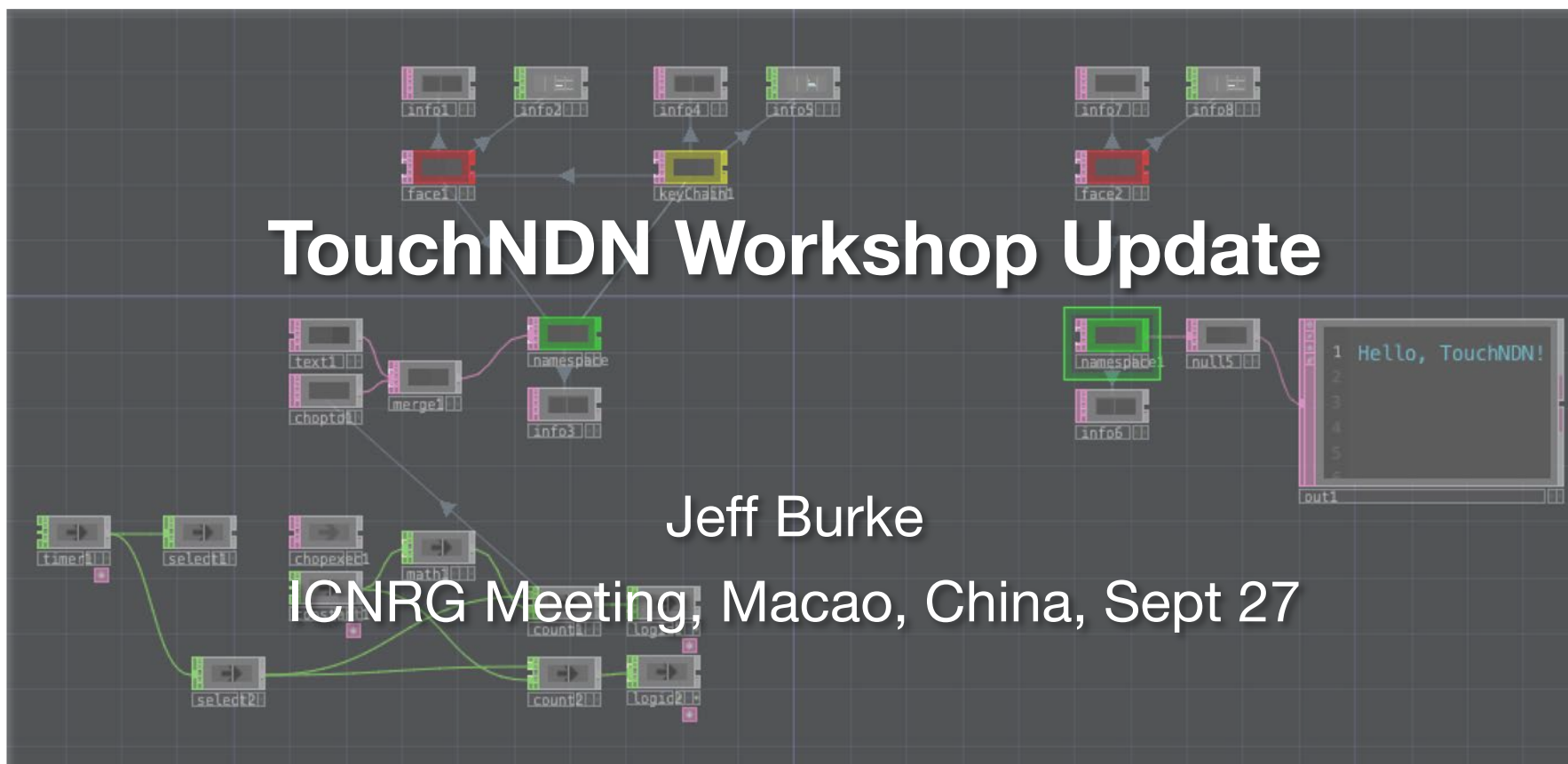


# TouchNDN Workshop Update

Jeff Burke

ICNRG Meeting, Macao, China, Sept 27



# Touching the Future Internet

Creating Distributed Media Experiences with  
TouchDesigner and NDN

23 September 2019, 10am-4pm

School of Creative Media

City University of Hong Kong

# “Plz, I can haz video for 2019, not 1950?”

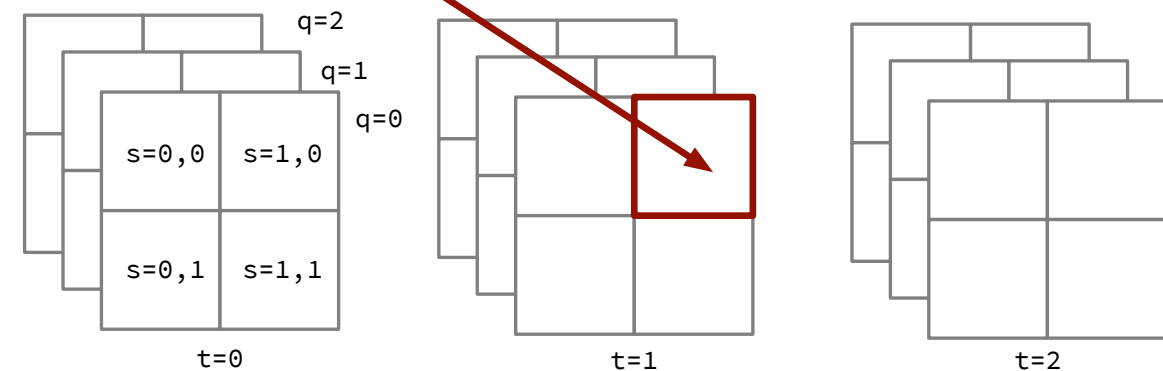


- World is moving away from analog broadcast way of thinking about moving images. Are we?
