

SmartSpace[®] Paths and Queues Configuration Guide

From version 3.7

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Paths and queues configuration

What is Paths and queues?

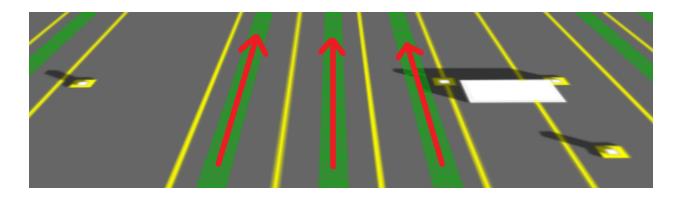
Paths and queues is a feature introduced into the Location Rules component of SmartSpace 3.4. Its purpose is to allow you to introduce prior knowledge of object locations in your system, in particular when objects travel along fixed paths like this:



When you configure Paths and queues to control objects, they will be snapped to nearby paths as tags move around. You can introduce further constraints to control object speed and separation such that objects form queues along the paths. You can then use the object sequence information in your application to report things like "number of vehicles in front".

Paths

Paths are physical routes that you know objects will follow. You draw these in SmartSpace Config:



Paths configured to keep object neatly positioned within the lanes

Path constraints

Path constraints are normally intended to match the real-world, physical, immutable constraints of the thing being modeled. In SmartSpace 3.4, the following constraints are configurable:

- Rotates object rotations, which can change as they move along a path
- HasSpeed object speeds
- IsInTrain object separations

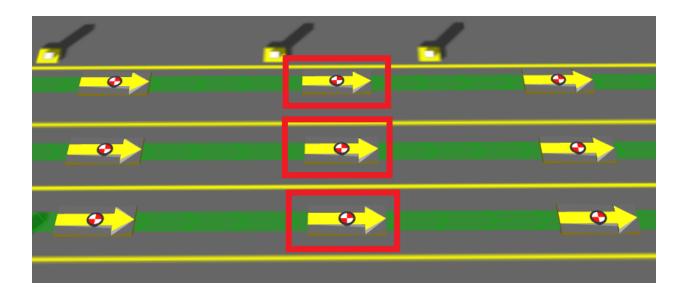
For example, a production line might move at a known constant speed that won't change over time. In this case, you could use the *HasSpeed* constraint.

Path sections

Paths can be split into sections in order to assign different constraints to different sections of the path.

Path points

A path point is an object intended to be located exactly on a path. There is an object type called *Path Point* that you can use directly, or inherit, to give objects special UI features to get them to snap to paths or generate them at regular intervals.



Path points, automatically generated at regular intervals

Path groups

A path group is a logical grouping of paths used to determine which objects are being controlled by the path tracking location rules. A path group has an extent which, by default, is used to determine which objects to control.

How do I get Paths and queues?

Version and license

You will need SmartSpace 3.4 with a license for Location rules.

Installation

Click **Install services...** in Service Manager to install service packages. If you have a license, Paths and queues will appear in the list of features:

🟮 Service Manager							
MANAGE SERVICES	Select the packages directory from which to install						
	C:\Ubisense\SmartSpace_3_5_7375\packages	Browse	C:\Ubise				
INSTALL SERVICES	SELECT FEATURES TO INSTALL	VENDOR	PACKAG				
Select features and install the	AVL/GPS connect	Ubisense	Applicati				
required service packages	AnglelD connect	Ubisense	Applicat				
	Application .NET API	Ubisense	Applicat				
CLEANUP SERVICES	Application REST API	Ubisense	Applicati				
	Automated tag association	Ubisense	Business				
	Business object properties	Ubisense	Business				
	Business rules engine	Ubisense	Business				
	✓ Driven objects	Ubisense	Business				
	Email	Ubisense	IT suppo				
	External data connector	Ubisense	IT suppo				
	Failover control	Ubisense	IT suppo				
	HMIs H	Ubisense	IT suppo				
	Health monitoring	Ubisense	IT suppo				
	✓ ISO 24730	Ubisense	IT suppo				
	LLRP interface	Ubisense	Location				
	Location and property history for Oracle	Ubisense	Locatior				
	Location and property history for SQLServer	Ubisense	Location				
	Operations web interface	Ubisense	Location				
	Parking bay snapping	Ubisense	Location				
	Paths and queues	Ubisense	Location				
	Property transfer	Ubisense	Location				
	RDBMS map for Oracle	Ubisense	Location				

Selecting the Paths and queues feature in Service Manager

Where does Paths and queues appear?

