

Halo 3: Audio Post Mortem

Marty O'Donnell

Audio Director / Composer

Jay Weinland

Audio Lead / Sound Design

C Paul Johnson

Sound Designer / Add'l Composition

Mike Salvatori

Additional Composition

## The Rest of the Team

Mat Noguchi – Audio Programmer

Aaron Nichols – Additional Programming

Peter Comley – Additional Sound Design

Mark Yeend – Additional Sound Design

Stan LePard – Orchestrator

Simon James – Music Contractor

David Sabee – Music Contractor / Conductor

Joe Crnko – Conductor

Reed Rudy – Music Recording Engineer - Seattle

Bryan Hensley – Dialog Recording Engineer Chicago

David Atherton – Dialog Recording Engineer LA

Bindlight Media – Casting and Contracting

# Overview

- The Gory Details
  - Moving from Xbox to Xbox 360
  - Technical Challenges
  - Cinematics
  - Dialog
- The Fun Stuff
  - LOD's
  - Ambience
- Music And Playing Nice Together

# Moving To Xbox360

- No Hard Drive
  - XBOX
    - Sounds resident on hard drive for fast access
    - Very little RAM used
    - No data size restrictions
  - XBOX 360
    - All sounds need to be in RAM
- No Audio Chip
  - No Free DSP
  - No Free Rendering (3d positioning)
- Programming Support
  - Bulk of engine ported relatively early on in development
  - Key Elements were left undone until late (DSP, voice optimization)
  - They Nicked Our Programmer

# Solutions

- **No Hard Drive**
  - If user = HD all is well with the world
  - No HD meant we stripped permutations programatically
  - We were able to salvage permutations on some sounds
- **No Audio Chip**
  - Ended up using all of thread 5 and most of thread 4
  - Decoding vs. Rendering
  - 32 mono, 32 stereo, ~12 4.0, and ~8 5.1 voices allocated
  - Voice Priorities via class AND distance
- **Waves Plug-Ins**
  - Licensed L360, Q10, C1, C4, RenVerb
  - Custom L360 with L1 algorithms
  - Q10 for radio, occlusion, and obstruction
  - Presets exported directly out of Pro Tools
  - Ren Verb too expensive
- **XMA FTW!**
  - Much improved audio quality
  - Default of 75, most assets at 50, combat dialog at 40

# Cinematics

- **Pre-Rendered**
  - Carry on – head to Pro Tools and GO
- **Halo 1**
  - Everything In Engine
  - Let anything triggered by game engine play
  - Director scripted additional foley as necessary
  - Vehicles were triggered by playback
  - No frame accurate sync
- **Halo 2**
  - Anything triggered by game engine played
  - Vehicles were animated only - boo
  - Audio scripted vehicle acceleration/deacceleration
  - Director scripted additional foley – still no sync
- **Halo 3**
  - Finally – SYNC!
  - Captured all in-engine SFX into 5.1 track
  - Posted to video capture
  - Exported 6-channels AIFF file – imports directly into engine
  - Powerful tool to hitch up ambience and music – Director not needed

NON FACETE NOBIS CALCITRARE VESTRYM

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# Dialog

- Halo 2

- ~385 AI states – 2 to 10 permutations per state
- 25 actors, 21,000 lines produced
- We needed to cut back

- Halo 3

- ~290 AI States – 2 to 10 permutations per state
- 34 actors – entered studio with more written lines
- Net result = 34,000 lines produced

- Lessons Learned

- Focus on “bang for the buck”
  - Rare categories trimmed or removed
  - Mission dialog finalized earlier
- Consistent vision from design/programming/writers/audio
- Avoid the fire drills – Start Early!

- Outtakes

# Sound LOD System

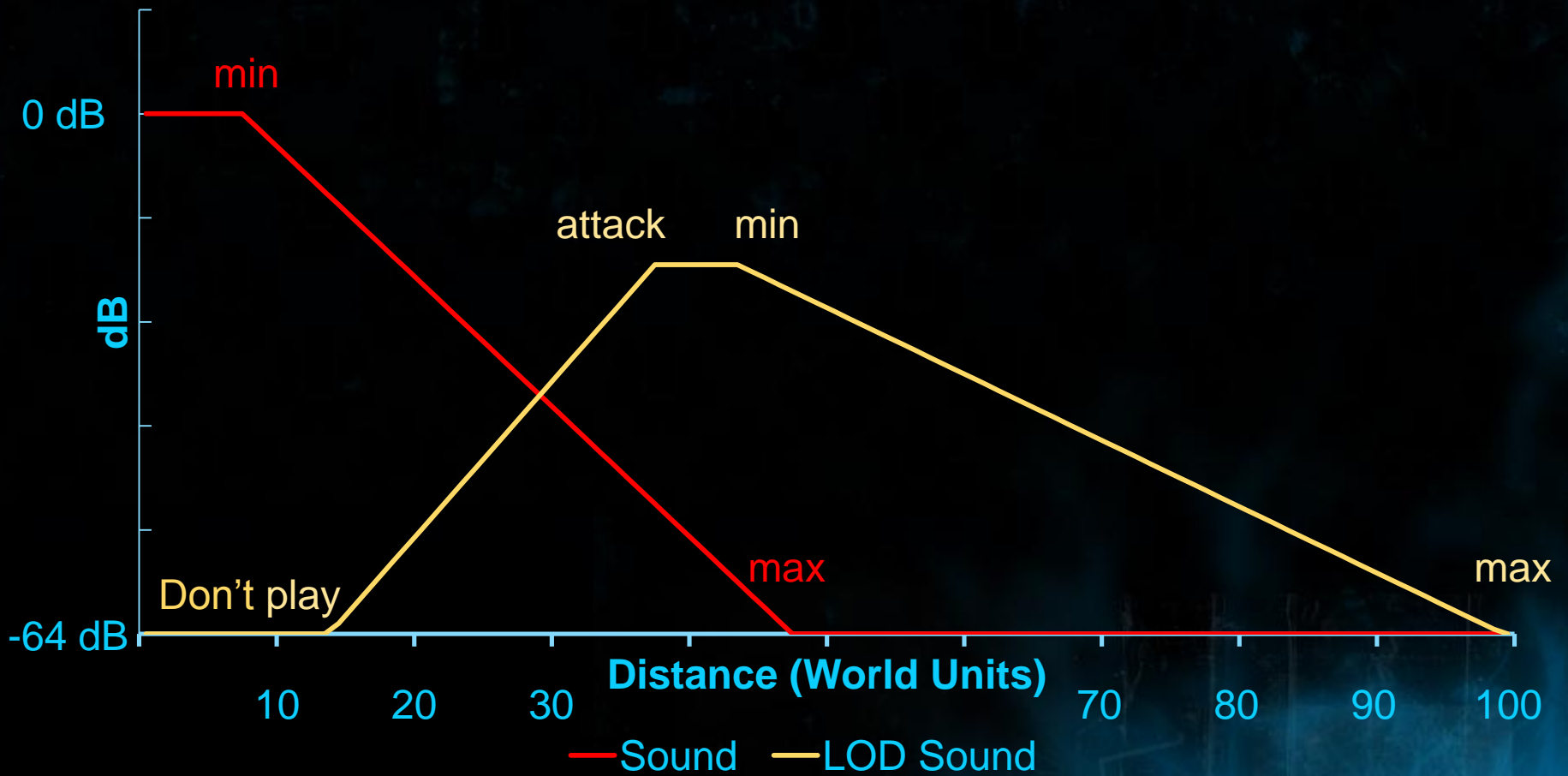
Distance based volume envelopes  
to cross-fade between close and  
distant sounding samples



