Integrated Collaboration Object Model (ICOM) for Interoperable Collaboration Services Version 1.0

Committee Specification 01

31 January 2013

Specification URIs

This version:

http://docs.oasis-open.org/icom/icom-ics/v1.0/cs01/icom-ics-v1.0-cs01.doc (Authoritative)
http://docs.oasis-open.org/icom/icom-ics/v1.0/cs01/icom-ics-v1.0-cs01.html
http://docs.oasis-open.org/icom/icom-ics/v1.0/cs01/icom-ics-v1.0-cs01.pdf

Previous version:

http://www.oasis-open.org/committees/download.php/46823/icom-ics-v1.0-csprd04.zip

Latest version:

http://docs.oasis-open.org/icom/icom-ics/v1.0/icom-ics-v1.0.doc (Authoritative)
http://docs.oasis-open.org/icom/icom-ics/v1.0/icom-ics-v1.0.html
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OASIS Integrated Collaboration Object Model for Interoperable Collaboration Services (ICOM) TC

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This prose specification is one component of a Work Product which also includes:

- XML schemas: http://docs.oasis-open.org/icom/icom-ics/v1.0/cs01/schemas/

Declared XML namespaces:

http://docs.oasis-open.org/ns/icom/core/201008
http://docs.oasis-open.org/ns/icom/accesscontrol/201008
http://docs.oasis-open.org/ns/icom/metadata/201008
http://docs.oasis-open.org/ns/icom/content/201008
http://docs.oasis-open.org/ns/icom/document/201008
http://docs.oasis-open.org/ns/icom/message/201008
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http://docs.oasis-open.org/ns/icom/contact/201008
http://docs.oasis-open.org/ns/icom/calendar/201008
http://docs.oasis-open.org/ns/icom/task/201008
http://docs.oasis-open.org/ns/icom/forum/201008
http://docs.oasis-open.org/ns/icom/conference/201008

Abstract:

The Integrated Collaboration Object Model (ICOM) for Interoperable Collaboration Services defines a framework for integrating a broad range of domain models for collaboration activities in an integrated and interoperable collaboration environment.

The framework is not intended to prescribe how applications or services conforming to its model implement, store, or transport the data for objects. It is intended as a basis for integrating a broad range of collaboration objects to enable seamless transitions across collaboration activities. This enables applications to maintain a complete thread of conversations across multiple collaboration activities.

The model integrates a broad range of collaboration activities, by encompassing and improving on a range of models which are part of existing standards and technologies. The model is modular to allow extensibility. The core concepts, metadata concepts, and their relations are included in the Core, while the specific concepts and relations for each area of collaboration activities are defined in separate extension modules.

Status:

This document was last revised or approved by the OASIS Integrated Collaboration Object Model for Interoperable Collaboration Services (ICOM) TC on the above date. The level of approval is also listed above.

Technical Committee members should send comments on this specification to the Technical Committee's email list. Others should send comments to the Technical Committee by using "Send A Comment" button on the Technical Committee's web page at http://www.oasis-open.org/committees/icom/.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the Intellectual Property Rights section of the Technical Committee web page (http://www.oasis-open.org/committees/icom/ipr.php).

Citation format:

When referencing this specification the following citation format should be used:

[ICOM-ics-v1.0]

Integrated Collaboration Object Model (ICOM) for Interoperable Collaboration Services Version 1.0. 31 January 2013. OASIS Committee Specification 01. http://docs.oasis-open.org/icom/icom-ics/v1.0/cs01/icom-ics-v1.0-cs01.html.

Notices

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1 Introduction

The Integrated Collaboration Object Model (ICOM) for Interoperable Collaboration Services specification defines a framework for integrating a broad range of domain model for collaboration activities in an interoperable collaboration environment. The standard promotes an integrated user experience with seamless transitions across collaboration activities. It enables applications to support continuity of conversations across diverse collaboration activities. For example, applications can aggregate conversation threads in email with other conversations on the same topic in instant message, over the phone or via real-time conferencing, by discussion threads in community forum, weblog or micro blog, and activity stream of participants from all channels.

The specification defines a core model and a set of extension modules. The core model (Section 3) defines the classes (Section 3.1 Main Branch) that bring together the model of directory (Section 3.2 Scope Branch), identity management (Section 3.3 Subject Branch), and content management (Section 3.4 Artifact Branch) in a framework with a common access control model (Section 3.5) and metadata model (Section 3.6). The extension modules in Section 4 extend the artifact and folder model of Artifact Branch (Section 3.4) to define the specialized model for different collaboration activities. The range of collaboration model includes content sharing and co-creation, asynchronous communication, instant communication, presence awareness, moderated group discussion, time management, coordination, real-time interaction, etc.

The Subject and Artifact branches support separation of concerns for user administration and content management. Subject branch includes the model of actors, groups of actors, and role assignment of actors. Actors, groups, and roles typically appear as the subject in the (subject, privilege, object) triples of an access control model. The Artifact branch includes the model of content and metadata produced by actors. The Scope branch includes the model of communities and spaces that contain subjects and artifacts. Communities and spaces join the subjects and artifacts in a role-based access control model where a role is assigned to an actor in a specific scope. Thus Scope, Subject, and Artifact form a framework for applications to integrate and interoperate with directory, identity management, content management, and collaboration services.

The model specified in ICOM is part of existing standards and technologies, several of which are referenced in Section 1.3 Non-Normative References. The model is modular and extensible, with common concepts, metadata concepts, and their relations provided in the Core, while the specific concepts and relations for each area of collaboration activities defined in separate extension modules. ICOM core model encompasses LDAP Directory Information Models [RFC4512]. The extension modules integrate models from Content Management Interoperability Services [CMIS], Java Content Repository API [JCR 2.0], Web Distributed Authoring and Versioning (WebDAV) [RFC4918], Internet Message Access Protocol (IMAP) [RFC2119], Simple Mail Transfer Protocol (SMTP) [RFC5321], Extensible Messaging and Presence Protocol (XMPP) [RFC3920], XMPP Instant Messaging and Presence [RFC3921], vCard MIME Directory Profile [RFC2426], Internet Calendaring and Scheduling Core Object Specification (iCalendar) [RFC5545], and Calendaring Extensions to WebDAV (CalDAV) [RFC4791].

ICOM is open for extensions with additional domain models to enable seamless integration with business processes and social networks: for example in process integration domain which includes Business Process Model and Notation [BPMN], Web Services Business Process Execution Language [WS-BPEL], WS-BPEL Extension for People [BPEL4People], and Web Services for Human Task [WS-HumanTask]; in social networking domain, which includes Friend of a Friend [FOAF], Semantically-Interlinked Online Communities [SIOC], Open Social [OpenSocial], and Facebook Platform Open Graph [OpenGraph]. The OASIS ICOM TC Wiki [ICOM Wiki] provides Non-Normative supplemental information, including overview, primer, extensions, use cases, and mappings to various standard and proprietary data models.

The integrated model can be the foundation for defining the application programming interfaces (API) for application developers to develop integrated collaboration applications to interoperate with collaboration services. A service provider interface (SPI) can be specified to support interchangeable and interoperable services that conform to the ICOM application framework. ICOM does not prescribe how applications or services conforming to its model implement, store, or transport the data for objects.

1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in **[RFC2119]**.

1.2 Normative References

[CMIS] OASIS Standard, *Content Management Interoperability Services (CMIS) Version 1.0,* May 2010. (http://docs.oasis-open.org/cmis/CMIS/v1.0/os/cmis-spec-v1.0.doc)

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[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005. (http://www.ietf.org/rfc/rfc3986.txt)

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[XML SCHEMA] Biron, P.V. and Malhotra. A., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, 28 October 2004. (http://www.w3.org/TR/xmlschema-2/)

1.3 Non-Normative References

[BPEL4People] OASIS Committee Specification, *WS-BPEL Extension for People (BPEL4People) Specification Version 1.1,* August 2010. http://docs.oasis-open.org/bpel4people/bpel4people-1.1.html

[BPMN] OMG, “Business Process Model and Notation (BPMN) Version 2.0”*,* January 2011. (http://www.omg.org/spec/BPMN/2.0/PDF)

[FOAF] Brickley, D. and Miller, L., “FOAF Vocabulary Specification”*,* August 2009. (http://xmlns.com/foaf/spec/)

[ICOM Wiki] OASIS ICOM TC Wiki, (http://wiki.oasis-open.org/icom)

[JCR 2.0] Java Specification Request (JSR) 283, *Content Repository for Java™ Technology API 2.0 Specification,* August 2009. (http://jcp.org/en/jsr/detail?id=283)

[OpenGraph] Facebook Platform Open Graph Core Concepts, (http://developers.facebook.com/docs/coreconcepts/)

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[RFC2060] Crispin, M., "Internet Message Access Protocol – Version 4rev1", RFC 2060, December 1996. (http://tools.ietf.org/html/rfc2060)

[RFC2426] Dawson, F. and Howes, T., "vCard MIME Directory Profile", RFC 2426, September 1998. (http://tools.ietf.org/html/rfc2426)

[RFC3920] Saint-Andre, P., "Extensible Messaging and Presence Protocol (XMPP): Core", RFC 3920, October 2004. (http://tools.ietf.org/html/rfc3920)

[RFC3921] Saint-Andre, P., " Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence", RFC 3921, October 2004. (http://tools.ietf.org/html/rfc3921)

[RFC4512] Zeilenga, K., "Lightweight Directory Access Protocol (LDAP): Directory Information Models", RFC 4512, June 2006. (http://tools.ietf.org/html/rfc4512)

[RFC4791] Daboo, C. and Desruisseaux, B., "Calendaring Extensions to WebDAV (CalDAV)", RFC 4791, March 2007. (http://tools.ietf.org/html/rfc4791)

[RFC4918] Dusseault, L., "HTTP Extensions for Web Distributed Authoring and Versioning (WebDAV)", RFC 4918, June 2007. (http://tools.ietf.org/html/rfc4918)

[RFC5321] Klensin, J., "Simple Mail Transfer Protocol, Draft Standard" RFC 5321, October 2008. (http://tools.ietf.org/html/rfc5321)

[RFC5545] Desruisseaux, B., "Internet Calendaring and Scheduling Core Object Specification (iCalendar)", RFC 5545, September 2009. (http://tools.ietf.org/html/rfc5545)

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[WS-BPEL] OASIS Standard, *Web Services Business Process Execution Language Version 2.0,* April 2007. http://docs.oasis-open.org/wsbpel/2.0/wsbpel-v2.0.html

[WS-HumanTask] OASIS Committee Specification, *Web Services – Human Task (WS-HumanTask) Specification Version 1.1, CS-01,* August 2010. http://docs.oasis-open.org/bpel4people/ws-humantask-1.1-spec-cs-01.html

2 Modeling Language

2.1 Introduction

ICOM specifies a set of objects in a collaboration environment, in terms of class definitions and property definitions of the classes. Objects comprise the information structures in a common application framework. An ICOM information structure MAY be composed of information from multiple repositories or collaboration services.

Note: To offer closer interoperability with OASIS Content Management Interoperability Services, ICOM specification follows the class and property definitions grammar of CMIS specification [CMIS], which is a normative reference for ICOM specification. ICOM specification adapts the CMIS class and property definitions grammar to introduce mixed-in types, enumeration types, and other base types which are not part of the domain model of CMIS Version 1 specification.

Note: One objective of ICOM standard is to offer seamless interoperability among identity management, content management, and collaboration services. Scope and Subject classes, defined respectively in Section 3.2 Scope Branch and Section 3.3 Subject Branch, can represent objects in Identity Management domain (such as LDAP). Artifact classes defined in Section 3.4 Artifact Branch can represent the extensions of CMIS Folder and Document base types. The extension modules in Section 4 define specialized subclasses of artifact and folder in Artifact Branch to support collaboration activities.

Note: ICOM extends the CMIS base types in several ways. ICOM Relationship class defined in Section 3.6.21 can represent n-nary relationships whereas CMIS Relationship base type represents binary relationships. ICOM version control model defined in Section 4.3.1 adopts the CMIS version control model and extends it with the concept of representative copy.

ICOM application framework includes a core model and a set of extension modules. All objects in the framework must be instances of at least one class.

Each class is defined in the class definition grammar, which specifies a `namespace` attribute, a `localName` attribute, a `description` attribute, an `extendsFrom` attribute representing a set of zero or more super classes, a `stereotype` attribute indicating whether a class is primary or mixin, an `isAbstract` attribute indicating whether a primary class is abstract, an `isEnumeration` attribute indicating whether instances of a primary class are enumerated, and a `propertyDefinition` attribute defining a set of zero or more properties of objects of the class. The properties are defined in the property definition grammar.

Note: The class and property definitions grammar corresponds to the UML meta-model, which is an OMG Meta Object Facility (MOF) M2-model. Each of the classes and properties thus defined are faithfully depicted by UML 2.0 diagrams in this specification.

A fully expanded class name, `namespace`/`localName`, MUST be unique within a domain.

Note: A namespace IRI reference qualifies a local name by associating the local name with the IRI reference to derive an expanded name.

2.2 Class Definition Grammar

A **class-definition** MUST contain the following attributes:

`namespace` String

The `namespace` attribute specifies an IRI.

`localName` String

The `localName` attribute specifies a local name portion of an expanded name or qualified name.

description String (optional)

The description attribute describes the nature and intended use of a class.

extendsFrom IRI (multi-valued)

The extendsFrom attribute specifies a set of zero or more super classes.

stereotype Enum

The stereotype attribute specifies whether a class is a primary or mixin class.

The values of stereotype attribute are:

- **Primary:** A primary class is part of a single inheritance class hierarchy;
- **Mixin**: A mixin class is part of multiple inheritance class hierarchy.

A particular class is either a primary class or a mixin class, i.e. it cannot be both.

Inheritance is constrained by:

- a primary class MUST extend from one and only one primary class;
- a primary or mixin class MAY extend from zero or more mixin classes;
- a mixin class MUST NOT extend from a primary class.

An object MUST be an instance of one and only one primary class.

Note: When there is more than one super class in a class definition, at most one of the super classes is a primary class and the rest of the super classes are mixin classes. For example, Scope extends from Entity, RelationshipBondable, and Extent. Scope is a primary class. Among its super classes, only Entity is a primary class while RelationshipBondable and Extent are mixin classes.

isAbstract **Boolean**

The isAbstract attribute specifies whether a primary class is an abstract class. It is applicable only when the value of stereotype attribute is **Primary**.

The values of isAbstract attribute are:

- **TRUE** if the primary class is an abstract class;
- **FALSE** if the primary class is not an abstract class.

The default value is **FALSE**.

Note: An abstract class typically does not provide a complete declaration and cannot be instantiated. An abstract class is intended to be extended by other primary classes.

An abstract primary class MUST NOT extend from any non-abstract primary class.

isEnumeration **Boolean**

The isEnumeration attribute specifies whether instances of a primary class are enumerated in a class definition. It is applicable only when the value of stereotype attribute is **Primary**.

The values of isEnumeration attribute are:

- **TRUE** if the instances of a primary class are enumerated in a class definition;
- **FALSE** if the instances of a primary class are not enumerated in a class definition.

The default value is **FALSE**.

Note: A primary class which is an enumeration of instances is also known as an enum class.

instances

The instances attribute enumerates instances of an enum class. It is applicable only when the value of stereotype attribute is **Primary** and the value of isEnumeration attribute is **TRUE**.

propertyDefinition **property-definition** (multi-valued)

The propertyDefinition attribute defines a set of zero or more property definitions for a class.

Property definitions of a class are a union of inherited property definitions from super classes and property definitions explicitly defined on a class.

The order of property definitions within a class is not significant.

Property definitions MUST be uniquely named to avoid conflicts from multiple inheritances.

Note: It is possible for the same property definition to be inherited through different paths in a super class hierarchy. Duplicate property definitions are eliminated from the set of property definitions of a class.

2.3 Property Definition Grammar

A **property-definition** MUST contain the following attributes:

namespace String

The namespace attribute specifies an IRI.

localName String

The localName attribute specifies the local name portion of an expanded name or qualified name.

description String (optional)

The description attribute specifies a description of a property

propertyType Enum

The propertyType attribute specifies a **property-type** for property values.

The value of propertyType attribute is one of the **property-type** names**.** The **property-type** names include names for the following data type defined by XML Schema Part 2 [XML SCHEMA]:

• string	(xsd:string)
• boolean	(xsd:boolean)
• decimal	(xsd:decimal)
• integer	(xsd:integer)
• datetime	(xsd:dateTime)
• duration	(xsd:duration)
• iri	(xsd:anyURI)

In addition, the following data type names are also specified by ICOM:

• id	(an opaque string representing an object id of an identifiable object)
• html	(a document or fragment of Hypertext Markup Language)

cardinality Enum

The cardinality attribute specifies a cardinality of property values.

The values of cardinality attribute are:

- **Single**: Property can have zero or one value (if property is not required), or exactly one value (if property is required)
- **Multi**: Property can have zero or more values (if property is not required), or one or more values (if property is required).

updatability Enum

The updatability attribute specifies under what circumstances the value of this property MAY be updated.

The values of updatability attribute are:

- **ReadOnly:** The value of this property MUST NOT be set directly by application. It is a property that is either maintained or computed by a service provider.
- **WriteOnly:** The value of this property can be set by application. It is a property whose value MAY be propagated into another **ReadOnly** property by a service provider.
- **ReadWrite:** The property value can be modified.
- **OnCreate:** The property value MUST only be update-able during the creation (a create operation) of an object.

inherited Boolean

The inherited attribute specifies whether a property definition is inherited from a super class.

The values of inherited attribute are:

- **TRUE** if a property definition is inherited from a super class;
- **FALSE** if a property definition is explicitly defined for a class.

required Boolean

The required attribute is only applicable to read-write and on-create properties, i.e. properties whose value is provided by application.

The values of required attribute are:

- **TRUE** if the value of a property MUST never be set to the “not set” state when an object of this type is created or updated. If a value is not provided during a create or update operation, a service provider MUST provide a value for the property. If a value is not provided, then a default value defined for the property MUST be set. If no default value is defined, a service provider MUST throw an exception.
- **FALSE** if the value of a property MAY be set to the “not set” state when an object of this type is created or updated.

This attribute is not applicable when the value updatability attribute is **ReadOnly**. In that case, required attribute SHOULD be set to **FALSE**.

Note: The value of a read-only property (such as icom_core:objectId, icom_core:createdBy) is set by a service provider. Hence, the value of the required attribute SHOULD be **FALSE** because it is read only for applications.

`choices` **property-choice-type** (multi-valued)

The `choices` attribute specifies a set of single values allowed for this property.

Each value of `choices` attribute is an instance of **property-choice-type** that specifies a display name and a value to be stored in a property when selected.

If the value of `cardinatity` attribute is **`Single`** and the value of `openChoice` attribute is **`FALSE`**, then a property value MUST be at most one of the values listed in `choices` attribute.

If the value of `cardinatity` attribute is **`Single`** and the value of `openChoice` attribute is **`TRUE`**, then a property value MAY be one of the values listed in `choices` attribute.

If the value of `cardinatity` attribute is **`Multi`** and the value of `openChoice` attribute is **`FALSE`**, then a property value MUST be zero, one, or more than one of the values listed in `choices` attribute.

If the value of `cardinatity` attribute is **`Multi`** and the value of `openChoice` attribute is **`TRUE`**, then a property value MAY be zero, one, or more than one of the values listed in `choices` attribute.

If `choices` attribute is "not set", then a property value MAY be an instance of the **property-type** specified by the `propertyType` attribute of a property definition.

`openChoice` Boolean

The `openChoice` attribute specifies whether the value of a property must be listed in `choices` attribute. It is applicable only when `choices` attribute is set.

The values of `openChoice` attribute are:

- **`TRUE`** if a value of a property MAY be other than those listed in `choices` attribute;
- **`FALSE`** if a value of a property MUST be among those listed in `choices` attribute.

`defaultValue` **property-type**

The `defaultValue` attribute specifies a value that a service provider MUST set for a property if a value is not provided by application when an object is created.

If no default value is specified and application creates an object of this class without setting a value for a property of this property definition, a service provider MUST attempt to store a "not set" state for the property value. If this occurs for a property that is defined to be required, then a service provider MUST throw an exception.

The value of the `defaultValue` attribute is an instance of the **property-type** specified by the `propertyType` attribute of a property definition.

`minValue` Integer | Decimal

The minimum value allowed for a property. It is applicable only when the `propertyType` attribute of a property definition specifies the property types Integer or Decimal.

`maxValue` Integer | Decimal

The maximum value allowed for a property. It is applicable only when the `propertyType` attribute of a property definition specifies the property types Integer or Decimal.

A **property-choice-type** MUST contain the following attributes:

`displayName` String

The `displayName` attribute specifies a string for presentation by application.

`value` **property-type**

The `value` attribute specifies a value compatible with the **property-type** specified by the `propertyType` attribute of a property definition.

2.4 Namespaces

Qualified names are subject to namespace interpretation depending on the namespace prefixes.

A class definition includes the two attributes: `namespace` **`and`** `localName.` The `namespace` specifies one of the namespace prefixes in Table 1. The `localName` specifies an unprefixed name of a class. Syntactically, the namespace qualifies the local name.

Table 1 Namespace prefixes and IRI references.

icom_core = http://docs.oasis-open.org/ns/icom/core/201008
icom_ac = http://docs.oasis-open.org/ns/icom/accesscontrol/201008
icom_meta = http://docs.oasis-open.org/ns/icom/metadata/201008
icom_content = http://docs.oasis-open.org/ns/icom/content/201008
icom_doc = http://docs.oasis-open.org/ns/icom/document/201008
icom_msg = http://docs.oasis-open.org/ns/icom/message/201008
icom_card = http://docs.oasis-open.org/ns/icom/contact/201008
icom_presence = http://docs.oasis-open.org/ns/icom/presence/201008
icom_cal = http://docs.oasis-open.org/ns/icom/calendar/201008
icom_task = http://docs.oasis-open.org/ns/icom/task/201008
icom_forum = http://docs.oasis-open.org/ns/icom/forum/201008
icom_conf = http://docs.oasis-open.org/ns/icom/conference/201008

Note: The namespace prefix icom_core represents the IRI reference http://docs.oasis-open.org/ns/icom/core/201008 for ICOM core namespace. Both the unprefixed name Entity and prefixed name icom_core:Entity are qualified names that SHALL be interpreted by the expanded name http://docs.oasis-open.org/ns/icom/core/201008#Entity.

3 Core Model

3.1 Main Branch

3.1.1 Entity and Top-Level Subclasses

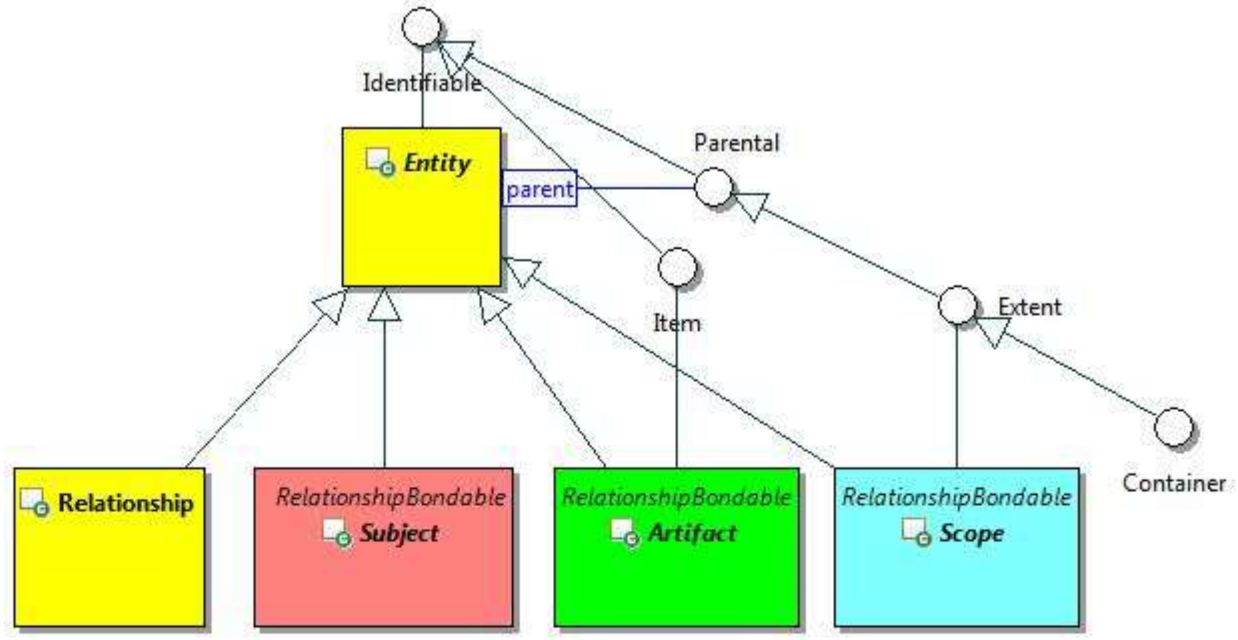


Figure 1: Entity and Top-Level Abstract Classes.

Figure 1 depicts Entity and top-level abstract classes forming the main branch of the ICOM class hierarchy. It depicts the Scope, Subject, and Artifact classes that represent the roots of the three major sub-branches of ICOM class hierarchy.

3.1.2 Identifiable

3.1.2.1 Description

An identifiable object has *objectId* and *changeToken* properties. The assignment of an *objectId* is implementation-dependent. The *objectId* is read only (immutable) once it is assigned.

3.1.2.2 Class Definition

The `Identifiable` class is a mixin class which defines the characteristics of entities and non-entities that enables unique identification.

The Identifiable class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Identifiable

extendsFrom

Value:

stereotype

Value: mixin

description

Value: Identifiable is a mixin class which defines the characteristics of all entities and some non-entities that enables unique identification.

propertyDefinitions

The values for this attribute are defined in Section 3.1.2.3.

3.1.2.3 Property Definitions

The Identifiable class MUST have the property definitions:

icom_core:objectId

Description:	A persistent identifier of an object.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

icom_core:changeToken

Description:	An opaque token used for optimistic locking & concurrency checking.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

The Identifiable class MAY include additional property definitions which are implementation-defined.

3.1.3 Parental

3.1.3.1 Description

A parental object may be a parent of other objects.

3.1.3.2 Class Definition

The Parental class is a mixin class which defines the characteristics of entities that may be parents of other entities or identifiable objects.

The Parental class has attribute values:

localNamespace

Value: icom_core

localName

Value: Parental

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: mixin

description

Value: Parental is a mixin class which defines the characteristics of the entities that can be parents of other entities or identifiable objects.

propertyDefinitions

The values for this attribute are defined in Section 3.1.3.3.

3.1.3.3 Property Definitions

The Parental class inherits property definitions from super classes.

The Parental class MUST have the property definition:

icom_core:parent

Description:	Parent of an object.
Required:	False
Inherited:	False
Property Type:	icom_core:Parental
Cardinality:	Single
Updatability:	Read Only

The Parental class MAY include additional property definitions which are implementation-defined.

3.1.4 Extent

3.1.4.1 Description

An extent object is a parental object which may contain other entities.

3.1.4.2 Class Definition

The Extent class is a mixin class which defines characteristics of entities that may contain other entities.

The Extent class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Extent

`extendsFrom`

Value: icom_core:Parental

`stereotype`

Value: mixin

`description`

Value: Extent is a mixin class which defines the characteristics of entities that may contain other entities.

`propertyDefinitions`

The values for this attribute are defined in Section 3.1.4.3.

3.1.4.3 Property Definitions

The Extent class inherits property definitions from super classes.

The Extent class MUST have the property definition:

icom_core:parent

Description:	Parent of an extent.
Required:	False
Inherited:	True
Property Type:	icom_core:Extent
Cardinality:	Single
Updatability:	Read Only

The Extent class MAY include additional property definitions which are implementation-defined.

3.1.5 Entity

3.1.5.1 Description

An entity is an identifiable object that can be persisted and that has an access control list.

Each entity is assigned an internationalized resource identifier (IRI) composed from its *objectId*. The form of the IRI is implementation-dependent.

3.1.5.2 Class Definition

The Entity class has attribute values:

localNamespace

Value: icom_core

localName

Value: Entity

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: An entity is an object with an immutable id and individual access control.

propertyDefinitions

The values for this attribute are defined in Section 3.1.5.3.

3.1.5.3 Property Definitions

The Entity class inherits property definitions from super classes.

The Entity class MUST have the property definitions:

icom_core:name

Description:	Name of an entity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:createdBy

Description:	An actor who created an entity.
Required:	False
Inherited:	False

Property Type:	icom_core:Actor
Cardinality:	Single
Updatability:	Read Only

icom_core:creationDate

Description:	Date and time when an entity is created. It is immutable.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:lastModifiedBy

Description:	An actor who last modified an entity.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Single
Updatability:	Read Only

icom_core:lastModificationDate

Description:	Date and time of last modification.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:parent

Description:	A parental entity which contains an entity.
Required:	False
Inherited:	False
Property Type:	icom_core:Parental
Cardinality:	Single
Updatability:	Read Only

icom_ac:owner

Description:	A subject who owns an entity.
Required:	True
Inherited:	False
Property Type:	icom_ac:Owner
Cardinality:	Single

Updatability:	Read Write

icom_ac:accessControlList

Description:	Access control list on an entity.
Required:	False
Inherited:	False
Property Type:	icom_ac:AccessControlList
Cardinality:	Single
Updatability:	Read Write

icom_meta:attachedMarker

Description:	Zero or more markers applied on an entity.
Required:	False
Inherited:	False
Property Type:	icom_meta:Marker
Cardinality:	Multi
Updatability:	Read Only

icom_meta:categoryApplication

Description:	Zero or more category applications on an entity.
Required:	False
Inherited:	False
Property Type:	icom_meta:CategoryApplication
Cardinality:	Multi
Updatability:	Read Only

icom_meta:tagApplication

Description:	Zero or more tag applications on an entity.
Required:	False
Inherited:	False
Property Type:	icom_meta:TagApplication
Cardinality:	Multi
Updatability:	Read Only

The Entity class MAY include additional property definitions which are implementation-defined.

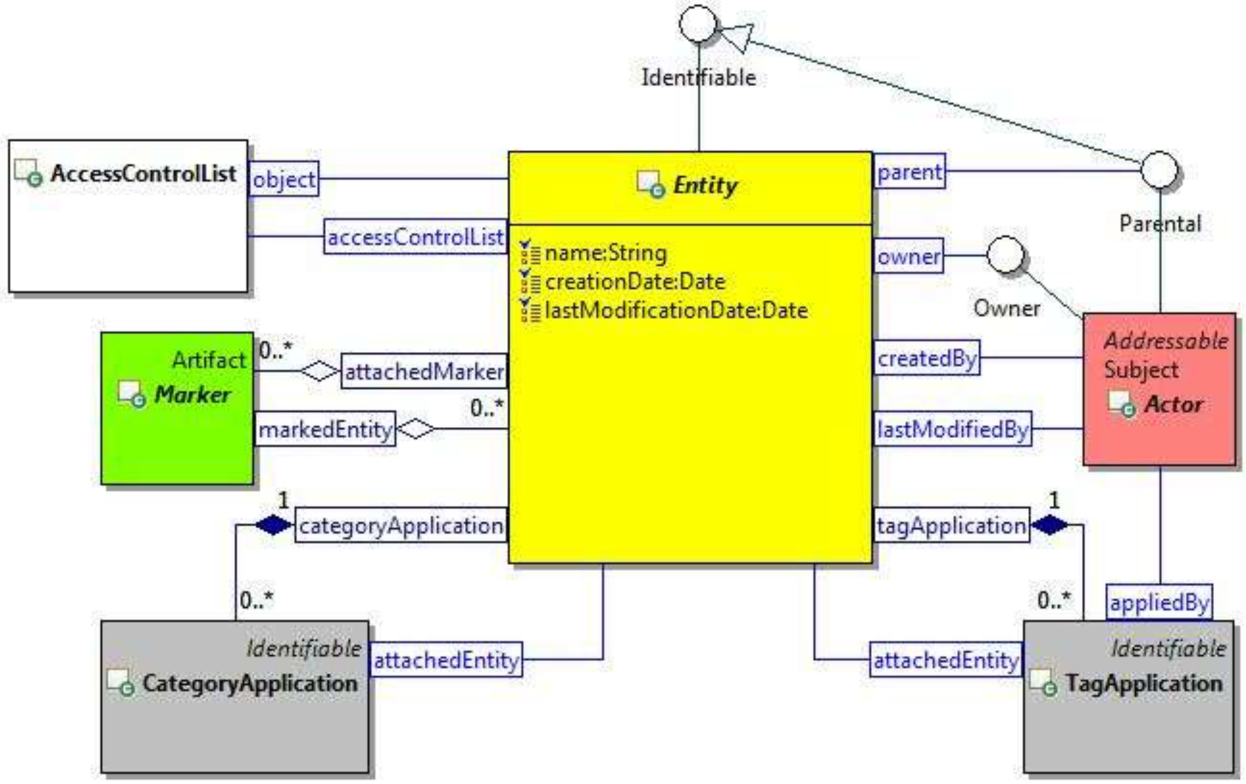


Figure 2: Entity Class Diagram.

3.1.6 Overview of Scope, Subject, and Artifact Branches

The UML diagram in Figure 3 depicts the core classes in the Scope, Subject, and Artifact branches of ICOM class hierarchy. Scope branch includes the model of communities and spaces which are containers of subjects and artifacts. Subject branch includes the model of actors, groups, and roles. Artifact branch includes the model of content and metadata produced by actors.

Note: The Subject and Artifact branches support the separation of concerns of user administration and content management. Typically subjects and artifacts are joined in the (subject, privilege, artifact) triples of access control model. Some of the (subject, privilege, artifact) triples are derived from the scopes of the role assignments and the artifacts contained by the scopes. The communities and spaces contain subjects and artifacts; however, membership of subjects in a space is administered separately from management of artifacts in the space.

Scope, Subject, and Artifact are defined in Section 3.2, 3.3, and 3.4, respectively.

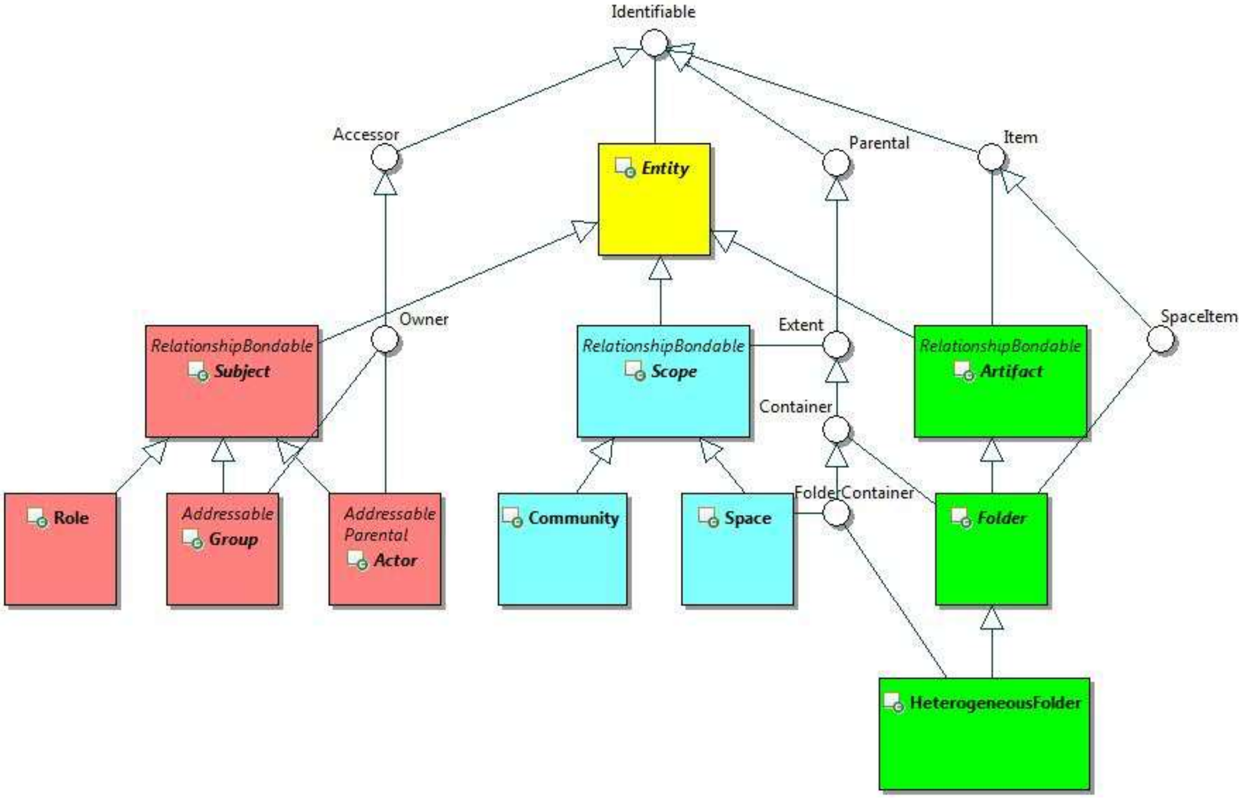


Figure 3: Scope, Subject, and Artifact Branches.

