DOOM

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Not if I Frag You First

DOOM *Multiplayer*

Shooting Zombies is fun, right? What could be more fun than dancing the chaingun cha-cha with a roomful of the undead? The answer is simple: shooting your boss; standing behind your friends just waiting, patiently, until they turn around, then letting them have a full plasma clip to the head; coming around a corner on full sprint, dodging a rocket, and letting fly with everything you have at point-blank range; taking the final frag when you are down to 23 health and the other fella has a BFG.

As I noted right back in the beginning, the very first FPS game was basically a multiplayer deathmatch. You can find plenty of examples of multiplayer games in the arcades and even via a network such as *MIDI Maze* (Xanth Software F/X 1987), but once again, it was *DOOM*'s speed and intensity that pushed it into completely new territory. If *DOOM* was a groundbreaking single-player game, it can arguably take credit for giving the world the online tournament, the clan, the cyberathlete. The formal structure was there in *Maze War,* an FPS game where you had multiple players playing competitively over a network. And the term *deathmatch* was used way back in 1982 to describe battle in *Triple Action Biplanes* (Mattel 1981) by Russ Haft and Steve Montero, two Mattel Intellivision coders.[1] But *DOOM* added complexity to the proceedings, as well as speed. It had more rules than just two sprites in a simple environment trying to kill each other, because *DOOM* had things like ammo counters and power-ups, exploding barrels, splash damage, acid, and lifts and crushing ceilings. And did I mention how fast it was? OK, well, just to be sure, it was fast.

The description of the game in the *DOOM* Bible is, typically for id Software, a masterpiece of understatement.

> Up to four players can play over a local network, or two players can play by modem or serial link. You can see the other player in the environment, and in certain situations you can switch to their view. This feature, added to the 3-D realism, makes *DOOM* a very powerful cooperative game and its release a landmark event in the software industry. . . .
>
> This is the first game to really exploit the power of LANs and modems to their full potential. In 1993, we fully expect to be the number one cause of decreased productivity in businesses around the world.

The really interesting thing about this statement is that it's not trying to sell the deathmatch experience. Instead, it describes *DOOM* as "a very powerful *cooperative* game" (italics mine). The vision here is not strictly, formally competitive, which is certainly not how the world got to know the final product. *DOOM* was certainly groundbreaking for cooperative play, but it was its competitive modes that really created shock waves. The deathmatch mode in particular, a huge last-man-standing free-for-all, was about to take over the world. Romero puts this down to two factors.

> Well, to me, co-op is one of the most fun ways to play the game. Deathmatch is a more powerful game mode, so people are drawn to it more. In fact, the "attitude" of the game was to kill things, and multiplayer allowed you to kill something other than monsters, plus most people had never killed another person in a high-speed game ever before, so deathmatch was a huge draw. (JR)

Carmack remains somewhat skeptical of deathmatch as a play mode in general but sees its limitations as a result of lack of time to spend on multiplayer and the fact that its late addition meant that the game's scale just wasn't designed for cooperative play.

> The deathmatch gameplay is not the optimal gameplay mode. For one on one, as a duel kind of thing, that's reasonable on there. Co-op, even though we had no design for it on there, was a ton of fun, but the problem was you could play through the entire game in a couple of hours. You'd both start it up and be like "Wow, that was a great two hours, but we're done!" But the other side of things is that there are good funda-

mental reasons why team play is superior to a large free-for-all, because half the people always win, rather than just one person. (JC)

In fact, the really interesting thing is, Bible notwithstanding, multiplayer wasn't that high on the agenda. It didn't actually get worked on until right at the very end of development. "That there was enough time [after building everything else] to go ahead and get multiplayer was fortunate," says Carmack. So the idea that *DOOM* was ever optimized or designed for multiplayer is just plain wrong. Petersen recalls,

> We firmly believed that 99 percent of all players would only ever do single-player. We only put multiplayer into the game because we, personally, liked it. Remember that at this time there were basically no successful multiplayer games unless you count MUDs, and those were penniless. (SP)

As a result, Romero says, multiplayer was never a conscious part of the initial level design and was tweaked retrospectively.

