

The Business Value of the Connected Lab

Are you still unconvinced about the advantages of the client-server model? Take a closer look and see the full range of benefits—and the true costs of the isolated workstation model.

Introduction

The client-server model has proven its value in laboratory environments for decades. Why then are some laboratories still reluctant to transition from isolated workstations to a connected lab?

For many lab managers, it comes down to perceived cost savings. They feel the move to the client-server model will be expensive and potentially disruptive. While there are short-term expenses involved in the transition, it is easy to overlook the full range of benefits to the lab and its staff. These include:

- **Higher lab productivity**, with more testing and higher accuracy due to an ability to scale and greater proficiency at identifying and resolving issues that impact workflows.
- **Lower total costs** through more efficient, less repetitive, less error-prone maintenance and support processes.
- **Lower long-term costs** due to increased collaboration among lab staff—which impacts the quality of results and morale—and an ability to get products on the shelf faster than competitors, which positively impacts brand image and customer loyalty.



Figure 1. The client-server model interconnects workstations, instruments, and other devices to allow for centralized management, increased communication and collaboration, and improved productivity and cost-efficiency across the lab.

Moreover, the client-server model can also reduce the risk of a security breach, data loss, and noncompliance, each of which carries high costs and penalties.

This paper compares the workstation and client-server models, shows how client-server overcomes the inefficiencies of isolated workstations in the lab, and illustrates why an OpenLab CDS Client-Server System is the optimal solution for maximizing business value. It also outlines key strategies and considerations for implementing the client-server model and provides real-world examples of customers that have transitioned and achieved quantified results.

The limitations of individual, isolated workstations

To fully understand the consequences of staying with an individual workstation model, it is helpful to quickly review the differences between this model and client-server.

Feature	Individual Workstation	Client-Server Model
Data Storage	Data stored locally on each machine; each workstation is an island unto itself	Centralized data storage and sharing via network-connected servers
User & Instrument Management	Individual user/instrument setup per machine; managed separately on each workstation	Unified management of users and instruments; centralized control of methods and sequences
Security	Security managed separately per workstation	Centralized security administration and monitoring
Access	Physical presence required at workstation in the lab	Remote access to resources; flexibility to work in person or remotely
Collaboration	Limited collaboration capabilities; isolated work environment	Enhanced team collaboration and workflow; enables staff to work together
Administration	Individual management required for each machine	Centralized monitoring and control of all key elements

Table 1. Workstation vs. Client-Server.

Many lab managers have chosen to preserve their isolated workstation models to avoid IT issues: fear that moving to client-server will add to IT OpEx, that it will slow implementations down, that servers will need to be managed by IT, and so on. However, in many cases these sensitivities are not based on a full and complete assessment of the client-server model.

The transition from individual workstations to a client-server architecture represents a fundamental shift in laboratory operations. While the immediate benefits of lower costs and higher productivity are compelling, the client-server model delivers additional strategic advantages that transform how laboratories operate:

1. Operational efficiency

The client-server model transforms laboratory operations through remote accessibility and control. Teams can securely access instruments and data from any location, eliminating the constraint of physical presence at workstations. This model enables multi-user operation where one analyst can run samples while others review and process data, significantly reducing workflow bottlenecks. The centralized monitoring capabilities streamline instrument status tracking across the entire laboratory environment.

2. IT management and security

Centralized management through the client-server model addresses critical IT challenges. Software updates can be deployed systematically across all computers, ensuring consistent versions and eliminating the risk of outdated software. By bringing laboratories into the corporate network infrastructure, the model eliminates isolation risks while maintaining security protocols. This integration enables standardized IT support and management practices across the organization.

3. Resource optimization

Previously underutilized instruments gain new life when incorporated into the connected ecosystem. Through the client-server model, labs can transform rarely used equipment into fully operational assets, maximizing their return on investment. This connectivity simplifies maintenance scheduling and support task management across the entire instrument fleet.

4. Installation/validation efficiency

Once the OpenLab CDS client/server system is installed and validated (if required), the addition of more instruments becomes seamless. In some cases, a new AIC is not even required. Expansion of your system for new instruments or even an entire new lab becomes streamlined and efficient because the purchase, installation, and validation of individual workstations are no longer required.

5. Cloud integration and accessibility

The client-server model supports both private clouds — accessible only to authorized users within the company — and public platforms like Google Cloud Platform (GCP) or Amazon Web Services (AWS) where users from multiple companies share space and securely distribute resources. This flexibility enables organizations of all sizes to optimize their operations — from global enterprises requiring worldwide access to smaller labs leveraging outsourced IT. Cloud integration enhances security, increases operational agility, and streamlines maintenance processes.

