



Online World Design Patterns



A Definition

- **A spatial representation of a virtual world.**
- **Avatar representation within the space.**
- **Persistence of some degree of data.**



Avatars



Avatars

Usually called *characters* because of the derivation from pen and paper roleplaying games.

A constellation of statistics and data that serve as proxy for a player on the server.



Avatar Attributes

- **Tangible attributes**
 - Things that affect the physics of the game world in some manner
 - What we tend to think of as “stats”
 - This is how the server relates to an avatar
- **Intangible attributes**
 - Leadership, charisma, prejudices, eloquence.
 - This is how other players relate to the avatar.



Avatar Identity

- Identity is driven by intangible attributes, not tangible ones.
- Intangibles get filtered by both the avatar and the player.
- Avatars are *iconic abstractions*, not *representational*.
- The greater the leap of closure, the easier to identify with an icon.
- This may portend trouble as we improve our graphics!



Names and Descriptions

- **Names**
 - Almost always single names or handles
 - Descriptive tags are also common
 - Global namespaces imply *pseudonymity* not *anonymity*.
 - Introduction systems can serve as tickler files.
- **Descriptions and appearances**
 - Player-entered backgrounds
 - Occasionally constructed by the code



Avatar Profiles

- **Profiles are publicly visible**
- **Histories**
 - **Game-tracked data that records activities**
 - **Levels**
- **Reputations**
 - **Player-given point system (think eBay or Slashdot).**



A Typical Profile

- **Name**
- **Description**
- **Tangible attributes (maybe how healthy they are)**
- **A list of equipment**
- **Some degree of history (levels achieved)**
- **Perhaps a reputation (criminal flag, etc)**



Roleplaying

- Races and classes are just templates for intangible attributes.
- In other words, races, classes, and stats are just *modes of expression* for players.
- Avatars are the masks players wear.
- Roleplaying is just matching the player's personal expression to the mask.
- To put it in another way: it's matching the font to the words.

Roleplaying example

- **Bad:**

This world sucks, dude. Like, lame-o-rama.

Indeed, I suffer mightily from ennui.

- **Good:**

This world sucks, dude.
Like, lame-o-rama.

*Indeed, I suffer mightily
from ennui.*



Game data models

User impact vs amount of persistence

Can
players
change
the
world?

	Only persist map and characters	Persist some objects		Save world state	
	AlphaWorld			LambdaMOO	Free building MOOs
The Palace		DikuMuds with corpse- saving	Asheron's Call	LPMuds	
			Dikus with housing	Ultima Online	
WorldsChat	DikuMuds with OLC	EverQuest			
AberMuds	DikuMuds				
Talkers					Enforced roleplay MUSHes

Amount of persistence



Tiers of Data Storage

- The world is always persistent
- Characters are usually persistent
- Some objects are often made persistent (corpses)
 - *EverQuest* saves corpses over reboots, but creatures are recreated at every reboot.
- Occasionally, everything is persisted-
-“world state”
 - *Ultima Online* saves every creature, every sword left on the ground, etc.



Implications of Persistence

- The more you save, the slower your database will be.
- Depending on what needs to be saved, a true transactional DB may be too slow for real-time game purposes.
- You cannot afford to have conflicting states saved—this is how you get duping.



Master Game Database

- **Template-based**

- Ideal for using a database
- Can support inheritance
- Easy to keep balanced
- Limits flexibility as all templates are in the same format

- **Aggregated world**

- Relies on OOP principles
- Developers always derive new objects
- Much harder to keep balanced
- Much more flexible



Handling spawning



Geographical Resets

Spawner at a fixed location

- **Reset**
Single table entry to create a single mobile; respawns when mobile is deleted.
- **Triggered reset**
Single table entry to spawn something when a player gets near (“eggs” in CRPG parlance); also capped at one instance
- **Generator**
Like a reset or triggered reset, except it’s uncapped or spawns on an interval.
- **Rotating reset**
Like one of the above, except that there are multiple entries that are rotated amongst so that successive visits yield different mobiles



Regional Resets

Regions use boxes rather than fixed points

- Region repopulate**

The equivalent of a reset, spawns a given creature repeatedly up to the region's cap

