

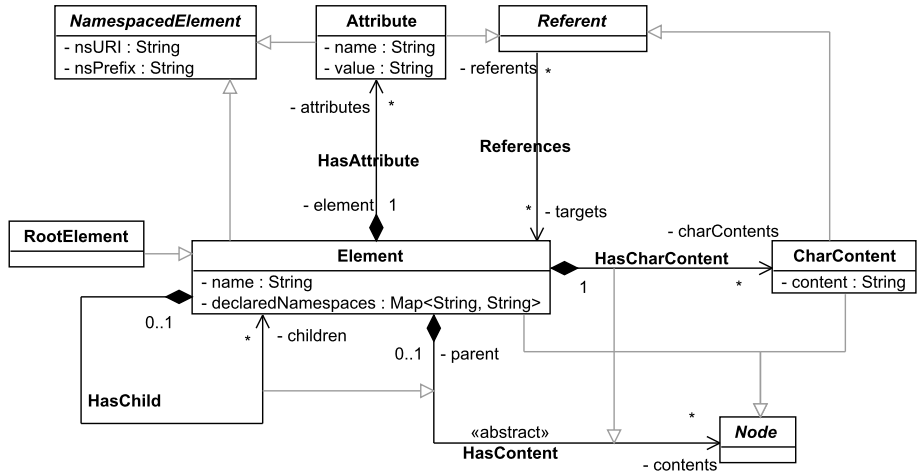
# Solving the TTC FIXML Case with FunnyQT

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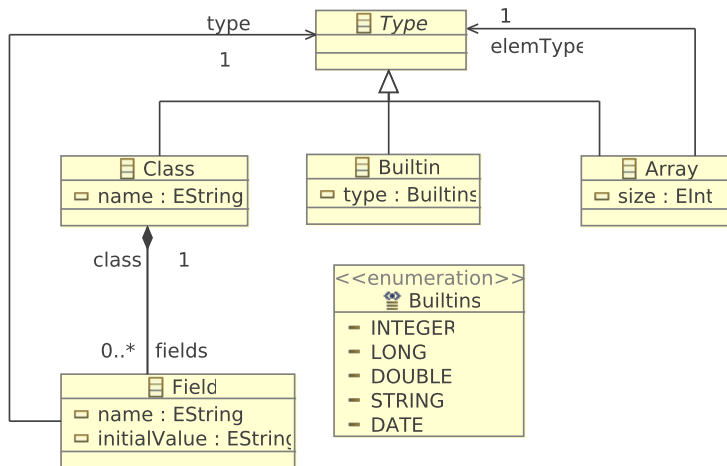
# Task 1: XML to XML Model

That's a FunnyQT built-in Transformation.



# Task 2: XML Model to OO Model

# The OO Metamodel



# The XML Model to OO Model Transformation

- Guesses attribute types (integer, long, double, Date, String)
- Multiple children of the same name become an array field
- Also transforms character contents to fields, e.g., `<foo>17</foo>` will become a field of type integer

# Task 3: OO Model to Code

# The OO Model to Code Transformation

- 1 Uses the Moustache templating library
- 2 Generates Java, C#, C++, and C code (+ getters, setters, destructors, etc.)
- 3 Converts OO Model attribute types to what's appropriate in that language



# Mustache

```

1 class {{{class-name}}} {
2     {{{#fields}}}
3     private {{{field-type}}} {{{field-name}}};
4     {{{/fields}}}
5
6     public {{{class-name}}}() {
7         {{{#fields}}}
8         this.{{{field-name}}} = {{{field-value-exp}}};
9         {{{/fields}}}
10    }
11
12    public {{{class-name}}}({{#fields}}{{~first}}, {{{/first}}}{{{field-type}}} {{{field-name}}}{{{/fields}}}) {
13        {{{#fields}}}
14        this.{{{field-name}}} = {{{field-name}}};
15        {{{/fields}}}
16    }
17
18    {{{#fields}}}
19    public {{{field-type}}} get{{{field-name}}}() {
20        return {{{field-name}}};
21    }
22
23    public void set{{{field-name}}}({{{{field-type}}} {{{field-name}}}) {
24        this.{{{field-name}}} = {{{field-name}}};
25    }
26    {{{/fields}}}
27 }

```

# Evaluation

**Complexity** About 300 expressions, 24 metamodel type references, and 18 property references

**Accuracy** 100%

**Dev. Effort** About 12 person hours

**Fault Tol.** Rejects incorrect XML; can reject invalid FIXML if DTD or XSD is provided (standard StAX parser)

**Exec. Time** Less than 1 sec for any provided model; 1.6 sec for all 6 valid models + 5 extra ones in “multi-message mode”

**Modularity**

- xml-graph2oo-model: 6 rules, 5 dependencies  $\Rightarrow$  0.1666
- to-moustache: 10 functions, 12 dependencies  $\Rightarrow$  -0.2

**Abstr. Level** medium

# Conclusion

- The solution does all extension tasks (except FIXML Schema to Code)
- It even does more than the extensions (e.g., destructors, separation in header/impl for C++ and C, correct imports/includes, array fields instead of multiple fields)
- The generated code compiles as-is (without warnings)
- It has a more accurate “multi-messages mode”
- It's reasonable fast