

Cees de Laat 
CineGrid Amsterdam
System & Network Engineering

Many slides from partners & CineGrid.org



What is CineGrid?

- ❑ Formed 2004 – non-profit international membership organization
- ❑ Members – media arts schools, research universities, scientific labs, post-production facilities & hardware and software developers around the world
- ❑ Connected – via 1 G - 100 G Photonic - Ethernet networks
- ❑ For – research & education, experimentation, prototyping



CineGrid Mission

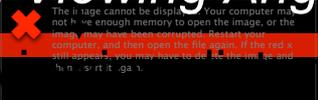
To build an interdisciplinary **community** that is focused on the **research, development, and demonstration** of **networked** collaborative tools to enable the production, **use** and **exchange** of very-high-quality digital media over **photonic networks**.

<http://www.cinegrid.org/>



Why is more resolution better?

1. More Resolution Allows Closer Viewing of Larger Image
2. Closer Viewing of Larger Image Increases Viewing Angle
3. Increased Viewing Angle Produces Stronger Emotional Response



UHDTV(8K)

7680



4320

0.75 x Picture Height



100°

HDTV (2K)

1080

1920



30°

3.0 x Picture Height



UHDTV(4K)

3840



2160

60°

1.5 x Picture Height



Moving Big Data Objects Globally

□ Digital Motion Picture for Audio Post-Production

- 1 TV Episode Dubbing Reference ~ 1 GB
- 1 Theatrical 5.1 Final Mix ~ 8 GB
- 1 Theatrical Feature Dubbing reference ~ 30 GB

□ Digital Motion Picture Acquisition

- 4K RGB x 24 FPS x 10bit/color: ~ 48MB/Frame uncompressed (*ideal*)
- 6:1 ~ 20:1 shooting ratios => 48TB ~ 160TB digital camera originals

□ Digital Dailies

- HD compressed MPEG-2 @ 25 ~ 50 Mb/s

□ Digital Post-production and Visual Effects

- Gigabytes - Terabytes to Select Sites Depending on Project

□ Digital Motion Picture Distribution

- Film Printing in Regions
 - Features ~ 8TB
 - Trailers ~ 200GB
- Digital Cinema Package to Theatres
 - Features ~ 100 - 300GB per DCP
 - Trailers ~ 2 - 4GB per DCP

“Learning by Doing” Early CineGrid Projects



CineGrid @ iGrid 2005



CineGrid @ AES 2006



CineGrid @ Holland Festival 2007



CineGrid @ GLIF 2007





CineGrid 2013 International Workshop
December 9 – 11, 2013
San Diego, CA





4K interactive digital cinema color grading
realtime 4K uncompressed streaming over IP

CinePOST@Prague



Calit2@San Diego



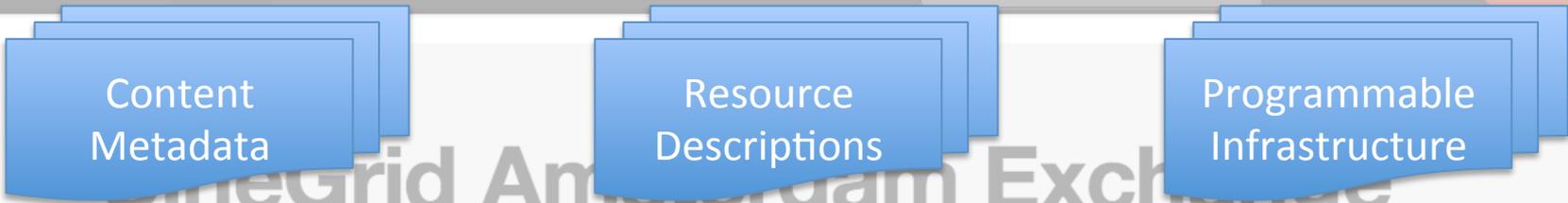
Places + Perspectives

A Growing Documentary in HD

Keio University/KMD @ Hiyoshi
UCSD/Calit2 @ San Diego



- Explore network-supported collaboration process
- Combine traditional production tools with emerging tools for media sharing, review and critique such as Vroom, CineSAGE & PIX
- Use cloud server for media transfer and storage
- Use multi-channel 4K/HD video teleconferencing for face-to-face discussions, context sharing and project development



Browse content



Portal

The purpose of this portal is to make the public familiar with super-high-quality video and to make the content more accessible for other CineGrid members.

CineGrid

Find out more about Cinegrid Amsterdam.

