Integrating ASTD in the RODIN platform

RODIN U&DW 2010 - Jérémy Milhau
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What does ASTD mean ?

ASTD

stands for **Algebraic State Transition Diagram**

ASTD

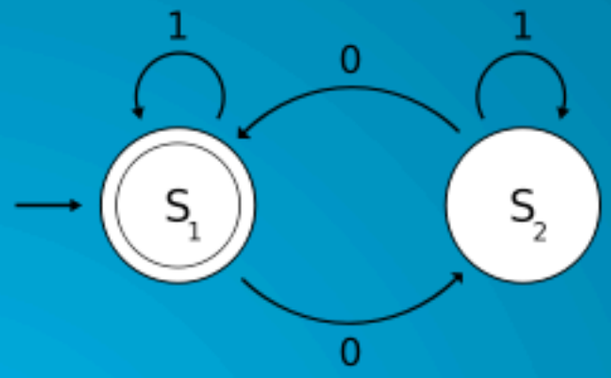
Automata

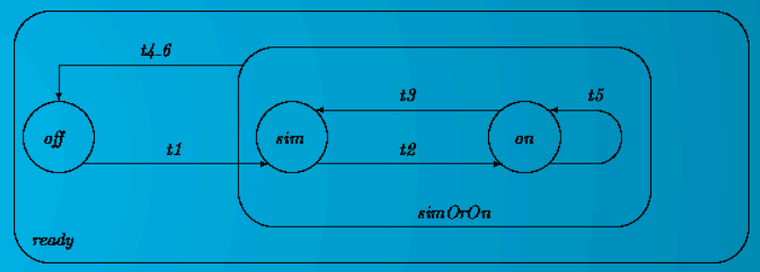
+

Harel's Statecharts

+

Process Algebra





$$
\begin{array}{lcc}
Proc & ::= & STOP \\
 & | & SKIP \\
 & | & e \rightarrow Proc \\
 & | & Proc \,\Box\, Proc \\
 & | & Proc \,\sqcap\, Proc \\
 & | & Proc \,|||\, Proc \\
 & | & Proc \,|[\{X\}]|\, Proc
\end{array}
$$

Who is behind ASTD ?

