

libSBML

&

SBML

Sarah Keating



SBML

A machine-readable format for representing computational models in systems biology



libSBML

- API library for working with SBML

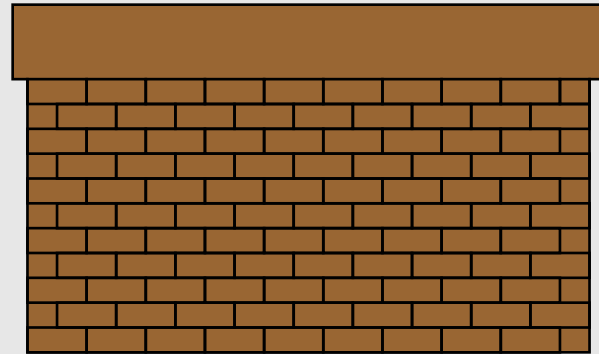
libSBML

- read



libSBML

- read
- create



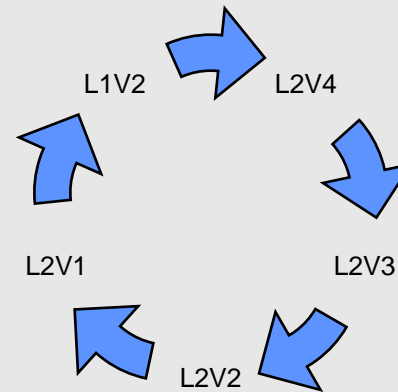
libSBML

- read
- create
- manipulate



libSBML

- read
- create
- manipulate
- convert between levels/versions



libSBML

- read
- create
- manipulate
- convert between levels/versions
- write



libSBML

- read
- create
- manipulate
- convert between levels/versions
- write
- validate



