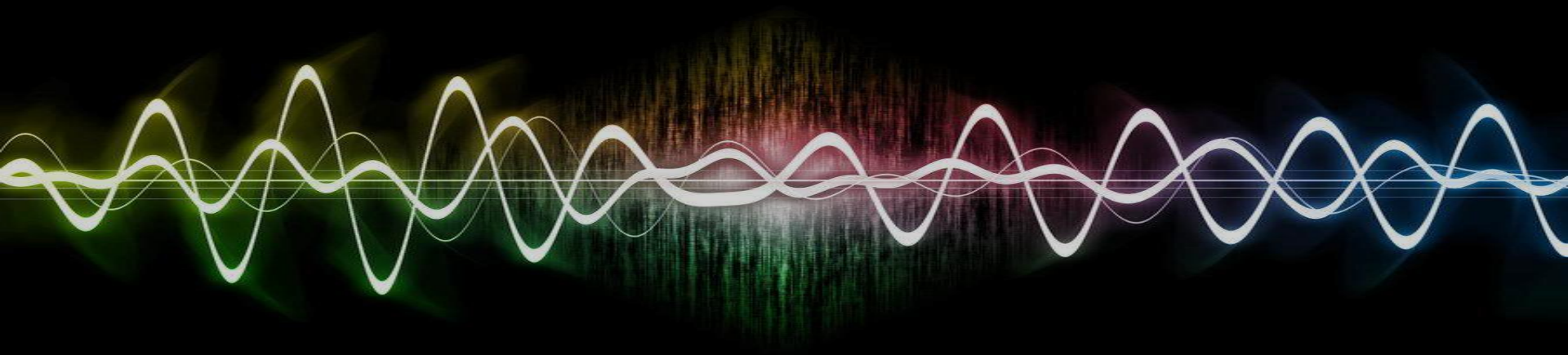# IMGD 4000 Guest Lecture:
"Audio in Game Development"

Keith Zizza, IMGD Professor of Practice (Game Audio)
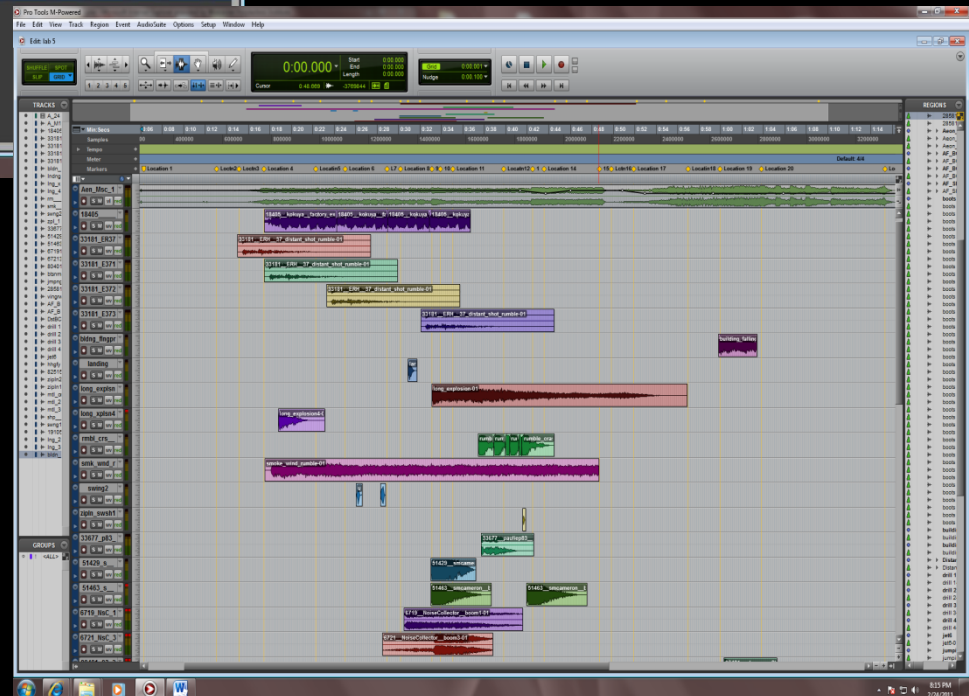
kzizza@wpi.edu
Office: Salisbury Labs 205
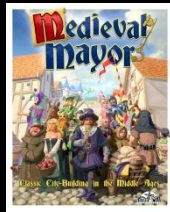
Keith Zizza, IMGD Professor of Practice

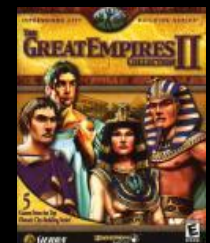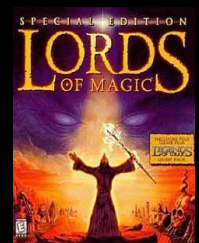- Active in Game Industry for 17 years
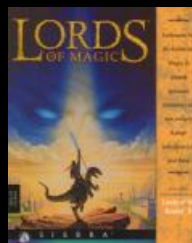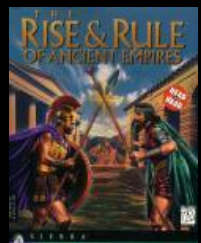
- Specializing in Game Audio

- Recording, Editing, Mixing
- Aesthetic and Technical Issues
- Audio Design and Technology
- Music, Sound, and Dialogue
- Real-Time Soundscapes

Keith Zizza, IMGD Professor of Practice

Game Audio Consultant for recent projects:

Other games include:
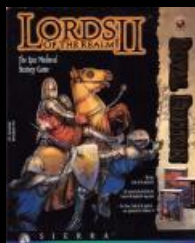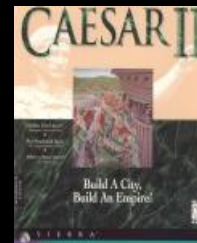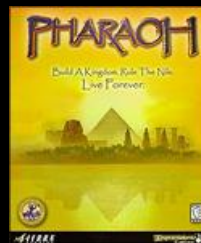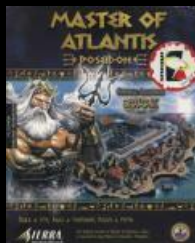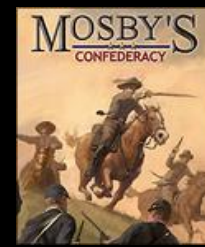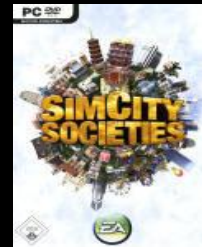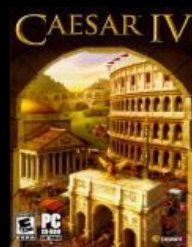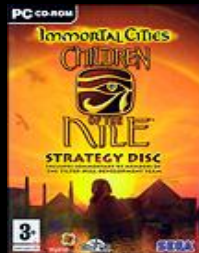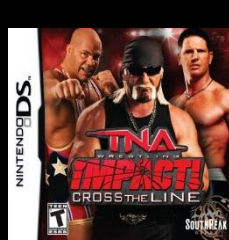
Audio in Game Development

Purpose of Game Audio

The Soundscape

Roles in Game Audio Design

Recording Sound, Music, and Dialogue

Making It Sound Good

Getting It in the Game

Purpose of Game Audio

Purpose of Game Audio

Game audio provides three basic functions**:**

- **Provides Feedback to Player**

- **Adds to Immersion**

- **Adds Entertainment Value**

Purpose of Game Audio

Game audio can also provide a **UNIQUE** experience to each player.

Sound, Music, and Dialogue combine in various ways to help "sell" the game, and to suspend your disbelief.

MLB 2K 11

The Soundscape

The Soundscape

This total mix of music, sound, and / or dialogue is also known as the game's **SOUNDSCAPE**. The best soundscapes will be transparent to the player and not distract them from the game itself.

Star Wars – The Old Republic

The Soundscape

Components of the Game Soundscape

- **Music**

- **Sound**

- **Dialogue**

The Soundscape

Music

- Cinematics / In-game cutscenes

- Main Menu

- World / Environment based

- Character-based

- Milestone / Level up

- Ambient

- Battle / Challenge

The Soundscape

Sound

- Broadest scope of assets / total experience

- Simple to complex palette

- Cinematics / In-game cutscenes

- Ambience

- Objects

- Actions & Reactions

- *User Interface*

The Soundscape

Sound: User Interface

- Heads-up-display (HUD), indicator bars, lights, etc.

