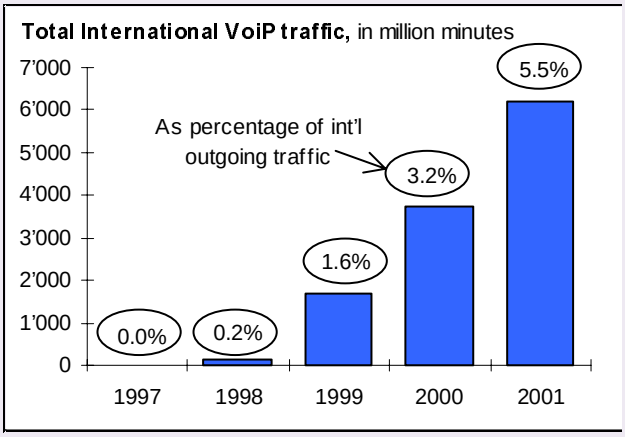
ITU INTERNET REPORTS 2001: IP TELEPHONY

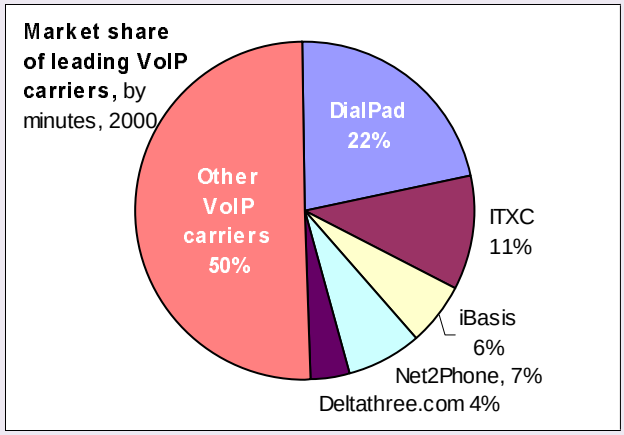
This new addition to the ITU Internet Reports series looks at the topic of IP Telephony. Internet Protocol (IP) Telephony is rapidly reaching the top of the agenda for the telecommunications industry worldwide. The key issue that has gained the attention of policy-makers, regulators, and industry alike is that the Internet, and other IP-based networks, are increasingly being used as alternatives to circuit-switched telephone networks. The many different 'flavours' of IP Telephony provide, to varying degrees, alternative means of originating, transmitting, and terminating voice and data transmissions that would otherwise be carried by the public switched telephone network (PSTN). In many countries it is now possible, using a standard telephone, to call almost any other telephone in the world by means of IP Telephony. By 2004, this could account for up to 40 per cent of all international traffic. Because these calls are mainly carried outside of the PSTN, they are also outside the regulatory and financial structures that have grown up around it.

The transmition of voice over IP-based networks, with its challenges and associated opportunities, of voice and data integration, etc., constitutes a milestone in the convergence of the communications sector. Accordingly, IP Telephony has been selected as the topic of the *3rd World Telecommunication Policy Forum (WTPF)*, to be held in Geneva, 7-9 March 2001.

This report discusses and analyses many of the issues surrounding IP Telephony. Chapter one, 'Why IP Telephony', defines IP Telephony and looks at the different forms that IP Telephony can take. Chapter two, 'Technical Aspects of IP Telephony', suggests more specific definitions and looks at the interworking of IP-based networks with circuit-switched networks. Chapter three, 'Economic aspects of IP Telephony', looks at the reasons for the popularity of IP Telephony, which mainly stem from the fact that it offers price and cost advantages over conventional forms of telephony. Chapter three also considers the likely impact on public telecommunication operators. Chapter four, 'Regulatory aspects of IP Telephony', discusses the different regulatory approaches to IP Telephony, and the methods used to categorize it within those regulatory structures. Chapter five, 'IP Telephony in practice', presents summaries of a series of country case studies. Finally, Chapter six, 'Conclusions', brings these different themes together and concludes that the IP Telephony industry is now approaching maturity.

Figure 1: Taking off
Voice over IP market growth, 1997-2001 (left), and carrier market shares, 2000 (right)



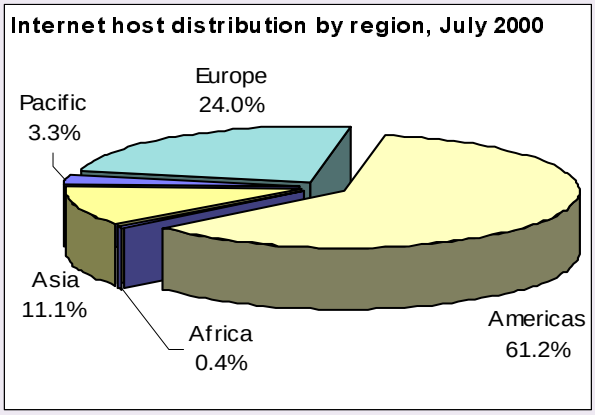


Source: ITU, adapted from TeleGeography Inc. and Company annual reports.

