GlycoVault: A Bioinformatics Infrastructure for Glycan Pathway Visualization, Analysis and Modeling

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NCRR

Integrated Technology Resource for Biomedical Glycomics

GlycoVault

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- Integrated bioinformatics infrastructure that can serve as a resource to end users, other programs and applications
- Collects data and knowledge from different resources
- Supports glycan data analysis
- Provides foundation for integration and visualization of knowledge and data

Motivation

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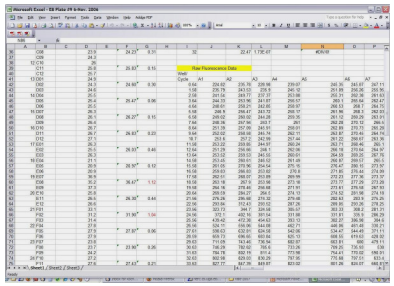

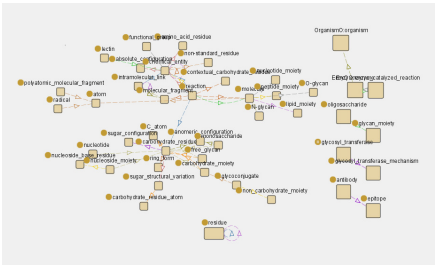

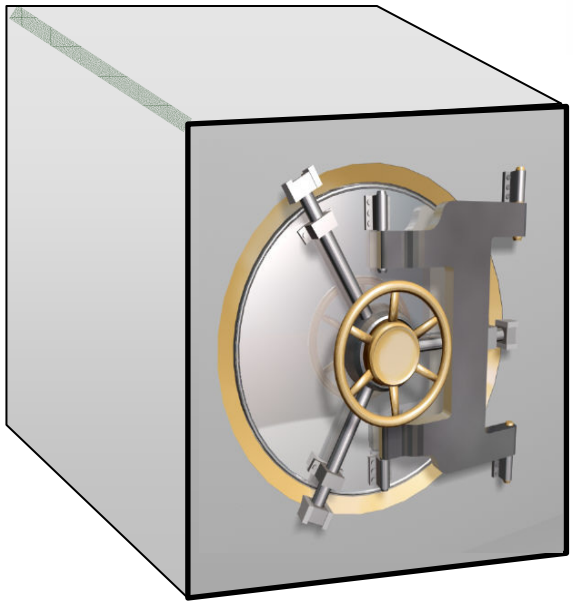

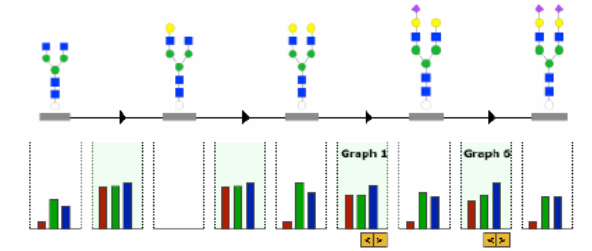

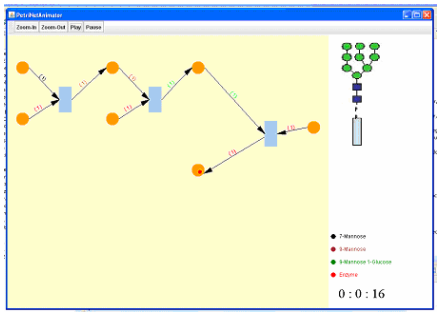

Why Not Just a Simple Database?

