SBML Packages: Update
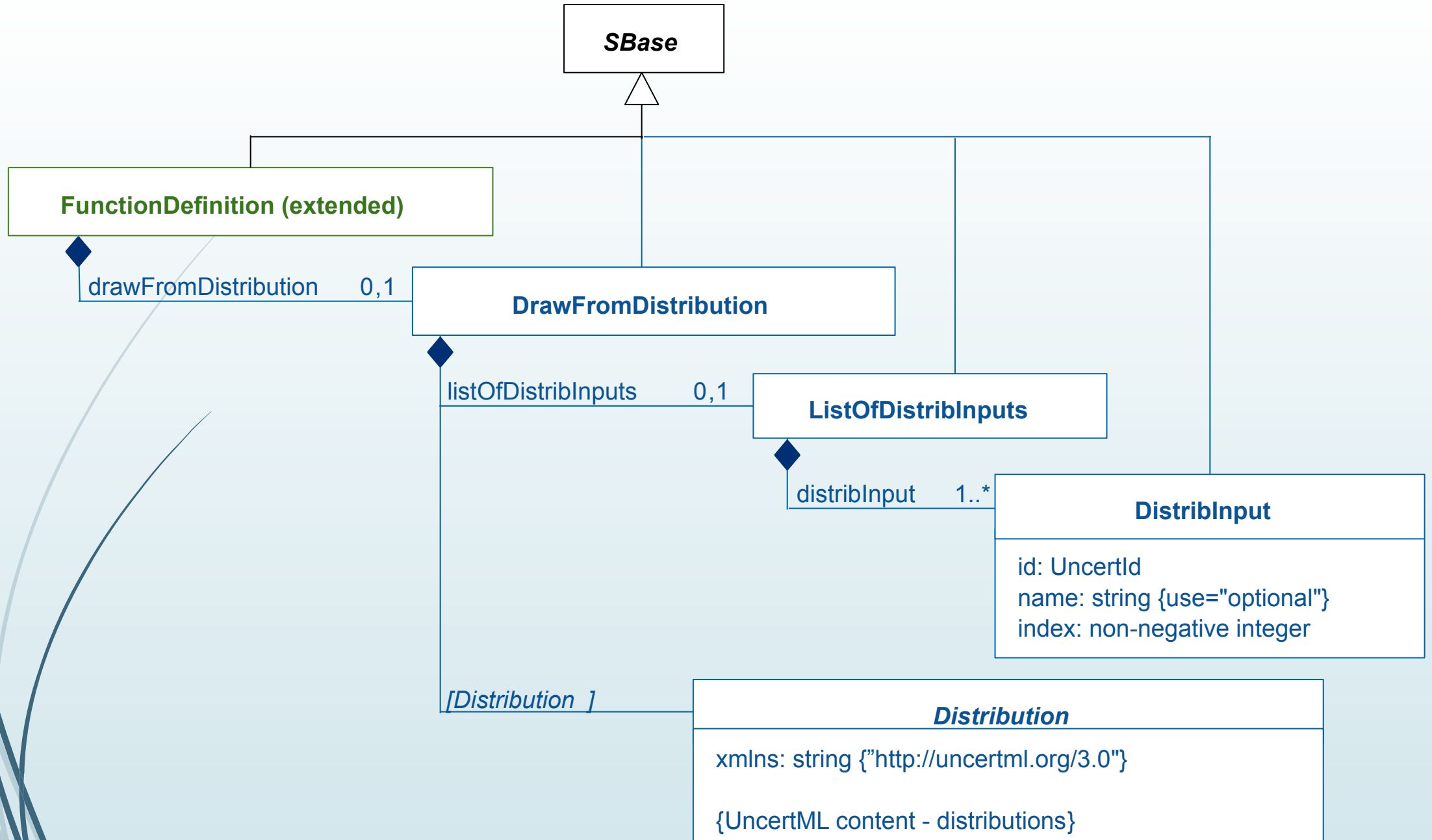