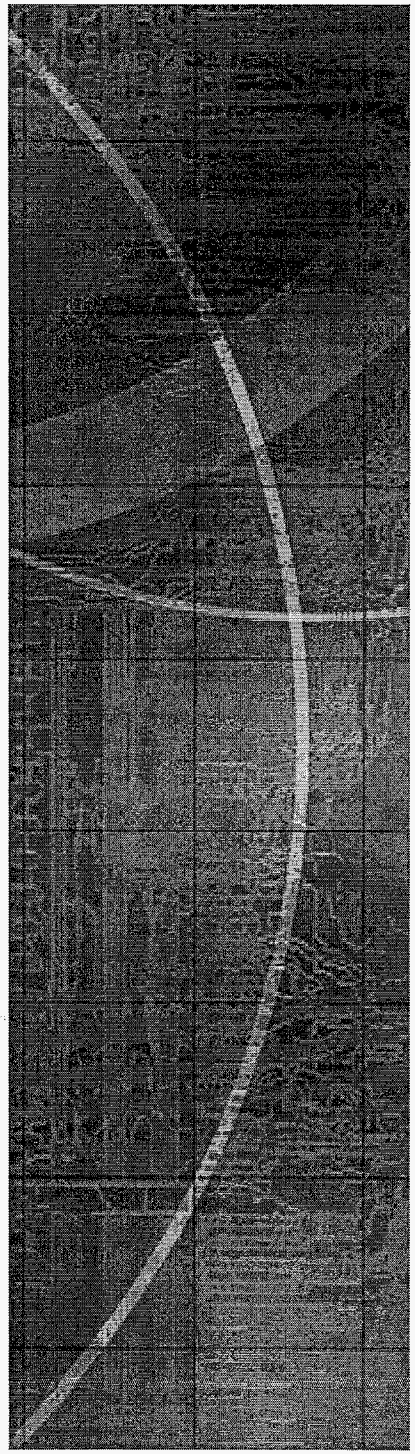

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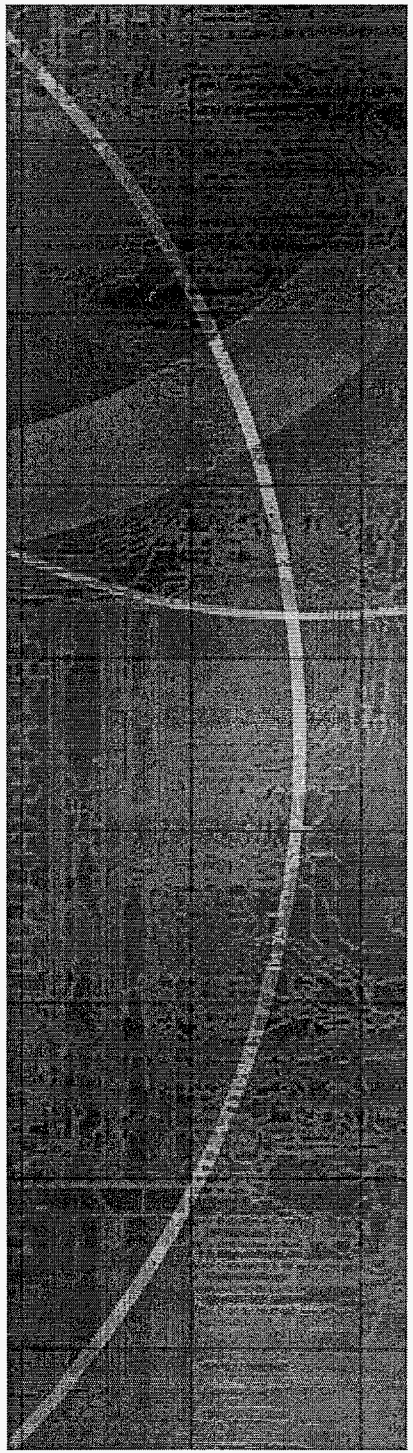
Cable, Public Safety and National Security

Date: January 25, 2006

Presenter: Ralph W. Brown, CTO



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CableLabs® Overview

Who is CableLabs?

