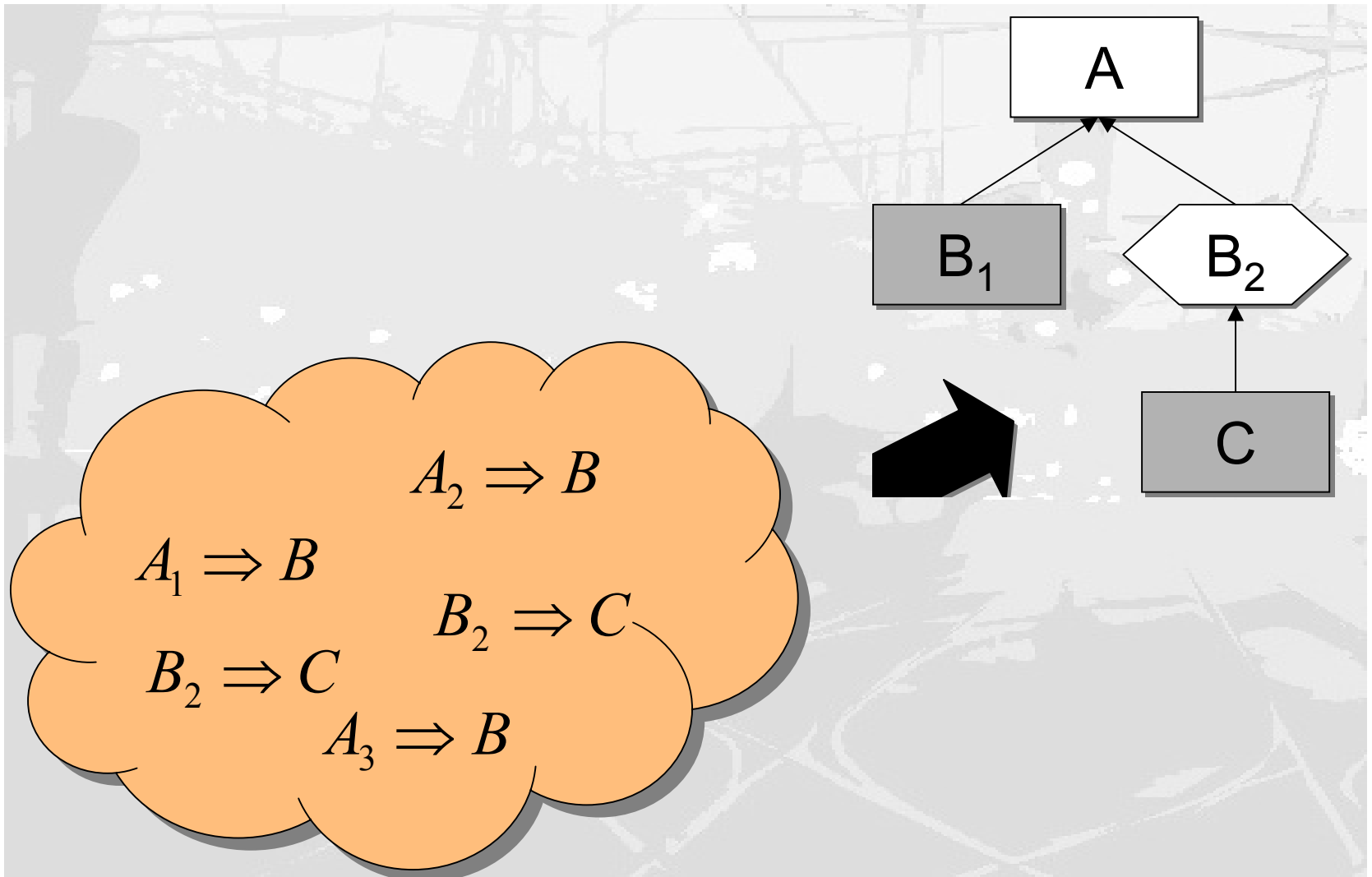


XML for causal relationships

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

Dipl.-Ing. Oliver Lemke, Braunschweig, 02.07.03



Causal relationships themselves are an abstract piece of information

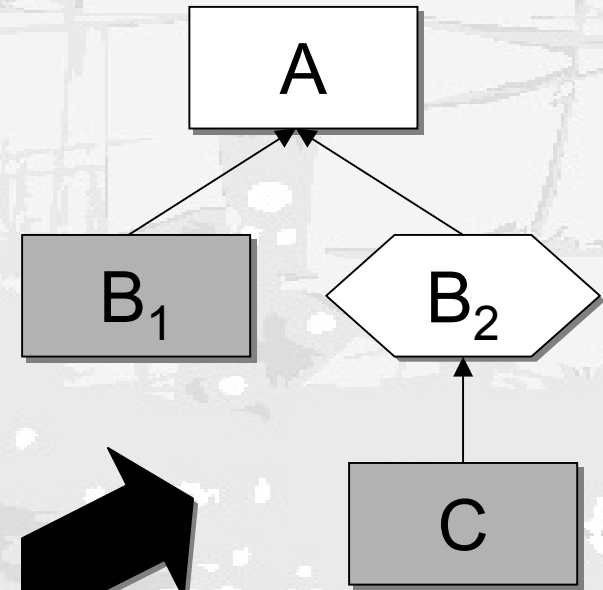
