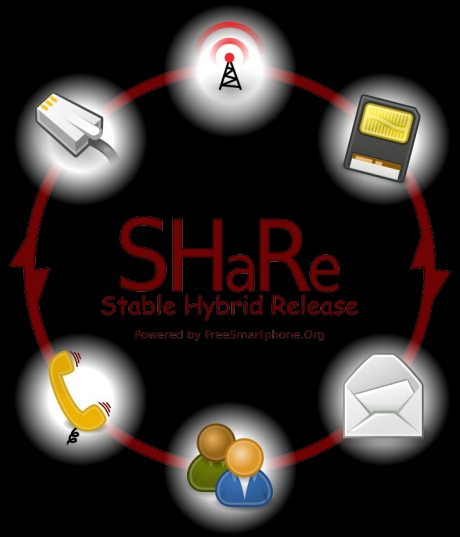
Ologicd

A “DBus-enabled logic inference server”

FSO|SHR '09
Users & Developers Convention

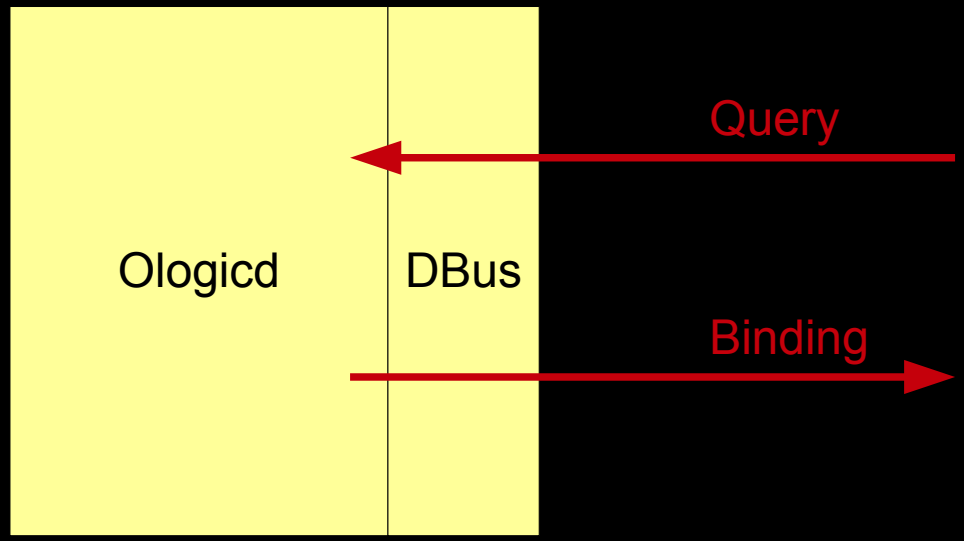


Ologicd – Summary

- The initial idea
- Inference use cases
- About XSB
- About Flora-2
- Architecture
- Expected logic frameworks
- Current state
- Conclusion

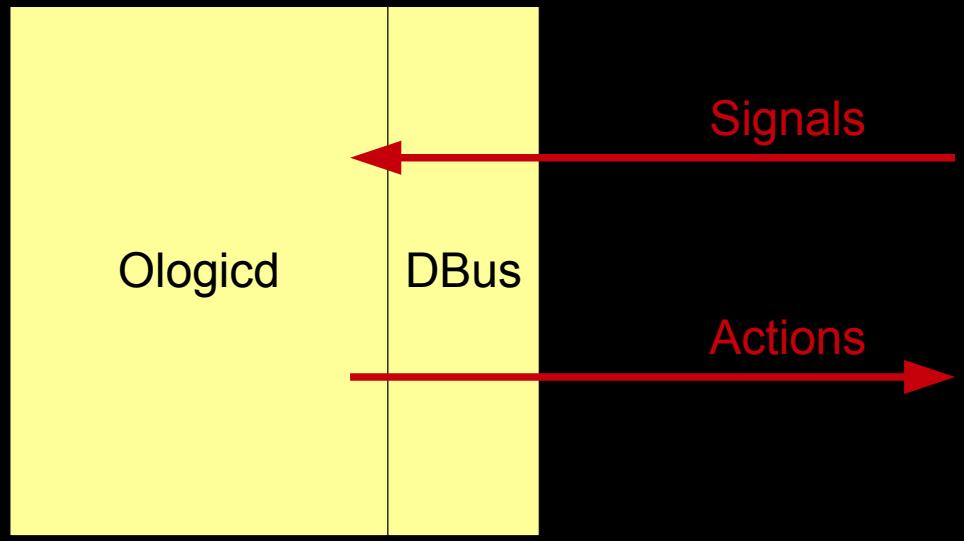
Ologicd – The initial idea "DBus logic inference server" (1/3)

