Integrating and Working with ACES 1.2

Live Webinar

April 29, 2020

ACES 1.2 has Shipped!

Community-driven revisions to:

- ACES Metadata File (AMF, formerly ACESclip) spec
- Common LUT Format (CLF) spec
- Small enhancements and fixes

ACES

ACES 1.2 enables companies to further develop interoperability between their systems, a key goal of an end-to-end ACES color-managed workflow

Today's Program

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Joachim Zell
Chair ACES Implementation TAC

What is ACES?

The Academy Color Encoding System (ACES) is a global standard for interchanging digital image files, managing color workflows and creating masters for delivery and archiving.

Why Use ACES?

ACES standardizes color management, maintains color fidelity of your production at the highest, simplifies camera matching in DI, improves color and workflow communication, and “future proofs” the creation of outputs.

ACES

AMF Architecture and Implementation

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Chris Clark - AMF Architecture VWG Chair
Dan Tatut - AMF Implementation VWG Chair

ACES

ACES Metadata File (AMF)

Chris Clark - AMF Architecture VWG Chair
Manager, Imaging Technology, Netflix

Why is metadata needed for ACES?

AMF Use Cases

Colorist: “I’m starting an ACES project and I want to build a look.

How do I create / store / share it?”

Studio / Prod Co: “I’m finishing an ACES project and I want to archive it.

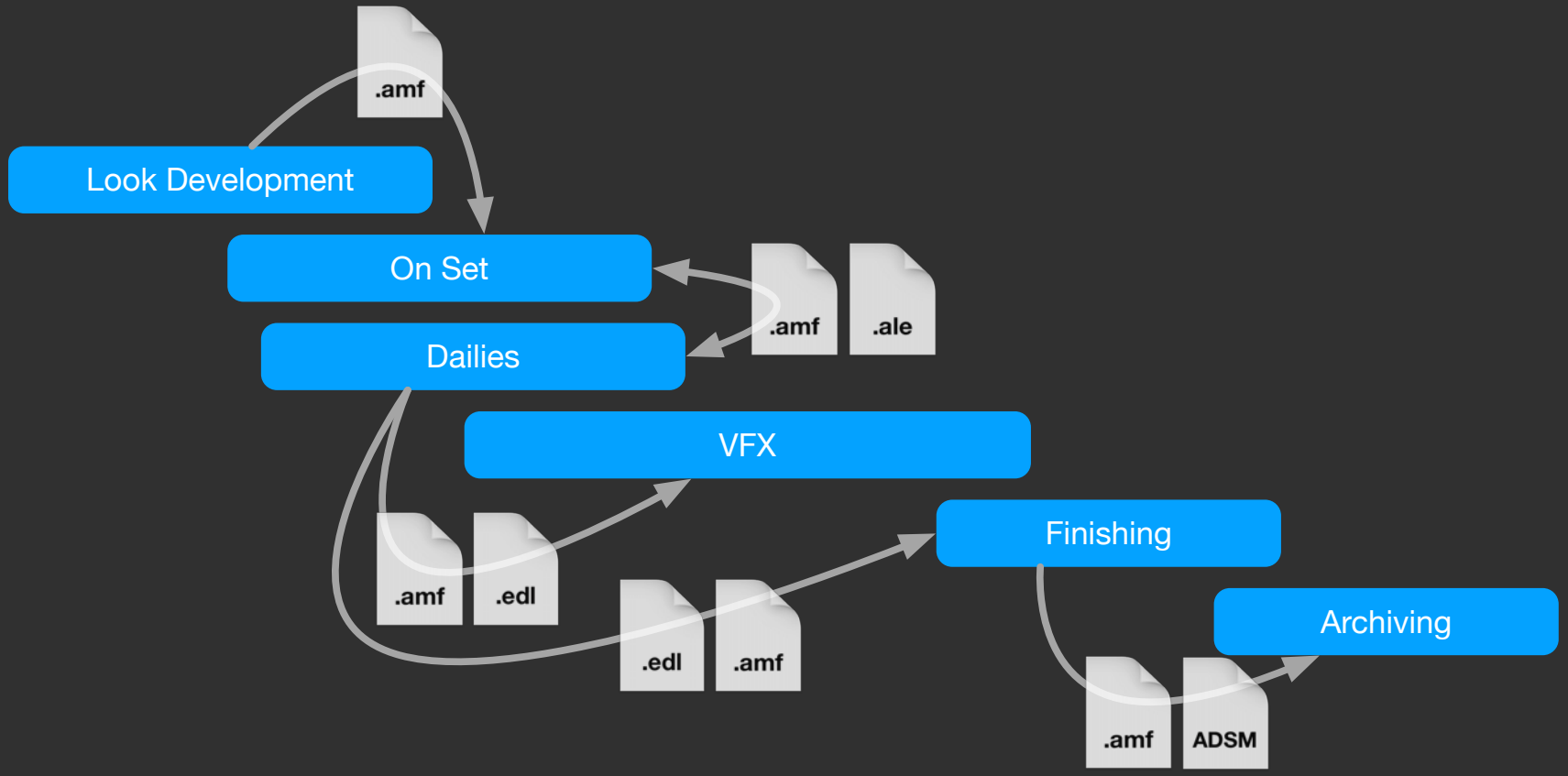
How can I store what was used (ACES version, ODT, etc)?”

