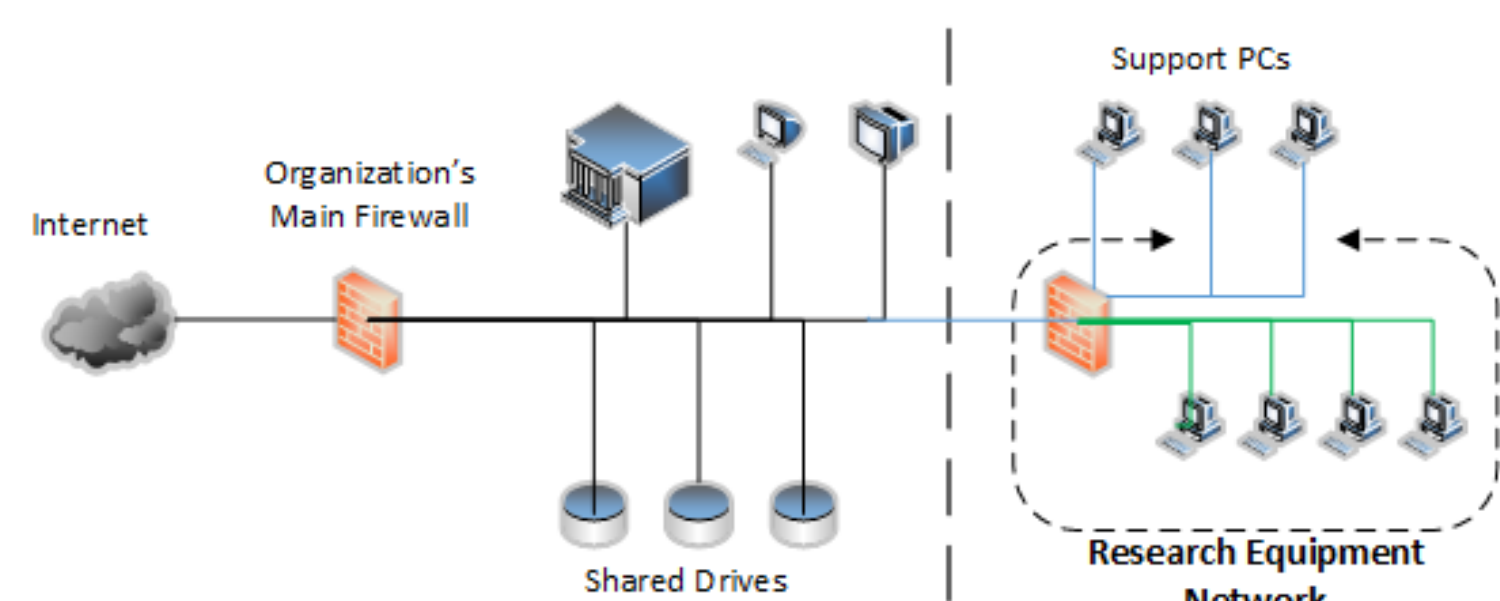


An Overview of the NIST MATERIAL MEASUREMENT LABORATORY Microscopy Data Ecosystem

Joshua Taillon - NIST MML Office of Data and Informatics

Physical & Digital Infrastructure

Research Equipment Network (REN)



