

WEHI

Not-for-profit research institution is a leading centre for research into the human immune system and treatments for cancer, autoimmune disorders, and infectious diseases such as malaria.

Industry: Life Sciences

Geography: Australia

Deployment Summary

- Data from both molecular and cellular screening campaigns stored in IDBS ActivityBase drug discovery informatics database
- TIBCO Spotfire Server analyzes and visualizes ActivityBase data to assist researchers in quickly identifying trends in data and candidates for follow-up
- Web based environment allows researchers to access data analysis from their desktops while handling number-crunching on the server side

Benefits

- Hit Discovery data processing time reduced by more than 65 percent
- Researchers can easily identify patterns and trends in data that were previously very difficult to spot
- Candidate molecules can be more quickly identified and referred to biologists and medicinal chemists for follow up
- Increased reliability due to automatic data aggregation
- Spotfire software supports WEHI's role in the public – private partnership Cancer Therapeutics CRC



“Previously, it was difficult to identify trends in the large amounts of screening data generated, including systematic issues. With TIBCO Spotfire, we can visualize our results in a real-time dashboard, identify and exclude the systematic errors as they occur, and run repeat samples as required. We’ve reduced Hit Discovery data processing by more than 65 percent.”

Dr. Kurt Lackovic, Senior Research Officer, Walter + Eliza Hall Institute of Medical Research

WEHI Speeds Drug Discovery With TIBCO Spotfire

With limited budgets and intense competition, life sciences research organizations such as Australia’s Walter + Eliza Hall Institute of Medical Research (WEHI) face significant pressure to quickly identify and test potential novel drug therapies. Doing this, however, requires regular filtering and analysis of millions of laboratory test results that must be turned into actionable research, quickly and cost-effectively.

A leading centre for research into the human immune system and treatments for cancer, autoimmune disorders, and infectious diseases such as malaria, WEHI employs 30 scientists on the task of drug discovery. To identify promising new molecules, they test a bank of more than 350,000 compounds for interaction with important biological targets. Molecules demonstrating the strongest target inhibition are referred to medicinal chemists and other researchers for further analysis.

To streamline the process, WEHI set up a \$4.5 million High-Throughput Chemical Screening (HTCS) laboratory in 2003, which uses robotics to test biological targets against 350,000 small molecules. The extent and nature of each reaction is monitored and recorded in a back-end database for analysis, and the entire primary screening procedure is run against more than 10 targets per year.

In the past, WEHI’s researchers would identify promising candidates by poring over millions of numerical results pulled from the database into Excel spreadsheets. This process was slow, limiting the HTCS facility’s ability to quickly identify significant results for follow up. Worse still, reliance on large volumes of numbers meant researchers had to be extremely careful not to make procedural errors that were difficult to spot in a sea of numerical data.



Walter+Eliza Hall
Institute of Medical Research

Improved Reliability

In such carefully controlled laboratory conditions, even small errors can invalidate critical data. For example, a clogged pipette tip may result in an incorrect amount of testing reagent being added to a test well and, when a large number of plates are being screened, this could potentially affect the same well on many plates.

Researchers knew about such errors, but often found it difficult to compensate for them. The sheer volume of data they were dealing with made it extremely difficult to isolate the errors.

“Previously, we couldn’t see trends in the data,” said Dr Kurt Lackovic, Senior Research Officer, WEHI. “If we had a systematic problem throughout the screening process, it was really difficult to identify. Spotfire allows us to identify and exclude problematic trends, saving time and money.”

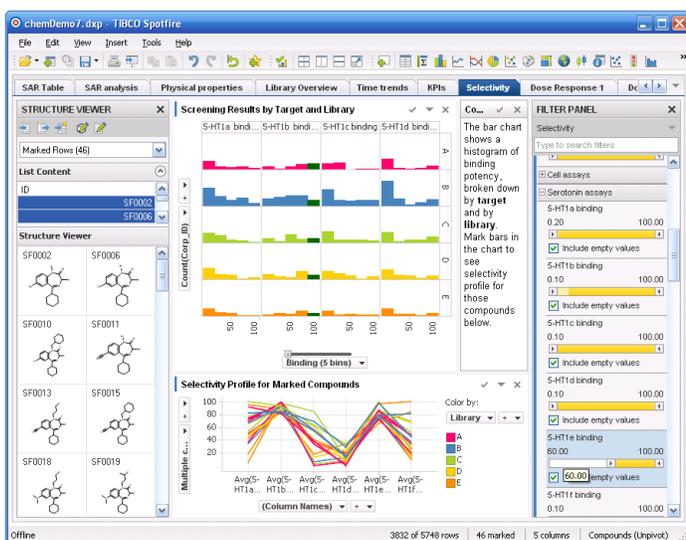
Better visibility available in real time

