

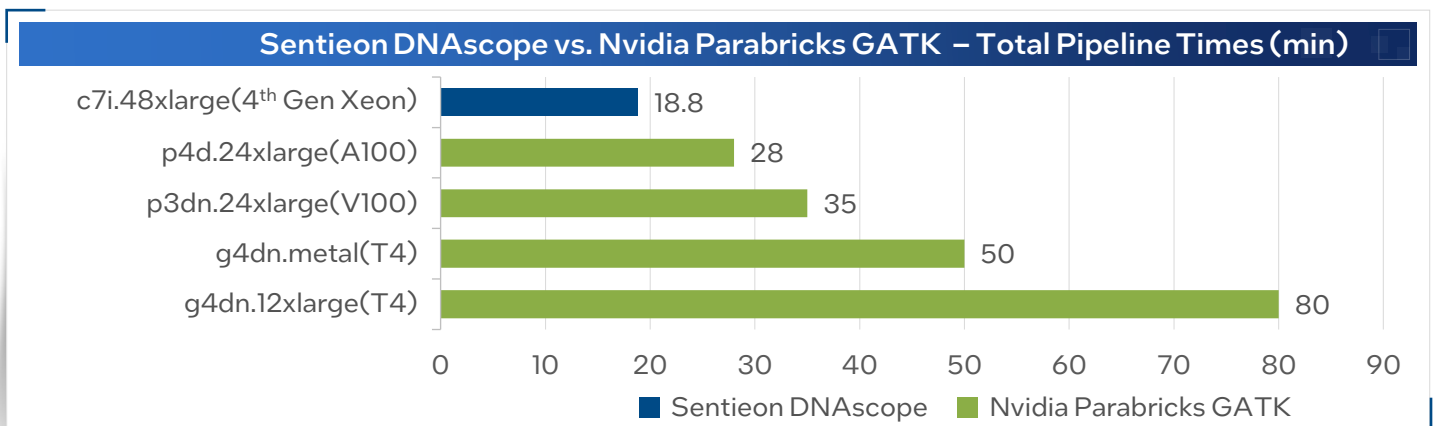
Streamlining Genomic Analysis with Faster and More Accurate Technology

Empowering health professionals and research communities to improve patient outcomes by using faster, less expensive and more accurate bioinformatics.



Sequencing the human genome is one of the world’s greatest scientific accomplishments. Within it are the answers to some of the most pressing global health issues, and analysis of genome sequences can be the key to solving those problems. As genomics becomes more commonplace in clinical practice and in research settings, so too does the need for quick, accurate, and efficient analysis of genome sequences. Clinicians and researchers must make sense of increasingly large datasets, and they must do it faster and at reasonable cost.

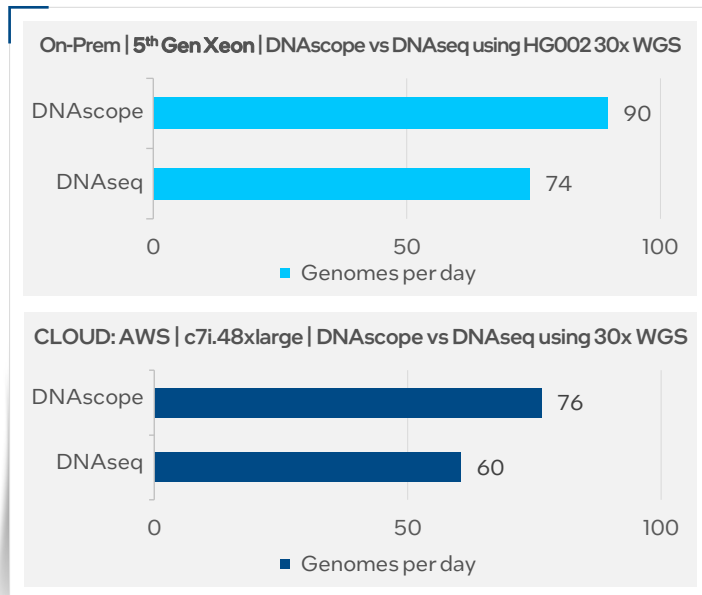
Many health and life sciences organizations have heard claims that GPU- or FPGA-hardware accelerated solutions are required to analyze the large amount of data generated by genome sequencing. But what if there was a faster, less expensive, and more accurate way? Sentieon’s uncompromisingly accurate and efficient algorithms enable genomic data analysis applications for CPUs that are not only faster and more accurate, but also more cost- and power-efficient. In fact, when compared to Nvidia Parabricks, Sentieon’s DNAscope is up to 4.25 times faster. Sentieon’s software is sequencer agnostic, supporting genome analysis of data generated from both short and long read sequencing platforms.



Lower is better. See backup for workloads and configurations. Results may vary.

Fast and scalable results

Researchers and clinicians have limited time and numerous priorities. This means they need tools that speed up analysis and hone in on the most useful ways to leverage that data to maximize the outcomes they are trying to drive. When optimized with an Intel® 5th Gen Xeon® 8582V Processor, Sentieon software is much more scalable both locally or in a cloud and can analyze a genome sequence faster than competing GPU or FPGA solutions. DNaseq provides the exact same data as the Genome Analysis Toolkit (GATK) from the Broad Institute, which is the industry standard software. Sentieon’s DNAScope, however, is faster and more accurate, analyzing 16 more genomes per day in the cloud.



