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House of Reps. Standing Committee on Agriculture and Industry

Public Hearing Wednesday 13th April 2016

SMART Farm University of New England

Some dot points and explanatory diagrams for your consideration from Alun Davies

Head of the Armidale Digital Economy Implementation Group &
Regional Communications Advocate

Whether it be climate change or population the result will still be same, less water and less food to go around, unless we act now
Whilst Australia can't physically feed the world, we can certainly provide the techniques, technology, and training to help do so. This is Australia's future

1. Professor David Lamb & the SMART Farm UNE

- People like ***David*** only come along once in a generation, we as a country need to support him
- His biggest asset is his ability to bridge the gap between Academia/Theory and the real world of farmers, a rare gift indeed
- Need to organise a SMART Farm Operations and Development Manager to
  - Conduct the day to day operations at the SMART Farm
  - Run Tours
  - Most importantly help bring companies, businesses, Technology and School Students to the SMART Farm, we want scientists, technicians all working together onsite.
  - Just imagine Korean Technology combined with Australia's Agricultural know how
- This will free ***David*** and his team up so they can concentrate on building the next phase/stage/future of the SMART Farm and Agriculture in Australia

2. ***We need to work towards a long term integrated yearly program to continue the expansion of Mobile Coverage infrastructure throughout Regional Australia.***
   - Mobile Coverage in Regional Australia is the missing link in our Telecommunications network and is vitally important for the future of:
     i. Increased food production and efficiency
     ii. Modernisation of Agriculture and the supply chain
     iii. "The Internet of Things" – Sensors connected to the Mobile Network
     iv. Agricultural "Big Data" applications that will rely on sensors connected to the Mobile network
   - By ***integration*** I mean build it into the economic strategies of Australia e.g. Free Trade Agreements with Japan, Korea, China and India right down to an LGA level.
   - Northern Inland NSW areas around Narrabri, Moree and Gunnedah have been totally missed by both the Mobile Black Spot program and rollout of NBN Fixed Wireless. They are significant areas in cotton, broad acre farming and more recently mining, coal and coal seam gas, this should be taken into consideration when deciding Mobile site coverage/locations

3. **Increase rollout and implementation of IPv6 at every opportunity, make it a condition of Mobile network and RSP's.** (*See Pages 4, 5 & 6 for explanatory Diagrams for what IPv6 is)*
   - A number of our major trading nations, China and India are rapidly introducing IPv6 and we need to be on the same wavelength to continue Australia's economic development and integration with them.
   - Get rid of Network Address Translating(NAT'ing),(see Pages 4, 5 & 6). Just like Pair Gain Systems and PABX's we don't need NATing to get in the way of direct communications
   - Make Australia a test bed for peer to peer and machine to machine learning, which implementation of IPv6 will enable
   - The American Military have a huge program to introduce IPv6, why? Just like agriculture direct communications, peer to peer and machine to machine learning are critical to their operations and campaigns
   - The question that needs to be posed to the Network Providers like Telstra is ***"What date will native IPv6 be available on your Mobile Network?***
   - Similar for Depts. ***"Do you have a plan to bring in IPv6 and what is the time frame?"***

4. **Build or foster the creation of Data Centres in Regional Areas, particularly near Regionally based Universities like UNE, that would specialise in Agricultural, Meteorological and Climate Change data and how it will impact on water efficiencies and food production**
   - The closer you are to a "Data Centre" the better off you are - ***"Edge Computing"***, move the data closer to the action
   - Apart from Agricultural "Big Data" projects it will also have the added advantage of attracting more high tech industries to Regional Australia eg. 3D Printing, Robotics and Virtual Reality
   - This is a great opportunity for Regional Australia to take advantage of ***"Digital Disruption"***

5. **Build practical Agricultural "Big Data" projects to predict "*Tip Over Points*"**
   - ***Imperative with a changing climate we use Data Centres and associated "Big Data" projects to begin predicting and preparing before we reach tip over points of no return***
   - Must be of practical help to Farmers eg. help improve his bottom line
   - Collection of Data must be automatic, minimal work for farmer involved – Ipv6
   - Output must be visual wherever possible. Farmers are mostly visual people and masses of figures won't work
   - Combine data from many sources eg. existing data bases(soil, weather and Bees), in the field sensors, Satellites, cameras, markets and climate change models
   - ***Native Bees/Insects are a critical component to pollination of crops***

