UNIVERSITY OF CALIFORNIA,
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Server Worlds:
Preservation, Virtualization, and Infrastructures of Control in Online Gaming

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Anthropology

by

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Dissertation Committee:
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DEDICATION

For my grandmother, Grace, who would be proud to know I eventually went on to become a doctor, though maybe not the type of doctor she had in mind.

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ACKNOWLEDGMENTS

I finally made it to the end, and I have many people to thank. First, I would like to extend my gratitude to all of the nerdy gamers and experts I spoke with while conducting this research, especially the folks at the MADE, Stanford University, and the Internet Archive, as well as all of the anonymized World of Warcraft players who shared with me their passions and experiences. I'd especially like to thank the Rough Trade Gaming Community, who welcomed me with open arms during my first summer of preliminary research. I had the absolute pleasure of being a member of their guild in Guild Wars 2, and the Bear Taint guild in World of Warcraft. My guildmates provided me with so much guidance, encouragement, and friendship that were invaluable early on in my research career. Lok'tar Ogar!

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I am humbled to look back at all the people who have built me, loved me, and supported me. In this dissertation, their voices echo between the margins. Thank you. I love you.

CURRICULUM VITAE

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EDUCATION

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2020	Social Media and Youth Wellbeing Report: What We Know and Where We Could Go. With Mizuko Ito, Candice Odgers, Stephen Schueller, Jennifer Cabrera, Remy Cross, and Maya Hernandez. Connected Learning Lab website, published June 23.
2019	The Server Souvenir: Taking Home Remnants of Virtual Worlds. Platypus, the official blog of the Committee on the Anthropology of Science, Technology, and Computing (CASTAC), posted 10 December.

2018 Do We Inherit Abandoned Online Games? Platypus, the official blog of CASTAC, posted 27 November.

2018 Privacy and Piracy: Investigating Unauthorized Online Gaming (Law in Computation Series). Platypus, the official blog of CASTAC, posted 8 February.

2017 From the Archives: Play as Theory, Object, and Analytic. American Anthropologist website, posted 27 November.

2017 Locating Servers, Locating Politics. Platypus, the official blog of CASTAC, posted 17 October.

2017 The Nerd is Dead, Long Live the Nerd. With Lina Eklund. Platypus, the official blog of CASTAC, posted 27 June.

2016 Pokémon GO and the Visibility of Digital Infrastructure. Platypus, the official blog of CASTAC, posted 26 July.

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2016 "Server Worlds: the Ethnographic Lives of Game Servers." Invited speaker (Fatima Jonsson, host), Media Technology Department, Södertörn University, Sweden, 7 September.

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ABSTRACT OF THE DISSERTATION

Server Worlds: Preservation, Virtualization, and Infrastructures of Control in Online Gaming

by

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Doctor of Philosophy in Anthropology

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Professor Tom Boellstorff, Chair

This dissertation focuses attention on the capacity of servers, the mundane building blocks of internet infrastructure that support online social environments, to be understood as worlds themselves, as places with names, histories, and politics. This dissertation turns to game servers, those that help to run virtual worlds like World of Warcraft, to explore questions related to infrastructural forms, players' memory practices (like the memorialization, commemoration, and preservation of games), and struggles for control over games in light of processes that continue to strip players of their agency. In studying player practices, I explore how relations between servers and worlds shape and are shaped by gamer communities.

Based on ethnographic fieldwork conducted over 12 months, this dissertation follows distinct, yet overlapping populations of players as they engage with different memorial practices and desires. Traversing multiple field sites, this study follows World of Warcraft players and explores their nostalgic yearnings, onto a museum in Oakland working to preserve virtual

worlds, finally landing in players' homes as they remember gaming experiences channeled through commemorative server hardware.

Through an analysis of the memorial practices that players perform through servers, this dissertation contends with both the infrastructural qualities of servers and their impacts on users, tracing the ways that the state of matter in which servers exist is seemingly in flux, as a result of cloud computing. This dissertation therefore contributes to anthropological studies of both virtual world sociality and infrastructure, arguing for a more nuanced understanding of the shifting relationships between digital technologies and the worlds they generate.

Introduction

It had been an hour since we started chatting about *World of Warcraft* (*WoW*), sitting around a table outside of a Panera Bread in Brea, California. Although this was meant to be an interview, it was also the first time East, Sig, Adore, and Ember had seen each other in quite some time, so I gave them space to reconnect in person. These four *WoW* players were former members of a guild—a structured gaming community in *WoW*—called "The Church," and as we sat there, I marveled at how vividly and collectively they remembered specific moments from their time playing *WoW* together. They recounted fond memories of exploring dungeons together, attending in-person guild meetups, and forging lifelong friendships. At one point, Sig, former leader of their guild, interrupted the conversation and asked: "Can we see it again?" East thoughtfully combed his beard with his hand and responded with a nod.

Moments later he was walking back from his truck holding "it"—a large black rifle case, about three feet long and one foot wide, which he placed on the table in front of Sig with a smile. It felt like everyone was holding their breath as East opened the case to reveal the thing that had initiated this gathering. The case no longer held what it was designed to contain. Its interior was padded with grey foam, with rectangles carved out on the top and bottom to fit the shape of the object it was now modified to protect: a *WoW* server blade. A server "blade" is the hardware that is dedicated to running server software, forming the vital "back end" of *WoW* which supports online gameplay. Servers are the things that allow players to share space together in a "realm"—an individual instance or copy of the game world with its own population of players. Though the current physical infrastructure of the game looks different today, there was a time when each realm, of which there are dozens, ran on four of these now-obsolete server blades. This particular blade is one that, from November 26, 2004 to June 9, 2010, helped to run the Darkspear realm,

the very realm where the members of The Church guild played together for many years.

I had learned about this group from a thread on the subreddit r/wow, in which the original person posting was showing off their own server blade from a different realm. Reading through the comments, another user's remark caught my attention: "One of my guildies bought one, and every time we get together, everyone signs it." That commenter was Adore, who privately shared with me the story of The Church's Darkspear server blade and sent me photos from guild meetups, where attendees proudly posed with the autographed server. After some back and forth, she put me in touch with East to organize this meetup with some local guild mates, to chat about their experiences and to see the blade in person. Before the meetup, East and I had a private chat where he explained that the commemorative server had been purchased by a guildmate and close personal friend of his, Lion, who had recently passed away. Lion, who had been ill for some time, bought the blade and showed up to a meetup unannounced with it in hand, with the intention of leaving something behind for the group to remember their bonds and experiences at various scales: in *WoW*, on Darkspear, in The Church, and at these meetups.

Imagine for a moment that you lived in the Bay Area of California, and for five years explored its towns and hinterlands with a group of friends—shared adventures and challenges, but also shared quiet moments of storytelling and made memories. Now imagine if the Bay Area, a place that captured an important time of your life, could be saved on an object small enough that you could carry it with you, and furthermore that the Bay Area had otherwise ceased to exist in the physical world. This somewhat awkward analogy captures some of the emotional power and cultural meaning of the story I have just described.

The server, even as an artifact no longer sitting in a data center, carried so much significance from its previous life as the host of a world. It was in seemingly pristine condition, the plexiglass

Figure 0.1: Members of The Church guild huddle around a *World of Warcraft* server blade, indicating the signatures of their guildmates. Source: Author.

cover wrapped in plastic to protect it from scratches and wear. Yet even with the plastic wrap on, I could see the silver Sharpie markings all over it—signatures and messages from fellow guildies. Adore and Ember stood up to get a better look. I watched the four of them as they enthusiastically pointed to each other's signatures and lovingly called out their names: "there's Lion's right there." I learned that the guild's membership extended well beyond Southern California, with players even traveling from Brazil and Europe to attend annual in-person "ChurchCons" where the blade sometimes made an appearance. As they scanned the object's surface and wondered aloud how certain people might be getting on, Sig made tentative plans to post on The Church's Facebook group about scheduling another guild meetup to get signatures

from a select group of people who had yet to wield the silver Sharpie. The server that once united them virtually had now become a catalyst for in-person gatherings.

Throughout our meeting, the four of them would periodically point to the server, saying things like "that was our server." From moments like this, where "[t]he material artifact 'points to' other phenomena (social meanings, history) as an indexical sign" (Beckstead et al 2011, 199), to the practice of autographing the surface of the blade, what is important about the Darkspear server blade for this group is its value as, in a very real sense, the actual place where collective experience took place. It constitutes the place where a group of people's affects, investments, affinities, and memories of both a game and a social world. Yet during the time in question, it literally was the world of *World of Warcraft*, the sociotechnical instantiation of a well-trodden, deeply meaningful and real place that triggers memories and storytelling. Of particular import here is that the technological foundation of a virtual place can act as an artifact to memorialize the community that once inhabited that place.

At first blush, this server blade might seem to be like to a commemorative plaque at a memorial site. In one sense the analogy is apt, since the blade is no longer plugged into an outlet and is no longer connected to the internet. Yet in another sense, the analogy misses how the server blade actually constituted the place of sociality within which these guild members remember their unity, their past experiences and relationships, and Lion, an important individual for whom they have collectively mourned. It was clear by their reactions and stories that members of The Church saw this otherwise-mundane object as more than just a dead piece of hardware or collectible item of *WoW* merchandise. On the contrary. While it was active, the server was the place of sociality itself. As a disconnected artifact, it symbolizes and memorializes collective experiences from many people who have and can still interact with it. It

overflows with life, especially when in the presence of those who inhabited it when it was "live." From the intangible memories and feelings evoked by its presence to the very tangible and permanent markings placed there by guildmates, to the unusual things people do to it (like licking it, as Sig had reportedly once done), it is an enchanting source of remembrance and nostalgia, deeply evocative and strangely beautiful despite its mundanity.

This is one of four Darkspear blades in existence and only one of several hundred server blades that were auctioned off in the early 2010s. As I stand watching the members of The Church take a group selfie with decommissioned server hardware from an online game, I am struck by the magnitude of the game's influence on people, and marvel at how this object can constitute both a world and countless players' experiences. How can a server, an object that normally lies unseen and so far away from its users, carry this much weight for these individuals? What impacts can servers have on players, and what meanings and practices have been evolving around them? What other server stories are there to tell?

What is a "Server World"?

This dissertation is about shifting relationships between digital technologies and the places they create. It focuses attention on the capacity of servers, the mundane building blocks of internet infrastructure that support social environments on the internet, to be understood and experienced as worlds themselves, as places with names, histories, and politics. In particular, this dissertation turns to game servers, those that help to run virtual worlds like World of Warcraft, to explore questions related to infrastructural forms, players' memory practices (like the memorialization, commemoration, and preservation of games), and struggles for control over games in light of processes that continue to strip players of their authority. In studying player practices, I explore

how relations between servers and worlds shape and are shaped by gamer communities.

The term "server" has a number of distinct but interrelated uses in English. Generally, the term is used to describe someone who works in a restaurant or bar who brings food and drink to customers. In law, a server is a person who hands off legal documents, like a contract or subpoena, to a recipient. Server is also used in tennis to denote the player that begins the match and first sends the ball to the other side of the court. The common meaning between these definitions is that a server is someone who delivers something, like a message, a product, or a service. In computing, we can understand a server as both a recipient of requests and as a deliverer in response. Servers deliver messages, products, and services in the form of data packets transferred over a network; in other words, a server is a computer at one end of a network that makes certain services accessible to other computers in the network. According to media historian Markus Krajewski, the use of this term to describe these machines constitutes a metaphor that draws upon historical understandings of servants and servitude. In his book *The Server*, Krajewski (2018) writes that, "the server metaphor represses some levels of meaning but privileges others, and in that process forms an image that renders visible the services of those mysterious network actors… the image of a diligent and quiet, present yet absent servant helps others understand the notion of the server as a function of permanent data availability" (324–25). The server is an agent of service, one that operates in the background and delivers the data and information required for everyday interconnectivity.

There are millions of servers that make up the structure of the internet, including email servers, web servers, media servers, file servers, and more, all dedicated to their particular roles. Almost every action that the average internet user takes requires interactions with one or more servers. In our everyday lives, even though we might not always be aware of it, we constantly

interact with servers. A key feature of servers is that they are infrastructural, and as such, when they are working as intended, we as users barely notice them. They are often hidden from view, located in distant, remote buildings known as data centers. By now, thanks to journalists and technology companies like Google posting "insider views" of server rooms, you may have actually seen a server, one of many boxes with blinking lights in one of many black cabinets, neatly arranged in rows in data centers around the world. As the "back end" node of a network, each of these boxes does the work of responding to data signals and requests for access in isolation from users at the various front-facing ends of a network (the "end users"). Servers often only make themselves known in moments when something goes wrong. For example, an unstable connection or network failure might trigger the server to send a message to the user saying something to the effect of "server error" or "the server is not responding."

Most of the literature in infrastructure studies deals with material infrastructures, the "material forms that allow for exchange over space" (Larkin 2008, 5). This includes things like roads (Harvey and Knox 2012), pipes (Anand 2011), and undersea fiber optic cables (Starosielski 2015). Servers are infrastructural objects that actually occupy both physical and digital space. Like these other forms of infrastructure, servers are tangible, material things, heavy metallic boxes sitting in data centers. At the same time, servers are also the name used for the software programs encoded into the hardware components of server blades. Therefore, it can be said that servers are an assemblage of material and virtual components, an inherent dualism in which they have been designed to exist. However, what has been happening over the last decade is that the state of matter in which servers exist is seemingly in flux, and in many cases this seemingly material infrastructure can become "more virtual."

What is sometimes called "server virtualization" is a process by which server systems

become integrated in a cloud-based system, in which developers can designate many server softwares to run on one server hardware to improve efficiency. The entangled processes of server virtualization have had immense impact worldwide, but in this dissertation I focus on the effects that changing virtual world server forms have on their inhabitants. By virtual worlds, I mean persistent, shared environments generated by computers, where people take on avatar bodies and interact daily, forming long-lasting relationships and dynamic communities. These worlds are in part powered by servers, which are responsible for enabling multiple people to co-exist in one place together. Virtual worlds can take many forms, from the social sandbox worlds like Second Life and Minecraft, to the more game-oriented massively multiplayer online role-playing games (MMORPGs, or simply MMOs), WoW and Final Fantasy XIV. In this dissertation I will largely focus on the server entanglements of players of the latter, specifically WoW gamers, though I will make references to other worlds, such as Second Life, as points of comparison. I hone in on more game-oriented worlds to focus on certain changes that the games industry has undergone in the last decade, ideological shifts in business and product decision-making that have not only necessitated alterations to infrastructural forms, but also immense changes to how games and game worlds are designed and marketed as services. I bring into conversation anthropological literature on infrastructure with scholarly work from game studies, examining how fans of online video games experience infrastructures and sometimes assert control or authority over that which might normally be out of reach.

Though servers might "operate in the background" of MMOs and virtual worlds, gamers are acutely aware of their presence and impact on their daily lives, in a way that other users of the internet might not always be. It is typically not through technical know-how that players come to understand servers, but instead through the ways in which servers shape so much of in-game life.

Figure 0.2: The VP of Global IT at Blizzard Entertainment reinserts a *World of Warcraft* server blade into a server rack at their headquarters in Irvine, CA. Source: Documentary, *World of Warcraft: Looking for Group* (2014).

As has been the case in most MMOs, the population is often divided up across multiple servers, which all run distinct copies of the world, in order to lighten the load on other servers. As an analogy, imagine if there were multiple copies of Los Angeles, all identical in appearance and essentially layered on one another, occupying the same space, but with different populations of people living with them. Though not always the case, oftentimes when players first enter an MMO, the system asks them to choose a server on which to play, a process which some players describe as choosing a home or planting one's flag. Even if players do not actively choose a server, as is becoming more common in the MMO genre, the system typically will assign the player to a server and the player is shown a message that might read something like "Looking for World" or "Looking for Server." Moreover, in-game time—often called "server time"—which players use to organize events and meet-ups, is determined by the geographical location of the

server on which one is playing. Servers are undoubtedly integral to virtual world experiences, as scholars of virtual worlds studies have highlighted in their work (see Boellstorff 2008; Taylor 2009; Nardi 2010). These virtual worlds, therefore, are more-than-virtual.

What this dissertation contributes to academic literature on virtual worlds is to take into account the ontological perspective of understanding servers as worlds, proposing a theoretical reframing of virtual worlds as "server worlds." In putting forth this analytical approach that largely operates infrastructurally, in the background of each chapter, to network all the chapters together, I center servers as objects of anthropological inquiry in the studies of virtual worlds and, more specifically, online game worlds like WoW: as foundational infrastructure that shapes social interaction, as sites of meaning-making and resistance, and as tools for world creation and re-creation.

Just as the forms that servers take are in flux, so are the virtual worlds they support. Leveraging servers constantly running in the background, game developers are able to update these games on the fly, to quickly fix bugs and add content. This has created a situation in which virtual worlds, like other modern software, are frequently being modified and altered, with new versions with the latest updated software replacing previous versions. Additionally, most virtual worlds do not survive forever; sometimes developers take them offline permanently, disconnecting the servers and causing the world to cease to exist. As a result of changing and disappearing virtual worlds, many players are often nostalgic for lost worlds, and take up projects to bring them back. Therefore, in light of these cultural and infrastructural shifts, I analyze the place of servers in player practices around remembering, examining how passionate fans of games use servers to act upon their nostalgic longings for past versions and for games that are no longer online. I focus especially on the challenges they encounter when taking on

projects of world restoration, as well as the ways in which using servers for preservation practices actually constitutes a kind of resistance, which in some ways can be seen as granting a certain amount of otherwise unattainable infrastructural authority to end users.

Although this is a study of gamers, this is not a study of gameplay, per se. Rather, I follow the lead of anthropologist Valerie Olson (2018) in closely examining systems of changing relations, and treating the server, as she treats the "system" in her work on spaceflight programs in the US, "as an ethnographic object—a *relational technology*—to examine socially interconnected… efforts to naturalize as well as build sets of relations" (217). I offer close examination of sets of relations between players of massively multiplayer online role-playing games, developers of these games, and the infrastructures that support them, as well as the memorial practices of gamers as they commemorate, preserve, and restore online game worlds. Inspired in part by the work of Raiford Guins (2014) and others in the growing field of game preservation studies who are invested in studying the "afterlife" of games, this dissertation follows what I call a life path of game servers, marking particular "stages of life." While the server is not a living organism, terminology of life and death pervades discourse around them: players describe an online server as "live," a low-population virtual world as "dying," and decommissioned servers as "dead" hardware. They use such terms generally to describe servers and virtual worlds in moments in transition, from one state of matter or being to another. These paths are often not predetermined or linear; as such, I trace gamer narratives across the moments of juncture and transition. Each of the chapters in this dissertation focuses on a distinct moment in which the vital relationship between servers and virtual worlds takes shape, from servers dying, to worlds being brought back to life using servers, to dead servers gaining new value in light of the lives they impacted.

The Lives and Afterlives of Game Servers

The first chapter begins with an exploration of the vitality of game servers, and what servers mean for players in their everyday lives playing World of Warcraft. I examine servers' impacts and effects on player social worlds when they are working as programmers designed them to work, seated in data centers, connecting people together, and supporting social interaction. In doing so, I argue that what makes game servers appear lively is that they have populations of players using them. To tell the stories of server vitality, I begin by investigating servers "in place," highlighting their infrastructural qualities and illustrating those moments when servers "surface" and make themselves known to players. I then move to defining servers "as place," explaining how server worlds are shaped by both hard-coded and soft-coded rules and defining how WoW players have historically understood salient ideas of server community, server culture, and server identity as core features of their play experiences.

As a specific case study of these concepts, I draw upon data collected during two summers of ethnographic fieldwork with an LGBTQ gamer community, the Rough Trade Gaming Community, on WoW's Proudmoore server, which many players describe as the "gay server." The chapter ends with an exploration of the mortality of game servers, and the ways in which WoW developers have altered their server architectures in light of so-called "dying servers" or "ghost servers," or ones that have lower active populations of players. I discuss important changes that have been made to the way servers work and how the process of server virtualization has immensely altered social worlds, leaving players feeling that they have lost control of their worlds as a result of changing infrastructural forms.

In the second chapter, I turn to the next server life stage, one characterized by refashioned and preserved servers. I follow the stories of players holding onto old forms of life by creating

what are known as “private servers,” or servers that are privately administered by individuals or teams of people. These private servers run game server software that has been recreated by fans, largely in order to keep certain outdated infrastructural forms alive and make accessible previous versions of WoW that have since obsolesced, specifically the original or “vanilla” WoW. I argue for an understanding of these private servers as forms of what Kari Kraus (2011) has called “folk preservation,” or projects for the preservation of cultural artifacts conducted by laypeople, as opposed to a more formal institution like a museum, library, or archive. I also build on Alexander Galloway’s (2004) concept of “protocological power” to propose that, when players go “back in time” using private servers, they are resisting the forward motion of the game industry by wielding what I call “server power,” a rare moment when end users re-appropriate and retake control of the infrastructure upon which a virtual world is run.

Tapping into survey and interview data collected from WoW players who had experienced playing on or running vanilla WoW private servers, this chapter delves deep into capitalist structures in place in the gaming industry, like the “Games-as-a-service” consumer model, which have created the problem of “versioning.” A nightmare for players and for preservationists alike, versioning is a process by which old versions of online games get buried under updates and large-scale expansions to the game world. This chapter also outlines certain temporal instabilities of private servers, or the limitations and weaknesses that stand to threaten their longevity as active worlds and put players in a precarious state of potentially losing their game data and their communities.

Virtual worlds and their underling infrastructure not only undergo numerous changes, but also can be said to “die” when developers decide to disconnect their servers and take them online. The third chapter examines virtual world death and people’s efforts to bring these lost or

defunct virtual worlds "back to life." Turning from examining forms of folk preservation to institutional preservation projects, in this chapter I look closely at how one institution, the Museum of Art and Digital Entertainment (MADE) in Oakland, CA, has become involved in nostalgia-fueled necromancy, restoring network connectivity to offline virtual worlds. This research was conducted with key staff members at the MADE, and is bolstered by interviews with historians, journalists, game developers, and a legal scholar who has worked closely with the MADE. Pairing this ethnographic data with a review of archival legal documents, I attend to the ways in which the MADE has acted at social, technical, and legal levels to alter the structural conditions that challenge their efforts.

These challenges include what I call the "worlds-as-a-service" paradigm (a play on the idea of "games-as-a-service") under which virtual worlds are understood to be services rather than products, and the current US copyright legal regime, specifically the Digital Millennium Copyright Act, which views server code as intellectual property. To demonstrate how the MADE has worked to alter these systems, I recount two examples: (1) the MADE's recent efforts to restore the world's first graphical virtual world, Habitat, using obsolesced server hardware and reverse-engineered server software; and (2) how the MADE, alongside legal teams, historians, and activists, have leveraged a segment of copyright law that enables certain work-arounds, called copyright exemptions, to extend their efforts, in essence hacking or "modding" the doctrine.

Finally, this dissertation ends just as it began, with an examination of the decommissioned WoW server blades described in the prelude to this introduction. Drawing upon data collected from a survey of almost 100 players who had purchased one of these pieces of server hardware, interviews with a subset of this group, and a comprehensive review of Reddit posts about these

objects, the fourth and final chapter looks to the afterlife of "dead" server hardware: unseated from data centers, circulated among players, and gaining new value and meaning as commemorative artifacts. This chapter captures a rare moment when infrastructure changes hands and players get the opportunity to own a server on which they once played, and the multiple intersecting meanings that players attach to servers. I describe players touching, holding, displaying, and protecting servers, examining how these individuals, through their interactions with servers and other players, variously make sense of and value these objects as doubtlessly nostalgic artifacts, ones imbued with social, memorial, aesthetic, spatial, and historical value.

Because players generally expressed a sense of wonderment about these paradoxical objects that both represent experiences and are understood to literally "contain" experiences and memories, I employ Jane Bennett's (2016) concept of "enchantment" to describe the multi-faceted and difficult-to-define fascination players have with these at times seemingly magical artifacts, literally inscribed with meaning across their material surfaces. Bringing the afterlife of physical servers into conversation with the first chapter's focus on server virtualization, this chapters closes the loop and addresses how these server blades came to be in circulation in the first place, examining how the changing material form of the server, in the context of WoW, has impacted this style of virtual world commemoration, as well as players' relationship to game companies as consumers and fans.

We are now living in a world powered by servers, vital infrastructures that keep us interconnected. This dissertation is an ethnographic investigation of populations of people who interact with servers in specific, and often incredibly direct, ways. These interactions are in some ways distinct to specific communities of play, but they also illuminate broad cultural

understandings and practices of digital culture. In each chapter I approach the historic, contemporary, and evolving relationships between gamers, game developers, virtual game worlds, and the servers that run them from a different perspective. Ultimately, each chapter addresses a manner in which forms of server ownership and control shape and are shaped by gamers' memorial practices and engagements with the past.

Chapter 1

Servers in/as Place

In 2020, during the first COVID-19 lockdown, I made a new friend online. He was a lifelong gamer, with extensive experience playing massively multiplayer online role-playing games (hereafter MMOs), including Guild Wars 2 and Final Fantasy XIV. One night, after giving each other a tour of our Animal Crossing islands, we decided to chat on FaceTime, and eventually the topic of my research came up. After a little back-and-forth between explaining my research topics and answering his questions, he got hung up on something I had said—that servers matter differently for gamers than for the average person. He cocked his head inquisitively and looked off-camera for a moment. Looking back at me, he responded: "What do you mean by that? I mean, when I talk about servers, it's just for figuring out how to meet up with friends in the game. Servers are the world." It is this exact notion that I examine in this chapter. It is not that servers are *like* worlds—rather, they *are* the world. This ontological distinction is worth exploring in order to uncover the cultural significance of servers. What social and technical processes have made players tacitly experience servers as worlds? How do players develop a sense of the "culture" of a server? In this chapter, I argue that players' conceptions and experiences of the game server as a place are shaped by both the characteristics of the server as a piece of infrastructure designed by developers and the characteristics of the sociality that emerges among the people that choose to play on that server.

Servers are unmistakably present in the work of those studying virtual worlds, and they are clearly important to the lives of players who depend upon them for gaming and social interaction. What differentiates game servers from e-mail servers or web servers is not a

significant difference in hardware components. In other words, the materiality of these worlds are not contingent on the materiality of the servers, but rather a difference in the design of the software: that the programs stored on them allow multiple people to occupy social space together simultaneously. Servers are often described as "dedicated" to a task, like a Dropbox server is dedicated to storage. The way game servers are coded make them dedicated to the tasks of co-presence and synchronicity, making it possible for players' avatars to stand next to one another and to register the movements, actions, and communications of one player's avatar on other players' screens. Because of the way the infrastructural networks of game worlds like World of Warcraft (WoW) are designed, servers play an integral role in the place-making practices of players. In the sections that follow, I will describe how gamers have come to experience and inhabit servers as worlds, specifically focusing on the everyday experiences of gamers in MMOs. In later chapters, I discuss unauthorized (Chapter 2), recreated (Chapter 3), and decommissioned (Chapter 4) servers. Here, however, my goal is to illustrate player experiences when game servers are working as developers intend them to, sitting in data centers and hosting social interactions in virtual spaces.

While the hard-coded rules and technical structure of WoW servers can generate place and powerfully shape players' sense of place, the fact is that servers are changing form and, in some ways, player sociality changes as a result. Many developers of MMOs and other virtual worlds have largely moved to systems that relies on cloud computing, meaning that multiple servers can run on one piece of server hardware. And as infrastructures of virtual worlds change, so do players' experiences of virtual place and ways of knowing and inhabiting the virtual world. While this chapter is in some ways about community and identity formation on servers, it is also about the social implications of server virtualization and the tension between the promising

effects of infrastructures and the affects of online gamers in the midst of a transition from one state of infrastructural matter to another. The opening sections of this chapter are historical, based on information about WoW servers that was true at the time. However, it is important to know the past to know how things have changed, by seeing both the past and present through players' eyes. In moving between the past and present of MMO server environments, I ultimately argue that, while MMO gamers have historically experienced servers as both infrastructure and world, certain infrastructural shifts to a system that is "more" virtual and in the cloud has decoupled these conceptualizations, transforming the "server as world" concept.

Servers "in" Place / Servers "in" the World

When WoW players think of servers, they are not typically thinking of rows of machines in data centers; they are more often concerned with the placeness of servers (e.g., accessing the server on which they have stored their character avatars or joining the same server as their friends to play together). However, before turning to player conceptions and experiences of servers "as" place, I would like to pause for a moment on the idea of servers "in" place and the effects that the emplacement and materiality of online gaming infrastructure has on players, whether they know it or not. A slew of media studies literature has concentrated on the places in which the internet exists, focusing on the countless networks of "tubes" (Blum 2013), undersea cables sea (Starosielski 2015), routers (Dourish 2017), and data centers (Vonderau 2018) that make up the internet's infrastructure. Servers are housed in data centers located around the world. Where they are located can have powerful impacts on the people who access the internet every day, though they may not always know it. For example, an online video might reveal itself to be region-locked, only accessible and downloadable by users in the same region as the server on which it is

located. Yet sometimes knowing the location of servers offers its own set of opportunities and consequences. Such knowledge might benefit a stock trader, for instance, who might strategically migrate to an office closer to a banking server to get a faster connection that affords more rapid decision-making regarding buying and selling stocks (Lewis 2014). For most internet users, however, servers remain infrastructural and backgrounded; their materiality is primarily felt when they are not functioning properly, causing disruptions to daily life.

Scholars studying infrastructure have long been concerned with issues around the visibility of infrastructure and users' everyday awareness of infrastructure, such as how things like roads (Harvey 2010), water supply systems (Anand 2011), and cellphone towers (Tawil-Souri 2015) are meant to go unnoticed or remain "invisible" to everyday social interaction, though they may still be in plain sight. In such studies, the relative "visibility" (or people's awareness) of infrastructure is often defined in terms of breakdown, those "moments of failure" (Graham 2010) in which the otherwise "hidden mechanisms" (Star 1999) of infrastructure reveal themselves to us, bringing to consciousness the conditions of "flow and circulation" (Parks and Starosielski 2015) that sustain infrastructural operations. In other words, people tend to think about infrastructure when it is not working as it should, or when it breaks down.

Such is the case for online gamers as well—in moments of breakdown, what normally might go unnoticed comes into harsh focus. As a way of understanding gamers' server awareness, I pause here to look at how the maintainers of servers, or those who encounter servers firsthand as a part of their daily life, discuss server communication. In the client-server model of network computing, the "client" is known as the "front end," the software located locally on the user's computer or device. Put simply, the client is the software that sends requests to a server for access to data or a service. On the other end is the server, known as the "back end." The server

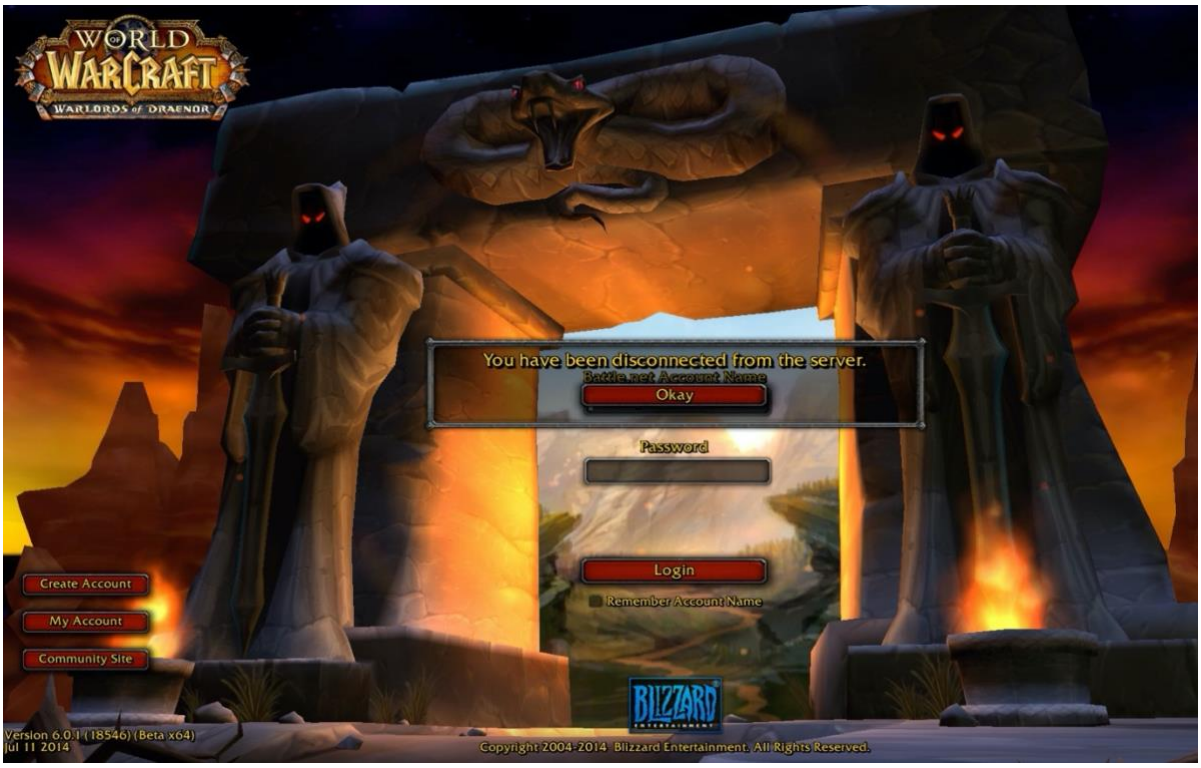

Figure 1.1: The *World of Warcraft* login screen displayed after a player gets "disconnected from the server." Source. Author.

receives requests from the client and responds from the "back," sending the messages to the "front." Even though front-end software is on the user's device, the user is not always aware of when a client is requesting or receiving information from a back-end server. This state is what Heidegger (2008) called "ready-to-hand," when things in the world—whether they be more concrete, like technologies, or more behavioral, like social norms—go largely unnoticed, their utility perhaps taken for granted in the thrownness of action and everyday life.

