

cceHUB: An Infrastructure for Cancer Care Engineering Research

Developer's Forum Presentation

April 2, 2009

- Overview of the cceHUB Infrastructure (Ann Christine)
- Dynamic Forms for Metadata Creation and Control (Ruchith)
- The Metadata Database (Ahmad)

April 9, 2009

- The Metadata Processor (Bara')
- The Data Uploader (Dave, Ruchith, Bara', Ahmad)
- The Data Explorer (George, Ruchith, Bara', Ahmad)

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Overview

cceHUB: An Infrastructure for Cancer Care Engineering Research

cceHUB Series: Part 1 of 2
Scientific Solutions Developers Forum
April 2, 2009



the cancer**care**engineering model

1. Blood Sample Acquisition

Sample & Patient Data

IUSCC

2. OMIC Laboratory Analysis

Data & Knowledge Acquisition

Klaunig Lab Oxidative Stress IUSCC

Xu Lab Lipidomics IUSCC

Raftery Lab Metabolomics Purdue

Regnier Lab Glycoproteomics Purdue

Adamec Lab Global Proteomics Purdue

Teegarden Lab Vitamin D Purdue

3. Integrative Mathematical Modeling

Data Synthesis & Analysis

Knowledge Acquisition

Zhang Group Statistical Models Purdue

4. Visual Analytics

Data Exploration & Analysis

Knowledge Acquisition

Ebert Group PURVAC Purdue

5. Iterative Feedback & Validation

the CCE Team: IUSCC and Purdue



from blood samples to molecular signatures
predicting susceptibility, treatment response and ultimate treatment outcome

OMIC workflow for users + OMIC data lifecycle + OMIC analysis tools
unified in a single, constantly evolving environment
→ shared discovery and transformational workflows



Supporting the CCE Model with cceHUB

Leverage content & tool support

- **Documents and Content**
 - information sharing
 - tagging, linking
 - groups for access control
 - workflow guides
- **Modeling & Visualizer Codes**
 - tool sharing
 - shared tool execution
 - computational power
 - shared development
 - subversion & code control
 - groups for access control
 - data sharing among tools

[cceHUB](#)

Design & develop data support

- **Data ... the new resource**
 - HUB data repository
 - full resource support
 - contribute, archive, curate,
 - search, process, track

