

Welcome!

- **Audio & Video:** All participant microphones and cameras are muted and will remain disabled during the presentation
- **Sound Check:** Please verify your speaker volume is turned up and not muted
- **Questions:** The chat function is disabled, but you can submit questions through the Q&A box. We will address questions at the end during the Q&A session
- **Recording:** This webinar is being recorded. The recording and a compilation of Q&As will be made available to all attendees afterwards



AMERICAN
SCIENCE CLOUD

January 20, 2026

Introduction to the American Science Cloud (AmSC): Part 2



U.S. DEPARTMENT
of ENERGY

What is the American Science Cloud (AmSC)

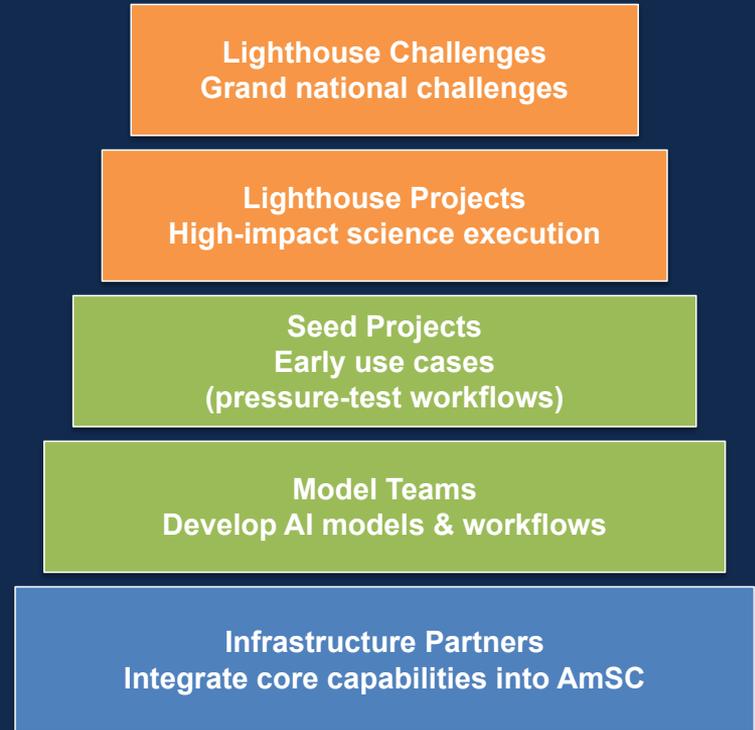
- AmSC is a secure, federated, and science-optimized cloud environment
 - *Not centralized servers or services but rather an environment that will support contributed tools and capabilities*
- AmSC integrates the DOE's world-leading computing and experimental facilities, data resources, and high-performance networks
 - *A flexible structure to support integration of capabilities*
- AmSC enables AI-ready end-to-end workflows
 - *Not a single set of predefined workflows but inclusive of contributions across the complex*



**Genesis Mission defines ambition and urgency.
AmSC is a cornerstone building a shared platform
to execute the Genesis Mission**

AmSC Concepts and Connections to ModCon and GM

- **Infrastructure Partners (IPs):** DOE labs that contribute and integrate core capabilities into AmSC
- **Model Teams (MTs):** Multi-lab teams developing domain AI models and workflows
- **Seed Projects:** Early, mission-driven use cases that pressure-test data, models, and workflows
- **Lighthouse Projects (LHPs):** High-impact scientific efforts that built on MTs/Seed projects to address Genesis Mission priorities in energy, science, and national security.
- **Lighthouse Challenges (LHCs):** Grand challenges composed of multiple coordinated LHPs



Infrastructure Partners

Infrastructure Partner(s)	Lab(s)	Key Contacts (POC/PI, Leads)
OLCF	ORNL	Arjun Shankar
ALCF	ANL	Mike Papka
ESnet	LBNL	Inder Monga
NERSC	LBNL	Sudip Dosanjh
HPDF	TJNAF, LBNL	Graham Heyes
C3	PNNL	Robert Rallo
Scientific User Facilities	LBNL, ANL, TJNAF, BNL, FNAL, SLAC, ORNL	Paolo Calafiura, Nicholas Schwarz

Infrastructure Partner(s)	Lab(s)	Key Contacts (POC/PI, Leads)
DeepLynx	INL	Peter Suyderhoud
DIII-D Digital Twin	GA	Sterling Smith
EDX	NETL	Kelly Rose, Chad Rowan, Jack Searle
FemtoMind	TJNAF, FNAL	Robert Edwards
Fermi Data Platform	FNAL	James Amundson
HAIDIS	TJNAF	Ilya Baldin
SCDF	BNL	Adolfy Hoisie
S3DF	SLAC	Jay Srinivasan
Stellar-AI	PPPL	Shantenu Jha
VEE-ARIES/HERO	NLR	Kristi Potter

Multi-Lab and Public-Private Partnership

Science Council

Chair: Andreas Kronfeld (FNAL)
Kevin Yager (BNL)
Michael Begel (BNL)
Kjiersten Fagnan (LBNL)
Oliver Gutsche (FNAL)
Joel England (SLAC)
Todd Satagota (JLAB)
Jana B. Thayer (SLAC)
Neeraj Kumar (PNNL)

Industry Council

AWS
AMD
Cisco
Dell
Google
HPE
Microsoft
NVIDIA
Nokia
CORNELIS Networks

AmSC Project Leadership Office

DIRECTOR: **Gina Tourassi** (ORNL)
DEPUTY: **Arjun Shankar** (ORNL)
DEPUTY: **Inder Monga** (LBNL)
CTO: **Sarp Oral** (ORNL)
Product Manager: **Deborah Bard** (LBNL)
PMO: **Denise Hoomes** (ORNL)
CISO: **Ryan Adamson** (ORNL)

ModCon CoDesign Liaisons

Wahid Bhimji (LBNL)
Feiyi Wang (ORNL)
Venkat Vishwanath (ANL)

IRI Liaisons

Deborah Bard (LBNL)
Thomas Uram (ANL)

OPERATIONS

L1: **Ashley Barker** (ORNL)

Virtual Organization
Veronica Vergara (ORNL)
Adam Slagell (LBNL)

Intelligent Operations
Ed Balas (LBNL)
Eric Pershey (ANL)

User Engagement
Haritha Siddabathuni Som (ANL)
Chris Fuson (ORNL)

INTERFACES AND SERVICES

L1: **Mike Brim** (ORNL)

AmSC Interfaces
Taylor Childers (ANL)
John MacAuley (LBNL)

Infrastructure Services
Zach Mayes (ORNL) *
Shane Canon (LBNL)
P. Shyamshankar (ANL)

Data Services
Ilya Baldin (TJNAF)
Rajesh Kalyanam (ORNL)

AI SERVICES

L1: **Thomas Uram** (ANL)

Model Services
John Gounley (ORNL)
Huihuo Zheng (ANL)

At-Scale Services
Murali Emani (ANL)
Steven Farrell (LBNL)

Intelligent Interfaces
Wahid Bhimji (LBNL)
Shreyas Cholia (LBNL)

AmSC PARTNER INTEGRATION

L1: **Chin Guok** (LBNL)

IRI Integration
John MacAuley (LBNL)
Paul Rich (ANL)

CSP Integration
Roger Cass (PNNL)
Jack Deslippe (LBNL)

Industry & Gov IP Integration
David Martin (LBNL)
Rebecca Hartman-Baker (LBNL)
Ben Mintz (ORNL)

* Integration Architect

The American Science Cloud (AmSC)

A Unified Cloud Platform for Transformational AI and Science Across DOE
A cornerstone of the Genesis Mission

