Telecommunications Act Review: Options Paper: Response

> "We must welcome the future, remembering that soon it will be the past; and we must respect the past; remembering that once it was all that was humanly possible." —George Santayana

Introduction

The Telecommunications Act (TA) Review Options Paper is another exciting step on the path from a State-owned natural and legislative single-service vertically integrated utility monopoly toward a much richer telecommunications ecosystem with a minimum of stable regulation consistent with encouraging the desired outcomes. Standard regulatory best practice.

The requirement for sector specific legislation is slowly being whittled away as telecommunications becomes just another service, freed of its exceptional features, no longer considered desirable or necessary to operate in the isolation of its own idiosyncratic Act.

The shift toward Part 4 of the Commerce Act (CA) 1986 (**Part 4**) is timely and appropriate and reflects to a degree the FCC's shift of Internet transit to Title II from the misapplied Information Service exception which Internet transit superficially resembles. It is to be hoped that the taxonomy of telecommunications will eventually move beyond the its provenance in state postal services and be recognised for the bidirectional multiple service delivery system that it is.

Rather than respond to the paper directly I'd like to step back and survey where it fits in the progression described above, describe how telecommunications might be visualised in a way to aid analysis of its features, and from that illustration perhaps argue for greater clarity in the goals and steps to be taken toward the outcomes ringingly described in the paper.

I'd like to consider two ways to cut the Gordian Knot of regulating the telecommunications sector. First, to divide it into layers, and then separate the past from the future, copper and fibre.

Both these ways can be combined in a matrix of components of the problem and I set the out in the **Framework** section below..

Background

> "...regulating a field of enterprise the dominant characteristic of which was the rapid pace of its unfolding" United States Supreme Court NBC. v. U. S., (1943)

A quick summary of the areas of change in telecommunications is presented in Table 1:

	Was	**Is becoming**
Ownership	State	Decentralised
Structure	Vertically integrated	Layered
Signalling	Analogue	Digital
Product	Dialtone	Too numerous to count
Price	Expensive	Cheap
Topology	Centralised	Distributed
Regulation	Fiat	Competition
Innovation	Slow	Rapid
Bearer	Free-space, copper	Free-space, fibre
Network Protocols	Myriad	Ethernet, TCP/IP
Performance	Slow	Ultra-High Speed

Table 1

The New Zealand government has struggled with the telecommunications sector for around 25 years[1], attempting to move it to a dynamic, contested environment that performs its critical function in a 21st century nation.

The problem is large and the time to solve it short. It is appropriate to consider dissecting the problem to determine if there are component solutions that might lead to a less fraught and costly solution

Breaking apart the problem has a good record in improving understanding and the functional and operational separations that have been applied to the legacy incumbent have facilitated changes in attitude, performance and focus.

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[1] "When Will They Ever Learn" Reg Hammond - InternetNZ Policy Contractor
https://2014.internetnz.net.nz/news/blog/2013/When-Will-They-Ever-Learn

Framework

Layers

The most significant of these changes has been the development of technology facilitating a layered architecture in networking. It is a structure that is most resistant to obstruction by incumbents, the range of their control over the stack being limited.

Another important benefit of the layering model is illustrating the benefit of decoupling layers that move at different speeds:

Civilization
doesn't move all at the same speed

FASHION

COMMERCE

INFRASTRUCTURE

GOVERNANCE

CULTURE
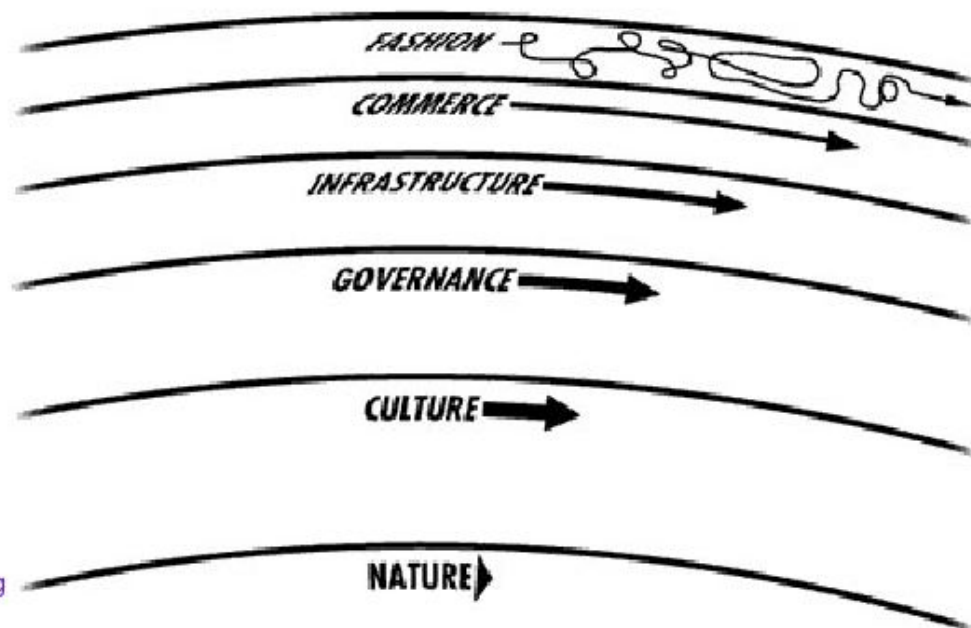
Source:
longnow.org

NATURE

25 July, 2002, OSCon   Infrastructure   29
2

Figure 1

This slide illustrates how civilisation can be described as a number of layers which form a stack and move at different speeds, sliding over one another with one hopes, minimal friction and disruption .

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[2] "Infrastructure: Why geeks build it, why Hollywood doesn't understand it, how business can take advantage of it." http://conferences.oreillynet.com/presentations/os2002/doc/index.html

The diagram appeals in that it clearly locates each participant within the stack and helps them recognise their location and responsibilities.

Layered models have long history in network analysis reaching back to the late '70s. In 1984 the OSI Model was published.[3] Due to the many networking technologies being experimented with and deployed at this time, the layered model was extensive, complex and comprehensive. Over time the number of technologies has converged on one or two, simplifying the layer model while not diluting its analytical strength.

The layered model was not always as useful or appropriate as it has become. Initially many services were inseparable from the bearer. For example when telephony was an electrical analogue of an audio signal and the supplier controlled all elements of that service it was a single-player game. When digitisation allow audio to be a string of bits, and everything that could be represented as a string of bits could be carried, the first layer separation had occurred.

There is no field of activity that has changed as comprehensively or rapidly as ICT, and consequently no other field of endeavour has remained immune to those changes. While there are unfortunate results, the general view is that the outcomes have been nett positive and that more improvements await us.

Once any digitisable service could be carried over any bearer upon which bitstream service could be imposed, many more opportunities arose, not all to the benefit of the bearer operator.

It may be that vertical integration would continue to serve the legacy bearer, however the abundance that arises from the diversity of uses of infrastructure cannot be allowed to be limited to that the operator can capture the value of.

The number and functions of layers can be debated, but a simple model is sufficient:

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[3] https://en.wikipedia.org/wiki/OSI_model

Fashion	**Application**	Protocol					Protocol
Commerce (Active)	**Transit**		Routing			Routing	
	Connection			Transmission	Transmission		
Infrastructure (Passive)	**Bearer**				Free space, Copper, Fibre		

Table 2

Bearer is what carries the signal. Next up is **Connection** where the signal is imposed on the bearer. This arrangement covers a single span. **Transit** offers to deliver packets to all cooperating networks with which it has a relationship. Then there is **Application** which is analogous to Fashion, subject to the fastest and most idiosyncratic variation.

Any layer that encourages competition is unregulated, any layer that is infrastructure (cf. platform), will have Common Carrier obligations and entitlements.

Each layer supplies to the layer above and is discouraged from entering that layer as a supplier.

The Bearer must be impartial and provide common carriage under reasonable and non-discriminatory terms.

Copper Past & Fibre Future

The other way to separate the problem is along the medium line. Setting aside free-space, it is pretty clear that copper represents Chorus, the past and the Telecommunications Act model of regulation and fibre is the future.

It therefore seems inappropriate to transition a decaying bearer to the new model of regulation. The Telecommunications Act and all the work that has been done in its name to bring us to the current pricing model should not be abandoned. The Act should be amended

to reflect the sunsetting of copper and permit its release from regulation as fibre matches its footprint.

Discussion

My suggestion is to separate the problem in two dimensions, as described in the framework above; functional layers and bearers, copper and fibre:

Bearer	Copper	Fibre
Layer		
Retail	ISP/CA[4]	RSP/CA
Active	ISP unbundlers Chorus/TA[5]	RSP/CA Active Wholesale LFC/CA
Passive	Chorus/TA	LFC/Part 4[6] [Anchor Products]

Table 3

Anchor Products

As in other areas regulated under Part 4, it is clear that it relates to access to the passive infrastructure; electricity *transmission*, gas *pipelines* and airport *services* but not to the electricity or gas carried. Thus in the telecommunications sector, the anchor product should be at the passive layer, the bearer foundation.

Copper is an historical artifact and should be sunset under the legislation that has managed it for so long. It would be nice to have a consistent model, and BBM would apply to copper, but it is too late. Copper doesn't have the lifespan that would justify the effort of migration at this stage. It will simply complicate the new model. Copper needs to be isolated from fibre as much as possible.

