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Information technology — Multimedia framework (MPEG-21) —

Part 20: Contract Expression Language

Technologies de l'information — Cadre multimédia (MPEG-21) —

Partie 20: Langage d'expression des contrats

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 21000-20 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

— *Part 1: Vision, Technologies and Strategy* [Technical Report]

— *Part 2: Digital Item Declaration*

— *Part 3: Digital Item Identification*

— *Part 4: Intellectual Property Management and Protection Components*

— *Part 5: Rights Expression Language*

— *Part 6: Rights Data Dictionary*

— *Part 7: Digital Item Adaptation*

— *Part 8: Reference software*

— *Part 9: File Format*

— *Part 10: Digital Item Processing*

— *Part 11: Evaluation Tools for Persistent Association Technologies* [Technical Report]

— *Part 12: Test Bed for MPEG-21 Resource Delivery* [Technical Report]

— *Part 14: Conformance Testing*

— *Part 15: Event Reporting*

— *Part 16: Binary Format*

— *Part 17: Fragment Identification of MPEG Resources*

— *Part 18: Digital Item Streaming*

— *Part 19: Media Value Chain Ontology*

— *Part 20: Contract Expression Language*

— *Part 21: Media Contract Ontology*

Introduction

Today, many elements exist to build an infrastructure for the delivery and consumption of multimedia content. There was, however, no "big picture" to describe how these elements, either in existence or under development, relate to each other. The aim for the ISO/IEC 21000 series has been to describe how these various elements fit together. New standards as appropriate will be developed while other relevant standards may be developed by other bodies.

The result is an open framework for multimedia delivery and consumption, with both the content creator and content consumer as focal points. This open framework provides content creators and service providers with equal opportunities in the ISO/IEC 21000 enabled open market. This will also be to the benefit of the consumer providing them access to a large variety of content in an interoperable manner. The vision for ISO/IEC 21000 is to define a multimedia framework *to enable transparent and augmented use of multimedia resources across a wide range of networks and devices* used by different communities.

ISO/IEC 21000 aims thus at defining an open framework for multimedia applications, where users distribute, consume, operate on and transact with content represented as Digital Items. These transactions can be automatically governed by licenses using the Rights Expression Language from ISO/IEC 21000-5. However, beyond the operative information present in a digital license, the digital representation of the complete business agreements between the parties may prove useful for a number of purposes. The Contract Expression Language is the ISO/IEC language for expressing such contracts in a structured representation.

Information technology — Multimedia framework (MPEG-21) —

Part 20:
Contract Expression Language

1 Scope

This part of ISO/IEC 21000 specifies a language for representing contracts in the Multimedia Framework formed for the transaction of MPEG-21 Digital Items or services related to the MPEG-21 Framework.

The Contract Expression Language (CEL) aims at digitally representing the agreements made in an environment of ISO/IEC 21000 use. These contracts include those about both transactions of content packed as Digital Items as well as services provided around this content.

The range of contracts under scope are:

— contracts about transactions of content as MPEG-21 Digital Items;

— contracts about the provision of MPEG-21-based services, i.e. delivery, identification, encryption and search.

The aspects represented by CEL contracts include:

— the textual clauses, in natural language as they are in the narrative contract, duly structured;

— the operative clauses, as computer language expressions.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 15836, *Information and documentation — The Dublin Core metadata element set*

ISO/IEC 21000-3, *Information technology — Multimedia framework (MPEG-21) — Part 3: Digital Item Identification*

ISO/IEC 21000-5, *Information technology — Multimedia framework (MPEG-21) — Part 5: Rights Expression Language*

ISO/IEC 21000-21, *Information technology — Multimedia framework (MPEG-21) — Part 21: Media Contract Ontology*

XML Encryption Syntax and Processing Version 1.1, W3C Working Draft 16 March 2010,, http://www.w3.org/TR/xmlenc-core1/

IETF RFC 2141, *Uniform Resource Name (URN) Syntax*, May 1997, http://www.ietf.org/rfc/rfc2141.txt

IETF RFC 2396, *Uniform Resource Identifiers (URI)*: Generic Syntax, Internet Standards Track Specification, August 1998, http://www.ietf.org/rfc/rfc2396.txt

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
MPEG-21 Contract
representation of agreements formed for the transaction of MPEG-21 Digital Items or services related to the MPEG-21 Framework

