

THE POST BANDWIDTH Era: A LABEL FOR INTERNET GOODNESS

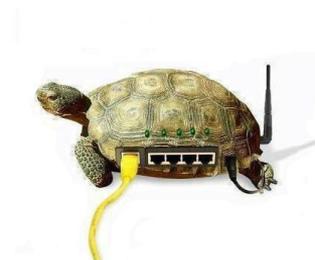
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Inspired by an “Inventory of Aspirations” (2015)

*Want Internet everywhere (**reach, ubiquity, uptake**), safe and law abiding (**trustworthiness and lawfulness**), **Interdisciplinary approach***

Missing:

- **Sufficient capacity and speed** for online work, learning and leisure
- Activities kept **private & free of censorship**
- **Choice** and flexibility of service
- Clarity and **Transparency** in carrier/content provider metrics and advertising



The Challenge, Obstacles and A Proposal

Challenge: Researchers, operators, government and consumers at odds about what constitutes a **good** Internet connection, how to measure it and how to visualize it.

Obstacles:

- Last mile offered bandwidth is a proxy often used, but its existence is rarely verified.
- End user experience is relative.
- Researchers, government and ISPs have a symbiotic relationship.
- Some topics are 'don't ask don't tell' in network community - ie privacy and surveillance.

Proposal: Create a better, yet measurable definition of “Good” that encompasses interdisciplinary work of network researchers, end user point of view, social scientists and economists. Converting it to a visual representation aids consumers and government in understanding metrics.

The Purpose

ISP Accountability

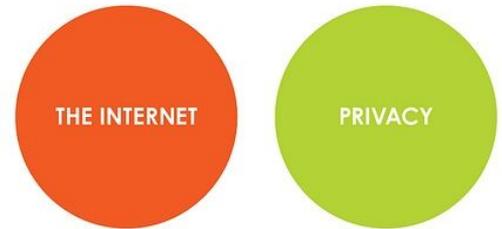
To consumers

To policymakers & funders

Stimulate R&D by exposing ground truth and places where investment needed

Economic Competitiveness

Reclaim Privacy - perhaps move to GDPR in US



A HELPFUL VENN DIAGRAM

Scoring “Goodness”

Weighted score based on several factors:

- Speed - Must be verified by independent auditors, not ISPs nor willing participants with software. Are consumers actually getting speeds reported by the carrier?
- Availability - Infrastructure and Form 477 data should be audited and validated by a 3rd party.
- Privacy Preservation/Trustworthiness - Are consumers allowed to opt-out of data collection?
- Anti-surveillance. Does the ISP follow the legal regulations only and no more.
- Research-friendly - Is the carrier willing to provide data sets to researchers?



NO Internet



SLOW Internet

Scoring “Goodness” (more)

- No Bandwidth Throttling. No data caps.
- Routing Policies. Does the carrier have accurate IRR data? Are they adhering to MANRS?
- Corporate Responsibility/Trustworthiness.
- Cost - Are the tiers of service reasonable, transparent and comparable in structure to other carriers?
- Consumer Transparency in Advertising - Understand offering.
- Security - Are best practices in place?
- Economic Impact - how many jobs were created as a direct result

Oversight - Watchdog Group Needed

Researchers in academia and at carriers produce results that are acceptable, not controversial. Can't risk funding!

FCC is not non-partisan

Alternatives to ensure more transparency and accountability:

- Empower FTC to levy penalties for false advertising
- An NTSB or NHTSA type function independently verifying measurement

Funding for this: Carriers and content providers should pay for it via a **special tax** levied by size of customer base.

Who's measuring Now



Sticks not Carrots

Providers should be penalized for :

Inaccurate last mile broadband maps

Throttling to force unnecessarily expensive data plans

Charging consumers to opt out of selling their data

False advertising

Privacy Nutrition Labels Have Been Suggested Since 2001



Mozilla - 2011 - icons: 3rd party use of your data for intended purposes only vs selling to data brokers

Bell Group

| information we collect | ways we use your information | | | | information sharing | |
|-------------------------|--------------------------------------|-----------|---------------|-----------|---------------------|---------------|
| | to provide service and maintain site | marketing | telemarketing | profiling | other companies | public forums |
| contact information | | opt in | | | opt out | |
| cookies | | | | | | |
| demographic information | | opt in | | | opt out | |
| financial information | | | | | | |
| health information | | | | | | |
| preferences | | | | | | |
| purchasing information | | opt in | | | opt out | |

CMU/CyLab prototype 2009

Goal: Intentionally designed, common format

See: "Standardizing Privacy Notices: An Online Study of the Nutrition Label Approach", Kelley and Cranor

How Would We Make an Internet Nutrition Label?

