

Appendix

Axioms of General Legal Entity Identifier Ontology (GLEIO)

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Axioms are expressed in Description Logic with expressivity: SHIQ(D), i.e., it is allowed to use: complement of any concept, concept intersection, universal restrictions, limited existential quantification, role (binary predicate) hierarchy, transitive and inverse relations, qualified cardinality restrictions and use of datatype properties, data values or data types.

Classes

Address

Address $\sqsubseteq = 1$ hasCountry Country
Address $\sqsubseteq \geq 0$ hasPostalCode $\sqcap \leq 1$ hasPostalCode
Address \sqsubseteq GeographicalLocation
Address $\sqsubseteq \geq 0$ hasSubdivision Subdivision $\sqcap \leq 1$ hasSubdivision Subdivision
Address $\sqsubseteq = 1$ hasStreetAddress
Address $\sqsubseteq = 1$ hasCity

BusinessLegalEntityIDManifestation

BusinessLegalEntityIDManifestation $\sqsubseteq = 1$ isManifestationOf BusinessLegalEntityIdentifier
BusinessLegalEntityIDManifestation \sqsubseteq VariableEntityManifestation
BusinessLegalEntityIDManifestation $\sqsubseteq \geq 0$ hasBusinessIdentifierCode $\sqcap \leq 1$ hasBusinessIdentifierCode

BusinessLegalEntityIdentifier

BusinessLegalEntityIdentifier $\sqsubseteq = 1$ isRegisteredBy BusinessRegister
BusinessLegalEntityIdentifier \sqsubseteq LegalEntityIdentifier

BusinessRegister

BusinessRegister \sqsubseteq RegistrationAuthority

Country

Country \sqsubseteq GeographicalLocation
Country $\sqsubseteq = 1$ hasISOCCode

GLEIManifestation

GLEIManifestation \sqsubseteq VariableEntityManifestation

GLEIManifestation $\sqsubseteq \geq 0$ hasGLEICode $\sqcap \leq 1$ hasGLEICode

GLEIManifestation $\sqsubseteq \geq 0$ hasSuccessorGLEI GlobalLegalEntityIdentifier $\sqcap \leq 1$ hasSuccessorGLEI GlobalLegalEntityIdentifier

GLEIManifestation $\sqsubseteq = 1$ hasNextRenewalDate

GLEIManifestation $\sqsubseteq = 1$ isManifestationOf GlobalLegalEntityIdentifier

GLEIManifestation $\sqsubseteq = 1$ hasGLEIRegistrationStatus RegistrationStatus

GLEIManifestation $\sqsubseteq \geq 0$ hasValidationSource ValidationSource $\sqcap \leq 1$ hasValidationSource ValidationSource

GLEIQualitativeValue

GLEIQualitativeValue \sqsubseteq QualitativeValue

GeographicalLocation

GeographicalLocation \sqsubseteq NonVariableEntity

GeographicalLocation $\sqsubseteq \neg$ VariableEntityManifestation

GeographicalLocation $\sqsubseteq \neg$ QualitativeValue

GlobalLegalEntityIdentifier

GlobalLegalEntityIdentifier $\sqsubseteq = 1$ identifies LegalEntity

GlobalLegalEntityIdentifier $\sqsubseteq = 1$ hasLastManifestation GLEIManifestation

