GBIF

INFORMATION FACILITY

GBIF data architecture

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Based on presentations by Tim Robertson (GBIF Information Systems Architect), David Remsen (ECAT PO)

NATIONAL MUSEUMS OF KENYA
WHERE HERITAGE LIVES ON

KENBIF TRAINING WORKSHOP

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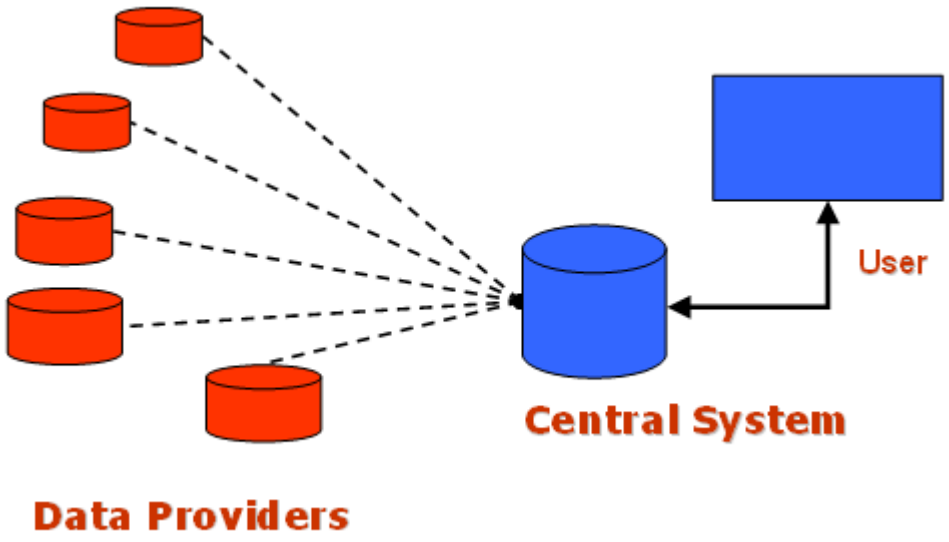
About GBIF

- An operational network
- Connecting hundreds of institutions
- Thousands of data sources
- Free and open access to information

Centralized model



Distributed model (network)