3.2 Scope Branch

3.2.1 Scope and Top-Level Subclasses

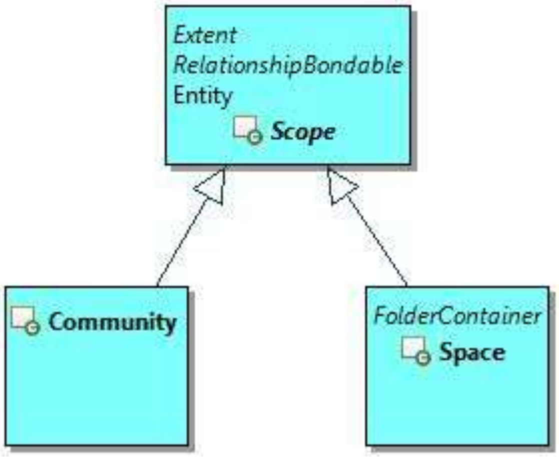


Figure 4: Scope Branch.

Figure 4 depicts the top-level classes of Scope Branch, which includes Scope, Community, and Space.

3.2.2 Scope

3.2.2.1 Description

A scope is an extent of an administrative policy.

3.2.2.2 Class Definition

The Scope class has attribute values:

localNamespace

Value: icom_core

localName

Value: Scope

extendsFrom

Value: icom_core:Entity, icom_core:Extent, icom_meta:RelationshipBondable

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: A scope is an extent of an administrative realm.

propertyDefinitions

The values for this attribute are defined in Section 3.2.2.3.

3.2.2.3 Property Definitions

The Scope class inherits property definitions from super classes.

The Scope class MUST have the property definitions:

icom_core:description

Description:	A description of a scope.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:parent

Description:	A community which contains a scope.

Required:	False
Inherited:	True
Property Type:	icom_core:Community
Cardinality:	Single
Updatability:	Read Only

icom_core:group

Description:	Zero or more groups defined in a scope.
Required:	False
Inherited:	False
Property Type:	icom_core:Group
Cardinality:	Multi
Updatability:	Read Only

icom_core:memberGroup

Description:	Member groups of a scope, i.e. groups whose assigned scopes include this scope.
Required:	False
Inherited:	False
Property Type:	icom_core:Group
Cardinality:	Multi
Updatability:	Read Only

icom_ac:roleDefinition

Description:	Zero or more role definitions defined in a scope.
Required:	False
Inherited:	False
Property Type:	icom_ac:RoleDefinition
Cardinality:	Multi
Updatability:	Read Only

icom_ac:role

Description:	Zero or more roles defined in a scope.
Required:	False
Inherited:	False
Property Type:	icom_ac:Role
Cardinality:	Multi
Updatability:	Read Only

icom_meta:relationship

Description:	Zero or more relationships associated with a scope.
Required:	False
Inherited:	False

Property Type:	icom_meta:Relationship
Cardinality:	Multi
Updatability:	Read Only

The Scope class MAY include additional property definitions which are implementation-defined.

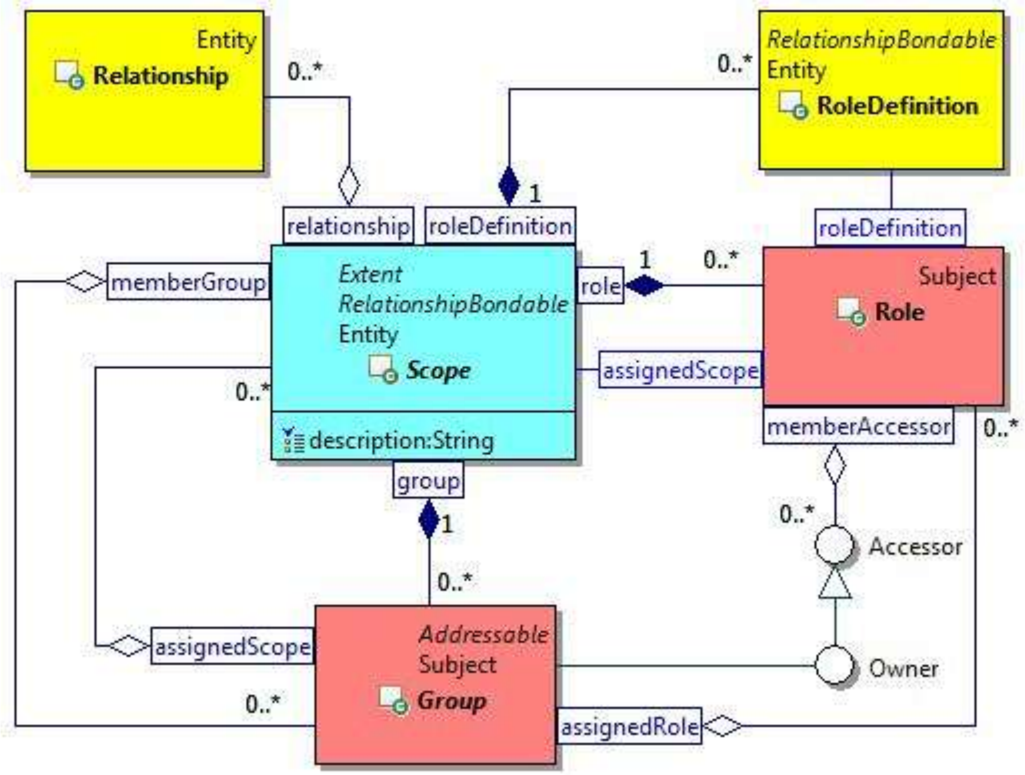


Figure 5: Scope Class Diagram.

3.2.3 Community

3.2.3.1 Description

A community is a scope that has a set of actors as members who can participate in a set of spaces.

It is implementation-dependent whether or not a space in a community can include participating actors who are not members of a parent community or ancestor communities.

3.2.3.2 Class Definition

The Community class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Community

extendsFrom

Value: icom_core:Scope

stereotype

Value: primary

description

Value: A community is a scope that has a set of actors as members who can participate in a set of spaces.

propertyDefinitions

The values for this attribute are defined in Section 3.2.3.3.

3.2.3.3 Property Definitions

The Community class inherits property definitions from super classes.

The Community class MUST have the property definitions:

icom_core:community

Description:	Sub-communities of a community.
Required:	False
Inherited:	False
Property Type:	icom_core:Community
Cardinality:	Multi
Updatability:	Read Only

icom_core:space

Description:	Spaces of a community.
Required:	False
Inherited:	False
Property Type:	icom_core:Space
Cardinality:	Multi
Updatability:	Read Only

icom_core:actor

Description:	Managed actors of a community, i.e. actors whose parent community is this community.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Multi
Updatability:	Read Only

icom_core:memberActor

Description:	Member actors of a community, i.e. actors whose assigned communities include this community.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Multi
Updatability:	Read Only

The Community class MAY include additional property definitions which are implementation-defined.

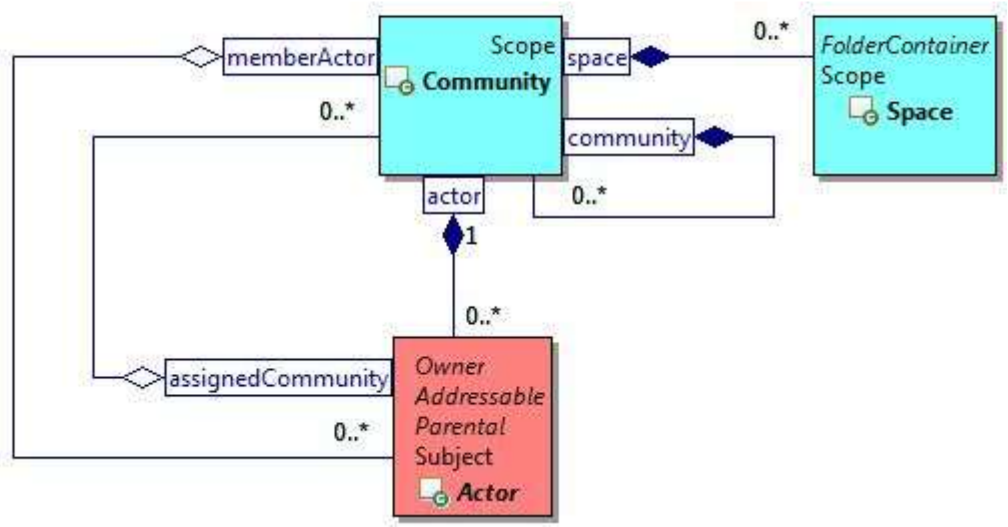


Figure 6: Community Class Diagram.

3.2.4 Space

3.2.4.1 Description

A space is a scope that defines a durable context and place for actors to work or collaborate.

3.2.4.2 Class Definition

The Space class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Space

`extendsFrom`

Value: icom_core:Scope, icom_core:FolderContainer

stereotype

Value: primary

description

Value: A space is a scope that defines a durable context and place for actors to work or collaborate.

propertyDefinitions

The values for this attribute are defined in Section 3.2.4.3.

3.2.4.3 Property Definitions

The Space class inherits property definitions from super classes.

The Space class MUST have the property definition:

icom_core:element

Description:	Elements of a space.
Required:	False
Inherited:	True
Property Type:	icom_core:SpaceItem
Cardinality:	Multi
Updatability:	Read Only

The Space class MAY include additional property definitions which are implementation-defined.

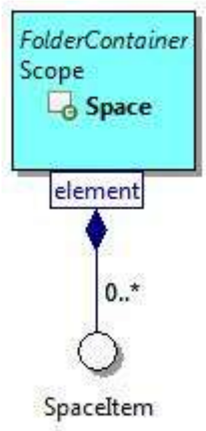


Figure 7: Space Class Diagram.

3.3 Subject Branch

3.3.1 Subject and Top-Level Subclasses

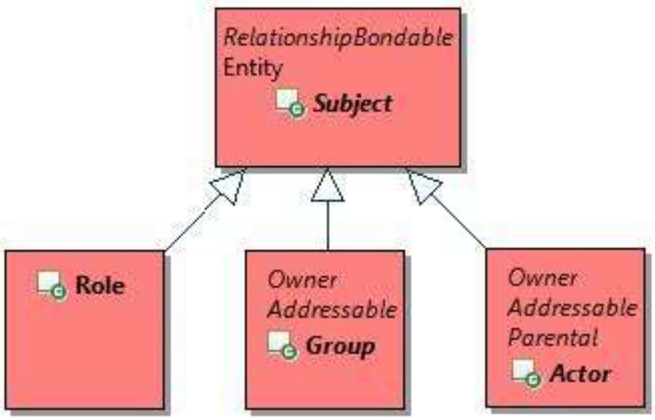


Figure 8: Subject Branch.

Figure 8 depicts the top-level classes of Subject Branch, which includes Subject, Role, Group, and Actor.

3.3.2 Subject

3.3.2.1 Description

A subject is an entity that can have rights to perform actions.

3.3.2.2 Class Definition

The Subject class has attribute values:

localNamespace

Value: icom_core

localName

Value: Subject

extendsFrom

Value: icom_core:Entity, icom_meta:RelationshipBondable

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: A subject is an entity that can have rights to perform actions.

`propertyDefinitions`

The values for this attribute are defined in Section 3.3.2.3.

3.3.2.3 Property Definitions

The Subject class inherits property definitions from super classes.

The Subject class MUST have the property definitions:

icom_core:description

Description:	A description of a subject.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:parent

Description:	A scope which contains a subject.
Required:	False
Inherited:	True
Property Type:	icom_core:Scope
Cardinality:	Single
Updatability:	Read Only

icom_meta:relationship

Description:	Zero or more relationships associated with a subject.
Required:	False
Inherited:	False
Property Type:	icom_meta:Relationship
Cardinality:	Multi
Updatability:	Read Only

icom_meta:property

Description:	Zero or more extended properties of a subject.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

The Subject class MAY include additional property definitions which are implementation-defined.

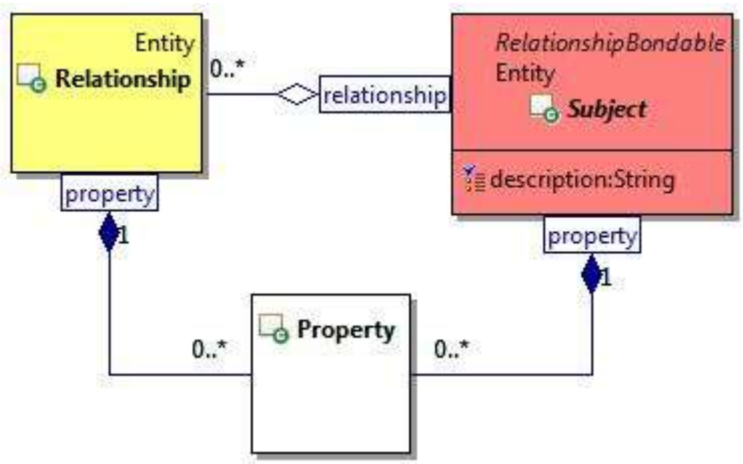


Figure 9: Subject Class Diagram.

3.3.3 Group

3.3.3.1 Description

A group is a subject representing a set of actors and sub-groups.

A group can be part of one or more super-groups.

It can be an owner of one or more entities.

3.3.3.2 Class Definition

The Group class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Group

`extendsFrom`

Value: icom_core:Subject, icom_core:Addressable, icom_ac:Accessor

Optional Value: icom_ac:Owner

`stereotype`

Value: primary

`description`

Value: A group is a subject representing a set of actors and sub-groups. A group can be part of one or more super-groups. It can be an owner of one or more entities.

`propertyDefinitions`

The values for this attribute are defined in Section 3.3.3.3.

3.3.3.3 Property Definitions

The Group class inherits property definitions from super classes.

The Group class MUST have the property definitions:

icom_core:assignedGroup

Description:	A group’s super-groups.
Required:	False
Inherited:	False
Property Type:	icom_core:Group
Cardinality:	Multi
Updatability:	Read Write

icom_core:assignedScope

Description:	A group’s scopes.
Required:	False
Inherited:	False
Property Type:	icom_core:Scope
Cardinality:	Multi
Updatability:	Read Write

icom_core:memberGroup

Description:	Sub-groups of a group.
Required:	False
Inherited:	False
Property Type:	icom_core:Group
Cardinality:	Multi
Updatability:	Read Only

icom_core:memberActor

Description:	Actors in a group.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Multi
Updatability:	Read Only

icom_ac:assignedRole

Description:	A group’s roles.
Required:	False
Inherited:	False
Property Type:	icom_ac:Role
Cardinality:	Multi

Updatability: Read Write

The Group class MAY include additional property definitions which are implementation-defined.

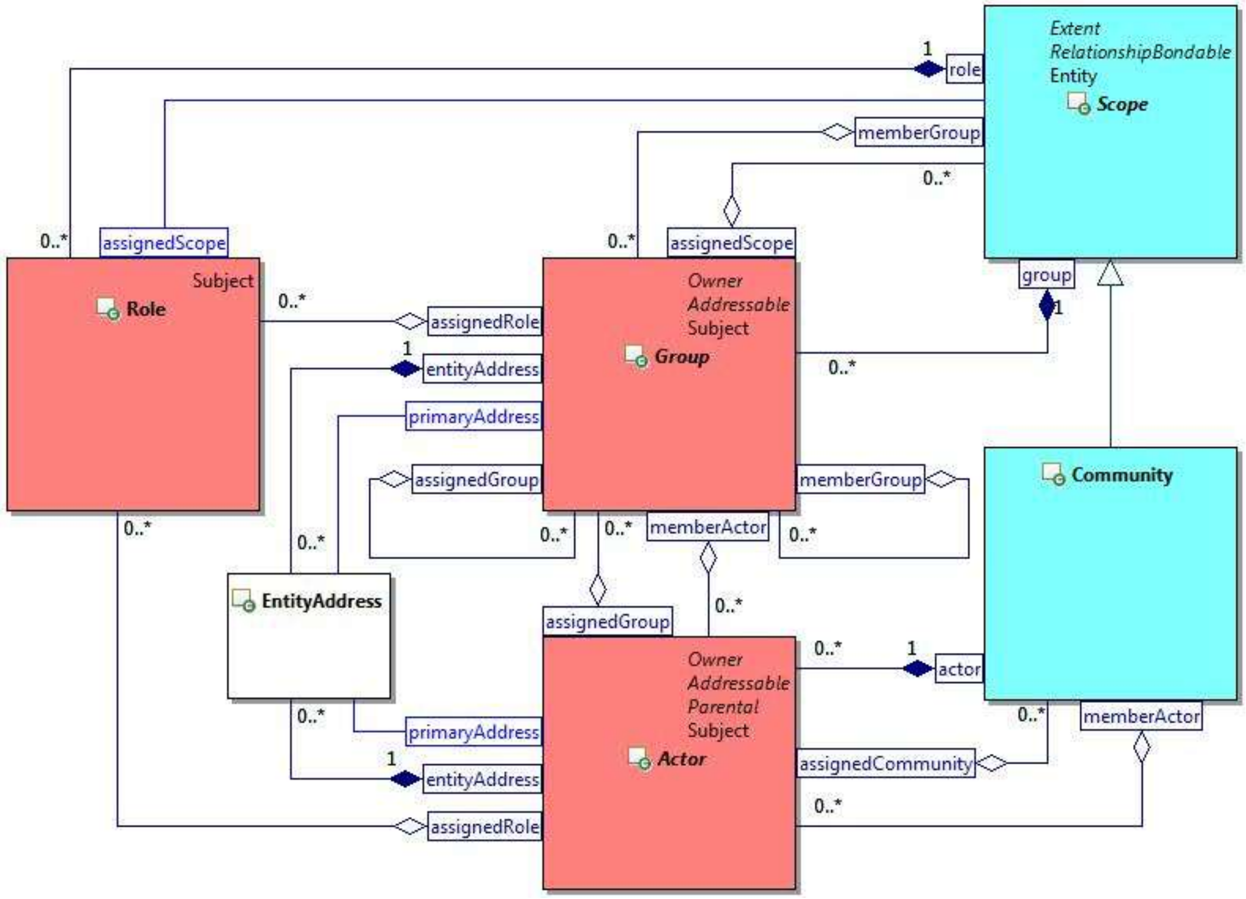


Figure 10: Group and Actor Class Diagram.

3.3.4 Actor

3.3.4.1 Description

An actor is a subject that can perform actions on objects.
It can be an owner of entities.

3.3.4.2 Class Definition

The Actor class has attribute values:

localNamespace

Value: icom_core

localName

Value: Actor

extendsFrom

Value: icom_core:Subject, icom_core:Addressable, icom_ac:Owner

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: An actor is a subject that can perform actions on objects.

propertyDefinitions

The values for this attribute are defined in Section 3.3.4.3.

3.3.4.3 Property Definitions

The Actor class inherits property definitions from super classes.

The Actor class MUST have the property definitions:

icom_core:parent

Description:	A community which contains an actor.
Required:	False
Inherited:	True
Property Type:	icom_core:Community
Cardinality:	Single
Updatability:	Read Only

icom_core:assignedGroup

Description:	An actor’s groups.
Required:	False
Inherited:	False
Property Type:	icom_core:Group
Cardinality:	Multi
Updatability:	Read Write

icom_core:assignedCommunity

Description:	An actor’s communities.
Required:	False
Inherited:	False
Property Type:	icom_core:Community
Cardinality:	Multi
Updatability:	Read Write

icom_ac:assignedRole

Description:	An actor's roles.
Required:	False
Inherited:	False
Property Type:	icom_ac:Role
Cardinality:	Multi
Updatability:	Read Write

The Actor class MAY include additional property definitions which are implementation-defined.

3.3.5 Person

3.3.5.1 Description

A person is an individual human who may be an actor.

A person has a personal space.

3.3.5.2 Class Definition

The Person class has attribute values:

localNamespace

Value: icom_core

localName

Value: Person

extendsFrom

Value: icom_core:Actor

stereotype

Value: primary

description

Value: A person is an individual human who may be an actor.

propertyDefinitions

The values for this attribute are defined in Section 3.3.5.3.

3.3.5.3 Property Definitions

The Person class inherits property definitions from super classes.

The Person class MUST have the property definitions:

icom_core:givenName

Description:	Given name of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:middleName

Description:	Middle name of a person. Can include multiple names concatenated.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:familyName

Description:	Family name of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:prefix

Description:	Prefix of a person’s name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:suffix

Description:	Suffix of a person’s name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:nickname

Description:	Nickname of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Multi
Updatability:	Read Write

icom_core:jobTitle

Description:	Job title of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:department

Description:	A person’s affiliated department.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:officeLocation

Description:	Location of a person’s department.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:company

Description:	A person’s affiliated company.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:profession

Description:	A person’s profession.

Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:personalSpace

Description:	Personal space of a person.
Required:	False
Inherited:	False
Property Type:	icom_core:Space
Cardinality:	Single
Updatability:	Read Only

icom_presence:presence

Description:	Presence of a person.
Required:	False
Inherited:	False
Property Type:	icom_presence:Presence
Cardinality:	Single
Updatability:	Read Only

icom_msg:instantMessageFeed

Description:	Instant message feed for a person.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessageFeed
Cardinality:	Single
Updatability:	Read Only

The Person class MAY include additional property definitions which are implementation-defined.

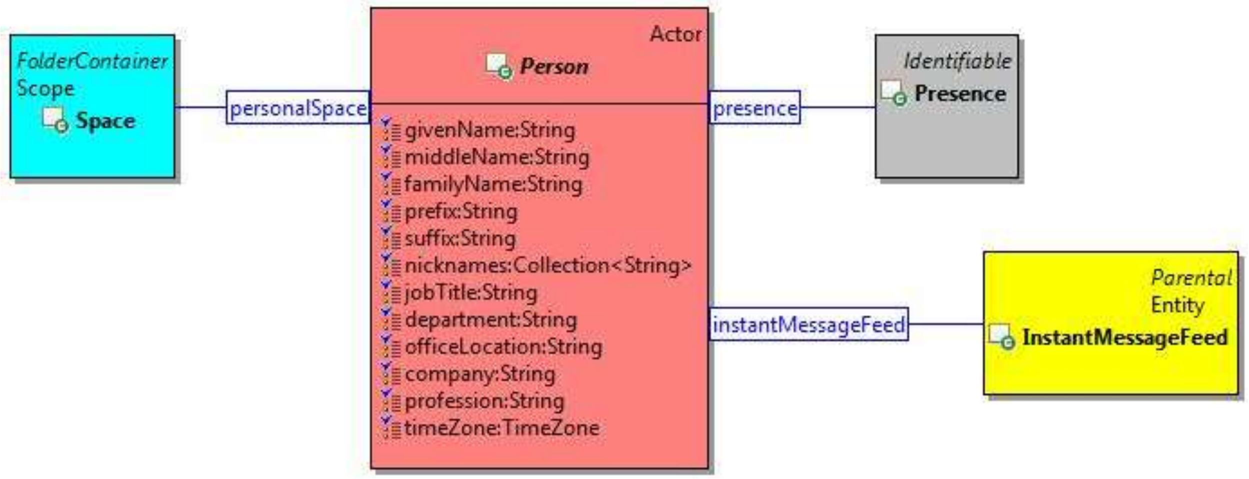


Figure 11: Person Class Diagram.

3.3.6 Resource

3.3.6.1 Description

A resource is an actor representing a bookable resource, such as a conference room, equipment, or on-line conference.

A resource is associated with a resource space that contains a resource scheduling calendar and on-line conference.

3.3.6.2 Class Definition

The Resource class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Resource

`extendsFrom`

Value: icom_core:Actor

`stereotype`

Value: primary

`description`

Value: A resource actor is an actor representing a bookable resource, such as a conference room, equipment, or on-line conference.

`propertyDefinitions`

The values for this attribute are defined in Section 3.3.6.3.

3.3.6.3 Property Definitions

The Resource class inherits property definitions from super classes.

The Resource class MUST have the property definitions:

icom_core:resourceSpace

Description:	Administrative space of a resource actor.
Required:	False
Inherited:	False
Property Type:	icom_core:Space
Cardinality:	Single
Updatability:	Read Only

icom_core:location

Description:	Location of a resource.
Required:	False
Inherited:	False
Property Type:	icom_core:Location
Cardinality:	Single
Updatability:	Read Write

icom_core:capacity

Description:	Capacity of a resource.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Write

icom_core:resourceType

Description:	Type of a resource.
Required:	False
Inherited:	False
Property Type:	icom_core:ResourceType
Cardinality:	Single
Updatability:	Read Write

icom_core:bookingRule

Description:	Resource booking rule.
Required:	False
Inherited:	False
Property Type:	icom_core:ResourceBookingRule
Cardinality:	Single

Updatability: Read Write

icom_core:bookingApprover

Description: One or more persons who approve the booking of a resource.
Required: False
Inherited: False
Property Type: icom_core:Person
Cardinality: Multi
Updatability: Read Write

The Resource class MAY include additional property definitions which are implementation-defined.

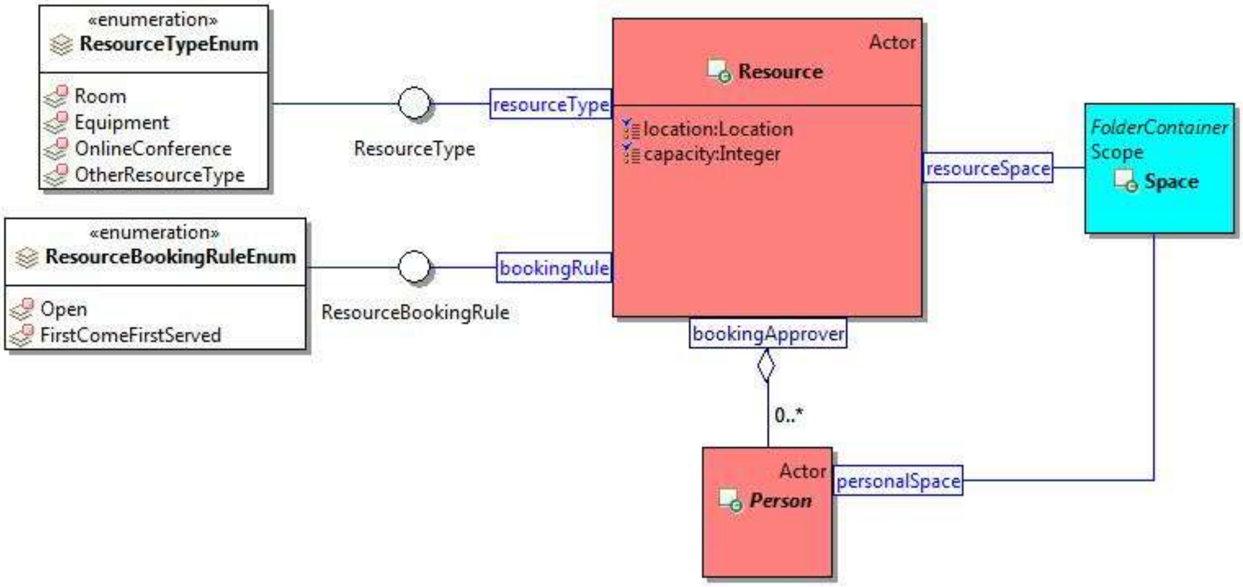


Figure 12: Resource Class Diagram.

3.3.7 ResourceType

3.3.7.1 Description

A resource type is a category of resources.

3.3.7.2 Class Definition

The ResourceType class is a mixin class which defines a resource type.

The ResourceType class has attribute values:

`localNamespace`

Value: icom_core

localName

Value: ResourceType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ResourceType is a mixin class which defines a type of resources.

propertyDefinitions

The values for this attribute are defined in Section 3.3.7.3.

3.3.7.3 Property Definitions

The ResourceType class MAY include additional property definitions which are implementation-defined.

3.3.8 ResourceTypeEnum

The ResourceTypeEnum class is an enum class that enumerates the instances each of which expresses a type of resources.

The ResourceTypeEnum class has attribute values:

localNamespace

Value: icom_core

localName

Value: ResourceTypeEnum

extendsFrom

Value: icom_core:ResourceType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A type of resources.

instances

Value: <icom_core:Room, icom_core:Equipment, icom_core:OnlineConference, icom_core:OtherResourceType>

ICOM defines four resource types:

- **icom_core:Room** a resource represents a room.
- **icom_core:Equipment** a resource represents an equipment.
- **icom_core:OnlineConference** a resource represents an online conference.
- **icom_core:OtherResourceType** a resource represents other things.

3.3.9 ResourceBookingRule

3.3.9.1 Description

A resource booking rule is a strategy for allocating resources for calendar scheduling.

3.3.9.2 Class Definition

The ResourceBookingRule class is a mixin class which defines a resource booking rule.

The ResourceBookingRule class has attribute values:

localNamespace

Value: icom_core

localName

Value: ResourceBookingRule

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ResourceBookingRule is a mixin class which defines a rule for allocating resources for calendar scheduling.

propertyDefinitions

The values for this attribute are defined in Section 3.3.9.3.

3.3.9.3 Property Definitions

The ResourceBookingRule class MAY include additional property definitions which are implementation-defined.

3.3.10 ResourceBookingRuleEnum

The ResourceBookingRuleEnum class is an enum class that enumerates the instances each of which expresses a booking rule.

The ResourceBookingRuleEnum class has attribute values:

localNamespace

Value: icom_core

localName

Value: ResourceBookingRuleEnum

extendsFrom

Value: icom_core:ResourceBookingRule

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A resource booking rule for allocating resources for calendar scheduling.

instances

Value: <icom_core:Open, icom_core:FirstComeFirstServed>

ICOM defines two resource booking rules:

- **icom_core:Open** a resource is open for booking.
- **icom_core:FirstComeFirstServed** a resource is first come first served.

3.4 Artifact Branch

3.4.1 Artifact and Top-Level Subclasses

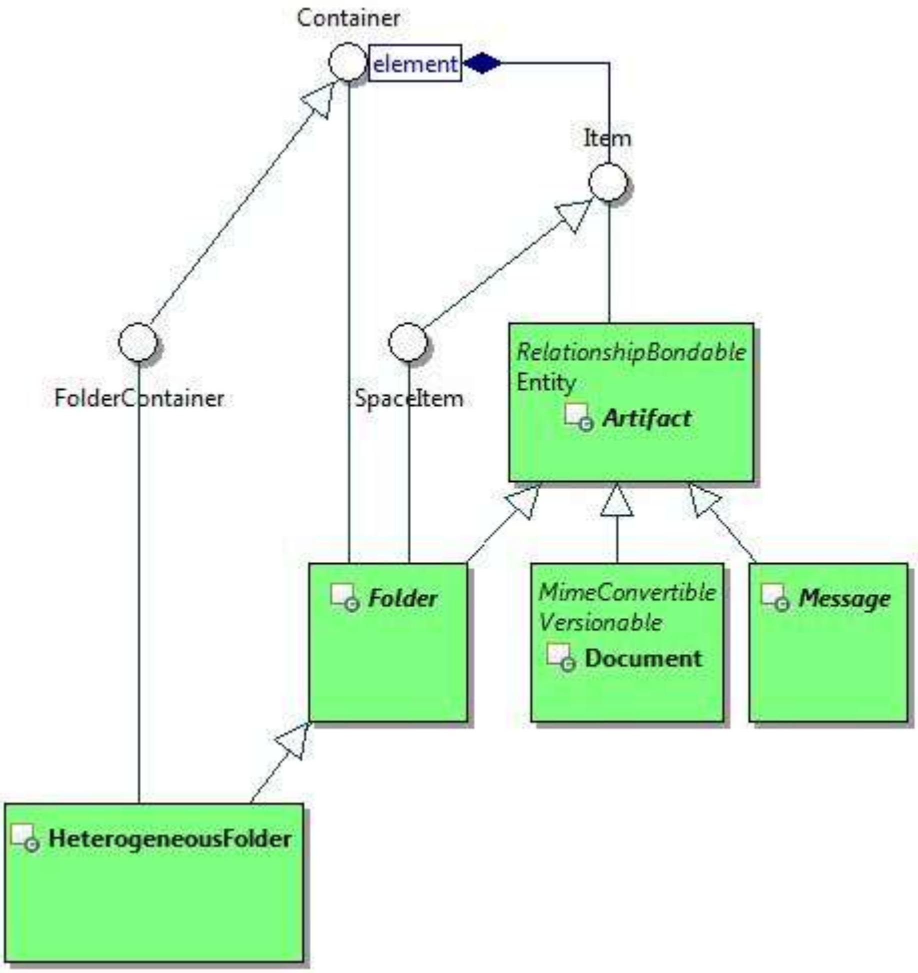


Figure 13: Artifact Branch.

Figure 13 depicts the top-level classes of Artifact Branch, which includes Artifact, Folder, HeterogeneousFolder, Document, and Message.

3.4.2 Item

3.4.2.1 Description

An item is an element of a container.

The parent of an item MUST be a container.

3.4.2.2 Class Definition

The Item class is a mixin class which defines the characteristics of entities that can be elements of a Container.

The Item class has attribute values:

localNamespace

Value: icom_core

localName

Value: Item

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: mixin

description

Value: Item is a mixin class which defines the characteristics of entities that can be placed in a Container.

propertyDefinitions

The values for this attribute are defined in Section 3.4.2.3.

3.4.2.3 Property Definitions

The Item class inherits property definitions from super classes.

The Item class MUST have the property definition:

icom_core:parent

Description:	A parent container of an item.
Required:	False
Inherited:	True
Property Type:	icom_core:Container
Cardinality:	Single
Updatability:	Read Only

The Item class MAY have the optional property definition:

icom_core:container

Description:	Zero, one, or more containers of an item, including the parent container.
Required:	False
Inherited:	False
Property Type:	icom_core:Container
Cardinality:	Multi
Updatability:	Read Write

The Item class MAY include additional property definitions which are implementation-defined.

3.4.3 SpaceItem

3.4.3.1 Description

A space item is an item that can be an element of a space.

3.4.3.2 Class Definition

The SpaceItem class is a mixin class which defines the characteristics of items that can be elements of a Space.

The SpaceItem class has attribute values:

localNamespace

Value: icom_core

localName

Value: SpaceItem

extendsFrom

Value: icom_core:Item

stereotype

Value: mixin

description

Value: SpaceItem is a mixin class which defines the characteristics of entities that can be elements of a Space.

propertyDefinitions

The values for this attribute are defined in Section 3.4.3.3.

3.4.3.3 Property Definitions

The SpaceItem class inherits property definitions from super classes.

The SpaceItem class MAY include additional property definitions which are implementation-defined.

3.4.4 Container

3.4.4.1 Description

A container is an extent that contains items.

3.4.4.2 Class Definition

The Container class is a mixin class which defines the characteristics of extents that contain items.

The Container class has attribute values:

localNamespace

Value: icom_core

localName

Value: Container

extendsFrom

Value: icom_core:Extent

stereotype

Value: mixin

description

Value: A container is an extent that contains items.

propertyDefinitions

The values for this attribute are defined in Section 3.4.4.3.

3.4.4.3 Property Definitions

The Container class inherits property definitions from super classes.

The Container class MUST have the property definition:

icom_core:element

Description:	Elements of a container, i.e. items whose parent container is the container or whose containers include the container.
Required:	False
Inherited:	False
Property Type:	icom_core:Item
Cardinality:	Multi
Updatability:	Read Only

The Container class MAY include additional property definitions which are implementation-defined.

3.4.5 FolderContainer

3.4.5.1 Description

A folder container is a container which may contain folders. Space and heterogeneous folder are folder containers.

3.4.5.2 Class Definition

The FolderContainer class is a mixin class that defines the characteristics of containers that may contain folders.

The FolderContainer class has attribute values:

localNamespace

Value: icom_core

localName

Value: FolderContainer

extendsFrom

Value: icom_core:Container

stereotype

Value: mixin

description

Value: A folder container is a container which may contain folders.

propertyDefinitions

The values for this attribute are defined in Section 3.4.5.3.

3.4.5.3 Property Definitions

The FolderContainer class inherits property definitions from super classes.

The FolderContainer class MAY include additional property definitions which are implementation-defined.

3.4.6 Artifact

3.4.6.1 Description

An artifact is a result of a communication, cooperation, content creation, or collaboration activity.

Note: Document versioning is an example of content creation activity resulting in an artifact (a version of a document).

3.4.6.2 Class Definition

The Artifact class has attribute values:

localNamespace

Value: icom_core

localName

Value: Artifact

extendsFrom

Value: icom_core:Entity, icom_core:Item, icom_meta:RelationshipBondable

Optional Value: icom_core:SpaceItem

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: An artifact is a result of a communication, cooperation, content creation, or collaboration activity.

propertyDefinitions

The values for this attribute are defined in Section 3.4.6.3.

3.4.6.3 Property Definitions

The Artifact class inherits property definitions from super classes.

The Artifact class MUST have the property definitions:

icom_core:description

Description:	A description of an artifact.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:userCreationDate

Description:	Date and time when an artifact was created.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_core:userLastModificationDate

Description:	Date and time when an artifact was last modified.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single

Updatability: Read Write

icom_meta:property

Description: Zero or more extended properties of an artifact.
Required: False
Inherited: False
Property Type: icom_meta:Property
Cardinality: Multi
Updatability: Read Write

icom_meta:viewerProperty

Description: Zero or more extended properties of an artifact visible to a viewer.
Required: False
Inherited: False
Property Type: icom_meta:Property
Cardinality: Multi
Updatability: Read Write

icom_meta:relationship

Description: Zero or more relationships associated with an artifact.
Required: False
Inherited: False
Property Type: icom_meta:Relationship
Cardinality: Multi
Updatability: Read Only

The Artifact class MAY include additional property definitions which are implementation-defined.

