

Chapter 5. The ICAIS Policy Environment: Conclusions and Possible Outcomes

Section 6.4 of the Module 3 RFP asks the consultants to provide conclusions pursuant to the Terms of Reference. In order to assist the work of the APEC TEL ICAIS Task Force, this section analyzes possible policy options and likely outcomes relating to the ICAIS issue.

In each Module of the ICAIS Study, the consultants have emphasized that the Internet cannot be analyzed through traditional telecommunications measures. One of the challenges in analyzing the ICAIS issue involves bridging the division between telecommunications economics and Internet economics. On the telecom side are core telecommunications economics issues of bandwidth pricing, access arrangements, and the perceived circumvention of telecommunications pricing models. On the Internet side, the core issues involve the value of content, the expansion of the APII and access to it, and the relegation of carriage to a subsidiary role.

As has been noted, the Asia-Pacific Internet economy has changed markedly even during the brief course of this study. Several developments have taken place since Module 1 of the *Study* was launched at the beginning of 1999:

- The continuing dramatic increase in the amount of overall bandwidth available;¹
- An even greater increase in the number of users;²
- An immense rise in the levels and valuations of Asia-Pacific e-commerce, both at the pan-Asian level and within APEC member economies.³

Each of these phenomena will drive traffic growth trends and, as a result, will influence network economics. We have noted that “traffic matters”⁴; it is important to note that just as the Web irrevocably and unpredictably changed the development of the global network, new networking applications may rapidly alter the trends and outcomes noted in this report.

If traffic matters, so too do applications. Content drives traffic: a program called NAPSTER is a dramatic example of how a new application can alter traffic flows. NAPSTER, once downloaded, transforms every host that runs into an MP3 file server (MP3 is an audio file technology that has had a dramatic effect on the recording industry⁵). As is often the case with new applications, academics and university students comprise the “first wave” of users. At the University of California – San Diego (UCSD),

¹ *ICAIS Module 2 Final Report*, Appendix 2.

² This steady growth is tracked by NUA (www.nua.ie), among others, e.g., Messaging On-Line, “One Billion E-mail Accounts by 2002”, NUA Daily Summary, 6 April 2000

³ Archive articles at asia.internet.com., e.g. “Cyberbrains Bullish on Chinese-Language Net Services,” 30 March 2000.

⁴ *ICAIS Module 1 Final Report: Issues Paper*

⁵ www.mp3.com

50% of outbound traffic is now NAPSTER traffic, and at the University of Iowa Ames Internet Exchange (AIX) NAPSTER traffic represents up to 3% of all total bytes.⁶

The scale of these audio file transfers, along with the growth of e-mail file transfers, may over time lead to a greater equalization of bilateral traffic flows between North America and other parts of the world. Conversely, other North American-sourced content, such as other audio and video streaming applications, may perpetuate the current imbalance of traffic flows.

I. An Assessment of Outcomes in the Near-Term

This section examines the near-term future of ICAIS in the context of how stakeholders will likely address the issues, or whether they do so at all. There is, at the heart of this issue, a fundamental choice to be made whether to “do nothing” – allow technological and marketplace factors and their direct involvement to remedy existing problems- or “do something”, which may involve efforts at bilateral or multilateral levels to create an international charging arrangement structure.

“Do nothing” scenarios

In the near-term, significant change will affect Internet stakeholders without any active efforts on the part of APEC economy governments. A passive approach will still lead to changes. The volatility of the Internet and the pace of change in Internet market segments means that a “do nothing” approach nevertheless will result in stakeholders facing significantly different conditions in the months ahead. The robustness of the Internet economy means that what had appeared unchangeable may become dislodged and upended. Dominant market shares may become unsustainable as incumbents fail to sustain their technological and marketplace leadership in the face of innovations and the next “killer application.”

Already in the short history of the Internet, ventures as large as IBM and as small, but promising, as Pointcast⁷, have lost their opportunity to extract monopoly rents, or at least to capitalize on first to market advantages. As noted, the growth of the NAPSTER application and other new “top layer” Internet services will defy even the most comprehensive future planning efforts.

⁶ Rene Hatem, “The Next Killer Application”, CANARIE-NEWS List, 28 Feb 2000, at www.canet3.net.

