lane for them selves and their customers? These questions are particularly important if the communication infrastructure in question is financed by public resources.

1.2.3 Innovation neutrality

The Internet has proved to be a fantastic platform for technical innovation and economic restructuring. Today there are nearly 70 broadband telephony service providers in Norway. There are 149 providers of broadband Internet service registered in the country.² It could well be that the true number is even larger.

The fervour of the debate stems in part from a fear that regulation – or lack of regulation – could cause the Internet to stop being a major force for innovation and economic development.

Some people claim that an open and neutral Internet is a precondition for the continued flowering of the grassroots global economy. They say government must protect the Internet as a common arena. It is important for small, innovative companies to be able to try out their ideas and bring them to market alongside large companies with deep pockets.

Others claim that network owners must be able to respond to the danger of network anarchy and gridlock with segmentation and prioritization. They must have means and incentives to continue expanding the capacity and functionality of the Internet. Most proponents of this view would look positively on giving network owners the opportunity to divide the net into dedicated tiers and segments. They argue that network owners who make a profit from customers able to pay will invest those proceeds in the future of the net. A network that’s expanding and growing in complexity is seen as a basis for future economic and societal growth.

¹ As described by Jan Audestad, Telenor/Prof. II, Norwegian University of Science and Technology (NTNU)

² Norwegian Post and Telecommunication Authority (2006). “The Norwegian telecommunication market, first half year 2006,” Oslo, Oct. 2006

2 Openness and neutrality – as Høykom see it

Høykom makes a distinction between “openness” and “network neutrality”. A network’s openness refers to its accessibility to those who provide services. The network is not considered open if the only ones able to provide services on it are those who control the access. We choose to limit the discussion somewhat by excluding “openness” in the meaning of free user access to network or broadband services.³

Neutrality, or non-discriminatory behaviour, refers to the relationship among network owners, network operators, service providers and ISPs that have their own service networks. Høykom’s basic intent in this context is to support infrastructure development projects that promote diversity of content and service.

As Høykom sees it, projects receiving state aid should choose business models that provide end users and content providers/service providers with equal access to infrastructure. When applying for support to establish broadband infrastructure, applicants should therefore provide a description of their business and cooperation model.

- Everyone should in principle have access to all information
- Everyone should be able to connect
- Everyone should be able to produce and deliver products and services

2.1 Infrastructure

Infrastructure investors must secure a return on their investments. As owners, they must achieve sufficient profitability to cover future upgrades and maintenance.

Network owners today are experiencing a general decline in price. Subscribers are paying less and less for access to the same capacity. As a result, many infrastructure developers will seek to control the value chain all the way to the end user – an approach that may be particularly attractive in the start-up phase. In this vertically integrated business model, network operators can invoice end users for services beyond basic communication.

More in step with Høykom are networks with a well-defined technological and commercial interface that is open to service-providers. Developers should include a wholesale product, thus lowering the entrance threshold for actors with differentiated offerings, such as alternative pricing models, customer support or content.

Wholesale could increase demand for network capacity and thus boost profitability for network developers. A network operator, having no interests of its own at the service level, would be sensitive to the needs of all service providers and would tend to their interests in an efficient way.

For owners, more traffic should give more income

Increased traffic resulting from increased access to new content creates demand for network expansion and improvement. For infrastructure owners, a successful pricing model will be one that brings them enough revenue to justify additional investments.

One possible business model is known as gross minus. Under this model the service provider and network owner share income from the end user and thus share an interest in that user’s purchase of expanded capacity. The network owner is motivated to upgrade the network to

Høykom wants ...

The best possible publicly financed infrastructure at the lowest possible unit cost

³ Free broadband access may be offered to the general public in wireless access zones by organizations or individuals with “surplus” broadband capacity – an offering most likely to be made in urban areas.

accommodate more content and a higher quality of service. Service providers have an easier time getting established because their obligation to the network owner under this model varies according to revenues.

Alternatively, the network owner could bill content providers for priority service. In Høykom's view, this model is less consistent with the ideal of a neutral network, and thus less desirable.

Regardless of whether the network owner receives income from content suppliers or from end-users, it is necessary to establish pricing models that are seen as being fair to all. Pricing of access, pricing of transmitted volume or pricing by application type are all possibilities.

2.2 Service providers

Seen from the vantage of those who serve end customers, the debate over network neutrality is mostly about access to customers via the access

Høykom wants ...

Broadband access for all on objective, transparent and equal terms

network. Next in importance are any conditions placed on this access. Are they objective, transparent and non-discriminatory? A yes answer does not necessarily mean that everyone has to pay the same amount. A network owner may provide volume discounts as long as the criteria are objective and known to all.

The number and diversity of service providers is important to Høykom. As much as possible, they should be able to offer their unique combinations of basic products, services and content at the price and service level that they wish.

2.3 Content

Network neutrality is about equality in the handling of content and services. At issue is whether network operators shall be permitted to

discriminate among various types of content and service. Imagine a global content provider that pays for guaranteed high quality in data transmission, while a local newspaper that pays less is transmitted at lower quality.

Situations can also be imagined in which a network owner or service provider chokes off transmission capacity for certain content providers so it can offer end users the same content for a fee. On the one hand, if such discriminatory treatment of content providers is allowed to persist, network revenue streams may rise to the level required to sustain a high quality of service provision. On the other hand, it could violate the principles of equal treatment on which the Internet as we know it is built.

In the context of Høykom's activities, therefore, it is a matter of some importance to know what plans applicants may have for the differentiation of service and content providers.