Research

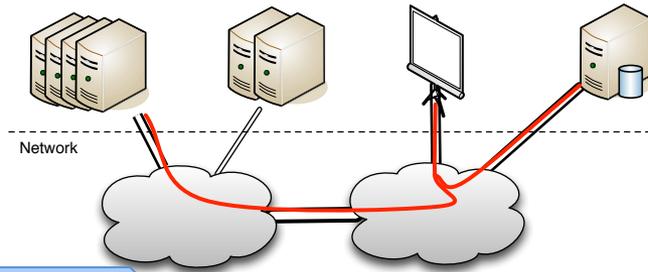
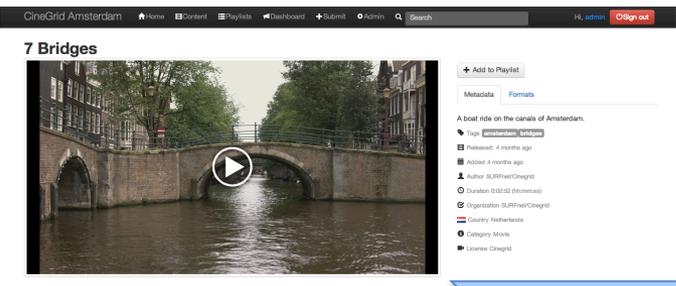
Find out more about the Cinegrid Description Language

Infrastructure

The Amsterdam node now has over 64 Terabytes of storage dedicated for CineGrid.

CineGrid Portal

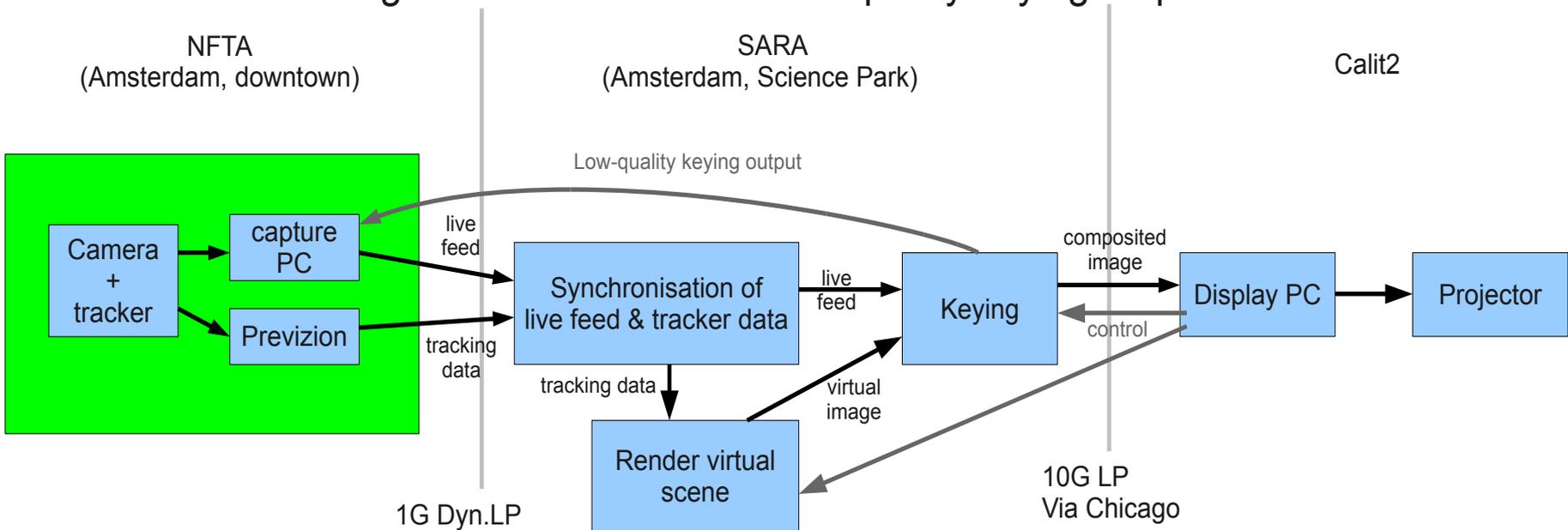
Unified orchestration of distributed CineGrid resources



