EasyGenomics

华大基因 BGI

EasyGenomics

Next Generation Bioinformatics on the Cloud

http://www.easygenomics.com

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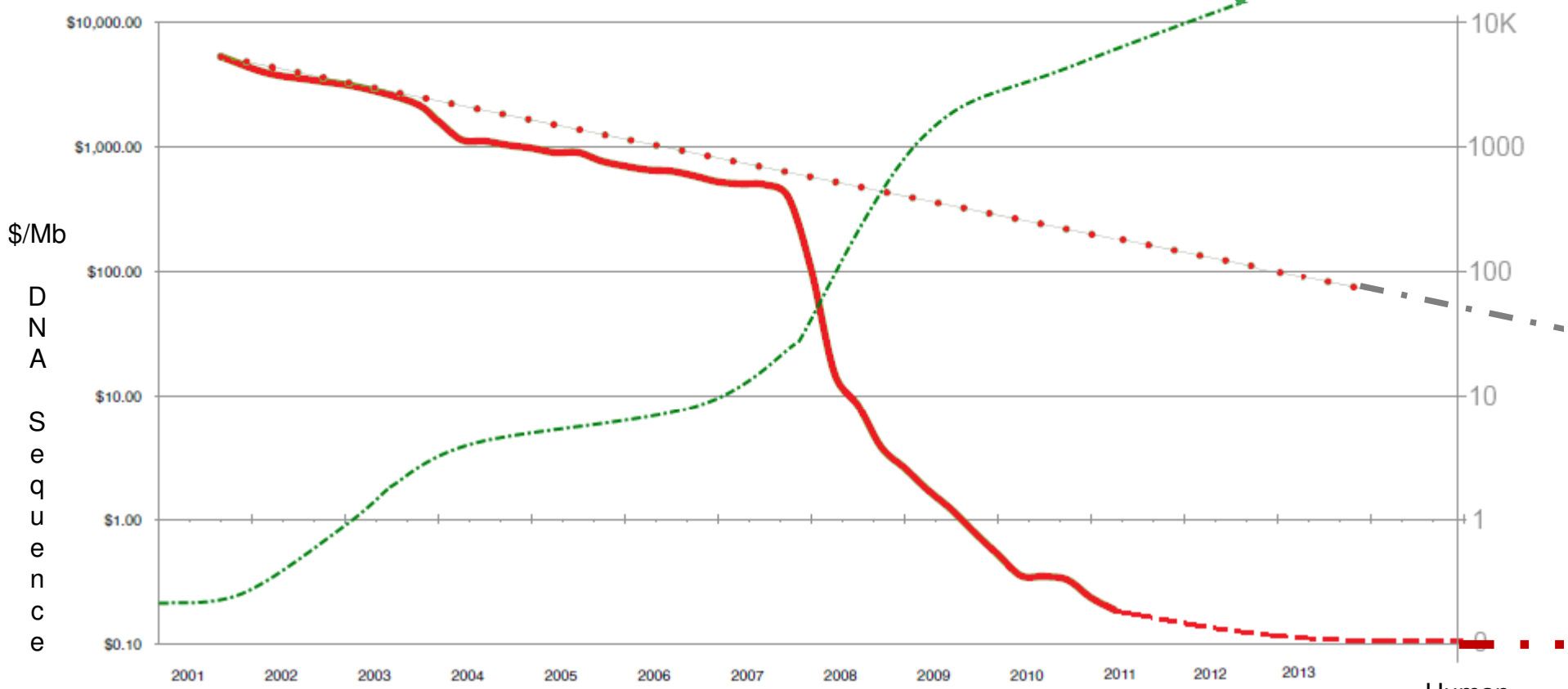
info@easygenomics.com

Agenda

- Vision and Strategy
- Problems and Solutions
- Product Introduction
- LIVE Demo
- Future Roadmap
- Q&A

Trend of Volume and Cost

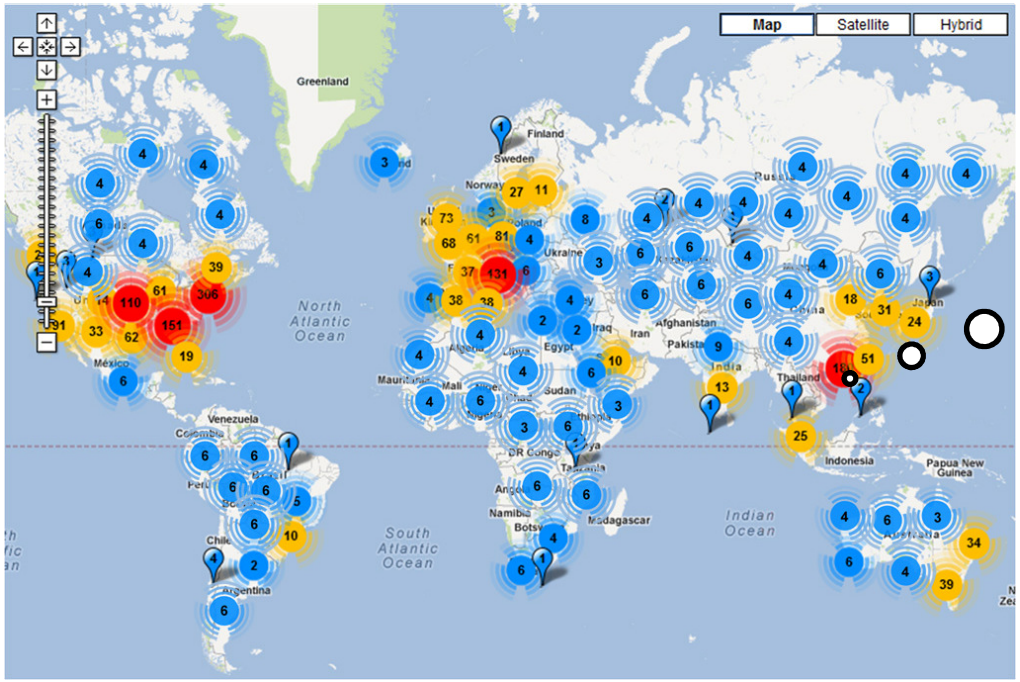


Figures adapted from Sboner A, *et al.*: The real cost of sequencing: higher than you think! *Genome Biology* 2011, 12:125
Numbers and Images from private research and the open Internet

Geological side of the problem

+

Sequencing is a COMMODITY and happens EVERYWHERE.

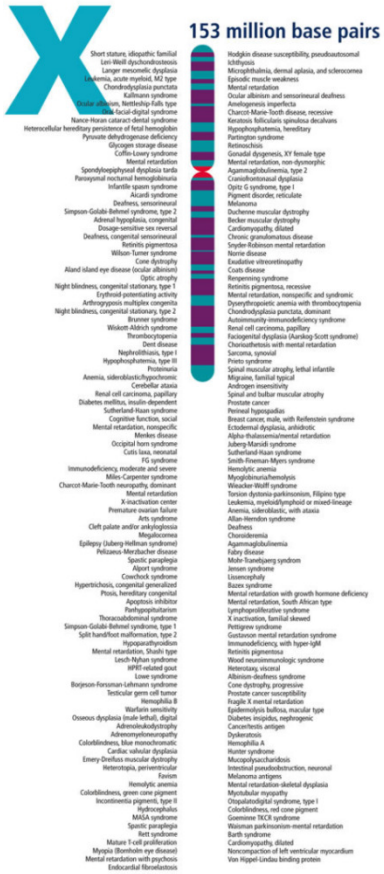


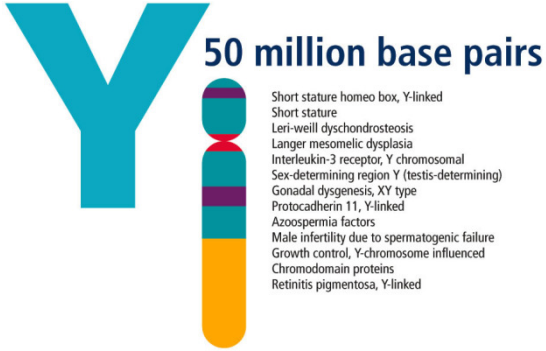
BGI

Images from omicsmaps.com

Interpretation is the KEY

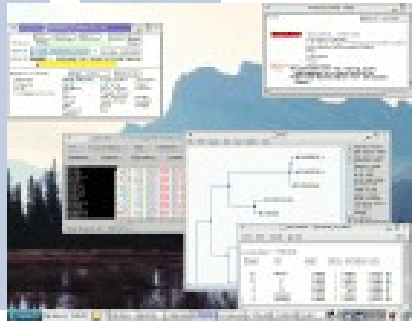
- **Analysis** and **Interpretation** is the KEY
- **Application** is the "Silver Bullet"





Difficulties of Analysis

Primary analysis	Secondary Analysis	Tertiary Analysis	Post Tertiary Analysis
Base calling	Mapping	Variant Calling	In-depth Annotation
Data throughput	Computation intensive	Complicated Algorithms	Lack of knowledge
Data storage	Data storage	Computation intensive	



Problems and Solutions

Solutions

Cloud

High Speed Data Exchange

Workflows

+) Resource Management

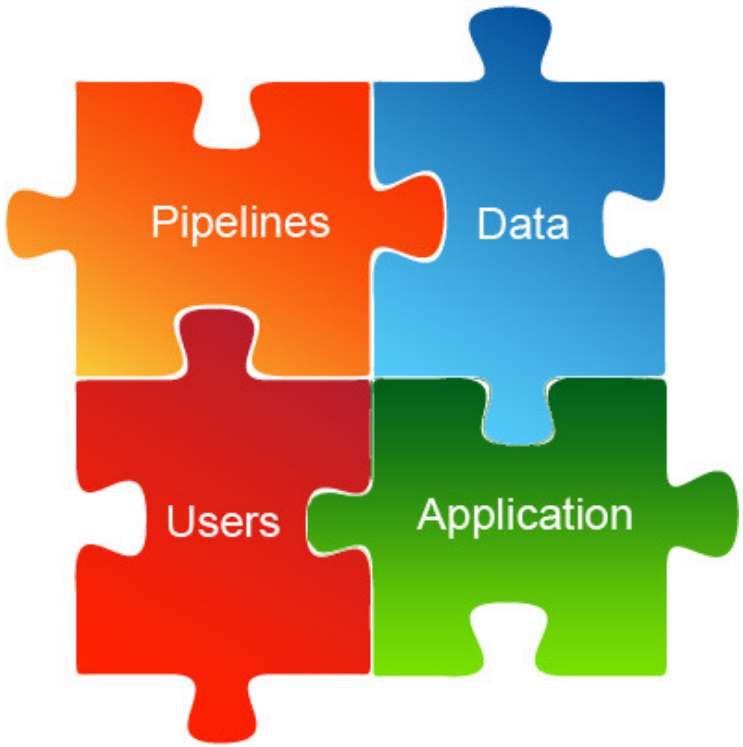
EasyGenomics

Problems:

- ~~Big genomic data~~
- ~~Geological distribution~~
- ~~Algorithm integration~~
- ~~Computational demand~~

EasyGenomics™

- **EasyGenomics is the bioinformatics platform for research and applications on the cloud**



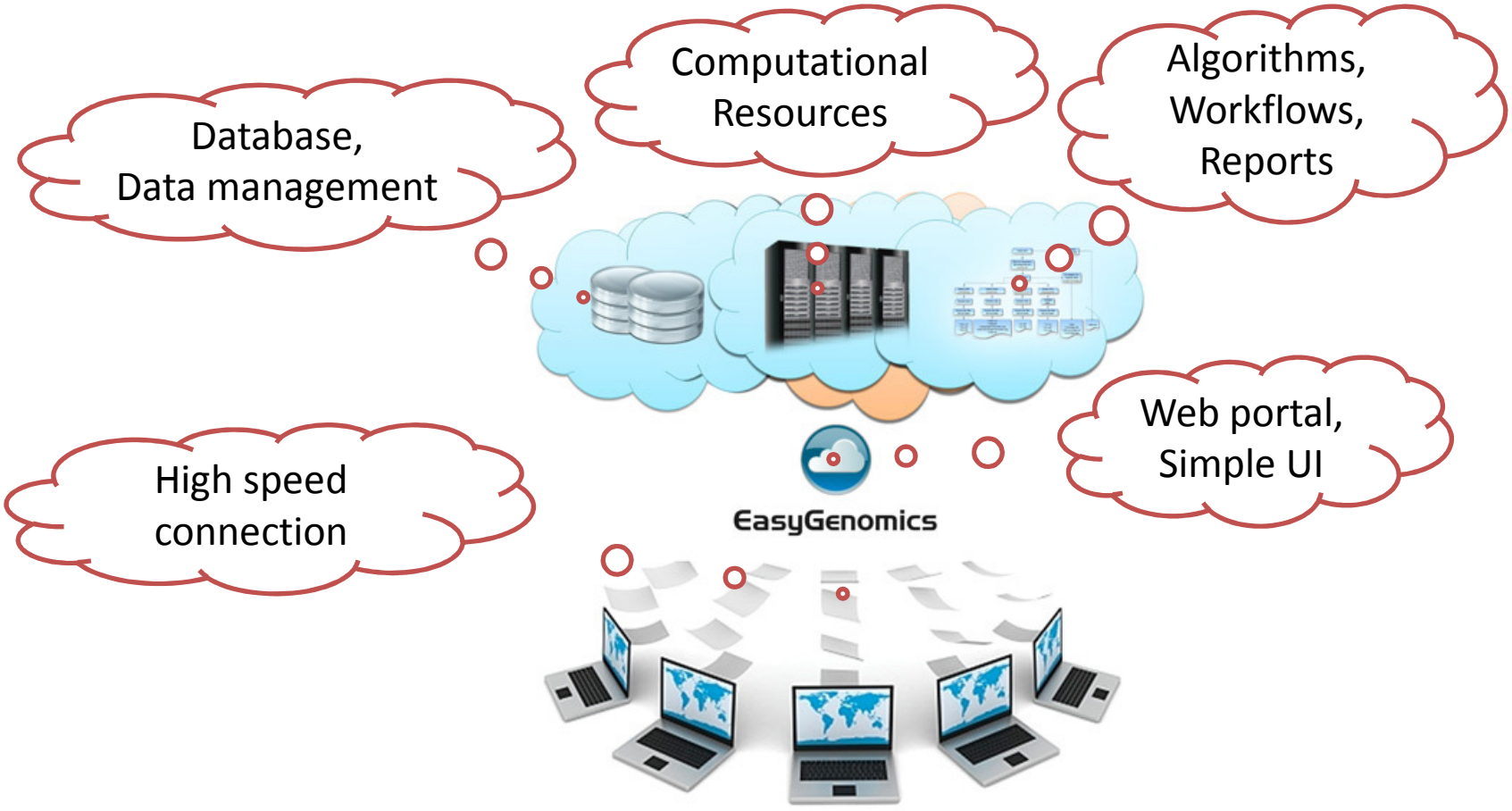
High speed data exchange

Fast and accurate pipelines

Easy and straightforward UI

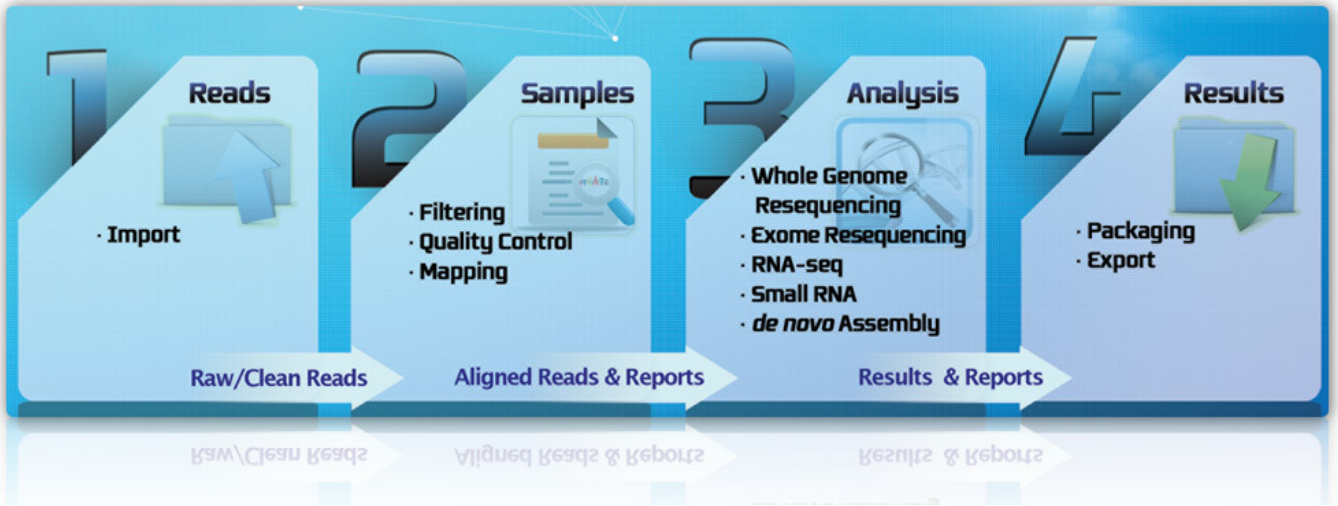
Application integration

EasyGenomics™



EasyGenomics is the bioinformatics platform for research and applications on the cloud

