CASE STUDY

Thermo Fisher™ Platform for Science™ Software

Streamlining microbiome workflows at Microba

Cloud-based platform for next generation sequencing

Abstract

The components that make up the human microbiome, including bacteria, viruses, protists and fungi, produce a wide range of metabolites that interact with systems throughout the body and, as a result, influence a person's overall health. Microba is a microbial genomics company offering the public direct access to cutting edge metagenomic sequencing technology to analyze their personal gut microbiome and provides sample processing and analysis services to large Australian and international research projects.

Microbiome science continues to evolve, requiring organizations to have a flexible informatics solution that enables them to easily adopt new instrument technology and workflows. Microba has taken a platform approach to laboratory informatics and is using the Thermo Fisher™ Platform for Science™ software to ensure they remain agile while streamlining their laboratory data and processes. Using this approach, scientists can quickly and easily deploy preconfigured applications to support laboratory activities such as study and sample management, molecular biology based assays, genomic analysis, and high-throughput screening. Microba has partnered with Thermo Fisher Scientific to ensure they meet the needs of their customers now and in the future.

Introduction

The microbiome is the community of microorganisms living in and on the body. This microbial community is unique to each individual and is a delicate balance between beneficial and less-desirable microorganisms. As the healthcare industry strives to deliver more personalized medicine, understanding a person's unique microbiome is a critical piece to understanding and promoting a person's overall health and wellbeing.

Microba empowers consumers to gain a deeper understanding of their personal gut microbiome including the bacteria, archaea, fungi, and protists at the species level and the potential to produce metabolites linked to health and disease. Microba Insight™ helps people understand and improve their unique gut microbiome through advanced genome sequencing technology.

Business challenge

Microba works directly with the consumer to capture their gut microbiome through the Insight sampling kit. In turn, they provide the consumer with a detailed picture of their specific microbial community that is clear, concise, and easy to understand. While this is seamless to the customer, there is a complex laboratory process behind the scenes generating these results. Once the customer submits the completed kit, the sample will go through sample QC, DNA extraction, library preparation, and next generation sequencing (NGS) analysis.

Prior to deploying the Platform for Science software, Microba experienced several of the common challenges faced by genomics laboratories. NGS samples undergo a highly involved, multi-step preparation procedure before they can be analyzed. During this process, it is not easy to track sample progress in real-time, making it difficult to identify any bottlenecks that occur. For Microba, just providing accurate results isn't enough. They need to ensure a quick turnaround to give their customers the best experience possible.

Laboratory workload management is a common problem to all laboratories. Microba had limited visibility into the queued NGS work. Microba was managing their laboratory through a manual system. They knew that, as their business continued to grow, this solution would become insufficient and increase the risk of human error. Microba chose the Platform for Science software to ensure they could continue to deliver accurate and timely results to their growing customer base.

A scalable, cloud-based platform for genomics laboratories

Platform for Science software provides the scientific community with a flexible, scalable and secure way to collect, store, analyze and share information. Scientists can perform the most simple or complex tasks, from tracking sample inventory to automating data collection and workflows from the latest genetic analysis equipment, all while collaborating in real-time from any device.

Thermo Fisher Platform for Science is a complete genomics solution. Data can be captured and tracked easily and accurately from sample

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Laboratory Data Management Solutions

accessioning to final report generation. The Platform for Science helps scientists to manage their scientific process and track laboratory activities and information associated with projects, shipments, samples, users, instruments and consumables in real-time.

Platform for Science users can create integrated environments by configuring applications to meet their unique requirements. In a research environment, flexibility in configuring applications to meet continuously changing workflow needs within the lab as customers add new test types, is as important as meeting the increasing demand for more collaboration. A solution that can evolve with these challenges is essential to keeping pace with and increasing the rate of change in microbiome science.

Managing data, workflows and processes with the Platform for Science

The teams from Microba and Thermo Fisher worked closely together to understand the laboratory and business needs of Microba and how the Platform for Science could help to address those needs. They chose to implement the solution to cover their complete process, including plate preparation, DNA quantitation, plate transfers, and library quantitation.

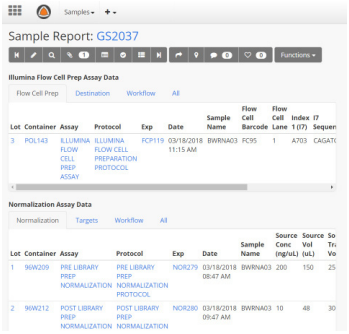
For Microba, instrument integration and automation was critical. The Platform for Science enables integration with liquid handlers and sample preparation equipment. It supports both Ion Torrent and Illumina workflows allowing laboratories to choose the best solution for their workflow.

Some of the key benefits to Microba are:

- Sample tracking through each step of the workflow.
- Easy visualization of sample hierarchy through the plate preparation dashboard as samples are aliquoted and associated with the 96 and 384 well plates.
- Support for DNA quantitation workflows (withequipment like Qubit, QIAXCEL), file generation for liquid handlers (including Echo525 and Epmotion for dilutions) and generation of Sample sheets to enable NovaSeqsequencing. Users can import the instrument data, quantify extracted DNA samples, and assess the quality of the samples before they move to the next step in theprocess, library preparation.
- Sample transfers throughout the library preparation proceed through an intuitive dashboard. The system makes plate to plate transfers easy. For example, users can easily model behavior like consolidation of four 96 well plates to a single 384 well plate maximizing instrument throughput.
- Library quantitation can also be managed by the Platform for Science software. Users can import results, quantify prepped libraries and move processed samples to library normalization, pooling or flow cell preparation depending on the laboratory workflow.

A cloud-based platform for microbiome data

Fast growing organizations, like Microba, want to leverage both the reduced overhead and scalability that the cloud provides. A cloud-based infrastructure allows for instant data and document sharing, speeding timelines and improving security. Deploying in the cloud reduces capital expenditure and operating expenses by providing the appropriate amount of bandwidth. As Microba's sample and data volumes increase or decrease, they can easily scale up or down helping to control their cost per sample ensuring they remain competitive. The ability to quickly create new, secure accounts with access to the platform, without having to invest in expensive IT infrastructure, is invaluable. The Platform for Science software deployed on Amazon Web Services (AWS), provides Microba with a secure, flexible, and scalable solution that will grow with them.



Why AWS

- Scalability to support a growing database
- Reduced maintenance
- Reduced overhead costs

aws partner network

Conclusion

Microba needed a solution that would support their growing business and enable them to quickly deliver accurate results to their customers. Through the Platform for Science, Microba is now able to manage their laboratory operations and is positioned to optimize their laboratory processes, easily adopt new technology and scale their operations as their business grows. Through their partnership with Thermo Fisher Scientific, Microba truly has a complete solution for their laboratory enabling them to focus on their science and their customers.

Find out more at **thermofisher.com/digitalscience**

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