

HOSTED INFORMATICS:

How Pharma can Harness the “Cloud” to Capture More Value from Software Ownership

THE FORECAST FOR INFORMATION-DRIVEN R&D IN PHARMA IS “CLOUDY” TODAY—AND THIS IS A GOOD THING.

An information-driven approach to R&D focuses on exploiting all available knowledge to enable scientists to make better, more informed decisions. Scientists have come to rely on a variety of software tools to leverage accumulated organizational expertise and collaborate effectively with colleagues. Collectively, information management, decision support, and reporting tools all help scientists decide how best to turn experimental results into timely, actionable information that drives better decisions and more successful product pipelines.

R&D organizations have traditionally relied on a license-based software model in acquiring software applications, but today’s economic and competitive pressures are leading many organizations to consider a new model in which scientific software and information are hosted offsite and accessed as a subscription-based service online. Under this model, users simply point a web browser at what is colloquially known as “the cloud” to gain access to shared technology and infrastructure that a vendor hosts and maintains. The concept is so appealing that Claus Mortensen, IDC’s principal for emerging technologies advisory services, predicts that “IT cloud services will form 25 percent of all incremental global IT spending growth by 2012.”¹

Symyx believes that cloud computing is a natural fit for pharma. Historically,

merger and acquisition activity have challenged pharma companies to find ways to integrate and empower project teams and associated data. More recently, the industry has embraced outsourcing, which has resulted in globally dispersed, multidisciplinary, virtual teams that form and disband according to corporate priorities. Now more than ever, pharma companies require easily shareable software, on-demand information in the context of scientific workflows, and effective collaboration tools that are easy to turn on and off as relationships and project management needs change and evolve. Hosted informatics meets these requirements by making scientific information and applications available as shared resources that can be accessed by many scientists, as needed, online. With many of the original barriers to hosted informatics dissolved, the question is no longer if pharma R&D will invest in the cloud, but when.

HOSTED INFORMATICS: EVOLUTIONARY, NOT REVOLUTIONARY

Hosted informatics is an evolutionary—rather than a revolutionary—shift in information management. Just a decade ago, the concept of hosted solutions would have been anathema to research organizations due to concerns about data security and intellectual property. The chemical structures in a compound registry, the experimental information in a lab notebook, and the accumulated

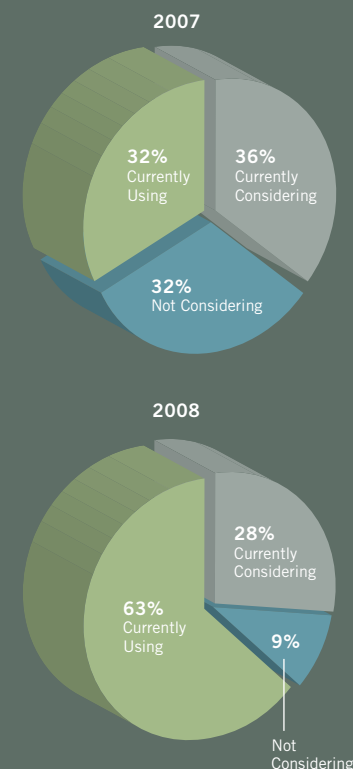


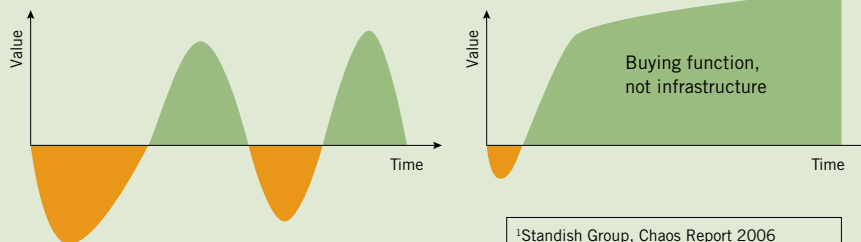
Fig 1: Interest in SaaS applications among U.S. businesses, as reported by THINKstrategies/Cutter Consortium, 2009

¹ Yeo V, Analysts: 2009 The Year of the Cloud. *ZDNet Asia* [Online] 2008.