Bioinformatics Core



- **Algorithms:**

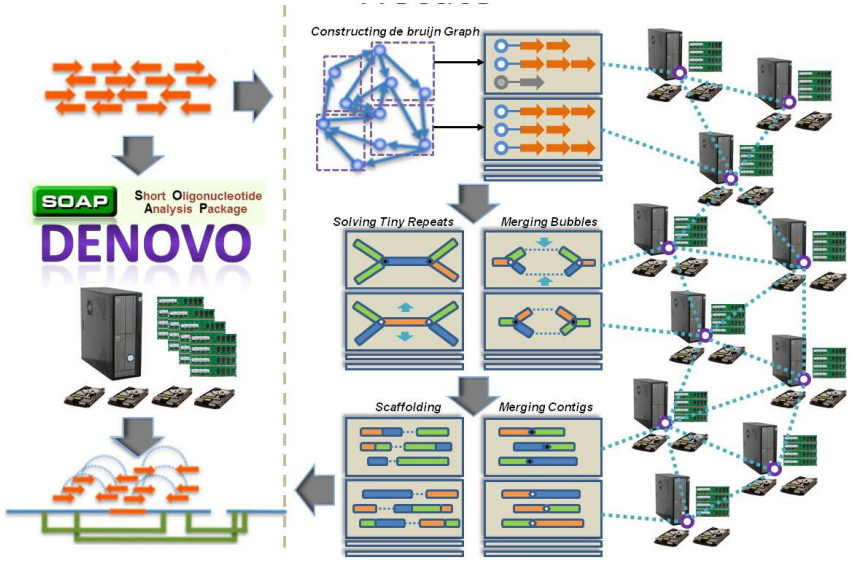
  Carefully chosen, tested and optimized

- **Workflows:**

  Whole genome resequencing, exome resequencing, RNA-Seq, small RNA, *de novo* Assembly

Enabling Technology

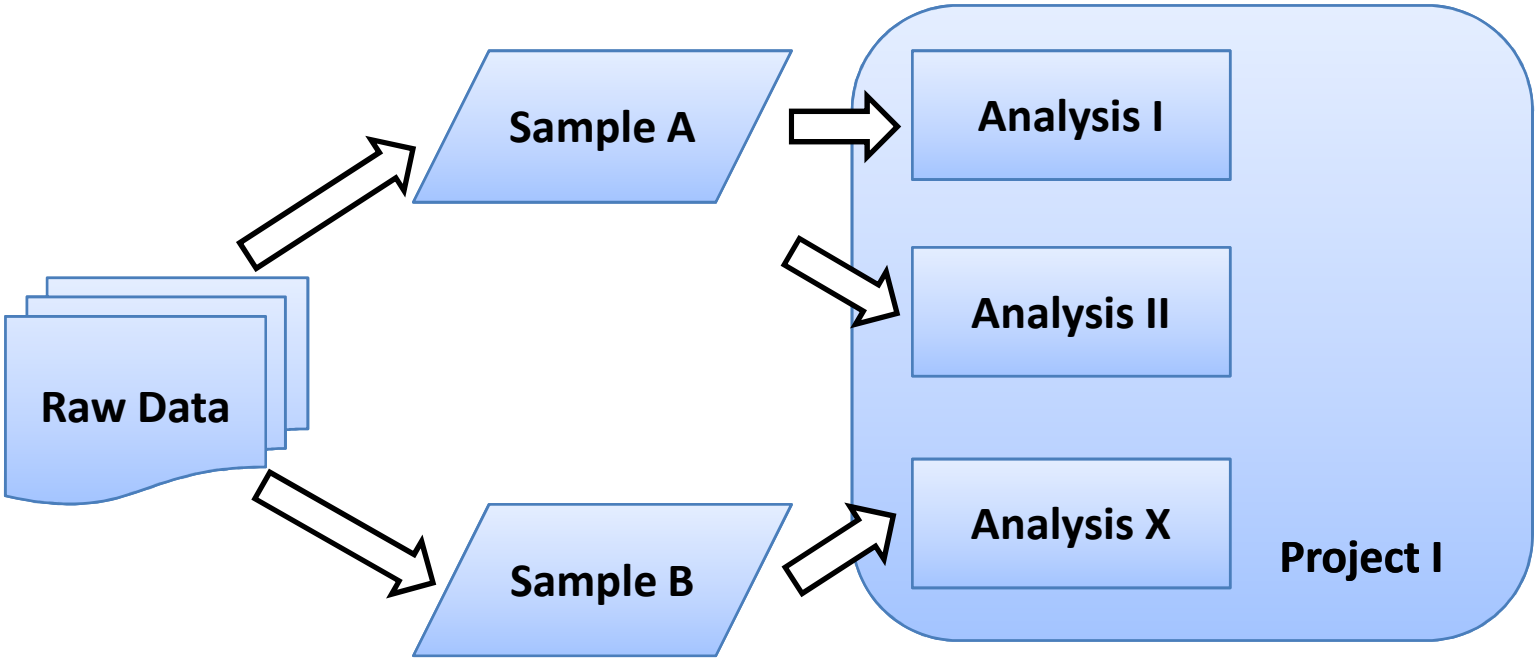
Best Practice Award for IT Infrastructure



Hadoop-based Flexible Computing

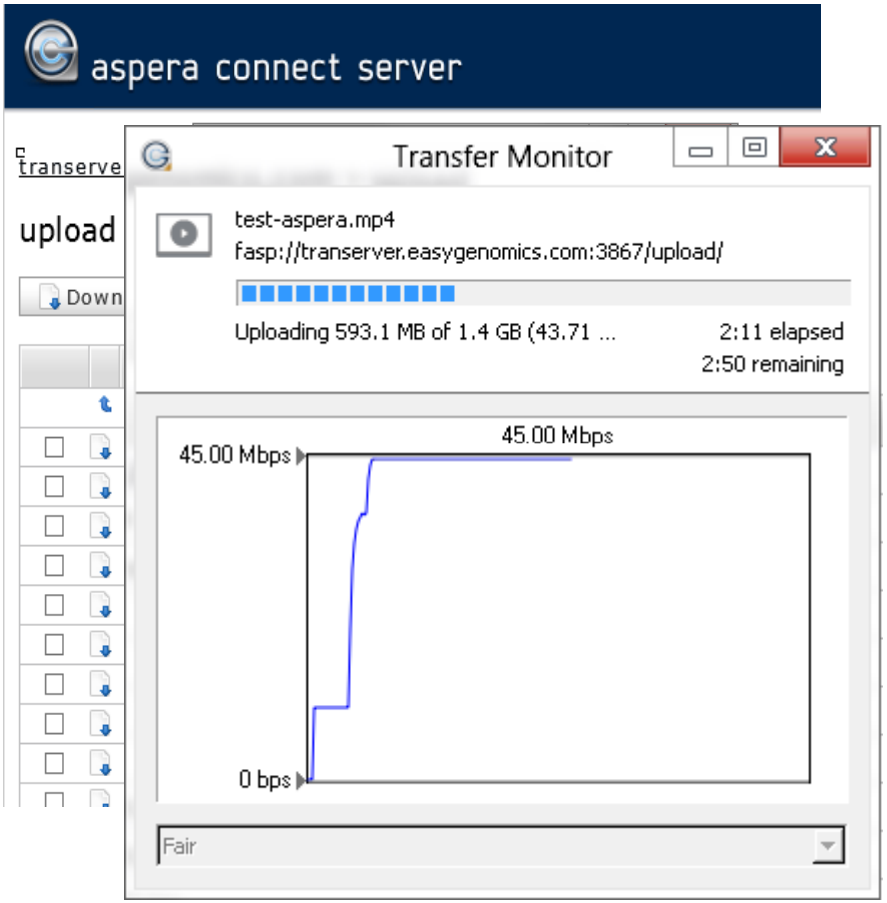
Human Genome	SOAP*denovo*	EasyGenomics™ (192 cores)
Genome Coverage	86%	86%
Assembly Time	70h	55h
No. of Servers	1	15
Memory Size	500GB x 1	24 GB x 15
Mode	Centralized	Distributed

Data Management



- **"Sample", "Analysis", "Project"**
- **Mimicking real research procedure**
- **Automatic management of underlying data structure**

High Speed Data Exchange



- **Aspera's patented *fasp™* high-speed file transferring technology**
- **10~100X faster than FTP**

