TECHNICAL REPORT

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AMENDMENT 1
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Amendment 1

Power system control and associated communications – Deregulated energy market communications

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FOREWORD

This amendment has been prepared by IEC technical committee 57: Power system control and associated communications.

The text of this amendment is based on the following documents:

Enquiry draft	Report on voting
57/556/Q	57/576/RQ, 57/576A/RQ

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until 2003. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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0.1 Reference documents

Add the following reference to the list:

ISO/IEC 14662, *Information technology – Open-edi reference model*

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Add the following new annex E:

Annex E

Use of Internet technologies

E.1 Technological advancement

The report gives an overview of market models at the time of writing and possible communication platforms based on UN/EDIFACT messages or Internet technologies as HTML over HTTP. Whereas EDIFACT messages were widely used (e.g. in the Ediel System of Scandinavia and now also in some other European countries and elsewhere), the Internet approach at the time of writing had the drawback that no standardized messages in HTML were available leading to proprietary solutions. Also security of the Internet was an issue.

In the meantime the Internet Language Definition Standard XML (eXtensible Markup Language) was defined by W3C as a subset of SGML (Standard Generalised Markup Language). With XML applications can share data using a Schema as DTD (Document Type Definition) or XSD (XML Schema Definition) which defines the grammar. One of the outstanding features of XML is that data can be given a name tag which makes it easier to map data to data bases. Whereas the main purpose of XML is data transmission between applications and data bases the content can also easily be visualized with an Internet Browser using CSS (Cascaded Style Sheets) or XSLT (Extensible Stylesheet Language for Transformation) together with CSS.

UN/EDIFACT and XML are not competing solutions and can be combined in what is now called “Web-EDI”. Already regional new initiatives are taken to define their own XML/EDI solutions. Many XML architectures have been proposed, so far none of these is a global Standard and they compete against each other. The most promising architecture seems to be ebXML (electronic business XML) supported by UN/CEFACT (The United Nations Centre for Trade and Electronic Business) which is intended to become an International Standard. This architecture can be combined with EDIFACT messages mapped to XML. The mapping is already done by CommerceNet, XML/EDI Group and ANSI ASC X12 Working Group and will be soon available in the Internet. Alternatively, the content of EDIFACT messages is re-engineered using so called core components from a future and hopefully standardized global e-business XML vocabulary under the auspices of UN/CEFACT.

Business processes can be modelled with the meta language UML (Unified Modeling Language of Open Management Group (OMG)). Figure E.1 shows the modelling with UML and the production of XML Schemas with the XMI (XML Meta Interchange) of OMG.

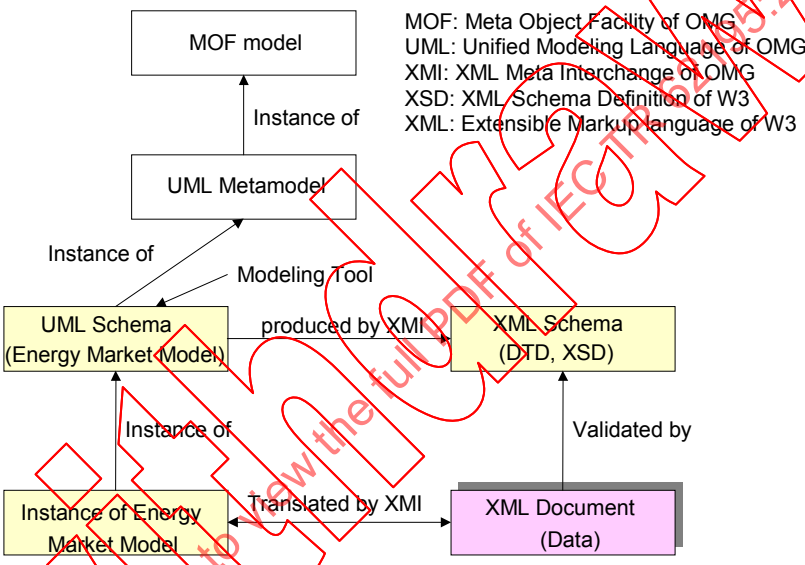

Figure E.1 – UML-Modelling and XML Schema

Electronic business with XML-messages is estimated to have the potential to become a big global market within the next couple of years if a single global International Standard can be successfully implemented. Given the potential of XML it will be wise to base the communication of electricity markets on the coming XML Standard Architecture of UN/CEFACT. This allows vendors to offer products across different markets with lower cost. Using general used platforms has also advantages regarding implementation, test and future development. In the meantime, besides EDIFACT, also non-standard XML solutions are possibly which may migrate in the future to the Standard Architecture.

