Overall Summary

of the

2011.10.12/13 OECD Broadband Metrics Workshop

at the

Federal Communications Commission

The OECD Metrics Workshop focused primarily on developing a new metrics framework to facilitate OECD member economies' domestic analysis of broadband infrastructure availability, access, and use, and the impact of the Internet on productivity and other macroeconomic parameters.

Day 1 of the Workshop:

- o Session 1 – Current Approaches to Measuring the Economic Impact of Broadband
- o Session 2 – Current Approaches to Measuring Broadband Deployment and Adoption
- o Session 3 – Looking Ahead – The Need and Use of Data for Broadband Policy Making
- o Session 4 – Looking Ahead – Examining the Relationship of Broadband to Entrepreneurship, Innovation, and Productivity

- The major underlying theme of the workshop was the need to standardize terms, goals/benchmarks and indicators, and data collection and reporting tools/methods employed by the OECD and member countries.
  - o Standardize terms.
    - There is some international disagreement as to what the term "broadband" should mean.
  - o Standardize goals/benchmarks and indicators.
    - Statistics must serve an end purpose (goals/benchmarks) otherwise time may be wasted collecting too many irrelevant indicators and overcomplicating analysis.
    - OECD and members should define the end goals/benchmarks to determine what indicators will be needed for the analysis instead of "collect data and analyze it to see what can be discovered."
    - Look to the future – set goals based on predictions of future uses.
    - Form public and private partnerships, in addition to inter-agency cooperation, to set goals and benchmarks and collect indicators.
    - Need to consider that sectors, such as education, business, government, etc., have their own influence over, different needs for, and different uses of, broadband. Inversely, broadband has varying influences over each sector, and may dictate what the sectors and end-users do.
      - Many countries have different priorities regarding these sectors, so the data they collect and report out do not agree because their end goals are different.
      - Use a social-networking tool similar to OECD's "Create Your Better Life Index" as a method for determining what end-users in the sectors want and what policy goals should flow therefrom.[1] (Irene Wu)
    - The World Bank is working on a Broadband Strategy Toolkit for Developing Countries that could be a useful model to look to regarding goals/benchmarks and indicators.[2] (Irene Wu)
  - o Standardize data collection and reporting methods.
    - Currently, countries, such as the United States and United Kingdom, in addition to the European Union, have deployed, or plan to deploy, tools to measure actual speeds.
      - However, the data collected by such tools may not comport because there are many design choices for technologies and protocols.

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[1] Create Your Better Life Index, OECD, http://www.oecdbetterlifeindex.org/, (Last visited October 19, 2011).
[2] Building a Toolkit on Broadband Strategies for Developing Countries, *info*Dev, World Bank, (Nov. 5, 2009), available at http://www.infodev.org/en/Document.936.pdf.

- ▪ Use machine readable data, which can be shared among public and private institutions. (Irene Wu)
    - • One file format – software used to analyze the data can be customized to the end goals.
    - • Facilitate implementation of machine readable data by cooperating with hardware manufacturers.
    - • Take measure to protect privacy and information assurance that the data collected is correct. Must balance the value of privacy and information assurance versus the value of making informed policy and economic decisions, and legal ramifications.
- • However, OECD standardization of broadband metrics should not affect what public and private entities do internally – it should only affect what they report out internationally, at the very least to the OECD.
- • Look to "Routed IPv4/IPv6 Addresses" for possible indicators.

Day 2 of the Workshop:

Session 5.1 -- The Future of Broadband Measurement: A Discussion of the Metrics Checklist (Short-term Goals)

Rapporteur: Richard Clarke, BIAC and AT&T

Session Focus:
How ready are country broadband data collecting agencies, whether policy agencies, statistical agencies or regulatory agencies, to provide some of the data needed for the "Short-term goals" section of the OECD broadband measurement checklist listed below? What are the major definitional and methodological issues that need to be treated to both refine and implement this portion of the Checklist?

