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From Scarcity to Abundance – Pricing

Legacy pricing structures based on scarce transmission capacity are no longer appropriate and will slow the development of the Knowledge Economy.

Traditionally, bandwidth has been a scarce commodity. Pricing reflected distance (with costs proportional to distance), duration (minutes) and time-of-day (busy-hour peaks). But bandwidth is no longer scarce. Optical fibre and DWDM (dense wave division multiplexing) have changed the economics of transmission. In the mid 1980s one Telstra fibre strand between Sydney and Melbourne could carry 0.565 Gbp/s. Today the same fibre pair carries 40 Gbp/s and could easily be upgraded 320Gbps or more.

Internationally, the Southern Cross Cable between Sydney and the USA has about 75 Gbp/s active out of 240Gbp/s equipped capacity and a design potential of 640Gbp/s.

Yet, while transmission capacity is now abundant, it is massively underutilised. This is holding back emerging e-business and the development of a knowledge based economy. For example, the post production (film) industry really needs short-period, large capacity pricing. Bandwidth could revolutionise this industry. The supply is there but effective demand is not. Why?

Narrowing the Gap

Until recently, the weakest link in the broadband supply chain was the loop. But, this will change rapidly. The next impediment is bandwidth pricing.

Retail broadband plans offer “all-you-can-eat” subject to monthly caps or “slo-mo” (throttling speed) on downloads. The marginal cost to, say, Telstra of 1Mbyte of traffic (most of which is sourced overseas) is 0.5 cents but the marginal price to retail customers is 15 cents/Mbyte.[1]

Most owners of transmission capacity are reluctant to make cheap capacity available, especially in large amounts, because it may be resold and so undermine their own retail revenues and profit margins. Only those owners/operators which have no retail business are more willing to sell raw capacity.

However, greater capacity can be profitably supplied by all capacity owners pricing down the demand curve (ie according to willingness-to-pay). This would enable users with large volume requirements to get more affordable access to bandwidth without compromising existing revenues. The trick is to avoid arbitrage across customer classes or applications (ie resale).

Session Pricing

With the migration of traditional networks and services to IP, a byte is a byte is a byte. The bytes carrying voice and video are the same. Right?

Wrong. At the “session layer” [2] where most retail services are provided, a service provider can identify not only what type of content is carried but also how it is to be handled [3]. There are five dimensions to content: audio, video, data, image and text. With four dimensions in handling: interactive, retrieval, distribution and messaging, we get a matrix of twenty flow types. For example, voice is audio/interactive.

This still leaves considerable flexibility in how service providers price these session types. The point is that pricing should be more sophisticated than the pricing per byte or pricing per bits/s that is usually the case now. Apart from extracting consumer surplus (and increasing output and asset utilisation), the marginal costs of each session type are very different and this needs to be taken more into account in pricing than it is now.

A Paradox?

Some might expect that as communications goes simply to bits, pricing would follow the simplicity that we have enjoyed with our internet usage to-date. Not so. If prices are driven to the lowest common denominator, future networks will not be built. There is no such thing as a free byte, let alone a free lunch!

Note that we have addressed only the session-layer. More sophisticated pricing approaches can and should be applied at other layers too. The difference between your kid downloading movies (video/retrieval) and Animal Logic (which is famous for the visual effects it adds to movies) is in security and reliability attributes which may be priced at the “transport layer”. Value added should be captured at the appropriate layer.

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[1] “Download Charging – Right or Wrong” in Exchange, 11 June 2004

[2] I am indebted to Jude de Silva for these insights.

[3] This could be provided in session initiation or by the TPDU within IP packets. Only two of the four TCP transport classes are currently used providing more scope for this taxonomy of traffic.