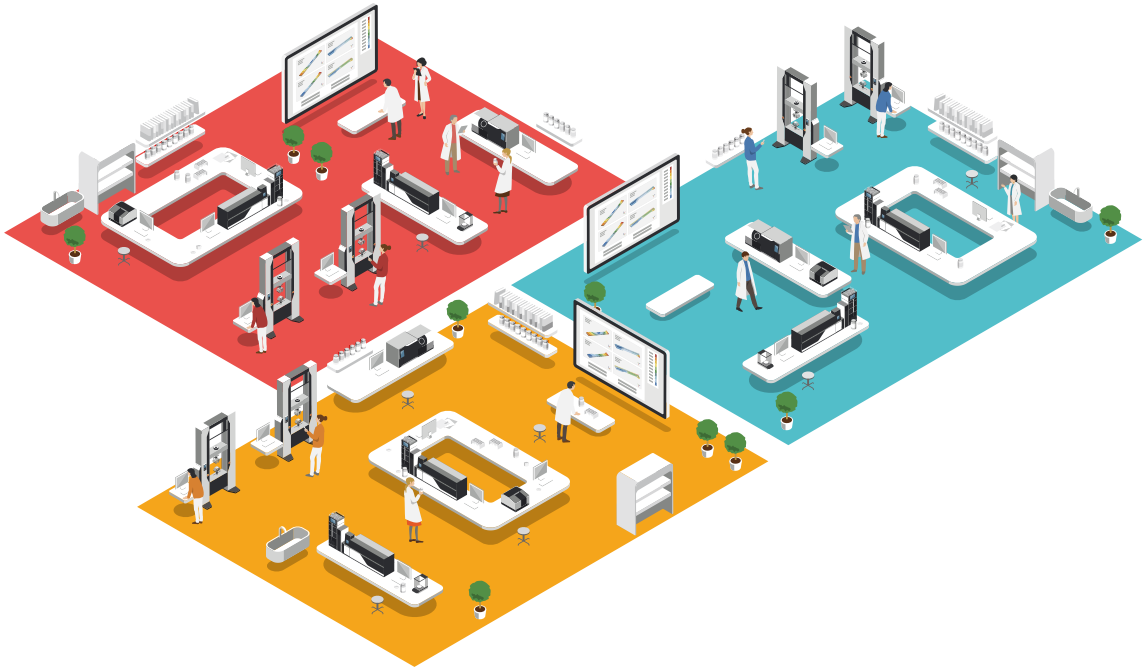
C191-E018F

SHIMADZU
Excellence in Science

Analytical Data System

LabSolutions DB/CS



LabSolutions

Offers Workflow Support for Analytical Laboratories

Convenient Operating Environment

Learning costs can be reduced by enabling data acquisition, data analysis, and report creation with a common user experience that is independent of the different instruments used in the laboratory. Instruments and data can be managed together as an integrated system, which helps ensure efficient laboratory operations.

Supports Diverse Operating Practices

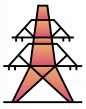
From laboratories with only one computer to networked systems, the software supports a wide variety of laboratory sizes and environments, including those with systems configured in a cloud environment or linked to a host system.

LabSolutions can increase workflow efficiency and strengthen compliance with data integrity requirements, providing solutions for a wide variety of industries and departments.

Numerous analytical instruments are used in the quality control, research and development, and other departments of companies that develop pharmaceuticals, chemicals, foods, and other products. With the increasing performance level and system-wide automation level of analytical instruments there is a need for higher analytical workflow efficiency due to the dramatic increase in the quantity of analytical data and samples handled. Also, there is a growing demand for achieving more flexible working styles in response to advancements in cloud and remote operation technologies, working practice reforms, and measures to resolve dependence on specific individuals. Meanwhile, despite the pharmaceutical industry facing increasing requirements for compliance with CSV and PIC/s GMP guidelines, FDA 21 CFR Part 11 requirements, and other regulations and guidelines, scandals involving data falsification have become a major problem. Even outside the pharmaceutical industry, there are strong demands for better data reliability and compliance with various data integrity regulations. Given such circumstances, there is a need for appropriate maintenance and management of instruments, analytical data, and systems in order to improve the efficiency of analysis and overall workflows, operate increasingly diverse analytical laboratories, and ensure regulatory compliance.
LabSolutions is an analytical data system that can simultaneously achieve higher analytical workflow efficiency and stronger data integrity compliance. It also offers flexibility for use in all sorts of industries and departments.

Pharmaceutical Industry

Petroleum and Chemical Industries



Steel and Transport Equipment Industries

Next-Generation Battery Industry

Academic Labs / Public Research Institutions

Food Industry

• • •
etc.

LabSolutions enables information to be managed easily and securely in a single database.

File-based data management offers convenience, but files can be easily renamed, overwritten, or deleted, leading to concerns about data falsification. By managing data in a database, such actions can be carefully restricted. LabSolutions databases enable not only data but also records of operations associated with the data and information about systems and users to be easily managed centrally.

Safe/Secure System and Data Management

Centrally managing laboratory data can prevent data losses or data falsification and provide an easy way to protect system and user information. Integrating analytical instrument information to manage it collectively offers powerful support for ensuring compliance with data integrity requirements and can efficiently achieve compliance with increasingly sophisticated regulatory requirements.

