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Interoperability and networking: common aim, diverse approaches

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Informatics-diversity

- No uniform approach within BIOLOG
- Great advantage in a rapidly evolving environment (technical, sociological, state of knowledge)
- Diversity of approaches allows for an evolutionary process of adaptation

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- Incorporation of successful features into an interoperable environment

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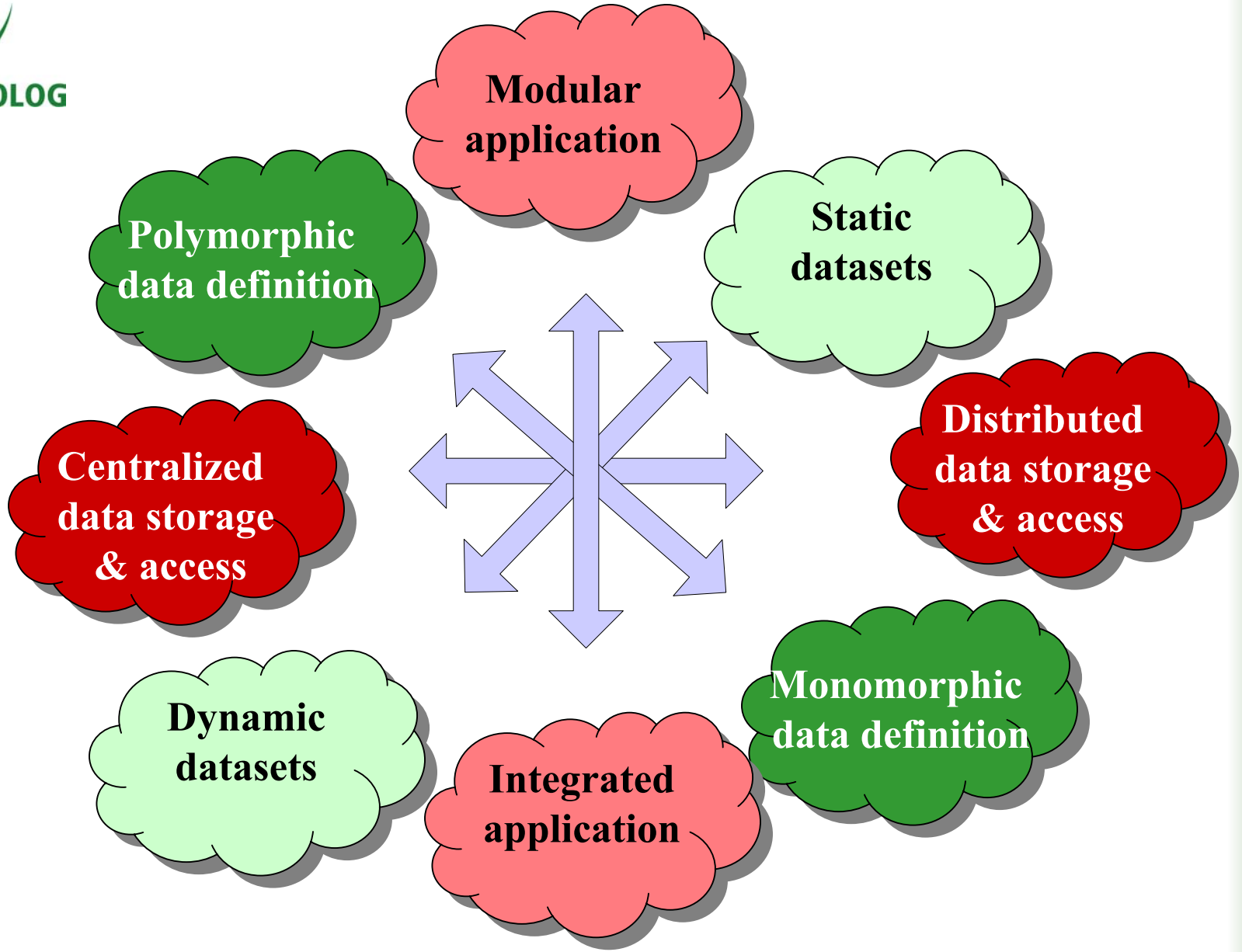
Modular application
Polymorphic data definition
Static datasets
Centralized data storage & access
Distributed data storage & access
Dynamic datasets
Integrated application
Monomorphic data definition

