

# Telzed Limited

## Broadband speed and Internet use

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A discussion  
paper



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## **Broadband speed and Internet use**

### **A short analysis based on Akamai data**

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# 1 Broadband speed and Internet usage

A huge debate is underway in the UK, and many other countries, on the broadband access speeds that are required. Different countries and reports measure speeds in different ways. Some may include mobile, others may not.

The Akamai “State of the Internet” report<sup>1</sup> is published regularly and this has been used in this short Telzed analysis. It has also been used in other comparison analyses.

Broadband is widely agreed to be good for the economy and citizens’ welfare. The primary benefit is not in the telecoms industry itself but in the wider Internet enabled economy that “merely” uses the broadband to function. Of course the two are related: it is hard to have an Internet Economy without broadband. Conversely, it is arguably possible to have fast broadband that is underused and has not helped to develop an Internet economy.

This short Telzed report examines the Akamai data and examines the relationship of Internet development and broadband speed.

The key purpose of the report is to show how analysis such as this can help raise questions about the direction a country is moving in and where it should try to be when compared to others. This helps with the development of thinking on the bigger issues: the national strategic debate and how to move forward.

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<sup>1</sup> <https://www.akamai.com/us/en/our-thinking/state-of-the-internet-report/ Q3 2015 report>

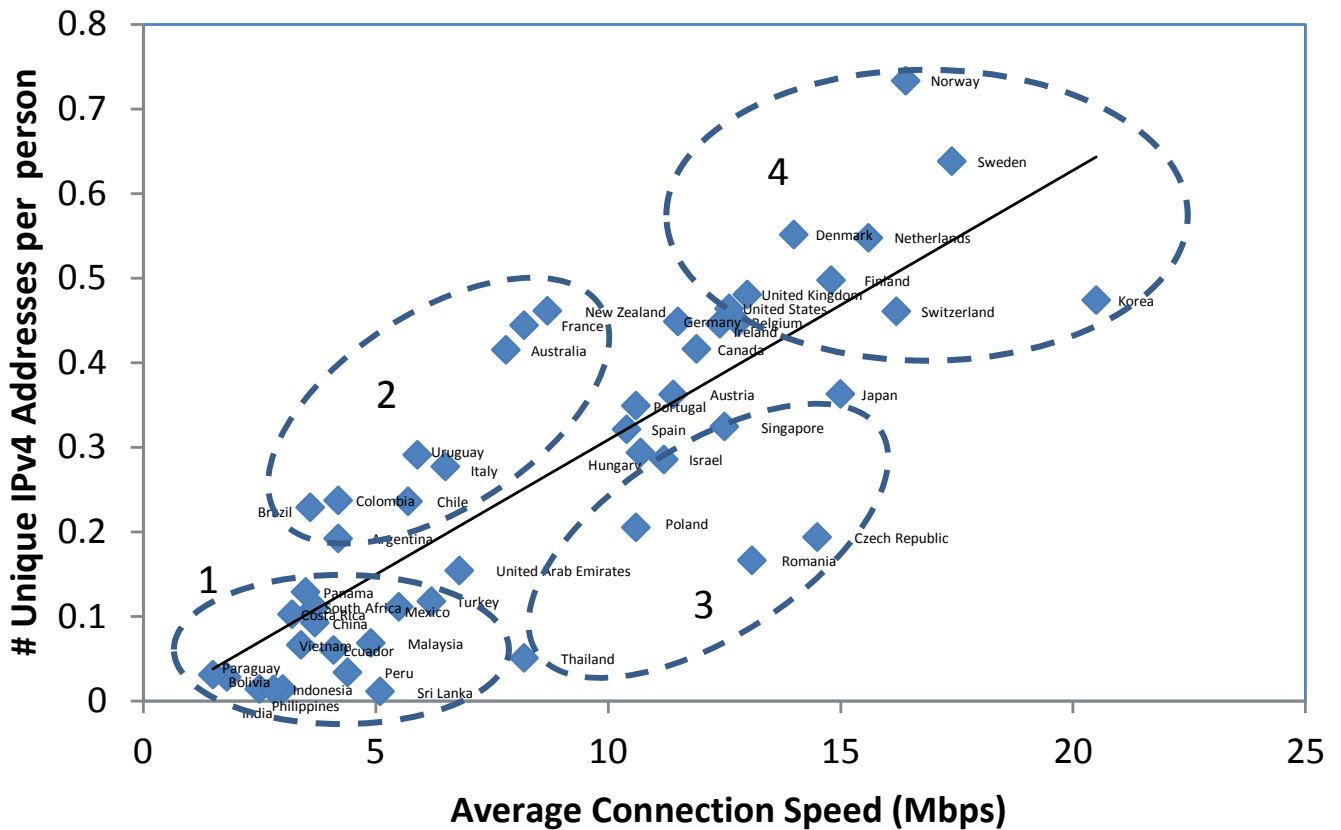
## 2 Internet usage and speed

### 2.1 Broadband speed and Internet usage are closely related

The level of Internet economy can be measured in many ways: such as the amount of e-commerce, or Internet TV, on-line retail sales, numbers of government services on-line etc. In this simple analysis the number of IPv4 addresses is used (from Akamai). This gives a rough indication of the number of Internet systems and hence of the development of national networks (and by implication, of services). This is not a very precise measure of the Internet economy. It also has limitations (see Akamai) – for example it does not take into account the level of IPv6 take-up that may be greater in some countries.

The number of Internet Hosts is another possible measure of the Internet development. This is available for 2012 from CIA World Fact book. It generally correlates to the number of IP addresses (with some exceptions such as China and USA). The Akamai IPv4 address numbers are used here as the data is more up to date and correlates reasonably to the number of hosts anyway.

**Figure 1** # IP addresses per person versus broadband speed



Source Akamai, World Bank and Telzed

As well as the address numbers having some limitations, the broadband speed measures from Akamai are also subject to some limitations (see Akamai report), but both provide a reasonable basis for analysis. In the figure above, the Akamai data is combined with World Bank population data, to derive the number of IP addresses per person.

As expected, the number of IP addresses is correlated to broadband speed. More broadband encourages greater Internet usage and a more-developed Internet-based economy increases the pressures on the telecom suppliers to deliver more capacity to enable use of the Internet.

