IoT Alliance Australia

21st October 2016

Ed Seymour
Australian Competition and Consumer Commission
GPO Box 3131
Canberra ACT 2601

commsmarketstudy@accc.gov.au

Dear Mr Seymour,

Submission re: ACCC communications market study paper - Response of IoT Alliance Australia (IoTAA)

Thank you for the opportunity to contribute to the development of the ACCC's communications market Issues paper.

This is the submission of IoT Alliance Australia (IoTAA). IoTAA has a diverse membership and over 300 volunteers participate in its current workstreams, including valuable contributions from officers of the OAIC, the ACMA, the ACCC and other Federal and State Government departments, authorities and other agencies. While this submission has been prepared by the IoTAA Workstream 1 participants, it may not reflect the views of individual participants in IoTAA or (if applicable) their employers. The officers of the ACCC participating in our workstreams did not participate in development of this submission.

The draft communications market study examines the changing communications landscape to test whether evolving markets are structured so there can be confidence they will operate efficiently. Taking this approach will encompass **the dramatic impact the Internet of Things (IoT) will have over the next five years on the mix of devices connected, nature of the connectivity and communications traffic, service characteristics, fragmentation and obligations of service providers, service security requirements and user privacy and education.**

About IoTAA

The IoT Alliance Australia is the peak Australian Internet of Things (IoT) body. It is a registered not-for-profit entity currently hosted by the University of Technology Sydney (UTS).

Our Vision is to empower industry to grow Australia's competitive advantage through IoT. Our Purpose is to accelerate IoT innovation and adoption by:

- Activating and supporting collaboration across industry, government, research and communities
- Promoting enabling, evidence-based policy and regulation
- Identifying strategic opportunities for economic growth and social benefit [i]

There are six IoTAA workstreams that are run by some 300 volunteers who are part of IoTAA. The current six workstreams include the following areas.

1. Collaborative Australian IoT Industry
2. Smart Cities & Industries
3. Open Data & Privacy
4. Spectrum Availability & Licensing
5. Cyber Security & Network Resilience
6. IoT Start-Up Innovation

This submission has been prepared by IoTAA Workstream 1.

Our interest in the draft market study

The mass connection of "Things" to applications across communication networks in contrast to the connection of people to people has significant implications for the definition and business model of the "IoT service provider" and the relationship between users and the service provider and the possibly many wholesale components of service provision – only one of which will include connectivity. Indeed, the term IoT Service Provider is unlikely ever to be used, rather communications will be subsumed into the service delivery model, for example in the delivery of utility services to the home.

The result of the above is to create new business opportunities for service bundling by retailers, using traditional communications carriers as wholesale providers, not unlike the over-the-top (OTT) model, new service specific communications players and opportunities for "verticalised" product offerings from communications carriers.

Consistent with our purpose, IoTAA is interested in ensuring the competitive environment supports rapid employment of IoT for the greater benefit of the Australian economy.

IoTAA response

Our response is limited to issues associated with the Internet of Things and as such we have made several comments to specific paragraphs and answered specific questions.

We welcome the opportunity to discuss our position in more detail with the ACCC at your convenience.

Section 3: Study Approach

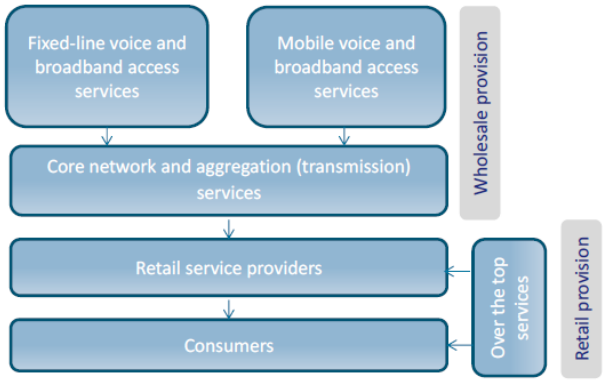
IoTAA takes particular note that it is likely, and indeed would be to Australia's economic benefit, that the total number of connected devices connected to communications networks will exceed the number of connected phones (mobile and fixed) within the next five years. (See Cisco estimate of 237m by 2020 referenced in section 5.25.) The principal drivers for this massive change in device and service mix will be due to IoT driven new services made possible due to the dramatic decrease in service connectivity, device and data storage costs. Example use cases for this phenomenon are:

- Mass metering of energy and water services (over 10m)
- On-farm sensing
- Consumer wearables and home devices
- Connected transport vehicles and infrastructure (including car systems)

