

The background features a dark, textured surface with a glowing blue and purple sphere in the center. A white Apple logo is positioned at the top of the sphere. The text "Worldwide Developers Conference" is overlaid on the image. "Worldwide" and "Conference" are in a gold, serif font, while "Developers" is in a white, serif font enclosed in a white rectangular box. The overall aesthetic is futuristic and tech-oriented.

Worldwide

Developers

Conference





# Integrating QuickTime VR into Applications

*QuickTime VR  
Engineering Team*

# Session Outline

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## *Integrating QTVR into applications*

- Introduction
- The API
- Future Directions
- Q&A







# Interfacing Applications to QuickTime VR

*Tim Monroe*

# The API

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## *QuickTime VR Manager, v. 2.0*

- Overview
- Media Integration
- Demos

— *Tim Monroe*



# For Further Information

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- *Virtual Reality Programming With QuickTime VR 2.0*
- Articles in *MacTech* Magazine (forthcoming)
- Source code:
  - on CD packaged with *VRPWQTVR 2.0*
  - <http://qtvr.QuickTime.apple.com>



# Capabilities of the QuickTime VR Manager

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- View angles: *pan, tilt, FOV*
- Hot spots: *trigger, enable*
- Object characteristics
- Image characteristics
- Scene and node information
- Memory usage
- Your own hooks





# Your Hooks

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- **Mouse-over hot spot procedures**
- **Node entering procedures**
- **Node leaving procedures**
- **Back buffer imaging procedures**
- **Prescreen buffer Imaging completion procedures**
- **Intercept procedures**





# Media Integration

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- **Sounds**
- **Pictures**
- **QuickTime movies**
- **QuickDraw 3D objects**
- **Speech recognition**
- **Time**



# Sounds

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- **Ambient sounds**
- **Localized sounds**
  - SoundSprocket
  - SoundSprockette
- **QuickTime sound tracks**
- **QuickTime MIDI files**



# Pictures and Movies

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- **Draw into the back buffer**
  - May need to rotate image
  - May need to warp image
- **Texture map onto 3D object**





# QuickDraw 3D Objects



- Change QD3D camera settings when QTVR angles change
- Render 3D scene into a PixMap draw context
- Copy the rendered 3D scene into the prescreen buffer
- Resize draw context if the movie window changes size





Demo





# Future Directions for QuickTime VR

*Ken Turkowski*

*Mark Wheeler*

*Yalin Xiong*



# QuickTime VR Future Directions

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- **High performance panoramas**
- **Node transitions**
- **Movies in panoramas**