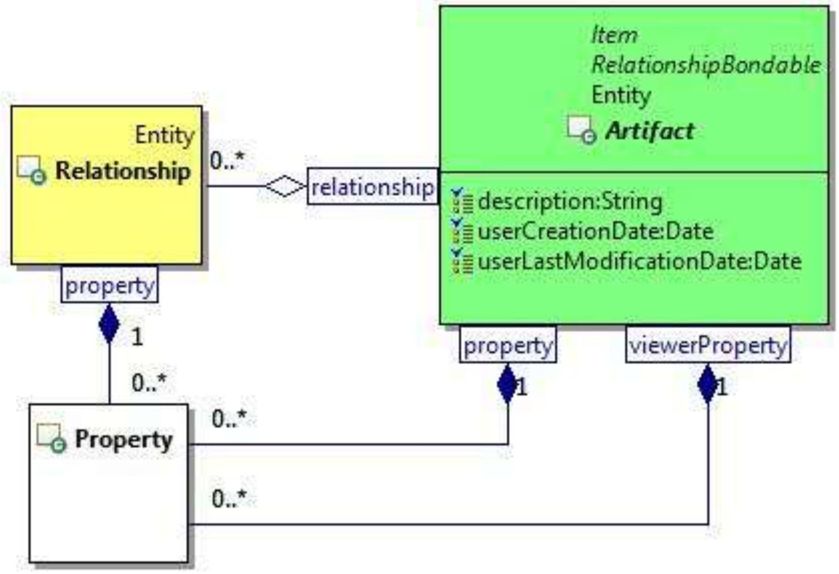


Figure 14: Artifact Class Diagram.

3.4.7 Folder

3.4.7.1 Description

A folder is an artifact that may contain other artifacts.

Note: Every folder except root folders has at least one parent folder. The parent of a root folder is a space. Subclasses of Folder class should enforce their own semantics on elements.

3.4.7.2 Class Definition

The Folder class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Folder

`extendsFrom`

Value: icom_core:Artifact, icom_core:Container, icom_core:SpaceItem

`stereotype`

Value: primary

`isAbstract`

Value: TRUE

description

Value: A folder is an artifact that may contain other artifacts.

propertyDefinitions

The values for this attribute are defined in Section 3.4.7.3.

3.4.7.3 Property Definitions

The Folder class inherits property definitions from super classes.

The Folder class MUST have the property definition:

icom_core:parent

Description:	A parent container of a folder.
Required:	False
Inherited:	True
Property Type:	icom_core:FolderContainer
Cardinality:	Single
Updatability:	Read Only

The Folder class MAY include additional property definitions which are implementation-defined.

3.4.8 HeterogeneousFolder

3.4.8.1 Description

A heterogeneous folder is an unconstrained folder to contain any type of artifacts.

Note: It is typically used for document folders, inbox, outbox, and trash folder of a space.

3.4.8.2 Class Definition

The HeterogeneousFolder class has attribute values:

localNamespace

Value: icom_core

localName

Value: HeterogeneousFolder

extendsFrom

Value: icom_core:Folder, icom_core:FolderContainer

stereotype

Value: primary

`description`

Value: A heterogeneous folder is an unconstrained folder to contain any type of artifacts.

`propertyDefinitions`

The values for this attribute are defined in Section 3.4.8.3.

3.4.8.3 Property Definitions

The HeterogeneousFolder class inherits property definitions from super classes.

The HeterogeneousFolder class MUST have the property definition:

icom_core:element

Description:	Elements of a heterogeneous folder.
Required:	False
Inherited:	True
Property Type:	icom_core:Artifact
Cardinality:	Multi
Updatability:	Read Only

The HeterogeneousFolder class MAY include additional property definitions which are implementation-defined.

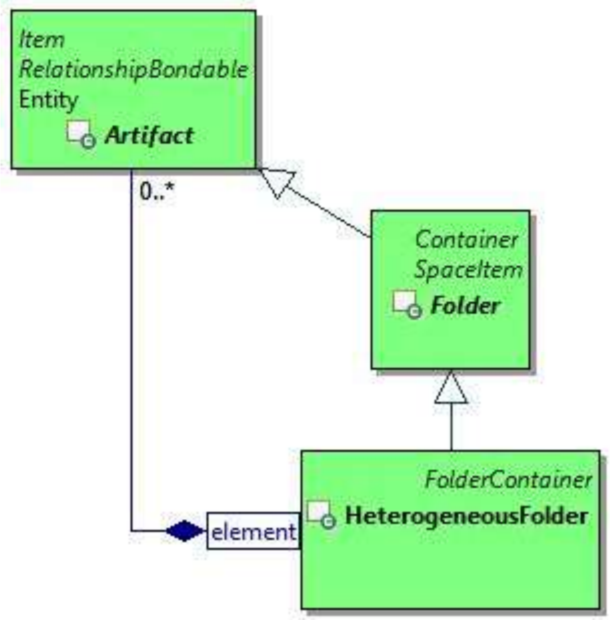


Figure 15: Heterogeneous Folder Class Diagram.

3.5 Access Control Model

3.5.1 Accessor

3.5.1.1 Description

An accessor can be granted or denied access rights to objects.

3.5.1.2 Class Definition

The Accessor class is a mixin class which defines the characteristics of subjects such as groups and actors that can be granted or denied access types in access control lists and privileges in role assignments.

The Accessor class has attribute values:

`localNamespace`

Value: icom_ac

`localName`

Value: Accessor

`extendsFrom`

Value: icom_core:Identifiable

`stereotype`

Value: mixin

`description`

Value: Accessor is a mixin class which defines the characteristics of subjects such as groups and actors that can be granted or denied access types in access control lists and granted privileges in role assignments.

`propertyDefinitions`

The values for this attribute are defined in Section 3.5.1.3.

3.5.1.3 Property Definitions

The Accessor class inherits property definitions from super classes.

The Accessor class MAY include additional property definitions which are implementation-defined.

3.5.2 Owner

3.5.2.1 Description

An owner is a subject that can be the owner of entities.

An owner of an entity MAY always have rights to update the access control list for the entity.

3.5.2.2 Class Definition

The Owner class is a mixin class which defines the characteristics of subjects such as groups and actors that can own entities.

The Owner class has attribute values:

`localNamespace`

Value: icom_ac

`localName`

Value: Owner

`extendsFrom`

Value: icom_ac:Accessor

`stereotype`

Value: mixin

`description`

Value: Owner is a mixin class which defines the characteristics of subjects such as groups and actors that can own entities.

`propertyDefinitions`

The values for this attribute are defined in Section 3.5.2.3.

3.5.2.3 Property Definitions

The Owner class inherits property definitions from super classes.

The Owner class MAY include additional property definitions which are implementation-defined.

3.5.3 RoleDefinition

3.5.3.1 Description

A role definition is a named set of privileges.

3.5.3.2 Class Definition

The RoleDefinition class has attribute values:

`localNamespace`

Value: icom_ac

`localName`

Value: RoleDefinition

extendsFrom

Value: icom_core:Entity, icom_meta:RelationshipBondable

stereotype

Value: primary

description

Value: A role definition is a named set of privileges.

propertyDefinitions

The values for this attribute are defined in Section 3.5.3.3.

3.5.3.3 Property Definitions

The RoleDefinition class inherits property definitions from super classes.

The RoleDefinition class MUST have the property definition:

icom_core:description

Description:	A description of a role definition.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_ac:privilege

Description:	A set of privileges.
Required:	True
Inherited:	False
Property Type:	icom_ac:Privilege
Cardinality:	Multi
Updatability:	Read Write

The RoleDefinition class MAY include additional property definitions which are implementation-defined.

3.5.4 Role

3.5.4.1 Description

A role assigns a named set of privileges to a set of accessors for operations within an assigned scope.

3.5.4.2 Class Definition

The Role class has attribute values:

`localNamespace`

Value: icom_ac

`localName`

Value: Role

`extendsFrom`

Value: icom_core:Subject

`stereotype`

Value: primary

`description`

Value: A role assigns a named set of rights to a set of accessors for operations within an assigned scope.

`propertyDefinitions`

The values for this attribute are defined in Section 3.5.4.3.

3.5.4.3 Property Definitions

The Role class inherits property definitions from super classes.

The Role class MUST have the property definitions:

icom_ac:roleDefinition

Description:	A role definition containing a set of privileges.
Required:	True
Inherited:	False
Property Type:	icom_ac:RoleDefinition
Cardinality:	Single
Updatability:	On Create

icom_ac:assignedScope

Description:	A scope in which a role is assigned.
Required:	True
Inherited:	False
Property Type:	icom_core:Scope
Cardinality:	Single
Updatability:	Read Write

icom_ac:memberAccessor

Description:	Accessors (actors and groups) assigned to a role.
Required:	False
Inherited:	False

Property Type: icom_ac:Accessor
Cardinality: Multi
Updatability: Read Write

The Role class MAY include additional property definitions which are implementation-defined.

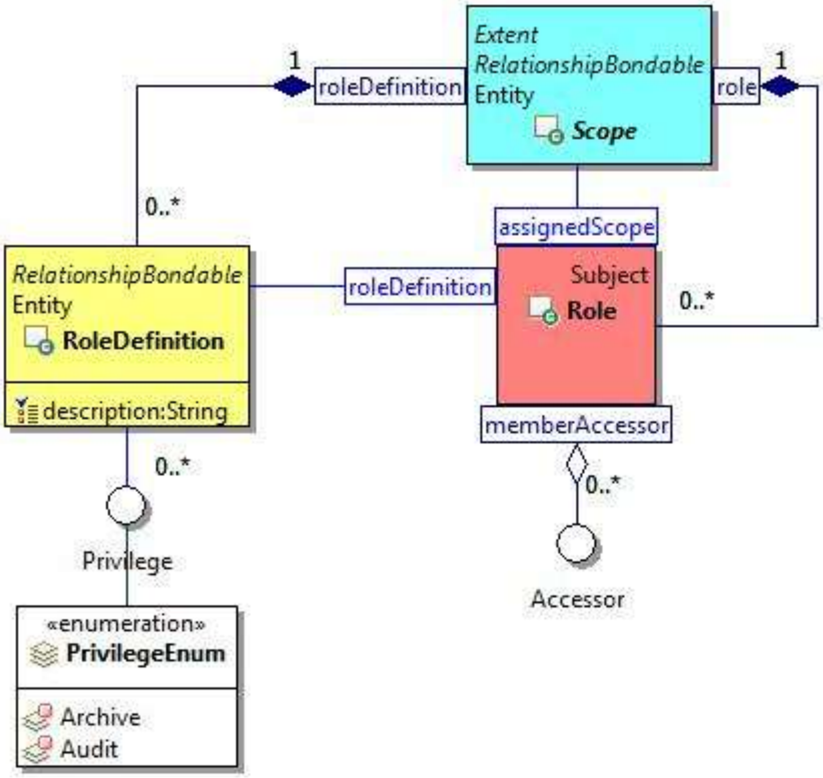


Figure 16: Role Definition and Role Class Diagram.

3.5.5 Privilege

3.5.5.1 Description

A privilege is an access right granted through roles.

3.5.5.2 Class Definition

The Privilege class is a mixin class which defines access rights that can be included in role definitions.
The Privilege class has attribute values:

localNamespace

Value: icom_ac

localName

Value: Privilege

extendsFrom

Value:

stereotype

Value: mixin

description

Value: Privilege is a mixin class which defines access rights that can be included in role definitions.

propertyDefinitions

The values for this attribute are defined in Section 3.5.5.3.

3.5.5.3 Property Definitions

The Privilege class MAY include additional property definitions which are implementation-defined.

3.5.6 PrivilegeEnum

The PrivilegeEnum class is an enum class that enumerates the instances each of which expresses a privilege that can be assigned to a role.

The PrivilegeEnum class has attribute values:

localNamespace

Value: icom_ac

localName

Value: PrivilegeEnum

extendsFrom

Value: icom_ac:Privilege

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Privilege that can be assigned to a role.

instances

Value: <icom_ac:Archive, icom_ac:Audit>

ICOM defines two privileges:

- **icom_ac:Archive** a right to archive contents in a scope.
- **icom_ac:Audit** a right to audit activities in a scope.

3.5.7 AccessControlList

3.5.7.1 Description

An access control list (ACL) is an object attached to an entity to specify a list of permissions to access the entity.

3.5.7.2 Class Definition

The AccessControlList class has attribute values:

localNamespace

Value: icom_ac

localName

Value: AccessControlList

extendsFrom

Value:

stereotype

Value: primary

description

Value: An access control list (ACL) is an object attached to an entity to specify a list of permissions to access the entity.

propertyDefinitions

The values for this attribute are defined in Section 3.5.7.3.

3.5.7.3 Property Definitions

The AccessControlList class MUST have the property definitions:

icom_ac:object

Description:	Associated object.
Required:	True
Inherited:	False
Property Type:	icom_core:Entity
Cardinality:	Single
Updatability:	On Create

icom_ac:accessControlEntry

Description:	One or more access control entries.
Required:	True
Inherited:	False
Property Type:	icom_ac:AccessControlEntry
Cardinality:	Multi
Updatability:	Read Write

AccessControlList class MAY include additional property definitions which are implementation-defined.

3.5.8 AccessControlEntry

3.5.8.1 Description

An access control entry specifies access types granted to or denied for an accessor.

3.5.8.2 Class Definition

The AccessControlEntry class has attribute values:

localNamespace

Value: icom_ac

localName

Value: AccessControlEntry

extendsFrom

Value:

stereotype

Value: primary

description

Value: An access control entry is associated with an accessor and contains a list of access types (permissions) granted to or denied from the accessor.

propertyDefinitions

The values for this attribute are defined in Section 3.5.8.3.

3.5.8.3 Property Definitions

The AccessControlEntry class MUST have the property definitions:

icom_ac:subject

Description:	Associated subject.
Required:	True

Inherited:	False
Property Type:	icom_ac:Accessor
Cardinality:	Single
Updatability:	On Create

icom_ac:grant

Description:	One or more access types granted to a subject.
Required:	False
Inherited:	False
Property Type:	icom_ac:AccessType
Cardinality:	Multi
Updatability:	Read Write

icom_ac:deny

Description:	One or more access type denied for a subject.
Required:	False
Inherited:	False
Property Type:	icom_ac:AccessType
Cardinality:	Multi
Updatability:	Read Write

The AccessControlEntry class MAY include additional property definitions which are implementation-defined.

3.5.9 AccessType

An AccessType is an access right granted through an access control entry.

3.5.9.1 Class Definition

The AccessType class is a mixin class which defines access rights that can be granted or denied in an access control entry.

The AccessType class has attribute values:

localNamespace

Value: icom_ac

localName

Value: AccessType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: AccessType is a mixin class which defines access rights that can be granted or denied in an access control entry.

propertyDefinitions

The values for this attribute are defined in Section 3.5.9.2.

3.5.9.2 Property Definitions

The AccessType class inherits property definitions from super classes.

The AccessType class MAY include additional property definitions which are implementation-defined.

3.5.10 AccessTypeEnum

The AccessTypeEnum class is an enum class that enumerates the instances each of which expresses an access type that can be granted or denied in an access control entry.

The AccessTypeEnum class has attribute values:

localNamespace

Value: icom_ac

localName

Value: AccessTypeEnum

extendsFrom

Value: icom_ac:AccessType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Access type that can be granted or denied in an access control entry.

instances

Value: <icom_ac:Read, icom_ac:Write, icom_ac:Delete>

ICOM defines three access types:

- **icom_ac:Read** a right to retrieve an entity.

- **icom_ac:Write** a right to update an entity.
- **icom_ac:Delete** a right to delete an entity.

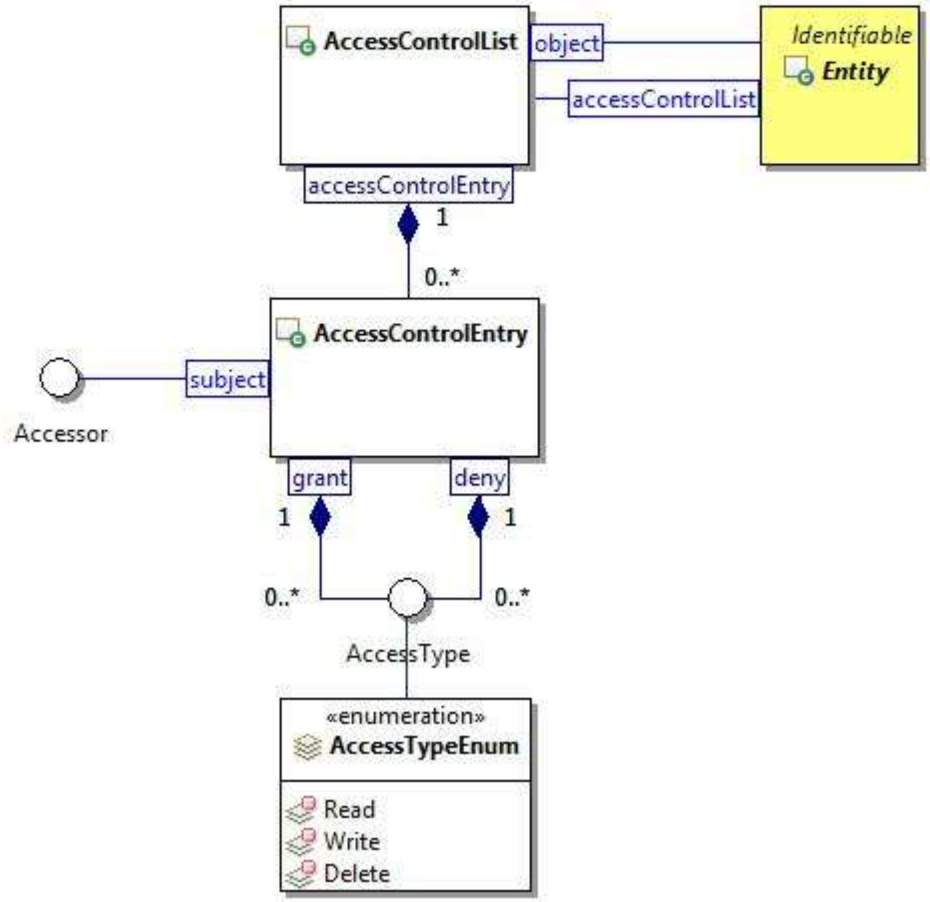


Figure 17: Access Control List Class Diagram.

3.6 Metadata Model

3.6.1 ClassDefinition

3.6.1.1 Description

A class definition is an entity that defines a type of entities.

3.6.1.2 Class Definition

The ClassDefinition class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: ClassDefinition

extendsFrom

Value: icom_core:Entity, icom_meta:RelationshipBondable

stereotype

Value: primary

isAbstract

Value: FALSE

description

Value: A class definition defines a type of entities.

propertyDefinitions

The values for this attribute are defined in Section 3.6.1.3.

3.6.1.3 Property Definitions

The ClassDefinition class inherits property definitions from super classes.

The ClassDefinition class MUST have the property definition:

icom_core:namespace

Description:	Namespace for a class name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:description

Description:	A description of a class.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_meta:extendsFrom

Description:	One or more generalizations of a class.
Required:	True
Inherited:	False
Property Type:	icom_meta:ClassDefinition
Cardinality:	Multi
Updatability:	Read Write

icom_meta:stereoType

Description:	Stereo type of a class.
Required:	True
Inherited:	False
Property Type:	icom_meta:StereoType
Cardinality:	Single
Updatability:	Read Write

icom_meta:abstract

Description:	Indicates whether a class is abstract or concrete.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:enumeration

Description:	Indicates whether instances of a class are enumerated. This property is applicable only if the stereo type property is primary.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:instances

Description:	Instances of an enumeration class. This property is applicable only if the enumeration property is true.
Required:	False
Inherited:	False
Property Type:	IRI
Cardinality:	Multi
Updatability:	Read Write

icom_meta:propertyDefinition

Description:	One or more property definitions of a class definition.
Required:	False
Inherited:	False
Property Type:	icom_meta:PropertyDefinition
Cardinality:	Multi
Updatability:	Read Write

The ClassDefinition class MAY include additional property definitions which are implementation-defined.

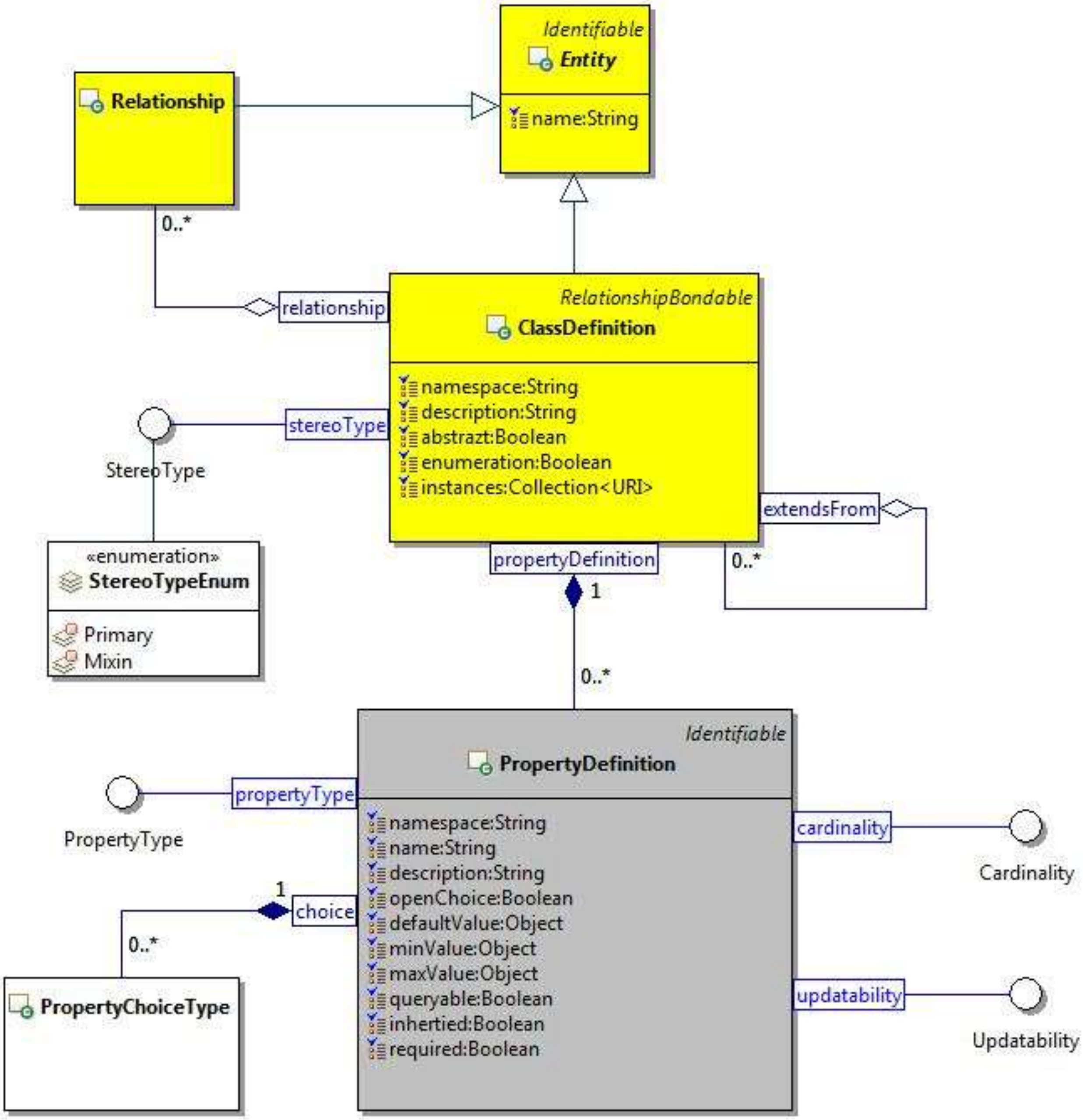


Figure 18: Class Definition and Property Definition Class Diagram.

3.6.2 StereoType

3.6.2.1 Description

A stereo type of a class definition.

3.6.2.2 Class Definition

The StereoType class is a mixin class which defines a stereo type of a class definition.

The StereoType class has attribute values:

localNamespace

Value: icom_meta

localName

Value: StereoType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: StereoType is a mixin class which defines a stereo type of a class definition.

propertyDefinitions

The values for this attribute are defined in Section 3.6.2.3.

3.6.2.3 Property Definitions

The StereoType class MAY include additional property definitions which are implementation-defined.

3.6.3 StereoTypeEnum

The StereoTypeEnum class is an enum class that enumerates the instances each of which defines a stereo type of a class definition.

The StereoTypeEnum has attribute values:

localNamespace

Value: icom_meta

localName

Value: StereoTypeEnum

extendsFrom

Value: icom_meta:StereoType

stereotype

Value: primary

`isEnumeration`

Value: TRUE

`description`

Value: Stereo type of a class definition.

`instances`

Value: <icom_meta:Primary, icom_meta:Mixin>

ICOM defines two stereo types:

- **icom_meta:Primary** a primary class.
- **icom_meta:Mixin** a mixin class.

3.6.4 PropertyDefinition

3.6.4.1 Description

A property definition specifies the name, type, choice, and cardinality of values for properties.

3.6.4.2 Class Definition

The PropertyDefinition class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: PropertyDefinition

`extendsFrom`

Value: icom_core:Identifiable

`stereotype`

Value: primary

`description`

Value: A property definition specifies the name, type, choice, and cardinality of values for properties.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.4.3.

3.6.4.3 Property Definitions

The PropertyDefinition class inherits property definitions from super classes.

The PropertyDefinition class MUST have the property definitions:

icom_core:namespace

Description:	Namespace for a property name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:name

Description:	Name for a property.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:description

Description:	A description of a property definition.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_meta:propertyType

Description:	Type of a property.
Required:	False
Inherited:	False
Property Type:	icom_meta:PropertyType
Cardinality:	Single
Updatability:	On Create
Choices:	{PropertyChoiceType}
Open Choice:	False

Note: The notation {PropertyChoiceType} represents a set of PropertyChoiceType.

icom_meta:defaultValue

Description:	A default value for a property.
Required:	False
Inherited:	False

Property Type:	**property-type**
Cardinality:	Single
Updatability:	Read Write

icom_meta:choice

Description:	An allowed value for a property.
Required:	False
Inherited:	False
Property Type:	icom_meta:PropertyChoiceType
Cardinality:	Multi
Updatability:	Read Write

icom_meta:openChoice

Description:	Indicates whether value of the property must be listed among the choices.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:inherited

Description:	Indicates whether a property definition is inherited from a super class.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:required

Description:	Indicates whether a property value must be provided. It is applicable only when the updatability of the property is read-write or on-create.
Required:	True
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:updatability

Description:	Updatability of a property specifying under what circumstances the property value can be updated.
Required:	True

Inherited:	False
Property Type:	icom_meta:Updatability
Cardinality:	Single
Updatability:	On Create

icom_meta:cardinality

Description:	Cardinality of a property specifying whether the property can have “zero or one” or “zero or more” values.
Required:	True
Inherited:	False
Property Type:	icom_meta:Cardinality
Cardinality:	Single
Updatability:	On Create

icom_meta:minValue

Description:	Minimum value for an integer or decimal property.
Required:	False
Inherited:	False
Property Type:	Integer | Decimal
Cardinality:	Single
Updatability:	Read Write

icom_meta:maxValue

Description:	Maximum value for an integer or decimal property.
Required:	False
Inherited:	False
Property Type:	Integer | Decimal
Cardinality:	Single
Updatability:	Read Write

The PropertyDefinition class MAY include additional property definitions which are implementation-defined.

3.6.5 Property

3.6.5.1 Description

The property holds a property value.

3.6.5.2 Class Definition

The Property class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Property

`extendsFrom`

Value:

`stereotype`

Value: primary

`description`

Value: A property value.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.5.3.

3.6.5.3 Property Definitions

The Property class MUST have the property definitions:

icom_meta:propertyDefinition

Description:	A property definition that specifies the name, type, and cardinality of a property.
Required:	True
Inherited:	False
Property Type:	icom_meta:PropertyDefinition
Cardinality:	Single
Updatability:	On Create

icom_meta:value

Description:	A value of a property.
Required:	True
Inherited:	False
Property Type:	**property-type**
Cardinality:	Single
Updatability:	Read Write

The Property class MAY include additional property definitions which are implementation-defined.

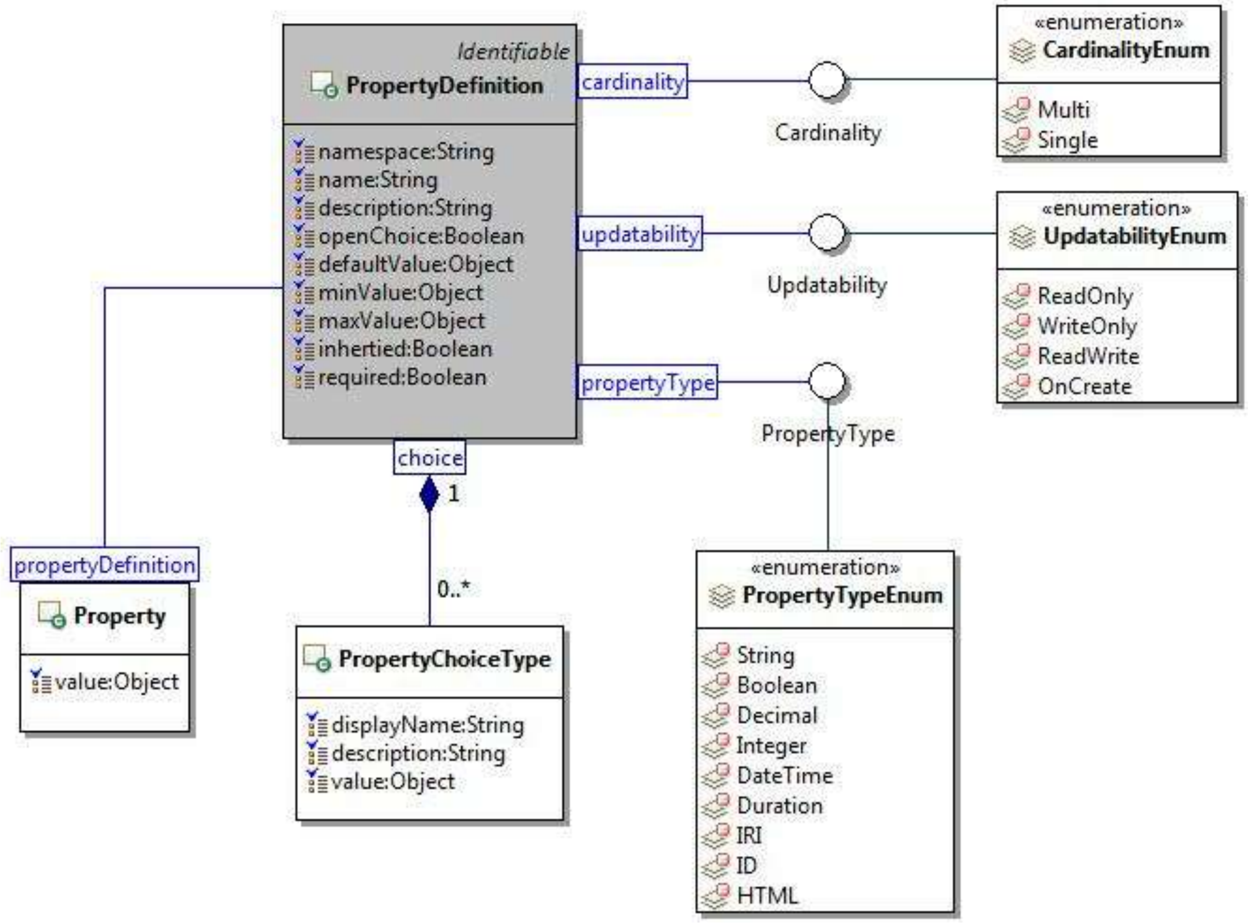


Figure 19: Property Definition and Property Class Diagram.

3.6.6 PropertyChoiceType

3.6.6.1 Description

The property choice type represents a value choice for a property. Each choice includes a display name to be used for presentation purpose and a value to be stored in a property when a choice is selected.

3.6.6.2 Class Definition

The PropertyChoiceType class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: PropertyChoiceType

`extendsFrom`

Value:

`stereotype`

Value: primary

`description`

Value: A choice for a property value.

`propertyDefinitions`

The values for this attribute are defined Section 3.6.6.3.

3.6.6.3 Property Definitions

The PropertyChoiceType class MUST have the property definitions:

icom_core:description

Description:	A description of a property choice.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_meta:displayName

Description:	Display name of a property choice.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_meta:value

Description:	A value of a property choice.
Required:	True
Inherited:	False
Property Type:	**property-type**
Cardinality:	Single
Updatability:	Read Write

The PropertyChoiceType class MAY include additional property definitions which are implementation-defined.

3.6.7 PropertyType

A PropertyType expresses a name of a **property-type**.

3.6.7.1 Class Definition

The PropertyType class is a mixin class which expresses a name of a **property-type**.

The PropertyType class has attribute values:

localNamespace

Value: icom_meta

localName

Value: PropertyType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: PropertyType is a mixin class which expresses a name of a **property-type**.

propertyDefinitions

The values for this attribute are defined in Section 3.6.7.2.

3.6.7.2 Property Definitions

The PropertyType class MAY include additional property definitions which are implementation-defined.

3.6.8 PropertyTypeEnum

The PropertyTypeEnum class is an enum class that enumerates the instances each of which expresses the name of a **property-type**.

The PropertyTypeEnum class has attribute values:

localNamespace

Value: icom_meta

localName

Value: PropertyTypeEnum

extendsFrom

Value: icom_meta:PropertyType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Name of a basic data type.

instances

Value: <icom_meta:String, icom_meta:Boolean, icom_meta:Decimal, icom_meta:Integer, icom_meta:Datetime, icom_meta:Duration, icom_meta:IRI, icom_meta:ID, icom_meta:HTML>

ICOM defines nine data types:

- **icom_meta:String** is equivalent to XML schema type **xsd:string**.
- **icom_meta:Boolean** is equivalent to XML schema type **xsd:boolean**.
- **icom_meta:Decimal** is equivalent to XML schema type **xsd:decimal**.
- **icom_meta:Integer** is equivalent to XML schema type **xsd:integer**.
- **icom_meta:Datetime** is equivalent to XML schema type **xsd:dateTime**.
- **icom_meta:Duration** is equivalent to XML schema type **xsd:duration.**
- **icom_meta:IRI** is equivalent to XML schema type **xsd:anyURI**.
- **icom_meta:ID** opaque object identifiers.
- **icom_meta:HTML** documents or fragments of Hypertext Markup Language (HTML) content

Note: ICOM uses basic data types defined by "XML Schema Part 2: Datatypes Second Edition" (W3C Recommendation, 28 October 2004, http://www.w3.org/TR/xmlschema-2/).

3.6.9 Updatability

3.6.9.1 Description

Updatability specifies under what circumstances a property value can be updated.

3.6.9.2 Class Definition

The Updatability class is a mixin class which specifies under what circumstances a property value can be updated.

The Updatability class has attribute values:

localNamespace

Value: icom_meta

localName

Value: Updatability

extendsFrom

Value:

stereotype

Value: mixin

description

Value: Updatability is a mixin class which specifies under what circumstances a property value can be updated.

propertyDefinitions

The values for this attribute are defined in Section 3.6.9.3.

3.6.9.3 Property Definitions

The Updatability class MAY include additional property definitions which are implementation-defined.

3.6.10 UpdatabilityEnum

The UpdatabilityEnum class is an enum class that enumerates instances each of which expresses the updatability of a property.

The UpdatabilityEnum has attribute values:

localNamespace

Value: icom_meta

localName

Value: UpdatabilityEnum

extendsFrom

Value: icom_meta:Updatability

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Updatability of a property.

instances

Value: <icom_meta:ReadOnly, icom_meta:WriteOnly, icom_meta:ReadWrite, icom_meta:OnCreate>

ICOM defines four updatability types:

- **icom_meta:ReadOnly** a property must not be updated directly by application.
- **icom_meta:WriteOnly** a property can be updated but cannot be read by application.

- **icom_meta:ReadWrite** a property can be updated by application.
- **icom_meta:WriteOnly** a property can be updated during the creation by application.

3.6.11 Cardinality

3.6.11.1 Description

Cardinality specifies whether a property is single or multi valued.

3.6.11.2 Class Definition

The Cardinality class is a mixin class which defines whether a property is single or multi valued.

The Cardinality class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Cardinality

`extendsFrom`

Value:

`stereotype`

Value: mixin

`description`

Value: Cardinality is a mixin class which defines whether a property is single or multi valued.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.11.3.

3.6.11.3 Property Definitions

The Cardinality class MAY include additional property definitions which are implementation-defined.

3.6.12 CardinalityEnum

The CardinalityEnum class is an enum class that enumerates instances each of which expresses the cardinality of a property.

