nClouds | AWS Case Studies

TetraScience

How nClouds helped TetraScience improve performance efficiency and flexibility while protecting intellectual property and patient data in a secure, enforceable, and regulatory-compliant manner.

TETRASCIENCE

Industry

Life Sciences, Internet of Things, Data Integration, Cloud Computing, Enterprise Software

Location

Boston, Massachusetts

Challenge

Improve performance efficiency and flexibility while protecting intellectual property and patient data in a secure, enforceable, and regulatory-compliant manner

Featured Services

Containerization (AWS Fargate, Amazon Elastic Container Service), infrastructure automation, database backup (AWS Systems Manager), cloud management (nOps), 24/7 support services.

About TetraScience

TetraScience is a life sciences cloud data integration company founded in 2014 by scientists and engineers from Harvard and MIT. Their SaaS solution for large pharmaceuticals and growth-stage biotech centralizes scientific data from instruments, contract research organizations (CROs), and software systems in a single, cloud-based repository. Customers use their software to easily access scientific data, improve operational efficiency, enable novel analytics, and support regulatory compliance.

The solution can interact with hundreds of lab instruments because it is instrument and manufacturer agnostic. Data streams from labs, databases, and collaborators to a cloud-based dashboard. Researchers can then remotely monitor, manage, and automate their experiments from any location, with data logged and alerts sent when necessary.

They were named a Cool Vendor by Gartner in the May 2017 report, “Cool Vendors in R&D for Manufacturers, 2017”. To learn more, go to tetrascience.com.

Benefits Summary

- Improved performance efficiency
- Repeatability
- Consistency
- Flexibility

CHALLENGE

Improve performance efficiency and flexibility while protecting intellectual property and patient data in a secure, enforceable, and regulatory-compliant manner.

TetraScience’s mission is to modernize life sciences research by bringing cloud software to the laboratory, making any device Internet-connected. While developing the software for their life sciences solution, TetraScience recognized the need to modernize their IT infrastructure to improve performance efficiency.

They needed the flexibility to automate the management and deployment of tenant configuration options to multiple tenants based on the varying architectural requirements for each tenant. Their solution needed to enable data exchange among clinical researchers at different entities while preventing cross-tenant access to system resources to protect intellectual property and patient data. Security at every layer of the architecture, enforceability, and regulatory compliance were essential requirements.

> "In nClouds we found a partner who became an extension of our team, sharing our passion and goals. And we got a broad, expert skill set with DevOps, containers, AWS infrastructure, and cloud management that has delivered a modern infrastructure for growth and innovation that has empowered us to rapidly evolve our product offerings."
>
> **Spin Wang,**
> **Co-Founder & COO,**
> **TetraScience**

Why AWS and nClouds

TetraScience was evaluating top AWS partners to help them modernize their infrastructure. After the evaluation, TetraScience selected nClouds, a Premier Consulting Partner in the AWS Partner Network (APN), based on the firm's years of experience, case studies, and customer references. nClouds' model of becoming an extension of their client's team really resonated with TetraScience, because they were looking for such a relationship.

TetraScience leveraged several Amazon Web Services:

- **Amazon Elastic Container Service (ECS)** - Enables TetraScience to run and scale containerized applications on AWS easily.
- **Amazon ECS Service Discovery** - To provide a framework to describe the relationship between different microservices.
- **Amazon Elastic Compute Cloud (Amazon EC2)** - Services that are part of the environment run on Amazon EC2 instances and are organized using AWS instance tags.
- **Amazon Elastic Container Registry (Amazon ECR)** - A fully-managed Docker container registry that makes it easy for TetraScience to store, manage, and deploy Docker container images.
- **Amazon Relational Database Service (Amazon RDS)** - Enables TetraScience to easily set up, operate, and scale a relational database in the cloud.
- **Amazon Virtual Private Cloud (Amazon VPC)** - Enables TetraScience to provision a logically isolated section of the AWS Cloud where they can launch AWS resources in a virtual network that they define.
- **AWS Application Load Balancer** - Integrated with Amazon ECS in each private subnet to support content-based routing and applications that run in containers.
- **AWS Auto Scaling** - Monitors TetraScience's applications and automatically adjusts capacity to maintain steady, predictable performance at the lowest possible cost.
- **AWS CloudFormation** - Allows TetraScience to treat its infrastructure as code.
- **AWS Fargate** - Enables TetraScience to run containers without having to manage servers or clusters.
- **AWS Identity and Access Management (IAM)** - To control users' access to AWS services.
- **AWS Systems Manager** - To provide visibility and control of the infrastructure.

TetraScience's solution stack also includes additional essential tools and services:

- **Datadog** - A monitoring service providing visibility into TetraScience's entire environment.
- **Elasticsearch** - Enables TetraScience to store, search, and analyze big volumes of data quickly and in near-real-time.
- **ELK Stack** - An end-to-end stack that delivers actionable insights in real time from almost any type of structured and unstructured data source.
- **nOps** - A SaaS cloud management platform for AWS that enables TetraScience to optimize cost and manage security and compliance for their AWS resources..
- **OpsGenie** - A SaaS platform that enables TetraScience to prevent and resolve business-impacting incidents to improve customer experience.

- **RabbitMQ** - A messaging broker that provides TetraScience with a common platform to send and receive messages, and a safe place for messages to reside until received.
- **Travis CI** - A hosted, distributed continuous integration service used to build and test software projects hosted on GitHub.

nClouds' Solution Architecture for TetraScience

TetraScience engaged with nClouds, early in their software development process. nClouds partnered with TetraScience to modernize their infrastructure using containerization and a DevOps approach. Plus, nClouds now provides 24/7/365 infrastructure support services with a 10-minute SLA.