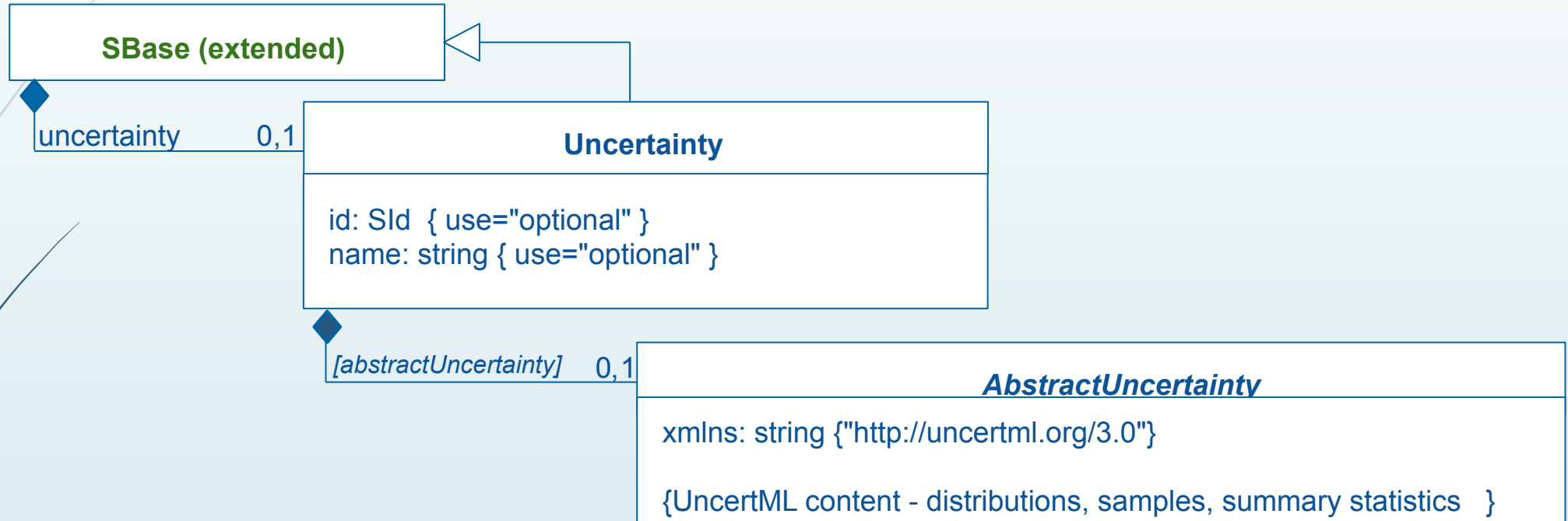
Lucian Smith

