Diminishing Electronic Surveillance Capabilities in the Communications Age

Drug Enforcement Administration

Conducting lawful intercept in the past was straightforward…

Target phone

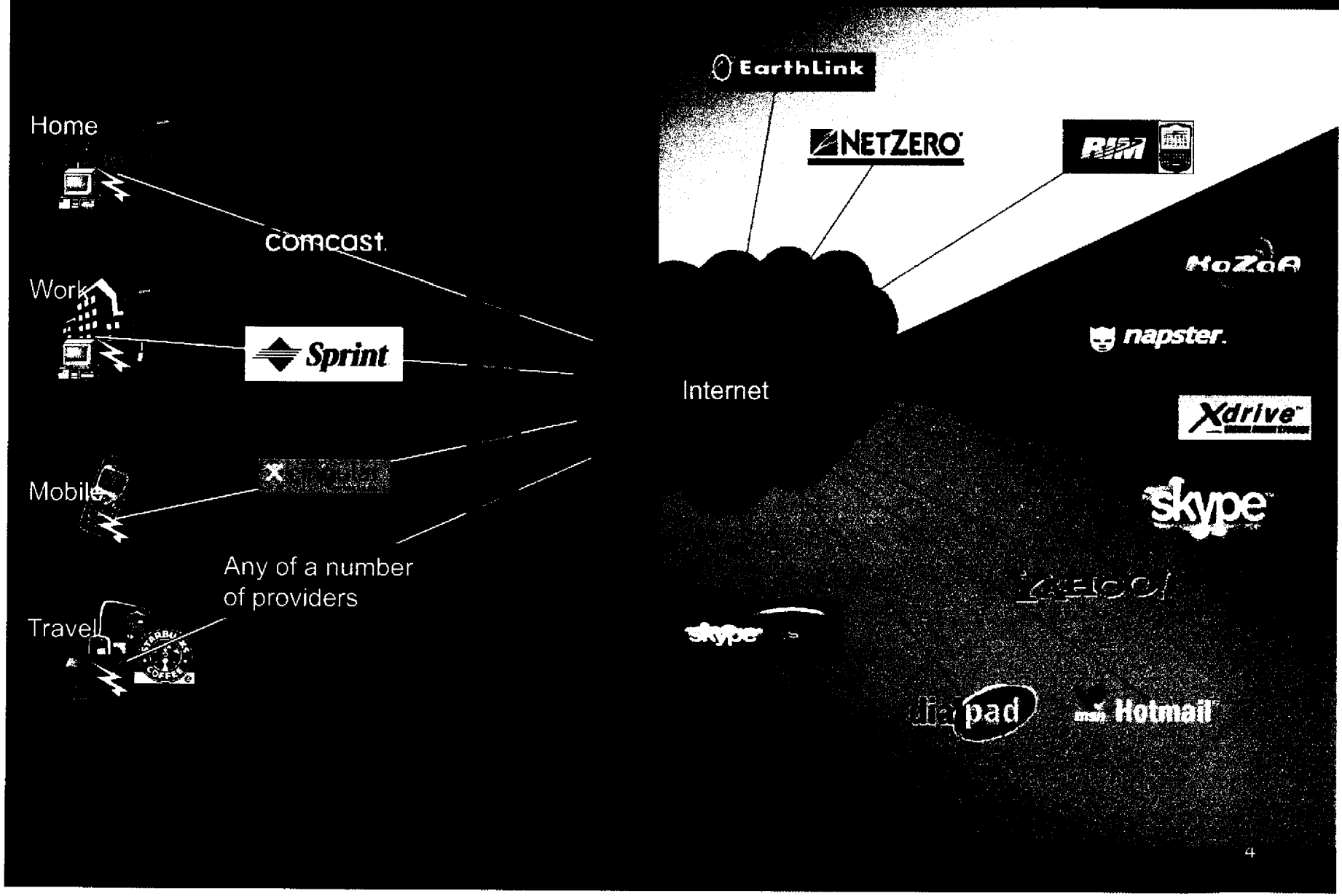
Single POTS carrier

Intercepting Agency

Local loop intercept
Single carrier

Simple access and understanding
Inexpensive

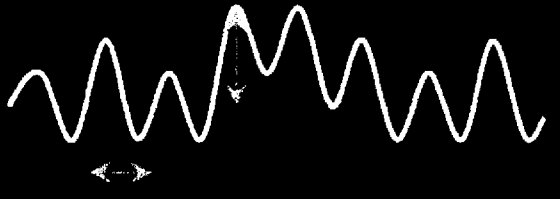
MULTIPLE ACCESS METHODS TO A VARIETY OF SERVICES



VoIP

BASIC VOICE CHARACTERISTICS

- The human voice is a continuous acoustical waveform
- Expressed as an oscillating sine wave (see below)
- Components
  - Frequency (number of cycles per second)
  - Amplitude

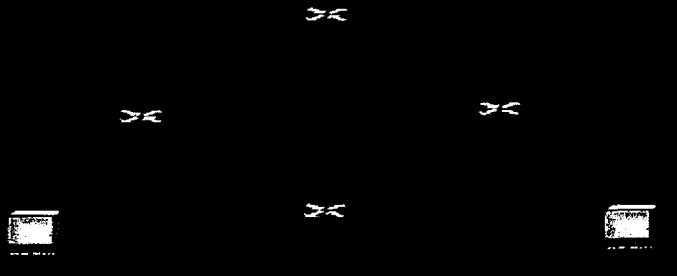


ANALOG TO DIGITAL CONVERSION

WHAT IS A PACKET?

- A packet consists of two basic components:
  - a "payload" of digital information to be transmitted
  - header that contains control information needed to transmit the information across the network

CONNECTIONLESS PACKET ROUTING



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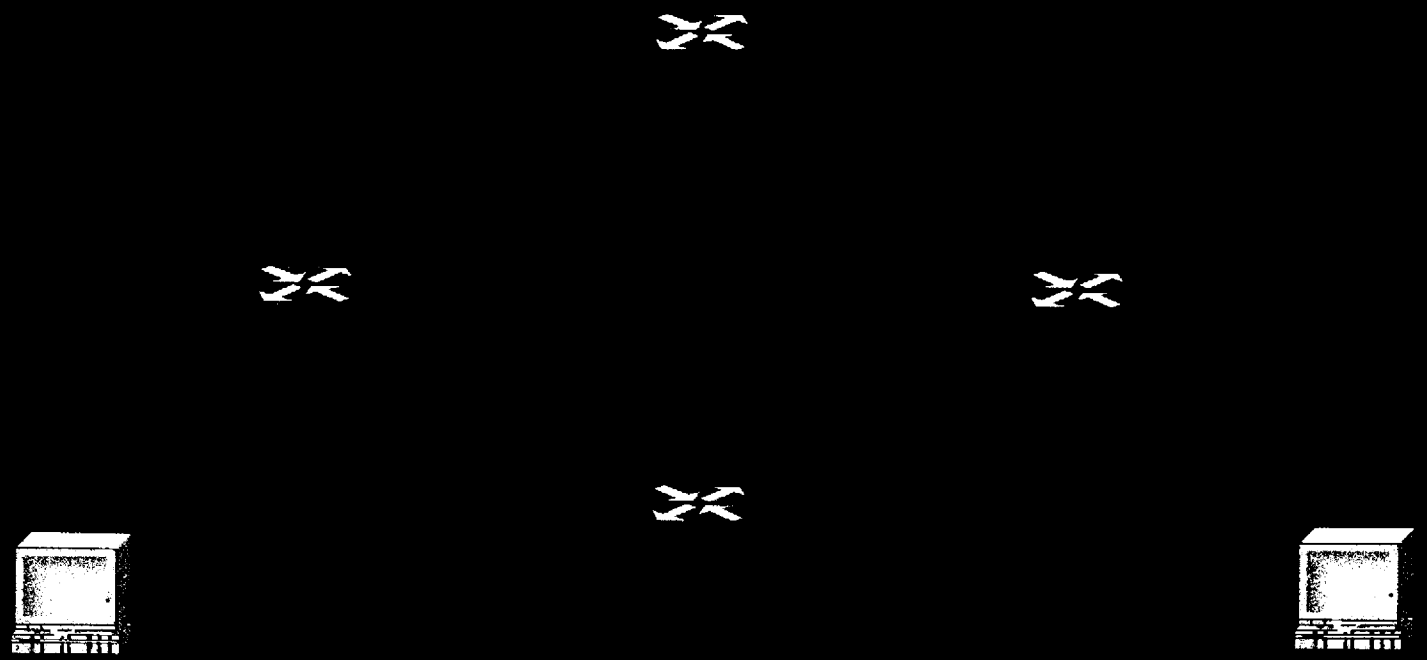
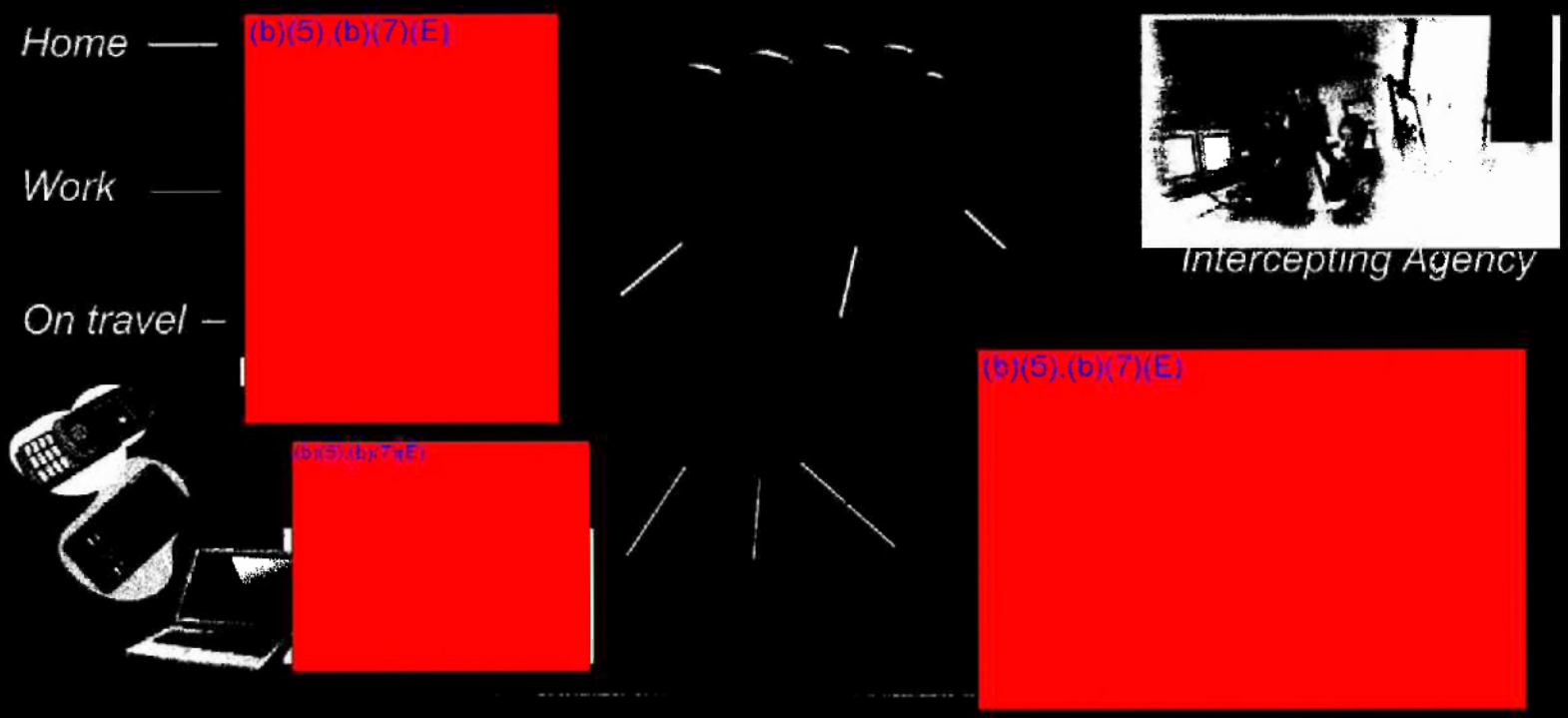


Mr. Watson come here!

Mr. Watson come here!

Conducting lawful intercept today is highly complex



Multiple carriers and applications

(b)(5),(b)(7)(E)

Technology is complex and varied

Unregulated services

Multiple protocols

Expensive

Data Retention

- Where are the records?
- What are the records?
- How long are the kept?

Diminishing Electronic Surveillance Capabilities in the Communications Age

Drug Enforcement Administration

DEA SENSITIVE,
DO NOT RELEASE WITHOUT THE EXPRESS PERMISSION OF DEA'S OFFICE OF THE CHIEF COUNSEL

Next Generation Wireless

DEA's Need to Preserve Lawful Intercept Capabilities

Discussion Document
January 2009

- 3.3 billion active cell phones on a planet of 6.6 billion people
  - fastest diffusion of any type of technology in history
- 2G capabilities and solutions do not work against Next Generation Wireless (NGW) technology
  - Circuit vs. Data
  - Public vs. Private Design

(b)(5),(b)(7)(E)

- High potential opportunities exist for collaboration
- Foreign based industry – U.S. presence
- More text messages/IM's sent in 2008 than voice calls
- Technology of interest:
  - wi-fi – 500 million users by 2011
  - 3G (CDMA2000, TD-SCDMA, 3GSM/UMTS, LTE)
  - 4G (wi-max, LTEA)
  - IP based
  - Encryption

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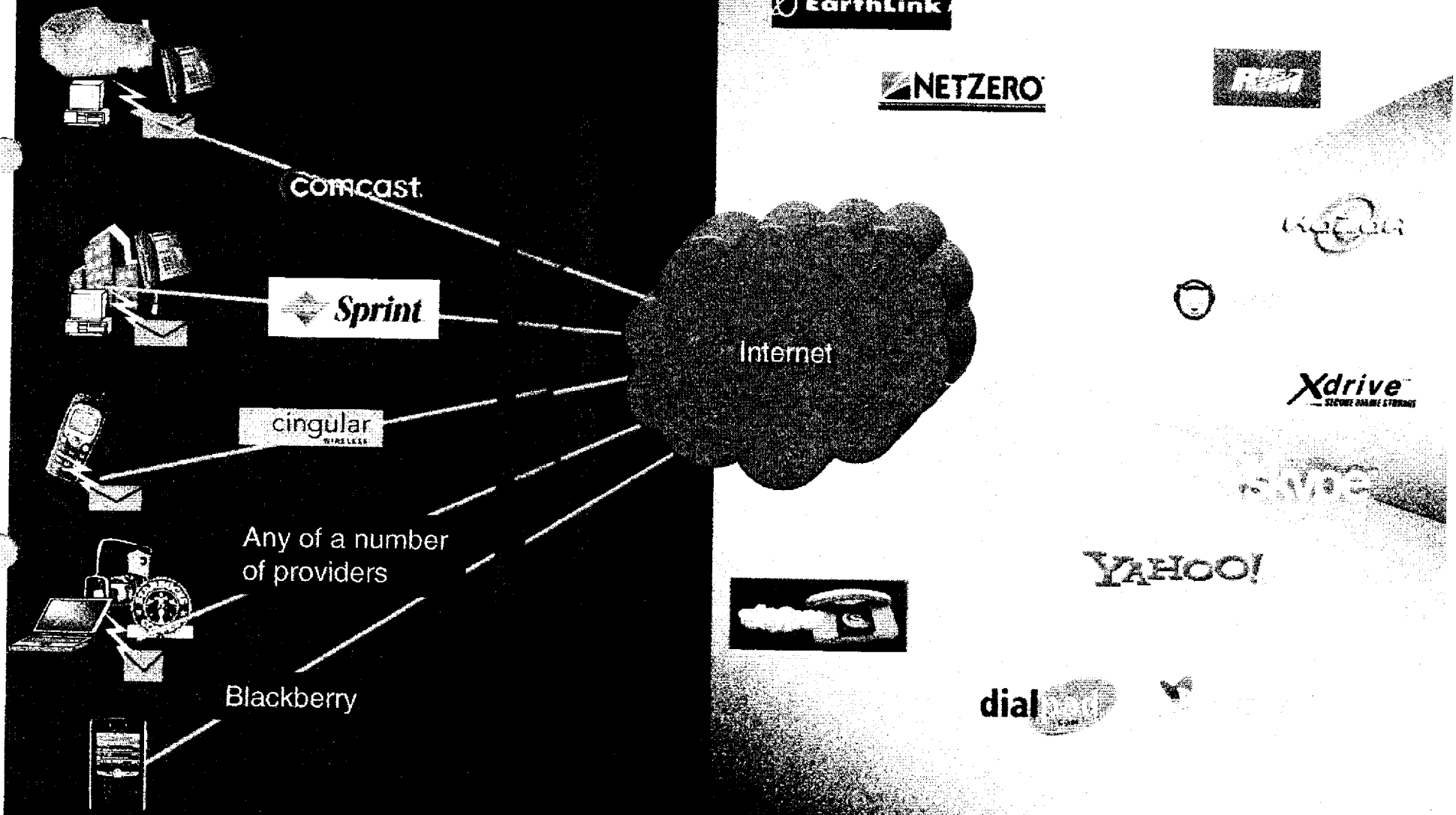
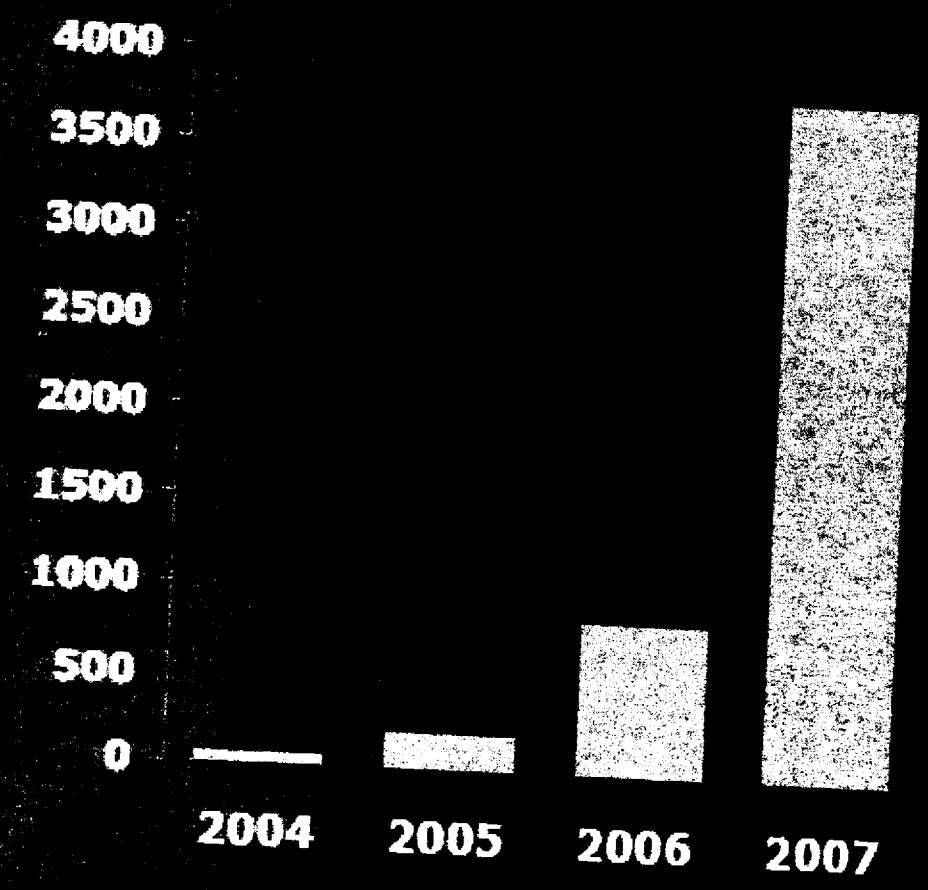


