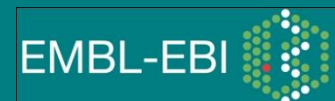


PSICQUIC

The PSI Common QUery Interface

Interesting facts

pronounced “psykick”, but also known as “pisquick”
spelled in 40 different ways (PSIQUIC, PSICIQK, QPSICUI...)



About me

- Name: **Bruno Aranda**
- Affiliation: **European Bioinformatics Institute (EBI)**
- Role: **Software Engineer** at the **IntAct Team**

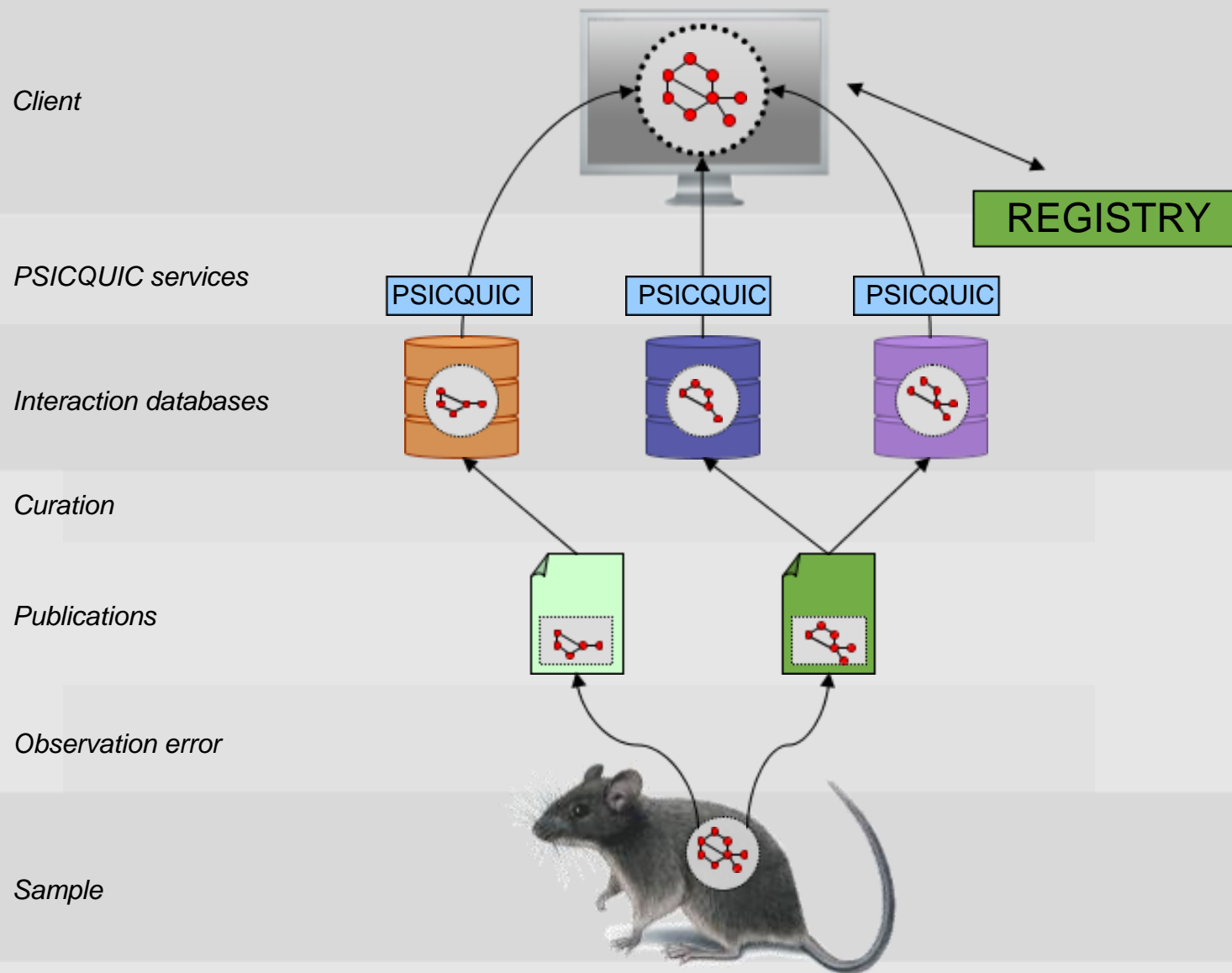
- **IntAct** provides **Molecular Interaction** data through its **open source services and tools**.

- One of such tools is **PSICQUIC**.

Take a deep breath

INTRODUCTION

What is PSICQUIC?



What is PSICQUIC?



- **P**roteomics **S**tandards **I**nitiative **C**ommon **Q**Uery **I**nterfa**C**e.
- Community effort to standardise the way to access and retrieve data from Molecular Interaction databases.
- PSICQUIC is a specification of a **web service**.
- Resources already implementing PSICQUIC are listed in a **registry**.
- Based on the PSI standard formats (PSI-MI XML and MITAB)
- Documentation: ***<http://psicquic.googlecode.com>***

Justification

- So basically, if all interaction databases provide data in the same way, we can have...



“The one Client to rule them all”



228,262



74,861

MatrixDB

845

STRING

12,231,763



404,453

MINT

124,473



20,769

BioGRID

337,957

APID

416,124



581,858

**J. Craig Venter
INSTITUTE**

24,268



9,909

More
than **14 million**
binary interactions
available using
PSICQUIC

EMBL-EBI



What can I do?

