Maximizing Productivity and Creating New Revenue Opportunities via Cloud Computing

" Our race engineers have as little as a week to find the optimal setup for the next race. When working on production vehicle programs, they have to comprehend increasingly complex vehicle subsystem interactions within shrinking program timelines. We needed to enable them to evaluate larger design spaces and dramatically decrease their time spent waiting for results. "

Chris Morgan
SENIOR SYSTEMS ENGINEER
PRATT & MILLER ENGINEERING

PRATT & MILLER

BUSINESS
Founded in 1989, Pratt & Miller Engineering is a full-service engineering and manufacturing company. Pratt & Miller's advanced simulation software has made them the dominant force in professional motorsports, having won the "24 Hours of Le Mans" seven times.

CHALLENGE
Insufficient compute resources were restricting Pratt & Miller's ability to run simulations. This cost them valuable time and potentially a race.

SOLUTION
CliQr enabled Pratt & Miller to on-board their High Performance Compute application to any cloud quickly and without any recoding. Powerful command line access allowed seamless parallelization of workloads without impacting user experience.

BENEFIT
CliQr enabled Pratt & Miller to on-board their application quickly and without any recoding. Powerful command line access allowed seamless parallelization of workloads without impacting user experience.

USE CASE: High Performance Compute

Business

A Windows-based vehicle simulation application called Pratt & Miller Lap Time Simulation (PM-LTS), allows Pratt & Miller clients a dynamic "13 Degrees of Freedom" vehicle model that predicts lap times. The software accepts input parameters for all aspects of the vehicle (such as tires, brakes, suspension, engine, and drivetrain and a variable to represent the racetrack) to be simulated (including elevation, braking, friction, cornering, and atmospheric conditions).

Challenge

Typical usage of PM-LTS has users try different configurations, each simulated with different manually entered or spreadsheet-imported parameters. PM-LTS was originally architected to run on a single machine took more than an hour to run. If multiple iterations were necessary, simulations could run for days before an actionable result was generated.

As vehicle designs became more complex, processing these simulations became a bottleneck. To meet project timelines, engineers were forced to reduce the number of iterations being run, which impacted Pratt & Miller's ability to tune performance and ensure a win on race day.

To address this problem, Pratt & Miller wanted to parallelize this effort by running simulations across multiple machines. But they did not want to incur the capital cost and ongoing management overhead of purchasing servers hosted onsite. Due to frequent cloud bursting and High Performance Compute (HPC) nature of their workload, moving to a public cloud could help. Thus, Pratt & Miller began a search for a solution that would:

1. Allow the PM-LTS modeling process to be parallelized

2. Allow the PM-LTS application to be run on public cloud infrastructure

3. Require no change to any workflow, and be completely transparent to their clients

Solution

After investigating multiple potential options, Pratt & Miller chose CliQr's CloudCenter platform to help them accelerate their simulations and get their business back on track. Two key factors made CliQr the obvious choice.

First, CliQr's hybrid cloud management platform provided Pratt & Miller with an easy way to cloud-enable and parallelize their application without requiring any recoding. In particular, CliQr's comprehensive support for simulation and other HPC applications allowed Pratt & Miller to easily capture the multi-step workflow required to deploy and manage the PM-LTS application across tiers of tens or hundreds of cloud nodes efficiently. This approach was vastly different from some of the other options they reviewed, including one estimate of approximately four to six weeks for an experienced software engineer to re-architect their application so it could run on multiple back-end servers.
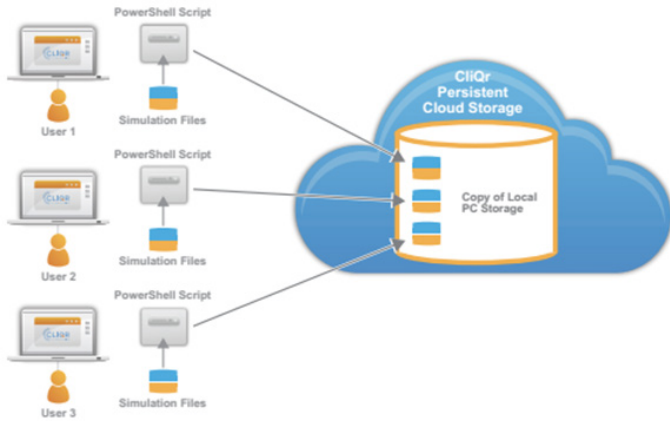
Second, CliQr's extensive command line interface allowed the use of a simple Windows PowerShell script to automate the transfer of simulation files from a local machine to a private and secure persistent cloud storage area. Once uploaded, the simulation was invoked on the cloud to process the files without impacting the users workflow, and without requiring any changes to the desktop user interface.

Benefit

Using CliQr, Pratt & Miller increased their processing power anywhere from two to hundreds of times with no changes to the PM-LTS application.
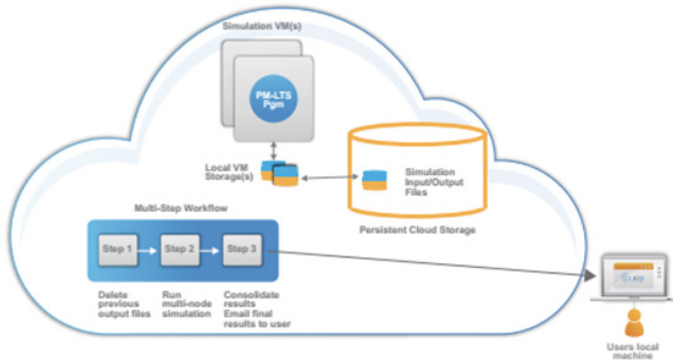
They can now parallelize the workload and dynamically scale up the number of nodes provisioned in the cloud to adapt consumption based on business requirements and project timelines. In one instance, CliQr allowed Pratt & Miller to accelerate the completion of a simulation consisting of more than

2,500 iterations. If left to run on a single 8-core workstation, this workload would have taken more than 14 days to complete. By parallelizing this workload across 500 cloud nodes, they were able to reduce the completion time to about five hours.

PRATT & MILLER PM-LTS CLOUD PROCESS FLOW

In addition, the portable and cloud-agnostic nature of CliQr's platform eliminated the threat of cloud lock-in, enabling Pratt & Miller to run their application, without modification, on any CliQr-supported public or private cloud. This portability, coupled with CliQr's automated benchmarking capability, allows Pratt & Miller to

" Cloud computing is a game changer for technical computing because it enables any size simulation to be completed in an hour (who needs a supercomputer?). CliQr let us harness enormous compute power without having to become cloud computing experts, and gave us complete flexibility and the ability to use the cloud provider that best met our needs based on simulation requirements. "

determine the best location for each simulation, based on the lowest price, the best performance, and the best overall price-performance value depending on the specific needs of each simulation batch. Portability also ensures that they can continue to run simulations on alternate clouds, if their preferred provider was down.

CliQr allows Pratt & Miller's engineering team to keep projects on schedule, spend more time in the design phase when required, and bid on more complex design projects. These benefits mean better service and increased product quality for their customers as well as the potential for Pratt & Miller to increase their market size.

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