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- Including ontologies allows greater flexibility
- Complex relationships often stored across many relational tables
- Complexity increases as the number of properties to be stored increases
- Querying is often complex and involves many tables

Application Support

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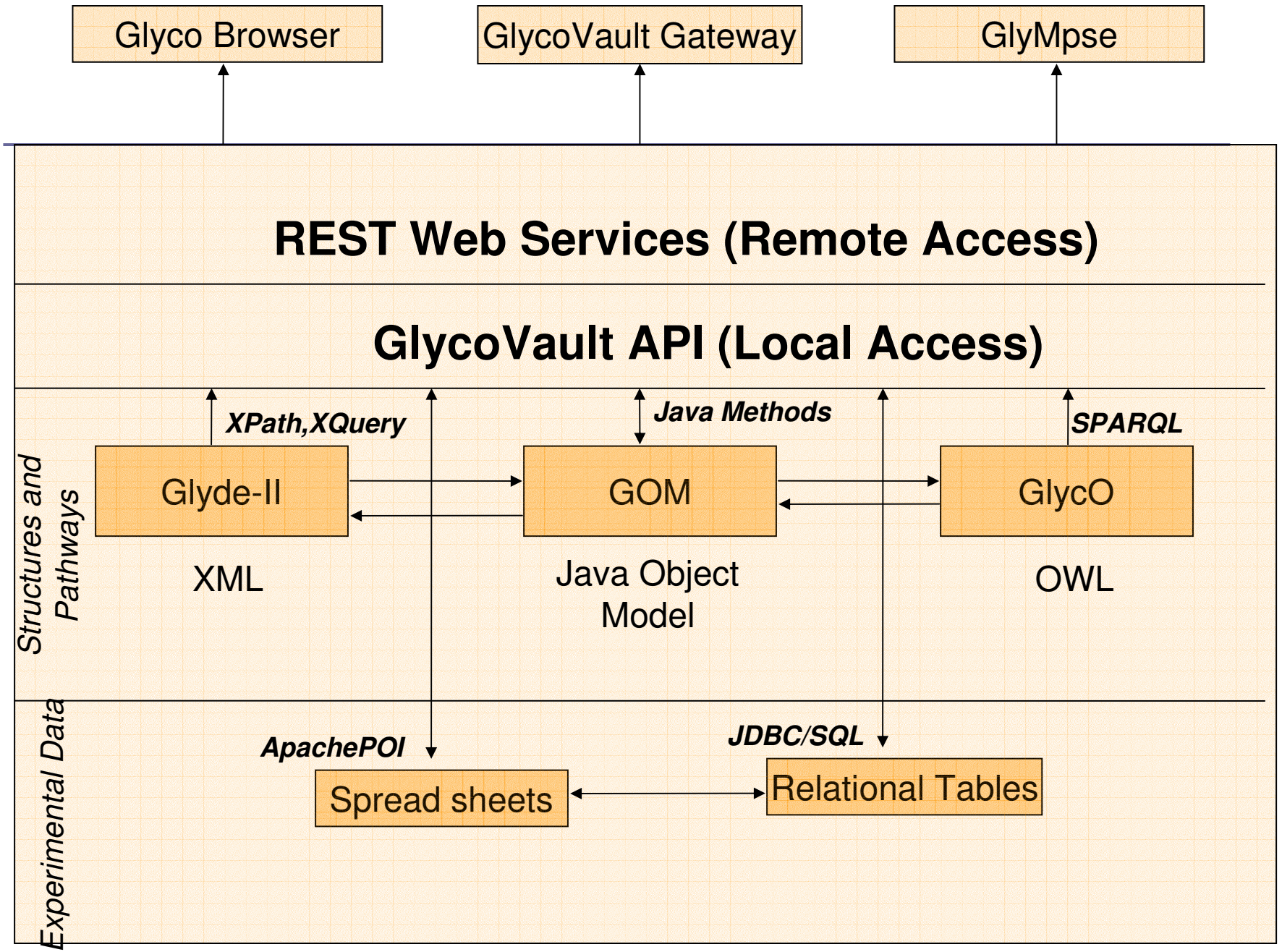
- GlycoVault supports data retrieval in different formats that can be used by other applications instantly
- Some of the applications supported include:
  - GlycoBrowser
    - Ontology based visualization tool that supports glycan pathway analysis
  - GlyMpse
    - Ontology driven simulation tool for biochemical pathways