In thinking about game servers' infrastructural "visibility," or online gamers' awareness of servers, we might use a similar framework. Servers are ready-to-hand when they are operating from the back end as intended. However, they become "present-at-hand" during moments of disruption or breakdown, surfacing to the level of consciousness and making themselves known to the front end with a server error message or the user being forcibly disconnected from a server

(Heidegger 2008; Schwenkel 2015). After all, when we are acutely aware of something in the present or something is particularly important to us, we might say it is at the "forefront" of our minds; and when we are not presently thinking about something, we might say it has been put on the "back burner." There is this idea that hidden or obscured things, much like servers, lie at the back of the brain, literally "out of sight, out of mind." So when do servers move from the back end to the front end of the mind of the online gamer? Under what conditions are servers present-at-hand? For online gamers, especially those that play MMOs, these moments of failure are only the tip of the iceberg in terms of the presence of servers in their gameplay and social interactions.

Most of these moments of failure are less like breakdown, causing the server to cease to function, and are more like partial breakdown, more temporary and mundane. Disruptions, glitches, and moments when the game is "down" are all examples of partial breakdown, when the experience of the game is interrupted and the server is operating at something in between fully functioning and malfunctioning. This notion of a partial breakdown as disruption to everyday life recalls the breaching experiments of the ethnomethodologists in the 1960s. Made popular by Harold Garfinkel (1967), these experiments were a practice of intentionally disrupting the social order through breaches of understood social norms, with the purpose of seeing how people respond to such disruptions, revealing the normality of social order. In my conception of partial breakdown, I understand that looking to these moments of more unintentional disruptions can serve a similar purpose—to reveal certain tacit knowledge and open up for further investigation the everyday experiences of players.

In MMOs and other virtual worlds, one common type of partial breakdown is lag, or "any perceived temporal abnormality in the game simulation where the game player and the game server do not agree upon the game state at a given point in time" (Brandt 2007, 8). Time delays

resulting from lag have historically "disrupted the feeling of shared space" in virtual worlds (Kendall 2002, 7), and as Boellstorff (2008) describes, "lag is nothing less than an interruption in the thrownness of temporality, a breakdown of time made possible by the gap between virtual and actual" (106). Phenomena like lag, among others such as lowered frame rates and server response time, are examples of moments when servers rise to player's consciousness, becoming part of the everyday routine of gaming. Like a slow water leak in bathroom plumbing, these partial breakdowns are constant reminders of infrastructure working in the background, creating a situation in which breakdown is not perceived as an end to game play (e.g., a server crash or network disconnection), but rather as part of a routine, described by Jackson (2014) as a world "always-almost-falling-apart" (222). These conditions even inspire players to research the geographic locations of their servers, which is a quick Google search away for WoW players—the general geographic region for each realm in WoW is publicly accessible knowledge. With this information, players can strategically choose to play on servers closer to their home in order to reduce server response time[1] and thus reduce lag.

Working through experiences of network lag, server crashes, and other forms of partial and total breakdown, gamers experience and feel the existence of servers supporting their worlds. They have uniquely come to experience the critical role of this infrastructure in the game's operation, even though they might still describe the servers themselves as simply "boxes in data centers." Yet, for how "backgrounded" game servers might appear to be, except in these moments when servers are not working as intended, gamers still interact with servers all the time. In fact, from an epistemological standpoint, it is abundantly clear that gamers in particular

[1] Server response time, i.e., latency, is sometimes called "ping," so named after the tool used to determine network connection quality.

are aware of servers in place, even when servers are not breaking down and even if gamers are not explicitly thinking about them. The way in which gamers think about servers as worlds gives us an opportunity to think about the impacts of infrastructure on users' sociality beyond moments of breakdown. Most scholars of online gaming and anthropologists of virtual worlds typically address servers or data centers in some way, highlighting this critical infrastructure's role in enabling the world (Castronova 2005; Candy 2012), influencing gameplay and sociality (Taylor 2006; Boellstorff 2008), or even serving as a site of fieldwork (Williams et al 2006; Goulart 2012). In the remainder of this chapter, I go just a step further, centering online gamers' experience of server infrastructures insofar as they inhabit servers as places, while also discussing those moments when the infrastructure has a hand in shaping and changing the social worlds of players on servers.

Shaping Server Worlds through Code

People who play WoW are divided up amongst many servers, referred to by Blizzard as "realms" and often colloquially referred to by players as simply "servers." Every realm is a copy, an identical version of the game world populated by a different group of players. Think of it this way: imagine you and your friend decide to play World of Warcraft, and you choose different realms to play on, without communicating with the other. Your avatars are both standing on the same hill, overlooking the Orc city of Orgrimmar. Though you are seeing essentially the same landscape, you see completely different players running through the streets of Orgrimmar, and you might be frustrated to find that you cannot see each other. The reason for this spatial rift is that these are discrete bounded places, identical worlds similar in structure and aesthetic, but different in membership, separated as a result of the code and hardware governing them.

Although they may be running essentially the same software, it is the hard-coded rules alongside the accepted social norms that principally differentiate the realms of WoW from one another. As one player explained to me, "it's the same world, but it's different." In this section, I explore why WoW is divided up in this way, how players choose servers, and how particular rules for gameplay and social norms are variably enforced by server code. This section refers to both hard-coded rules, programmed into servers, as well as "soft"-coded rules, or tacitly understood social norms, the latter being a formulation which partially draws upon Clifford Geertz's (1966) early concept of culture, which relied on cybernetic theories of "control mechanisms" as sort of behavioral instructions and operational codes for human social life.

Imagining different servers as distinct places in MMOs is made possible because, in most games like this, the server has also historically had its own set of boundaries. In WoW, it is not possible to intentionally move freely between realms on a daily basis. As many interviewees put it, choosing one is like choosing where to "plant your flag." This is a consequence of *WoW*'s "sharded" server model of distributing players across multiple server worlds, or shards, to reduce the strain on any one server. Because servers have finite storage space and computing resources, and are subject to the limitations of network bandwidth, developers will eventually need to scale their server architecture to increase space and computing power to accommodate significant growth in use of their service. Early infrastructural limitations at Blizzard paired with rapid growth in WoW subscriptions required developers to add more servers to the back end, further divvying up players across multiple server shards running the same software, thus lightening the load on each server and making them less likely to be overwhelmed and crash. Doing so increased server load, thus accommodating increases in traffic. And as more server hardware was added, new realms were formed. Importantly, this is not the only solution—not all virtual worlds

use sharding. In the case of Second Life for example, the developers at Linden Lab have established a system that reduces server stress and prevents crashes, in part by only allowing a certain number of avatars and prims (player-constructed virtual objects) on any one sim (one of several regions running together on one piece of server hardware).

One consequence of the sharded server model is that it generates a world in which many copies of the same MMO run simultaneously, enabling something like a multiverse wherein many identical worlds exist, dividing the player population among them. According to Richard Garriott, creator of one of the first MMOs, Ultima Online, the idea of an MMO being divided into multiple "shards" by servers has its origins in the production of this game (Burke 2015). Originally, Garriott imagined all players being in the same world playing together, yet the game's sales were higher than anticipated. To accommodate the larger player base, the server system was changed to one in which multiple servers would host copies of the world for different groups of players, dividing the player population. To make sense of this division for players, Garriott wrote a fiction of in-game lore in which a wizard named Mondain bound the world of Sosaria into a gem of immortality, in order to magically control its destiny. When the character called the Avatar defeated Mondain, the gem shattered into many crystal shards, each of which contained a perfect copy of Sosaria that continued to exist in parallel to the other copies. This story helped developers explain to players how the MMO was structured at the server level, divided up into multiple distinct servers that contained exact copies of the game world.

Although Garriott imagined that one day the "shards" of Sosaria would be reunited, the gem once again made whole, such a thing never occurred for Ultima Online. In fact, most MMOs run on some version of a sharded server model, with players divided, rather than all playing seamlessly in one world together. As a result of this division, players have an important decision

to make—choosing which server to play on, deciding where to "plant their flag" and call home. MMO forums online overflow with curious players asking for help with this exact thing, frequently asking for recommendations on servers to join (particularly if they are new to the game, or if the game itself is new), or asking specific questions about the reputation or population of certain servers. Barring any outside influence, when players first log into WoW, they are presented with a long list of servers on a screen, left to choose based on distinct server names and certain descriptors that reflect the geographic location of the server, the number of players on that server, and a particular set of hard-coded server-wide parameters for gameplay, or rules enforced by code, set by developers.

So how is it that a player decides which server to join, especially given that, in North America alone, there are over 200 realms from which to choose? First and foremost, players are funneled into a geographic region, which players lock themselves into upon creating an account. Players might be in the Americas, Europe, China, or Korea, and each of those regions is divided up into smaller regions, like Brazil and Germany, which help to determine the language spoken on the realm. Within their "region-locked" realm selection screen, players can see a vague marker indicating relative population size of each realm, including Full, High, Medium, Low, or New Players, specifically inviting newcomers to the game. As will be elaborated in a later section, population size can let players decide whether they want to be on a highly populated server, where there is more competition for resources and more active chat channels, for instance, or on a lower population server, where the world might feel a bit quieter and a bit emptier.

Beyond just the choice of region and number of active players, there are two basic types of

Figure 1.2: Selecting a World of Warcraft realm. Source: Wowpedia.

realms one can choose from in WoW: PvP and PvE. On player versus player (PvP) realms, members of the two player factions, Alliance and Horde, can attack and kill players who are members of the opposing faction. PvP realms also feature peaceful areas, what are called “no kill zones,” wherein players cannot attack one another. On player versus environment (PvE) realms, the entire realm is a no kill zone, and players are unable to battle one another. The distinction between PvP and PvE realms is important to understanding the culture of the server community in that PvP realms can engender animosity between players of the opposing factions and make

certain areas of the game world feel unsafe for fear of being ambushed.

Yet player-on-player dueling can happen across realms as well, and who a player fights against depends on the geographical location of their server. Each realm is located in one of many data centers within each region; although this information is not visible in-game, it is easy to find on the official WoW wiki page. Multiple realms located within the same data center are grouped into what are called Battlegroups, which are groups of realms that battle amongst each other in the PvP area called the Battlegrounds, wherein players fight other players from opposing factions located on other servers. It is due to the close proximity of the servers that they are connected this way, to optimize connection speeds and minimize latency issues and lag. The location of the data center also determines the time zone of the server, colloquially referred to as "server time." Players use server time to organize events in-game, especially when coordinating with players across different time zones.

Another type of server for which server-wide parameters for gameplay are set are known as role-playing servers, or RP servers. An RP server is a unique kind of server world where developers have a hand in suggesting a standard of gameplay by marking the server as such, but where the rules governing gameplay are based on mutual agreement among players rather than server code. Like other realms, RP servers are characterized as either PvP or PvE, but what distinguishes them from non-RP servers is a set of standards for role-play. On RP servers, players are encouraged to take on character personas and interact with the world in character. This typically includes typing out their discourse in a way that resembles how they imagine their in-game characters might actually speak to one another. And in-game locations take on new meaning as spaces designed by developers but refashioned by player use. For example, as Chen (2010) explains in her analysis of player-organized events on an RP server, players move their

avatars into a bounded space of the event, known colloquially as the "scene," where they are expected to remain in character. It is only when a player moves their avatar outside the bounds of the scene that they may transition to out-of-character communication and action.

The rules of RP servers are designated and labeled by developers, yet are socially enforced, making them more akin to "soft"-coded, rather than hard-coded, rules. Even so, like the other sets of rules and gameplay mechanics used as labels that I have discussed in this section, these server rules help shape the culture of the server. For example, PvP servers might make players more distrusting of players in the opposing faction. Any given server might develop its own sort of soft-coded rules, ones enforced by the players that play on that server, what I will refer to as server culture. In the next section, I describe how one server in particular became known as the LGBTQ server, or "gay server," and how the characteristics, norms, and behaviors of this server community exist beyond code, as soft-coded social rules that are understood by the broader player community.

The "Culture" of a Server

This project is not just about developers' rules enforced through code and the materiality of information; it is also about social formations and the ways in which communities of players can change the shape and general understanding of the server on which they play. These sociocultural differences between server worlds are not visible from the outside; for example, there are no in-game markers to let people know that a server has a large LGBTQ population. What is it about servers that afford the establishment of these accepted social norms? How do people come to identify with their server and call it their home? In order to illustrate the importance of WoW realms for players more generally, I will use as a more specific case study:

the world-making practices of an LGBTQ gamer community in WoW—the Rough Trade Gaming Community (RTGC) on the Proudmoore server. For LGBTQ people, gaming can be an escape from a more exclusionary reality, wherein they might feel unsafe and unable to embrace their own identities. Gaming can provide a space for reimagining their own worlds, experimenting with new sexualities and gender expressions, and even coming out of the closet to first reveal their identities to others (Sherlock 2013; Shaw 2015). While many LGBTQ people yearn for connection and community in online games, other players of multiplayer games have historically discriminated against players who are not white, heterosexual, cisgender males (Pulos 2013). Though LGBTQ players still frequently find it difficult to feel safe in online games, they can sometimes exploit the technical architecture of MMOs like WoW for projects of queer place-making.

First and foremost, the technical structures of the server powerfully shape queer understandings of the server. There was often an assumption that for an LGBTQ server to exist at all, it would need to be separate from other servers, unlinked and bounded. As one long-time RTGC member pointed out, "I don't remember ever seeing anybody else on Proudmoore other than the gay community." Queer players have particularly benefited from the sharded server structure used by Blizzard for developing WoW, because it does just that: successfully generates a more or less bounded space, allowing players to form tight-knit communities that stand apart from others. With players playing together in a closed-off space, they can expect to see and play with the same people, getting to know one another, earning certain reputations (whether positive or negative), and freely expressing their sexuality and gender without negative repercussions. Social experiences on the realm over time help reinforce interpersonal bonds and create a sense of community. Even the developer-determined, hard-coded rules of the server have an impact on

Figure 1.3: An impromptu dance party with LGBTQ players from several guilds on Proudmoore. Source: Author.

server community. Leaders of RTGC chose to locate their family of guilds on Proudmoore for several reasons, chief among them that it is a PvE server. With both Horde and Alliance guilds in their network, the leadership wanted there to be a partnership between the two sides, rather than any feelings of opposition, something that a PvE server affords. This may also help explain how Proudmoore and other PvE servers have developed reputations, as evidenced by forum posts and conversations with players, for being particularly "friendly," especially to new players.

Proudmoore has become known as the LGBTQ server in large part due to the presence of several large meta-guilds, or "collections of guilds under a common name linked by chat channels, websites, and other online spaces" (Sherlock 2013, 165), that identify themselves as

specifically LGBTQ on both the Horde and the Alliance sides of the servers. Guilds in *WoW* parallel guilds of the actual world in that they are based on semipermanent membership, a particular social hierarchy with continual leadership, collaboration among group members, and shared resources, all of which are also reinforced and shaped in some way by game code (Poor and Skoric 2014). That several large LGBTQ-identified guilds coalesced on one server was no accident, but rather a coordinated effort on behalf of the RTGC leadership team alongside that of other meta-guilds, like the Stonewall Alliance, and other smaller guilds. One RTGC guild member, Ben, described the relationship between servers and guilds in this way: "Oh, I mean, the server is… in real life context, so let's say, I'm part of the Red Hat Society, and I want me and my ladies to go out to Las Vegas to meet for whatever reason. Well, the server would be the Holiday Inn Convention Center. And the guild would be the Red Hat Ladies' Society." With many societies joining the server, the population of Proudmoore came to feel like it was majority LGBTQ players and allies. Once the server achieved a critical mass of players with guild tags on their avatars and in the chat identifying them as LGBTQ, there developed an expectation among players that they would co-enforce of a kind of social code through chat, where expressions of homophobia, racism, sexism, and other forms of hate speech would not be tolerated. Certain guild members known as "officers" are often tasked with policing the chat channels and shouting down any players who do not follow the largely unstated server-wide accepted norms and behaviors, a practice of queer place-making.

In conversations with players from RTGC, they often referred to themselves as identifying with their server in particular, what I interpret as forming a "server identity," the feeling of affinity or belonging one feels toward their server. Server identity is related to what Poshansky, Fabian, and Kaminoff (1983) call "place identity," or "a sub-structure of the self identity of the

person consisting of broadly conceived cognitions about the physical world in which the individual lives" (59). The reputation of the community on a server can significantly impact server identity, and thus the identity of the players within those servers. As Plunkett (2011) explains, "places allow for individuals to express and affirm their identities" (171). Members of RTGC felt that Proudmoore was a sort of identifier, often referring to themselves as members of the "gay server." In turn, they also often assumed others to be LGBTQ if they said they played on Proudmoore, even though not all Proudmoore players identify this way. After all, Proudmoore has historically been a populous server, and it has many overlapping server identities associated with it that circulate among other communities. There are some instances in the game, e.g., during player-versus-player modes, where one's server name is displayed above the avatars' heads, allowing players to identify others by the server they play on. Perhaps unsurprisingly, the same kind of identification by server can happen outside of the game, in the actual world. As T.L. Taylor explains in the opening of *Play Between Worlds* (2009), at a convention she found people she knew from EverQuest by asking them to name the server on which they played.

Certain special community-organized events can powerfully shape the sense of community on a server. The facilitation of annual "Pixel Prides," or "Proudmoore Pride" celebrations as they have come to be called, have solidified over time the server's status as a safe haven for LGBTQ players across all realms. Players meet up and travel across the virtual landscape in a parade, using emotes and spells along the way, chatting with passersby and with one another via voice chat. The celebration either ends in Booty Bay or The Darkmoon Faire, depending on the year, at which points players hold a dance party, complete with a DJ or pre-recorded mix playing on an external site. The Proudmoore Pride parade stands as an example of how moving across the landscape on a virtual world server can powerfully shape players' understandings of place

Figure 1.4: LGBTQ players and allies celebrate Proudmoore Pixel Pride at The Darkmoon Faire in 2015. Source: Author.

and of community. On the one hand, participating in the event influences the meanings players associate with certain places within the game world (e.g., note the double entendre in "Booty Bay" as a location known for either pirates or posteriors). On the other hand, Proudmoore Pride also impacts participants' understandings of the server as a unique place, one with a community that has developed a set of values and norms (i.e., what players understand as the "culture" of the server) that accommodates embodied expressions of queerness. Importantly, Proudmoore has become a destination for players from other realms to travel to during Pride, by temporarily visiting the server. In the next section, I delve deeper into this topic of movement—how does movement within and between servers impact players' unique senses of place in virtual game worlds?

Moving Between Servers

Players making new characters on the Proudmoore server in order to participate in Pride festivities is an example of a critical component of place-making on servers in WoW—the capacity for players to move between servers. Importantly, there are numerous instances where players relocate to different servers, crossing infrastructural boundaries. For example, deciding to play on a particular realm is not always a final decision. Some players choose a server and stay there, satisfied with their decision and finding they have no reason to leave. Yet for most players with whom I have spoken, moving between servers is an important part of social life in WoW and of their own personal history. I argue that understanding the ways in which players traverse the invisible walls that separate and distinguish servers from one another is key to understanding the ideas of server culture and server identity in WoW. The ability to move between servers is hard-coded, but the ways in which people make use of this affordance of the technological infrastructure of the game are shaped by a number of social processes. Thus, this section addresses both the affordances of boundary-crossing and players' boundary-crossing as a social practice that shapes and is shaped by server culture.

For many players, identity as a citizen of the world of WoW is inherently multiple: embodying multiple avatars, existing in multiple worlds, participating in multiple communities. A player's sense of self and belonging often cannot be reduced to a single guild or server. However, players more often have a character who they consider to be their "main," and the server on which the main resides and the guild of which the main is a member are usually the ones with which the players share their closest bonds and identify with most strongly. A player's character is only permitted by the rules of the game to occupy one server and belong to one guild at a time; yet players can have different characters on different servers, just as they can have

different characters in different guilds. Citing Heidegger's understandings of embodiment, Boellstorff (2011) writes, "virtual worlds pluralize being-in-the-world. Since no one lives 24 hours a day in a single virtual world without any form of actual-world sociality, and few persons participate in only one virtual world… being-inworld is always a form of being-in-multiplicity" (512). Pearce (2009) refers to the practice of moving between virtual worlds in one play session as "world-hopping." So, while players may have one server they consider to be their home, they might also belong to multiple servers and "hop" between them. Therefore, the being-in-multiplicity to which Boellstorff refers can also take place within a single virtual world context—a player might have multiple avatars (i.e., alternative characters, or "alts") in different in-world places at one time, or multiple alts in different sharded places or servers.

A player might decide to play on another server for any number of reasons. They might find the community on a particular server to be hostile or unfulfilling (as one anonymous commenter on Reddit eloquently wrote, "My server is full of a bunch of assholes"), so they create a character on a different server that has a server culture that feels more friendly. They might find that they like to alternate between PvE and PvP gameplay, so they have characters on two servers, one of each type, for varied gameplay. They might have friends who chose to play on a different server than they did, so they start anew to play with their friends. When a player has reached the maximum number of characters on one realm, they might choose to start fresh on a new realm because they want to create more new characters. The developers of WoW and most MMOs place a limit on the number of characters one player can have on any one server; for instance, in WoW the current maximum is 50, though at one time it was only 18. For this reason, character creation can represent two phenomena—both a potential rationale for finding a new server on which to play, and one of two modes of moving between servers.

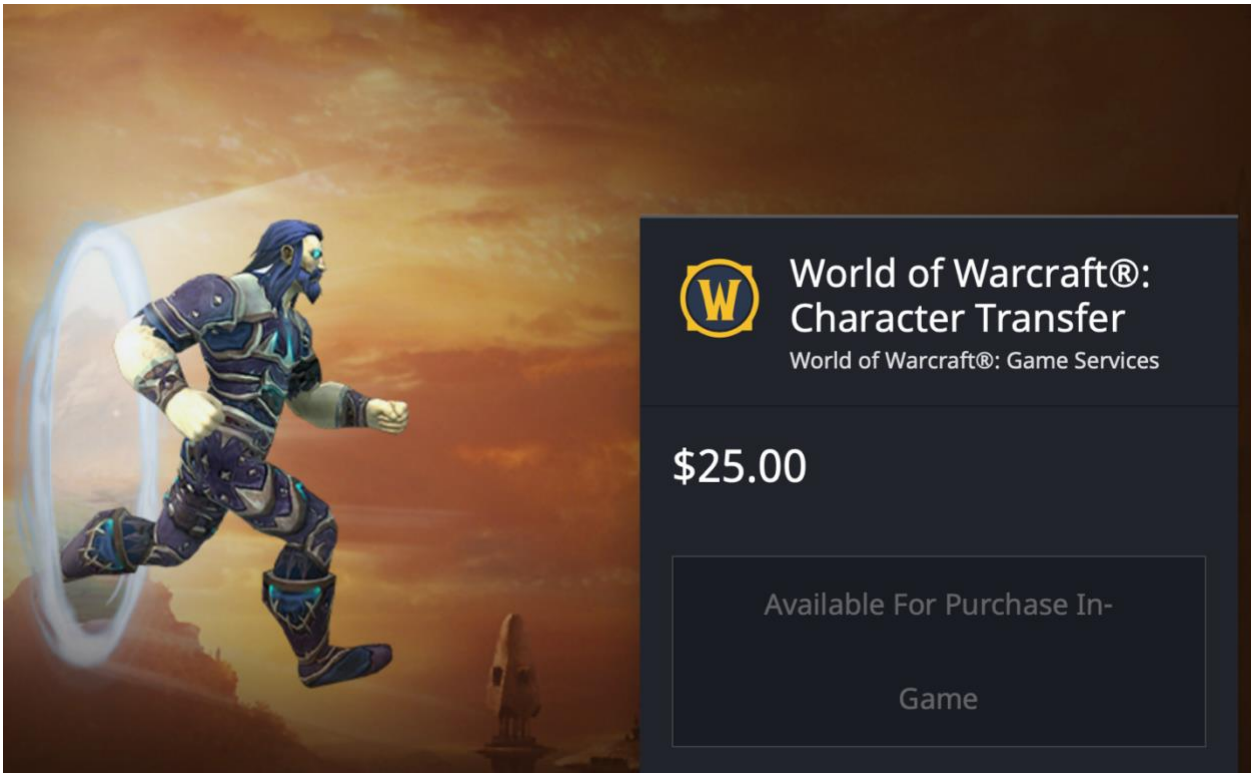

Figure 1.4: Image from the WoW Character Transfer screen on the official website, depicting a player's character running through a portal from one realm to another. Source: Blizzard Entertainment.

Although it is possible to simply make a new character on another server, many players also talk about moving their characters between servers, commonly referred to as server migration.[2] Blizzard has made this possible by creating a feature called Character Transfers (or Realm Transfers). When a player wants to migrate or transfer a character to another server, they have to complete certain tasks on their current realm, including ending active auctions, reading mail, and reaching level 10, along with a few other limitations. Once these conditions are met and the player has no unfinished business on their current realm, that player can pay a $25 fee to Blizzard to move their character to a different realm. More recently, these migrations have been

[2] Perhaps not coincidentally, in the world of Information Technology, server migration is also the term used to describe the process by which data is moved from one server to another, typically to improve loading speeds, change hosts, or make data more secure.

offered free of charge.

As a result of this ability to traverse server boundaries, identifying which server is a player's primary or home server can be tricky, and stories of server migration have become key parts of many players' understandings of place in WoW. For example, when I asked players in interviews to tell me which server they played on, they were rarely able to give me a straightforward answer. Take as an example one player, Claudia, and her history of server migration. She started on the Gilneas realm, and that is where most of her characters are. She calls Gilneas her home server, and often plays with her daughter on Gilneas: "I played with a lot of people in California, but that's because of my daughter, and Gilneas is basically on that time." However, she also has a son, who lives at home with her, who has characters on Earthen Ring, an RP server. In order to play with him, she has made characters there as well and joined a devoted role-playing guild with her son. Claudia also identifies as a lesbian and loves to play with like-minded individuals who identify as LGBTQ. In order to play with other LGBTQ players, she paid the fee to move a character to Proudmoore for a while so she could join RTGC. After about a year and a half of playing there consistently, she decided that the community was too young for her, so she moved that character from Proudmoore back to Gilneas. Even still, she told me that she sometimes logs into Proudmoore just to attend the annual Pride celebration held there during Pride Month in June, explaining, "I loved the gay pride parade that they have every year. I actually will make a character to run over there and dance on Booty Bay every year." It was easier for her to make a new character, rather than initiating a Realm Transfer, as migrating through Blizzard's system is pricey and time-consuming.

Because of the way servers are networked together for most MMOs, players also often unwittingly move between servers within their realm. In the case of WoW, realms have

historically been divided up into four servers managing one realm, and players move between these multiple servers within that realm to distribute the server load to prevent the server from crashing. Measures have been taken to make these transitions seamless, so the player does not know when they are passing the threshold of one server to enter another. (Staats 2019, 134). He later refers to the seams as "invisible boundaries" that a player would cross unknowingly as they played the game (ibid., X). These sorts of encoded boundaries are of course distinct from the more visible sorts of in-game boundaries that exist in WoW and other video games, a mountain blocking what appears to be a potential pathway or even the walls on either side of the screen in Tetris, for example.

In the case of unintentional server boundary-crossings, while moving one's avatar across the landscape of WoW, movement between servers is often not felt. However, as inhabitants of other virtual worlds casually move between servers, sometimes they do feel the switch. For example, in Second Life each "sim," or region of the world, is hosted on a dedicated server. When an inhabitant's avatar passes from one sim to another, known as "sim crossing," the movement is felt in the form of a graphical blip where avatars might change positions and movement might appear stunted. The world quickly skips a beat as objects in the world momentarily dissolve and reload just as quickly. Interestingly, as a result of developer Linden Lab moving its servers to a cloud-based system, in which servers are internetworked in a different way, developers report that these instances of disruption resulting from sim crossing may actually be reduced (Pey 2020). In infrastructures studies, there is often a heightened interest in breakdown, though the everyday experience is more of a flow, the flow of everyday sociality mediated by shifts, changes, and partial breakdowns, and importantly even those partial breakdowns can be controlled in some ways. Although unintentional boundary-crossings have little to do with server

culture in particular, it is worth mentioning here that they can still shape players' relationships to the server as a place more generally. This will become especially evident in the following two sections, in which I describe how changes to WoW's server infrastructure to one that also depends on "the cloud" has changed the ways in which players pass between servers, not only within one realm configuration, but also between realms, ultimately altering the very notion of server culture.

Dead Realms and Ghost Servers

So far in this chapter, I have explored how players have come to understand servers as worlds and how certain place-making practices within developer-made structures bring those worlds to life. In other words, what gives a server "life" is that it contains and supports a community of people. What happens when a server is no longer brimming with life, when population numbers dwindle, and developers can no longer justify keeping the servers online? Curiously, players have been using discourse around death to describe WoW server worlds, describing some servers as being on life support, turning into ghost towns, or simply being "dead realms." In the final two sections of this chapter, I move away from discussing primarily LGBTQ servers to address this question of server death. In this section, I ask what players are really saying when they say that a server is dying. In the next section, I explore how developer modifications to the game's infrastructure (in response to so-called "ghost servers") have shifted player conceptions of the realm as a world, which has also affected the importance of categories like "server community" and "server identity."

To begin, let us take a look at how the population of World of Warcraft has changed over time. At its peak, around 2010, the popular game had an active player base of around 12 million

monthly paying subscribers. This was a peak in WoW's history, and since 2015, those numbers have steadily decreased. To sustain a large number of active players has proven difficult for any massively multiplayer online game, for a number of reasons. The hype for a game typically dies down after a time, perhaps once the feeling of novelty has run its course, players have progressed through all the currently available game content, or people follow their friends to other games. New large-scale multiplayer games get released annually and often draw players' attention away from older games. Additionally, players over the age of 30 tended to tell me in interviews that, while they had more time to invest in the game when they were in high school or college, they now lack the hours to fully immerse themselves into time-consuming MMOs, especially as they assume full-time jobs.

Whatever the reason, undoubtedly player investment in WoW has decreased over time, with numbers reaching a new low of 5.5 million subscribers in 2015. It was that year that Activision-Blizzard even made the decision to no longer make public their total quarterly number of subscribers, claiming "there are other metrics that are better indicators of the overall Blizzard business performance" (Makuch 2015). The decision to hide this data from the public cast a veil over the precise population numbers of WoW, and many players and media sources speculated that this obfuscation might be a direct result of declining numbers. They proposed that the development company likely made this decision to avoid dissuading potential new players or return players from subscribing. Therefore, we can understand MMO population size as a capitalist indicator of success or failure. It appears that the common sentiment among players, fans, and outside onlookers was that WoW itself was "past its prime" and ultimately "dying." So, when the population size is seen to be declining, this links up to player conceptions of server world liveliness. And subscriber numbers have continued to fall; according to the reports of data

miners in the community, there were around 1.7 million players in May of 2019 (Sara 2019).

Despite the novelty of Blizzard's decision to hide overall subscriber numbers, for some time the precise populations of individual realms have been obscured from view. Since the initial release of the game, players had to rely on third-party sources like wowrealmpopulation.com and wowprogress.com for approximate population numbers per realm, alongside the vague markers of Low, Medium, and Full that Blizzard provides in the list of servers on the official realm selection screen. This is important because, as one might guess, most players would prefer to play on a more populated server, because it presents more opportunities for play and these realms usually have more high-profile guilds that competitive or "hardcore" players find attractive. This was part of the rationale for RTGC choosing Proudmoore as their home base: that it would make gameplay more fun to be on a more populated server, even if a high population might mean being confronted by a larger number of unfriendly players.

