**INNOVATIONS FOR SUCCESSFUL SOCIETIES**

# BREAKING NEW GROUND:
# PIONEERING ELECTRONIC LAND REGISTRATION IN ONTARIO, 1987–2010

## SYNOPSIS

In 1987, Ontario's land registration system was overwhelmed. Budget constraints and a surge in property sales were straining the Canadian province's paper-based operation. After struggling to computerize its land records during the previous seven years, civil servants at the provincial Ministry of Consumer and Commercial Relations led a groundbreaking effort to form a public–private partnership to convert millions of property records—both from paper to digital and in some cases from a deeds system to titles—and create the world's first electronic land registration system. During the partnership's first 12 years, beginning in 1991, the provincial government and joint venture company Teranet worked to persuade sometimes skeptical politicians and real estate professionals of the value of their model and laid the groundwork for a lasting relationship even after the government sold its ownership stake in 2003. Despite early financial challenges and a slower-than-expected conversion process, Teranet and the Ontario government pioneered technology that became a model for the world, simplified transactions for the province's landowners, and built a relationship that continued to offer value for both partners in 2016, 25 years after the partnership began.

*Maya Gainer drafted this case study based on interviews conducted in Toronto, Vancouver, and Victoria, Canada, in August and September 2016. Case published January 2017.*

## INTRODUCTION

"We had to set up tents because we couldn't fit people in our offices," recalled Art Daniels, who joined Ontario's Ministry of Consumer and Commercial Relations in 1987 as the ministry's land registry offices were struggling to keep up with a surge in property transactions. Lawyers and other users of congested registry offices had to wait outside to register land agreements and had to review records in nearby tents. "The economy was booming, land was selling, and we couldn't cope with the volumes," said Daniels, who served as assistant deputy minister.

As housing prices in Ontario—Canada's most populous province and its political and economic center—shot up and the number of property deals increased, the province's outdated land registration system staggered.

"There were long lines, and people were not getting registered, so they weren't getting their keys and they were unable to move on the weekend they had planned," said Elgin Farewell, a provincial land registrar at the time. "So I think there was alignment within government that something needed to change."

The provincial government had known for years that modernizing the system would reduce processing times and make records more accessible. Land records were kept on paper in more than 50 registry offices around the province, and people involved in real estate transactions submitted copies of their documents for review and certification by registry officers. In 1980, a team of civil servants had begun developing a digital database to store land records more securely and make data easier to find. However, after seven years of development and piloting, the project, called the Province of Ontario Land Registration Information System, or POLARIS, had digitized only 250,000 of an estimated 4 million records. The time, staff, and funds required to expand the system to cover the entire province were beyond the government's capacity. "The Treasurer would have thrown me out of his office with a request for additional funding and increased staffing," Daniels said.

A major hurdle for any proposed solution was that Ontario used both a deeds system and a Torrens title system for land registration. Under the deed model, parties to a property transaction had to review 40 years of records to ensure that the current owner had a valid claim. The title system treated a single record (the title) as definitive, and the provincial government guaranteed the owner's claim. Converting deeds to titles was a painstaking process that required heavy additional investments of time and money.

Embracing the idea of a major overhaul but lacking the means to implement one, Daniels, Director of Land Registration Ron Logan (who died in 2009), and their colleagues began exploring alternative ways to get the resources required to both digitize the records and bring the entire province under the titles system. Ontario's premier and other high-level officials had expressed growing interest in public–private partnerships (PPPs) wherein the government and a private company worked together to deliver a service and the company profited from user fees rather than a fixed service contract—a new model in Ontario at the time. The government also wanted to

strengthen its ties to Ontario's service sector, including geospatial services, and a PPP offered the opportunity to do so.

Inspired by projects elsewhere—notably, a hydroelectricity project in Quebec and railroads in both Canada and the United States—the Ministry of Consumer and Commercial Relations considered ways of working with the private sector to digitize and convert Ontario's land records and use emerging technologies to revamp the land registration system.

THE CHALLENGE

Creating a successful partnership to transform Ontario's land registration system was a formidable task. Although Ontario had few problems with corruption and informal tenure—factors that can amplify the difficulties of reforming land administration systems—the provincial government and its private counterpart had to navigate a wide variety of other challenges, from setting up the partnership to designing the technology.

Selecting the right private partner was a crucial first step. The provincial government's ambitious plan meant that it had to find a company or companies that had a wide range of skills and the ability to make a sizable investment. Effective implementation meant that the private partner had to have not only a working knowledge of the real estate industry but also the ability to develop software, convert records, reengineer business processes, and manage government relations. Finding companies with the right set of skills or getting companies to work together presented an immediate challenge.

Furthermore, the relationship between Ontario's government and its private counterpart had to be structured carefully and precisely so as to deliver on the objectives and be financially viable. "We were not very sophisticated about PPPs at the time," said Harriet Velazquez, who served as the ministry's chief information officer and who joined the board of Teranet, the joint venture company formed by the partnership in 1991. Given the lack of experience with PPPs, it was

essential to clearly demarcate the roles of the government and the private partner, to create targets and monitoring systems, and to establish coordination mechanisms. The two prospective partners also had to agree on the main aspects of the business model, such as revenue sharing and ownership of systems and data.

The scale of the project posed a significant challenge. With an area of approximately 900,000 square kilometers, Ontario was Canada's fourth-largest jurisdiction (including Nunavut and the Northwest Territories). At the time, the government estimated that 4 million properties had to be entered into the system, as well as more than 200 million total paper records.[1] Furthermore, converting properties under the deeds system to the titles system required skilled workers to review the ownership of each property and ensure there were no overlapping claims or other potential disputes.

In addition to the project's scope, "we were doing a lot of crazy technical stuff," said Aris Kaplanis, who became the first chief executive officer of Teranet. "Back in 1991, the biggest image-based database we could find was the Pentagon [headquarters of the US Defense Department], with 35 million records, and we had to build something that was six times bigger than the Pentagon had." Although the province had created a digital database, it had struggled to scale up POLARIS—and the existing software was designed only for managing records and finding information.