Mission

Deliver a seamless integration of DOE science instruments, computing, experimental, and networking capabilities, AI, data, modeling and simulation software tools in a single advanced programming interface – the **AmSC API**

What We Deliver

- ✓ Unified APIs for data, model, and workflow access
- ✓ Secure, federated identity (Virtual Organization model)
- ✓ Seamless interoperability between DOE facilities and CSPs

Reduce “time to insight” from months to days through composable AI-driven workflows

Our milestones will build towards our MVP

3-MONTHS FEDERATED ACCESS DEMONSTRATION

✓ Unified login across multiple DOE HPC sites; first operational **REST API and Python client** enabling authentication, dataset discovery, and workflow execution

6-MONTHS SCIENCE TEAM ONBOARDING

✓ Two to three research teams execute **end-to-end workflows** (data search → transfer → model fine-tuning) on **Frontier, Perlmutter, or Aurora** using the AmSC Data Catalog

9-MONTHS INTELLIGENT WORKFLOW MILESTONE

✓ First early **agentic workflow framework** autonomously discovers data, trains, fine-tunes, and performs **reasoning-based inference** across federated DOE and cloud resources

12-MONTHS MINIMUM VIABLE PRODUCT

✓ Link IPs and CSPs into a **unified pre-production environment** to support AI-ready data services, agentic frameworks, large-scale model training/inference and advanced simulation. Establish a **foundation for future expansion** to additional partners and services.

LONG-TERM VISION

Accelerate discovery cycles by building the world's most integrated scientific platform

In Month 3, AmSC is delivering the first capabilities to support end-to-end scientific AI workflows

3-MONTHS FEDERATED ACCESS DEMONSTRATION

✓ Unified login across multiple DOE HPC sites; first operational **REST API and Python client** enabling authentication, dataset discovery, and workflow execution

Unified login across multiple DOE sites:

- The AmSC federated identity system
- The AmSC User Dashboard
- The AmSC staff hub and myAmSC user portal

First operational APIs and Services:

- AmSC Science AI Analysis Support with ChatUI
- AmSC Data Catalog and Data Movement API
- AI Software Stack, including prototype MLOps platform and Inference services
- The AmSC REST API with Python Client Module
- CSP Integration via IRI API
- Our AmSC development AWS environment

What does the AmSC MVP look like for a simple workflow for data discovery and model training?

1. Register & Discover Data

- Register datasets in Data Catalog
- Search for similar relevant datasets



2. Find Base Model

- Search Model Catalog for appropriate model

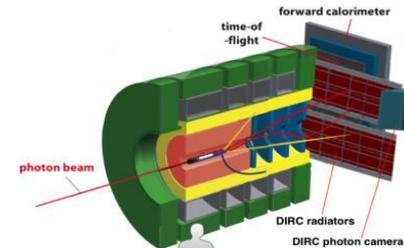
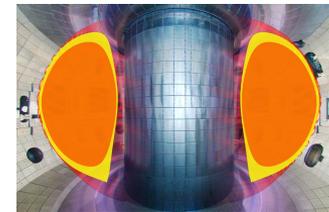


3. Train Model

- Move data to appropriate site
- Train model with selected data
- Run on AmSC infrastructure

This set of basic AI capabilities forms part of multiple science use cases:

- **GridAI:** foundation model development for electrical grid planning and decision-support.
- **DIII-D:** surrogate model development for fusion reactor facility digital twin.
- **HADIS:** extracting physics information from GLUEX nuclear physics data.



What does the AmSC MVP look like for a simple inference workflow?

1. Data produced at experiment facility

- May be file-based or streaming

2. Data processed with AI-enhanced analysis

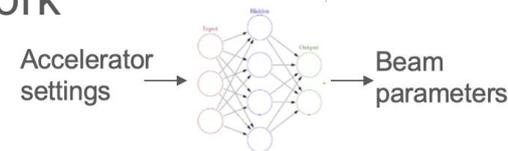
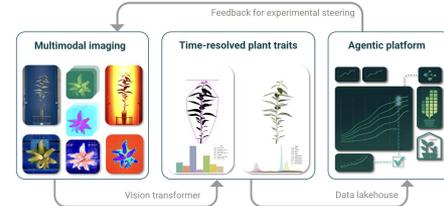
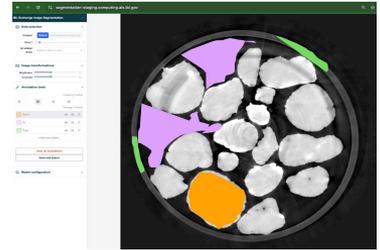
- May be time-sensitive
- May include simulations

3. Results inform next steps

- Action may be directed by user, or performed automatically as part of an agentic workflow.

This is a common workflow for facilities who will use AmSC to accelerate experimental science:

- **ALS:** Image analysis, used to give lightsource users feedback on experiment progress in real time.
- **Genomics (FAMOUS/OPAL):** agent-driven feedback for steering autonomous lab experiments.
- **SUF + MOAT:** build framework of AI-powered real-time feedback for particle accelerator operators.



AmSC Identity Management

MVP Goal: User can use a single identity to access all AmSC services and interfaces, running across multiple DOE sites and CSPs.

Month 3 Deliverable: User can login via ESnet and OLCF accounts (other identity providers in progress) and gain access to the Staff Hub and User Portal.



AmSC User Dashboard

MVP Goal: User can access all AmSC Services via a Dashboard. APIs enable service execution. User can also view and track their work executed within the AmSC ecosystem.

Month 3 Deliverable: User Dashboard design mockup with stubbed backend services.

Note: All AmSC services shown hereafter will be accessible via the Dashboard in the MVP

Your AmSC Portal

My Workflows

Workflow	Current Job/step?	Status	
Federated Catalog Integration	Publish Access Documentation	Complete	Go to Job
Data Transfer & Cataloging	Data Transfers	Failed	Go to Job
Virtual Connection Assembly	Load Subscription	In Progress	Go to Job

Model Catalog
This contains all the Models available for your use through the American Science Cloud.
[Go →](#)

Data Catalog
This contains all of the Datasets from across the National Lab system available for your use through the American Science Cloud.
[Go →](#)

MONITORING
Get a detailed look at your project's metrics.
[Go →](#)

Joe Scientist
Lawrence Berkeley National Lab
Admin

Recent /Starred

- Perlmutter
- ALS
- New Workflow

Resources

- Contact List
- How to Start a Workflow
- File a Ticket

Scheduled Maintenance
ALS will be closed 12/24/25-1/1/26 for the holiday
CHIC-STAR will be offline briefly on 1/2/26 for maintenance

AmSC User Dashboard

MVP Goal: User can access all AmSC Services via a Dashboard. APIs enable service execution. User can also view and track their work executed within the AmSC ecosystem.

Month 3 Deliverable: User Dashboard design mockup with stubbed backend services.

