# State of GraphML
## Structural Layer & Attributes

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# Design Goals

- simple

  easy to read and parse, no ambiguities,. . .

- general

  mixed multigraphs, hyperedges, nested graphs,. . .

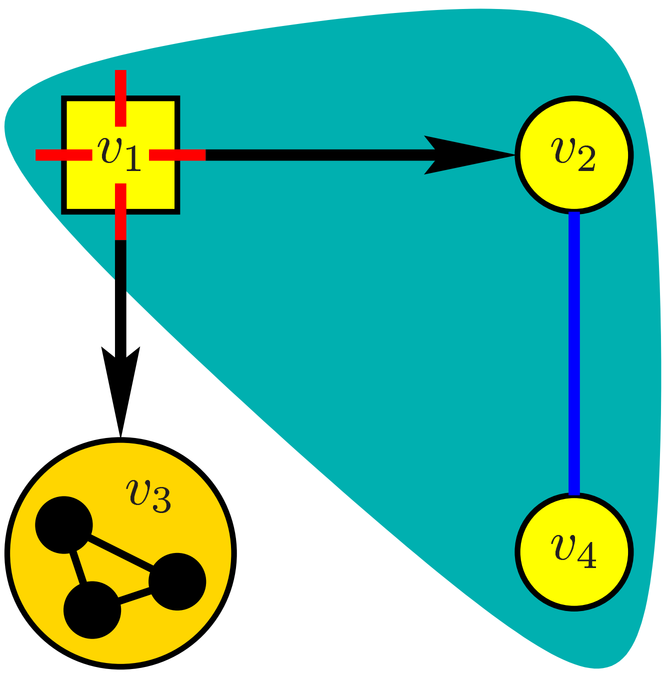
- robust

  layered/modular architecture, fallback interpretations,. . .

- extensible

  structured and unstructured data, meta information,
  application-specific data. . .

# GraphML Example (Structural Layer)



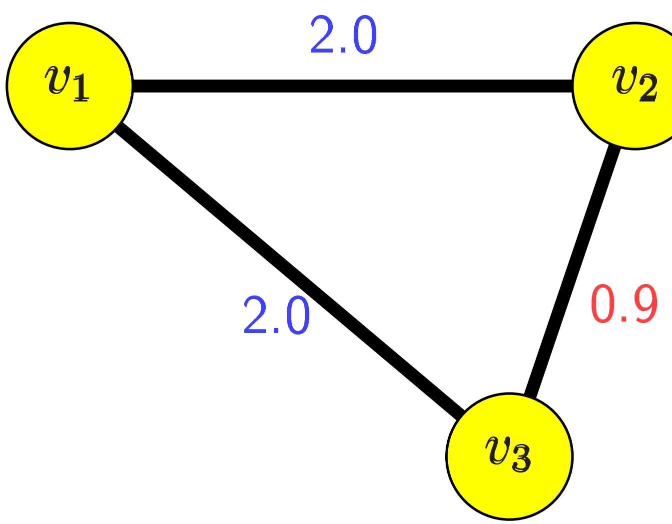

```
<graphml>
  <graph edgedefault="directed">
    <desc>a simple example</desc>

    <node id="v1">
      <port name="north"/> <port name="east"/>
      <port name="south"/> <port name="west"/>
    </node>
    <node id="v2"/> <node id="v4"/>
    <node id="v3">
      <graph> <locator xlink:href="url"/> </graph>
    </node>

    <edge source="v1" sourceport="east" target="v2"/>
    <edge source="v1" sourceport="south" target="v3"/>
    <edge source="v2" target="v4" directed="false"/>

    <hyperedge>
      <endpoint node="v1" port="south" type="out"/>
      <endpoint node="v2" type="in"/>
      <endpoint node="v4" type="undir"/>
    </hyperedge>
  </graph>
</graphml>
```

# Data Attributes




```
<graphml>
  <key  id="k1"   for="edge">
    <desc>edge length in cm</desc>
    <default>2.0</default>
  </key>
     ...
    <edge source="v2" target="v3">
      <data key="k1">0.9</data>
    </edge>
    <edge source="v1" target="v3"/>
    <edge source="v1" target="v2"/>
     ...
</graphml>
```

# Basic Data Types: Attributes Extension

```
<graphml  schemaLocation=" ... graphml-structure-1.0rc.xsd
                          ... graphml-attributes-1.0rc.xsd">
   <key  id="k1"   for="edge"
        attr.type="double"  attr.name="length">
     <desc>edge length in cm</desc>
     <default>2.0</default>
   </key>
      ...
     <data key="k1">0.9<data>
      ...
```

Basic data-types: *boolean*, *int*, *long*, *float*, *double* and *string*.

## Structured Data: Custom Extensions

```
<graphml  schemaLocation=" ... graphml-structure-1.0rc.xsd
                           ... graphml-1.0rc+custom.xsd">
  <key  id="k1"   for="node"   custom.content="logfile_entry"/>
    ...
    <node id="n1">
      <data key="k1">
        <entry url="http://localhost/index.html"
               ip="127.0.0.1" referer="n7"/>
      </data>
    </node>
    ...
    <node id="n7"/>
```

# Current & Future Plans

- extension for lightweight parsers

  node and edge ordering, #nodes, #edges, degrees, . . .

- parser

  yFiles Extension, LEDA Extension Package

- graph layout extension

  using XSLT for export formats

see: http://graphml.graphdrawing.org/