**To Advance through Presentation
Use Page Up and Page Down Keys**

99 | Worldwide
Developers
Conference

QuickTime and the Internet

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QuickTime Engineering

QuickTime 4.0 and the Internet

- Application support
- Data Handler enhancements
- Plug-in enhancements
- QuickTime Streaming

Streaming Playback

- Fast-start
    - Guaranteed quality
    - Plays movie as it downloads to disk

- On-demand or live Streaming
    - Plays in real time
    - Doesn't store data to disk

Hybrid Movies

- Can combine Fast-start and Streaming or local and Streaming
    - Chapter Track and Streaming Track
    - Streaming sourcing an effect

Demo

Make Your Application a Good QuickTime Citizen

- Use the Movie Controller

- Automatic resize (hintsAllowDynamicResize)

- But if you really can't use the Movie Controller…
  - PrePrerollMovie

Start Movie Playing

- You really should use the Movie Controller

```
SetMoviePlayHints(m,
hintsAllowDynamicResize,
                hintsAllowDynamicResize);
MCDoAction(theController,
                mcActionPrerollAndPlay,
                (void *)fixed1);
```

If You Can't Use the Movie Controller...

```
SetMoviePlayHints(m,
hintsAllowDynamicResize,
                  hintsAllowDynamicResize);
PrePrerollMovie(m, 0, fixed1, nil, 0);
StartMovie(m);
```

- PrePrerollMovie can take a long time
  - Can pass an asynchronous completion proc
  - Or let it be synchronous

More Application Notes

- Streaming tracks can change while playing
  - Size
  - Duration
  - Presence of audio or video streams
  - Number of streams
- How do I know it changed?
  - Movie Controller action filter
    - **mcActionControllerSizeChanged**
    - **mcActionMovieEdited**

Other Issues...

- Infinite duration streams (live)
- All the streams are in a single track
  - Similar to QuickTime MPEG with audio and video streams in a single track
  - BUT—can have multiple Streaming tracks in a single Movie
- Fast-start movies not completely loaded
  - GetMaxLoadedTimeInMovie( )

Data Handler Updates

- URL data handler is new

- NewMovieFromDataRef supports MIME types

- Handle data handler updated to be more useful

  - See Ice Floe note
  <http://www.apple.com/quicktime/ developers/icefloe/>

URL Data Handler

- HTTP, FTP, FILE protocols
- Data reference is a Handle to a C string (null termination!)

```
Movie m;

Handle dataRef;

char url[ ] = "http://www.apple.com/starwars.mov"

PtrToHand(url, &dataRef, sizeof(url) + 1);

NewMovieFromDataRef(&m, newMovieActive, nil, dataRef,
        URLDataHandlerSubType);

DisposeHandle(dataRef);
```

Data Handlers and Data Types

- To determine the extension
  DataHGetFileName( );

- To retrieve a Mac OS file type for data
  DataHGetMacOSFileType( );

- To retrieve the data's MIME type
  DataHGetMIMEType( );

GetFileSize

- How many bytes are in the file?
  DataHGetFileSize( );

- How many bytes are accessible in the file right now?
  DataHGetAvailableFileSize( );

- But GetFileSize( ) might take a long time
  - Asynchronous call
    DataHGetFileSizeAsync( );

notEnoughDataErr (-2149)

- Indicates the read request is within the file but can't be read in a "reasonable" amount of time

- Typically from a synchronous request that timed out

QuickTime Plug-in

- Plays QuickTime media in web browser
    - Any media type—
      not just QuickTime Movies

- QT 3.0 features you might not know about
    - Poster-frame movies
    - Alternate Movies

Streaming Movies with the Plug-in

- http and rtsp

- Embedding a movie file that contains an rtsp reference

- Streaming without any movie file at all (QTSRC)

Miscellaneous Tags

- More on QTSRC
- QTSRCCHOKESPEED
- QTNEXT tag (and accompanying "GOTO" value)
- STARTTIME and ENDTIME

More Plug-in features

- Target="QuickTimePlayer"

- "No save" option

- KIOSKMODE tag

- MOVIENAME and MOVIEID tags; event sending

- Enhanced BGCOLOR tag lets you specify HTML color names

Demo

Open Standards

- RTSP (Real-Time Streaming Protocol)—control

- RTP (Real-Time Protocol)—media transport

- SDP (Session Description Protocol)—media description

- Many codecs—H.261, H.263, JPEG, GSM, μLaw, aLaw, DVI, raw audio

Media Formats

- Video

- Sound

- Music

- Text
    - URL links
        - Automatic or manual (with click)

Codecs

- PureVoice vs. QDesign

- Sorenson vs. H.263

- H.261, H.263, JPEG, GSM, μLaw, aLaw, DVI for interoperability with other vendors (VIC, VAT, Cisco's IP/TV)

Streaming Process

- Hinting (packetizing)

- Serving—Mac OS X and open source (Darwin), SGI, IBM, Sun

- Network

- Client (reassembling)

- Live broadcasts are similar

Hinting

Original Image

Hinting

Original Image

Packetized Image

Streaming — Reflector

Firewalls

- Instructions on configuring your firewall
  <http://www.apple.com/quicktime/resources/qt4/us/proxy/>

- RTSP/RTP Proxy source code

- Vendors that work with RTP/RTSP today
  - Firewalls
    - CheckPoint
  - NAT
    - FlowPoint, Vicom

Developer Opportunities

- Packetizers—media data --> packets

- Reassembler—packets --> media data

  - Send media data to Stream Handlers which uses Image Compression Manager or Sound Manager

Writing a Packetizer/Reassembler

- QuickTime generic
- Better way of packing specific codecs
  - Reduce data rate
  - Recover from packet loss
- http://www.ietf.org/html.charters/avt-charter.html
- http://www.apple.com/quicktime

Performance

- Internet—28.8, 56K, ISDN
- Intranet—megabits

Demo

Think different.™

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