- Menu / in-game buttons and sliders

- *Any button, message, popup, or indicator sound*

The Soundscape

Dialogue

- Characters vs. Narrator(s)

- Cinematics / In-game cutscenes

- Wide variety of actors / actresses

- Foreign languages = Localization

- Dialogue as sound effects

- *Note*: Maintaining continuity

- *Note*: Most outsourced scheduling

Roles in Game Audio Design

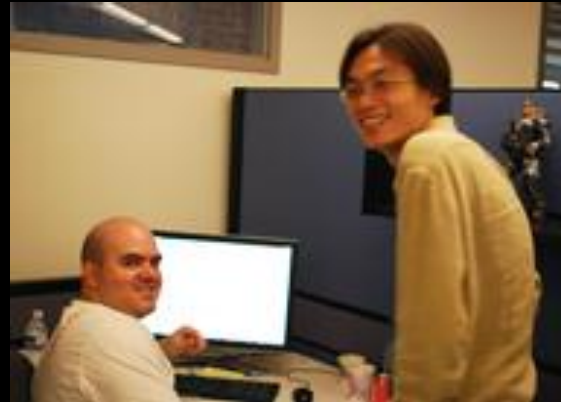# Roles in Game Audio Design

Components of Game Company, in no particular order

	Biz / Legal	
Programming	Art	Audio
Design	Production	Writing
QA / Testing	IT / Net	Web

Roles in Game Audio Design

Often you'll see a large group working together in a common area: artists, animators, writers, producers, and designers.

Roles in Game Audio Design

But almost always, in a remote office, studio, or cave, lurks the audio designer. We need to shut out visual stimuli and other audible distractions.

It's worth noting, audio personnel need to get out more! It can sometimes be a challenge to stay integrated with the team, often having to work in a more isolated environment.