2.4 End users

A central tenet of Høykom's policy is that end users should be able to choose for themselves their service providers and services. When providers bundle Internet access together with telephony and television in a way that denies the end user a choice of individual products, they have in a way "locked in" that customer. Network providers might argue that the customer can always

Høykom wants ...

Freedom for end users to choose among service providers and individual services

choose an additional provider, but if the customer must nonetheless pay for the original "full package", any choice is actually quite limited, economically speaking.

Others would argue that the customer has complete freedom of choice as long as he or she has access to the Internet and can choose, for example, among various sources of TV content.

However, future Internet providers may vary significantly in their offerings according to investments they have made in network quality, interconnection and partnership agreements.

2.5 Authorities

Today, the regulation of operators with significant market power (SMP) occurs only at the national level. Possibilities remain for the purposeful establishment of local monopolies when new infrastructure is to be constructed. The regulation of SMP actors will be a matter of balance for the authorities. For example, lowering end-user costs by making it cheaper to gain access to the incumbent's infrastructure would complicate the economic environment for establishing an alternative infrastructure like wireless access.

Høykom demands ...

That projects receiving support refrain from violating competition rules and principles

Høykom has detected a flurry of recent initiatives and activities by municipalities and regional partnership constellations interested in broadband development. In many cases, municipalities and public service providers are acting like ordinary market players. For Høykom, it is important that the resources it allocates for

broadband expansion end up in projects that minimise distortion of competition.

In the case of a project that wishes to transfer its Høykom funds to an established market player it should be noted that this is in principle prohibited by Article 61 of the European Economic Area (EEA) agreement. However, the European Free Trade Association's monitoring organ (ESA) may permit such support if it qualifies for exception under special provisions of the EEA agreement. There are no specific guidelines for public support of broadband. The commission has nonetheless approved certain subsidy arrangements. The likelihood of a subsidy proposal being judged acceptable depends on a number of factors. Two of the most relevant to Høykom are as follows:

1. Project applicants should make sure broadband infrastructure developments have economic significance to the general population. In practice, this means support is to be given to network infrastructure investments at the wholesale level. In two French cases,⁴ the Commission did not regard retail sales as being of economic significance to the general population.
2. Actors that receive state aid must not be overcompensated. In practice, this means that operators seeking to establish and operate networks in rural districts must be selected in an open tendering process.

⁴ Pyrenées-Atlantiques, case N 381/04; Limousin, case N 383/04

3 Network neutrality – USA and EU

3.1 A hot topic in the United States

The debate over “network neutrality” can be traced back to articles in legal publications around the year 2000. Two names that come up repeatedly are those of the professors Tim Wu and Lawrence Lessing, who have studied regulatory issues associated with packet switched networks.


Today’s debate in the United States stems from a change in the regulations for public telecommunication networks. In August 2005, the Federal Communications Commission (FCC) ruled that DSL-based broadband services were no longer to be considered communication services; they were instead information services. With that distinction came a weakening of the requirement that network operators refrain from bundling communication services and content.

The American debate has become high pitched. On the one side, we find service and content providers. The most famous of them is Google,

which has expressed grave worries over what will happen if its search results and other content are de-prioritized in relation to other network traffic.

On the other side we find primarily the telecom industry. It accuses the content industry of making huge profits exploiting infrastructure without being willing to help pay the bill for maintenance and expansion. Behind this view, one discerns a shadow of self interest related to the telecoms’ own commercial products and services.


The FCC’s decision triggered a debate on whether net operators now had the authority to wave forward certain traffic on their networks at the expense of others. Should well-heeled content and service providers be able to purchase speedier and more reliable communication services that enable them in turn to offer superior products to user groups willing to pay extra?



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Network Neutrality

Posted by [James Seng](#) on Feb 08, 2006



In January of this year, [a frontpage article on WSJ](#) quoted Verizon Chief Executive Ivan Seidenberg “*We have to make sure they (Google) don’t sit on our network and chew up our capacity*”. Both AT&T and Bellsouth also made similar statements in the same article. A few days ago, Verizon repeat their call to [“End Google’s Free Lunch”](#): “*A Verizon Communications Inc. executive yesterday accused Google Inc. of freeloading for gaining access to people’s homes using a network of lines and cables the phone company spent billions of dollars to build.*”

Also related, Verizon filed with FCC that they have plans to [set aside bandwidth on their fiber optical network](#), effectively creating a two-tier Internet, one big-fat pipe for Verizon and their partners services and another for the rest. This is one of the consequences many already foresee when [FCC removed the many obligations](#) from broadband providers in order to spur the growth of broadband and fiber network in 2003.

Thus, it is no surprise that [Network Neutrality](#), a concept where broadband providers are not to discriminate rivals when they charge tolls or prioritize traffic, is now on the agenda of the US Congress.

“Of course,” said the telecom operators. “Just look at the cable companies. They’ve always been allowed to do it.” Indeed, cable companies have been able to freely bundle Internet access with other services. There is nothing stopping them from choosing favourites among the variety of services and content on their infrastructure.

Christian organizations in the United States

... oppose blocking Internet privatization

The Christian right in the United States is mobilizing against a legislative bill designed to block the increasing privatization of the Internet. The bill, which is supported by a number of Democratic senators, would make it illegal to prioritize network actors according to their pocketbooks. In the struggle for bandwidth, one could for example imagine a large Internet store such as Amazon.com being given network advantages over a small local newspaper in the Midwest.

