Tutorial: Genomics and Towards Personalized Medicine

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Goal: This tutorial will provide an introduction to the field of computation genomics, focusing on the SW tools used to perform DNA/RNA sequencing as well as advanced analysis targeted towards personalized medicine.

Duration: Half a day (including Hands on Exercises)

Course structure:

Introduction to Genomics and Towards Personalized Medicine – 30 mts
Genomics Basics - 30 mts
DNA/RNA pipeline and Hands on Class – 2 hours
Discussion and next steps – 30 mts

We will do a followup based on the inputs and feedback.

Background:

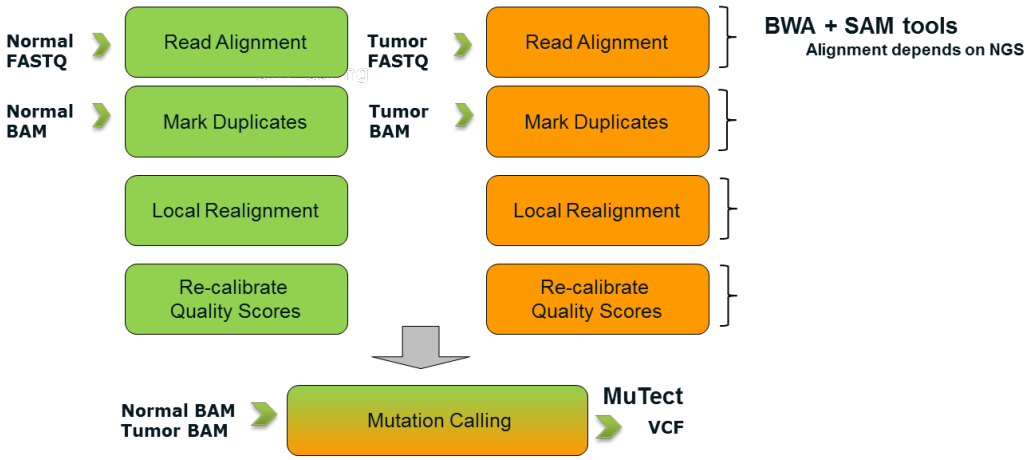
The overarching goal is to design a scalable **big data framework** around emerging applications namely genomics and personalized medicine.

Intel is collaborating with OHSU – Oregon Health Sciences University to tackle the big data application on Genomics and Personalized Medicine.

Introduction to Genomics:

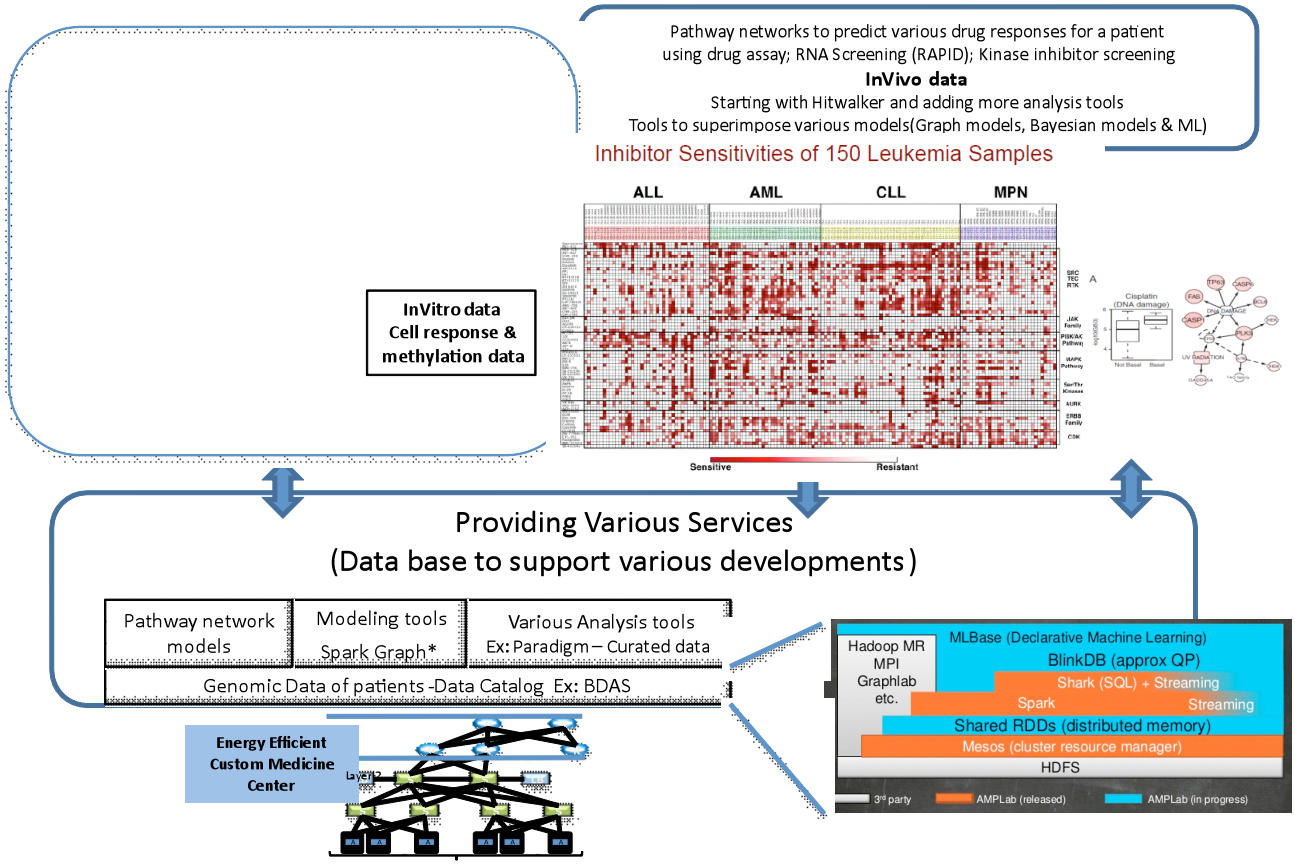
We will introduce the pipelines used today to process raw DNA/RNA sequences and motivate the need for optimizations. Also we will provide an overview on the downstream analysis such as population studies.

Discussion will focus on the design of an energy efficient solution, including techniques such as data-parallel processing. The figure below represents the DNA pipeline we will be using for the Hands-On exercise.



Advanced Class: Towards Personalized Medicine.

What we envision is a framework consisting of a genomic database and corresponding query mechanism (which includes invivo data per patient), and means to perform analysis across the genomic database and curated **invitro** data from the labs. The ultimate goal is to have a system of algorithms and models to predict the drug outcome for individual patients.



Ultimate Goal in the area of Genomics and Personalized Medicine

This class introduces the participants to the full pipeline and shares our vision with all the participants.