

EXIGEN® SERVICES: CASE STUDY: LABKALL LABORATORY INFORMATION SYSTEM

"CSC and Exigen Services have established a fruitful relationship after partnering on numerous projects since 1997, particularly on the LABKALL project, our largest collaboration to date. The collective team of developers, testers, analysts and managers from CSC and Exigen have done an outstanding job coming together to overcome numerous challenges in order to deliver LABKALL R1.2, a highly complex product, to our first customers. Establishing the right processes and communication channels with the Exigen Services team was crucial to our success on the project. This success has allowed CSC to look to future market opportunities with both the LABKALL product in EMEA and with other CSC Healthcare products globally. Overall, we are very pleased with Exigen Services' skills, partnership-centric mentality and work ethic, and we look forward to our continued collaboration."

*Alan Guthrie
Program Manager
Labkall*



CSC Corporation, together with Exigen Services provide laboratory information system (LIS) LABKALL

System advantages:

- ▶ Complete laboratory automation;
- ▶ Wide flexibility;
- ▶ Easy integration and scalability;
- ▶ Developed for the international market;
- ▶ Online laboratory tests ordering, and online results;
- ▶ Familiarization and use simplicity.

LABKALL is a system for automating medical laboratories work. Its user-friendly graphical interface is aimed both at laboratory and clinical users. Main Labkall features are built on the roles principle so that each type of user is working in the role one is intended for. Key Topics: research process management, hospital unit management, materials fencing, management of analyzers, research results management, automatic quality control of laboratory results, and reports printing.

SYSTEM FEATURES

LIS Scale

There is a distinct tendency for increasing the scale of modern LISs – coming from local labs solutions to large systems covering all needs of the Labs networks. Larger systems improve management of the lab activities, reduce the costs, consolidate the processes and allow tight integration with other HC systems such as Electronic Patient Records, Hospital Administration systems, etc.

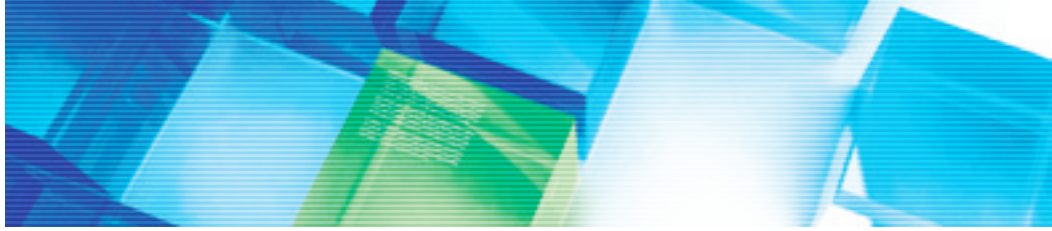
Exigen has proven to be able to provide LIS solutions of the regional scale – one system installation can support all business processes in the Labs of the regions with 2,000,000+ population enabling to process 30,000,000 tests per year.

Integration with Other Systems

LABKALL does not require additional intermediate software product to interact with other systems. The system is built on open architecture. Together with global data exchange standards widely used in medical practice, it provides an excellent opportunity for expanding of communication capabilities.

Instant Access from Anywhere in the World

LABKALL allows you to work anywhere in the world where Internet access is available. All laboratory information, including laboratory research requests, test processing monitoring and results presentation, is available either from work-stations inside the clinic or from computers connected to the World Wide Web. All you need is Microsoft Internet Explorer browser version higher than 6.0.



Reports

Laboratory system allows producing a bulk number of reports both in electronic and paper form. One of the most convenient services is coupling of all records for a particular patient followed by the presentation of the accumulated results in one form or as a set of reports arranged by time (in text or graphical form). Graphical reports are the most actual and allow practitioners to make the best decisions in treating of the patients as they accurately illustrate the indicators dynamics.

