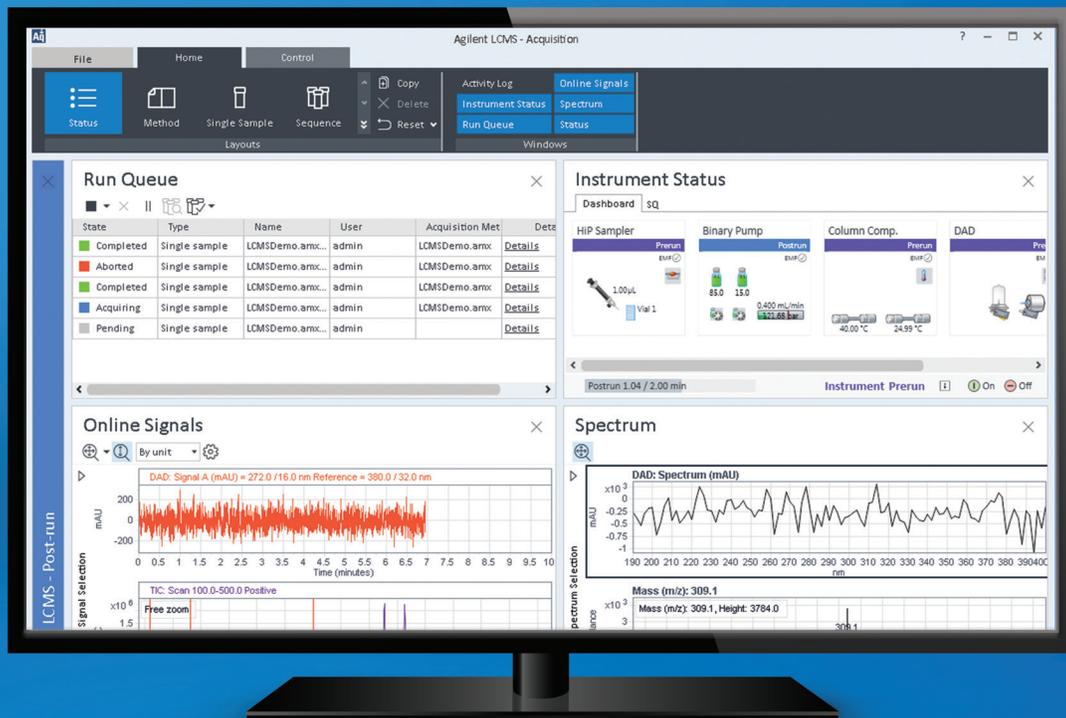


# Designed for the Modern Chromatography Lab

Agilent OpenLab CDS





# The Future is Here

At Agilent, our commitment to innovation includes software as well as instruments. We combine decades of experience with feedback from labs like yours to shatter the boundaries of speed, accuracy, and simplicity for chromatography laboratories.



## Now, this process has brought forth the next generation of OpenLab CDS

Agilent OpenLab CDS enables you to:

- 1. Lower laboratory costs**  
Reduce management, infrastructure, and training expenses
- 2. Improve productivity**  
Focused analytical workflows for speed to result
- 3. Meet scientific challenges**  
Capture analytical data and transform that data into insight
- 4. Enhance your data integrity solutions**  
Ensure that your data are consistent, accurate, and protected
- 5. Scale to meet future growth**  
Workstation to client/server configurations

## More than 40 years of CDS innovation

### 1970s

Agilent introduces CDS software, based on minicomputers

### 1990s

Agilent develops the first PC-based CDS using the Windows graphical user interface

### 2000s

Agilent CDS expands to deliver networked client/server systems for multi-instrument, multivendor environments

### 2010s

Next generation CDS designed specifically for ease of use and productivity

# Lower Laboratory Costs



We understand that you are under enormous pressure to do more with less—and we designed OpenLab CDS with that in mind.

## One software solution for the analytical lab

OpenLab CDS simplifies standard laboratory procedures—eliminating errors and improving speed to results. Your LC, GC, and single quad MS instruments can all be controlled using the same powerful toolset, eliminating the need to learn multiple software packages.

What's more, the software minimizes time-consuming configuration from user to user, and displays only the information critical to the task at hand. On-demand learning tools are also included to reduce training time and costs.

## Data Acquisition

The screenshot displays the OpenLab CDS software interface for data acquisition. The main window is titled "1260\_LC\_78 - Acquisition". The interface includes a top menu bar with "File" and "Home" tabs, and a toolbar with icons for "Status", "Method", "Single Sample", and "Sequence". Below the toolbar is a "Layouts" section with "Activity Log" and "Spectrum" tabs. The main workspace is divided into several panels:

- Run Queue:** A table showing the status of samples being processed.
- Instrument Status:** A dashboard showing the status of various instrument modules (Sampler, Quat. Pump, Column Comp., DAD) and their parameters.
- Online Signals:** A plot showing the signal intensity over time for a specific sample.
- Spectrum:** A plot showing the UV or mass spectrum for a sample.

Blue lines connect the text descriptions below to specific features in the software interface.

