
INFRASTRUCTURE FOR ICT IN THE CARIBBEAN

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**Presented to the NovaTech Investment Conference on Information and
Communication Technologies, Santo Domingo, 25 – 27 October 2005**

Outline

- **Basic requirements for the development of an information-based industry**
- **The situation in the Caribbean today**
- **How does the Caribbean measure up in terms of access and prices?**
- **Regulatory barriers to investment**
- **Recommended action**

Basic requirements for the development of an information-based industry

- **The availability of physical infrastructure which allows people, businesses and governments to communicate**
- **Ease of accessibility to all who have or want to communicate at affordable prices and adequate quality of service**

The situation in the Caribbean today

- **Telecommunications markets have been almost completely liberalized in most countries and territories**
- **There is competition in the cellular market in most countries (current exceptions: The Bahamas, Suriname). The situation is changing in Trinidad & Tobago, BVI, Turks & Caicos**
- **Most countries and territories have at least 3 operators. Some have up to 7 (eg. St. Martin, Puerto Rico)**

The situation in the Caribbean today (2)

- International calling rates are starting to decline in some countries but are still very high by North American and European standards**
- International leased circuit prices and consequently the costs for business and Internet users are high in a large part due to limited access to submarine fibre optic cable systems. The situation is changing.**

The situation in the Caribbean today (3)

- **Revenues from incoming international traffic are declining due to falling settlement rates; Resulting negative impact on prices for local calls.**
- **Former monopolies continue to dominate especially in the fixed network.**
- **New entrants, especially local investors are disadvantaged with respect to well organized and resourced multinationals including the incumbent.**

The situation in the Caribbean today (4)

- Many regulators currently do not have sufficient resources and professional staff to regulate adequately in this situation.**
- How does the Caribbean measure up in terms of access (fixed and mobile penetration, Internet hosts and use, fibre optic backbone and satellite access) to communications facilities and prices that people have to pay (retail and wholesale prices) ?**

The situation in the Caribbean today (5)

- **How does the Caribbean measure up in terms of access to communications facilities**
 - **fixed and mobile penetration,**
 - **Internet use and number of hosts**
 - **fibre optic backbone and**
 - **satellite access**
- **prices that users have to pay (retail and wholesale) ?**

