PLATFORM STUDIES

MINITEL

Welcome to the Internet

Julien Mailland and Kevin Driscoll

Minitel

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Welcome to the Internet

Julien Mailland and Kevin Driscoll

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Contents

Series Foreword vii

Acknowledgments ix

1 A Tale of Two Parties 1

2 Disaggregating the Minitel Platform 23

3 Embedding Culture in Architecture 49

4 Not End to End, but Open 73

5 The Booming Minitel Private Enterprise 95

6 On the Fringe 129

7 Conclusion 149

Appendix: Currency Conversion Table 157

Glossary 159

Notes 163

Bibliography 195

Index 211

Series Foreword

How can someone create a breakthrough game for a mobile phone or a compelling work of art for an immersive 3D environment without understanding that the mobile phone and the 3D environment are different sorts of computing platforms? The best artists, writers, programmers, and designers are well aware of how certain platforms facilitate certain types of computational expression and innovation. Likewise, computer science and engineering have long considered how underlying computing systems can be analyzed and improved. As important as scientific and engineering approaches are, and as significant as work by creative artists has been, there is also much to be learned from the sustained, intensive, humanistic study of digital media. We believe it is time for humanists to seriously consider the lowest level of computing systems and their relationship to culture and creativity.

The Platform Studies series has been established to promote the investigation of underlying computing systems and of how they enable, constrain, shape, and support the creative work that is done on them. The series investigates the foundations of digital media—the computing systems, both hardware and software, that developers and users depend upon for artistic, literary, and gaming development. Books in the series will certainly vary in their approaches, but they will all share certain features:

- a focus on a single platform or a closely related family of platforms
- technical rigor and in-depth investigation of how computing technologies work
- an awareness of and a discussion of how computing platforms exist in a context of culture and society, being developed on the basis of cultural concepts and then contributing to culture in a variety of ways—for instance, by affecting how people perceive computing.

Acknowledgments

Minitel was brought to life through the ingenuity of countless engineers, entrepreneurs, administrators, and enthusiasts. While Internet folklore tends to celebrate small groups of computer wizards hacking away in basements and garages, Minitel thrived at the forefront of French popular culture. During the 1980s and 1990s, Minitel was on the street, in the cinema, on the radio, and in the news. People from all over France experimented with the new medium—men and women, young and old, urbanites and country dwellers, rich and poor, gay and straight. That Minitel continues to provoke our thinking about technology, policy, and culture is a tribute to the creativity and curiosity of its diverse users.

Just as Minitel was produced by a multitude, many different people assisted in the preparation of this book. We would like to thank the staff at Orange/Direction de la Gestion et de la Conservation de l'Information, the Conseil d'État, and the Archives Nationales whose help in locating and scanning materials was crucial—in particular, Emmanuelle Flament-Guelfucci, Pierre Philippi, and Irmine Vieira as well as the community of researchers and Orange employees and former employees in Brittany, Paris, and San Francisco who provided us with access, support, feedback, and unbridled enthusiasm about the ongoing relevance of Minitel: Isabelle Astic, Patrice Battiston, Yochai Benkler, Jean-Luc Beraudo De Pralormo, John Coate, Daniel Hannaby, Bernard Louvel, Jean-Paul Maury, Georges Nahon, Camille Paloque-Berges, Bernard Peuto, Monroe Price, Valérie Schafer, Gérard Théry, Benjamin Thierry, and Marc Weber. In addition to archival research, this book depends on several firsthand

accounts, and we are grateful to those individuals who agreed to sit for interviews: Michel Baujard, Jean-Luc Beraudo De Pralormo, Laurent Chemla, John Coate, Daniel Hannaby, Jean-Baptiste Ingold, Michel Landaret, Bernard Louvel, Allan Lundell, Jean-Marc Manach, Bernard Marti, Jean-Paul Maury, Georges Nahon, Dusty Parks, Jean-Eudes Queffélec, Christian Quest, Gérard Théry, and LaRoy Tymes.

A big shout-out goes to today's Minitel enthusiasts whose hacks, pranks, and tributes provided us with inspiration and insight during the preparation of this book. We are especially grateful to those *minitelistes* who document their explorations for other to follow. Special thanks are due to Frédéric Cambus, whose archives of Minitel and French bulletin board systems materials were invaluable during the research process.

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Lastly, Julien and Kevin would like to acknowledge the invaluable contributions of Cooper, the Minitel dog.

Le Minitel est mort, vive le Net!

A Tale of Two Parties

1

June 29, 2012. A large crowd is gathered in a covered passage outside a digital start-up incubator in the up-and-coming Silicon Sentier neighborhood of Paris, grabbing bottles of the city's newly revived ancestral microbrew, Gallia, from milk crates. It doesn't get much more hipster than this. It's the third half of a Minitel "wake," and Minitel enthusiasts—mostly entrepreneurs both old and young—are gathered here to celebrate and bid adieu to a time where France was the most wired country in the world. The 1980s: when anyone in France could easily jump online to order groceries for same-day delivery, preorder movie tickets before a night on the town, play video games with strangers, register for school and check their grades, and of course, frolic in a sexy chat room—all using the same convenient little Minitel box. While in the United States, access to the online world was the privilege of a geeky few until the privatization of the Internet backbone in 1995, all of France had been online for more than a decade, discovering and enjoying the new electronic frontier in the form of a mass consumer service.

The June 29 alley party followed a roundtable discussion and animated question-and-answer session with the lively audience. The men sitting on stage were stewards and champions of the online world: Louis Pouzin, the engineer credited for inventing the datagram concept that evolved into the Transmission Control Protocol (TCP)/Internet Protocol (IP), and Laurent Chemla, cofounder of France's largest Internet registrar and the first person in the country to have been indicted for hacking into a computer system … using a Minitel terminal.[1] One notorious figure is

missing in action. Xavier Niel, the telecom entrepreneur who instigated a price war that made France one of the most competitive markets for Internet access in the world, declined the organizer's invitation. His apology e-mail—"sorry, not my thing"—is projected on a large screen. Maybe the fact that Niel made his first fortune—one that enabled him to open a free computer science school—running cybersex services on Minitel plays a role in his absence. Michel Landaret, however, is in the room. Landaret is often said to have invented *les messageries*, the online chat rooms that propelled the popular adoption and commercial success of Minitel.[2] While claims to invention and "firsts" are often dubious, Landaret's 1981 system captivated early users, observers, and journalists from the US and abroad, heralding the arrival of thousands of chat rooms, message boards, and social games on Minitel.[3]