- Seeking usual NDN benefits plus:
- Application-level framing for consumers to fetch **selectively** and non-sequentially based on:
  - semantics (pick prefix)
  - specific time intervals (pick frame)
  - quality (pick layers)
  - space (pick tile)
- Unified historical / live playback + transparent storage
- Hybrid abstraction for app developers
  - Bus, stream, and k-v store

Example NDN video packet name format:

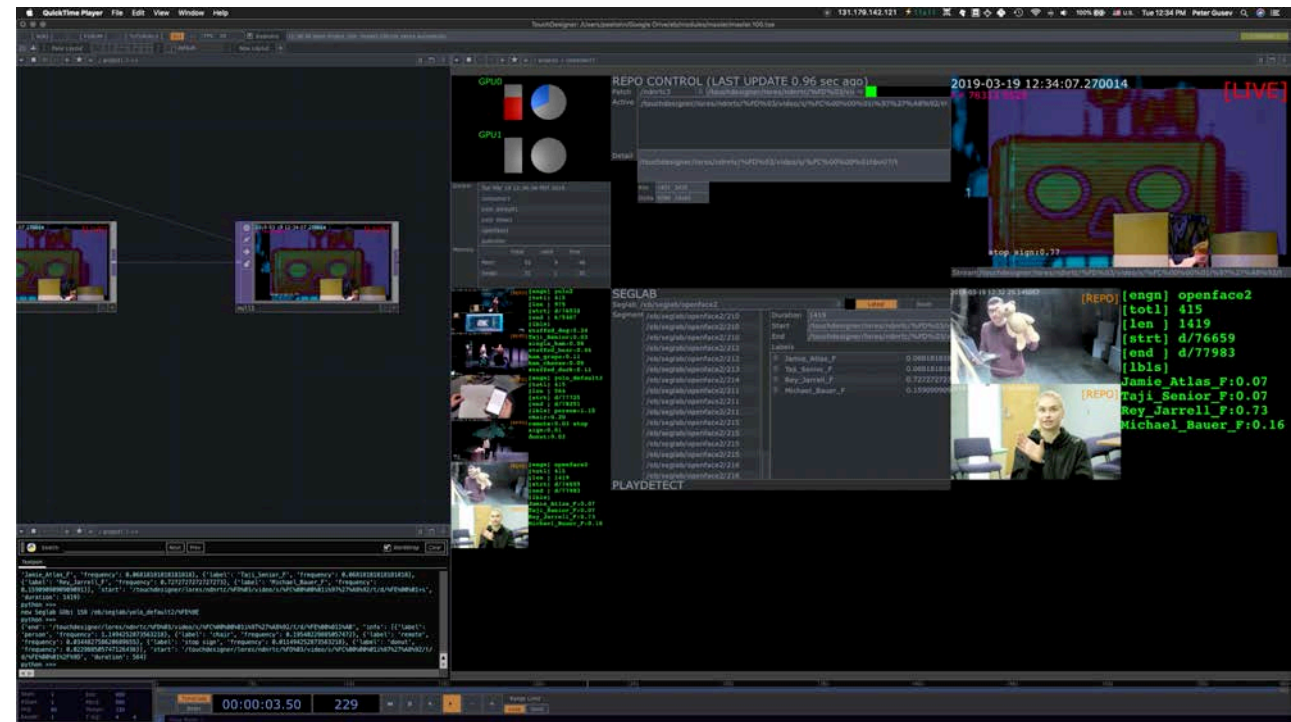
/<video-name>/<version>/<time>/<space>/<quality>/<chunk>