Example services:

1. **Graphs for quick assessment.**
2. **Recent work presented with current status.**
3. **Current Site Status**
4. **Data/Model Catalog**

Your AmSC Portal

1

2

3

4

Joe Scientist
Lawrence Berkeley National Lab
Admin

Recent /Starred

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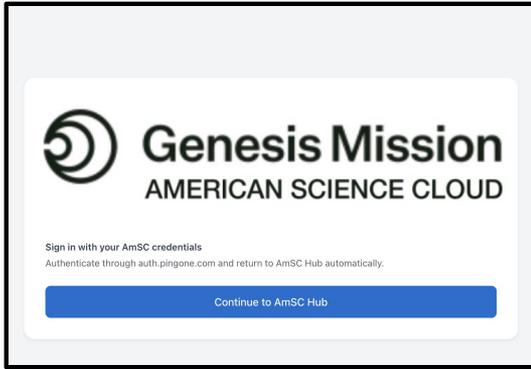
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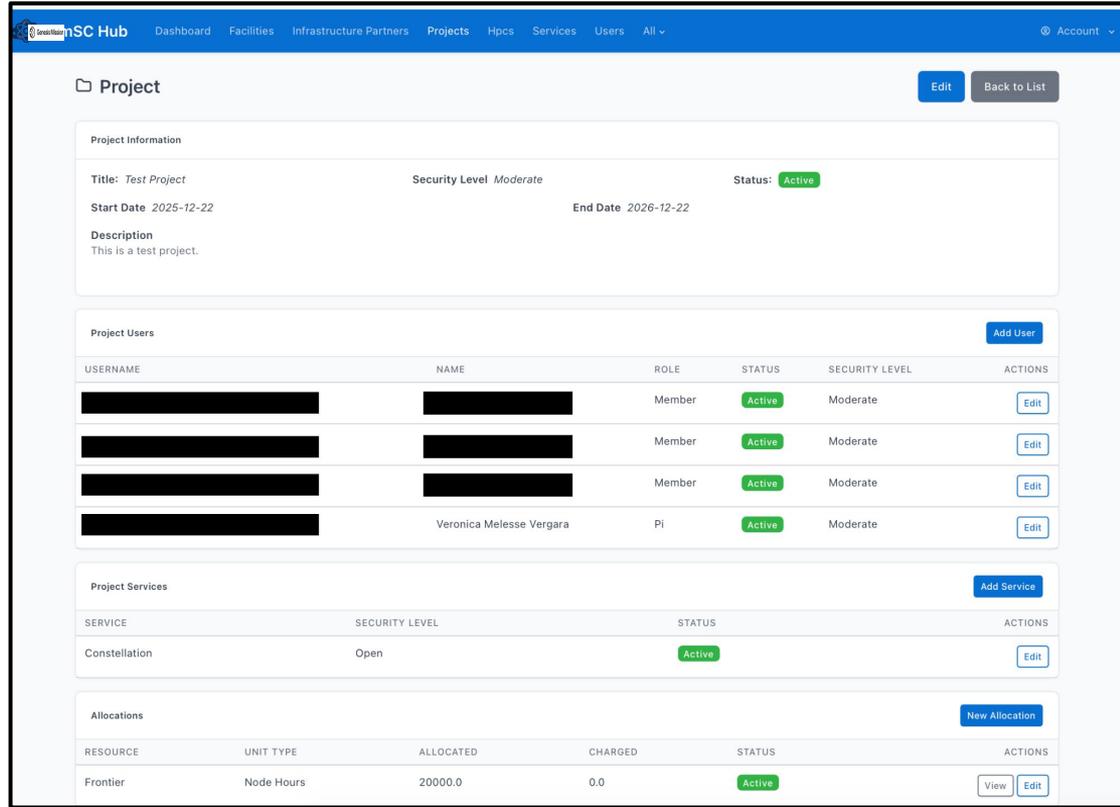
MONITORING
Get a detailed look at your project's metrics.
Go →

AmSC PI Hub



MVP Goal: PIs can manage AmSC projects, resources, services and users. Hub is customizable for all infrastructure partners.

Month 3 Deliverable: Functional prototype hub with view of projects and allocations, accessible via AmSC Fed ID.



Project Information

Title: Test Project Security Level: Moderate Status: Active

Start Date: 2025-12-22 End Date: 2026-12-22

Description: This is a test project.

Project Users

USERNAME	NAME	ROLE	STATUS	SECURITY LEVEL	ACTIONS
[REDACTED]	[REDACTED]	Member	Active	Moderate	Edit
[REDACTED]	[REDACTED]	Member	Active	Moderate	Edit
[REDACTED]	[REDACTED]	Member	Active	Moderate	Edit
[REDACTED]	Veronica Melesse Vergara	Pi	Active	Moderate	Edit

Project Services

SERVICE	SECURITY LEVEL	STATUS	ACTIONS
Constellation	Open	Active	Edit

Allocations

RESOURCE	UNIT TYPE	ALLOCATED	CHARGED	STATUS	ACTIONS
Frontier	Node Hours	20000.0	0.0	Active	View Edit

myAmSC User Portal



MVP Goal: Users can access the myAmSC user portal to: apply for accounts, view account and project information, and manage their projects.

Month 3 Deliverable: Functional initial portal with user profiles and account application, accessible via AmSC Fed ID.

Account Application

The screenshot displays the 'AmSC ACCOUNT APPLICATION' form. It is organized into three sections: 'PERSONAL INFORMATION', 'EMPLOYER INFORMATION', and 'AmSC INFORMATION'. The 'PERSONAL INFORMATION' section includes fields for Title, First Name, Middle Name, Last Name, Email, Phone, Birth Country, ORCID, and Citizenship(s). The 'EMPLOYER INFORMATION' section has an Employer field. The 'AmSC INFORMATION' section has an AmSC Username field. A 'Submit' button is at the bottom left, and a 'Cancel' button is at the bottom right.

Project Profile

The screenshot shows the 'Project Profile' page. The left sidebar contains a navigation menu with 'Dashboard', 'Profile', 'Test Project', 'Project Profile', and 'Users'. The main content area is titled 'GENERAL' and shows 'Project Name: Test Project' and 'Current Status: Active'. Below this is the 'DESCRIPTION: This Is A Test Project.' and 'Security Level:'. The 'ALLOCATIONS' section contains a table with the following data:

Type T1	Status T1	Allocation Unit Type T1	Allocated Units T1	Charged Units T1
hpc_systems	active	Node Hours	20000	0

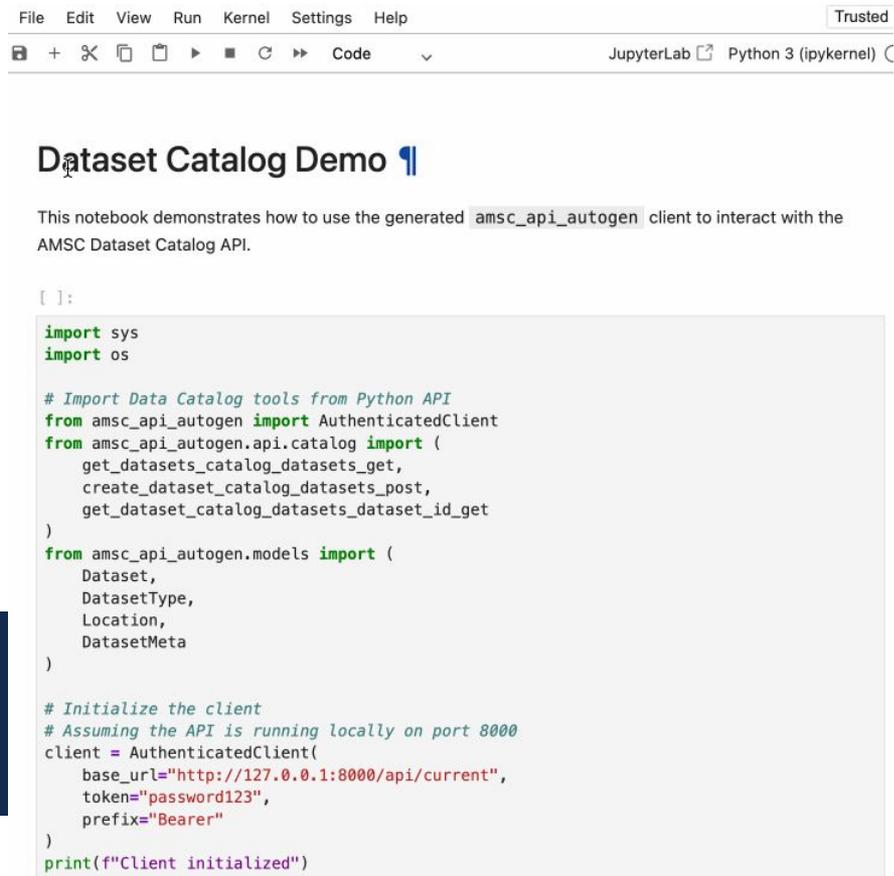
Below the table, the 'HPC Systems:' section lists 'Active Frontier - Frontier Is A High-Performance Computing (HPC) Facility At Oak Ridge National Laboratory (ORNL)'. The 'POINTS OF CONTACT' section lists 'Principal Investigator: . Veronica Melesse Vergara (vergaravg@ornl.gov)' and 'Co-Principal Investigator: . ()'.

