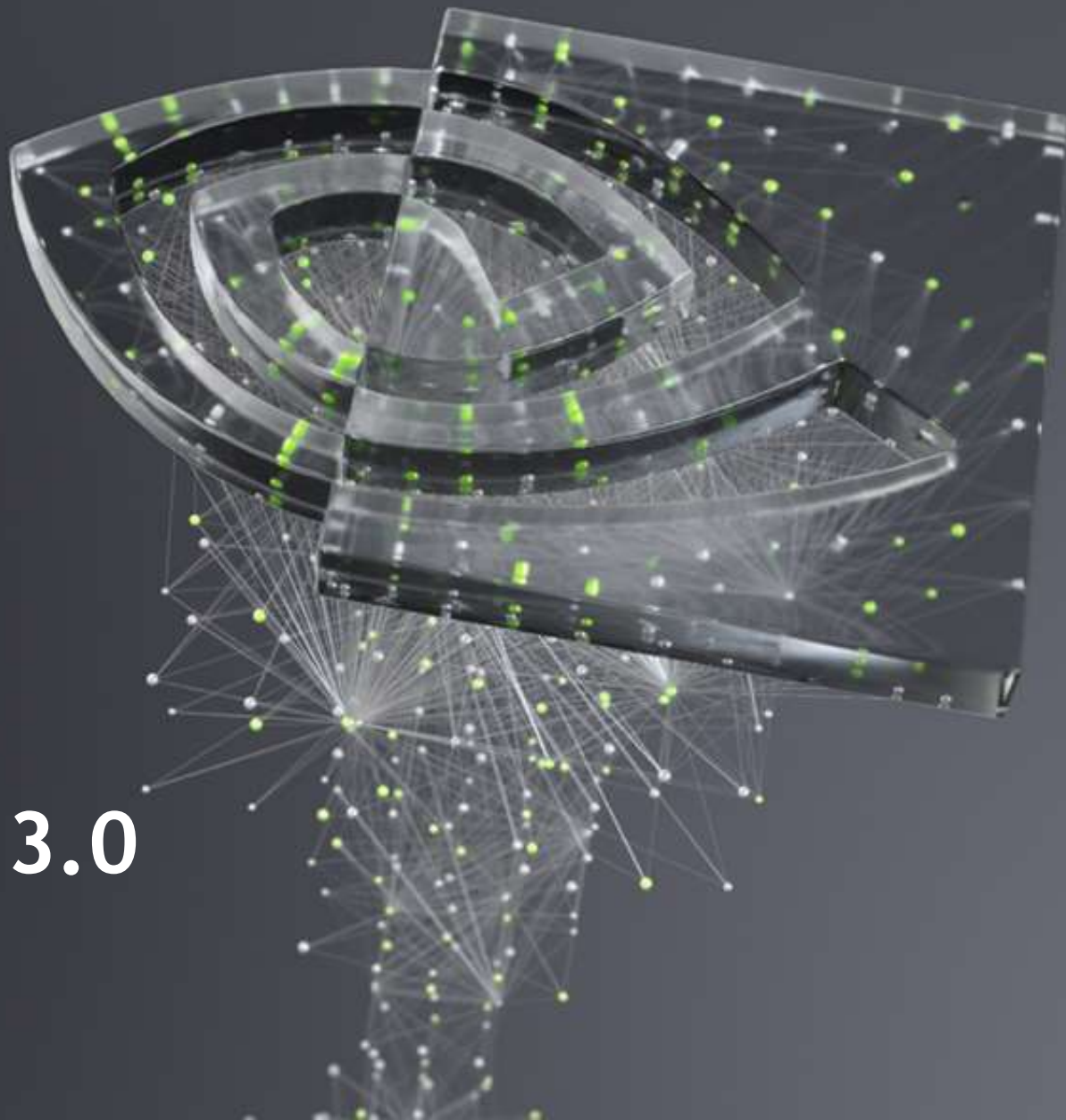




CLARA PARABRICKS 3.0

July 2020



TRENDS DRIVING COMPUTATIONAL GENOMICS



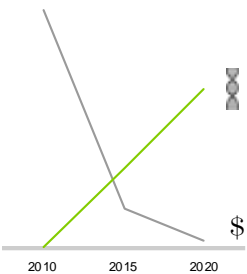
POPULATION GENOMICS

Many 1M+ Genome Projects
50+ National Programs in Flight
Petabyte Scale GWAS



CLINICAL GENOMICS

Oncology
Inherited Disease
Rare & Undiagnosed Disease



