

THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY



LOCATION:
Foster City, California, United States

YEAR:
2006

STATUS:
Laureate

CATEGORY:
Science

NOMINATING COMPANY:
Deloitte

ORGANIZATION:

Applied Biosystems

PROJECT NAME:

New Portal Project

Summary

In 2004, Applied Biosystems (AB) made a decision to fundamentally rebuild its Web capabilities to better serve researchers and customers in pursuit of the advancement of scientific research. The resulting e-commerce portal is a market-leading blend of science and commerce. Results of this visionary investment include best-in-class tools to search AB's thousands of products and millions of genotyping and gene expression assays; new, robust, and streamlined tools for configuring customized genomic materials at the forefront of scientific research; powerful and simple processes for life scientists, purchasing agents, and dealers to transact online; and a stable, robust, user-friendly eCommerce platform ranked as one of the top 5% of eCommerce sites surveyed by a leading market research firm.

Introductory Overview

The Applied Biosystems New Portal Project was conceived in an environment of dynamic change in the way scientific research is conducted, and equally profound changes in the way scientists seek information and products to serve their research needs. Scientists are collaborating as never before on both basic and applied research, and using the Internet as the primary tool to communicate findings – and to advance their research agendas. Collaboration now crosses many legacy barriers – national boundaries, academic / government / pharmaceutical organizations, and traditional basic research / applied markets.

In response to these changes, and given AB's position at the cutting edge of the genomics revolution, the company created the New Portal Project, the most fully integrated blend of scientific data and eCommerce yet developed. Genomic data, products, and services are all available in one place for scientists, as are tools to design and customize genetic tools, collaborate on experiments, and route orders through institutional purchasing channels. The end result of this tool fundamentally changes the way in which scientists can conduct leading-edge research across a variety of fields.

The scope of the project was ambitious, including integration of scientific and eCommerce Web sites; creation of a robust search engine capable of finding not only products, information,



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and scientific literature but also of searching among millions of genotyping and gene expression assays; development of cutting-edge configuration engines for genomic arrays, primers, and probes; and expansion of eCommerce capabilities to allow for a variety of purchase paths and a much simpler user experience.

All of this was accomplished in an environment of limited human and financial resources, and under tremendous time pressure. Given these challenges, the success of the project can largely be attributed to the remarkable degree of collaboration between a broad group of well over 100 scientists, software and hardware engineers, sales and marketing professionals, and external consultants and a spirit of partnership that endured throughout the 9 months required to design and build the solution.

Benefits

The understanding of life sciences is poised to change more in the next decade than it has since James Watson and Francis Crick discovered the structure of DNA 50 years ago. The practice of medicine is about to change just as radically, based on improved understanding of the relationship between individuals (and their genomes) and their biology, with the result of totally personalized medicine. Applied Biosystems has played, and will continue to play, a critical role in driving these transformations through science and technology. AB's New Portal Project represents a bold, sustainable strategy for accelerating the conversion of biological advances into new products that will improve human health and quality of life. Fundamentally, the portal brings these offerings and vast information to its scientific customers faster and more easily.

As further detailed in the "Originality" section below, the AB New Portal Project offers researchers an opportunity to fundamentally change the way in which science is conducted. The result of these innovations is a fundamental acceleration in the pace of discovery in the markets Applied Biosystems serves: academic research, pharmaceutical research & drug discovery, and applied markets such as forensic testing and food safety testing. Researchers across a wide variety of scientific disciplines are now able to discover the causes of disease, develop therapies targeting these causes, and bring the resulting products to market more quickly and efficiently. As the development of new pharmaceutical compounds moves from mass therapies to personalized medicine, research scientists at the forefront of this revolution will turn to this Portal for information and products. Meanwhile, products made available by the Portal bring the promise of safer food, more thorough criminal investigations, and more accurate forensic work to entire new markets and countries where these technologies have historically been difficult to obtain.