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EDIS / SysTax

- Pragmatic approach:
  - EDIS project databases and SysTax are integrated applications
  - Centralized storage and WWW access
  - Static datasets are imported from dynamic systems (time slice / edition) using a monomorphic import format
- Remote data input possible; centralized SysTax system envisioned to replace EDIS project databases

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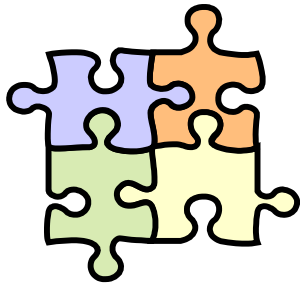
Modular application design



Example in BIOLOG:

DiversityWorkbench (GLOPP-IT)

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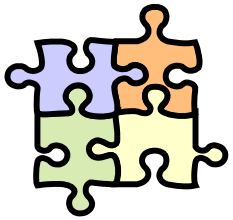
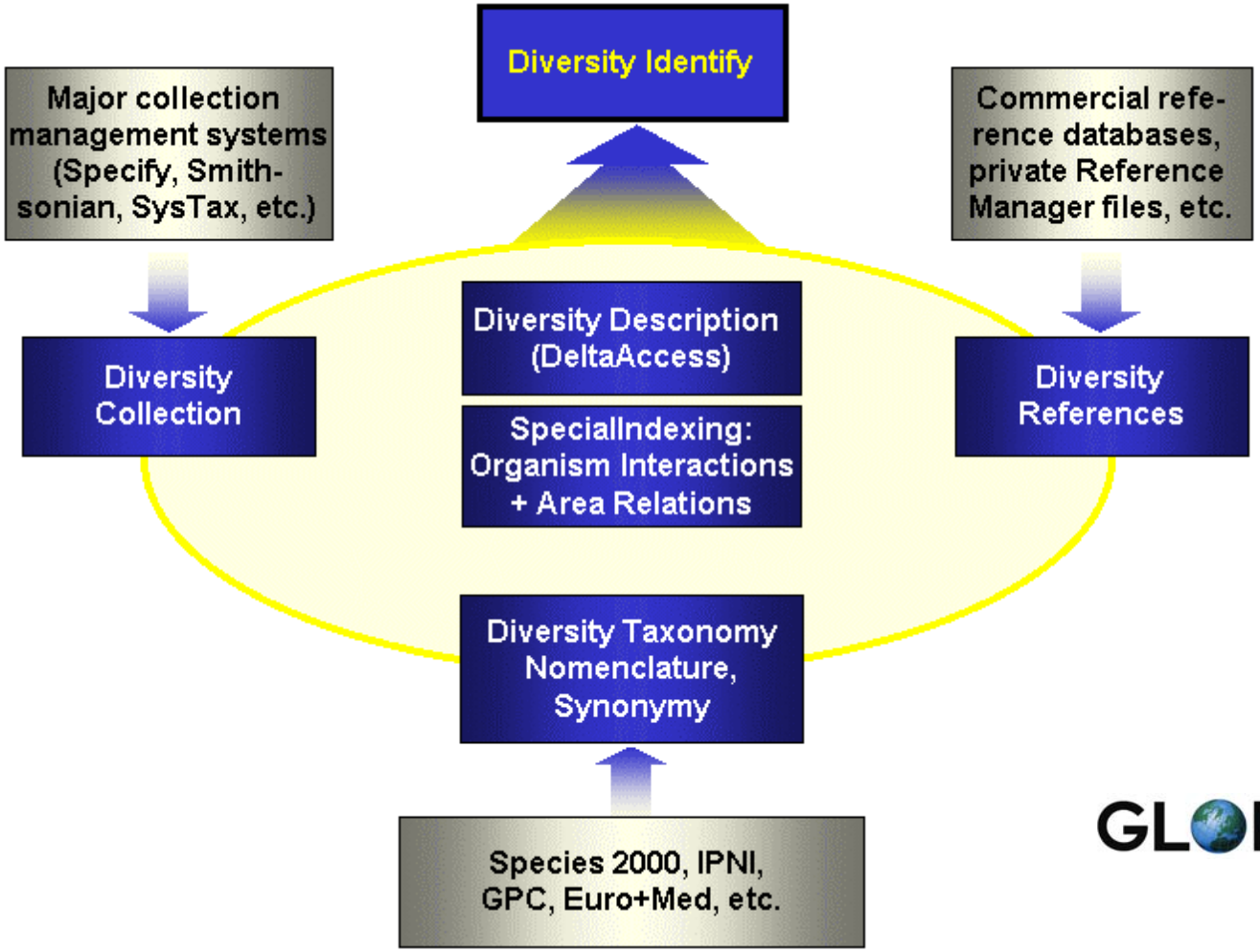
DiversityWorkbench





