The National Broadband Network

Australian Centre for Innovation Luncheon
Sydney University

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August 8th 2011
Just Three Short Stories

• How did we get to where we are right now?
• How, what and why a Bunch of Furphies about the NBN?
• Why High Speed Networks are vital to Australia’s future?

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Looking Back....how did we get to where we are right now?
Five major waves of innovation have shaped world economic activity during the last 250 years.

See: Carlota Perez “Technological Revolutions and Financial Capital”
Waves of Innovation 1770’s – 2030’s

1st wave
Iron
Water power
Mechanisation
Textiles

2nd wave
Steam Power
And Railroads

3rd wave
Steel
Electricity
Chemicals
Heavy Engineering

4th wave
Oil
Automobiles
Petrochemicals
Aviation
Space

5th wave
Nano Technology
Bio Technology
Geo Science

6th wave
Digital Networks
Software
Information
Technology
Telecommunications

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Two different periods in each great surge

<table>
<thead>
<tr>
<th>Time</th>
<th>INSTALLATION PERIOD</th>
<th>Turning point</th>
<th>DEPLOYMENT PERIOD</th>
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<tbody>
<tr>
<td>Next big-bang</td>
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<td>50 – 60 YEARS</td>
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<td>GREAT SURGE</td>
<td>Technological Revolution</td>
<td>INSTALLATION</td>
<td>DEPLOYMENT</td>
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<td>Core Country</td>
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<tr>
<td>1st</td>
<td>The Industrial Revolution</td>
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<tr>
<td></td>
<td>Britain</td>
<td>1770's and early 1980's</td>
<td>1793-97</td>
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<tr>
<td>2nd</td>
<td>Age of Steam and Railways</td>
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<tr>
<td></td>
<td>Britain (spreading to continent and USA)</td>
<td>1830's</td>
<td>1848-50</td>
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<tr>
<td>3rd</td>
<td>Age of Steel, Electricity and Heavy Engineering</td>
<td>1875 - 1884</td>
<td>1893-95</td>
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<td>USA and Germany overtaking Britain</td>
<td>1884 - 1893</td>
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<td></td>
<td>USA (spreading to Europe)</td>
<td>1920 - 1929</td>
<td></td>
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<tr>
<td></td>
<td>USA (spreading to Europe and Asia)</td>
<td>1987 - 2008</td>
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SOURCE: Perez, “Technological Revolutions and Financial Capital” 2005
The halfway mark of each Revolution is marked by a turning point featuring;

- Manic behaviour
- A Financial Bubble
- The inevitable crisis and crash
The Financial Bubbles that actually Burst

- 1793-97
- 1848-51
- 1893-95
- 1929-34
- 2008-11
During each Financial Crisis the world’s financial systems were described as broken and discredited.

Governments of all leading nations developed strategies to ensure……..

“ The excesses of the last 5-6 years would never happen again”. 

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Classic Phases of the ICT Revolution
1970’s – 2030’s

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>1971</td>
<td>1987</td>
</tr>
<tr>
<td>2008-11?</td>
<td>20??</td>
</tr>
<tr>
<td>20??</td>
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</table>

SOURCE: Perez, “Technological Revolutions and Financial Capital” 2005
The current great wave of Innovation (ICT Revolution) has just passed the halfway mark.  

35 years into a 60 year phenomenon

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Key features of the ICT Revolution in Australia for the next 20 years will be:

• The Roll out of High Capacity Bandwidth..... the NBN

• A content revolution

• The devolution of supercomputing and cloud computing

• Grid services and data storage services

• Visualization technology and video collaboration.

• Serious convergence of technologies eg;
  (Bioinformatics, geoinformatics, nanotechnology and computational chemistry)
How, what and why a bunch of Furphies about the NBN?
How Bandwidth became important.

• 1876-1970’s: Bandwidth not an issue for the telephone system.
• 1980’s: Move from analogue to digital technologies and data becomes important.
• 1990’s: Telecoms system expected to carry voice traffic, data, graphic intensive images, AND video traffic.
• 1997-8: In Australia the volume of data transmitted surpassed the volume of voice traffic for the first time.
Telecommunications becomes a political issue.

• The lost decade 1997-2007
• Telecoms public policy and the 2007 poll.
• Political and commercial opportunism is normal
• The 2010 Federal Election.
• The Murdoch Media
We can’t afford $36 Billion.

