

# ***Bringing Australia's Broadband Network into the 21<sup>st</sup> Century***

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# National Broadband Network

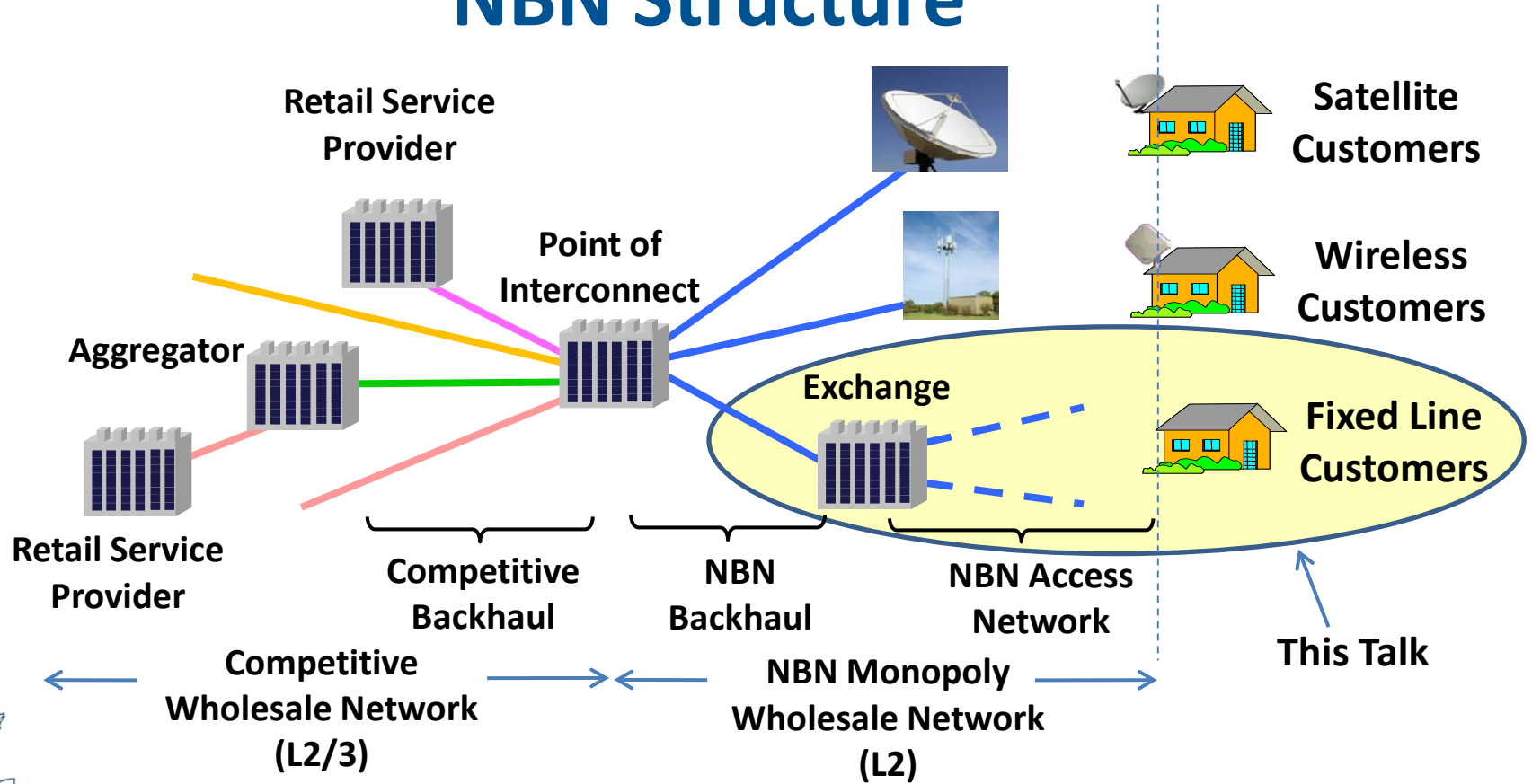
- **April 2009:** Announced by Federal Government
  - 93% fibre to the premises (FTTP)..... by 2021
  - \$41 billion
  - “Single biggest infrastructure project in Australia's history”
- **September 2013:** New Government changes technologies
  - Fibre to the node (FTTN) in place of FTTP..... by 2016
  - \$28.5 billion
  - “*fast, affordable, sooner*”
- **September 2015:** Transition to FTTN (and HFC) yet to commence
  - Too slow, cost blown out to \$46 - \$56 billion, delayed till 2020

# Summary

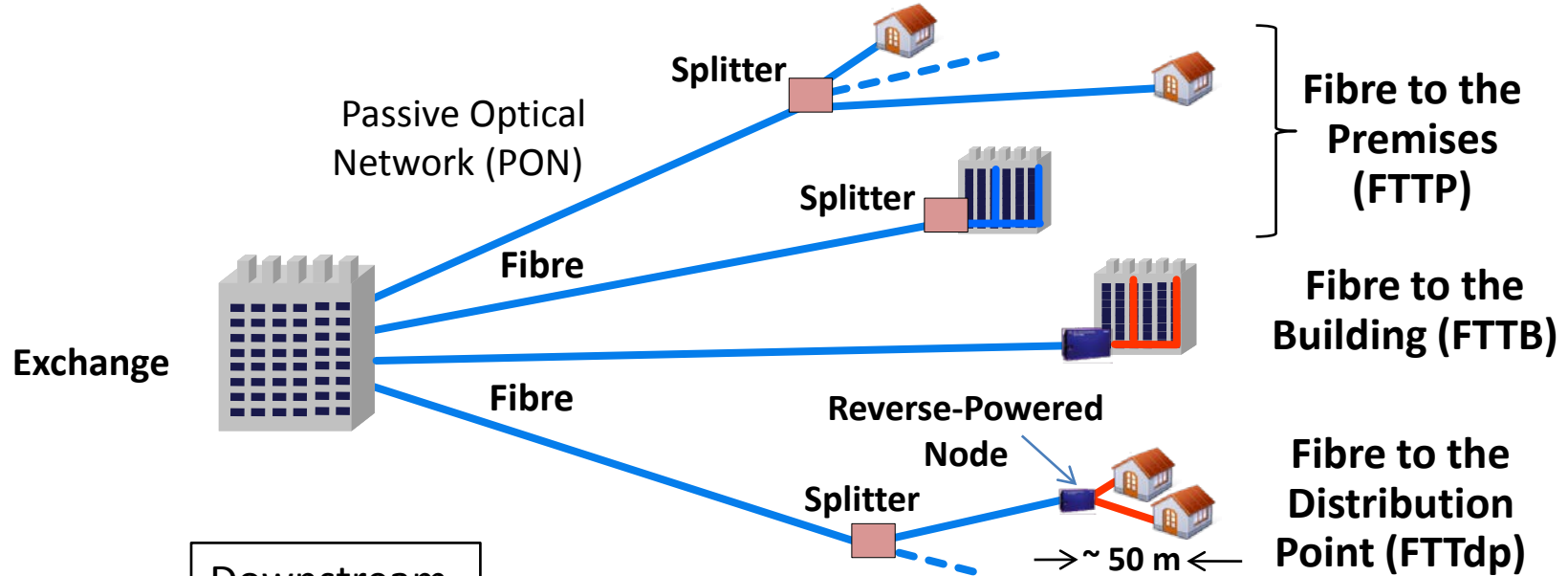
- **Technologies**
  - Options and global trends
  - Why FTTN is a bad idea
- **Broadband supply and demand**
  - Australian and global trends
- **State of the NBN**
  - Roll-out rate and funding
- **Is Australia's network moving into the 21<sup>st</sup> century?**



