VicRoads:
IBM Technology Paves the Way for Faster, Better Service

An IDC e-business Case Study

WHY IBM	*"Our choice of IBM Global Services as a Web solutions partner was clearly a testament to our confidence in their ability to meet our demanding requirements—in terms of both the complexity of solution and the aggressiveness of the timetable."*

THE GOAL	NEAR-TERM:	Provide an improved platform for delivering electronic services to its customers.
	LONG-TERM:	Create a platform for the efficient development and delivery of next-generation Web-based applications.

THE COMPANY	VITALS:	VicRoads is a statutory authority of the state of Victoria, Australia, with responsibility for the state's extensive (22,240 km) arterial road network. Tasks range from transportation planning to administration.

THE SOLUTION	PROFILE:	Web-based Customer Self-Service Solution
	DEPLOYMENT TIME:	3 months
	IMPLEMENTATION TEAM:	IBM Global Services and VicRoads IT personnel

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VicRoads, an agency of the state of Victoria, Australia, handles a wide range of transportation issues, ranging from the planning, implementation and management of transport projects to providing various administrative and informational services to the three million drivers that use the Victorian road system. Above and beyond such high-profile services as licensing and registration, VicRoads also provides highly specialized services targeted to a narrower audience. One of the most important of these services, known as VR Online, provides car dealers and financial institutions with a means of placing and tracking the status of vehicles, thus protecting their legal and financial interests.

An online service originated in the mid-1990s through a joint venture involving VicRoads and its incumbent telecommunications service provider. VR Online evolved from an earlier solution that ran on the provider's proprietary platform, which was accessed via a dial-up modem connection. After the provider announced in January, 1999 that it planned to discontinue the service in nine months, VicRoads needed to rapidly develop a roadmap for providing an alternative delivery channel. A consensus was quickly established that a Web-based platform was the answer. Despite the certainty with which it embraced the Web as the technology of the future, VicRoads still faced the challenge of deploying a fully functional solution within nine months.

As IBM Global Services was VicRoads' major IT service provider and had a good understanding of VicRoads' business and strategic directions, IBM Global Services was a logical choice for a project of this complexity. VicRoads' Web-based solution was designed, developed and implemented by IBM Global Services, based on specifications provided by VicRoads. VicRoads internal personnel also assisted the IBM Global Services team in project coordination and planning. IBM Global Services selected VisualAge for Java as the development environment, as well as key software components including WebSphere, MQSeries, and DB2 Universal Database. Servers used include the IBM RS/6000, Netfinity, AS/400 and S/390.

In addition to saving its customers the chaos of disrupted service, VicRoads also saved (and continues to save) itself an estimated A$600,000 annually in administrative costs, while its "customers" save an estimated A$1 million or more in similar costs. VicRoads attributed the success of the engagement to IBM Global Services' ability to meet all of its business requirements within a very tight timeframe.

The Solution

Core Functionality

- Web-based Customer Self-Service Solution

Software

- IBM WebSphere Application Server
- IBM DB2 Universal Database
- IBM MQSeries
- IBM VisualAge for Java

Servers

- IBM RS/6000
- IBM Netfinity
- IBM AS/400
- IBM S/390 Parallel Enterprise Server

Services

- IBM Global Services

Benefits

- Annual estimated savings of A$600,000 in administrative costs for VicRoads
- Increased satisfaction among users due to faster, better, and more available service
- More than A$1 million in cost savings (estimate) for users of the VR Online system

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! **Background**

VicRoads, also known as the Roads Corporation, is a statutory authority of the state of Victoria, Australia, with responsibility for most issues related to the state's extensive (22,240 km) arterial road network, including the planning, implementation and management of transport projects. In addition to transportation policy issues, VicRoads also provides various administrative and informational services to the public, including the development of road safety programs and the registration and licensing of the states 3.1 million cars and three million drivers. Employing over 2,000 statewide, VicRoads operates under the same mandate that guides all other Victorian state agencies—that it provide the public with valuable services in as cost-effective a manner as possible.