3.1.2
MPEG-21 Service
system supplying utility in the Framework of MPEG-21

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

CEL: Contract Expression Language

IPRE: Intellectual Property Rights Exploitation

MCO: Media Contract Ontology

MPEG: Moving Picture Experts Group

MPEG-21: ISO/IEC 21000

MPEG-7: ISO/IEC 15938

OWL: Web Ontology Language

RDF: Resource Description Framework

REL: Rights Expression Language

URI: Uniform Resource Identifier (IETF Standard is RFC 3986)

URN: Uniform Resource Name (IETF Standard is RFC 2141)

W3C: World Wide Web Consortium

XML: Extensible Markup Language (W3C Recommendation)

4 Conventions

4.1 Document conventions

4.1.1 XML Representation

The syntax of each XML element in the Contract Expression Language is specified using the constructs provided by XML Schema [4]. XML Schema documents or its fragments are presented in orange boxes. Omissions are marked with suspension points ([...]).

```
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema" [...]
```

XML documents or its fragments are presented in gray boxes. Omissions are marked with suspension points ([…]).

```
<cel-core:contract  id="715" xsi:schemaLocation="urn:mpeg:mpeg21:cel:core:2012
cel_core.xsd" xmlns:dc="http://purl.org/dc/elements/1.1/" [...]
```

This part of ISO/IEC 21000 also makes use of diagrams to express portions of XML Schema, as shown in Figure 1.

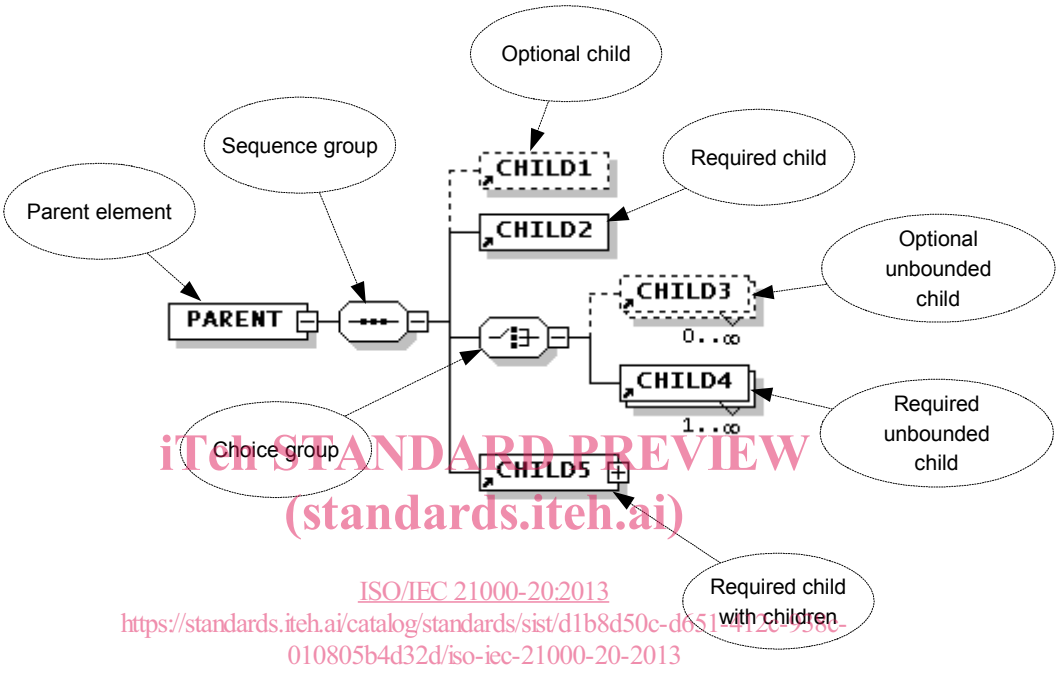

Figure 1 — Sample XML Schema diagram

This schema diagram states which elements are required (boxes with solid outline), those that are optional (boxes with dashed outline), the number of occurrences of each element (0…), and the lineage between elements (symbols between elements indicating either a choice, or a sequence).

Figure 2 — Compositors used in XML Schema diagrams

Compositors, as shown in Figure 2, describe (from left to right) respectively a *sequence* of elements, a *choice* of elements and the *all* model.