# NBN Structure



# Fibre-Based Access

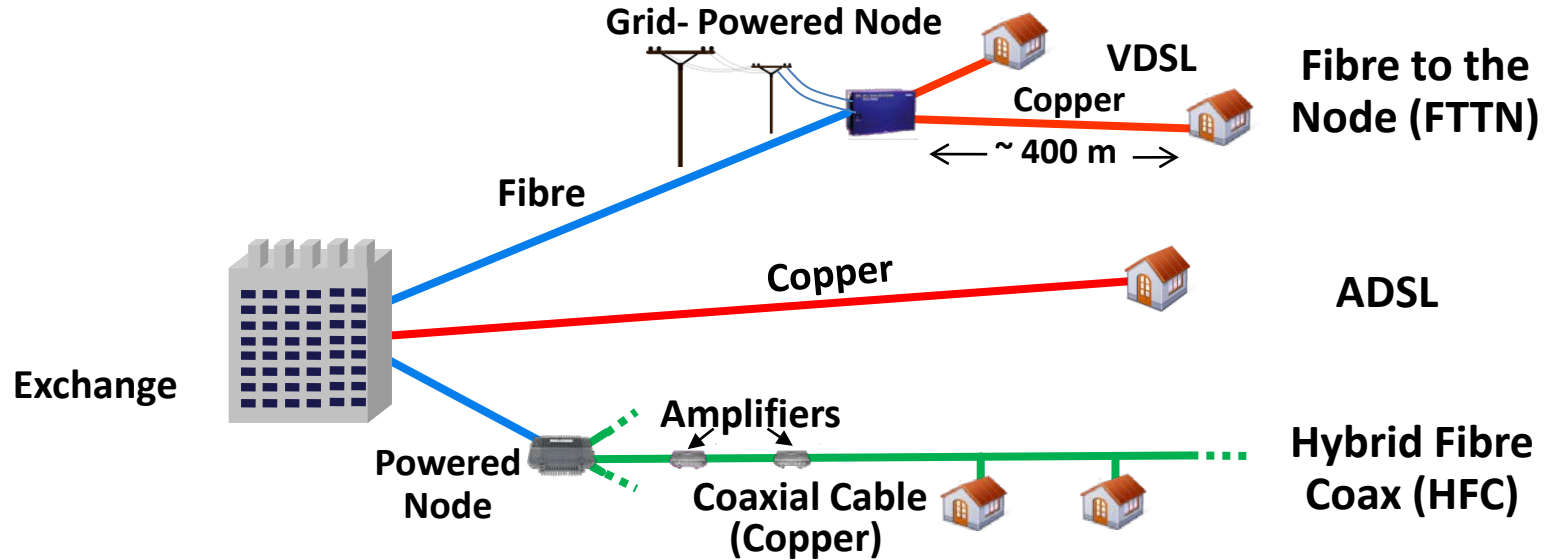


Downstream

GPON: up to ~ 1 Gbps  
XGPON: up to ~ 10 Gbps  
FTTdP: up to ~ 1 Gbps

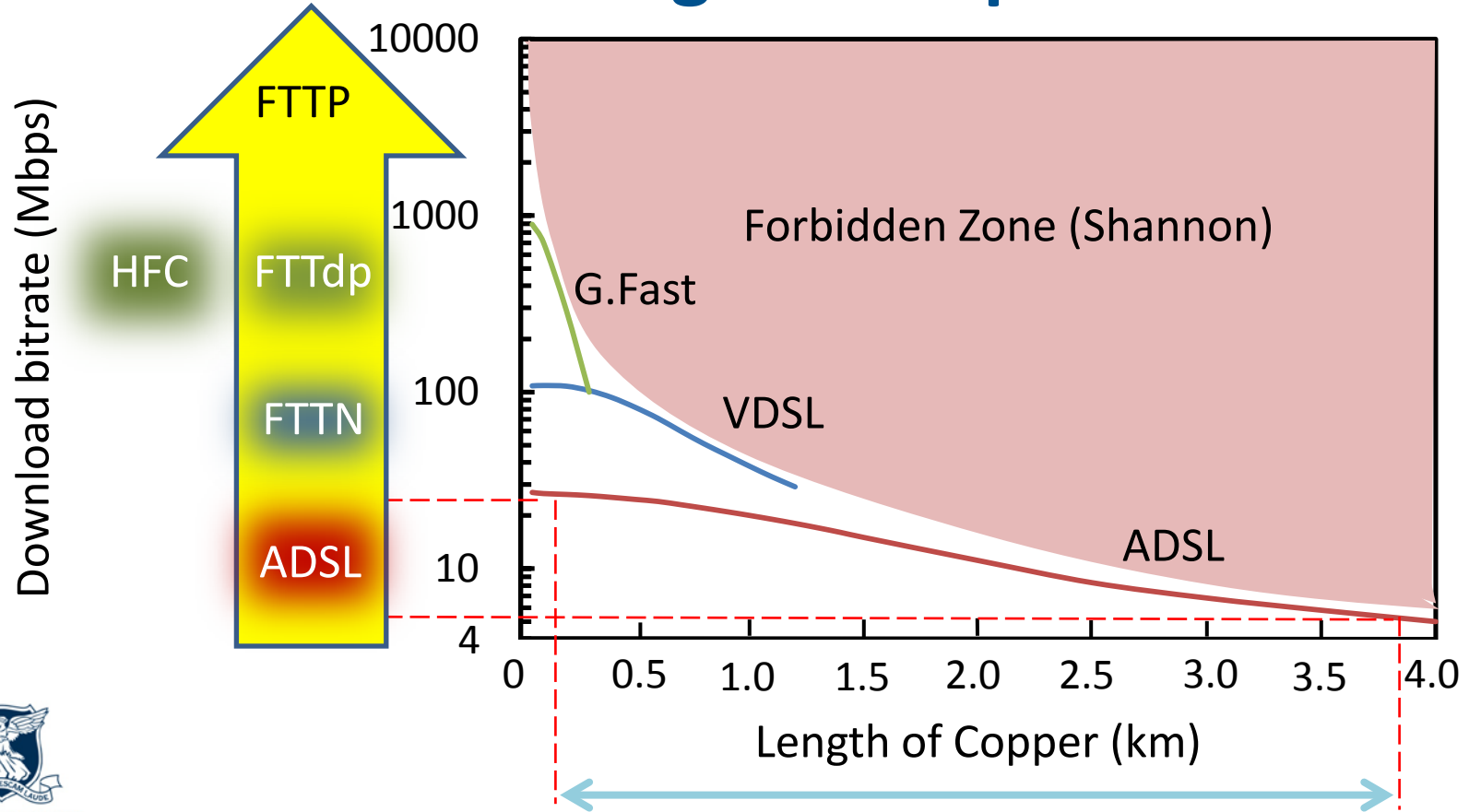
Upstream: > 100 Mbps

# Copper-Based Access



	Downstream	Upstream
FTTN:	~ 50 – 100 Mbps (depends on distance)	~ 40 Mbps
HFC:	up to ~ 1 Gbps (DOCSIS 3.1 upgrade)	up to ~ 100 Mbps

# Technologies Compared



# FTTN

## The Copper Bottleneck

“The quality of (Telstra’s copper) network is not fully known... However, it is known that there is significant work required to remove broadband blockers from the copper network.

If copper rehabilitation costs are prohibitively high in an area, nbn can choose alternative technologies to reduce costs.”

*NBN Corporate Plan, August 2015*



Powered Node  
Source: nbn

Annual copper maintenance costs: ~ \$1bn

# Some Global Trends

- Orange (France) to pass 60% of premises with FTTP by 2022
  - FTTP connections in Asia-Pacific reached 100 million in 2014
  - China plans 40 million new FTTP connections by December 2015
  - BT trial of G.fast (FTTdp) to 2 k premises this year - up to 330 Mbps
  - Deutsche Telekom to expand FTTN coverage in Germany
  - 1 Gbps now highly desirable in the USA ←
- } *NBN Corp Plan,  
August 2015*

# AT&T submission to FCC (April 2015)

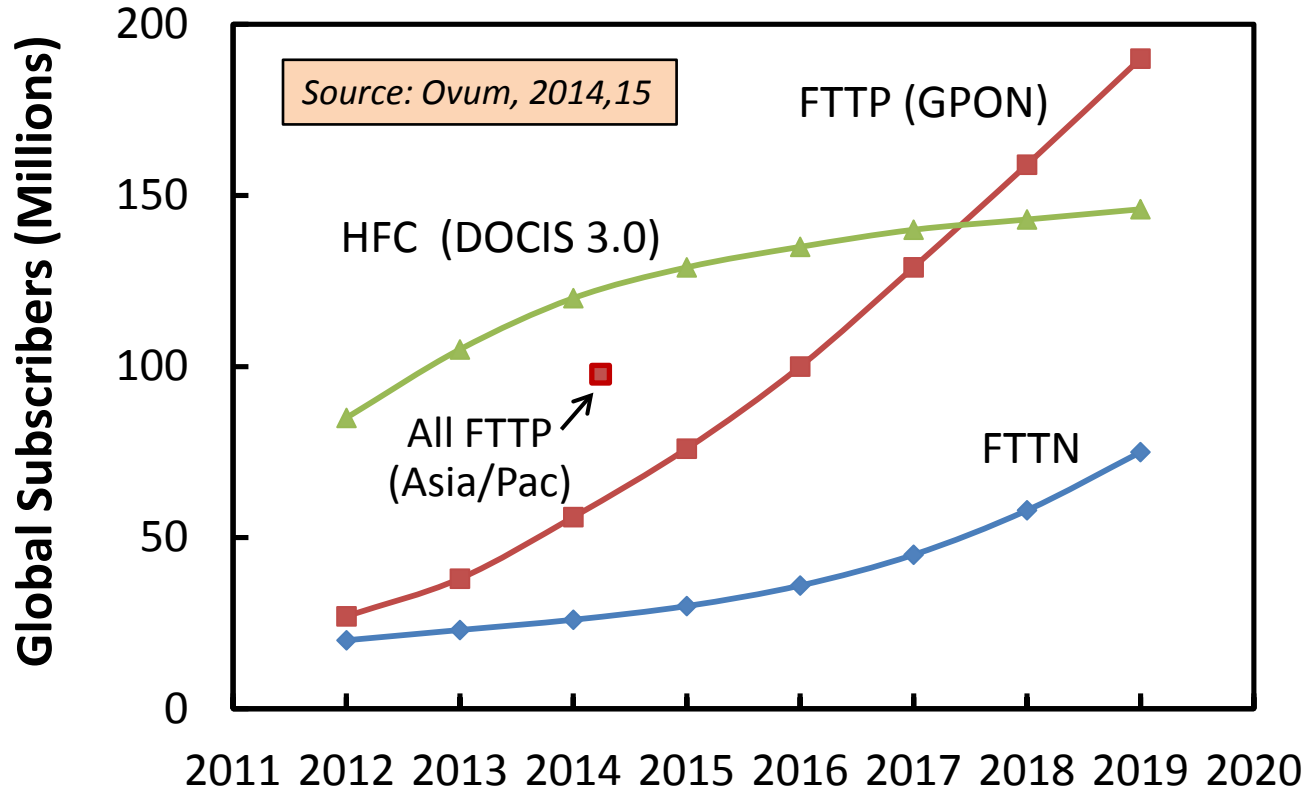
Provider	Maximum Speed	Notes
Google	1 Gbps	Available in 8 major cities in 2015
Comcast	2 Gbps (Symmetrical)	In Atlanta by May 2015
AT&T	1 Gbps	To be provided in 100 cities
Bright House	1 Gbps	Available in parts of Florida
CenturyLink	1 Gbps	Available in 10 major cities <i>AT&amp;T</i>
Cox	1 Gbps	In all markets by 2016
Suddenlink	1 Gbps	Available to most customers in 2016
Verizon	500 Mbps	Available in NYC

# AT&T submission to FCC (April 2015)

“Demand is growing for faster broadband speeds than AT&T, or anyone else, for that matter, can deliver with FTTN...”