Once you have installed *Paths and queues*, since it is integrated into existing SmartSpace components, it will appear in various places in Ubisense programs.

Service Manager

In Service Manager, there are some new *Location rules* services:

Ubisense	Location rules	Parking and stale configuration	3.5.7375	Site
Ubisense	Location rules	Path constraint configuration	3.5.7375	Site
Ubisense	Location rules	Path simulation configuration	3.5.7375	Site
Ubisense	Location rules	Path simulator	3.5.7375	Location Cell 00001
Ubisense	Location rules	Path tracking configuration	3.5.7375	Site
Ubisense	Location system	Boot server	3.5.7375	Site

Service Manager showing Paths and queues services

Application Manager

In **DOWNLOADABLES**, there are new items in the Location rules task:

APPLICATIONS	Download selected items	 Group by type
DOWNLOADABLES Download tools and documentation to this computer	DOWNLOADABLE V Ubisense Application integration RDBMS admin tools Business rules Rules import and export IT support Health metrics admin tools Health metrics sample dashboards	VERSION
	 Location rules Path import and export ubisense_path_export.exe ubisense_path_import.exe Path simulation tools ubisense_path_simulation_admin.exe Path tracking admin tools ubisense_path_tracking_admin.exe 	3.5.7375 3.5.7375 3.5.7375 3.5.7375

Application Manager showing Paths and queues downloadables

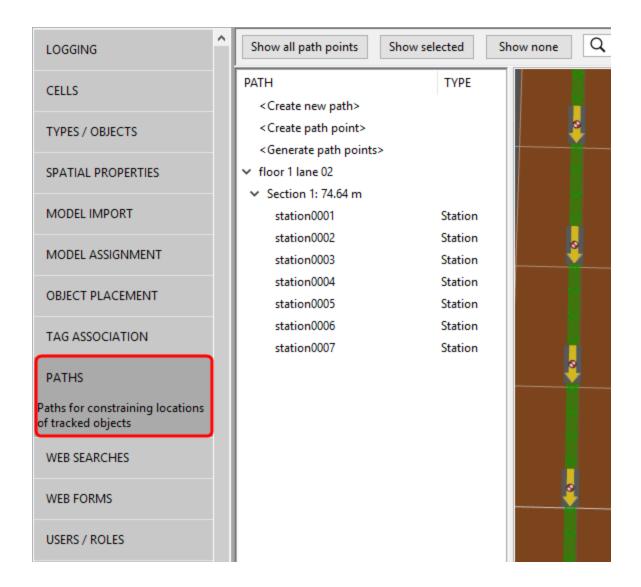
SmartSpace Config

In TYPES / OBJECTS, there are two new types:

LOGGING	^ TYPE	IDENTIFIE	D BY	
	GPS Zone			
CELLS	Kit	name		🖸 Path Group objects (3) 🗖 🗉 🖾
	LLRP Reader			
TYPES / OBJECTS	Path Group			Q <show items="" matching="" only=""></show>
Data model of object types,	Path Point			
objects and their properties	> Person	name		<create new="" object=""></create>
	Process Area	name		1st floor group
SPATIAL PROPERTIES	✓ Product	name		2nd floor group
MODEL IMPORT	Assembly Product	name		3rd floor group
MODELINFORT	Quality Note	name		
MODEL ASSIGNMENT	Room			🖸 Path Point objects (0)
	Skip	name	~	
OBJECT PLACEMENT	PROPERTIES OF PATH GROUP	TYPE	INHERITED FF	Q <show items="" matching="" only=""></show>
	<create new="" property=""></create>			
TAG ASSOCIATION	delete pending flag	Bool	Object	<create new="" object=""></create>

SmartSpace Config TYPES / OBJECTS automatically has two new types

There is a new task called **PATHS**:



SmartSpace Config PATHS task

In SERVICE PARAMETERS, there are new options in the drop-down list:

SmartSpace Config path tracking service parameters

Creating the data model for Paths and queues

Using the PATHS task

Use the **PATHS** task in SmartSpace Config to model the physical layout and constraints of your environment.