$$A_1 \Rightarrow B$$

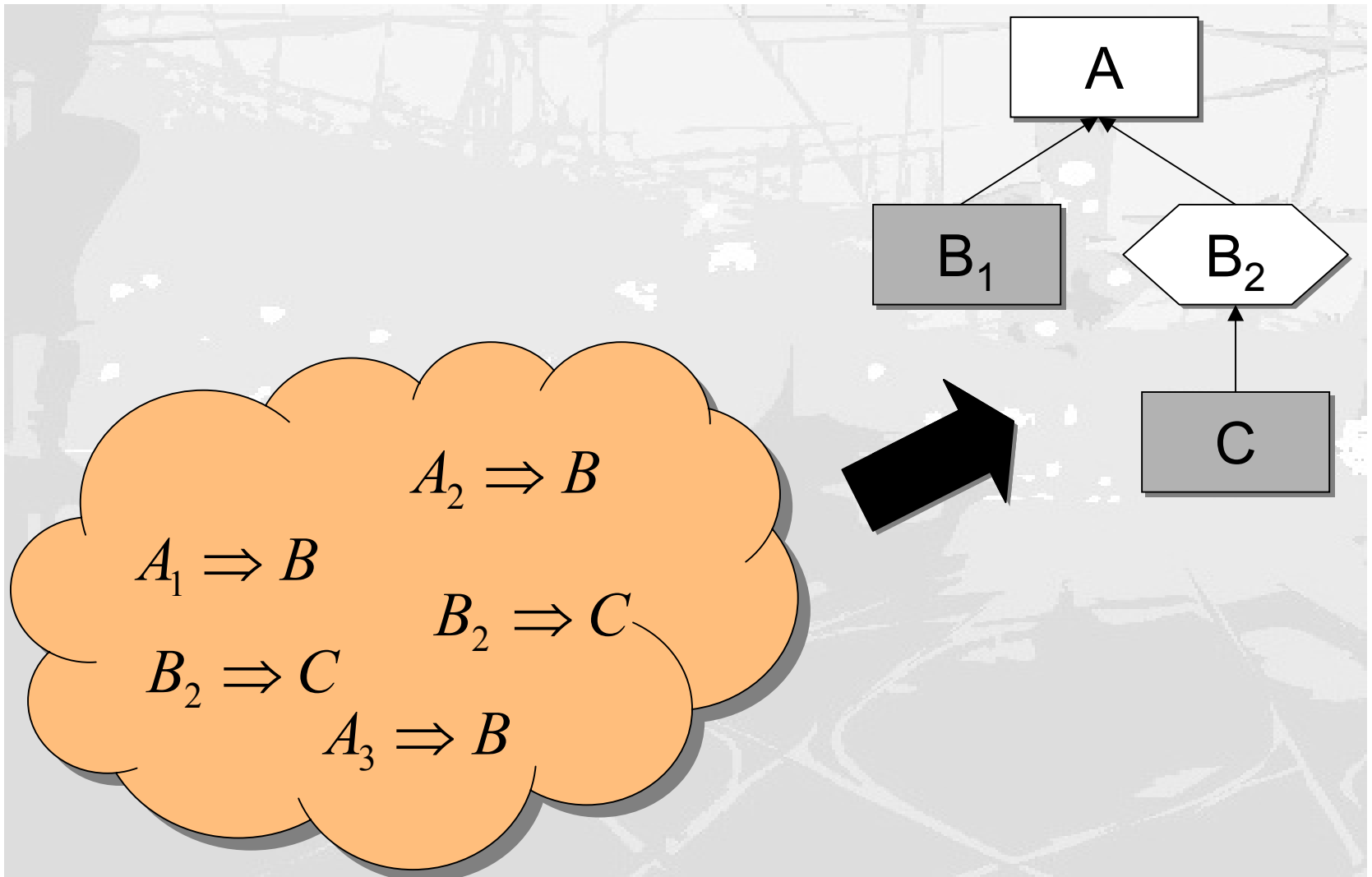
$$A_2 \Rightarrow B$$

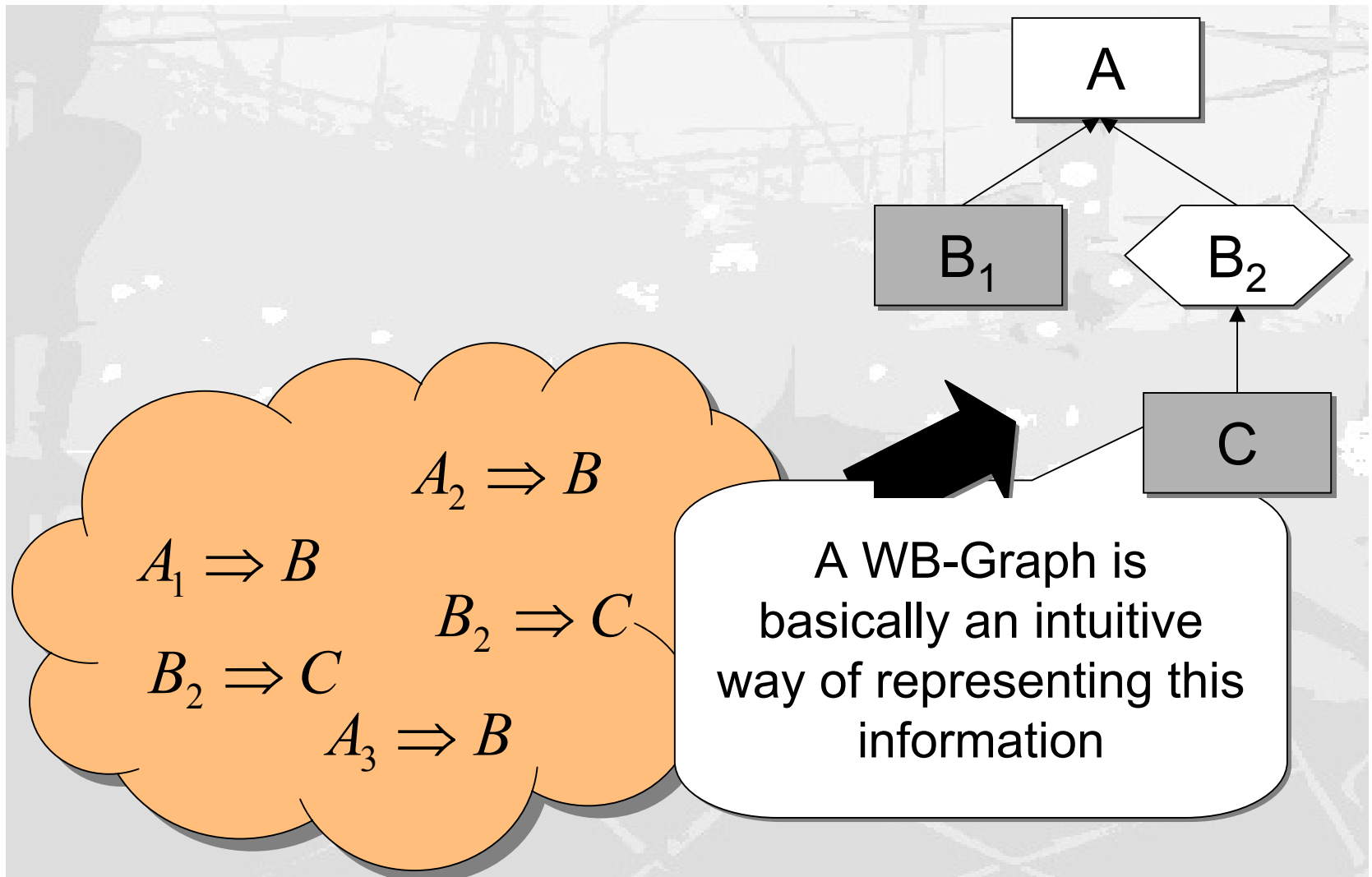
$$B_2 \Rightarrow C$$

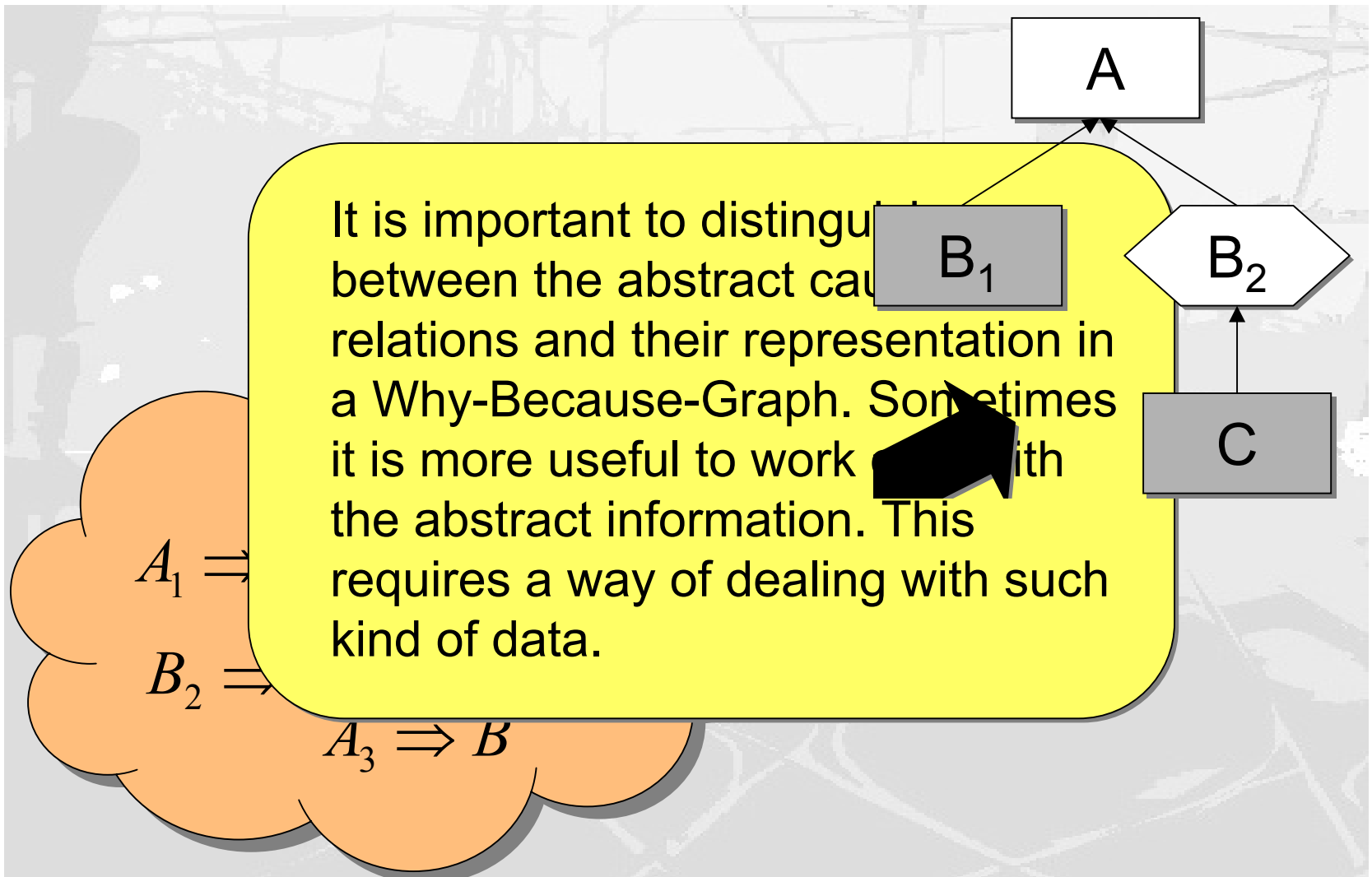
$$B_2 \Rightarrow C$$

$$A_3 \Rightarrow B$$











