HCL

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Nuances of Low Cost Effective LIMS Implementation: Can SaaS be an option?

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WHITE PAPER

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Abstract

A new dawn in business applications... 'Cloud Computing'. Today's buzz word is 'Cloud Computing' and one day our business is going to be very cloudy every day. A Laboratory Information Management System (LIMS) is a software system that is heavily used in different industries like Pharmaceutical, Manufacturing, Agriculture, Mining, Automotive, Aerospace defense etc. This article describes about next generation LIMS i.e. how LIMS can be leveraged using 'cloud computing architecture' than traditional LIMS. Let's step in...

What is LIMS?

Laboratory Information Management System (LIMS) is a software system that collects, processes, stores, retrieves, and analyzes data that is used heavily in laboratories for the management of samples, lab users, instruments, standards and laboratory functions like capturing structured data generated from R&D, process, Quality Assurance and Quality Control processes.

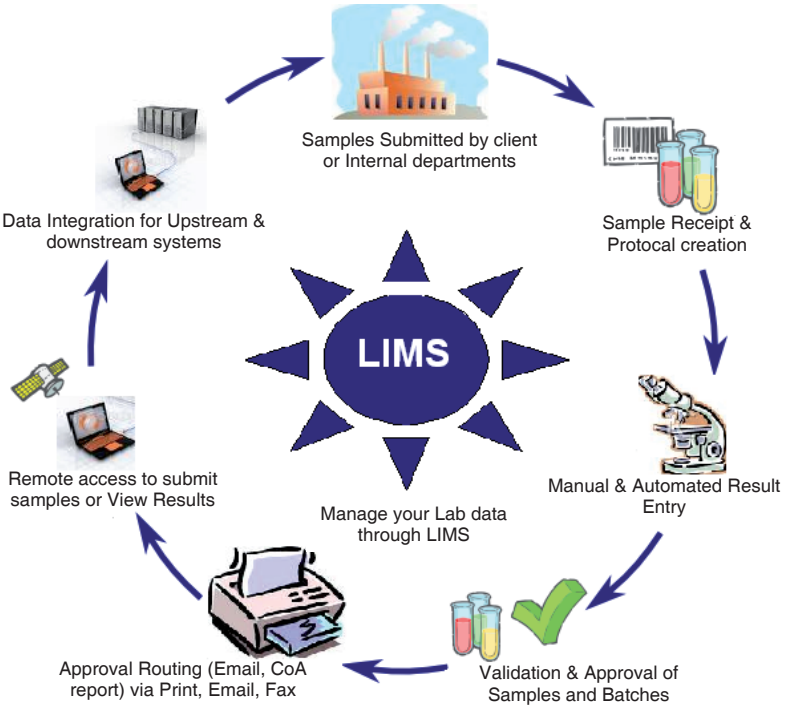

Figure 1: LIMS Process

As a first step, sample login done by client or internal departments and send samples to Lab for further analysis. At Lab, samples will be received and analyzed using LIMS system. The analyzed sample data will be entered into LIMS through manual or automatic process (predominantly automatic) and scientist will validate those data and approve it. The final reports are sent to concerned authorities.

What is Cloud Computing?

"Cloud computing is an operational model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction" – *National Institute of Standards and Technology, August, 2009.*

Cloud computing began in large-scale by internet giants like Google, Amazon and others built out their infrastructure. The network is massively scaled, wide distributed system resources, visualized as virtual IT services that were managed/supported continuously by pooled resources.