Nutrition Facts

Serving Size 1 cup (228g)
Serving Per Container 2

Amount Per Serving
Calories 250 Calories from Fat 110
% Daily Value*

| | | |
|--------------------|-------|-----|
| Total Fat | 12g | 18% |
| Saturated Fat | 3g | 15% |
| Cholesterol | 30mg | 10% |
| Sodium | 470mg | 20% |
| Total Carbohydrate | 31g | 10% |
| Dietary Fiber | 0g | 0% |
| Sugars | 5g | |
| Protein | 5g | |

| | |
|-----------|-----|
| Vitamin A | 4% |
| Vitamin C | 2% |
| Calcium | 20% |
| Iron | 4% |

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

| | Calorie | 2,000 | 2,500 |
|--------------------|-----------|----------|----------|
| Total Fat | Less than | 65g | 80g |
| Sat Fat | Less than | 20g | 25g |
| Cholesterol | Less than | 300 mg | 300mg |
| Sodium | Less than | 2,400 mg | 2,400 mg |
| Total Carbohydrate | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

LOW Fat 7.7g per serving

LOW Saturates 2.0g per serving

HIGH Sugars 42.2g per serving

MED Salt 2.0g per serving

WARNING:
CHOKING HAZARD
This toy is a small ball.
Not for children under 3 yrs.

Drug Facts

Active ingredient (in each tablet) Chlorpheniramine maleate 4 mg **Purpose** Antihistamine

Uses temporarily relieves these symptoms due to hay fever or other upper respiratory allergens: ■ sneezing ■ runny nose ■ itchy, watery eyes ■ itchy throat

Warnings
Ask a doctor before use if you have
■ glaucoma ■ a breathing problem such as emphysema or chronic bronchitis
■ trouble urinating due to an enlarged prostate gland

Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives

When using this product

WATER RATING

The more stars the more water efficient

Water Consumption: 54
Litres per wash with heated program

For more information and to compare appliances, visit www.waterrating.gov.au

Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
Without Through-the-Door Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator with Others before You Buy.

This Model Uses 776 kWh/year

Energy Use (kWh/year) range of all similar models

Uses Least Energy 742 Uses Most Energy 856

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 to 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:

\$68

Based on a 1992 U.S. Government national average cost of 8.24¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Refrigerator Energy Use of this Scale When Consumer Purchases is a function of Model No. (2013-12-05)