- Rotating regional reset**

Applies rotating resets to regions

- Tabular region repopulate**

Allows the mixing of different creature templates within a given region

- Ecological systems and population containers**

Attempts at simulating shifting populations



Player-based Resets

**These don't rely on the map, but
on the presence of players**

- Random encounters**

**Familiar from pen & paper; may check
regions for better fictional coherence**

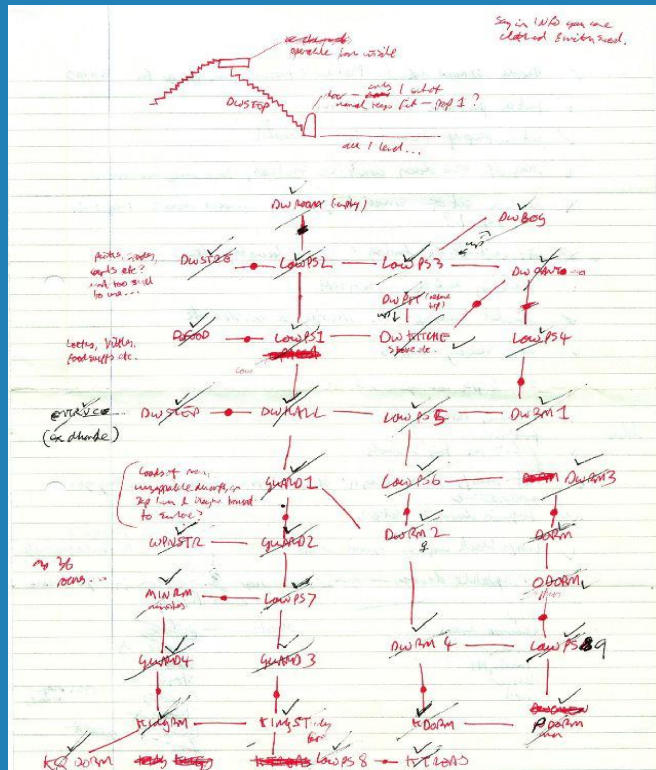
- Flag-based**

**Spawn attackers based on an aspect of
the player profile (revenants)**



Map structures

Room-based maps



- Based on nodes which are database entries with logical links
- Easy to expand
- Often relies on non-Euclidean Spaces
- No coherent scale implied
- Rooms are also used for culling and collating data to transmit



More on rooms

Rooms can be graphical as well as textual (generally a static picture)

Rooms can embed continuous maps (Euclidean spaces)

Often the “area” concept is used, where rooms are thematically grouped, and they share a nodal link to another area.



Continuous maps

- **Spatiality is real, not logical convention**
- **Imposes travel time, whereas rooms do not**
- **Can still be *presented* as rooms**
- **May or may not be built from tiles**
- **Very difficult to expand except at the edges**
- **Occasionally embeds multiple scales (iconic cities that expand to full-fledged new maps)**



“Zones”

- **Nodal arrangements of continuous maps, like *EverQuest*. Term lifted from alternate term for “areas.”**
- **Links between zones are still logical, not spatial; not necessarily a true expansion of the coordinate space**
- **Like a room-based model with continuous maps embedded in the rooms**



Other structures

Sparse arrays

- A method of constructing continuous maps that tags features with locations & assumes some sort of backdrop (often procedural)
- Saves a ton of space, but may not match quality in environment
- This is how housing works in *UO*

Dynamic world

- Systems whereby the map data is not static but can evolve; best suited to sparse array structures



Breaking down the types of spaces



Impositional space

- **A setting and expected modes of behavior are imposed**
- **There is a coherence to the virtual setting**
- **You take actions that correspond to the actions rewarded in the environment**
- **Typically includes positive feedback mechanisms**
- **Just about all ORPGs are impositional spaces**
- **Can require extremely strong administration if standards are high**



Expressive space

- **Generally no mandated activity in the environment—not a task-based environment**
- **World is often member-constructed**
- **World is generally fictionally incoherent**
- **Users not required to conform to an established standard for avatars**



Classic models for virtual worlds

Scavenger model

- **An impositional space**
 - Derived from *Zork*
 - Can be seen in *Pokemon* as well
 - Highly addictive model
- **Gather game objects and return to them to a particular location**
- **Generally there is no loss of achievements**
- **Almost always requires a game reset periodically**



Social

- **An expressive space**
 - The “chat room” extended to spaces
 - *MOO, MUSH, MUCK, MUSE*
 - *Habitat* is an early graphical example
- **Primarily for social interaction**
- **Relies heavily on complex profiles**
- **Self-selects for intangible attributes**
- **Often embeds subgames**
- **Often used for counseling, education, business purposes**



D&D Style

- **An impositional model**
 - The oldest model there is
 - May or may not make heavy use of the scavenger model
- **Based on accruing points through domination of the environment (PvE game)**
- **Relies on the tangible elements in the profile**
- **Generally attempts to have narratives**



PvP style

- **Expressive model**
 - A very old model created by accident
- **Players determine social hierarchy via conflict**
- **Requires tangible attributes near parity**
- **Heavily dependent on intangible attributes for success**
- **Often added as an “elder game” to other models**



