BGCaT bioinformatics

# BridgeDb: standardized access to gene, protein and metabolite identifier mapping services

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The Identifier mapping problem

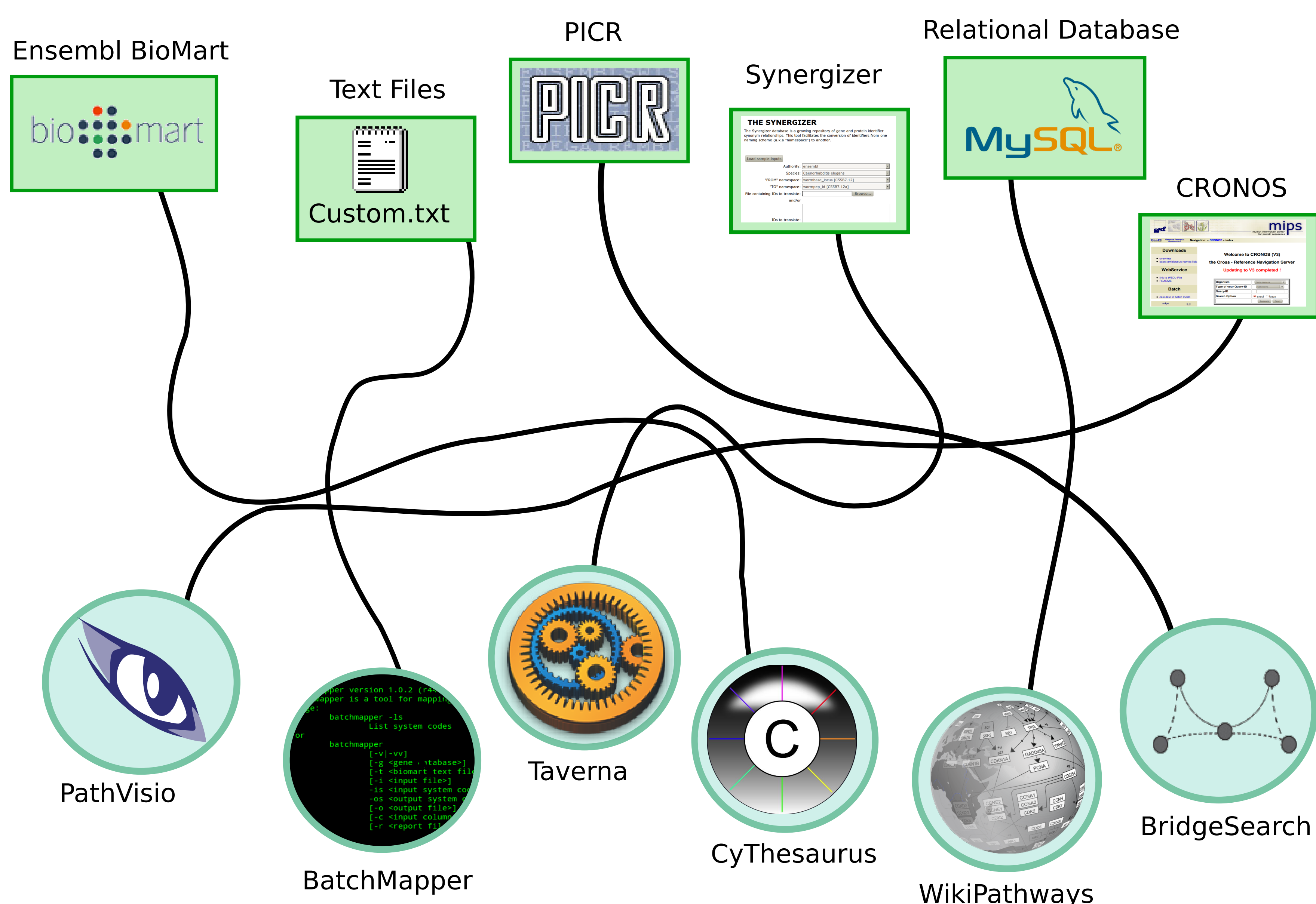Many interesting problems in bioinformatics require integration of data from various sources:

