The iPlant Data Commons

Using iRODS to Facilitate Data Dissemination, Discovery, and Reproducibility

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The iPlant Collaborative

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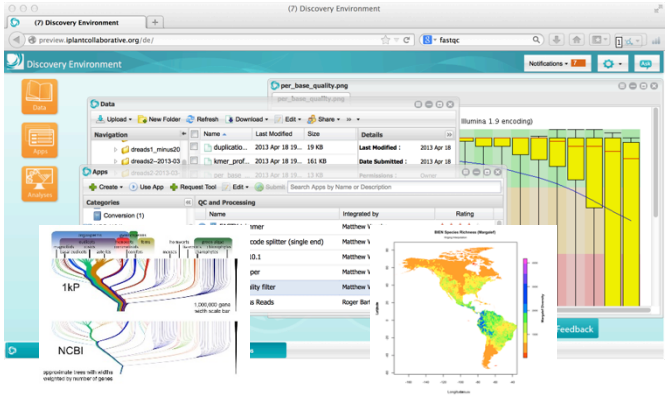
We are a Cyberinfrastructure



Platforms, tools, datasets

Storage and compute

Training and support

The iPlant Collaborative

And a virtual organization

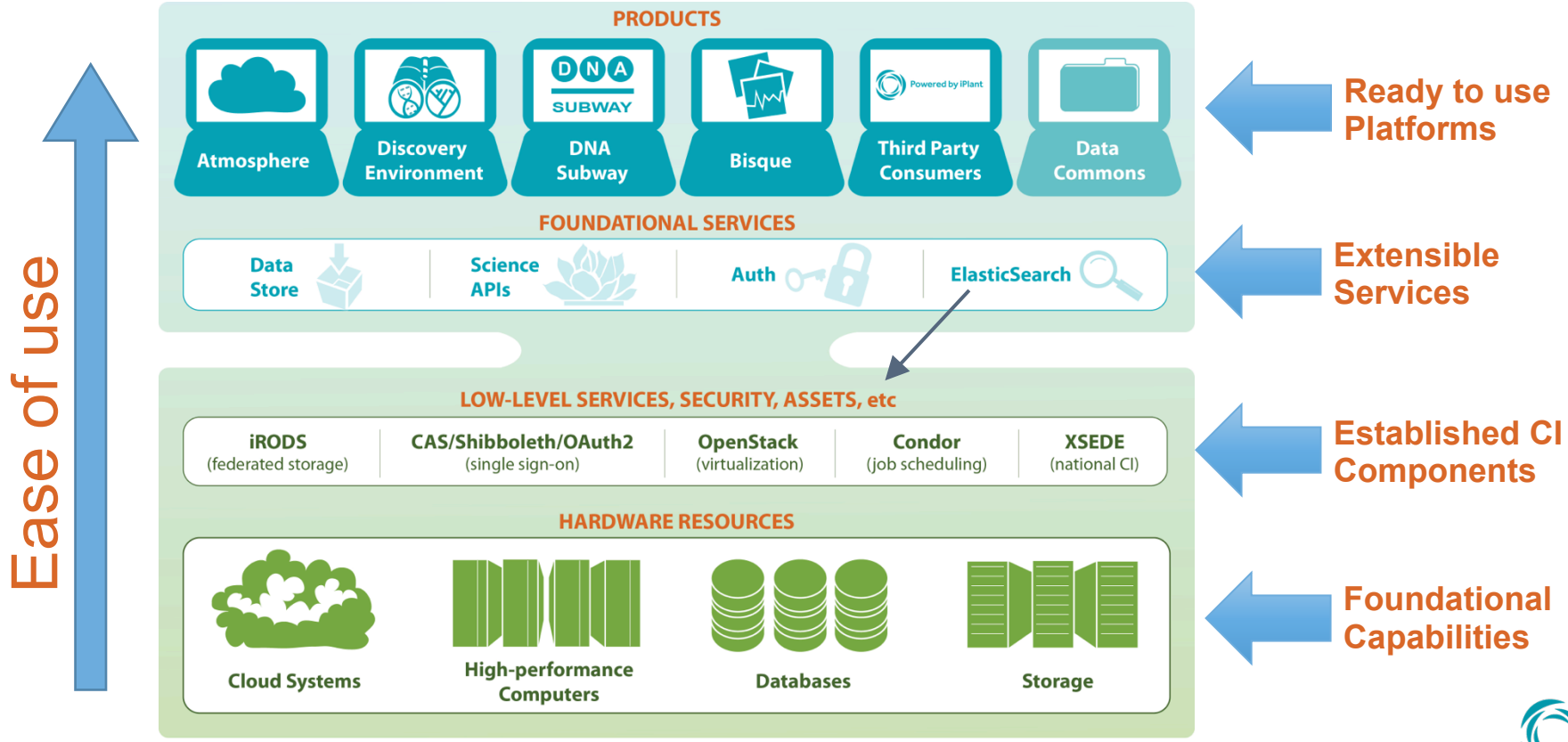
Developer Expertise
Computational Capacity
Science Domain Expertise
Training
Administrative and Organization

