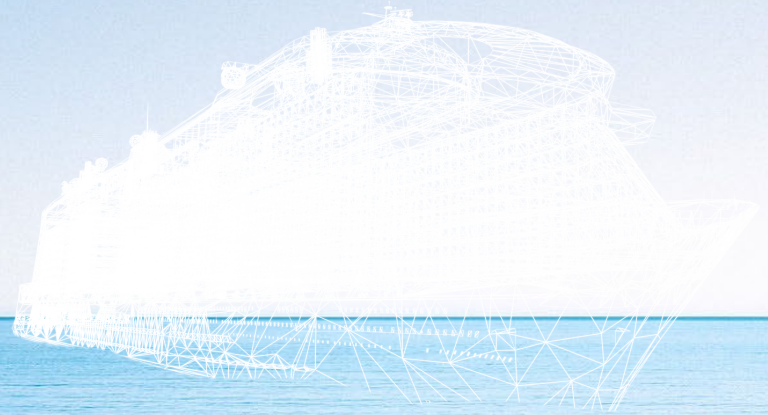
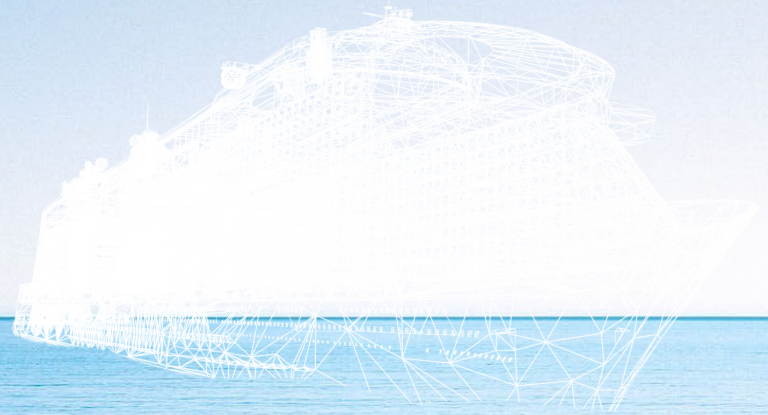


OCX Revisited

The Profane Thoughts of Alexander Danetzky, Jan Bitomsky, Carsten Zerbst

COMPIT 2022



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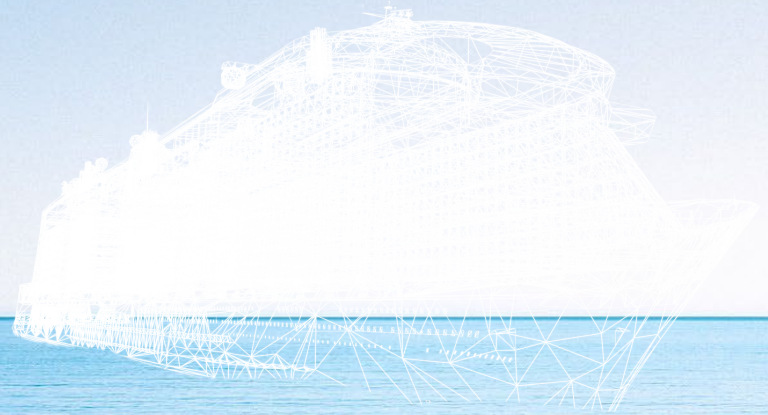