METHODS

Web Service Methods

- **getByInteraction**
Retrieves interactions by using an interaction AC.
- **getByInteractionList**
Retrieves interactions by using a list of interaction AC.
- **getByInteractor**
Retrieves interactions by using a participant identifier.
- **getByInteractorList**
Retrieves interactions by using a list of participant identifiers.
- **getQuery**
Retrieves interactions by using a Molecular Interaction Query Language (MIQL) query (full text searches)

Web Service Methods

Other metadata methods:

- **getVersion**
Returns the version of the web service implementation.
 - **getSupportedDbAcs**
Returns the supported database identifiers
 - **getSupportedReturnTypes**
Returns the list of available format types for the results.
- A limited number of interactions can be fetched. It is possible to retrieve large datasets using **pagination**. Most methods have two additional parameters:
 - *First result*: Index for the first result to retrieve.
 - *Max results*: Number of interactions returned per query.

Take a shower before going to sleep?

SOAP AND REST (PROTOCOLS)

How can I access PSICQUIC?

As PSICQUIC is a Web Service, you can access the data:

- Via SOAP
 - A WSDL file exists, and it is the same for all the databases.
 - IntAct has developed a Java client, but any other languages can be used.
 - You can use it to get interactions in two standard formats: PSI-MI XML and PSI-MI TAB.
- Via REST
 - Retrieving data directly by using a URL
 - Easy to access and data can be obtained just using an internet browser.
 - Effective for scripting.

uniprotkb:O35274	intact:EBI-80022	uniprotkb:P61169	intact:EBI-80012	uniprotkb:Neurabin-II (gene name synonym)	uniprotkb:Spinophilin (gene name synonym)
uniprotkb:O35274	intact:EBI-80022	uniprotkb:P61169	intact:EBI-80012	uniprotkb:Neurabin-II (gene name synonym)	uniprotkb:Spinophilin (gene name synonym)
uniprotkb:O35274	intact:EBI-80022	uniprotkb:P63088	intact:EBI-80049	uniprotkb:Neurabin-II (gene name synonym)	uniprotkb:Spinophilin (gene name synonym)
uniprotkb:O08838	intact:EBI-80080	uniprotkb:P21575	intact:EBI-80070	uniprotkb:Amph1 (gene name synonym)	uniprotkb:amph_rat (shortlabel)
uniprotkb:O08839	intact:EBI-80095	uniprotkb:P21575	intact:EBI-80070	uniprotkb:Amph2 (gene name synonym)	uniprotkb:Amph1 (gene name synonym)
uniprotkb:O08838	intact:EBI-80080	uniprotkb:O08839	intact:EBI-80095	uniprotkb:Amph1 (gene name synonym)	uniprotkb:amph_rat (shortlabel)
uniprotkb:O08839	intact:EBI-80095	uniprotkb:O08838	intact:EBI-80080	uniprotkb:Amph2 (gene name synonym)	uniprotkb:Amph1 (gene name synonym)
uniprotkb:O08839	intact:EBI-80095	uniprotkb:P21575	intact:EBI-80070	uniprotkb:Amph2 (gene name synonym)	uniprotkb:Amph1 (gene name synonym)
uniprotkb:O70467	intact:EBI-78724	uniprotkb:Q63009	intact:EBI-78708	uniprotkb:Hrmt113 (gene name synonym)	uniprotkb:Heterogeneous nuclear ribonucleoprotein A2 (gene name synonym)
uniprotkb:Q9JIL3	intact:EBI-78714	uniprotkb:Q63009	intact:EBI-78708	uniprotkb:ilf3_rat (shortlabel)	irefindindex:QhW5KzPsYeHPUCRmeLCrOtOC6T810116
uniprotkb:Q63009	intact:EBI-78708	uniprotkb:Q63009	intact:EBI-78708	uniprotkb:Hrmt112 (gene name synonym)	uniprotkb:anm1_rat (shortlabel)
uniprotkb:Q63009	intact:EBI-78708	uniprotkb:P27049	intact:EBI-78953	uniprotkb:Hrmt112 (gene name synonym)	uniprotkb:anm1_rat (shortlabel)
uniprotkb:O70467	intact:EBI-78724	uniprotkb:O70467	intact:EBI-78724	uniprotkb:Hrmt113 (gene name synonym)	uniprotkb:Heterogeneous nuclear ribonucleoprotein A2 (gene name synonym)
uniprotkb:O88498	intact:EBI-78989	uniprotkb:Q9Z1P3	intact:EBI-78982	uniprotkb:Bin (gene name synonym)	uniprotkb:Bod (gene name synonym)
uniprotkb:Q9Z1P3	intact:EBI-78982	uniprotkb:O88498	intact:EBI-78989	uniprotkb:mcl1_rat (shortlabel)	irefindindex:sUveXa+Li21aYsa+UmQJc75Lk9Y10116
uniprotkb:Q9WV48	intact:EBI-80909	uniprotkb:P97837	intact:EBI-81025	uniprotkb:GKAP/SAPAP-interacting protein (gene name synonym)	uniprotkb:SPAM1 (gene name synonym)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P19491	intact:EBI-77718	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:Q9WV48	intact:EBI-80909	uniprotkb:P97836	intact:EBI-80901	uniprotkb:GKAP/SAPAP-interacting protein (gene name synonym)	uniprotkb:SPAM1 (gene name synonym)