⁷ Pointcast was a first mover in “push” technologies delivering Internet subscribers with massive amounts of mostly unsolicited content. It recently closed its doors.

ICAIS issues may become less troublesome

The matter of ICAIS has presented a problem to some Asia/Pacific ISPs primarily because the access and transit services provided by Tier-1 ISPs constitute a significant portion of the Asia/Pacific ISPs' operating expenses compared to other ISPs. Asia/Pacific ISPs have incurred substantially higher overall costs in doing business relative to similarly situated ISPs in some other regions. One near-term scenario presents the ICAIS problem as temporary and solvable, because the solution is available to Asia/Pacific ISPs, their government and the marketplace.

Changes in traffic flows and market conditions support better peering terms and conditions

Regardless of their geographical location, smaller ISPs incurred higher telecommunication transport costs once Tier-1 backbone ISPs replaced open peering and started charging for access to the Internet. Bluntly, smaller ISPs needed Tier-1 backbone ISPs more than they needed the smaller ISPs. Any change in the balance of power and network access over time will inevitably translate into different ICAIS terms and conditions.

As noted above, new applications and higher demand for local content may create a more balanced exchange of traffic across the Pacific. Asia/Pacific ISPs can secure better ICAIS terms and conditions when and if demand elasticities and traffic flows trend more closely toward parity for inbound and outbound traffic flows. The move toward parity can occur primarily when in-region content grows in availability and popularity and when ISPs opt to host that content in region.

Currently, the desirability of content hosted in North America places ISPs located elsewhere in a demand-inelastic position. However, this situation does not mean that ISPs subscribers in Asia/Pacific purposefully eschew indigenous, non-North American content. As with television, in almost every economy local programming and content is far more popular than imported content. International broadcasters have had to adapt their programming for local taste, e.g., MTV Asia or HBO-Olé in Latin America. The Internet has adapted to local interests even more quickly, largely because of lower costs of entry for content providers. Domestic Web sites now dominate the "most popular site" tables in almost every APEC economy. This situation is even more dramatic in non-English speaking economies. The most popular international Web sites are search engines such as Yahoo or Lycos, or major sites relating to software or browser requirements such as Netscape or Microsoft.⁸

However, ICAIS issue relief will not necessary result simply because of less reliance on North American content. ISPs must locate the content closer to subscribers and outside North America. As anomalous as it may seem, at present non-North American ISPs incur a cost penalty for locating content closer to their subscribers. As

⁸ CNNIC, *Statistical Report of the Development of China Internet*, Jan. 2000

noted in Module Two, despite the burden of self-provisioning lines all the way to North America the cost of such routing can and usually does undercut shorter and more geographically direct intra-regional routes. A recent article in *The Industry Standard*, a widely read Internet news magazine, reported that an Australian-based content provider has opted to locate its content in North America, because it could save 40% in hosting and telecommunications costs⁹. Lower ICAIS costs to North America would only bolster the incentive to host content there.

Module Three does not provide an appropriate vehicle for examining all the reasons for the significant cost disadvantage experienced by Asia-Pacific economies. However, one can conclude that even if ICAIS terms and conditions more closely approximated a telecommunications model of line cost sharing on a 50/50 basis, telecommunication transport providers outside North America would continue to offer comparatively less attractive and more expensive rates. Surely economies of scale and scope contribute to a North American carrier comparative cost advantage. But, as illustrated in Module Two, pricing policies, particularly for local loop access and the comparatively less robust degree of competition factor prominently as well.

Accordingly, changes in domestic and intra-regional pricing policies and the increased scope of competition might drive rates closer to North American levels. Quite possibly carriers outside North America can unleash pent-up demand for Internet services by lowering access costs. Empirical evidence supports the view that a reduction in end-user rates – and intermediate pricing factors like international accounting rates – tend to stimulate substantial increases in consumer demand, so much so that operators can make up in volume what they lose in margins.