**Status Bar:**  
Instantly know when the system is ready, injecting, or running

**Run Queue:**  
View the status of all your samples at a glance

**Workflow Toolbar**  
Guides you through data acquisition tasks

**Multi Technique Data**  
Combine chromatograms with UV or Mass Spectra

**Instrument Status**  
Updated in real time for all configured instrument modules

## Data Analysis

The screenshot displays the 'Demo - Data Analysis' software interface. The top menu bar includes File, Home, Processing, Audit/E-Sign, and Injection Tree. Below the menu is a toolbar with icons for Open Data, Close Data, Open Method, Save Method, Close Method, Reprocess All, Save All Results, Print All, and View PDF. The main workspace is divided into four panels:

- Data Processing:** A sidebar on the left showing a list of data files (e.g., Water, STD 0.1-0.5, Sample 0.1-0.2) and instrument traces (e.g., DAD1, Board Temperature, PMP18, Pressure).
- Chromatograms:** A central plot showing 'Response (mAU)' vs 'Retention time [min]'. It displays multiple overlaid chromatograms for different samples (STD 0.3, STD 0.5, Sample 0.1) with peaks labeled at retention times like 0.129, 0.157, 0.253, 0.381, 0.564, 0.870, and 2.140.
- Injection Results:** A table below the chromatograms showing peak data in a tabular format.
- Peak Explorer:** A bubble chart on the right showing retention time trends across different injections, with bubbles representing individual peaks.

At the bottom left, it says 'Current user: SYSTEM'.

### Data Processing

Open and compare data across injection results quickly. Select the signals and traces you see to dial in on the data you care about most.

### Chromatograms

View processed chromatograms individually or overlaid

### Injection Results

Displays results in tabular format

### Peak Explorer

Spot trends, unexpected or missing peaks, retention time shifts, integration problems, outliers, and artifacts. You can also diagnose instrument problems quickly by visualizing retention time trends.

*“With new people joining and lab turnover rates, it’s a lot easier when software is intuitive—someone can operate the instrument almost immediately.”*

## Make the transition to OpenLab CDS and accelerate your technology refresh

Agilent offers a set of services and tools to help reduce the cost and downtime of upgrading to OpenLab CDS.

**Automate the process:** If your lab uses Agilent ChemStation, OpenLab CDS ChemStation Edition, or OpenLab CDS EZChrom Edition, the automated migration toolset for OpenLab CDS can maximize the preservation and reuse of methods and data electronically by eliminating manual transcription. Quickly and easily automate the export and import of system configuration, users, roles, permissions, and instruments.

**Let us do the heavy lifting:** Agilent offers a complete set of services to help you move to the latest software and instruments. Let us consult with you to plan and project manage the transition of methods, workflows, and data to your new platform. We also offer convenient training so that staff members can utilize the full potential of new software and instruments.

## Control ownership costs

Do you want to keep OpenLab CDS up to date with the most recent features and bug fixes? An Agilent annual software subscription automatically updates your software for 46% less than the cost of a single upgrade every 3 years.

And remember, when you choose OpenLab CDS, you choose more than software. Agilent University, our online education center, offers a growing selection of coursework to help you get the most from every instrument in your lab. Agilent Communities offers online communication with other Agilent customers where you can share experiences, helpful tips, report templates, and more. You also get support from our global network of experts dedicated to maximizing your investment with services such as Site Preparation, Installation, Familiarization, and Custom Training. To join the Agilent Community, visit [community.agilent.com](https://community.agilent.com).

## Get the most out of your software

The new Help and Learning system for OpenLab CDS makes it easy for users at every level to find the information needed to get the job done.

**Getting Started** contains instrument-specific learning modules that teach novice users how to perform basic operations quickly through guided simulations.

**How-To** provides detailed information about performing tasks within OpenLab CDS. Browse through the vast library of software and hardware topics, or search for instant access to the information you need.

**Setup and Maintenance** guides administrators through configuration and maintenance tasks.

**Glossary** provides a comprehensive list of OpenLab CDS terms and their definitions.

Need a hand? Simply press "F1," and you will automatically be taken to the appropriate Help and Learning section.

