

Nástroje a možnosti internetu

Síťová neutralita

23. 9. 2022

Co na Internetu
děláte **nejčastěji**?
Jaké typy služeb
využíváte nejvíc?

Co na Internetu
děláte **nejčastěji**?
Jaké typy služeb
využíváte nejvíc?



Who should decide how we can use the Internet?

Sítová neutralita

- *„Who should decide how we can use the Internet? Internet service providers like AT&T, Comcast, Deutsche Telekom, or Telefónica that provide the on-ramps to the Internet, or Internet users?“*
- základní otázka *sítové neutrality*

**Network Neutrality and
Quality of Service:
What a Non-Discrimination Rule
Should Look Like¹**

Barbara van Schewick

June 26, 2014

Forthcoming, Stanford Law Review, Volume 67, Issue 1 (2015)

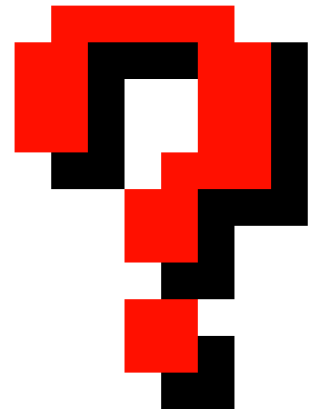
¹ Barbara van Schewick is a Professor of Law, Helen L. Crocker Faculty Scholar and Director of the Center for Internet and Society at Stanford Law School and a Professor (by Courtesy) of Electrical Engineering at Stanford University. This paper is a revised version of a paper that was published as a White Paper by Stanford Law School's Center for Internet and Society in June 2012 (van Schewick (2012b)). Earlier versions of this paper were filed with the Federal Communications Commission in August 2010 (van Schewick (2010e)), presented at the 38th Research Conference on Communication, Information and Internet Policy (TPRC 2010) (van Schewick (2010g)) and filed with the Federal Communications Commission in December 2010 (van Schewick (2010f)).

Many thanks to Marvin Ammon, Scott Bradner, Ryan Calo, Richard Clarke, Alissa Cooper, Mariano-Florentino Cuéllar, Antony Falzone, Laura Fong, Brett Frischmann, Martin Geddes, Jennifer Granick, Mark Kolman, Dan Kessler, Mark Lemley, Peter Menell, Luke Pelikan, David Reed, Morgan Weiland, and to participants of the Stanford Law School Faculty Workshop, the 2010 Wharton Colloquium on Media and Communications Law and TPRC 2010 for their comments on earlier versions of this paper.

Over the past years, I have had many conversations and discussions which have considerably influenced my thinking on these issues. For discussions of the ideas in this paper, I thank Marcelo Bagnulo Braun, Jack Balkin, Yochai Benkler, Brad Burnham, Bob Briscoe, Don Bowman, Gonzalo Camrillo, Vint Cerf, Cindy Cohn, Michael Copps, David

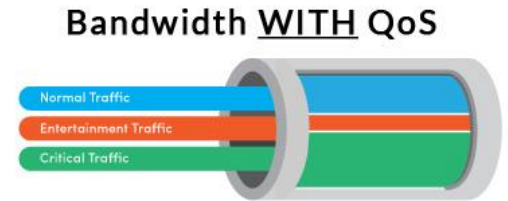
Sítová neutralita

- původně neměl ISP sílu vidět, co se děje v jeho síti
- Schewick: *application-blind* network
- nyní má nástroje k identifikaci aplikace, obsahu, služeb
- **jak toho může ISP zneužívat?**



Síťová neutralita

- blokování obsahu či služeb
- zpomalování/zrychlování vybraných aplikací
- *pomalé a rychlé linky*
- uzavírání smluv s poskytovateli obsahu (PO se podílejí na nákladech ISP – Comcast a Netflix)
- zvýhodňování vlastních služeb (*Time Warner*)
- **svobodná volba aplikací a nástrojů**