6. Staff retention

Analysts want to be productive – to do their work quickly, accurately, and collaborate with peers to refine methods and continuously improve the quality of results. The client-server model delivers exactly this by connecting your team’s work seamlessly. This leads to higher job satisfaction, which can make it easier to find and retain top talent, which in turn enhances the reputation of the lab and adds to the credibility of its findings.

These advantages of client-server architecture set new standards for laboratory efficiency and productivity. However, realizing these benefits requires a robust platform designed specifically for analytical laboratory environments.

OpenLab CDS Client-Server: Driving business value through connectivity

OpenLab CDS is a chromatography data system that integrates and centralizes access, control, and maintenance of your Agilent LC, GC, single quadrupole LC/MS, and GC/MS, as well as other vendors’ instruments in the lab. When deployed in a client-server configuration versus a workstation configuration, labs can dramatically cut the time, expense, and error rates in analysis, interpretation, and reporting workflows, while technical controls ensure work quality, effective records management, and enhanced data security.

Moving to client-server architecture sets new standards for laboratory efficiency and productivity. However, realizing these benefits requires a robust platform designed specifically for analytical laboratory environments. OpenLab CDS Client-Server is designed to deliver these advantages while addressing the unique demands of analytical laboratories. The platform provides a comprehensive set of capabilities that directly address the limitations of individual workstations:

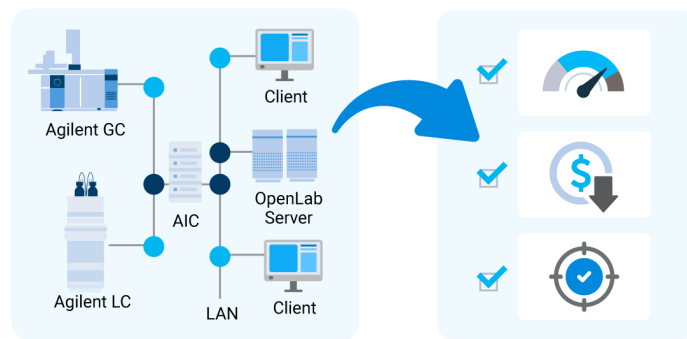


Figure 2. OpenLab CDS Client-Server integrates workstations and other lab devices and provides centralized administration and maintenance—saving time, increasing productivity, and cutting redundancy, error rates, and total cost.

• Centralized lab management and IT operations

OpenLab CDS Client-Server consolidates user, instrument, and data management with configurable eSignature workflows and role-based permissions into a unified system. The platform provides comprehensive laboratory dashboards for monitoring instrument status, configuration details, activity logs, and user privileges across projects. Furthermore, this centralization significantly reduces IT overhead by eliminating individual workstation management through centralized software updates, automated backups, and security controls into a unified system, streamlining information access and software administration.

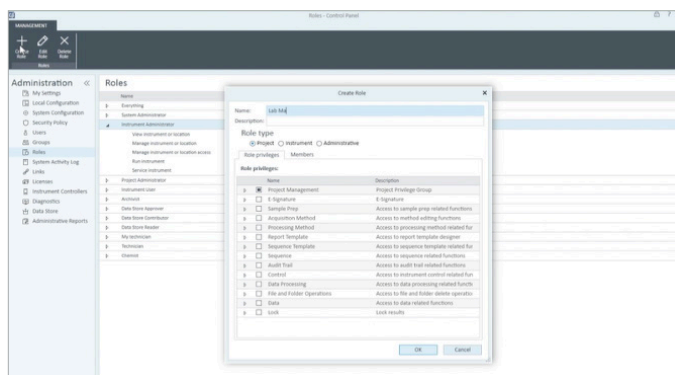


Figure 3. OpenLab CDS Client-Server provides centralized, lab-at-a-glance dashboards with instrument status, configuration details, activity logs, user roles and privileges, and more.

• Remote monitoring and access

The client-server model makes it possible to access instruments and data remotely, allowing staff to control instruments and review their status from any network location. Staff can quickly detect and respond to instrument issues without having to be in the lab. Access from any PC on the network eliminates the need for dedicated workstations at each instrument.

• Regulatory compliance and data integrity

Centralized management of technical control settings for data integrity and compliance can help organizations meet stringent regulatory standards. Key features include centralized control over user accounts, roles, and permissions, as well as centralized eSignature workflows, activity logging, and audit trail review and documentation. These centralized controls facilitate compliance with guidelines such as FDA 21 CFR Part 11, EU Annex 11, GAMP5, ISO/IEC 17025, and EPA 40 CFR Part 160.