# Improve Productivity



## Sample automation: Streamline workflows and minimize errors

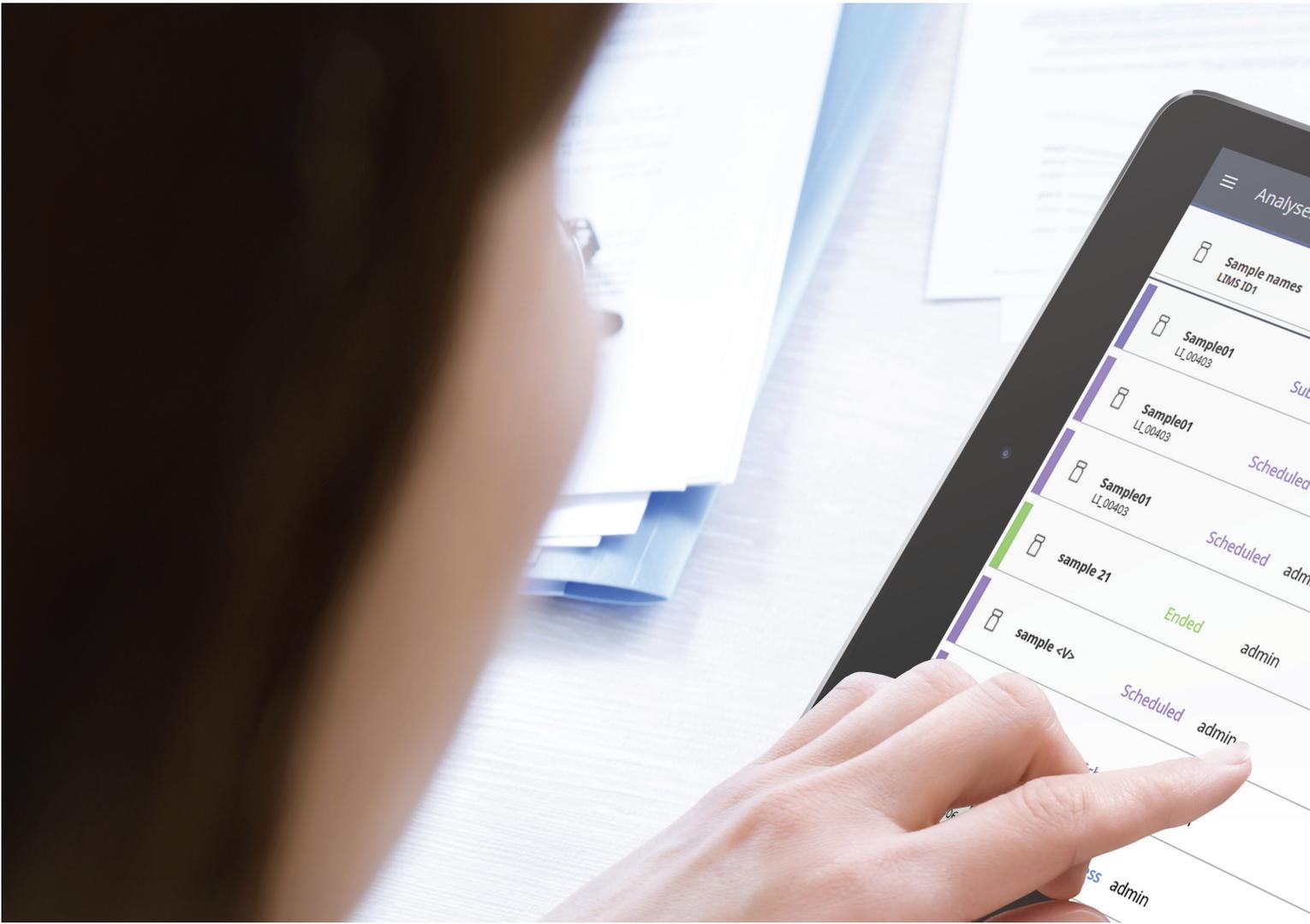
OpenLab CDS enables you to efficiently generate quality results—whether you are running single samples or complex sequences with blanks, calibration standards, and unknowns.

**The single sample analysis screen** makes running individual samples quick and easy. Simply input some basic information about your method, injection, and sample, then press the large green RUN key.

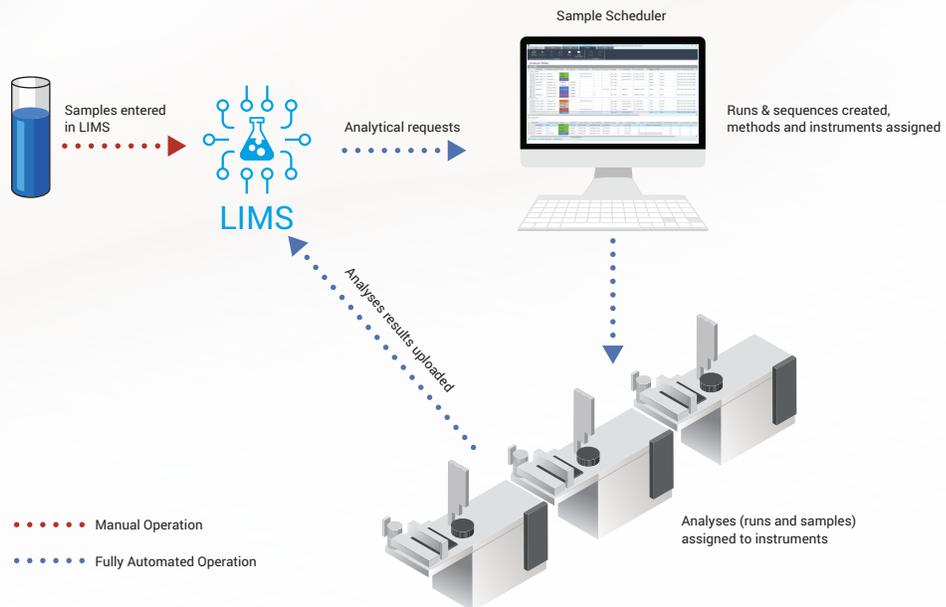
**Sequence templates** let you quickly and easily create sequences that adhere to your instrument SOPs. Just enter a list of samples and apply a template to instantly populate your sequence with pre-established structural patterns.