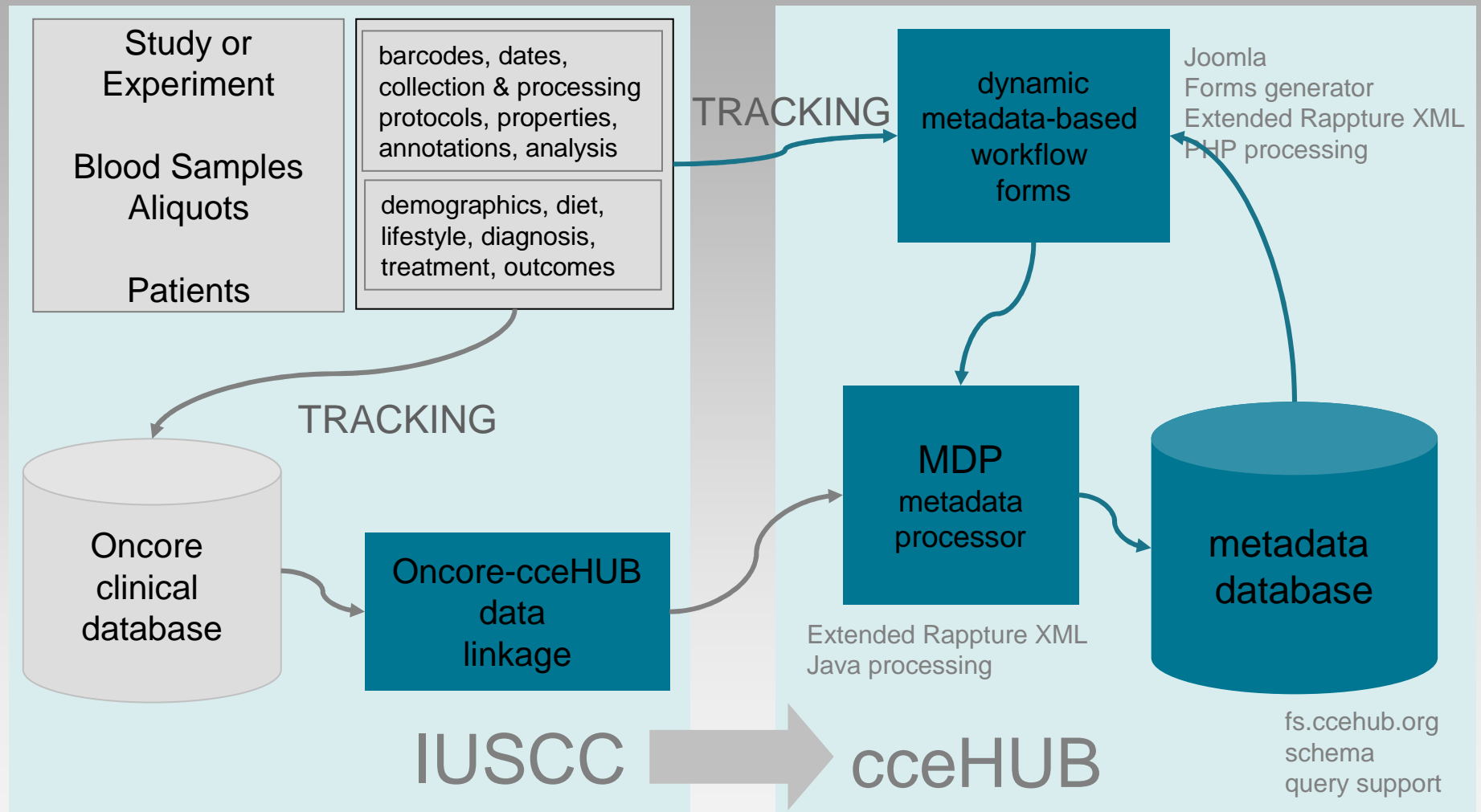
?

organized repository structure
data uploader
metadata for
 annotation, provenance,
 semantics, privacy, ...
metadata database
metadata processor
