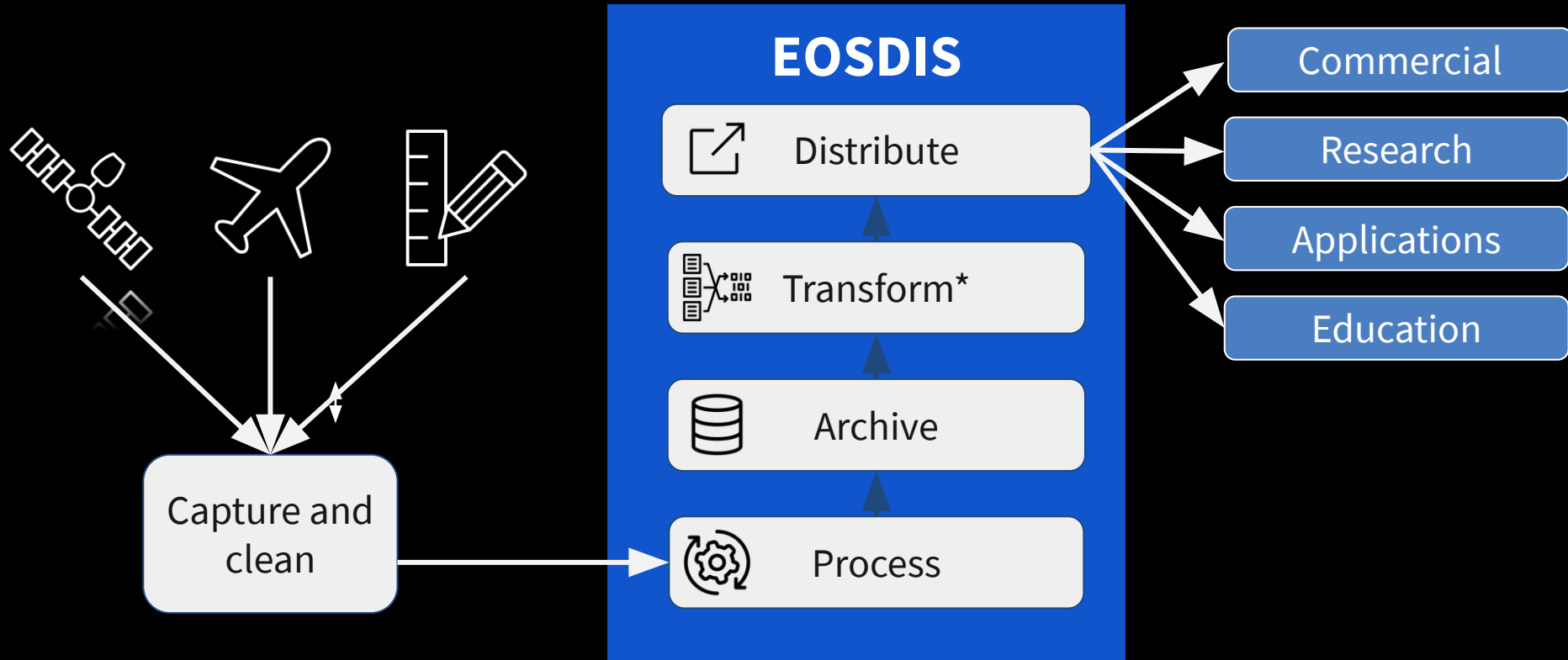# Designing the User Experience for Earth Observation Data Services in the Cloud

