Ansys Gateway powered by AWS – Architecture Overview

Today's complex engineering projects need access to state-of-the-art high-performance computing (HPC) infrastructure, as well as advanced computer-aided engineering (CAE) and computer-aided design (CAD) software, to meet challenging design goals and deadlines. However, the configuration of these resources at scale, security, and cost effectiveness can require deep technical expertise. Additionally, long deployment timelines in procurement of such infrastructure can impact the time to successfully deliver the project.

Ansys Gateway powered by AWS is the solution to these constraints. It provides developers, designers, and engineers seamless access to Ansys simulation products and other CAD/CAE applications in their own AWS cloud environment, accessible via web browser.

Here are the outcomes you can benefit from running your workloads on Ansys Gateway powered by AWS:

- Speed up your innovation by overcoming limitations created by fixed capacity of on-premises HPC clusters with flexible cloud-based compute capacity.
- Scale up/down hardware resources easily and meet project demands and timelines by reducing time to market.
- Manage and control your cloud consumption and costs directly within your AWS subscription. Get access to the latest compute, storage, and networking technology, and control costs of cloud utilization by entering and managing expense via a direct contract with AWS rather than through a third party.
- Enable efficient and effective production and project management of engineering simulation resources anywhere, anytime, and with easy access. IT will no longer have to deal with infrastructure.

/ ARCHITECTURE

The following figure illustrates the architecture and components of a typical workflow using Ansys Gateway powered by AWS.
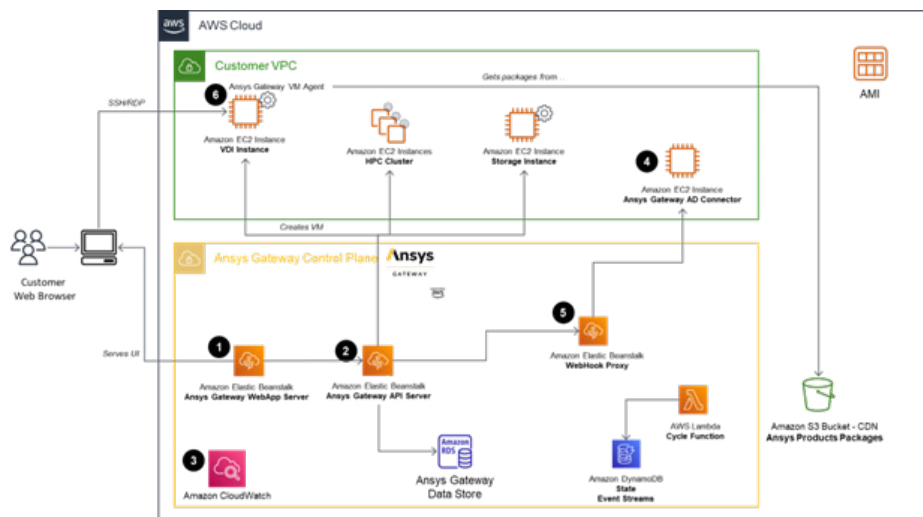

Figure 1. Ansys Gateway powered by AWS architecture, consisting of components based on AWS services

Ansys Gateway powered by AWS can be divided in to two broader parts — Control Plane and Data Plane. The Control Plane is made up of the following principal components (see Figure 1) :

- **Web Servers (1):** These provide the user interface to allow Ansys Gateway powered by AWS customers to follow guided-access wizards to create, view, and access HPC clusters, Virtual Desktop Infrastructure (VDI) instances, and general supporting resources. It also provides the interface to manage access, usage reports, budget and security control, and general Ansys Gateway powered by AWS administration. These are based on automatically scalable AWS Elastic Beanstalk instances that scale to meet the demand.