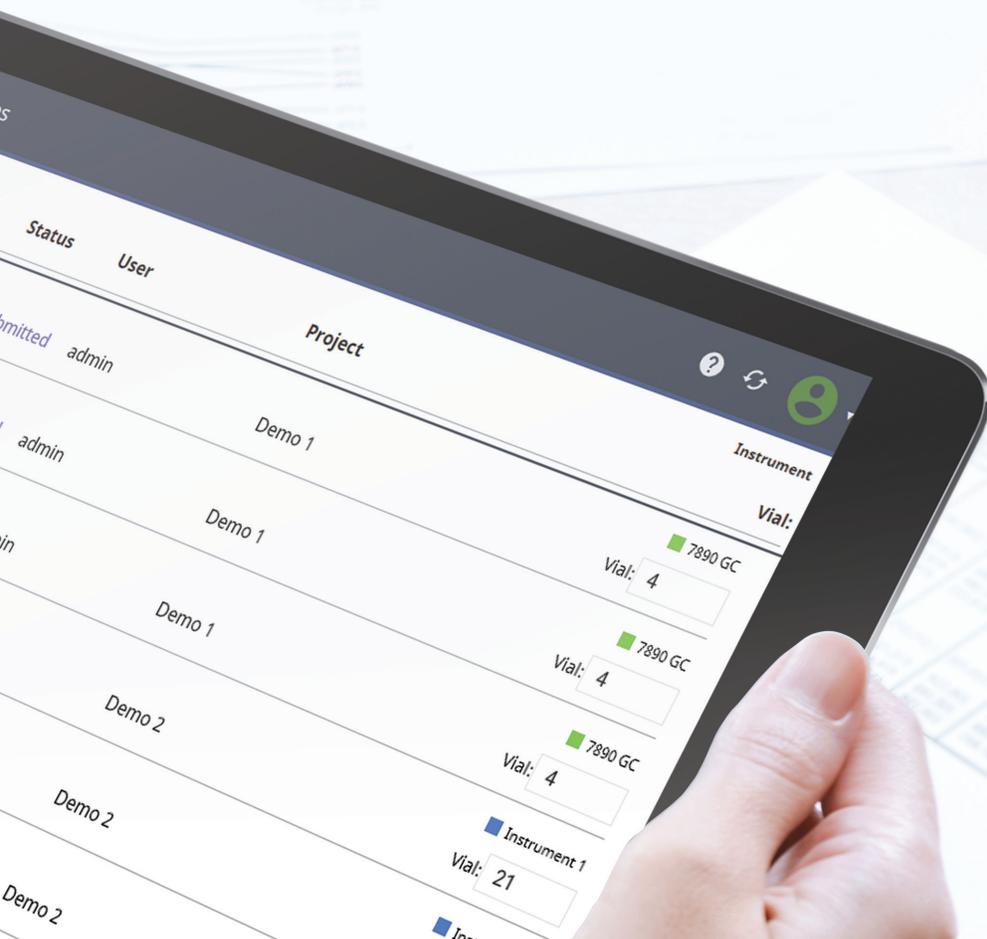
This sequencing capability...	Allows you to...
Save/Load Sequence Templates	Create sequence structure without time-intensive manual entry
Fill Down	Easily fill in multiple table columns with the same information
Flexible Run Queue	Easily see which samples are to be run. Add a priority sample to a running queue
Bracketing	Use calibration standards before and after unknowns to calculate results
Import CSV Files	Drag/drop sample information generated from Excel or LIMS
Pre-run Error Checking	Ensure that all required fields are properly addressed prior to run submission
System Suitability	Demonstrate instrument fitness for purpose before sampling





