Multiplayer Game Programming: Architecting Networked Games (Game Design)

By Josh Glazer, Sanjay Madhav

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The Practical Guide to Building Reliable Networked Multiplayer Games

Networked multiplayer games are a multibillion dollar business: some games now attract tens of millions of players. In this practical, code-rich guide, Joshua Glazer and Sanjay Madhav guide you through every aspect of engineering them. Drawing on their immense experience as both game developers and instructors, the authors lead you through building a robust multiplayer architecture, and creating every engine-level system. You'll learn through in-depth working code examples for two complete games: an action game and a real time strategy (RTS) game.

First, Madhav and Glazer review the essentials of networking and network programming from the standpoint of game developers. Next, they walk through managing game data transmission, updating game objects across the network, and organizing the devices that join your game. You'll learn how to ensure reliable performance despite the Internet's inherent inconsistencies, and how to design game code for maximum security and scalability. The authors conclude by addressing two increasingly crucial issues: incorporating gamer services and hosting your games in the cloud.

This guide's content has been extensively tested through the authors' multiplayer game programming courses at USC. It is equally valuable both to students *and* to working game programmers moving into networked games.

Coverage includes

- How games have evolved to meet the challenges of networked environments
- Using Internet communication protocols and standards in game development
- Working with Berkeley Socket, the most widely used networking construct in multiplayer gaming
- Formatting game data for efficient Internet transmission
- Synchronizing states so all players share the same world
- Organizing networking topologies for large-scale games
- Overcoming latency and jitter problems that cause delays or lost data
- Scaling games without compromising performance
- Combating security vulnerabilities and software cheats
- Leveraging the networking functionality of the popular Unreal 4 and Unity

game engines
- Integrating gamer services such as matchmaking, achievements, and leaderboards
- Running game servers in the cloud

About the Website C++ source code for all examples is available at ***github.com/MultiplayerBook*** . Instructors will also find a full set of PowerPoint slides and a sample syllabus.

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Editorial Review

Review

“For any aspiring game programmer, this book is a must read! Glazer and Madhav are some of the best at explaining these critical multiplayer concepts. I look forward to their next book!”

—ZACH METCALF, Game Programmer at Rockstar Games and USC Games Alum

About the Author

Joshua Glazer is a cofounder and CTO of Naked Sky Entertainment, the independent development studio behind console and PC games such as *RoboBlitz*, *MicroBot*, *Twister Mania*, and more recently, the mobile hits *Max Axe* and *Scrap Force*. As a leader of the Naked Sky team, he has consulted on several external projects including Epic Games’ Unreal Engine, Riot Games’ *League of Legends*, THQ’s *Destroy All Humans* franchise, and numerous other projects for Electronic Arts, Midway, Microsoft, and Paramount Pictures.

Joshua is also a part-time lecturer at the University of Southern California, where he has enjoyed teaching courses in multiplayer game programming and game engine development.

Sanjay Madhav is a senior lecturer at the University of Southern California, where he teaches several programming and video game programming courses. His flagship course is an undergraduate-level game programming course that he has taught since 2008, but he has taught several other course topics, including game engines, data structures, and compiler development. He is also the author of *Game Programming Algorithms and Techniques*.

Prior to joining USC, Sanjay worked as a programmer at several video game developers, including Electronic Arts, Neversoft, and Pandemic Studios. His credited games include *Medal of Honor: Pacific Assault*, *Tony Hawk’s Project 8*, *Lord of the Rings: Conquest*, and *The Saboteur*—most of which had networked multiplayer in one form or another.

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