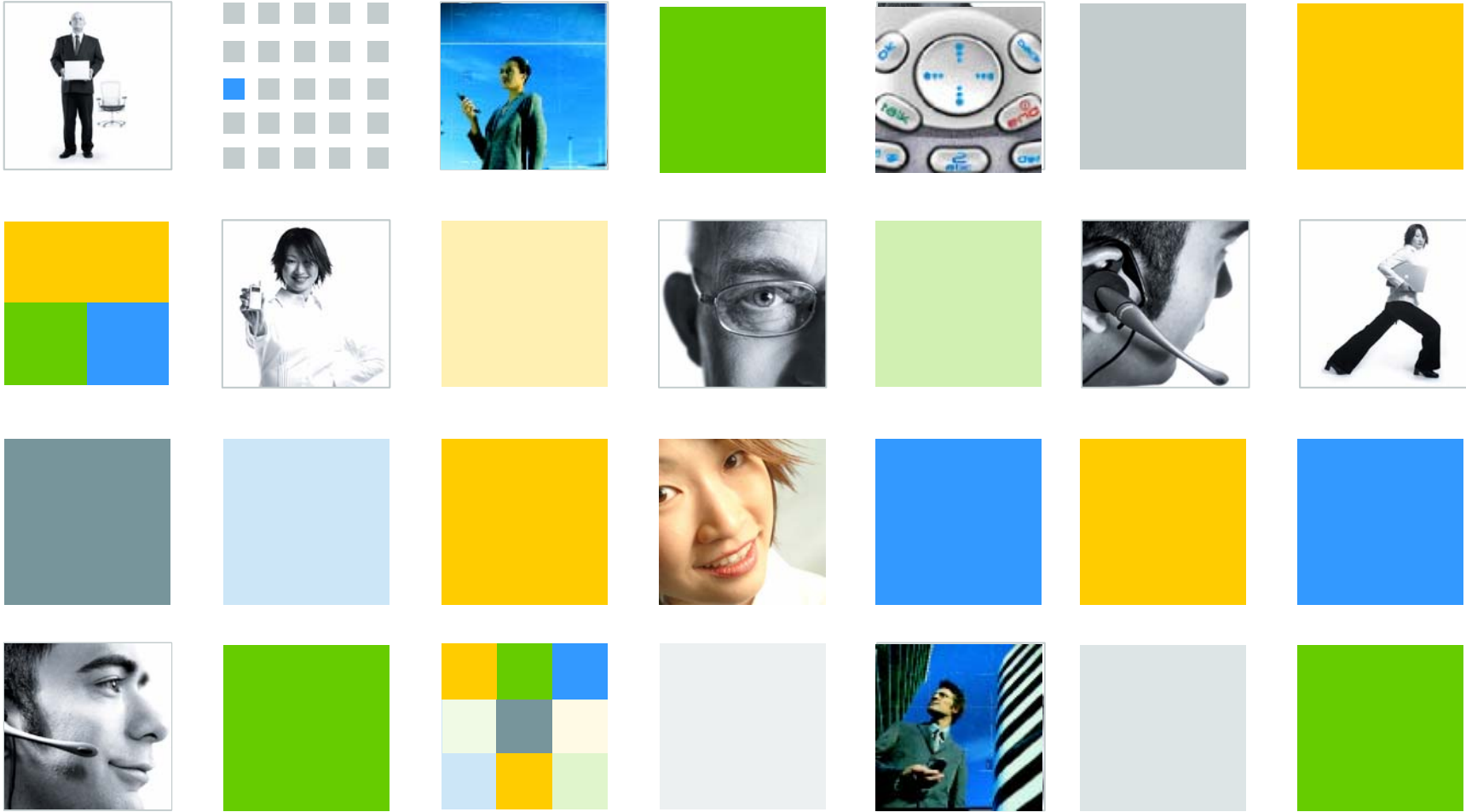


Commerce Commission Conference on UBS



Telecom New Zealand
4 July 2005



Summary of Key Points

- The copper cable, DSLAM and ATM aggregation are parts of a complex shared resource
- The fair management of copper cable spectrum requires an explicit trade-off between reach and bit rate
- The fair allocation and distribution of shared resources in the DSLAM and ATM aggregation for all broadband users requires defined service parameters (cf. unconstrained)
- Consistent comparative reporting can only be achieved with constrained services
- Turning interleaving off does not appear to offer considerable service benefits relative to the risks of negative service impacts, but Telecom has an open mind and like any prudent operator, recommends testing before releasing such a capability for commercial service.
- Similar levels of innovation can be achieved with constrained and unconstrained downstream services.

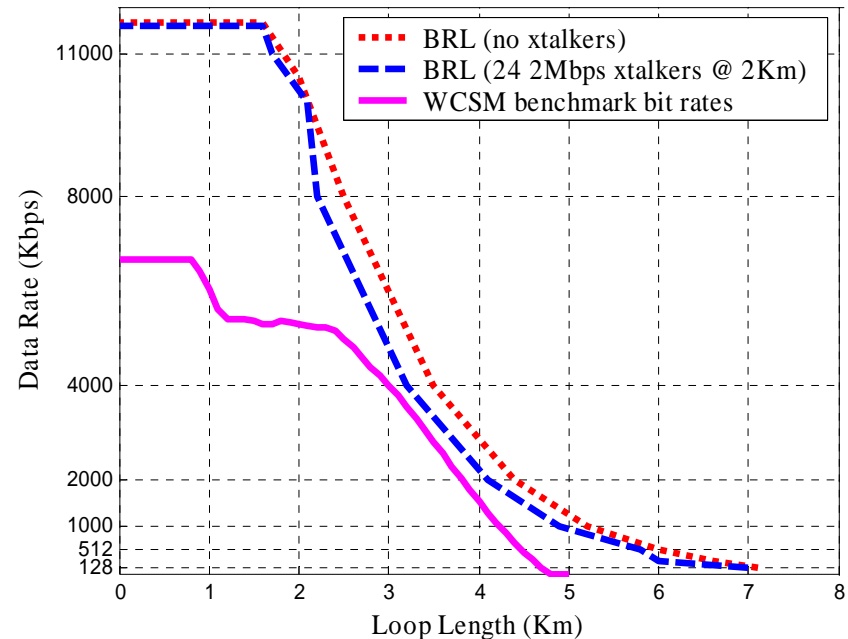
Downstream Peak Information Rate Trade-offs

	1Mbps	3Mbps	5Mbps	Unconstrained (>256k, <8M)
Addressable Market	>90% of lines	Approx. 75% of lines	<50% of lines	Approx. 80% of lines
