Case study

Reckitt transforms QC processes with SampleManager LIMS and Azure

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Reckitt is a multinational consumer goods company headquartered in Slough, England. The company offers some of the world's most well-known hygiene, health, and nutrition brands. Its brands share three simple goals: protect, heal, and nurture.

For more than 20 years, Reckitt's Nutrition business has partnered with Thermo Fisher Scientific to manage its laboratory quality control (QC) needs. Laboratory information management systems (LIMS) help maintain data integrity by making sure that the entire sample workflow is tracked and managed inside a single application. From the time a sample enters the lab until it leaves with a usage decision of approved/rejected, there are multiple workflows that track the quality control process.

What makes the quality control process more complex for companies like Reckitt is each lab operates with custom workflows applicable to the product the company is making, the regulations it must follow, and GxP norms. Not all requirements apply to each Reckitt customer, and some customers have unique requirements for Reckitt products. Reckitt required a LIMS with the flexibility to meet its business requirements.

Using Thermo Scientific™ SampleManager™ LIMS, Reckitt delivers more than 16 million batches of Nutrition product to its customers annually. With Thermo Scientific™ SampleManager™ IDI software, Reckitt shares lab data like lot information, dates, and usage decisions/results with SAP. Together, the systems provide the backbone for a compliant and efficient lab.

Like many companies, Reckitt's growing technology needs prompted a paradigm shift to cloud. This case study examines Reckitt's cloud transformation, the key considerations for upgrading and moving an existing SampleManager LIMS implementation to cloud, and the company's future plans.

Mindset shift to cloud

In 2018, Reckitt began analyzing its evolving solution landscape and IT infrastructure, looking for cloud transformation opportunities. More than 400 applications will move to cloud over the next 5 years.

"For a legacy solution like our global LIMS, which had complex customizations and several point to point integrations, the need for solution revamp was imminent for a long term sustainable future," said Raj Patra, Head of IT, Life Sciences, Reckitt. "Moving into cloud allowed us an opportunity to not only overcome current solution scaling limitations but also integrate with enterprise middleware and exploit data for better insights and analytics."

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> —Raj Patra, Head of IT, Life Sciences, Reckitt

Reckitt's ambitious cloud transformation began with the Nutrition business' QC LIMS. The company's version of SampleManager LIMS software was nearing end of support, so an upgrade project was already planned. Knowing Thermo Fisher's experience with cloud LIMS deployments, the team agreed that moving SampleManager to cloud as part of the upgrade project made sense.

Migrating an existing LIMS to cloud was not without its challenges. The system was not only heavily integrated with various on-premises applications, but was also heavily customized. The team estimates that at least 60 percent of the application was customized over the previous 20 years. Maintaining the current integrations and minimizing the customizations would be key to project success.

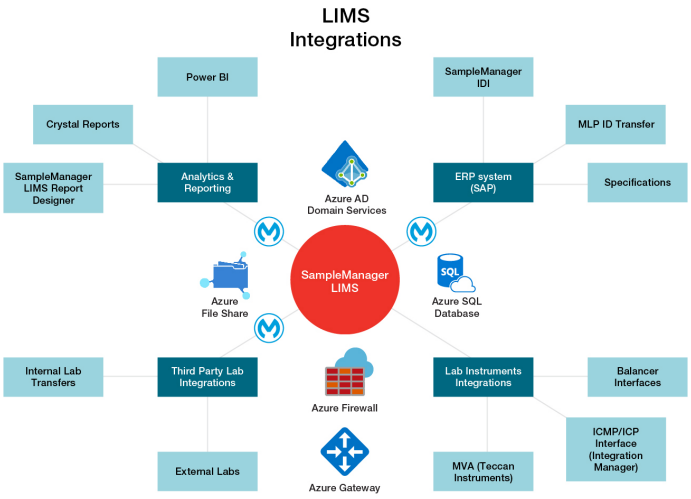
Reckitt carefully studied how the legacy application would fit in Azure cloud. The LIMS holds extremely sensitive data like customer details, formulas on how the testing is performed, test methods, master-level specifications for each product and, most importantly, the test results and certificates of analysis. For Reckitt, data security on cloud was paramount.

The project team considered IaaS/PaaS/SaaS cloud models for the project. Ultimately, Reckitt selected an IaaS implementation. The team felt IaaS was a low-risk first step in their cloud journey, delivering a high level of security while providing close to a like for like upgrade experience. Choosing IaaS for this project afforded the team extra time to unravel 20 years of system customizations. Minimizing dependence on custom code, the team believed, would ease future upgrades. In the future, Reckitt will consider moving to a PaaS cloud model for applications.

Building SampleManager LIMS in Azure cloud

The project team had a mountain to climb with its first cloud migration project. The team needed to plan the up-versioning of the legacy SampleManager software application. Further, the team selected to migrate the SampleManager LIMS database from Oracle to Microsoft SQL Server. The project team also needed to replicate existing instrument and system integrations before walking away from on-premises.