data explorer
tool results capture
workflow support

[cceHUB](#)



Building the IT infrastructure ... Part I

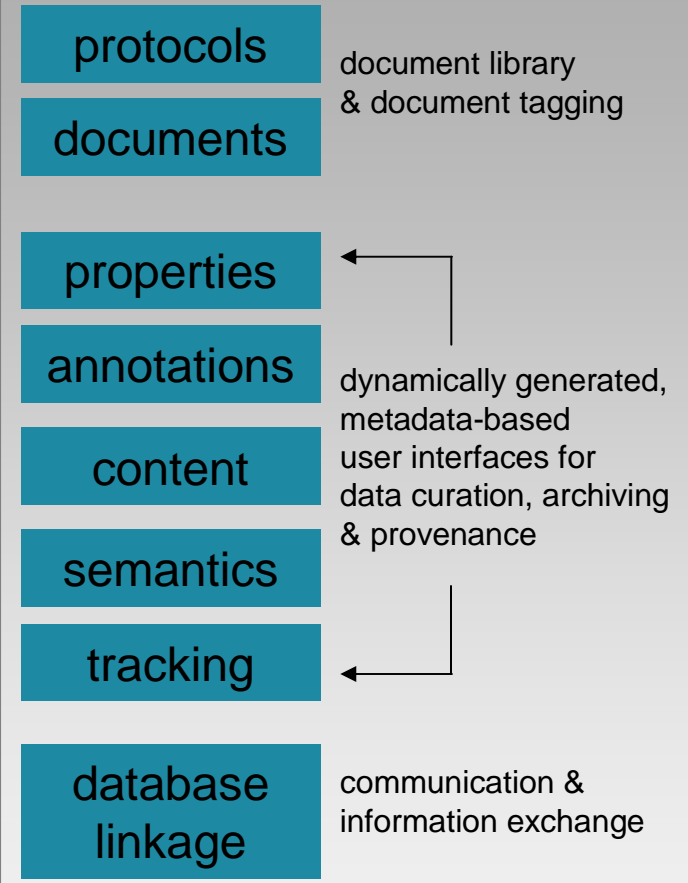
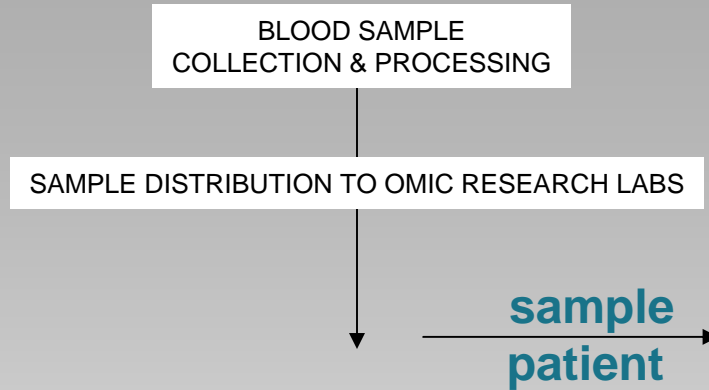


