



GETTING STARTED WITH
AWS FOR LIFE SCIENCES

The Life Sciences Guide to Cloud Modernization



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INDUSTRY TREND

Why leading life sciences organizations are moving to the cloud

Although we are in the golden age of innovation, the highly regulated and competitive life sciences industry is rife with challenges, including increasing global pricing pressures, ballooning commercialization costs, and lowering returns on R&D investments.

And with the move toward novel therapeutic modalities, life sciences organizations must increasingly balance the drive to innovate and develop more complex and personalized therapeutics with the need to increase Return on Investment (ROI).

As a result, life sciences organizations are experiencing challenges and pressures across the value chain, including:

- Balancing the needs to reduce costs and implement innovative technologies
- Accelerating time to market
- Validating compliance changes
- Handling, analyzing, and storing growing datasets
- Lacking data visibility and growing data silos
- Managing talent and resource constraints while scaling the business

Amid these challenges, **life sciences organizations are turning to the cloud to modernize and discover new tools to optimize business operations and accelerate new developments.**



“Imaging tools are becoming the backbone of the entire drug discovery and development industry. But they’re generating so much new data that we can no longer rely on a human to be the expert that can interpret all of that data.”

*Director for Molecular Imaging,
AstraZeneca*

[Read more](#)

Defining your cloud migration strategy

A successful cloud migration strategy starts with understanding your organization's goals and business case.

Develop a data-driven business case for migration

Creating a business case on your own can be a time-consuming process and does not always identify the most cost-effective options.

To help life sciences organizations more easily identify opportunities for optimization, cost savings, and to accelerate their migration journey, AWS offers [Migration Evaluator](#)—a no-cost assessment tool that includes projected cost estimates and savings, as well as recommendations.

Understanding common life sciences migration strategies

While there are a number of migration strategies, the two most common migration methods amongst life sciences organizations are 1/lift-and-shift and 2/modernization-first. Often times, we see life sciences companies select different migrations strategies across different areas of their value chain, depending on the business goals and needs.

LIFT-AND-SHIFT

In the life sciences industry, this is the most common migration model. This method focuses on first replicating existing on-premises workload and data in the cloud, and provides a more approachable method for migrating in highly regulated industries. Once all data and workloads are replicated and validated in the cloud, life sciences organizations can start modernizing and innovating with new technologies and processes to achieve greater benefits.

MODERNIZATION-FIRST

The modernization-first method focuses on building updated or new workloads in the cloud. The most common use case for this method is a hybrid model of building new applications or solutions in the cloud, and moving and improving legacy workloads over time as equipment or procedures reach end of life.

Key considerations for life sciences modernization

Whether seeking to optimize your manufacturing process or accelerate drug discovery, life sciences organizations share a common set of considerations. These include:

| TOP MIGRATION CONSIDERATIONS | SOLVING WITH AWS FOR LIFE SCIENCES |
|---|--|
| How can my organization maintain security and compliance during migration? | AWS expedites cloud migration by focusing on specific AWS applications that establish the environment needed to maintain GxP compliance. |
| How can I build an infrastructure that can scale globally? | AWS provides the most extensive global infrastructure and the most functionality of any offering, enabling customers to seamlessly scale on-demand and easily implement new technologies to expand their offerings. |
| How can I fill talent gaps within my organization? | Access a variety of learning and certification courses to help organizations train and re-train employees. Additionally, AWS Professional Services and AWS for Life Sciences Competency Partners can help with your migration process. |
| How do I move from a CapEx to an OpEx model? | Leverage services and tools like Migration Evaluator and AWS Budgets to help your organization navigate the change, predict costs, and optimize spend. |
| How can I maintain continuity with legacy data, workloads, and equipment? | Utilize solutions and tools for secure legacy data transfers and workload migrations. |
| How can I get more valuable data to inform business decisions | Deploying SAP on AWS allows for the rapid, ongoing iteration of the latest SAP components, helping pharma organizations adopt modules for compliance quicker than on-premises and achieve greater flexibility in managing resources. |
| How can I increase collaboration amongst my organization and with third parties? | AWS provides security and access controls for secure data sharing on a global scale. |

This eBook explores key considerations for getting started with cloud migration, outlines available implementation paths, and shares learnings from industry leaders.



Data security & compliance on AWS

Maintaining GxP compliance and safeguarding sensitive data is “job zero” for any migration strategy. When considering a large-scale migration to the cloud, many organizations begin with extensive planning and assessment that require an investment of significant time and resources to ensure continuous compliance.