This Minitel wake is wild. The attendees represent the wide range of stakeholders in the Minitel industries—from former lobbyists and trade journalists to subversive countercultural figures. All are joyfully putting to rest an old friend, the platform that brought the whole of France online years ahead of the rest of the world. The current media is here, too. Earlier that day, *Le Monde* featured the efforts of two researchers in the United States working to document Minitel for a US audience.[4] International newspapers and websites—*WIRED*, the *New York Times*, the *Guardian*, Ars Technica, and *Fox Business News*—have been covering the end of *le Minitel* for weeks. AP reporters at the party are taking people aside for video interviews.[5] Meanwhile, hackers are providing entertainment: one old-timer turned a Minitel terminal into a Twitter client and is streaming tweets from the #minitel hashtag; a group of younger enthusiasts is showing off Minitel-based videotex art. As the sun goes down and less legal substances come out, the sustained energy of the crowded party reflects the goodwill felt by so many hackers and entrepreneurs for the deceased. For these creative minds, Minitel was a platform that empowered them to distribute their creations widely, cheaply, with few constraints, and often to great personal profit, long before the commercialization of the World Wide Web and the dot-com boom.

There is a strong irony in the history of the Internet that the great hope of cyberlibertarianism was a network funded by the US government and justified by its military applications (note that when we say "Internet," we refer to the specific IP-based family of networks that grew out of the ARPANET family of experimental networks).[6] In France, likewise, it was the government, through the Post, Telegraph, and Telephone (PTT) administration, that supported Minitel. But while both the Internet and Minitel were born out of a combination of public and private investment,

the two networks are frequently depicted in opposition to one another. In the typical comparison, the Internet is said to represent massive private investment, decentralized control, and a lack of regulation, while Minitel is presumed to be a failed state project, beset with slow-moving bureaucracy and centralized authority. Perhaps this historiography fits a familiar frame in the US imagination pitting free market capitalism against authoritarian socialism, but it does not hold up to historical scrutiny. Indeed, strategic French interventionism is precisely what enabled a vibrant and innovative private market to form around Minitel in the 1980s, just as the decision of the US government to privatize the Internet backbone enabled a commercial Internet boom during the 1990s.[7] Neither system could have succeeded without the combination of public and private support.

The French State was indeed a key player in the domestic success of Minitel, albeit not exactly as it is commonly remembered by champions of the US-centric Internet story, but State administrators were absent from the raucous Minitel wake.[8] So, the day after the rogue entrepreneurs' party, we traveled to the historic heart of French telecommunications, the Brittany region, to see how the brainchild of State planning would be laid to rest.

June 30, 2012, Cesson-Sévigné, France. The sky is crying over a grey industrial development in Brittany, France's west coast region. Fifty years earlier, the State had earmarked the area for redevelopment. It would become the Silicon Valley of France, the epicenter of domestic telecommunications excellence and international prestige. While start-ups tend to congregate in Paris these days, large historical players such as Orange (formerly France Telecom, which itself is formerly the PTT administration), Alcatel, Thomson, Matra, and SAGEM, as well as many specialized schools, gathered in Brittany.[9] The legacy is strong, but the area, populated with run-down, Stalinist buildings, aches with a brutalist gloom—a fitting decor for the official wake of a high-modernist State project: a data network for the people, Minitel.

Just as the networking experiments that produced the Internet had roots in the Cold War politics of the 1960s, Minitel was developed in response to the unstable politics of the period. Convinced that France needed a domestic military-industrial complex to gain independence from US and UK network standards and manufacturers, French policy makers endeavored to stimulate local development in information and communication technology—a vision of the future known as *telematics*. This was a period in which France pulled out of the North Atlantic Treaty Organization, kicked US troops out of the country, built its first radar

dome, and launched its first satellite. A decade later, with information being increasingly digitized, commodified, and distributed internationally, some began to see a threat to French independence in the design and implementation of communication infrastructure. In this battle for information sovereignty, France's enemies were IBM and the British PTT—outsider organizations promoting their own standards for building online systems.

In 1974, the State's joint television and telephony research center, le Centre commun d'études de télévision et télécommunications (CCETT), began developing Antiope, its own standard for the display of information on video screens. Antiope was infrastructure neutral. It could be transmitted through any channel, from over-the-air radio broadcast to fiber-optic cables. At the time, the French telephone network was one of the worst in the industrial world and in dire need of improvement. Saddled with flagging technology and feeling the pressure of foreign competition, the executive branch committed to a series of ambitious upgrades. After working to improve residential service in 1974, it decided in 1978 to create a new information service pairing Antiope with analog modems. The ambitious telematics project would drive the investment needed to replace the analog telephone network with a fully digital system while providing private entrepreneurs with an open platform for innovation. It was part of a broader array of related projects, such as developing widespread fax and videoconferencing systems. Supporters hoped that this aggressive strategy might jump-start a new French industry to rival their US opponent, IBM, in both the domestic and international markets for information technologies.[10]

To realize its dream of nationwide telematics, however, the State had to take charge of the overall ecosystem, absorbing the massive sunk costs of building out new infrastructure as well as artificially creating demand for telematics products and services. The growth of information and communication systems like Minitel depends on an economic phenomenon known as *network effects*. The term refers to the relationship between the value of a network to any individual user and the total number of connected users. A canonical example is the telephone: a telephone is only useful if there are other people to call. Two-sided platforms such as social networking sites exhibit network effects on both sides of the market: no user will go online if there is no content, and no content will be produced if there are no users. Conversely, as more users come online, the network's content and services grows, thereby attracting yet more users in a positive feedback loop. The chief problem for a new network is to attract enough participants on at least one side of

the market early on to get this virtuous cycle started before running out of money.[11]

In the early 1980s, growing a platform like Minitel was especially difficult because the general public did not yet see the point of going online. To wit, the failure of early commercial online services like the Source, Viewtron, Covidea, Trintex, or Keycom in the United States. One strategy for attracting a critical mass of users and service providers to a new network is to "prime the pump"—that is, to create a temporary stimulus that will attract demand on one or more sides of the market and kick-start the positive feedback loop. This is exactly what happened in France. The State ordered millions of terminals from private manufacturers (which prompted the creation of new manufacturing lines) and gave away the equipment, free of cost, to every French telephone subscriber—free computers for everyone! The State further incited this fresh user base to actually connect to the network by creating a free, online phone book, *l'annuaire électronique*. Finally, it substantially lowered the barrier to entry for end users by not implementing an up-front subscription model but rather charging users based on their connection time and adding the resulting fees onto users' monthly phone bills—play now, pay later. To support the creation of new services, the telephone company rebated about two-thirds of the connection fees to the service providers. The billing and rebate system was named Kiosk (*le kiosque)*, a reference to the role of traditional newspaper kiosks as intermediaries between publishers and readers. With an artificially created user base and built-in business model, content creators flocked to the platform, eager to deploy experimental new services. In short order, this positive feedback loop resulted in a lively Minitel ecosystem with a growing variety of activities and increasingly diverse population of users.

