Carnation Communications Inc.

Jimei University
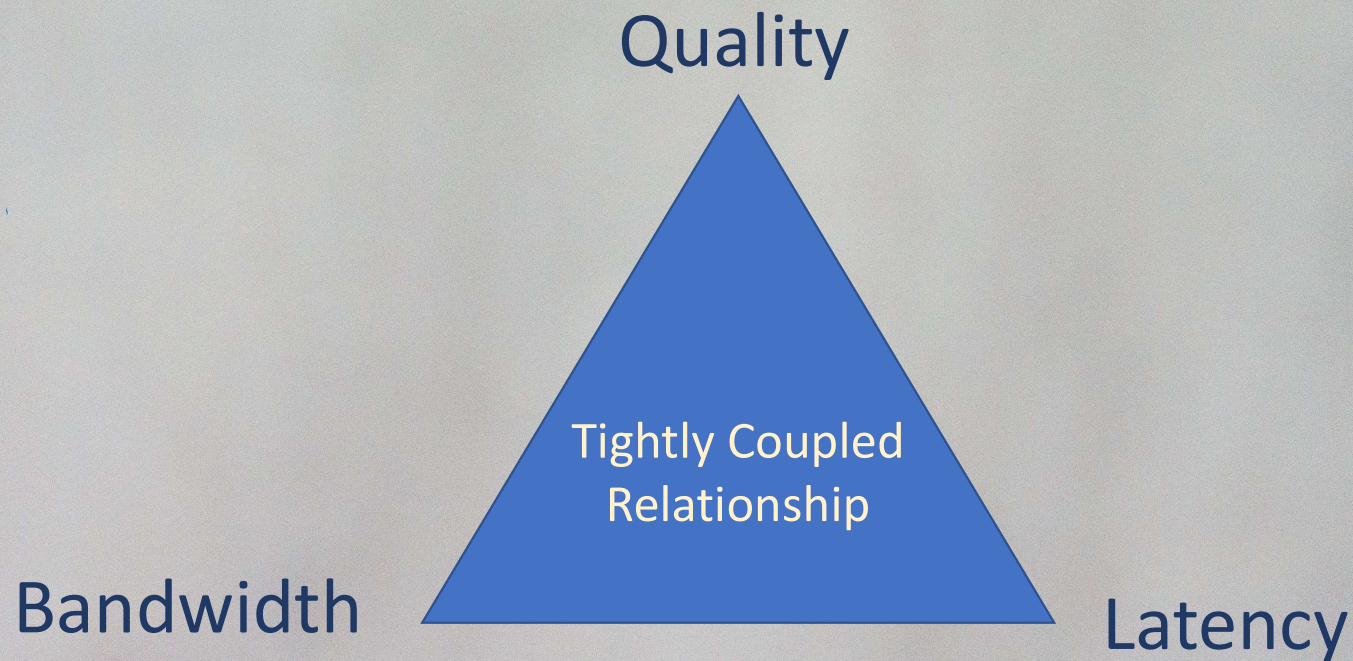
PROPOSAL

A Benchmarking Standard to bring Quality, Bandwidth, and Latency into a Common Measurement Domain
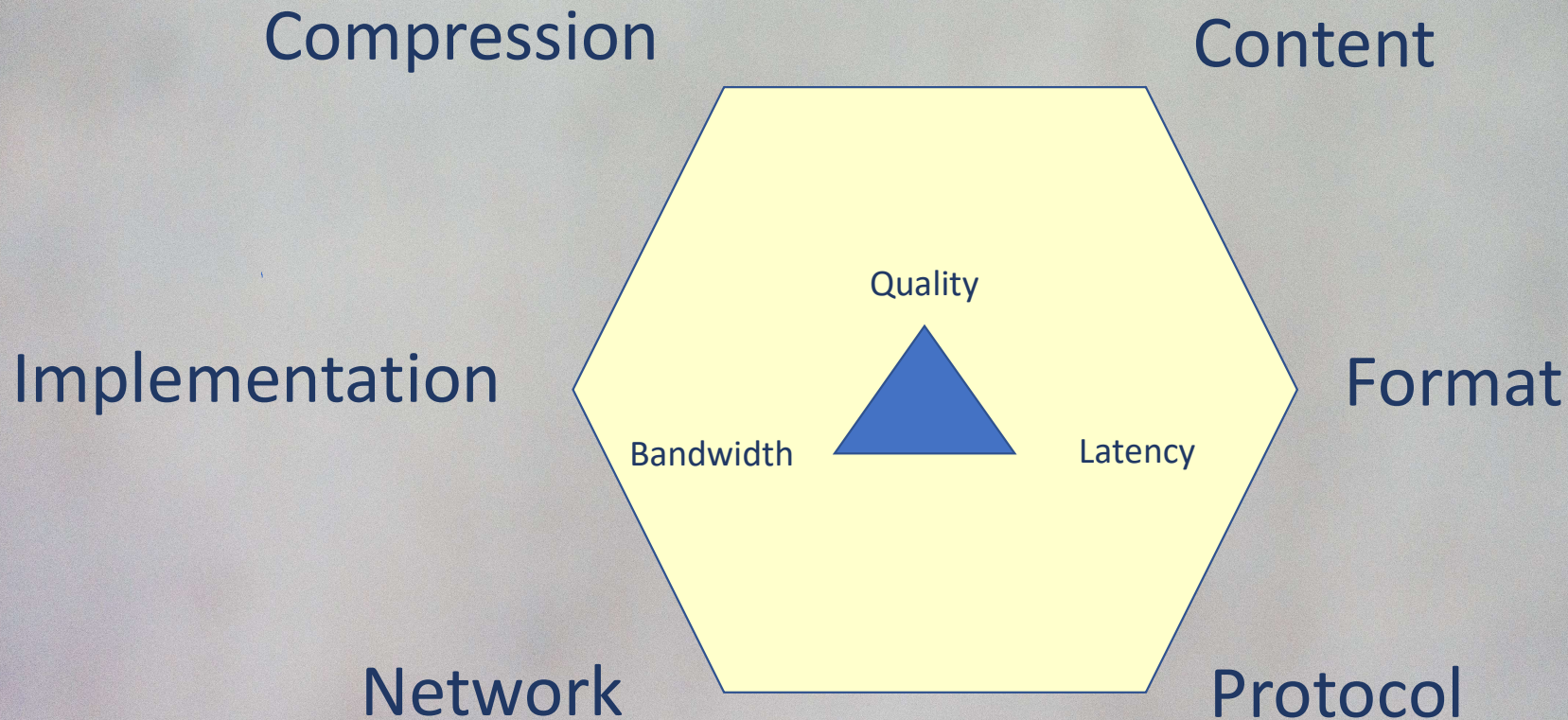
Dr. Yendo Hu, Carnation Communications Inc.

Dr. Wu Yi Liang, Jimei University

The Inter-Dependencies between Quality Bandwidth Latency

Quality

Tightly Coupled Relationship

Bandwidth

Latency

Six Classes of Influencing Parameters

Compression

Content

Implementation

Format

Network

Protocol

Quality

Bandwidth

Latency

Influencing Parameters
Compression Standards

MJPEG

MPEG2

H264

H256

VC9

AV1

Proprietary

Influencing Parameters
Content Examples

Talking Heads

Action

Stills

Film Credits

Landscapes

Fades

Grass

Influencing Parameters
Format Variations

1080i59

720p60

480p24

UHD@24

DCI@30

VGA

Custom

Influencing Parameters
Implementation Approaches

Software

Hardware

Hybrid

Offline/Realtime

Vender Specific

Proprietary

Influencing Parameters
Network Types

Wired Point-to-Point

Wireless Point-to-Point

Wireless Mesh

Satellite Contribution

Satellite Distribution

Cloud Point-to-Point

Cloud Bonding

OTT Distribution

Protocols

TS	ES
TS-FEC	TS-ARQ
IP-UDP	IP-TCP
IP-FEC	IP-ARQ
IP-RTMP	IP-SRT
IP-LLCMAF	IP-LLHLS
IP-WebRTC	

Proposal: Framing the Test Bench
Six Domains

| Domains	Elements
Content	TBD defined set
format	TBD Pixel size / frame rate
Compression	TBD standards
Implementation	TBD classes
Network	TBD networks Wired point-to-point Wireless point-to-point IP Network
Protocol	IP-UDP IP-TCP TBD others