- Established in 1988, CableLabs is a non-profit, research and development organization for the cable industry
- Members are exclusively cable system operators
- There are currently 48 member cable companies representing 70.8 million cable subscribers in North and South America, and Europe
  - 82% of cable subscribers in U.S.
  - 42% of cable subscribers in Canada
  - 49% of cable subscribers in Mexico
  - 16% of cable subscribers in Europe

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Mission

- Plan, fund and perform R&D projects
- Funnel relevant research to member companies
  - Serve as a clearinghouse to provide information on current and prospective technological advances through strategic and technical assessments
  - Develop technology for new businesses
- Foster equipment development
  - Interoperability and certification activities
  - Members, however, make own independent purchasing and deployment decisions
- Coordination of industry standards activities

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CableLabs Governance

- CableLabs Board of Directors is made up of CEOs from member companies
- Technical leadership is provided by CTOs from member companies
- Certification decisions are made by subject matter experts from member companies and not by CableLabs Staff
- CableLabs works with the manufacturing community to develop technology to meet the business and strategic initiatives of its members

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CableLabs Projects

- DOCSIS®
- CableHome®
- OpenCable™
- PacketCable™
- Go2Broadband℠
- On-Going Projects
  - VOD Metadata
  - Bandwidth Management
  - Security

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Cable's Proactive Approach to Public Safety and National Security Concerns

- PacketCable VoIP and DOCSIS Broadband Surveillance
- PacketCable VoIP and E911
- PacketCable VoIP and the Alarm Industry

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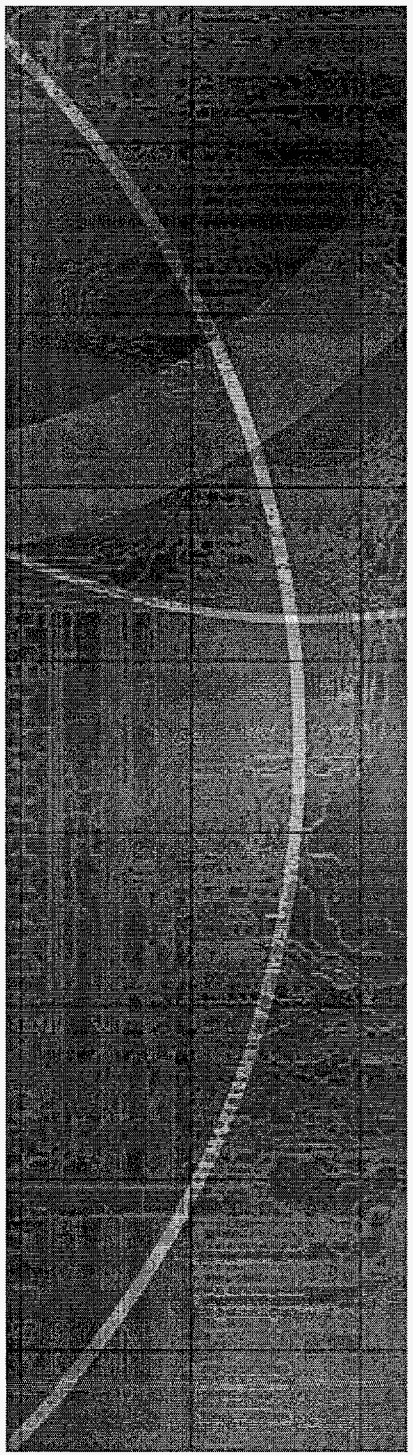

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Cable and the Application of CALEA to VoIP and Broadband Services

Cable and CALEA VoIP

- Began drafting PacketCable CALEA safe harbor specification in 1999
- Active FBI involvement beginning in 2001
- Current version, released in July 2004, viewed as industry success