## Sample Scheduler: Communicate with your LIMS

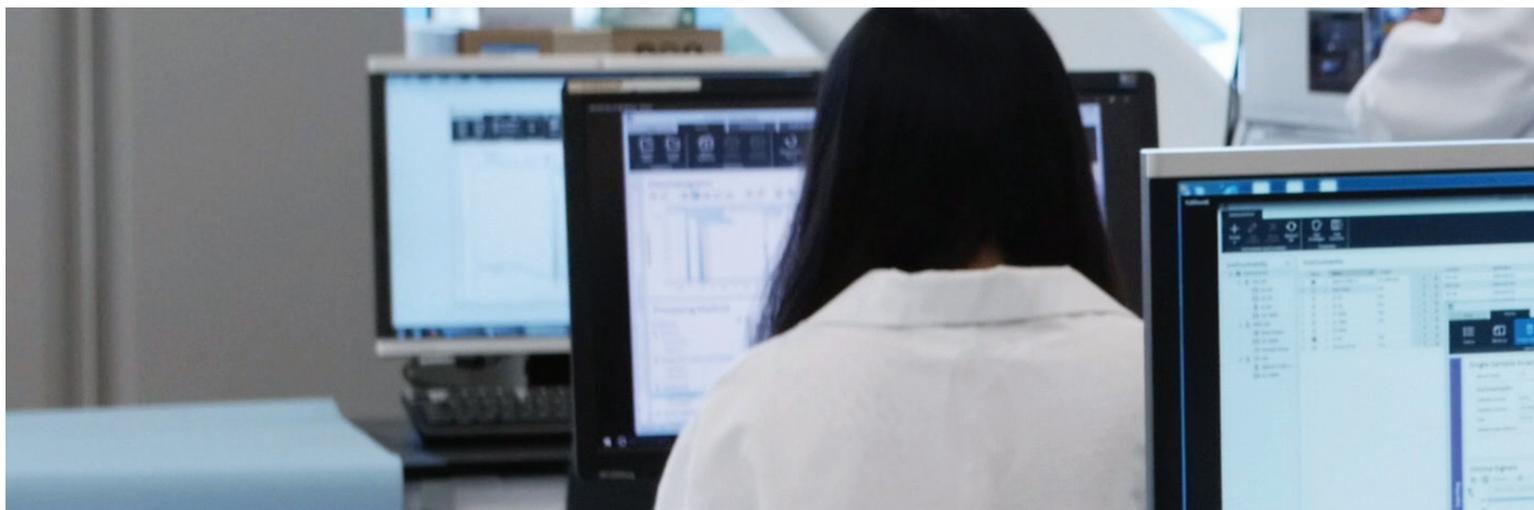




For multi-user/multi-instrument labs, Agilent **Sample Scheduler for OpenLab** serves as a communication hub between OpenLab CDS and your Laboratory Information Management System (LIMS). First, it organizes all the worklists received from the LIMS into a single table. Then, it automatically transfers all the information needed for sample acquisition and analysis directly into OpenLab CDS—eliminating transcription errors. Sample Scheduler automatically sends all results back to the LIMS with correct sample assignments.

Sample Scheduler also serves as a laboratory dashboard. Lab managers and technicians can immediately see where scheduled samples are in the queue, so they can reset sample priorities, schedule new samples, or see when an analysis will be completed.

To learn more about Sample Scheduler, visit: [www.agilent.com/chem/sample-scheduler-for-openlab](http://www.agilent.com/chem/sample-scheduler-for-openlab)



### Failover mode ensures operational continuity

Unexpected computer and network problems happen at the worst possible times. Given the importance of uptime in a high-volume laboratory, your CDS and instruments must be able to handle these situations with minimal data loss. Ideally, instruments should also be able to continue running the current queue of samples.

#### **The failover capability of OpenLab CDS does exactly that when configured in a networked environment.**

If your network, or computer hardware develop problems, Agilent Instrument Controllers (AIC) will continue to acquire and process previously scheduled samples and store data locally on the AIC. If the outage persists—and there are still samples to run—no problem. You can transform the AIC into a workstation that can schedule and run more samples. Once the server connection is restored, data are mapped back to central storage with all electronic records intact.

### Comprehensive instrument control

OpenLab CDS offers the most comprehensive instrument control and data acquisition for Agilent flagship systems—including GC, LC, GC/MS Single Quadrupole, LC/MS Single Quadrupole, as well as SFC. We integrate native instrument drivers developed for each instrument class directly into OpenLab CDS. Then, we test run the new instruments for thousands of hours to ensure the highest possible reliability.

In addition, OpenLab CDS supports an expanding array of instrumentation from other vendors—realizing the promise of one software system for your entire laboratory.

Agilent also works directly with instrument vendors to integrate their system drivers into OpenLab CDS. To see which non-Agilent instruments are supported by OpenLab CDS, visit [www.agilent.com/chem/openlabcds](http://www.agilent.com/chem/openlabcds)



## Custom calculation makes fast review of multiple samples possible

Typically, analysts must review collected data to ensure quality and accuracy. OpenLab CDS speeds this review by providing selection tools that enable you to see your results peak-by-peak, spectrum-by-spectrum, or summarized across hundreds of injections.

The new **Custom Calculator** allows you to embed calculations on your basic result information. You can use these calculations to generate application-oriented results (such as NGA/RGA, or Dissolution) or quality-control statistics that reveal problem injections.

Custom calculations allow you to produce new values based on mathematical calculations of system-generated results. Calculations can be made peak-by-peak or across an entire injection set, and complex, multi-variable calculations are also possible. You can incorporate custom calculations into the processing method with a single mouse click.

## With custom calculations, you can quickly...

See results, at the injection level as defined for the analysis (i.e. method specific).

See results directly in the final report

Present your findings visually to enable fast decision-making



# Meet Scientific Challenges



OpenLab CDS provides data analysis, reporting, and management tools that help you obtain new insights into complex chromatograms—and report your findings clearly.

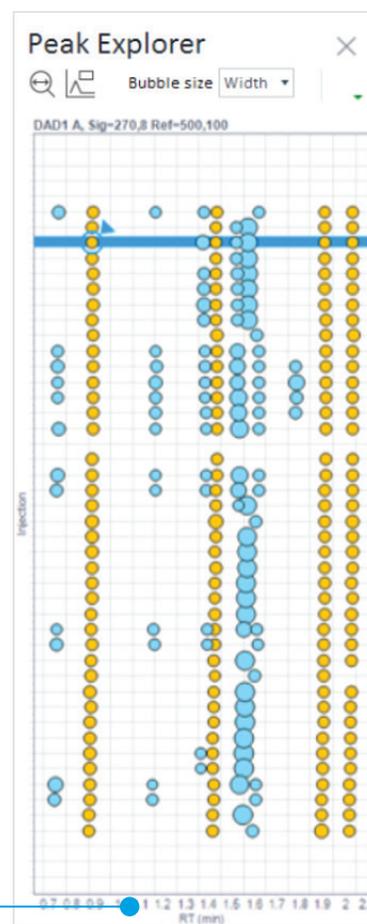
## Powerful peak integration, exploration, and processing

With complex mixtures, even the best chromatography cannot fully separate all unique components every time. That's why OpenLab CDS features embedded mathematical and graphical display algorithms that help you resolve, find, and process these mixtures.

