WORLD CUSTOMS ORGANIZATION
ORGANISATION MONDIALE DES DOUANES
WCO Data Model Official Distributor
Approved WCO Distributor

GEFEG

Fast-Track To Electronic Cross Border Procedures

# WCO DM XML and Auto-generation Exercise

- **Introduction to WCO DM XML**
- **Exercise to auto-generate conformant WCO DM XML message**
- **Benefits of auto-generation from customisations**

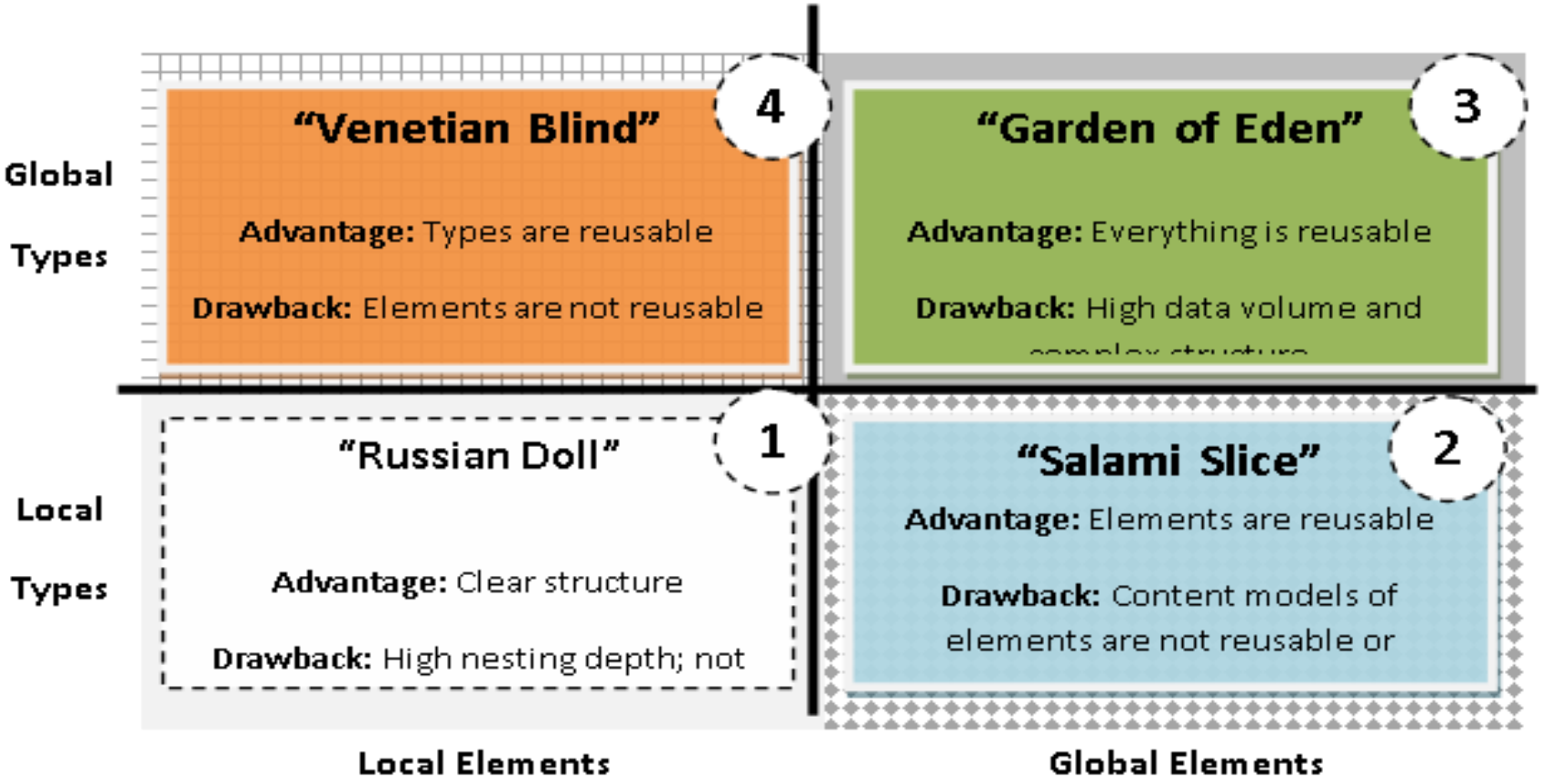
**Michael Dill, GEFEG**

# XML Schema Design Aspects

- The design and consequently the usage of any XML schema depends on the relationships between elements and their types
- Each design pattern has pros and contras
- WCO XML Design: almost (simple types are global) Russian Doll
- The Russian Doll design allows for maximum customization, maximum validation and minimum reuse, supports well Web Services development (e.g. Boeing WebService)
- In some cases this has raised XML concerns when the XML design of the published schemas are actually not suited to their required usage of their planned XML exchanged schemas
- In these cases the advice would be for them to generate differently designed XML schemas based on the UML data model message structures published Information Packages

