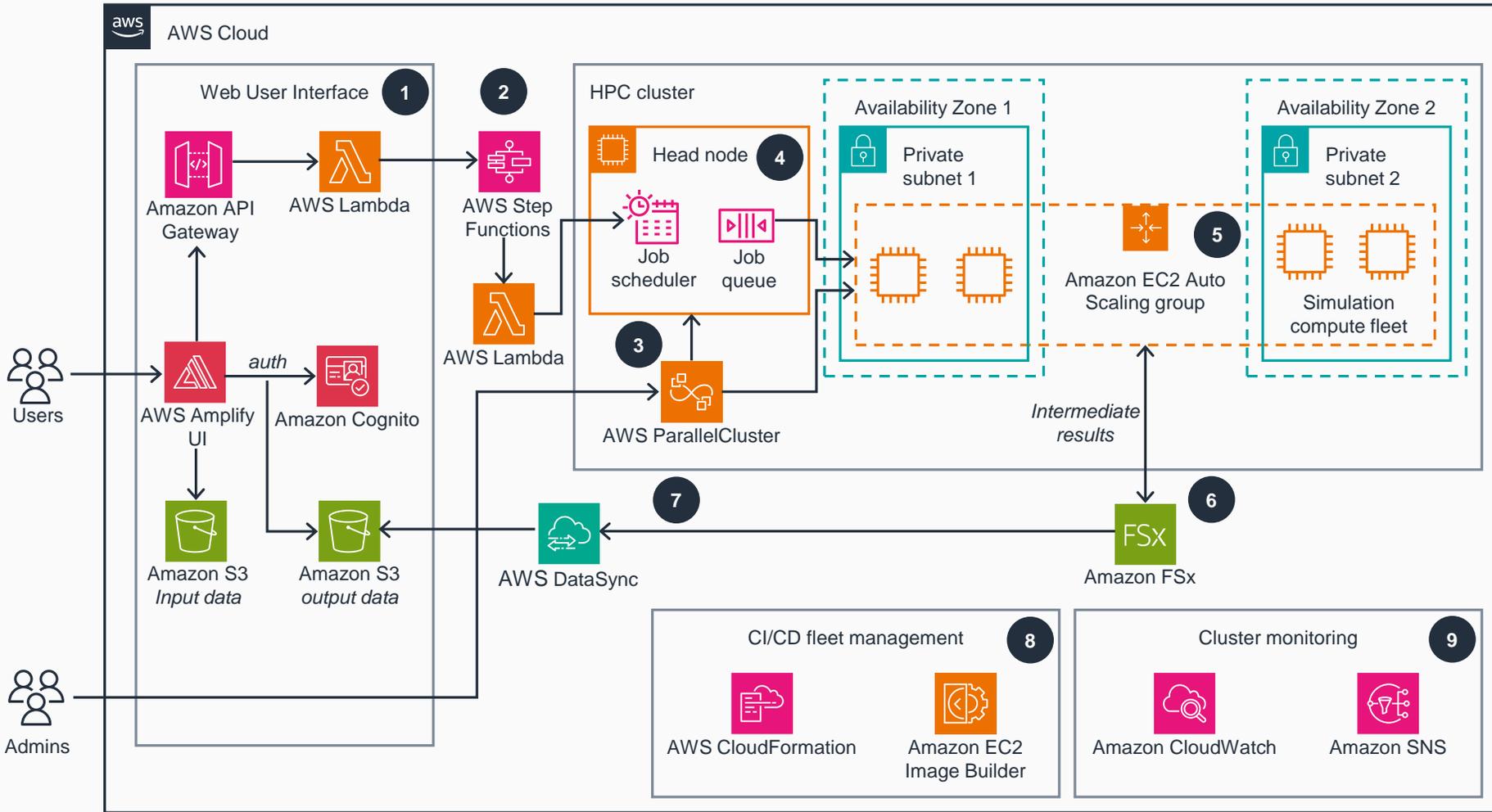# Guidance for Generation Interconnection Simulation on AWS

This architecture diagram illustrates how utilities, grid operators, and renewable energy companies can host generation interconnection simulations using high performance computing (HPC) on AWS.
This slide details steps 1–6 of the architecture diagram. For steps 7-9, refer to the next slide.

1   Use **AWS Amplify** to build a simple, full stack web application and get authenticated with **Amazon Cognito**. Upload and download data stored in **Amazon Simple Storage Service (Amazon S3).** Invoke an **AWS Lambda** function to preprocess input data for generation interconnection simulation, and start **AWS Step Functions**.

2   Use **Step Functions** to create a workflow that submits the simulation job, automates job batching, and monitors job status.

3   Configure an **AWS ParallelCluster** with the required software and dependencies to run generation interconnection simulations with job schedulers. Admins can interact with the high performance computing (HPC) cluster using the `pcluster` command line interface (CLI) and the **ParallelCluster** UI (from ParallelCluster version 3.5.0). **NICE DCV** is also included in **ParallelCluster**.

4   Use a job scheduler with a built-in queue to optimize generation interconnection simulation tasks depending on the job attributes (such as the number of tasks or priority) and the compute environment. **AWS Batch** and Slurm are natively supported. Alternatives are Terascale Open-Source Resource and Queue Manager (TORQUE) and HTCondor.