*AT&T*

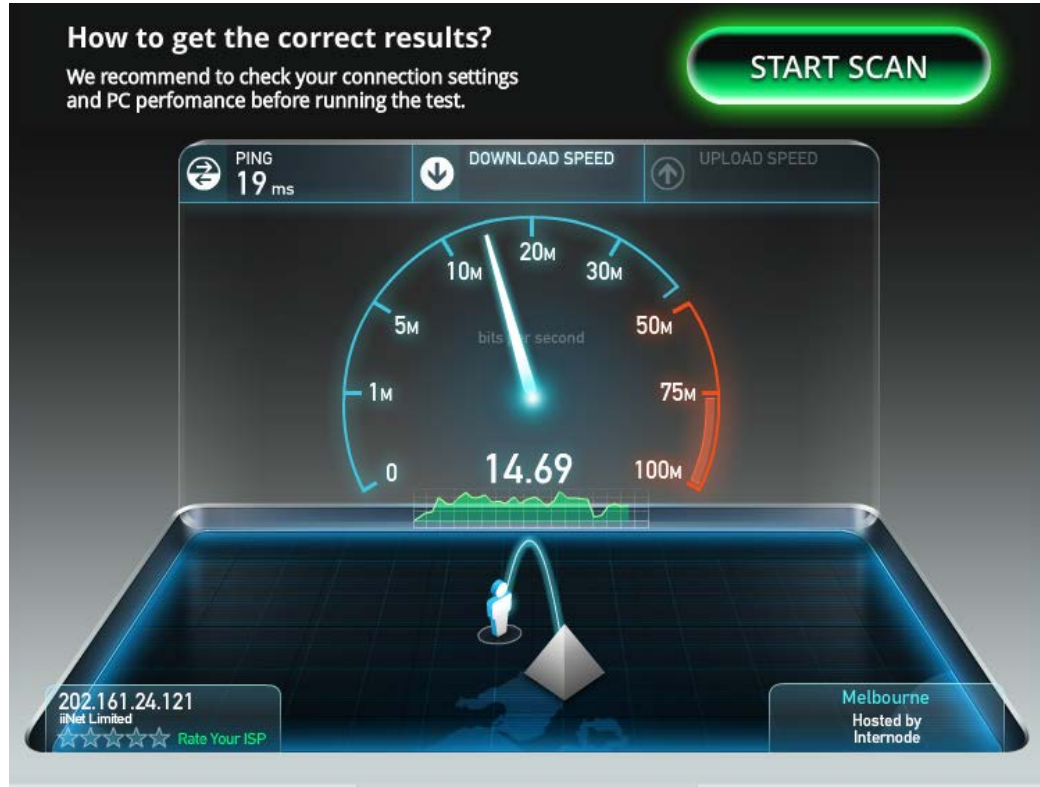
# Global Subscribers by Technology



# Not Speed for Speed's Sake

- *Czernich et al., 2011*: 10% increase in broadband penetration >1% increase in GDP growth
- *Kongaut et al., 2014*, (European Investment Bank): Economic growth scales with broadband speed
- *Soza et al., 2015*: Gbps broadband → >1% increase in GDP growth
- *Oomens et al., 2015*, (EU Directorate-General for Communications): Socio-economic benefits of high-speed broadband (FTTP) are large

