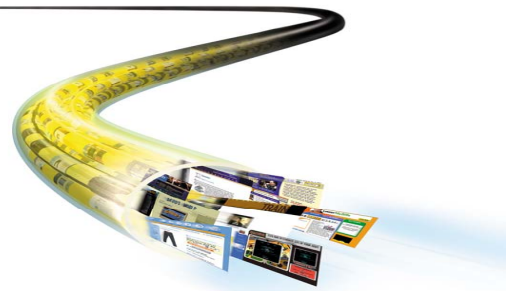


# ICT as a Utility for Education



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July 2009

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## Agenda

- Education Landscape
- Change Agenda ... and The Role of ICT
- Working Together

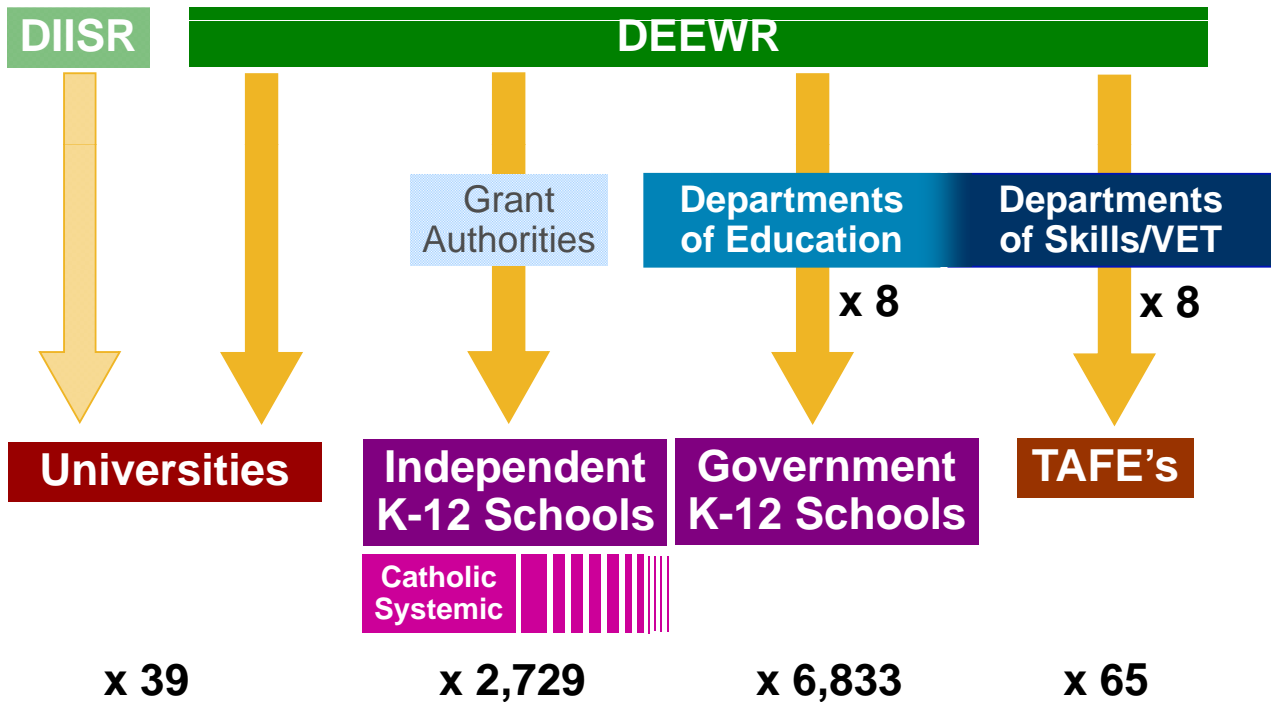
## Education Landscape



## Education Landscape in Australia

- Higher Education
  - Universities
- Vocational Education and Training (VET)
  - Colleges of Technical and Further Education (TAFE)
- Kindergarten to year 12 (K12)
  - Kindergarten
  - Primary School
  - High School
- Have been three largely independent sectors and largely unchanged for some time

# Education Funding



## Universities

- Varying mix of research and teaching business objectives
  - Compete regionally, nationally, internationally
- Notionally a single system, but actually quite diverse
  - Group of 8
  - Innovative Research Universities
  - Regional Universities
  - Australian Technology Network
- Key constituents
  - General Staff, Academic Staff, Students (under and post graduate)
- Typically large multi-building facilities; many multi-campus
- Extremely broad and demanding range of ICT needs
  - From classic administration ...
  - ... to computational and visualisation research

# Vocational Education and Training

- Very tight coupling to industries that consume students
- Nationally endorsed standards and qualifications
- Largely regionally focused, with little direct competition
- Key constituents
  - Administration, Educators, Students
- Typically large multi-building facilities; many multi-campus
- ICT needs
  - Alignment with industry requirements
  - Administration at both an individual TAFE and state level

## K12

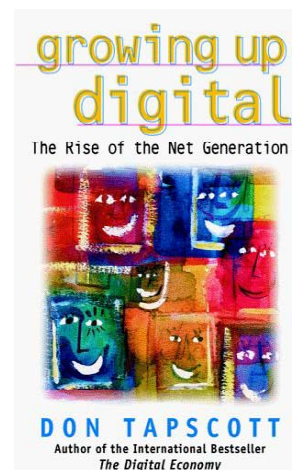
- Obvious split between state government and private (including Catholic) schooling options
  - Compete at a regional, almost suburb, level
- Key constituents
  - Teachers, Students, Parents
  - Very high focus on duty of care
- Multi-building facilities
  - State Departments of Education are very large organisations
- ICT needs are potentially quite demanding
  - Somewhat constrained by the lack of *real* broadband (coverage/cost)
  - Often variable and fragmented use of ICT – spread between Department (system) and individual schools

