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by Andrés Broner

Guide to Caribbean ISP Markets 2001

Executive Summary

The Caribbean Internet market has had steadily growing domestic demand for residential Internet access across the island nations. Many of these small but growing markets have been accustomed to high prices for low-quality connectivity in monopoly environments. This is changing as markets liberalize and competition appears in even the smallest markets. However, no two markets are similar, and consumer purchasing power varies greatly between islands.

Puerto Rico is an important market in the Caribbean environment given the attractive number of Socio-Economic Strata (SES) A and B households. Puerto Rico, the Dominican Republic, Jamaica, Trinidad and Tobago, Haiti, and Cuba together accounted for 435,393 dial-up subscribers at year-end 2000 (see Exhibit 1). We predict that these countries—which totaled over 35 million inhabitants at year-end 2000—will reach more than 1 million subscribers by 2006 for a compound annual growth rate (CAGR) of 15.74%.

This Report analyzes the environment and opportunities in the Caribbean's ISP markets.

(Note: All prices are quoted in U.S. dollars.)

Exhibit 1
Paid Dial-Up Subscriber Accounts by Country
Source: the Yankee Group, 2001

Country	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)
Puerto Rico	260,000
Jamaica	81,500
Dominican Republic	52,761
Trinidad and Tobago	35,000
Haiti	4,096
Cuba	2,036
Total	435,393

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I. Introduction

The Caribbean region is witnessing a transformation in the Internet market, with important growth occurring across residential SES A and B households. Diverse, small, and ignored by many equipment vendors and service providers, the Caribbean Internet markets are beginning to grow steadily as the effects of market deregulation and privatization appear in the market. In this Report we analyze the residential ISP service developments and demand across the Caribbean, including Puerto Rico, the Dominican Republic, Jamaica, Trinidad and Tobago, Haiti, and Cuba. We also forecast paid dial-up subscribers and penetration by country. We examine each principal Internet market, presenting a forward-looking summary of trends and our recommendations for service providers and vendors.

II. Methodology

The Yankee Group surveyed top-tier Internet service providers (ISPs) operating in Puerto Rico, the Dominican Republic, Jamaica, Trinidad and Tobago, Cuba, and Haiti about their year-end 2000 subscribers as well as expected 2001 numbers based on mid-year results. In addition to final subscriber numbers, pricing plans, and new broadband service initiatives, we also solicited each ISP's qualitative assessments of the market challenges and opportunities for each country market.

The Yankee Group has also forecast paid dial-up Internet subscribers by country, taking into consideration supply-side as well as demand-side factors such as income distribution, service affordability estimates, price elasticity of demand, mainline penetration, educational level, and PC penetration.

III. Incumbent Telcos Dominate the Market . . . for Now

Incumbent telcos, unsurprisingly, are the leaders across ISP markets in the Caribbean. The incumbent telcos have a daunting lead over pure play or new entrants in the Dominican Republic, Puerto Rico, and Jamaica, for example. Codetel in the Dominican Republic is the most significant example of this. With more than 86% of all Internet dial-up accounts, Codetel has retained close to a monopoly market share. No new entrant pure-play ISPs have made major inroads in Caribbean markets.

IV. Puerto Rico, the Dominican Republic, Jamaica, and Trinidad and Tobago

Puerto Rico

This island, ceded by Spain to the United States in 1898 following the Spanish-American War, is the most developed Caribbean island in terms of Internet penetration. The country has a healthy economy and high GDP per capita (see Exhibit 2).

The incumbent telephone company PRT (Puerto Rico Telephone Company) leads the Internet market through its two subsidiaries, PRT Internet and Coqui.Net (see Exhibit 3). PRT Internet will focus on enterprise markets, while Coqui.Net plans to concentrate on consumer markets. On June 2001, PRTC launched ADSL services (256 Kbps/128 Kbps) available for $59.95 per month.

Private investors own number-two player Caribbean Internet (formerly PSINet). Created in 1995, Caribbean Internet had 20,000 dial-up subscribers along with 300 dedicated lines and 2.4-GHz wireless corporate clients at year-end 2000. Its primary corporate subscribers are financial institutions and universities. The company is also a network service provider (NSP) providing transit to six small ISPs.

Widespread ADSL services will exert pressure on corporate dedicated access prices. Caribbean is now offering ADSL as a solution for multi-tenant office buildings with 1-Mbps shared bandwidth.

In Puerto Rico, paid dial-up residential prices are very similar among ISPs, on average $18. AOLA has the most expensive price, $23.90 for credit card payment and $28.90 for cash. **This pricing is an inhibitor for AOLA's growth. A review of AOLA subscription revenues indicates that after one month of free trial, most customers drop the service. AOLA must revise its pricing strategy to meet average market prices if it expects to retain free trial subscribers.**

Centennial provides dial-up access and corporate dedicated access, and is the only company in Puerto Rico offering cable modem access ($39.95 for 500 Kbps/128 Kbps, with an average bandwidth of 300–320 Kbps, plus $299 for the modem). **This broadband hegemony will not last for long. Cable competitors Adelphia and Liberty are upgrading their networks to offer cable modem Internet access in 2002.**

Exhibit 2
Puerto Rico Basic Country Data

Source: CIA World Factbook and the Yankee Group

Puerto Rico

Population (Year-End 2000)	3,808,610
GDP per Capita (1999 Estimated PPP)	$9,800
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	260,000
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	6.8%
Fixed-Line Penetration	32%

