

XML for causal relationships

Proposal of a file format for storing causal relationship data - based on XML

Dipl.-Ing. Oliver Lemke, Braunschweig, 02.07.03

Standardised and well documented

- File format should be based on an open standard (no licensing)
- File format should be well documented

Flexible and widely supported

- It should be easy to adopt the file format to the specific needs
- Reading and writing of data in the file format should be supported by a wide range of operating systems, programming languages and development toolkits

Nice-to-have-features

- File format should be human readable, at least to a certain degree

Drawing-oriented tools

- MS PowerPoint ~~WB-Graphs are stored without their~~

None of the tools uses a file format that fulfils all requirements. And even worse: They are all incompatible with each other. Exchanging and working with causal relationship data becomes sometimes very difficult. That's when the idea for a common exchange format for causal relationship data came up.

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- CEdit ~~different formats (binary, database)~~

The solution: Development of a new XML-based file format

Standardized and well documented

- XML is a mark-up language standardized by the W3C
- XML is well documented; documentation is available to the public

Flexible and widely supported

- The XML standard only defines *how* data are stored, but not *what* information is contained in a file – everyone can create his own file format based on XML
- XML is supported by a large number of toolkits available for nearly all programming languages and system platforms

Nice-to-have-features

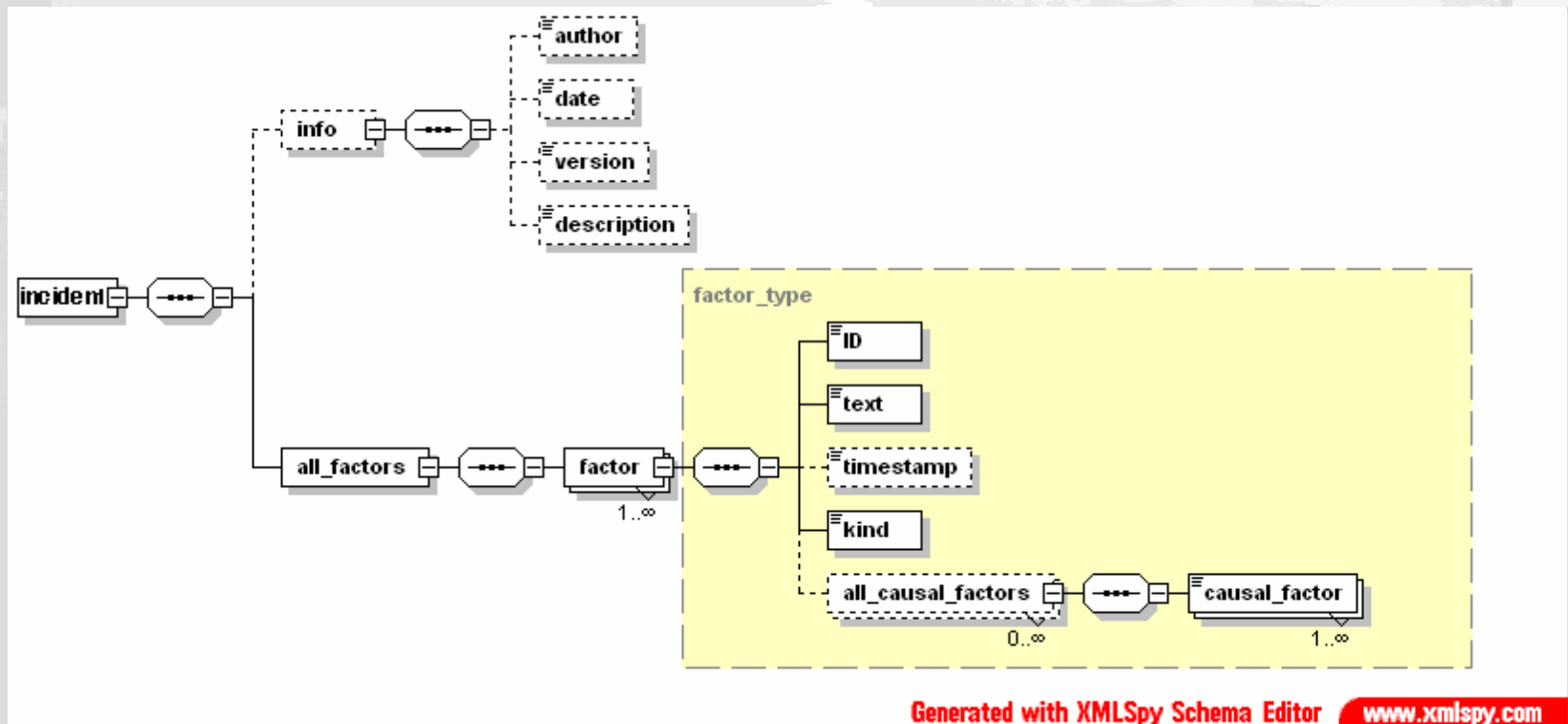
- XML-files are text files and (more or less) human readable