# Change Agenda



## Demographic Change – The Net Generations

- Successive generations growing up immersed in an ever increasing array of digital technologies
- Multi-modal experiences are commonplace
- These generations are the *input* to the education system

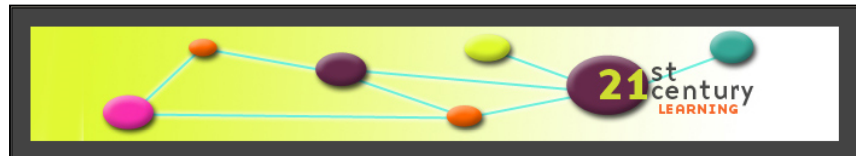


# Teaching and Learning are Changing

- 21<sup>st</sup> Century Teaching and Learning
- 21<sup>st</sup> Century Skills

21st Century Schools

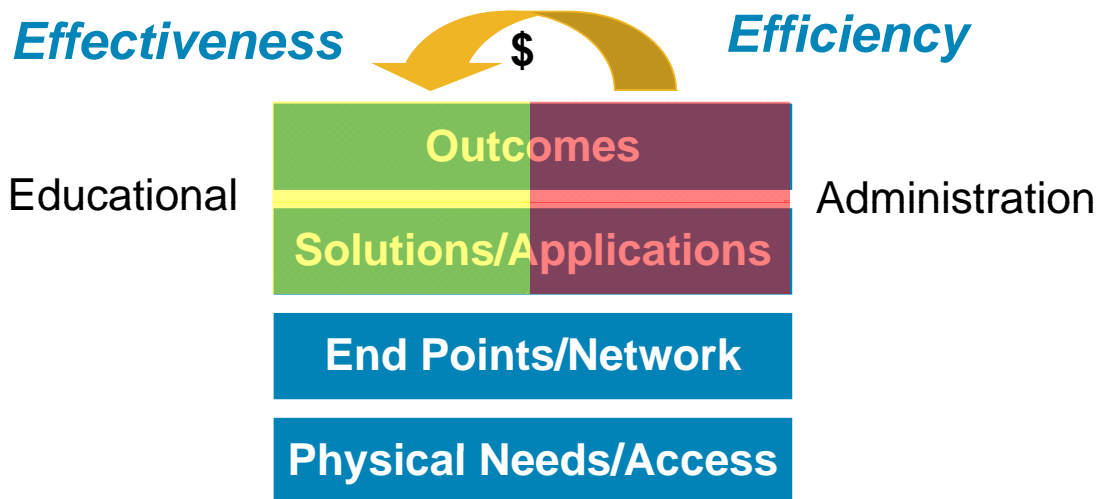
Creativity



## Policy Change

- Bradley review HE VET  
Student demand-driven model for tertiary education
- Digital Education Revolution K12  
Computers+On Costs, Fibre Connection to Schools  
Professional Development, National Curriculum
- Vocational Education Broadband Network VET  
1Gb Links for main campus of every TAFE
- National Broadband Network HE VET K12  
FTTH/FTTP for 90% of Australia
- TAFE Training Centres VET K12  
Collaboration/integration between K12 and VET
- Building the Education Revolution K12  
More Building than Education ...

# Very High Expectations of ICT in Education



- ICT provides a better, new, and/or converged way of doing things
- By being more **efficient**, ICT becomes a platform to support innovation and creativity, to deliver more **effective** teaching and learning outcomes

## Implementation and Support of ICT

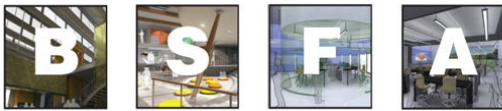
- The processes for reducing ICT complexity and improving ICT effectiveness are well understood\*



