SBE Ennes Workshop, Miramar, FL

# AUDIO & VIDEO CONTRIBUTION OVER IP

Los Angeles Times -- January 10, 2009

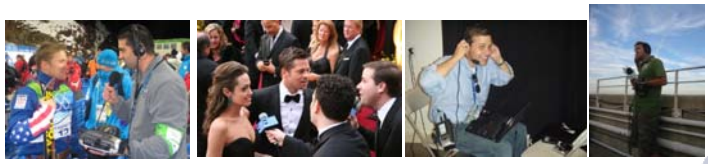
Verizon Communications Inc., the second-biggest U.S. telephone company, plans to do away with traditional phone lines within *seven years* as it moves to carry all calls over the Internet.

An Internet-based service can be maintained at a fraction of the cost of a phone network and helps Verizon offer a greater range of services, Stratton said.

"We've built our business over the years with circuit-switched voice being our bread and butter...but increasingly, we are in the business of selling, basically, data connectivity," Chief Marketing Officer John Stratton said.

# Audio & Video Contribution

- Outside Broadcast
- Dedicated Links
- Reportage



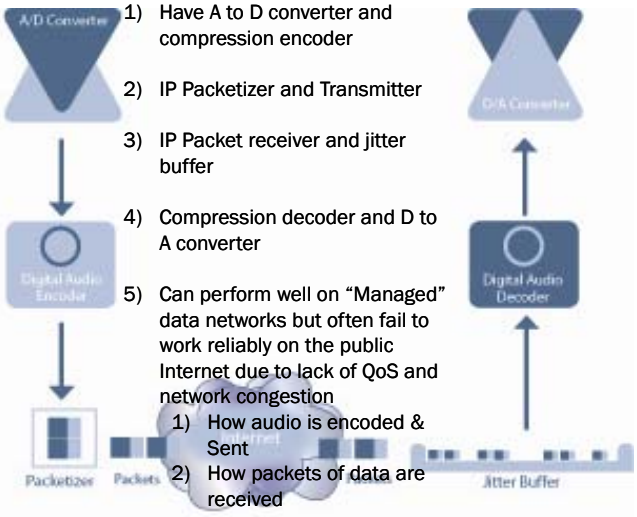
# IP Network Technologies: Networks

3G, 4G WiMax & LTE, Wi-Fi

FLASH-OFDM devices

- Device supported with Integrated Drivers
- BGAN Support
- Optimized and customizable profiles

# Characteristics of the Typical IP Codec



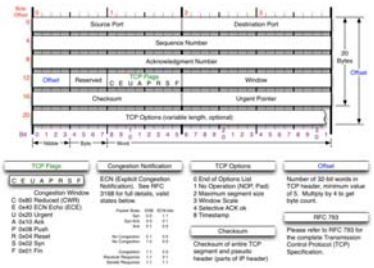

1) Have A to D converter and compression encoder
2) IP Packetizer and Transmitter
3) IP Packet receiver and jitter buffer
4) Compression decoder and D to A converter
5) Can perform well on "Managed" data networks but often fail to work reliably on the public Internet due to lack of QoS and network congestion
   1) How audio is encoded & Sent
   2) How packets of data are received

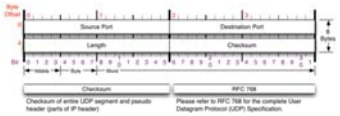
# IP Network Technologies: BRIC Technology

- Intelligent, adaptive jitter buffering tool
- Comprehensive suite of algorithms
- STUN-based BRIC-Traversal Server

# IP Network Technologies: BRIC Technology

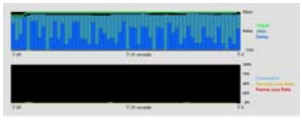
- TCP vs. UDP

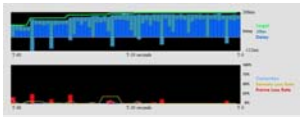


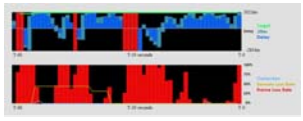


# IP Network Technologies: BRIC Technology

Three Different “Last Mile” connections via 3G

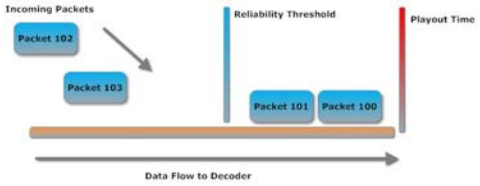






# IP Network Technologies: BRIC Technology

- BRUTE – BRIC UDP Transmission Enhancement
  - UDP Reliability
  - Congestion Avoidance




