The Web- and Mobile-Enabled Mainframe

Applications and Interfaces for Modern Users

A HostBridge White Paper

866-965-2427
info@hostbridge.com

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In challenging economic times, organizations feel ever greater pressure to squeeze every dollar of value out of core information systems – mainframe and distributed. Integration is a proven way to do so. By enabling disparate applications and systems to work together, enterprises optimize business processes, make people more efficient and productive, extend the life of existing systems, avoid costly infrastructure changes, and drive savings to the bottom line.

Integration comes in two basic forms – system-to-system and system-to-people. Today there are few organizations that do not employ systems integration. But there are still many that have not embraced system-to-people integration and its full potential. This is especially the case for organizations dependent on the mainframe.

While the mainframe remains the most powerful, reliable, scalable platform for executing tremendous numbers of transactions and managing vast stores of data, it has a "legacy" problem. Many mainframe applications were built for an earlier era when the word "user" referred to a select, highly trained, highly experienced group of inside employees who alone had access privileges. Today of course, we live in the age of Web and cloud, and "user" means any human being anywhere who expects Web 2.0 functionality and self-service access to everything. For many mainframe shops, providing every user with valued mainframe access remains a distant prospect.

People

If your organization relies on terminal-oriented applications, then people should be an integral part of your mainframe thinking. You might have five thousand employees who use CICS or IMS applications and would benefit from modernized, streamlined Web- or mobile-based access. Or you might have five million customers who have to phone into your call center and engage a customer service representative to make the simplest account update. There may be people everywhere who, given appropriate levels of access to your highest-value applications and data, would literally help themselves – and thus help you reap a range of benefits.

It seems a safe bet that every business process – building, shipping, flying, analyzing, managing, measuring, selling, buying – involves people. Some processes may be highly automated, but there's always somebody – usually a great many somebodies – behind the curtain. It seems equally safe to say that all these modern processes require the exchange of information. And there are always enterprise systems – and more people – behind that curtain. Wherever business processes, information, and people converge, there must be user interfaces and user-oriented applications.

[1] This white paper is a revision of "Mainframe to the People: Interface Strategies for Every User Need," published by HostBridge in 2011.

Interfaces

Many HostBridge customers use our products for systems integration, and we provide programmatic interfaces – XML, JavaScript, SOAP, REST – to automate the exchange of data between systems. But the majority of our customers use HostBridge to Web- and mobile-enable terminal-oriented applications to meet the needs of large numbers of users. A financial institution provides three million members with access to CICS financial applications as part of its online banking system and through ATMs located around the world. A state health agency delivers Internet-based mainframe access to patients and health providers statewide. Many others provide employees and partners with modernized access to many different mainframe applications and data.

Anytime, anywhere access to applications and data consistently delivers quantifiable benefits. It increases usability, efficiency, and productivity. It reduces the costs of critical business operations. And when larger populations gain modernized access to high-value resources, it boosts customer satisfaction, spurs new business, and generates higher revenue.

Together

This white paper, "The Web- and Mobile-Enabled Mainframe: Applications and Interfaces for Modern Users," is about putting the most powerful information resources into the hands of all the people who can use these assets to do more. The technology benefits we talk about again and again – productivity, efficiency, economy – are really all about people getting better at their jobs, about employees offloading tasks to customers who can do them more effectively and economically, or simply about working faster and smarter.

The three use cases that follow describe organizations using HostBridge WIRE, the Web Interface Rules Engine, to develop Web/mobile applications and interfaces that bring the mainframe to people to meet a range of needs and deliver real business benefits. The use cases include implementations that are in production and envisioned.

Terminal Emulation Replacement at a Department of Motor Vehicles

A state Department of Motor Vehicles provides its customer-service employees with IMS application access using 3270 terminal emulation software. In recent years, two significant issues – the limitations of emulation and high recurring costs – led the DMV to rethink its mainframe access strategy.

By definition, terminal emulation is a limited, restrictive technology. It sustains an outdated user interface and costs organizations money while delivering a narrow payback. Even if a terminal emulator serves up an "improved" green screen with a quasi-Web/Windows look, mouse-click interaction, and some macro shortcuts, it is delivering a text-based interface to unfamiliar applications. As such, it meets the access needs of a very specific, very small user group – the trained "power user." If it also

happens to be an organization's only access solution, it effectively blocks access for everyone outside that group – employees, partners, and customers.