Implementing a system that would enable users to submit documents and enable registry officers to review and certify transactions electronically required even greater effort and expense. Although some Canadian jurisdictions had started automating their records, there was no model for completely electronic land transactions. As Ontario went through the process of documenting the methodology for different transaction types, reorganizing work flows, translating them into steps that could be computerized, and writing the code, new situations were bound to arise, and "we would have to make

new rules quickly to address them," said Kate Murray, Ontario's former director of titles.

Finally, the project had to overcome skepticism from several key groups. Any public–private partnership required sustained political commitment. In the course of a long-term project, governments and high-level civil servants were likely to change and would have to be brought on board. The overhaul risked losing support either because of ideological opposition—for instance, opposition to PPPs—or because a new government opted not to continue following its predecessor's priorities.

Second, staff in the land registry offices and on the ministry's POLARIS team had concerns about the new arrangement. It was a new model, Murray said, and especially early on, "it was hard for government staff to hand over a piece of their work—to say, 'We'll steer, you row.'" Many feared they would be out of a job as a result of computerization or that they would lose their union rights and benefits if they had to move to a private company. Registry staff also had to adapt to new ways of working, and many had to develop computer skills that their previous jobs did not require.

Third, the outside professionals who handled land transactions had to change their own ways of doing things—a shift that some would likely embrace and others might resist. The main users of the registry offices were real estate lawyers and conveyancers, who performed title searches and prepared and submitted transaction documents, usually on behalf of a lawyer. At the time, many of them "were hand-creating documents, and most of them used typewriters," said Vicki McArthur, a deputy land registrar who later became director of product development at Teranet. For lawyers, the main issue involved changing their office work flows and methods, but for conveyancers, an online system posed a direct threat to business.

## FRAMING A RESPONSE

Daniels, Logan, and a team of civil servants at the Ministry of Consumer and Commercial Relations assembled a working group of assistant

deputy ministers from the ministries involved in land issues—environment, transportation, and finance—to discuss their specific needs in any new land information system. Because the participants each used different types of land information, the meetings were especially helpful in finding common ground on mapping and data, Daniels said, and they took place on weekends to accommodate the participants' busy schedules.

To attract a reliable private partner and enable the resulting joint venture company (Teranet) to deliver on the project's wide-ranging objectives, the business model had to offer an attractive return on investment. The ministry's team envisioned giving the company the right to collect revenue from every land transaction in the province, but the government would still set fees and receive a share of the payments. To strengthen the project's appeal, the business model included a 10-year exclusive license to use the data, thereby enabling the company to develop new products and services that repackaged land data for uses that went beyond standard transactions.

In collaboration with the Ministry of Industry and Trade, Daniels's team at the Ministry of Consumer and Commercial Relations developed a request for information to gauge private sector interest in the computerization project and advertised it in business journals and national newspapers. The Ministry of Industry and Trade had been coordinating a related effort to promote relationships between the government and service industries both to improve service delivery and to develop Ontario's service sector, and members of its staff worked with the Ministry of Consumer and Commercial Relations to design the request for information and promote it to industry groups.

Daniels said the response was encouraging: "I thought, 'Oh, my God, this is a good idea; so many people are interested in it.'" But even though more than 70 companies expressed interest, none demonstrated the capacity to take on the entire project alone. The two ministries asked them to form consortia that could work together to cover all aspects of the effort. As the companies organized themselves, the civil servants drafted a

more detailed request for proposals, and in December 1988, 21 companies were invited to respond. Two consortia, representing most of those companies, bid on the project.

The bids went through several layers of review: by experts in land information systems from New Brunswick and the Maritime provinces; by lawyers, consultants, and audit firms; by deputy ministers from all of the ministries that would be involved in the project; and by staff from Ontario's Treasury.[2] However, Daniels said, "We realized as we got into the results the two consortia were very similar in a lot of ways."

Rather than choosing either bid immediately, the ministry negotiated with both groups. "We didn't want to play one off the other, but to see what's the best they can do," said Bonnie Foster, a member of the ministry's negotiating team who later became a vice president at Teranet. Neither consortium made a satisfactory initial offer, and in early 1990, the government created the Strategic Alliance Liaison Office specifically to handle negotiations for the deal and oversee the resulting partnership. The office stipulated more-specific conditions, including 50/50 ownership, a major financial investment by the private partner, government ownership of the data, and completion of the project in less than 15 years.

One of the two consortia, called Real/Data Ontario, emerged as the province's choice of a private partner. "After two years, it came down to who really believed in partnership," Daniels said. Made up of five companies that specialized in areas such as database management and surveying, plus a group of individual investors, Real/Data offered the skills to complete the project and promised to match the government's financial contribution—a condition the competing consortium did not meet, he said.

For the business model to work, Ontario's legislature had to amend laws on land administration, a process that took place in parallel with the negotiations. In 1990, parliament approved two crucial pieces of legislation: the Land Registration Reform Act and amendments to the Land Titles Act. The legal changes authorized

and regulated the use of electronic records and assigned the director of titles the authority to convert properties in the deeds system to titles, respectively. The amendments to the Land Titles Act also included a new qualified title, which was designed to make the conversion process easier by reducing the number of records that had to be searched in order to convert property deeds to the title system (see Textbox 1).

The final negotiations were in progress when provincial elections shook up the political scene in September 1990. For the first time, the socialist New Democratic Party (NDP) won a majority in the Legislative Assembly, raising fears that the government would be hostile to the idea of any partnership with the private sector. "We all

thought, 'Well, that's it. No NDP government is going to approve [involving] a private company in the land registration system,'" Foster recalled.

But the project's proponents were pleasantly surprised by two aspects of the political turnabout, Daniels said. First, the new minister of Consumer and Commercial Relations turned out to be very receptive to the idea of a PPP. Second, the change in government helped resolve an issue that could have become contentious: what to do with unionized POLARIS staff when the new joint venture company, named Teranet, came into existence. The private consortium had been hesitant about the new company's taking on staff who remained in the public sector union, but the group dropped its opposition when it became clear

## Box 1. Land Registration Systems in Ontario

In 1987, Ontario used both a Torrens title system and a deeds, or registry, system to register land. The deeds system had been introduced in the late 1700s, and covered mainly properties in the more densely populated southern part of the province. A century later, in 1885, the province introduced the Torrens system, which became more prevalent farther north. Which system a property was registered under varied by county, which was the level at which land records were managed.