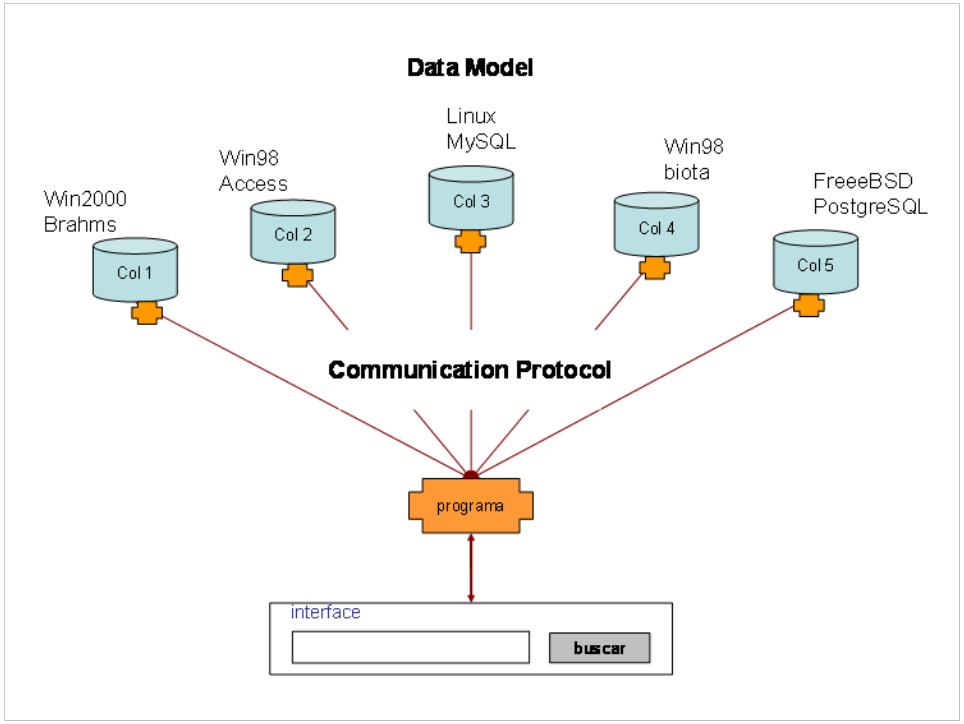
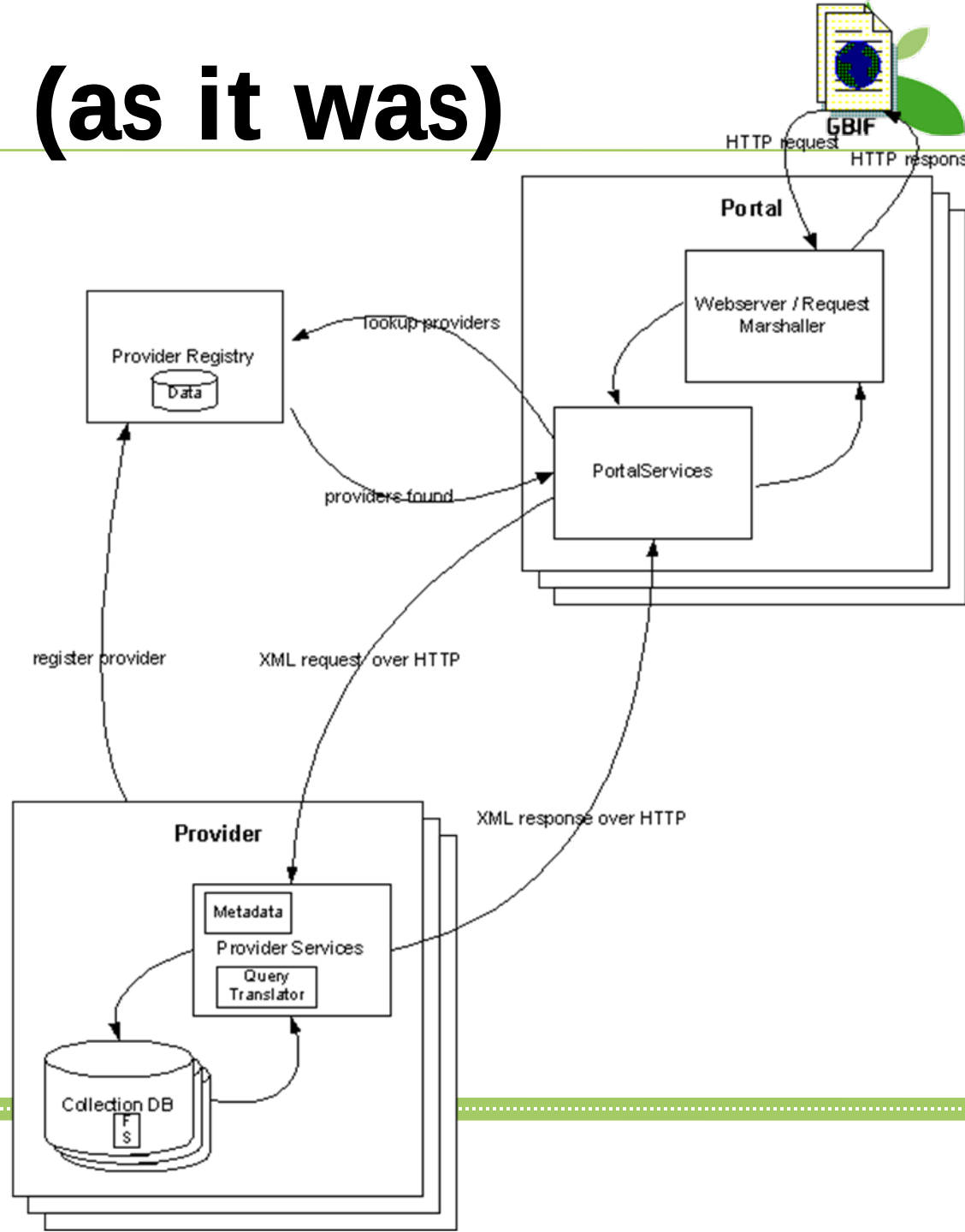


Figure 4. Diagram showing the complexity of integrating data from biological collections

In some detail (as it was)

