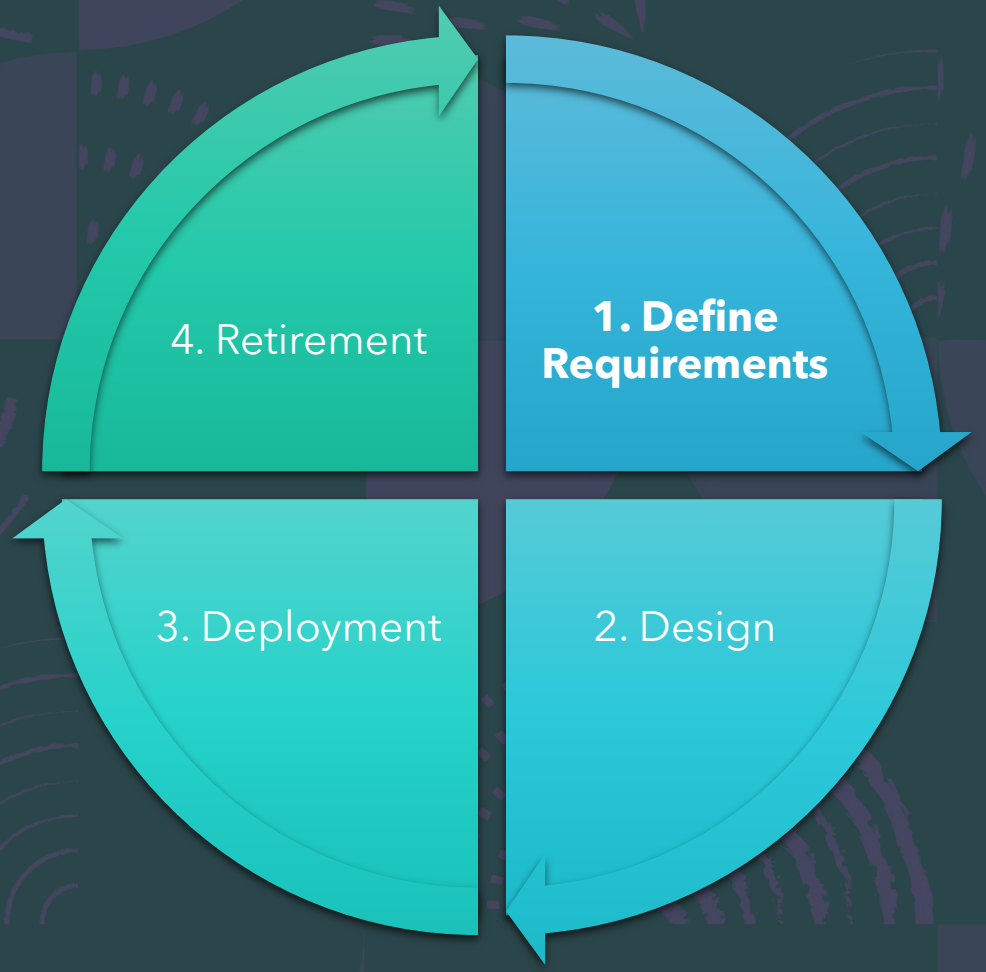
From Legacy to Modern: The Journey to a New Video Solution