INSTRUMENT THROUGHPUT

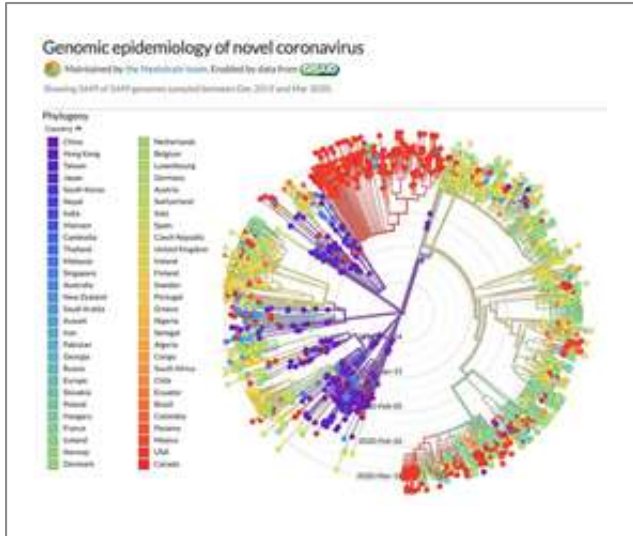
+ Number of Samples
+ Data per Run
- Price per Data Point



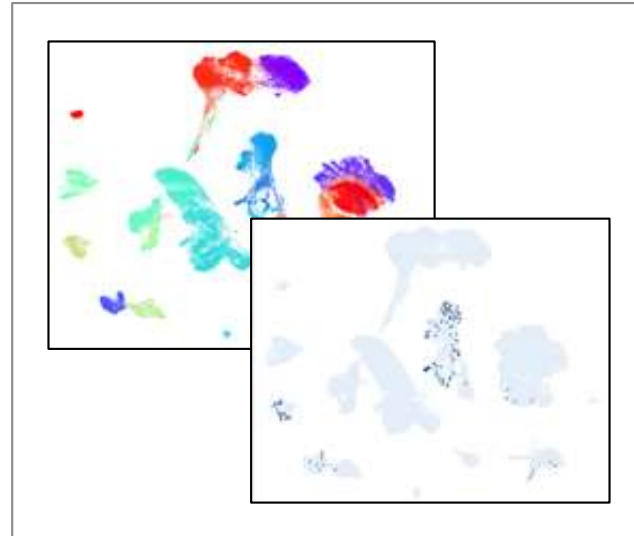
SAMPLE SIZE

DNA -> Single Cell
Sequencing More on Less Input
Instrument & Biology Noise

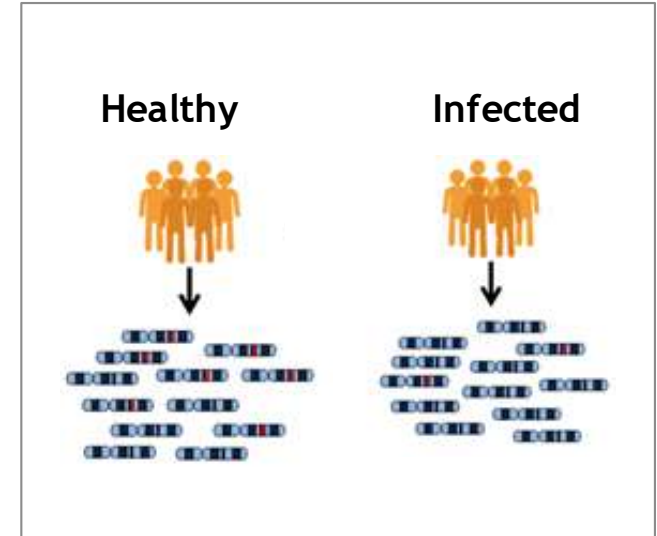
COMPUTATIONAL GENOMICS SPANNING COVID SPECTRUM



