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Network Neutrality - Again

It strikes me as odd to see a developed and, by any reasonable standard, a prosperous economy getting into so much trouble with its public communications policy framework.

I'm sure that this comment could apply to many countries, including Australia with their political football called the National Broadband Network. But this time I'm referring to the United States of America and its rather strange on-again off-again regulatory dance with the concept of "Network Neutrality". Evidently, it's now about to be turned off again as the current chairman of the FCC, Ajit Pai, is setting up the US Federal Communications Commission (FCC) to repeal their earlier 2015 ruling, with what appears to be the enthusiastic support of the White House. In 2015, the FCC moved to apply many of the common carrier provisions of Title II of the Telecommunications Act to Internet Service Providers (ISPs). In particular, ISPs were unable to discriminate their services based on the content they were carrying. This ruled out earlier efforts by some ISPs to force some of the larger video streaming services to pay some form of access fee to carry their content. The 2015 measure intended, among other objectives, to put a stop to this crude extortion racket, and it was evidently greeted with popular support from Internet users. So why the current enthusiasm to repeal this act? What's going on?

Maybe we have to look back to the start of the last century to find some answers to this question.

Telephony as a Public Utility Service

In almost every country, except the United States, telephony was a service operated as a public utility.

The large-scale investments in telephone infrastructure were undertaken through public borrowing, underwritten by government-based bonds, and the operating principles of these services centred about the uniform provision of a consistent service to all subscribers without any form of discriminatory or predatory pricing.

The United States followed a different and somewhat unique path, thanks to the actions of Theodore Vail, with the financial backing of J. P. Morgan, a little over a century ago. Espousing the principle of "One System, One Policy, Universal Service" Vail, as the chairman of AT&T, went after the other private telephone service operators and either bought them out or squeezed them out, openly positioning AT&T as the last operator standing. Vail had created a national communications monopoly that stood alongside US Steel and Standard Oil as one of the emerging behemoths of the earlier days of the twentieth century.

In an adroit twist to the story, when the US Department of Justice invoked the Sherman Act, a broad anti-trust regulatory measure, in an investigation of AT&T's emerging position, Vail went to the government and agreed to be regulated! In the Kingsbury Commitment of 1913 Vail had AT&T abandon its telegraph service to Western Union, and committed AT&T to a rather singular public mission for a private corporate entity: to bring the wonder of the telephone to every American business and household at a price everyone could afford.

Congress evidently agreed to what was then, and now, a unique national experiment in a "public spirited monopoly". Vail's commitment encompassed a commitment to "common carriage" in the form of an undertaking to provide service to any customer willing to pay, charge fixed rates that are unrelated to any inherent value of the traffic that is carried, and carry this traffic without discrimination.

Why was this commitment to a common carrier role so essential?

Common Carriage and Public Service Utilities

Most countries take the generic position that the provision of infrastructure services to the public is a public function. In other words, it is the general responsibility of the instruments of government to construct and maintain services such as hospitals, schools, roads, railways, water, sewage, and telephony, and the role is generally undertaken by public utility corporate entities. These entities invest capital to construct the underlying infrastructure and operate the resultant service. They may structure themselves in ways very similar to privately owned corporate entities, but the essential difference is that these corporations are owned by government, its costs are typically underwritten by government, and operating profits, if any, are returned to government. The principles of operation are associated with the objective of benefit to all, in so far as the operations typically encompass structural cross subsidies to allow the same service to cost the same to every public consumer of the service, and the objective of the corporation is not primarily to benefit shareholders, but to operate the service to the benefit of the public. All aspects of an economy benefit from an efficient and ubiquitous public sector that constructs and maintains such common public services to the benefit of all. Or at least that's the conventional orthodoxy behind the operation of such public services by public entities.

Within the transport and communications sector, this public service function is expressed through the concept of "common carriage". At the heart of this concept is the observation that certain public services are so important to the public good that their provision places the service provider in a position of power over their customers. If this service is operated as a monopoly then the monopoly operator's inevitable abuse of this social power demands a restraining response that compels government to provide the service as a public good, namely in a non-discriminatory and universally accessible manner.