AmSC Interfaces: Python & REST API

MVP Goal: Users, workflow engines and AmSC services can access and manage AmSC services via a fully-featured Python API client.

Month 3 Deliverable: use the AmSC Python Client API running in a Jupyter Notebook to communicate with AmSC Data services via the REST API.

This example shows listing datasets and registering a new dataset in the catalog. APIs now exist for model catalogs and workflow launching.



```
File Edit View Run Kernel Settings Help Trusted
+ ✂ 📄 📁 ▶ ■ ↻ ▶▶ Code ▾ JupyterLab Python 3 (ipykernel)

Dataset Catalog Demo ¶

This notebook demonstrates how to use the generated amsc_api_autogen client to interact with the AMSC Dataset Catalog API.

[ ]:

import sys
import os

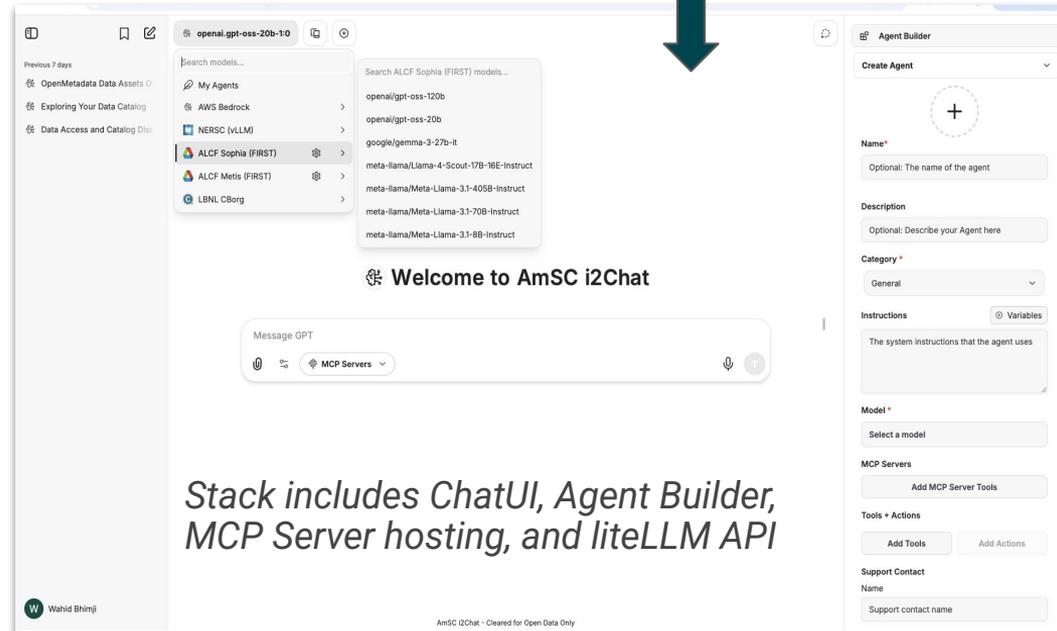
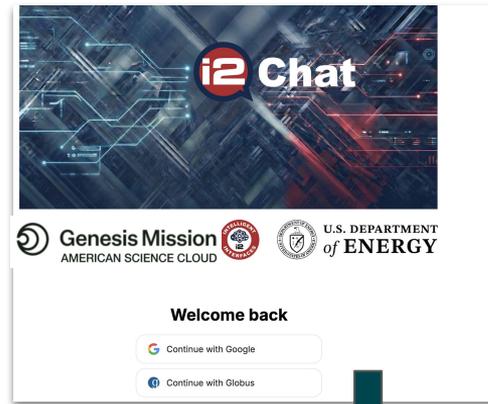
# Import Data Catalog tools from Python API
from amsc_api_autogen import AuthenticatedClient
from amsc_api_autogen.api.catalog import (
    get_datasets_catalog_datasets_get,
    create_dataset_catalog_datasets_post,
    get_dataset_catalog_datasets_dataset_id_get
)
from amsc_api_autogen.models import (
    Dataset,
    DatasetType,
    Location,
    DatasetMeta
)

# Initialize the client
# Assuming the API is running locally on port 8000
client = AuthenticatedClient(
    base_url="http://127.0.0.1:8000/api/current",
    token="password123",
    prefix="Bearer"
)
print(f"Client initialized")
```

AmSC Agentic Stack

MVP Goal: User can interact with all AmSC services via an agentic interface, and use agents to discover data, train/ fine-tune models, and perform reasoning-based inference across federated DOE and cloud resources.

Month 3 Deliverable: AmSC staff have prototyped and evaluated the first full AmSC agentic stack, deployed on AmSC AWS platform.



Stack includes ChatUI, Agent Builder, MCP Server hosting, and liteLLM API

AmSC Agentic Stack: Agents for Data Discovery

The image displays two overlapping screenshots of the AmSC OpenMetaData Search interface. The left screenshot shows the 'AmSC OMD Data Discovery Assistant' with a search bar and a list of agents including 'My Agents', 'AWS Bedrock', 'NERSC (vLLM)', 'ALCF Sophia (FIRST)', 'ALCF Metis (FIRST)', 'LBNL CBorg', and 'AmSC Agents'. The right screenshot shows the 'Agent Builder' with 'data agent' selected and a 'Create New Agent' button. Below this, the 'AmSC OpenMetaData Search' interface is shown with the query: 'What datasets in the catalog are relevant to Critical Minerals?'. The results show 21 datasets found, categorized by 'Rare Earth Elements (REE) Data'.

“What datasets in the catalog are relevant to Critical Minerals?”

AmSC OpenMetaData Search

Message AmSC OpenMetaData Search

AmSC OpenMetaData Search

What datasets in the catalog are relevant to Critical Minerals?

AmSC OpenMetaData Search

Thoughts

Ran search_metadata

Excellent! I found **21 datasets** relevant to Critical Minerals in the system. Here's a comprehensive summary:

Critical Minerals Datasets in AmSC

Total Found: 21 datasets

Dataset Categories:

- Rare Earth Elements (REE) Data** - 2 datasets

Key Dataset:

- `quillinan_gto_ree_original_data_csv` (EDX Catalog)
 - Contains comprehensive REE analysis including: La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu
 - Also includes critical minerals: **lithium, boron, strontium**
 - Plus other metals: Cu, Ni, Zn, Pb, Co, Cr, Mo, V, U
 - Geothermal water chemistry data
 - Full DOI and location data

User can use agents to explore the AmSC Data Catalog, integrated via an MCP service.