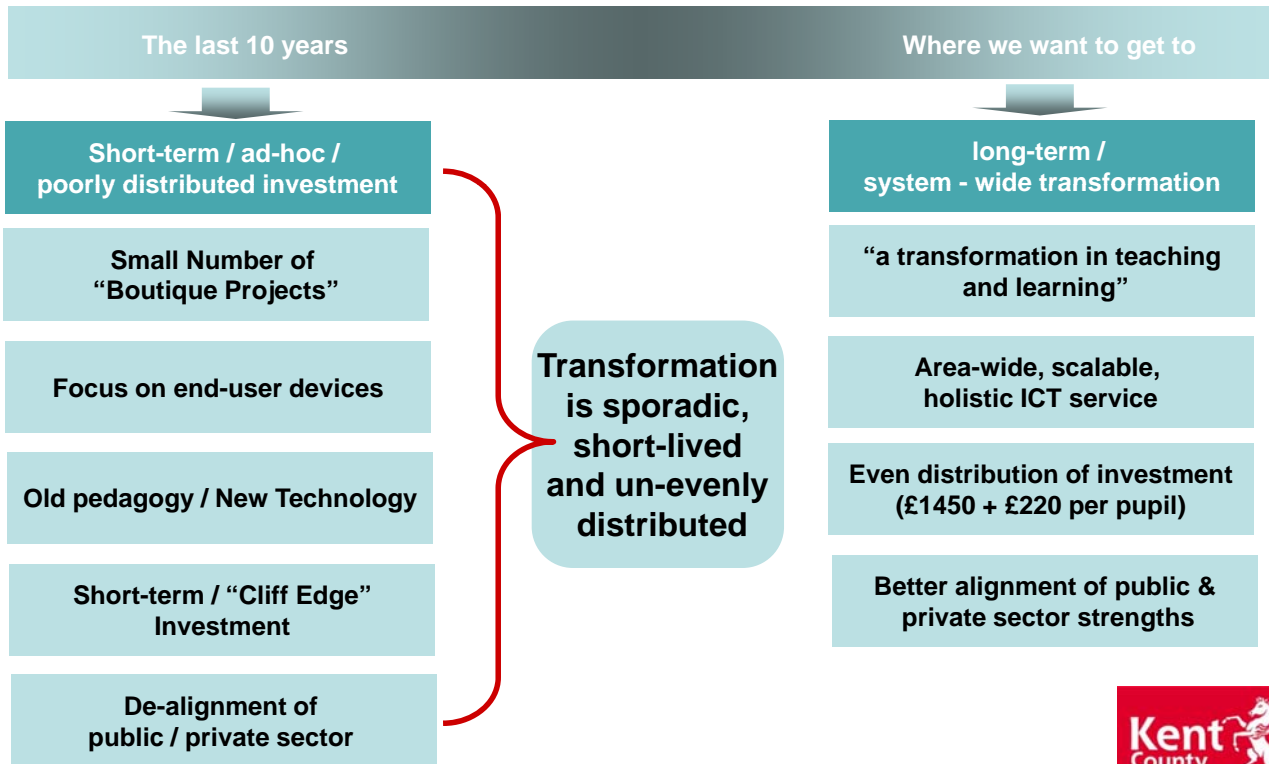
- Standardised architecture (templates, blueprints)
- Centralised/coordinated procurement (leverage volume)
- End-to-end management (outsourced or in-house)
- Shared services (consistent, uniform)



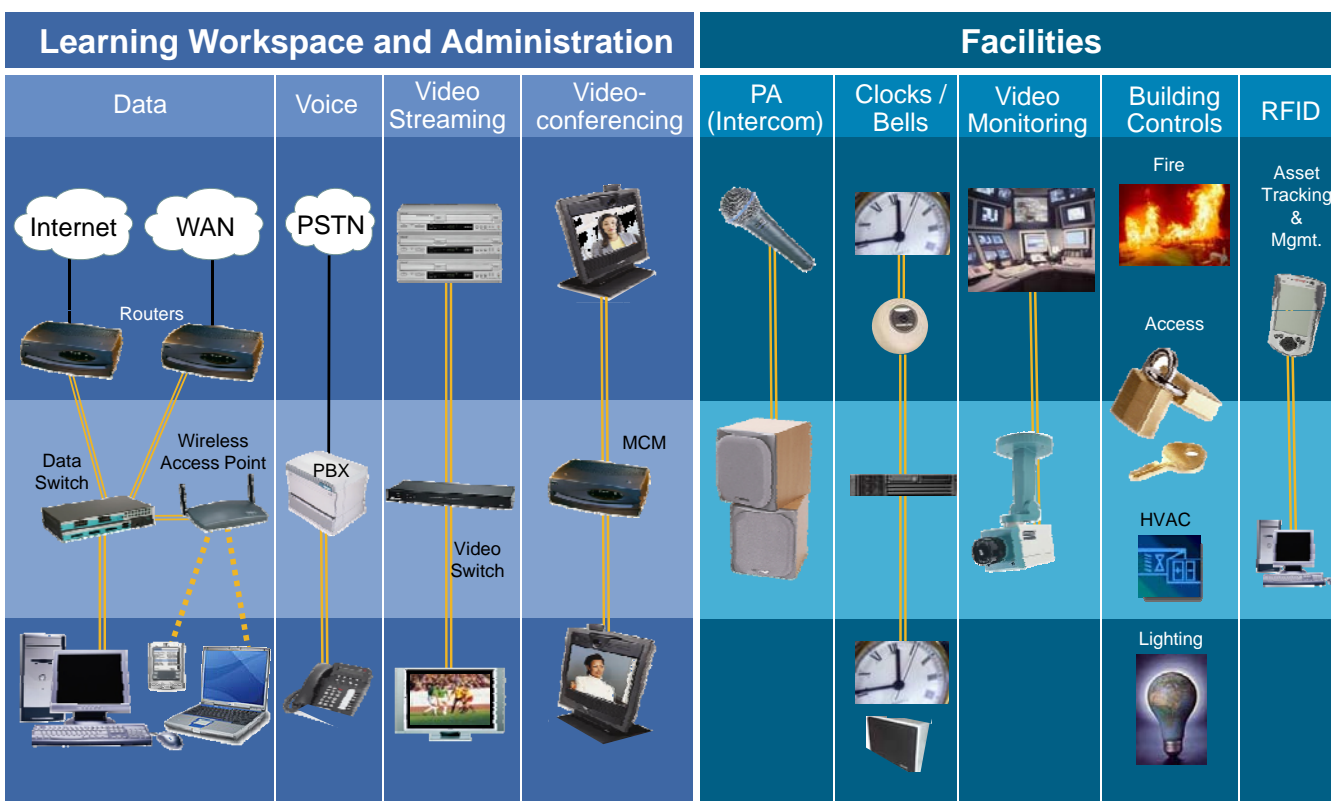
\*Within the bounds of governance and funding