- Serves deductions
  - Give it a query formula, it returns its truth conditions
  - This may imply querying additional DBus servers



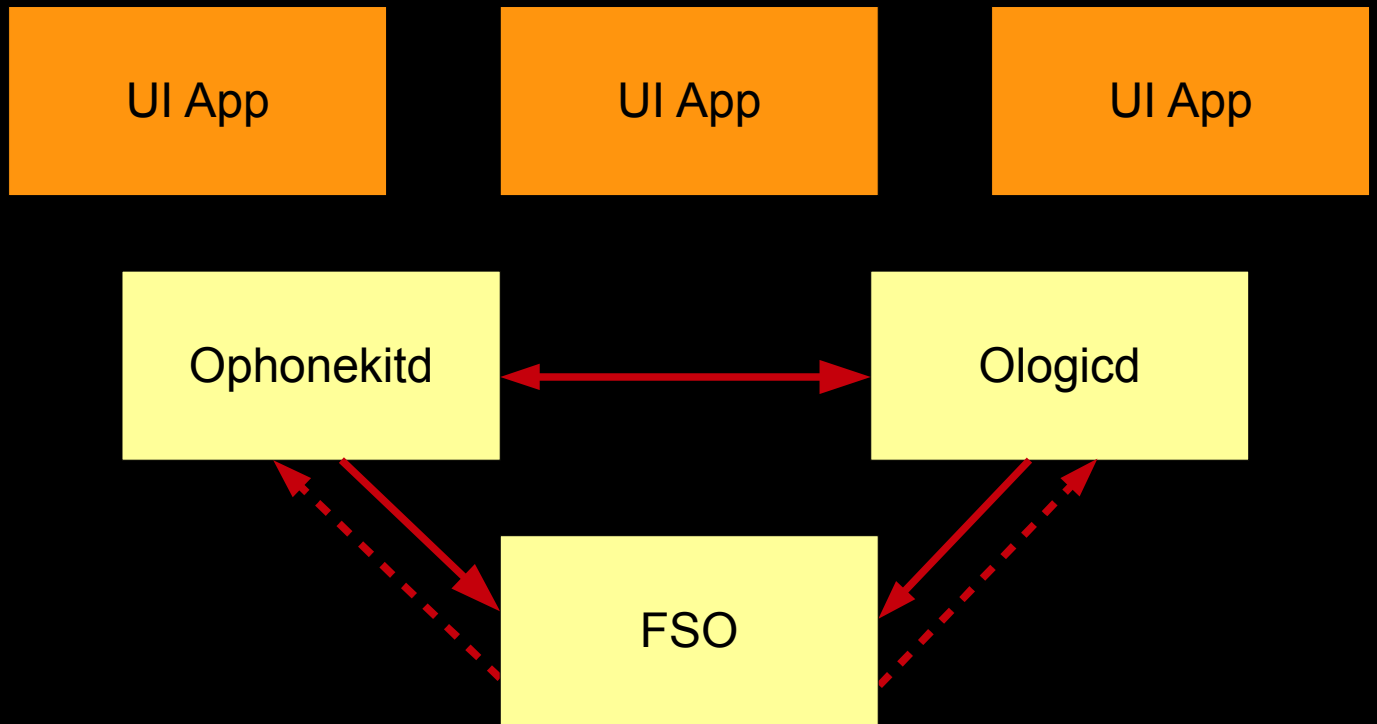
Ologicd – The initial idea "DBus logic inference server" (2/3)

