

BUILDING CONFIDENCE IN CODE GENERATORS WITH MODEL TESTING

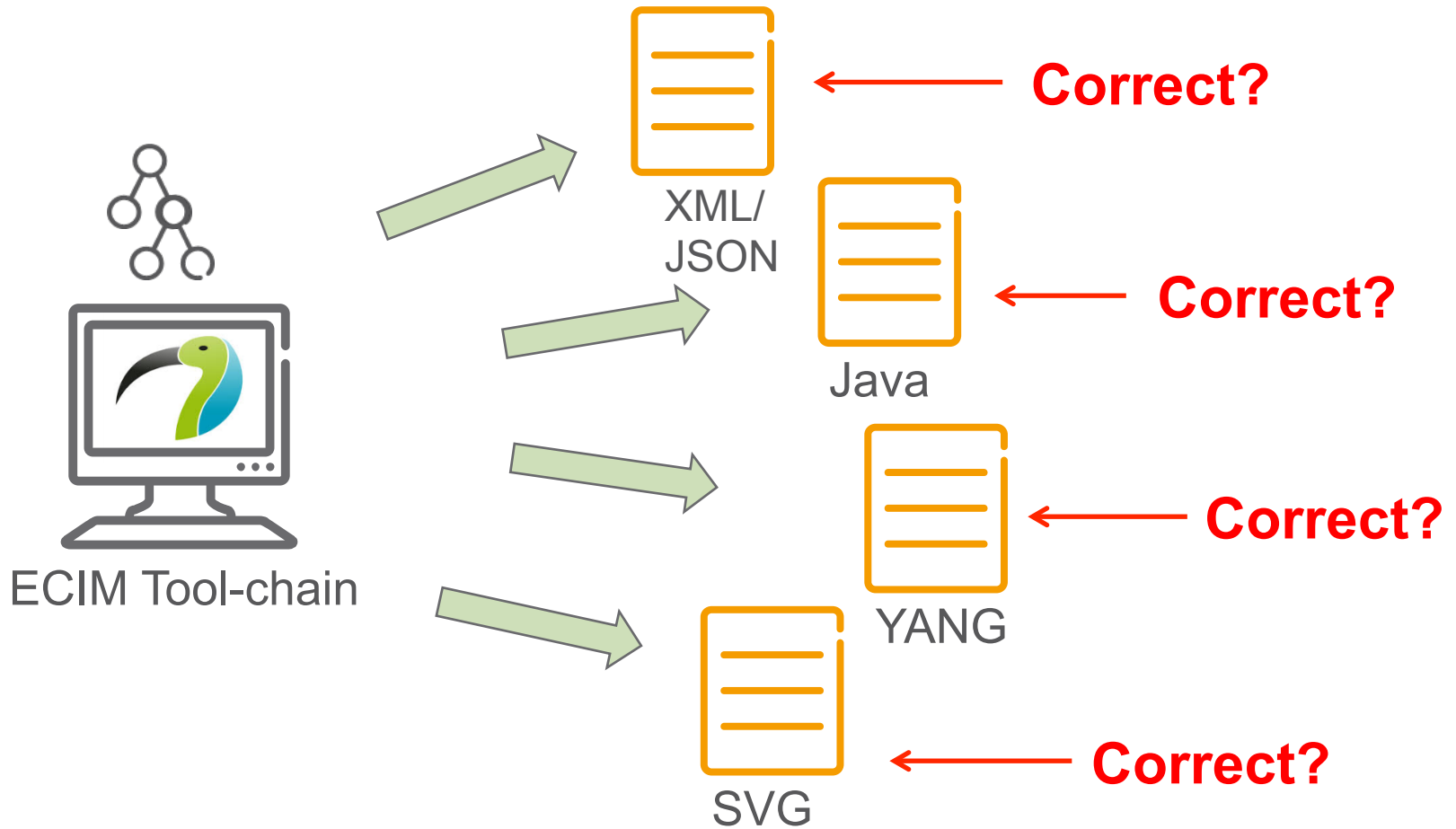
WHO ARE WE?



- › Eclipse Tool Developers
 - Enabling model driven O&M solutions



THE PROBLEM



JUST LIKE TESTING CODE?



