VOIP in the TAL group

June 15th, 2005

Buenos Aires, Argentina

IP Telephony:

- IP Telephony shall be defined as the SERVICE and PROTOCOL suite associated with the transport of voice communication over the Internet independent of the end-point devices.

IP performs the following:

- Logical addressing
- Connectionless packet delivery
- Fragmentation and re-assembly

Internet Architecture

(Address,Routers, Hosts and Protocols)

- IP addresses are basically broken down into 4 numbers separated by a dot e.g 196.3.132.1
- There are currently two standards - IPV4 (detailed above) and IPV6. IP addressing scheme is broken down in classes that allow for sub-netting or separation of logical address boundaries.
- Routers: (Hardware) devices that direct IP packets to their next hop on the way to their final destination.
- Host: A generic term used to identify devices other than routers on the Internet. May be computers or other addressable devices

Protocols: The language of the net. Typically service specific.

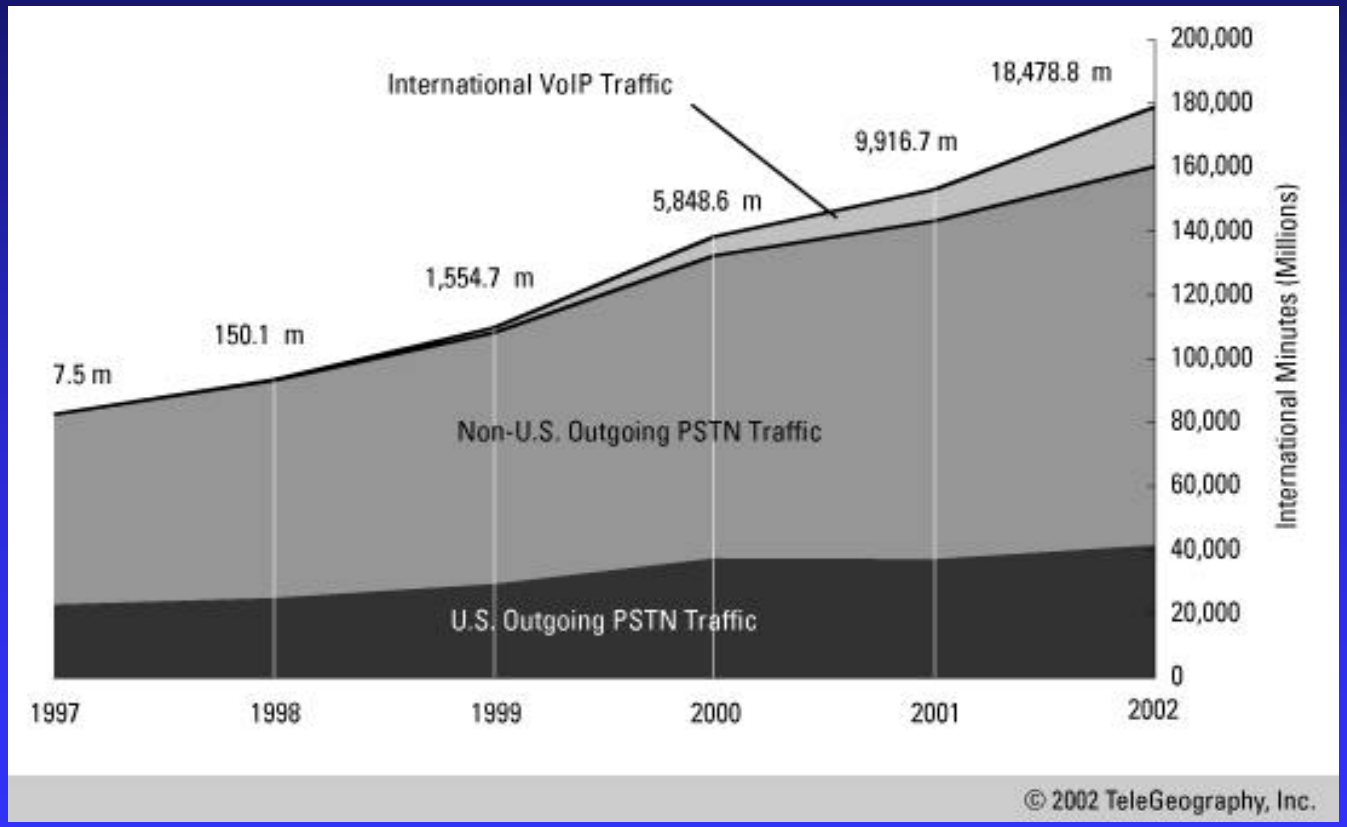
- http, H.323 (protocol used for the transport of voice over IP (VoIP)

Internet Policy - General

The USA and most developed countries have policies that essentially preserve the vibrant and competitive free market which presently exists for the internet and other interactive and computer services, unfettered by Federal or State Regulation.