Under a Torrens system (named after Sir Robert Torrens, a mid-nineteenth-century Australian politician), a certificate of title constitutes a strong and permanent record of property ownership. The person registered on the title has a definitive claim to the property, and the government guarantees the claim and provides compensation for the rightful owner if a title gets issued or transferred in error. A Torrens system can simplify transactions because the title takes precedence over any other claims, and it guarantees that the registered owner has the right to sell the property.

In contrast, a deeds system requires the registry office to keep a record of each transaction in the property's history. Before a sale, a mortgage, or other transaction can take place, the parties must verify that the deeds in the registry show an unbroken chain of ownership in order to ensure that the owner in fact has the right to make the transaction and that there are no competing claims to the property. In Ontario, the law required 40 years of records to verify ownership.

Because the Torrens title certificate serves as a definitive record of ownership, the issuance of titles requires care in order to avoid dispossessing a person who has a legitimate claim to the property. Boundaries must first be described clearly, and any disputes or overlapping claims must be resolved. When Ontario's government decided to convert all property records in the province to titles, it created a new qualified title to simplify the process. To create a qualified title, those doing the conversion had to search only three arm's length transactions or 10 years back, whichever was longer. The administrative nature of the conversion process meant qualified titles could not provide exactly the same guarantees, but to ease real estate professionals' acceptance of the process, the government added some new guarantees beyond those standard in the Torrens system. For instance, property owners or buyers typically had to search adjoining parcels to make sure that there was no history of improper division from neighboring properties. When issuing a qualified title, staff did those searches, and the government guaranteed such problems were not present up to the date of conversion. If errors during the conversion process led to a financial loss for the owner, he or she could go through a hearing process to claim compensation from the title assurance fund.

that the new socialist government would never agree to such an arrangement. "There was no way they'd get the deal" unless the consortium accepted the unionized workers, Daniels said, "so it turned out to be really great."

After a final round of reviews by the new government, the province and Real/Data signed the partnership agreement in February 1991, and Teranet was formed in May. The 50/50 partnership committed the province and Real/Data to each contribute C$29 million of equity—Real/Data's in cash and the government's mainly in the forms of hardware and software that the Ministry of Consumer and Commercial Relations transferred to the venture, which received full ownership of POLARIS for the 10 years of the agreement. The government retained ownership of the data and the original documents, however, and continued to guarantee titles and set the fees for services such as searching and registration.

The agreement made Teranet the exclusive provider of property search and registration services for 10 years and required the company to digitize and convert all of Ontario's land records by 2002. Each partner appointed four members of Teranet's board, and they jointly agreed on another five. Because of its 50% stake in the company, the government was entitled to half of any dividends provided for shareholders, and the agreement also granted the government a 25% royalty from registration-related revenue and 5% from nonregistration services.

## GETTING DOWN TO WORK

In 1991, the Ministry of Consumer and Commercial Relations and Teranet began working together to transfer staff, digitize and convert records, and develop a pioneering electronic land registration system. As the project progressed, the two partners had to overcome an initial crisis and develop structures for collaboration, eventually culminating in the sale of the government's ownership stake in 2003.

*Building Teranet*

Before the newly created company could begin operations, Teranet had to hire staff—in many cases, experienced civil servants—and establish itself as a cohesive institution.

A key component of the partnership agreement was that unionized staff working on POLARIS would receive job offers from Teranet and would still be represented by their public sector union. The Strategic Alliance Liaison Office, which became the focal point for monitoring and coordination with Teranet after the agreement was signed, was responsible for ironing out any wrinkles in the transition.

Sue Corke, a career civil servant who served as the office's first director, spent months working with the union. Drawing on her experience in mediation, Corke held regular meetings to keep the staff updated on the process. Finally, Corke said, "they were all handed their pink slips, were laid off from the government, and one second later were handed their job offers from Teranet." For those who did not want to leave the civil service, "we'd match them if we could, but it was never guaranteed," she said. Of approximately 100 union employees, more than three-quarters moved to Teranet, where they received comparable salaries and relatively few changes in benefits.[3]

Many of Teranet's senior managers also came from the civil service. Originally, many senior staff were seconded from the government, Foster said, including herself, but "having two bosses wasn't going to work. . . . Teranet had to have real employees." Several months into the partnership, most chose to become full employees at the company. Teranet also hired additional staff, including its first CEO, Kaplanis, from the private sector.

The management team worked hard to smooth the transition, Kaplanis said. The POLARIS staff who transferred to Teranet were "scared to death," he said, "then you had private sector people going to an environment where they didn't know what to expect… you had to make

people feel comfortable that they weren't going into a lion's den." To bridge the gap in work styles and expectations between former government employees and those who had spent their entire careers in the private sector, Teranet's managers strongly emphasized corporate culture. The senior management team tried to keep everyone aware of developments by way of all-staff meetings and to build cohesion through social events and peer-nominated awards.

The partnership was not designed to completely privatize land administration. "The idea of Teranet was to be the enabler of systems" rather than take over the entire land registration process, said Farewell, who joined Teranet in 1997 and became its CEO in 2013. Throughout the process of digitizing the records and designing the electronic registration system, the government continued to own and operate the province's land registry offices and employ registry staff who ran the front offices and approved transactions.

*Finding a new financial partner*

In late 1992, not long after Teranet's creation, the company ran into a financial crisis: The partnership agreement required Real/Data to contribute C$29 million to match the government's earlier investments in POLARIS. Although the consortium put up an initial C$5 million, it missed the next two installments of C$4 million in October and C$10 million in January 1993, and its members were not in a position to invest any more funds.

Real/Data's primary financial partners—a small group of venture capitalists—had expected to raise the remaining money on the strength of Teranet's business model. But two problems caused them to ultimately fail to meet their commitments and lose much of their initial investment.

First, Ontario's heated economy cooled. The partnership had been negotiated at the height of a real estate bubble in the Toronto area, driven in large part by a healthy job market, migration into the city, and low mortgage rates. When the bubble burst, prices dropped sharply—by 39% for

condominiums and 27% for other types of housing—and transactions decreased.[4] Growth also slowed across the rest of Canada.[5] Between the declining real estate market and the sluggish overall economy, few investors were willing to sign on to an ambitious and unproven land project.

