Render Everything Everywhere: 3D Commerce by Khronos

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Today’s Speakers

Moderator
Leonard Daly

3D Commerce
WG Chair
Shrenik Sadalgi, Wayfair

Eric Bennett, Amazon Imaging Sciences

Brent Scannell, Autodesk

Max Limper, DGG

Nathaniel Hunter, Dreamview

Thomas Lucchini, Microsoft

Jon Wade, Shopify

Norbert Nopper, UX3D
Leonard Daly

- Independent Consultant
  - xR Systems Architecture
  - eCommerce specialist

- 40 years in Computer graphics, Analysis, Architecture, eCommerce, and Standards

- Khronos
  - Secretary 3D Commerce Working Group (WG)
  - Co-Chair of Certification & Validation Technical Sub-Group (TSG)

- Support clients through advanced commerce, information handling, and 3D web-based applications
Eric Bennett

- Senior Science Manager of Amazon Imaging Sciences
  - 3D Content Creation and Processing at Scale

- Focus on New Media Adoption and CV/ML 3D Processing Algorithms
- Supporting Multiple Customer Experiences
  - Augmented Reality
  - Room Decoration
  - 360 Spins

- Previous Background in Computational Photography
Shrenik Sadalgi

- Chair of 3D Commerce WG
- Director of R&D @ Wayfair (Wayfair Next)

Wayfair is one of the largest online retailers for home goods & furniture

Wayfair Next focuses on emerging tech & Next-gen merchandising -
- View in Room 3D
- Patio Playground
- IdeaSpace
- Wayfair Spaces on Magic Leap
- VR in Store
- 3D Room Planner
Jon Wade

- Product manager for video, 3D, and AR/VR at Shopify
- Co-chair of the 3D Commerce Metadata TSG

Shopify

- A commerce platform to start, grow, market and manage a retail business of any size
- Over 1 million merchants in 175 different countries
- We want to democratize 3D for businesses of any size
- Shopify has native support for glTF models on products. Allows for viewing on the web and AR on iOS and Android.
Nathaniel Hunter

- Co-Chair of 3D Commerce Asset Creation TSG

- 30 years in content creation spanning film, TV, commercials, games, products, and internet technology

- Chief Operating Officer at DreamView, Inc.
  - B2B online platform serving retailers, suppliers, manufacturers and brand owners
  - Scalable and standardized management, creation and distribution of real-time and photo-real product content
Max Limper

- Co-Chair of 3D Commerce Asset Creation TSG
- glTF spec contributor (binary glTF, 2.0 PBR model)
- PhD in CS on 3D data optimization (Fraunhofer / TU Darmstadt)
- CEO & Co-Founder at DGG, creating RapidCompact
  - Commercial 3D asset optimization solution serving leading retailers & 3D studios
  - Tech & workflows aligned with standards (glTF, USDZ, Asset Creation Guidelines)
  - Additional open-source scripts on GitHub
Thomas Lucchini

• Program Manager of the Babylon.js Team at Microsoft

babylon.js

• Open-Source, 3D engine for the Web
• Javascript library, built entirely on open web standards
  - WebGL, WebXR… and the upcoming WebGPU
• Full featured rendering and game engine
  - PBR, Physics, Animation, AR/VR, Particles, Raycasting…
• Always backwards compatible
  - Your creation will always work!

• Member of 3D Formats and 3D Commerce working groups
  - Early implementations, feedback and contributions
Brent Scannell

- Product Owner/Product Manager at Autodesk for 3ds Max

make anything.autodesk.com/3dsmax
Norbert Nopper

- Managing Director at UX3D
  - GPU based software

- **Gestaltor** - visual glTF editor
  - Engineered for glTF
    - View
    - Inspect
    - Edit
    - Optimize
    - Compose
  - DCC Tool for 3D Commerce

- Working since 2017 on glTF
- Participating since 2020 in the 3D Commerce group
Impact of 3D in Retail

“…46 percent of retailers planned to deploy either AR or VR solutions to meet customer service experience requirements….”

“…the impact of AR or VR in retail can be transformative…”

“…retailers can use AR as an extension of the brand experience to engage customers in immersive environments and drive revenue...Additionally, AR can be used outside the store after a sale to increase customer satisfaction and improve loyalty…”

April 2019 Gartner press release
Let’s Think About “Search” as a Use Case
E.g. Google Search now enables 3D and AR experience directly from Search results
.... Across different platforms
Inconsistent visual quality across experiences
Where Does 3D Content Come From?

