

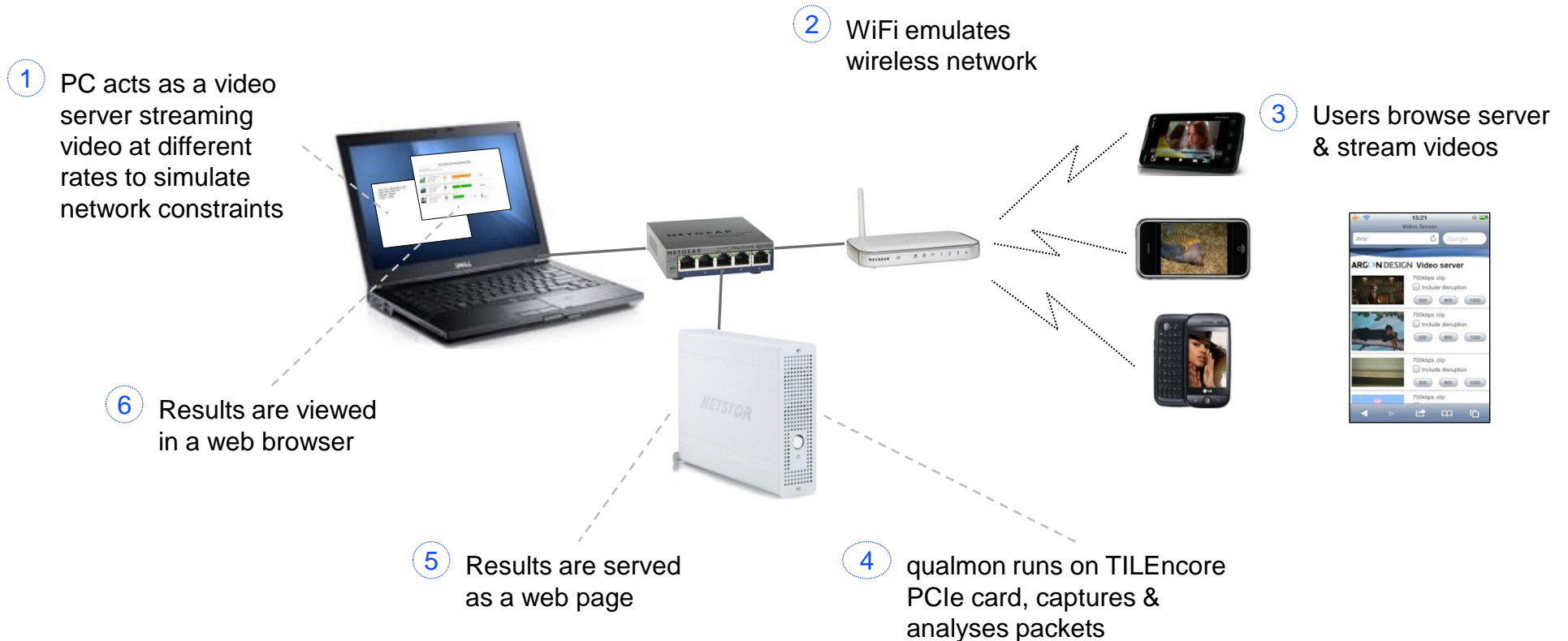
## Video Quality Monitor Demonstration

By Argon Design in partnership with Qosmos and Tileria

2011

# System Overview

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



## DPI and Video Analysis

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The DPI and video analysis program qualmon:

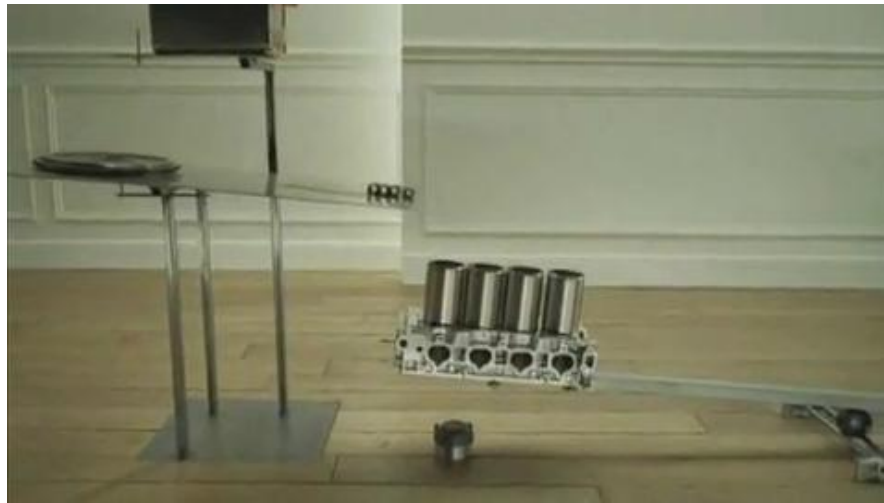


- Uses Qosmos ixEngine to inspect packets
- Recognises video streams
- Extracts details of the stream from the container format and displays them
- Extracts a representative thumbnail from the video stream
- Recognises the player being used from the HTTP user agent and replicates its buffering model
- 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

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- 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