Builder model

- **Expressive model**
 - *MOO, AlphaWorld*
 - Wizard system on gaming muds
- **Expression through creation, not communication**
- **Status via intangible attributes (player skill at aesthetics)**
- **Creates very strong attachment to the environment**
- **Often used as an elder game**



Advancement models



Reinforcement by actions

- **XP systems**
 - **Granting of points for doing an activity**
 - **Reaching certain amounts of points increases your “level.”**
- **Multiple XP systems**
 - **Levels require reaching thresholds on multiple scales (killing XP, quest XP, exploration XP, etc).**



Reinforcement by usage

- **The more you do, the better you get**
- **Must account for differing times required to perform tasks**
- **Encourages automation, even if you combat it via algorithmic balancing or time limits**



Reinforcement by results

- **You advance when you present results, not just by performing the activity.**
 - **Consensual systems**
 - **Like reputation systems**
 - **Advance you when others agree you have completed a task**
 - **Point spending systems**
 - **Acquire points from a wide range of activities, and spend them on advancement.**
 - **You can spend points on any advancement ladder you choose**



Single advancement ladder

- **The classic level-based system**
- **Only one “engine” for pushing you up the ladder**
 - **Usually this engine is killing creatures**
- **This is a finite game.**
- **You have to start over to try a different mode of play.**
- **Gaining a level generally grants power AND abilities, and generally the abilities also grant power.**



Why levels can suck

- **Every level is a content-generation multiplier**
 - **Content is tuned for specific level ranges—this is NOT how paper games do it**
 - **This prevents disparate levels from playing together**
 - **Players don't fight things of comparable power, only things they can beat easily**
 - **They acquire goods they don't need, which trickle down as “twinking.”**



Why levels can suck

- **“Trickle-down” raises player standard of living**
- **This causes lower-level game data to become obsolete**
 - **This makes the game less friendly. “The game doesn’t start until level 10...”**
 - **Players demand that all new content be at the high end**
- **Players pile up at the high end. So you add more levels.**
- **Go back to previous slide!**



Multiple advancement ladders

- **Instead of having one type of level, have multiple ones.**
- **These must have different advancement engines!**
 - **Ex.: killing, exploring, politics, roleplay, trivia games, etc**
- **Must be able to shift emphasis from any ladder to any other**
- **Offers longer retention—if you can provide the content.**



Floating datasets

- **Attempts to solve the level dilemma by procedurally changing the datasets based on player accomplishments**
- **Routinely done in racing games (chase car speed-up) and platform games (more life pickups if you're doing badly)**
- **Never been done in a mud?**



Atrophy

- **Removing unused power or abilities from a player.**
- **Players hate it in theory.**
 - **If time-based, will go to lengths to prevent the timer from going off**
- **Allows reversing past choices made in character development, which players like**



Fixed feedback

- **Every time the mouse pushes the lever, they get cheese**
- **Use-based systems without restriction give this.**
- **Humans find this boring in games, unlike mice, but there are some places where they want it:**
 - **Want to find adventure every session**
 - **Want guaranteed return after significant investment**
 - **Want guaranteed return after any sacrifice**



Variable feedback

- The mouse only gets cheese *some* of the time
- May be based on variable time feedback loops
- May be based on player skill or random rolls
- This is the most addictive mechanic there is



PvP models



Player-based: Free

- **Anyone can attack anyone**
- **Often accompanied by admin-based solutions**
- **Does not scale to larger populations very well**
- **Relies on social mechanics to curb grief player behavior**
- **Reduction in audience of up to ~40%**



Player-based: Flagging

- **A single action (often within towns) is server-detected and the criminal is flagged**
- **May allow attacks against criminals with no repercussions**
- **May allow tracking of the criminal (bounty hunting)**
- **May allow “forgiveness” of the criminal**
- **Often used to handle thievery as well as playerkilling**
- **Can impose tangible penalties**



Player-based: Reputation

- **Like flagging, except that players decide when to “report.”**
- **Is theoretically less unforgiving than a flag system; in practice, players just about always report their aggressor**
- **Unlike the flag system, cannot really be used by NPCs. But you can mix flags and reputation in the same system pretty easily**



Player-based: PK Switch

- **Players choose whether or not they are capable of attacking; only those who can attack are vulnerable**
- **Wreaks havoc with grouping systems and area effects; traditionally fairly easy to circumvent**
- **Can be elaborated into a “PK OK” system of permissions for duels, groups, individuals, etc**
- **Often level-limited**



Player-based: Safe

- **No players can attack any other player**
- **Grief players will circumvent this, which puts the burden on the administrators, just like free PK**
- **Reduction in audience size of potentially up to ~20%**



