

# **Technical Aspects and Tools for Net Neutrality**

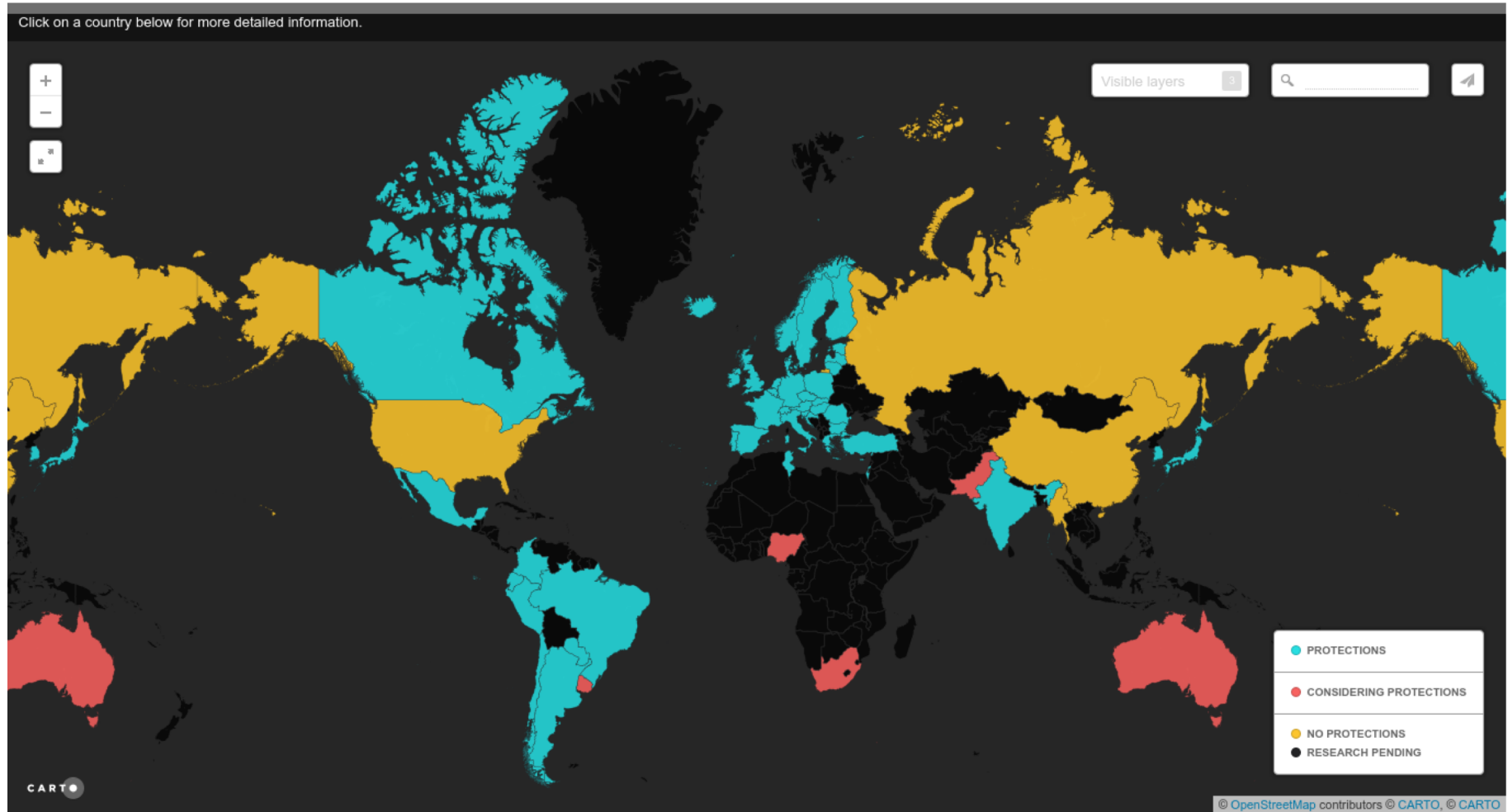
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# Introduction

- Network neutrality is best defined as a network design principle.
- The idea is that a maximally useful public information network aspires to **treat all content, sites, and platforms equally**. This allows the network to carry every form of information and support every kind of application.
- The principle suggests that information **networks are often more valuable when they are less specialized** – when they are a platform for multiple uses, present and future.
- (For people who know more about network design, what is just described is similar to the "end-to-end" design principle).

Tim Wu

# Introduction



Map created by [dejiaccessnow](#)

# Introduction

- Different interests in relation to net neutrality
  - Telcos and ISPs
  - Big Content Providers
  - Small Content Providers
  - Users

# Introduction

- There are at least **3 ways** for an Internet service provider to **discriminate** a specific content or application on the Internet, violating the network neutrality:
  - **Total blocking** of the application and/or content on the Internet;
  - **Reduced speed** compared to other applications and/or content; and
  - Charging a **different price** for access to that content and/or application in comparison to the others.

# Metrics & Tools

	Neubot	Glasnost	NDT	ShaperProbe
Throughput - TCP	no	no	yes	no
Throughput - UDP	no	no	no	yes
Throughput - BitTorrent	no	yes	no	no
Throughput - HTTP	no	yes	no	no
Goodput - TCP	yes	no	no	no
Goodput - BitTorrent	yes	no	no	no
Goodput - HTTP	yes	no	no	no
RTT - TCP	no	no	yes	no
Latency - HTTP	yes	no	no	no
Latency - TCP	yes	no	no	no
Jitter - TCP	no	no	yes	no

# Tools

- Neubot
  - The client needs to be installed on the computer
  - Continuously monitors the end-user connection rather than sending probe packets to ISPs
  - Performance variation may be a result of other factors such as network congestion, and not always because of discrimination by the ISP

# Tools

- Neubot
  - There are significant variations in the tests, especially in the measures of HTTP and BitTorrent protocols download
  - In fact, it is not possible to affirm by these isolated measures if it is the case of a deliberate degradation of the traffic



# Tools

- NDT
  - An easy user interface because it is a Java applet running on a web page
  - The measured metrics are quite limited
  - The tool do not tell you whether traffic discrimination is occurring because it does not compare with other protocols or what happens in other ISPs

# Tools

- Glasnost
  - There is a web page where you can test directly through a browser
  - More possibilities to give a more interesting diagnosis than happens in a network, since it measures several metrics, different protocols
  - Good accuracy and simplicity of use
  - Focused on end-user differentiation and may not be able to detect discrimination between content providers made by ISP

# Tools

- Glasnost
  - In the measurements performed, the tool presented an alert for a possible favoring of the download of HTTP packages in relation to others in the same port (8080)
  - Since it was only possible to perform a complete test, it is not possible to affirm that this behavior is continuous in this network or if it happened due to some temporary situation

# Tools

- ShaperProbe
  - It is necessary to be installed locally for testing
  - It was not possible to perform tests. Although, on the website say that the tool works in NAT network (which was the case of the network tested), this can be an explanation for the non-functioning of the tests

# Discussion and Final Consideration

- It can be notice that tools for detecting discrimination are specific to an application, a protocol or a specific mechanism of discrimination and, most of the time, rely on active measurement tests
- The use of only one of these tools do not tell enough about the net neutrality violation according to the definition of the legislations

# Discussion and Final Consideration

- It is still expected that tools developed in the future to indicate whether network neutrality is being violated can be used to enforce laws
- In 2017, BEREC released a specification of a net neutrality measurement tool to support harmonised measurement metrics and methodologies in a federated platform for measurements of IAS quality. It also provides a basis for further researching the area of net neutrality supervision.

# **Thank You!**

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