Distributions: recap

- Extended FunctionDefinition:
  - 'DistribInputs' mimic 'bvars'
  - UncertML-defined distribution.
- New child of Sbase
  - Annotates any element with uncertainty description

FunctionDefinition Example

```xml
<functionDefinition id="normal">
    <math xmlns="http://www.w3.org/1998/Math/MathML">
        <!-- Overridden MathML -->
    </math>
    <drawFromDistribution xmlns="http://www.sbml.org/sbml/level3/version1/distrib/version1">
        <listOfDistribInputs>
            <distribInput id="avg" index="0"/>
            <distribInput id="var" index="1"/>
        </listOfDistribInputs>
        <NormalDistribution xmlns="http://uncertml.org/3.0">
            <mean> avg </mean>
            <variance> var </variance>
        </NormalDistribution>
    </drawFromDistribution>
</functionDefinition>
```

Annotation

SBase (extended)

uncertainty   0,1

Uncertainty

id: SId   { use="optional" }
name: string { use="optional" }

[abstractUncertainty]   0,1

AbstractUncertainty

xmlns: string {"http://uncertml.org/3.0"}

{UncertML content - distributions, samples, summary statistics   }

SBase example

```
<species id="x" compartment="C" boundaryCondition="false"
         initialConcentration="3.22"
         hasOnlySubstanceUnits="false" constant="false">
  <distrib:uncertainty>
    <StatisticsCollection xmlns="http://uncertml.org/3.0">
      <NormalDistribution>
        <mean> 3.2 </mean>
        <variance> 0.09 </variance>
      </NormalDistribution>
      <StandardDeviation>
        <values> 0.3 </values>
      </StandardDeviation>
    </StatisticsCollection>
  </distrib:uncertainty>
</species>
```
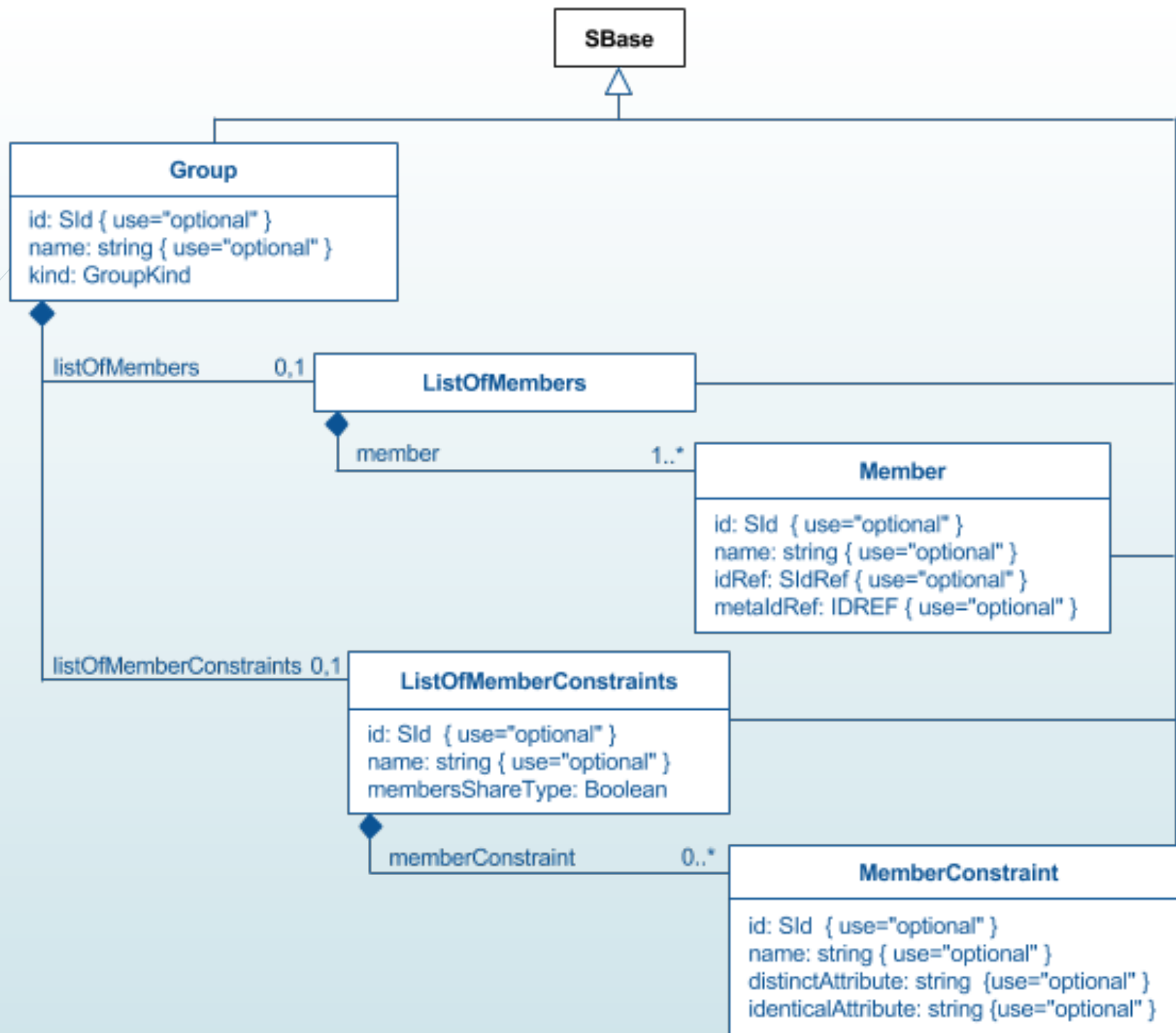
Distributions: Work left to do

- Figure out UncertML 3.0 (newly-updated xsd)
- Finish spec
- Two implementations (without Stuart?)

Groups: recap

- New ListOfGroups that has Group children.
- Each Group collects a variety of objects together semantically, though with no mathematical meaning.

Groups: work left to do

- Update to L3v2? (Mostly 'id's)
- List and implement validation rules.
- Two implementations (anyone?)

Comp: recap

- Allows models to be built from submodels, reconnected, and changed.
  - First release in November of 2011
  - Second release in February of 2012
  - Third release in November of 2013
- Gaining use gradually
  - Easy simulator import through flattening

Comp: future

- New specification for L3v2 in the works
  - Updates to 'id' and 'name' attributes
  - Allows earlier SBML levels/versions to be used as submodels.
- Work left:
  - Further discussion
  - Implementation of the above
  - Incorporation into two tools.