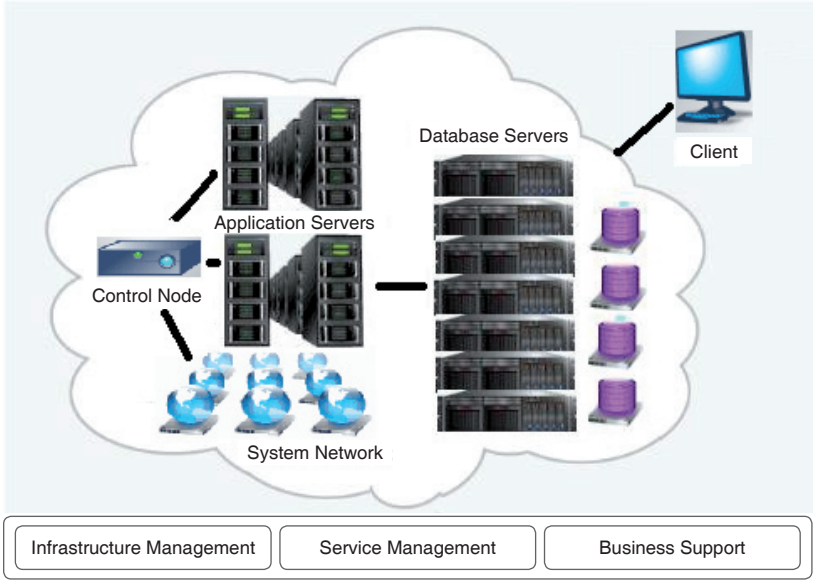

Figure 2: Cloud Computing Services

"Cloud computing is an emerging computing technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without any software installation and access their application anywhere at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth"- *Wikinvest.*

A cloud can be private or public. Public clouds cater services to anyone on the Internet. (Currently, Amazon Web Services is the largest public cloud provider.) A private cloud is a proprietary network or a data center that supplies hosted services to organizations.

These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).

- **Infrastructure-as-a-Service** like Amazon Web Services provides virtual server instances and blocks of storage on demand. Cloud computing allows a company to pay for only as much capacity used, and jump start the business instantaneously
- **Platform-as-a-service** in the cloud is defined as a set of software and product development tools hosted on the provider's infrastructure
- In the **software-as-a-service** cloud model, the vendor supplies the hardware infrastructure, the software product and provides application support. Because service provider hosts both the application and the data, the customer is free to use the service from anywhere

LIMS through Cloud Computing

Laboratories generate enormous amounts of data from the hundreds (or even thousands) of samples processed per day. "As a sample processed through the laboratory, a LIMS collects, processes, and stores data at each step of the analysis to ensure sample traceability, regulatory compliance, and adherence to industrial standards, as well as provide reporting capabilities" – *ARC Advisory Group.*

There are around one million independent laboratories worldwide, and 80% of scientific labs (small-to-medium sized labs) are still operating without a traditional LIMS because of heavy investment cost, time and maintenance. The Software-as-a-Service (SaaS) model provides an opportunity to those small to medium sized labs that are aspiring for more cost effective LIMS. Primary drivers of SaaS adoption are low initial cost of ownership, rapid deployment, low internal IT resource need, and improved growth management.

Annual expenditures for the implementation, administration, and maintenance of LIMS solutions are very high as it involves

- License cost of product
- Dedicated Infrastructure cost
- Customization to fit the purpose
- Annual Maintenance & Support
- Software and Hardware upgrades

With the introduction of LIMS delivered via the very efficient Software-as-a-Service (SaaS) delivery model, labs can jump start their LIMS very quickly. "With many cost and resource utilization advantages, SaaS-based LIMS with effective tailorability will become the fastest growing segment in the LIMS industry" – *Sciformatix.*

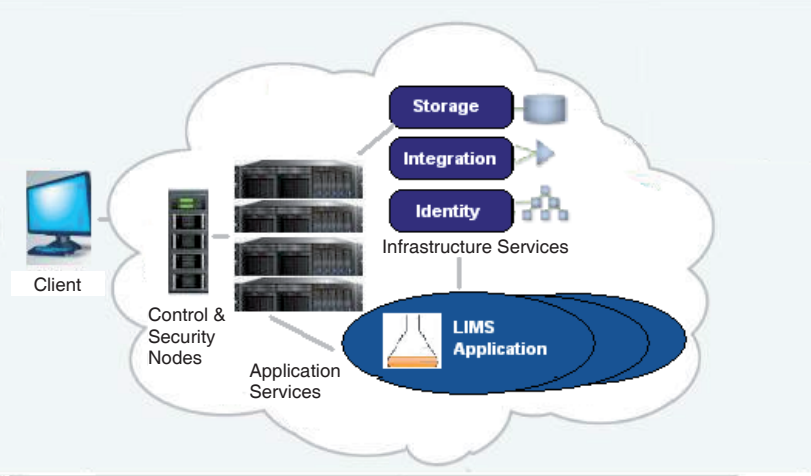

Figure 3: LIMS through Cloud Computing

A software-plus-services Cloud computing model makes affordable LIMS solution to all customers irrespective of their size of labs. It helps organizations and lab manager to predict lab costs over the time that helps for better planning and budgeting. As software-

plus-services implementation is simple; lab analysts can begin using LIMS extremely quick. That means customers start receiving ROI right away.

