

# Modding as an Open Source Approach to Extending Computer Game Systems

Walt Scacchi

Center for Computer Games and Virtual Worlds  
and

Institute for Software Research  
University of California, Irvine

<http://cgvw.ics.uci.edu>

# Overvie

W

- Introduction
- Software Engineering (SE) of games via software extension
- Types of game mods
- Game modding tools and support
- Opportunities for Modding and SE

# Introduction

- ◉ Modding is a form of *end-user* software engineering
- ◉ Modding is a form of *learning* via practice, self-tutoring, and self-organized projects
- ◉ Game mods cover customizations, tailorings, and remixes—*software extensions*—of game embodiments
- ◉ Modding is to games, like OSS development is to SE
- ◉ Modding is a leading method for developing or customizing game software, by independent game developers

# Software extensions used in game modding

- Module
  - addition, update, removal, re-interconnection
  - plug-ins
- Architecture
  - Multi-version system (re-)configuration
- Domain-specific languages (scripting) and software product lines
  - reused game platforms/engines
- Open source software development (OSSD)
  - common approach for learning game development
  - “Games” is second largest project trove at SourceForge

## Browse Software

→ **Clustering** (959)

→ **Database** (13908)

→ **Desktop** (7524)

→ **Development** (66433)

→ **Enterprise** (7181)

→ **Financial** (5426)

→ **Games** (42351)

→ **Hardware** (3088)

→ **Multimedia** (34260)

→ **Networking** (8713)

→ **Security** (7548)

→ **Storage** (5348)

→ **SysAdmin** (6155)

→ **VoIP** (794)

→ **Display All »**

# Types of game mods

- User interface customizations
  - in-game identity, themes, dashboard add-ins
- Game conversions via scripting
  - repurposing game play mechanics and content
  - total conversions
- Machinima
  - repurposing game usage sessions for cinematic storytelling or play documentation
- Hacking closed game systems
  - overcoming security mechanisms
  - opening games to restricted markets

# UI customization – identity, theming, dashboard add-ins

The collage displays four distinct screenshots from the EVE Online interface, illustrating various UI elements and customization options:

- Top Left:** A screenshot of the 'Fitting' window, showing a detailed view of a ship's internal components and a large circular radar display. The interface includes a sidebar with various icons and a top bar with the text 'CCP SESSIONCHANGE'S RIFTER'.
- Top Right:** A screenshot of the 'STATION INFORMATION' window, featuring the Caldari Navy logo and a list of station services, including 'STATION SERVICES', 'GUESTS', 'AGENTS', and 'OFFICES'.
- Bottom Left:** A screenshot of the 'Market' window, displaying a price history graph for the 'SMALL 'ACCOMMODATION' VESTMENT RECONSTRUCTOR'. The graph shows price fluctuations over time, with a sidebar listing various market categories like 'Electronic Warfare', 'Electronics and Sensor', and 'Engineering Equipment'.
- Bottom Right:** A screenshot of the 'Local' window, showing a list of local players and their ship names, such as 'Shizo Lang', 'Banked', 'ModernWarfare 2', 'Biddy Diaz', and 'Bandibrice O'Aste'.

The interface is highly customizable, allowing users to modify their dashboard, themes, and add-ins to suit their preferences.

