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**Global Smart Spaces**

# **GloSS Ontology and Narratives**

**D 7.0**

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<b>Abstract (for dissemination)</b>	<p>A description of the Gloss Ontology and the Narrative Language. The present document describes the Gloss Ontology that constitutes part of the User and Spatial Narratives. The ontology identifies the properties of the entities that make up the Gloss universe while the Narratives provide the form in which scenarios can be captured at the user level. This is a necessary step in order to coordinate the building of services and infrastructure and provide a common framework in which these services can interact and interoperate. The ontology provided here is sufficiently concrete so that it can be modelled and also sufficiently flexible and extensible so that new entities can be incorporated in the future or current entities defined in a more specific ways.</p>					
<b>Keywords</b>	Universe of Discourse, Domain Ontology					

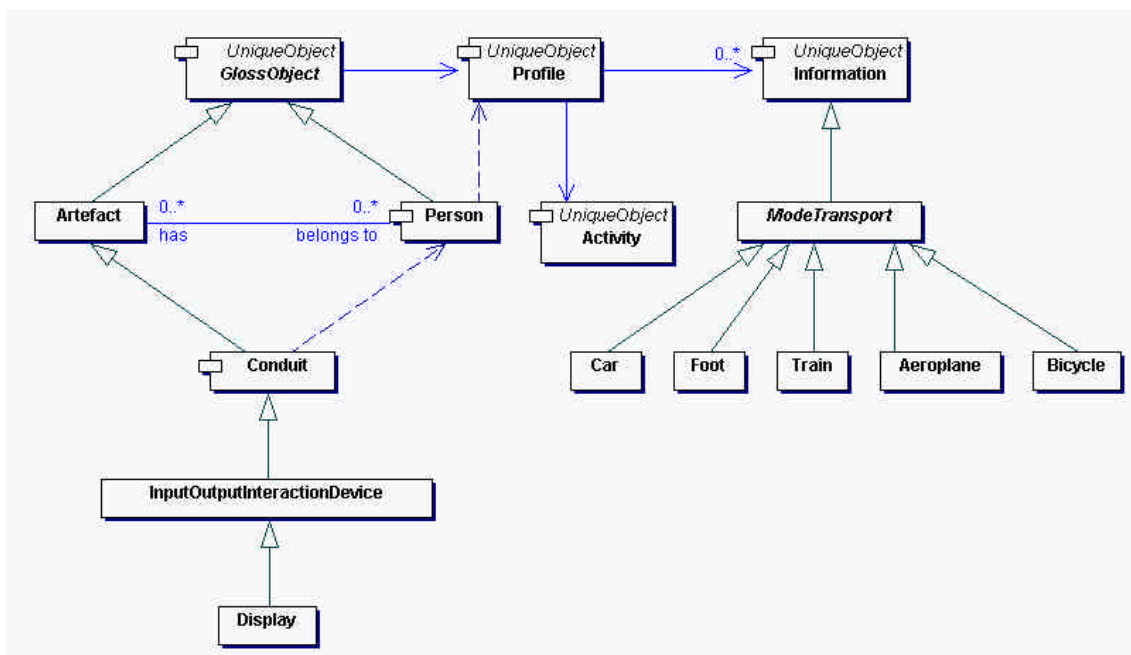
# 1 INTRODUCTION

The present document describes the Gloss Ontology that constitutes part of the User and Spatial Narratives. The ontology identifies the properties of the entities that make up the Gloss universe while the Narratives provide the form in which scenarios can be captured at the user level. This is a necessary step in order to coordinate the building of services and infrastructure and provide a common framework in which these services can interact and interoperate. The ontology provided here is sufficiently concrete so that it can be modelled and also sufficiently flexible and extensible so that new entities can be incorporated in the future or current entities defined in a more specific ways.

The description of the Gloss Ontology is captured using the Object Oriented model and is organised into several packages to aid comprehension. In section 2, each package is modelled in a graphical form - depicting the relationships between its entities - followed by a detailed textual description. Section 3 contains the user and spatial narrative which stems from the combined ontology.

