# GenAI: how to build a resilient strategy

**José Lorenzo Cuéncar Garza**

**Sr. Solutions Architect.**

**Mexico Public Sector**

# Generative AI creates significant **business value**

## New experiences

New innovative ways of engaging with customers and employees

## Productivity

Radically improve productivity

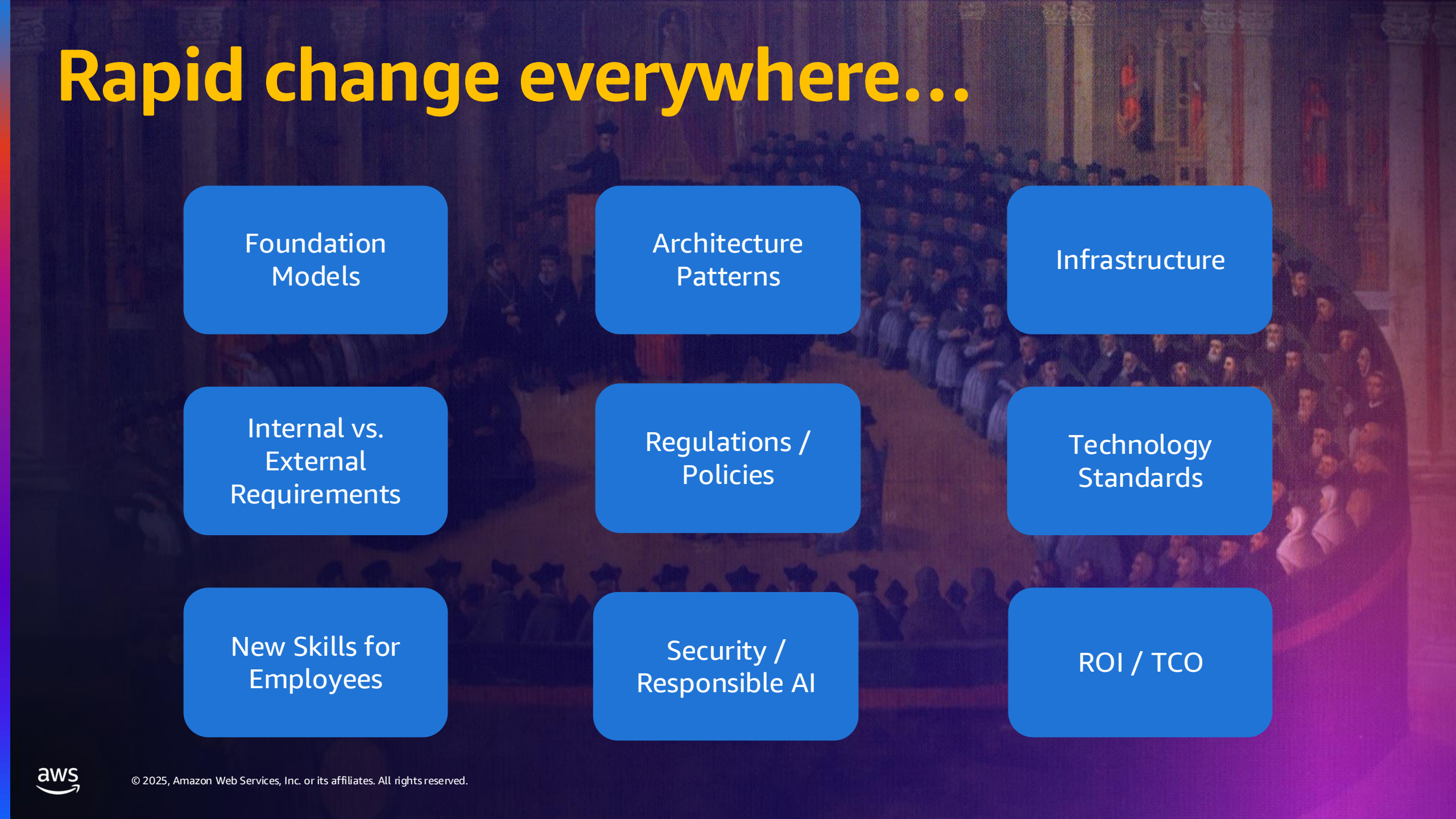
## Insights

Extract insights and answers from all corporate information, enabling faster, better decisions

## Creativity

Create new content and ideas, including conversations, stories, images, videos, and music

# Rapid change everywhere…



# Six lessons from history

1

**Those that succeed use the right tools**

The right tool for the right job

Use the right approach

2

**A strong foundation is required**

Accelerate your cloud journey

Get your data foundation right

3

**There will be skepticism and hype**

Help your people be comfortable

Fall in love with the problem, not the solution

4

**New skills enable work to be reimagined**

Train your own teams now

Rethink work

5

**Change brings new risks and responsibilities**

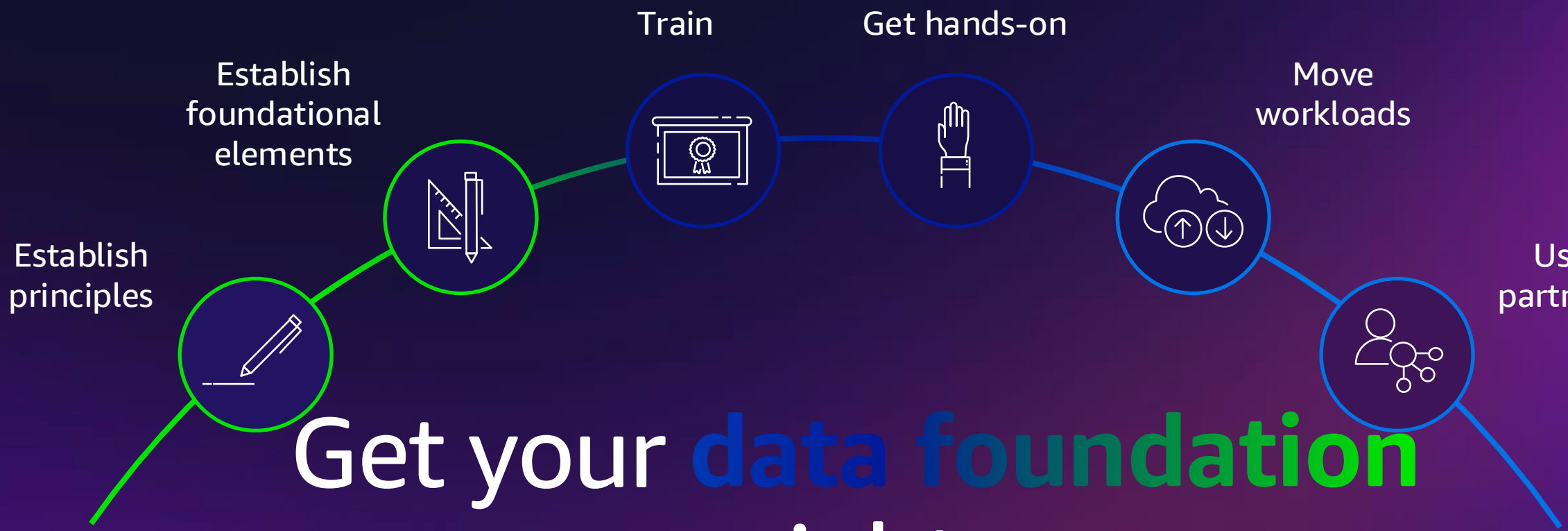
Implement a responsible AI program

6

**Value from new ideas go mainstream**

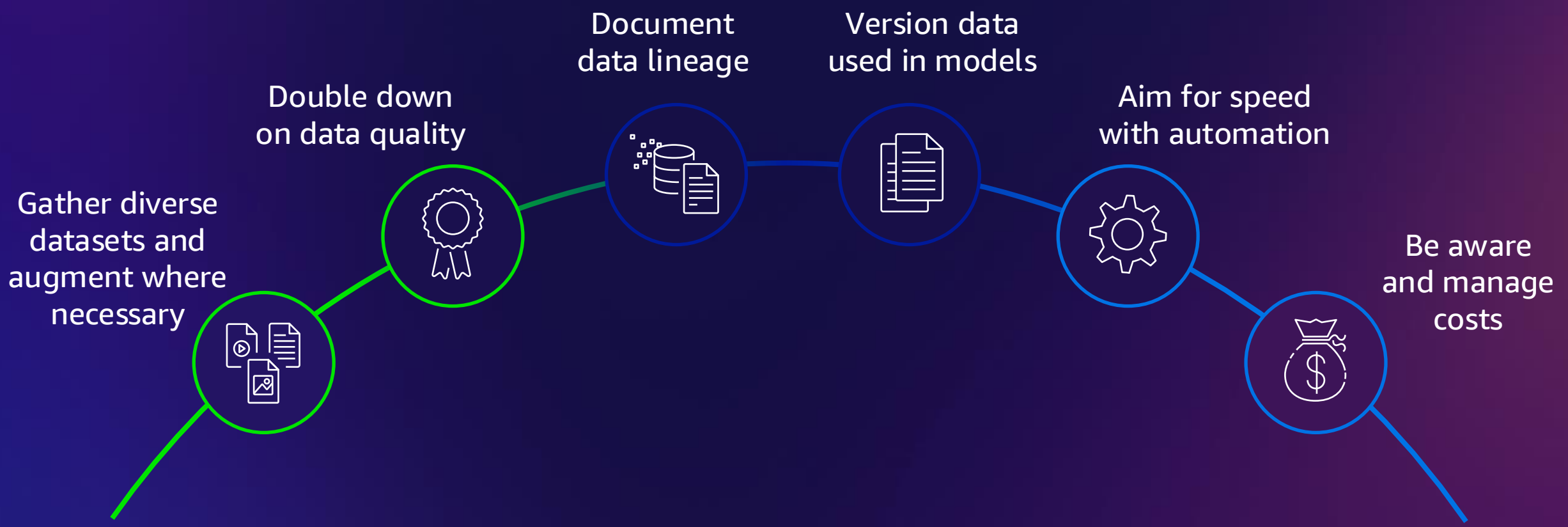
Light your first street with generative AI…now