LIMS Software as a Service will help all labs to start their business with minimal subscription charges (approximately few hundred dollars per month) and free from license cost, software and hardware administration and maintenance. This is an attractive model for all labs; as their current annual licensing and administrative costs are very high and struggling to contain its running cost. There are lots of six sigma projects executed in different organization to minimize their cost effectively and I am sure this model will open the door for them to re-think whole product and support strategy. This model also helps their business continuity during adverse event without impacting their revenue and customer satisfaction.

"Software-plus-services gives cloud computing architecture a huge competitive advantage in LIMS" – *Sciformatix.*

How it works?

LIMS applications will be installed and supported at Vendor end (Cloud computing provider) and customers can use Software-as-a-Service (SaaS) model to use LIMS remotely for their efficient lab processes. Using this SaaS model, customers have to pay low monthly subscription charges initially and get ready to use the application instantaneously. There is no investment like hardware, software and support issues by customer; as all these can be taken care at Vendor end.

There might need of initial customization to fit customer's independent lab processes that can be performed by Cloud Computing support team with minimal cost. For Traditional LIMS, normal customizations and new workflow processes would be implemented by LIMS vendor that can take a lot of time and money. Using SaaS, customers can also integrate various instruments to LIMS system to transmit data from instruments to LIMS automatically.

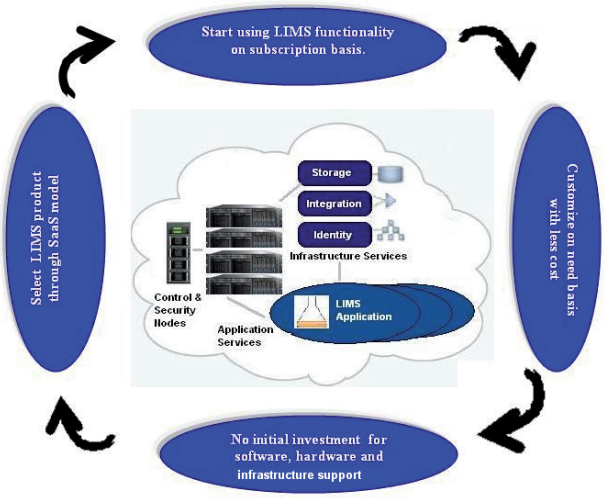

Figure 4: LIMS through Cloud Computing

To consolidate, using SaaS any customers can jump start using LIMS system without having concerns regarding license cost, software implementation and infrastructure support. The following are the options customer can think of using SaaS delivery model for their implementation.

- Subscribe LIMS services and integrate instruments as per the need (available solution like Sciformatix LIMS)
- Subscribe LIMS and integrated systems like Scientific Data Management Systems, Open Lab etc (future solutions-yet to be available)
- Subscribe entire Lab Automated Services by just shipping the samples and review at the end of the process (ideal target solution-yet to be available)

Benefits

There are numerous benefits using LIMS through SaaS delivery model; few highlights are:

- Significant cost savings. Traditional LIMS implementation can cost around $200K to $1 million depends on concurrent users and number of business functionalities where as LIMS through SaaS cost around few hundred dollars per month
- Application and Data – Anywhere, Anytime
- Cloud – Accessible from any Computer connected to Internet
- Reduced need for advanced hardware
- Company wide access
- Metered fees
- Removes need for physical space
- Streamlined Hardware
- Grid Computing
- Improved Service delivery
- Enabled Business Innovation

There are two areas the current industries are concerned about i.e. Security & Privacy. There are private clouds using private LAN with respective customers with dedicated instance of software and virtual infrastructure setup that will be highly secured to improve security and privacy of data. As currently lot of sample analysis executed by third party with non-disclosure agreement, the same ideology can be adapted to cloud computing model for LIMS.

The traditional model has demanded that labs/businesses go through an extended RFP/proposal/negotiation/demo process which in itself costs thousands in man hours, then pay a license fee costing $10,000 – 100,000 before they even install the software, let alone configure and customize it.

The SaaS subscription model for a LIMS typically requires a small configuration and/or training fee (around $1000 – $2000) if anything up front, then just a monthly fee, which can be as low as $295.