4.2 Namespace prefix conventions

The namespace for CEL core XML Schema is:

```
urn:mpeg:mpeg21:cel:core:2012
```

The namespace for CEL extension on exploitation of intellectual property rights XML Schema is:

```
urn:mpeg:mpeg21:cel:ipre:2012
```

4.2.1 Use of prefixes

The CEL makes use of elements defined in other schemas, either given by MPEG-21 or others. The used namespace prefixes together with their reference is given in Table 1.

Table 1 — Mapping of prefixes to namespaces in examples and text

Prefix	Corresponding namespace	Ref
cel-core	urn:mpeg:mpeg21:cel:core:2012	Here
cel-ipre	urn:mpeg:mpeg21:cel:ipre:2012	Here
dc	http://purl.org/dc/elements/1.1/	ISO 15836
xsi	http://www.w3.org/2001/XMLSchema-instance	[4]
dsig	http://www.w3.org/2000/09/xmldsig#	[1]
rel-r	urn:mpeg:mpeg21:2003:01-REL-R-NS	ISO/IEC 21000-5
dii	urn:mpeg:mpeg21:2002:01-DII-NS	ISO/IEC 21000-3
xenc	http://www.w3.org/2001/04/xmlenc#	W3C XML Encryption Syntax and Processing
xsd	http://www.w3.org/2001/XMLSchema	W3C XML Schema

5 Relationship to other ISO/IEC 21000 parts

The Digital Item is the fundamental unit of distribution and transaction in the Multimedia Framework. While the different parts of ISO/IEC 21000 deal with the components and different aspects of Digital Items, together they form a complete integrated interoperable framework. This clause describes the relationship of this part of ISO/IEC 21000 with the other parts of ISO/IEC 21000 in addressing the representation of the agreements for the aforementioned transactions.

A contract represented following this part of ISO/IEC 21000 may become a part of a Digital Item (whose declaration is given with ISO/IEC 21000-2). If so, it will be declared with the `Type` element of ISO/IEC 21000-3 pointing to the CEL URI.

This part of ISO/IEC 21000 has the aim, as ISO/IEC 21000-21, of digitally representing contracts information. CEL enables the structured representation of contracts' information making use of XML, while MCO provides their semantic representation by means of OWL [2][5] or RDF [6]. Both parts share the goal of defining a contract document able to provide the information listed in Clause 6.1.

This part of ISO/IEC 21000 makes use of the semantic for Actions, Facts and Services defined in ISO/IEC 21000-21.

6 Overview

6.1 General aspects

A Contract Expression Language (CEL) contract is a document providing the following information, optional unless otherwise stated:

— Identification of the contract itself – Required

— Possible relationships with other contracts

— The Parties

— The textual version of the contract

— A number of textual clauses which can be referenced by the operative part element

— The Object of the contract (Content or Service) - Required

— The Operative part, containing the contract information which have to be machine readable (deontic expressions, links to textual clauses) – Required

CEL supports the possibility to encrypt either the whole contract or part of it.

CEL aims at providing the structural elements to syntactically represent operative clauses, in a machine-readable form.

6.2 Syntactic representation

A Contract document defined by CEL shall be compliant to the XML representation defined in Clause 7. The document format is specified by an XML Schema [4]. Any representation of a contract document defined by CEL support the possibility to encrypt either the whole contract or part of it.

Contract documents shall validate against the CEL XML Schema, which is provided, as normative specification, in Annex A. A detailed description of the structured representation is given in Clause 7.

7 Contract Structured Representation

7.1 Introduction

CEL standard specification enables the structured representation of digital media contracts by means of XML. To this end, the CEL XML schema has been defined. It normatively defines the core elements for media contracts. Its URI is:

```
urn:mpeg:mpeg21:cel:core:2012
```

Media contracts consist of deontic expressions which permit, obligate or prohibit users to execute generic actions over digital media if the imposed conditions are fulfilled. Common actions and conditions in media contracts have been defined as acts and constraints in the XML CEL extension on exploitation of intellectual property rights. Its URI is:

```
urn:mpeg:mpeg21:cel:ipre:2012
```

MPEG-21 CEL contract documents shall validate against the XML Schema specification described in this subclause.

7.2 XML Schema definition

7.2.1 Contract element and main structure

The root element of a CEL contract is the `cel-core:contract` element, which includes the structured representation of the contract by means of deontic clauses, as well as the original text version of the contract. It also provides mechanisms for relating the narrative clauses of the contract with its structured XML representation.