Resource Management

Multitenancy

Workspace

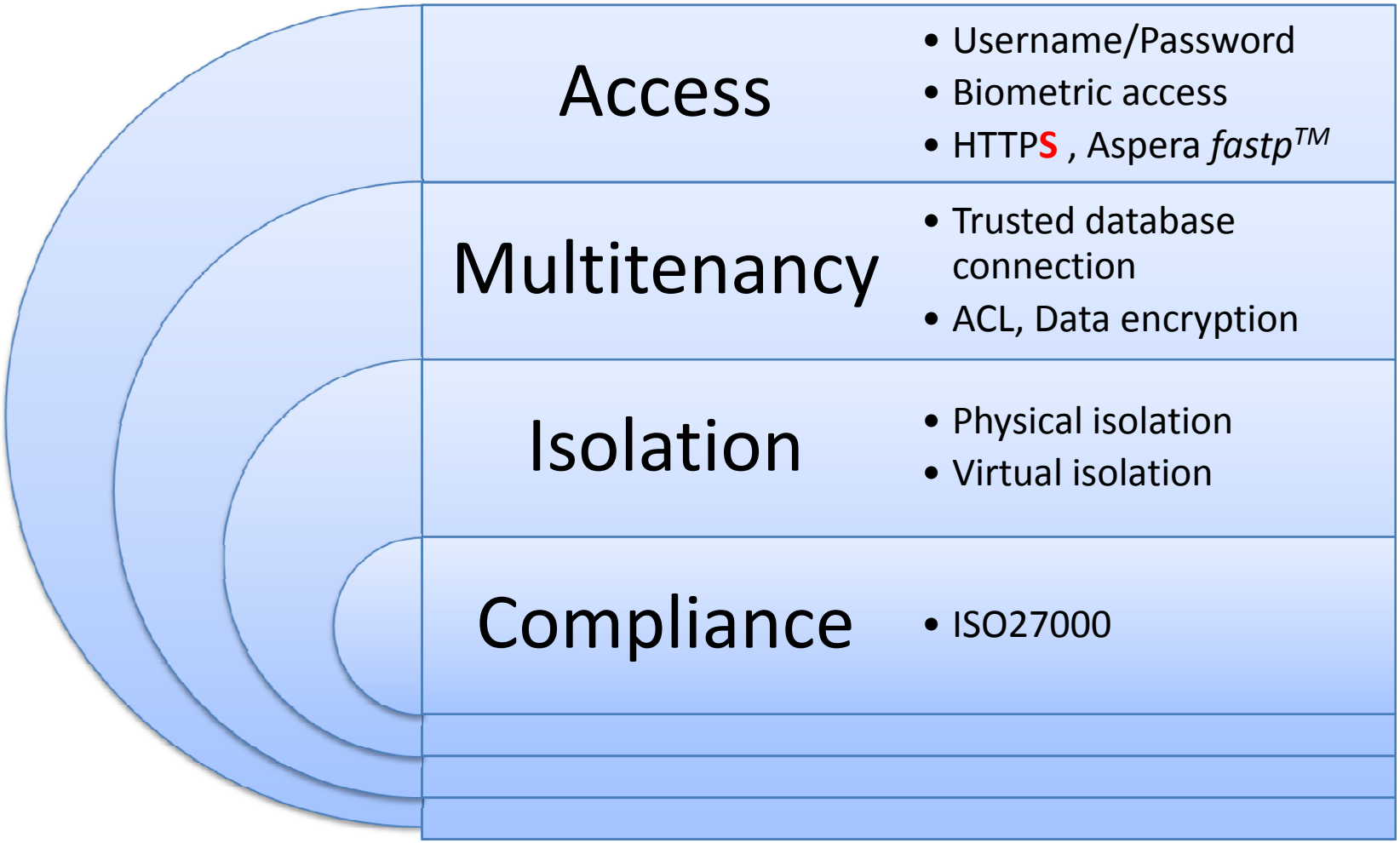
Managed
Data Structure

Managed
Task

Safe

Backup

Security

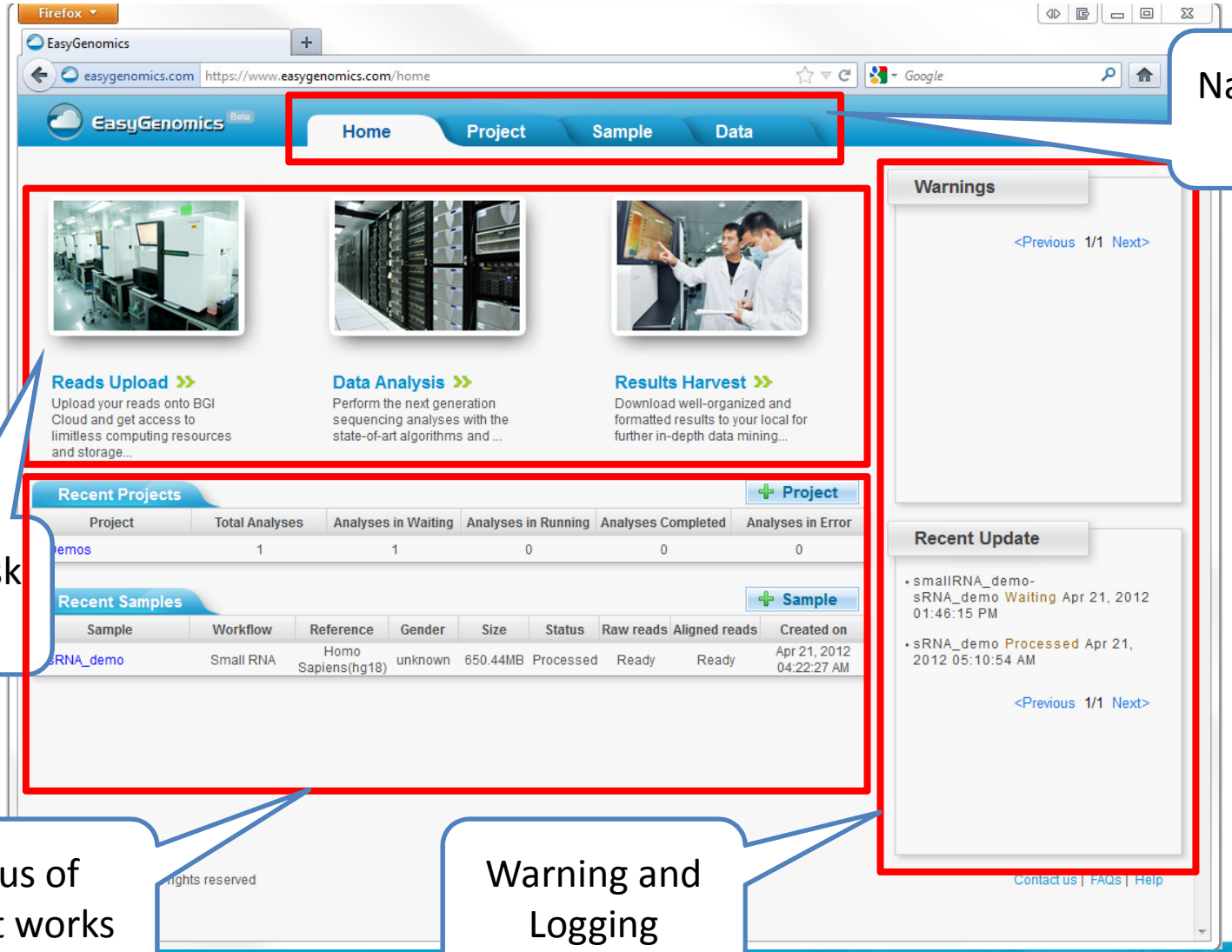

Access
• Username/Password
• Biometric access
• HTTPS , Aspera fastp™
Multitenancy
• Trusted database connection
• ACL, Data encryption
Isolation
• Physical isolation
• Virtual isolation
Compliance
• ISO27000

