

# AWS re:Invent

NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

CMP326

# Design, engineering & simulation on AWS using HPC & virtual desktops

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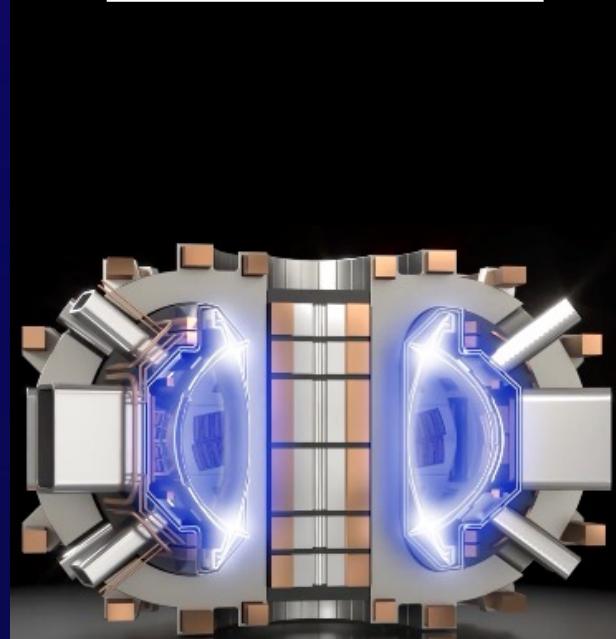
Sr. SA, HPC  
AWS



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# What tools do you need to design the next-generation fusion reactor?

CUSTOMER PROFILE



# Agenda

- 01 Blockers to innovation
- 02 Architecture of RES
- 03 Key features
- 04 Integration with AWS ParallelCluster
- 05 Demo
- 06 Q&A

# Innovation blockers in research and engineering



**Difficulty collaborating** among globally dispersed teams creates work silos leading to time-consuming ad hoc DIY solutions

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**IT complexity** takes time and focus away from critical research and engineering projects

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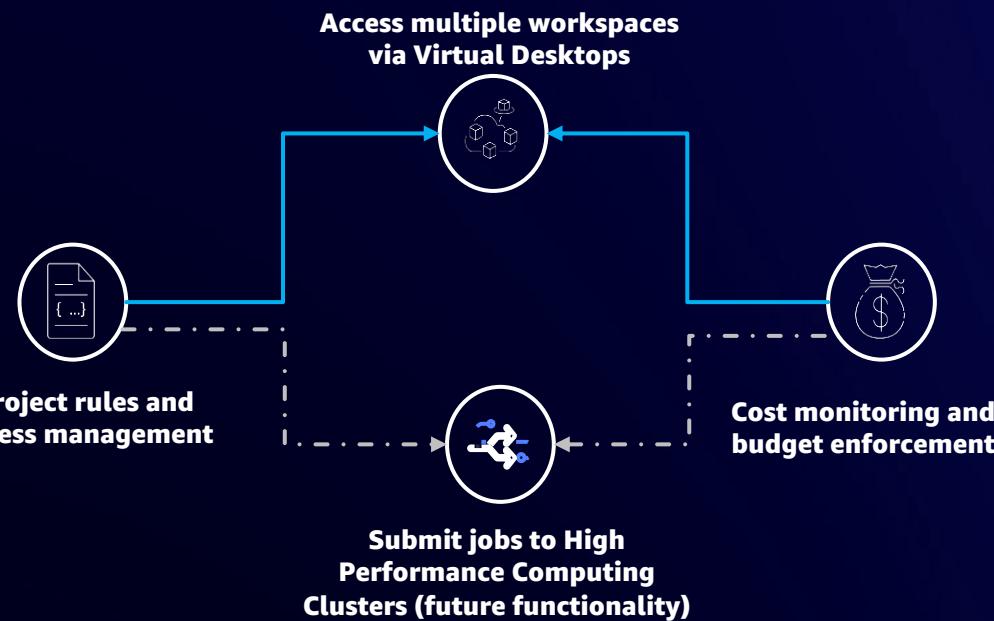
**Fixed compute resources are hard to scale**, leading to lack of agility and flexibility for expanding teams and fast-tracking projects