Marc Frappier
Université de Sherbrooke

Régine Laleau
Université Paris Est

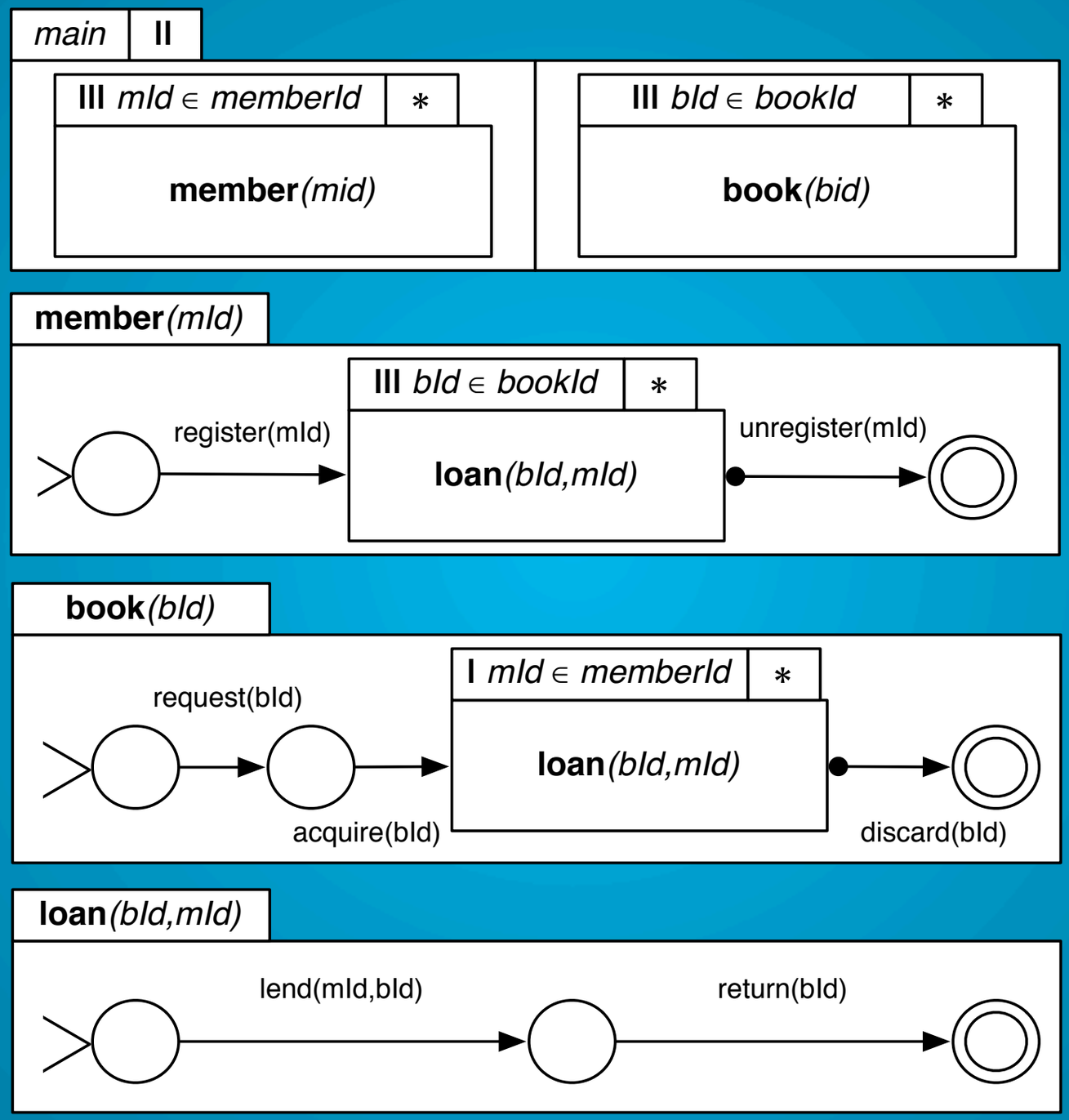
Frédéric Gervais
Université Paris Est

Richard St-Denis
Université de Sherbrooke

Benoît Fraikin
Université de Sherbrooke

What can I do with ASTD ?

I can model


main
II
III mId ∈ memberId
*
member(mid)
III bId ∈ bookId
*
book(bid)
member(mId)
III bId ∈ bookId
*
register(mId)
loan(bId,mId)
unregister(mId)
book(bId)
request(bId)
I mId ∈ memberId
*
loan(bId,mId)
acquire(bId)
discard(bId)
loan(bId,mId)
lend(mId,bId)
return(bId)

I can **execute**

*i*ASTD

interpreter for **Algebraic State Transition Diagram**

I can translate

ASTD 2 B

translation for Algebraic State Transition Diagram

to B and Event-B

How do I write an ASTD specification ?

iASTD reads that

```
(MEM0,<*;
        (QSYN0,<|[]|:;
                x;
                [1,4]-{3};
                {Lend};
                (AUT1 , <aut;
                         { (A1->elem),
                           (A2->elem),
                           (A3->elem)
                         };
                         { ((local,A1,A2),Lend,{},False),
                           ((local,A2,A3),Return(x),{},False),
                           ((local,A3,A1),Reinit(x),{},False)
                         };
                         {
                           A3
                         };
                         {
                         };
                         A1
                        >
                )
               >
);

(MAIN,<|[]|;
        {Lend,Return};
        (CALL1,<call;
                MEM0;
                {}
               >
        );
        (CALL2,<call;
                MEM0;
                {}
               >
        )
       >
```