ITS Texas/TexITE Joint Conference



The Journey

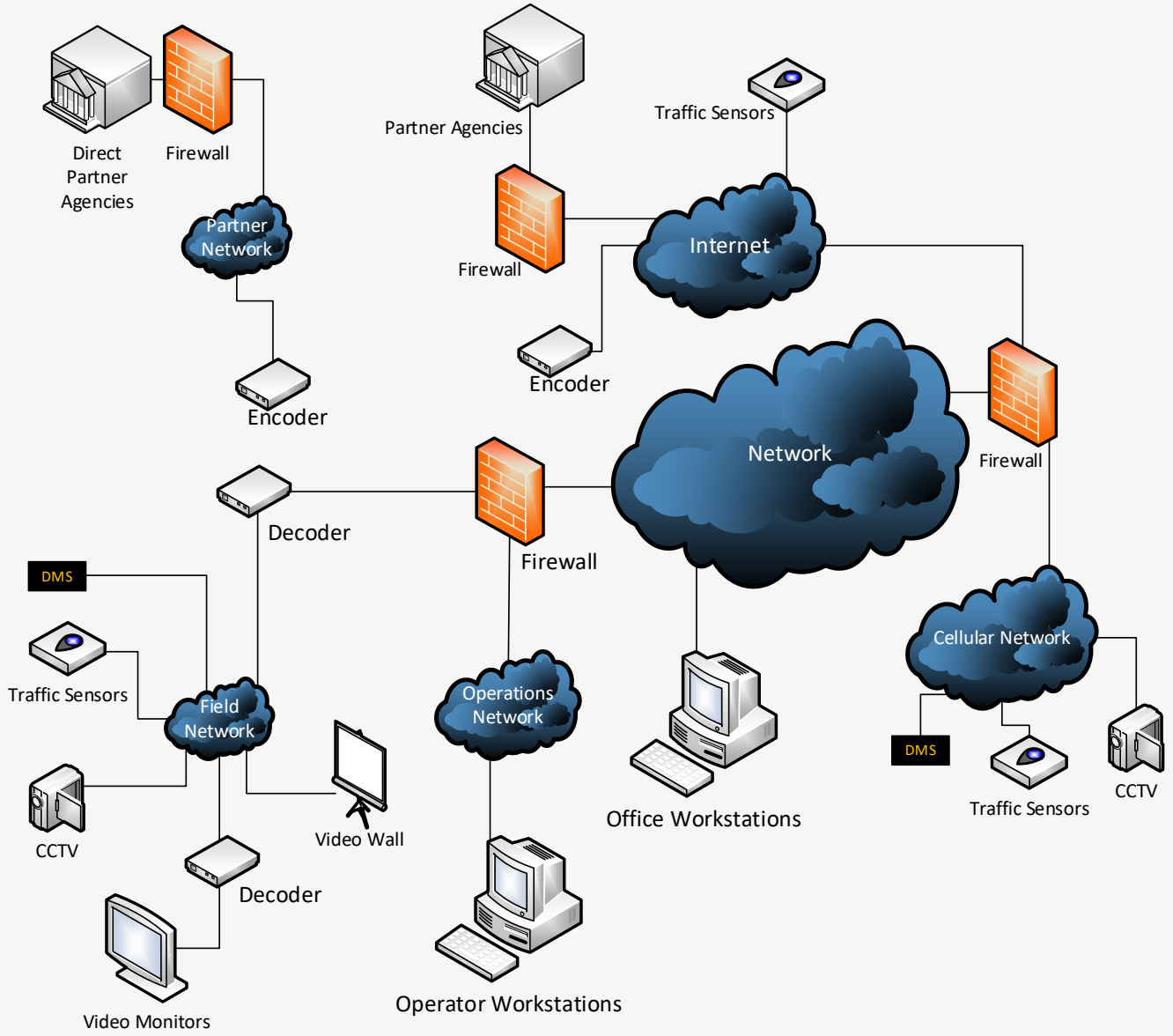
Technology Deployment Lifecycle

1. **Define Requirements**
    i. Gather data and needs from stakeholders
2. Design
    i. Develop a blueprint
3. Deployment
    i. Prepare for the migration
4. Retirement
    i. Identify End Of Life (EOL) equipment

How did we get here?

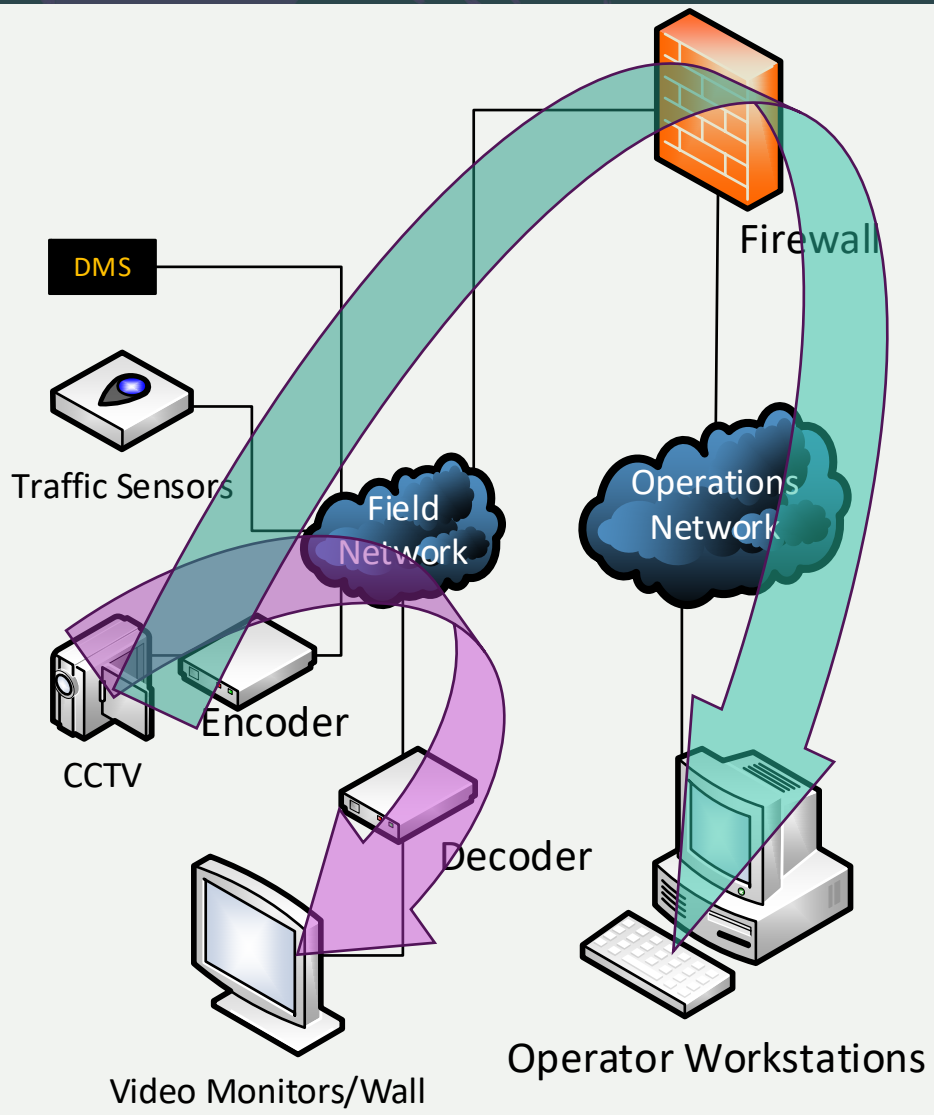
- Rise and Fall of Video Codecs in ITS
- MPEG4 Hardware EOL Announcement