The CardinalityEnum has attribute values:

`localNamespace`

Value: icom_meta

localName

Value: CardinalityEnum

extendsFrom

Value: icom_meta:Cardinality

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Cardinality of a property.

instances

Value: <icom_meta:Single, icom_meta:Multi>

ICOM defines two cardinality types:

- **icom_meta:Single** a property can have zero or one value (if property is not required), or exactly one value (if property is required).
- **icom_meta:Multi** a property can have zero or more values (if property is not required), or one or more values (if property is required).

3.6.13 Marker and Subclasses

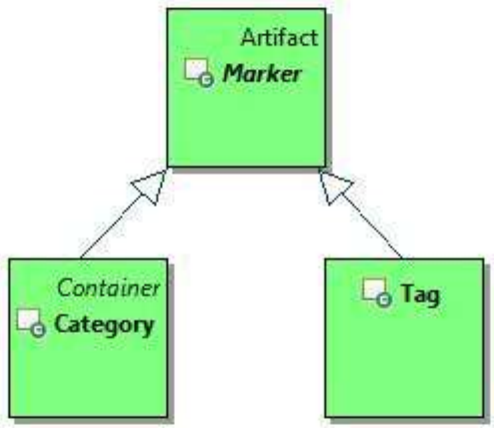


Figure 20: Marker Branch.

Figure 20 depicts the main classes of Marker Branch, which includes Marker, Category, and Tag.

3.6.14 Marker

3.6.14.1 Description

A marker is an artifact that groups together entities by a criterion. Markers can be flat or hierarchical. Flat markers are modeled by tag and hierarchical markers are modeled by category.

Note: In some cases when a user applies a marker to an entity, the marker application should be private such that only the user who applies the marker can browse or locate the entity through the marker. This is especially the case when markers are created by a user and visible only to the user who created them.

3.6.14.2 Class Definition

The Marker class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Marker

`extendsFrom`

Value: icom_core:Artifact

`stereotype`

Value: primary

`isAbstract`

Value: TRUE

`description`

Value: A marker is an artifact that groups together entities by a criterion.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.14.3.

3.6.14.3 Property Definitions

The Marker class inherits property definitions from super classes.

The Marker class MUST have the property definition:

icom_meta:markedEntity

Description:	A marked entity.
Required:	False
Inherited:	False
Property Type:	icom_core:Entity
Cardinality:	Multi
Updatability:	Read Only

The Marker class MAY include additional property definitions which are implementation-defined.

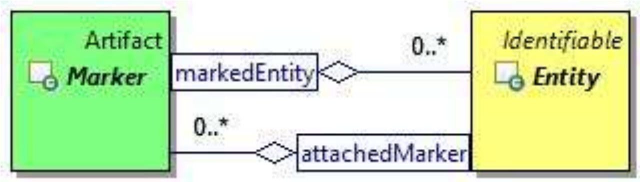


Figure 21: Marker Class Diagram.

3.6.15 Category

3.6.15.1 Description

A category is a marker that classifies entities.

3.6.15.2 Class Definition

The Category class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Category

`extendsFrom`

Value: icom_meta:Marker, icom_core:Container

`stereotype`

Value: primary

`description`

Value: A category is a marker that classifies entities.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.15.3.

3.6.15.3 Property Definitions

The Category class inherits property definitions from super classes.

The Category class MUST have the property definitions:

icom_meta:superCategory

Description:	Zero or more super categories.
Required:	False

Inherited:	False
Property Type:	icom_meta:Category
Cardinality:	Multi
Updatability:	Read Only

icom_meta:subCategory

Description:	Zero or more sub categories.
Required:	False
Inherited:	False
Property Type:	icom_meta:Category
Cardinality:	Multi
Updatability:	Read Only

icom_meta:abstract

Description:	Indicates whether a category is abstract or concrete.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_meta:propertyDefinition

Description:	Optional or mandatory properties for a category application.
Required:	False
Inherited:	False
Property Type:	icom_meta:PropertyDefinition
Cardinality:	Multi
Updatability:	Read Write

The Category class MAY include additional property definitions which are implementation-defined.

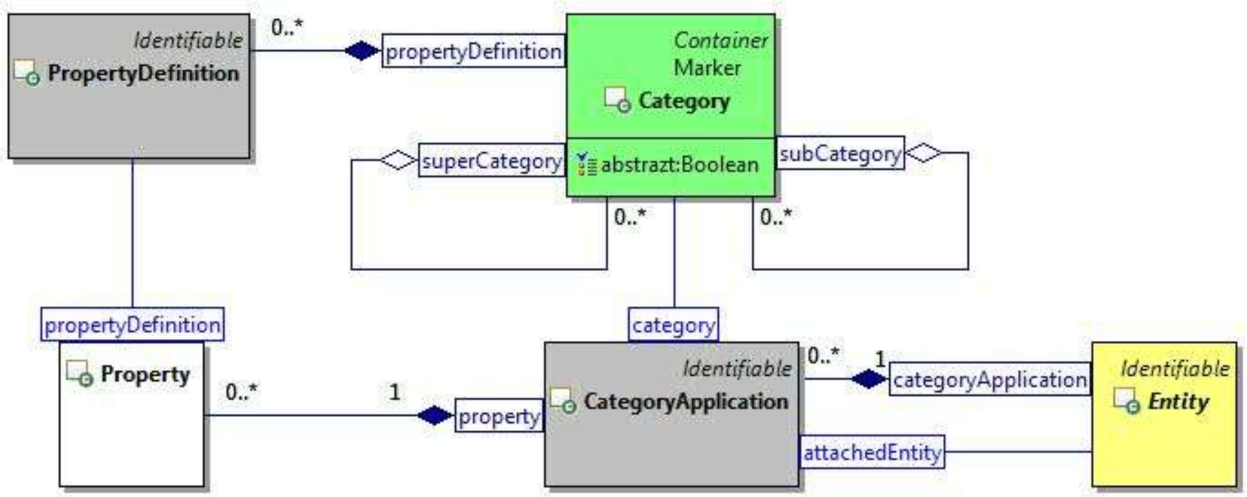


Figure 22: Category and Category Application Class Diagram.

3.6.16 CategoryApplication

3.6.16.1 Description

A category application is an instance of association between a category and a specific entity.

3.6.16.2 Class Definition

The CategoryApplication class has attribute values:

localNamespace

Value: icom_meta

localName

Value: CategoryApplication

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: primary

description

Value: A category application is an instance of association between a category and a specific entity.

propertyDefinitions

The values for this attribute are defined in Section 3.6.16.3.

3.6.16.3 Property Definitions

The CategoryApplication class inherits property definitions from super classes.

The CategoryApplication class MUST have the property definitions:

icom_meta:attachedEntity

Description:	An entity to which a category is applied.
Required:	True
Inherited:	False
Property Type:	icom_core:Entity
Cardinality:	Single
Updatability:	On Create

icom_meta:category

Description:	A category which is applied on an entity.
Required:	True
Inherited:	False
Property Type:	icom_meta:Category
Cardinality:	Single
Updatability:	On Create

icom_meta:property

Description:	Zero or more properties.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

The CategoryApplication class MAY include additional property definitions which are implementation-defined.

3.6.17 Tag

3.6.17.1 Description

A tag is a marker that labels entities by a keyword.

3.6.17.2 Class Definition

The Tag class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Tag

`extendsFrom`

Value: icom_meta:Marker

`stereotype`

Value: primary

`description`

Value: A tag is a marker that labels entities by a keyword.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.17.3.

3.6.17.3 Property Definitions

The Tag class inherits property definitions from super classes.

The Tag class MUST have the property definition:

icom_meta:applicationCount

Description:	An estimate of the number of times a tag is applied on entities.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Only

The Tag class MAY include additional property definitions which are implementation-defined.

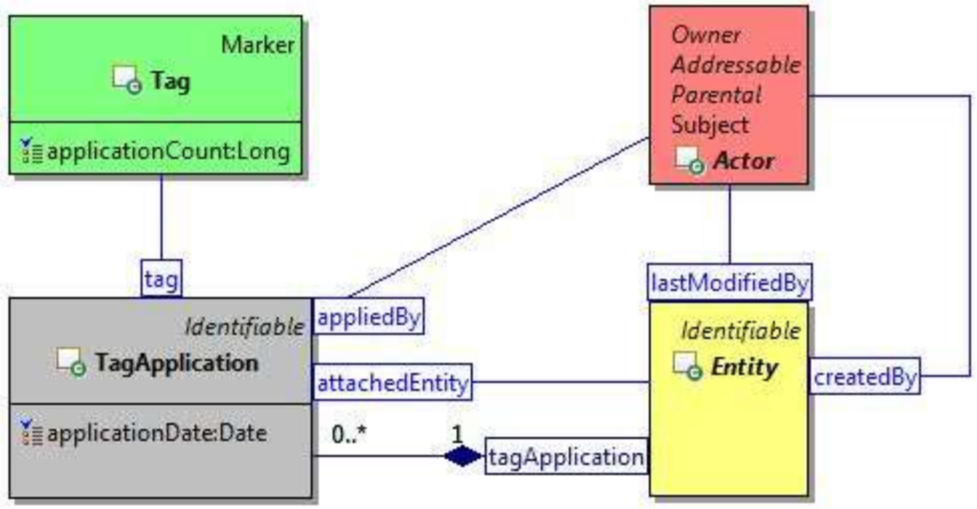


Figure 23: Tag and Tag Application Class Diagram.

3.6.18 TagApplication

3.6.18.1 Description

A tag application is an instance of association between a tag and a specific entity.

3.6.18.2 Class Definition

The TagApplication class has attribute values:

localNamespace

Value: icom_meta

localName

Value: TagApplication

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: primary

description

Value: A tag application is an instance of association between a tag and a specific entity.

propertyDefinitions

The values for this attribute are defined in Section 3.6.18.3.

3.6.18.3 Property Definitions

The TagApplication class inherits property definitions from super classes.

The TagApplication class MUST have the property definitions:

icom_meta:attachedEntity

Description:	An entity on which a tag is applied.
Required:	True
Inherited:	False
Property Type:	icom_core:Entity
Cardinality:	Single
Updatability:	On Create

icom_meta:tag

Description:	A tag which is applied to an entity.
Required:	True
Inherited:	False
Property Type:	icom_meta:Tag
Cardinality:	Single
Updatability:	On Create

icom_meta:appliedBy

Description:	A user who applies a tag to an entity.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Single
Updatability:	Read Only

icom_meta:applicationDate

Description:	A date and time when a tag is applied to an entity.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

The TagApplication class MAY include additional property definitions which are implementation-defined.

3.6.19 RelationshipBondable

3.6.19.1 Description

A relationship bondable entity is an entity which may be related to other entities by a relationship.

Note: A relationship can exist among entities that are not relationships.

3.6.19.2 Class Definition

The RelationshipBondable class is a mixin class which defines the characteristics of entities that may be relationship bonded. It includes almost every subclass of Entity except Relationship.

The RelationshipBondable class has attribute values:

localNamespace

Value: icom_meta

localName

Value: RelationshipBondable

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: mixin

description

Value: RelationshipBondable is a mixin class which defines the characteristics of entities that can be relationship bonded.

propertyDefinitions

The values for this attribute are defined in Section 3.6.19.3.

3.6.19.3 Property Definitions

The RelationshipBondable class inherits property definitions from super classes.

The RelationshipBondable class MAY include additional property definitions which are implementation-defined.

3.6.20 RelationshipDefinition

3.6.20.1 Description

A relationship definition is an entity that defines a type of relationship, including a name and a description of the relationship type, types of source entity and target entities of a relationship, and definition of properties in a relationship.

3.6.20.2 Class Definition

The RelationshipDefinition class has attribute values:

localNamespace

Value: icom_meta

`localName`

Value: RelationshipDefinition

`extendsFrom`

Value: icom_core:Entity, icom_meta:RelationshipBondable

`stereotype`

Value: primary

`description`

Value: A relationship definition is an entity that defines a type of relationship.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.20.3.

3.6.20.3 Property Definitions

The RelationshipDefinition class inherits property definitions from super classes.

The RelationshipDefinition class MUST have the property definitions:

icom_core:description

Description: A description of a relationship definition.
Required: False
Inherited: False
Property Type: String
Cardinality: Single
Updatability: Read Write

icom_meta:propertyDefinition

Description: Optional or mandatory properties for a relationship.
Required: False
Inherited: False
Property Type: icom_meta:PropertyDefinition
Cardinality: Multi
Updatability: Read Write

icom_meta:allowedSourceType

Description: A list of expanded names of relationship bondable classes, indicating that the source entity of a relationship MUST be an instance of a class in the list.
Required: False
Inherited: False
Property Type: IRI
Cardinality: Multi

Updatability:	Read Write

icom_meta:allowedTargetType

Description:	A list of expanded names of relationship bondable classes, indicating that the target entity of a relationship MUST be an instance of a class in the list.
Required:	False
Inherited:	False
Property Type:	IRI
Cardinality:	Multi
Updatability:	Read Write

The RelationshipDefinition class MAY include additional property definitions which are implementation-defined.

3.6.21 Relationship

3.6.21.1 Description

A relationship is an entity that relates a set of entities by a predicate.

3.6.21.2 Class Definition

The Relationship class has attribute values:

`localNamespace`

Value: icom_meta

`localName`

Value: Relationship

`extendsFrom`

Value: icom_core:Entity

`stereotype`

Value: primary

`description`

Value: A relationship is an entity that relates a set of entities by a predicate.

`propertyDefinitions`

The values for this attribute are defined in Section 3.6.21.3.

3.6.21.3 Property Definitions

The Relationship class inherits property definitions from super classes.

The Relationship class MUST have the property definitions:

icom_meta:relationshipDefinition

Description:	A definition of relationships.
Required:	True
Inherited:	False
Property Type:	icom_meta:RelationshipDefinition
Cardinality:	Single
Updatability:	On Create

icom_meta:sourceEntity

Description:	A source entity of a relationship.
Required:	True
Inherited:	False
Property Type:	icom_meta:RelationshipBondable
Cardinality:	Single
Updatability:	On Create

icom_meta:targetEntity

Description:	One or more target entities of a relationship.
Required:	True
Inherited:	False
Property Type:	icom_meta:RelationshipBondable
Cardinality:	Multi
Updatability:	Read Write

icom_meta:property

Description:	Zero or more properties.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

The Relationship class MAY include additional property definitions which are implementation-defined.

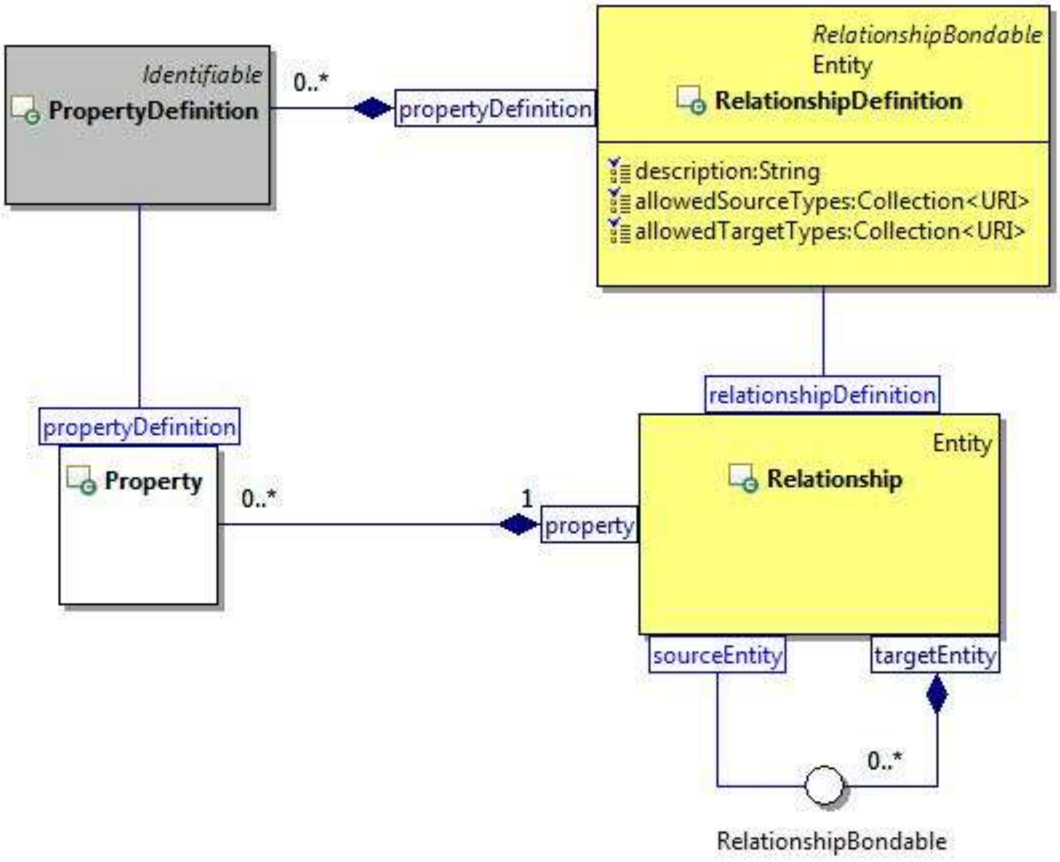


Figure 24: Relationship Class Diagram.

3.7 Common Concepts

3.7.1 Addressable

3.7.1.1 Description

An addressable object is an identifiable object that has one or more addresses.

3.7.1.2 Class Definition

The Addressable class is a mixin class which defines the characteristics of entities that has one or more addresses.

The Addressable class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Addressable

`extendsFrom`

Value: icom_core:Identifiable

`stereotype`

Value: mixin

`description`

Value: Addressable is a mixin class which defines the characteristics of entities that has one or more addresses.

`propertyDefinitions`

The values for this attribute are defined in Section 3.7.1.3.

3.7.1.3 Property Definitions

The Addressable class inherits property definitions from super classes.

The Addressable class MUST have the property definitions:

icom_core:entityAddress

Description:	Zero or more addresses of an addressable object.
Required:	False
Inherited:	False
Property Type:	icom_core:EntityAddress
Cardinality:	Multi
Updatability:	Read Write

icom_core:primaryAddress

Description:	The primary address of an addressable object.
Required:	False
Inherited:	False
Property Type:	icom_core:EntityAddress
Cardinality:	Single
Updatability:	Read Write

The Addressable class MAY include additional property definitions which are implementation-defined.

3.7.2 EntityAddress

3.7.2.1 Description

An entity address object represents an address which is defined by type and IRI.

3.7.2.2 Class Definition

The EntityAddress class has attribute values:

localNamespace

Value: icom_core

localName

Value: EntityAddress

extendsFrom

Value:

stereotype

Value: primary

description

Value: An entity address object represents an address which is defined by type and IRI.

propertyDefinitions

The values for this attribute are defined in Section 3.7.2.3.

3.7.2.3 Property Definitions

The EntityAddress class MUST have the property definitions:

icom_core:addressType

Description:	Type of an address.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:address

Description:	A IRI representing an address.
Required:	False
Inherited:	False
Property Type:	IRI
Cardinality:	Single
Updatability:	Read Write

3.7.3 Participant

3.7.3.1 Description

A participant object represents the participation of any addressable entity in a collaboration activity such as an occurrence, task, conference, discussion, and message.

If an addressable entity is not specified, an address must be specified.

3.7.3.2 Class Definition

The Participant class has attribute values:

localNamespace

Value: icom_core

localName

Value: Participant

extendsFrom

Value:

stereotype

Value: primary

description

Value: A participant object represents the participation of any addressable entity in a collaboration activity such as an occurrence, task, conference, discussion, and message.

propertyDefinitions

The values for this attribute are defined in Section 3.7.3.3.

3.7.3.3 Property Definitions

The Participant class inherits property definitions from super classes.

The Participant class MUST have the property definitions:

icom_core:participant

Description:	An addressable entity to participate in a collaboration activity.
Required:	False
Inherited:	False
Property Type:	icom_core:Addressable
Cardinality:	Single
Updatability:	On Create

icom_core:address

Description:	An address of a participant in a collaboration activity.
Required:	False
Inherited:	False
Property Type:	IRI
Cardinality:	Single
Updatability:	On Create

icom_core:name

Description:	Name of a participant in a collaboration activity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	On Create

The Participant class MAY include additional property definitions which are implementation-defined.

3.7.4 Priority

3.7.4.1 Description

A priority level for delivery of information.

3.7.4.2 Class Definition

The Priority class is a mixin class which defines a priority level for delivery of information.

The Priority class has attribute values:

localNamespace

Value: icom_core

localName

Value: Priority

extendsFrom

Value:

stereotype

Value: mixin

description

Value: Priority is a mixin class which defines a priority level for delivery of information.

propertyDefinitions

The values for this attribute are defined in Section 3.7.4.3.

3.7.4.3 Property Definitions

The Priority class MAY include additional property definitions which are implementation-defined.

3.7.5 PriorityEnum

The PriorityEnum class is an enum class that enumerates the instances each of which defines a priority level for delivery of information.

The PriorityEnum has attribute values:

localNamespace

Value: icom_core

localName

Value: PriorityEnum

extendsFrom

Value: icom_core:Priority

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Priority level for delivery of information.

instances

Value: <icom_core:Normal, icom_core:Low, icom_core:Medium, icom_core:High>

ICOM defines four priorities:

- **icom_core:Normal** a normal priority.
- **icom_core:Low** a low priority.
- **icom_core:Medium** a medium priority.
- **icom_core:High** a high priority.

3.7.6 DateTimeResolution

3.7.6.1 Description

A date time resolution is a resolution of date time value.

3.7.6.2 Class Definition

The DateTimeResolution class is a mixin class which defines a resolution of date time value.

The DateTimeResolution class has attribute values:

localNamespace

Value: icom_core

localName

Value: DateTimeResolution

extendsFrom

Value:

stereotype

Value: mixin

description

Value: DateTimeResolution is a mixin class which defines a resolution of date time value.

propertyDefinitions

The values for this attribute are defined in Section 3.7.6.3.

3.7.6.3 Property Definitions

The DateTimeResolution class MAY include additional property definitions which are implementation-defined.

3.7.7 DateTimeResolutionEnum

The DateTimeResolutionEnum class is an enum class that enumerates the instances each of which expresses a resolution of a date time value.

The DateTimeResolutionEnum has attribute values:

localNamespace

Value: icom_core

localName

Value: DateTimeResolutionEnum

extendsFrom

Value: icom_core:DateTimeResolution

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Resolution of a date time value.

instances

Value: <icom_core:Year, icom_core:Date, icom_core:Time>

ICOM defines three date time resolutions:

- **icom_core:Year** date time resolution is in years.
- **icom_core:Date** date time resolution is in years and days.
- **icom_core:Time** date time resolution is in years, days, and time of day.

3.7.8 TimeZone

3.7.8.1 Description

A time zone is a region that has a uniform standard time.

3.7.8.2 Class Definition

The TimeZone class has attribute values:

localNamespace

Value: icom_core

localName

Value: TimeZone

extendsFrom

Value:

stereotype

Value: primary

description

Value: A time zone is a region that has a uniform standard time.

propertyDefinitions

The values for this attribute are defined in Section 3.7.8.3.

3.7.8.3 Property Definitions

The TimeZone class inherits property definitions from super classes.

The TimeZone class MUST have the property definitions:

icom_core:ID

Description:	Identifier of a time zone.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	On Create

icom_core:rawOffset

Description:	An offset to add to Universal Coordinated Time (UTC) to get local time. If Daylight Saving Time is in effect at the specified date, the offset value is adjusted with the amount of daylight saving.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	On Create

The TimeZone class MAY include additional property definitions which are implementation-defined.

3.7.9 Location

3.7.9.1 Description

A location object represents a physical location which is defined by name, description, and geo coordinates.

Note: The name of a location may remain unchanged while a physical location may be changing. For example, a location name might be “On an airplane” while a physical location might be the geo coordinates of a flight path or current coordinates of a plane.

3.7.9.2 Class Definition

The Location class has attribute values:

`localNamespace`

Value: icom_core

`localName`

Value: Location

`extendsFrom`

Value:

stereotype

Value: primary

description

Value: A location object represents a physical location which is defined by name, description, or geo coordinates.

propertyDefinitions

The values for this attribute are defined in Section 3.7.9.3.

3.7.9.3 Property Definitions

The Location class MUST have the property definitions:

icom_core:name

Description:	Name of a location.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:description

Description:	A description of a location.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:timeZone

Description:	Time zone of a location.
Required:	False
Inherited:	False
Property Type:	icom_core:TimeZone
Cardinality:	Single
Updatability:	Read Write

icom_core:coordinates

Description:	A list of geo coordinates marking a point, path, or area of a physical location.
Required:	False
Inherited:	False
Property Type:	icom_core:GeoCoordinates

Cardinality:	Multi
Updatability:	Read Write

The Location class MAY include additional property definitions which are implementation-defined.

3.7.10 GeoCoordinates

3.7.10.1 Description

A geo coordinates object specifies the latitude, longitude, and altitude of a physical location.

3.7.10.2 Class Definition

The GeoCoordinates class has attribute values:

localNamespace

Value: icom_core

localName

Value: GeoCoordinates

extendsFrom

Value:

stereotype

Value: primary

description

Value: A geo coordinates object specifies the latitude, longitude, and altitude of a physical location.

propertyDefinitions

The values for this attribute are defined in Section 3.7.10.3.

3.7.10.3 Property Definitions

The GeoCoordinates class MUST have the property definitions:

icom_core:latitude

Description:	Latitude of a location.
Required:	False
Inherited:	False
Property Type:	Float
Cardinality:	Single
Updatability:	Read Write

icom_core:longitude

Description:	Longitude of a location.
Required:	False
Inherited:	False
Property Type:	Float
Cardinality:	Single
Updatability:	Read Write

icom_core:altitude

Description:	Altitude of a location.
Required:	False
Inherited:	False
Property Type:	Float
Cardinality:	Single
Updatability:	Read Write

The GeoCoordinates class MAY include additional property definitions which are implementation-defined.

4 Extension Modules

4.1 Overview of Extension Modules

Each extension module defines a model of a collaboration activity. Different models of collaboration activities in this specification include content creation, communication, coordination, discussion forum, and conference. Except for the Presence Module and Free Busy Module, the extension modules in this section introduce specialized subclasses of Artifact and Folder of Artifact Branch.

Note: ICOM Core Model (Section 3) establishes a framework to integrate specialized collaboration activities of the extension modules, which more or less represent technology or protocol channels. The framework is extensible with additional extension modules. For example, applications can adopt a model for CMIS Policy base type as a new extension module, which can be used to integrate with BPMN or BPEL processes outside the ICOM domain. An ICOM space can provide a durable context for continuity of conversations and activities related to a business process type or process instance. Some new extension modules may import the models from related standards. For example, social network model may be imported from [OpenGraph] or [OpenSocial].

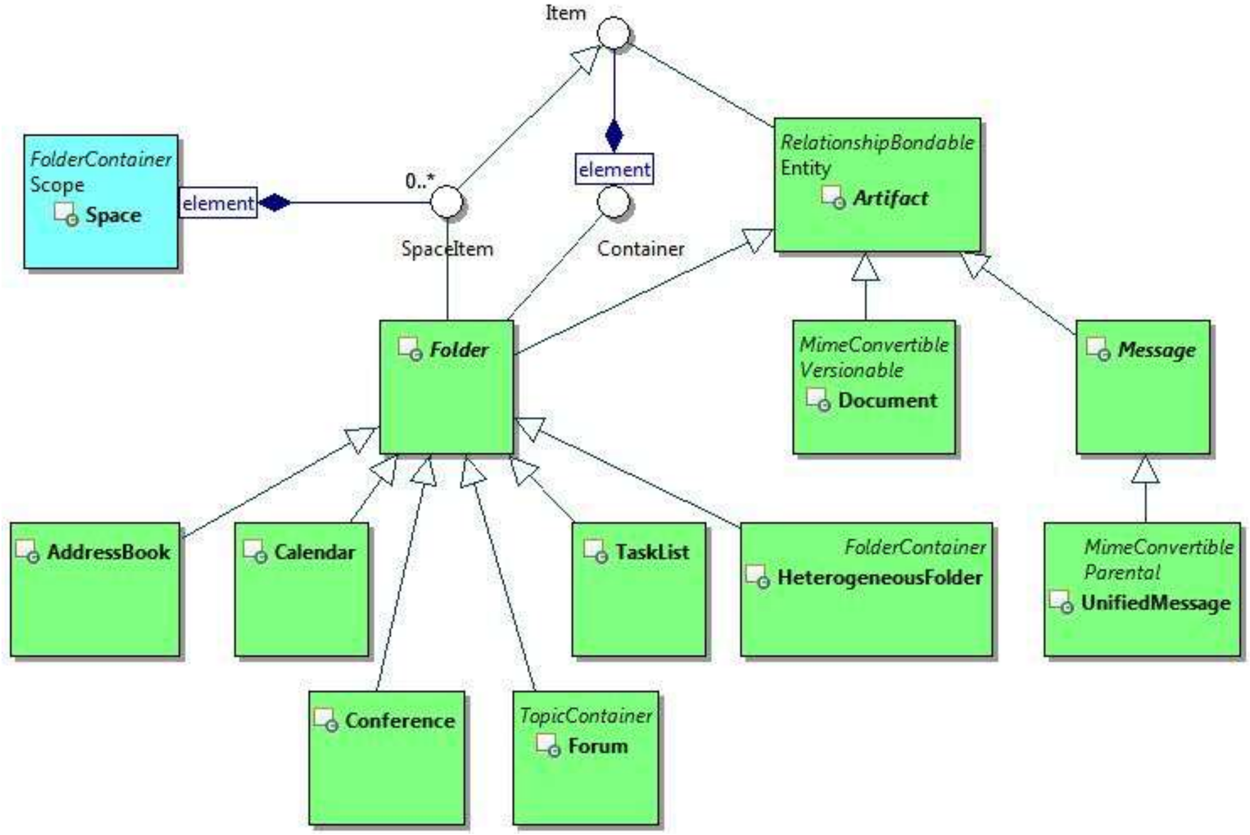


Figure 25: Containers of Collaboration Activities.

ICOM defines containers that provide contexts and structures for specific areas of collaborative activities. The UML class diagram in Figure 25 depicts a Space as a hub of containers, including HeterogeneousFolder, AddressBook, Calendar, TaskList, Forum, and Conference. These containers are briefly described as follows:

HeterogeneousFolder (defined in Core Model) is a general purpose container that can contain any type of artifacts, and therefore, can serve as

- a library of documents and wiki pages to support content sharing and co-creation,

- an inbox or outbox for communication, or
- a trash folder to archive all types of artifacts deleted from a space.

AddressBook is a specialized container to manage contact or personal information, such as addresses, phone numbers, birthdays, anniversaries, and other entries.

Calendar is a specialized container to support time management.

TaskList is a specialized container to support task coordination.

Forum is a specialized container to support

- **Topic** sub-containers for threaded discussions and
- **Announcement** sub-containers for time-sensitive communication.

Conference is a specialized container that provides a durable context for real-time interactions.

The following ten modules are specified as extension modules of ICOM:

1. Content Module (in Section 4.2) defines Content, MultiContent, and SimpleContent. A content represents a piece of data in a document or message. Content, multi-content, simple content, and online content form a composite design pattern.
2. Document Module (in Section 4.3) defines Document, WikiPage, and version control model. A document can contain a composite content defined in Section 4.2. Documents are typically contained by heterogeneous folders.
3. Message Module (in Section 4.4) defines Message, UnifiedMessage, InstantMessage, and related classes. A message can contain a composite content defined in Section 4.2. Unified messages are typically contained by heterogeneous folders.
4. Presence Module (in Section 4.5) defines Presence, Activity, and Contact Method. Presence represents a watchable state of a presentity (which is usually a person). Presence state is derived using an actor's subscriptions.

Note: Since a Presence is derived using a viewer's subscriptions, a Presence should not be shared with other viewers. For this reason, Presence is not modeled as Entity and is not assigned an access control list.

5. Address Book Module (in Section 4.6) defines AddressBook and PersonContact. A person contact can bookmark a reference to a person in an ICOM community as well as store addresses, phone numbers, and other entries about a person who may not be in any ICOM community.
6. Calendar Module (in Section 4.7) defines Calendar, Occurrence, and OccurrenceSeries. Occurrence artifacts are used to resolve the free-busy times of participants for scheduling of meetings and booking of rooms and other resources.
7. Free Busy Module (in Section 4.8) defines FreeBusy. FreeBusy is a view derived from occurrences in a calendar or a set of calendars using an actor's privileges to determine the free or busy states of calendar occurrences.

Note: Since a FreeBusy view is derived using a viewer's privileges, a FreeBusy should not be shared with other viewers. For this reason, FreeBusy is not modeled as Entity and is not assigned an access control list.

8. Task List Module (in Section 4.9) defines TaskList and Task. Tasks are used to coordinate the assignment of tasks and to track the progress of task activities.
9. Forum Module (in Section 4.10) defines Forum, Topic, Announcement, and DiscussionMessage. Topics, announcements, and discussions are used for treaded discussions. Moderators of a forum can prune, merge, or fork the discussion threads.
10. Conference Module (in Section 4.11) defines Conference and related classes. A conference can contain visual, audio, and chat transcripts of the conference sessions. It also contains the current status, conference settings, past sessions, active session, and activity logs.

4.2 Content Module

4.2.1 MimeConvertible

4.2.1.1 Description

A MimeConvertible object represents an object that has Multipurpose Internet Mail Extensions (MIME) characteristics such as headers, content transfer encoding, and possible hierarchy of sub-contents.

4.2.1.2 Class Definition

The MimeConvertible class is a mixin class that defines the characteristics of objects that can be represented in MIME format.

The MimeConvertible class has attribute values:

`localNamespace`

Value: icom_content

`localName`

Value: MimeConvertible

`extendsFrom`

Value: icom_core:Identifiable

`stereotype`

Value: mixin

`description`

Value: MimeConvertible class is a mixin class that defines the characteristics of objects that can be represented in MIME format.

`propertyDefinitions`

The values for this attribute are defined in Section 4.2.1.3.

4.2.1.3 Property Definitions

The MimeConvertible class inherits property definitions from super classes.

The MimeConvertible class MAY include additional property definitions which are implementation-defined.

4.2.2 Content

4.2.2.1 Description

A content object represents a piece of data in a document or message. Content, multi-content, simple content, and online content form a composite design pattern.

4.2.2.2 Class Definition

The Content class has attribute values:

localNamespace

Value: icom_content

localName

Value: Content

extendsFrom

Value: icom_core:Identifiable, icom_content:MimeConvertible

stereotype

Value: primary

isAbstract

Value: TRUE

description

Value: Content represents a piece of data in a document or message.

propertyDefinitions

The values for this attribute are defined in Section 4.2.2.3.

4.2.2.3 Property Definitions

The Content class inherits property definitions from super classes.

The Content class MUST have the property definitions:

icom_content:contentId

Description:	A content id is a unique identifier for a part of content in multi-part contents.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:mediaType

Description:	Media type is a two-part identifier for Internet file formats.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single

Updatability:	Read Write

icom_content:contentDisposition

Description:	Content disposition specifies a presentation style.
Required:	False
Inherited:	False
Property Type:	icom_content:ContentDispositionType
Cardinality:	Single
Updatability:	Read Write

The Content class MAY include additional property definitions which are implementation-defined.

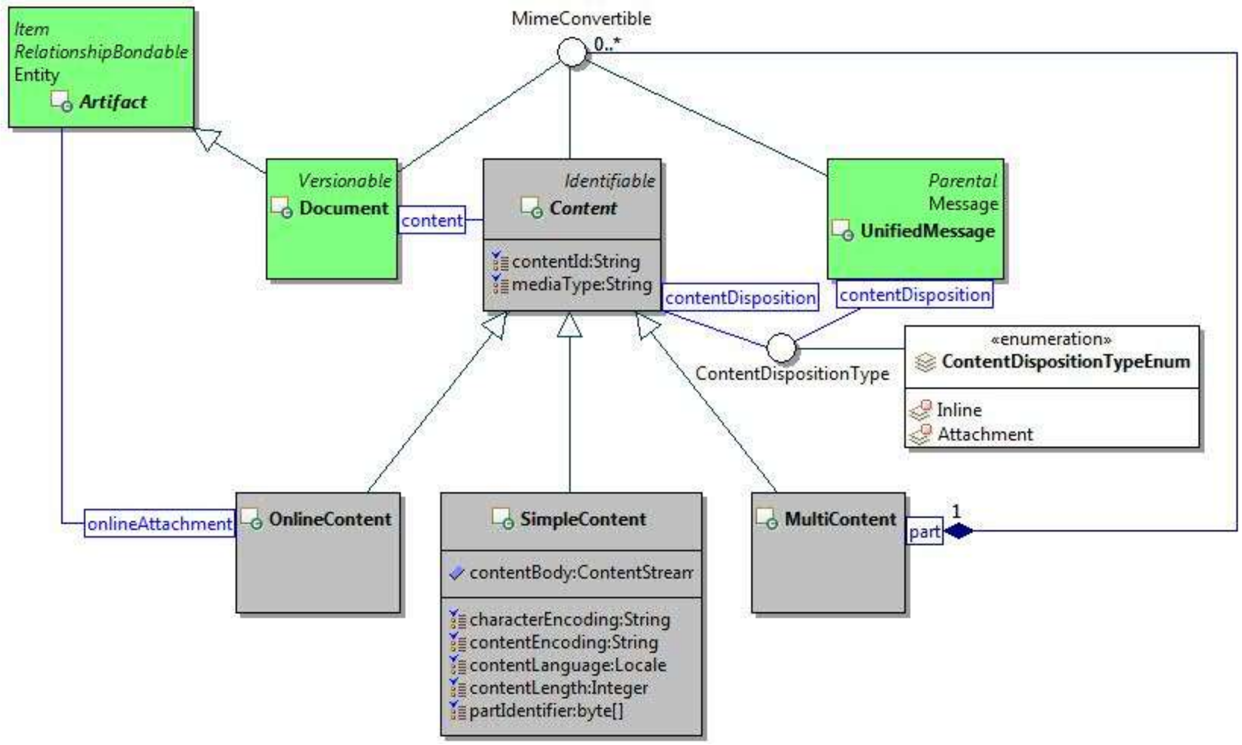


Figure 26: Composite Content Class Diagram.