Uniprot P12567

Agilent A_P65_45819

Entrez Gene 3643
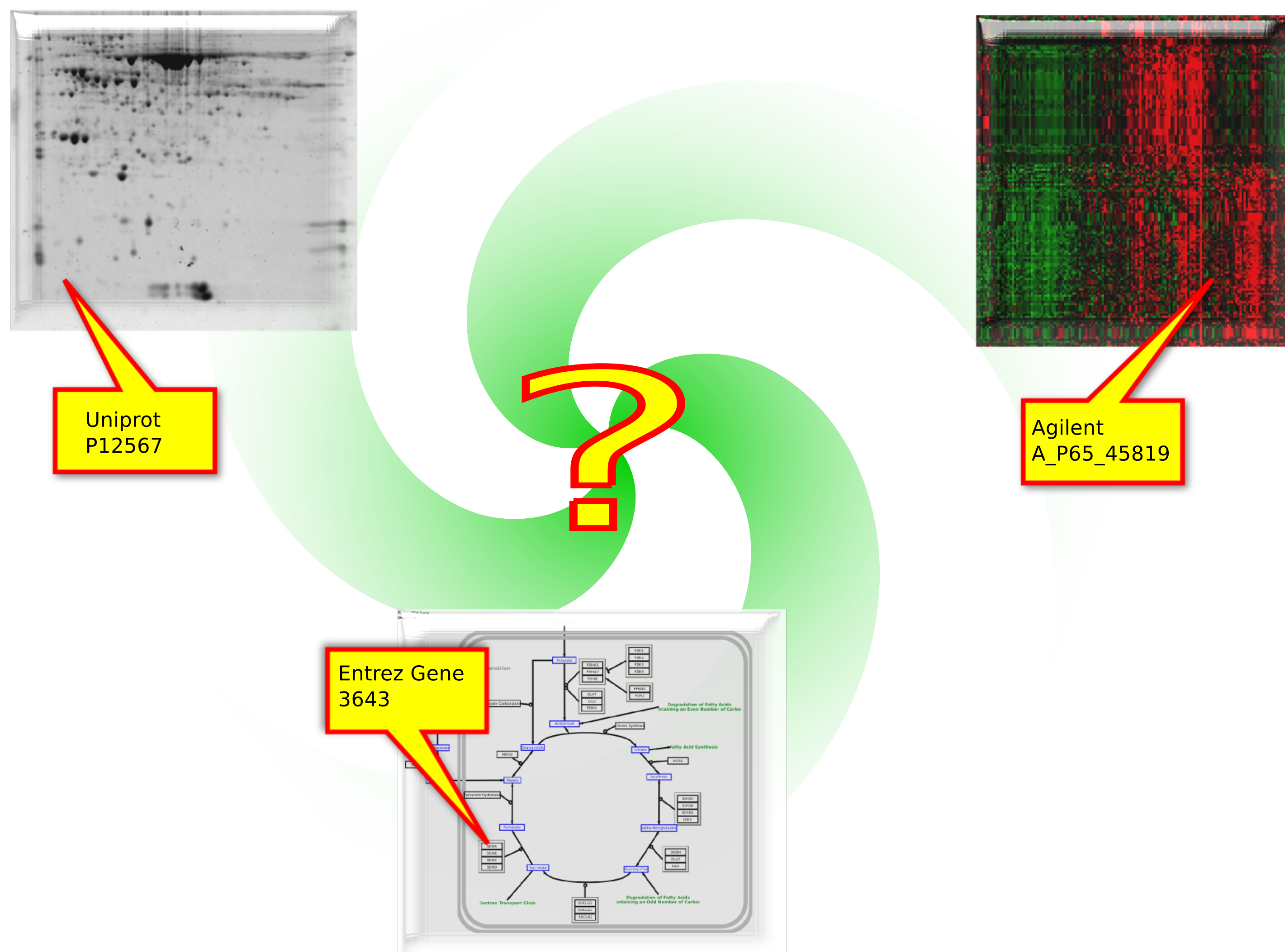
Whenever we integrate datasets from different origins, inevitably an identifier mapping problem occurs. BridgeDb helps to solve that problem.

Connect mapping sources to tools

Which mapping source is connected to which bioinformatics tool? Follow the lines to find out!

Ensembl BioMart

Text Files
Custom.txt

PICR

Synergizer
THE SYNERGIZER

Relational Database
MySQL.

CRONOS
mips

PathVisio

BatchMapper

Taverna

CyThesaurus
C

WikiPathways

BridgeSearch

BridgeDb connects any mapping source to any bioinformatics tool. This way we avoid duplication of effort, and enable more features for more tools.

Information for developers

BridgeDb is an Application Programming Interface (API), and thus it is primarily useful for bioinformatics tool developers.