supporting physicians, clinical & hospital staff : users, workflows, data



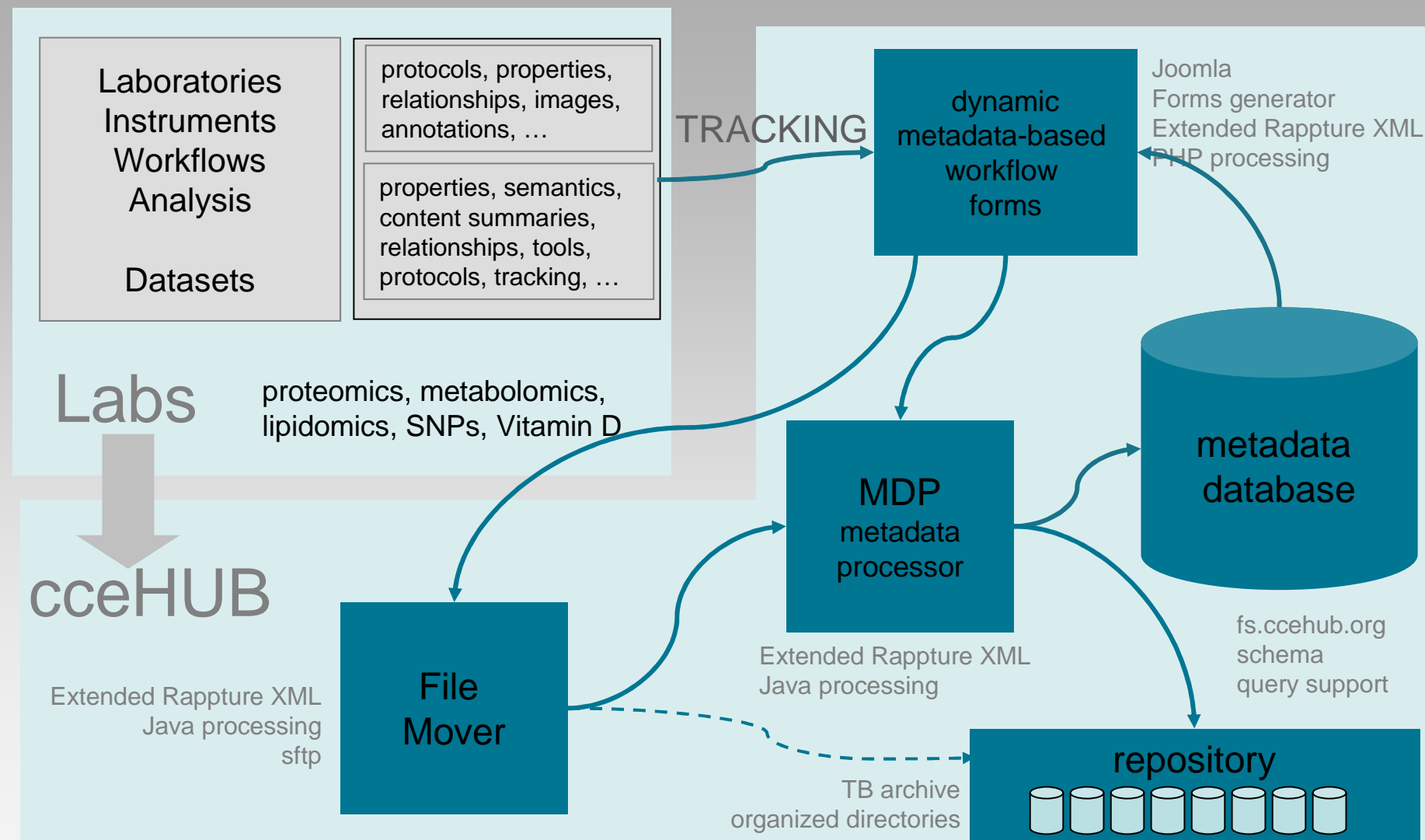
IUSCC workflows, data, metadata

**IU
Simon
Cancer
Center**





Building the IT infrastructure ... Part II



supporting the OMIC labs: instruments, workflows, analysis, datasets



Lab workflows, datasets, metadata, analysis

Bindley Biosciences Laboratories

WORKFLOW

SAMPLE PREPARATION

INSTRUMENT SETUP

BIODATA GENERATION

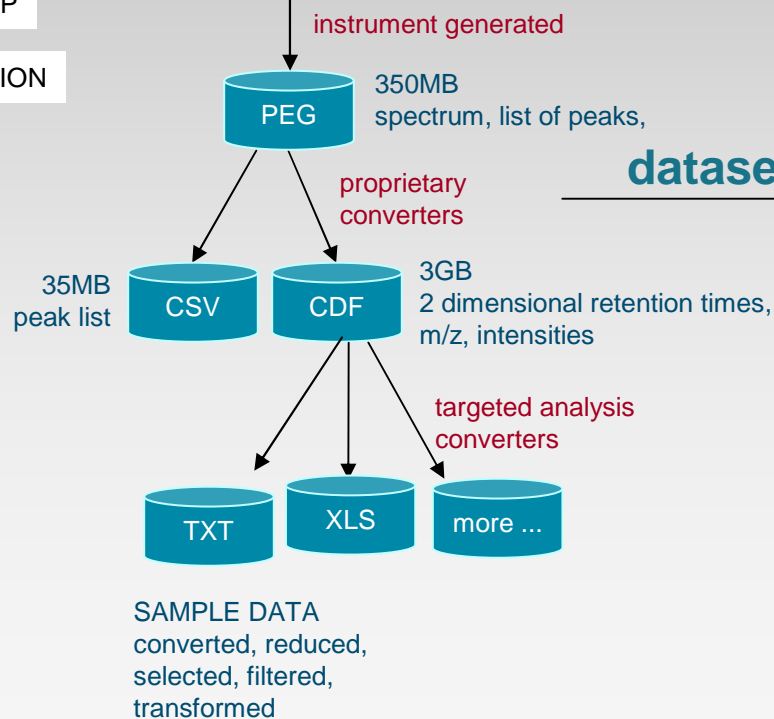
RAW DATA

PRE-PROCESSED DATA

ANALYSIS



LECO
GC GC MS



datasets

protocols

document library & document tagging

documents

upload

data transfer

archive

data storage & backup

properties

annotations

dynamically generated, metadata-based user interfaces for data curation, archiving & provenance