Second, the deal had come under intense scrutiny in 1992 after the losing bidder complained that Real/Data had been selected for political reasons and that the government had behaved improperly during the bidding process.[6] As a result, "I don't think there was a single oversight body that didn't have a go at us," Corke said. Daniels, Corke, and other ministry staff had to provide a thorough accounting of the decision-making process to a legislative committee and other oversight agencies. Although none of the inquiries led to charges of wrongdoing, investors were wary of signing on to a project that was under a cloud and facing an array of negative media coverage.

Inexperience with PPPs and problems involving transparency complicated the situation. "I wasn't helped at all by the former partner, Real/Data," Daniels said. "They became obsessed with [the] secrecy of their deal. . . . The private sector can have commercial advantage by keeping secrets [information] to itself, but there's no advantage in government to keeping secrets." As the press and opposition parties raised questions, Real/Data's reluctance to disclose information such as its shareholders or the details of the contract compounded the consortium's financial struggles.

With the Real/Data consortium unable to provide the required capital, the province began looking for a new investor. While in talks with the Royal Bank of Canada, an especially attractive possibility emerged: Miralta Capital, an investment firm that managed several large pension funds. Daniels said the firm appeared to be an ideal partner because of its willingness to make the entire remaining investment up front—bringing the private contribution to the agreed C$29 million—and to wait 10 years to begin earning a profit on the deal. "They very much understood

the idea that this required patient money. . . . They'll invest in something that has a long-term return," he said. Teramira Holdings, a new consortium formed by Miralta, included some of the original companies from Real/Data but replaced the investors with Miralta and served as Teranet's main private investor from 1993 until the company's initial public offering in 2006.

*Converting Ontario's land records*

Real/Data's default slowed the project, but with Teranet financially secure, the company and the civil servants it worked with could focus on their core task: converting all of the province's land records to digital format, and those in the deeds system to land titles. Conversion was fundamental, Farewell said. "We wanted to convert and automate the records, we wanted to provide remote access and an electronic marketplace for transacting in land registration, and we wanted to be able to leverage those capabilities and take it to other markets. I still remember that three-bullet slide that said that's what Teranet does . . . and you didn't really focus on that last bullet until you'd been successful with the first two."

The conversion process lasted almost two decades, ending in 2010. However, Teranet and the province sequenced the conversion process to get to critical mass as quickly as possible. Records were stored at the county level, and the company and its government counterparts at the Strategic Alliance Liaison Office focused first on populous counties with more-active real estate markets, mainly in southern Ontario near the United States border. Daniels said condominium property records were the easiest to convert, so the office and Teranet "picked counties where there were lots of condominiums, like Toronto, and then moved on to slower projects—First Nations reserves, crown [government-held] land, and areas with lots of properties with old records or lost records."

Throughout the process, Teranet's conversion team followed the same basic procedure: Scan the paper records; enter data from the image into POLARIS; have a staff member certified as a title analyst review it for errors or, if the property was

in the deeds system, any problems that would prevent it from being converted to a title; and send the data to Teranet's mapping group for entry into a spatial database as well. If there was a discrepancy with the record, the problem would be passed up through several layers of authority, from the on-site supervisor to Teranet's legal department, to the province's director of titles for a decision. However, the conversion proved more complex and more time-consuming than originally anticipated, and as Teranet gained experience, Farewell and his team refined many of the procedures.

Initially, Teranet's conversion team rented space next to the land registry office in each county it was working on, took records from the office to its space, scanned the records, and did the conversion on-site. However, as the quality of scanned images improved, the company could process documents—scanned by a small team of Teranet staff—at a central location rather than placing a conversion team, often made up in part of local conveyancers, at every registry office. The creation of a "virtual registry office" meant the same workforce could handle each set of records, which reduced the need to train new staff, Farewell said. Improving technology also enabled Teranet to build an integrated electronic worksheet that prompted users to enter specific data and eased the process of linking the typed information to the scanned image, thereby reducing human errors that were more common when staff relied on spreadsheets.

The records also proved more variable than the provincial government or the company had expected, and the number of records ended up being significantly larger—closer to 5 million than 4 million. The partners worked together to plan how to handle the more complicated properties and increase efficiency.

One crucial change was to plan how to respond to certain problems in advance. Before beginning work in each county, a joint team from Teranet and the ministry visited the local registry office to look at sample records and speak with staff and clients about potential problems related

to the conversion process. Then "we would try to cut those off at the pass and make decisions at a bulk property level," said Eric Black, who headed Teranet's legal team responsible for conversion and later became its director of government relations. That way, when title analysts ran into a problem—for instance, unofficial private roads or parcels with water access—they already had guidance on what to do. As Teranet converted new counties, "we created a database that captured those decisions so the staff, the quality assurance folks, [and] the legal folks all had a reference point," Farewell said. The need to consult government legal experts eased as joint decisions with the province set precedents.

Another improvement was the development of an effective performance management system for title analysts. Measuring performance had proved challenging early in the process because of the wide variability of records. For instance, a new subdivision lot that was already in the title system was much easier to get into the database than an old property in the deeds system. But by the late 1990s, Farewell said, Teranet had developed a system to sort records by their complexity during the initial review, so "it didn't matter what record you were working on, because we classified all the records and knew the property type."

By weighting records based on their complexity and factoring that into measurements of individual work quality and productivity, the managers of the conversion process could evaluate staff more fairly and identify training needs.

*Developing electronic systems*

By 1995 almost half of the province's records had been converted, and the company launched its first digital tool: Teraview, a software package that enabled users to search and view records from their homes and offices.

But remote access was just the first step. While the conversion process was in progress, Teranet and the ministry worked to develop an electronic system that would overhaul the entire process of making land transactions, from documentation to government review, to final record changes.

Designing the Electronic Land Registration System, or ELRS, required close collaboration between Teranet's product development team, the provincial government—especially the titles division—and real estate attorneys. The lawyers played an especially important role during the planning stage because they were the primary end users of whatever kind of system came about. Teranet, the ministry, the Law Society of Upper Canada, and the Ontario Bar Association formed a joint committee to review land transaction procedures and create guidelines for electronic registration.

After identifying needs and setting broad guidelines for the new ELRS, officials at the ministry and Teranet hashed out every detail in an effort to eliminate inconsistencies and latent problems. "One of the things the system was trying to do was standardize. . . . Each registry office had its own unique way of doing things, so there were a number of us from different registry offices, and as you're trying to set a rule or say what's happening, there ended up being some interesting debate about what the real rule was," said McArthur, Teranet's director of product development. McArthur worked on the ELRS as one of the province's representatives before joining the company in 1998.

