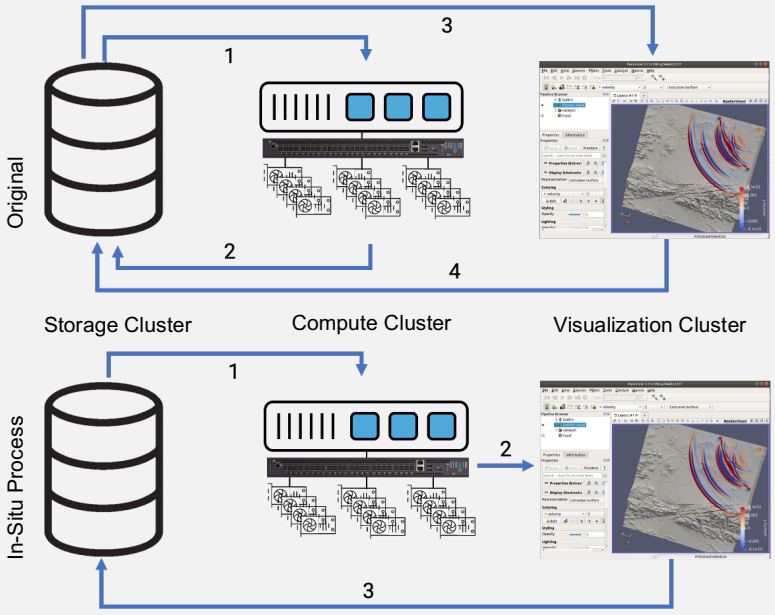
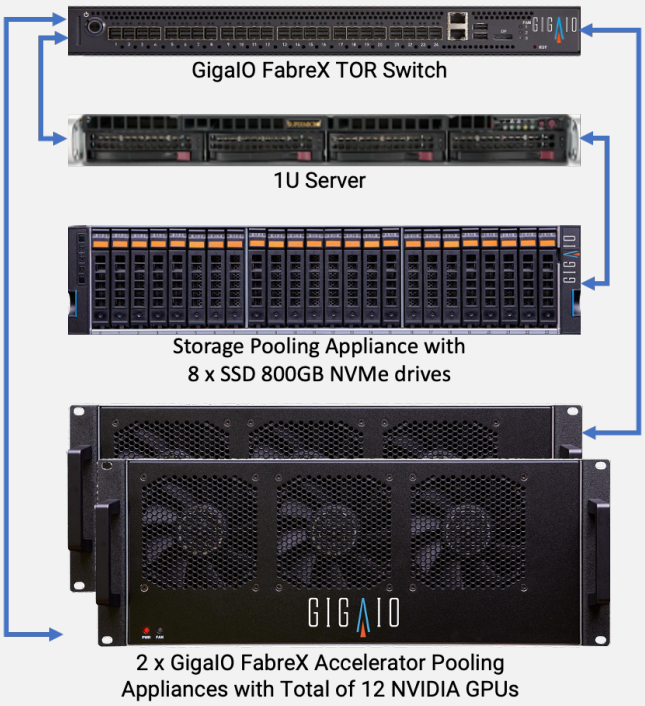
Concurrent Computing with Real-Time Visualization Cuts Time-to-Solution in Half



Configuration



Concurrent Computing with In-Situ Visualization Cuts Time-to-Solution, Storage and Network Traffic in Half.

Configuration -- The configuration is a 1U server connected to the FabreX™ PCIe Network fabric. The resources composed with FabreX include a Storage Pooling Appliance and two Accelerator Pooling Appliance with NVIDIA GPUs, 8 GPUs in the compute cluster and 4 GPUs in the visualization cluster.

The application software is “awp-odc-insitu”, based on the well-known seismic simulation software “awp-odc-os”. The in-situ visualization is the open-source application “ParaView”.

Objective – Today, numerical simulation plays a vital role in analyzing and assessing earthquakes. Storage performance and network bandwidth have not kept pace with the growth of computing power; as a result, post-processing (visualization) has become the bottleneck to end-to-end performance. One way to solving this performance imbalance is to reduce the amount of output data by implementing In-Situ visualization.

Results Summary – The upper graphic shows today’s 4-step process. Data is moved from the storage cluster to the compute cluster (1) and results returned to the storage cluster (2). The visualization cluster then accesses the results from storage (3) and then returns data back to the storage cluster (4).

The In-Situ visualization is a 3-step process in the lower graphic. Data is moved for the storage cluster to the compute cluster (1) then results are sent to the visualization cluster (2) and displayed in real-time. The results are moved back to storage cluster (3). The In-Situ results added only 2.5% to the compute stage, but cut overall time-to-solution in half and dramatically reduced network traffic and storage by ~50%.

GigaIO FabreX is a Rack-Scale composable infrastructure solution that delivers the unlimited flexibility and agility of the cloud, at a fraction of the cost. Benefits include:

Improved system agility by disaggregating system resources on the fly and creating shared resource pools that can then be dynamically composed in real-time.

Slashed Total Cost of Ownership by enabling device sharing which increases resource utilization and eliminates over provisioning, resulting in reduced CapEx and OpEx.

Simplified and automated system set-up, administration and serviceability with freedom of choice for management tools from powerful CLI and Redfish® APIs to ready-to-run, off-the-shelf enterprise-class orchestration software.

Seamless support for any PCIe-compliant device including servers, CPUs, memory, 3D-XPoint, storage, GPUs, FPGAs, specialty ASICS and NICs.

Blazing system performance with industry leading PCIe latency and bandwidth throughout the rack and beyond. As PCIe resources are added they immediately benefit from the native PCIe performance as all data transfers and buffers are completely eliminated.

Visit www.gigaio.com to discover more about GigaIO and FabreX, the industry’s only pure PCIe Network Fabric.

Download the In-Situ paper published and presented at PEARC 2019 -- In-situ Analysis and Visualization.