| Project	**IEEE 802.20 Working Group on Mobile Broadband Wireless Access** <http://grouper.ieee.org/groups/802/20/>
Title	**Voice Over IP Sources Modeling: An Update**
Date Submitted	**2004-05-12**
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Re:	MBWA Call for Contributions
Abstract	Between the January and March meetings of 802.20 a call for contributions on modeling Voice Over IP (VOIP) traffic was made to the participants of 802.20. This contribution provides an update to the group on the source modeling portion of the VOIP Evaluation.
Purpose	To provide a basis for developing models, and evaluation criteria for VOIP traffic in 802.20.
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Patent Policy	The contributor is familiar with IEEE patent policy, as outlined in Section 6.3 of the IEEE-SA Standards Board Operations Manual <http://standards.ieee.org/guides/opman/sect6.html#6.3> and in *Understanding Patent Issues During IEEE Standards Development* <http://standards.ieee.org/board/pat/guide.html>.

VOIP Models - Update

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Voice – An Important Service

- Requirements, Section 2.1:
  - *"The MBWA will support VOIP services. QoS will provide latency, jitter, and packet loss required to enable the use of industry standard codecs"*

- *C802.20-04-12.ppt – VOIP Capacity Analysis*
  - *" A sophisticated system simulation with appropriate VoIP model is required to accurately evaluate 802.20 system capacity."*

- *Call for Submissions on Voice Models*
  - *ECCG Call, 2004*

A VoIP Modeling Framework
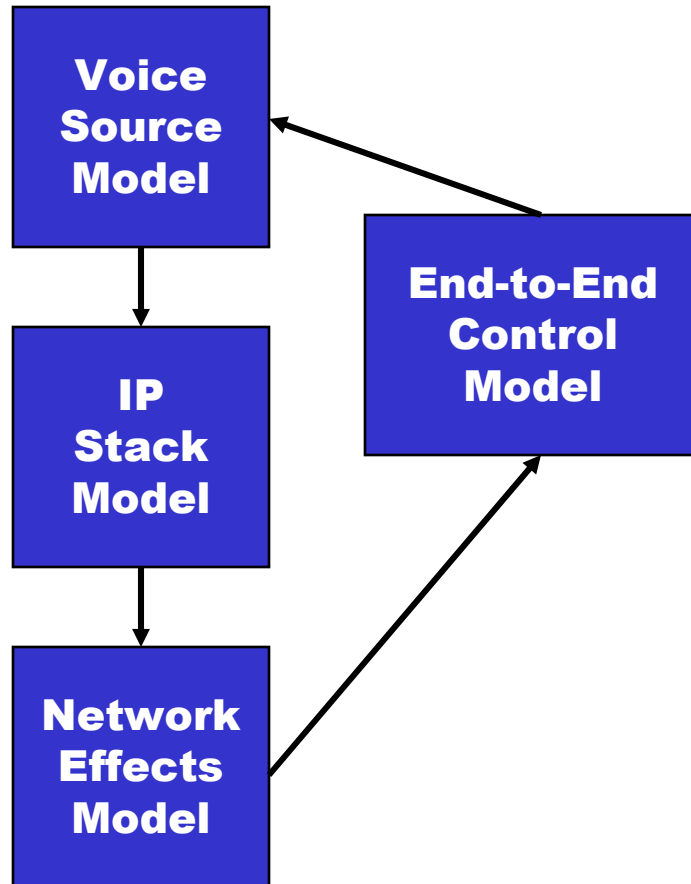
- Framework Advantages
  - Breaks up the Problem
  - Allows Flexibility in Voice Source Model
  - Accounts for End-To-End Mechanisms
  - Discussion Today Limited to Source Models

Voice Source Classes

- Fixed Rate
  - Example: ITU-T G.729
  - 8 kb/s Constant Rate
  - Frame Size: 10 ms
  - Used in Multi-media Applications
- Fixed Rate with DTX
  - Example: ITU-T G.729 with Annex A
  - Frame Size: 10 ms
- Variable Rate
  - Example: EVRC (TIA/EIA/IS-127)
  - 4 Rates (8.6, 4.3, 2.1, 1 kbs Approx)
  - Frame Size: 20 ms

Fixed Rate with DTX
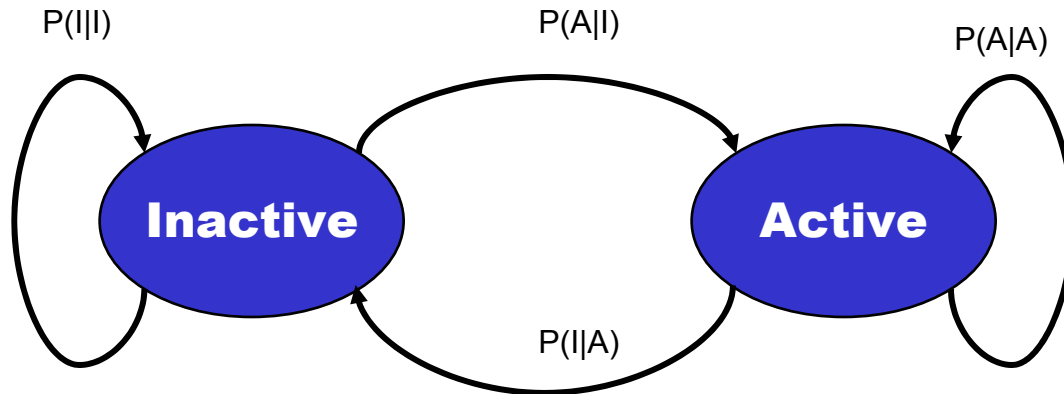
- DTX in G.729 is a Simple Energy Detector
- Active: Vocoder Sends Frames
- Inactive: Vocoder Sends No Frames
- Model Selection Is a Selection of Transition Probabilities
- 802.20 Evaluation Criteria Document Should Specify

Markov Features

- 16 State, Standardized (3GPP2 C.S0025) Model
- For Further Description See: http://www.3gpp2.org/Public_html/specs/C.S0025_Markov_Service_Option.pdf
- Transition Probabilities are based on Measurements
  - Specified in C.S0025 (for 13k Vocoder)
- Rate Selection:Based on Speech Characteristics
- For Modeling Purposes, Data Rates can be Normalized to Any Values
- Markov Service Option Miscellaneous Features
  - Random Data Fill for Vocoder Frames
  - Vocoder-to-vocoder Synchronization for Frame Loss Calculation
  - Standardized Statistics Counters
  - Selectable Fixed Rate and Variable Rate Operation

Proposal

- Evaluation Should Include Voice
  - VOIP is Likely to be Used in 802.20 Networks
- Evaluation Should Include Each Source Class
  - Fixed, DTX, and Variable Rate are all Likely
  - Models Should be Standardized Where Possible
  - Markov Service Option Model is Commonly Used
- Are There Other Standardized Models 802.20 Should Consider??