**Any adoption of the WCO Data Model may require other formats in addition or as alternatives to the use of the WCO Data Model XML schemas.**

# XML Schema Design Patterns



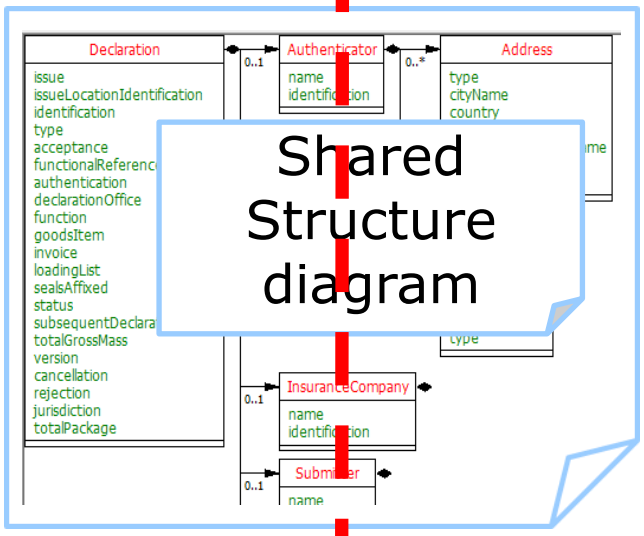
# From Message Specification to Technical Implementation



**Business Expert** | **Technical Implementer**

My business contextualisations will be automatically „transformed" to support my technical implementation team.

Business Usage Documentation




Shared Structure diagram

XML Usage Documentation

Schematron validation rules

XML Schemas (XSD)