Deciding to play on a highly populated server certainly makes it easier to find others to play with, but it comes with a fair amount of risk. Server load is the same across all realms, so higher population servers pose a number of infrastructural challenges. For example, logging into the game and entering a high population server in the first place can be difficult, with longer queue times. One player told me that sometimes the queue time to enter their high population realm was so long they would log in to enter the queue and walk away to make dinner and do chores as they waited in "limbo." Players have told me that these queue times are always exacerbated by the release of major expansions and the release of update patches, the new content bringing players back to the game in high numbers. I encountered this firsthand when I first started doing fieldwork in 2014, right around the time that the expansion Warlords of Draenor was released. When I tried to log into my realm on the night of the release, I was greeted with the image of an

Figure 1.6: A pop-up window on the World of Warcraft login page showing the wait time to enter the Proudmoore realm. Source: Author.

enormous gateway, the infamous Dark Portal in the Blasted Lands zone, and a pop-up message reading "Proudmoore is Full" and an estimated wait time of 278 minutes (Figure 1.6).

Additionally, high-population servers tend to produce more lag in general, especially in dense zones like capital cities and raids. This makes gameplay staggeringly slow and difficult, ultimately discouraging players from forming large groups that might cause more lag. Yet big groups are a major component of everyday life in WoW—public large-scale boss fights and dungeon raids are among the most popular in-game activities, and high population servers could often not handle the load of so many players being in one area at once and would ultimately crash, catapulting players out of the area or the raid and disrupting what are considered to be some of the most challenging and rewarding features of gameplay in *WoW*.

Nevertheless, over time the number of low-population servers kept rising as players either left the game altogether or moved to servers with higher populations. The remaining players on low-population servers are left with the decision to either find a new home by creating a new character and starting fresh or paying for a realm transfer, or else be forced to cope with the feeling of emptiness and loneliness of their home realm. When people are playing on low-

population servers, they might move about the world and never see another player's avatar. It is worth noting that many players derive a great deal of pleasure from low-population servers. A few interviewees extolled the benefits of playing on relatively dead realms, such as lack of competition for rare items and creatures, less lag, and a lack of social interaction, something that many players appear to actually desire. Nevertheless, these experiences of seeing altogether de-populated zones, especially in a game that used to have upwards of 12 million players worldwide, led players in forums and interviews to very frequently refer to such servers as "desolate" or even "dead," in the same sense as one might describe a party with very few attendees.

I have seen some instances of players referring to such low-population realms as "ghost servers," perhaps inadvertently harkening to images of the haunting ghost towns of the American West, now only ruins that once teemed with human life. The name "ghost servers" seems even more appropriate in light of the frequency with which I have seen players talk in colonial terms about their first experiences of World of Warcraft when it was a new game, recalling the thrill of adventure and exploration, even referring to the game as a "new world" or "new frontier." However, ghost servers bear little resemblance to ghost towns. Ghost towns in the physical world—and even areas in other virtual worlds like Second Life and Minecraft that are not always bustling with users—indeed can be a source of tourism, destinations to travel to or stumble upon, for people with a penchant for the creepy atmosphere of an abandoned settlement. Not so in the case of ghost servers in WoW, where there is little user-created content that might at least superficially differentiate one realm from another.

In this section I have argued that the liveliness of an MMO server is measured in terms of population size—players see high population realms as more alive and thriving, while players

perceive low population realms as dead, dying, empty, or ghostly. Perhaps not coincidentally, the term “ghost server” is also used by server maintainers to describe server hardware that is still running in data centers, using up energy and costing a company money, but serving little to no purpose. As of 2012, approximately 15% of all data center servers might qualify as ghost servers, and companies were spending more than $24 million a year on “ghost server energy.” Ghost servers, as in low-population realms, also might be referred to as ghost servers in the hardware sense, as servers that are underutilized by users, but still running in data centers. In the section that follows, I address how developers at WoW chose to handle this issue of some servers serving larger populations as others remained underutilized and the consequences that followed their decision to virtualize their servers.

Virtualizing Server Worlds

Developers at Blizzard have responded to the proliferation of low-population realms, which are powered by the same kinds of servers serving larger realms, by making big changes to the shape of their data infrastructure, also termed server architecture. To reduce the number of physical servers required to run the realms (thus cutting costs) while also improving particular aspects of gameplay, developers have gradually implemented a system in which multiple realms could run on one physical server, a process many players refer to as “server virtualization.” As one forum commenter eloquently explained:

> You have to imagine, that a low population server and a high population server had the same hardware. So the low population server would be idling around while the high population would be crashing. With virtual servers you can have multiple low population servers on one physical server and utilize its resources better. It also allows to move the virtual server on a different physical host if it has issues.

In her ethnographic work on data centers and their local and global entanglements, Asta

Vonderau (2018) proposed the term "clouding" to refer to the processes by which the cloud's visibility is augmented over time. I build on this idea of clouding, a play on the idea of infrastructuring, or making something "more" infrastructural, adding to it this notion that servers can not only become more obscured, as Vonderau explored, but also more virtual. Where before there was a trend in the realm of digital technologies toward miniaturization, the trend since 2010 is unequivocally toward virtualization.[3]

Despite the promise of this new infrastructural order, players have since the 2010s lamented that their social worlds have been disrupted and altered as a result. In order to increasingly virtualize their servers and refine the WoW player experience, a number of modifications were made to the way realms worked, including merging smaller realms with larger ones. These changes had rather drastic impacts on the dynamics of the social landscape of WoW and changed the way players understood and related to the concept of realms and thus to foundational ideas of community, culture, and identity. In this section, I outline the changes that Blizzard developers made to WoW's server architecture and how these virtualizing measures impacted players' social worlds. I follow Vonderau in exploring server virtualization's "planned effects as well as its unintended consequences" (2018, 4). One such consequence is that, as game developers have moved their server architecture to a cloud-based system, one that is "more" virtual than before, the idea of discrete server worlds—"realms" in the case of WoW—has irrevocably shifted and transformed for players. This section is about the social implications of server virtualization and of the tension between the promising effects of infrastructures and the affects of online gamers in the midst of a transition from one state of infrastructural matter to another.

[3] In fact, as early as the 90s, researchers at Stanford were working on a concept design for a server called the "Pocket Server" that was the size of a matchbox—small enough to fit in one's pocket to carry around as a wireless network hub.

Before discussing the impacts of virtualization on ideas of server culture and server identity, I will briefly outline here five important changes that developers have gradually made to the way realms and servers work: (1) cross-server play, (2) coalesced realms, (3) connected realms, (4) sharding, and (5) phasing. With the introduction of (1) cross-server play, developers reported that they wanted to solve the issue of "under-crowding" in in-game areas, or "zones." Under-crowding happens when zones are not well-populated, leading to players having trouble finding play partners or feeling like a realm is empty (hence the player-borne concept of "dead realms" or "ghost servers" discussed in the previous section). Developers integrated new search systems into the game to help players find people with which to participate in raids (Looking for Raid, also called LFR), dungeons (Looking for Dungeon, also called LFD), and other task-based groups (Looking for Group, also called LFG). In cross-server play, players end up forming groups with people from other realms , eliminating the need to cultivate a reputation on one's own server or to socialize to find play partners. (2) Coalesced realms (also commonly known as cross-realm zones, or CRZs) also involve cross-server play, but they are different in that they are but temporary moments when different players from different realms are joined together by the system (and not by player choice) in the same zone to fill out a low-population zone.

Developers have introduced another measure to fix under-crowding: (3) connected realms, also called virtual realms. Connected realms are, according to the Blizzard website, "a joining of realms, where players from different realms function as though they were full members of any of the other connected realms." At various points over the last several years, developers have rolled out a series of realm merges, uniting certain lower-population realms with higher-population ones to make a seamless realm-like experience that is made up of multiple individual realms. Rather than a starker merging of realms—a process which I imagine would eliminate some

realms, subsuming them into others—connecting realms is more of a light merge, in which players get to keep their server's name, but are not always aware of who is from their home realm and who is from another realm within their now connected realms.

The final two server-performance modifications are sharding and phasing, both of which are not unique to WoW. While sharding is a response to a technological problem, phasing is a response for an issue of narrative structure, or keeping everyone in their respective "chapter" of the story of WoW as a narrative-driven virtual world. Although distinct in the reasons for which they were created, they functionally do the same thing: they are game design tools operating at the server level to seamlessly migrate players into different instances of the world within the same realm, usually unbeknownst to the player. (4) Sharding was intended to fix the problem of zone overcrowding, as large numbers of players in one zone can cause the CPU of one server to be overutilized, degrading server performance, resulting in immense lag and potentially a server crash. When a zone gets too crowded, the system will splinter the realm (which as noted earlier is also called a shard) to create a new temporary shard on another server, and then move some players to the temporary shard to distribute the load across servers. (5) Phasing, on the other hand, was originally intended to fix the problem of players being at different stages of the game at the same time. Because players are at different phases of certain quests, the same zone might actually look different. To work around this issue, developers decided to hide players in different phases of quests from one another, meaning that even if players are in a group together, if one of those players has yet to complete a particular leg of a quest, the server will "phase" them into a new instance of the game. When players are phased, it typically interrupts gameplay and players are left scrambling to regroup.

As a direct result of changes like phasing, which divide players within their realm, and

coalesced realms, which bounce players back and forth between servers full of people from various realms, players ideas and experiences of the relationship between servers and virtual worlds have shifted. Players have gradually become less tied to their realm, a concept of place, which has a significant impact on the ideas of server culture and community I have discussed in this chapter. This sentiment was shared across most players I spoke with, including Will, who explained it to me this way: "So they have a new system now where everything's sort of cross realms, and I might be playing with a guy from whatever Silverhand or something. That sort of changed my relationship with my server." In many ways, these server enhancements improved gameplay by making it easier for players to find others to play with, reducing partial breakdown like lag, and more. However, many players have reported that these modifications to the game's infrastructure have other effects on their in-game experience, leaving them feeling lonely and still plagued by network-related inconsistencies. One player, Dakota, explained to me that he had joined a high-population realm because he enjoys being in lively in-game cities, but "as soon as I left the city the world is empty… I want to play an MMO not a single player game… I want to see the people from my server when I level up not a random guy from RP server that I'll never see again in my life." Important here is that players explicitly want this kind of shared sociality—to see familiar names and avatars over time; however, changing servers forms are shifting the affordances for creating and maintaining these kinds of relationships. Another player, Chris, argued that gameplay has been improved overall by changes like cross-server play, but his social experience has suffered greatly: "from a sort of social end, I'm way less committed to being locked into that server just cause it doesn't really mean anything anymore."

Without persistent worlds that contain independent communities that players have fostered over time, players feel that their sense of server culture and server community has been

Figure 1.7: An example of cross-server play. In this screenshot of the *World of Warcraft* general chat window, players from multiple realms (including Akama, BlackDragonflight, Nagrand, Frostmourne, and Uldum) interact during an LFR-generated raid. Source: Author.

diminished or erased entirely. In her dissertation on the social affordances of certain game mechanics in World of Warcraft, Nikki Crenshaw (2017) argued that changes like cross-server play dealt a massive blow to the idea of server community, arguing that they diminished aspects of social life and in-game communal spaces that players generally valued, such as persistent player identities, persistent guild reputations, and repercussions for players' actions. Yet these changes made players lose a sense of "loyalty" to their server in particular, as Will explains: "That made me less, I guess less loyal to the server I was on because at that point it didn't really matter. When you ran into people kinda out in the world, it was like, well, the odds that I see this person again are exponentially worse than when you were tied to just a specific server." Another unintended consequence for communities like RTGC, who revel in the feeling of playing in a secure safe space, has been the loss of a sense of boundedness. RTGC in particular has historically valued this kind of bounded space, because they want to separate themselves from the mainstream WoW community, which has not been friendly to LGBTQ players. As the infrastructure has been altered to make the world feel more unified, like an interconnected

network rather than divided shards, the game no longer affords that sense of safe space, with overflow from other servers and machinations in place that sometimes placed them in other realms or servers, subjecting them to the occasional harassment that they were able to avoid in previous years.

No doubt there are numerous benefits to having more populated zones in the game, and Blizzard developers have made efforts to give all players access to those benefits by making changes to the way the game works and the way their server architecture looks. In the official WoW forums, a community manager from Blizzard published the following text within a post about this very topic:

> World of Warcraft is best when you have a community of other players around you, and while numerous ways to participate in cross-realm play have been added to the game over the years, there are still many aspects of the experience that are realm-based. From your history with your guild to your interactions with the economy around you, a realm with a healthy population provides more opportunities.

Here, a Blizzard spokesperson insists that realms are still important, despite players reporting the opposite. The tension here is that infrastructure changes have been implemented while trying to leave the realm concept intact, while players insist that their connection to their realm has been irreparably damaged by the very changes intended to maintain it. This brings to mind the work of anthropologist Brian Larkin, who, in his work on media infrastructures in urban Nigeria (2008), has written about a kind of urban infrastructural layering, that "the physical shape of the city emerges from the layering of these infrastructures of time" (5). In the case of WoW, this infrastructural layering has been a process of adding new mechanics and features (cross-server play, coalesced realms, connected realms, sharding, and phasing) on top of existing infrastructure, modifications that have continued to shape WoW's social landscape, the old ways buried beneath layers of infrastructural changes include a move toward virtualization and

clouding.

Conclusion

In this chapter, I described how players make sense of ideas and experiences of place in World of Warcraft and how server code and social interactions shape those understandings and place-making practices. Certain hard-coded rules, like determinations about the nature of player rivalries on the server and the sharded server model, can have just as much of an impact on ideas of "server culture" as the sort of soft-coded, community-developed social structures and norms. Importantly, just as gameplay mechanics and landscapes in the game world can change, so can these hard-coded rules and structures, with developers now increasingly opting to move servers to a cloud-based system. As a result of these changes, which have made it so that servers are now more networked and less walled off from one another than before, servers are now "more virtual" and the notion of a unified server world no longer exists in the way it did before such shifts were implemented. In a sense, server sociality itself has become "more virtual" too, as players feel that social components of WoW have diminished as a result of these changes. In other words, the more virtual servers become, the less like worlds they appear to be.

For reasons of increased profitability, speed, and ease of access, the games industry in general is rapidly adopting cloud-based models for organizing players and distributing their content. This new era is marked by changing relationships between players and servers, as well as between players and game development companies. As infrastructure changes, and social worlds shift as a result of the virtualization of servers, there arises a tension between corporate notions of progress and player-held beliefs about how social life online should be. For MMO players in particular, gone are the days of individual realms with server cultures and feelings of

server identity or server loyalty, and server changes have fed players' nostalgia. For a subset of players, there is an urgency with which they wish to return the old days, when the server meant something different, when the "world" was different. In the next chapter I describe critical processes of reclamation and resistance, as players attempt to take servers into their own hands, reframing notions of server ownership, rebuilding and reshaping server communities, and indeed resisting the march of time.

Chapter 2

Private Server Temporality, Preservation, and Resistance

Just a few days before I began writing this chapter, World of Warcraft (WoW) turned 16, having debuted on November 23, 2004. This immensely popular online game has grown and developed over time, undergoing numerous changes during its lifespan. The geography of the game world has drastically changed as developers add new areas, and some old areas are flooded, scarred, or demolished. Developers have slowly refined and redesigned graphics and tweaked game mechanics. The community of players has changed with it, redefining in-game social dynamics and expectations of one another in gameplay. As discussed in the previous chapter, changes to the server architecture have undoubtedly altered the social landscape of WoW and how people relate to and understand WoW as a place. The server-as-world concept continues to shift, at least in the context of WoW, as developers have transitioned their servers into an internetworked cloud structure, with smaller, less popular servers being connected to and fused with more populated ones. A lot has changed about WoW. One of the key consequences of these changes is that players miss older iterations of the game. In fact, so many updates have been made to the game and its infrastructure that many players have argued that the game is unrecognizable from how it looked and felt in 2004.

In the context of online gaming, once a game world has been updated the previous version of that game is typically inaccessible. The same goes for any piece of software—after all, why would the average user want to go back and use a 2019 version of Microsoft Word when the 2020 version has newer features, sleeker design, and fewer bugs? Because these changes can mean drastic modifications to social worlds, for many players of WoW, there has been a stirring

desire to experience the game as it once was when it was first released. Game development lead at Blizzard Entertainment, J. Allen Brack, posted to the official WoW forums in 2016, introducing the possibility of "pristine realms," or servers that would turn off certain aspects of game play that players found to damage the quality of the game. He explained that this was an effort to "capture that nostalgia of when WoW first launched." It is clear from this proposal alone that Blizzard staff had been considering the calls from increasingly vocal fans who feel nostalgic for a time in WoW's past to bring back older versions. For an even longer amount of time, nostalgic fans who want to play older versions of WoW and see them preserved for future gameplay have taken matters into their own hands. Many of these players, in a sense, have gone back in time. But what does "going back in time" entail when it comes to online games like WoW?

Enter private servers. Generally speaking, a private server is a physical or virtual machine running server software that is privately administered by an individual or a team, as opposed to a company or government entity. In the context of gaming, the term "private server" is often used for servers running reimplemented game server software, typically clones of proprietary commercial software, outside the purview of the company that owns the source code. Typically, these servers are rented from a third party service provider, but they are sometimes found in the homes of ordinary gamers. Since the first updates were patched into World of Warcraft, which included bug fixes and changes to game mechanics, players with more expertise in programming and operating servers have been using these private servers to run their own iterations of WoW for a subset of the player base. Sometimes these expert communities are even running up-to-date software to support their projects, though many, if not most, are running older versions even dating back to the very beginning of WoW history, the original version of WoW released in

2004, often referred to as “vanilla” or “classic” WoW.

Vanilla is the term in computer programming referring to the first version of a piece of software. Similarly, when fans of WoW talk about “vanilla,” they are referring to a place in time. Vanilla indexes a time when WoW was a different game than the current instantiation commercially available to a paying public. Think of it this way: over time, content has been added to the game that has changed the overall flavor of the world: the virtual landscape, game play, and virtually every visual element of the game world has been altered. Expansions have added additional flavors. But vanilla WoW is the scoop at the bottom, a WoW without other flavors or additives; it is an original, seemingly lost to time. Not only that, WoW players yearn for a return to a specific period of time, where they spent time with specific people, in specific guilds. Dozens of vanilla WoW private servers were in operation until 2016, when NostalriusBegins, a private server boasting tens of thousands of active players at any given time, was forced to shut down. That year, Blizzard Entertainment’s legal team served the development team behind NostalriusBegins a cease-and-desist letter, forcing them to shutter the private server, revealing the impermanence of even the most resilient private server communities.

Where Chapter 1 was more about place, Chapter 2 turns to the topic of time. On the one hand, this chapter is about preservation, holding on to and saving a cultural artifact, vanilla World of Warcraft, thus extending the length of its existence. On the other hand, the chapter is about resistance against time. The consumer model that is the game industry’s forward progression of time relies on the obsolescence of games and platforms to make room for new iterations. While the majority of players move along with this temporality, continually demanding new content, other players—faced with the rapid alteration and disappearance of their online social worlds—are resisting this consumer model and attempting to revisit the past.

Amidst explorations of the "versioning" of online games and virtual worlds and of player engagement with forms of folk, or non-expert, preservation through server emulation, I describe how and why subsets of the WoW player population have been using private servers to play WoW as it was when it was originally released, despite it being commercially unavailable. For many of these players, their work is part of a process of preserving WoW, an engagement with the history and temporality of the game as a series of moments in time, as a place, and as a cultural object. However, in doing this work and playing on private servers, they are also actively resisting the consumer models which continually force updates to the game, a practice that I interpret as a form of what Švelch (2019) refers to as "patch resistance" against what Galloway (2004) has posited as "protocological power." I argue that, while these projects face certain inevitable instabilities (social, legal, and technical) that prevent them from achieving permanent control over game world temporalities, private server play and development are acts of resistance that struggle against and reclaim a form of infrastructural power, or server power.

The Versioning of Worlds

In the early days of home video gaming, video games were delivered as full products, more or less static from the developers' side, with some exceptions.[4] The way software developers distribute games and most other kinds of software has changed dramatically with the advent of more sophisticated server systems running the internet and the increased adoption of mass cloud computing. As a result of these broad-scale infrastructural changes, game companies have shifted their distribution practices to digital game marketplaces, which have proliferated and saturated

[4] Historian Henry Lowood told me stories of early game developers delivering updates to computer games via floppy discs.

Figure 2.1: A sign of changing times. The two PlayStation 5 consoles, one with a disc drive and one "Digital Edition" without. Source: PlayStation blog.

the market; according to the Electronic Software Association, "Gaming software delivered via physical media, which accounted for two-thirds of sales in 2010, has now largely been replaced by digital delivery" (Vaudour and Heinze 2020, PAGE). Models of Xbox and PlayStation released since 2020 no longer have game disc readers, and these models are priced lower than those that still retain a disc drive, perhaps to give consumers more incentives to buy into the all-digital revolution in which digital delivery is more desirable than buying physical copies of games (see Figure 2.1). Digital distribution, it appears, is the present and the future for software generally, even digital content like books and music. With games being delivered to consumers digitally and with increasing numbers of games that rely on an internet connection to play, the current consumer model for games is one in which game companies view games not as products, but as services that they offer. This model of digital distribution is commonly referred to as "games-as-a-service" (GaaS), or a method used by service providers (game companies) to distribute game-based services to client software via a single centralized server. In this section, I

explore how, under the GaaS paradigm, online games and virtual worlds undergo a temporal process of "versioning," in which updates to the game code create a system in which previous iterations of games obsolesce in favor of newer versions layered over them.

The primary benefit of the GaaS model for players, developers, and companies alike is that developers can update games on the fly through updates downloaded from servers. This allows the developers to evolve a game over time, fixing bugs and other issues, responding to community requests, and issuing expansions and add-ons that extend the life of the game past what might be considered its typical "endgame" point. However, this is where GaaS becomes contentious for gamers. When games are a service, players are often forced or coerced into not only paying for the base game, but also continuing to pay for the ensuing "services" provided by the company, if they want to keep playing the game (e.g., subscription fees, referred to by players as pay-to-play) or at least to keep playing the game successfully (e.g., microtransactions, referred to by players as pay-to-win). Many games under this model are free-to-play but often include opportunities for players to make what are known as microtransactions, or small purchases of in-game items or currency. Ultimately GaaS works because the game becomes a monetized service that developers provide to the players, one that keeps players interested in playing while keeping profits flowing by having players continually pay for incremental updates, changes, and special items. GaaS keeps popular games that players invest in alive and online much longer.

Developers at Blizzard Entertainment periodically deliver alterations to WoW in two primary forms: patches and expansions. Patches are updated versions of the game code sent to players that include changes like fixes to software "bugs," additional items and content, and improvements to graphics and gameplay mechanics, to name a few. Patches can be considered

Figure 2.2: A complete list of World of Warcraft expansions (left) and patches (right). Source: Wowpedia.

major or minor, depending on the amount of content they add or the number of changes they make. Expansions, on the other hand, are large-scale updates to the game that incorporate a large amount of new content all at once, including new storylines, new characters and character models, new items and activities, major graphical and mechanical overhauls, and, most notably, the introduction of new landscapes, alterations to existing ones, and extensions of the size of the world (including new zones, cities, continents, or even new planets). According to Debeauvais and Nardi (2010), "for [players] the expansions are like mods of the original game" (48). Messias (2020) compares online game expansions in particular to literature, writing that they operate narratively, "much like volumes or chapters of a fantasy series. Each having its own title, storyline, and corresponding code" (3).

This is the process of versioning. As is the case for all massively multiplayer online games, when a new patch or expansion is pushed through and players log in to this updated world, they are entering a new version of the world that has never existed. As one interviewee, Wendy, explained it, "I think it was maybe the first time I had even experienced like… kind of being able to see that the game that I was playing was progressing and it was a new different world to explore that I had already known." This new version of the world has a "corresponding code"—such as 8.2.5—where the first number is the expansion number and the second and third numbers correspond to major and minor patches. Newer versions leave behind the iteration of the world preceding it; for example, when players downloaded and installed version 8.2.5 in 2019, version 8.2.0 was no longer available to those players. The older version of the world that existed before the update is lost and obsolete, inaccessible to a subscribing public of players. In this way, expansions are quite unlike books in the way that Messias (2020) described; you cannot go back and see the world as it was like you might with a book.

Curiously, it is possible that players might be playing in different versions of the world at the same time. Speaking on contemporary change in video games, media theorist Grant Bollmer (2015) astutely points out that "the fact that the game changes over time leads to a situation where, depending on the time of purchase, the platform, the number of updates and patches applied, different players playing ostensibly the same game might necessarily enjoy different experiences in markedly, or subtly, different worlds" (132). There are a multitude of versions of WoW as a result of this process, and older versions are considered obsolete, buried under these periodic updates. As Švelch (2019) explains, "the contemporary practice of video game updates follows the logic of obsolescence and innovation… With the release of a new patch, the previous version of the game becomes outdated and often loses some of its functionality, such as online

connectivity or multiplayer capabilities" (7). While much of the content from those older versions is still within the game world, the game looks very different as changes and new content have been layered on top of the original game. For example, the fourth WoW expansion, called "Cataclysm," drastically changed the landscape, flooding some zones, revealing previously inaccessible areas, and casting a large glowing geologic scar over much of the map.

This process of the versioning of online games has led to a situation in which previous versions obsolesce, following a general trend in the gaming industry of forward progress without looking back. Newman (2012) wrote that the "game industry does a good job of selling a utopian dream of continual upgrades" (46). This can be seen in the way that newer consoles are referred to in terms of "generations," a label which invoke a continuity of ages, of the desire on the part of game companies to maintain a sense of forward motion. Newer generations force previous iterations into obsolescence, especially as many new consoles don't allow for backwards compatibility, or the capacity for a newer console to run games from previous generations of consoles. Obsolescence occurs when digital media are replaced by newer, faster, more functional versions; consequently, certain data becomes unreadable between different "generations" of software and hardware platforms, making it difficult to use and to preserve (Monnens 2009; Swalwell 2009; Boellstorff and Soderman 2017). The same can be said for the progression of virtual worlds. On the topic of the virtual world genre, Bollmer (2015) has pointed out that, "its own history erodes and vanishes as technological progress moves 'forward'" (70).

What has happened with World of Warcraft is just that—buried under the latest patches and expansions that have progressed the game "forward" are versions that some players miss, to which they long to go back and play again. For some time, there has existed a large, widespread, and very vocal group of players who want to play the original version, before all the expansions,

as the game was when it was first released. Some players miss the way the game looked, some players miss certain mechanics, some players miss certain places in the game that no longer exist. Most notably, players miss the way the social landscape used to feel (see Chapter 1). These players want to go back in time, to peel back the layers that the game developers have packed on top of something they loved, something they feel has been taken away from them, now seemingly lost to the relentless forward motion of capitalist technological progress under the sign of games-as-a-service. In the following sections, I take a step back to describe the evolution and uses of private servers, as a sort of historical background that sets the stage for describing how they are used by players now—as practices that preserve old versions, allowing players to "travel back in time" while simultaneously resisting the forward motion and rapid obsolescence that characterizes the games industry.

Emulation as a Method of Preservation

In this chapter, I argue that private servers are a form of video game preservation that exists outside the purview of a typical preservation institution, like a museum, archive, or library. They should be classified in this way insofar as they have the capacity to accomplish some of the goals of historical preservation, specifically the task of bringing the past into the present. Private servers are one of three types of what Winget (2011) refers to as "artifacts of participatory culture" or modifications to an online game which are not created by the formal development team but by independent individuals. Referring to them in this way highlights the characteristic involvement of fans of the game in the world of video game preservation. Generally speaking, fans and players have been involved in the preservation of video game history for much longer than preservation institutions took it up as a key interest. In other words, for some time the work

of video game preservation had been predominantly folk preservation: avocational, amateur, distributed, and unauthorized (Kraus 2011). Some examples of folk preservation in video games includes fans amassing software and hardware, creating hardware replacements, repairing hardware, and collecting metadata and other ephemera, like game magazines, developers' notes, and marketing materials (Swalwell 2016; Guins 2014). A prominent example of a fan-produced collection is the MAME, or Multiple Arcade Machine Emulator, a virtual project which currently supports the ability for any user to play over 7,000 video games, all made possible by a process called emulation (Ippolito 2016).

Emulation—which has long been the principal method for preserving video games—is a key tool of folk preservation. It is process by which programmers create systems of software to mimic and run the original game and console software on another device, like a personal computer or another console (Winget and Murray 2008). New media scholar Jon Ippolito (2016) writes, "to emulate is to translate the code for one hardware or software environment into semantically equivalent instructions for a new environment." In other words, emulation means replicating the exact, or close to exact, operation of another hardware or software environment, essentially to fool the original code into assuming that it is running on its original equipment. It requires "careful attention to the relationship between hardware, code, use, and context for use" (Lowood 2004, 4). For example, to play the original Super Smash Brothers on Nintendo 64, one would need a Nintendo 64 console, a controller, and the game cartridge, along with a television to connect it to and the appropriate cables and cords. Nowadays it is possible for people to download a piece of software onto a computer that acts like a Nintendo 64, allowing the mouse and keyboard to serve as the controller. Then a player can choose from any number of website repositories to download a second piece of software called a ROM, which imitates game

software to be read by the emulator. Emulation can be used to recreate games or other non-game programs, such as early versions of MS Paint. For some time, game fans have been actively creating and using emulators to recreate and replay game software.

While emulation is certainly a popular practice among gamers interested in making games more accessible, it has also become increasingly adopted by players and preservation institutions alike as an option for video game preservation (Barbier 2014). Digital materials are more at risk than their analogue counterparts due to their shorter lifespan. For example, books can last for around two thousand years, while USB drives can last for around fifty (Houghton 2016). Game hardware falls apart over time, as soon as 10 years after creation, due to processes like bit rot and media decay, the natural and gradual processes by which digital information and hardware slowly degrade over time, especially affecting magnetic storage devices and optical discs (Winget and Murray 2008; Lowood et al 2009). Emulators have become popular for this kind of work because they effectively translate hardware and software components of digital technologies into software data stored in repositories online, offering a solution to the gradual obsolescence and breaking down of video games, what Newman (2012) has referred to as their "unexpected fragility." Therefore, emulation makes for a more long-term option for keeping them accessible, interactive, and playable.

Many players have nostalgia for old games and numerous fans who are also passionate amateur programmers or professional-turned-rogue engineers have recognized this growing desire for retro, classic, or forgotten games for some time and have used emulation to satisfy these desires. The same desires exist for previous versions of online games that are no longer commercially available, and these individuals are investing time, money, and resources to bring these old worlds back to life and keep them online using emulation. However, emulation alone is

not sufficient for preserving networked games like WoW and other massively multiplayer online games. Because these games store some data on the client side (i.e., the software located on the user's computer) and other data on the server side, emulating the user's hardware and the client-side software is not enough to reproduce the entire internet environment needed to make a game like this function as intended. Any emulation of this sort would be partial at best, resulting in a reproduction that would, in effect, be more akin to a simulation of the original experience rather than a living breathing world (Winget and Murray 2008). For a game like WoW, originally played on PC, the difficulty is not exclusively in creating a ROM of the game. The game is a virtual world, an online game with networking requirements for multiplayer capabilities, and for that reason it also requires a server emulator to run.

The server is the lifeblood of not only the social components of the game, but of the game itself. And so the server must also be understood as the lifeblood of any preservation efforts that seek to make the game playable. The game simply will not run without corresponding server code that will fool the game software into assuming that it is still connecting to a server to which it was designed to connect. However, one of the issues with the adoption of emulation as a viable form of preservation for online games and virtual worlds, especially for folk preservationists, is that although the game code is usually easy to acquire from a disc or cartridge, or even an online download, the server code is proprietary and often not readily accessible to the public, except in very rare cases. While code can sometimes be obtained—through a leak from within a game company or by players hacking and illegally procuring it—it often must be created from scratch. In order to make the server code that makes the networking components of the game work, player-programmers with a unique set of skills and knowledges have to dedicate hours of free labor to use what is known as packet transfer analysis to reverse engineer the server code

themselves. By sending code signals to the client, these programmers can interpret the responses given by the client to figure out how the server and client should communicate with one another. Using these responses as a framework, they can create a server to act closely to how the original did. Once server code has been obtained or reverse engineered, it is often modified, circulated, and distributed to other private server communities, to the point that most private WoW servers apparently operate using copies of only a small number of versions of WoW server code.

Resisting Updates, Reclaiming Time

Every year, Blizzard Entertainment hosts a convention called BlizzCon, where fans convene to celebrate their love for online multiplayer Blizzard games like World of Warcraft and Overwatch, and there they also learn about updates to their favorite franchises. During a Q&A session at one of the panels in 2016, which included such figures as J. Allen Brack, the executive producer of WoW, one audience member asked, “have you ever thought about adding servers for previous expansions as they were then?” To this Brack responded, “No, and by the way, you don’t want to do that either; you think you do but you don’t.” Many dedicated WoW players took this to mean that Brack was not in favor of ever offering a retail version of vanilla or “classic” WoW, and “you think you do but you don’t” became fuel for what some of my interviewees referred to as a “movement,” motivating people developing and playing on private servers to continue their work and play in earnest.