IP Telephony: The What and Why

International VoIP and PSTN Traffic Summary, 1997-2002



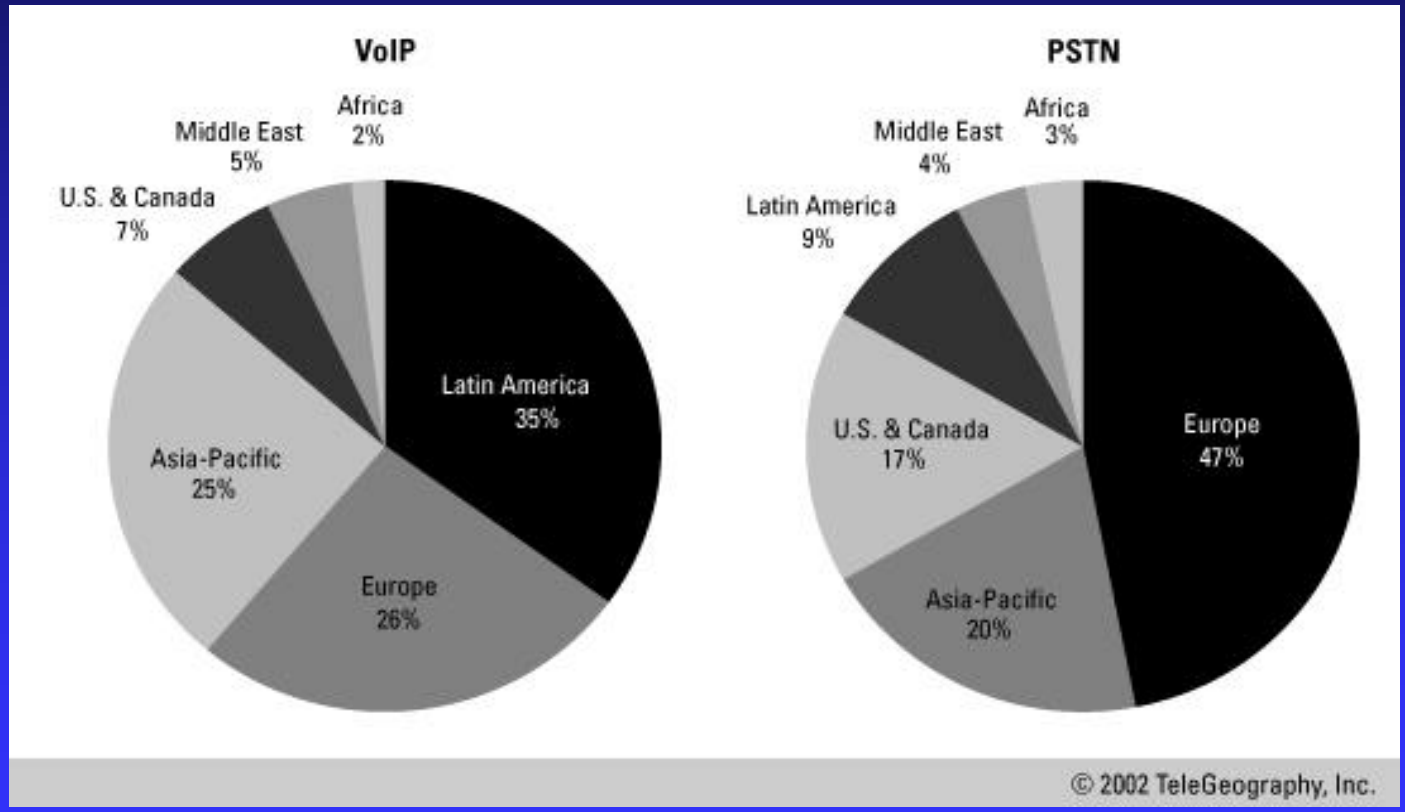
IP Telephony: The What and Why

The promise made by VoIP include:

- Increased service revenues
- Shorter time to Market
- Service Flexibility
- Expenditure and Revenue Opportunities

IP Telephony: The What and Why

International VoIP and PSTN Traffic Destination Summary, 2001



The H.323 Protocol

H.323 is the cornerstone technology for the transmission of real-time audio, video, and data communications over IP packet based networks

- Version 1 of the standard was proposed by the ITU-T Study Group 16 and was accepted in Oct 1996 (Version 1 DOES NOT provide guaranteed QoS)
- Current Standard is H.323 Version 4 approved Nov 2000

