# DAARWG Updates: NOAA Enterprise Data Curation, Big Data Program, Data Science

W. Christopher Lenhardt

DAARWG

9 April 2018

# Topics

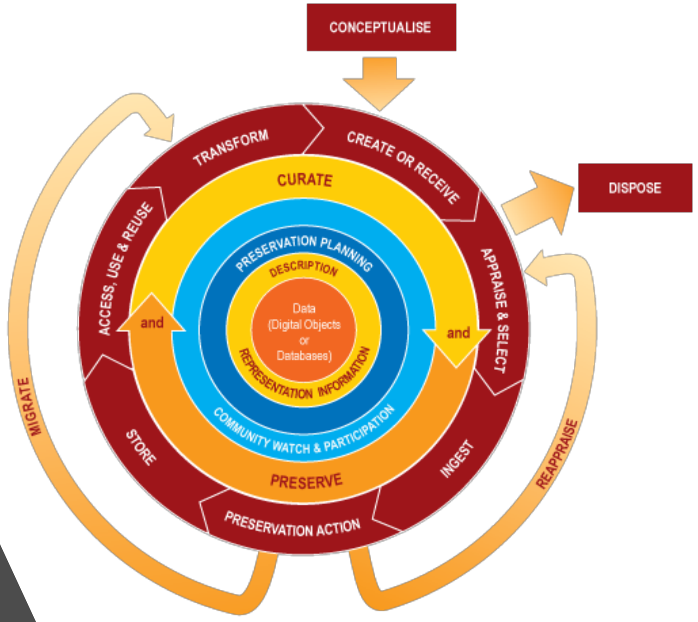
- Data Curation
- NOAA Big Data Program
- Data Science
- DAARWG and SAB Priorities

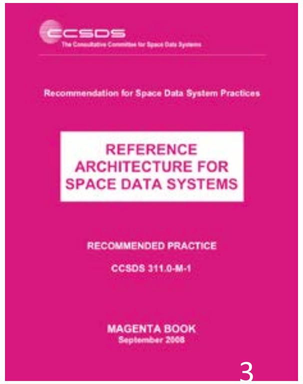
# Data Archiving (aka Data Management)

- Data archiving focuses on the value-added activities to support the full data lifecycle: Ingest, Curation, Reuse
    - *http://www.dcc.ac.uk/sites/default/files/lifecycle_web.png*
- In the satellite data world the gold standard conceptual framework is the Open Archival Information System (OAIS)
    - Submission Information Package
    - Archival Information Package
    - Dissemination Information Package
    - *https://public.ccsds.org/Publications/MagentaBooks.aspx*
- Newer conceptual version is data curation should support FAIR Principles: *Findable, Accessible, Interoperable, Reusable*
    - *https://www.force11.org/group/fairgroup/fairprinciples*