To streamline migration efforts and help life sciences organization maintain compliance, AWS for Life Sciences helps life sciences organizations:



Automate GxP compliance

Enable continuous monitoring and alerting with centralized audit/logging capabilities for applications running on GxP-compliant infrastructure. Leverage automated traceability with real-time audit view and risk management.



Deploy fine-grained data access controls

Inherit global security and compliance controls with dedicated hosts/instances for patient data and tools to encrypt data at rest or in motion.



Adhere to data regulations & sovereignty

Encrypt at-scale to comply with local data privacy laws such as PCI DSS, SOC, FedRAMP, NIST, ISO, HIPAA, and HITRUST. With more than 84 Availability Zones, organizations can analyze and store data in-region.



Minimize downtime

Minimize downtime and data loss with fast, reliable recovery of on-premises and cloud-based applications using affordable storage, minimal compute, and point-in-time recovery.

Expediting migration with GxP compliance on AWS solution

[AWS Solutions for GxP Compliance](#) expedite cloud migration by focusing on specific AWS applications that establish the environment needed to maintain compliance and enable customers to improve user experience, reduce cost, improve security, and enhance agility of a GxP compliance-aligned AWS Cloud environment.

[Read GxP on AWS whitepaper](#)



Waters

THE SCIENCE OF WHAT'S POSSIBLE.®

“By deploying Empower Cloud on AWS, our customers know that they can adapt to rapidly changing research needs and still meet their goals for GxP data integrity and computer-system validation.”

Director, Waters

[Learn more](#)

Featured AWS for Life Sciences Partners

Deloitte. 

 **TULIP**

Building a foundation for growth

Building a scalable and adaptable IT backbone is vital for business growth and should be a central goal for any cloud migration. With the increasing adoption of more data-intensive applications like CryoEM and next-generation sequencing, a scalable and cost effective IT environment provides the ability to expand and leverage new technologies.

On-demand scalability, globally

Life sciences organizations utilize AWS to seamlessly scale their businesses and expand applications to meet business growth and evolving market needs.

AWS offers the most extensive global infrastructure with 84 Availability Zones in 26 geographies, delivering on-demand scalability, enabling global collaboration, and supporting data sovereignty.

Agility to respond to market opportunities

CASE STUDY: MODERNA

Challenge: To meet global vaccine demands, Moderna needed an agile and scalable infrastructure to expand operations globally.

Solution: From leveraging on-demand compute power and machine learning (ML) to accelerate discovery and development, to building flexible capacity and real-time analytics into its award-winning, cloud-native manufacturing facility, Moderna leverages the scale, reliability, and performance of AWS to expand the possibilities of its mRNA platform and scale its manufacturing and supply chain to meet global demands.

Results:

- Completed the sequence for its mRNA COVID-19 vaccine in 2 days using ML built on AWS
- Provide researchers with remote access to datasets and resources
- Upgraded SAP ERP in 2 months to meet increased demands
- Scale manufacturing to deliver vaccines to more than 30 countries



“The science behind mRNA medicines is advancing at a rapid pace, and building Moderna’s technology platform on AWS gives our scientists the insights, agility, and security they need to continue to lead in the industry.”

CEO, Moderna

[Learn more](#)



Investing in your talent

Life sciences organizations need individuals with cloud skills and expertise in the sciences to help transform their business. When developing a cloud migration strategy, many pharma organizations take a two-pronged approach to filling talent gaps, leveraging both AWS training programs and AWS Professional Services to up-level their teams.

Up-leveling employees

AWS offers a robust portfolio of training and certification programs designed to help your organization up level employees and propel cloud fluency. Whether your employees are just starting out, building on existing IT skills, or sharpening their cloud knowledge, AWS Training and Certification can help you be more effective and do more in the cloud.

Popular AWS Training and Certification programs include:



Data Analytics

Learn to design, build, secure, & maintain analytics solutions

[Explore this training »](#)



Security

Learn the processes & best practices for securing the AWS platform

[Explore this training »](#)



Databases

Learn best practices for database creation and management.

[Explore this training »](#)

Bridging the gap with consultants

To help life sciences organizations get up and running quickly, AWS Professional Services and AWS for Life Sciences Consulting Partners are available to accelerate your migration.