Draw a path

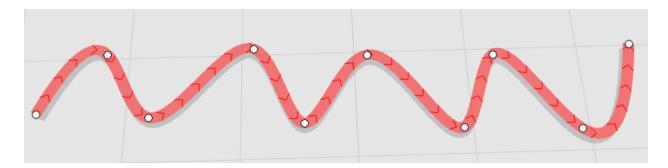
Show all path points	Show selected Show n	one Q <show matching="" only="" path="" points=""> Showing</show>	ng 17 of 1
PATH	TYPE	P	
<create new="" path=""></create>		Start here	
<create path="" point=""></create>			
<generate path="" points=""></generate>			
✓ floor 1 lane 01			
Section 1: 212.62 m			

Getting started in SmartSpace Config PATHS

When drawing a path, read the instructions carefully to ensure you know all the capabilities of the tool. You can line paths up neatly using the *Snap grid* and *Path height* controls.

Drawing a path in SmartSpace Config PATHS

See the green drawing instructions on the map for how to smooth a path to look like this:



Drawing a smoothed path in SmartSpace Config PATHS

The path will always go through the control points, so if the smoothing doesn't behave as required, add more control points.

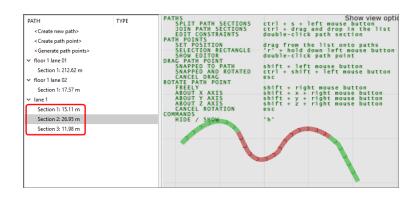
Add path constraints

If your environment has physically constrained paths, use the path editor to add constraints:

Path name lane 1	
Snap grid 0.1	
Path height 1	
Object constraints:	
Object constraints:	
Rotates	Object will rotate as it
rotation initial yaw 0	moves along the path
rotation initial pitch	
rotation initial roll 0	
rotation total yaw 360	
rotation total pitch 0	
rotation total roll 0	
rotation absolute	If correct, this helps
✓ HasSpeed	the location filtering
speed value 0.01	
speed std dev	
IsInTrain	
Save Cancel	

Adding path constraints in SmartSpace Config PATHS

If your path has different constraints in different sections, you can split the path by following the instructions in the in-place help in the **PATHS** map.



A path split into three sections in SmartSpace Config PATHS

Double-click individual path sections to edit constraints separately.

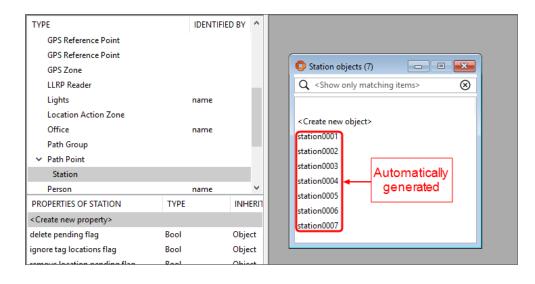
Generate path points

Use **<Generate path points>** to automatically generate objects at regular intervals along paths. You can create types that inherit from *Path Point* in **TYPES / OBJECTS**. To avoid confusion, give them a representation using **MODEL IMPORT** and **MODEL ASSIGNMENT** before creating any.