Optimization of Analytical Workflows and Laboratories

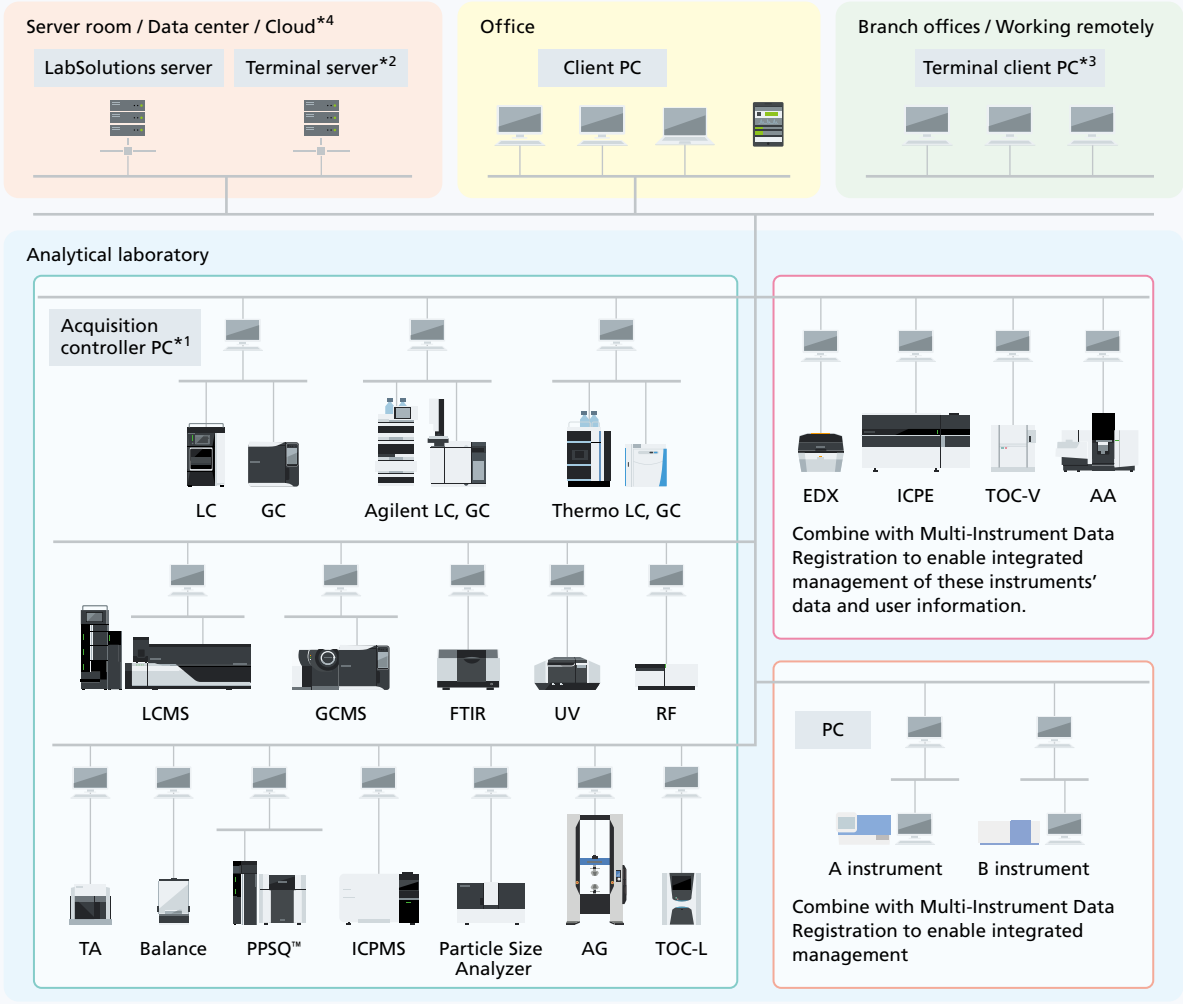
LabSolutions includes many powerful functions for supporting the processes in analytical laboratories, such as data acquisition, data analysis, report creation, and data management. That helps optimize overall laboratory operations and workflows.

Provides Flexible Support for Diverse Laboratory Operations

LabSolutions CS

Freely Access Analytical Networks

Because all analytical data is managed in a database in the LabSolutions server, the data can be viewed from any computer connected to the network. That means a client computer not directly connected to the instrument can be used to perform data acquisition or monitor and control instruments. Furthermore, Windows® Terminal Services can be used to view, electronically sign, acquire, or analyze data on any computer without installing LabSolutions software. It can also directly control non-Shimadzu LC and GC systems.



*1 The acquisition controller PC controls analytical instruments.

*2 A terminal server is a server for using terminal services. Users can view data reports and perform electronic signature operations through terminal services. It is ideal for remote connections because of the low network load. Only LC, GC, LCMS, and GCMS support analysis and postrun operations through terminal services.

*3 If a terminal service is used, LabSolutions software does not need to be installed on client PCs or tablets.

*4 Servers can be built on various clouds (IaaS). AWS (Amazon Web Services), Microsoft® Azure®, GCP™ (Google Cloud Platform™)

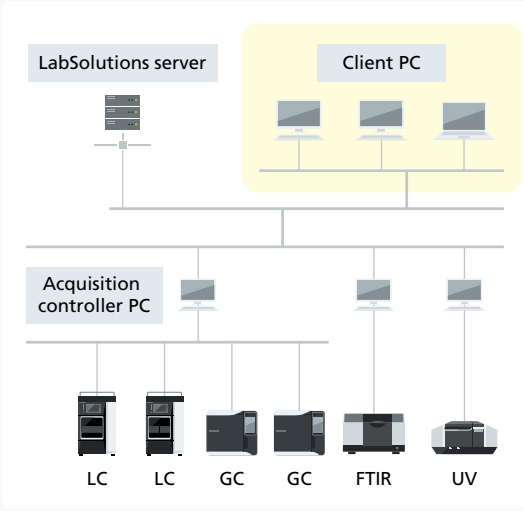
With LabSolutions, systems can be configured appropriately for the given laboratory operating scale, ranging from small systems with one instrument and one computer to large-scale networked environments. In addition to intuitive operation, an integrated user interface for data acquisition, data analysis, report creation, and other functionality makes it easy to learn how to operate the software.

Systems Can Be Configured According to a Laboratory's Size and Requirements

LabSolutions CS offers the flexibility to configure systems optimized for laboratory environments ranging from small-scale networked systems to large-scale environments. Also, additional instruments can be easily added later to expand the system. Furthermore, networked systems can be configured with only non-chromatography systems to reduce management costs by centrally managing instrument information and data.

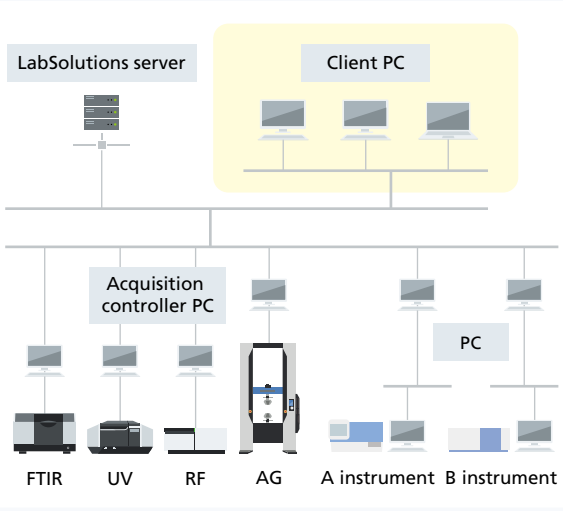
Small-Scale Laboratory System

Example of System Configured with 2 LC Units, 2 GC Units, 1 FTIR Unit, and 1 UV Unit



System with No Chromatography Instruments

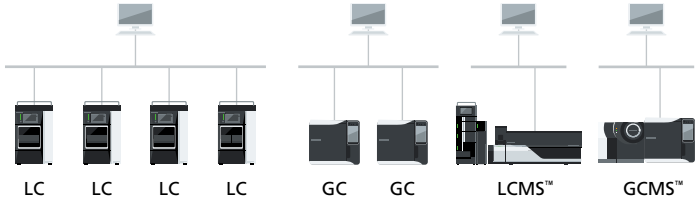
Example of System Configured with 1 FTIR Unit, 1 UV Unit, 1 RF Unit, 1 AG Unit, 1 Brand-A Unit, and 1 Brand-B Unit



LabSolutions DB

Achieving Safe Data Management with One Computer

LabSolutions DB manages data from analytical instruments connected to only one computer. This standalone configuration is ideal for customers who want to manage data on one computer.



*1 LabSolutions DB can be used for up to 4 LC or GC units at the same time.
*2 LabSolutions DB LCMS can be used for 1 system at a time.
*3 LabSolutions DB GCMS can be used for up to 2 GC–MS units at the same time.
*4 LabSolutions DB supports configurations with non-chromatography instruments controlled from an independent computer.