Session Chair: Richard Clarke, BIAC and AT&T

Discussants:
- o *Steven Rosenberg, FCC, USA*
- o *Harald Wium Lie, Nexia, Norway*
- o *Inigo Herguera Garcia, CMT, BEREC*
- o *Ian Macrae, Ofcom, UK*

Prepared comments

Steven Rosenberg highlighted the importance of understanding the purposes of the data collection in order to inform the particular metrics collected. In particular, for deployment it is important to choose a level of granularity that allows adequate precision, but is coarse enough for the collection to be administrable. One also needs to decide whether data are to be collected separately for residence vs. business use, or on a unified basis. For adoption, time series data is important, but it must recognize that the adopted technologies may also be changing, which may provoke a need to adjust the particular item being measured. The source of the information may also need to be multifaceted as customers often do not know the particulars of the service they are buying as well as does the provider of that service. Pricing data decisions can be especially vexing as different purposes (e.g., measurement of best-available prices vs. average prices vs. competitive interaction) may dictate different metrics. Further, the advent of bundling, promotions and evolving service levels make definition of simple price metrics very difficult.

Harald Wium Lie focused on the ability to collect service availability and deployment information at very granular levels. He provided a description of the process that has been used in Norway to collect this information, on a national basis, down to the individual building level. He noted that this collection process has

required integration of data from several statistical sources, but has been performed quite economically in Norway.

Inigo Herguera Garcia participated remotely from Spain and discussed some of the differences between fixed and mobile broadband offers and prices as well as particular difficulties with certain price comparisons. Specific points were that since most fixed broadband in usage-unlimited, speed is an important differentiator. But since mobile broadband offers are mostly usage-limited, bandwidth allowances are critical. Further, offers can differ as to how limits are enforced: by payment additives once allowances are exhausted, or by speed reductions, or flat limits. Because of this variety of mechanisms as well as multi-service bundling, individual service price comparisons are difficult and basket comparisons are required. But this creates its own set of challenges because different usage patterns exist across service types and nationalities.

Ian Macrae presented Ofcom's experience in collecting data related to broadband performance and pricing. As to broadband performance, the SamKnows project in the UK was described whereby a large number of subscribers were provided with a test box that they attached to their broadband lines. This box then regularly communicated with measurement servers within the network to test the performance of the broadband connection. This testing revealed that UK customers' lines only performed at roughly half of these lines' headline speeds – which in the UK are generally not tiered speeds. Ofcom's experience with price measurements employing multi-service baskets was described as well. This approach examined the cost of a quadruple-play: voice, broadband, video and mobile. While theoretically such broad measurements may be the most relevant, it was noted that significant differences in usage patterns across countries make the selection of a uniform basket very problematic – with the choice of basket influencing greatly the implied performance of particular countries.

The following general points were made by the audience in the direct discussion that followed each of these presentations:

- In many countries, many data are not reported on a regional basis, so it may be very difficult achieve consistency between these national-only data and possibly more granular data reported for other measures.
- Purposes of data reporting and usage have to be made more clear. Are these data and the accompanying OECD reports for the purpose of informing nations as to their absolute level of performance, or for the purpose of comparisons across countries?
    - One participant observed that countries may differ in terms of wage rates, which could result in different broadband prices. But it was doubted that it was appropriate for a high OECD price report for that country's broadband due to its high wage rates should be taken as instruction for that country to endeavor to reduce its wage rates in order to reduce its broadband prices;
    - To focus comparisons more appropriately, consider reporting deviations from averages or medians rather than cheapest outlier.
- It was noted that certain metrics used for granular reports may not be relevant, collected consistently, or collected at all in all countries. For example, while statistics on income levels are likely collected universally across the OECD, statistics on race may not be; and statistics on urban vs. rural may not reflect consistent definitions.
- There was a discussion of whether collected data should focus solely on broadband access, or whether "middle of the network" metrics should also be examined. There was generally agreement that it is quite difficult to measure the "middle of the Internet," and that for the time being, broadband access should remain the focus.
- The problem of comparing price and performance of broadband services that are sold by speed-tier with services that are sold based on maximum theoretical speed was raised.
- It was noted that even within countries there are disputes over appropriate metrics, across countries these differences are only likely to be magnified.

- An issue was raised that sometimes particular services are only available in particular portions of a country, and some agreed-upon method was needed for how to report and characterize the prevalence/price/performance of such services.