**/video/v3/1/1,0/0/\***



# TouchNDN Alpha

- Integration of NDN with Derivative's TouchDesigner realtime 3D engine via the NDN-CNL/CCL stack (C++ and Python).
- Video streaming using the NDN-RTC library.
- General messaging and obj transport via NDN-CNL. No need to code Interest / Data.
- Platform for experimenting with data-centric media: oriented towards real-time and random access.

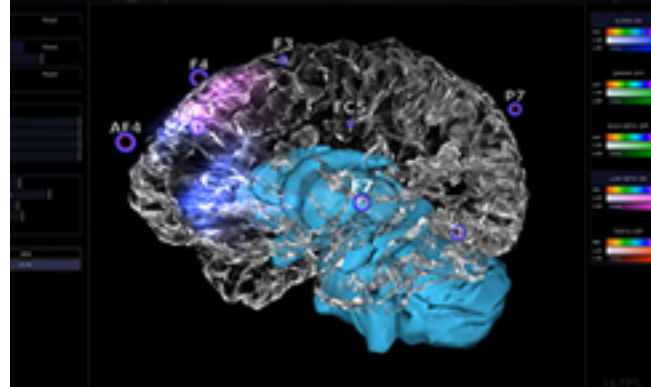


Gusev, Thompson and Burke. "Data-centric Video for Mixed Reality," ICCN 2019, Valencia, Spain.