E.2 Generic e-business architecture

The technical Standard Architecture of e-business based on XML should follow the “Open-edi reference model” (ISO/IEC 14662) and the e-business semantic of the UN/CEFACT UMM (Unified Modeling Methodology), Document N090, where applicable. The content and structure of existing EDIFACT messages already used for the electricity market should be taken into account. Whereas EDIFACT is more intended for large business, the future XML communication architecture should be scalable and also affordable for small business.

Figure E.2 below shows the Open-edi environment according to ISO/IEC 14662.

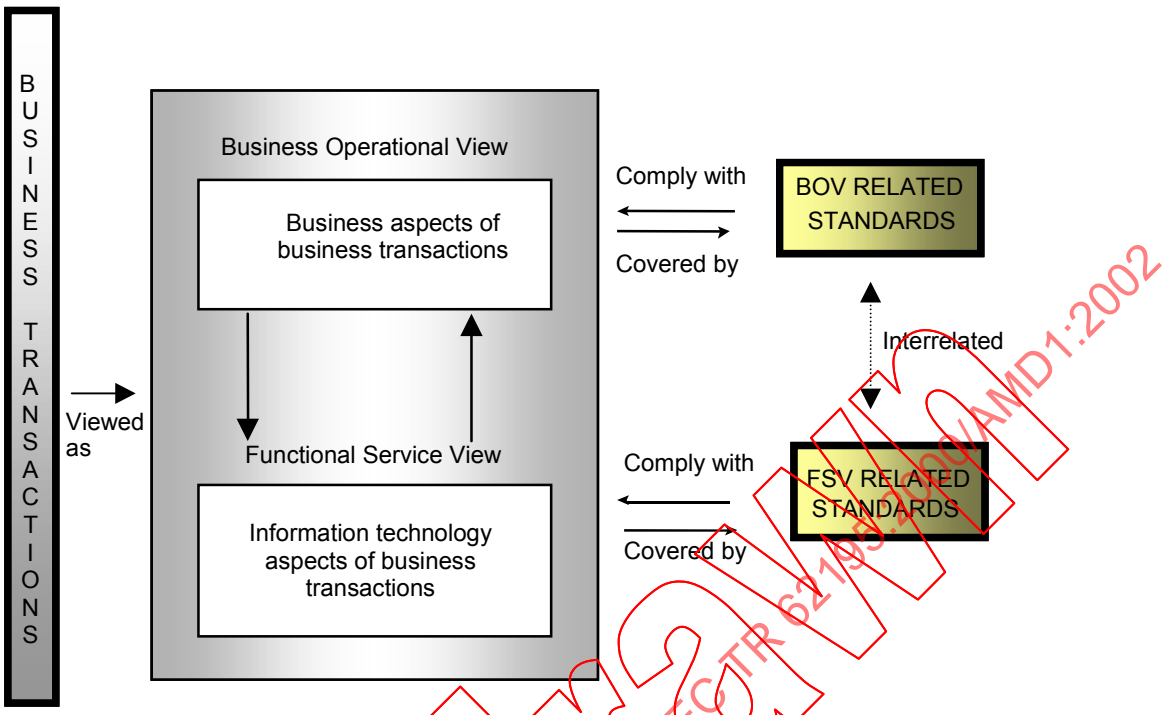

Figure E.2 – Open-edi environment

Fundamental to standardization is the notion of *generic* Open-edi standards: Business Operational View (BOV) languages, tools and methods, Functional Service View (FSV) used by all industries and sectors and *sectorial* Open-edi standards (BOV Open-edi models with contents and processes of the business transactions) to facilitate the re-use of Open-edi components. The same is true for the de-coupling of BOV and FSV to allow the use of the same BOV above evolving new or other FSV related technologies.

Presupposition for e-business and transactions in deregulated electricity markets are harmonized *market rules* that may span a country or even a whole region consisting of many countries. An incomplete list may include the legal and regulatory framework, legal and security aspects of e-business, technical market rules (network access, balance management, schedule management, congestion management), identification schema of market participants and e-business objects, metering rules (service and access to metering values), grid rules (operation), distribution rules (operation), load profiles (synthetic and analytical). The model has to comply with these rules and must include all market participants and transactions to allow seamless communication. The BOV includes all applications from trading over supply to balancing generation and consumption and billing. Congestion management and ancillary services are closely related to the process but may use at least the same FSV platforms.

Because market rules of regions may differ from each other also the BOVs may be different but may also include generic models and messages.