GlobalLegalEntityIdentifier $\sqsubseteq = 1$ hasInitialRegistrationDate

GlobalLegalEntityIdentifier \sqsubseteq LegalEntityIdentifier

GlobalLegalEntityIdentifier $\sqsubseteq = 1$ isRegisteredBy LocalOperatingUnit

LOUManifestation

LOUManifestation \sqsubseteq LegalEntityManifestation

LegalEntity

LegalEntity \sqsubseteq VariableEntity

LegalEntity $\sqsubseteq = 1$ hasLastManifestation LegalEntityManifestation

LegalEntity $\sqsubseteq \neg$ LegalEntityIdentifier

LegalEntityExpirationReason

LegalEntityExpirationReason \sqsubseteq LegalEntityQualitativeValue

LegalEntityIdentifier

LegalEntityIdentifier \sqsubseteq VariableEntity

LegalEntityIdentifier $\sqsubseteq \neg$ LegalEntity

LegalEntityManifestation

LegalEntityManifestation $\sqsubseteq \geq 0$ hasLegalFormAbbreviation $\sqcap \leq 1$ hasLegalFormAbbreviation
LegalEntityManifestation $\sqsubseteq \geq 0$ isIdentifiedBy BusinessLegalEntityIdentifier $\sqcap \leq 1$ isIdentifiedBy BusinessLegalEntityIdentifier
LegalEntityManifestation $\sqsubseteq \geq 0$ hasExpirationReason LegalEntityExpirationReason $\sqcap \leq 1$ hasExpirationReason LegalEntityExpirationReason
LegalEntityManifestation $\sqsubseteq = 1$ hasAddressOfLegalFormation Address
LegalEntityManifestation $\sqsubseteq \geq 0$ isIdentifiedBy GlobalLegalEntityIdentifier
LegalEntityManifestation $\sqsubseteq \geq 0$ hasExpirationDate $\sqcap \leq 1$ hasExpirationDate
LegalEntityManifestation $\sqsubseteq = 1$ hasLegalName
LegalEntityManifestation $\sqsubseteq \geq 0$ hasAutoTransliteratedLegalName
LegalEntityManifestation \sqsubseteq VariableEntityManifestation
LegalEntityManifestation $\sqsubseteq \geq 0$ hasPreferredTransliteratedLegalName
LegalEntityManifestation $\sqsubseteq \geq 0$ hasSuccessorLegalEntity LegalEntity $\sqcap \leq 1$ hasSuccessorLegalEntity LegalEntity
LegalEntityManifestation $\sqsubseteq = 1$ hasHeadquartersAddress Address
LegalEntityManifestation $\sqsubseteq = 1$ hasLegalEntityStatus LegalEntityStatus
LegalEntityManifestation $\sqsubseteq \geq 0$ hasAssociatedEntity LegalEntity
LegalEntityManifestation $\sqsubseteq \geq 0$ hasLegalJurisdiction (Country \sqcup Subdivision) $\sqcap \leq 1$ hasLegalJurisdiction (Country \sqcup Subdivision)
LegalEntityManifestation $\sqsubseteq = 1$ isManifestationOf LegalEntity

LegalEntityQualitativeValue

LegalEntityQualitativeValue \sqsubseteq QualitativeValue

LegalEntityStatus

LegalEntityStatus \sqsubseteq LegalEntityQualitativeValue

LocalOperatingUnit

LocalOperatingUnit \sqsubseteq RegistrationAuthority
LocalOperatingUnit $\sqsubseteq = 1$ isIdentifiedBy GlobalLegalEntityIdentifier

NonVariableEntity

NonVariableEntity $\sqsubseteq \neg$ VariableEntity

QualitativeValue

QualitativeValue \sqsubseteq NonVariableEntity
QualitativeValue $\sqsubseteq \neg$ VariableEntityManifestation
QualitativeValue $\sqsubseteq \neg$ GeographicalLocation

RegistrationAuthority

RegistrationAuthority \sqsubseteq LegalEntity

RegistrationStatus

RegistrationStatus \sqsubseteq GLEIQualitativeValue

Subdivision

Subdivision \sqsubseteq GeographicalLocation

Subdivision $\sqsubseteq = 1$ hasISOCODE

ValidationSource

ValidationSource \sqsubseteq GLEIQualitativeValue

VariableEntity

VariableEntity $\sqsubseteq \exists$ hasLastManifestation VariableEntityManifestation

VariableEntity $\sqsubseteq \neg$ NonVariableEntity

VariableEntityManifestation

VariableEntityManifestation \sqsubseteq NonVariableEntity

VariableEntityManifestation $\sqsubseteq = 1$ isManifestationOf VariableEntity

VariableEntityManifestation $\sqsubseteq \exists$ hasUpdateDate Datatypehttp://www.w3.org/2001/XMLSchema#dateTime