# TouchDesigner



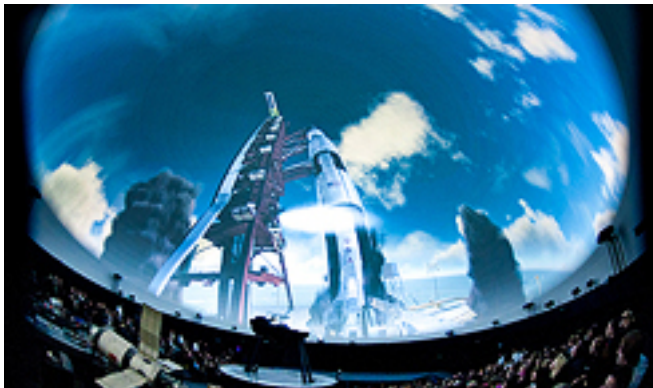
Projection mapping



Interactive visualization



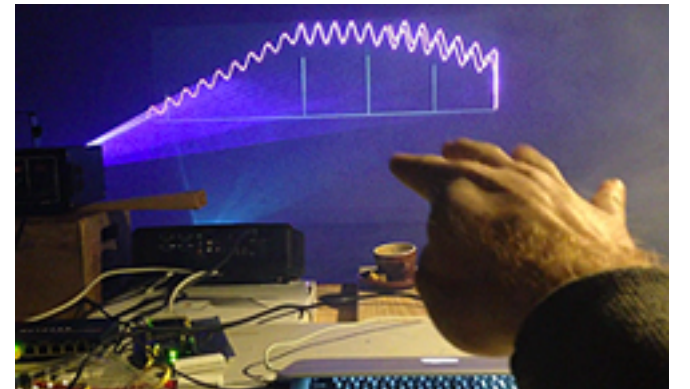
Live show control



High performance video

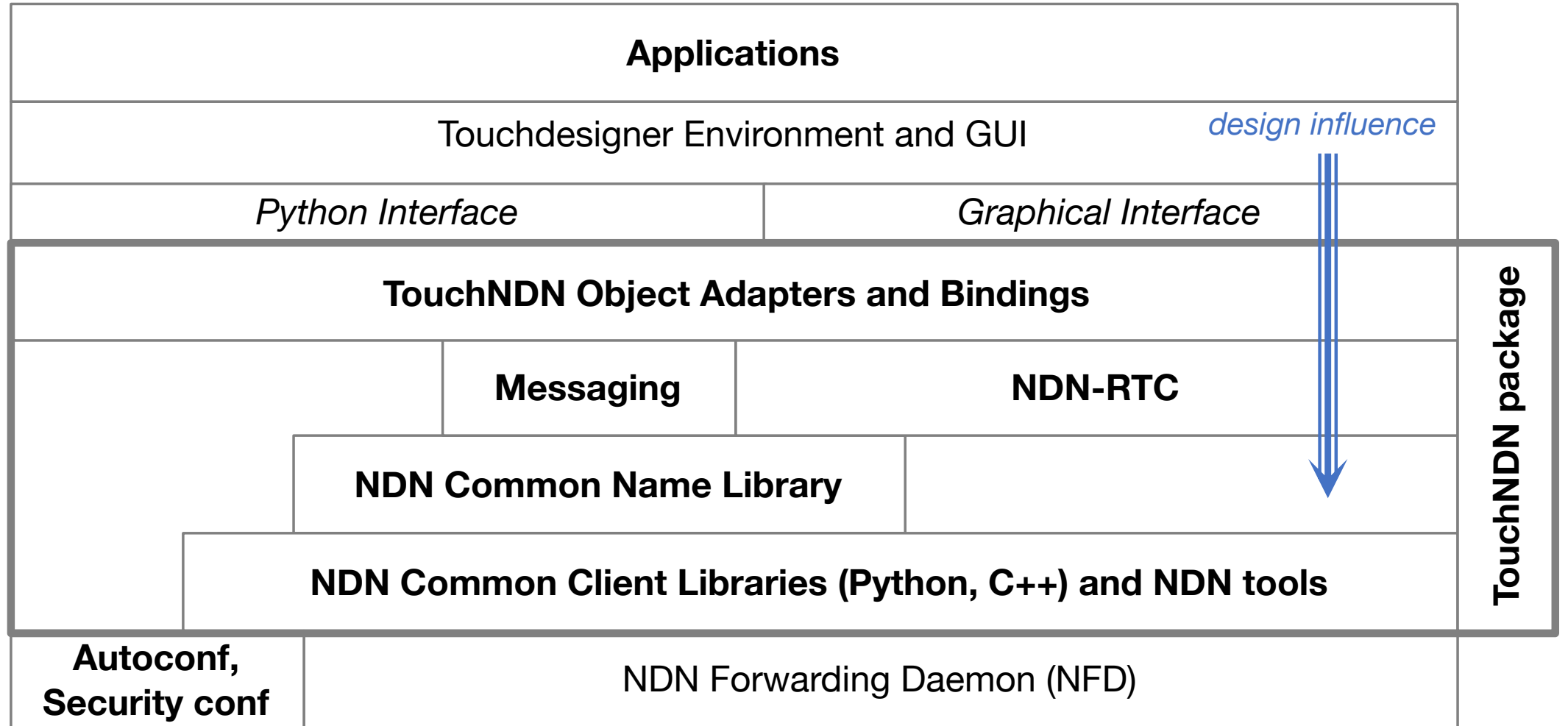


Education / learning



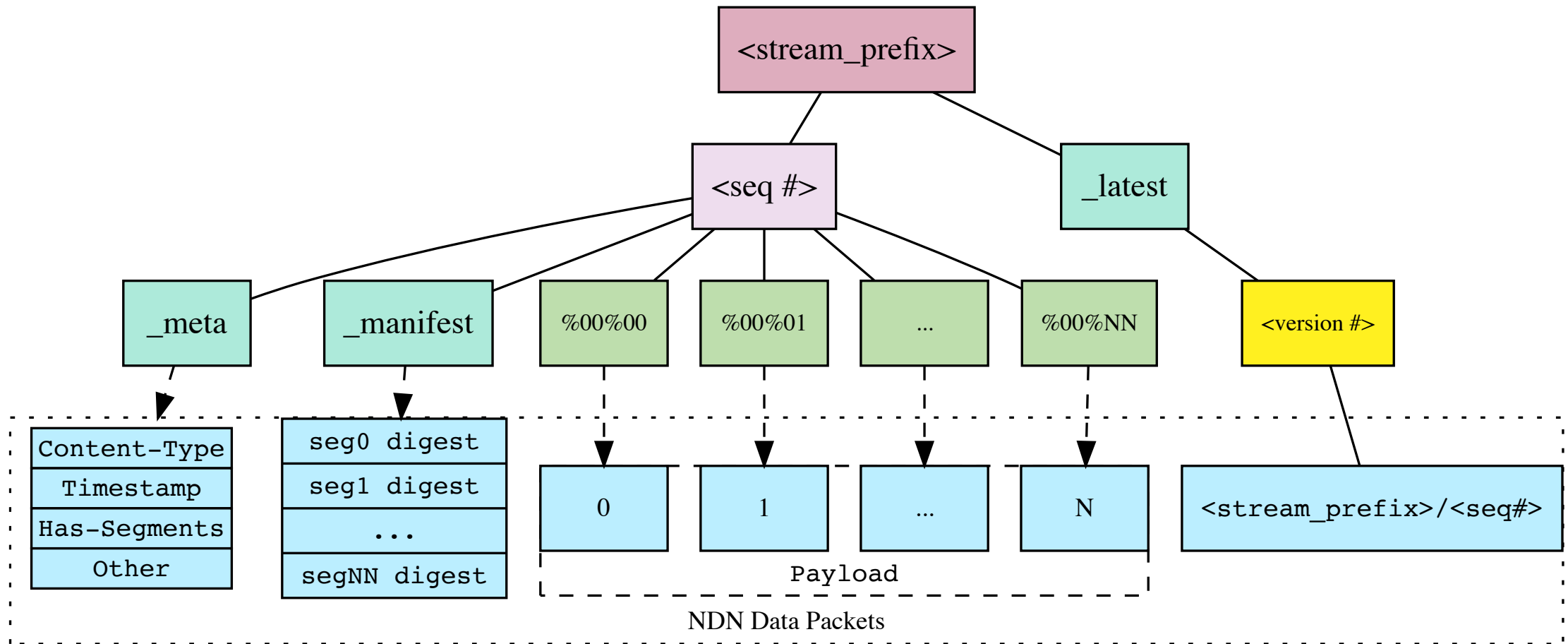
Rapid prototyping