Networked vs Standalone Systems

LabSolutions CS

Networked Systems

- **Many instruments and/or users**
- **Used to improve efficiency of data or system management**
- **Used to manage data and system information at multiple facilities**
- **Allows more flexible working environments**

LabSolutions DB

Standalone Systems

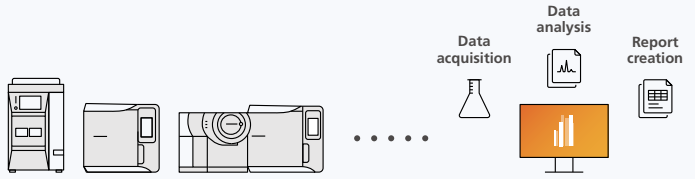
- **Few instruments and/or users**
- **Used to strengthen data integrity compliance by isolating the system**

Convenient Operating Environment

Software with Integrated and Common Operating Feel

CS DB

LabSolutions provides consistent operation for all instrument types and functions, such as data acquisition, data analysis, and report creation. That makes it easy to learn operating methods, regardless of the type of instrument, which can help reduce learning costs.



Regardless of the type of instrument

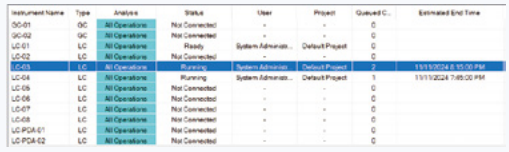
Provides consistent operation

Check Instrument Operating Status at a Glance

CS DB

The instrument operating status monitor enables verifying the operating status of connected instruments or checking the scheduled data acquisition finish time for each instrument. Furthermore, LabSolutions CS can be used to check the operating status of all instruments connected to the network.
As a result, even if multiple LC, GC, or other instruments are operating concurrently, their operating status can be determined at a glance, which is useful for scheduling analytical processes based on instrument availability. In addition, instrument icons to be freely arranged, such as based on their actual layout in the analytical instrument room.

Table View
Instrument Operating Status Confirmed at a Glance



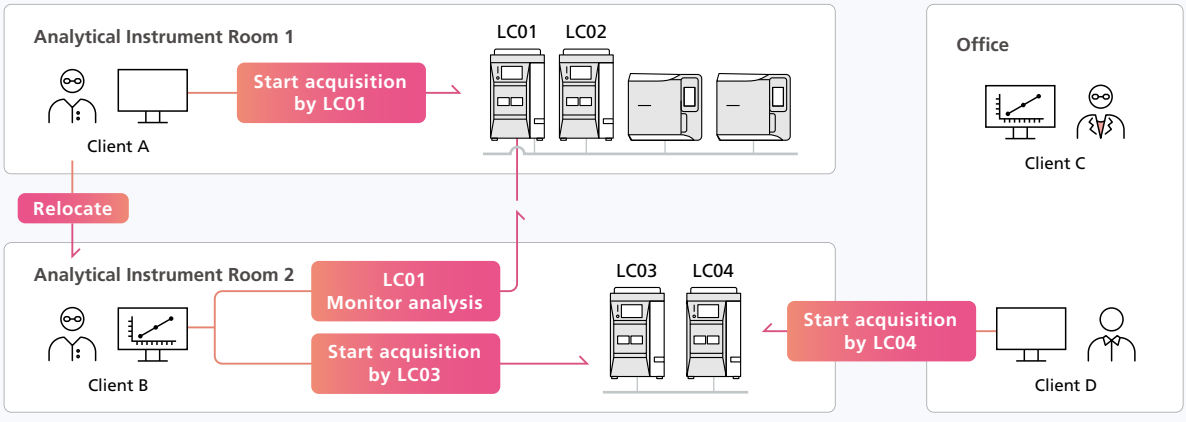
Icon View
Icons Arranged According to Laboratory Layout

Enables Control and Data Analysis Operations from Computers Other Than the Analysis Computer

CS

For standalone systems, the computer connected to instruments is used exclusively by the person performing the analysis, with other users unable to view or further analyze data. LabSolutions CS ensures free access to instruments and data, regardless of the laboratory, office, or other location, while also maintaining security.
For example, analysis condition settings can be checked before starting data acquisition and acquisitions can be started from a client computer in the analytical instrument room. After acquisitions are started, the operating status can be checked, instruments controlled, and data analyzed from a client computer in the office. That can increase the efficiency of analytical work, such as monitoring the acquisition progress, controlling instruments, and preparing reports.

Note: Data acquisition and data analysis operations are only supported for LC, GC, LCMS, and GCMS systems.



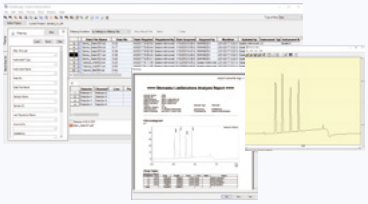
CS Functionality included in LabSolutions CS

DB Functionality included in LabSolutions DB

Quickly Search Vast Amounts of Data

CS DB

All data obtained from analysis is managed in a LabSolutions database, with not only test results but also linked files viewable via Data Manager. LabSolutions CS manages all data centrally on a server, so data can be viewed from anywhere. It also includes more advanced search functionality for quickly finding target data, such as searching all data obtained during a given analysis schedule.

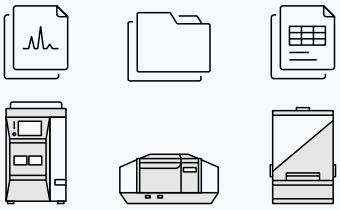


Including Data from a Variety of Instruments in One Report

CS DB

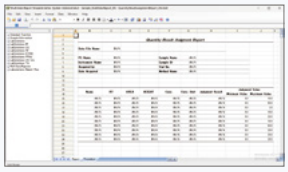
Using Multi-Data Report functionality, reports can be created in a spreadsheet to suit a wide variety of objectives. Reports that include quantitative calculations and graphs can be created by simply selecting analytical results and a previously prepared template. This eliminates the need to manually transcribe data from various laboratory notes, spreadsheet software, or other sources, which can help reduce human errors and prevent data alterations or falsification.
Thus, reports that combine analytical results from a variety of instruments can be created in three easy steps to achieve more efficient report creation.