The design team then had to turn the complex procedures and legal requirements into reasonably straightforward prompts for users. The ELRS relied on lists of legal statements—descriptions of the property owner, the property owner's rights, and what rights were being transferred. To maintain accuracy, the system included error notifications that alerted users to missing or contradictory statements before they submitted documents. The design team had to come up with a comprehensive list of statements for each transaction type and rules stipulating which combinations of statements were and were not allowable.

Developing and checking the rules was a grueling process, Murray recalled. "We were sitting in boardrooms for days and weeks, talking about extremely detailed design matters like Boolean

logic," the operating basis for binary computer systems, she said.

To register a transaction through the ELRS, the system retrieved and displayed existing information on the parcel from POLARIS, such as the owner's name and a property description. Lawyers or conveyancers representing both parties to the transaction entered new material, including transaction type and cost, and selected a series of legal statements that the system cued based on transaction type. Once the documents were completed, both lawyers reviewed and signed them electronically on behalf of their clients and submitted them online to the registry office for review and registration.

Although anyone could use the software, "it was really built with a focus on lawyers," McArthur said. The interface was organized to resemble the files in a lawyer's office, and the system could be integrated into desktop programs that lawyers used for managing their files and preparing supporting documents for submission.

*Rolling out digital transactions*

Involving professionals in the design process was an important first step, but once electronic transactions were ready to launch in 1999, Teraview's proponents had to get its users on board. "The process wasn't going to work if we didn't work with and accommodate the users," Murray said.

Although the transition to electronic registration had little impact on people who were selling their properties or buying someone else's, the change raised concerns among real estate lawyers and the conveyancers who had to navigate the particulars of each transaction.

Real estate professionals were divided on their feelings about the new system. Many, like lawyer Jerry Udell, were eager for change. "I embraced it—anything to make my life easier," he said. Still, Udell recalled that some lawyers and clerical staff chafed at having to alter their way of doing things and "didn't want to deal with computers."

The law society and the bar association became valuable allies in bringing reluctant lawyers

on board. "Some people hated us, and some people said this is the right thing to do," Farewell recalled—including influential members who advocated for the system with the others. Local chapters organized information sessions so Teranet could explain the system, and early adopters spoke with their colleagues about the advantages of computerization. Teranet also held individual sessions with lawyers, sending a team to visit law offices, help them set up the software, and walk them through how to use it. "Our representative would come sit with you for hours," Black said—a service that was included with the purchase of the software.

For conveyancers, concerns often ran deeper because the ELRS threatened to reduce their role in the transaction process or cut them out altogether. Conveyancers had functioned as intermediaries between land registry offices and real estate lawyers, combing through thick registry files to perform title searches, preparing lengthy paper transaction documents, and delivering completed applications to registry offices. By eliminating the need to visit registry offices to search records and submit documents, the new system jolted their business model.

"Conveyancers did have concerns, and some resisted," Murray said. "We did listen to everyone, but our objective was electronic registration for the whole province, for good reasons—you can't do a transaction that's half electronic and half on paper."

The nature of their work made adapting to the digital system challenging for many, and "we had some very heated and difficult meetings," Foster said. However, she said, some conveyancers "got out in front of it, learned Teraview early on, and continued to make themselves indispensable to the lawyers that way."

Introducing the system gradually helped ease tensions. Although the 1990 Land Registration Reform Act authorized the minister responsible for land matters to issue regulations making electronic registration mandatory, the province did so slowly, giving lawyers and conveyancers time to adjust. Once a county's records had been fully or

almost fully converted, the ministry filed a regulation making electronic registration optional. After a transition period, a second regulation was filed making electronic registration mandatory. The transition period for the land registry offices early in the process was approximately a year, McArthur said, but by the time the last county was converted a decade later, the time span was just two months.

*Coordination and oversight*

Throughout the partnership, success hinged on maintaining close communication between the provincial government and Teranet and tracking progress across the entire project.

After the agreement was signed, the Ministry of Consumer and Commercial Relations designated the Strategic Alliance Liaison Office to monitor Teranet's progress and iron out everyday issues. Corke, the office's first director, headed a small team that included experts in land titles, POLARIS, and human resources. As the first point of contact for Teranet, the team either resolved disagreements directly or passed them up the chain to higher-level officials.

The office's staff and their counterparts at Teranet established committees made up of senior managers from the company and the civil service to oversee specific areas of the partnership. Especially important were those that tracked implementation of the conversion, development of the software system, and overall management of the relationship, including dispute resolution.

Initially, the focal point was the joint implementation committee, which supervised the conversion process. In addition to responding to major legal questions, the group set the schedules and determined the order in which counties were automated. The joint systems committee coordinated software development and facilitated meetings between Teranet, the government, and the legal community to design the ELRS. Finally, the joint management committee monitored the progress of both the conversion and system development. "If there were performance issues, you had to report it to that committee, and it would review remedial plans,"

Farewell said. The committee was responsible for resolving disagreements, he said. "If one of the subcommittees can't agree on something, it goes to joint management; if joint management can't figure it out, it goes to the CEO and deputy; and if they can't figure it out, it goes to arbitration."

In addition to helping Teranet and the provincial government quickly identify and resolve their differences, attention to governance structures was a political asset, Corke said. Because of the value and sensitivity of land information, she said, some government officials were concerned about "what was going to happen once the private sector got their hands on our precious data." Demonstrating that the two partners had regular contacts and clear ways of resolving issues helped "assure people that government was in charge," Corke said, especially when new—and sometimes skeptical—civil servants took senior positions in the ministry.

"We did more briefing of government people than we did of new board members or staff," Foster recalled. Because civil servants frequently moved between ministries and departments, there was "constant turnover" of the people Teranet interacted with, she said. As personnel changed, the established governance structures provided an opportunity for the company to "help [them] understand why we were in the room and why we were there to begin with."

*Selling the government's stake*

After almost 10 years of working together, Teranet's contract was nearing its end, and the government, led by the Conservatives since the 1995 elections, began to consider selling its stake in the company so it could raise funds to help cover the province's budget deficit. In 1998, the government and Teranet began renegotiating, with an emphasis on adjusting timelines and formalizing governance mechanisms before the sale.