content

semantics

tracking

workflow linkage

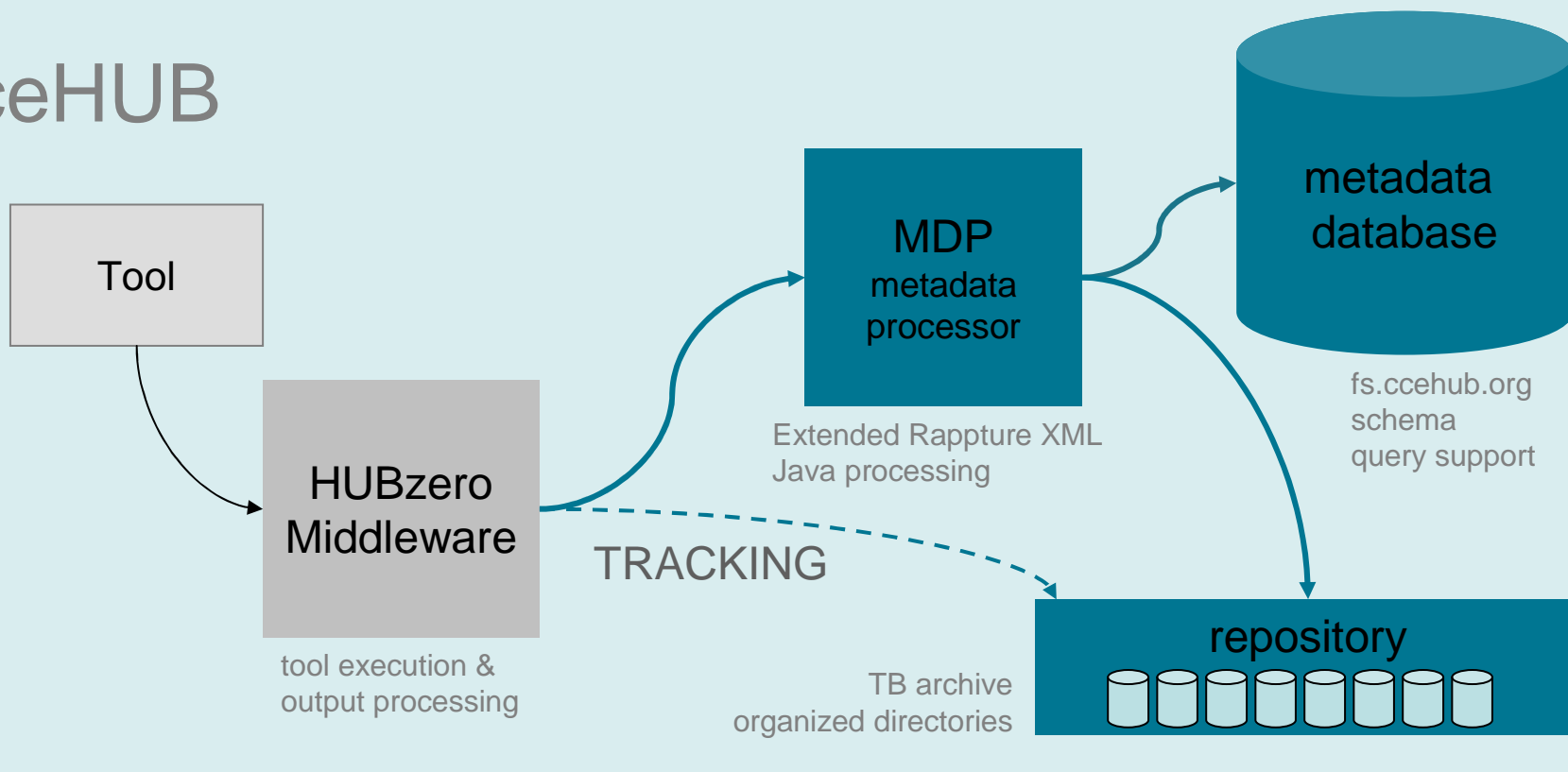
data & tool relations

example
[cceHUB](#)



Building the IT infrastructure ... Part III

cceHUB



supporting the modeling & visualization groups

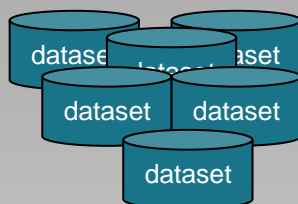
... and all cceHUB users



storage, analysis, visualization, tracking, ...

