

# Creative Frame Rates in Practice

## War Stories and Successes

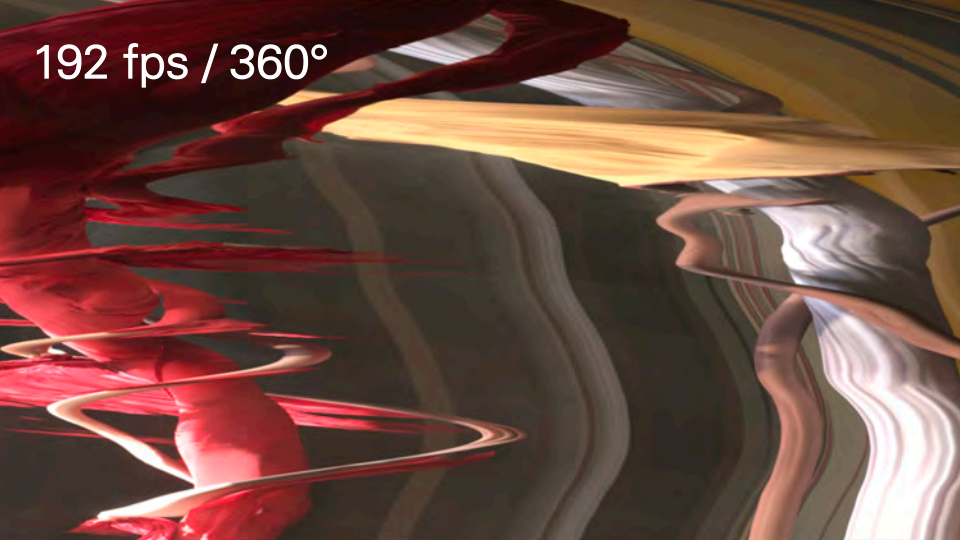
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**REALD**



