six nines
Cloud Responsibly™

UNLOCKING THE POTENTIAL OF CLOUD-BASED WEATHER MODELING TO INNOVATE RISK TRANSFER

CC — CLOUD CIO™

HPC — HIGH PERFORMANCE COMPUTING

OVERVIEW

GP

Global Parametrics harnesses advances in climate science, data modeling and financial engineering to create innovative risk transfer products that mitigate the economic effects of extreme climate and natural disasters in emerging markets. Six Nines expedited the use of Amazon Web Services (AWS) for Global Parametrics and enabled them to migrate a numerical weather model used to inform risk transfer contracts from on prem to the cloud.

CHALLENGES

Through a combination of scientific, financial and technical expertise, Global Parametrics is tackling big insurance industry challenges and pioneering new fintech approaches. In 2019, Global Parametrics partnered with Enki Research for help making a flexible atmospheric modeling framework based on the National Center for Atmospheric Research (NCAR) Model for Prediction Across Scales (MPAS). Global Parametrics needed a version of MPAS stable enough to support risk transfer contracts along with a scalable and redundant infrastructure for running many iterations of high resolution MPAS simulations. Although message-passing bottlenecks have traditionally limited the utility of big numerical weather models like MPAS in the cloud, the Global Parametrics team had heard about the AWS Elastic Fabric Adapter (EFA) pilot and was keen to test the potential of its simulations on AWS.

SOLUTION

Global Parametrics reached out to AWS about distributing an open source version of its MPAS model. AWS asked Six Nines, an AWS Premier Consulting Partner, to help deploy an infrastructure for an MPAS pilot. Six Nines not only provided guidance and support with efficiently migrating the MPAS model to AWS, but it also used its HPC expertise to help Global Parametrics optimize the CPU scaling curve for MPAS on AWS. Global Parametrics runs its simulations on c5n.18xlarge instances, featuring custom second-generation Intel Xeon Scalable Processors (Cascade Lake), on Amazon Elastic Compute Cloud (EC2). The c5n.18xlarge instances include the AWS Elastic Fabric Adapter, a network interface that supports the Message Passing Interface (MPI) and Intel MPI and is designed to accelerate HPC across EC2 instances.

Global Parametrics is also evaluating CloudCIO™ from Six Nines to optimize and apply governance to its AWS services. Through customized CloudCIO dashboards and detailed reports, Global Parametrics can easily and accurately track AWS usage and identify ways to further optimize costs as their usage patterns change.

RESULTS

Global Parametrics needs to be able to complete its analysis or forecasts in specific timeframes, so scale-out ability is key. For example, it may only have a 24-hour window to complete a 180-day forecast on a given day at 30KM resolution. With the help of Six Nines and the use of EFA, Global Parametrics has achieved promising results with MPAS simulations in AWS, scaling out to just shy of 200 cores. (In a past on-prem versus cloud comparison of a similar model, Community Earth System Model (CESM), the University of Michigan hit a similar plateau at 64 cores on AWS EC2). The Global Parametrics team feels Six Nines has put it on a path of stability, scalability, redundancy and reliability it needs in AWS.

"When it comes to cloud migrations, our use case was non-traditional. The Six Nines team didn't bat an eye at bringing our complex and difficult-to-understand model into the AWS ecosystem. They saved us a lot of valuable time and I'm sure countless headaches as well."

\- Aaron Michel, CTO, Global Parametrics

AWS SERVICES USED

- Amazon Elastic Compute Cloud (EC2)
- Amazon Simple Storage Service (S3)
- Amazon Virtual Private Cloud (VPC)
- Amazon Elastic File System (EFS)
- AWS ParallelCluster using Slurm
- AWS Elastic Fabric Adapter (EFA)

SIX NINES EXPERTISE

- High Performance Computing (HPC)
- Slurm Scheduler
- Infrastructure as Code (IaC)
- DevOps
- Custom Intel MPI and MPICH Deployment
- Security, Cost Optimization and Governance

aws partner network

Premier

Consulting Partner

DevOps Competency

Microsoft Workloads Competency

Solution Provider

WHY SIX NINES?

Six Nines IT is an AWS Premier Consulting Partner and AWS Solution Provider specializing in helping businesses migrate to the cloud responsibly. A member of the AWS Partner Network since its inception, Six Nines has successfully migrated hundreds of customers across all industries to the cloud and offers an unparalleled combination of speed, agility, experience, and proprietary solutions to deliver accelerated solutions and a rapid time-to-value. The Oakland-based company combines old-school, on-premises IT roots together with deep expertise and a laser focus on all things AWS - including a core concentration on high-performance computing, artificial intelligence, machine learning, Microsoft workloads and DevOps - to deliver solutions that are individually tailored to meet customers' needs throughout the cloud lifecycle.

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