> There was no thought during level design for multiplayer until I was making E1M7. After we started getting multiplayer working, we went through all the levels and started tweaking them for co-op and deathmatch. The network code was being optimized postlaunch, and new versions were included in our patches. The game was originally designed as a single-player game that we added multiplayer to. (JR)

Given that E1M7 was the penultimate level Romero designed, this gives an impression of how late multiplayer functionality was actually added. Having said that, Romero's obsession with deathmatching is well documented (when I spoke to him, he actually used the term *addicted,* a word most game developers tend to avoid like the plague). Petersen attributes the fact that Romero's levels were more multiplayer friendly to their designer's love of the format, while his own focus stayed with single-player, with the result, as he says, that only "some of mine were so suitable." The reason may run slightly deeper than that in design terms, of course, particularly as Romero claims that he wasn't designing for multiplayer either: Romero's single-player levels tended to be built for combat, with the wider corridors and open spaces that transfer well to multiplayer, whereas Petersen was fond of tight, claustrophobic spaces that would inevitably make both cooperative

Fig. 21. DM6 The Dark Zone from *Quake*—a "template" deathmatch map

play and deathmatch less rewarding, as they offer fewer opportunities to work strategically or show off arcade gunplay skills. A notable exception, as we have seen, was E3M6 Mount Erebus. Designing specifically for multiplayer had to wait for *Quake,* where, in the face of Romero's skepticism, Willits placed the first deathmatch-only maps (fig. 21). As Willits describes, once this was established as a model, a standardized design practice quickly emerged.

> If you are making a deathmatch map, and you want to make the greatest deathmatch map ever, follow the formula for all the other greatest deathmatch maps ever and you will succeed. It's really simple. You make a big room in the middle with some elevation changes, then you make a bunch of little passages around the outside, and you're done. (TW)

Regardless of its late addition to the game, multiplayer, particularly deathmatch multiplayer, proved irresistible, even if, according to Willits, its actual impact is often overstated.

The whole multiplayer gaming was cool, but actually not that many people did it, because it was so damn hard to figure out, which is one of the reasons *Quake* changed things more. It was cool to have it in it, and people played on college campuses, but most people couldn't figure it out. (TW)

DOOM offered two multiplayer forms, online and LAN (local area network). LAN gaming was more robust and allowed up to four players at a time, rather than the initial two for online play.[2] LAN essentially meant hardwiring a bunch of computers together using physical cables, which, at the time of *DOOM*'s release, coincided perfectly with the rise of general access computer labs at colleges and universities. We were already camped out in the corners, discreetly mudding and mooing until either dawn broke or the lab staff caught us and threw us out. Was there "decreased productivity"? Hell, yeah. The idea that you could drag your PC around to where your friends had theirs, hook them all up together, and LAN party until your fingers cramped caught on rapidly and has continued to expand to the behemoth gatherings we see today. Anyone of my generation has a LAN story somewhere: my mate Alex remembers duct taping cables across the road to connect up to his friend's place opposite. Who says gaming keeps us shut up indoors when we could be playing out on the street?

Technically speaking (on behalf of the nontechnical readers), this is how online multiplayer works: You need two systems as a minimum. In modern multiplayer, it is more normally three, one of which is a dedicated server that exists purely to manage everybody's game. But you can also use one of the player's systems as a server: they host the game, the other player(s) connect to them, and their computer manages the game for everyone. The conceptual model is that you link together at least two computers running the game (normally called clients) and that somewhere in this network is a server that manages the game. Clients send the server local game information (keys being pressed and computations being carried out, or—if you like, although it's not strictly accurate—where the avatar is, what state it is in, and what it is doing), and the server sends on this information to all clients, to update what they are displaying to each player. So everybody gets a constantly updating picture of the total game world, and everyone is sending local information that can impact on everybody else. When Player A moves into Player B's line of sight, their *xyz* coordinates are sent, via the server, to Player B's client-side software, which renders Player A's avatar on

Player B's screen. When Player B fires a salvo of rockets as a response, the trajectory of this is computed locally and sent to the server, which calculates if Player B has hit the target and passes this information on to Player A's machine. Gibbing follows.