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Dear Mr. Green,

Thank you for your letter. I believe that it is no understatement to say that the FBI and the American People are indebted to you and your colleagues for the work they have done in this regard. It is this work which will facilitate the timely and lawful collection of critical intelligence which is essential if elements of the United States Government are to have any hope of preventing future terrorist attacks against the U.S. and its citizens. **Perhaps unlike any other work you do, this work is most likely to have a real, direct and continued bearing upon our ability to save lives. It is to counterterrorism what radar was to WWII, and your exemplary service in its development in such relative short order is a tribute to the responsible citizenship of your industry.**

Again, our thanks,

Gregg Motta

Thos. Gregory Motta
Associate General Counsel - Unit Chief
Science & Technology Law Unit, Office of the General Counsel
FEDERAL BUREAU OF INVESTIGATION
Engineering Research Facility, Room A-027
Quantico, VA 22135
Tel. 703.632.6319

FBI HEADQUARTERS
935 Pennsylvania Ave. N.W. Rm. 7877
Washington, D.C. 20535-0001
Tel. 202.324.5643

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Scope of PacketCable LAES Specification

- The PacketCable LAES Specification
  - Defines the interface used to deliver call identifying information and call content from a Delivery Function (DF) to a Collection Function (CF)
    - DF is the mediation server run by the operator
    - CF is run by the LEA and receives data and content
    - Other interfaces within the PacketCable architecture are used to enable surveillance and to deliver surveillance information to the DF
  - Does not define the means by which an operator provisions a surveillance warrant into the system

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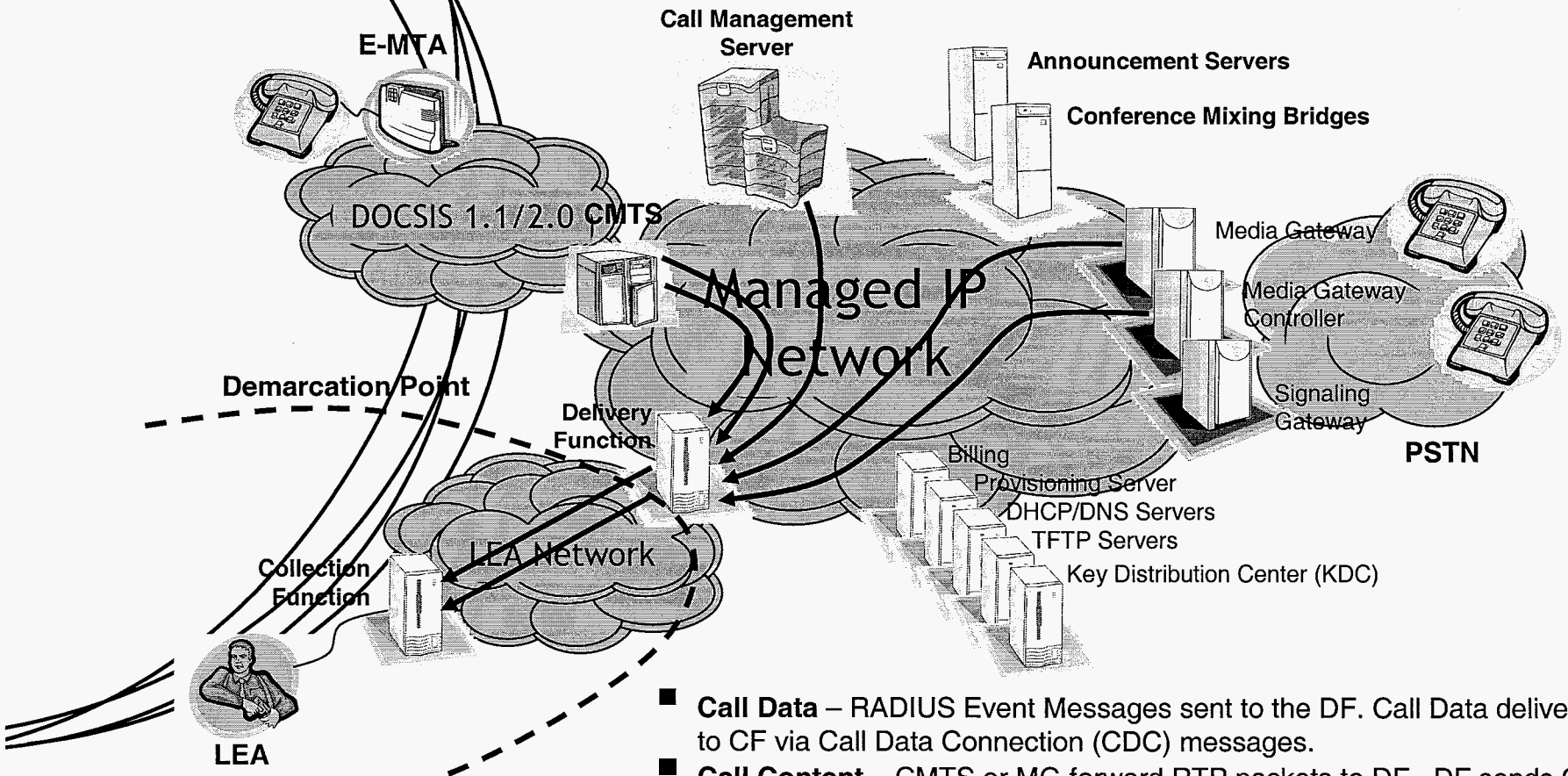
PacketCable Architecture with Electronic Surveillance