# Measuring Broadband Speed

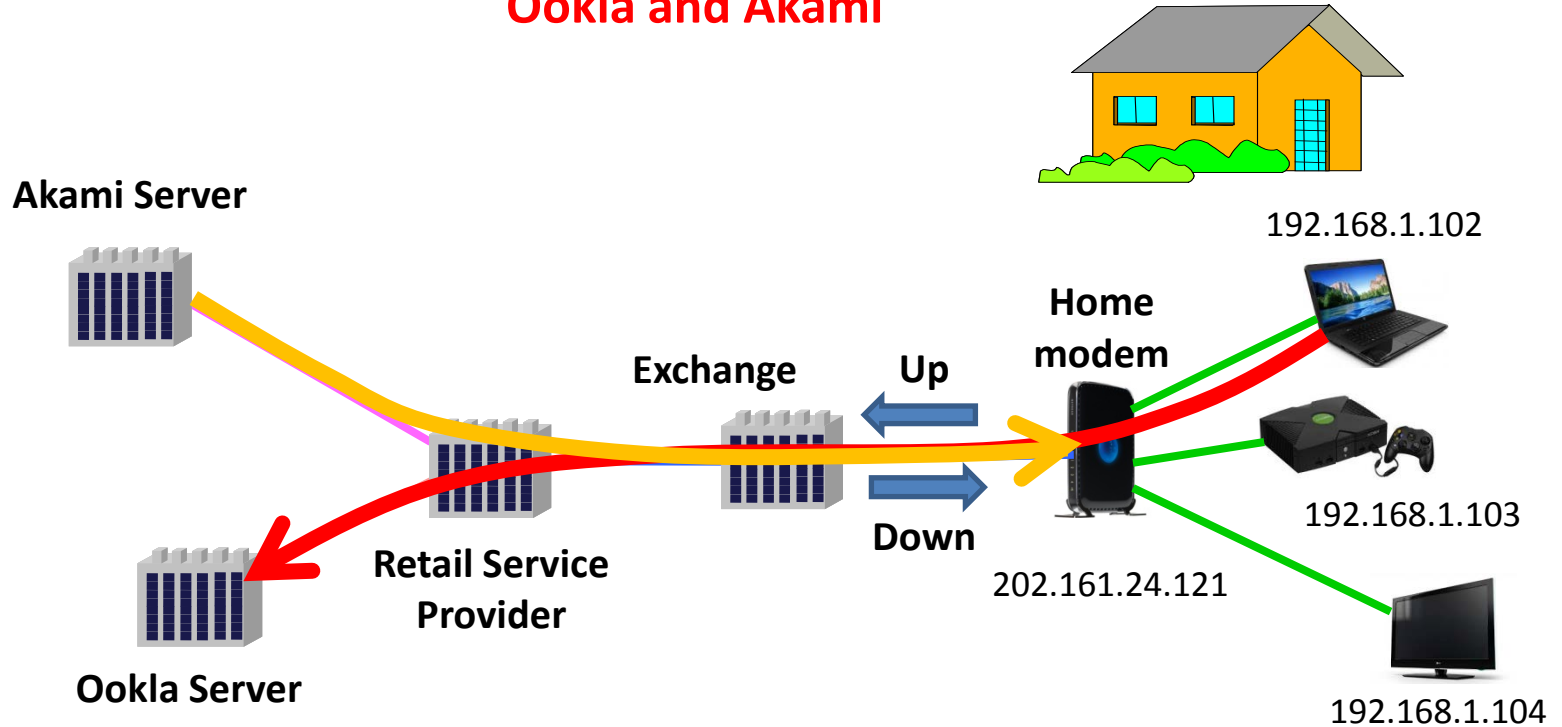


Ookla speed test

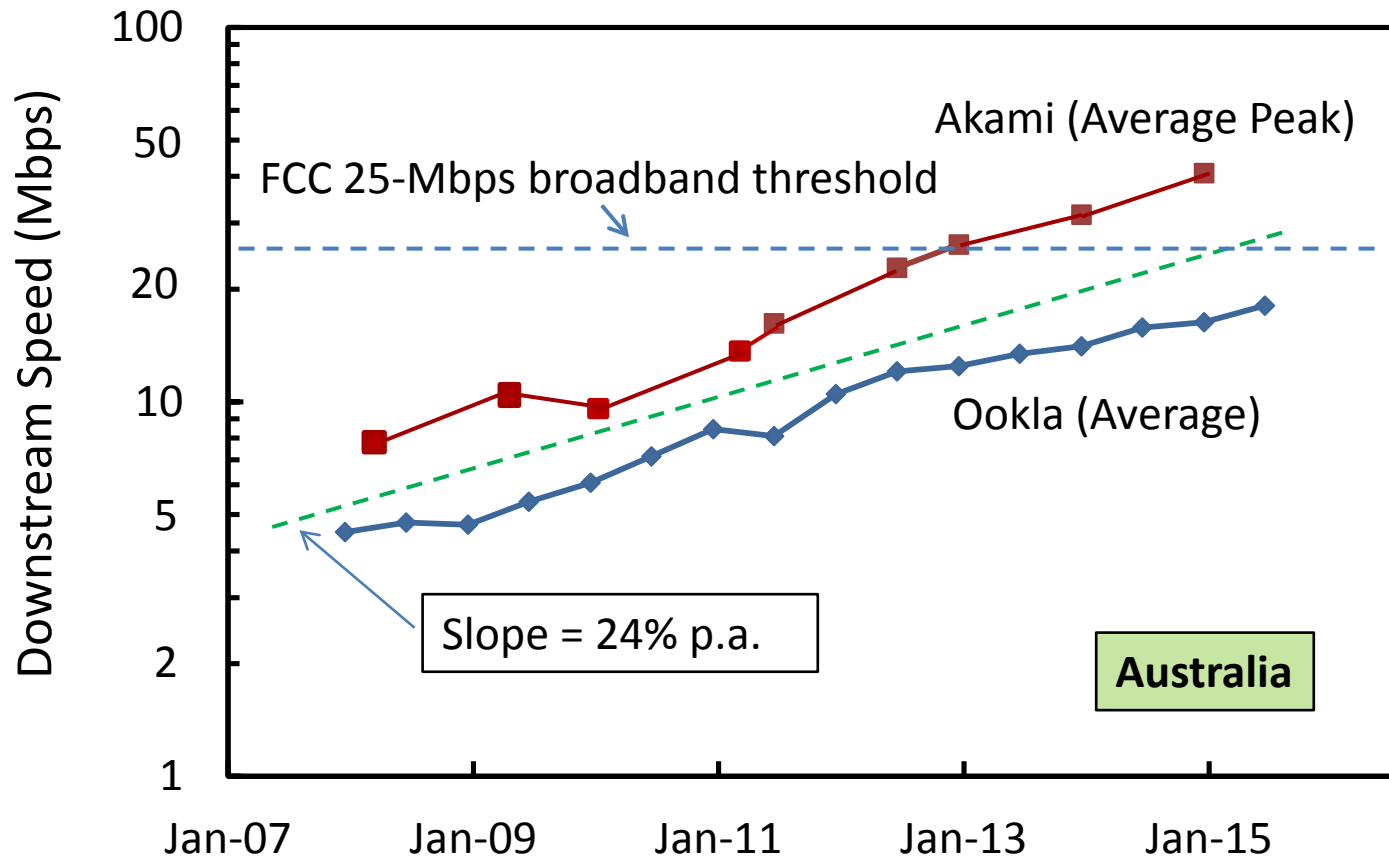


# Measuring Broadband Speed

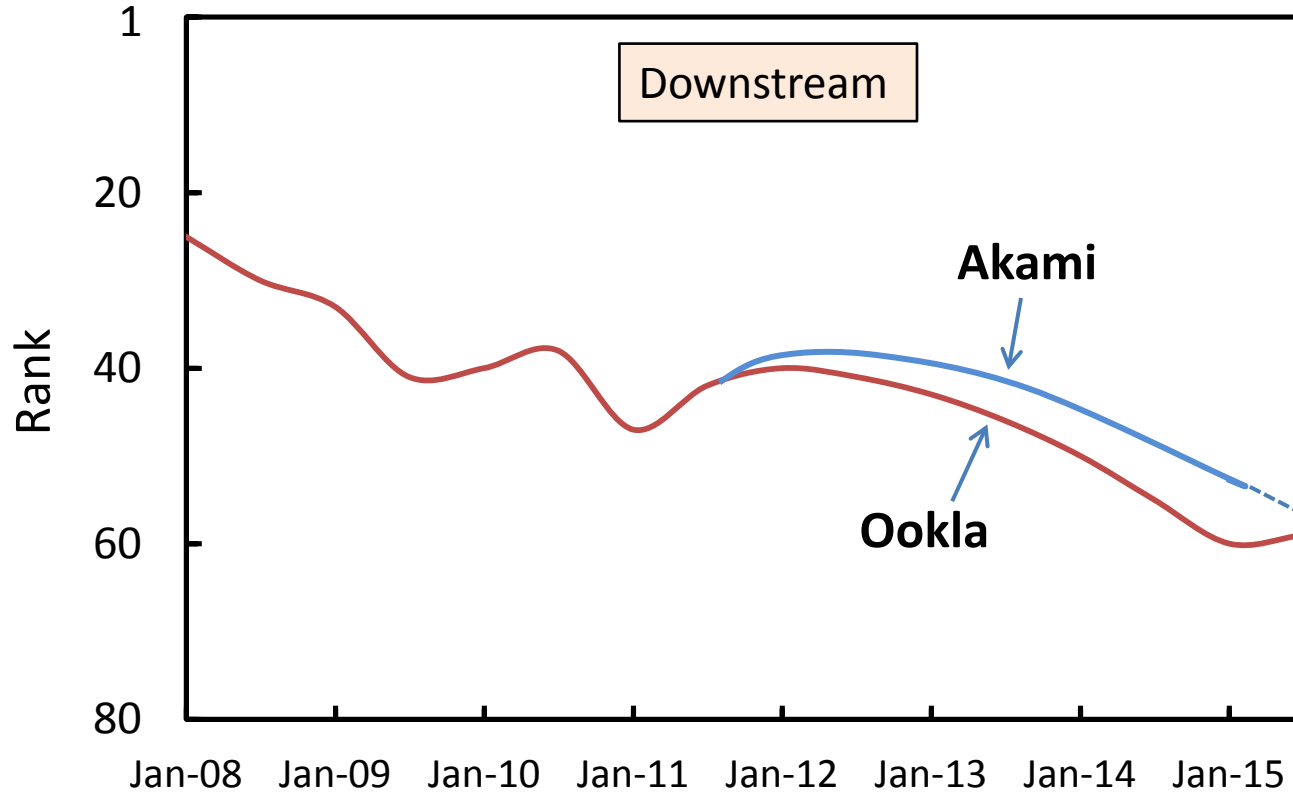
Ookla and Akami



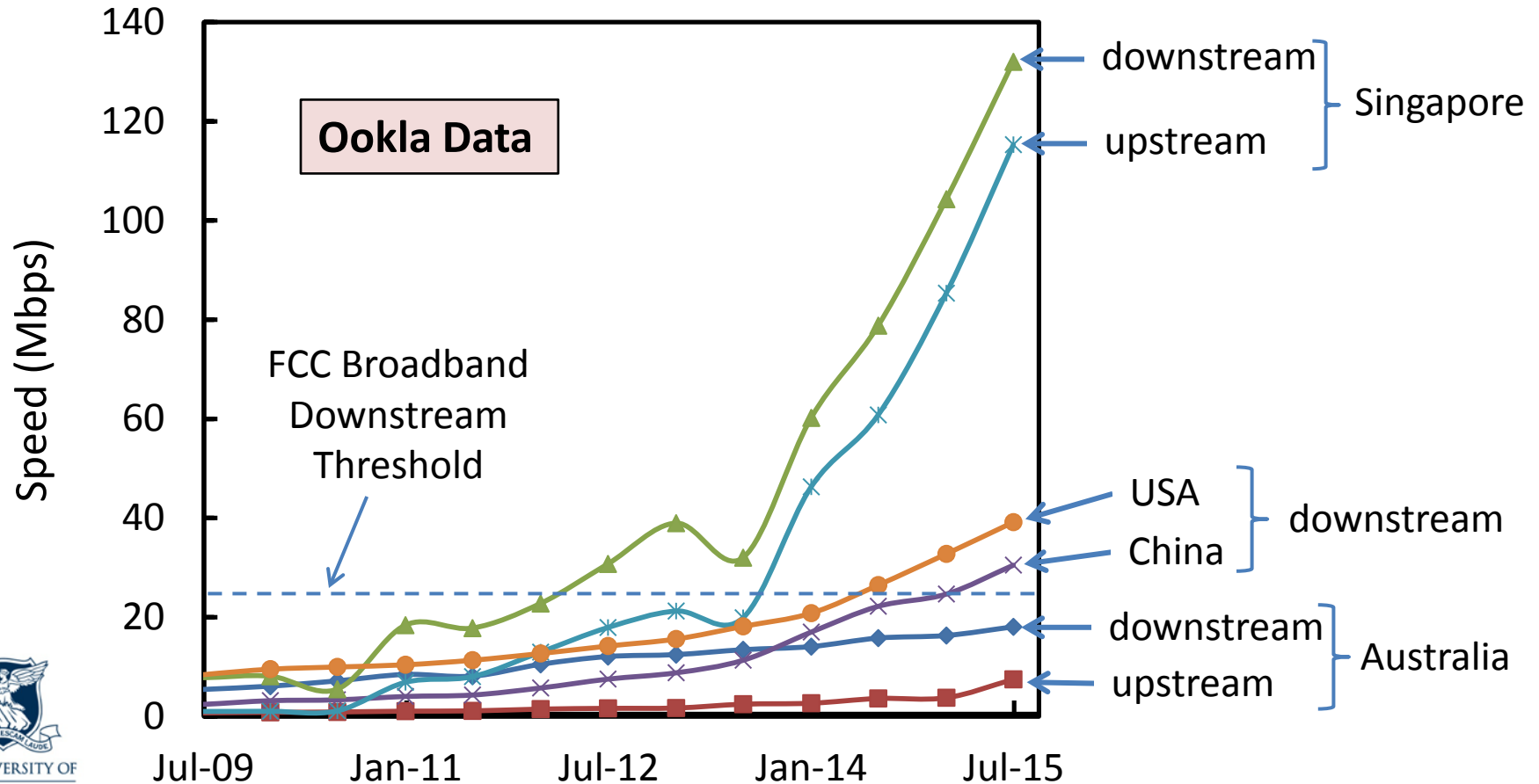
# Measured Downstream Speeds



# Australia's World Ranking



# Australia Compared



# Estimating Future Demand

van der Vorst  
et al., 2014



## Fast Forward »

How the speed of the internet will  
develop between now and 2020

Vertigan, 2014

## Independent cost-benefit analysis of broadband and review of regulation

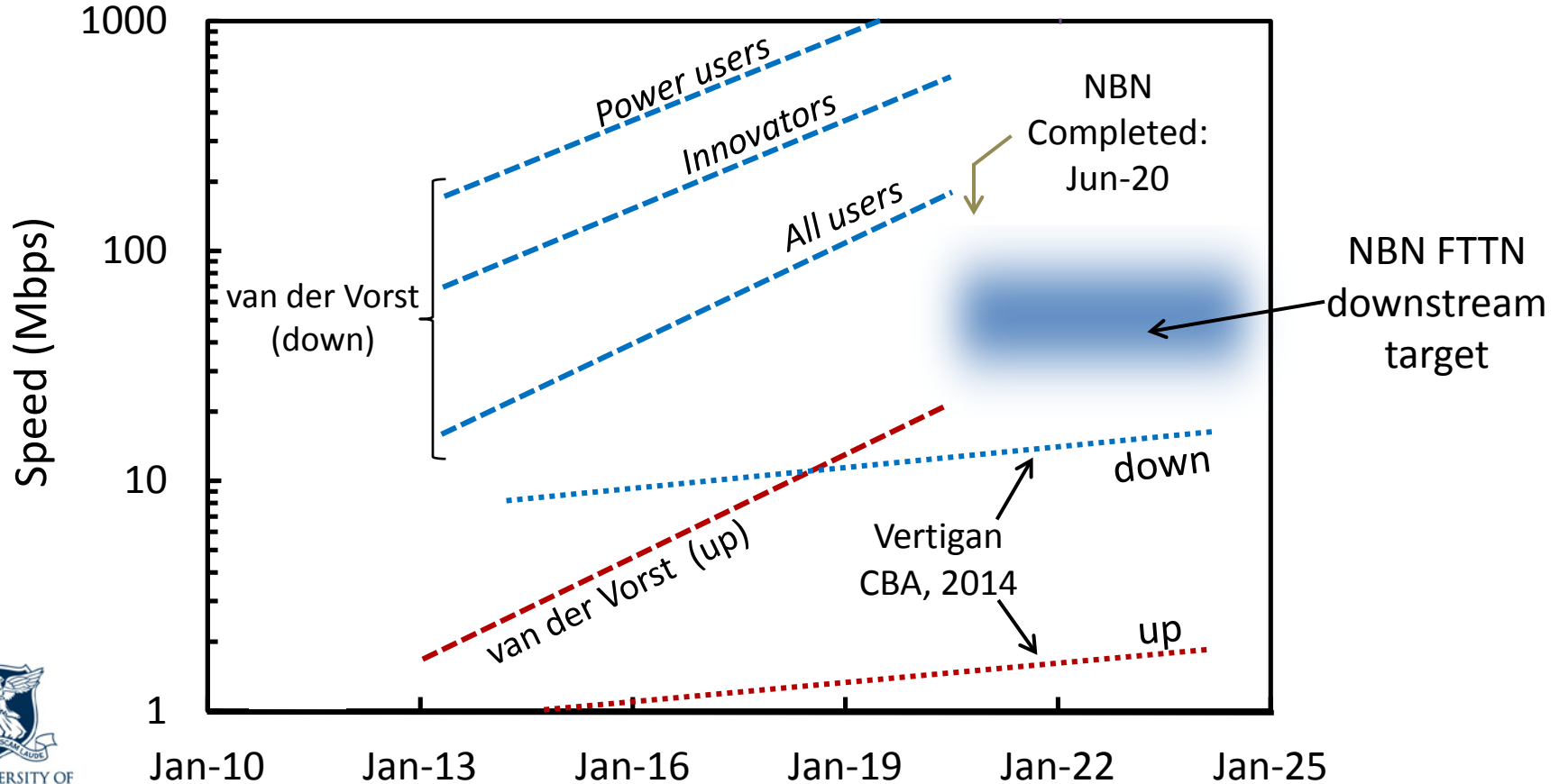
Volume II – The costs and benefits of  
high-speed broadband