The postal service was a good example of this activity, where the social value of transporting pieces of paper between individuals was far greater than the value of moving the paper artefact - the value lay in the carriage of the information written on the paper, and in this value transaction the post office deliberately took no position. The envelope remained sealed on the letter's journey through the postal service and the charge levied by the post office to deliver the letter did not change, irrespective of the value of the information contained in the letter.

Now the big question, and in today's world it's a trillion-dollar question, is what activities should be considered as public sector activities? What activities encompass responsibilities to the public whose social value far exceeds the value of the provision of the actual service per se? To put it another way, what activities are so critical to the public that leaving their provision to an unregulated free market, with the vicissitudes of the day to day operation of such a market, the risks of cartels, monopolies and other forms of market abuse, is simply untenable? Over the past few centuries we've seen a number of activities as being placed within this public service sphere, include the provision of drinking water, health, education, finance, energy, transportation and communication.

Now this does not necessarily imply that these services are exclusively provided through public sector utility corporations, but there is a consistent form and motivation of the regulatory framework surrounding these activities that relate to the concept of public good. In other words, each of these activities plays a certain essential role in the workings of a national economy, and are regulated in a manner that reflects this critical dependence.

"Vail himself offers as apt a description as anyone of the common law orthodoxy: For the protection of the community, of individual life and health, there are some necessities that should be provided for all at the expense of all, such as roads, pure water, and sanitary systems for concentrated population, and reasonably comprehensive mail service. The determination between services that should be operated by the government and those which should be left to private enterprise under proper control should be governed by the degree of necessity to the community as a whole as distinct from personal or individual advantage."

Wu, Tim. *The Master Switch: The Rise and Fall of Information Empires* (pp. 57-58). Atlantic Books.

Now it may well be heresy to followers of Adam Smith, but I side with John Ralston Saul in observing that it is sheer folly to expect any privately-owned company to act wholeheartedly for the public good. Their over-riding mission is to act in the interests of their share-holders. This is often expressed as a responsibility to take actions that are intended to increase the value of their enterprise to the benefit of their share-holders above all other considerations. Obviously, the public good is not a deterministic factor in such decision making, and when these interests coincide it's a fortunate coincidence, but when corporate interests and public interest diverge, the corporate entity is bound to a duty to its share-holders to act in the interests of the corporation. It therefore should come as absolutely no surprise that the over the following century, the inevitable happened, and AT&T largely shed itself of the role of self-regulation to the public interest ideal that was described in the Kingsbury Commitment of 1913. The regulatory role with respect to the national telephone service was inevitably passed to government.

In many national regimes, this shift would imply a regulatory role that is largely bureaucratic, and the United States has its own communications bureaucratic instrument, namely the FCC. The United States also is a remarkably litigious society, and it also features an activist judicial system where bureaucratic decisions can be tested through the courts. The twist here lies in the overt politicisation of the bureaucracy. Each incoming President replaces the top layer of the management of the federal bureaucracy with folk who could be characterised as a motley collection of party hacks and sycophantic party donors. That situation implies that the judicial system is not just a mechanism to appeal a bureaucratic decision based on the perceived fairness under current laws and regulations, but a way to curb the enthusiasm of the political regime of the day to push the needle too far from the previous status quo. The obvious result is that communications policy in the United States is one that carries the burden of being overly susceptible to the excesses of political and judicial interference.

Which brings us circling closer to the issues surrounding net neutrality.

Network Neutrality

AT&T's national monopoly was broken up in the last quarter of the twentieth century. A successful anti-trust action carved out the local access network into nine regional fiefdoms (the so-called baby bells") who maintained their local monopolies for a limited period, and the long-distance carriage role was open up to competitive access. The regulatory framework surrounding these carriers was encompassed in what was to be Title II of the US Federal Communications Act.