STEP 01
Select analytical results

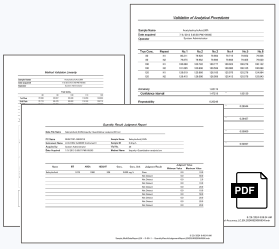


LC UV Analytical balance

STEP 02
Select template



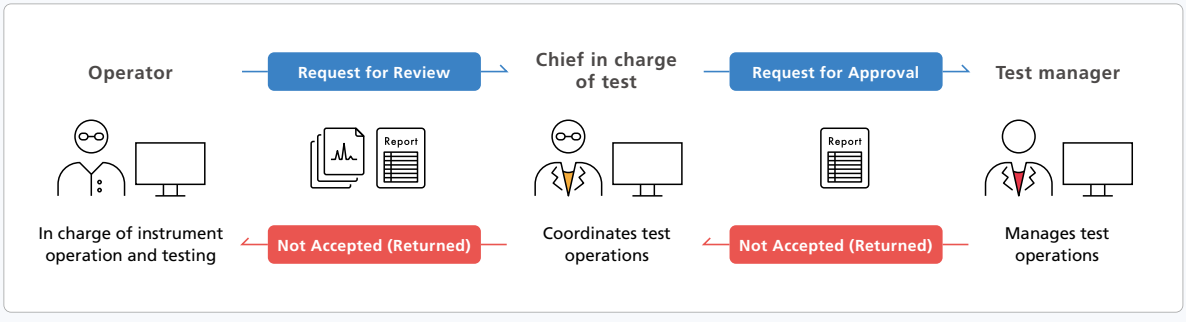
STEP 03
Create report



Data/Report Reviewing/Approval Process Accomplished via Software

CS DB

Analytical data is centrally managed in a LabSolutions database, reports can be viewed using Data Manager, and data files can be approved electronically according to the customer workflow. Also, a record of reviewing the content of reports can be included anywhere in the test results report, which is output as a PDF file.
Thus, the same software can be used to review and approve data/reports in order to establish paperless electronic operations.



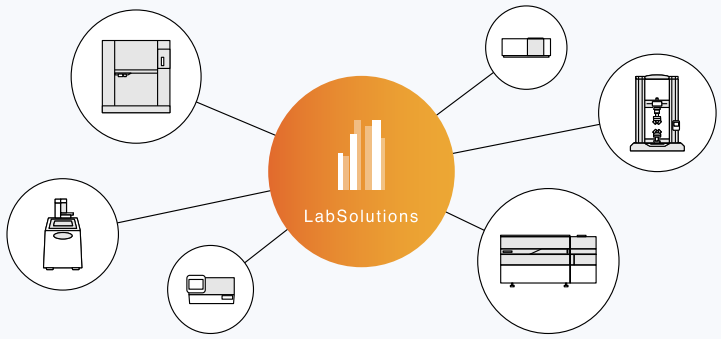
Supports Diverse Operating Practices

Integrate/Manage a Variety of Analytical Instruments

CS

LabSolutions CS can centrally manage data, operation logs, and other information for non-chromatography instruments, user account information, and system security information in a LabSolutions database. In addition, by using optional Multi-Instrument Data Registration functionality, raw data from a wide variety of analytical instruments, PDF reports, and other information can be automatically saved in a LabSolutions database to help ensure secure data management.

Note: For more details about supported instruments or analytical systems, contact a Shimadzu representative.



Seamless Linking to Host Systems

CS DB

With the increasing use of automation and digital technologies in analytical laboratories, more and more laboratories are introducing electronic laboratory notebook (ELN) software or laboratory information management systems (LIMS). Data obtained by LabSolutions software can be output in a variety of formats and seamlessly linked to a host system, LIMS, or other application.

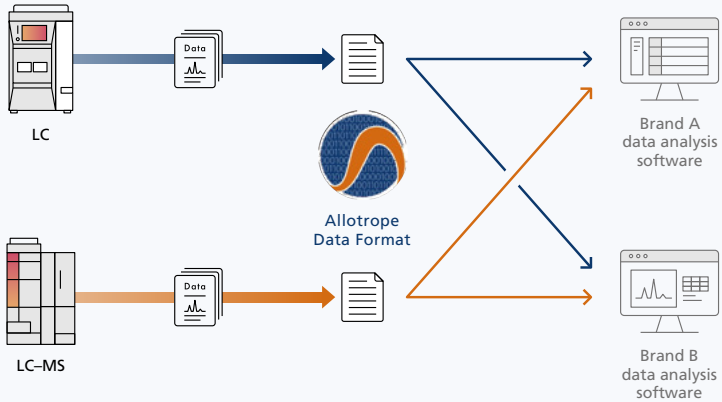
Note: Linking to a host system requires an additional software license. Contact Shimadzu for further details.

Flexible Support for Output in Common Formats

CS DB

In recent years, there have been active efforts to try harmonizing data formats to avoid dependence on the data formats of specific manufacturers or software. LabSolutions supports outputting data in the format specified by the Allotrope Foundation, an international consortium of pharmaceutical companies, biotech companies, analytical instrument manufacturers, and software vendors, so that data can be utilized independently of specific manufacturers or software.

Note: Conversion to the Allotrope data format requires an additional software license. Contact Shimadzu for further details.

