

SBML Core Extensions

Stefan Hoops

SBML Workshop
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Overview

- ▶ Conversion Factor
- ▶ Object Reference
- ▶ Include
- ▶ Species Attribute Yield

Conversion Factor

The conversion is such that following two MathML fragments are equivalent in value and in units.

```
<ci> target </ci>
```

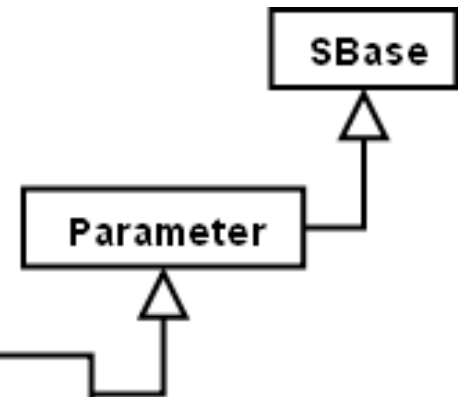
```
<apply>
```

```
<times/>
```

```
<ci> conversionFactor </ci>
```

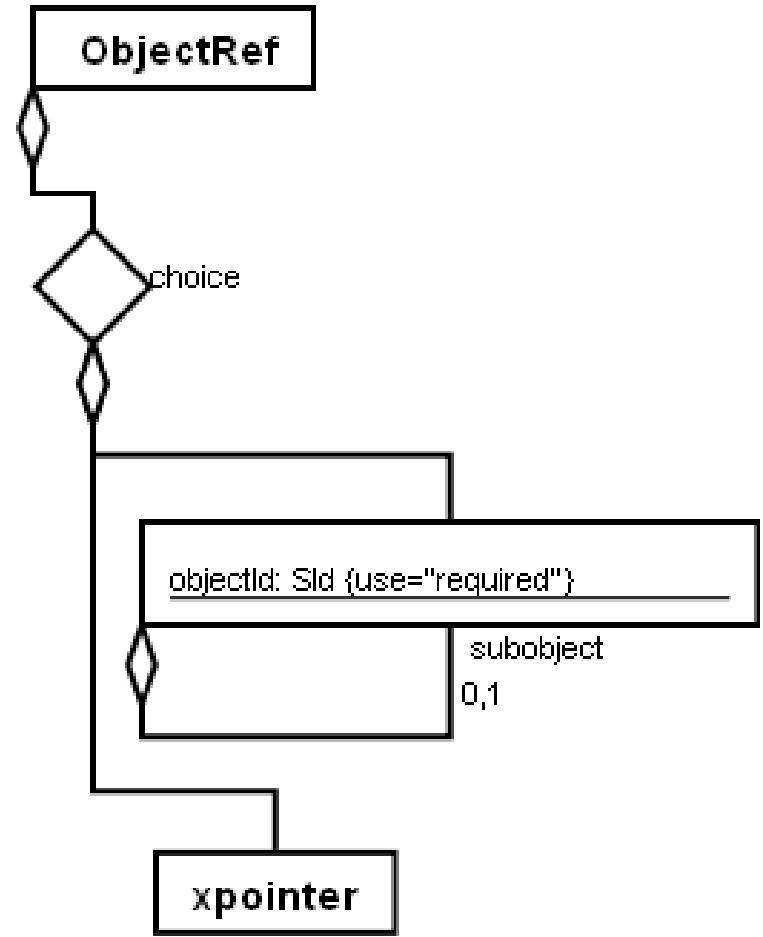
```
<ci> source </ci>
```

```
</apply>
```



Object Reference

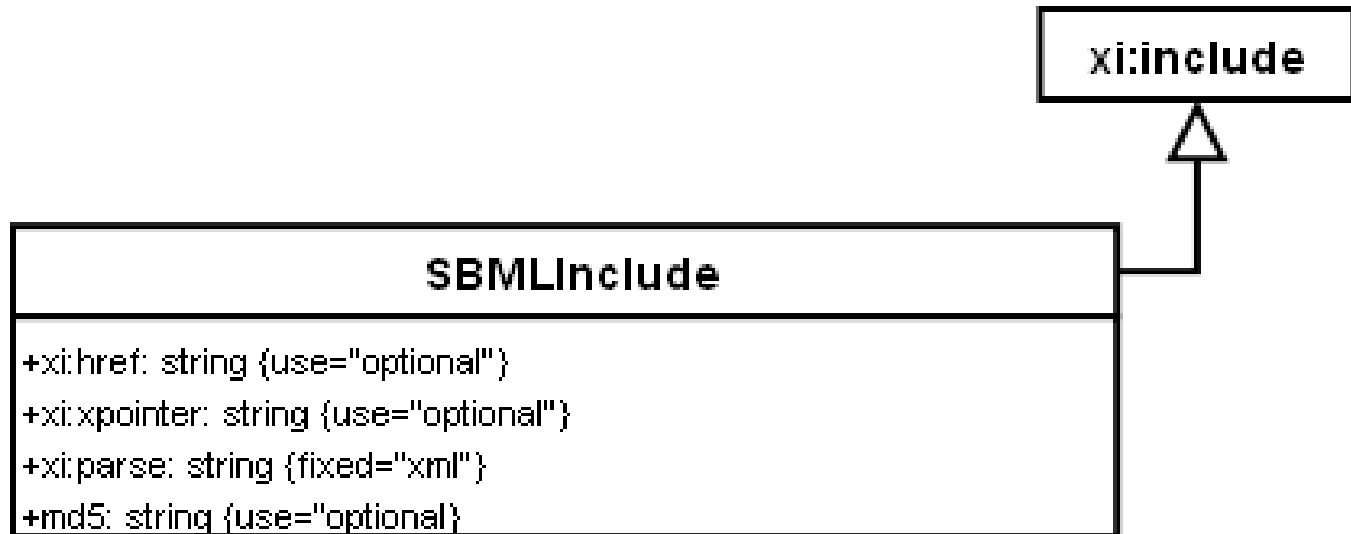
- ▶ We need to have the ability to reference other SBML objects within one document.
- ▶ Since SIds are not globally unique we need to allow recursive definitions.
- ▶ To refer to objects without an SId alternatively xpointer may be used/



SBML Include

For several extension we need the ability to include parts of other XML documents in an SBML file.

- ▶ The included items are instantiated in the model
- ▶ This works recursive
- ▶ md5 attribute allows to detect changes in included XML



Species Attribute: `yield`

- ▶ The clean implementation of models containing species with different units within on reaction requires the definition of a conversion factor.
- ▶ The **`yield`** attribute is the SId of such a conversion factor and will be used to construct the yield matrix.
- ▶ The value is optional. A missing **`yield`** means that the conversion factor has the value 1 and the units dimensionless.