The DMV launched a strategic analysis of its mainframe access methodology, starting with a hard look at the costs of terminal emulation.

Licensing, Training, and IT Support Costs

In its call center, the DMV employs 2,800 personnel who use PC-based terminal emulation software at $16 per seat, for a total annual expenditure of $44,800. The DMV also incurs $322,840 in training costs per year. (A Customer Service Rep I earns a median income of $30,000,[2] and training takes two intensive weeks. At that salary level, training costs slightly more than $1,153 per employee. Assuming the DMV turns over about 10 percent of its workforce annually, the training of 280 new employees each year costs $322,840.)

The DMV also looked at the administrative costs of IT staff who install, maintain, and support terminal emulation. At the time, the DMV was in the process of upgrading desktops to Windows 7, which would have necessitated purchase of the latest version of the terminal emulator and re-installation on 2,800 desktops. While this no longer means a human visit to every workstation, it requires oversight, communication with 2,800 affected personnel, and troubleshooting by IT staff – not to mention computer downtime in the call center. Other complexities add to the challenge and cost. Within each terminal emulator, IT staff had set up macros to print records housed on the mainframe. Every time these records are modified – roughly once per quarter – the IT team has to reconfigure the macros on all 2,800 desktops.

While the DMV did not put a hard dollar amount on IT support for terminal emulation, it conservatively estimated the cost at $50,000 per year, bringing its total annual expenditure to more than $370,000 for terminal emulation.[3] Faced with the prospect of these costs recurring year after year, the DMV realized it needed to replace its terminal emulation product, but with minimal – or ideally zero – impact on existing processes.

The DMV chose HostBridge WIRE for its ability to meet these key requirements immediately. WIRE's Standard Mode delivers the same interface call center personnel already used at lower cost – and did so rapidly. Within a few weeks, programmers had configured displays to include all the macros and function keys the DMV's power users depended on, and the DMV transitioned to a new, yet thoroughly familiar interface. Call center personnel saw no change whatsoever, and there was no loss of productivity or interruption of customer service. And by delivering IMS screens to desktop browsers, server-based WIRE allowed the DMV to cut licensing costs as well as installation and maintenance costs.

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[2] Per www.salary.com a Customer Service Representative I in the state in question has a median salary above $30,000. Accessed August 30, 2011.

[3] For an organization with 10,000 users, terminal emulation could easily cost $1.35 million per year ($150,000 @ $15 per seat, plus $1.13 million in training, plus $100,000 in support).

Emulation Replacement and the Path to Web and Mobile

But the DMV quickly saw how much more WIRE delivers and embraced the vision. User interfaces have come a long way in recent years, and they now represent tremendous opportunities to re-engineer the way organizations do business with customers and partners. During proof of concept, the DMV gained a real appreciation for WIRE's ability to deliver rich interfaces and effectively re-create mainframe applications as streamlined, intuitive Web and mobile apps. The DMV realized that with WIRE modernizing applications and data for entirely new groups of people, it could do even more with its mainframe. The DMV charted two paths to make mainframe resources available to more people via new interfaces.

For its second WIRE deployment, the DMV plans to develop a new Web-based call center application leveraging its existing IMS application. The Web application will dynamically orchestrate, automate, and streamline IMS transaction processes so that call center personnel will effectively interact with an entirely new application. Rather than having to navigate dozens of screens to get to the required screen, users will interact using typical Web links. Choosing one of these will cause WIRE to navigate transparently through the IMS application and arrive directly in the right place.

The new application is expected to reduce training time for new DMV users by as much as 50%, allowing them to focus on learning the business process rather than application navigation. Because the new application is streamlined and access is simpler, the DMV also expects dramatic improvements in process efficiency, increased productivity so staff can handle more customer interactions every day, and higher customer satisfaction.