# **Accelerate** your cloud journey

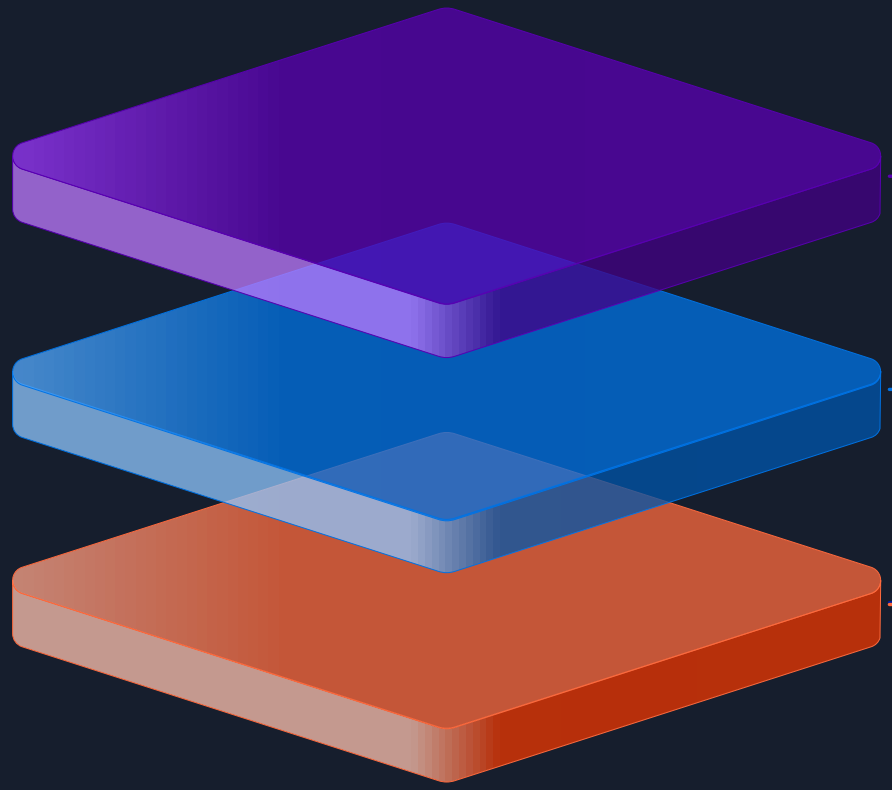



# Get your **data foundation** right

# Build your data foundation



# Enabling Choice: the AWS Generative AI Stack



## APPLICATIONS TO BOOST PRODUCTIVITY

**Amazon Q Business**
INSIGHTS AND AUTOMATION

**Amazon Q Developer**
SOFTWARE DEVELOPMENT LIFECYCLE

## MODELS AND TOOLS TO BUILD GENERATIVE AI APPS

**Amazon Bedrock**
AMAZON MODELS | PARTNER MODELS

## INFRASTRUCTURE TO BUILD AND TRAIN AI MODELS

**Amazon SageMaker AI**
MANAGED INFRASTRUCTURE

**AWS Trainium**
**AWS Inferentia**

**GPUs**

HIGH PERFORMANCE COMPUTE

# Amazon Bedrock

## BROAD CHOICE OF MODELS

| AI21labs | amazon | ANTHROPIC | cohere | deepseek | Luma | Meta | MISTRAL AI_ | poolside | stability.ai |
|---|---|---|---|---|---|---|---|---|---|
| Effective reasoning & rapid analysis for long context windows | Frontier intelligence & industry leading price performance, high-quality image & video generation | Advanced reasoning & coding capabilities, including computer use skills | Multimodal search & advanced retrieval powering multilingual knowledge agents | Advanced reasoning, comprehension, scientific & mathematical analysis, & code generation | High-quality video generation from text & images | Advanced image & language reasoning | Knowledge summarization, expert agents, & code completion | Software engineering AI for large enterprises | High-quality AI image generation, easily deployable at scale |
| JAMBA | AMAZON NOVA | CLAUDE | COMMAND<br>EMBED<br>RERANK | DEEPSEEK-R1 | LUMA RAY 2 | LLAMA | MISTRAL<br>MIXTRAL | MALIBU<br>POINT | |

Coming soon

Amazon Bedrock Marketplace enables developers to discover, test, and use over 100 popular, emerging, and specialized foundation models (FMs) alongside the current selection of industry-leading models in Amazon Bedrock**. DeepSeek-R1** model is now available in Amazon Bedrock Marketplace.

The majority of Amazon Bedrock customers

# USE MORE THAN ONE MODEL

# Evolving into Agentic AI


- Follow a set of rules
- Automate repetitive tasks

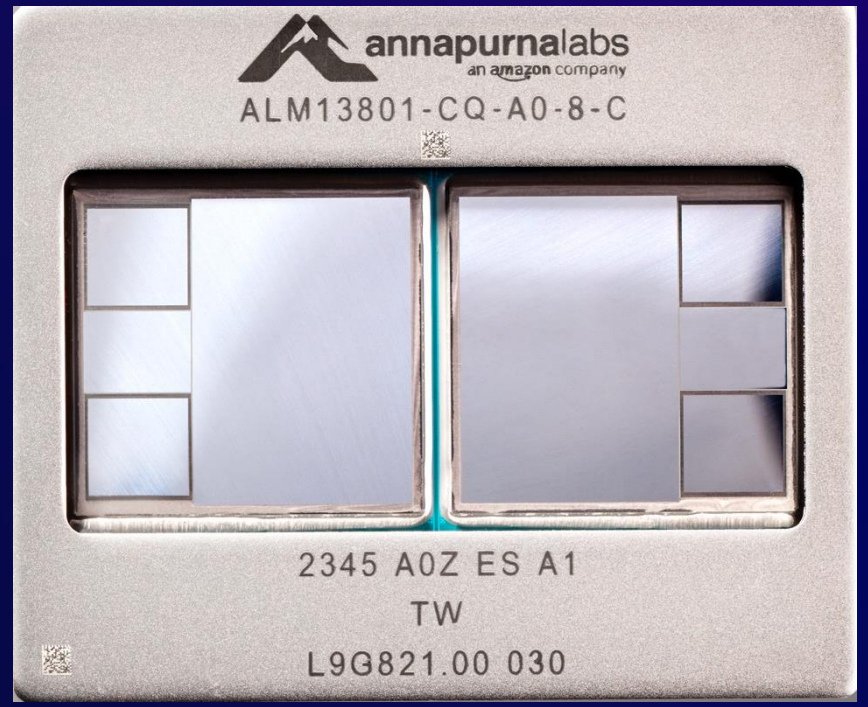
- Achieve a singular goal
- Address broader range of tasks
- Automate entire workflows

- Fully autonomous
- Multi-agent systems
- Mimic human logic and reasoning

# Innovating at the silicon level

## BUILDING, TRAINING, AND SCALING AGENTS WITH PURPOSE-BUILT AI CHIPS


Inferentia




Trainium

# The skills you need

Data science and machine learning

Software engineering

Cloud engineering

Domain knowledge

Critical thinking and problem-solving

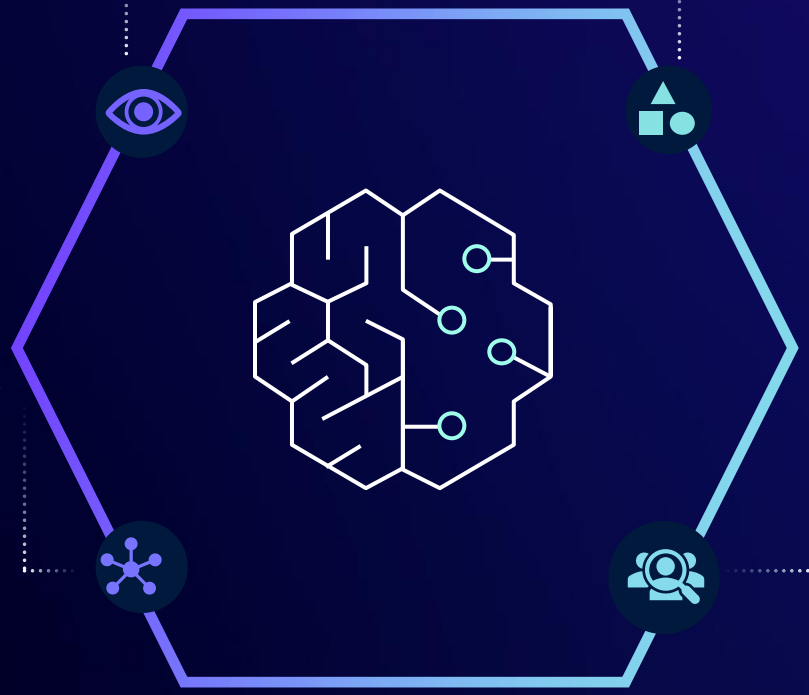
# **Strategic recommendations** on generative AI

## EYES WIDE OPEN

- Culture of continuous experimentation
- Prevent early dependencies

## FLEXIBILITY IS KEY

- Innovation requires flexibility free from technical or contractual lock-ins.
- Infrastructure supporting 3rd-party Generative AI integration
- A breadth of services ensures long-term flexibility and business value



## NO ONE SIZE FITS ALL

- Generative AI as an enhancement – not a replacement.
- Requirements in enterprises differ based on financial resources, security needs, governance and skills.
- Evaluate buy-vs-build

## LISTEN AND ENABLE

- Work backward from your customers
- Listen to your domain experts
- Enable employees with the right set of tooling

# AWS education mission

To accelerate the digital transformation of education in partnership with the full education community including learners, educators, researchers, and technology providers

# Why use AWS for research?

## Simple for researchers

Reducing user friction by providing powerful yet simple to access services

## Security controls and roles

Intuitive to manage access to data

## Budget and cost management

Cost transparency and simple estimation

## Long-term investment

We’re here to stay with stable long-term technology

## Open innovation

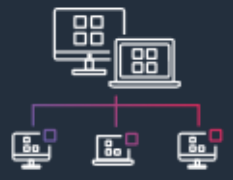
Constantly defining new technologies and committed to providing tools to enable research

## Culture and people

Shared mindset as we are constantly publishing, teaching, and engaging with academia

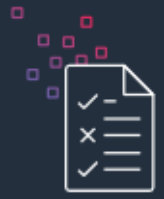
# AWS accelerates research

### Science, not servers
Compute when you need it at any scale



### Collaboration
Access datasets that span institutions and borders

### Research data management
Storage, secure access, and management



### Share and reproduce research
A common platform for reproducing scientific analyses

### State-of-the-art analytics
Use data science methods in your research

### Security
A collection of tools to protect data and privacy

# Enterprise IT and Research

## Enterprise IT cares about…

**Stability & Operational Excellence**

**Cost Optimization**

**Security & Compliance**

## Research cares about…

**New Ideas & Innovation**

**Speed & Agility**

**Value & Results**

# Research is not one size fits all

Research is an **ecosystem** of solutions

But it's more than just technology

It's **dedicated** teams structured to support **research outcomes**

## Researcher Workspaces

relevance lab

Research Gateway

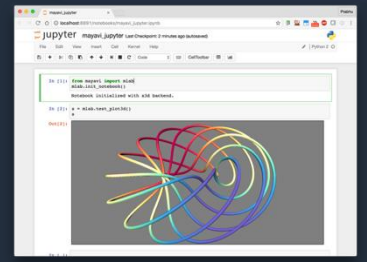
RONIN

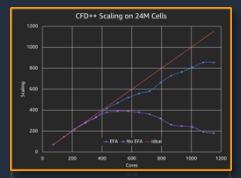
AWS Research & Engineering Studio

lab

## Solutions & Guidance

Amazon SageMaker



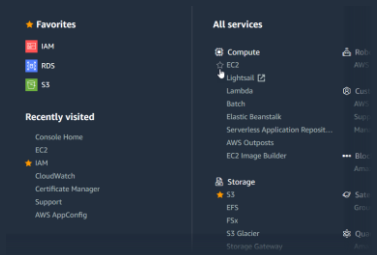



AWS ParallelCluster

aws thinkbox

## Native AWS

AWS Console, CLI, SDKs, etc.