uniprotkb:P97836	intact:EBI-80901	uniprotkb:P97837	intact:EBI-81025	uniprotkb:Gkap (gene name synonym)	uniprotkb:Guanylate kinase-associated protein 1 (gene name synonym)
uniprotkb:Q9JIL3	intact:EBI-78714	uniprotkb:Q63009	intact:EBI-78708	uniprotkb:ilf3_rat (shortlabel)	irefindindex:QhW5KzPsYeHPUCRmeLCrOtOC6T810116
uniprotkb:P97836	intact:EBI-80901	uniprotkb:Q9WV48	intact:EBI-80909	uniprotkb:Gkap (gene name synonym)	uniprotkb:Guanylate kinase-associated protein 1 (gene name synonym)
uniprotkb:Q91X38	intact:EBI-77460	uniprotkb:Q9Z1Y0	intact:EBI-77480	uniprotkb:Drak2 (gene name synonym)	uniprotkb:DAP kinase-related apoptosis-inducing factor 2 (gene name synonym)
uniprotkb:Q91X38	intact:EBI-77460	uniprotkb:Q9Z1Y0	intact:EBI-77480	uniprotkb:Drak2 (gene name synonym)	uniprotkb:DAP kinase-related apoptosis-inducing factor 2 (gene name synonym)
uniprotkb:P26431	intact:EBI-77471	uniprotkb:Q9Z1Y0	intact:EBI-77480	uniprotkb:Nhe1 (gene name synonym)	uniprotkb:"Na(+)/H(+) exchanger 1" (gene name synonym)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P19491	intact:EBI-77718	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P19491	intact:EBI-77718	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P19492	intact:EBI-77764	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:P19492	intact:EBI-77764	uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:Glur3 (gene name synonym)	uniprotkb:GluR-K3 (gene name synonym)
uniprotkb:O88498	intact:EBI-78989	uniprotkb:P49950	intact:EBI-79006	uniprotkb:Bin (gene name synonym)	uniprotkb:Bod (gene name synonym)
uniprotkb:P53563	intact:EBI-79042	uniprotkb:O88498	intact:EBI-78989	uniprotkb:Bclx (gene name synonym)	uniprotkb:Bcl2l1 (gene name synonym)
uniprotkb:O88996	intact:EBI-79061	uniprotkb:O88498	intact:EBI-78989	uniprotkb:bcl-2 (gene name synonym)	uniprotkb:o88996_rat (shortlabel)
uniprotkb:Q925A9	intact:EBI-79073	uniprotkb:O88498	intact:EBI-78989	uniprotkb:Bcl2a1 (gene name synonym)	uniprotkb:q925a9_rat (shortlabel)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P27049	intact:EBI-78953	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:P27049	intact:EBI-78953	uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:Pc3 (gene name synonym)	uniprotkb:BTG family member 2 (gene name synonym)
uniprotkb:Q9EP80	intact:EBI-77728	uniprotkb:P27049	intact:EBI-78953	uniprotkb:Prkcabp (gene name synonym)	uniprotkb:Protein kinase C-alpha-binding protein 1 (gene name synonym)
uniprotkb:P61765	intact:EBI-1029097	uniprotkb:O35430	intact:EBI-704760	uniprotkb:Unc18a (gene name synonym)	uniprotkb:Unc-18 homolog (gene name synonym)
uniprotkb:P61765	intact:EBI-1029097	uniprotkb:O35431	intact:EBI-2028211	uniprotkb:Unc18a (gene name synonym)	uniprotkb:Unc-18 homolog (gene name synonym)
uniprotkb:P61765	intact:EBI-1029097	uniprotkb:P31016	intact:EBI-375655	uniprotkb:Unc18a (gene name synonym)	uniprotkb:Unc-18 homolog (gene name synonym)
uniprotkb:Q08851	intact:EBI-2028244	uniprotkb:P61765	intact:EBI-1029097	uniprotkb:Stx5a (gene name synonym)	uniprotkb:stx5_rat (shortlabel)
uniprotkb:P61765	intact:EBI-1029097	uniprotkb:O35430	intact:EBI-704760	uniprotkb:Unc18a (gene name synonym)	uniprotkb:Unc-18 homolog (gene name synonym)
uniprotkb:O35431	intact:EBI-2028211	uniprotkb:P61765	intact:EBI-1029097	uniprotkb:Kint2 (gene name synonym)	uniprotkb:Neuron-specific X11L protein 1 (gene name synonym)
uniprotkb:P63045	intact:EBI-520880	uniprotkb:P63081	intact:EBI-2025009	uniprotkb:Syb2 (gene name synonym)	uniprotkb:Synaptobrevin-2 (gene name synonym)
uniprotkb:P63045	intact:EBI-520880	uniprotkb:P32851	intact:EBI-539720	uniprotkb:Syb2 (gene name synonym)	uniprotkb:Synaptobrevin-2 (gene name synonym)
uniprotkb:P63045	intact:EBI-520880	uniprotkb:P07825	intact:EBI-976085	uniprotkb:Syb2 (gene name synonym)	uniprotkb:Synaptobrevin-2 (gene name synonym)
uniprotkb:P63045	intact:EBI-520880	uniprotkb:P60881	intact:EBI-1027214	uniprotkb:Syb2 (gene name synonym)	uniprotkb:Synaptobrevin-2 (gene name synonym)