Wireless Data Traffic Growing Exponentially

Usage Quadrupling Every Year

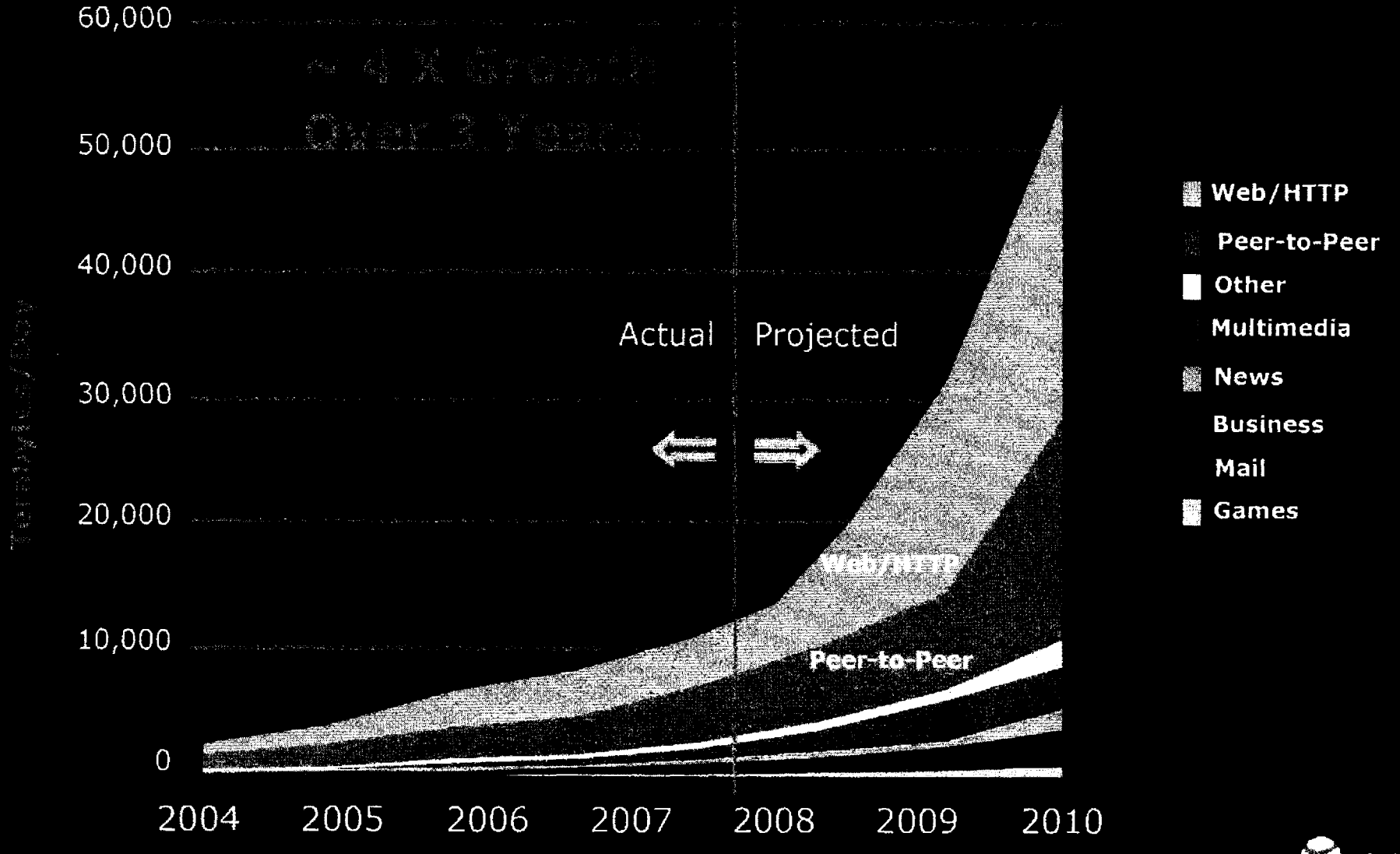


Driven by new applications:

- Internet
- Video
- Photo Sharing
- Messaging

The Network Is Relevant:

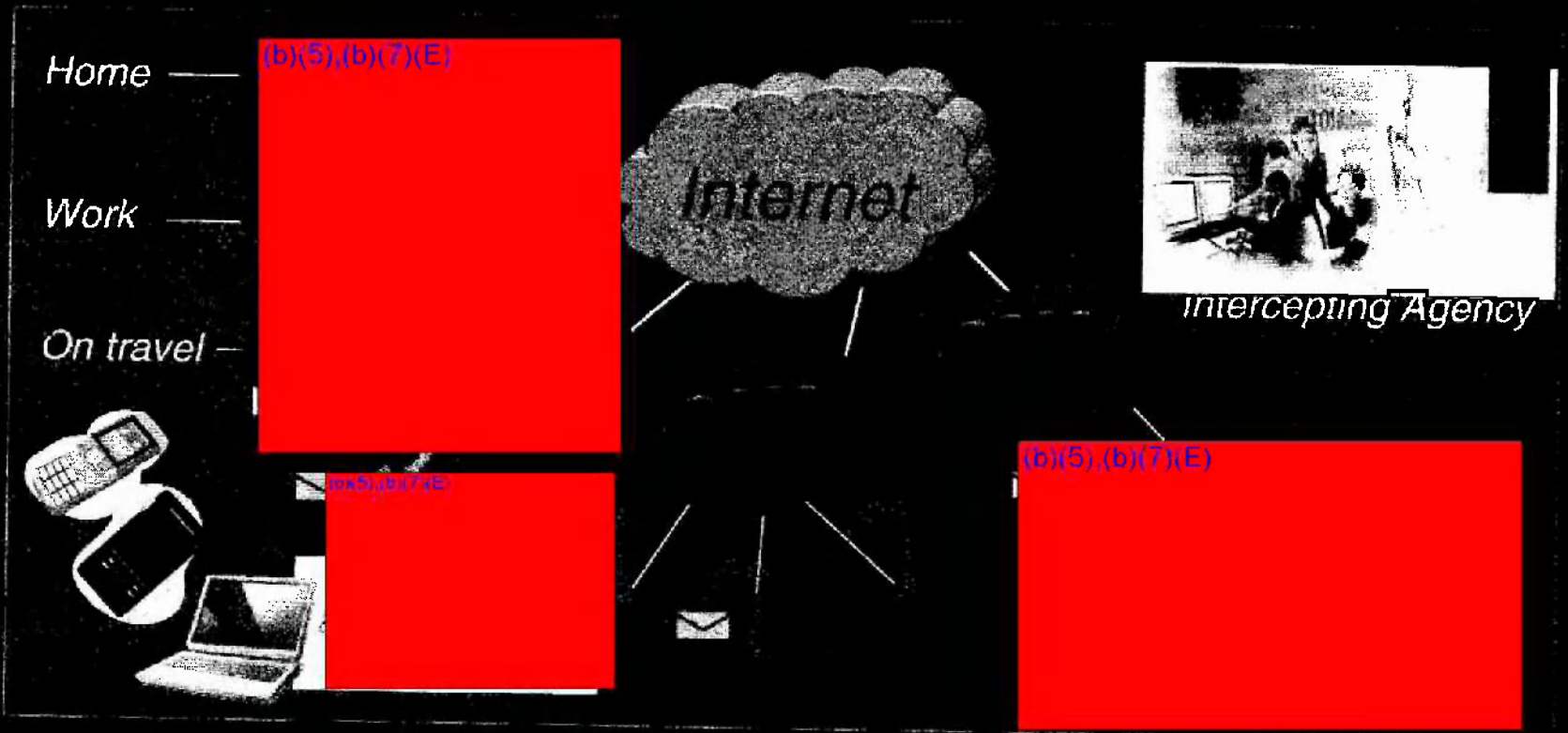
AT&T IP Backbone Projected Traffic Growth



10 terabytes equal the entire printed collection of the Library of Congress.

at&t

Conducting lawful intercept today is highly complex



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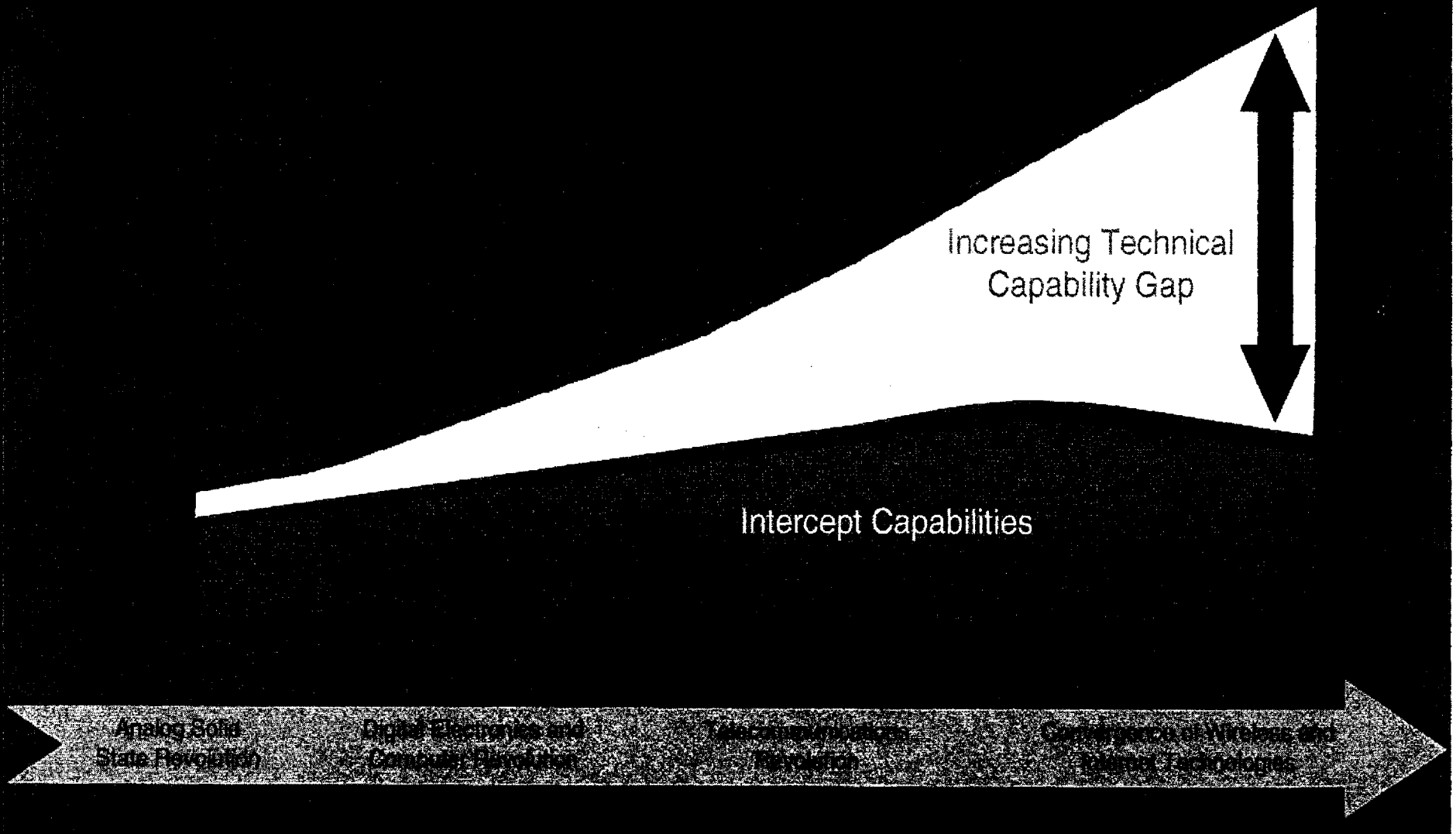
Law enforcement's lawful intercept capabilities are eroding by the day



Law Enforcement's Need to Preserve Lawful Intercept Capabilities

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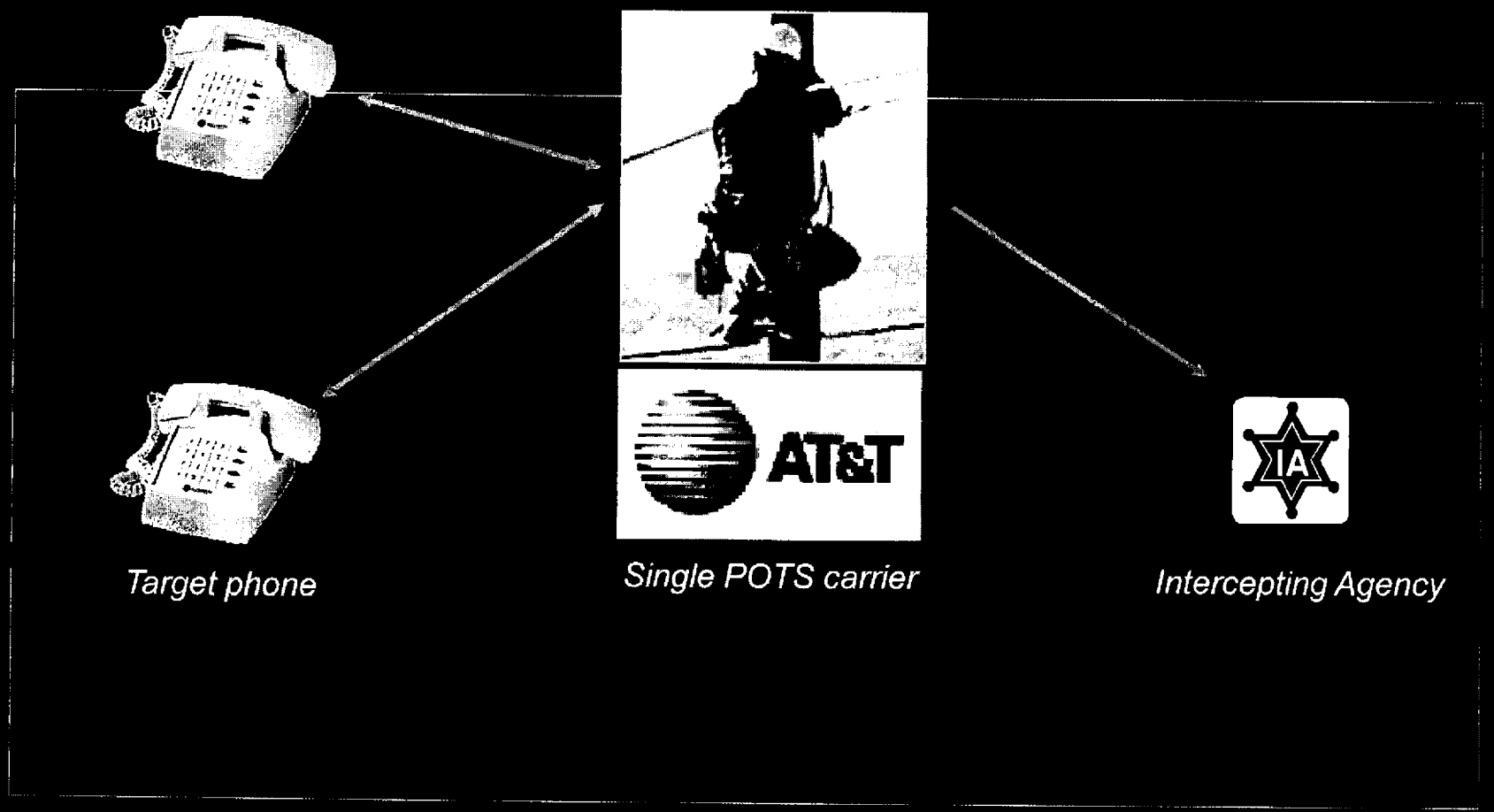

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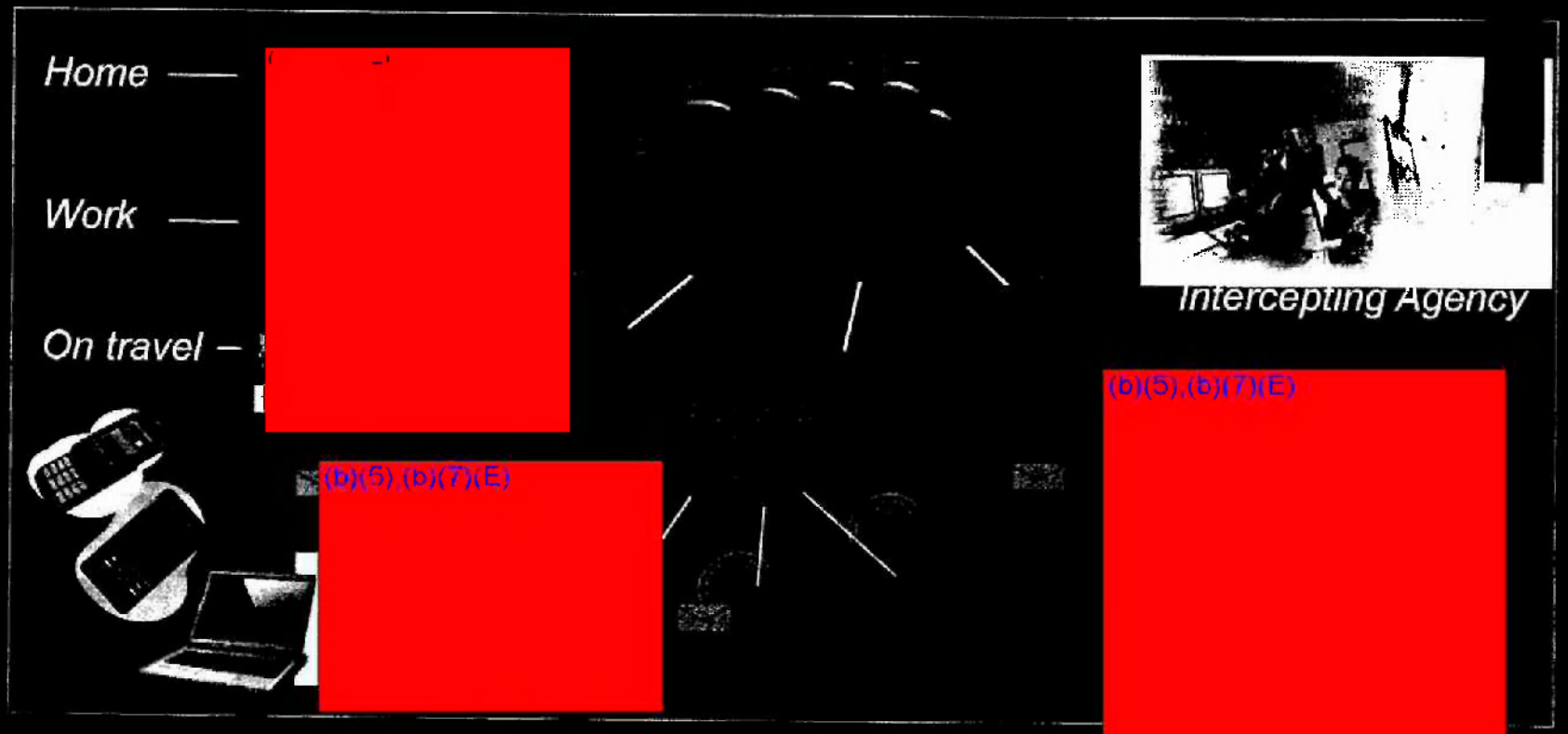