VariableEntityManifestation $\sqsubseteq \neg$ QualitativeValue

VariableEntityManifestation $\sqsubseteq \neg$ GeographicalLocation

Object properties

hasAddress

hasAddress \sqsubseteq hasLocation

\exists hasAddress Thing \sqsubseteq LegalEntityManifestation

\top $\sqsubseteq \forall$ hasAddress Address

hasAddressOfLegalFormation

hasAddressOfLegalFormation \sqsubseteq hasAddress

\top $\sqsubseteq \leq 1$ hasAddressOfLegalFormation Thing

\exists hasAddressOfLegalFormation Thing \sqsubseteq LegalEntityManifestation

\top $\sqsubseteq \forall$ hasAddressOfLegalFormation Address

hasAssociatedEntity

hasAssociatedEntity \sqsubseteq topObjectProperty
 \exists hasAssociatedEntity Thing \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasAssociatedEntity LegalEntity

hasCountry

hasCountry \sqsubseteq isPartOf
 \exists hasCountry Thing \sqsubseteq Address
 $\top \sqsubseteq \forall$ hasCountry Country

hasExpirationReason

hasExpirationReason \sqsubseteq hasQualitativeValue
 $\top \sqsubseteq \leq 1$ hasExpirationReason Thing
 \exists hasExpirationReason Thing \sqsubseteq Country \sqcup Subdivision
 $\top \sqsubseteq \forall$ hasExpirationReason LegalEntityExpirationReason

hasFundFamily

hasFundFamily \sqsubseteq hasAssociatedEntity

hasFundManager

hasFundManager \sqsubseteq hasAssociatedEntity

hasGLEIRegistrationStatus

hasGLEIRegistrationStatus \sqsubseteq hasQualitativeValue
 $\top \sqsubseteq \leq 1$ hasGLEIRegistrationStatus Thing
 \exists hasGLEIRegistrationStatus Thing \sqsubseteq GLEIManifestation
 $\top \sqsubseteq \forall$ hasGLEIRegistrationStatus RegistrationStatus

hasHeadquartersAddress

hasHeadquartersAddress \sqsubseteq hasAddress
 $\top \sqsubseteq \leq 1$ hasHeadquartersAddress Thing
 \exists hasHeadquartersAddress Thing \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasHeadquartersAddress Address

hasLastManifestation

hasLastManifestation \sqsubseteq hasManifestation
hasLastManifestation \equiv isLastManifestationOf⁻
 $\top \sqsubseteq \leq 1$ hasLastManifestation Thing

hasLegalEntityStatus

hasLegalEntityStatus \sqsubseteq hasQualitativeValue
 $\top \sqsubseteq \leq 1$ hasLegalEntityStatus Thing
 \exists hasLegalEntityStatus Thing \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasLegalEntityStatus LegalEntityStatus

hasLegalJurisdiction

hasLegalJurisdiction \sqsubseteq hasLocation
 $\top \sqsubseteq \leq 1$ hasLegalJurisdiction Thing
 \exists hasLegalJurisdiction Thing \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasLegalJurisdiction (Country \sqcup Subdivision)

hasLocation

hasLocation \sqsubseteq topObjectProperty

hasManifestation

hasManifestation \equiv isManifestationOf⁻
 \exists hasManifestation Thing \sqsubseteq VariableEntity
 $\top \sqsubseteq \forall$ hasManifestation VariableEntityManifestation

hasPredecessorEntityManifestation

$\top \sqsubseteq \leq 1$ hasPredecessorEntityManifestation Thing
 \exists hasPredecessorEntityManifestation Thing \sqsubseteq VariableEntityManifestation
 $\top \sqsubseteq \forall$ hasPredecessorEntityManifestation VariableEntityManifestation

hasQualitativeValue

$\top \sqsubseteq \forall$ hasQualitativeValue QualitativeValue

hasSubdivision

hasSubdivision \sqsubseteq isPartOf
 \exists hasSubdivision Thing \sqsubseteq Address
 $\top \sqsubseteq \forall$ hasSubdivision Subdivision

hasSuccessorEntity

hasSuccessorEntity \sqsubseteq topObjectProperty

hasSuccessorGLEI

hasSuccessorGLEI \sqsubseteq hasSuccessorEntity
 $\top \sqsubseteq \leq 1$ hasSuccessorGLEI Thing