PSICQUIC: REST query

<http://www.ebi.ac.uk/Tools/webservices/psicquic/intact/webservices/current/search/query/species:rat>

Standards and more
FORMATS

Default formats

- The default formats are:
 - PSI-MI XML 2.5.4 ([psi-mi/xml25](#))
 - PSI MITAB 2.5 ([psi-mi/tab25](#))
 - Compressed MITAB ([tab25-bin](#)) – Only REST
 - Count ([count](#)) – Only REST
- New formats will be included in the future (work in progress):
 - BioPAX ([biopax](#))
 - And other RDF formats ([rdf-xml](#) / [rdf-n3](#) / [rdf-n3-triple](#) / [rdf-turtle](#))
 - (so it will be possible to use PSICQUIC in the semantic web!)

```

uniprotkb:P51587|intact:EBI-79792      intact:EBI-539895      uniprotkb:FANCD1(gene name synonym)|uniprotkb:FACD(gene name synonym)|uniprotkb:Fanco
uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9-2|intact:EBI-596878  uniprotkb:FANCD1(gene name synonym)|uniprotkb:FANCD1(gene name synonym)|uniprotkb:Fanco
uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9-2|intact:EBI-596878  uniprotkb:FANCD1(gene name synonym)|uniprotkb:FANCD1(gene name synonym)|uniprotkb:Fanco
uniprotkb:Q9BXW9-2|intact:EBI-596878  uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9-2(short label)|irefindex:6AUD3dGTnA2Iv00RuKrBihoxny09
uniprotkb:Q9XIR8|intact:EBI-931045     uniprotkb:Q7Y1C4|intact:EBI-930753     uniprotkb:At1g64750(locus name)|uniprotkb:F13O11.6(orf name)|uniprotkb:
intact:EBI-1639774      uniprotkb:Q8R4X4|intact:EBI-1639762     irefindex:n9+iM0YoJOC9AgBNURd2G9PXjAo10029(rogid)      uniprotkb:q8r4x4_crigr(short l
uniprotkb:Q8R4X4|intact:EBI-1639762     intact:EBI-1639774      uniprotkb:q8r4x4_crigr(short label)|irefindex:yFw+icocB1uWApX3L62zhgIHJt010029(rogid)
uniprotkb:Q8R4X4|intact:EBI-1639762     intact:EBI-1639774      uniprotkb:q8r4x4_crigr(short label)|irefindex:yFw+icocB1uWApX3L62zhgIHJt010029(rogid)
intact:EBI-1639774      uniprotkb:Q8R4X4|intact:EBI-1639762     irefindex:n9+iM0YoJOC9AgBNURd2G9PXjAo10029(rogid)      uniprotkb:q8r4x4_crigr(short l
uniprotkb:Q8R4X4|intact:EBI-1639762     intact:EBI-1639774      uniprotkb:q8r4x4_crigr(short label)|irefindex:yFw+icocB1uWApX3L62zhgIHJt010029(rogid)
uniprotkb:P60896|intact:EBI-79819      uniprotkb:P51587|intact:EBI-79792      uniprotkb:DSS1(gene name synonym)|uniprotkb:SHFDG1(gene name synonym)
uniprotkb:P60896|intact:EBI-79819      uniprotkb:P51587|intact:EBI-79792      uniprotkb:DSS1(gene name synonym)|uniprotkb:SHFDG1(gene name synonym)
uniprotkb:P60896|intact:EBI-79819      uniprotkb:P51587|intact:EBI-79792      uniprotkb:DSS1(gene name synonym)|uniprotkb:SHFDG1(gene name synonym)
uniprotkb:P51587|intact:EBI-79792      uniprotkb:P60896|intact:EBI-79819      uniprotkb:FANCD1(gene name synonym)|uniprotkb:FACD(gene name synonym)
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uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:P60896|intact:EBI-79819      uniprotkb:P97929|intact:EBI-1034100     uniprotkb:DSS1(gene name synonym)|uniprotkb:SHFDG1(gene name synonym)
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
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uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:FANCD1(gene name synonym)|uniprotkb:FACD(gene name synonym)
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:P51587|intact:EBI-79792      uniprotkb:FACD(gene name synonym)|uniprotkb:facd2_human(short label)|i
uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:FANCD1(gene name synonym)|uniprotkb:FACD(gene name synonym)
uniprotkb:P51587|intact:EBI-79792      uniprotkb:Q9BXW9|intact:EBI-359343     uniprotkb:FANCD1(gene name synonym)|uniprotkb:FACD(gene name synonym)

```

psi-mi/tab25

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<entrySet minorVersion="4" version="5" level="2">
- <entry>
- <source releaseDate="2009-04-17+01:00">
- <names>
  <shortLabel>European Bioinformatics Institute</shortLabel>
</names>
- <attributeList>
- <attribute name="postalAddress">
  Wellcome Trust Genome Campus, Hinxton, Cambridge, CB10 1SD, United Kingdom
</attribute>
  <attribute name="url">http://www.ebi.ac.uk</attribute>
</attributeList>
</source>
- <interactionList>
- <interaction id="201">
- <names>
  <shortLabel>P51587-EBI-539895-P51587-Q06609-1</shortLabel>
</names>
- <xref>
  <primaryRef refTypeAc="MI:0356" refType="identity" id="EBI-297231" dbAc="MI:0469" db="intact"/>
</xref>
- <experimentList>
- <experimentDescription id="202">

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psi-mi/xml25

```
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  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:bp="http://www.biopax.org/release/biopax-level3.owl#"
  xmlns:owlmi="http://purl.org/obo/owl/MI#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:psimi="http://www.ebi.ac.uk/~intact/psimi.owl#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns="http://www.ebi.ac.uk/intact/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xml:base="http://www.ebi.ac.uk/intact/">
<owl:Ontology rdf:about="">
  <owl:imports rdf:resource="http://www.biopax.org/release/biopax-level3.owl"/>
</owl:Ontology>
<bp:MolecularInteraction rdf:about="http://purl.uniprot.org/intact/EBI-1639937">
  <bp:participant>
    <bp:Protein rdf:about="http://purl.uniprot.org/uniprot/Q9BXW9">
      <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
        >Q9BXW9</rdfs:label>
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  </bp:participant>
  <bp:participant>
    <bp:Protein rdf:about="http://purl.uniprot.org/uniprot/P51587">
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        >P51587</rdfs:label>
    </bp:Protein>
  </bp:participant>
  <bp:interactorType>
    <bp:InteractionVocabulary rdf:about="http://purl.org/obo/owl/MI#MI_0915">
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      <rdfs:label>physical association</rdfs:label>
    </bp:InteractionVocabulary>
  </bp:interactorType>
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    >P51587-Q9BXW9-1</bp:name>
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
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</bp:MolecularInteraction>
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  <bp:participant>
    <bp:Protein rdf:about="http://purl.uniprot.org/uniprot/Q9W157">
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        >Q9W157</rdfs:label>
    </bp:Protein>
  </bp:participant>
```