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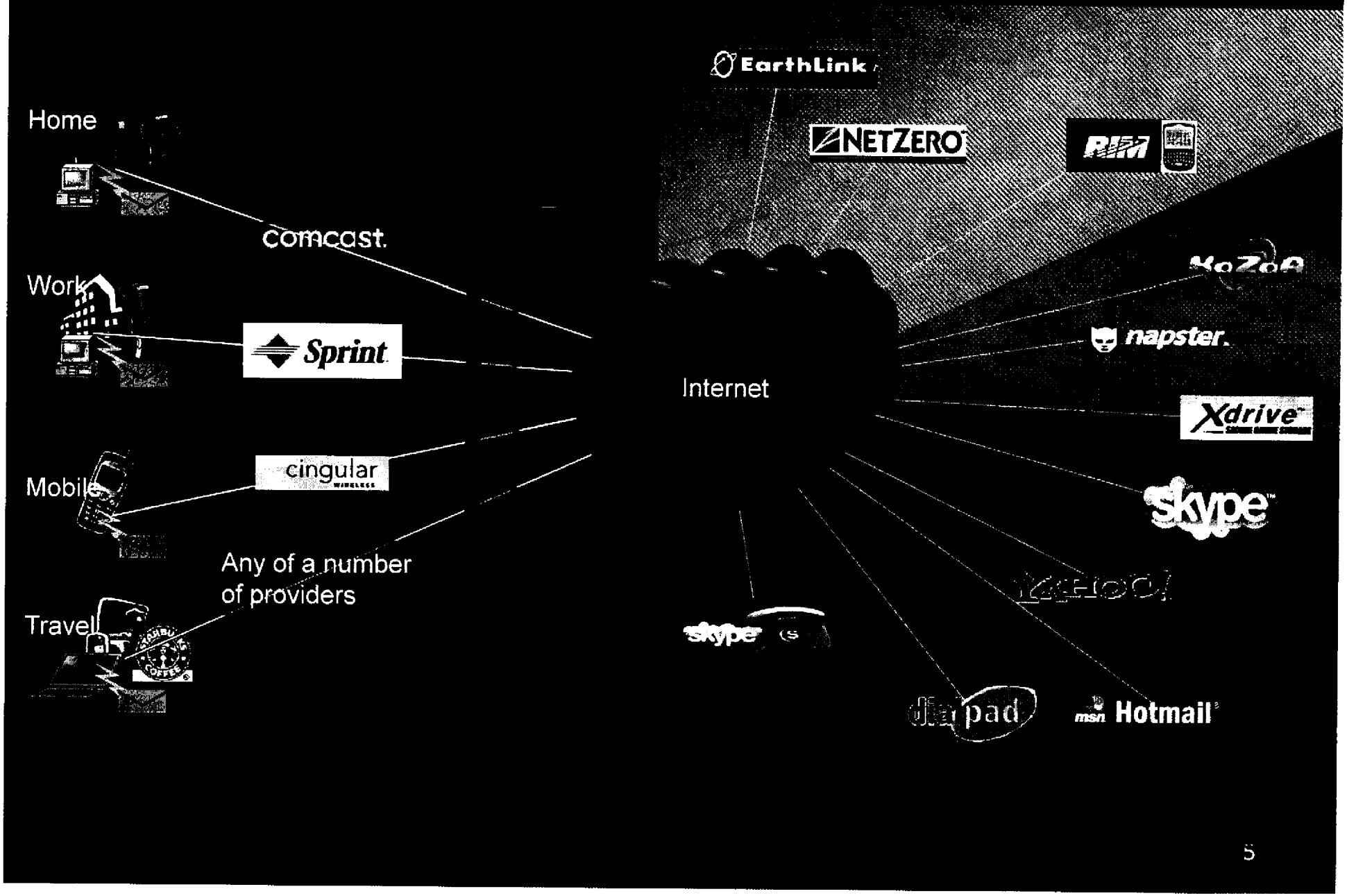
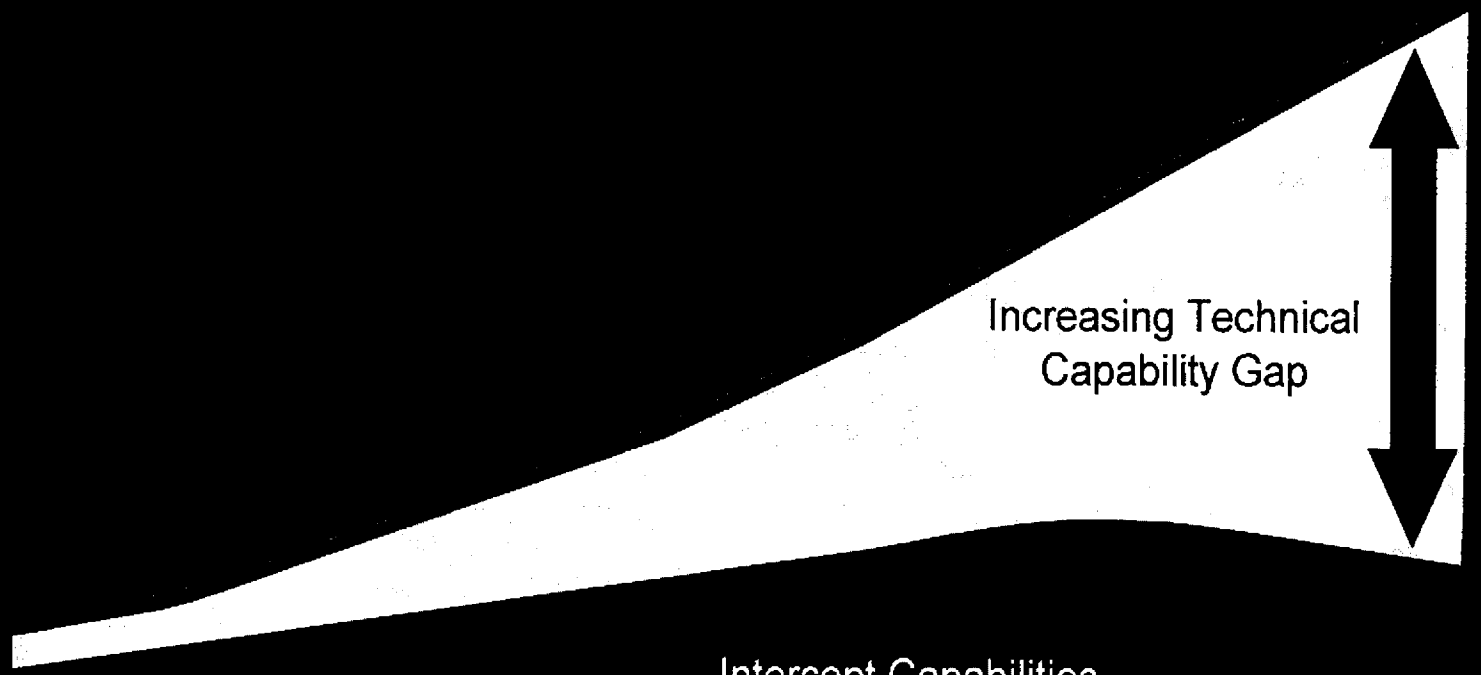


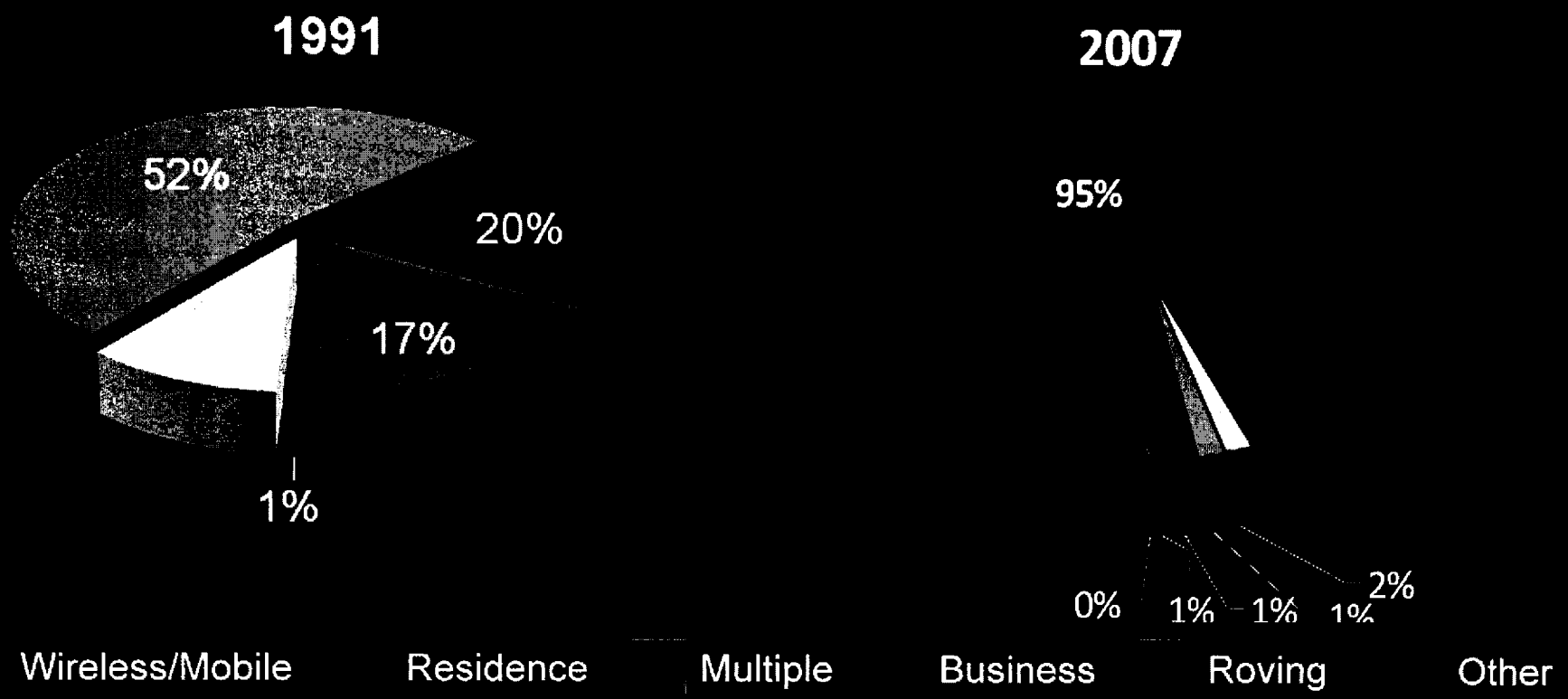
Law enforcement's lawful intercept capabilities are eroding by the day, creating a "Lawful Intercept Capability Gap." All Law Enforcement Agencies are on the road to "Going Dark



ELECTRONIC SURVEILLANC TRENDS - WHERE TITLE III WIRETAP AUTHORIZATIONS OCCUR

Shift in location of wiretaps

Wireless / mobile technologies are the preferred medium of communications for targets



Source: 2007 Wiretap Report, Administrative Office of the United States Courts

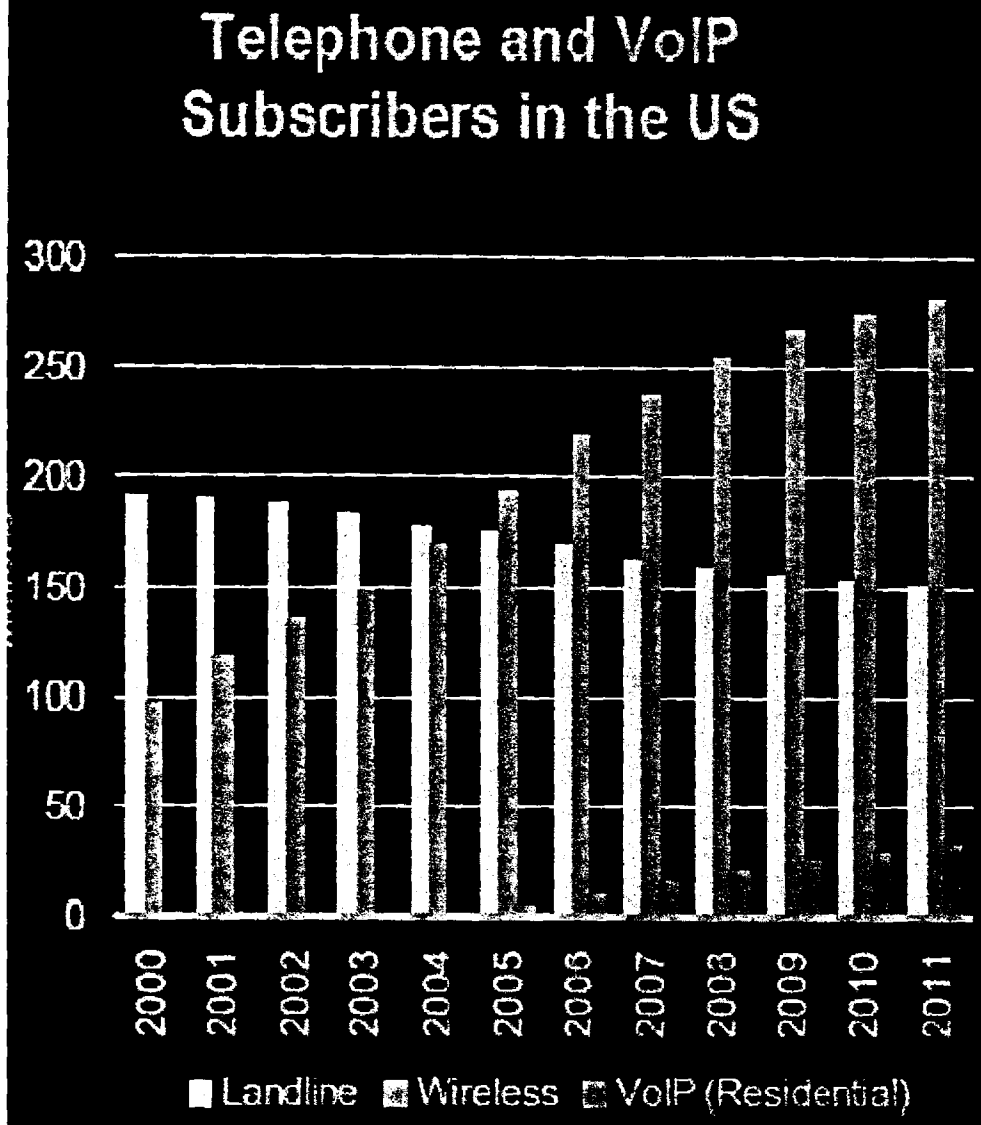
Industry Trends in Wireless Data Services

- 2008 Revenues for Verizon Wireless Data Services ($10.7 billion) represents a 44 percent increase over 2007.

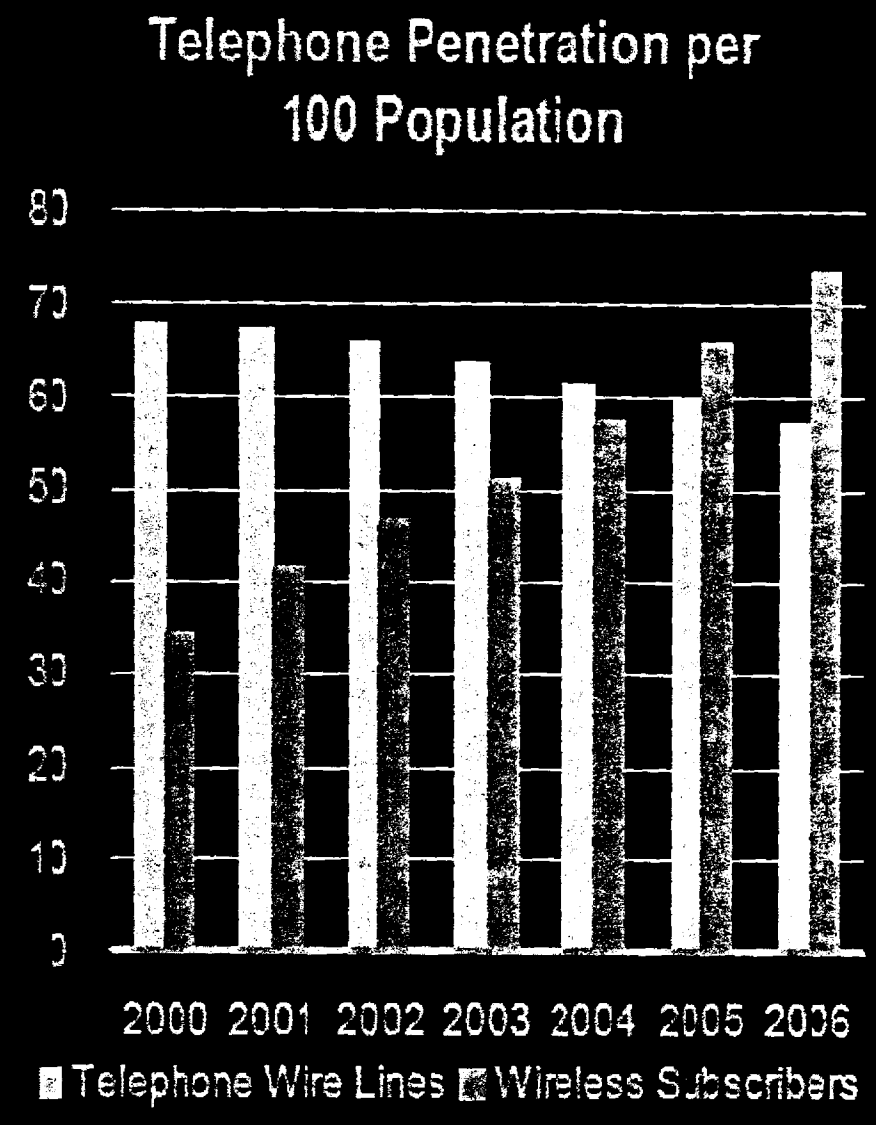
- More than 65 percent (45.5 Million) of its retail customers now own 3G broadband-capable devices. During the fourth quarter of 2008, Verizon Wireless customers sent or received more than 90 billion text messages, more than double the volume of texts sent in the same period one year earlier.

- In Q4-2008, AT&T reported a 57.5 percent increase in wireless data revenues over Q4-2007. The Data Growth reflects increases in the adoption of smart phones and 3G wireless devices.

There is a steady move away from traditional fixed line phones



Source: TIA 2008 Telecommunications Market Review & forecast, Federal Communications Commission, CTIA - The



Source: Trends in Telephone Service, FCC, 2007

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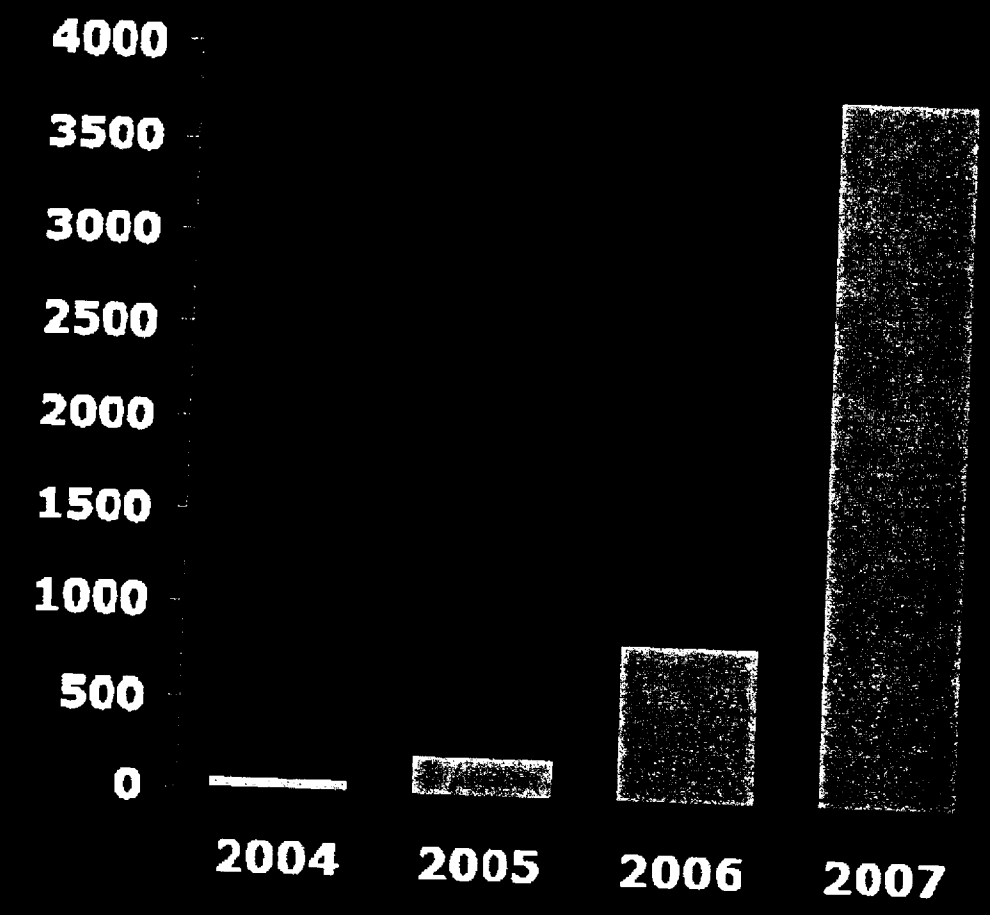
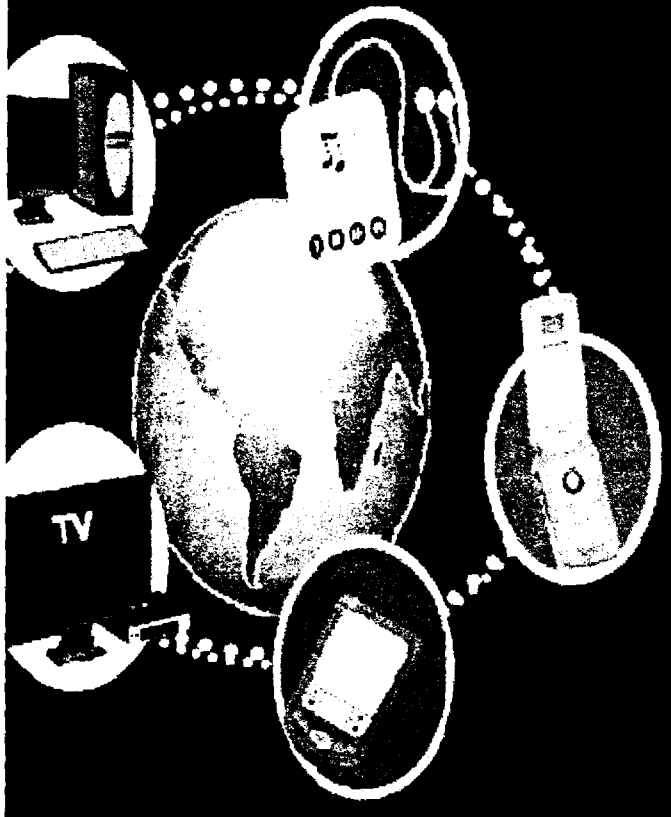


Driven by new applications:

- Internet
- Video
- Photo Sharing
- Messaging

hree Screens of the uture

nytime, anywhere access to communications nd entertainment services on any device



United States' largest digital voice and data wireless network, with broad 3G deployment

One of world's largest backbone networks

Extensive broadband and video access network

Discussion?

Drug Enforcement Administration
Office of Investigative Technology

Briefing for the
DEA Acting Administrator Leonhart
and the Executive Staff

October 20, 2009

Next Generation Wireless (NGW)

Office of Investigative Technology
Operational Support Unit

- Emerging Communications Challenges
- Electronic Surveillance Reform
- Communications Records Exploitation

Drivers

- Full scale convergence by industry to transform technology and wireless communications throughout the world.
- Wireless data (i.e., Smartphones, mobile broadband) is driving the world economy and creating new revenues.
- Next Generation technologies-economies of scale.
- Consumer's growing demand for wireless data services and computer-like capabilities such as Skype, encryption, peer-to-peer, VoIP.
- Data subscribers are doubling every year to an average of more than 2 billion messages per day.
- Industry is responding accordingly.