- **Call Data** – RADIUS Event Messages sent to the DF. Call Data delivered to CF via Call Data Connection (CDC) messages.
- **Call Content** – CMTS or MG forward RTP packets to DF. DF sends Call Content Connection (CCC) messages (encapsulated RTP Packets) to CF.

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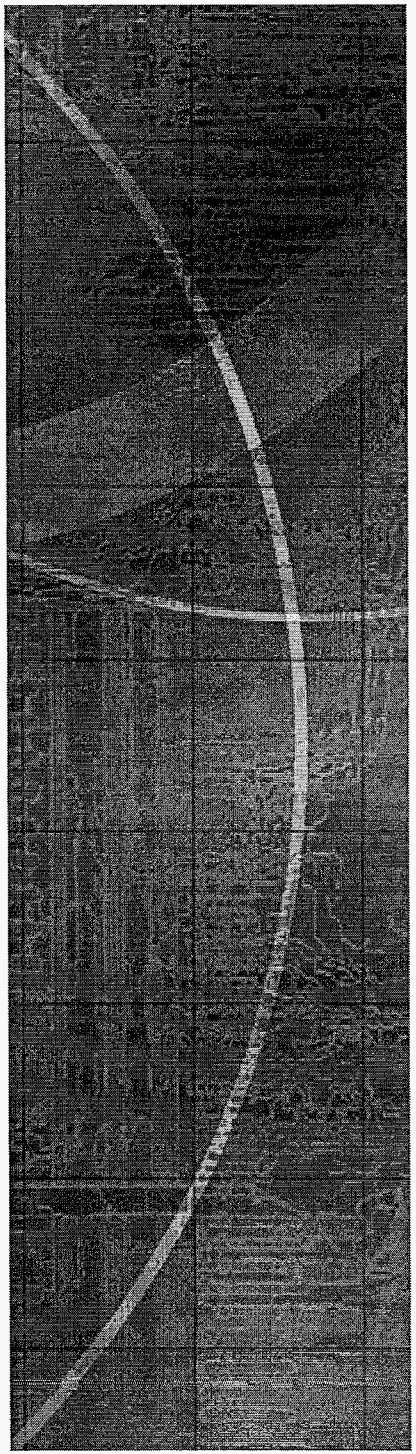

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Broadband and CALEA

Broadband and CALEA
First Issue: CALEA is Telephony Centric

- Requires "call identification"
- Requires "call content" punch list
- How to make sense of this in a broadband context?

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Second Issue: How to Meet CALEA's Network Mandates While Meeting LEA's Broadband Intercept Needs

- CALEA does not authorize a LEA to require or prohibit of MSO any specific design of equipment, facilities, services, features, or system configurations
- Yet, LEA has legitimate need to conduct broadband surveillance
- How to meet LEA's need while meeting CALEA's requirement?

