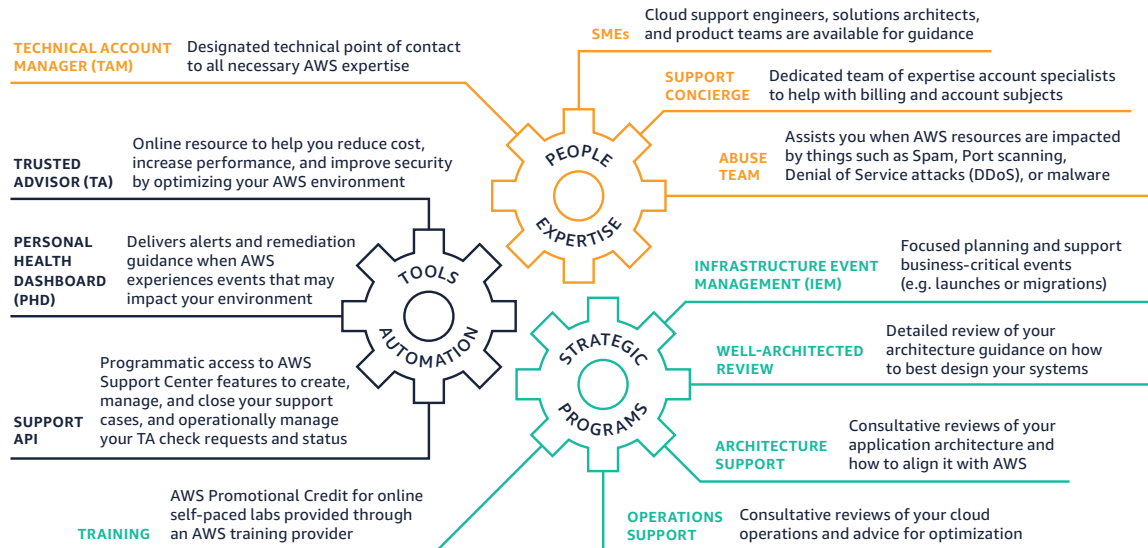## Biomedical research in the cloud

The National Institutes of Health (NIH) **Science and Technology Research Infrastructure for Discovery, Experimentation, and Sustainability (STRIDES)** Initiative is designed to enhance biomedical discovery and improve efficiency through new digital data management strategies that contribute to NIH efforts to develop and sustain a modern biomedical data ecosystem. In partnership with cloud service providers, like **Amazon Web Services (AWS)**, STRIDES provides a cost-effective way for biomedical researchers at the NIH and at NIH-funded institutions to access rich datasets and the most advanced computational infrastructure, tools, and services. STRIDES aims to:

- Encourage implementation of FAIR (findable, accessible, interoperable, reusable) best practices for data stewardship
- Comply with NIH information security policy to protect sensitive data
- Encourage cloud adoption without interfering with researchers' decision making and control over their accounts

TECHNICAL ACCOUNT MANAGER (TAM) — Designated technical point of contact to all necessary AWS expertise

SMEs — Cloud support engineers, solutions architects, and product teams are available for guidance

SUPPORT CONCIERGE — Dedicated team of expertise account specialists to help with billing and account subjects

TRUSTED ADVISOR (TA) — Online resource to help you reduce cost, increase performance, and improve security by optimizing your AWS environment

ABUSE TEAM — Assists you when AWS resources are impacted by things such as Spam, Port scanning, Denial of Service attacks (DDoS), or malware

PERSONAL HEALTH DASHBOARD (PHD) — Delivers alerts and remediation guidance when AWS experiences events that may impact your environment

INFRASTRUCTURE EVENT MANAGEMENT (IEM) — Focused planning and support business-critical events (e.g. launches or migrations)

SUPPORT API — Programmatic access to AWS Support Center features to create, manage, and close your support cases, and operationally manage your TA check requests and status

WELL-ARCHITECTED REVIEW — Detailed review of your architecture guidance on how to best design your systems

ARCHITECTURE SUPPORT — Consultative reviews of your application architecture and how to align it with AWS

TRAINING — AWS Promotional Credit for online self-paced labs provided through an AWS training provider

OPERATIONS SUPPORT — Consultative reviews of your cloud operations and advice for optimization

PEOPLE EXPERTISE · TOOLS AUTOMATION · STRATEGIC PROGRAMS

Benefits of STRIDES on AWS

- Discounts
- Consultation
- Coordination
- Office Hours
- Subsidized cloud training
- Enterprise support
- Reporting
- Data egress waiver
- Dedicated account managers
- Dedicated solutions architects
- Initial program/project setup
- Support concierge