AMF Use Cases

DI / VFX house: “Even on ACES projects, I still have confusing emails, specs, and .cube filenames to figure out the viewing pipeline.”

Why is metadata needed for ACES?

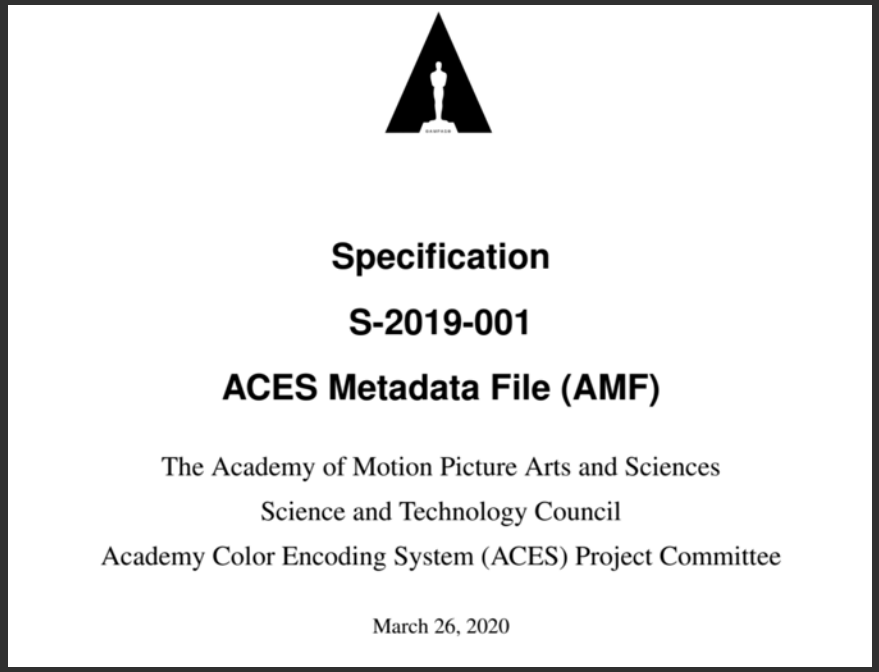
- If ACES is a standard set of ingredients, AMF is a recipe.
  - Snapshot of creative intent
  - Helps reduce ambiguity
  - Serves as archival element



Courtesy: Patrick Renner, Pomfort

ACES

ACES Metadata File (AMF)



Specification

S-2019-001

ACES Metadata File (AMF)

The Academy of Motion Picture Arts and Sciences

Science and Technology Council

Academy Color Encoding System (ACES) Project Committee

March 26, 2020

ACES Metadata File (AMF)

Dan Tatut - AMF Implementation VWG Chair
VP Business Strategy and Development, Marquise Technologies

Implementation Group Mission

- Take the specifications created by the Architecture Group and help ensure they will work in commercial and free products and systems
- Work with the Architecture group on potential modifications if needed
- Develop the “AMF Toolkit” to make it easier for companies to implement
- Promote the adoption of ACES Metadata File via the “AMF toolkit”

AMF Toolkit - 1

What's in the "Toolkit"

Interoperability canonical test vectors for the primary use-cases

AMF in Avid Log Exchange (ALE) workflows

AMF in CMX3600 Edit Decision List (EDL) workflows

AMF in Apple Final Cut Pro X workflows

AMF in OpenTimelineIO workflows

AMF Toolkit - 2

What's in the "Toolkit"

- AMF Util (courtesy of Pomfort, a must have tool!)
- Reference Material

Coming soon..