In short, one benefit of completing this project is an acceleration in the research leading to the prevention, treatment, and cure of human disease.

The Importance of Technology

The technology deployed with the release of this portal also offers, for the first time, the full benefits of the discovery of the human genome, announced jointly in 2000 by Craig Ventner and Celera Genomics and the U.S. Government's Human Genome Project. Applied Biosystems realized the importance of Web and related technologies as being both strategic lower cost channels as well as tools that enable genomic research.

Due to the complex nature of Applied Biosystems products and customer needs, traditional



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eCommerce technologies were extended so that they could be applied in unique ways to enable scientific commerce.

Search & Taxonomy Management

Applied Biosystems markets and sells traditional core instruments such as genotyping and real-time PCR systems as well as millions of assays using genomic references, public identifiers, etc. In an effort to help customers research, find, configure and buy products online, the company knew that making data available to customers was critical. Applied Biosystems was able to release a new and more robust search engine based on Autonomy's (formerly Verity) K2 Enterprise platform. This effort involved customizing the platform in unique ways to meet AB's complex business needs. The portal's search functionality was designed focusing on three primary components critical for scientific research & commerce:

Scientific Searching

Applied Biosystems was able to index metadata for over 3 million assays to support an advanced scientific querying engine that allows customers to search for assays based on specific genetic attributes. To provide a flexible solution that complemented customer's research processes, the application was designed to allow users to search by directly entering sequence information or by uploading files that can contain thousands of genetic identifiers. Results are displayed where each identifier is mapped to an individual search result, allowing customers to easily find the results for which they are searching.

Taxonomy Management

AB was able to develop an enterprise-wide taxonomy based on a categorization scheme that currently encompasses all of its products and services. This taxonomy, developed using Autonomy's Collaborative Classification tool, was applied to the portal's search engine, allowing customers to search and refine results based on the categorization of Applied Biosystems product lines and service offerings, regardless of how or where the data is stored. This significantly improves the accessibility and usability of the site as scientists are able to find what they need, when they need it.

Online Product Configuration

Applied Biosystems is among the largest suppliers of genotyping products in the world. To enable customers to customize products to suit their research needs, Applied Biosystems has developed a solution enabling customers to configure the Taqman[®] Low Density Arrays (TLDA) and the Oligonucleotide product lines. Unlike most companies that require products to have predefined structures, Applied Biosystems allows their customers to specify the gene sequences and array configuration for some products they sell and manufacture. Due to the complexity of the genomic data and the manufacturing process, a complex set of configuration rules was needed.

To address these challenges, Applied Biosystems leveraged the product configuration capabilities of the C3 Configurator[™] from Comergent and extended them to meet the needs of scientific commerce. To support Oligonucleotide and TLDA configuration, Applied Biosystems extended the C3 Configurator rules engine with regular expressions, enabling the application to determine what bases and dyes are allowed to be combined at a given location in the sequence. In addition, default and nested configurations were utilized to help adapt the C3 Configurator's



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product configuration capabilities to this scientific paradigm.

The combination of the two technologies gave Applied Biosystems the ability to use all of the standard functionality of the configuration framework and enabled their customers to define the DNA sequences of the products they want the company to manufacture.

eCommerce (Order Management & Integration)

In developed countries, the Web has matured and become one of the primary channels customers use for both research and the purchase of products. This evolution of the technology has impacted the life sciences industry by changing the way that scientists and researchers access the information and products they need to support their research and product development. To capitalize on this evolution, Applied Biosystems underwent a technology transformation. They built a robust ecommerce platform, leveraging the eCommerce capabilities from Comergent, that allows customers to find, configure & purchase products in over 100 countries.

Flexibility

Due to the complexity of the global sales model (Direct, Indirect, Business-to-Business (B2B), etc.), Applied Biosystems needed a flexible solution that could support different types of customers in different geographies. To enable global variation, the solution required core ecommerce capabilities and associated management tools allowing the administration of orders from users as well as from institutions. The tools that were developed allowed site administrators to specify the allowable sales and approval routes (direct, reseller, etc.). Customers are associated to an institution, and to each other, to enable online order approval before a customer is allowed to purchase on behalf of a company.