The e-business standard framework ebXML that can be used for electricity markets is more than just an exchange format for data and may include (references B.N.N to the Open-edi reference model are given in brackets):

a) a standard mechanism for describing a *Business Process* and its associated information model (B.2.2);

b) a mechanism for registering and storing *Business Process and Information Meta Models* so they can be shared and reused (B.2.3);

c) discovery of information about each participant including:

- the *Business Processes* they support,
- the *Business Service* Interfaces they offer in support of the *Business Process*,

- the *Business Messages* that are exchanged between their respective *Business Service Interfaces*,
- the technical configuration of the supported transport, security and encoding protocols;

d) a mechanism for registering the above-mentioned information so that it may be discovered and retrieved (B.3.2, B.3.3);

e) a mechanism for describing the execution of a mutually agreed upon business arrangement which can be derived from information provided by each participant from item c) above;

f) a standardized business *Messaging Service* framework that enables interoperable, secure and reliable exchange of *Messages* between *e-business Partners* (B.3.1, B.3.2);

g) a standardized business *Transport Service* framework (as SMTP, FTP, HTTP, ... over TCP/IP) (B.3.2);

h) a standardized *security* framework for Integrity, Signature, Authentication, confidentiality and authorization that can be applied using customized profiles (B.4);

i) a mechanism for *configuration* of the respective Messaging Services to engage in the agreed upon Business Process in accordance with the constraints defined in the business arrangement;

j) a migration path from the EDIFACT environment and messages to the XML architecture (B.6).

For part 1 the use of the graphical meta modelling language UML (*U*nified *M*odeling *L*anguage of OMG) based on a semantic subset of UMM (see above) is recommended but not mandatory. From the model XML models and message schemas can be generated automatically by XMI (XML Meta Interchange of OMG).

E.3 Re-use of components

One of the main advantages of the architecture is the re-use of not only the IT-infrastructure (FSV, Functional Service View) but also of the Business Process (BOV, Business Operational View) itself.

For the electricity industry there may be specific BOV/FSV for different geographical regions. This is shown in figure E.3 below.

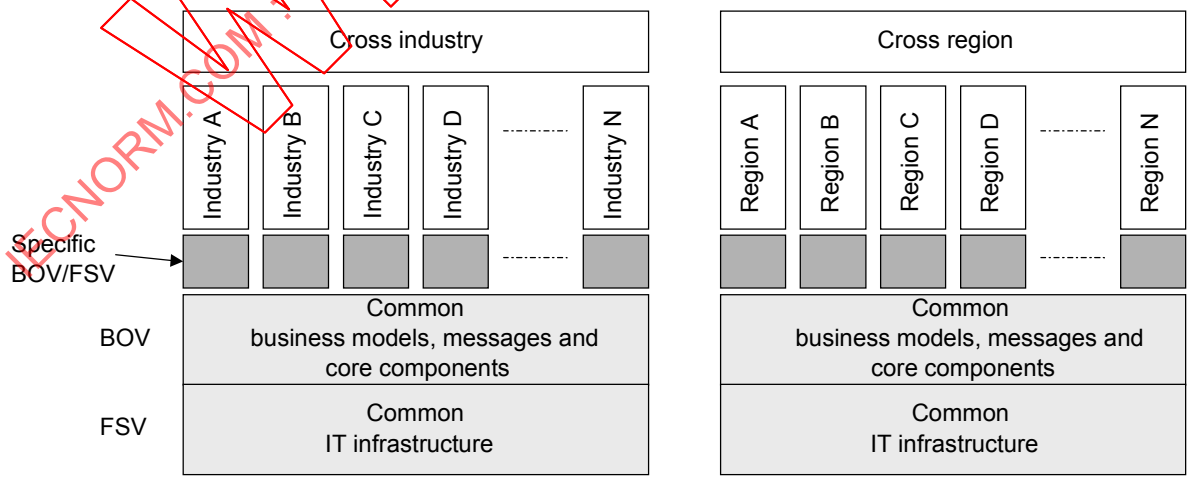

Figure E.3 – Re-use of core components across industries and regions

By all limitations the success of EDIFACT was due to the fact that messages could be used in principle not only in one industry but for many other industries and cross industries following the supply chain. So generic EDIFACT messages (e.g. DELFOR for schedules, MSCONS for metering values, ...) defined by industries very different to electricity markets are also used today in some regional electricity markets. The same is expected for XML messages.

It is important to note that no restrictions are imposed on regional standards in defining their market model, use cases and messages according to the market rules stated above. With ongoing convergence of market rules one or more generic core models with associated messages (so called re-usable components) might be feasible for all regional markets but this is left for the future.

Taking all this into account the standardization process for electricity markets may follow:

1) definition of a global generic standard communication architecture by UN/CEFACT (in the mean time regional proprietary architectures may be necessary),
2) definition of an electricity market specific profile of this architecture,
3) development of generic core components (models, processes and messages),
4) development of electricity market specific components by regional initiatives based on 3).

Steps 2) and 3) are within the scope of the IEC.