In retrospect, one can see that Minitel was also hindered by some of the decisions that enabled its explosive early growth. The terminal technology was frozen in time, the administrative bureaucracy created chilling effects on innovation, and the centralized accounting system based on virtual circuit routing protocols limited the adoption of interoperable "end-to-end" protocols characteristic of the Internet. But it is also these centralized aspects that made Minitel viable at a time when privately run gated communities in the United States resulted in fragmentation and commercial failure.

Whereas the Minitel wake at Orange in Brittany was a somber affair, the entrepreneurs' wake in Paris had been a rave-up, infused with a belief that the energy, wonder, and possibility that had animated the earliest days of Minitel are still with us, and that tremendous online futures are

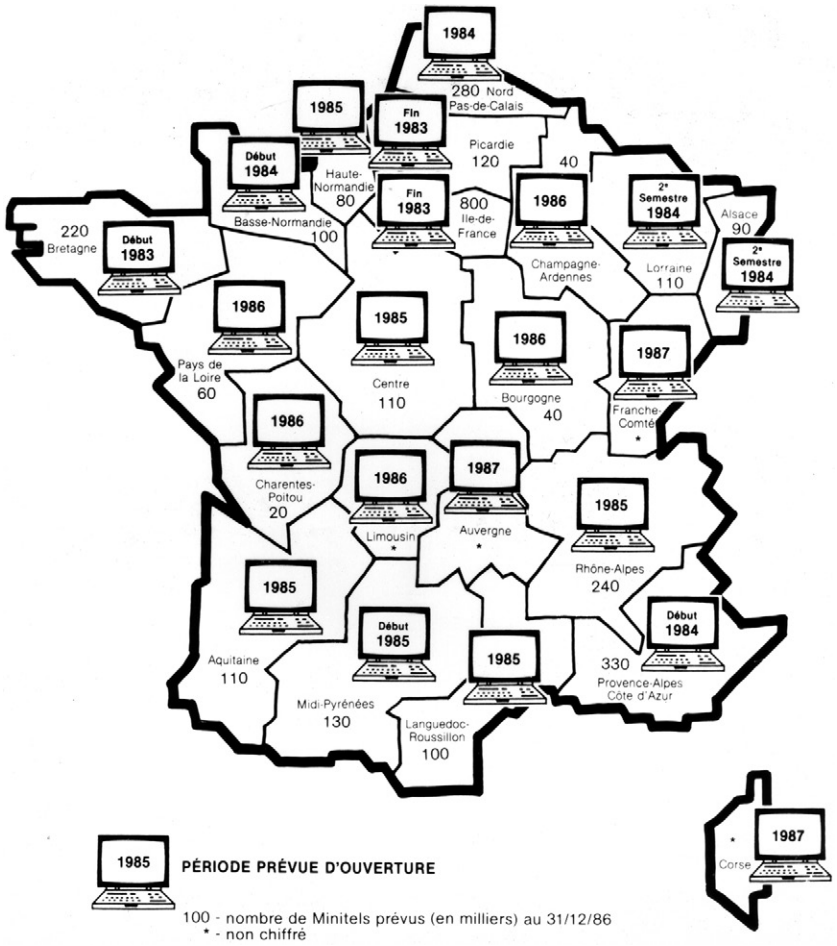

Figure 1.1 Minitel implementation map published in 1984. The numbers refer to the number of terminals (in thousands) requested by local authorities—a projection into the future. In the following years, terminals were distributed in even greater numbers to many of these regions. *Source*: Orange/DGCI référence photo F008571.

yet to come. We took a similar forward-looking approach in writing this book and posit that there is much to learn from the Minitel experience that will help us apprehend and devise better policies for the future. The official wake, in contrast, offered a vision of the past that has no future. "General, Mister Mayor," started the speaker at the military transmissions museum set in the middle of the industrial zone. The only real excitement came from the crowd of cadets with the local telecommunications military squadron, glad to get out of the barracks, if only for an afternoon. And then

there were the Orange public relations officers, happy to see that the local television station was covering the event for a two-minute segment on the evening news, and a few engineers from the 1970s, some still wearing their bell-bottom suits, bright eyed from what they'd accomplished. There were trays of lavish petits fours. But even the endless supply of champagne could not relax the stiff atmosphere. By 9:00 p.m., the party had wrapped up. We were offered a to-go tray of food so it wouldn't go to waste. For all that the attendees had accomplished, the event was blanketed by a glum administrative nostalgia for the 1970s.

The third category of Minitel constituents, the users, said adieu without a party of their own, though many certainly attended some of the other events that took place that week. As a wave of nostalgia swept the country, numerous conferences, dance parties, faux wakes, and art exhibits were held to commemorate, venerate, and poke fun at the system. By 2012, most (but not all) users had abandoned their Minitel terminals and messageries for laptops and web browsers, smartphones and apps.[12] As a result, a new collector's market for Minitel artifacts blossomed in online auction sites, and hackers playfully adapted the millions of remaining devices, connecting them to the modern-day Internet and demonstrating their surprising durability. Minitel was finally put to rest with an outpouring of affection.

Minitel was a technical marvel, commercial success, and ambitious social experiment. By providing terminal equipment free of charge and supporting risk-taking entrepreneurs, Minitel propelled France into the information age. Other networks may have introduced protocols and software standards that continue to be used today, but Minitel presaged the social, political, economic, and regulatory issues pertaining to widespread telecomputing. By the end of the 1980s, Minitel mirrored the patterns of everyday life, as a platform for curiosity, play, commerce, politics, work, sex, and love.

For contemporary readers, Minitel offers a unique model for thinking about the design and regulation of platforms, and their resulting place in society. The massive public investment in information and communication technologies—what the French called *la télématique* (a combination of the words *telecommunications* and *informatics*)—represents a natural experiment in the use of computer networks as infrastructures for public culture. Unsurprising, yet seldom explored, the challenges and controversies that arose during the Minitel period reflect many of the same tensions that animate the "platformization" of the Internet today.[13] In particular, the history of Minitel invites us to revisit three of the conventional dialectics used to analyze media systems. Minitel was, at once, open and closed,

public and private, centralized and decentralized, pushing us to think with greater nuance about how we characterize online systems. Instead of attempting to position Minitel as either/or, we examine the shades of difference between these extremes, and draw observations that others can use in the future to better design information services and network policies to foster innovation and civic participation.