Christopher Lynnes, NASA*
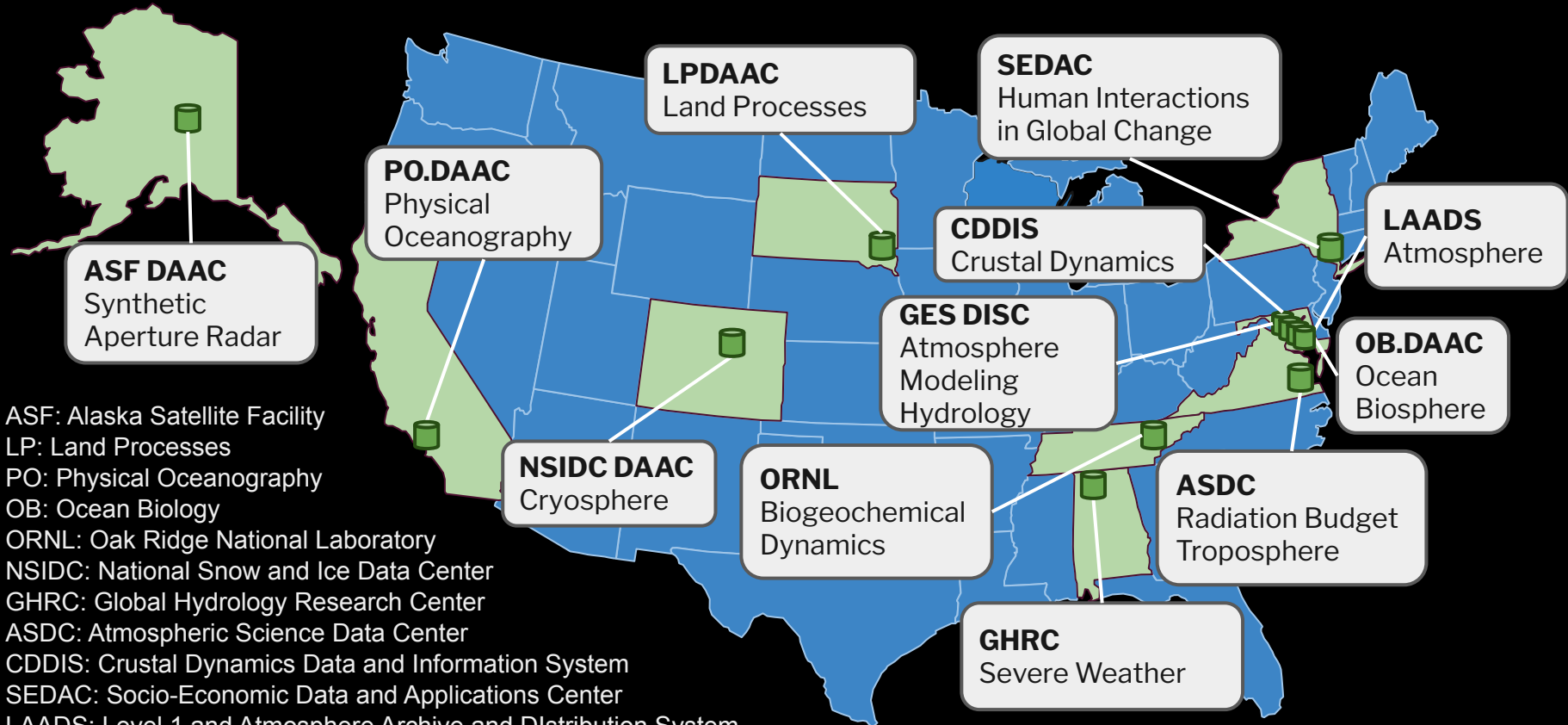
*U.S. Civil Servant

# Earth Observing System Data and Information System (EOSDIS)

EOSDIS

- Distribute
- Transform*
- Archive
- Process

Capture and clean

Commercial

Research

Applications

Education

*Subset, reformat, reproject

Distributed Active Archive Centers (DAACs)