- City amenity measurement
- Asset and supply chain tracking
- Medical patient monitoring
- Environmental management
- Operations management of appliances

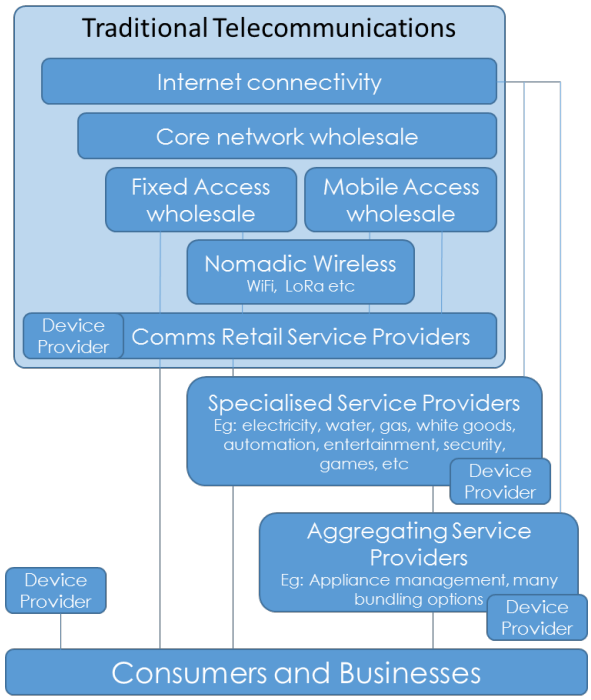
The high level communications sector supply chain diagram may need to be redrawn to reflect the intimate connection between the provision of services and the devices which are used to access the services – many of the communications features (and the overall service features) are tightly coupled with the end device. It makes sense for them to be separately identified in the supply chain:

Figure 1 – High-level communications sector supply chain



We propose replacing this figure with the following which helps to illustrate that the telecommunications sector will in many cases become less visible to the end user while playing a vital role as an enabler for "smart" solutions across all other industry sectors. Solution providers and consumers will source IoT devices. This is very different from the traditional telco provided or recommended phone or modem model.

Alternative Figure 1.

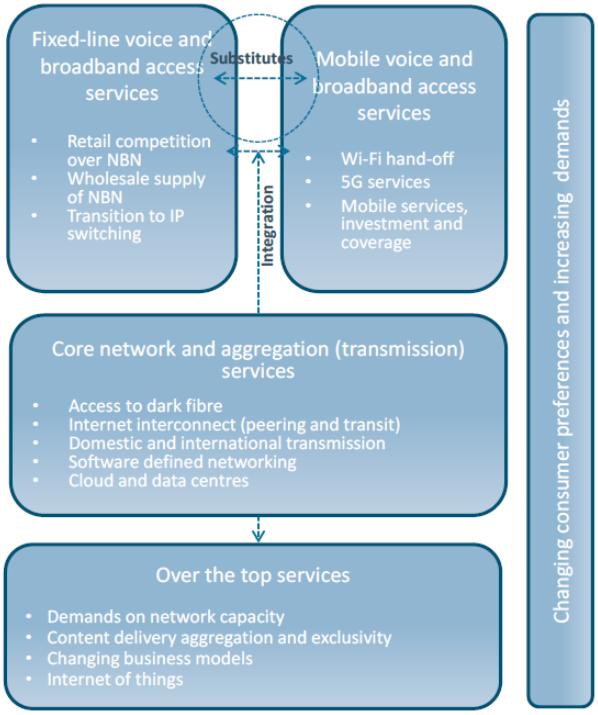


The implications for communications networks will be profound. These include:

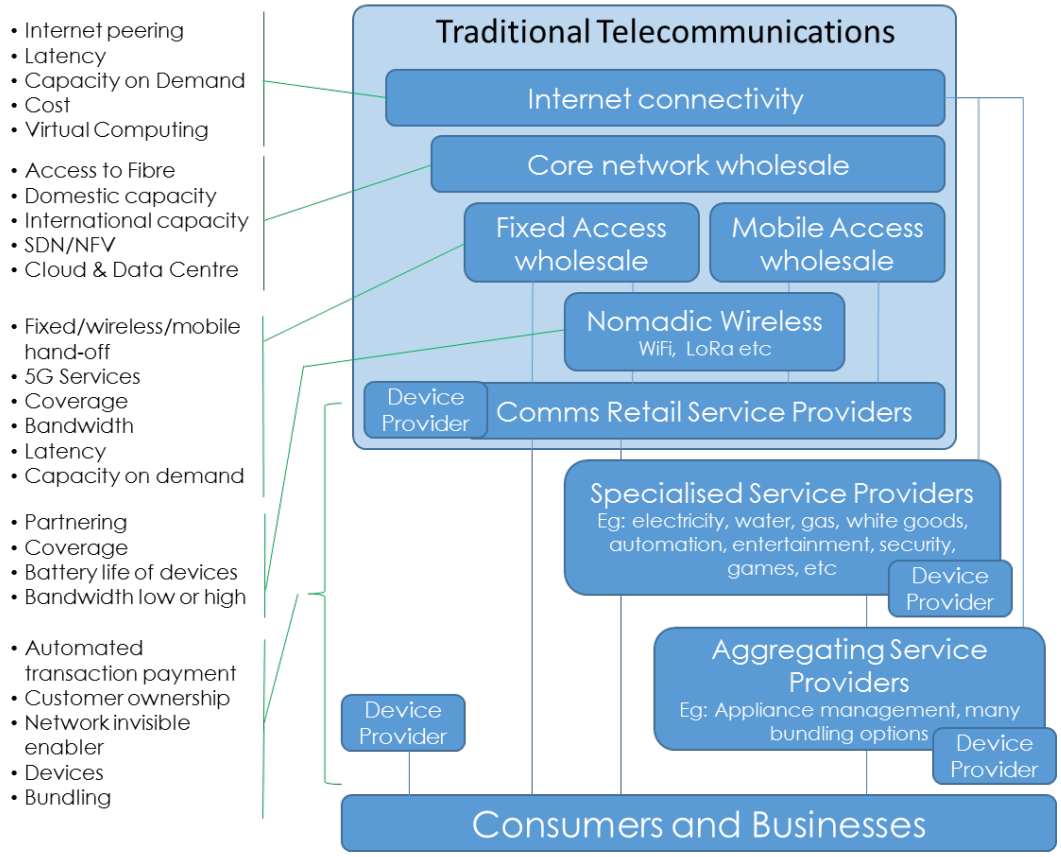
- A massive increase in service providers which include a component of communications. The current over-the-top descriptor will describe the majority of communications services.
- Traditional numbering plans for communications services will become less relevant to consumers and IP addressing and other schemes will become more important than telephone numbers. Indeed it is possible that within a decade phone numbers will no longer be used or supported by the network providers.
- The need for increased bandwidth for real-time, low latency service will continue to grow e.g. for connected cars
- There will be a massive demand for low bit rate, non-real time, asymmetrical services which will need to be very low cost. Between one and two orders of magnitude lower cost. This has implications for the monopoly access provider nbn and mobile operator.
- IoT will require communications service coverage to be wider and with greater service mix – covering farms and rural for low-bit rate sensors/actuators and high bandwidth for analytics and applications
- Wireless solutions in the unlicensed ISM band will play a significant role in many IoT cases, as will Wi-Fi in other cases as well as mobile and fixed network access solutions.
- A distinct trend is to incorporate a Compute element into the mix of Communications architecture. For example ETSI is standardising Mobile Edge Computing and are about to change the name to Multi-service Access Edge Computing (still called MEC) because it is broadly applicable across any mode of access networks. MEC can also be installed at Core, Aggregation or Edge points in a network. Key new digital markets will rely extensively on the ability to access Compute close to devices for latency purposes. An example is for Edge Video Analytics. Although ACCC may see this to be outside their focus the need remains for Telco network architectures to be open to MEC at the different points in a network, provided either by the Telco or other parties. MEC will be part of the Comms landscape but should be open to different competitive constructs.
- Broader and deeper service coverage will have implications for access providers – beyond the home (especially for nbn). The majority of sensors will be static and will therefore need only a form of fixed access (cabled or wireless). Access points for wireless coverage will in many cases be better provided from non-residential premises. For example street furniture such as lampposts, poles, bus shelters etc.
- An important requirement of the new IoT market place is the need for end to end operational visibility and management. This includes the need for open sharing of network operational data across automated management systems and into service control centres. This becomes critical for high availability and low latency applications for example. In the context of Smart Cities they need this for their Command and Control Centre as a default. It is almost a Business to Business model similar to the NBN example today but adding real-time to the model.

Consistent with the above proposed new figure we are of the view that the following figure does not represent the IoT impacted landscape so we have proposed an alternative figure below.