- AMF in Academy Digital Source Master (STMPTE ST2067-50 IMF App#5)
- And much more...

Resources

Specification (March 2020)
https://www.dropbox.com/s/4phjfkae2gykctt/S-2019-001.pdf?dl=0

XML Schema GitHub Repository
https://github.com/ampas/aces-dev/tree/master/formats/amf

AMF Toolkit GitHub Repositories
https://github.com/pomfort/amf-util
https://github.com/dtatut/amf-implementation

Meetings & Events

The group has regular virtual meetings

- Once a week (Thursdays)
- Implementation status
- Interoperability issues
- Workflows in practice

WE NEED MORE IMPLEMENTERS & USERS TO PARTICIPATE
JOIN NOW

Contact Information

To join the implementation effort send an email to:

Ricardo Rodriguez
rrodriguez@oscars.org

Dan Tatut
dtatut@marquise-tech.com

DEMO

ACES

Pomfort Livegrade

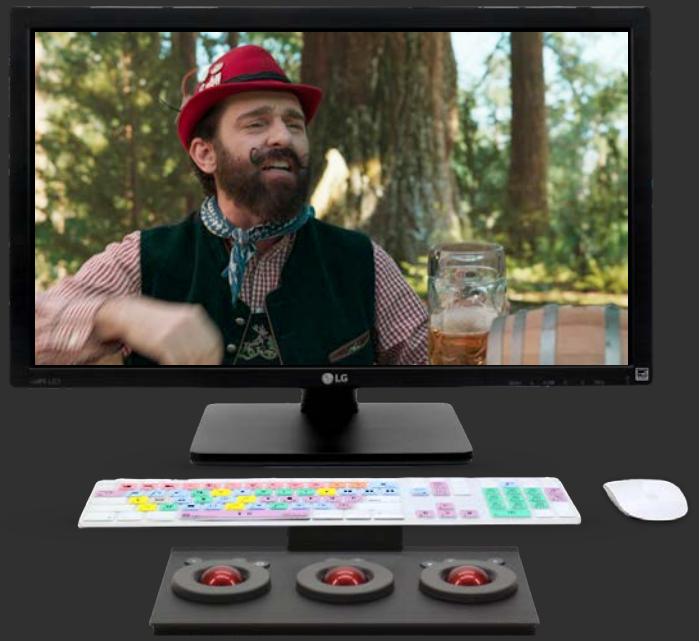
Live Color On Set

Dailies Creation

ACES

Live Color On Set

Dailies Creation



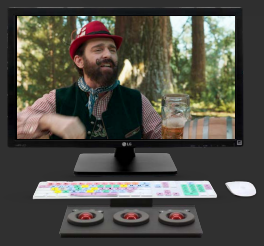
ACES

Live Color On Set

IDT	Acme Cam
CDL	0.4 0.35 0.4 …
RRT	
ODT	P3

Dailies Creation

IDT	Acme Cam
CDL	0.4 0.35 0.4 …
RRT	
ODT	P3



ACES

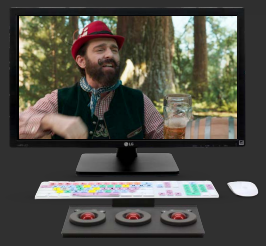
Live Color On Set

IDT	Acme Cam 5600K
CDL	0.4 0.35 … (ACEScct)
RRT	ACES v1.0
ODT	P3 D60

!

Dailies Creation

IDT	Acme Cam 3200K
CDL	0.4 0.35 … (ACEScc)
RRT	ACES v1.2
ODT	P3 D65 sim D60



ACES

AMF – What is it?