The DMV's third implementation will put mainframe access at the fingertips of an entirely new and very large group of people – the three million drivers who reside in the state. The DMV is in the initial stages of planning Web and mobile interfaces that will reinvent the IMS application for DMV customers, enabling them to use computers and smartphones to access the state's mainframe to update profiles, apply for permits, renew registrations, and so on. New interfaces will also merge relevant data, content, and feeds from numerous DMV and Internet-based resources, enabling residents to check traffic conditions, construction, weather, or anything transportation-related. Anyone with Internet access will be able to use the DMV's easy, intuitive Web interface with no training whatsoever.

With new interfaces for citizens and employees, the DMV expects that citizens will perform many of the tasks that now require a call to service personnel. As a result, staff will be able to focus instead on more knowledge-intensive issues. Ultimately, the DMV anticipates reducing its operational costs and saving taxpayer money.

Mobile Mainframe at a Motor Vehicle Manufacturer

A large multinational manufacturer of motor vehicles with production plants around the world needed a unique solution to streamline a critical component of inventory management. With the ongoing goal of optimizing processes, maximizing productivity, and controlling costs, the company focuses diligently on just-in-time (JIT)

manufacturing. Every day, millions of parts move through its system, arriving from suppliers and then moving directly to staging areas at stations across the factory floors, where the parts wait – for the shortest time possible – for assembly into finished vehicles. To manage its high-volume, perpetual-motion inventory, the company relies on CICS-based logistics applications.

While the manufacturing process is highly computerized – with a PC or thin-client terminal at every work station – those computers are in constant use by production teams. So until recently, inventory control personnel had to print inventory reports from the CICS logistics applications and walk their factory floors to get an accurate count of parts on hand. They then returned to their offices, where they entered the latest data into the CICS applications. Needless to say, this manual process had serious drawbacks and impacts. It consumed tremendous amounts of time and was very prone to errors, which in turn resulted in parts shortfalls, production downtime, rush orders for missing parts, late fulfillment of vehicle orders, and unhappy customers.

Inside the factories, parts moved fluidly, but mainframe-connected computers were stuck to the floor, reducing inventory reporting to a slow grind. Enter the mobile mainframe.

HostBridge WIRE, with its support for all leading browsers, including Safari and Android, allows the manufacturer to bring its inventory management into the twenty-first century. Today, with iPads and iPhones in hand, inventory control teams carry the mainframe throughout their production facilities. Thanks to handheld access, they can finally match the mobility of the millions of vehicle parts flowing from shipping dock to manufacturing stations. At anytime, from anywhere, in any facility, team members can update the CICS logistics application with an accurate count of parts, place orders, change orders, and perform other inventory management tasks.

By implementing the mobile mainframe, the manufacturer has helped its employees become more efficient and productive, improved inventory visibility, further streamlined its JIT manufacturing processes, and eliminated the errors that plagued the manual process and cut into the bottom line. In light of this success, the manufacturer is planning to provide more operations people – distributors, dealers, parts dealers, and company headquarters – with mobile access to the new everywhere mainframe.

eHealth Community Portal for a Health Insurer

A typical health insurance company, whom we'll call HICO, faces a familiar situation – a need to make business processes more efficient, shrink operating costs, and keep up with the competition. As the company studies its situation, two major areas of focus emerge – its aging technology infrastructure and rapidly evolving market.

For many of its operations, HICO relies on CA Ideal applications and a Datacom database. These house information on millions of policyholders and policies, health and insurance records, and claims. They also support operational processes with complex business logic developed over decades. Though these mainframe systems are powerful, reliable, and represent a sizable long-term investment, HICO confronts the same problem other mainframe-centric organizations face. Legacy applications and data are

accessible only by employees and agents and only via expensive terminal emulation. In part because of its reliance on legacy applications, HICO also maintains large call centers to assist agents and partners.

Some in the company advocate migrating to a new platform and rewriting applications, but this would entail a monumental development effort, long deployment and testing cycles, and extensive retraining – and cost tens of millions of dollars. Others recognize that the real issue is not the platform, but its accessibility – in other words, people and interfaces.

Health insurance is a people-driven business. Millions of policyholders interact daily with thousands of insurance agents in offices across the company's service region. The agents also work with thousands of HICO product specialists, claims administrators, and business managers, who in turn work with administrative personnel at healthcare facilities and government agencies, and directly with the healthcare professionals who treat those millions of policyholders as patients. Everyone in this vast human network has a stake in the efficiency of interactive processes and the timely exchange of accurate, complete information.