Introduction to EasyGenomics™

Xing Xu, Ph.D

Senior Product Manager

Homepage



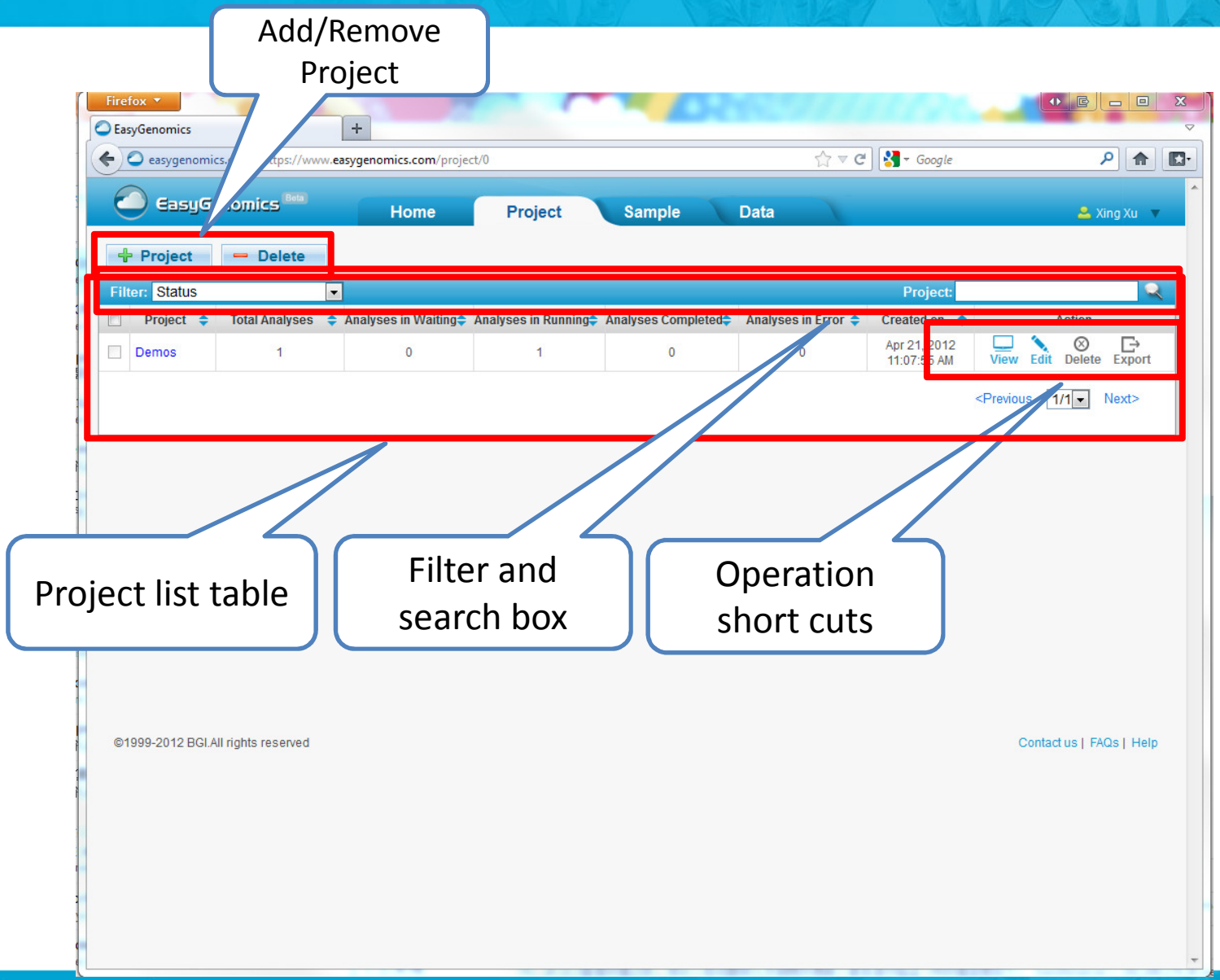
Navigation Tabs

Three task portals

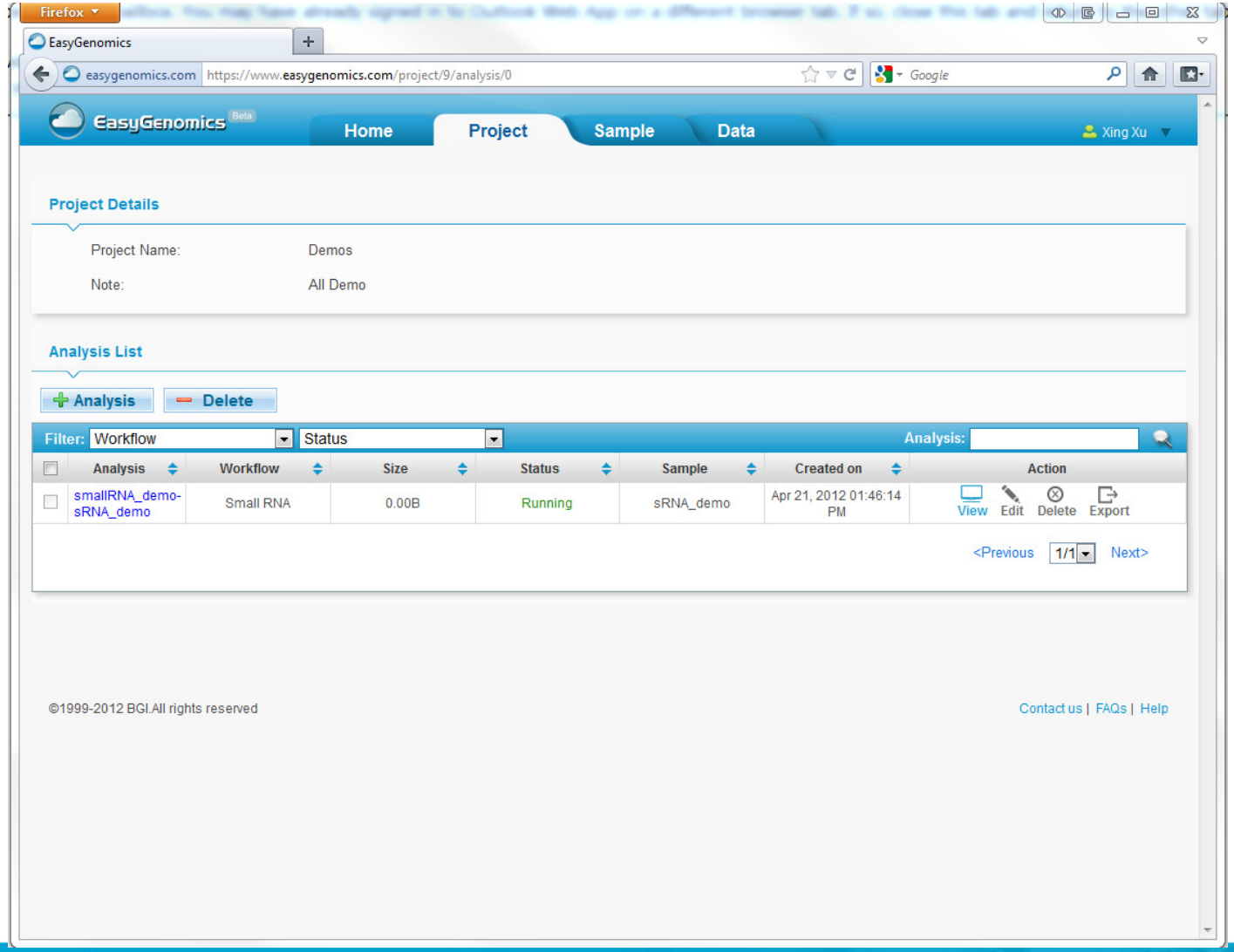
Status of recent works

Warning and Logging

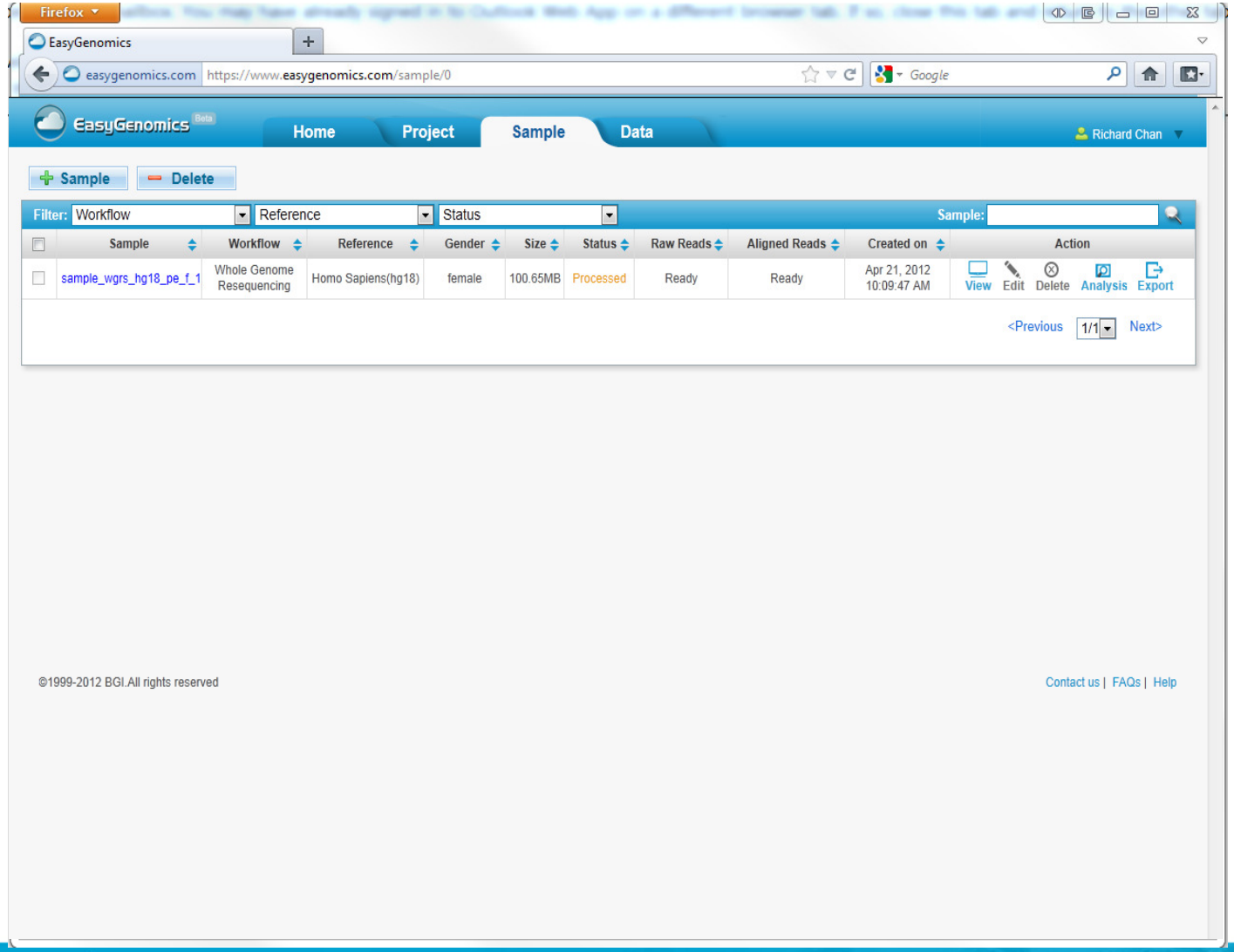
Project Table



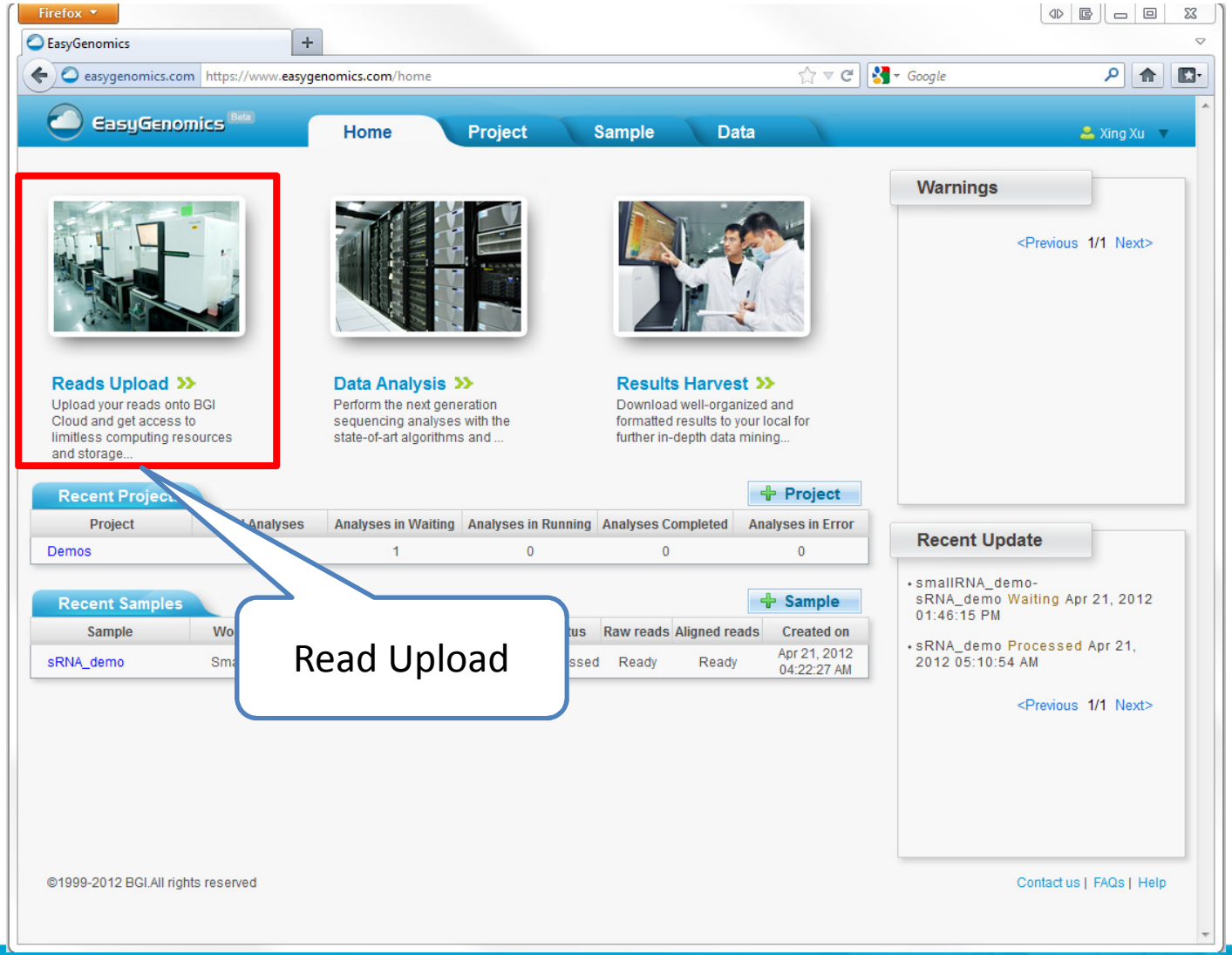
Analysis Table



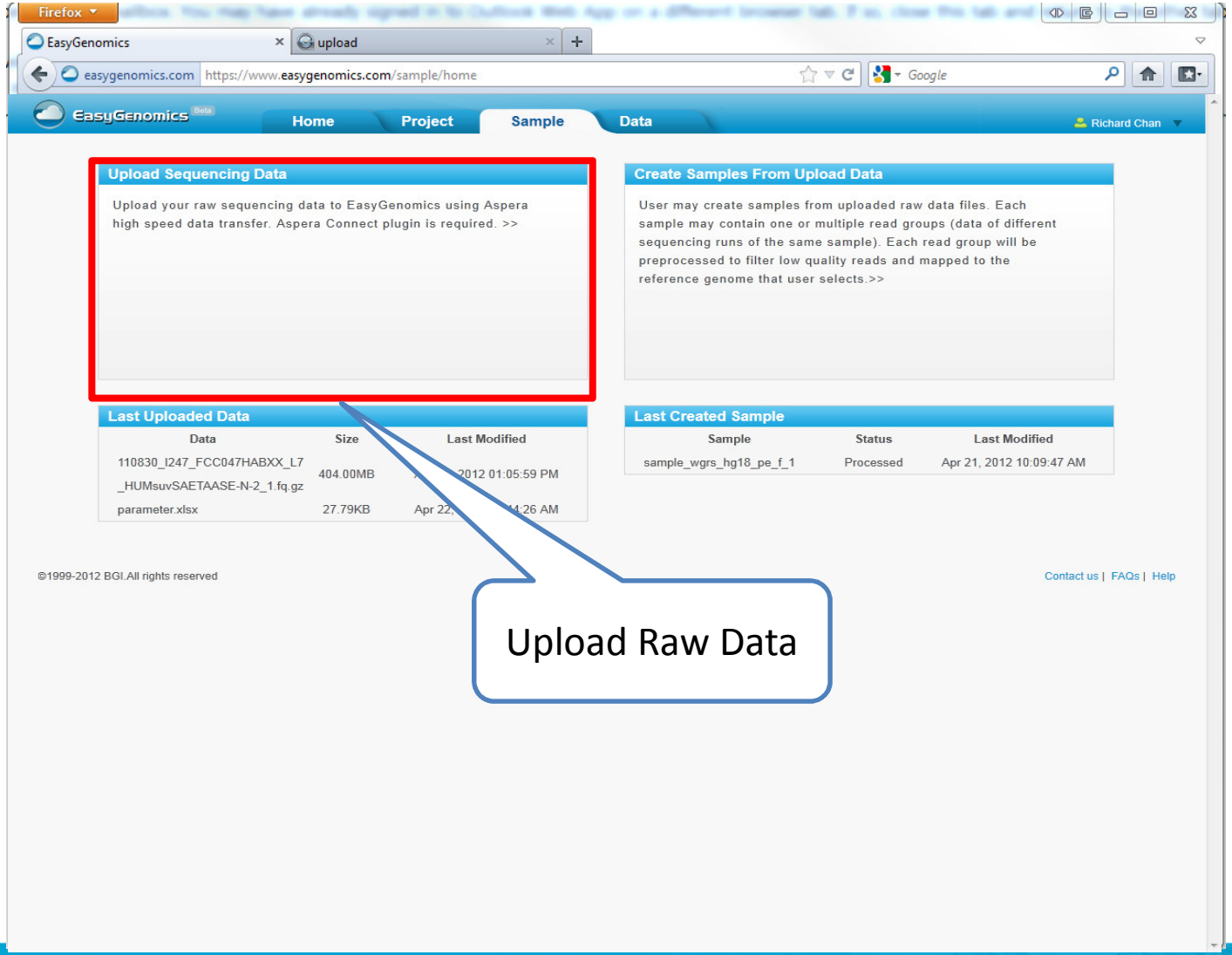
Sample Table



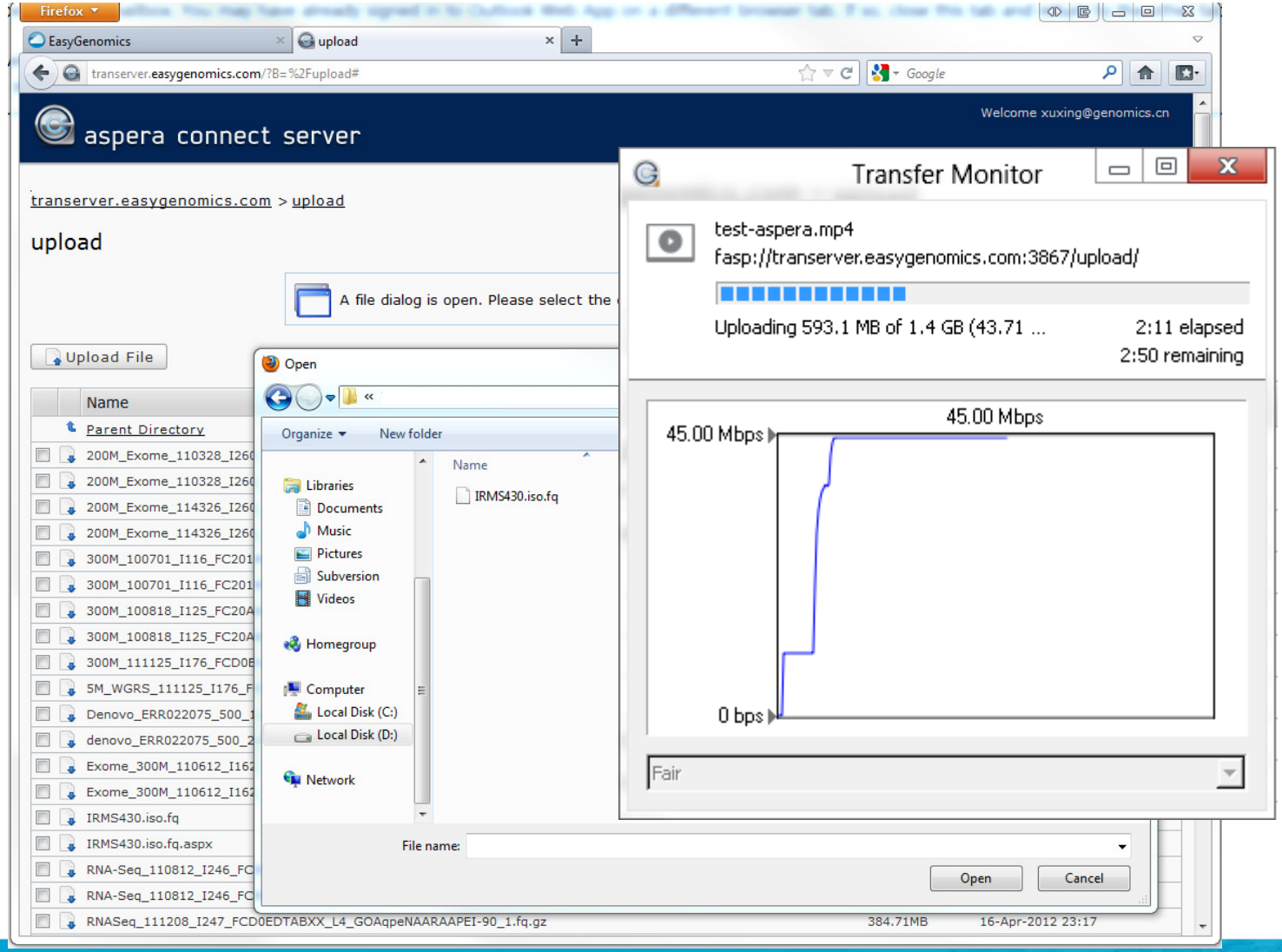
Read Upload Portal



Create a Sample



Upload Raw Reads (Aspera connect server)



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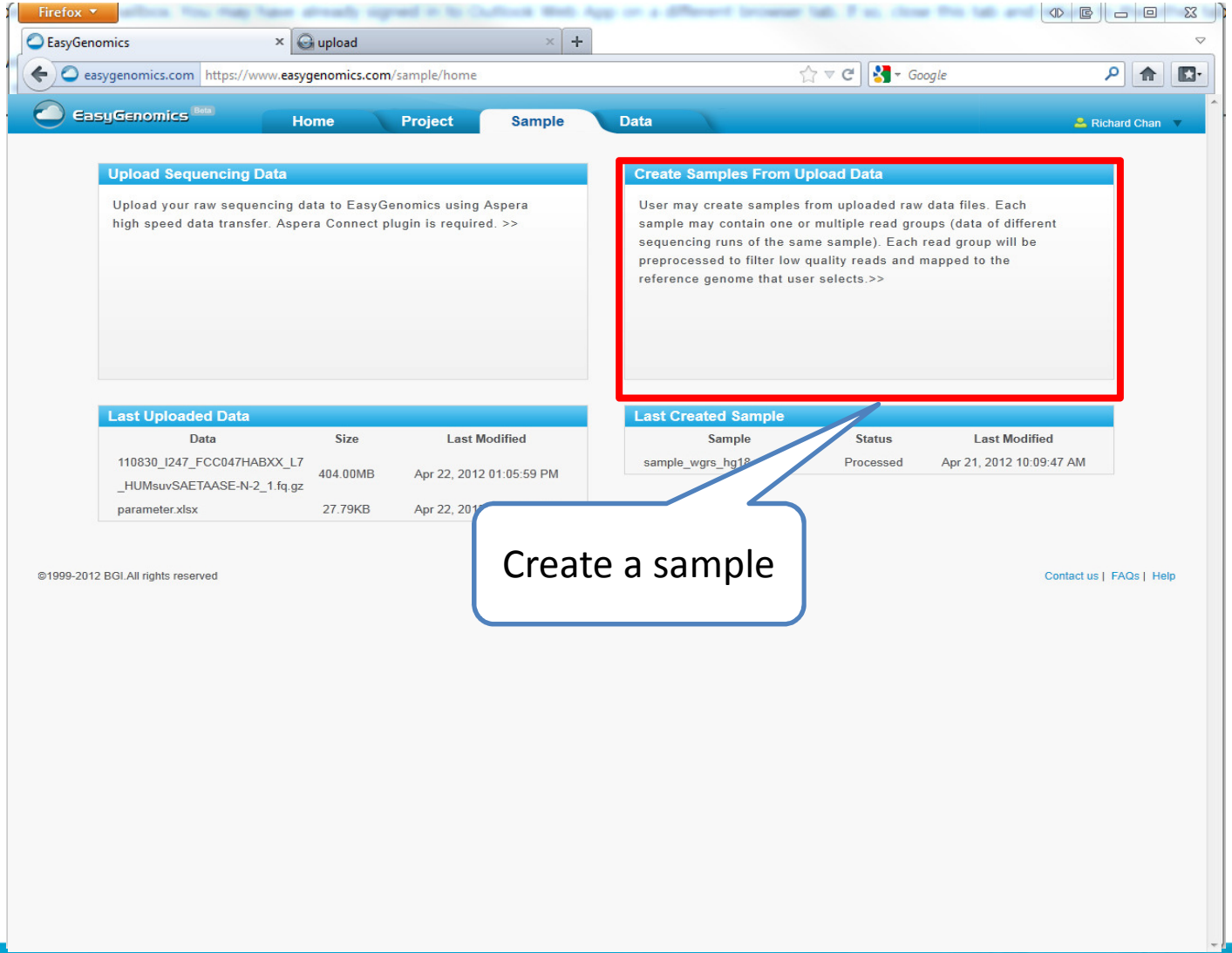