The H.323 Protocol

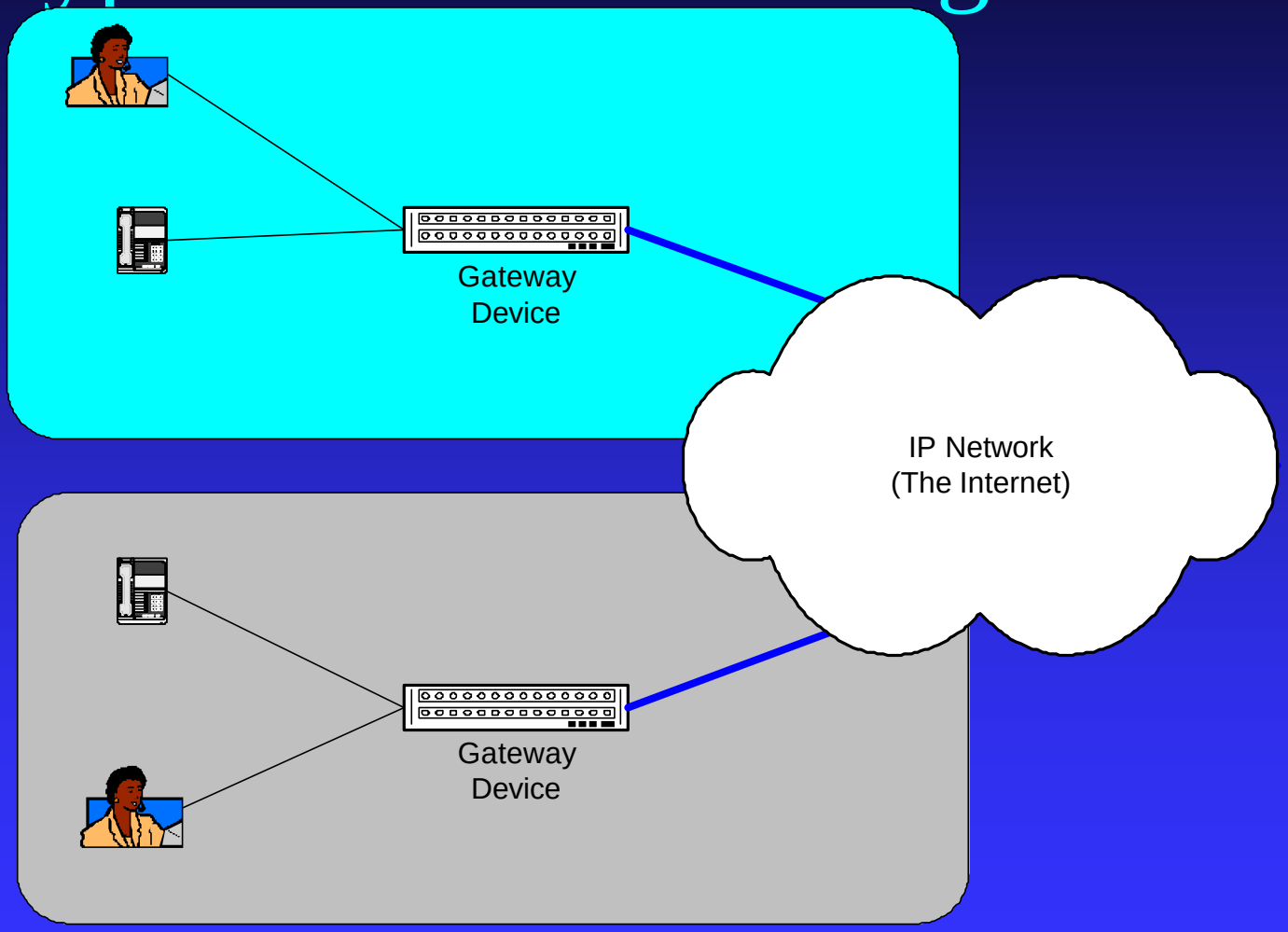
H.323 defines four major components for a network-based communications system:

1. Terminals
2. Gateways
3. Gatekeepers
4. Multipoint Control Units

What happens to phone and video with IP?

- To the phone/cable company, many changes
  - Video and voice can come over phone lines, cable, and wireless service provider
  - Can use same central office equipment and staff for data, video, and voice
  - Service (phone dialtone, video content) can be independent of the carrier (Comcast, SBC)
- Regulatory situation and rights of communities under challenge

Typical IP Call routing



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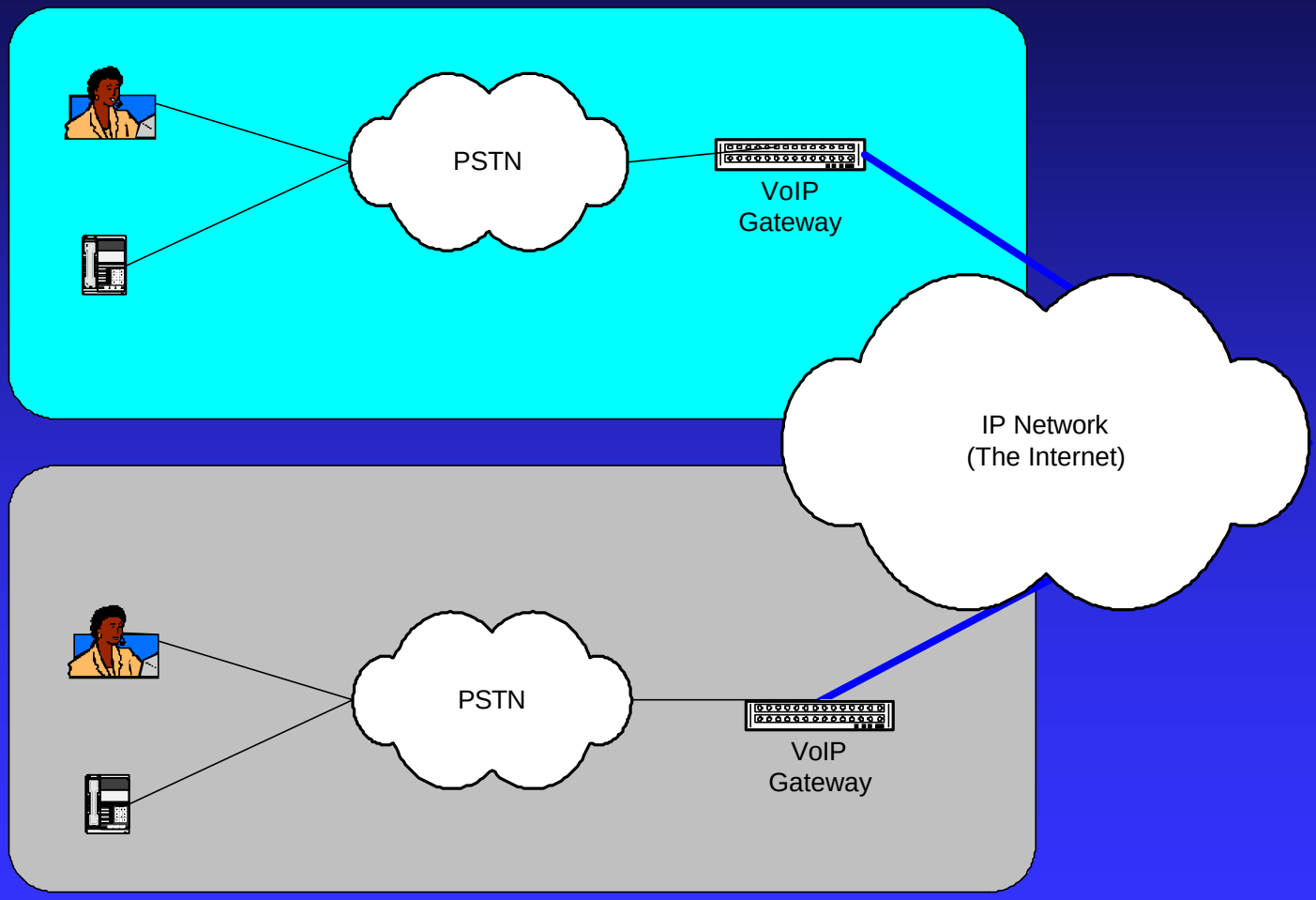