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Cable Broadband Internet Access Can Provide Some "Call Identification" and "Call Content" Like Information

- Broadband Internet Access "Call Identification"
  - Access Sessions (when a subject first purchased broadband access)
  - Assignment of IP address to subject and ability to keep that IP address static based upon business need or service of valid warrant
  - IP Packet headers sent and received from subject's IP address to/from another IP address
  - Changes to subject's service or account profiles, such as logins and passwords
- Broadband Internet Access "Call Content" raw packet stream, so long as law enforcement has sufficient bandwidth collection capacity

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CableLabs Continues to Work with FBI

- Ongoing dialog to determine FBI's Broadband Internet Access surveillance needs (last meeting 1/18/06)
  - Close to achieving specification for FISA intercepts
  - Cooperative work on broadband intercept CALEA safe harbor that balances burdens between MSO and law enforcement
- Meet CALEA mandate to protect subscriber privacy
  - Ensure only subject's stream is under surveillance
  - Cable operator's review of subpoenas

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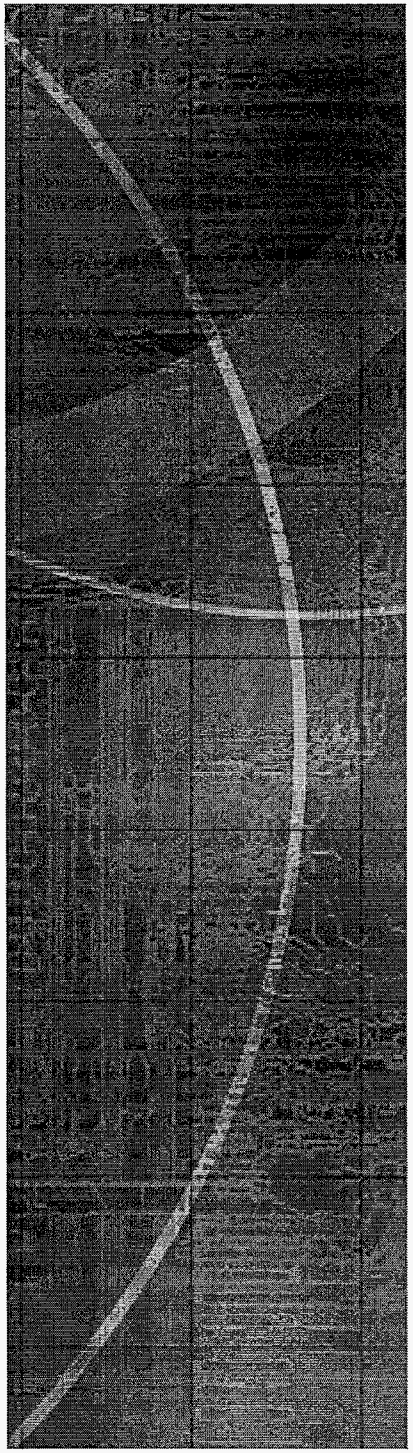