Oxford Nanopore Sequencing
 Viral Genome <7 Hrs
 Phylogenetics to Track Virus



RNA-Sequencing Analytics
 Interactive Workflow using Rapids
 Biomarker Identification



GWAS
 Genetic Risk Factors for COVID

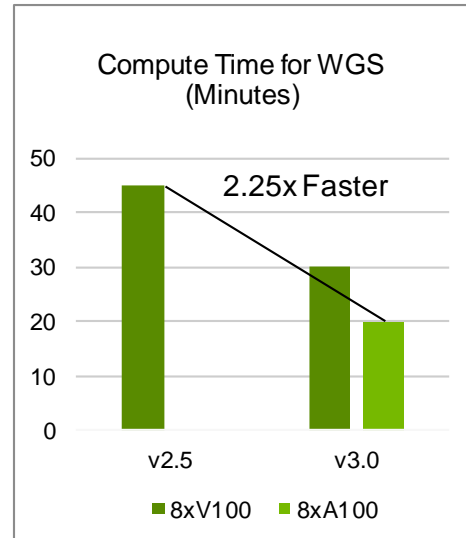
WHAT'S NEW IN NVIDIA CLARA PARABRICKS 3.0

Accuracy | Speed | Cost

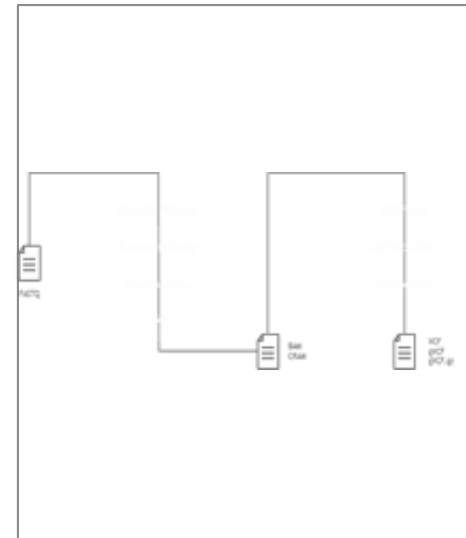
GATK4.1

DeepVariant
v0.10.0

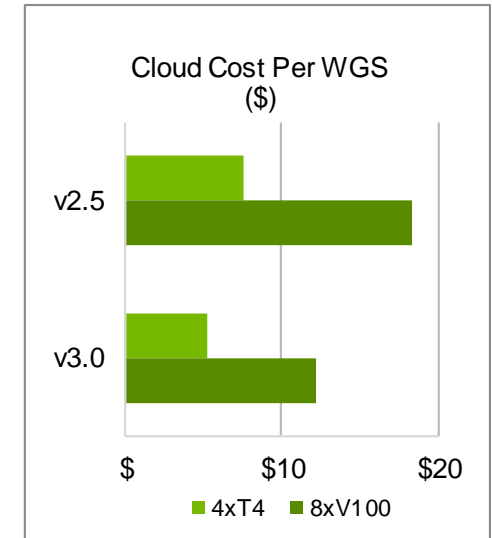
Latest Best Practices
Most Trusted Tools
Consistent Analysis Pipeline