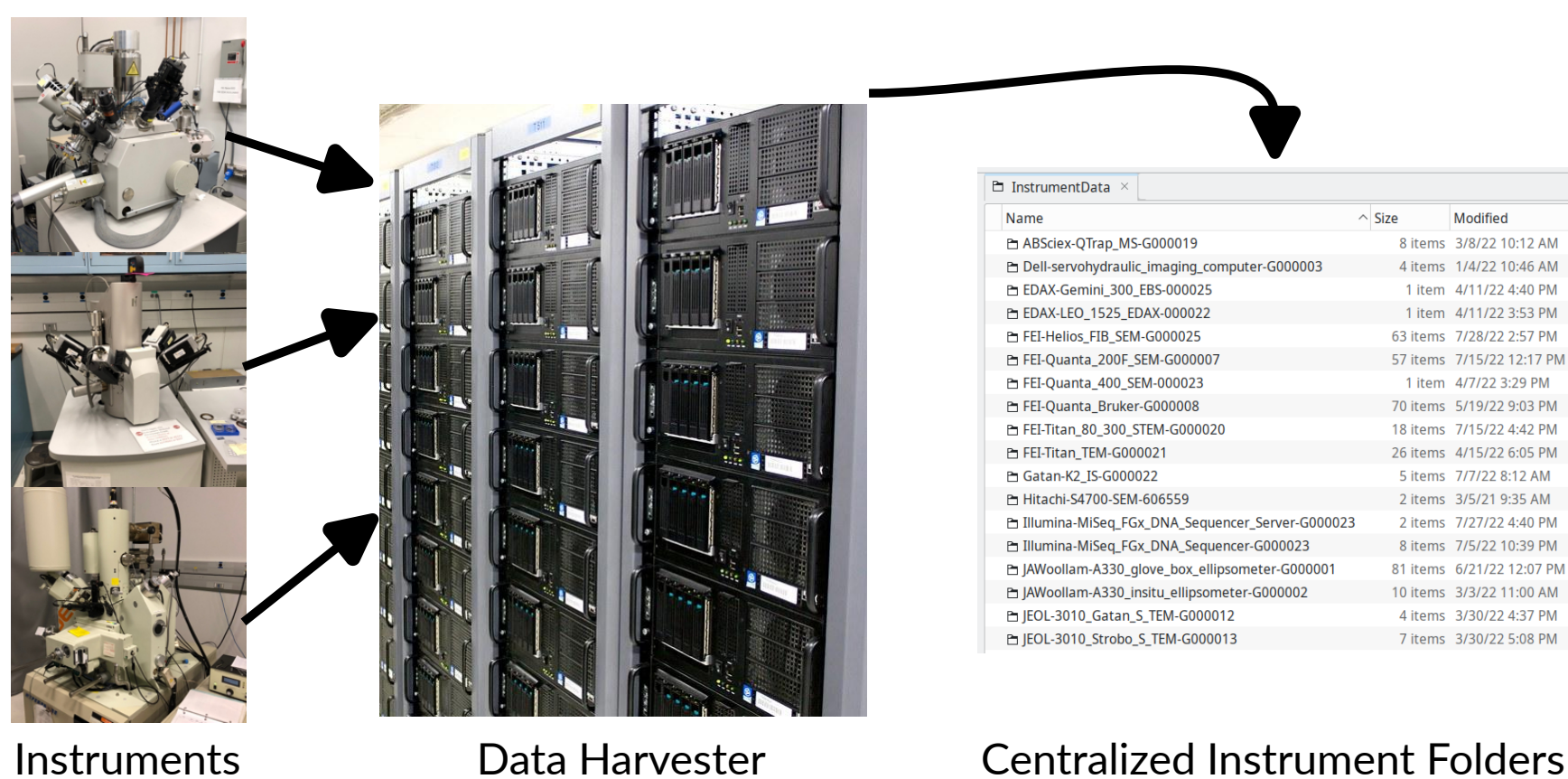
- Segregates computers via firewall between REN and main network
- Pinholes for OS updates, and critical network resources

Centralized File Storage

- Controlled by the *scientific staff* for *scientific purposes*
- Purposefully distinct from "office/administrative" file storage
- Has read-only, instrument-specific folder structure