The FCC later put forward a regulation that stipulated, “Consumers are entitled to access the lawful Internet content of their choice.” In 2006 this was followed by a bill in the House of Representatives⁵ that allowed fines of up to \$750 000 for violating the FCC’s latest regulation.

Some American proponents of “network neutrality” are working to achieve their goal through specific legislative proposals. They want laws and regulations that prohibit “tiering” in public communication networks. They want to preserve the Internet as a “commons,” and they oppose the sale of transport routes with quality-of-service specifications favouring, for example, speech or video. They want laws guaranteeing that broadband providers do not block selected services or forms of content.

Such legislative proposals are backed (for now, anyway) by Google, Yahoo, Microsoft and a number of non-profit organizations.

On the other side stand Verizon, Comcast, AT&T and other large and small companies in the telecom industry. They want to offer non-neutral Internet services, and are asking Congress and the regulatory authorities not to intervene.

The telecom companies are supported by the US Chamber of Commerce as well as a variety of organizations.

WIKIPEDIA:

The telecommunications companies have found allies in various groups such as the US Chamber of Commerce, the National Black Chamber of Commerce, and the League of United Latin American Citizens – alliances the telecommunications companies forged in exchange for promises to provide improved Internet services to certain communities.⁶

3.2 EU is watching the situation closely

In March 2006, the EU Commission issued a Communication from the Commission that addressed the importance of securing broadband access for all.⁷ Access in this context meant not only physical access to broadband lines but also the opportunity to participate and the “freedom to speak”. In contrast to the terms of the American debate, the European basis for discussing Internet openness and neutrality has centred on multiculturalism and democracy. In October 2006, when European Commission member Vivian Reding addressed the Internet Governance Forum in Athens, the title of her lecture was, typically enough: “The Internet: Key to Freedom, Democracy and Economic Development”. The order in which she placed “freedom”, “democracy” and “economic development” reflected European priorities. Vivian Reding is the EU’s Commissioner for In-

⁵ Communication Opportunity, Promotion and Enhancement Act of 2006

⁶ Wikipedia (2006). Network neutrality, http://en.wikipedia.org/wiki/Network_neutrality

formation, Society and Media. Her responsibilities range from content and associated services to infrastructure; they include telecommunications infrastructure, broadband access, mobile communication and Internet telephony.

Commissioner Reding sees ICT as a stimulant to economic growth and a solver of problems. She has striven to persuade the EU to boost ICT research and innovation. Market openness and competition are among her goals. Her area of responsibility includes the regulatory framework for electronic communication and audio-visual content. She is also the EU coordinator for media affairs, in which capacity she has said:

“I will use this role to ensure that issues such as the competitiveness of the media industry and media freedom are taken into account in all relevant EU initiatives.”

To date (November 2006), the EU Commission has not put forward any proposals aiming to regulate the ability of network operators to sell higher quality services – such as guaranteed network passage – to clients willing to pay for it. The EU has, however, been keeping an eye on the issue, and has expressed “its readiness to closely monitor attempts to call into question the neutral character of the Internet”.

The EU’s regulatory framework for electronic communication gives the Commission the right to comment on rules enacted by individual nations, and in certain cases it can veto them. The goal is to promote open and competitive communications markets in the interests of European inhabitants.

Recently, Commissioner Reding took action against the German Bundestag, which wanted to give Deutsche Telekom dispensation from openness requirements in operating a new high-speed network that was under construction. Deutsche Telekom argued that it had to have the network to itself for a start in order to earn back its investment, which would total €3 billion. To make this possible, an exception to the legal requirement for openness was being drafted.

Vivian Reding made it clear in the summer of 2006 that the Bundestag was on a collision

EU Commissioner Vivian Reding says . . .

This is why I have already stated publicly my intention – which I reaffirm today – to start infringement proceedings against Germany if the draft should become law without substantial changes.

Telecommunications Online,

**28 June 2006
COM(2006) 129**

course with basic EU telecom principles. She announced that she would impose penalty measures if the draft legislation favouring Deutsche Telekom were enacted. By the autumn, the draft was withdrawn. The German episode

illustrates how political leaders at all levels can find themselves under pressure in connection with broadband development issues. Deutsche Telekom had signalled a willingness to blanket Germany’s 50 largest cities with a fast new broadband network if the company were permitted to deny competitors access to it.

Similar situations are well known to local and regional authorities in Norway. It’s not unusual for local network developers to demand long-term monopoly control over strategic parts of the local infrastructure. In more than one case they have obtained what they requested.

⁷ Communication from the Commission to The Council, The European Parliament, The European Economic and Social Committee and The Committee of the Regions. Bridging the Broadband Gap. COM (2006) 129 final

4 Invited Comments

4.1 Network neutrality: Consumer perspective

*Senior adviser Torgeir Andrew Waterhouse,
Norwegian Consumer Council*

The Norwegian Consumer Council would like to see a debate over who should be in charge on the Internet. Should it be those who use it, or those who provide the broadband capacity? The debate over network neutrality is about the degree to which the Internet should remain a free and open network as it is today, or if broadband providers should be allowed to take full control discriminating between content, services and connected parties.

For consumers, one of the most important aspects of the Internet is the freedom it provides them to choose the services⁸ they want to use or contribute to. This freedom has become a crucial factor in the development of the Internet; it is also a prerequisite for the effective functioning of our digital society. Because of network neutrality, the diversity and versatility of the Internet are evident in the almost all of its everyday uses. This network neutrality is now being threatened.