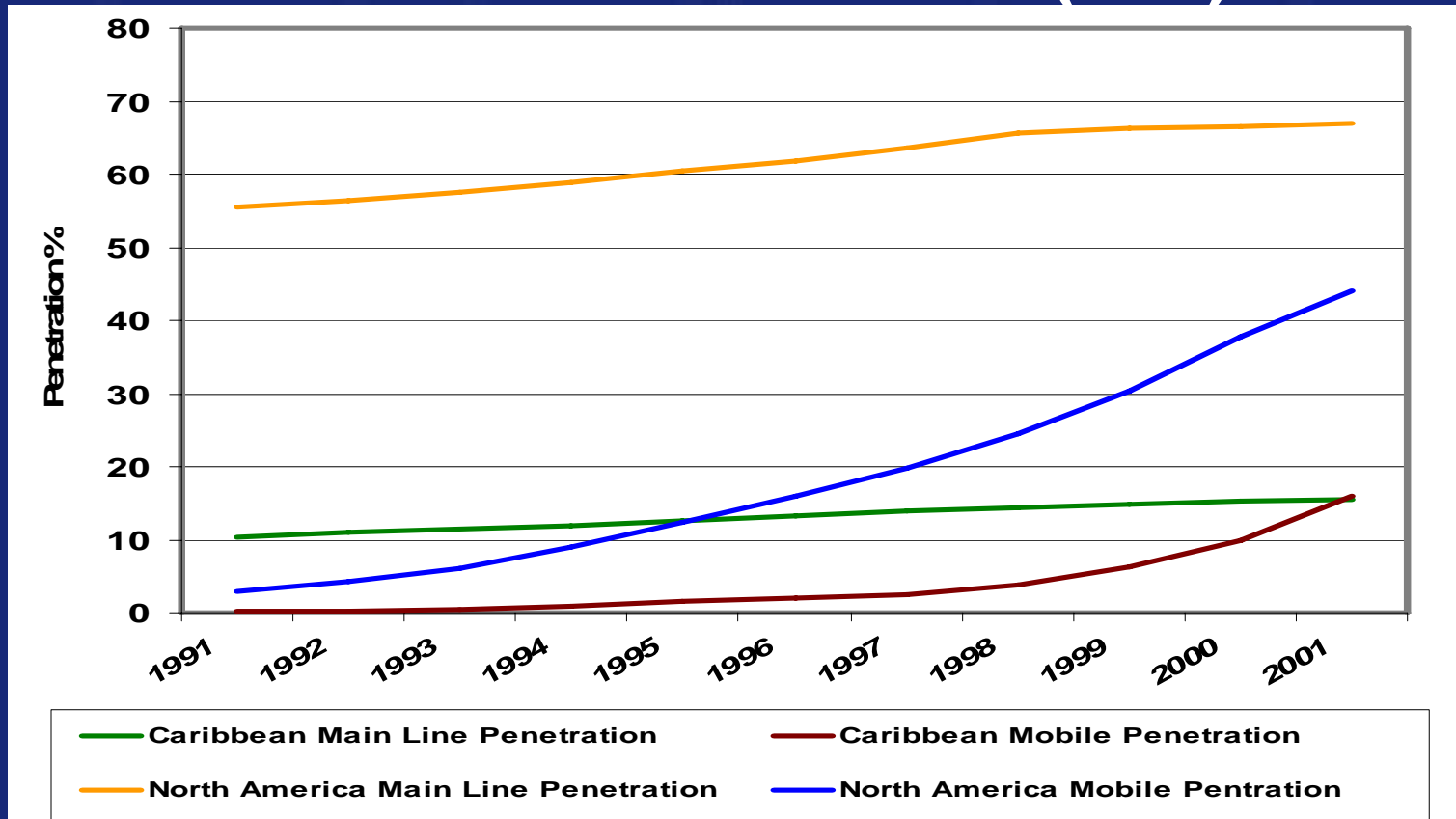
In terms of access

- **Fixed penetration rates are stable; mobile penetration rates are growing exponentially; wide discrepancies remain across the Caribbean**
- **Wide discrepancies in Internet access and use**
- **Large number of submarine fibre optic cable systems; however, access to them remains a problem. This is changing.**
- **Good satellite coverage but this is an expensive solution.**

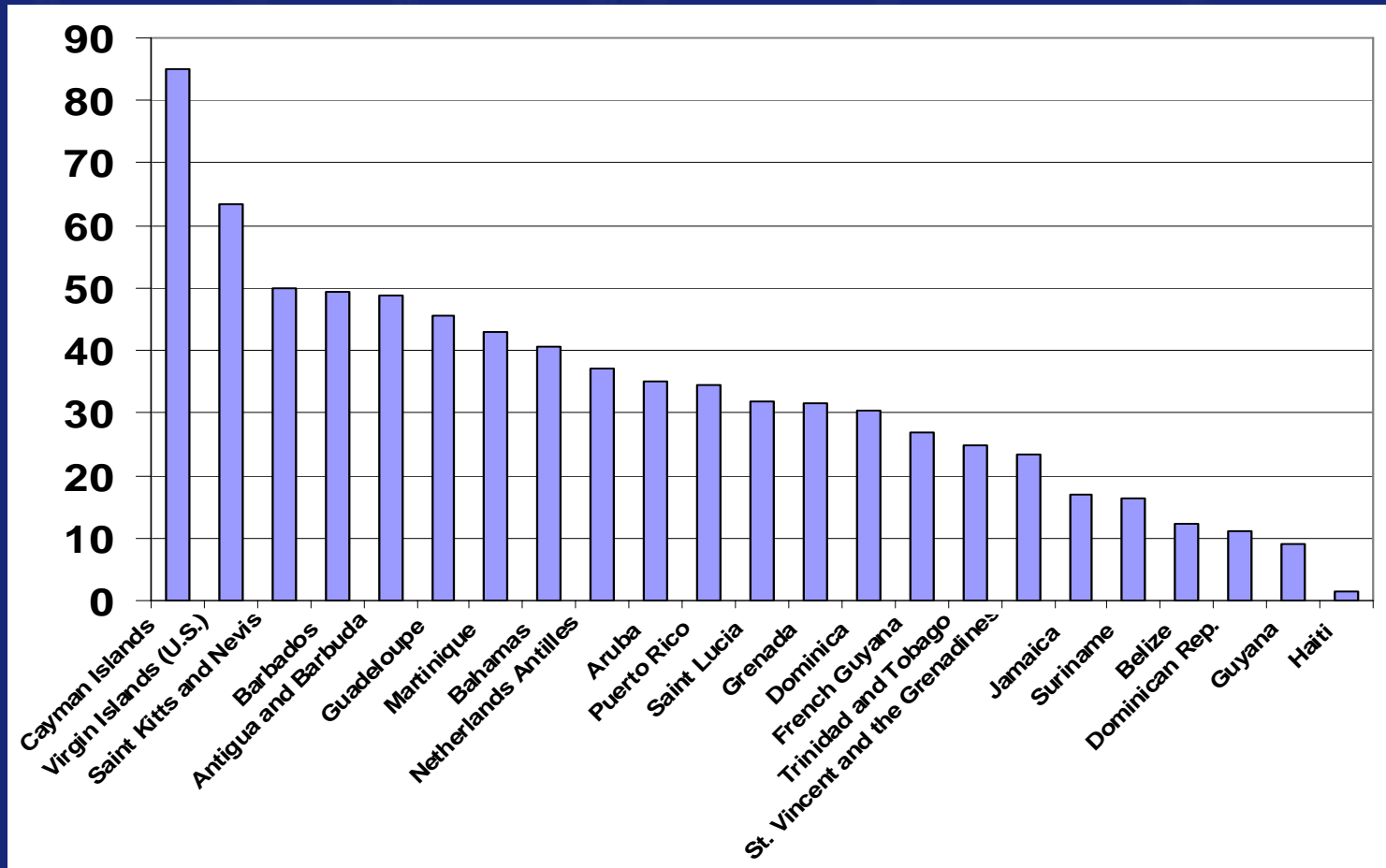
In terms of access (2)