Sítová neutralita

- [Comcast x VPN](#) (2001)
- [Comcast x P2P a torrenty](#) (2007)
- AT&T x Skype (2007-9) – nebylo možné využívat mimo Wi-Fi síť + AT&T měl výhradní právo na prodej prvních modelů iPhone
- Google Wallet x tři ISP
- [Paxfire + ISP](#) (2011) – přesměrování vyhledávání

Sítová neutralita

- **Tim Wu** – [A Proposal for Network Neutrality](#), 2002
- ISP X uživatelé
- *ISP*: zvyšování zisku = provozuschopná síť
- *uživatel*: neomezený přístup

III. In Practice (str. 5)



Sítová neutralita

Uživatelé musí být těmi, kdo se rozhoduje jak Internet budou využívat, pokud se má plně realizovat ekonomický, sociální, kulturní a politický potenciál Internetu.

Sítová neutralita

- zákony aplikující principy sítové neutrality
- **USA:** FCC (2018) zrušení SN, rychlé následky
- *pokud svoji politiku ISP zveřejní, je to v pořádku*
- SN nyní předmětem politických bojů
- aktuálně se hraje o SN na úrovni států (Kalifornie)
- Bidenova administrativa nařizuje FCC obnovit SN

INTERNET

FCC
HAVE A
HEART
KEEP THE
INTERNET
FREE

Let
Freedom

SAVE
INTER

12
Stop
THE
INT

MERGER

KEEP THE
INTERNET
FREE
CODE PINK . ORG

HAVE THE
INTERNET





Domáci úkol



- A Declaration of the Independence of Cyberspace
- *John Perry Barlow*
- 1996 – *Communications Decency Act*

Argumenty proti SN

- **Ajit Pai** (*FCC - Federal Communication Commission*)
 - síťová neutralita = státní regulace = špatná cesta
- *„The Internet has unleashed innovation, enabled growth, and inspired freedom more rapidly and extensively than any other technological advance in human history. Its independence is its power. The Internet offers a communications system uniquely free from government intervention.“*



DC



Dr. Verizon's

THE
GRINCH

who

STOLE THE
INTERNET



Argumenty proti SN

„The last thing we should want is President Obama or a government agency picking winners and losers on the Internet. And enforcing net neutrality is picking winners and losers even if it looks like it is just “leveling the playing field.” He may think it is not, but it completely blocks certain business models and stops any possible innovation that might emerge if given the option of seeking differential access to bandwidth. [...] If an ISP blocks Netflix because of the bandwidth it requires, consumers who want Netflix will take their business elsewhere. If enough people do so, the ISP will have to change policies or go out of business.“ [ZDROJ](#)

Argumenty proti SN

- trh uživatele ochrání
- konkurenční prostředí vytvoří nejlepší služby
- mimo to vygeneruje i finance na rozvoj

- ke znevýhodňování může docházet nenápadně
- nemusí být pro uživatele viditelné (*Comcast + Netflix*)

MEDDLE / WEHE

- tiché přiškrcování služeb
- Projekt Wehe
- MEDDLE
- 2018: *Sprint x Skype*

A Large-Scale Analysis of Deployed Traffic Differentiation Practices

Fangfan Li
Northeastern University

Arian Akhavan Niaki
University of Massachusetts Amherst

David Choffnes
Northeastern University

Phillipa Gill
University of Massachusetts Amherst

Alan Mislove
Northeastern University

ABSTRACT

Net neutrality has been the subject of considerable public debate over the past decade. Despite the potential impact on content providers and users, there is currently a lack of tools or data for stakeholders to independently audit the net neutrality policies of network providers. In this work, we address this issue by conducting a one-year study of content-based traffic differentiation policies deployed in operational networks, using results from 1,045,413 crowdsourced measurements conducted by 126,249 users across 2,735 ISPs in 183 countries/regions. We develop and evaluate a methodology that combines individual per-device measurements to form high-confidence, statistically significant inferences of differentiation practices, including fixed-rate bandwidth limits (i.e., throttling) and delayed throttling practices. Using this approach, we identify differentiation in both cellular and WiFi networks, comprising 30 ISPs in 7 countries. We also investigate the impact of throttling practices on video streaming resolution for several popular video streaming providers.