LPDAAC
Land Processes

SEDAC
Human Interactions
in Global Change

PO.DAAC
Physical
Oceanography

CDDIS
Crustal Dynamics

LAADS
Atmosphere

ASF DAAC
Synthetic
Aperture Radar

GES DISC
Atmosphere
Modeling
Hydrology

OB.DAAC
Ocean
Biosphere

NSIDC DAAC
Cryosphere

ORNL
Biogeochemical
Dynamics

ASDC
Radiation Budget
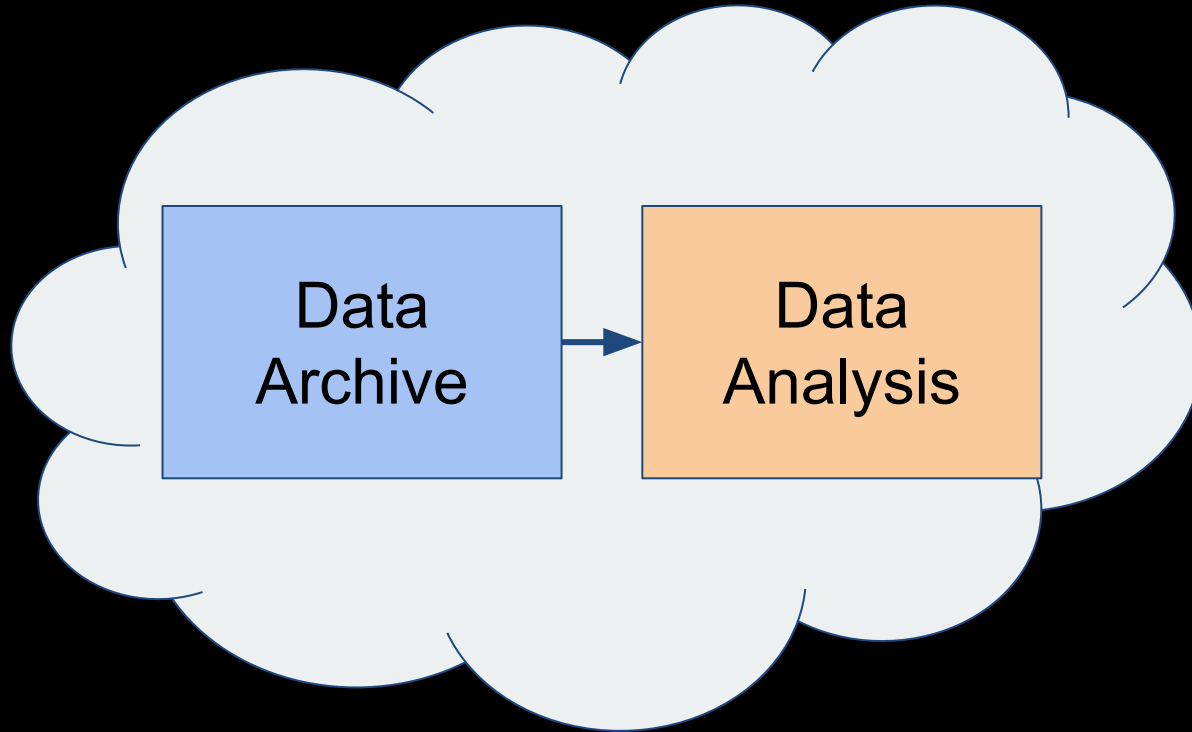Troposphere

GHRC
Severe Weather

ASF: Alaska Satellite Facility
LP: Land Processes
PO: Physical Oceanography
OB: Ocean Biology
ORNL: Oak Ridge National Laboratory
NSIDC: National Snow and Ice Data Center
GHRC: Global Hydrology Research Center
ASDC: Atmospheric Science Data Center
CDDIS: Crustal Dynamics Data and Information System
SEDAC: Socio-Economic Data and Applications Center
LAADS: Level 1 and Atmosphere Archive and DIstribution System
GES DISC: Goddard Earth Sciences Data and Informations Services Center
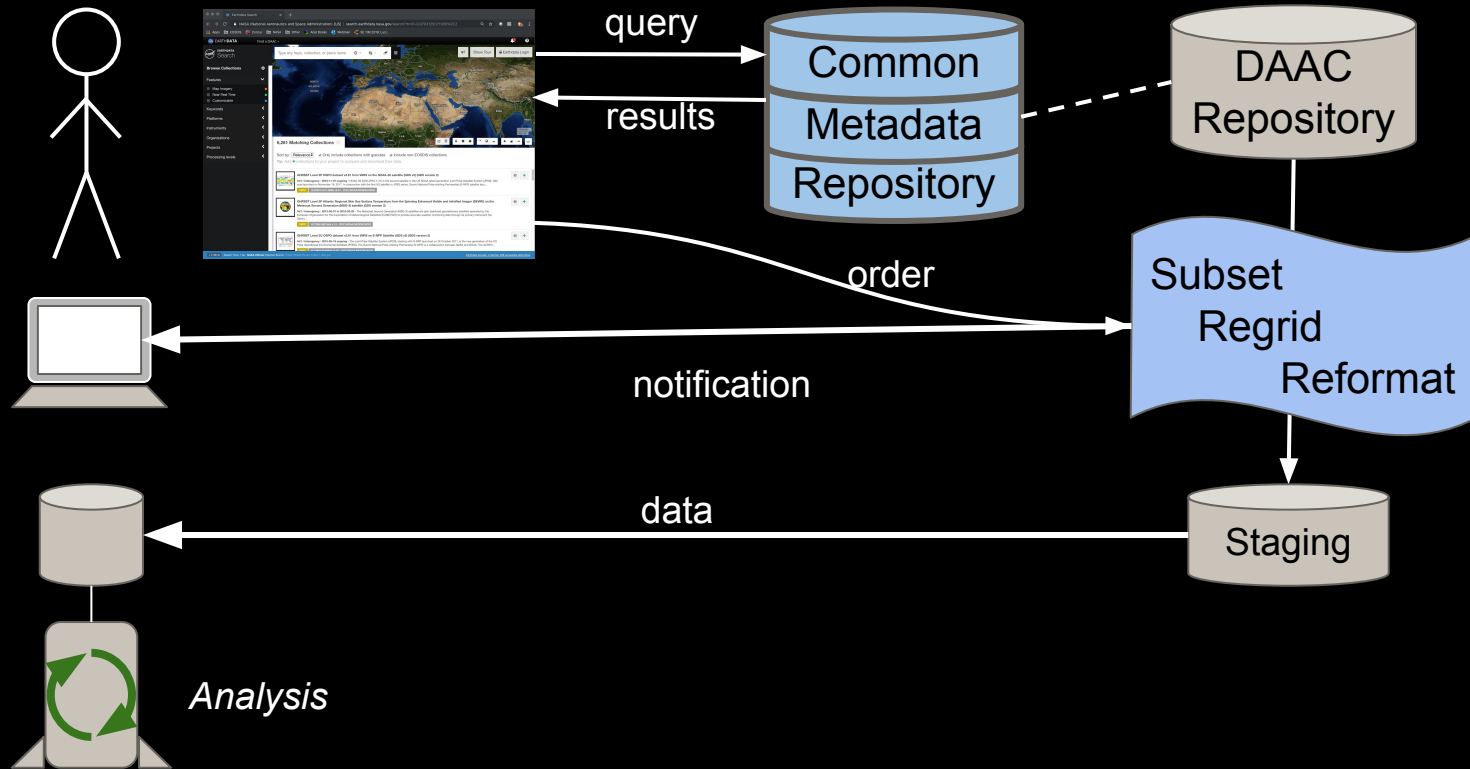
3

