

A white flag is flying against a clear blue sky. The word "VATTENFALL" is printed in large, bold, black capital letters across the middle of the flag. To the right of the text is a stylized logo consisting of three curved, overlapping shapes in yellow, white, and blue. The flag is attached to a pole on the left side.

**VATTENFALL**

# **The Vattenfall Group**

Presented in September 2007

# Number of substations using IEC 61850 (sept 2007)

- Germany 5
- Sweden 3
- Finland 1

## Most important problems to date

For utilities:

**Lack of training and education !!!!!!**

For suppliers:

**Lack of training and education !!!!!!**

- SSD = System specification description
- ICD = IED capability description
- SCD = Substation configuration description
- CID = Configured IED description
- IID = Instantiated IED description
- SED = System exchange description

SCD

SSD

```
<xs:element name="LN" type="TLN">
  <xs:unique name="uniqueReportControlLN">
    <xs:selector xpath="/scl:ReportControl"/>
    <xs:field xpath="@name"/>
  </xs:unique>
  <xs:unique name="uniqueLogControlLN">
    <xs:selector xpath="/scl:LogControl"/>
    <xs:field xpath="@name"/>
  </xs:unique>
  <xs:key name="DataSetKeyInLN">
    <xs:selector xpath="/scl:DataSet"/>
    <xs:field xpath="@name"/>
  </xs:key>
  <xs:keyref name="ref2DataSetReport" refer="DataSetKeyInLN">
    <xs:selector xpath="/scl:ReportControl"/>
    <xs:field xpath="@datSet"/>
  </xs:keyref>
  <xs:keyref name="ref2DataSetLog" refer="DataSetKeyInLN">
    <xs:selector xpath="/scl:LogControl"/>
    <xs:field xpath="@datSet"/>
  </xs:keyref>
</xs:element>
```

```
<ConnectedAP iedName="E1Q1SB1" apName="S1">
  <Address>
    <P type="IP">10.0.0.1</P>
    <P type="IP-SUBNET">255.255.255.0</P>
    <P type="IP-GATEWAY">10.0.0.101</P>
    <P type="OSI-TSEL">00000001</P>
    <P type="OSI-PSEL">01</P>
    <P type="OSI-SSEL">01</P>
  </Address>
  <GSE IdInst="C1" cbName="IIIPositions">
    <Address>
      <P type="MAC-Address">01-0C-CD-01-00-01</P>
      <P type="APPID">3000</P>
      <P type="VLAN-PRIORITY">4</P>
    </Address>
  </GSE>
  <SMV IdInst="C1" cbName="Volt">
    <Address>
      <P type="MAC-Address">01-0C-CD-04-00-01</P>
      <P type="APPID">4000</P>
      <P type="VLAN-ID">123</P>
      <P type="VLAN-PRIORITY">4</P>
    </Address>
  </SMV>
</ConnectedAP>
```

SED

```
<xs:element name="LN" type="TLN">
  <xs:unique name="uniqueReportControlLN">
    <xs:selector xpath="/scl:ReportControl">
    <xs:field xpath="@name"/>
  </xs:unique>
  <xs:unique name="uniqueLogControlLN">
    <xs:selector xpath="/scl:LogControl">
    <xs:field xpath="@name"/>
  </xs:unique>
  <xs:key name="DataSetKeyInLN">
    <xs:selector xpath="/scl:DataSet">
    <xs:field xpath="@name"/>
  </xs:key>
  <xs:keyref name="ref2DataSetReport" refer="DataSetKeyInLN">
    <xs:selector xpath="/scl:ReportControl">
    <xs:field xpath="@datSet"/>
  </xs:keyref>
  <xs:keyref name="ref2DataSetLog" refer="DataSetKeyInLN">
    <xs:selector xpath="/scl:LogControl">
    <xs:field xpath="@datSet"/>
  </xs:keyref>
</xs:element>
```

IID

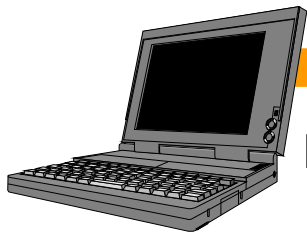
```
<xs:complexType name="TLN">
  <xs:complexContent>
    <xs:extension base="AnyLN">
      <xs:attribute name="InClass" type="TLNClassEnum" use="required"/>
      <xs:attribute name="Inst" type="xs:unsignedInt" use="required"/>
      <xs:attribute name="prefix" type="AnyName" use="optional"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

ICD