ON-PREMISE OPERATIONS:
53% of software projects cost
189% of original estimate¹

CLOUD COMPUTING:
Average **49% ROI**
within 10 months²



¹Standish Group, Chaos Report 2006
²Third Party CustomerSat Research on 4,165
Salesforce.com customers, February 2008

Fig 2: These graphs show the projected costs associated with on-premise software systems vs. cloud computing as a function of value over time. In the figure on the left, the mountains and valleys illustrate the unpredictability of on-premise management, which requires both a large up-front investment and further costs with upgrades and maintenance. Cloud computing comes with a small initial up-front cost, and because companies are investing in functionality rather than infrastructure, value is more immediately realized.

knowledge and insights of an employee brain trust were just too valuable to consign online.

Today, however, organizations and individuals routinely outsource the management of proprietary and confidential information. Consider the public's daily experience with secure online banking and tax preparation services, or the success of a growing number of software as a service (SaaS)-based enterprises like Amazon.com, Google Docs, and Salesforce.com. The uptake of this technology by business has been extremely rapid according to a study presented by THINKstrategies at a SaaS conference in June 2009. Between 2007 and 2008, the number of U.S. companies using SaaS applications jumped from 32% to 63% and those not considering the technology dropped from 32% to 9% (see Fig 1). It's no wonder that *Chemical & Engineering News* recently reported on the efforts of several large pharma companies to investigate cloud computing options.² Any concerns about data and operations security in the cloud are

largely alleviated by today's mature, scalable, and redundant multitier architectures and shared resource environments. Highly specialized and secure third-party data centers offer the ability to isolate customer data, perform regular data backups, and minimize failures via redundancy. Detailed service level agreements spell out SaaS providers' responsibilities for end-to-end delivery of efficient and reliable hosted services. Finally, today's industry-standard disaster recovery and business continuity plans are backed by comprehensive SAS 70 auditing standards and specifications for the guidance of SaaS providers and the protection of SaaS customers.

Pharma—like so many other industries—has been successfully integrating hosted solutions into its clinical, sales, and marketing activities. It only seems logical to use this same framework to empower scientific R&D. The benefits in reducing costs, improving workflows, and focusing on core excellence now far outweigh the risks.