When we purchase a broadband service, we do so as consumers, but when we use it, we do so as citizens. For Norwegian consumers, the Internet represents a fully legitimate and necessary alternative to traditional arenas of community participation. Political expression, dialogue with

public agencies, news and information services, shopping, education and interpersonal communication – all are accommodated on the Internet. Broadband has quite simply become a necessity for practical interaction in society. Therefore, it matters who controls a nation's broadband infrastructure.

The ongoing network neutrality debate shows clearly that certain market players, both national and international, wish to employ discriminatory actions that would put an end to neutral point-to-point communication. The worst possible outcome would be that consumers would lose the opportunity to choose their own content on the Internet. Point-to-point communication and consumer choice are among the things that have made the Internet a vast and important consumer arena.

For many years observers have identified consumer "lock-in" in the cable and satellite TV markets as a problem. The Internet itself may come to resemble these problematic markets if network neutrality is not secured. Seeking to exercise their rights as consumers, many people have experienced the problem represented by lock-in technologies. Microsoft Office and iTunes are among the closed systems being criticized.⁹

⁸ The Internet is used, among other things, for access to the World Wide Web, e-mail, community participation, bank services, education, online gambling, socializing, cultural exchange, broadband telephony, the exercise of free speech and the purchase of cultural products such as films and music.

⁹ Many important initiatives are underway to tackle the problem of consumer lock-in and the lack of interoperability in the digital world. Examples include:

- Sitemaps (<http://www.sitemaps.org>), an initiative seeking to make sure that competing search engines have equal access to content on websites, thus providing consumers with better search results.
- Open Document Format, designed to solve the problems we have today with the exchange of text documents, spreadsheets and presentations.
- Project DReaM (<http://www.openmediacommons.org>), an initiative to develop an open Digital Rights Management (DRM) solution aimed at solving the problems associated with iTunes, Zune and other services in which legally purchased cultural products can be played only on certain hardware.

The desire by certain interests to violate network neutrality is the latest in a string of attempts to exploit disparities of power and knowledge in the digital world at the expense of consumers and communities. Discriminatory networks and consumer lock-in could become a threat to freedom of expression on the internet. Eventually, they could narrow the access to alternative information and sources, in effect forcing consumers to buy certain types of content only from the network owner or operator. In short, the diversity that characterizes the Internet of today could be reduced dramatically.

There are numerous examples around the world of network neutrality norms being circumvented, as when broadband providers censor the e-mails¹⁰ and websites¹¹ of broadband telephony services that compete with the broadband providers' own services.¹² We have no reason to believe Norwegian broadband providers have plans to use harshly discriminatory tactics of this sort. Nonetheless, two recent episodes illustrate that network neutrality in Norway is threatened:

- Canal Digital has experimented with limiting certain types of Internet usage during periods of the day with heavy traffic. The technique used reduces the consumer's range of choices and bandwidth availability.¹³
- NextGenTel and NRK came into conflict over the accessibility of NRK's web TV service to NextGenTel's customers. Media reports indicated that NextGenTel was prioritizing content in which it had a financial interest,¹⁴ in effect denying consumers genuine choice in selecting content.

Such examples illustrate the technical power of broadband providers to infringe network neutrality. When they use that power, they deprive content providers of the ability to compete freely. They also violate the established principle that consumers get to deploy the broadband capacity they have purchased in accord with their own content and service preferences, whatever these preferences might be.

In debating whether or not to preserve network neutrality, it is important to keep in mind the core issues, which are: 1) the relative degree to which consumers and broadband providers shall control consumers activity on line, and 2) whether the Internet shall continue to be an open arena of community participation or be reduced primarily to a marketplace for buying

The Norwegian Consumer Council says . . .

For consumers, one of the most important aspects of the Internet is the freedom it provides them to choose the services they want

[. . .]

Internet service quality and accessibility must not be degraded as a result of agreements, preferences, economic advantages or other more or less incidental considerations of network providers.

and selling. Without Internet neutrality we could eventually be left with a market in which network providers decide which services their consumers will have access to.

¹⁰ AOL took steps to prevent e-mail in a "Dear AOL" campaign (<http://www.dear-aol.com>) from reaching AOL's customers. The campaign's goal was to keep AOL from introducing a payment system for email delivery in violation of network neutrality principles. See http://www.eff.org/news/archives/2006_04.php#004556

¹¹ Telus (<http://www.telus.com>), in Canada, prevented its customers from accessing a website (<http://www.voices-for-change.ca/index.asp>) that contained information about an ongoing labour conflict at Telus. See: <http://www.cbc.ca/canada/story/2005/07/24/telus-sites050724.html>

¹² In 2004 Madison River Communication prevented its customers from employing broadband telephony provided by other companies, including competitors See: http://news.com.com/Telco+agrees+to+stop+blocking+VoIP+calls/2100-7352_3-5598633.html

¹³ "Canal Digital squeezes file sharing traffic": <http://www.itavisen.no/php/art.php?id=340607> (in Norwegian)

¹⁴ "Low NRK-quality for NextGenTel customers": <http://www.aftenposten.no/forbruker/digital/nyheter/data/article1477077>. ece (in Norwegian)

In the view of the Norwegian Consumer Council, the Internet is so important to each consumer and each citizen, and so important for innovation and to society at large, that network neutrality must be secured. Internet service quality and accessibility must not be degraded as a result of agreements, preferences, economic advantages or other more or less incidental con-

siderations of network providers. It is critical in a well-functioning digital society for broadband and Internet-based services to be organized in effective markets, and for consumers to enjoy open, neutral access to the Internet so that they can continue to participate fully in the Internet society as both consumers and citizens.