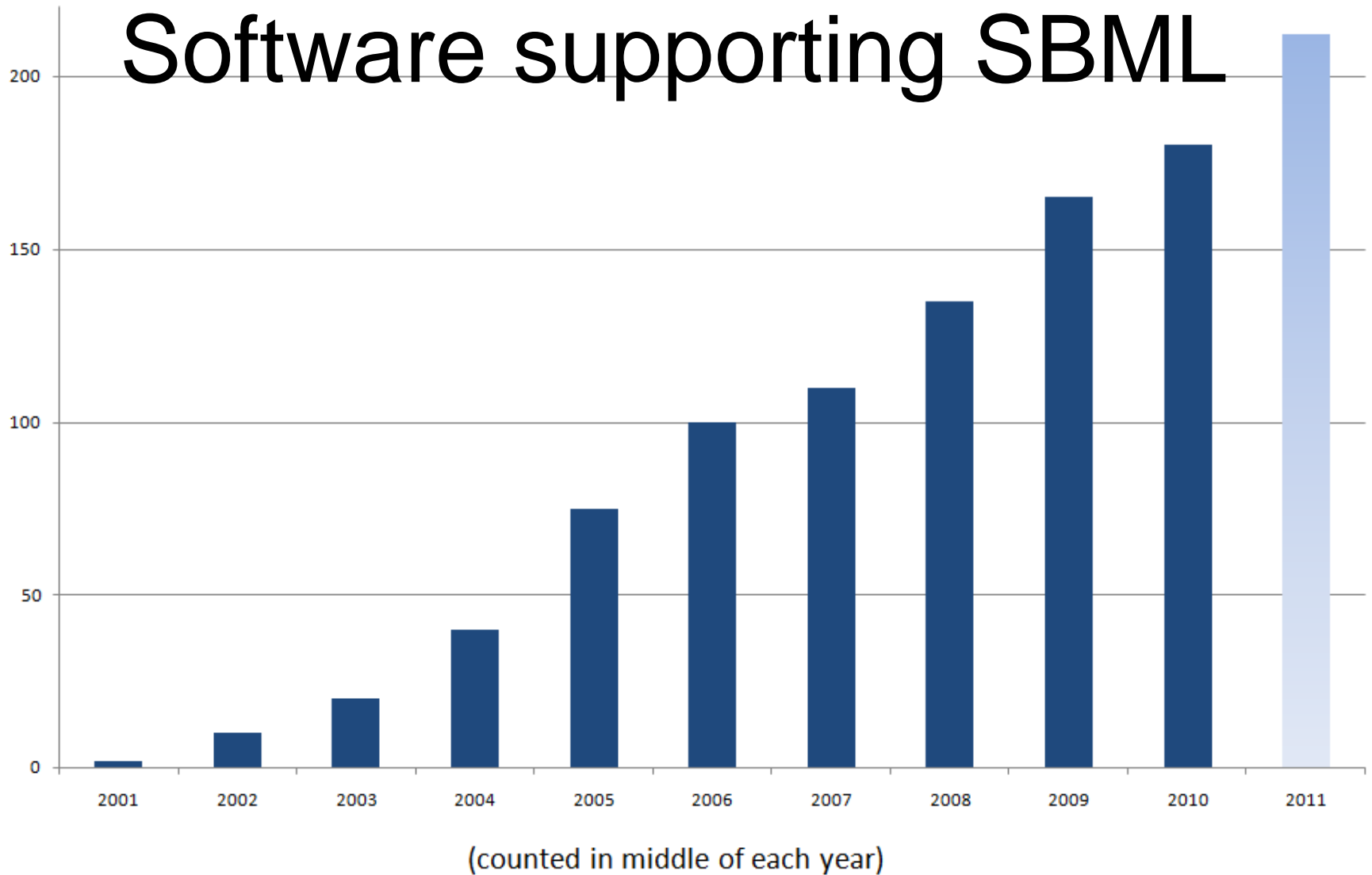
libSBML

- API library for working with SBML

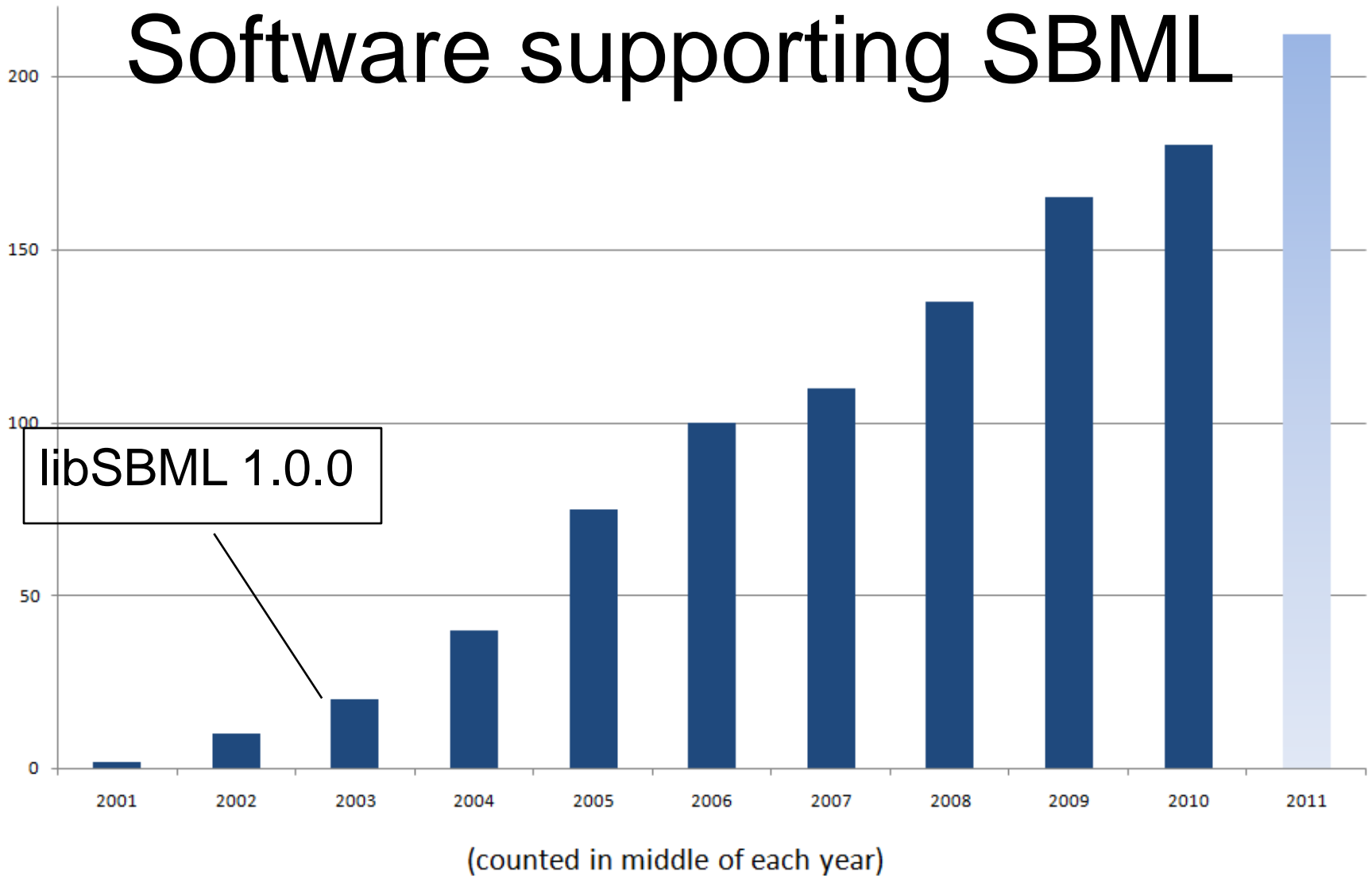


and the benefits to SBML