```
<xs:complexType name="TLN">
  <xs:complexContent>
    <xs:extension base="AnyLN">
      <xs:attribute name="InClass" type="TLNClassEnum" use="required"/>
      <xs:attribute name="Inst" type="xs:unsignedInt" use="required"/>
      <xs:attribute name="prefix" type="AnyName" use="optional"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

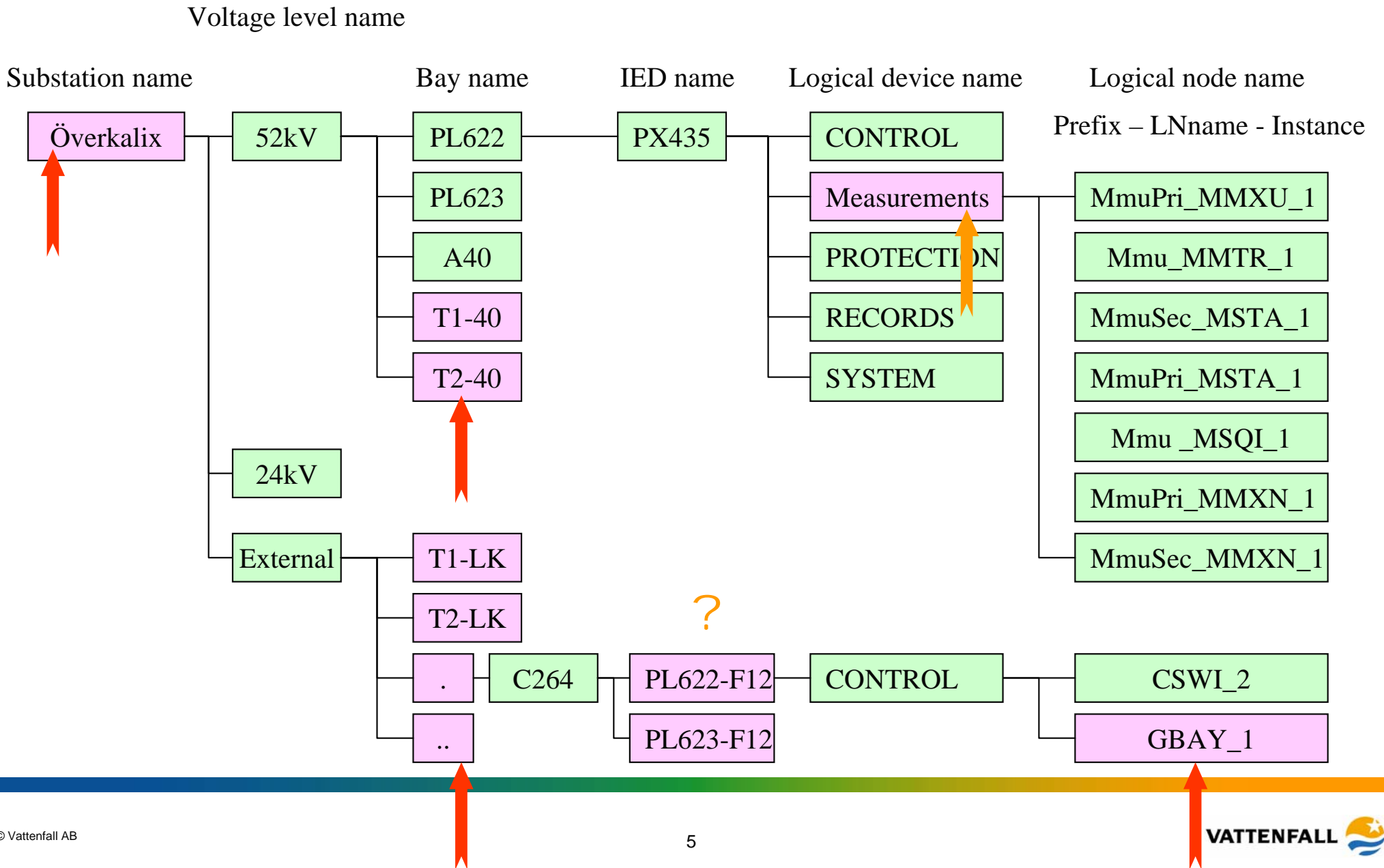
CID

Parameterization



Usage of the configuration language

# Errors found in SCD file of a turn-key substation



## Other problems

- Interfaces in case of partial refurbishments
- No vendors of HMI systems on line yet
- No “certified” tools for use by utility / maintenance
- What should be included in a sufficient SAT?