However, deregulation of the telephone network was not only a reform of telephony. The incumbent and its successor nine "Baby Bell" mini-monopolies, had taken a position not dissimilar to the petrol engine industry, namely ensuring that alternative approaches to communications services were variously suppressed. While the goose was laying golden eggs, the incumbent cartel was totally disinterested in alternatives that could result in providing a cheaper egg, let alone experimenting with producing a different form of protein! Deregulation of the telephone industry directly assaulted the assumption that this was a conversation all about telephony. Deregulation of the industry heralded a wave of new

entrants that wanted to use the national communications network to allow computers to communicate, and provide public services based on this incredibly fertile marriage of computers and communications.

For example, in retrospect the fax, which such a useful business tool when it was introduced, was just insanely silly by the 1980's. We took a document that existed within a computer, printed it on paper, scanned it into a digital image, and sent an analogue encoding of this picture to a remote printer, which reassembled this analogue signal to a printed image, and if we really wanted the digital artefact and not just the paper image, we had to pass the result through an optical character recognition process to try and reconstruct the original document! In the light of all this, the rise of electronic mail was irresistible as soon as the industry had the regulatory freedom to experiment with non-telephone-based communication models.

Section 706 and the Internet

The world of the early 1990's was a world where the incumbent telephone operators were perceived as the reactionaries, and the regulators who oversaw the telephone service were thrown into the same disparaging bucket. If we wanted the Internet to emerge and not be swallowed up and killed by the telephone incumbents we needed to 'protect' the Internet. We needed to encourage entrepreneurs and venture capital forays. We needed the ability to proffer risky experiments into the public communications sector, and do so without hanging what was seen as a regulatory millstone around the neck of this Internet activity. The Internet was positioned as a "value added service" within the framework of the US Communications Act. Section 706 of the act was intended to promote private sector investment in Internet infrastructure and saw the prospect of economic return as incentive for infrastructure investment.

The intent was to allow, and even encourage, a so-called "virtuous circle" of investment and innovation in broadband infrastructure. This was intended to allow a diverse range of different investment models with similarly diverse range of possible retail offerings in broadband services without the imposition of regulated process, access services and without what many see as the "dead weight" of regulatory compliance that would stifle further innovation in access offerings. Section 706 presented a far less onerous set of constraints on providers than the common carrier option of Title II, but at the same time it has fewer protections relating to Network Neutrality and non-discriminatory practices. Indeed, one interpretation of Section 706 is that Internet access providers would be able to levy different charges to different content providers in exactly the manner that Title II is intended to prevent. The provision in Section 706 is for certain forms of quality of service within this contemplated framework, which is in effect a polite euphemism for describing the differential treatment of traffic. There is also wording in the section that is intended to identify and rule out some forms of discriminatory behaviors, and its unclear how this meshes with the ability of these carriers to also impose various service grades upon content flows within a differential service framework.

Within the overall objectives of carrier neutrality, this sanctioned ability for a carrier to exercise discretionary control over the delivery of certain content appears to be a concept that is diametrically opposed to that of an open, neutral and accessible Internet access infrastructure.

The thinking of the time was that in order to encourage private sector investment in this novel and exciting activity, we had no desire to load it down with the same regulatory leaden weights that we applied to the incumbent telephone operators. It appears that the thinking at the time was that we had no idea where and how this venture would lead us, but we were keen to find out. In this light, using a constraining regulatory framework was the completely wrong response from government.

But entrepreneurial involvement is largely opportunistic in nature, and opportunism has a short life cycle. Once larger actors express an interest, and redeploy their considerable capital and resources to also participate in this activity, then their sheer size and capability largely overshadows the smaller undercapitalised entrepreneurs. “Get Big or Get Out!” is the inevitable next step in the process. And this has been the case in the Internet, where the ensuing years has seen a predictable consolidation of this industry.