Automated Data Harvesting

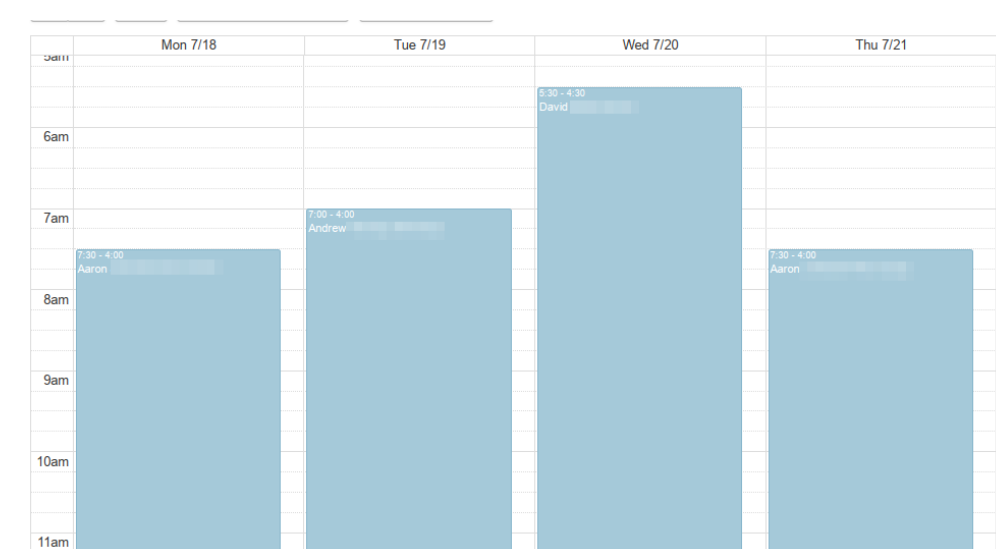
- Instrument data automatically flows from into centralized storage
- One folder per "instrument PC" with persistent name
- Each PC shares read-only folder, users organize data as they wish
- Networked data controller periodically copies data (using rsync)



Institutional Digital Assets

Instrument Reservation/Usage Tracking

- Interactive and programmatic information about instruments, who's using them, and when
- NEMO (<https://github.com/usnistgov/NEMO>) (NanoFab Equipment Management & Operations)



Reservation Calendar Web UI

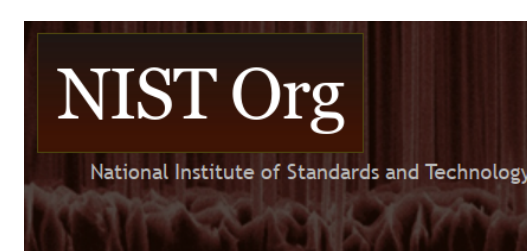
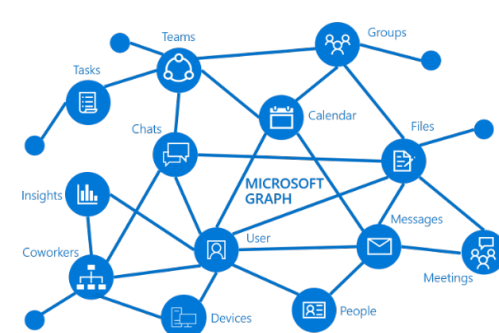
```

{
  "id": 246,
  "question_data": {
    "project_id": "Hydrogen",
    "experiment_tic": "Information evolution",
    "experiment_purpose": "Compare microstructures after various ...",
    "data_consent": "Agree",
    // could have additional samples defined
  },
  "sample_group": {
    "sample_name": "4139-no strain",
    "sample_or_pid": "Sample Name",
    "sample_details": ""
  },
  "creation_time": "2022-01-18T15:40:19.987314-07:00",
  "start": "2022-02-02T00:00:00-07:00",
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  "user": 2,
  "tool": 15,
  "project": 14
}
    
```

Reservation API response

Information about People & Places

- NIST has an administrative application with API access, but this information can also be found using tools such as Active Directory or the Microsoft Graph API