- **API Servers (2):** This is the core business logic where Amazon Elastic Compute Cloud (EC2) resources, HPC clusters, and VDI images are requested, configured, and maintained with permission from the customer. This set of servers handles all functions, from receiving user interface instructions and reporting on status to deploying Ansys simulation software and managing user access. This critical component of the system is supported with Amazon CloudWatch (3) for up-to-date monitoring and reporting to ensure operational efficiency and resilience.

- **Amazon RDS Data Store and Amazon S3 Package Store:** The server elements of the Ansys Gateway powered by AWS architecture are stateless, so all necessary data is stored in this resilient Amazon RDS database. The Package Store contains cloud-optimized packages to automatically install and configure selected Ansys applications, including the automated setup of HPC clusters.

- **AD Connector (4) and Communication Proxy (5):** These allow Ansys Gateway powered by AWS to join Amazon EC2 resources to the customer domain for seamless integration into existing customer workflows. An Active Directory (AD) Connector and associated proxy have been developed to securely handle this process.

- **Ansys Gateway powered by AWS Compute Agents (6):** These agents are installed on Amazon EC2 instances and provide the management capability for Ansys Gateway powered by AWS to install, configure, and manage each instance.

/ DESCRIPTION

Customer Deployment
Starting with a secure onboarding experience, customers are taken from the AWS Marketplace to the Ansys Gateway powered by AWS onboarding wizard. This is a guided entry point to provide details, set up prerequisites, and commission the AD Connector.

Customers are always in control of the permissions granted to Ansys Gateway powered by AWS, and authorization is based on AWS shared roles for cross-account access. AWS CloudFormation templates are generated for customer use during setup to ensure a smooth onboarding process.

Governance Capabilities
Ansys Gateway powered by AWS is configurable to allow for ease-of-management of HPC clusters, as well as ease of creation. You can set budgets for each Project Space, a collection of resources related to a single workflow or department, as well as manage role-based access control to machines, data, and compute resources.

Resources such as license servers or data stores can be easily shared across Project Spaces to allow efficient operation of multiple types of workflows. Administrators can review estimated costs, set budgets, and usage data to manage resources provisioned with Ansys Gateway powered by AWS. The following figure shows a screenshot of a sample Project Space.
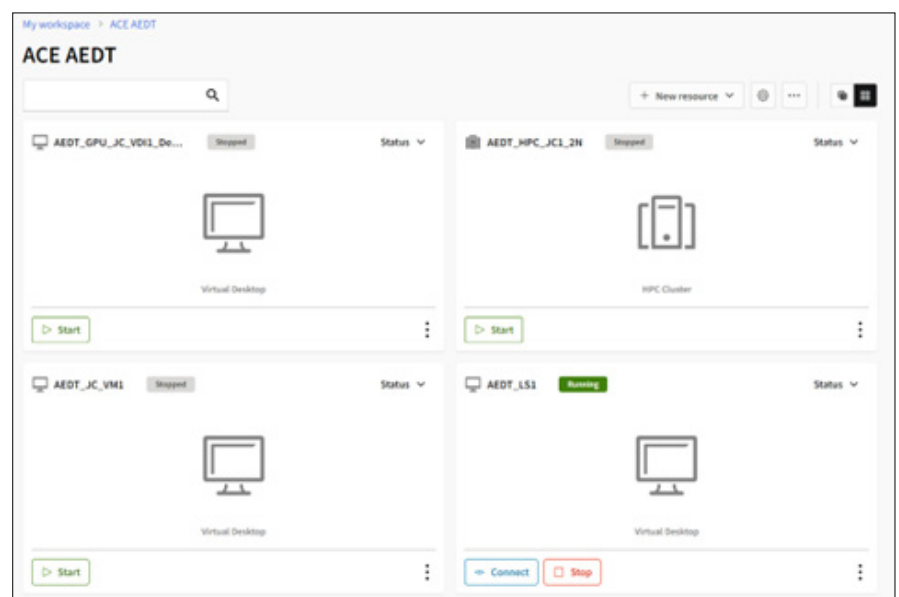

Figure 2. Project Space within Ansys Gateway powered by AWS