Note: PPP = Purchasing Power Parity

Exhibit 3
Top-Tier Internet Service Providers in Puerto Rico

Source: the Yankee Group, 2001

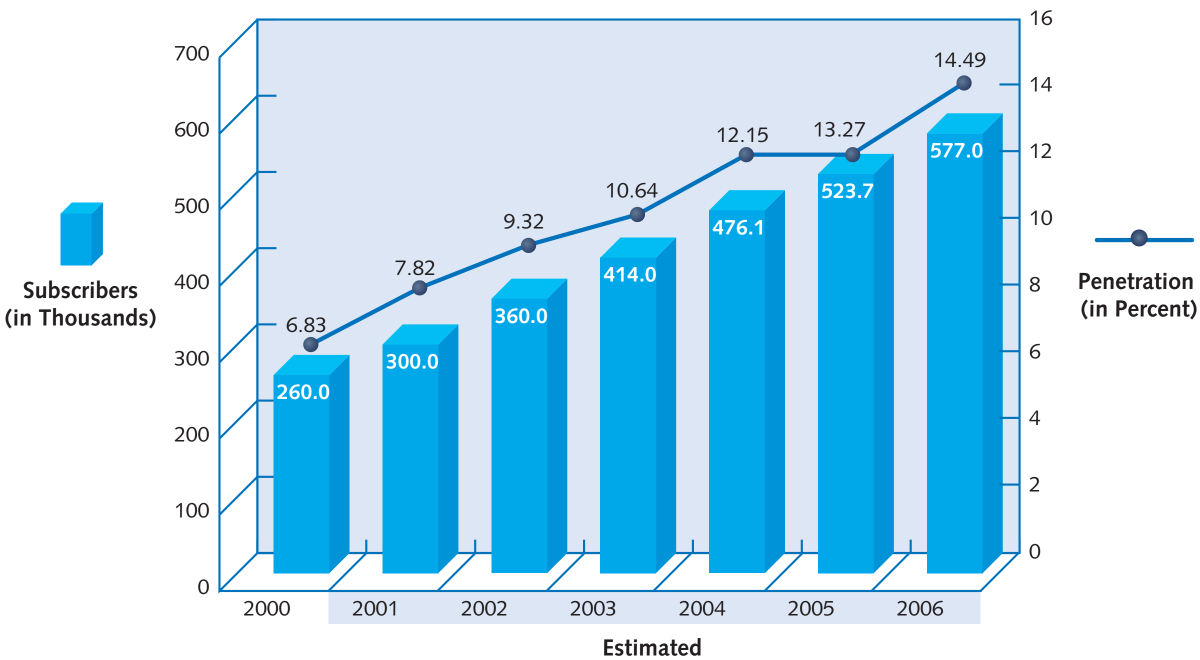
Company	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
PRTC Internet/Coqui.Net	110,075	Verizon	42%
Caribbean Internet	20,000	Private Investors (formerly PSINet)	8%
Centennial	15,000	Centennial	6%
Other	114,925		44%
Total	260,000		100%

Centennial offers a bundled 20% discount applied to its standard $19.95 dial-up Internet access to its fixed-line and mobile customers. More than 25 smaller ISPs complete the ISP panorama in Puerto Rico.

The Puerto Rican market is among the top tier in the Caribbean, and remains so in our forecast of subscribers and penetration, reaching an expected 14.49% penetration in 2006 (see Exhibit 4). Puerto Rico's income distribution and high consumption levels are more similar to developed Latin American economies such as Argentina and Chile than to its less developed Caribbean neighbors.

Exhibit 4
Puerto Rico Dial-Up Subscriber Forecast

Source: the Yankee Group, 2001



The Dominican Republic

The Dominican Republic has a liberalized, open telecom market, although incumbent Codetel retains the largest market share in every telecom service and owns 89% of the mainlines. **The Dominican Republic has enjoyed an excellent GDP per capita and strong economic growth compared to the rest of the region. The market opportunity in the Dominican Republic includes raising its low teledensity and dial-up Internet penetration (see Exhibit 5).**

Codetel, which has been owned and operated for over 40 years by GTE/Verizon, has the largest customer base in every segment. As an incumbent, Codetel has a stronger brand and service quality reputation than most operators in the region. This position allows the incumbent player to hold more than 85% of all dial-up accounts (see Exhibit 6). Codetel launched ADSL services on May 2001 and today offers 256 Kbps/192 Kbps for $68 for residential customers and $171 for businesses. Tricom is second in the market with more than 11% dial up-market share at year-end 2000. On June 2001, a group including Mexican billionaire Carlos Slim Helu (Telex's owner) increased its stake in Tricom from 12.1% to 17.5%, enhancing the possibility of synergies between the Mexican incumbent player and the Dominican telco.

Tricom is aggressively focusing its strategy on the broadband services through its $63.7 million acquisition of the largest domestic cable TV operator, Telecable Nacional (TCN). Tricom will add cable TV services, Web TV, and cable modem Internet access to its existing local and long-distance services, and wireless mobile, Internet, video, and high-speed data services.

TCN, a technology innovator in the cable market, started to offer WorldGate's interactive TV in 2001 and cable modem Internet access on August 2001. Around 80% of TCN's cable plant has been upgraded to 750 MHz and should be fully upgraded by the first quarter of 2002. TCN expects to have 11,000 Interactv users (offering e-mail and local content, chat, e-shopping, information, games, news) at year-end 2001 as a free service for its "Premium" level customers. Netv customers are expected to grow to 2,200 by year-end 2001. The cost of this service is $15 in addition to $25 for basic cable television. **TCN is an excellent acquisition for Tricom given its focus on high-spending consumers and the opportunity to bundle value-added services.** With its

Exhibit 5
Dominican Republic Basic Country Data

Source: CIA World Factbook and the Yankee Group

Dominican Republic

Population (Year-End 2000)	8,553,742
GDP per Capita (1999 Estimated PPP)	$5,400
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	52,761
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	0.62%
Fixed-Line Penetration	11%