Why Data Commons (by Phil Bourne)

- The Commons is a pilot experiment in the efficient storage, manipulation, analysis, and sharing of research output, **from all parts** of the research lifecycle.
- Should The Commons be successful we would achieve a level of **comprehensive access and interoperability** across the research enterprise far beyond what is possible today.
- Some key attributes:
  - *Should support Sharing & Accessibility*
  - *International to be maximally successful*
  - *Should allow data science become more cost-effective, hence more sustainable*
  - *Replicability, opportunity and ability to reproduce, or at least replicate, experiments*
  - *Discoverability of research output through indexing or other methods*

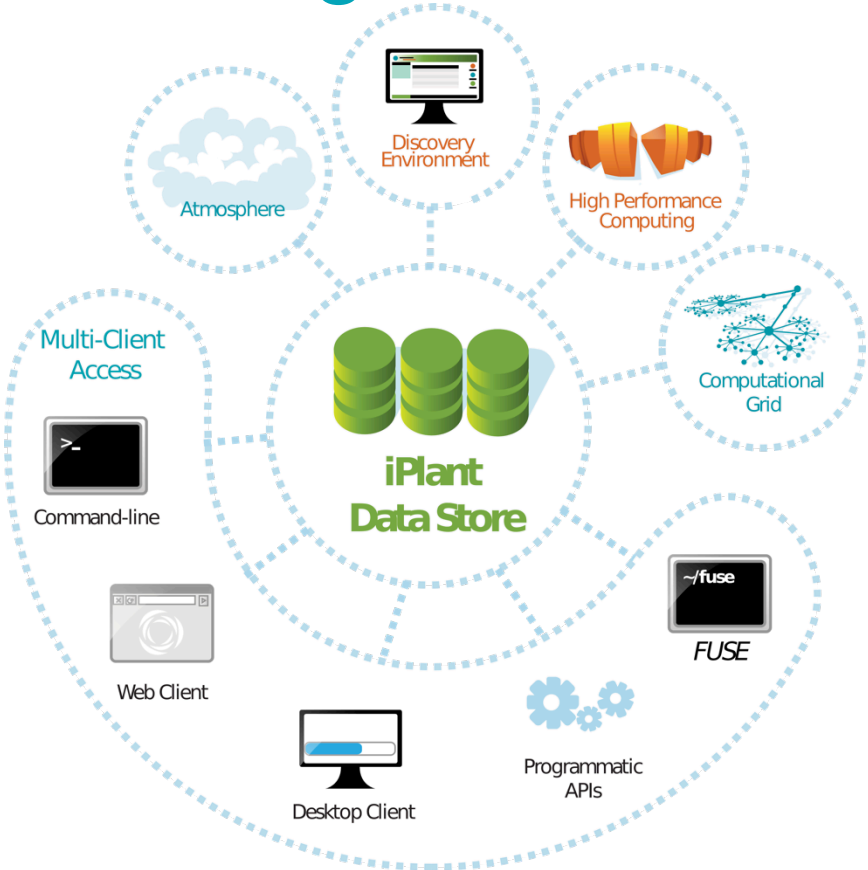
Phil Bourne is the Associate Director of Data Science (ADDS) at NIH
https://pebourne.wordpress.com/2014/10/07/the-commons/

iPlant Collaborative Products



Data Store: Sharing Data

- peer to peer
  - ACL based
  - iRODS tickets
  - public links, anonymous read-only access through URLs
- Community Data, large dataset sharing