DiGIR

- Protocol
- Provider
- Portal
- Registry



Architecture Strategic Big Picture

GBIF'S ARCHITECTURE

Services

Integration

GBRDS REGISTRY

DATA STORES

METADATA

SPECIMEN & OBSERVATION

CHECKLIST

SPATIAL

VOCABULARY REPOSITORY

HARVESTING & INDEXING TOOLKIT

DiGIR

BioCASE

Other tools

DarwinCore archive

INTEGRATED PUBLISHING TOOLKIT

Legend

Data store

data flow

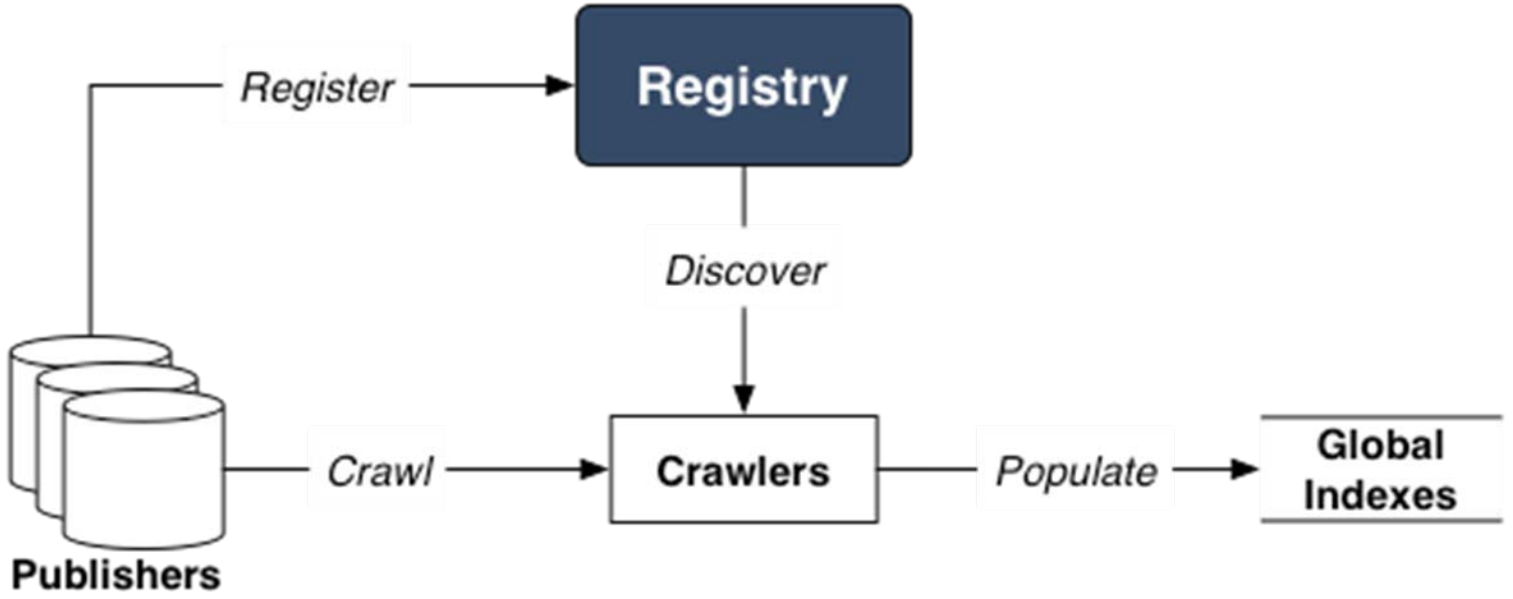
registration and resolution

work in progress

- Data profile standard (Darwin Core)
- Registry
- Index, Cache databases & protocols
- Portal

