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.