Evolution of visionOS

2023

visionOS 1.0 beta

Metal 3
- CompositorServices API (C and Swift APIs)
- World tracking with ARKit (C and Swift APIs)

RealityKit
- Window / Volume / Space
- SwiftUI views : Model3D, RealityView, SwiftUI attachments
  Vibrant material, Glass background, Ornaments, Hover Effect
- SwiftUI gestures : RotateGesture3D, targetedToEntity, SpatialTapGesture,
  preferredHandAction, 3D properties on spatial gestures
- Custom component/system, Attachment entities: AttachmentProvider
- Image-based lighting, Shadows, ShaderGraphMaterial, Rasterization rate map,
  Foveation, Dynamic content scaling, Particle emitters, Portals
- VideoPlayerComponent : 3D video support (MV-HEVC)
- RealityKit USD schemas
- SharePlay
- Accessibility component, Voice over

ARKit
- ARKitSession, DataProvider
- Privacy and authorization API
- Automatic persistent WorldAnchors
- Scene understanding: Plane detection & classification, Scene geometry, Image Tracking,
  Hand Tracking with render struct/function
- Ray casting with system gestures or hand tracking

Reality Composer Pro
- RealityKitContent Swift Package
- ShaderGraphMaterial: MaterialX, ShaderGraph Node Editor
- Particle system
- Audio authoring
- Statistics: Materials, Geometry, etc.
- USDZ export

3D QuickLook
- Volume, USDZ metersPerUnit, 100% scale
- Automatic ground plane and shadow
- < 25 MB better, < 200 mesh, < 100k vertices in total, max 2K x 2K texture, 8-bit per
  channel texture, use MaterialX Unlit surface
- Windowed Quick Look / In-app Quick Look

Xcode
- SwiftUI preview, visionOS simulator
- Instruments : RealityKit Trace template

Unity
- Unity Shader Graph -> MaterialX
- AR : Plane detection, World mesh, Image markers
- Static foveated rendering, Universal rendering pipeline, Single-pass instanced
  rendering, Depth composition
- Input: XR Interaction Toolkit

2024

visionOS 1 / visonOS 2
Apple Vision Pro   M2(8CPU/10GPU/16NE) 16GB / R1

Metal 3
- Render Metal in mixed style
- Upper limb visibility (visible/hidden/automatic)
- Scene-aware projection matrix
- Trackable anchor prediction

RealityKit
- Cross-platform APIs
  - RealityView, ShaderGraph, Particle System, SpacialAudio
  - Hover effects (Highlight, Shader)
  - Hand tracking, Joints
  - Force effects,
  - Dynamic lights and shadows
  - Portal crossing
- Multi-view video playback: AVKit AVPlayerViewController
- Spatial tracking: Hand AnchorEntity
- Mesh generation with Path / AttributedString
- Hover effect: Highlight, Shader, Hover State node
- Add blend mode
- LowLevelMesh, LowLevelTexture
- Viewpoint, Baseplate, Immersion level, World scaling, Coordinate conversion, Volume
  resizing, Anchored UI, Surroundings effects, World alignment, ZStack spacing
- Enterprise APIs
  - Sensor access: Main camera access, Passthrough in-screen capture,
    Barcode/QR code scanning
  - Platform control: ANE access, Object tracking adjustment, Increased
    performance headroom
  - Apple business manager
- USD and MaterialX
  - Blend shapes, Subdivision surfaces
  - USD variant

ARKit
- Room tracking
- Plane detection: Slanted plane
- Object tracking: ML-trained reference objects, Coaching UI, Event handling
- World tracking: Orientation-based tracking
- Hand tracking: Prediction API, Hand anchor entity

Reality Composer Pro
- Timelines: Editor, Actions(built-in/custom), AnimationLibraryComponent
- Skeletal poses, Inverse Kinematics
- Blend Shapes animations

TabletopKit
- Tabletop, Seat, Equipment, Interaction callback, actions

3D QuickLook
- PreviewApplication API: Launching, Editing, Managing events
- 3D preview enhancements: Surface snapping, Configuration (USD Variants)

Web
- Interaction region shape, Gamepads, Speech
- Spatial photos, Panorama photos, 3D models, Web Audio APIs
- WebXR, Transient pointer

Xcode
- Scene/Components hierarchy and inspection
- FaceTime for simulator

Misc.
- SwiftUI:
  - pushWindow, Window placement (.utilityPanel)
  - Custom Hover Effects: Clip effects, Effect groups, Delayed effects, Reduce
    motion
- Spatial Photo/Video:
  - PhotosPicker, PhotoKit, AVAssetPlaybackAssitant, AVPlayerViewController,
    Custom spatial media
- Environment:
  - Docking Region, Reflection(Specular, Diffuse)
  - Environment Probe, Brightness, Tint
  - Reverb Component
  - Environment picker
- HealthKit
  - query/write health data, register for updates, guest user support
- SharePlay
  - Custom spatial templates
  - FaceTime for simulator