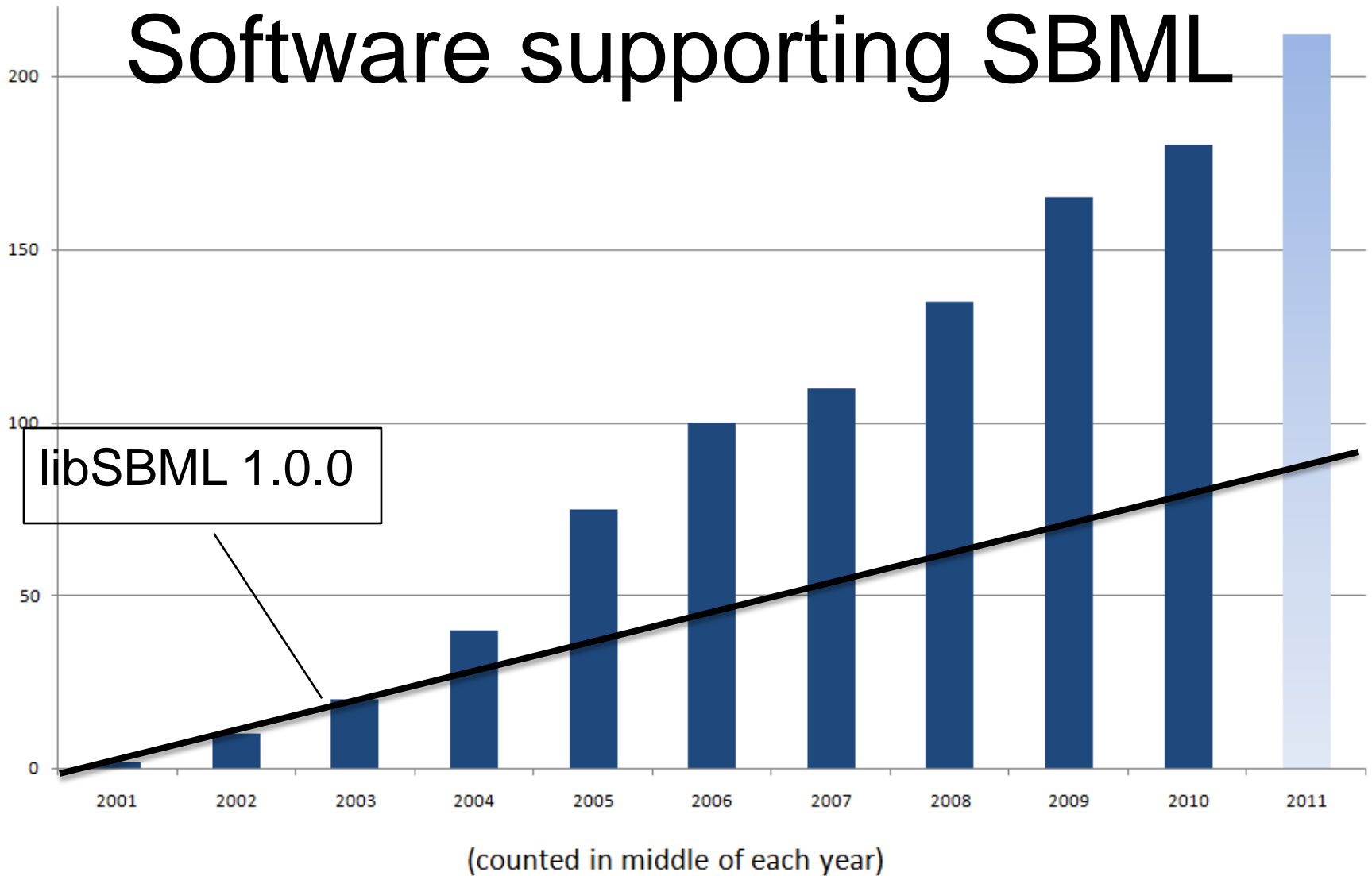
Software supporting SBML



Software supporting SBML



Software supporting SBML



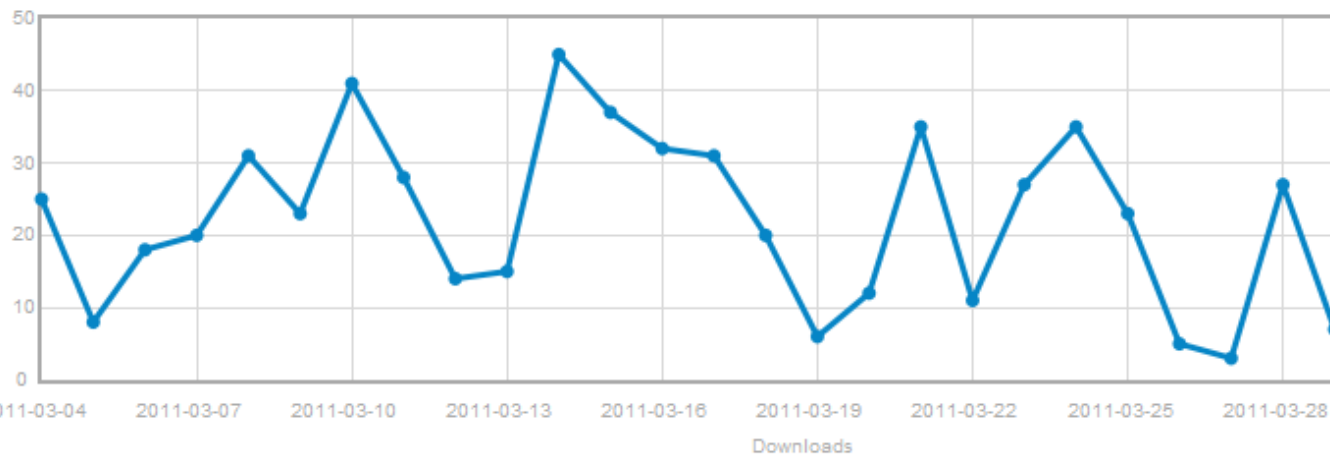
libSBML

Systems Biology Markup Language (SBML) by [ajouraku](#), [bbornstein](#), [beshapiro](#), [funa](#), [luciansmith](#), [mhucka](#), [niko-rodrigue](#), [sarahkeating](#)