Standardised and well documented

- File format should be based on an open standard (no licensing)
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Nice-to-have-features

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



Currently available
tools for working with
WB-Graphs and how
they store their data

Drawing-oriented tools

- MS PowerPoint
 - MS Visio
 - other
- WB-Graphs are stored as drawings without information about their contents

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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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- 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

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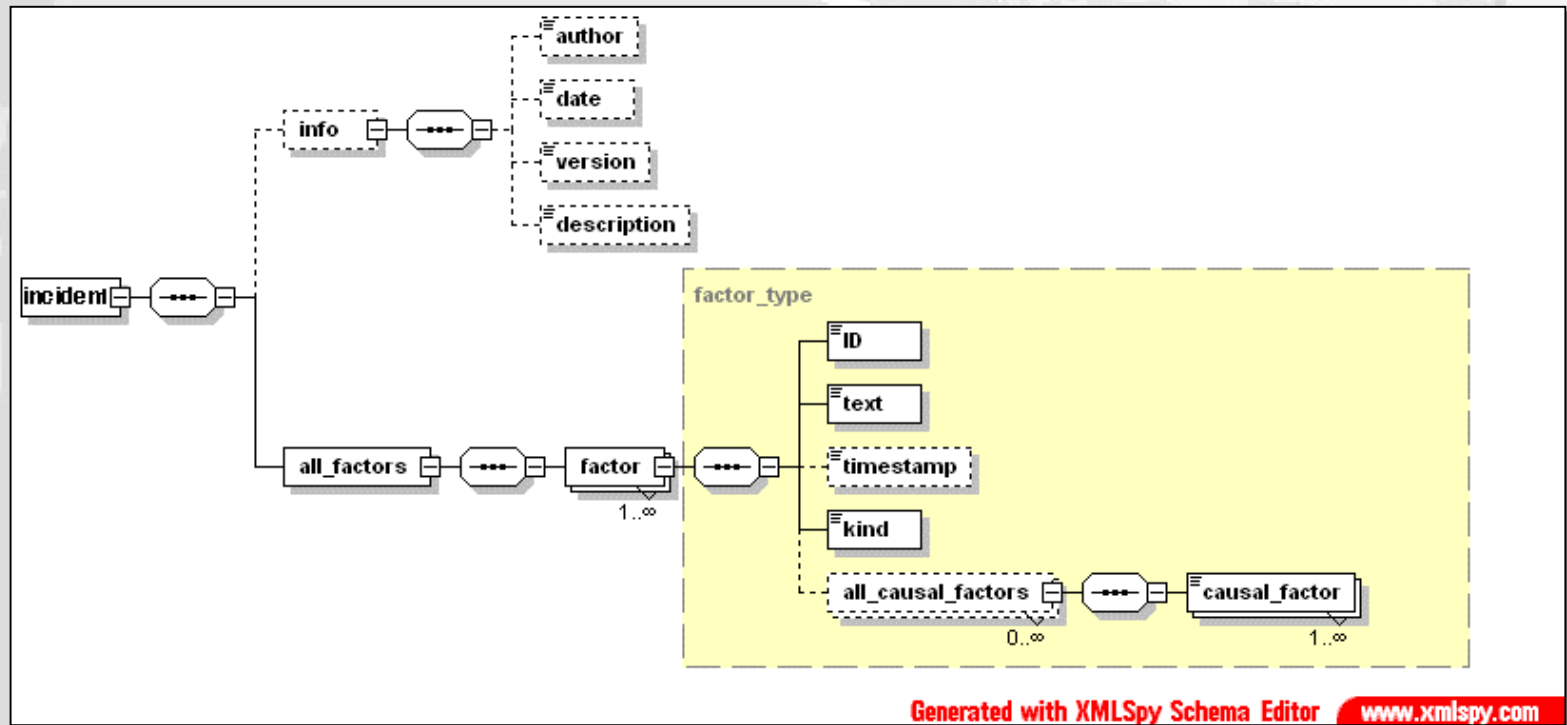
- XML-files are text files and (more or less) human readable