Drivers

- "We are not on the defensive, we are on the offensive."
  Anssi Vanjoki, Nokia Executive Vice President
- "The revolution is upon us.....we've only just begun."
  Neville Ray, T-Mobile U.S.A. Senior Vice President
- "Wireless data is driving the economy, Smartphone wireless connectivity is the answer."
  Meredith Attwell-Baker, Commissioner Federal Communications Commission
- "Data traffic is doubling every six months."
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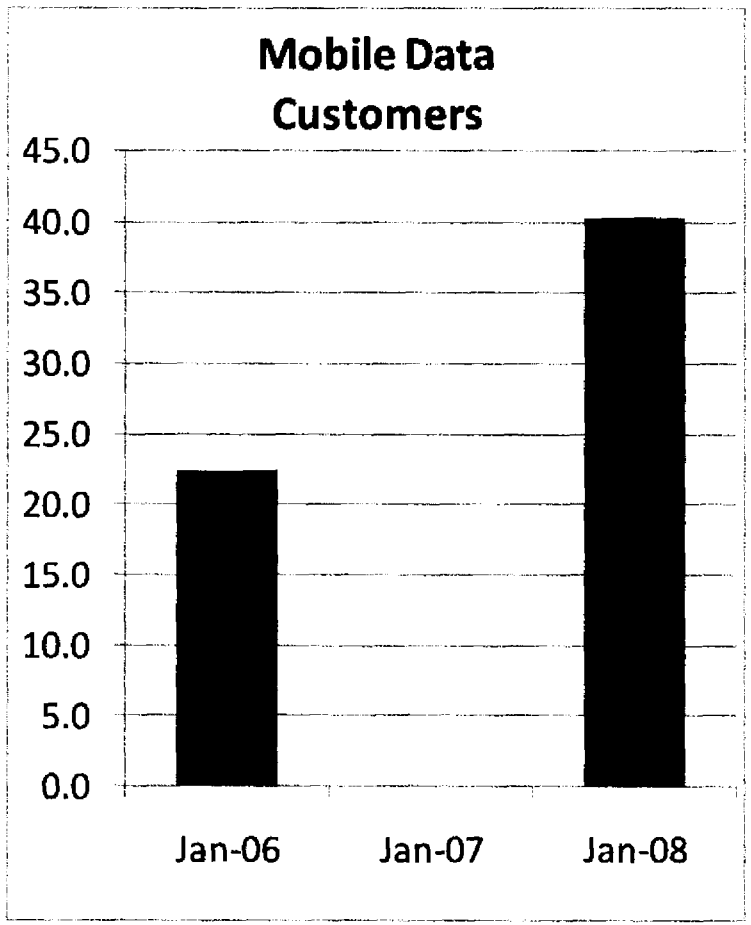
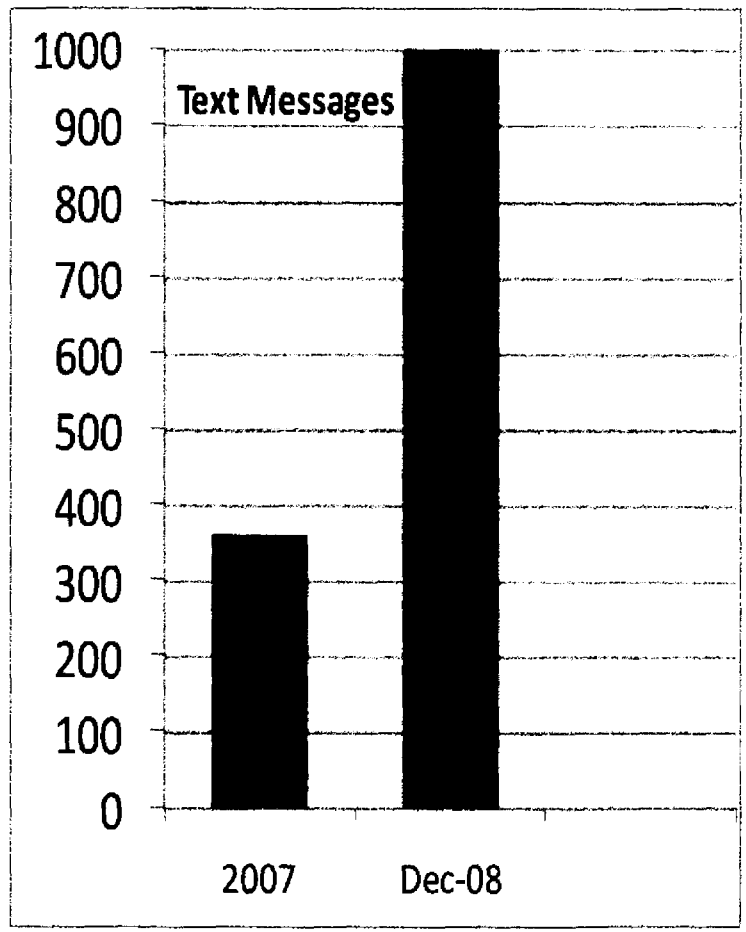
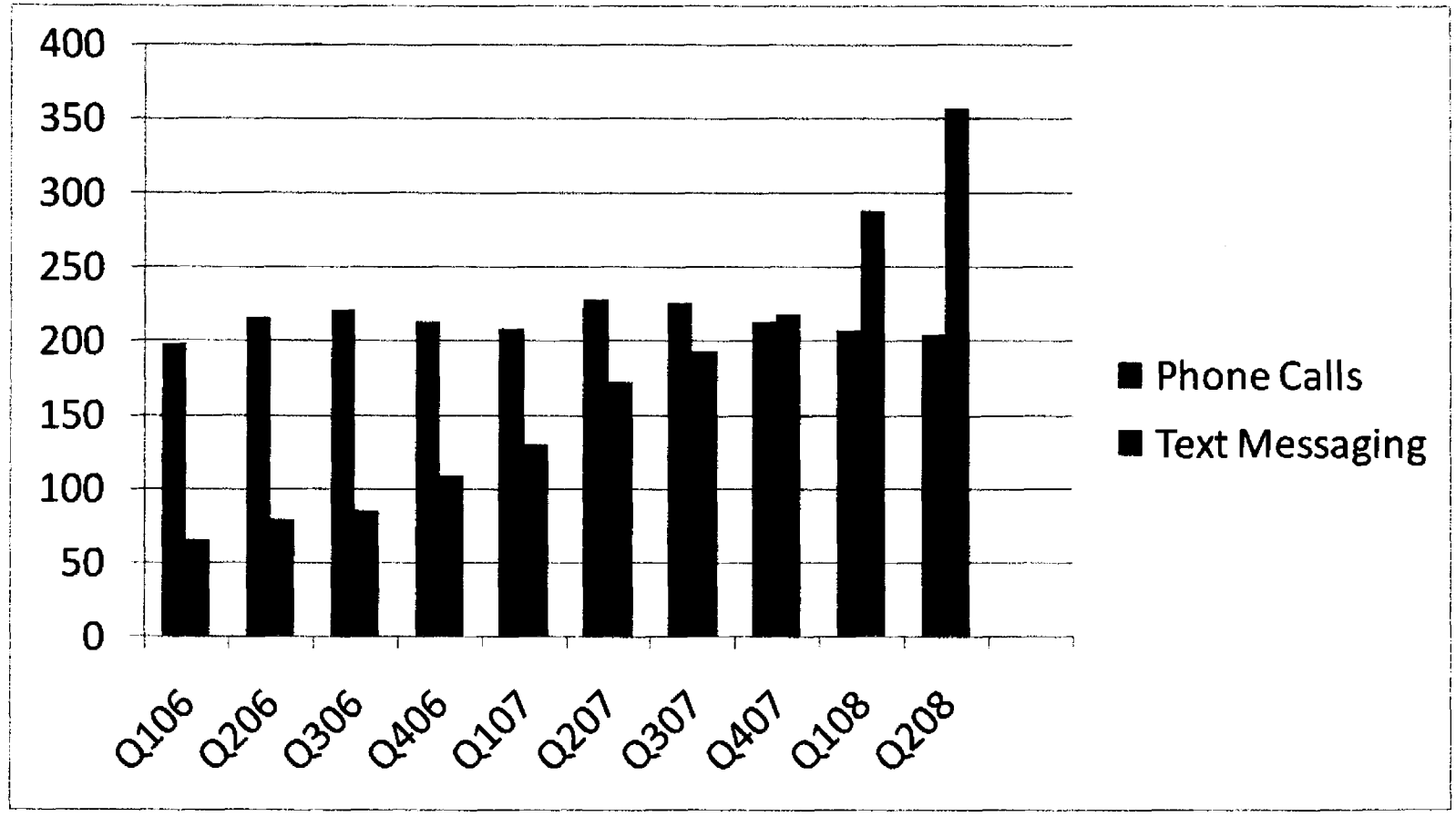
- "Wireless has evolved from mere voice communications to a new era of data transmissions and democratizing communications that are transforming commerce and culture."
  Steve Largent, President and CEO of CTIA

Shift from Mobile Voice to Mobile Internet - Data Communications





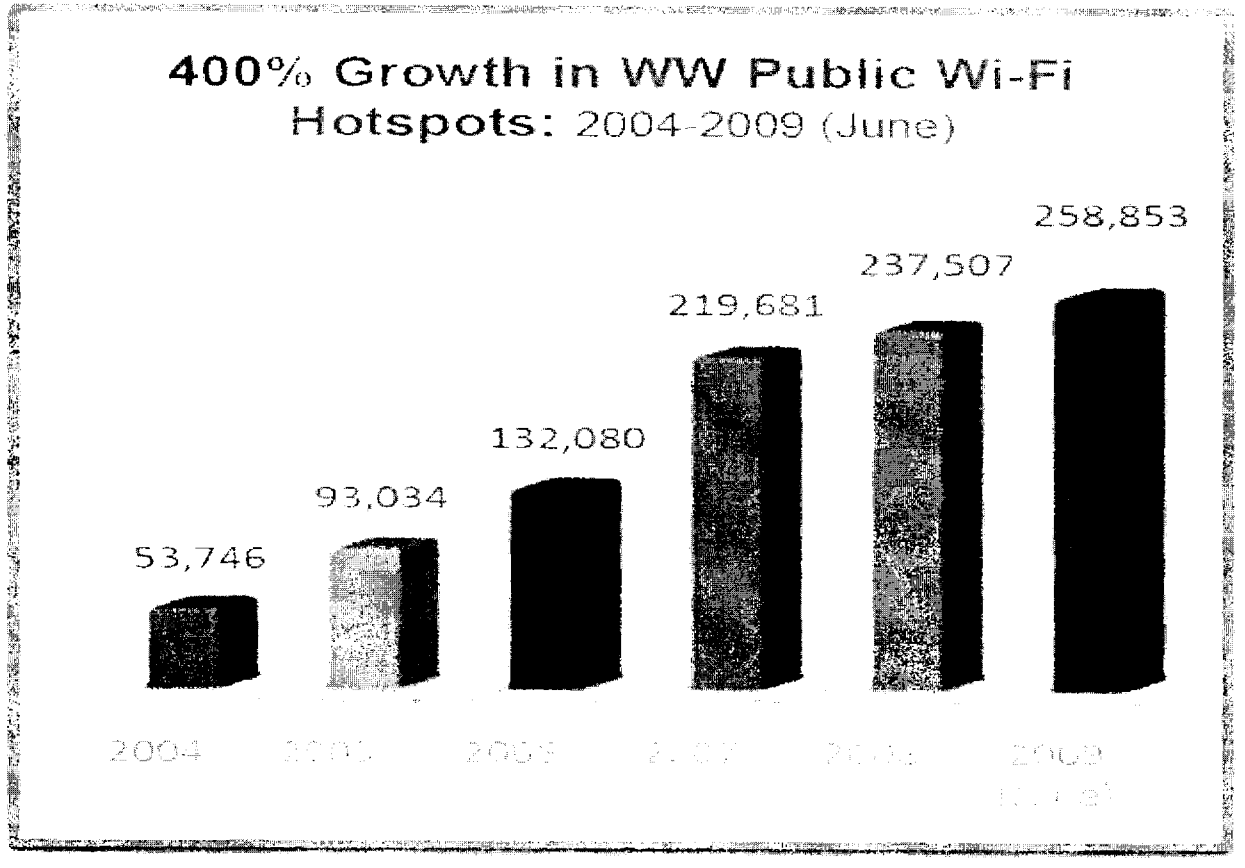
Average Number of Monthly Calls vs. Text Messages Among U.S. Wireless Subscribers



Source CTIA

Wi-Fi Cell Phones Expected to Double in Two Years

8-28-09 CIO.com



Source: JiWire, 2009

1	New York City	887
2	San Francisco	872
3	Chicago	792
4	Seattle	625
5	Houston	617
6	Los Angeles	505
7	Atlanta	453
8	San Diego	438
9	San Antonio	431
10	Austin	417

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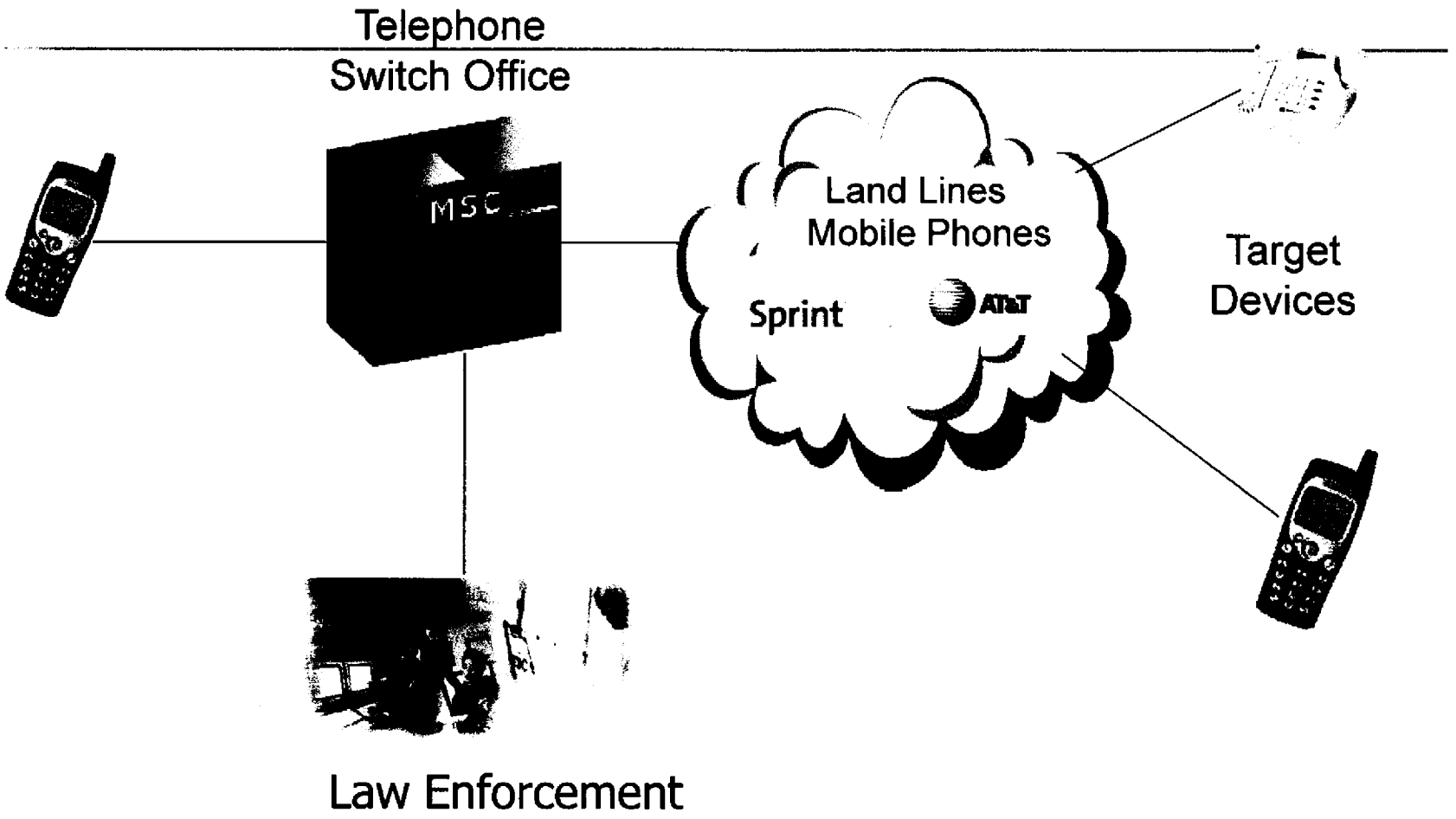
Traditional Switch Based Intercept



FCC inquiry on LE capabilities for LE

Public Safety & Homeland Security On An Open Internet
October 19th, 2009 by Jennifer Manner

- There are many important public safety and homeland security issues that are being examined by the FCC right now as part of the development of the National Broadband Plan, as well as in open FCC proceedings. These areas range from ensuring that broadband communications is available to the public safety community for their day to day communications, helping to ensure America's cyber security, developing Next Generation 9-1-1 and of course, ensuring that emergency alerting is brought into the twenty first century. All of these issues can be affected by open internet rules. Accordingly, one of the areas we are actively exploring is how best to address the needs of law enforcement, public safety, and homeland and national security.

- It is important that the public safety and homeland security community, and other interested parties have a voice in this debate. It could impact the next generation technologies that are being rolled out to the public safety and homeland security communities already and will only increase in proliferation. Accordingly, interested parties are urged to file comments, providing data and other evidence of how the FCC should look at these very important issues.

Drug Enforcement Administration
Office of Investigative Technology

Briefing for the

DEA Field Advisory Committee

November 4, 2009

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Operational Support Unit

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- Next Generation technologies-economies of scale.
- Consumer's growing demand for wireless data services and computer-like capabilities such as Skype, encryption, peer-to-peer, Location based Services (LBS), multi-media, VoIP.
- AT&T wireless data traffic is doubling every quarter and being driven by messaging, internet access, applications and related services.

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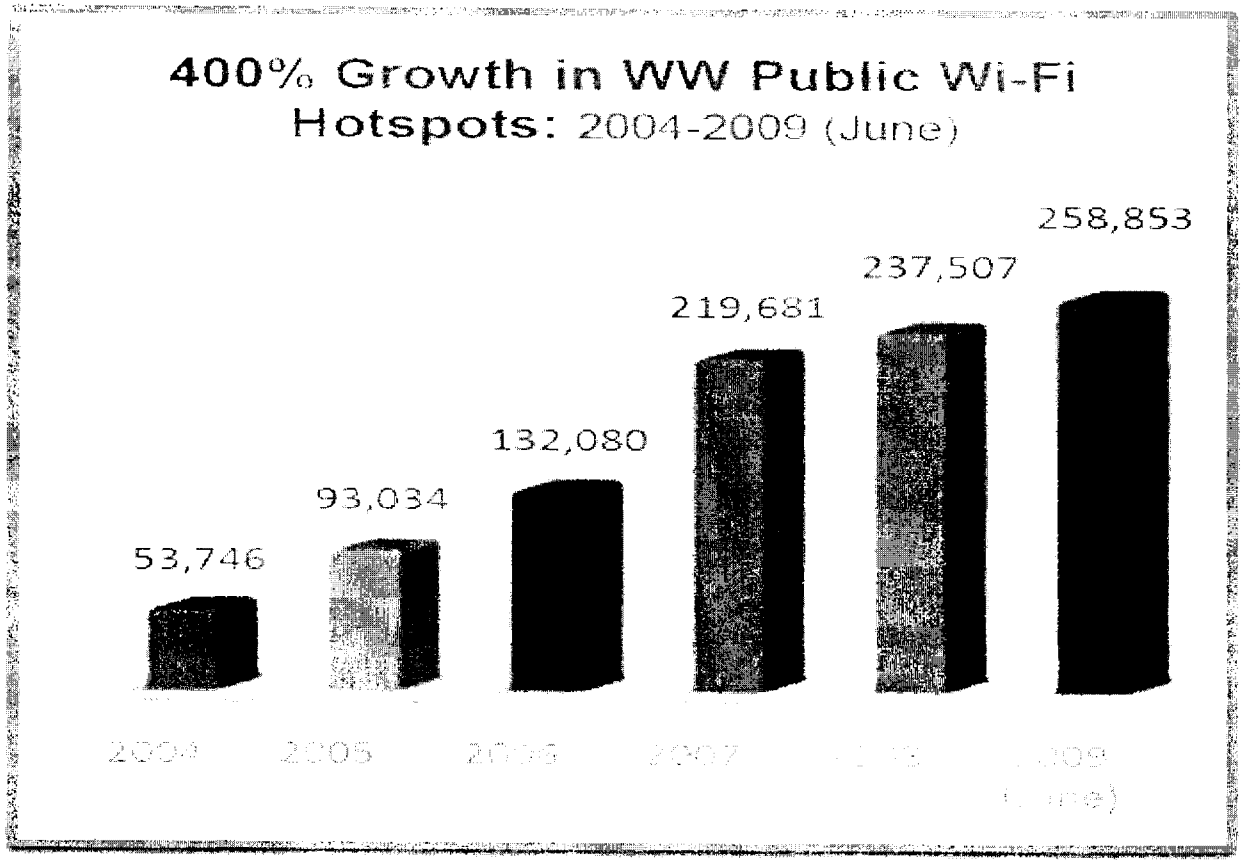
Wireless Data Trends

