

2021 Survey of Internet Carrier Interconnection Agreements

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PCH Peering Survey

In 2011, PCH conducted the first-ever broad survey of Internet peering agreements.

We asked ISPs to tell us three things about each of their peering agreements:

- Is the agreement formalized in a written document, or is it a “handshake” agreement?
- Does the agreement have symmetric terms, or do the parties exchange different things?
- What is the country of governing law of the agreement?

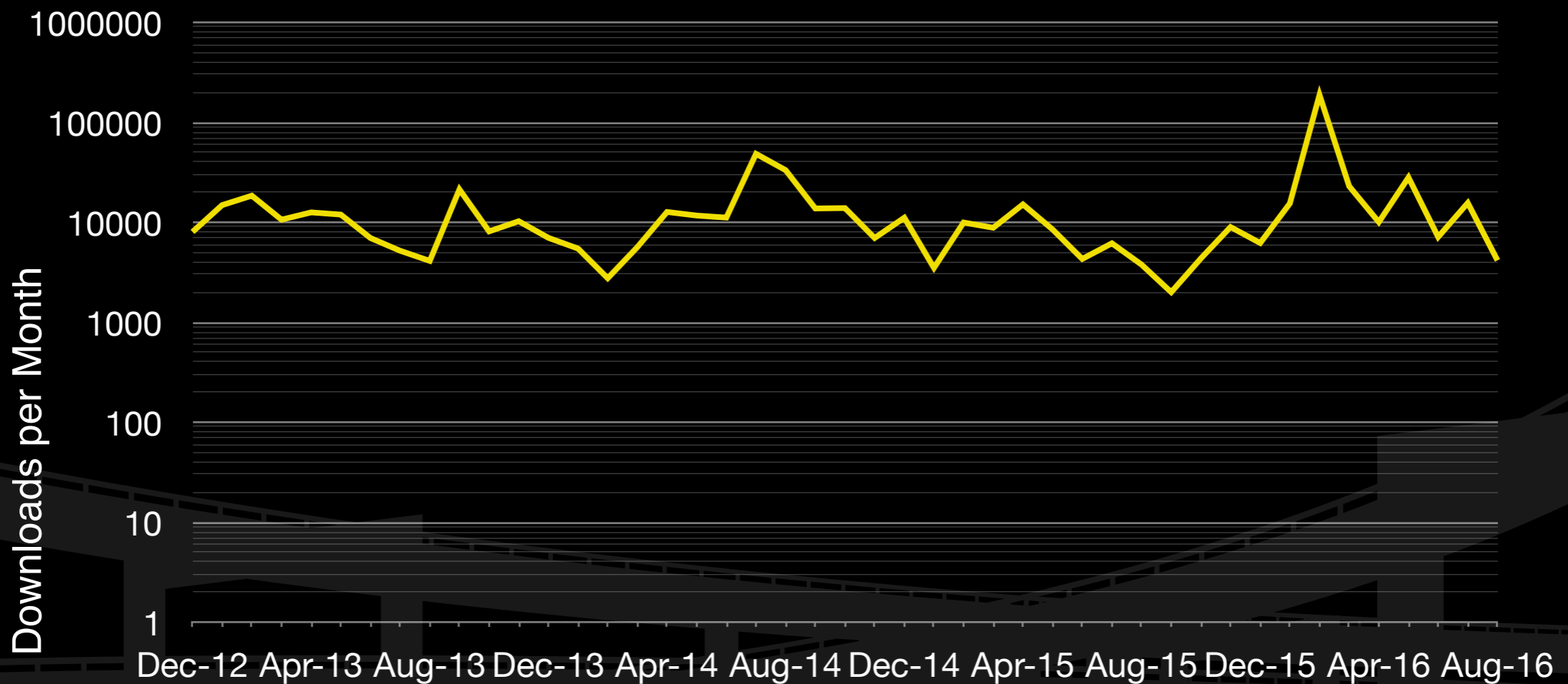
PCH Peering Survey

The previous largest survey analysed sixteen agreements, all in the United States. In 2011 we analysed 142,210 agreements from 4,331 Internet service provider networks in 96 countries.