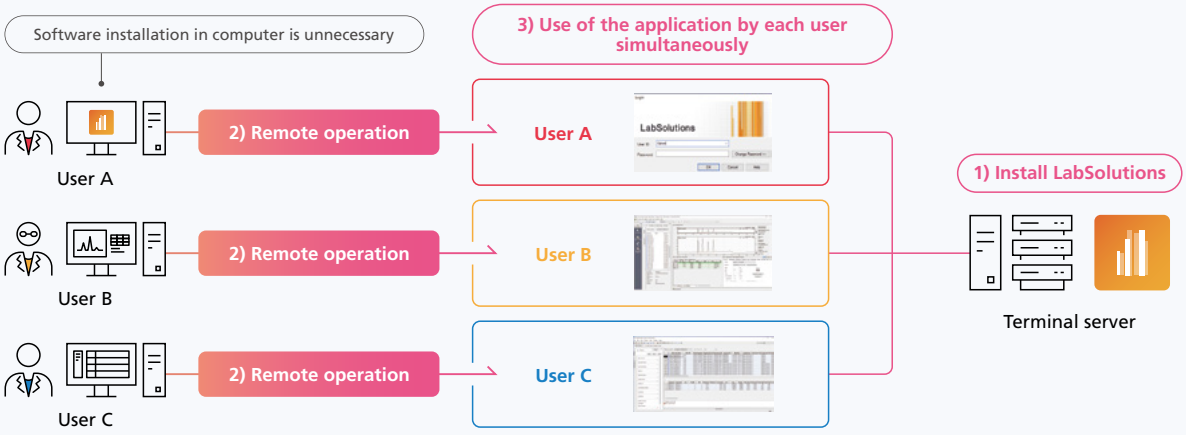


CS Functionality included in LabSolutions CS

DB Functionality included in LabSolutions DB

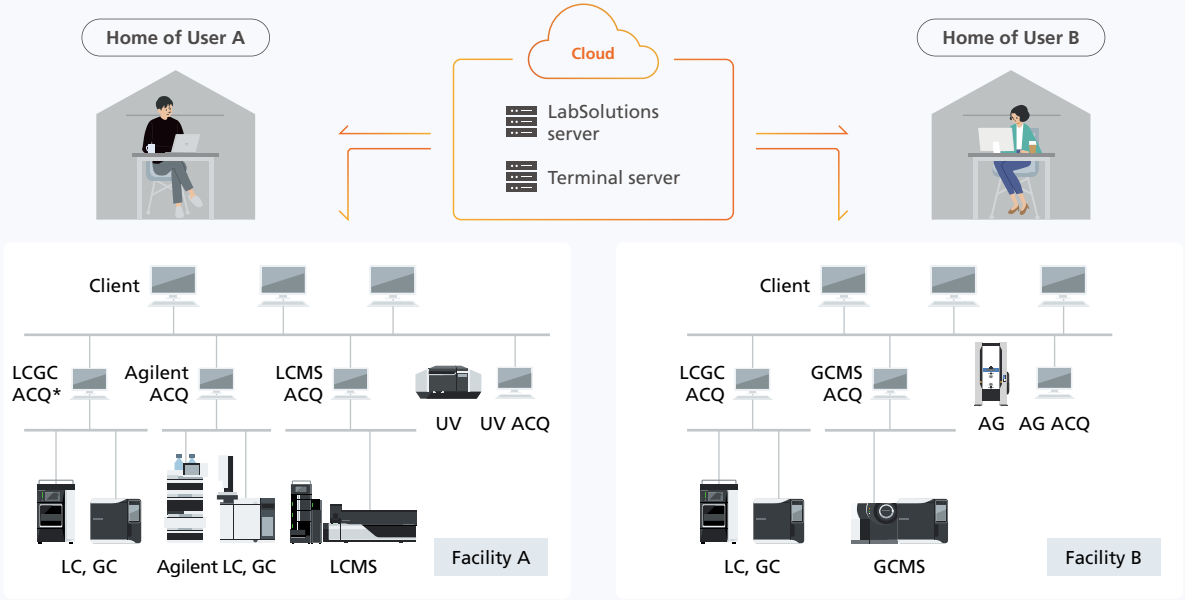
Checking Data and Reports without Installing Software CS

LabSolutions CS supports Terminal services, so data and reports can be checked without installing LabSolutions software in the terminal client computer. Furthermore, for LC, GC, LC–MS, and GC–MS systems, data acquisition, data analysis, and report creation operations can be executed via respective terminal client computers. LabSolutions software is only installed in the terminal server, which significantly reduces the time and trouble of updating software or managing software content.



Supports Cloud/Remote Operating Environments and Configuring Networks that Extend beyond Single Facilities CS

By establishing a LabSolutions server and terminal server in a cloud environment and connecting each facility to the cloud environment via a secure network, a network that extends beyond an individual facility can be established regardless of the location. Establishing a terminal server also allows viewing data, reviewing reports, checking instrument status, and checking acquisition status via the network from individual computers outside of the analytical laboratory, such as from a home or office.



*ACQ: Acquisition controller computer for controlling analytical instruments

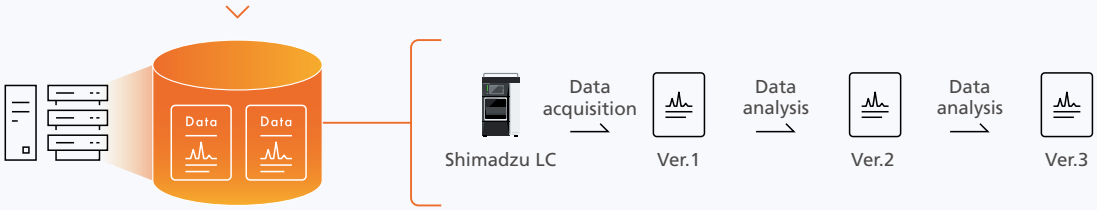
Safe/Secure System and Data Management

Preventing Human Errors by Database Management

CS DB

Using a database ensures analytical data can be managed securely and analytical data histories in a database can prevent operator errors, such as overwriting or deleting data. If analytical data is analyzed, the data from Postrun Analysis is saved as a separate set of data (using version numbers) that is linked to the original data instead of overwriting it. That makes it easy to check past data.

By saving data in a database, deleting/overwriting can be prohibited, and a history of changes managed

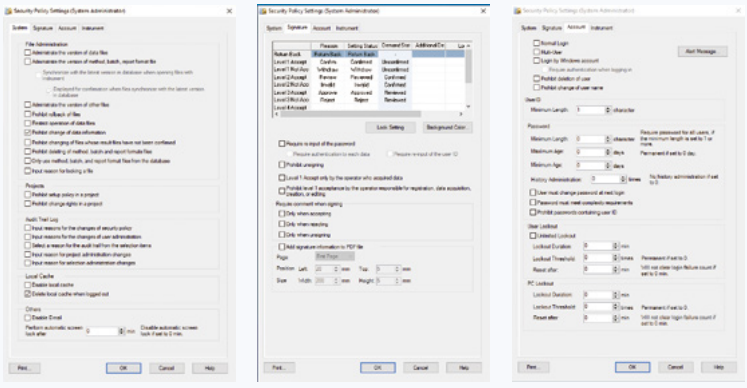


Database management

Robust Security

CS DB

Many policies are provided to strengthen system security. For example, electronic signature workflows, minimum password lengths, validity periods and other password policies, audit trail settings for ensuring data integrity, and other settings can be customized in detail based on actual operations.
Furthermore, the basic settings for ensuring data integrity can be automatically specified collectively.

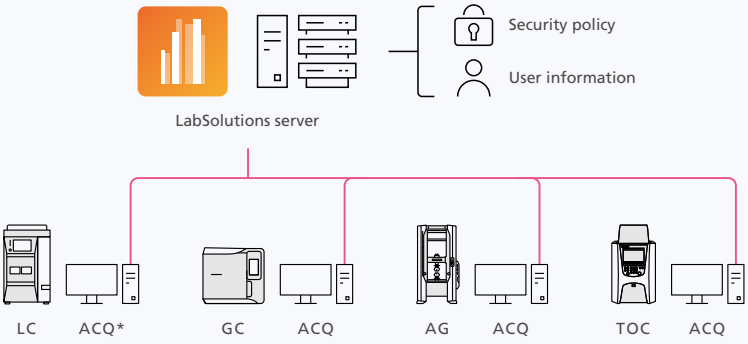


Security policy

Manage Not Only Data but Also User and System Information Centrally in a Server

CS

With LabSolutions CS, user and system information is managed centrally on a server, which reduces administrator workloads because it eliminates the need to manage users separately for each computer.
By specifying a system backup schedule, the database can be appropriately backed up automatically, which can be used as a disaster recovery plan in case a hard drive failure or natural disaster occurs.