## 2 PACKAGES

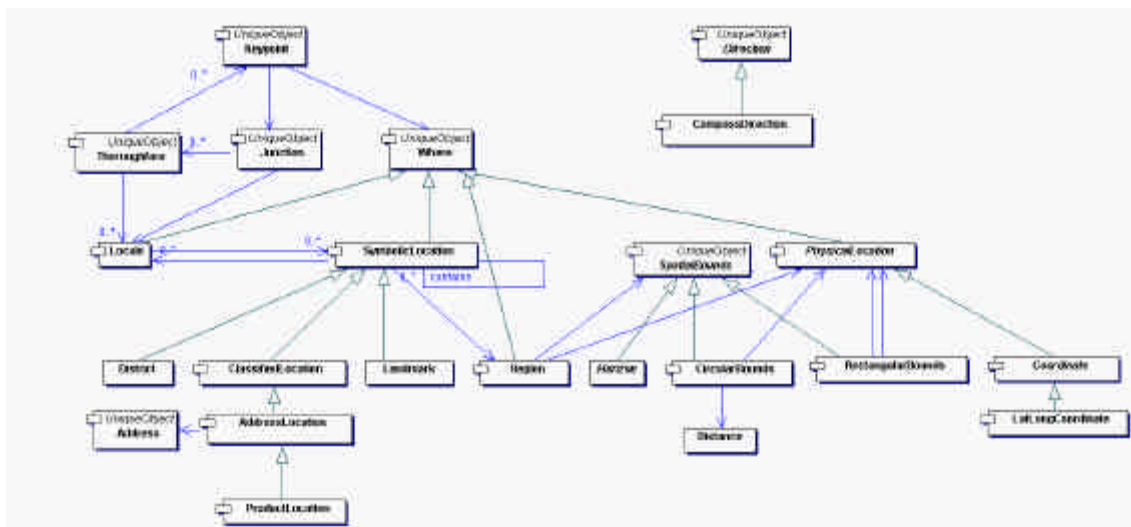
### 2.1 UNIVERSE



Class Summary	
<a href="#">Activity</a>	Activity that someone or something is doing.
<a href="#">Aeroplane</a>	A mode of transport.
<a href="#">Artefact</a>	An inanimate entity that is significant in the GLOSS universe.
<a href="#">Bicycle</a>	A mode of transport.

<a href="#">Car</a>	A mode of transport.
<a href="#">Conduit</a>	A distinguished artefact that acts as a conduit for information transfer with the GLOSS fabric.
<a href="#">Display</a>	A physical output device.
<a href="#">Foot</a>	A mode of transport.
<a href="#">GlossObject</a>	Superclass unifying the concepts of <a href="#">Person</a> and <a href="#">Artefact</a> .
<a href="#">Information</a>	Arbitrary data in arbitrary format.
<a href="#">InputOutputInteractionDevice</a>	A device supporting input from, or output to, a user.
<a href="#">ModeTransport</a>	A mode of transport.
<a href="#">Person</a>	Representation of a GLOSS-enabled person.
<a href="#">Profile</a>	A profile associated with a GLOSS-enabled person.
<a href="#">Train</a>	A mode of transport.

