LucasArts and ILM:
a Course in Film and Game Convergence

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Abstract

In this course, senior members of ILM and Lucasarts describe the motivation, experiences, and lessons learned in integrating film and game technologies at the Lucas companies.

The presentation starts with a quick overview of the two companies, their new combined facility in the Presidio, and some of their goals and challenges for building a unified base of technology. The discussion then turns to Zeno - the shared digital studio software framework - and the speakers present a series of case studies on topics such as level editing, effects authoring, animation blending, rendering, likeness capture, and mocap.

The session closes with a diagnosis of what worked and what didn't, plus discussion of some of the cultural, procedural, and communication hurdles encountered along the way.

Prerequisites

The session is appropriate for anyone involved with designing, creating, or using tools for visual effects or next generation game development.

Syllabus

Part 1: History and Goals of Collaboration: 3:15-3:45

- Background on ILM and LucasArts
- Recent film and game projects
- Our new combined facility in San Francisco
- Topics/goals for collaboration

Part 2: Case Studies: 3:45-4:45

- ILM's Zeno platform
- Level authoring/editing
- Particle effects
- Digital Actor Studio
- Structural and fluid simulation
- Likeness capture, facial mocap
- Realtime and offline rendering

Part 3: Lessons learned, what's ahead : 4:45-5:15

- What went right
- What went wrong
- Challenges ahead
- Takeaway points

Part 4: QA: 5:15-5:30

Part 1: Overview of ILM and LucasArts

ILM

- Founded in 1975 for Star Wars
- 5-6 shows at once,10-15 shows/year
- 15 Academy Awards for visual effects
- 19 Academy Awards for technology
- Mixture of practical and CG techniques
- Client-driven, fee-for-service work
- Delivers images, many cheats, NOT realtime
- Many milestones in computer graphics
  (Pixar, Abyss, Terminator 2, Jurassic Park, Forrest Gump, Star Wars I,II,III)

LucasArts

- Founded in 1982
- “Rebooted” in 2004 to focus on next-gen
- Mix of internal/external titles, existing/new IP
- Controls product content+timelines
- Delivers software, must be realtime+robust
- Legacy of innovation (Rescue on Fractalus, Maniac Mansion, Secret of Monkey Island, Sam and Max, Star Wars: Knights of the Old Republic)

Topics/goals for collaboration

- High-detail modeling
- Image-based modeling
- Scene layout
- Creature setup/rigging
- Material models/acquisition
- Body mocap and keyframe techniques
- Facial mocap and keyframe techniques
- Procedural animation
- Structural simulation (rigid, cloth, hair, flesh)
- Effects simulation (fluid, smoke, fire)
- Lighting techniques
- Rendering techniques

Part 2: Case studies

- ILM's Zeno platform
- Level authoring/editing
- Particle effects
- Digital Actor Studio
- Audio tools
- Realtime and offline rendering
- Structural and fluid simulation
- Likeness capture, facial mocap

Part 3: Lessons learned (so far), what's ahead

What went right

- We've built a successful vendor/client workflow for frequent communication and tool iteration

- Tracking and project management practices have matured and are influencing game teams

- LucasArts established a build/release/QA process for the tools which is influencing ILM

- The shared tech effort is now a permanent group with dedicated management and staffing

- We haven't splintered into factions, all sides are still cooperating/collaborating

- Both companies are constructively discovering similarities/differences between game & film tech

- LucasArts was able to directly leverage some existing ILM workflows and technology

- The tools effort was focused on a single game during rampup, project priorities were consistent

- We now have a functional base toolset, still lots of room for improvement

- LucasArts was able to leverage ILMs existing training philosophies and facility

What went wrong

- We were slow to do several of the above, putting us in reactive "red alert" chasing the basic needs of the first next-gen project.

- We underestimated the cultural challenges in creating shared tech with an all-new team

- Too many cooks in the kitchen, lines of decision not clear enough - sometimes took too long to decide issues with many stakeholders

- Overhead for developing small tools too high, still need to improve developer efficiency

- Lack of clarity and coordination between the engine programmers on the game and tools programmers in shared tech - poor hand-offs of tools

- LucasArts was too exposed to raw ILM code checkins (and vice versa).

- Tools and engine were built in parallel, specs drifted, hard to create tools for future features

- Not enough early focus on rallying around tech that leveraged convergence

- Early games carry extra burden in building strategic tech, break-even benefit at best.

- Almost all effort went to the first game, little support for the needs of other game teams yet.

- Our ability to think long term was constrained by the need for immediate functionality for SW

- Focus on single game has confused structural issues, who drives what, what's shared vs. per-game.

- We continue to struggle with how to structure "Shared" vs. "Central" tech in a multi-game studio

Takeaway points

- Ensure all projects have clear production and engineering owners

- Mandatory face-to-face meetings (frequent, small, short) are important to catch issues in the cracks

- Content creation tools and game engine must be designed to complement each other

- Make technology decisions early, rally to make one thing work rather than keep all options open

- Design reviews, coding standards, and best practices are critical for shared efforts

- Shared tech must be driven by specific game needs. Keep a long-term vision, but get there step-by-step.

- QA/build for tools should be separate from game projects

- The two industries are very similar in how tools are developed for assets and layout, but tools for gameplay authoring require a very different development environment

Challenges ahead

- Transition from a one-game mindset to a more strategic multi-game approach

- Increase engineer speed/efficiency of iterating on tools, particularly gameplay-related.

- Look for more explicit "win-win" situations between game and films and exploit them

- Now that toolsets are converging, we need more collaboration and communication between LucasArts and ILM production/artists.

- Make more LEC tools and runtime technology available to ILM and Lucas Animation workflows

- As common tools mature, begin to reduce the number of per-game tools engineers

- Continue toward WYSIWYG level/character authoring

- Leverage ILM previz system as a cinematic pre-viz and possibly production tool for games

- Continue adapting Zeno to live closer to the engine and better support native game data formats