4.2.3 MultiContent

4.2.3.1 Description

A multi-content object represents multiple parts of a message or document. It is a composite content that can contain a list of simple or composite contents.

4.2.3.2 Class Definition

The MultiContent class has attribute values:

localNamespace

Value: icom_content

localName

Value: MultiContent

extendsFrom

Value: icom_content:Content

stereotype

Value: primary

description

Value: A multi-content object represents the multiple parts of a message or document.

propertyDefinitions

The values for this attribute are defined in Section 4.2.3.3.

4.2.3.3 Property Definitions

The MultiContent class inherits property definitions from super classes.

The MultiContent class MUST have the property definitions:

icom_content:part

Description:	Zero or more parts of a hierarchical composite content.
Required:	False
Inherited:	False
Property Type:	icom_content:MimeConvertible
Cardinality:	Multi
Updatability:	Read Write

The MultiContent class MAY include additional property definitions which are implementation-defined.

4.2.4 SimpleContent

4.2.4.1 Description

A simple content holds a single piece of data.

4.2.4.2 Class Definition

The SimpleContent class has attribute values:

localNamespace

Value: icom_content

localName

Value: SimpleContent

extendsFrom

Value: icom_content:Content

stereotype

Value: primary

description

Value: A simple content holds a single piece of data.

propertyDefinitions

The values for this attribute are defined in Section 4.2.4.3.

4.2.4.3 Property Definitions

The SimpleContent class inherits property definitions from super classes.

The SimpleContent class MUST have the property definitions:

icom_content:characterEncoding

Description:	Character encoding specifies character set of a content (a missing value means that a piece of content should be treated as binary or raw).
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:contentEncoding

Description:	Content encoding specifies encoding of a piece of content.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:contentLanguage

Description:	Content language specifies language for a piece of content (a missing value means non-natural language content).
Required:	False
Inherited:	False
Property Type:	Locale
Cardinality:	Single
Updatability:	Read Write

icom_content:contentLength

Description:	Length of a piece of content.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Write

icom_content:contentBody

Description:	Body of a simple content.
Required:	False
Inherited:	False
Property Type:	Object
Cardinality:	Single
Updatability:	Read Write

The SimpleContent class MAY include additional property definitions which are implementation-defined.

4.2.5 OnlineContent

4.2.5.1 Description

An online content holds an online artifact attached to a document, message, or invitation.

Note: An online artifact must be rendered as an IRI when a message or invitation is delivered to external recipients.

4.2.5.2 Class Definition

The OnlineContent class has attribute values:

`localNamespace`

Value: icom_content

`localName`

Value: OnlineContent

extendsFrom

Value: icom_content:Content

stereotype

Value: primary

description

Value: An online content holds an online artifact attached to a message or invitation.

propertyDefinitions

The values for this attribute are defined in Section 4.2.5.3.

4.2.5.3 Property Definitions

The OnlineContent class inherits property definitions from super classes.

The OnlineContent class MUST have the property definition:

icom_content:onlineAttachment

Description:	An online artifact attached to a message.
Required:	True
Inherited:	False
Property Type:	icom_core:Artifact
Cardinality:	Single
Updatability:	Read Write

The OnlineContent class MAY include additional property definitions which are implementation-defined.

4.2.6 ContentDispositionType

4.2.6.1 Description

A content disposition type is a presentation style of content.

4.2.6.2 Class Definition

The ContentDispositionType class is a mixin class which defines a presentation style of content.

The ContentDispositionType class has attribute values:

localNamespace

Value: icom_content

localName

Value: ContentDispositionType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ContentDispositionType is a mixin class which defines a presentation style of content.

propertyDefinitions

The values for this attribute are defined in Section 4.2.6.3.

4.2.6.3 Property Definitions

The ContentDispositionType class MAY include additional property definitions which are implementation-defined.

4.2.7 ContentDispositionTypeEnum

The ContentDispositionTypeEnum class is an enum class that enumerates the instances each of which expresses a presentation style of content.

The ContentDispositionTypeEnum class has attribute values:

localNamespace

Value: icom_content

localName

Value: ContentDispositionTypeEnum

extendsFrom

Value: icom_content:ContentDispositionType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A presentation style of content.

instances

Value: <icom_content:Inline, icom_content:Attachment>

ICOM defines two content disposition types:

- **icom_content:Inline** content is to be displayed automatically upon display of the main body of an artifact.
- **icom_content:Attachment** content is separate from the main body of an artifact, and that its display should not be automatic, but contingent upon some further action of a user.

4.2.8 AttachedItem

4.2.8.1 Description

An attached item holds a content for an occurrence, task, and contact artifact.

4.2.8.2 Class Definition

The AttachedItem class has attribute values:

`localNamespace`

Value: icom_content

`localName`

Value: AttachedItem

`extendsFrom`

Value:

`stereotype`

Value: primary

`description`

Value: An attachedItem holds a content for an occurrence, task, and contact artifact.

`propertyDefinitions`

The values for this attribute are defined in Section 4.2.8.3.

4.2.8.3 Property Definitions

The AttachedItem class MUST have the property definitions:

icom_core:name

Description:	Name of a content attachment.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:content

Description:	A content attached to an occurrence, task, or contact artifact.
Required:	True
Inherited:	False
Property Type:	icom_content:Content
Cardinality:	Single
Updatability:	Read Write

The AttachedItem class MAY include additional property definitions which are implementation-defined.

4.3 Document Module

4.3.1 Versionable

4.3.1.1 Description

A versionable artifact is

1. a non-version-controlled copy,
2. a specific versioned copy,
3. a private working copy, or
4. a representative copy (optional)

of an artifact version series.

When a versionable artifact is not under version control, a non-version-controlled copy MUST be the only copy in a version series, i.e. there is only one copy and one o*bjectId*.

When a versionable artifact is under version control, a representative copy MAY provide a version-independent view of a versionable artifact.

When a non-version-controlled copy is placed under version control, a versioned copy MUST be created. Assignment of an object identifier to a versioned copy is implementation-dependent:

- if a versioned copy retains the object identifier of a non-version-controlled copy, the version type of a versionable artifact MUST change from NonVersionControlledCopy to VersionedCopy;
- if a versioned copy is assigned a new object identifier that is different from the object identifier of a non-version-controlled copy, a representative copy MAY retain the object identifier of the non-version-controlled copy;
- if both versioned copy and representative copy are assigned new object identifiers that are different from the object identifier of a non-version-controlled copy, the non-version-controlled copy SHALL be discarded.

When a private working copy is checked in, a versioned copy MUST be created. Assignment of an object identifier to a versioned copy is implementation-dependent:

- if a versioned copy retains the object identifier of a private working copy, the version type of a versionable artifact MUST change from PrivateWorkingCopy to VersionedCopy;
- if a versioned copy is assigned a new object identifier that is different from the object identifier of a private working copy, the private working copy SHALL be discarded.

It is optional for a service provider to provide a representative copy for a version series. If a representative copy is provided:

- a representative copy MUST have its own object identifier that is different from the object identifier of any versioned copy or private working copy;

- assignment of an object identifier to a representative copy is implementation-dependent:
    - a representative copy MAY retain the object identifier of a non-version-controlled copy; if so the version type of a versionable artifact MUST change from NonVersionControlledCopy to RepresentativeCopy;
    - a representative copy MAY be assigned a new object identifier that is different from the object identifier of a non-version-controlled copy;
- content and state of a representative copy is implementation-dependent:
    - a representative copy MAY be a copy of the content and state of the latest versioned copy or the latest major versioned copy in a version series;
    - a representative copy MAY be a copy of the content and state of a private working copy if the current user loading the representative copy is the same user who checks out a version series.

Note: Each versioned copy of a versionable artifact is itself a versionable artifact, i.e. it has its own o*bjectId*. A versioned copy has a version number, label, and check in comment.

Note: A private working copy is a versionable artifact created by an explicit checkout operation on a versionable artifact under version control. The properties for a private working copy are identical to the properties of a versioned copy on which a checkout operation was performed. Certain properties such as o*bjectId* and *creationDate* are different from a versioned copy. The content of a private working copy is identical to the content of a versioned copy. Its object identifier is different from that of the representative copy or any versioned copy.

A private working copy MAY be saved in a version series for sharing and co-editing, however, it needs not be visible to users who may only have permissions to view other versioned copies in a version series.

Note: Until it is checked in using an explicit check-in operation, a private working copy must not be considered the LatestMajorVersion in a version series.

A container of a versionable artifact CAN contain a representative copy so that it provides a version-independent view of a state of the version series.

Note: Starting from a representative copy in a container, an actor can traverse a version series to retrieve any versioned copy or private working copy.

ICOM version control model is based on the CMIS version control model specified in Section 2.1.9 of Content Management Interoperability Services Version 1.0 [CMIS].

4.3.1.2 Class Definition

The Versionable class is a mixin class that defines the characteristics of artifacts that can be versioned.

The Versionable class has attribute values:

localNamespace

Value: icom_doc

localName

Value: Versionable

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: mixin

description

Value: Versionable class is a mixin class that defines the characteristics of artifacts that can be versioned.

propertyDefinitions

The values for this attribute are defined in Section 4.3.1.3.

4.3.1.3 Property Definitions

The Versionable class inherits property definitions from super classes.

The Versionable class MUST have the property definitions:

icom_doc:versionControlMetadata

Description:	A version control metadata object attached to a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:VersionControlMetadata
Cardinality:	Single
Updatability:	Read Only

icom_doc:versionType

Description:	A type of version controlled copy of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:VersionType
Cardinality:	Single
Updatability:	Read Only

The Versionable class MAY include additional property definitions which are implementation-defined.

4.3.2 VersionControlMetadata

4.3.2.1 Description

A version control metadata is an object that contains version control information.

There are two classes of version control metadata: version series and version. A version control metadata of a versionable artifact is either a version series or a version depending on the version type.

- If the version type is icom_doc:NonVersionControlledCopy then metadata is optional; if metadata is present, it MUST be a version series object.
- If the version type is icom_doc:RepresentativeCopy, then metadata MUST be a version series object.
- If the version type is icom_doc:VersionedCopy or icom_doc:PrivateWorkingCopy, then metadata MUST be a version object.

4.3.2.2 Class Definition

The VersionControlMetadata class is a mixin class that defines the characteristics of version or version series metadata for version control.

The VersionControlMetadata class has attribute values:

localNamespace

Value: icom_doc

localName

Value: VersionControlMetadata

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: mixin

description

Value: VersionControlMetadata is a mixin class that defines the characteristics of entities that serve as metadata for version control.

propertyDefinitions

The values for this attribute are defined in Section 4.3.2.3.

4.3.2.3 Property Definitions

The VersionControlMetadata class inherits property definitions from super classes.

The VersionControlMetadata class MUST have the property definition:

icom_doc:representativeCopy

Description:	A representative copy of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:Versionable
Cardinality:	Single
Updatability:	Read Only

The VersionControlMetadata class MAY include additional property definitions which are implementation-defined.

4.3.3 VersionSeries

4.3.3.1 Description

A version series is a version control metadata that contains a version history and check in/out states of a versionable artifact.

A version series object is a version control metadata of a representative copy of a versionable artifact.

4.3.3.2 Class Definition

The VersionSeries class has attribute values:

localNamespace

Value: icom_doc

localName

Value: VersionSeries

extendsFrom

Value: icom_core:Entity, icom_doc:VersionControlMetadata, icom_meta:RelationshipBondable

stereotype

Value: primary

description

Value: A version series is version control metadata that contains a version history and check in/out states of a versionable artifact.

propertyDefinitions

The values for this attribute are defined in Section 4.3.3.3.

4.3.3.3 Property Definitions

The VersionSeries class inherits property definitions from super classes.

The VersionSeries class MUST have the property definitions:

icom_doc:versionHistory

Description:	A history of version nodes of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:Version
Cardinality:	Multi
Updatability:	Read Only

icom_doc:versionableHistory

Description:	A history of the versioned copies of a versionable artifact.

Required:	False
Inherited:	False
Property Type:	icom_doc:Versionable
Cardinality:	Multi
Updatability:	Read Only

icom_doc:latestVersionedCopy

Description:	Latest versioned copy of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:Versionable
Cardinality:	Single
Updatability:	Read Only

icom_doc:privateWorkingCopy

Description:	A private working copy of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:Versionable
Cardinality:	Single
Updatability:	Read Only

icom_doc:versionSeriesCheckedOut

Description:	Indicates whether a version series is checked out.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Only

icom_doc:versionSeriesCheckedOutBy

Description:	An actor who checks out a version series.
Required:	False
Inherited:	False
Property Type:	icom_core:Actor
Cardinality:	Single
Updatability:	Read Only

icom_doc:versionSeriesCheckedOutOn

Description:	The time when a version series is checked out.
Required:	False
Inherited:	False

Property Type: DateTime
Cardinality: Single
Updatability: Read Only

icom_doc:versionSeriesCheckoutComment

Description: A check out comment of a version series.
Required: False
Inherited: False
Property Type: String
Cardinality: Single
Updatability: Read Only

icom_doc:totalSize

Description: Total size of all versioned copies of a versionable artifact in a version series.
Required: False
Inherited: False
Property Type: Integer
Cardinality: Single
Updatability: Read Only

The VersionSeries class MAY include additional property definitions which are implementation-defined.

4.3.4 Version

4.3.4.1 Description

A version is a version control metadata that contains a version number, label, and description.

A version object is a version control metadata of a versioned copy or a private working copy of a versionable artifact.

4.3.4.2 Class Definition

The Version class has attribute values:

`localNamespace`

Value: icom_doc

`localName`

Value: Version

`extendsFrom`

Value: icom_core:Entity, icom_doc:VersionControlMetadata, icom_meta:RelationshipBondable

stereotype

Value: primary

description

Value: A version is a version control metadata that contains a version number, label, and description.

propertyDefinitions

The values for this attribute are defined in Section 4.3.4.3.

4.3.4.3 Property Definitions

The Version class inherits property definitions from super classes.

The Version class MUST have the property definitions;

icom_doc:checkinComment

Description:	A check in comment of a versioned copy.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_doc:versionNumber

Description:	A version number of a versioned copy.
Required:	True
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Write

icom_doc:versionLabel

Description:	A version label of a versioned copy.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_doc:majorVersion

Description:	Indicates whether a versioned copy is a major version.
Required:	True
Inherited:	False
Property Type:	Boolean

Cardinality:	Single
Updatability:	Read Write

icom_doc:versionedOrPrivateWorkingCopy

Description:	A versioned copy or private working copy corresponding to a version of a versionable artifact.
Required:	False
Inherited:	False
Property Type:	icom_doc:Versionable
Cardinality:	Single
Updatability:	Read Only

The Version class MAY include additional property definitions which are implementation-defined.

4.3.5 VersionType

4.3.5.1 Description

A version type is a version state of a copy of versionable document.

4.3.5.2 Class Definition

The VersionType class is a mixin class which defines a version state of a copy of versionable document.

The VersionType class has attribute values:

`localNamespace`

Value: icom_doc

`localName`

Value: VersionType

`extendsFrom`

Value:

`stereotype`

Value: mixin

`description`

Value: VersionType is a mixin class which defines a version state of a copy of versionable document.

`propertyDefinitions`

The values for this attribute are defined in Section 4.3.5.3.

4.3.5.3 Property Definitions

The VersionType class MAY include additional property definitions which are implementation-defined.

4.3.6 VersionTypeEnum

The VersionTypeEnum class is an enum class that enumerates the instances each of which expresses a version type.

The VersionTypeEnum class has attribute values:

localNamespace

Value: icom_doc

localName

Value: VersionTypeEnum

extendsFrom

Value: icom_doc:VersionType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A version type of a copy of versionable document.

instances

Value: <icom_doc:NonVersionControlledCopy, icom_doc:VersionedCopy, icom_doc:PrivateWorkingCopy, icom_doc:RepresentativeCopy>

ICOM defines four version types:

- **icom_doc:NonVersionControlledCopy** a versionable artifact is not under version control.
- **icom_doc:VersionedCopy** a versionable artifact is a version of an artifact version series.
- **icom_doc:PrivateWorkingCopy** a versionable artifact is a private working copy of an artifact version series.
- **icom_doc:RepresentativeCopy** a versionable artifact is a version-independent representative copy of an artifact. This version type is optional and implementation-dependent.

4.3.7 Document

4.3.7.1 Description

A document is a versionable artifact that can contain a single content of a media type or composite contents of an assortment of media types.

4.3.7.2 Class Definition

The Document class has attribute values:

localNamespace

Value: icom_doc

localName

Value: Document

extendsFrom

Value: icom_core:Artifact, icom_doc:Versionable, icom_content:MimeConvertible

stereotype

Value: primary

description

Value: A document is a versionable artifact that may contain a single content of a media type or composite contents of an assortment of media types.

propertyDefinitions

The values for this attribute are defined in Section 4.3.7.3.

4.3.7.3 Property Definitions

The Document class inherits property definitions from super classes.

The Document class MUST have the property definitions:

icom_content:content

Description:	Content of a document.
Required:	False
Inherited:	False
Property Type:	icom_content:Content
Cardinality:	Single
Updatability:	Read Write

icom_doc:size

Description:	The size of a copy of a document.
Required:	False

Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Only

The Document class MAY include additional property definitions which are implementation-defined.

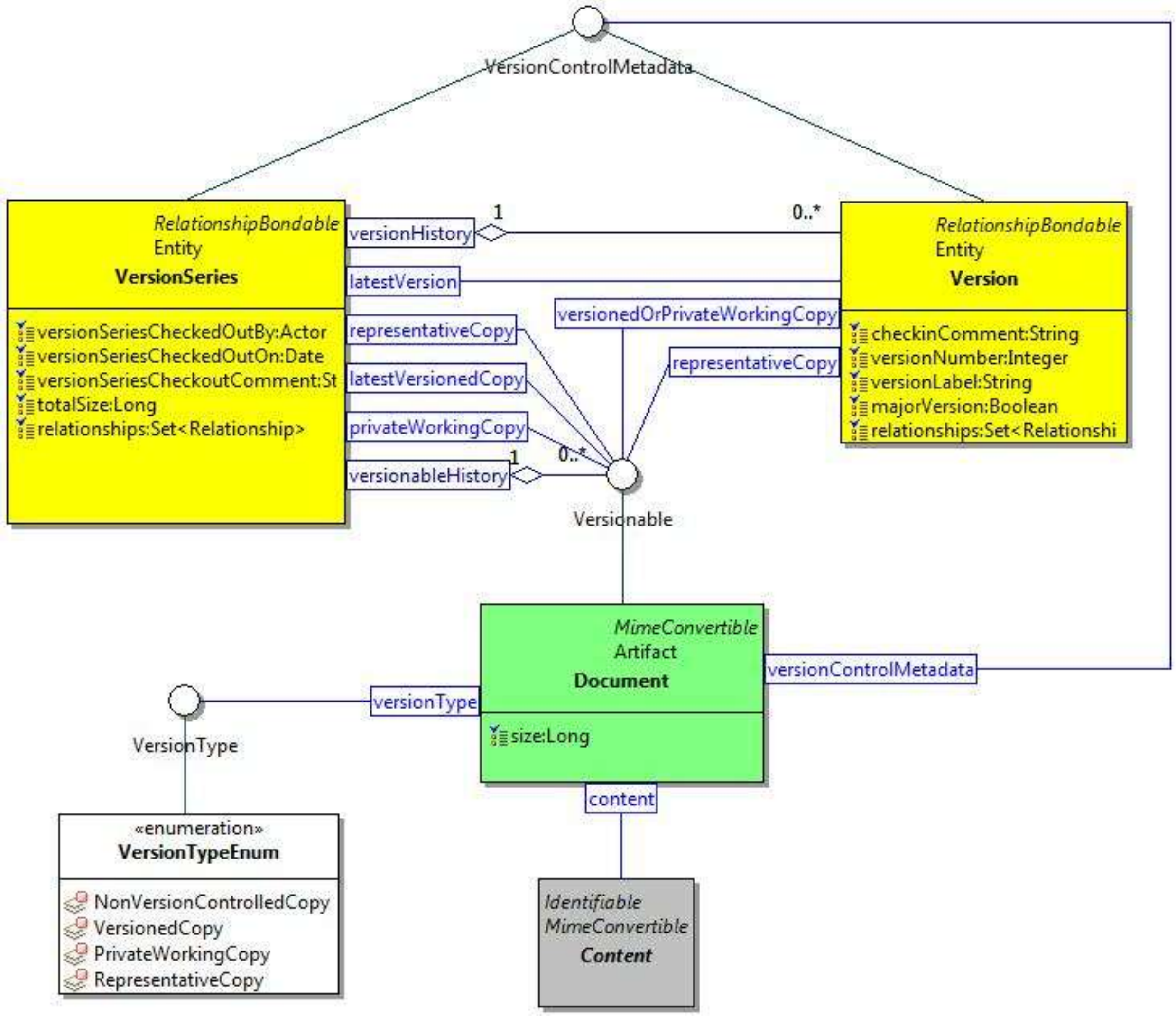


Figure 27: Document, Version Series, and Version Class Diagram.

4.3.8 WikiPage

4.3.8.1 Description

A wiki page is a document that contains a wiki content and that provides an html page generated from the wiki content.

4.3.8.2 Class Definition

The WikiPage class has attribute values:

localNamespace

Value: icom_doc

localName

Value: WikiPage

extendsFrom

Value: icom_doc:Document

stereotype

Value: primary

description

Value: A wiki page is a document that contains a wiki content and that provides an html page generated from the wiki content.

propertyDefinitions

The values for this attribute are defined in Section 4.3.8.3.

4.3.8.3 Property Definitions

The WikiPage class inherits property definitions from super classes.

The WikiPage class MUST have the property definitions:

icom_doc:renderedPage

Description:	An html page generated from a wiki content.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

The WikiPage class MAY include additional property definitions which are implementation-defined.

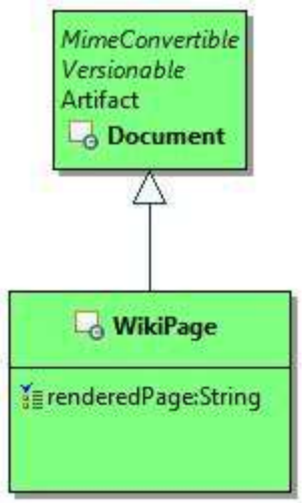


Figure 28: Wiki Page Class Diagram.

4.4 Message Module

4.4.1 Message

4.4.1.1 Description

A message is a unit of conversation. It holds a simple content or multipart message contents in a content property. It has a single sender.

Note: The delivered time is the time when a message is delivered to a given recipient. The user creation date and time property can be used as the sent date and time of a message. The name property can be used as the subject of a message.

4.4.1.2 Class Definition

The Message class has attribute values:

`localNamespace`

Value: icom_msg

`localName`

Value: Message

`extendsFrom`

Value: icom_core:Artifact

`stereotype`

Value: primary

`isAbstract`

Value: TRUE

description

Value: A message is a unit of conversation.

propertyDefinitions

The values for this attribute are defined in Section 4.4.1.3.

4.4.1.3 Property Definitions

The Message class inherits property definitions from super classes.

The Message class MUST have the property definitions:

icom_content:content

Description:	Content of a message
Required:	False
Inherited:	False
Property Type:	icom_content:Content
Cardinality:	Single
Updatability:	Read Write

icom_msg:sender

Description:	Sender of a message.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	Read Write

icom_msg:deliveredTime

Description:	The date and time when a message is delivered to a given recipient.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

The Message class MAY include additional property definitions which are implementation-defined.

4.4.2 UnifiedMessage

4.4.2.1 Description

A unified message is a type of message delivered electronically over a computer, voice, fax, and other networks.

A unified message can be one of these types:

- Email is a message delivered electronically over a computer network.
- Voice is a message that contains a voice or audio stream.
- Fax is a message that contains an image transmitted via phone lines using the fax protocol.
- Notification is a type of message sent by applications.

4.4.2.2 Class Definition

The UnifiedMessage class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessage

extendsFrom

Value: icom_msg:Message, icom_content:MimeConvertible

stereotype

Value: primary

description

Value: A unified message is a type of message delivered electronically over a computer, voice, fax, and other networks.

propertyDefinitions

The values for this attribute are defined in Section 4.4.2.3.

4.4.2.3 Property Definitions

The UnifiedMessage class inherits property definitions from super classes.

The UnifiedMessage class MUST have the property definitions:

icom_core:priority

Description:	The priority of a message.
Required:	False
Inherited:	False
Property Type:	icom_core:Priority
Cardinality:	Single
Updatability:	Read Write

icom_content:contentId

Description:	Content id is a unique identifier for a message part in multi-part messages.

Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:mediaType

Description:	Media type is a two-part identifier for Internet file formats.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:contentDisposition

Description:	Content disposition specifies a presentation style.
Required:	False
Inherited:	False
Property Type:	icom_content:ContentDispositionType
Cardinality:	Single
Updatability:	Read Write

icom_msg:envelopeSender

Description:	An envelope sender is a participant to receive bounced message. It is also known as return path.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	Read Write

icom_msg:toReceivers

Description:	A list of participants to receive a message.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_msg:ccReceivers

Description:	A list of participants to receive carbon-copies of a message.
Required:	False
Inherited:	False

Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_msg:bccReceivers

Description:	A list of participants to receive blind-carbon-copies of a message.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_msg:replyTo

Description:	A list of participants to receive a reply message.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_msg:flag

Description:	Zero or more flags on a message.
Required:	False
Inherited:	False
Property Type:	icom_msg:UnifiedMessageFlag
Cardinality:	Multi
Updatability:	Read Write

icom_msg:messageDispositionNotificationRequested

Description:	A message disposition notification requested for a message.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Write

icom_msg:messageDeliveryStatusNotificationRequest

Description:	Indicates the types of delivery status notifications requested for a message. Default is icom_msg:Failure.
Required:	False
Inherited:	False
Property Type:	icom_msg:UnifiedMessageDeliveryStatusNotificationRequest

Cardinality:	Multi
Updatability:	Read Write

icom_msg:channel

Description:	Indicates the delivery channel of a message.
Required:	False
Inherited:	False
Property Type:	icom_msg:UnifiedMessageChannel
Cardinality:	Single
Updatability:	Read Write

icom_msg:editMode

Description:	Indicates an editable mode (new, draft, or delivered) of a message.
Required:	False
Inherited:	False
Property Type:	icom_msg:UnifiedMessageEditMode
Cardinality:	Single
Updatability:	Read Only

icom_msg:mimeHeader

Description:	A list of headers. Each header is represented by a multi-valued property.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

icom_msg:size

Description:	The size of a unified message.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Only

The UnifiedMessage class MAY include additional property definitions which are implementation-defined.

4.4.3 UnifiedMessageParticipant

4.4.3.1 Description

A unified message participant object represents the participation of an addressable entity in a unified message.

4.4.3.2 Class Definition

The UnifiedMessageParticipant class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageParticipant

extendsFrom

Value: icom_core:Participant

stereotype

Value: primary

description

Value: A unified message participant object represents the participation of an addressable entity in a unified message.

propertyDefinitions

The values for this attribute are defined in Section 4.4.3.3.

4.4.3.3 Property Definitions

The UnifiedMessageParticipant class inherits property definitions from super classes.

The UnifiedMessageParticipant class MUST have the property definitions:

icom_msg:fullAddress

Description:	Full address of a participant.
Required:	False
Inherited:	False
Property Type:	IRI
Cardinality:	Single
Updatability:	Read Write

icom_msg:localPart

Description:	Local part of a full address.
Required:	False

Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_msg:domainPart

Description:	Domain part of a full address.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

The UnifiedMessageParticipant class MAY include additional property definitions which are implementation-defined.

4.4.4 UnifiedMessageFlag

4.4.4.1 Description

A unified message flag is a flag on a message.

4.4.4.2 Class Definition

The UnifiedMessageFlag class is a mixin class which defines a flag on a message.

The UnifiedMessageFlag class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageFlag

extendsFrom

Value:

stereotype

Value: mixin

description

Value: UnifiedMessageFlag is a mixin class which defines a flag on a message.

propertyDefinitions

The values for this attribute are defined in Section 4.4.4.3.

4.4.4.3 Property Definitions

The UnifiedMessageFlag class MAY include additional property definitions which are implementation-defined.

4.4.5 UnifiedMessageFlagEnum

The UnifiedMessageFlagEnum class is an enum class that enumerates the instances each of which expresses a flag on a message.

The UnifiedMessageFlagEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageFlagEnum

extendsFrom

Value: icom_msg:UnifiedMessageFlag

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A flag on a message.

instances

Value: <icom_msg:Answered, icom_msg:Forwarded, icom_msg:Redirected, icom_msg:Hidden, icom_msg:MarkedForDelete, icom_msg:MarkedForFollowUp, icom_msg:MarkedForDraft, icom_msg:MessageDispositionNotificationProcessed>

ICOM defines eight flags:

- **icom_msg:Answered** a message is answered.
- **icom_msg:Forwarded** a message is forwarded.
- **icom_msg:Redirected** a message is redirected.
- **icom_msg:Hidden** a message is hidden.
- **icom_msg:MarkedForDelete** a message is marked for delete.
- **icom_msg:MarkedForFollowUp** a message is marked for follow up.
- **icom_msg:MarkedForDraft** a message is marked for draft.
- **icom_msg:MessageDispositionNotificationProcessed** a message disposition notification is processed.

4.4.6 UnifiedMessageDeliveryStatusNotificationRequest

4.4.6.1 Description

A unified message delivery status notification request is a directive for notifying a participant of delivery status of a message.

4.4.6.2 Class Definition

The UnifiedMessageDeliveryStatusNotificationRequest class is a mixin class which defines a directive for notifying a participant of delivery status of a message.

The UnifiedMessageDeliveryStatusNotificationRequest class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageDeliveryStatusNotificationRequest

extendsFrom

Value:

stereotype

Value: mixin

description

Value: UnifiedMessageDeliveryStatusNotificationRequest is a mixin class which defines a directive for notifying a participant of delivery status of a message.

propertyDefinitions

The values for this attribute are defined in Section 4.4.6.3.

4.4.6.3 Property Definitions

The UnifiedMessageDeliveryStatusNotificationRequest class MAY include additional property definitions which are implementation-defined.

4.4.7 UnifiedMessageDeliveryStatusNotificationRequestEnum

The UnifiedMessageDeliveryStatusNotificationRequestEnum class is an enum class that enumerates the instances each of which expresses a request for one of several types of delivery status notification.

The UnifiedMessageDeliveryStatusNotificationRequestEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageDeliveryStatusNotificationRequestEnum

extendsFrom

Value: icom_msg:UnifiedMessageDeliveryStatusNotificationRequest

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A request for one of several types of delivery status notification.

instances

Value: <icom_msg:Never, icom_msg:Success, icom_msg:Failure, icom_msg:Delay>

ICOM defines four delivery status notification requests:

- **icom_msg:Never** a sender requests status notification not be returned to the sender under any condition.
- **icom_msg:Success** a sender requests a status notification for successful delivery of a message.
- **icom_msg:Failure** a sender requests a status notification for delivery failure of a message.
- **icom_msg:Delay** a sender requests a status notification when delivery of a message has been delayed for an unusual length of time.

4.4.8 UnifiedMessageChannel

4.4.8.1 Description

A message channel used to deliver a unified message.

4.4.8.2 Class Definition

The UnifiedMessageChannel class is a mixin class which defines a channel used to deliver a unified message.

The UnifiedMessageChannel class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageChannel

extendsFrom

Value:

stereotype

Value: mixin

description

Value: UnifiedMessageChannel is a mixin class which defines a channel used to deliver a unified message.

propertyDefinitions

The values for this attribute are defined in Section 4.4.8.3.

4.4.8.3 Property Definitions

The UnifiedMessageChannel class MAY include additional property definitions which are implementation-defined.

4.4.9 UnifiedMessageChannelEnum

The UnifiedMessageChannelEnum class is an enum class that enumerates the instances each of which expresses a type of delivery channel.

The UnifiedMessageChannelEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageChannelEnum

extendsFrom

Value: icom_msg:UnifiedMessageChannel

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A delivery channel.

instances

Value: <icom_msg:Email, icom_msg:Voice, icom_msg:Fax, icom_msg:Notification>

ICOM defines four channel types:

- **icom_msg:Email** delivery channel is email.
- **icom_msg:Voice** delivery channel is voice.
- **icom_msg:Fax** delivery channel is fax.
- **icom_msg:Notification** delivery channel is notification.

4.4.10 UnifiedMessageEditMode

4.4.10.1 Description

A unified message edit mode is a mode that indicates whether a unified message is editable.

4.4.10.2 Class Definition

The UnifiedMessageEditMode class is a mixin class which defines a mode that indicates whether a unified message is editable.

The UnifiedMessageEditMode class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageEditMode

extendsFrom

Value:

stereotype

Value: mixin

description

Value: UnifiedMessageEditMode is a mixin class which defines a mode that indicates whether a unified message is editable.

propertyDefinitions

The values for this attribute are defined in Section 4.4.10.3.

4.4.10.3 Property Definitions

The UnifiedMessageEditMode class MAY include additional property definitions which are implementation-defined.

4.4.11 UnifiedMessageEditModeEnum

The UnifiedMessageEditModeEnum class is an enum class that enumerates the instances each of which expresses whether a message is a new copy, saved draft copy, or delivered copy.

The UnifiedMessageEditModeEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: UnifiedMessageEditModeEnum

extendsFrom

Value: icom_msg:UnifiedMessageEditMode

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A message is a new copy, a saved draft copy, or a delivered copy. New or draft copies are usually editable while delivered copies are usually not editable.

instances

Value: <icom_msg:NewCopy, icom_msg:DraftCopy, icom_msg:DeliveredCopy>

ICOM defines three modes:

- **icom_msg:NewCopy** a message is a new message.
- **icom_msg:DraftCopy** a message is saved as a draft.
- **icom_msg:DeliveredCopy** a message is a sent or received message.

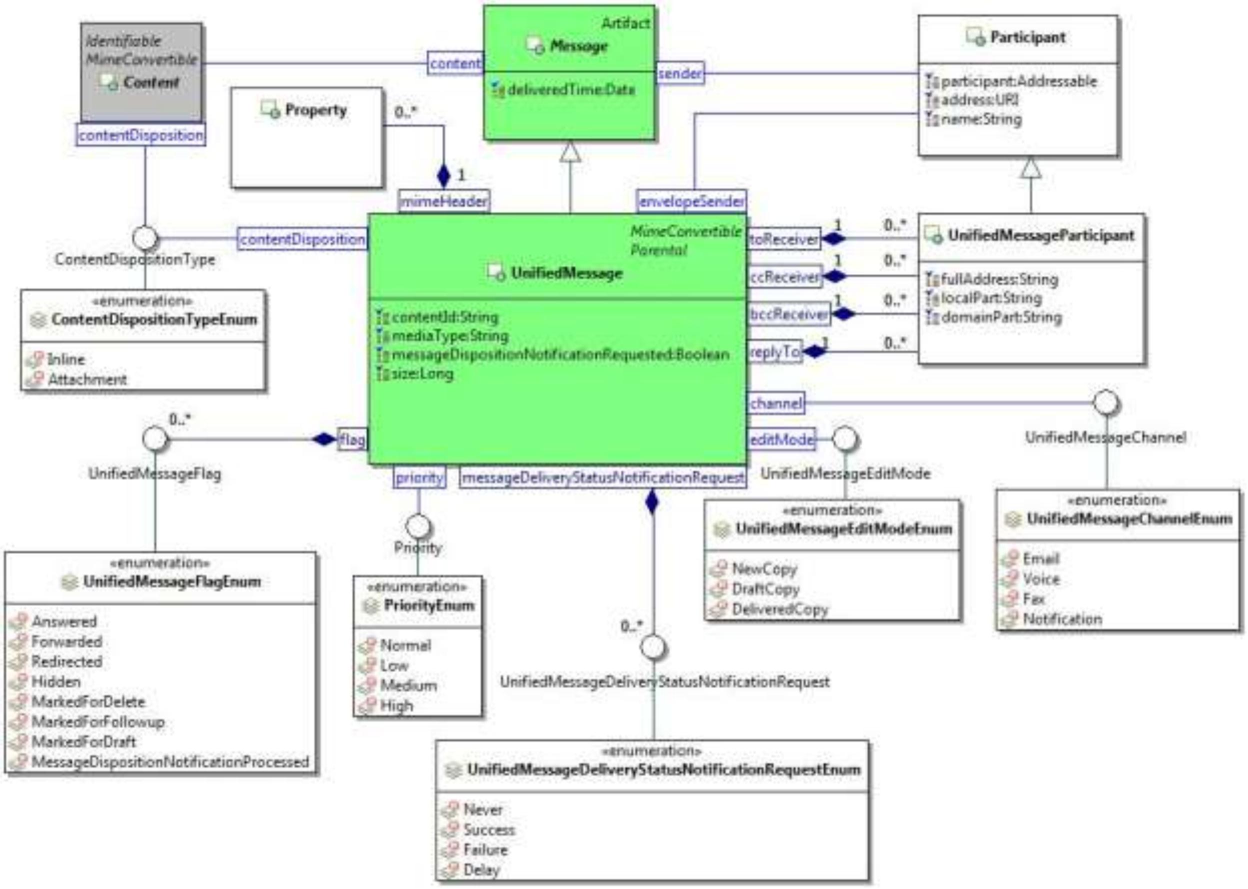


Figure 29: Unified Message Class Diagram.