Motivated by their own nostalgia and sometimes in part stimulated by statements like this by game developers, players who want to play vanilla WoW again have been running and playing on private servers using emulated server code in an attempt to go back in time and revisit versions of the game that are no longer commercially available, and to have new experiences in

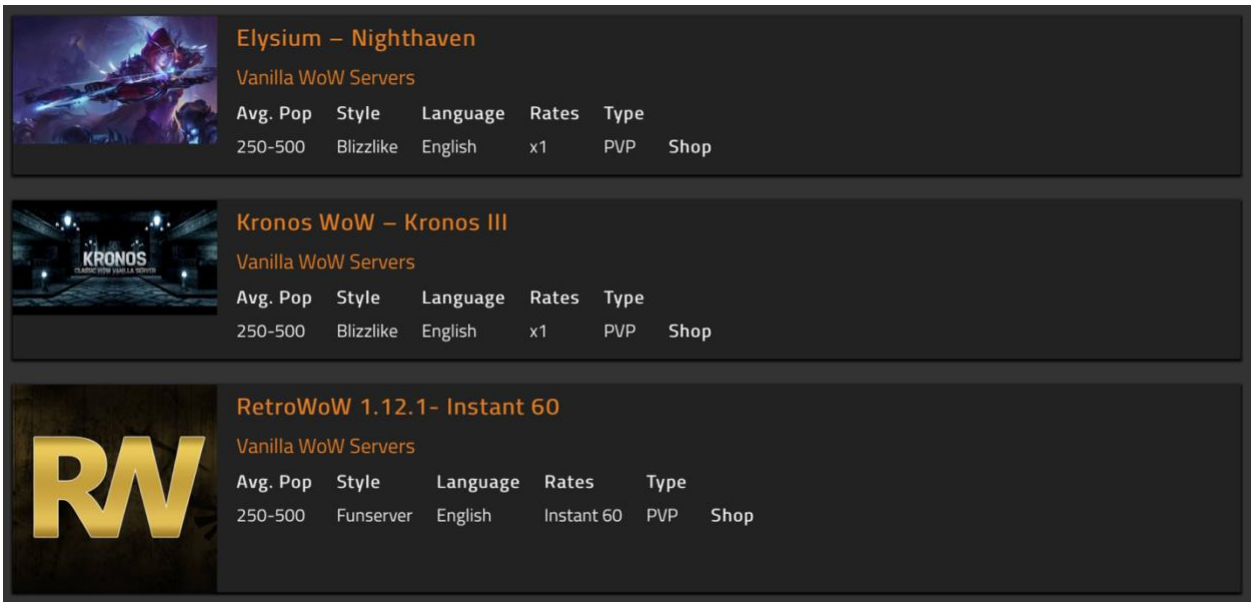

Figure 2.3: A list of three vanilla private servers from a website that provides a publishes information and news about live private servers for World of Warcraft and RuneScape. Source: DKPminus.

this familiar place and time. And these projects have been immensely popular among those players looking to play these versions. For example, the vanilla WoW private server community called NostalriusBegins (commonly referred to simply as Nostalrius), boasted over 800,000 accounts created. As the community manager of Nostalrius wrote on their website in 2015, "Foremost, we're all passionate about World of Warcraft. We love the game and want to see it preserved: we are a kind of museum curators of the Vanilla game." In this way, private servers are a form of folk preservation, to protect and keep online these obsolesced versions. In this section, I explain how private servers also constitute a form of resistance against video game updates, one that questions the normative flow of time in the games industry by asserting control at the level of infrastructure. I will argue for an understanding of nostalgic private servers, especially those running vanilla WoW, like Nostalrius, as wielding a kind of "infrastructural power" or "server power" used by players in the service of taking control of WoW time, to

enable “saving” and revisiting old WoW versions.

According to media scholar Švelch (2019), the current modes of control in video game culture have changed drastically in the last two decades with the increased reliance by the games industry on cloud-based infrastructures. He has written, “The autonomy to choose whether to update or not has been replaced by self-maintaining online gaming platforms and by the growing acceptance of the “games as service” paradigm by both the industry and the audiences” (6). He argues that this change has meant a change in the nature of patches, from a form of technical support to a “tool of iterative game design and control over the way the game is played” (6). Gameplay is now regulated in a way it had not been previously, with contemporary automated mandatory patches giving way to a new form of control on behalf of game developers through internet protocols. Media theorist Alexander Galloway (2004) calls this phenomenon “protocological power,” or the power inherent in the language of the internet that guides how data is transmitted across distributed networks. Players have notably reacted and rebelled in various ways, including finding unauthorized workarounds to opt out of otherwise mandatory patches. Drawing upon Galloway, Švelch refers to these defiant acts as “patch resistance” and “video game update resistance,” which he explains successfully resist protocological power by defying the forward march of time insisted upon by game patches, but notably do not extend to the level of infrastructure.

I propose that players and developers of vanilla WoW private servers are practicing a form of video game update resistance that does indeed tap into the infrastructure underlying these systems. These amateur developers reverse engineer or otherwise acquire their own versions of WoW server code, giving them the tools to establish a connection with the WoW client software. This in turn allows them to recreate their own instance of WoW, ones in which they have the

power to modify, regulate, and populate. By recreating server code on their own terms and having control over which version they are playing, private server developers also give players more control over WoW time. This is similar to Švelch's understanding of resistance, but it is importantly a resistance that happens not in the moment of the patch download, but as a retroactive resistance, one insisted upon well after-the-fact, to recreate lost and buried versions.

In resisting the forward flow of time, in a sense, private servers afford "saving" or holding onto something that players felt was taken from them. The idea of saving is a very familiar concept in the world of gaming. Just as Microsoft Word allows you to "save" your documents in a particular state, or how Instagram allows you to save drafts of posts, most video games have the option to save progress before logging off or turning off your console. This logic of saving one's game, freezing it in a particular state, was taken up originally not by video game developers but by players of analog games (Tobin 2016). Things like keeping score on a piece of paper, verbal anecdotes of previous game play, and annotating chessboard states are all examples of saving in games. Later, with the advent of digital games, players learned to hack the game software to save a snapshot of a set of conditions as a file. Inspired by the pioneering work of such players, file-based saves went on to become the norm in digital gaming, with the introduction of features like in-game save points and autosaves. I bring this history into this discussion to point to the interesting parallels between this fan-produced lineage of the game save and the modern practices of player-led "saving" of virtual worlds. Insofar as private servers can be used to restore and save a previous version of WoW, connecting to a private server also means connecting to a game save state suspended in time. Players want to save WoW and have emotional affinities to periods of time in the history of WoW. Yet the game has been around for 16 years and, at this point, has multiple expansions and countless updates and patches layered on

top of it. Many players frequently reference the early days of WoW as a long lost "golden age" or the era of vanilla WoW.

While this research was conducted primarily with players who have played the original version of WoW on private servers, it is worth noting that not all WoW private servers are vanilla private servers. Original, vanilla, or "classic" servers certainly get the most press and arguably have garnered the largest player base, yet players have historically created and played on private servers for every expansion in the WoW timeline. Private servers usually advertise themselves as having content up to a particular expansion. For example, a server running *The Burning Crusade* software has content from classic WoW plus *The Burning Crusade* (*TBC*) expansion, and a *Mists of Pandaria* (*MoP*) server would have content from classic and sequential expansions, up to and including the release of *MoP*. In fact, as of this writing, the most popular server on the private server listing website is one running *Wrath of the Lich King* (*WOTLK*), the second expansion. *TBC* and and *WOTLK* are particularly popular because they both represent the period following the vanilla era, but preceding the *Cataclysm* expansion, which brought dramatic changes to the landscape and game mechanics. The pre-*Cataclysm* era is one that players frequently referred to positively in interviews, illustrating a notable sea change in attitudes toward the game after this expansion, and thus the desire to play on servers running software before this moment.

While private servers resist the linear flow of time by freezing a normally rapidly evolving game in a save state, they can also reproduce the linearity of retail WoW in the form of "progressive servers." Many private servers consider themselves to be "progressive," which denotes engagement in a practice of rolling out content updates to the game code in a similar fashion to the original WoW timeline. In this way, they are replicating the model of forward

"progress" of patches and expansions layered on top of the base game. This is a different kind of preservation, one that not only preserves the world and gameplay, but also attempts to preserve and curate the flow of time. While progressive private servers resist flows of time, allowing users to "go back," they also promote a "moving forward," a desirable feature for many players who want to experience the game as it really was over time, and not just at one moment in history. I argue that, while these so-called progressive private servers strive to recreate the normative flow of time established by Blizzard, by rolling out updates and expansions in a similar fashion to the original game, these servers are still a form of resistance, a reclamation of time to be determined on players' own terms. Player-developers determine which patches get rolled out and when based on the popularity of the server and the readiness of the community to take the next step together.

With all this is mind, there is still something to be said for the desire to momentarily relive the past. It is true that preservation projects are meant to have longevity; they serve to collect and maintain historical objects for future generations. However, not every player wants the stability of a long-term community. In fact, many expressed to me the desire to simply be able to go back when they wish, with many of these nostalgic players maintaining a subscription to retail WoW. Such players want the availability and easy accessibility of older versions of the game world, especially vanilla, without the necessity of commitment or fear of losing data. Most private server players I spoke with are not dedicated to playing one game at a time; they want the game to exist in particular states and to have the freedom to choose, rather than having that choice made for them.

Oftentimes players are highly motivated by momentary bouts of nostalgia. For example, Darren plays retail WoW but shyly admitted to routinely playing on vanilla WoW private

servers, specifically to revisit areas of the game that do not look the same anymore in the retail version, such as Thousand Needles, which was flooded with the release of the *Cataclysm* expansion. As he explained, "I distinctly remember that I wanted to go back to Thousand Needles without the water in it… just being there was the most relaxing, pleasant thing you can imagine. I wasn't doing anything; I was just running around." Darren feels immense nostalgia for those areas of the world that have changed, and private servers give him the opportunity to see them again, a feeling he described as a "coming home." There is also a large subset of players who have never played vanilla WoW in the first place. These players have expressed a curiosity about the past, a certain "anemoia" or nostalgia for a time one has never known, a swelling desire to revisit vanilla almost like an anthropologist or historian, with questions to study and phenomena to observe. One player, Ford, who admitted he felt that he missed out on the true vanilla experience, had a very particular experience in mind: "I also wanted to experience the lack of flying mounts and how that impacted Player versus Player in the game."

The versioning of game worlds has led to a situation in which a subset of players feel that their worlds are being overhauled and buried under updates, patches, and expansions. By refashioning server code and reprogramming game code, players are resisting these waves of developer-made changes and creating their own servers on which to play WoW, forming communities of their own. In doing so, players are wielding a kind of "server power," an infrastructural form of control that gives players the ability to resist the flow of time and recreate the world as it looked at different periods of time. In the next section, I outline three ways in which people have tapped into server power using vanilla WoW private servers in ways that question game developer's original intentions when designing the game.

Wielding Server Power in Three Ways

Players have been creating and running private WoW servers since just after the game was first released, reverse engineering code and emulating their own iterations of the game world. While this chapter has largely worked through the motivations and practices of those using private servers to play earlier versions of WoW, people have multiple reasons for wanting to play the game on private servers. Perhaps the principal reason for the emergence of these alternative communities playing unauthorized versions of WoW is an issue of cost. Players pay not only an initial price up front, but also a monthly subscription to continue to have access to the servers. Additionally, whenever a new expansion is released for the game, adding a large amount of new content to the world, players must pay for that software as well, in addition to their monthly fee. As Wendy explains, "[my friends] were just like, 'well I can't pay for all the expansions, can't pay the monthly subscription, so I'm just gonna go on a private server.'" Creating a private server gives players the opportunity to play the game for free, offering an alternative to the pay-to-play model of what is known as "retail WoW."

Many players, even in the early days of WoW, opposed or could not afford the monthly fee, and opted to play on private servers instead. It is a common story to hear that some players, perhaps especially younger players, never played retail WoW at all for this very reason. As Mabel explains:

> I'd always been jealous of people who had the internet and like the $15 a month to play Warcraft and I really wanted to play. But even then, or at least especially then my first year out as an adult in the world, I was like $15 a month like Jesus Christ. I can't afford that. And then… my friend Eric was like well did you know there's a way you can play WoW without having to like pay for it strictly speaking? I was like, Oh my god, really?… And that is how I ended up on the private server that was known as aniWow. And that was my first ever taste of World of Warcraft… My first experience playing WoW was in a private server.

Avoiding the subscription cost of WoW may be a rather prominent rationale players give for

deciding to play WoW on a private server, and it is indeed a common stereotype of private server players more generally. However, the idea that all players who play on private servers are only doing it to play the game for free is a myth, one that ignores and diminishes the fascinating work being done by private server gamers. In the previous section, I explored how private servers give players a tool to resist the forward motion of time in the games industry, to resist versioning and take control of their experiences. In this section, I show three other ways in which players have historically used private servers to assert control over the game: modding, theorycrafting, and machinima.

The first is very commonly discussed among private server players—technical modification, or "modding." Because private server programmers are working with the code themselves, they can alter the game parameters from the inside, something not afforded to retail WoW players. Private server administrators can "mod" the game to make hard-to-get items more easily attainable, redesign user interfaces, give out in-game currency, change how players interact with non-player characters, and toy with the gameplay mechanics, such as the amount of damage dealt to a player by an enemy's attack (Debeauvais and Nardi 2010). Oftentimes, specific mods are highly visible to those searching for server communities to join on private server websites, as programmers frequently use perks, such as immediately advancing a character to the maximum level, to promote and market servers to entice new players. As one interviewee, Stan, explained, "around that time there was a private server, where you could get instant 70. So, some of my friends, we jumped on that instead, because we all hated the leveling." These "instant" boosts to the highest level allow players to engage with so-called "endgame" content more quickly and avoid the "grind" of leveling.

Modding is also popular in part because it offers an alternative style of gameplay from retail

WoW, a way for players to reimagine their own versions of World of Warcraft and to have new game experiences. Typically, servers running relatively "pure" or un-modified WoW software are referred to as "blizzlike," while those running heavily modded WoW software are referred to as "nonblizzlike," a distinction emerging from player comparisons between the authenticity—and sometimes overall quality—of the experience to that of the "official" retail version offered by Blizzard. These modding practices fit into a broader history of gamers breaking the rules of games and otherwise acting against designer intentions (Consalvo 2007). Aarseth (2007) explains that player subversions and transgressions are moments of "hope" when players see the possibility of escaping the submission that their game playing implies. For example, modifying game code also allows private server developers to invent and install new games within the game world. Interviewees mentioned some instances of servers where developers had designed games within the game world, like mazes and puzzles for players to navigate. As John explains, "they also had like obstacle courses, or you do these jump challenges where you're jumping across benches that are in the sky and trying not to fall and stuff like that. So those are my first few reasons I jumped on to a private server, just to mess around and have fun."

The practice of modding also affords players the opportunity to use private servers to engage in a second activity, what is known as "theorycrafting," or a method of testing out certain strategies, character arrangements, and items to determine best practices for gameplay. By "using statistical analysis and mathematical modeling, theorycrafters seek out underlying formulae that govern WoW, largely in an attempt to play better" (Paul 2011, 1). Theorycrafting, which requires some knowledge of the code of the game as well as the use of third-party applications, is possible to do in retail WoW—many players do it (Paul 2011). However, a large subset of players prefers to use private servers to theorycraft to more easily access in-game content, quickly acquire and

assemble items and gear, and otherwise break some of the rules in order to get at this hidden knowledge. Private servers might be thought as a "sandbox" version of WoW, one that players with a theorycrafting mindset can tinker and toy with, creating what some refer to as a "theorycrafting environment." Oftentimes these theorycrafters (and even more casual players who are simply practicing dungeons and raids) learn better strategies to transfer that knowledge to other players and apply it to gameplay in retail WoW. In this way, private servers can function not as an alternative to retail WoW, but rather as a supplementary component.

In a conversation with digital media preservation scholar Henry Lowood, I learned of another popular use of private servers, one that constitutes both a form of play and filmmaking: machinima. Machinima—another form of modding—is, in short, a genre of animated films created using video games (Lowood 2008); filmmakers produce these videos by synchronizing footage from a game to prerecorded or voiced over dialogue and other bits of audio. Lowood explained that in addition playing the game on private servers, players have been using these servers to make machinima for over a decade. Machinima is a very popular art form in the world of gaming. For example, the web series *Red vs. Blue*, which uses footage from the sci-fi first-person shooter game franchise Halo, has been running consistently for almost 18 years. Ng (2016) explains that "recording and creating films in game worlds expands those worlds" and "stretches the possibility of that world and of being in it" (290). As such, machinima is also quite popular among WoW players. Players can download graphics from the game, including shots of landscapes and 3D character models, which they then load into 3D-modeling software and video-editing software to make their films. Though machinima filmmakers do not need to use private servers to make their films, many extol the benefits offered by some of these less-populated WoW realms, including emptier landscapes for cleaner shots and more easily accessible code.

From creative pursuits like making digital films, to more practical scenario-running to determine best practices for gameplay, to modifying and toying with game code, players are utilizing the power that holding onto WoW server code gives them, engaging in many fascinating activities using private WoW servers that allow them to assert a certain amount of control over their version of the world and their experiences inside and outside of WoW. Such activities as the ones I have laid out here change the design intentions of game developers and are thus forms of play that reconfigure notions of server ownership and game ownership. Importantly, player practices like theorycrafting and machinima are uses of private servers that only require momentary use of the server, rather than long-term play as is the case with other vanilla WoW private servers like Nostalrius briefly discussed previously. Numerous challenges keep long-term private servers from staying afloat. In the next section, I explore the various technical, social, and legal issues that plague private server projects and threaten the longevity of their existence as forms of preservation and as forms of resistance.

Temporal Instabilities

Despite these desires to recreate and stabilize temporalities, using private servers for either preservation or recreation is far from perfect; these projects are largely unstable. In vanilla WoW private servers, there are elements that players report make the world "feel" like retail WoW, such as the visuals and graphics, which are ripped from official Blizzard-owned code. Such elements lend themselves to a feeling of stability, that the game is functioning as intended, and help players feel like their worlds might have longevity, as retail WoW has demonstrated. However, the private server experience is lacking in many ways, as evidenced by many players I interviewed lamenting the negative aspects of everyday life on private servers. Things such as

seemingly perpetual lag and the looming fear of legal retribution were frequently mentioned in interviews as factors that tend to dissuade people from playing on them. Vanilla WoW private servers are characterized by certain inherent instabilities, commonplace patterns of experience across private server player narratives wherein private server play is disrupted, with the worlds eventually being shut down only to be replaced by new ones.

To further illustrate the challenges of resisting a game company's temporalities and the limitations of infrastructural power, in this section, I bring together player experiences of instability, breaking them down into three forms—technical, social, and legal—and arguing for an understanding of private servers as temporally unstable objects. Working through examples learned through fieldwork, I read these experiences of instability alongside Kari Kraus' three characteristics of folk preservation (amateur, distributed, and unauthorized). In so doing, I do not intend to establish a one-to-one relationship between these categories, but rather to analyze how players experience private servers not only as a form of video game update resistance and an assertion of server power, but also as always already unsustainable projects that destabilize both preservation and play.

Technical instability

Perhaps the most common characteristic of life on private servers that tends to frustrate players is technical instability. Because the servers are running unauthorized versions of the game, these projects lack developer support, like from Blizzard Entertainment, WoW's development company, as well as institutional support, like from a museum or other preservation institution. Without ties to a corporation or an institution, administrative teams struggle to maintain the technical stability of their servers. An administrator of the Elysium private server revealed to me

that the unpaid volunteer members of these teams vary widely in background expertise, typically comprising both amateur and career programmers who are fans of the game and living lives of their own, often with full-time jobs as government agency employees, IT security experts, game developers, or students. On the one hand, volunteer administrators must take on the overwhelming task of fixing bugs, conducting server stress tests, responding to player requests and community concerns, and performing other general technical maintenance on both server and client side. At the same time, they must also fund these projects, which are extraordinarily expensive to run due to the high operating costs of renting server space from a third-party provider. These projects often rely on donations from their players to continue operating, and frequently programmers simply run out of money, or the donations are not sufficient to cover costs. This can become one of the many reasons these projects get taken offline, taking with them the data of all the players who made their home there.

On an everyday basis, because of this lack of support and unpredictable funding, the users of these unsupported and unauthorized private servers report frequent server issues. I frequently heard reports of graphical glitches, missing or incomplete elements of in-game quests, and lag, common occurrences characteristic of everyday life on any given private server. Many players also lamented server-specific network issues, like frequent server downtimes due to errors and maintenance, unstable connections, and server overload causing longer queue times to entry, making it difficult to even connect to the server in the first place. Stan told me about the difficulties experienced when the new, highly anticipated Elysium server was opened for the first time: “I remember when Elysium launched. You could wake up in the morning, put yourself in the queue, go to school, go to work, shop, go home, and you will still be a queue. It was that bad, and that was one server.” What often happens is that players quit playing on these servers as a

result of having experienced a number of these technical downfalls, complaining that the quality of these projects is not up to the "standards" that have been set for them by the retail version or even by other, perhaps better-funded, private servers that boast a "blizzlike" experience.

Social instability

Players leaving private servers is also a consequence of another defining characteristic of life on private servers—social instability. Players might leave because of technical instability, but they also might leave for a number of other reasons, for example, to play other games or to subscribe to and play retail WoW, or even simply because of a lack of free time to devote to play. For these reasons, among others, population numbers on private servers are highly variable, leading many players to refer to the liveliness of private servers, mirroring conceptions of retail server worldliness I explored in Chapter 1. Several interviewees explained to me that low or fluctuating population numbers can lead to these worlds not feeling "alive" and for certain servers to be considered "dead servers." With the sheer number of private servers and the cyclical closing of old servers and opening of new ones, the project of preserving *WoW* is a largely distributed process, with no central leadership. This is all exacerbated by the release of a retail version of vanilla under the name WoW Classic, which I will briefly discuss later. Many players have flocked to this authorized, official version, and many private servers have agreed to cease operations. While there are still holdouts who believe that what Blizzard is offering is not enough or feel attached to their private server community, private servers have certainly taken a hit in what can accurately be described as an exodus. For example, on dkpminus.com (a popular private server listing site), of the top 20 WoW private servers listed as of 11/19/20, 11 of those servers are categorized as Wrath of the Lich King (i.e., the third expansion) and only 1 is vanilla.

Additionally, as I explained briefly in the previous section, there are many different private server communities available for each expansion, and populations of interested players are distributed across a number of different private servers with distinct leadership teams. Many servers offer similar experiences; for example, when I was conducting this research, there were four popular vanilla WoW servers that players could choose from, along with many smaller ones, all offering a "blizzlike" vanilla experience. Despite this redundancy, fans create new servers with some frequency, offering more stable connections, a different community experience, or perhaps a set of desirable mods to the game. To keep up with these changes in the ecology of private servers or to even find a server to play on in the first place, players must follow trends on third party websites and the wowservers subreddit. There they are able to track changes in population numbers and read player-reported accounts of what the quality of the experience is like on the server and in the community's chat channels, like Discord or other online forums. Leadership on these servers is unstable as well, especially given that they are performing free labor, and changes in leadership frequently result from squabbles among the team, scandal (e.g., questionable use of donation money), and burnout. Generally speaking, there is a palpable lack of centralized leadership involved in using private servers as a means by which fans are preserving WoW.

Legal instability

On top of the technical and social issues that plague private server players and developers, private servers also operate in a precarious legal state and are sometimes forced to shut down because the emulation of server software to run a private instance of a copyrighted online game world is classified as copyright infringement under US copyright law. A key example of this

comes from a federal lawsuit in 2010, in which Blizzard sued a company called Scapegaming, which ran a private server and collected over $3 million in profits through micropayments from players. The federal court ruled in favor of Blizzard and awarded the WoW game development company $85 million in damages for "willful infringement." During the case, Blizzard argued that the private server infringed on four copyrights, including the base game, the first two expansions, and the server code itself (listed on the letter sent to the Copyright Office as "World of Warcraft--server").[5] With this case, Blizzard's legal team has suggested that it is perhaps willing to take down any attempts to profit from their intellectual property, even if they are not as litigious as they could be.

On a daily basis, private server players do not seem to think much about the potential legal impact of their play on their own lives. As one player, Paul, put it, "Connecting to a private server is not illegal, but hosting one is, in a way." In this way, most players I spoke with were not worried about legal retribution for playing on these servers; however, they did worry some that the server would be forcibly shut down, which meant losing their game progress and social community. Many private server communities have survived for years without incident or any contact from Blizzard, likely in some part due to developers of private servers working to get around these potential legal threats by hosting[6] their servers in other countries, ones with more relaxed rules around copyright infringement. Nevertheless, after Nostalrius was asked to shutter its operations, the Blizzard legal team continued to occasionally serve cease and desist letters to other new private servers; in the case of Felmyst, a vanilla WoW private server, they received a letter just five days after their server opened and were forced to close.

[5] Blizzard Entertainment, Inc. v Alyson Reeves et al, 2:2009cv07621 (2009)
[6] These server hosting services located in other countries are often called "DMCA ignored hosting services."

Temporal instability

The technical, social, and legal instabilities discussed above also lead to private servers being inevitably temporally unstable. In their work on strategies for preserving console games, Guttenbrunner et al. (2010) wrote that emulation projects, often labors of love, are typically abandoned or discontinued by their authors. Ultimately, what this means is that these private servers, emulation projects for virtual worlds, are largely temporary; they come and go, with some projects failing and new ones being created all the time. The culture of private servers is one overshadowed by the precarious nature of their existence. To play on a private server is to embrace precarity and instability. In an interview, private server player Wendy explained this precariousness in terms of authenticity and ephemerality:

> Whenever I would play, always in the back of my mind, I'm like, "oh, this is just a private server." Like, not that it's not real, but if—not sure how to describe it, but it's just sort of like, "oh, this is not World of Warcraft, like, this isn't *the* World of Warcraft, even though it's the same game. It's the same interface... Just, in the back of my mind I was thinking maybe this doesn't matter or I don't care… Maybe the server is just going to be gone at some point.

Players like Wendy fear their server might lose support, experience dwindling population numbers, or even be threatened or forcibly shut down by game developers citing copyright infringement. Therefore, players are reluctant to dedicate their time and energy to developing a character on one of these servers, only for their data to be lost and all their hard work consigned to oblivion. Dipper shared this sentiment, reflecting on his preemptive departure, saying that the "reason why I quit Light's Hope was because I didn't want to get too attached to a character that was going to get deleted because they're going to shut down." In many ways, then, playing vanilla World of Warcraft on private servers feels only like an approximation, one that forces the player to succumb to a cyclical time characterized by servers closing and opening, in which vanilla WoW becomes an uneven and unending temporal loop, unless a player chooses to leave.

As evidenced by the forms of instability discussed in this section, private servers, despite being popular projects led by passionate fans, are ultimately impractical as solutions to the question of how to preserve virtual worlds in an interactive format long-term. In Chapter 3, I ask what museums and other preservation institutions are doing to advance these complex and difficult projects, but what I want to assert here is this: What private servers do successfully is send a message. Fans desperately want companies to listen to them and their concerns, and with how much many people invest in these game worlds, fans want some amount of control and agency over the availability and temporality of these worlds. The story of private server communities cannot be boiled down to simply a desire among players to play games for free. The existence of private servers is one way for fans to explicitly communicate with the developers of these games to say that they want to play games that are no longer available online, as well as older versions of actively online games, and that fans are willing to take part in keeping these lost worlds online. But do these companies listen?

Conclusion: WoW Classic

During the opening ceremony for BlizzCon 2017, J. Allen Brack, who one year prior had told an audience member who asked about classic WoW servers, "you think you do but you don't," suddenly began speaking to the audience about ice cream. And as he did, fans in the audience and on Twitch streams began to exclaim the word "vanilla!" Brack said, "Ice cream is one of my favorite desserts. Personally, I love chocolate and I love cookies and cream… But I understand that for some of you, your favorite flavor is vanilla." The crowd erupted in screams and applause. At that opening ceremony for BlizzCon, Brack was announcing the release of a version of WoW that hadn't existed for 10 years. And as a knowing wave of understanding erupted in

this huge hall of the Convention Center in Anaheim, California, a video played on an enormous screen, showing a female gnome from WoW standing in front of a giant green portal. She looked to the riled-up viewers and spoke, “Someone once said that you can’t go home, but they lacked vision and a temporal discombobulator!” Rapidly, a montage of cinematic videos from WoW played in reverse, ending on a clip from the original WoW trailer, showing a dwarf walking through snow. The WoW logo appeared, with the word “Classic” emblazoned below it. The audience went wild for what felt like a solid minute.

Importantly, the corporate restoration of WoW Classic as a commercially available game world is an example of the kind of outputs private servers can yield, the spaces of possibility generated by resistances and battles for control. By wielding server power, players can not only assert control over the flows of time that feel so out of control; they can also send a message in a gaming culture ruled by systems like “games-as-a-service” in which players increasingly feel like their voices are not heard. However, while players can tap into server power to compel corporate decision-making, the reverse is also true. As Foucault (1979) wrote: “Where there is power, there is resistance, and yet, or rather consequently, this resistance is never in a position of exteriority in relation to power” (95). That a company can make these decisions means they also can wield server power toward corporate gain. By now, WoW Classic is widely regarded as a commercial success, with thousands of active players playing the game through a retail WoW subscription. Though this announcement might never have happened without private servers, it is critical to recognize that these acts of resistance fueled a common course of action, with Blizzard also buying into this mode of temporality. And it was Brack himself which fueled the movement in the first place, when he insisted players did not want this thing that they had been begging for and indeed had been playing surreptitiously on private servers. Moreover, after Blizzard

Figure 2.4: Dozens of excited BlizzCon attendees play a demo of the then-unreleased WoW*:* Classic in 2018. Source: Author.

pressured Nostalrius, once the most popular vanilla WoW private server, to stop offering its services, a WoW development team at Blizzard invited members of the Nostalrius team to a meeting at Blizzard headquarters in Irvine, California in 2016. No news of what happened during this private meeting has been made public, but one year later Brack stood on stage at BlizzCon and announced WoW Classic. Undoubtedly, the wave of popularity of private servers motivated Blizzard to listen to the demands of players and supply them with a retail version of this game that so many wanted to return to, but critically this was ultimately in the service of gain for Blizzard as well. The announcement and subsequent release of Classic meant that, while some stayed active despite the news, countless vanilla private servers now faced a new temporal

instability as a result, because what they had been begging for was going to be available for them, without the precarity and instability from before. The era of vanilla private servers appears to be waning.

Through explorations of the "versioning" of online games and virtual worlds, and player engagement with forms of folk, or non-expert, preservation through server emulation, in this chapter I have described how and why subsets of the WoW player population have been using private servers to play WoW as it was when it was originally released, despite it being (previously) commercially unavailable. Many of these private server players have expressed that their work and play are part and parcel of a process of preserving WoW in particular states, an engagement with the history and temporality of the game as a series of moments in time, as a place, and as a cultural object. As I have explored here, they are also actively resisting the consumer models which continually force updates to the game, a practice I refer to as a form of patch resistance against the infrastructural power of game developers. Server emulation and private servers allow players to struggle against and reclaim a form of server power that has the potential to generate spaces of possibility and open productive channels of communication between players and developers. However, it is crucial to understand the ways in which this server power might also be passed back to its originator, wielded once again by the game developer in the service of resolidifying the station of the corporate entity.

CHAPTER 3

Restoring Offline Worlds at a Video Game Museum

A wave of nostalgia swept over me sitting inside the museum. I was on a faded black leather couch in front of a row of flatscreen and cathode-ray tube televisions, holding a grey controller for the first PlayStation. Looking toward the TV closest to me, the distantly familiar title sequence for the video game *Legend of Dragoon* (2000) appeared on the screen. The combination of visuals and music immediately reminded me of the hours I spent with my childhood best friend holding a controller just like the one I was currently gripping (see Figure 3.1), playing this exact same video game, which was so large that it had to be spread across four discs (a fact which the museum volunteer who set up the console for me remarked upon with surprise).

A little boy of maybe 10 years sat a few feet from me on the couch, his hands holding a Super Nintendo controller, his eyes fixed on a screen displaying a map I immediately recognize as being from the *Secret of Mana* (1993). A little girl, who I assume is his sister, calls out to him to play a round of *Super Smash Bros. Brawl* (2008) on a Wii console. Out of the corner of my eye, I see the boy turn around and give an insistent response, "I can't come right now!" He turns back to his game, "I'm having an adventure!" Across the room, an adult woman sits alone on a small chair, silently wiggling the joystick of an Atari controller as *Tetris* blocks fall in front of her. She bears an intense look of concentration, as if to drown out the cacophony—a mixture of electronic sound effects, buttons clicking, and people chatting and laughing—that filled the museum space.