Exhibit 6
Top-Tier Internet Service Providers in the Dominican Republic
Source: the Yankee Group, 2001

Company	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
Codetel	45,653	Verizon	86.53%
Tricom	6,080	Tricom	11.52%
Centennial	528	70% Centennial/30% All America Cables & Radio	1%
Platinom	500	Telecable Nacional (Sold to Tricom)	0.95%
Total	52,761		100%

TCN purchase, Tricom will add a new price-competitive product like cable modem to compete with CATV Supercable, the number two player, which has a lower expenditure per customer. This company has only 20% of its core network upgraded to fiber-optic in Santo Domingo and no fiber on its network outside the capital. TCN (Tricom) is expected to launch 384-Kbps/256-Kbps cable modem Internet access for $52 residential and $92 business in December 2001, a price level that will be very competitive with Codetel's new ADSL tariffs. In December 2000, TCN acquired ISP Platinom.net to offer dial-up (500 accounts at year-end 2000 for a $12.25 monthly fee). Tricom is adding 500 dial-up accounts to its customer base, while TCN has concentrated its efforts on Interactv and Netv, and on cable modem services since December 2001.

Centennial, third in the market, relaunched its Internet service on January 2001 and expects to increase its dial-up customers fivefold by year-end 2001. The company is also working as a wholesaler for ISPs, providing connectivity to Platinom Internet.

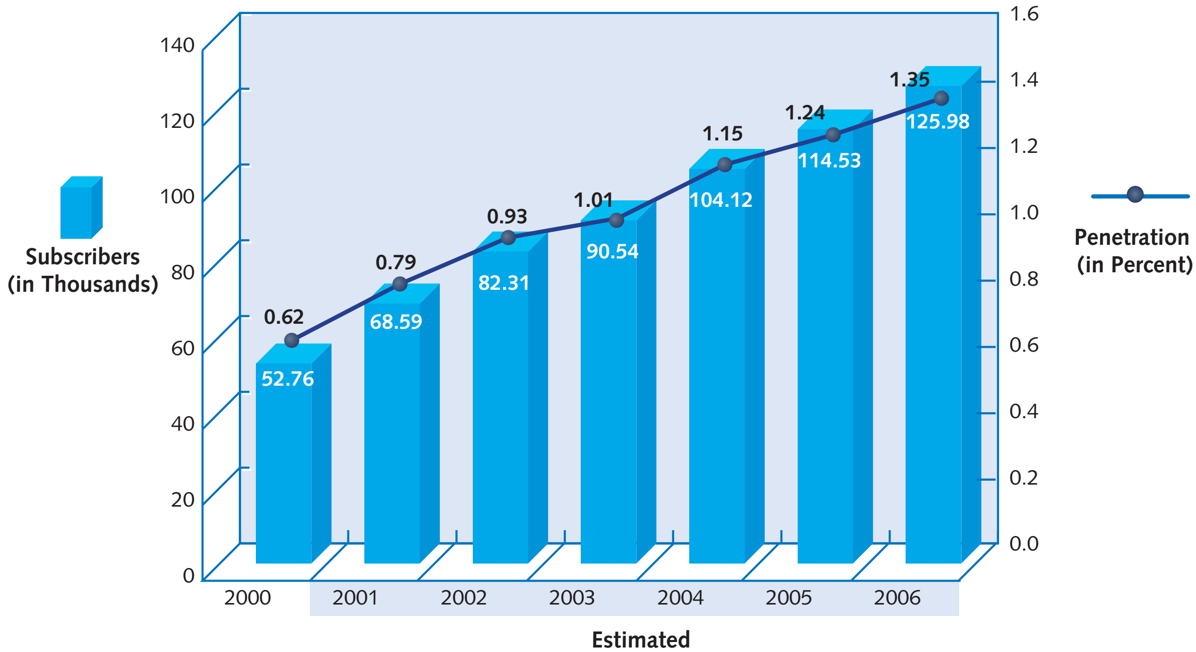
We expect to see rapid growth in broadband penetration in ADSL, cable modem, and wireless services. The Yankee Group dial-up subscriber forecast is for significant growth reaching an expected 125,983 dial-up accounts by 2006 (see Exhibit 7).

Jamaica

Until recently, the monopoly Cable & Wireless Jamaica (C&W) enjoyed an exclusive concession and guaranteed rate of return on investment for the provision of all wireline telephone services, domestic and international, under a license granted by the government. Despite the Cable & Wireless monopoly in the telecommunications market, Jamaica's teledensity is not as low as Haiti's or Cuba's (see Exhibit 8). However, deregulation is changing the profile of the service provider market. The deregulation process of telecommunications sector has three phases:

- **Phase 1 (March 2000–September 2001):** Granting licenses for two additional domestic wireless mobile operators. Competitors include Cable & Wireless, Centennial, and Digicel. International voice service providers for resale of international long-distance (ILD) minutes obtained from the existing carrier (C&W). Open ISP market with a service provider ceiling of 100 competitors. Data services through use of existing operator's infrastructure.

Exhibit 7
Dominican Republic Dial-Up Subscriber Forecast
Source: the Yankee Group, 2001



- **Phase 2 (September 2001–March 2003):** Granting of licenses for basic services: Domestic carriers can offer services over their own networks as domestic voice service providers (resale of minutes).

- **Phase 3 (March 2003):** Full liberalization of ILD carriers.

Cable & Wireless is the leading ISP on the dial-up and dedicated line markets (see Exhibit 9). Before the end of 2001, the company will launch ADSL services at 256-Kbps/64-Kbps, 768-Kbps/128-Kbps, and 1.5-Mbps/256-Kbps speeds. C&W conducted field trials with 600 subscribers through June 2001.