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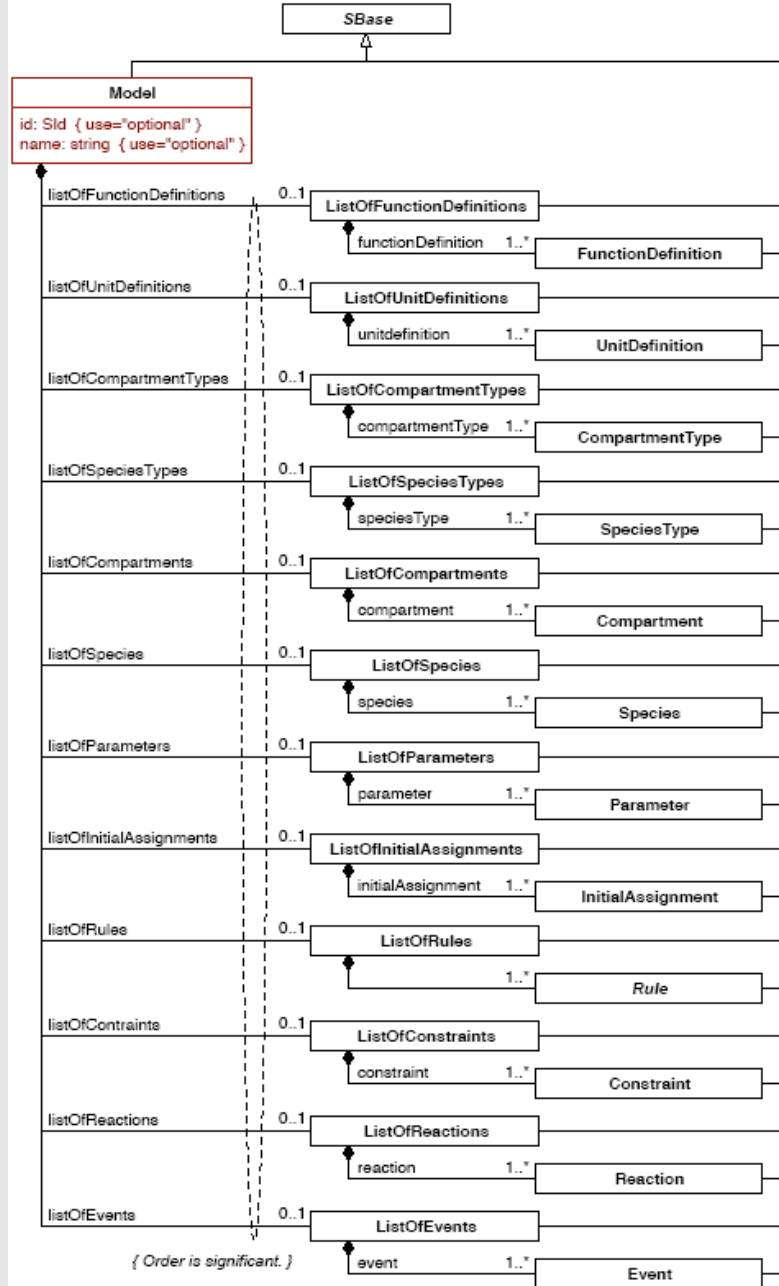
TOP OS

Windows

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libSBML

- closely mimic SBML structure



```
ModelHistory*    mHistory;

ListOfFunctionDefinitions  mFunctionDefinitions;
ListOfUnitDefinitions     mUnitDefinitions;
ListOfCompartmentTypes   mCompartmentTypes;
ListOfSpeciesTypes       mSpeciesTypes;
ListOfCompartments       mCompartments;
ListOfSpecies             mSpecies;
ListOfParameters          mParameters;
ListOfInitialAssignments mInitialAssignments;
ListOfRules               mRules;
ListOfConstraints         mConstraints;
ListOfReactions           mReactions;
ListOfEvents              mEvents;

ListFormulaUnitsData      mFormulaUnitsData;

#ifdef USE_LAYOUT
    ListOfLayouts mLayouts;
#endif /* USE_LAYOUT */
```