Storage and data solutions to meet the specific researcher needs

Researcher Technical Requirements & Capability

Simpler/Common Requirements

Complex/Niche Requirements

# Research solutions framework




Represents a subset of the total number of solutions available to a customer

# Inherit global security and compliance controls

| Certifications / Attestations | | |
|---|---|---|
| C5 | DE | ✓ |
| Cyber Essentials Plus | GB | ✓ |
| DoD SRG | US | ✓ |
| FedRAMP | US | ✓ |
| FIPS | US | ✓ |
| HITRUST | US | ✓ |
| IRAP | AU | ✓ |
| ISO 9001 | 🌐 | ✓ |
| ISO 27001 | 🌐 | ✓ |
| ISO 27017 | 🌐 | ✓ |
| ISO 27018 | 🌐 | ✓ |
| K-ISMS | KR | ✓ |
| MTCS | SG | ✓ |
| PCI DSS Level 1 | 🌐 | ✓ |
| SEC Rule 17-a-4(f) | US | ✓ |
| SOC 1, SOC 2, SOC 3 | 🌐 | ✓ |

| Laws / Regulations / Privacy | | |
|---|---|---|
| Argentina Data Privacy | | ✓ |
| CISPE | EU | ✓ |
| EU Model Clauses | EU | ✓ |
| FERPA | US | ✓ |
| GDPR | EU | ✓ |
| GLBA | US | ✓ |
| HIPAA | US | ✓ |
| HITECH | 🌐 | ✓ |
| IRS 1075 | US | ✓ |
| ITAR | US | ✓ |
| My Number Act | JP | ✓ |
| UK DPA - 1988 | GB | ✓ |
| VPAT/Section 508 | US | ✓ |
| Data Protection Directive | EU | ✓ |
| Privacy Act [Australia] | AU | ✓ |
| Privacy Act [New Zealand] | NZ | ✓ |
| PDPA—2010 [Malaysia] | MY | ✓ |
| PDPA—2012 [Singapore] | SG | ✓ |
| PIPEDA [Canada] | CA | ✓ |
| Spanish DPA Authorization | ES | ✓ |
| Spanish DPA Authorization | ES | ✓ |

| Alignments / Frameworks | | |
|---|---|---|
| CIS (Center for Internet Security) | 🌐 | ✓ |
| CJIS (US FBI) | US | ✓ |
| CSA (Cloud Security Alliance) | 🌐 | ✓ |
| ENS High | ES | ✓ |
| EU-US Privacy Shield | EU | ✓ |
| FFIEC | US | ✓ |
| FISC | JP | ✓ |
| FISMA | US | ✓ |
| G-Cloud | GB | ✓ |
| GxP (US FDA CFR 21 Part 11) | US | ✓ |
| ICREA | 🌐 | ✓ |
| IT Grundschutz | DE | ✓ |
| MITA 3.0 (US Medicaid) | US | ✓ |
| MPAA | US | ✓ |
| NIST | US | ✓ |
| PHR | US | ✓ |
| Uptime Institute Tiers | 🌐 | ✓ |
| Cloud Security Principles | GB | ✓ |

🌐 = industry or global standard

aws

# Inherit global security and compliance controls

| Certifications/Attestations | | |
|---|---|---|
| DoD CMMC | US | ✓ |
| FedRAMP | US | ✓ |
| FISMA | US | ✓ |
| HITRUST | US | ✓ |

| Laws/Regulations/Privacy | | |
|---|---|---|
| FERPA | US | ✓ |
| GDPR | EU | ✓ |
| GLBA | US | ✓ |
| HIPAA | US | ✓ |
| IRS 1075 | US | ✓ |
| ITAR | US | ✓ |

| Alignments/Frameworks | | |
|---|---|---|
| CIS (Center for Internet Security) | 🌐 | ✓ |
| CJIS (US FBI) | US | ✓ |
| CSA (Cloud Security Alliance) | 🌐 | ✓ |
| FFIEC | US | ✓ |
| FIPS | US | ✓ |
| NIST | US | ✓ |
| PHR | US | ✓ |

🌐 = industry or global standard

# "We have experts who understand your research needs”

“In AWS, we recognize a like-minded organization, one which shares our far-reaching vision and ambition.

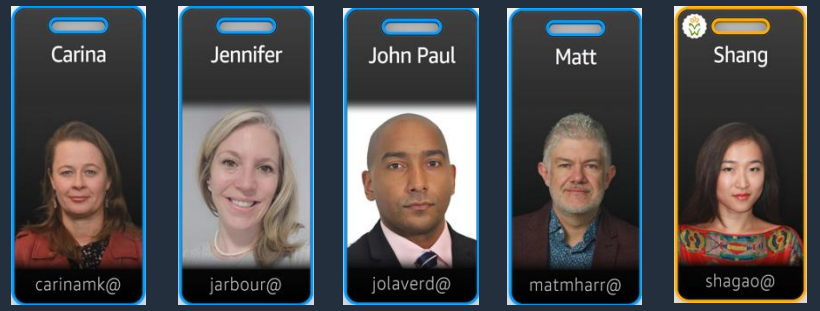
For this reason, together with AWS, we have engaged in a broad and ambitious programme of collaboration. Over the past 24 months hundreds of Oxford students and researchers have engaged with AWS services and subsequently used it to conduct cutting edge research.”

**Professor Louise Richardson**

Vice-Chancellor of the University of Oxford

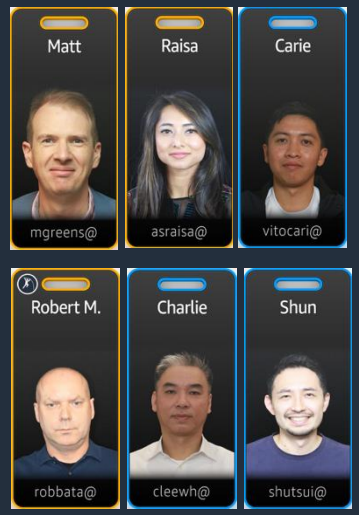
https://www.youtube.com/watch?v=zYFbymsCMmo
https://www.human-machine.org/

# Meet the Global Education – Academic Research Team:

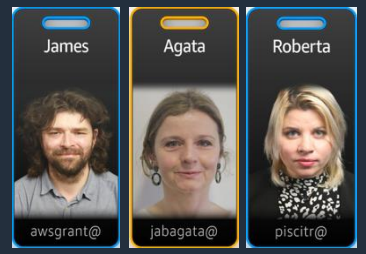



# And who we work with:

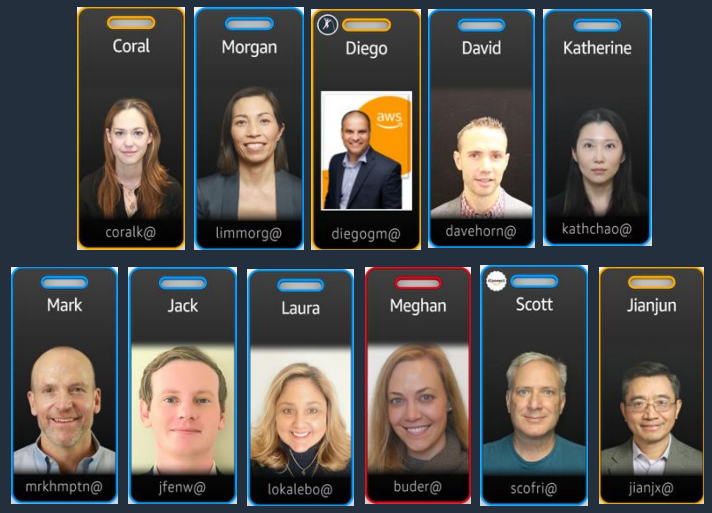
## APJ:



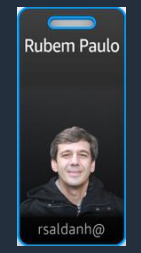

## EMEA




## NAMER



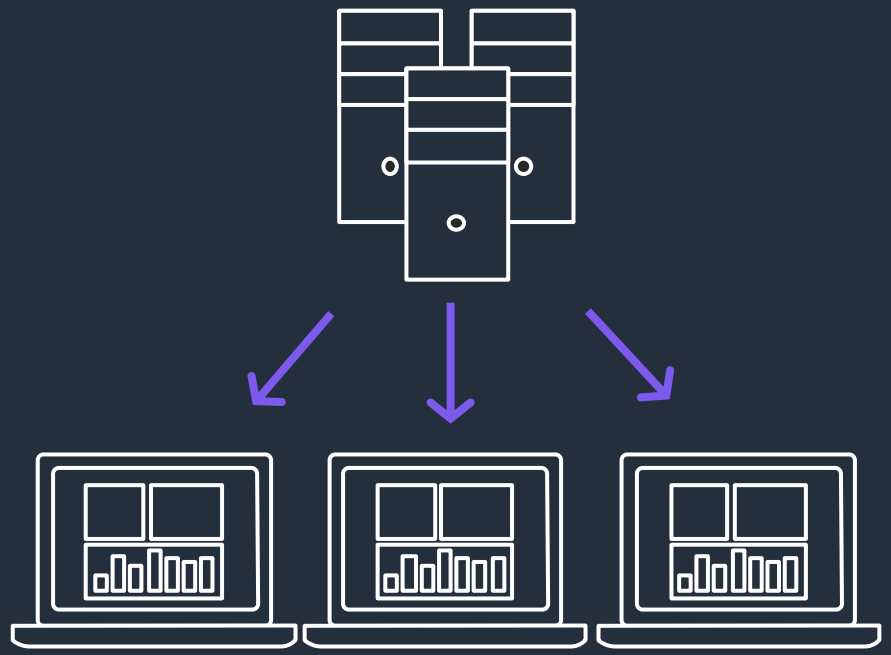

## LATAM



# A cloud-based model promotes collaboration

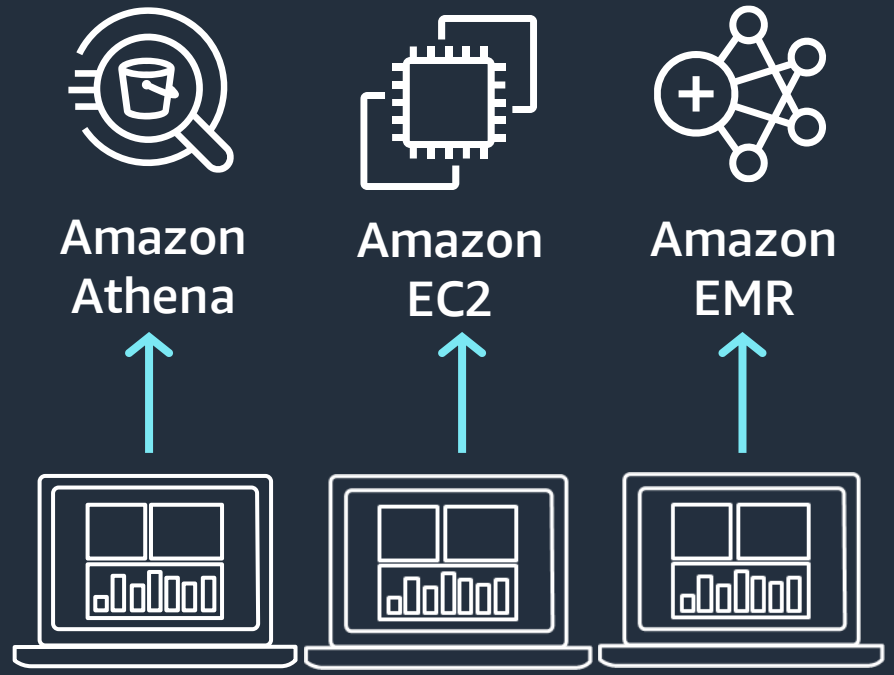
## Traditional approach:

Move data to computing resources

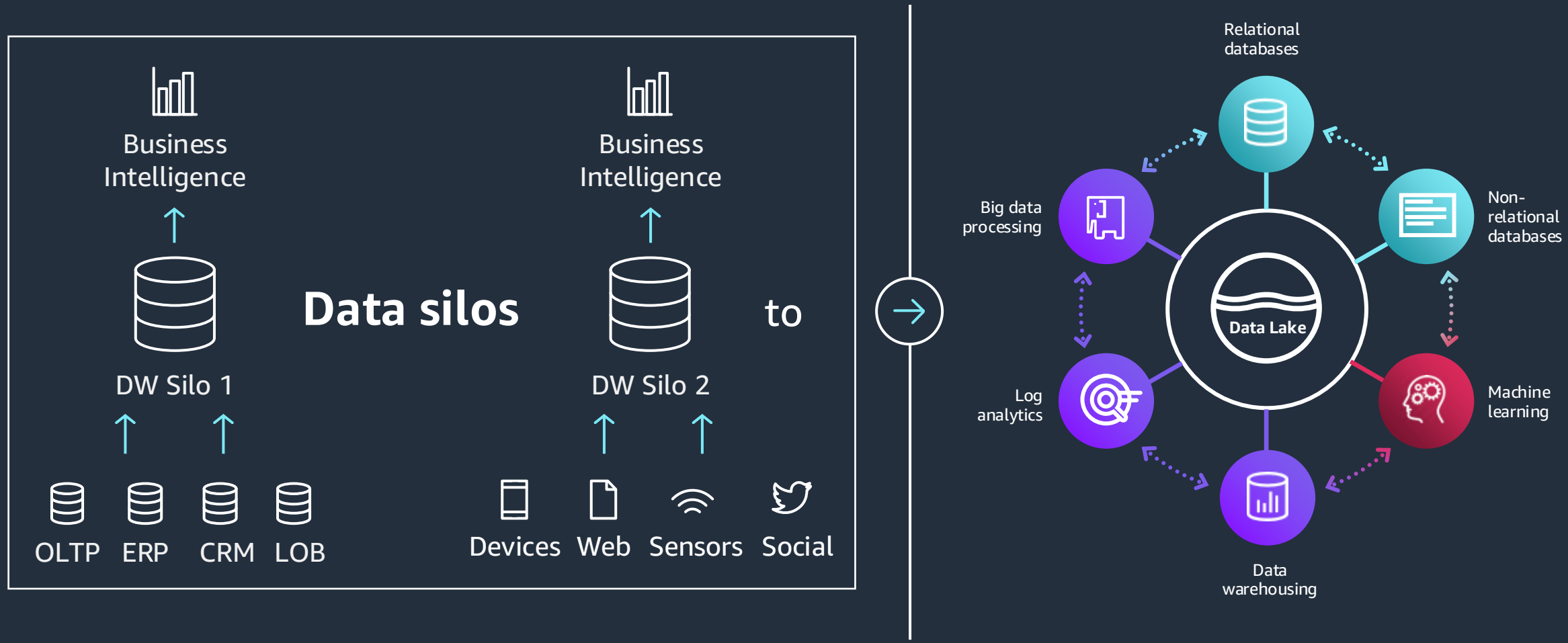


## Cloud approach:

Move computing resources to data

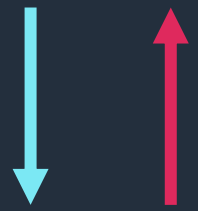


# Moving from traditional data warehouse approach



# Research needs are different than IT needs

| Generalized IT needs | Research IT managers, researchers, engineers, scientists, etc. |
| --- | --- |
| **Same problems, different priorities** | |
| 1. Reliability<br>2. Manageability<br>3. Cost<br>4. Performance | 1. Performance<br>2. Cost<br>3. Manageability<br>4. Reliability |
| **User/management engagement** | |
| • Users:<br>▪ Want complete solutions<br>▪ Minimize disruption<br>▪ Consistency<br>• Management:<br>▪ How does this fit with everything else?<br>▪ How does it save money? | • Users:<br>▪ Want access to technology<br>▪ Want a partner to understand their problem & develop solutions WITH them<br>▪ No “constraints”<br>• Management:<br>▪ How do we accelerate grants? |



# Research considerations for institutions

Understand how the money flows and build an engine to drive future funding

Solve the problems that researchers don’t like (data, security, training, maintainability, grant writing)

Focus on a set of core strengths (technology, support, startup, domain expertise, on premises vs. cloud)

Use an incremental change approach, focus on researchers who want help

# Empower researchers

> **"Biggest benefit for us was really shrinking the time to science. Giving faculty the tools that they wanted, doing that in an agile timely fashion and at the same time combining that with a set of security practices that allowed them to do their work in a secure manner and stay out of trouble."**