While serving a broad range of citizens with such high-profile services as licensing and registration, VicRoads also provides highly specialized services targeted to a narrower audience. One of the most important of these services, known as VR Online, is intended to provide car dealers and financial institutions with a means of placing and tracking the status of vehicles, thus protecting their legal and financial interests. Under the VR Online service:

- Car dealers or auction houses can confirm ownership details (e.g., whether a vehicle has a "clean" title or is stolen) or check for financial encumbrances (i.e., liens).

- Financial institutions (which lend money for vehicle purchases and, as such, have a financial interest) can use the system to 1.) register an encumbrance against a vehicle, 2.) vary the details of an existing encumbrance, or 3.) cancel an encumbrance.

For both dealers and lenders, the fundamental benefit of VR Online is to mitigate the risk that a vehicle will be repossessed, resulting in financial loss to either the dealer or the lender. Since it was introduced, VR Online has come to represent an indispensable, mission-critical tool for its users.

An online service was originally developed in the mid-1990s through a joint venture involving VicRoads and its incumbent telecommunications service provider. At the root of the service is a sophisticated database platform known as the Vehicle Securities Register (VSR), which contains encumbrance data on vehicles for the entire state of Victoria. Because the system is linked to similar databases across Australia (with the exception of Western Australia and Tasmania), VSR provides a virtual nationwide database of encumbrance information to VicRoads' base of users. Under the original architecture, the service was delivered over a proprietary platform, with access via a dial-up modem connection. But as the following section shows, a series of unexpected events compelled VicRoads to reassess its service delivery strategy, and to do so within a very tight timeframe.

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In January, 1999, VicRoad's incumbent telecommunications service provider announced that the proprietary infrastructure over which the online access to VSR was delivered was not year 2000 compliant, and that—as a result—its support for the infrastructure would be discontinued in September, 1999. According to Rod Chapman, Manager of Information Services at VicRoads, the agency saw the need to rapidly develop a roadmap for providing an alternative delivery channel for the service—and all signs pointed to the Web. "The fact that the online service had become so deeply ingrained in the business processes of our 'customers' meant that turning it off was just *not* an option," says Chapman. "It didn't take us very long to conclude that the Web represented the ideal platform for delivering the online service."

The idea of migrating to a Web architecture was not new to VicRoads, as evidenced by the fact that a number of proposals to build a Web-based platform had been made in the previous years. While Chapman points to the decision to withdraw support for the old platform as the primary impetus for VicRoads' strategic shift to the Web, he also saw that a number of sub-surface factors favoring the adoption of the Web model had been building over time. For instance, VicRoads had long sought to make the system more user-friendly by replacing its DOS-based interface with a standard browser. More importantly, VicRoads had long sought to move its IT architectural strategy toward a more open-systems approach, with standards-based technology at the core of its service delivery platform. "We saw the adoption of Web technology as timely because it allowed us to build the foundation for a new generation of Web-based services," says Chapman. "We saw a Web-based approach as favoring our customers by significantly lowering their access costs. The general direction of our path—toward the Web—was quite clear."

Despite the certainty with which it embraced the Web as the technology of the future, VicRoads still faced the need to have a fully functional solution up and running in less than nine months. "Our main challenge was to design, deploy and test a solution within an extremely aggressive timetable," says Chapman. "Our credibility—and the interests of our customers—hung in the balance, but we were determined to succeed."

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e-business Challenge VicRoads

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Key Decision Criteria In Selecting IBM

"In the six years we've been working with IBM, they've earned our complete confidence in their ability to deliver to our satisfaction. Our choice of IBM Global Services as a Web solutions partner was clearly a testament to our confidence in their ability to meet our demanding requirements—in terms of both the complexity of solution and the aggressiveness of the timetable."

—Rod Chapman

With less than nine months remaining before its existing VR Online platform was phased out, VicRoads moved aggressively to energize its Web initiative, gaining internal approval for the plan in February 1999. Since IBM Global Services was VicRoads' major supplier of outsourced IT services—and had a good understanding of VicRoads' business and strategic direction—it represented the logical choice for a project of this complexity and so demanding a timetable.