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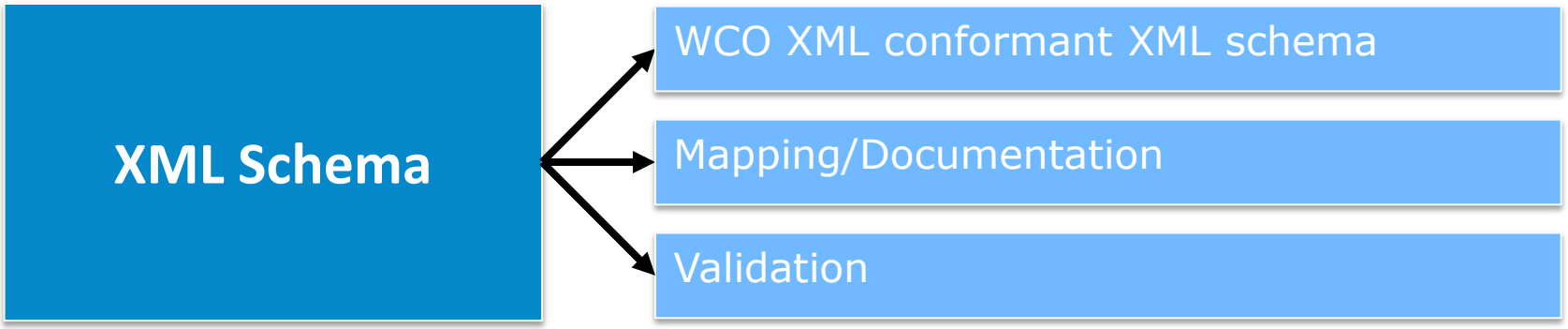
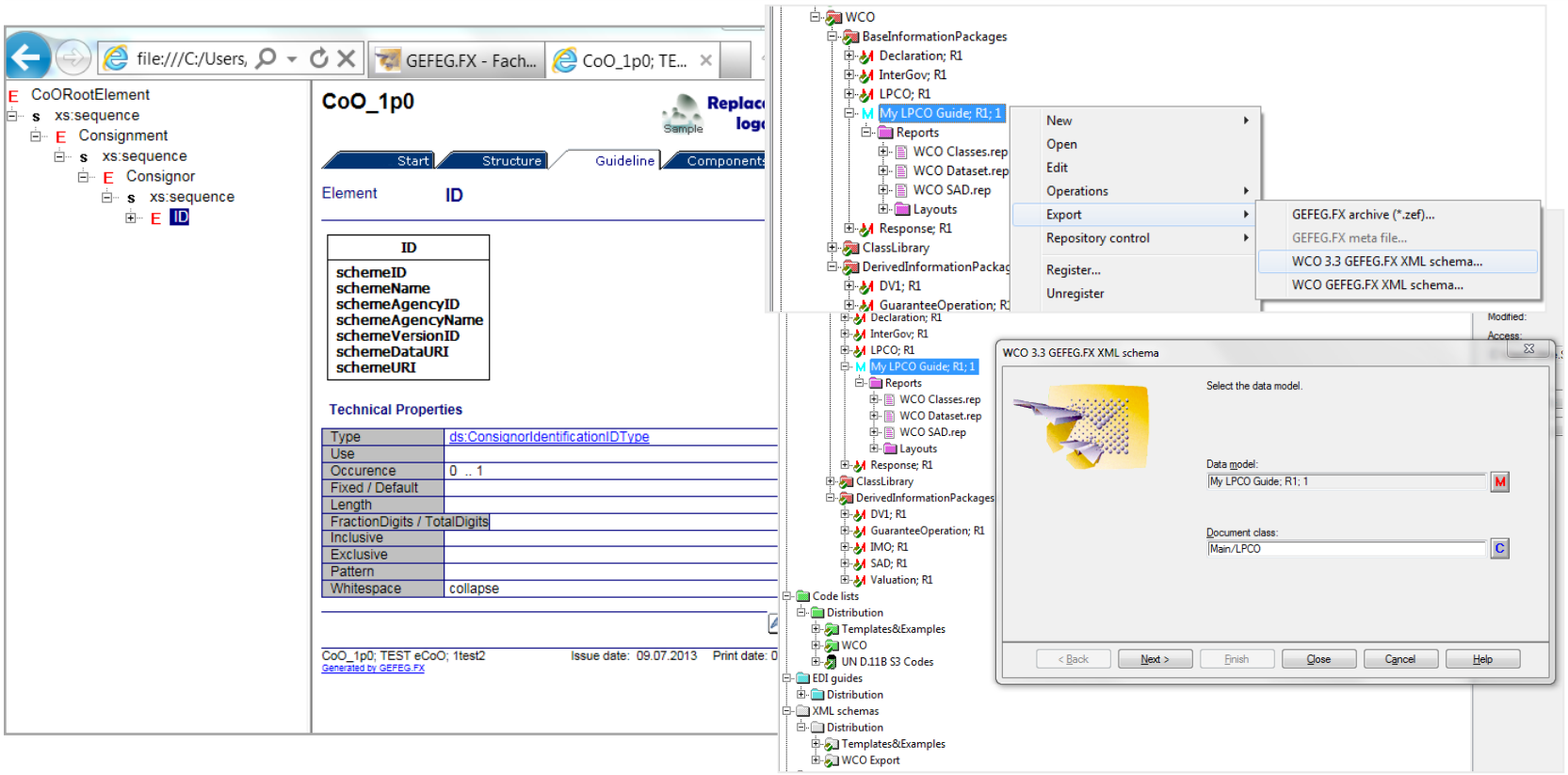
# WCO DM Compliant XML Schema



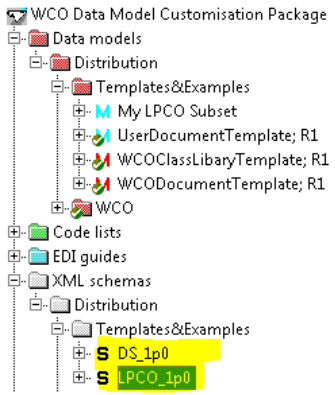

- Display XML languages, develop and manage XML
- Auto-generation of XML from Data Model structures
- Create business documentation for XML schema implementation
- Validation of business rules (Schematron)
- Complete W3C recommendation implemented

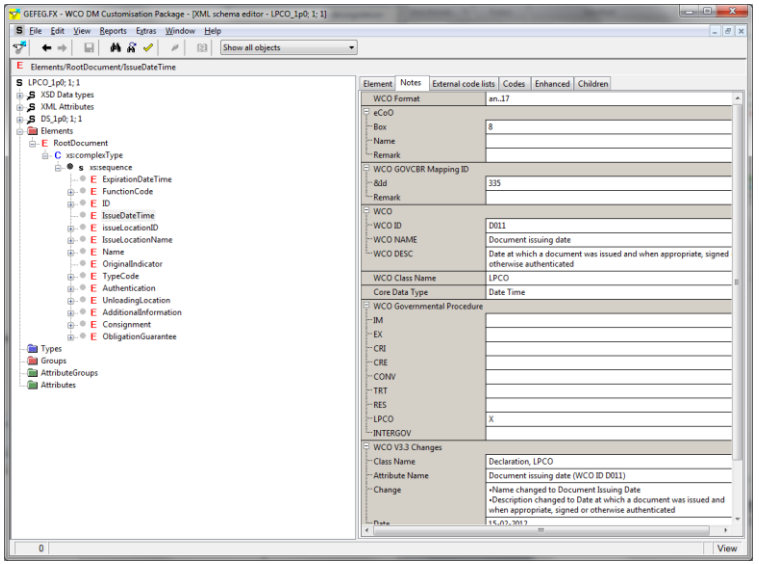
# WCO Compliant XML Schemas Specifications