# High Performance Panorama Playback

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– *Ken Turkowski*

- High speed
- High quality
- Big windows





Demo



# Node Transitions in QuickTime VR

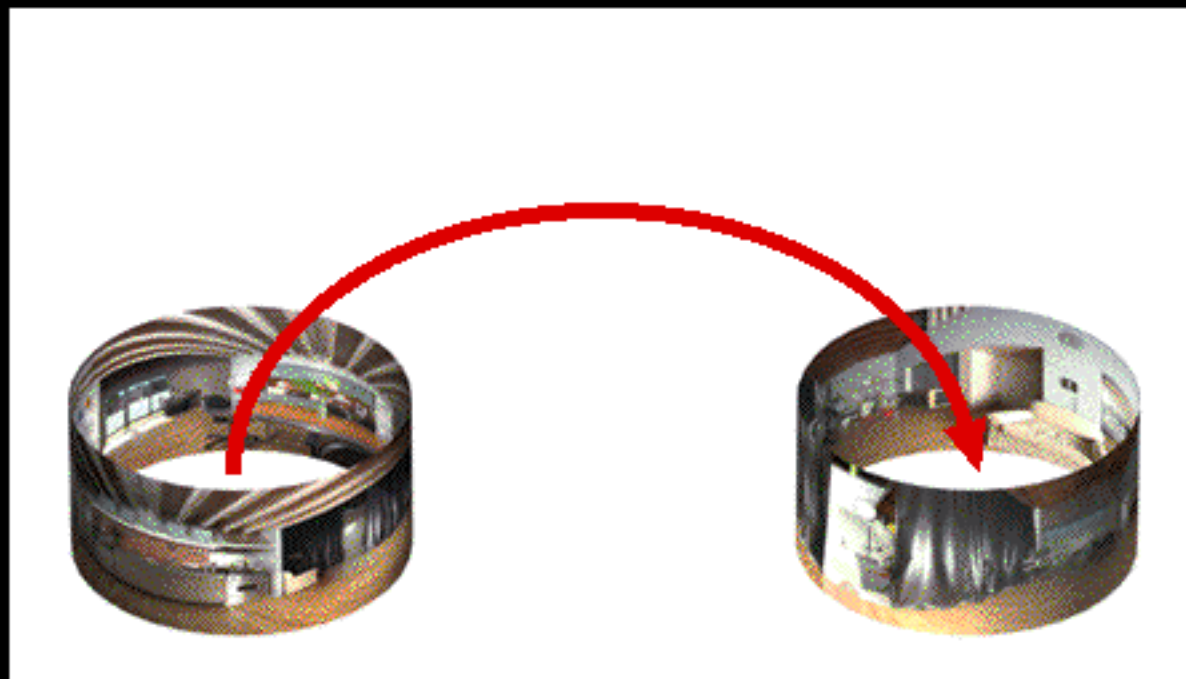
– *Mark Wheeler*

- **Straight jump**
- **Swing and zoom**
- **Animated transitions**
- **Problems with jump transitions**
  - Jumpy/artificial experience
  - Disorients the user

