NVIDIA DGX A100
FOR BUILDING CONVERSATIONAL AI APPLICATIONS

Conversational AI is on the Rise

> Worldwide spending on conversational AI is expected to top $13.8 billion by 2023.¹ – IDC
> Early benefits of conversational AI adoption yield an average of 30% annual growth in business value.² – Deloitte Digital

The Challenge for Building State-of-the-Art Conversational AI

The successful adoption of conversational AI hinges on the delivery of natural interactions that feel human. This requires contextual awareness, the capacity to understand sentiment, and the ability to hold simultaneous conversations—all delivered in milliseconds. Also, in order to realize ROI, developers need AI expertise, access to large amounts of industry or product-specific data, and the infrastructure and tools to speed model iteration and accuracy. NVIDIA® DGX™ A100 offers the high-performance AI infrastructure needed to deliver state-of-the-art conversational AI, making it easier for enterprises to implement AI-powered assistants, messaging apps, and chatbots with superhuman levels of language understanding.

Leverage Ready-to-use Tools and Optimized Models

NVIDIA Jarvis, an application framework developed to build end-to-end GPU-optimized conversational AI services, includes hundreds of pre-trained models. Jarvis boasts optimized, end-to-end pipelines for speech, vision, and natural language understanding (NLU) tasks. These models were trained for more than 100,000 hours, across open and proprietary datasets, using NVIDIA DGX systems. Developers can fine-tune them with their domain-specific data using a simple API with the NVIDIA NeMo toolkit on their DGX system. They can also build and train state-of-the-art models, such as Quartznet, Jasper, BERT, Tacotron2, and WaveGlow from scratch using NeMo. More natural interactions can be achieved on conversational AI applications by building multimodal skills that fuse speech and vision.

Achieve Highest Levels of Accuracy and Human-Like Conversation

NVIDIA DGX A100 features eight NVIDIA A100 Tensor Core GPUs—the most advanced data center accelerator ever made. Third generation Tensor Cores

are optimized to accelerate matrix-multiplication calculations, which are at the heart of AI training and inference. Tensor Float (TF32) precision enables support for both larger magnitudes and precision, delivering 10X the AI performance improvement than previous generations—without any code change. And because natural language processing (NLP) is typically faced with large and sparse input matrices, as the number of useful words is a tiny fraction of the size of the dictionary\(^3\), the new structural sparsity feature within the A100 GPU can accelerate computations by an additional 2X across a variety of common AI networks. Third generation NVIDIA NVLink\(^{®}\), NVIDIA NVSwitch\(^{™}\), and NVIDIA Mellanox InfiniBand delivers ultra-high bandwidth and low latency connections between all the GPUs and enables scaling of multiple DGX A100 systems to train the largest NLP models.

**Deliver Interactive Response**

The latency threshold for real-time performance and human-like conversations is under 300 milliseconds [ms]. Using the NVIDIA Jarvis conversational AI framework, developers can optimize state-of-the-art models for inference and offer real-time services that run in 150 ms [vs. 25 seconds on CPU-only platforms], delivering a 160X performance improvement. Serve several models on NVIDIA Triton Inference Server, running efficiently with NVIDIA TensorRT\(^{™}\) optimizations, and deploy services using a single command through Helm charts on Kubernetes clusters. Use Multi-Instance GPU (MIG) innovation to maximize throughput, and enable up to 56 simultaneous inference servers on a single DGX A100—each fully isolated at the hardware level with high bandwidth memory, cache, and compute cores.

**Universal Conversational AI Platform: From Prototype to Production**

NVIDIA DGX A100 is the universal system for AI infrastructure, ranging from analytics to training to inference. DGX A100 sets a new bar for compute density, packing 5 petaFLOPS of AI performance into a 6U form factor, replacing inflexible legacy compute infrastructure with a single, unified system that can do it all. Train and fine-tune large models, such as Megatron-BERT on your DGX A100, using up to eight NVIDIA A100 Tensor Core GPUs or divide each GPU into 7 separate instances to run inference. This MIG innovation allows users to mix and match multiple training and inference jobs in parallel, on the same system, with dedicated resources for optimal utilization.

**Get to Success Faster with Advice From DGXxperts**

NVIDIA DGX A100 is a complete hardware and software platform, backed by thousands of NVIDIA AI experts, and is built upon the knowledge gained from the world’s largest DGX proving ground, NVIDIA DGX SATURNV. Owning a DGX A100 gives you direct access to NVIDIA DGXxperts, a global team of AI-fluent practitioners who offer prescriptive guidance and design expertise to help fast-track AI transformation. This ensures mission-critical applications get up and running quickly and stay running smoothly, dramatically improving time to insights.

Learn more about NVIDIA DGX A100: [www.nvidia.com/dgxa100](http://www.nvidia.com/dgxa100)


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