- Describes ACES pipeline
- Sidecar file, XML-based
- Including ACES version, IDTs, ODTs, LMTs
- Can be associated with a specific clip
- Option: Archive with versions of older pipelines

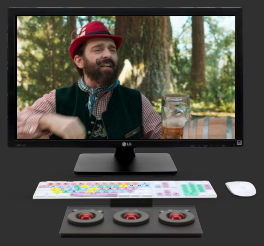
IDT Acme Cam 5600K

CDL 0.4 0.35 … (ACEScct)

RRT ACES v1.2

ODT P3 D60

.amf



ACES

IDT Acme Cam 5600K

CDL 0.4 0.35 … (ACEScct)

RRT ACES v1.2

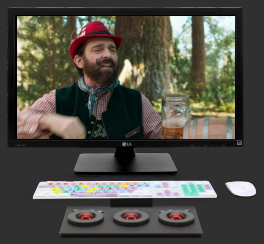
ODT P3 D60

IDT Acme Cam 5600K

CDL 0.4 0.35 … (ACEScct)

RRT ACES v1.2

ODT P3 D60

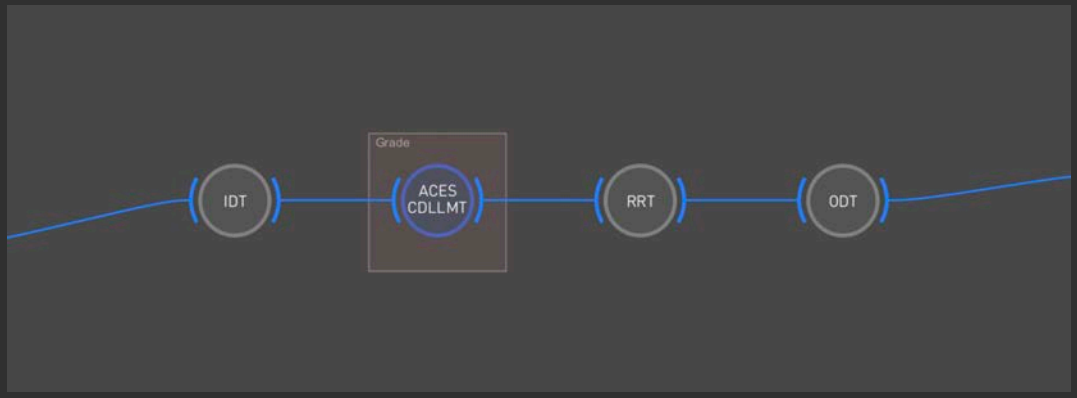


ACES

colorfront

Colorfront AMF Demo

- AMF import in 2020 version of Colorfront products
- Supports CDL, the official IDTs, RRTs, ODTs and custom LMTs
- Manual and automated application of AMF files



Q&A

CLF Architecture and Implementation

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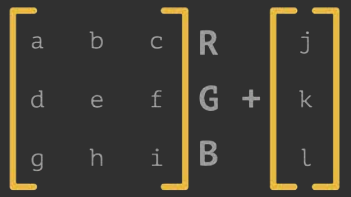
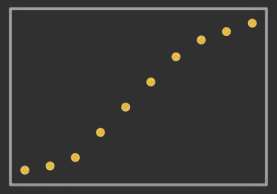
Doug Walker
CLF Implementation VWG Chair

ACES

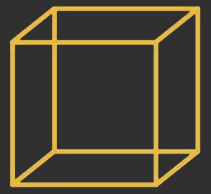
Common LUT Format (CLF)



