

Accuracy Evolution for Genomics Secondary Analysis

Lightning Solution- Accelerating the Genomics Pipeline



"Next-Generation Sequencing (NGS)" is leading to a new era of precision medicine. By comparing and analyzing the DNA sequences, NGS can precisely customize treatment and prescribe medication for different patients based on the human genome database. Furthermore, NGS is helping lead the fight against cancer and rare diseases by locating and storing information related to their causes and helping medical personnel prevent further spread and infection.

Today, academic researchers and gene service providers face the problem of processing an endless array of genomic data. This time consuming process hinders the research process. To address this, a lightning quick solution was devised - a genetic sequencing all-in-one server that optimizes and accelerates data processing, specifically designed for the precision medical industry. Lightning Solution has been delivered to research institutions, biobanks, clinics, hospitals, ...etc., providing much more flexibility and agility in genomics data analysis and pushing the value of precision medicine to a higher level.

Key Features



Multiple Applications

Lightning solution uses the optimized BWA+GATK algorithm that can be applied to the Whole Genome Sequencing (WGS), Whole Exome Sequencing (WES), cancer diagnosis, and more.



All-in-One Solution

Lightning solution integrates FPGA (Field Programmable Gate Array) card with the server to effectively accelerate secondary analysis.



Accuracy & Consistency

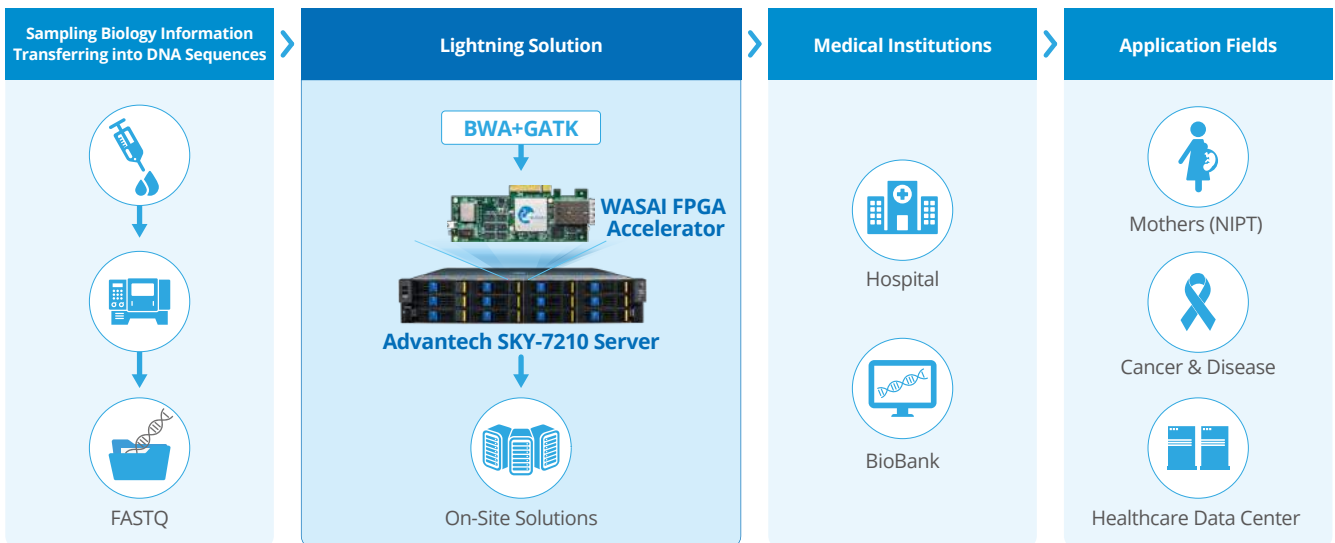
Lightning solution provides excellent performance. Overall SNPs and INDELs precision, variants' recall and accuracy are consistent.



Time-Saving

Calling Time can be reduced to less than 8 hours.

