NGS-HPC

FIGURE 1: ILLUMINA SEQUENCING DATA ANALYSIS WORKFLOW

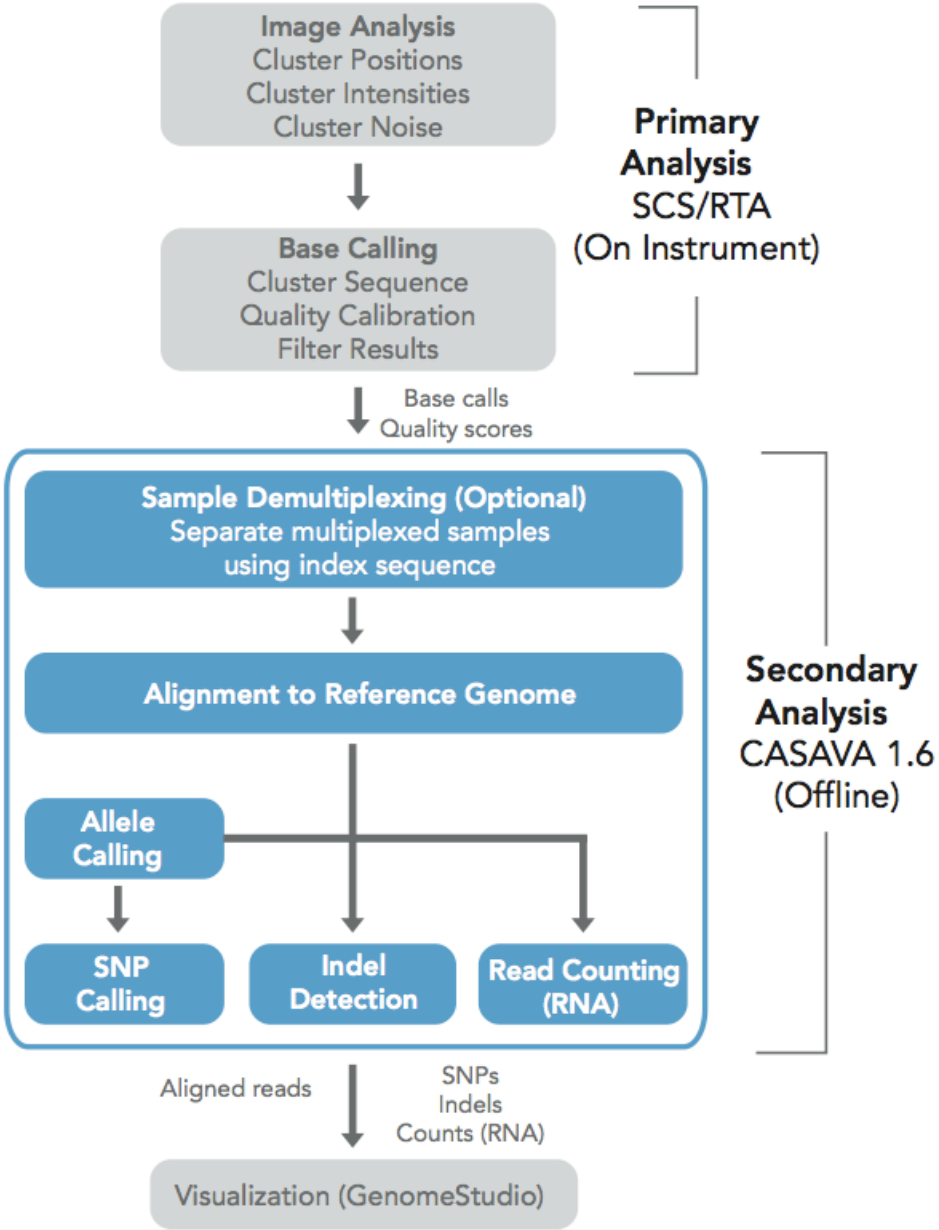
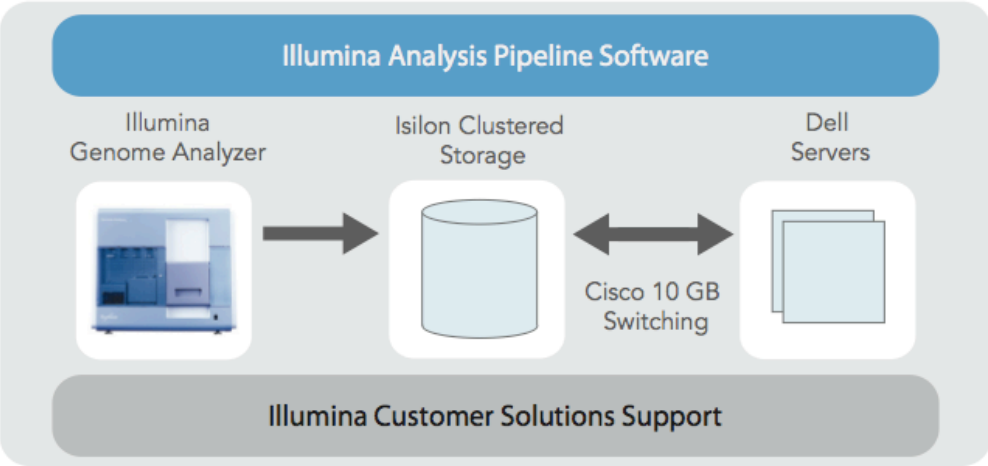