This is just another day at the Museum of Art and Digital Entertainment, or the MADE, in

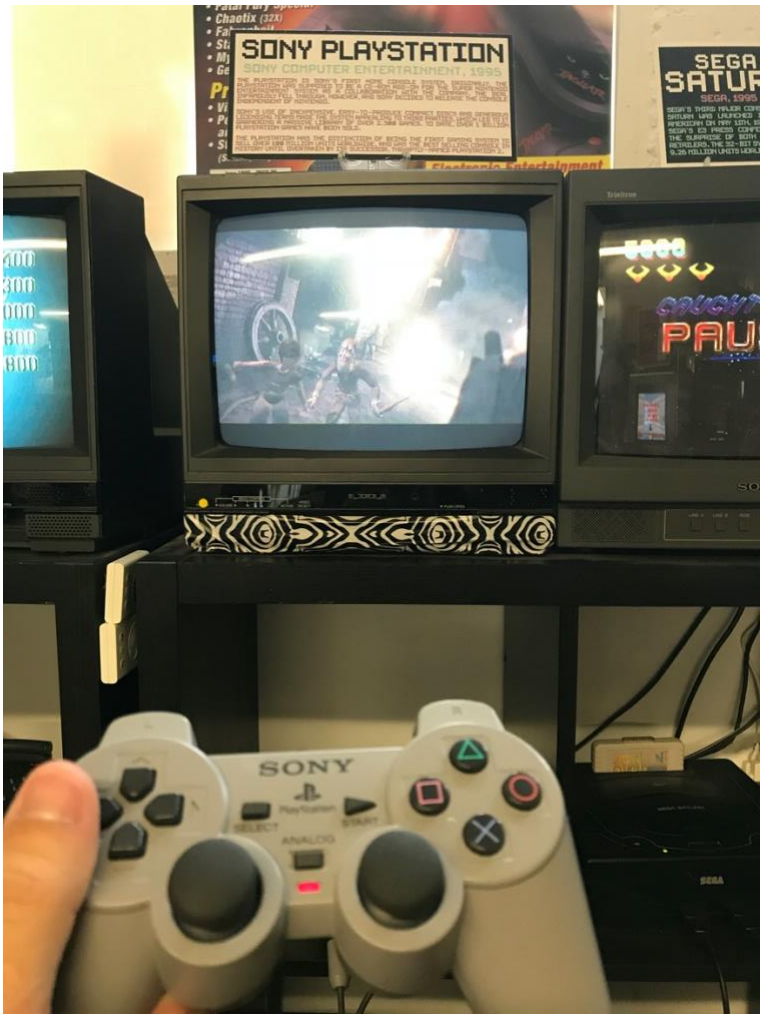

Figure 3.1: Playing *Legend of Dragoon* on an original Playstation at the Museum of Art and Digital Entertainment. Source: Author.

Oakland, CA. The museum is located in an historic beige sawmill building with a huge sign above it that reads “VIDEO GAME MUSEUM” in bold white letters, clearly visible from cars driving along Interstate 580. The MADE is one of the few specialized video game museums in the country, and their entire collection is playable. For an entrance fee of $10, members of the public can enter the space, which contains small exhibits on video game history, informational displays about certain gaming artifacts, and, most notably, many shelves packed with original and recreated game boxes, representing a catalogue of over 6,000 titles on almost any game

console. And visitors can play any of them.

After reading the last two chapters, you might be asking: what about World of Warcraft? Does the MADE offer access to online games and virtual worlds? Well, yes and no. During my first visit, I noticed some evidence of virtual world history in the museum. Prominently displayed on the back wall was a poster for one of the first popular fantasy MMOs (and my point of entry for online gaming), EverQuest, featuring the instantly recognizable image of the scantily clad staff-wielding Paladin Princess, Firiona Vie. The MADE also did have a range of online PC game discs on its shelves, including original boxes for World of Warcraft and its various expansions, all haphazardly clustered together on a small shelf near the front of the space. However, these games were not playable. As I discussed briefly in Chapter 2, it is not possible to simply slide the disc of one of the WoW expansions into a PC and immediately be able to sit down and play the game, as they require servers and an online account to run. Especially complicated is the process of rendering playable a virtual world that has been taken offline, any connection between client and server severed. This is the focus of this chapter—how is the MADE working to make disconnected virtual worlds playable once again, and in engaging with the challenges they face, what do their preservation practices reveal about processes that increasingly rely on servers?

According to the MADE's founder, the museum's primary goal is "to preserve our digital heritage in a playable form." For them, that heritage includes MMOs and virtual worlds that are no longer online, especially ones that are considered games. This work of restoration and subsequent preservation poses numerous challenges, and in this chapter I explore two interrelated issues: (1) the games industry has shifted to a consumer model that views games like this as neither worlds nor products but instead as digital "services" dependent upon servers, what

I refer to as "worlds-as-a-service;" and (2) the Digital Millennium Copyright Act prohibits circumvention of technological protection measures that copyright holders have placed on that server software. In essence, these regimes create a situation in which the power to control the life and death of a virtual world is in the hands of whoever owns and has control over the server. In recent years, leadership at the museum has been making moves to incorporate virtual worlds and online games that have been taken offline into their collection, moves that open the door for new ways of imagining long-term solutions to video game preservation on a grand scale. Despite the lack of support from game developers (most of whom have historically not supported such preservation projects), folks at the MADE, alongside legal teams, historians, and activists, are leveraging a segment of copyright law that enables a potential workaround, essentially hacking or "modding" the doctrine, to make possible the restoration of offline virtual worlds.

In the last chapter, I wrote about the ways in which players can reassert control over the temporality of online game worlds by recreating or accessing server code and running the world on their own "private" servers. This chapter shifts to look at more institutional forms of preservation that can offer avenues for controlling the life of game worlds themselves by changing modes of server ownership. In exploring the challenges facing proponents of virtual world restoration and preservation, I highlight the tensions between preservation institutions, game companies, and copyright legal doctrine, relations which also generate certain spaces of possibility for reshaping ideas of server ownership. In our current situation, in which the games industry has shifted from viewing MMOs and virtual worlds as products to viewing them as services, institutional projects of virtual world resurrection—projects that extend the life of online game worlds and make possible the revival of their communities—are dependent upon the modifiability of copyright law. To explain this point, in this chapter, I delve into what it means

for a virtual world to "die" (rather than just to change over time, as discussed in the previous chapter), what it means for copyright law to be imagined as "moddable," and how the MADE is leveraging copyright mods to bring dead virtual worlds back to life.

Virtual World Endings and the Aftermath

Imagine for a moment that you started playing a new massively multiplayer online role-playing game called Wildside.[7] It was fairly popular when released in 2015, and there were massive queues to join any of the 10 open servers. When you finally joined a server, you immediately made a friend who quickly became someone you played with almost every single evening after work. Eventually, after making more friends in the game, you and your friend decided to start a guild, and over the course of three years, the membership of your guild climbed to 200 members. Every evening, you spent hours with your friends that you met in Wildside, teaming up to fight bad guys, trading resources with one another, and chatting through text and voice chat software.

All things considered, the game was moderately successful among MMO fans. It had received some bad press because players online were saying that the game was too labor intensive and repetitive, but that is the way you and your friends liked it! However, around the fall of 2018, you started to notice that the world felt a bit empty—the overall Wildside player population had dropped to an all-time low. Even your guild size was declining, with a roster of 50 active members. Then in late 2019, the game development company behind Wildside announced that they were discontinuing server support for the game. Wildside was going offline. This was nothing new to you, of course, because being an MMO gamer inevitably means having

[7] This is a fictional MMO, whose name I created as a portmanteau of Wildstar and Planetside, two MMOs that are no longer online.

to cope with your worlds' potential to disappear. Nevertheless, you and a few dedicated friends continued playing the game for a few more months, awaiting the day and time that the developers had announced the game was going dark.

Today is that fateful day, a day that many players have started referring to as the "apocalypse." You log into Wildside and find a few of your friends in the game world's largest city, surrounded by more player avatars than you had seen in over a year! The avatars are dancing, running around, and casting spells, and the general chat window on the left side of the screen is scrolling so quickly that you cannot keep up with the conversation. The game feels so alive in these final moments, almost like it felt back in 2015. And then all of a sudden everything goes silent. Avatars are starting to rapidly disappear one by one. Your screen freezes, and a grey dialogue window pops up on your screen: "You have been disconnected from the server." And just like that, Wildside vanished.

In the last two chapters, I discussed at length how online games and their underlying infrastructure can change over time, with developers adding updates that come with the addition of new features and modifications to existing ones. These changes can fundamentally alter the way the game world looks and operates, so much so that players might assert that the resulting world is completely different from the original one they purchased. But as this vignette suggests, online game worlds are not only modifiable; they can be terminated. New versions of online games like WoW are often temporary, but so are the worlds themselves. Virtual worlds tend to go offline, to get seemingly blinked out of existence. Players often say that virtual worlds "die," rather than to say they are underpopulated or "uninhabited" because they become literally inaccessible. In this chapter, I will be discussing institutional projects of virtual world restoration

and preservation, but to fully understand the stakes involved in worlds being brought back to life, it is important to first understand the conditions of virtual world death. How can a whole world just come to an end, and what does it mean for the player communities in the aftermath?

For game companies, it is a difficult task keeping virtual worlds alive. They are notoriously expensive to continually operate and update, with the high costs of maintaining a team of developers and keeping servers up and running. Therefore, for a world to be kept online, that world has to make money by sustaining a player base that is subscribing, buying in-game items, and watching ads. However, keeping a dedicated player population is challenging, especially in a commercial environment in which the market is dominated by a few lasting titles, with WoW, Final Fantasy XIV, Guild Wars 2, EVE Online, and Elder Scrolls Online being among the largest. New MMOs roll out every year or two, but few achieve the lasting endurance of these big names. Additionally, much like players who invest time playing large-scale single-player RPGs, most MMO players cannot play more than one title at a time, as these worlds are incredibly time-consuming and immersive. In an interview with journalist Noah Davis (2012), games scholar Jesper Juul explained the challenges in this way: "There is a very natural limit to the size of the market. People will keep launching these games in hopes of capturing some of that slice, but most of them are going to fail." Developers of online game worlds that are unable to build and sustain a dedicated player base, and thus to continue turn a profit, will not be able to afford to keep their titles online. Sometimes, despite achieving some form of success, a game company might still decide to take a game world offline for internal strategic reasons, as was the case with NCSoft when they decided to take City of Heroes offline.

As for the players who make up the remaining population of a dying world, when these worlds get taken offline it can feel apocalyptic, especially given that virtual worlds leave no ruins

Figure 3.2: A first-person view during a virtual world apocalypse. Meteors fall from the sky in Planetside marking its final day online. Source: GameWatcher.

behind. When they are gone, players cannot even revisit the remains of the world. Sometimes the end of a virtual world can even take on all the drama and excitement of an actual apocalypse. For example, when Rogue Planet Games, the company behind the sci-fi MMO Planetside, decided to stop supporting the game in favor of their sequel Planetside 2, they designed a meteor shower that slowly killed players' avatars, thus permanently removing them from the game. The event ended in a standstill, with a few players surviving the onslaught, resisting the end of the game world. Similarly, the developers of Final Fantasy XIV, whose numerous design flaws inspired them to take the game offline and re-release it as FFXIV: A Realm Reborn, designed a villainous red moon that slowly descended toward players. Players were then presented with a server error message, which was followed by a cinematic video of the world ending, setting the stage for the story of the game to continue in the re-release.

More often, however, the developers do not create a gamified apocalypse narrative, but rather opt to simply write a letter to the community containing the day and time after which the game

will no longer be accessible. The game development company Maxis did just that with The Sims Online. After re-branding the world as EA-Land and making numerous unpopular changes (including fusing all zones into one megacity), player numbers declined, and the company announced the world would be closing four months later. The final day, often referred to as "EA-Land Sunset," when the virtual world was shutdown, players held an in-world party before being delivered a network error message saying the connection to the server was lost. Even if the imagery does not have the same dramatic flair as a meteor storm or a descending red moon, it is not hyperbole when players describe these events as apocalyptic—an important world and social space that they have spent a lot of time in is suddenly going to become inaccessible. Many players cling to those final moments; there is even a whole genre of YouTube video that has emerged, with players posting video footage from their perspective of the final minutes of life in a dying game world, capturing the often quiet and peaceful, but sometimes chaotic, moments before the developers finally pull the plug on the world, the game, and the community.

What happens to these communities after the world ends? Though players may have a client-side program launcher still present on their computer, there is no server to which that client can establish a connection. The world is simply not there. But this is typically not the end of the community, as they often have forums and other spaces online in which to gather, mourn, and plan next steps. Players have several options to pursue, and the easiest and most common is to find another game world. As I mentioned in Chapter 1, games scholar Celia Pearce (2008) urges for an understanding of players' involvement in game worlds as "trans-ludic," highlighting the ways in which players exist across multiple games and often recreate similar versions of themselves in different worlds. Some dedicated MMO players even frequently practice "world-hopping," or moving between a few different worlds in one day. So when a world ceases to exist,

there is a chance that many players will have other worlds to fall back on or escape to. Pearce has written extensively on the concept of virtual world diaspora—how player communities tend to disperse to other game worlds, sometimes seeking to recreate not only community structures and social norms, but also entire environments, avatars, and objects that resemble those from their lost world (Pearce and Artemesia 2009).

As Pearce has shown in her work, players tend to grow strong attachments to these worlds, and their communities are resilient. Players will often find ways of reconnecting with each other once again, even if in smaller groups, and rebuilding their community in some fashion. Sometimes, that process of rebuilding includes resurrecting the world that was taken offline. In one interview, Alex at the MADE even described bringing a world back online as more than just preservation of a world, but characterized it as a kind of "community revival," stressing the reinvigoration of the players when they can be in their worlds again. Player nostalgia is a powerful sentiment, and players' desires to visit lost worlds can actually motivate them to spring into action to recreate the worlds for themselves. Just as players have invested time and resources into recreating out-of-date versions of still-online game worlds (as discussed in Chapter 2), they have been involved in reverse engineering server code to create private servers that restore access to game worlds that developers have taken offline. There are countless stories of community-led restoration projects, or projects of "community revival," from The Matrix Online to City of Heroes. Ultimately, however, as these projects are instances of folk preservation, they are too often labors of love subject to the instability common among private servers, resulting from insufficient technical support, issues with their social structure, or potentially even legal trouble. If these sorts of projects had institutional support, backed by a formally recognized archive or museum, what difference would it make? In the sections that follow, I discuss the

challenges posed by the consumer models and legal regimes that govern virtual worlds and how the MADE has worked to overcome these challenges.

The MADE's Mission

In summer of 2008, a lifelong gamer and career games journalist named Alex Handy was walking through the flea market at Laney College in Oakland and happened upon a collection of ROM chips (pieces from the hardware memory storage hidden inside of game cartridge shells) that amounted to 27 games for the ColecoVision and the Atari 2600 consoles. One set of chips stood out from the rest, as they contained 12 versions—in fact iterative revisions—of an unreleased Atari 2600 game called *Cabbage Patch Kids: Adventures in the Park*. This rare find showed the development process for a game that was never made available to the public. In an interview a decade later, Alex explained to me that this was the catalyst for his decision to create a video game museum: While these artifacts had little resale value, they held immense historical significance and might otherwise be lost. In Chapter 2, I explained that the team behind Nostalrius saw themselves as, in their own words, "kind of museum curators" of vanilla WoW. In much the same way as these and many other private server developers, Alex—a dedicated fan and collector of video games—acknowledged the importance of player-led stewardship, especially as pieces of gaming history get discarded or fall into disrepair.

This is a core principle on which the MADE was founded: that players and fans of video games are the primary stewards of video game history. But what does this mean for a small video game museum? While attending my first meeting at the MADE, I realized that it is run primarily by volunteers and a few paid staff members, all of whom are involved in several activities critical to the functioning of the museum. They, often alongside Alex, work on exhibitions, help

Figure 3.3: Volunteer-made Perler bead pixel art adorns the street-facing windows of the Museum of Art and Digital Entertainment. Source: Author.

curate the collection, repair gaming hardware, put together fundraising efforts, staff the museum during open hours to help visitors learn history and find games to play, teach free coding and game development classes, put together community events at the MADE, and organize MADE presence at other venues, like the Vintage Computer Festival and the Game Developer's Conference. Every time I went to a volunteer meeting, there was a new enthusiastic volunteer (or five!) ready to learn how they could help preserve video game history. On their own, some of these volunteers had even engaged in folk preservation practices at home, crafting emulators, repairing consoles, and amassing their own collections of video games and memorabilia. In a

sense, the work they are doing at the MADE is extraordinarily similar to private server projects in that they are preservation efforts intended for players, led by a team of players. What sets the MADE apart is its recognition as a legitimate, formal institution of history and learning, one that is funded by a community-backed Kickstarter and museum grants, has nonprofit status, and partners with other formally recognized organizations invested in preserving software, like the Electronic Frontier Foundation and the Internet Archive. At the same time, though, it is important to keep in mind that these are not museum scholars or professional curators; even Alex has said, "It's wonderful to be way out there on the cutting edge, but at the same time we have no idea what we're doing…we're learning every day."

What makes the MADE an interesting case in this study of the preservation of virtual worlds is evidenced by its core tenets, the four primary goals set forth in their official mission statement, which are as follows:

(1) "the preservation of historic artistic works in the digital media;"

(2) "the education of the public in the process of creation for digital works of art and video games;"

(3) "the exhibition and curation of individual artists and creators, their works, and their biographies;" and

(4) "that all exhibits should be playable: games are to be played, not viewed from afar or watched on video."

It is especially on this fourth goal that I would like to pause and examine: What does playability mean? Alex and others have made it clear that archives and other cultural artifacts of video game preservation (like videos of gameplay) are just as important as the more interactive work being done at the MADE and other video game museums around the country, like the US

National Videogame Museum in Frisco, Texas and the Strong Museum of Play in Rochester, New York. The work they do differs, however, from the work being done at academic archives. Of Stanford's Preserving Virtual Worlds project for example, Alex said, "If we are Yin, this is Yang. This paper talks about every nook and cranny, and how they would be saved. Very academic. We're much more rubber-to-road, focusing on getting the game back up and running, but this other work is just as important… but video is always less desirable than actual hands-on gameplay, we feel." This follows the assertion by Ermi and Mäyrä (2005) that "there is no game without a player" (16). In other words, a "game" is actualized in the instance of being played. As Alex has pointed out, institutions like Stanford and the Smithsonian have a number of limitations in this regard. "Stanford University has the world's largest curated collection of video games, but you can't go see them. They're locked away." Additionally: "if you go to the Smithsonian exhibit about video games, there's like 20 games to play." Ultimately, the MADE and others believe that to deny play is to deny the game as a cultural form. The MADE offers an example of a video game–specific preservation institution that is working to collect and display objects of video game history while also making the games accessible to the public, reflecting the interactive nature of the medium and thus actualizing the objects in the collection.

Also core to the MADE's mission is understanding video games as cultural heritage and, more specifically, as game heritage. What I mean by heritage here is a particular status that is ascribed to an object as worthy of preservation, one to pass down to future generations. As Barbier (2014) puts it, "Heritage is the sum of all these preserved objects drawing a link between the past, present, and future" (3). Digital games are increasingly being recognized as not only representations of forms of heritage (such as games like *Assassin's Creed* which draw upon and refer to actual histories), but also as forms of cultural heritage in their own right. For example,

the Library of Congress has begun to document and archive games in earnest, and in 2020, the International Journal of Heritage Studies devoted an entire issue to the relationship between games and heritage. The meaning of heritage in games studies has evolved recently, with scholars urging museums to consider not only forms of "tangible heritage," like hardware and other game-related objects, but also forms of "intangible heritage," like gamer's ideas and values, their cultural practices, and the larger societal structures that give meaning to tangible objects when curating video game exhibits (Nylund et al. 2020).

Newman (2012) has suggested that preservation institutions shift their focus from preserving games as artifacts to preserving play as an activity. The MADE purports to do just that—investing resources into curating a space that makes room for playing and sharing games and creating and communicating new meanings among communities of players. The activity of play in the MADE then becomes a way of valuing both tangible and intangible heritage, recognizing that these worlds are both artifacts and experiences, historically and culturally. Thus, regarding MMOs, the MADE's core mission of player-led stewardship that prioritizes the playability of games also includes sociality as inherent to games and as part of their associated intangible heritage. Reflective of the medium, Alex and the MADE believe offline virtual worlds should be restored to a state in which, amid completing quests and exploring landscapes, social interaction and community can also thrive.

In response to the increasing number of virtual worlds that are no longer online and the tendency of many game companies to not take good care of their data (perhaps especially server code), the MADE has now turned its eye toward making dead virtual worlds playable and thus inhabitable once again. The preservation of virtual worlds poses innumerable challenges. On this topic, McDonough et al. (2010) have written that, "Installing EverQuest in 2050 will not reveal

much about the virtual world that emerged from the software, how it was built or used, even if future writers and historians have access to everything needed to run a fully functioning version of the game" (49). On the other hand, Alex follows the philosophy of Jason Scott, the head archivist for the video game collections at the Internet Archive, who insists that we, in the present, do not get to choose what might be important to people in the future. In the sections that follow, I discuss some of the challenges faced by the MADE, like digital distribution and server contingencies, as well as certain legal obstacles, and how the museum staff and collaborators are working to overcome each.

Servers as Worlds, or Worlds as Services?

In this section, I discuss the ways in which the lives of online game worlds are "extended" and how the structures (consumer models) put in place by game developers to extend the lives of games are the very structures that threaten their longevity by making preservation efforts even more challenging. Players themselves are frequently involved in activities that might be said to "extend" (Unger 2012) the lives of games and virtual worlds in various ways: such as replaying the game over again and participating in para-ludic activities characteristic of participatory cultures, like making fan art, writing fan fiction, and making mods to the game (Consalvo 2007; Jenkins 2012; Vaudour and Heinze 2020). These practices tend to extend the game into other worlds, extend the narrative of the game beyond what developers have written into the game's stories and lore, and ultimately make the game at least, in some ways, feel like it "lasts" longer. With the increasing digitization of the games industry at large, players are now also participating in a more and more prevalent system called "games-as-a-service," or GaaS, which I introduced in Chapter 2. By way of updates and patches, the GaaS model extends the life of a game beyond

its initial release. Here, I propose a reframing of this model as "worlds-as-a-service" to specifically consider the virtual worlds that are impacted by these measures of extension and the challenges by which preservation institutions like the MADE are confronted as a result of the rising dominance of digital distribution and network-contingent worlds.

In Chapter 2, I explained how game companies have shifted over time to a model of providing gaming as a service, rather than as goods. Prior to 2002, for example, when Unreal Championship on Xbox became the first ever console game to receive a downloadable patch update to fix performance issues (Guinness World Records 2021), it was usually the case that, once the game had been programmed onto a cartridge or disc and shipped out to the world, the data was set in silicon. From one day to the next, the data on the cartridge or disc would typically not be altered by developers. However, when game consoles and computers used for gaming increasingly become connected to the internet, everything changed; the video game as an object was no longer static and unchanging. Today, many video games no longer require a physical manifestation to be sold by retailers like Walmart and Best Buy, as they now also exist in digital marketplaces to be purchased online by player-consumers around the world.

With the digitization of the video game economy, developers could take advantage of these new networking capabilities and send updates to games. Where games were once delivered as full products, game development companies and publishers now rely on servers to digitally distribute games to which they subsequently deliver updates over time. These previously unmodifiable objects became immensely dynamic ones, which could be modified, expanded, and improved upon after being manufactured and shipped to consumers. Updates, patches, and expansions are often monetized now in such a way that players have the option to buy into future updates (with so-called "season passes"). Increasingly, these companies also sell games through

subscription models, like the monthly fee that WoW players pay, which contrasts with the previous business model of purchasing a singular game. Ultimately, GaaS works because the game becomes a monetized service that developers provide to players, one that keeps players interested in playing while keeping profits flowing by having players continually pay for incremental updates, changes, and special items. GaaS keeps popular games that players invest in alive and online much longer. However, because these worlds are reliant on servers to operate, if the game company no longer sees that service as profitable, they can discontinue support of the service. Such worlds also fall under the sign of GaaS in that they are often subscription-based services or at least include expansions or microtransactions into which players buy. Therefore, online game worlds that players often describe as being "dead" or "taken offline" are just services that are "no longer supported." For this reason, offline or "unsupported" virtual worlds are not really gone, but in a sort of stasis mode, where the community still exists and the server software (supposedly) still exists, but the clients do not have servers to which they can connect. The service has been suspended, but the world is not gone, suggesting the possibility of a return, a hope for revival and restoration, and a renewal of a service.

I propose thinking of persistent online game worlds as falling under a different, intersecting category: "worlds-as-a-service" (WaaS). WaaS is my own term, generally referring to worlds that are supported by servers, whether behind a paywall or not. While at first glance it may seem a bit redundant, the term does do a different kind of work, shifting from GaaS as a contemporary business logic to WaaS as an analytic. On the one hand, WaaS can gesture toward virtual worlds in general, not just the ones that are explicitly game-oriented. On the other hand, transforming "games"-as-a-service and to "worlds"-as-a-service can signal the importance of sociality to these worlds and highlights the importance of recognizing that not only are these games being updated

through patches and expansions, but they are also social worlds being constantly updated by the users themselves. Here I speak not of user-generated content or in-game items but of user-generated sociality, the behaviors and interactions of the player communities that exist in them that continue to exist in some form or another once the worlds are no longer supported. In this way, my framing of the WaaS paradigm acknowledges the conflicting nature of understanding worlds not only as experiences and communities but also as consumer services supported by servers. After all, virtual worlds rely on servers to exist, and, at least nominally, servers are designed to provide a service. For my purposes, I also propose understanding WaaS as including both digital distribution and network-contingent games.

While understanding worlds as services makes more room for seeing the possibility of restoration, a space of hope and potential, the WaaS paradigm itself makes restoring and preserving unsupported game worlds logistically much more difficult. For one thing, because game worlds are constantly updated, patched, and expanded, it is extraordinarily difficult for preservation institutions to make the call on what version to preserve. Some players might urge institutions to preserve "vanilla" versions as we saw with private server players of World of Warcraft to hold onto an "original" or "classic" artifact. Yet there is also a case to be made for choosing to restore a version of the game with all the patches, all the expansions, and all the possible content added to the world. On top of this conundrum, user-generated sociality means that these worlds are constantly evolving socially as well, begging the seemingly unanswerable question: How do you preserve an experience? However, before these kinds of questions can even be asked, a museum would have to attend to figuring out how to preserve the underlying infrastructure of these worlds, the servers which run on specifically designed server software that is also proprietary code owned by game companies. Often, this server code gets updated over

time alongside the game client and therefore is also an unstable object. Furthermore, some game companies have historically admitted to discarding server code once a game goes offline, as with Blizzard (in the case of World of Warcraft *Classic*) who was forced to rebuild game client software and server software in a piecemeal fashion from partial backups.

In addition, within this prominent consumer model, the notion of ownership has changed, which has significant consequences for any attempts to bring any version of no longer supported worlds online. The increased adoption of providing games and worlds as services follows a general trend in business marked by a transition from a product-centered logic toward a "service-dominant logic" (Dubois and Weststar 2021, 1). The term "servitization" was coined by Vandermewe and Rada (1988) to describe the processes by which businesses have transitioned to offering certain services in addition to or instead of products. Conceived as a way of yielding higher profits and garnering more customer engagements, the adoption of servitization might include a business offering certain "after-sale" services, like maintenance, repair, insurance, or even a more long-term investment in the entire product life-cycle, what are called "product-service systems" like Microsoft 365 (also called "software-as-a-service"). Increasingly, because of the shift to a more customer-centric model of offering services, many industries even beyond gaming have opted for subscription-based services, like Spotify and Netflix, which rely on servers to provide the service of on-demand streaming and distribution of content and media updates. This is what I seek to highlight with the worlds-as-a-service concept—not the particular monetizing strategies involved in the production cycles of games-as-a-service, but rather the reliance on servers, those underlying vital infrastructures on which virtual worlds and their subsequent preservation projects rely that provide the service of virtual world access. The world itself is the service.

Games are offered not as products that players own, commodities to be bought and passed around, but as services that players access through a licensing agreement. Similarly, MMOs and other virtual worlds were only ever worlds offered as a service, even if early versions might have had physical discs that players used to install the client-side software. In the words of Rob Walker, a copyright lawyer who worked closely with the MADE as a part of his work at the Samuelson Law, Technology, and Public Policy Clinic at UC Berkeley, "Basically, we're subscribing to everything and we own nothing… You don't own software at all, you own licensing." Henry Lowood at Stanford confirmed this trend, saying of this "new regime" that, "all the paradigms about what the carrier media are, how software is distributed, who controls it, you know, all those things have completely changed in the last few years and in the direction of: You generally don't own anything anymore."

Even if players have been subscribing to World of Warcraft since its initial release, they have only ever been paying to continue to have access to a service; they never owned the game or the server. They are not copyright holders, and they have never owned any part of WoW. This applies even to the avatars and items they have spent hours crafting and collecting within the world, a condition they contractually agreed to when they signed the End User License Agreement before ever entering the world in the first place. Rob put it this way: "If we take the server down, it's gone… everything's online and as soon as it's shut down, it's gone." Thus, the goals of the museum (of historical preservation) and the goals of player communities (to play these games and inhabit worlds that are no longer online) are both in conflict with the idea of worlds-as-a-service, a governing principle that on the one hand extends the longevity of virtual worlds while also making it more difficult for them to be resurrected.

Case Study: NeoHabitat

To better understand the stakes involved in the reliance of virtual world preservation projects on servers, let us take as an example the steps the MADE has recently taken to restore a virtual world. The MADE has successfully restored one world so far, the world known as LucasFilms' Habitat, released in 1986 for the Commodore 64 PC. While World of Warcraft is sometimes regarded as one of the first "games-as-a-service" games, I would argue that Habitat was technically the first title that might be categorized under "worlds-as-a-service." Habitat made waves when it was released as the first-ever "graphical" virtual world, as up to this point all virtual worlds had been text-based (e.g., Multi-User Dungeons or MUDs). Habitat was a world provided as a service to a paying public—users had to pay $0.08 a minute to access the beta version on the Commodore 64's QuantumLink online service, which made the world accessible to multiple people at once. In 1989, LucasFilms was approached by the IT company Fujitsu, who, according to Stuart Cass from the Reno Project,[8] "wanted to invest in the future of cyberspace" (e-mail message to author, November 2019). As a result, they ended up purchasing the intellectual property rights to Habitat. QuantumLink, on the other hand, was purchased by AOL and eventually terminated in 1994.

Fast forward to early 2014: Alex from the MADE met Chip Morningstar, the programmer of the original server architecture of Habitat, and they chatted about restoring access to the virtual world. Chip handed over the source code for Habitat, and Alex had to contact Fujitsu, who gave the museum permission to make the code open source. With a team of former Habitat team members, former QuantumLink engineers, and museum volunteers, the museum held a

[8] The Reno Project is a website that Stuart started in 2013 with the goal of documenting the history of the virtual worlds that ran on WorldsAway technology. WorldsAway was the successor to Lucasfilm's Habitat.

Figure 3.4: Logging into NeoHabitat for the first time. Source: Author.

hackathon, an event in which the team engaged in collaborative coding and reverse engineering in order to create a server that could communicate with the source code. The team worked to translate from an older programming language called PL/1 to the more modern Javascript and reverse engineered and converted old database backups to a file that could be read by the source code. They even had an original Stratus server, the hardware on which the QuantumLink network software once operated, delivered to them by an enthusiastic volunteer. The server sat in the corner of the room on the day of the hackathon, surrounded by both circulation fans (to keep it cool) and engineers, who huddled around it as they brainstormed next steps. It seemed like all the pieces were in place to restore Habitat without trouble.

Yet even with all the software, hardware, and expertise at their disposal, the team realized they were missing an essential piece of the puzzle: third-party QuantumLink billing server

software code that was technically owned by America Online (AOL), which is now owned by Verizon. While AOL initially showed signs of cooperation, ultimately Verizon refused to hand over this missing code, and the project was put on hold for two years until Randy Farmer, who first wrote the original client for Habitat, decided to take matters into his own hands and fully wrote a modern Habitat server on his own time. Three years after the project start date, Habitat has now been reborn as NeoHabitat, and is publicly accessible to play online. NeoHabitat's success was reliant on the original developers being alive and on board with the project; yet even with all the tools and support at their disposal, the project almost did not come to fruition as a result of one critical piece of code being locked away by a corporate entity. As the server is the lifeblood of the world, the world could not be accessed without this missing code. In the next section, I explain how, when confronted by the limitations posed by worlds-as-a-service, especially regarding game and server ownership, the MADE has made use of the modifiability of copyright law to make strides toward accessing these proprietary servers and enlivening these worlds once again.

Reimagining Copyright Exemptions as Mods

Normally, we might think of the written word of law as more or less stable doctrine, though the law and how it is interpreted can and often do change. Courts provide readings of the law that may bolster or nullify existing laws. Legislators can introduce and pass new laws that alter existing laws by amending or replacing them. Copyright law is a unique class of legal doctrine in the US for which certain exceptions can be made in special cases, a rule that is built into the structure of the law itself. The MADE has made use of these "copyright exemptions" in order to break down certain barriers presented by contemporary copyright law and the contingencies of

worlds-as-a-service that make virtual world preservation particularly difficult. In this section, I draw comparisons between exemptions and modding to propose the idea of the copyright mod, an act of resistance against the system of copyright that works from within it to make practices related to modding more easily accessible for the purposes of restoring offline virtual worlds. In this way, the MADE seeks to change the relations of control between fans (including players and preservationists) and game companies by participating in the digital rights movement toward a free and open culture of participation.