This flexibility helps Applied Biosystems market and sell products globally regardless of business model. Providing a flexible and reliable global commerce and order management system has not only reduced the cost of sales, but helps the company to accelerate genomic research by providing the tools, information and products they need online.

Integration

Due to the diversity of Applied Biosystems product lines, integration to other scientific tools and systems was required. For example, to assist scientists in finding assays for biological experience, Applied Biosystems has built a tool that allows them to browse the human, mouse, rat genomes and to select relevant assays targeting the specific gene(s) in an interactive graphical viewer. These tools have been seamlessly integrated into the research, find, configure and buy experience to help accelerate research

Originality

The AB New Portal Project offers researchers an original opportunity to fundamentally change the way in which science is conducted. Scientists have the ability to perform a wide variety of searches against, and order, over 3 million single nucleotide polymorphism (SNP) genotyping and gene expression assays; configure a near-infinite number of custom arrays, PCR and real-time PCR primers and probes; and discover the applications of the full range of thousands of cutting-edge research solutions offered by Applied Biosystems.

For the first time, eCommerce is fully and seamlessly combined with international scientific



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data, including full integration with the National Institute of Health's National Center for Biotechnology Information (NCBI) and Applied Biosystems sister company, Celera Genomics enormous database of formerly proprietary genomic data. Integration with scientists' existing data is streamlined for ease of use, including the ability to upload sequences from existing research data to run searches or configure custom products. This represents nothing less than the founding technology for the next phase of growth in the genomic science industry, allowing researchers to find and configure their custom experiments to track down disease-causing variations in the human genome.

Success

The Applied Biosystems New Portal Project opened its "doors" to the research world on December 4, 2005. The site enjoyed a highly successful go-live thanks to the collaboration of a broad array of over 100 scientific, marketing, and technical stakeholders over the course of the nearly 18 months it took to craft strategy, design, and build the optimal portal to serve the unique needs of AB's customers. The portal is fully operational, as it has been since its launch, enjoying an extraordinary record of reliability with over 99% availability and nearly no unscheduled downtime – requirements when serving a global research constituency. Since December, the thousands of users and millions of dollars in orders are a testament to the unmet need fulfilled by the project.

At the inception of the New Portal Project, AB management put forward a series of goals by which the success of the portal could be measured. Although some of the data on ultimate success are still emerging, as the site has only been available for approximately four months, the trend is clear when the portal's two key goals are compared to accomplishments to date:

•Goal: Transform from an instruments and consumables vendor to a complete solutions provider, utilizing a portal to better educate customers, support higher revenue and transaction volumes, and provide the tools and services that life science researchers need to conduct increasingly complex research.

Accomplishments to Date: Transformation is well underway. So far, Applied Biosystems has: launched the new portal which supports higher revenue and transaction volumes, with substantial additional capacity available; created new tools and re-platformed existing scientific tools and services to provide a more robust, stable, fast, and user-friendly environment for scientific exploration; created a robust platform for future expansion and growth as the scientific marketplace evolves.

•Goal: Bring integrated science to all researchers by deploying a new marketing and sales channel (the Portal), enhancing AB's brand awareness, eCommerce, marketing, and customer support capabilities.

Accomplishments to Date: Launched new Portal, bringing a new integrated scientific, marketing, and sales channel to the Web. The new portal includes enhanced branding, vastly improved, best-in-class eCommerce capabilities, flexible and targeted marketing and promotions capacity, and 24x7 customer support by a blended onshore / offshore team of portal experts.

