AWS BioPharma AI Hackathon

bit.ly/45YzgXY

Real-world use cases from drug discovery to diagnostics

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Resources

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Natera scales clinical diagnostic testing using AWS HealthOmics

Diagnostics

Challenge:

Natera needed to scale their fast-growing oncology test (Signatera) without sacrificing turnaround time, while unifying fragmented lab and analytics workflows and combining genomic with clinical data under governed, cost-predictable, petabyte-scale infrastructure.

Solution:

Built a digitally connected “Lab X” on AWS using reusable assays and AWS HealthOmics workflows (standardized on WDL, containerized) and a governed analytics data mesh, enabling one-call scalable runs and zero-ETL querying to deliver near real-time, multimodal insights.

Results:

- Scaled to process +54K tests and 60K pipelines weekly across two labs
- Generate ~1.6 PB of data per week while maintaining fast turnaround times
- Detect disease recurrence up to nine months earlier than standard imaging

Case Study Link

Caris Life Sciences accelerates genomics insights with AWS

Research

Challenge:

Caris Life Sciences needed to process whole transcriptome sequencing data from over 400,000 cases. The typical processing time took months on traditional infrastructure

Solution:

Leveraged AWS services like Batch, ECS, EC2 Spot Instances, and HealthOmics Sequence Store to develop a custom Nextflow-based pipeline to scale to 200,000 concurrent vCPUs across various EC2 instance families: general purpose (M-type), compute-optimized (C-type), and memory-optimized (R-type). Implemented gradual scaling and AWS Batch array jobs for efficiency.

Results:

- Processed 400,000 RNA-seq samples in just 2.5 days, compared to 3 months on premises
- Accelerated time-to-insight for cancer research
- Maintained cost efficiency through strategic use of EC2 Spot Instances

Case Study Link

AstraZeneca future-proofs genomic infrastructure

Research

Challenge:

AstraZeneca's Centre for Genomics Research (CGR) integrates large-scale genomic and clinical data leveraging multi-omics approaches at population scale, making it one of the largest and most diverse datasets globally. The CGR uses Illumina DRAGEN® workloads for processing Whole Exome Sequencing (WES) and Whole Genome Sequencing (WGS) data. With F1 instances approaching end-of-service, they evaluated F2 instances as the next-generation solution for continuing large-scale workloads without disruption.

Solution:

1. AWS led extensive testing comparing F1 and F2 instance performance across multiple genomic workloads and AWS Regions.
2. The data suggested that successful migration included advantages that extended beyond simpler infrastructure upgrades. The immediate benefits included establishing a clear, validated migration path from F1 to F2 instances, ensuring business continuity and achieving significant cost and CO2 emissions optimization for large-scale genomic workloads.

Results:

- 60% faster processing
- 70% cost reduction
- Reduced energy use and associated carbon emissions by completing workloads more efficiently
- Enhanced scalability and improved performance across multiple AWS regions
- Maintained accuracy with no compromise in research data integrity

Case Study Link

What Is Strands Agents?

Open-source Python SDK for building production AI agents

Model-agnostic

Bedrock, Anthropic, OpenAI-compatible endpoints

Built-in tools

30+ ready tools: files, HTTP, shell, memory, MCP

Multi-agent

Compose agents as tools — pipelines, subagents, loops

MCP native

Connect any MCP server as a tool source out of the box

```
pip install strands-agents  →  from strands import Agent
```

A Strands Agent in 10 Lines

```
from strands import Agent
from strands.models import BedrockModel
from strands_tools import file_read, http_fetch

model = BedrockModel(
    model_id="us.anthropic.claude-sonnet-4-5",
    region_name="us-east-1"
)

agent = Agent(
    model=model,
    tools=[file_read, http_fetch],
    system_prompt="You are a video pipeline agent."
)

result = agent("Summarize this transcript: transcripts/ep01.txt")
```

Strands Agents MCP Server

`bit.ly/strands-mcp-server`

Gives Claude Code, Kiro, and Cursor live access to Strands documentation while you code

What It Exposes

`search_docs(query, k)`

TF-IDF ranked search over Strands doc titles

`fetch_doc(page)`

Full page content — section-aware for token efficiency

Add to Your Agent

Install:

```
uvx strands-agents-mcp-server
```

Claude Code:

```
claude mcp add strands uvx strands-agents-mcp-server
```

Kiro · Cursor · VS Code:

```
"strands-agents": {
  "command": "uvx",
  "args": ["strands-agents-mcp-server"] }
```

Package: strands-agents-mcp-server · Your agent can query Strands docs inline during the hackathon

AWS Agent Toolkit

go.aws/4vXCO7s

Free · No additional charge

Gives any coding agent the tools, knowledge, and guardrails to build on AWS

AWS MCP Server

· 300+ AWS services, 15,000+ API actions

· Sandboxed Python script execution

· Real-time AWS docs access

· CloudWatch monitoring + IAM policies

Agent Skills

· Service decision guides

· Step-by-step procedures

· Troubleshooting runbooks

· Load only when relevant — saves context

Agent Plugins

· Pre-bundled: MCP Server + curated skills

· One-command setup per coding agent

· Works with Strands, LangChain, AgentCore

· Supports Claude Code, Kiro, Codex, Cursor

```
Claude Code: /plugin install aws-core@claude-plugins-official    |    Kiro/Cursor: add MCP JSON config
```

Workshop Access

Workshop

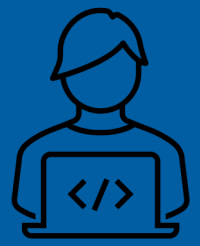
Accelerating Bioinformatics with AWS HealthOmics

`bit.ly/strands-agents-workshop`

Next steps

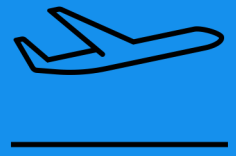
Discovery

- Identify use cases for migration/optimization



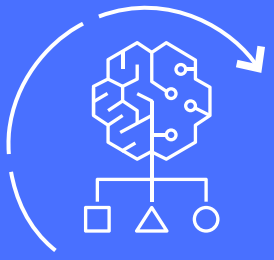
Immersion Day

- Prioritized use cases
- Determine KPIs
- Hold Workshop



POC / MVP

- Small scale production testing and validation
- Use case focused
- Performance evaluation



Production

- Large scale application that has already been validated
- User focused

Thank You!

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Blog & Socials

elifuentes.tech