**Rich Mendola**

Vice President and CIO, John Hopkins University and Medicine

# Research customers





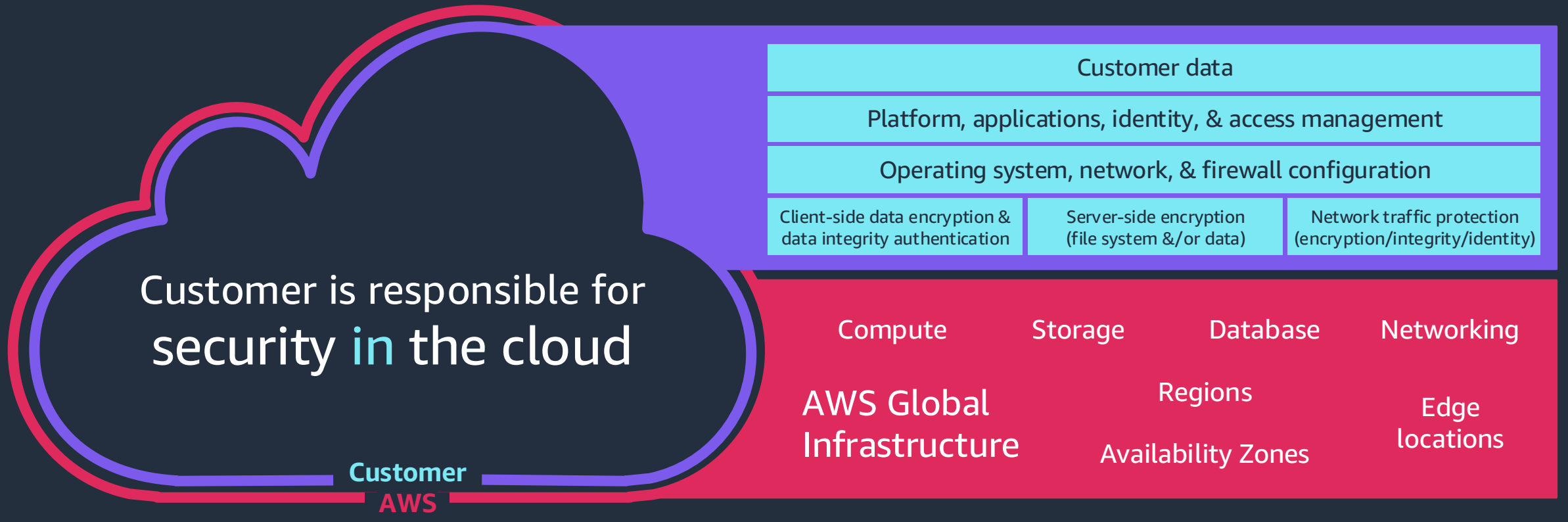







# Secure research

# Shared security responsibility model

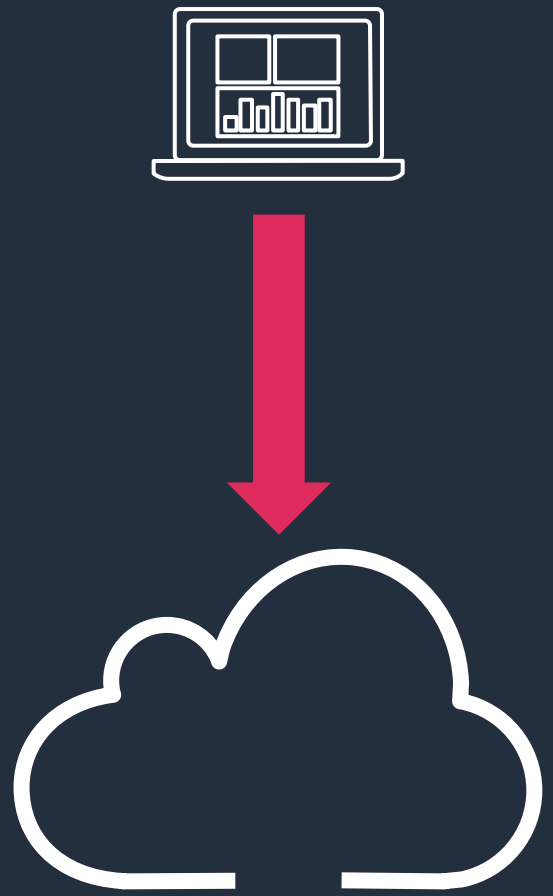



AWS is responsible for security of the cloud

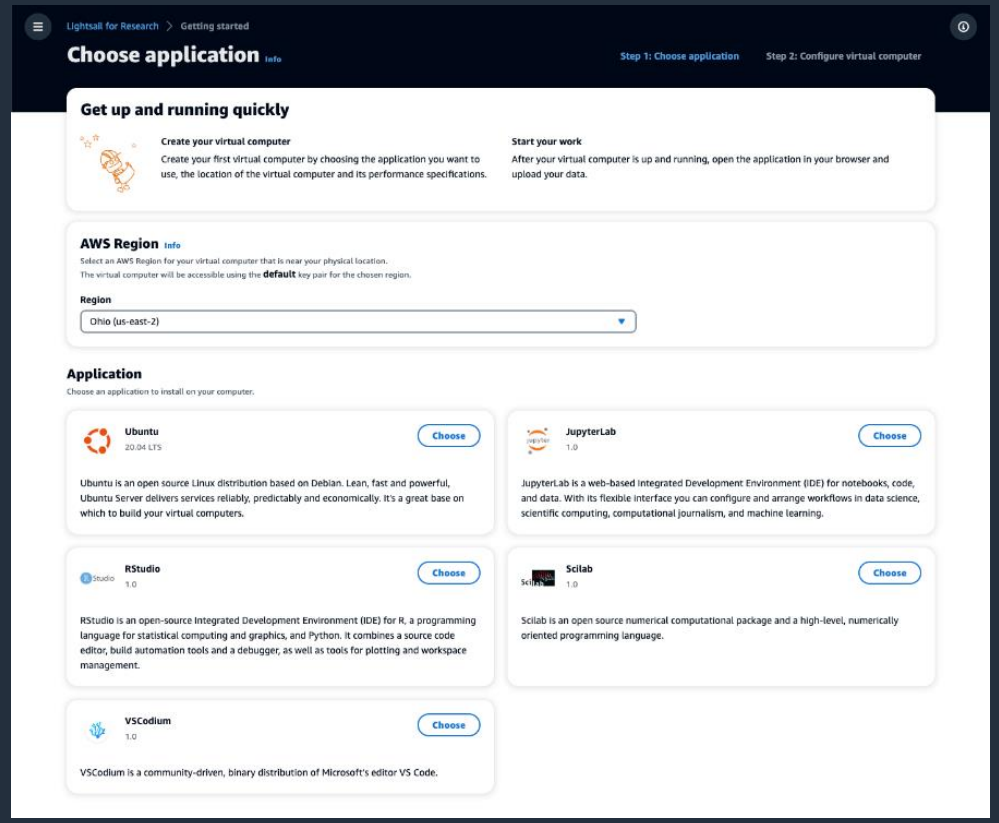
# AWS solutions for research

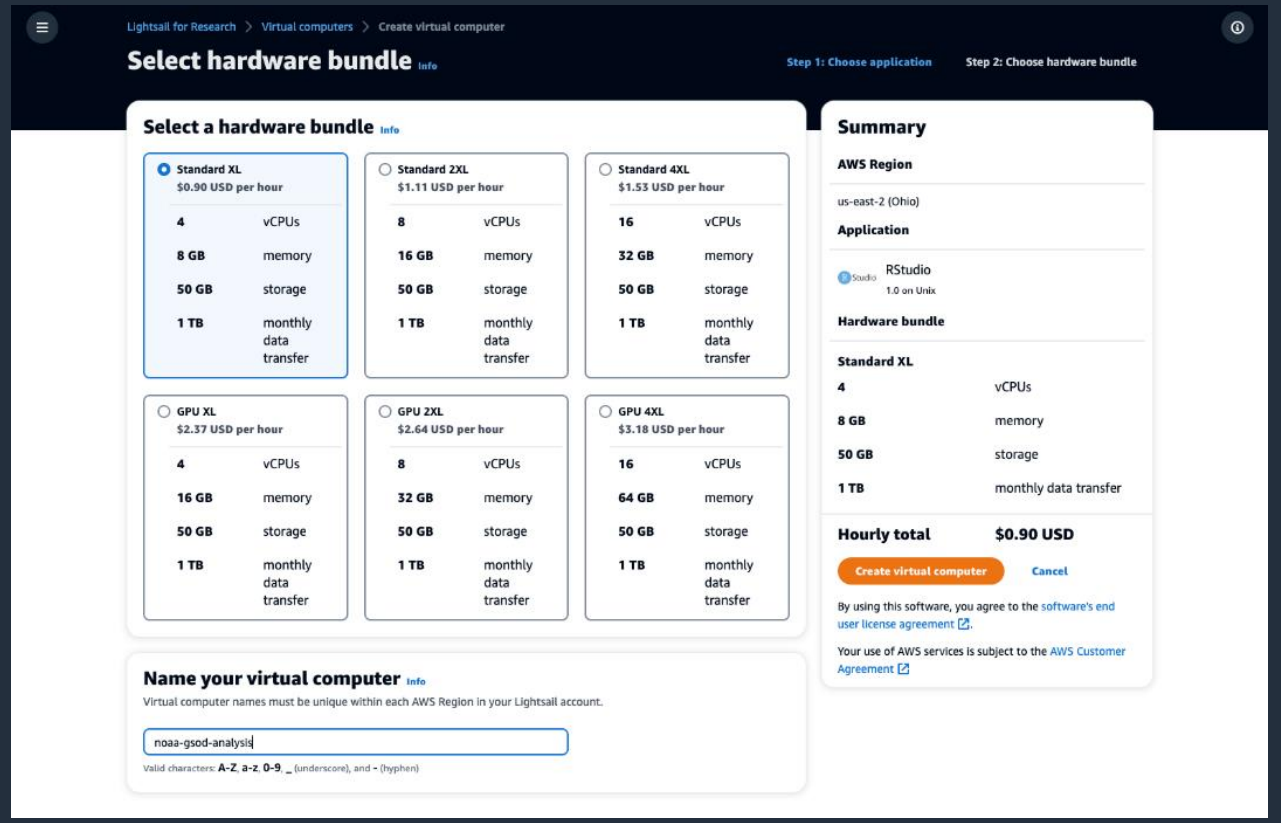
# Introducing Amazon Lightsail for Research

- **For users with limited experience running large computation**
  - Ex: Researchers currently doing all analysis on their laptops and looking to quickly spin up an environment to test ideas
  - No need to configure or manage cloud infrastructure components
- **Access to applications through browser based, simple create wizard**
  - Pick from a fixed set of compute options matched to pre-installed application
  - Run scripts, analyze data, and install additional packages
  - Drag and drop web interface to upload datasets or download results
- **All-inclusive pricing**
  - Includes compute, storage, and data transfer only for duration
  - Data can persist after power down
  - Budgeting tools to manage costs, power down idle research computers, etc.



# Amazon Lightsail for Research



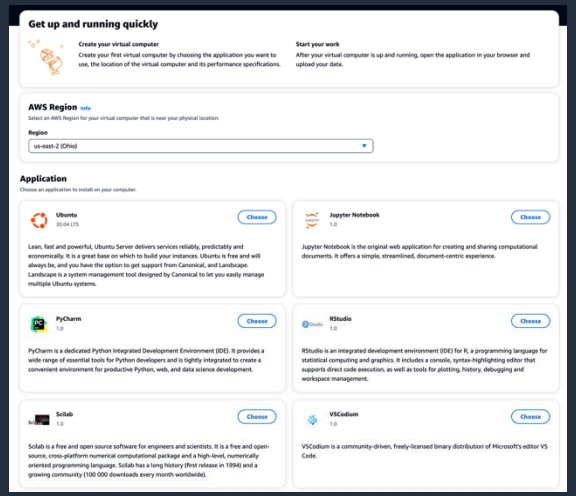
# Amazon Lightsail for Research

| Features | |
|---|---|
| What | Amazon managed service |
| Use cases | Research workstation (CPU/CPU+GPU) |
| Configuration | Snapshots/DIY |
| Setup persona | Researcher |
| Setup skills | Basic |
| User skills | Basic |
| Compliance | *GDPR TBC* |

| Pricing & Billing | |
|---|---|
| Egress traffic | Included/$ |
| Pricing | Bundled |
| Billing | Second/GB |
| Requires an AWS Account per User | |

| Solution Data | | |
|---|---|---|
| Description | Run complex research simulations in the cloud with ease | |
| Key points (Why?) | • Lightsail for Research is a fully managed AWS service<br>• Has built-in cost controls, saving customers money<br>• There is nothing for customers to install<br>• Requires no cloud or IT skills to get started | • Simple to explain, understand, and use<br>• Offers bundled pricing, makes spending clear up front<br>• Lightsail for Research full integrates with AWS Control Tower for Security/Governance |
| Limitations | • Lightsail for Research does not offer compliance eligibility for PHI<br>• No estimate of compliance support to announce at this time | |
| Category | Research tools | |