Proposal: Framing the Test Bench
Three Measurements

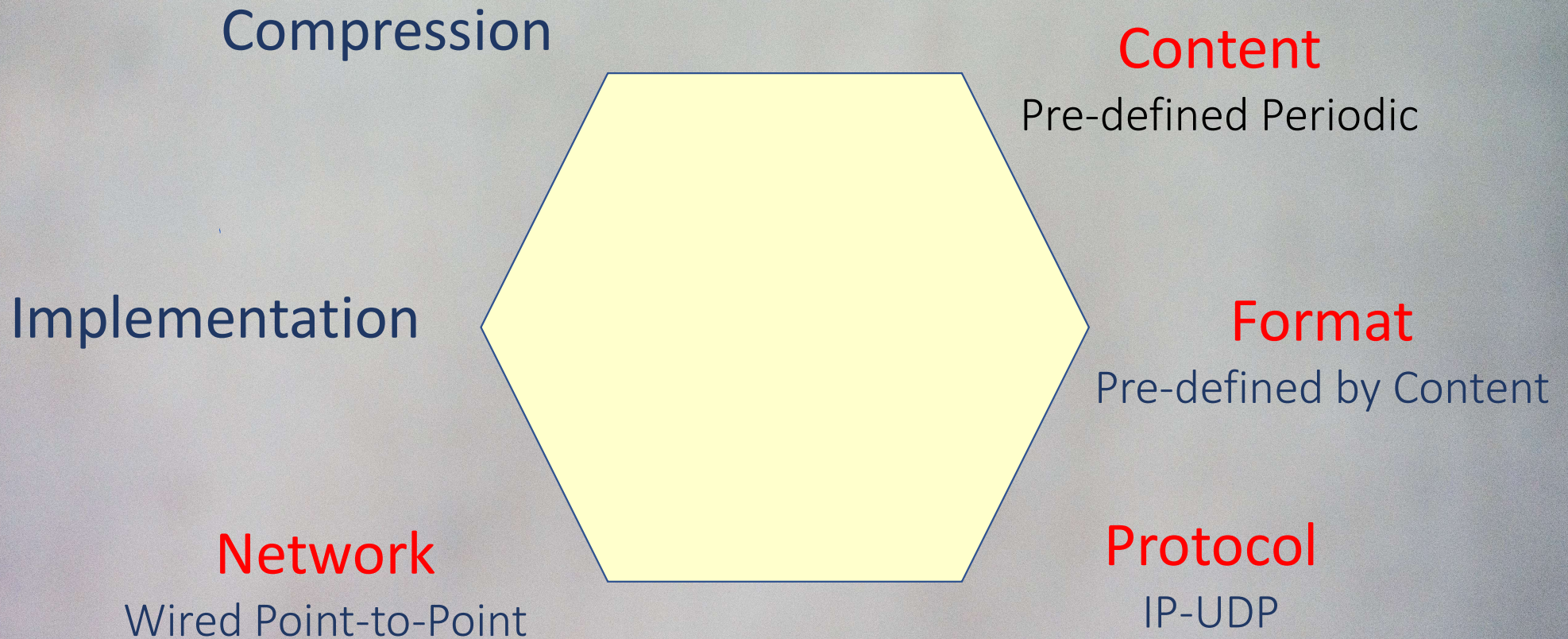| Measurements |
| --- |
| Quality (PSNR) |
| Bandwidth |
| Latency |