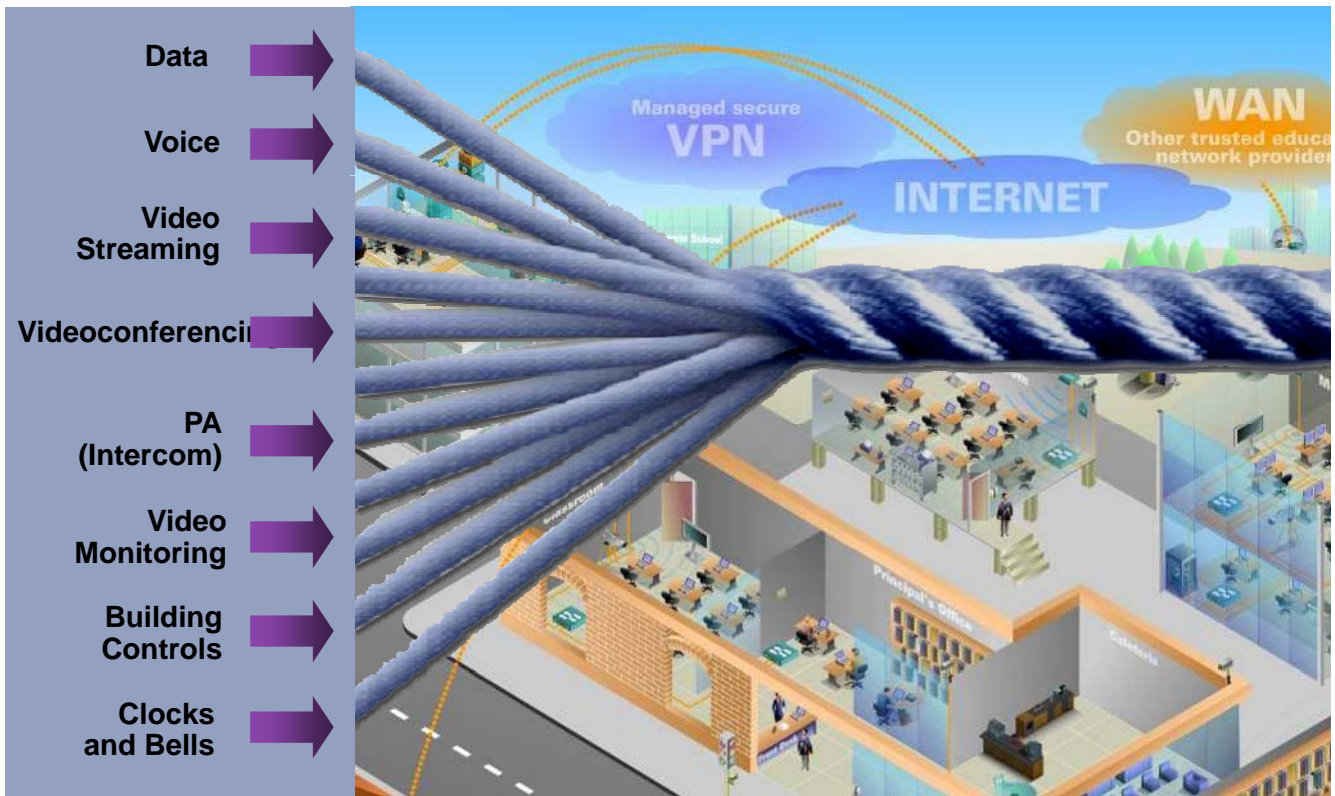
**THE BUSINESS CASE FOR ICT TRANSFORMATION**