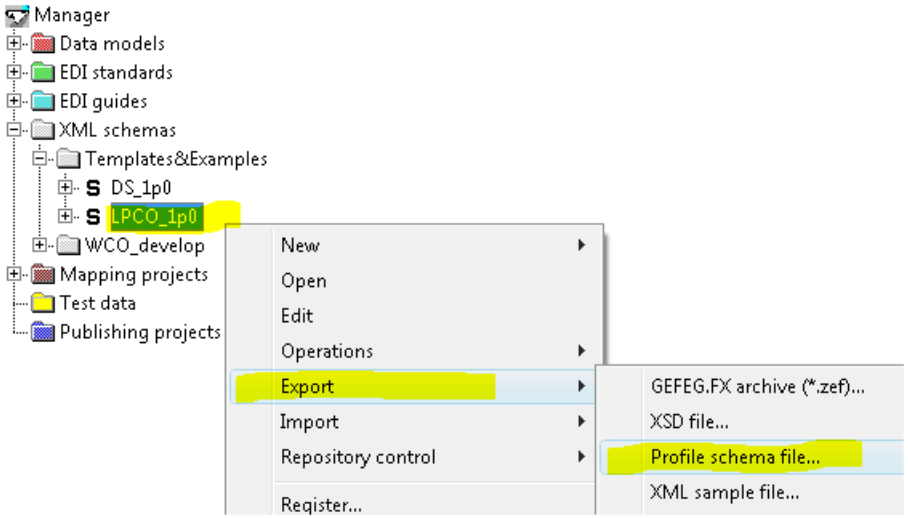
# Resulting GEFEG.FX XML Schemas

- Order of Elements in the schema is following the Order of classes and attributes in the WCO Data Model
- Mixture of Russian Doll and Venetian Blind schema design approach is used
- Element Naming follows „UpperCamelCase" naming and design concept
- Use of UN/CEFACT Unqualified Data Type to represent the Core Component Technical Specifications (CCTS) Core Data Types of the WCO data elements
- For any WCO Data Model attribute one unique type will be created in the Dataset schema e.g. "DS_1p0 XML-Schema"