The structure of the `cel-core:contract` element is depicted in Figure 3. It only has one attribute, the `contractId` which uniquely identifies the contract.

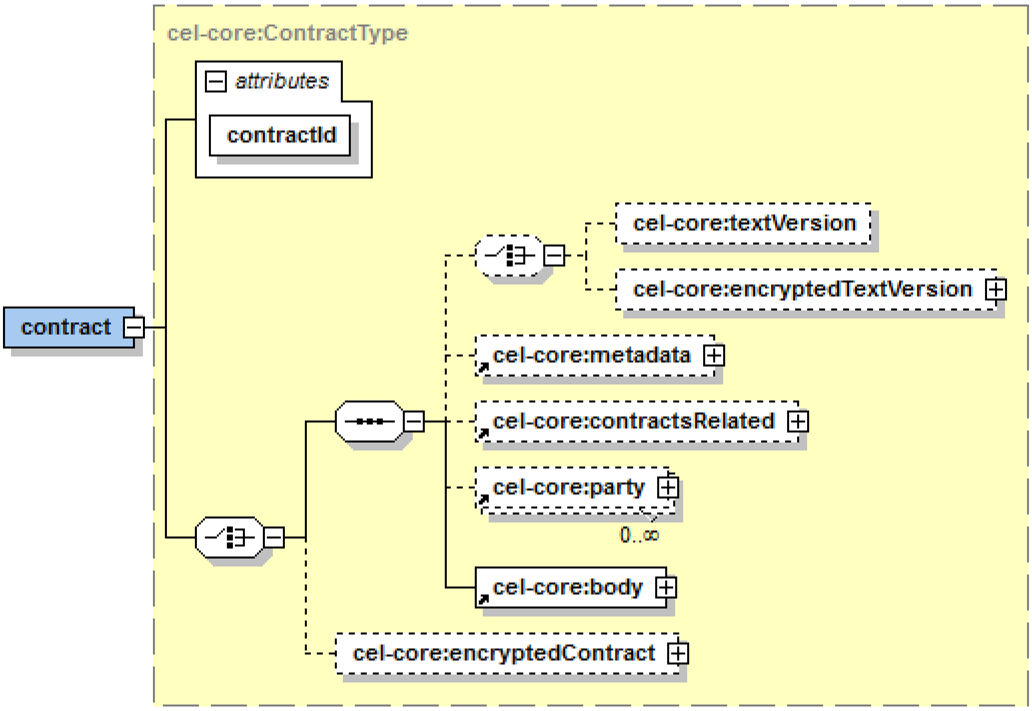

Figure 3 — Root and main elements in the contract

The child elements of the `cel-core:contract` element are:

— optionally a choice of `cel-core:textVersion` containing the whole narrative contract as plain text; or `cel-core:encryptedTextVersion` containing an encrypted version of the whole narrative contract

— `cel-core:metadata`, optionally including metadata such as contract author, contract language, etc.

— `cel-core:contractsRelated`, optionally including references to pre-existing contracts the validity of which might be affected by the present one

— `cel-core:party`, the number of parties is open; 0 means that the contract is a template

— `cel-core:body`, exactly one body is mandatory, with the contract clauses

— `cel-core:EncryptedContract`, a full version of a contract encrypted

The CEL core XML Schema has the following header.

```
<schema xmlns="http://www.w3.org/2001/XMLSchema"
   xmlns:cel-core="urn:mpeg:mpeg21:cel:core:2012"
   xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
   xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
   xmlns:xenc="http://www.w3.org/2001/04/xmlenc#"
   xmlns:rel-r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
   xmlns:dc="http://purl.org/dc/elements/1.1/"
   targetNamespace="urn:mpeg:mpeg21:cel:core:2012"
   elementFormDefault="qualified"
   attributeFormDefault="unqualified">
   <import namespace="http://purl.org/dc/elements/1.1/"
schemaLocation="http://dublincore.org/schemas/xmls/qdc/2008/02/11/dc.xsd"/>
```

```
    <import namespace="urn:mpeg:mpeg21:2003:01-REL-R-NS"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
21_schema_files/rel-r/rel-r.xsd"/>
    <import namespace="http://www.w3.org/2000/09/xmldsig#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmldsig-core-20020212/xmldsig-core-
schema.xsd"/>
    <import namespace="urn:mpeg:mpeg21:2002:01-DII-NS"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
21_schema_files/dii/dii.xsd"/>
    <import namespace="http://www.w3.org/2001/04/xmlenc#"
schemaLocation="http://www.w3.org/TR/2002/REC-xmlenc-core-20021210/xenc-
schema.xsd"/>
```