Specific comments on "short-term goals" from the metrics shortlist

Goal	*Discussion issues and comments*
0. What is the definition of broadband service?	• *Should it remain at 256k? While this may be useful for time-series comparisons, no one believes that either today or going forward, 256k is adequate. But what should the new standard be? 1mbps? 3mbps? 5mbps? Different thresholds have been established in different countries.*
1. Broadband deployment at a disaggregated, statistical, geographic area level for residential and business grade services together, and separately for residential grade services and business grade services where possible	• *Measurement should be by counts or percent of POPs (households are also a possibility)* • *Percent of landmass are not viewed as terribly informative or practical.* • *Should differentiate between rural and urban, if possible.* • *Likely no need to differentiate between residential and business, as networks are fungible between residence and business use.* • *Mapping would remain a national and not an OECD responsibility.*
a. Speed tiers	• *Not viewed as needed for deployment data. Technology information should suffice.*
b. Number of competitors (including facilities-based and non-facilities-based providers with annotations of the member country's definition of "facilities-based")	• *Not needed for deployment information. Deployment reports should only be by the owner of the facility to avoid double-counts from resellers or lessees.*

c. Differentiated by technology including fibre, hybrid fibre/coax (HFC), twisted pair copper, fixed and mobile wireless, satellite and others.	• *Technology categories should be:*
	     o *FTTH*
	     o *ADSL*
	     o *VDSL*
	     o *HFC*
	     o *Fixed terrestrial wireless*
	     o *Satellite*

2. Broadband adoption at a disaggregated, statistical, geographic area level, for residential and business grade services together, and separately for residential grade services and business grade services where possible	• *Information likely must be collected from carriers as customer information about technology and speed tiers tends to be unreliable. But data must be kept confidential.* • *Measurement should be by counts or percent of POPs (households also a possibility)* • *Should differentiate between residence and business.*
a. Speed tiers	• *Should be recorded, also significant bandwidth use limitations.*
b. Number of competitors (separately for facilities-based providers and non-facilities-based providers with annotations of the member country's definition of "facilities-based")	• *Number of competitors is problematic, short of reporting specific market shares.* • *Substantial competitive information will be available from disaggregation by technologies.* • *Facilities-based vs. non-facilities-based is a possible option.*
c. Differentiated by technology including fibre, hybrid fibre/coax (HFC), twisted pair copper, fixed and mobile wireless, satellite and others.	• *Because customers may not know the technology used to serve them, this would likely need to be collected from the carrier.*
3. Demographic metrics at a disaggregated, statistical, geographic area level	• *Agreed that these measures will likely be imported from generic studies performed by national statistical organizations.*
a. Including education, income, age, household type, gender, employment, occupation and other factors as appropriate	• *While specificity is desirable, the measures need to be standardized as much as possible across countries.*
b. Urbanicity metrics, particularly urban versus rural	• *Ditto.*
c. Metrics for household dispersion to compare/normalise availability figures	• *Ditto.*
4. Continued discussion of purpose and methods for broadband price collection including issues such as:	• *Need to decide what prices are the most important to collect. Currently-available prices for new customers? Or prices being paid by the embedded base? It will depend on the purpose of the price report.* • *Will need to add new baskets – such as various double- or triple-play baskets. Possibly even a quadruple-play basket.* • *Strongly consider pruning some current baskets from further reporting, e.g., PSTN baskets and Leased Line baskets.*

a. Price benchmark methodology and "affordability" analyses	• *Affordability is sensitive to income levels. Is it relevant for all bundles/services, or just entry-level ones?* • *What should be the service quantity definition? A monthly "up-to" plan? Or an actually realized amount of usage/speed?* • *Consider, also, collecting information about the total revenue for a particular service or bundle of services and divide by total number of subscribers or population.*
b. Usage structure of packages (such as data caps, metered pricing, and other elements), bundling, roaming	• *How do we untie this knot? Pricing is sensitive to so many things. Indexing on only one or two is extremely difficult.*
c. Metrics such as revenue per bit	• *Not sure this is necessary. User can perform the division by himself if he thinks it relevant. Also, it is unclear at to whether the denominator should be throughput rate (bit) or monthly bandwidth usage (byte).* • *Equipment prices may also be important.*
d. Frequency of data collection	• *Consider the burden. Information is intended to inform governments, not to be consumers' guide.*
e. Enterprise metrics, such as ICT and broadband investment by industry and geography, and how businesses use those investments.	• *Given the heterogeneity of business services, this seems especially challenging.*