- **Limited deployment of wireless access technologies; FWA in Barbados, Jamaica and Trinidad & Tobago; MMDS in Jamaica; LMDS in Barbados**
- **Cable modem in Dominican Republic, The Bahamas, Trinidad & Tobago**
- **Some WiFi deployment**

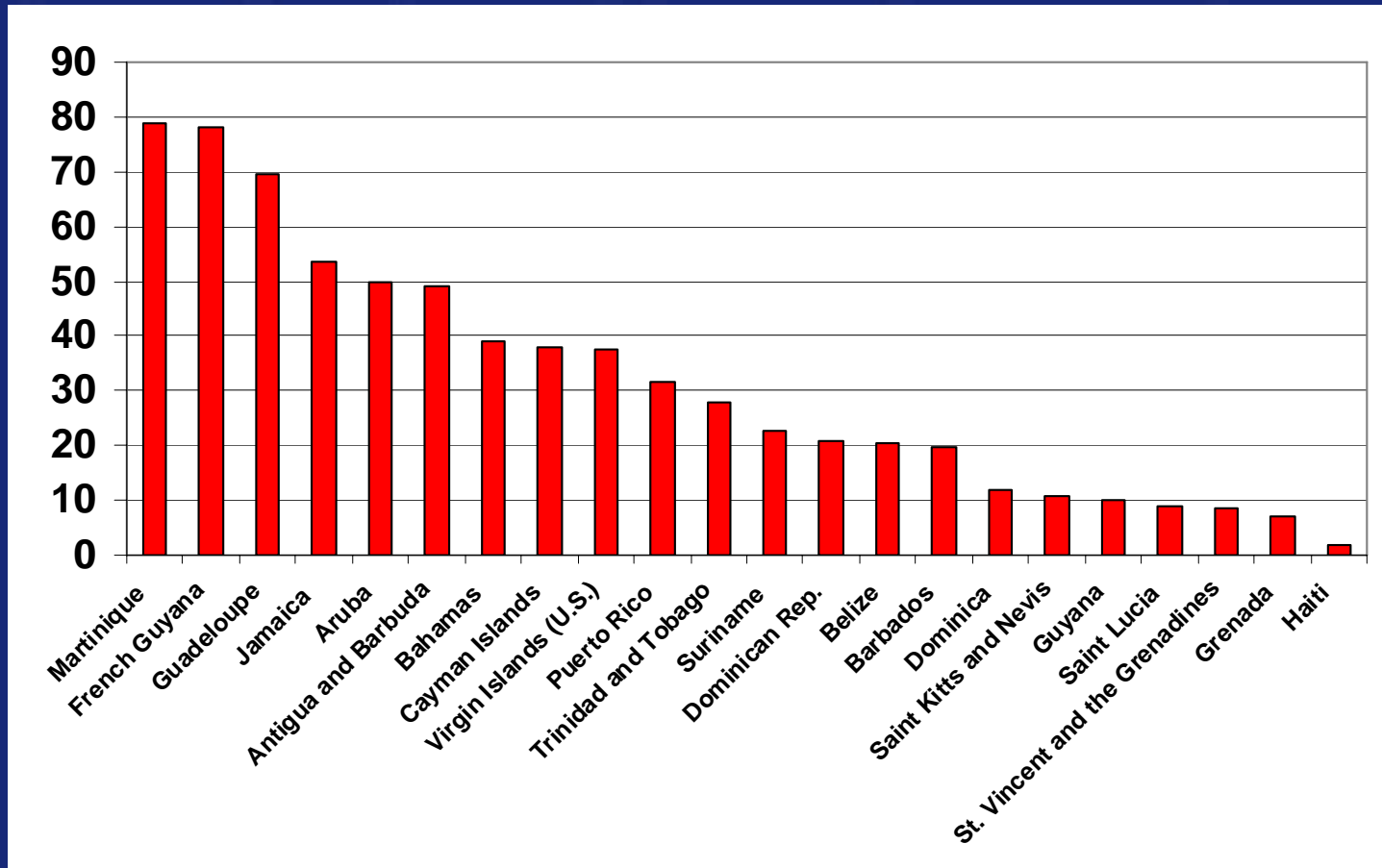
Growth of fixed and mobile: comparison with North America (ITU)