OpenLab CDS also lets you choose between multiple integrators, which can be configured to make sure chromatograms are integrated correctly the first time. That means existing OpenLab CDS ChemStation or EZChrom Edition users can rest assured that the results generated today will be consistent with those from the past.

Occasionally, a peak will appear that requires manual integration. These peaks can easily be addressed using the context-sensitive manual integration capability of OpenLab CDS. Simply move the cursor to your area of interest, and the correct integration tool will be activated automatically. If more than one integration tool is applicable, an integration wheel displaying each tool makes selection easy.

Want to correct a baseline? Just move the leading or trailing point. Want to integrate an overlooked peak? Simply add the baseline. Results are automatically generated and displayed after each operation. Manual integration events can also be incorporated into your data analysis method to increase your speed to results.



### Peak Explorer: a new way of navigating and visualizing large sample sets

Peak Explorer presents a multi-dimensional “bubble chart” view of a complex data set, allowing you to easily spot trends, unexpected or missing peaks, retention time shifts, integration problems, outliers, or artifacts.

Peak Explorer can help you diagnose instrument problems quickly by visualizing retention time trends for a single compound over a series of injections. With LC systems, earlier elution times may suggest solvent mixing problems, later elution times indicate improper column equilibration, and random elution times signal air in the pump.

## Show your data in the best possible light

OpenLab CDS contains a versatile reporting engine that generates standard reports using more than 20 out-of-the-box templates. You can easily modify these templates to suit your lab, or generate custom reports for export into common word processing formats.

In addition, OpenLab gives you unprecedented flexibility, whether you are creating a single injection report or a sequence summary report for hundreds of samples. Custom calculations can also be included, allowing you to develop industry-specific reports—such as System Suitability, Impurity Profiling, British Thermal Unit Analysis, and Content Uniformity.

The report template editor uses a familiar drag-and-drop approach that makes it easy to bring in the report elements you want. These elements can include your company logo, sample information, instrument parameters, injection results, and custom calculations.

Finally, reports from OpenLab CDS can be exported to several file formats (such as txt, csv, pdf, MS Word, and MS Excel). You can then import these reports to a LIMS or ECM system—or integrate them with other sources to create journal-ready documents.

## Optional application software

The architecture of OpenLab CDS lets you easily add application-specific capabilities.

The following applications are currently available.

Gel Permeation Chromatography	Data analysis add-on that enables Gel Permeation Chromatography calculations and reporting
Match Compare	Streamline QC process, particularly in foods/flavors applications, through automated peak identification and area comparisons across unknowns and standards
Natural Gas Analysis Refinery Gas Analysis	Export chromatography data to existing simulated distillation software
Simulated Distillation	Data analysis add-on that determines the boiling point distribution of hydrocarbon fractions before refining
Sample Scheduler	Communication hub to your LIMS and doubles as your laboratory dashboard



# Enhance Your Data Integrity Solutions



For decades, Agilent has helped labs comply with evolving global data integrity regulations. OpenLab CDS reflects this experience with extensive technical controls to help your lab meet the core requirements of Title 21 CFR, Part 11, EU Annex 11, and more. These technical controls reduce the number of procedural controls your lab needs for complete data integrity, including electronic records security, work attribution, and electronic signatures.

## User and data security: Give the right people the right access to the right information

With OpenLab CDS, you can choose from seven default laboratory roles, each providing unique levels of access and ability. New roles can also be created with the ability to assign over 50 system attributes to a particular role.

To ensure data security, OpenLab CDS identifies specific records as critical—such as acquisition/analysis methods, acquired data, analysis results, audit trails, and electronic signatures, which are automatically check-summed to check for invalid or altered records. If a tampered record is discovered, these files are locked and securely stored, while an error message is displayed.

## End-to-end attribution of work

OpenLab CDS can automatically generate audit trails that enable staff and regulatory inspectors to help reconstruct the history of an electronic record. The software records who is responsible for the action, what took place, when it occurred, which record was impacted, and why a record was changed.