Much of the research for this report was carried out under the 'New Initiatives' programme, launched at the ITU in 1999. The research program included the case studies and a workshop on IP Telephony in Geneva on 14-16 June 2000 (see: www.itu.int/iptel).

The ITU is committed to playing a positive role in the development of the Internet and to extending the benefits of new telecommunication technologies, such as the Internet, to all the world's inhabitants. The Minneapolis Plenipotentiary Conference (1998) passed Resolution 101, which calls upon the ITU to "fully embrace the opportunities for telecommunication development that arise from the growth of IP-based services." The ITU Internet Reports are hopefully a significant contribution to that commitment.

Figure 2: Internet host distribution



Source: ITU, partially based on data from the Internet Software Consortium (www.isc.org) and RIPE (www.ripe.net).

Table 1: Multimedia access

Economies rank based on the cumulative score in Teledensity, TVs, Internet hosts, and Cellular mobile density

Overall Rank	Economy	Telephone main line density per 100 inhabitants 1999	Rank	TV sets density per 100 inhabitants 1999	Rank	Internet host density per 10'000 inhabitants 1999	Rank	Cellular mobile subscriber density per 100 inhabitants 1999	Rank
1	Norway	71.2	5	58.50	16	1'694.55	3	61.75	4
2	Finland	55.2	18	64.3	10	1'850.51	2	65.12	1
3	Denmark	68.5	7	62.1	12	1'134.50	6	49.47	10
4	Iceland	67.7	9	52.00	25	1'895.69	1	61.93	3
5	United States	68.2	8	84.90	2	1'386.99	4	31.15	25
6	Sweden	66.5	10	53.1	23	1'116.40	7	58.29	5
7	Netherlands	60.6	12	55.3	18	1'011.21	9	43.54	17
8	United Kingdom	57.5	16	64.5	9	549.93	18	46.28	13
9	Australia	52.1	23	70.50	7	1'028.81	8	34.28	22
10	Canada	65.5	11	71.50	5	976.98	10	22.65	35
11	Switzerland	69.9	6	51.80	26	714.00	12	41.08	19
12	Japan	49.4	27	71.20	6	371.81	24	44.94	16
13	France	57.9	14	60.3	13	313.22	26	36.40	20
14	Austria	48.2	31	51.6	27	583.87	16	51.44	8
15	Hongkong SAR	57.6	15	43.40	38	305.00	28	63.61	2
16	Germany	58.8	13	58	17	361.48	25	28.57	28
17	Luxembourg	72.4	4	38.9	50	399.91	21	48.70	11
18	Taiwan-China	54.5	20	41.60	41	482.19	19	52.24	7
19	Belgium	50.2	26	52.3	24	582.19	17	31.45	23
20	New Zealand	49.0	28	51.20	28	1'262.38	5	23.01	34
21	Italy	46.2	34	48.8	30	142.60	40	52.83	6
22	Portugal	42.4	41	54.2	21	149.22	37	46.81	12
23	Ireland	47.8	32	40.7	48	298.40	28	45.67	15
24	Greece	52.8	22	47.2	34	128.14	42	31.06	26
25	Spain	41.8	43	50.8	29	201.80	31	31.20	24
26	Israel	45.9	35	32.80	60	424.95	21	45.89	14
27	Singapore	48.2	30	29.00	70	679.92	15	41.88	18
28	Czech Republic	37.1	50	46.70	35	205.32	31	18.95	46
29	Korea (Rep.)	44.1	38	34.60	57	44.92	61	50.03	9
30	Hungary	37.1	50	44.20	36	200.76	33	16.21	49
31	Poland	26.3	68	41.30	42	81.25	46	10.21	65
32	Argentina	20.1	85	29.30	69	69.49	50	12.12	58
33	Turkey	26.5	66	31.50	65	22.02	72	11.91	60
34	Chile	20.7	81	23.60	91	47.74	59	15.05	51
35	Brazil	14.9	95	32.40	61	47.41	60	8.95	70
36	Mexico	11.2	101	26.10	80	74.19	49	7.94	74
37	Malaysia	20.3	84	17.00	111	48.23	58	13.70	54
38	South Africa	13.8	97	13.40	120	74.96	48	13.21	55
39	Russia	20.6	82	42.10	39	15.78	78	0.92	126
40	Venezuela	10.9	103	18.50	107	10.75	94	14.34	52
41	Thailand	8.6	115	24.00	86	11.78	91	3.84	94
42	China	8.6	114	28.70	71	1.01	133	3.42	97
43	Philippines	4.0	140	11.00	128	2.97	113	3.66	95
44	Indonesia	2.9	118	13.60	118	1.79	121	1.06	123
45	India	2.7	140	7.50	140	0.42	148	0.19	159

Source: ITU, partially based on data from the Internet Software Consortium (www.isc.org) and RIPE (www.ripe.net).