As might be obvious from the preceding description, there are a number of core technical principles required to make online multiplayer work. Primarily, it means you need at least two machines with a stable network connection. If this fails, the game fails. Further, the connection needs to be running at a good enough speed, and this really needs to be fairly equal. If Player B's network connection is slower than Player A's, then Player A can respond to server information faster, meaning Player B may be trying to respond to server events that have, in essence, already passed for Player A. This kind of lag imbalance can be extremely frustrating. Equally, the processing and rendering speed of each player's client-side machine can create an imbalance. If Player A's machine has a weaker graphics card and takes more time to render the server information, this increases the time it may take for Player A to respond. This has a particular effect on more modern shooters that existed before broadband, as hardcore players deliberately set their graphics and sound preferences low, shaving milliseconds off rendering time to speed up their game. In many ways, sacrificing representation for performance flew in the face of the general trends of game evolution, and it's DOOM we have to thank for that. In the gaming world, online multiplay was a primary reason why the Internet just *had* to get faster.

When discussing deathmatch, Romero focuses on the psychology above anything else. He talks of the "psychological issues with out-thinking and patterning other players. You just had a space where you could do much more advanced head-to-head play in than any game that had gone before." Romero highlights the fact that deathmatch wasn't just about arcade skill (the "actual dexterity" on which hardcore single-player *DOOM* play rests) but required a more complex ability to predict, strategize, and adapt at high speed. This expanded the conceptual game space dramatically. For Romero, it is "incredible the depth of psychology that exists (that you never guessed would happen before), even in a simple game like *DOOM*." He recognizes that this expands the core skill set required for expert play: "In a deathmatch situation, there was no precedent for it or the psychology or the strategy you could employ if you were one of the players who could get to that level where you could pattern the other player and use psychology on them

to make them lose or reveal themselves." He is in no doubt that "*DOOM* really nailed the psychology of deathmatch."

Let's pause and unpack that idea a little. What exactly do we mean by the psychology of deathmatch? Perhaps a better way to put it would be to recognize that deathmatches are psychologically complex games in a way that single-player games can only aspire to. This comes from two factors: first, the inherent complexity of human beings and their behavioral responses and the innate (and complex) response to both competition and cooperation and, second, the much higher degree to which, as a result of this, multiplayer gameplay is *emergent*. The term *emergent* has quite a specific meaning in relation to game design and game theory. It basically boils down to the idea that even with a simple set of rules, highly complex forms can emerge through their interplay, particularly (though not necessarily) when human agency is introduced into the mix. In *Rules of Play: Game Design Fundamentals,* Katie Salen and Eric Zimmerman are predictably clear and succinct about this, noting that "complex possibilities are the result of a simple set of rules" and that "in games, emergence arises through the interaction of the formal game system and decisions made by players" (2004, 159, 164). In other words, emergence—the generation of complex, highly variable, events that are not necessarily predictable or expected from a basic, often simple rule set—is an intrinsic feature of game systems and is amplified dramatically by the presence of a human agent. This is because human agents are inherently, intrinsically emergent systems themselves.

