

Introduction to XML Schema Document (XSD) visualization

Part III: RCE & Eclipse

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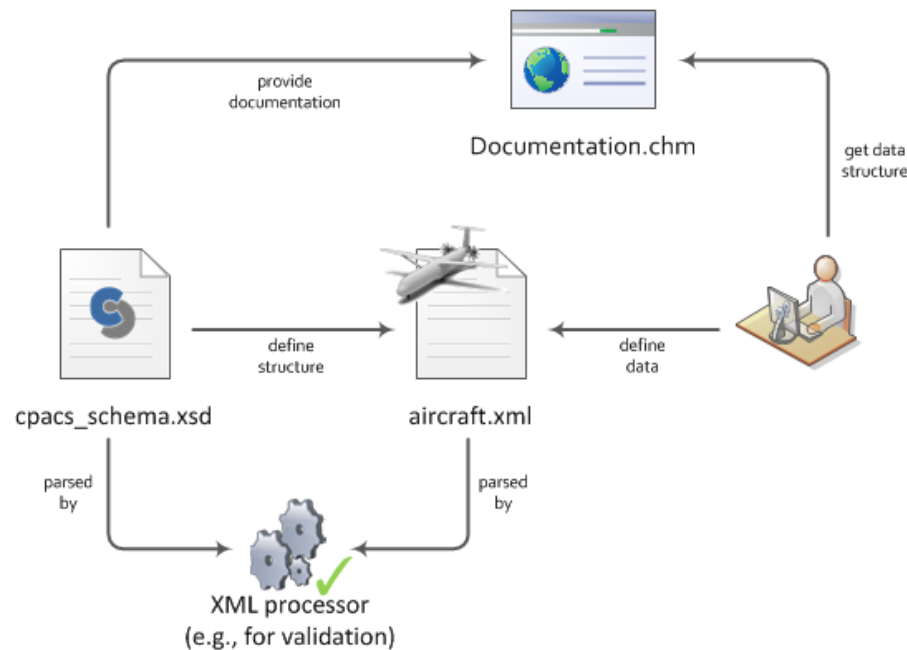


Knowledge for Tomorrow



What is a schema?

- A schema* is itself an XML file (*.xsd), which defines the rules/syntax how a CPACS file (*.xml) may be structured:
 - how often and in which order may elements appear
 - what is the type of elements (string, double, complex type with sub-elements, etc.)
- summarized as *type* of an *element* 🧩



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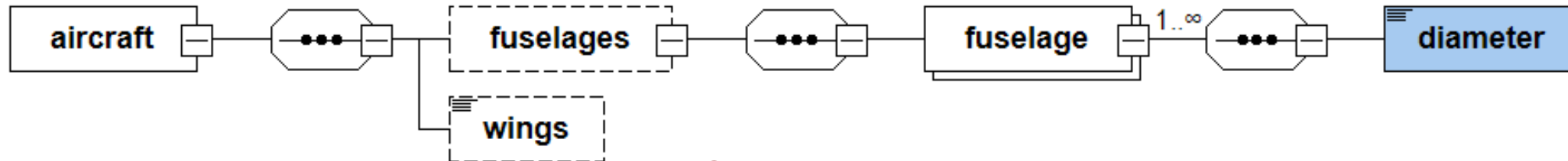
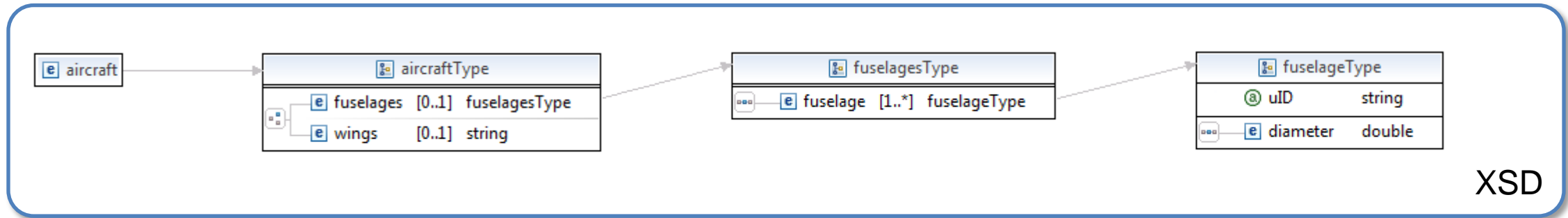
- <xsd:complexType name="aircraftType">
-   <xsd:annotation>
-     <xsd:appinfo>
-       <sd:schemaDoc>
-         <ddue:summary>
-           <ddue:para>aircraftType</ddue:para>
-         </ddue:summary>
-         <ddue:remarks>
-           <ddue:para>Aircraft type, containing all the aircraft models</ddue:para>
-         </ddue:remarks>
-       </sd:schemaDoc>
-     </xsd:appinfo>
-   </xsd:annotation>
-   <xsd:complexContent>
-     <xsd:extension base="complexType">
-       <xsd:sequence>
-         <xsd:element maxOccurs="unbounded" name="model" type="aircraftModelType" />
-       </xsd:sequence>
-     </xsd:extension>
-   </xsd:complexContent>
- </xsd:complexType>

```

*) in IT called *schema* and not *scheme*..