Exhibit 8
Jamaica Basic Country Data
Source: CIA World Factbook and the Yankee Group

Jamaica

Population (July 2000)	2,607,836
GDP per Capita (1999 Estimated PPP)	$3,350
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	81,500
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	3.13%
Fixed-Line Penetration	19%

Exhibit 9
Top-Tier Internet Service Providers in Jamaica
Source: the Yankee Group, 2001

Company	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
Cable & Wireless	40,000	82% Cable & Wireless plc/ 18% Members of the Public	49.08%
InfoChannel	5,000	40% Centennial/ 60% Private Investors	6.13%
N5	5,000	Private Investors	6.13%
Colis	4,500	Private Investors	5.52%
KasNet	4,300	Private Investors	5.28%
World Telenet	1,000	Bought by Infochannel	1.23%
Other	21,700		26.63%
Total	81,500		100%

Currently, dedicated Internet access in Jamaica is priced beyond the means of many enterprises. After a 40% price reduction in 2001, current C&W dedicated Internet access rates are $1,500 for 128 Kbps, $2,700 for 256 Kbps, $4,860 for 512 Kbps, and $8,748 for 1.5 Mbps. The set-up fee for these services is $1,300.

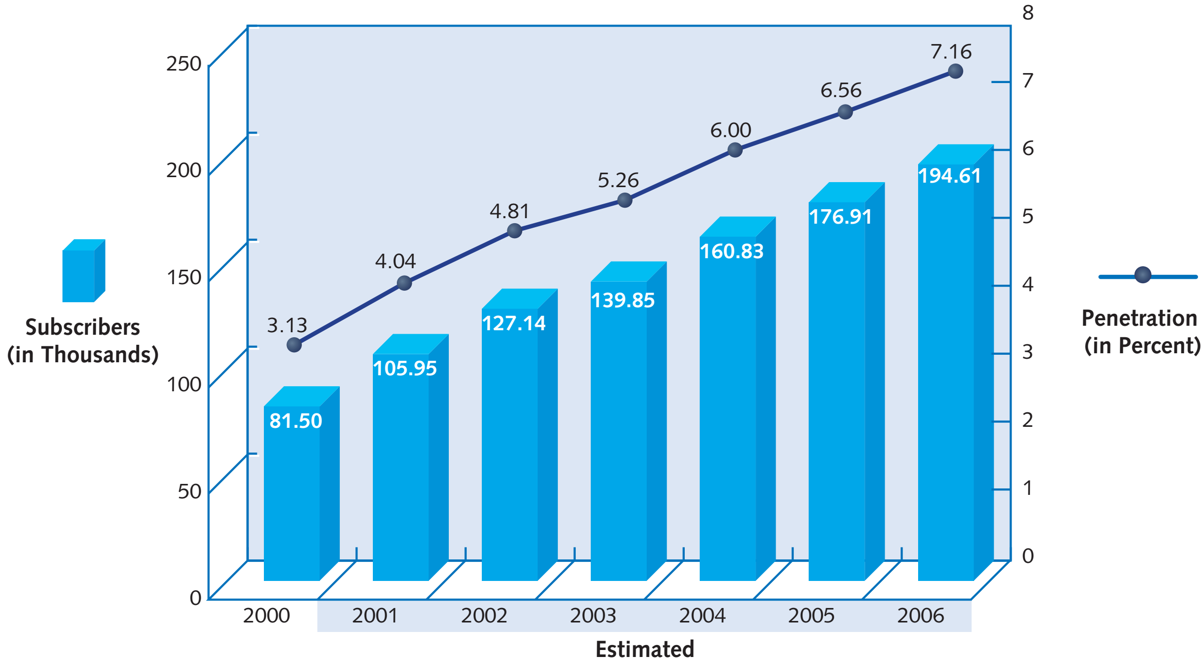
Centennial Communications Corp. bought a majority stake in InfoChannel, the number-two ISP player in the market, in September 2000 for $4.72 million. Medium-sized ISPs such as KasNet and Colis are providing 2.4-Ghz fixed wireless access in addition to dial-up services. ISPs expect that $35–$45 current average unlimited usage dial-up tariffs will drop to $25–$30 in the wake of new competition.

Dial-up subscribers in Jamaica will grow by 139% from 2000 to 2006, reaching an expected 194,607 subscribers by the end of that period (see Exhibit 10). In 2006, Jamaica will reach an Internet penetration rate of 7.16%. Among the countries analyzed in this Report, only Puerto Rico and Trinidad and Tobago will reach a higher penetration rate.

Although Jamaica is in the midst of the deregulation process, competitors feel that the Jamaican government has made too many concessions to Cable & Wireless. The liberalization process and the commitment to increase fixed-lines essentially guarantee that the company will capture the fixed line pent-up demand prior to the introduction of competition.

Government regulators have not inspired service provider or investor confidence. Rather than investing license concession proceeds in demand-generating call center developments as initially announced, proceeds were instead diverted to the country's debt service and other uses.

Exhibit 10
Jamaica Dial-Up Subscriber Forecast
Source: the Yankee Group, 2001



Many important aspects of deregulation are unclear, including dates for awarding operating licenses and service launch, structure of licensing (auctions, beauty contest, or simple request submission), and number of licenses for each service (it appears there will be no limit to the number of competitors). Regulators need more autonomy and separation from the rest of government to create a transparent pro-business environment if Jamaica is to develop the telecom service provider market.

