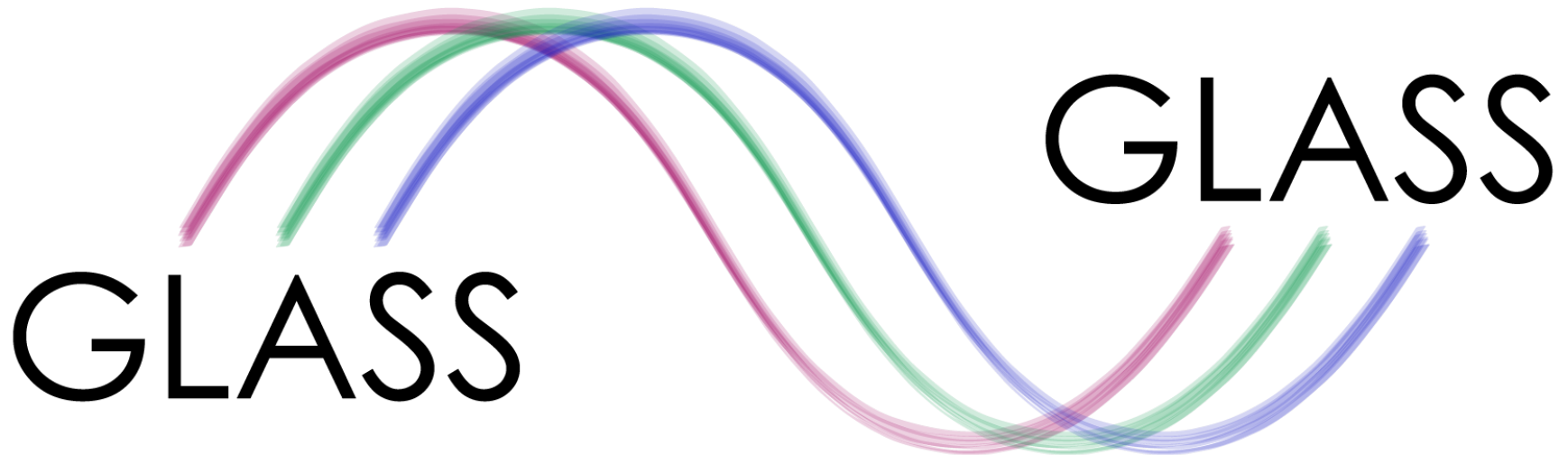


# GGIE: the Glass to Glass Internet Ecosystem



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a foundation for evolving Internet Video distribution

Glenn Deen – [glenn.deen@nbcuniversal.com](mailto:glenn.deen@nbcuniversal.com)

IETF 96 ART Dispatch July 18, 2016

# Internet Drafts

**Glass to Glass Internet Ecosystem Introduction**

[draft-deen-daigle-ggie](#)

**Using Media Encoding Networks to address  
MPEG-DASH video**

[draft-deen-naik-ggie-men-mpeg-dash](#)

# Problem

- Video is the #1 use of Internet Bandwidth
- Video growth is outpacing Bandwidth Growth  
(has been for years, is expected to continue)
- This isn't a sustainable trend

# Existing solutions help, but they aren't enough

- Grow Bandwidth
- Better Codecs
- CDNs & Caching
- Transport Protocols

## Because at the same time

- Global growth of
  - Content Creators & Viewers
  - Connected Video Devices
  - New Video Applications
- Each resolution increase means 4x data increase  
SD ->HD -> 4K -> 8K =  $4 \times 4 \times 4 = 64x$  data

# What else can be done to help?

- This was asked in the W3C Web & TV Interest Group
- Led to the Glass to Glass Internet Ecosystem taskforce
- Took a step back – looked at end to end video
- Looked at both professional and user video
- Produced 33 use cases based on current media needs & developing trends
  - many of them involved IETF related work

# Observations from GGIE Use-Cases

- **End-End Video ecosystem is incredibly complex, but...**
- **Each layer is well encapsulated**
  - permits innovation without breaking the other pieces
- There are **fundamental elements** that **appear in the use cases over and over**:
  - Identification of the video
  - Locating the video data
  - Referencing the video data
- Standardizing these can be a foundation for building new ways to help to the Internet Video scaling problem

# Two more observations

1. The current video ecosystem is widely deployed - Tossing it out and starting over is not a option
2. To help the scaling problem, you need to help both the current existing ecosystem and the cool new video devices & applications to come

# Foundation: Media Identifier

- Identifies the Video
  - There are already many video naming systems
    - EIDR – Entertainment Identifier Registry
    - AD-ID – Used by the advertising industry
    - Many, many, many more...
  - We don't need another one
  - But having a standard way of referring to video by whatever naming system it uses would be useful
  - **A standard URI that carries the video's identifier**
  - **uri:eidr-s:F1F8-3CDA-0844-0D78-E520-Q**  
(this is the Minions movie)