Registry component

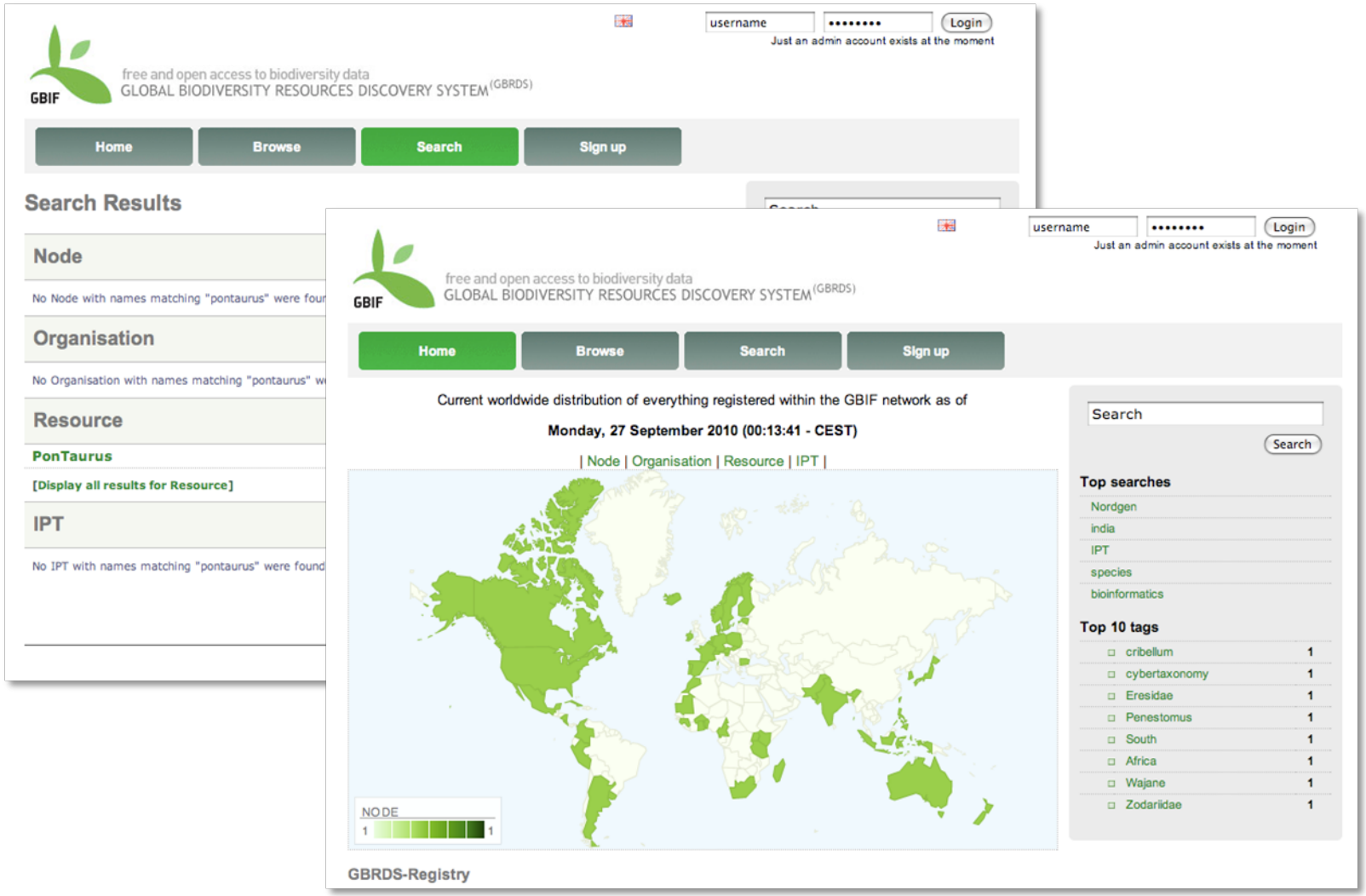
- Provides the information to determine the participating institutions in GBIF and the technical end-points to access their datasets, along with contact information.



Registry component

- Previously implemented using an open industry business registry known as UDDI
  - 2-tier model of “data publisher having several datasets”
- The GBIF network is more complicated than this.
  - Datasets are shared or published through multiple channels. Results in complex attribution chains.