192 fps / 360°



24 fps  
Synthetic Shutter



24fps / 180°

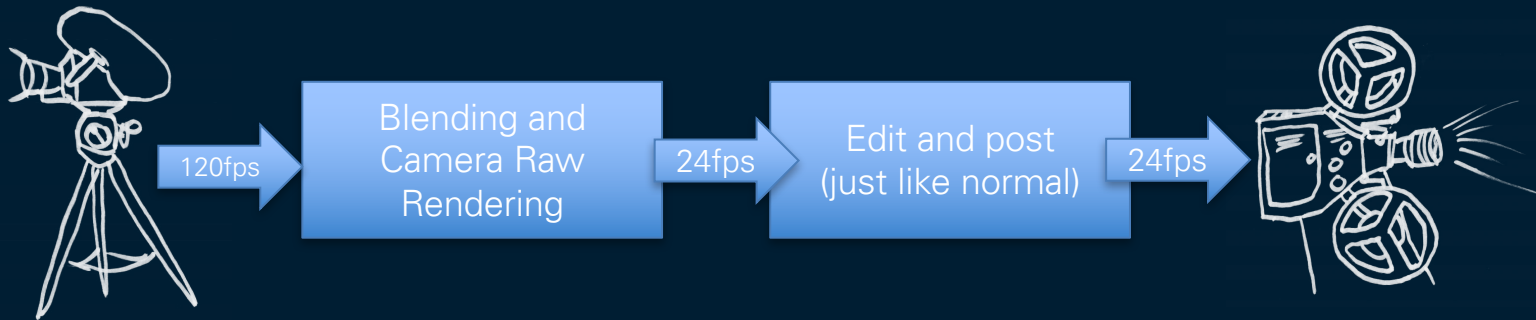


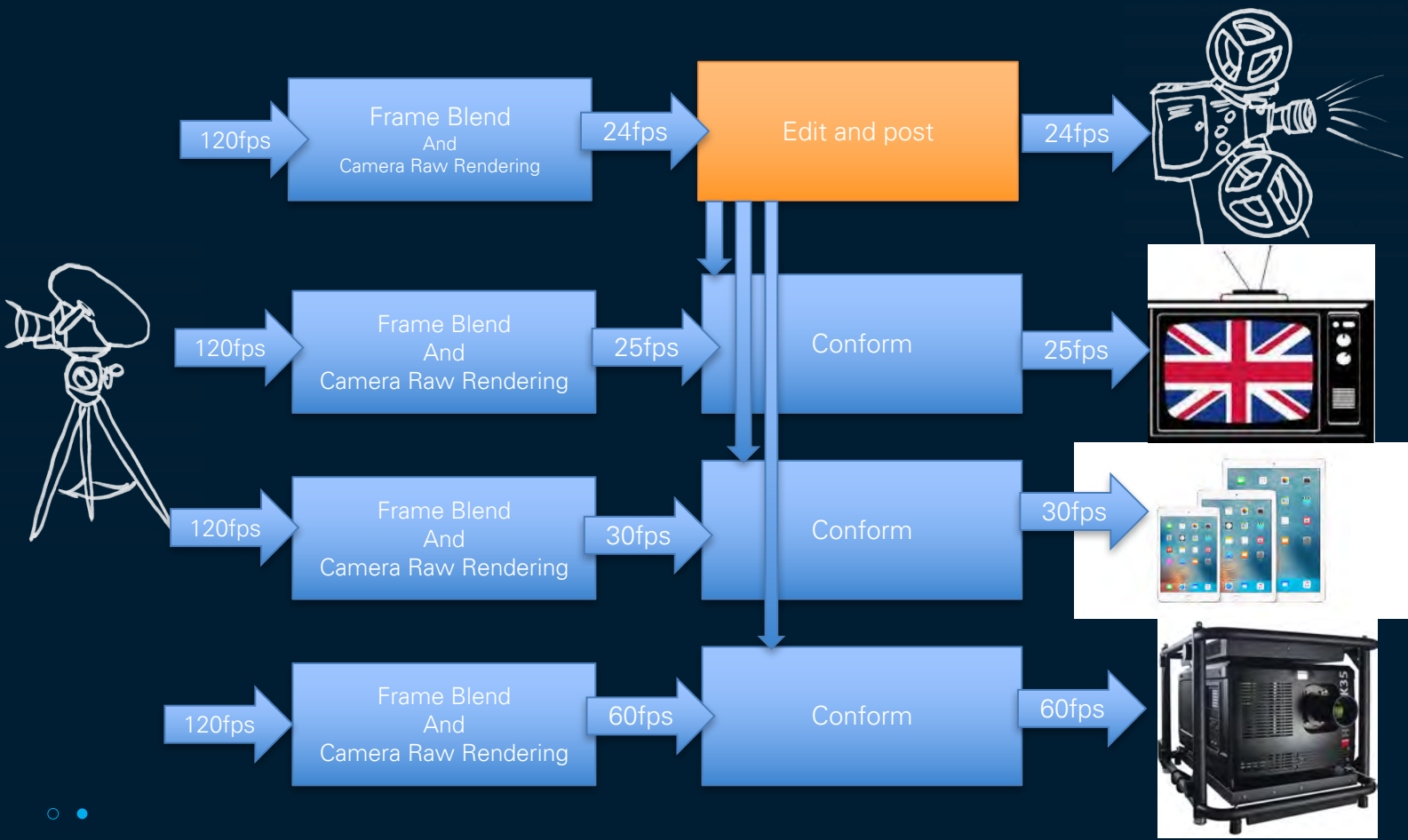
24fps / 45°



# High-Frame-Rate Mastering

- Acquire at a high frame rate (96 frames-per-second or higher)
- During post production, choose the motion look or looks desired for the aesthetic of the particular shot
- Use software to produce the intended output frame rate before edit.
- If multiple output frame rates are needed, can produce each output from the original source material rather than attempting to standards-convert.