SBase



Compartment

id: SId

name: string { use="optional" }

compartmentType: SId { use="optional" }

spatialDimensions: int { use="optional" default="3" }

size: double { use="optional" }

units: UnitSId { use="optional" }

outside: SId { use="optional" }

constant: boolean { use="optional" default="true" }

Compartment.h

Compartment

Compartment

```
class LIBSBML_EXTERN Compartment : public SBase
{
    . . .

protected:
] /** @cond doxygen-libsml-internal */

/**
 * Subclasses should override this method to read values from the given
 * XMLAttributes set into their specific fields. Be sure to call your
 * parents implementation of this method as well.
 */
virtual void readAttributes (const XMLAttributes& attributes);

/**
 * Subclasses should override this method to write their XML attributes
 * to the XMLOutputStream. Be sure to call your parents implementation
 * of this method as well.
 */
virtual void writeAttributes (XMLOutputStream& stream) const;

std::string    mCompartmentType;
unsigned int   mSpatialDimensions;
double         mSize;
std::string    mUnits;
std::string    mOutside;
bool           mConstant;

bool           mIsSetSize;

/** @endcond doxygen-libsml-internal */
};
```

```
class LIBSBML_EXTERN Compartment : public SBase
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```

libSBML

- closely mimic SBML structure
- different language bindings

- Standard ANSI C++

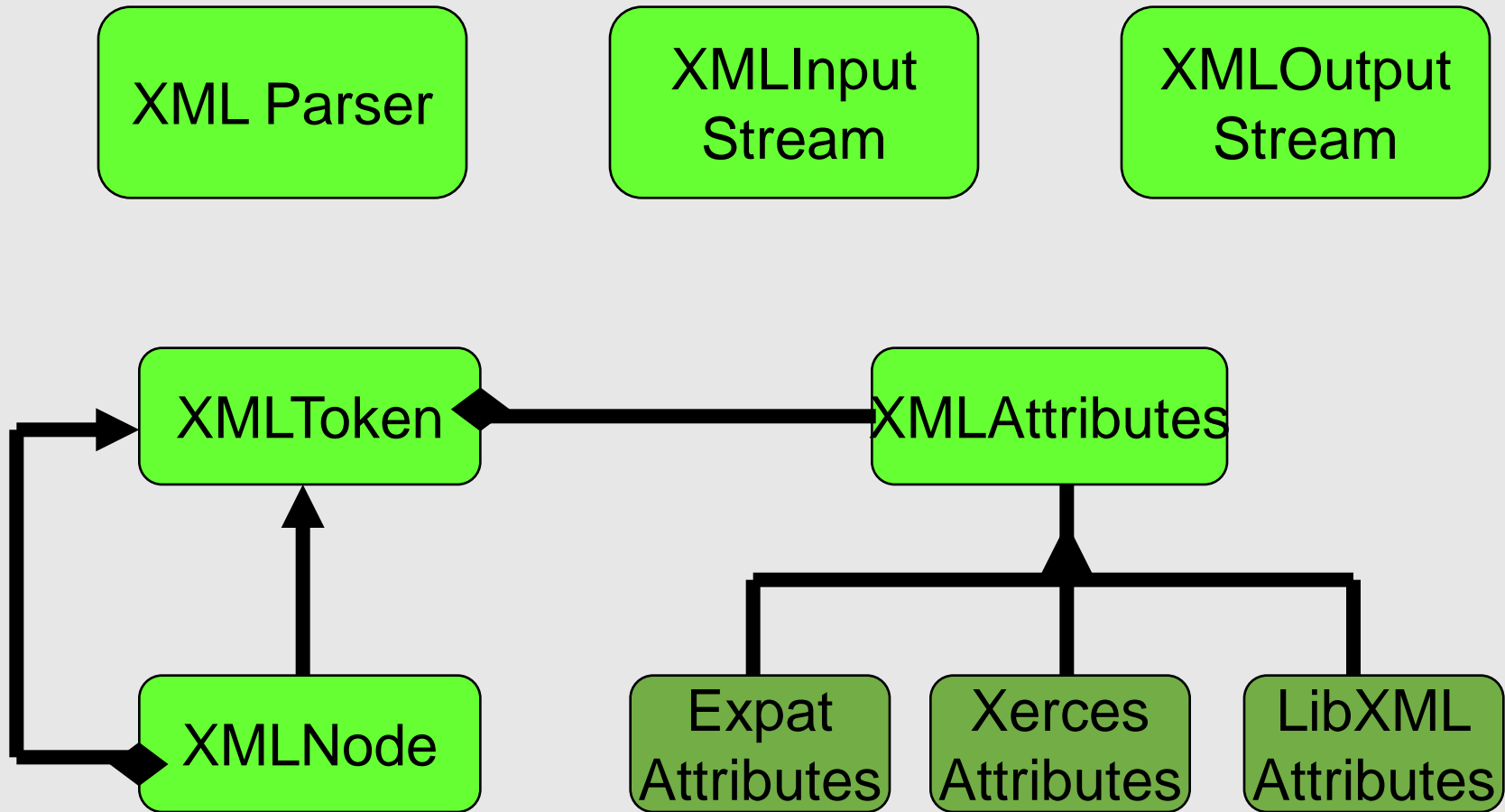
- C
- C#
- Python
- MATLAB
- Java
- Octave
- Perl
- Ruby



libSBML

- closely mimic SBML structure
- different language bindings
- XML parsers

XML Layer



libSBML

- closely mimic SBML structure
- different language bindings
- XML parsers
- develop in line with specification

libSBML

- closely mimic SBML structure
- different language bindings
- XML parsers
- develop in line with specification
- backwards compatibility

Acknowledgements

- Frank Bergmann
- Bill Denny
- Christoph Flamm
- Akira Funahashi
- Ralph Gauges
- Martin Ginkel
- Alex Gutteridge
- Stefan Hoops
- Moriyoshi Koizumi
- Ben Kovitz
- Rainer Machné
- Nicolas Rodriguez

Acknowledgements



Ben Bornstein
JPL, USA



Akiya Jouraku
Keio, Japan



Mike Hucka
Caltech, USA