6. **Encourage Regional e-Commerce web sites like Regional Development Australia Northern Inland's *"Come On Shopping"* e-commerce Web Site. Well done *Nathan***
   - http://www.rdani.org.au/projects/come-on-shopping.php.
   - Another important part of Regional Australia Agriculture is all the unique cottage/farm industries that produce for niche markets. We need to provide avenues, especially Internationally to not only sell their products but add to the narrative we are building for Regional Australia

- Blueberries, Goats Milk Soap, Truffles, Native Trees and the list is only limited by imagination

Conclusion

The recent refugee problem in the EU will be nothing compared to what will happen if large scale famines are bought on by climate change, population growth or a combination of both.

Whilst Australia can't physically feed the world, we can certainly provide the techniques, technology, and training to help do so, this is Australia's future

We can make a difference to the world our next generations of Australians will live in

Again, welcome to Armidale we feel quite honoured by your presence and happy to discuss further any of the points I have raise

I wish you all a safe trip home

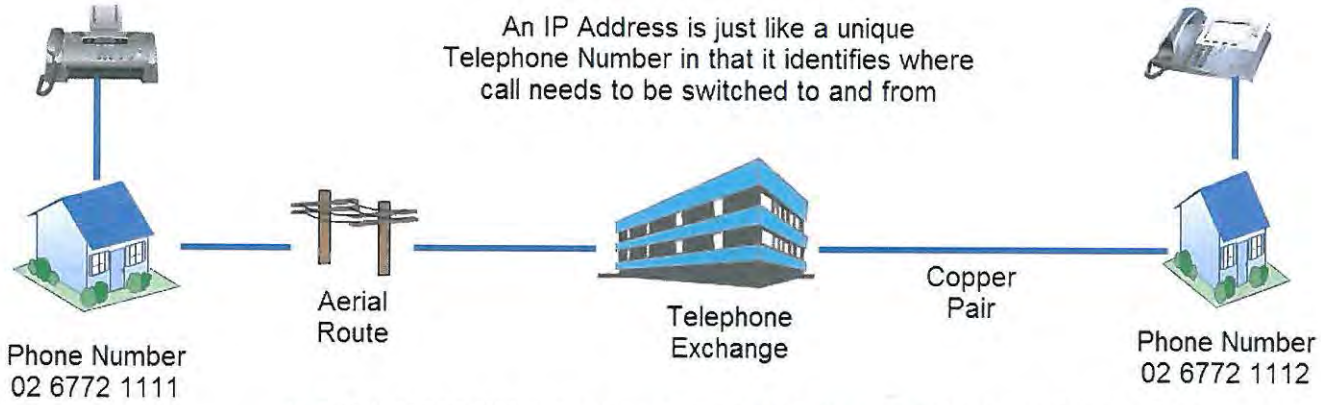
Thanks
Alun

Alun Davies
Digital Economy Coordinator &
Regional Communications Advocate
New England NSW