FORCE11

The Future of Research Communications and e-Scholarship





CCSDS

The Consultative Committee for Space Data Systems

Recommendation for Space Data System Practices

REFERENCE ARCHITECTURE FOR SPACE DATA SYSTEMS

RECOMMENDED PRACTICE

CCSDS 311.0-M-1

MAGENTA BOOK
September 2008

# What has this focus meant in terms of DAARWG activities:

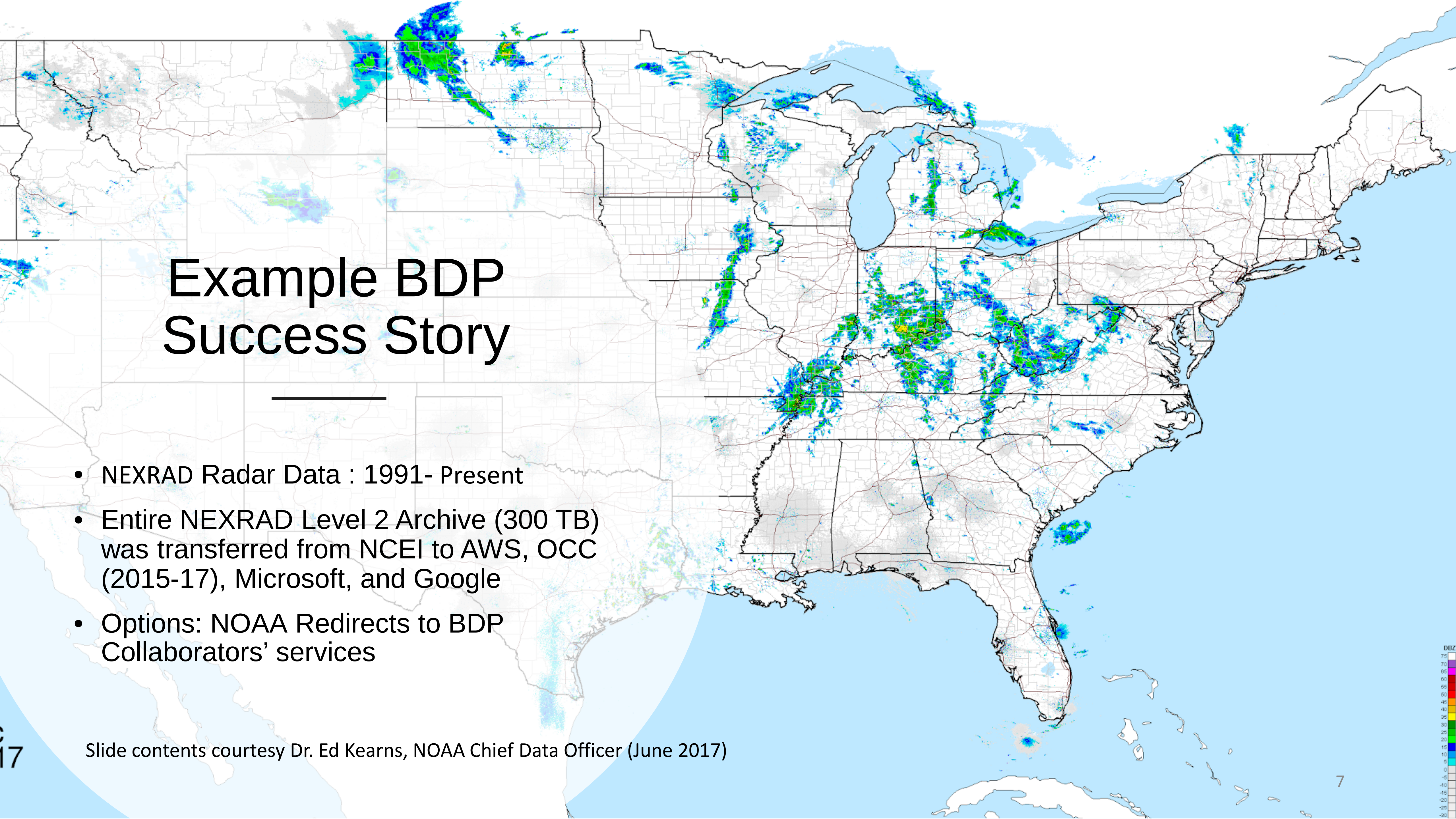
- Early work largely focused on helping to identify areas of potential leverage where NOAA might apply its resources for maximum effect
  - Policies and procedures
  - Organizational activities
  - Some interactions on technology front
- NOAA had three long-standing data archives well-versed in data archiving leading practices
- Challenge was to encourage diffusion across the enterprise the prioritization of data as a first class object
- NOAA created a series of data management policy directives and procedures, in part due to recommendations from SAB to NOAA put forth from DAARWG
- NOAA has also kept DAARWG apprised of topics related to improving access such as the development of metadata, catalogs, and interfaces

# More recently

- Along the way
  - Updated on CLASS (Comprehensive Large Array Storage System)
  - Reorganization of core data centers into NCEI
- GOES Level 1a archiving recommendation memo
- Looking to identify what other pockets of NOAA data activity are relevant
  - Social science data
- As rise of concern over replication increased, looked at what other NOAA products might be important to include as a 'first class object'
  - Code / Models
  - Physical specimens

# NOAA Big Data Project

- Started with an RFI call and followed-up with an industry day, 2014
- Announced 5, 3 year CRADAs, 2015
  - Amazon, Microsoft, IBM, Google, OCC (AMIGOs)
  - 1 year extension in the works
- Initial data put in place
  - NOAA NEXRAD data
  - Has expanded to include other NOAA data, e.g. NCDC ftp mirror
- Something of an experiment, try new collaborative partnerships, work with new technologies, contain costs, respond to demand
- Overarching goal is to improve access to NOAA data