- AWS Professional Services: AWS Professional Services Life Sciences Practice help organizations define and execute their migration strategy, as well as train employees on new technologies and methods. [Learn more »](#)
- AWS for Life Sciences Partners: AWS Partners offer migration and training services across the value chain. [Learn more »](#)

Benefiting from an OpEx model

Moving from a capital expenditures (CapEx) to operating expenses (OpEx) is often cited as a migration hurdle amongst life sciences organizations. To help navigate this transition, AWS provides a suite of tools, including:

- [Migration Evaluator](#): a no-cost assessment tool to help life sciences organizations more easily define a business case and uncover opportunities for cost optimization
- [AWS Pricing Calculator](#): designed to configure a cost estimate that fits your unique business or personal needs with AWS products and services
- [AWS Budgets](#): simplified planning and cost controls tool for budgeting and forecasting

Modernizing for cost efficiency

Reducing costs is a top driver for cloud migration amongst life sciences organizations, increasing with the growing need to navigate pricing pressures. In addition to removing expensive up-front IT investments, life sciences organizations recognize additional savings by using AWS tiered storage and compute services.

AUTOMATICALLY REDUCE COSTS WITH INTELLIGENT STORAGE TIERING

[The Amazon S3 Intelligent-Tiering](#) storage class is designed to optimize storage costs by automatically moving data to the most cost-effective access tier when access patterns change.

RUN FAULT-TOLERANT WORKLOADS FOR UP TO 90% OFF

[Amazon EC2 Spot Instances](#) are an ideal option for applications that are fault-tolerant, scalable, or flexible, and offer up to a 90% discount compared to on-demand prices.

REDUCE COSTS WITH TIERED PRICING OPTIONS

For long-term storage of infrequently used data, [Amazon S3 Glacier](#) provides secure data archiving starting at \$1 per terabyte per month, and Amazon EFS Standard-Infrequency Access can reduce storage costs by up to 92%.

REPLICATE CAPEX WITH SAVINGS PLANS

[AWS Saving Plans](#) offer a flexible pricing model that provides savings of up to 72% on AWS compute usage. Select from 1- or 3-year plan terms.



Relay Therapeutics leverages AWS EC2 Spot Instances to **reduce compute costs by 50%**

[Learn more](#)

Numerate

"We can run compute clusters for one-eighth the cost we could before because of Amazon EC2 Spot Instances."

CTO & Co-founder, Numerate

[Learn more](#)

Business continuity

Ensuring business continuity and continuous compliance is the backbone of any successful migration program. Whether looking to mirror enterprise resource management tools or ensure interoperability when using genomics data analysis pipelines, AWS for Life Sciences solutions and partners can help ensure continuity.

Securely migrating legacy data

Migrating legacy data to the cloud can help reduce costs, increase data visibility, and is important for maintaining compliance. But migrating the volume of data aggregated in silos from years, or often decades, of experimentations, trials, and commercialization is a heavy lift.

AWS offers a wide variety of services and partner tools to help you migrate your data sets, whether they are files, databases, machine images, block volumes, or even tape backups. Life sciences organizations commonly use [AWS Database Migration Service](#) to migrate legacy databases quickly and securely, with minimal downtime.

Migrate legacy applications

AWS for Life Sciences and AWS Partners offer a variety of cloud-based implementations of common industry tools and solutions including SAP, Salesforce, and genomic analysis tools like DRAGEN. AWS also offers migration support for bespoke applications.

AWS for Life Sciences resources

AWS PROFESSIONAL SERVICES'

LIFE SCIENCES PRACTICE

Collaborate with AWS Professional Services' Life Sciences practice to migrate legacy data, applications, and establish security best practices. [Learn more »](#)

AWS MIGRATION ACCELERATION PROGRAM

The AWS Migration Acceleration Program (MAP) is a comprehensive and proven cloud migration program based upon AWS's experience migrating thousands of enterprise customers to the cloud. [Learn more »](#)



ArisGlobal provides software to 40 of the top 50 biopharmaceutical companies, and required data replication on a global scale.

The company uses AWS Database Migration Service to achieve data replication across regions in under a second.

[Learn more](#)



Unleashing more value from data

The ability to extract, analyze, and visualize data quickly from across the company can help biopharmaceutical companies become intelligent enterprises and better serve patients.

Life sciences organizations running SAP on further unleash the value of their data by using AI/ML to introduce efficiencies across the enterprise, including supply chain forecasting, manufacturing efficiencies, and long-term supply/demand planning.

