Case Studies

HPC in the Cloud: A Solution for Varied Computing Needs

A sampling of use cases

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Prepared by

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Why HPC in the Cloud?

In our experience, HPC users are turning to the cloud on an ever-increasing basis. The reasons for this increased demand are many and varied, including:

- a lack of funding for hardware and software
- a lack of support (nobody to manage and optimize the cluster)
- a lack of flexible availability for local or in-house HPC resources
- a work flow that includes "burst" or rapid deployment
- a work flow that requires scalability at all times

Advanced Clustering Technologies is sharing the following case studies to demonstrate how our customers are making use of ACTnowHPC, our on demand HPC cluster in the cloud – and the results they are getting.

These case studies are intended to help you answer the following questions:

- When is HPC in the cloud the best solution?
- Is HPC in the cloud right for my project?
- What sort of increased efficiencies can I expect from the cloud?

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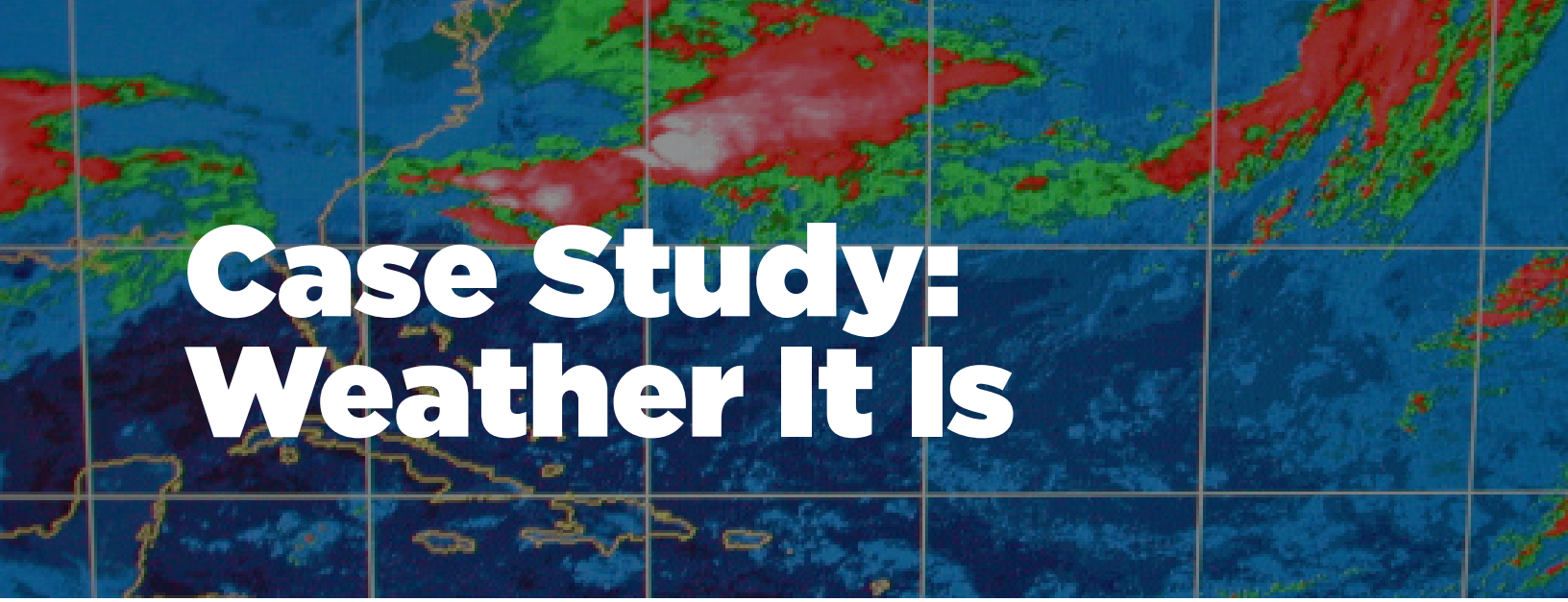

Case Study: Weather It Is

Weather It Is makes high resolution forecasts to maximize forecast accuracy. Areas of research include numerical modeling of severe storms and lightning, the impact of greenhouse gases on climate, and the effect of aerosols on precipitation and hurricane development.

Weather It Is, LTD, is using Advanced Clustering Technology's ACTnowHPC cloud high performance computing cluster to forecast potentially severe winter snowstorms, including storms like the one that threatened the East Coast Jan. 22-24,2016.

CHALLENGES FACED BEFORE THE CLOUD

Before Weather It Is started using ACTnowHPC, the company faced a lack of availability on its own HPC cluster, where the forecasters were running various Fortran compilers and running on about 150 cores every day. Weather It Is needed something reliable that fit the budget and offered full technical support.

"We chose the ACTnowHPC system because it offers reliability and quick turn-around times without the headaches of owning and managing your own system," said Weather It Is CEOBarry Lynn.

Reasons for Switching to ACTnowHPC:

- Availability
- Quick turn-around times
- Technical Support
- No initial capital outlay

"Set-up was easy. We basically mirrored our own high powered computing system on the HPC system and adapted our programs that had already been running on our internal system."

BENEFITS OF WORKING ON THE CLOUD

Weather It Is has experienced greater flexibility in scheduling and completingjobs sincestarting on ACTnowHPC.