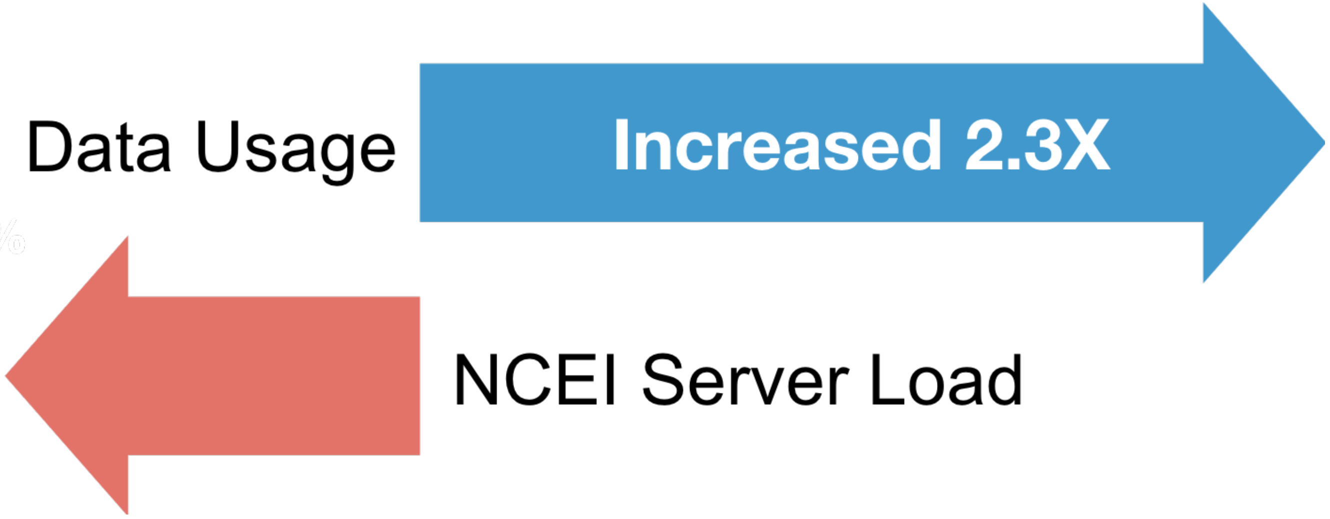
# Example BDP Success Story

- NEXRAD Radar Data : 1991- Present
- Entire NEXRAD Level 2 Archive (300 TB) was transferred from NCEI to AWS, OCC (2015-17), Microsoft, and Google
- Options: NOAA Redirects to BDP Collaborators' services

Slide contents courtesy Dr. Ed Kearns, NOAA Chief Data Officer (June 2017)

# Example BDP Success Story

- NEXRAD Level 2 Radar Data on AWS
- Ansari et al., 2017. Unlocking the potential of NEXRAD data through NOAA's Big Data Partnership
- http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-16-0021.1



Data Usage

Increased 2.3X

NCEI Server Load

Slide contents courtesy Dr. Ed Kearns, NOAA Chief Data Officer (June 2017)