The renegotiation covered several major issues, said Velazquez, who left the board in 1999, set up a private mediation practice a year later, and was selected to facilitate the renegotiation in 2002 because of her knowledge of the partnership.

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Chief among the renegotiation issues were the timeline and the cost of conversion, user demands for changes to the ELRS, and how to handle value-added products that used the system's land data, which Teranet was just starting to develop.

Ontario and Teranet agreed to restructure the agreement to extend to 2007 the deadline for converting all of the province's records, to require the joint committees to meet regularly, and to establish a new privacy committee. Privacy was becoming an increasingly important issue as Teranet designed new products that used the data for purposes other than core land registration functions. The government received a 5% royalty for nonregistration services, with the rest of the revenues going to Teranet. One example was GeoWarehouse, a subscription platform Teranet launched in 2001 to provide sales data, property information, and streetscape imagery for real estate professionals. Purview, launched a year later, provided valuation information for lenders and insurers and enabled them to automatically check for indicators of fraud such as unusual activity or property values inconsistent with a local market. The government and Teranet agreed these were acceptable uses of the data, but they restricted other uses—for instance, by prohibiting bulk sales of information, which would otherwise be valuable to advertisers. "There was tremendous pressure from the private sector, but we just refused," Kaplanis recalled. "I told them, we're not a list company; we're not going to sell you a list of all the 5% mortgages… That's not what Teranet is." Eventually, the joint privacy committee established a formal structure for reviewing new products and making sure they complied with government privacy requirements.

With the revised agreement in place, in August 2003 the province sold its shares to Teramira Holdings, the private group of investors who had held the other 50% since 1993. Although Teranet maintained its contractual relationship with the province as a service provider and continued to work closely with the government representatives on the joint committees, the government no longer had either an ownership stake or seats on the

board. The sale brought in C$370 million, helping cover the budget deficit that the Conservative government had been concerned about.

As the government exited Teranet, the two partners more than ever had to provide assurances that the arrangement would benefit the province and the public. A critical provision of the sale agreement was that the government would receive half of any additional value generated by any subsequent sale of the company within three years. The government also maintained ownership of the registry offices and the data itself, as had been the case in the original agreement.

## OVERCOMING OBSTACLES

Shortly after Ontario sold its shares in Teranet, the province confronted a series of high-profile cases of title theft and mortgage fraud. Although there were only a handful of reported fraud cases out of approximately 2 million transactions per year, the cases undermined public confidence in the system and prompted the provincial government to make changes that would tighten security and prevent fraudulent transactions.

The most prominent of Ontario's fraud cases involved a 55-year-old widow named Susan Lawrence, who in 2006 received an eviction notice after someone impersonated her and transferred her property to another imposter. The title thief then took out a mortgage on the property and disappeared with the money.[7] Based on a 2005 precedent, Ontario's appeals court initially ruled that the mortgage company had the right to take the house and that Lawrence had no choice but to claim compensation from the province's title assurance fund.[8] Several other victims of fraud—mainly older people—faced similar predicaments.

The cases highlighted a pitfall of Ontario's title system: Victims had few options when the registration process failed to prevent fraudulent transactions. What was on the title was legally indefeasible—that is, unalterable—because titles were considered definitive records of property ownership and associated rights. In December 2006, Ontario's parliament amended the Land Titles Act to invalidate any transaction that took

place after a fraudulent one, and it increased the penalties for fraud. Under the revised law, a mortgage given to a fake owner was no longer valid—even if the bank believed the owner was legitimate when it issued the mortgage. Lawrence appealed the court's decision, and in February 2007, the Court of Appeal for Ontario reversed its 2005 decision and invalidated the mortgage. However, the legal changes helped only after an act of fraud rather than changing the system to prevent fraud from happening in the first place.

To tighten access to the system and increase the chances of detecting scammers, the titles division and the law society implemented rules to allow only lawyers to submit transfers and to require them to share the risk of any fraudulent transfer. "It made lawyers bear the burden of client identification," said Jeffrey Lem, a real estate lawyer who became director of titles in 2014. "If someone wants to commit fraud they have to go through a lawyer and convince them." Although the move sparked objections from conveyancers, "the facts in the Susan Lawrence case created a lot of political will," Lem said. The new restrictions were finalized in 2008.

After the agreement with the law society, only lawyers in good standing could file transfers in Teraview, although other transactions such as mortgages could still be submitted by banks or conveyancers. Because lawyers served as "gatekeepers" under the new system, Udell said, "it was imperative that we confirm the identities of those we represented." Udell said he made sure clients had two pieces of identification, and he also had a bar code reader to check that information on the front of clients' driver's licenses matched the encrypted information on the back.

Lawyers were required to pay into a fund that served as compensation for people defrauded of their property, but in addition to the financial risk, lawyers could lose their professional licenses if they allowed fraudulent transactions to get through. The law society served as the regulator of the profession and could penalize lawyers who failed to check identities or allowed others to access their Teraview credentials. Because the law

society determined who was allowed to practice law, Teranet automatically checked the society's list of lawyers in good standing every day and blocked anyone whose name did not appear on the list from filing transfers in Teraview.

Despite efforts to improve the security of the registration system, some risks remained. The new restrictions significantly reduced title theft, Lem said, but some fraudulent activity survived and perhaps increased in mortgages, which were not subject to the same lawyer-only controls. A fraudster could still artificially inflate the value of a property, have a conveyancer take out or discharge a mortgage, and disappear—and the title assurance fund was much more difficult for mortgage lenders to access. It was also fairly common for lawyers to allow their clerical staff to use the Teraview account and submit transfers for them, real estate lawyer Alan Silverstein said. The lawyer could still be held responsible if there was a problem, but the practice compromised security.

Although the cases made the public uneasy, "you can't blame those on the electronic system; I don't see how you can argue the paper system was more secure," Murray said. "The issue was due diligence," she added, which the controls introduced in 2008 helped address.

## ASSESSING RESULTS

In 2016, almost 30 years after Ontario began exploring the idea of creating a PPP to modernize its land registration processes, its pioneering electronic registration system had become an essential element of the province's daily workings. Teranet continued to manage land registration services, electronic registration was in widespread use, and the provincial government had reaped financial rewards from the partnership—despite a rocky start.