- Wireless data service revenues for the first half of 2009 climbed to more than $19.4 billion—a 31% increase from the first half of 2008.
  - There are more than 276 million U.S. wireless subscribers.
  - More than 740 billion text messages were reported for the first half of 2009—breaking down to 4.1 billion messages per day— which is nearly double the amount of texts reported for the first half of 2008.
  - 1.1 trillion minutes were used in the first half of 2009—breaking down to 6.4 billion minutes-of-use per day.
  - More than 246 million data-capable devices are in the hands of consumers today. More than 40 million of these devices are Smart-phones or wireless-enabled PDAs and more than 10 million are wireless-enabled laptops, notebooks or air-cards

Wi-Fi Cell Phones Expected to Double in Two Years

8-28-09 CIO.com

Worldwide Public Wi-Fi Hotspots: 2004-2009



Source: JiWire, 2009

Top 10 U.S. Cities for Public Wi-Fi June 2009

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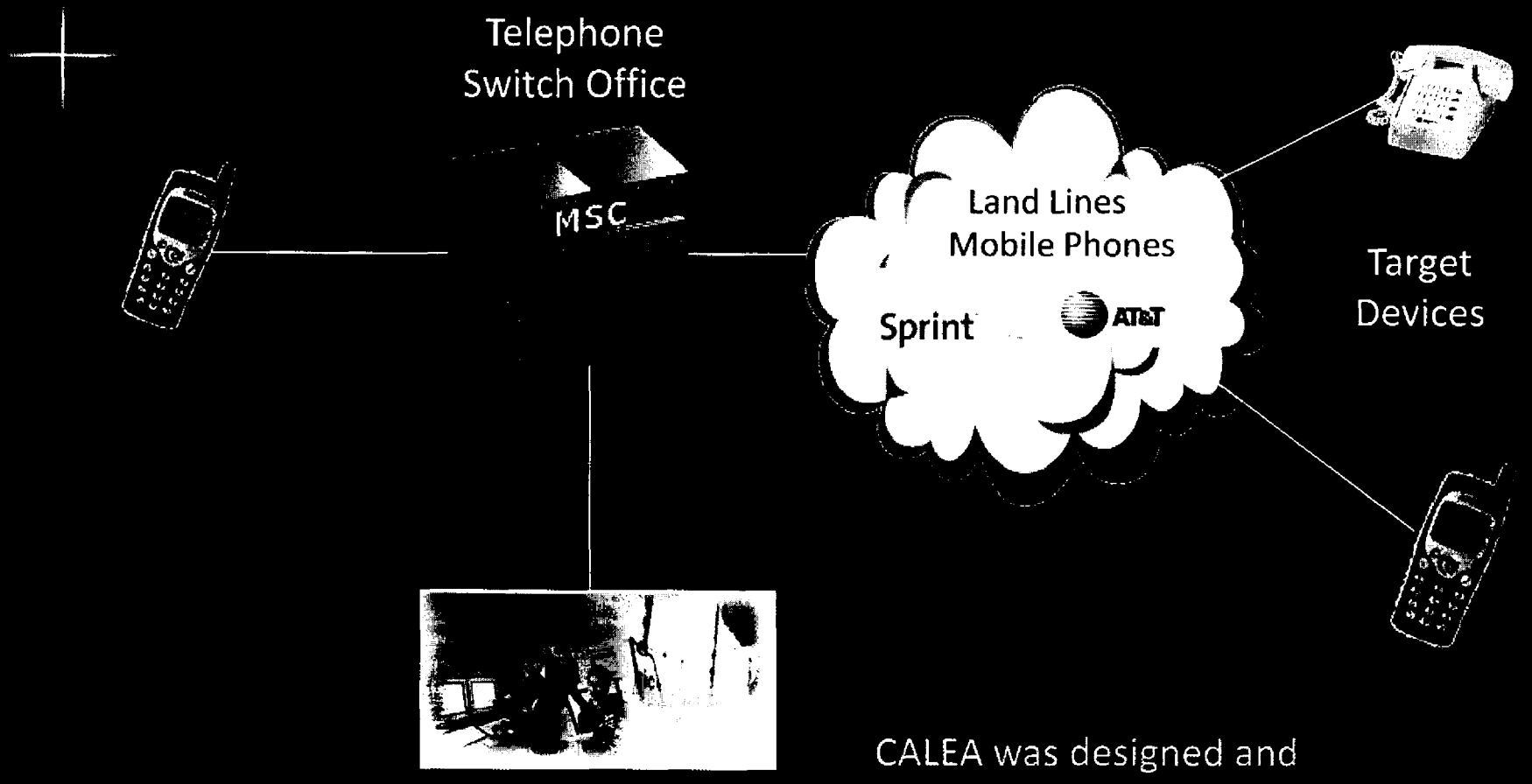
Communications Assistance For Law Enforcement Act (CALEA)

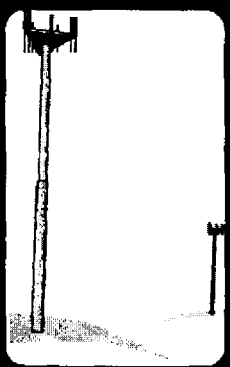
- Congress enacted CALEA in October 1994 to **preserve the ability of law enforcement to conduct electronic surveillance** by requiring that telecommunications carriers and manufacturers of telecommunications equipment modify and design their equipment, facilities, and services to ensure that they have the necessary surveillance capabilities. Applies to—
-
  - Common carriers
  - Facilities-based broadband Internet access providers
  - providers of interconnected Voice over Internet Protocol (VoIP) service.

  - All defined as "telecommunications carriers" for purposes of CALEA

Traditional Switch Based Intercept



CALEA was designed and Implemented for the PSTN Infrastructure depicted here.

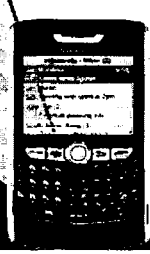


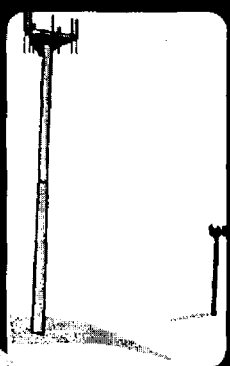
Wi Fi ZONE

When in range of Wi-Fi hotspot .. Handset connects over VoIP

User talking via standard cell tower

Auto-authentication allows some smart-phone users to seamlessly switch from a 3G network to an Wi-Fi Hot Spot without being prompted





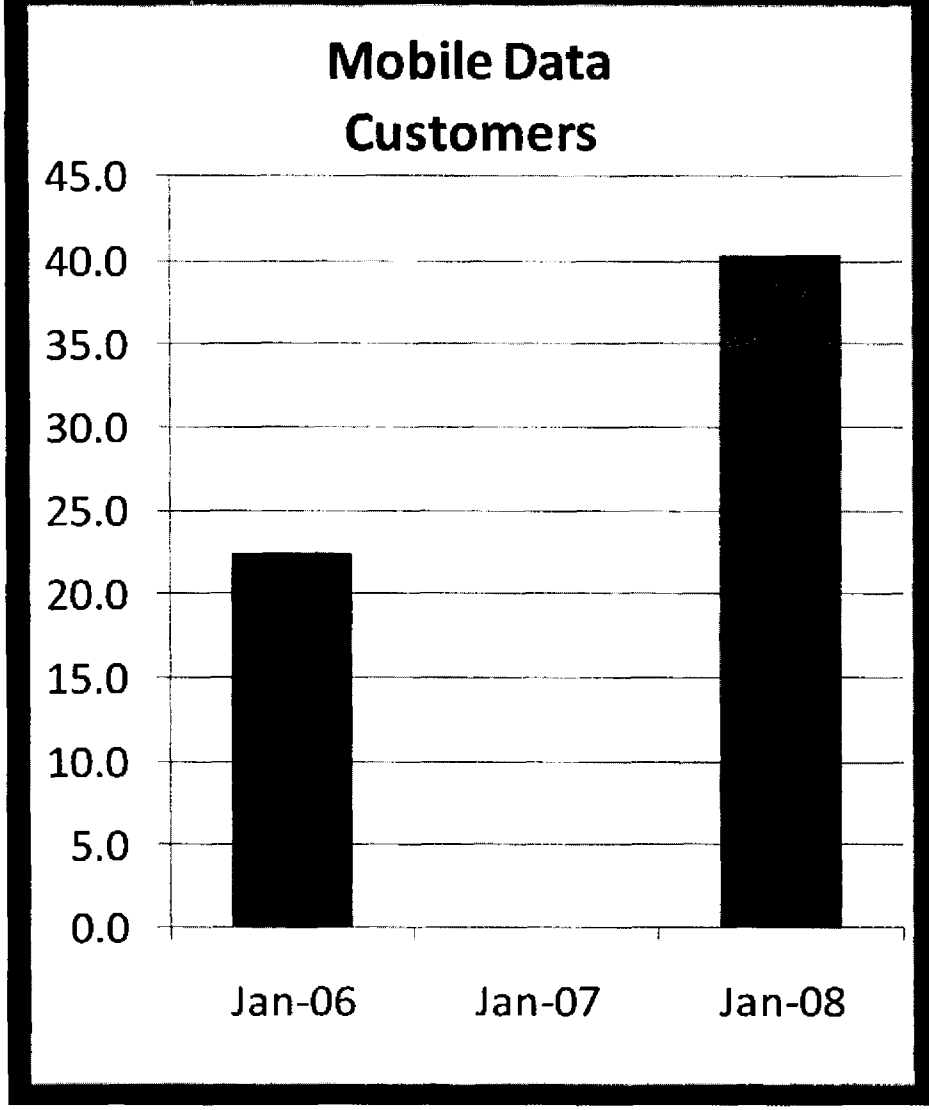
Lose Wi-Fi signal .. Back to standard cell tower

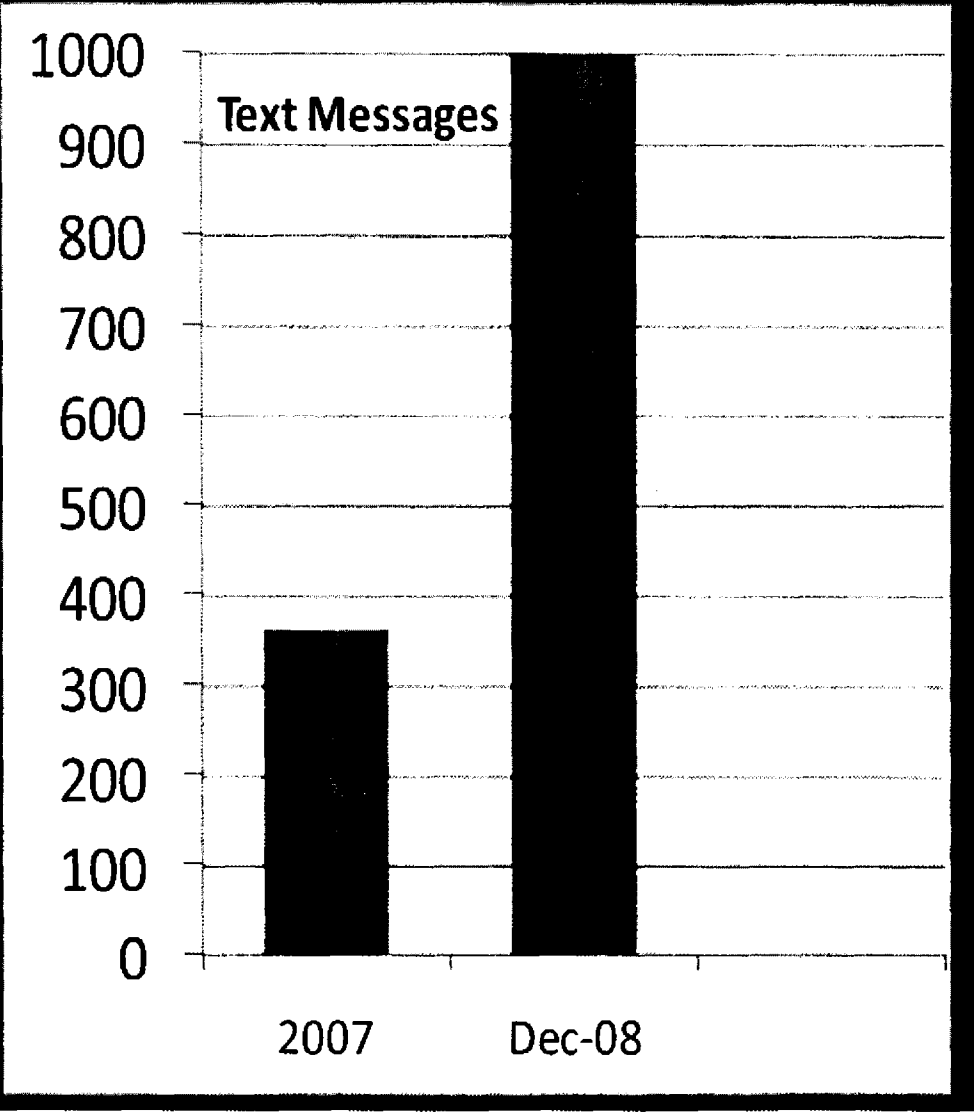
What does this mean for Title III and Call Detail Records?

Technology Challenges

- Target Mobility
- Target Identification
- IP Based Communications
- Peer to Peer Communications
- Multiple types of Broadband Services (e.g., Wireless, Cable, FIOS)
- Encryption
- Authentication
- (b)(5),(b)(7)(E)

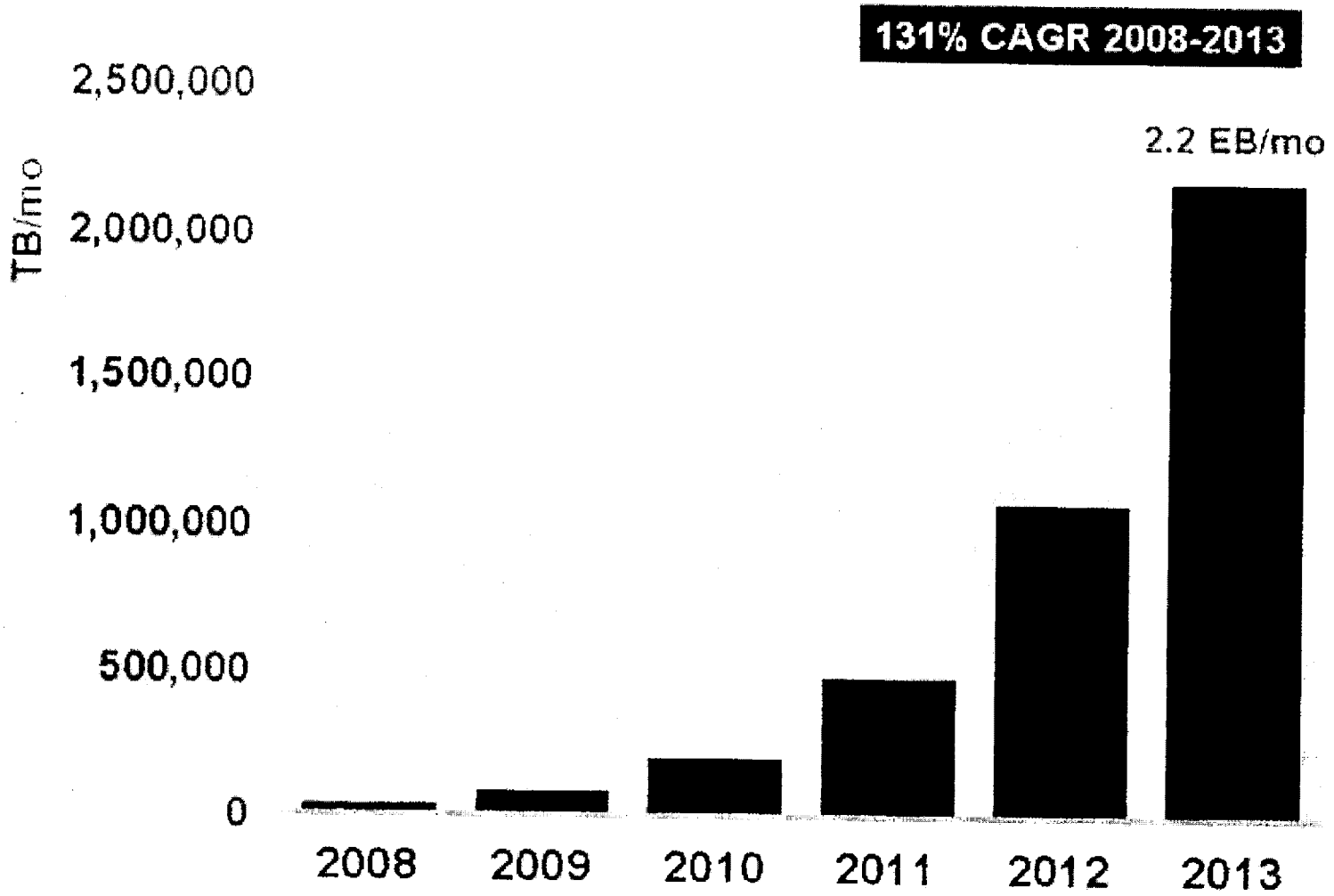
Shift from Mobile Voice to Mobile Internet - Data Communications





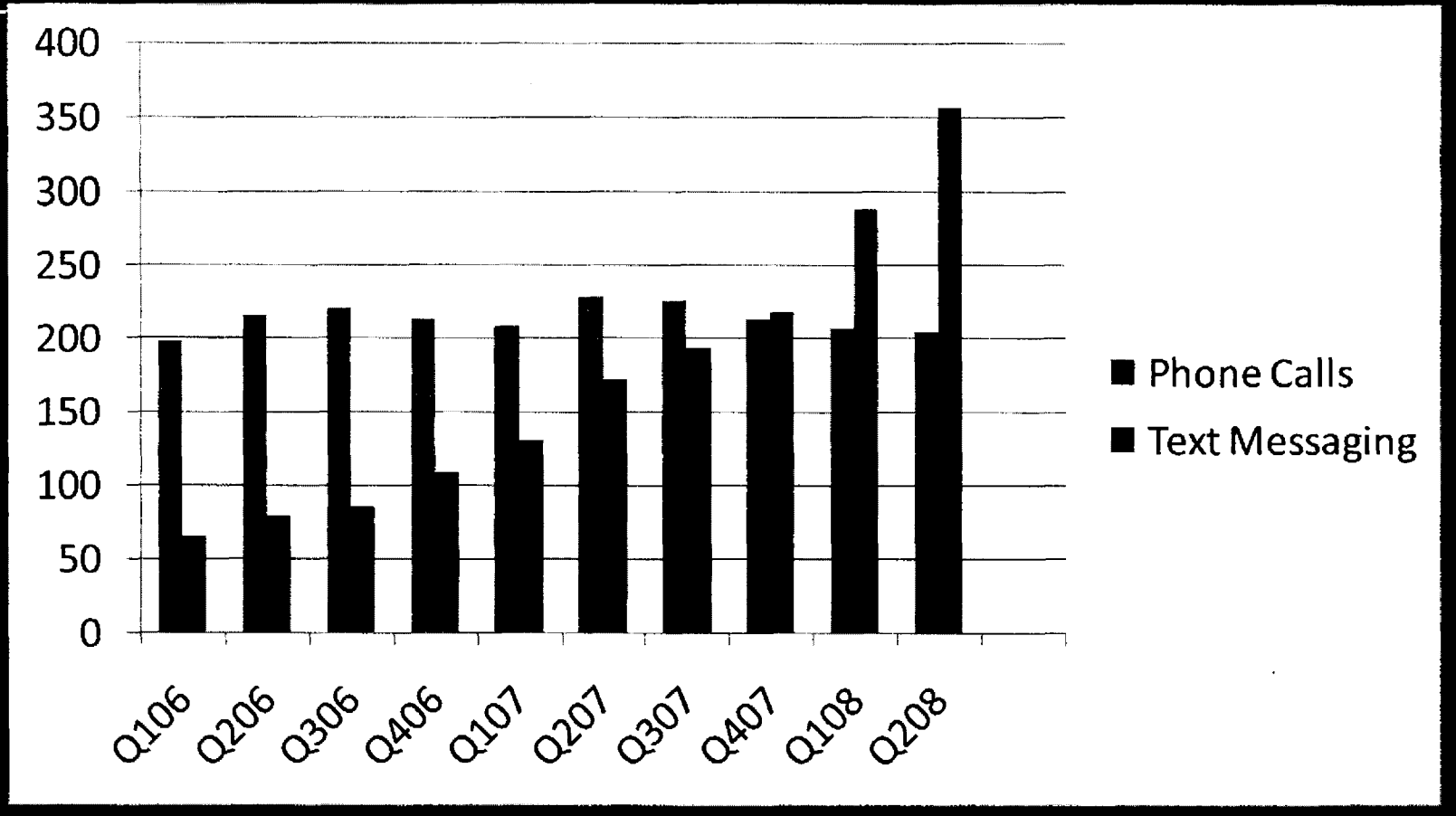
Global Mobile Data Traffic Growth

Mobile data traffic will increase 56X from 2008 to 2013



Source: Cisco Visual Networking Index – Forecast, 2008-2013

Average Number of Monthly Calls vs. Text Messages Among U.S. Wireless Subscribers



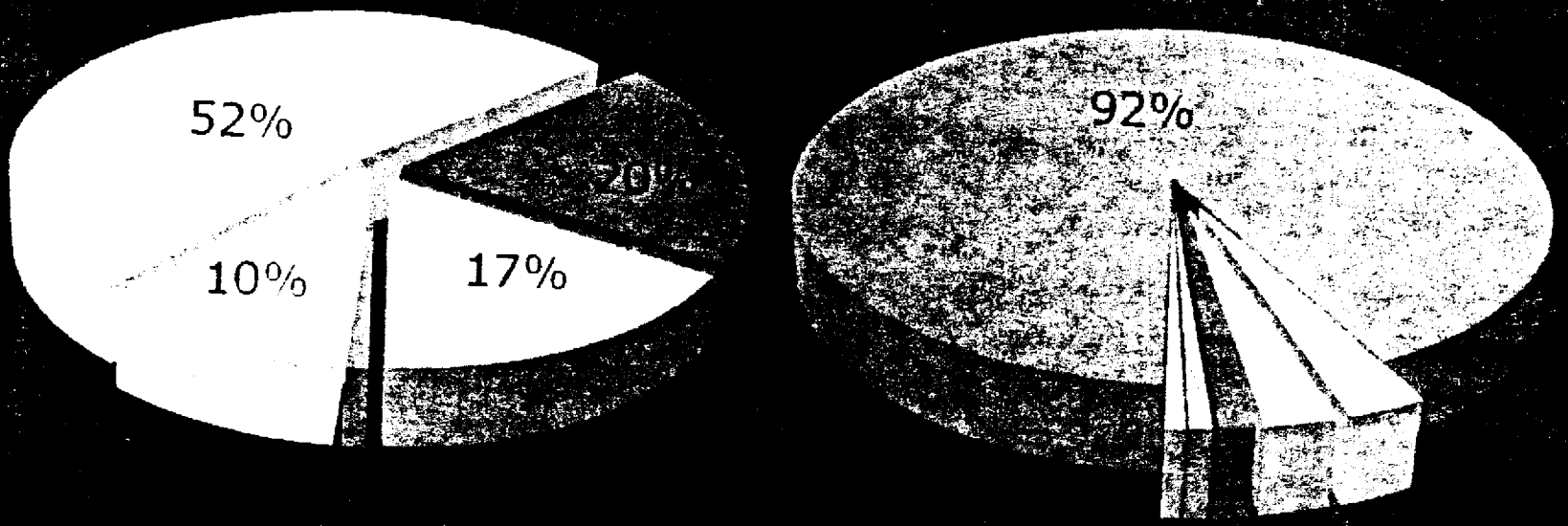
Source CTIA

Who Are They?