# We Can L.O.D. Any Sound

- Four point envelope on all sound tags
- Don't play, Attack, Min, Max
- Hook two sound tags to the source with inverse parameters

# Grenade L.O.D.'s



# Ambience

# Ambience Features

- Multiple loops played back with randomness – stereo, quad, or 5.1
- One shot details layered on top – can be mono, stereo, surround
- Sound Points placed in level editor
- The engine crossfades between ambient zones based on distance.

# Creating Loops Quickly

- Cut the file at the desired loop point
- Drag the beginning to the end
- Crossfade in the middle (you now have a loop)
- Cut data from the middle of the loop you just created to create variations

# Tips

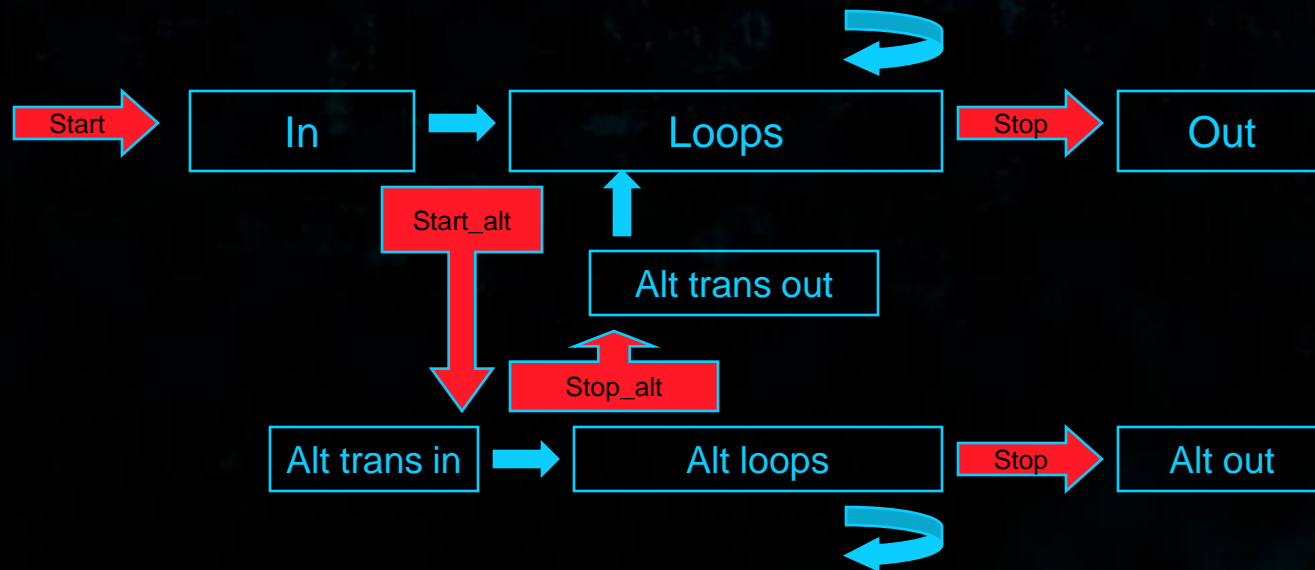
- Mix adjoining ambiances into each other
- Don't sound design too literally. Create a sound scape for people to enjoy
- Don't squash the rest of your mix
- Listen to your ambiances for hours on end



# Marty and Mike

# Looping Tag

Instructions for playing back specific sound tags



## 4 Commands:

Start  
Start\_alt  
Stop\_alt  
Stop

## Transitions:

Xfades  
At marker

## Duration:

Infinity  
Bored now

## Overlap:

Stops music  
Doesn't stop music

# Wrap Up

The Ear Doesn't Blink

Sound Makes It Real-Music Makes You Feel

First Do No Annoying

Make Someone Happy

# Questions?



These slides will be available online  
Feb. 25th, 2008

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