Trinidad and Tobago

Despite a monopoly over the telecommunications market, Trinidad and Tobago has 20% mainline penetration (see Exhibit 11). The Telecommunications Services of Trinidad and Tobago Ltd. (TSTT), which is owned by Cable & Wireless and the Government of Trinidad and Tobago, is the monopoly domestic provider of public switched local and international telecommunications services.

Internet service is not a TSTT monopoly. While initially all ISPs had to pass traffic through the TSTT loop, since 2000 some companies have subscribed to satellite services for downloads. TSTT is the leading ISP for dial-up services and also provides ISDN via dial-up lines (see Exhibit 12). TSTT ADSL services are now in the field-trials process and will launch in October 2001. Competitor Gillette Group is the owner of three ISPs in Trinidad and Tobago: Carib-Link, CableNeTT, and InterServ. All offer dial-up access, but Carib-Link is also providing MMDS broadband wireless services on 2.5 and 2.6 Ghz, and leased lines through copper cable.

Exhibit 11
Trinidad and Tobago Basic Country Data
Source: CIA World Factbook and the Yankee Group

Trinidad and Tobago	
Population (Year-End 2000 Estimated)	1,305,000
GDP per Capita (1999 Estimated PPP)	$8,500
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	35,000
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	2.68%
Fixed-Line Penetration	20%

Current prices for an unlimited dial-up account in TSTT are $50 + VAT for a single log-in, and $114 + VAT for three log-ins. TSTT dedicated 64-Kbps corporate plans cost $1,221 + 15% VAT, though we expect ADSL services to bring about a decline in price. Currently TSTT has 10 POPs throughout the country in Diego Martin, West, Thompson, St. Augustine, Mausica, Couva, Chaguanas, Scarborough, San Juan, and Port of Spain.

In spite of its small population, Trinidad and Tobago has a very high GDP PPP per capita, with significant SES A and B households compared to other Caribbean countries. The country's income distribution is similar to Mexico in terms of household buying power (though certainly not in the number of households). According to our subscriber forecast, Internet penetration in Trinidad and Tobago is expected to grow to 8.65% by the end of 2006 (see Exhibit 13).

V. Haiti and Cuba

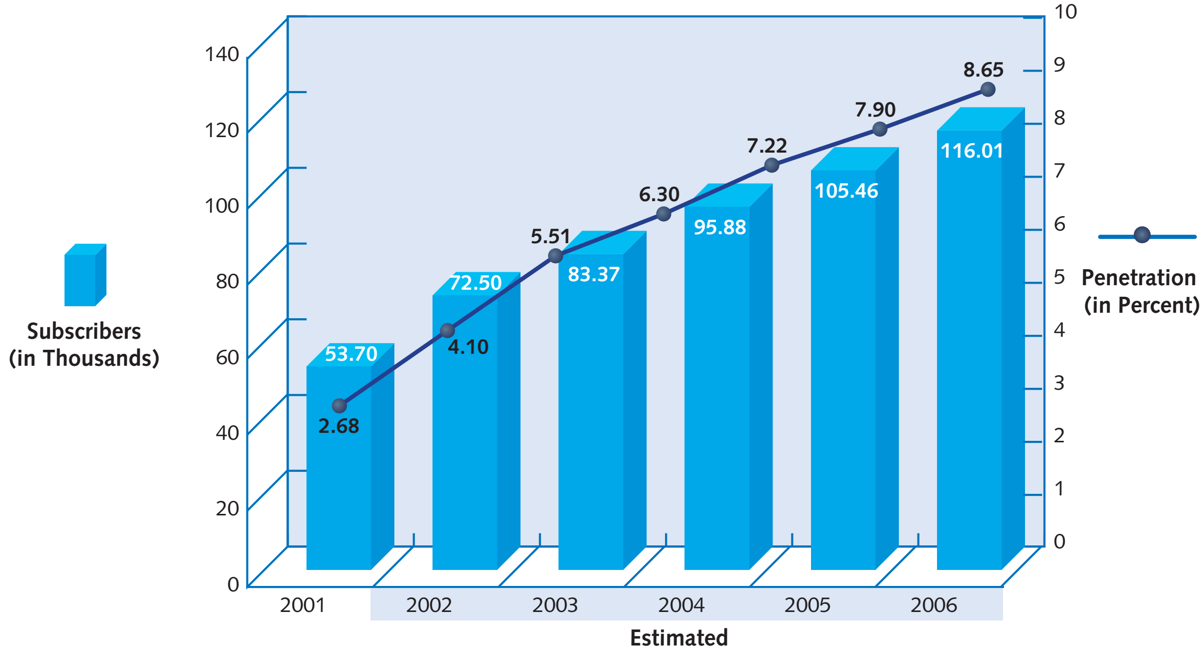
Haiti

Haiti is one of the poorest countries in the Caribbean region, with extremely low GDP per capita and few SES A and B households. Haiti is attempting to improve its telecom infrastructure, but poor local loop service and reach are delaying Internet market development (see Exhibit 14).

Exhibit 12
Top-Tier Internet Service Providers in Trinidad and Tobago
Source: the Yankee Group, 2001

Company	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
TSTT	23,000	51% National Enterprises Ltd. (State)/49% Cable & Wireless Ltd.	66%
Gillette Group (CableNeTT, Carib-Link, and InfoServ)	7,500	Private Investors	21%
WOW.Net	1,500	Private Investors	4%
Others	3,000		9%
Total	35,000		100%

Exhibit 13
Trinidad and Tobago Dial-Up Subscriber Forecast
Source: the Yankee Group, 2001



Top-tier ISPs are providing mainly 2.4-GHz–2.6-GHz fixed wireless services on public spread-spectrum, while others focus on consumer and business dial-up access. In view of the poor condition of the local loop, most ISPs are moving toward wireless solutions.