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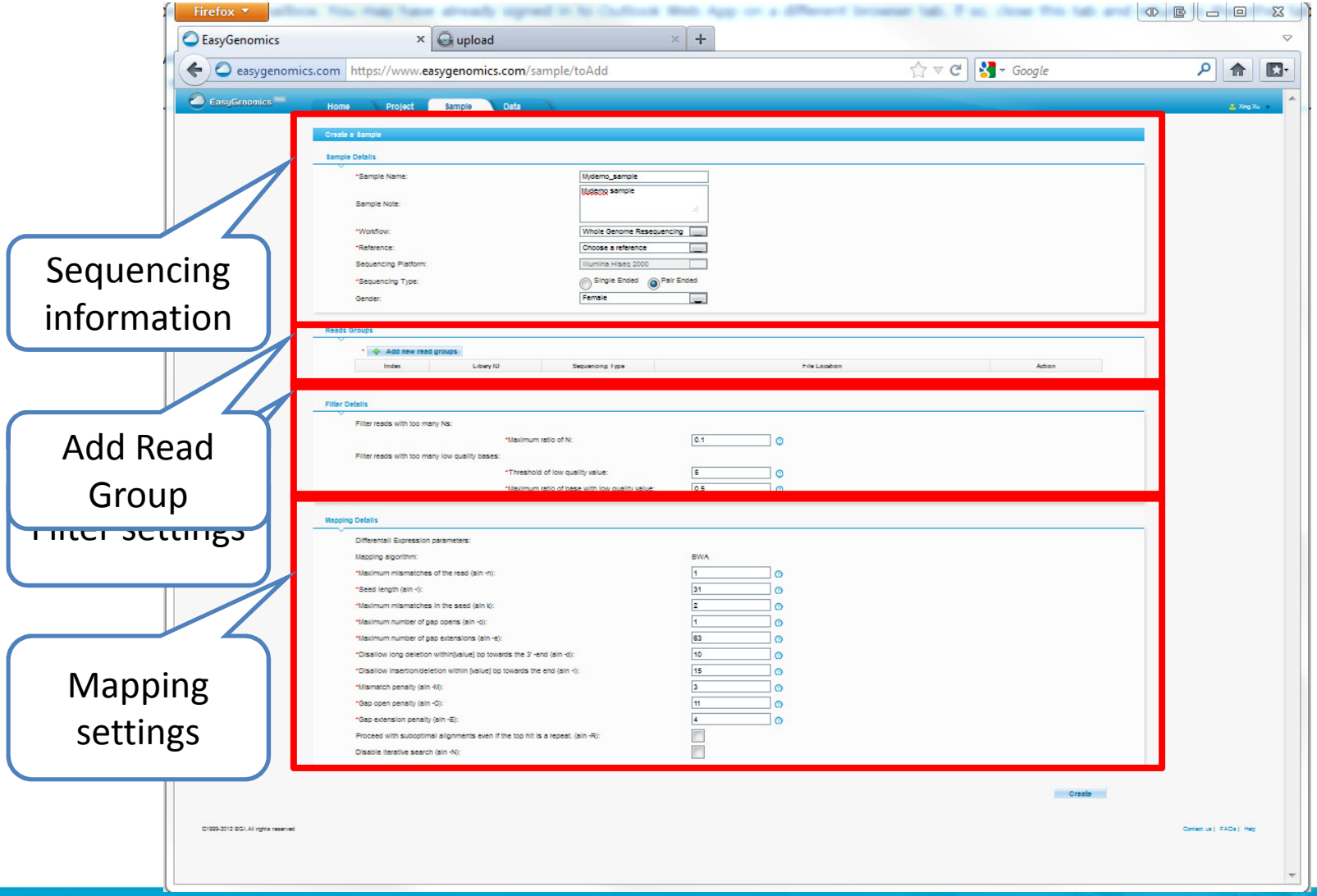
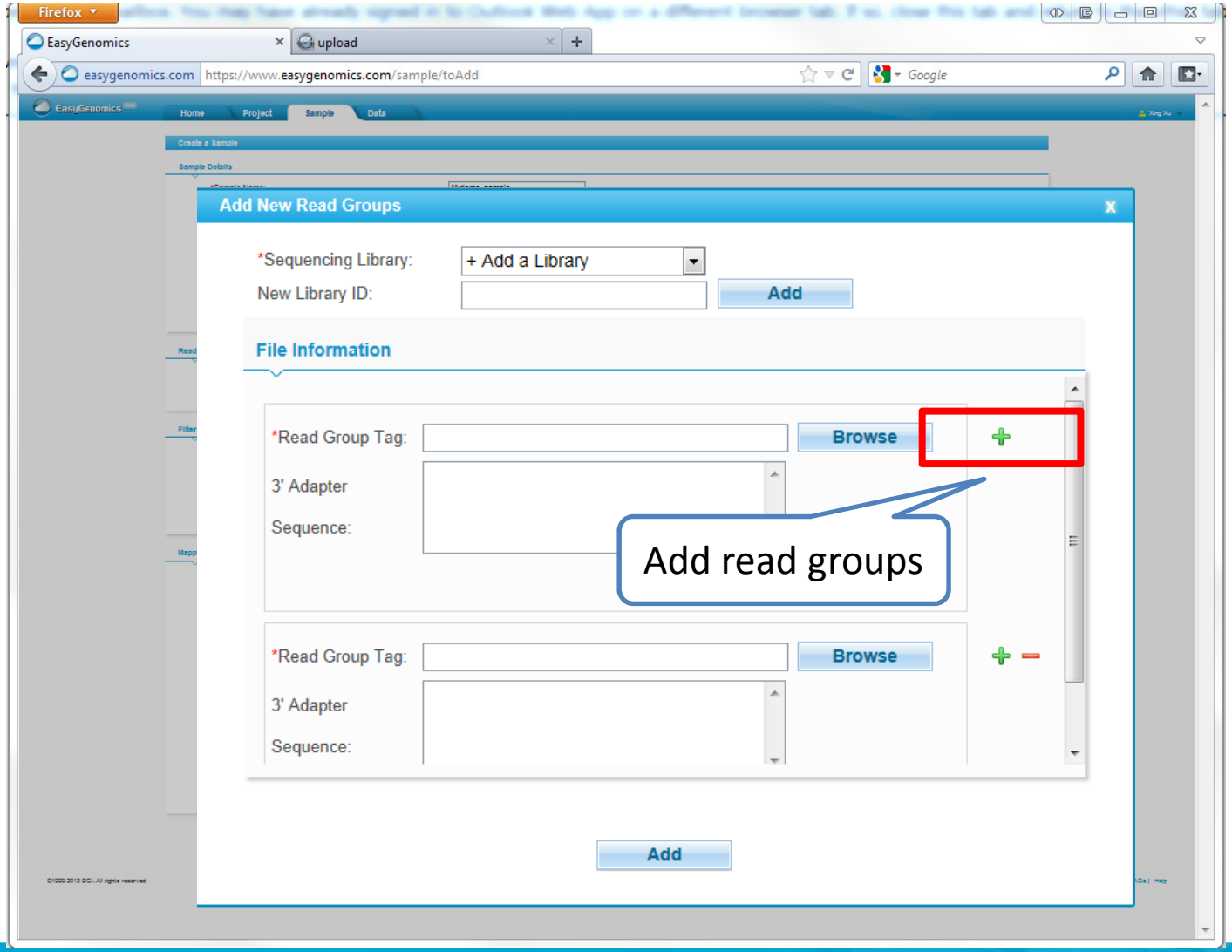
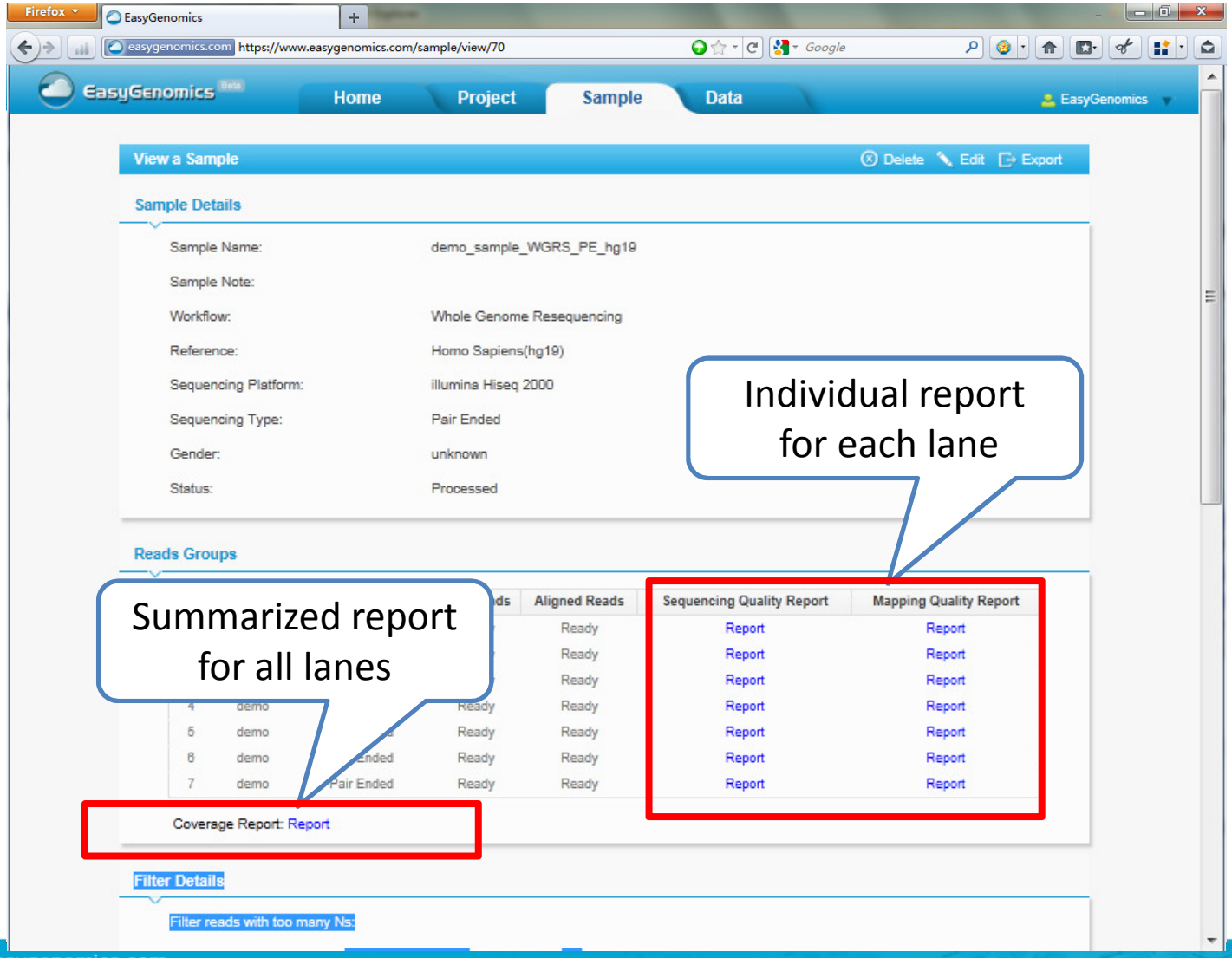