In XML data storage is tag / element based:

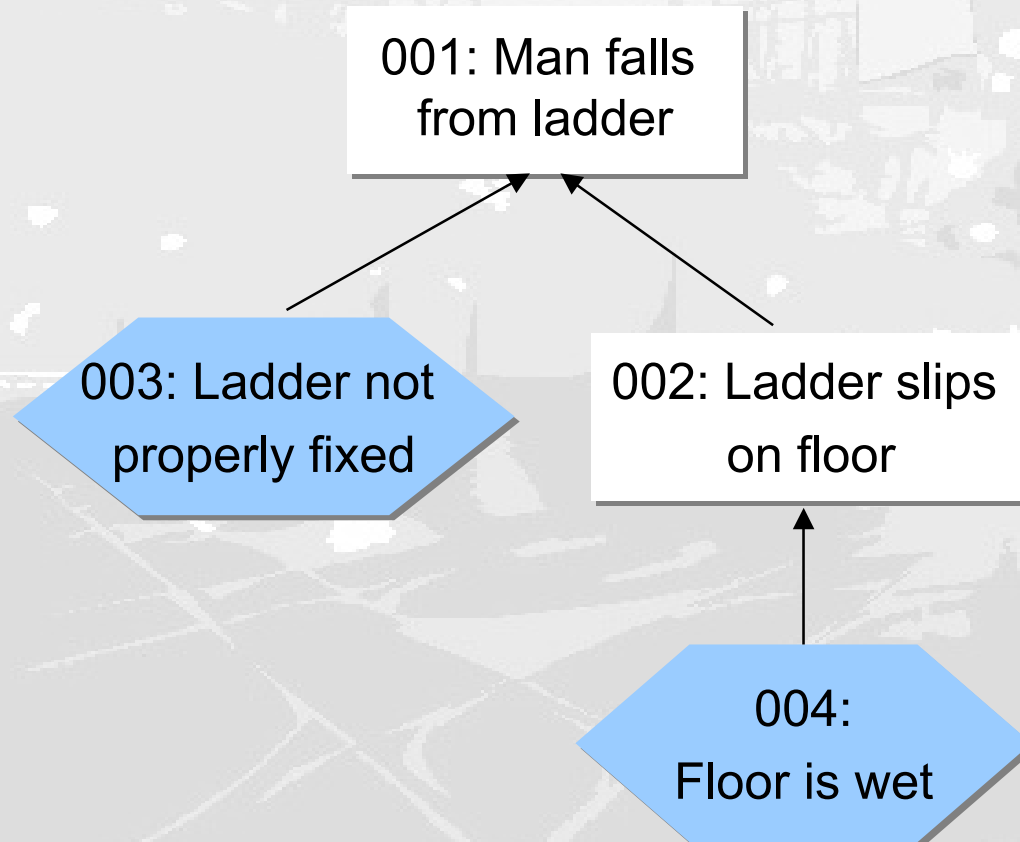
```
<workshop>
  <title>Bieleschweig II</title>
  <date>01.07.2003</date>
  <attendants count="2">
    <attendant>
      <name>John Foo</name>
      <occupation>Engineer</occupation>
    </attendant>
    <attendant>
      <name>Frank Bar</name>
      <occupation>Student</occupation>
