

CASE STUDY

INDUSTRY

Financial Services
Internet-based Banking

THE COMPANY

Egg

BUSINESS CHALLENGE

Secure, personalised delivery of financial services via the public Internet

KEY SOLUTION REQUIREMENTS

- Secure Web portal environment
- Open computing platform
- Web content management
- Backend system integration

KEY SOLUTION COMPONENTS

- getAccess™ secure portal and application infrastructure software
- iPlanet™ Web and application servers
- Sun® Enterprise Web, application and database server hardware
- Solaris Operating Environment
- Microsoft Windows® NT servers
- Microsoft IIS Web server
- Vignette® StoryServer for personalisation
- Oracle® RDBMS
- BEA™ TopEnd middleware

KEY BUSINESS RESULTS

- Over 600,000 Egg customers in first 18 months of operations
- Egg recognised as UK's leading Internet financial services brand
- Egg in top 10 worldwide Internet-based financial services organisations for 1999

EGG'S STRATEGIC TECHNOLOGY DECISION

Selection of the getAccess software which enables security and transaction management and provides the infrastructure for Internet-based services.

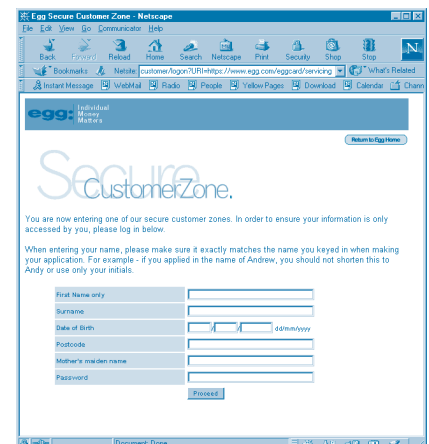
"We chose Entrust to provide the critical secure portal software for our Internet banking solution because we liked their attitude, we liked the quality of the getAccess product, the price was reasonable and the company had a strong UK presence. We judged that the Entrust staff would be fully committed to the success of our project and that they would be easy to work with — and that has proved to be true. The Entrust organisation and the getAccess secure portal solution have made a major contribution to the success of Egg."

Iain Hunneybell
Head of System Architecture

The Customer: Egg

Egg is the UK's leading online financial services brand. Egg is 80 percent owned by Prudential plc and was launched in October 1998—following 12 months of intensive research in which more than 5,000 consumers were surveyed regarding their needs and preferences with respect to financial products and services. As a result of the research, Egg was targeted from the outset to meet the requirements of three key demographic groups—young professionals, affluent elderly of retirement or near-retirement age, and the busy younger members of the work force with a high level of technology comfort. The target market in the UK included about 15 million when Egg was founded.

From the outset, Egg offered service delivery by telephone (through a Derby call center), post, ATM access card and via the public Internet. The new direct venture initially offered three product lines for consumers, savings accounts, residential mortgages and consumer loans. It offered very attractive rates for both its savings and credit products and gained quick acceptance. In six months, Egg had met its 5-year goal for savings deposits of £5 billion and had more than 500,000 customers. These numbers increased to £6.7 billion savings deposits and more than 600,000 customers by September 1999, with 30 percent of customers using Internet-based online banking services and 44 per cent shopping online through the Egg portal.