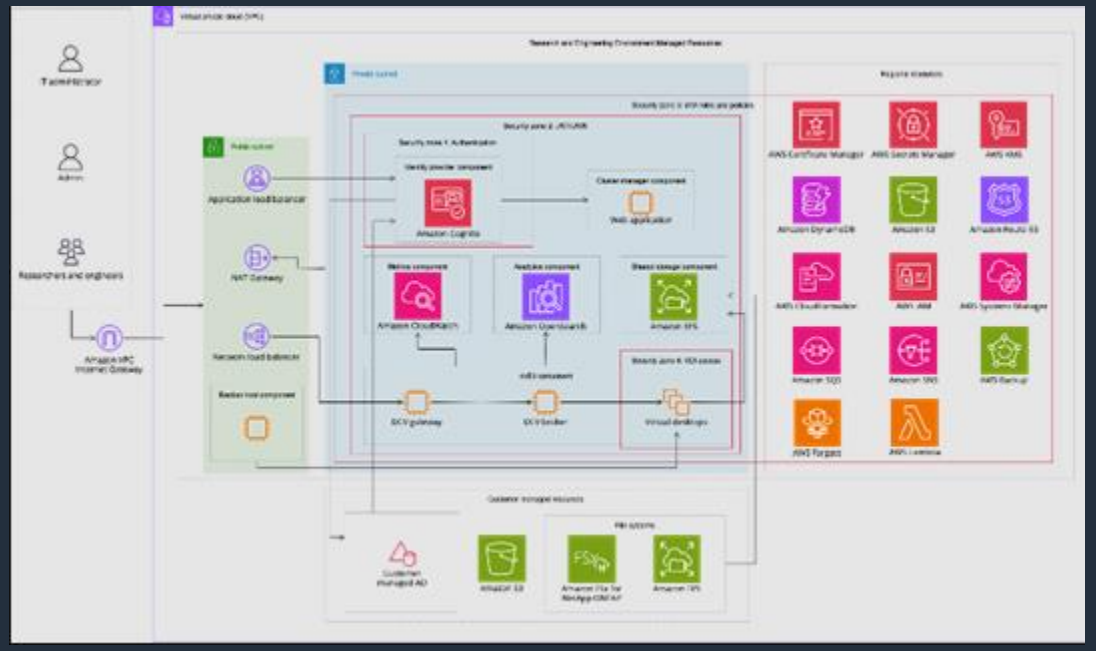
| Technical Features | |
|---|---|
| Configuration | Snapshots/DIY |
| Access control | OS Native |
| Scaling/H | None |
| Scaling/V | Manual |
| Connection | NICE DCV |
| VPC | Managed |
| Persistence | Built-in/Amazon EBS |
| API | Yes |



# Research and Engineering Studio

| Features | |
|---|---|
| What | Supported open source AWS Solution |
| Use cases | Federated control of access to data, tooling and compute power for researchers |
| Configuration | Pre-built environments |
| Setup persona | Research IT / Partner / ProServe |
| Setup skills | Advanced |
| User skills | Intermediate |
| Compliance | Depends on Setup |
| **Pricing & Billing** | |
| Egress traffic | As per services used |
| Pricing | Free opensource |
| Billing | As per services used |

| Solution Data | |
|---|---|
| Description | Research and Engineering Studio on AWS is a cloud solution that enables IT teams to provide secure, repeatable, and federated control of research environments. |
| Key points | • Research and Engineering Studio is a cloud solution<br>• A Partner or AWS Professional Services can install the solution<br>• Creates on-demand research environment capabilities<br>• Enables pre-built, secure and compliant environments<br>• Transparent view of total cost through costs centers and individual environments |
| Category | Research tools |



# SageMaker

| Features | |
|---|---|
| What | AWS service |
| Use cases | Development of machine learning (ML) models |
| Configuration | Configurable |
| Setup persona | Research IT / Partner / ProServe |
| Setup skills | Advanced |
| User skills | Advanced |
| Compliance | Depends on Setup |

| Pricing & Billing | |
|---|---|
| Egress traffic | Per service usage |
| Pricing | Metered service |
| Billing | As per services used |

| Links |
|---|
| Public service page |

| Solution Data | |
|---|---|
| Description | Build, train, and deploy ML models for any use case with fully managed infrastructure, tools, and workflows |
| Key points | • Access, label, and process large amounts of structured data (tabular data) and unstructured data (photo, video, geospatial, and audio) for ML<br>• Reduce training time from hours to minutes with optimized infrastructure. Boost team productivity up to 10 times with purpose-built tools<br>• Enable more people to innovate with ML through a choice of tools—IDEs for data scientists and no-code interface for business analysts<br>• Automate and standardize MLOps practices and governance across your organization to support transparency and auditability |
| Category | Research tools |

# RONIN

| Features | |
|---|---|
| What | Partner solution |
| Use cases | Easy use of complex solutions for researchers |
| Configuration | Configurable |
| Setup persona | Research IT / Partner |
| Setup skills | Partner |
| User skills | Medium |
| Compliance | Depends on setup |

| Pricing & Billing | |
|---|---|
| Egress traffic | Dependent on license |
| Pricing | Annual per seat licensing |
| Billing | Direct from partner |

| Links |
|---|
| AWS Marketplace page |

| Solution Data | |
|---|---|
| Description | RONIN allows your AWS consumers, researchers, scientists, analysts, students to easily launch secure, complex, compute resources within minutes, providing enterprise-level IT management capability and cost traceability. |
| Key points | • **Cloud made simple:** RONIN allows your AWS consumers, researchers, scientists, analysts, students to easily launch secure, complex, compute resources within minutes, providing enterprise-level IT management capability and cost traceability.<br>• **No nerds needed:** Technical hurdles. Assumed knowledge. These are the stresses faced by your researchers. RONIN removes the stress and enables access to vast amounts of compute and storage in seconds, not months. No IT degree required. No helpdesk calls. No more late nights reading about ports and mounts.<br>• **Cooked to perfection:** RONIN comes pre-baked with enterprise-ready reporting, collaboration, business intelligence and management information capabilities. Business sponsors? Happy. CFOs? Happier. Security? If they could smile, they would. |
| Category | Research tools |

# Research Gateway

| Features | |
|---|---|
| What | Partner solution |
| Use cases | Easy use of complex solutions for researchers |
| Configuration | Configurable |
| Setup persona | Research IT / Partner |
| Setup skills | Partner |
| User skills | Medium |
| Compliance | Depends on setup |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | Subscription pricing |
| Billing | Direct from partner |

| Links |
|---|
| AWS Marketplace page |

| Solution Data | |
|---|---|
| Description | RRLCatalyst Research Gateway is a solution built on AWS, and provides a self-service portal with cost and budget management that helps consume AWS resources for Scientific Research. |
| Key points | • Accelerates Scientific Research using AWS resources with cost and budget governance<br>• Simple, secure, self-service portal with 1-Click AWS Service Catalog assets like SageMaker, Amazon EC2, Amazon S3, etc.<br>• Built on AWS and available in SaaS and enterprise models |
| Category | Research Tools |

# ParallelCluster

| Features | |
|---|---|
| What | Amazon solution |
| Use cases | HPC Management |
| Configuration | DIY |
| Setup persona | Technical |
| Setup skills | Medium |
| User skills | Basic |
| Compliance | Configurable |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | $0 |
| Billing | Resource dependent |

| Solution Data | |
|---|---|
| Description | AWS ParallelCluster is an open source cluster management tool that makes it easy for you to deploy and manage high performance computing (HPC) clusters on AWS |
| Key points | • CLI driven but with deployable GUI<br>• Control automation of jobs in a secure environment<br>• Multiple instance type support<br>• Integrates with schedulers such as AWS Batch and Slurm |
| Limitations | • Amazon EC2 account limits apply<br>• Python knowledge required |
| Category | Cluster technologies |

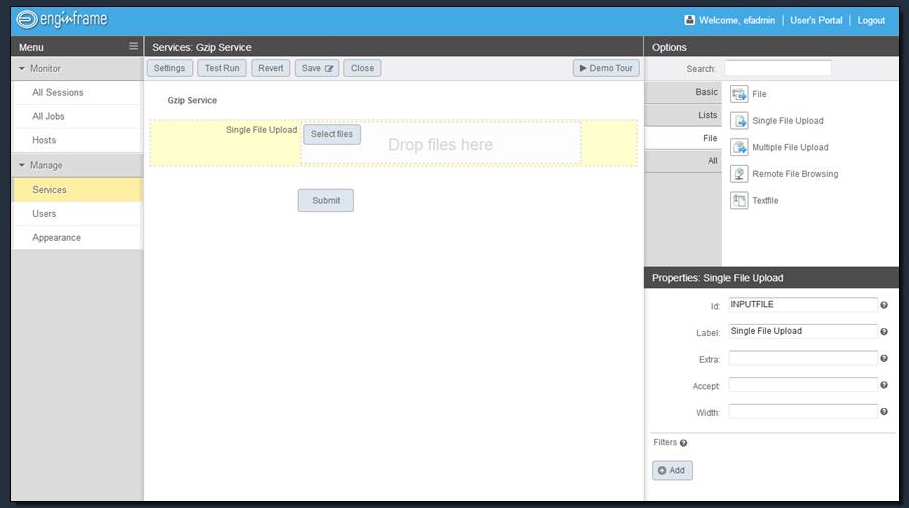
# NICE EngineFrame

| Features | |
|---|---|
| What | Amazon solution |
| Use cases | HPC Management |
| Configuration | DIY |
| Setup persona | Technical |
| Setup skills | Medium |
| User skills | Medium |
| Compliance | Configurable |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | $0 |
| Billing | Resource dependent |

| Links |
|---|
| Public solution page |

| Solution Data | |
|---|---|
| Description | **Integrate on-premises and AWS HPC environments** |
| Key points | • Run simulations via on-prem or on-cloud HPC in one console<br>• Easy to use interface<br>• Integrates to other AWS services like FSx Lustre |
| Limitations | • Service limits apply |
| Category | Cluster technologies |