# Foundation: Media Encoding Network

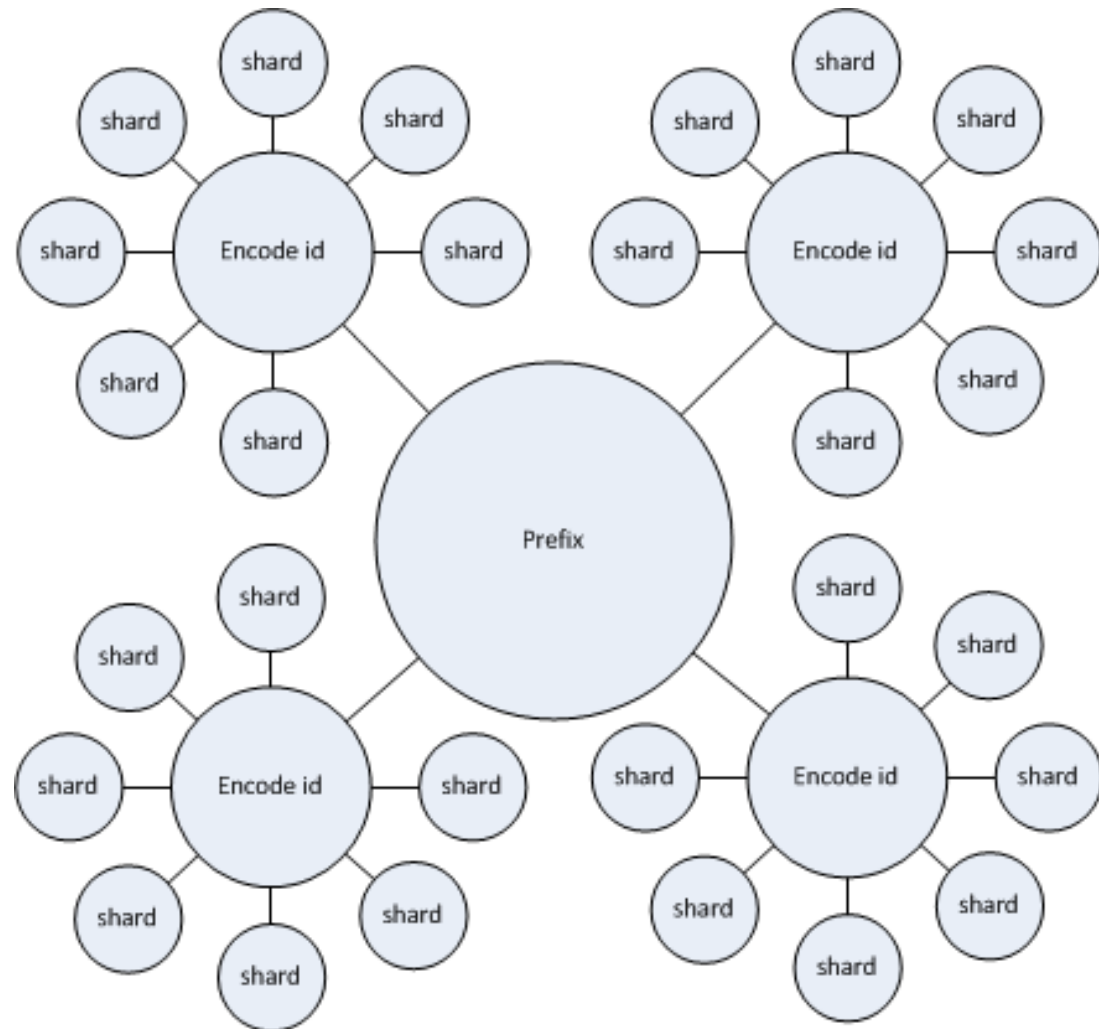
- Addressing the Video data
- Independent of video codec & transport scheme
- Abstraction permitting instances to be defined for different applications
- Each encoding of a video gets a distinct address
- Example for MPEG-DASH:

Draft: [draft-deen-naik-ggie-men-mpeg-dash-00](#)

Using Media Encoding Networks to address MPEG-DASH video

# Media Encoding Network

Encoded video data organized as an aggregated addressable entity



Foundation:

## Mars (Media Address Resolution Service)

- Maps Media Identifiers to Media Encoding Networks
- Bridges Media Identifiers used in applications to the Media Encoded Networks used by devices to address the video data
- Connects **What is it** to **Where is it**

# Security & Privacy considerations

- GGIE doesn't touch access control or content protection, that remains at the application layer as it does today
- Media Encoding Network's distinct addresses for video encodings could permit network level monitoring of what is a user is accessing.
  - Proposed Solution: Session level MEN addresses. This creates a privacy protection zone between the user and video data sources.