\exists hasSuccessorGLEI Thing \sqsubseteq GLEIManifestation
 $\top \sqsubseteq \forall$ hasSuccessorGLEI GlobalLegalEntityIdentifier

hasSuccessorLegalEntity

hasSuccessorLegalEntity \sqsubseteq hasSuccessorEntity
 $\top \sqsubseteq \leq 1$ hasSuccessorLegalEntity Thing
 \exists hasSuccessorLegalEntity Thing \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasSuccessorLegalEntity LegalEntity

hasValidationSource

hasValidationSource \sqsubseteq hasQualitativeValue
 $\top \sqsubseteq \leq 1$ hasValidationSource Thing
 \exists hasValidationSource Thing \sqsubseteq GLEIManifestation
 $\top \sqsubseteq \forall$ hasValidationSource ValidationSource

identifies

identifies \equiv isIdentifiedBy⁻
 \exists identifies Thing \sqsubseteq LegalEntityIdentifier
 $\top \sqsubseteq \forall$ identifies (LegalEntity \sqcup LegalEntityManifestation)

isIdentifiedBy

identifies \equiv isIdentifiedBy⁻
 \exists isIdentifiedBy Thing \sqsubseteq LegalEntity \sqcup LegalEntityManifestation
 $\top \sqsubseteq \forall$ isIdentifiedBy LegalEntityIdentifier

isLastManifestationOf

isLastManifestationOf \sqsubseteq isManifestationOf
hasLastManifestation \equiv isLastManifestationOf⁻

isManifestationOf

hasManifestation \equiv isManifestationOf⁻
 \exists isManifestationOf Thing \sqsubseteq VariableEntityManifestation
 $\top \sqsubseteq \forall$ isManifestationOf VariableEntity

isPartOf

TransitivePropertyisPartOf

isRegisteredBy

$\top \sqsubseteq \leq 1$ isRegisteredBy Thing
 \exists isRegisteredBy Thing \sqsubseteq LegalEntityIdentifier
 $\top \sqsubseteq \forall$ isRegisteredBy RegistrationAuthority

topObjectProperty

Data properties

hasAutoTransliteratedLegalName

hasAutoTransliteratedLegalName \sqsubseteq hasLegalName
 \exists hasAutoTransliteratedLegalName Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasAutoTransliteratedLegalName Datatypehttp://www.w3.org/1999/02/22-rdf-syntax-ns#PlainLiteral

hasBusinessIdentifierCode

hasBusinessIdentifierCode \sqsubseteq hasCode
 \exists hasBusinessIdentifierCode Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq BusinessLegalEntityID-Manifestation
 $\top \sqsubseteq \forall$ hasBusinessIdentifierCode Datatypehttp://www.w3.org/2001/XMLSchema#string

hasCity

\exists hasCity Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq Address
 $\top \sqsubseteq \forall$ hasCity Datatypehttp://www.w3.org/1999/02/22-rdf-syntax-ns#PlainLiteral

hasCode

hasCode \sqsubseteq topDataProperty

hasDate

hasDate \sqsubseteq topDataProperty

hasExpirationDate

hasExpirationDate \sqsubseteq hasDate
 $\top \sqsubseteq \leq 1$ hasExpirationDate
 \exists hasExpirationDate Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasExpirationDate Datatypehttp://www.w3.org/2001/XMLSchema#dateTime

hasGLEICode

hasGLEICode \sqsubseteq hasCode
 $\top \sqsubseteq \leq 1$ hasGLEICode

\exists hasGLEICode Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq GLEIManifestation
 $\top \sqsubseteq \forall$ hasGLEICode Datatypehttp://www.w3.org/2001/XMLSchema#string