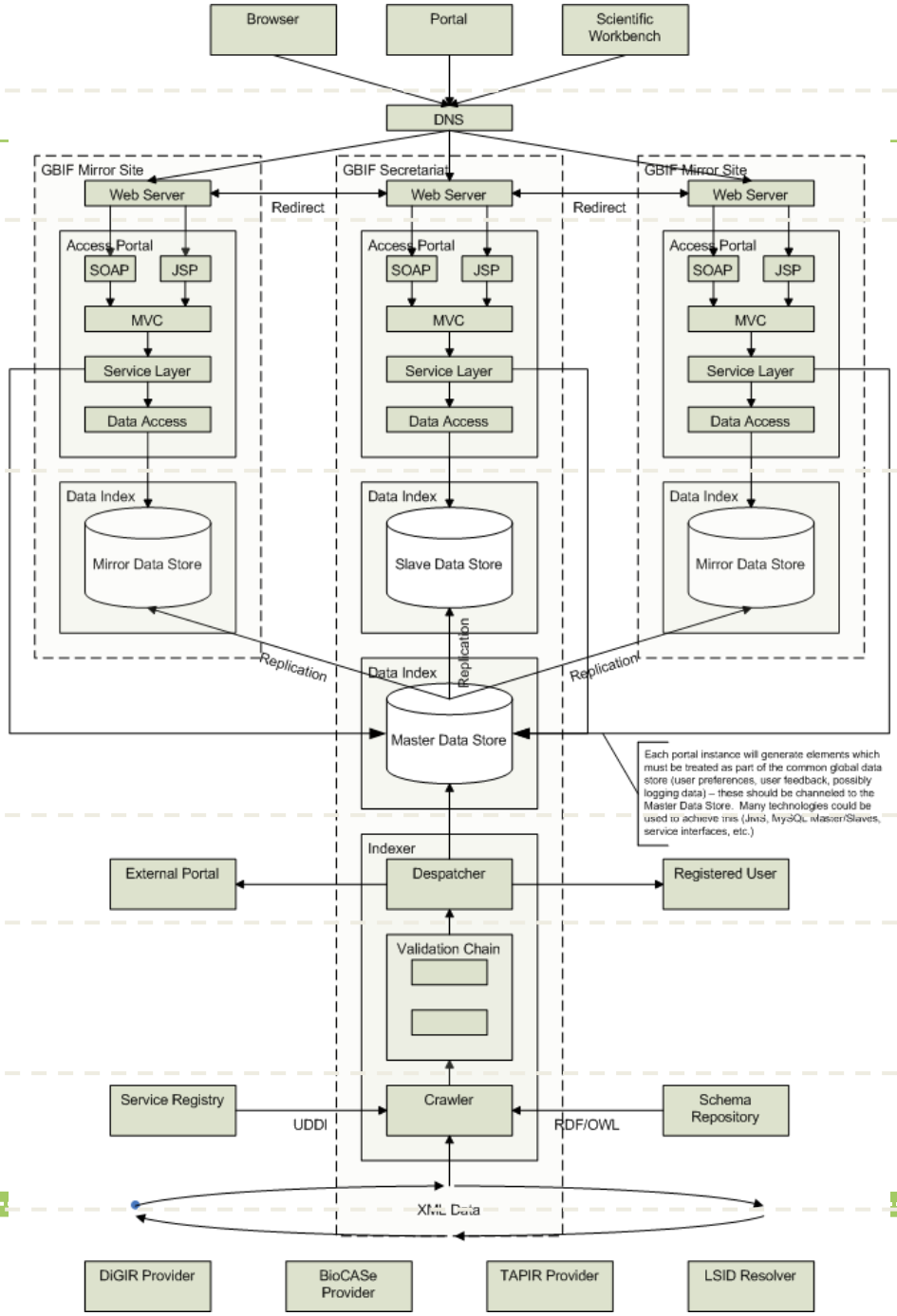
Registry component



Status: Prototype available

http://gbrds.gbif.org

Portal architecture



Clients

Mirrored access

Web applications

Synchronised data stores

Data despatcher

Interpretation and validation

Resource crawler

Data resources

Challenge: performance

- Post-harvesting stage:

215,000,000 records refreshed in a month	
7,000,000 per **day**	
300,000 per **hour**	(24/7 is a challenge in itself!)
5000 per **minute**	
83 per **second**	(with no growth…)