Roles in Game Audio Design

Audio Director

Audio Manager

Audio Lead

Audio Editor
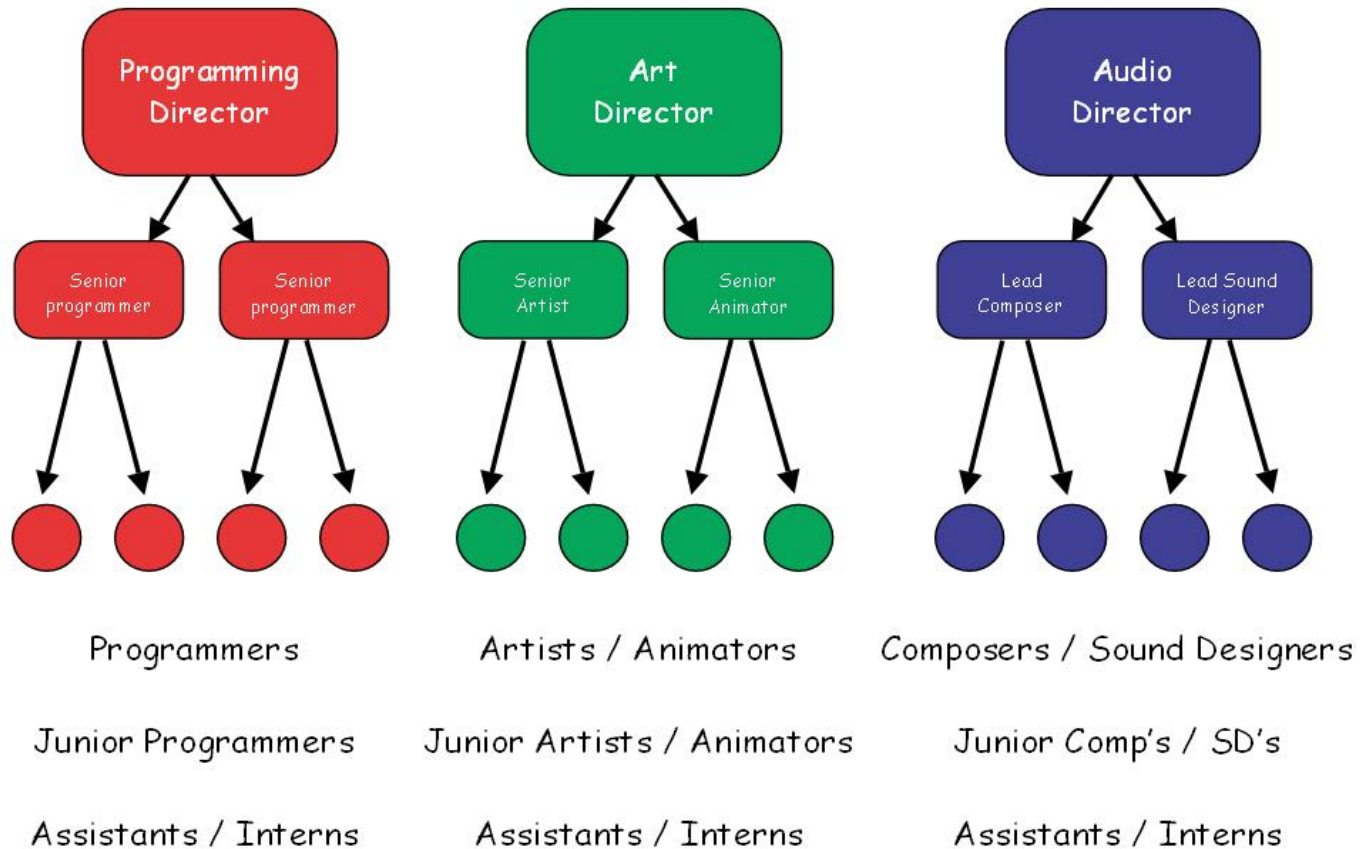
Voiceover (VO) Director

Composer

Sound Designer

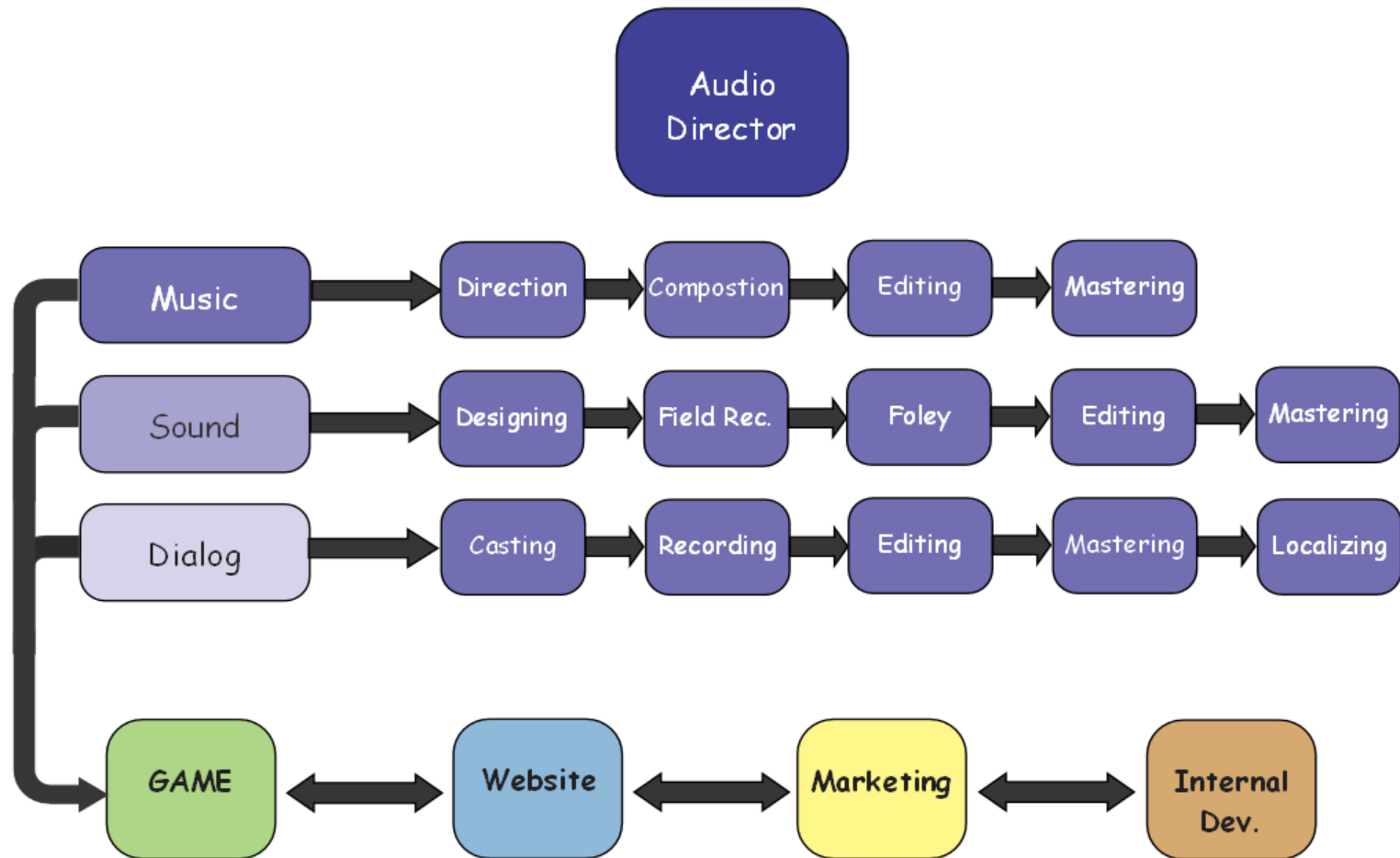Audio Programmer

Assistants and Interns

Roles in Game Audio Design

Roles in Game Audio Design

The Audio Director is accountable for:

Audio Director

Music	→	Direction	→	Compostion	→	Editing	→	Mastering		
Sound	→	Designing	→	Field Rec.	→	Foley	→	Editing	→	Mastering
Dialog	→	Casting	→	Recording	→	Editing	→	Mastering	→	Localizing

GAME ↔ Website ↔ Marketing ↔ Internal Dev.

Across MULTIPLE projects

Roles in Game Audio Design

In a smaller company, you will probably handle most or ALL of these roles yourself!

Audio Director

Audio Manager

Audio Lead

Audio Editor

Voiceover (VO) Director

Composer

Sound Designer

Audio Programmer

Assistants and Interns

Roles in Game Audio Design

Any of these roles (usually not the Audio Director) can be contracted out "Third Party"

Audio Director

Audio Manager

Audio Lead

Audio Editor

Voiceover (VO) Director

Composer

Sound Designer

Audio Programmer

Assistants and Interns

Recording Sound, Music, and Dialogue

Before You Begin

Start working on a solution to the audio design, with the programmers and designers.

Define a set of rules or a guide for the technology being used.

Before You Begin

Need to set up ideas and concepts early on, working with designers and concept artists.

Starting early also gives us a better sense of the style, scope, and technical challenges of the project.

Reality dictates that starting early is often not the case, unless there is an in-house sound department. More often than not, the work is contracted out.

Before You Begin

First ideas are usually overly optimistic (100,000 sound effects!)

Need to create an **Audio Asset List**.

Need to create a **Schedule** with the **Producer**.

Before You Begin

Example of a Audio Asset List

Recording Sound Effects

Remote (Field) Recording

Requires skill and patience – but can add originality, amazing depth

Recording Sound Effects

Foley Recording

Foley is the art of synchronizing sound effects to on-screen (or for us, in-game) actions.

Named after Jack Foley, the who created the technique for movies in the early 20th century.

Recording Sound Effects

Foley Recording

The "classical" definition of **Foley** is the art of synchronizing sound effects to film or video.

The person performing is in fact, a *Foley Artist*.

Recording Sound Effects

Foley Recording

Sometimes we *have* to record Foley if we can't get the right sound effects to work. Here's an example of some Foley I had to do for a brick maker in SEGA's Children of The Nile™:

Sequence: Make Bricks   Variant: 3   Speed: 135 ms/frame

Scoop mixture

Frame 28
make_bricks_1a

1a 2a 3a 4a

Place in box

Frame 5
make_bricks_1b

1b 2b 3b 4b

Drag board

Frame 16
make_bricks_1c

1c 2c 3c 4c

Drop board

Frame 23
make_bricks_1d

1d 2d 3d 4d

Recording Sound Effects

Studio Recording / Custom Sound Design

Vocal sound absorbers

Ceiling treatments

Total room solutions
(sold as a package)
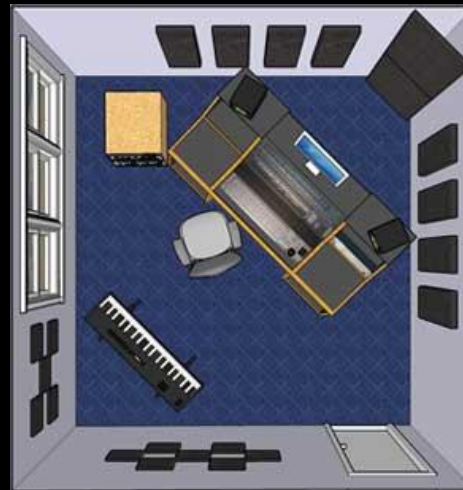
Recording Sound Effects

Off-the-Shelf Solutions

Recording Sound Effects

Off-the-Shelf Solutions

Sound Effects Marketplaces / Subscriptions:

Buy a single sound, or subscribe annually to download as many sounds as you want, under the license terms.

Recording Music

Live Recording

Commercial Recording Studios are used when we need to capture live performances, and have access to the best equipment and acoustic space. The only disadvantage is the cost, and keeping an eye on the studio clock.

Ron Jones conducting in a commercial studio

Recording Music

Studio Recording

Personal Project Studios are in greater use today, now that many recording tools are more affordable and can be "virtualized" in the computer.

A great advantage here is that the composer has 100% control over the entire recording process, and session time. And there is no monetary overhead (aside from having to purchase your own equipment).

Recording Music

Studio Recording

Other Music Creation Methods besides live recording include MIDI sequencing, virtual instruments, samplers, and looping software, such as Sony's Acid (below).

*Alesis iPad Audio Dock
running GarageBand*
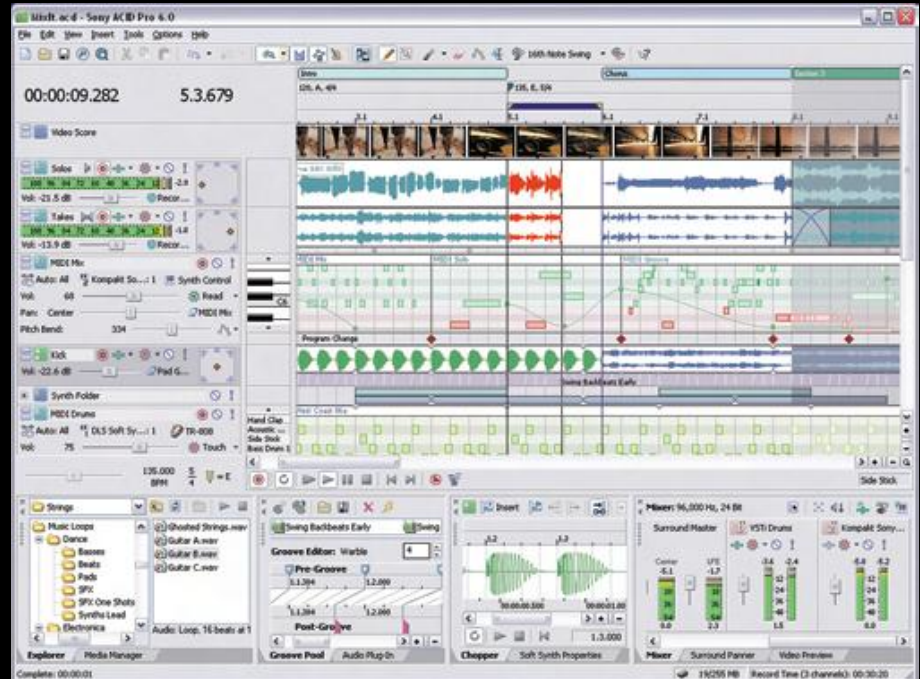
Recording Music

Studio Recording

Other Music Creation Methods besides live recording include MIDI sequencing, virtual instruments, samplers, and looping software, such as Sony's Acid (below).