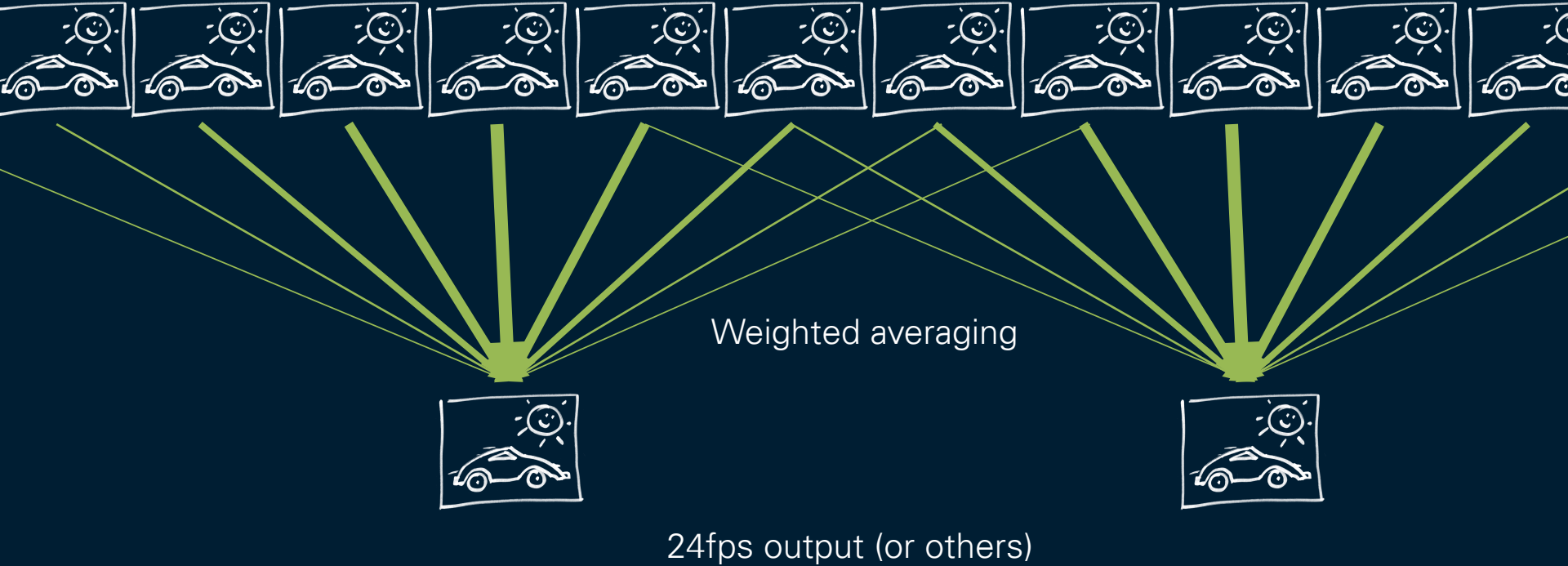




# Acquire at very high frame rate to compute a shutter



120 fps, 360° shutter raw input



# HFR For On-Set Flexibility

Commercial Shoot

- Decisions regarding motion softness, speed, and ramping can be deferred until post production.
- No motion data is lost during the shoot.
- On-set previews of the potential motion look can be rendered quickly.
- Increased data rate can be mitigated by using higher compression rates, with compression artifacts reduced during frame blend.

IncomingResampled



A001C003\_140427\_R0UQ Tessive\_Be  
SP11 SRC 10:00:15:03 DST 09:59:39:19

Source

Current: 10:00:15:03 (frame 1111)

In: 09:59:30:23 (frame 51)

Out: 10:00:36:04 (frame 1616)

Duration: 00:00:13.89 (1667 frames)

Destination

09:59:39:19 (frame 213)

09:59:30:23 (frame 1)

09:59:44:00 (frame 314)

00:00:13:02 (314 frames)



Speed Factor 1

Effective acquisition frame rate 24 fps

Start Processing

Input Clip

A001C003\_140427\_R0UQ.mov  
/Volumes/RealDDData/Users/tdavis/RealD My F  
ProRes 422 (HQ)  
ARRI Log-C  
120.000 fps  
Duration: 00:00:13.89

Output Clip

A001C003\_140427\_R0UQ-TM  
/Volumes/RealDDData/Data/NotBackedUp/Terr  
File Type Frame Rate  
ProRes 422 (HQ) 24

☒ Constant Speed Factor  
1

Synthetic Shutter  
Tessive Be

Tessive Beryllium



ShutterMTF

Advanced Options...

REALD

# Billy Lynn's Long Halftime Walk +



Ang Lee, Director

John Toll, Cinematographer

Tim Squyres, Editor

Ben Gervais, Technical Supervisor

Demetri Portelli, Stereographer

Scot Barbour, VP Production Technology, Sony

- Sony F65 raw frame ( 5.2 MB - compressed 6:1)
- 49-day shoot
- Average raw footage per day: 7.5TB
- Average minutes running time per day: 200 (100 stereo)
- Largest day (raw): 17.5 TB
- Number of cards on hand: 104 (512GB cards)
- Total raw negative size (including test material): 404 TB
- $\cong$  1.5 PB spinning disk storage
- 12 Fully loaded Mac Pros (64GB ram, 1TB SSD, 12-core) -  
- 6 for render farm, 2 as NAS servers, 4 for QC and Ingest
- 4 24-core PCs (Colorfront - each with 1x Nvidia K5200 and 2x Titan X)