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:bp="http://www.biopax.org/release/biopax-level3.owl#"
  xmlns:owlmi="http://purl.org/obo/owl/MI#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:psimi="http://www.ebi.ac.uk/~intact/psimi.owl#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns="http://www.ebi.ac.uk/intact/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
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<rdf:Description rdf:about="http://purl.uniprot.org/intact/EBI-1639937">
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/Q9BXW9"/>
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/P51587"/>
  <bp:interactorType rdf:resource="http://purl.org/obo/owl/MI#MI_0915"/>
  <bp:name rdf:datatype="http://www.w3.org/2001/XMLSchema#string">P51587-Q9BXW9-1</bp:name>
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string">P51587-Q9BXW9-1</rdfs:label>
  <rdf:type rdf:resource="http://www.biopax.org/release/biopax-level3.owl#MolecularInteraction"/>
</rdf:Description>
<rdf:Description rdf:about="http://purl.uniprot.org/intact/EBI-260802">
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/Q9W157"/>
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/O77135"/>
  <bp:interactorType rdf:resource="http://purl.org/obo/owl/MI#MI_0915"/>
  <bp:name rdf:datatype="http://www.w3.org/2001/XMLSchema#string">O77135-Q9W157-1</bp:name>
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string">O77135-Q9W157-1</rdfs:label>
  <rdf:type rdf:resource="http://www.biopax.org/release/biopax-level3.owl#MolecularInteraction"/>
</rdf:Description>
<rdf:Description rdf:about="http://purl.uniprot.org/intact/EBI-2461712">
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/P51587"/>
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/O94776"/>
  <bp:interactorType rdf:resource="http://purl.org/obo/owl/MI#MI_0914"/>
  <bp:name rdf:datatype="http://www.w3.org/2001/XMLSchema#string">O94776-P51587-1</bp:name>
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string">O94776-P51587-1</rdfs:label>
  <rdf:type rdf:resource="http://www.biopax.org/release/biopax-level3.owl#MolecularInteraction"/>
</rdf:Description>
<rdf:Description rdf:about="http://purl.uniprot.org/uniprot/O77135">
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string">O77135</rdfs:label>
  <rdf:type rdf:resource="http://www.biopax.org/release/biopax-level3.owl#Protein"/>
</rdf:Description>
<rdf:Description rdf:about="http://purl.uniprot.org/intact/EBI-930908">
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/O81303"/>
  <bp:participant rdf:resource="http://purl.uniprot.org/uniprot/P94102"/>
  <bp:interactorType rdf:resource="http://purl.org/obo/owl/MI#MI_0915"/>
  <bp:name rdf:datatype="http://www.w3.org/2001/XMLSchema#string">P94102-O81303-1</bp:name>
  <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string">P94102-O81303-1</rdfs:label>
  <rdf:type rdf:resource="http://www.biopax.org/release/biopax-level3.owl#MolecularInteraction"/>
</rdf:Description>
```

```

@prefix :      <http://www.ebi.ac.uk/intact/> .
@prefix rdfs:  <http://www.w3.org/2000/01/rdf-schema#> .
@prefix bp:    <http://www.biopax.org/release/biopax-level3.owl#> .
@prefix xsd:   <http://www.w3.org/2001/XMLSchema#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdf:   <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owlmi: <http://purl.org/obo/owl/MI#> .
@prefix psimi: <http://www.ebi.ac.uk/~intact/psimi.owl#> .

```

```

<http://purl.uniprot.org/intact/EBI-1639937>
  a      bp:MolecularInteraction ;
  rdfs:label "P51587-Q9BXW9-1"^^xsd:string ;
  bp:interactorType owlmi:MI_0915 ;
  bp:name "P51587-Q9BXW9-1"^^xsd:string ;
  bp:participant <http://purl.uniprot.org/uniprot/Q9BXW9> , <http://purl.uniprot.org/uniprot/P51587> .

```

```

<http://purl.uniprot.org/intact/EBI-260802>
  a      bp:MolecularInteraction ;
  rdfs:label "O77135-Q9W157-1"^^xsd:string ;
  bp:interactorType owlmi:MI_0915 ;
  bp:name "O77135-Q9W157-1"^^xsd:string ;
  bp:participant <http://purl.uniprot.org/uniprot/O77135> , <http://purl.uniprot.org/uniprot/Q9W157> .

```

```

<http://purl.uniprot.org/intact/EBI-2461712>
  a      bp:MolecularInteraction ;
  rdfs:label "O94776-P51587-1"^^xsd:string ;
  bp:interactorType owlmi:MI_0914 ;
  bp:name "O94776-P51587-1"^^xsd:string ;
  bp:participant <http://purl.uniprot.org/uniprot/O94776> , <http://purl.uniprot.org/uniprot/P51587> .

```

```

<http://purl.uniprot.org/uniprot/O77135>
  a      bp:Protein ;
  rdfs:label "O77135"^^xsd:string .

```

```

<http://purl.uniprot.org/intact/EBI-930908>
  a      bp:MolecularInteraction ;
  rdfs:label "P94102-O81303-1"^^xsd:string ;
  bp:interactorType owlmi:MI_0915 ;
  bp:name "P94102-O81303-1"^^xsd:string ;
  bp:participant <http://purl.uniprot.org/uniprot/O81303> , <http://purl.uniprot.org/uniprot/P94102> .

```