**Applies Not Just to "Network" ... or "ICT" ... Think – Networked Infrastructure**



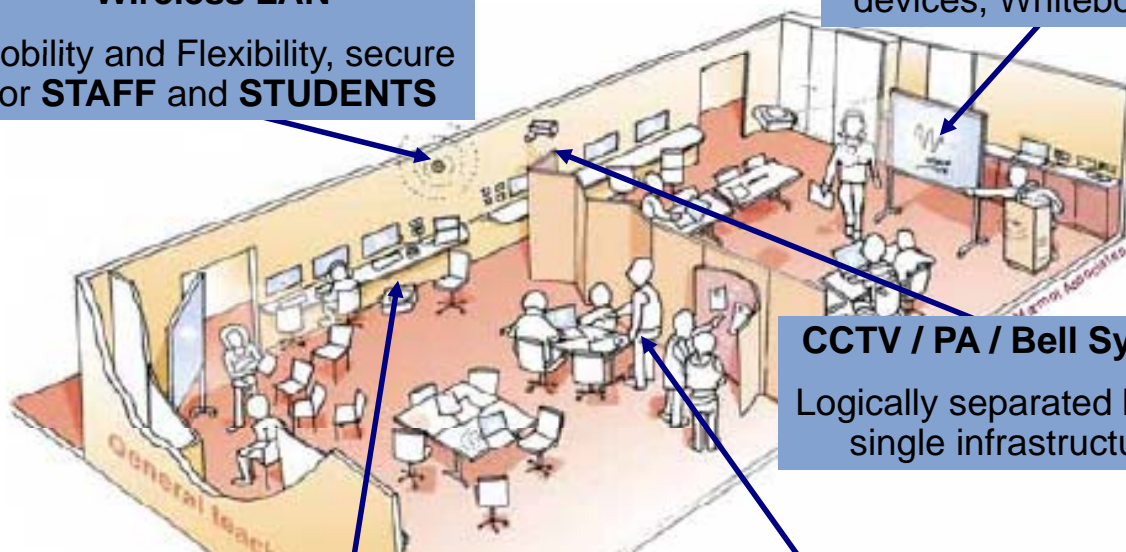
# IP Provides a Convergence Platform



## Spaces for Effective Learning

**Wireless LAN**  
 Mobility and Flexibility, secure for **STAFF** and **STUDENTS**

**Electronic Peripherals**  
 End user digital devices, Whiteboards



**CCTV / PA / Bell System**  
 Logically separated but on single infrastructure

**Wired LAN**  
 Ultra High throughput, inline **power** for phones, cameras, clocks, secure for **STAFF** and **STUDENTS**

**Collaboration**  
 Peer to peer and group voice/video/web applications for **STUDENTS** and **STAFF** (eg. PD)

# Teaching and Learning ICT Experience

- Consistent, reliable, dependable, affordable

Reusable skills, training

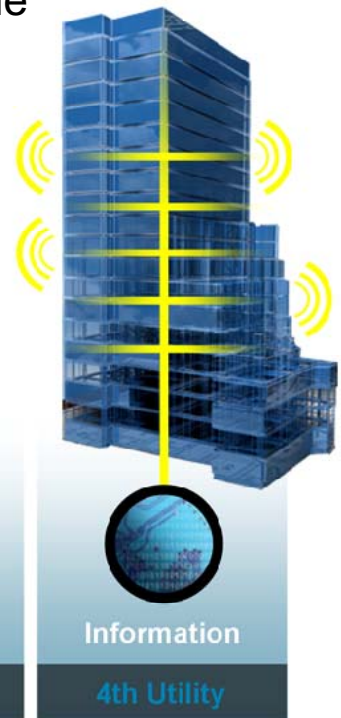
Builds confidence in ICT

Leverage economies of scale for support and operation over a common network

- Concept of common platforms

Support local innovation at all levels

Allows incremental deployment, development



Gas



Electricity



Water

Essential Utilities

Information

4th Utility

QuestNet 2009

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## Working Together



## Many Dimensions of Together ... ... in the context of ICT for better outcomes

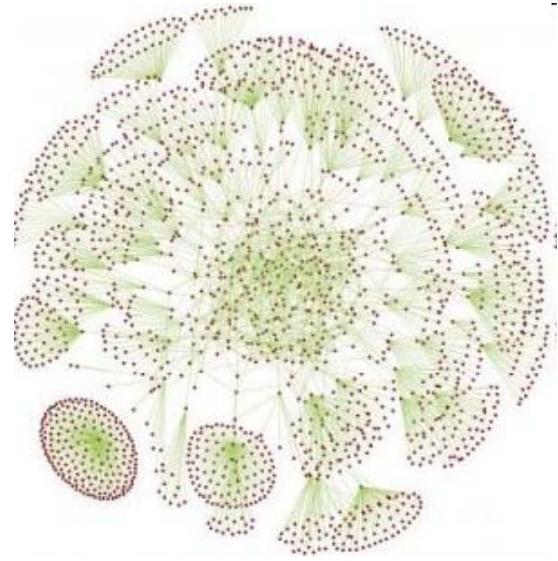
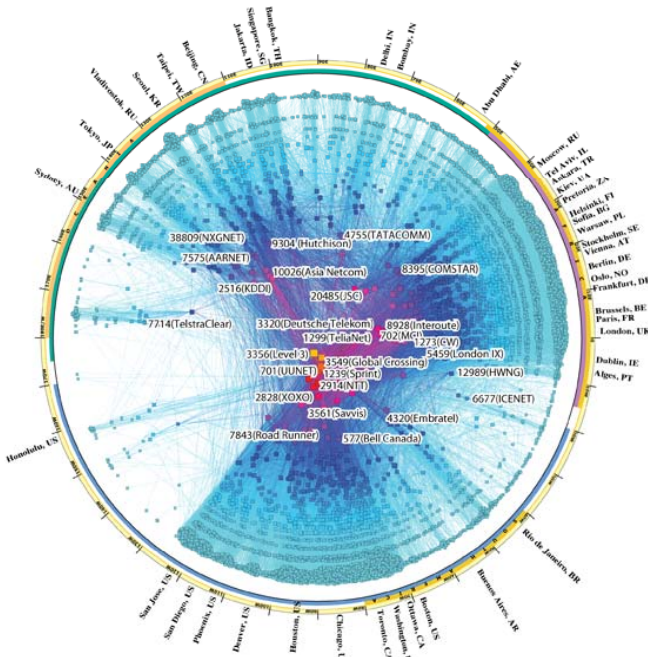
- Multiple “silos” within an institution (school, TAFE, uni)  
Teaching ICT, Learning ICT, Administration ICT  
Telephony, Video, Security, PA, building controls
- All institutions within a “system”  
Centralised and standardised ICT, eg. for all schools within a school system, or for all departments within a university  
Shared WAN network, eg. AARNet,
- Between Higher Education, VET, K12  
TTC’s, TAFE’s as “hubs” for schools, VIC Regeneration
- Education and Other adjacent sectors  
Research, Health
- Federal and State governments