4.2 Network neutrality: Regulatory perspective

Chief Engineer Torgeir Alvestad, Norwegian Post and Telecommunication Authority

The Norwegian Act relating to electronic communication (ekomloven), which became effective on 25 July 2003, is designed to secure high-quality, affordable and future-friendly electronic communication services for users. Successfully cultivating such services requires effective use of the country's resources by facilitating and stimulating sustainable competition, business development and innovation. Laws and regulations must create a framework for commercial behaviour in the marketplace while simultaneously protecting the important interests of society and consumers.

On the issue of network neutrality and openness, Norwegian law seeks to facilitate variety and competition. The operative assumption is that would-be network and service providers should face as few hurdles as possible – whether in the form of required individual authorizations or other conditions – to delivering their services. To encourage a large degree of freedom of choice, the regulatory framework includes stipulations about the use of open standards. Among the requirements is one guaranteeing users access to information about the quality of the services they buy.

The market for broadband services

In accordance with recommendations from the EU Commission, the telecommunication authorities in Norway have defined relevant

product and service markets within the category of electronic communication. Two such relevant markets are of special concern in the delivery of broadband services:

- The fixed access network market (physical leasing of subscription lines)
- The broadband access market (resale of xDSL broadband access in the fixed telecommunications network)

These two markets have been subject to extensive analysis, and in both of them Telenor has been assigned special responsibilities as a result

The Norwegian Post and Telecommunication Authority says . . .

Giving different treatment to different services in a network need not automatically be considered a violation of regulations. However, if the services or content of a certain provider are generally de-prioritized, allocated disproportionately low capacity or discriminated against in other ways, there may well be a violation.

of its strong market position. The markets are delimited by Norway's national boundaries. Generally speaking, commercial actors enjoying significant market power (SMP) may be required to meet the following official conditions:

- Transparency and standardization in service offerings
- Non-discriminatory behaviour
- Accounting separation

- Access to their networks by other service providers
- Price regulation and cost accounting requirements

If the likelihood of duplicating the existing infrastructure is small, regulators should try to cultivate the best possible competitive environment for services. At the same time, another aim should be to provide incentives to upgrade and develop existing infrastructure. In markets where the possibility of developing an alternative infrastructure over time is good, regulation should seek to stimulate investment toward that end. This means that short-term competition based on access to Telenor's network must not obviously reduce the incentives for more infrastructure-based competition in the longer run.

The Norwegian Post and Telecommunication Authority has viewed Telenor's copper-based access network as essential to the expansion of broadband services in Norway, and an extensive duplication of this network is unlikely. Telenor has therefore had a relatively strong set of regulations imposed upon it in the market for access to the fixed access network, including price regulation in the form of maximum pricing. In the broadband access market (xDSL resale) Telenor has been subject to milder regulations, with no price regulation.

As of today a relatively high proportion of broadband connections in Norway rely on physical access to Telenor's access network. Some 30% of all xDSL lines are produced in this way. This state of affairs makes possible a more highly differentiated service spectrum than if all connections in the market were based on Telenor's own services and resale products. In addition, the digitalization of cable TV networks and the development of new regional/local broadband networks, some with support from Høykom, are

now gradually contributing to the establishment of an alternative infrastructure for broadband services.

Choice of technologies

IP-based network services are developing at the expense of traditional circuit-switched networks, which are expected gradually to be phased out. One goal of the regulatory system for electronic communication is to be as neutral as possible with regard to the whole spectrum of technology choices. It will generally be the case, therefore, that regulations and instruments imposed in different markets will be the same regardless of technology platform.

IP-based networks provide a greater opportunity for service integration and the transmission of multimedia services. But there is also a number of challenges regarding the quality of services. Mechanisms that can prioritize certain traffic streams or services in a network may have to be introduced in order to preserve a high quality of service. Real-time services like telephony, TV and video are highly sensitive to packet loss, time delay and jitter. Giving different treatment to different services in a network need not automatically be considered a violation of the regulations for electronic communication. However, if the content or services of a certain provider are generally de-prioritized, allocated disproportionately low capacity or discriminated against in other ways, there may well be a violation. Norway's telecommunication authorities will follow developments in this area closely to make sure that companies and organizations follow all applicable regulations and that the interests of consumers with regard to freedom of choice and service quality are guarded.

4.3 Network neutrality: Operator perspective – Telenor

Director Berit Svendsen, Telenor¹⁵

The Internet is experiencing growing pains, with content providers and telecom operators arguing about who should get the bill for required upgrades in network capacity, Telenor Director Berit Svendsen writes.

Telecom regulations rarely cause tempers to flare. The principal of network neutrality has done exactly that, though. The reason is that the issues at stake pit powerful telecom operators in the United States against fast-growing content providers, most notably Google.

The content industry is afraid that telecom network operators will choose who gets to offer content on their networks. Telecom operators, for their part, look with concern on the content industry's success in harvesting profits while the

Telenor says . . .

The question of network neutrality is really a question about financing and payment methods related to the necessary expansion of network capacity . . . Today's business model, with fixed prices for broadband access, does not encourage telecom operators to make large investments in network capacity.

operators alone face the expense of constructing costly new broadband infrastructure required for the transmission of film, music and other bandwidth-hungry content proliferating on the Internet. Network neutrality and any regulatory measures associated with it are therefore of global significance. The discussion now taking place mostly in the United States can be expected to spread, firstly to Europe.