The Wallander Brass Virtual Instrument Environment
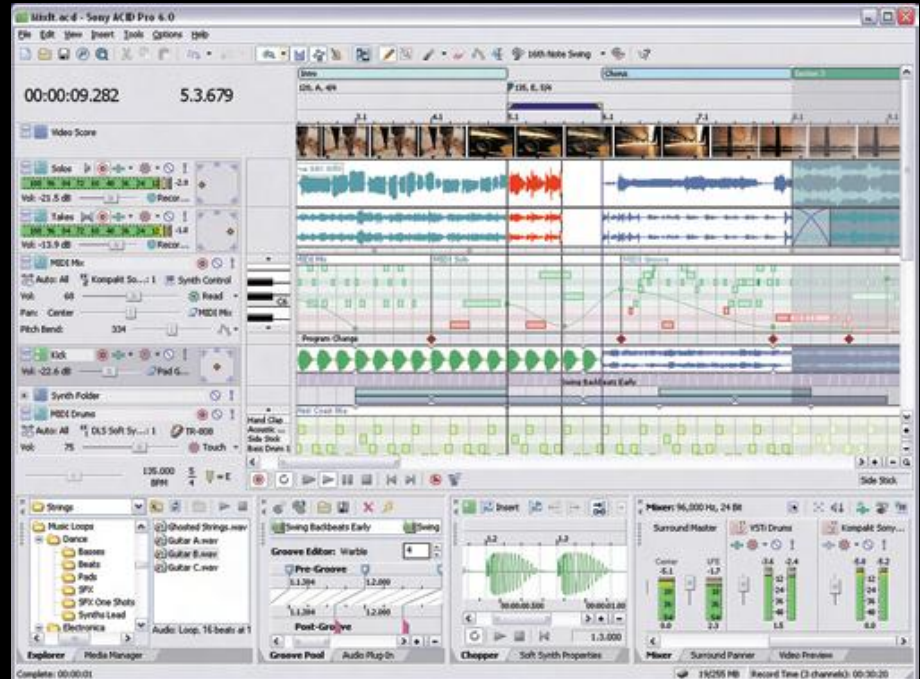
Recording Dialogue
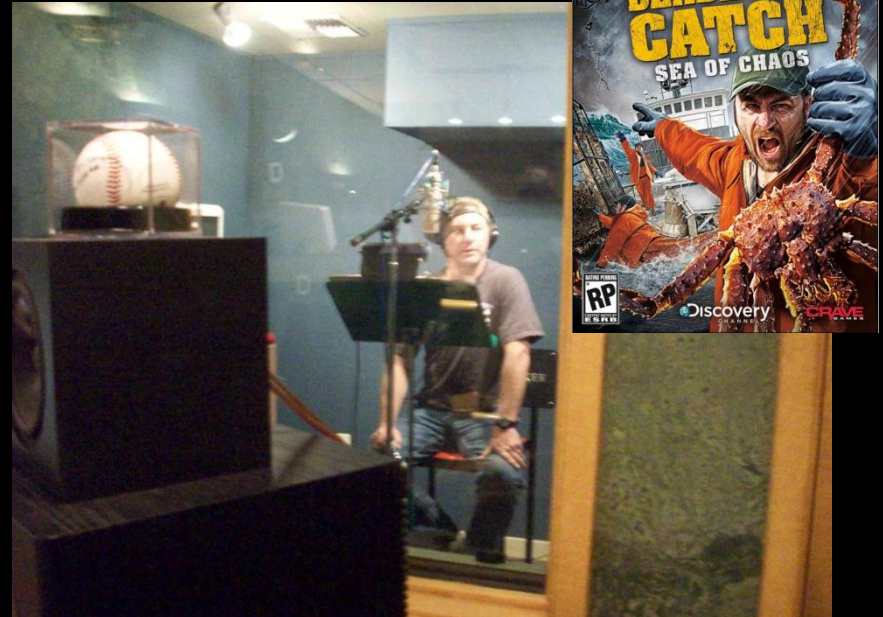
Andy Hillstrand at *Bad Animals* Recording Studio in Seattle

The dialogue is recorded with the VO director / coach, voice talent, and recording engineer. Providing encouragement to the voice talent and having a sense of humor are a must!

Recording Dialogue

Scripts are normally read in a linear fashion, but in the case of Interactive or Adaptive Dialogue, scripts can be printed in a "flowchart"-style format for reading through possible dialogue paths.
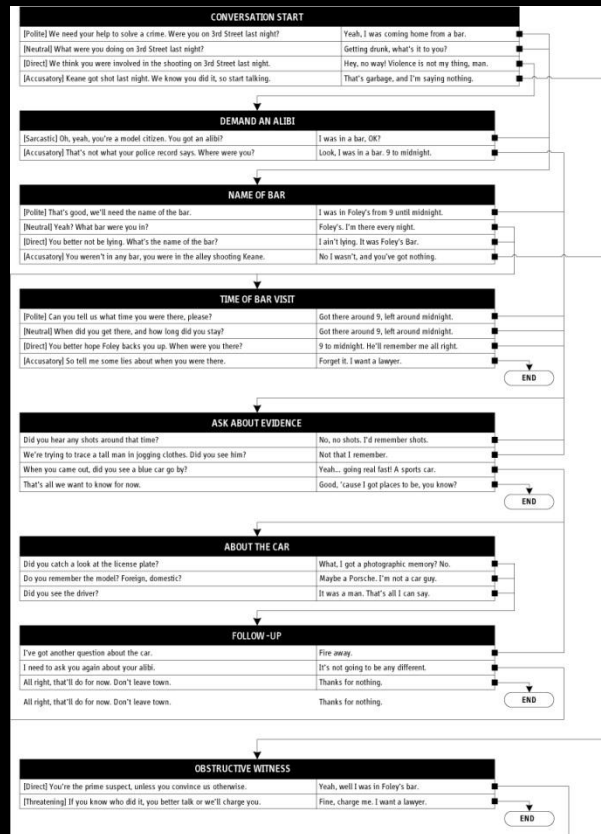
Lani Minella of *AudioGodz* casting services

Recording Dialogue

Above all you have to try to **stay on schedule**, receive **advice and criticism** from people in the voice session, and also **be confident** in your abilities to manage the process.

There will be a lot of **opinions** offered, but as the VO Director / Coach, it's up to you to **take charge** and decide what the best approaches will be for the voice talent.

Seated behind Keith:

- 4 Executives from Discovery Channel

- 3 Executives from the game publisher

- Studio Manager and Recording Engineer

- Temperature in room: about 80 degrees

- Opinions: MANY

- Stress level: What do YOU think!?!? ☺

Keith with Johnathan Hillstrand, recording VO
For Deadliest Catch: Sea of Chaos

Recording Dialogue
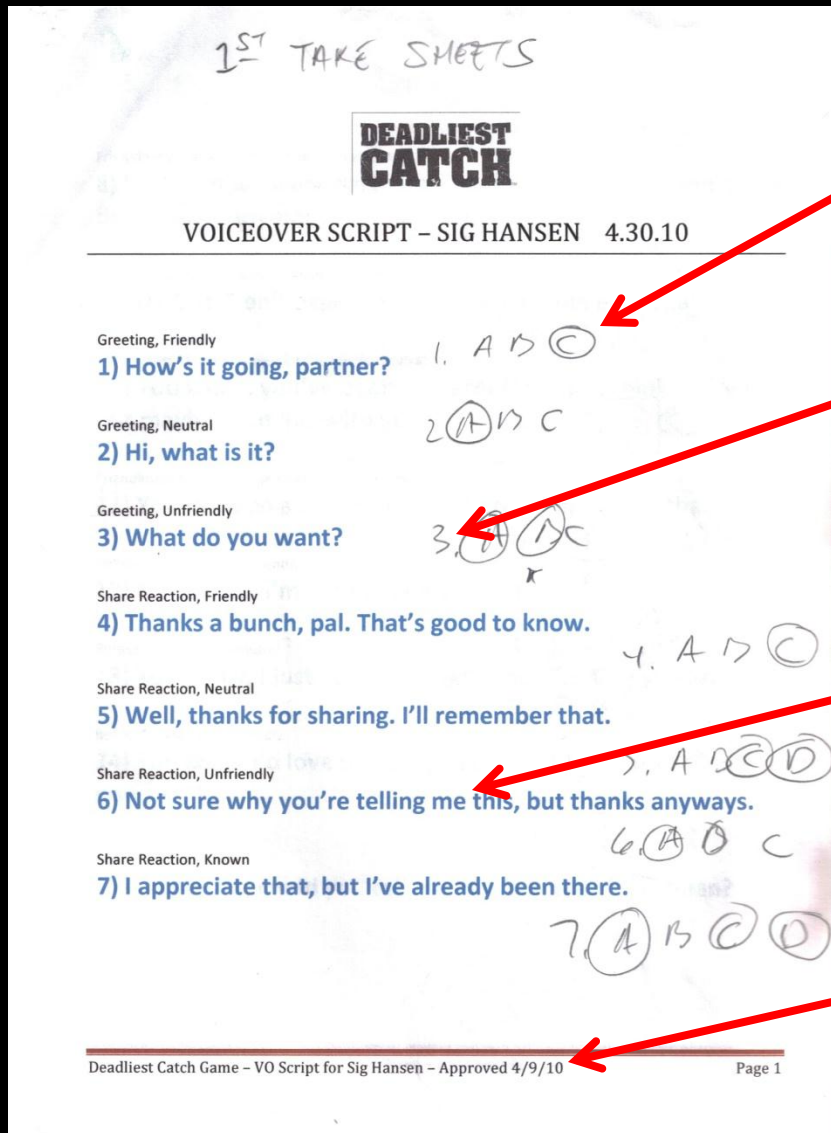
The script is marked up with the various "good" takes (A, B, C, etc) for reference later.