AmSC Data Catalog

MVP Goal: Users can register new datasets and find and/or update existing datasets, setting appropriate access controls. Datasets can be accessed by users and all AmSC services and interfaces.

Month 3 Deliverable: Functional prototype Data Catalog based on OpenMetadata and populated with datasets from AmSC IPs.

The image displays the AmSC Data Catalog interface. On the left, a navigation sidebar includes Home, Explore, Lineage, Observability, Insights, Domains, and Governance. The main area shows a tree view of Data Assets under 'amsc lakehouse', including 'glue', 'containers', 'customstorage', 'edx_catalog', 'essdive_catalog', 'fna_amsc_storage', 'nmdc_catalog', 'osti_catalog', and 'Governance'. A callout box in the top right corner, with a dark blue background and white text, says 'Inspect and query data tables in AmSC Lakehouse'. An arrow points from the 'gene2pfam' dataset in the tree to a detailed view of its columns. This view shows a table with columns: 'gene_oid' (string, No Description), 'pfam' (string, No Description), and 'percent_identity' (double, No Description). Below this, another screenshot shows a search for 'minerals' in the 'Containers' category, resulting in 78 items. A dark blue callout box with white text says 'Search across IP data catalogs'. The search results show a match for 'National Critical Minerals Data Dashboard' from the 'osti_catalog' service, with a description: 'The Critical Minerals (CM) Data Dashboard provides data-driven insights to help unlock the potential of conventional and unconventional CM resources in the United States. The dashboard focuses on 12 CM essential for producing ...'.

AmSC Data Movement API

MVP Goal: User can move data between AmSC sites (DOE and CSP) via a unified service; AmSC services can transfer data to appropriate compute resources as necessary.

Month 3 Deliverable: Globus-based data movement between NERSC and OLCF, using AmSC API-minted tokens.

The image shows a REST client interface with a POST request to `{{baseUrl}}/datasets/transfers/globus`. The request body is a JSON object:

```
1 {
2   "source_url": "globus://cfs.cern.ch/cern/global/cfs/cdirs/m37",
3   "destination_url": "globus://olcf.org/olcf/cad4/gpfs/wolf2/olcf",
4   "label": "AmSC Transfer"
5 }
```

The response is a detailed task object:

```
{
  "Task Label": "AmSC Transfer",
  "Source": "NERSC DTN",
  "Source Local User": "tylern",
  "Destination": "NCCS Open DTN (Globus 5)",
  "Destination Local User": "not available",
  "Task ID": "a9d7a912-ea79-11f0-b553-0eb0b913a0ab",
  "Owner": "Nick Tyler (tylern@nersc.gov)",
  "Condition": "At...",
  "Requested": "1/5/2026, 01:01 PM",
  "Deadline": "1/6/2026, 01:01 PM",
  "Duration": "1 minute 13 seconds",
  "Base Path": {
    "Source": "...",
    "Destination": "...",
    "Transfer Settings": [
      "transfer encrypted",
      "preserve source file modification times",
      "transfer new or changed files where the modification time is newer (sync)",
      "skip files on source with errors",
      "quota errors prevent transfer retry"
    ]
  }
}
```

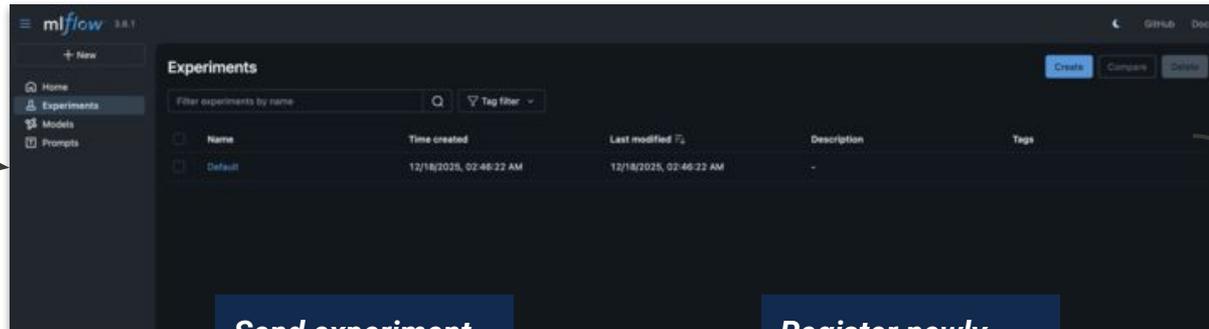
An arrow points from the `"label": "AmSC Transfer"` field in the request body to the `Task Label` field in the response.

AmSC MLOps Platform: Experiment Tracking and Model Registry

MVP Goal: Users can leverage industry-standard tools to track experiments and run automated training, fine-tuning and hyperparameter optimization.

Month 3 Deliverable: Deployment of MLFlow in AWS, with connection tested from ALCF, BNL, NERSC, OLCF. Evaluating ClearML and ZenML across AmSC sites.

AmSC deploys support for model development at AmSC sites, and for cataloging and sharing AI models



Models pulled from catalog for use at AmSC sites

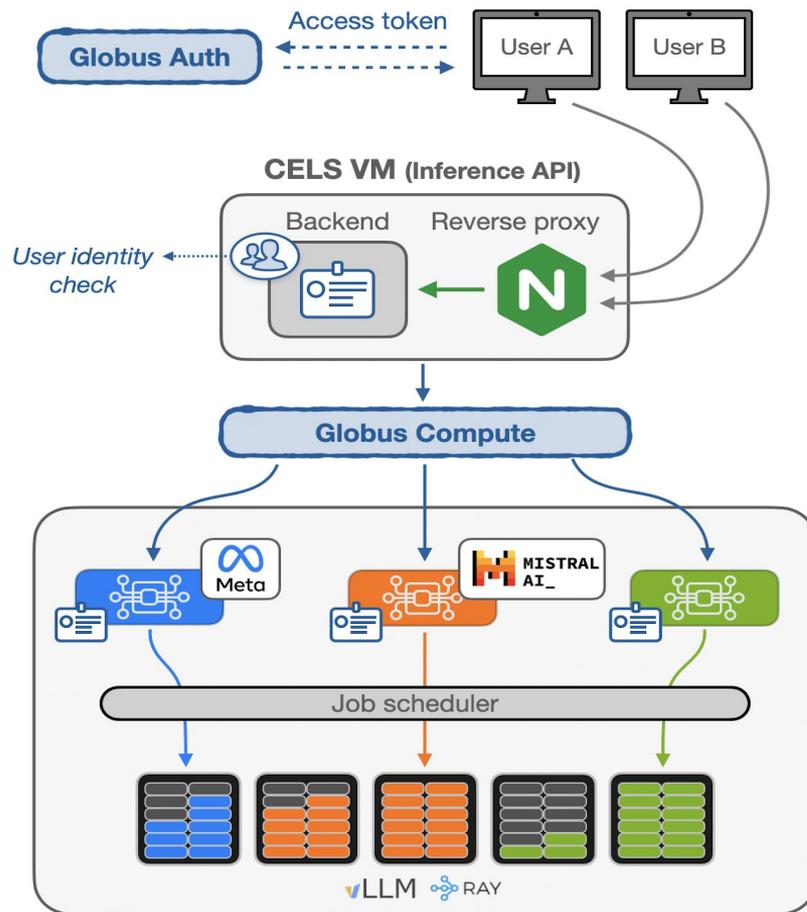
Send experiment data to MLOps

Register newly trained models

AI Inference Services

MVP Goal: Users can leverage high-performance inference servers (e.g. vLLM, SGLang) hosted at AmSC sites.