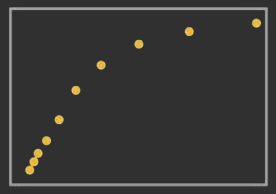
Matrix
plus offset



Lut1D

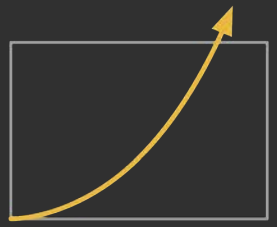


Lut3D

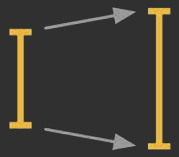


half-float
Lut1D

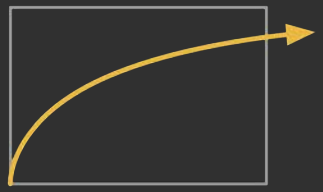
ASC CDL



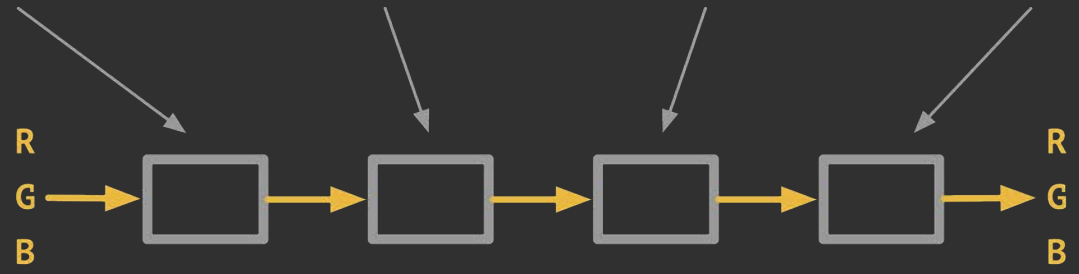
Exponent



Range



Log

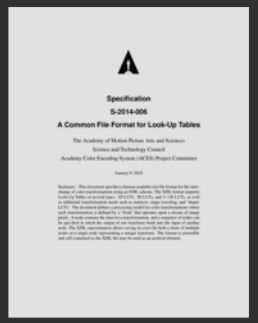


ACES

Yet another LUT format? Here's why!

222.125
0.18752
–0.0042

Floating-point ready


Specification
S-2014-006
A Common File Format for Look-Up Tables

Thoroughly documented

Implementation test kit

High-quality open source implementation

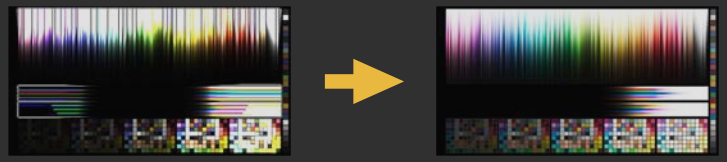
→ ***Must be an Archival Element***

ACES

CLF Implementation VWG

- Building an implementation test kit

Sample CLF files



Processed reference images

Implementation guide

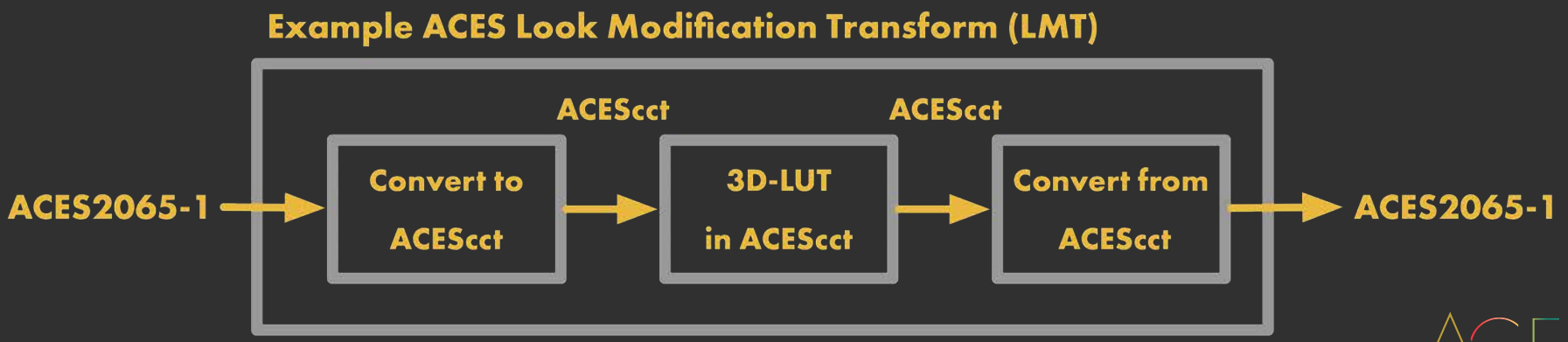
- Discussing how to validate implementations
- ***Please get involved on ACESCentral !***