Geographic: Zone based

- **Often embedded as arenas into the other systems**
- **Relies on lines in the world where the systems change from free to safe, or from reputation-driven to safe, etc**
- **People tend to “play the lines” a lot**
- **The more dangerous zone is always underused because players attempt to maximize profit**



Geographic: Team-based

- **Usually, teams are also geographically based**
- **Often termed “RvR” or realm vs realm**
- **Danger increases as you move towards the other’s territory**
- **Territory is usually static though it doesn’t have to be**
- **Can feel futile as neither side can gain the upper hand**



Narrative models



The Storytelling Cube

- **Three axes:**
 - **Is it directed by players or by admin?**
 - **Does it spring from the backplot or not?**
 - **Does the event alter the world or is it ephemeral?**



Box One

Design-directed stuff that springs from the backplot but does not change the world

- **Static scenarios built into the map**
- **Static backplot provided when the game begins**
- **This is the default state of the art today.**



Box Two

Design-directed material that springs from the backplot but does affect the world

- **What players say when they mean “plot.”**
- **Things like destroying towns, changing the map, toppling NPC rulers, etc.**
- **Allowing players to determine the outcome via their actions**



Box Three

Design-directed material that does not spring from the backplot and does not change the world

- **In-game holiday celebrations**
- **Recognition of real-world events in the virtual world**
- **Tend to be transitory, unless they also involve Box Four...**



Box Four

Design-directed material that does not spring from the backplot and does change the world

- **Occurs when game changes are made that significantly affect the game's storyline**
- **New types of items, like weapons or armor. In UO, black dye.**
- **Can often have subtle ripple effects across the game's fiction**



Box Five

Player-directed material that springs from the backplot but does not change the world

- **Players tell themselves a backplot-driven story that is parallel to the broader narrative**
- **This has no wider impact.**
- **In UO, Seekers of the Wisps.**



Box Six

Player-directed material that does spring from the backplot and does affect the world

- **Players topple the king! Players reshape the continents!**
- **And somehow it all fits into the plot!**
- **The Trinsic Rebellion, the Temple of Mondain.**



Box Seven

Player-directed material that does not spring from the backplot and does not change the world

- **This is the default player activity.**
- **They mythologize their adventures into narratives.**
- **Themed dungeon crawls**
- **Player journals**
- **Taverns doing roleplay stories**



Box Eight

Player-directed material that does not spring from the backplot and does change the world

- **This is what players want.**
- **They want their own king to rise up and overthrow Lord British.**
- **They want to found new cities that are more important than the designer provided ones.**
- **They want to permanently reshape the environment, to make a mark.**



Communications models



Contextual vs non-contextual

- **Contextual methods are ones that are explained within the game fiction.**
- **Non-contextual ones are bolted on, with no justification provided**



Synchronous vs asynchronous

- **Synchronous methods occur in near-realtime.**
 - You have to be there to get the message
 - Messages are not persistent
- **Asynchronous methods are post-and-retrieve**
 - Messages are persisted
 - Recipients do not need to be present at the time

Spatial broadcast

- **Synchronous, usually contextual**
- ***Say*: limited range broadcast to multiple recipients**
- ***Talk*: like *say*, but one recipient called out publicly as the intended recipient**
- ***Whisper*: like *talk*, but message is garbled for any but the recipient, unless skills or proximity override**



Peer to peer

- **Instant messages sent to single recipients.**
- **Generally synchronous**
- **Almost always non-contextual**
 - **Some games explain it with psionics or communicators**
- ***Tell* is the classic command**
- **May add AFK buffers, answering machines, etc, making it asynch**
- **ICQ/IM is a more complex variant that becomes asynch**



Multichannel broadcast

- **Synchronous system**
- **Subscribe to channels to receive text, rather than using distance**
- **Almost always non-contextual**
- **Static chat channels are the standard implementation**
- **Can also support dynamic conferencing**



Asynch peer to peer

- **Messages sent to a mailbox to be retrieved later**
- **Embedded mail systems are common on all text muds**
- **AFK systems in instant messaging systems accomplish the same thing**
- **Almost always non-contextual**



Asynch broadcast

- **Persistent messages broadcast to multiple people**
- **Most text muds support embedded bulletin board systems**
- **May have “channels” like chat by using different boards**
- **Boards often tied to locations (thus contextual) but not always**



Context embellishment

- **Players like everything to be contextual if possible**
- **Ways of embellishing the context:**
 - **Town criers: spatially limited broadcast mechanisms for news**
 - **Books and notes: player-created means of persisting text**
 - **Rumor systems: Procedural detection of significant events or player-performed actions, broadcast out randomly via the NPCs or town criers, used to make NPCs seem more alive**