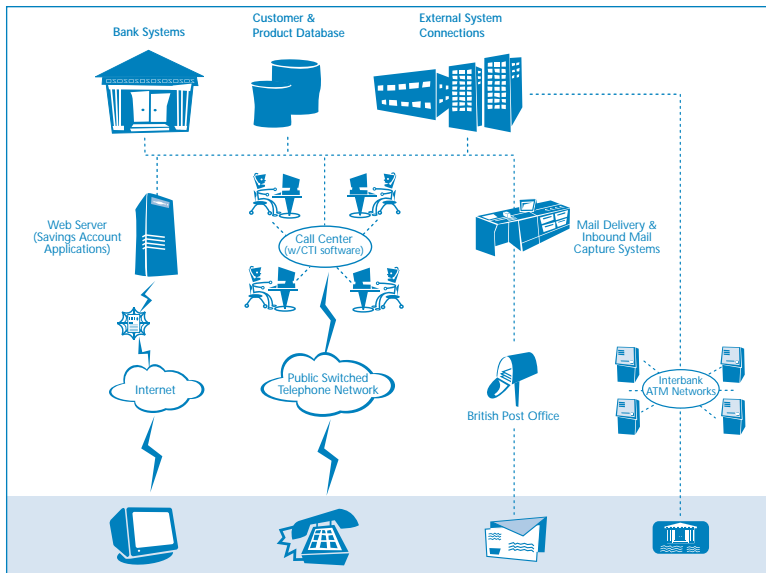


Figure 1: Egg Start-up Delivery Channel Overview

To meet the growing demands for a broader range of Internet-based services, Egg senior management decided to establish Egg as a secure Internet portal, not only for its own financial services but also for a broader range of shopping and information access services through its Web site. The early-1999 planning for this expansion led to the selection of the getAccess™ software to enable secure, single sign-on portal access and provide the infrastructure for the integration of Web applications. The resultant Egg system for the delivery of personalised financial services to its customers is the focus of this case study report.

The Initial Egg Direct Service Delivery Environment

When Egg first went into business, Internet-based services were limited to savings account applications and access to financial product and service information. The telephone was the primary delivery channel for transactional services. An overview of the startup delivery environment is shown in Figure 1.

The Internet channel proved extremely popular and soon after Internet services were expanded to include account balances, information on transactions and an increased selection of financial information. It was clear to the Egg staff early in 1999 that the rapid growth in customers, products and Web visits

established the need for a more robust, secure and flexible front-end for the Egg Internet channel.

The Requirement for a Secure Internet Portal Solution

The Egg technical staff conducted a search starting in November 1998 to define and acquire the key components for a new computing environment for Internet-based banking services. Key technology goals for the new environment quickly became clear and included *an open architecture, scalability, reliability, flexibility and security.*

- **Open architecture:** The new Egg computing environment must be fully suitable to the open standards and Web-based technologies fundamental to network-based computing in the Internet world. An open architecture would also help fulfill Egg's requirement for an environment that would support performance, security and transaction auditing from a single observation point.
- **Scalability:** It was of vital importance that Egg be able to sustain very high growth rates for existing products and services while continuing to develop and deploy new ones. Each hardware and software component must be able to scale up to meet growth projections without the need for any change to the underlying architecture. According to Egg's lead architect Iain Hunneybell, *"Scalability clearly was the most demanding of all our evaluation criteria. We knew that without assurance of a highly scalable computing environment, we would not be able to meet the Egg business goals."*
- **Reliability:** Each hardware and software component must not only be of proven quality on its own, but also must perform reliably under peak load conditions when integrated with other solution components. Customer confidence in Internet-based service delivery systems is extremely dependent on the customers' perceptions with respect to the prompt and reliable execution of every customer request.
- **Flexibility:** The Egg business strategies for Internet-based service delivery must be able to adapt quickly and efficiently to unforeseen changes in market needs, the emergence of

new technologies (e.g., wireless communications), customer preferences, the regulatory environment and the competition. To meet such demands, each component of the new IT environment must offer a high level of flexibility and adaptability.

- **Security:** It was absolutely critical that the new IT solution include a robust set of end-to-end security mechanisms that could be implemented, managed and maintained separately from business logic functions. It was deemed essential that the security features be easily customisable, e.g., offer a plug-in authentication architecture completely independent of the business logic supporting differing transactions and applications. The Egg technical team defined the need for three security zones:

- *Zone 1, Anonymous browser:* No authentication required for non-secure Web content.
- *Zone 2, Registered users:* Not customers but those who want access to selected content and may become customers.
- *Zone 3, Customers:* Enable a secure environment; access to account servicing functions (real money).