FIGURE 1: ILLUMINACOMPUTE WORKFLOW AND COMPONENTS



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 upgrade and maintenance, low power consumption and heat generation
Networking	Dual-path interconnectivity via 1GB 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
Service	On-site needs assessment, installation, system verification, and training

Data generation on HiSeq 2000

- HiSeq will produce 1.1TB of data per run
- Data transferred from instrument to server is compressed before transfer (100gb), but it is uncompress on the server for analysis.
- HiSeq requires 7TB of transient storage to do analysis
- HiSeq will produce 150G compared to 35G from GA
- Data analysis will take 5 to 6 days on 16 cores with 4GB memory per core. With load balance on two servers. It could take one additional day if run on a single server.
- HiSeq produces 4 times the amount of data compared to the GA

COMPONENT INFORMATION

PRODUCT	DESCRIPTION	QUANTITY
Medium-Throughput Configuration Processes up to 200 gigabases/week	APC Netshelter: 40U Rack with 1U KMM console Dell R610 Server: 8 CPU cores, 48 GB RAM each Isilon IQ12000x storage modules Serial MGT Console 16 Cisco 3750e switches	1 3 3 1 2
Medium-Throughput Upgrade Processes an additional 100 gigabases/week	Dell R610 Server, 8 CPU cores 48 GB memory Isilon IQ12000x storage modules	As Needed
High-Throughput Configuration Processes up to 700 gigabases/week	APC Netshelter: 40U Rack with 1U KMM console Dell M1000e Blade Chassis with 8 M610 server blades (8 cores, 48 GB/blade) Isilon IQ36000x storage modules Serial MGT Console 48 Cisco 3750e switches	1 1 3 1 2
High-Throughput Upgrade Processes an additional 350 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

SE-401-1001	**IlluminaCompute Tier 1 – Base Configuration** IT hardware to perform secondary data analysis on data resulting from HiSeq2000 runs. - 1 APC Netshelter: 40U Rack with 1U KMM console - 3 Dell R610 servers: 8CPU cores, 48GB RAM each - 3 Isilon IQ12000x storage modules - 1 Serial MGT Console 16 - 2 Cisco 3750e switsches	€301.530	1	€301.530
50 %discount on IlluminaCompute Tier 1 IT infrastructure				- €150.765

Handles one HiSEQ at full capacity

(Tier 2 quotation has been requested)

PSSC LABS

Alex Lesser
PSSC Labs
Tel : (562) 810-5998
Fax : (949) 380-9788
alex@pssclabs.com

To: Stein Aerts
K U Leuven
+32 16 330710
stein.aerts@med.kuleuven.be

Quotation # 11-051210-01
Valid Through: 6/10/2010

Total Price: €250,000.00 EURO
***Price includes all shipping costs*
***Any VAT or Duties (if any) are the responsibility of the university. PSSC Labs believe*
University is exempt from all VAT and Duties however this needs to be confirmed by th
University.

PSSC Labs PowerWulf GRaNDE Compute Engine

The PowerWulf GRaNDE Compute Engine is a custom configured high performance computing engine designed specifically to meet the computing needs of next generation sequencing technologies. The PowerWulf Appliance contains **344 total processor cores and 80 TB of usable storage space and an automated tape back up supporting 76 TB of secondary storage space**. The system will also include a total of five separate servers that can be used for web server applications. The ability to upgrade the number of processor cores and storage space preconfigured into the PowerWulf GRaNDE Compute Engine.



Image is Representative Only

PSSC Labs Cluster Technicians will install and test either Illumina's Casva application or Applied Biosystems' Bioscope application. Onsite installation and training for the PowerWulf GRaNDE Cluster is included

PSSC Labs preinstalls, preconfigures and pretests all necessary cluster management software tools included in our CBeST Cluster Management Suite (http://www.pssclabs.com/support_cbest.asp). Our plug and play design, installation and testing procedure is unique and allows end users to focus on their work (and consuming reagents). PSSC Labs cluster technicians will automate the transfer of files between the head node and and tape back up unit. Complete technical specifications are included on the following page.

Home-made cluster

- Local vendors (Dell, Netapp, ..) with reduction prices
- Hardware support and maintenance contracts directly with provider
- Installation and sysadmin: LUDIT HPC? Help from local IT (gbiomed) and integration with other servers and network
- Integration and scalability with HPC cluster KULeuven and VSC

Dell blade system



- Blade chassis with 8 server blades
  - M610 blades, 48 GB Memory: 33.371 EUR
  - M910 blades, 64 GB Memory: 75.522 EUR
- Memory: quotations have been requested
- Switches (Cisco WS-C3750X-24T-L) ~3000 EUR each

- 344 cores : 4 (assuming quad core) = 86 processors
- 16 blades * 2 processors = 32 processors per enclosure = 128 cores
  - 2 enclosures = 256 cores (~120K)

- Other blade systems possible (HP, IBM)
- Rack system is more expensive for space and energy