ACES

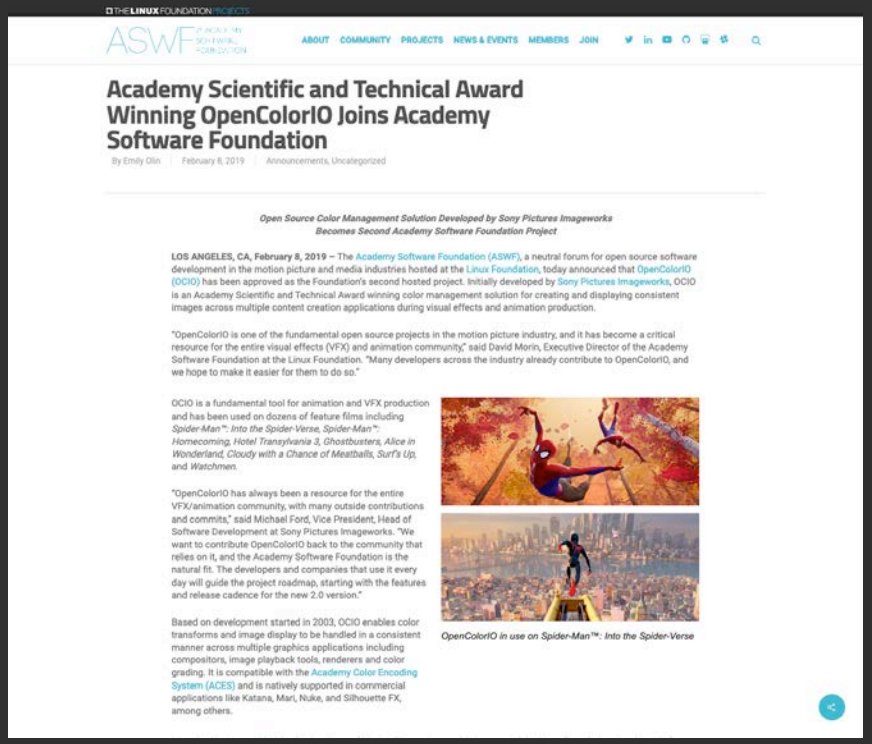
ACES Look Modification Transforms (LMTs)

Key points:

- An LMT is how an external look LUT is referenced from AMF
- Requires ACES2065-1 color space on input and output
- Typical (camera log) 3d-LUTs must be packaged accordingly



OpenColorIO



THE LINUX FOUNDATION PROJECTS

ASWF

ABOUT COMMUNITY PROJECTS NEWS & EVENTS MEMBERS JOIN

Academy Scientific and Technical Award Winning OpenColorIO Joins Academy Software Foundation

By Emily Olin | February 8, 2019 | Announcements, Uncategorized

Open Source Color Management Solution Developed by Sony Pictures Imageworks Becomes Second Academy Software Foundation Project

LOS ANGELES, CA, February 8, 2019 – The Academy Software Foundation (ASWF), a neutral forum for open source software development in the motion picture and media industries hosted at the Linux Foundation, today announced that OpenColorIO (OCIO) has been approved as the Foundation's second hosted project. Initially developed by Sony Pictures Imageworks, OCIO is an Academy Scientific and Technical Award winning color management solution for creating and displaying consistent images across multiple content creation applications during visual effects and animation production.

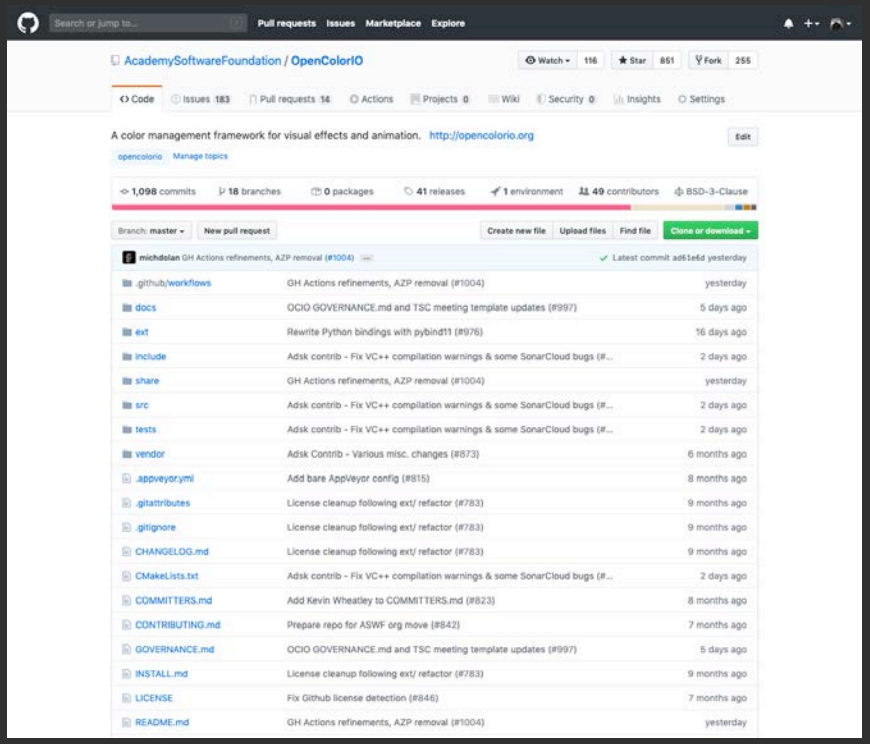
"OpenColorIO is one of the fundamental open source projects in the motion picture industry, and it has become a critical resource for the entire visual effects (VFX) and animation community," said David Morin, Executive Director of the Academy Software Foundation at the Linux Foundation. "Many developers across the industry already contribute to OpenColorIO, and we hope to make it easier for them to do so."