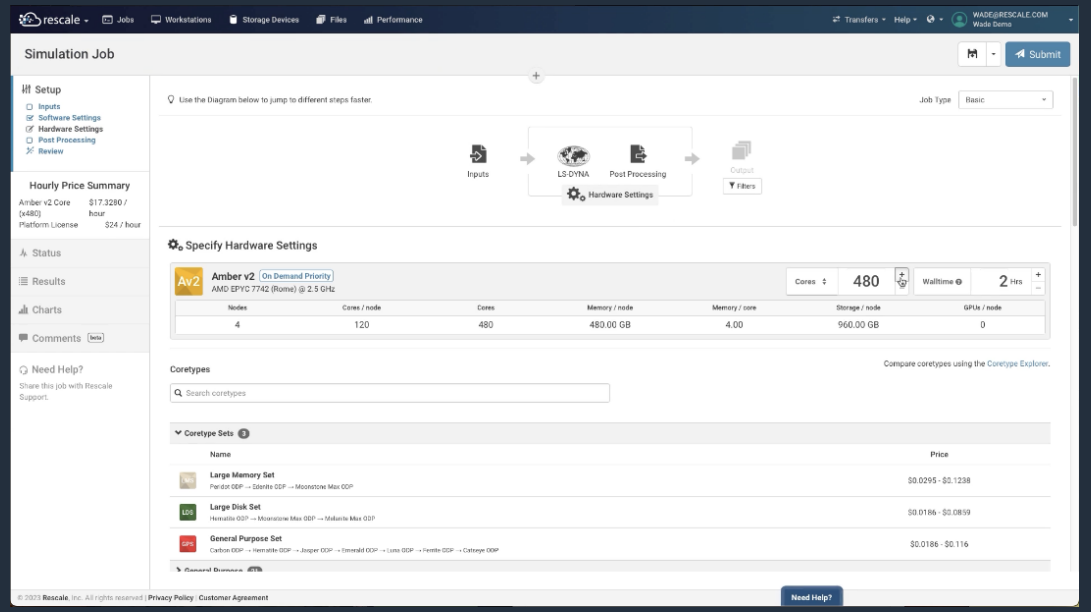
# Rescale

| Features | |
|---|---|
| What | Partner solution |
| Use cases | Self-service HPC |
| Configuration | Complex |
| Setup persona | Partner |
| Setup skills | High/Complex |
| User skills | Medium |
| Compliance | Configurable |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | Subscription |
| Billing | Committed block pricing, unit driven |

| Links |
|---|
| Public solution page |

| Solution Data | |
|---|---|
| Description | **Integrate on-premises and AWS HPC environments** |
| Key points | • Turnkey full-stack HPC<br>• 1,000+ engineering, scientific & AI/ML applications pre-installed/optimized |
| Limitations | • Service limits apply |
| Category | Cluster Technologies |



# CloudyCluster

| Features | |
|---|---|
| What | Partner solution |
| Use cases | Self-service HPC |
| Configuration | Complex |
| Setup persona | Partner |
| Setup skills | High/Complex |
| User skills | Medium |
| Compliance | Configurable |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | Subscription + usage |
| Billing | Resource dependent |

| Links |
|---|
| Public solution page |

| Solution Data | |
|---|---|
| Description | CloudyCluster provides self-service HPC and Parallel computation in your own AWS account |
| Key points | • Collaborative Self-Service HPC and Parallel Computation in your own AWS account with Open OnDeman HPC User Interface<br>• Use the included CCQ meta-scheduler to launch elastic autoscaling HPC jobs using on-demand and spot instances<br>• Popular HPC and machine learning software is pre-installed and configured for use so you can focus on your research and scientific computing |
| Limitations | • Service limits apply |
| Category | Cluster technologies |

# IDEA (Integrated Digital Engineering on AWS)

| Features | |
|---|---|
| What | AWS solution |
| Use cases | HPC end-user portal |
| Configuration | Moderately complex |
| Setup persona | Technical |
| Setup skills | Medium |
| User skills | Medium |
| Compliance | Configurable |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | ~$600/month excluding resources |
| Billing | Resource dependent |

| Links |
|---|
| Public solution page |

| Solution Data | |
|---|---|
| Description | **I**ntegrated **D**igital **E**ngineering on **A**WS (**IDEA**) empowers teams of engineers, scientists, and researchers with a cloud environment to host engineering tools required for end-to-end product development workloads |
| Key points | • Collaborative self-service HPC and parallel computation in your own AWS account with Open OnDeman HPC User Interface<br>• Use the included CCQ meta-scheduler to launch elastic autoscaling HPC jobs using on-demand and spot instances<br>• Popular HPC and machine learning software is pre-installed and configured for use so you can focus on your research and scientific computing |
| Limitations | • Service limits apply |
| Category | Cluster technologies |

# Trusted Research Environment

| Features | |
|---|---|
| What | AWS solution |
| Use cases | Regulated research environments on SWB |
| Configuration | Pre-built environments |
| Setup persona | Research IT / ProServe |
| Setup skills | Advanced |
| User skills | Intermediate |
| Compliance | Depends on setup |

| Pricing & Billing | |
|---|---|
| Egress traffic | As per services used |
| Pricing | No cost |
| Billing | As per services used |

| Solution Data | |
|---|---|
| Description | Trusted Research Environment on AWS (TRE) is a self-service research solution built to secure and analyse sensitive data, delivering the flexible tools and technologies to enable research conducted at scale |
| Key points | • Comply with privacy legislation and safeguard the trust of data providers<br>• Allow researchers to securely collaborate on shared, sensitive datasets<br>• They need to analyse petabyte-scale, modal datasets including tabular, imaging and -omics datasets<br>• Closely manage and monitor research costs and the consumption of IT resources – can't overspend on research funding<br>• Scale research computing up and down as needed to reduce the time to science, allow for research otherwise not possible and achieve this in a cost-effective way |
| Category | Secure data environments |

# Industry Landing Zones

| Features | |
|---|---|
| What | AWS solution |
| Use cases | Foundation for complex/regulated environment on AWS |
| Configuration | CloudFormation template |
| Setup persona | Proserve/Partner |
| Setup skills | Advanced |
| User skills | N/A |
| Compliance | Depends on setup |

| Pricing & Billing | |
|---|---|
| Egress traffic | N/A |
| Pricing | |
| Billing | As per services used |

| Links |
|---|
| Public Solution page |

| Solution Data | |
|---|---|
| Description | The Landing Zone Accelerator on AWS solution deploys a cloud foundation that is architected to align with AWS best practices and multiple global compliance frameworks. With this solution, customers with highly-regulated workloads and complex compliance requirements can better manage and govern their multi-account environment. When used in coordination with other AWS services, it provides a comprehensive low-code solution across 35+ AWS services. |
| Key points | • Automatically set up a cloud environment suitable for hosting secure workloads. You can deploy this solution in all AWS Regions. This helps you maintain consistency of your operations and governance across AWS standard Regions, AWS GovCloud (US), and other non-standard partitions in AWS<br>• Deploy the solution in an AWS Region suitable for you data classification, and use Amazon Macie to provide sensitive data detection in Amazon S3. This solution also helps you deploy, operate, and govern a centrally managed encryption strategy using AWS KMS<br>• Leverage a foundational infrastructure for deploying mission-critical workloads across a centrally-governed multi-account environment |
| Category | Secure Data Environments |

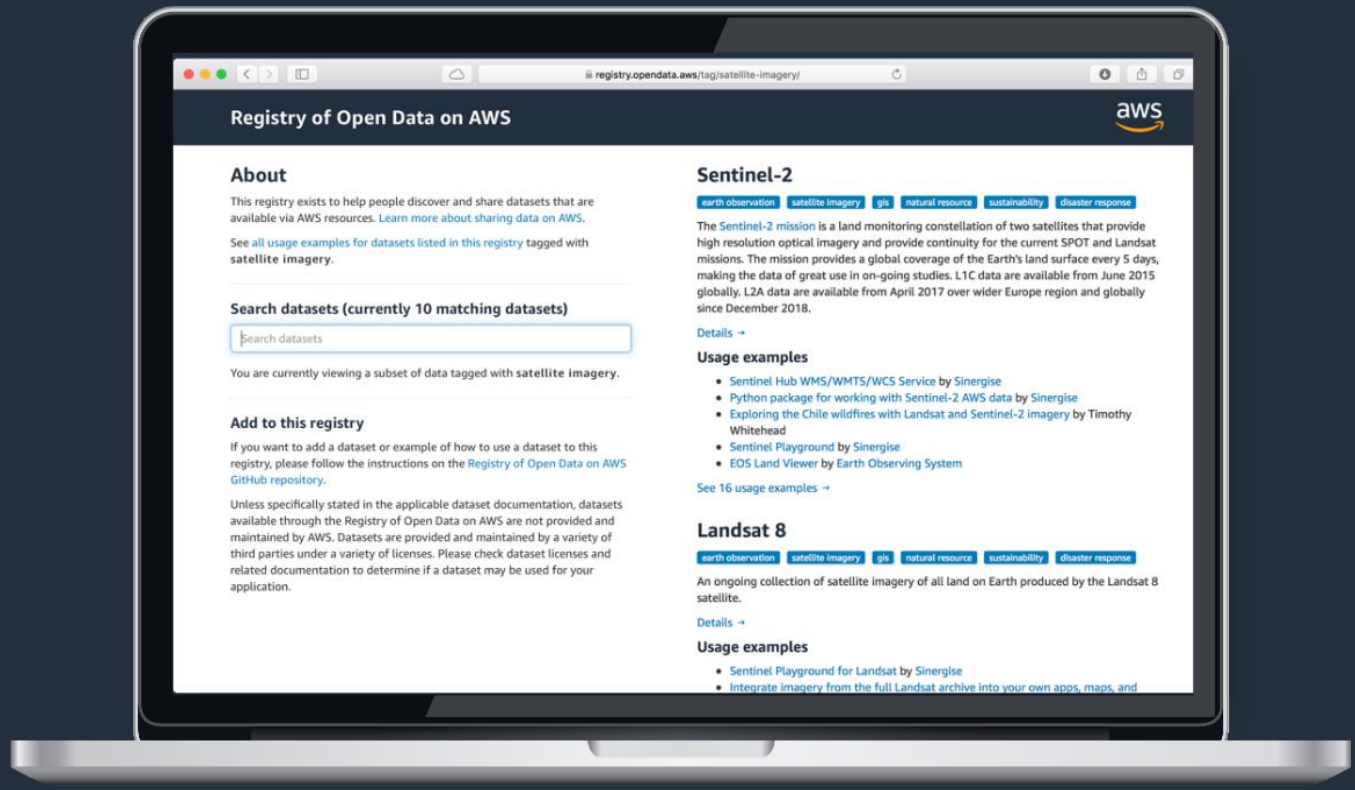
# Research resources from AWS and Amazon

# Open data on AWS

AWS HOSTS PUBLIC DATASETS TO LOWER THE COST AND IMPROVE THE SPEED OF RESEARCH.