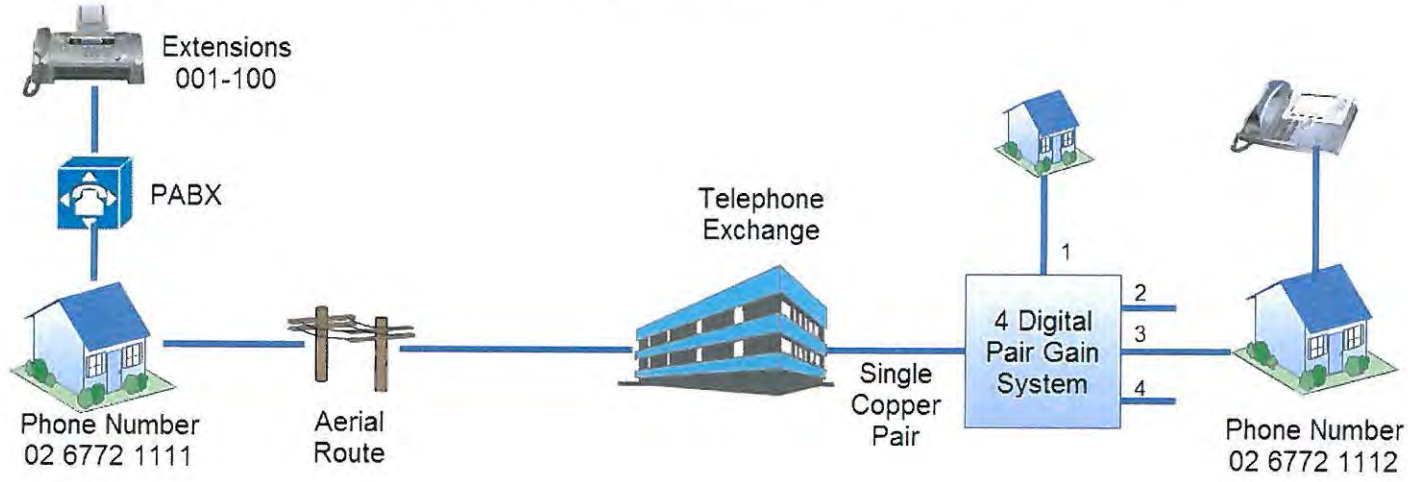
My Experience relevant to this Hearing

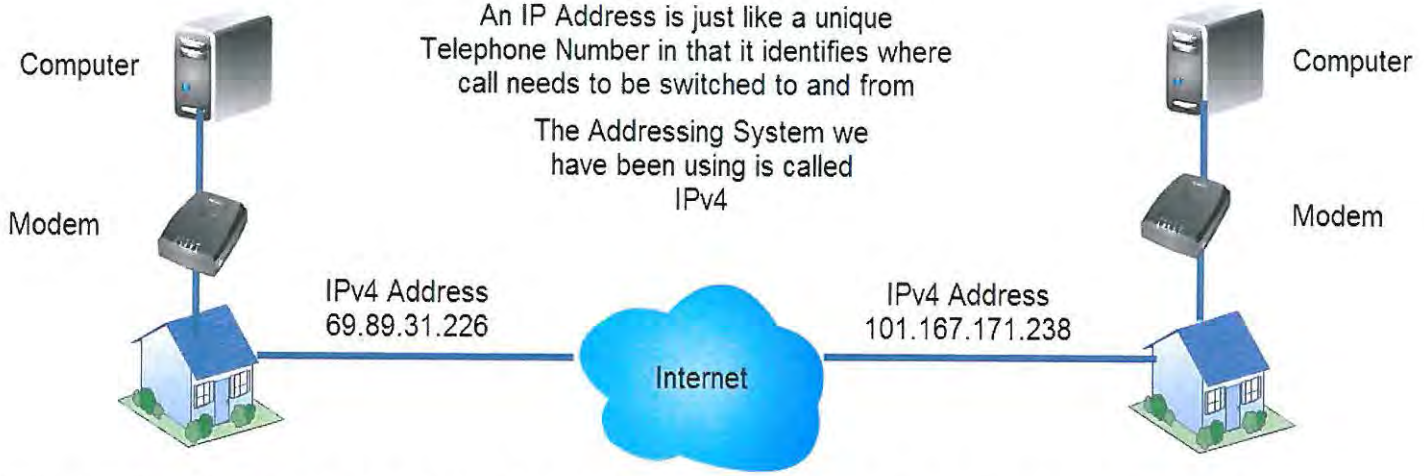
- Headed the successful NBN Lobby Group for New England
- Member of the Regional Telecommunication Review Committee 2011-2012
- Head the Armidale Digital Economy **Implementation** Group, which has helped resolve 250+ NBN Connection issues. It is very much a series process Customer – RSP-NBN-Contractor-NBN-RSP-Customer. We fix the problem where ever it is
- Member of the Regional Digital Taskforce organised through Regional Development Australia Northern Inland RDANI
- Part of the work groups for both the "SMART Farm" and "Smarter, Safer Houses" Projects
- 40+ years of experience in Telecommunication Networks, Mobiles, Broadband and fault reduction etc based mainly in North West NSW
- And most relevantly, in past couple of years have attended and participated in such events as the
    - Australian Cloud and Data Centre Strategy Summit, 2016, 2015 and 2014
    - Australian Korean Business Council 2015 – Led a delegation of eight(8) businesses and groups from Armidale
    - Big Data and the Future of Agriculture Canberra 2015

