Virtual Worlds
Lessons from the Bleeding Edge of Multiplayer Gaming

Greg Corson
Dave McCoy

What’s This About?

- Dealing with bleeding-edge technology
- Multiplayer game design/development lessons learned.
- Tuning the game for maximum fun
- Strategies/tools for art and game development/debugging
- Working with complex multiprocessor computer systems
- Developing a ton of content
- Keeping artists and programmers from killing each other in the process.
Tutorial Background

- Covers development of Virtual World Entertainment’s multiplayer games from 1990-1997
- Experiences from 4 distinctly different multi CPU hardware platforms
- 2 games, Battletech (giant robots) and Red Planet (high-speed racing).
- 8 or more players per game.
- Socially oriented gaming.
- Playable over the internet (in 1991)

Why is this info useful today?

- Dealing with Multiprocessors
  - Playstation II, 2 CPUs, 2 Vector Units, Image Processor, Programmable DMA
  - Xbox 1 CPU, 1 GPU
  - Virtual World, as many as 5 CPUS per cockpit
- Multiplayer over broadband
- Holding stable 3D frame rates
- Cinematic quality game replays.
- Shows how to build an on/off-line community around a simulation game
A quick timeline

• 1990 VWE system 1
  – sprite based 3d
  – 1 cpu (amiga)
  – custom sprite 3d transform engine. (TRW video engine)

• 1992 VWE system 2
  – flat shaded 3d
  – up to 16 dynamic, moving lights
  – 5 CPUs (68020, 68000, TI 34020, 34082)

• 1992 IDsoftware Wolfenstein 3D released
• 1993 VWE system 2.5 improved design
• Late 1993 IDsoftware DOOM released
• Early 1994 VWE system 3 new sound system

• 1995 VWE “Tesla” system
  – 3 cpus with about 8meg RAM total (P90 class)
  – 1 “pixel planes” GPU
  – 4 channel sound (2 AWE-32 cards)
  – texture mapped graphics (< 1 meg texture RAM)
  – 7 screens

• 1996 ID software QUAKE released, full 3d
• Late 1997 ID software Quake II released
• 1997 First useful consumer PC 3d accelerators.
The Games-Battletech

• Giant Robot Combat
• Lasers, projectile and missile weapons
• Urban and open country maps
• Emphasis on team play

The Games-Red Planet

• Racing “mining vehicles” in Martian canals
• Demolition derby style combat at mach 1
• Imagine flying an F16…indoors.
Video Introduction

ALL PILOTS TRAVELING TO THE VIRTUAL WORLD™ DO SO AT THEIR OWN RISK.

VIRTUAL WORLD™ ASSUMES NO LIABILITY FOR PRE-EXISTING CONDITIONS WHICH MAY BE AGGRAVATED BY INTERDIMENSIONAL TRAVEL.

WHILE WE CANNOT GUARANTEE YOUR SAFETY, WE ARE PROUD OF THE LOW FATALITY RATE AMONG OUR PILOTS.

YOUR SAFETY IS OUR PRIMARY CONCERN!

Tesla Cockpit

• 3 CPUs, 1 GPU
• 7 Screens
• Simulator Optics
• Over 60 functional buttons
• Joystick, pedals & throttle controls.
• 4 channel sound
• External Plasma Panel
• External light control
Briefing Area

- Players come here 10 minutes before game.
- Beginners watch a training video
- Advanced players plan the mission, choose teams, vehicles…etc.

- A PC and videodisk player.
- Area heavily themed with vehicle blueprints, course maps…etc.

Mission Review

- Players get a 10 minute replay of the game with “wide world of sports” production values
- Used virtual “cameras” on the playing field and on vehicles like the NASCAR “bumper cam”.
- Printed a record of the game
- Gave players a chance to cool down after a game and interact with the other players face to face
A Small Site

- 8 cockpits
- Operators console
- Briefing Station
- Reservation Station
- Mission Review
- Scoresheet Printer
- 28 CPUs total

Larger Sites Were Also Made

- 32 cockpits, usually used in groups of 8
- 3 reservation computers
- 4 operators console computers
- 4 briefing stations with videodisk players
- 8 mission review computers
- 20 monitors, computerized video switcher
- 2 laser printers, 3 ticket printers
- ISDN and video-phone link to other sites
- Internet and local information kiosk’s
- Over 130 CPUs and 40 GPUs in the system
A very complicated project!

- Lots of content (software, art, live action video and physical props/themeing)
- Many interactions between CPUs to debug
- Game design can’t overwhelm new users, but must challenge veterans to keep them coming back
- Handicapping players is essential if all the people in the game are to have fun.
- System must run continuously for 16 hours a day with no breaks between games and no crashes on ANY processor.

Again, Why is this useful today?

- All these elements (lobby, reservations, briefing, mission review, merchandise sales) can be integrated into a modern online game and will increase revenues.
- All the design and social lessons learned are just as valid for current online games
- The design challenges of this system are similar those of modern PC’s and consoles
Who is Greg Corson?

• Actively working in computer industry since 1974
• Writing multiplayer/network games since 1975
• Experience in Radio/TV production
• Computer based (book) publishing experience
• Freelance computer consulting/troubleshooting
• Factory automation (steel mills, assembly lines)
• Data Networking & telecommunications
• Product design/development/review
• Game designer

Who is Greg Corson?

• Wrote multiplayer games and chat software on the PLATO system in the late ’70s.
• Developed 3D multiplayer games for GEnie in the mid 1980’s and wrote/operated “The Connection” multiplayer BBS system.
• 1990-1997 Chief Software Engineer of Virtual World Entertainment
• 1997-1999 NEC Electronics PowerVR dev support, evangelism and project management including Sega Dreamcast
• 1999-now Sony Playstation R&D lab.
Who Is Dave McCoy

• Working in computer graphics field since 1981
• CGI Animation for video
• Pre-press CGI work for publication
• Wrote assembly code for CGI toys
• Patent for film compositing technique using CGI
• Co-Founder Video/Film Graphic Production Company Atlantic Digital Image 1988

Who Is Dave McCoy

• 1991-1996 Art Director then Creative Director for Virtual World Entertainment
• Co-signed patent for texture projection technique
• 1996-1999 Creative Director for FASA Interactive
• Co-Creator Crimson Skies
• 1999-2000 Creative Director for Microsoft Games Intellectual Properties Group
• 2000-now Graphics Techniques Consultant for Xbox Advanced Technology Group
Tutorial Schedule
The class runs from 10:00 am to 6:00 pm
We will stop and start on time for the breaks.
• Intro, what is Virtual world?
• Game Design
• Art and Content
• Programming and Software Design
• Last Words

Break Schedule
11:00-11:15 Morning break
12:30-2:00 Lunch
4:00-4:15 Afternoon break

Questions???
• If you need something we are talking about clarified, feel free to put your hand up and we’ll try to get to you quickly.
• If you have general questions, please hold them till we get to the end of a topic or till we call for them.
• Please give us a moment to grab our snacks and lunch at the beginning of the breaks, then we’ll come back here and answer your questions for the rest of the break.
Contact Information

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