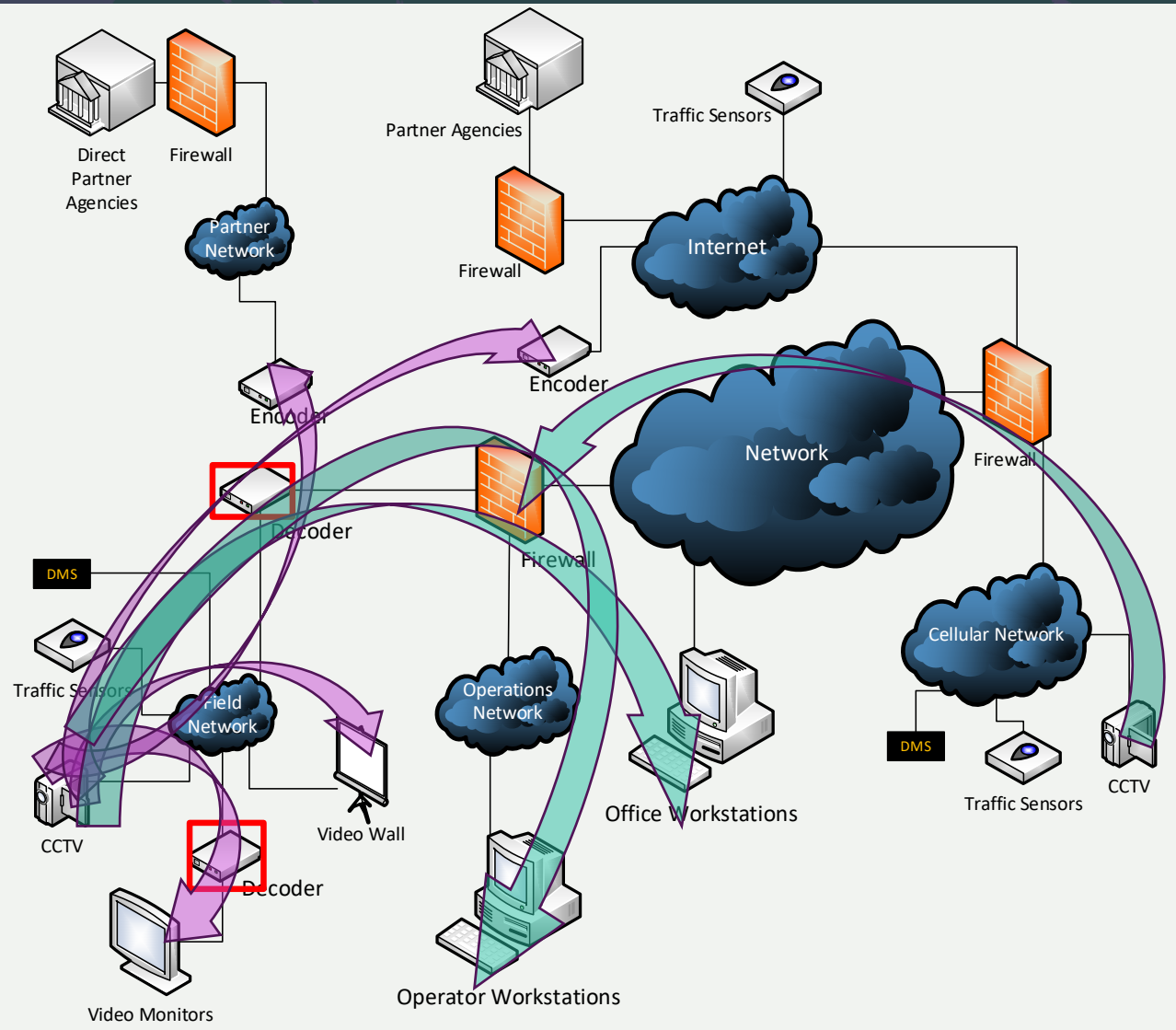
Video Streaming Infrastructure



Past Video Streaming Infrastructure

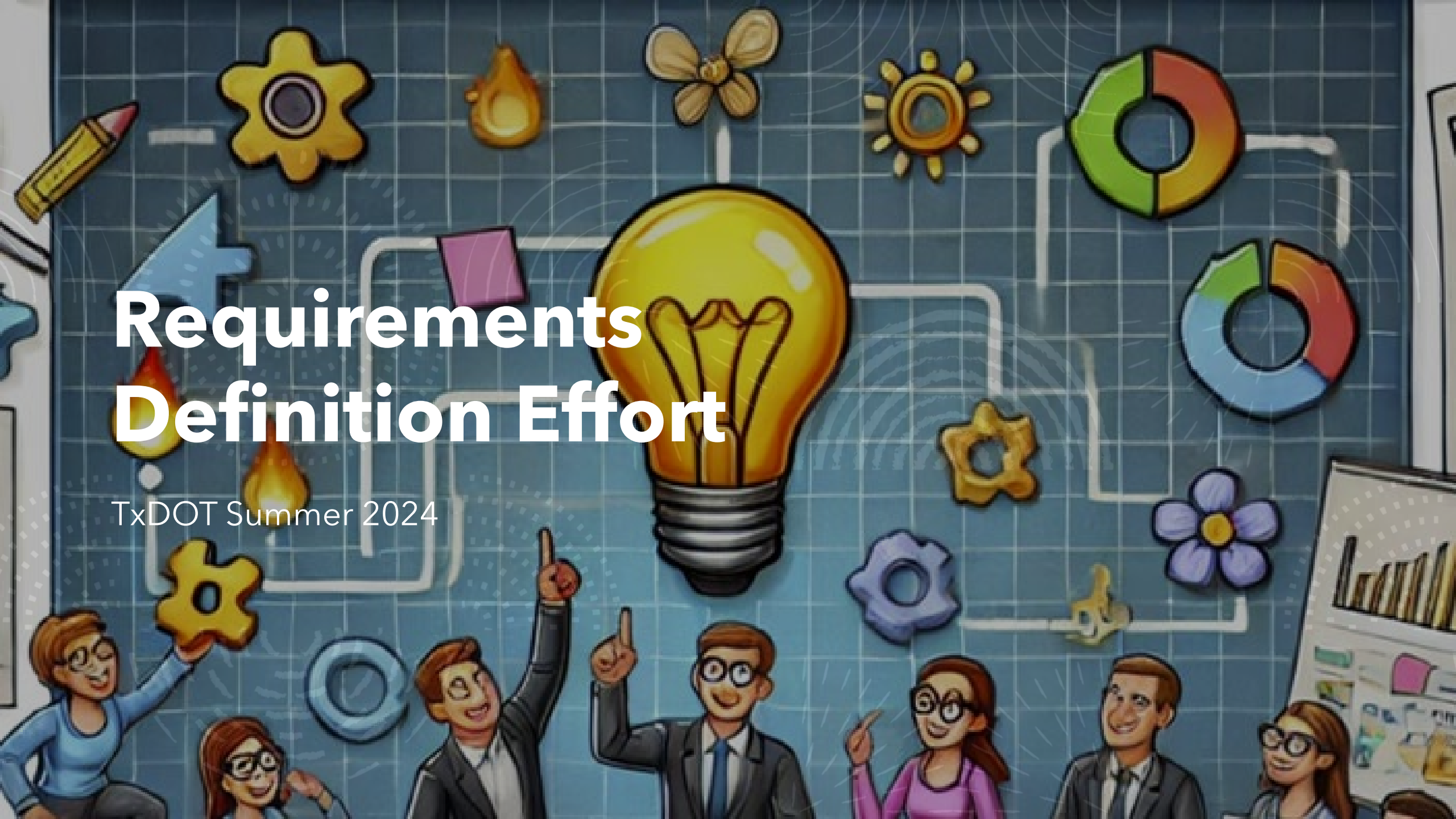
Analog cameras, encoders, network switches, decoders, displays requiring a physical connector