Energy **Washing machine**

Manufacturer Model

More efficient

A
B
C
D
E
F
G

B

Internet Nutrition Label

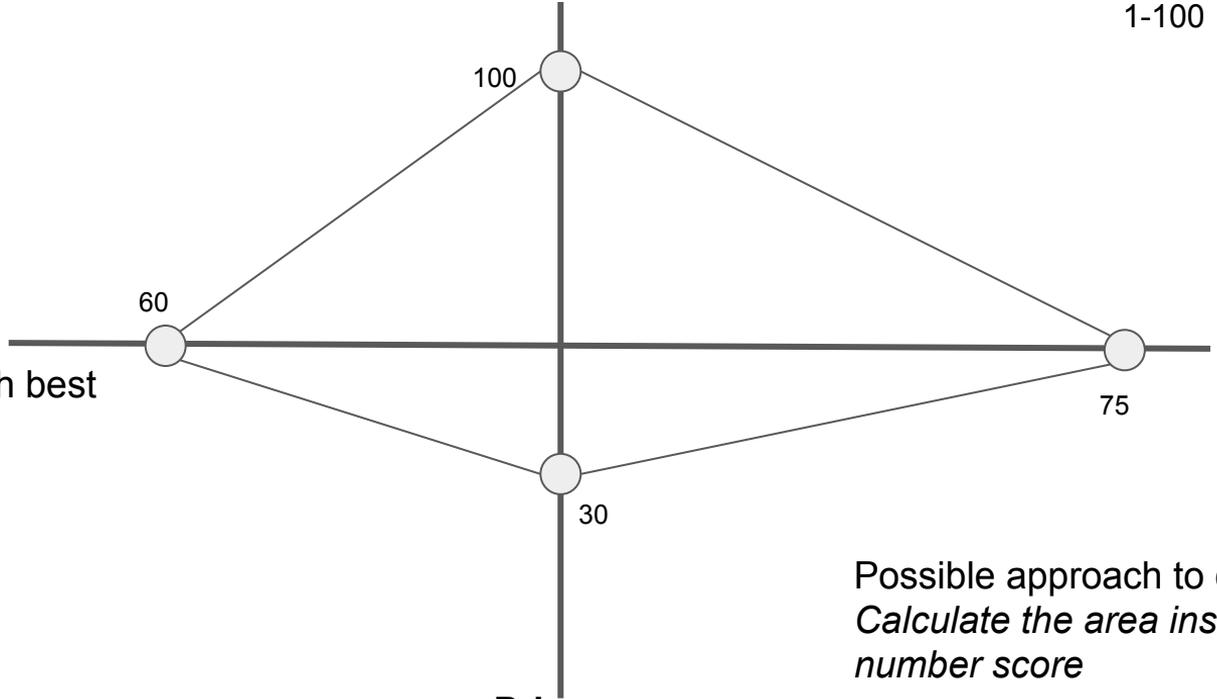
Scale 0-100

Speed
Score of 100 = Gig

These factors will vary based on the focus of the metric. Scale is 1-100

Safety
Compliance with best practices

Latency
to consumer



Possible approach to creating a score...
Calculate the area inside the lines for a single number score

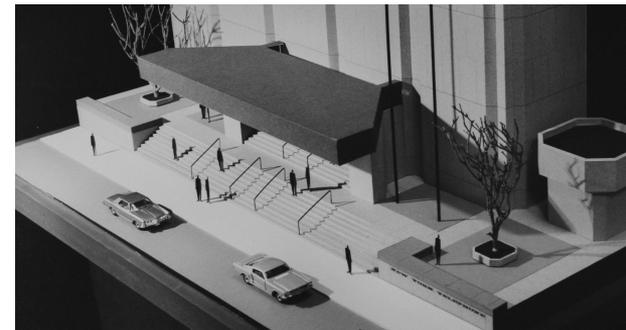
Privacy
Compliance with best practices
Score of 0 results from a lack of consumer privacy protections

Scoring: Privacy Example

| | |
|---|-----|
| Don't sell consumer Data | 100 |
| Opt Out from Data Collection at No Additional Cost | 100 |
| Transparent cooperation with Federal data collection | 100 |
| No throttling of VPN | 50 |
| Easy to understand privacy policy telling users where data is kept and how its used | 10 |

Weighted Score (1-100)

AT&T - NSA TITANPOINTE site in NYC <?>



Scoring: Physical Infrastructure Example

| | |
|--|--|
| Accurate Mapping Data given to FCC | |
| Easy access to UNEs | |
| Building out accurately if in receipt of Federal funds | |
| Truthfully advertise infrastructure to consumers | |
| | |



Fiber “available” per Form 477.
Score must be less than 50.

NY vs Spectrum/TWC (Case 450318/2017): Spectrum gets a 0 for false advertising of capabilities

Score (1-100)

Integrate Other Approaches



Crowdsourcing Measurement- ie Broadband Catalysts - data from FCC, open access fiber networks & citizens

Bug bounties Popular for discovery of security vulnerabilities. How about to those who prove carrier throttling or practices that violate those stated in carrier policy?

Non-academic conferences empower tech advocates and activists to make change.

hackerone

Open Questions

- Label design?
- Who'd run a watchdog group?
- Should policymakers just use the overall optimal score?
- What factors should be universally at a certain level?
- What does “underserved” mean?