- › Not at all... It is complex to
 - Generate test data
 - Define oracles for testing



MODEL TRANSFORMATION EXAMPLE



```
<m>  
  <a n="1">  
    <b>x</b>  
  </a>  
  <a n="2">  
    <b>x</b>  
    <b>y</b>  
  </a>  
</m>
```

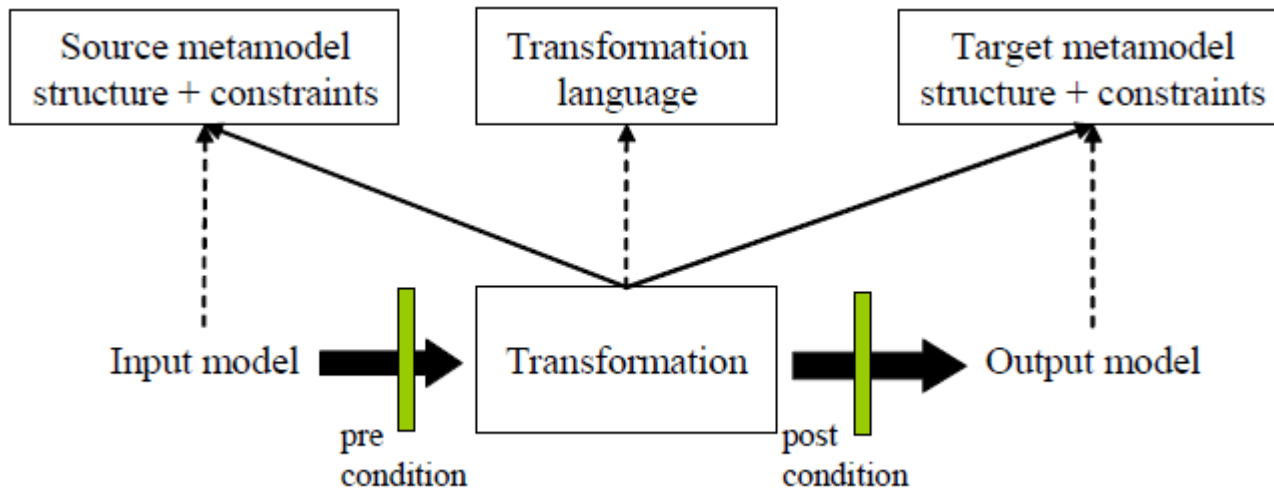
input



```
<m2>  
  <w q="x">1,2</w>  
  <w q="y">1</w>  
</m2>
```

output

GENERAL FRAMEWORK FOR MODEL TRANSFORMATION



TEST MODEL



Conforms to

- structure
- constraints
- pre-conditions

Complete

- all constructs covered

TEST MODEL GENERATION



Manually defined

Automatically generating

Hybrid approach

TEST ORACLES



- › Conformance to target meta model
- › Post-conditions
- › Invariants

```
<m>  
  <a n="1">  
    <b>x</b>  
  </a>  
  <a n="2">  
    <b>x</b>  
    <b>y</b>  
  </a>  
</m>
```

input



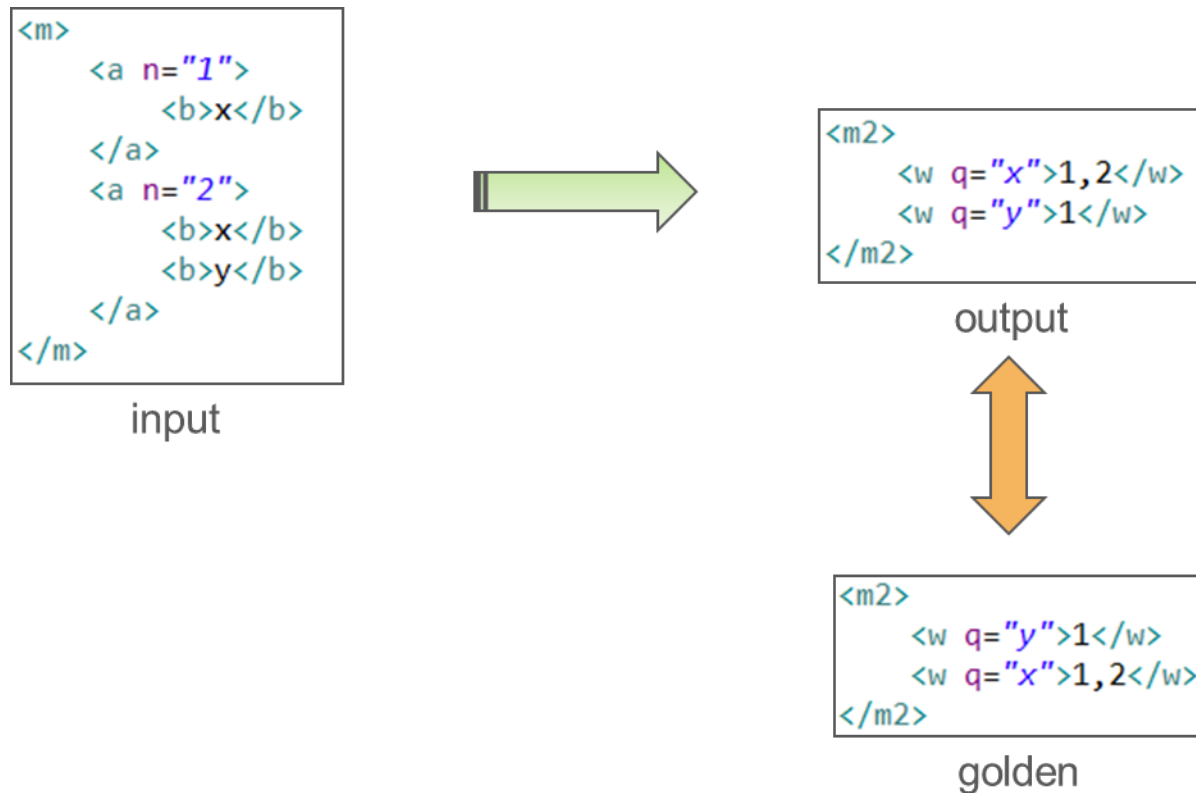
```
<m2>  
  <w q="x">1,2</w>  
  <w q="y">1</w>  
</m2>
```