Game artificial intelligence, in contrast, is inherently, intrinsically less emergent (even though it can be fairly emergent), and this isn't necessarily a failure of agent AI but is arguably an inherent, instrinsic requirement for satisfying gameplay. To put this another way, the bottom line with AI is that it's capable of doing things human players are not, and this has to be kept in check. An example would be AI hitting you with a grenade from a four-mile distance without line of sight because it has the advantage of massive computational speed over a human player. We all know how enormously irritating that can be—I'm looking at you, *Clear Sky* (GSC Game World 2009). So often, the challenge for AI developers is to balance the requirements for the system to be smart, such as in the form of pathfinding, and the requirements for the system to be stupid, in the form of basically letting the player outsmart it. We require *challenging predictability* in single-player game agents by the same token, because it's rewarding as a player to pattern

an enemy and beat them as a result. This is clearly a balancing act for designers. *DOOM*'s artificial intelligence was comparatively crude—basically just a rehash of the two-dimensional tile-based AI originally created for the earliest *Catacomb* game. That doesn't stop players attributing more complex motives and behaviors, of course. But the reality, as John Carmack recalls, is prosaic.

> It was always amusing when you'd hear people ascribe or anthropomorphize the enemies, talking about how they snuck up on you or cooperated. There was absolutely none of that going on. It was very, very crude and simple AI. They are basically targets that come towards you that you can project some feelings into. (JC)

In multiplayer the focus shifts away from arcade skill, where the patterning is relatively fast and efficient, enabling the focus to be reflected back on ourselves and our own skills, toward a much more complex emergent relationship with the other agents—human agents this time—sharing the game space. The focus now is on their behavior, not ours, to a far greater extent. It's much harder to predict human behavior, particularly when the other agent is trying to predict yours and also potentially trying to give you false information so that your predictions of their behavior are flawed, giving them a tactical advantage, and so on. In other words, if the *Game of Life* (Conway 1970) is emergent, it has nothing on even a simple player-versus-player board or card game, like poker or even snap, where winning is no longer predominantly about skill at play but about skill at patterning the opponent.

So when we talk about deathmatch (and cooperative play, for that matter) being psychologically complex, it's due to a mix of two things. Sharing with other people your emotional response to your actions or another person's actions is inherently more complex. While single-player shooters can, if badly managed, descend into repetitive button mashing, it rarely gets boring either saving a friend's neck or fragging them with extreme prejudice. In deathmatch, every kill counts, in terms of reward. On top of this, when playing competitively, there's not just the penalty of having to reload or respawn; there's public humiliation, which raises the stakes or significance of getting wasted by your grandma on a busy server. Equally, the focus of a multiplayer game changes from mainly skill-based prowess to psychological prowess, the ability to predict and react to a highly emergent flow

of events and, if you are really good, to start controlling and manipulating them. It's this that Romero really means when he talks about the psychology of deathmatch, and in both cases, *DOOM*'s speed amplifies the effect dramatically.

The optional rules for *DOOM*'s deathmatch (known as 1.0 and 2.0, the second being released in the v1.2 patch of February 1994) give some indication of the type of action on offer. For example, in the original 1.0 rules, objects did not spawn, and weapons could only be picked up once unless the player died and respawned. This was changed in 2.0 so that all objects respawned after a short period of time (normally thirty seconds). The new rules counted death by misadventure or suicide as a frag against the player guilty of the self-inflicted demise, decreasing the player's frag count by one. In both cases, we can see a change in style of play: away from the strategic "every shot counts" thinking of limited ammo/object 1.0 play toward a constantly firing, even more amped up 2.0 play, with a new focus on self-preservation in terms of using the environment intelligently.

Following *DOOM,* new variations on deathmatching arrived thick and fast. Apogee's 1995 shooter *Rise of the Triad* (featuring Tom Hall on design) introduced the world to capture the flag and rocket jumping, although it was id's own *Quake* that really made that a household term (in gaming households, obviously). The diversification of deathmatch ran alongside the rise of competitive professional gaming, both of which can be read as clear signs that deathmatch, team deathmatch, online cooperative play, and any variation on the basic format of gibbing alongside one another had a very rosy future. It was going to take a while for the fires *DOOM* lit to ignite pro-gaming tournaments and clans—that's for another book—but all the ingredients were right there. Every time you take down a tank in Louisiana's misty swamps, every bullet you take in Blood Gulch, every time your Demoman arcs a grenade over onto an unsuspecting Medic or you ace a bomb run—it all started here.