- **Scalability and cost-effectiveness**

Expanding a laboratory becomes easier with the ability to quickly add new instruments to the current system, seamlessly integrating them with existing lab and IT infrastructure. Additionally, adding new users to access the lab's instruments and data can be done simply by connecting additional clients. These features allow the lab to scale in a cost-effective manner over time.

- **Leverage a connected SDMS**

Using OpenLab ECM XT as a unified backend in a Client-Server configuration brings additional efficiencies by bringing in data from all systems within the lab, even non-Agilent instruments. These data can be scheduled for collection and storage within a single secure SDMS. This backup method also logs changes and versions files automatically.

- **Unlocking additional capabilities with add-on software**

The benefits of OpenLab CDS Client-Server don't stop there. To further enhance its value, a range of powerful add-on software are exclusively available for client-server configurations.

- **Connected Instrument Device (CID)**

The CID is an IoT device that works with the CID Hub (a SaaS management web application) to streamline deployment processes for OpenLab Analytical Instrument Controllers (AICs). The CID simplifies software updates, troubleshooting workflows, and remote access, reducing management resources and instrument downtime.

- **Status board for OpenLab**

This operational dashboard continuously monitors the lab's data system environment, proactively identifying issues to prevent downtime and maintain smooth operations. It queries and reports to keep updated records and views, and continuously monitors your data system environment, spotting issues or potential breaches proactively to prevent downtime and maintain smooth operations.

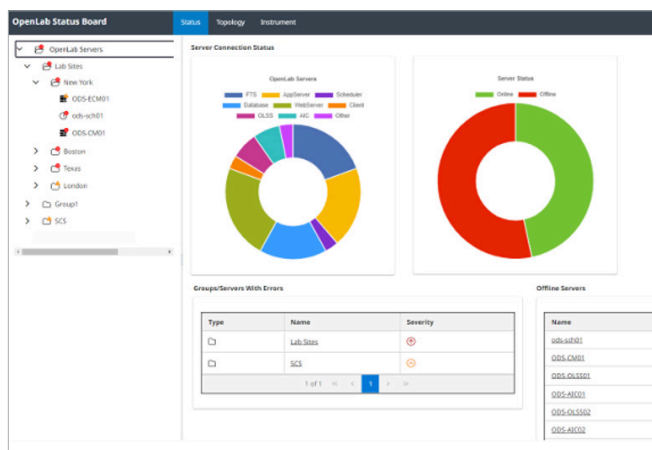


Figure 5. Status Board is easy to install and provides an at-a-glance view of your entire software environment, helping to minimize effort for system maintenance, increase supportability, and maximize uptime and reliability.

- **Data Accessibility Tool**

This tool allows for interactive exploration and visualization of OpenLab CDS data. It enables users to build custom dashboards and reports for deeper analysis, providing flexible access to processed chromatography data without modifying existing reports.

- **Advanced Sample Linking**

This solution combines Infinity III hardware and Sample Linking software to streamline laboratory processes through innovative barcode technology. It ensures efficient data transfer, precise sample tracking, eliminates manual transcription errors, and ensures sample traceability.

- **More than just CDS**

The unified OpenLab ecosystem does not just connect LC, GC, and SQ MS systems. Networked solutions can also connect instruments such as the Cary 3500 UV, many TQs and TOFs/QTOFs with LC or GC, and ICP-MS.

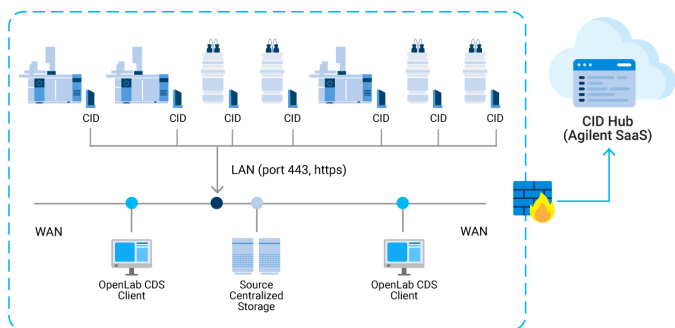


Figure 4. Easily deployed using a QR code, the CID is an IoT device that streamlines the deployment processes for OpenLab AICs.

Quantifying the value of Client-Server: Overview and examples

The business value of transitioning to client-server is clearly demonstrated by both internal research and customer experiences. While calculating the precise ROI of OpenLab CDS Client-Server is very lab-specific and depends on multiple variables, the overall value can be quantified in several ways.