System Architecture



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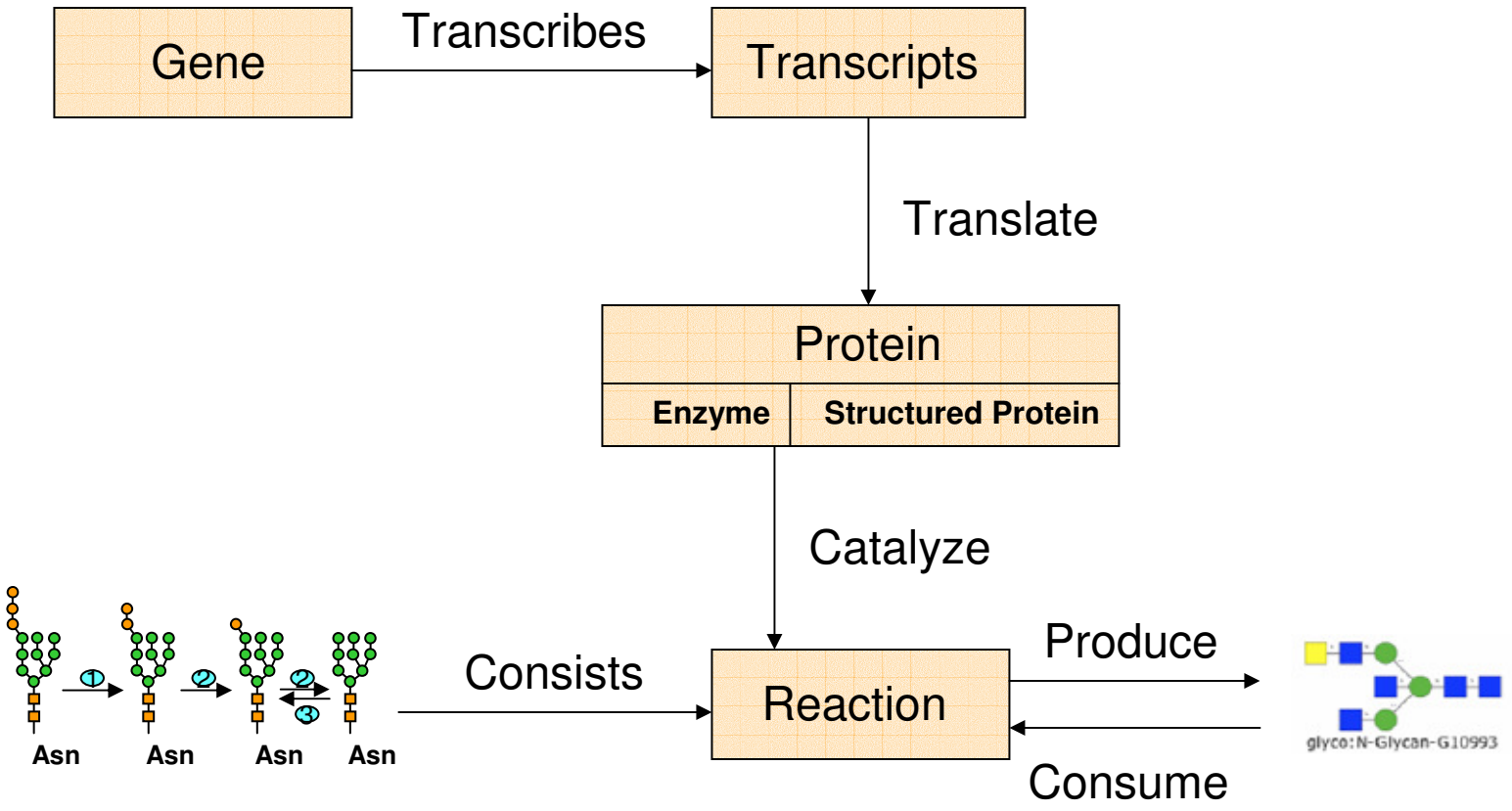
Example for Contents in GlycoVault



How It Is Populated?