Proposal: Framing the Test Bench
Three Profiles

BASE

COMPRESSION

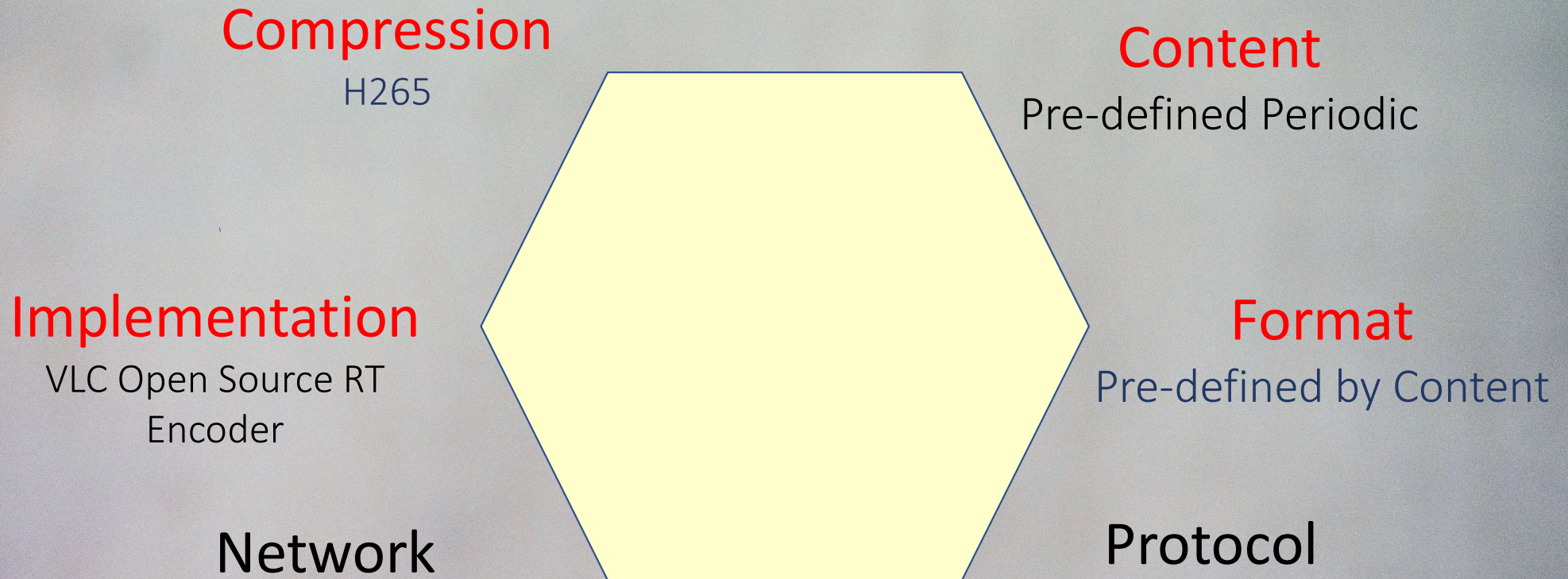NETWORK

Proposal: Bounding the Scope Proposal
Base Profile

Compression

Content
Pre-defined Periodic

Implementation

Format

Network

Protocol
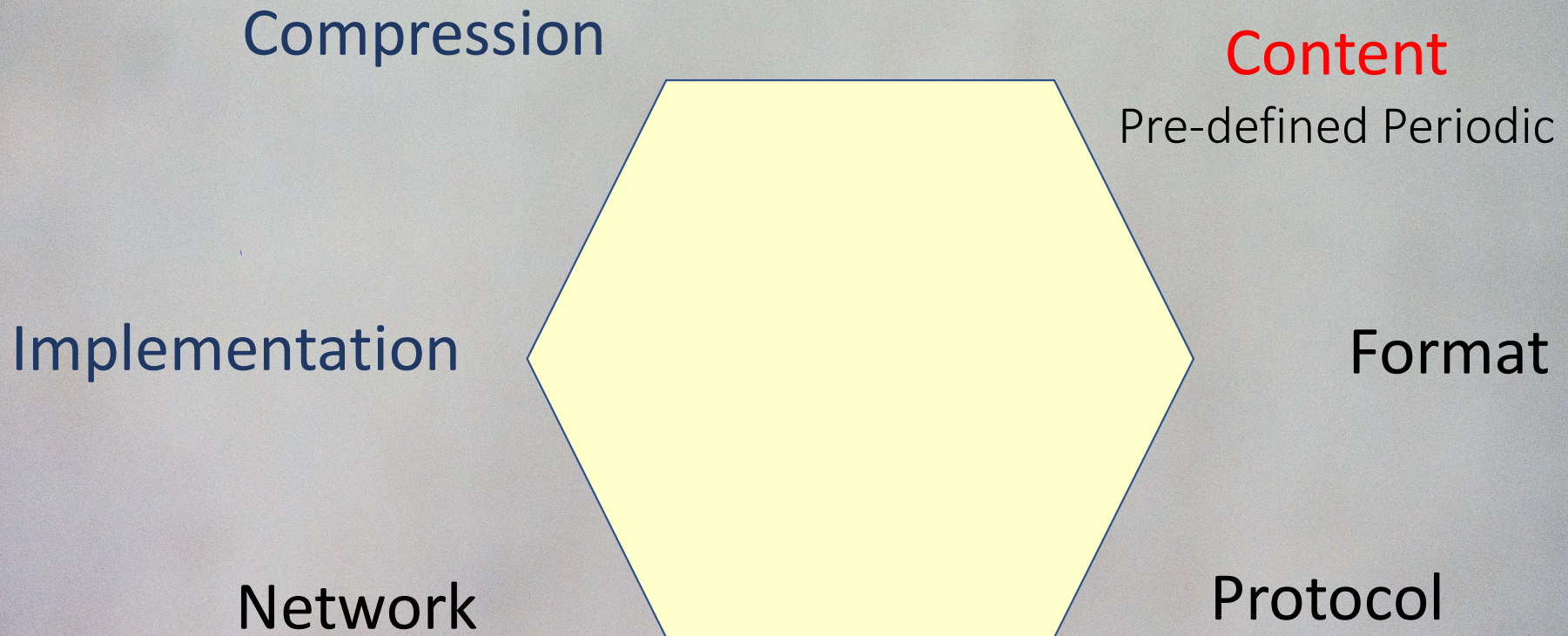
Proposal: Bounding the Scope Proposal
Compression Profile