Data Volumes are Growing...
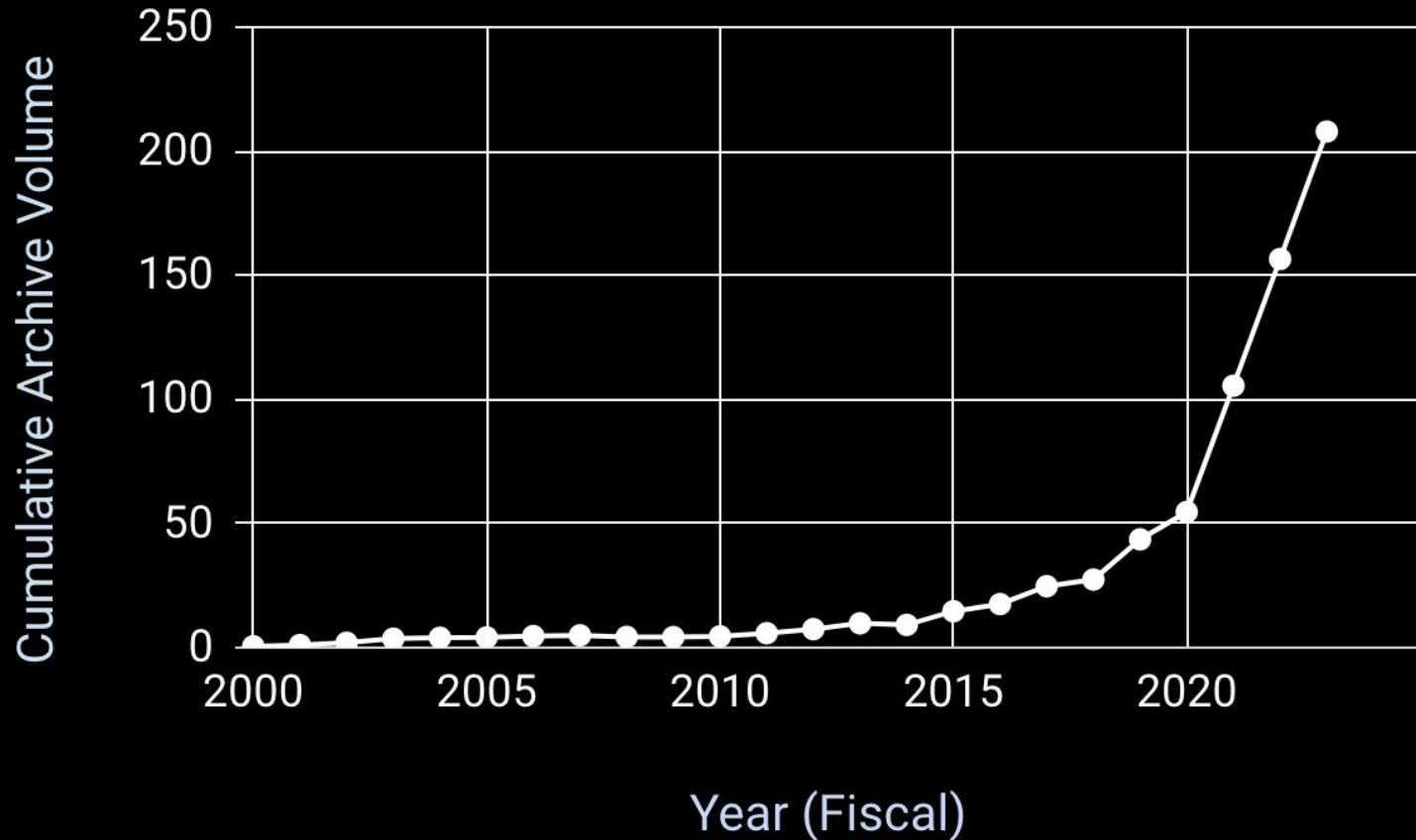
Cloud Data Hosting for Data-Proximal Computing