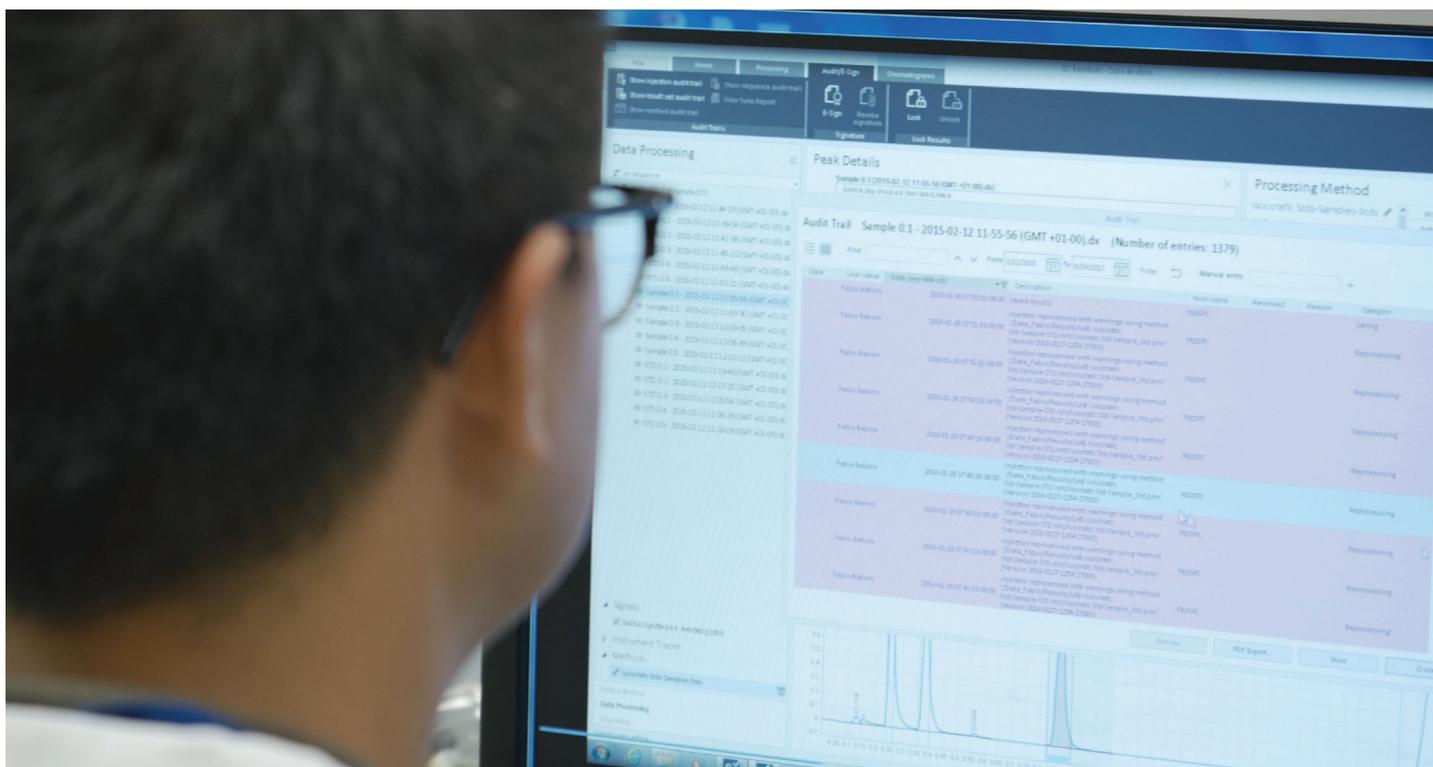
## Built-in system suitability

When you choose OpenLab CDS, you get all the tools you need to perform a comprehensive system suitability test in accordance with ASTM and global Pharmacopeia (USP, EU, and Japan) standards.

- Instrument Test: Detector sensitivity, retention time precision, and peak area precision
- Method Test: Precision of retention times and amounts, method selectivity and robustness, and day-to-day operational variances
- System Test: Precision of amounts, resolution between two specific peaks, and peak tailing

Samples used for system suitability testing can easily be integrated into existing sequences by tagging the sample type as “System Suitability.”

In addition to standard system suitability reports, such as Performance+Noise and Extended Performance, OpenLab CDS contains report templates that allow you to collate and evaluate results from several runs. All calculations are fully documented in the OpenLab Help and Learning system.



## Advanced audit trail review

Recently, regulatory authorities changed the way they want labs to conduct and document audit trail reviews. For example, European Annex 11 requirements introduced in 2010, specify that—in addition to recording the audit trail—labs must review the audit trail and document the review. In addition, the FDA recently announced that audit trail reviews must take place in the context of the reviewed electronic record and with its associated metadata. This means that when a sequence and its results are reviewed, the corresponding audit trail must be reviewed at the same time.

OpenLab CDS has been updated to meet these new requirements. You can now include confirmation and documentation of audit trail reviews as part of the electronic record—eliminating the need for manual printing and signing.

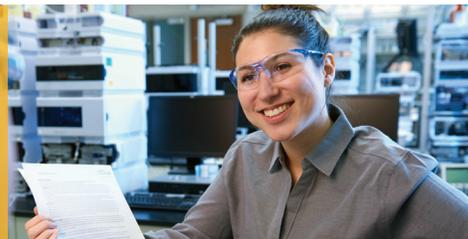
You can also perform full-text searches, or search by audit categories, such as audit trail entries arising from data reprocessing or manual integrations. So you can filter and find the audit trail information you need with ease.

## Electronic signatures that conform to regulations

OpenLab CDS ensures that all electronic signatures within the system:

- Link irrevocably to the corresponding record
- Show the full name of the signer, date and time, and the reason for the signature
- Are displayed whenever the signed records are electronically viewed or printed

# Scale to Meet Future Growth



Whether your lab has a few instruments... or up to 100 systems...  
OpenLab CDS can scale to meet your needs.

## Workstation configuration: A simple choice for small labs

The OpenLab CDS workstation configuration is best for labs with five instruments or fewer. A single PC can be configured to control up to four instruments, including system functions, with no databases to worry about.

Smaller regulated laboratories can step up to OpenLab CDS Workstation Plus. WorkStation Plus replaces unsecured file-based storage with local secured database storage, creating a system that securely stores electronic records required for compliance.



## Networked configuration: Ideal for larger enterprises

When your lab grows to more than five instruments, the networked configuration of OpenLab CDS can greatly improve your overall lab operations through centralization. Instead of having to manage user and instrument setups across individual workstations, you can do it all system-wide from a single location. What's more, OpenLab CDS centralizes data and methods to encourage collaboration and ensure secure system backups. Adding new users and instruments can be accomplished in just a few easy steps, as most of the system is already up and running. You can also check lab-wide instrument status from a single screen.