What Do We Mean When We Say Minitel?

From its public debut in the early 1980s to its retirement in 2012, the term *Minitel* has been used colloquially to refer to the public videotex system in France (*videotex* itself refers to a family of two-way interactive media systems that bridge the telephone and television). From services, software, and protocols, to networks, switches, and computers, it's all *le Minitel*. Initially, however, the word *Minitel* referred only to the videotex terminal equipment deployed in the homes and offices of end users. Tracing the etymology of the term reveals a technical name for a generic input/output (I/O) device: *le médium interactif par numérisation d'information téléphonique*.[14] In the beginning, Minitel was just a terminal.

The transition from Minitel as a technical term with a specific meaning to Minitel as a metonym for the whole system reflects the way that everyday users encountered the platform. For the overwhelming majority, the terminal, monthly phone bill, and advertisements on the street provided their only points of contact with the system. The vast network that carried data to and from their terminals and calculated the cost of their time online was, like so much infrastructure, invisible. This invisibility is not unique to Minitel, of course, and many previous scholars and writers have pursued networks underground, across oceans, and into outer space. Computer historian Paul Ceruzzi found himself tromping through empty parking garages and construction sites in search of "the granddaddy of all switches" somewhere beneath Tysons Corner, Virginia.[15] Silicon Valley chronicler Po Bronson encountered "three gigabit switches, each the size of a microwave" during a tour of the main Bay Area switching office, leading him to conclude that "[t]he great Internet hub of hubs in the heart of Silicon Valley is composed of less high-tech equipment than most people have in their living rooms."[16] And artist Ingrid Burrington described New York City as an environment laden with "markings and remnants" of infrastructure that only become visible "once you know how to look for them."[17] Our task is similar: to invert the invisibility of infrastructure, crawling into the network through the video terminal and beyond the telephone jack to understand how the various technical

components, economic models, and regulatory bodies came together to produce the system we call Minitel.[18]

An important characteristic of the colloquial use of *Minitel* is that it refers to the entire system in the singular. Although there were many different terminals, services, and peripherals, there was only ever one Minitel. In this respect, Minitel is more like the midcentury US telephone network than the Internet. Consider a term like *the Bell System*, used by AT&T to refer to the entire Bell assemblage—from the handset to the switching board to the interstate long-distance lines—as a single system with many components. But whereas the Bell System came to be known colloquially as *the phone*, Minitel was never replaced by a generic term. There were many videotex systems in Europe but only France had Minitel. Speaking about Minitel in the singular calls attention to the invisible, infrastructural components of the platform. In this respect, each individual Minitel terminal was not a stand-alone device but rather the end point or leaf node of a massive, *singular* telematics network blanketing the nation. Just as there is only one France, there was only one Minitel.

The singular meaning of Minitel also facilitates a convenient comparison between Minitel and the present-day Internet. In spite of its singular name, the Internet is fundamentally multiple. It is, by design and definition, a dynamic composition of independent systems—a network of networks—joined by gateways that translate local networking protocols into the widely understood Internet Protocol. As a result, it is difficult to think or write about *the Internet* without providing some context—temporal, geographic, technological, or economic. Minitel, by contrast, is a singular, stable object of study.

Exploring the differences between the singular Minitel and multiple Internet draws out the political, ontological, and technical characteristics of the two systems. Whereas the particular networks, protocols, and regulatory regimes that make up the Internet are constantly changing, the component parts of Minitel remained largely unchanged for more than thirty years. Unlike the Internet, Minitel has clear edges and boundaries, as well as a beginning and end. The system was brought to life by State edict in 1978 and shut down with the push of a button in 2012.

How Did Minitel Grow over Time?

Minitel was a public service, accessible to anyone in France. Terminals were distributed incrementally by geographic region between 1983 and 1987.[19] Minitel use was voluntary and expensive, however, so while everyone in France was aware of Minitel, not everyone chose to participate.

France Telecom gathered and published a variety of statistics regarding the size and growth of Minitel, including the diffusion of hardware, amount of time people spent online, and growth of commercial videotex services. The simplest measure was to estimate Minitel penetration by dividing the number of installed terminals by the total number of active telephone lines. In 1991, this method indicated that approximately one-fifth of all telephone subscribers in France owned a Minitel terminal. Although this approach produced a seemingly easy to interpret percentage, it offers a limited account of Minitel as it was actually used by the population. Minitel connection fees could be quite costly, and many people never brought a terminal into their homes. The lack of home use did not mean that they were nonusers, though. Minitel access was also available from public kiosks and terminals installed in the workplace. The distribution of Minitel terminal equipment described just a slice of the overall number of active users on the system.

A second limitation of measuring penetration by system-wide proportion is that it masks the unequal geographic distribution of Minitel. In 1991, for example, near the system's historical peak, France Telecom issued a map showing the penetration of Minitel across twenty-two cities. Major metropoles consistently ranked higher than their rural counterparts. Penetration rates ranged from 23.9 percent in Paris and 22.4 percent in Lille to 16.2 percent in Clermont-Ferrand and 15.3 percent in Ajaccio on the island of Corsica. Furthermore, socioeconomic status could have qualitative effects on the experience of using Minitel. A typical Parisian would be more likely than a farmer in Brittany to engage in casual chat over Minitel, due to the high connection cost. Conversely, a Parisian would have little interest in using Minitel to check the latest swine trade rates or regional news. Although every effort was made to deploy Minitel as a universally accessible system, it could not entirely overcome the existing differences between city and country life.