Rethinking the User Experience

How Data Distribution Largely Works Today

query

results

Common Metadata Repository

DAAC Repository

order

Subset Regrid Reformat

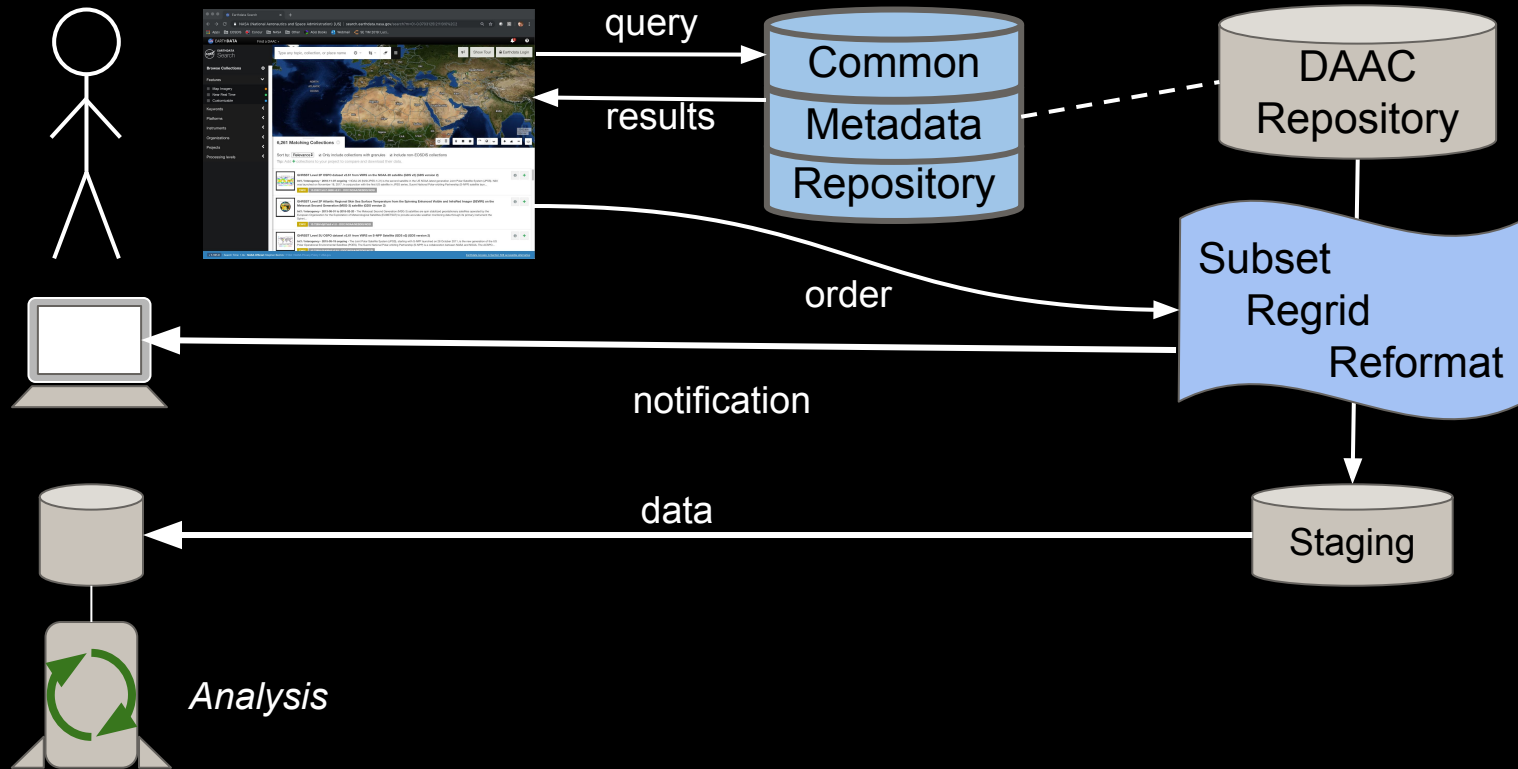notification

data

Staging

Analysis
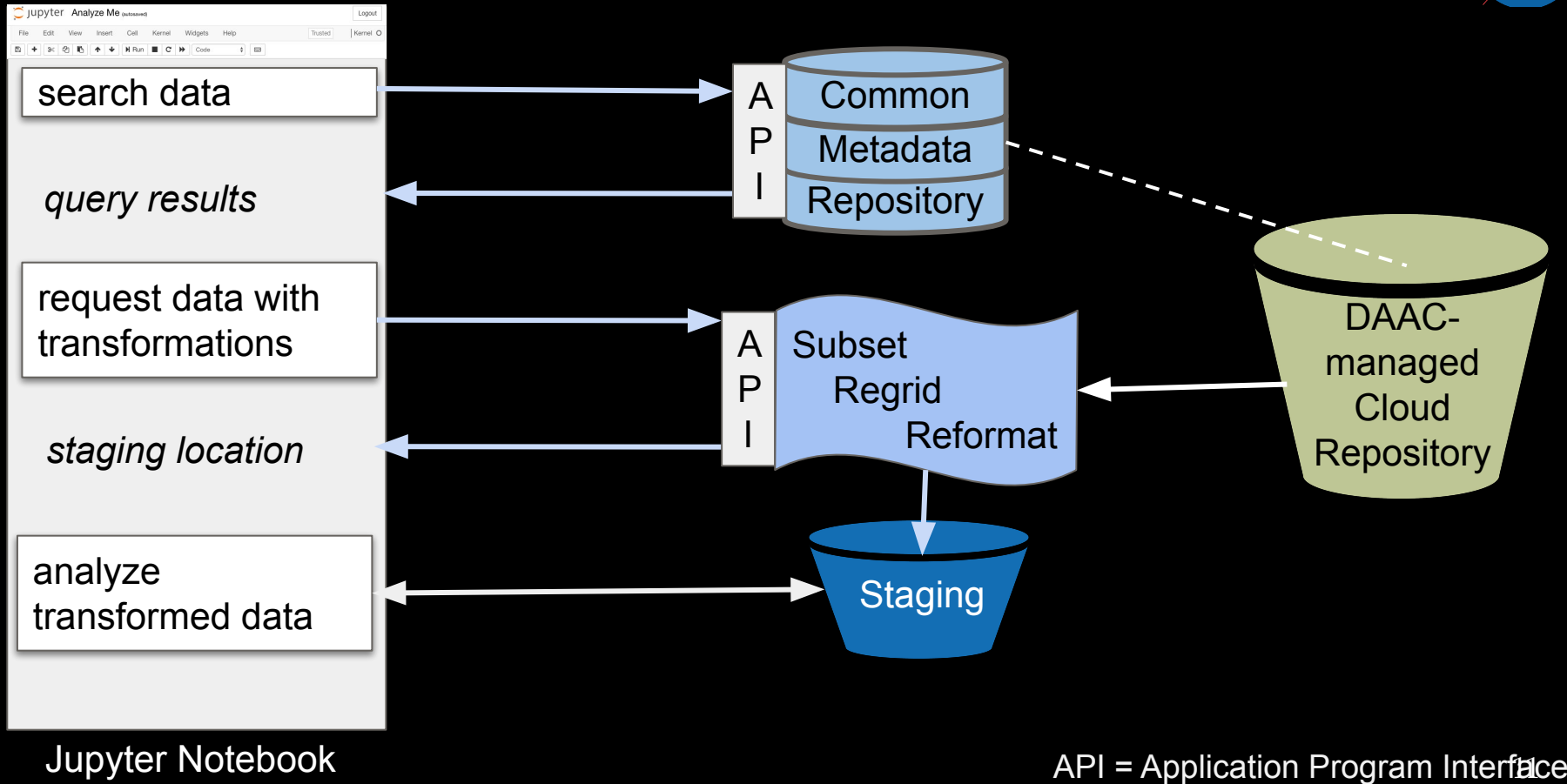
