Loki
A Video Payload Format

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Goals & Constraints

- **Research**
  - **Learn About Network Video**
  - **PC Environment Constraints**
  - **What can be done on the PC (and our stack!)**
- **PC/Windows Environment**
  - **Limited Host Resources**
  - **Limited Network Interface Resources**
  - **Varying Resources**
  - **PC Byte Ordering**
- **Standard APIs**
  - **Winsock**
  - **Video For Windows**
- **Load on the Transmitter**

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What We Did

- **Developed a Video Payload Format: LOKI**
  - **Packet Formats**
  - **Video Data Formats**
  - **Control Protocol**
  - **Algorithms**
  - **Will be available as an ID**
- **Developed an Application for PCs**
  - **Will be available for anon. ftp**

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Packet Format

- **Each data packet has a 'main' header (after RTP header) with:**
  - **Image size (width/height)**
  - **Image encoding information**
- **Send data with each packet to deal with low reliability.**
- **Header followed by chunks of video data**
- **Each chunk has additional header information (x/y position, length)**

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Video Data Formats

- **Two Major formats Y-UV and RGB**
  - **Derive 4- and 8- bit monochrome from RGB**
  - **Driven by capture hardware**
  - **Receivers must accept all encodings**
- **‘Simple’ mode**
  - **Chunks prepended with x-y-length header. Then video data.**
  - **Can blast whole image OR**
  - **Do Pixel-by-Pixel diffing**
- **‘Block’ mode**
  - **8x8 pixel blocks**
  - **Prepended with x-y-flags**
  - **Image data not necessarily transferred**
  - **Includes a backgrounding function**
  - **Send only changed blocks**

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Control Protocol

- **Encapsulated in RTCP packets**
  - **Application name 'loki'**
- **Suspend**
  - **If SOURCE is temporarily not sending data**
- **Can I See Request**
  - **Requests some frames to be sent to a specific unicast address.**
  - **Number of frames and format specified by the requestor.**
  - **Responder *may* honor the request.**
- **Can I See Status**
  - **Indicates that a Can I See Request has been finished or rejected, and reason why.**

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Algorithms

- **Pixel Comparison**
  - **RGB Data has a lot of noise**
  - **Do comparisons as:**

```
if ((a>(b-x))&&(a<(b+x)))
```

- **Adaptive Transmit**
  - **Increase inter-packet gap to get % received packet rate above a threshold X.**
  - **Don't adjust gap unless % received falls below threshold Y (Y<X).**
  - **If % received > threshold X, reduce gap.**
- **Block Mode**
  - **Divide image into 8x8pixel blocks.**
  - **Send block if it changes -- check only 1 or 2 pixels in the block.**
  - **Look for 'constant' parts and call them 'background'**
  - **Display background with a 'short' command, not data.**

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