GLOPP

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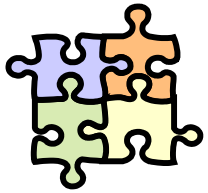

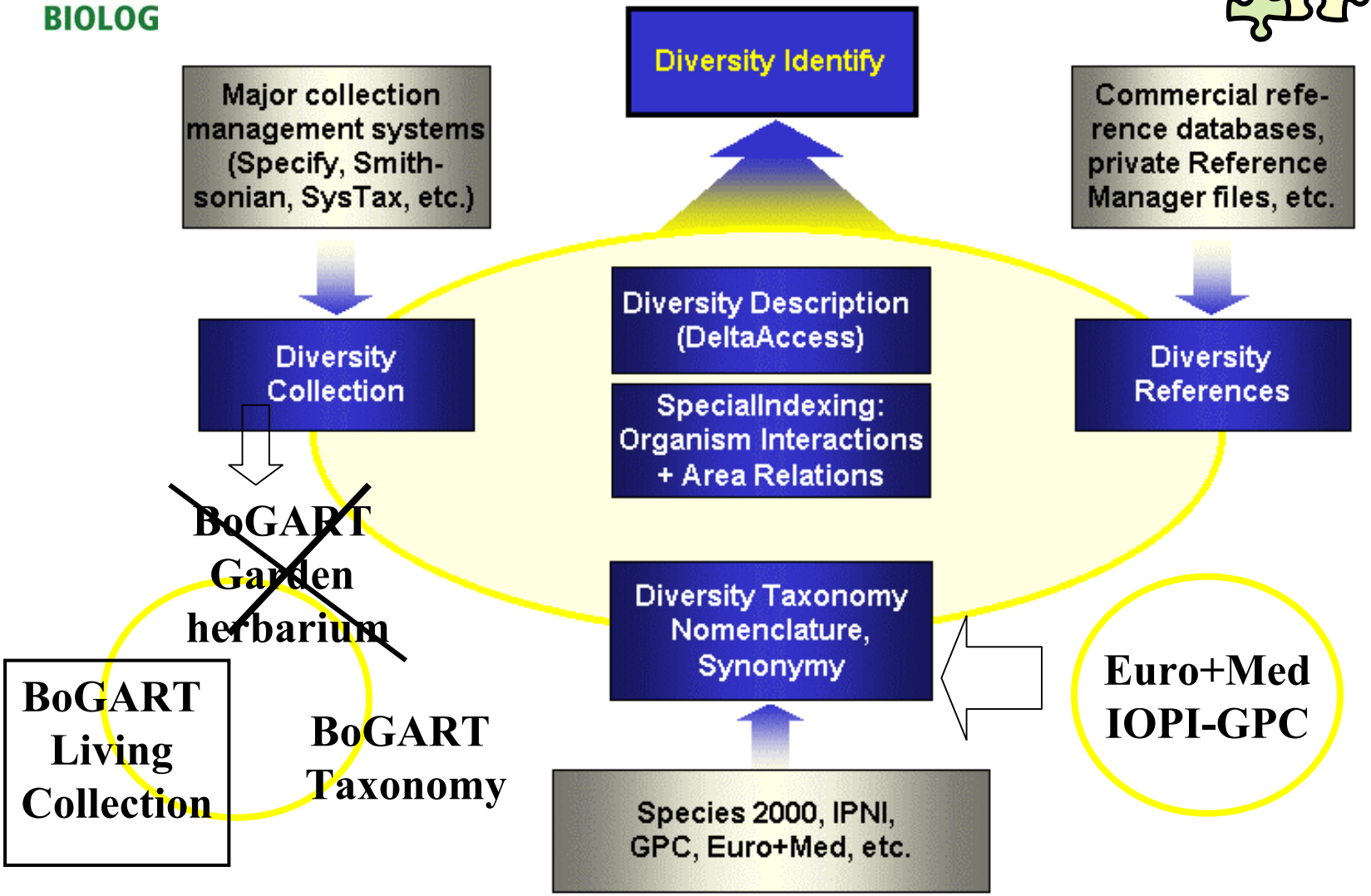
Diversity Identify
Major collection management systems (Specify, Smithsonian, SysTax, etc.)
Commercial reference databases, private Reference Manager files, etc.
Diversity Description (DeltaAccess)
SpecialIndexing: Organism Interactions + Area Relations
Diversity Collection
Diversity References
BoGART Garden herbarium
BoGART Living Collection
BoGART Taxonomy
Diversity Taxonomy Nomenclature, Synonymy
Euro+Med IOPI-GPC
Species 2000, IPNI, GPC, Euro+Med, etc.