To start addressing this challenging situation, HICO asks a series of pivotal questions. What could we build that would meet the access needs of employees, customers, and partners – that would give them more of the information they value and improve their interactions? Better yet, what could we build that would really change the game? Could we enable all our systems to work in concert? Could we improve the way we all do business? Could we gain a competitive advantage? How much money could we save? How much more money could we make?

HICO's compelling answer is an eHealth Community built around rich Web and mobile portals, one that would bring together employees, partners, customers, information, access, and process. HICO reaches out to top partners for buy-in and to a technology vendor for a solution that would give this vision shape and clarity. The solution is HostBridge WIRE.

eHealth Portal – People, Systems, Interfaces

HICO and its partners next engage in planning an interactive, collaborative online community for the many people involved in nearly every aspect of healthcare – physicians and other medical professionals, emergency personnel, pharmacists, product and service suppliers, government agents, HICO employees, and millions of patients/policyholders.

The partners choose WIRE for the breadth and flexibility of its key deliverables:

- Interfaces for every imaginable user, ranging from classic "green screen" for power users to Web 2.0 and mobile interfaces for the most up-to-date users
- Support for every leading browser and device, including the latest tablets and smartphones
- Integration of data from the widest range of enterprise resources into composite Web applications
- Enterprise-class development and runtime capabilities of the .NET framework.

With a WIRE-delivered eHealth Community Portal, the millions of people in the HICO network will get secure, anywhere, anytime access to content, data, business applications, and many other healthcare-related resources. Wherever they are, whether at home or traveling the world, so long as there's an Internet or telecom connection, policyholders/patients, physicians, and other participants will have the full capabilities of the eHealth Community at their fingertips.

The eHealth Community Portal will present intuitive interfaces providing users with clear navigation options to reach desired information and application functionality – health records, insurance records, health and medical content; access to the Web sites of hospitals, clinics, doctors' offices, local pharmacies, and HICO; appropriately authorized interaction with applications running on service provider systems; and unified communication – chat, IM, audio, and video – allowing users and care givers to reach out to one another on demand. Physicians will be able to confer with colleagues, submit ePrescriptions, or share records with administrative personnel who can then submit claims. Patients/policyholders will be able to make appointments, check on prescriptions, access their own health records and insurance policies, submit claims, and communicate with their care or insurance providers. People throughout the HICO network will be able to do their jobs more efficiently from within the eHealth Portal's composite application interface.

For provider-partners, the eHealth Portal will also make it easy to integrate their existing resources – data, content, other information, business logic – into this unified community framework. With its object-oriented tool set, WIRE will provide new interfaces to backend systems without any change to the source application or data. From an integration point of view, WIRE and therefore the Portal are platform-independent, an open, flexible architecture allowing participation by any number of tenants with any IT infrastructure.

Tactical Rollouts for HICO and Its Users

Strategic initiatives on this scale take time and can impact business operations. HICO and partners anticipate that planning, design, and development of the eHealth Community Portal will take several years. In the meantime, HICO must continue to provide its personnel with uninterrupted mainframe access and do so without loss of employee or agent productivity or cost increase.

Multi-mode WIRE resolves these issues, allowing HICO to deploy different applications in a series of practical, tactical steps. First, HICO will replace its terminal emulation product with WIRE Web-enablement in Standard Mode, which will be rapidly configured to present CICS application access including all the functions various employee groups currently depend on.

