Why Use ARQ Error Correction?

- Broadcasters Need Reliable, Uninterrupted Video Transport
- Internet &Wireless Networks Lose Packets
- ARQ Specifically Designed for **Reliable** Live Broadcast Video
- Feedback-based: ARQ Adapts to All Packet Loss Combinations
- Patented, Unique to QVidium Products & QVidium Licensees
- FEC Cannot Handle Internet or Wireless Video

What Is ARQ?

- **A**utomatic **R**etransmission re**Q**uest
- Error Correction Designed for Live Video
- 3 US Patents Granted:
  - #7,522,528 for ARQ error correction,
  - #7,551,647 for Internet Clock Synchronization, and
  - #7,539,187 for FEC
- Intelligent & rapid re-send of data: like TCP
- Optimized for low delay video & audio
- Automatic configuration

TCP vs. ARQ Comparison

Vidium®

ARQ Advantages

- Designed for live, real-time (audio, video, etc.)
- Hard time deadlines
- Allows maximum throughput
- Only negative ACKs – minimizes overhead

TCP/IP Disadvantages

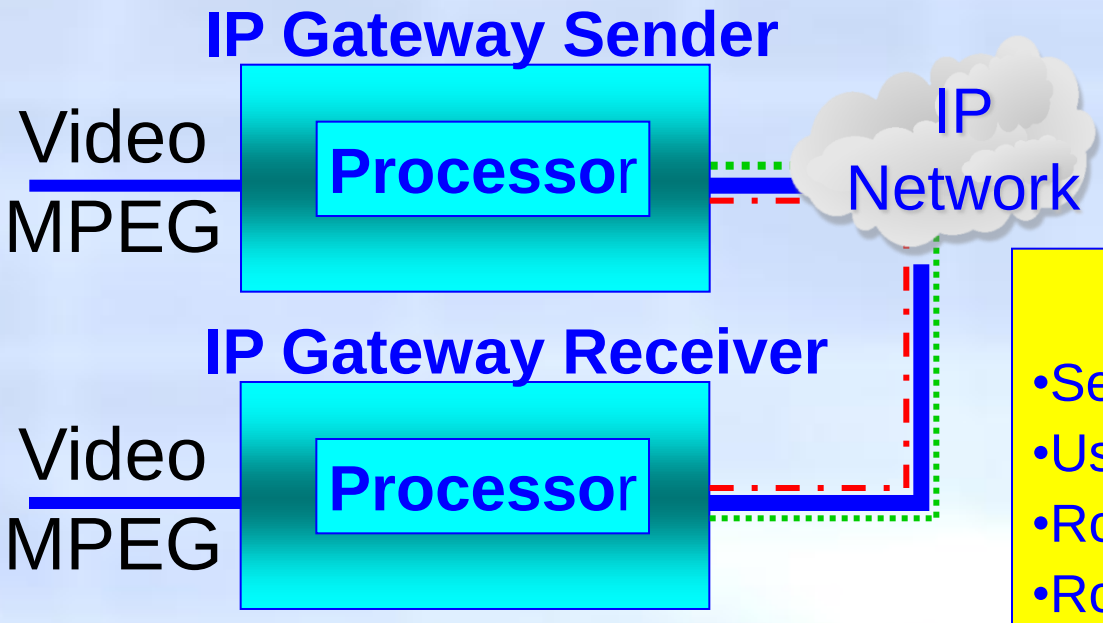
- Designed for data (web, e-mail, ftp)
- No time bounds: unsuitable for video/audio
- Limits throughput
- Requires positive ACK for all packets

ARQ Operation

- Simple 2-step process:
  - Step 1: Transmit the DATA
  - Step 2: If there is trouble on the line re-transmit only the missing data
- Adds small fixed delay at receiver
  - Can repeat as time allows
  - Multiple retries → nearly zero loss
- Auto measurement & configuration
- Ideal for wireless connections & Internet

IP Gateway Application

A Closer Look at ARQ



Request for Re-send

Re-sent Data

Processes

- Sender stores outgoing pkts
- Uses RTP seq numbers
- Rcvr sends requests to sender
- Rcvr delays video output to give time for recovered pkt to arrive
- Synchronized timing & delays

ARQ Software Integration