```

<http://purl.uniprot.org/intact/EBI-931053>
  a      bp:MolecularInteraction ;
  rdfs:label "O81303-Q9XIR8-1"^^xsd:string ;
  bp:interactorType owlmi:MI_0407 ;
  bp:name "O81303-Q9XIR8-1"^^xsd:string ;
  bp:participant <http://purl.uniprot.org/uniprot/Q9XIR8> , <http://purl.uniprot.org/uniprot/O81303> .

```

Where are the services?

THE REGISTRY

The PSICQUIC Registry

- It contains a **list of the PSICQUIC services** from different providers.
- It is a **web service** itself, and it can be accessed remotely using REST.
- Information can be found about the services, such as the URLs to use, number of interactions provided, versioning, etc.
- The Registry can be found at:
<http://www.ebi.ac.uk/Tools/webservices/psicquic/registry/registry?action=STATUS>

PSICQUIC Registry

Name	Active	Interactions	Version	SOAP URL	REST URL	REST Example	Restricted	Tags	Comments
APID	YES	416,124	1.1.5	http://cicblade.dep.usal.es	http://cicblade.dep.usal.es	Example	NO	protein-protein imported spoke clustered	
ChEMBL	YES	581,858	1.1.0	http://www.ebi.ac.uk/Tools	http://www.ebi.ac.uk/Tools	Example	NO	smallmolecule-protein internally curated mimix curation spoke evidence	
InnateDB	YES	9,909	1.1.5	http://imex.innatedb.com/	http://imex.innatedb.com/	Example	NO	protein-protein internally curated spoke rapid curation evidence	
DIP	YES	20,769	1.1.6-SNAPSHOT	http://imex.mbi.ucla.edu/p	http://imex.mbi.ucla.edu/p	Example	NO	protein-protein internally curated imex curation mimix curation spoke evidence	
BioGrid	NO	337,957	1.1.6-SNAPSHOT	http://tyerslab.bio.ed.ac.uk	http://tyerslab.bio.ed.ac.uk	Example	NO	protein-protein internally curated rapid curation spoke evidence	
MINT	YES	124,473	1.1.5	http://mint.bio.uniroma2.it/	http://mint.bio.uniroma2.it/	Example	NO	protein-protein internally curated imex curation mimix curation spoke evidence	
IntAct	YES	228,262	1.1.6-SNAPSHOT	http://www.ebi.ac.uk/Tools	http://www.ebi.ac.uk/Tools	Example	NO	protein-protein smallmolecule-protein nucleicacid-protein	

More than **14,000,000** binary interactions available
from **13** different sources

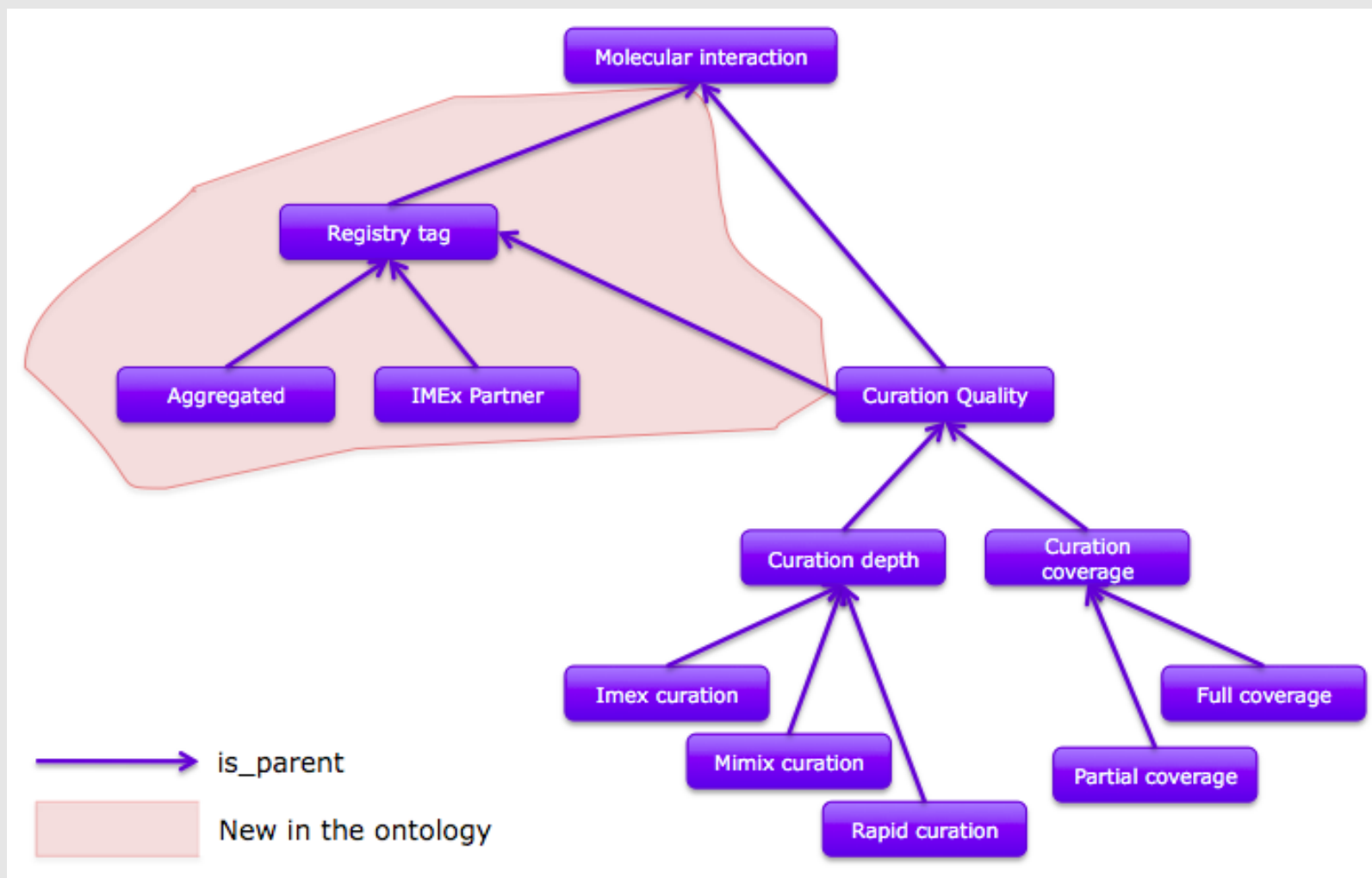
iRefIndex	YES	404,453	1.1.5	http://biotin.uio.no:8080/p/	http://biotin.uio.no:8080/p/	Example	NO	protein-protein	
---------------------------	-----	---------	-------	---	---	-------------------------	----	-----------------	--

PSICQUIC: Registry

<http://www.ebi.ac.uk/Tools/webservices/psicquic/registry/registry?action=STATUS>

Registry Tagging system

- The registry classifies the different services with tags.



Querying the registry

- The registry can be accessed with the browser or programmatically (it is a **web service**).
- Instructions on how to use it can be found here:
 - <http://code.google.com/p/psicquic/wiki/Registry>
- Querying by tags is work in progress at the moment (it will be explained tomorrow).

Examples

REAL APPLICATIONS

PSICQUIC Applications

- It is clear the value of PSICQUIC to application developers, so indirectly the end-user is benefited too.
- Reduces the time to implement an application that uses data from the different provides, as all of them are accessed the same way.
- Some of the applications:
 - Cytoscape 2.7.x
 - PSICQUIC View
 - Envision2
 - PSICQUIC Client for Android