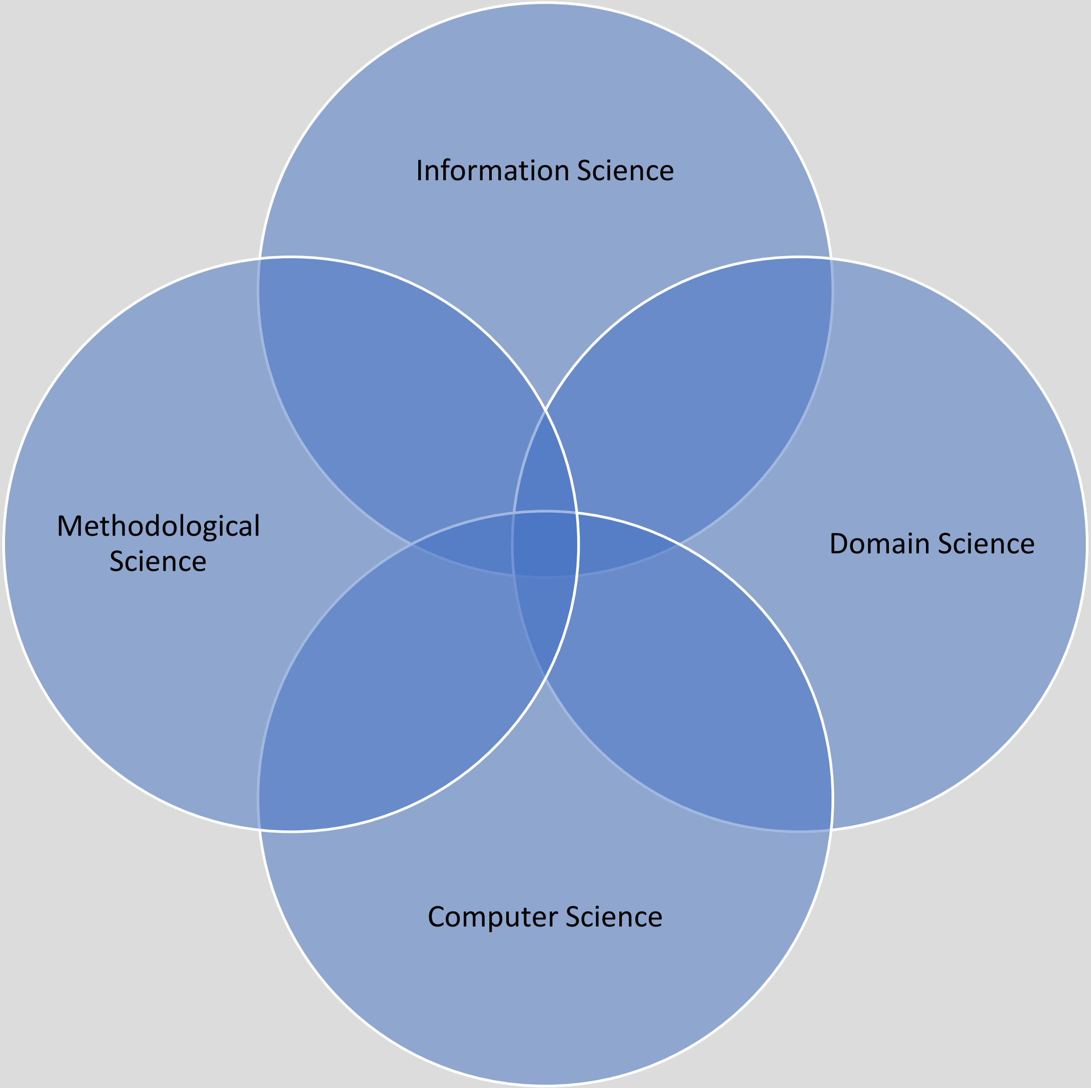
# BDP Partner Links Data Offerings

- **AWS**
  - https://aws.amazon.com/noaa-big-data/
- **Google Cloud Platform**
  - https://cloud.google.com/bigquery/public-data/
- **IBM**
  - https://noaa-crada.mybluemix.net/node/32
- **Microsoft**
  - No public service to date
- **Open Commons Consortium**
  - https://www.opensciencedatacloud.org/publicdata/?commons_type=Environmental

Slide contents courtesy Dr. Ed Kearns, NOAA Chief Data Officer (June 2017)

# DAARWG and the BDP

- Briefings from various key leads of the Big Data Project, most recent from Ed Kearns, NOAA Chief Data Officer (June 2017)
- Issues discussed:
  - Identifying hidden costs
  - Challenges of potential multiple copies of data
  - Tracking usage and receiving credit
  - Storing data in the cloud versus curation of data in the cloud
  - Privatizing a public good
- DAARWG has been enthusiastic about the experiment



# Data Science

- Is there a common understanding of what Data Science is?
  - Analytics (statistics + big data)?
  - Science of data?
  - Techniques, tools, standards, knowledge, communities of practice around making data reusable and interoperable?

# DAARWG and SAB Topics

- Finalize revisions to DAARWG Terms of Reference
- Specialized curation requirements for:
  - Information products
  - Decision-support data
  - Social science data
  - Models and software
  - *'Omic' data*
  - *Other data platforms, e.g. IoT, drones*
  - *Citizen science*
- Explore information sharing with other working groups