The Digital Millennium Copyright Act (DMCA) was introduced by media industries and passed by Congress in 1998, allegedly as a measure to bring copyright law into the digital age, though Gillespie (2004) has argued that this dramatic addition to copyright law was put in place as a result of corporate panic about digital piracy. Gillespie has written that this act is only nominally about copyright, regulating not only limitations of copying but also "every facet of the purchase of use of cultural goods" (239). Among the many controversial aspects of the DMCA, one of the most troubling lies in Section 1201, which contains language that prohibits the circumvention of certain technological protection measures (TPM) that developers of digital works design into the software itself. TPMs are put in place essentially to control access to the software and determine what users can and cannot do with it. According to Section 1201, to circumvent TPM is "to descramble a scrambled work, to decrypt an encrypted work, or otherwise to avoid, bypass, remove, deactivate, or impair a technological measure, without the authority of the copyright owner" (DMCA 1998). As an example, circumvention as described here would include the work of private server gamers who work to reverse engineer server code or get around encryption locks on segments of server code. Gillespie (2006) refers to the introduction of TPM and the anti-circumvention enforcement under the DMCA as a new kind of

legal regime, marked by a dependence upon technologies themselves, rather than law, to regulate access and use; in other words, a shift from "the 'code' of law to the 'code' of software" (1).

The broad reach of the policies introduced by the DMCA to copyright law have been widely criticized. Perhaps its greatest critics have been proponents of the intersecting free culture and digital rights movements, groups of activists who feel that the DMCA and other regulating structures run explicitly counter to their belief in "a culture that is participatory in mass-cultural products" (Postigo 2012, 7). Such a culture is charactered by mutuality, solidarity, and interactivity and includes people increasingly claiming the right to be heard rather than being spoken to (Deuze 2006). Participation in the media industry and its products is already happening in earnest (Jenkins 2006), and modding is a key example of this kind of cultural participation around games in particular. As discussed in Chapter 2, modding is "any form of noncommercial modification of a proprietary digital game" (Unger 2012, 514). Though the actual ends may be distinct, both modders and preservationists at the MADE engage in practices that extend the lives of games, such as manipulating and recreating code and refurbishing and tinkering with hardware. In this section, I rely on Unger's definitions of mods as "products of collective intelligence and skills" and modding as "a form of culture where fans actively engage with cultural artifacts and change them within," specifically aligning such activities with the MADE's practices, especially regarding server recreations and hackathons held for *NeoHabitat* (Unger 2012, 514). Yet mods themselves have been the source of much copyright controversy, especially because they involve people tinkering with proprietary source code. Modding as a subversive act of "user-led innovation" (Scacchi 2011) and institutional virtual world preservation as perhaps "user-led restoration" in some senses both seek to work toward this free digital culture of open participation by user-consumers.

According to activists and organization in the digital rights movement, the key to achieving this culture certainly involves promoting cultural change, but critically, it also means broad technological and legal change through both traditional political institutions and forms of extrainstitutional protest (Postigo 2012). Both institutional and extrainstitutional avenues of pursuing changes to the existing system rely on incremental change toward a future of a more free and open participatory culture that values the cultural commons and cultural ownership. For the MADE to ensure that the DMCA does not limit their work in the future—as was the case with NeoHabitat—they have engaged in the legal work of such incremental change through what I will refer to as "copyright mods." As laid out in Section 1201, the DMCA allows for the Librarian of Congress, under the guidance of the Copyright Office, to, in a sense, "modify" the law to permit the legal circumvention of the anti-circumvention prohibition for some classes of works and some organizations, like non-profit libraries, archives, and educational institutions. In special cases, the Copyright Office will hear cases and comments from proponents, opponents, and the public and deliver rulings granting certain "exemptions" that allow institutions like the MADE to develop workarounds to access TPM-protected content and devices in the service of certain non-infringing uses of particular classes of works. These exemptions can be renewed and even expanded every three years through the same rule-making process. Therefore, the DMCA itself offers a specific avenue for copyright reform, albeit temporary and renewable, that works from within the system of copyright law.

Considering this idea that people can reshape copyright law in the service of restoring access to and subsequently preserving online game worlds, I propose thinking of copyright law as modifiable, or moddable, and thinking of copyright exemptions as mods in the same sense that gamers use mods to extend the lives of games. These "copyright mods" are not permanent

Figure 3.5: The MADE's Twitter feed, featuring tweets about the DMCA exemption process. Source: Author.

changes to the law, but rather small "modifications" that "tinker" with the law to shape it to certain needs. They are products of the collective intelligence and skills of users of digital technologies, and they change the coding of law from within. Importantly, what copyright mods do is create space for incremental change, much like patches or updates to the source code of copyright law. In the same way that Debeauvais and Nardi (2010) have described online game expansions as mods to the original game, copyright exemptions are like mods of copyright law, expanding what is possible in the face of limitations presented by current legal doctrine. In essence, they create new "versions" of copyright law that allows new classes of works to be preserved. Copyright mods are essentially updates to the system and move copyright law closer to being in alignment with the evolving space of digital technology innovation. These mods can even become permanent expansions upon which other mods might be built. For example, the Internet Archive successfully argued for exemptions in 2006 and again in 2009, at which point

the Copyright Office extended indefinitely the Archive's ability to make available software programs and video games that were originally distributed in formats that are now obsolete.

In 2015, the Electronic Frontier Foundation successfully proposed and made the case for an exemption from the Copyright Office to allow museums, archives, and libraries to circumvent TPM on video games in order to make them playable, so long as the copyright owner has ceased to provide access to the server. Notably, this exemption applied only to games that are played locally but require user authentication through an external server. The Copyright Office chose to omit online multiplayer games from this exemption. Then in 2017, in advance of the 2018 round of decision-making regarding exemptions, the MADE partnered with a legal team from Berkeley, as well as other experts, to propose an exemption that would allow them to expand upon the 2015 exemption to include MMOs and other game worlds which required server access to be able to play the game over an internet connection. The Librarian decided in favor of a much more pared down version of what the MADE had proposed, with several caveats such as the prohibition of server recreation (through processes like reverse engineering), the requirement that the server code must be obtained legally from the developer or copyright owner, and that all preservation activities must be confined within the premises of the museum, archive, or library involved in circumventing TPM for these purposes. In what follows, I offer a very brief overview of the two exemptions, framed as a MMO patch log, using the language of the Copyright Office.

Section 1201 Patch Log - Video Game Preservation

Patch 2015 37 CFR §201.40(b)(8)

8. Proposed Class 23: Abandoned Software—Video Games Requiring Server Communication

Where access to an external server necessary to facilitate authentication for local gameplay is no longer provided, circumvention is permitted to:

- Restore access for personal gameplay on a personal computer or video game console; or
- Allow preservation in a playable format by an eligible library, archive, or museum. Such activities by libraries, archives, or museums must be carried out without commercial advantage and the video game may not be made available outside the physical premises of the institution.
- This is limited to "lawfully acquired video games requiring server communication."

Patch 2018 37 CFR §201.40(b)(12)

8. Proposed Class 8: Computer Programs—Video Game Preservation (extension of previous patch, plus an expansion)

When access to an external computer server necessary to facilitate authentication for gameplay is no longer provided, circumvention is permitted for purposes of restoring access:

- For personal, local gameplay; or
- To allow preservation in a playable format by an eligible library, archive, or museum (including discontinued video games that do not require access to an external computer server for gameplay), where carried out without any purpose of commercial advantage and without distribution outside the physical premises. Includes circumvention of computer programs used to operate video game consoles to engage in preservation activities.
- This is limited to "Video games in the form of computer programs, lawfully acquired as complete games" meaning the client and server code are acquired together.

The process of gaining the exemptions involves a time for comment from all relevant parties and a roundtable hearing among members of the Copyright Office, the opponents to the proposal, and proponents of the proposal. For the MADE and other groups in the digital rights movement, the process is important not only for extending the realm of possibility for video game and virtual world preservation but also for extending the ways in which particular institutions are perceived by the government moving forward. A key example of this comes from the hearing, in which the Electronic Software Association (ESA, the opponents) launched several critiques of the proposed exemption and of the MADE as an institution. For instance, the ESA charactered the MADE as "a clubhouse where people gather to play games" and repeatedly asserted that the goals of MADE are to enable recreation and gameplay, rather than preservation for scholarly purposes. With the granting of at least some version of what the MADE proposed, the exemption also does the work of legitimizing the MADE as a place of both scholarship and recreation. After all, according to game archaeologist Andrew Reinhard, "it's ridiculous for developers or the ESA to think that somehow we can divorce fun from scholarship" (e-mail message to author, December 2018).

Through the work of generating the new copyright mod, involving the push and pull of all entities involved in the rule-making process, the MADE was successful in "breaking down barriers" as Alex put it, ones put in place by the DMCA that protect copyright holders while preventing the fulfillment of important preservation projects that protect cultural heritage. In arguing for an understanding of the MADE as a place of scholarship, rather than just recreation, the hearing made room for the MADE to further solidify its status as a legitimate institution, granting further legitimacy to its efforts in the future. For Alex, this all was a step in the right

direction toward a more open future, a small modification made possible through user-led action and innovation. However, as the current exemption does not allow for server recreation and the multiplayer network of an online game or virtual world must be confined within the walls of the museum, the mod will need extensions as it is incomplete, according to the legal team at Berkeley, in its current state. Nevertheless, the power of users to reshape the conditions under which they may restore and preserve online game worlds is shifting as more and more modifications get added, extended, and expanded. Ultimately this started with the museum dealing with online games that require certain authentication servers, but from this small seed grew larger consequences, opening up further questions of institutional legitimacy and cultural ownership and taking incremental steps toward perhaps broader technological, legal, and cultural change.

Conclusion: Ephemerality

On August 27, 2020, the Twitter account for the MADE posted a tweet that read, "As you may have heard, we will be closing our current space and moving our collection into storage. Do not fear, we're not going away forever! Just until we can create the video game museum of our dreams." Due to the ravages of the COVID-19 pandemic, the MADE was no longer inviting visitors into their space, and as a result of a dearth of funds, the MADE was forced to pack up its games, hardware, and ephemera and go into a stasis mode. In a series of tweets, journalist and activist of copyright liberalization Cory Doctorow urged readers to donate to the shuttering museum, writing:

> In 1991, [Bruce Sterling] gave a landmark keynote at the Game Developer's Conference in which he lamented game developers' technological amnesia—the fact that old game platforms disappeared and when they did, they took the games that ran on them with them. 1/

Figure 3.6: A view of the MADE in its final days. Source: Twitter, Cory Doctorow.

> Imagine an art form where anything more than a few years old is inaccessible without specialized equipment, and after a decade, most of it disappears forever! 2/
>
> Since Sterling's talk, preservation efforts have sprung up to ensure that the history of video games isn't lost. One of the most important of these is [The MADE], a museum that preserves both hardware and code. 3/
>
> They even secured a DMCA exemption to let them crack games so they'd remain playable. 4/
>
> As you might expect, the plague has been hard on The MADE. They are mothballing their entire collection—a unique, important, vital history of an otherwise ephemeral medium… 5/

Just as the game industry's pattern of abandonment has highlighted the ephemerality of the video game, the closing of the MADE highlights the ephemerality of the video game museum itself and, with it, the ephemerality (or even "temporal instability;" see Chapter 2) of virtual world preservation. According to their copyright exemption, "As with games generally, the recommended exemption for preservationists does not extend to circumvention to enable online

multiplayer play, which is an activity that would extend beyond the walls of the preserving institution." Still, virtual world preservation projects must be confined to the space of the museum. But what if there is no sanctioned museum space in which to do this work? What happens to abandoned worlds in stasis? As of this writing the MADE is in a similar stasis, with all preservation projects on a temporary hold as they raise funds and plan next steps. There is a powerful symmetry here, one that highlights the "unexpected fragility," as James Newman (2012) puts it, of video games but also of preservation institutions.

We are in a world of ever-increasing digitization, including the virtualization of games and the prominent adoption of providing games and worlds as services. As disc drives disappear and servers continue to virtualize, how will our relations with the materials of gaming change? In the chapter that follows, I build on this point, exploring the very materiality of servers themselves and their fate once infrastructures undergo processes of virtualization. Servers that no longer serve their original purpose change hands and serve new purposes, reflective of their lives as components of world-generating infrastructures. Some players have come to value these obsolescent artifacts of past virtual worlds as nostalgic mementos, as keepsakes from their experiences, and as symbols of community and love. The next chapter is a culmination where the layers of server meaning fall back on themselves, revealing at the same time the server as a place, as a carrier of memory, as an artifact of digital heritage, and as an emblem of changing forms of technological ownership in the virtual age.

Chapter 4

The Enchanting Afterlives of Decommissioned Servers

Up to this point I have discussed at length how specific groups of nostalgic players and particular preservation institutions are working to preserve or restore virtual worlds. I have focused on the efforts of groups whose end goals have been to see these worlds brought back to life, the connections between the software and hardware components reproduced, and the capacity for multiplayer play brought back online. The memory work in the space of video game and virtual world preservation that I have discussed thus far has been the labor of resurrecting or resuscitating lost worlds, whether complicated by the existence of multiple versions, obsolesced due to hardware limitations, or "unplugged" completely. In this chapter, I move away from discussing the preservation and restoration of virtual worlds themselves, turning my analytical gaze to the afterlife of the server hardware used to power these worlds. What can we learn from people's engagements with servers that have been turned off and are no longer in use?

In 2011, Blizzard Entertainment auctioned off decommissioned WoW server hardware, known as "server blades." On the surface, this process benefitted a charity and put the otherwise trashed computer waste to good use. However, it also introduced new, fascinating commodities to players, who bid upwards of hundreds of dollars per server at these auctions. But why? What is it about server blades that players find so valuable and meaningful? To find out, I surveyed approximately 80 people who won one of these auctions, interviewed 20 of them, and read through dozens of forum posts on Reddit and similar sites, following conversations about the blades and what they meant to people, even to those who did not actually own one. Through this process, I have found that the server blades do not always mean the same thing to different

players, and players' reasons for wanting to own one range widely. In this chapter, by juggling this multiplicity of intersecting meanings, identities, and relations associated with these artifacts, I argue that there is something unequivocally enchanting about dead hardware.

I use the word enchanting for these difficult-to-define sets of affects primarily because players frequently had a difficult time explaining exactly what gave these objects so much value, prestige, and interest. Several players said there was something "magical" about the way servers work or that they had been in some way captivated by seeing them for the first time, sometimes brought to tears. "Enchantment," the quality of being under a spell or filled with delight, is one productive and generalizable way to conceptualize the fascination many players have with these objects. In choosing enchantment for this chapter, I am also nodding to Jane Bennett's (2016) conception of enchantment as a characteristic of moments of wonder in everyday life, as "an affective force" (1) that is unexpected, surprising, and visceral or as a "pleasurable feeling of being charmed by an as yet unprocessed experience" (5). For Bennett, enchantment is not so much a way of knowing or believing, but rather feeling, a form of "active engagement with objects of sensuous experience" (5). Similar to the way in which Harvey and Knox (2012) drew upon Bennett's earlier work on enchantment to argue for an understanding of roads as retaining an infrastructural promise for the future, I draw upon this notion of enchantment to argue that server blades are "more-than-material" (523), abandoned and repurposed infrastructure representing a promise for the recall and retention of the past into the future.

In other words, servers are enchanting because players are nostalgic. Throughout this dissertation I have written about the ways in which nostalgic yearnings for gaming's past have acted as driving affective forces for players in their interactions with private servers and abandoned worlds, but the server blades are unique in that they represent a moment when the

Figure 4.1: One of the four server blades that ran the Proudmoore realm. Source: Blake, interviewee.

virtual world as a set of a places and memories literally materializes and enters the player's personal home and collection as a souvenir. This is especially poignant in the present moment, when more and more of our lives become digitized or virtualized, as material remnants become cultural artifacts to which memories and affects "stick" and carry that significance as they circulate (Ahmed 2010). Through describing the enchanting nature of server blades as material artifacts of nostalgia, I also describe how they became marked as objects worth preserving and holding onto and as artifacts to be cared for, as well as how players in various ways have taken up the tasks of stewards of history—just as they have been doing for years, even before museums like the MADE took up the same tasks. Ultimately, in this chapter I argue that, although people

associate different meanings with server blades and have different rationales for purchasing them, what unites these meanings is that the server blade is a material commemorative manifestation of a player's entire experience playing and socializing on that server; it is an "affectively charged" object (Herrmann 2015), one that encapsulates and symbolizes a collection of moments in time while also serving as a nostalgic memorial and souvenir.

I begin this final chapter by providing background knowledge regarding the WoW server blades—commemorative objects that have been purchased and re-circulated over the last decade—including how they were introduced and designed by Blizzard.[9] One the one hand, my goal here is to paint a detailed picture of what these blades look like and the context of their distribution. On the other hand, I want to illustrate how Blizzard communicated to its player base that its used servers were objects worthy of preserving and collecting, especially through literal inscription onto the surface of the server. In the four sections that follow, I extend this analysis to the attitudes, affects, and activities of players, exploring how they variously make sense of and value these objects as nostalgic artifacts, ones imbued with social, memorial, aesthetic, spatial, and historical value. In each section, I consider what impacts the ownership of these obsolete pieces of hardware has on players, as well as players' relationships to each other, the game, the company, and the past. The final section addresses the issue of infrastructural virtualization in the context of WoW and how the changing material form of server blades has impacted this style of virtual world commemoration as well as player relationships to game companies.

[9] Aside from press materials, online discussion, and a couple of short online articles, little has been written on these server blades. To give due diligence to the complexity of meanings, practices, and contexts surrounding them, ample attention in this chapter is devoted to description and historical background.

Breathing Life into Dead Hardware

As Beckstead et al. (2011) point out in their study of war memorials, "much of human life revolves around objects that are, at first glance, intrinsically non-significant, but which become highly valued as a result of cultural processes" (193). Drawing from work by virtual world preservationists, scholars, and my own interlocutors, I have shown throughout this dissertation that virtual worlds pose a number of seemingly insurmountable challenges to their own preservation and longevity and that specific communities and institutions are working to find new ways of saving online games, now understood by players and institutions alike to be culturally and historically important. Obsolesced WoW server blades getting sold at auction represents yet another novel way of preserving virtual worlds, uniquely breathing new life into virtual world hardware while also animating players' imaginations and memories of the game world. In this section, I detail the history of the blades themselves, explaining how, through contextual framing at BlizzCon and in press materials, Blizzard has marked otherwise forgotten and trashed server hardware as commodities worth purchasing, cultural artifacts worth preserving, and valuable personal mementos for players.

At BlizzCon

The hype over the WoW server blades began to swell in October 2010 at BlizzCon, Blizzard's annual fan convention, held at the Anaheim Convention Center, just under 20 miles northwest of Blizzard Headquarters in Irvine, California. Every year at this convention, fans gather to share their passion for Blizzard's products, attend panels to discuss games and learn about upcoming releases, purchase official merchandise, and show off their cosplay of characters and creatures from Blizzard games. On the main floor of the convention that year, amongst the bustle of

enthusiastic fans and elaborate displays, Blizzard had arranged an exhibit featuring one of the four blade servers that helped to run the WoW realm called Dalaran, which is just one of hundreds of realms that players have occupied since the game's inception in November 2004.

The server blade was presented unmarked and behind a large glass enclosure, sitting next to an empty server rack—a piece of technical architecture that originally held a number of these blade servers—from an official Blizzard data center. Next to this display, they had posted a sign that read, in bold lettering:

> We preserve the retired server blades that hosted WoW's realms in our archives. Enclosed in this display is an actual blade from a WoW server rack, which hosted the Dalaran, Dalvengyr, and Black Dragonflight realms in years past. In the near future, a limited number of blades like this one will be going up for auction and the net profits will be donated.

At base, this sign served to plant the seed, in the minds of attendees at least, that soon players might be able to own one of these objects. And with the display of the large server rack standing next to the blade, the infrastructure of WoW—albeit empty and decontextualized—was for the first time publicly made visible for players to see and inspect for themselves.

However, another more curious seed that had been planted that day, at least for BlizzCon attendees, was the idea that used and unplugged servers, ones that would otherwise be discarded and replaced in other contexts of data hardware upgrades, were in fact historical artifacts that Blizzard seemed to value so much that they had been preserving them for some undisclosed amount of time and in fact storing them in "archives." This sign discursively marked servers as objects worthy of holding onto, imbuing them with a historical significance that many attendees understood, perhaps especially those players who played on the Dalaran realm who might feel a more personal connection to the server blade on which they played.

At Auction

A year later, in October of 2011, just seven years after the birth of the game, Blizzard announced that they would be auctioning off a selection of "retired" WoW server blades. In a post on the official WoW website, Blizzard explained that they had decided to implement some major changes to their server architecture. Rather than disposing of the decommissioned server hardware that had helped to run the game world for many years, they would be entrusting players with their care, auctioning pieces of this infrastructure off to benefit the St. Jude's Children's Research Hospital. Blizzard has a long history of managing annual (sometimes biannual) WoW fundraising events to benefit charity. Typically, these events work by encouraging players to purchase in-game items or virtual companion pets, with the knowledge that the proceeds will go to a non-profit organization like the Make-A-Wish Foundation. A notable example comes from November 2012 when WoW players were given the option to purchase a pet called Cinder Kitten, a tiny virtual cat engulfed in flames and wearing a helmet; thanks to widespread player participation in this sale, Blizzard was able to make a charitable donation of over $2.3 million for the American Red Cross's Hurricane Sandy relief efforts.

In October 2011, over two thousand server blades representing about 500 realms (for years, each realm had four dedicated server blades running it) were put up for auction on eBay in both the US and in Europe, in several waves over the course of four weeks, with final bids ranging from $100 to over $1000. In interviews, players explained to me that lower population servers had lower final bids and vice versa, most likely as a result of higher population servers having more players actively placing bids. Eventually, the server blade auctions allowed Blizzard to

donate over $330,000 to the St. Jude's Children's Research Hospital.[10] Interestingly, the 2011 server blade charity event is an outlier in Blizzard's history of charity events in that it is the only time a physical object was up for sale, yet the physical matter of the server blades carries significance well beyond this historical fact.

Blizzard made these servers valuable to players through commodification, turning them into commemorative collectibles by drawing upon players' memories and nostalgia for WoW. According to Bach (2015), nostalgia can be thought of as a "collective phenomenon that emerges through the effects of commodification, which transforms everyday objects into nostalgia objects and thus makes them capable of transmitting cultural knowledge" (124). Commodification can mark items as valuable, worthy of preserving, and worth purchasing. It can transform objects into symbolic carriers of meaning, moving nostalgic commodities into the realm of "secondary production" (de Certeau 1984), where consumers attribute new symbolic meanings to them. It is through this process of commodification that Blizzard extends their assertion that the server blades are essential pieces of their history, further augmenting the value players attributed to them.

Server Aesthetics and Memorial Inscription

Now let us take a close look at what these things actually look like. After all, it is through "the texture of a thing's aesthetic surface that things are experienced" (Alexander 2008, 782). The server blades that were advertised and sold were not simply unmarked slabs of metal and silicon that Blizzard planned to box up and send out to the highest bidders. They were even unlike the

[10] The auctions were so successful that the developers of another popular online game, EVE Online, emulated Blizzard's efforts by crafting and auctioning off their own server blades in 2015 to benefit Barnaspítali Hringsins, the Icelandic Children's Hospital.

Dalaran blade that had been showcased at BlizzCon one year prior. Instead, they had been refashioned into something more than just a server blade. Looking at the server blade straight on, the right side of the surface is all circuit boards and RAM cards, a complex assemblage of hardware computing components put in place by Hewlett-Packard (HP). This part of the server blade remains a black-boxed mystery to most players; despite being completely visibly exposed, some understanding of the technical operation of computing hardware is required to make sense of this otherwise purely aesthetic feature. The hard drives had been removed from all the blades, so no data remains stored in them. Over the top of the circuitry was placed a thin sheet of plexiglass with the WoW logo delicately etched into the center of the surface, with magnets along the edge to attach the transparent cover to the blade.

However, what really distinguished these objects from any given HP server blade and transformed them into valuable commodities was on the left side, where designers had placed what official Blizzard press releases referred to as a commemorative plaque. Typically found affixed to a wall, statue, or building in public spaces, commemorative plaques have been used around the world to mark something or someone as historically significant and worthy of remembrance and thus, by association, make the location of the plaque a place worth visiting. Commemorative plaques frequently feature descriptions of historical events and important dates (such as birth and death dates of a figure being memorialized), providing information to visitors from any background and guiding their interpretations of memorials and landmarks toward a shared understanding of the history of the site (Foote and Azaryahu 2007). The decorative commemorative plaque affixed to each server blade had a few key components. Below the WoW logo at the top was the name of the realm the server had helped to host (e.g., Azuremyst), with smaller text underneath listing the start and end dates of the period during which the server was

Figure 4.2: A close-up of the commemorative plaque on the left side of a Wildhammer server blade, showing the dates of operation, the inscription, and developer signatures. Source: Will, interviewee.

in operation (e.g., "October 24, 2008 - June 15, 2010"). At the bottom was placed an assortment of etched signatures from key WoW developers, like Mike Morhaime (cofounder and then-CEO of Blizzard) and Jeffrey Kaplan (vice president of Blizzard), names that many players recognize and respect. Despite these autographs being copied renderings rather than unique signatures on each blade, seeing their names on the plaque gave some players comfort—a sense that the blade was "from" the developers—and also added value to the blade, just as an autograph from an actor might enhance a movie poster.

Perhaps the most impactful aesthetic feature of the plaque, and the one players pointed to and discussed most frequently in interviews and in public online forums, is the inscription engraved

in the center, which reads:

> Blizzard has carefully preserved and archived our retired server blades, releasing only a limited number for a noble cause. To us, this server blade is more than just hardware: within the circuits and hard drive, a world of magic, adventure, and friendship thrived. From fishing in quiet lakes to defeating Arthas in Icecrown Citadel, this blade was home to thousands of immersive experiences across the world of Azeroth and beyond. We thank you for the safekeeping of this important part of our history.

At first glance, this inscription leaves behind a number of breadcrumb trails to follow in terms of identifying why the server blades are important to players. It references players' play experiences by referencing activities commonly performed at locations in the game world and waxes sentimental by referring to the server as a "home" where "friendship thrived." One player, Wren, told me he did not know that the blades had an inscription on them when he placed his bid and won his blade. When he received it in the mail and read those words for the first time, he said he teared up because, "Well it's true, like you, I spent so much time in those circuits, with those people." One forum commenter compared the inscription to poetry, explaining, "I got chills when I read that plate. That truly is a great piece." These expressions of WoW players at the sight of the inscription powerfully exemplify the enchantment players feel toward these objects. Conveniently, "enchantment" is also an internally coherent term within WoW—it is a learned trade skill that allows one to improve in-game equipment using the magical residue of disenchanted items. To sell an enchantment, one must put the spell onto a piece of Enchanting Vellum, an object created through a profession in WoW called "Inscription," practiced by Scribes who "weave words of power." Inscription "allow[s] the enchantment to be treated and moved around as a physical item" (Wowpedia 2021). It might follow then that the inscription, the powerful words etched onto the surface of the blade, is paramount to the ability of the objects to carry more affective weight, which allows them to enter circulation as a commodity.

In her work on the reconstruction of urban Vietnam, Schwenkel (2013) offers a way for us to

think about how enchantment can be controlled or engineered in some ways and how perception of a phenomenon can be altered and feelings shaped by the way a process of remembrance and preservation is purposefully designed. Schwenkel analyzes how the Vietnamese government has "harnessed" certain "socialist affects" through material ruins in order to "produce new, feeling subjects committed to the work of socialist nation-building" (2013, 252). Similarly, Blizzard has harnessed certain affects through textual devices, such as mentioning friendships and specific locations in WoW, to contextualize the blade as deeply personal and trigger or engineer an affective response of enchantment from players. Furthermore, in interviews, players frequently used terminology and phrasing from the inscription (such as "within the circuits" or "more than just hardware") to describe how they value the blade within the context of their own life history and experience with WoW. These words printed on every server blade have had an impact on the myriad ways in which players relate to the blade, the game, their memories, and each other. However, what is at work here is not just affective engineering, but also what Middleton and Brown (2007) call a "deepening" of memories, where through the objectification of memorials and inclusion of resonant narratives, social and individual memories meet and expand, having a strong impact on people in their life course. In part through the commodification and objectification of the server, players might feel a deeper connection to their memories of the game, their guild mates, and their experiences.

In these preceding two sections, I have described how Blizzard transformed these otherwise mundane objects into valuable commodities and meaningful artifacts through repackaging and inscription, pointing to the personal experiences of players and identifying the server blade as the place that hosted those experiences. I have briefly explained how many players drew upon the rhetoric laid out by Blizzard to explain why the server had value, indicating how I understand

their affect to have been in some ways directed and their memories "deepened." The following two sections expand on this, drawing upon data from interviews, which reveal a complex array of ways in which players find the server desirable and important to them and their personal history. When I first learned about the blades, my first question was: Why are players buying these things? In other words, what is it that gives these objects value and what makes them worth owning and preserving? While they are not valuable to everyone (e.g., to quote one dissenting forum commenter, "It's just hardware"), in the next two sections I explore why these things matter to the people that do care about them, taking a closer look at the affective ties symbolized and strengthened by the server blades. In the first of these two sections, I outline their significance as pieces of infrastructure, especially to players who also have worked with servers occupationally. In the second, I focus on the values generated by players' understandings of server blades as worlds in and of themselves.

Fascination with Unplugged Infrastructure

Because players have been taught over time to see servers as the power source of virtual worlds, when the metaphorical "plug" is pulled, players imagine themselves being untethered from the server. This understanding that players have of the connective tissue between servers and network connectivity is further reinforced in "moments of failure" (Graham 2010), when the infrastructure of virtual worlds "surfaces" to the level of consciousness (Schwenkel 2015). Servers reveal themselves to us on the user end of the network in the form of messages displayed on a user device's screen. In the context of online games, that text might read something like "you have been disconnected from the server" as a player is yanked from the game world. But what can happen when the server is unplugged and put into circulation outside of a data center?

What new kinds of understandings, practices, and feelings might this generate? What does the distribution of unplugged infrastructure do in the world?

I argue that there is something unequivocally enchanting about server blades out of place. The very idea that these blades were once housed in a data center in some undisclosed location might make them seem like forbidden fruit, once out of reach and now in plain sight. In the context of WoW, players do not discuss servers on a daily basis. To quote one poignant commenter on a forum post regarding the server blades, "What the fuck is a server?" Players do not really think about servers except when they malfunction or when talking about moving from one server realm to another. Part of the enchantment of the server blades is that they are surfaced infrastructure, once hidden or backgrounded and now ready-at-hand (literally in-hand). From the standpoint of the user sitting at the computer, what the server does can feel like magic, as Emery explained:

> I understand the reality of: I have a front-end client, there is a back-end server, there is communication going on between the two of them, and, on the server, magic things are happening with software that make this all come together, and I get something happening on my screen.

Like Emery, for the majority of players WoW servers have remained a black box, or "simply used and not entirely understood as technical objects" (Hertz and Parikka 2012, 427). And this sense that servers are doing something magical dates back to the days of MUDs in the 1990s, when special users—those who acted as governing forces and had direct access to the MUD's servers—were known as "Wizards."

Having little direct technical interaction with WoW's infrastructure, many players have for some time fantasized about what it might look like. In 2009, Gamasutra reported on a Game Developer Conference keynote by lead WoW developers where they gave audience members a behind-the-scenes look at the inner workings of various technical aspects of WoW, working to

separate "the 'universe' of WoW (its design, production, and implementation) from the in-game universe of barbarian shamanism and magical power" (Staff 2009). But it was not a "look" at all. While some comments praised the keynote, several lamented not getting a visual depiction of the servers that Blizzard was using to operate WoW. For example, one commenter asked, "No pictures of a datacenter?" Likely due to a desire to understand what makes WoW "tick" or just to uncover something out of sight, WoW players have had this fascination with servers and data centers for years.

Unlike public works infrastructure, such as roads and bridges, and telecommunications infrastructure, such as cellphone and radio towers, that are in plain sight, cyberinfrastructures like data centers, routers, and servers remain largely out-of-sight for everyday users. And while many players have expressed a desire to pull back the curtain and expose the otherwise unseen magic of servers, Blizzard had for some time kept the inner workings of WoW's infrastructure intentionally vague. In the 2014 documentary *World of Warcraft: Looking for Group* (2014), these players got their wish. The filmmakers included a segment where Robert Van Dusen, the Vice President of Blizzard's Global IT department, brings the camera crew into one of the data centers and pulls a server blade out of a rack to show it off. Before doing so, he explains: "There is a high level of security. Whether it's malicious or accidental, we want to make sure that people stay outside of our areas. This is actually the first time we've actually let cameras into our cages." The mystery, security, and exclusivity of the server blades is likely a big part of what makes them so appealing as collector's items.