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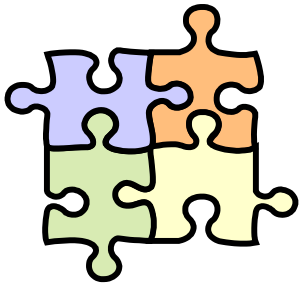
Modular application design



- Interoperability layers in local applications
  - Complementary database modules
  - Complementary database modules with “business logic”
  - Complementary modules with user interface
- Distributed applications
  - Web services
  - SOAP etc.

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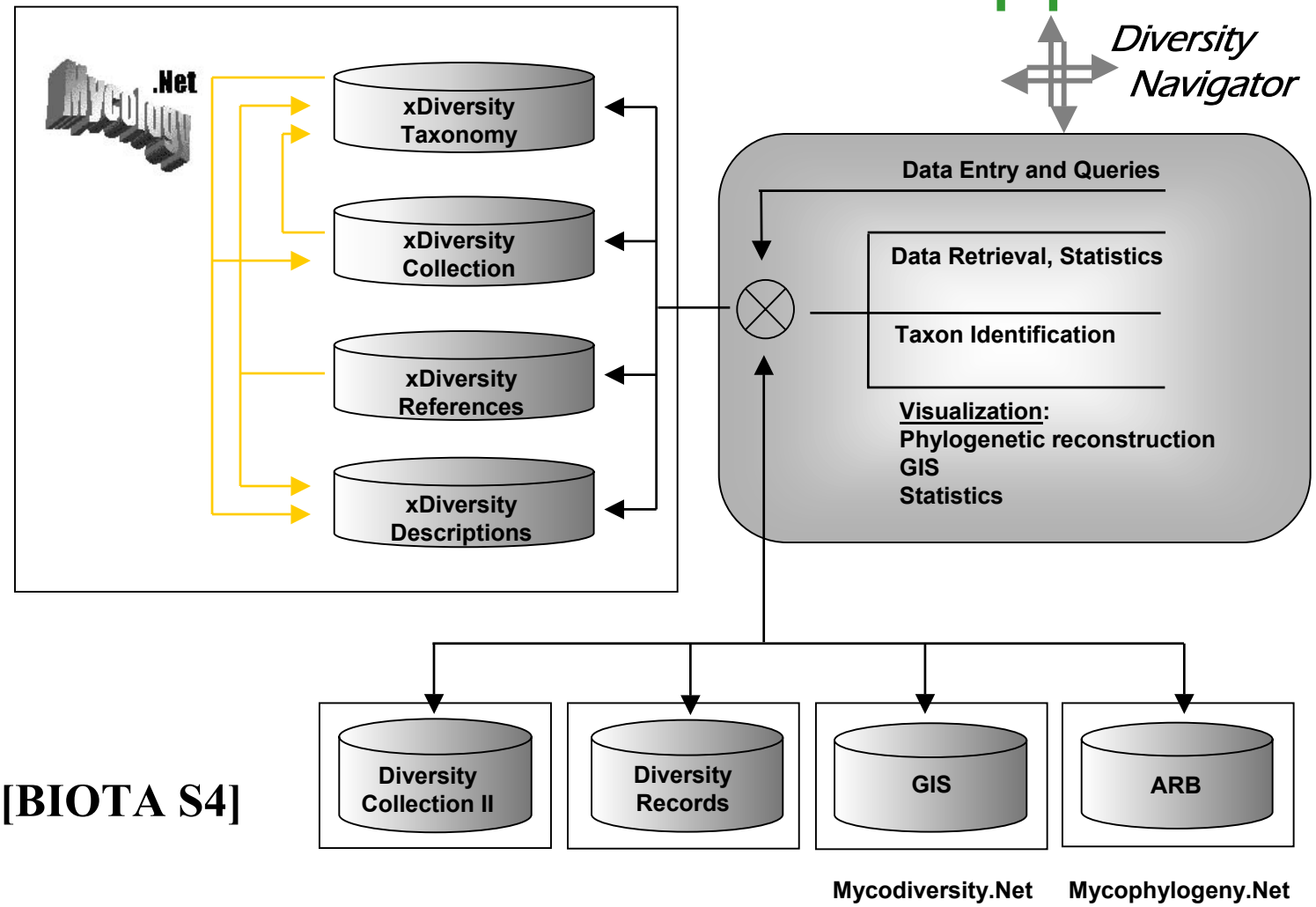
Modular design -> distributed applications



[BIOTA S4]

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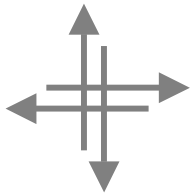

Diversity Navigator

- Java interface to biodiversity data
- Data model: DiversityWorkbench; OS: Linux; DBMS: Postgres
- Web Services: Soap (simple object access protocol) and remote procedure calls
- Monomorphic data definition; distributed

[Biota S4: U. Bayreuth, G. Rambold]

Common access as a first step towards interoperability

Example: biological collections

- BIOLOG project: ZEFOD
- EU projects:
  - ENHSIN
  - BioCASE
  - ENBI
- International collaboration:
  - TDWG/CODATA working group on biological collection data access connects several initiatives