August 2014

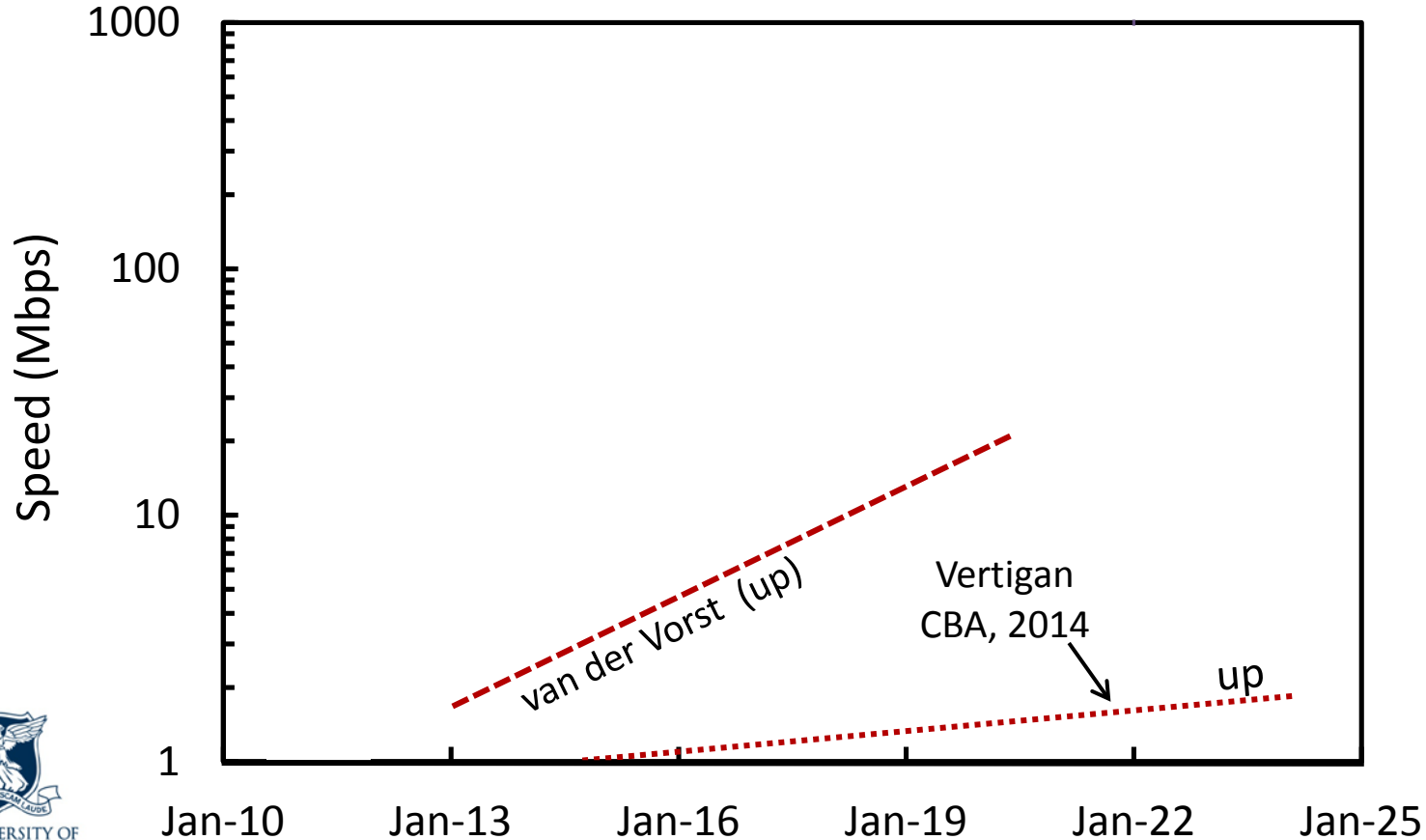
- Sponsored by European cable TV trade association)
- Extensive involvement of industry experts
- Includes “future revolutionary services”
- Sponsored by government
- Conservative approach to uptake of future services

Both account for a variety of user types  
(e.g. power users, innovators, mainstream  
users, and laggards)

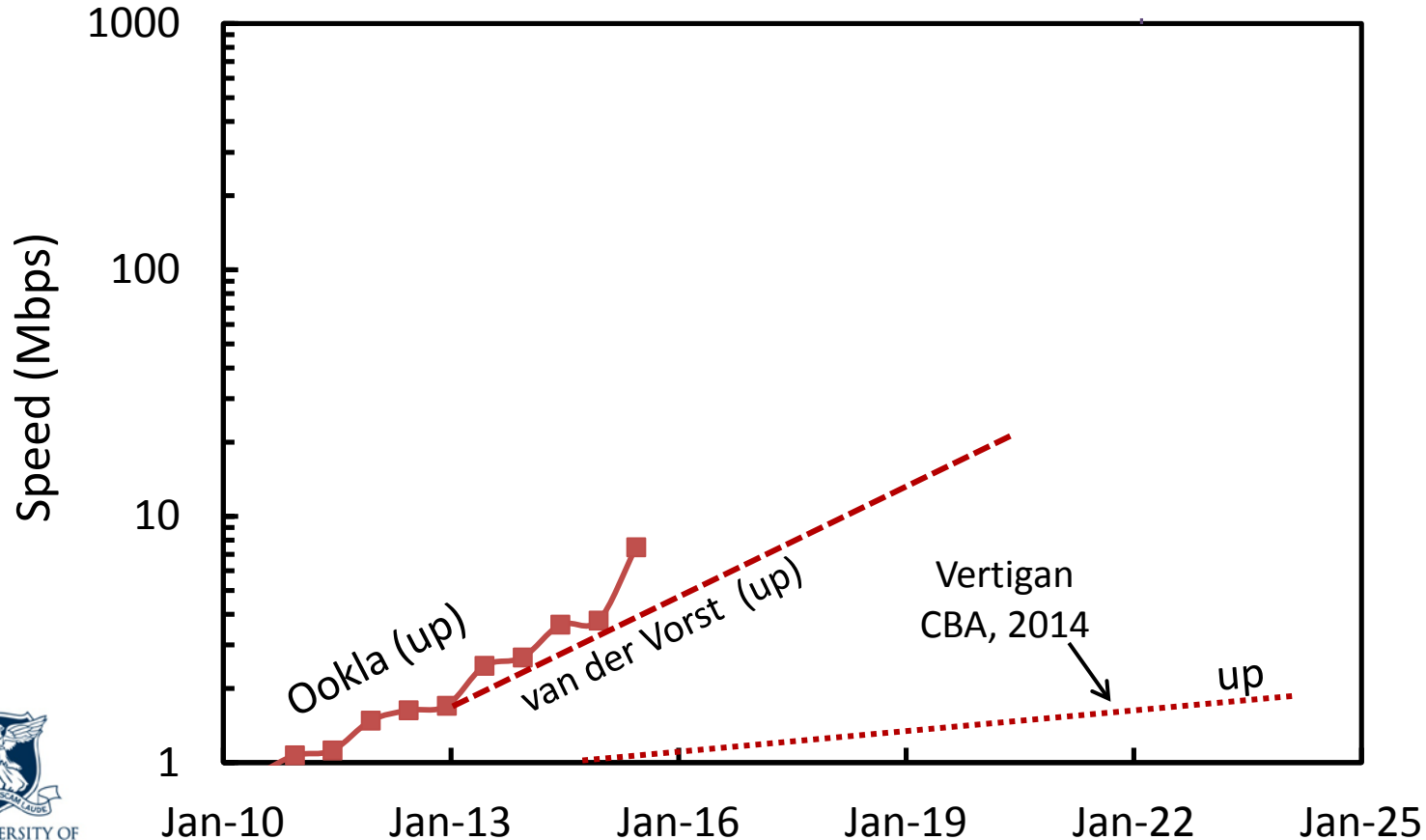
# Estimated Demand



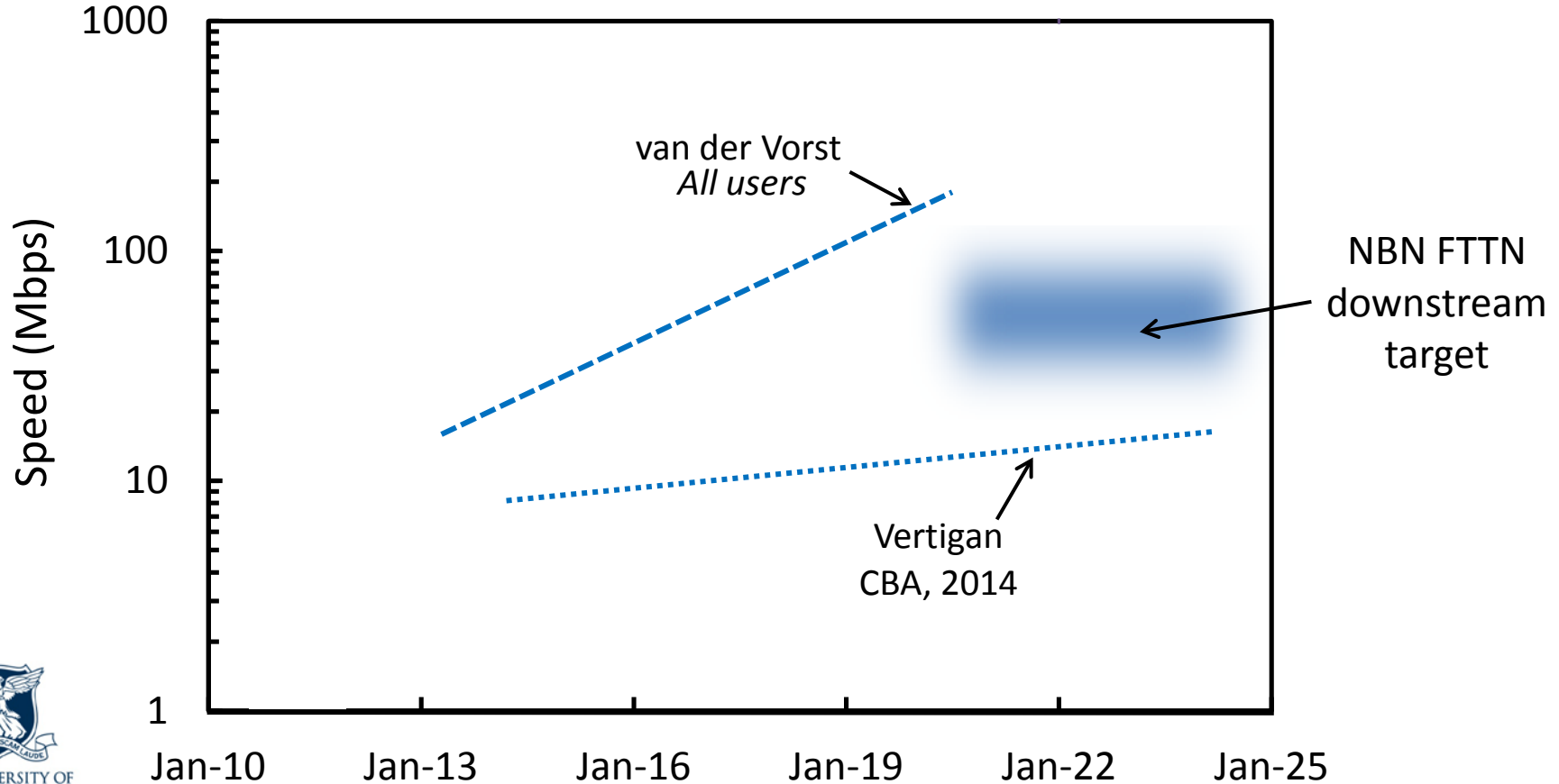
# Supply and Demand (Upstream)