Teleco, the state-owned incumbent telco, owns the copper network. Haitel, the new basic and wireless mobile services competitor, received a license to provide fixed wireless and cellular telephony over the 1,900-MHz band in 1998. ISPs must obtain a license to provide Internet services, and it is difficult to obtain a concession. The regulator also charges ISPs a "contribution fee" equal to 10% of revenues. Dial-up competitors face challenges delivering local loop access at bandwidth higher than 36.6 Kbps due to poor infrastructure. Incomplete and dropped calls are common.

Exhibit 14
Haiti Basic Country Data
Source: CIA World Factbook and the Yankee Group

Haiti

Population (Year-End 2000)	7,866,250
GDP per Capita (1999 Estimated PPP)	$1,340
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	4,096
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	0.05%
Fixed-Line Penetration	1%

The reporting relationships and independence of the regulator Conatel are problematic. Contatel reports to the Ministry of Telecommunications and Transport, the same ministry that controls Teleco. This has led to numerous conflicts of interest and poor market development. For example, Teleco convinced Conatel to shut down ACN and fine it $120,000 for Voice-over-IP (VoIP) calls made by customers. ACN reopened and the fines were dropped after pressure from the business community, but counterproductive internal pressure over the regulator by Teleco continues.

There are no network access points (NAPs) in Haiti, and all ISP traffic is routed to the United States or France. Top-tier ISPs pay $10,000 per month for a satellite E1, while smaller players pay more than $10,000 for a 512-Kbps upload/128-Kbps download connection.

As one of the most important enterprise ISPs, Netcom is the only company providing services outside the capital, Port-au-Prince, and is expanding to Cap-Haitien and Port-de-Paix. Most Netcom clients (99% fixed wireless/1% dial-up) are connected at 64 Kbps. Today Netcom is working with equipment vendors BreezCom (from Israel) and Wiman (from Germany). **The Yankee Group expects more opportunity for fixed wireless equipment vendors since privatization of the PTT and copper cable network upgrades are unlikely in the short term.**

Fixed wireless broadband equipment for enterprise customers is priced between $3,000 and $6,000 in Haiti, while for single users prices range from $1,300 to $1,600. The ISP Alpha Communications Network (ACN) is providing wireless access with Lucent equipment.

At year-end 2000, Teleco had 80,000 fixed lines installed but only 70,000 in service. Teleco service costs a monthly flat rate of $7 for local calls allowing dial-up users to connect to their ISP without onerous per-minute charges. Teleco launched its own ISP services in August 2001 focused on connectivity for banks, large enterprises, and ISPs as an NSP. In the next six months, Teleco will install 100,000 fixed wireless lines to provide voice and Internet services.

Teleco's wholesale services are in serious need of improvement. As in Jamaica, Haitian ISPs submit requests for additional lines for local POPs with little or no effective response. This is contributing to the drive toward fixed wireless access solutions. Hainet, the most important dial-up provider (see Exhibit 15), is trying to increase its business in wireless access because of the problems with Teleco and the poor circuit quality. Despite these problems, Hainet grew quickly over the year 2001, more than doubling its customer base. This development drove an increase in its satellite bandwidth from 1 Mbps in 2000 to 5 Mbps in 2001 for connection to the UUNET and AT&T backbones in Miami.

Users in Haiti also access the Internet through 200 cybercafés, with most offering five to ten workstations. There are no ADSL or cable modem Internet access services. Cable TV player Tele Haiti is currently prohibited from providing broadband access.

As the poorest country analyzed in this Report, Haiti has the lowest PC and fixed-line penetration. The National Household distribution by SES has very low A and B percentages, and household buying power is weak. Demand generation is a challenge in this market, and we forecast total dial-up subscribers to reach only 14,500 by year-end 2006 (see Exhibit 16). Pricing in Haiti is high: an unlimited access dial-up account costs $50, and a wireless connection costs around $125 for a single user and $250 for multi-users with 64-Kbps bandwidth. A cybercafé pays an average of $750 for a multi-user connection.

Exhibit 15
Top-Tier Internet Service Providers in Haiti
Source: the Yankee Group, 2001