- Stays aware of system state changes
  - Registers to signals, and apply a specific query
  - May imply triggering actions, or firing other signals



Ologicd – The initial idea "DBus logic inference server" (3/3)

- Collaborator in a DBus network
  - Its clients are UI apps and ophonekitd
  - It is a client of frameworkd and ophonekitd
  - ophonekitd and ologicd may be mutual clients



Ologicd – The initial idea
Agents

- Domain-specific inference sources
- Autonomous execution (in its own thread)
- May collaborate with other agents
- Perfectly maps to the Component concept

Ologicd – Inference use cases Data mediation

- Front-end over opimd
  - Managing complex queries in one method call
- Filtering content in some situations
  - Use context to serve adhoc content
    - profile, activity, location, ...
  - May help in better completion and “smart” views
- Data reconciliation
  - Integrating|correlating data from multiple sources
    - SIM, desktop PIM software, received mails and SMS

Ologicd – Inference use cases Rule processing

- Modifying phone behaviour
  - Use context to react differently
    - profile, activity, location, …
  - May help in call protocol selection
- Using call patterns
  - Recognize contacts and call differently
    - “Beep me, I'll call you free of charge”

Ologicd – About XSB Overview

- Prolog interpreter
- Tabled predicates
- Multi-thread engine
- Provides loads of Prolog modules
  - Database access/mapping, …
- Funky build system
  - Automake but not Autoconf (but very portable)
- No shared library
  - Provides an xsb.o

Ologicd – About Flora-2 Overview

- Frame Logic engine
- Syntax very close to standard F-Logic
- Implemented in Prolog/XSB
- Transaction Logic support

Ologicd – About Flora-2 Frame Logic

- Brings object-oriented paradigm to logic
- Supports
  - Object identity
  - Inheritance
  - Polymorphism
  - Encapsulation
- Declarative object-oriented formalism

Ologicd – About Flora-2
Some examples

```
John[name → 'John Doe', phones → {1234567, 76442211},
        children → {Bob, Mary}
].
```

- Structures can be nested

```
Jane[spouse → John[address → '123 Main st.']].
```

- Class membership with :
- Subclass relationship with ::

```
John:Person.
Alice:Student.
Student::Person.

Person:EntityType.
Student:EntityType.
```

Ologicd – About Flora-2 Some examples

- Variables starts with ?
- Method definitions

```
?P[ageAsOf(?Year) → ?Age] :-
      ?P:Person, ?P[born → ?B], ?Age is ?Year–?B.
```

  - Attributes are methods without arguments
- Queries

```
?- John[born → ?Y,  children → ?C], ?C[born → ?B],  ?B > ?Y+30.

?- John[ageAsOf(?Y) → 30, children → ?C], ?C[born → ?B],  ?B>?Y.
```