Lower transmission costs reduce significance of the issue

Much of the ICAIS dispute stems from the comparatively greater percentage of total operating costs that must be allocated on the part of Asia-Pacific carriers and ISPs to the trans-Pacific telecommunication transport portion. According to John Hibbard, Telstra's Managing Director of Global Wholesale Business, up to "70% of an Australian ISP's costs are due to the international segment to the US . . . [thereby] loading up the domestic cost structure."¹⁰

The ICAIS dispute can grow less troublesome thanks to the benefit of lower per-unit transmission costs to North America coupled with the proliferation of in-region ISPs and transmission options. Despite the seemingly unquenchable demand for ever expanding bandwidth, we can envision a near-term future where the variety of new extremely high bandwidth, Dense Wave Division Multiplexing (DWDM) fibre optic cable projects actually changes the region's infrastructure supply from one of scarcity to one of at least temporary glut. Even if Asia-Pacific Internet users persisted in their preference for North American content or if ISPs continued to host "local" content in the US, with commensurate traffic routing by their ISPs, the cost of such a routing topology

⁹ Stewart Taggart, "Fed Up Down Under," 3 *The Industry Standard* No. 5, 260 (Feb. 14, 2000).

¹⁰ *Ibid.*, at 265.

would decline on a per unit of capacity basis. And reduction in reliance on North American content and routing options would contribute to reaching closer parity in demand elasticities.

A contrary view: ICAIS issues may become more troublesome

Despite our optimism that the evidence points to an improved ICAIS environment from the perspective of the growth of the APII in an equitable and sustainable fashion, we must acknowledge the potential for the status quo and perceptions of inequality to extend into the future. The possibility exists for the financial burden borne by smaller ISPs to grow more acute if demand for high bandwidth applications stimulates ever-increasing requirements offsetting even large reductions in per-unit costs.

Under this scenario, Tier-1 global backbone ISPs can maintain or increase their market power and demand even greater compensation for access. At the very least, leaving ICAIS to commercial negotiations will result in some degree of lag as contracts may have lengthy terms before coming up for renewal and renegotiation. As well, the negotiation process and the balance of power in them may heavily weigh other factors in addition to traffic flow and transmission costs.

“Do something” scenarios

Several near-term scenarios involve significant change affecting Internet stakeholders, because they have engaged in “self-help” and/or resorted to external forums for redress. By self-help we mean that smaller ISPs can take affirmative steps to improve their negotiating leverage with Tier-1 ISPs. Additionally they can attempt to discuss and publicize ICAIS issues in a number of bilateral and multilateral forums, regardless of whether these issues lend themselves to examination, much less resolution, in these forums.

Aggrieved ISPs pursue “self-help”

Smaller ISPs have every financial incentive to find ways to minimize their reliance on Tier-1 ISPs for Internet connectivity. They can enhance their bargaining leverage to seek better terms and conditions at contract renewal time by pursuing alternatives to contract renewals. To achieve this end, smaller ISPs should exploit their affiliation or subsidiary relationship with a facilities-based carrier. Integrated international carriers with an ISP affiliate or subsidiary can efficiently load voice, data and Internet traffic on self-provisioned and leased lines.

Additionally, the burden of whole-circuit provisioning does in fact lead to some operational advantages. For example, in some economies, including the US, the self-provisioning of circuits to an international point provides greater opportunities for low cost access to the public switched telephone network in the other economy without toll

revenue sharing or an accounting rate settlement. In other words, the ISP may, through “self-termination” be able to extend its addressable market to the other economy.¹¹

Self-help also includes the use of technological remedies including a recalibration of bandwidth sizing for outbound and inbound traffic. The asymmetrical nature of Internet traffic lends itself to asymmetrical transmission pathways to and from North America. By this we mean that smaller ISPs need not provision an identical amount of bandwidth when outbound traffic to North America might require substantially less bandwidth than the return flow: a file request of a few bytes outbound to North America can trigger an onslaught of several hundred thousand bytes representing the requested content. This asymmetry is becoming even more extreme as Web sites become more elaborate and content-rich. Several Asian and Pacific carriers have created asymmetrical bandwidth arrangements of this kind, often using low-cost satellite capacity for the westbound “bulk” flows.¹²

Caching of the most frequently viewed Web pages in local servers and other technological options can help conserve in bandwidth. Many US sites such as CNET, Internet News, Yahoo, etc. have Asian versions of their sites as well as locally-mirrored versions of their home sites. This potentially reduces the trans-Pacific burden on smaller Asia-Pacific ISPs. Self-help involves both unilateral and jointly undertaken efforts by smaller ISPs. In the latter category, Asia-Pacific ISPs can coordinate more closely to aggregate traffic for efficient long haul loading to North America. As well they could pursue alternative peering opportunities in-region and with other ISPs in North America willing to provide better ICAIS terms and conditions.