Current Video Streaming Infrastructure

Digital Cameras, network switches, decoders (EOL), displays requiring a physical connector, and video walls

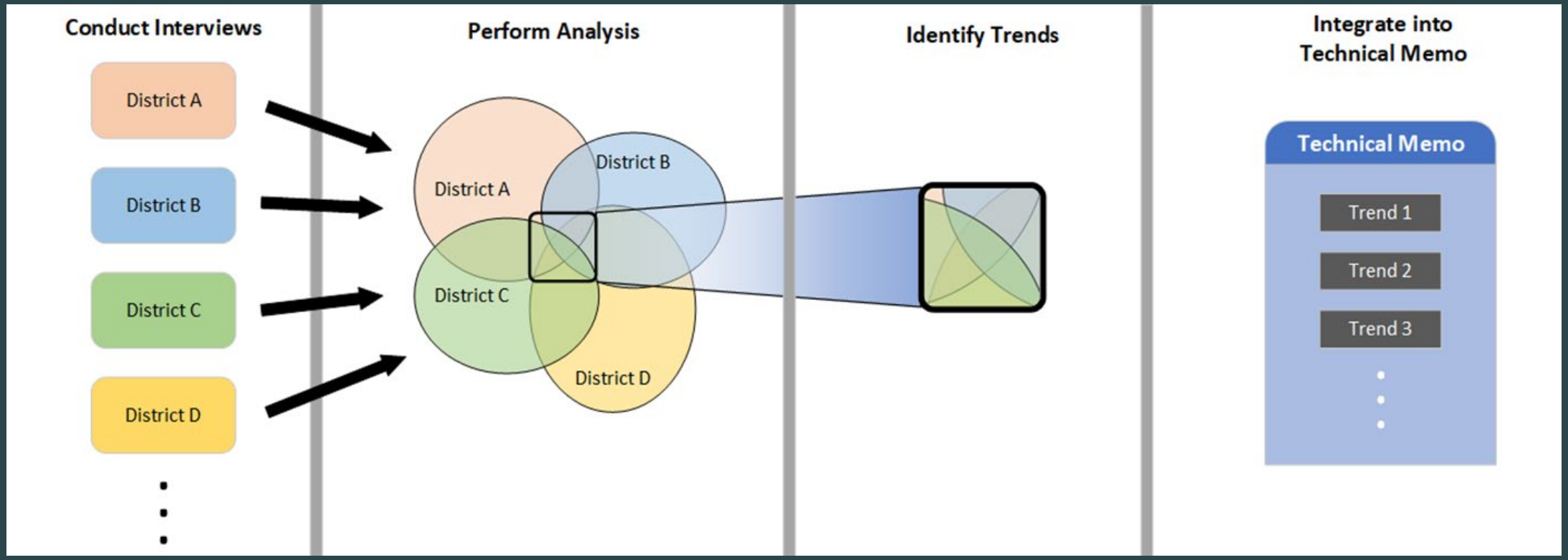


Requirements Definition Effort

TxDOT Summer 2024

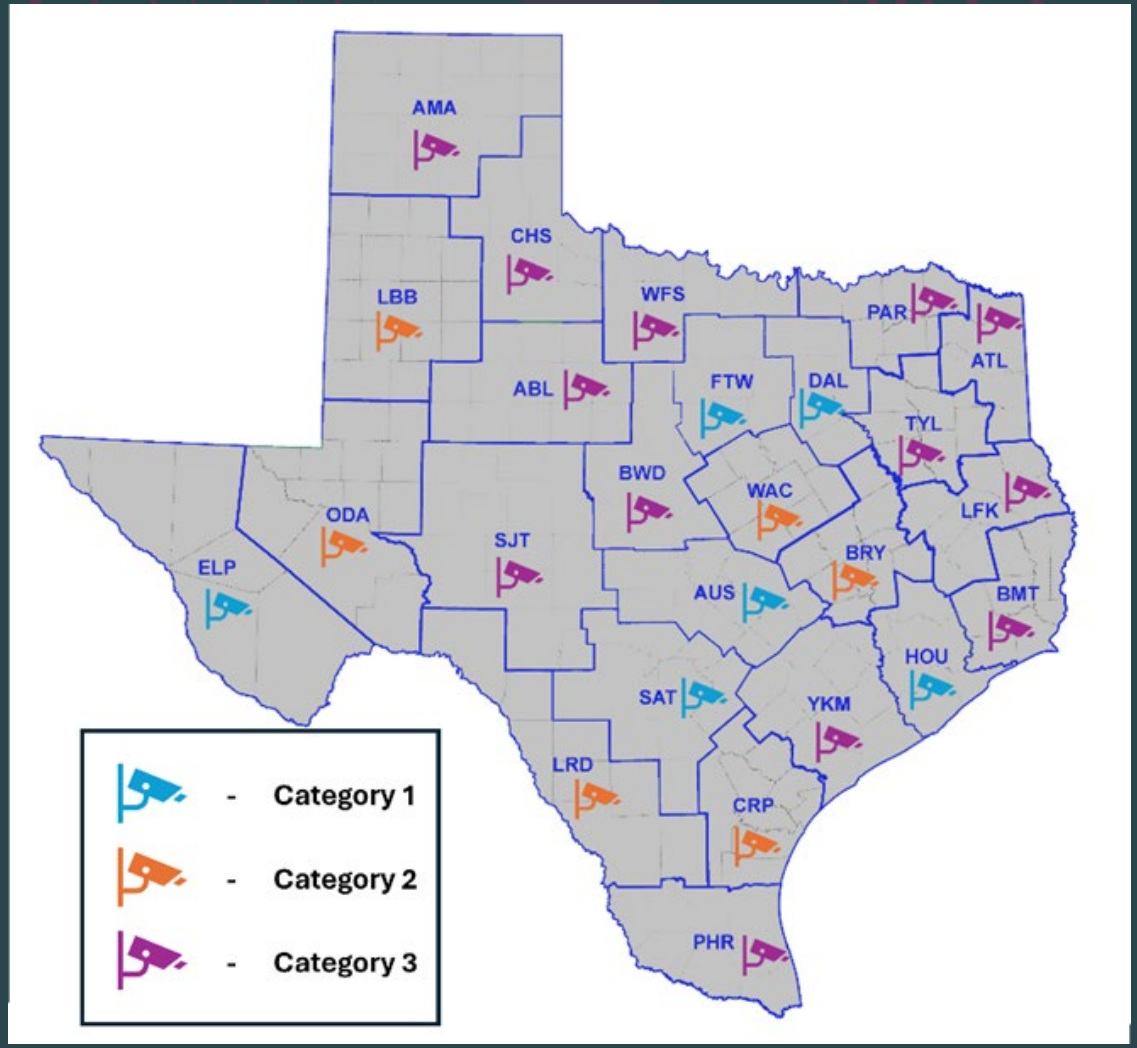
Identify User Needs

- Goal: Define requirements for streaming CCTV video from field sites to Traffic Management Centers and partners.