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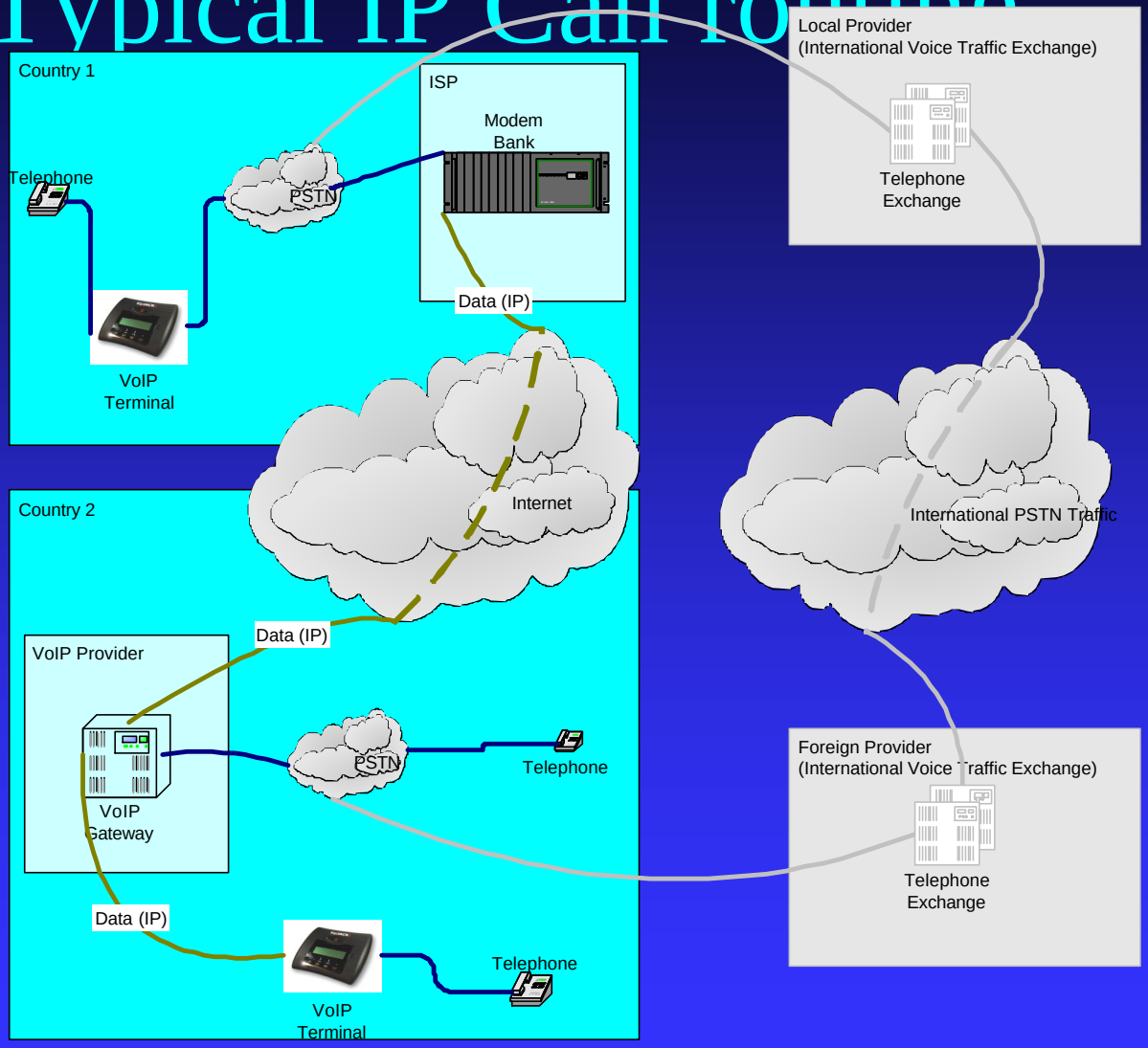


Approaches to VoIP: Incumbent providers

1. Initiate (technical) actions to protect rights offered under subsisting licenses
2. Initiate legal action
3. Offer competitive differentiators and directly face the competing offers.

