



TV Convergence Project *A work in progress*

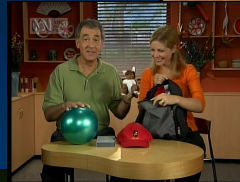
Roy Meuronen
QUESTnet 2005

Introduction

- How we reticulate TV now
- How we plan on doing it better
- The story so far...
- There will be no rocket science, but acronyms are unavoidable

Why Reticulate TV?

- Language Labs
- Student Accommodation
- Libraries
- Arts
- Music



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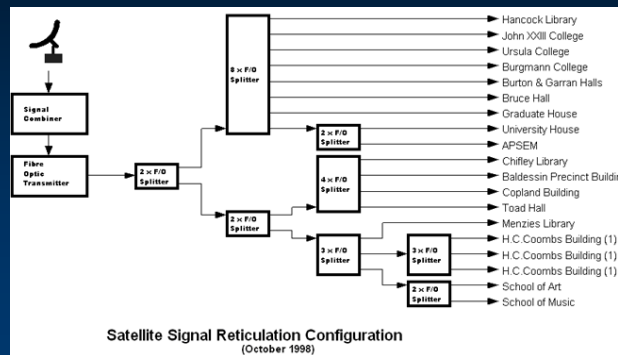
Existing Infrastructure

- Satellite dishes
- DVB-S set top boxes
- Analogue combiner
- Analogue fibre transmitter
- Splitters
- Media converter
- TV



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Existing Infrastructure

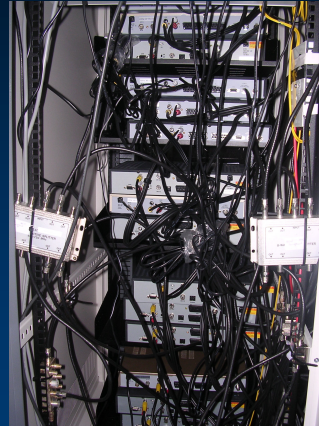


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Existing Infrastructure



Existing Infrastructure



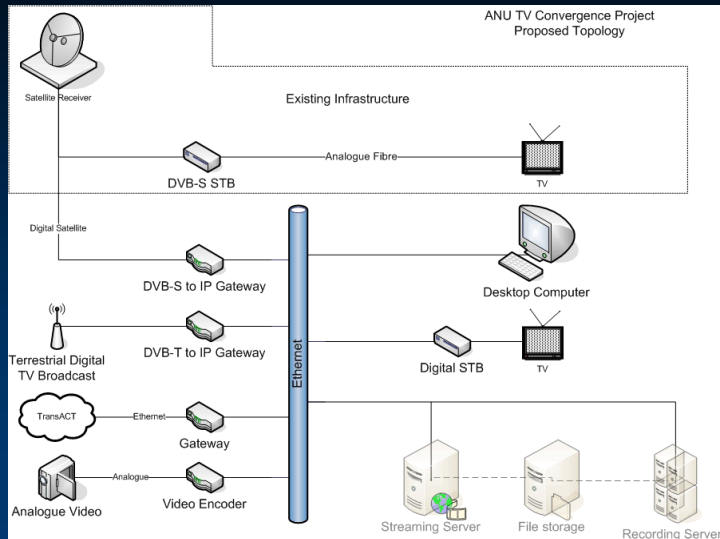
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Core Concepts

- Use existing infrastructure
 - IP network goes everywhere
- Keep it digital
 - No encoding, decoding
- Multicast
 - Maximum one copy of a stream on any link
- Content
 - Maximise access to available content

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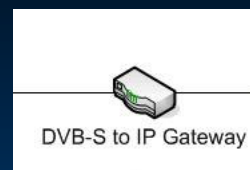
Topology



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Satellite to IP gateways

- History
- Hardware
- Video streaming
- Limitations



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History

- Evo I
 - PC - Windows 2000 - Vic / Vat
 - TV Tuner card plugged into RF side of existing network
 - Dodgy
- Evo II
 - How many tuner cards to fit into a rack mount server?
 - DIY architecture
 - Overtaken by off the shelf technology
- Evo III
 - DVB-S to IP gateway

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DVB-S Hardware



- Anevia Flamingo 200S
 - DVB-S to IP Gateway
 - 2 DVB-S in
 - 3 100Mbps out
 - Management by web interface
 - First in Australia

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DVB-S Video streams

- **MPEG in** (TV/Radio)
- Multiple channels per tuner
- Automatic de-multiplex
- Assign multicast address to channel
- Can stream to multiple interfaces
- **MPEG out**

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DVB-S Configuration

QuickStream - DVB Settings

Main Page

DVB Settings

Configuration

Logs

DVBS CARD 1 (bottom)

Transponder settings	
Freq.:	3920 MHz
Signal:	87
Bit Error Rate:	25856
Symbol Rate:	26850 kHz
Pol.:	V
FEC:	7/8

Lnb settings	
Freq. Band :	c
Offset 1:	5750 MHz
Offset 2:	
Threshold:	
Inversion:	on

Other	
Timeout:	disabled

DELETE

DVBS CARD 2(top)

Transponder settings	
Freq.:	4000 MHz
Signal:	89
Bit Error Rate:	56832
Symbol Rate:	28124 kHz
Pol.:	V
FEC:	3/4