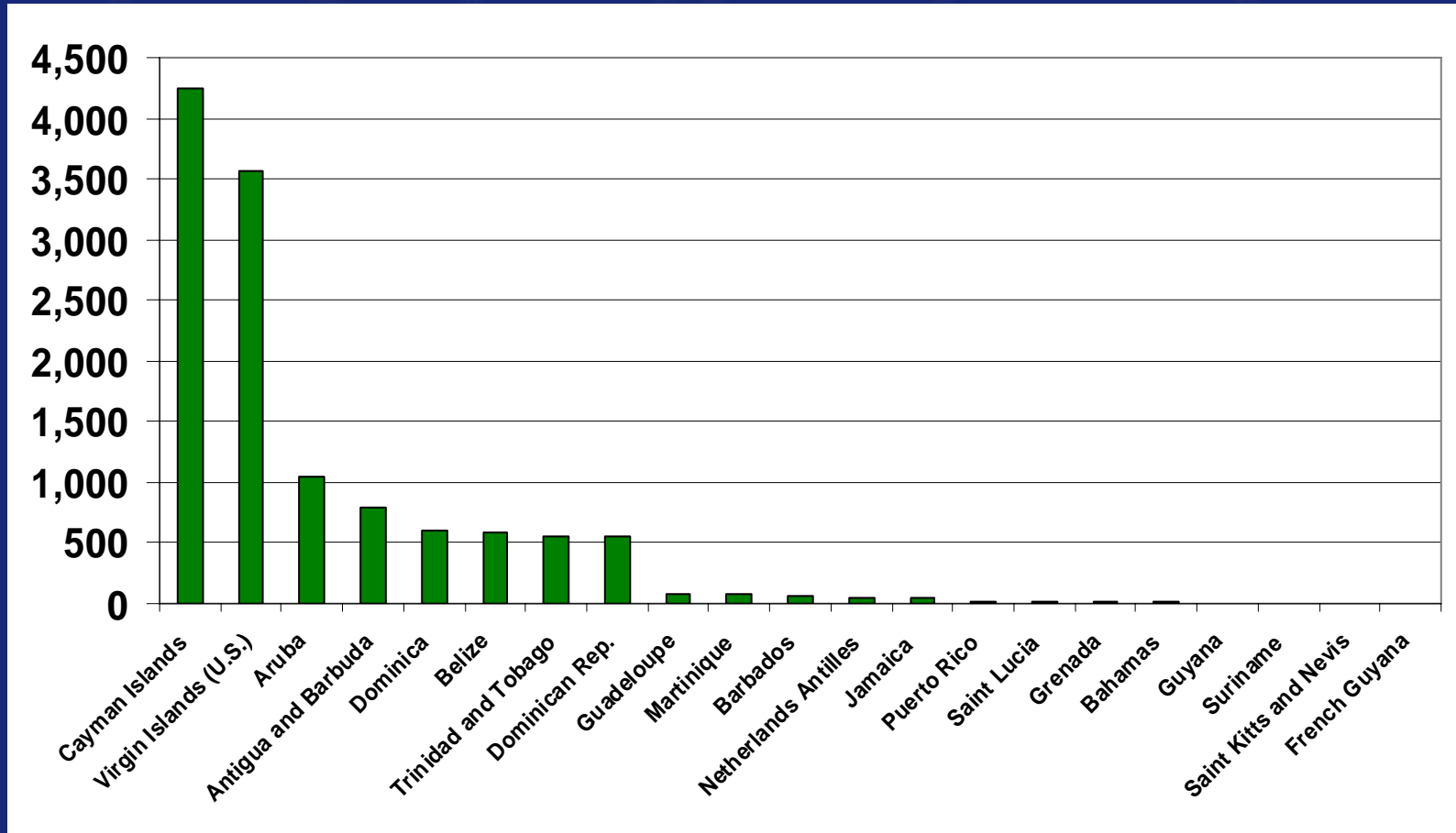
Fixed line penetration (ITU 2002)



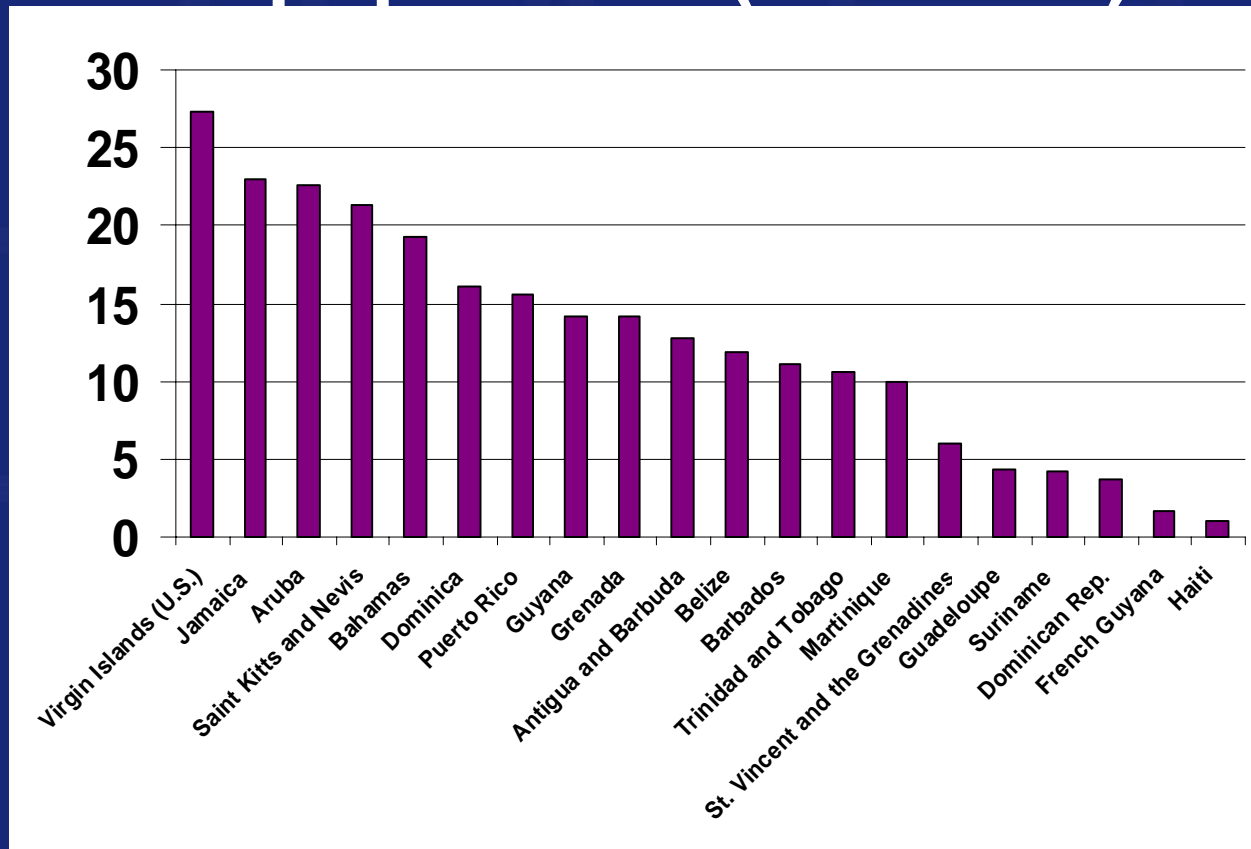
Mobile penetration (ITU 2002)