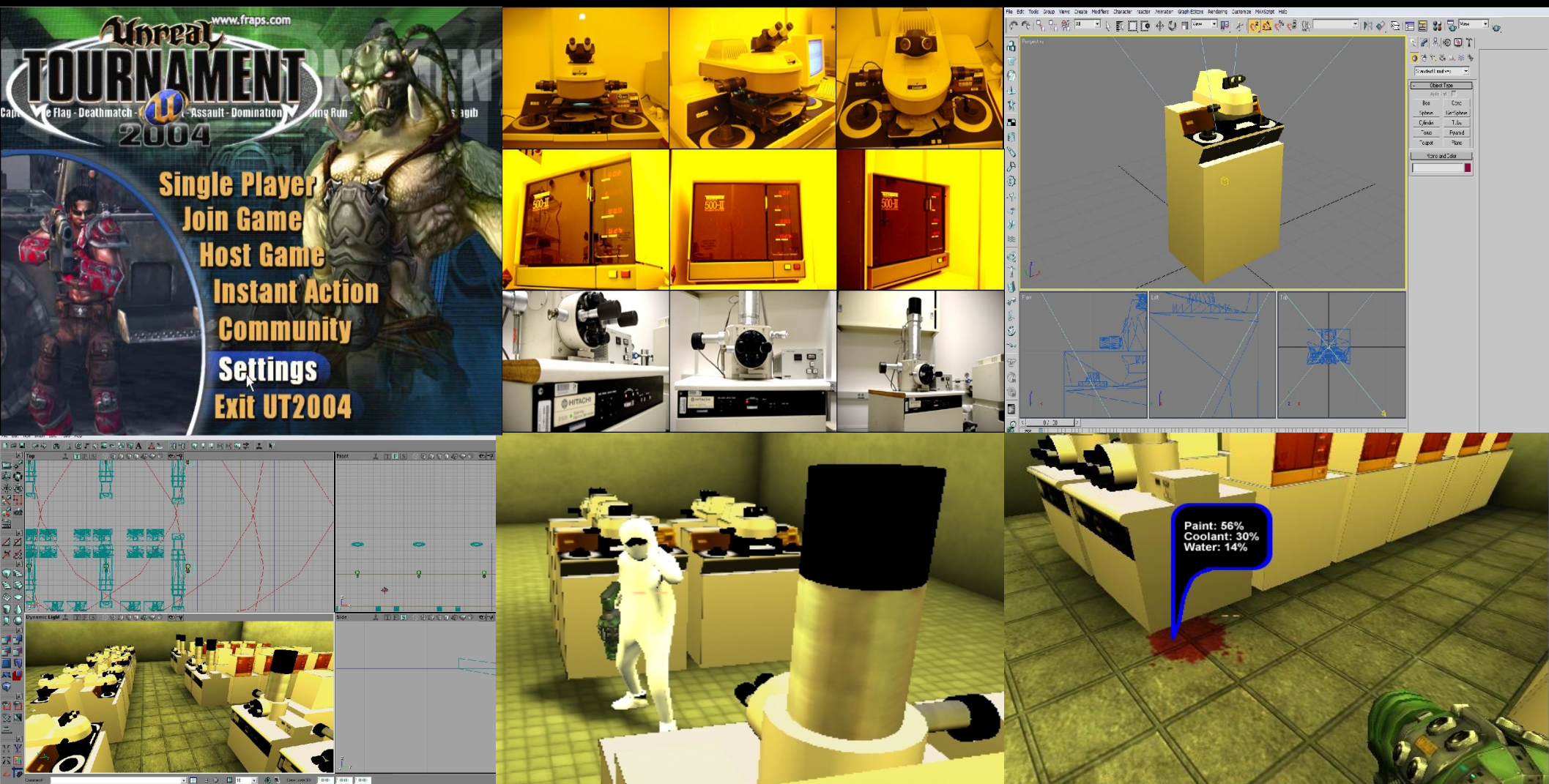


# Types of game mods

- User interface customizations
  - in-game identity, themes, add-ins
- **Game conversions**
  - **repurposing game play mechanics and content**
  - **total conversions**
- **Machinima**
  - **repurposing game usage sessions for storytelling or documentation**
- Hacking closed game systems
  - overcoming security mechanisms
  - Opening games to restricted markets



# Total conversion – from *first person shooter* into semiconductor fabrication and diagnostics training game



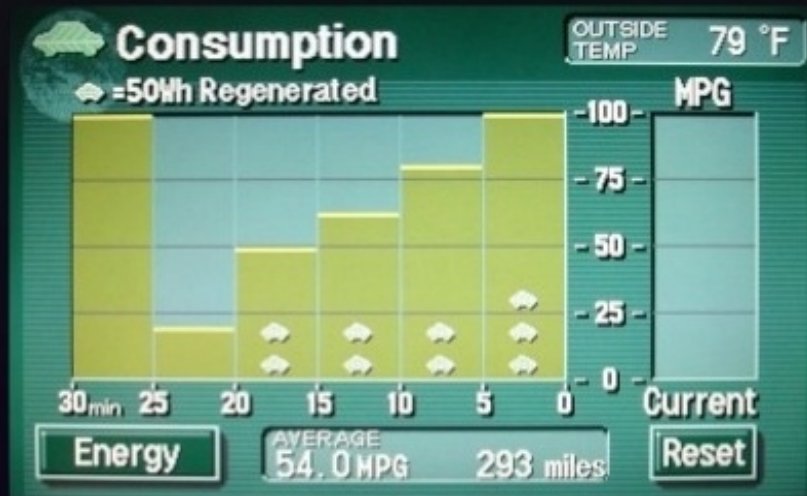
FabLab Demo Reel

# Types of game mods

- User interface customizations
  - in-game identity, themes, add-ins
- Game conversions
  - repurposing game play mechanics and content
  - total conversions
- Machinima
  - repurposing game usage sessions for storytelling or documentation
- Hacking closed game systems via reverse engineering
  - overcoming security mechanisms
  - opening games to restricted markets
  - Enables game “piracy” and additional revenues



# Hacking autonomous/electric vehicle games?



Toyota Prius



Nissan Leaf



Ford Focus



# Hacked arcade system -- *OutRun* @ UCI



OutRun: Augmented Reality Driving Video Game (YouTube)

# Game modding tools and support

- Game engine based software development kits (SDKs) are widespread
  - *Unreal Development Kit* (UDK) now available as “freeware”
  - *Doom* and *Quake* engines now OSS
    - Game content assets are NOT OSS
  - Dozens of good quality OSS game SDKs available
- Meta-modding tools also appearing
  - *Garry's Mod* kit for *Half-Life* product line

# Payoffs of Game Modding

- Modding tools and techniques can substantially increase retail game sales and industry revenues!
- Mods, modding, and modding technology is an *engine of innovation* for independent game developers

# Conclusions

Game modding demonstrates the practical value of (open source) software extension as a user-friendly approach to custom game development.

Modding demonstrates the success of end-users learning how to extend software to create custom games or game-based applications/products.

Game modding represents a viable form of end-user engineering of complex software that may be transferable to other domains.

Large-scale studies of OSS may often be examining game software development projects.