Speed Record on Germline
WGS <20 Minutes
DGX A100 26K Genomes/Yr



New RNA-Seq Pipeline
<2Hrs vs 17Hrs
10x Faster the CPU

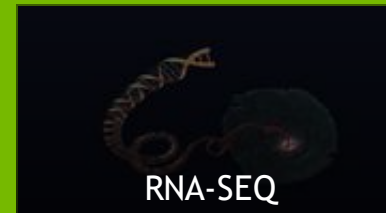


Optimized for Cost
30% Cheaper than v2.5
On Demand AWS

NVIDIA CLARA PARABRICKS PIPELINES

Fast | Accurate | Scalable

NVIDIA Clara Parabricks Pipelines



Applications

Alignment

Variant Calling

Variant Processing

Preprocess

Joint Genotyping

Quality Checking

CUDA-X

EGX



DGX



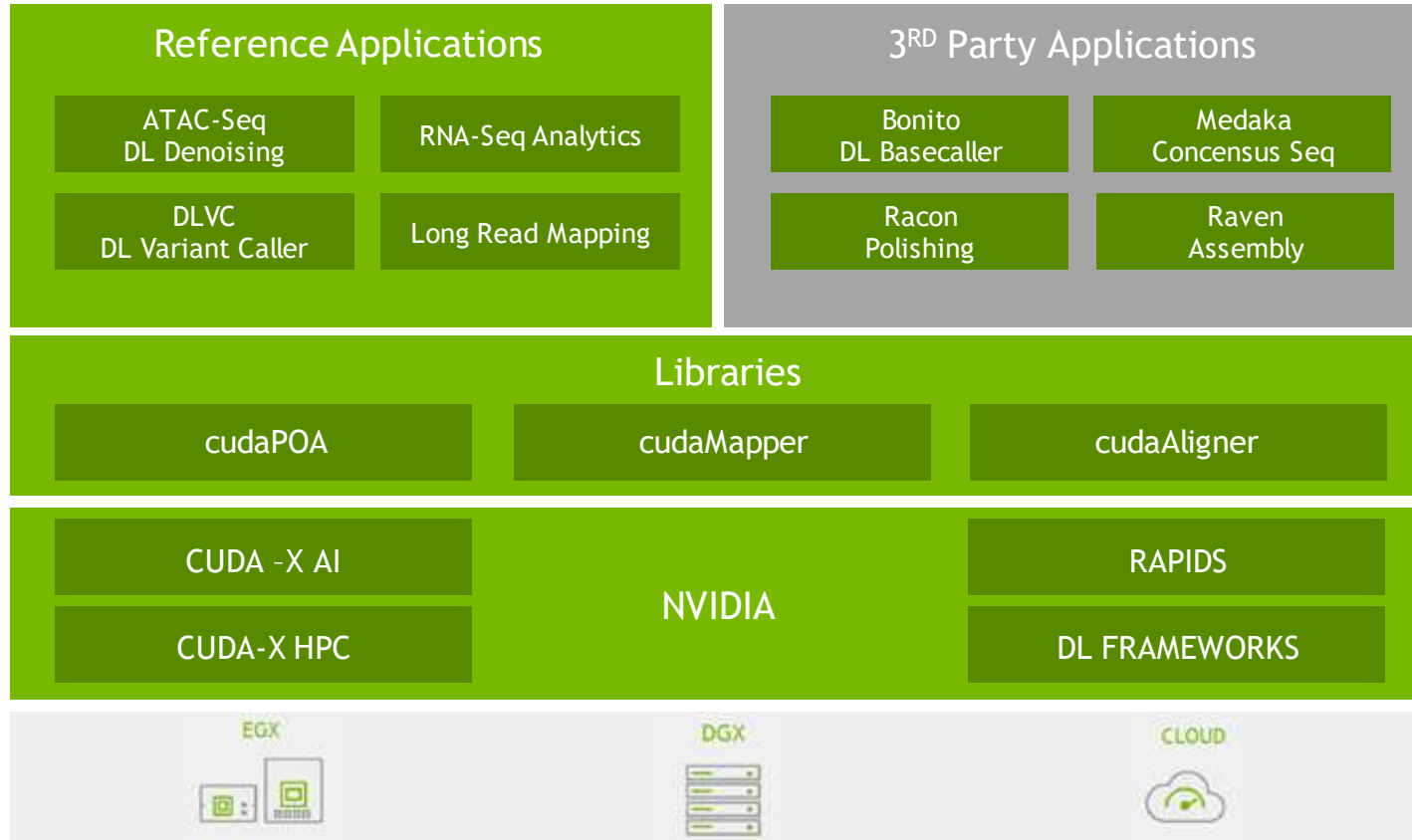
CLOUD



Available on NGC

NVIDIA CLARA PARABRICKS TOOLKIT

Long Read | Deep Learning | Data Analytics | Machine Learning



Available on github.com/clara-parabricks

CLARA PARABRICKS GERMLINE PIPELINE

Population & Clinical Genomics

Speed Record:

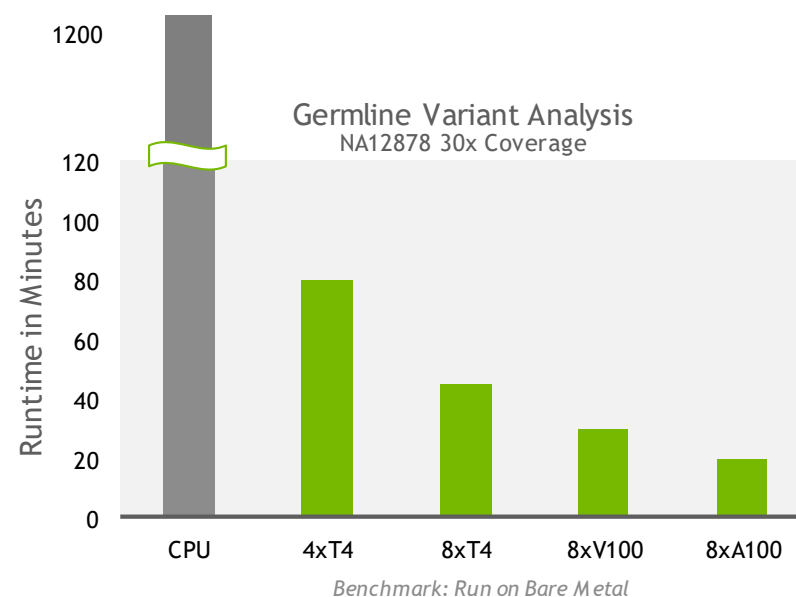
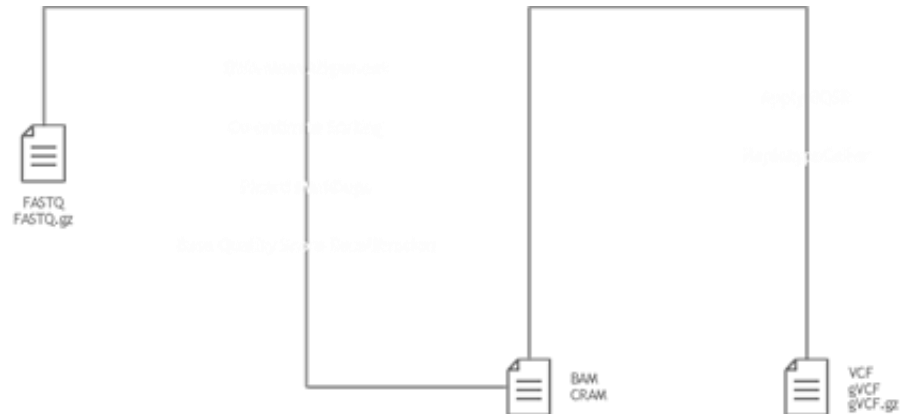
WGS in <20 min vs 30 hrs on CPU GATK4.1

Reduce Cost by 30% per WGS vs v2.5

Accuracy:

Equivalent Results to GATK Best Practices

Includes Google's DeepVariant 0.10.0



CLARA PARABRICKS SOMATIC PIPELINE

Cancer Sequencing: Detect Mutations

Both normal and tumor genomes are analyzed and compared to find cancer mutations

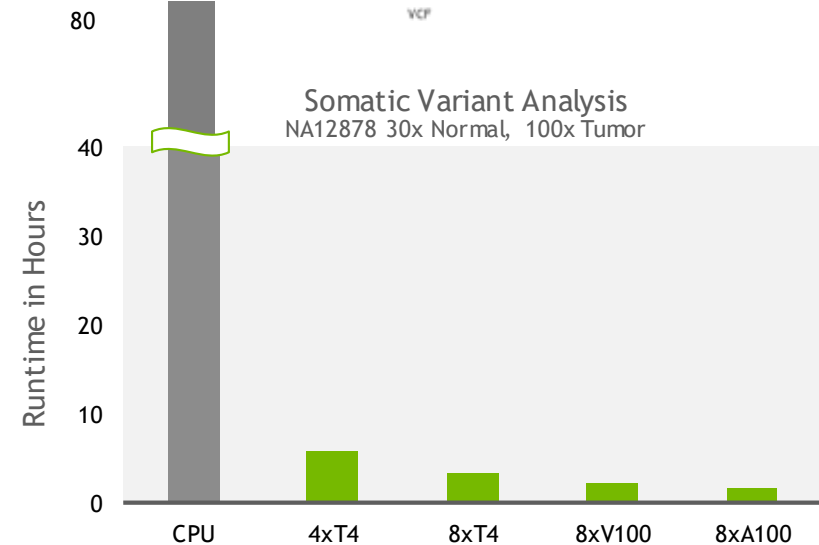
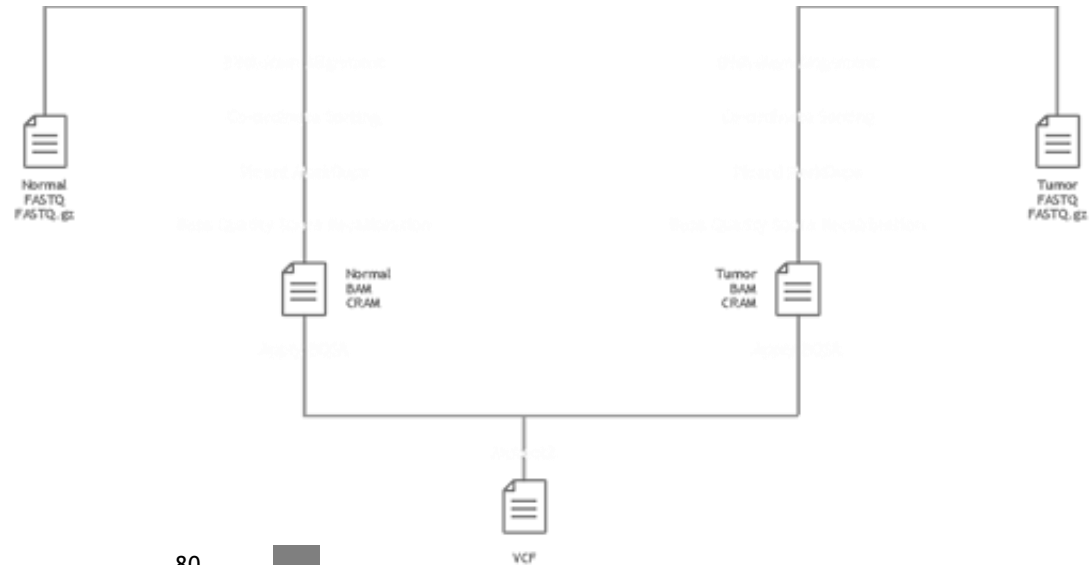
Speed:

90 min on 8xA100 | 50x Faster than CPU

Accuracy:

Equivalent Results to BWA-GATK Best Practices

Uses Mutect2 Somatic Caller



Benchmark: Run on Bare Metal

CLARA PARABRICKS RNA-SEQUENCING PIPELINE

Function and State of Cells

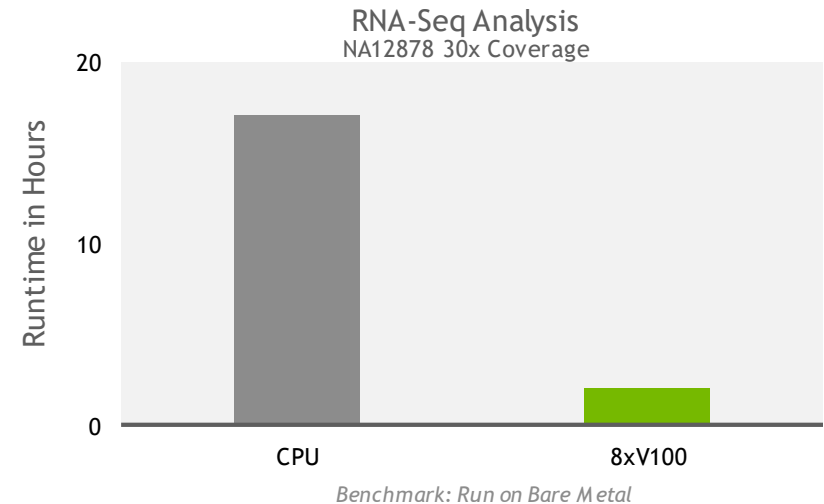
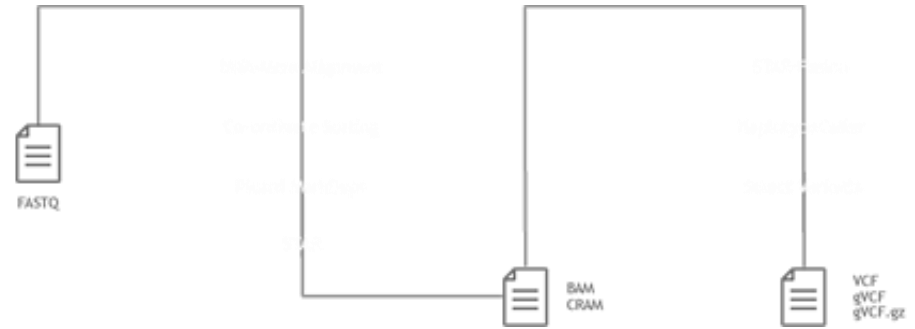
Bulk and Single Cell RNA Sequencing Data
Determine gene function and regulation

Speed:

8x Faster on Bulk, 2x Faster on Single Cell

Accuracy:

Includes STAR-Fusion Aligner, Detect Re-arrangements



NGC READY INFRASTRUCTURE

COTS | AI Supercomputers | Cloud



OEM Systems



DGX Systems



Cloud Services

NVIDIA CLARA PARABRICKS POPULATION TO CLINICAL GENOMICS



Singaporean 10K WGS in 2020
Scaling to Whole Population



ToMMo & Riken
Japan Reference Genome



Japan 100K Human
Genome Program



Thailand 50K Human
Genome Program



Personalized
Cancer Therapy



Treatments for Rare
Disease in Children



Human Genome Center
Hematologic Cancer



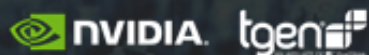
National Taiwan University Hospital
Pre- & Postnatal Genetics Testing

FASTER ANALYSIS LEADS TO QUICKER DIAGNOSIS AND BETTER TREATMENT OUTCOMES

Understanding individual rare disease patients at the molecular level is critical to assessing what their future may hold and for optimizing treatment approaches.

The Center for Rare Childhood Disorders (C4RCD) at the Translational Genomics Research Institute (TGen) converts research discoveries into clinical treatments for children with rare neurological diseases with a goal to deliver a patient's genome sequence analysis results as quickly as possible.

Using NVIDIA Clara Parabricks running on NVIDIA V100 Tensor Core GPUs, TGen accelerates whole genome sequencing analysis in undiagnosed children to determine the most effective therapy for each patient, enable them to qualify for clinical trials, and provide much-needed answers to families.



ANNOUNCING NVIDIA CLARA PARABRICKS & UAE POPULATION GENOME PROGRAM

NVIDIA Clara Parabricks
Accelerating Sequencing Analysis

Build Reference Genome for UAE Citizens

10,000 Genomes -> Whole Population

Artermis #26 Top 500 | 81 DGX-2 AI Supercomputers

Oxford Nanopore Promethion & BGI DNBSEQ



PARABRICKS ENTERPRISE SUPPORT

SERVICE OFFERINGS

License Support



Annual per node (on Prem) or 10k hour (cloud) License includes:

- Full access to all pipelines in the NVIDIA Parabricks software suite
- Access to different versions of the same tool
- No limitations on the number of genomes analyzed

Access to Experts



Join the Forum:

<https://forums.developer.nvidia.com/c/healthcare/Parabricks/290>.

Direct access to NVIDIA expertise for timely resolution of issues

Case Logging



Available via email or phone today.