eASTD

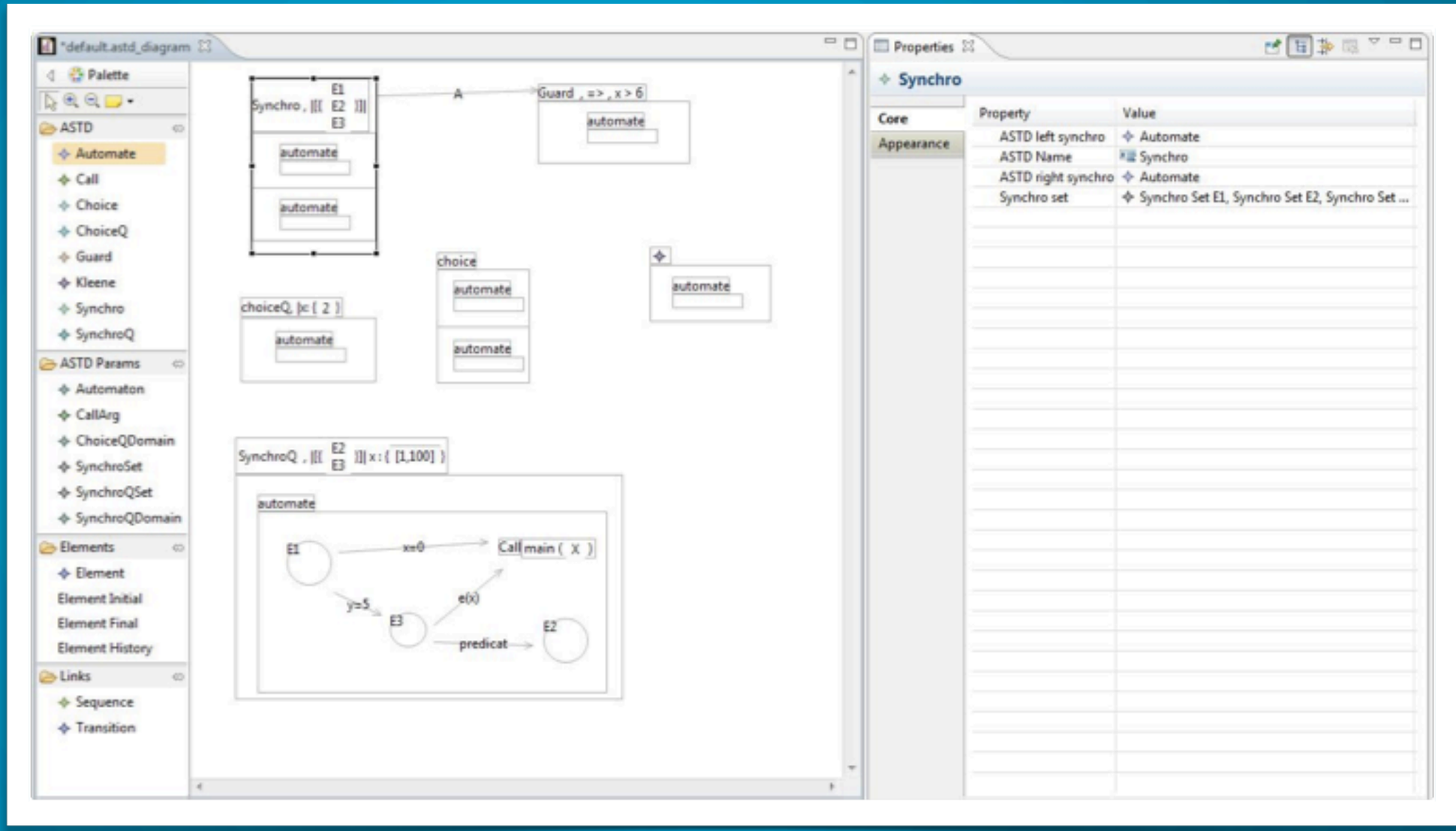
editor for **Algebraic State Transition Diagram**