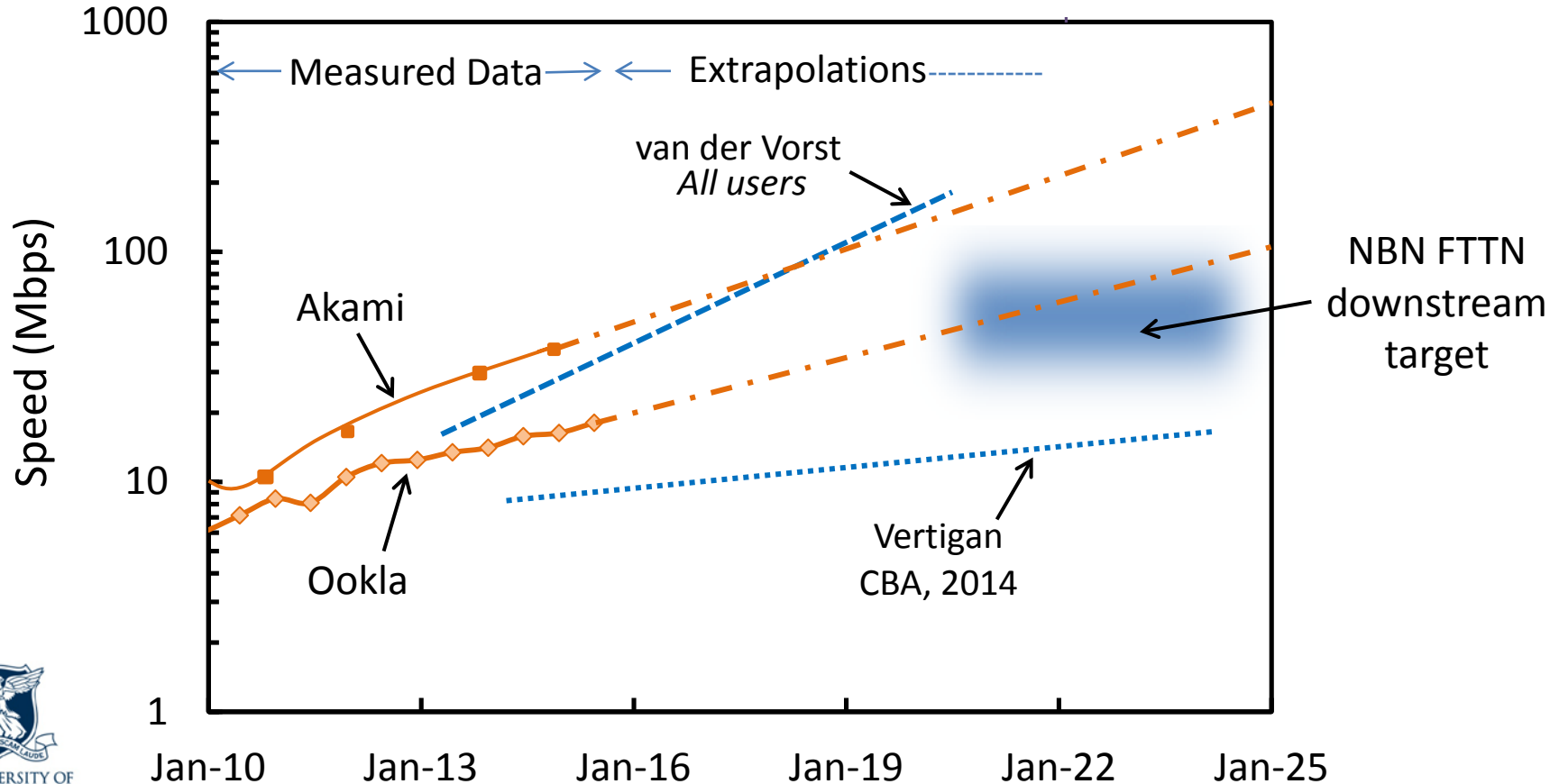
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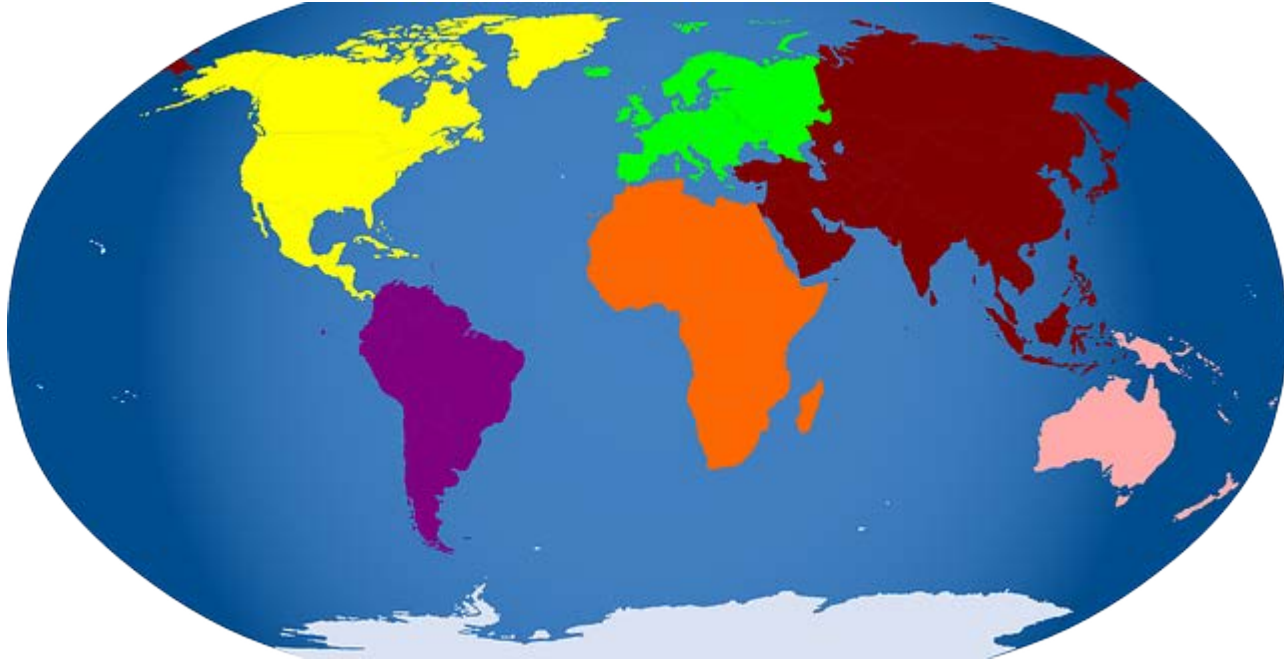
# Supply and Demand (Downstream)