The WEHI team needed a better way to see the data their assays were producing, and a suitable option presented itself as the researchers learned of TIBCO Spotfire, a business intelligence analytics tool that offers robust data visualization and decision support against even the largest data sets.

TIBCO technical experts worked with WEHI to implement Spotfire analytics within four days, linking it with the database in which the experimental data was being stored and customizing the system so that the molecular structure of candidate molecules could be displayed onscreen to assist researchers.

Spotfire analytics was implemented using Citrix thin-client technology, allowing researchers to quickly view and access the results of number-crunching that was executed on high-powered WEHI servers. Using Spotfire analytics’s visualization tools, researchers are able to get a visual representation of the reaction data, with each measurement overlaid on a map of the wells where the reaction took place.

Whereas they had previously struggled to identify sources of systematic errors, Spotfire analytics’s visualization helped researchers quickly spot anomalies. For example, while a clogged tip might just appear as null activity buried amongst other numbers on one of dozens of Excel spreadsheets – requiring a keen eye and considerable work by the researcher doing the analysis – use of Spotfire analytics makes it obvious that a particular well has produced no reaction in any of the plates assayed on a particular day.



Faster candidate analysis

Being able to quickly spot anomalies in generated data has proved invaluable to researchers. Data from problem areas in the plates can be excluded without affecting the rest of the plate – increasing the amount of usable data the HTCS facility produces. And, because Spotfire analytics provides a real-time view of data generated, issues with any laboratory setup can be identified and rectified well before the entire run of 350,000 target substances is completed.

“With TIBCO Spotfire, we can visualize our results on a real-time dashboard, identify and exclude any errors as they happen, and repeat if necessary,” said Dr Lackovic. “We’ve reduced our Hit Discovery data processing time by more than 65 percent, our ability to view trends in the data is greatly improved, and our ability to report the results to stakeholders has been greatly enhanced in terms of both quality and speed.”

Since the HTCS facility is structured as a service provider to outside parties, quality of results and turnaround time are extremely important. Because researchers no longer need to repeat as many plates, they can isolate high quality data quickly and use Spotfire analytics’s reporting capabilities to deliver actionable

leads faster than ever. This reduces the expenditure of precious and limited research funding to repeat assays.

Implementation of TIBCO Spotfire has also assisted WEHI in its role in the public-private partnership The Cancer Therapeutics Cooperative Research Centre (CTx CRC), in which WEHI is a partner with two other high-throughput screening groups, as well as biologists and medicinal chemists at several other institutions worldwide.

CTx CRC members also use Spotfire analytics to analyze the data their laboratory systems produce, delivering similar efficiency improvements on a more specific set of candidate molecules that can be analyzed in-depth by other affiliated researchers.

Throughout the implementation, Dr Lackovic said “TIBCO has been a valued and available partner. The whole implementation went smoothly, and TIBCO have been quick to respond to any issues,” he explained. “Spotfire provides a tool which is complementary to our database’s own tools enabling us to interrogate our research database easily and comprehensively. Spotfire analytics has proved so intuitive to use that people quickly get up to speed and continue learning as they go.”

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Research

TECHNOLOGIES USED

TIBCO Spotfire

TIBCO Spotfire Server

TIBCO Spotfire Lead Discovery

IDBS ActivityBase

Citrix Presentation Server



TIBCO Software Inc. (NASDAQ: TIBX) is a leading independent business integration software company and a leading enabler of real-time business, helping companies become more cost-effective, more agile and more efficient. TIBCO has delivered the value of real-time business, what TIBCO calls The Power of Now®, to thousands of customers around the world and in a wide variety of industries.

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