Working with Thermo Fisher, the Reckitt team developed this hybrid cloud implementation:



Overcoming technical roadblocks

One of the first challenges in any laboratory IT project is addressing integration. This challenge exists at both the instrument and system level. For Reckitt, this meant having a clear understanding of the integration requirements of each location, each business function, and each lab instrument. The project team worked to establish seamless connections from lab sites to cloud. In an on-premises model, it was easy for Reckitt to connect between different systems as all the ports were fully allowed. When moving to cloud, the security teams had restrictions allowing only specified ports to the system to communicate. Significant discovery effort was needed to understand what level of firewalls should be allowed in the cloud for different ERP systems, reporting systems, printing ports, sites and their subnets. Considering that most of the labs operate out of the corporate network and have dedicated lab networks, the team opened a secured Supernet connection between lab networks and data centers. The team then securely opened the specific application/printers/lab-related ports onto Palo Alto Network.

Next, the team went to work resolving database migration issues. Migrating data from Oracle to SQL Server helped the team identify several index issues that impacted performance on SQL Server. These issues were especially apparent with large data sets across active/committed/archive tables. The team introduced new indexes to optimize system performance on cloud.

The migration to SQL Server also required changes to the functions used in view definitions. Functions that were present for Oracle did not work with SQL Server. The team rewrote these functions for compatibility with SQL Server.

The next challenge was the constraints. NULL values are user-friendly in Oracle, and Reckitt's historic data had many columns with NULLS. When the team loaded that data in SQL Server, the migration tool crashed due to duplicates. To resolve this, the project team had to correct the data before migrating to SQL Server.

Implementing Azure Windows Virtual Desktop (WVD) for thick client access also presented challenges. The team had multiple working sessions with Microsoft to understand the dependencies on MS VDI (Virtual Desktop Infrastructure), how OneDrive is setup and accessed, what level of folder structures was needed on the client, how to enable the seamless export/import access to business users, and which region of cloud VDI should be used for optimal performance (the team opted to shared VDI regions).

Finally, the team addressed the existing custom code. While customizations helped the business operate effectively and efficiently, they made the application more and more complex to migrate for version upgrades. Along with movement to cloud, most of the custom functions were replaced with configuration options or migrated to latest .net technology to streamline future upgrades.

Integrating cloud LIMS to on-premises systems

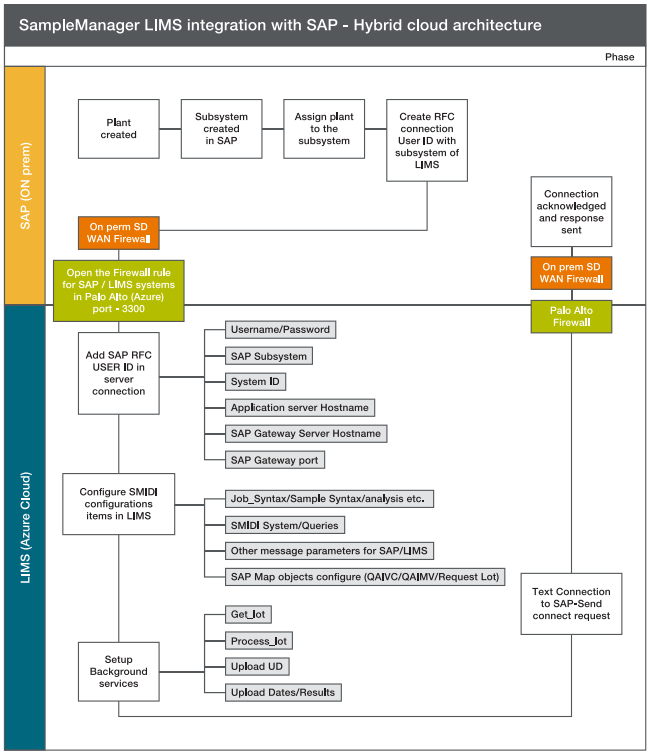
From the beginning of the project, the Reckitt team sought a clear understanding of the integration requirements of each system, location, business function, and instrument. With those requirements captured, the Reckitt team worked with Thermo Fisher to understand the capabilities of each system and instrument, as well as the tools available to aid in the process of connecting. Ultimately, Reckitt chose a combination of tools to meet its integration needs.