Easily manage, deploy and run cloud-based research and engineering environments

**Research and Engineering Studio on AWS (RES) is an open source, easy-to-use web-based portal for administrators to manage and create environments to enable researchers and engineers to run workloads without the need for cloud expertise.**

# What is Research and Engineering Studio?



## Research and Engineering Studio on AWS

Deploy and operate computationally intensive workloads.

### Features and Benefits

#### Accelerate time to result

Let your users focus on what they do best by simplifying access to a broad range of AWS infrastructure and services.

#### Improve collaboration

Enable your engineers and researchers to collaborate in a common environment with access to shared data.

#### Security and compliance

Allows IT administrators to standardize engineering and research workspaces and maintain consistent security, compliance and governance.

#### Web-based user interface

Research and Engineering Studio includes a simple web UI designed to simplify user interactions.

#### Simplify user management

Easily integrate with your existing identity management infrastructure to minimize administrative overhead.

#### Management and governance

Manage access to resources and data at a project level. Monitor and manage costs for each project with a simple interface.

### Getting started

[What is Research and Engineering Studio on AWS?](#)

[Getting started with Research and Engineering Studio on AWS](#)

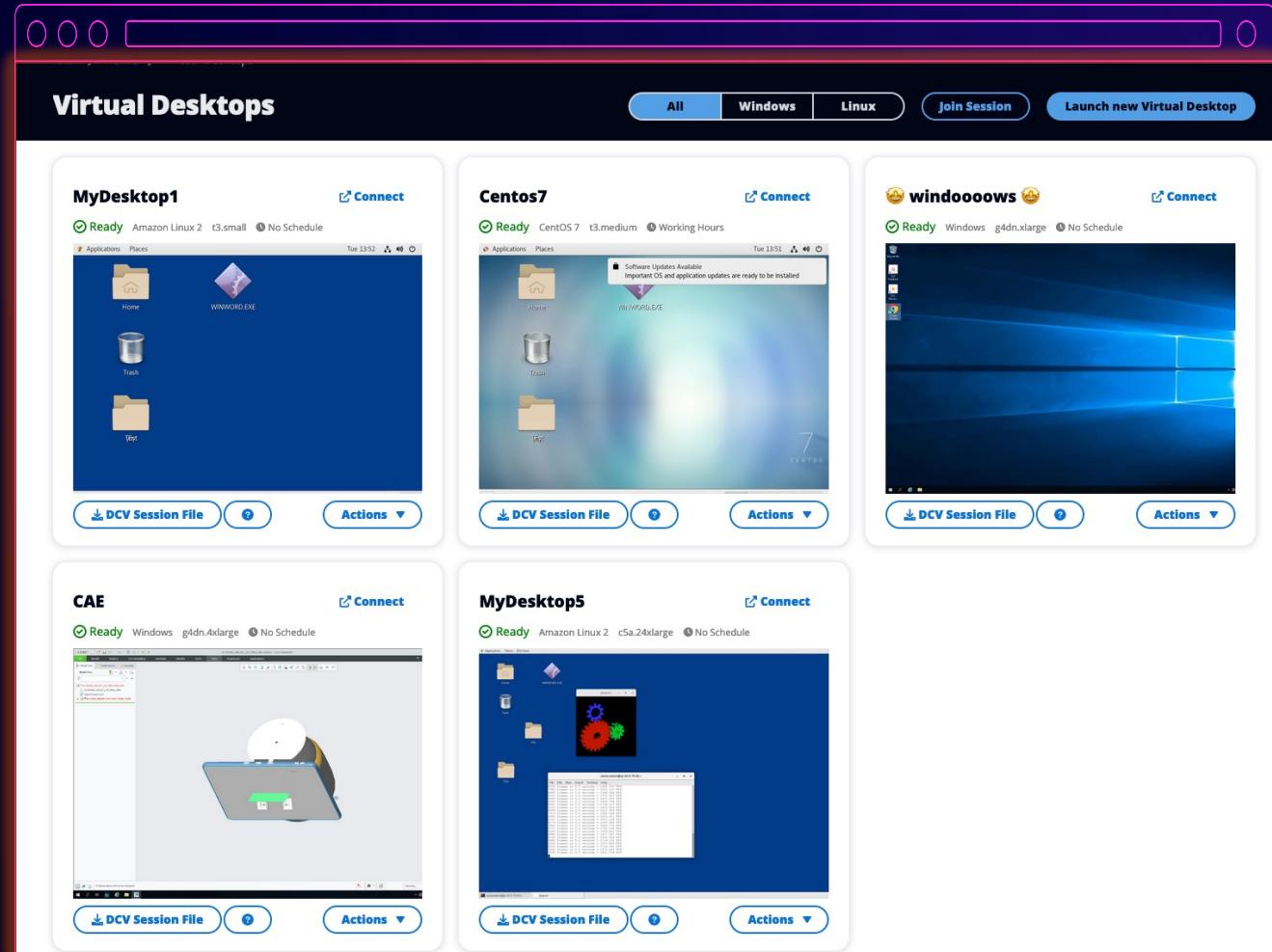
### More resources

[Documentation](#)

[Report an Issue](#)