CCS CONCEPTS

• Networks → Network measurement;

KEYWORDS

Network Neutrality, Traffic Differentiation

ACM Reference Format:

Fangfan Li, Arian Akhavan Niaki, David Choffnes, Phillipa Gill, and Alan Mislove. 2019. A Large-Scale Analysis of Deployed Traffic Differentiation Practices. In *SIGCOMM '19: 2019 Conference of the ACM Special Interest Group on Data Communication, August 19–23, 2019, Beijing, China*. ACM, New York, NY, USA, 15 pages. <https://doi.org/10.1145/3341302.3342092>

this work, we fill this gap via a large-scale study of a common form of net neutrality violations: content-based traffic differentiation that limits throughput for specific applications.

A large-scale study of net neutrality violations and their implications is long overdue, given that the most recent large-scale audits of net neutrality came a decade ago and focused on either backbone networks [27] or a single protocol (BitTorrent) [11]. In the intervening decade, the Internet has evolved in two key ways that require a new approach to auditing. First, today's dominant source of Internet traffic is video streaming from content providers, not BitTorrent. Second, users increasingly access the Internet from their mobile devices, often with a spectrum-constrained cellular connection. There is a need to conduct a study of net neutrality violations that takes these changes into account.

We address this need using 1,045,413 measurements conducted by 126,249 users of our Wehe app, across 2,735 ISPs in 183 countries/regions. From this set of raw measurements, we identify 144 ISPs with sufficient tests to confidently identify differentiation. We build on prior work for detecting traffic differentiation over mobile networks [16], however, while prior work focused on detecting differentiation on a per-device basis, we leverage our large-scale crowd-sourced data to develop more robust differentiation detection techniques. We then apply these techniques to conduct the largest-scale study of content-based differentiation practices to date.

The main contributions of this paper are the methods to detect throttling using data from a large user base, analysis of this data, and findings related to detecting fixed-rate throttling and their impact on affected apps. Beyond technical contributions, our findings have been used by a European national telecom regulator, the US FTC and FCC, US Senators, and numerous US state legislators. To

Argumenty proti SN

- různý obsah nemá stejnou důležitost

„The idea that internet service providers should be forced to provide unlimited access to content transmitted indiscriminately whether it is old episodes of Sesame Street, pornographic videos of simulated rape, or a column at The Week, makes as much sense as saying that a brewing company should be able to suck up all the water in a river so long as people like drinking it. [...] The prospect of a segregated internet in which much of the crap now gumming up the works remains legal but available only to those willing to pay a premium to access it is a welcome one.“

([Zdroj](#))

Sítová neutralita *lvl 1000*

- komerční pohled na neutralitu je jedna věc
- pak je tu ještě další rovina
- *2005 – TELUS (Kanada)*
- přístup na server, kde běžel web s informacemi o stávce odborů (a s tím [800 dalších webů](#))
- **zpomalování politických webů a tiskovek?**

NET NEUTRALITY
IS
FREEDOM
OF SPEECH

verizon,

Support Net
Neutrality because it
will SAVE the
economy & create a new
MARKETPLACE!

port
neutrality.

Setkali jste se vy sami se SN?

Sítová neutralita u nás

- **EU:** 2015/2120 – přístup o otevřenému internetu (8, 9)
- Příslušným dozorovým orgánem u nás je ČTÚ
- *občasně uděluje pokuty a sjednává nápravy*
- Zpráva ČTÚ o plnění nařízení EU

- Zlom v Maďarsku
- ECLI:EU:C:2020:708 (10, 44)



Zero-rating

- *pozitivní cenová diskriminace*
- letité diskuze
- rozdílné náklady na straně uživatele
- poprvé v USA (2011) pro službu YouTube

HAVING YOUR CAKE AND EATING IT TOO?
ZERO-RATING, NET NEUTRALITY, AND
INTERNATIONAL LAW

Professor Arturo J. Carrillo*

CITE AS: 19 STAN. TECH. L. REV. 364 (2016)