In the green fields of UFB fibre, it would be best to start as we mean to go on and that is with open access to the foundational utility, fibre.

Given the effort and resources expended in unbundling copper, it is unfortunate that circumstances led to LFCs being required to provide active bitstream services, and the establishment of anchor products at the active layer only bakes in the problem. It may be argued that the architecture selected for UFB by the LFCs in negotiation with CFH makes unbundling glass difficult, but it is not impossible. It may be argued that unbundling of

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[4] Regulated by Commerce Act
[5] Regulated by Telecommunications Act
[6] Regulated by Part 4 of the Commerce Act

copper was not eagerly adopted, none the less it had an effect in moderating the excesses of a monopolist in passive infrastructure.

One reason for selecting the active layer as the locus for anchor products is that it matches the current model, or that it provides for the opportunity for "technology-neutral anchor products." In the latter case the difficulties of regulation at the active layer (diversity, rate of change) particularly of a few anchor products, outweigh the benefits. At the passive layer there are only three options, and one of those is in decline. Anchor products at the passive layer are fibre, lambdas and copper. They are simple and easy to monitor. Anchor product conditions could also include coverage requirements that would incent expansion of the footprint.

The proposed active anchor products should be retained and regulated in the TA. Perhaps by reviewing the value of regulating a service that's now: "Add a Homeline to your plan for an extra $5 a month - Free National Calling." Dialtone[7] has been competed, human productivity maximised. People freed for new pursuits. And disruption yes, but nett we think it's worth it.

Regulated Asset Base

There should be only one. A single consistent Regulated Asset Base over fibre alone. The paper proposes a single Regulated Asset Base engulfing both the legacy copper and future fibre. In order to provide "sufficient flexibility built into the framework." Binding two disparate bearers into one unwieldy whole is unlikely to provide much in the way of flexibility, rather more likely, many ways to obfuscate. By giving the LFC incentives that align with the other LFCs, it will strengthen the independence of the new. The copper will naturally wither away and the legislation sunsets on some kind of bearer choice at any location. Youth will have its hour.[8]

Active Layer

Ideally, and originally in the UFB, there would be three layers, as per the diagramme. For pragmatic reasons, mostly the justified uncertainty about the active layer, UFB merged passive and active, bundling them.

But there is still interest in open access to the passive infrastructure and so there may be room for a mixed model, perhaps over time leading to a wholesale layer of specialist suppliers. The LFCs may wish to remain, but it seems likely that the skillsets required at the passive layer do not serve well at the active layer. There is also the risk that passive operators will be tempted to indulge in the higher and riskier returns of the active layer to the despite of the passive. BT Openreach is the unfortunate example of this neglect.[9]

[7] "Who Made That Dial Tone? - The New York Times." 2014. 1 Sep. 2016 <http://www.nytimes.com/2014/01/12/magazine/who-made-that-dial-tone.html>
[8] "536. Ode. Intimations of Immortality. William Wordsworth. The Oxford ..." 1 Sep. 2016 <http://www.bartleby.com/101/536.html>
[9] "UK telecoms review – is Openreach too hot to touch? - LSE Blogs." 2016. 31 Aug. 2016 <http://blogs.lse.ac.uk/mediapolicyproject/2016/02/25/uk-telecoms-review-is-openreach-too-hot-to-touch/>

Regulation

Many of the Government's aims would be better served by running a dual stack regulatory model during the transition. The transition covers many dimensions from copper to fibre, from the vertically integrated exceptionalism of the TA to a conventional utility BBM, all the changes described in Table 1, and more.

Thus copper would be sunset along with the TA itself, aligned with the availability of fibre. Fibre would be BBM and open access from the commencement of the Part 4 regulation. In line with the open access undertakings, 2020.

Regulating at the passive layer is a smaller and easier task. At the upper and faster moving layers, normal commercial competition can ensure both competition and innovation. The topical example of Stuff Fibre[10] illustrates the ease of entry (and possibly exit) to the RSP market.

Since the fibre footprint is the definition of availability (moderately extended by wireless) this should be the area where government investment and incentives might be targeted during an era of low demand and failing stimulus.

Conclusion

Reconsideration of the locus of the anchor products for regulation by Part 4 of the Commerce Act would have considerable benefits in minimising costs and complexity and providing appropriate incentives for expanding the fibre footprint, reducing prices of the anchor products while enhancing performance and facilitating competition and innovation to the benefit of the NZ consumer, inclusive social good and economy.

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[10] "Stuff Fibre a risk worth taking | Stuff.co.nz." 2016. 31 Aug. 2016
<http://www.stuff.co.nz/business/opinion-analysis/82908022/stuff-fibre-a-risk-worth-taking>