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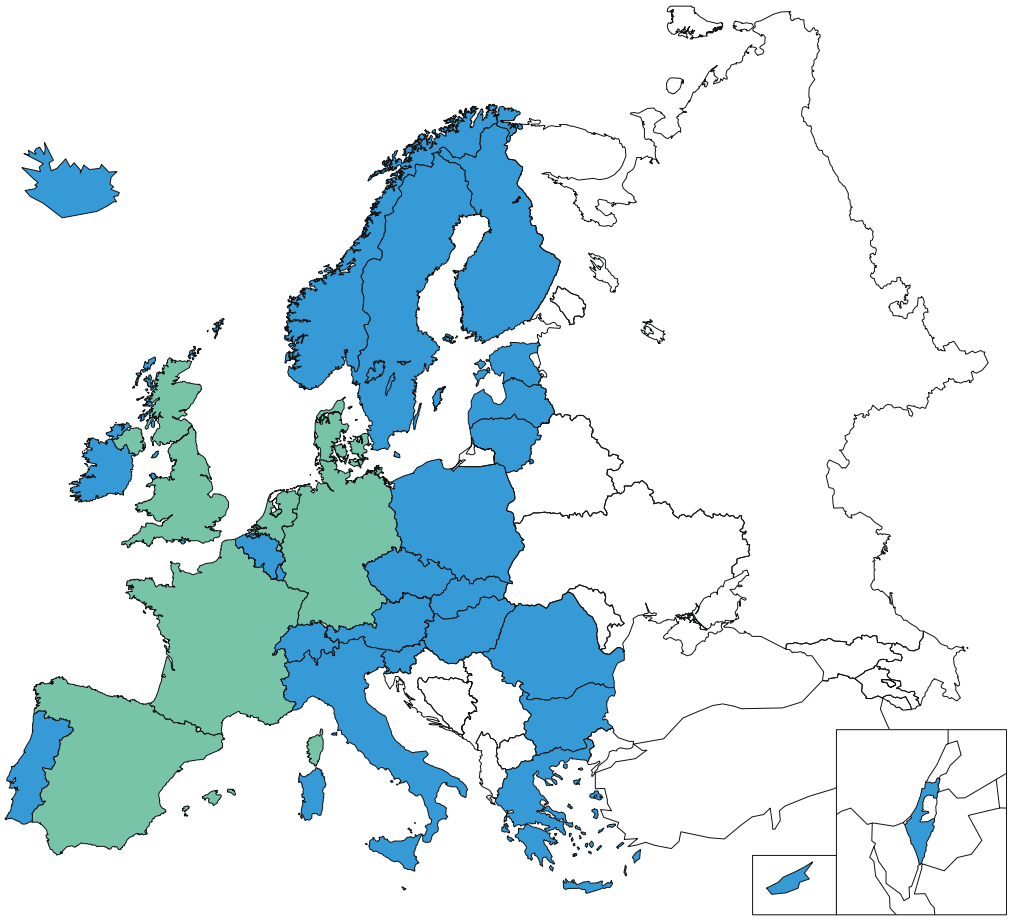
Access to European collections

ENHSIN

European Natural History Specimen Information Network

BioCASE

Biological collection Access Service for Europe



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ENHSIN/BioCASE concepts

- Distributed data storage
- Monomorphic metadata
- Modular applications
- Common distributed thesauri
- Static and dynamic datasets
- Polymorphic unit data
- Conforms to TDWG/CODATA standard

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Interoperability standard

- TDWG/CODATA working group on biological collection data access
- Two workshops in 2001, with participants from BIOLOG projects
- Content definition subgroup
- Protocol development subgroup
- www.bgbm.org/TDWG/CODATA/

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Interoperability standard

Content definition subgroup

- Develop a “federation scheme”, i. e. an XML schema where data elements are described (a.k.a. data dictionary)
- Based on published standards and information models used (HISPID, ITF, ASC, BioCISE, UK-Recorder, ..)
- RFC (request for comment) starting now