Approaches to VoIP: Governments and regulators

1. Embrace and establish a legal framework for official competition
2. Defer to industry self regulation with only timed interventions

Issues to be considered

- Internet Interconnection (Peering) VS Transit arrangements
- Universal Service Obligations and the inclusion of the Internet
- VoIP cost models and a framework for competition

The issues

- US :Contribution to Universal Service Fund i.e. Payment of access chgs, provision of emergency and disabilities services.
- EU Regulatory Status

- Access Directive: For networks that provide publicly available electronic communications services. It covers access and interconnection among service providers and does not apply to non-public networks.
- Authorization Directive: Legal frameworks to ensure uniform ability of all would-be and existing providers, to provide electronic communications networks and services subject only to EU public policy.
- Framework Directive: General, permissive, non-licensing legal framework where all are subject to general public welfare conditions and none are subject to barriers to entry

VoIP: 911

- Offered by Vonage, Packet8 for additional fee
  - Caller location info not always transmitted to 911 operators
  - 911 calls typically sent to general access line
  - E-911 (automatic location information) engineering in progress
- Customer must
  - manually provide location information to VoIP provider at signup,
  - wait days for service to be activated
  - keep provider updated if service is moved
- Some governments encourage users to test (once)
  - Minnesota

Regional Cases
Panama

República de Panamá

ENTE REGULADOR DE LOS SERVICIOS PÚBLICOS

Resolución Nº: JD-3576 **Panamá 25 de octubre de 2002**

Por la cual el Ente Regulador de los Servicios Públicos ordena a los concesionarios del Servicio No. 211 SERVICIO INTERNET PARA USO PUBLICO bloquear 24 puertos de acceso User Datagram Protocol (UDP).

LA JUNTA DIRECTIVA

Del Ente Regulador de los Servicios Públicos
en uso de sus facultades legales

CONSIDERANDO:

1. Que mediante Ley No. 26 de 29 de enero de 1996, modificada mediante Ley No. 24 de 30 de junio de 1999 y Ley No. 15 de 7 de febrero de 2001, se creó el Ente Regulador de los Servicios Públicos como organismo autónomo del Estado, con personería jurídica y patrimonio propio, el cual tiene a su cargo el control y fiscalización de los servicios públicos de abastecimiento de agua potable, alcantarillado sanitario, telecomunicaciones, electricidad, radio y televisión, así como la distribución y transmisión de gas natural, de conformidad con las disposiciones contenidas en la citada Ley y las respectivas leyes sectoriales;

Regional Cases
Panama

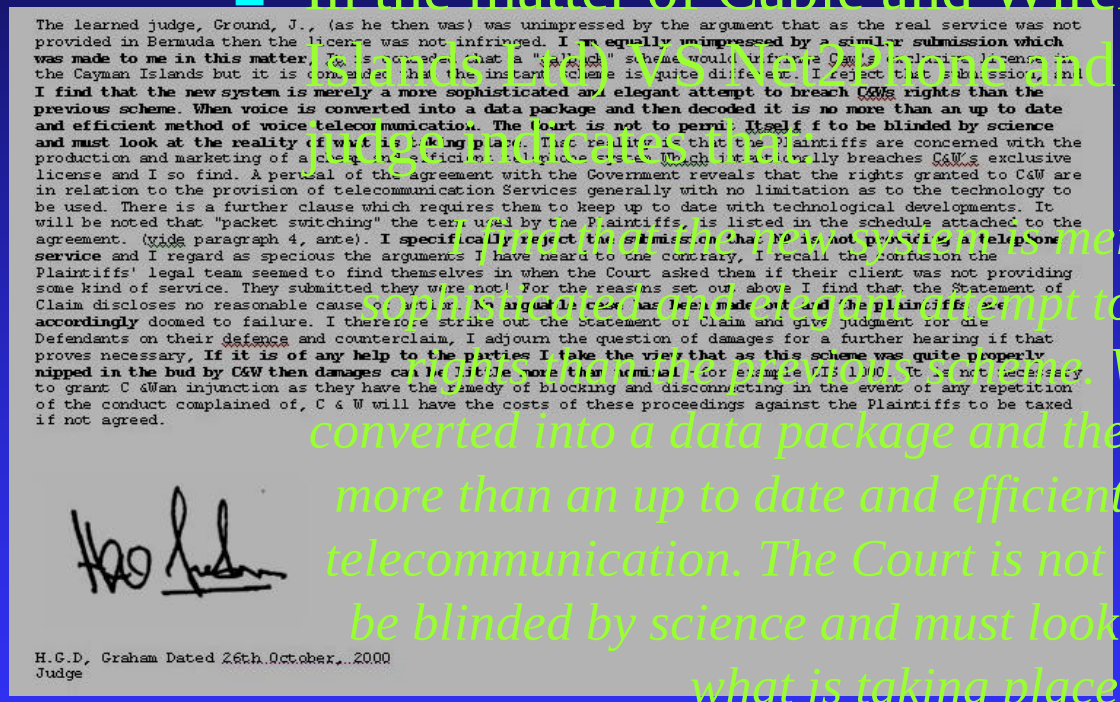
- In Nov 2002 the Gov't took measures to outlaw VoIP

C&W argues that unlicensed providers took advantage of Panama's liberalization of wireless and data services last year, bypassing the traditional voice market … The VOIP ban also poses some interesting technical challenges—and some question whether it's enforceable … Dialpad and Net2Phone are reportedly among the service providers that have seen their services disrupted in Panama