The new infrastructure enables TetraScience to save time, improve repeatability and consistency, enable deployment flexibility, support regulatory compliance, and reduce costs.

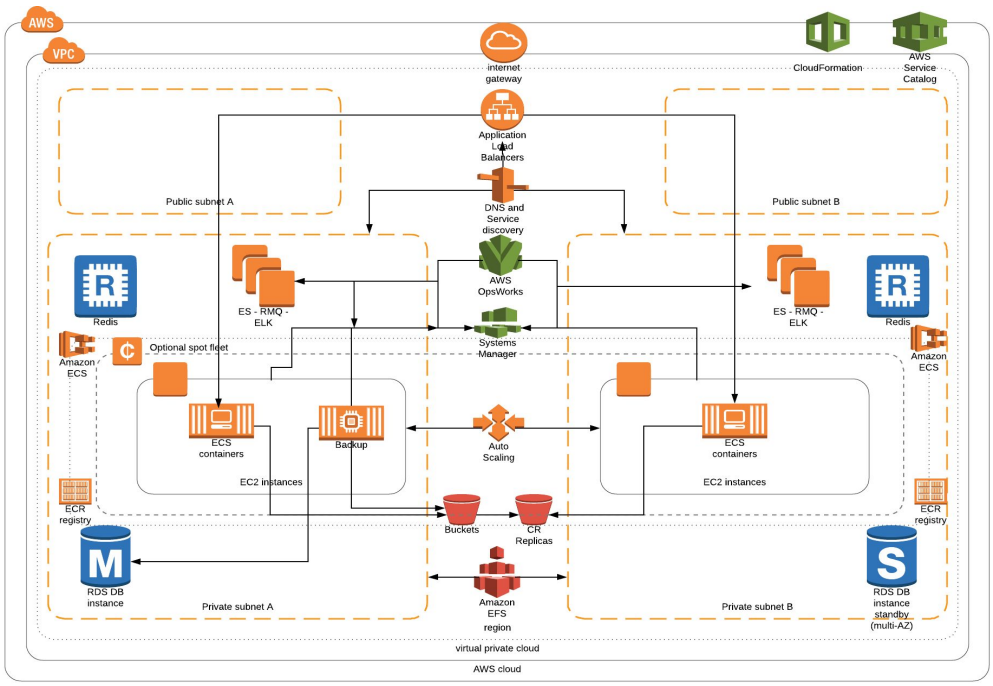
Container-based applications are abstracted from the environment in which they run, enabling them to be deployed easily and consistently. TetraScience now has the flexibility to deploy containers on any compute resource (regardless of software, operating system, or hardware configurations) through the development, testing, and production lifecycle. AWS Fargate, a compute engine for Amazon ECS and EKS, enables TetraScience to run containers without having to manage servers or clusters. Container management processes are repeatable across applications, enabling TetraScience to save time.

Other time savers include Amazon ECS to automate container management, scaling and workload scheduling, and AWS CloudFormation to automate modeling and provisioning the resources needed for TetraScience's applications across all regions and accounts.

The infrastructure supports versioning to track control and improvement of specific requirements. Versions can be shared across accounts with the help of AWS Service Catalog to set up new environments easily.

nClouds built an automated database backup process using AWS Systems Manager to store encrypted authentication credentials and execute backup procedures for services. All data is encrypted in flight and at rest to help TetraScience comply with life sciences regulations. Monitoring, centralized logging, and testing help improve database capacity to handle near-real-time data querying and analytics, optimize container performance and health, maintain flexibility, and reduce operations overhead and complexity.

To optimize cost, the new solution architecture includes nOps, a cloud management solution for AWS. The team uses nOps to proactively identify unused and underutilized resources.



The Benefits

Teaming with nClouds, TetraScience moved from an outmoded infrastructure to a secure, efficient, reliable, and cost-optimized environment on AWS cloud. The project has yielded numerous benefits:

Improved performance efficiency, repeatability, consistency, and flexibility

Containerization helps ensure that applications deploy quickly, reliably, and consistently regardless of deployment environment. Automation enables faster and more efficient deployments, development, and test workflows, container management, and configuration management.

Improved security and regulatory compliance

TetraScience's new infrastructure encrypts all data in flight and at rest, contributing to improved security at every layer of the architecture and compliance with life sciences regulatory requirements governing drug and device research (e.g., clearance processes, subject recruitment, safety reporting, privacy, and good clinical practices issues).

Reduced costs

nOps helps TetraScience reduce costs by identifying and terminating zombie instances (unused servers left running because no one turned them off or an instance that failed in booting). And, if multiple developers launch resources on AWS using different workflows, TetraScience can easily determine if services should remain active or be terminated to save costs.

Improved user experience and SLAs

TetraScience engineers are focused on the business of innovating new features rather than supporting infrastructure because nClouds provides 24/7/365 infrastructure support services with a 10-minute SLA. This support has improved user experience by providing TetraScience with real-time awareness of their environment's status, preventing many issues from ever occurring, and, when needed, quick remediation of incidents.

About nClouds

nClouds is a certified, award-winning provider of AWS and DevOps consulting and implementation services. We partner with our customers, as extensions of their teams, to build and manage modern infrastructure solutions that deliver innovation faster. We leap beyond the status quo.