Four categories of solution components for the new Egg computing environment were defined by the Egg technical team charged with the task of designing, acquiring, integrating and deploying the new solution:

- **Secure portal software product.** It was essential to provide a security infrastructure that could be implemented without being incorporated directly into the business logic code. The security infrastructure had to be an end-to-end solution beginning with the sign-on, identification and authentication of the remote user and continuing through each level of information and transactional access while maintaining security logs and an auditing system.

Egg made a very deliberate decision to separate authentication and access control from the Web applications. The reasons for this were:

- Single point of audit of security procedures, processes, authentication methods and access control.

- Removal of the possibility of application error, either accidental or deliberate, that would allow unauthorised access to a specific page or pages of information.
- Desire to have a single set of core services, named "Ringmain" by Egg after the term used in the UK for the main loop of electrical power in a house, which allows any service to be plugged in as needed. Single sign-on for purposes of security and consistent access to all applications was a key objective.

Another essential capability was that of a general purpose portal that could interpret and define appropriate routing of all user traffic—including the redirection of messages to other Web sites if and as appropriate e.g., for e-commerce shopping functions or access to third-party investment products offered through the Egg Web site. The scalability, flexibility and security requirements for the Egg solution were heavily dependent on finding a proven secure portal software solution.

- **Open computing platform.** The team decided that the best alternative for meeting the scalability and reliability criteria for an open computing platform would be with a UNIX-based platform. Although the NT servers had proved adequate for the Egg startup and for the taking of savings account applications, it was considered necessary to have a more robust environment for the expanded solution.
- **Web content personalisation.** A key Egg business objective was to provide products and services tailored to the individual and it was essential that the new computing environment use proven software for the personalisation of content. In addition, it was important to choose a technology that would also support content management via the abstraction of content from presentation—but personalisation was the most vital feature.
- **Backend system integration.** It was essential that the Internet-based transactions be capable of ready integration with backend banking systems and databases in the simplest and most reliable manner. The technical team would seek to resolve this requirement by making use of already existing backbone middleware facilities but would acquire new middleware if necessary.

Key Technology Suppliers

Egg Internet Service Delivery



Entrust®, Inc., the world's leading trusted e-business infrastructure company, provides the most comprehensive Web, wireless, and enterprise solutions that make e-business safe and convenient. With Entrust® solutions, millions of users instantly confirm the identities of e-business counterparts, engage in confidential communications, access personalized information, digitally sign binding transactions, and pay for goods and services. Entrust solutions can be deployed using in-house products or outsourced services, and in combination with over 100 complementary Entrust-Ready™ products from industry leading partners who integrate their solutions with Entrust's innovative technology. Entrust's customers can be found in 40 countries around the world. For more information, please visit www.entrust.com.



Sun Microsystems, Inc., (www.sun.com), headquartered in Palo Alto, California is a leading provider of industrial strength hardware, software and services that power the Internet and allow companies worldwide to ".com" their businesses. Since its inception in 1982, a singular vision — "The Network Is The Computer™" — has propelled Sun Microsystems to its present market position. With \$12.4 billion in annual revenues, Sun can be found in more than 170 countries.



Vignette Corporation, (www.vignette.com), with headquarters in Austin, Texas, is a leading supplier of e-business applications for building online businesses. The Vignette StoryServer product provides a unique combination of personalisation, content management, decision support and enterprise integration services.



BEA Systems, Inc. (www.bea.com), headquartered in San Jose, California, is best known as a leading supplier of middleware for enterprise applications—and holds a 46 per cent market share for such products. The broader vision of BEA is to provide a comprehensive infrastructure for the development and deployment of reliable, scalable business applications for e-commerce.

The Egg technical team concluded that the most critical component for the new computing environment would be the software to provide secure portal access and also serve as the framework for the integration of personalisation, management and presentation functions with respect to Web content.