# TouchNDN Stack

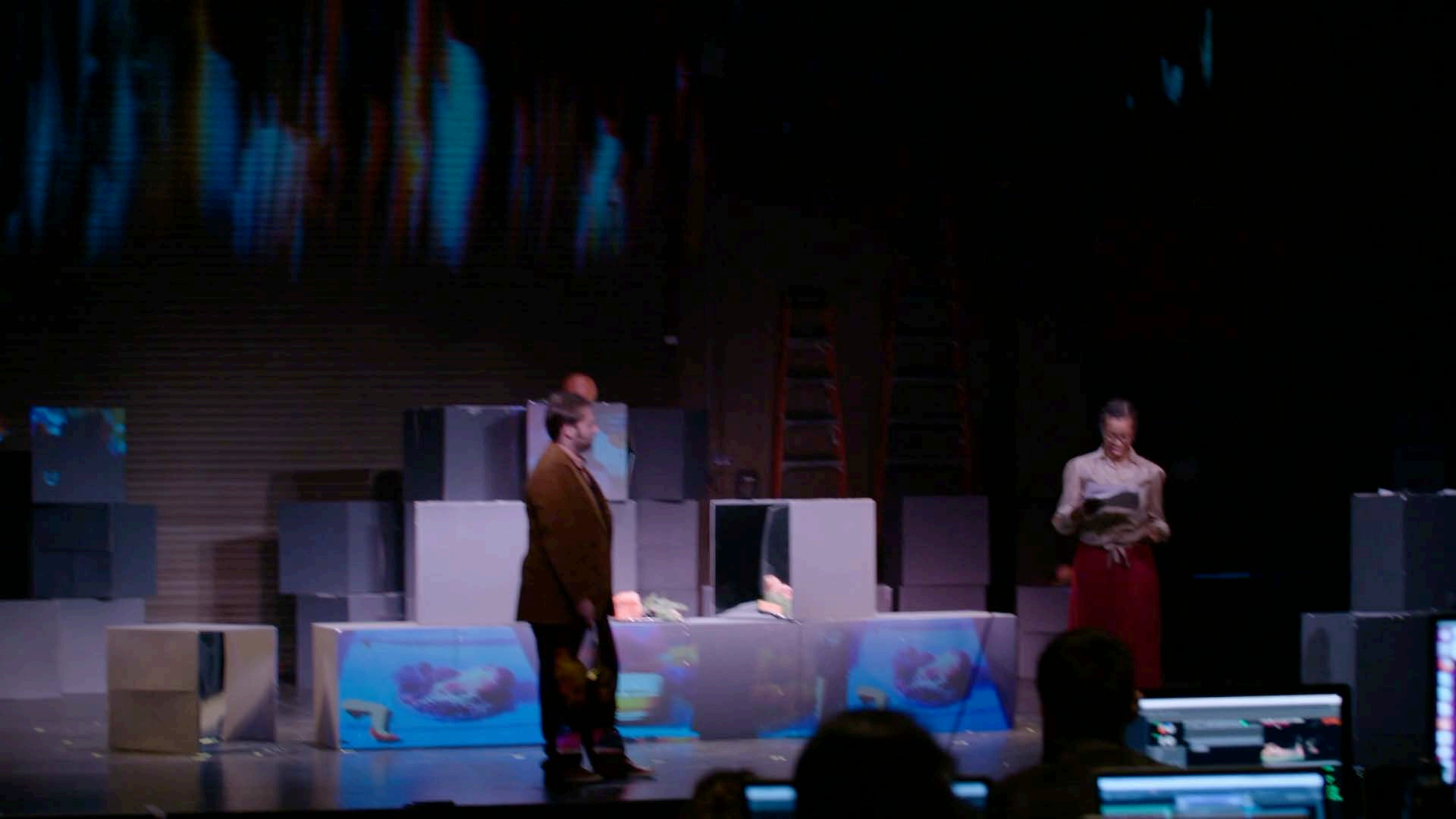




# “Generalized” Objects + Streams



*Generalized object stream namespace, NDN-CNL*





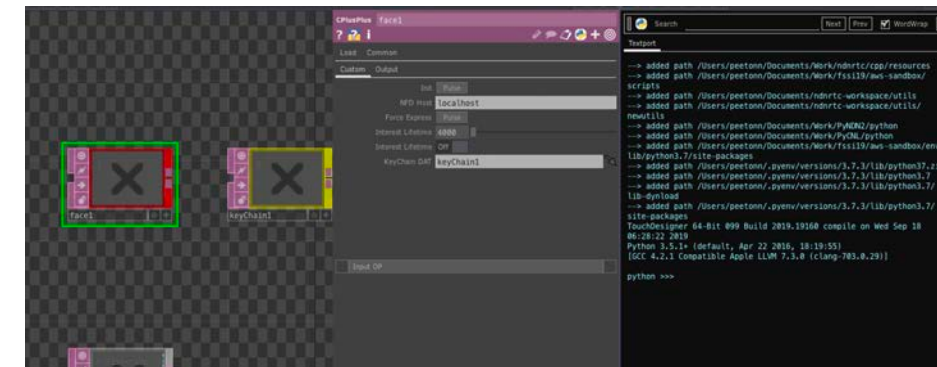
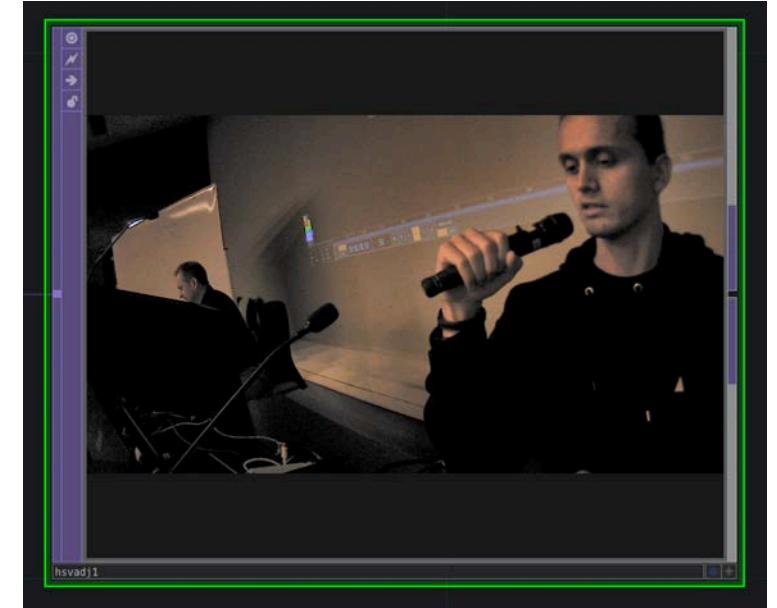
# Objectives of the Workshop

- **Force forward TouchNDN development.**
  - Start to converge REMAP's NDN research with its artistic and cultural projects.
  - Bring NDN out of the lab and into hands of creators in arts, culture, and entertainment.
- Introduce opportunities in real-time rendering / visual programming environments to the ICN community.
  - New infrastructure as “shared visions of the possible and acceptable dreams of the innovative.”

- L. L. Bucciarelli in Star, 1999

# Basic details

- School of Creative Media,  
City of University of Hong Kong
- About 20 people (evenly distributed  
between ICN folks and others from  
university and industry).
- Agenda including background on REMAP  
work, NDN, TouchNDN, plus demos and  
discussion.
- L2 network for hands-on experimentation.
- *Early* stage version of software and demos.