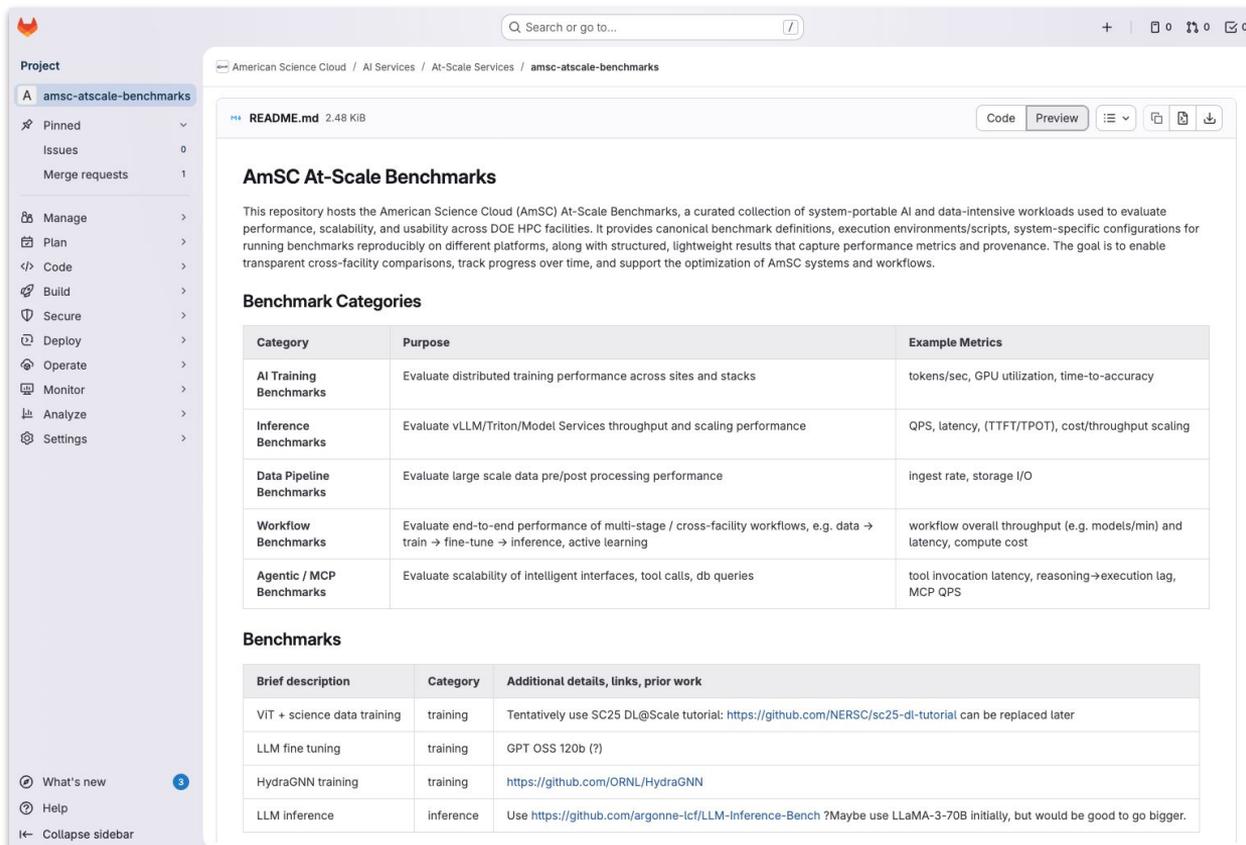
Month 3 Deliverable: Prototype deployment of inference services at ALCF, OLCF, and NERSC.



AmSC At-Scale Services: AI Software stacks and benchmarks

MVP Goal: Users can access the same software stack across all AmSC sites; software stack performs efficiently at each site.

Month 3 Deliverable: Completed survey of AI software at ASCR facilities; developed baseline benchmarks with initial performance measurements across sites.



The screenshot shows a GitHub repository page for 'amsc-atscale-benchmarks'. The main content is the README file, which describes the repository's purpose and includes a table of benchmark categories. The table has three columns: Category, Purpose, and Example Metrics.

Category	Purpose	Example Metrics
AI Training Benchmarks	Evaluate distributed training performance across sites and stacks	tokens/sec, GPU utilization, time-to-accuracy
Inference Benchmarks	Evaluate vLLM/Triton/Model Services throughput and scaling performance	QPS, latency, (TTFT/TPOT), cost/throughput scaling
Data Pipeline Benchmarks	Evaluate large scale data pre/post processing performance	ingest rate, storage I/O
Workflow Benchmarks	Evaluate end-to-end performance of multi-stage / cross-facility workflows, e.g. data → train → fine-tune → inference, active learning	workflow overall throughput (e.g. models/min) and latency, compute cost
Agentic / MCP Benchmarks	Evaluate scalability of intelligent interfaces, tool calls, db queries	tool invocation latency, reasoning→execution lag, MCP QPS

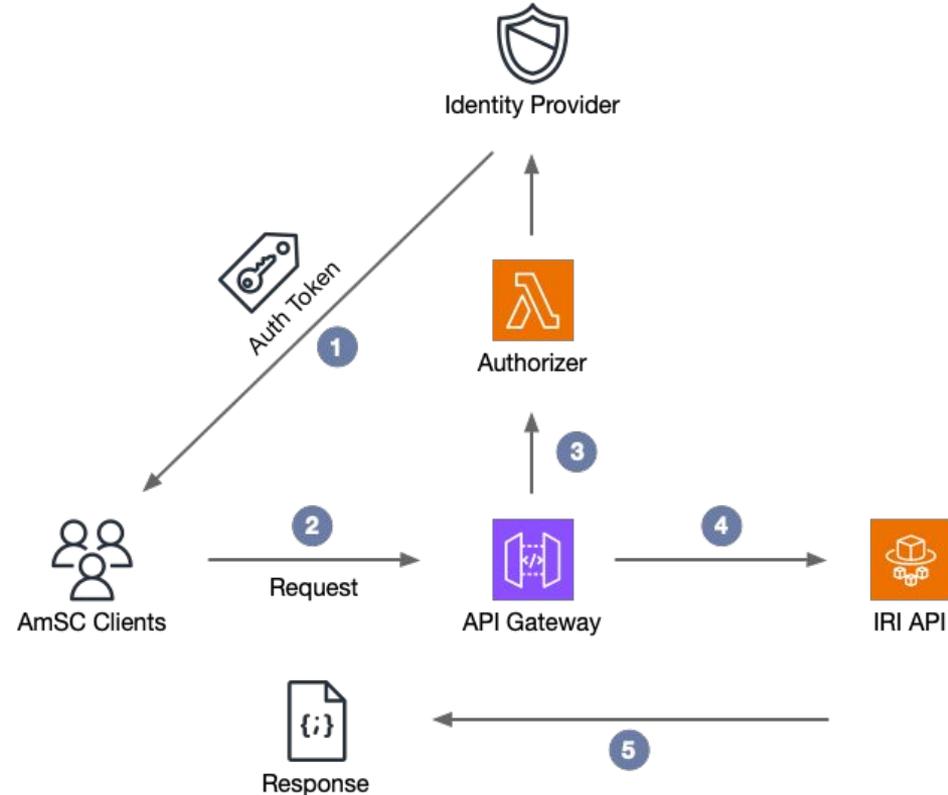
Below the categories table, there is a section for 'Benchmarks' with a table listing specific benchmarks:

Brief description	Category	Additional details, links, prior work
VIT + science data training	training	Tentatively use SC25 DL@Scale tutorial: https://github.com/NERSC/sc25-dl-tutorial can be replaced later
LLM fine tuning	training	GPT OSS 120b (?)
HydraGNN training	training	https://github.com/ORNL/HydraGNN
LLM inference	inference	Use https://github.com/argonne-lcf/LLM-Inference-Bench ? Maybe use LLaMA-3-70B initially, but would be good to go bigger.