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- Workflow engines
  - rt-PCR workflow
  - Glyco Analysis workflow (under development)
- Ontology Population
  - GlycO Qrator
- Administrators would be able to upload files using the GlycoVault API

GlycoVault API (Local Access)

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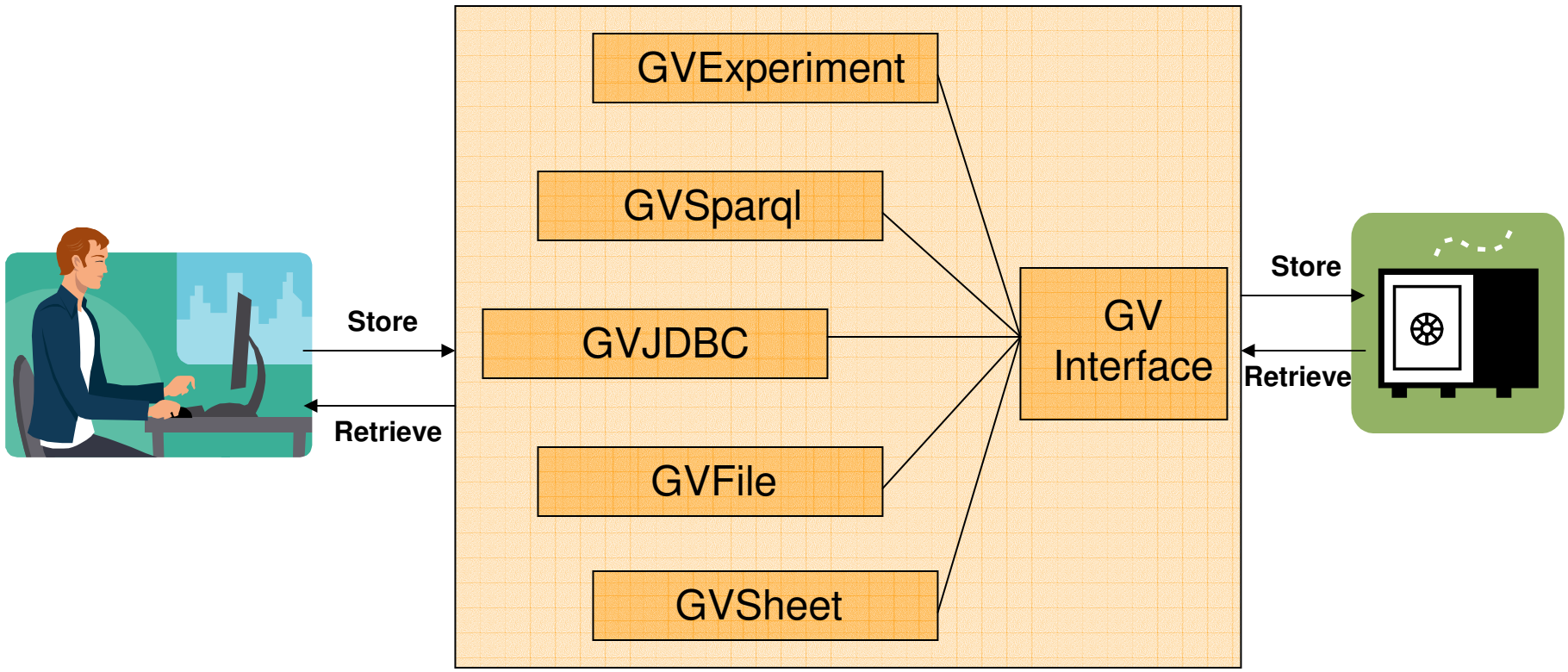

GlycoVault API

Web-based User Interface

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- Supports data retrieval from GlycoVault
- Aggregation of services designed to support efficient usage of available data
- Supports different users
  - pure biologists
  - professional computer scientists

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A mockup home page for GlycoVault Gateway

Conclusions and Future Work

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- Multi-faceted approach provides flexibility in utilizing content
- API supports data retrieval in different formats to support various applications
- A user friendly interface called “GlycoVault Gateway” is being developed

Thank You

Questions

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