## 2.2 SPACE

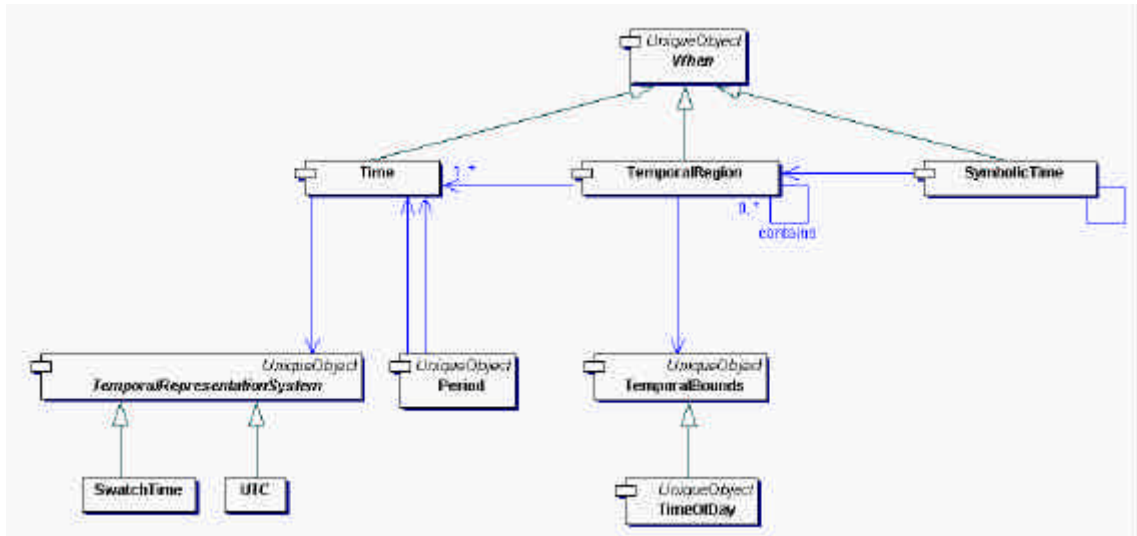


### Class Summary

<a href="#">Address</a>	A postal address.
<a href="#">AddressLocation</a>	A <a href="#">ClassifiedLocation</a> with an <a href="#">Address</a> .
<a href="#">CircularBounds</a>	A 2-D circular bounding region.
<a href="#">ClassifiedLocation</a>	A <a href="#">SymbolicLocation</a> annotated with additional information.
<a href="#">CompassDirection</a>	A <a href="#">Direction</a> represented as a bearing in degrees from True North.

<a href="#"><u>Coordinate</u></a>	A point represented in some geographical coordinate system, which may be 2-dimensional or 3-dimensional.
<a href="#"><u>Direction</u></a>	An orientation represented in some way.
<a href="#"><u>Distance</u></a>	Representation of the distance between two <a href="#"><u>Wheres</u></a> .
<a href="#"><u>District</u></a>	A district within a town, city or country.
<a href="#"><u>Horizon</u></a>	Region currently perceived by a Gloss user.
<a href="#"><u>Junction</u></a>	A junction at which a number of <a href="#"><u>Thoroughfares</u></a> meet.
<a href="#"><u>Keypoint</u></a>	An individual point on a <a href="#"><u>Thoroughfare</u></a> .
<a href="#"><u>Landmark</u></a>	A well-known landmark.
<a href="#"><u>LatLongCoordinate</u></a>	A 2-dimensional point represented as degrees latitude and longitude.
<a href="#"><u>Locale</u></a>	A logical grouping of <a href="#"><u>SymbolicLocations</u></a> .
<a href="#"><u>PhysicalLocation</u></a>	A point represented in some way.
<a href="#"><u>ProductLocation</u></a>	An <a href="#"><u>AddressLocation</u></a> where a particular user service may be obtained.
<a href="#"><u>RectangularBounds</u></a>	A 2-D rectangular bounding region.
<a href="#"><u>Region</u></a>	A bounded fixed region of space that may contain or intersect with other regions.
<a href="#"><u>SpatialBounds</u></a>	A 2-dimensional or 3-dimensional shape bounding a region.
<a href="#"><u>SymbolicLocation</u></a>	An entity, fixed or moveable, that may contain people, artefacts and other locations.
<a href="#"><u>Thoroughfare</u></a>	A sequence of <a href="#"><u>Keypoints</u></a> and related <a href="#"><u>Locales</u></a> .
<a href="#"><u>Where</u></a>	Superclass unifying the concepts of <a href="#"><u>PhysicalLocation</u></a> , <a href="#"><u>Region</u></a> and <a href="#"><u>SymbolicLocation</u></a> .