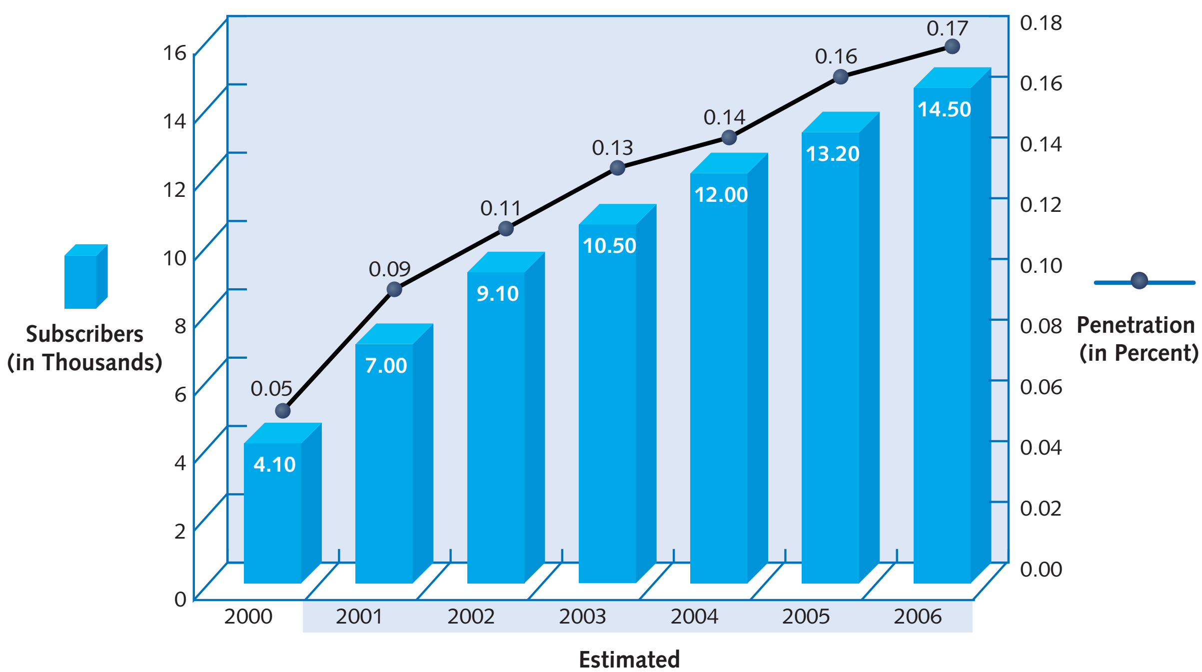
Dial-Up

Company	Estimated Paid Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
Hainet	2,096	Private Investors	51%
Hintel Focus	1,500	Private Investors	37%
Others	500		12%
Total	4,096		100%

Fixed Wireless

Company	Estimated Paid Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
ACN	800	Private Investors	41%
Netcom	645	Private Investors	33%
Others	500		26%
Total	1,945		100%

Exhibit 16
Haiti Dial-Up Subscriber Forecast
Source: the Yankee Group, 2001



Cuba

Cuba has the most highly regulated telecom market in the Caribbean. Government supervision is exercised through the new Informatics and Communications Ministry, which also owns two of the five ISPs operating in Cuba. ISPs are permitted to provide Internet access to companies, government, and hotels, but no residential services are allowed. Although black market connectivity is available, Cubans are not officially permitted to connect to the Internet, although a project to be implemented this year will allow Cubans to directly send and receive e-mails through public cabins at the Cuban Mail Service as well as navigate a government Intranet Web. Foreign tourists can access the Internet through special public access points (“InfoInternet”) by paying cash, and prepaid cards will be put into service in late 2001. The low penetration of Internet services in the country is partially due to strict government restrictions but also due to low consumer purchasing power (see Exhibit 17).

Infocom is the ETECSA ISP (Empresa de Telecomunicaciones de Cuba S.A., the telephone monopoly operator) owned by the government and Telecom Italia, which has a 29.29% stake. The Ministry of Science, Technology, and Environment runs Ceniai ISP, and the Informatics and Communications Ministry holds Teledatos and Colombus (see Exhibit 18). ISPs provide connectivity to governmental entities; each ministry, university, or secretary provides internal e-mail and intranet services. Infomed, for example, is a health network that provides electronic information and Internet access to hospitals and medical staff in Cuba.

As mentioned, most of the content and communications are not really a product of “Internetworking” with autonomous systems and networks as in the rest of the world, but rather from Cuban government–approved content over an intranet. However, these internal networks are allowing more Cubans to access the Internet from the ministries or governmental agencies. Overall, demand for paid access is extremely limited by the country’s precarious command economy. The Cuban government’s own estimate of total Internet users in Cuba is 40,000.

In addition to the dial-up services, the ISPs provide dedicated-line services. Colombus has 125 customers on X.25 and frame relay; Teledatos (focused on hotels) serves 150 dedicated lines from 64 Kbps to 128 Kbps; Ceniai has 50 dedicated line customers; and Infocom has 280 customers on dedicated lines. A new ISP, Cubacel (the wireless/mobile operator), was permitted to provide Internet services in mid-2001. Most dial-up customers have only SMTP e-mail accounts, but this is changing as more companies need reliable HTTP and FTP to serve tourists and foreign investors.

Exhibit 17
Cuba Basic Country Data

Source: CIA World Factbook and the Yankee Group

Cuba	
Population (Year-End 2000)	11,164,000
GDP per Capita (1999 Estimated PPP)	$1,700
Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	2,036
Estimated Dial-Up Internet Account Penetration (Year-End 2000)	0.02%
Fixed-Line Penetration	4%

Exhibit 18
Top-Tier Internet Service Providers in Cuba
Source: the Yankee Group, 2001

Company	Estimated Paid Dial-Up Internet Accounts (Year-End 2000)	Ownership/Affiliation	Estimated Market Share
Infocom	1,350	ETECSA (Mixed Telephone Company: 29.29% Telecom Italia/70.71% Cuban State)	66%
Ceniai	300	CITMATEL (Science, Technology, and Environment Ministry)	15%
Teledatos	200	Informatics and Communications Ministry	10%
ColombusNET	186	Informatics and Communications Ministry	9%
Total	2,036		100%

ETECSA is the NSP for all ISPs. With Telecom Italia participation, the operator increased total lines in service to 520,000 in August 2001, and is upgrading its network by installing digital switches, microwave antennas, and metro fiber-optic rings in the main cities. Today, 59.8% of the lines in service are digital, and there are 682 miles (1,097 kilometers) of fiber-optic cable installed.

In addition to Telecom Italia, other European companies are entering the Cuban Internet and data transmission markets. For example, through an agreement with the Informatics and Communications Ministry, Telefonica Data (Spain's Group Telefonica) has a 50% stake in the new company Telefonica Data Cuba.