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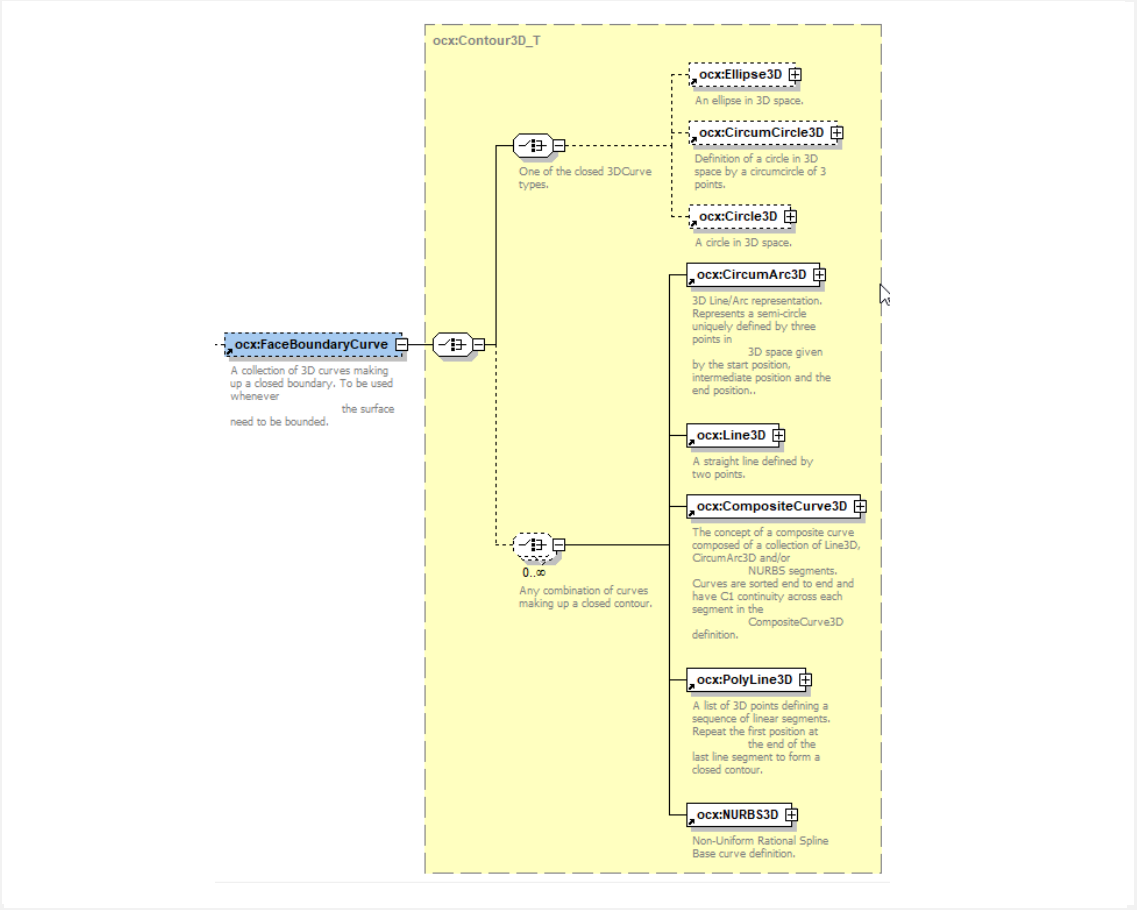
OCX Format

- A XML schema dedicated to transferring ship information
- Sections for
  - Major Dimensions
  - Compartmentation
  - Ship Structure
  - Catalogue information
- Geometry model supports all currently used basic curve and surface types



OCX Format

Caveats and Minor Criticisim

Caveats

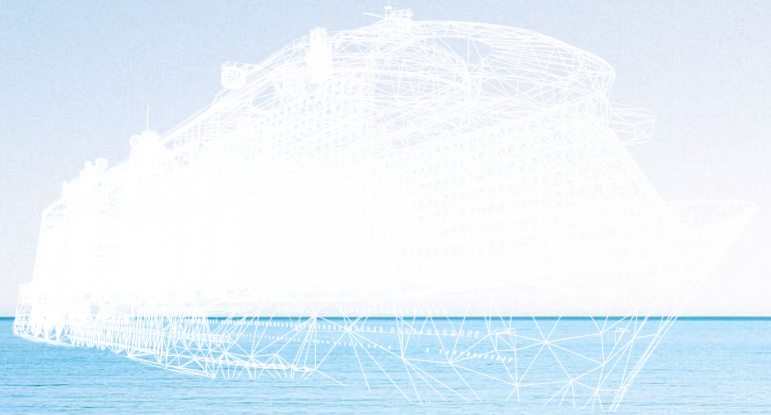
- Requires Unit Handling Implementation
- Requires geometry evaluation

Minor Criticism

- URL for XSD Schema is not the download address
- Schema version is not part of the URL
- Duplicated Element Name

```
http://data.dnvgl.com/Schemas/ocxXMLSchema

https://github.com/OCXStandard/OCX_Schema/
        blob/main/OCX_Schema.xsd
```