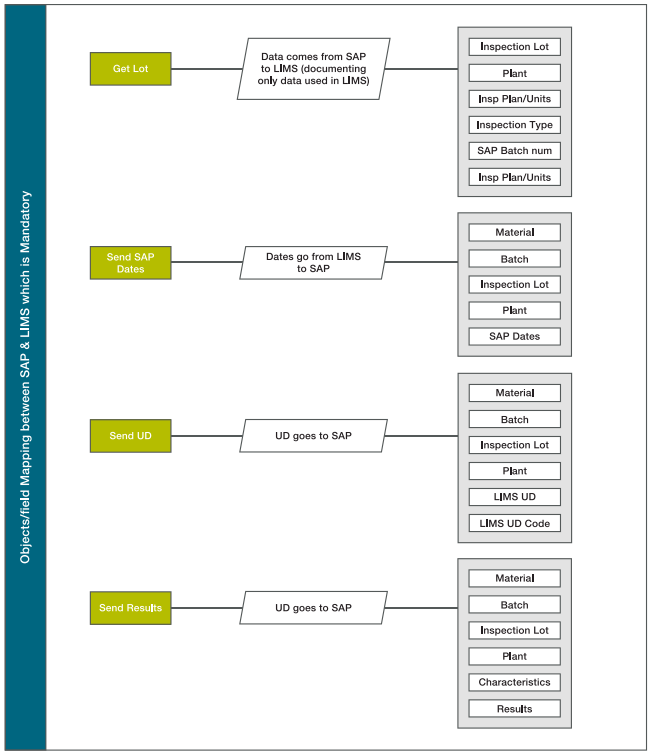
For connectivity to SAP, Reckitt deployed Thermo Scientific™ SampleManager™ IDI software. SampleManager IDI software expedites data flow between the laboratory and the manufacturing functions, streamlines data handling, and integrates data collection and reports. With SampleManager IDI software, enterprises can integrate the laboratory with S/4HANA for comprehensive quality management support throughout the supply chain. The solution addresses the needs of large-scale production facilities where integration with S/4HANA is a business requirement. The latest version of SampleManager IDI software supports connectivity to S/4HANA Cloud, a cloud-based deployment of S/4HANA. The solution also supports on-premises deployments of S/4HANA, along with SAP R/3.

SampleManager IDI software provides a highly configurable link between SampleManager LIMS software and S/4HANA. This flexibility enables the software to support a variety of scenarios in the laboratory. The process maps for the Reckitt integration are shown below.

Reckitt also partnered with MuleSoft for connectivity solutions, using those solutions to share data across multiple sites and to minimize future development efforts. To support the ERP integration, the Reckitt in-house development team developed a Web API at SampleManager LIMS application server and exposed it to MuleSoft. When SAP requests data, a trigger invokes MuleSoft API via PI/PO. When the request is received by MuleSoft, MuleSoft makes a call to SampleManager LIMS API and transfers the requested data.

Reckitt also integrated its product lifecycle management (PLM) application Optiva with SampleManager LIMS using MuleSoft. Again, the Reckitt team developed a Web API on the SampleManager application server to communicate with MuleSoft. When Optiva PLM makes a request for results/specs, the MuleSoft API invokes the SampleManager LIMS API and sends the data. Finally, Reckitt deployed MuleSoft to manage integration with third-party labs. The solution replaced the existing PI/PO operation where .csv flat files were shared with third-party labs via SFTP/FTP. MuleSoft completes the same activity in a more efficient way, making future integrations with third-party labs easier.





Integrating cloud LIMS with lab instruments

Like most labs, Reckitt utilizes a broad spectrum of instruments from a variety of manufacturers. Each instrument vendor has its own approach to sharing data. Some instruments produce a file containing result data, while others use a database to store results. Modern instruments might connect to a cloud-native solution to share data, while legacy instruments might keep data on-premises in proprietary data formats.

Reckitt turned to Thermo Scientific™ Integration Manager™ software to address these challenges. Integration Manager software includes all the tools to build the pipeline between cloud-native and on-premises instruments and systems. The Integration Manager toolset includes robust data translation capabilities, helping transform data from the source format into a format the destination can consume. Once configured, Integration Manager software operates autonomously, sending notifications when an issue requires attention.

Integration Manager delivers bi-directional connectivity between cloud native solutions and on-premises instruments and systems. With Integration Manager software, users can easily and securely send experiment data from the cloud to on-premises software like a chromatography data system (CDS). Once the chromatography testing is complete, the results are digitally transmitted back to the cloud-based software. Integration Manager software maps the results directly to the appropriate experiments in the cloud, minimizing data entry errors and boosting lab efficiency.

Integration Manager software provides a secure, highly scalable and easily deployable API. This API enables Integration Manager software to connect to any system capable of making HTTP requests. Once data is available in Integration Manager software, it can be shared with any connected instrument and system. Integration Manager software can also push data into any system with an HTTP-based API, which is common in cloud native solutions.

Path forward with next gen cloud

Reckitt's successful migration of SampleManager LIMS to Azure cloud serves as a model for future cloud projects at the company. With their IaaS implementation in Azure cloud complete, the team is already evaluating how it can implement PaaS technology for its labs. The PaaS model could help Reckitt reduce run costs, with capabilities like automatic database resizing. Testing is underway to assess data security and ensure optimal performance for end users. After minimizing dependence on custom code, the team anticipates an easier transition to PaaS.

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