The Selection of getAccess as the Secure Portal Software

The Egg technical staff collected information and made informal evaluations of a number of security, portal and infrastructure software products early in 1999, and chose the getAccess solution as the best fit for the new system. Key reasons for the selection of getAccess included:

- The presence of a strong service and support organisation in the UK was a critical evaluation factor.
- It became clear during the evaluation process that getAccess offered the best combination of business and technical goals set by the Egg organisation. *"We judged that the Entrust staff would be fully committed to the success of our project and that they would be easy for us to work with,"* said Iain Hunneybell, *"and that has proved to be true. They are an excellent organisation."*
- Still another product advantage for getAccess was that it was judged by the Egg technical team to offer the security and scalability that would be critical to the introduction and support of the Egg credit card, a key product in the design phase at the time of the evaluation.
- It also was a very favorable evaluation point that Entrust had an established and close working alliance with Sun Microsystems — as Egg had already decided that their expansion plans would include a Sun Solaris computing platform. Sun advisors were especially positive regarding the security features of the getAccess software, calling it the "Dream Team" security product.

Other features of the getAccess solution that led to its selection as the key security and application infrastructure software by Egg include:

- The getAccess secure portal is an Internet-scale secure Web access management solution that dramatically reduces the time and cost of deploying and managing secure, personalised content for Web-based e-commerce applications. It gives users simple, secure personalised access and enables centralised administrators to manage and enforce enterprise information security policies, while delegating secondary tasks to others across

the organisation. The getAccess solution is all-in-one Web security management software for single sign-on, unified administration, and fine-grain application access control.

- Key features of getAccess from the perspectives of Egg administrators as well as Egg customers on the Internet, include:
 - No client software required other than an industry standard Web browser.
 - Users can be automatically categorised using self-registration procedures to gain various levels of access, e.g., to non-secure public domain Web pages, as registrants to specific types of content on an on-going basis, or for full, secure access as customers for various types of e-banking or e-commerce services.
 - End-to-end SSL encryption at the 128-bit level of security is provided to enable secure transactions.
 - Support is provided for multiple user identification and authentication mechanisms including name and password, LDAP directory services, X.509 digital certificates, and various smart card mechanisms.
 - Access control is supported by user "roles and rules" parameters.
 - Centralised control is based on enterprise security policies with modularity that permits the delegation of selected administrative functions to Help Desks and line-of-business administrators.
 - Single-click application deployment facilitates the integration of new or changed applications and functions.
 - Multiple open APIs support customisation and integration with third party applications and with backend systems and databases.
 - The getAccess product is interoperable with a variety of operating systems (e.g., NT and UNIX), Web servers (e.g., IIS and iPlanet Web servers), Web application development tools and database management systems.

- A modular, distributed, high performance and reliable architecture, getAccess is scalable to millions of users and easily extensible to work with a wide range of third party applications.

Other Components for the New Egg Internet-based Delivery Solution

In parallel with the selection of the getAccess secure portal software, the Egg team made final their choices for the other three key solution components:

- Sun Microsystems Computing Platform. Sun Enterprise servers (ranging from the E450 to the E10000 models) were chosen along with the Solaris 2.6 Operating Environment to provide the computing platform for the expanded Internet delivery system.
- Vignette StoryServer for Personalisation. Vignette's StoryServer, a market-leading product for e-commerce solutions, was selected to provide personalisation of content to be sent to customers. Information collected by getAccess during the user authentication process is passed to StoryServer for personalised page presentation in accordance with customer menu options managed by StoryServer.
- BEA TopEnd Middleware. The requirement for backend integration middleware was satisfied with an existing BEA TopEnd middleware backbone facility already in place for other Prudential Bank systems. No new middleware was required, it was only necessary to connect the Internet applications to TopEnd, an excellent and well-supported product for both mainframe and open client/server computing environments.

By mid-1999, all of the components for the new Egg Internet-based service delivery system were selected and ordered. These included Oracle Corporation's RDBMS, iPlanet Web and Applications servers and various other secondary products in addition to the three key components described above. Installation and integration followed immediately.