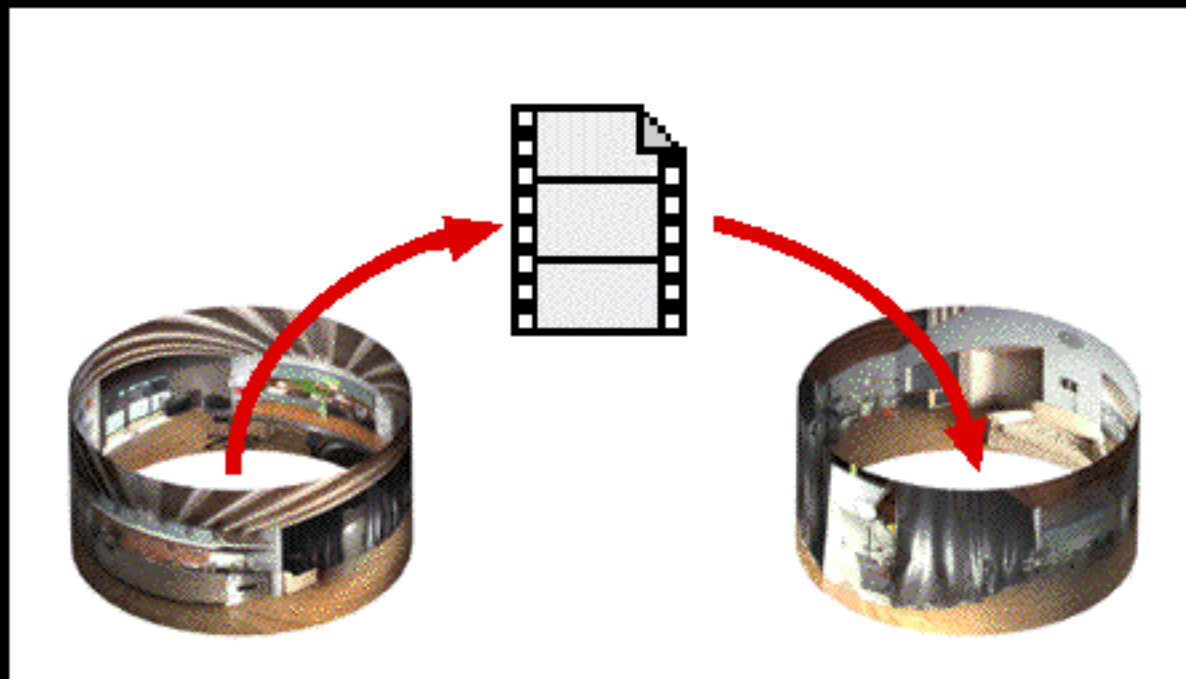


# Jump Transitions

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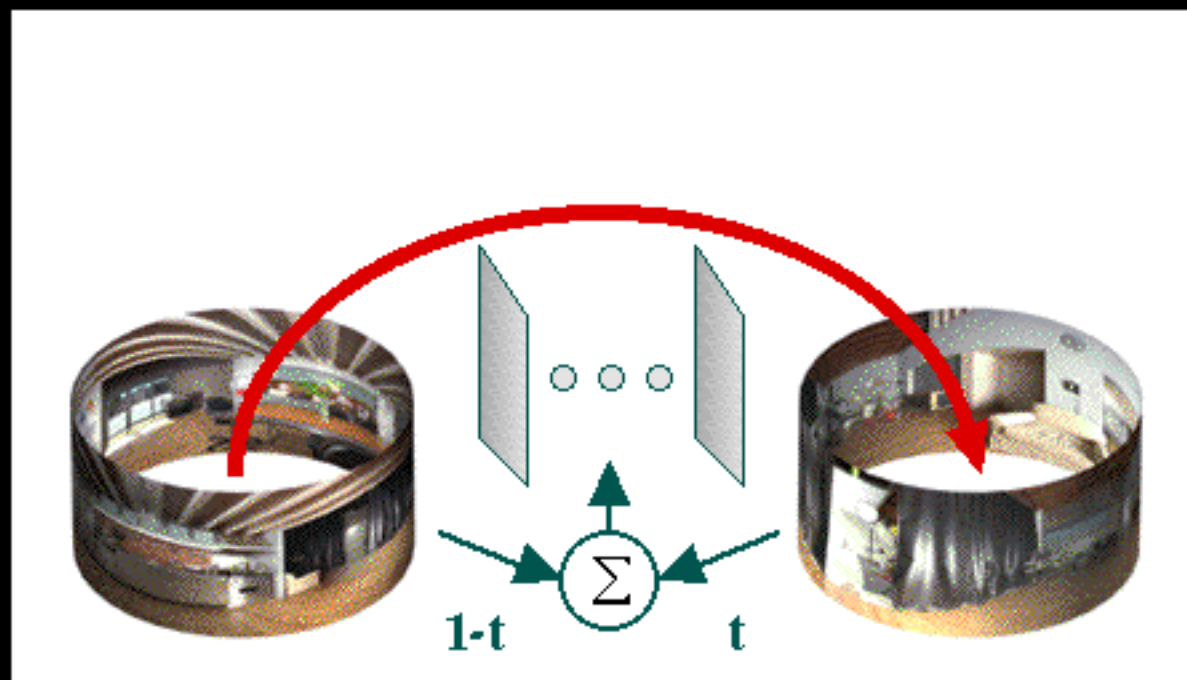


# Animated Transitions





# Interpolated Transitions





Demo

# Movies in Panoramas

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*– Yalin Xiong*

- **Movie Location fixed in panorama**
- **Movie Location changes in panorama**  
 (“Sprite”)
- **Object Movie within scene**







Demo

# Movies in Panoramas

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- Movie Location fixed in panorama
- Movie Location changes in panorama (“Sprite”)
- Object Movie within scene







Demo



# Movies in Panoramas

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- **Movie Location fixed in panorama**
- **Movie Location changes in panorama**  
("Sprite")
- **Object Movie within scene**





Demo





Q&A



The background of the image is a collage of various items: a magnifying glass with an Apple logo on its handle, a green pen holder with several pens, a globe, and some papers. The text is overlaid on this background.

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