Finally, the Portal recently concluded an assessment by a leading market research firm. This independent third party found that the new portal was in the top 5% of over 600 eCommerce sites assessed for usability, despite the very high complexity of the products and information



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presented on the portal. In particular, several elements of the new portal were commended:

- Clean page layouts with persistent location cues showcasing essential content and function
- New, logical information hierarchy based on the way scientists conduct research
- Interactive elements clearly identified and placed within the natural user flow
- Contextual help which anticipates potential user challenges
- Value added content in appropriate context and specifically targeting the research and applied markets AB serves

Difficulty

Developing the strategy, and designing the UI, tools, and scientific commerce solution was a significant challenge requiring global people, process and technology changes.

Resources & Expertise

To successfully design, develop and deploy this type of global technology solution requires the right resources and subject matter expertise.

Technical Expertise

The nature of the scientific commerce solution required both deep scientific as well as Web development expertise. Applied Biosystems, while having the scientific knowledge, did not have sufficient development resources with the right expertise to dedicate to the project. As a result, Applied Biosystems looked to a leading professional services firm to assist with the design and development of the eCommerce solution.

While engaging a professional services firm helped to provide the process and technology know-how, helping them understand the specifics of our industry, the desired solution as well as global business model to support such a complex solution was a challenge. The firm was faced with having to quickly get up-to-speed on the scientific nature of the products so that they could effectively engage the core Applied Biosystems team to design and build the new system.

Industry & Subject Matter Expertise

The scale and scope of the solution required that Applied Biosystems engage resources in various geographies and divisions across sales, marketing, IT and finance. Having access to the right resources, with the right experience (order administration, price list management, promotions management, marketing, etc.) available to make decisions and provide direction to the consulting firm was a challenge. Throughout the project we found that there was an impedance mismatch between the velocity at which the consulting firm and the organization could move while staying in-synch. We overcame this challenge by constructing an integrated (AB and consulting firm) project structure and promoted an environment of empowerment. These two factors fostered a high degree of collaboration and rapid decision making which helped to make the project a success within an aggressive timeline.

Technology Challenges

Due to the scientific nature of the solution, a significant amount of customization was required to provide the level of flexibility needed by the business.



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Search

Designing and delivering an integrated search solution was critical for creating an effective find, configure and buy experience. However, it was difficult to design and build a solution that quickly searches content ranging from product data sheets to millions of assays stored within a data mart. The massive amount of data, coupled with the fact that scientists / researchers can search for hundreds of products simultaneously using Batch ID search, make search performance a challenge that was overcome by both performance tuning as well as collection design.

In addition to performance, classification of the data indexed by the search engine was a challenge. To help assist classify data indexed by Verity K2, Verity Collaborative Classifier was used to construct rules that grouped results according to the content and location of the data. For example, if a FAQ document was published about the 310 Genetic Analyzer, the application would recognize the product category (DNA Sequencers) as well as the type (Support) of the collateral. This helps customers find what they need when they need it.

eCommerce & Product Configuration

Due to the scientific nature of the solution, the eCommerce platform had to be extended. As described above, this flexibility was required to support both the wide range of products (assays, instruments, consumables, etc.) as well as varying sales models that exist within the organization. The tools that were developed allowed site administrators to specify the allowable sales and approval routes (direct, reseller, etc.). Customers were then associated to an institution, and to each other, to enable online order approval before a customer is allowed to purchase on behalf of a company.

The complexity of the products also complicated Oligo & TLDA configuration. Due to the scientific nature of the products being ordered, as well as complex manufacturing rules that needed to be enforced, an extensive amount of customization was required. The core challenge was one of determining how the existing configuration framework needed to be customized to enforce the manufacturing rules while ensuring there was not a negative impact on :

Existing out-of-the-box functionality

Data integrity passed to the manufacturing system

Application performance

Application user interface

Integration

In addition to integration of innovative tools such as MapViewer, FileBuilder, etc., the scientific commerce platform required complex integration to middleware as well as ERP systems to securely store and transmit sensitive customer, order or sequence related data. A lack of detailed documentation on each of the interfaces made the development effort complex and time consuming.