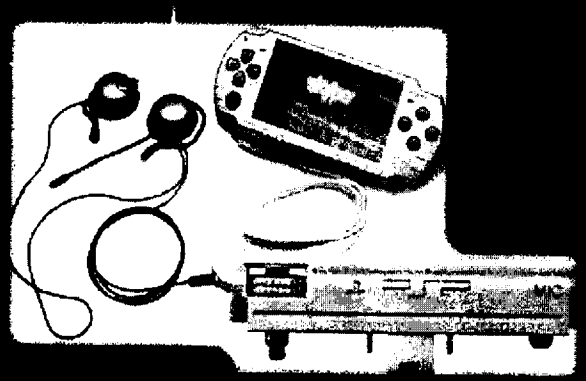
Per Month	Phone Calls	Text Messages
All Subscribers	204	357
12 & Under	137	428
Ages 13 - 17	231	1742
Ages 18 - 24	265	790
Ages 25 - 34	239	331
Ages 35 - 44	223	236
Ages 45 -54	193	128
Ages 55 - 64	145	38
Ages 65+	99	14

Shift in Judicial Intercept Trends

Wireless communications technologies are the preferred medium for of communications for targets



Convergence of Smart-Phones, Game Stations, VoIP Applications and 3G/Wi-Fi Technology



skype

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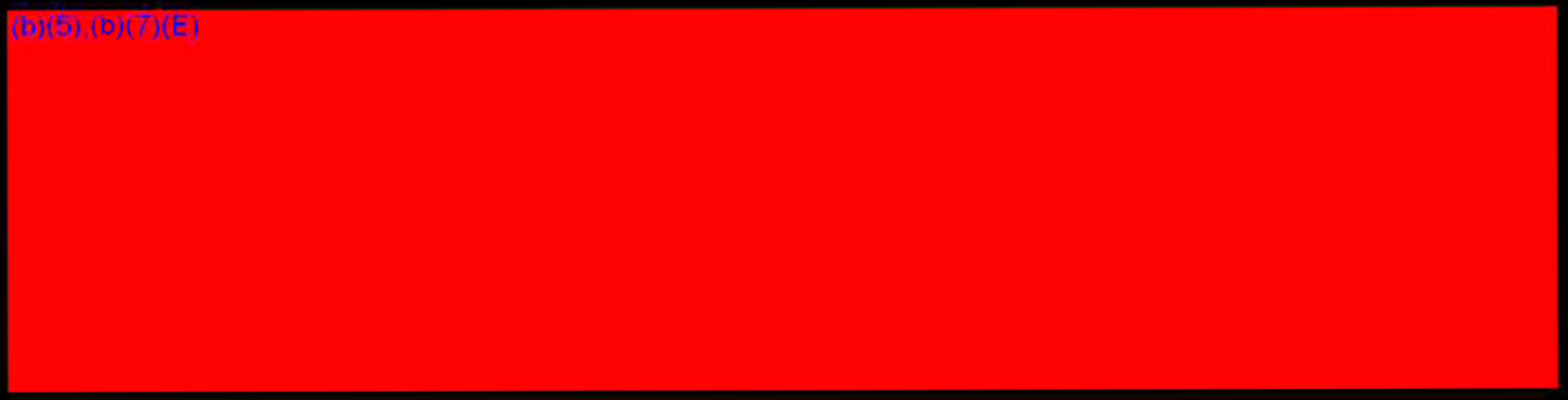
Wi Fi

Smart-Phone Capabilities
Mobile Data

- Smart-phone capabilities include:
  - Traditional Voice
  - Email
  - Text Messaging (SMS)
  - Instant Messaging (IM)/ Chat
  - 72 different Voice over IP (VoIP) applications available
  - Web-based Virtual Worlds. (Second life, World of Warcraft
  - Wi-Fi [redacted]
  - 3rd party GPS Mapping Applications
  - Social Networking (Facebook, Flickr, MySpace etc...)
  - Web-based email (Hotmail, Yahoo etc..)

I-Phone
Multiple Carriers in 2010

- Currently serviced only through AT&T
- Multiple applications that facilitate voice and data communications.
  - Skype, Fring, Free SMS, Email, Facebook



Q & A

Drug Enforcement Administration
Office of Investigative Technology

Diminishing Electronic Surveillance Capabilities in the Communications Age

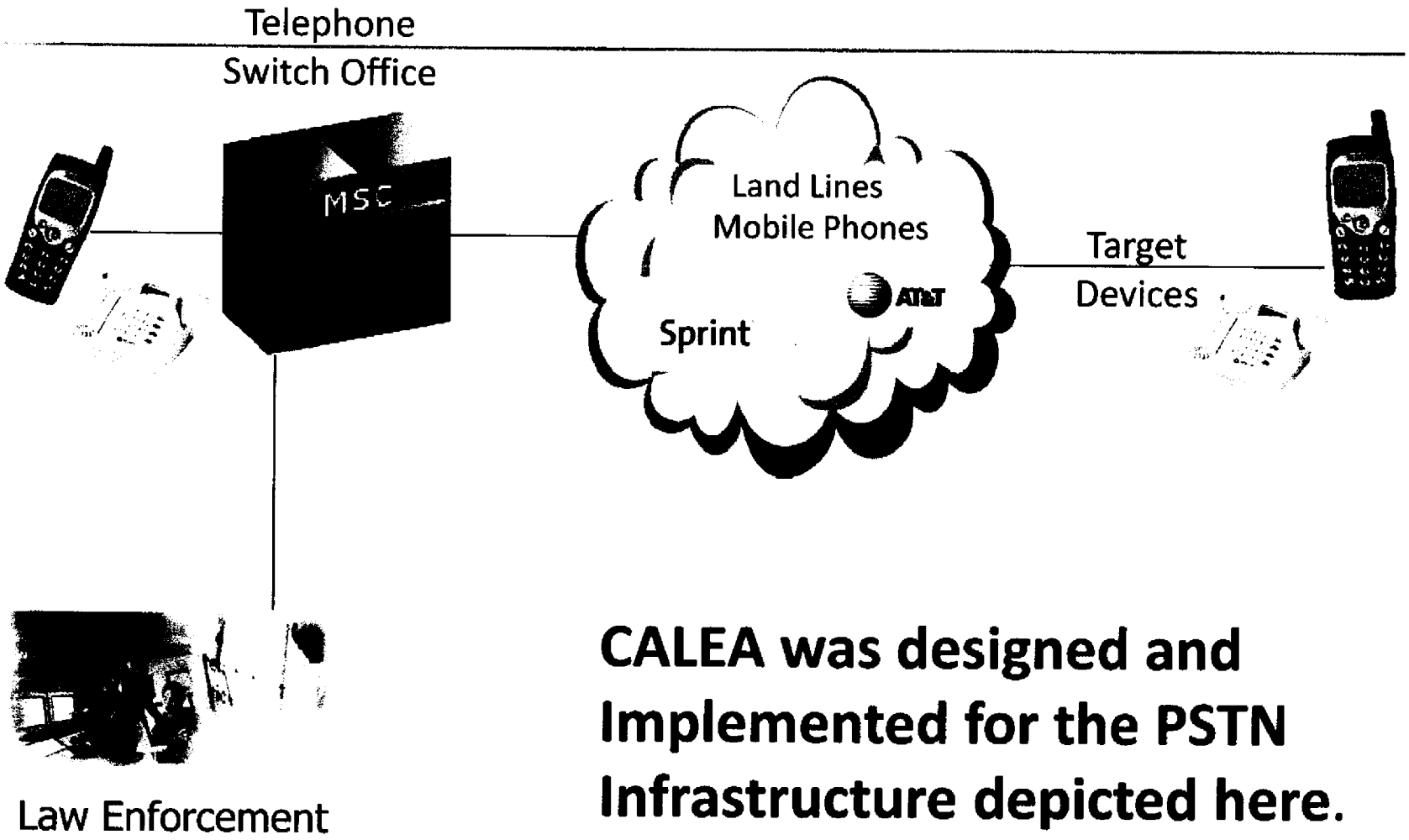
November 18, 2009

Communications Assistance For Law Enforcement Act (CALEA)

- Congress enacted CALEA in October 1994 to **preserve the ability of law enforcement to conduct electronic surveillance** by requiring that telecommunications carriers and manufacturers of telecommunications equipment modify and design their equipment, facilities, and services to ensure that they have the necessary surveillance capabilities. Applies to—
-
  - Common carriers
  - Facilities-based broadband Internet access providers
  - Providers of interconnected (MANAGED) Voice over Internet Protocol (VoIP) services.

  - All defined as "telecommunications carriers" for purposes of CALEA

Traditional Switch Based Intercept 1994 Landscape



CALEA was designed and Implemented for the PSTN Infrastructure depicted here.

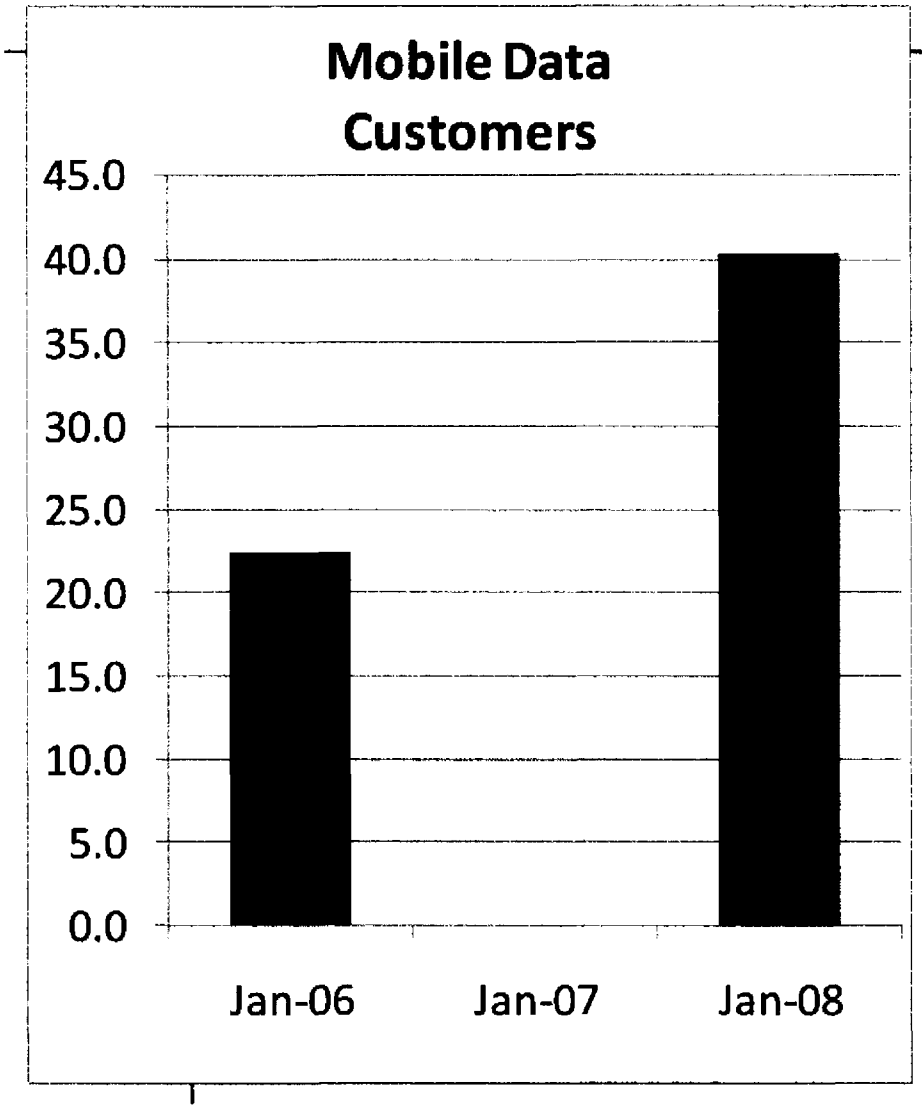
Drivers

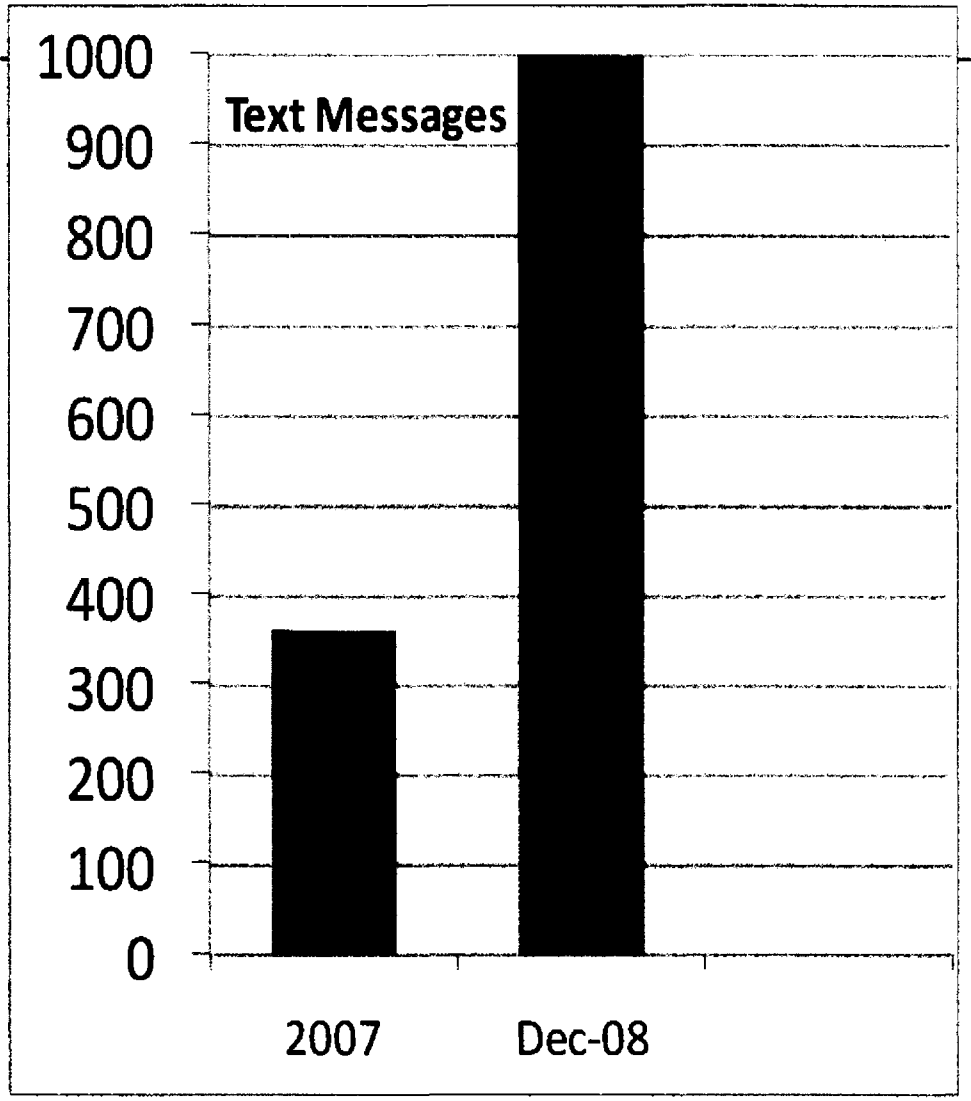
- Industry full scale convergence and transformation of traditional circuit switched communications to I.P. based communications throughout the world.
- Wireless data (i.e., Smart-phones, mobile broadband) is driving the telecommunications industry and creating new revenues.
- Consumer's growing demand for wireless data services and computer-like capabilities such as Skype, encryption, peer-to-peer, location based services (LBS), multi-media, VoIP.
- AT&T wireless data traffic is doubling every quarter and being driven by messaging, internet access, applications and related services.
- "Wireless data is driving the economy, Smartphone wireless connectivity is the answer." *Meredith Attwell-Baker, Commissioner Federal Communications Commission*

Wireless Data Trends

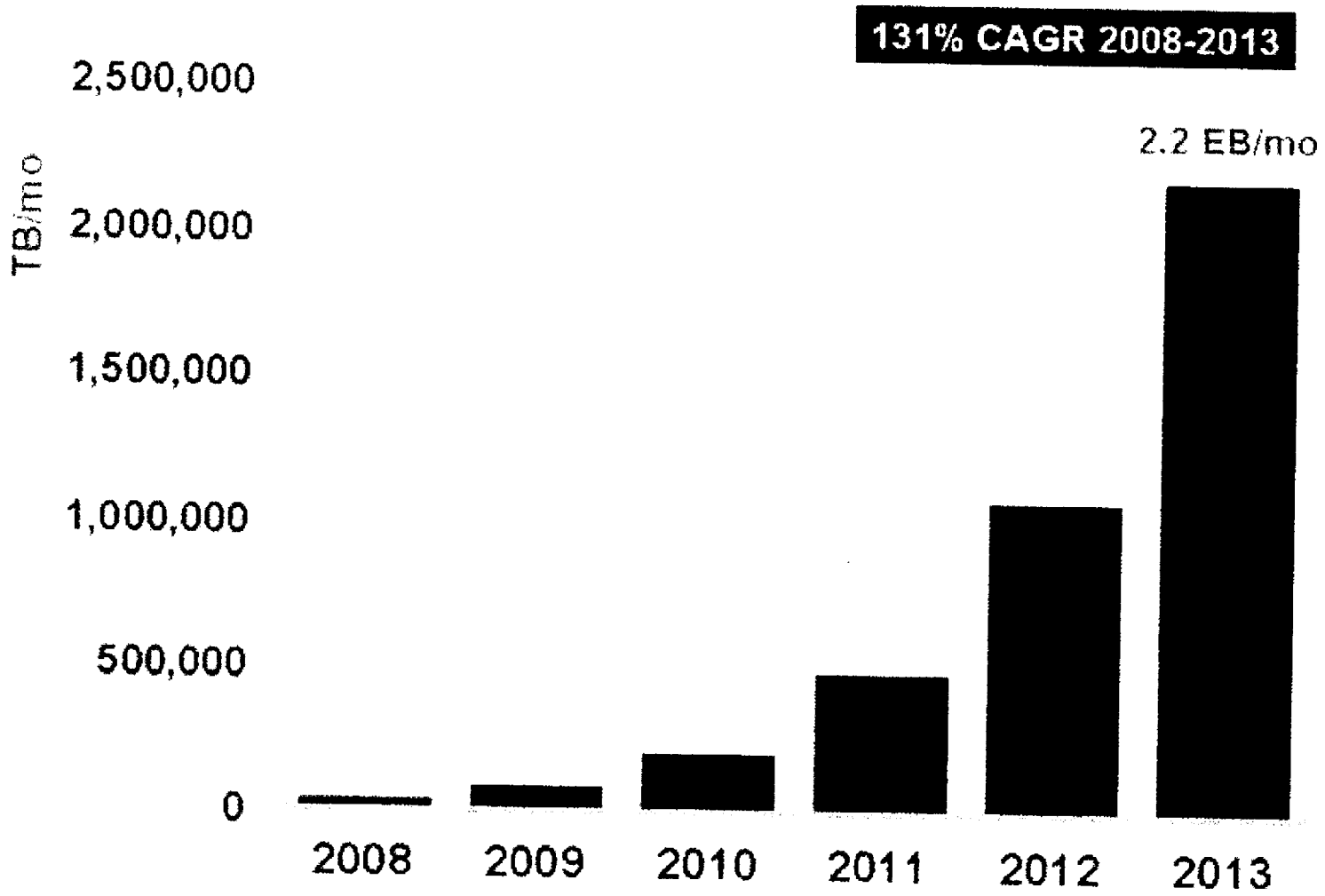
- Wireless data service revenues for the first half of 2009 climbed to more than $19.4 billion—a 31% increase from the first half of 2008.
  - There are more than 276 million U.S. wireless subscribers.
  - More than 740 billion text messages were reported for the first half of 2009—breaking down to 4.1 billion messages per day— which is nearly double the amount of texts reported for the first half of 2008.
  - 1.1 trillion minutes were used in the first half of 2009—breaking down to 6.4 billion minutes-of-use per day.
  - More than 246 million data-capable devices are in the hands of consumers today. More than 40 million of these devices are Smart-phones or wireless-enabled PDAs and more than 10 million are wireless-enabled laptops, notebooks or air-cards