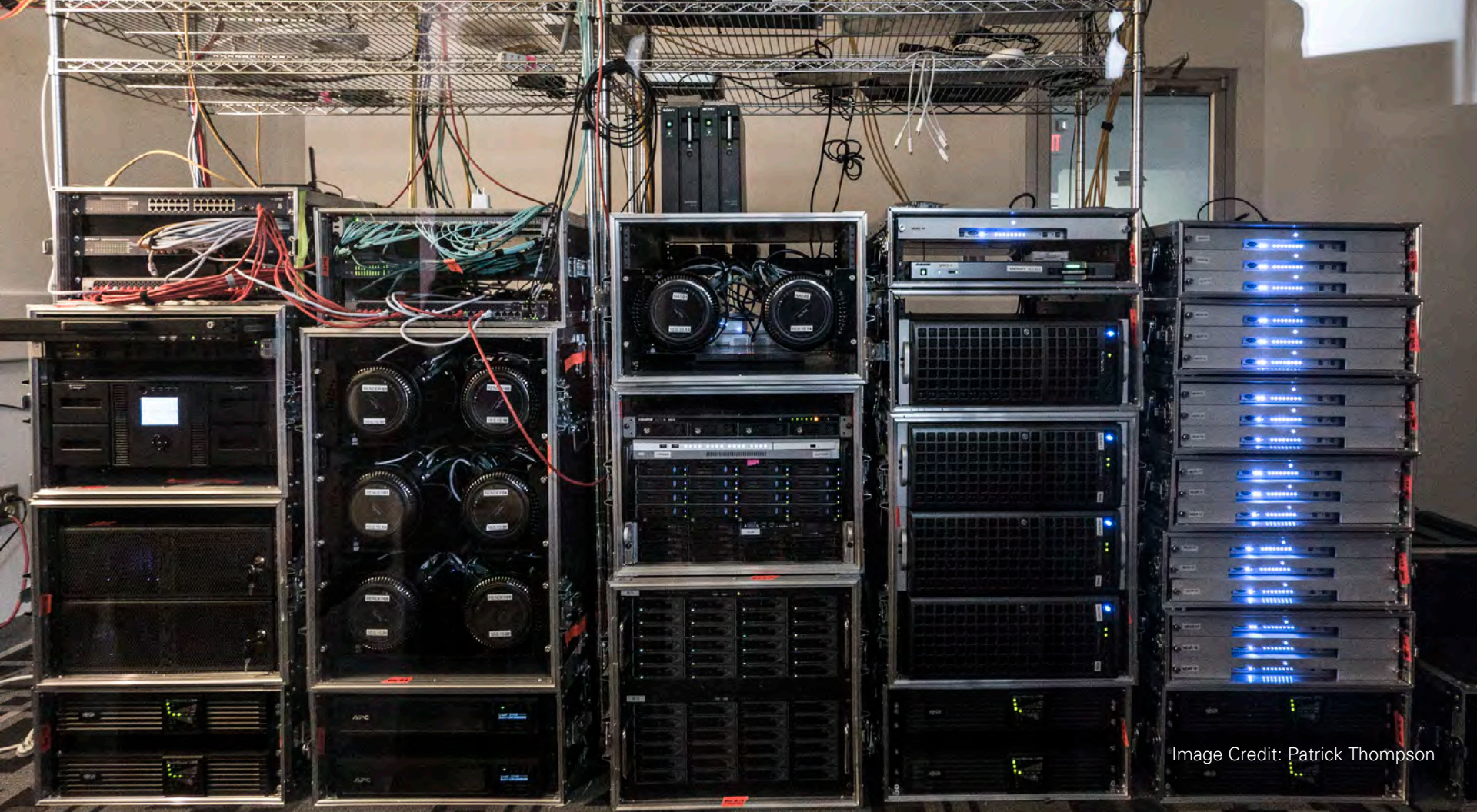


Image Credit: Patrick Thompson

Incoming

Resampled



Source  
Current: 10:00:22:16 (frame 1292)  
In: 09:59:30:23 (frame 51)  
Out: 10:00:36:00 (frame 1612)  
Duration: 00:00:08.68 (1667 frames)

Destination  
09:59:37:10 (frame 156)  
09:59:30:23 (frame 1)  
09:59:39:02 (frame 196)  
00:00:08:04 (196 frames)



Speed Factor 1  
Effective acquisition  
frame rate 23.98 fps

Start Processing

## Input Clip

A001C003\_140427\_R0UQ.mov  
/Volumes/RealDData/Users/tdavis/RealD My F  
ProRes 422 (HQ)

ARRI Log-C

192.000 fps  
Duration: 00:00:08.68

## Output Clip

A001C003\_140427\_R0UQ-TM  
/Volumes/RealDData/Data/NotBackedUp/Ten

File Type Frame Rate

ProRes 422 (HQ)

23.976

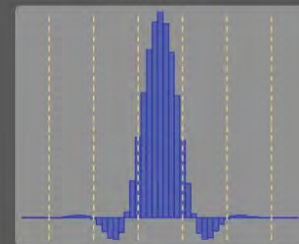
☒ Constant Speed Factor

1

Synthetic Shutter ☒ Interpolate

Tcessive Be

Tcessive Beryllium



Shutter

MTF

Advanced Options...

# Demonstration Footage



- Dual ARRI Alexas in a Cameron | Pace 3D rig
- One Alexa Mini for 2D coverage
- Footage acquired at 96, 120, and 192 fps
- First use of ARRI Master Anamorphic lenses for 3D production
- Created extremely high dynamic range scenes during the shoot