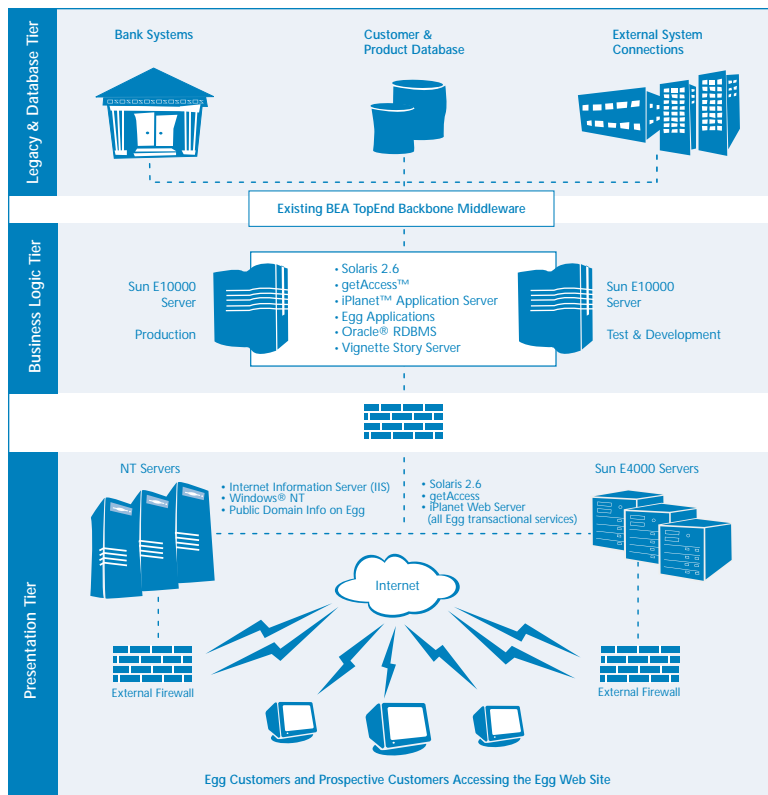


Figure 2: Egg's Current Internet-based Delivery System.

The New Internet-based Computing Environment at Egg

Integration and rigorous testing of the expanded Egg Internet delivery solution proceeded into the 3rd Quarter 1999 and it was ready to support the launch of the Egg credit card in September 1999.

As of April 2000, the Egg Internet service delivery solution supports the following products and services:

- The Egg Savings Account, now an Internet-only application.
- An online "e-Forum" to encourage customers to voice their needs and preferences with respect to current and future Internet-based products and services.
- Online consumer loan applications and processing.
- Online residential mortgage loan applications.
- Online Global Investor bookshop. (over 1,400 current titles in finance)
- Egg shopping tools, including product & price

search engines and e-commerce shopping site referrals with Egg discounts.

- Consumer investment products, including over 220 investment funds from 17 leading fund providers — investment products with very low management fees.
- The Egg credit card, the UK's first Internet-based credit card, offers market-leading rates — includes cashback as well as special discounts for online purchases, an Egg Shopping Zone of over 225 leading online retail brands, a guarantee against online fraud, and 24-hour online account servicing and payments.

The new Egg computing environment is fully integrated and operational, and transaction volumes are growing at a very high rate. A graphic overview of the Egg computing environment for Internet-based financial services is shown in Figure 2.

Current Status and Future Outlook

By any measure, the Egg direct financial services initiative is a major success. For example, Egg was the first financial institution to launch a credit card with special features for Internet-based e-commerce—and the acceptance rate for that card ranks first amongst all credit card introductions.

Both Egg and its CEO, Mike Harris, have received awards for the extraordinary success achieved by the Egg business model in its first year of operations. At the end of 1999, Egg's rapid acceptance made it the UK's leading Internet financial services brand, well ahead of Internet initiatives by the large traditional banking organisations as well as other direct banking startups. On a global basis, Egg was ranked in the top 10 Internet-based financial services organisations in an IBM/Interbrand survey conducted in 1999.