Why Life Sciences Organization Migrate SAP to AWS

On-premises SAP installations typically need large internal teams for management, take significant effort to upgrade, and are sized to support peak volumes. This results in day-to-day underuse of infrastructure support and investment.

Life sciences organizations like [Amgen](#), [Gilead](#), [Moderna](#), and [Bristol Myers Squibb](#) have relied on AWS and SAP to support different parts of their operations and realize benefits including:

- More cost-effective uptime of mission critical applications
- Greater business agility
- Ease of adapting to changing regulations
- Stronger security posture

Migrating SAP Workloads

To simplify the migration of SAP to AWS, AWS provides a breadth of SAP resources, including an SAP HANA AWS Quick Start that provisions and configures the infrastructure required to deploy SAP HANA in minutes, following best practices from AWS.

To help ensure compliance, AWS provides a [GxP Installation Qualification \(IQ\) Template](#) that helps customers plan and document their SAP HANA installation activities to expedite the setup and validation of SAP on AWS.

[Learn more about SAP on AWS Migration Methodology »](#)



"Our partnership with Accenture, SAP, and AWS was crucial for a project of this size and scale, and their combined expertise ensured there was no business disruption."

Executive Director, Digital Capability Manager – Enterprise Resource Planning, Bristol Myers Squibb

[Read more](#)

Deeper collaboration

Fostering deeper collaboration both within an organization and with external parties is often sighted as a key driver for cloud migration. When evaluating and determining your cloud migration strategy, outlining the flow of data both internally and externally can help create a more seamless migration process.

QUESTIONS TO CONSIDER

- Who should have access to what data?
- How will you organized data for sharing?
- How will you ensure security and compliance?
- How long should access be available?
- What changes would alter this access?
- Are you looking to provide one-time or continuous access to your data?



Whether following the principle of least privilege like AWS or providing open data access to all, AWS provides technical, operational, and contractual measures needed to protect your data.

[Learn how AWS can help you:](#)

1. Manage the privacy controls of your data
2. Maintain security and compliance
3. Control how your data is used
4. Control who has access to your data
5. Define and enforce data encryption

Fostering data collaboration internally

Life Sciences organizations like [Eli Lilly](#) use the flexible nature of AWS to democratize access to data enterprise-way in a secure and collaborative manner.

With purpose-built solutions like [Service Workbench on AWS](#), IT teams can easily provide secure, repeatable, and federated control of access to data, tooling, and compute power that researchers need.

[Learn more about how Eli Lilly set the foundation for enterprise-wide data sharing »](#)

Secure external collaboration

Life sciences organizations around the globe leverage AWS to manage a secure flow of information between their organization and third parties, such as Contract Research Organization (CRO).

And open with access to more than 60 life sciences and genomics datasets through the [Registry of Open Data on AWS](#), organizations can expand their research and accelerate innovations.

Additionally, [AWS Data Exchange](#) makes it easier for healthcare and life sciences organizations to find, subscribe to, and use external healthcare data in the cloud.

DEEP 6 AI

"What we have seen by partnering with AWS is that we could basically construct a federated system where we can have multiple academic medical centers, smaller trial sites, sponsors, and CROs all act and share workflows on a common data infrastructure."

*CEO and Founder
Deep 6 AI*

[Learn more](#)

Hybrid-cloud migration

AWS offers hybrid cloud solutions to connect on-premises applications and systems to cloud storage to help reduce costs, minimize management burden, and innovate with your data.

Connect and extend your on-premises applications with AWS for Life Sciences

AWS offers a variety of solutions and tools for seamless hybrid cloud operations:

- With [AWS Outposts Family](#), life sciences organizations are running AWS infrastructure and services on-premises to create a consistent hybrid experience.
- Many life sciences organizations leverage [AWS Storage Gateway](#) to seamlessly connect and extend their on-premises application to AWS Storage. This is a prime method for replacing tape libraries with cloud storage, provide cloud storage-backed file shares, or create a low-latency cache to access data in AWS for on-premises applications.
- To further accelerate network transfers between on-premises datacenters and AWS datacenters, life sciences organizations leverage [AWS Direct Connect](#) for a dedicated physical connection.

Featured AWS for Life Sciences Partner: VMware

Using VMware Cloud on AWS, customers can consolidate their on-premises data centers, extend their data center capacity with cloud resources, and enhance their disaster recovery capabilities.