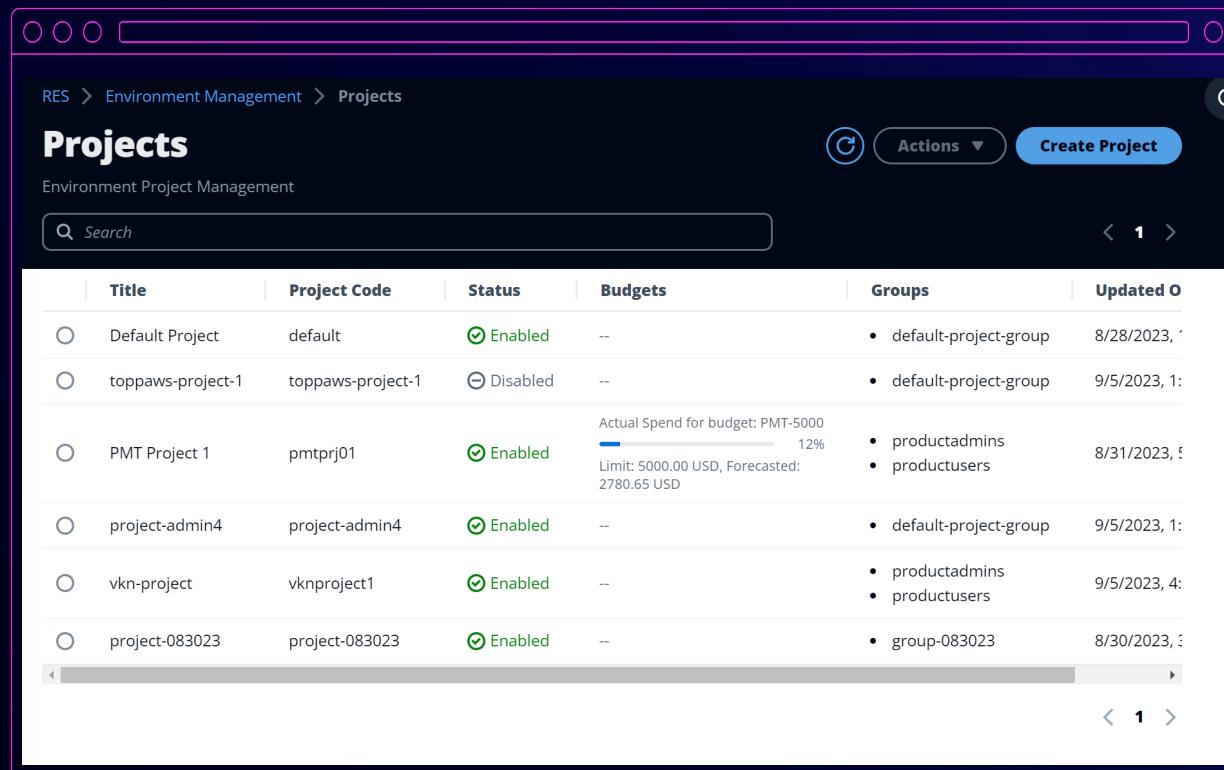
# Virtual desktop access

WINDOWS AND LINUX



# Project-based accounting

## TRACK COSTS BY PROJECT



The screenshot shows the AWS Environment Management Projects interface. At the top, there's a navigation bar with 'RES > Environment Management > Projects'. Below it is a header with 'Projects' and 'Create Project' buttons. A search bar is present. The main area is a table with columns: Title, Project Code, Status, Budgets, Groups, and Updated On. The 'Budgets' column includes a progress bar and text: 'Actual Spend for budget: PMT-5000' (12%), 'Limit: 5000.00 USD, Forecasted: 2780.65 USD'. The table lists several projects:

Title	Project Code	Status	Budgets	Groups	Updated On
Default Project	default	Enabled	--	• default-project-group	8/28/2023, 1:59 AM
toppaws-project-1	toppaws-project-1	Disabled	--	• default-project-group	9/5/2023, 1:59 AM
PMT Project 1	pmtprj01	Enabled	Actual Spend for budget: PMT-5000 12% Limit: 5000.00 USD, Forecasted: 2780.65 USD	• productadmins • productusers	8/31/2023, 1:59 AM
project-admin4	project-admin4	Enabled	--	• default-project-group	9/5/2023, 1:59 AM
vkn-project	vknproject1	Enabled	--	• productadmins • productusers	9/5/2023, 4:00 AM
project-083023	project-083023	Enabled	--	• group-083023	8/30/2023, 3:59 AM

- Track individual team costs using AWS Budgets
- Control access on a project level
- Integrated with Active Directory user and groups