* ACQ: Acquisition controller computer for controlling analytical instruments

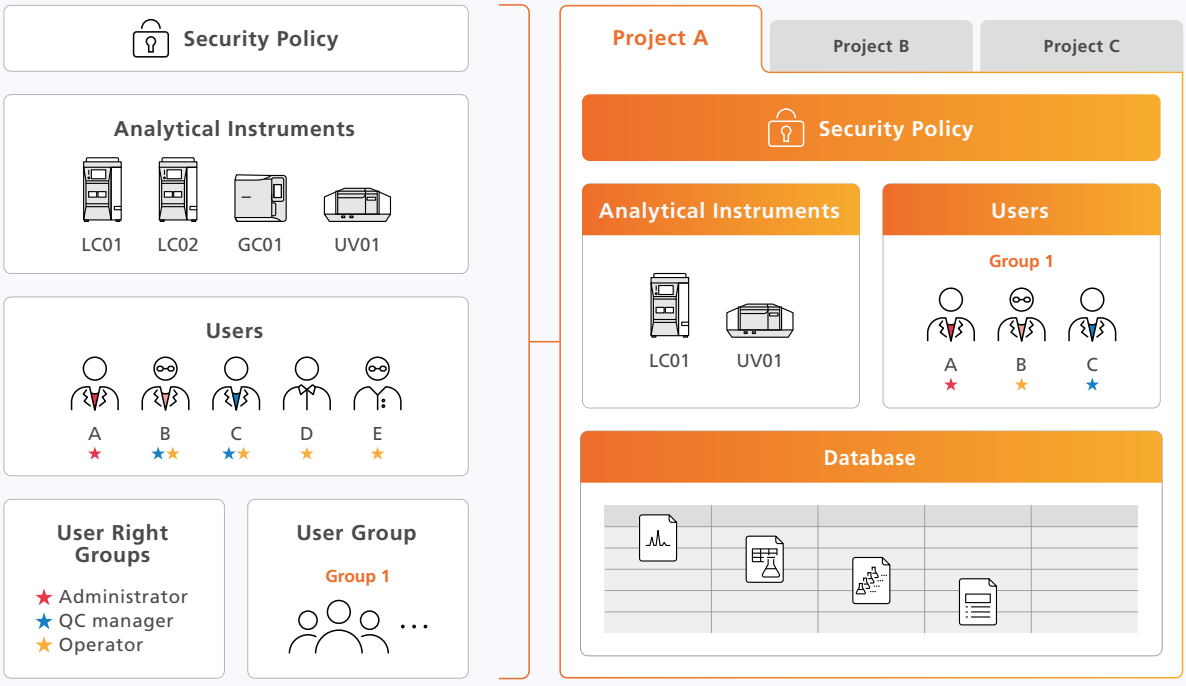
CS Functionality included in LabSolutions CS

DB Functionality included in LabSolutions DB

Managing Related Information for Each Project

CS DB

Instruments, users, security policies, data, and data analysis settings can be specified and managed for specific processes or systems referred to as "projects." That can be used to ensure that only appropriate personnel can access appropriate information, helping to ensure data searching and management operations are accomplished securely.



Keeps Data Fully Protected Even if a Server Problem Occurs

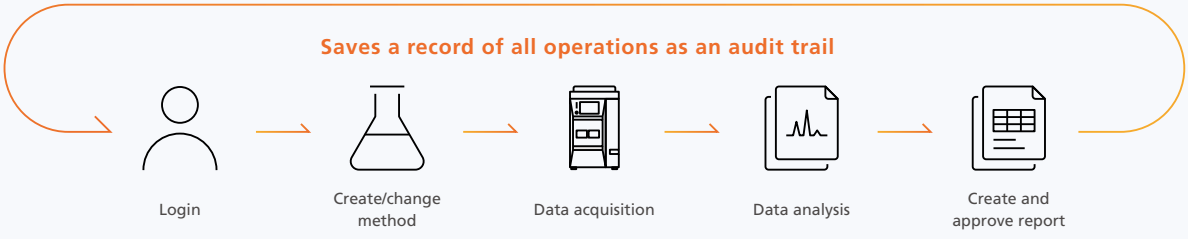
CS

For typical systems, a network problem or a server failure can result in losing the data being acquired or stopping analytical processes. With LabSolutions CS, even if a server problem occurs, the acquisition computer will continue to acquire data to prevent losing valuable customer data or samples. After server recovery, the analytical data is automatically saved in the LabSolutions server to promptly resume acquisition processes and minimize downtime.

System Automatically Records "Who," "What," and "When" Information

CS DB

The system automatically saves a record of each change to data acquisition and data analysis parameter settings. It can also record the reasons for changing the parameter settings so that a detailed record is retained.

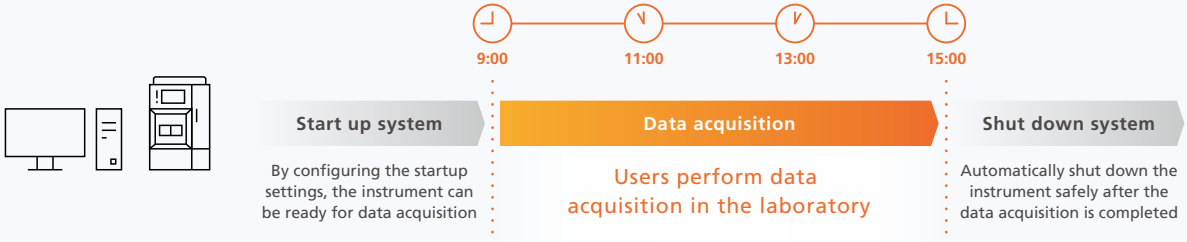


Optimization of Analytical Workflows and Laboratories

Provides Powerful Support for Analytical Workflows

CS DB

LabSolutions improves the efficiency of workflows before and after analytical operations.
If startup settings are specified before data acquisition, instrument conditioning can be performed according to a schedule so that data acquisition can begin as soon as the user arrives at the laboratory. If shutdown settings are specified for after data acquisition, instruments can be shut down to a safe state, the user does not need to wait for acquisition to finish, and mobile phase and carrier gas consumption can be reduced.
Furthermore, flowrates can be automatically adjusted based on a trial acquisition to result in eluting target compounds at specific times.* Because no manual changes are made to analysis condition settings and any changes are automatically recorded in event logs, that can ensure efficient automatic data acquisition and also prevent operator errors or data falsification.
Thus, using the various features of LabSolutions for data acquisition can help optimize the overall schedule, including before and after data acquisition, and allow users to focus on more important work.



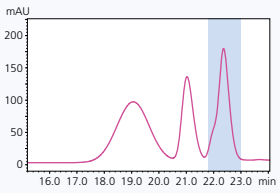
* The feature for automatic flowrate adjustment only supports some LC models. Contact Shimadzu for further details.

Superior Data Analysis Increases the Reliability of Qualitative and Quantitative Results

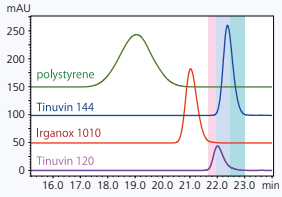
CS DB

LabSolutions includes many outstanding model-specific data analysis features.
For peaks that cannot be completely separated with a column or analyzed by simple peak integration methods, LabSolutions can be used in combination with an LC–PDA detector to qualitatively and quantitatively analyze unseparated peaks or even analyze hidden impurities and trace components using Shimadzu's proprietary i-PDeA II algorithm, which is based on the multivariate curve resolution alternating least squares (MCR-ALS) method.

i-PDeA II



Deconvolution to Individual Peak Elements



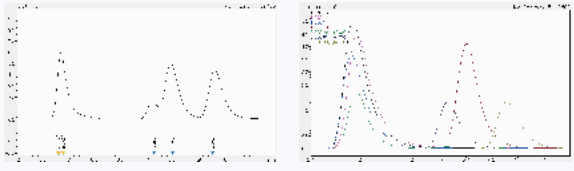
i-PDeA II Chromatogram

For LC–MS systems operated with LabSolutions software, the Mass-it feature can automatically match compound mass information obtained with the mass spectrometer to the corresponding LC chromatogram. That can improve the reliability of identifying compounds and the immediate understandability of the LC chromatogram.
Thus, by using LabSolutions in combination with Shimadzu instruments, the outstanding data analysis features can be used to improve the reliability of qualitative and quantitative analysis operations.