# Foundational Building Blocks not a Complete End-End architecture

- Internet video is constantly evolving
  - New applications, devices, and uses
  - New distribution models
- Media Identifiers, Media Address Resolution Service (Mars) & Media Encoding Networks are foundational building blocks, and are not a complete solution, but they would provide standardized ways for the new innovations to commonly build upon

## A few of the innovations that these would enable

- Devices that can make smarter content selection choices because they can make informed source and format selections
- Smarter interaction between video devices and video sources
- Network level delivery optimizations
- New multi-source & multi-device video capture and viewing models

# Internet Video is evolving

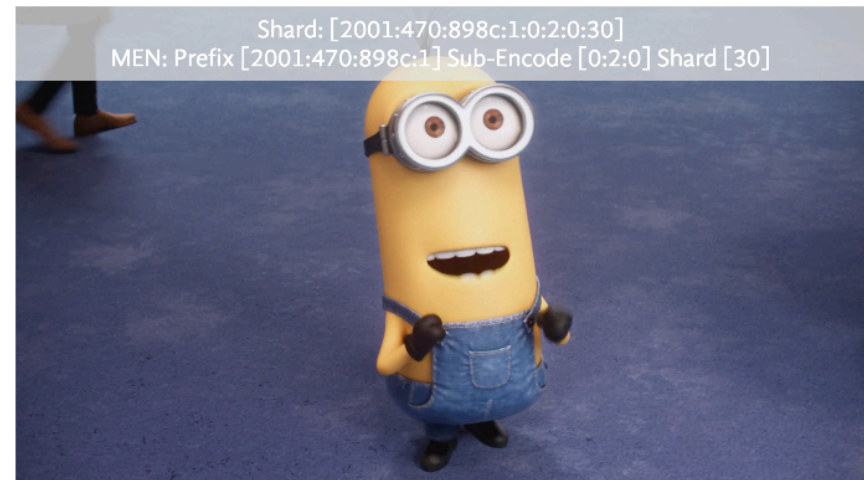
- First generation mimics film & tv
  - Essentially delivery of the film frames in a contiguous data stream from the source to the player.
  - Aka today's streaming
- Next generation is beginning to appear
  - Live broadcast by anyone to many viewers
  - Coordinated multi-device viewing
  - User defined dynamic assembly of multi-source content
- GGIE's foundational building blocks are designed to support both today's first generation and the next generation of Internet video

# GGIE Demo @ Bits-n-Bytes

- See a demo Thursday night @ IETF 96
- 7:45pm-9:45pm
- Comcast booth@BnB

Minions Clip 1

By: Illumination Entertainment



Shard: [2001:470:898c:1:0:2:0:30]  
MEN: Prefix [2001:470:898c:1] Sub-Encode [0:2:0] Shard [30]

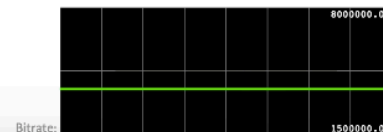
EIDR: 10.5240/f1f8-3cda-0844-0d78-e520-q

Manifest Segment: f1f8-3cda-0844-0d78-e520-q.demo.vg-6.net

Serving Cache: origin

Video Shard: [2001:470:898c:1:0:2:0:30]

Video Bitrate: 1920x1080, 3778663 bits/s





# Internet Drafts & Mailing List

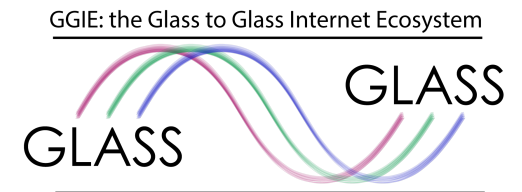
**Non-WG Mailing list: [ggie@ietf.org](mailto:ggie@ietf.org)**

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# Thank you

- Glenn Deen

[Glenn.Deen@nbcuniversal.com](mailto:Glenn.Deen@nbcuniversal.com)

# GGIE – Potential IETF Work

Leslie Daigle

# Potential IETF work – why

Now

- Individual problems can be solved by hacks to bit rate, compression, specific technologies to address particular points
- Proprietary solutions for individual products and services

Soon

- New applications and uses have different requirements – some of the fixes work, some do not
- Proprietary solutions are not reusable

The not so distant future

- Option 1
  - Networks littered with individual solutions, proprietary efforts, closed systems, nowhere to go
- Option 2 – open standards suite
  - Video understood as a complex application data type, integrated into support at all layers of the stack

# Potential IETF work – what

- Lower layer compatibility
  - Use of IPv6 addresses
    - allocation
    - routing
  - Lookups services
    - Sigh. DNS?
- Driven by a coherent plan at the application level
  - Building blocks / toolbox
  - Identification of video components
  - It's Discovery, Identification and Location all over again...
    - But this time, there are concrete use cases and applications