## 2.2 High levels for both measures, are good

Clearly increases in IP addresses and broadband speed are both good signs. Where each country stands in the above figure should not be taken as an exact measure of how it rates to others. Number of addresses is only one measure and not a direct indication of the economic outcomes. Speed and address numbers are also open to some limits/questions as noted above and in the Akamai report. As a more general point: all league tables on broadband and Internet need to be viewed with some caution. An even wider discussion point is: what is *good*, depends on what is the strategic vision that guides the thinking<sup>2</sup>.

Some general deductions can be taken for the four regions shown in the figure above:

- Countries in Region 1 have both low broadband speeds and low IP numbers. Logically these countries need the most work done to develop the telecoms industry and the Internet based economy. Some countries are clearly moving to have greater internet speed, but the IP growth has not taken place (e.g. Thailand). In part this may relate to the country's demographics. If there is a large rural/poor population that cannot afford to use the Internet then they will reduce the #IP addresses per population. This indicates a divided economy, in some countries. Large percentages of the population who are too young or old to use the Internet, will also affect the results in a similar way. See the Appendix analysis in this report that shows how the number of Internet users affects the picture. In other countries with growing broadband speed, the Internet based economy still needs major development.
- Countries in Region 2 have greater numbers of IP addresses, but the broadband speeds have not risen significantly over the Region 1 countries. This could indicate that the telecoms industry may be holding back the users from exploiting the Internet based economy. Faster broadband is probably needed.
- Countries in Region 3 have reasonable broadband speeds but the implied Internet economy has not yet grown. Romania for example has invested in fibre access – so the average speed has grown to be comparable to, or even better than many leading countries. High average broadband speed might also mask the fact that many have

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<sup>2</sup> This moves discussions that far beyond this short paper. Fast broadband is "good" but if this investment was at the penalty of less healthcare investment, then perhaps it is not so good. A counter argument might be that this matters more only if the broadband was from government funds and furthermore the economic growth from broadband/Internet might well have given enough indirect government revenues to have funded the healthcare (or other options for government investment). High average speeds but with a large digital divide and many un-served consumers, might also not be such a good outcome. A definition of the "National vision" is required to help define the required measures – some of the measures for a developing economy and an EU country are likely to differ

no broadband at all – it is easy to have very high speeds to a small percentage of households. The high broadband speed in this Region 3 should encourage more Internet services to be developed and used, but this may take time to happen. The Internet based services are usually seen as a competitive market, so it should happen anyway in a free market – therefore a position in Region 3 may be more of a timing issue and Internet services will grow, now that fast broadband is available. Some countries may still need a specific national focus on enhancing this Internet market to make full use of the broadband speeds. However some countries will see such developments happening mostly in other countries, and not nationally – a consequence of the Internet economy being global.