Once Portal plans are finalized, HICO will also employ WIRE's Enhanced Mode to develop and roll out new employee- and customer-facing Web and mobile applications on its own accelerated schedule. In this second phase, HICO will re-create its legacy applications as modern, streamlined applications. Anticipated outcomes include dramatic reductions in employee and agent training, transition of significant portions

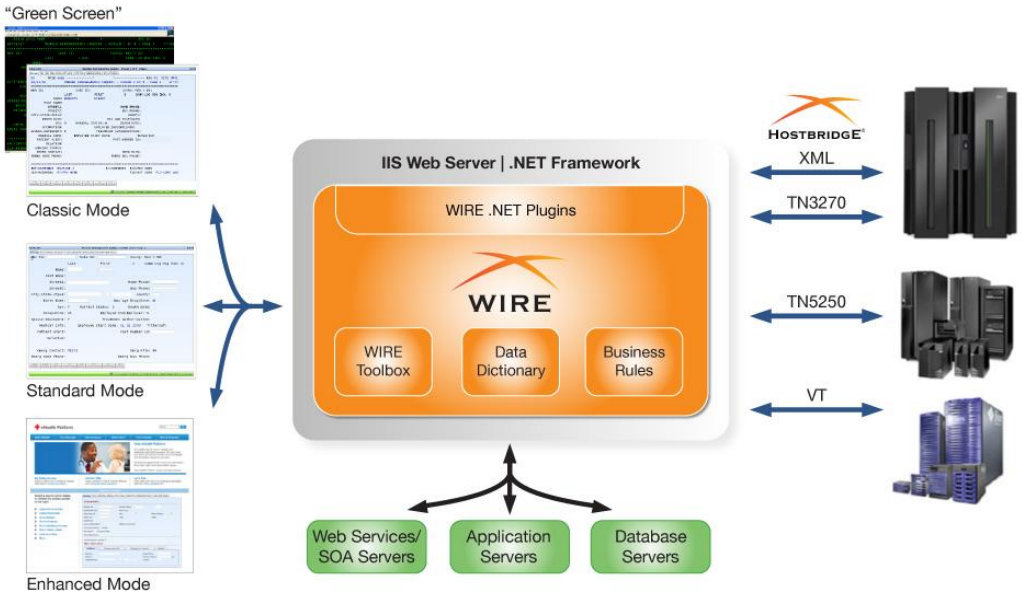
of basic tasks to customer self-service, call center reduction, greater productivity company-wide, and substantial cost savings.

Using WIRE and HostBridge, HICO, like many organizations in similar situations, can modernize high-value System z applications and data, and leverage its proven legacy systems as the muscle behind an entirely new Web-based community.

HostBridge WIRE: Multi-Mode Web/Mobile Interfaces

HostBridge WIRE is a complete solution for rapidly developing and deploying Web and mobile interfaces for IBM mainframe and midrange applications and data. And it is much more. Leveraging the object-oriented capabilities of the Microsoft .NET framework, WIRE makes it easy to integrate data and business logic from *any* XML/Web services-enabled resource into new user-friendly applications – *without any change to any source application*. Using WIRE, developers can create rich and dynamic composite applications from virtually any enterprise data source and design interfaces that take the user experience to the highest levels of sophistication.

WIRE was originally designed to meet the access and interface needs of all types of mainframe users – from the "power user" with training and experience in legacy applications and interfaces to the online customer who can benefit from anytime access to mainframe applications and data. Supporting the most widely used browsers – Internet Explorer, Firefox, Chrome, Safari, and Android – and all leading client devices – desktops, laptops, thin-clients, as well as the latest tablet PCs, Chrome notepads, iPads, iPhones, and Android phones – WIRE provides everyone with the right interfaces to the right resources so they can be more efficient and productive.



As the diagram illustrates, WIRE integrates zSeries resources via HostBridge XML or TN3270, iSeries via TN5250, and Unix via VT. For users, WIRE offers three interface "modes" to meet employee, partner, and customer needs.

Terminal-Type Presentation: WIRE Classic and Standard Modes

WIRE Classic and Standard Modes are designed primarily for organizations with employees who use terminal-oriented mainframe applications. Classic Mode, WIRE's "out-of-the-box" presentation mode, replicates the look and feel of a 3270 or 5250 terminal screen for highly skilled terminal-type users. As soon as WIRE is installed on a Microsoft IIS server and pointed to a System z or System i application, it provides users with a classic "green screen" interface.

Standard Mode preserves 3270/5250 functionality while simplifying display for employees with less training and less terminal experience. Standard Mode is customizable with function keys, macros, short cuts, and display options for improved usability and easier readability.