Web Portal for optimal customer experience under development

STARTING POINTS

Clara Pararicks Home Page

developer.nvidia.com/Clara-parabricks

github.com/clara-parabricks

Getting Started

www.youtube.com/watch?v=r5iWLqguRLk

<https://github.com/clara-parabricks/Compute4COVID>

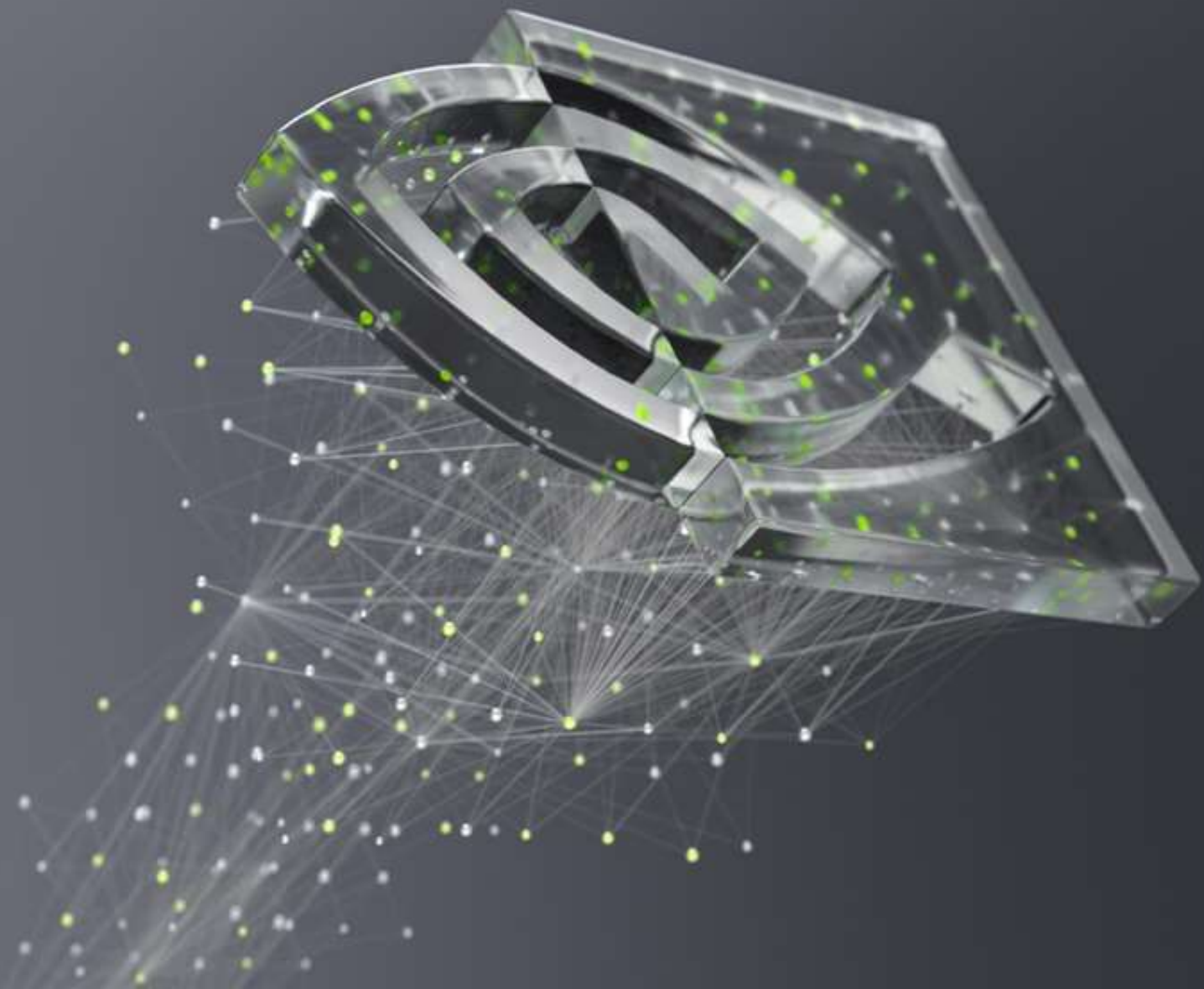
Request Free Eval

On Prem or Cloud

www.nvidia.com/en-us/docs/nvidia-parabricks-general/

Buy It Now

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