**Examples include:**

- 1000 Genomes Project
- The Cancer Genome Atlas
- International Cancer Genome Consortium
- Landsat 8
- Common Crawl
- SpaceNet
- OpenStreetMaps

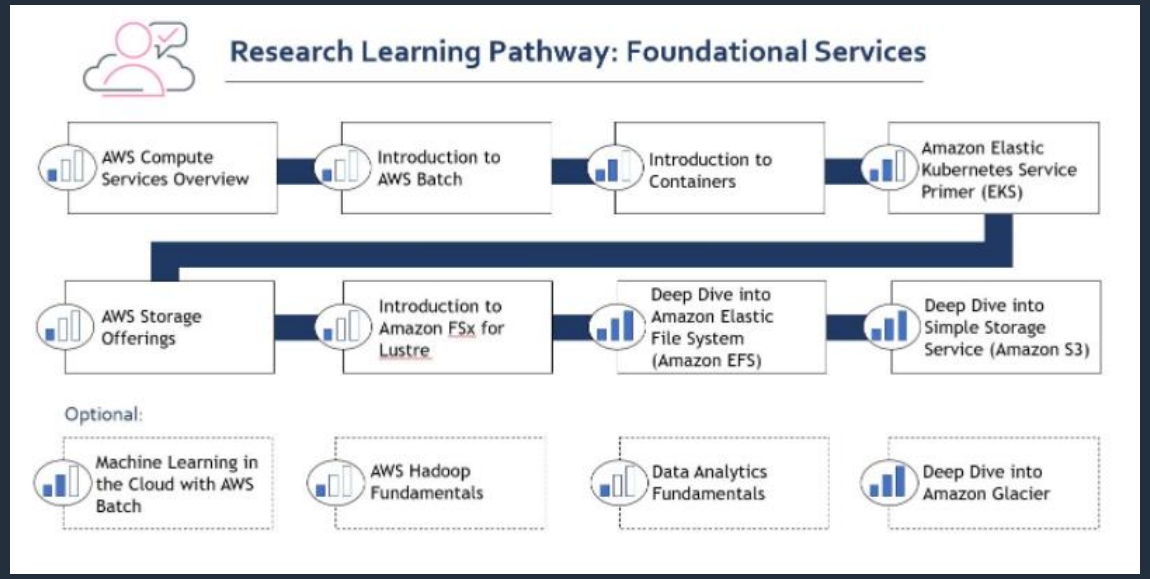


# Global Data Egress Waiver

| | |
|---|---|
| Why | Researchers need predictable budgets |
| Who | Available to degree-granting and research institutions<br>Must use a research network (e.g. Internet2) or AWS Direct Connect |
| What | Waives charges for data downloads<br>Waives up to 15% of the customer total account bill<br>Data uploads are no-charge |
| How | Contact your AWS account manager<br>Or via research portals (e.g. Arcus, GEANT)<br>Or via certain resellers (e.g. DLT/I2 NET+, VMWare on AWS) |

# No-cost Research Learning Pathways

In support of the diversity of researcher needs around the world, Amazon Web Services (AWS) is excited to announce three new researcher-focused learning plans and four ramp-up guides, which build upon our existing no-cost online AWS training pathways for researchers and research IT announced in 2020.




AWS Skill Builder provides 500+ no-cost digital courses

# Amazon’s investment in science

## Academics at Amazon

We hire world-class academics as Amazon Scholars and Amazon Visiting Academics to work on large-scale technical challenges, while they continue to teach and conduct research at their universities. Programs from Amazon Science include:

- Amazon Scholars
- Amazon Visiting Academics
- Postdoctoral Scientists

amazon | science

## Collaborations

Whether you’re a faculty member, student, developer, thought leader, or a policy maker, Amazon offers a number of ways for you to engage with the company’s science community.

amazon research awards

NSF amazon

alexa prize

alexa fund

sure

MACHINE LEARNING UNIVERSITY

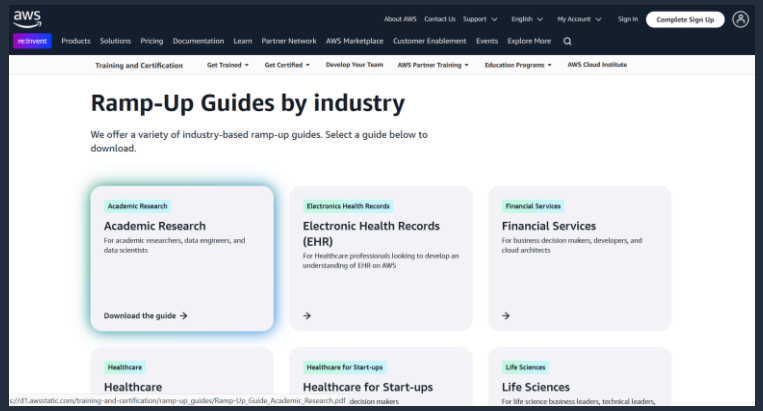
# Technology enables innovation, but people make it happen

## Advancing research in the cloud: new training courses on AWS for Academic Researchers

In support of the diversity of researcher needs around the world, Amazon Web Services (AWS) offers researcher-focused learning plans and ramp-up guides that cover Cloud Essentials, Foundational Learning Plans, and courses that cater to different learning needs for Research IT professionals and academic researchers who use AWS cloud for High Performance Computing (HPC), Quantum, Statistics, Artificial Intelligence (AI), Machine Learning (ML) and Generative Artificial Intelligence (Generative AI). All courses for academic researchers can be found on our AWS ramp up guide home page.

Find out more:

Ramp-up Guide




- AWS Cloud Essentials
- Foundational Researcher Learning Plan
- Quantum: Amazon Braket Knowledge Badge Readiness Path
- AI, ML, Generative AI ramp-up guide (page 2)
- HPC ramp-up guide (page 3)
- Statistician Researcher ramp-up guide (page 4)
- Research IT ramp-up guide (page 5)

# Summary

Cloud solutions for any researcher, anytime, anywhere

Common research tools, cluster technologies, and solutions for security and compliance

Broadest and deepest solution set to support research globally

Industry experts who understand your research needs

**Connect with an expert to start a conversation about moving your research programs to AWS**

# Thank you!

# References

# SURF Research Cloud brings data power to science using AWS

SURF—the National Research and Education Network (NREN) in the Netherlands—wanted to create a secure, reliable research and data sharing platform that would be compliant with data privacy laws across international borders and offer different levels of access.

It used Amazon EC2 for secure, resizable compute power and AWS Control Tower to set up and govern secure, multi-account AWS environments with different levels of access and functionality that would also be GDPR compliant.

The SURF Research Cloud provides security and GDPR compliance without compromising mobility of data. It supports multi-region networks and offers multiple interfaces that allow researchers to select the right system for their work using mature and stable AWS services.

**“Success isn’t just a question of technology. It can’t happen without compliance, which is a dimension that researchers often struggle with. We overcame that by using cloud native technologies from AWS.”**

**Ivar Janmaat**

Team Lead, High Performance Compute Cloud, SURF

SURF

# Genomics group cuts research time from days to hours on AWS


### Challenge

Researchers at the Australasian Wildlife Genomics Group were limited by the compute capabilities of the University of Sydney's on-premises high-performance computing (HPC) environment.

### Solution

The group uses RONIN's Intel HPC solution on AWS to conduct research into Australia's Tasmanian devil population. RONIN provides an HPC environment that relies on Intel-powered Amazon EC2 C5 instances.

### Benefits

- Reduces genomic analysis time from 10 days to 5 hours
- Increases scalability for HPC workloads
- Scales research capacity up or down on demand

| | |
|---|---|
| Company: | Australasian Wildlife Genomics Group |
| Industry: | Education |
| Country: | Australia |
| Employees: | 15 |
| Website: | sydney.edu.au/science/our-research |
| About: | A part of the University of Sydney in Australia, the Australasian Wildlife Genomics Group studies the molecular genetics and evolution of gene families and genomes of the country's native wildlife. |

"AWS helps us expand rapidly in real time while we are doing our analysis. Rather than make the data fit the compute we have available, we can make the compute fit the data we have."

**Dr. Carolyn Hogg**

Senior Research Manager, Australasian Wildlife Genomics Group

aws

# Australasian Wildlife Genomics Group cuts research time from 10 days to 5 hours using RONIN on AWS

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THE UNIVERSITY OF SYDNEY

| | |
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| Country: | Australia |
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| Website: | sydney.edu.au/science/our-research |
| About: | A part of the University of Sydney in Australia, the Australasian Wildlife Genomics Group studies the molecular genetics and evolution of gene families and genomes of the country's native wildlife. |

"AWS helps us expand rapidly in real time while we are doing our analysis. Rather than make the data fit the compute we have available, we can make the compute fit the data we have."

**Dr. Carolyn Hogg**

Senior Research Manager, Australasian Wildlife Genomics Group

aws

# University of Adelaide analyzes 3 TB of genomics data in hours on AWS


## Challenge

Researchers needed to analyze 48 wheat exomes and 18 whole barley genomes—totaling almost 3 terabytes of data. However, timely analysis of the data required increased HPC compute capacity to ensure the project could happen.

## Solution

Bioinformaticians at the university worked with AWS Partner RONIN to build a new HPC research cluster that runs on Amazon EC2 instances, uses Amazon S3 to store research data, and relies on AWS Auto Scaling.

## Benefits

- Analyzes genomics data in 6 hours instead of 2 weeks
- Powers innovative research into wheat genomics
- Helps scientists more effectively cross wheat
- Saves on research costs

| | |
|---|---|
| Company: | University of Adelaide |
| Industry: | Education |
| Country: | Australia |
| Employees: | 3,400 |
| Website: | adelaide.edu.au |
| About: | The University of Adelaide is a public university located in Adelaide, South Australia. Established in 1874, it is the third-oldest university in Australia and has more than 22,000 students and 3,400 faculty and staff. |

"Using our AWS-based HPC cluster, we easily analyzed 3 terabytes of wheat exome data in 6 hours. Typically, this kind of project would take at least two weeks to complete on our local infrastructure."

**Dr. Nathan Watson-Haigh**

Research Fellow in Bioinformatics, University of Adelaide, School of Biological Sciences

aws