Both Classic and Standard Modes offer affordable alternatives to terminal emulation products with high license fees and IT support costs. And they are often used to deliver uninterrupted mainframe access and productivity while organizations build new interfaces to achieve greater business benefits with WIRE's Enhanced Mode.

Advanced Interfaces and Integration: WIRE Enhanced Mode

Enhanced Mode delivers rich Web/mobile interfaces for today's most sophisticated users. In Enhanced Mode, WIRE also integrates data from virtually any enterprise data source. WIRE consumes XML, Web services, or JavaScript generated by mainframe-resident HostBridge or TN3270 and TN5250 data streams. It also leverages .NET's object-oriented capabilities to enable integration of data from any distributed enterprise resource or any cloud or Web feed. Utilizing these broad capabilities, organizations create entirely new Web- and mobile-based composite applications with the most advanced interactive functionality to meet any and every user need.

Interface design and development are carried out within the WIRE Toolbox, a complete ASP.NET programming environment. Running in Visual Studio 2008 or 2010, the WIRE Toolbox allows developers to design richer, more functional pages with appealing layouts, formatting, navigation tools, images, and more. Within the Toolbox, developers can bind ASP.NET custom controls directly to mainframe fields and use the WIRE Data Dictionary to define rules around the data elements that are used to enhance presentation. On the inbound side, WIRE leverages the full complement of .NET capabilities to allow integration of any XML-capable data or application asset. By integrating data, designs, services, controls, and objects into new composite applications, WIRE offers a single, efficient point of entry for every human interaction with the mainframe.

First designed to give mainframe access to mainframe users, WIRE has evolved as access and interface needs have changed. Organizations now compete in the rapidly changing world of SOA and cloud-based architectures, and do business with changing

populations of users. Today with WIRE, these organizations can ensure that more employees, partners, and customers have rich interfaces that dynamically merge data and business logic from many information systems into powerful new composites that will change the way organizations and people do business.

HostBridge, WIRE, Real People, and You

HostBridge the company has always been about integrating System z.[4] To do this well, we depend on the insight and input from our customers – real System z user-organizations – to help guide the development of our software products. From its inception, HostBridge the product was designed to exploit the very best tools and technologies that System z has to offer[5]; adhere to the best interoperability standards, including XML, SOAP, REST, and JavaScript; and keep pace with evolving trends in enterprise computing and user interfaces.

Our determination to build solutions based on the very best technologies led directly to HostBridge WIRE. As we conceived and drew up the first set of plans for a Web interface engine for mainframe resources, we had to make choices regarding platform, development environment, tools, access protocols, and so on. The real world, where real customers do business – the new world of cloud apps, Web 2.0, mobile, and everywhere access to everything – shaped our decision. If you're a bank, your next user may be that college freshman at a local boutique using an iPhone app to debit her checking account before she shares her shopping adventure with Facebook friends. In today's reality, you still have to interface with users of old, but you also have to meet the needs and expectations of the ever-changing everywhere generation.

We designed WIRE with our sights set squarely on this reality. Uniquely among HostBridge products, WIRE runs not on the mainframe, but on Microsoft IIS Web Server. As a .NET application running under Visual Studio, WIRE offers one of the most powerful interface tool sets in the enterprise Web development realm. Coupled with mainframe-resident HostBridge, WIRE delivers performance, reliability, fidelity, and flexibility in new mainframe Web and mobile interfaces for every user.

We invite you to consider HostBridge and HostBridge WIRE to interface with *all* the people who are your business.

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[4] HostBridge wrote to book on integration of terminal-oriented applications – literally. Read *Composing CICS® Services: A HostBridge White Book*, by HostBridge CEO Russ Teubner, to learn the why, what, where, and how of orchestrating and integrating CICS visual transactions. You can find an introduction to these concepts in our white paper, *Modernizing CICS® and System z with Web Services/SOA: The HostBridge Approach*. Both are available at www.hostbridge.com/index.php/library/whitepapers.

[5] HostBridge is an IBM Business Partner, a certified Ready for Rational and Ready for SOA partner, and a CICS Beta Partner, participating in beta cycles from CICS TS V3.1 through CICS TS V5.1 and counting. IBM has also licensed HostBridge to zIIP-enable its integration products.