Note: For more information about Mass-it functionality or compatible models, contact a Shimadzu representative.

UV Chromatogram
(Absorption Wavelength 254 nm)

Mass Chromatogram



Mass-it Feature Provides Supplemental Information for Identifying Compounds and Checking for Impurities and Coeluting Peaks

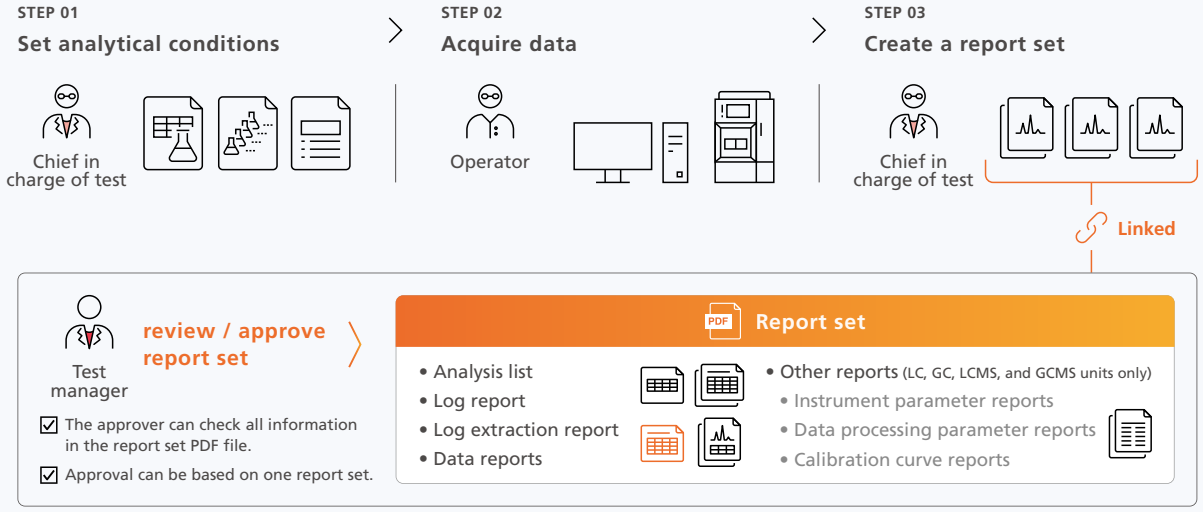
CS Functionality included in LabSolutions CS

DB Functionality included in LabSolutions DB

Report Set Functionality Improves Data Reliability While Also Increasing Operating Efficiency

CS DB

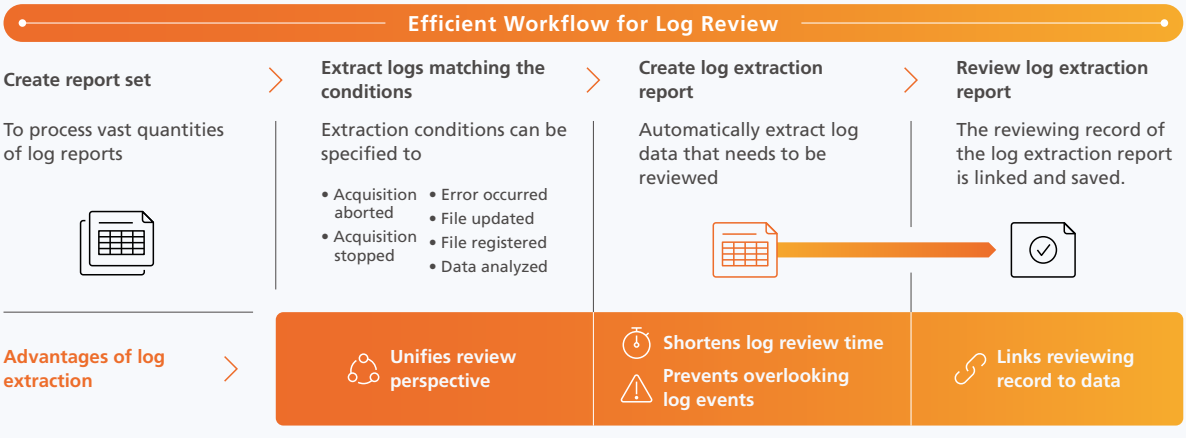
Report set is a proprietary LabSolutions feature that prepares a PDF file (report set) that combines analytical information, results, and conditions from a series of analyses (batch analyses) with a log of all operations, from beginning to end, performed during corresponding analytical operations. Creating a report set improves reliability by linking results from a series of analyses to prevent alterations or falsification and allows the information, operation log, and analytical results related to the analyses to be reviewed as a single report. By checking and electronically approving a single report set PDF file after analysis, linked data files can also be approved electronically to achieve a more efficient and simple approval process for each person involved.



Log Review Records Also Managed by Software to Achieve Paperless Operations

CS DB

Log reviews have been required in recent years to guarantee that electronic records do not include any fraudulent or suspicious data. In addition to linking analytical data in report sets to related information and corresponding log files, and electronically managing that information, log events that need to be reviewed can be prespecified to automatically extract all corresponding log data necessary for reviews to more efficiently comply with increasingly strict regulatory requirements. Furthermore, records of reviewing analytical results or log events can be saved and even electronically signed for paperless operations.