Redress through multilateral forums

The ICAIS matter has become a subject for examination by APEC-TEL largely because some stakeholders have failed to secure what they consider suitable resolution in the context of commercial negotiations between ISPs. Under circumstances where a matter has become a chronic irritant and financial drain, it follows that these stakeholders would seek new forums for resolution. It is beyond the scope of this *Study* to assess whether ICAIS issues properly fall within the purview of multilateral organizations. However, for the limited purpose of projecting what stakeholders may do in the near-term, we will consider two scenarios where stakeholders seek to raise the profile of this issue at the International Telecommunication Union (ITU) and the World Trade Organisation (WTO).

1. Role of the ITU

The ITU provides a forum primarily for standard setting, allocating spectrum, registering spectrum and satellite orbital arc usage and recommending policies and

¹¹ Telstra, KDD, Telmex and other carriers have established points of presence in the US with this objective in mind.

¹² Telstra and Telecom New Zealand are two examples of carriers that have successfully structured such asymmetrical arrangements.

procedures in telecommunications. This specialized agency of the United Nations lacks enforcement powers, but has proven effective in limited instances because most economies recognize the value in achieving uniform “rules of the road.” Over the years the ITU has lent its “good offices” for addressing and attempting to resolve complex and contentious issues.

In view of the convergence of telecommunications and information processing technologies, the ITU has begun to address matters relating to the Internet including standard setting for Internet-mediated telephony and domain name registration. As well the ITU has addressed matters, such as international telecommunications accounting rates, that arguably have a trade policy aspect.

The nature of this assignment does not require the consultants to analyse whether and how the ITU would accept an invitation to examine ICAIS issues. Reasonable people could disagree whether Internet connectivity, pricing and access issues have a close enough parallel to telecommunications policies considered by and promulgated through the ITU. We do note that the ITU can legitimately address a matter like international accounting rates, because a direct link exists to tariffs, interconnection and telecommunication development matters clearly within its purview. ICAIS matters do not appear to have a similar linkage, such that the ITU representatives may not reach a consensus on whether to study ICAIS issues much less promulgate recommendations on how economies should address them.

2. Role of the WTO

The WTO provides a forum primarily for shaping trade policy and for resolving trade disputes. ICAIS issues may not fit within the scope of responsibilities conferred to the WTO by treaty. The nature of this assignment does not require the consultants to analyse thoroughly whether and how the WTO would accept an invitation to examine ICAIS issues. However, the role of the WTO was noted in Modules One and Two, and it is possible that some stakeholders may cast this dispute in the context of the WTO Telecom Annex or other trade-related issue. In that case, the WTO might undertake the following:

- The WTO Directorate rejects application as outside the reach of the WTO;
- Representatives might not reach a consensus for even a limited WTO study;
- As in the case of international accounting rates, a multilateral “Gentlemen’s Agreement” might forestall involvement in the short term;
- A commercial, contractual solution is found.

Redress through domestic forums

Stakeholders might also pursue domestic forums alone or in tandem with a multilateral forum campaign. Even if the ITU and WTO do not address ICAIS issues, a national regulatory authority might, despite the difficulty in asserting extraterritorial jurisdiction on ISPs not operating domestically. National regulatory authorities might attempt unilaterally to remedy perceived problems by ordering structural and regulatory

remedies, perhaps in manner similar to how the US FCC prescribed benchmark settlement rates for telecommunication carriers.¹³ However, such steps are often seen as efforts at extraterritoriality. For example, the FCC benchmark settlement rates have been opposed by many developing economy carriers and governments as being beyond the purview of the US government.

Alternatively national regulatory authorities might pursue liberalization, privatization and deregulatory initiatives that could stimulate competition resulting in downward pressure on local loop and long haul rates. Lower telecommunication costs should reduce Asia/Pacific ISPs' costs and narrow the financial penalties and comparative disadvantages they face. Yet another scenario involves adjudication by national courts on competition policy/antitrust claims.