# IP Network Technologies: VoIP/SIP

- SIP RFC3261 (standardizes how calls are negotiated between caller and called parties)
  - Endpoint intelligence vs. Network intelligence
  - Negotiation between list of supported codecs
  - Smartphone proliferation
  - Interoperability standard for IP codec EBU Tech3326

# IP Network Technologies: NAT & Firewall Traversal

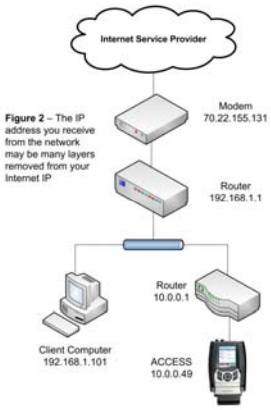
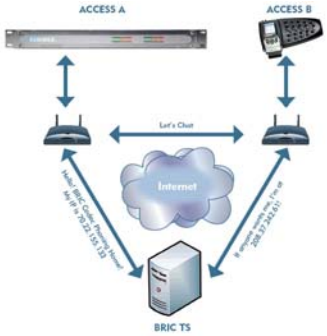



**Figure 2** – The IP address you receive from the network may be many layers removed from your Internet IP

STUN-
Session Traversal
Utilities for NAT




# Production Environments: Studio

**ACCESS Rack & BRIC-Link**

## Production Environments: OB Vehicle


## Production Environments: Sports

**ACCESS Portable & Commentator Console**

# Production Environments: Stand-Alone

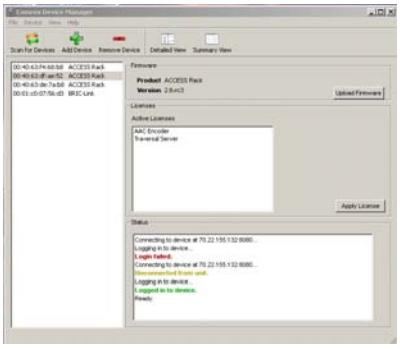
**ACCESS Portable**



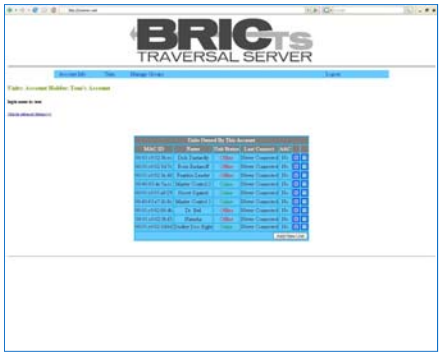


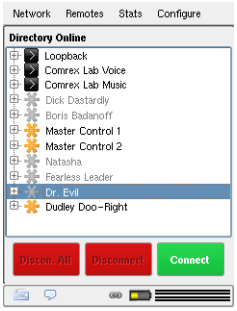



# Management Tools: Device Manager

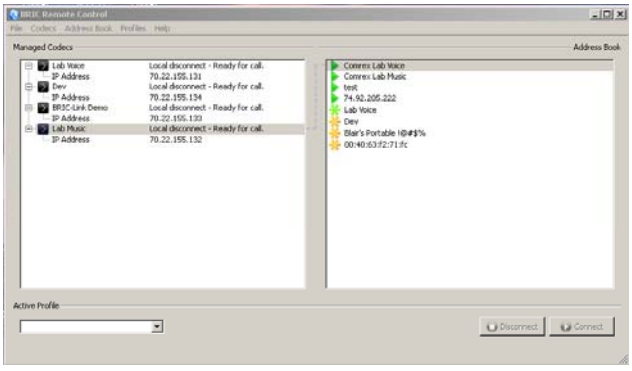


# Management Tools: BRIC-TS

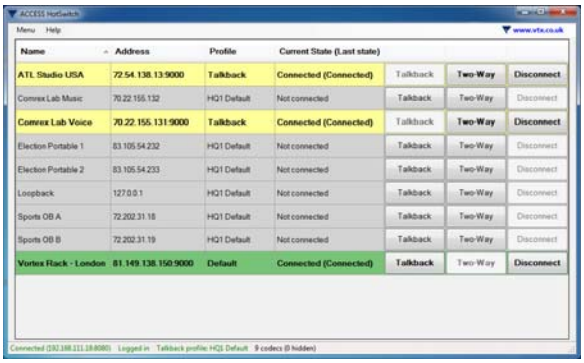



# Management Tools: BRIC-RC



# Management Tools: HotSwitch




# In Development

- **STAC VIP**—Wideband "HD" Voice for Talkshows
  - Skype
  - Smartphone
  - IP PBX
  - Legacy POTS
- **LiveShot**—Live, Real-time video
  - Record, store & forward
  - 3G, 4G, Wi-Fi, BGAN, Broadband
  - Data Channel bonding
  - Built-in IFB and return video

# Thank you from everyone at Comrex