<https://pch.net/resources/papers/peering-survey>

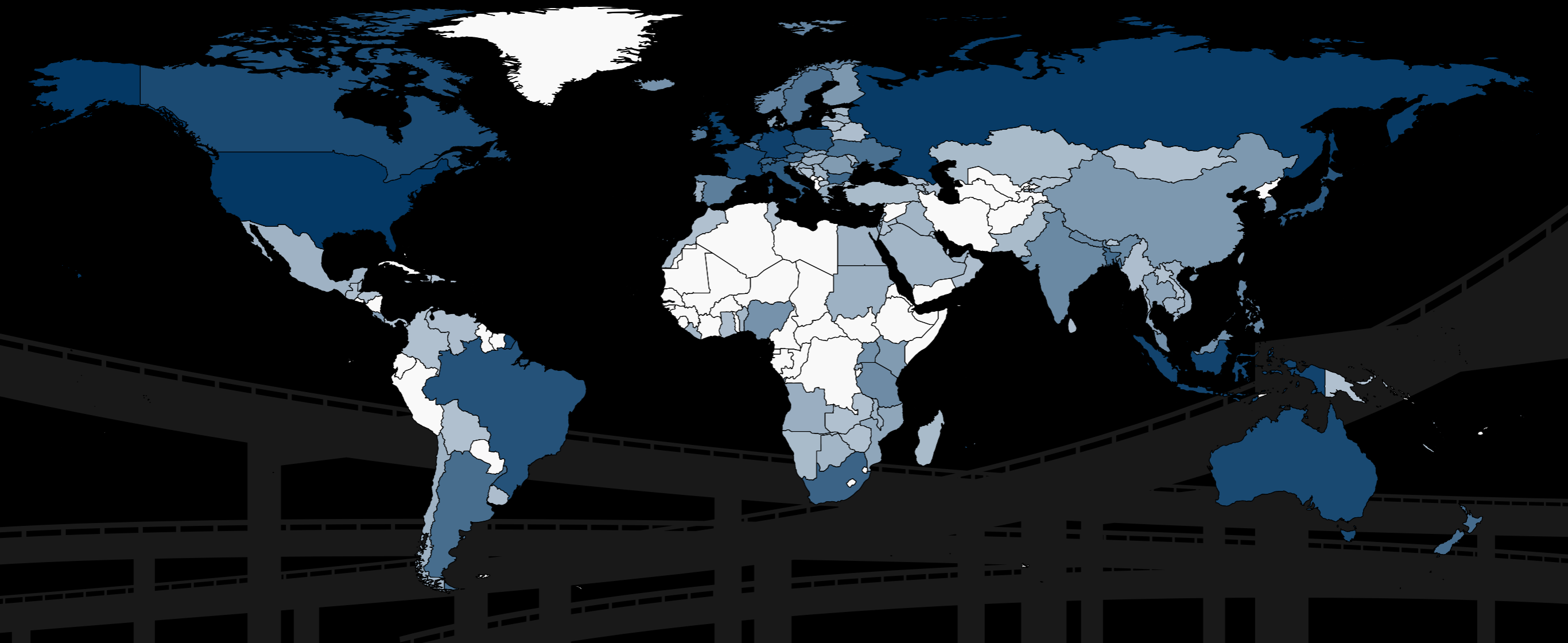
In 2011, we promised to repeat the survey every five years, in order to document trends in the industry and begin building time-series data.

The reports have been downloaded more than 1,5million times over the past ten years.



PCH Peering Survey 2016

We analysed 1,935,822 interconnection agreements representing 10,794 carrier networks in 148 countries including all 35 OECD member countries and 21 UN LDCs.



PCH Peering Survey 2021

We analysed 15,105,101 interconnection agreements representing 17,192 carrier networks in 192 countries including all 35 OECD member countries and 35 UN LDCs.