Even over software's lifetime, a viable SaaS solution will be well below LIMS costing $200,000 – $500,000. And the SaaS model lifetime is effectively infinite, since upgrades are included. Even any training and configuration needed won't require travel costs.

HCL Offers

HCL is the leading Lab Automation service provider with strong certified professionals providing consultation to various customers spanning all industries. HCL can provide consultation services related to Laboratories to opt specific Laboratory Automation package, services related to End-To-End implementation of Lab Automation package and continuous maintenance of Laboratory Automation packages.

Why HCL?

HCL being a leading provider of Lab Automation, Infrastructure Management kit and SaaS expertise, have been recognized as a thought leader in the area of LIMS. Some key attributes regarding HCL's service offering are:

- Robust Support Service with Optimum Onsite/Offshore mix. Focused Lab Automation practice that is the largest amongst the Indian offshore IT players
- Proven Consultation Services in LIMS & Bioinformatics, Manufacturing, CAPA and Validation Services and SaaS
- State-of-The-Art Adapter for Interfacing
- Proven Validation Team
- Proven Expertise in IT Infrastructure Management: Since your money (and data) is bet on a hosted model, probably the most important thing to look for is that the provider operates from a good quality data center (or two!). It's important that operational uptime, data protection, redundancy and overall data protection and security be at least as good, and preferably better than your own capabilities. HCL has been meeting this demand since ages
- HCL's "GateKeeper Model" helps organization to keep confidentiality of data of different companies and different projects
- Proven Program Management Service throughout the Life Cycle with Risk Reward approach
- HCL assure reduces Cost of Ownership & transfer Benefits to Customer End

Conclusion

Cloud computing is a brand new architecture and dynamic shift to the way we handle LIMS business today. I know it would be hard for big players to change their propriety LIMS process very quickly but it is an enormous boost for small and medium labs to jump start LIMS. Other industry giants can follow the foot-path and establish this new efficient architecture on the way. Some of the highlights.

- Tremendous benefits to customers of all sizes
- Cloud services are simpler to acquire and scale up or down
- Key opportunity for application and infrastructure vendors
- Public clouds work great for most of the applications
- Private cloud is an excellent choice for regulated industries owning the data and security of their applications

As mentioned earlier, "Today's hot word is 'Cloud Computing' and one day our business is going to be very cloudy every day". It is applicable to all applications and in all industries and for LIMS it would be more efficient; as cost of ownership related to license, implementation, administration, and maintenance of LIMS solutions are very high.

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About Author

Padmanabhan Nagalingam is a head of Chennai LIMS CoE and has more than 11 years of experience in IT; predominantly in LIMS domain. Have good experience in Pharmaceutical and Manufacturing industries.

ABOUT HCL

HCL Technologies

HCL Technologies is a leading global IT services company, working with clients in the areas that impact and redefine the core of their businesses. Since its inception into the global landscape after its IPO in 1999, HCL focuses on 'transformational outsourcing', underlined by innovation and value creation, and offers integrated portfolio of services including software-led IT solutions, remote infrastructure management, engineering and R&D services and BPO. HCL leverages its extensive global offshore infrastructure and network of offices in 26 countries to provide holistic, multi-service delivery in key industry verticals including Financial Services, Manufacturing, Consumer Services, Public Services and Healthcare. HCL takes pride in its philosophy of 'Employee First' which empowers our 55,688 transformers to create a real value for the customers. HCL Technologies, along with its subsidiaries, had consolidated revenues of US$ 2.5 billion (Rs. 11,833 crores), as on 31st December 2009 (on LTM basis). For more information, please visit www.hcltech.com

About HCL Enterprise

HCL is a $5 billion leading global Technology and IT Enterprise that comprises two companies listed in India - HCL Technologies & HCL Infosystems. Founded in 1976, HCL is one of India's original IT garage start-ups, a pioneer of modern computing, and a global transformational enterprise today. Its range of offerings spans Product Engineering, Custom & Package Applications, BPO, IT Infrastructure Services, IT Hardware, Systems Integration, and distribution of ICT products across a wide range of focused industry verticals. The HCL team comprises over 62,000 professionals of diverse nationalities, who operate from 26 countries including over 500 points of presence in India. HCL has global partnerships with several leading Fortune 1000 firms, including leading IT and Technology firms. For more information, please visit www.hcl.in