Internet hosts per 100,000 population (2002)



Estimated number of Internet users per 100 population (ITU 2002)



Fibre optic cable networks

- **20 international systems; 14 of which primarily serve the region**
- **Combined total capacity at construction = 70 Gbps; combined potential capacity > 3 Tbps**

Fibre optic cable networks (2)

- **Of 25 countries and territories in the Caribbean more than half have access to only one cable system; in many of these countries and territories all cables landing are controlled by the same operator, generally Cable & Wireless**
- **Taino Caribe (1991), TCS-1 (1991), and ECFS (1995) are older systems approaching the end of their design life**

Access to fibre optic cable systems in the Caribbean

Country/Territory	No. of cables	Cable systems landing in country or territory
Anguilla	1	ECFS
Antigua & Barbuda	1	ECFS
Aruba	2	Pan American, Alfonso de Ojeda
Bahamas	3	Arcos-1, Bahamas II, Bahamas Internet Cable System (BICS)
Barbados	1	ECFS
Belize	1	Arcos-1
British Virgin Islands (Tortola)	2	CARAC, Taino
Cayman Islands (BOT)	2	CJFS, MAC
Curacao (incl. Bonaire)	3	Amerigo Vespucci, Americas-2, Alfonso de Quejeda
Dominican Republic	3	Antillas-1, Arcos-1, TCS-1
French Guyana	1	Americas-2
Grenada (OECS)	1	ECFS
Guyana	1	Americas-2 via French Guyana and Suriname
Jamaica	2	CJFS, TCS-1
Martinique/Guadeloupe	2	Americas-2, ECFS
Montserrat (BOT)	1	ECFS
Puerto Rico	6	Americas-2, Antillas-1, Arcos-1, Emergia, Taino, TCS-1
St. Kitts & Nevis	1	ECFS
St. Lucia (OECS)	1	ECFS
St. Martin/St. Maarten	2	ECFS, SMPR-1
St. Vincent (OECS)	1	ECFS
Suriname	1	Americas-2 via French Guyana
Trinidad & Tobago	3	Americas-1, Americas-2, ECFS
Turcs & Caicos (BOT)	1	Arcos-1
US Virgin Islands (St. Croix, St. Thomas)	7	Americas-1, Americas-2, Pan American, PAC, MAC, SAC-1, Taino

Caribbean fibre optic cable systems (Planned or under construction)

- **FibraLink**, connecting Jamaica to ARCOS-1 landing site in the Dominican Republic, RFS March 2006
- **Antilles Crossing Fibre Optic Cable System** connecting Barbados, St. Lucia and St. Croix in Phase 1, Trinidad, Tobago, Grenada, St. Vincent in Phase 2 and Martinique, Dominica, Guadeloupe and St. Kitts in Phase 3

Caribbean fibre optic cable systems (Planned or under construction)

- **Trans-Caribbean Cable Network (TCCN)**, cable connecting Jamaica, Cayman Islands and Dominican Republic - ?
- **Bahamas Domestic Submarine Cable Network** connecting New Providence to Inagua via Andros, Exuma, Long Island and Ragged Island in Phase 1; (December 2005); and Inagua to New Providence and Mayaguana, San Salvador, Rum Cay, Cat Island, Eleuthera, Abaco and Grand Bahamas. in Phase II (June 2006)

Caribbean fibre optic cable systems (Planned)

- **Eastern Caribbean Fibre Optic Cable System (EC-1)**, 1,872 km unrepeated 6 fibre pair system in the Eastern Caribbean with initial design capacity of 1.92 Tbps (6 fibre pairs x 32 WDM x 10 Gbps each wavelength) - ?
- **Win-1**, 3,000 km Eastern Caribbean system with connection to Jamaica - ?

