802.20 Traffic Models: Status/Discussion

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Background

- 802.20 Channel & Traffic Model Correspondence Group
  - Formed May 2003, Chair: Glenn Golden
  - Channel Model Subgroup, Traffic Models Subgroup
- 802.20 Traffic Models Correspondence Subgroup
  - Editor: N. K. Shankar
  - Objective: To develop a consensus traffic model that can be used in simulations of MBWA systems

Status

- We have a baseline draft document: C802.20-03-66
  - Table of Contents
  - Initial thoughts on scope & approach of modeling effort
  - List of traffic types
  - Illustrative content from contributions
- We need contributions
  - Get consensus on some issues regarding scope and approach of modeling work. Some of this overlaps with other groups.
  - Detailed statistical models of each traffic type

Relevant contributions

- C802.20-03/43 (& 03/57) has a detailed proposal for traffic models for Web-browsing, FTP, WAP, and near real time video.
- C802.20-03-13r1 details a user modeling approach including a Web/interactive user/capacity model.
- C802.20-03/35 gives a list of MBWA traffic types.
- C802.20-03/53 shows a measurement of the mix of traffic types.
- C802.20-03/46r1 states that a mix of narrowband of broadband traffic types should be used

Need for Traffic Models

- MBWA will have multiple types of IP-based services
- Performance often defined at application layer
- State-of-the-art is to simulate all layers: application, protocols, MAC, PHY
- Complex interactions

=> Simulations need traffic models that capture application characteristics

Traffic types

- List of traffic types (so far)
  - Web browsing
  - FTP (File transfer)
  - E-mail
  - WAP (Wireless Application Protocol)
  - Voice / VoIP
  - Video telephony / videoconference
  - Audio streaming
  - Video streaming
  - Gaming
  - Other (PDA synchronization, file-sharing ..)
- Downlink and uplink
- Adds/deletes/changes ?

User Scenarios

- Traffic & application details depend on user & device scenario. Some examples:
  - Laptop user: Large display, high power, large storage, portable
  - PDA: Medium display, medium power, medium storage, mobile
  - Phone: Small display, low power, low storage, very mobile
  - ??
- Traffic model parameters are influenced by usage scenario
  - e.g. small storage => limited download
- Logistics
  - What kind of consensus is needed re. usage scenarios?
  - Which is the right group/forum?

Traffic modeling approach/scope (1/2)

- Relatively low amount of validated published work (e.g. compared to channel models)
  - Use models based on measurements from wired networks
- We are (probably) not considering trace-based models
  - Not flexible, too dependant on source system
- Traffic models will specify traffic from an active/registered user/session. Does not model statistics of inactive subscribers becoming active (?)

Traffic modeling scope/approach (2/2)

- Performance specification is outside scope (?)
  - e.g. required web page delay
- Protocol specification is partially outside scope (?)
  - e.g. TCP details (what flavor?), HTTP version outside scope
  - some interdependencies exist: Audio streaming model may change based on underlying protocol being TCP or UDP
- What about adaptive applications?
  - e.g. rate/content adaptation of audio streaming, image browsing
  - “Traffic model senses network condition and adapts” v. “simulation picks hi-rate or lo-rate version”

Traffic Mix

- Proportion of different traffic types influenced by:
  - Different types of devices: laptop, PDA, phone
  - Different services from same device/user:
    Web-conference (Web + audio) v. single-service (E-mail)
  - Different design choices made by operator
- Measurement-based statistical approach makes more sense for application traffic model, and perhaps make less sense for traffic mix (?)
- Traffic mix specification coupled strongly to what you want to evaluate and measure
  - More delay-sensitive traffic will emphasize response time & delay.
  - Heavy FTP-type traffic will emphasize sustained throughput
- Logistics: how to handle overlap with eval group

The “real” detailed traffic models

- We need more input & discussions.
- Only one detailed contribution: C802.20-03/43 with detailed models for Web, FTP, WAP, video streaming. Based on 1x-EVDV work. Content is pasted in baseline document.
- Baseline document has some references for traffic modeling: gaming, audio streaming etc.