4.4.12 InstantMessage

4.4.12.1 Description

An instant message is a type of message for synchronous, usually text based, conversation.

4.4.12.2 Class Definition

The InstantMessage class has attribute values:

`localNamespace`

Value: icom_msg

`localName`

Value: InstantMessage

`extendsFrom`

Value: icom_msg:Message

stereotype

Value: primary

isAbstract

Value: FALSE

description

Value: An instant message is a type of message for synchronous, usually text based, conversation.

propertyDefinitions

The values for this attribute are defined in Section 4.4.12.3.

4.4.12.3 Property Definitions

The InstantMessage class inherits property definitions from super classes.

The InstantMessage class MUST have the property definitions:

icom_msg:toReceivers

Description:	A list of participants to receive a message.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_msg:conversationId

Description:	An identifier of a conversation involving one or more instant messages.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Write

icom_msg:clientSideId

Description:	An identifier of a client.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_msg:formatingStyle

Description:	A style for formatting a rich text message.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_msg:instantMessageType

Description:	A type of instant message.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessageType
Cardinality:	Single
Updatability:	Read Write

icom_msg:chatStatus

Description:	A chat status of a user.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessageChatStatus
Cardinality:	Single
Updatability:	Read Write

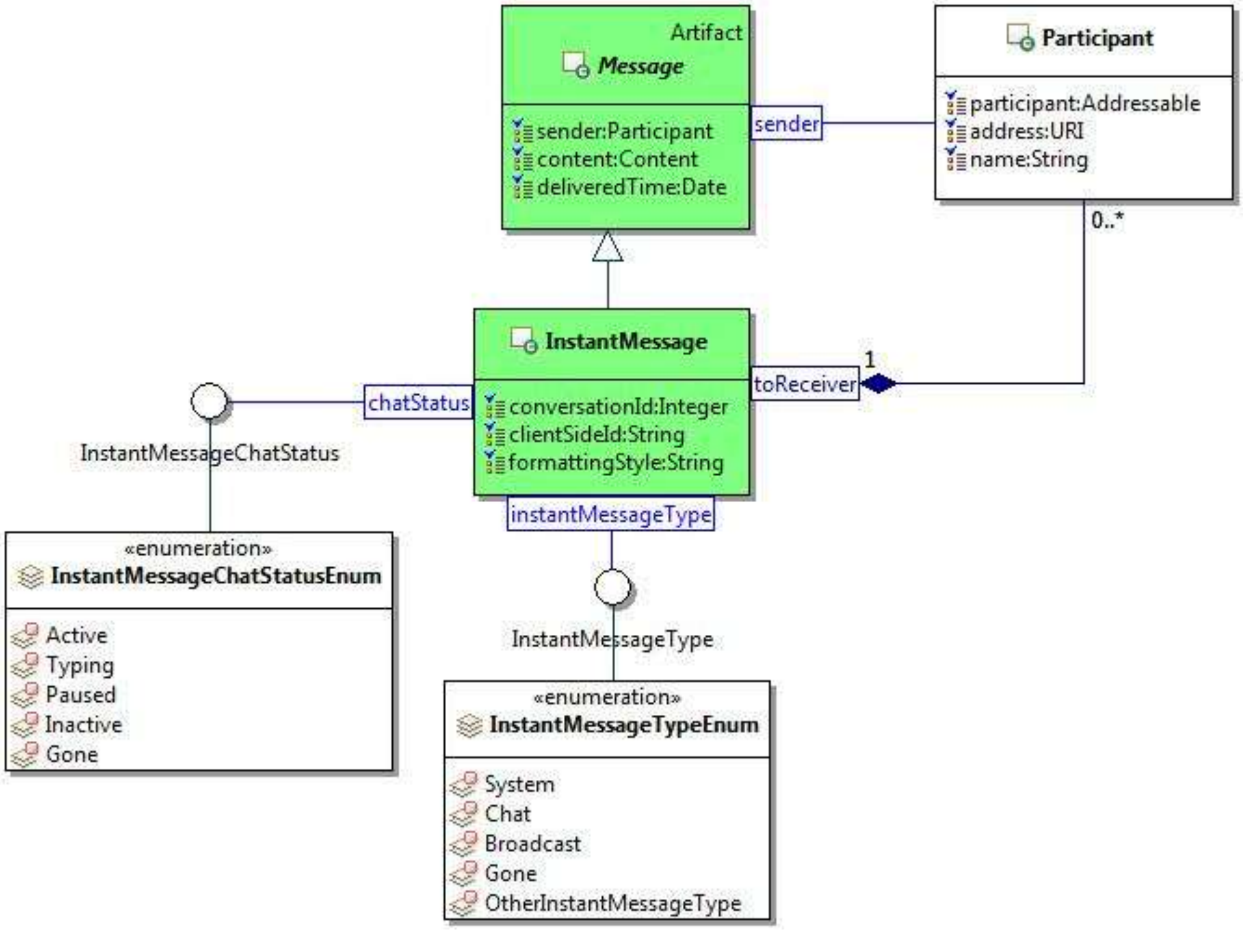


Figure 30: Instant Message Class Diagram.

4.4.13 InstantMessageType

4.4.13.1 Description

An instant message type.

4.4.13.2 Class Definition

The InstantMessageType class is a mixin class which defines a type of instant message.

The InstantMessageType class has attribute values:

localNamespace

Value: icom_msg

localName

Value: InstantMessageType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: InstantMessageType is a mixin class which defines a type of instant message.

propertyDefinitions

The values for this attribute are defined in Section 4.4.13.3.

4.4.13.3 Property Definitions

The InstantMessageType class MAY include additional property definitions which are implementation-defined.

4.4.14 InstantMessageTypeEnum

The InstantMessageTypeEnum class is an enum class that enumerates the instances each of which expresses a type of instant message.

The InstantMessageTypeEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: InstantMessageTypeEnum

extendsFrom

Value: icom_msg:InstantMessageType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A type of instant message.

instances

Value: <icom_msg:System, icom_msg:Chat, icom_msg:Broadcast, icom_msg:Gone, icom_msg:OtherInstantMessageType>

ICOM defines five instant message types:

- **icom_msg:System** an instant message is a system message.

- **icom_msg:Chat** an instant message is a chat message.
- **icom_msg:Broadcast** an instant message is a broadcast message.
- **icom_msg:Gone** an instant message is a message indicating that a user is gone.
- **icom_msg:OtherInstantMessageType** an instant message is of other type.

4.4.15 InstantMessageChatStatus

4.4.15.1 Description

An instant message chat status defines a vocabulary of chat status.

4.4.15.2 Class Definition

The InstantMessageChatStatus class is a mixin class which defines a chat status.

The InstantMessageChatStatus class has attribute values:

`localNamespace`

Value: icom_msg

`localName`

Value: InstantMessageChatStatus

`extendsFrom`

Value:

`stereotype`

Value: mixin

`description`

Value: InstantMessageChatStatus is a mixin class which defines a chat status.

`propertyDefinitions`

The values for this attribute are defined in Section 4.4.15.3.

4.4.15.3 Property Definitions

The InstantMessageChatStatus class MAY include additional property definitions which are implementation-defined.

4.4.16 InstantMessageChatStatusEnum

The InstantMessageChatStatusEnum class is an enum class that enumerates the instances each of which expresses a chat status of a user.

The InstantMessageChatStatusEnum class has attribute values:

localNamespace

Value: icom_msg

localName

Value: InstantMessageChatStatusEnum

extendsFrom

Value: icom_msg:InstantMessageChatStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A chat status of a user.

instances

Value: <icom_msg:Active, icom_msg:Typing, icom_msg:Paused, icom_msg:Inactive, icom_msg:Gone>

ICOM defines five chat status:

- **icom_msg:Active** a user is active.
- **icom_msg:Typing** a user is typing.
- **icom_msg:Paused** a user has paused.
- **icom_msg:Inactive** a user is inactive.
- **icom_msg:Gone** a user is gone.

4.4.17 InstantMessageFeed

4.4.17.1 Description

An instant message feed contains a set of instant message connections and a queue of outbound instant messages.

4.4.17.2 Class Definition

The InstantMessageFeed class has attribute values:

localNamespace

Value: icom_msg

localName

Value: InstantMessageFeed

extendsFrom

Value: icom_core:Entity

stereotype

Value: primary

description

Value: An instant message feed contains a set of instant message connections and a queue of outbound instant messages.

propertyDefinitions

The values for this attribute are defined in Section 4.4.17.3.

4.4.17.3 Property Definitions

The InstantMessageFeed class inherits property definitions from super classes.

The InstantMessageFeed class MUST have the property definitions:

icom_msg:connection

Description:	One or more instant messaging connections.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessageConnection
Cardinality:	Multi
Updatability:	Read Only

icom_msg:outboundInstantMessage

Description:	Outbound instant messages.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessage
Cardinality:	Multi
Updatability:	Write Only

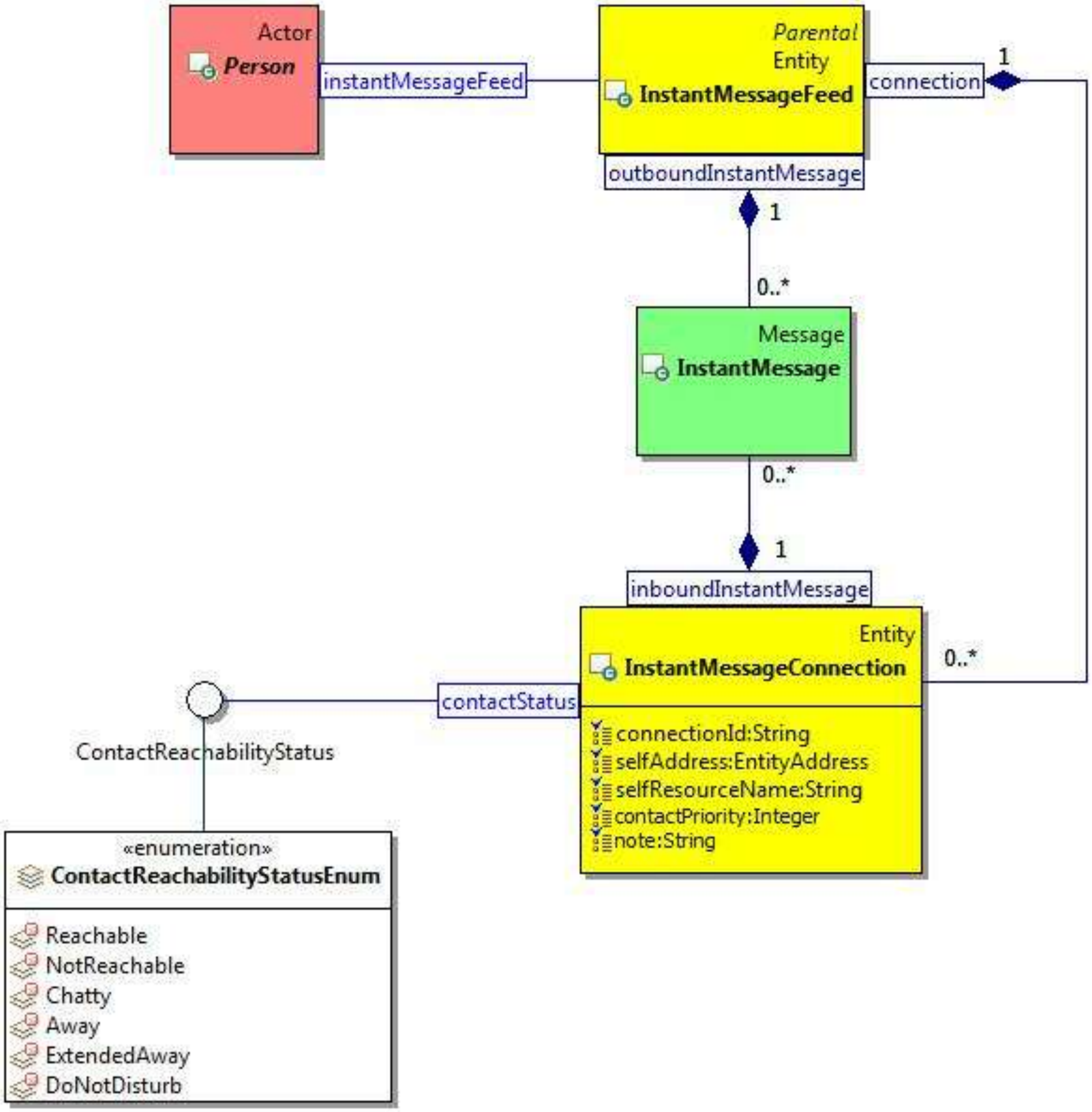


Figure 31: Instant Message Feed and Connection Class Diagram.

4.4.18 InstantMessageConnection

4.4.18.1 Description

An instant message connection contains queues for inbound instant messages.

A presentity can update the contact status, contact priority, and note for a contact method associated with a connection.

4.4.18.2 Class Definition

The InstantMessageConnection class has attribute values:

localNamespace

Value: icom_msg

localName

Value: InstantMessageConnection

extendsFrom

Value: icom_core:Entity

stereotype

Value: primary

description

Value: An instant message connection contains queues for inbound instant messages.

propertyDefinitions

The values for this attribute are defined in Section 4.4.18.3.

4.4.18.3 Property Definitions

The InstantMessageConnection class inherits property definitions from super classes.

The InstantMessageConnection class MUST have the property definitions:

icom_msg:connectionId

Description:	An identifier of a connection.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

icom_msg:selfAddress

Description:	Address of a presentity who opens a connection.
Required:	True
Inherited:	False
Property Type:	IRI
Cardinality:	Single
Updatability:	On Create

icom_msg:selfResourceName

Description:	Resource name associated with a connection.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	On Create

icom_msg:inboundInstantMessage

Description:	Inbound instant messages.
Required:	False
Inherited:	False
Property Type:	icom_msg:InstantMessage
Cardinality:	Multi
Updatability:	Read Only

icom_presence:contactStatus

Description:	Reachability status to be propagated to an associated contact method in presence.
Required:	False
Inherited:	False
Property Type:	icom_presence:ContactReachabilityStatus
Cardinality:	Single
Updatability:	Write Only

icom_presence:contactPriority

Description:	Priority to be propagated to an associated contact method in presence.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Write Only

icom_presence:note

Description:	Note to be propagated to an associated contact method in presence.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Write Only

4.5 Presence Module

4.5.1 Presence

4.5.1.1 Description

A presence describes the contact methods and activities of a presentity.

It provides a list of contact methods describing how to contact a presentity. A viewer may choose any one of the contact methods based on circumstances.

It includes a list of activities describing what a presentity is doing.

4.5.1.2 Class Definition

The Presence class has attribute values:

localNamespace

Value: icom_presence

localName

Value: Presence

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: primary

description

Value: A presence describes the contact methods and activities of a presentity.

propertyDefinitions

The values for this attribute are defined in Section 4.5.1.3.

4.5.1.3 Property Definitions

The Presence class inherits property definitions from super classes.

The Presence class MUST have the property definitions:

icom_core:lastModificationDate

Description:	Last modification date and time of information in a presence.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:location

Description:	Location of a presentity.
Required:	False
Inherited:	False
Property Type:	icom_core:Location
Cardinality:	Single
Updatability:	Read Only

icom_presence:editMode

Description:	Indicates a mode which determines whether a presence is editable.
Required:	False
Inherited:	False
Property Type:	icom_presence:PresenceEditMode
Cardinality:	Single
Updatability:	Read Only

icom_presence:contactMethod

Description:	A collection of contact methods describing how to contact a presentity. A viewer may choose any one of the contact methods based on circumstances.
Required:	False
Inherited:	False
Property Type:	icom_presence:ContactMethod
Cardinality:	Multi
Updatability:	Read Only

icom_presence:activity

Description:	A collection of activities describing what a presentity is doing.
Required:	False
Inherited:	False
Property Type:	icom_presence:Activity
Cardinality:	Multi
Updatability:	Read Only

The Presence class MAY include additional property definitions which are implementation-defined.

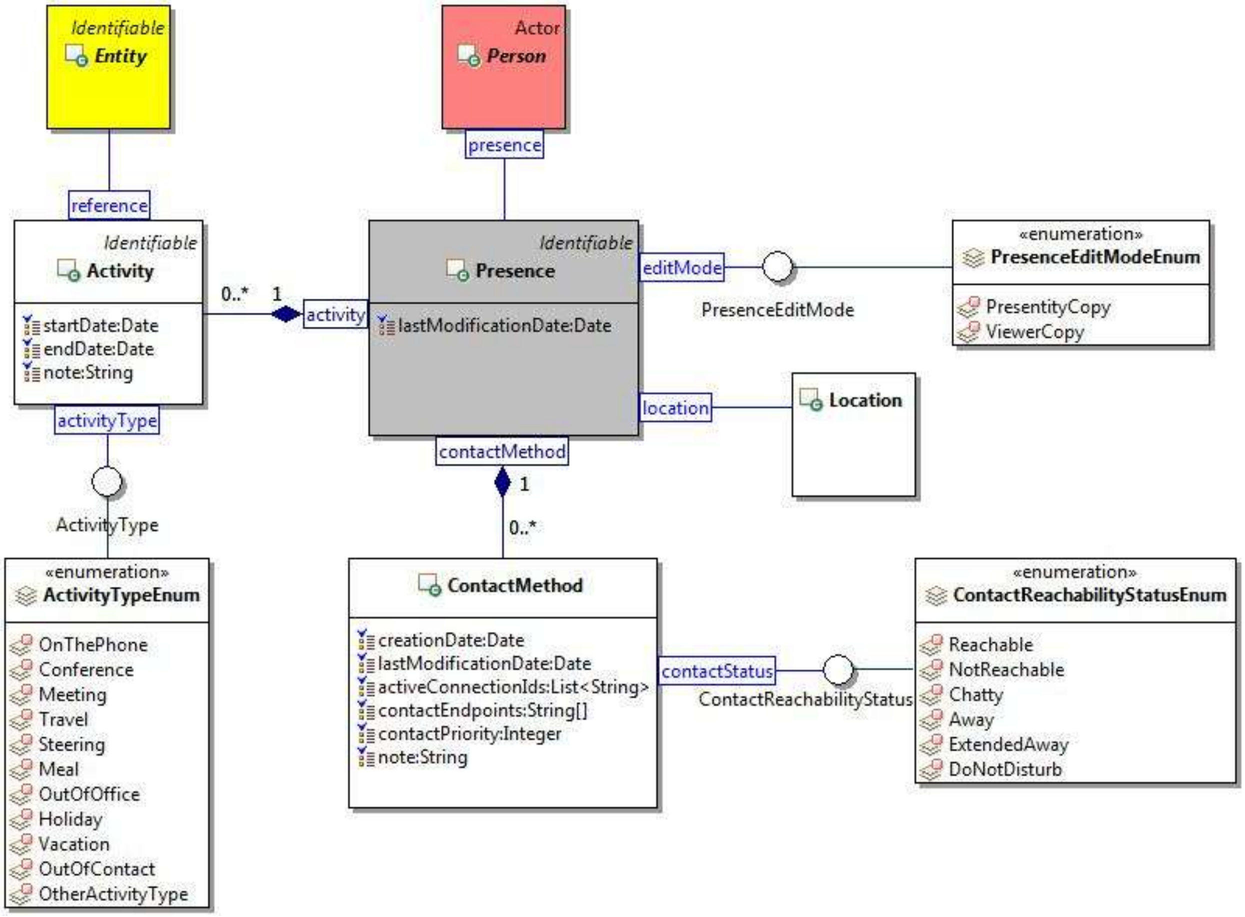


Figure 32: Presence Class Diagram.

4.5.2 PresenceEditMode

4.5.2.1 Description

A presence edit mode is a mode that indicates whether a presence is editable.

4.5.2.2 Class Definition

The PresenceEditMode class is a mixin class which defines a mode that indicates whether a presence is editable.

The PresenceEditMode class has attribute values:

`localNamespace`

Value: icom_presence

`localName`

Value: PresenceEditMode

`extendsFrom`

Value:

stereotype

Value: mixin

description

Value: PresenceEditMode is a mixin class which defines a mode that indicates whether a presence is editable.

propertyDefinitions

The values for this attribute are defined in Section 4.5.2.3.

4.5.2.3 Property Definitions

The PresenceEditMode class MAY include additional property definitions which are implementation-defined.

4.5.3 PresenceEditModeEnum

The PresenceEditModeEnum class is an enum class that enumerates the instances each of which expresses a mode that indicates whether a presence is editable.

The PresenceEditModeEnum class has attribute values:

localNamespace

Value: icom_presence

localName

Value: PresenceEditModeEnum

extendsFrom

Value: icom_presence:PresenceEditMode

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A mode that indicates whether a presence is editable.

instances

Value: <icom_presence:PresentityCopy, icom_presence:ViewerCopy>

ICOM defines two presence editable modes:

- **icom_presence:PresentityCopy** a presence is a copy belonging to a presentity who may update the properties such as activities.
- **icom_presence:ViewerCopy** a presence is a copy visible to a subscriber who may not update the properties.

4.5.4 ContactMethod

4.5.4.1 Description

A contact method object describes reachability circumstances of a presentity.

4.5.4.2 Class Definition

The ContactMethod class has attribute values:

localNamespace

Value: icom_presence

localName

Value: ContactMethod

extendsFrom

Value:

stereotype

Value: primary

description

Value: A contact method object describes reachability circumstances of a presentity.

propertyDefinitions

The values for this attribute are defined in Section 4.5.4.3

4.5.4.3 Property Definitions

The ContactMethod class MUST have the property definitions:

icom_core:creationDate

Description:	Creation date and time of information in a contact method.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:lastModificationDate

Description:	Last modification date and time of information in a contact method.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_presence:activeConnectionId

Description:	A list of active connection ids of a presentity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Multi
Updatability:	Read Only

icom_presence:contactEndpoint

Description:	A list of endpoints or IRIs for contacting a presentity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Multi
Updatability:	Read Only

icom_presence:contactPriority

Description:	Priority of a contact method relative to other contact methods in a presence.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Only

icom_presence:contactStatus

Description:	Status of a contact method in a presence.
Required:	False
Inherited:	False
Property Type:	icom_presence:ContactReachabilityStatus
Cardinality:	Single
Updatability:	Read Only

icom_presence:note

Description:	A note about contacting a presentity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

4.5.5 ContactReachabilityStatus

4.5.5.1 Description

A contact reachability status is a status of a contact method.

4.5.5.2 Class Definition

The ContactReachabilityStatus class is a mixin class which defines a status of a contact method.

The ContactReachabilityStatus class has attribute values:

localNamespace

Value: icom_presence

localName

Value: ContactReachabilityStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ContactReachabilityStatus is a mixin class which defines a status of a contact method.

propertyDefinitions

The values for this attribute are defined in Section 4.5.5.3.

4.5.5.3 Property Definitions

The ContactReachabilityStatus class MAY include additional property definitions which are implementation-defined.

4.5.6 ContactReachabilityStatusEnum

The ContactReachabilityStatusEnum class is an enum class that enumerates the instances each of which expresses a reachability status of a contact method.

The ContactReachabilityStatusEnum class has attribute values:

localNamespace

Value: icom_presence

localName

Value: ContactReachabilityStatusEnum

extendsFrom

Value: icom_presence:ContactReachabilityStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

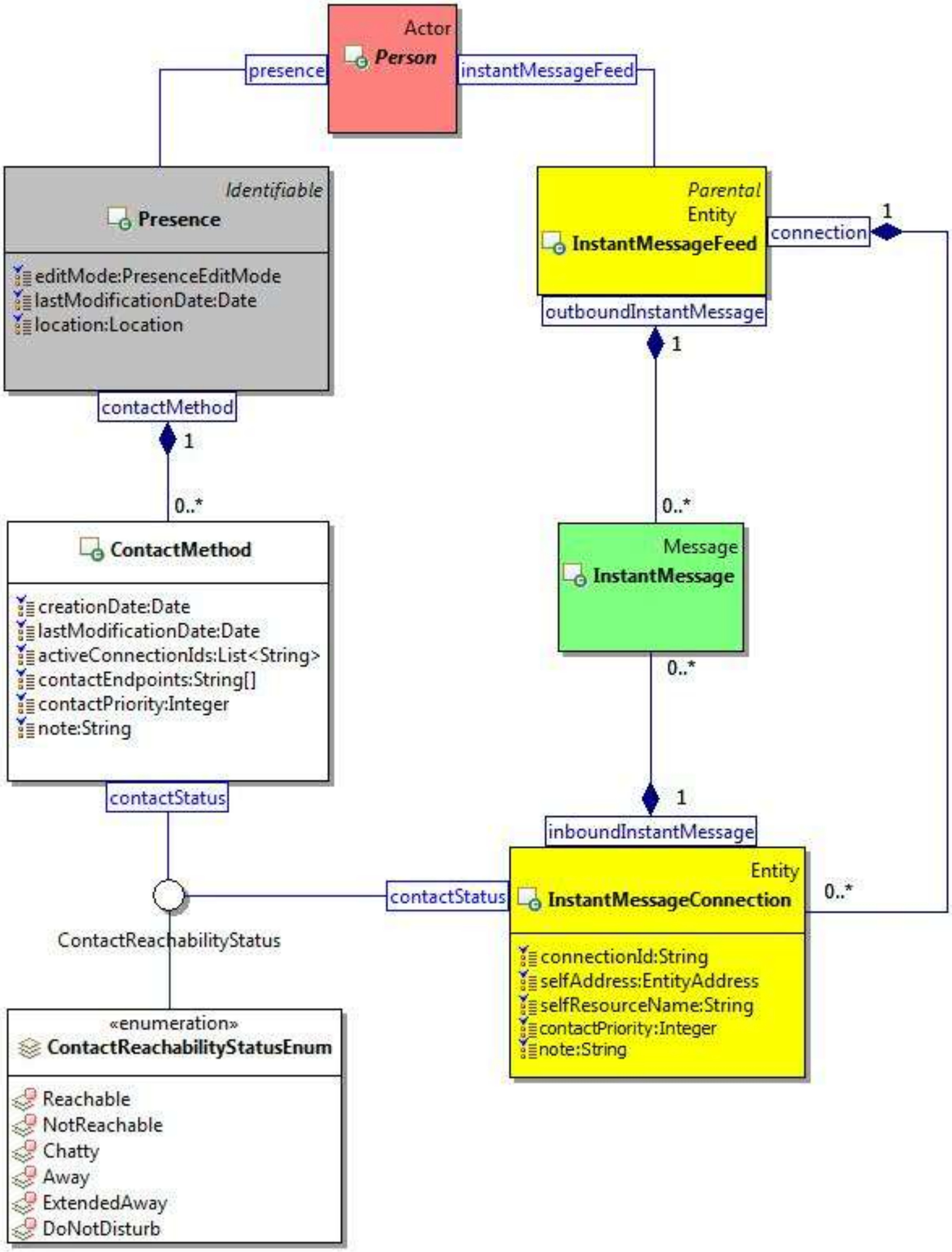
Value: A reachability status of a contact method.

instances

Value: <icom_presence:Reachable, icom_presence:NotReachable, icom_presence:Chatty, icom_presence:Away, icom_presence:ExtendedAway, icom_presence:DoNotDisturb>

ICOM defines six reachability status:

- **icom_presence:Reachable** a presentity is reachable through a contact method.
- **icom_presence:NotReachable** a presentity is not reachable through a contact method.
- **icom_presence:Chatty** a presentity is chatty.
- **icom_presence:Away** a presentity is away.
- **icom_presence:ExtendedAway** a presentity is away for an extended period.
- **icom_presence:DoNotDisturb** a presentity prefers not to be disturbed.



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5661 *Figure 33: Presence Contact Method and Instant Message Connection Class Diagram.*

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4.5.7 Activity

4.5.7.1 Description

An activity object describes what a presentity is doing.

4.5.7.2 Class Definition

The Activity class has attribute values:

localNamespace

Value: icom_presence

localName

Value: Activity

extendsFrom

Value:

stereotype

Value: primary

description

Value: An activity object describes what a presentity is doing.

propertyDefinitions

The values for this attribute are defined in Section 4.5.7.3.

4.5.7.3 Property Definitions

The Activity class MUST have the property definitions:

icom_core:startDate

Description:	Start date and time of an activity.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_core:endDate

Description:	End date and time of an activity.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single

Updatability:	Read Write

icom_presence:activityType

Description:	Type of an activity.
Required:	true
Inherited:	False
Property Type:	icom_presence:ActivityType
Cardinality:	Single
Updatability:	Read Write

icom_presence:note

Description:	A note describing an activity.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_presence:reference

Description:	An entity, such as occurrence, task, conference, etc., which is the source of or reference for an activity.
Required:	False
Inherited:	False
Property Type:	icom_core:Entity
Cardinality:	Single
Updatability:	Read Write

4.5.8 ActivityType

4.5.8.1 Description

An activity type is a vocabulary of activities for rich presence information model.

4.5.8.2 Class Definition

The ActivityType class is a mixin class which defines an activity.

The ActivityType class has attribute values:

`localNamespace`

Value: icom_presence

`localName`

Value: ActivityType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ActivityType is a mixin class which defines a type of activity.

propertyDefinitions

The values for this attribute are defined in Section 4.5.8.3.

4.5.8.3 Property Definitions

The ActivityType class MAY include additional property definitions which are implementation-defined.

4.5.9 ActivityTypeEnum

The ActivityTypeEnum class is an enum class that enumerates the instances each of which expresses a type of activity.

The ActivityTypeEnum class has attribute values:

localNamespace

Value: icom_presence

localName

Value: ActivityTypeEnum

extendsFrom

Value: icom_presence:ActivityType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A type of activity.

instances

Value: <icom_presence:OnThePhone, icom_presence:Conference, icom_presence:Meeting, icom_presence:Travel, icom_presence:Steering, icom_presence:Meal, icom_presence:OutOfOffice, icom_presence:Holiday, icom_presence:Vacation, icom_presence:OutOfContact, icom_presence:OtherActivityType>

ICOM defines eleven activity types:

- **icom_presence:OnThePhone** a presentity is on the phone.
- **icom_presence:Conference** a presentity is in a conference.
- **icom_presence:Meeting** a presentity is in a meeting.
- **icom_presence:Travel** a presentity is traveling.
- **icom_presence:Steering** a presentity is steering a vehicle.
- **icom_presence:Meal** a presentity is having a meal.
- **icom_presence:OutOfOffice** a presentity is out of office.
- **icom_presence:Holiday** a presentity is on holiday.
- **icom_presence:Vacation** a presentity is on vacation.
- **icom_presence:OutOfContact** a presentity is out of contact.
- **icom_presence:OtherActivityType** a presentity is involved in an unspecified activity.

4.6 Address Book Module

4.6.1 AddressBook

4.6.1.1 Description

An address book is a folder that contains sub-address books and addressable contacts.

4.6.1.2 Class Definition

The AddressBook class has attribute values:

`localNamespace`

Value: icom_card

`localName`

Value: AddressBook

`extendsFrom`

Value: icom_core:Folder

`stereotype`

Value: primary

`description`

Value: An address book is a folder that contains sub-address books and addressable contacts.

`propertyDefinitions`

The values for this attribute are defined in Section 4.6.1.3.

4.6.1.3 Property Definitions

The AddressBook class inherits property definitions from super classes.

The AddressBook class MUST have the property definitions:

icom_card:addressBook

Description:	Sub-address books in an address book.
Required:	False
Inherited:	False
Property Type:	icom_card:AddressBook
Cardinality:	Multi
Updatability:	Read Only

icom_card:contact

Description:	Contacts in an address book.
Required:	False
Inherited:	False
Property Type:	icom_card:PersonContact
Cardinality:	Multi
Updatability:	Read Only

The AddressBook class MAY include additional property definitions which are implementation-defined.

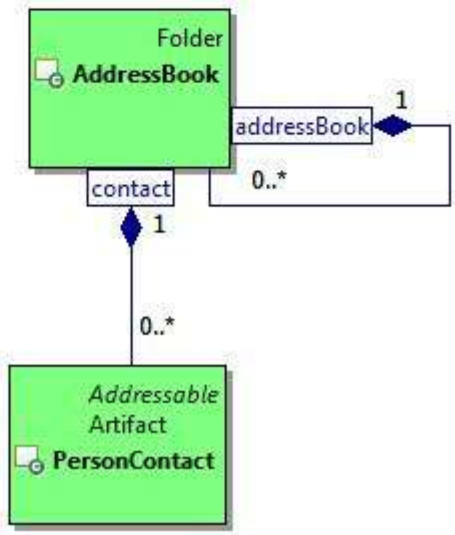

Figure 34: Address Book Class Diagram.

4.6.2 PersonContact

4.6.2.1 Description

A person contact is an artifact that contains address information about a person.

4.6.2.2 Class Definition

The PersonContact class has attribute values:

`localNamespace`

Value: icom_card

`localName`

Value: PersonContact

`extendsFrom`

Value: icom_core:Artifact, icom_core:Addressable

`stereotype`

Value: primary

`description`

Value: A person contact is an artifact that contains address information about a person.

`propertyDefinitions`

The values for this attribute are defined in Section 4.6.2.3.

4.6.2.3 Property Definitions

The PersonContact class inherits property definitions from super classes.

The PersonContact class MUST have the property definitions:

icom_core:timeZone

Description:	Time zone of a person.
Required:	False
Inherited:	False
Property Type:	icom_core:TimeZone
Cardinality:	Single
Updatability:	Read Write

icom_core:givenName

Description:	Given name of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:middleName

Description:	Middle name of a person. Can include multiple names concatenated.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:familyName

Description:	Family name of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:prefix

Description:	Prefix of a person’s name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:suffix

Description:	Suffix of a person’s name.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:nickname

Description:	Nickname of a person.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Multi
Updatability:	Read Write

icom_core:jobTitle

Description:	Job title of a person.

Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:department

Description:	A person’s affiliated department.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:officeLocation

Description:	Location of a person’s department.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:company

Description:	A person’s affiliated company.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:profession

Description:	A person’s profession.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_content:attachment

Description:	One or more content attachments in a contact.
Required:	False
Inherited:	False

Property Type:	icom_content:AttachedItem
Cardinality:	Multi
Updatability:	Read Write

icom_card:bookmark

Description:	A person which is bookmarked by a contact.
Required:	False
Inherited:	False
Property Type:	icom_core:Person
Cardinality:	Single
Updatability:	On Create

The PersonContact class MAY include additional property definitions which are implementation-defined.