Object Model

The figure on the right shows the object model. The BridgeDb class is a central access point, which instantiates an implementation of IDMapper. A DataSource (such as *Ensembl* or *Entrez Gene*) is combined with a local identifier to form an Xref. An Xref functions as a global identifier.
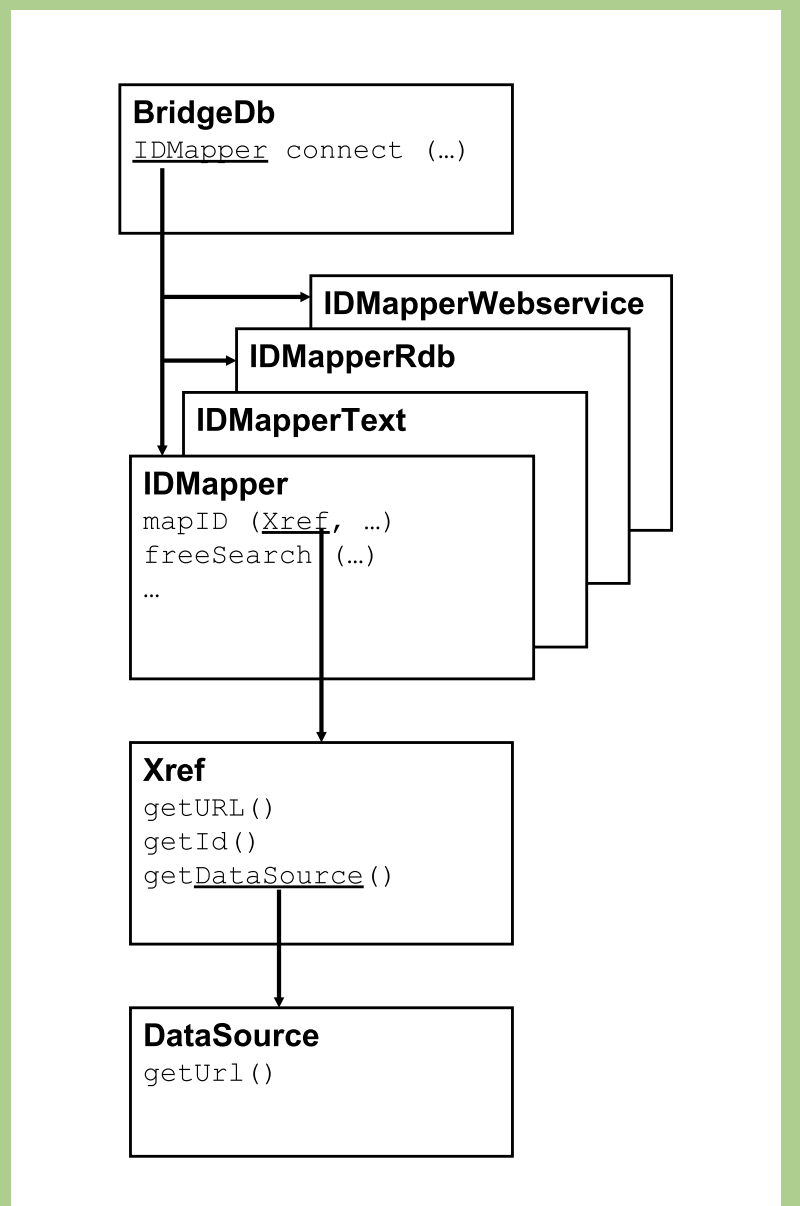
Java API

First, establish a connection through a JDBC-like connection string.

```
// connect to a local derby database
IDMapper mapper = BridgeDb.connect ("idmapper-pgdb:" + PGDB_HUMAN);

// connect to a BioMart WebService
IDMapper mapper = BridgeDb.connect ("idmapper-biomart:" +
    "http://www.biomart.org/biomart/martservice?" +
    "mart=ensembl&dataset=hsapiens_gene_ensembl");

// connect to the PICR WebService
IDMapper mapper = BridgeDb.connect ("idmapper-picr:");
```

After that you can map, search and get the name of identifiers in the same way regardless of the mapping source.

```
Xref ref1 = new Xref("3643", BioDataSource.ENTREZ_GENE);
Xref ref2 = new Xref("1004_at", BioDataSource.AFFY);

// get an URL to the EntrezGene page for 3643
ref.getUrl();

// get all cross-references
mapper.mapID(ref);

// get all cross-references in UniGene
mapper.mapID(ref, BioDataSource.UNIGENE);
```

Rest API

For non-Java programming languages a REST API is also available.

```
http://<Base URL>/<Species>/<function> [ /<argument> ... ]\

http://webservice.bridgedb.org/Human/xrefs/L/1234
http://webservice.bridgedb.org/Human/search/ENSG00000122375
http://webservice.bridgedb.org/Human/attributeSet
http://webservice.bridgedb.org/Human/properties
http://webservice.bridgedb.org/Human/targetDataSources
http://webservice.bridgedb.org/Human/attributes/L/3643
http://localhost:8183/Human/xrefs/L/3643
```

Contact

Website: http://www.bridgedb.org
Mailinglist: bridgedb-discuss@googlegroups.com
Availability: Open Source (Apache 2.0 License)
Code repository: http://svn.bigcat.unimaas.nl/bridgedb
See also: Van Iersel et al., *BMC Bioinformatics 2010*, 11,5