Yes, this mode will still be available in the cloud, but...

...you're gonna need a bigger disk.

How Data Distribution Largely Works Today

Working toward a seamless User Experience...

Jupyter Notebook
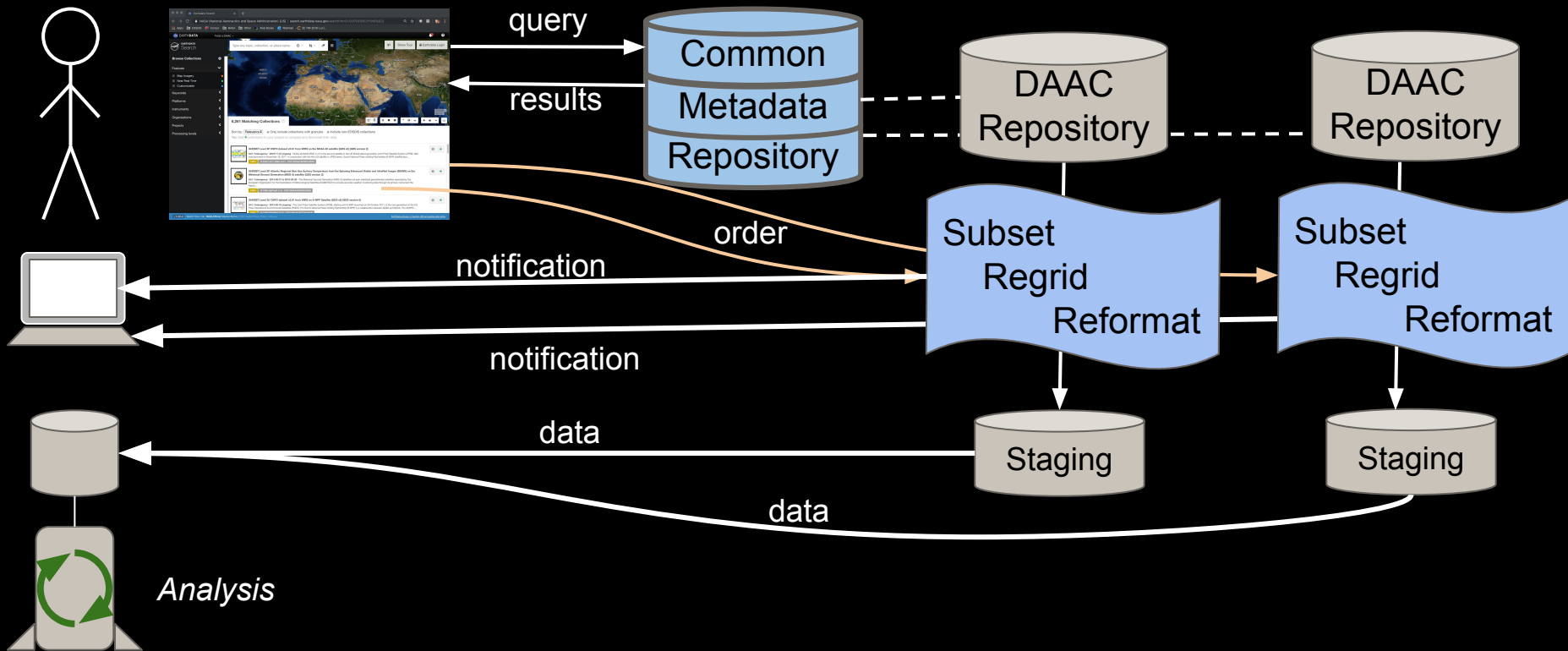
What Do We Need to Get There?