What are elements and types?

Simplified example similar to CPACS



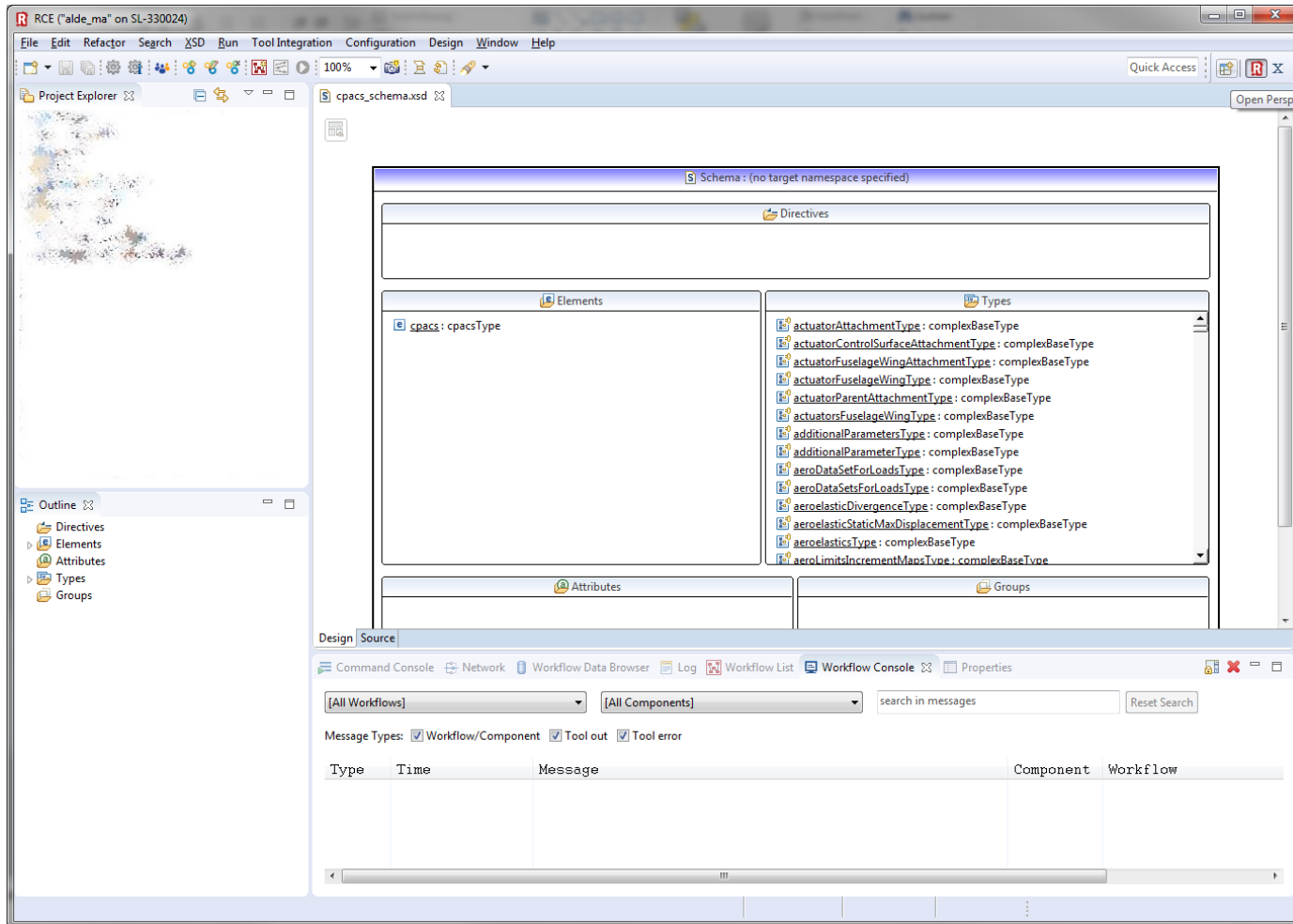
- **Simple types:** double, string, integer ...
