The Role of XML in TMN Evolution

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Presentation Overview

- Evolution as a consequence of convergence in the communication market.
- Extended Mark-up Language (XML) applied within TMNs existing structure.
- XML development in the FORM project.
- A ‘Simple Textual Alarm Interface with XML’ specification.
- ITU-T SG4 adopts XML-based standards for telecommunication management.
- Conclusions

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Convergence in the communications market will:

- Put pressure on TMN to support the integration of a wider range of management technologies.
- Increase the needs for mediation support for the interoperation between TMN conformant technologies and emerging ones.
- Open for reuse of components, tools and skills from other technologies in development of telecommunication management systems.

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XML applied within TMNs existing structure:

- For generation and publication of MIB specifications.
- For definitions of managed objects that are independent of the syntax of existing modelling languages, but can be mapped to them.
- As the basis for a new protocol binding for CMIS using XML to CMIS gateways.

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XML for generation and publication of MIB spec's

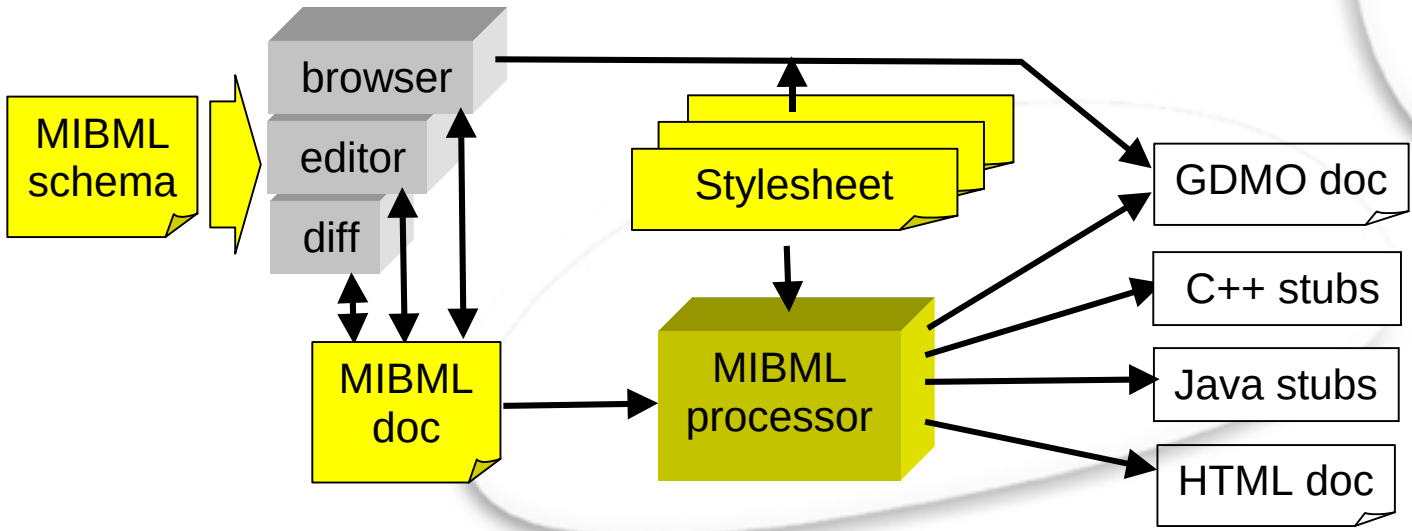

Figure shows use of a MIB Mark-up Language (MIBML).

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XML as basis for a new protocol binding for CMIS