Net neutrality is a term whose meaning is imprecise. Some of the debate and conflict out there can be attributed to differences of understanding among the various parties involved. One commonly held understanding is that telecom operators are supposed to treat all traffic in their

networks alike. This understanding has deep roots. For most people, it is hard to imagine telephone companies being allowed to limit who they can call or what they can say in a telephone conversation.

But today's Internet presents quite a different situation. The Internet was designed a quarter of a century ago with a simple architecture. Any computer can send a data packet to any other computer through a network that does its job of transportation without concerning itself about content. This simple architecture and the principal of non-discriminatory transport are the reason the Internet has been able to grow into a globe-spanning network with a billion users, 100 million websites and innumerable applications.

The development of innovative new applications has turned the Internet into an irreplaceable medium for finding and exchanging information. Individual users and businesses are equally dependent on it, and the amount of information contained in each transmission has grown significantly. In the early years of the Internet, information volumes put only a moderate demand on network transmission capacity and quality. Today, people want to send and receive large volumes of information, including live or "real-time" pictures and speech that can strain transmission capacity.

Overall network usage has increased, too, with public agencies, businesses and consumers all taking a toll. The Internet has become critical to the way society functions. Real-time applications, putting ever larger demands on the networks, have challenged the simple Internet business model devised long ago by telecom operators.

Companies like Google, Yahoo and Vonage are worried the telecom industry could ruin network neutrality by offering express delivery to content providers that are able to pay for it, then billing the network's own end customers

¹⁵ Article first published in Dagens Næringsliv on 28 Aug. 2006 under the Norwegian title "Når nettene blir trange".

for large content packages. Such express lanes would guarantee quick and reliable delivery alongside regular Internet traffic. The data from clients who paid extra (Google and Yahoo, let's say) would be prioritized ahead of data packets from small content companies that are less able to participate in such a business model. Content companies and user organizations in the United States claim that differentiated quality levels and differentiated pricing could threaten user access to vital information while impeding the development of new services on the Internet.

Big companies are all ready paying extra for express lanes on the Internet in order to provide the capacity needed for internal communication in the company. However, telecom operators in the USA claim that this has not in any way hampered an innovative development of the Internet. Net neutrality is a challenge. Today's business

model, with fixed prices for broadband access, does not encourage telecom operators to make large investments in network capacity. That's because expanded capacity does not automatically expand revenue. The solution may be to divide overall network capacity into different quality categories or tiers at different prices. The customer could thus choose a quality level and price, knowing clearly what he or she was paying for. In the final analysis the question of network neutrality is really a question about financing and payment methods related to the necessary expansion of network capacity. Since the Internet and IP technology will be our most important bearer of information in the future, it is crucial that content providers and telecom operators find a workable solution.

4.4 Network neutrality: Operator perspective – Lyse Tele

Managing Director Erik Gundegjerde, Lyse Tele

Lyse's so-called «closed network» solution should be put on equal footing with so-called «open networks» in qualifying for public subsidies to develop fibre-optic networks. Our network is closed because we desire growth, both for our customers and our partners' regions. It is closed for the same reason that a greenhouse encloses a field – to boost growth.

Lyse Tele AS was established in 2002 and is the telecommunications arm of the Lyse concern. The purpose of the company is to develop and deliver broadband services to private individuals and companies in southern Rogaland County while also providing wholesale products to other fibre developers across the country. Today, Lyse Tele has 25 partners in Norway. The partnerships significantly reduce the risk associated with building an infrastructure like Lyse's. They also enable the best building practices to be imple-

mented while giving our activities a profile that is natural to each region.

Over the years we have acquired 70 000 broadband contracts based on our business models. The penetration level of our commercially available products has made it possible to build a fibre-optic infrastructure on solid business grounds. We have examined open network models closely, and they only work if the end customer finances large parts of the investment so that high penetration of products is not necessary.

Lyse's perspective on neutrality and openness

In today's debates about so-called open and closed networks, the common view is that open networks are the ones that promote diversity and choice for end customers, and that the so-called closed networks do not do so. Lyse does not share this view. Indeed, our view is that so-called open networks are less diverse and in the long

run will accommodate far fewer services than the so-called closed model we offer. That said, the neutral element in Lyse's network is actually far greater than that of other networks, including open networks.

In open networks one finds, naturally enough, a larger number of service vendors than in Lyse's network. The commonest conclusion drawn from this is that open networks contain a wider diversity of available services. This is not accurate, however, because a larger number of service vendors does not equate to a broader range of services. If one studies what is available in open networks, one often finds a large number of service providers, such as ISPs, whose products are practically identical. In many cases, price is all

Lyse Tele says . . .

Lyse's "closed" network provides more diversity of service and content than so-called "open" networks. One should drop the term "closed network" and use "neutral greenhouse growth network". That is what Lyse is building and developing in cooperation with its regional partners -- to the benefit of all of Norway.

that differentiates these service providers. And if the open-network price (including access fee) is higher than the price found in closed networks, it's hard to argue that open-network consumers get a better deal. In open networks, we also find significantly lower penetration of products than in "closed" networks. This is because in addition to the services available on open fibre most homes also have copper and often coaxial connections that other service providers use in competition with what is offered on the fibre.

A lack of clarity in the division of responsibility between net operators and service providers will result in finger-pointing when something goes wrong. The customer, moreover, will receive many bills with many fees that rapidly add up. The net result: far less "service content" in circulation than would be the case with a single bill.

The existence of many service providers offering practically identical services and operating with

relatively small profit margins could provoke what we call the "lemming effect". One will reach a peak only to see the number of service providers fall dramatically. We know that the disappearance of service providers is a problem for end customers who must not only sort out the resulting mess but resign themselves to lost subscription fees and other headaches.