hasISOCCode

hasISOCCode \sqsubseteq hasCode
 \exists hasISOCCode Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq Country \sqcup Subdivision
 $\top \sqsubseteq \forall$ hasISOCCode Datatypehttp://www.w3.org/2001/XMLSchema#string

hasInitialRegistrationDate

hasInitialRegistrationDate \sqsubseteq hasDate
 $\top \sqsubseteq \leq 1$ hasInitialRegistrationDate
 \exists hasInitialRegistrationDate Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq GlobalLegalEntityIdentifier
 $\top \sqsubseteq \forall$ hasInitialRegistrationDate Datatypehttp://www.w3.org/2001/XMLSchema#dateTime

hasLegalFormAbbreviation

\exists hasLegalFormAbbreviation Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasLegalFormAbbreviation Datatypehttp://www.w3.org/2001/XMLSchema#string

hasLegalName

\exists hasLegalName Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasLegalName Datatypehttp://www.w3.org/1999/02/22-rdf-syntax-ns#PlainLiteral

hasNextRenewalDate

hasNextRenewalDate \sqsubseteq hasDate
 $\top \sqsubseteq \leq 1$ hasNextRenewalDate
 \exists hasNextRenewalDate Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq GLEIManifestation
 $\top \sqsubseteq \forall$ hasNextRenewalDate Datatypehttp://www.w3.org/2001/XMLSchema#dateTime

hasPostalCode

hasPostalCode \sqsubseteq hasCode
 \exists hasPostalCode Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq Address
 $\top \sqsubseteq \forall$ hasPostalCode Datatypehttp://www.w3.org/2001/XMLSchema#string

hasPreferredTransliteratedLegalName

hasPreferredTransliteratedLegalName \sqsubseteq hasLegalName
 \exists hasPreferredTransliteratedLegalName Datatypehttp://www.w3.org/2000/01/rdf-schema#Literal \sqsubseteq LegalEntityManifestation
 $\top \sqsubseteq \forall$ hasPreferredTransliteratedLegalName Datatypehttp://www.w3.org/1999/02/22-rdf-syntax-ns#PlainLiteral

hasStreetAddress

\exists hasStreetAddress Datatype`http://www.w3.org/2000/01/rdf-schema#Literal` \sqsubseteq Address
 \top \sqsubseteq \forall hasStreetAddress Datatype`http://www.w3.org/1999/02/22-rdf-syntax-ns#PlainLiteral`

hasUpdateDate

hasUpdateDate \sqsubseteq hasDate
 \exists hasUpdateDate Datatype`http://www.w3.org/2000/01/rdf-schema#Literal` \sqsubseteq VariableEntityManifestation
 \top \sqsubseteq \forall hasUpdateDate Datatype`http://www.w3.org/2001/XMLSchema#dateTime`

Individuals

Active

Active : LegalEntityStatus

Annulled

Annulled : RegistrationStatus

Cancelled

Cancelled : RegistrationStatus

CorporateAction

CorporateAction : LegalEntityExpirationReason

Dissolved

Dissolved : LegalEntityExpirationReason

Duplicate

Duplicate : RegistrationStatus

EntitySuppliedOnly

EntitySuppliedOnly : ValidationSource

FullyCorroborated

FullyCorroborated : ValidationSource

Inactive

Inactive : LegalEntityStatus

Issued

Issued : RegistrationStatus

Lapsed

Lapsed : RegistrationStatus

Merged

Merged : RegistrationStatus

Other

Other : LegalEntityExpirationReason

PartiallyCorroborated

PartiallyCorroborated : ValidationSource

Pending

Pending : ValidationSource

PendingArchival

PendingArchival : RegistrationStatus

PendingTransfer

PendingTransfer : RegistrationStatus

PendingValidation

PendingValidation : RegistrationStatus

Retired

Retired : RegistrationStatus

Transferred

Transferred : RegistrationStatus