Ologicd – About Flora-2 Transaction Logic

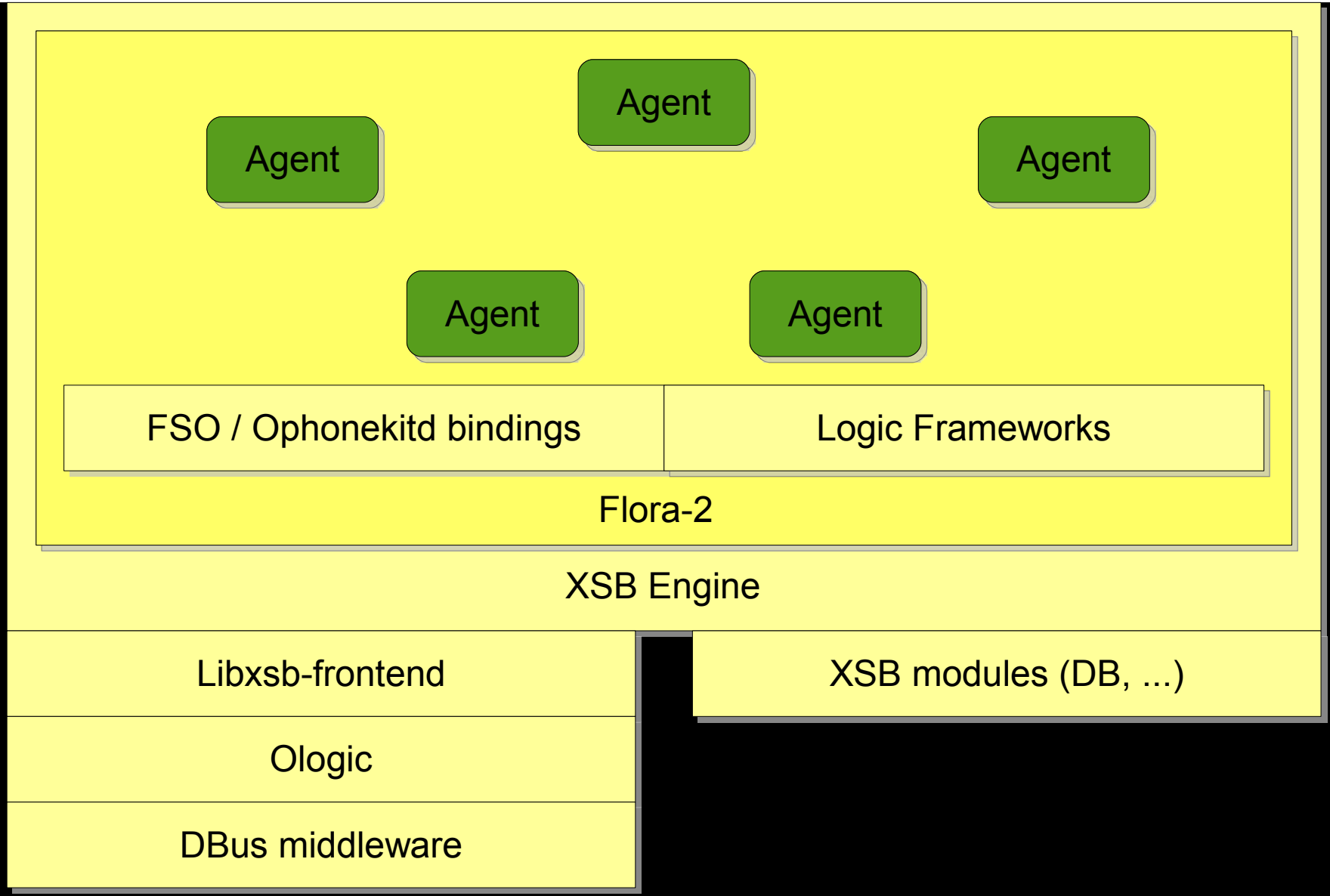
- Updates in usual logic programming
  - `assert/retract` have no logical semantics
  - Can't be backtracked

```
?- assert(p), q.
```