OCIO is a fundamental tool for animation and VFX production and has been used on dozens of feature films including *Spider-Man™: Into the Spider-Verse*, *Spider-Man™: Homecoming*, *Hotel Transylvania 3*, *Ghostbusters*, *Alice in Wonderland*, *Cloudy with a Chance of Meatballs*, *Surf's Up*, and *Watchmen*.

OpenColorIO in use on Spider-Man™: Into the Spider-Verse

"OpenColorIO has always been a resource for the entire VFX/animation community, with many outside contributions and commits," said Michael Ford, Vice President, Head of Software Development at Sony Pictures Imageworks. "We want to contribute OpenColorIO back to the community that relies on it, and the Academy Software Foundation is the natural fit. The developers and companies that use it every day will guide the project roadmap, starting with the features and release cadence for the new 2.0 version."

Based on development started in 2003, OCIO enables color transforms and image display to be handled in a consistent manner across multiple graphics applications including compositors, image playback tools, renderers and color grading. It is compatible with the Academy Color Encoding System (ACES) and is natively supported in commercial applications like Katana, Mari, Nuke, and Silhouette FX, among others.



Search or jump to... Pull requests Issues Marketplace Explore

AcademySoftwareFoundation / OpenColorIO

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Code Issues 183 Pull requests 14 Actions Projects 0 Wiki Security 0 Insights Settings

A color management framework for visual effects and animation. http://opencolorio.org

opencolorio Manage topics

1,098 commits 18 branches 0 packages 41 releases 1 environment 49 contributors BSD-3-Clause

Branch: master New pull request Create new file Upload files Find file Clone or download

michdolan GH Actions refinements, AZP removal (#1004) Latest commit ad61e6d yesterday

.github/workflows	GH Actions refinements, AZP removal (#1004)	yesterday
docs	OCIO GOVERNANCE.md and TSC meeting template updates (#997)	5 days ago
ext	Rewrite Python bindings with pybind11 (#976)	16 days ago
include	Adsk contrib - Fix VC++ compilation warnings & some SonarCloud bugs (#...	2 days ago
share	GH Actions refinements, AZP removal (#1004)	yesterday
src	Adsk contrib - Fix VC++ compilation warnings & some SonarCloud bugs (#...	2 days ago
tests	Adsk contrib - Fix VC++ compilation warnings & some SonarCloud bugs (#...	2 days ago
vendor	Adsk Contrib - Various misc. changes (#873)	6 months ago
.appveyor.yml	Add bare AppVeyor config (#815)	8 months ago
.gitattributes	License cleanup following ext/ refactor (#783)	9 months ago
.gitignore	License cleanup following ext/ refactor (#783)	9 months ago
CHANGELOG.md	License cleanup following ext/ refactor (#783)	9 months ago
CMakeLists.txt	Adsk contrib - Fix VC++ compilation warnings & some SonarCloud bugs (#...	2 days ago
COMMITTERS.md	Add Kevin Wheatley to COMMITTERS.md (#823)	8 months ago
CONTRIBUTING.md	Prepare repo for ASWF org move (#842)	7 months ago
GOVERNANCE.md	OCIO GOVERNANCE.md and TSC meeting template updates (#997)	5 days ago
INSTALL.md	License cleanup following ext/ refactor (#783)	9 months ago
LICENSE	Fix Github license detection (#846)	7 months ago
README.md	GH Actions refinements, AZP removal (#1004)	yesterday

ACES

OpenColorIO CLF tools

Command-line tools:

