

International Charging Arrangements for Internet Services, Module 1

Chapter One

INTRODUCTION

The Internet is perhaps the most important engine of economic activity in our time. What it is and what it means remain poorly understood, even by those who are most involved in it. But we all recognize that the Internet will change –and change utterly- the way we perceive the world.

Recognizing this, the APEC Ministers for Telecommunication and Information Industry have acknowledged that the Internet is the cornerstone of the creation of the Asia-Pacific Information Infrastructure (APII).

The APEC Telecommunications Working Group (APECTEL) has noted how the Internet is increasingly at the centre of the growth of e-commerce within the region. The Internet is also vital to other key APEC priority areas such as the growth of small and medium sized enterprises (SMEs), overall capacity building throughout the region, and as a primary vehicle for fostering economic and technical co-operation (Ecotech). The Internet is as important to the APEC economies as are the region's shipping lanes, air routes and telecommunications facilities.

The APEC Business Advisory Council, at its 1998 Hongkong, China meeting, noted that E-commerce technology offers the opportunity “to create export markets over the Internet, eventually providing pay-back of national investments in information technology infrastructure”¹

Despite its importance, the Internet does not have an established set of international charging arrangements. Charging arrangements remain a purely private affair. Yet existing cost elements, pricing structures, traffic flows, domestic regulations, interconnection charges and so forth all have an impact on what Asia-Pacific Internet Service Providers (ISPs) must pay to gain access to the global information highway. These charges have an effect on the region's ability to build and maximize the APII.

The economics of the Internet evolved in an ad hoc fashion that has not accommodated the requirements or challenges facing economies at different levels of development. This issues paper seeks to identify the key elements that must be considered by APEC in assessing the role of ICAIS.

Chapter 2 of the Issues Paper chronicles the historical development of the Internet, describes the basic concepts of how the Internet works, and reviews how the

growth of the Internet is changing how we define and understand telecommunications. This section explains the Internet's open network architecture, the crucial role of "layers" within Internet network topology, the role of addressing, how ISPs communicate, the centrality of the World Wide Web, and the changing nature of international capacity requirements.

Chapter 3 shows how this new world is fundamentally altering the economics of international telecommunications. This chapter explains the economics of the Internet, current international charging arrangements, and how Internet traffic patterns are an important driver in the geography of network growth and hence may be distorting the costs and economies of scale within the network. The chapter also looks at private peering and other means by which major ISPs are seeking to minimize network congestion, and what economic impact this has on the APII.

Chapter 4 establishes a methodological framework for the following modules of the ICAIS Study. Because of the pioneering nature of this Study, the authors of follow-on modules will be required to develop a workable, acceptable set of basic indicators and criteria that may be routinely updated to chart to progress of the APII. These matrices focus on the three pillars of current and future ICAIS: international private line services (ie, the global Internet backbone); domestic factors such as access, internal private line/local loops, and ISP arrangements, ; and Internet traffic distribution trends based upon extensive surveying and interviewing of ISPs. This would attempt to find out what the breakdown is of Internet traffic by type, international vs. domestic, and so forth .

At this stage in the Internet's development, it is fair to say that "the dynamic Internet engine of wealth creation is politically immature"². The authors would add that the economics of the Internet are immature as well, at least in comparison to the venerable, established world of international telephony – although that is undergoing revolutionary change as well, largely as a result of the Internet. The Internet is the evolving product of brilliant computer scientists who envisaged an optimal way for computers to communicate with one another. The founders of the Internet could not foresee a global, multi-billion dollar world of e-commerce, just as Orville Wright, Karl Benz, or Alexander Graham Bell could not foresee the impact of their inventions. While it is no doubt true that the Internet remains at a very early stage of development, it is already a central part of the global economy and e-commerce. For example, on-line retail sales in the USA jumped from \$2.4 billion in 1997 to \$ 7.8 billion in 1998, and are expected to leap to \$108 billion by 2003³

This growth has been too rapid for any structural arrangements and coordinating mechanisms to grow apace. Unlike telecommunications, or civil aviation, or international shipping,

"the Internet is remarkably decentralized and un-institutionalized. Its future is not tied to any particular organization, although a number of different organizations play critical roles. As it grows in scope, bandwidth and functionality the Internet

will require greater coordination, but it is not clear what kind of coordinating mechanisms and institutions will evolve”⁴.

The Internet was designed to resist central control., which makes it especially difficult to fit into existing international economic or organizational moulds. Unlike telecommunications, which had a recognized international component from the earliest days of telegraphy⁵, the Internet has evolved from a different conceptual basis.

Traditional switched voice telecommunications is easily measured through minutes of use (MOUs), erlangs, and other conventional means. Consequently, it is relatively easy to gauge network demand, growth and development. This also makes pricing international telecommunications services a straightforward process that has evolved historically, with antecedents in the international charging arrangements for postal services⁶. Even variations on traditional telecommunications pricing, such as call-back, refile, and international simple resale are predicated on stable arrangements between bilateral or multilateral actors.

Unlike the public switched telecommunication network (PSTN), the Internet is an amorphous collection of small and large networks – a “network of networks” based upon a common set of protocols. This set of layered protocols is far more robust and flexible than the Internet’s pioneers envisaged: the World Wide Web, IP-telephony, audio and video streaming, and many as yet undiscovered uses can all be sent over the same networks in the same way. The network does not distinguish between a e-mail, a website or a video stream: simply put, all are broken into packets to be sent and reassembled at their destination. The packets of data are sent from, say, Kuala Lumpur to Seoul in the most efficient and most rapid manner. At present, that will probably be via San Francisco or Vancouver.

However technologically and economically rational these packets behave as they scurry about the globe, it must be remembered that the Internet continues to rely upon two elements of the traditional telecommunications network: private lines for bulk transport of data; and the local operator for the “last kilometer” connection to the customer. Pricing arrangements for private lines and interconnection are founded upon the requirements of the circuit-switched network, and are based upon distance and traffic flows. This may be seen to put Asia-Pacific ISPs at an economic disadvantage as long as it remains inherently more efficient technologically to route even intra-regional Internet traffic via points in North America.

This raises a central point: the Internet cannot be viewed in isolation from a more holistic view of the entire global network. The Internet is completely unlike the traditional telecommunications network, but is akin to an internal “agent” that is transforming everything and changing how telecommunications are defined and approached.

The APECTEL ICAIS Study, of which this Issues Paper is merely an introductory part, will constitute a pioneering, timely analysis of the inter-relationships within the

APEC economies that have an impact on the APII. The Study will delineate the relationships between these conventional telecommunications elements, review the Internet ISP pricing and coordination arrangements that rely upon them, analyze the impact of existing Internet traffic flows and what drives them, and suggest steps to be undertaken by APEC economies to maximize the development of the APII through compatible and sustainable ICAIS.

Endnotes

¹ APEC Business Advisory Council, 1998 Report to the APEC Economic Leaders - APEC Means Business: Restoring Confidence – Regenerating Growth, (Singapore: APEC Business Advisory Council, 1998), p. 58.

² www.cookreport.com/insurgence.html

³ “Internet Shares: When the Bubble Bursts”, *The Economist* 350:8104, 30 January 1999, p.23.

⁴ See B Kahin and J H Keller, eds., *Coordinating the Internet*, Cambridge, Ma: MIT Press, 1997, p.4.

⁵ Described in J Savage, *The Politics of International Telecommunications Regulation*, Boulder: Westview Press, 1989, pp.28-33.

⁶ Best described in R Frieden, *International Telecommunications Handbook*, Boston: Artech House, 1996, pp. 133-149.