Shift from Mobile Voice to Mobile Internet - Data Communications





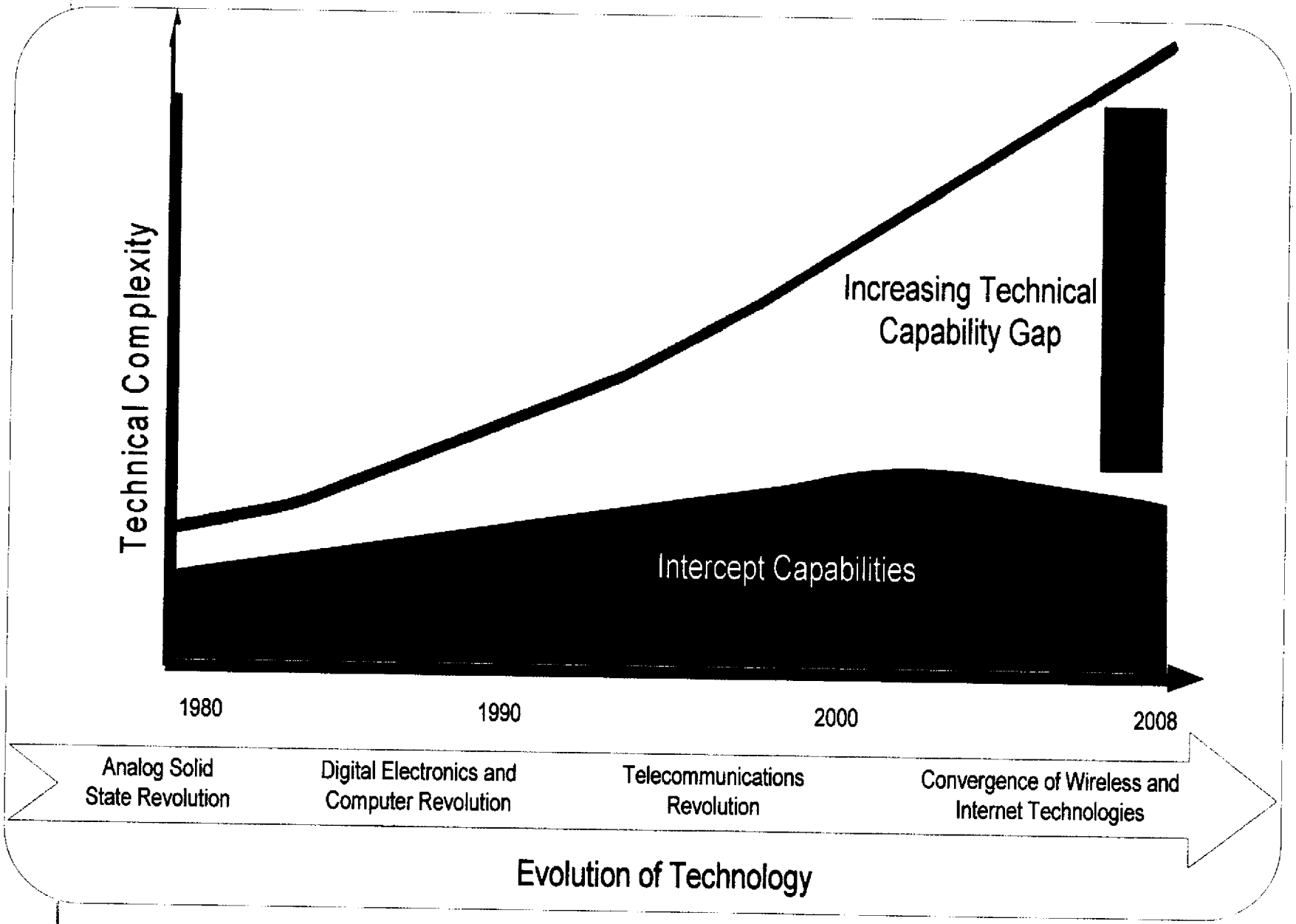
Global Mobile Data Traffic Growth



Source: Cisco Visual Networking Index – Forecast, 2008-2013

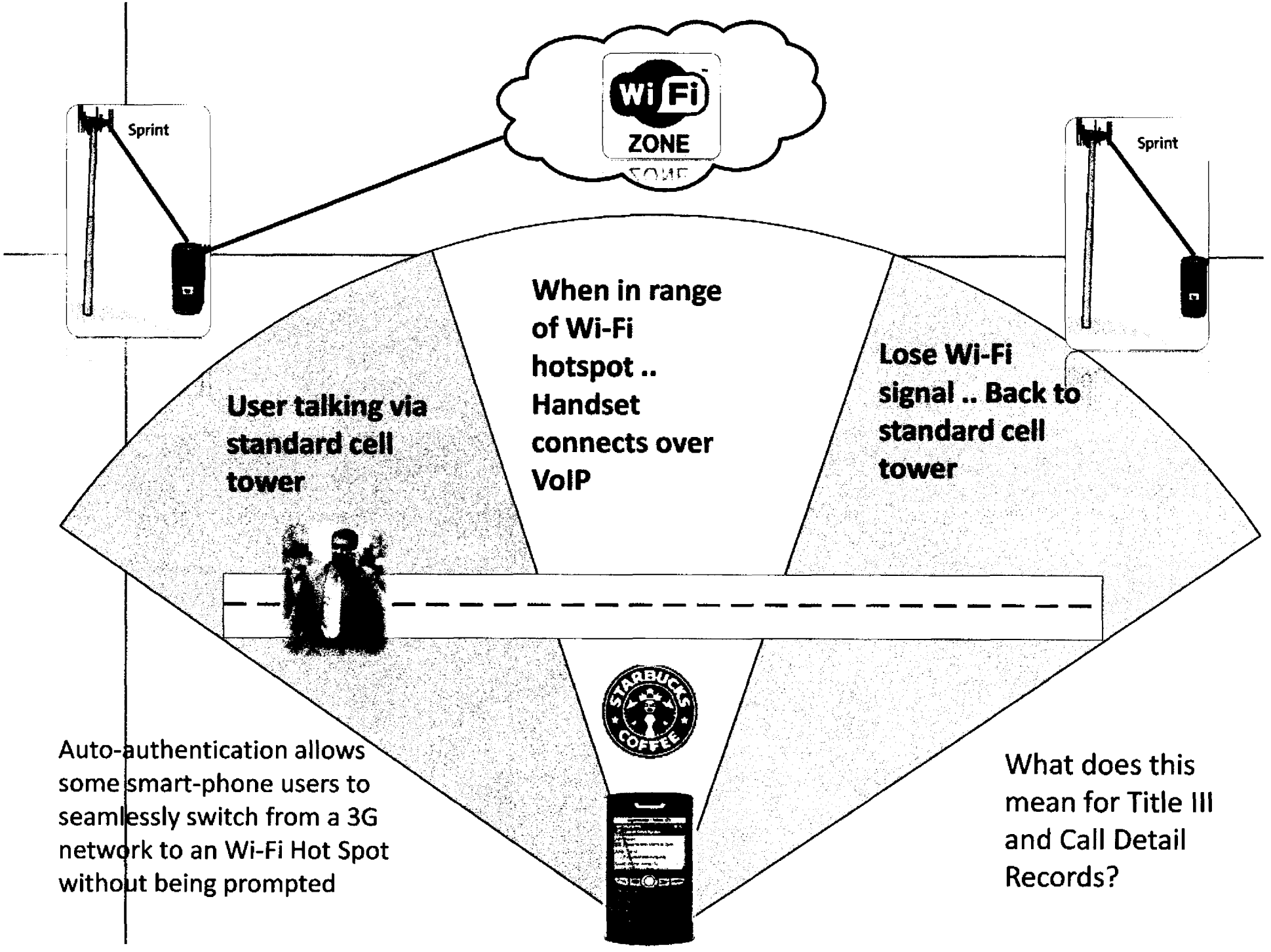
Chasing Technology

- Target exploitation in an IP world does not look the same as in a switched-based world.
- Scale and pace of wireless IP communications technology is developing quicker that we can adapt to in light of current legislation and policies.
- We need to improve our ability to respond to developing communications technologies through both resource allocation and legislative reform.


Technical Complexity
Increasing Technical Capability Gap
Intercept Capabilities
1980
1990
2000
2008
Analog Solid State Revolution
Digital Electronics and Computer Revolution
Telecommunications Revolution
Convergence of Wireless and Internet Technologies
Evolution of Technology

Technology Challenges Today

- Target Mobility
- Target Identification
- IP Based Communications
- Peer to Peer Communications
- Multiple types of Broadband Services (e.g., Wireless, Cable, FIOS)
- Encryption
- Authentication
- (b)(5),(b)(7)(E)

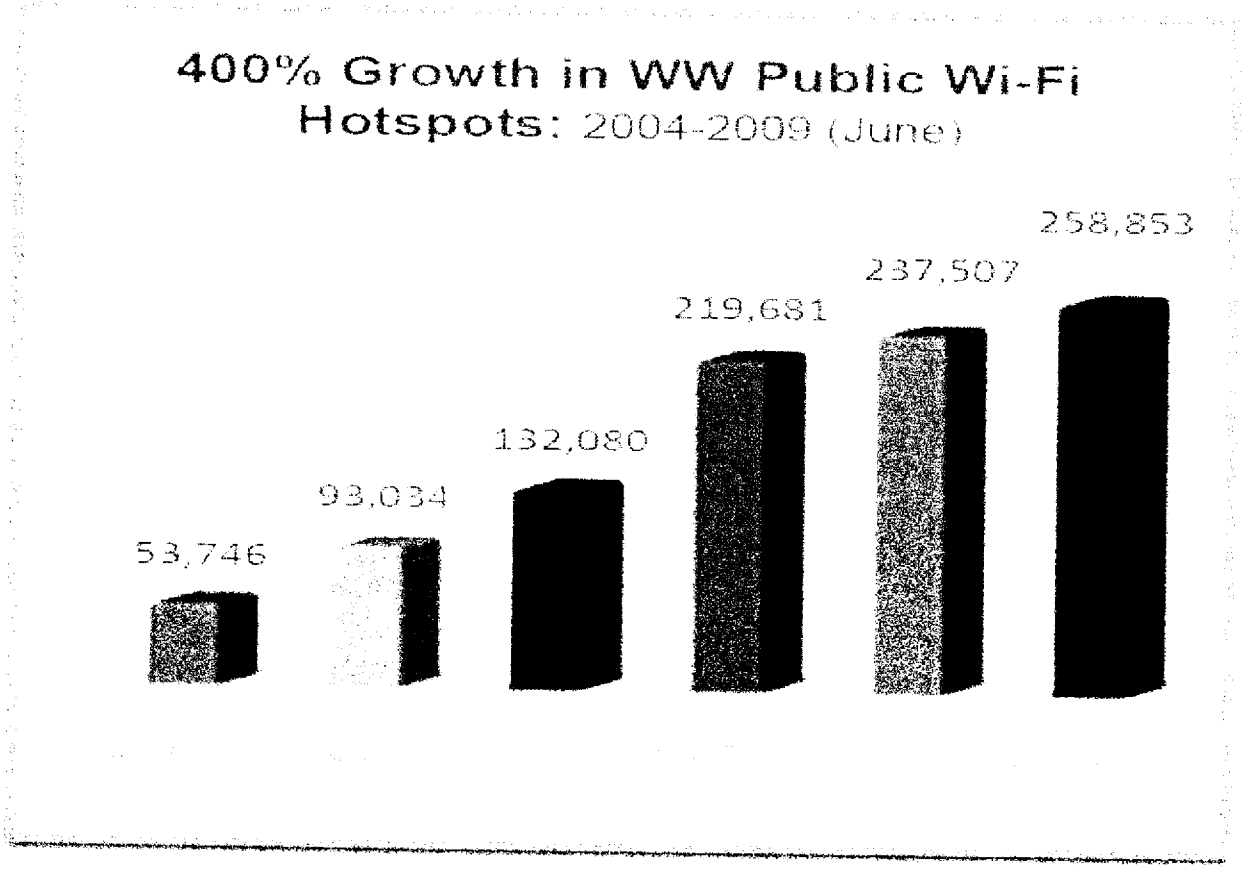


Auto-authentication allows some smart-phone users to seamlessly switch from a 3G network to an Wi-Fi Hot Spot without being prompted

What does this mean for Title III and Call Detail Records?

Wi-Fi Cell Phones Expected to Double in Two Years

8-28-09 CIO.com

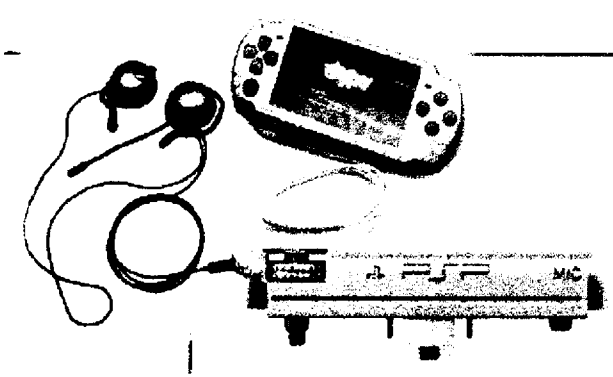


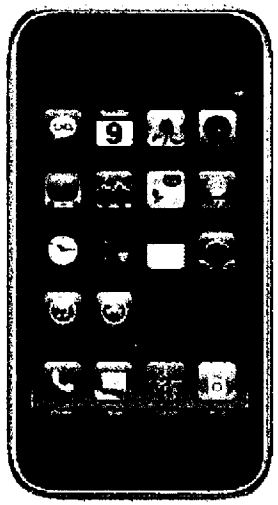
Source: JiWire, 2009

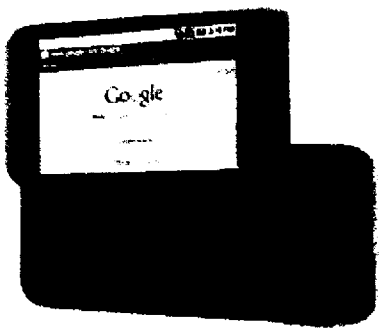
1	New York City	887
2	San Francisco	872
3	Chicago	792
4	Seattle	625
5	Houston	617
6	Los Angeles	505
7	Atlanta	453
8	San Diego	438
9	San Antonio	431
10	Austin	417

Source: JiWire, 2009

Convergence of Smart-Phones, Game Stations, VoIP Applications and 3G/Wi-Fi Technology