Laboratory Analysis Statistical Modeling Visual Analytics

Processing multiple samples
Comparisons across samples
Modeling across samples
Visualization across samples



ANALYZED
DATA

datasets



data exploration

data tracking

tool tracking

visual analytics

modeling

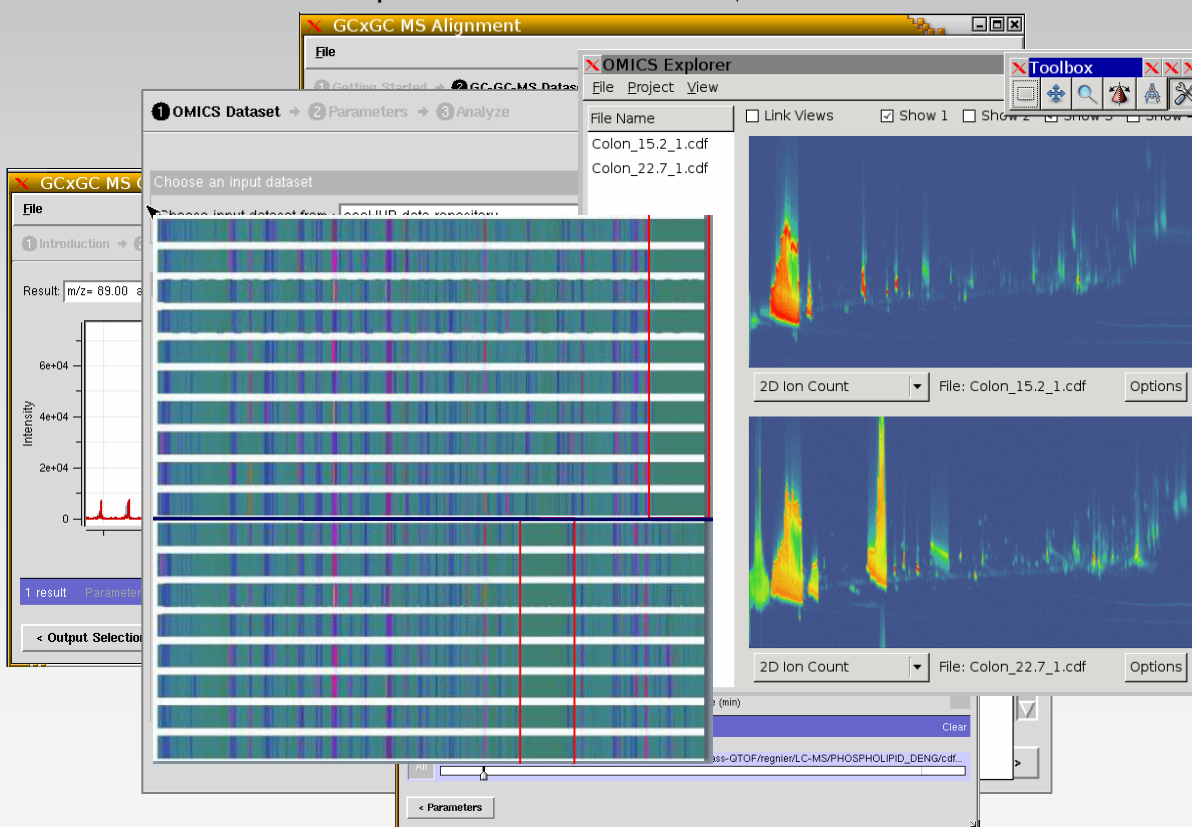
results capture

annotation

curation

metadata linkage

archival





a HUB data support framework