ABSTRACT

This Article analyzes the international law response to the zero-rating conundrum. National debates rage across the globe on whether to permit zero-rating, which violates net neutrality, as a means of increasing connectivity, especially in the developing world. As a rule, these highly contentious discussions lack rigor, objectivity, and impact. They are characterized by a clash of dogmas: the sanctity of net neutrality principles, on the one hand, versus the imperative to close the digital divide or respect free markets, on the other. This Article seeks to bridge that dichotomy by invoking the applicable international law framework to analyze zero-rating as a limitation on net neutrality understood as a norm of human rights, which net neutrality demonstrably is. When viewed in this light, the zero-rating conundrum becomes a more tractable conflict of rights—the right to impart and receive information freely vs. the right to access the Internet—that can be constructively analyzed using the exceptions regime that human rights law provides precisely to resolve such conflicts. Under this framework, which legally binds almost 80% of the countries in the world, proposed exceptions to net neutrality like zero-rating must be examined under specific country conditions. These exceptions are assessed using a balancing test of factors, including necessity and proportionality, to determine whether, on the whole, freedom of expression is advanced or not in that particular context. This approach has the additional

Zero-rating

Vládní digitální koordinátor:

„Lidé nechtějí při používání telekomunikačních služeb přemýšlet, co je a co není účtováno. Zero-rating ve skutečnosti žádná omezení neodstraňuje. Operátoři jen oddalují nevyhnutelné, a to nástup neomezených datových tarifů.“

Mluvčí T-Mobile:

„Zero-rating chápeme jako čistě obchodní rozhodnutí, které s neutralitou internetu nemá nic společného. Striktní pohled na věc může ve svém důsledku mimo jiné poškodit zájmy poskytovatelů aplikací.“

Zero-rating

- *lepší pokrytí poptávky zákazníků?*
- specifické nabídky umožňují větší konkurenci ISP
- nebo jde o znevýhodňování aplikací a služeb?



muni.cz/go/nami22

Svět on-line

- u nás je to otázka často v komerční rovině
- doma máme většinou pevné připojení atp.
- **ale co jiné oblasti?**
- digitální kolonialismus

Myslíte si, že přístup k internetu je **nutností** moderního života, jako tekoucí voda nebo elektřina, nebo to berete jako **bonus**, něco, co je hezké mít, ale není to povinné?

muni.cz/go/nami22



Svět on-line

- LMIC (*low- and middle-income countries*)
- 40 % populace LMIC bude 2025 stále off-line [ZDROJ](#)
- mobil mnohdy jako jediná brána k přístupu
- data jako zbytečný luxus

Svět on-line

Uživatelé Internetu (ZDROJ)	Population (2020 Est.)	Population % of World	Internet Users 30 June 2020	Penetration Rate	Growth 2000-2020	Internet World %
Africa	1,340,598,447	17.2 %	566,138,772	42.2 %	12,441 %	11.7 %
Asia	4,294,516,659	55.1 %	2,525,033,874	58.8 %	2,109 %	52.2 %
Europe	834,995,197	10.7 %	727,848,547	87.2 %	592 %	15.1 %
Latin America / Caribbean	654,287,232	8.4 %	467,817,332	71.5 %	2,489 %	9.7 %
Middle East	260,991,690	3.3 %	184,856,813	70.8 %	5,527 %	3.8 %
North America	368,869,647	4.7 %	332,908,868	90.3 %	208 %	6.9 %
Oceania / Australia	42,690,838	0.5 %	28,917,600	67.7 %	279 %	0.6 %
Total	7,796,949,710	100.0 %	4,833,521,806	62.0 %	1,239 %	100.0 %



E-mail nebo telefon

Heslo

Zapomněli jste přístup k účtu?

[Přihlásit se](#)

Chcete se přidat na Facebook?

[Zaregistrovat se](#)

Je možnost připojení lidským právem?