# Research and Engineering Studio (RES)



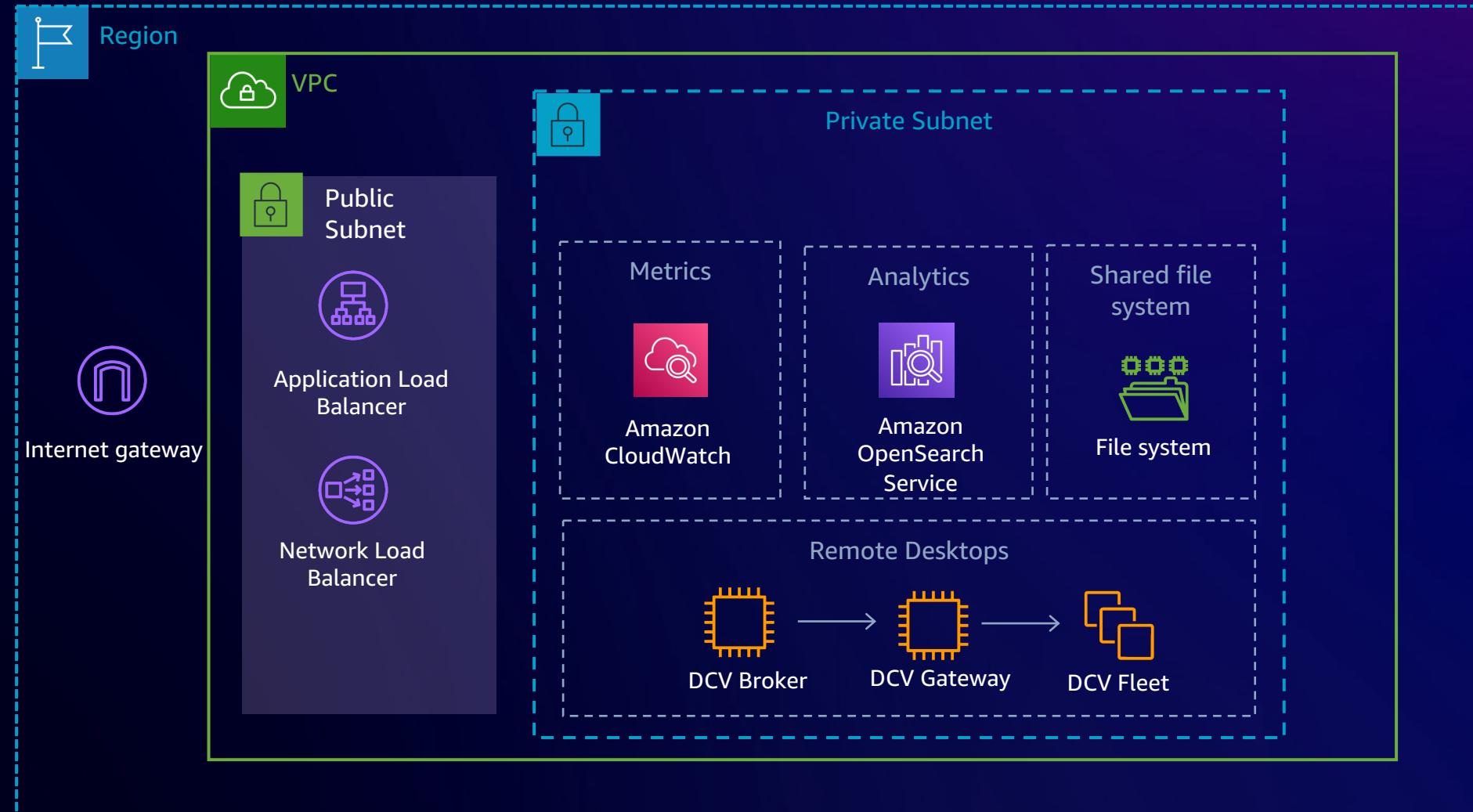
Administrators



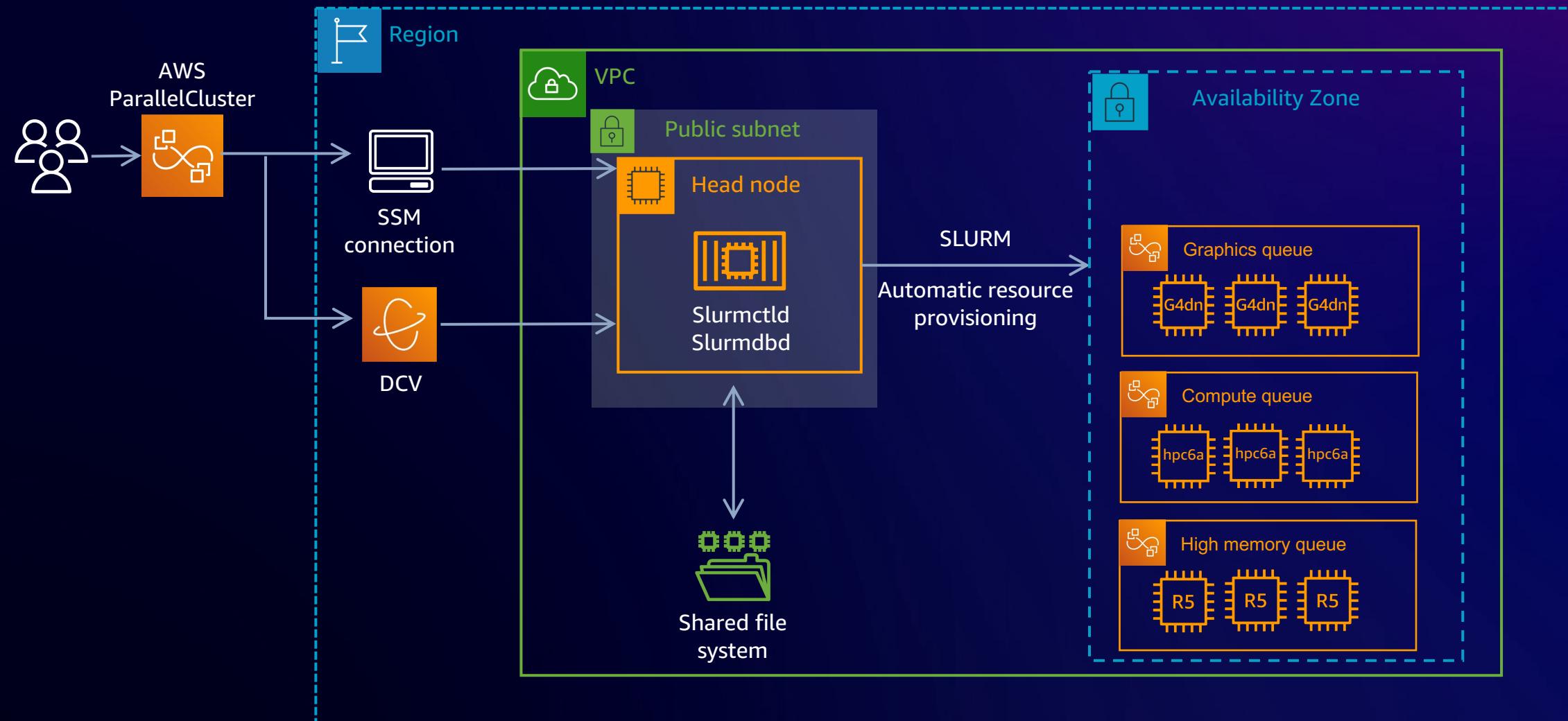
Power users



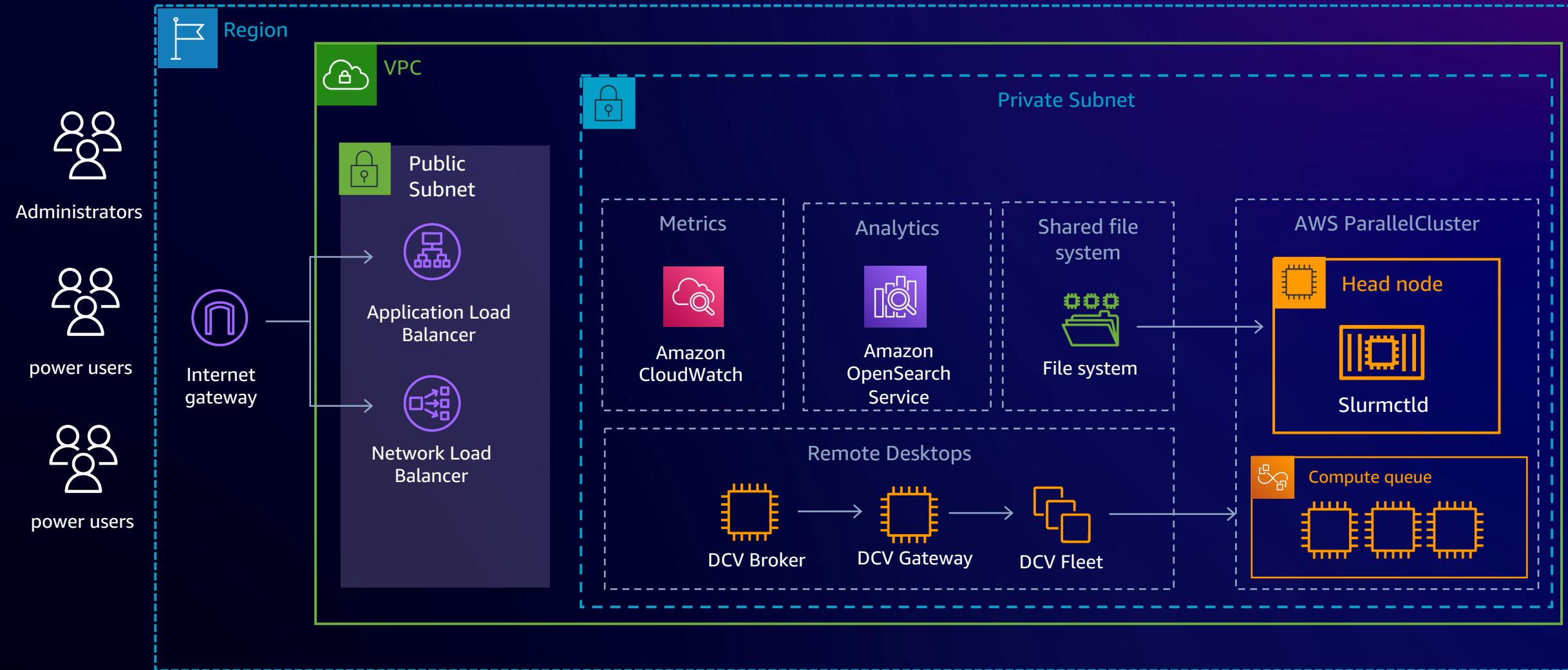
Power users



# AWS ParallelCluster architecture



# Research and Engineering Studio + AWS ParallelCluster



# Two distinct personas – Two distinct advantages

Install, configure, manage