1. Easy-to-use API

2. *Fast* data transformations for synchronous response

3. Generous staging space and longevity

4. Analysis- and cloud-friendly data access

   a. Cloud-friendly output formats

      i. Cloud-optimized GeoTIFF

      ii. zarr

   b. OPeNDAP* in the Cloud

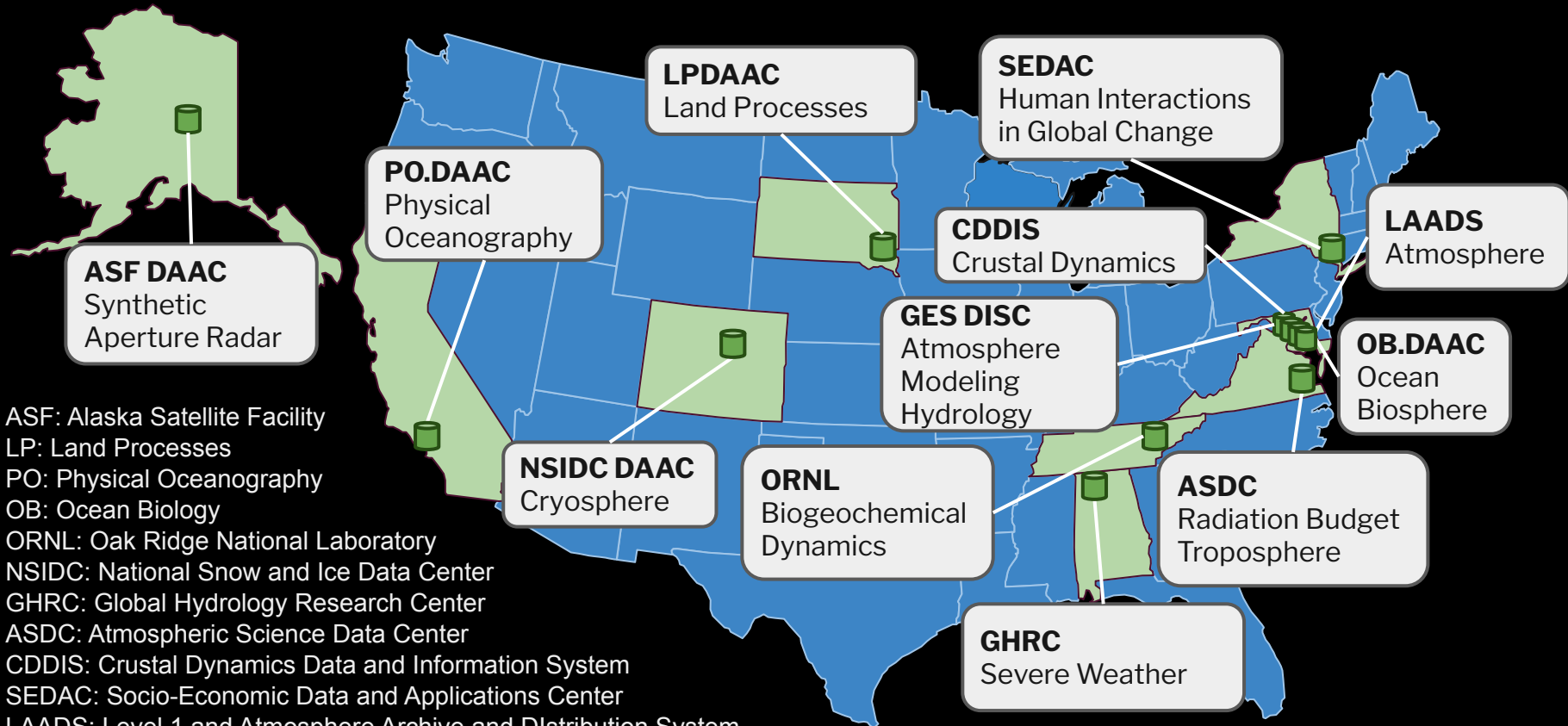*OPeNDAP = Open-Source Project for a Network Data Access Protocol