- **Complex types:** specify sub-elements and attributes of elements
→ used to build hierarchical structure

HTML documentation

- Download one of the tools below and follow the corresponding installation instructions:
 - RCE: <https://rcenvironment.de/pages/download.html>
 - Eclipse (choose a package with XML Editor, e.g. Java IDE):
<https://www.eclipse.org/downloads/packages/>
- Download the CPACS schema file (.xsd):
 - <https://cpacs.de/pages/download.html>
 - e.g.: https://www.cpacs.de/schema/v3_2_0/cpacs_schema.xsd
- RCE is based on the Eclipse framework → following examples are based on RCE

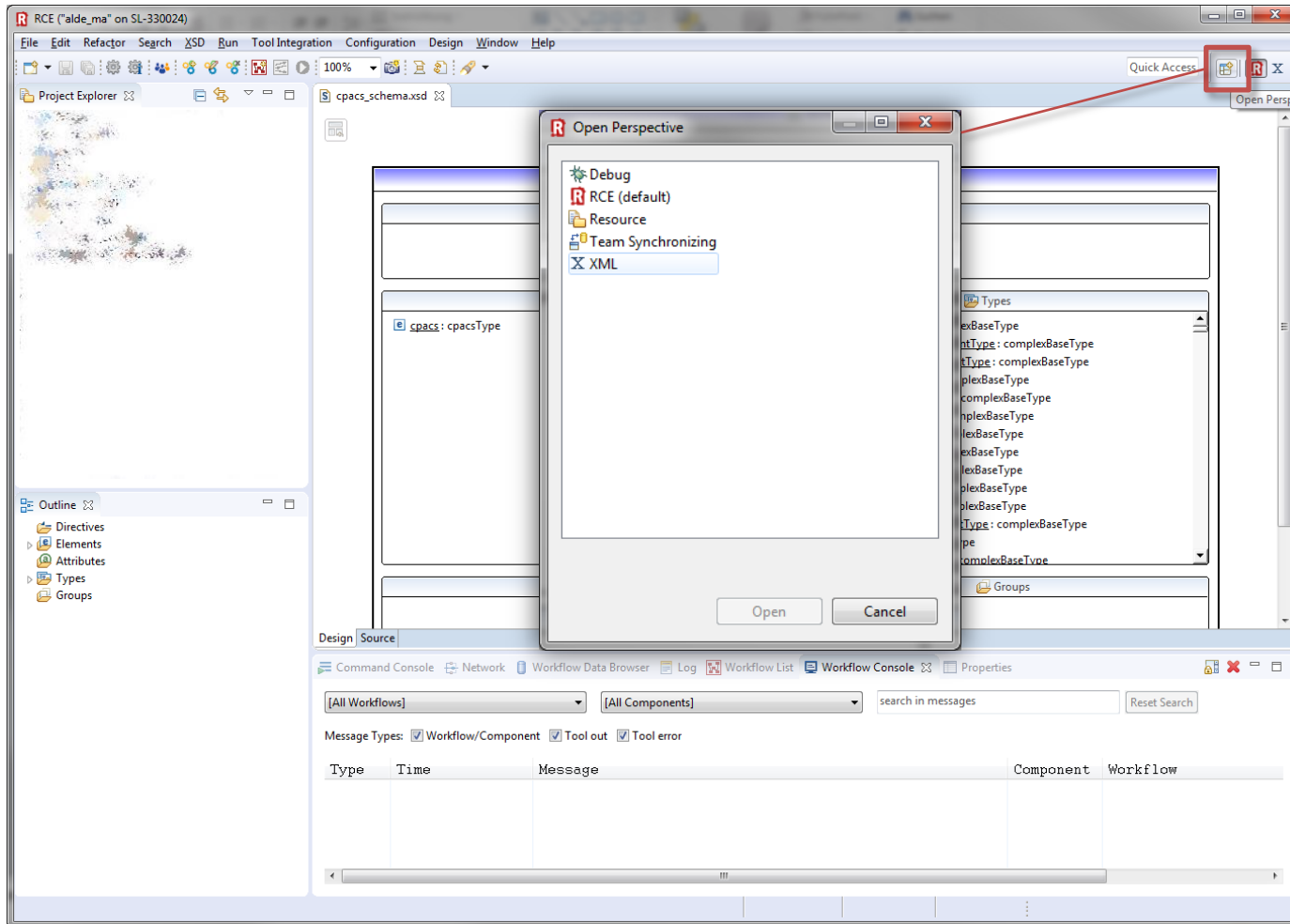


HTML documentation



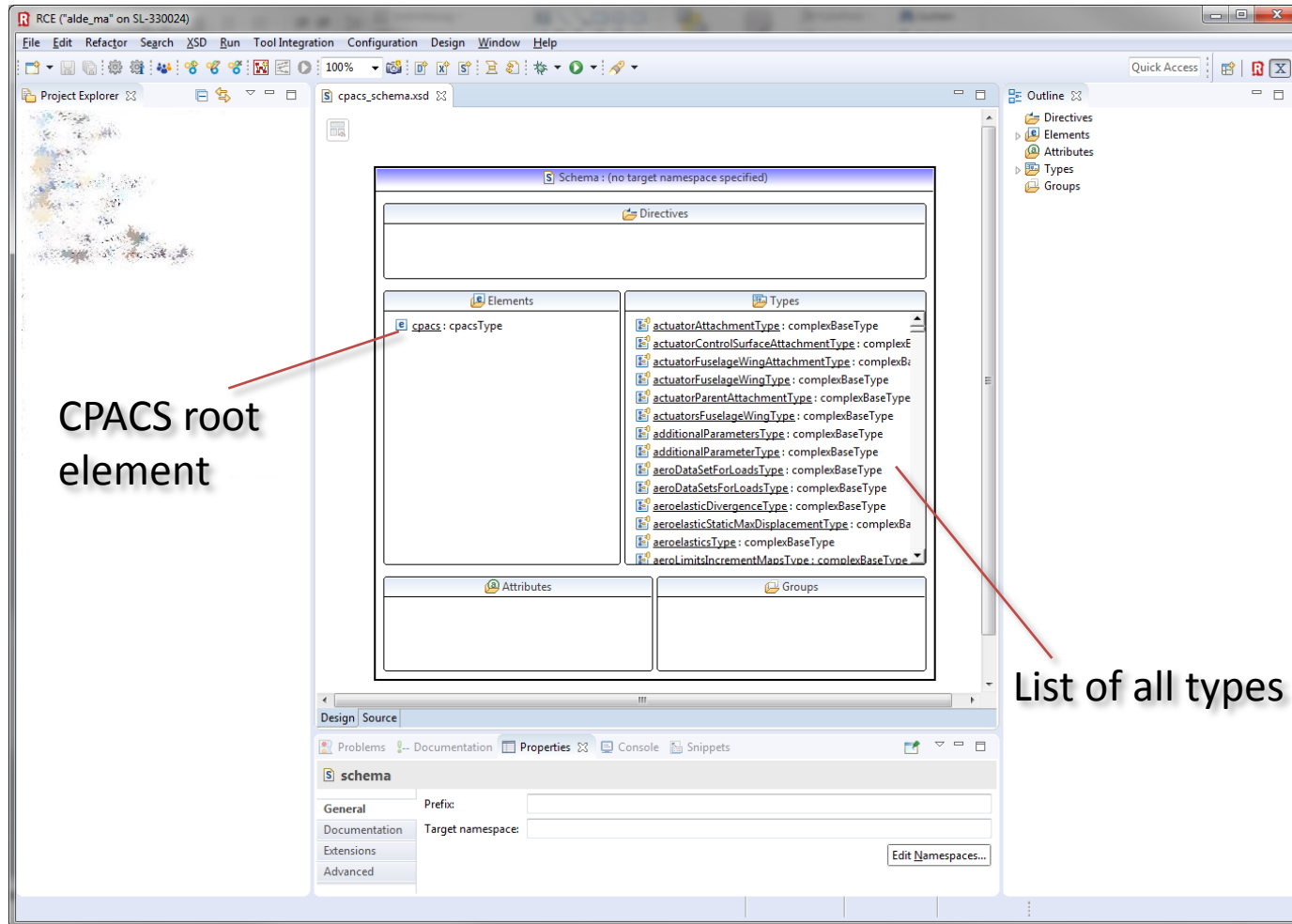
- Open RCE and import the *xsd* file
 - *File* → *Open File...* → *cpacs_schema.xsd*

HTML documentation



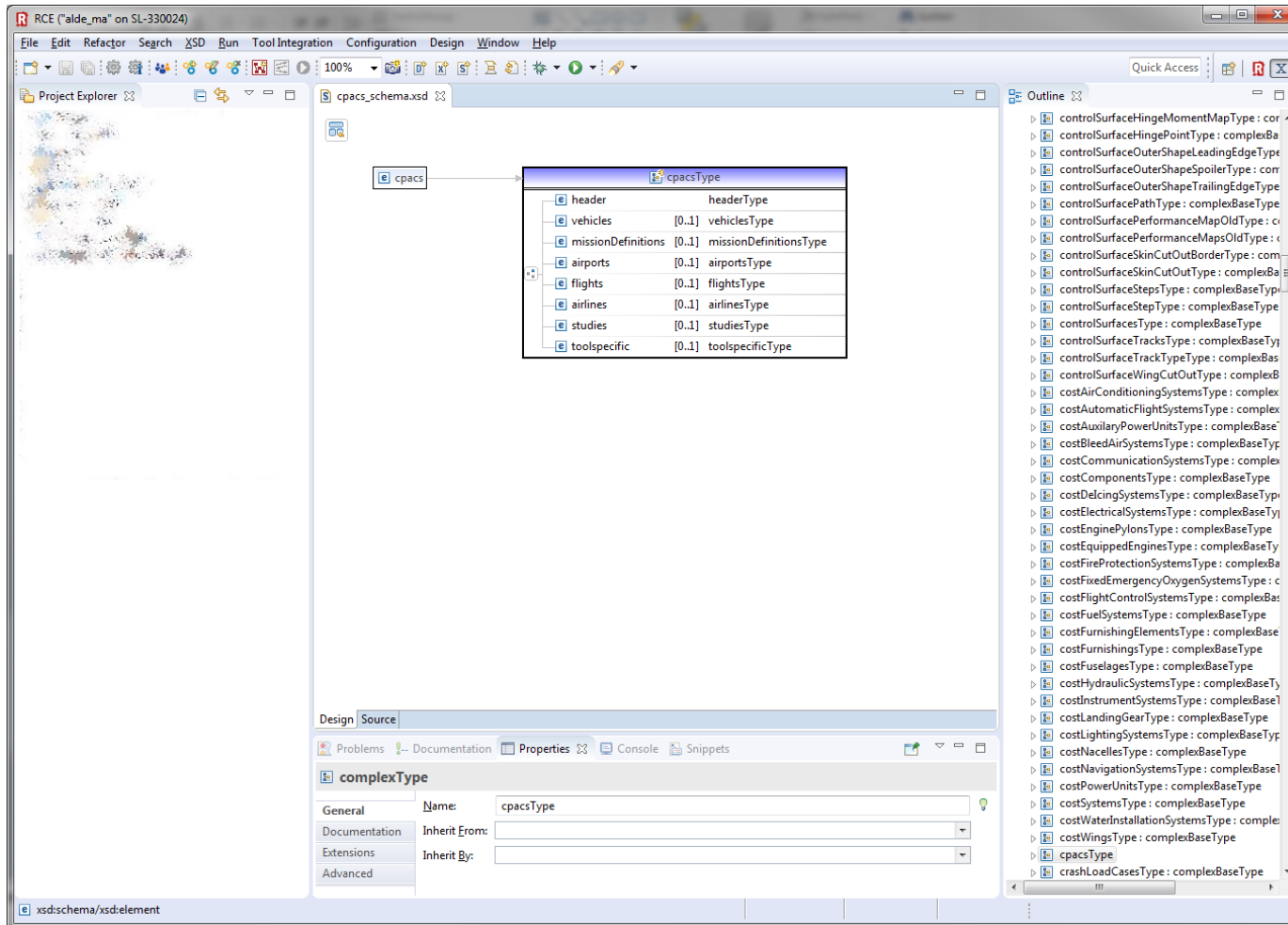
- Open RCE and import the *xsd* file
 - *File* → *Open File...* → *cpacs_schema.xsd*
- It might be more convenient to switch to XML perspective

HTML documentation



- Open RCE and import the *xsd* file
 - *File* → *Open File...* → *cpacs_schema.xsd*