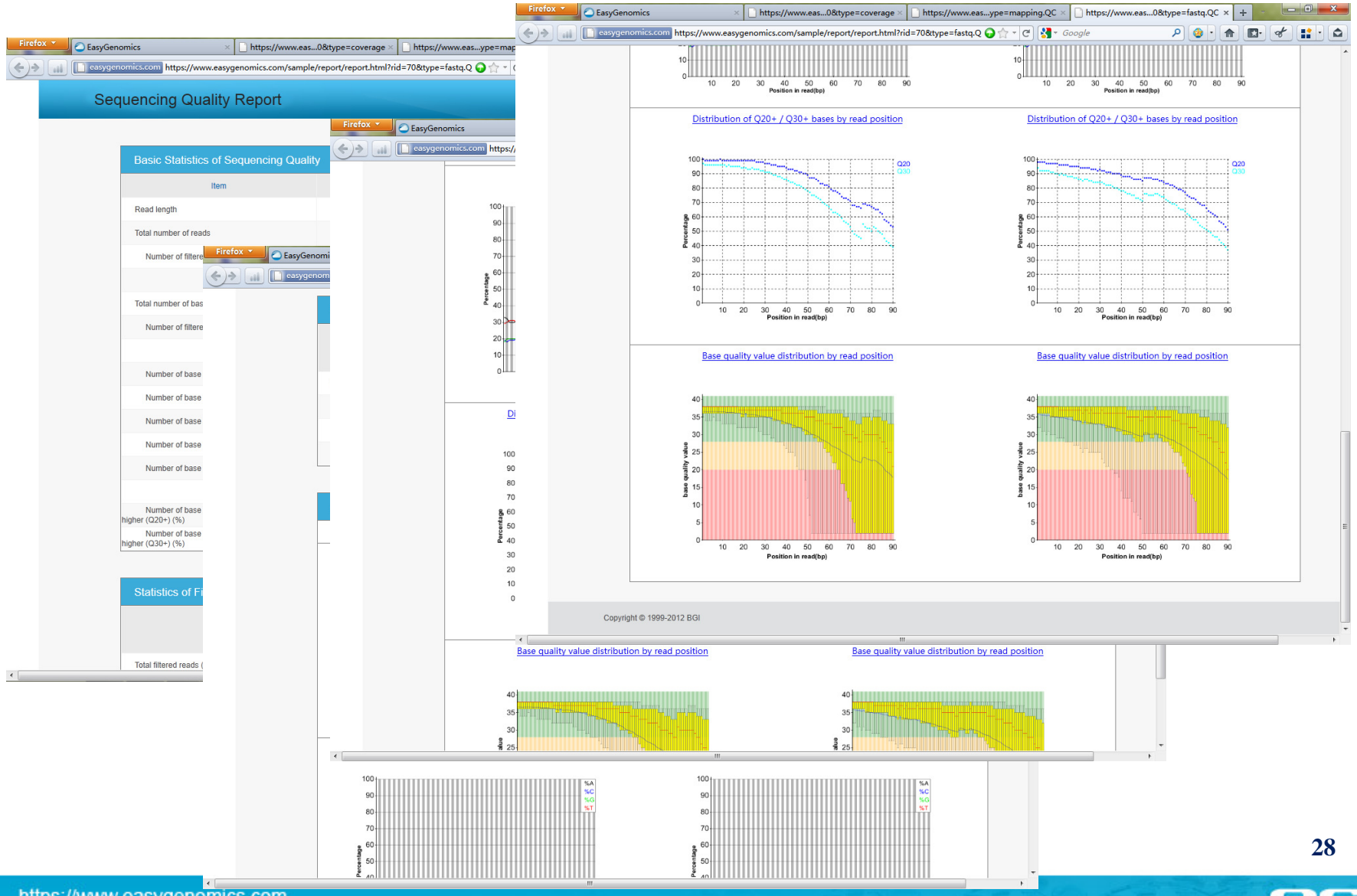
Create a Sample



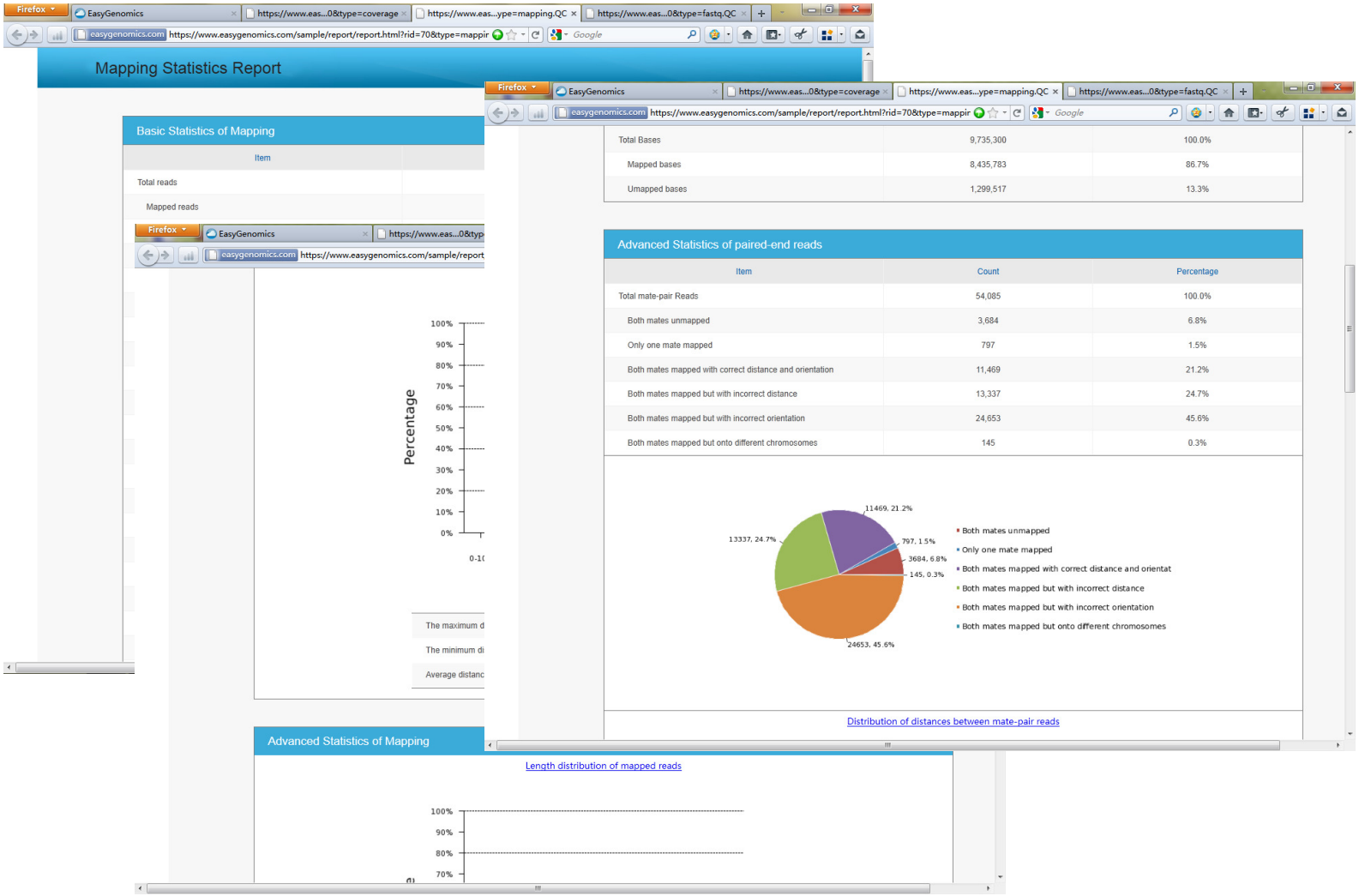
Sample Page


Firefox
EasyGenomics
https://www.easygenomics.com/sample/view/70
Home
Project
Sample
Data
View a Sample
Delete
Edit
Export
Sample Details
Sample Name: demo_sample_WGRS_PE_hg19
Sample Note:
Workflow: Whole Genome Resequencing
Reference: Homo Sapiens(hg19)
Sequencing Platform: illumina Hiseq 2000
Sequencing Type: Pair Ended
Gender: unknown
Status: Processed
Reads Groups
Aligned Reads
Sequencing Quality Report
Mapping Quality Report
Coverage Report: Report
Filter Details
Filter reads with too many Ns:
Individual report for each lane
Summarized report for all lanes