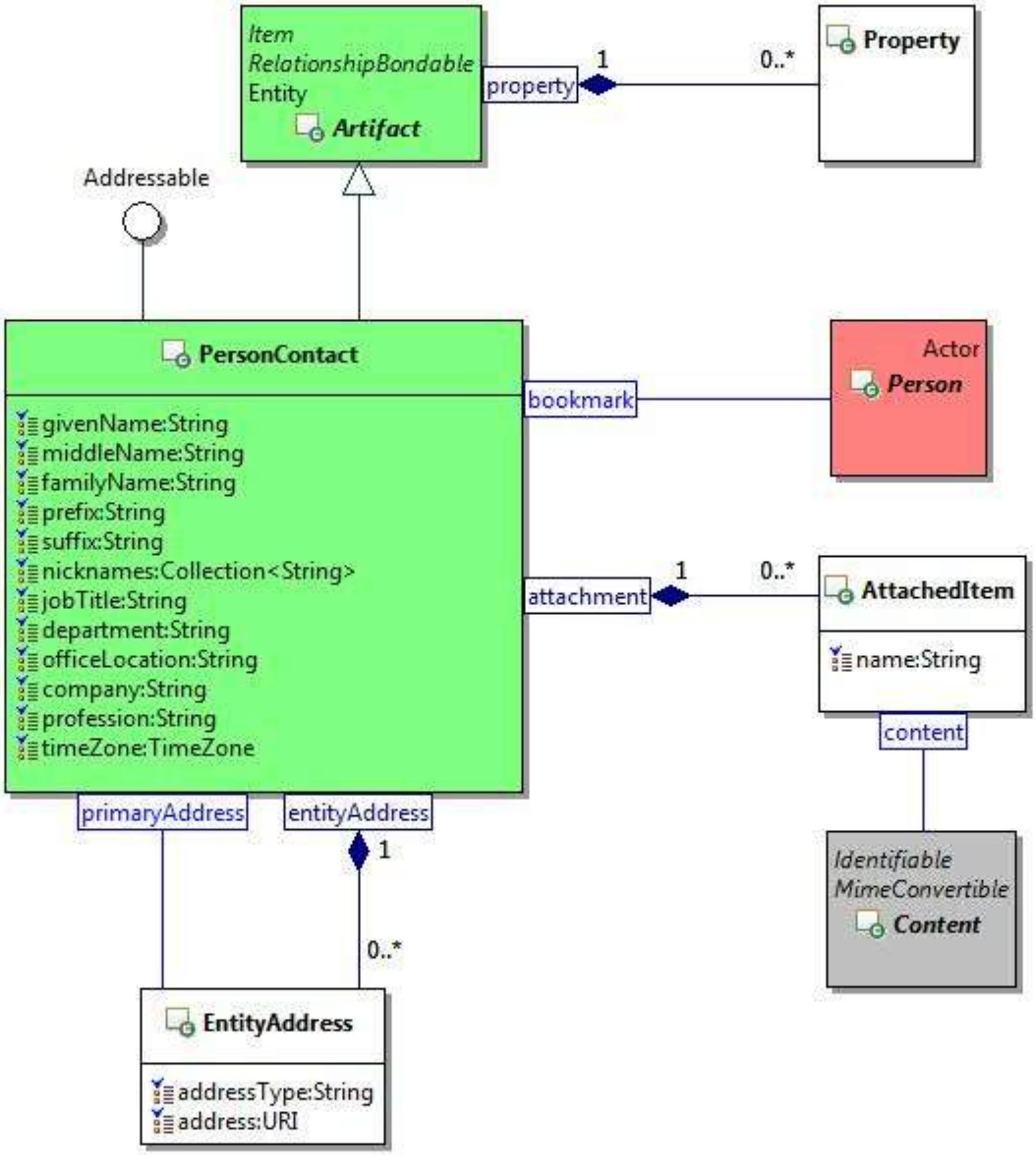

Figure 35: Person Contact Class Diagram.

4.7 Calendar Module

4.7.1 Calendar

4.7.1.1 Description

A calendar contains time management artifacts that include occurrences and occurrence series.

4.7.1.2 Class Definition

The Calendar class has attribute values:

localNamespace

Value: icom_cal

localName

Value: Calendar

extendsFrom

Value: icom_core:Folder

stereotype

Value: primary

description

Value: A calendar contains time management artifacts that include occurrences and occurrence series.

propertyDefinitions

The values for this attribute are defined in 4.7.1.3.

4.7.1.3 Property Definitions

The Calendar class inherits property definitions from super classes.

The Calendar class MUST have the property definitions:

icom_core:timeZone

Description:	Time zone setting for a calendar.
Required:	True
Inherited:	False
Property Type:	icom_core:TimeZone
Cardinality:	Single
Updatability:	Read Write

icom_core:element

Description:	Elements of a calendar.
Required:	False
Inherited:	True
Property Type:	icom_cal:Occurrence
Cardinality:	Multi
Updatability:	Read Only

icom_cal:recurrence

Description:	Occurrence series of a calendar.
Required:	False
Inherited:	False

Property Type:	icom_cal:OccurrenceSeries
Cardinality:	Multi
Updatability:	Read Only

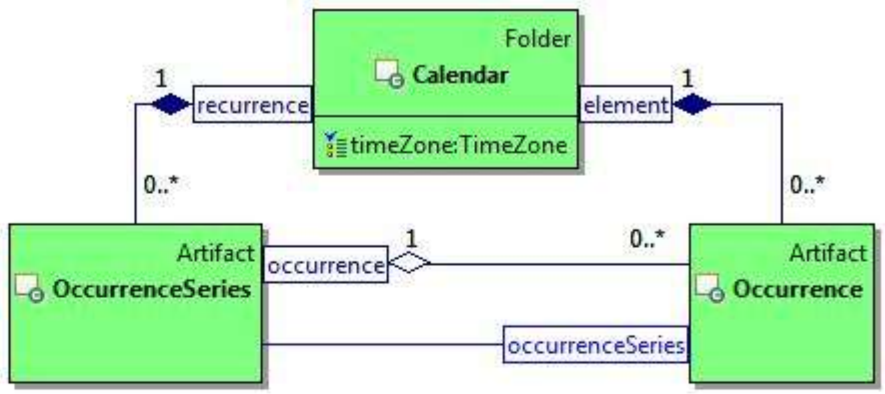

Figure 36: Calendar Class Diagram.

4.7.2 OccurrenceSeries

4.7.2.1 Description

An occurrence series represents a series of occurrences associated with the same calendar event.

4.7.2.2 Class Definition

The OccurrenceSeries class has attribute values:

`localNamespace`

Value: icom_cal

`localName`

Value: OccurrenceSeries

`extendsFrom`

Value: icom_core:Artifact

`stereotype`

Value: primary

`description`

Value: An occurrence series represents a series of occurrences associated with the same calendar event.

`propertyDefinitions`

The values for this attribute are defined in 4.7.2.3.

4.7.2.3 Property Definitions

The OccurrenceSeries class inherits property definitions from super classes.

The OccurrenceSeries class MUST have the property definitions:

icom_core:location

Description:	Location of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_core:Location
Cardinality:	Single
Updatability:	Read Write

icom_core:organizer

Description:	Organizer of an occurrence series.
Required:	True
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	On Create

icom_core:participant

Description:	Participants in an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipant
Cardinality:	Multi
Updatability:	Read Write

icom_core:priority

Description:	Priority for an attendee of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_core:Priority
Cardinality:	Single
Updatability:	Read Write

icom_content:attachment

Description:	One or more content attachments in an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_content:AttachedItem
Cardinality:	Multi

Updatability:	Read Write

icom_cal:recurrenceStartDate

Description:	Start date and time of an occurrence series.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	On Create

icom_cal:recurrenceStartDateResolution

Description:	Resolution of start date and time of an occurrence series.
Required:	True
Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	On Create

icom_cal:duration

Description:	Duration of each occurrence in an occurrence series.
Required:	True
Inherited:	False
Property Type:	Duration
Cardinality:	Single
Updatability:	On Create

icom_cal:recurrenceRule

Description:	A recurrence rule of an occurrence series.
Required:	True
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	On Create

icom_cal:occurrenceStatus

Description:	Status of an occurrence series.
Required:	True
Inherited:	False
Property Type:	icom_cal:OccurrenceStatus
Cardinality:	Single
Updatability:	Read Write

icom_cal:occurrenceType

Description:	Type of an occurrence series.
Required:	True
Inherited:	False
Property Type:	icom_cal:OccurrenceType
Cardinality:	Single
Updatability:	Read Write

icom_cal:editMode

Description:	Indicates a mode which determines whether an occurrence series is editable.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceEditMode
Cardinality:	Single
Updatability:	Read Only

icom_cal:occurrence

Description:	Occurrences in an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_cal:Occurrence
Cardinality:	Multi
Updatability:	Read Only

icom_cal:attendee

Description:	An attendee of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	Read Only

icom_cal:attendeeParticipantStatus

Description:	Participation status for an attendee of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipantStatus
Cardinality:	Single
Updatability:	Read Write

icom_cal:transparency

Description:	Participant transparency for an attendee of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipantTransparency
Cardinality:	Single
Updatability:	Read Write

icom_cal:attendeeProperty

Description:	Extensible properties for an attendee of an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

icom_conf:conference

Description:	One or more conferences for an occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_conf:Conference
Cardinality:	Multi
Updatability:	Read Write

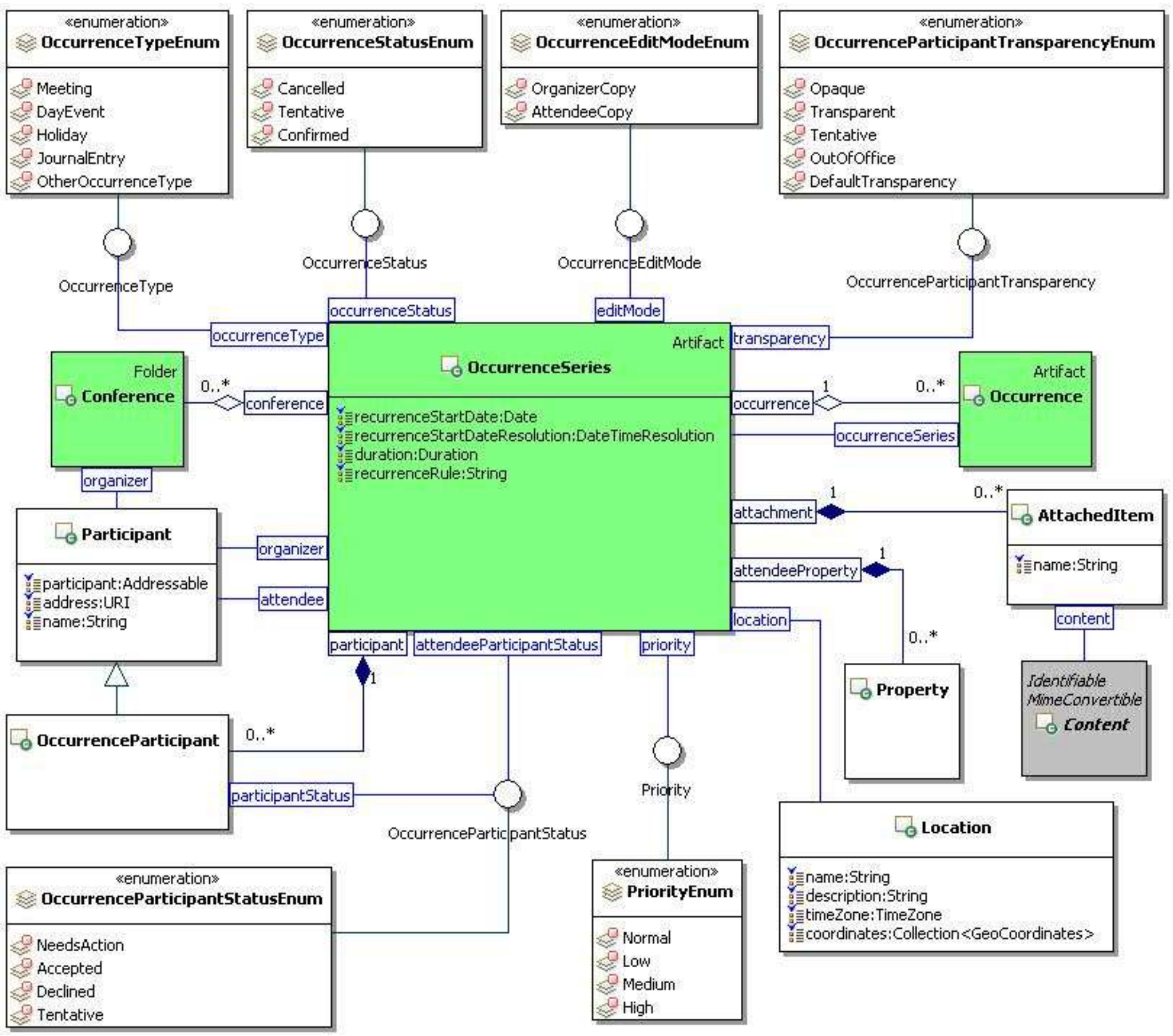

Figure 37: Occurrence Series Class Diagram.

4.7.3 Occurrence

4.7.3.1 Description

An occurrence represents an event in a calendar.

4.7.3.2 Class Definition

The Occurrence class has attribute values:

`localNamespace`

Value: icom_cal

`localName`

Value: Occurrence

extendsFrom

Value: icom_core:Artifact

stereotype

Value: primary

description

Value: An occurrence represents an event in a calendar.

propertyDefinitions

The values for this attribute are defined in 4.7.3.3.

4.7.3.3 Property Definitions

The Occurrence class inherits property definitions from super classes.

The Occurrence class MUST have the property definitions:

icom_core:location

Description:	Location of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_core:Location
Cardinality:	Single
Updatability:	Read Write

icom_core:organizer

Description:	Organizer of an occurrence.
Required:	True
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	On Create

icom_core:participant

Description:	Participants of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipant
Cardinality:	Multi
Updatability:	Read Write

icom_core:priority

Description:	Priority for an attendee of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_core:Priority
Cardinality:	Single
Updatability:	Read Write

icom_core:startDate

Description:	Start date and time of an occurrence.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	On Create

icom_core:startDateResolution

Description:	Resolution of start date and time of an occurrence.
Required:	True
Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	On Create

icom_core:endDate

Description:	End date and time of an occurrence.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	On Create

icom_core:endDateResolution

Description:	Resolution of end date and time of an occurrence.
Required:	True
Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	On Create

icom_content:attachment

Description:	One or more content attachments in an occurrence.

Required:	False
Inherited:	False
Property Type:	icom_content:AttachedItem
Cardinality:	Multi
Updatability:	Read Write

icom_cal:occurrenceSeries

Description:	An occurrence is part of this occurrence series.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceSeries
Cardinality:	Single
Updatability:	Read Only

icom_cal:fromRecurringOccurrenceSeries

Description:	Occurrence is part of a recurring occurrence series.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Only

icom_cal:exceptionToOccurrenceSeries

Description:	Occurrence is an exception to an occurrence series.
Required:	False
Inherited:	False
Property Type:	Boolean
Cardinality:	Single
Updatability:	Read Only

icom_cal:occurrenceStatus

Description:	Status of an occurrence.
Required:	True
Inherited:	False
Property Type:	icom_cal:OccurrenceStatus
Cardinality:	Single
Updatability:	Read Write

icom_cal:occurrenceType

Description:	Type of an occurrence.
Required:	True
Inherited:	False

Property Type:	icom_cal:OccurrenceType
Cardinality:	Single
Updatability:	Read Write

icom_cal:editMode

Description:	Indicates a mode which determines whether an occurrence is editable.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceEditMode
Cardinality:	Single
Updatability:	Read Only

icom_cal:attendee

Description:	An attendee of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	Read Only

icom_cal:attendeeParticipantStatus

Description:	Status for an attendee of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipantStatus
Cardinality:	Single
Updatability:	Read Write

icom_cal:transparency

Description:	Transparency for an attendee of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipantTransparency
Cardinality:	Single
Updatability:	Read Write

icom_cal:attendeeProperty

Description:	Extensible properties for an attendee of an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi

Updatability:	Read Write

icom_conf:conference

Description:	One or more conferences for an occurrence.
Required:	False
Inherited:	False
Property Type:	icom_conf:Conference
Cardinality:	Multi
Updatability:	Read Write

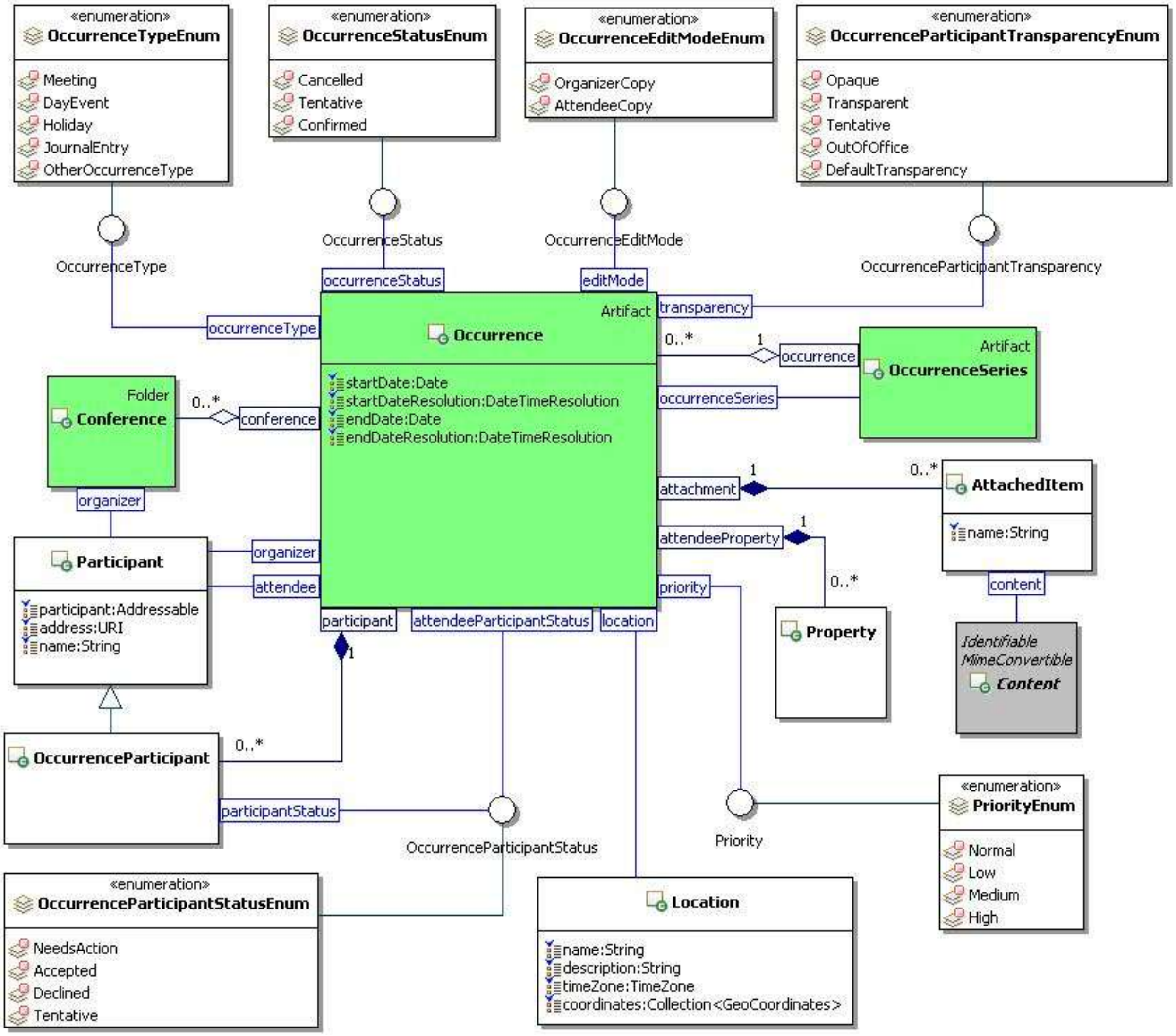

Figure 38: Occurrence Class Diagram.

4.7.4 OccurrenceStatus

4.7.4.1 Description

An occurrence status is a status of a calendar occurrence.

4.7.4.2 Class Definition

The OccurrenceStatus class is a mixin class which defines status of a calendar occurrence.

The OccurrenceStatus class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: OccurrenceStatus is a mixin class which defines status of a calendar occurrence.

propertyDefinitions

The values for this attribute are defined in Section 4.7.4.3.

4.7.4.3 Property Definitions

The OccurrenceStatus class MAY include additional property definitions which are implementation-defined.

4.7.5 OccurrenceStatusEnum

The OccurrenceStatusEnum class is an enum class that enumerates the instances each of which expresses a status of an occurrence or occurrence series.

The OccurrenceStatusEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceStatusEnum

extendsFrom

Value: icom_cal:OccurrenceStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Status of an occurrence or occurrence series.

instances

Value: <icom_cal:Cancelled, icom_cal:Tentative, icom_cal:Confirmed>

ICOM defines three occurrence status:

- **icom_cal:Cancelled** an occurrence or occurrence series is cancelled.
- **icom_cal:Tentative** an occurrence or occurrence series is tentative.
- **icom_cal:Confirmed** an occurrence or occurrence series is confirmed.

4.7.6 OccurrenceType

4.7.6.1 Description

An occurrence type is a category of calendar occurrences.

4.7.6.2 Class Definition

The OccurrenceType class is a mixin class which defines a type of occurrence.

The OccurrenceType class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: OccurrenceType is a mixin class which defines a type of occurrence.

propertyDefinitions

The values for this attribute are defined in Section 4.7.6.3.

4.7.6.3 Property Definitions

The OccurrenceType class MAY include additional property definitions which are implementation-defined.

4.7.7 OccurrenceTypeEnum

The OccurrenceTypeEnum class is an enum class that enumerates the instances each of which expresses a type of an occurrence or occurrence series.

The OccurrenceTypeEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceTypeEnum

extendsFrom

Value: icom_cal:OccurrenceType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Type of an occurrence or occurrence series.

instances

Value: <icom_cal:Meeting, icom_cal:DayEvent, icom_cal:Holiday, icom_cal:JournalEntry, icom_cal:OtherOccurrenceType>

ICOM defines five occurrence types:

- **icom_cal:Meeting** an occurrence or occurrence series is a meeting.
- **icom_cal:DayEvent** an occurrence or occurrence series is a day event.
- **icom_cal:Holiday** an occurrence or occurrence series is a holiday.
- **icom_cal:JournalEntry** an occurrence or occurrence series is a journal entry.
- **icom_cal:OtherOccurrenceType** an occurrence or occurrence series is of other type.

4.7.8 OccurrenceParticipant

4.7.8.1 Description

An occurrence participant object is a participant object that contains an occurrence participant status.

4.7.8.2 Class Definition

The OccurrenceParticipant class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceParticipant

extendsFrom

Value: icom_core:Participant

stereotype

Value: primary

description

Value: An occurrence participant object is a participant object that contains an occurrence participant status.

propertyDefinitions

The values for this attribute are defined in Section 4.7.8.3.

4.7.8.3 Property Definitions

The OccurrenceParticipant class inherits property definitions from super classes.

The OccurrenceParticipant class MUST have the property definition:

icom_cal:participantStatus

Description:	Status of an occurrence participant.
Required:	False
Inherited:	False
Property Type:	icom_cal:OccurrenceParticipantStatus
Cardinality:	Single
Updatability:	Read Write

4.7.9 OccurrenceParticipantStatus

4.7.9.1 Description

An occurrence participant status is a participant's response status for an occurrence or occurrence series.

4.7.9.2 Class Definition

The OccurrenceParticipantStatus class is a mixin class which defines a participant's response status for an occurrence or occurrence series.

The OccurrenceParticipantStatus class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceParticipantStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: OccurrenceParticipantStatus is a mixin class which defines a participant's response status for an occurrence or occurrence series.

propertyDefinitions

The values for this attribute are defined in Section 4.7.9.3.

4.7.9.3 Property Definitions

The OccurrenceParticipantStatus class MAY include additional property definitions which are implementation-defined.

4.7.10 OccurrenceParticipantStatusEnum

The OccurrenceParticipantStatusEnum class is an enum class that enumerates the instances each of which expresses a participant's response status for an occurrence or occurrence series.

The OccurrenceParticipantStatusEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceParticipantStatusEnum

extendsFrom

Value: icom_cal:OccurrenceParticipantStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Participant's response status for an occurrence or occurrence series.

instances

Value: <icom_cal:NeedsAction, icom_cal:Accepted, icom_cal:Declined, icom_cal:Tentative>

ICOM defines four occurrence participant's status:

- **icom_cal:NeedsAction** an attendee needs to act on an occurrence or occurrence series.
- **icom_cal:Accepted** an attendee accepted an occurrence or occurrence series.
- **icom_cal:Declined** an attendee declined an occurrence or occurrence series.
- **icom_cal:Tentative** an attendee is tentative about attending an occurrence or occurrence series.

4.7.11 OccurrenceParticipantTransparency

4.7.11.1 Description

An occurrence participant transparency is visibility of an occurrence or occurrence series in a participant's calendar or free busy.

4.7.11.2 Class Definition

The OccurrenceParticipantTransparency class is a mixin class which defines visibility of an occurrence or occurrence series in a participant's calendar or free busy.

The OccurrenceParticipantTransparency class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceParticipantTransparency

extendsFrom

Value:

stereotype

Value: mixin

description

Value: OccurrenceParticipantTransparency is a mixin class which defines visibility of an occurrence or occurrence series in a participant's calendar or free busy.

propertyDefinitions

The values for this attribute are defined in Section 4.7.11.3.

4.7.11.3 Property Definitions

The OccurrenceParticipantTransparency class MAY include additional property definitions which are implementation-defined.

4.7.12 OccurrenceParticipantTransparencyEnum

The OccurrenceParticipantTransparencyEnum class is an enum class that enumerates the instances each of which expresses an occurrence or occurrence series transparency in a participant's calendar or free busy.

The OccurrenceParticipantTransparencyEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceParticipantTransparencyEnum

extendsFrom

Value: icom_cal:OccurrenceParticipantTransparency

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Occurrence or occurrence series transparency in a participant's calendar or free busy.

instances

Value: <icom_cal:Opaque, icom_cal:Transparent, icom_cal:Tentative, icom_cal:OutOfOffice, icom_cal:DefaultTransparency>

ICOM defines five participant transparencies:

- **icom_cal:Opaque** an occurrence or occurrence series is opaque in a participant's calendar or free busy.
- **icom_cal:Transparent** an occurrence or occurrence series is transparent in a participant's calendar or free busy.
- **icom_cal:Tentative** an occurrence or occurrence series has a tentative transparency in a participant's calendar or free busy.
- **icom_cal:OutOfOffice** an occurrence or occurrence series has out of office transparency in a participant's calendar or free busy.
- **icom_cal:DefaultTransparency** an occurrence or occurrence series has default transparency in a participant's calendar or free busy.

4.7.13 OccurrenceEditMode

4.7.13.1 Description

An occurrence edit mode is a mode that indicates whether an occurrence or occurrence series is editable.

4.7.13.2 Class Definition

The OccurrenceEditMode class is a mixin class which defines a mode that indicates whether an occurrence or occurrence series is editable.

The OccurrenceEditMode class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceEditMode

extendsFrom

Value:

stereotype

Value: mixin

description

Value: OccurrenceEditMode is a mixin class which defines a mode that indicates whether an occurrence or occurrence series is editable.

propertyDefinitions

The values for this attribute are defined in Section 4.7.13.3.

4.7.13.3 Property Definitions

The OccurrenceEditMode class MAY include additional property definitions which are implementation-defined.

4.7.14 OccurrenceEditModeEnum

The OccurrenceEditModeEnum class is an enum class that enumerates the instances each of which expresses a mode that indicates whether an occurrence or occurrence series is editable.

The OccurrenceEditModeEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: OccurrenceEditModeEnum

extendsFrom

Value: icom_cal:OccurrenceEditMode

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A mode that indicates whether an occurrence or occurrence series is editable.

instances

Value: <icom_cal:OrganizerCopy, icom_cal:AttendeeCopy>

ICOM defines two occurrence editable modes:

- **icom_cal:OrganizerCopy** an occurrence or occurrence series is a copy created by an organizer who may update the properties such as occurrence type, occurrence status, etc.
- **icom_cal:AttendeeCopy** an occurrence or occurrence series is a copy delivered to an attendee who may only update the attendee properties such as priority, transparency, etc .

4.8 Free Busy Module

4.8.1 FreeBusy

4.8.1.1 Description

A free busy object specifies the free time and busy time intervals of one or more participants.

4.8.1.2 Class Definition

The FreeBusy class has attribute values:

localNamespace

Value: icom_cal

localName

Value: FreeBusy

extendsFrom

Value:

stereotype

Value: primary

description

Value: A free busy object specifies the free time and busy time intervals of one or more participants.

propertyDefinitions

The values for this attribute are defined in Section 4.8.1.3.

4.8.1.3 Property Definitions

The FreeBusy class MUST have the property definitions:

icom_core:participant

Description:	A list of participants whose free busy intervals are included.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Only

icom_core:creationDate

Description:	Creation date and time of a free busy object.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:startDate

Description:	Start date and time of a list of free busy intervals.

Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:endDate

Description:	End date and time of a list of free busy intervals.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_cal:interval

Description:	A list of free busy intervals.
Required:	False
Inherited:	False
Property Type:	icom_cal:FreeBusyInterval
Cardinality:	Multi
Updatability:	Read Only

4.8.2 FreeBusyInterval

4.8.2.1 Description

A free busy interval specifies an interval of free or busy time.

If a free busy type is icom_cal:Free, then a time interval is free for scheduling.

If a free busy type is icom_cal:Busy, then a time interval is busy because one or more events have been scheduled for the interval.

4.8.2.2 Class Definition

The FreeBusyInterval class has attribute values:

`localNamespace`

Value: icom_cal

`localName`

Value: FreeBusyInterval

`extendsFrom`

Value:

stereotype

Value: primary

description

Value: A free busy interval object specifies an interval of free or busy time.

propertyDefinitions

The values for this attribute are defined in Section 4.8.2.3

4.8.2.3 Property Definitions

The FreeBusyInterval class MUST have the property definitions:

icom_core:startDate

Description:	Start date and time of a free busy interval.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:endDate

Description:	End date and time of a free busy interval.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_cal:freeBusyType

Description:	A type of free busy interval.
Required:	False
Inherited:	False
Property Type:	icom_cal:FreeBusyType
Cardinality:	Single
Updatability:	Read Only

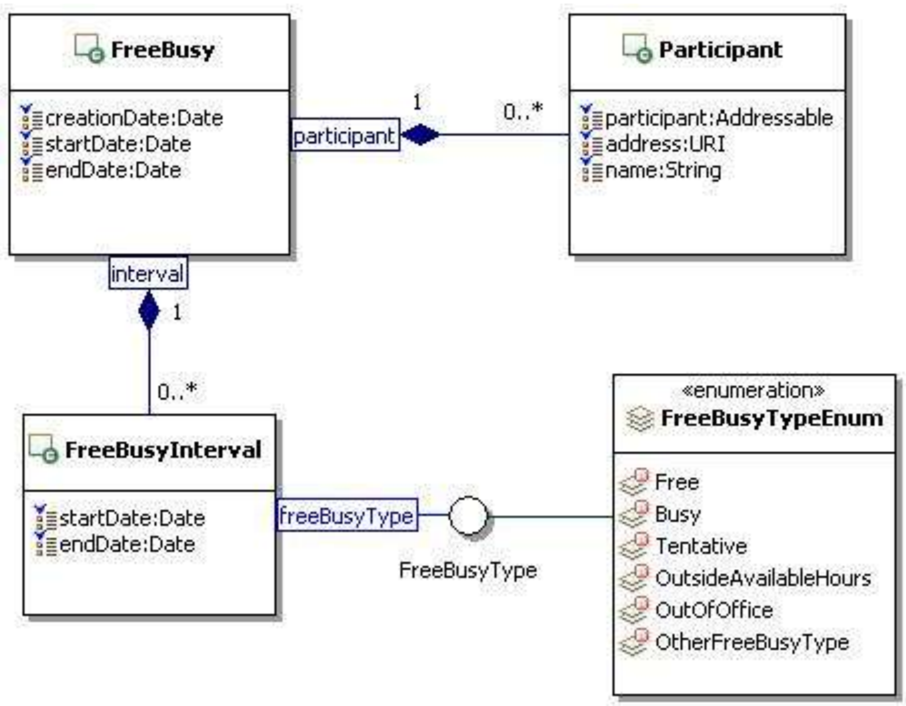

Figure 39: Free Busy Class Diagram.

4.8.3 FreeBusyType

4.8.3.1 Description

A free busy type classifies a time interval as free, busy, or other.

4.8.3.2 Class Definition

The FreeBusyType class is a mixin class which defines different types to classify a time interval.

The FreeBusyType class has attribute values:

`localNamespace`

Value: icom_cal

`localName`

Value: FreeBusyType

`extendsFrom`

Value:

`stereotype`

Value: mixin

`description`

Value: FreeBusyType is a mixin class which defines different types to classify a time interval.

propertyDefinitions

The values for this attribute are defined in Section 4.8.3.3.

4.8.3.3 Property Definitions

The FreeBusyType class MAY include additional property definitions which are implementation-defined.

4.8.4 FreeBusyTypeEnum

The FreeBusyTypeEnum class is an enum class that enumerates the instances each of which expresses a type of free busy interval.

The FreeBusyTypeEnum class has attribute values:

localNamespace

Value: icom_cal

localName

Value: FreeBusyTypeEnum

extendsFrom

Value: icom_cal:FreeBusyType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A type of free busy interval.

instances

Value: <icom_cal:Free, icom_cal:Busy, icom_cal:Tentative, icom_cal:OutsideAvailableHours, icom_cal:OutOfOffice, icom_cal:OtherFreeBusyType>

ICOM defines six free busy types:

- **icom_cal:Free** a free busy interval is free.
- **icom_cal:Busy** a free busy interval is busy.
- **icom_cal:Tentative** a free busy interval is tentative.
- **icom_cal:OutsideAvailableHours** a free busy interval is outside available hours.
- **icom_cal:OutOfOffice** a free busy interval is within out of office hours.
- **icom_cal:OtherFreeBusyType** a free busy interval is of other type.

4.9 Task List Module

4.9.1 TaskList

4.9.1.1 Description

A task list contains task management artifacts.

4.9.1.2 Class Definition

The TaskList class has attribute values:

`localNamespace`

Value: icom_task

`localName`

Value: TaskList

`extendsFrom`

Value: icom_core:Folder

`stereotype`

Value: primary

`description`

Value: A task list contains task management artifacts.

`propertyDefinitions`

The values for this attribute are defined in 4.9.1.3.

4.9.1.3 Property Definitions

The TaskList class inherits property definitions from super classes.

The TaskList class MUST have the property definitions:

icom_core:timeZone

Description:	Time zone of a task list.
Required:	True
Inherited:	False
Property Type:	icom_core:TimeZone
Cardinality:	Single
Updatability:	Read Write

icom_core:element

Description:	Elements of a task list.
Required:	False

Inherited:	True
Property Type:	icom_task:Task
Cardinality:	Multi
Updatability:	Read Only

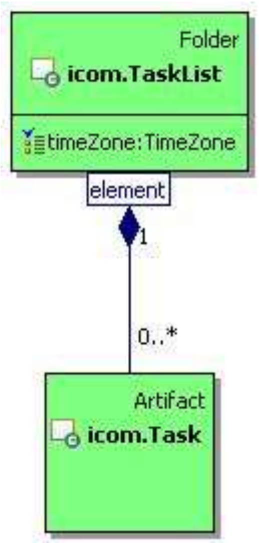

Figure 40: Task List Class Diagram.

4.9.2 Task

4.9.2.1 Description

A task is an artifact that represents a task to do or a task assignment in a task list.

4.9.2.2 Class Definition

The Task class has attribute values:

localNamespace

Value: icom_task

localName

Value: Task

extendsFrom

Value: icom_core:Artifact

stereotype

Value: primary

description

Value: A task is an artifact that represents a task to do or a task assignment in a task list.

`propertyDefinitions`

The values for this attribute are defined in 4.9.2.3.

4.9.2.3 Property Definitions

The Task class inherits property definitions from super classes.