Show all path points Show selected Show no	ne Q <show o<="" th=""><th>nly matching</th><th>path point</th><th>\$> 🛞</th><th>There are no</th><th>) path points</th><th></th></show>	nly matching	path point	\$> 🛞	There are no) path points	
Choose the type of path point	Create type TYPES	s in	_				
Station	OBJECT	s					
Choose a path on which to generate path points							
Enter the start offset	1						
Enter the interval between path points							
10	4						
Enter the path point name prefix (optional)	1						
station							
Enter the first path point number Use leading zeroes to set the naming scheme width							
0001							
Enter the path point name postfix (optional)							
Save Cancel							
	1=						
	Į						

Generating path points in SmartSpace Config PATHS

There is nothing special about objects created in this way, other than the fact that their name and location were generated by SmartSpace Config. You can see them in **TYPES / OBJECTS**, give them properties, and use them in SmartSpace Business rules if you have the appropriate licenses.



Path points are normal objects in SmartSpace Config TYPES / OBJECTS

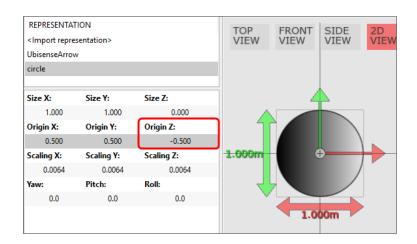
2D Reps and Path Points

When creating path points, the path point generation code places the path point object instances at exactly the same position on the z axis as their path. If the path point type has a 2D rep with a z offset of zero, then the point is exactly coplanar with the path section ribbon and this might lead to you seeing rendering artifacts.

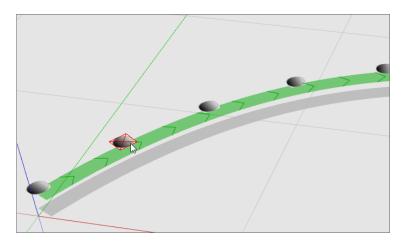
It can also make it difficult to select a path point: sometimes clicking the point might pick it, or it might pick the path section instead.

To make path points easier to select, you can set a non-zero z origin offset (e.g. -0.5) on the representation used for Path Point (the base type used when generating path points). Any path point types you create will inherit this rep and its default offset.

For example, if you decide to use a rep called circle, a simple 2D circle, for your path points, when you import the image in MODEL IMPORT, in addition to any scaling you apply, also set the z origin:



Assign this rep to the Path Point type in MODEL ASSIGNMENT and then any path points generated using this rep, will "float" above the path:



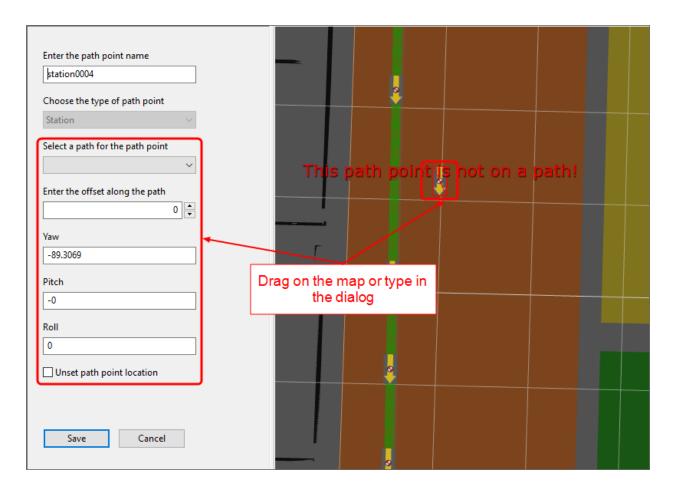
Moving path points

Since they are normal objects, you can drag path points around in **OBJECT PLACEMENT**. However, this doesn't snap them to paths. The **PATHS** map will warn you when path points are not on a path:



SmartSpace Config PATHS map warns about orphaned path points

Fix this error by double-clicking on the path point to bring up the editor:



Moving a path point using the editor in SmartSpace Config PATHS

Controlling path tracking

Path-to-group mapping

You must assign paths to groups using **SERVICE PARAMETERS**. Select *Path tracking* and *Path* in the dropdowns. Drag the *group* parameter onto the right-hand panel. Assign path groups as required.