Již téměř deset let se Facebook snaží, aby byl svět otevřenější a propojenější. V současné době každý měsíc propojíme 1,15 miliardy lidí, ale když jsme začali přemýšlet o propojení dalších 5 miliard, přišli jsme na něco důležitého: valná většina lidí na světě nemá přístup k internetu.

V dnešní době je online pouze 2,7 miliard lidí – o málo víc než jedna třetina světa. Každoročně toto číslo vzroste o necelých 9 %. Uvážíme-li však, že v rozvoji internetu jsme teprve na začátku, je tento nárůst pomalý. I když podle odhadů bude mít v příštím desetiletí smartphony většina lidí,

Internet.org

- 2014
- projekt [Aquila](#) (internetové drony)
- **Free Basics**





Free Basics by Facebook



Free Basics by Facebook provides people with access to basic websites for free – like news, job postings, health and education information, and communication tools like Facebook.

[LEARN MORE →](#)











free basics

Free Services Airtel

BROUGHT TO YOU BY

-  **Facebook - Free Data**
Communicate with friends and family

MORE FREE SERVICES

-  **AccuWeather**
Get updated weather information
-  **BabyCenter**
Learn about pregnancy and children
-  **BBC News**
Read news from around the world
-  **BBC Swahili**
Soma habari kutoka duniani kote
-  **BrighterMonday**
Search for jobs