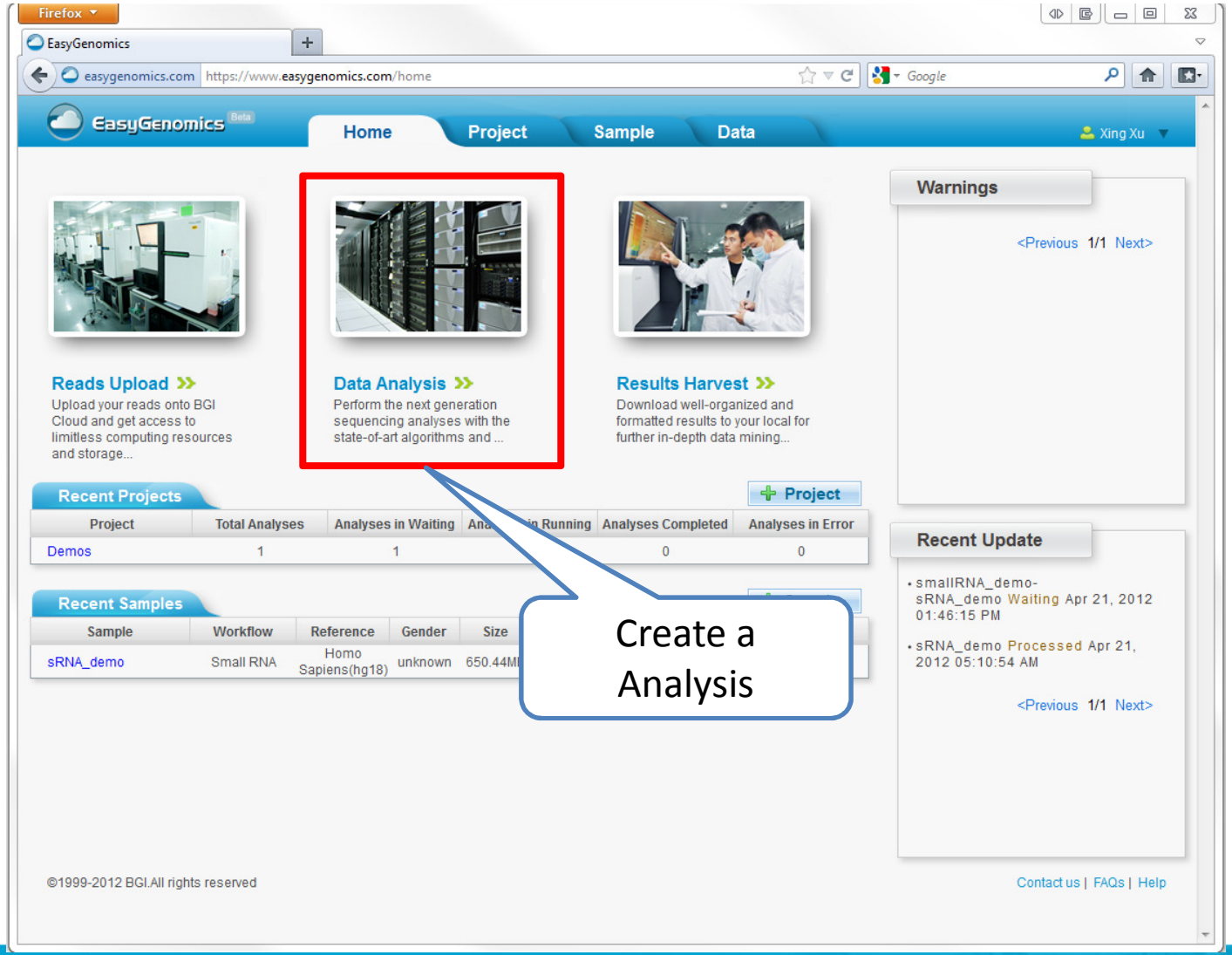
Sequencing Quality Report



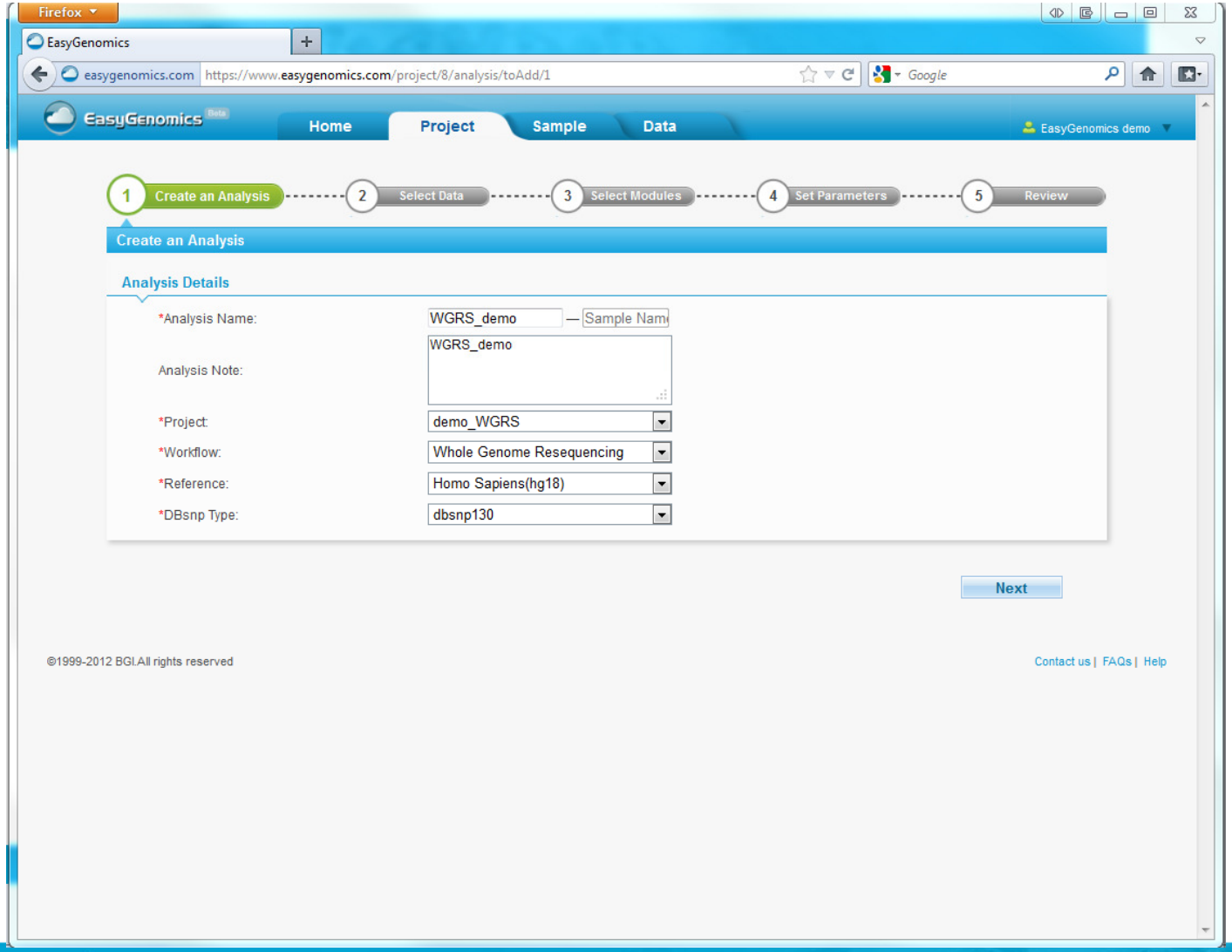
Mapping Report



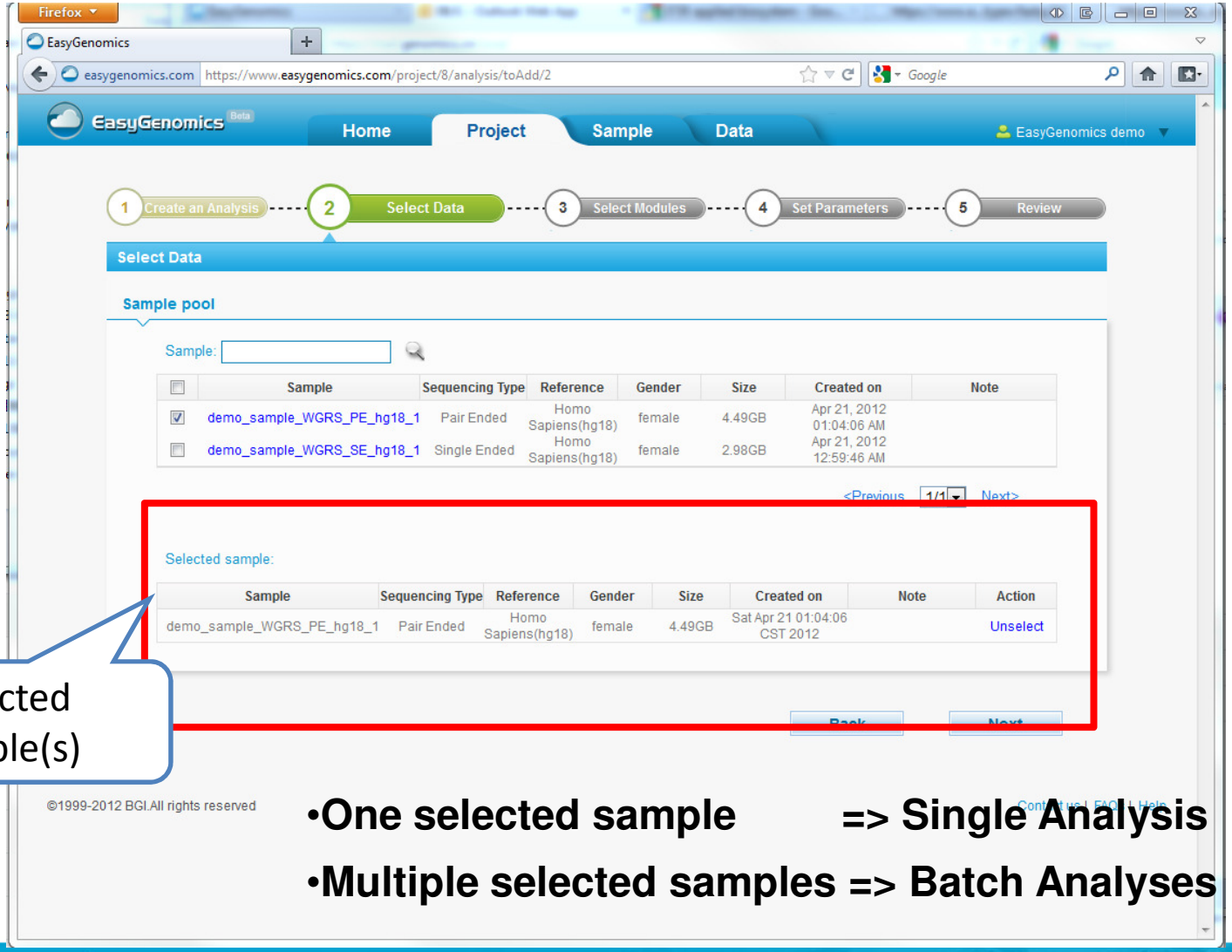
Data Analysis Portal



Create an Analysis



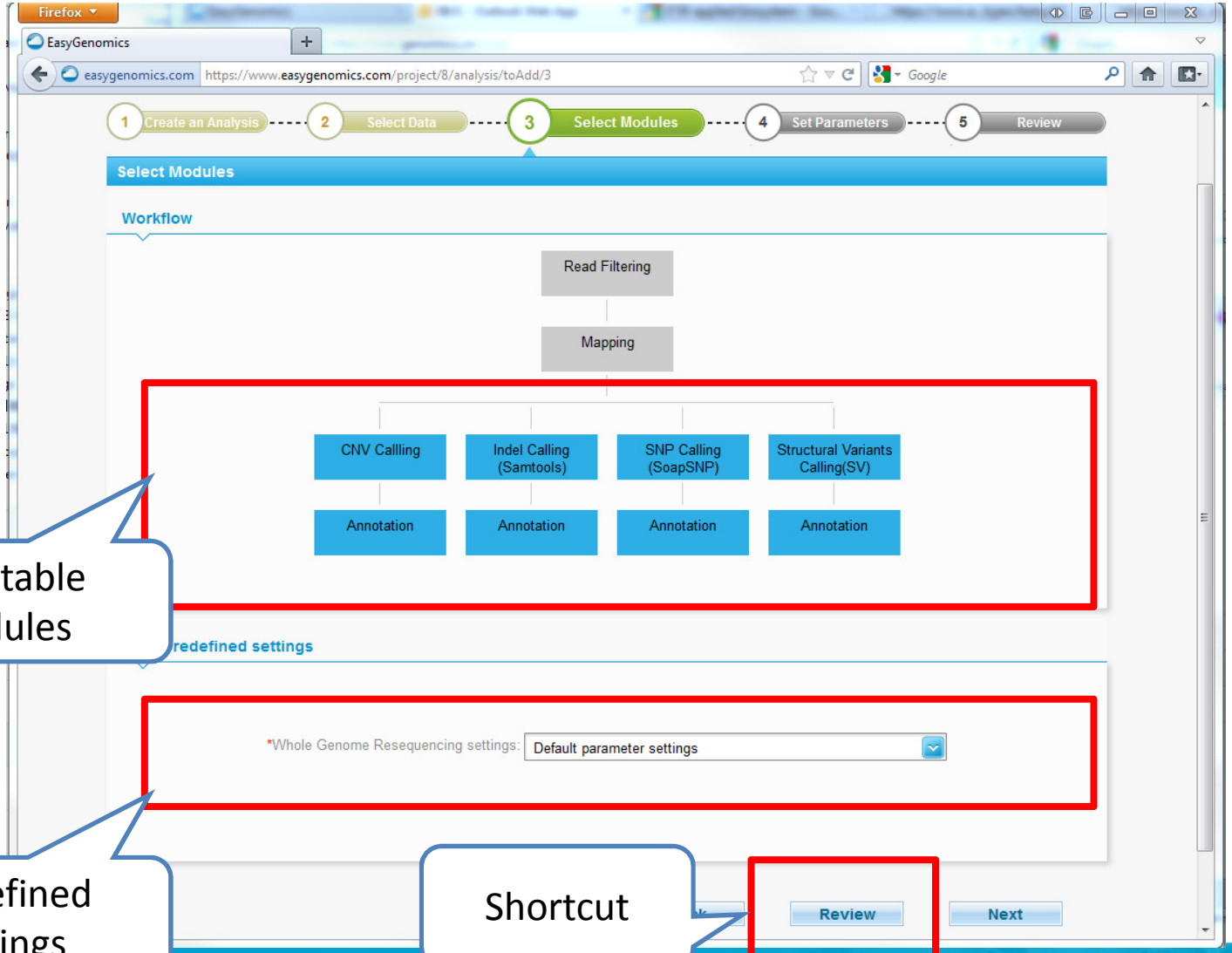
Create an Analysis



Selected sample(s)

- **One selected sample => Single Analysis**
- **Multiple selected samples => Batch Analyses**

Create an Analysis

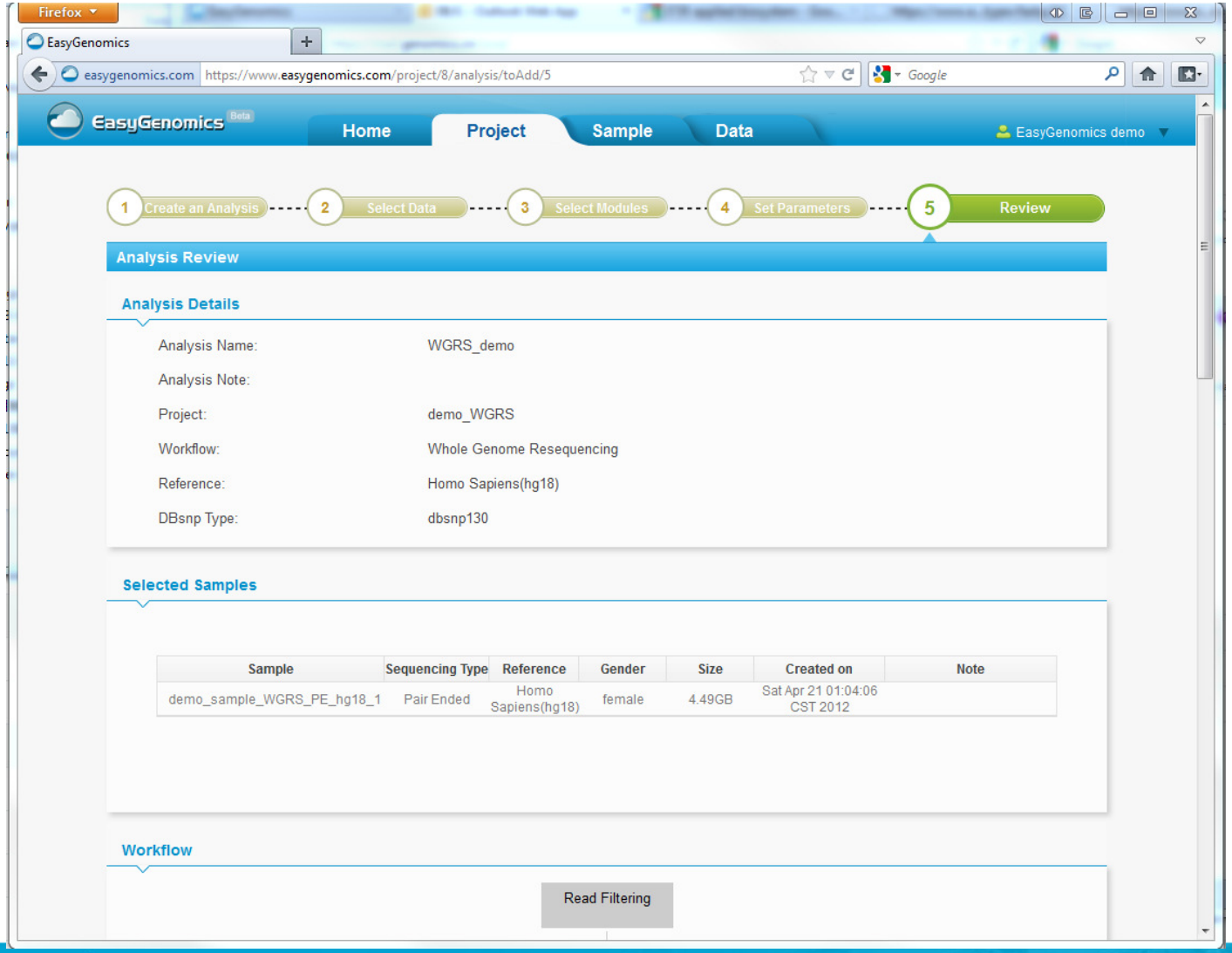


Selectable modules

Predefined Settings

Shortcut

Create an Analysis



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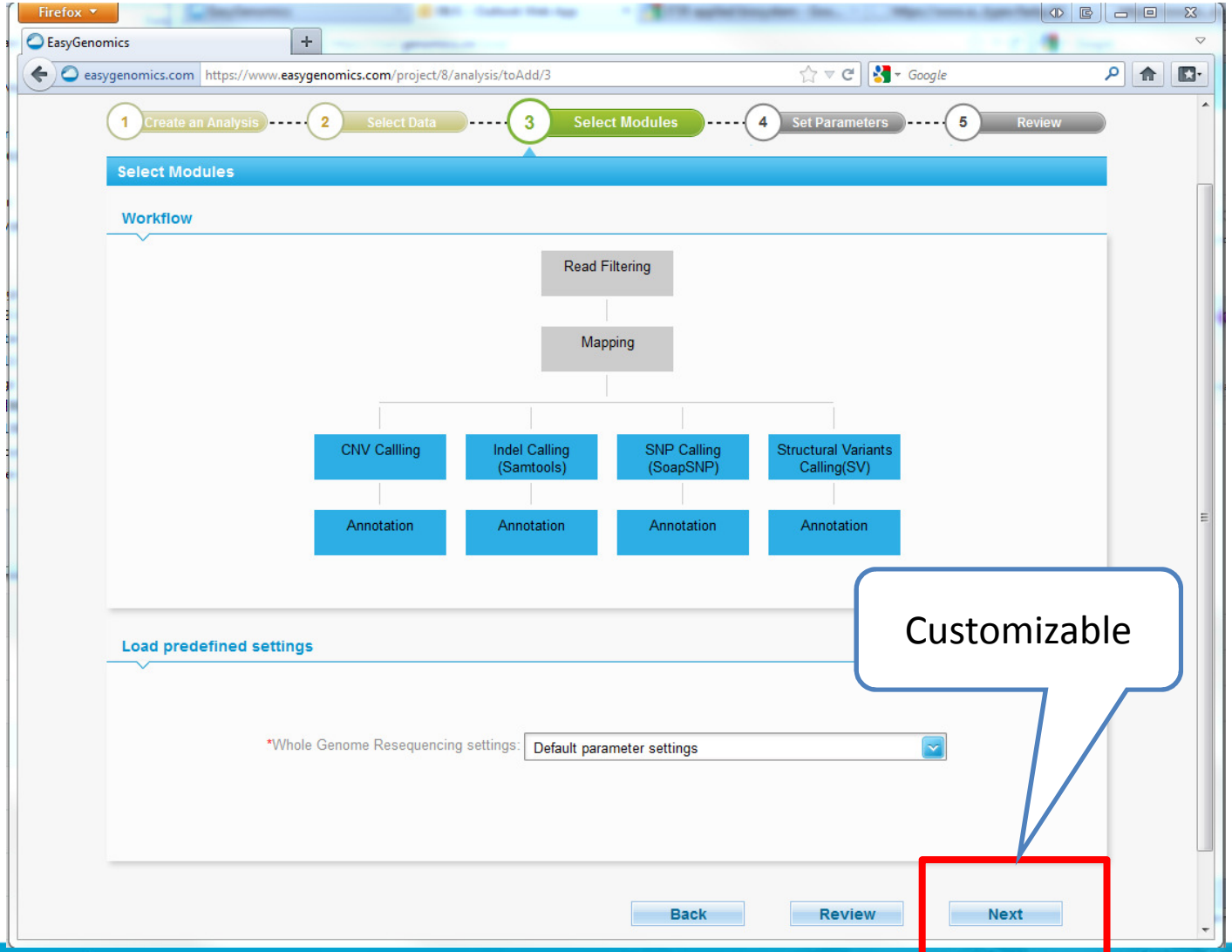

