Video Quality Monitor Demonstration

By Argon Design in partnership with Advantech and Qosmos

February 2012

System Overview

A demonstration of how DPI and video analysis can be applied to mobile video streaming

ADVANTECH
Enabling an Intelligent Planet

QOSMOS
Your Network is Information

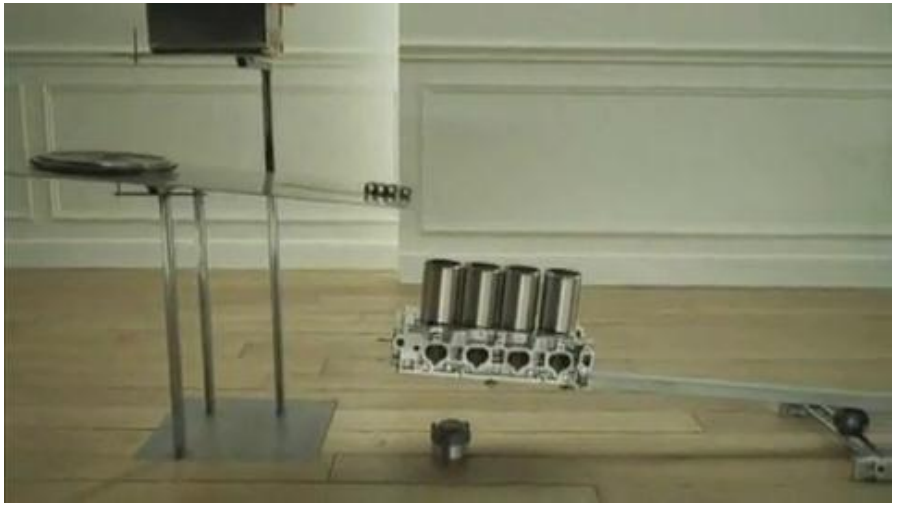
DPI and Video Analysis

The DPI and video analysis program qualmon:

- Uses Qosmos ixEngine to inspect packets
- Recognises video streams
- Extracts details of the stream from the container format and displays them
- Extracts a representative thumbnail from the video stream
- Recognises the player being used from the HTTP user agent and replicates its buffering model
- Simulates the player's buffer and displays the margin as a time graph correctly predicting when the player will freeze when starved of data
- Decodes the video
- Performs image processing to assess visual quality – freedom from blockiness, blurring and noise

Visual Quality Assessment

- Uses quality measure based on Farias *"No-reference video quality metric based on artifact measurements,"* Image Processing, 2005
- Performs separate measurements of blockiness, blurriness and noisiness and combines them into an overall metric, averaged over the whole video
- Examples:



Overall score = 9.48
Blurriness score = 9.3

Overall score = 2.96
Blurriness score = 1.8

Example web page output

Browsing information

Thumbnail

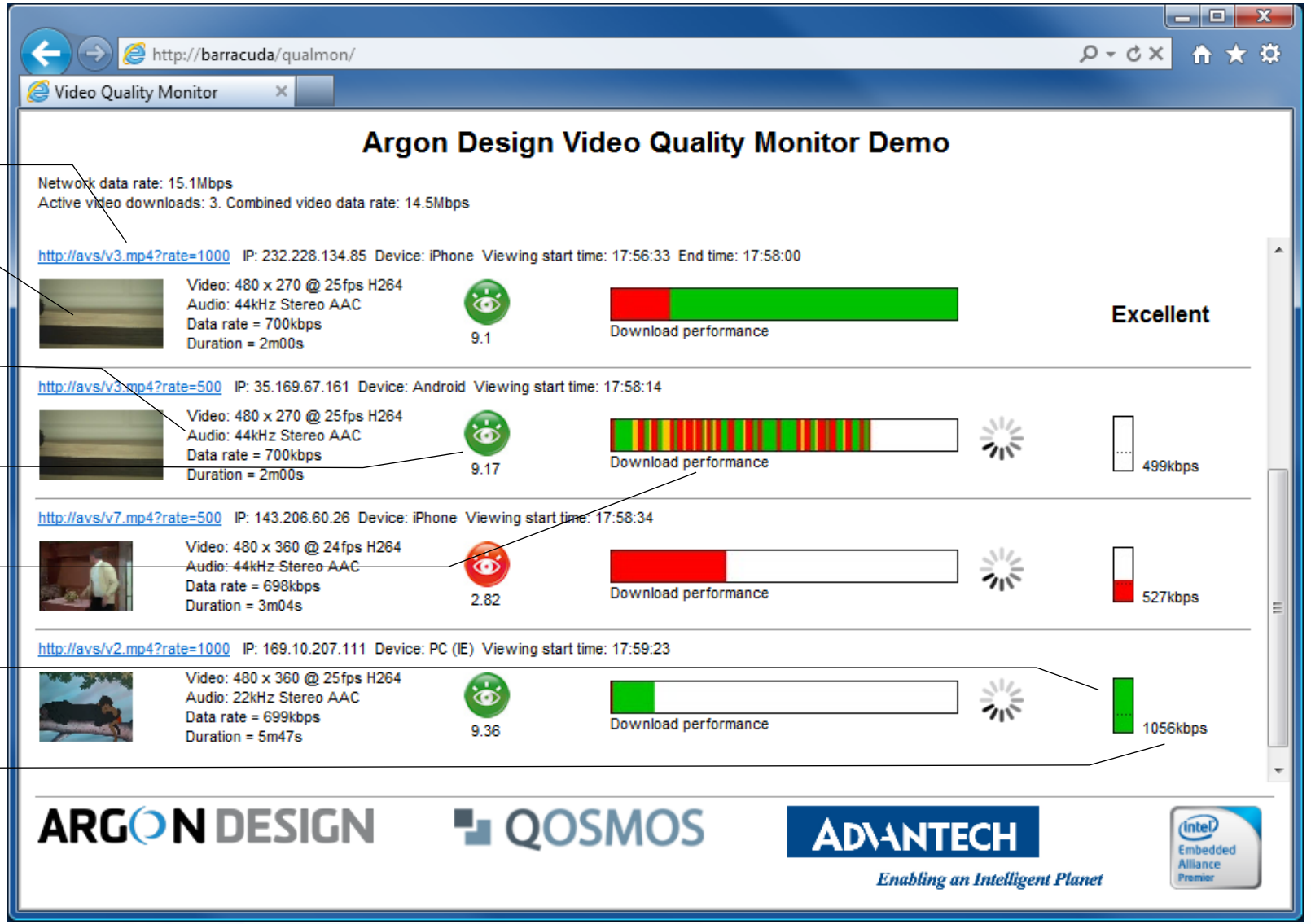
Stream information

Visual quality (0 – 10)

Player freeze experience

Player buffer level

Instantaneous bit rate

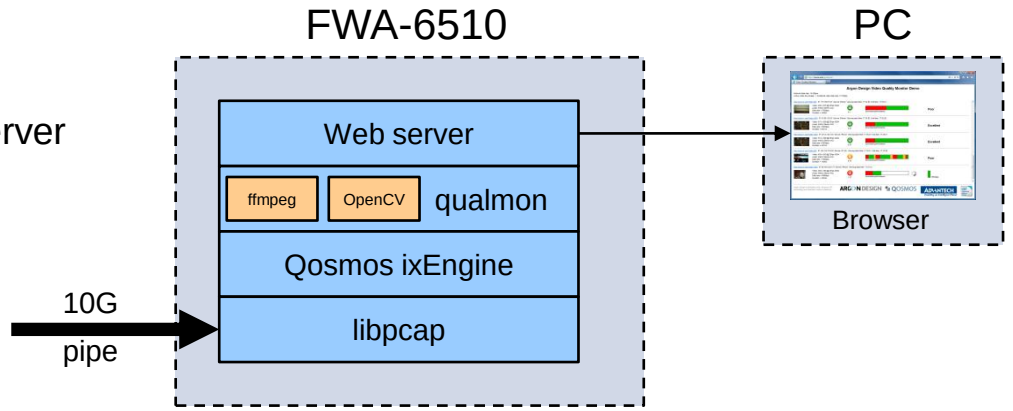


Software Structure

- Runs on:

ADVANTECH
Enabling an Intelligent Planet

FWA-6510 network server



- Uses a SMP model with Pthreads
- Captures network traffic via the libpcap library
- We reorder TCP packets and call ixEngine to process packets and trigger event callbacks
- Callbacks for video data trigger a new thread to analyse the data for each video stream
- The video thread is linked by an asynchronous FIFO to the worker threads
- Video threads are responsible for analysing the video stream, generating the statistics and presenting the data to generate the output web page
- Video data is decoded using the ffmpeg library
- Video frames are analysed for “visual quality” using image processing built with OpenCV primitives
- Results are written to an XML file and various JPG images
- A web server serves a page that displays the data from the XML file and refreshes every 1s

Qed
Deeper Expertise

Applications

This is just a demonstration, but could easily be adapted to:

- Gather statistics on user video usage
- Monitor user experience and identify problems
- Optimise use of limited wireless data channels by prioritising traffic based on actual buffer margins and/or video use case

ADVANTECH

Enabling an Intelligent Planet

ARGON DESIGN

QOSMOS

A powerful combination for streaming video management