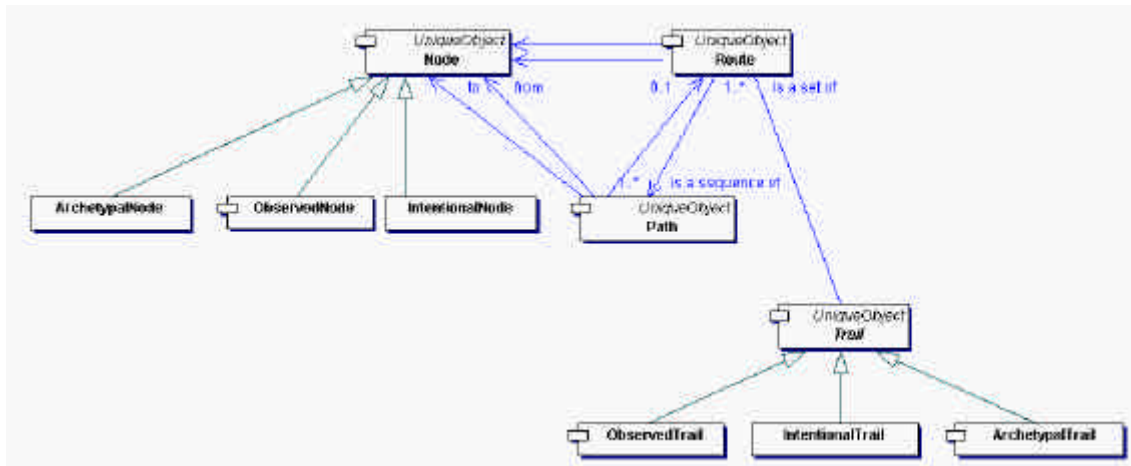
2.3 TIME



Class Summary	
<a href="#"><u>Period</u></a>	A contiguous period of time.
<a href="#"><u>SwatchTime</u></a>	Swatch temporal system.
<a href="#"><u>SymbolicTime</u></a>	A time instant, period or set of periods.
<a href="#"><u>TemporalBounds</u></a>	Temporal analogy to <a href="#"><u>SpatialBounds</u></a> : a set of one or more <a href="#"><u>Periods</u></a> .
<a href="#"><u>TemporalRegion</u></a>	A set of time periods.
<a href="#"><u>TemporalRepresentationSystem</u></a>	A system for representing time.
<a href="#"><u>Time</u></a>	A point in time expressed using a particular representation system.
<a href="#"><u>TimeOfDay</u></a>	A time of day expressed without reference to any particular day.
<a href="#"><u>UTC</u></a>	UTC temporal system.
<a href="#"><u>When</u></a>	Superclass unifying the concepts of <a href="#"><u>Time</u></a> , <a href="#"><u>SymbolicTime</u></a> , and <a href="#"><u>TemporalRegion</u></a> .

## 2.4 METAPHORS

### 2.4.1 CLASS DIAGRAM



Class Summary	
<a href="#"><u>ArchetypalNode</u></a>	An individual node within an archetypal trail.
<a href="#"><u>ArchetypalTrail</u></a>	A route between two Wheres, with optional multiple sub-routes.
<a href="#"><u>IntentionalNode</u></a>	An individual node within an IntentionalTrail.
<a href="#"><u>IntentionalTrail</u></a>	An unordered set of locations, regions or coordinates, with associated information, linked by theme.
<a href="#"><u>Node</u></a>	An individual node within an ArchetypalTrail or IntentionalTrail.
<a href="#"><u>ObservedNode</u></a>	An individual observation within an ObservedTrail.
<a href="#"><u>ObservedTrail</u></a>	An ordered sequence (a snail trail) of observations of a <a href="#"><u>Person</u></a> or <a href="#"><u>Artefact</u></a> , each recording a time (a <a href="#"><u>When</u></a> ), a place (a <a href="#"><u>Where</u></a> ) and optionally some additional information.
<a href="#"><u>Path</u></a>	A path between two Wheres.
<a href="#"><u>Route</u></a>	A sequence of <a href="#"><u>Paths</u></a> linking a start Where and an end Where.
<a href="#"><u>Trail</u></a>	Abstract superclass for various trail classes.