II. A Framework for Advising APEC TEL Ministers

The culmination of the ICAIS study and the work of the APEC TEL ICAIS Task Force will be a report of findings to APEC telecommunications ministers at the forthcoming TELMIN 4, in May 2000. The ICAIS *Study* process – Modules 1,2 and 3 – have brought forward the issues, facts and analysis required to advise Ministers on the development of equitable and sustainable international charging arrangements. While not without controversy, this issue is critical to the development of the APII.

As noted above, there are in essence three distinct courses of action open to ICAIS:

Status quo

A continuation of current developments would see the following occur: a combination of wholly-owned international circuits to North American network access points (NAPs), a growing number of regional NAPs and growing intra-regional/domestic traffic flows, solutions such as asymmetrical bandwidth arrangements, increased use of bandwidth exchanges, perhaps relatively diminished use of regional exchanges (CIX,

¹³ See *1998 Biennial Regulatory Review Reform of the International Settlements Policy and Associated Filing Requirements*, IB Docket No. 98-148, Report and Order and Order on Reconsideration, 14 FCC Rcd. 7963 (1999). See also, *Policy Statement on International Accounting Rate Reform*, 11 FCC Rcd. 3146 (1996) [stating intent to update accounting rate policies to encourage competition and technological innovation]; *International Settlement Rates*, IB Docket No. 96-261, Report and Order, 12 FCC Rcd. 19806 (1997) [creating four transition periods for compliance with benchmarks and responding to the potential for expanded opportunities for one-way bypass of an accounting rate settlement created by the Basic Telecommunications Service Agreement]; *Regulation of International Accounting Rates*, CC Docket No. 90 337, Phase II, Fourth Report and Order, 11 FCC Rcd. 20063 (1996) [permitting carriers to negotiate alternatives to the traditional settlement rate system for routes where effective competitive opportunities exist for U.S. carriers]. *1998 Biennial Regulatory Reviews Reform of International Settlements Policy and Associated Filing Requirements*, IB Docket No. 98-190, 13 FCC Rcd. 15320 (1998) [proposing largely to abandon accounting rate scrutiny for traffic to WTO member nations]. Rob Frieden, "Falling Through the Cracks: International Accounting Rate Reform at the ITU and WTO," 22 *Telecommunications Policy* No. 11 (December 1998).

STIX etc) and Asia-Pacific carriers developing their own points of presence (POPs) in North America.

A striking aspect of the status quo is that it is neither easily classified nor subjected to any sort of regimes analysis. It is not purely commercial or contractual, in that there are still many public-sector ISPs (e.g., universities, governments) that work with non-commercial Internet exchanges (IXs). Likewise, exclusive bilateral peering agreements may be considered a type of traditional cartelized arrangement, along traditional telecommunications lines. Most agreements are hierarchical or bilateral contracts on commercial lines, reflecting all the imbalances and inequities one might expect when small parties contract with larger ones. At the same time, those large parties do pay the major portion of the cost of the massive facilities expansion under way throughout the region.

There is no “regime” or deliberately multilateral aspect to the status quo. Even at the domestic level, regulators and policy-makers are struggling to define the Internet as either a telecommunications or broadcasting service, or both, or neither. Modules One and Two detailed at length what the Internet is and what makes it different.

That difference has resulted in an ad hoc economic evolution that is seen by some parties to perpetuate traffic –and hence economic – imbalances. These imbalances are seen to entrench an economic disadvantage for those ISPs and carriers distant from the Internet’s North American centre.

Sometimes inelegant or inefficient standards become entrenched and innovators simply work around them – the English-language QWERTY keyboard is a classic example, and there are many others. During the course of this study the consultants have witnessed and tracked a remarkable shift in the emphasis of “disadvantaged” carriers and ISPs toward maximizing what advantages they can gain within the messy status quo. This has taken many forms, as outlined above.

In each APEC economy, almost all of the carriers and ISPs involved in this study have undergone remarkable changes over the past year. It has been a period of remarkable mergers and acquisitions. In every instance, these metamorphoses are designed to make the firm more Internet-centred and better prepared for the e-commerce era. In the absence of any multilateral framework, the region’s carriers and ISPs are consolidating and acquiring commensurate scale to be “equal peers” to the world’s largest firms.

As discussed above, this industry consolidation is leading to scale economies and a remarkably rapid expansion of the APII. Only through the prism of competition policy (antitrust) may it be assessed for sustainability and equitability, also discussed above. Despite dramatic growth, there are two remaining centres of high cost:

- Economies with high domestic access and domestic bandwidth charges;
- Distant economies with limited telecoms access and high cost structures.