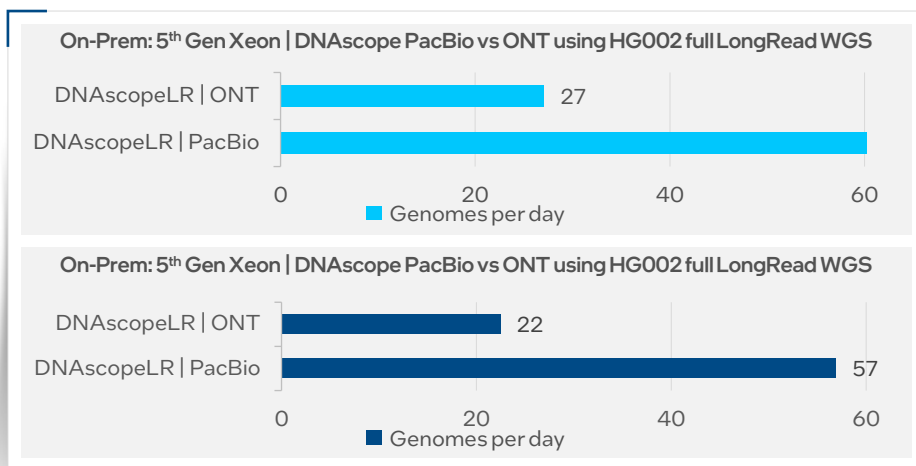
Higher is better. See backup for workloads and configurations. Results may vary.

Quick results aren’t useful if they aren’t accurate. In an FDA accuracy benchmark, Sentieon solutions were awarded most accurate and 100% consistent, while being much faster than competitors’ offerings¹. When working to identify cancers or genetic diseases, there’s no room for error. Sentieon can provide the accuracy to ensure that genome sequences are analyzed as correctly as possible.



Simplifying the tools for genome sequence analysis

As speed and accuracy increase, it’s critical for clinicians and researchers that the tools they use are compatible with all their needs. Across the industry, researchers and clinicians use multiple sequencers, some that output short reads and some that output long reads. But unlike other available genome sequence analysis products, Sentieon’s unique software can process both long and short sequences.



Higher is better. See backup for workloads and configurations. Results may vary.

In addition, Sentieon can use long and short reads together for joint calling, allowing users to generate insights from all available data within a single tool. Instead of trying to compare data generated by different sequencing platforms and requiring the use of different computing platforms (FPGA, GPU, CPU) and software packages, Sentieon user data is uniformly processed with one software package and only requires economic, scalable, and widely available servers based on common CPUs while achieving world-class performance. With Sentieon, end users can analyze up to 60 long reads per day, depending on the genome sequencing service used to generate the bioinformatics.

Even if there are breakthroughs around speed and precision of genomic analysis, organizations must also consider their budgetary constraints. Usually, higher performance means higher costs, but in this case that's not true. Whether on premises or in the cloud, Sentieon's solutions can analyze genome sequences more cost-efficiently than competitors. The cost-per-genome falls to \$2.26 for 5th Gen Intel™ Xeon™ processors assuming it has similar AWS EC2 pricing to c7i.48xlarge. Nvidia's A100 Tensor Core GPU costs \$15.29 for the same service. Using Spot Instances, the cost-per-genome of Sentieon is only \$0.74. At that large of a discount, the ability to perform genomics becomes vastly more accessible, enabling improved health outcomes for more people.

The ability to analyze a genome sequence has changed healthcare, and Sentieon has a competitive solution. It's no longer the case that FPGAs and GPUs are the only way to accelerate the software used for this scientific feat. In fact, Sentieon software optimized with Intel CPUs does the job faster than any other on the market. At the same time, Sentieon eliminates the need for two proprietary software products by using joint calling, uniting otherwise siloed data. All of this is available for less than competing offerings while also providing the most accurate bioinformatics in the industry. Now is the time to take your organization to the next level of genomics.

AWS EC2 Instance	Processor	On-Demand Price (USD/hour)	Runtime (Min)	Cost-per-Genome (USD)
c7i.48xlarge	Intel Xeon Platinum 8488C	\$8.57	18.8	\$2.68
c6i.metal	Intel Xeon Platinum 8375C	\$5.44	42.7	\$3.87
p4d.24xlarge	NVIDIA A100 Tensor Core	\$32.77	28	\$15.29
p3dn.24xlarge	NVIDIA Tesla V100	\$31.21	35	\$18.21
g4dn.metal	NVIDIA T4 Tensor Core	\$7.82	50	\$6.52
g4dn.12xlarge	NVIDIA T4 Tensor Core	\$3.91	80	\$5.22

AWS EC2 price comparisons for Intel and NVIDIA instances running HG001 at 30x coverage. Prices are for on-demand and spot instances in the US West (Oregon) region as of February 13, 2024 (see [Amazon EC2 Pricing](#)).

Learn More

- [Products - Sentieon](#)
- [Delivering Cost-Effective Genomics for Precision Medicine | by Intel | Intel Tech | Medium](#)
- [White Paper - Accelerating Genomics Data Processing with Persistent Memory and Big Memory Software \(intel.com\)](#)
- [Tuning Guide for Genomics Analytics \(intel.com\)](#)



1. [Sentieon wins the precisionFDA Truth Challenge V2 and launches PacBio data analysis workflow. – Sentieon](#)
2. Parabricks times are taken from previously published results: [Benchmarking the NVIDIA Clara Parabricks germline pipeline on AWS | AWS HPC Blog \(amazon.com\)](#)

Performance measurements were performed by Sentieon in December 2023. The Intel® Xeon® 8582V processor-based system has two [2.0 GHz Intel Xeon Platinum 8582V](#) processors (128 cores, HyperThreading enabled, TDP: 330 W), 512 GB DDR5–5600 memory, and 960 GB Intel D3–S4510 SSD. Ubuntu Linux 22.04.3 LTS was installed on this system. Performance varies by use, configuration, and other factors so results may vary.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. No product or component can be absolutely secure.

Your costs and results may vary.

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