A recent cost analysis of networked vs. workstation models revealed a key finding: the break even point is just three instruments. Labs controlling three or more instruments through a networked system see lower total costs compared to individual workstations, with cost-efficiency increasing with each additional instrument connected to the network.

Transitioning to a client-server model represents a significant opportunity for cost optimization and operational efficiency. When performing the cost-benefit calculation for your lab, be sure to consider these key factors that extend beyond immediate hardware savings:

- **Lower staffing costs** due to the higher efficiency of the client-server model. Connected resources simply require less time and attention from both analysts and IT staff. Time is money, and if users no longer have to share data and methods through “sneakerware” and thumb drives, the lab saves time and money.
- **Reduced support costs** through centralized management. IT can spend less time managing individual devices and more time on higher-value activities.
- **Lower recruitment/hiring costs** in the client-server model, because top talent wants to work for a lab where their productivity and collaboration capabilities are maximized. You won't have to look so long and hard for outstanding employees.
- **Higher cost-efficiency through higher scalability:** In the client-server model, lab staff can control instruments and review status across the lab from any PC, which eliminates the need to purchase and set up dedicated workstations for each instrument.
- **Ability to access cloud cost-efficiencies:** The financial, scalability, and efficiency advantages of the cloud model are not available in the isolated workstation model.
- **Lower risk of a security breach**, which translates to lower costs to remediate breaches, less risk of penalties/fines for non-compliance, and less downtime for the lab.

- **Competitive advantage:** Labs that transition to client-server get more testing done in a given timeframe than competitors, which ultimately results in getting products on the shelf faster, which means higher revenue.

The real-world impact of these benefits is demonstrated through Agilent customers' experiences. The following case studies showcase three key patterns seen across successful transitions:

1. Significant productivity gains (40-50% increase in some cases)
2. Dramatic reductions in response times and error rates
3. Enhanced collaboration and resource utilization

Each organization, while facing different challenges, achieved measurable improvements in their laboratory operations.

Ajanta Pharma Ltd.: 40%-50% Increase in lab productivity

With headquarters in Mumbai, India, Ajanta is a specialty pharmaceutical company that provides quality medicines across 30 countries worldwide. With 7 state-of-the-art facilities across India and stringent compliance requirements to meet from US FDA, MHRA, WHO, and others, Ajanta decided to move to a digitized, client-server environment to accelerate delivery of quality products to its customers. The company is now using OpenLab CDS Client-Server and Sample Scheduler to make its chromatography workflow more automatic and paperless.

“With an instrument dashboard that allows real-time status of instrument runs, the lab team can allocate instruments efficiently to run the samples, and with real-time access to all the data, reviewers and lab managers can make informed decisions quickly, wherever they are... leading to a 40-50% increase in productivity. Analysis that used to take days or hours is now completed in minutes.”

--Jayakumar AV, Executive Vice President, Corporate Quality, Ajanta Pharma Ltd.

Watch the Ajanta case study video

APC Microbiome Ireland: Productivity gains, fewer errors, easier management

APC Microbiome Ireland brings together talented researchers, clinicians, and industry leaders to develop life-changing medicines. Harnessing OpenLab CDS, APC also brought its workstations together into a networked system, delivering increased cost efficiency, productivity gains, and scalability that resulted in better lab performance.

“Obviously running a networked system is a lot more cost-effective, especially in terms of the productivity gains we experienced right from the get-go. We've also seen benefits

for the analysts: custom calculation routines means no more use of Excel, no more transcription errors; and system administrators can easily restrict or grant access to particular analysts. The benefit from an IT perspective is also obvious with automated backup of data, and we're able to monitor the capacities of equipment and man-hour capacities. I would definitely recommend OpenLab CDS to my colleagues. It offers seamless integration of new equipment into an ever-expanding laboratory... and our IT department spends less time in the laboratory so we can spend more time doing excellent research."

—Damien Connolly, Senior Analytical Scientist, APC Ltd.

[Watch the APC case study video](#)

Siegwerk: 80% reduction in response time, 2x samples completed

Headquartered near Cologne, Germany, Siegwerk is a leading international manufacturer of printing inks and solutions for packaging, labels and catalogs. Siegwerk's analytical laboratory plays a key role in supporting new product development, troubleshooting manufacturing problems, and ensuring raw materials and final products are of outstanding quality and safety. However, achieving these goals in a multivendor instrument environment was challenging. By moving to a networked OpenLab chromatography data system, Siegwerk was able to control multiple instruments and centrally store, process and access data generated. The net result: Siegwerk reduced response time to clients by 80% while doubling the number of samples completed.