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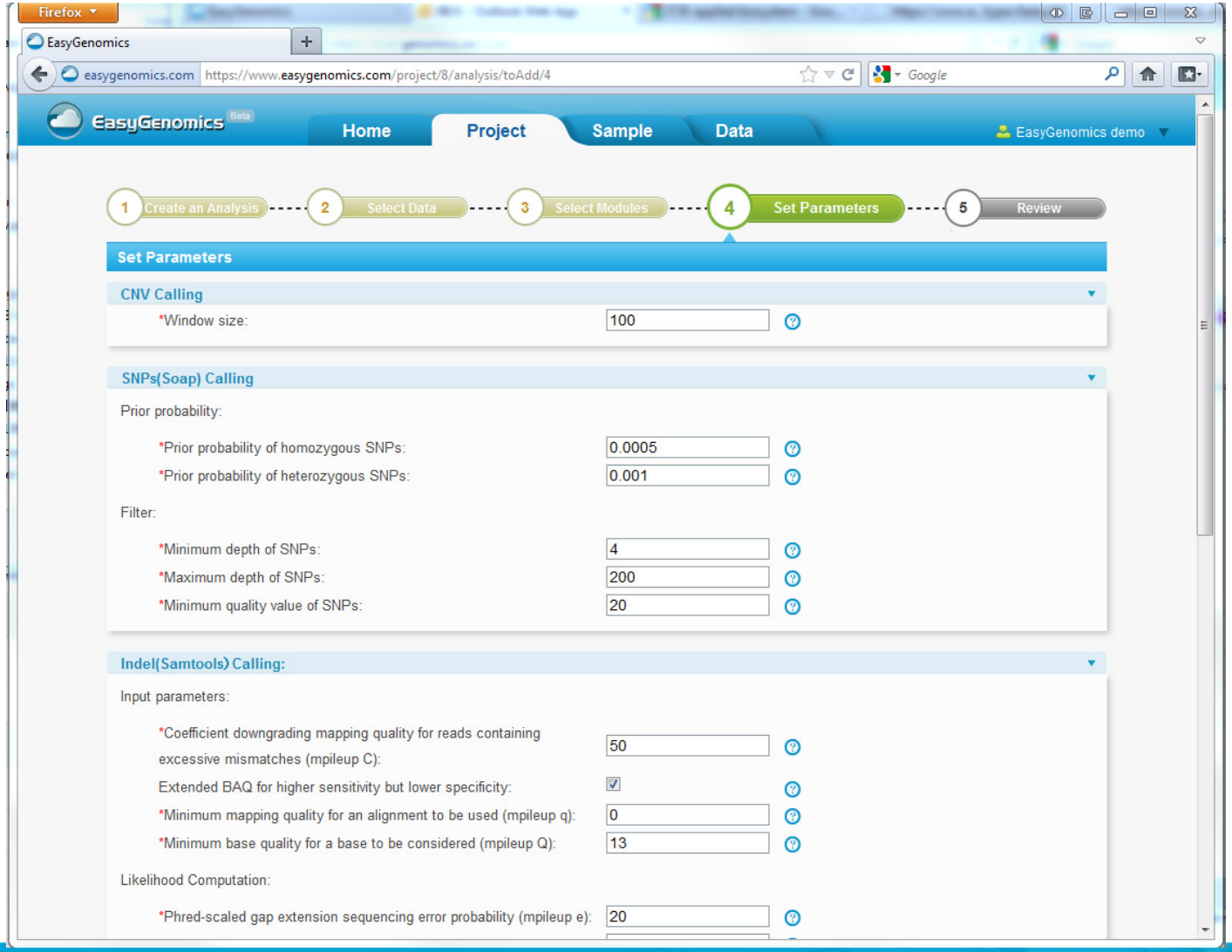
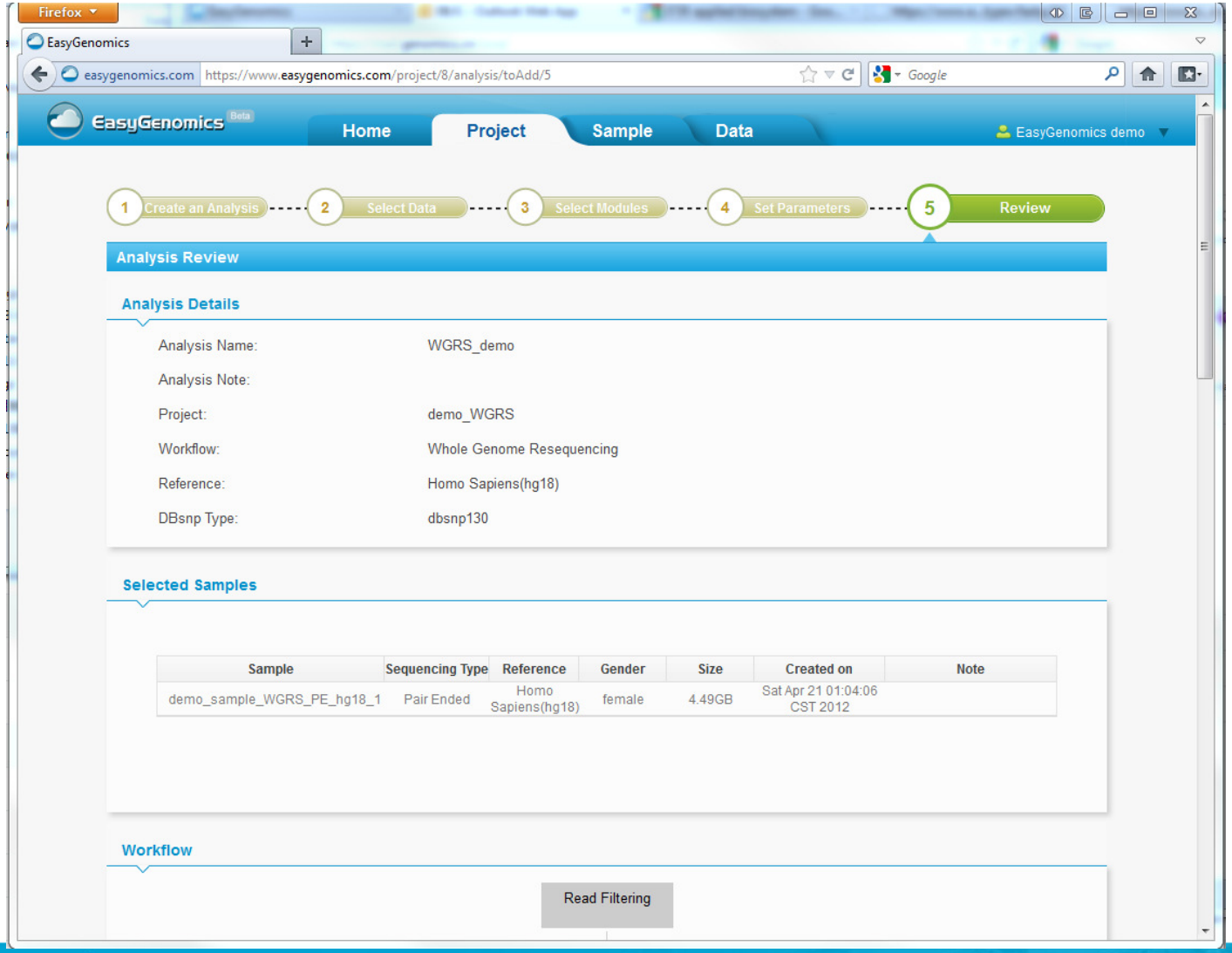
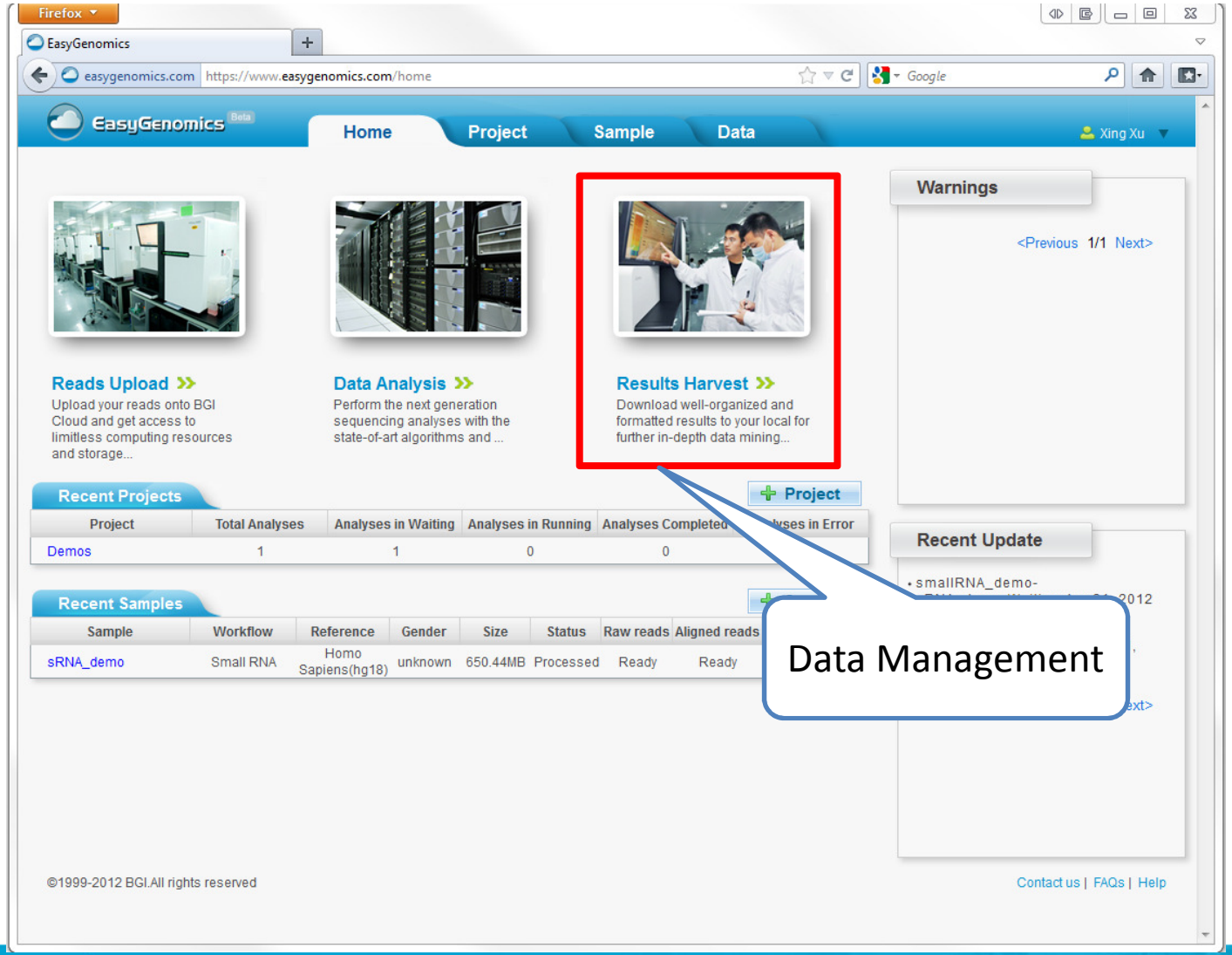


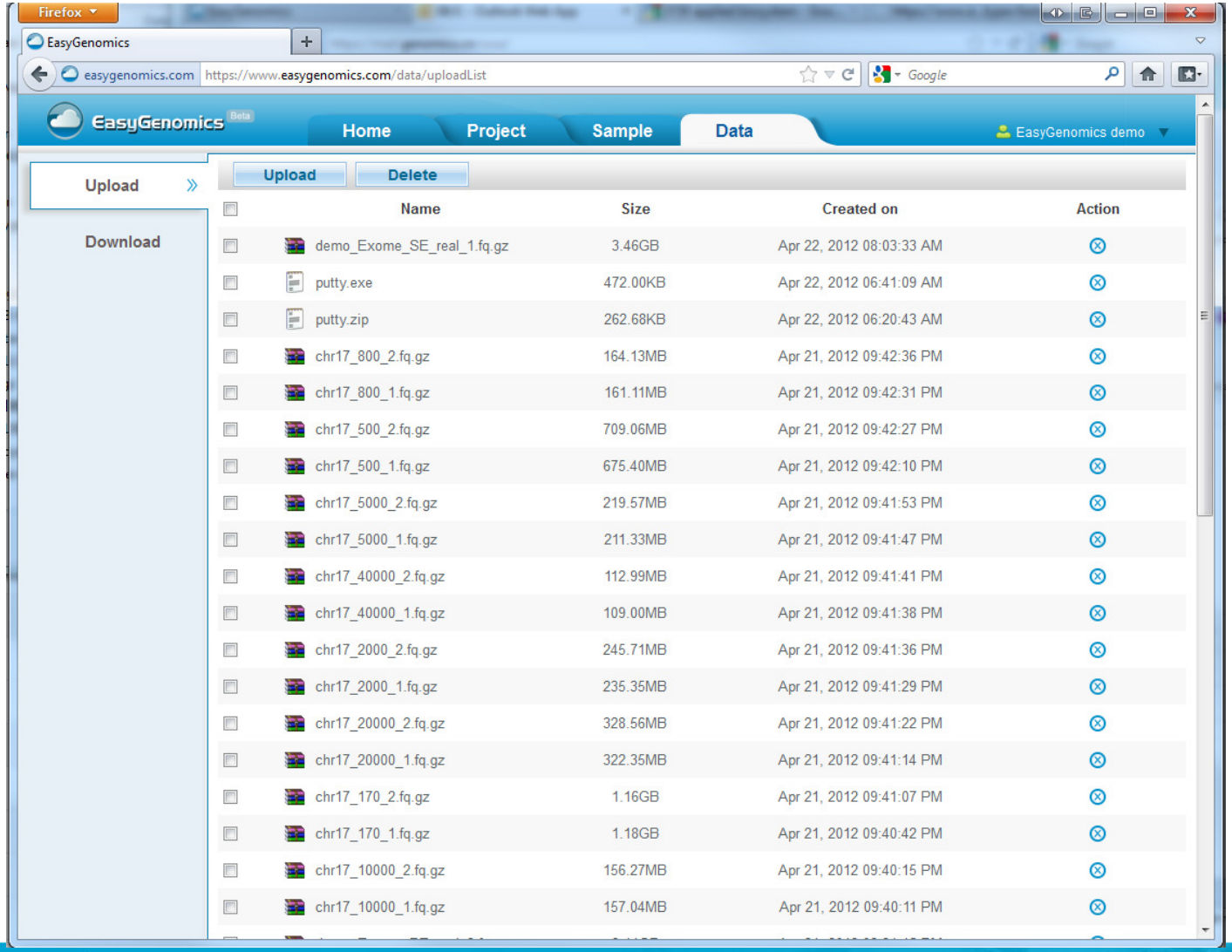
Create an Analysis



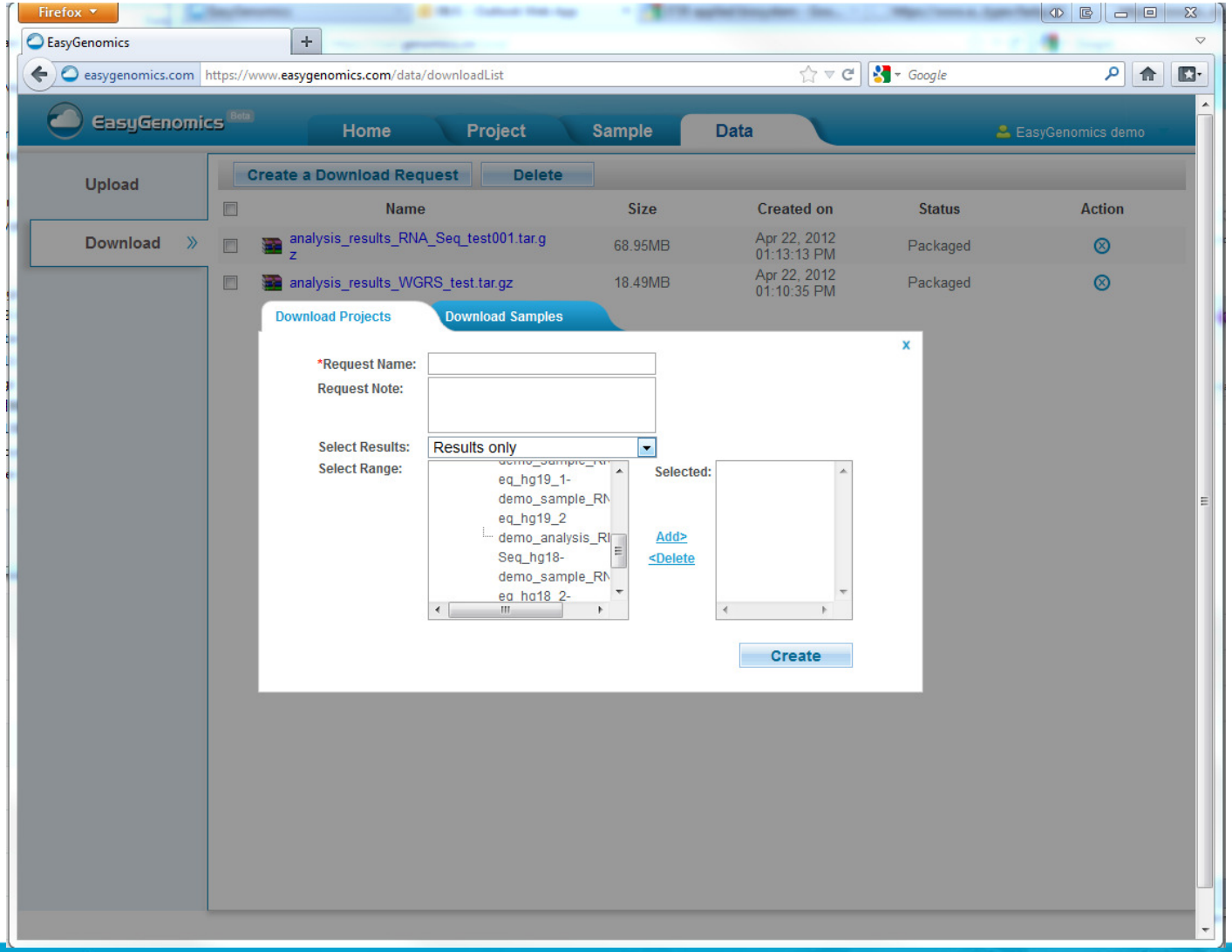
Data Harvest Portal



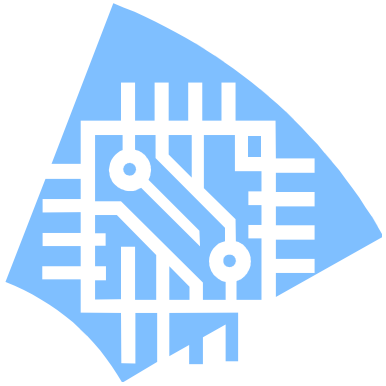
Upload Management



Download Management



LIVE DEMO



Sifei He

Director of BGI Cloud

Applications

- **Complex -Omics research**
- **Genetic testing**
- **Diagnostics**

EasyGenomics

One More Thing ☺

FREE

Ref: BOSTON

Please Visit BGI Booth @ 213

Subject to T&C

Q & A

BACKUP