Compression

Content
Pre-defined Periodic

Implementation

Format
Pre-defined by Content

Network
Wired Point-to-Point

Protocol
IP-UDP

Proposal: Bounding the Scope Proposal
Network Profile

Compression
H265

Content
Pre-defined Periodic

Implementation
VLC Open Source RT
Encoder

Format
Pre-defined by Content

Network

Protocol

15

Proposal: EXAMPLE
Compression Profile

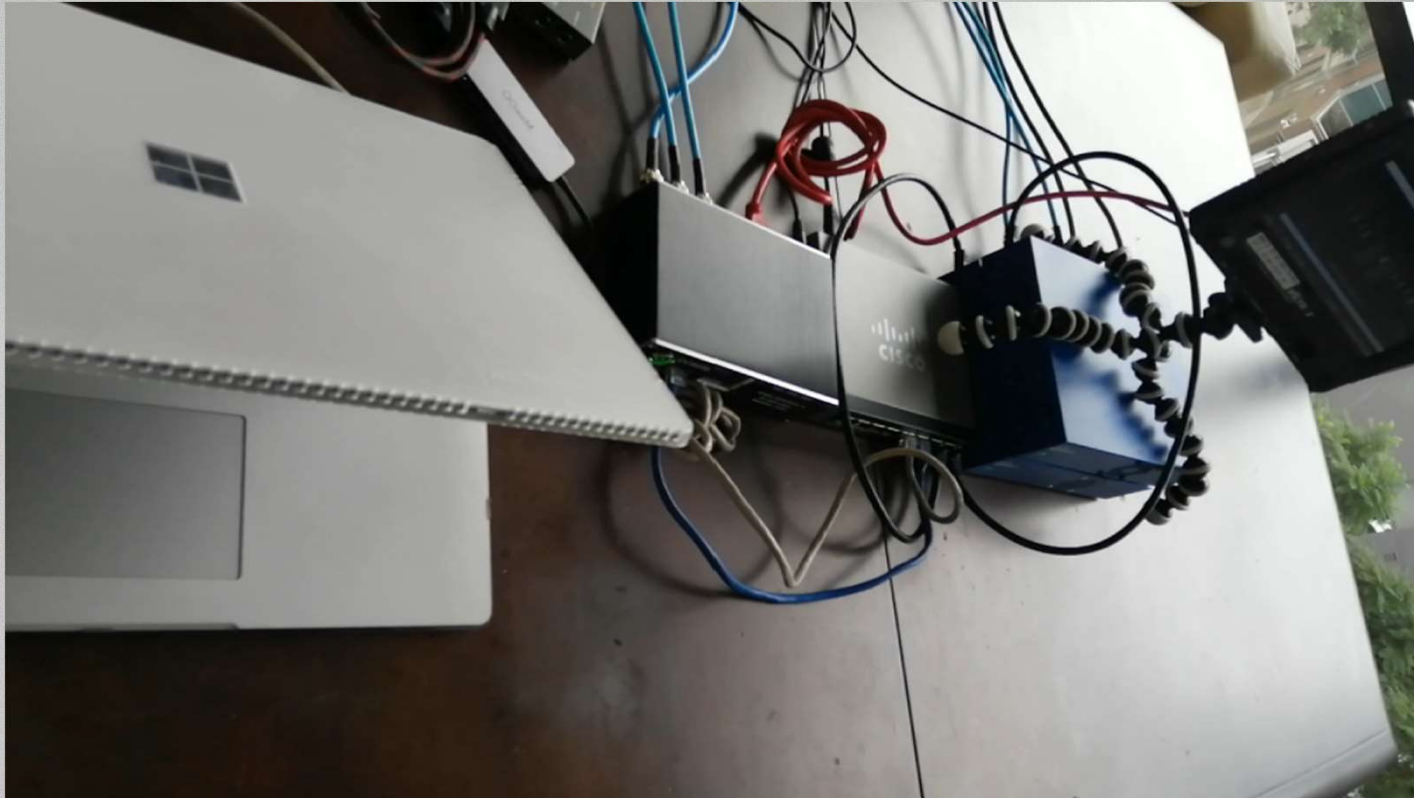| Domain	Bound	Device Under Test
Content	Star Wars Trailer	
Compression		H265
Implementation		Qvidium 4K Codec
Format	1080p24	
Network	Wired Point-to-Point	
Protocol	IP-UDP	