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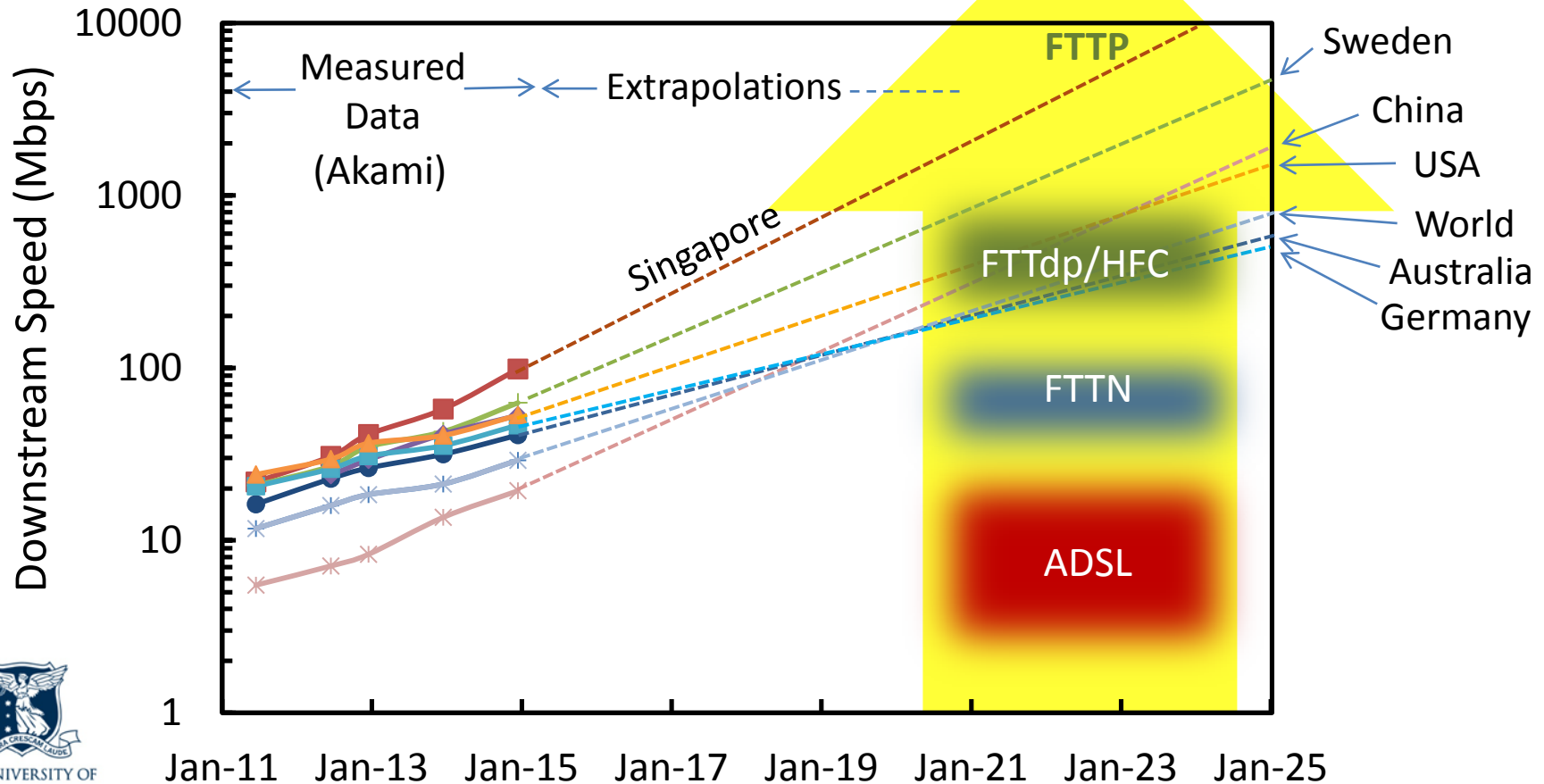


# Global View





THE UNIVERSITY OF  
MELBOURNE

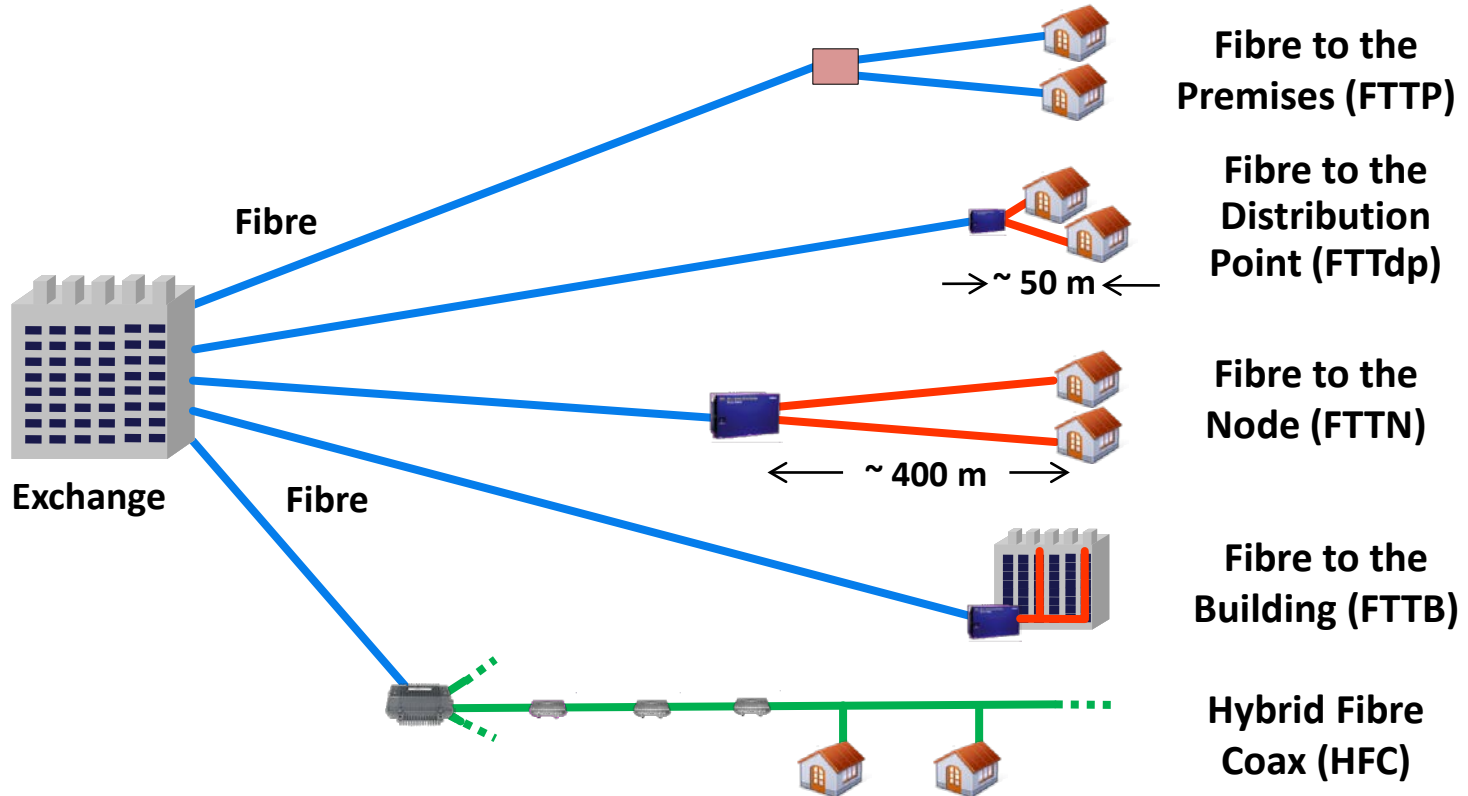


# FTTN

- Will be obsolete before it is rolled out
  - Yesterday's technology tomorrow
- Will contribute to the nation's decline in world broadband rankings
  - ~ 100<sup>th</sup> in the world by 2020
- Cost comparable to a full FTTP network
  - Complicated IT systems, costly repair of Telstra's copper network, multiple trades
- Difficult to upgrade to FTTP at a later date
  - Lack of competitive incentives, legislated monopoly