Figure 2 – Key segments of the supply chain and issues for the communicati sector



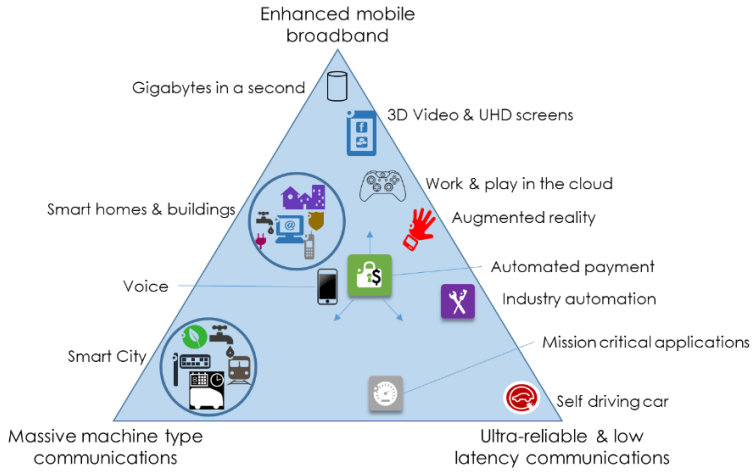
Alternative Figure 2.



The Internet today offers only best efforts regardless of access bandwidth or symmetry. However, as we are already seeing it does not lead to "fit for purpose" for the range of emerging IoT digital services. This will become even more acute with the extent of automation from IoT and the range of new digital services demanding more certainty in the future.

The following figure represents the overall challenge for the mobile network. At the three points of the triangle there are specific performance characteristics that are important and the services that will leverage this performance are shown positioned in the triangle. So aspects of the network must be optimised for enhanced broadband to support very large file use while low latency is important for services such as autonomous vehicle communications and massive machine communications will be necessary for IoT across the board. Today's voice services will become a shrinking component of the service mix compared with this pressures on the network.

Personal Usage Scenarios 5 – 10 years



Furthermore, work is progressing today on the use of block chain technologies for automated payment systems that will underpin many new and emerging business models leveraging IoT and this network performance. The use of these technologies will probably put pressure simultaneously on all three performance characteristics. The carriers will be challenged by this demand and how the transition towards this high performance network is managed will require compromises and careful understanding of any limitations.

Section 4: Consumer trends and Issues

The existing Figures 3 through 5 take no account of the rise of IoT services and sensors/actuators connected. This needs to be included to reflect the shift from predominantly person to person to predominantly machine to machine communications trend.

IoTAA would be pleased to work with ACCC to produce these figures.

Questions 1: Consumers choices of services will increasingly be business service and lifestyle driven without knowingly choosing a communications carrier for service supply – eg: home medical monitoring. The implications are that while communications becomes more important, the direct relationship with consumers for communications carriers will become less evident – and "buried" within service bundles. Exceptions to this may be where communications carriers "verticalise" and brand a non-communications service – eg: Telstra

Health. Consumer trends will therefore be increasingly driven by the needs of the (OTT) services). E.g.

- Low-bit rate, very low cost for sensing
- Very high rate and fast response for emergency services

Furthermore extensive growth in ever fragmenting new digital markets may appear to be chaotic but must be cultivated. The new digital markets will be driven by innovation which will drive economic and social development that will in many cases be underpinned by IoT.

Question 2: Increasingly services will be delivered over IP fixed or mobile and smart devices will choose the most suitable network at any given moment. If fixed and mobile network services are offered from different providers then it may be impractical to leverage som3e of these innovative new service models. Or looking at it from the service provider's perspective, there will be a significant advantage for a service provider that can offer both fixed and mobile services seamlessly.

Question 3: There is a concern that the communications sector may not be able to respond as nimbly as needed for Australia to maintain and enhance its global competitiveness to the needs and drivers of the industries requiring and needing IoT innovations. Market factors which affect this include:

- Wholesale fixed access provided by NBN today only provides broadband and only to premises currently defined as homes or businesses with the exception of mobile base station backhaul in same cases. The IoT market is now demanding much lower bit rate services at much lower prices. Furthermore, premises new extend well beyond dwellings and places of business. IoT Sensors/actuators will increasingly be located on street furniture and many other random locations. Very low cost connectivity is required and today this market is being addressed by Low Power WAN technologies such as LaRaWAN, Zigfox and others in unlicensed ISM band spectrum.

- Limitations and barriers caused by the need for retail services providers with a component of communications to provide metadata to government. This doesn't make sense if the retail service is gathering data from a herd of cows or a fish farm or a vineyard etc.