Proposal: EXAMPLE
# Compression Profile Measurements

Example: Test Setup

HDMI

SDI

SDI

SDI

SDI

HDMI

USB3

Status

Configured for Decoding   Configured for Encoding
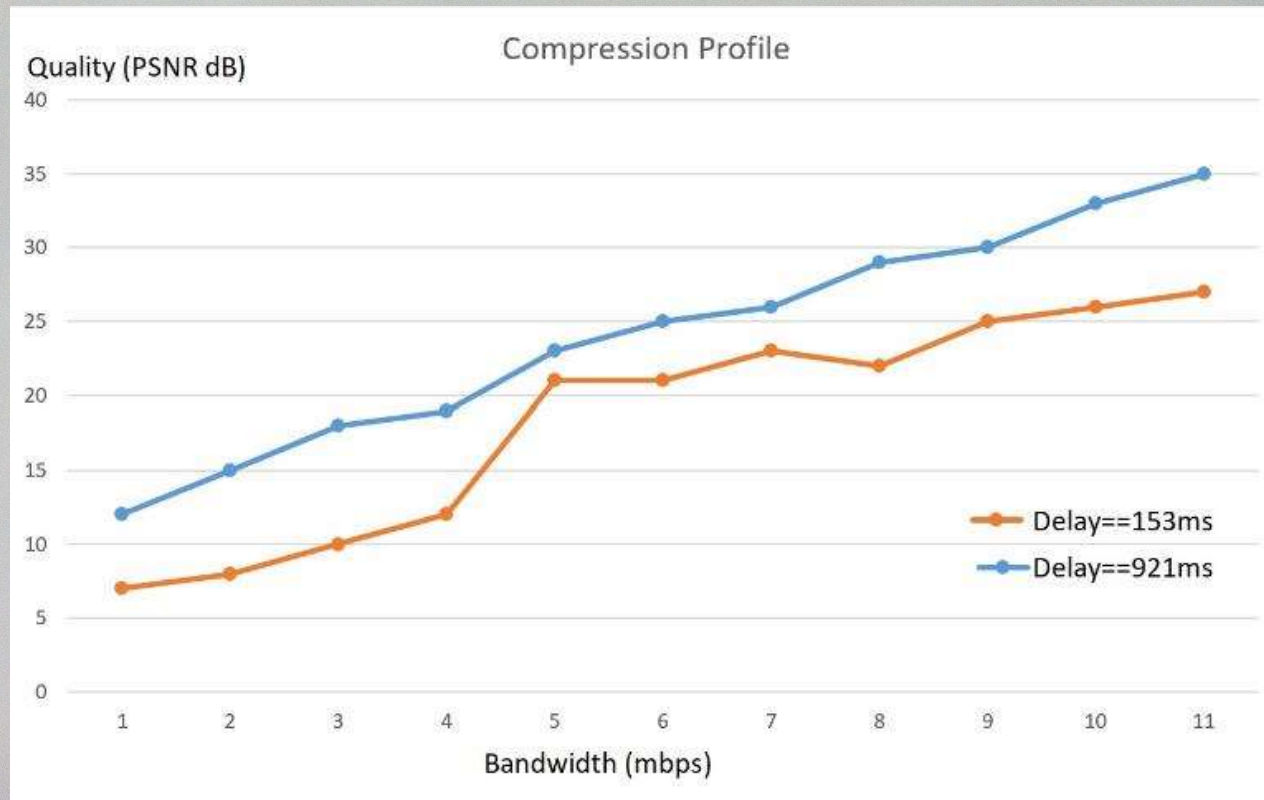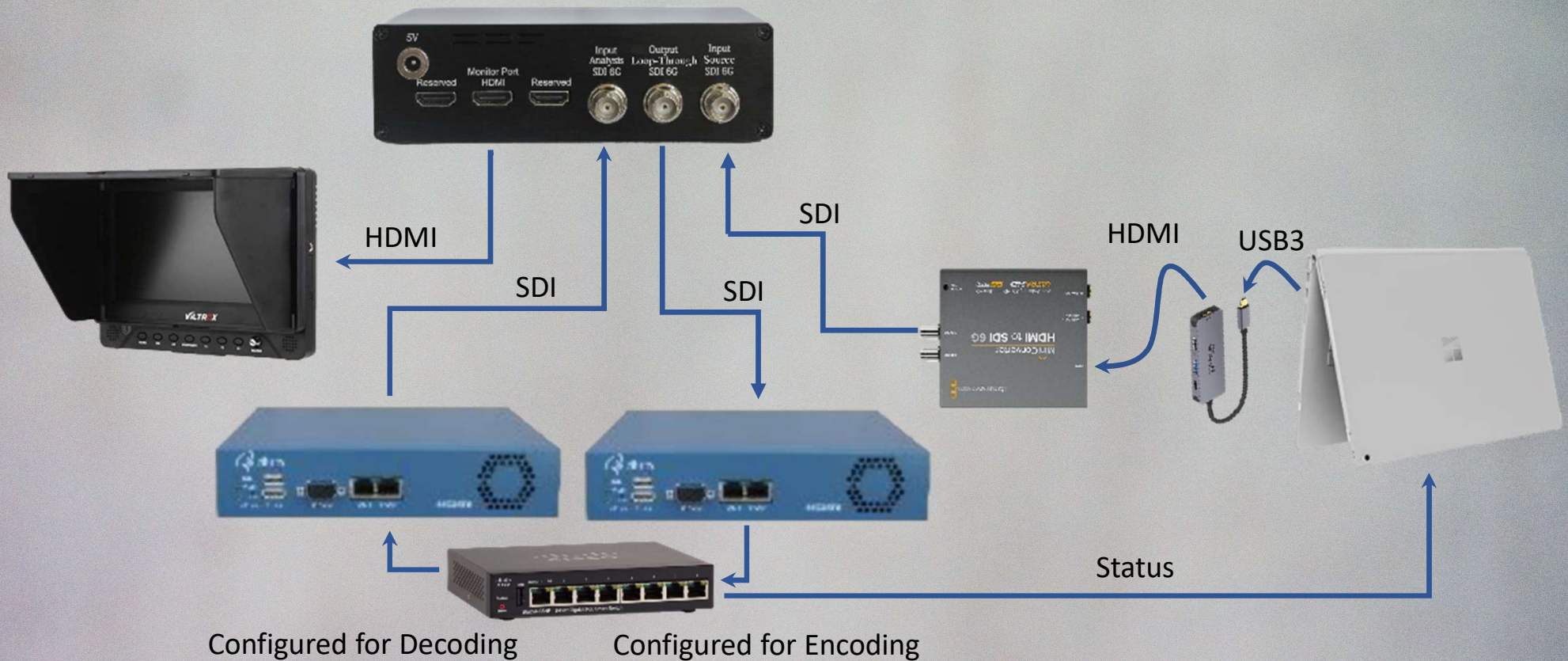
Example: Wiring Setup

Example: Parts List

CC3030   Carnation Communications Inc. SDI Video Latency + Quality
                  www.carnationcommunications.com
SG250-08   Cisco 8 Port Smart Switch with 8 Gigabit Ethernet
                  www.amazon.com
QVCodec4K   QVCodec4K 4K/UHD-HDR HEVC Low Latency Encoder/Decoder
                  www.qvidium.com
B07Y6F74F1   QGeeM 4 in 1 USB-C to HDMI Adapter
                  www.amazon.com
CONVMBHS24K6G   Blackmagic Design HDMI to SDI 6G Mini Converter
                  www.amazon.com
DC-70EX   Viltrox 7" 4K HD 1024x600 HDMI/SDI/AV LCD Monitor
                  www.amazon.com