5   Schedulers distribute jobs across multiple nodes of a compute fleet. **Amazon EC2 Auto Scaling** is configured to scale compute capacity dynamically according to the number of jobs scheduled. Compute-optimized instances are recommended for the compute node (for example, Amazon EC2 C7i Instances or Amazon EC2 C7a Instances).

6   Use **Amazon FSx for NetApp ONTAP** or **Amazon FSx for OpenZFS** as a high performance file system to process and store intermediate results generated by generation interconnection simulation software. **Amazon S3** can be used to store the output files.

AWS Reference Architecture

Guidance for Generation Interconnection Simulation on AWS

Steps 7-9
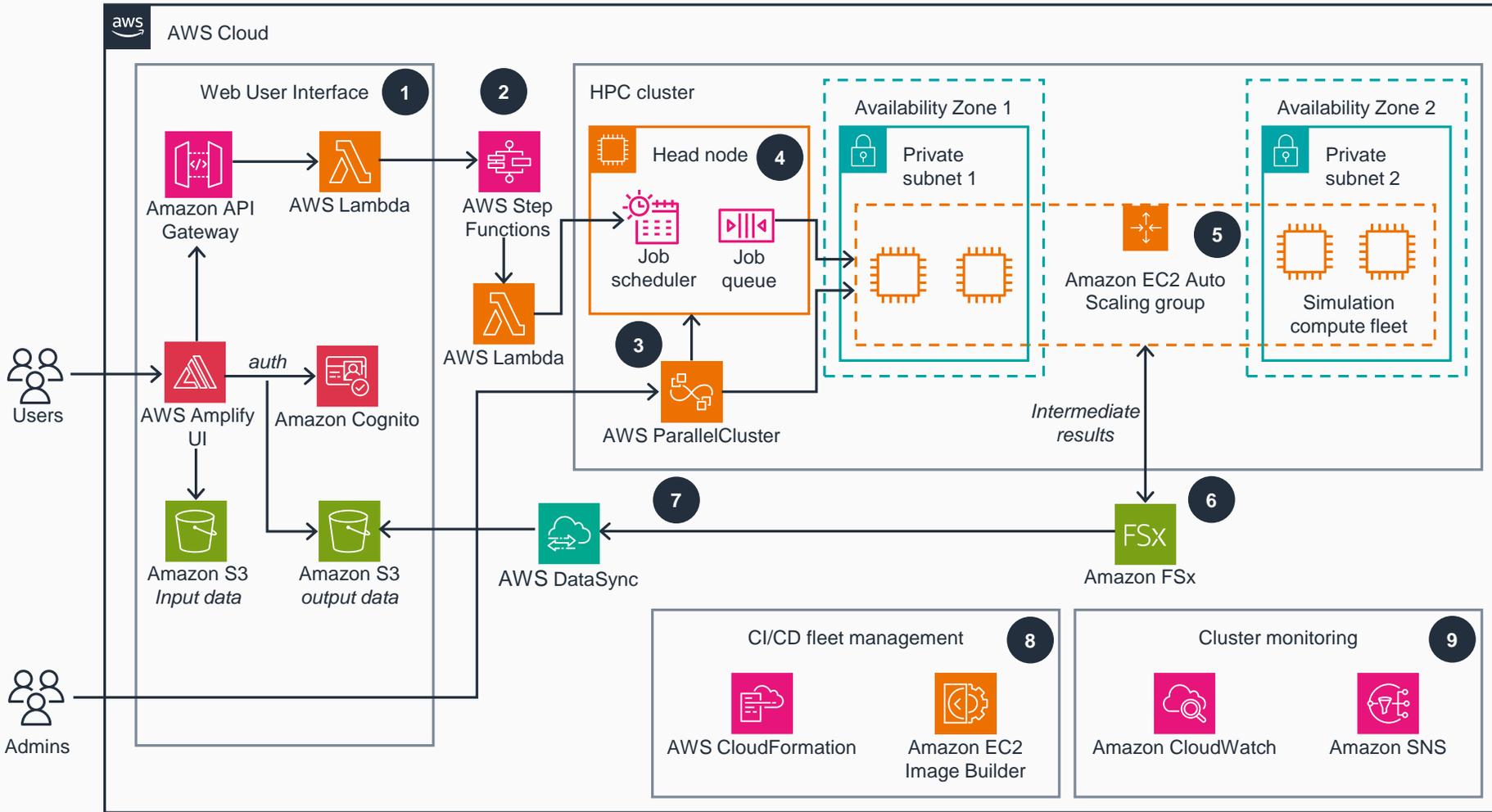
7 Use **AWS DataSync** to move a selected portion of data from **Amazon FSx** to **Amazon S3** for output visualization.

8 Use **EC2 Image Builder** and predefined **AWS CloudFormation** templates to manage the image for the cluster head node and the compute node for continuous integration and continuous delivery (CI/CD).

9 Use **Amazon Simple Notification Service (Amazon SNS)** and **Amazon CloudWatch** to monitor the cluster and notify users of simulation job status changes, such as starting and completion.

AWS Reference Architecture