- The complex ecosystems required to support the emerging IoT market is not the traditional strength of incumbent telecommunications service providers. Cross-sectoral collaborations and partnerships are critical. In many cases the collaborations will be led by industry specialists – not the communications industry. Increasingly problems that need solving with IoT solutions are presented as a problem with water leakage or environmental concerns for example. The solution must be addressed in these terms and an underlying element of communications is only a fraction of the solution.

Question 4: Of key concern to consumers will be:

- to understand the service provider responsibilities for quality and support in an increasingly fragmented services supply chain
- To be able to easily appreciate privacy implications of IoT services (location, name, sharing of data) and to be able to readily understand and choose appropriate options
- Many future services will make the communications element invisible. Consumers will at least need to know who is responsible for the overall service and the service provider of the bundled service will need to be able to deal with the telecommunications providers invisible to the user.

Question 5: Telecommunications bundles are visible and comparable. Although terms such as speed, latency, bandwidth, committed information rate etc should not be exposed to consumers as this simply adds confusion. Bundles that combine services such as health and communications or security and communications etc will become common and these will be compared at the overall service level and not at the communications level.

Question 6: see Question 4.

Section 5. Emerging Services

Mostly covered in Section 3 response, above.

In today's market and increasingly in the future, the term OTT will not be relevant. Indeed the concept of OTT relegates carriers to dumb pipe providers and they are all trying hard to prevent this outcome. Service bundling is key but not just communications services. Communications bundled with other things will become the norm. Water monitoring as a service will be bundled with communications. Medical services will be bundled with communications etc.

5.24: We do not agree at all with this paragraph. IoT has no restriction across active or passive devices. As a general statement IoT is a broader concept which incorporates M2M connectivity. IoT is a term more commonly used outside the Telco community, especially in enterprise and in verticals.

5.27 – IoT is far more than just the collection of massive amounts of data from an enormous number of sources. It will also include the processing of this data, the delivery of analytics results, driving applications and the visualisation information for the end user. As such, there is a need for high bandwidth services at the outcomes and user end of the IoT impact as well as the sensor/actuator device high-volume data collection end of the service.

We are strongly of the view that these impacts will be significant and felt well within five years.

Question 19: Significant trends emerging from IoT technologies will include:

- Scaling for number of devices
- Scaling for low latency applications
- Scaling for very high bandwidth application
- And then scaling for all three above sometimes
- Alternative carriers for low-bit rate services analytics
- Where data analytics is performed (in Australia or OS) – has major tax implications since the value is in the analytics
- Rate of acceptance of LPWAN technologies as a low-bit rate solution for sensor deployment and consequent demand for spectrum (especially for technologies using the ISM band)
- The timing of the onset of NB-IoT carrier services at low enough cost and wide coverage for sensor deployment

- Unprecedented increase in digital IoT innovation creating new digital markets. Effective innovation which is most important to economic development will be end to end (device-network-data-analysis-application).

Question 20: The embedding of communications services within IoT (industry) services will have implications on the wholesale/retail mix which may have profound implications in market structures, and business models. It is critical that communications carriers develop nimble IoT wholesale services to enable IoT service innovation and as a consequence Australian economic development. Also sensing and actuating devices are likely to be provided by many more players than the existing telecommunications service providers. This will extend to retail service providers in every sector as well as telecommunications RSP's as well as consumers, enterprises etc.

The Communications sector becomes more like a horizontal enabler with the onset of IoT that will be more hidden from the applications layers in many cases.

Question 21: Referring to the proposed new figures above. Every industry sector will deploy solutions leveraging underlying telecommunications networking. Both public and private wireless and fixed solutions will be deployed across the geography.

Sensors and actuators will be deployed everywhere and this will not be correlated with the human population. There will be many devices that are related to people but there will be many more that are not. Every cow, sheep, goat and pig will have a sensor and this will be mostly in rural areas. Every farm will have sensors, every forest and every building will too. This means that the notion of population coverage of wireless networks will not be a complete measure of coverage. Every human endeavour will require some form of network coverage. This is both for the collection of data and for the use of the resulting analysis of the data. The uses may give rise to very high bandwidth needs for data visualisation and real time processing. The impact of IoT should not be underestimated. Refer to the triangle diagram above.

Services will combine telecommunications, devices, processing, data storage, analytics and subject matter expert applications. This means that traditional telecommunications providers will become either a part of the overall service or they will become an end to end provider of all these elements of an IoT solution. In either case this is a major change to the telecommunications market landscape.