(actually $27Billion)
Some Basic Numbers

- $36$ Bill for NBN over 8 years ($4.4$ B Per Annum)
  - $27$ Billion from the taxpayers
- 2011-12 Federal Budget = $360$ Billion in revenue.
- Federal Budget over 8 years = $3.8$ Trillion
- Australia’s Public Debt Level < 9% of GDP
- NBN expenditure = 4% of Australia’s GDP.
- Federal Government Tax cuts 2008-10 = $47$ Billion
- cf: Rio’s next expansion? Cost of Gorgon?
Wireless not Fibre Cable?
• Not either but BOTH

• Capacity of Wireless is seriously limited.

• The spectrum is already crowded.

• Wireless is ideal in certain applications.

• Fibre Cable is future proof in basic terms (147 colours etc)

• There is no magical alternative infrastructure around the corner in the medium term.

• ref: Reed Hundt.
The basics of a hard wired community?

- 10 – 100 Mbps at home
- 1-10 Gbps at work
- Wireless all around.

Ref: Reed Hundt 2003 (Former Chair US Communications Commission)
Who on earth needs 100mbps?
Leave it to the Private Sector.
The US v Australia comparison.
Surely, not without a cost benefit analysis??
Looking Forward....why High Speed Networks are vital for Australia?
“....The Internet has transformed the Australian economy over the last 10 years”

INTERNET BY THE NUMBERS

3.6% The internet’s direct contribution to GDP last year

190,000 People in Australia employed in occupations directly related to the internet

80,000 Additional internet-related jobs to be created by 2016

$27bn Productivity increases to businesses and government last year

$53bn Benefit to households in convenience, time saving, access to goods and services and recreation

CONTRIBUTIONS TO GDP IN 2010

- Finance and insurance: $127bn
- Mining: $100bn
- Construction: $94bn
- Healthcare: $75bn
- Transport: $62bn
- Retail: $53bn
- Education and training: $53bn
- Internet: $50bn
- Rental and real estate: $33bn
- Electricity, gas and water: $25bn

Source: Deloitte Access Economics /The Connected Continent
High Speed Networks
and Australia’s Digital Future

Our Future...... means

More People, more data, more locations Online
Faster Speeds and faster Outcomes

Source: A Faster Future Howarth and Ledwidge
Beyond 30% penetration for Broadband ......the revolution really begins
For every 10% increase in the BB penetration rate GDP increases by 1.4%

Email

• 2010  2 Billion people sent 183 Billion emails per day.
• Video mail will subsume data based email.
• Eventually we will be able to search video.
Telecommuting moves to centre stage

- Fast affordable broadband
- New management culture
- Significantly increased mobility
Homes and offices will become instrumented buildings

- Sensors
- Radio systems
- Converted devices

....measuring the status of almost everything
Smart Utilities

With smart services (often automated)

• Water wastage
• Traffic congestion
• Energy consumption

...will all be managed more efficiently
Traffic Congestion and Global Gridlock

<table>
<thead>
<tr>
<th>THE WORLD</th>
<th>AUSTRALIA</th>
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<tbody>
<tr>
<td>2011</td>
<td>6.8 Billion People</td>
</tr>
<tr>
<td>2045 Est.</td>
<td>9 Billion people ?</td>
</tr>
</tbody>
</table>

BROADBAND: is essential for the smart infrastructure to manage smart cars and personal mobility systems.

Source: Bill Ford TED Talks March 2011

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Key industries/organizations in denial and difficulty.

• Music
• General retailers (large and small)
• Newspapers
• Video Stores
• Political Institutions.
Where are the Benefits?
• The business sector.
• The TAKE OFF for Telework
• Substitution of Bits for Atoms
• Intelligent buildings and homes
• Intelligent utilities....power grids etc.
• Rich media and entertainment.
• Intelligent transport logistics
• Personalized public transport
• Telemedicine and eHealth
• Education services and Life long learning.
• eGovernment service delivery.
• Personal security and public safety
• The new democracy.
Conclusions
All world changing innovations create serious challenges and particular difficulties.

- A new playground for digitally savvy criminals.
- Cyber warfare and new threats to national security.
- Cyber threats to commerce.
- Identity theft and the need for “Certification”
- Limitations of national Statute Law.
Classic Challenges (cont)

- Integrity of hosting services.
- Extraction of information from the web.
- Vulnerability and potential for failure of online services.
- Complexities and drawbacks of “Social Media”
- The Digital Divide.
Australia’s Window of Opportunity 2010-2020

• Hard Infrastructure AND soft infrastructure.
• The content revolution.
• A future alongside and beyond the extraction industries.
• Australias entry into the 6th Wave.
Waves of Innovation 1770’s – 2030’s