based on **GMP / EMF / GEF**

eASTD

attributes

palettes



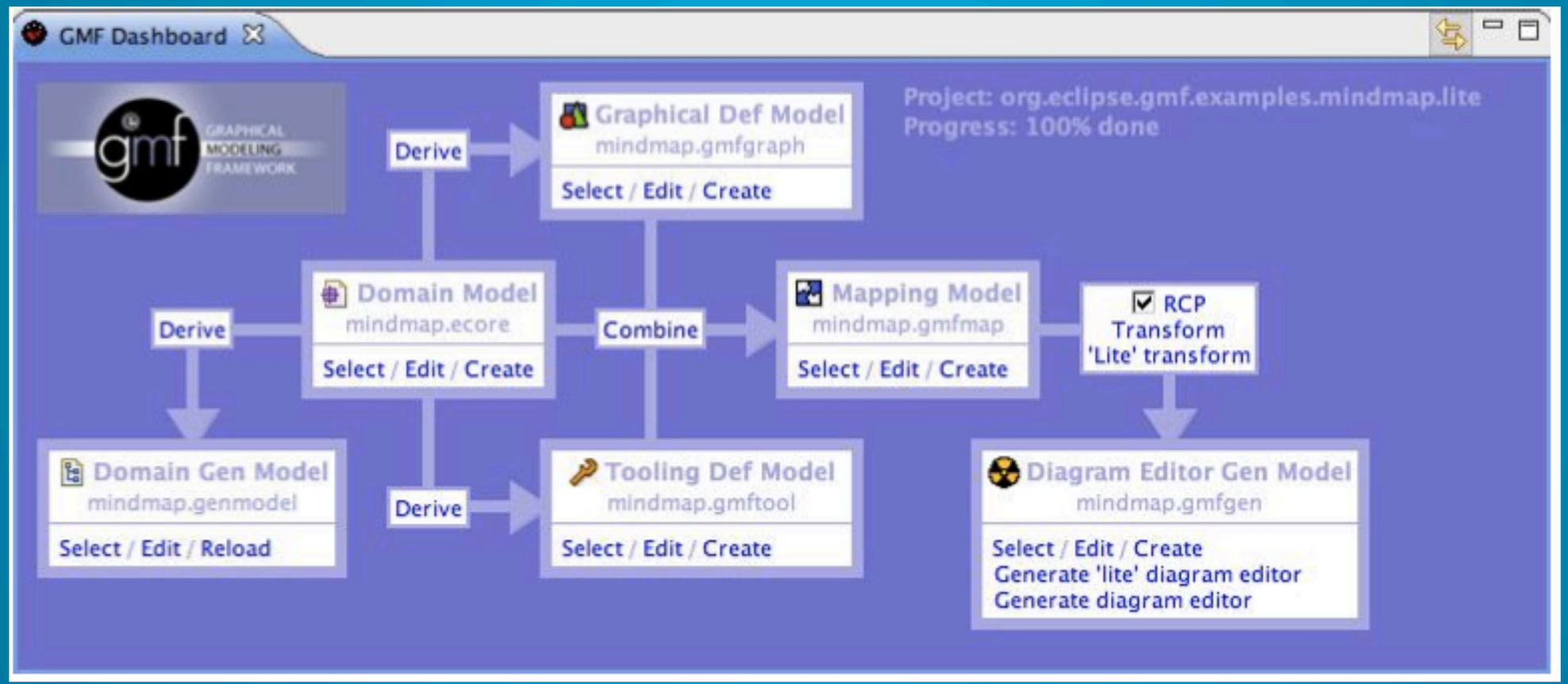
drawing zone

What are the difficulties of EMF/GMF plugin creation ?

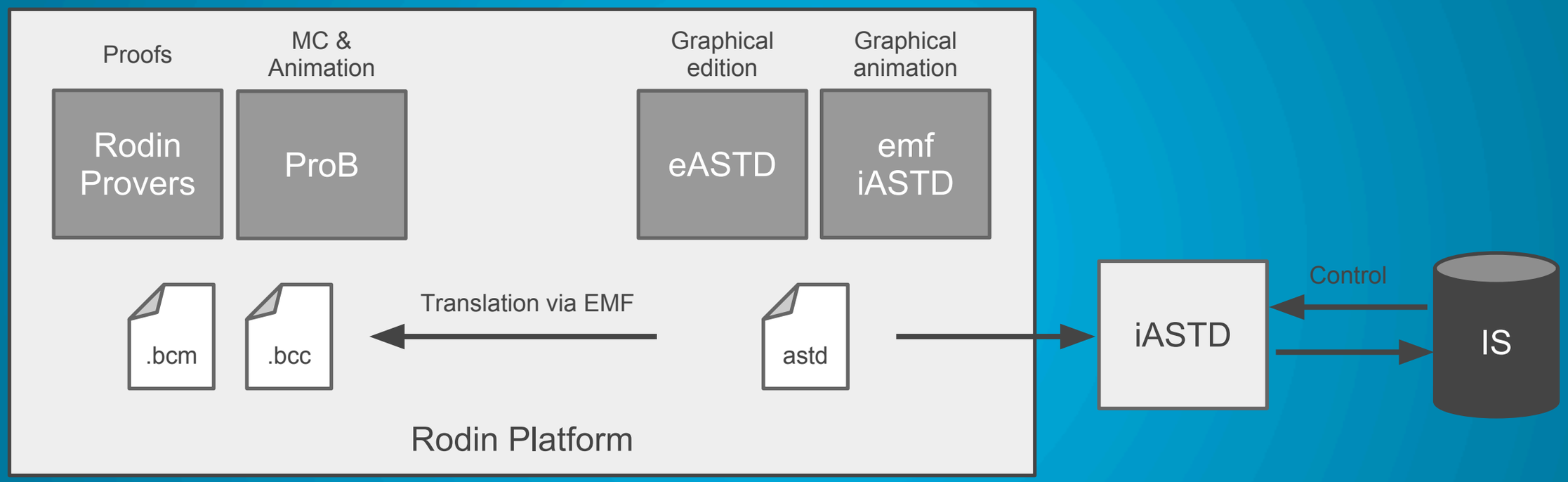
Difficulties of EMF/GMF

- EMF Meta-Model is different
- GMF needs help to find links in the Meta-Model
- New instance of Eclipse for each build of the tool
- Documentation is too light
- Update propagations are not always automatic

Difficulties of EMF/GMF



Why integrating ASTD into RODIN ?


Proofs
MC &
Animation
Graphical
edition
Graphical
animation
Rodin
Provers
ProB
eASTD
emf
iASTD
.bcm
.bcc
Translation via EMF
astd
iASTD
Control
IS
Rodin Platform

Thank you

< your question here >

2010 : 50 participants / 12 papers

Special issue of "Software: Practice and Experience"

Workshop on

tool building

in

formal methods

2011 : Second Meeting in Spring