# Discussion

## What worked

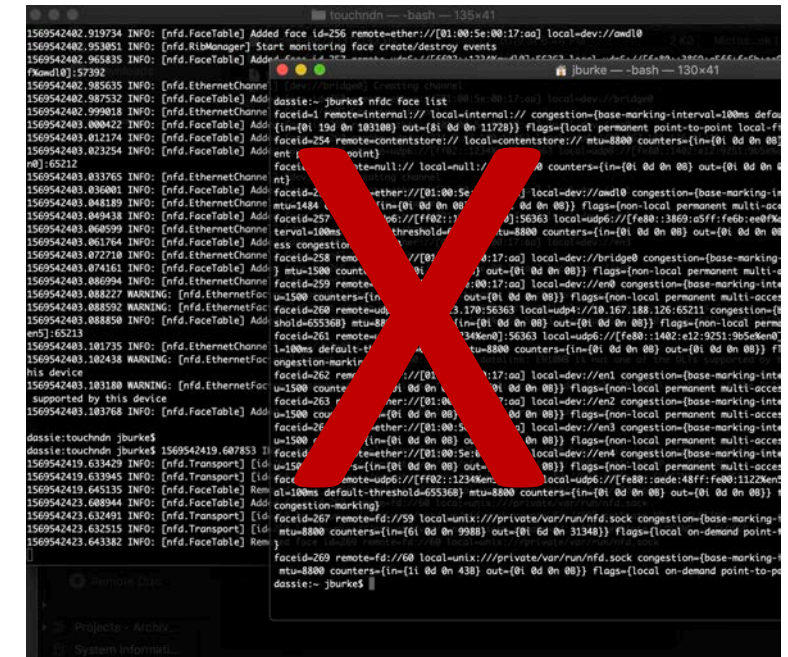
- Problem setup and discussion – audience seemed to appreciate need for data-centric media.
- TouchNDN basic objects and demo examples.
  - Face, Keychain, Namespace
  - Video streaming
  - Generalized object/object streaming.
- NDN over L2.  
(Look ma, no DHCP!)

## What didn't

- Attendees had less baseline experience with Touchdesigner than expected
- Still way too tedious to install and run NDN platform
  - NFD defaults to being disconnected from the network.
  - We have to grep the outputs of *ifconfig* and *nfdc face list* to even start??
- Still working to demo most compelling use cases (redundant producers, spatial selectivity) – need to debug strategy/app interaction.

# Next steps

- Various functionality / performance updates.
- Remove NFD install dependencies and configuration terminal-jazz and strategy uncertainty via a statically linked microforwarder for the LAN (to start).
- Try to debug the demos that should be simple.
- Incorporate HEVC tiling support to allow spatial selectivity of video via namespace.
- Still no goals for WAN – though WUSTL still interested in helping evaluate NDN-RTC behavior over testbed.
- Unclear how to fund the above (primarily engineering challenges and app research) – looking for sponsors!



A terminal window displaying NFD (Named Data Forwarder) logs. The logs show various system messages, including face creation, congestion marking, and network events. A large red 'X' is overlaid on the terminal output, indicating that the current state or configuration is not recommended or is being discarded.

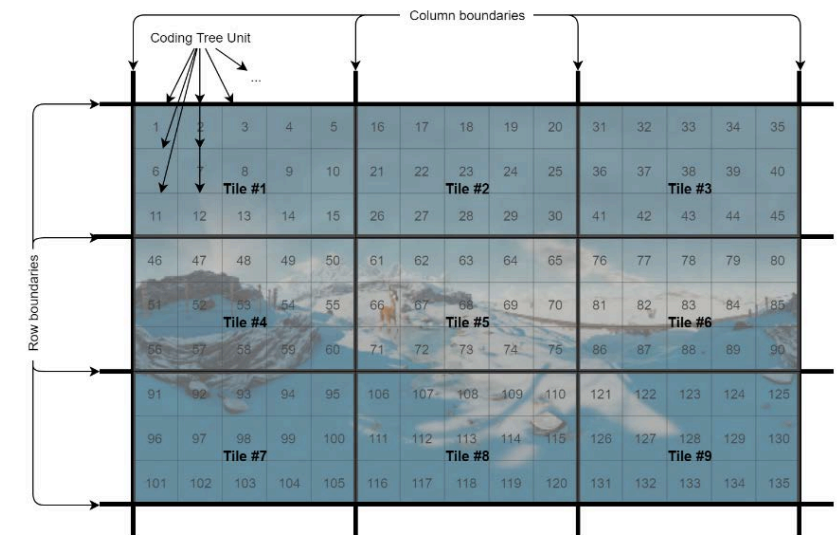


Figure 2.1: A frame out of a video. The picture is divided in a 3x3 tiled picture divided by the CTU boundaries

# Thank you!

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<https://github.com/remap/TouchNDN>  
<https://github.com/named-data/cnl-cpp>