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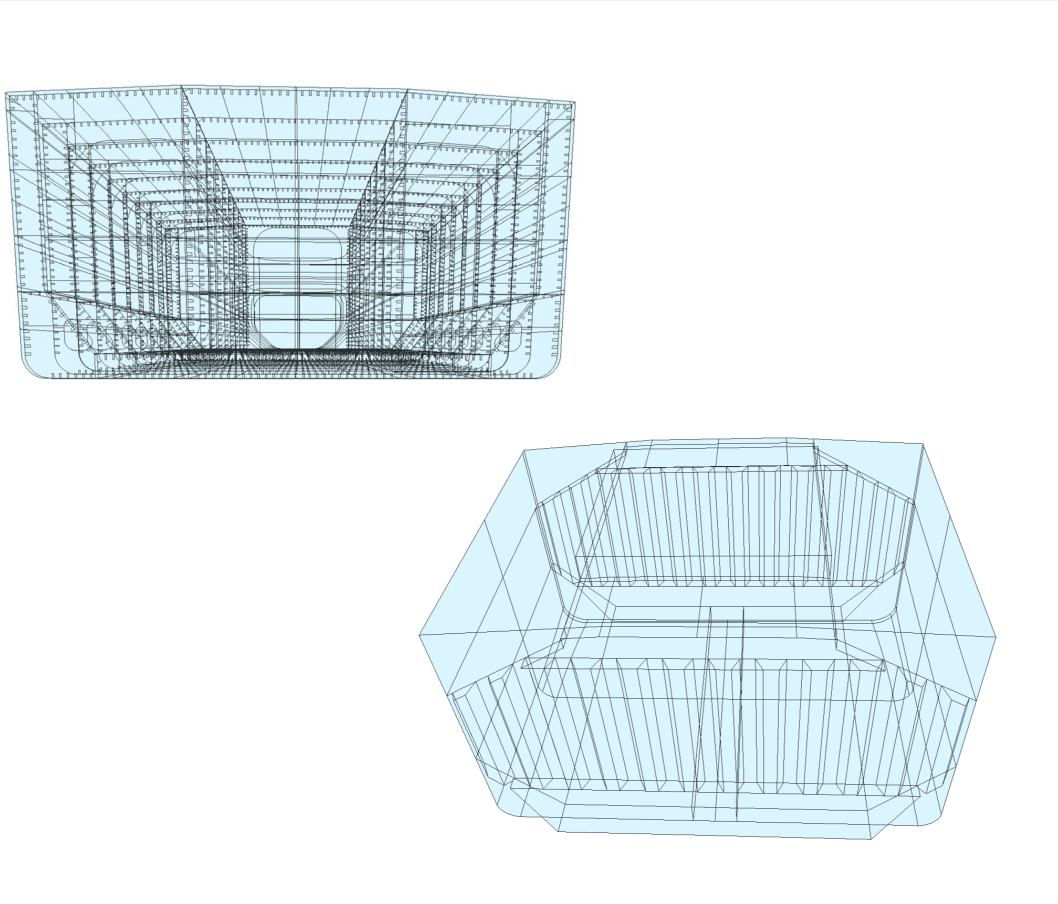
Implementation

JAVA

- Create JAVA classes and readers using JAXB
- Two elements called Length in the schema, needs manual annotation

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs=http://www.w3.org/2001/XMLSchema
    xmlns:vc=http://www.w3.org/2007/XMLSchema-versioning
    xmlns:ocx="http://data.dnvgl.com/Schemas/ocxXMLSchema"
    xmlns:unitsml="urn:osis:names:tc:unitsml:schema:xsd:
                                        UnitsMLSchema_lite-0.9.18"
    xmlns:jaxb="http://java.sun.com/xml/ns/jaxb"
    xmlns:xjc="http://java.sun.com/xml/ns//xjc"
    targetNamespace="http://data.dnvgl.com/Schemas/ocxXMLSchema"
    elementFormDefault="qualified" attributeFormDefault="unqualified"
    vc:minVersion="1.1" jaxb:version="2.0">
      <!-- CZ Import the NIST unitsML lite schema from local file -->
      <xs:import namespace="urn:oasis:names:tc:unitsml:schema:xsd:
                                        UnitsMLSchema_lite-0.9.18"
                schemaLocation="unitsmlSchema_lite-0.9.18.xsd"/>
  …