One More Seam to Target...
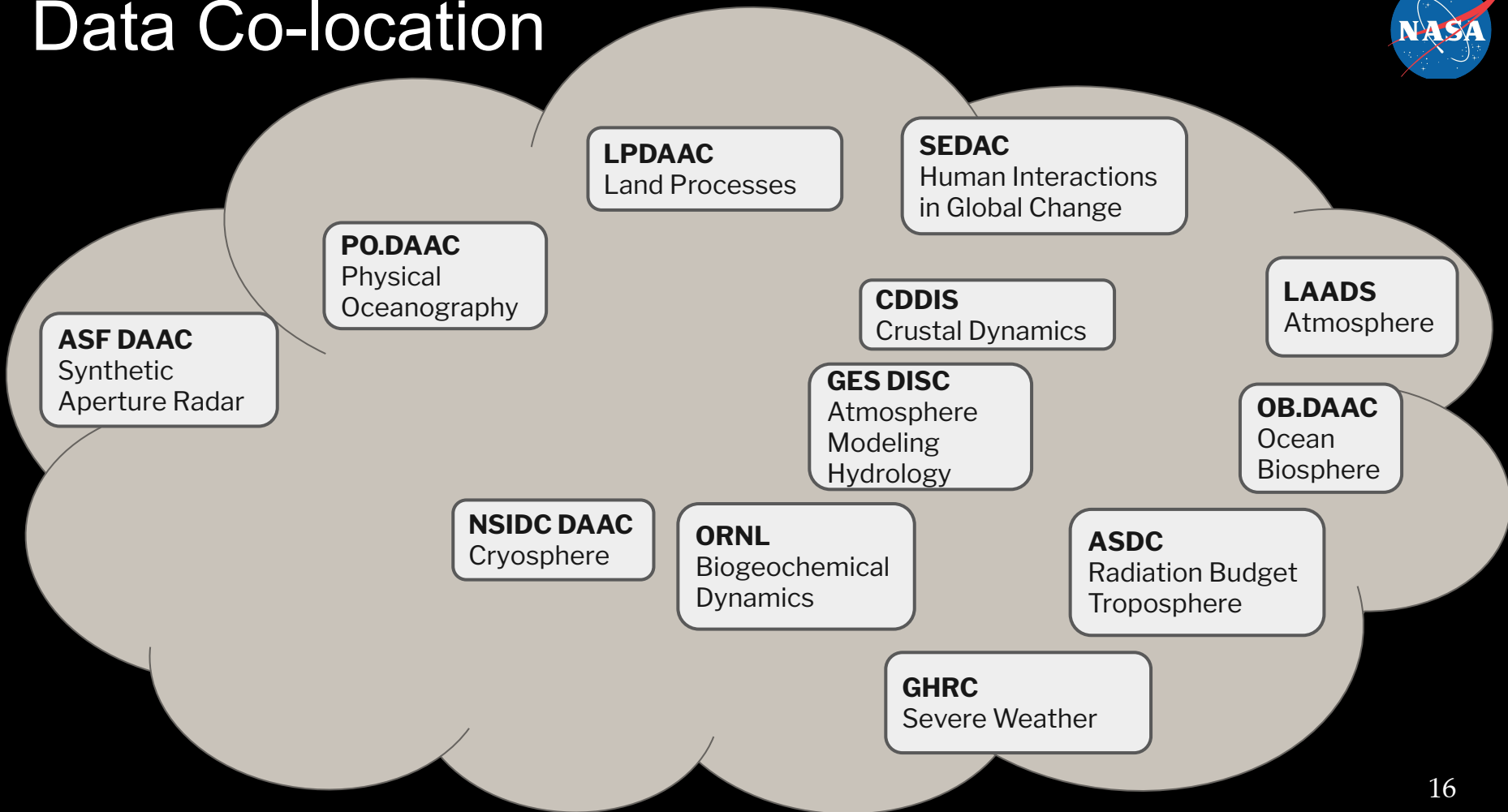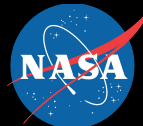
Distribution from Multiple DAACs

Data Co-location

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Land Processes

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EOSDIS in the Cloud Going Forward...

- Migration to cloud based on prioritization by DAACs
- Iterative development of data transformation services
- Community engagement
  - Conferences and Workshops
  - User Working Groups
  - Beta testing
  - <your idea / input here>