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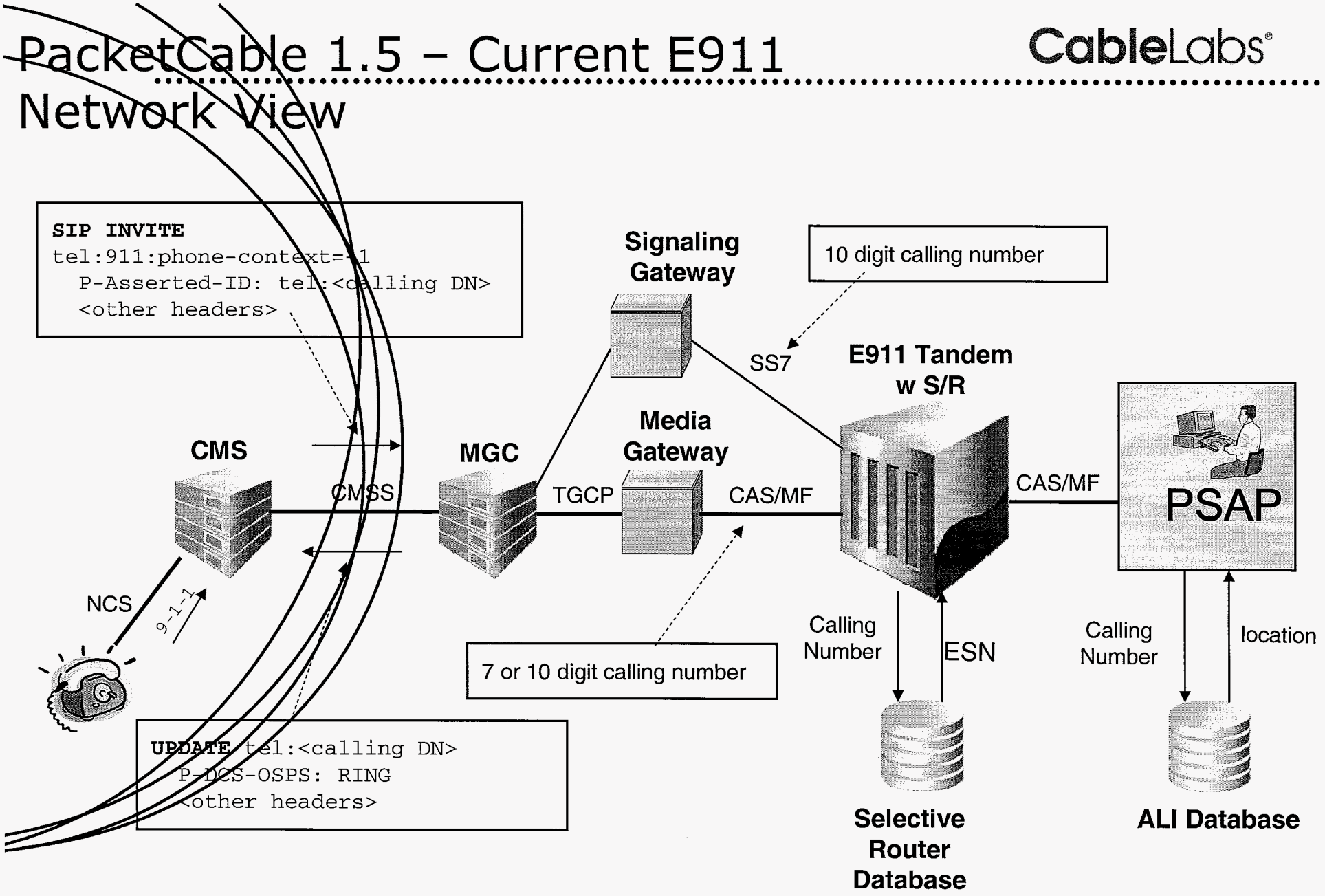
PacketCable and 911/E911

PacketCable 1.5 – Current E911 Network View



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Non-Facilities Based VoIP 911/E911 Issues

- Subscriber mobility
  - Locate appropriate 911 PSAP
  - Discovery of accurate location per call on a broadband network,
  - Delivery of VoIP call to correct PSAP based on dynamic location,
  - How to communicate dynamic location to PSAP
- Regulation and Billing of 911 service
  - Voice service provider may not be the "pipe" provider,
  - There may be no service provider
- VoIP and security
  - Provide universal service, and at same time protect IP enabled PSAPs from attack/overload

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PacketCable Integrated Support for E911

- Special 911 call handling and authorization
- Enhanced access network QoS for emergency calls
- Provide emergency service to endpoints not authorized for outgoing calls
- Do not release call if caller hangs up
- Disable custom call features such as call hold
- Support operator re-ring
- Accurate identification of telephony endpoints
- Support for trunking gateways to connect to PSAP

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Future Support for PacketCable Subscriber Mobility

- CableLabs and its participating vendors are participating in and tracking the active work in IETF, 3GPP and the NENA VoIP Technical Committee for
  - Location determination (on a per registration/call basis)
  - Location storage and conveyance
  - Emergency call routing to the correct PSAP based discovered location (NENA i2 – NENA i3)
- This topic is a work item for the next release of PacketCable based on SIP