In terms of prices

- **At retail level**
 - Rebalancing is taking place; international calling charges are decreasing but are still high with respect to other regions
 - Internet access charges are higher than in other regions
- **At wholesale level**
 - Leased circuit prices are excessively high
 - Interconnection charges appear to be in line with international benchmarks

International telephone calling charges

Country from where call originates	Service provider	Destination of call								
		Caribbean				North America		Rest of World		
		Anguilla	Jamaica	St. Lucia	T&T	USA	Canada	UK	France	Brazil
Any	Skype (computer to computer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Skype (computer to telephone)	0.18	0.13	0.26	0.16	0.02	0.02	0.02	0.02	0.06
	Vonage	0.18	0.12	0.22	0.14	0.00	0.00	0.03	0.03	0.09
Canada	Goldline (anytime)	0.23	0.14	0.21	0.16	0.02	0.02	0.02	0.04	0.09
USA	MCI (anytime)	0.61	0.52	0.41	0.35	0.05	0.05	0.07	0.08	0.15
Anguilla	Cable & Wireless (Anytime)		0.67	0.67	0.67	0.67	0.67	0.67	0.89	0.89
The Bahamas	BTC (reduced)	0.70	0.66	0.70	0.70	0.51	0.54	0.89	0.89	0.89
	BTC (regular)	2.25	2.25	2.25	2.25	0.99	1.25	2.75	2.75	2.75
Barbados	C&W (daytime)	0.40	0.40	0.40	0.40	0.65	0.65	0.65	0.75	1.00
	C&W (evening)	0.23	0.23	0.23	0.23	0.50	0.50	0.50	0.60	0.75
Guyana	GT&T (peak)	0.51	0.73	0.51	0.40	0.56	0.75	0.76	1.91	1.51
	GT&T (off peak)	0.36	0.51	0.36	0.28	0.50	0.52	0.69	1.33	1.06
Jamaica	Digicel	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
	Cable & Wireless (Anytime)	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
St. Lucia	Cable & Wireless	0.25	0.25		0.25	0.47	0.47	0.47	0.49	0.49
Suriname	Telesur	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
	Greentone	0.33	0.34	0.36	0.29	0.15	0.18	0.22	0.22	0.22
Trinidad and Tobago	TSTT (daytime)	0.33	0.33	0.17		0.32	0.32	0.32	0.48	0.80
	TSTT (night saver)	0.27	0.27	0.14		0.27	0.27	0.27	0.41	0.68

