IlluminaCompute

Simplified computation for production-scale sequencing.

IlluminaCompute Highlights

- **Ready-to-Use Solution:**
  Validated, scalable package, configured for your needs and ready to run with high efficiency and minimal downtime
- **Industry-Leading Biocomputing:**
  Illumina analysis software, high-performance Dell blade servers, and Isilon modular storage
- **Peace of Mind:**
  Installation and comprehensive maintenance from Illumina Customer Solutions

Introduction

Illumina's massively parallel sequencing by synthesis technology has transformed the way genomic research questions are asked and answered. Illumina sequencing is the most widely-adopted and accurate next-generation sequencing technology available. The simple sequencing workflow enables the generation of basecalls and quality scores in real time. Illumina continues to empower the transformation of billions of bases of raw sequencing data into publishable, biologically meaningful results with the introduction of IlluminaCompute, the first of its kind, optimized computing architecture for human-scale genomic data processing and analysis. IlluminaCompute provides a complete genomic data processing solution comprising hardware, software, and support services that can be deployed with minimal time and with no pre-existing computer infrastructure (Figure 1).

System Overview

For growing research labs that have sequencing power comparable to that of genome centers, the scaling up of data output presents unique data management challenges. Instead of spending time and resources configuring a system composed of storage and servers from different suppliers to fit your analysis workflow, IlluminaCompute delivers the best that the biocomputing industry has to offer with high-performance blade servers from Dell and clustered modular storage from Isilon. Developed in conjunction with leading genome centers around the world, IlluminaCompute has proven to be an efficient and scalable end-to-end data processing, storage, and analysis solution for high-throughput sequencing.

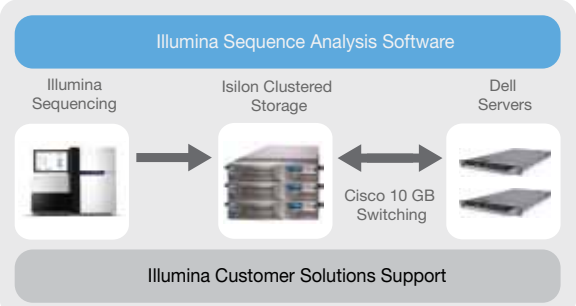
Upgradable Custom Solution

IlluminaCompute can be quickly and easily expanded or reconfigured with support from Illumina, so that researchers can keep pace with changing sequencing needs, with virtually no system downtime. Your individual computing, server, and storage needs are carefully evaluated, and the installation site is pre-validated by an Illumina technician to maximize uptime. IlluminaCompute is installed and configured by an Illumina maintenance team, and is designed not to require major maintenance or frequent service calls that might interrupt your production sequencing environment.

Power Your Lab

IlluminaCompute enables you to free your research and development from the constraints of institutional IT resources by providing a turnkey, centralized, high-performance computational and storage infrastructure. Researchers who implement the IlluminaCompute solution will have the flexibility to design experiments that workstation-level computing infrastructures cannot support. IlluminaCompute provides sufficient processing resources for

Figure 1: IlluminaCompute Workflow and Components



Component	Description
Storage	Isilon IQ and the OneFS intelligent single file system provide storage scalability measured in petabytes and sustained I/O performance (>500 MB/s) for analysis and archive
Processing	High-performance compute cluster running SGE on high-availability, power efficient, fault-tolerant blades. Dell update and maintenance, low power consumption and heat generation
Networking	Dual-path interconnectivity via 1 GB and 10 GB network ports
Off-Line Archive	Tape-based solution for data archiving and long-term retention
Software	Pre-installed software for data processing, alignment, and variant detection
Support	On-site needs assessment, installation, system verification, training, and maintenance

Scale up your sequencing workflow. IlluminaCompute is a pre-configured, pre-packaged data analysis solution consisting of scalable processing, scale-out storage, and comprehensive support for installation, training, and maintenance.

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Component Information

Product	Description	Quantity
Tier 1 Base Configuration Processes up to 500 gigabases/week	APC Netshelter: 40U Rack with 1U KMM console	1
	Dell R610 Server: 8 CPU cores, 48 GB RAM each	3
	Isilon IQ12000x storage modules	3
	Serial MGT Console 16	1
	Cisco 3750e switches	2
Tier 1 Upgrade Processes an additional 200 gigabases/week	Dell R610 Server, 8 CPU cores 48 GB memory Isilon IQ12000x storage modules	As Needed
Tier 2 Base Configuration Processes up to 1,500 gigabases/week	APC Netshelter: 40U Rack with 1U KMM console	1
	Dell M1000e Blade Chassis with 8 M610 server blades (8 cores, 48 GB/blade)	1
	Isilon IQ36000x storage modules	3
	Serial MGT Console 48	1
	Cisco 3750e switches	2
Tier 2 Upgrade Processes an additional 700 gigabases/week	Dell M1000e Blade Chassis with 16 M610 server blades (8 cores, 48 GB/blade) Isilon iQ36000x storage modules Cisco 3750e switches	As Needed
Optional Archive System	LT04 Archiving System, 32 TB Isilon IQ Backup Accelerator	As Needed

genome assembly, deep sequencing, metagenomics research, and other computationally intensive secondary analyses that require clustered processing and shared data repositories. Illumina remains committed to providing scalable and manageable solutions like IlluminaCompute for managing data and expanding your research.

Additional Information

For more information about Illumina sequencing technology and data analysis solutions, visit www.illumina.com/sequencing or contact us at the address below.

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