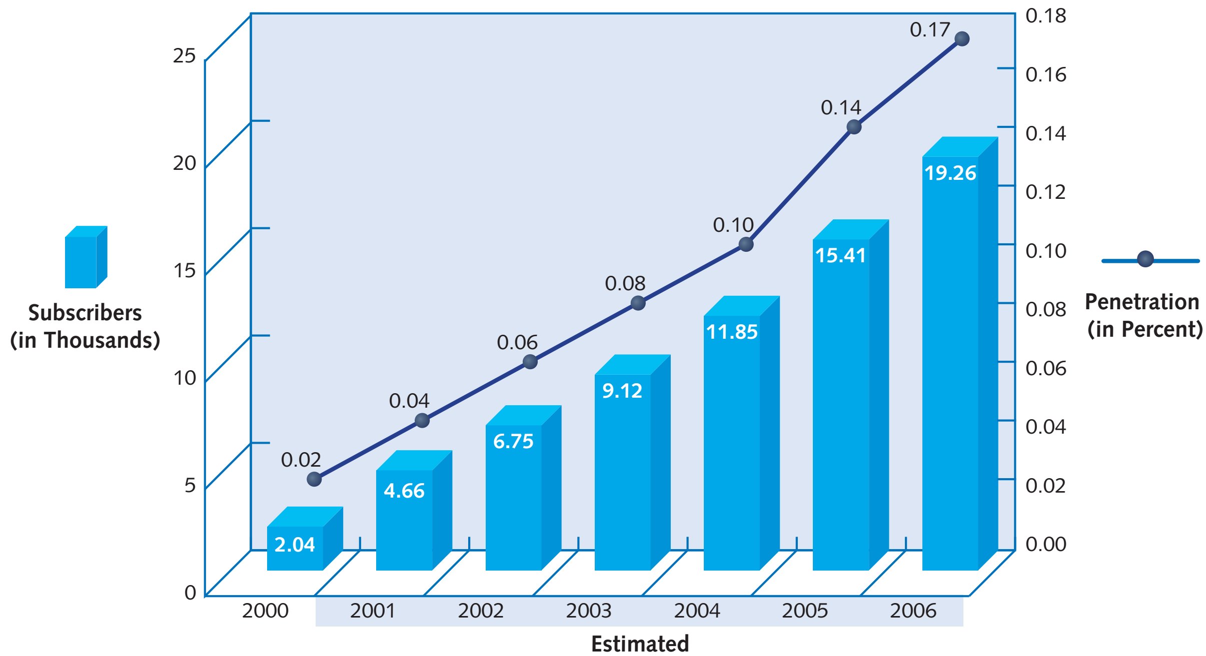
Our subscriber forecast for Cuba includes governmental and private sectors (in general, state/private mixed companies), and increasing residential subscribers during 2003 under more flexible Internet regulation with content controls (see Exhibit 19). The Cuban GDP PPP per capita is very similar to Haiti, but since the Cuban market is underdeveloped compared to the total population, it will witness a tremendous percentage growth in coming years.

VI. Challenges

The Caribbean has many obstacles to increased Internet penetration that must be considered:

- **PC penetration:** Low PC penetration is the major inhibitor of Internet growth in the Caribbean. In Haiti, for example, the penetration was 0.3% at year-end 2000, in Cuba 1.2% (government and private sector employees represent the majority of those who have access to PCs and Internet), and in the Dominican Republic 1.3%. The other countries averaged 5% PC penetration at the end of 2000.

Exhibit 19
Cuba Dial-Up Subscriber Forecast
Source: the Yankee Group, 2001



- **Addressable residential market:** Poor income distribution and low income relative to the prices of PCs, Internet access, and telephone per-minute charges price Internet beyond the means of a large percentage of households.

- **Local service changes and Internet pricing:** Another inhibitor for Internet growth in the region is the price for Internet access in most of these countries. Tariffs more than double the average for Latin America in Haiti and Cuba, and are high in Jamaica and Trinidad and Tobago. Only in the more developed Dominican Republic and Puerto Rico have economies of scale allowed prices to fall to the Latin American average.

- **Regulatory risks:** Lack of autonomy, independence, low accountability, conflicts of interest, and lack of transparency are major issues affecting regulators in the Caribbean. For example, markets such as Jamaica's must undergo painful rate rebalancing in coming years, but lack of autonomy may not allow the regulator to take the necessary steps.

VII. Opportunities

In spite of the Caribbean market size and previously mentioned challenges, opportunities abound for service providers and vendors in the region. Major opportunities foreseen by the Yankee Group over the medium term include:

- **Caching and CDSP solutions:** ISPs are only beginning to optimize their transit bandwidth utilization through sophisticated caching and content delivery service provider (CDSP) solutions. Even as additional submarine cable capacity is lit and makes its way off the beach, ISPs will continue to demand solutions to lower unnecessary transit costs.

- **Content management:** Content creation and management is still nascent across the region. With the exception of Puerto Rico, local Internet content is underdeveloped. Appropriately priced tools for sophisticated content management will be in high demand by Caribbean media organizations and enterprises in the region as Internet penetration increases.

- **Public Web phones:** Incumbent telcos and ISPs can immediately increase usage and demand for home solutions following the successful footsteps of giants such as Telmex. Telmex has installed attractive public Internet phones, with matrix screens and keyboards in high-traffic public spaces. This provides a low-cost introduction to Internet services and consumer demand for home Internet access.

- **Spread-spectrum fixed wireless:** Last-mile solutions are beginning to explode across the region as a way to leapfrog local loop challenges. Vendors able to provide branch office customer-premises equipment at sub-$1,000 price points will encounter strong market demand.

- **Customer premises VoIP and VPN solutions:** Irrespective of regulator movements, CIOs continue to buy customer-premises equipment solutions to provision VPNs and voice services over the corporate network. Vendors will find demand much stronger for customer-premises solutions than for ISP managed service solutions over the medium term.

Further Reading

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"A Guide to Latin America's ISP Markets, 2000," *Yankee Group Report, Internet Strategies Latin America,* Vol. 1, No. 4, April 2000.

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