Converting all of the province's land records into the titles system and digital format took longer than expected, but the process was finally completed in 2010. At that time, 99.9% of properties had been converted and digitized, with only about 34,000 so-called nonconverts that had

specific problems preventing them from being converted from deeds to titles.

The conversion simplified transactions because lawyers or property owners no longer had to search 40 years of records to establish ownership. Computerizing the records eased access to land information because users could instantly obtain digital copies of titles from anywhere rather than having to visit local registry offices to get paper records. The digital database and its backups also reduced the risk that crucial paper documents could be damaged or stolen.

The conversion process formed the backbone of Ontario's electronic registration system—among the first in the world. The world's first electronic land transaction took place in Ontario in 1999, and use of the ELRS took off in subsequent years because the system sped up and simplified real estate transactions. "I shudder to think how we did deals without it," real estate lawyer Silverstein said. Teranet consistently received high marks for customer satisfaction in surveys conducted by the ministry, averaging around 85%.[9]

However, some lawyers complained about the complexity of the system's interface and about the need to decipher codes indicating the required legal statements. In 2016, Teranet was preparing to launch an update that would simplify the process and enable online access rather than requiring users to install a desktop program.

Standardized metrics of land administration indicated that Ontario's performance was strong but not outstanding globally. The World Bank's *Doing Business* Quality of Land Administration index, which awards points based on the reliability of institutions and infrastructure, transparency of land information, geographic coverage, and land dispute resolution processes, gave Canada a score of 21.5 out of a possible 30 points in 2016, slightly below the average of 22.7 for high-income countries in the Organisation for Economic Co-operation and Development (OECD).

The *Doing Business* methodology for evaluating property registration is based on a transaction in a country's largest business city—in this case, Toronto—making the data applicable specifically to Ontario. Canada's strongest score was for reliability, and its weakest was for transparency—in part because Teranet and the registry offices did not publicize some of the statistics, such as transaction volumes or timelines.[10]

Canada's distance to frontier score for property registration in the *Doing Business* reports (again, based on a transaction in Toronto), which represents the gap between a country's performance and the best practice in the data set, has consistently been 75 to 79 out of 100 possible points since 2005, the first year data were available. In 2016, Canada received a score of 75.09, slightly below the average of 76.73 for OECD high-income countries, and was ranked 42nd out of 189 countries.[11] However, the *Doing Business* methodology covers preliminary steps such as receiving an appraisal of a property's value and obtaining a municipal tax clearance certificate. Those steps increased the time and cost associated with property registration beyond those associated with the online process itself.

The province and Teranet also won several awards for the project—notably, the Commonwealth Association for Public Administration and Management's International Innovations Awards gold medal in 2002[12] and Canadian Information Productivity Awards Award of Excellence in 2001.[13] Teranet's systems served as a model for several other jurisdictions, including Jamaica, Lebanon, and the Czech Republic.

Despite some challenges in adjusting to the new technology, "I don't think there would be a lawyer in the province today who'd go back to the old way," Farewell said. A gradual rollout, close collaboration with professional associations, and individual support helped stragglers adopt the system. However, the change hurt business for conveyancers, who made their livings as the experts in interacting with the registry offices and searching paper records.

## Box 2. Technology at the Land Title and Survey Authority in British Columbia

In 2002, just over a decade after Ontario's provincial government signed its partnership agreement with Teranet, the government of British Columbia was facing similar problems. A booming real estate market was overwhelming the province's registry offices. At the same time, the government was facing a budget crunch and was considering closing registry offices in remote areas to save money, which sparked protests by indigenous First Nations groups, who worried about losing access to their property records.

Inspired by the not-for-profit organization set up to manage Vancouver's airport, in 2003 the Law Society of British Columbia proposed that the province use a similar model for land registration, which was handled by government ministries. The envisioned nonprofit corporation would focus on providing a single service—rather than being one of a ministry's numerous responsibilities—and could bring together the titles and survey functions, which at the time were in different ministries. Crucially, a nonprofit corporation would face financial pressures to improve services and create efficiencies because it would be supporting itself by using fee revenue, but it could not put profitability ahead of the best interests of the province.

The government quickly adopted the law society's plan and assigned Godfrey Archbold, a career civil servant with a background in land administration, to begin setting up the new organization. Called the Land Title and Survey Authority (LTSA), the nonprofit opened its doors in January 2005.

The LTSA faced two major challenges right away: a workforce on the verge of retirement and unacceptably long turnaround times. Although British Columbia had been working on computerizing its land records since the 1980s, in 2004 only 13% of transactions were submitted electronically; and reviewing the documents and processing the transactions took more than a month. Especially given the high volume of transactions in the early 2000s, the LTSA had to either hire more staff—in an environment in which the agency was already having difficulty attracting candidates to replace those about to retire—or make its processes more efficient. And it would have to do so while funding its operations and maintaining the existing system entirely on its own resources.

Technology offered a solution to both problems. By computerizing a large portion of the processes, the authority could quickly reduce turnaround times. And with a sophisticated enough system, the LTSA would be able to replace some of the retiring staff with computers. The older staff would keep the paper-based system running until electronic registration was in place, but to operate the digital system, the authority could hire a smaller and younger workforce that focused on only the complicated transactions.

The first change the authority introduced was the use of smart PDF forms that enabled its system to pull the data that lawyers or notaries submitted and fill in much of the information required to process the transaction. However, the process still required review by an officer of the authority.

The next step was to create a program that could check the data submitted against the legal requirements and either flag issues for an officer to review or certify the transaction automatically. The LTSA brought in a new chief information officer, Al-Karim Kara, to lead the development of the system. Kara coordinated a team of experienced registry officers to document their work flows and develop system rules that his technology team then converted into specifications for the contractor hired to write the code. The authority also consulted users in its development of an interface that was easy to work with and as a way of making sure there would be no surprises about the transition. As in Ontario, electronic registration was rolled out as an option and later became mandatory.

The technological changes—and the business process revisions that took place as part of their development—slashed the LTSA's turnaround times from 37 days in 2003 to 3 in 2016. By 2016, 95% of transactions were being submitted and processed electronically, and 47% were automatically reviewed.