## The Network is All About Access and Experiences

- Access to Content and Resources
  - Content
    - Digital stored documents, videos, learning elements (static)
    - Digital learning services (dynamic)
  - Resources (or connectivity)
    - People – collaborators, students, experts, specialists
    - Places – museums, galleries
- Experiences
  - Multi-modal – face to face, live video (HD, SD, Web), recorded video, live audio, recorded audio, IM ...
  - 1:machine, 1:1, 1:many, few:many, many:many, meshed ...
- It’s all on the ‘Net!! Or is it ?
  - It’s as simple as plugging in ... it’s cheap and you get all of this ...

# The Internet is Actually ...

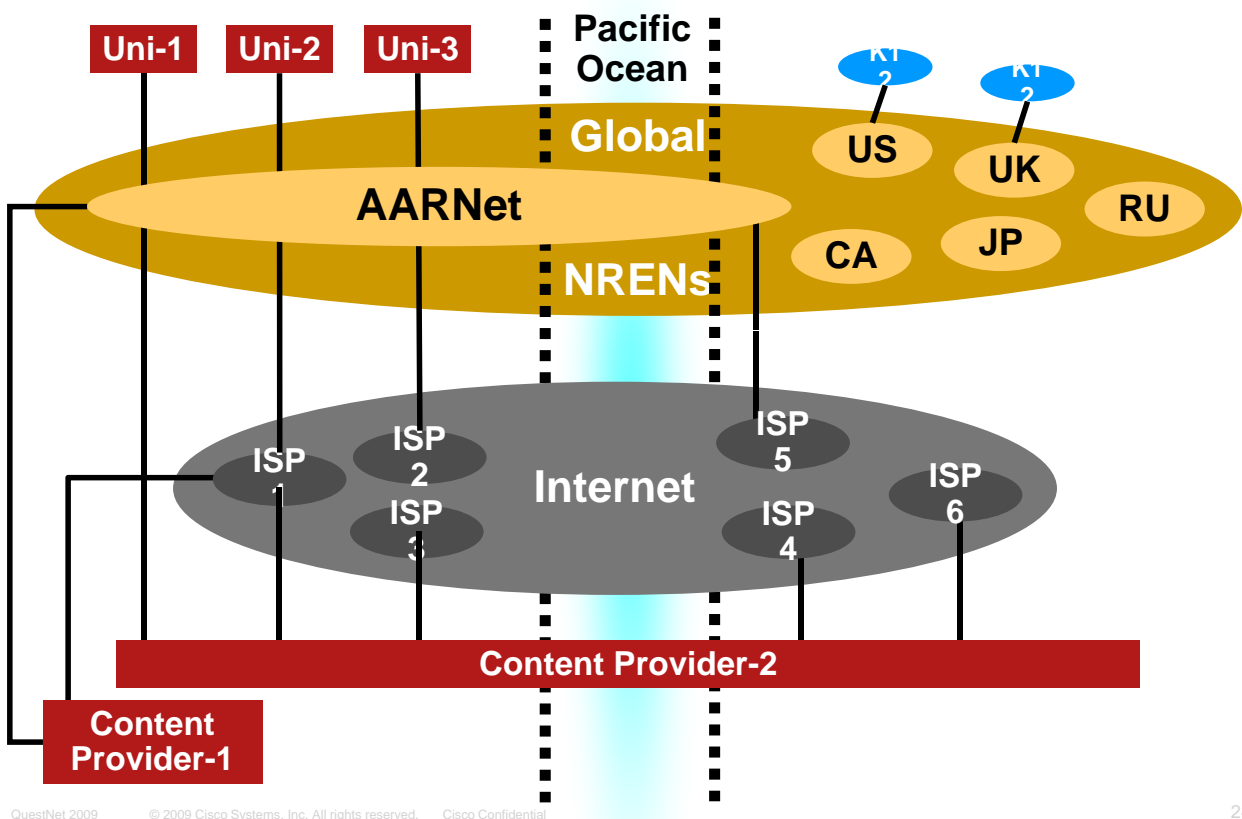


UC Dan Diego

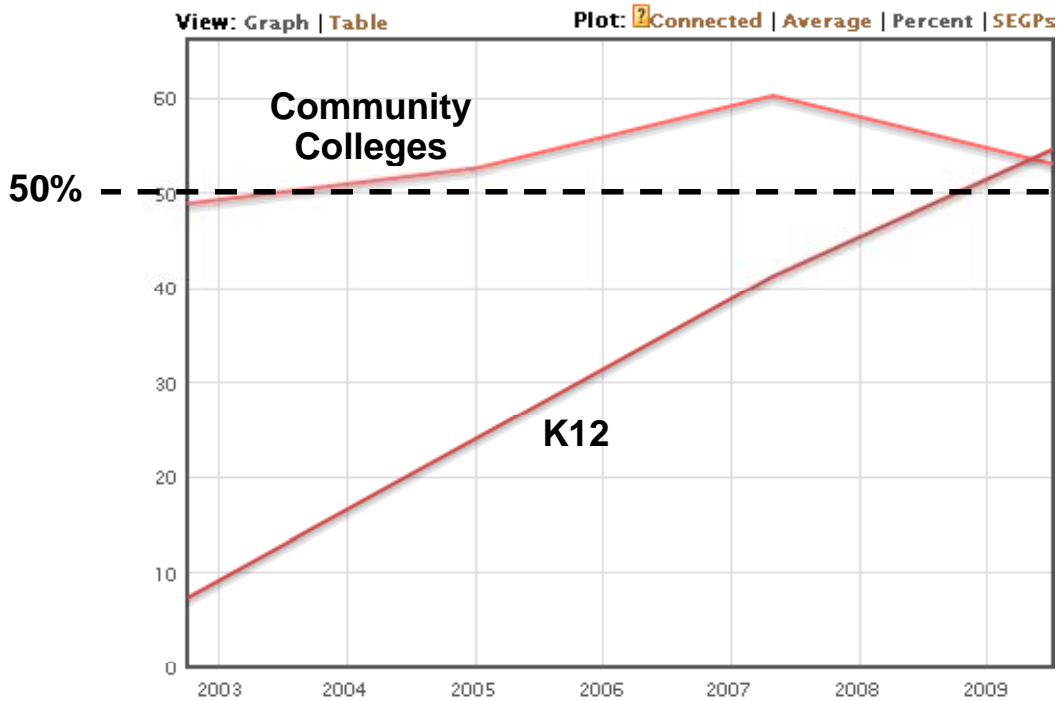
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## ... Complicated