[Learn more »](#)

ThermoFisher
SCIENTIFIC

Thermo Fisher Device Connect, built on AWS, unifies traditional wet lab workspaces and computational space through new data-driven workflows.

With this, researchers can connect their on-premises instruments to a central cloud ecosystem for secure, cloud-based data storage, and access to scientific analysis apps and peer collaboration tools.

[Read more](#)



Getting started with AWS for Life Sciences

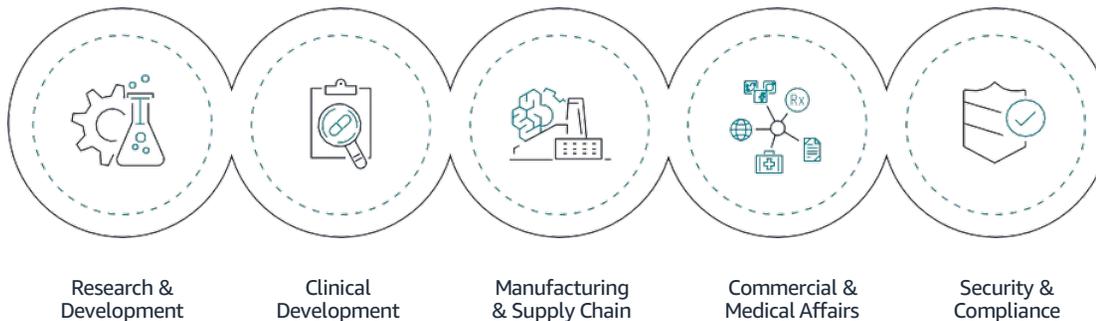
From machine learning tools to accelerate breakthrough research, to global scalability on-demand, life sciences organizations around the world leverage AWS to solve core business challenges and propel their business forward.

For almost a decade, industry leaders such as [AstraZeneca](#), [Eli Lilly](#), [Moderna](#), [Novartis](#), and [Pfizer](#) have leveraged AWS to develop, trial, manufacture, and commercialize therapeutics quickly and efficiently.

Purpose-built solutions designed for the life sciences

Developed to help life sciences organizations of all sizes and disciplines harness the power and scalability of the AWS cloud, [AWS for Life Sciences](#) provides a curated portfolio of industry solutions, tools, resources, and AWS Partners across the value chain. Whether you're looking to buy, build, partner, or a combination of the three, AWS for Life Sciences makes it easier to identify, validate, and deploy the right solutions to meet your organization's objectives.

AWS for Life Sciences supports innovation across the value chain:



[Learn more about AWS for Life Sciences »](#)



“Building Moderna’s technology platform on AWS gives our scientists the insights, agility, and security they need to continue to lead in the industry.”

CEO, Moderna

[Read more »](#)



Merck improves speed and reduces manual effort to assess change proposals up to 70% on AWS.

[Read More »](#)



“The pace of innovation at AWS is staggering. And the adoption of AWS capabilities has helped us accelerate our product development and reduce our overall time to market.”

Vice President, Thermo Fisher Scientific

[Read More »](#)

Your journey starts here

Tomorrow's innovations start with today's modernization. Explore how you can get started with AWS for Life Sciences.

AWS Migration Acceleration Program

The AWS Migration Acceleration Program (MAP) is a comprehensive and proven cloud migration program based upon AWS's experience migrating thousands of enterprise customers to the cloud. Enterprise migrations can be complex and time-consuming, but MAP can help you accelerate your cloud migration and modernization journey with an outcome-driven methodology.

[Learn more »](#)

AWS for Life Sciences Featured Consulting Partners

AWS for Life Sciences features a curated portfolio of industry consulting partners with experience in pharma and medical device enterprise migrations.

 **accenture**

 **BIOTEAM**
Enabling Science

Cognizant

 **NAVISITE**

 **pwc**

 **saama**

slalom

virtusa

 **ZS**

Create Enterprise-grade Research Environments

AWS Biotech Blueprint is designed to enable biotech customers to rapidly and inexpensively create enterprise-grade research environments in the cloud in as little as 30 minutes.

[Learn more »](#)



About AWS for Life Sciences

AWS for Life Sciences reduces barriers to innovation by providing a curated suite of industry services and solutions designed to help organizations develop, trial, manufacture, and commercialize therapeutics quickly and efficiently—all while meeting the most stringent security and compliance regulations.

[Learn more](#)