Yet for those players who also happen to work in information systems as a career, their daily interactions with servers color their perceptions of the WoW server blades. As components of infrastructure, servers must be cared for and managed by a class of maintainers. According to

Young's (2021) review of scholarly work addressing the comparisons between users and infrastructural maintainers, "maintainers inhabit fundamentally different perspectives to the user on the nature of technology itself" (13). In other words, by being intimately involved with the inner workings of infrastructure, these individuals develop a particular view of servers that strongly differs from the average player's view. The players I interviewed who worked in systems administration, technical support, or programming each expressed that they felt a unique connection to the server blade because of their occupation. Of course, none of them worked with these particular servers, but they attributed this bond not only to their personal attachments to the game and the importance of the friendships they made while playing, but also to their affective relationship to this type of hardware, which they came into contact with on a daily basis. Even the developers of these worlds can have similar affective connections—for example, Philip Rosedale, former CEO and founder of Linden Lab, has a Second Life server blade hanging up in his office.

Dakota told me that it was important that he bid on one of the blades because, "they're always someone else's at work. You know, they're always a customer's or client's blade server that I was working on… [the WoW server blade] is kind of useless and it didn't function, but it was nice to have one of those as my very own." This suggests that the server blades disrupt a dynamic in which an ethic of infrastructural care that exists in the workplace does not typically extend into the home and that there may be some desire for this connection. Spencer put it this way:

> As an IT system admin I can relate to this. When you maintain, service, and uphold a piece of hardware for decades, you form a sort of bond with it. When you know that this exact clusterfuck of transistors serviced thousands and thousands of people for decades and you finally turn off the lights, there is a sense of sadness. I bet many feel the same about their cars, boats, trailers, and other equipment they've used for a long time. Nostalgia, man.

Servers are temperamental objects—they can experience "stress," and they can be "overwhelmed" and crash. They need to be cared for, and maintainers tend to form bonds with them as a result. It is for this reason that, even for those who did not work personally with the WoW server blades, some IT workers can still appreciate the sentiment and indeed feel that connection through the hardware. They typically describe the feeling as a particular kind of nostalgia for their experiences both with systems and with the game.

The commemorative server blade also carries special aesthetic value for server maintainers, in part due to their deep admiration for and fetishization of computing hardware. For example, some argued that they appreciated the blade as an art piece that has only gained value over time, even acknowledging their unique perspective as maintainers. Carmen explained it this way: "To me, having Sunstrider [the name of a WoW realm] on my wall is like having a Monet or a Rembrandt on my wall… But that's a relative thing obviously. I'm a systems administrator, geek, programmer and an ex-WoW player." Simon (2007) discusses the special relationships between gamers and their machines, that hardware can become foregrounded in certain communities and treated as spectacle. For example, many personal computer modders who are also gamers would bring their modded computer cases to LAN parties, where the attendees would "revel in the material guts of their computer systems," privileging the visual presence of hardware, a "machine aesthetic" that becomes essential to the overall gaming experience (Simon 2007, 175). This enchantment with looking at circuit boards and RAM cards is further evinced by the popular subreddit r/ServerPorn in which posters share photographs of their server set ups and wire cable organization schemes.

For most of these players, occupation is but one source of meaning in a complex constellation of meanings they draw upon when interpreting these objects. Emery told me that he

Figure 4.3: Circuitry under the skin. Emery showing off his tattoo. Source: Emery, interviewee.

decided to buy the blade "because of the very deep personal connection to the realm; that piece of hardware relates to my profession, the purpose that the game served in my life, and the growth that I realize as an individual because of it. It's my personal centerpiece." His passion for IT and for WoW runs so deep that he got a tattoo as a permanent tribute to this confluence of interests. The large tattoo is the Horde tribal symbol from WoW, filled in with what gives the appearance of skin being pulled back to revealed "circuitry under the skin."[11] For Emery, the server blade and the tattoo share some connective tissue in what they symbolize, specifically his occupation and his relationship to World of Warcraft, more specifically his realm and other in-game

[11] He has plans to extend this left arm tattoo into a full sleeve, but as of this writing he is still planning out the design that will further signify the meaningful connections that can be made between WoW and the hardware that is used to run it.

allegiances like the Horde and his guild. Though largely dissimilar in form, the tattoo and the server blade both represent this connection between a person and the technology that he believes has molded him as an individual, the technology he remains fascinated with and enchanted by still.

Server Blades as Places and Souvenirs

Servers are also enchanting in that they are an object that has the ability to contain an entire world. As a reminder, WoW, like other virtual worlds and MMOs, works as a social space by connecting its player base through a collection of servers. In the context of WoW in particular, every live server hosts a discrete copy of the world, and players choose which server they want to join. These servers are categorized by game developers through different parameters for play and time zone, and players have come to understand that at least at one time, each server hosted its own community, with unique reputations, norms, and histories. In this way, players view WoW servers as places, akin to neighborhoods, and use spatial terminology to describe them—after all, the cluster of servers that form one distinct WoW server world is called a "realm." So, when Blizzard turned old server hardware into commemorative commodities, players jumped at the opportunity to own a physical piece of the thing that once housed their experience in this virtual world. In other words, they conflated the server with the place and at the same time valued the server blade as a souvenir from that place.

In the documentary *World of Warcraft: Looking for Group* (2014), Van Dusen explains that, generally speaking, "The world you interact in is all contained within data centers," and more specifically, of individual servers: "It's essentially what creates the world." This idea is understood generally among players: that servers host the game world, that the game world is on

servers, and subsequently that servers, in essence, are the game world. Reflecting on her time in the game while pointing at their server blade, Adore, who I introduced in the Prelude to this chapter, explained, “It’s amazing to think those little circuits that we can carry around were an entire world to us.” And it is this conflation that gives the server blade some of its value. That a player can hold in their hands an entire world invokes a sense of wonder. As one forum commenter wrote, “It's so crazy that an entire living breathing world can fit on your desk. On that server.”

To think of a server as a place also assumes that the server “contains” places and thus it follows that perhaps the WoW server blades at one time “contained” people. This notion of containing of a sort of lively essence channeled through an object or place brings to mind the idea of haunting, like a haunted house, characterized by the inhabitation of spirits in place. Many players wondered if the servers still contained data that corresponded to player characters and if they might contain something of an avatar afterlife: “it’s like owning an entire world where thousands of people lived out their fantasies, died, played, loved, hated, destroyed, and got destroyed. that's a hell of a thing to own. People literally threw away their real lives to dive into that server and lose themselves in another world. If I were into mysticism, I’d say it must be haunted” (forum commenter). Though players might imagine the servers as haunted, containing a kind of spiritual essence or even whispers of the past, that the server blades are actually devoid of data (according to the official Blizzard FAQ about the blades and interviewees’ personal accounts) perhaps makes them more akin to ruins, an uninhabited symbol of the past that no longer serves its original intended function. Though the hard drives had been removed and thus all data wiped from the server, for many players the value was not in the presence of actual data or lively essence. Instead, players value the blade as a reminder of their time in WoW, something

like a memory cue or a container of memory, as Will explained: “There was a place mentally I kind of go when I think about that hardware and it's very easy for me to sort of visualize my character and my friends’ characters sort of being stored in there like a time capsule even though I know the drivers were all removed.”

Players repeatedly reflected on the idea that the server was like a miniaturized version of WoW, a tiny world they can hold in their hands and carry with them. This recalls a similarly enchanting object that could not be more physically distinct from a server blade. Think of a snow globe: a little object that contains a tiny visible world trapped inside a sphere, a world that fits in the palm of one’s hand. Snow globes typically feature some kind of recreation of a scene or monument seemingly frozen in time but that comes alive when it is upturned and the “snow” magically dances inside the clear dome. The snow globe has historically been a popular souvenir, especially during the post-war tourism boom in the United States during the 1950s (Hart 2018), and you can find snow globes in souvenir shops at almost every tourist destination around the world (Armstrong 2014). Though now relegated to the ‘kitsch’ or ‘tacky,’ snow globes remain enchanting in that they capture the liveliness of a world within a handheld object. Server blades are a bit like snow globes in that players imagine a world inside of them, and they have this liveliness, or a capacity to come alive under the right circumstances. However, they are quite unlike snow globes in several critical ways. Importantly, the snow globe depicts one scene, frozen in time; the server blade not only represents a place but a multitude of places and experiences, relations, and moments. Ontologically, it is a place that players spent much time, rather than just a representation of such a place, which is a big reason why so many players value them as commemorative souvenirs of their time in WoW.

In interviews, players had some difficulty describing exactly why they found the blades

meaningful and would frequently draw on analogies to actual world examples to explain their value. One player, Wren, explained that the server blade auctions were comparable to the demolition of Hubba Hideout in the Embarcadero in San Francisco. With its multiple slopes and staircases, Hubba Hideout had been a popular spot for skateboarding fanatics. When it was destroyed, frequent visitors to the spot lined up to receive pieces of bricks, material traces of a place that no longer existed:

> It was this huge line all the way down the Embarcadero of just these like skaters that wanted a piece of the Embarcadero because it was the iconic spot in the Bay Area to go show off skateboarding, and they've since like repaved it so it's all concrete and like people still skate there but when it happened, having a piece of that was so important.

Much like the skateboarder's brick that Wren described, the server blade has the function of a souvenir; it is a memento of a place in time, a catalyst for remembering. In her book "On Longing" (1984), Susan Stewart writes, "The souvenir may be seen as emblematic of the nostalgia that all narrative reveals—the longing for its place of origin" (xii). The server blade has acquired value for the player because it is an object of nostalgia, nostalgia for an older WoW lost to time. Players cite their memories of playing with others on their server as important reasons why the server blade is such a precious item to own.

Just as the skateboarder's brick might remind the nostalgic skateboarder of a particular time skating with friends, the server blade might remind the nostalgic gamer of a particular time raiding with guildmates. They are both physical remnants of a place that symbolize a different time. However, the server blade is quite dissimilar to the skateboarder's brick insofar as it is not just a piece of a place. It is true that both in some way represent a place they once served to support, functioning as infrastructure and, specifically, infrastructure of play. But they differ in that the brick is a mere representation, whereas the server blade is the place itself. Because servers are the objects that "host" players, the server blade operates as both place and souvenir.

In a very real sense, it is ontologically the place it represents and it acquires its value as a souvenir through both its placeness and its capacity to symbolize a network of memories, relationships, and experiences for which the nostalgic player yearns.

The Player as Amateur Collector, Curator, and Conservator

Players value the WoW server blades as symbols of their past experiences and their connection to people and the game world, a constellation of affective meanings I have termed "enchantment." The blades also carry historical value, situated firmly within the legacy of WoW's history. Servers have long been valued as a part of WoW history—photographs of the first physical WoW server and the first server blueprint are both included in former WoW developer John Staat's *The WoW Diary: A Journal of Computer Game Development* (2018). And as noted by the inscription on each of the commemorative blades, with phrases that characterize each blade as "carefully preserved and archived" and an "important part of our history," developers at Blizzard have positioned them as a historical artifacts worthy of preservation and "safekeeping."

Given the history of fan involvement in games preservation being paired with the advent of the WoW server blades being in circulation among players, it is apparent that servers are an essential piece of the material culture and history of WoW, alongside collector's editions boxes containing original game discs, strategy guidebooks, and figurines depicting characters from the game. Indeed, WoW server blades have not only appeared on display in people's private homes, but also in preservation institutions across the country, including the Computer History Museum in California and the Strong Museum of Play in New York. However, before ever making it to a

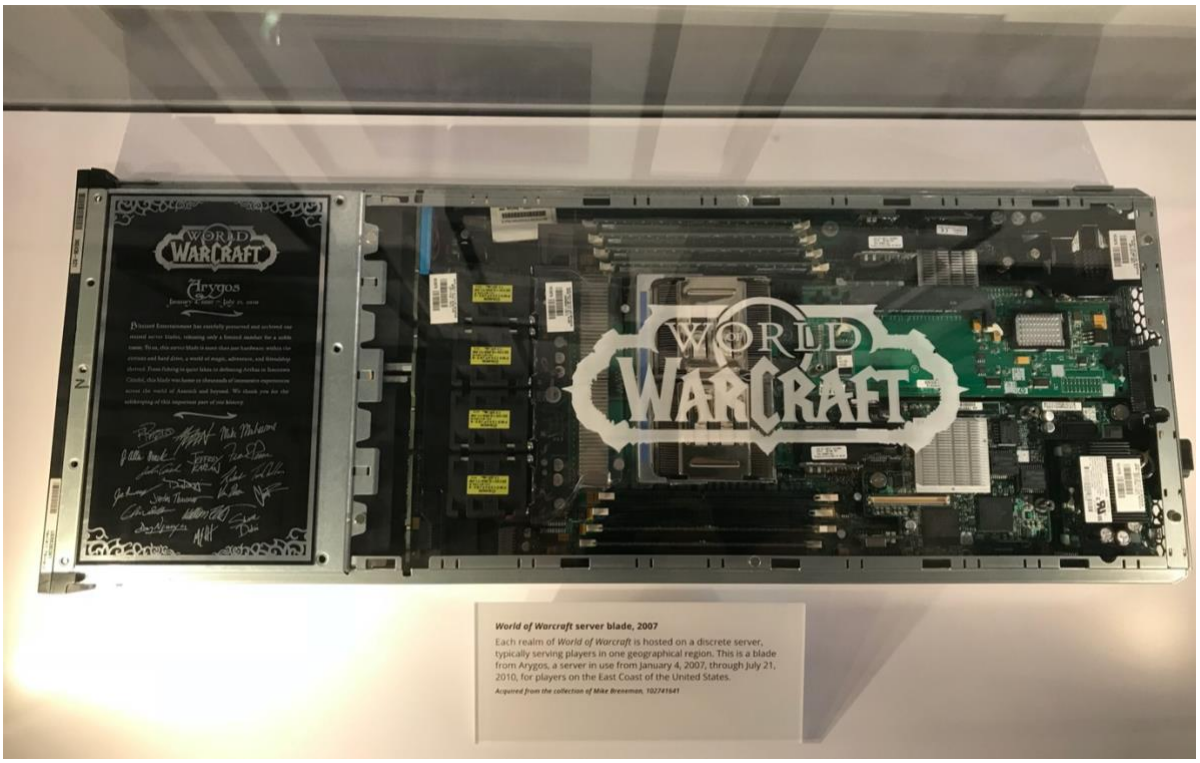

Figure 4.4: An Arygos server blade sits on display in the Computer History Museum's exhibition "Make Software: Change the World," a showcase of socially impactful software that included *World of Warcraft*. Source: Author.

museum, the server blades entered the homes of ordinary gamers who largely understand them to be both historically and personally significant. Strikingly, players handle the server blades somewhat like historical artifacts in a museum, adding them to their personal collections of gaming and WoW memorabilia, displaying them in creative ways, and taking care of them to prevent any damage. Museum studies scholar Flora Kaplan has written that the primary tasks of many museums are to "collect, conserve and display the 'things' of culture, belonging to the material world" (1994, 1). In this section, I do not want to over-romanticize museums or overestimate players' own investments in formal historical stewardship. Instead, what I set out to do is to draw comparisons between the player's home and the museum primarily to organize the section in terms of how server blades enter players' collections, how players curate displays of

their server blades, and the ways in which players care for and conserve them. As Susan Stewart (1984) pointed out, collections are a form of art and play. Ultimately this section is not only about the blades' historical value, but also about further explicating what these blades mean to players personally by taking a closer look at their practices of acquiring and keeping physical artifacts of their own personal history.

Collections

Players frequently told me that they bid on one of the server blades to add onto their collection of gaming memorabilia or WoW-related possessions, which in some way contributed to their sense of self and identity as a gamer and WoW player. Fan culture, and especially the culture of fans of games, is a consumerist culture of collecting that has even launched secondary markets for trading, buying, and selling collectible merchandise for cartoons, movie franchise, television shows, and games. Games themselves often involve collecting, and collecting itself could be considered a game (Jones 2008). Gamers amass large collections of objects such as figurines, books, consoles, games themselves, and peripheral gaming hardware. For WoW players, these collections often include collector's edition boxes released with game expansions, action figures and Funko Pop! dolls of characters from the game, merchandise from annual BlizzCons, or special commemorative items directly sent to players by Blizzard. Many players who purchased a server blade told me that this object feels like it "completes" their collection of WoW memorabilia, in some way completing a narrative of their experience and selfhood through objects (Chin 2016). As Belk (2006) has written, "The act of collecting something also sacralizes it and it should accordingly be 'priceless' for the collector, who is as unwilling to part with the object as they would be to part with a child" (540). Players in forums have frequently referred to

the WoW server blade as the "holy grail" for WoW collectors, as it encompasses a number of meanings for many players. When it enters the player's collection, it becomes invaluable, and players usually refuse to give it up.

However, some players explained that they may decide to sell their blade if they no longer have room for it. For this and other reasons, server blades, previously sitting in peoples' closets in some instances, have begun to recirculate in secondary markets. As Acland (2007) has pointed out, "Accumulated artifacts do more than gather dust… They can become an essential part of secondary markets, from garage sales to antique collectibles, altering both commercial and semiotic value" (xv). Players who want a server blade but were unable to win one of the original auctions often seek them out on digital secondhand marketplaces like eBay and craigslist, though nowadays they typically carry a large price tag, sometimes upward of $4,000. They have even been spotted in brick-and-mortar secondhand shops as well. In one instance from 2017, a player in the UK reported he had discovered one of the blades on sale in a thrift store for around £200. In these cases, meaning might be carried across the exchange, through stories exchanged between buyer and seller, further enhancing the sentimental value of the thing.

Display

While some players reported that their server blade was sitting in storage or in a closet—a part of their collection but not yet part of a curated display—the majority had decided to put theirs on display in some fashion. The idea of a decorative server as a historical object to be placed in a player's home may seem odd to some at first, but they also serve to represent players' personal histories. As this forum commenter put it, "They are mementos, no different from collector's editions that give you an item from the in-game world you have spent a lot of time in." How do

Figure 4.5: A Wildhammer server blade surrounded by World of Warcraft memorabilia, including figurines and collector's edition expansion boxes. Source: Will, interviewee.

players choose to incorporate these mementos into their curated exhibitions in their home? In their descriptions of their strategies for displaying their server blades, it was around certain kinds of related objects that the server blade sometimes sits. For example, several players had their blades displayed on a bookshelf with other memorabilia from *WoW*, such as figurines and strategy guides, displayed around it and on top it, as a way of transforming a room into a dedicated "gaming room" in their home or building up an existing gaming room. Just as objects get added to exhibitions in a museum, the meanings embodied within the blades get "reanimated through its role within particular exhibitions" (Shelton 2016, 484). The blade affixed to a wall or lying on a shelf gets added to a unique exhibition, a very personalized gaming museum all their own.

For owners of server blades, their visibility is critically important for them to see it and to

show it to other people. Along those lines, Will compared it to another familiar memorial object:

> It's kind of the equivalent of photo albums for me… so we still print physical photos, even though everything's digital now… I can get a photo album out and show you, like, here's pictures of my family or pictures of me when I was a kid. I can go in there and I can show you… here's physically this server that I played on for—literally months of my life are plugged into that thing.

Most players want to see their blade and to be able to show it off to visitors, telling stories and reminiscing together. Grey told me that some of his guildmates made a sort of pilgrimage from out of state to come see the blade in person, and they sat reminiscing together as a result, like The Church members from the beginning of this chapter.

In Keith Murphy's (2015) ethnographic work on Swedish design, he points to the ways in which collections of banal, mundane objects, like those in IKEA model rooms, can become a whole image, "a simple microcosm of the social democratic order, a top-down provision of basic raw materials that support and encourage the ongoing self-assembly of a better social world" (202). Though different in scale, the display of collected WoW memorabilia seated with a server blade can also stand for a whole world of collective experiences, "not only one's own lived world, but the lived worlds one shares with others" (Murphy 2015, 202). Many players display their blade prominently in their home: secured atop a shelf, as a centerpiece on a wall in their kitchen, inside a glass-top coffee table, or framed in a shadow box in the living room, much like collections of framed family photographs or pieces of art. Dakota placed his underneath his television, "Cuz that's where I sat and looked at things. You know, sit and look at the TV and I could look at that too. So it was kind of just prominently displayed for me to see." One individual posted a video to YouTube showcasing their server blade, which they had modded with strips of colorful, blinking LED lights around the outside edge, a flashier presentation than most.

Preventive Conservation

Some players told me they refuse to display their servers, worrying that hanging them up might damage them. Blake, for instance, pulled out the blade to show it to me, but did not remove the plastic sleeve that the etched plexiglass came in—in fact, he had never removed it:

> I have like 20 guitars at home.. and you have to like anchor those things into studs in order to hang that. And if one of those fell I would be just crushed. But if that [points to the server blade] fell I would be equally as crushed if it was damaged at all. You know, that's why I have it on the bookcase because I know it won't fall, it's stable. It just played such an important role in my life.

An ethic of care has evolved around these objects as a result of them being perceived as both historical artifacts and valuable personal mementos. I have already discussed several examples of this ethic of care, from the insistence embedded within the inscription that they must be kept safe to the foam-padded modified gun case used to house The Church guild's Darkspear blade. Additionally, fans online who see people posting images of their blades will weigh in, pleading that the blade must be cared for on their behalf; for instance, one forum commenter insisted: "You take good care of that girl. A good years' worth of my first foray into online gaming, and some of my fondest video game memories, are stored on that baby."

During a Discord interview call with Fiona, who purchased a Farstriders server blade for herself and her husband, she offered to show me the framed and mounted display she was working on as a piece of wall art dedicated to her guild, her husband, and their memories. To get it within eyeshot of the webcam, she had her son help her lift up the display, which contained the Farstriders blade, several photos of the guild, and a blank space where she intended to put a piece of aluminum with the guild insignia laser cut into it. After she explained each piece of the display, she exclaimed, "This is our little relic of WoW history!" And then I watched as she cautiously instructed her son on how he should place the heavy frame back on the ground:

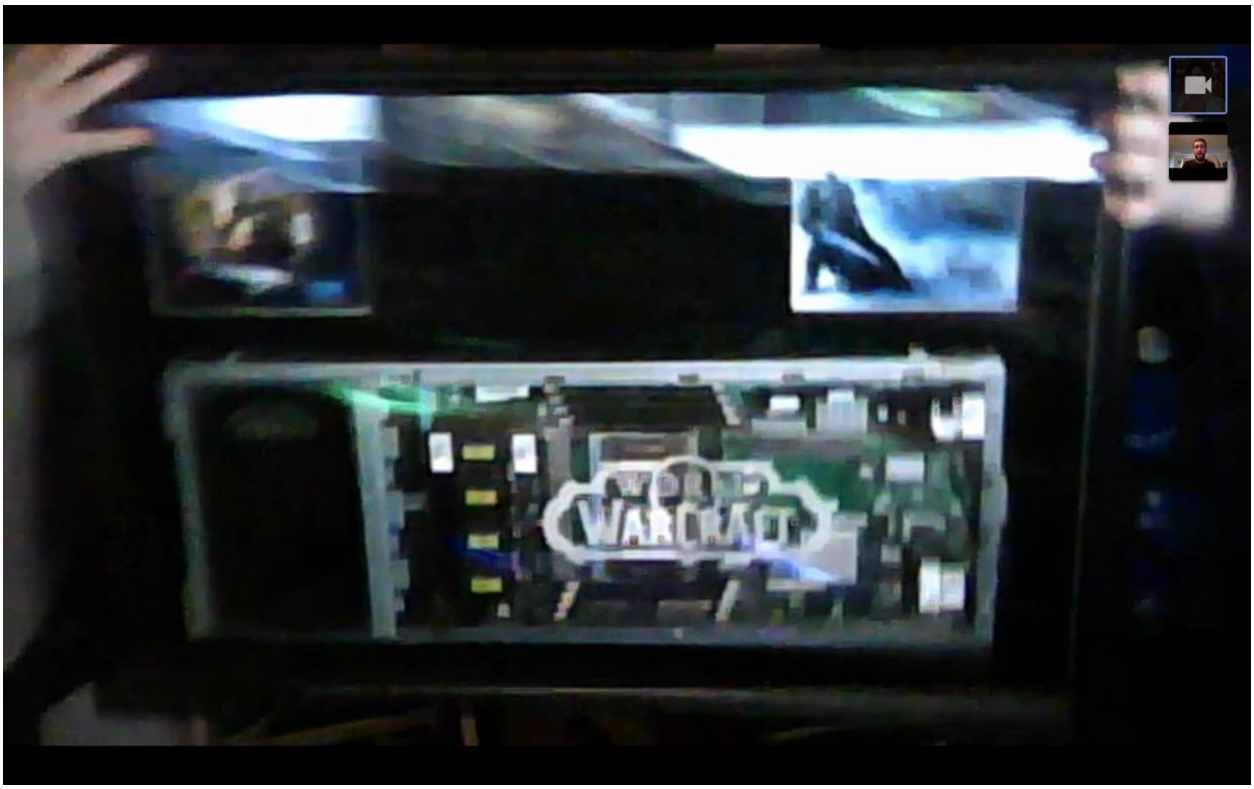

Figure 4.6: With help from her son, Fiona carefully shows off her framed server blade display on a video call. Source: Author.

> Got it ok? Be very careful. Making my teenager carry it back. You can leave it right up there, [Jonas]. Actually that's probably a good spot. Yeah, right up against that wall. Face the glass toward the wall. Yeah, there you go bud. Perfect. Like there's a spot on the wall right there. We can put it back and just push it– push it a little closer to the wall. Closer than that. No, toward the wall, honey. This way. There you go.

In putting the server blade into a display case behind glass and in instructing her son how to handle this display containing a "relic," Fiona is taking part in what museum conservators refer to as "preventive conservation" in that much of her care for these objects involves preventing damage rather than restoring an object (Rowlands and Tilley 2006). Server blade owners want these objects in pristine condition, as they attribute personal and historical value to them. This and the examples above showcase the ways in which players care for the blades as significant and delicate objects to be securely stored and handled with care.

Physical Servers in a Virtualized World

The server blades have been prized as physical, tactile (not to mention big and heavy!) objects from the world of WoW that that player can touch and hold, caring for them and attributing personal and historical meaning to them. As Blake explained to me, "when you live in the digital world, everything is ephemeral. You don't keep anything physical and everything goes away and nothing is kept forever… It was cool to hold that and say okay, there are memories that I have, that this piece of machine gave me." The server blades represent a rare moment when the virtual world literally materializes for the player in the form of an object, a memento or souvenir from the game world. Piggybacking on the success of the old server blade auctions, in 2019 Blizzard tried to recreate this magic by putting newer server blades up for sale on their website—at a flat cost of $300 USD rather than an auction—to commemorate the game's 15 year anniversary. While many players celebrated this second opportunity to own *WoW* servers, other players bemoaned the ways in which these servers were notably very different, and indeed less valuable, than the ones auctioned off in 2011; player attitudes toward them tell an interesting story of virtual world change and consumer-company relations, which I refer to as a process of disenchantment.

In Chapter 1, I wrote about how servers have historically structured the network of *WoW* and how that has changed dramatically in recent years. It used to be that, when you connected to the game, your computer communicated with a particular server "realm" that others were also connecting to, and that server was formed by four servers all communicating with one another. The networks of WoW were more closed and discrete, offering some opportunities for cross-realm interactions but most of the time with players staying within their discrete realms separated from other realms. With the rapid growth in WoW's popularity and the introduction of new in-

game features that made it easier to find people to play with, developers at Blizzard made infrastructural decisions that led to servers becoming more interconnected as many lower-population realms were subsequently merged with larger ones. The idea of discrete realms quickly faded away, and servers themselves became more and more virtualized, with many realms simultaneously working from one server blade. The servers being networked together in this new way has had all sorts of impacts on gameplay and social relations, which many players have lamented as having damaged many social aspects of the game.

The virtualization of servers in essence virtualized people's sense of place in the virtual world as well. It changed the ways players related to the server as a community, as Wilson explains: "That made me less, I guess less loyal to the server I was on because at that point it didn't really matter." When the server blades from 2011 were released, some players saw them as objects of nostalgia for a time when servers actually mattered as discrete places in the multiverse of WoW. Wren expressed that he understood the uniqueness of this moment, that the server blade auctions were capturing something in the blades' final material moments before obsolescence: "so when I found out when they were dismantling all the servers, I didn't know they were moving to a cloud-based server system, but I was like, I definitely want a part of that, that's something I could spend my money on that I'm never gonna be able to spend on for the rest of my life." Players understood that this was a rare moment, when their virtual world was materially manifesting in its final moments of obsolescence.

However, Wren insisted he would not be bidding on newer server blades in the future, because his relationship to his server has changed over time due to increased virtualization: "I don't know if I would do it again. Cause I just don't care about my server." In other words, any new server blade would not be enchanting in the same way as the original blades, because the

materiality and the world have been decoupled. This is the beginning of the process of disenchantment. It should come as no surprise then that upon announcing this new slate of decommissioned WoW server blades to be sold, the FAQ on the Blizzard website highlighted a critical difference from the original ones that reflected these changes in server architecture: "Due to advancements in the technology behind WoW and the ability to host many realms on one blade, there's no way to guarantee purchasers will receive a server blade that previously hosted a specific realm they were interested in." These newer blades were very different from the 2011 blades, and that difference has everything to do with the ways in which Blizzard has altered WoW's server infrastructure.

These server blades even looked different. Of course, the hardware itself was distinct from the earlier ones, a technological upgrade that replaced the previous iterations. However, these new blades did not come with a commemorative plaque with the name of the realm it served or the start and end dates of operation. There was no inscription, no signatures, no personalized attributes, each one a clone of the last. Player reception of these new blades was mixed, and the meanings people attached to them varied widely. Some players jumped at the opportunity to own a commemorative piece of WoW history, while others lamented the new look and feel. Many players expressed severe disappointment at the announcement of the new blades that were products of the wave of virtualization in the world of MMORPGs. One forum commenter wrote, "Would be really really cool to get the specific servers. Because thats just more bad ass and collectible."

For many players, these blades were more like shells, really heavy (and "empty") decorative slabs of metal. They were once seen as symbols of particular realms, but now the relationship between blade and server can no longer be conflated, making it difficult for the player to relate to

the server blade as a place they used to inhabit. Without the dates of operation and the name of the server etched onto the surface, the new server blades are alienated from both place and time. Lacking temporal and spatial specificity, they will not, as souvenirs from specific places do, "capture its viewer into reverie" in the same way (Stewart 1984). The changes in infrastructure that minimized the importance of material components have unequivocally altered players' relationships to the infrastructure itself that no longer exists in a 1-to-1 relationship with the worlds they help to create.

Nevertheless, the new blades sold out almost immediately, and individuals quickly began reselling them at an inflated price for a profit on sites like eBay.[12] This rapid positive response in sales can be attributed in part to the anticipated potential resale value, but also the new meanings that players attached to these new blades. While the old blades signified a relationship with a particular realm, some players online explained that these instead felt like a representation of World of Warcraft as a whole. As one forum commenter wrote, "I think its still pretty cool to have something that you can have that says world of warcraft happened here. Inside this box." Many players, especially those who were unable to obtain one of the original blades, chose to imagine that these unmarked blades once hosted their realm. For example, one commenter posted, "I would rather have one of these at $300 than nothing at all. I will just imagine that it hosted my original server. Who's to say it didn't?"

To reiterate, I do not want to suggest that these server blades were completely lacking in value; on the contrary, players found new ways to ascribe meaning to them and justify their purchase. However, the player backlash was rather severe regarding the lack of specificity in knowing

[12] As of January 26, 2021, the average resale value of a 2019 WoW server blade was around $1000, while the average resale value of a 2011 WoW server blade was around $3500.