But consolidation also has expectations of stability in the emerging market. Applying this expectation to the Internet experience translates to the observation that after making all this investment in Internet access and carriage infrastructure, the carriage operators would be able to recoup the costs of this investment, together with a handsome bonus, by simply operating their service. As with telephony they had the expectation that technology would continue to drive down costs and a somewhat cosy cartel of carriers would keep retail prices unvaried. The result is an expectation of handsome profit in a bountiful future!

But the assumption that the service profile of the Internet would be constant was a deeply flawed assumption, as it turned out. Streaming video gained the ascendancy, and within the video world the rise of 4K video meant that these high-volume video streams were now impacting on the internal capacity of the carriage networks. Customers were paying the same amount for their Internet service, but in fact were pulling ever larger volumes of data through the network. If the network operator wanted to maintain a consistent level of carriage quality they were faced with the prospect of making further investment in network infrastructure capacity without a compensating increase in revenue. To make matters worse the video streamers started publishing their measurements of the quality of the carriage networks, adding to the pressure on the operators to keep pace with capacity to match escalating demand.

One possible resolution of this situation was to attempt to force the content providers who were generating these high-volume video streams to pay a premium to have their content passed through the carriage networks to customers. And the best way to provide that level of coercion was to selectively drop service quality until they caved. This crude form of extortion appears to be the motivation between a dispute between Korea telecom and Samsung (<https://www.whathifi.com/news/korea-leading-broadband-provider-throttles-data-hungry-samsung-smart-tvs>) in 2012. The Korean dispute was evidently resolved in Samsung’s favour, but a similar dispute two years later between Netflix and Comcast resulted in Netflix paying Comcast an “access fee” to have Comcast support the Netflix video streams.

The tensions at the time were variously portrayed as a mob shakedown by the carriage operators, holding end users hostage while they extorted opportunistic fees from content providers, or as a voracious and unscrupulous move by the content folk to cynically exploit the existing carriage arrangements and leverage free transit for their voluminous content while passing the blame onto the erstwhile carriage operators.

Network Neutrality and its Consequences

The FCC’s 2015 reclassification of ISPs essentially reclassified Internet Service Providers as being common carriers. The most immediate implication was that carriage providers were effectively prevented from extracting “access fees” from content providers, and had to treat all content in a fair and non-discriminatory manner. The pragmatic outcome was that if there were network upgrades required to accommodate the introduction of these high volume data flows then either the carriage operator had to absorb these costs, or pass them onto customers. Most of the providers took the former option, but did so unwillingly.

While this reclassification was welcomed by many commentators, the FCC order had its detractors, including the current chair of the FCC, Agit Pai. It was seen as a move against the operation of a free

and open market for services, and one that acted as a disincentive for further private sector investment in broadband infrastructure, it was argued. Exactly how such crude measures of extortion can be portrayed as detrimental to the provision of broadband access infrastructure on a national scale is a line of argument that I simply cannot follow, but I suppose that, like Comcast, if you spend enough money lobbying politicians then literally anything can be portrayed as being “reasonable”.

The proponents of the restoration of Section 706 for the ISP sector argue that this will prompt the carriers to provide faster and cheaper broadband product offerings. Investment in broadband infrastructure appears to be falling in the United States, and the argument is that Title II actively discourages carriage providers from making further infrastructure investment. They argue that the removal of common carriage measures will restore the previous investment environment and create incentive for the industry to make further private investment in carriage infrastructure.

The problem with this line of argument, namely that the provision of common carriage provisions on the ISP sector is detrimental to the public interest, is that while their case is strong on rhetoric, it is short on actual data.

It is true that the fortunes of the communications carriage role have declined in recent times in the Internet. But it is a specious line of reasoning to link such a decline in fortunes to the regulatory classification of the activity. There is a deeper shift going on here, and it has its roots partly in the inability of carriage and content actors to reach a mutually satisfactory and stable relationship, but also partly in terms of the expectations of users. The consequence of this underlying shift is to take much of the communications carriage function out of the purview of public infrastructure and place it into private hands, away from conventional regulatory oversight.