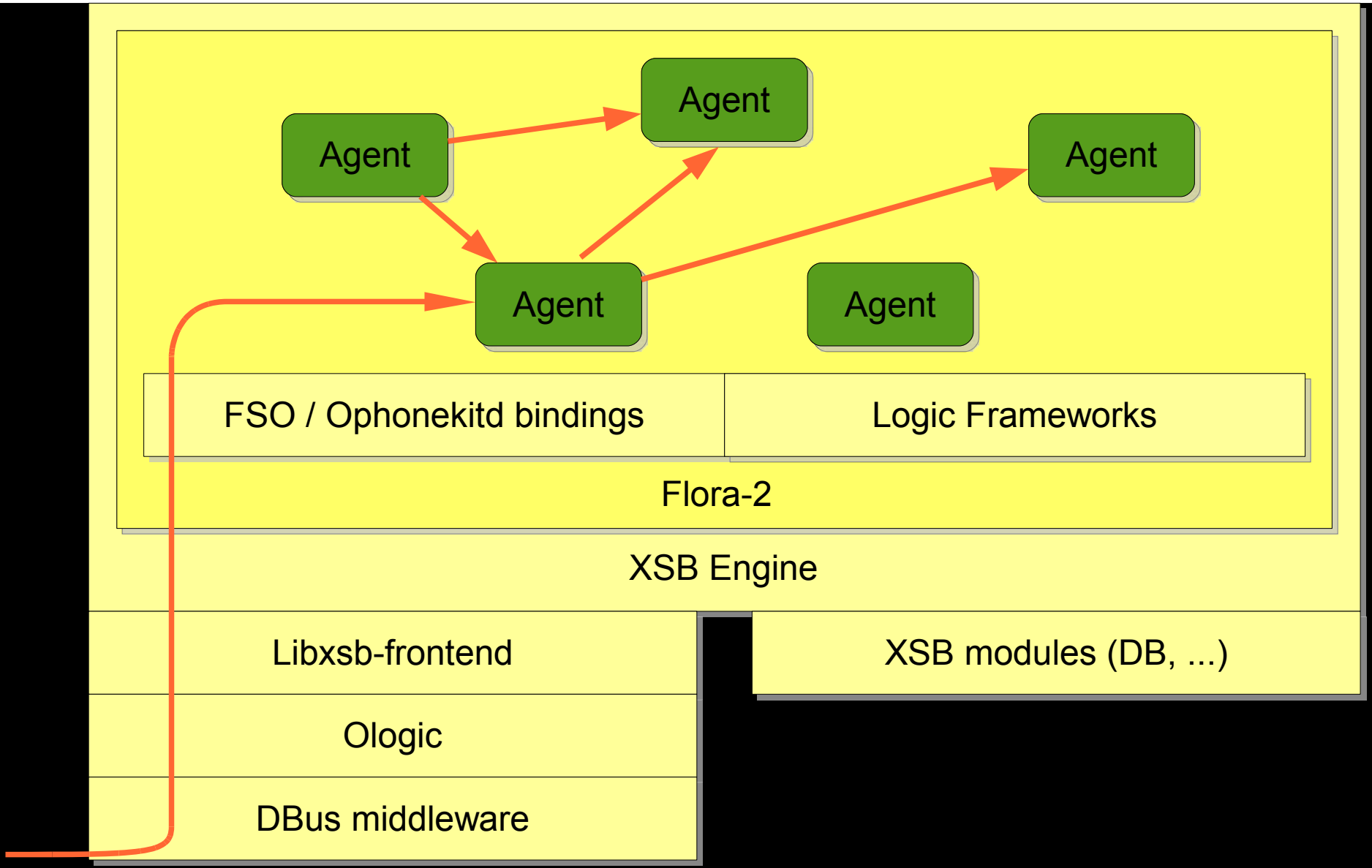
    - If q is false, p stays.

- Transaction Logic
  - `t_insert{fact}/t_delete{fact}` are transacted
  - Can be backtracked

Ologicd – Architecture Overview



Ologicd – Architecture Overview



Ologicd – Architecture
Libxsb-frontend

- Vala-oriented C wrapper
- Full management of XSB threads
- Full manipulation of Prolog terms
- Encapsulate xsb.o

Ologicd – Architecture
Access to phone features

- Needs access to UI phone features
  - Rejecting and ignoring a call
  - Routing a call to another destination
  - ...

Ologicd – Logic Frameworks Web crawling

- Crawls the web / semantic web
  - Pull RDF data
  - Extract from HTML pages
- Gives more facts to deduce interesting things
- Typical use case
  - Pizzerias around

Ologicd – Logic Frameworks Trust network

- User specify how much he trusts some others

- Others provide agents
- Others provides rule and/or fact sets
- Others provides their own trust assertions