  <xs:element name="Length" type="ocx:Quantity_T">
      <xs:annotation>
          <xs:documentation>The curve length computed by the  …
          </xs:documentation>
          <!-- CZ Rename classname to OCXLength to avoid name clash -->
          <xs:appinfo>
              <jaxb:class name="OCXLength"/>
           </xs:appinfo>
      </xs:annotation>
  </xs:element>
```



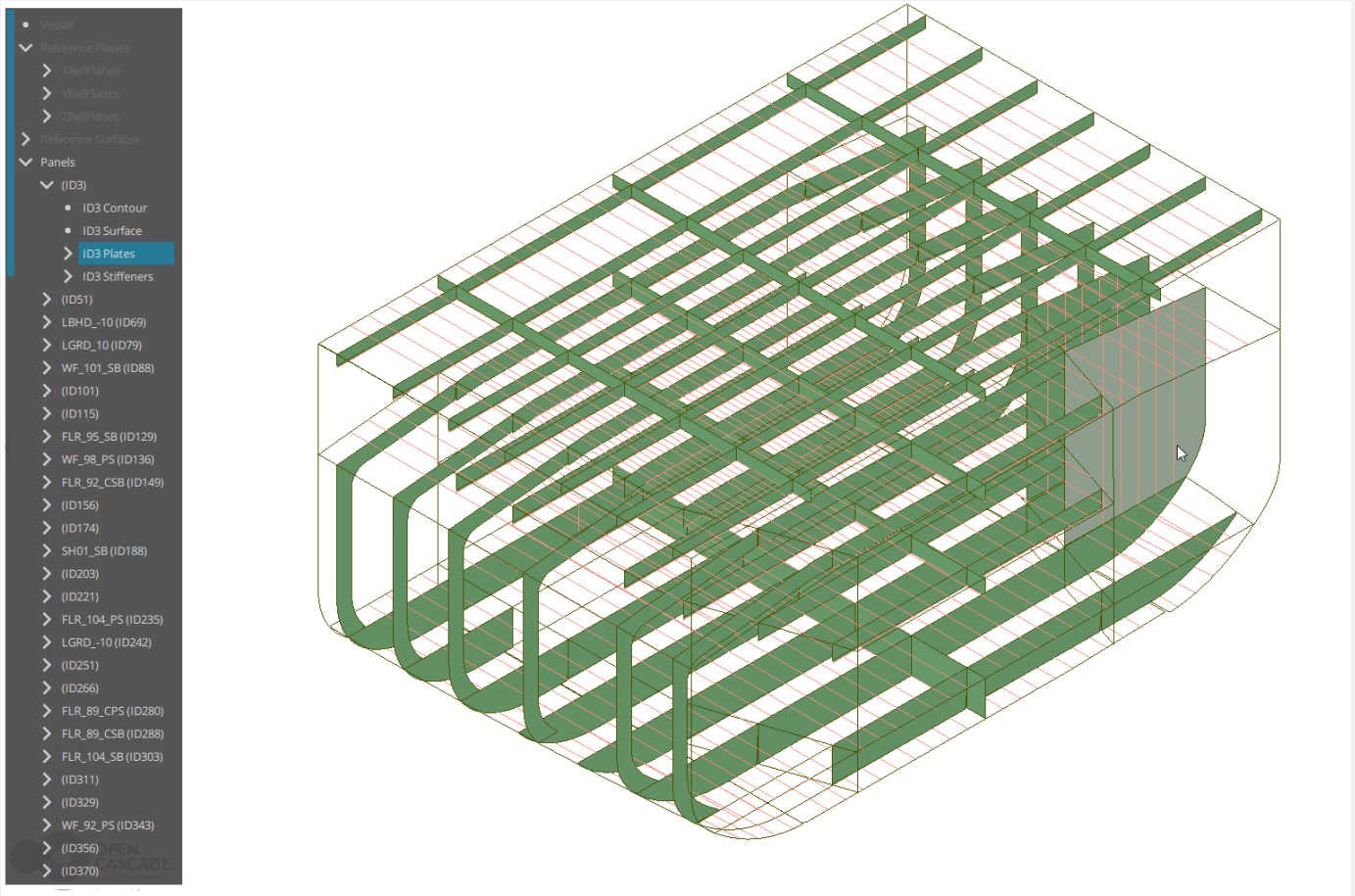
Implementation

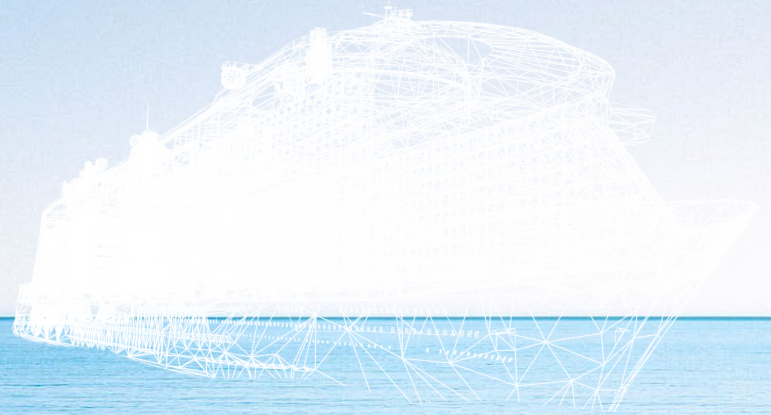
Open CASCADE Based

- Read OCX Files into Open CASCADE OCAF