As users, we all want a faster and more capable Internet. But we also want a cheaper Internet. The original approach was to use the network to carry users to the service delivery point, but the problem in this approach is that distance causes delay and delay creates the user perception of a slow service. How do you make the network look like a faster network? Sure, more bandwidth in the network will help, but equally importantly, distributing content from service points closer to the user is a critical shift in engineering network services. In other words, a certain way to create faster content is to bypass as much of the carriage function as possible, and bring the content as close as possible to the user. With the inexorable rise of content distribution systems, content is moving closer to users. In the wake of these highly distributed front-of-house content service portals, we are also seeing the rise of back-end content distribution networks.

This introduces the second part of the shift we are seeing in today’s networks. Content Distribution Networks (CDNs) are moving away from using the public carriage services and are constructing their own private networks instead. Content is generating significant revenues, and a number of these operators are using some of this revenue stream to construct their own privately operated distribution networks. This shift has gone so far that over the past five years almost all of the major undersea fibre cable projects were privately funded by the content distribution operators. The public carriage sector is seeing no significant growth in forecast demands for long haul carriage, while the content sector is painting the exact opposite, which vibrant growth predicted for the next five years in demand for dedicated privately controlled carriage capacity.

Perhaps it is a failure of the regulatory regime that the carriage and content folk have managed to part ways in such a visible manner. Perhaps it is an eloquent expression of failure when content sees its interests best served in bypassing the existing carriage service offerings and trying to secure basic bandwidth services and construct the rest of the service in-house. And perhaps it's a source of further inefficiency as each CDN constructs its own distribution infrastructure, and this inefficiency is ultimately reflected in the costs of the CDN and the revenue targets that need to be met by content.

It is never a good thing when an entire nation’s communications policy process becomes a spectator sport. With both a heavily politicised bureaucracy and an interventionist judicial system, the concept of

working together is replaced by adversarial activities that use any means at their disposal to leverage relative advantage. Individual actors feel that they are unnecessarily exposed if their service is too reliant on others. The content operators feel that their only recourse is to build around carriage services wherever and whenever they feel that they can. And as the carriage operators gain the impression that they are being marginalised, they resort to the political and judicial process to advocate measures that allow them more latitude to exploit their position while they still can.

This is not over by any means, and the last mile will remain the venue where these competing interests collide. Personally, I have little confidence that a deregulated open market will naturally seek an outcome that works to the same objectives as a public utility. Equally, I have little faith in a government system that is so dominated by corporate interests in this sector that it has no residual understanding of what it means to operate a truly public utility in the public interest, and instead spends most of its effort to ease the residual impediments to further private sector exploitation of this once public space.

If “Network Neutrality” is a coded expression of a desire to create a true common carriage regime for the Internet, then I’m afraid that it takes a whole lot more than the provisions of Title II to get there. But I’m not sure that we even want what that “there” may be. I characterised the Australian experience with the National Broadband Network as being a little more than a political football game. It was a project with lofty intentions: a project to revitalise an entire country’s communications infrastructure by providing high speed services to every house and business in Australia, replacing the venerable copper network with a fibre optic cable service. The project is a public sector project, and service providers are essentially retail channel overlays across this public infrastructure. This was intended to be the epitome of a common carriage infrastructure. The vision was grand. The reality has been far more tawdry. The project’s costs inevitably escalated in the face of actual reality and the political will to fork out ever greater amounts of public monies to properly complete the task has largely dissipated.

Maybe it’s that we just want magic. We want an infrastructure service that can deliver multiple 4K video streaming services to every residence on the earth. We want a capable infrastructure that can readily cope with these never-ending 5 Gigabyte bundles of software updates to common operating platforms. We want it all, and, by the way, we really don't want to pay for it! So, yes, we want Network Neutrality in the same way that we want magic. Prosaically, I suspect that both are simply unattainable.

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