Chapman notes that VicRoads could ill afford the luxury of taking a chance with an unproven vendor when time was such a critical factor. "In the six years we've been working with IBM, they've earned our complete confidence in their ability to deliver to our satisfaction," says Chapman. "Our choice of IBM Global Services as a Web solutions partner was clearly a testament to our confidence in their ability to meet our demanding requirements—in terms of both the complexity of solution and the aggressiveness of the timetable."

John Ford, Manager of Electronic Service Delivery, points out that there was also a close fit between what VicRoads has defined as its strategic architecture—Java technology at the client and IBM DB2 at the back-end—and IBM's portfolio of technologies. "We see IBM's Application Framework for e-business as embodying the same principles—facilitating innovation—that we try to achieve through our own strategic architecture," says Ford. "Specifically, we want a flexible infrastructure that allows us to not only develop and deploy applications quickly, but also provides us with a scalable platform for all of our future service offerings."

! The VicRoads Solution

VicRoads' high-level electronic service delivery architecture, comprised of three tiers, is designed to provide browser-based access to Web applications and enterprise servers communicating with each other across a network. At a basic level, the three tiers of the architecture include:

- A Java-enabled client tier containing logic related to the presentation of information and results produced by an application to the user.

- A Web Application Server tier that controls the reading and writing of data.

- An Enterprise server tier that provides the data storage and transactional applications used by the Web Application Server processes.

The application elements residing in these three tiers are connected through a set of industry standard protocols, services and software connectors.

An important aspect of VicRoads' service delivery architecture is a set of common transaction services, developed by IBM Global Services based on a specification provided by VicRoads. [All technology products underlying the VR Online platform, such as IBM WebSphere Application Server and MQSeries, were selected by IBM Global Services based on their ability to conform to VicRoads' stringent business requirements.] By deploying this "applications infrastructure," VicRoads sought to provide a set of common functions (e.g., security, merchant services, and directory services) that can be accessed by its entire portfolio of electronic service offerings. In addition to providing uniform functionality to all of VicRoads' services, the common transaction services framework is also designed to streamline application development going forward by allowing new applications to "plug into" this core base of application functionality via standard interfaces.

The Web-based VR Online system user gains access to the systems via a user name and password. VicRoads' home page (www.vicroads.vic.gov.au) resides outside the site's firewall. Inside the firewall are two Web application servers (IBM Netfinity 7000 servers running IBM WebSphere Application Server and MQSeries) and two load-balancing servers. These servers use Java servlets and dynamic HTML to facilitate the connection to back-end databases (discussed below). The other major architectural component of the solution is the VicRoads intranet, a Token Ring LAN networked through IBM 2210 routers, on which resides user-sensitive data and enterprise systems. The intranet's key elements include:

- a Lightweight Directory Access Protocol (LDAP) directory server (running on an IBM Netfinity 7000) that maintains registered user information and access control lists;

- a database server (running DB2 Universal Database on an IBM Netfinity 5500) that stores batched data and audit logs of all transactions;

- an IBM AS/400 server (running DB2 Universal Database) that supports the VicRoads Vehicle Securities Register system; and

- an IBM S/390 Parallel Enterprise Server (running DB2 Universal Database) that houses the vehicle registration database, containing registration details on vehicles, ownership data, etc.