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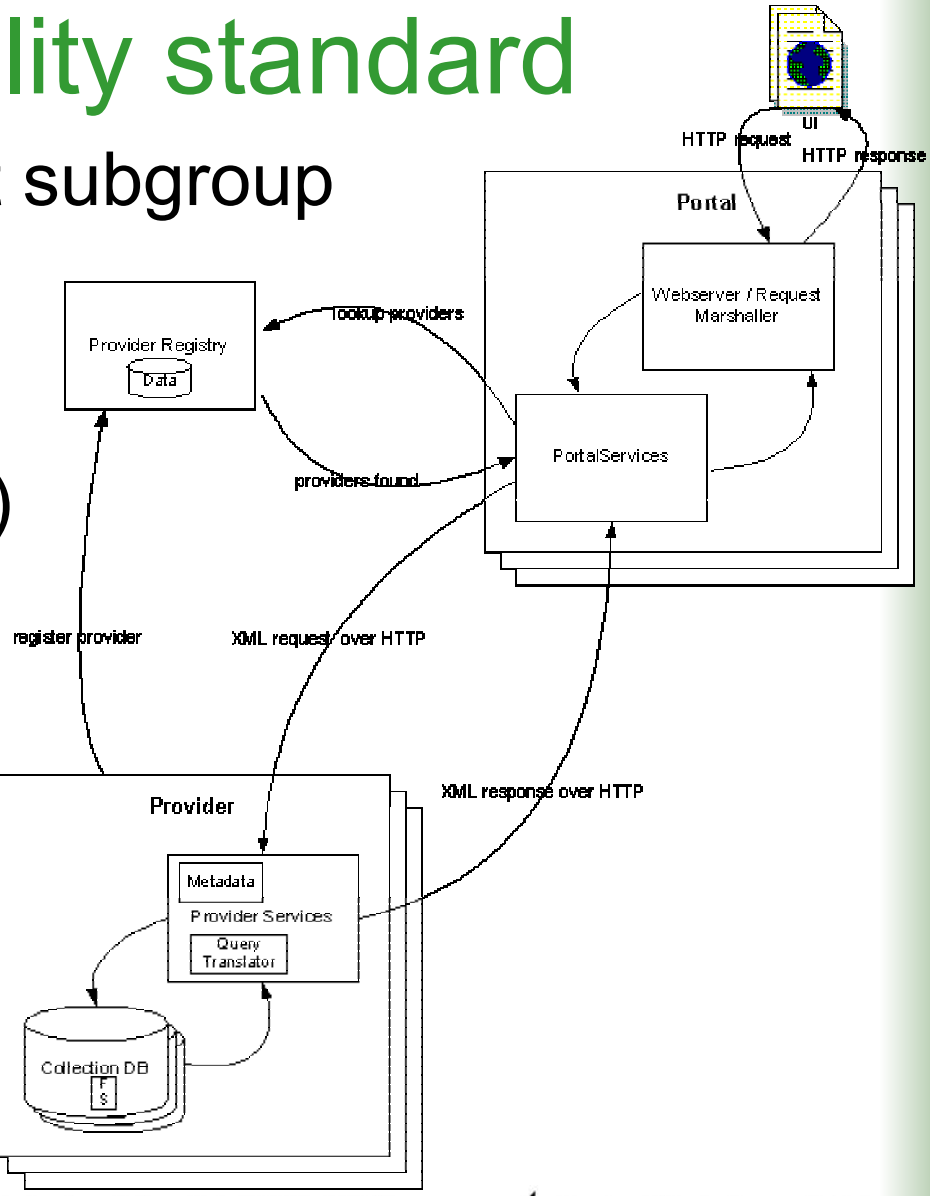
Interoperability standard

Protocol development subgroup

- DiGIR Project (Distributed Generic Information Retrieval)
- Aim:
  to define a protocol for retrieving structured data from multiple, heterogeneous databases



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Interoperability standard

Basic architecture of protocol

- Query and results based on federation schema
- Wrapper on provider's side with metadata and query translator; understands XML query and produces XML output
- Providers registered at a web service
- Portal services receive queries (from user interface or other services), checks provider registry, checks metadata, and sends information request to appropriate providers

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The international context

- Individual projects well connected internationally
- Many use internationally available information resources (e.g. lists of taxa)
- Several directly contribute to emerging global information systems
- Projects are building resources for GBIF