"On our current system, we can run just three large jobs at the same time.On ACT-nowHPC, we've more than tripled our productivity with even faster turn-around time job-per-job than on our own system."

BIOO SCIENTIFIC

Case Study: Bioo Scientific

Bioo Scientific Corporation is an Austin, TX based biotechnology company that provides innovative solutions for food and feed safety testing and life science research.

CHALLENGES FACED BEFORE THE CLOUD

Bioo Scientific was running on a workstation, which is very timely in completing target regions. Researchers have access to 24 cores, enabling them to run 21 jobs or targets concurrently. This is adequate when working on only one gene for one panel. However,the challenge researchers face is that panels vary in size. For instance, when trying to work on 21 panels composed of 58 genes, the 700 targets. Trying to run 700 jobs locally did not make sense, nor was it economical.

After testing several platforms, Bioo Scientific found that ACTnowHPC delivers results more quickly due to less queue time and slightly better processing time on a per job basis. Today Bioo Scientific is utilizing the cloud cluster to run NextflexTM Amplicon StudioTM for the mass design of target specific PCR primers.

Reasons for Switching to ACTnowHPC:

- Saves time and cost
- Allows faster delivery
- Technical Support

BENEFITS OF WORKING ON THE CLOUD

Before the release of custom panels, Bioo Scientific was using the same software to perform much smaller jobs, for fixed panels.

Custom Amplicon Panels allow sequencing of very specific information, giving the researcher exactly what they requested. Using ACTnowHPC allows Bioo Scientific to accept several custom orders and design high quality primers more efficiently.

> The cloud reduces time from initial customer contact to product delivery because it allows for much higher throughput of information. The ability to run hundreds of jobs at the same time is really what makes the difference.

Case Study: Auto Research Center

Auto Research Center, LLC uses testing devices such as wind tunnel, CFD Elements software, a seven post rig and a drive train test rig to provide analysis for customers that include professional auto-motive racing teams, auto-motive manufacturers, delivery vehicle manufacturers, and heavy duty truck and trailer manufacturers.

CHALLENGES FACED BEFORE THE CLOUD

Auto Research Center maintains its own in-house high performance computing data center for maximum customer privacy. Current cluster computing power includes more than 10 teraFLOPS and 600+ cores.

More than 1,000 additional processors are also accessible remotely outside of the headquarters. Despite all of this computing power, the company's resources can be limited when the need arises to satisfy a demanding project in a short period of time. Auto Research Center turned to ACTnowHPC to supplement its HPC resources.

"Ramp up was simple, including the account setup, initial testing and job monitoring," said

Reasons for Switching to ACTnowHPC:

- Fast job execution speed
- Access to RAM
- HPC support

ARC Director of Analytics Jean-Michel Esclafer de La Rode.

> "The access to extra cores on the cloud allowed for more throughput in the same period of time. The run times were reduced compared to our in-house resources."

BENEFITS OF WORKING ON THE CLOUD

Auto Research Center found that the key benefits to working in the ACTnowHPC cloud are in the job execution speed, access to RAM, HPC support and maintenance."Run times were up to 20% faster than our resources. File transfer times were not of concern. The overall customer experience is pleasant, and support response times are relatively fast compared to other clouds."

Case Study: University of Massachusetts

David P. Schmidt is a Professor of Mechanical and Industrial Engineering at the University of Massachusetts. Prof. Schmidt's research is in the fluid mechanics of two-phase flow. For his PhD., hestudiedcavitationindieselfuelinjectornozzles. Sincethen,he has focused more on sprays and flash-boiling.

He is studying primary atomization, droplet collision, non- Newtonian atomization, and new numerical methods for spray simulations. His research will help diesel, gasoline, and aircraft engines operate efficiently while producing less pollution.

CHALLENGES FACED BEFORE THE CLOUD

Schmidt found that his computational needs were not being met by on-campus resources. He looked to the ACTnowHPCcloudservicefor support.

"Mostofthesystemswehaveaccesstoaregrossly oversubscribed so, whenever we have computations that were time sensitive, we want to see if it would be faster to use ACTnowHPC, and it is."

Schmidt says he has been able to expedite his work thanks to the ACTnowHPC cloud solution.

Reasons for Switching to ACTnowHPC:

- Fast job run times
- No waiting for access
- Technical support

BENEFITS OF WORKING ON THE CLOUD

"It's as fast as the fastest machine we have access to, which is Stampede, which is run by XSEDE. Often you'll have a 12-hour wait to submit a job, then when it's ready to start, you find a small glitch," Schmidt said. "I'm impressed by how ACTnowHPC is run. I appreciate the administrators. Whenever we ran into a problem, your administrators were great at getting it fixed. For example, our revision system wasn't working with the filesystem, but the ACTnowHPC administrators fixed that very quickly. When we needed software, the administrators installed that for us as well.

> ACTnowHPC is a high quality service and as fast a machine as we've ever used."

Produced By Advanced Clustering Technologies

Advanced Clustering offers customized, turn-key high performance computing clusters, servers, storage solutions, workstations and on demand HPC cloud computing. With morethan 15 years of experience developing HPC solutions for universities, government agencies and industry, Advanced Clustering is a proven leader when it comes to providing innovative high performance computing solutions. Learn more at AdvancedClustering.com. For more information about ACTnowHPC, and tosignup for a free trial today, visit ACTnowHPC.com.