Section 6. Fixed Line and broadband services

Question 25/26/27: IP voice will be an important "data" component of a more complex service offering. In which case it may not be clear to the user, who supplies it.

Moreover, it is more likely that voice will increasingly be charged at data rates (e.g. as per Viber and many other VoIP services) not separately as a service, but bundled within a data service.

Indeed the concept of telephone numbers will probably be obsolete in about a decade giving way to all IP addressing for both fixed and mobile services.

The concept of voice interconnect becomes mute when it is simply an IP service end to end.

Question 28: This raises many issues. Does a health industry retail service provider for example buy wholesale service direct from NBN or does it buy retail services from a Telecoms RSP? Could the NBN handle relationships with hundreds of retail service providers across all industry sectors?

IoT is already being deployed leveraging NBN connection as backhaul for LoRaWAN and other base stations. This will continue to grow rapidly but today these base stations can only be deployed in premises defined by NBN. Other forms of premises could be of great value to the IoT community. This could include bus shelters, lamp posts, power poles, hill tops, traffic controller housings, electricity transformers and indeed any street furniture. Today NBN is not equipped to support services in these locations. Furthermore, NBN's systems and processes would suggest that a two year planning cycle is needed to introduce a new service concept and the IoT industry is moving much faster than this.

The introduction of carrier NB-IoT or low bandwidth LTE and later to 5G will likely see a very large number of very small cells deployed, both in licensed and unlicensed spectrum. Many of these street furniture locations may well be useful for this deployment with NBN backhaul. This should be considered along with issues of interworking between private and public networks.

Question 29, 30: sections 6.22/6.24 – What is CVC pricing for narrowband services? The IoT community will need some form of pricing model that makes sense for large numbers of very low bandwidth devices. Today's CVC pricing is not appropriate.

Question 31: With a high bandwidth broadband only focus, NBN will become a 'backhaul' provider of private networks suitable for large volumes of connected devices. NBN could play a much bigger role if it were able to offer different connection and pricing models to the IoT market. The IoT Alliance would welcome the opportunity to discuss this in more detail.

Section 6.34: Small operators are taking advantage of the ISM band unlicensed spectrum to build networks at much lower cost than mobile networks specifically to address IoT opportunities. Whole cities can be covered with far fewer low cost gateways (than for mobile networks) connected with limited bandwidth to the Internet. The NBN would typically be the backhaul for these nodes.

Today, high cost mobile dongles with a sim card are often used in homes and offices rather than connecting IoT devices via fixed RSPs mainly due to home routers configuration complexity. This is a costly and poor substitute for the NBN. If NBN worked with RSPs to be consistent with home network router configurations then this 3G overlay would not be necessary. This is reducing the value of the NBN to consumers and adding costs to providers and consumers.

Question 34: Refer to comments above regarding Section 6.34. Also, Competition in the access network is continuing with the mobile network being used inappropriately for some solutions. Other access technologies will also dilute the NBN value going forward. However we see LoRaWAN and other similar technologies as somewhat similar in nature and positioning as Wi-Fi. In other words, an extension of the NBN and Mobile access networks. The market will have good reasons to support this as well as next generation NB-IoT and 5G evolution.

Section 7: Mobile Voice and broadband Services

Question 38. Consumers are in many cases unaware of the fact that they are using a network at all. This is a good thing and as more embedded devices emerge in the market, this trend will grow. In the future the service may be defined by the device and the application while the network plays a role it will often not be visible at all.

Section 8: Interaction between fixed line and mobile services

Question 55. Increasingly the user device will make the decision about which network is the most suitable for a given application and as a result the user will not know if they are connected via a fixed or mobile network. 5G amplifies these opportunities.

Section 9: Core Transmission networks and services

Q83: The IoT solution providers definitely need to address where data resides. Performance, cost and sovereignty of data are all important considerations. Data privacy and the commercial value of data are all major considerations. The important thing here is that IoT Service providers are able to explicitly know where their client's data is being stored and processed.

We trust that these comments are of assistance to the ACCC in its further review of the market study.

Should you wish to discuss any aspect of this submission, kindly contact Frank Zeichner or Geof Heydon and they will coordinate our further input.

Frank Zeichner – frank@creatortech.com 0408 233 762
Geof Heydon – geof@creatortech.com 0419 203 993

Yours sincerely,

John Stanton

Chair Executive Council
IoT Alliance Australia

[i]