# Generate XSD Files

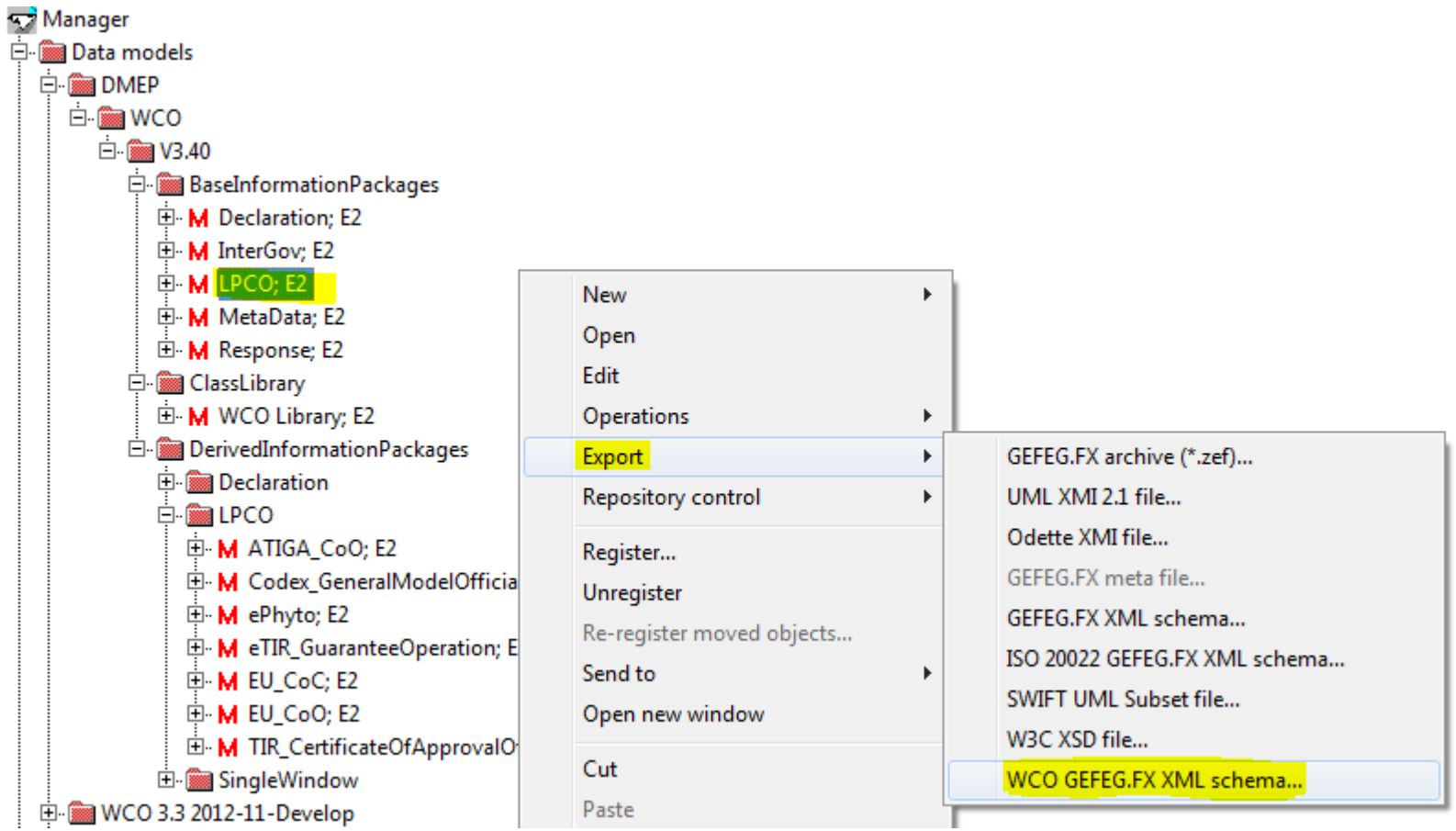



```
  elementFormDefault="qualified">
<xs:import namespace="urn:wco:datamodel:WCO:DS:DS" schemaLocation="CoO_1p0_urn
<xs:element name="CoORootElement">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="Consignment" minOccurs="0" maxOccurs="unbounded">
        <xs:annotation>
          <xs:documentation xml:lang="EN">
            <WCO_ID>28A</WCO_ID>
            <WCO_NAME>Consignment</WCO_NAME>
            <WCO_DESC>Details about the transport between a consignor and a co
          </xs:documentation>
        </xs:annotation>
        <xs:complexType>
          <xs:sequence>
            <xs:element name="Consignor" minOccurs="0" maxOccurs="unbounded">
              <xs:annotation>
                <xs:documentation xml:lang="EN">
                  <WCO_ID>30A</WCO_ID>
                  <WCO_NAME>Consignor</WCO_NAME>
                  <WCO_DESC>Name and address details of the party which, by co
                </xs:documentation>
              </xs:annotation>
              <xs:complexType>
                <xs:sequence>
```

# Generate Schematron Files as the W3C Standard for Validation

```
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns="http://purl.oclc.org/dsdl/schematron"
    queryBinding="gefeg"
    schemaVersion="iso">
  <title>Schema for CoO_1p0; TEST eCoO; 1test2</title>
  <ns uri="coo_ns:1" prefix="p1"/>
  <ns uri="http://www.gefeg.com/xsltextensions" prefix="gefeg"/>
  <ns uri="urn:un:unece:uncefact:codelist:standard:IANA:CharacterSetC
  <ns uri="urn:un:unece:uncefact:codelist:standard:IANA:MIMEMediaType
  <ns uri="urn:un:unece:uncefact:codelist:standard:ISO:ISO3AlphaCurre
  <ns uri="urn:un:unece:uncefact:codelist:standard:UNCEFACT:Character
  <ns uri="urn:un:unece:uncefact:codelist:standard:UNECE:AgencyIdenti
```

# Auto-generate Conformant WCO DM XML Message



# Benefits of Auto-generation from Customisations

- Easy to use function for non technical business users
- User subsets and customizations (My Information Packages) can be exported, as well as WCO Base Information Packages (BIPs), Derived Information Packages (DIPs)
- Auto-generation of XSD Schema files based on the WCO data model
- Result is a WCO conformant XML Schema
- Final output can be influenced in regard to contents, design