When a user logs on to the VR Online solution, the LDAP directory stores and maintains information that is used by the common transaction services framework to authenticate and authorize user access to specific applications. Based on services specified by the user, the request is sent on to either the AS/400 (for encumbrance data) or the S/390 (for registration data). The system also allows users to conduct transactions that access both systems simultaneously. For example, a user can confirm ownership of a vehicle while simultaneously checking to see if a vehicle has a financial encumbrance on it. Under this scenario, a single inquiry from the user would split off into two transactions, one going to the S/390, the other going to the AS/400.
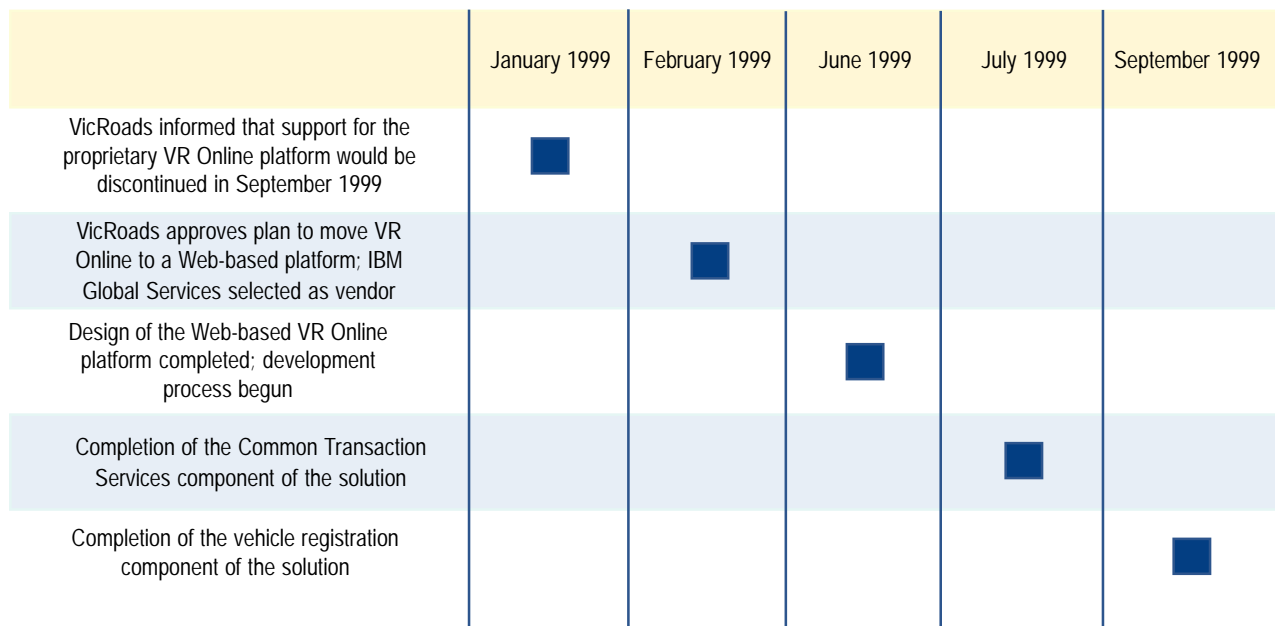
! Implementation Approach and Timetable

VicRoads' Web-based solution was designed, developed and implemented by IBM Global Services, based on specifications provided by VicRoads. VicRoads internal personnel also assisted the IBM Global Services team in project coordination and planning. The development effort moved along two parallel paths, with one effort dedicated to the construction of the VSR Online application, and the other simultaneously focused on building the common transaction services framework (upon which the application would ultimately rely). The deployment team was compelled to follow this parallel approach because of the project's extremely tight timeframe, which provided insufficient time for a more sequential, "one-step-at-a-time" approach.

While necessary, this parallel approach significantly increased the complexity of the overall development effort for a number of reasons. First, the vehicle registration as designed relied on the functionality of the common transaction services infrastructure; as such the registration application was dependent on the successful deployment of the common transaction services layer. Second, VicRoads was—like the rest of the world—engaged in year 2000 remediation efforts. Third, VicRoads had just installed a new AS/400, as part of a general upgrade. As Chapman explains, the confluence of these factors created a "volatile" environment for application development. "There were a lot of projects that were very closely coupled and relied on each other exclusively, within a tight timeframe where the end date was immovable," says Chapman. "The fact that the team succeeded was a major credit to everyone involved."

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After completing the design process in June, 1999, the IBM Global Services team began development of the solution, relying mainly on IBM VisualAge for Java as its development environment. Both the VSR Online application and the common transaction service components were written in Java using the e-business Application Framework as the basic architecture. VicRoads sees the key value of Java in its support for the rapid deployment of platform-independent, Web-based applications. Development of the common transaction services layer was completed in July 1999, while the vehicle registration application was completed in early September, just prior to the decommissioning of the previous, proprietary infrastructure. While the application has not changed substantially since that time, the common service development effort has continued in earnest, with additional functions including payments capability. By investing in a common transaction services platform, VicRoads expects to substantially streamline its application development process and, in the process, reduce its costs and shorten its development cycle.