IRI API: Integrating with AmSC sites and facilities

MVP Goal: AmSC services can use the IRI API to interact with AmSC IP sites. Endpoints include resource status, authenticated endpoints for job management, local file management, allocation information, resource orchestration and WAN management.

Month 3 Deliverable: completed API design spec and stubs for compute and filesystem control, as well as resource/site status endpoints. Connected AWS to AmSC APIs and services via an extension to the IRI API.



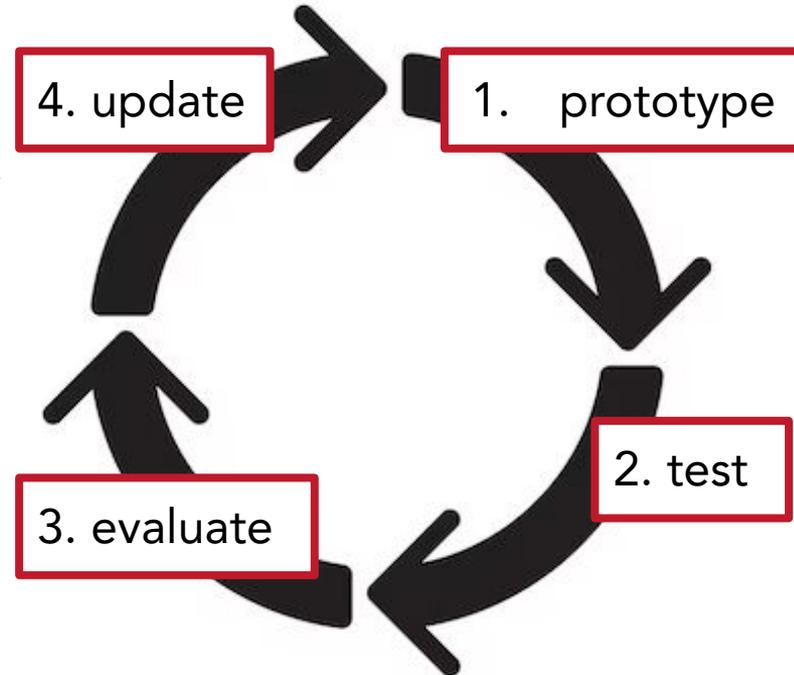
AmSC is developing capabilities via a process of iterative co-design

Next step: iterate with key AmSC users to evaluate how well capabilities meet science requirements and recommend changes to better align with science needs.

There are many AmSC stakeholders. Iteration will be managed via:

- Deeper dives into AmSC services via hackathons and workshops for current early adopters
- AmSC Liaisons to our early adopters are playing a pivotal role by giving feedback on individual use cases
- Coordinated process for scope changes

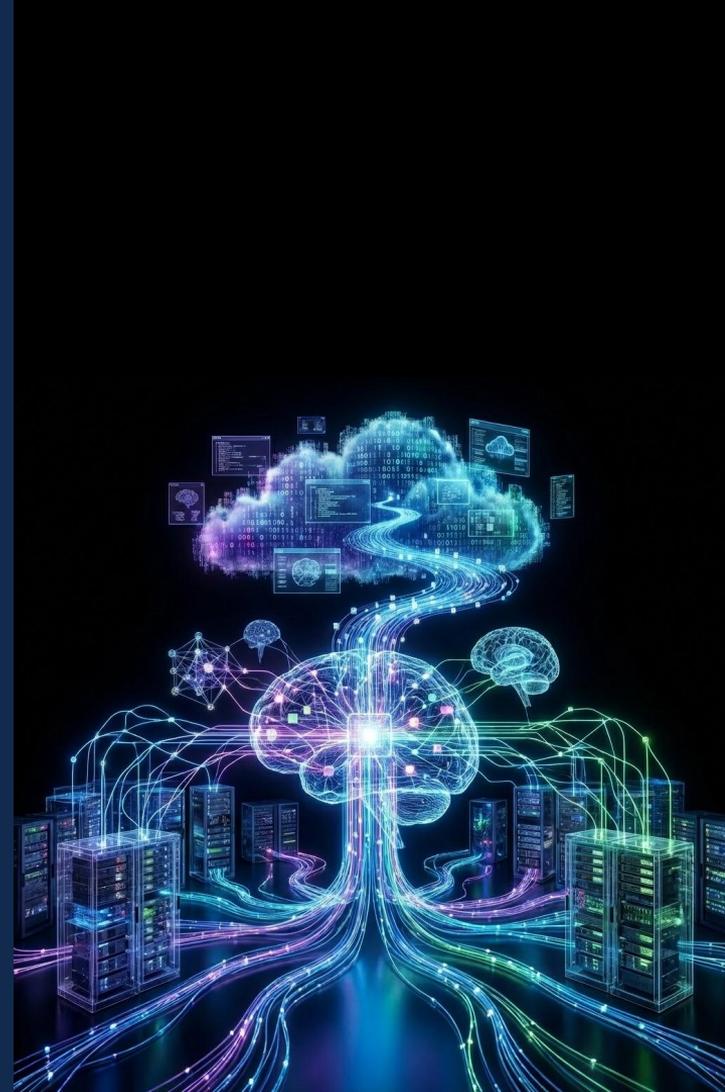
We will learn a huge amount as we work together to prepare for the Month 6 deliverables!



Infrastructure Partners (IPs) are a necessary component in the success of AmSC

IPs leverage AmSC to provide enhanced capabilities for the scientific workflows they currently support.

IPs integrate resources into the AmSC ecosystem to offer additional capabilities for all AmSC scientific workflows. Resources include physical infrastructure (e.g., compute, storage, network), services (e.g., data curation, inference), and data.



BES/HEP/NP Scientific User Facilities Infrastructure Partnership (AmSC SUF IP)

Establish AmSC as a shared platform for the research communities of multiple (accelerator-based) BES, HEP, and NP Scientific User Facilities (SUFs), along with their industry and research partners, to reduce the time to science and unlock challenging measurements and experiments

SUFs power the DOE SC mission by advancing discovery

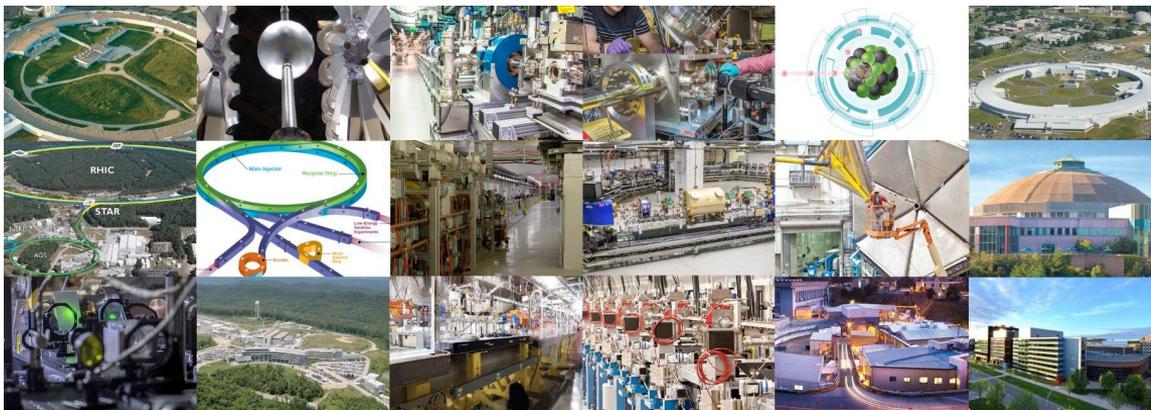
- >> 10,000 users per year, producing thousands of publication annually

Pose complex computing challenges and opportunities

- Exabytes of high-quality scientific data
- Multiple petabytes of curated data
- Hundreds of production workflows and AI models

AmSC Capabilities

- Federated identity and virtual organizations
- AI services: IaaS, training, model catalogs, agentic AI
- Robust data services
- Operations services / IRI foundation



1. Agentic Accelerator Controls

Real-time guidance and optimization of particle accelerators
(LBNL, SLAC, ANL, BNL, ...)