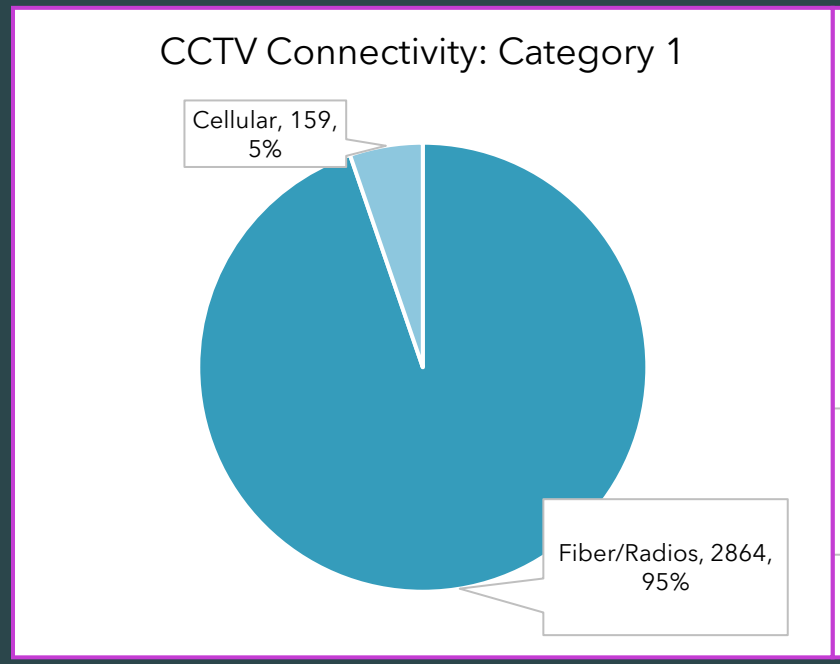


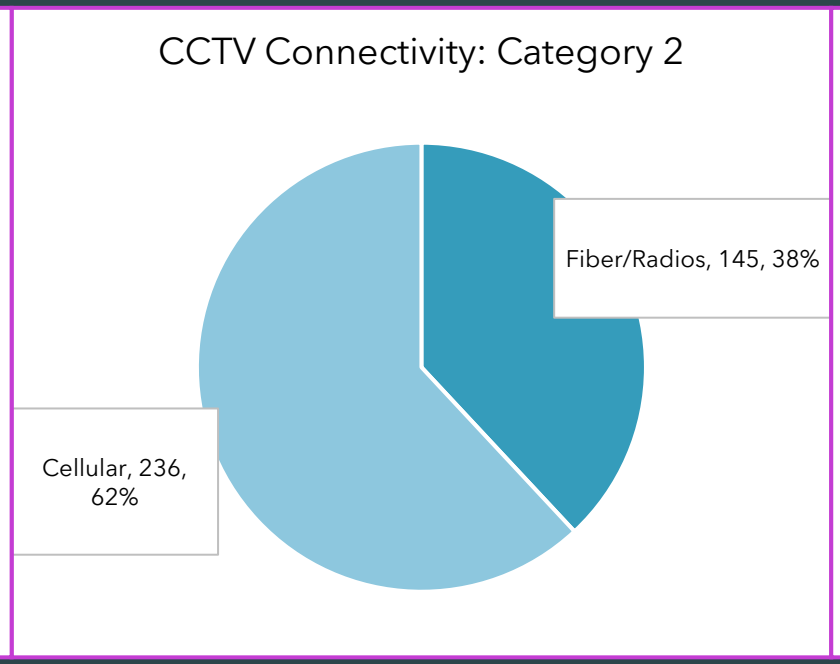
Know the Users

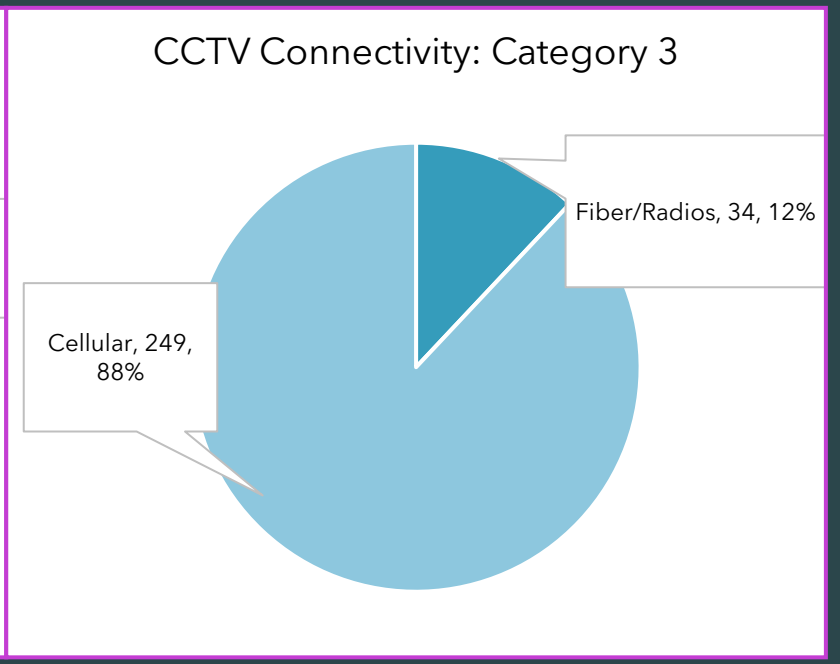
- **Category 1:**
  - More than 200 cameras
  - Most cameras are fiber-connected to a TMC
- **Category 2:**
  - Between 50 and 200 cameras
  - Cameras connect back to a central location
- **Category 3:**
  - Less than 50 cameras
  - Mostly decentralized ITS communication network