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Q & A

Overview of Communication Technology and Electronic Surveillance

October 19, 2010

Conducting lawful intercept in the past was straightforward…

Target phone

Single POTS carrier

Intercepting Agency

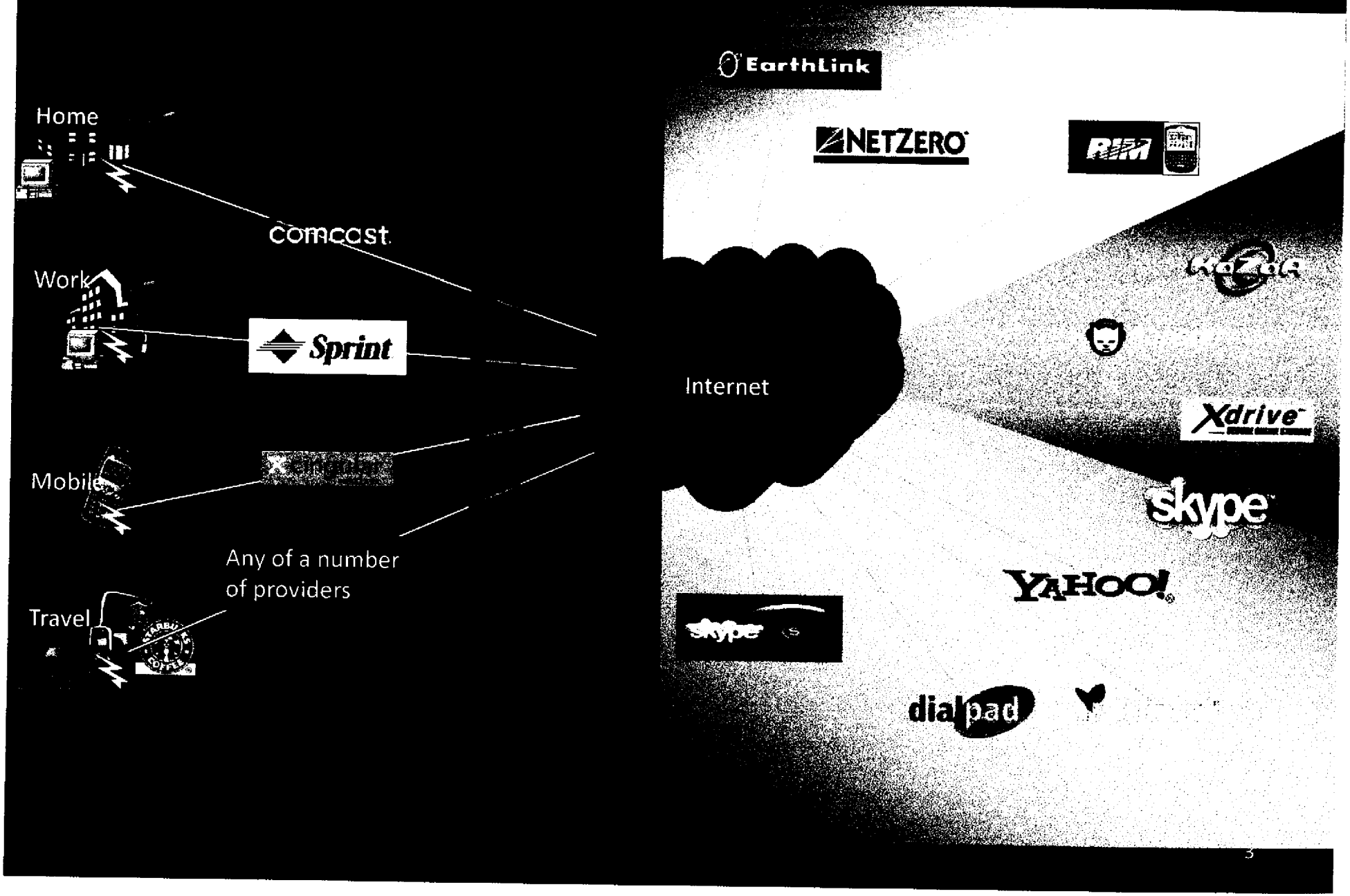
Local loop intercept

Single carrier

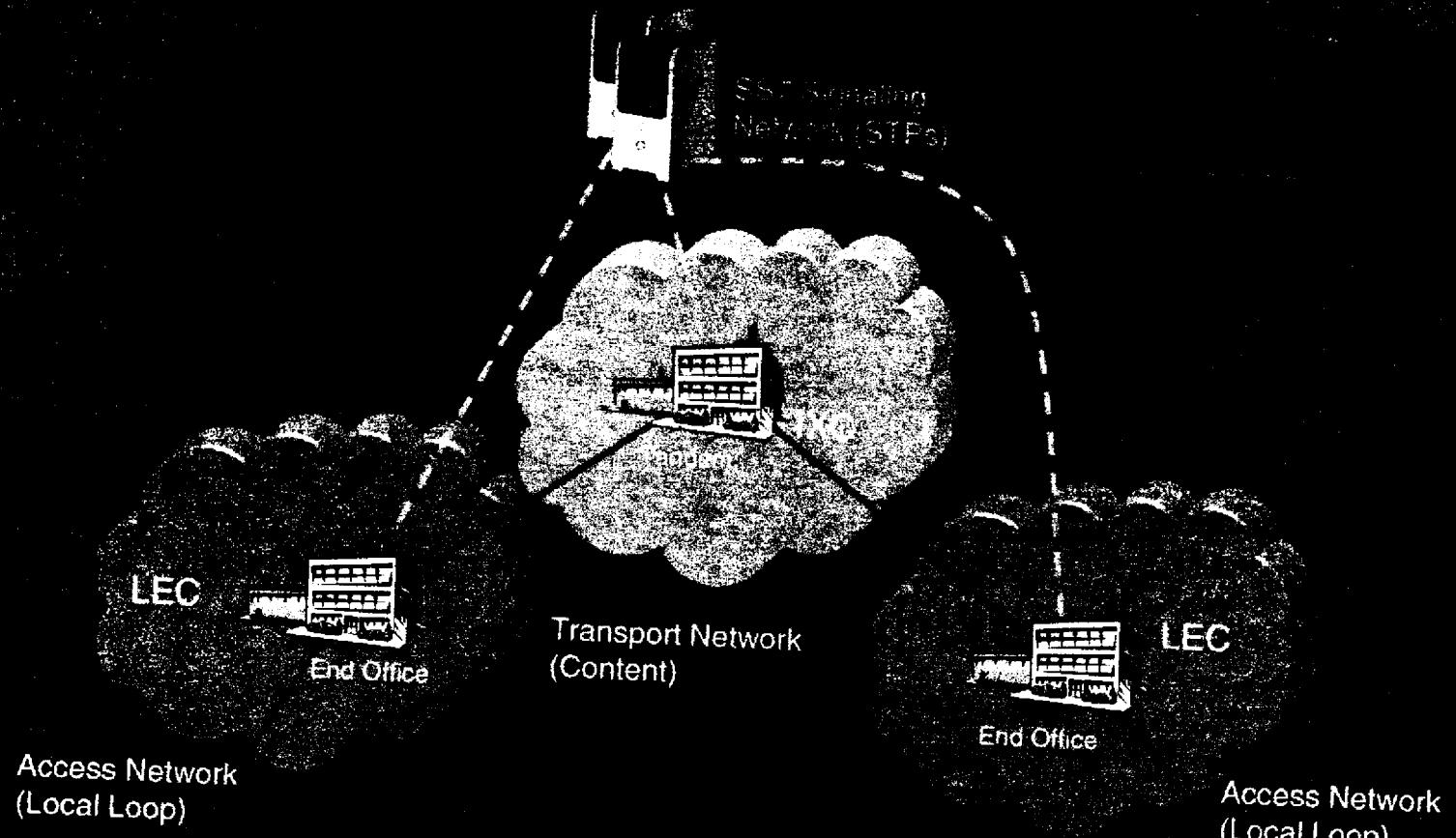
Simple access and understanding

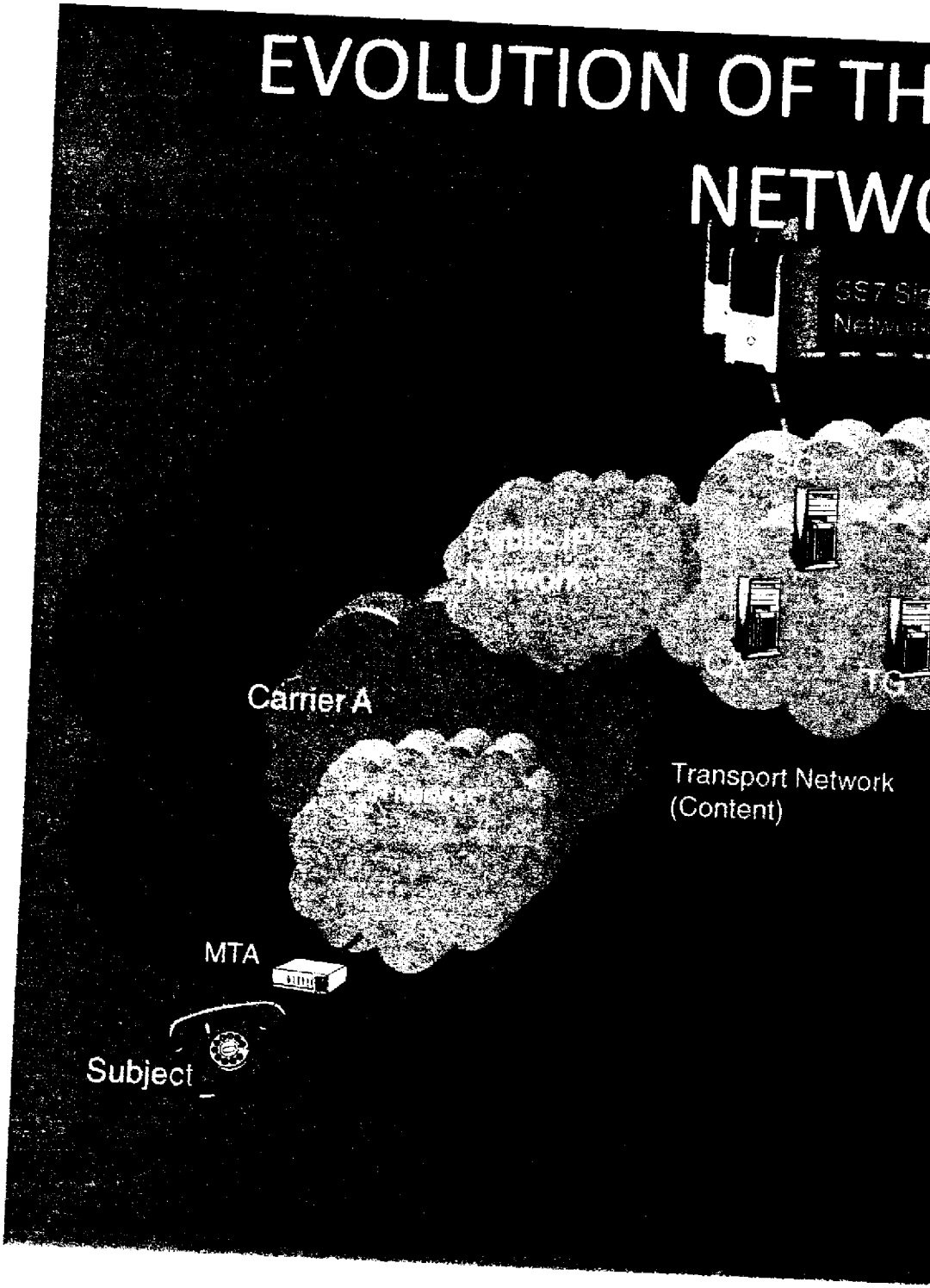
Inexpensive

MULTIPLE ACCESS METHODS TO A VARIETY OF SERVICES



TRADITIONAL NETWORK ARCHITECTURE




EVOLUTION OF TH
NETW
Carrier A
Transport Network
(Content)
MTA
Subject

E TRADITIONAL ORK

CA - Call Agent
SG - Signaling Gateway
TG - Trunk Gateway

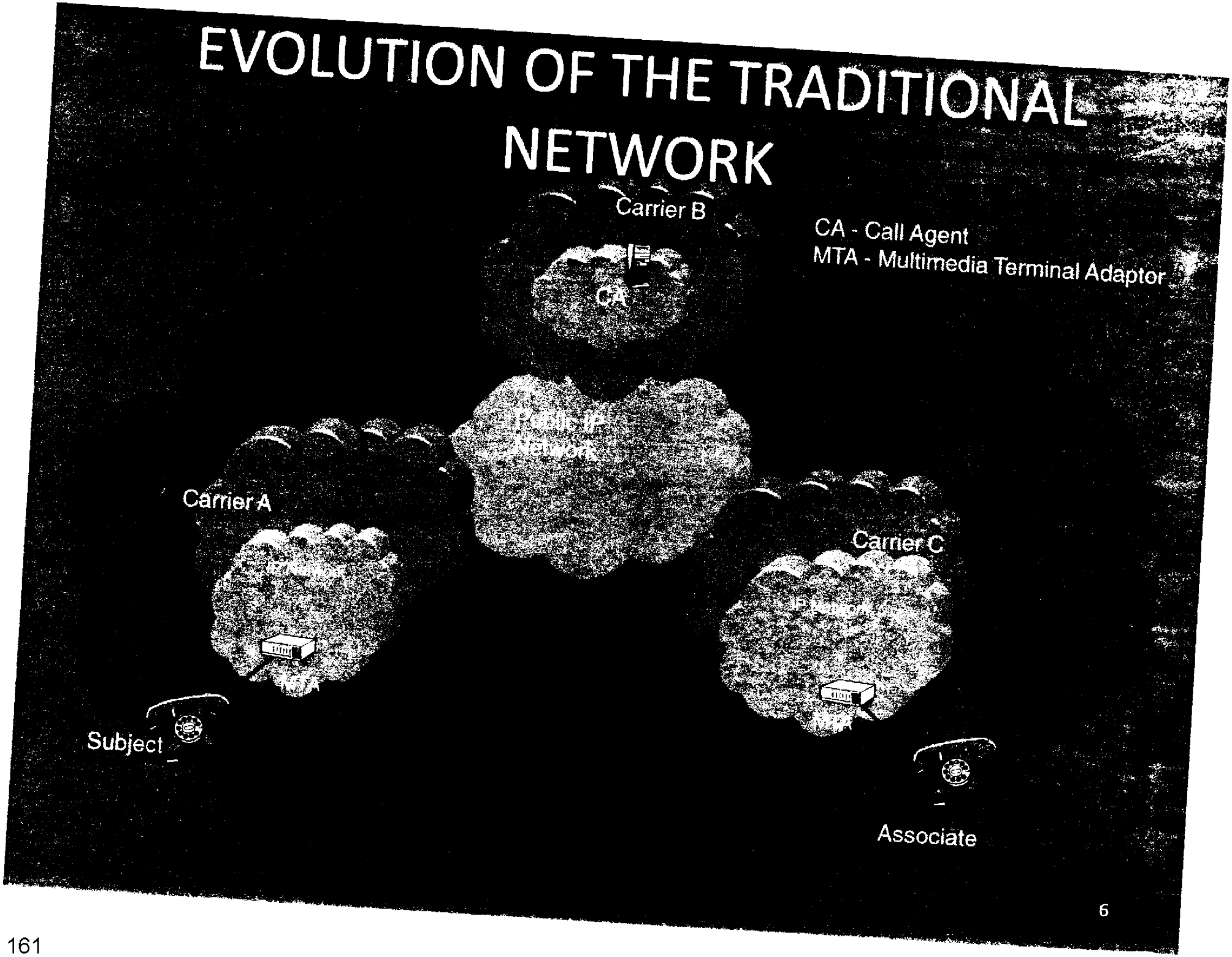
Carrier C

End Office

Access Network
(Local Loop)

Associate

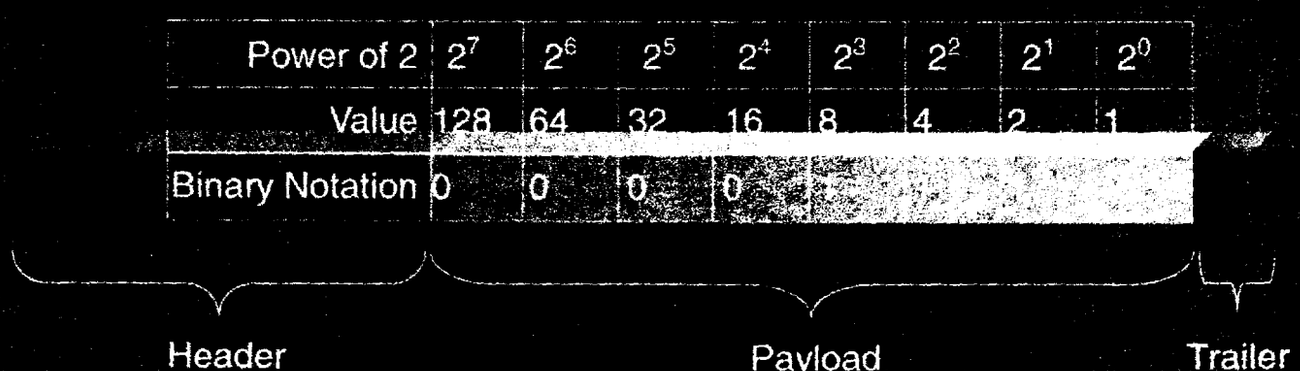
EVOLUTION OF THE TRADITIONAL NETWORK



WHAT IS A PACKET?

- A packet consists of three basic components:
  - a "payload" of digital information to be transmitted
  - header that contains control information needed to transmit the information across the network
  - trailer that indicates the end of the packet

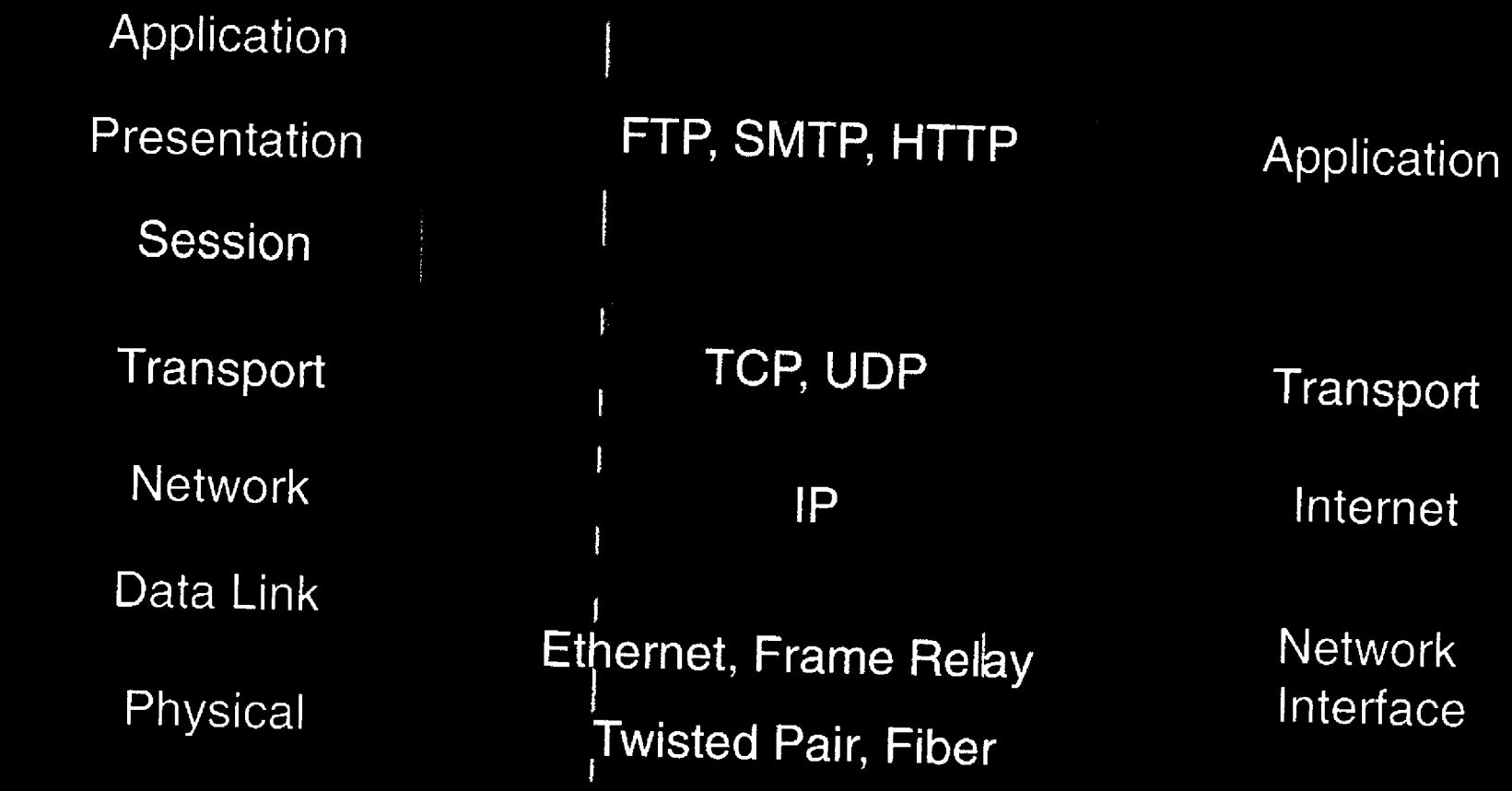
Length



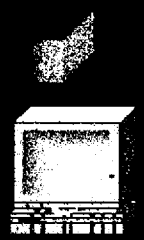
CONNECTIONLESS PACKET TECHNOLOGIES

- Technologies do not establish a connection across a network before exchanging communications
- Each packet includes the source and destination address and is routed through the network independently
- Traffic involved in these connections most likely do not traverse the network using the same path
- Examples include: IP, many next-generation wireless networks

DIFFERENT LAYERED COMMUNICATIONS MODELS



CONNECTIONLESS PACKET ROUTING



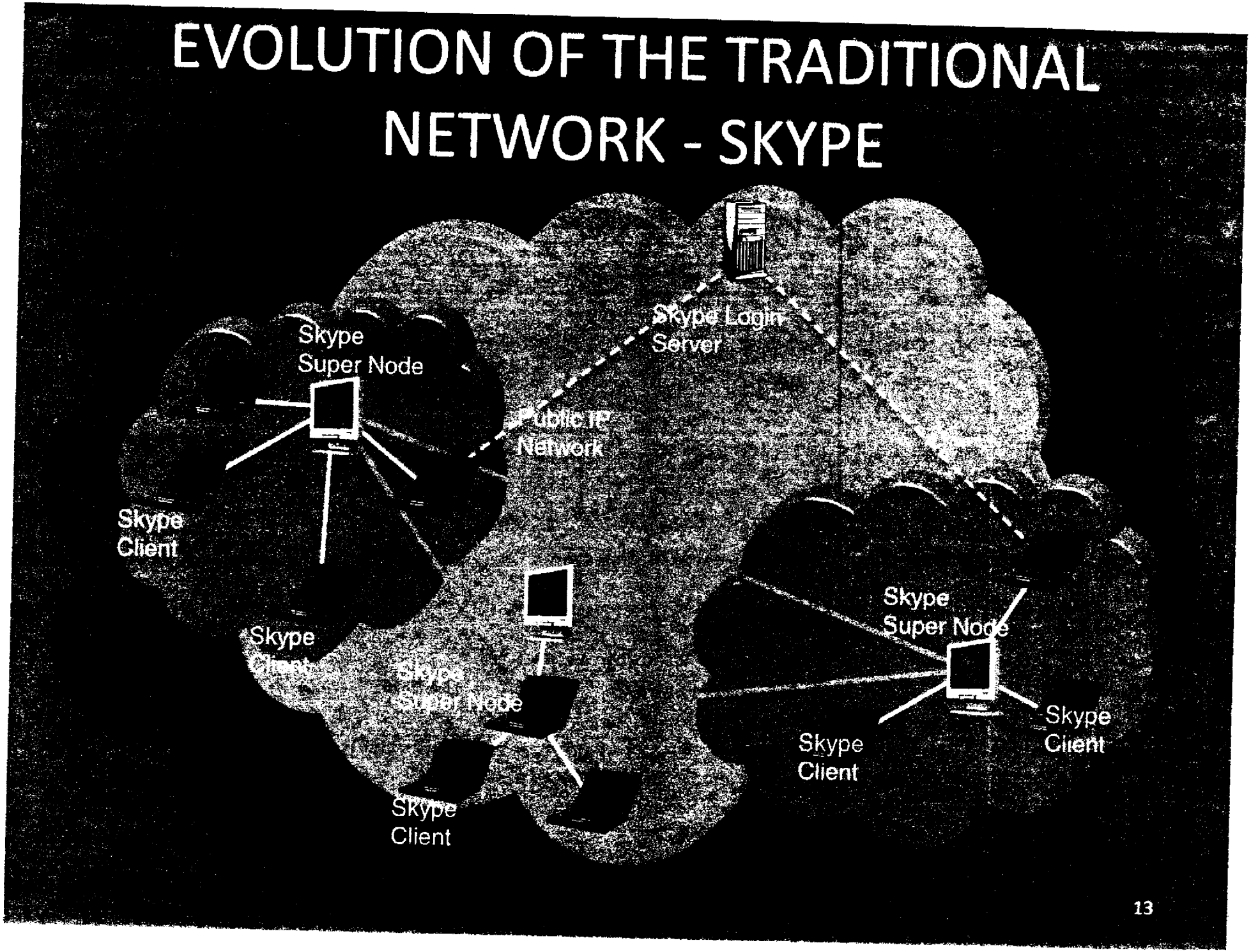
User A

User B

Mr. Watson come here!

Mr. Watson come here!

EVOLUTION OF THE TRADITIONAL NETWORK - SKYPE



LEGAL AUTHORITIES

- Pen Register/Trap and Trace
  - 18 U.S.C. § 3121 et. seq.
  - A device or process that records, decodes or captures dialing, routing, addressing, or signaling information transmitted by a device or identifying the source of the communication
  - Relevant to an ongoing investigation

- T-III
  - 18 U.S.C. § 2510 et. seq.
  - Content of the communication
  - Probable cause that individual is using a "facility" to commit, has committed or is about to commit an enumerated offense.

- FISA/ FISA Pen Register
  - 50 U.S.C. § 1801 et. seq./ 50 U.S.C. § 1842 et. seq.
  - Content of the communication/ communication identify information
  - Probable cause target is a foreign power or an agent of a foreign power