Reach (0.4mm copper)	Up to 5.0km	Up to 3.6km	Up to 3.0km	Up to 4.0km (1Mbps)
Current Equipment Constraints	Available on all DSLAMs	Unavailable on 25% of Conklins	Unavailable on Conklins	Unavailable on Conklins
Rel. Cost	Low	Medium	High	Higher
Fairness-cable - aggregation	Good Good	Good Good	Moderate Good	Poor Poor
Consistent Reporting	Yes	Yes	Yes	No
Innovation	Medium	High	High	High
Better than Com. UBS	No	Yes	Yes	Yes
Operational Complexity	Low	Low	Medium	High

Dr Lee Garth's Annex on Copper Spectrum Management

Dr Lee Garth is a world recognised expert in the field of copper spectrum management and has performed research in this field over several years. He has demonstrated that:

- Analytical approaches can be used to optimise the use of the shared cable resource to the maximum benefit of all users in terms of both reach and efficiency.
- There are two primary approaches to copper spectrum management:
 - Strategy A: Worst Case Spectral Mask (WCSM)
 - Strategy B: Bit Rate Limiting (BRL)
- The use of constrained bit streams (BRL) enables the greatest reach to be achieved for all users while still enabling high bit rates to be achieved for some users.



Fairness and Dimensioning for Unconstrained Downstream