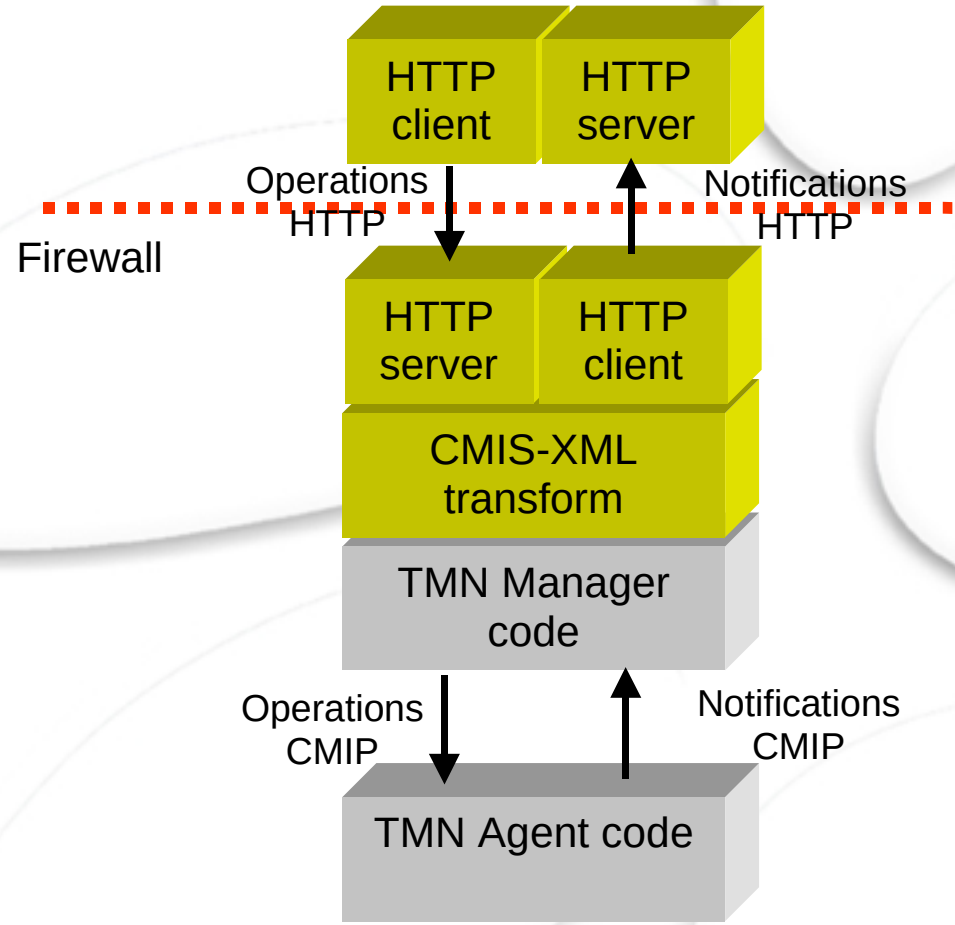

Figure shows integration of TMN conformant systems with Web-based systems.

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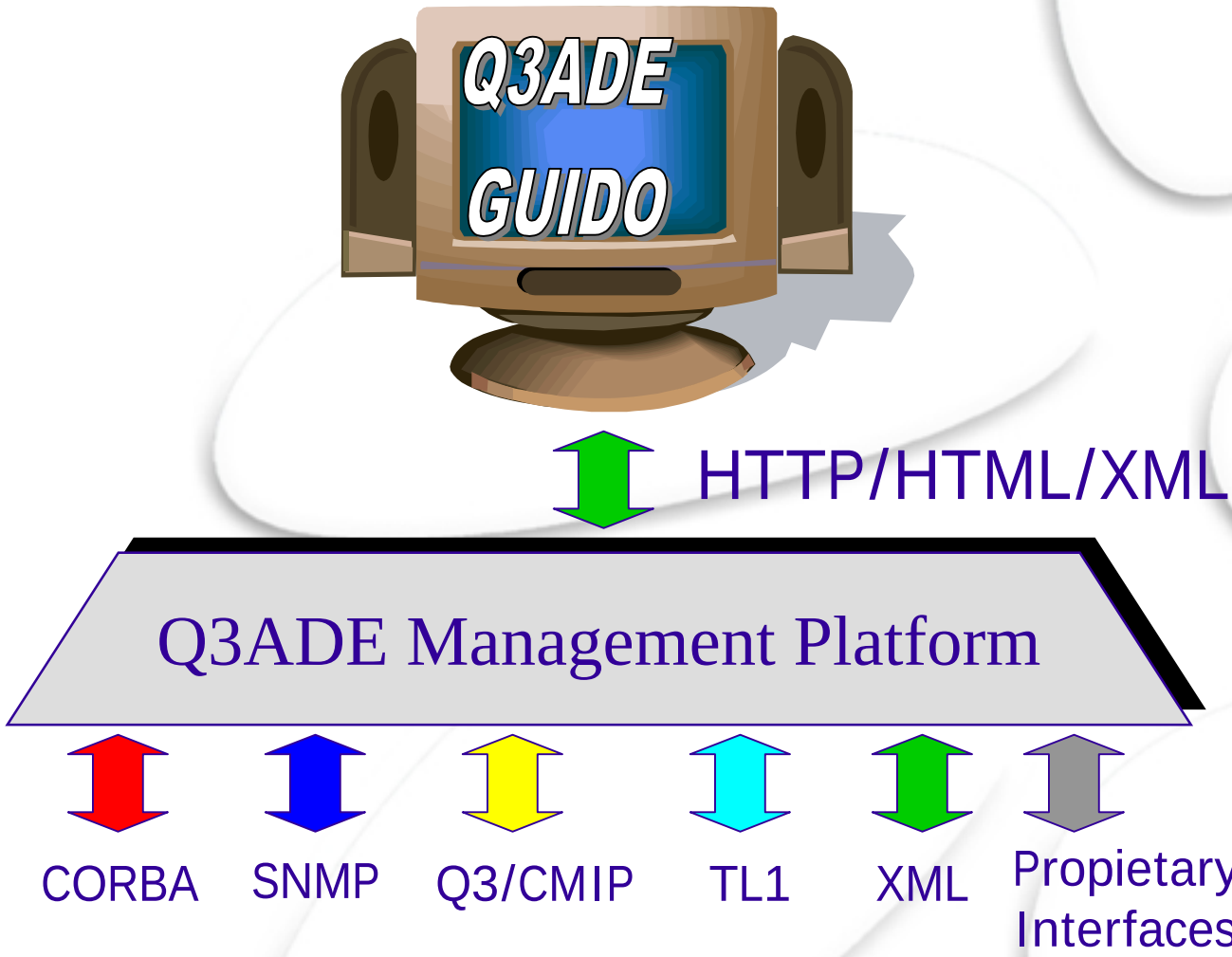
XML as basis for a new protocol binding for CMIS