- ***ociconvert*** -- Process an image file through a CLF
- ***ociochecklut*** -- Check CLF syntax and evaluate RGB values through a CLF
- ***ociomakeclf*** -- Convert other LUT formats to CLF
  - ➡️ Also builds/packages an ACES and AMF-compliant LMT CLF

OpenColorIO CLF Demo

OpenColorIO CLF implementation

- Complete implementation of the ACES 1.2 CLF spec
  - In the master branch on GitHub:

    https://github.com/AcademySoftwareFoundation/OpenColorIO

Part of:

OpenColorIO **v2**

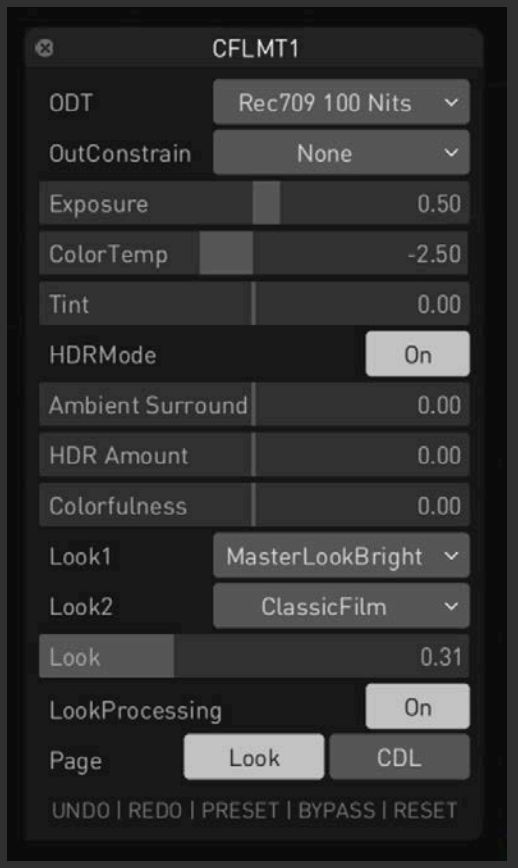
Coming soon! (SIGGRAPH)

ACES

Colorfront LMT Demonstration

- AMF Loads Creative LMT (CLF)
  - Additional metadata allows Colorfront LMT to remain editable
- Design your own LMT with Colorfront Engine
  - Scene referred adjustments such as exposure and color temperature
  - Display referred adjustments such as ambient surround, dynamic range
  - Library of creative looks, ability to mix them
  - Perceptually matching cinema, SDR and HDR output
  - Handling of out-of-gamut colors
- Custom LMT can be exported as a CLF file to ensure **compatiblity**

Parametric LMT
Publishes CLF



Q&A

Other 1.2 Features and Fixes

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Alex Forsythe
ACES Staff Technology Lead

ACES 1.2 Features and Fixes

- Major Features
  - New Common LUT Format (CLF) specification
  - New ACES Metadata File (AMF) specification
- Other new features
  - Adds ACES Project Organization and Development Procedure document
  - Adds ACES Color Space Conversion transforms
  - Adds new P3D65 ST.2084 HDR Output Transforms (RRT+ODT)
  - Adds Sony Venice IDT

ACES 1.2 Features and Fixes

- Bug Fixes
  - Adds missing D65 to D60 CAT to 'InvODT.Academy.P3DCI_D65sim_48nits.
- Miscellaneous changes
  - Reverts function parameters of ODTs with full/legal option from 'uniform bool' to 'varying int'
  - Updates ACES System Versioning document (S-2014-002)
  - Updates TransformIDs of ACES reference implementation transforms
  - Removes "ACES Clip-level Metadata File Format Definition and Usage" (TB-2014-009)
  - Add reference images to accompany new ACEScsc transforms
  - Various minor typo fixes in document LaTeX source files

Q&A

Wrap-up

ACES 2.0 Development Launched!

Please participate in VWGs and Suggesting Work

- Gamut Architecture Study
- IDT Implementation Group
- Other Groups forming

ACES

Wrap-up

- Thanks to our presenters today and to everyone that has participated in VWGs and on ACESCentral
- Please join our development efforts particularly if you're from a Product Partner company and need to implement ACES for your customers
- Look out for a new and improved ACESCentral.com! Launching in a week or so

ACES

Thanks!

See you on
ACESCentral.com