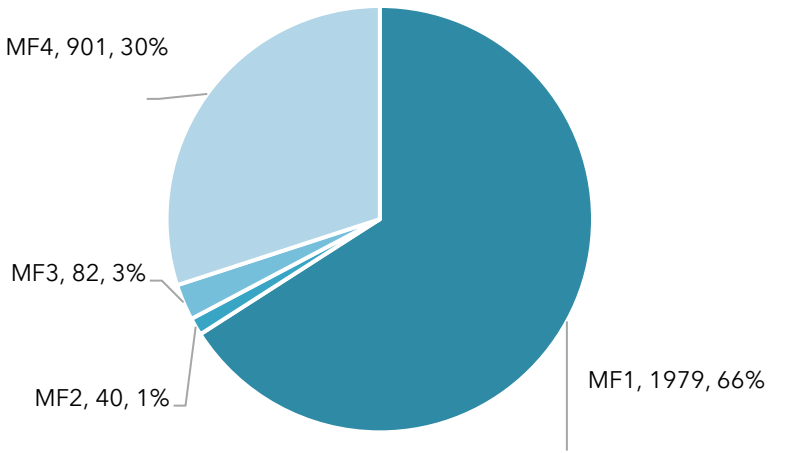
CCTV Connectivity

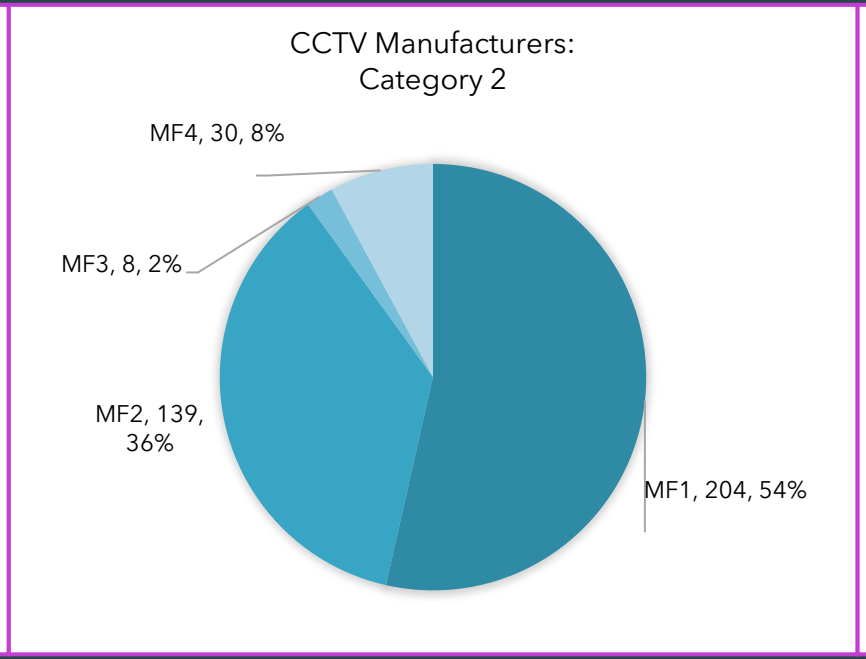


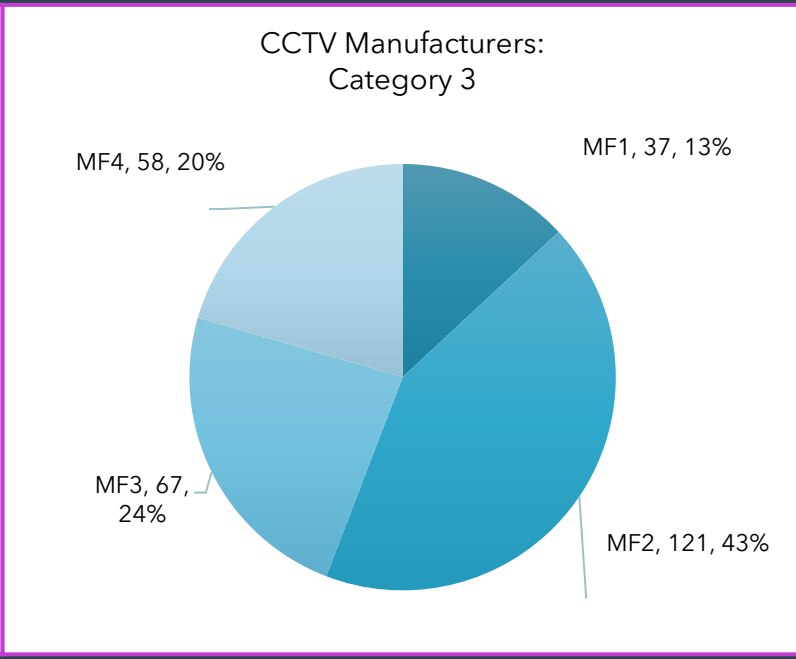




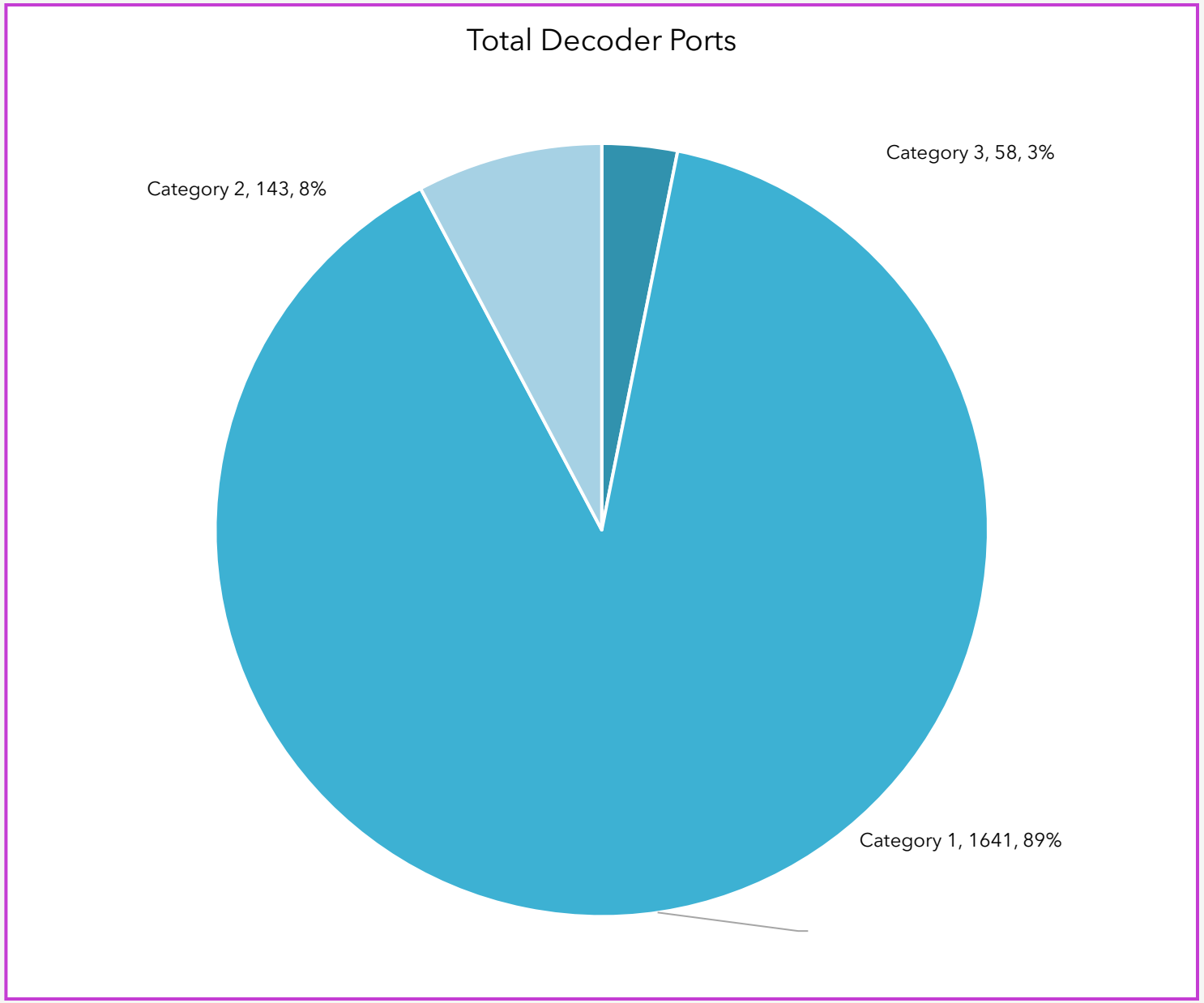
CCTV Manufacturer Counts







Physical Decoder Port Usage



New(ish) Technologies

- Transcoders
- Software decoding
- Video walls as a system

Requirements

- Provide a guide for implementing a robust video streaming solution
- Generated 7 categories
  - Began with survey data and refined from feedback

Quality of Service Requirements

- Defined minimum resolution and Frames Per Second (FPS)
- Each video source and destination shall support these streams
- Defined the minimum resolution and FPS delivered to the demarcation point for partners