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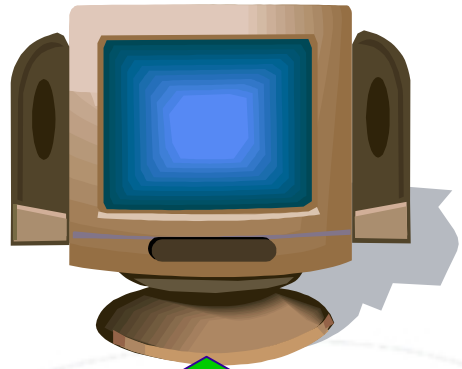
COM-enabled applications
e.g. Word, Excel etc.



HTTP/HTML/XML

Apache/IIS Web server

Server scripts
e.g. ASP, PHP

Servlet/COM

Q3ADE Management Platform

CORBA SNMP Q3/CMIP TL1 XML Propietary Interfaces

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XML Development in FORM project

- The use of XML for accessing service level TMN models is being prototyped in the FORM project using a XML-HTTP to CMIS gateway from U.H.C.
- Early results shows that XML is a very useful technology to convey management information.
- The feasibility of using an existing TMN platform (UHCs Q3ADE) for supporting management information models represented in XML is also being examined in FORM.

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Simple Textual Alarm Interface with XML

Reasoning for specifying a low-level and low-cost method:

- Vendors of network elements outside the mainstream telecommunication world generally neglected requirements for a standard network management interface.

By utilising XML TDC Tele Danmark enables:

- Vendors to utilise low cost XML tools to generate alarms.
- Q-Adaptor developers to utilise standard XML techniques and tools to process alarms.
- Specification: 'Simple Textual Alarm Interface with XML', was submitted to ITU-T SG4 (January 2001).

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Simple Textual Alarm Interface : QXML alarm template

```
<?xml version="1.0" encoding='ISO-8859-1' ?>
<!DOCTYPE roiv-apdu SYSTEM "stai.dtd">
<roiv-apdu>
  <invokeID>45</invokeID>
  <operation-value oper="m-EventReport" />
  <argument>
      <managedObjectClass>smscFacility</managedObjectClass>
      <managedObjectInstance>
          <distinguishedName>
              <rdn attrname="managedElementId">smsc</rdn>
              <rdn attrname=" softwareId">AD</rdn>
          </distinguishedName>
      </managedObjectInstance>
      <eventTime timetype="mix">20000531102959.9+0200</eventTime>
      <eventType evtype="communicationsAlarm" />
      <eventInfo>
          <probableCause cause="5" />
          <perceivedSeverity severity="minor" />
          <notificationIdentifier>345</notificationIdentifier>
          <additionalText xml:lang="en-uk">This is an alarm
          </additionalText>
      </eventInfo>
  </argument>
</roiv-apdu>
```

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Simple Textual Alarm Interface : DistinguisedName

- DN of an object comprises the sequence of Relative DNs.
- To maintain this significant ordering of RDNs the element ‘rdnlist’ was defined to allow recursive usage:

```
DTD: <!ELEMENT rdnlist (rdn, rdnlist?)>
        <!ELEMENT rdn (#PCDATA)>
        <!ATTLIST rdn
                  attrname   CDATA   #REQUIRED>

Schema:  <xsd:complexType name="rdnlistType" content="elementOnly">
            <xsd:sequence>
                <xsd:element name="rdn" type="rdnType"
                             minOccurs="1" maxOccurs="1" />
                <xsd:element name="rdnlist" type="rdnlistType"
                             minOccurs="0" maxOccurs="1" />
            </xsd:sequence>
         </xsd:complexType>
```

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ITU-T SG4 Adopts XML Based Standards

- ITU-T SG 4 will publish a series of telecommunications management Recommendations based on the WWW Consortium (W3C) XML standard, which will be referred to as ‘telecommunications Mark-up Language’ (tML).
- To provide support for message exchanges across different networking, hardware, and software platforms that exist between telecommunication trading partners.
- To use tML to enable telecommunication businesses to develop new ways to facilitate efficient and automated interactions between their trading partners.

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Conclusions

The paper outlined how XML can play an important role in the evolution of TMN.

- XML will allow TMN to preserve its strengths while making it accessible to a wider range of software developers and more easily interoperable with the rapidly increasing range of technologies that can be applied to management.
- The hierarchical structure of XML documents reflects well that of the Manager-Agent models typical in management applications.
- The use of general purpose XML tools to define management information models and to process information in management applications becomes an attractive possibility.

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