Lyse believes many services of the future will come as a result of convergence. Part of the reason is that IP and fibre alone will not be enough. A common IP service platform is also required to make it possible for different services (like TV and the Web) to be able to "talk to each other". Several examples of convergent services are available from Lyse today, simplifying and enriching the daily life of our customers.

In open networks there is no common IP service platform. Instead, services are offered by many different providers who do not cooperate with each other and do not cooperate with the network infrastructure operator or owner. As a result, end users in open networks will never be able to take full advantage of the new convergence-based services that are on the way. Their range of choices will be much smaller.

In the long run, in our opinion, the end customer is best served by a stable, self-sufficient provider of both infrastructure and services.

Computer users who desire access to quality content in the service market of the future should make sure their local network operator has a sustainable economic model. With this in mind, Lyse and a number of our regional partners have embarked on a range of innovative projects and R&D whose ultimate beneficiary will be the end user in the network operators' region. This effect of closed-network management is not to be underestimated.

Anyone worried about the future of service diversity within closed networks should simply examine Lyse's Internet access offerings. They are absolutely the best in the market. Our customers

have every opportunity to pick out services from among the many thousands of service providers on the Internet.

Lyse's "closed network" is neutral

The debate over net neutrality -- in contrast with the debate over open and closed networks -- has to do with discrimination among various providers of service and content on the Internet.

Often there is a clear connection between an operator's capacity limitations and the degree of network neutrality provided. If for example an ADSL operator enters into a partnership with a TV company for exclusive content and revenue sharing, it is easy to see how it would be tempting to "choke" off capacity to other providers of TV content that may be clamouring for the attention of end customers without contributing as much to the network's cash bin. This is what we see when a network chooses to maintain capacity and quality for a certain pay-for-Web TV

provider by discriminating against other Web TV providers.

This type of limitation is not to be found at Lyse. There is more than enough capacity in our network, whose optical fibre goes all the way to the homes of our end customers.

Open network operators that likewise provide fibre direct to the home will be more likely than Lyse to find themselves in the difficult situation of having to provide equal treatment to five or 10 different ISPs across all or parts of their networks. The end customer will experience a lower level of reliability because his or her network operator has far less opportunity to foresee and control variations in the various ISP traffic patterns and streaming practices. The result may be both voluntary and involuntary discrimination of service and content providers over the Internet access network.

4.5 Network neutrality: Content provider perspective – NRK

Media developer and strategic advisor Eirik Solheim, NRK Development and New Media

The issue of network neutrality raises a number of fundamental questions about the relationship between content and network providers. From the earliest years of the Internet, observers have questioned the idea of network providers charging end customers for a product whose attractiveness lies in the fact that there are content providers out there providing entertainment and valuable information. Without content providers, a network would not be worth much; in some cases, broadband providers have even touted content from large media companies in their broadband marketing campaigns.

Network providers seek payment at both ends

Back when the income to content providers was extremely low, eyebrows were raised over the fact that network operators were making all the

profits. Eventually, however, the Internet began to be a truly commercial arena, and a number of content providers found practical business models. Today, some have even begun to earn money, and network operators are turning the original question about profit-making inside out. Surely, they say, content providers must now pay for transporting the signals that give them their income. They want, in other words, payment at both ends of the deal -- from the end user and from those who fill the network with content.

For content providers this is an extremely important question. Predictability and clarity for end users are crucial. When people pay for broadband access it must be easy for them to understand what they are getting. Such access may eventually be used to receive a wide variety of content types. Someone who pays extra for IP TV has no doubt about what he or she is paying for. Quality and channel selection are clearly defined.

The part of a broadband subscription that grants general access to the Internet is particularly dependent on neutrality. The end user expects it and will naturally question the service quality of a particular content provider if its competitors seem to offer a better online experience.

NRK says . . .

To preserve the quality of our services, we may well consider the possibility of making agreements directly with network operators. The regulatory and legal framework ought to allow this, though general access to the Internet must be handled neutrally.

This issue came to a head in Norway recently when NextGenTel chose to lower the transmission rate of traffic from NRK without informing the network's users. When the quality of NRK's service suddenly declined, the complaints and comments came directly to NRK.

The general public expects a neutral Internet. If network providers begin to manipulate content in their broadband packages, they must at least communicate to their customers what they are doing. If they make a deal with Yahoo to favour its search engine and video services, the customer must be made clearly aware of this fact. They must be told that the Internet access they are buying provides good quality on service from Yahoo and poorer quality on service from Google and YouTube.

The services that we, as a content provider, make available have been demanding more and more of network operators. There is a tendency in the market for broadband providers to oversell their capacity. It then becomes difficult for them to deliver the most popular types of content they have promised. To preserve the quality of our services, we may well consider the possibility of making agreements directly with network operators. The regulatory and legal framework should accommodate such arrangements. But end customers must be told about them, and they must not be made at the expense of other content providers.

The Internet is a highly dynamic medium. Needs, usage patterns and technology are all changing quickly. It is crucial for us as a content provider to be able to be flexible while maintaining an orderly and clear relationship with our public.

What follows is an overview of sources for more information on the subject of network neutrality. The list was prepared in November 2006. Though new sources are always appearing, it can at least provide a starting point for additional reading. Feel free to contact us if there are other important sources we should have drawn attention to. The issue of network neutrality will remain timely long after this goes to press.