Reflex Tests / Formula Supporting

The system we have developed can reduce research costs by means of complex (also named "reflex") tests where the sequence of sub-analyses is determined automatically during the test. Moreover, the necessity of pcoming analysis depends on the outcome of the previous test (or tests). Thus, there is no need to perform additional research because it would be unclaimed subsequently.

Quality Control

The experience our company has in the laboratory research area allows us to include a powerful expert system to LABKAll. This system is based on a number of standards (Shewhart, Westgard and Cusum) and cumulative analysis of the results. Consequently, incorrect data will be weeded out with a guarantee at some stage of quality control, or it will receive necessary gauge correction. You can specify rules for each type of research on each analyzer. The number of rules is not limited.

In addition, the system can be configured in such a way that in case of a quality control error the analysis results are automatically rejected or highlighted (the user defines the way it is displayed). From here the system continues to store reference information for possible follow-up inspections.

Durability and Performance

Exigen has implemented the distributed LIS where critical data are replicated on local lab servers enabling 24x7 availability even in case of network failures. This is possible due to special architecture when the main server "charges" the laboratory computer with work, then laboratory computer "shares" the results with the "center" subsequently. Special effort was spent on performance aspects of the system ensuring the ability of LIS to process heavy workload of the labs during the busy hours.

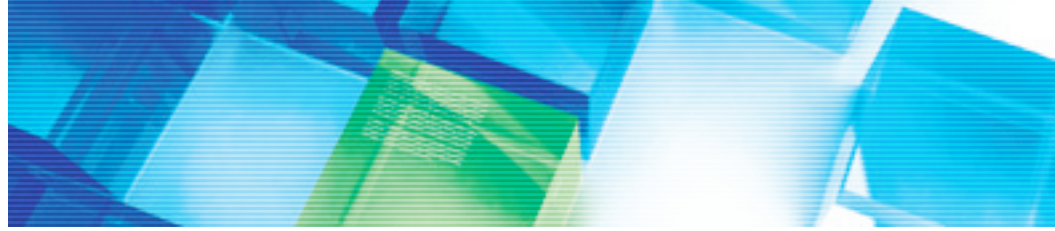
Safety

Strong access control barriers by means of custom password complexity, extensive system of roles and data encryption ensure that information is be accessible only to authorized persons.

User-Friendly Interface

LABKAll is designed to be convenient for both experienced users and beginners who are introduced to this "powerful" product for the first time. In addition to smart working place organization, system also works as an "assistant": for instance, it issues special red markers for problematic fields and presents extensive background information for each window or event.

LABKAll offers E-learning IT-based self study training materials for end-users at laboratories and clinical wards:



- ▶ IT-based training materials for the clinical wards enable end-users to perform their daily routines in LABKAll browser based on the Ordering/Result system.
- ▶ IT-based training materials describing work steps at the laboratory are used as a preliminary study before end-users' course for the laboratory staff.

Both IT-based courses contain more than 20 interactive exercises.

Analysis Requesting Flexibility

LABKAll allows using different ways of analysis requests. Depending on the situation, these can be a direct request from a computer connected to the LIS or recognition of a pre-filled paper form, or another electronic system request, for example, the Electronic Patient Journal system.

Sample Tracking

LABKAll provides the facility to track the lifecycle of a sample. LABKAll "Trace sample" module supports more than 30 events. This is possible because LABKAll uses individual sample numbers. This is a core functionality in a laboratory that fulfils the accreditation requirement.

Samples Collecting Automation

LABKAll accelerates collection of biological material and reduces the risk of errors in the collection by automating the manual process.

LIS offers two options: by means of special "sample collection forms", produced by the system right before the fencing process, and which the system automatically reads in the future; and through small personal computers, PDAs. With the help of PDA, collection of samples becomes even more automated because personal computers are built into the laboratory system network. The received results are automatically fed to the LABKA main server.