Implementation Timetable for the VicRoads Solution

	January 1999	February 1999	June 1999	July 1999	September 1999
VicRoads informed that support for the proprietary VR Online platform would be discontinued in September 1999	■				
VicRoads approves plan to move VR Online to a Web-based platform; IBM Global Services selected as vendor		■			
Design of the Web-based VR Online platform completed; development process begun			■		
Completion of the Common Transaction Services component of the solution				■	
Completion of the vehicle registration component of the solution					■

Source: VicRoads and IDC

One business benefit of the VicRoads engagement dwarfs all others: the fact that VicRoads' business customers were never subjected to a service outage as a result of the discontinued support for the older, proprietary platform. "If we had discontinued the online service in September, we would have betrayed our users' interest," notes Chapman. "This would go against the spirit of what Victorian state government is trying to achieve—more responsiveness towards our users' needs. Increasing satisfaction is the single most significant driving factor behind all our online initiatives."

However, Chapman is quick to add that the benefits of the continuity and enhancement of the service extend far beyond the symbolic and translate into concrete, bottom-line benefits. For instance, he estimates that VicRoads alone would avoid more than A$600,000 annually in internal administrative costs by keeping the system online—and avoiding a reversion to "off-line" transactions processing (i.e., via telephone, fax, or postal mail). Chapman estimates that it costs ten times as much to process an off-line transaction as an online one. Chapman adds that for the 250 registered users of the VR Online service— generating 90,000 online transactions per month—the stakes were even higher. "The cost to our customers, if they lost the online capability, would have been many times this—perhaps an order of magnitude higher."

In addition to facilitating major cost avoidance, the shift to a Web-based platform provided a number of significant performance advantages over the previous system. For instance, in addition to having the capability to operate on a 24 by 7 basis, users now enjoy an easier-to-use interface, access to more

Overview of VicRoads' Business Results Achieved

Business Process Area	Nature of Benefit	Description or Metric
Customer Service	Cost Savings	The system allows VicRoads to avoid an estimated A$600,000 in administrative costs annually.
Customer Service	Cost Savings	The system allows VicRoads' "customers" to avoid more than A$1,000,000 (estimated) in administrative costs annually.
Customer Service	Strengthened Relationship	VicRoads' commitment to keeping its customers online underscored the Victoria government's dedication to providing world-class service.

Source: VicRoads and IDC

services, and significantly improved levels of system performance. As Chapman points out, VicRoads' shift to a Web-based architecture lays the groundwork for the faster deployment of a new generation of services. "The fact that we now have a state-of-the-art application allows us to build on a foundation by adding more and more offline functions onto the online plat-form," says Chapman. "Ultimately, this will lead to more and more people using the online system."

Case Epilogue

Looking back on the project, VicRoads' Chapman enumerates what he believes are the key factors that led to a "highly successful" engagement. "The main element that made the VR Online project a success was IBM Global Services' ability to meet each of our business requirements within a very tight timeframe," says Chapman. "For a solution as complex as this, we believed that only an experienced solutions provider—especially one with whom we've had such a strong relationship—would be able to deliver within this timeframe. We were especially impressed with the strength of IBM's project management approach, which helped ensure the project would stay on track."

Chapman also points out the inherent benefit of working with a vendor who could handle all aspects of a complex project: "The fact that IBM was able to manage everything from the firewall to the back end, and everything in be-tween, meant that we could hold them accountable for all aspects of the delivery," says Chapman. "This was very appealing to us."

In the future, VicRoads plans to expand the range of services it offers, includ-ing more transactional services and richer billing functionality. VicRoads also expects to make the service available to the general public, an undertaking made considerably more feasible by VicRoads' adoption of the Web model. As VicRoads' expands its use of Web technology to make information more accessible to the public, Chapman sees IBM as an ally going forward. "VicRoads will continue to evolve as an e-business, with the Web becoming our dominant vehicle for delivering applications and services," says Chapman. "It's reassuring to have a partner like IBM to help us navigate along the way."

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