output

TEST ORACLES, CONT.



› Comparing with Golden model



GOLDEN-OUTPUT DIFF



- › In XML, what about
 - Order of elements?
 - Comments?
 - Certain tag data?

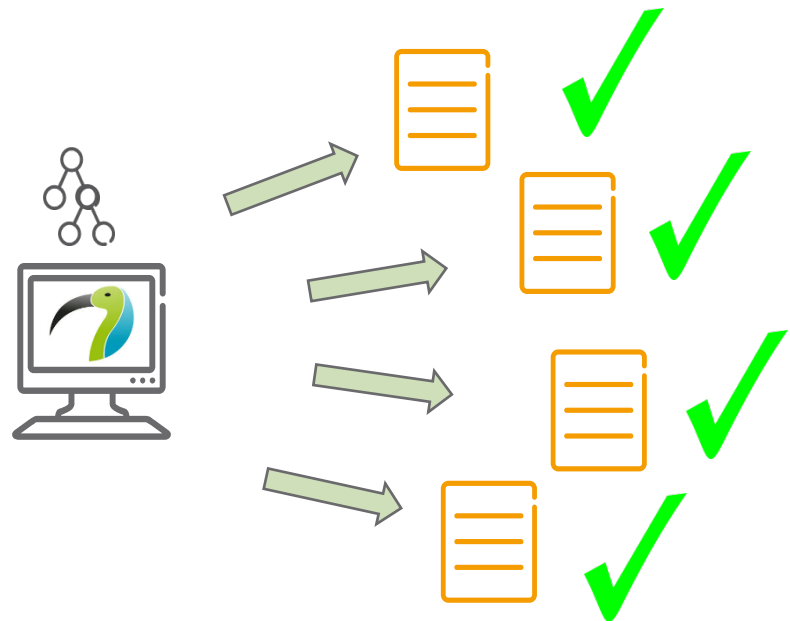


- › Custom XML comparison utility needed

OUR SOLUTION



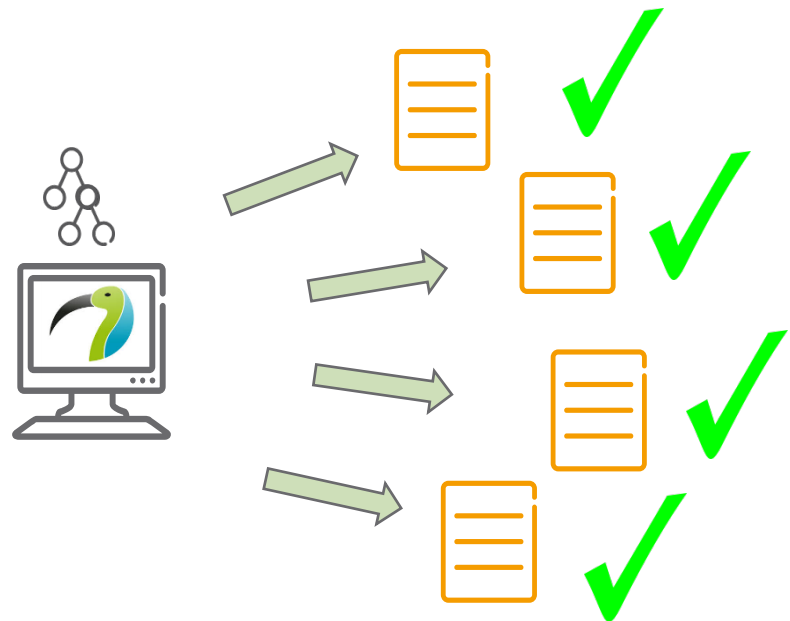
- › Mix of test models
- › Schema Compliance
- › Comparison with Golden Files



OUR SOLUTION CONT.



- › External model validators
- › Oracle invariants
- › Custom post checks



...BRAVELY TRIED



› Image pattern matching



THANK YOU FOR LISTENING!





ERICSSON