2. Cross-Facility Data Ingestion and AI Workflows for NP

Automated AI pipelines
(JLAB, BNL)

3. Inference as a Service for HEP and NP Data Analysis

Distributed IaaS for data analysis
(FNAL, LBNL)

4. Light and Neutron Source AmSC Demonstrator

AI-enabled workflows across 6 facilities
(ANL, BNL, LBNL, ORNL, SLAC)

5. OpenCosmo on AmSC

Seamless access to peta-scale cosmological data
(DOE Computing Facilities)

Aligned with: MOAT, SYNAPS-I, MAIQMag, NARAD, ISAAC, LAMBDA

APS, ATLAS, AWA at ANL, ATF, EIC, NSLS-II, RHIC at BNL, the Accelerator Complex, FAST, IOTA at FNAL, CEBAF at JLAB, ALS, BELLA at LBNL, SNS at ORNL, FACET-II, LCLS, SSRL, NLCTA at SLAC, and FRIB at MSU

Paolo Calafiura (LBNL, PI), Nicholas Schwarz (ANL, co-PI) - POCs: Salman Habib (ANL), David Lawrence (JLAB), Meifeng Lin (BNL), Auralee Edelen (SLAC), Jonathan Taylor (ORNL), Nhan Tran (FNAL), Remi Lehe (LBNL)

STELLAR-AI: Contribution to AmSC

Deployment, Development, and Integration/Usage

- **Deployment** of AmSC Software and Services
 - Accelerated Fusion requires Learning Everywhere: AI toolkits, workflows, surrogate models
- **Development** of AmSC Services
 - Consumers and producers of scalable software and services
 - Provides baseline ECP ExaWorks SDK and associated capabilities
- **Integration** into production computational campaigns
 - NSTX-U Digital Twin: A FES AmSC Project
 - Stellaris: Seed Fusion Foundation Model

STELLAR-AI: Leveraging AI for Accelerated Fusion Research
Simulation, Technology, and Experiment Leveraging Learning-Accelerated Research enabled by AI

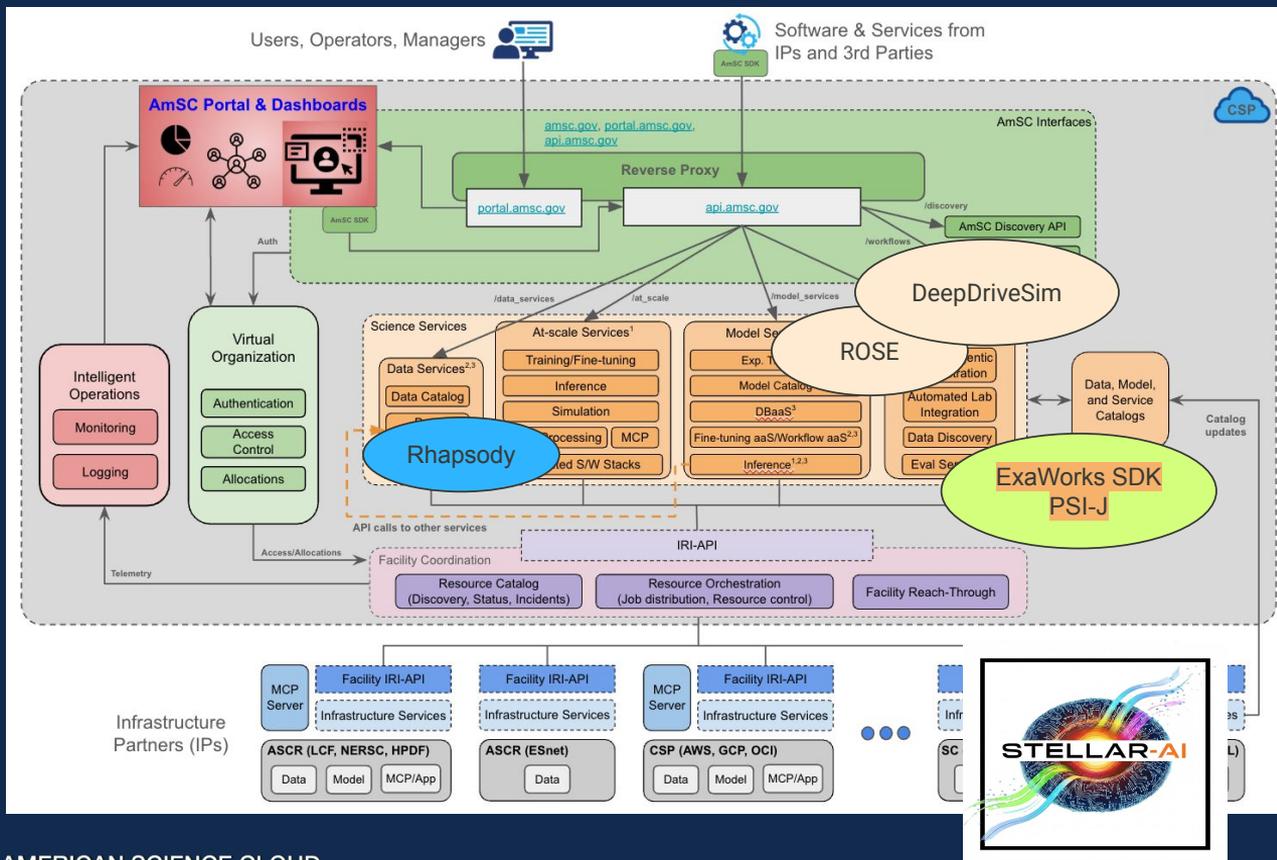


Platform Capabilities

- STELLAR-AI is a CPU-GPU platform for high-performance computing.
- Acceleration of high-demand/high-fidelity codes partnering with HPC/AI companies.
- Fusion code ecosystem, AI toolkits, workflows, surrogate models.
- Digital twins for fusion industry and DOE Facilities

STELLAR-AI 3

STELLAR-AI: Contribution to AmSC Development



Getting Help

Questions, Problems, Requests

SEED PROJECTS

- Questions about using the AmSC environment?

Engage with your UE Liaison

AmSC INFRASTRUCTURE

- Feature Requests or requirements (routed to Prod Mgt)
- Bug reports (routed to appropriate AmSC team)
- Anything else; questions, comments, problems

help@amscproject.atlassian.net

COMMUNICATION TOOLS

- Questions about communication/collaboration tools used by AmSC teams such as Slack, Jira, Confluence, Google Cloud, GitLab?

amsc-admins@ornl.gov

<https://american-science-cloud.github.io/amsc-site/>

Future Events



- We will continue to have webinars for the user community as we move forward
- Deeper dives into AmSC services, updates via hackathons and workshops for current early adopters
- <https://american-science-cloud.github.io/am-sc-site/events>



Q&A Session