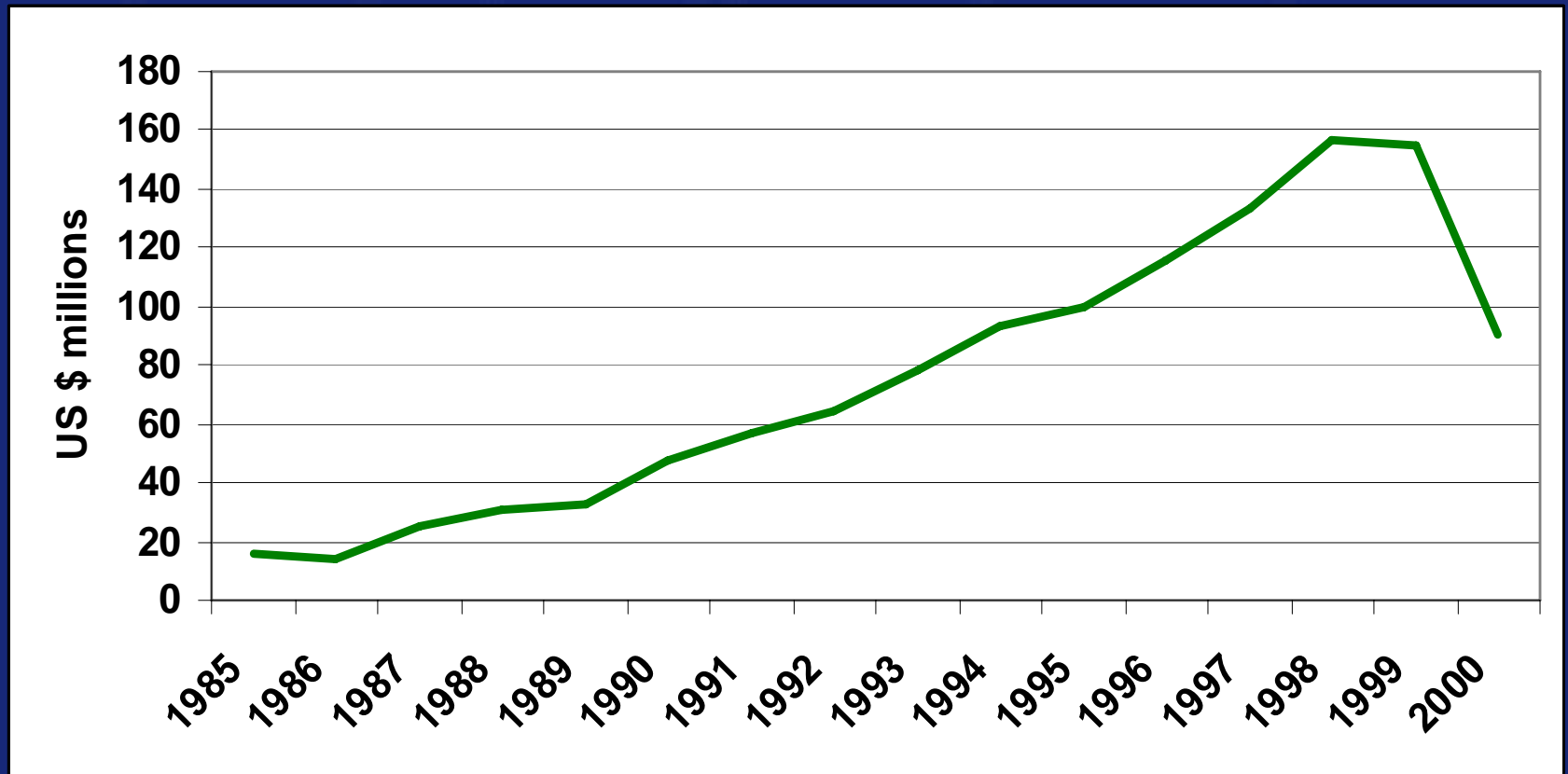
Prices for high speed Internet access

Country	Service Provider	Service	Techn.	Speed (Kbps)		US \$/m
				Down	Up	
Argentina	Ciudad	Flash	Cable	512	128	15
Argentina	Ciudad	Flash	ADSL	1,200	256	23
France	FT	Internet 512	ADSL	512	128	30
Barbados	C&W	ADSL 256	ADSL	256	64	31
Canada	Videotron	Haut Vitesse	Cable	3,000	820	32
Bahamas	Coralwave	Lite	Cable	2000	512	37
Canada	Bell Canada	Sympatico	ADSL	3,000	800	38
Jamaica	C&W	Ultra	ADSL	128	64	40
Jamaica	C&W	Premium	ADSL	768	256	40
Bahamas	Coralwave	Groove	Cable	3,000	768	55
Jamaica	N5	Wireless	MMDS	256	128	55
Dominican Republic	Tricom	Turbo Plan 1	ADSL	128	128	60
Bahamas	Coralwave	Rock	Cable	4,000	1,000	70
Trinidad & Tobago	TSTT	High Speed	ADSL	128	64	74
Jamaica	Kasnet	Res. Silver	MMDS	256	128	75
Barbados	C&W	ADSL 768	ADSL	768	128	86
Barbados	C&W	ADSL 1544	ADSL	1,544	256	108
Trinidad & Tobago	TSTT	Business 1	ADSL	128	64	184
Dominican Republic	Tricom	Turbo Plan 7	ADSL	1,536	768	259
Trinidad & Tobago	TSTT	Business 2	ADSL	256	64	286
Trinidad & Tobago	TSTT	Business 7	ADSL	1,544	256	693

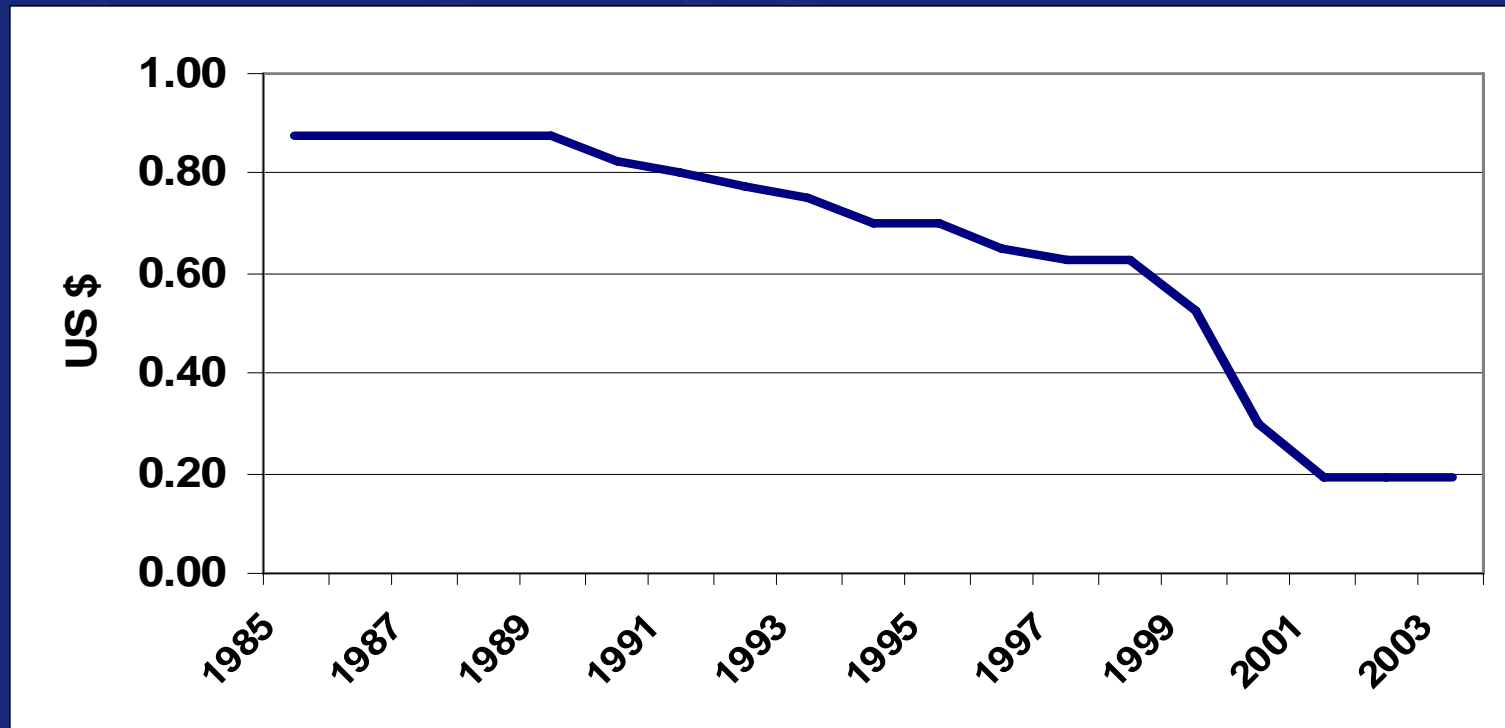
Comparison of T1/E1 lease circuits prices