- Create Geometry for reference surfaces, plates, stiffeners, brackets
- Write e.g. as STEP or GLTF
- Work in Progress

- Giving Back to the community
- Copyright Carsten Zerbst, LGPL v2.1
- https://github.com/skfcz/OCXReader

- Expect the first usable version in autumn
- Collaboration welcome





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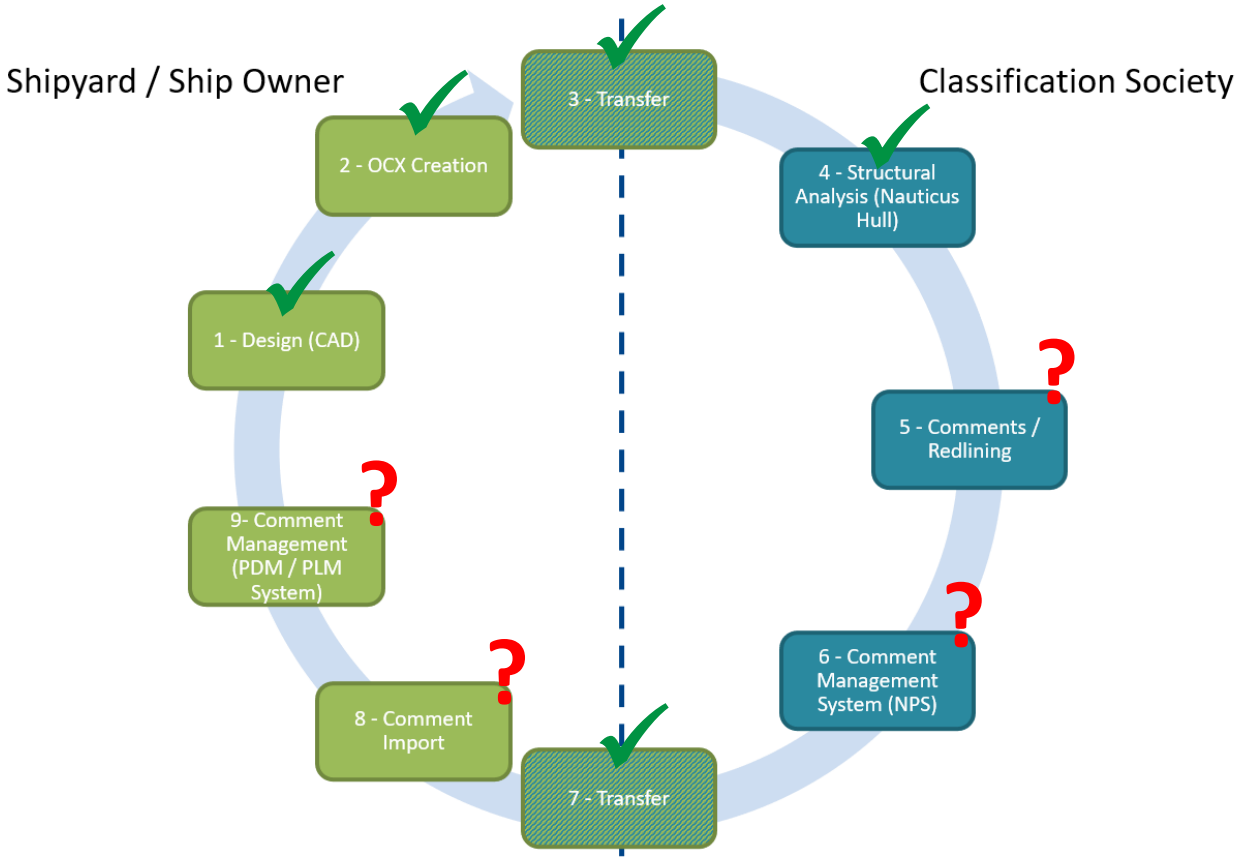
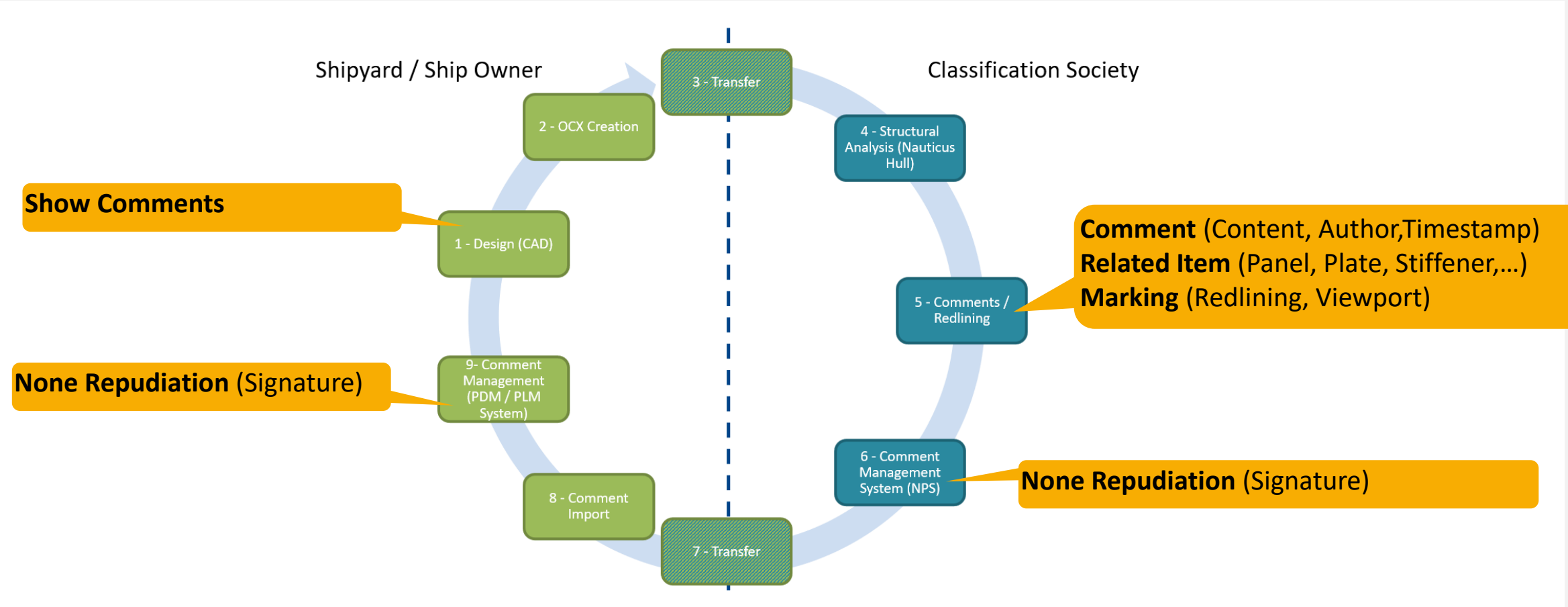
Use Case Yard and Classification Society



Use Case Yard, Classification Society



Enhancement Potential

Comments, Redlining