Egg's success is attributable to a combination of aggressive and insightful business planning and a solid technology foundation. Scalability, flexibility and reliability have been key to the Egg success story, with the role of the getAccess secure portal software being particularly critical. According to Iain Hunneybell, Egg's head of system architecture,

"We chose getAccess for the product concept model and the company's staff. We're impressed with the product, the flexibility, the scalability and especially with the staff."

And much more is yet to come, the successful introduction of savings, loan, mortgage, investment and Internet-specialty credit card products will be followed in 2000 by a new array of direct delivery offerings.

On the technical side, the computing platform will continue to be scaled up to support increased traffic volumes from more customers. The Egg technical staff recently completed the migration of all savings account servicing functions from an NT server environment to the Sun Solaris servers, putting all applications within the getAccess single sign-on management infrastructure. The only remaining NT-based function is for responses to requests from non-registered Egg Web site visitors for general information ("brochureware").

Future plans from the technical perspective also include plans for supporting a growing variety of Internet access devices and communications environments, including the wireless application protocol (WAP), interactive digital TV and other emerging technologies. The channel-neutral nature of the Entrust software will facilitate support for wireless devices.

Business Benefits of the getAccess Portal Solution for Egg

The success of Egg brings significant benefits to Egg customers, including the following:

- Customers receive attractive interest rates for both savings and loan products, including residential mortgages, as well as the availability of a wide range of investment fund products with minimal management fees. The financial benefits of depositing, investing or borrowing funds through Egg accounts are significant.
- The secure environment offered to Egg customers relieves customers of concerns with respect to privacy, fraud or transaction loss or repudiation.

- The getAccess software provides an infrastructure for all applications that help to provide customers with prompt, secure and accurate execution of all Internet-based requests as well as the presentation of personalised responses to those requests.
- Although the Internet-based part of the Egg delivery service is the fastest growing, customers also have the support of telephone, traditional credit card, ATM and postal channels if and as desired. Egg provides a full range of integrated, personalised and consistent services for its customers across multiple delivery systems.
- Since launching in October 1998, Egg has established itself as one of the UK's most recognized names in Internet financial services. Through its strategy of offering some of the most competitive products in the market, it now has a large and satisfied customer base.
- Egg has established a sound business and technical foundation in the UK that is positioned to support expansion into new markets. The business model and the technology platform can be applied without modification to other geographic and line-of-business markets.
- The spectacular acceptance of the new Egg credit card, designed specifically to facilitate Internet-based electronic commerce within the proven, global Visa network environment, offers enormous business-expansion potential and also has already differentiated Egg from all other card issuers.

Mike Harris, Egg's chief executive, summarises his organisation's position as follows: *"Egg is now firmly established as a leader in the e-commerce market — and our target for two million Internet customers by 2004 is an ambitious goal, but in an e-commerce world things can happen faster than you expect and we intend to meet our target."*

"An obvious advantage of personal finance on the Internet is that costs can be as much as four times lower than telephone transactions and ten times lower than high street branches. These cost advantages will enable Egg to maintain attractive rates for all of its customers over the long term — with many other customer benefits still to come."

Concluding Observations

No other direct bank initiative in any major geographic market has achieved the same level of success in such a short period of time as that of Egg. While this success is due in large measure to the visionary planning and aggressive execution by a small group of highly motivated bankers, it also results to an important degree from the choices made by the Egg technical staff in building, expanding and managing the IT environment.

Egg's new architecture, implemented around the getAccess secure portal software provides the reliability, scalability and flexibility to support future growth while maintaining the highest level

of customer service. According to Egg's Chief Technology Officer (CTO), Pete Marsden, *"The getAccess software helps us treat every customer as an individual by tailoring the information each person sees. For example, a customer whose transactional history shows good credit quality may be presented with a re-mortgage offer unique to his or her circumstances when they first log-on to the Egg Web site. The power and scalability of getAccess assure us of an environment in which we can continue to design, develop and deploy new products and services for our Internet-based customers."*

Contact Entrust today.

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