Admin



Sys admins

Single pane of glass monitoring  
for AWS usage across projects

Login to a web portal and focus on their tasks

End users



Engineers



Analysts



Designers



Researchers

Accelerate time to results – with no learning  
curve to manage AWS resources

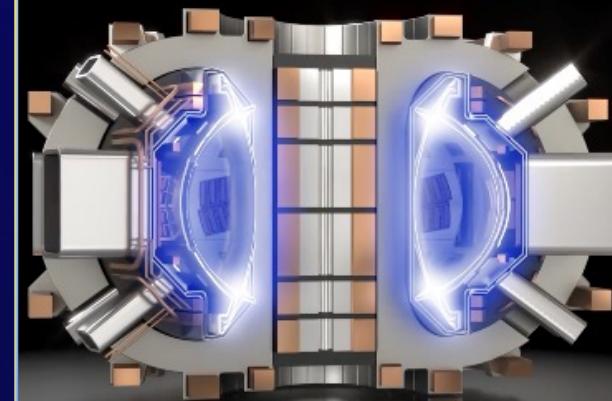
# Commonwealth Fusion Systems (CFS)

- Ansys Fluent, EM/Maxwell, mechanical
- **10,000+** AWS compute cores to run detailed simulations
- Almost **50%** reduction in runtime
- Reduce compute costs by more than **50%**
- Using Amazon EC2 Hpc6a.48xlarge instances to massively scale up simulations

"CFS has benefited greatly from high performance computing. The new Amazon EC2 Hpc6a has been a game changer. . . . We've been able to increase the speed of many simulation tasks, cut runtimes approximately in half, and reduce our computing costs by over 50%. As CFS works to bring clean, limitless commercial fusion energy to the grid, we're excited to work with AWS and their HPC team."

**Nate O'Farrell**  
Head of IT Infrastructure, Commonwealth Fusion Systems

## CUSTOMER PROFILE



# Thank you!

**Sean Smith**

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