- It might be more convenient to switch to XML perspective
- Double click on the CPACS root element

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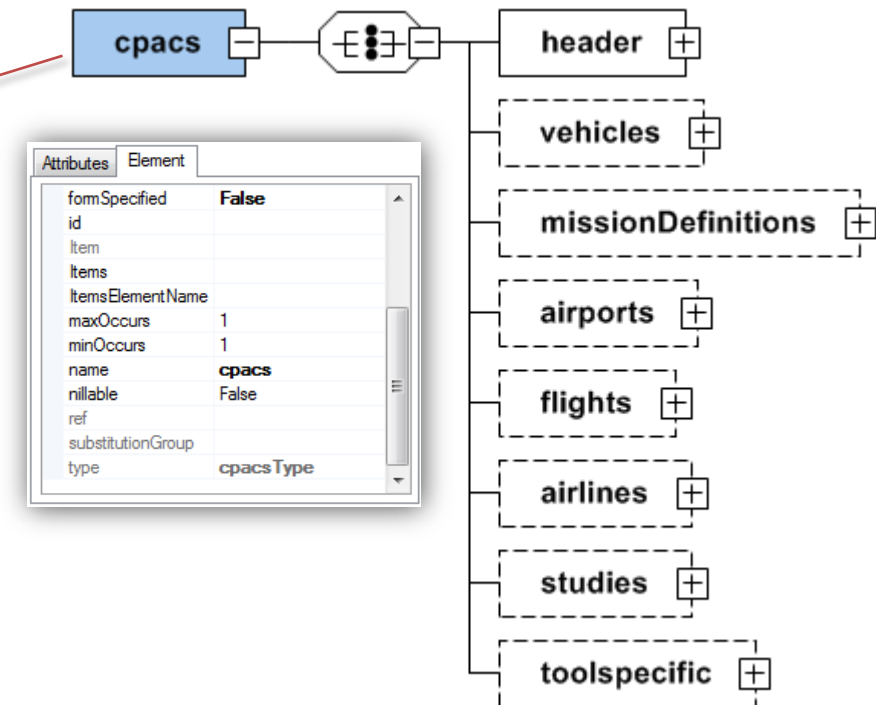


- Double click on the CPACS root element
 - → type of the root element (*cpacsType*) opens
 - it is a complex type, i.e. containing sub-elements

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element name

- Compare with XSD Diagram introduced in part I of this tutorial:

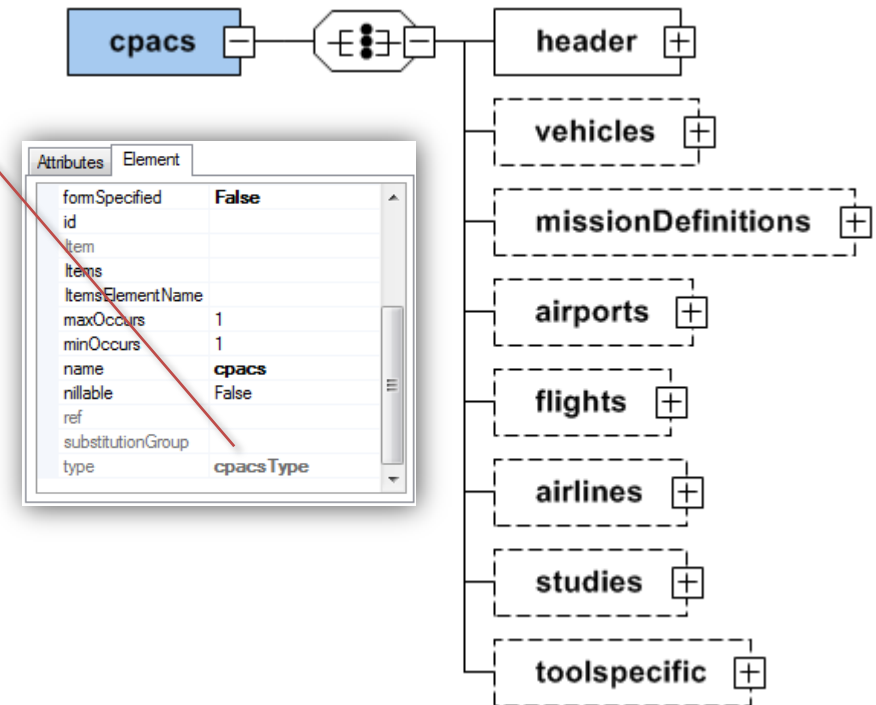


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type of the
element

The screenshot shows the Eclipse IDE with the RCE (XML Schema Editor) plugin. The main window displays the 'cpacs' element and its children: header, vehicles, missionDefinitions, airports, flights, airlines, studies, and toolsspecific. The 'vehicles' element is highlighted, and its details are shown in the 'Properties' pane. The 'Properties' pane shows the 'complexType' for 'vehicles' with the name 'vehiclesType' and the base type 'headerType'. The 'Design' pane shows the 'complexType' for 'vehicles' with the name 'vehiclesType' and the base type 'headerType'.