# State of the NBN

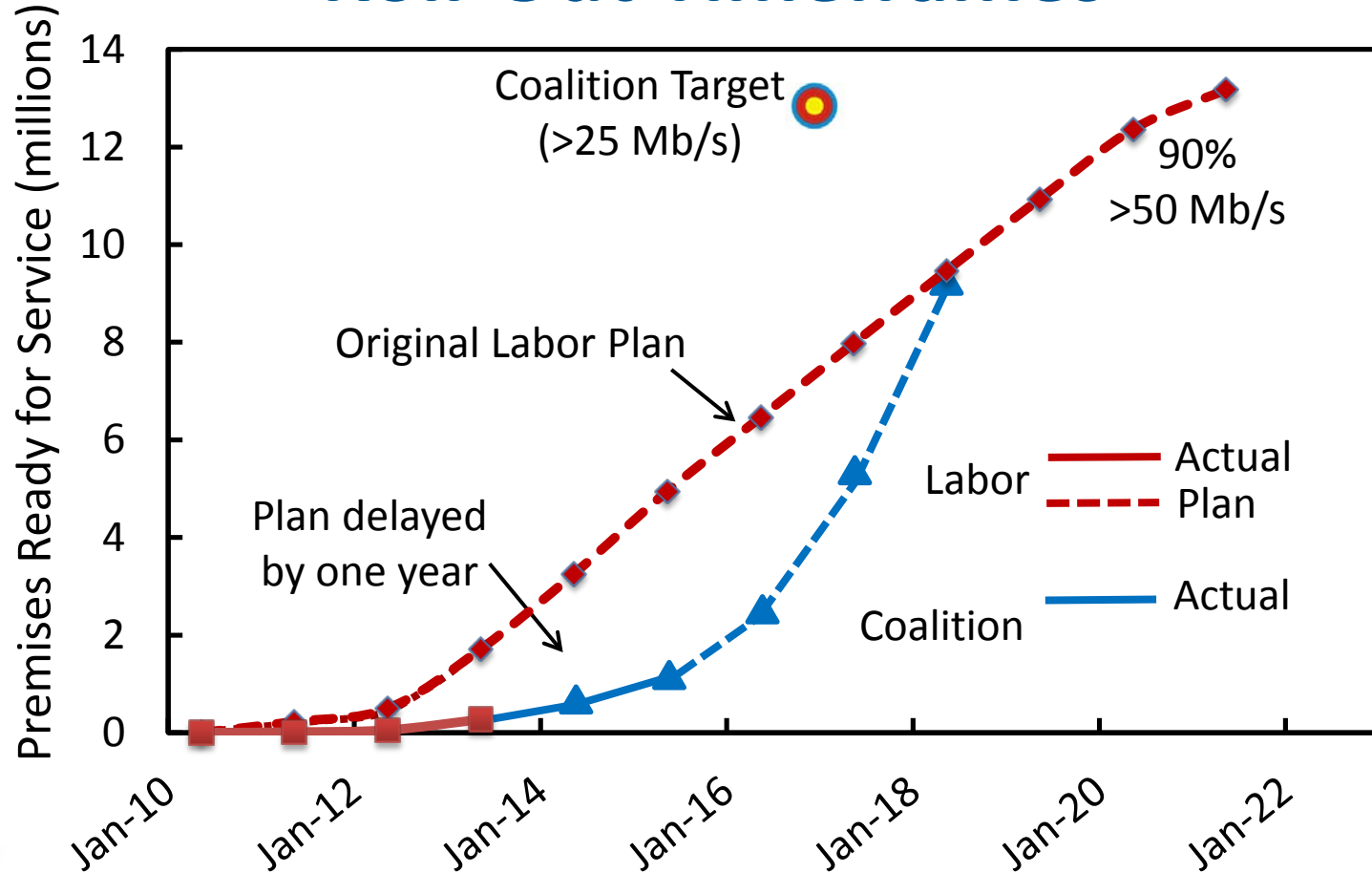
## Multi-Technology Mix



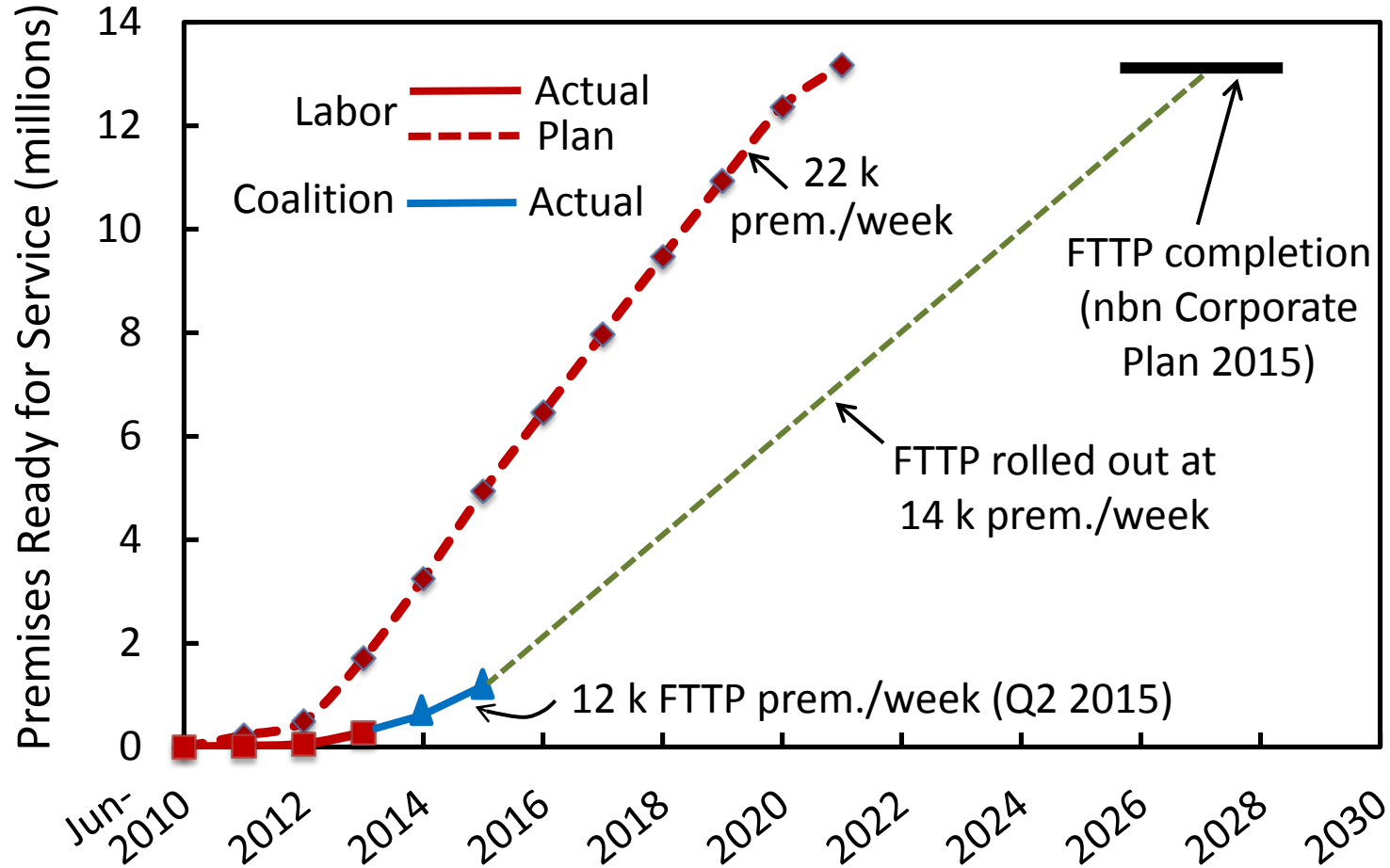
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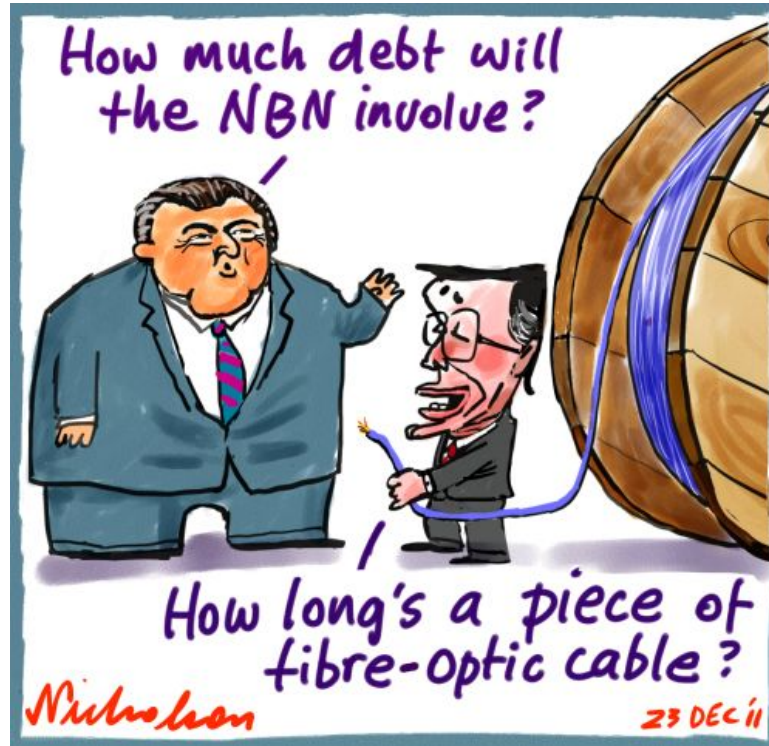
# Roll-Out Timeframes



# 2026-2028 for FTTP?

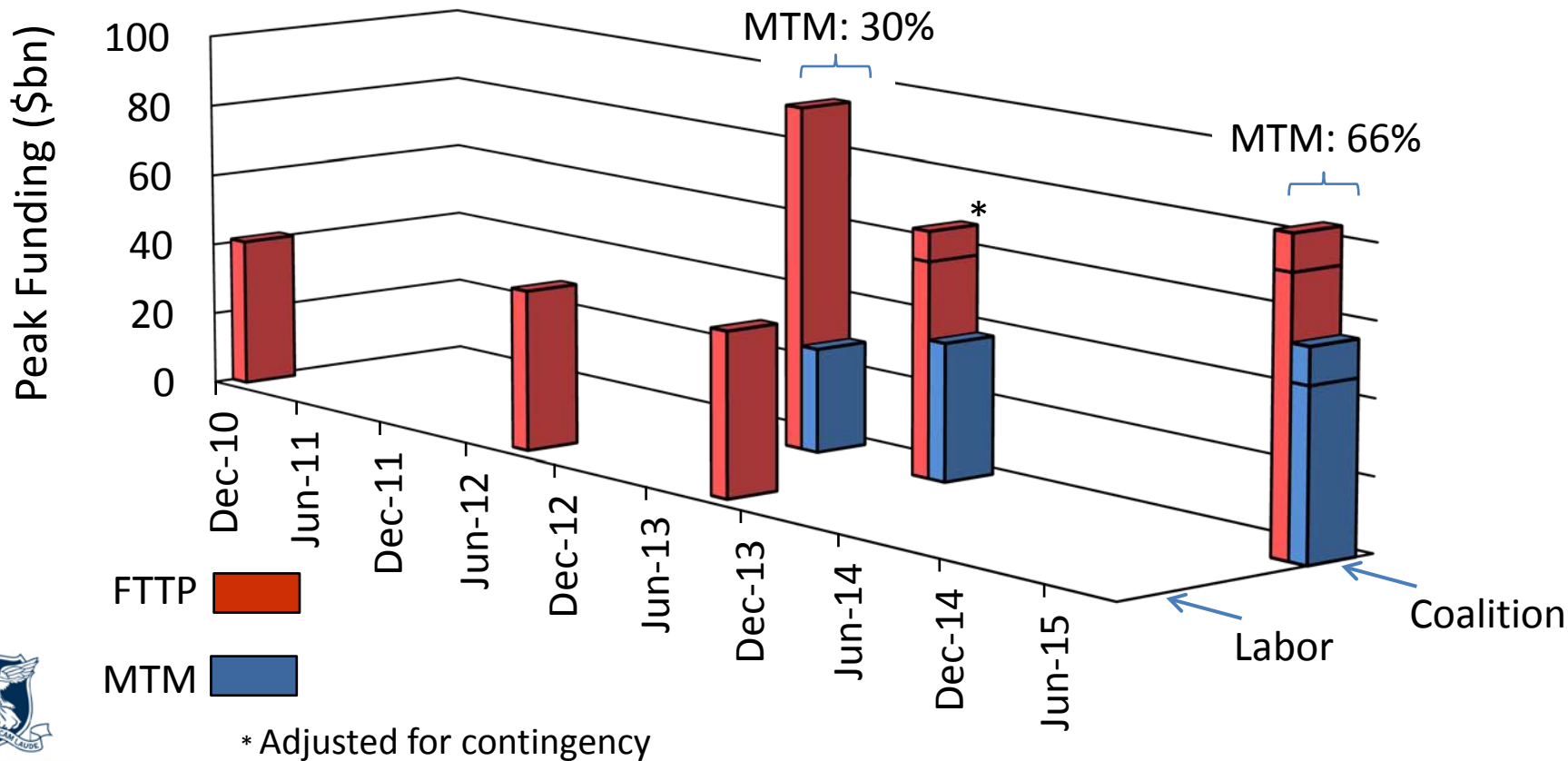


# NBN Cost



Source: [www.nicholsoncartoons.com.au](http://www.nicholsoncartoons.com.au)

# Peak Funding Estimates



# Is Australia moving into the 21<sup>st</sup> century?

- Slowly
- FTTN is bad for the NBN
- FTTN will exacerbate Australia's downward slide in world rankings
  - Possibly 100<sup>th</sup> in the world by 2020
  - Negative impact on national economy
- Upgrading to FTTP at a later date will be costly and slow
- *“fast, affordable, sooner”* → *“slow, costly, obsolete”*



# Finishing on a Positive Note

- Broadband will bring enormous benefits to the economy
- Both sides of politics support a National Broadband Network
- World-class broadband will eventually come to all Australians

