An End-to-End view of Telecommunications Policy Frameworks

Introduction

Recent ITU processes, such as the revision of the International Telecommunications Regulations (ITRs) at the 2012 World Conference on International Telecommunications (WCIT-12), have stimulated much debate about the manner in which telecommunications policies; particularly international frameworks for telecommunications policies are formulated. One view is to use the existing institutions and forums to consider such matters and use traditional representation-based mechanisms to bring various national perspectives into an international context of policy formulation. Another perspective that has come to prominence in recent years is to use a framework of direct participation in policy formulation, and directly involve the various stakeholders in the process of formulating common policies.

This paper looks at these approaches from the lens of the evolving technology base of communications, and argues that changes in the underlying architectures used in information technology and telecommunications have a direct bearing on the policy process and the way in which various interests are most effectively bought to bear on the process.

It is possible for some to construct a case that very little has actually changed in the past quarter century in the telecommunications sector. The larger players in this sector appear to be a constant, including AT&T, NTT, British Telecom, France Telecom and so on. Such entities, which were often the incumbent national monopoly telephone service operators during the last quarter of the twentieth century, still remain highly prominent entities today. While they may no longer operate in a monopoly manner, and may no longer operate as organs of public administration, they still possess significant market share in their respective national markets, they still are major conduits of infrastructure investment, still employ a significant workforce, and still exercise significant social power with their respective nations. If one were to look at these entities in their role as carriage service providers, then even from this perspective one could make the case that not all that much has changed over the past twenty-five years. By 1987 much of the core of the public telecommunications network had been transitioned to a fully digital system, and the base currency of the carriage function was that of a collection of digital switching and transmission units. The same can be said for today's telecommunications networks.

Given such an apparently relatively static view of the public telecommunications sector over the past quarter century, then it should not be surprising that a consistent view of the public policy agenda for the telecommunications sector should also make use of the same institutions, the same forums, the same set of actors and essentially the same set of objectives as was the case back in 1987.

An international expression of this conservative view of the public telecommunications endeavour is to continue to invoke these institutions, principally the ITU, as being the most

appropriate institution to facilitate international harmonization of what are represented to be essentially a collection of national telecommunications regulations. Such a view essentially promotes the primacy of the telecommunications role, and assumes that telecommunications policy lies at the heart of today's global online environment.

While such a nostalgic interpretation of the past twenty-five years may offer some basic reassurance and a degree of comfort to some, it represents a comprehensive misunderstanding of the true extent of the changes that have occurred in this sector over this time. Indeed to claim that telecommunications policy lies at the heart of the online environment and is the essential and vital core of the wellbeing of today's digital economy is to completely confuse the relative roles of carriage and content in the Internet.

The End-to-End Architecture of the Internet

To illustrate the extent of the change in approach in communications architectures over this period it is useful to compare the relative models of telephony and the Internet. In telephony, the terminal device and the handset are a very simple pair of analogue transducers, namely a speaker and a microphone. The totality of the telephone communications function is contained within the network. This entails a signalling system to support the establishment of virtual on-demand synchronous circuits across the network, and a set of switching functions that are able to support synchronous real-time circuit switches. The technology investment, and the capital investment model, was centralized in the form of the telephone service operator. The responsibility for the utility and fidelity of the service rested with the service operator, and necessarily this required all telephone service operators to operate their services within the confines of a common set of technical standards relating to the nature of the service. While it was possible to connect computers to a telephone network, and make use of the underlying digital circuits to support computer-to-computer communication, this represented an unnecessarily extravagant approach to computer-mediated communications.

The architecture of the Internet takes the paradigm of a simple terminal device and a capable network and inverts it. The network services required by the Internet are a simple, stateless datagram model. The network accepts individual transactions in the form of fully formed data packets, and uses the outer Internet Protocol packet header to forward the packet to its intended destination. There is no concept of synchronous virtual circuits in the Internet. Packets may take diverse paths through the network, packets may be reordered by the network, and arbitrary packets may be discarded completely. Within the IP architecture, there are no fixed or guaranteed service standards for a network, and no specified level of end-to-end service delivery. These factors are resolved instead by a competitive service model between telecommunications service providers that has seen, over the past 20 years, continual and dramatic increases in service value for all users.

In today's world, therefore, telecommunications networks perform a highly streamlined and commoditized utility role, while the onus for creating and exploiting network services lies instead with the terminal devices. Unlike telephony services, which were entirely artifacts of telecommunications network operations, Internet services are artifacts of end-point device operations connected to the network, and using network-independent service protocols. Transactions within the Internet are not defined and supported by the network;

rather, they are defined from end-to-end, and do not require the specialized support of the intervening telecommunications networks.

This technological shift has facilitated a remarkably different industry structure in the broader information technology and telecommunications sector. The primacy of the telecommunications network, and the relative significance of the telecommunications network operator have rapidly diminished with the advent of the Internet. Economic and social value has shifted to those operators who offer services over the Internet, and such service providers have no particular requirement to also operate a network in their own right. The end-to-end architectural model of network service essentially defines the services as a shared state between cooperating end systems that have direct visibility of each other over the top of the network. This has lead to a shift in value and impetus in the information technology and telecommunications sector from the traditional network operators to the so-called "over-the-top" service providers.

Public Policies and Internet Governance

How do these architectural changes in the model of networks that support computer-mediated services impact on public policy formulation?

In the period where delivered services were provided by telecommunications network operators, the public policy agenda focused on telecommunications policies in both national and international contexts. The harmonization of technical standards, operational practices, infrastructure investment, and various forms of cost apportionment and financial settlement between network operators were of paramount importance in order to provide consistent fidelity of service to customers. Such a requirement lead to the development of specialized telecommunications regulations at national levels, and the role of the International Telecommunication Union (ITU) in the international context to harmonize such national frameworks to support a consistent service that operated across national operators.

But while telecommunications policies have a dominion of the carriage function of the telecommunications activity, they do not necessarily have a clear purview over the functionality provided by computing systems, whether or not they are connected to the network. Typically national regimes use the policy frameworks associated with trade and commerce, consumer interests, and citizens' rights to oversee the provision of goods and services through computer mediated transactions, in the same way that the same policy framework is provided for their physical world counterparts of the provision of goods and services. This is not, as has been claimed by some, the invention of novel rules and law for the Internet, but the application of existing policies and law to the function of the provision of goods and services over the top of a communications network. The substantive change here is that the applicable framework for such policies is not based in telecommunications services and is not based solely in serving the interests of the network operators in undertaking a carriage function, but one that is based on the broader function of the efficient and effective provision of goods and services within national and global economies.

In this context the topic of "Internet governance" has many dimensions, and with each national environment there are many stakeholders and many diverse interests. To expect

that the diversity of these interests can be coherently represented within a single national delegation, and within a single telecommunications-oriented forum is surely unrealistic, or indeed impossible, in today's world.

The Internet is a highly diverse and flexible amalgam of many components, and when we consider the policy matters related to its governance now and in the future, it's clear that this topic is one that necessarily directly engages many stakeholders, of which the actors in the telecommunications sector form one part of many. The calls for the continuation of representative-based meetings of national delegations within the narrow confines of the telecommunications sector to subsume the public policy agenda of the Internet suffer from a limited perspective of the Internet itself. Addressing this limitation of perspective in such considerations of public policies entails far more than making working documents publicly available, or calling for national delegations to consult their national communities within the confines of telecommunications practices and policies. It calls for open, multi-stakeholder participation in an open dialogue about such topics of Internet governance that directly reflect the diversity of interests and activities that collectively form the Internet itself.