```
<ocx:Comment time_stamp="2022-03-27T10:24:26.6169717+02:00">
    <ocx:CommentText>...</ocx:CommentText>
    <ocx:Viewport id="viewPort1"  ocx:GUIDRef="eeb5c790-75a3-4d05-a220-e1716762a0bd"    >
        <ocx:EyePosition >
            <ocx:Point3D>
                <ocx:X numericvalue="81.95" unit="Um" />
                <ocx:Y numericvalue="-17.0412" unit="Um" />
                <ocx:Z numericvalue="15.7633" unit="Um" />
            </ocx:Point3D>
        </ocx:EyePosition>
        <ocx:EyeDirection >...</ocx:EyeDirection>
        <ocx:ViewportDiameter>
            <ocx:D numericvalue="93.8912" unit="Um" />
        </ocx:ViewportDiameter>
    </ocx:Viewport>
</ocx:Comment>
```

Borrow from AP242 or JT Standard

Enhancement Potential

Signature

- Sign the complete document or part of it
- Allows receiver to validate the information
- Existing Standard
  - RFC 3923, "End-to-End Signing and Object Encryption for the Extensible Messaging and Presence Protocol (XMPP)
  - S/MIME
  - PGP
  - XML-Dsig

```
<Signature>
  <SignedInfo>
    <CanonicalizationMethod />
    <SignatureMethod />
    <Reference>
       <Transforms />
       <DigestMethod />
       <DigestValue />
    </Reference>
    <Reference /> etc.
  </SignedInfo>
  <SignatureValue />
  <KeyInfo />
  <Object />
</Signature>
```

Enhancement Potential

Approval

- What parts have been approved for which status ?

Borrow from AP242 BOM Standard