Financially, the partnership made money for Ontario. The government contributed C$29 million in equity at the beginning of the project, largely in-kind (the value of the work it had already done on POLARIS). Twelve years later, it sold its 50% stake for C$370 million. Assuming the government bore 50% of the C$391 million in implementation costs reported by the provincial auditor for 1991–2002, the government still would have made a profit of more than C$140 million on the sale.[14] At the time, some criticized the 2003 valuation for being too low.[15] However, the sale agreement was designed to address those concerns: after Teranet's 2006 initial public offering, the provincial government received C$573 million because of a requirement that it share in the value of future sales.

The two partners formed a lasting relationship despite the structural changes. In 2010, Teranet paid Ontario C$1 billion for a 50-year concession to continue operating the ELRS, and it agreed to make annual royalty payments beginning in 2017.

Two years later, Teranet expanded into the neighboring province of Manitoba using a similar model—an up-front payment of C$75 million to operate the land registration system for 30 years plus annual royalties beginning at C$11 million. The agreement with Manitoba went further than the one in Ontario: instead of only providing the software, Teranet also staffed and operated the registry offices and certified titles itself. However, other Canadian provinces digitized their registries independently (see Textbox 2), and by 2016, Teranet had not expanded further. Although several countries looked to Teranet for inspiration, they did not work directly with the company on implementation.

## REFLECTIONS

Ontario's groundbreaking land registration system helped pave the way for widespread adoption of electronic registration technology and highlighted both the advantages and challenges of computerization. Years later, British Columbia's Land Title and Survey Authority (LTSA) pushed the technology further, adopting automated certification of titles (see Textbox 2). Taken together, Teranet and the LTSA demonstrate the possibilities of innovation in both the institutional design and the technology used to manage land—and the strategies and circumstances that made new approaches possible.

In several ways, Ontario and British Columbia were relatively easy targets for electronic registration. The provinces did not have to contend with several of the challenges common in developing countries that introduced similar reforms—notably, informal tenure systems. Canada had a long tradition of statutory recognition of land rights, LTSA CEO Godfrey Archbold pointed out, and "the technology wouldn't work as well in a context where land rights aren't as strongly protected."

Unlike in countries where land registration had been introduced recently or unevenly, even if records were sometimes flawed or out of date, nearly all private properties in Canada were recorded officially in either a deeds or a titles system.

Corruption, often a major challenge in land administration, also was minimal. Although leaders in both provinces had to get staff and users to learn new skills and although there was still some risk of title theft and fraud, Canada offered a relatively straightforward environment for developing and testing new ideas about land administration.

In both provinces, the governments adopted an alternative model of service delivery—working with a private partner in Ontario and establishing a new nonprofit corporation in British Columbia. Both Teranet and the LTSA had to support their operations and finance investments from their own revenues, which helped drive efficiencies and the adoption of new technologies.

The two provinces differed, however, in the type of corporation each created, and that in turn shaped outcomes. Teranet was established as a for-profit company, initially with partial ownership by the provincial government but later with only a contractual relationship as a service provider. The LTSA had never had government ownership and

was legally required to reinvest the money it made into its operations or use it to lower fees.

Because of their different financial structures, the two corporations pursued different improvements beyond their core registration systems. As a for-profit company, Teranet developed value-added services that used the data in new ways. "Teranet followed customers out of the office, and they came up with products for Realtors, mortgage products for banks, risk management products for insurance companies…. We never would have dreamed up any of these ourselves," said Art Daniels, former assistant deputy minister in Ontario's Ministry of Consumer and Commercial Relations.

In contrast, British Columbia's LTSA focused on improvements to its registration system, such as automated examination, and its interface, sometimes investing beyond the point of diminishing returns. "If we have the money, we can argue something is a public good even if there is not a strong financial return," Archbold said.

The move to a corporate model was made much easier by a favorable real estate market. Both provinces made the shift during a real estate boom, which created the impetus for change because existing systems were unable to manage the demand and helped the new corporation support its investments by generating transaction fees. Without a large and active real estate market, a private-sector-oriented institution would struggle for viability.

The transition was much easier in British Columbia because that province used only the Torrens system, which enabled it to avoid the conversion process that ended up being the most difficult and time-consuming aspect of the partnership in Ontario. Teranet CEO Elgin Farewell advised that in his experience, "legal conversion is pretty complex, so if you're going to go down that path, be conservative in your estimates."

In both provinces, the institutional change did not represent a complete break from the government. "It's a symbiotic relationship," Archbold said. Close involvement with the ministry responsible for land, whether through joint committees in Ontario or through frequent consultations on legislation in British Columbia, was vital. In both cases, the provincial government was represented on the corporation's board—in Ontario because of its ownership stake and in British Columbia because a seat was reserved for the province.

Getting a new institution up and running also required its leaders to draw heavily on civil servants' expertise. Both Teranet and the LTSA brought in senior and line staff managers from the government while recruiting people from the private sector to manage such areas as finance or software development. Employees with strong working knowledge of land administration and relationships with their counterparts in government proved critical in enabling both corporations to deliver. "I believe it's a great environment for a public-private partnership," Farewell said. "You really do leverage the expertise of each partner to mutual advantage, and the winner at the end of the day is the end user."

Other players in the land administration system played equally important roles. People in both Ontario and British Columbia stressed the need for lawyers or other professionals to serve as gatekeepers for the system so as to reduce the risk of fraudulent transactions and provide an accountability mechanism if one got through. Submitting transactions through lawyers or notaries had always been mandatory in British Columbia, while Ontario adopted the requirement only for transfers after encountering problems with fraud in 2008.

"The public has to trust the intermediaries, like the lawyers, the notaries," LTSA vice president Liza Aboud said. "We've seen some places where the public does not trust those groups, and they're a key part of our system here." The strategy adopted in Ontario and British Columbia would work only in environments in which lawyers themselves were not involved in corruption, were effectively regulated, and in which the public trusted them to faithfully represent their clients' interests.

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Ontario and British Columbia offered examples and lessons for other jurisdictions, but as others drew on the Canadian experience, Murray said, it was important to recognize that "systems aren't turnkey." Close attention to policy goals, the legal framework, and the political environment created a context in which a public-private partnership and innovative technology could succeed. Ontario's experience provided a valuable model, Murray said, but "you have to customize.

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