### 3 COMBINED ONTOLOGY

<b>Activity</b>	Activity that someone or something is doing.
<b>Aeroplane</b> extends ModeTransport	A mode of transport.
<b>Address</b>	A postal address.
<b>AddressLocation</b> extends ClassifiedLocation	A <i>ClassifiedLocation</i> with an <i>Address</i> .
<b>ArchetypalNode</b>	An individual node within an <i>ArchetypalTrail</i> .
<b>ArchetypalTrail</b> extends Trail	<p>A directed graph of locations, regions or coordinates, together with associated information and a recommended order for visiting them. The trail is a graph rather than a sequence since it may contain alternative sub-routes, for example to cater for different modes of transport or other user preferences. Example instances include:</p> <p>?? a route from St Andrews to Grenoble; ?? a recommended order to visit Scottish Whisky Distilleries.</p> <p>An archetypal trail might be distilled from a number of observational trails. It has no intrinsic time dimension, although information about travel times between nodes could be included.</p>
<b>Artefact</b> extends GlossObject	<p>An inanimate entity that is significant in the GLOSS universe. Example instances include:</p> <p>?? a building; ?? a road junction; ?? a projection screen.</p>
<b>Bicycle</b> extends ModeTransport	A mode of transport.
<b>Bounds</b>	<p>A 2-dimensional or 3-dimensional shape bounding a region. Example instances include:</p> <p>?? a regular shape; ?? an arbitrary polygon</p>
<b>Car</b> extends ModeTransport	A mode of transport.
<b>CircularBounds</b> extends SpatialBounds	A 2-D circular bounding region.
<b>ClassifiedLocation</b> extends SymbolicLocation	A <i>SymbolicLocation</i> annotated with additional information.
<b>CompassDirection</b> extends Direction	A <i>Direction</i> represented as a bearing in degrees from True North.



<b>Conduit</b> extends <i>Artefact</i>	<p>A distinguished artefact that acts as a conduit for information transfer with the GLOSS fabric. A conduit may optionally be associated with a person. Example instances include:</p> <p>?? a PDA;          ?? a mobile phone;          ?? a car radio;          ?? a display screen;          ?? a Java button.</p>
<b>Coordinate</b> extends <i>Where</i>	<p>A point represented in some geographical coordinate system, which may be 2-dimensional or 3-dimensional. Example instances include:</p> <p>?? the position of the first tee on the Old Course, St Andrews, expressed as [latitude, longitude, height];          ?? grid reference 781490 on British Ordnance Survey sheet 51.</p>
<b>Direction</b>	An orientation represented in some way.
<b>Display</b> extends <i>InputOutputInteractionDevice</i>	A physical output device.
<b>Distance</b>	Representation of the distance between two <i>Wheres</i> .
<b>District</b> extends <i>SymbolicLocation</i>	A district within a town, city or country.
<b>Foot</b> extends <i>ModeTransport</i>	A mode of transport.
abstract <b>GlossObject</b>	Superclass unifying the concepts of <i>Person</i> and <i>Artefact</i> . It represents any identity that is part of or tracked within the GLOSS fabric. A <i>GlossObject</i> may be interrogated for its most recent known position.
public <b>Horizon</b>	Region currently perceived by a Gloss user.
<b>Information</b>	Arbitrary data in arbitrary format.
<b>InputOutputInteractionDevice</b> extends <i>Conduit</i>	A device supporting input from, or output to, a user.
<b>IntentionalNode</b>	An individual node within an <i>IntentionalTrail</i> .
<b>IntentionalTrail</b> extends <i>Trail</i>	<p>An unordered set of locations, regions or coordinates, with associated information, linked by theme. There may be a number of ordered routes through the set. Example instances include:</p> <p>?? a Scotch Whisky Trail          ?? a Fife Tourist Trail          ?? the sites of the GLOSS consortium</p> <p>An intentional trail has no intrinsic time dimension, although information about travel times between nodes could be included.</p>
<b>Junction</b>	A junction at which a number of <i>Thoroughfares</i> meet.