- Region 4 countries are the leading players. Clearly being in this Region 4 is a good outcome. Perhaps they need not worry too much. However the need for ever-increasing access speeds and increasing traffic levels are well known, so the pressures to develop further are unrelenting. League tables between them are a common subject of debate and what are the best measures to use will continue to be relevant issues. Other strategic questions also follow; for example, should a country aim to be in the lead or just be a peer within the leading group?

## 2.3 Conclusions

Only limited conclusions should be taken from the data and this analysis. The source values of speed and number of addresses are only approximate indicators of a country's overall status. The true picture of the Internet economy is not shown, but it is still reasonable to expect that it is related to the number of IP addresses. Speed is also not the only broadband measure of interest and there are other ways of measuring speed. Availability, take-up, superfast broadband percentages, the level of the "digital divide" etc. are also relevant. However it is still reasonable to assume that the general position in the diagram gives some indication of a country's status: leading or lagging.

The analysis does provide some food for thought and ideas for further investigations:

- Broadband speed in itself is not the only desirable output. It is the enabler to the bigger benefits from the Internet economy.
- The high level of GDP in the countries with higher IP address and speed values is worth noting. This relates to other analyses that report how the Internet economy boosts GDP<sup>3</sup>. Of course the total GDP is only partly affected by the Internet Economy component. This means that a good position in the diagram (Region 4) generally reflects the pre-existing high GDP levels, however the synergies mean that these countries also gain the most GDP increase from broadband. Low GDP countries have at least as much to gain from increasing broadband levels (see footnote 3).

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<sup>3</sup> See for example Telzed paper for the ITU "[Strategies for the deployment of NGN in a broadband environment - Regulatory and Economic Aspects](#)" 2013. On ITU or Telzed web site. This reported on other studies that show the causality link of GDP and broadband/Internet levels. The causality link of GDP gain and broadband has been widely reported upon



- A major Internet economy is unlikely to happen without fast broadband.
- Some countries may need to apply more incentives to develop Internet services, having already partly addressed the Internet speed. With the international debates and focus on broadband speed, this greater prize might have been partly ignored. Are there reasons why Internet services are not being developed nationally by the countries in Region 3?
- There is no clear sign of any country with excess broadband speed and no Internet development to make use of it. Although possible in theory (as noted in Section 1), this is not really a likely outcome. Korea is one country with high broadband speed, and although the Internet numbers seem to lag, few can doubt that the country has not gained huge economic benefits in the last ~15 years from being a broadband world leader. The electronics/technology and manufacturing developments are testament to this; which also illustrates that the exact position in the Figure is only a general indication of the overall status.
- Analysis and comparison tables are interesting. More challenging are the policies and approaches to improve the position. Strategies are required no matter where a country stands.