By Eugenie Larson
Light Reading
21 November 2002

Regional Cases
Cayman Islands

- In the matter of Cable and Wireless (Cayman Islands) Limited and others the



The learned judge, Ground, J., (as he then was) was unimpressed by the argument that as the real service was not provided in Bermuda then the licence was not infringed. **I am equally unimpressed by a similar submission which was made to me in this matter.** It is contended that a "[illegible]" scheme would infringe C&W's exclusive licence in the Cayman Islands but it is contended that the instant scheme is quite different. I reject that submission, and **I find that the new system is merely a more sophisticated and elegant attempt to breach C&Ws rights than the previous scheme. When voice is converted into a data package and then decoded it is no more than an up to date and efficient method of voice telecommunication. The Court is not to permit Itself to be blinded by science and must look at the reality of what is taking place.** The reality is that the Plaintiffs are concerned with the production and marketing of a cheap and efficient telephone system which fundamentally breaches C&W's exclusive license and I so find. A perusal of the agreement with the Government reveals that the rights granted to C&W are in relation to the provision of telecommunication Services generally with no limitation as to the technology to be used. There is a further clause which requires them to keep up to date with technological developments. It will be noted that "packet switching" the term used by the Plaintiffs, is listed in the schedule attached to the agreement. (vide paragraph 4, ante). **I specifically reject the submission that [illegible] is not providing a telephone service** and I regard as specious the arguments I have heard to the contrary, I recall the confusion the Plaintiffs' legal team seemed to find themselves in when the Court asked them if their client was not providing some kind of service. They submitted they were not. For the reasons set out above I find that the Statement of Claim discloses no reasonable cause of action. No [illegible] has been made out and the plaintiffs are **accordingly** doomed to failure. I therefore strike out the Statement of Claim and give judgment for the Defendants on their defence and counterclaim, I adjourn the question of damages for a further hearing if that proves necessary, **If it is of any help to the parties I take the view that as this scheme was quite properly nipped in the bud by C&W then damages can be little more than nominal** for example US$ 100. It is not necessary to grant C &Wan injunction as they have the remedy of blocking and disconnecting in the event of any repetition of the conduct complained of, C & W will have the costs of these proceedings against the Plaintiffs to be taxed if not agreed.