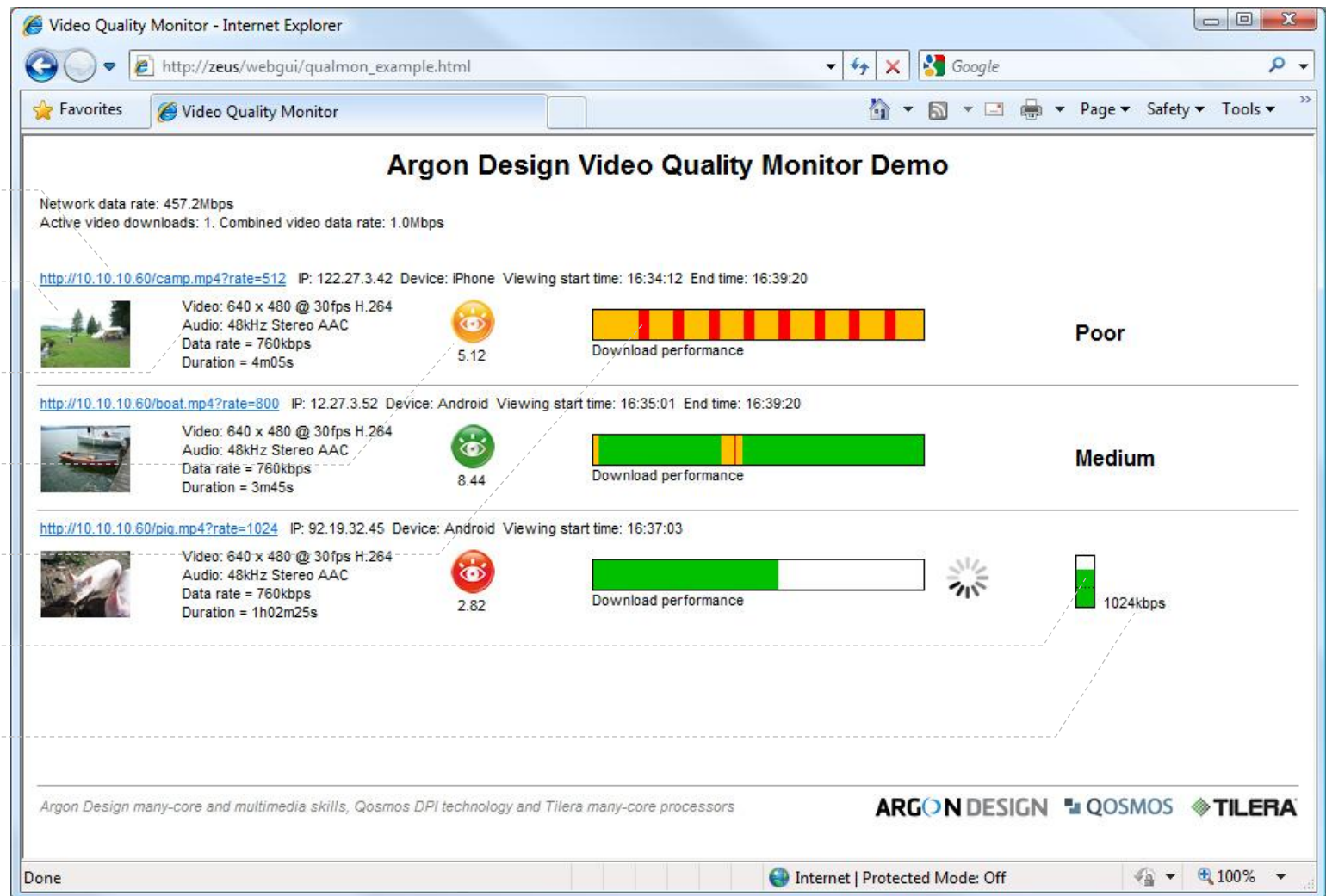
Stream information

Visual quality (0 – 10)

Player freeze experience

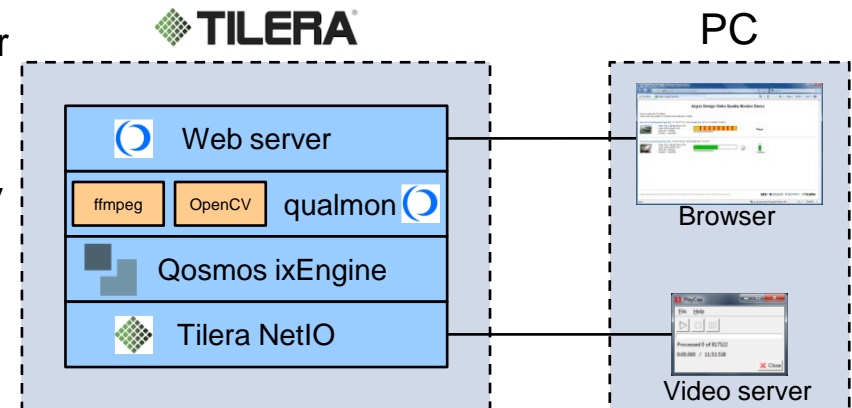
Player buffer level

Instantaneous bit rate



# Software Structure

- Runs on the Tileria TILEPro64 manycore processor
- Uses a SMP model with Pthreads
- Captures network traffic via the Tileria NetIO library
- NetIO runs on a dedicated tile and provides packets to 8 worker threads
- These 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



# Applications

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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



**ARGON DESIGN**

**QOSMOS**  
*Your Network is Information*

**TILERA**<sup>®</sup>

A powerful combination for streaming video management