Trends Impacting Bioinformatics on the Grid

Presented by:
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Overview

• -omics
  – Explosive growth
  – Systems biology

• Internet developments, specifically Web 2.0
  – Bioinformatics 2.0?
  – Mashups

• Impact of commercial activities
  – Personalised bioinformatics
  – Compute as service
Human Genome 1st draft: 10 years - USD 3 billion

James Watson’s Genome on DVD: 2 months - USD 2 million

Next Generation Sequencing Technologies

Personalised Medicine

Growth!!!

$1000 Genome
Faster and cheaper technology

• Explosive growth in data
• Personalised genomics
  – What happens when it costs $1000 to sequence a genome?
• What about other -omics
  – Proteomics, Metabolomics
• Systems biology
DOE Joint Genome Institute
Sequences the genomes of microbes and plants with capabilities important to DOE missions.

The genome determines dynamic biological structure and function at all scales, from genes to ecosystems.

Proteins

Genes

Microbial Genomes

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Web 2.0

- Transparent access to massive computational power
- Simple, powerful web interfaces
- Indexed, Fully searchable
- Online communities
- Open, programmable interface
  - Community applications, Mashups
Web 2.0 bioinformatics resource

• Given a biological feature
  – gene, sequence, protein, organism, pathway and so on
• Provide a Web resource that can find out everything that is known about it
• Simple, fast, comprehensive, intuitive
• Enable scientists to conduct analysis online, not just review precomputed data
• Access, communication, curation
Commercial - Compute as service

- Amazon S3
- clusterondemand.com
- nirvanix.com

- Some web 2.0 business are already built using compute as service model for infrastructure
Commercial Activities - Personalised genome

- Genetic information services
- 23andMe.com
  - Investment from google
  - Founded by wife of google founder (Sergey Brin)
Summary

– Masses of data requiring storage, analysis, integration
– Is Web 2.0 relevant?
– What can we leverage from Web 2.0 applications in other domains?
– Are the commercially available compute as service offerings relevant to the Grid?