- Clearly parallelisation is key…

  … and database becomes a bottleneck

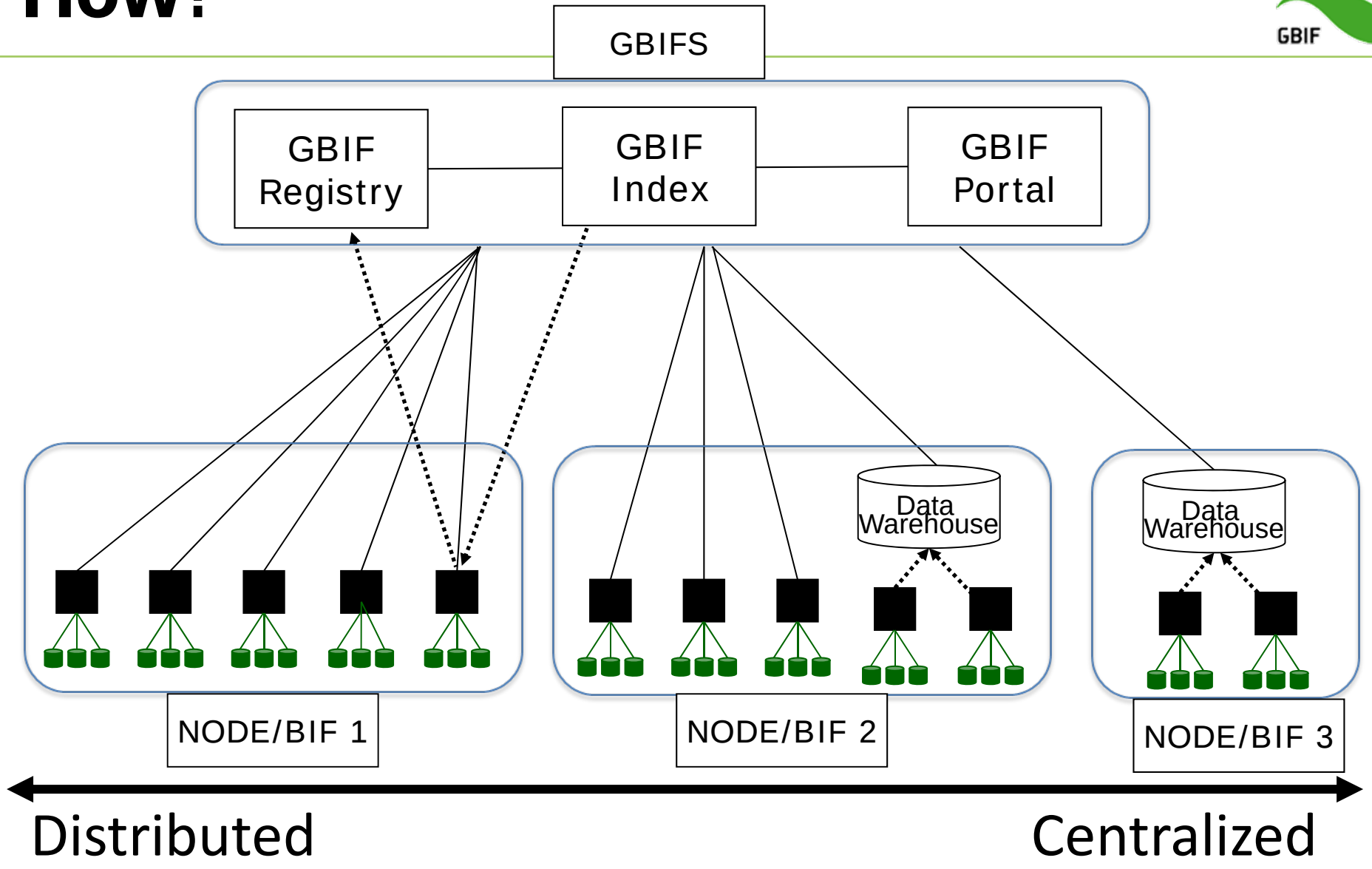
New approaches

- HIT (Harvesting Indexing tool
- Darwin Core Archive
- Cloud / Grid technologies

Protocols and other means of buliding the index (Cache database)

- May depend on the extent of your IT support
  - Via web services - data transfer long
    - BioCASE - Biological Collection Access Services
    - DiGIR - Distributed Generic Information Retrieval
    - TAPIR - TDWG Access Protocol for Information Retrieval
  - Via zipped text archives - data transfer short
    - Darwin Core Archives (GBIF)
    - Tab-separated values with appropriate headers (DiscoverLife.org)
    - GBIF's IPT (Integrated Publishing Toolkit)
  - XML - Guide includes
    - Simple Darwin Core Schema http://rs.tdwg.org/dwc/xsd/tdwg_dwc_simple.xsd
  - Additional resources (including Excel spreadsheet!)
    - http://code.google.com/p/darwincore/wiki/ToolsAndApplications

How?


GBIFS
GBIF Registry
GBIF Index
GBIF Portal
Data Warehouse
Data Warehouse
NODE/BIF 1
NODE/BIF 2
NODE/BIF 3
Distributed
Centralized

What makes GBIF work

- Standards for data and protocols (and their interaction via web services)
- Control and ownership of data remains with providers
- Registry for advertisement of data
- Integration at portals
- GBIF is multi-purpose open-ended cyber-infrastructure that enables taxonomists and others to serve the society in new ways

At your command

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