free basics

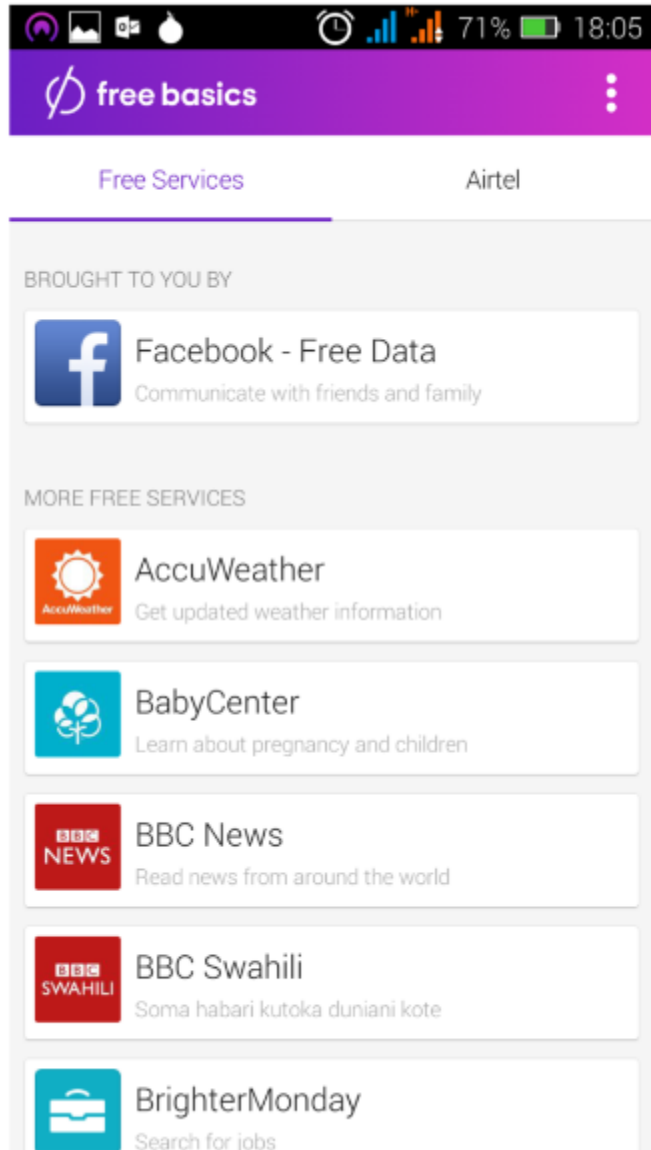
Free Services Airtel

BROUGHT TO YOU BY

-  **Facebook - Free Data**
Communicate with friends and family

MORE FREE SERVICES

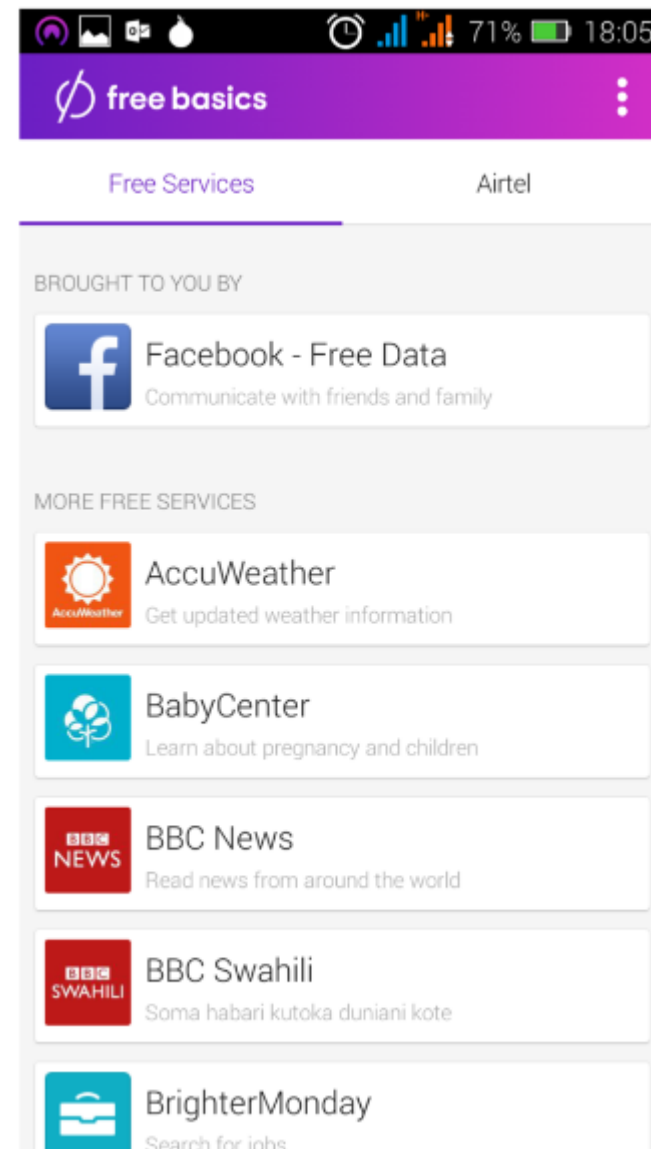
-  **AccuWeather**
Get updated weather information
-  **BabyCenter**
Learn about pregnancy and children
-  **BBC News**
Read news from around the world
-  **BBC Swahili**
Soma habari kutoka duniani kote
-  **BrighterMonday**
Search for jobs



Free Basics

Studie projektu v reálném světě:

- jazyková nepřístupnost
- zastoupení lokálních zdrojů
- *digitální kolonialismus*
- odporuje SN
- FB je jediná sociální síť ve výběru
- přístup k množství metadat
- *walled gardens*



Web
týdne

The screenshot shows a web browser window with the URL `lindat.cz/services/translation`. The browser's address bar and navigation icons are visible at the top. Below the browser, a navigation menu contains the following items: LINDAT (with logo), Repository, Corpus Search, TreeQuery, Treex, More Apps, About, and CLARIN (with logo). The main content area is titled "LINDAT Translation" and features two tabs: "Translate" (active) and "Docs". A notice states: "The translation service is available for *personal and non-commercial use* (see [terms of use](#) for more details)." Below this, there are two dropdown menus: "Source" set to "Czech" and "Target" set to "English". An "advanced" checkbox is currently unchecked. The interface is divided into two main sections: "Input sentences" on the left and "Translation" on the right, both represented by large empty text boxes. At the bottom, there are two buttons: "Translate" and "Choose file". A mouse cursor is positioned at the bottom right corner of the page.