<b>Keypoint</b>	An individual point on a <i>Thoroughfare</i> .
<b>Landmark</b> extends SymbolicLocation	A well-known landmark.
<b>LatLongCoordinate</b> extends Coordinate	A 2-dimensional point represented as degrees latitude and longitude.
<b>Locale</b>	A logical grouping of <i>SymbolicLocations</i> . Example instances include:  ?? a whisky locale in Speyside; ?? a tourism locale in North East Fife.
abstract <b>ModeTransport</b> extends Information	A mode of transport. Example instances include:  ?? car; ?? train; ?? aeroplane; ?? bicycle; ?? on foot.
<b>Node</b>	An individual node within an <i>ArchetypalTrail</i> or <i>IntentionalTrail</i> . Example instances include:  ?? location Edinburgh Airport; ?? coordinate British OS NM278162, which is the position of the entrance to the Talisker Distillery. Whisky has been produced here since 1834.
<b>ObservedNode</b> extends Node	An individual observation within an <i>ObservedTrail</i> . Example instances include:  ?? Graham Kirby was at location Sabena SN2069 at 14:17 UTC on 2nd May 2001, at which point drinks were served. ?? Sabena SN2069 was at coordinate 2.34E 51.92N 8000m at 15:17 Central European Time on 2/5/01
<b>ObservedTrail</b> extends Trail	An ordered sequence (a snail trail) of observations of a <i>Person</i> or <i>Artefact</i> , each recording a time, a place (coordinate, region or location) and optionally some additional information. Example instances include:  ?? an observational trail recording the travel of a person from St Andrews to Grenoble; ?? an observational trail recording the travel of a train along a route on a particular day.  The individual observations comprising an observational trail might be recorded automatically at fixed time or spatial intervals; manually by user intervention; and/or automatically whenever the observed entity comes into proximity with designated places.
<b>Path</b>	Represents a path between two <i>Wheres</i> .
<b>Period</b>	A contiguous period of time.
<b>Person</b> extends GlossObject	Representation of a GLOSS-enabled person. A person may have an associated profile.

<b>PhysicalLocation</b> extends Where	A point represented in some way.
<b>ProductLocation</b> extends AddressLocation	An <i>AddressLocation</i> where a particular user service may be obtained.
<b>Profile</b>	A profile associated with a GLOSS-enabled person. Example attributes may include: ?? current mode of transport; e.g. on foot, car, hovercraft, etc.; ?? food preferences; ?? personal interests.
<b>RectangularBounds</b> extends Bounds	A 2-D rectangular bounding region.
<b>Region</b> extends Where	A bounded fixed region of space that may contain or intersect with other regions. A region may be 2-dimensional or 3-dimensional. It is fixed relative to some geographical coordinate system. Example instances include: ?? the bounds of the Old Course, St Andrews; ?? the triangle bounded by Dublin, Glasgow and St Andrews; ?? the volume occupied by the Livingstone Tower, Strathclyde.
<b>Route</b>	A sequence of <i>Paths</i> linking a start <i>Where</i> and an end <i>Where</i> .
<b>SpatialBounds</b>	A 2-dimensional or 3-dimensional shape bounding a region.
<b>SwatchTime</b>	Swatch temporal system.
<b>SymbolicLocation</b> extends Where	An entity, fixed or moveable, that may contain people, artefacts and other locations. A location occupies a region, which may vary over time for a moveable location. Example instances include: ?? a train (moveable); ?? a car (moveable); ?? a bus-stop (fixed); ?? a room (fixed); ?? an airport (fixed); ?? a logical thing filling a defined 3-D space.
<b>SymbolicTime</b> extends When	A time instant, period or set of periods.
<b>TemporalBounds</b>	Temporal analogy to <i>SpatialBounds</i> : a set of one or more <i>Periods</i> .
<b>TemporalRegion</b> extends When	A set of time periods.
<b>TemporalRepresentationSystem</b>	A system for representing time.
<b>Thoroughfare</b>	A sequence of <i>Keypoints</i> and related <i>Locales</i> .
<b>Time</b> extends When	A point in time expressed using a particular representation system.
<b>TimeOfDay</b>	A time of day expressed without reference to any particular day.
<b>Trail</b>	Abstract superclass for various trail classes.

<b>Train</b> extends ModeTransport	A mode of transport.
<b>UTC</b>	UTC temporal system.
abstract <b>When</b>	Superclass unifying the concepts of <i>Time</i> , <i>SymbolicTime</i> , and <i>TemporalRegion</i> .
abstract <b>Where</b>	<p>Superclass unifying the concepts of <i>Coordinate</i>, <i>Region</i> and <i>Location</i>. The rationale is that in some contexts we may be interested in any one of:</p> <ul style="list-style-type: none"><li>?? a point position;</li><li>?? a physical fixed region;</li><li>?? a logical location.</li></ul> <p>For example, depending on the underlying hardware technology a person might be tracked to a point (e.g. GPS), a region (e.g. GSM) or a location (e.g. active badge in a building or train).</p>