3D Content Production

- View in 3D
- View in AR
- Retailer's Website
- Buy Now

Retailer's Content
3D Content Production
One example of the content production process

- **3D Tools**
  - Uses
  - Content Creator

- **Content Creator**
  - Uses
  - Manufacturer
  - Retailer

- **Manufacturer**
  - Distributes via

- **Retailer**
  - Publishes on

- **End-User Platform**
  - View in 3D
  - Search
Alignment Needed Across Supply Chain of 3D
Khronos 3D Commerce Mission

Create specifications and guidelines to align the 3D asset workflow from product design through manufacturing, through each stage of retail to end-user delivery platforms
Khronos 3D Commerce Goals

Guidelines for tools and product designers to create assets with consistent data to be used through the 3D Commerce pipeline

Structured metadata for product management and configurability of viewing

Visual realism and consistency no matter where the model is displayed

Alignment Needed

Reduce production, distribution and marketing costs

Product display configurability with consistency and authenticity
Asset Creation Problems

3D Modeling

Target Product

Inconsistent physical scale

Inconsistent size

<500K Polygons

180K Polygons

Inconsistent color

Inconsistent maps

Texturing

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Asset Creation Problems

- Inconsistent internal file structures, naming and meta-data
- Outdated or incorrect topology/modeling practices (Ngons, T welds, etc.)
- Inconsistent UV scale and/or layouts
- Incorrect pivot points
- Non-PBR based materials & maps
- Inconsistent map naming
- Unsupported material types
- Incorrect color space
- Unsupported, or outdated texture types
- Incorrect, or unsupported publish target specs
  - polygon count
  - texture aspect ratio
  - texture size
  - reduced draw calls
  - overall file size
Metadata Storage and Schemas

Metadata TSG

Goal: Establish expectations for schemas and storage of metadata. Allow interoperability between the diverse tools in the 3D commerce content pipeline with respect to metadata

- ISO-standard eXtensible Metadata Platform (XMP) for metadata storage
- 3D model schema with a small number of fields
- Leveraging many existing XMP namespaces. XMP allows users to add their own specific metadata schemas
Efficiently Delivering Options and Colorways

Configuration TSG

Goal: Products have variants related to colors, materials, and sizes. Enable efficient transport and switching between product variants.

- KHR_materials_variants is a glTF extension allowing storage of multiple material variants of a product in a single glTF asset
- Future work for geometry variants and issues around product configurators
Artistic Solution - Asset Creation TSG
Asset Creation Solutions

Asset Creation TSG

Offline CGI 3D Model

Real-Time Base Asset with PBR Materials

Catalogue Images

Stored in Exchange-/Authoring Format

Publishing Variants, Stored in Delivery Formats

Mobile AR Version (iOS)

Mobile AR Version (Android)

VR Planner Version

Web Catalogue Version

Floor Planner Version

...
Digital Content Creation Tools
Bridging the Gap Between Content Creators and Content Creation Guidelines

• Guidelines driven by and created by artists
  - Based on existing processes and tools, highlighting trouble areas
  - Generally supported by existing tools, but creates an opportunity for guided workflows and specialized features
Digital Content Creation Tools (cont.)
Bridging the Gap Between Content Creators and Context Creation Guidelines
3D Viewers
Real-time photo-realistic rendering

- **Visual realism is essential for a buying decision**
  - glTF 2.0 new materials ratified (Clearcoat, Sheen, Transmission) and upcoming (Volume, Translucency)
  - AR Scenario: make an object look like you can touch it (scale and lighting)

- **New interactive experiences for customers...**
  - Zoom in for details, inspect from any angle
  - Get into the scene (VR), “explode” complex objects in parts, animate objects

- **... need to be smooth across devices**
  - Realtime rendering = 60 FPS or more
  - Compromises and “tricks” (mostly from Gaming) to render realistic objects in real-time
  - Fallbacks depending on device capabilities

- **... and visually consistent across 3D viewers**
Certification: Consistency in the Marketplace

Certification & Verification TSG

Goal: To provide the entire eco-system with a known consistent means to display 3D commerce models
Certification Process

1. Certification models are assembled
2. Models rendered in candidate viewer
3. Candidate renders compared to reference renders
4. Human assesses viewer for certification
5. Viewer is certified!
Certification Program V1

- Initial release expected 1Q2021
- glTF V2.0 models
- Fully controlled image based lighting
- Fixed camera position
- Static models
- Models & Documentation released as Creative Commons
Scalability within Retailers

3D Content → Quality Assurance → 3D Asset Management → Shopping Experiences

3D Content → Quality Assurance → 3D Asset Management → Offline Rendering → Rendered Imagery → Desktop Interactive Experiences, Mobile and AR Experiences, Detail Page Experiences
Resources

- Khronos 3D Commerce Working Group
  - https://www.khronos.org/3dcommerce/
- glTF Home Page
  - https://www.khronos.org/gltf/
- More Information
  - 3dcommerce-feedback@khronos.org

Real-time Asset Creation Guidelines 1.0 released!

We look forward to your participation & feedback!
References

- 3D Commerce WG at Khronos: https://www.khronos.org/3dcommerce
- 3D Commerce Blog posts
  - Asset Creation:
  - Metadata: Coming Soon
  - Configuration: Coming Soon
- Asset Creation Guidelines: https://github.com/KhronosGroup/3DC-Asset-Creation
- glTF Specification:
Questions ?