Lnb settings	
Freq. Band :	c
Offset 1:	5150 MHz
Offset 2:	
Threshold:	
Inversion:	on

Other	
Timeout:	disabled

DELETE

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DVB-S Configuration

QuickStream - Main page

bitrate : 31.5 Mbps

Sources					Destinations				
type	name	id	CA	slot	IP	port	tth	intf	action
tv	14 ESPNplus	14	scrambled	dvbs_card1		1234	2	lan1	start
tv	20 STAR SPORTS ASIA	20	scrambled	dvbs_card1	239.224.1.14	1234	2	lan1	stop
tv	220 ESS CONTRIBUTION	220	scrambled	dvbs_card1		1234	2	lan1	start
tv	222 ESPN CHINA	222	scrambled	dvbs_card1		1234	2	lan1	start
tv	224 ESS CONTRIBUTION2	224	scrambled	dvbs_card1		1234	2	lan1	start
tv	226 ESS CONTRIBUTION3	226	scrambled	dvbs_card1		1234	2	lan1	start
unknown	65534	65534	unknown	dvbs_card1		1234	2	lan1	start
radio	DW1	6	clear	dvbs_card2	239.224.1.9	1234	2	lan1	stop
radio	DW2	7	clear	dvbs_card2		1234	2	lan1	start

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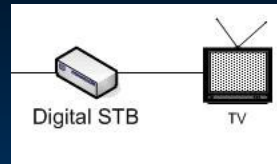
DVB-S Limitations

- One bouquet per tuner
 - Your mileage may vary
- Output limited to 3 x 100Mbps
- Encrypted channels

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Set top boxes

- Hardware
- Configuration
- Limitations



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STB Hardware

- Amino 110S
 - IP to TV gateway
 - Linux based
 - MPEG1/MPEG2
 - Up to 8Mbps
 - Browser
 - MP3
 - VOD



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STB Configuration

- NDA
- On screen
- Telnet
- Firmware upgrades
 - Multicast data carousel
- Inbuilt browser
 - Amino HTML and JavaScript extensions
- Channel selection

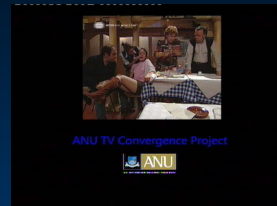
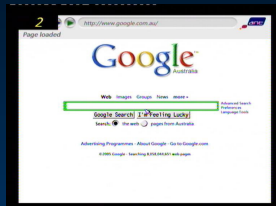
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STB Limitations

- MPEG1 and MPEG2 video
- 8Mbps
- *New model does 10Mbps and MPEG4/H264*

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STB Display Capabilities



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TV to the desktop

- Client software
 - VLC - www.videolan.org
 - Mac/Linux/Win
 - Free
- Directory service
 - SAP server?
 - Web based?



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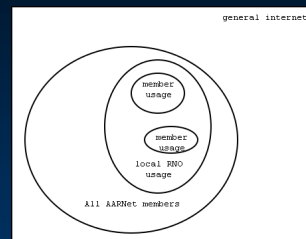
Multicast issues

- Scope
- Addressing
- Traffic levels
- Performance

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Multicast Scope/Addressing

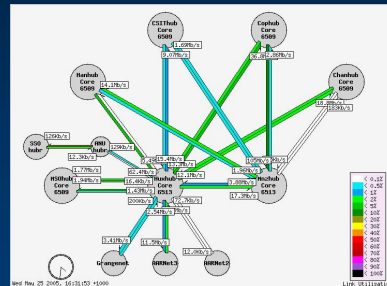
- On campus
 - Selected areas
- Administratively scoped addresses
 - Restrict multicast to on campus
 - Local peering?
 - RNO addressing model
 - Access list recipe from AARNET
- GLOP addressing for Internet content



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Multicast Traffic Issues

- TV streams 4Mbps - 10Mbps
- Radio streams 100Kbs - 250Kbs
- QoS
- Network capacity
 - 1Gbs - 100Mbps
- Supervisor modules
 - Multicast routing in software
 - CPU impact



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Non-technical issues

- Broadcasting Act
- What channels to distribute?
- Who gets access?
 - Environmental issues in labs
- Economics

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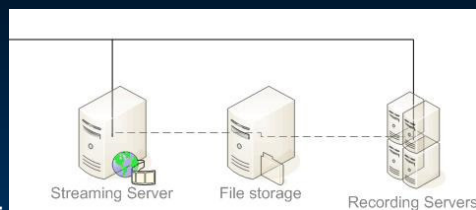
Other sources of content

- Terrestrial digital television - local FTA
- TransACT
- Network sourced multicast content
- Local content - ANUTV?
- Community television
- Peering with neighbouring institutions?

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Looking to the future

- Recording
- Archival
- Video on Demand
- Transcode to MPEG4



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Who else is doing this?

- University of Canberra
 - Language labs streaming/recording
- Parliament House
 - Proceedings to the desktop
- TransACT
 - Full on broadband TV
- Uni of Wisconsin - DATN



References

- www.videolan.org
- www.anevia.com
- www.aminocom.com
- www.aarnet.edu.au/engineering/networkdesign/multicast/adminscope.html
- www.lyngsat.com
- datn.wisc.edu



End



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