Takes marked "2", "3", and so on are usually returned to the audio editor as "Take 2.wav", "Take 3.wav".

Font size is **LARGE** and pages are formatted, so everyone can read the script clearly. Plus, there's lots of space for writing notes.

Also good to have something on the script that says "approved", as there could be several versions available. Only **one** is the final version!

Making it Sound Good

Making It Sound Good

When working with audio files, we are not just limited to the raw material itself.
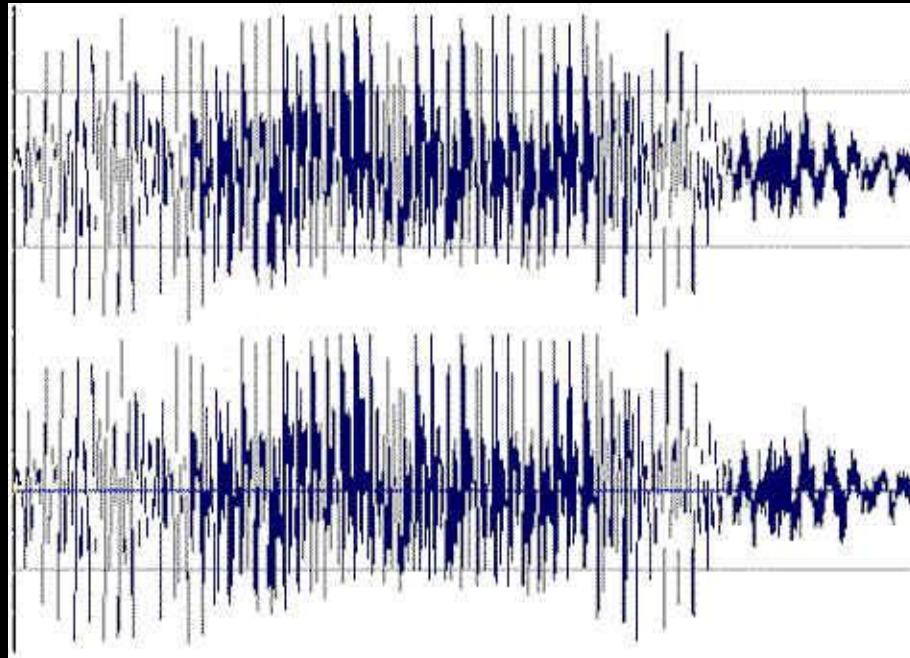
We can manipulate the audio in various ways, especially in the application of sound effects.

Making It Sound Good

Once in the computer, we can apply various adjustments, such as dynamics, frequency balancing ("EQ") and special effects.
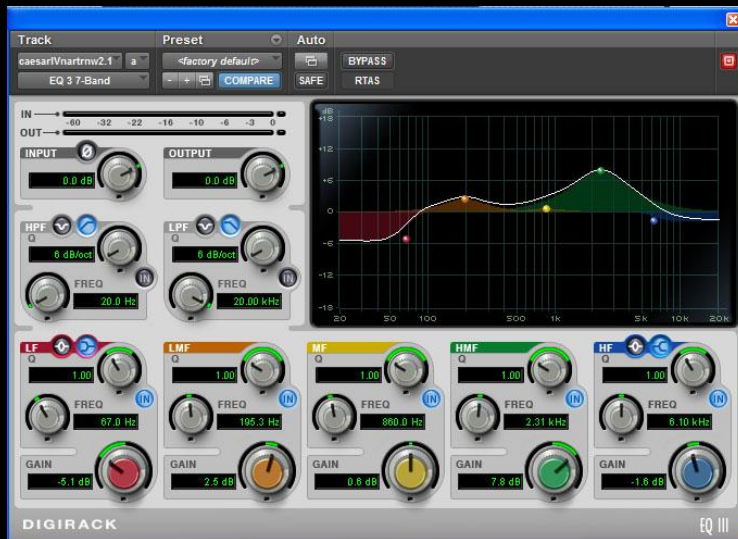
As a whole, these techniques are often called "DSP", or Digital Signal Processing.

Making It Sound Good

Audio Editors

Audio Editing software usually implies that we're working with a two-channel (stereo) editing system.
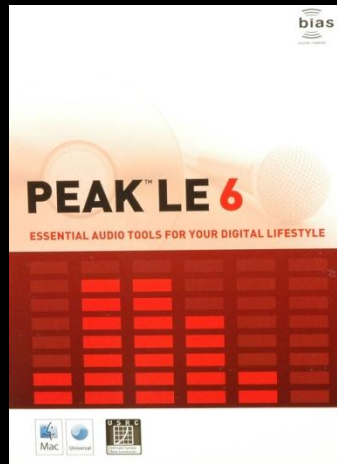
Here we can get very in-depth and "surgical" with our individual sound files, all the way down to the sample level.

Making It Sound Good

Audio Editors

Audio Editing software usually implies that we're working with a **two-channel** (stereo) editing system.
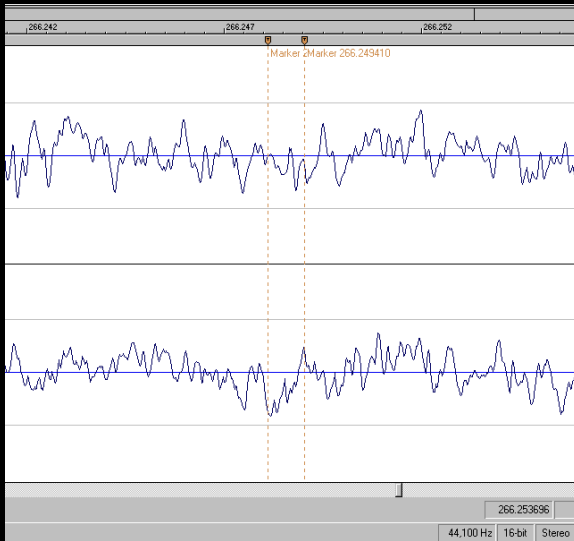
Sound Forge
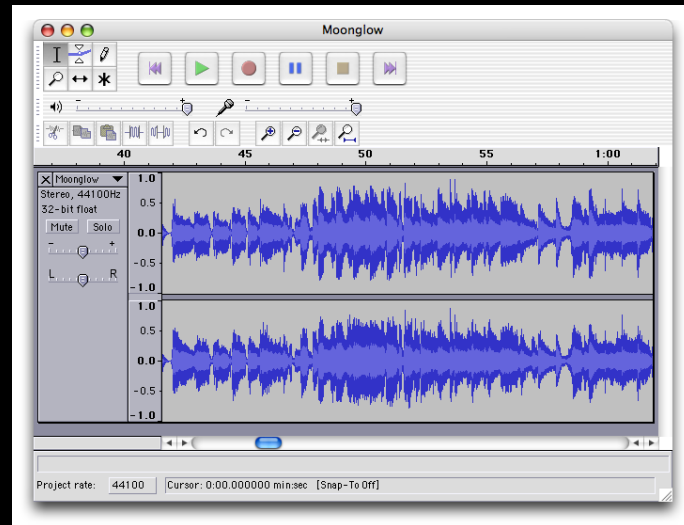
Audacity

Here we can get very in-depth and "surgical" with our individual sound files, all the way down to the sample level.