    </attendant>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

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

Graphical schema definition for CausalXML:



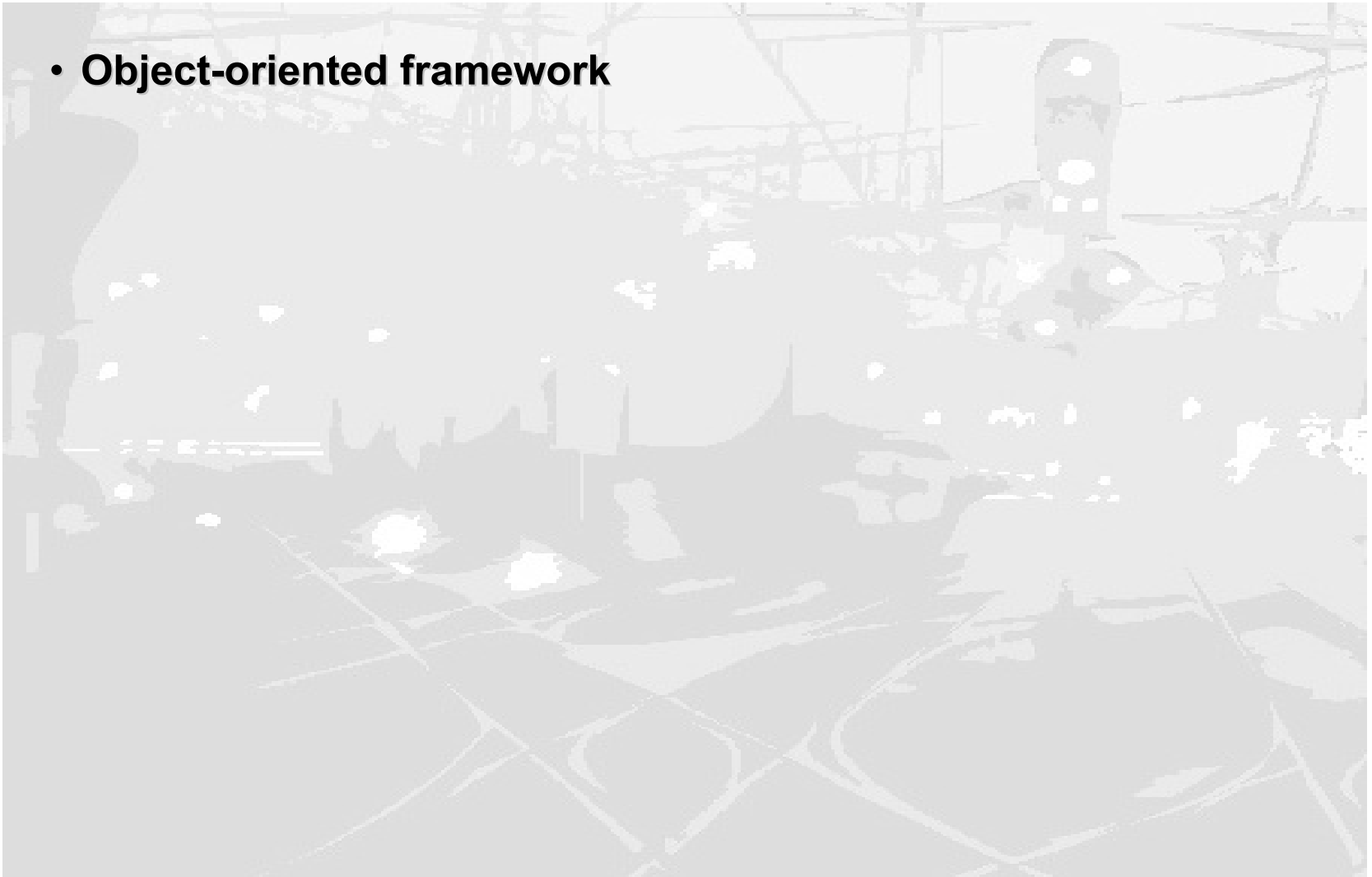
“The ladder incident”



```
<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>
```



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- 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!