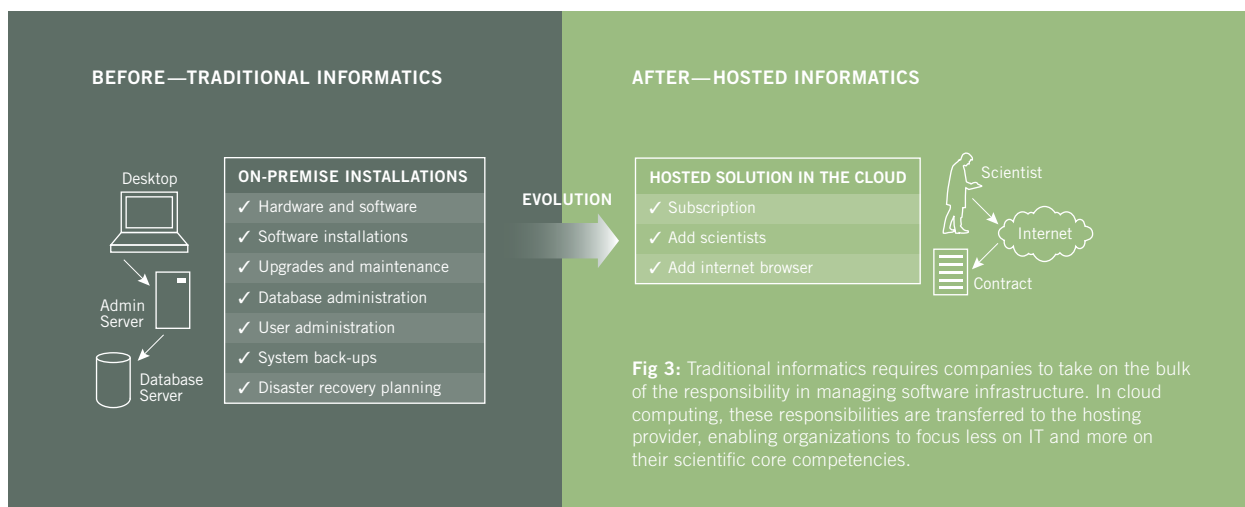
LOWERING COSTS

Traditional software can involve a considerable up-front outlay in cash and resources, as well as ongoing maintenance and support. Indeed, the global IT research firm Gartner estimates that owning and managing a traditional enterprise software application can cost up to four times more annually than the initial purchase. Furthermore, companies spend more than 75% of their IT budget just running and maintaining existing systems and software infrastructure.³ As shown in Fig 2 in data compiled by Salesforce.com, SaaS implementations enable companies to invest directly and predictably in relevant, valuable functionality. Plus, these investments free IT departments to focus on strategic business initiatives, such as better integration of the disparate systems associated with specific scientific workflows.

Hosted informatics provides direct and quantifiable cost benefits over the traditional software model because its shared resources

² Mullin, R. The New Computing Pioneers. *C&EN* 2009 87, (21), pp. 10-14. Note that this article cites Pfizer, Eli Lilly & Co., Johnson & Johnson, and Genentech as a few of the companies that are putting cloud computing to the test today.

³ Chou, T. *The End of Software: Transforming Your Business for the On Demand Future*; SAMS Publishing: Toronto, 2004; pp. 6-7.



environment offers significant economies of scale. Updating software applications in a license-based, single-tenant model involves expensive and inefficient duplication of effort. The cloud paradigm shifts this responsibility to a hosted informatics vendor who manages a single infrastructure shared by hundreds of companies (see Fig 3). Keeping software current is a much more cost-effective proposition when a hosted informatics vendor updates a single infrastructure and allows hundreds of companies to instantaneously access the latest functionality.

Of course, moving to a hosted informatics model solely to cut costs is not a sustainable strategy. As with all outsourcing, the primary strategic goal for adopting a hosted informatics model should be to improve operational agility and provide better focus on core competencies. If the move to hosted informatics is done with these larger aims in mind, additional cost reduction will follow.

IMPROVING OPERATIONAL AGILITY—WHEREVER YOU ARE

R&D organizations today need to react quickly to changing business opportunities but in a “just in time”

manner. Hoarding resources as a hedge against future changes in demand is not a viable option. This delicate balancing act in the handling of resources has led to the proliferation of agile, global, virtual teams frequently involving external partners and contract research organizations (CROs). On-demand, hosted informatics with its light (or zero) infrastructure and rapid deployment makes it much easier for companies to move resources around, expanding or reducing capacity to meet changing business needs while still providing partners with the full informatics capabilities necessary for effective collaboration.

Hosted informatics is especially helpful in the large biopharma sector that sees frequent merger and acquisition activity. It can take months to sort out the network deployments necessary to integrate globally dispersed teams into a newly merged organization. With hosted informatics, organizations need only an internet connection and a password to provide scientists with instant access to shared scientific information, tools, and workflows.

CRO engagement is an excellent example of how hosted informatics supports improved operational

agility in pharma R&D. A CRO performing library design for a pharmaceutical company can register new compounds into a shared, hosted registry. They can document the workflow used to create the library in a shared, hosted electronic laboratory notebook (ELN). By hooking into a common informatics environment in the cloud, multidisciplinary virtual teams can quickly and easily access the same information, use the same synthesis methodologies, and work together productively. Outsourcing organizations working with various third-party collaborators also gain the agility to turn partners on and off quickly and efficiently without disrupting ongoing operations.

FOCUSING ON CORE COMPETENCIES

As business author Geoffrey Moore has stated, successful companies assign their “A team” to core business activities that differentiate product offerings and win customers. They then outsource non-core or contextual activities to outside vendors specializing in those areas because “this is where [the outside vendors] are putting their A team. It’s context to you but is core to them.”²⁴

For example, Symyx has over 25 years of experience providing life scientists with advanced ELN, data acquisition, decision support, and content solutions backed by a proven, industry-leading chemistry engine. Developing, extending, and supporting scientific software and databases are core activities for Symyx. But these concerns are ancillary for our many customers who are primarily engaged in drug discovery or developing other chemical-based products in their core business areas.

