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ITU TELECOMMUNICATION INDICATORS UPDATE

INTERNATIONAL INTERNET BANDWIDTH IN ASIA-PACIFIC

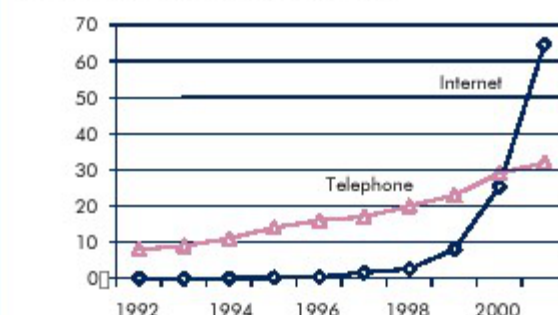
The Asia-Pacific region is witnessing an explosion of international Internet bandwidth. Capacity on Internet links connecting Asia-Pacific to the world have skyrocketed more than eightfold over the last two years from 8 to 65 gigabits (Gbit/s) by the end of 2001.¹ International Internet capacity in the region now far exceeds conventional telephone capacity (see Figure 1).

This is an astonishing achievement considering that just a few years ago, Asia-Pacific still had the bandwidth blues. The price of Internet bandwidth was dear and countries had to pay for the cost of the full link to the United States, the number one destination of choice for Internet connections. Not only did the United States host the sites users wanted to surf to, it was also the most popular transit point for Internet traffic. Australia complained that it was subsidizing United States' Internet service providers (ISP). New Zealand was losing e-commerce business to companies who would prefer to host their websites in the United States, where they would get more bandwidth for less money. Some countries in the region turned to methods like caching (storing popularly accessed Web pages locally) to reduce the need for users to surf abroad.

Asia-Pacific was the most vocal region about what it calls "International Charging Arrangements for Internet Services." The region passed a number of resolutions calling for a more equitable distribution of international Internet connectivity costs. But lately, this issue has not been as publicized and Asia-Pacific Internet connectivity has grown rapidly. What has changed and driven this massive boost in capacity?

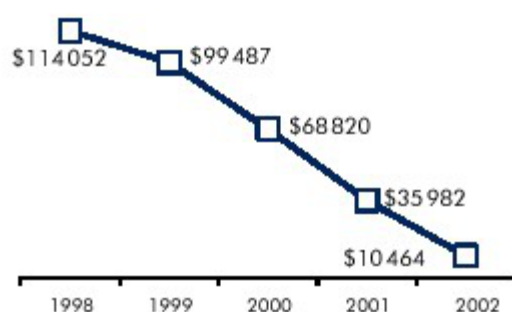
One is a bandwidth glut. Some half-dozen fibre-optic submarine cables have been completed in the region over the last few years. One example, the Australia-Japan fibre cable, which connects the two countries and is interconnected to submarine cables heading to Europe, other Asia-Pacific points and the United States, has a design capacity of 640 Gbit/s, "more than 500 times the capacity currently available from or to the East coast of Australia."

Figure 1 – Asia-Pacific international communications capacity (Gbit/s)



Note: Giga stands for 1000 million bits per second (Gbit/s). Telephone circuits have been converted assuming 64 kbit/s per circuit. Source: ITU.

Figure 2 – Price of international bandwidth from Japan to the United States per 1 Mbit/s (USD), per year



Source: Internet Initiative Japan.

A second trend is liberalization. Most of the region's advanced economies allow competition in the international Internet bandwidth market, which has driven down the costs of connectivity. For example, the Internet Initiative of Japan is paying one tenth of what it used to pay five years ago for Internet connectivity (see Figure 2).

A third trend is that telecommunication operators got more comfortable with the Internet. Many had inherited academic networks and were new to the world of the Internet. Over time, they have begun to realize that their own traditional circuit-switched networks would evolve to Internet networks. These traditional telecommunication operators are now investing heavily in Internet infrastructure. One focus has been on end-to-end connectivity. If you have to

pay for the full cost of a circuit, you might as well own the whole link. The most dramatic example is Japan's NTT purchase of Verio in August 2000 for USD 5.5 billion. Verio is one of the world's largest Web hosting companies with an extensive Internet back-bone. The purchase provided NTT with an instant international Internet network, including direct access points in the United States. Related to this are regional alliances and cross-holdings allowing companies to leverage partner links in order to reduce cost and duplication. For example, Hong Kong, China's Pacific Century CyberWorks

(PCCW) and Australia’s Telstra combined their Internet backbones to form Reach. Another example is ISPs using the Internet backbones of their parent companies. Sri Lanka Telecom, for example, has Internet connectivity to Japan via its part owner NTT while LankaCom, another ISP, has a four Mbit/s connection to Singapore via its owner SingTel.