 - **GMOD client?**

PSICQUIC View

Search: [Fields »](#)

[ChEMBL \(0\)](#)
[DIP \(0\)](#)
[IntAct \(89\)](#)
[MINT \(22\)](#)
[MPIDB \(0\)](#)
[MatrixDB \(0\)](#)
[Reactome \(0\)](#)
[Reactome-Functional-Interactions \(29\)](#)
[iRefIndex \(31\)](#)

Export: [MITAB 2.5](#) [PSI-XML 2.5.4](#)

	Name molecule A	Links molecule A	Name molecule B	Links molecule B	Alt. identifiers molecule A	Alt. identifiers molecule B	Aliases molecule A	Aliases molecule B	Species molecule A	Species molecule B
1	P51587 ; EBI-79792		EBI-539895		FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)	-1
2	P51587 ; EBI-79792		Q9BXW9-2 ; EBI-596878		FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human	Q9BXW9-2	BRCA2		Human (9606)	Human (9606)
3	P51587 ; EBI-79792		Q9BXW9-2 ; EBI-596878		FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human	Q9BXW9-2	BRCA2		Human (9606)	Human (9606)
4	P51587 ; EBI-79792		Q9BXW9-2 ; EBI-596878		FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human	Q9BXW9-2	BRCA2		Human (9606)	Human (9606)
5	CHEBI:15422 ; EBI-1108845		P51587 ; EBI-79792		atp	FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)
6	CHEBI:15422 ; EBI-1108845		P51587 ; EBI-79792		atp	FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)
7	CHEBI:15422 ; EBI-1108845		P51587 ; EBI-79792		atp	FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)
8	CHEBI:15422 ; EBI-1108845		P51587 ; EBI-79792		atp	FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)
9	CHEBI:15422 ; EBI-1108845		P51587 ; EBI-79792		atp	FANCD1 ; FACD ; Fanconi anemia group D1 protein ; brca2 human		BRCA2		Human (9606)
10	Q9FL96 ; EBI-931034		Q7Y1C4 ; EBI-930753		At5g45010 ; K21C13.20 ; sem12 arath	At5g01630 ; q7y1c4 arath		brca2b	Mouse-ear cress (3702)	Mouse-ear cress (3702)
11	Q9XIR8 ; EBI-931045		Q7Y1C4 ; EBI-930753		At1g64750 ; F13O11.6 ; sem11 arath	At5g01630 ; q7y1c4 arath		brca2b	Mouse-ear cress (3702)	Mouse-ear cress (3702)
12	Q9XIR8 ; EBI-931045		Q7Y1C4 ; EBI-930753		At1g64750 ; F13O11.6 ; sem11 arath	At5g01630 ; q7y1c4 arath		brca2b	Mouse-ear cress (3702)	Mouse-ear cress (3702)
13	Q9FL96 ; EBI-931034		Q7Y1C4 ; EBI-930753		At5g45010 ; K21C13.20 ; sem12 arath	At5g01630 ; q7y1c4 arath		brca2b	Mouse-ear cress (3702)	Mouse-ear cress (3702)

<http://www.ebi.ac.uk/Tools/webservices/psicquic/view/>

Split hand/foot deleted protein 1: dss1 human

Molecular Interactions for Dataset: set4

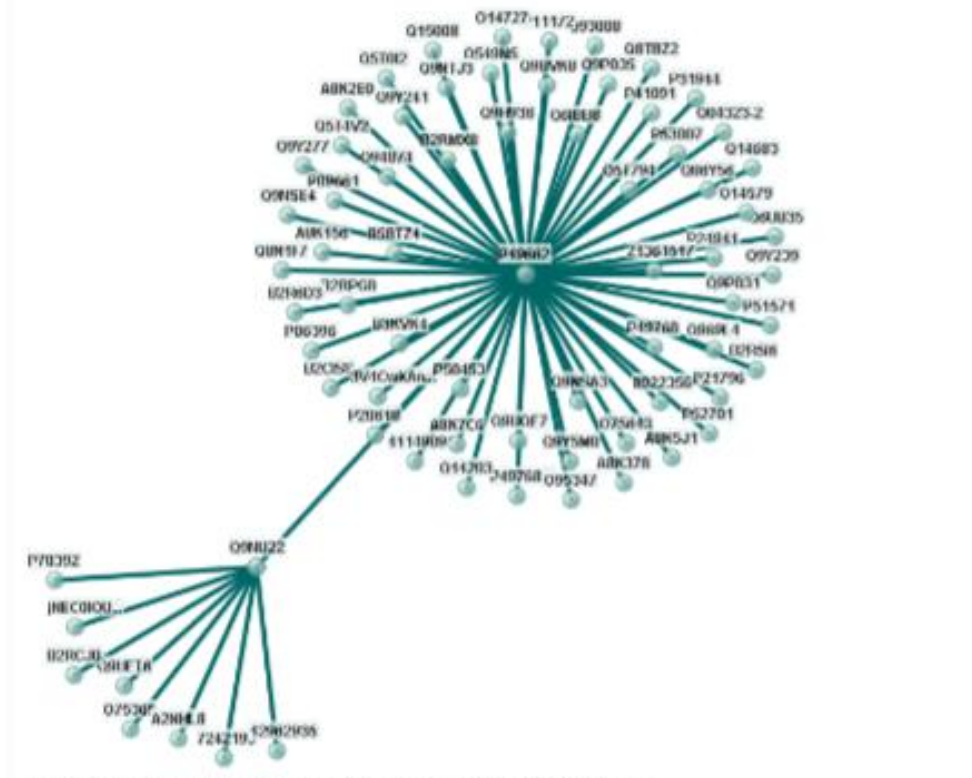
Envi2 makes use of [PSICQUIC](#) to retrieve molecular interactions, specially protein interactions. PSICQUIC is an effort from the [EMBL Proteomics Group](#) to access to molecular interaction databases programmatically.

Molecular interactions with at least one Protein from the query set:

Interactor A	Interactor B	Interaction IDs	Interaction Database	Pubmed IDs
P49862	P54981	014519	REFINDEX	17352891
P49862	014519	014519	REFINDEX	17352891
P49862	004874	004874	REFINDEX	17352891
P49862	069100	069100	REFINDEX	17352891
P49862	0114981	0114981	REFINDEX	17352891
P49862	P52798	052798	REFINDEX	17352891
P49862	054085	054085	REFINDEX	17352891
P49862	P05396	005396	REFINDEX	17352891
P49862	062205	062205	REFINDEX	17352891
P49862	062132	062132	REFINDEX	17352891
P49862	061891	061891	REFINDEX	17352891
P49862	2128157	2128157	REFINDEX	17352891