Symyx's online DiscoveryGate content platform, which has been in operation for over seven years, delivers hosted information on over 30 million molecules and 17 million reactions to over 600 companies worldwide. This content platform can be accessed directly via any Web browser, or can be configured as a web service to make vital scientific content seamlessly and immediately available within a customer's own internal applications and services. For instance, commercial compound availability and property information from DiscoveryGate could be made accessible directly in an ELN as scientists design and document experiments, rather than requiring scientists to leave the ELN to conduct necessary searches.

Small pharma and biotech companies that do not have the resources to support a large informatics infrastructure are perhaps best positioned to benefit from third-party content solutions such as DiscoveryGate, or from a remotely-hosted ELN, compound registration service, or logistics or workflow orchestration service such as a chemical inventory system. By tapping into the cloud, organizations can protect IP, optimize workflows, and stretch IT budgets further. Most importantly, hosted services enable companies to concentrate more resources on the

core excellence that ultimately drives strategic business success.

THE FUTURE OF THE ELECTRONIC LAB

Symyx's successful hosting of scientific content on the DiscoveryGate and DiscoveryGate Web Service platforms has increased our customers' interest in and acceptance of Symyx providing additional hosted services, such as ELN, cloud-based chemical registration, chemical inventory management, workflow orchestration, and R&D data management capabilities.

ELNs, in particular, are evolving into applications that could do perfectly well as hosted systems. According to Michael Elliott, CEO of Atrium Research & Consulting, first-generation ELNs were used for basic data capture in the late 1990s while second- and third-generation systems offered improved chemistry functionality and increasingly generic capabilities that extended the reach of the ELN to other disciplines including biology.⁵ Elliott states that today's fourth-generation ELNs are all about convergence. Labs today are demanding a single, flexible, enterprise ELN solution that combines generic, multidisciplinary functionality with mix-and-match, domain-specific modules for handling structured and unstructured

information. Elliott suggests that this is moving the fourth-generation ELN into territory traditionally inhabited by laboratory information management systems (LIMS) and scientific data management systems (SDMS).

Looking to the future, Symyx believes that the fifth-generation ELN will move the enterprise notebook into the cloud, helping companies of all sizes benefit from an ELN and enabling multidisciplinary, virtual project teams to share information more easily using a common notebook (see Fig 4).

The enterprise ELN in an independently managed, subscription-based, hosted informatics environment will enhance operational agility by improving support for distributed project teams. It will also enable pharma R&D organizations to focus on core competencies while reducing overall costs and providing earlier payback periods for pharma's critical investments in information-driven R&D. ^{MC}

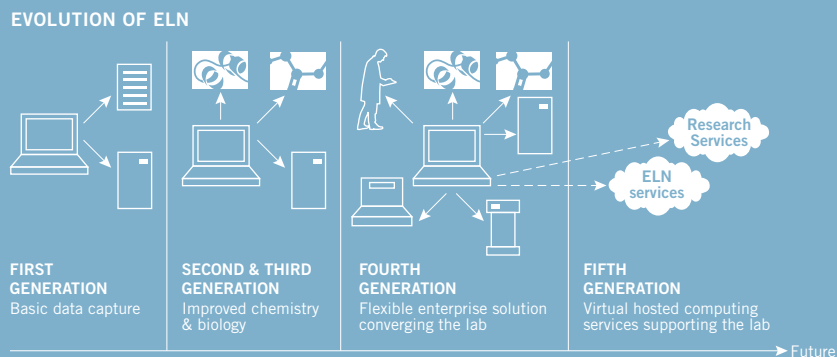


Fig 4: According to analyst Michael Elliott, ELNs have evolved from basic data capture systems to enterprise-critical functionality that now lends itself to being delivered as services in the cloud.

⁴ Moore, G.A. *Living on the Fault Line, Revised Edition: Managing for Shareholder Value in Any Economy*; HarperCollins: New York, 2002; p 31.

⁵ Elliott, M.H. What You Should Know Before Selecting an ELN, *ScientificComputing.com*, Spring 2009.