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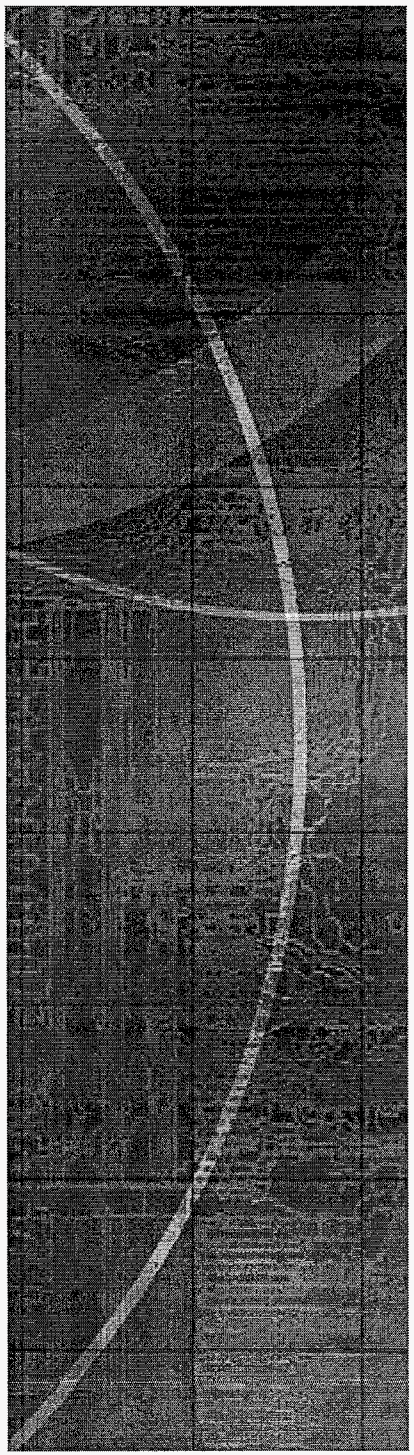

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PacketCable and the Alarm Industry

Overview

- The Alarm Industry publicly expressing its concerns about the compatibility of alarm services with VoIP, including, in some instances, advising their customers against using VoIP.
- On its own initiative, the Cable Industry, through CableLabs, has been taking steps to address the Alarm Industry's concerns:
  - Educated the alarm industry on the differences between facilities-based and non-facilities based VoIP offerings
  - Added features to PacketCable 1.5 to enhance alarm compatibility
  - Organized a technical summit with the alarm industry
  - Participated in the National Fire Alarm Protection workshop meeting to discuss the classification of VoIP
  - Organized interoperability events to verify PacketCable devices' ability to pass Alarm signals undistorted
- There do not appear to be any fundamental technology issues with PacketCable VoIP compatibility with alarm systems.
- The National Burglar and Fire Alarm Association (NBFAA) recommends that its members get into the VoIP business*

**From NBFAA Industry Affairs Update*

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PacketCable Support for Alarm Systems

- The PacketCable 1.0 architecture, as defined, is compatible with alarm systems
  - The required codec (G.711 – same Codec as used in the circuit switched network) and QoS support reliable transmission of DTMF and FSK tones
  - PacketCable 1.0 is being deployed successfully with alarm systems
- PacketCable 1.5 provides several enhancements over PacketCable 1.0
  - DTMF relay to complement low bitrate codecs
  - V.152 to allow reliable modem communication (FSK) with low bitrate codecs (currently being specified)
  - Battery Backup Monitoring
  - Line Status Control

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PacketCable Alarm Summit

- CableLabs hosted an Alarm Industry Summit on March 3, 2005 at CableLabs
- Objectives:
  - Establish contacts and dialogue between the cable industry and the security system industry
  - Provide forum for cable operators and security system industry members to exchange technical information regarding successful deployment of security systems with PacketCable
  - Identify current or potential interoperability issues and plans for their resolution
- CableLabs provided a PacketCable technical overview and highlighted the differences between a facilities-based cable voice service and non-facilities based VoIP service
- This event was well attended by members of the cable and alarm industries and was very interactive

