POC for Scalable and Heterogeneous Gen-AI Platform

Overview

Dell, Scalers.AI, and The Futurum Group present a Proof of Concept for scale-out inferencing using a common software stack across heterogeneous CPU and GPU systems demonstrating:

- A single CPU based system supporting multiple, simultaneous, real-time sessions
- GPU augmented clusters supporting hundreds of simultaneous, real-time sessions
- A common software stack for inferencing across heterogeneous hardware

Distributed Inferencing Stack

We present examples that include CPU only single and multi-node systems, and GPU augmented clusters for deployments of Generative-AI LLMs on these hardware configurations.

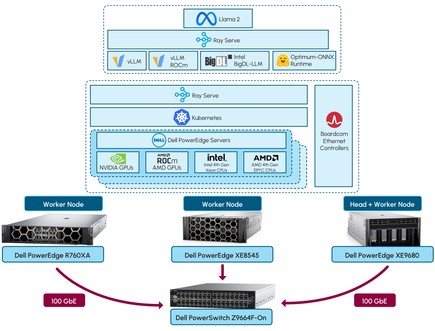


***Figure 1:** General, Scale-Out AI Inferencing Stack (Source: Scalers.AI)*

Several important aspects of the architecture enable organizations to customize and deploy generative AI applications in their choice of colocation or on-premises data center. These include:

- Dell PowerEdge Sixteenth Gen Servers, with 4th generation CPUs and PCIe Gen 5 connectivity
- Broadcom NetXtreme BCM57508 NICs with up to 200 Gb/s per ethernet port
- Dell PowerSwitch Ethernet switches Z line support up to 400 Gb/s connectivity

By using a scale out inferencing solution leveraging industry standard Dell servers, networking and optional GPU accelerators provides a highly adaptable reference that can be deployed as an edge solution where few inferencing sessions are required, up to enterprise deployments supporting hundreds of simultaneous inferencing inputs.

Performance

In Figure 2 below, we show the total throughput of 3 different CPU configurations, along with the associated per word latency.

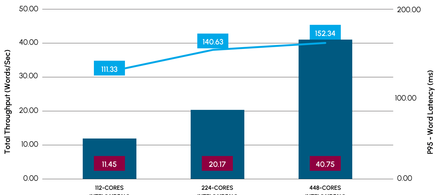


***Figure 2:** Interactive Inferencing Performance for CPUs (Source: Futurum Group)*

Results showed that not all generative AI inferencing applications require a GPU for real-time deployments. With a date of 3.33 words per second and 100 ms. serving as acceptable levels for interactive performance, we achieve between 3 and 12 simultaneous streams:

- 11.45 / 3.33 = 3
- 20.17 / 3.33 = 6
- 40.75 / 3.33 = 12

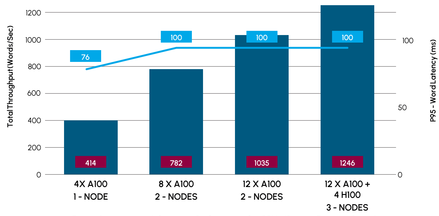


***Figure 3:** Interactive Inferencing Performance for GPUs (Source: Futurum Group)*

The GPU based results significantly exceed those of the CPU based deployments. In all cases latency remains below 100ms.

- 414 / 3.33 = 124
- 782 / 3.33 = 34
- 1035 / 3.33 = 310
- 1246 / 3.33 = 374

Highlights

A key aspect of the PoC is the software stack that helps provide a platform for AI deployments, enabling scale-out infrastructure to significantly increase content creation rates. Importantly, this AI Platform as a Service architecture was built using Dell and Broadcom hardware components, coupled with cloud native components to enable containerized software platform with open licensing to reduce deployment friction and reduce cost.

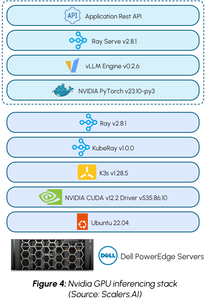


***Figure 4:** Nvidia GPU inferencing stack (Source: Scalers.AI)*

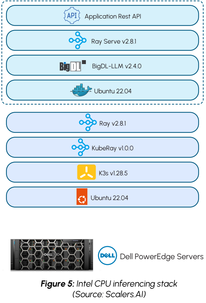


***Figure 5:** Intel CPU inferencing stack (Source: Scalers.AI)*

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