5 For more information

5.1 Websites

5.1.1 Wikipedia

Wikipedia has abundant information in its article titled Network neutrality. The main thematic emphases are the United States as well as legal and regulatory aspects. The article contains a number of good references to other sources, and is updated on an ongoing basis.

http://en.wikipedia.org/wiki/Network_neutrality

5.1.2 Cyber Telecom

Genny Persing is the editor of a website titled Network Neutrality at Cyber Telecom. It opens with a good introduction to the subject. Particularly noteworthy is the section that appears on the screen as three “pipes” with different characteristics and needs: Three pipes: Video, Internet and VoIP.

<http://www.cybertelecom.org/ci/neutral.htm>

For those who are especially interested in legislative developments in the United States, a sub-page is devoted to the subject:

<http://www.cybertelecom.org/ci/neutralleg.htm>

5.1.3 ECTA

The European Competitive Telecommunications Association (ECTA) is an association of new telecom companies, ISPs and other providers of communication products and services. It is a watchdog that comments, initiates debate and issues its own analyses (see “ECTA Positions” in the group’s website menu).

<http://www.ectaportal.com/en/index.html>

5.1.4 Annenberg Centre for Communication

The Annenberg Centre for Communication at the University of Southern California has run several seminars and workshops on network neutrality. The centre has published five guidelines it thinks should apply to the purchase and sale of Internet services. In brief, they are:

1. Operators and Customers Both Should Win
2. Light Touch Regulation
3. Basic Access Broadband
4. Transparency
5. Encouraging Competitive Entry

The entire text is available by following the link at: <http://www.annenberg.edu/>

5.2 Articles

Wu, Tim (2003): Network Neutrality, Broadband Discrimination, *Journal of Telecommunications and High Technology Law*, Vol. 2, p. 141, 2003

Because Tim Wu is credited with starting the neutrality debate, we include here one of his more recent academic commentaries: “. . . This paper examines the concept of network neutrality in telecommunications policy and its relationship to Darwinian theories of innovation. It also considers the record of broadband discrimination practiced by broadband operators in the early 2000s.” More on the paper is available at

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=388863

Stern, Christopher (2006): The Coming Tug of War Over the Internet, *Washingtonpost.com*, 22 Jan. 2006

Not quite up to date with the latest developments, but a good pedagogical run-through nonetheless. Christopher Stern takes for given that telecom are developing competently new business models.

Felden, Edvard (2006): *Nuts and Bolts of Network Neutrality*, Princeton University. <http://itpolicy/cs/princeton.edu/pub/neutrality.pdf>

Wikipedia: *End-to-end principle*. http://en.wikipedia.org/wiki/End-to-end_principle

Wikipedia has a good reference article on the End-to-end principle, a technical design principle that often pops up in the debate over network neutrality. The principle is fundamental in the TCP/IP protocol and implicates that a transport communication network should be “unintelligent” in the sense that it does not attempt to “fix problems” or provide to many facilities for higher levels in the communication hierarchy.

“... *The end-to-end principle has proved to work well for applications that require a high degree of data accuracy combined with high tolerance for*

delay, such as file transfer, and much less well for real-time applications such as telephony where low latency is more important than absolute data accuracy. The end-to-end model is also not appropriate for large multicast and broadcast networks, especially those with high loss such as wireless, because the overhead it imposes on retransmission is too high for most applications to bear.”

Seng, James (2006): *Network Neutrality*. CircleID, 8 Feb. 2006. http://www.circleid.com/posts/print/network_neutrality/

Isenberg, David S. (1998): *The Dawn of the Stupid Network*, ACM Networker 2.1, February-March 1998. <http://www.isen.com/papers/Dawnstupid.html>

Høykom supports broadband solutions in e-government and e-services

The Norwegian government intends to provide broadband access to all Norwegians by 2007. This is a substantial undertaking. Infrastructure suppliers, for example, must tailor their solutions to Norwegian conditions and reach into the country's most remote areas. The Høykom programme is one of the government's most important tools for overcoming such challenges and maximizing the benefits of market developments.

The Høykom programme is orientated to the public sector. There, an expanding broadband infrastructure holds the promise of enhanced public services and revitalized work routines. With Høykom at the fore, the government's progressive ICT policies encourage the development of innovative broadband-based services and operations at all levels of public administration.

The programme

Høykom has been the Norwegian government's central broadband initiative since 1999. The programme's objective is twofold: to stimulate public-sector demand for public-sector broadband services and to help revitalize public administration. The vision is "to initiate projects and disseminate the knowledge and skills Norway needs to be a leader in the innovative use of ICT and broadband services in every part of the public sector." Increased demand for broadband

access and services will stimulate new rollouts of infrastructure and technology offerings by private enterprise. Intervention by public authorities should be limited to areas and applications that the market is not expected to reach.

Since its inception, the Høykom programme has received about 1,100 project applications and has provided a total of some NOK 500 million to over 400 projects. Among the recipients have been 100 municipalities. From the beginning, the programme has enjoyed broad political support and has been explicitly referred to in the national strategy for advancing Norway's information society.

Knowledge development and dissemination

In addition to its role in funding projects, Høykom is a source of expertise. The Høykom reports are published to make knowledge developed within the programme generally accessible. The report series is based on work performed on assignment for the programme as well as analyses and memoranda by the programme secretariat and information submitted by projects that have received support from Høykom.

Printed versions of Høykom reports are available free of charge for as long as the supply lasts. The reports can also be downloaded from the Høykom website: www.hoykom.no.

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Responsible editor for report series:
Programme coordinator Vemund Riiser
The Research Council of Norway

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