A big boost in Internet connectivity is increasingly celebrated as a significant event in most countries throughout the region. Take India’s incumbent international operator VSNL, which proudly announced in April 2001 that it had reached 1000 Mbit/s of international Internet capacity, a major milestone: *“The achievement of 1000 Mbit/s of leased connectivity is a landmark for India...”* The increase in bandwidth was also significant since India now has more Internet than voice telephone capacity. Or take Fiji, which has the good fortune of being a landing point on the new 30 500 km-long Southern Cross Cable, which also links Australia and New Zealand to Hawaii and the United States West Coast. Fiji spent USD 22 million to connect to Southern Cross, one of the biggest investments the island nation has ever made. The Chairman of Fiji’s international telecommunication operator FINTEL, noted: *“The significance of the investment should not be under emphasized...the impact of the project will be far reaching...it will influence investors’ decisions to invest in Fiji.”*

But not all countries in the region have participated in the bandwidth boom. While some nations have gigabits of connectivity others get by on less bandwidth than an average Asymmetric Digital Subscriber Line (ADSL) connection. Two groups of countries are particularly suffering, cursed by unfavourable geographic locations. One group includes land-locked Asian nations such as Laos P.D.R or Nepal that cannot benefit from undersea cables. The other group, Pacific island nations, lies too far away from main submarine cable routes. These nations find themselves in a situation where they rely on lower quality and high-cost satellite connections. Another factor affecting these countries is economies of scale. While the cost of bandwidth is coming down, the savings are particularly significant when you buy megabits of it. Smaller nations do not have the resources to buy large amounts and thus pay higher prices. For example, ITU research suggests that countries in South East Asia are paying between six and seven times more than what Japan pays for international Internet bandwidth. There is also a lack of transparency in bandwidth pricing and vendors tend to not publish their prices.

What is the remedy for bandwidth crippled nations?

One way of reducing costs is to open up markets. While some countries profess to have open Internet markets with no restrictions on the number of ISPs, in reality they are constrained. ISPs are not allowed to directly procure their own international capacity and must instead obtain it from the monopoly gateway provider, typically the incumbent telecommunication operator. In other countries, although ISPs may be free to obtain international connectivity, it is only for a half circuit and they must obtain the other half from the incumbent operator.

Another way is to reduce the volume of outgoing Internet traffic. It is absurd for e-mails between two users in the same country to be transited through a third country. This can be avoided by the use of a national Internet exchange. In the case of Indonesia, ISPs estimate that half their operating costs go towards establishing international Internet links. The nation’s Internet Service Provider association, in cooperation with Cisco, built a national Internet exchange for ISPs to keep their national traffic from leaving the country. As a result, ISPs estimate they have reduced the costs for international links by some 15 per cent.

A third method is to develop asymmetric links. This is based on the assumption that incoming traffic (e.g., Web pages from abroad) will be greater than outgoing (e.g., a one line website address). A number of ISPs in the region have thus arranged for Internet connections via satellite where they have more incoming than outgoing bandwidth to reduce their costs. One drawback of this approach is that it is not ideal for electronic commerce. The reason is that overseas users will find it slower to access Web pages in the country that has asymmetric links since they will have less bandwidth available.

A fourth solution would be for countries with small markets to pool their bandwidth requirements in order to leverage lower connectivity costs.

In conjunction with these steps, other actions could be taken to ensure that geographically disadvantaged nations are not excluded from the global information society. This might include applying the spirit of various resolutions that call for the cost of the Internet link between countries to be shared.

Asia-Pacific Internet economy (2001)

		Number of users		Number of subscribers (000s)		

	<i>Number of ISPs</i>	<i>Total (000s)</i>	<i>Per 100 inhabitants</i>	<i>Total</i>	Broadband	<i>International Internet bandwidth (Mbit/s)</i>
Australia	603	7200	37.1	4181	123	7000
Bangladesh	60	250	0.2	100	-	40
Bhutan	1	3	0.4	2	-	2
Brunei Darussalam	2	35	10.4	23	-	60
Cambodia	2	10	0.1	5	-	6
China	936	33 700	2.6	17 364	203	7598
Fiji	2	15	1.8	6	-	4
French Polynesia	1	16	6.8	9	-	8
Guam	5	48	30.5			
Hong Kong, China	258	2601	38.5	2631	623	6308
India	90	7000	0.7	3200	50	1475
Indonesia	60	4000	1.9	600	15	343
Iran (Islamic Republic of)	1005	1.6	402	1	160	
Japan	4000	55 930	43.9	24 062	3835	22 705
Kiribati	1	2	2.3	1	-	0.13
Korea (Republic of)	99	24 380	52.1	8956	7806	5432
Lao P.D.R.	2	10	0.2	2	-	2
Macao, China	6	101	22.5	35	10	120
Malaysia	6	6500	27.3	2115	4	733
Maldives	1	10	3.6	1	-	5
Micronesia	1	5	4.2	2	-	1
Mongolia	7	40	1.7	10	-	10
Myanmar	1	10	0.0	4	-	2
Nepal	15	60	0.3	15	-	10
New Caledonia	4	25	11.4	15	-	8
New Zealand	80	1092	28.6	660	17	1900
Pakistan	70	500	0.3	200	-	225
Papua New Guinea	6	50	0.9	27	-	6
Philippines	51	2000	2.6	600	10	237

Samoa	3	3	1.7	...	-	2
Singapore	42	1500	36.3	927	151	2639
Solomon Islands	1	2	0.5	1	-	0.26
Sri Lanka	29	150	0.8	62	-	18
Taiwan, China	185	7820	34.9	6316	1130	7228
Thailand	18	3536	5.8	1500	2	642
Tonga	1	3	2.8	1	-	1
Vanuatu	1	6	2.7	2	-	1
Viet Nam	4	1010	1.2	252	-	34
Asia-Pacific	6654	160 217	4.6	74 290	13 979	64 955

Note: Local Internet access in Afghanistan and the Democratic People’s Republic of Korea is not available.

Source: ITU.

¹ Internet bandwidth refers to the capacity of the connection. It is measured in bits per second (bit/s).