In XML data storage is tag / element based:

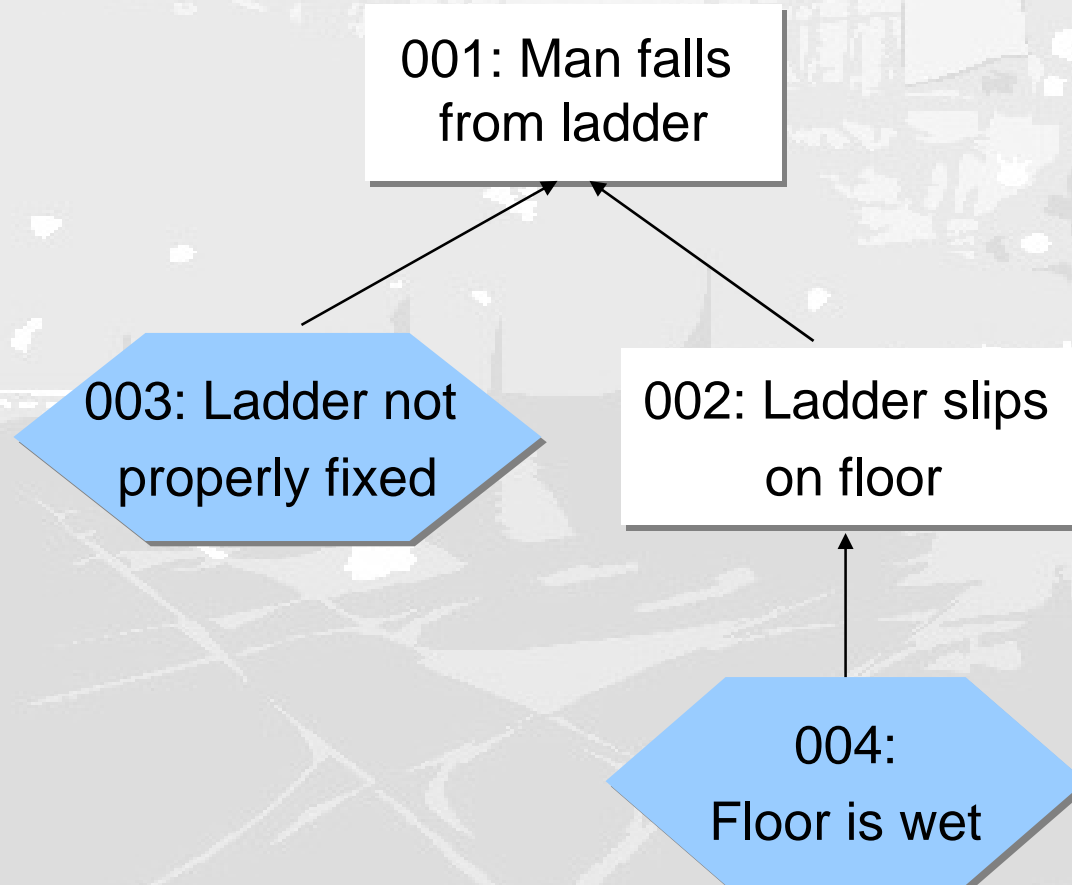
```
<workshop>
  <title>Bieleschweig II</title>
  <date>01.07.2003</date>
  <attendants count="2">
    <attendant>
      <name>John Foo</name>
      <occupation>Engineer</occupation>
    </attendant>
    <attendant>
      <name>Frank Bar</name>
      <occupation>Student</occupation>
    </attendant>
  </attendants>
</workshop>
```

Usually the structure of an XML file is defined in a schema.

Graphical schema definition for CausalXML:



“The ladder incident”



```
<incident xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <all_factors count="4">
    <factor>
      <ID>001</ID>
      <text>Man falls from ladder</text>
      <kind>internal_event</kind>
      <all_causal_factors count="2">
        <causal_factor>002</causal_factor>
        <causal_factor>003</causal_factor>
      </all_causal_factors>
    </factor>
    <factor>
      <ID>002</ID>
      <text>Ladder slips on floor</text>
      <kind>internal_event</kind>
      <all_causal_factors count="1">
        <causal_factor>004</causal_factor>
      </all_causal_factors>
    </factor>
    ...
  </all_factors>
</incident>
```

- **Object-oriented framework**

- Creating an object-oriented framework (UML ?) as a base for applications dealing with causal dependency data
- First ideas for a basic class hierarchy and class design have already been developed
- A tool for automatically create a WB-Graph out of a XML-file is currently being developed.

- **Database integration**

- Interfaces exist for exchanging data between databases and XML files, so large amounts of causal relationship data can be stored, managed and manipulated

- **XSL-Processing**

- XML-files can be easily converted to other formats by using style-sheets and XSLT-Engine. A CausalXML-Document e.g. may be converted into a PDF-file listing all causal factors and their connections



Any comments are welcome.
Thank you for your attention!