Session 5.2 -- The Future of Broadband Measurement: A Discussion of the Metrics Checklist (Long-term Goals)
Rapporteur: Ian Macrae, Ofcom

Session Focus:
How ready are country broadband data collecting agencies to provide the data for the "Longer-term goals" section of the OECD broadband measurement checklist, as listed in Annex A? What are the major definitional/methodological issues that need to be addressed in order to refine and to implement this portion of the Checklist and take the actions necessary to achieve our short term goals?
Session Chair: Richard Clarke, BIAC

Discussants:
- o *Alexandre Barbosa, Brazilian Network Information Center (NIC), Brazil*
- o *Annegret Groebel, BNetzA, Germany*
- o *Eric Ralph, FCC, United States*
- o *Luis Lucatero, Cofetel, Mexico*
- o *Federico Flaviano, AGCOM, Italy*

The wide-ranging presentations from the discussants focused on broadband speeds measurement (Italy and Brazil), the challenges of measuring pricing (USA), principles behind data collection (Germany) and challenges

and issues in ensuring that in fast-moving markets the right data sets are available at the right time to inform policy making (Mexico).

The following general points were made in the presentations and the discussion afterwards:

- Need to define the purpose for data collection. Understanding the needs of those who use should inform the total amount and level of granularity of the data collection. Before beginning data collections, should be clear about the analytical framework which will be used.
- Data collection should be limited:
  - Less can be more to inform policy making (excessive data can lead to confusion and obfuscation);
  - It is very important to be aware of the burden on data collectors and providers. A cost-benefit analysis should be completed before data collection begins (this is a formalised process for some data collection agencies, including the FCC).
- National data collection initiatives are typically rooted in specific policy objectives. This is less the case for international comparative data where policy objectives may be less clear. Therefore datasets collected need to be broader.
- Need to be very cognizant of risk of comparing apples with oranges in collecting and analyzing data collected in different countries.
- Should let the market work – the competitive market may be the best way of delivering data.
- Timeliness of data is paramount in rapidly changing markets and rapidly developing technologies (and therefore need to be forward-thinking in identifying the data which will be useful to future policy considerations).
- Other valuable metrics outside the metrics checklist may include measures of:
  - Service profitability;
  - Network capacity (Gbits/second/km2 suggested as a measure of spectrum usage);
  - Portability;
  - Affordability;
  - Usability.
- It was noted that the metrics shortlist was generally better framed for fixed than mobile broadband – but that mobile broadband metrics are as important and may require different approaches.

Specific comments on "Longer-term goals" from the metrics shortlist

1. **Mass market subscriber price data (including analysis of promotional pricing and bundling).**

- Much of the discussion focused on the complexities of collecting and comparing price data:
  - Difficult to isolate broadband prices when broadband is widely purchased in a bundle with other communications services;
  - Comparing prices between countries is very problematical because of the relationship between usage and price: it is meaningless to compare prices between countries which have very different usage profiles;
  - Tariff analysis has little value if isolated from take-up: risk is that obscure tariffs with very low take-up are taken as representative of pricing;
  - Average revenue per user also has limited value as a proxy for prices as given the wide range of types of consumers and types of tariffs "average" has little meaning.
- There are two different approaches: (i) the prices available to new consumers (i.e. tariffs); (ii) the prices installed consumers are paying.
- It had also been previously noted (in a presentation from Spain in Session 5.1) that approaches for monitoring fixed and broadband prices needed to be different in order to reflect that usage-based pricing (data volumes) is very important in mobile broadband, but much less so for fixed.

- However, it was generally accepted that prices are a very important metric: perhaps the most important metric of all for consumers and critical for understanding the context of markets and assessing competition.
- It was commented that there is a lot of expertise on pricing outside the forum and that this should be tapped into.

2. **Discussion of cost of broadband deployment by technology (e.g., initial cost vs. recurring costs, access to rights of ways, ducts, and conduits).**

- It was noted that the example of deployment costs focused on fixed networks; and that mobile is as important and has different cost structures.
- There are very different costs in different countries. And interesting cost dynamics when there are typically a very small number of supplier and buyers per country; one thing this leads to is the bundling of services which can make it difficult to isolate costs.