Instead of counting terminals, another approach to measuring the growth of Minitel was to examine the aggregate number of hours that people spent connected to the platform. This is also the most comprehensive quantitative data available because France Telecom reported the number of connection hours annually from 1985 to 2007 (except for 1995 and 2004), whereas data regarding sites, terminals, average call length, and penetration rate were not systematically nor comprehensively made available after 1994. Time spent online reflects a few different aspects of platform growth. First, it is an indication of both population and utility. We can reasonably assume that growth in the amount of time people spend online reflects a growing recognition of the value of online services across

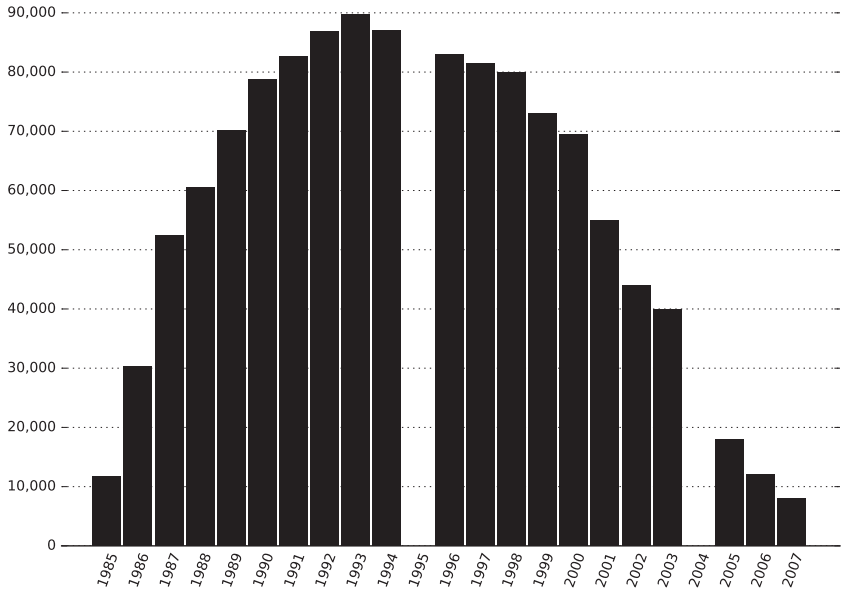

Figure 1.2 Connection hours (in thousands), 1985–2007. *Source*: Data published by France Telecom and available at Orange/DGCI.

the population of potential users. Second, the number of connection hours per year offers a general impression of economic growth because the revenue of most Minitel services came directly from the connection hours billed by France Telecom.

During the early years of the platform, approximately 1983–1993, when Minitel was booming, France Telecom published a number of additional statistics that provide a sense of how the various components of the system grew in relation to each other. These include the number of registered third-party services, number of installed terminals, and estimated proportion of the population with access to the platform. To facilitate comparison between these statistics, we constructed an index for each one by calculating their growth relative to a base year of 1985, when a majority of the country was connected (figure 1.3). While all the measures rose from year to year during this period, their patterns of growth differed in interesting ways.

In the early years of Minitel, between 1983 and 1987, the number of services used and hours that people spent connected to the network grew much faster than the diffusion of terminals and user population. Indeed, the number of services grew approximately 36.75 percent per year, on average, compared to 19.12 percent annual growth for the user population.

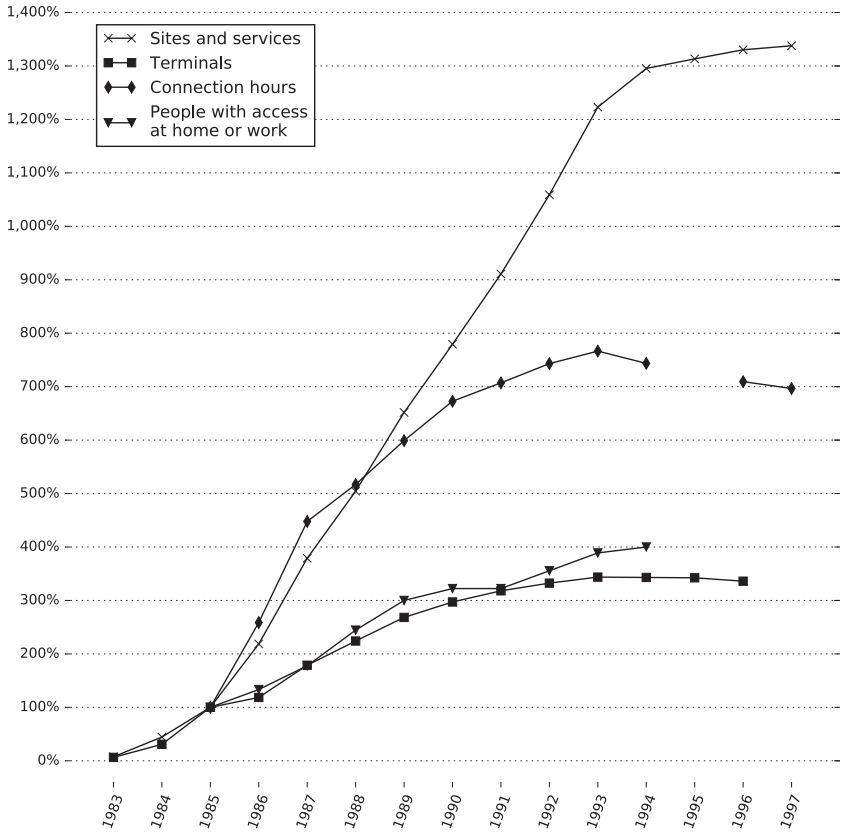

Figure 1.3 Minitel growth indexes, 1983–1997 (base year: 1985). *Source*: Data published by France Telecom and available at Orange/DGCI.

This rapid and steady growth reflected the low barriers to entry for entrepreneurs, value of hosting a service, and commercial promise of the Kiosk billing system. Building a Minitel service was a low-risk investment with a relatively strong potential for a good return. Furthermore, as Minitel became a part of popular culture, French organizations may have felt compelled to hang a shingle out in cyberspace, much in the same way that US companies later felt compelled to advertise a website.

The population of Minitel users grew steadily from 1983 to 1993, but the growth in annual connection hours began to slow down after an initial boom. This leveling off reflects the different practices of early and late adopters. Indeed, these data suggest that early adopters were eager to get online and explore. They had the money and interest to spend an unusual amount of time on the system, experimenting with new applications

and returning to their favorite services night after night. As the system continued to grow, however, Minitel started to spread to a less enthusiastic population. These folks might use the system occasionally for utilitarian tasks like booking a train ticket but they were less likely to have the resources and inclination to become dedicated *minitelistes*. This gap between casual and hard-core users was especially pronounced after 1991. The overall number of people with access continued to rise steadily, but the growth of connection hours actually began to fall; new users were accessing the system less often than earlier groups. Crucially, while Minitel is frequently remembered for ostentatious advertising and ribald messageries, the typical connection lasted just five minutes. Nearly everyone in France had access to Minitel, and everyone was required to use it at least once in their life since certain public institutions such as universities required online registration, but a much smaller proportion became devoted minitelistes.