H.C.D, Graham Dated 26th October, 2000
Judge

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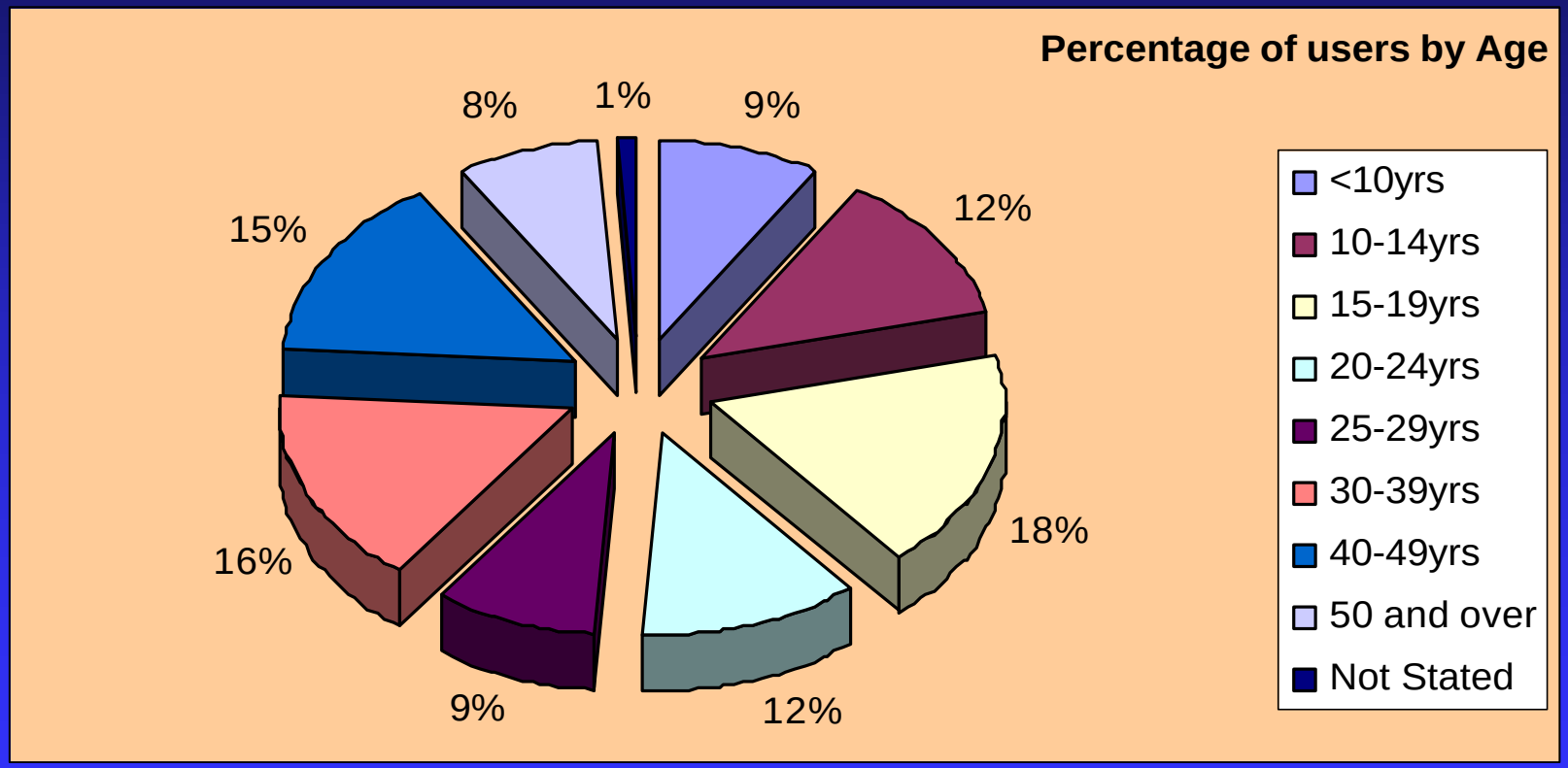
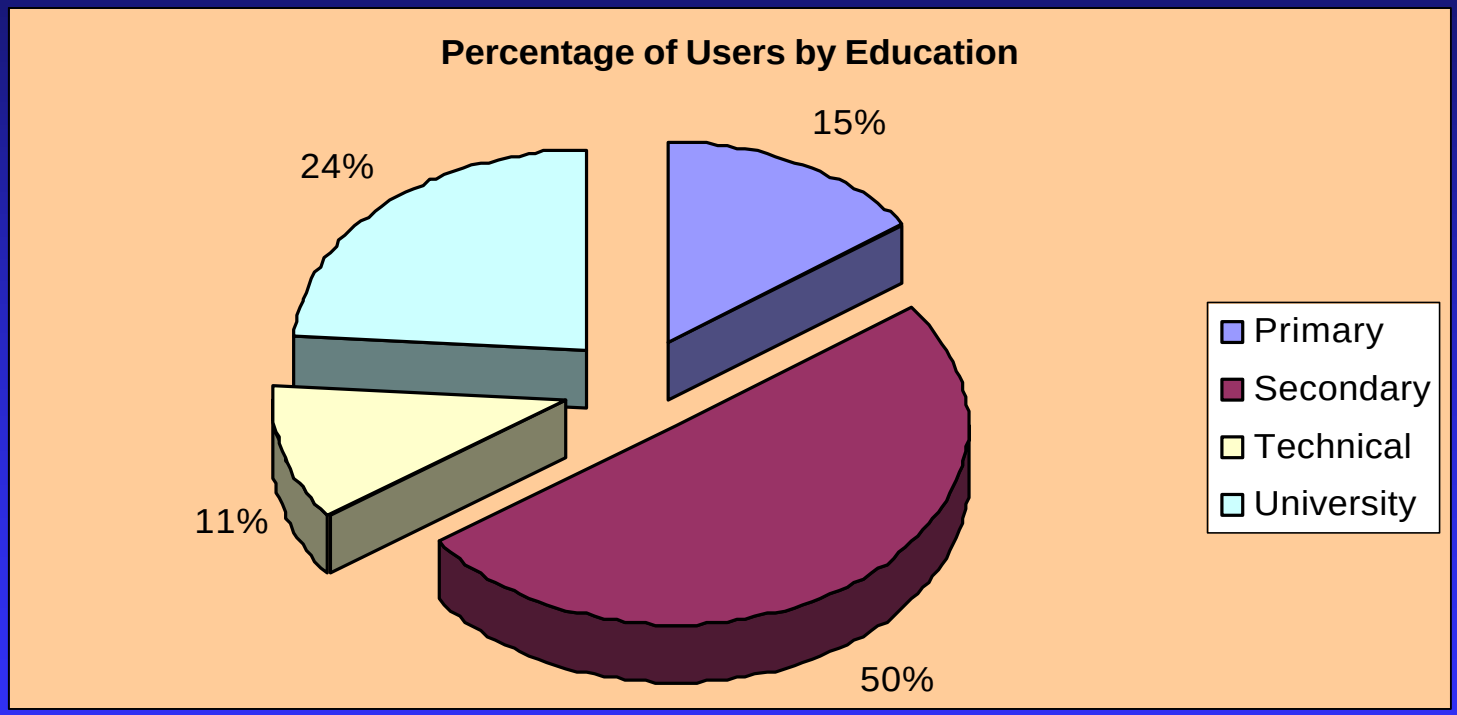
Oct 2000

The Trinidad and Tobago Landscape



The Trinidad and Tobago Landscape



Revenue Issues

- Current estimated potential leakage of US$400K / month (US$4.8M per annum).
- Estimated losses for the 2002/03 financial year of US$4M.

International Traffic

- Relatively “normal” traffic growth.
- No perceptible or easily associated movement of traffic to VoIP.
- International call termination rates are comparable between VoIP routes and traditional routes through tier-1 and tier-2 carriers (~US$0.10)