3. **Network performance data, including actual vs. advertised speeds, security, and reliability.**

- The measurement of actual broadband speeds was a major theme of this session and of the workshop as a whole. Presentations from Brazil and Italy in this session focused on measuring broadband speeds, and the workshop also heard of initiatives in the UK, the US and the European Commission (all in partnership with broadband measurement company SamKnows). Google M-Labs presented the resources they provide for measuring broadband performance and the data they collect and present, and there was also mention of data collected by Akamai and Ookla. The ITU also expressed interest, stating that it was high up its agenda.
- The Internet Society highlighted the difference between measuring connectivity (access) speeds and the speed of internet services.
- Suggested that in addition to performance information, security and privacy measures should be developed.

4. **Usage data (correlated with usage caps/plans) by demographics and geography, including: time of day (such as peak hours, peak days, peak periods), usage patterns for high bandwidth/low latency applications and content; and analysis of identified factors for why population is not using broadband.**

- Google M-Lab stated that it has interest and capability in collecting this data and offered further discussion of the options.
- There is a lot of usage data currently collected from likes of Cisco.
- There are privacy and legal challenges associated with collecting usage data.
- Noted that there is overlap between this metric and metrics 7 and 8.

5. **Standardized broadband mapping methods.**

- Broadband mapping was referenced throughout the workshop and initiatives from Norway, US, Germany and UK were presented. The EC also stated its interest.
- However, there was no detailed discussion of issues of standardisation – in addition to different deployment patterns, different legal frameworks will determine the data which can be collected.

6. **Discussion of metrics for assessing the competitiveness of markets (e.g., gauges of market power).**

- There was only brief discussion of this metric. It was noted that there is much competition law in place to analyse markets and assess market power and it was suggested that it should be sufficient

to examine wholesale broadband markets and not retail markets.

7. **Special considerations for data on mobile broadband services:**
    i. **Demand-side customer-survey metrics such as frequency and purpose of broadband Internet use by owners of mobile devices of various types, customer awareness of available mobile applications, and customer willingness to use new mobile applications; survey information about pricing and other customer concerns that affect adoption;**
    ii. **Supply-side metrics such as cell size, capacity utilization, and spectrum availability.**

- There was little discussion of these metrics.
- There are different challenges in measuring coverage and performance to fixed. It will be difficult to compare coverage between countries due to different methodologies for measuring coverage.
- Gbits/sec per km2 was suggested as a useful metric for measuring mobile broadband spectrum utilisation.

8. **Data on consumer demand for applications and content (such as VoIP, email) and social media. Best practices for data collection (e.g., granularity that allows aggregation to larger sub-national geographies; connections/person vs. connections/household).**

- There was no discussion of these metrics.

Chair's Summary—Concluding Session 7.0

The Chairman of the final session of the Workshop, Vince Affleck (Ofcom) noted the following (non-exclusive) generic points which came up during the workshop which he offered as a summary for how to continue the OECD metrics reform program going-forward:

·   Need to be clear why we are collecting data as this will influence what we collect

·   Data requirements including level and granularity will differ depending on role of body – so different for Policy makers (whether international institutions like OECD or individual governments), for NRAs and operators.

·   Need to have consistency across countries for key data

·   Cost and burden of collecting data on organisation and industry (cost benefit analysis)

·   Data needs to be compatible with other data harvested, e.g., census data

·   Transparency of raw data – be collected/ available in digital form

·   Concerns about properly identifying causality

·   Care to be taken that the term 'broadband' is defined properly and not used inappropriately in place of 'Internet' or Internet services broadband is internet economy

·   Market, technology and services changing constantly – implications on value of price comparisons and longitudinal data

· Issues of privacy and security

· Need to consider appropriate techniques (ways) of collecting data including how practical to collect data; exploit existing sources

· Some queries on business/ residential split, mobile and fixed split and whether, if you survey consumers, they know what technology or what speeds they are receiving

· Case studies can illuminate data collection

· Need for collaboration between the different agencies which collect data

· A reminder that data provides evidence but it is for decision makers to interpret that data and take the appropriate judgements.