```
<DocumentVersion uid="ID_138">
    <ApprovalAssignment uid="ID_342">
        <AssignedApproval uidRef="ID_337"/>
    </ApprovalAssignment>
```

```
<Approval uid="ID_337">
    <Description>
        <CharacterString>disposition</CharacterString>
    </Description>
    <Status>
        <ClassString>in progress</ClassString>
    </Status>
</Approval>
```

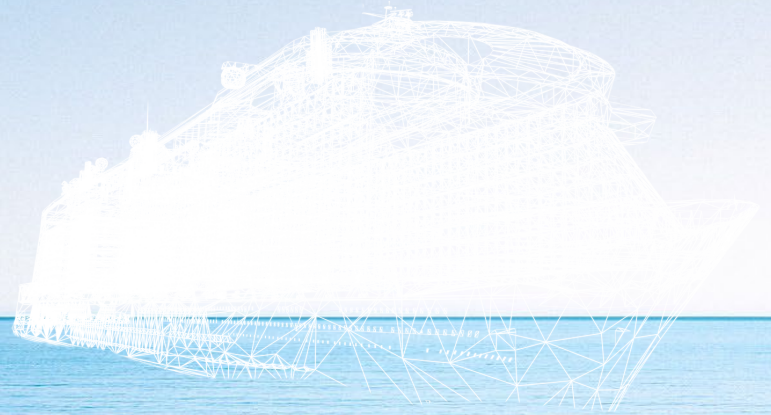
Enhancement Potential

Generic Property

- Many companies customize their CAD / PLM Systems
- Currently there is no place to transfer those customized information in OCX

Borrow from AP242 BOM Standard

```
<DocumentDefinition uid="ID_139" xsi:type="bom:DigitalDocumentDefinition">
    <Id id="/NULL"/>
    <PropertyValueAssignment uid="ID_140">
        <AssignedPropertyValues>
            <PropertyValue uid="ID_133" xsi:type="bom:StringValue">
                <Definition>
                    <PropertyDefinition uidRef="ID_67"/>
                </Definition>
                <Name>
                    <CharacterString>PDMIFInt_DS</CharacterString>
                </Name>
                <ValueComponent>
                    <CharacterString>1</CharacterString>
                </ValueComponent>
            </PropertyValue>
```



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OCX Format

Praise and Hail

- Well-made format
- Supported by major shipbuilding CAD companies
  - AVEVA
  - CADMATIC
  - HEXAGON
  - NAPA
  - SIEMENS
- OCX gained more support in the last 2 years than STEP protocols in the 20 years before
- Supports more use cases than just yard / classification society

- We identified some gaps, to support the full forth and back between the design office and the classification society
- Most notably these are
  - Commenting and redlining
  - Status / Scope definition
  - None repudiation
- We hope this could be introduced into the standard

We a **hiring** in Hamburg

THANK YOU!

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