Functional Requirements

The ability to block or restrict access to video streams

Latency Requirements

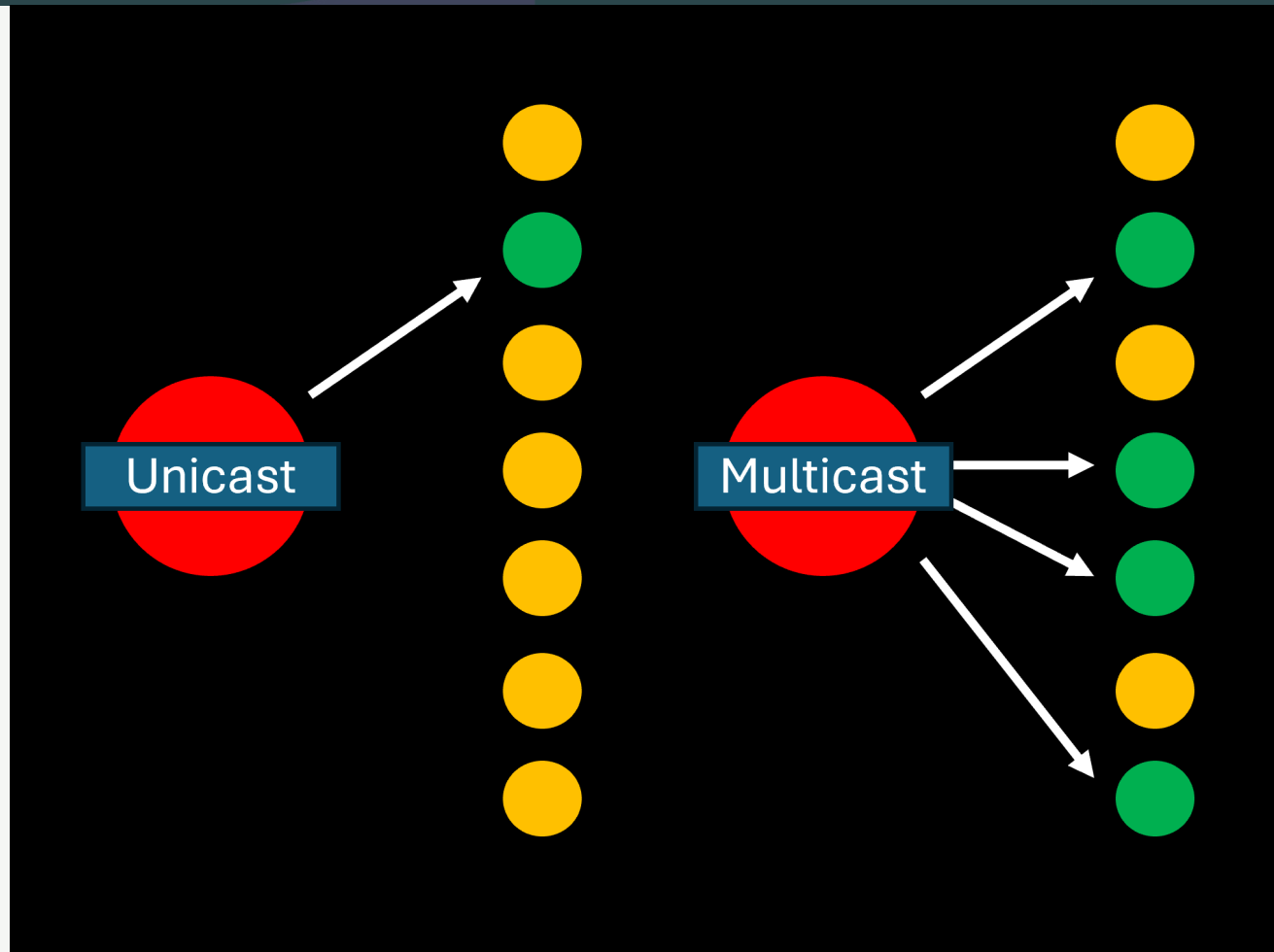
Maximum latency for each connectivity type and to partners

- Video source and destination codec interoperability
- Software operation
- Optional support for unicast video streams

Compatibility Requirements

Scalability Requirements

- Sources and destinations shall support multicast video
- Network path bandwidth capacity



- The selected devices shall be monitored, alerts generated, and reports available on the network performance

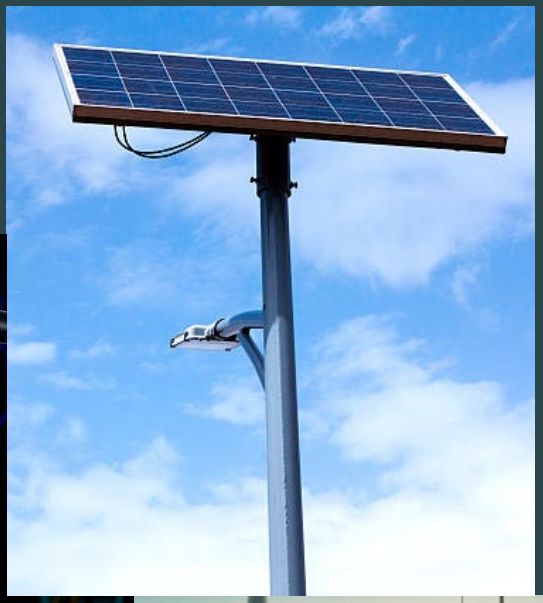
Monitoring Requirements

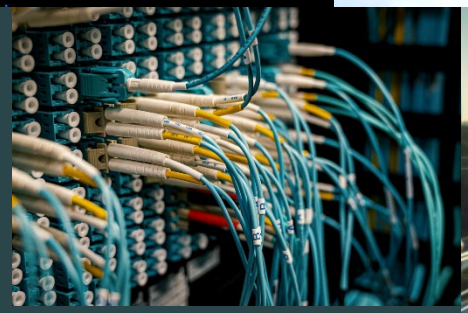
Security Requirements

- Agency security practices will be followed when sharing/providing access to video streams

Additional Recommendations

- High Priority
  - Multicast
  - Bandwidth limitations or redundancy
  - Usage of software decoders
- Medium Priority
  - H.265 over H.264
  - Expand fiber connectivity
- Low Priority
  - 24-hour operation
  - Periodic maintenance
  - Remote power switch





Questions?

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