# Higher Education Network Architecture

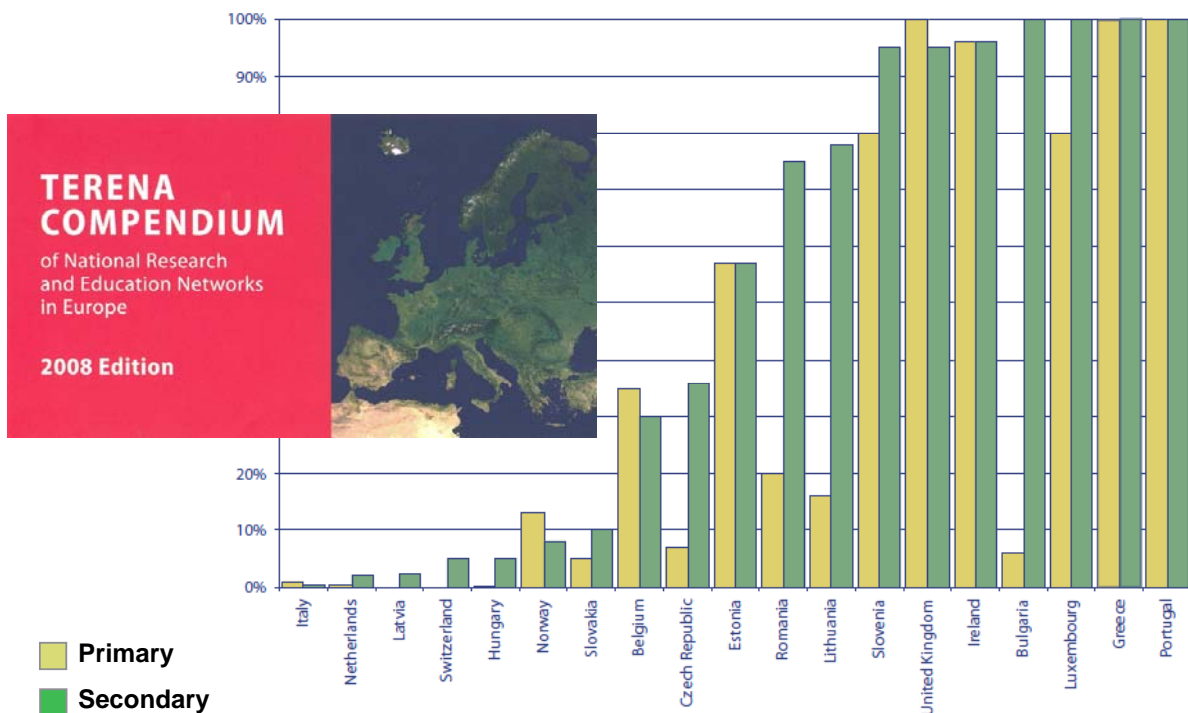


# K12 Schools and Community Colleges NREN Connected – US



<http://k20.internet2.edu/connectivity/data>

# K12 Schools NREN Connected – Europe



# TERENA Compendium 2008

- *Note that aside from the connection itself, the connection method and the type of services offered are also important.*
- *Thus, in the UK, schools are not connected directly to the NREN but via the regional broadband consortia or local authorities who use the NREN as their backbone. Schools receive a reduced set of services.*
- *In other countries, schools may be connected directly to the NREN backbone and may receive an extended set of services, tailored to the needs of schools.*

<http://www.terena.org/activities/compendium/2008/pdf/TERENA-Compendium-2008.pdf> (page 28)