Some methods employed in dealing with illegal traffic

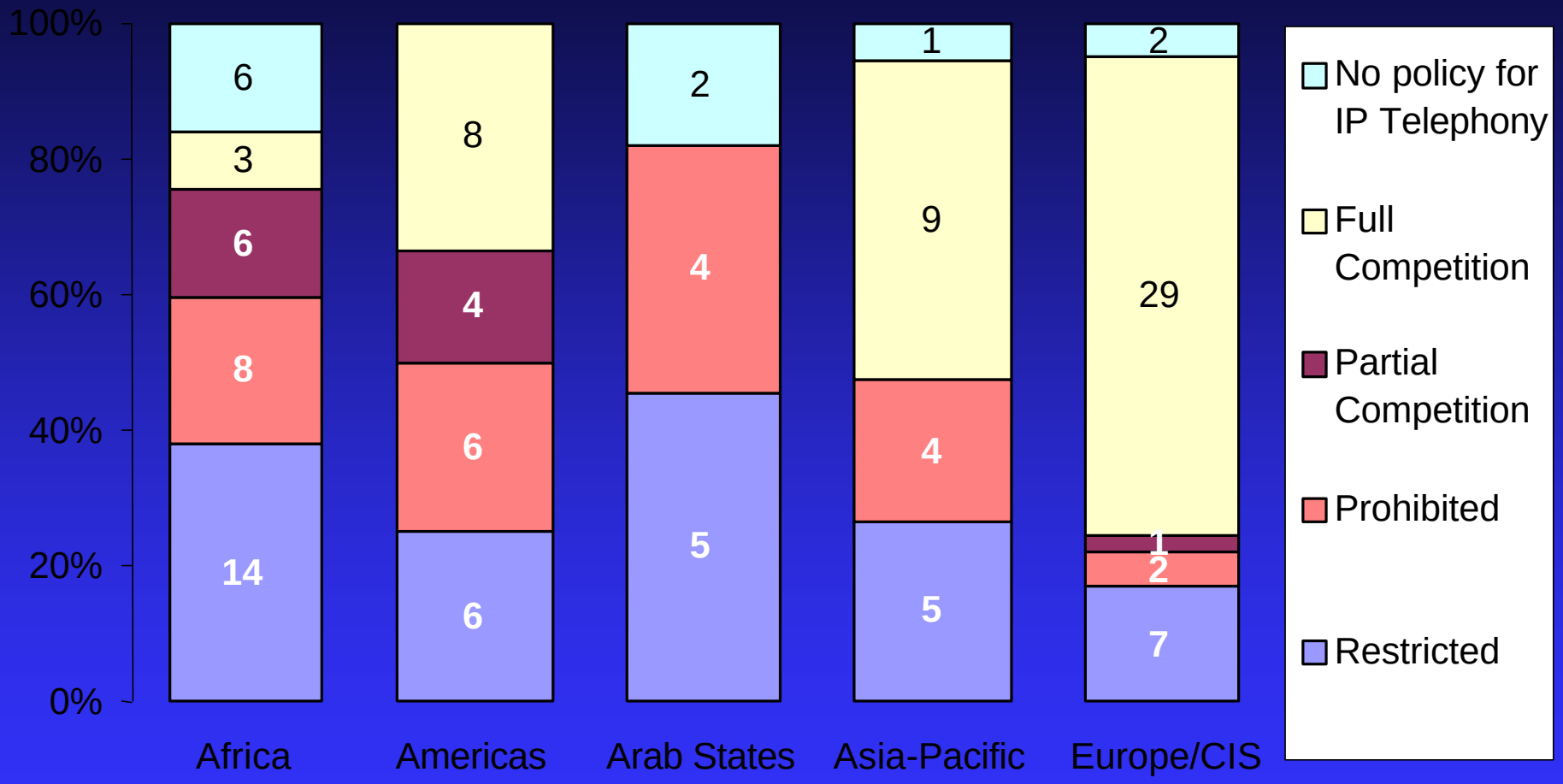
- Identification
  - Inspection of stated business operations and a match to the time and volume of calls originated and terminated on the network
- Confirmation
  - Use of (legal) options to inspect the call content
  - Opportunity created by service contracts to inspect provider equipment.

Some methods employed in dealing with illegal traffic

- Actions
  - Self Help / technical actions
    - Blocking of specific Internet/IP ports that are typically used to facilitate VoIP
    - Removal of service from offending providers (for breach of service contract)
  - Legal avenues - litigation
    - There are existing and pending cases regionally that provide a basis in law for actions in breach of the operating (telecommunications) licenses
  - Service delivery actions

Regulatory status of IP Telephony

By region, 2003



Note: Based on responses from 132 economies. "Prohibited" means no service is possible. "Restricted" means only licensed PTOs can offer the service. "Partial competition" means non-licensed PTOs may use either IP networks or the public Internet. "Full competition" means anyone can use or offer service.

Source: ITU (2005, forthcoming): General Trends in Telecom Reform"

Future

- **Mass Migration Expected 2005-2019**
- **Market Entry Barrier: Domestic; international high speed internet**
- **Vonage model: Domestic service exported to Intl.**
- **New Platform Investors: VoIP, Inc. and the “Virtual Service Providers**

Internet, price and service trends

- Towards a flat-rate price structure
  - All you can eat for US$20.00
- Towards lower service quality
  - “Best efforts” service delivery at lowest price
- Death of distance
  - Message to other side of earth costs same as a message sent next door
- Cross-promotion of Internet and other services
  - “Free PC” with three year’s ISP subscription
  - “Free Internet” with residential local loop charges
- Tendency towards industry concentration
  - AOL’s subscriber base > next ten ISPs added together

Considerations for Local Gov't

- Migration to IP inevitable
  - Costs
  - Features
- Test if callers reach the proper 911 dispatcher
- Educate consumers
  - E911 may not be available
  - Phone may die when power goes out
- Monitor openness of networks to 3rd party VoIP, non-cable video providers
- Encourage government and PEG operations to consider IP voice and video technologies

Thank You

Cleveland Thomas
cathoma1@tstt.co.tt