Efficient Multiplexing for Mobile Video Streaming

SFU

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1. Mobile Video

- Broadcast to many subscribers
- Receivers with limited resources: energy, processor, display
- Our work: efficient multiplexer
  - used at base stations

2. Features of Our Technologies

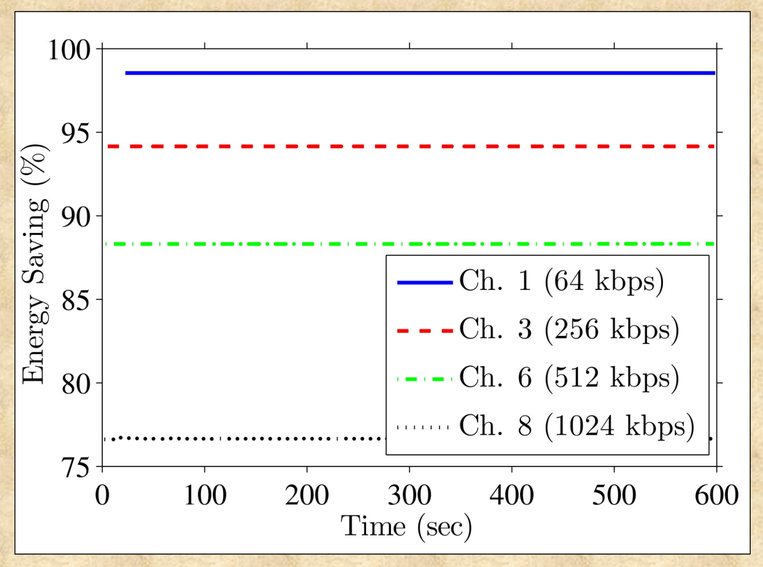
- **Optimal utilization of wireless bandwidth:** broadcast more video streams ➔ achieve higher net profits
- **High energy saving for mobile receivers:** prolong viewing time and reduce toxic battery waste
- **Real-time dynamic adaptation:** dynamically adapt to changes of broadcast schedules and insertions of commercials
- **Support for heterogeneous receivers:** support diverse receivers for more subscribers ➔ higher revenue
- **No manual configuration:** automatically choose the best parameters for each video stream
- **Low deployment cost:** function with and without expensive transcoders ➔ suitable for small- and large-scale service providers

3. Real Implementation

- **Base station**
  - PC with a PCI modulator
  - low-power amplifier
  - in-door antenna
- **Receivers**
  - phone and PC
  - analyzer for traffic analysis

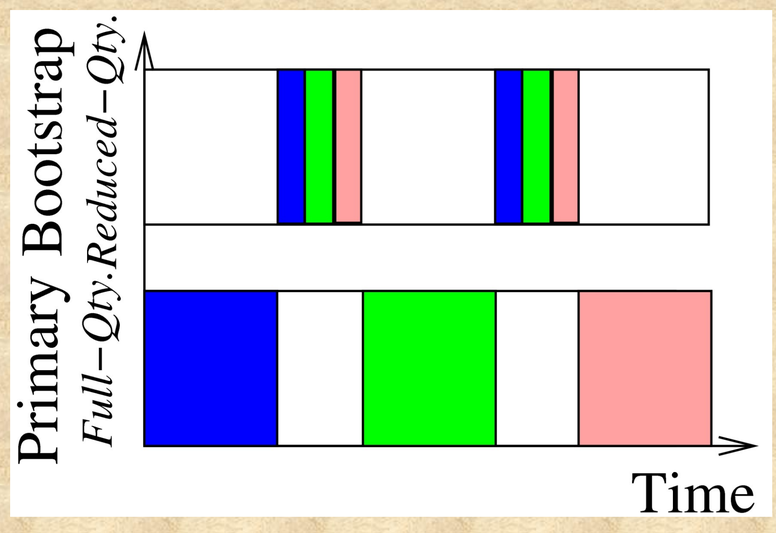
4. High Energy Saving

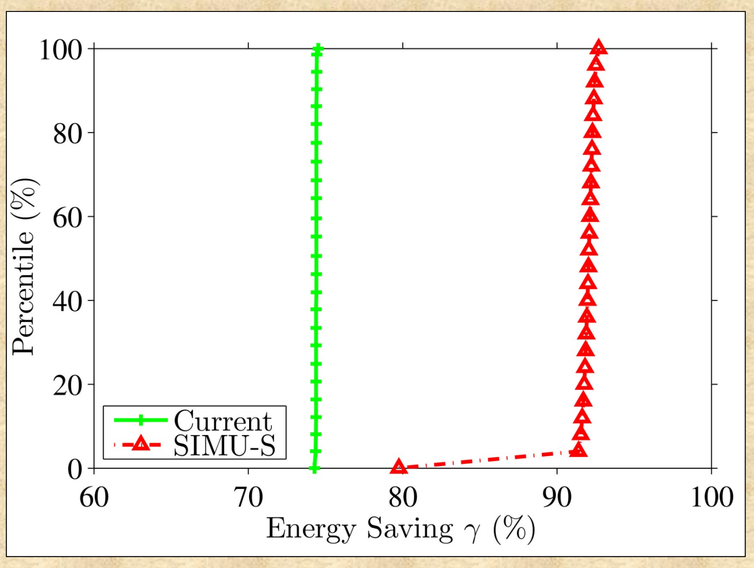
- **Challenge:** schedule video transmission to maximize battery life
  - mobile devices must wake up slightly earlier than each burst → overhead
- The problem is NP-hard
- We propose several optimal/ near-optimal scheduling algorithms



5. Fast Channel Switching

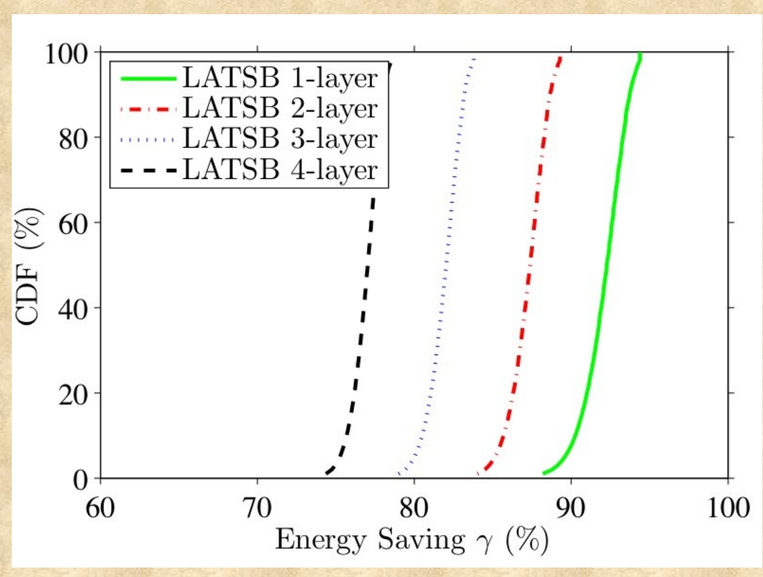
- **Challenge:** achieve small switching delay **AND** high energy saving
  - trade-off: longer inter-burst period → higher energy saving → higher switching delay
- We propose simulcast schemes with guaranteed delay bounds
  - sending reduced quality bursts very often → low delay
  - sending full quality bursts less frequently → high energy saving





6. Heterogeneous Receivers

- **Challenge:** efficiently support heterogeneous mobile receivers
- Tablets receive at higher resolution
- Smartphones receive at lower resolution to save more energy



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