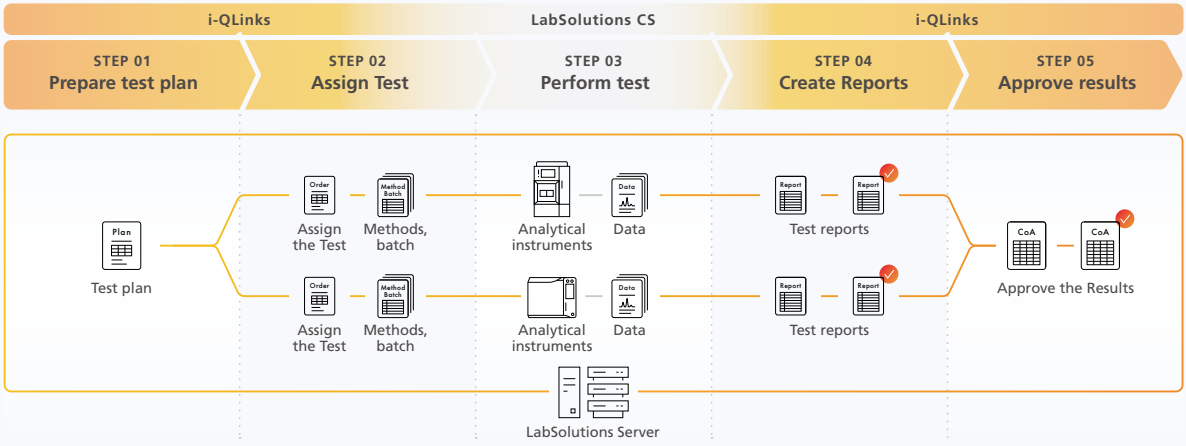


Optional Software to Improve Efficiency

LabSolutions i-QLinks

Improving Workflow Efficiency

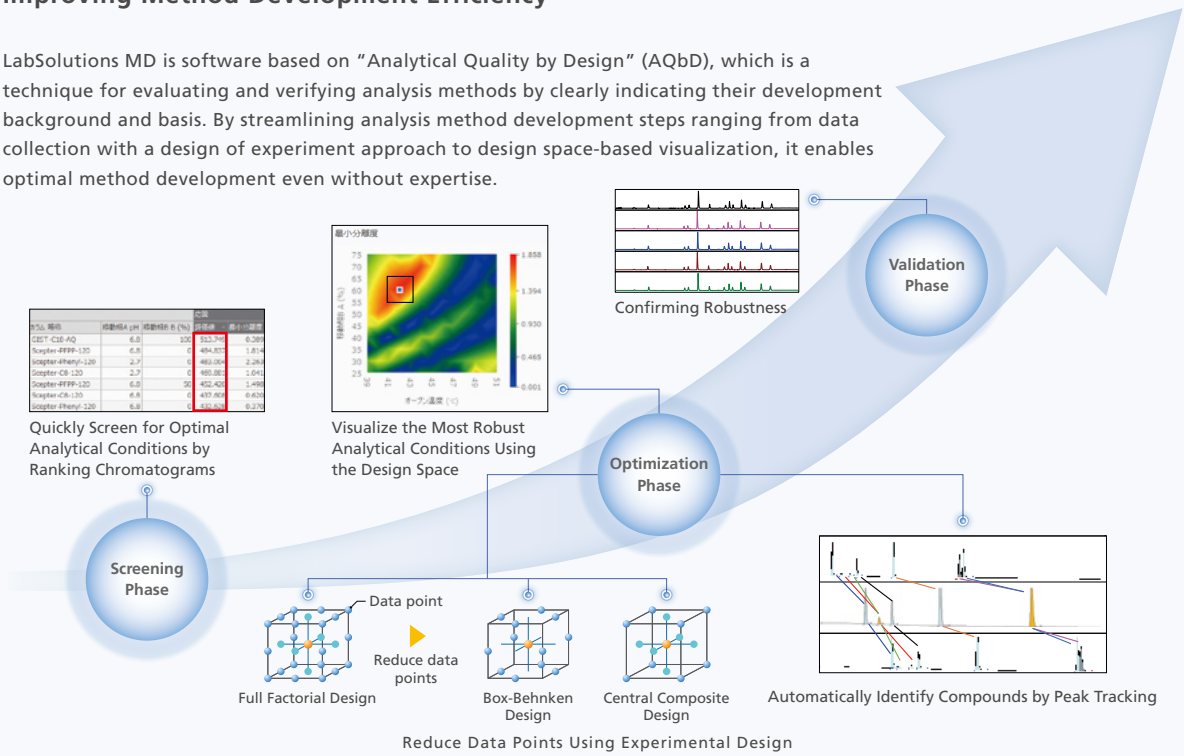
This simplified LIMS is designed specifically for analytical testing operations. LabSolutions i-QLinks is a web-based system that enables integrated management of respective analytical laboratory quality testing operations, such as creating test plans or test orders, loading test results from LC systems or other analytical instruments, automatically creating test reports from loaded test results, and managing the progress of quality tests. LabSolutions i-QLinks integrates seamlessly with LabSolutions CS to help ensure the reliability of testing operations and dramatically increase work efficiency.



LabSolutions MD

Improving Method Development Efficiency

LabSolutions MD is software based on "Analytical Quality by Design" (AQbD), which is a technique for evaluating and verifying analysis methods by clearly indicating their development background and basis. By streamlining analysis method development steps ranging from data collection with a design of experiment approach to design space-based visualization, it enables optimal method development even without expertise.



Peakintelligence

Improving Peak Integration Efficiency

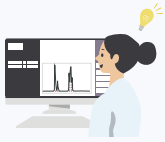
Peakintelligence is optional peak integration software equipped with AI algorithms developed by Shimadzu. The AI algorithm is based on deep learning of peak integration performed by experienced personnel, which means the AI can assist with chromatogram peak detection to achieve a level of data analysis that is equivalent to experts. When analyzing complex samples containing many target components, peaks are often obscured by a mixture of various large and small peaks from principal components and impurities in the sample, which can require a long time for determining parameter settings and manually integrating peaks. Using the software will not only eliminate the time required for optimizing parameter settings, but also reduce the burden of manual peak integration and time for data analysis by about 1/4 and provide a workflow without dependence on specific personnel.

Freedom from Parameter Settings

Eliminate Person-to-Person Differences in Analytical Results

90%

Match between Data from Expert Analysts and AI Process



Trust Algorithm

High Trustworthiness of Data Analysis Due to AI Technology

1/4

Working Hours Compared to Conventional Methods

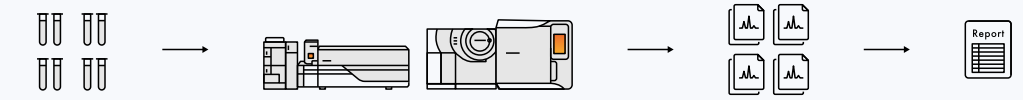
Dramatic Improvement in Operational Efficiency

Transforms Analyst Working Practices

LabSolutions Insight

Improving Quantitative Analysis Efficiency

LabSolutions Insight is software for GC–MS(/MS) and LC–MS(/MS) systems that enables simpler and more efficient analysis of data from multiple analytes, which can dramatically increase the efficiency of research or survey work. While systems can obtain large quantities of high-quality mass spectrometry data day and night, analyzing that data would be extremely time-consuming. Therefore, in order to increase analytical productivity, it is important to reduce the burden of analyzing the resulting data. Using LabSolutions Insight allows the data from multiple samples to be displayed side-by-side and important data highlighted based on specified threshold values for easy visual verification. This can improve quantitative analysis efficiency and significantly shorten the total time required for data analysis. In addition, an extensive selection of optional products for improving compound identification workflows, using AI for peak detection, and environmental regulatory compliance are available for many industries.

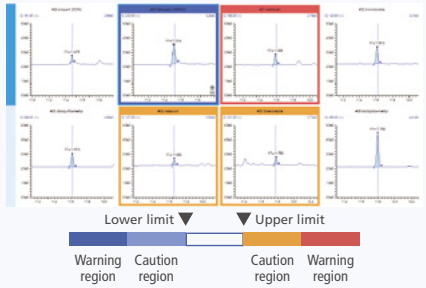


Multiple Samples → LC–MS(/MS) and GC–MS(/MS) → Analysis Data → Reports

Conventional Analysis

Each large set of data is opened and checked one at a time.
It requires switching between windows to check all data.

LabSolutions Insight Analysis



Large amounts of data can be checked side-by-side at one time.
Important data can be identified at a glance!

Shimadzu Corporation

www.shimadzu.com/an/