Route	Distance* (km)	Capacity/Speed		Avg. price/month (US \$)		
		Type	Mbps	per circuit	per Mbps	per Mbps per km
Sydney – Los Angeles	12,049	E1	2.048	5,117	2,499	0.21
Hong Kong – Los Angeles	11,640	E1	2.048	2,595	1,267	0.11
Hong Kong – London	9,740	E1	2.048	4,267	2,083	0.21
Tokyo – Los Angeles	8,815	E1	2.048	2,334	1,140	0.13
New York – London	5,585	E1	2.048	945	461	0.08
Amsterdam – Madrid	1,477	E1	2.048	1,152	563	0.38
Frankfurt - Madrid	1,434	E1	2.048	1,047	511	0.36
London - Madrid	1,261	E1	2.048	966	472	0.37
Frankfurt – London	634	E1	2.048	721	352	0.56
Trinidad & Tobago – Miami	2,602	T1	1.544	11,000	7,124	2.74
Barbados – Miami	2,584	T1	1.544	10,000	6,477	2.51
Kingston - Miami	932	T1	1.544	10,000	6,477	6.95

Evolution of settlement payments (Jamaica)



Evolution of the (official) settlement rate (Jamaica)



Actual (spot) settlement rates (US \$): Fixed termination

Termination Country	Sprint Canada	Canada Discount	Spot	Diff. w.r.t discount
Anguilla	0.33	0.23	0.14	0.087
Barbados	0.34	0.21	0.13	0.084
Dominica	0.44	0.20	0.15	0.056
Dominican Republic	0.14	0.11	0.05	0.059
Guyana	0.38	0.42	0.22	0.200
Jamaica	0.25	0.14	0.10	0.040
Suriname	0.60	0.34	0.20	0.133
Trinidad and Tobago	0.25	0.16	0.10	0.061
Japan	0.07	0.05	0.024	0.027
United Kingdom	0.04	0.03	0.012	0.022

Actual (spot) settlement rates (US \$): Mobile termination

Termination Country	Sprint Canada	Canada Discount	Spot	Diff. w.r.t discount
Anguilla	0.33	0.23	0.14	0.087
Barbados	0.34	0.24	0.13	0.111
Dominica	0.44	0.26	0.15	0.112
Dominican Republic	0.14	0.23	0.05	0.181
Guyana	0.38	0.42	0.22	0.201
Jamaica	0.25	0.30	0.15	0.152
Suriname	0.60	0.34	0.20	0.133
Trinidad and Tobago	0.50	0.17	0.10	0.062
Japan	0.33	0.23	0.125	0.110
United Kingdom	0.33	0.29	0.113	0.177

Regulatory barriers to investment

A. Barriers which relate to regulatory institutions and in particular

- A newly established competitive environment where one operator continues to dominate**
- Real or perceived political interference in the functioning of the regulator**
- Lack of experience and training in dispute resolution**
- A lack of sufficient expert resources within the regulatory body.**

Regulatory barriers to investment (2)

B. Barriers which result from deficiencies in the legal and regulatory framework, namely:

- Unpredictable and sometime unstable regulatory environments**
- Absence of harmonized regulations and policies in the region**

Recommended action

- **Establish a comprehensive regional program of resource sharing, training, and information exchange among regulators and policy makers**
- **Harmonize policies, legal and regulatory frameworks, procedures and standards to diminish uncertainty and simplify procedures for investors**

Recommended action (2)

- **Implement training and other programs for the newly established telecommunications regulators and government officials designed to familiarize them and become more effective with respect to:**
 - **their independence of political and other influences**
 - **the principles and best practices in dispute resolution (Develop a regional capacity to jointly deal with disputes)**

Recommended action (3)

- **business planning and finance practices to enhance their understanding of the implications of their decisions on the flow of investment into the telecommunications sector**
- **the principles and practices of the various free trade negotiations (WTO, FTAA, CARIFORUM – EU EPA, Canada - CARICOM) in order that they and also the private sector may become more involved in these negotiations**



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