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Attendee List

Security Industry:

Providers:

- ADT
- Vector Security
- Guardian Protection Services

Manufacturers:

- Honeywell/Adempco
- Bosch/Radionics
- DSC/Tyco

Associations:

- National Burglar and Fire Alarm Association
- Central Station Monitoring Association
- Security Industry Association

Cable Industry:

MSOs:

- Advance/Newhouse
- Armstrong
- Buckeye
- Cable One
- Cablevision
- Charter
- Comcast
- COX
- Rogers
- Time Warner Cable

Vendors:

- Broadcom, Motorola, SA, TI
- Cedar Point, Siemens

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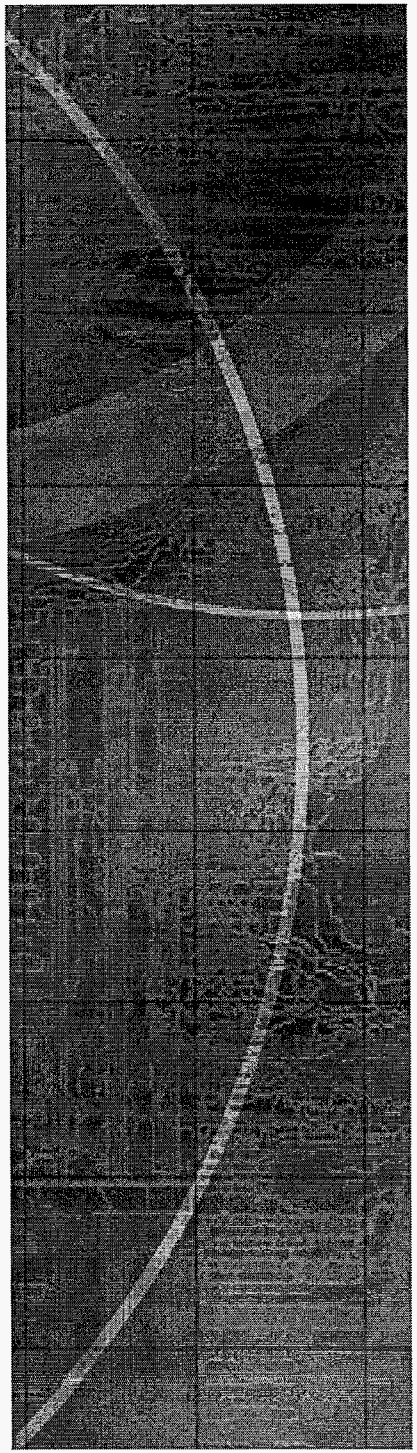

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Alarm Interoperability Events

Interoperability Events

- CableLabs has hosted two interoperability events with the alarm industry
  - The first event was held the week of September 19th, 2005
  - The second event was held the week of November 28th, 2005
  - Future events are being planned for 2006
- Participants included the major alarm equipment manufactures and PacketCable Vendors

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Alarm System Interops

- Objectives
  - Demonstrate that the PacketCable architecture does support alarm systems
  - Provide a forum for alarm system manufacturers and PacketCable manufacturers to verify implementations
  - Demonstrate commitment to interoperate with the alarm industry
- Scope
  - Verify operation of at least one format type within each format area (DTMF, Pulse and FSK) against the PacketCable 1.0 architecture
- The majority of Alarm formats worked with no issues
  - ContactID, Low Speed Ademco, Modem3, Low Speed Sescoa and BFSK
- All interoperability issues appear to be resolved after the second interop event
  - Additional interoperability events will be held in 2006 to verify continued support and PacketCable 1.5 functionality

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PacketCable VoIP Meets Alarm Industry Concerns

- Line Seizure is not compromised with proper installation. Alarm signal has priority.
- Telephone line equivalent provided (voltage and dial tone)
- Alarm communicator signals are passed undistorted
- Products support battery backup, primary issue is duration (Fire Code requires 24 hour backup)
- Unclear whether other VoIP technologies, such as fiber or even if the current PSTN, meets the 24 hour requirement

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