- Compare with XSD Diagram introduced in part I of this tutorial:

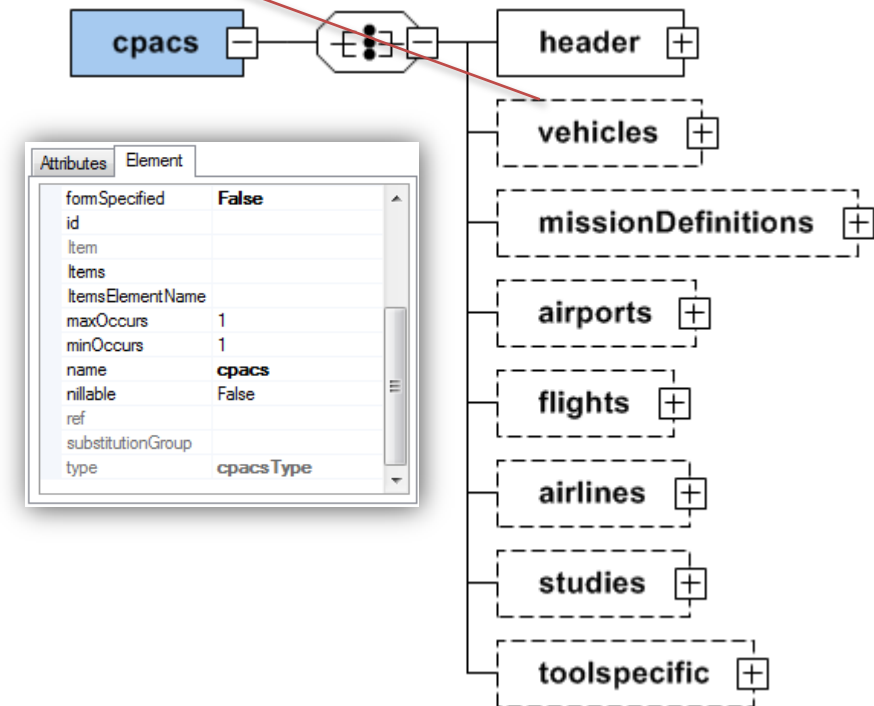


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occurrence of the
child elements

The screenshot shows the Eclipse IDE with the RCE (XML Schema Editor) plugin. The main editor displays the 'cpacs' complex type with its child elements: header, vehicles, missionDefinitions, airports, flights, airlines, studies, and toolspecific. The 'vehicles' element is highlighted, and its occurrence is shown as [0..1]. The 'Outline' view on the right lists all the elements and their base types. The 'Properties' view at the bottom shows the 'complexType' details for 'cpacsType'.

- Compare with XSD Diagram introduced in part I of this tutorial:



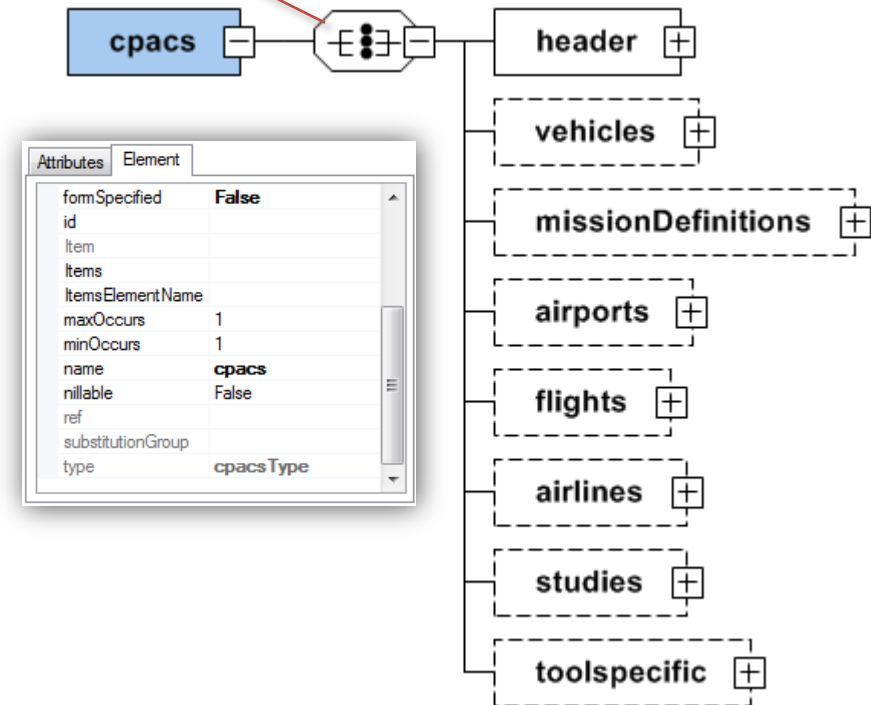
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order of appearance
of the child elements

Compare with XSD Diagram introduced in
part I of this tutorial:

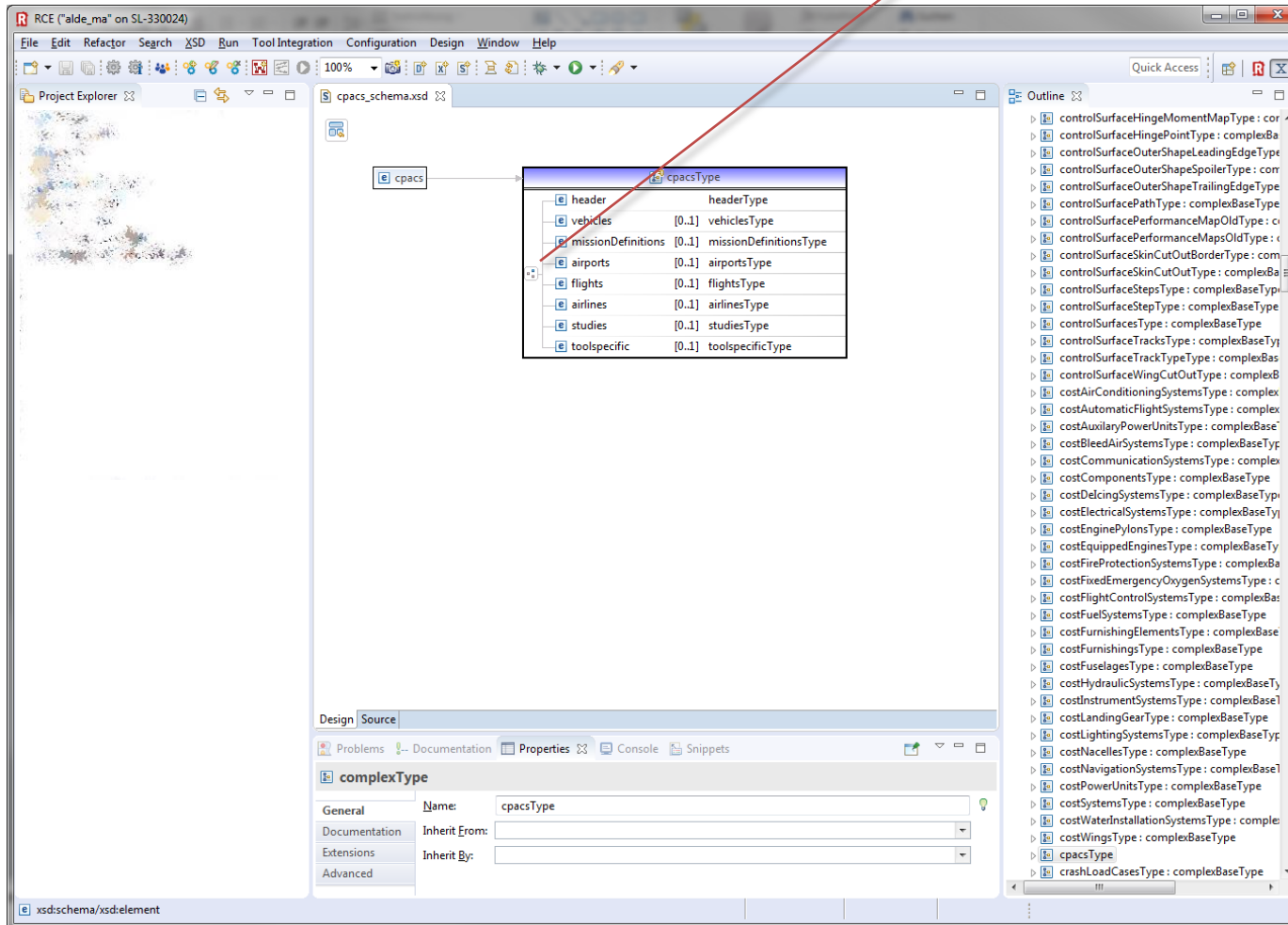
The screenshot shows the Eclipse IDE with the RCE (XML Schema Editor) plugin. The main window displays the 'cpacsType' complex type with its child elements: header, vehicles, missionDefinitions, airports, flights, airlines, studies, and toolspecific. The 'vehicles' element is highlighted. The 'Outline' view on the right lists all the elements and their base types. The 'Properties' view at the bottom shows the 'complexType' details for 'cpacsType'.

Attributes	Element
formSpecified	False
id	
item	
items	
itemsElementName	
maxOccurs	1
minOccurs	1
name	cpacs
nillable	False
ref	
substitutionGroup	
type	cpacsType



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order of appearance
of the child elements



- Sequence is arbitrary (i.e. it does not matter whether *aircraft* is specified first and then *engines* or vice versa)



- Sequence must correspond to the representation in the XSD diagram



- Only one of the nodes may be specified (=choice element):