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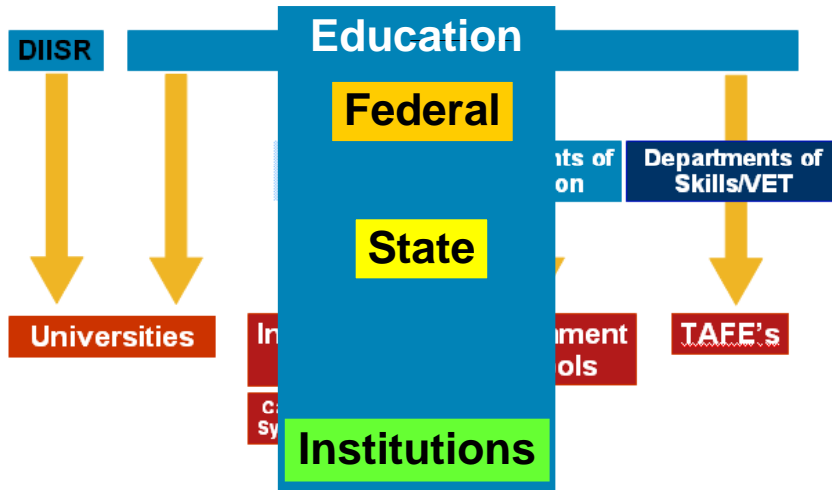
## Networking is NOT just The Internet

- Internal or Private Network
  - Interconnects all locations, campuses of a single organisation
  - Resources and services tailored to internal requirements
  - Particularly administration
- Typically more capable than commodity Internet – certainly provides MUCH greater **control** (security, content, QoS) and tighter **integration** with corporate IT systems
  - Not always true for a large WAN (eg. State DoEducation)

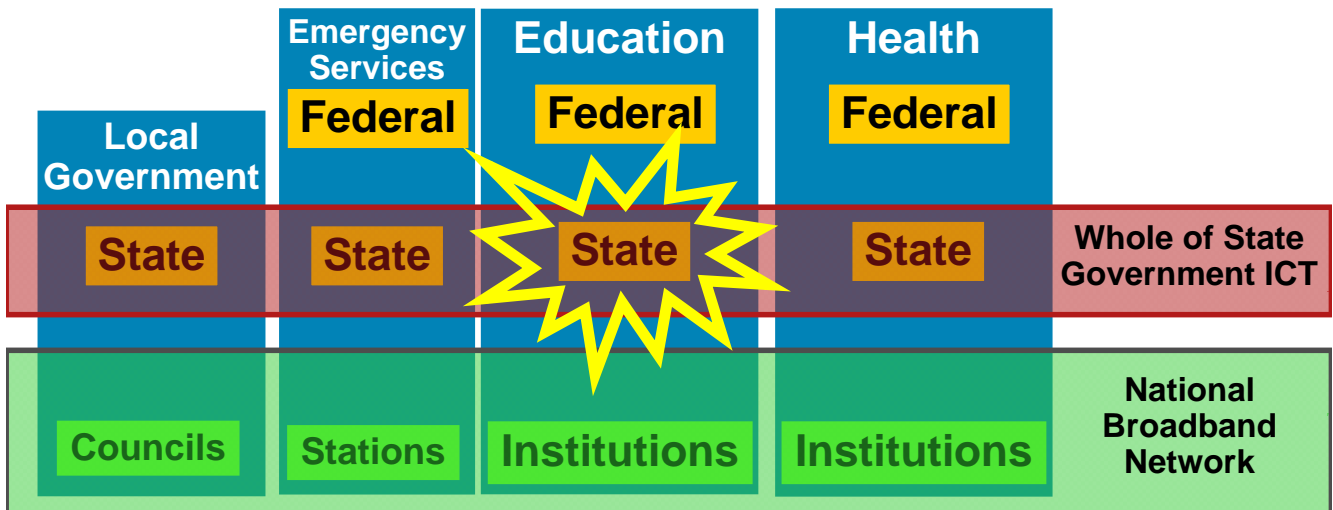
In a technology-rich learning environment for the next 5-7 years, SETDA recommends:

- An **external** Internet connection to the Internet Service Provider of at least 100 Mbps per 1,000 students/staff
- **Internal** wide area network connections from the district to each school and between schools of at least 1 Gbps per 1,000 students/staff

# Education: Adjacent Public Sectors



# Education: Adjacent Public Sectors



- Conflicting goals

Education (vertical) Outcomes vs. State/Department wide needs

## Closing



## In Closing (1/2)

- Although Education is not a single entity, all the entities that make up Education have some common challenges
  - 21<sup>st</sup> Century Teaching and Learning
  - An ICT-heavy policy agenda
  - The administration challenges of large, distributed, organisations
- An architectural approach to ICT across each education system can significantly improve ICT effectiveness and efficiency
  - Centralisation and standardisation
  - Integration of functions that are not “obviously” ICT
  - ICT should be a utility and not a organisational differentiator
- The dispersed nature of Education means that networks, both human and ICT, are critical enablers
  - Building and maintaining organisations, PD environments, community
  - Access to content and resources,
  - Experiences

## In Closing (2/2)

- Telecommunications (networking) in Australia is going through a period of profound change
  - Very little about the future is clear
- At the same time, there are many networking/ICT initiatives “in play” across the Education sector
  - The good news is that the technology is (relatively) trivial 😊
  - Working through the politics, and aligning the potentially conflicting objectives of the many stakeholders is harder
- So ...
  - Seek clarity regarding the “business problem we are trying to solve”
  - Align technology to stakeholder objectives
  - Maximise the Potential** of the funding available
  - Do No Damage**