Making It Sound Good

Multitrack Editors

When dealing with **multiple files** at once, mixing, and syncing to video (among other tasks), Multitrack Editors are essential to audio production.

Pro Tools Editing Software

Making It Sound Good

Multitrack Editors

When dealing with **multiple files** at once, mixing, and syncing to video (among other tasks), Multitrack Editors are essential to audio production.

Garageband for iPad

Making It Sound Good

Looping Software

Sample-based file creation can be accomplished with Looping Software, which is a **specialized version** of Multitrack Editing Software.
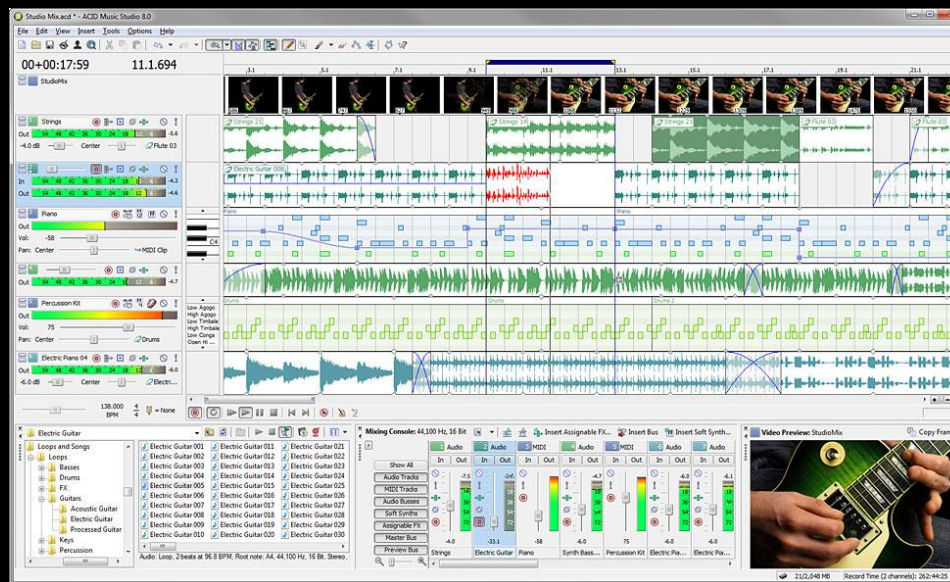
Drum Loop

Backing Loop

Result

Sample source: Zero-G Urban Underground, leased to Keith Zizza, Course Instructor.

Used mostly for quick music production from existing elements (drums, bass, guitar, keyboards, vocals, etc). Pitch and time can be manipulated to join all loops together seamlessly.

Making It Sound Good

Sequencers

What is also known as Tracking Software, Sequencers are focused on pure **music production** using a variety of input sources (from an audio interface).

Apple Logic Express and Logic Studio

Making It Sound Good

Plug-ins

Plug-ins are used as auxiliary programs in our "host" application (Pro Tools, etc) when we want to apply special effects, EQ, or dynamics processing to a particular sound or audio track.

Waves Platinum Bundle Plug-in Family

Making It Sound Good

Plug-ins

A large variety of plug-ins (usually virtual **effects**, or **DSP**, are necessary for adding variety, interest, and "pop" to sounds in game development.

Creature Vocal – before plug-in

Creature Vocal – after plug-in

Witch Laughter – before plug-in

Witch Laughter – after plug-in

Making It Sound Good

Plug-ins

Often you can chain plug-ins one after another, in real time, to cascade multiple types of effects onto a single audio clip.

Tutorial Voice – before plug-ins

Adding Doubler plug-in

Doubler + Pitch plug-in

Doubler + Pitch + Reverb plug-in

Getting It in the Game

Game Audio Resources

Game Audio Professionals are always competing for console / PC **resources**:

- **Memory**
- **CPU**
- **Number of Channels**
- **Real time Effects**

In Game Development (or any business):
The Triangle of Compromise

Fast

Cheap

Quality
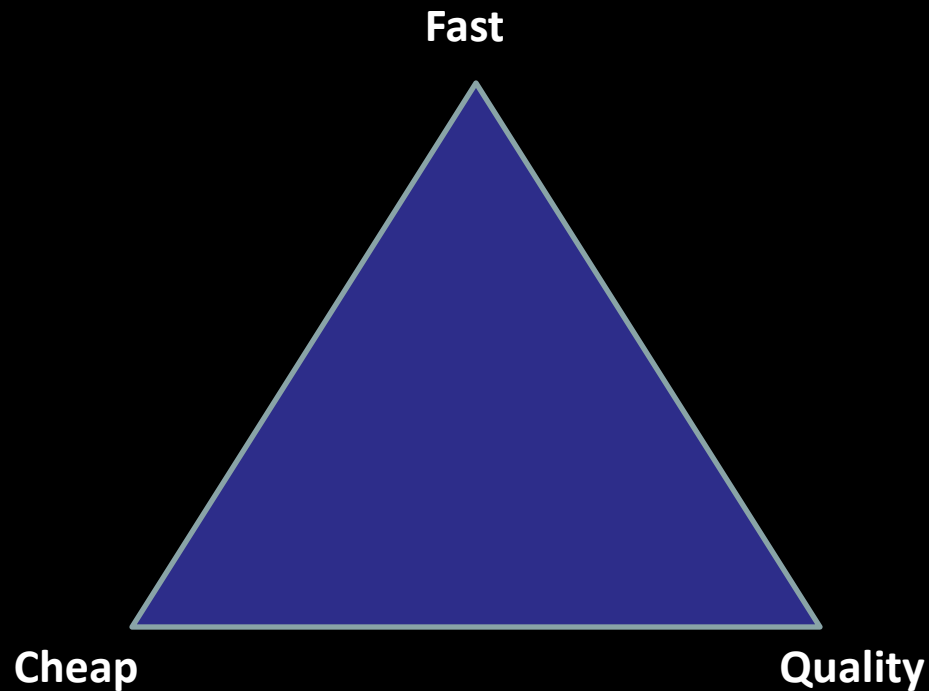
Game Audio Resources: The Triangle of Compromise
(or "The Triangle of Pain")

Memory

Variation

Quality
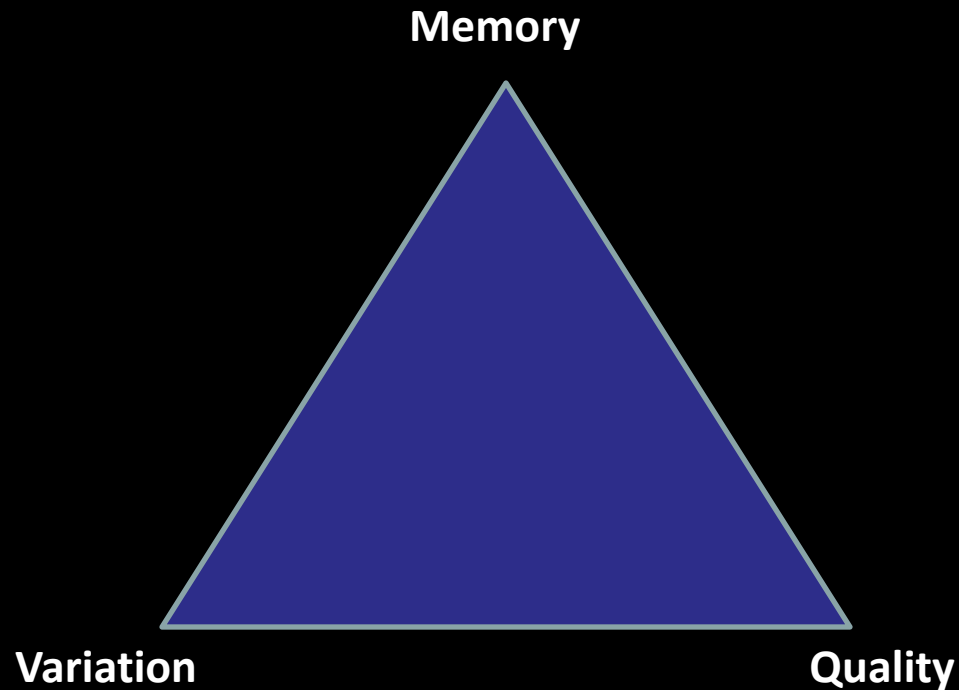
Getting It in the Game: Integration

Scripting Systems

Scripts (high-level code such as XML, C#, or a custom language) can be used to call up and manipulate sounds and special effects in a game.