7.2.1.1 Example

A sample contract may reference the XML Schema this way.

```
<?xml version="1.0" encoding="UTF-8"?>
<cel-core:contract xmlns:celxml="urn:mpeg:mpeg21:cel:core:2012"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:dsig="http://www.w3.org/2000/09/xmldsig#"
    xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
    xmlns:xenc="http://www.w3.org/2001/04/xmlenc#"
    xmlns:rel-r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
    xsi:schemaLocation="urn:mpeg:mpeg21:cel:core:2012 cel-core.xsd>
```


7.2.2 Metadata

Metadata can be added under the `metadata` element, giving information about the contract itself. Their optional elements can be seen in Figure 4. A DublinCore placeholder is provided (element `cel-core:simpledc` of type `dc:elementContainer`).

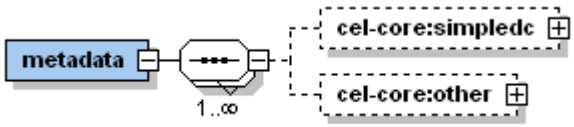

Figure 4 — Contract metadata elements

7.2.3 Element to relate contracts

The element `cel-core:contractsRelated` provides the means to relate the contract to other identified contracts, between the same partners, as shown in Figure 5. The validity of the related contract can be affected according to relationship type, which must be one of the following:

- `supersedes`, the referenced contract has to be considered terminated by the new agreement which totally replaces it
- `cancels`, the parties agree to cancel all the effects of the referenced contract
- `prevailsOver`, the referenced contract is generally still valid, but in case of conflict the terms of the new one prevail
- `isAmendmentOf`, the referenced contract is partially modified by the new agreement.

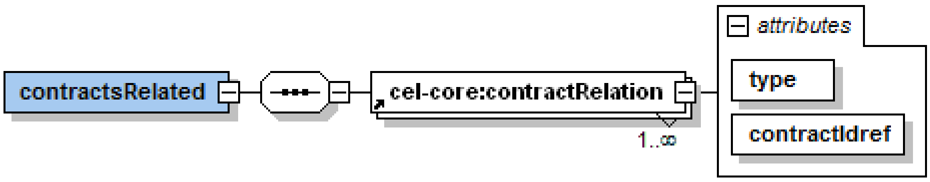

Figure 5 — contractsRelated element

7.2.4 The parties

The contract contains the parties in the contract, as described in Figure 6.

— `cel-core:party`, zero or more parties for which the contract is binding.

A contract template has zero parties, while a contract offer has one party.

Each party can be either a person (element `cel-core:person`) or an organization (element `cel-core:organization`). In the latter case, for the party to be binding it is necessary that a signatory person is given (element `cel-core:signatory`) together with his/her job title (element `cel-core:jobTitle`) within the organization.

The `cel-core:partyBasicGroup`, common to both Person and Organization cases, and to the signatory element as well, is made of:

— `cel-core:name` element, the name of the party

— a number of `dc:identifier` elements, to be used for giving references to registries in which the party is registered, such as the VAT identification number

— the `dc:description` element, to provide a free description of the party

— the `cel-core:details` element, to provide further detailed information.

The party element might be further enriched with the address (element `cel-core:address`).

Without the `dsig:Signature` element the contract is not binding.

The attribute `id`, of type `xsd:ID`, is used for uniquely identify the party element within the contract document.

The `cel-core:PartyType` complex type has been created with the structure depicted in Figure 6.