STRIDES on AWS for biomedical research

- **Compliance and security that matter.** You control where your data is stored, who can access it, and what resources your organization is consuming at any given moment. AWS regularly achieves third-party validation for thousands of global compliance requirements to help you meet security and compliance standards in healthcare, government, and beyond. AWS customers can use AWS services in a manner that supports the requirements of HIPAA, NIST, and HITRUST CSF.
- **Support.** You receive enterprise support with 24x7 technical support from engineers, tools, and technology to automatically manage the health of your environment, consultative architectural guidance delivered in the context of your applications and use cases, and a designated Technical Account Manager (TAM) to coordinate access to proactive/preventative programs and AWS subject matter experts.
- **Scalable compute with containerized workflows.** Eighty percent of all containers in the cloud run on AWS because of our security, reliability, and scalability. Amazon Elastic Kubernetes Service (Amazon EKS) runs upstream Kubernetes and is certified Kubernetes conformant so you can leverage all the benefits of open source tooling from the community.
- **Various artificial intelligence (AI) and machine learning (ML) capabilities for deeper scientific insights.** AWS allows you to choose from TensorFlow, PyTorch, Apache MXNet, and other popular frameworks to experiment with and customize machine learning algorithms.

- **Differentiating partner solutions like Illumina.** AWS is the only cloud service provider with Field Programmable Gate Arrays (FPGAs) instances that DRAGEN CS can leverage for optimized performance.
- **Access to tools.** With hundreds of services, AWS offers tools like Nextflow, Cromwell, GATK, DRAGEN CS, Hail, and RONIN that help researchers advance their projects.

Access valuable datasets

Researchers receive access to +12 PB of diversified biomedical datasets and workload management systems, including:

- **The Cancer Genome Atlas (TCGA).** A National Cancer Institute (NCI) and National Human Genome Research Institute (NHGRI) collaboration aims to generate comprehensive, multi-dimensional maps of the key genomic changes in major types/subtypes of cancer.
- **The Sequence Read Archive (SRA).** Produced by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the NIH, stores raw DNA sequencing data and alignment information from high-throughput sequencing platforms.
- **The NIH Common Fund's Gabriella Miller "Kids First" Pediatric Research Program.** Generates and shares whole genome sequence data from thousands of children affected by conditions ranging from rare pediatric cancers to more prevalent diagnoses.
- **NCBI Coronavirus Genome Sequence Dataset.** COVID-focused SRA dataset to support research and management of the SARS-CoV-2 outbreak hosted by the NCBI at the NLM as part of STRIDES.

Plus, more than 40 life sciences and genomics datasets are available in the Registry of Open Data on AWS (RODA) to help process your data or to develop new algorithms (e.g., ENCODE, BLAST, iGenomes, GAIB).

Who can join and who is involved?

Any researcher with a biomedical research project who is actively funded by the NIH is eligible to join STRIDES. AWS works closely with the NIH and Four Points Technology, our reselling partner, in support of STRIDES.

How to get started

To start, your research institution needs to be enrolled in the program. This is generally associated with an initial project that wants to leverage STRIDES, known as "provisioning." Follow these steps to begin:

1. Identify the contact at your institution who can assist with the onboarding process, often your institutional purchasing department.
2. Have your institution's contact complete the automated Four Points Technology form at https://www.4points.com/nih-strides-initiative.
3. Determine if a Business Associate Agreement (BAA) is required. This is a decision made at the institutional level based on the projects that will be associated with STRIDES. If your institution's project involves the storage or processing of Protected Health Information (PHI) data, a BAA establishes commitments and responsibilities for protecting the data. For ongoing projects, a BAA is often already in place and a new one is not required. If your project requires a BAA, Four Points Technology can help you get started.

Account creation or transfer

With STRIDES, researchers typically retain full control of their operating accounts, which are linked to a STRIDES master payer account. This enables all researchers to receive volume discounting and enables STRIDES to track cloud adoption by researchers. New AWS accounts can be created and existing AWS accounts can be the transferred to STRIDES. New accounts are setup by Four Points Technology and turned over to the researcher as soon as agreements are in place. For institutions with existing AWS environments that are centrally managed by the institution via AWS Organizations or a similar tool, Four Points Technology can with the approval of STRIDES, provide a dedicated AWS Consolidated Billing/Master Account to control all linked accounts funded by STRIDES. It is recommended that an early discussion between Four Points Technology, NIH, and the organization within your institution responsible for cloud governance and control be scheduled to discuss this scenario.

AWS and Four Points Technology are here to help

List of NIH grant recipients at your institution: NIH RePORT
STRIDES for AWS: strides-support@amazon.com
STRIDES for Four Points Technology: FPT_NIH_STRIDES@4points.com

aws

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