Getting It in the Game: Integration

Scripting Systems

These can be either typed from scratch or generated automatically from a database or special software application.

```
new AudioDescription(AudioNonLooping)
{
volume = 1.0;
isLooping= false;
is3D = false;
type = $GuiAudioType;
};

new AudioDescription(AudioLooping)
{
volume = 1.0;
isLooping= true;
is3D = false;
type = $GuiAudioType;
};
```

Torque audio script segment

Getting It in the Game: Integration

Scripting Systems

The programmer then simply drops the script into the existing code, saving a considerable amount of time.

```
new
AudioDescription(AudioNonLooping)
{
volume = 1.0;
isLooping= false;
is3D = false;
type = $GuiAudioType;
};

new AudioDescription(AudioLooping)
{
volume = 1.0;
isLooping= true;
is3D = false;
type = $GuiAudioType;
};
```

Getting It in the Game: Integration

Scripting Systems

Microsoft DirectMusic Producer (Xbox)

Getting It in the Game: Integration

Scripting Systems

Sony SCREAM Tool (PS3)
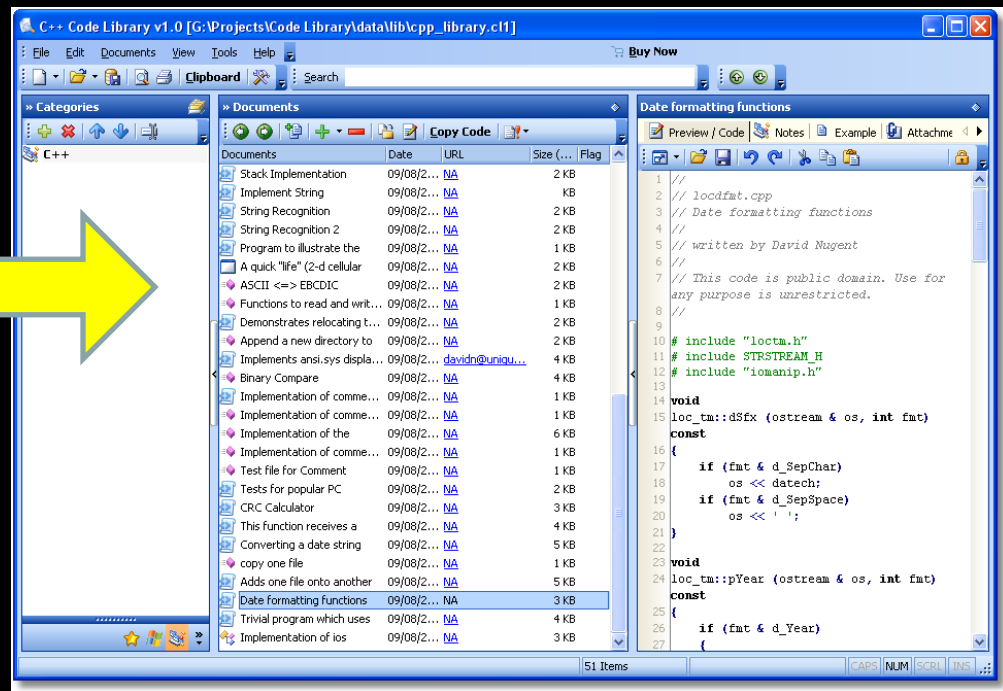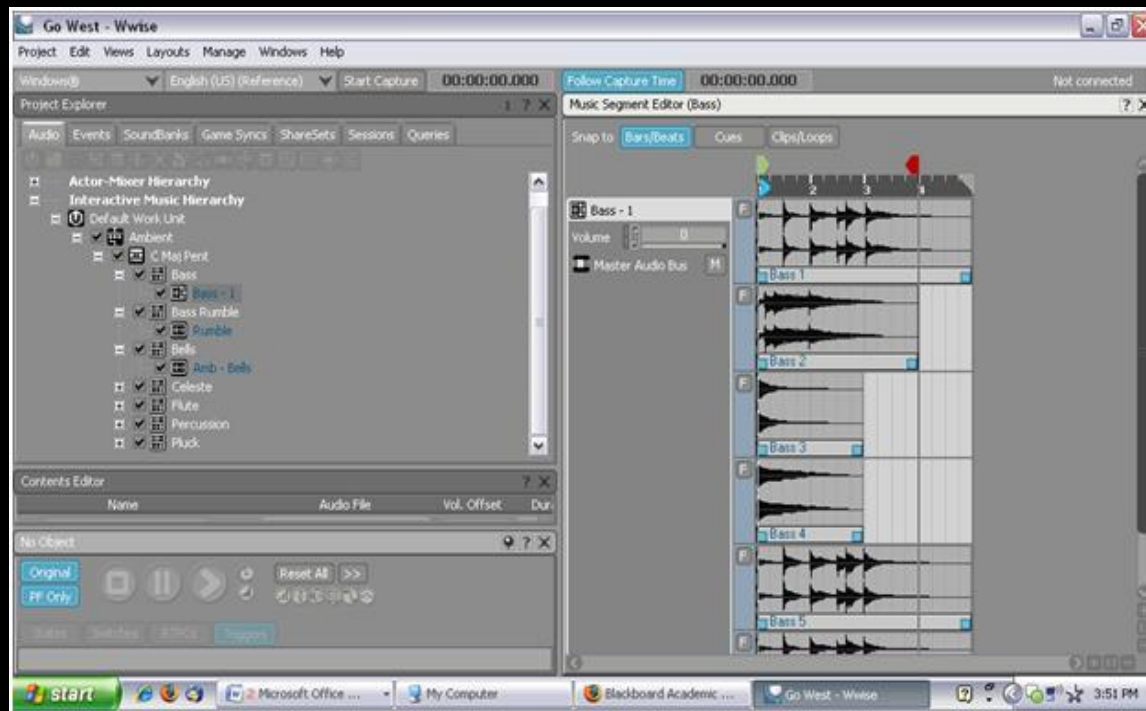
Getting It in the Game: Integration

Audio Engines
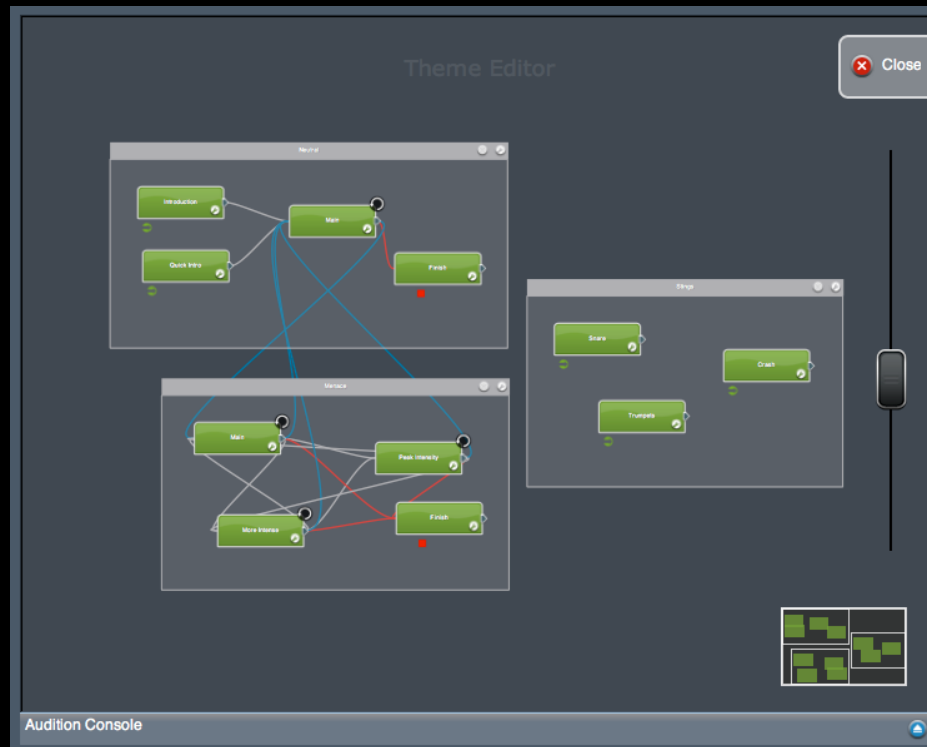
Often we require more than just exported scripts.