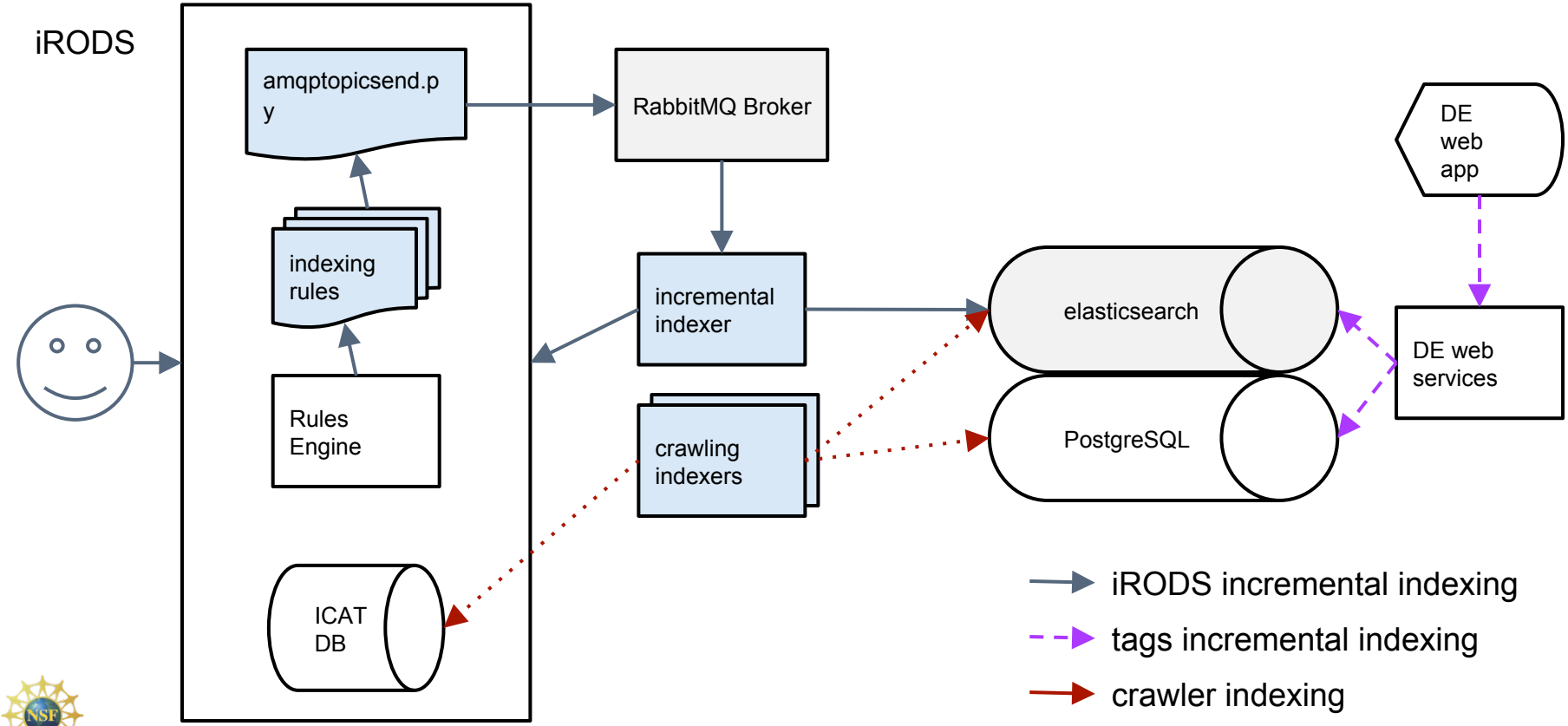


Sharing Usage Statistics

- User Statistics
  - 27000 user accounts
  - 4900 users with data
  - 2600 users (53% of users with data) made at least 1 share
  - 2100 shares per user
  - 42 million files (58% shared)
  - 59 million (1.1 million/month) shares
- Community Data Statistics
  - 5 million files
  - 55 million (1.0 million/month) shares
- ~1PB of data

A share is an instance of a user sharing a single file with a single user or group.

Indexing and Search



Data Analysis in the DE

- Data analysis tools are installed on Condor cluster or HPC. (user can request new tools)
- An *app* is an analysis template for a tool usable from the DE. (user can create and publish new apps)
- A *workflow* combines apps into an analysis pipeline (user can create and publish new workflows).
- Batches of files may be processed by apps and workflows.
- Ability to annotate results with metadata, comments and relationships to support reproducibility and manage large data sets

Current Tool Deployment

- Results reproduction is difficult outside of our infrastructure.
- Updates can make results reproduction impossible.
- Deployment requires support staff.
- Software conflicts may make certain tool combinations impossible.

Containerized Tool Deployment*
(or Docker to the rescue!)

- Containers are portable, so results can be reproduced outside of CI.
- Different versions of tool are placed in different containers. Old tool results are still reproducible after an upgrade.
- Users can bring custom tools in own containers.
- No conflicts occur between tools, since each in its own container.

** Coming July 2015*

The iPlant Data Commons

- It is a part of the Data Store for high-value, public datasets with links to external repositories.
- Its data are available throughout the CI.
- Its data are searchable and discoverable.
- Its data will be available and useful to the community, not buried in Data Store.

Data Commons Project Management

- Associate collaborators with a project.
- Add data and metadata to a project
- Organize data using standardized and project-specific metadata.
- Suggest analyses based on data type.
- Track history of operations. (provenance)

Data Commons Staging Area

- Distill project artifacts into package for publication to Data Commons and external repository.
- Combine and edit project metadata.
- Select appropriate licenses and persistent ids for the data and for the chosen repository.

Acknowledgements

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If you have additional questions, please don't hesitate to contact me at tedgin@iplantcollaborative.org.