"The Agilent solution works. Everything will be on the OpenLab system eventually. We can keep our old instruments or buy the new ones we like."

—Dr. Dieter Franke Head, Analytical Services Siegwerk

"With OpenLab, I can go to the office or the lab station and program a sequence, and then do the calculations and interpretation elsewhere using my tablet. It's so fast. It's awesome."

--Alexander Lichtenberg Team Manager Analytical Service, Siegwerk

[Read the Siegwerk case study](#)

Implementation strategies and key considerations

A successful transition to client-server requires careful evaluation of both business and technical factors. Strategic planning not only optimizes cost-efficiency, but also ensures stakeholder confidence throughout the process. Key considerations include:

- **Budgeting and senior management buy-in:** A comprehensive cost-benefit analysis is crucial for securing executive support. Start by pinpointing and categorizing all capital requirements—including new hardware, software upgrades, and support/consulting services—along with the timing of required payments and expected returns. This will help senior management understand both the short-term costs and long-term benefits, making it easier to secure budget approval and maintain support throughout the transition process.
- **Minimization of lab downtime:** The move to client-server does not need to cause major disruption to lab operations, and proper planning can ensure minimal downtime. Planning is the single most important and time-consuming stage of the migration—the what, when, and how of the move has to be determined well in advance and communicated effectively to all stakeholders before moving forward.
- **IT involvement:** The IT department will play a central role in the migration, and can end up being a key supporter or a key blocker. Make sure IT fully understands the advantages of the client-server model from a business, IT, and end customer perspective, and that IT is an integral part of all planning processes.
- It is also important to ensure that you have the budget for increased IT costs. For example, IT usually requires a "sandbox" deployment prior to roll-out into the production environment; make sure that investment is accounted for. In addition, it is helpful to ensure that IT is aware of the company's requirements on purchasing servers, and that IT is prepared to support a server topology and able to migrate data to a centralized database—on-premises or in the cloud.
- **Software/firmware upgrade requirements:** It is important to determine in advance whether the lab's existing instruments are supported on the latest version of OpenLab CDS Client-Server software, and whether the instruments will need firmware updates.
- **Training:** Depending on whether your lab was using Agilent ChemStation or OpenLab CDS as workstations, you may need to consider training analysts on the new OpenLab CDS Client-Server software. The next section summarizes the multiple training options offered by Agilent to assist customers.

Assistance from Agilent: Planning, tools, and training

Agilent offers a range of support services and capabilities to help customers prepare for and complete the transition to client-server with minimal cost, downtime, and disruption.

These offerings include:

- **Agilent Professional Services:** Partnering with Professional Services can expedite and streamline the process of creating an effective plan for the transition—one that accounts for every aspect of the move to client-server and involves all stakeholders in the process. The Professional Services team has significant experience with moving laboratories to new topologies and can walk you through walk the entire process.
- **Agilent Project Management Office (PMO):** Agilent's PMO is skilled at helping with every aspect of avoiding downtime in the transition to client-server, from kickoff to completion. The PMO gives you access to advanced tools for data migration and method validation, which helps ensure a faster migration and fewer errors. The PMO can also help with instrument compatibility verification to help prepare for the transition, as well as documentation of each step, tracking of all meetings, progress reports, and management of the cutover to the new client-server model.
- **Training support:** Agilent offers training in multiple forms and from multiple sources—bundled with installation services or as customized services covering specific topics. Types of training available include:
 - **Introductory training** at the time of installation to acquaint users with the client-server model and new features they'll have access to
 - **Agilent University**, providing advanced training on-site, at Agilent, or remotely
 - **Help and learning** via tutorials and guides, both online and in CDS
 - **Agilent Community**, a forum for user information, with a searchable database of frequently asked questions and answers
 - **Custom consulting services** to provide training on advanced topics or lab-specific processes

Ready to transform your lab?

Explore these key resources to learn more about maximizing your lab's efficiency with OpenLab CDS Client-Server:

OpenLab CDS Overview: Visit the webpage for vital information about the products features, capabilities, and benefits.

OpenLab CDS Client-Server Overview: Overview of how client-server overcomes the limitations and myths of the individual workstation model.

Client-Server FAQs: Get answers to your top questions and concerns about moving to the client-server model.

Client-Server Advantages Video: Get an overview of the key capabilities and benefits of the client-server model.

The transition to client-server represents a pivotal opportunity to transform your lab's capabilities while reducing long-term costs. Contact us today to discuss your lab's specific needs and develop a customized transition plan.

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