Explanation of Network Address Translation in the IP Network

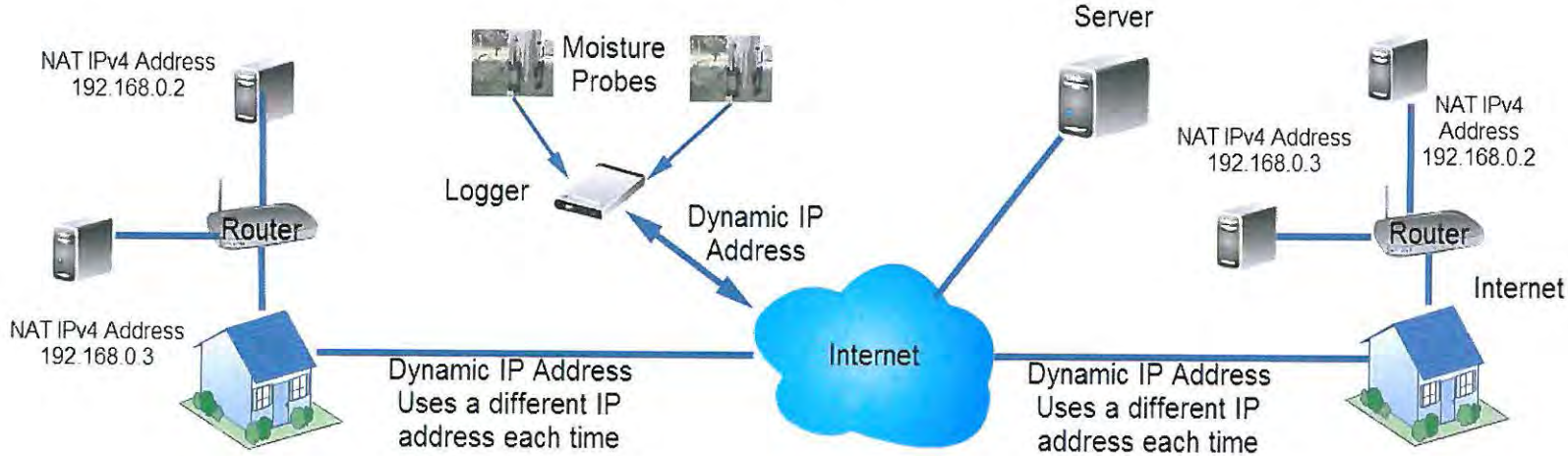


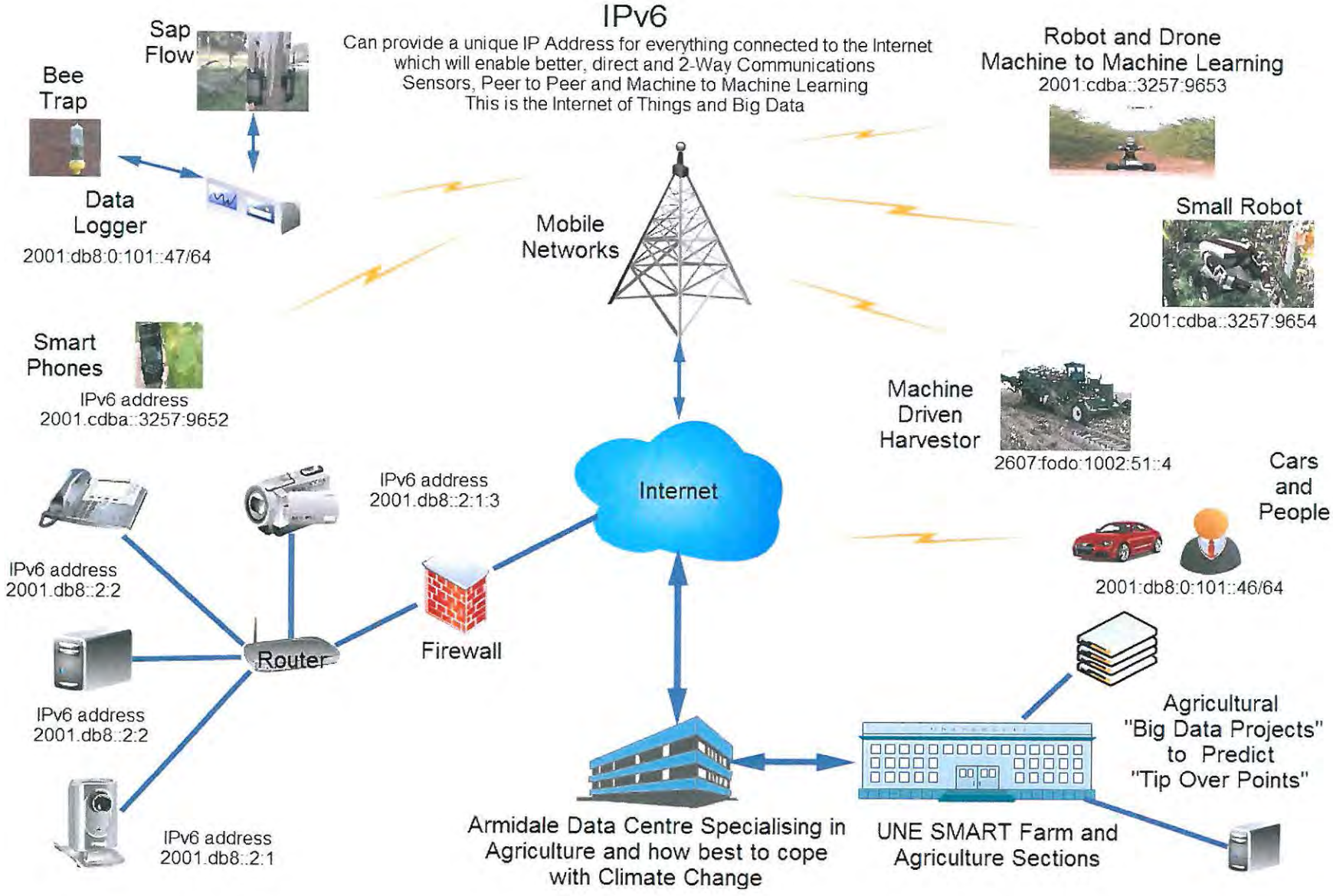
In a Telephone Network you can run out of phone numbers and copper lines
so you install PABX's and Pair Gain Systems
This complicates the system and inhibits direct communications





With the growth of the Internet and the need for more computers and devices to be connected, led to the number of IPv4 addresses being used up and to help work around the introduction of
Dynamic IP Addressing and
Network Address Translation - NAT'ing
Which has complicated the network and made it a lot harder for 2-Way and real time communications, especially with Sensors




IPv6
Can provide a unique IP Address for everything connected to the Internet which will enable better, direct and 2-Way Communications Sensors, Peer to Peer and Machine to Machine Learning
This is the Internet of Things and Big Data
Sap Flow
Bee Trap
Data Logger
2001:db8:0:101::47/64
Robot and Drone Machine to Machine Learning
2001:cdba::3257:9653
Small Robot
2001:cdba::3257:9654
Mobile Networks
Smart Phones
IPv6 address
2001.cdba::3257:9652
Machine Driven Harvestor
2607:fodo:1002:51::4
Cars and People
2001:db8:0:101::46/64
IPv6 address
2001.db8::2:1:3
Internet
IPv6 address
2001.db8::2:2
Router
Firewall
IPv6 address
2001.db8::2:2
IPv6 address
2001.db8::2:1
Armidale Data Centre Specialising in Agriculture and how best to cope with Climate Change
UNE SMART Farm and Agriculture Sections
Agricultural "Big Data Projects" to Predict "Tip Over Points"