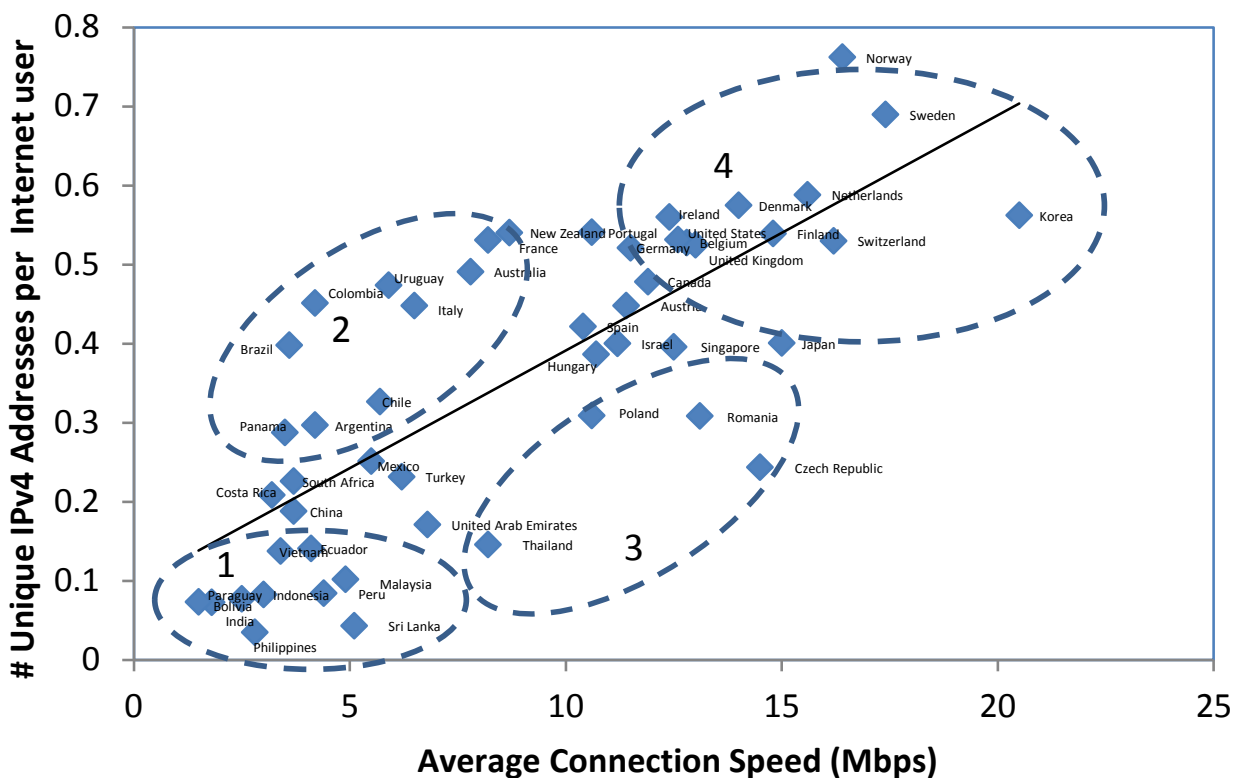
This paper is not intended to provide a comprehensive analysis, but only aims to provide some thoughts based on an analysis of the existing data. The best measures for any one country and the priority areas to focus upon, all need a more robust analysis. This relates to the bigger issues of developing the right national strategies, regulatory policies and business plans to achieve the best outcomes.

Please contact Telzed for additional questions, discussions and analysis, and for help with policies, regulation and strategic plans.

## Appendix A Internet addresses per user

The same data in Figure 1 above is analysed below but the number of IP addresses per person is weighted by the percentage of Internet users (from World Bank data). This shows the number of IP addresses per person *that uses the Internet*. This is debatably a better indicator as it shows how well developed the Internet is for those that actually use it. A good Internet might exist for just those that actually use it. This approach ignores the divided nation issue by taking out those who cannot or do not use the Internet.

**Figure 2** # IP addresses per person *that makes use the Internet* versus broadband speed



Source Akamai, World Bank and Telzed

The general picture and key deductions are not very different to that of Figure 1. It does illustrate that more countries have a reasonable number of IP addresses and, by implication, a developed Internet (Region 2), but only for those that actually make use of the Internet. The movement in this Figure 2 (c.f. Figure 1) to have more IP addresses per person is a good sign but the negative aspect is that a larger fraction of the population is not using the Internet at all. This is generally a bad outcome, but this of course depends on what is deemed good or bad and on national demographics. More countries in Region 2 also imply that more countries need to increase the broadband speed to cope with the needs of those that do make any use of the Internet.

The change in the trend line slope (Figure 2 versus Figure 1) shows how the countries closer to Region 1 tend to have a greater digital divide – a greater percentage of the population

unable to use the Internet. This is to be expected: lack of broadband or Internet service and the digital divide are expected to be related.

Many other analyses are possible. For example the broadband speed values do not take into account of the population that does not have any broadband – it is easier to have a high broadband speed for only a few.

Please contact Telzed for further discussions and analysis.