Table 1.1 Statistics published by France Telecom, 1983–1995

	Sites and services	Terminals	Connections hours per year	Proportion of population with access at home or work
1983	142	120,000		
1984	844	581,000		
1985	1,899	1,887,000	11,700,000	9%
1986	4,152	2,237,000	30,266,000	12%
1987	7,196	3,373,000	52,395,000	16%
1988	9,578	4,228,000	60,487,000	22%
1989	12,377	5,062,000	70,090,000	27%
1990	14,800	5,607,000	78,710,000	29%
1991	17,297	6,001,000	82,735,000	29%
1992	20,112	6,272,000	86,943,000	32%
1993	23,227	6,485,000	89,688,000	35%
1994	24,599	6,473,000	87,000,000	36%
1995	24,940	6,461,000		
1996	25,263	6,341,000	83,000,000	
1997	25,405		81,500,000	

Note: Empty cells were not reported in the applicable year.
Source: Orange/DGCI.

Was Minitel Completely Controlled by the Government?

In discussions of telecommunications policy and technology development in the United States, Minitel is occasionally cited as the prototypical "wrong way" to build a mass-scale information system. It is decried as the quintessential public works project gone awry: centrally planned, controlled, censored, and laden with bureaucracy. Economist Eli Noam called it a "technologically backward system," and as media historian Fred Turner observed, Minitel is considered a "joke" in Silicon Valley, and an example of "what not to do."[20]

The historical record does not support the myth that Minitel was a radically closed system. Yet the stereotype persists, in part through firsthand histories of the Internet written by researchers and engineers. These accounts tend to frame the late twentieth century as a period of competition among protocol standards and networking technologies, each with their own values and ideological commitments. From this perspective, the emergence of the Internet Protocol, domain name system, and World Wide Web as de facto standards in the 1990s is seen as a victory of horizontal, engineer-driven development over more administrative approaches *à la Minitel*.

The notion that Minitel represents strict State control reflects a general misunderstanding outside France of how the platform functioned in practice. In the absence of firsthand experience, US technologists might reasonably have assumed that the Minitel was a walled garden sponsored by the State—a publicly funded CompuServe. In a popular history published in 2003, former Stanford Research Institute researcher and current Silicon Valley venture capitalist Jacques Vallée described Minitel as the "exact opposite" of the Internet: "a closed system with no ability to grow organically."[21] While the growth of Minitel as a technical infrastructure was limited by its commitment to the videotex standards of the late 1970s, it nevertheless *did* grow, tremendously, as a platform for experimentation and entrepreneurship in the application of computer networks in everyday life. These dimensions of growth were simply beyond the scope of Vallée's analysis.

To reduce the history of Minitel—the first mass-scale telecomputing system—to a competition among arcane networking protocols, or between a backward state-centric economic system and forward-looking free market economy is an odd historiographical choice. Odd, that is, if one's goal is to provide a holistic account of early computer-mediated communication. The focus on technical development in histories such as Vallée's is not malicious. Rather, the lack of attention to the applications,

politics, and culture of Minitel is the result of a generation of engineers being called on, by circumstance, to explain the social changes that seemed to follow from the diffusion of computer networks into everyday life.

Dismantling the Minitel myth also unsettles widely accepted beliefs about the development of the Internet. Indeed, significant components of the global information infrastructure themselves are controlled, censored, and centralized to an extent unimaginable in the 1980s. As the ongoing controversy regarding "net neutrality" reveals, the Internet of the 2010s is a complex tangle of national and institutional gateways, policies, and protocols. Furthermore, its commercial growth post-1995 was made possible by tremendous previous public investments and subsidies. Historical analyses of early systems like Minitel offer important context to the study of institutional and infrastructural power in the present. In particular, the balance of public and private interests in Minitel provides us with an alternative schema for understanding the enclosure of today's Internet by private institutions like Apple, Facebook, Google, or Comcast.

What Are We Talking about When We Talk about "Platforms"?

Admittedly, talking about Minitel as a platform is a mild anachronism. There is no evidence that the term *platform* was used to describe communication networks of the 1980s. Indeed, the use of *platform* in the context of computing emerged only at the end of the 1990s, prompted by the impact of Microsoft Windows on the software industry.[22] During the antitrust case against Microsoft, expert testimony from economist Richard Schmalensee gestured toward a more inclusive meaning of the term. Schmalensee argued that Java, America Online, and Netscape Navigator should all be considered competitors to Windows because each provided a "platform" for the development of new software.[23] Microsoft Windows may have seemed dominant in the narrow market for operating systems, but it faced real competition in the dynamic market for software development platforms.

Amid a cross-examination dense with technical detail, the court pushed Schmalensee to clarify his definition of *platform*.[24] Sitting judge Justice Thomas Penfield Jackson asked if a program for porting Windows applications to Unix would be considered a "platform" in competition with Microsoft since it strengthened the appeal of Unix. No, replied Schmalensee, such a program would be a "link between" platforms, but it was not a platform in itself. "I'm having difficulty at this point," admitted Justice Jackson. "Is [Java] a platform?" Schmalensee agreed that, yes,

"pure" Java was a platform because new software could be built directly on top of it. In fact, he continued, any computing system with an interface "to which [software] applications can be written" is potentially a platform. By this definition, the typical personal computer of the period represented a matryoshka doll of recursive platforms: an Intel x86 microprocessor, Microsoft Windows operating system, the Java Virtual Machine, and the Netscape Navigator web browser.

Although the court was not convinced by Microsoft's argument, the tussle over the meaning of *platform* presaged a bloom of academic interest in the technical, economic, regulatory, and rhetorical implications of platforms.[25] Schmalensee's testimony gestured to an emerging area of economic theory that drew together questions regarding information products, standardization, and network effects.[26] Beginning in 2003, the term *platform* was routinely used to refer to firms operating as intermediaries in a multisided market.[27] Recurring examples in this literature included a variety of information and communication technologies such as payment cards, video game consoles, broadcast media, and online services.[28] In this context, *platform* refers to a metaphorical space enabling two or more groups of economic agents to interact. Platform providers such as American Express or Nintendo strategically "court" each side of their platform through competitive pricing while maximizing their own overall profit.[29]

Meanwhile, Silicon Valley was struggling to recover from the dot-com crash. Amid the wreckage of countless failed websites, platform economics suggested an alternative way of thinking about the World Wide Web. Beginning in 2004, rather than continue to approach the web as a hypertext publishing system, adherents of Tim O'Reilly's "Web 2.0" doctrine started to use commonplace web technologies such as HTTP, HTML, CSS, and JavaScript to create stand-alone programs, or "web apps."[30] By 2006, Google was offering a suite of office productivity software that ran in a standard web browser—an almost pitch-perfect realization of the future envisioned by Microsoft and others a decade before. As users and developers alike began to accept the concept of the web as a platform, web applications grew in complexity, becoming programmable platforms in their own right. In the course of everyday use, the architecture of the web started to fade from view, becoming a commodity infrastructure for new platforms.[31]