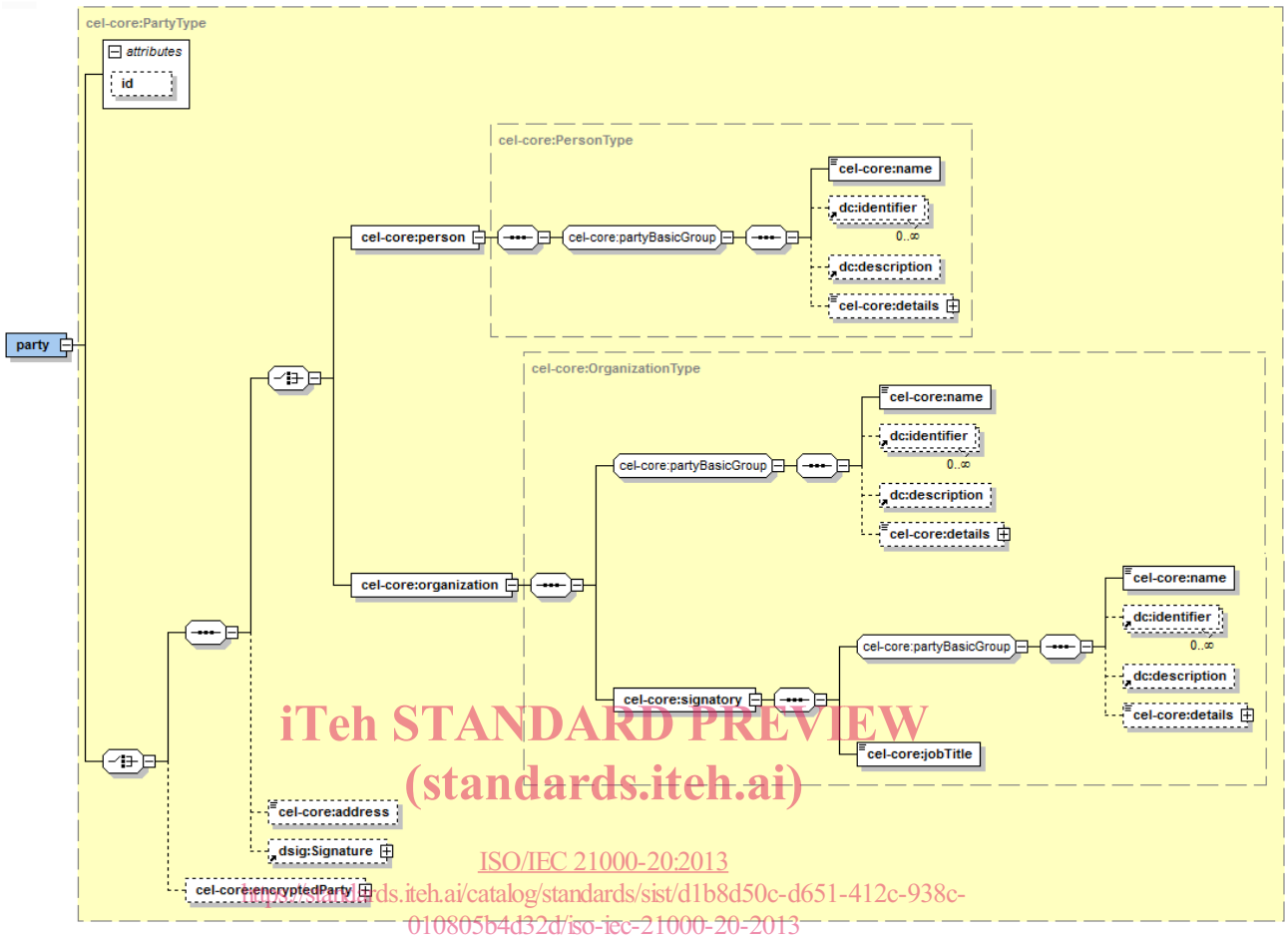

Figure 6 — Contract party element

The relevant elements of the XML Schema used for defining the `cel-core:PartyType` are given in the following box.

```
<complexType name="PartyType">
   <sequence>
      <choice>
         <element name="person" type="cel-core:PersonType"/>
         <element name="organization" type="cel-core:OrganizationType"/>
      </choice>
      <element name="address" type="string" minOccurs="0"/>
      <element ref="dsig:Signature" minOccurs="0"/>
   </sequence>
   <attribute name="id" type="ID"/>
</complexType>
<group name="partyBasicGroup">
   <sequence>
      <element name="name" type="string"/>
      <element ref="dc:identifier" minOccurs="0" maxOccurs="unbounded"/>
      <element ref="dc:description" minOccurs="0"/>
      <element name="details" type="anyType" minOccurs="0"/>
   </sequence>
</group>
<complexType name="PersonType">
```