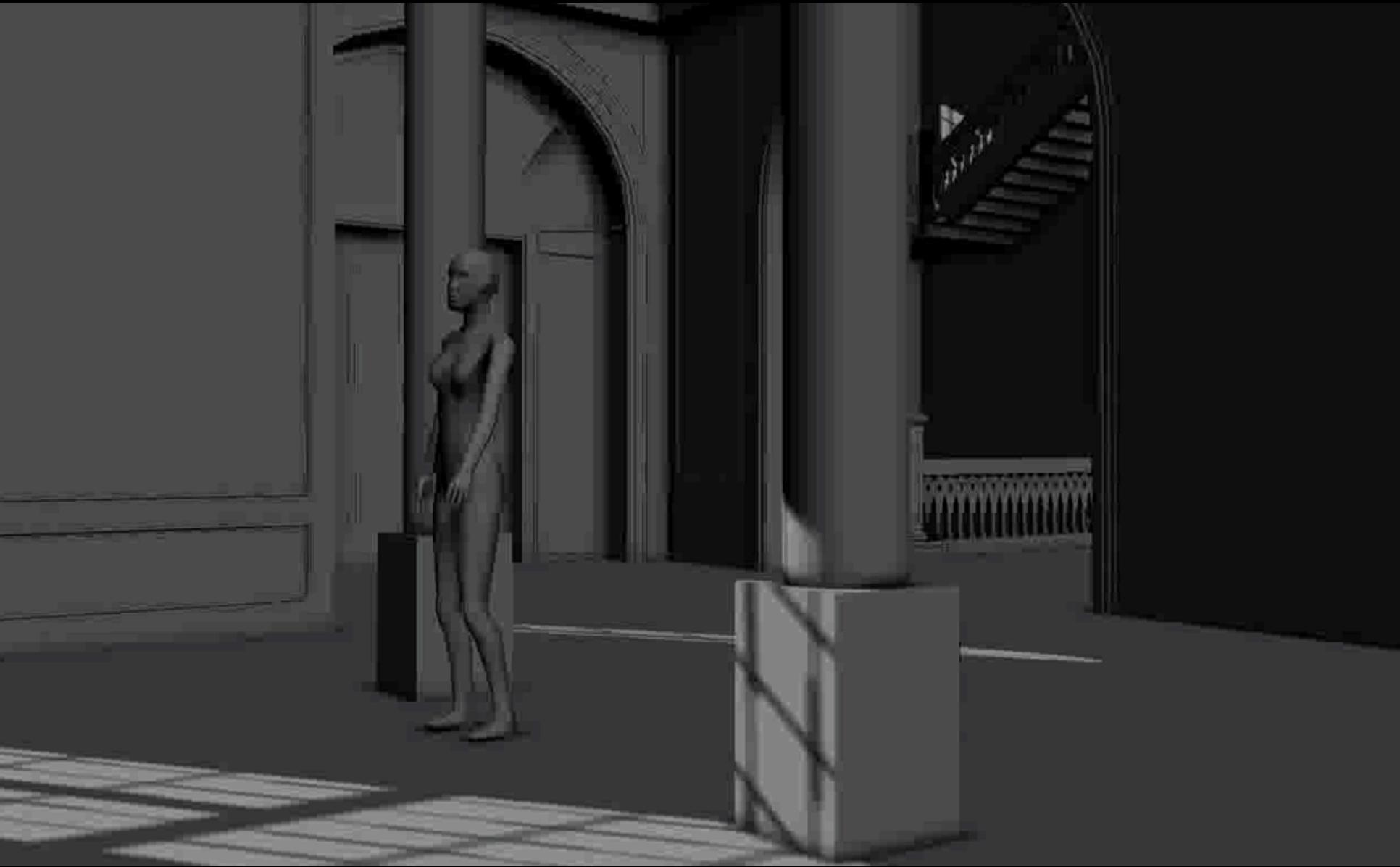
Real Time Rendering Workflow

Demo setup

- Three locations
 - 1) NFTA: greenscreen studio, Previzion, camera(+man), actress (+ dress)
 - 2) SARA: render node for keying, virtual scene rendering
 - 3) Calit2: keying controls, projection of final output, director
- Two lightpaths in between
- Video-conferencing for communication + low quality keying output back to NFTA









Directing Remote Live Shoot of Virtual Set Acting with Live Compositing in the Cloud



Live action camera, actors, green screen at NFTA (Amsterdam #1)
Virtual set compositing at SARA (Amsterdam #2)
Remote viewing and direction at UCSD/Calit2 Vroom (San Diego)

One Minutes: stunning quality



Direction

- Distributed Comp -> Grid -> Cloud -> Big Data
- Lego Block approach
- Application as a Service
- Elastic Cloud
- Determinism & Real Time?
- CineGrid ToolBox
- Storage
- Deep Storage
- Very Deep Storage



CineGrid-Amsterdam is supported by

City of Amsterdam, Pieken in de Delta

EFRO / Kansen voor West, Province of Noord-Holland



X
X
X **Gemeente
Amsterdam**



www.cinegrid.nl