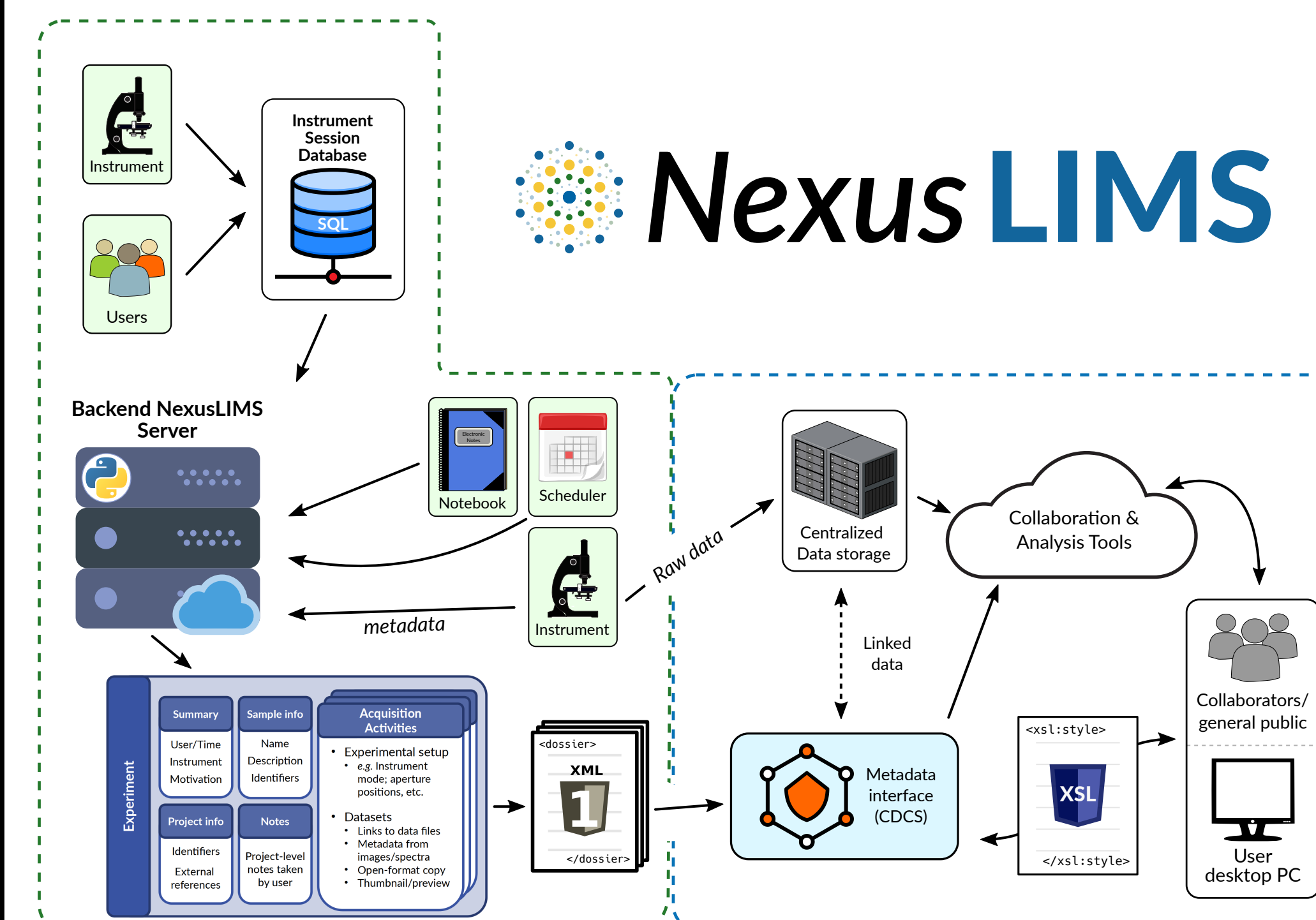


Persistent Identifiers



If it's a source of data, it should have an API!

Data Management Systems



Electronic Laboratory Notebooks eLabFTW

- Early days, but working to deploy an in-lab solution for researchers to digitize their research records and build simple yet flexible databases/inventories tailored to individual data models
- Application is open source and fully API accessible for interoperability

Public Data Repository

- Final archival destination for data publications from NIST work
- Data publications receive a DOI and are hosted in perpetuity by NIST
- Accessible at <https://data.nist.gov>

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