P49862	054022	054022	REFINDEX	17352891
P49862	072882	072882	REFINDEX	17352891
P49862	054521	054521	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	060582	060582	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891
P49862	051794	051794	REFINDEX	17352891
P49862	059195	059195	REFINDEX	17352891

61	P49862	P52811	052811	REFINDEX	17352891
62	P49862	059195	059195	REFINDEX	17352891
63	P49862	051794	051794	REFINDEX	17352891
64	P49862	059195	059195	REFINDEX	17352891
65	P49862	051794	051794	REFINDEX	17352891
66	P49862	059195	059195	REFINDEX	17352891
67	P49862	051794	051794	REFINDEX	17352891
68	P49862	059195	059195	REFINDEX	17352891
69	P49862	051794	051794	REFINDEX	17352891
70	P49862	059195	059195	REFINDEX	17352891
71	P49862	051794	051794	REFINDEX	17352891

Download table (1 row) | Print Table | Report | Copy



No negative results (no Proteins with no associated interaction are included in your dataset).

Envision2
As an example of PSICQUIC integration

Powerful queries with the Molecular Interaction Query Language

MIQL

Common Query Language

- The Molecular Interactions Query Language (MIQL) allows more powerful and flexible queries.
- It is the default query syntax for PSIQCUIIC.
- Designed for fast and effective searches on PSI-MI TAB files.
- All fields (columns) can be searched with specific queries.
- MIQL is a consensus between the different databases, so you should be able to use the same query across different repositories.

MIQL syntax reference

- The MIQL syntax is based on the Lucene syntax[1]. A query is broken into terms and operators:
 - Terms: single words or phrases (group of words surrounded by quotes). E.g. `brca2 AND "pull down"`
 - Fields: search in specific columns. E.g. `brca2 AND species:human`
 - Term modifiers: wildcard searches, fuzzy searches, proximity and range searches. E.g. `brc*`
 - Operands: OR (or space), AND, NOT, +, -. E.g. `brca2 AND rpa1 / brca2 NOT mouse / +brca2 -mouse -expansion:spoke`
 - Grouping and field grouping: `brca2 AND (mouse "in vitro")`

[1] <http://lucene.apache.org/java/docs/queryparsersyntax.html>

DIY

HOW TO CREATE YOUR SERVICE

Simplest recipe to implement PSICQUIC



- Ingredients:
 - PSI-MITAB compliant file.
 - Subversion: to get the source code.
 - Maven: to run the scripts and start the service.
- Steps:
 - Generate the MITAB compliant file.
 - Get the Reference Implementation (RI):
 - <http://code.google.com/p/psicquic/>
 - Run the script to index the file.
 - Start the service with the script provided .

Lots of possibilities

CURRENT AND FUTURE WORK

Future developments

- Smart PSICQUICs: Identification and removal of redundancy
 - Merger and Cluster PSICQUIC services
- PSICQUIC 2.0
 - Overcome the current limitations and many fancy features:
 - Queries using CV terms not possible in the reference implementation (it is possible in IntAct).
 - PSI-MI XML is created from the MITAB, so no n-nary interactions.
 - New features:
 - Redundancy detection mechanism. ROG/RIG ids by default.
 - Built from PSI-MI XML, so complex data available.
- A GMOD component?



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& former colleagues

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The Proteomics Services Team
Hinxton Sequence Forum

PSICQUIC