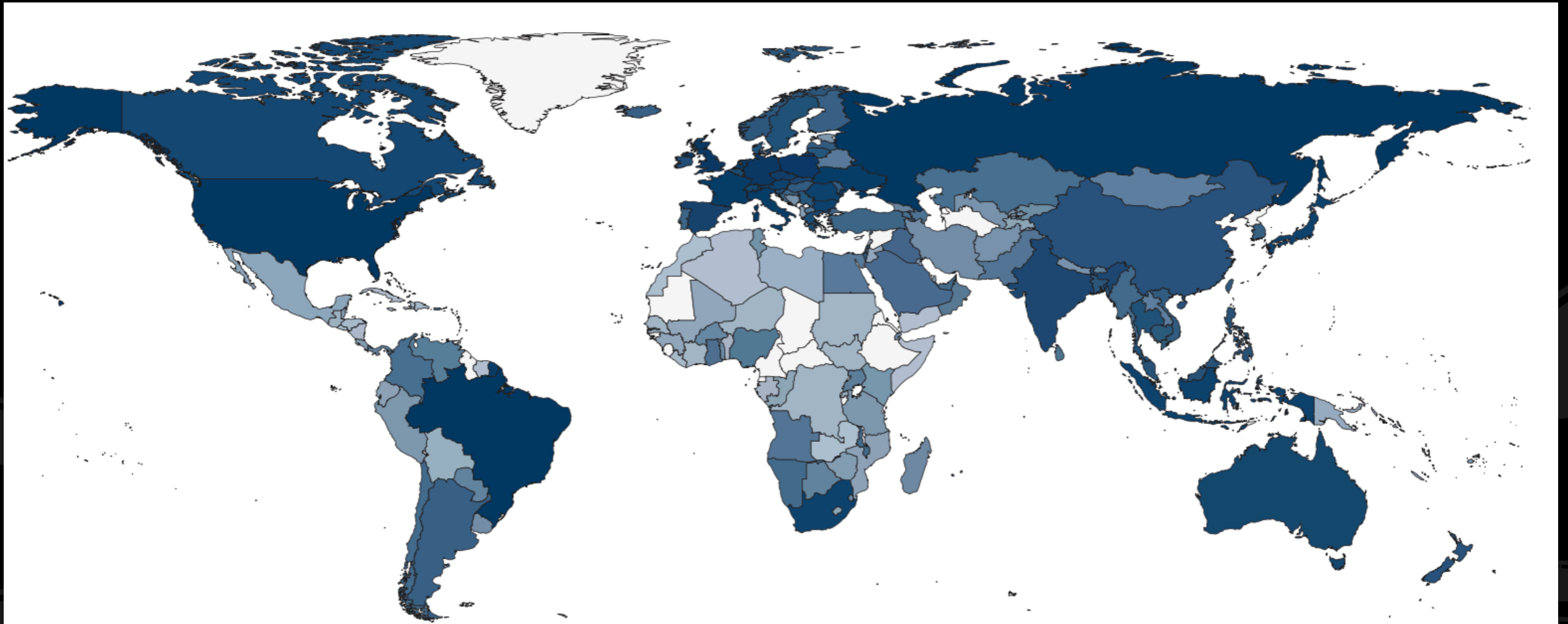


Figure 1: Geographic distribution of the networks represented in the dataset, color density by absolute number

“The PCH peering survey provides a unique insight into why the Internet’s model of traffic exchange has been so successful around the world. It underlines the degree of global uniformity across regulatory regimes that would otherwise not be able to harmonize among themselves. This information is invaluable to our work in providing advice to policy makers.”

– Dr. Sam Paltridge
Directorate of Science, Technology and Innovation
OECD

Key Findings (2021)

99.998% of peering agreements are informal “handshake” agreements in which both parties agree to abide by globally-recognized terms. This is up from 99.93% in 2016 and 99.51% in 2011.

This finding was not thrown off by unrepresentational participation: essentially all major backbone providers are represented in the dataset.

Follow-up interviews with holders of written contracts indicated that, while the contracts are being allowed to expire, the relationships they formalized continue to grow.

Key Findings

99.9996% of peering agreements had symmetric terms in which each party gave and received the same conditions as the other.

This is up from 99.98% in 2016 and 99.73% in 2011.
From 1 in 400 then to 1 in 4,800 today.

Market-dominant incumbents routinely advance the notion that “paid peering” or minimum peering requirements are commonplace. They do exist, but in vanishingly small numbers, and those numbers continue to dwindle rapidly relative to overall growth.

Key Findings

Strong preferences continue to exist for contractual country of governing law, closely paralleling perceived law & order and the degree to which legislation and governmental policy protect carriers from liability for content.

The United States, Canada, and Japan remain favored and, post-Snowden, Iceland and Finland join the list of favoured countries. By contrast Romania, the Ukraine, and Russia continue to be selected least often, and China and Thailand join them near the bottom of the list.

Key Findings

Nearly all peering is multilateral peering implemented through route-servers and multilateral agreements.

Incumbents often attempt to deride multilateral peering as peripheral and inconsequential. In fact, it was already becoming the dominant practice in 2011, and accounts for the vast majority of AS adjacencies from 2016.

Multilateral peering commands less mind-share because it's fire-and-forget. An agreement is established once, and continues to accrue new participants over time.

Key Findings

3,222,452 (21.33%) are exchanging IPv6 traffic while 11,882,649 (78.67%) were not.

This is up from 2016 where only 3.88% were exchanging IPv6 traffic.

Full reports

It's not possible to go through the full report in 5min.
Please download the report(s) online at :

<https://pch.net/resources/papers/peering-survey>

Thanks, and Questions?



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Copies of this presentation are available in PDF format.