- This builds a trust network
- Typical use case
  - Best pizzerias around

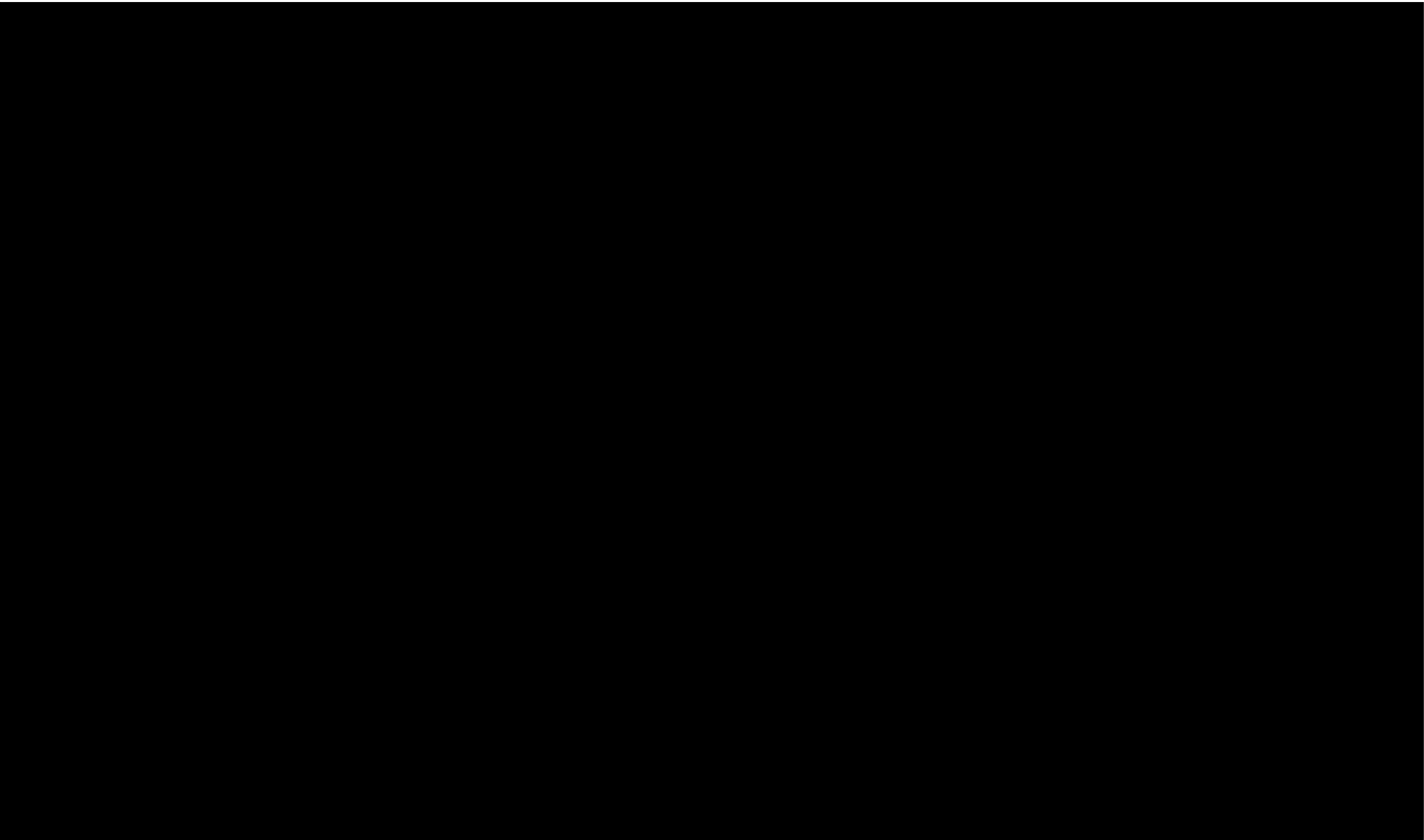
Ologicd – Logic Frameworks Proof builder

- Usually, give a query and get some bindings
- Proof Builder
  - Give the query and resulting bindings
  - Get the tree of rules to go from query to bindings
- Typical use case
  - Best pizzeria around

Ologicd – Current state

- Done
  - Libxsb-frontend
  - Ologicd
- To do
  - Bind FSO / Ophonekitd APIs in Flora-2
  - Wrap Flora-defined agents as Modulo components
  - Implement the Logic Frameworks

Ologicd – Conclusion



Ologicd – Resources

- XSB:
  http://xsb.sourceforge.net
- Flora-2:
  http://flora.sourceforge.net
- Libxsb-frontend:
  http://git.shr-project.org/git/?p=libxsb-frontend.git
- Ologicd:
  http://trac.shr-project.org/trac/wiki/Ologicd
- Frame Logic:
  http://flora.sourceforge.net/aboutTR.php
- Transaction Logic:
  http://flora.sourceforge.net/aboutTR.php