Workflow

Work begins with a sample request registration in the system. The physician chooses analysis he/she is interested in and designates the time and place for a sample collection, and selects the recipients of the results. Then the system analyzes the job and creates a unique number for collected materials to be marked with, and prints the appropriate barcode to stick on the samples container. At the same time information about the upcoming test is sent to the Instrument Server. This allows avoiding costly equipment downtime in case of connection problems. Having obtained the container, the analyzer reads the barcode and determines what kind of research is needed on the materials. Following the research, the received value is sent for approval. LABKAll is able to automatically make the decision about the analysis quality using test samples results, previous results, age and sex of the patient. When the QC is passed, the system provides the recipient with the results either in paper or electronic form.

CONFIGURATION

Windows-Based Platform, Linux Server for Oracle

The proposed solution consists of two separate computers based on Intel processor technology. The first server is running MS Windows 2003 and serves for the Labkall Server accommodation. The second computer is running Linux and is intended for the Oracle database. Print Server can



be located on any of the designated servers. Instrumental Server is located separately.

Light Solution

Light solution is designed to meet the challenges of a small laboratory automation. It includes two separate computers based on Intel processor technology. The first server is running MS Windows 2003, and serves to accommodate both Labkall Server and Instrumental Server. The second computer is running Linux and contains both the Oracle database and Print server.

AIX-Based Solution

The proposed solution consists of two logical partitions organized on a single IBM pSeries server. The first partition is used to start the Labkall server, the second one is allocated for Oracle database. Print Server can be located in one of the existing partitions or can be merged with Instrumental Server, or expanded to a separate server.

Robust Solution

Two physically separated computers running AIX contain two logical partitions each. The first partition contains the Labkall server, the second one is used for the Oracle database. Each server has an independent power supply and a cooling system. If one of the sections fails, it will be replaced by the corresponding section from another machine.

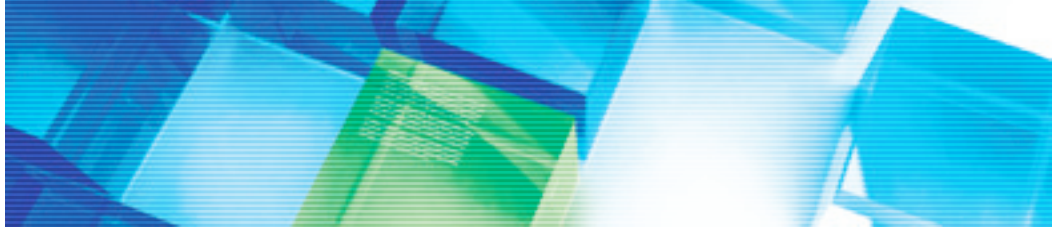
TECHNICAL INFRASTRUCTURE

Small clinic	City Hospital	Register of citizens
Antenatal clinic		
Laboratory workstation	Data centre Labkall server Print server Oracle database	Laboratory #2
Laboratory #1	WWW	

ABOUT EXIGEN SERVICES

Exigen Services is the leading application outsourcing services provider, and combines world class skills, recognized expertise in development methodologies, and industry experience to reduce risks, lower costs and deliver results. Exigen Services has pioneered a new approach to global application outsourcing, Outsourcing 2.0 that includes commercial terms that optimize financial alignment between client and vendor. As a result, Exigen Services makes IT outsourcing a much easier and more beneficial undertaking for global enterprises.

Since 2000, Exigen Services has been the global leader in the use of distributed Agile methods for rapid and precise systems development throughout the banking/ insurance/ brokerage, healthcare, telecommunications, government and media industries. Exigen Services has achieved high honors in a variety of independent lists and rankings, including Brown & Wilson Black Book of Outsourcing in 2008, Global Services 100 in 2009,



Inc Magazine's 2008 Inc5000 and is a top 10 provider of both outsourced product development and human capital development.

Clients range from mid-sized growth companies to Fortune 500 organizations including Sun Microsystems, CSC, Universal Music Group, Standard & Poor's, T-Mobile, Westpac Bank and many others.

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