The Task class MUST have the property definitions:

icom_core:location

Description:	Location of a task.
Required:	False
Inherited:	False
Property Type:	icom_core:Location
Cardinality:	Single
Updatability:	Read Write

icom_core:organizer

Description:	Organizer of a task.
Required:	True
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	On Create

icom_core:priority

Description:	Priority of a task.
Required:	False
Inherited:	False
Property Type:	icom_core:Priority
Cardinality:	Single
Updatability:	Read Write

icom_core:startDate

Description:	Start date and time of a task.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	On Create

icom_core:startDateResolution

Description:	Resolution of start date and time of a task.
Required:	True

Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	On Create

icom_content:attachment

Description:	One or more content attachments in a task.
Required:	False
Inherited:	False
Property Type:	icom_content:AttachedItem
Cardinality:	Multi
Updatability:	Read Write

icom_task:dueDate

Description:	Due date and time of a task.
Required:	True
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	On Create

icom_task:dueDateResolution

Description:	Resolution of due date and time of a task.
Required:	True
Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	On Create

icom_task:editMode

Description:	Indicates a mode which determines whether a task is editable.
Required:	False
Inherited:	False
Property Type:	icom_task:TaskEditMode
Cardinality:	Single
Updatability:	Read Only

icom_task:taskStatus

Description:	Status of a task.
Required:	True
Inherited:	False
Property Type:	icom_task:TaskStatus

Cardinality:	Single
Updatability:	Read Write

icom_task:assignee

Description:	An assignee of a task.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	Read Only

icom_task:participantStatus

Description:	Participation status of a task.
Required:	False
Inherited:	False
Property Type:	icom_task:TaskParticipantStatus
Cardinality:	Single
Updatability:	Read Write

icom_task:completionDate

Description:	Completion date and time of a task.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_task:completionDateResolution

Description:	Resolution of completion date and time of a task.
Required:	False
Inherited:	False
Property Type:	icom_core:DateTimeResolution
Cardinality:	Single
Updatability:	Read Write

icom_task:percentComplete

Description:	Percentage of task completed.
Required:	False
Inherited:	False
Property Type:	Integer
Cardinality:	Single
Updatability:	Read Write

icom_task:assigneeProperty

Description:	Extensible properties for an assignee of a task.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

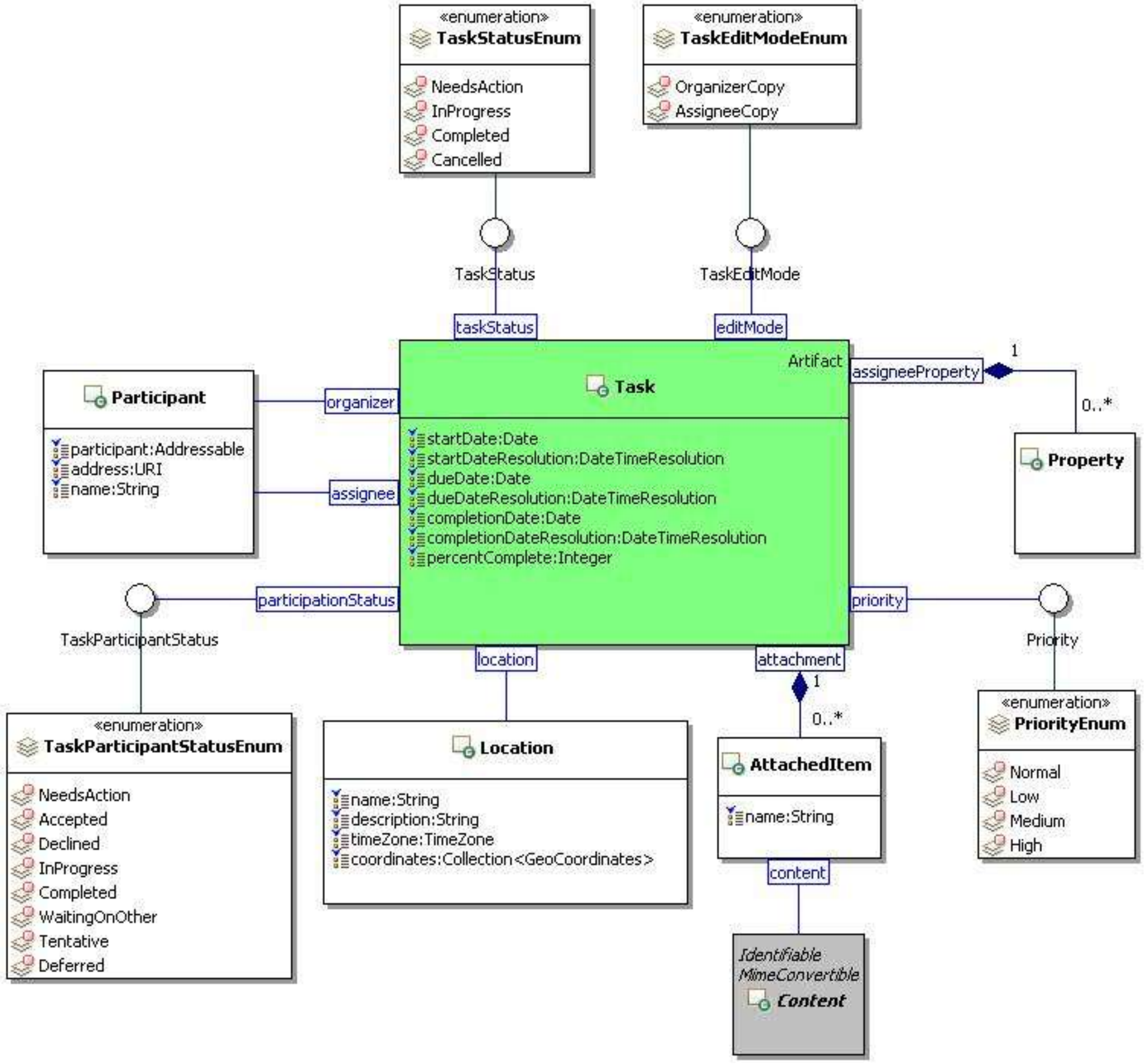

Figure 41: Task Class Diagram.

4.9.3 TaskStatus

4.9.3.1 Description

A task status is a status of a task.

4.9.3.2 Class Definition

The TaskStatus class is a mixin class which defines status of a task.

The TaskStatus class has attribute values:

localNamespace

Value: icom_task

localName

Value: TaskStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: TaskStatus is a mixin class which defines status of a task.

propertyDefinitions

The values for this attribute are defined in Section 4.9.3.3.

4.9.3.3 Property Definitions

The TaskStatus class MAY include additional property definitions which are implementation-defined.

4.9.4 TaskStatusEnum

The TaskStatusEnum class is an enum class that enumerates the instances each of which expresses a status of task.

The TaskStatusEnum class has attribute values:

localNamespace

Value: icom_task

localName

Value: TaskStatusEnum

extendsFrom

Value: icom_task:TaskStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Status of a task.

instances

Value: <icom_task:NeedsAction, icom_task:InProgress, icom_task:Completed, icom_task:Cancelled>

ICOM defines four task status:

- **icom_task:NeedsAction** a task needs action.
- **icom_task:InProgress** a task is in progress.
- **icom_task:Completed** a task is completed.
- **icom_task:Cancelled** a task is cancelled.

4.9.5 TaskParticipantStatus

4.9.5.1 Description

A task participant status is a participant's response status for a task assignment.

4.9.5.2 Class Definition

The TaskParticipantStatus class is a mixin class which defines a participant's response status for a task assignment.

The TaskParticipantStatus class has attribute values:

localNamespace

Value: icom_task

localName

Value: TaskParticipantStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: TaskParticipantStatus is a mixin class which defines a participant's response status for a task assignment.

propertyDefinitions

The values for this attribute are defined in Section 4.9.5.3.

4.9.5.3 Property Definitions

The TaskParticipantStatus class MAY include additional property definitions which are implementation-defined.

4.9.6 TaskParticipantStatusEnum

The TaskParticipantStatusEnum class is an enum class that enumerates the instances each of which expresses a participant's response status for a task.

The TaskParticipantStatusEnum class has attribute values:

localNamespace

Value: icom_task

localName

Value: TaskParticipantStatusEnum

extendsFrom

Value: icom_task:TaskParticipantStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Participant's response status for a task.

instances

Value: <icom_task:NeedsAction, icom_task:Accepted, icom_task:Declined, icom_task:InProgress, icom_task:Completed, icom_task:WaitingOnOther, icom_task:Tentative, icom_task:Deferred>

ICOM defines eight task participant's status:

- **icom_task:NeedsAction** an assignee needs to act on a task.
- **icom_task:Accepted** an assignee accepted a task.
- **icom_task:Declined** an assignee declined a task.

- **icom_task:InProgress** a task is in progress.
- **icom_task:Completed** a task is completed.
- **icom_task:WaitingOnOther** an assignee is waiting on other.
- **icom_task:Tentative** an assignee is tentative about a task.
- **icom_task:Deferred** an assignee deferred a task.

4.9.7 TaskEditMode

4.9.7.1 Description

A task edit mode is a mode that indicates whether a task is editable.

4.9.7.2 Class Definition

The TaskEditMode class is a mixin class which defines a mode that indicates whether a task is editable. The TaskEditMode class has attribute values:

`localNamespace`

Value: icom_task

`localName`

Value: TaskEditMode

`extendsFrom`

Value:

`stereotype`

Value: mixin

`description`

Value: TaskEditMode is a mixin class which defines a mode that indicates whether task is editable.

`propertyDefinitions`

The values for this attribute are defined in Section 4.9.7.3.

4.9.7.3 Property Definitions

The TaskEditMode class MAY include additional property definitions which are implementation-defined.

4.9.8 TaskEditModeEnum

The TaskEditModeEnum class is an enum class that enumerates the instances each of which expresses an editable mode of a task.

The TaskEditModeEnum class has attribute values:

localNamespace

Value: icom_task

localName

Value: TaskEditModeEnum

extendsFrom

Value: icom_task:TaskEditMode

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A mode that indicates whether a task is editable.

instances

Value: <icom_task:OrganizerCopy, icom_task:AssigneeCopy>

ICOM defines two task editable modes:

- **icom_task:OrganizerCopy**: a task is a copy created by an organizer who may update the properties such as start time, due time.
- **icom_task:AssigneeCopy**: a task is a copy delivered to an assignee who may only update the assignee properties such as completion time, participant status, percent completed.

4.10 Forum Module

4.10.1 Discussion

4.10.1.1 Description

A discussion is an item in a discussion container.

4.10.1.2 Class Definition

The Discussion class is a mixin class that defines the characteristics of artifacts that can be elements of discussion containers.

The Discussion class has attribute values:

localNamespace

Value: icom_forum

localName

Value: Discussion

extendsFrom

Value: icom_core:Item

stereotype

Value: mixin

description

Value: Discussion is a mixin class that defines the characteristics of artifacts that can be placed in a discussion container.

propertyDefinitions

The values for this attribute are defined in Section 4.10.1.3.

4.10.1.3 Property Definitions

The Discussion class inherits property definitions from super classes.

The Discussion class MUST have the property definition:

icom_forum:inReplyTo

Description:	Another discussion object that a discussion object is replying to.
Required:	False
Inherited:	False
Property Type:	icom_forum:Discussion
Cardinality:	Single
Updatability:	Read Write

The Discussion class MAY include additional property definitions which are implementation-defined.

4.10.2 DiscussionContainer

4.10.2.1 Description

A discussion container contains discussion items.

4.10.2.2 Class Definition

The DiscussionContainer class is a mixin class that defines the characteristics of folders that contain Discussion items.

The DiscussionContainer class has attribute values:

localNamespace

Value: icom_forum

localName

Value: DiscussionContainer

extendsFrom

Value: icom_core:Container

stereotype

Value: mixin

description

Value: DiscussionContainer is a mixin class that defines the characteristics of folders that contain Discussion items.

propertyDefinitions

The values for this attribute are defined in Section 4.10.2.3.

4.10.2.3 Property Definitions

The DiscussionContainer class inherits property definitions from super classes.

The DiscussionContainer class MUST have the property definition:

icom_core:element

Description:	Elements of a discussion container.
Required:	False
Inherited:	True
Property Type:	icom_forum:Discussion
Cardinality:	Multi
Updatability:	Read Only

The DiscussionContainer class MAY include additional property definitions which are implementation-defined.

4.10.3 DiscussionMessage

4.10.3.1 Description

A discussion message is a message in a forum discussion thread.

4.10.3.2 Class Definition

The DiscussionMessage class has attribute values:

localNamespace

Value: icom_forum

localName

Value: DiscussionMessage

extendsFrom

Value: icom_msg:Message, icom_forum:Discussion

stereotype

Value: primary

description

Value: Discussion message is a message in a forum discussion thread.

propertyDefinitions

The values for this attribute are defined in Section 4.10.3.3.

4.10.3.3 Property Definitions

The DiscussionMessage class inherits property definitions from super classes.

The DiscussionMessage class MUST have the property definition:

icom_forum:inReplyTo

Description:	Another discussion message that a discussion message is replying to.
Required:	False
Inherited:	True
Property Type:	icom_forum:DiscussionMessage
Cardinality:	Single
Updatability:	Read Write

The DiscussionMessage class MAY include additional property definitions which are implementation-defined.

4.10.4 TopicContainer

4.10.4.1 Description

A topic container contains topics.

4.10.4.2 Class Definition

The TopicContainer class is a mixin class which defines the characteristics of folders that contain Topics.

The TopicContainer class has attribute values:

localNamespace

Value: icom_forum

localName

Value: TopicContainer

extendsFrom

Value: icom_core:Container

stereotype

Value: mixin

description

Value: TopicContainer is a mixin class that defines the characteristics of folders that contain topics.

propertyDefinitions

The values for this attribute are defined in Section 4.10.4.3.

4.10.4.3 Property Definitions

The TopicContainer class inherits property definitions from super classes.

The TopicContainer class MUST have the property definitions:

icom_core:element

Description:	Elements of a topic container.
Required:	False
Inherited:	True
Property Type:	icom_forum:Topic
Cardinality:	Multi
Updatability:	Read Only

The TopicContainer class MAY include additional property definitions which are implementation-defined.

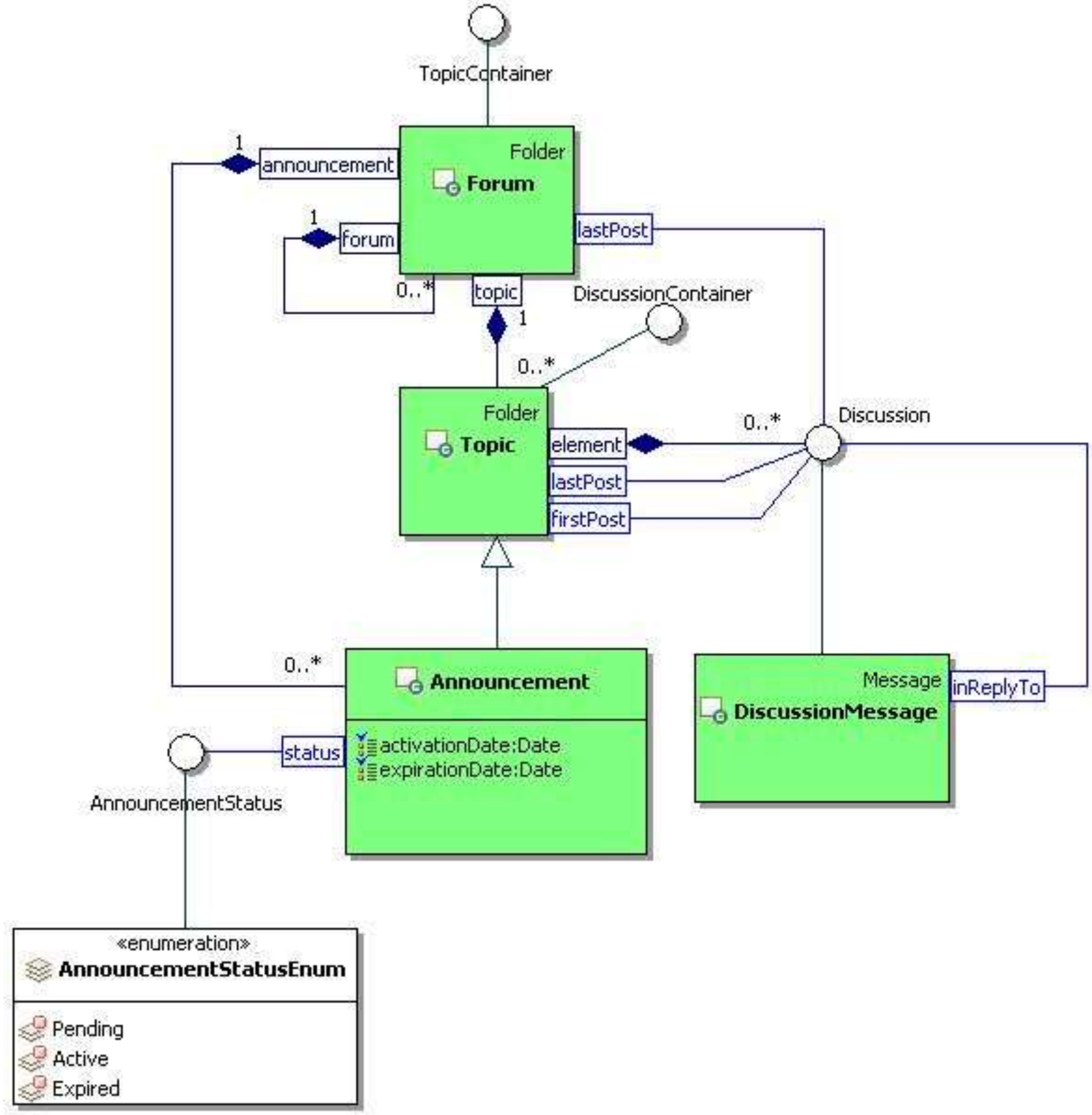

Figure 42: Forum Class Diagram.

4.10.5 Forum

4.10.5.1 Description

A forum contains sub-forums, topics, and announcements.

4.10.5.2 Class Definition

The Forum class has attribute values:

`localNamespace`

Value: icom_forum

localName

Value: Forum

extendsFrom

Value: icom_core:Folder, icom_forum:TopicContainer

stereotype

Value: primary

description

Value: A forum contains sub-forums, topics, and announcements.

propertyDefinitions

The values for this attribute are defined in Section 4.10.5.3.

4.10.5.3 Property Definitions

The Forum class inherits property definitions from super classes.

The Forum class MUST have the property definitions:

icom_forum:lastPost

Description:	The last posted discussion in a forum.
Required:	False
Inherited:	False
Property Type:	icom_forum:Discussion
Cardinality:	Single
Updatability:	Read Only

icom_forum:forum

Description:	Sub-forums of a forum.
Required:	False
Inherited:	False
Property Type:	icom_forum:Forum
Cardinality:	Multi
Updatability:	Read Only

icom_forum:topic

Description:	Topics of a forum.
Required:	False
Inherited:	False
Property Type:	icom_forum:Topic
Cardinality:	Multi
Updatability:	Read Only

icom_forum:announcement

Description:	Announcements of a forum.
Required:	False
Inherited:	False
Property Type:	icom_forum:Announcement
Cardinality:	Multi
Updatability:	Read Only

The Forum class MAY include additional property definitions which are implementation-defined.

4.10.6 Topic

4.10.6.1 Description

A topic contains conversations among forum participants. The discussions in a topic may be sorted in chronological order or threaded by reply.

4.10.6.2 Class Definition

The Topic class has attribute values:

localNamespace

Value: icom_forum

localName

Value: Topic

extendsFrom

Value: icom_core:Folder, icom_forum:DiscussionContainer

stereotype

Value: primary

description

Value: A topic contains discussion threads.

propertyDefinitions

The values for this attribute are defined in Section 4.10.6.3.

4.10.6.3 Property Definitions

The Topic class inherits property definitions from super classes.

The Topic class MUST have the property definitions:

icom_core:element

Description:	Elements of a topic.

Required:	False
Inherited:	True
Property Type:	icom_forum:Discussion
Cardinality:	Multi
Updatability:	Read Only

icom_forum:firstPost

Description:	The first posted discussion in a topic.
Required:	False
Inherited:	False
Property Type:	icom_forum:Discussion
Cardinality:	Single
Updatability:	Read Only

icom_forum:lastPost

Description:	The last posted discussion in a topic.
Required:	False
Inherited:	False
Property Type:	icom_forum:Discussion
Cardinality:	Single
Updatability:	Read Only

The Topic class MAY include additional property definitions which are implementation-defined.

4.10.7 Announcement

4.10.7.1 Description

An announcement contains time-sensitive discussion posts that are valid for a specified period of time, depending on activation and expiration times.

4.10.7.2 Class Definition

The Announcement class has attribute values:

`localNamespace`

Value: icom_forum

`localName`

Value: Announcement

`extendsFrom`

Value: icom_forum:Topic

stereotype

Value: primary

description

Value: An announcement contains discussion items that are valid for a specified period of time.

propertyDefinitions

The values for this attribute are defined in Section 4.10.7.3.

4.10.7.3 Property Definitions

The Announcement class inherits property definitions from super classes.
The Announcement class MUST have the property definitions:

icom_forum:activationDate

Description:	Date and time when an announcement becomes active.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_forum:expirationDate

Description:	Date and time when an announcement expires.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_forum:announcementStatus

Description:	Status of an announcement.
Required:	True
Inherited:	False
Property Type:	icom_forum:AnnouncementStatus
Cardinality:	Single
Updatability:	Read Write

The Announcement class MAY include additional property definitions which are implementation-defined.

4.10.8 AnnouncementStatus

4.10.8.1 Description

An announcement status is status of an announcement.

4.10.8.2 Class Definition

The AnnouncementStatus class is a mixin class which defines status of an announcement.

The AnnouncementStatus class has attribute values:

localNamespace

Value: icom_forum

localName

Value: AnnouncementStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: AnnouncementStatus is a mixin class which defines status of an announcement.

propertyDefinitions

The values for this attribute are defined in Section 4.10.8.3.

4.10.8.3 Property Definitions

The AnnouncementStatus class MAY include additional property definitions which are implementation-defined.

4.10.9 AnnouncementStatusEnum

The AnnouncementStatusEnum class is an enum class that enumerates the instances each of which expresses a status of announcement.

The AnnouncementStatusEnum class has attribute values:

localNamespace

Value: icom_forum

localName

Value: AnnouncementStatusEnum

extendsFrom

Value: icom_forum:AnnouncementStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Status of announcement.

instances

Value: <icom_forum:Pending, icom_forum:Active, icom_forum:Expired>

ICOM defines three announcement status:

- **icom_forum:Pending** an announcement is pending.
- **icom_forum:Active** an announcement is active.
- **icom_forum:Expired** an announcement is expired.

4.11 Conference Module

4.11.1 Conference

4.11.1.1 Description

A conference is a container that represents a durable context for conference sessions. It contains conference metadata, settings, and transcripts.

4.11.1.2 Class Definition

The Conference class has attribute values:

localNamespace

Value: icom_conf

localName

Value: Conference

extendsFrom

Value: icom_core:Folder

stereotype

Value: primary

`description`

Value: A conference represents a durable context for online conference sessions.

`propertyDefinitions`

The values for this attribute are defined in Section 4.11.1.3.

4.11.1.3 Property Definitions

The Conference class inherits property definitions from super classes.

The Conference class MUST have the property definitions:

icom_core:organizer

Description:	Organizer of a conference.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Single
Updatability:	On Create

icom_conf:conferenceType

Description:	Type of a conference.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceType
Cardinality:	Single
Updatability:	Read Write

icom_conf:conferenceStatus

Description:	Status of a conference.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceStatus
Cardinality:	Single
Updatability:	Read Only

icom_conf:runningSession

Description:	Current session of a conference.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceSession
Cardinality:	Single
Updatability:	Read Only

icom_conf:conferenceSetting

Description:	Configurable settings of a conference.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceSetting
Cardinality:	Single
Updatability:	Read Only

icom_conf:transcript

Description:	Transcripts from ended sessions of a conference.
Required:	False
Inherited:	False
Property Type:	icom_doc:Document
Cardinality:	Multi
Updatability:	Read Write

icom_conf:scheduledStartDate

Description:	Scheduled start date and time of a conference session.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

icom_conf:scheduledEndDate

Description:	Scheduled end date and time of a conference session.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Write

The Conference class MAY include additional property definitions which are implementation-defined.

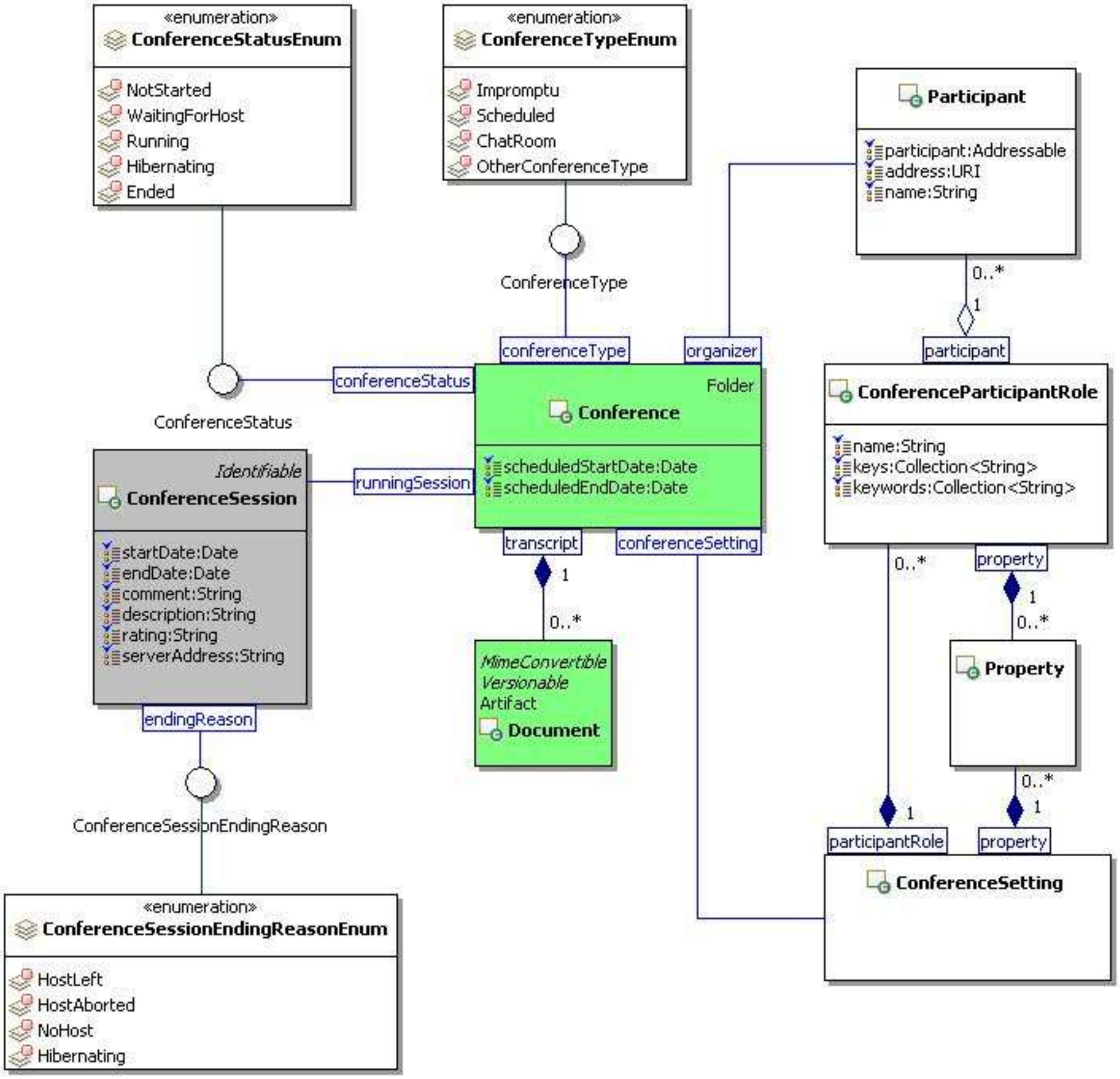

Figure 43: Conference Class Diagram.

4.11.2 ConferenceType

4.11.2.1 Description

A conference type represents a category of conferences.

4.11.2.2 Class Definition

The ConferenceType class is a mixin class which defines a type of conference.

The ConferenceType class has attribute values:

`localNamespace`

Value: icom_conf

localName

Value: ConferenceType

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ConferenceType is a mixin class which defines type of conference.

propertyDefinitions

The values for this attribute are defined in Section 4.11.2.3.

4.11.2.3 Property Definitions

The ConferenceType class MAY include additional property definitions which are implementation-defined.

4.11.3 ConferenceTypeEnum

The ConferenceTypeEnum class is an enum class that enumerates the instances each of which expresses a type of a conference.

The ConferenceTypeEnum class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceTypeEnum

extendsFrom

Value: icom_conf:ConferenceType

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: A type of a conference.

instances

Value: <icom_conf:Impromptu, icom_conf:Scheduled, icom_conf:ChatRoom, icom_conf:OtherConferenceType>

ICOM defines four conference types:

- **icom_conf:Impromptu** a conference session is started impromptu.
- **icom_conf:Scheduled** a conference session is scheduled.
- **icom_conf:ChatRoom** a conference is used for a chat room.
- **icom_conf:OtherConferenceType** a conference is of other type.

4.11.4 ConferenceStatus

4.11.4.1 Description

A conference status is status of an online conference.

4.11.4.2 Class Definition

The ConferenceStatus class is a mixin class which defines status of an online conference.

The ConferenceStatus class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceStatus

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ConferenceStatus is a mixin class which defines status of an online conference.

propertyDefinitions

The values for this attribute are defined in Section 4.11.4.3.

4.11.4.3 Property Definitions

The ConferenceStatus class MAY include additional property definitions which are implementation-defined.

4.11.5 ConferenceStatusEnum

The ConferenceStatusEnum class is an enum class that enumerates the instances each of which expresses a status of a conference.

The ConferenceStateEnum class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceStatusEnum

extendsFrom

Value: icom_conf:ConferenceStatus

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Status of a conference.

instances

Value: <icom_conf:NotStarted, icom_conf:WaitingForHost, icom_conf:Running, icom_conf:Hibernating, icom_conf:Ended>

ICOM defines five conference status:

- **icom_conf:NotStarted** a conference session is not started .
- **icom_conf:WaitingForHost** a conference session is waiting for a host.
- **icom_conf:Running** a conference session is running.
- **icom_conf:Hibernating** a conference session is hibernating.
- **icom_conf:Ended** a conference session is ended.

4.11.6 ConferenceSession

4.11.6.1 Description

A conference session represents the metadata for a session of a conference.

4.11.6.2 Class Definition

The ConferenceSession class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceSession

extendsFrom

Value: icom_core:Identifiable

stereotype

Value: primary

description

Value: A conference session represents the metadata for a session of a conference.

propertyDefinitions

The values for this attribute are defined in Section 4.11.6.3.

4.11.6.3 Property Definitions

The ConferenceSession class inherits property definitions from super classes.

The ConferenceSession class MUST have the property definitions:

icom_core:description

Description:	Description of a conference session.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:startDate

Description:	Start date and time of a conference session.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_core:endDate

Description:	End date and time of a conference session.
Required:	False
Inherited:	False
Property Type:	DateTime
Cardinality:	Single
Updatability:	Read Only

icom_conf:comment

Description:	Comment on a conference session.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_conf:rating

Description:	Rating of a conference session.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_conf:serverAddress

Description:	Address of a server that hosts a conference session.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Only

icom_conf:endingReason

Description:	Reason for ending a conference session.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceSessionEndingReason
Cardinality:	Single
Updatability:	Read Only

The ConferenceSession class MAY include additional property definitions which are implementation-defined.

4.11.7 ConferenceSessionEndingReason

4.11.7.1 Description

A conference session ending reason is an indication of how a conference session ended.

4.11.7.2 Class Definition

The ConferenceSessionEndingReason class is a mixin class which defines an indication of how a conference session ended.

The ConferenceSessionEndingReason class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceSessionEndingReason

extendsFrom

Value:

stereotype

Value: mixin

description

Value: ConferenceSessionEndingReason is a mixin class which defines an indication of how a conference session ended.

propertyDefinitions

The values for this attribute are defined in Section 4.11.7.3.

4.11.7.3 Property Definitions

The ConferenceSessionEndingReason class MAY include additional property definitions which are implementation-defined.

4.11.8 ConferenceSessionEndingReasonEnum

The ConferenceSessionEndingReasonEnum class is an enum class that enumerates the instances each of which expresses a reason for ending a conference session.

The ConferenceSessionEndingReasonEnum class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceSessionEndingReasonEnum

extendsFrom

Value: icom_conf:ConferenceSessionEndingReason

stereotype

Value: primary

isEnumeration

Value: TRUE

description

Value: Reason for ending a conference session.

instances

Value: <icom_conf:HostLeft, icom_conf:HostAborted, icom_conf:NoHost, icom_conf:Hibernating>

ICOM defines four conference session states:

- **icom_conf:HostLeft** a conference session ended after the host left.
- **icom_conf:HostAborted** a conference session ended after the host aborted it.
- **icom_conf:NoHost** a conference session ended due to no one hosting.
- **icom_conf:Hibernating** a conference session is hibernating.

4.11.9 ConferenceSetting

4.11.9.1 Description

A conference setting represents configuration settings for sessions of a conference.

4.11.9.2 Class Definition

The ConferenceSetting class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceSetting

extendsFrom

Value:

stereotype

Value: primary

description

Value: A conference setting represents configuration settings for sessions of a conference.

propertyDefinitions

The values for this attribute are defined in Section 4.11.9.3.

4.11.9.3 Property Definitions

The ConferenceSetting class inherits property definitions from super classes.

The ConferenceSetting class MUST have the property definitions:

icom_meta:property

Description:	Configurable properties for a conference.
Required:	False
Inherited:	False
Property Type:	icom_meta:property
Cardinality:	Multi
Updatability:	Read Write

icom_conf:participantRole

Description:	Role settings for conference participants.
Required:	False
Inherited:	False
Property Type:	icom_conf:ConferenceParticipantRole
Cardinality:	Multi
Updatability:	Read Write

The ConferenceSetting class MAY include additional property definitions which are implementation-defined.

4.11.10 ConferenceParticipantRole

4.11.10.1 Description

A conference participant role defines roles settings for a conference participant.

4.11.10.2 Class Definition

The ConferenceParticipantRole class has attribute values:

localNamespace

Value: icom_conf

localName

Value: ConferenceParticipantRole

extendsFrom

Value:

stereotype

Value: primary

description

Value: A conference participant role contains roles settings for a conference.

propertyDefinitions

The values for this attribute are defined in Section 4.11.10.3.

4.11.10.3 Property Definitions

The ConferenceParticipantRole class MUST have the property definitions:

icom_core:name

Description:	Name of a role setting in a conference.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Single
Updatability:	Read Write

icom_core:participant

Description:	One or more participants in a role setting.
Required:	False
Inherited:	False
Property Type:	icom_core:Participant
Cardinality:	Multi
Updatability:	Read Write

icom_meta:property

Description:	Configurable properties for a role setting.
Required:	False
Inherited:	False
Property Type:	icom_meta:Property
Cardinality:	Multi
Updatability:	Read Write

icom_conf:key

Description:	One or more sign on keys to activate a role setting.
Required:	False
Inherited:	False

Property Type:	String
Cardinality:	Multi
Updatability:	Read Write

icom_conf:keyword

Description:	One or more key words to activate a role setting.
Required:	False
Inherited:	False
Property Type:	String
Cardinality:	Multi
Updatability:	Read Write

The ConferenceParticipantRole class MAY include additional property definitions which are implementation-defined.

5 Conformance

5.1 Software Architecture or Framework Dependence

The ICOM specification does not presume a particular software architecture or framework for use of the ICOM model.

Fulfillment of ICOM use case roles and accompanying responsibilities is implementation dependent.

5.2 Platform Provider Conformance

5.2.1 Platform Provider Conformance – No Extension Modules

An ICOM platform provider with no extension modules (Section 4):

a. SHALL conform to all mandatory statements and

b. MAY conform to optional statements

of the core ICOM model as defined in Section 3 of this standard.

5.2.2 Platform Provider Conformance – One or More Extension Modules

An ICOM platform provider with extension modules (Section 4):

a. SHALL conform to Section 5.2.1 and

b. SHALL conform to all mandatory statements and

c. MAY conform to optional statements

as defined in Section 4 for each extension module.

5.3 Service Provider Conformance

5.3.1 ICOM Service Provider – No Extension Modules

An ICOM service provider may provide one or more services defined in Section 3. For each such service provided, an ICOM service provider:

a. SHALL conform to all mandatory statements and

b. MAY conform to optional statements

for the classes, super classes, and related classes defined in Section 3 of this standard.

5.3.2 ICOM Service Provider – One or More Extension Modules

An ICOM service provider MAY support one or more extension modules as defined in Section 4 of this standard. For each service provided, an ICOM service provider:

a. SHALL conform to Section 5.3.1 (if an offered service is defined in Section 3) and

b. SHALL conform to all mandatory statements and

c. MAY conform to optional statements

as defined in Section 4 for that extension module.

5.4 ICOM Producer Conformance

5.4.1 ICOM Producer Conformance – No Extension Modules

An ICOM producer that produces no objects of a class conforming to Section 4:

a. SHALL conform to all mandatory statements and
b. MAY conform to optional statements

for the class and super classes thereof in Section 3 of this standard, for any object produced.

5.4.2 ICOM Producer Conformance – One or More Extension Modules

An ICOM producer that produces objects of a class conforming to Section 4:

a. SHALL conform to Section 5.4.1 and
b. SHALL conform to all mandatory statements and
c. MAY conform to optional statements

as defined in Section 4 for that extension module.

5.5 ICOM Consumer Conformance

5.5.1 ICOM Consumer Conformance – No Extension Modules

An ICOM consumer that consumes no objects of a class conforming to Section 4:

a. SHALL conform to all mandatory statements and
b. MAY conform to optional statements

for the class and super classes thereof in Section 3 of this standard, for any object consumed.

5.5.2 ICOM Consumer Conformance – Extension Modules

An ICOM consumer that consumes objects of a class conforming to Section 4:

a. SHALL conform to Section 5.5.1 and
b. SHALL conform to all mandatory statements and
c. MAY conform to optional statements

as defined in Section 4 for that extension module.

Appendix A. Acknowledgements

The following individuals have participated in the creation of this specification and are gratefully acknowledged:

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Appendix B. Revision History

Revision	Date	Editor	Changes Made
CSPRD 01	March 16, 2011	Eric S. Chan Patrick Durusau	Committee Specification Draft for Public Review
CSPRD 02	November 8, 2011	Eric S. Chan Patrick Durusau	Changes in response to public review comments.
CSPRD 03	March 20, 2012	Eric S. Chan Patrick Durusau Laura Dragan	Changes in response to TC members review comments.
CSPRD 04	June 26, 2012	Ken Baclawski	Add 4 additional attributes from grammar to PropertyDefinition metadata model, corrected spelling of Cardinality, renamed the address property of Addressable to entityAddress to avoid clashing with the address properties of EntityAddress and Participant, and specified the omitted namespaces of the superCategories of some of the enumerations.
CSPRD 05	October 15, 2012	Ken Baclawski Eric S. Chan Patrick Durusau	Change InstantMessage isAbstract to false, change PropertyType to optional in PropertyDefinition, change cardinality of superCategory property in Category to multi, add ClassDefinition, StereoType, StereoTypeEnum in icom_meta, add Figure 18 ClassDefinition UML diagram, remove EntityDefinition in icom_core. Updated the conformance clauses in Section 5.