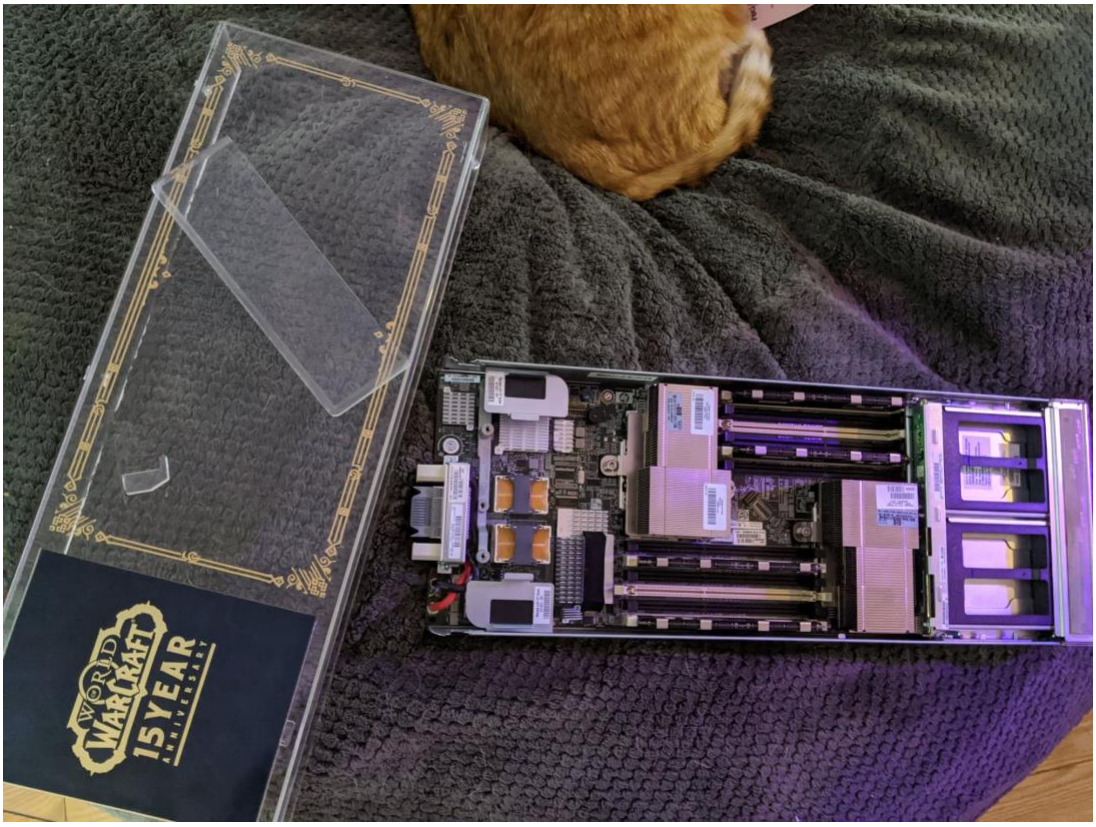

Figure 4.7: The plastic cover of one of the newer server blades lies broken next to the unadorned server hardware. Source: Icy-veins.com

which realm was linked to a particular blade. The materiality and aesthetics of the blade matter to many players, and without certain elements that made the blades appear unique, many players saw them as something akin to disenchanted items, impersonal and without sentimental value.

This growing disenchantment among players in how they valued these new blades was made even more complex when a major bungle in the shipping of the blades received attention on forums and in the press. After a long wait for the servers' arrival, a large number of players took to online forums to report that their blades had arrived damaged, with the metal case dented or the acrylic stand completely shattered, just as the act of disenchanting an item in the game actively destroys it in the process. Players took to forums to express frustration with the lack of communication and support to address the issue, posting images of broken pieces and

screenshots of e-mail requests for replacements. Numerous players on multiple platforms proposed that the carelessness of the packaging and fragility of the product were symbolic of a crumbling relationship between players and the company. Importantly, many fans remain loyal to the company, finding that Blizzard listens to players and supports their desires as long-time customers; as Will explained, "being a fan of Blizzard has more to do with just the fact they actively cater to their consumer base." Several interviews echoed this, even speaking to their shared values with the company overall. For example, Joel asserted, "It's a company that I align myself with heavily."

However, several people I interviewed hinted at a gradual shift in their attitudes toward Blizzard, especially after 2008 when the game development company was acquired by game publisher giant, Activision[13]. Joel echoed these concerns, saying that, "it's kind of gone by the wayside now that Activision had acquired them but back in the day, I mean they used to put gamers first… Traditionally they would listen to the audience, they would put games first." Devon, who once had a podcast that received a lot of attention from Blizzard and fans, felt that his previously close relationship to the company has decayed over time due to a growing communicative distance between the developers and the players:

> I've seen them be the most open, transparent company you could ever imagine… where they just they constantly talk to their community and they shared everything they had to where they are now, where everything is super big. And when they do come out with a thing… it's clear that they didn't consider the community or they didn't ask for community's input… which is a very corporate way of handling things.

Among players on several forums and comment threads online, the broken server blade casings[14]

[13] Activision-Blizzard recently came under fire for another controversy, in which current and former employees came forward to reveal incidents of discrimination and harassment in the workplace, leading eventually to Blizzard president J. Allen Brack stepping down.
[14] Blizzard did eventually respond to affected players by offering refunds for broken casings and sending out new ones.

quickly became further evidence of this growing divide between community desire and corporate response. The materiality of the server then became a new kind of symbol—rather than a symbol of place, memory, or community experience, these new blades for a segment of the fanbase were indicative of developers' distance from and lack of care for their players, at least in part due to what players understood as increasing "corporatization."

Conclusion: Server Cosmologies

This chapter explores the multivariate and intersecting meanings that flow across and through decommissioned server hardware, making them valuable and enchanting to nostalgic players. Some players valued their blade as an object of historical value, one they felt they had to safeguard and protect. For some, their blade is a trophy, a material possession that marks them as a dedicated, veteran player. More players still regarded the server blade as a memorial to their personal experiences or the collective experiences of their community, a souvenir from a time and place, a container of memory. Over time, despite this wide span of enchantments, a theme has emerged: The constellations of meanings players attach to their server blade reveal it as a kind of cosmological object that both stands for the world and is the world, past and present.

John Tresch (2007) has written on the relationship between modern technology and the cosmos, examining "cosmograms" as objects that represent totalities of worlds at moments in time. He describes them as "concrete, visible artifacts" with which people "represent the universe as a whole to themselves and to others" (92). I offer as a concluding thought here that server blades are like cosmograms of World of Warcraft; they are the stuff from which the world is made while also acting as representations of the world. Like server blades, cosmograms as representational objects are not confined to the particularities of time, place, or person; they

make possible an “open holism,” offering a unification of meaning “without requiring uniformity” (Tresch 2007, 93). Many players regarded them almost as religious objects, reporting that friends of theirs even made pilgrimages of a sort to see the server blade on which they spent so many years of their life. Much like the Temple of Humanity in Rio de Janeiro, described by Tresch as a cosmogram, the server blade, “is not just a symbol or a representation, not a reflection or a projection; it is an instrument, a machine for founding, maintaining, and extending a specific natural and social order and the emotions that will support it” (96). Similarly, the server blades act as a foundation upon which meaning is built and affects the ways in which players see and interpret the virtual world and relate it to the actual.

As an object depicting a cosmology of WoW for any given player, the server blade also stands for more than just virtual–actual relations. As I have illustrated in this chapter, through explorations of their physical properties, writing across their surfaces, and players’ tactile interactions with them, the blades also highlight the process of infrastructural transition from one state of matter to another. They represent moments when the process of virtualization, first outlined in Chapter 1, becomes more clear and materially manifest. The blades are debris, remnants and ruins left in the wake of an increased reliance on cloud computing. We are in an age of increased infrastructural decentralization and aggregation, one in which game companies are now providing worlds-as-services through the cloud, and multiple virtual servers can be hosted on one physical piece of hardware. In this new cosmology and world order, represented by these new server blades, players’ interactions with decommissioned hardware not only continue to powerfully showcase personal attachments to player experiences and to WoW as a game, but also points to detachments from Blizzard as a corporate entity.

Conclusion

This dissertation has told stories of relations between players of massively multiplayer online role-playing games, developers of these games, and the infrastructures that support them, as well as the memorial practices of gamers as they commemorate, preserve, and restore online game worlds. In each of its chapters, I have approached these historic, contemporary, and evolving relationships from different angles, from assessing the impacts of server virtualization on gamers' social worlds, to gamers restoring and preserving changing and disappearing virtual worlds, to the very material ways in which players might come to interact with the remnants left behind in the move to the cloud, the server blades that once powered their game world and enabled their social interactions. This dissertation has explored how gamers and servers meaningfully influence each other's lives, altering what it means to be a gamer and what it means to be a server.

The stories in this dissertation have also been about the unique ways in which forms of server ownership and control shape and are shaped by gamers' memorial practices and engagements with the past. By now, one important point should be clear: whoever controls the servers controls the virtual world. Server owners have the power to make structural and technical changes that shape the social landscape of games. However, this dynamic can shift, powerfully changing the way gamers relate to the worlds in which they spend much of their lives. Laws can be modified to include new ways for servers to change hands and circulate, fulfilling the heritage-related needs of preservation institutions. Servers can physically change hands and circulate. Server software can be crafted, recreated, and remolded to fit certain wants and needs. As games continue to virtualize and digitize, we should look to the players of these games for insights into

how these moves impact their lives and ask after the hidden connections they might be making to the infrastructure underneath it all. The future of virtual worlds, and indeed their conservation and preservation as pieces of our collective cultural heritage, will lie in the hands of those who can maintain control of the servers that serve as the foundation upon which these worlds are built.

In the final section of this brief conclusion, I return to a question I asked in the opening prelude to this dissertation: What other server stories are there to tell? During the first week after I moved to the Bay Area of California to conduct fieldwork at the MADE, I friend of mine invited me to visit the San Francisco Museum of Modern Art (SFMoMA) with him. During our delightful afternoon walk through one of the museum's many labyrinthine halls, filled with pieces from popular contemporary artists like Felix Gonzalez-Torres and Dan Flavin, we came across a curious display that included a server: an exhibit called *Autonomy Cube* (2014) by American artist Trevor Paglen. This is not the first time SFMoMA has shown digital technologies as art—in that same trip I came across an exhibit called Designed in California on the ideals and values of California designers, showcasing objects like a Macintosh computer and prototypes for a personal computer mouse. What set *Autonomy Cube* apart was that it featured a working server. It was a very small sculptural exhibit, placed in the middle of a wide open room, featuring a thick, but still transparent plexiglass cube, measuring probably two square feet, with two functional motherboards within it, a "live" infrastructural art piece on rare display.

The *Autonomy Cube* exhibit at SFMoMA, which is one of several instances of this piece that have circulated in museums around the country, is unique in comparison to *WoW* server blades on display in museums, because this server is active and online, and transforms the museum itself. According to the placard that was placed on the wall behind it, this server "uses the

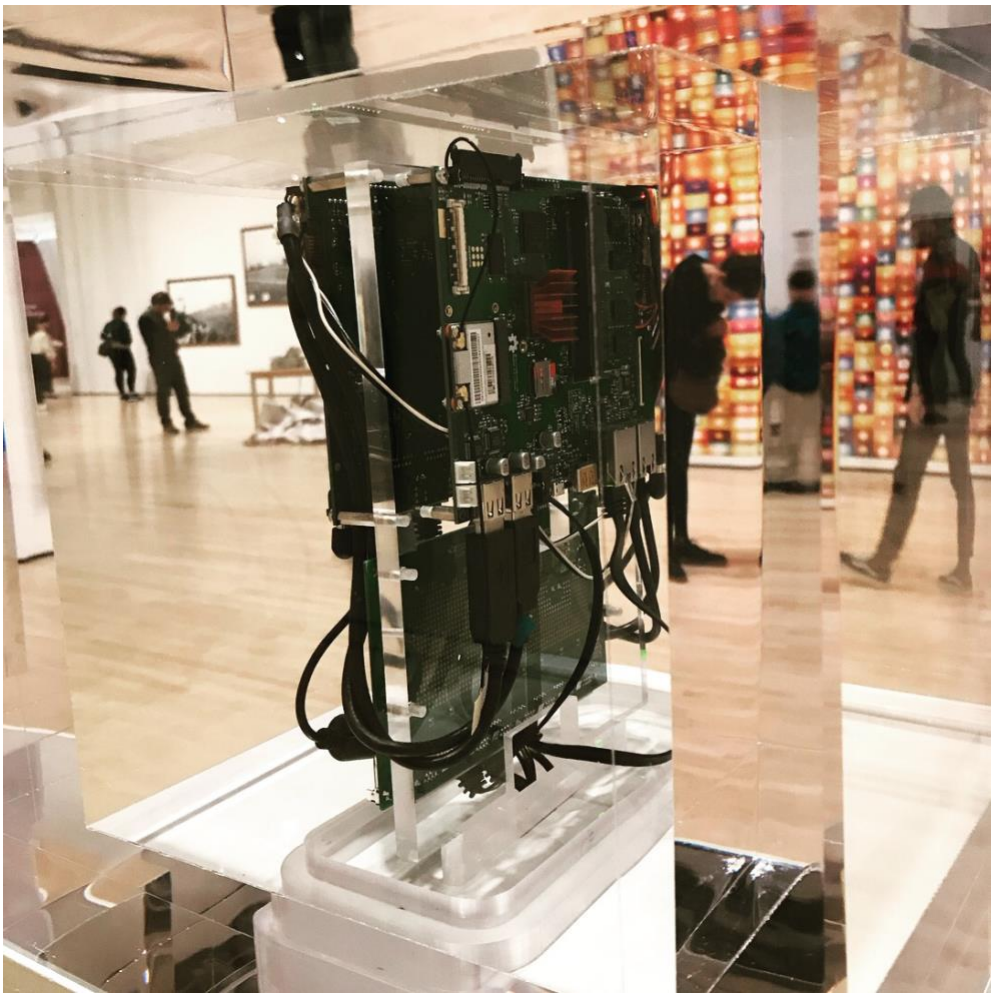

Figure 5.1: *Autonomy Cube*. Artist: Trevor Paglen, San Francisco Museum of Modern Art, 2018. Source: Author.

museum's public internet connection to create an open WiFi hotspot through which visitors can access the global Tor network with their mobile devices and laptops… Paglen proposes a means of furthering the civic mission of museums to support intellectual freedom." Granting museum-goers access to the Tor network, a free volunteer-run service that hides users' IP addresses while browsing the internet, this server on display makes a timely critique of the encroachments upon a free and open internet. With this series of exhibits, the artist uses sculpture, active servers, and the relatively high-bandwidth Internet connections provided by museums to turn museums into hosts for the Tor network and push museums themselves to consider their own stance toward

online privacy and surveillance. When I first came upon this object, I wrote a note to myself about the potential of servers as art pieces, especially when they are online, to be used top comment on our society and teach the public more about the hidden infrastructures that form the backbone of our daily lives. Looking back in light of this dissertation, the *Autonomy Cube* is also a beautiful encapsulation of some of the findings in this dissertation. It demonstrates ways in which people are in our current moment directly interacting with servers more frequently, despite their typical remoteness, servers can also serve as aesthetic pieces of art that act as carriers of deeper meaning and memory. Moreover, Paglen argues that the piece highly interactive, as it is meant to be both "seen" and "used." As a statement on net neutrality and infrastructural connectivity, this sculptural and "servitized" art project shows how making and remaking our own servers might be key in establishing and recapturing authority over our increasingly online and interconnected lives into the future.

References

Aarseth, E. 2007. "Allegories of Space: The Question of Spatiality in Computer Games." In *Space Time Play: Computer games, Architecture and Urbanism*, edited by von Borries, F., Walz, S. P., Böttger, M., 44–47. Berlin: BirkHäuser.

Acland, Charles R. 2007. *Residual Media*. Minneapolis: Unniversity of Minnesota Press.

Ahmed, Sara. 2010. "Happy Objects." In *The Affect Theory Reader*, edited by Melissa Gregg, Gregory J Seigworth, and Sara Ahmed, 29–51. Durham: Duke University Press.

Alexander, Jeffrey C. 2008. "Iconic Consciousness: The Material Feeling of Meaning." *Environment and Planning D: Society and Space* 26 (5): 782–94.

Anand, Nikhil. 2011. "Pressure: The Politechnics of Water Supply in Mumbai." *Cultural Anthropology* 26 (4): 542–64.

Armstrong, Lili. 2014. "Souvenir: A Brief History of Snow Globes." Liliontheloose, January 1. https://liliontheloose.com/2014/01/11/souvenir-saturday-brief-history-snow-globes/

Bach, Jonathan. 2015. "Collecting Communism: Private Museums of Everyday Life under Socialism in Former East Germany." *German Politics and Society* 33 (1): 135–45.

Barbier, Benjamin. 2014. "Video Games and Heritage: Amateur Preservation?" *Hybrid. Revue Des Arts et Médiations Humaines*, no. 01.

Beckstead, Zachary, Gabriel Twose, Emily Levesque-Gottlieb, and Julia Rizzo. 2011. "Collective Remembering through the Materiality and Organization of War Memorials." *Journal of Material Culture* 16 (2): 193–213.

Belk, Russell. 2006. "Collectors and Collecting." In *Handbook of Material Culture*, edited by Webb Keane, Susanne Küchler, Michael Rowlands & Patricia Spyer Christopher Tilley, 534–45. London: SAGE Publications Ltd.

Bennett, Jane. 2016. *The Enchantment of Modern Life: Attachments, Crossings, and Ethics.* Princeton: Princeton University Press.

Blum, Andrew. 2012. *Tubes: A Journey to the Center of the Internet*. New York: Harper Collins.

Boellstorff, Tom. 2008. *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human*. Princeton University Press.

Boellstorff, Tom. 2011. "Placing the Virtual Body: Avatar, Chora, Cypherg." *A Companion to the Anthropology of the Human Body and Embodiment*, edited by Frances E. Mascia-Lees. Blackwell Publishing Ltd.

Boellstorff, Tom, and Braxton Soderman. 2017. “Transplatform: Culture, Context, and the Intellivision/Atari VCS Rivalry.” *Games and Culture,* 14, no. 6 (September 2019): 680–703.

Bollmer, Grant. 2015. “Fragile Storage, Digital Futures.” *Journal of Contemporary Archaeology,* 2 (1): 66–72.

Brandt, David H. 2007. “Accelerating Online Gaming: Defining and Defeating Lag in Online Gaming.” Reykvavík University.

Candy, Graham. 2012. “In Video Games We Trust: High-Speed Sociality in the 21st Century.” *Fast Capitalism,* 9 (1)

Castronova, Edward. 2005. *Synthetic Worlds: The Business and Culture of Online Games*. Chicago: University of Chicago Press.

Chin, Elizabeth. 2016. *My Life with Things: The Consumer Diaries*. Durham: Duke University Press.

Consalvo, Mia. 2007. *Cheating: Gaining Advantage in Videogames*. Cambridge: MIT Press.

Crenshaw, Nicole. 2017. “Social Experience in ‘World of Warcraft’: Technological and Ideological Mediations.” University of California, Irvine.

Certeau, Michel De. 1984. “Walking in the City.” In *The Practice of Everyday Life*.

Debeauvais, Thomas, and Bonnie Nardi. 2010. “A Qualitative Study of Ragnarök Online Private Servers: In-Game Sociological Issues.” In *Proceedings of the Fifth International Conference on the Foundations of Digital Games,* 48–55. FDG ’10. New York, NY, USA: Association for Computing Machinery.

Deuze, Mark. 2006. “Participation, Remediation, Bricolage: Considering Principal Components of a Digital Culture.” *The Information Society* 22 (2): 63–75.

Dourish, Paul. 2015. “Packets, Protocols, and Proximity: The Materiality of Internet Routing.” *Signal Traffic: Critical Studies of Media Infrastructures,* 183–204.

Dubois, Louis-Etienne, and Johanna Weststar. 2021. “Games-as-a-Service: Conflicted Identities on the New Front-Line of Video Game Development.” *New Media & Society,* March 2021.

Ermi, Laura, and Frans Mäyrä. 2005. “Fundamental Components of the Gameplay Experience: Analysing Immersion.” *Worlds in Play: International Perspectives on Digital Games Research* 37 (2): 37–53.

Foote, Kenneth E, and Maoz Azaryahu. 2007. “Toward a Geography of Memory: Geographical Dimensions of Public Memory and Commemoration.” *Journal of Political and Military Sociology* 35 (1): 125.

Foucault, Michel. (1979) [1976]. *The History of Sexuality Volume 1: An Introduction*. London: Allen Lane.

Galloway, Alexander R. 2004. *Protocol: How Control Exists after Decentralization*. Cambridge: MIT Press.

Garfinkel, Harold. 1967. *Studies in ethnomethodology*. Englewood Cliffs, NJ: Prentice Hall. 2nd edn, Paradigm Publishers.

Geertz, Clifford. 1966. "The Impact of the Concept of Culture on the Concept of Man." *Bulletin of the Atomic Scientists* 22, no. 4: 2-8.

Gillespie, Tarleton. 2004. “Copyright and Commerce: The DMCA, Trusted Systems, and the Stabilization of Distribution.” *The Information Society* 20 (4): 239–54.

Gillespie, Tarleton. 2006. “Designed to ‘Effectively Frustrate’: Copyright Technology and the Agency of Users.” *New Media & Society* 8 (4): 651–69.

Goulart, Lucas Aguiar. 2012. “Proudmoore Pride: Potencialidades Da Cultura de Jogo Digital e Identidade Política de Gênero/Sexualidade.”

Graham, Stephen. 2010. *Disrupted Cities: When Infrastructure Fails*. Routledge.

Guinness World Records. 2021. “First Console Game to Receive a Downloadable Patch.” Https://Www.Guinnessworldrecords.Com/World-Records/First-Console-Game-to-Receive-a-Downloadable-Patch. June 10, 2021.

Guins, Raiford. 2014. *Game after: A Cultural Study of Video Game Afterlife*. Cambridge, MA: MIT Press.

Guttenbrunner, Mark, Christoph Becker, and Andreas Rauber. 2010. “Keeping the Game Alive: Evaluating Strategies for the Preservation of Console Video Games.”

Hart, Kim. 2018. “A Brief History of the Snow Globe.” Artsy, December 18. https://www.artsy.net/article/artsy-editorial-history-snow-globe.

Harvey, Penelope. 2010. “Cementing Relations: The Materiality of Roads and Public Spaces in Provincial Peru.” *Social Analysis* 54 (2): 28–46.

Harvey, Penny, and Hannah Knox. 2012. “The Enchantments of Infrastructure.” *Mobilities* 7 (4): 521–36.

Heidegger, Martin. 1954. “The Question Concerning Technology.” *Technology and Values: Essential Readings*, 99–113.

Herrmann, Gretchen M. 2015. “Valuing Affect: The Centrality of Emotion, Memory, and Identity in Garage Sale Exchange.” *Anthropology of Consciousness* 26 (2): 170–81.

Hertz, Garnet, and Jussi Parikka. 2012. “Zombie Media: Circuit Bending Media Archaeology into an Art Method.” *Leonardo* 45 (5): 424–30.

Houghton, Bernadette. 2016. “Preservation Challenges in the Digital Age.” *D-Lib Magazine* 22 (7/8): 1–6.

Ippolito, Jon. 2016. “Emulation.” *Debugging Game History: A Critical Lexicon*, 133.

Jenkins, Henry. 2012. *Textual Poachers: Television Fans and Participatory Culture*. Routledge.

Jones, Steven E. 2008. *The Meaning of Video Games: Gaming and Textual Strategies*. Abingdon: Routledge.

Kaplan, Flora S. 1994. *Museums and the Making of “Ourselves”: The Role of Objects in National Identity*. London: Leicester University Press.

Kendall, Lori. 2002. *Hanging out in the Virtual Pub: Masculinities and Relationships Online*. Univ of California Press.

Konwiser, Kern, and Kip Konwiser. 2014. *World of Warcraft: Looking for Group*. Blizzard Entertainment.

Krajewski, Markus. 2018. *The Server: A Media History from the Present to the Baroque*. New Haven: Yale University Press.

Kraus, Kari M. 2011. “Prim Drift, CopyBots, and Folk Preservation: Three Copyright Parables about Art in the Digital Age.” In *Digital Media: Technological and Social Challenges of the Interactive World*, edited by Megan A Winget and William Aspray. Scarecrow Press.

Larkin, Brian. 2008. *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria*. Durham: Duke University Press.

Lewis, Michael. 2014. *Flash Boys: Cracking the Money Code*. London: Allen Lane.

Library of Congress. 1998. *The Digital Millennium Copyright Act of 1998: U.S. Copyright Office summary*. [Washington, D.C.]: [Copyright Office, Library of Congress].

Lowood, Henry. 2008. “High-Performance Play: The Making of Machinima.” *International Journal of Technology Management & Sustainable Development* 7 (1): 25–42.

Lowood, Henry. 2004. “Playing History with Games: Steps Towards Historical Archives of Computer Gaming.” In *Annual Meeting of the American Institute for Conservation of Historic and Artistic Works Portland, Oregon*, 1-13.

Lowood, Henry, Devin Monnens, Zach Vowell, Judd Ethan Ruggill, Ken S McAllister, and Andrew Armstrong. 2009. “Before It’s Too Late: A Digital Game Preservation White Paper.” *American Journal of Play* 2: 139–66.

Makuch, Eddie. 2015. “Blizzard Will No Longer Report World of Warcraft Subscriber Numbers.” GameSpot. November 3, 2015. https://www.gamespot.com/articles/blizzard-will-no-longer-report-world-of-warcraft-s/1100-6431943/.

McDonough, Jerome P., Robert Olendorf, Matthew Kirschenbaum, Kari Kraus, Doug Reside, Rachel Donahue, Andrew Phelps, Christopher Egert, Henry Lowood, and Susan Rojo. 2010. “Preserving Virtual World Final Report.” http://hdl.handle.net/2142/17097.

Messias, José. 2020. “Emergent Precariousness: Video Game Modding in the Context of a Decolonial Philosophy of Technology.” In *International Conference on the Foundations of Digital Games*, 1–4.

Middleton, David, and Steven Brown. 2007. “Issues in the Socio-Cultural Study of Memory: Making Memory Matter.” In *The Cambridge Handbook of Sociocultural Psychology*, 661–77.

Murphy, Keith M. 2015. *Swedish Design: An Ethnography*. Ithaca: Cornell University Press.

Nardi, Bonnie. 2010. *My Life as a Night Elf Priest: An Anthropological Account of World of Warcraft*. University of Michigan Press.

Newman, James. 2012. *Best before: Videogames, Supersession and Obsolescence*. Abingdon: Routledge.

Ng, Jenna. 2016. “Machinima.” *Debugging Game History: A Critical Lexicon*, 287.

Noah Davis. 2012. “Digital Apocalypse: Living through the Death of Virtual Worlds.” *The Verge*. https://www.theverge.com/2012/12/20/3776210/electric-funeral-death-of-mmo.

Nylund, Niklas, Patrick Prax, and Olli Sotamaa. 2020. “Rethinking Game Heritage – towards Reflexivity in Game Preservation.” *International Journal of Heritage Studies*, April, 1–13.

Olson, Valerie. 2018. *Into the Extreme: US Environmental Systems and Politics Beyond Earth*. Minneapolis: University of Minnesota Press.

Parks, Lisa, and Nicole Starosielski. 2015. *Signal Traffic: Critical Studies of Media Infrastructures*. Champaign: University of Illinois Press.

Paul, Christopher A. 2011. “Optimizing Play: How Theorycraft Changes Gameplay and Design.” *Game Studies* 11 (2): 100.

Pearce, Celia. 2008. “Identity-as-Place: Trans-Ludic Identities in Mediated Play Communities—The Case of the Uru Diaspora.” In *Proceedings, Internet 9.0: Association of Internet Researchers Annual Conference.* Copenhagen, Denmark: Copenhagen IT University.

Pearce, Celia, and Artemesia. 2009. *Communities of Play: Emergent Cultures in Online Games and Virtual Worlds*. Cambridge: MIT Press.

Plunkett, Daniel. 2011. “On Place Attachments in Virtual Worlds.” *World Leisure Journal* 53 (3): 168–78.

Poor, N, and M M Skoric. 2014. “Death of a Guild, Birth of a Network: Online Community Ties Within and Beyond Code.” *Games and Culture* 9 (3): 182–202.

Postigo, Hector. 2012. *The Digital Rights Movement: The Role of Technology in Subverting Digital Copyright*. Cambridge: MIT Press.

Proshansky, Harold M, Abbe K Fabian, and Robert Kaminoff. 1983. “Place-Identity: Physical World Socialization of the Self.” *Journal of Environmental Psychology*.

Pulos, Alexis. 2013. “Confronting Heteronormativity in Online Games A Critical Discourse Analysis of LGBTQ Sexuality in World of Warcraft.” *Games and Culture* 8 (2): 77–97.

Rowlands, Michael, and Christopher Tilley. 2006. "Monuments and Memorials." In *Handbook of Material Culture*, 500-515. London: SAGE Publications Ltd.

Sara. 2019. “World of Warcraft Subscribers down Almost 11 Million since It’s Peak.” Medium. March 21, 2019. https://medium.com/fluffy-fruity-cats/world-of-warcraft-subscribers-down-almost-11-million-since-its-peak-25c2e0e1154c.

Scacchi, Walt. 2010. “Computer Game Mods, Modders, Modding, and the Mod Scene.” *First Monday*.

Schwenkel, Christina. 2013. “Post/Socialist Affect: Ruination and Reconstruction of the Nation in Urban Vietnam.” *Cultural Anthropology* 28 (2): 252–77.

Schwenkel, Christina. 2015. “Spectacular Infrastructure and Its Breakdown in Socialist Vietnam.” *American Ethnologist* 42 (3): 520–34.

Shaw, Adrienne. 2015. *Gaming at the Edge: Sexuality and Gender at the Margins of Gamer Culture*. Minneapolis: University of Minnesota Press.

Shelton, Anthony. 2006. "Museums and Museum Displays." In *Handbook of Material Culture*, 480-99. London: SAGE Publications Ltd.

Sherlock, Lee. 2013. “What Happens in Goldshire Stays in Goldshire: Rhetorics of Queer Sexualities, Role-Playing, and Fandom in World of Warcraft.” In *Rhetoric/Composition/Play through Video Games*, 161–74. Springer.

Simon, Bart. 2007. “Geek Chic Machine Aesthetics, Digital Gaming, and the Cultural Politics of the Case Mod.” *Games and Culture* 2: 175–93.

Staff. 2009. “GDC Austin: An Inside Look At The Universe Of *Warcraft.*” Gamasutra, September 17. https://www.gamasutra.com/view/news/116251/GDC_Austin_An_Inside_Look_At_The_Universe_Of_Warcraft.php.

Star, Susan Leigh. 1999. “The Ethnography of Infrastructure.” *American Behavioral Scientist* 43: 377–91.

Starosielski, Nicole. 2015. *The Undersea Network*. Durham: Duke University Press.

Steve Burke. 2015. “The Origin of the MMORPG & More – Profiling Richard Garriott’s Innovations.” Gamers Nexus. April 3, 2015. https://www.gamersnexus.net/gg/1891-where-mmorpgs-come-from-richard-garriott-interview.

Staats, John. 2019. *The WoW Diary: A Journal of Computer Game Development.* Self-published, Whenitsready.

Stewart, Susan. 1984. *On Longing: Narratives of the Miniature, the Gigantic, the Souvenir, the Collection*. Durham: Duke University Press.

Švelch, Jan. 2019. “Resisting the Perpetual Update: Struggles against Protocological Power in Video Games.” *New Media & Society* 21 (7): 1594–1612.

Swalwell, Melanie. 2009. “Towards the Preservation of Local Computer Game Software: Challenges, Strategies, Reflections.” *Convergence: The International Journal of Research into New Media Technologies* 15: 263–79.

Tawil-Souri, Helga. 2015. “Cellular Borders: Dis/Connecting Phone Calls in Israel-Palestine.” In *Signal Traffic: Critical Studies of Media Infrastructures*, 157–80. Minneapolis: University of Illinois Press.

Taylor, T L. 2006. “Does WoW Change Everything? How a PvP Server, Multinational Player Base, and Surveillance Mod Scene Caused Me Pause.” *Games and Culture* 1 (4): 318–37.

Taylor, T.L. 2009. *Play Between Worlds: Exploring Online Game Culture*. Cambridge, MA: MIT Press.

Tobin, Samuel. 2016. “Save.” *Debugging Game History: A Critical Lexicon*, 385.

Tresch, John. 2007. "Technological world-pictures: Cosmic things and cosmograms." *Isis* 98, no. 1: 84-99.

Unger, Alexander. 2012. “Modding as Part of Game Culture.” In *Computer Games and New Media Cultures*, 509–23. Springer.

Vandermerwe, Sandra, and Juan Rada. 1988. “Servitization of Business: Adding Value by Adding Services.” *European Management Journal* 6 (4): 314–24.

Vaudour, Fanny, and Aleksej Heinze. 2020. “Software as a Service: Lessons from the Video Game Industry.” *Global Business and Organizational Excellence* 39 (2): 31–40.

Vonderau, Asta. 2018. “Scaling the Cloud: Making State and Infrastructure in Sweden.” *Ethnos*, 1–21.

Williams, Dmitri, Nicolas Ducheneaut, Li Xiong, Yuanyuan Zhang, Nick Yee, and Eric Nickell. 2006. “From Tree House to Barracks the Social Life of Guilds in World of Warcraft.” *Games and Culture* 1 (4): 338–61.

Winget, Megan A. 2011. “Collecting the Artifacts of Participation: Videogame Players, Fan-Boys, and Individual Models of Collection.” *Digital Media: Technological and Social Challenges of the Interactive World*, 27–72.

Winget, Megan A, and Caitlin Murray. 2008. “Collecting and Preserving Videogames and Their Related Materials: A Review of Current Practice, Game-Related Archives and Research Projects.” *Proceedings of the American Society for Information Science and Technology* 45: 1–9.

Wowpedia. 2021. “Inscription.” Last modified 24 March, 2021. https://wowpedia.fandom.com/wiki/Inscription.

Young, Mark Thomas. 2021. “Now You See It (Now You Don’t): Users, Maintainers and the Invisibility of Infrastructure.” *Technology and the City: Towards a Philosophy of Urban Technologies.* Cham: Springer