The technical transition from web "sites" to web "platforms" after 2004, described by media scholar Anne Helmond as "platformization," was accompanied by wide-ranging changes in the social, political, and economic character of the web.[32] On the one hand, the borders of the ideal

Web 2.0 platform are designed to be porous, with user-generated data flowing in and out through publicly accessible programming interfaces, while on the other hand, enterprising platform providers must necessarily limit interoperability to prevent users from leaving for a competitor. Facebook, the canonical example of platformization, transformed itself from being a network of user profiles to a programmable platform by supplying third-party developers with convenient "plug-ins" and "widgets."[33] As third parties added "Like" and "Login with Facebook" buttons to their sites, Facebook shifted from being one of many social network sites on the web to a de facto standard infrastructure for sharing media with friends and verifying one's identity. Facebook's functionality seemed to explode outward onto the web while at the same time the entire web felt increasingly enclosed by Facebook.[34]

The platformization of the web by firms like Facebook was not a quiet transformation. Beginning around 2006, countless firms—from dot-com survivors like PayPal to newcomers like YouTube—started describing themselves as platforms. In 2010, communication scholar Tarleton Gillespie examined the use of *platform* in Silicon Valley discourse and found that firms routinely exploited the polysemy of the term to distract from their growing role as private mediators of public culture.[35] By portraying themselves as platforms rather than, say, intermediaries, social media providers hoped to position themselves as neutral channels, open to anyone. Of course, as Gillespie's analysis reveals, this populist appeal was not borne out in practice. The administrator of a social media platform always retains the power to determine who can participate and on what terms. These platforms not only host public discourse, they actively shape it.

Minitel was a platform in all these senses: computational, economic, and cultural. It was a platform for technical creativity, a platform for entrepreneurship, and a platform for the citizens of France to meet, chat, trade, and play.

How Do We Know What We Know about the Minitel Platform?

Most of the activity on Minitel was ephemeral. We have few records of the endless chats that took place on messageries, nor of the countless conferences, databases, and videotex pages that were published on the network. There is no surviving system to explore, no vestigial messageries to log on to. Minitel ended with finality in 2012, but the liveliest social systems had already faded away many years before. There is no way to emulate or simulate the experience of hanging out at home alone, dialing 3615, and flirting

with strangers all night on a messagerie as we might have done back in 1987.

Fortunately (or unfortunately, depending on one's perspective), this problem is not unique to Minitel. Media historian Megan Sapnar Ankerson notes that historians of radio and television have long struggled with the problems of ephemerality and incomplete archives.[36] Early broadcast programming was performed live, and even when a performance was recorded, the resulting tapes were not thought of as archival documents. Tapes were routinely recorded over, mislabeled, or destroyed. Preservation is the exercise of power to shape our knowledge of the past. Careful record keeping tends to reflect the cultural preferences of elites as opposed to providing a holistic snapshot of a medium. As a result, early entertainment—such as the daytime dramas aimed at women—were less often preserved than other sorts of programming.

Multiuser systems like Minitel introduce a second set of complications. Not only is the infrastructure and most of the content gone, but so are the users. Even if we were to build a replica Minitel network, complete with replica messageries, who would be there to chat with? Games scholars face this problem in the preservation of multiplayer games—particularly massively multiplayer online games and virtual worlds.[37] "Game worlds aren't games," writes researcher Richard Bartle, "they're *places*."[38] A depopulated World of Warcraft hardly represents the game as it was played. Faced with such an empty world, researchers rely on the firsthand accounts of former players as they are recorded in oral histories and paratexts such as blog posts, message board threads, screenshots, and gameplay videos.[39]

This book offers a history of Minitel as both a technical system and cultural phenomenon. The key analytic challenge in this approach is to synthesize these two aspects of the Minitel story in an effort to understand the social, economic, and political tenets of its technical design. Toward this end, we draw from a variety of primary and secondary sources, found in both official and informal collections. Whereas contemporaneous networks like the National Science Foundation Network (NSFNET) or Cyclades were developed largely outside the public eye, Minitel was deeply woven into the fabric of everyday life, as commonplace in French homes as the telephone and television, and omnipresent in the media.

Our study began with the mass-produced terminal devices that sojourned in domestic and professional spaces across France. Before the flurry of nostalgia that accompanied the end of the system in 2012, disused Minitels were shoved into closets and abandoned to the trash. During several years of trips back and forth to Paris and Brittany between 2008 and 2012, we assembled a collection of terminal equipment, peripherals,

software, and related ephemera. Through hands-on experimentation, we came to know these devices as working technologies, material objects with dimension and weight, sounds and smells.[40] The design and function of Minitel terminal equipment was revealed to us through both hobbyist forums on the web and the documentation produced by France Telecom (known as the Direction générale des télécommunications [DGT] until 1988, and Orange after 2013—note that we use France Telecom and DGT interchangeably throughout the book).

As a publicly funded infrastructure project, the development of Minitel was the subject of public policy, and the Bibliothèque Nationale de France, Archives Nationales, and France Telecom archives formally collected Minitel-related materials. As part of the State's effort to encourage entrepreneurship and third-party innovation, the technical components of Minitel were unusually well documented in technical manuals and user guides, all carefully edited and attractively designed. In addition, France Telecom was compelled to document the economic development of Minitel. Annual reports and periodic newsletters provide a source of quantitative data regarding the diffusion, adoption, and habitual use of Minitel services during the 1980s and 1990s. Unfortunately, these data are of limited use for serious statistical analysis. Published as part of the Minitel public relations strategy, the annual reports tend to paint a rosy picture, documenting the rise but not the decline of the platform. Similarly, some of the reports were simultaneously published in French and English in an effort to appeal to international investors. As a result, they offered a sanitized portrayal of Minitel. For this reason and also because of domestic political pressures, the vast market of sexually explicit services known as *Minitel rose* was largely absent, for example, despite its massive commercial success. Due to these biases, it was necessary to complement the official documentation of Minitel with secondary sources and first-person accounts.