Audio Engines allow the audio designer and the programmer to work even more efficiently together.

Getting It in the Game: Integration

Audio Engines

The audio designer focuses on the creative and production work.

The programmer then uses "hooks" and other tools in the audio engine to allow the soundscape to flourish in the game.

Getting It in the Game: Integration

Audio Engines used on the latest games:

Miles / RAD Game Tools – also includes video production tools

Microsoft XACT – exclusively for Xbox Development

Audiokinetic Wwise - WaveWorks Interactive Sound Engine
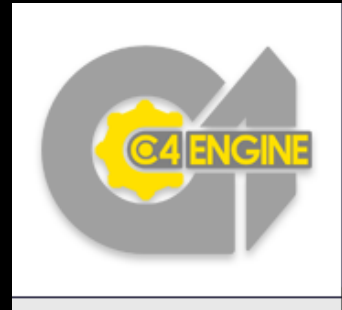

Firelight Technologies – FMOD Sound System

Getting It in the Game: Integration

There are other engines with audio tools, but these are "Turnkey" solutions (level design, graphics, animation, etc).

Unreal Engine – *Unreal Technologies*

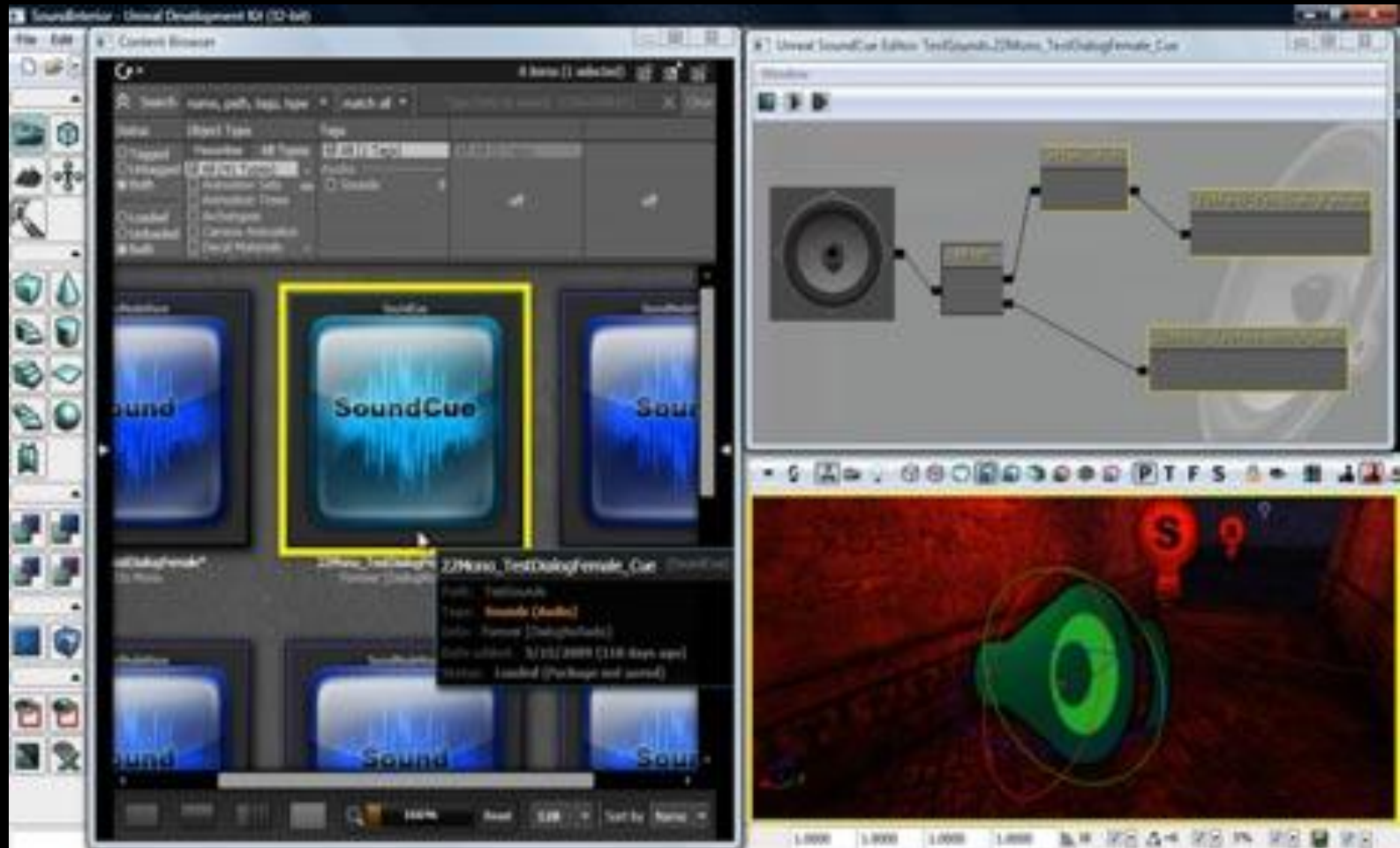**C4 Engine –** *Terathon*

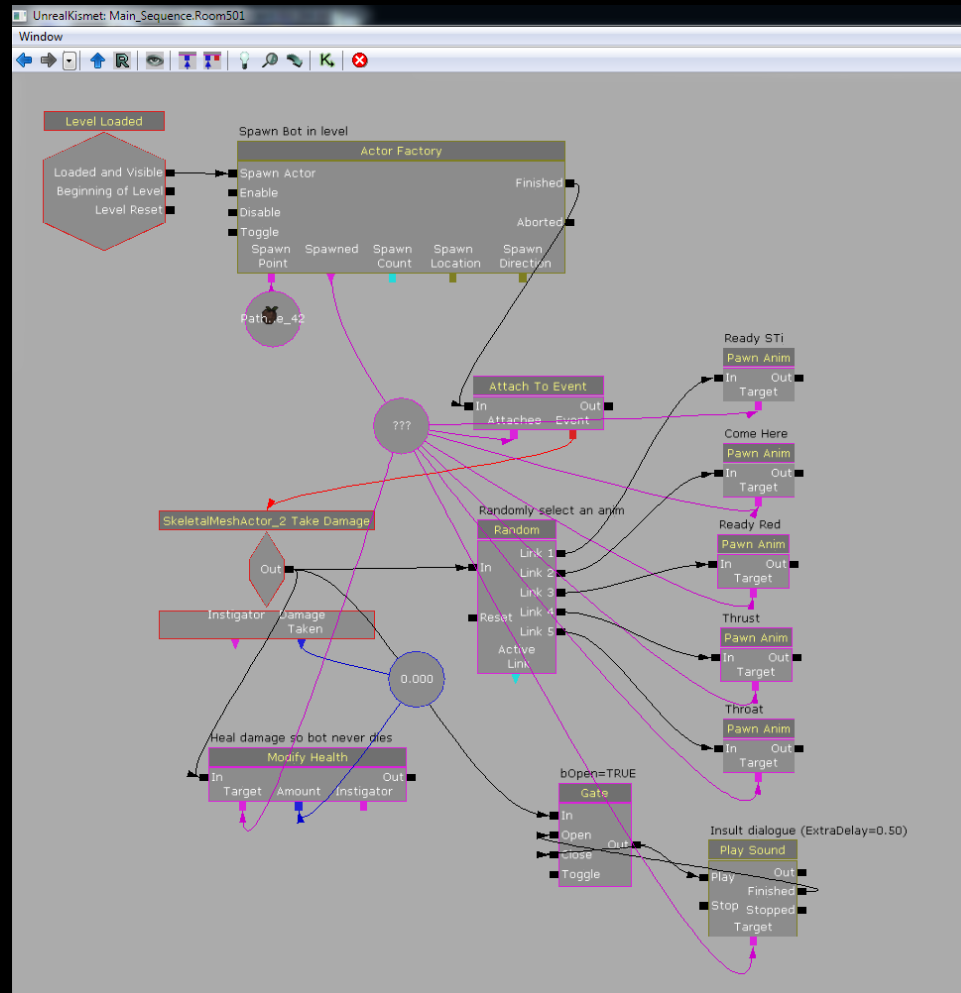**Torque Engine –** *InstantAction*

Unity 3D Engine – *Unity Technologies*

Getting It in the Game: Unreal Development Kit (UDK)

Getting It in the Game: Unreal Development Kit (UDK)

Kismet™ Visual Programming: adding logic, behavior, DSP, and mixing.