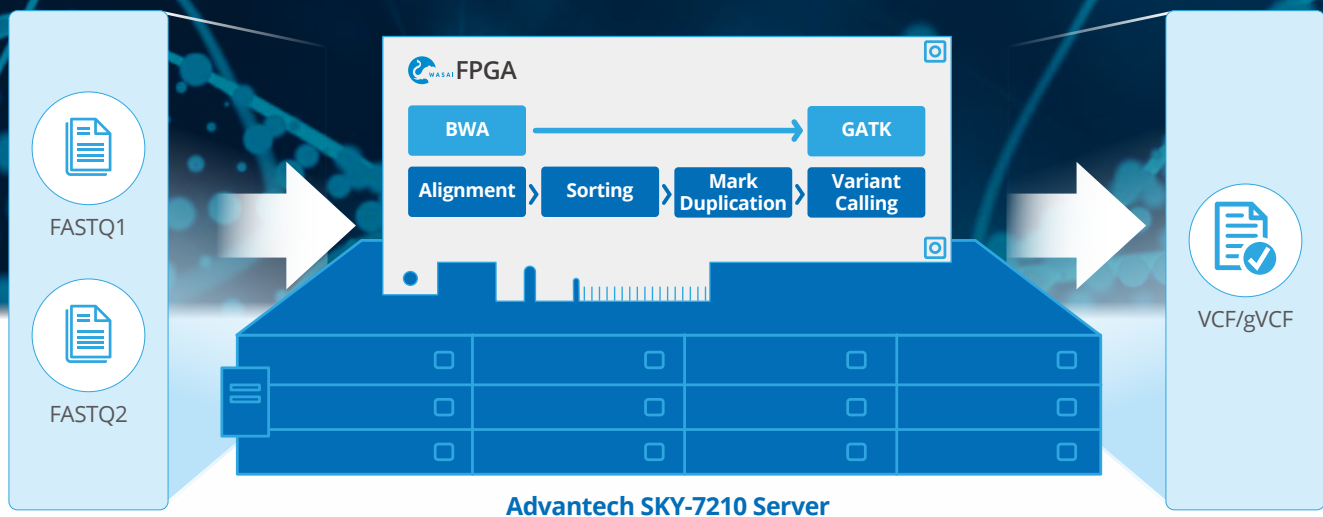
Application and Scenarios



Lightning All-in-One DNA Sequence Accelerated Solution

Lightning provides a painless upgrade process with native BWA-MEM and GATK for processing the secondary analysis of Germline pipeline. Users can complete the analysis of Alignment, Sorting, Mark Duplication and Variant Calling without changing the workflow. With the acceleration in native algorithms on Lightning Solution, the overall accuracy of SNPs and INDELS are 99.9%, the same as the original software. Moreover, Lightning pipeline provides exactly the same output files as the original software does.

Nearly 33 hours is required for the secondary analysis of 30x coverage of human genome with the original software. Lightning platform can complete the same Germline pipeline analysis in less than 8 hours, greatly improving efficiency and reducing TCO (total cost of ownership). In order to offer a platform in Big Data and Deep Learning deployments, Lightning provides a server with up to 3TB DDR4 slots, 3 x NMC (Network Mezzanine Card) and 2 x 300W GPU or 6 x 150W GPU, it helps reduce latency of data movement from HDD to FPGA. The connections are more flexible and ready for future expansions.



Product Offering

FPGA Card



Specifications	
Form Factor	<ul style="list-style-type: none"> Low profile PCI express card 200.00 x 68.98 x 67.00 mm (6.6 x 2.7 x 2.6 inch)
Processing	<ul style="list-style-type: none"> ALTERA Arria 10 GX 1150 F34 package ALTERA Max10
Sdram and Flash	<ul style="list-style-type: none"> Up to 16Gb DDR4 with ECC for Arria 10 1Gb FLASH for Arria 10 1Gb FLASH for Max10
Host Interface	<ul style="list-style-type: none"> PCI Express Gen3 x8 gold-finger
Power	<ul style="list-style-type: none"> 12V from PCIe and 12V DC in connector
Cooling	<ul style="list-style-type: none"> Single-width active cooler with fan Passive heatsink
Environment	<ul style="list-style-type: none"> Operation temperature: 0°C to 35°C Storage temperature: -20°C to 80°C Relative humidity: 45 to 95%

ADVANTECH SKY- 7210



Specifications	
Form Factor	2U rack mount system
Processing	Intel® Xeon® Scalable Processors Platinum 8100, Gold 6100 and 5100, Silver 4100, and Bronze 3100
Memory	24 x DDR4 with 2133/2400/2600MHz
Host Interface	Up to 6 x PCI Express Gen3 x 8 slots or 3x PCIe x16 slots
Power	Redundant CRPS PSU with 850W and 1200W 2 options
Cooling	6 x system FAN with smart FAN control
Environment	Operation temperature: 0°C to 40°C storage temperature: -20°C to 80°C and 40°C @ 95% RH non-condensing humidity

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