The first point is beyond the purview of this specific analysis, although it was identified in Module 2 as the most important cost element for the end-user. The ability of all APEC economies to fully benefit from the APII is strongly linked to resolution of these domestic issues. APEC TEL's Interconnection Task Force has focused on this issue as a major priority, and the consultants view it as a vital piece of the puzzle in the growth of the APII.

What about the smaller APEC economies and the needs of those economies still struggling to achieve basic telecommunications connectivity? There are remarkable technological solutions that harbour much promise, but simple economics render these economies high cost, low bandwidth jurisdictions. Under the status quo, the best they can hope for is the extension of regional connectivity and an overall lowering of bandwidth prices that will render their economies more competitive.¹⁴

That reduction of bandwidth prices is under way, although more slowly in the Asia-Pacific region than in other developed parts of the world. However, prices will decline as new capacity become available, paralleling what has happened in Europe and the Americas. In turn, this will fuel competition and liberalization within economies and an overall "virtuous circle" of declining prices and costs.

Doing something: self-help

The discussion of what economies can do on their own and in collaboration to maximize their terms of trade, found above and in chapter 4, largely reflects behaviour already shown by industry leaders in the Asia-Pacific region. This can be achieved through peering with similarly-sized carriers, maximizing use of bandwidth "spot" exchanges and markets, employing low-cost satellite circuit asymmetrical bandwidth exchanges, and extending one's own facilities and POPs to other parts of the region and the Americas (and even Europe). Self-help is largely outside the bailiwick of pro-active government intervention, except for providing an overall regulatory and economic climate that is favourable to APEC TEL's stated goals of liberalization, competition, capacity building, and sustainable and equitable economic development. Certainly, the work of the APEC TEL Interconnection Task Force will assist carriers and ISPs effort to obtain more favourable domestic access and bandwidth charging arrangements.

Doing something: multilateral bodies

The ICAIS Task Force and its efforts are a good example of how stakeholders can employ multilateral forums to move economic debates forward. However, as outlined above, it is less likely that international organizations such as the ITU or the WTO could be harnessed successfully to redress a given economy's or region's perception of ICAIS imbalance. This is the case for a variety of reasons, such as:

¹⁴ Computer Economics, "E-Commerce Bypasses Developing World", 25 Feb 2000; company release at www.computereconomics.com

- Inappropriateness for issues that do not have a well defined multilateral context – there is no Internet settlement structure, unlike telecommunications;
- Some economies would vehemently oppose using these forums as ICAIS dispute resolution mechanisms, seeing arrangements as contractual and private;
- Lack of enforcement power on the part of most international organizations.

III. ICAIS as a Fast-moving Target

Perhaps the greatest challenge to any effort to analyze, much less act upon, ICAIS issues is the rapid evolution of Internet economics. Within the short period of this study, Internet traffic and usage have multiplied several-fold. Similarly, carriers and ISPs have merged, divested, changed owners, changed strategies and crossed borders. New applications have altered traffic flows, and the spectre of US-centred content is much diminished as local sites have flourished and multiplied worldwide.

This is not to dismiss the concerns of Internet charging as an archaic view of a fast-changing world. Charging arrangements matter, and the lack of an international structure means there is little recourse for those who believe their economy's ability to harness these new technologies is structurally hindered by the ad hoc evolution of charging arrangements that they believe favour the large "founder" backbone carriers and ISPs.

It is beyond the scope of this study to propose any recommendations or solutions to this problem. Under the general category of self-help, however, APEC economies are enacting APEC TEL principles and surmounting perceived structural constraints to achieving the APII. The value of Internet technology is now taken for granted.

The Internet, by design, encourages innovative and non-traditional processes. This is at odds with the historical stability and multilateral structures that defined the telecommunications world.

ICAIS is an issue that exemplifies the uncomfortable transition from telecommunications-driven economics and pricing structures to as yet largely undefined Internet economics. The consultants believe that this Module of the *Study*, along with earlier Modules, provides an accurate snapshot of the economics of the Internet at the turn of the century and an outline of the key issues APEC TEL must consider in charting a new path that will enable Ministers to promote the widest possible expansion of the APII.