Example: Measurement
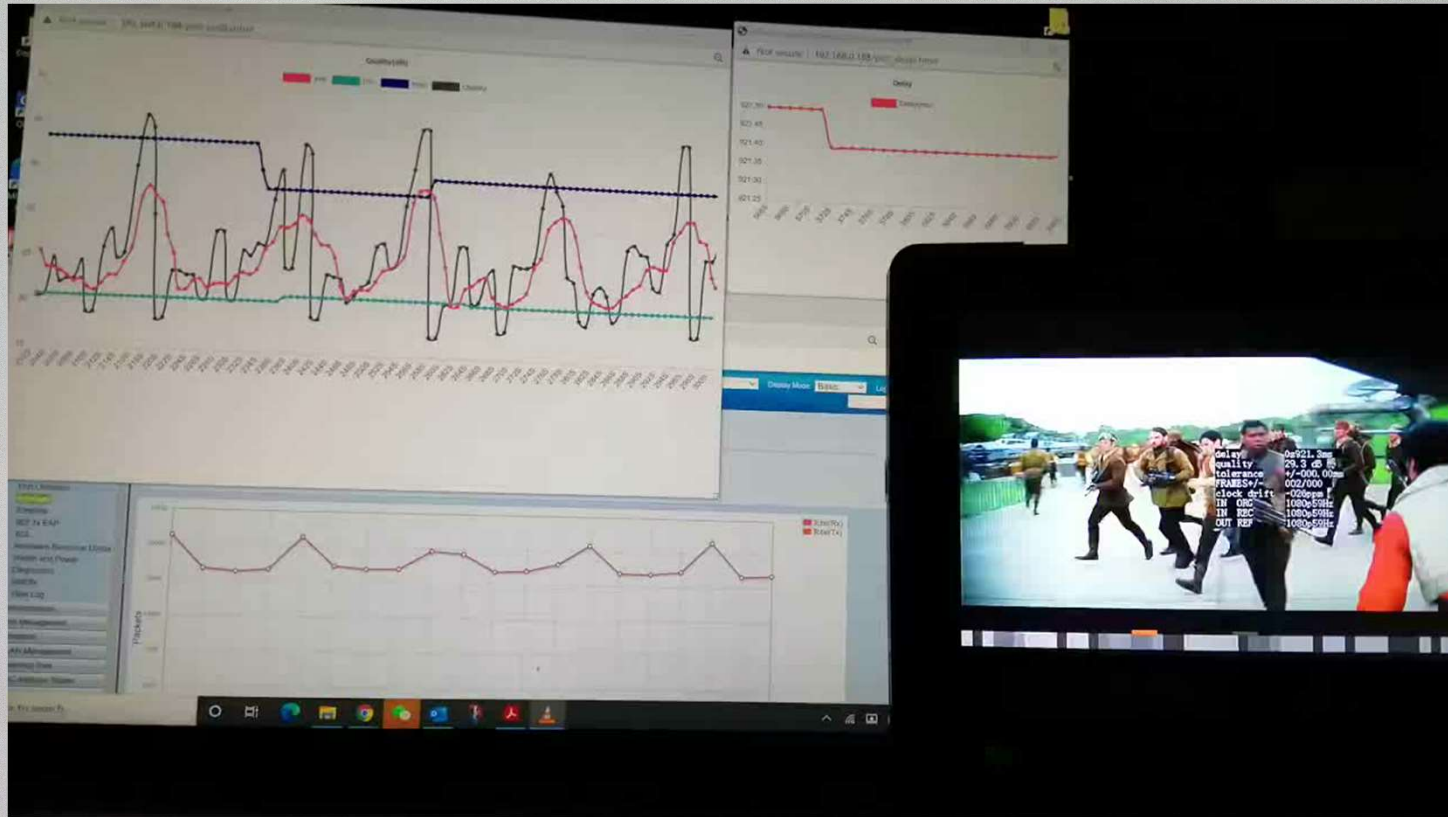
Please click link for a full Demo tutorial.   https://youtu.be/CVad5RhUsSk

Carnation Communications Inc.

Jimei University

Thank You