Beyond the official output of France Telecom, Parliament, and the various government ministries and agencies involved, we turned to a large volume of paratextual Minitel materials such as periodicals, trade books, and ephemeral literature. Unofficial directories such as *Listel* and *Le Guide du Minitel* served as a kind of yellow pages for videotex services. Published seasonally and jammed with advertising for messageries and other adult services, these fat paperback tomes provide a view of Minitel from the ground up. A small number of how-to books were written for new users and would-be entrepreneurs. News and opinion writing about Minitel services, peripherals, industry, and culture were routinely featured in hobbyist and trade magazines, such *Science et Vie Micro*, *La Revue du Minitel*,

Vidéotex, and *Minitel Magazine* as well as in magazines aimed at general interest readers. As a public utility, Minitel was often discussed in the editorial pages of newspapers and on television. Likewise, news reporters frequently asked politicians to comment on various features of the system. With all this discourse, it can be difficult to know when to stop searching. As Ankerson notes about web history, there is both "too much and too little."[41]

Whereas France Telecom, the National Archives, and the National Library (from which we also acquired most of the news reports we cite throughout the book) collected most of the official documentation of Minitel, there is no single, authoritative source for Minitel ephemera.

Beyond formal collecting institutions, we turned to online auction sites and used book dealers to find Minitel materials circulating in the collector market. During our search, we benefited significantly from the voluntary labor of Minitel enthusiasts, especially the online collections maintained by Frédéric Cambus at Minitel.org and GOTO10.fr. Cambus's collection features an idiosyncratic index of Minitel media on the public web including scanned documentation, advertisements, news clippings, documentary video, and related software. Without the efforts of enthusiasts like Cambus, much of the popular culture of Minitel would be lost.

In addition to documentary sources, we conducted over thirty interviews with engineers and administrators within France Telecom along with other administrative agencies, private entrepreneurs building services to run on the platform, hackers, industry lobbyists, and journalists. These interviews took place in Paris, Brittany, and the San Francisco Bay Area, where Orange maintains a research lab. In particular, on the administration's side, we met with Gérard Théry, former head of the DGT; Jean-Paul Maury, former head of the Minitel project, and two of his young engineers, Jean-Luc Beraudo de Pralormo and Bernard Louvel; Bernard Marti, the CCETT lead engineer for the Antiope video standard; and Georges Nahon, former head of France Telecom's Minitel export arm, Intelmatique. On the private sector and users side, we met in particular with Daniel Hannaby and Michel Landaret, pioneers of Minitel rose; other entrepreneurs such as Jean-Eudes Queffélec, Christian Quest, and Laurent Chemla, a notable hacker; and Michel Baujard, an industry lobbyist. These interviews served multiple purposes. They helped to triangulate data and explain gaps in the official documentation, provided background for well-documented events, drew our attention to conflicts and tensions that animated the development of the system, and most important, supplied a qualitative account of some people's firsthand experience of working with Minitel.

There were many possible avenues into this uneven archive of devices, documents, paratexts, and interview transcripts. Our chosen point of entry is the idea of the *platform*.[42] At the micro scale, platforms represent a set of creative constraints for users and developers, while at the macro scale, platforms shape the interactions among individuals, firms, governments, and other institutions.[43] Understanding the mechanics of a computational platform like Minitel enables us to make inferences about the governing role of the platform in society at a particular time and in a particular place. In spite of its singular name, the Minitel platform is constituted by several subsystems—terminals, networks, and servers—each with its own architectures, protocols, institutions, and histories. To make sense of Minitel as a platform with both technical and social characteristics, we perform a historical *disaggregation*, exploring the various components and their relationships.[44]

Platform studies offers an unusual perspective for analyzing the place of Minitel in French society during the 1980s and 1990s. As we delve into the architectural details of Minitel, we will regularly return to questions about the social and cultural consequences of this admittedly arcane technology. As a platform for computation, communication, and commerce, we wish to know how Minitel allocated power and authority among millions of users. What functions were exposed to whom? Who decided which programs could run and what they could do? Who could make money on Minitel? How did they set their prices and get paid? What were the barriers to entry? Who could speak on Minitel? What could they say? Who set the rules? What happened if a rule was broken?

Learning from Minitel

One purpose of this book is to bring Minitel to the attention of readers outside France, many of whom have never heard of the system before. As the first computer network to reach mass-scale participation, Minitel presaged the near-universal adoption of Internet access in many major metropolitan regions today. For critics and policy makers, Minitel provides an empirical case study of a system that was actually implemented and used by a diverse French public. Many of the matters of public concern and political scrutiny that arise from ubiquitous Internet use, from the regulation of speech by state institutions and private actors, including the issue of net neutrality, to the conditions of anonymity and privacy protections, first emerged on Minitel. Similarly, Minitel supplies an example of a platform built and maintained with an explicit mandate to serve the public interest. As more and more critics in the United States and Europe

regard Internet access as a matter of public safety and prosperity, the study of Minitel grows even more vital. Through comparisons with the Internet and private platforms such as the Apple and Facebook ecosystems, the exceptional Minitel story enables us to grasp subtle shades on the openness spectrum as well as shed new light on the entangled roles of the state and private sector in fostering digital innovation in ways that defy conventional Internet policy wisdom.

The rest of this book is divided into six chapters. Each chapter addresses a different aspect of the relationship between Minitel and society, and may be read independently from the rest. Chapter 2 maps out the key technical components of Minitel, including its physical infrastructure, routing protocols, addressing scheme, video standard, software interface, and unusual accounting and billing apparatuses. Together, these elements sustained a generative platform for the creation of novel online services and the emergence of thriving virtual communities. Chapter 3 explains how the unique French culture got embedded in the protocols, and how state policy and national identity were woven deeply into the design and implementation of the system. In particular, we discuss the relationship between specific features of the Minitel platform and the French political tradition of centralization. The PTT at the center of all networked activity plays as a leitmotiv on a backdrop of economic and infrastructure development. Most Minitel stories, especially on the US side of the Atlantic, stop there.

In chapter 4, we show another side of the story: the fact that the Minitel architecture was actually a novel hybrid model, with innovation decentralized to the edges of the network. This marked an ideological shift in French policy—one that enhanced spontaneity, mobility, and imagination, and marked a transition from traditional dirigisme to state venture capitalism *à la française*. In chapter 5, we detail the results of this public–private partnership on content creation, with a particular focus on Minitel rose and other private-sector digital innovations that the United States would not see appear until after 1995. In chapter 6, we return to a consideration of the radical potential of the Minitel system in the hands of a creative populace, and show that the seemingly tight grip of the State over Minitel did not prevent fringe uses of the network. The life of the Minitel platform involves complex interactions between technology, policy, law, business, and culture. Finally, in the conclusion, we revisit the overarching question of the book: What do we learn from the Minitel experience that we can use to better design information networks in the future to foster innovation and civic participation? The alternative example of yesterday's Minitel provokes us to think differently about the Internet we will inhabit tomorrow.

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