In the networked environment, two additional software components are needed: the Agilent Instrument Controller (AIC) and Server software.

One or more AICs are used to control, acquire, process/reprocess, and report on data from the instruments in the system. The AIC has been redesigned for OpenLab CDS to control up to six instruments while occupying less than half a square foot of bench space. In case of a network or server failure, the AIC can also be quickly transformed into a fully operational temporary workstation.

The Server centrally stores and manages all pertinent system electronic records, such as raw/processed data, method/sequence files, system configuration, and audit trails. To facilitate integration into standard IT departments, the server uses industry standard networking protocols and database storage (Oracle, SQL Server, and PostgreSQL).

### Incremental capabilities of the networked configuration

#### Centralized system administration

- Users/access privileges
- Instruments/setup
- Software licenses/distribution
- Database/content management system and upkeep
- Administrative reports

#### Centralized secured storage of electronic records

- Facilitates collaboration
- Ensures 21 CFR Part 11 and EU Annex 11 compliance

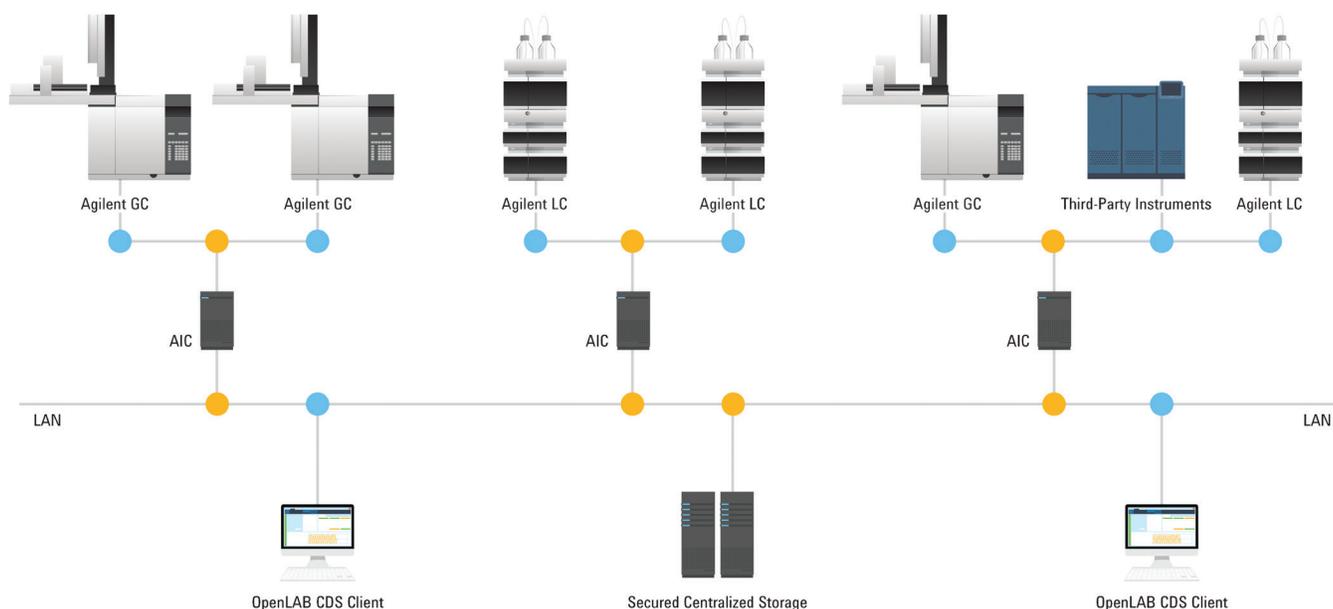
#### "Lab-at-a-Glance" view of instrument/ user status

#### Remote access to data/instruments from the lab, office, or home

#### Optional operation within a virtual environment

#### System diagnostics/log files

## OpenLab CDS client/server architecture



## What Sets OpenLab CDS Apart?

OpenLab CDS offers substantial benefits to all the key personnel in your lab.



### For laboratory managers

- Best possible cost of ownership
- Single software platform for the entire lab—including single quadrupole LC/MS and GC/MS
- Innovative tools for compliance with international regulations



### For instrument users/analysts

- Modern user interface makes learning the system easy
- Fastest data reprocessing speed on the market
- Flexible standard and custom reporting



### For IT managers

- Centralized system administration and management for maximum uptime
- Lowest possible hardware and support costs for a networked implementation
- Industry-standard architecture accommodates laboratory growth



To learn more about OpenLab CDS and to access our free online tutorials, visit:  
[www.agilent.com/chem/onelabonesoftware](http://www.agilent.com/chem/onelabonesoftware)

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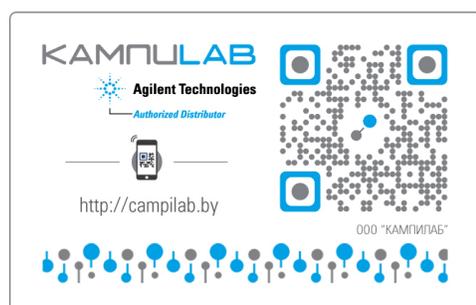
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