	Path tracking VPE Path Path Group			Path tracking : group PATH <set group=""></set>	GROUP
	PARAMETER	DEFAULT	TYPE	'Path' objects	1st floor group
By default, this is	default stderr	0.2	Double	lane 1	2nd floor group
empty: you must	group		Path Grou		
set the group	handover distance	10	Double		
	innovation multiplier	1	Double		
	max consecutive outliers	5	Int		
	max valid position variance	10	Double		
	max variance before reset	10	Double		
	outlier distance	5	Double		
	raw stderr multiplier	1	Double		
	stickiness	2	Int		
	train stale timeout	60s	Time Span		
	train update period	1s	Time Span		
	variance multiplier	1	Double		

Assigning paths to groups in SmartSpace Config SERVICE PARAMETERS

Default containment

The default path tracking behavior is to control objects that are contained in the extent of a path group. To set this up, create objects of type *Path group* in **TYPES / OBJECTS**. Set their *extent* property in **SPATIAL PROPERTIES**:

Path Group 🗸	
extent ~	
DEFAULT SPACES <create default="" new="" space=""></create>	
Q <filter names="" object=""></filter>	
SPECIFIC SPACES <create new="" space="" specific=""></create>	
1st floor group	
Edit Space View Space	

Creating path group extents in SmartSpace Config SPATIAL PROPERTIES

Create a SPACE property for the objects to be controlled in **TYPES / OBJECTS** and **SPATIAL PROPERTIES** and monitor the spatial relation:

MONITORED SPATIAL RELATIONS	REQUESTED BY	
<add new="" request=""></add>		
Assertion Area extent contains Assertion Point origin	Location rules	
Building extent contains Doorway extent	Room snapping	
Building extent contains Room extent	Room snapping	Add requests
Path Group extent contains Bus extent	SmartSpace Config	for the objects
Path Group extent contains Car extent	SmartSpace Config	monitored
		here

Setting up default containment in SmartSpace Config SPATIAL PROPERTIES

Controlling objects using business rules

For some applications, you might need to decide which objects are controlled by path tracking based on some other business logic. For this, you will need SmartSpace Business rules licenses.

First, turn off defau	lt containment in	SERVICE PARAMETERS:
-----------------------	-------------------	---------------------

TYPE Path Path Group Default is to use default containment Groups at once Path Group 'objects Overwrite existing values use default containment true Bool 1 type Save Cancel	Path tracking			~		
Path Group Default is to use default containment You can turn off default containment for all Path Groups at once Path Group Show only matching items> S 'Path Group' objects Data of fault S Output S With Groups at once Interview Wark selected Unmark selected Use default containment V Use default containment V Use default containment Trype Overwrite existing values	ТҮРЕ					💿 Path tracking : use default containment
Default is to use default containment You can turn off default containment for all Path Groups at once Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items> Image: Show only matching items Image: Show only matching items Image: Show only matching items> Image: Show only matching items> Image: Show only matching items Image: Show only matching items Image: Show only matching items Image: Show only matching items Image: Show only matching items Image: Show only matching items Image: Show only matching items	Path					
Default is to use default containment Groups at once 2nd floor group Mark selected Use default containment true Bool 1 type	Path Group					Path Group 🗸
default containment containment for all Path Groups at once Ist floor group Ist floor group Mark selected Unmark selected use default containment true Bool 1 type	Default is to use	You ca	an turn off d	efault		Q <show items="" matching="" only=""></show>
Default containment Unmark selected Use default containment Unmark selected Use default containment Unmark selected Use default containment Unmark selected						
PARAMETER DEFAULT TYPE OVERRIDES use default containment true Bool 1 type	containment	Gr	oups at one	ce 🛛 🔪		
PARAMETER DEFAULT TYPE OVERRIDES use default containment true Bool 1 type Overwrite existing values					\mathbb{N}	2nd floor group
PARAMETER DEFAULT TYPE OVERRIDES use default containment true Bool 1 type						Mark selected Unmark selected
PARAMETER DEFAULT TYPE OVERRIDES use default containment true Bool 1 type						
PARAMETER DEFAULT TYPE OVERRIDES use default containment true Bool 1 type						use default containment
use default containment true Bool 1 type						false 🗸 🗸
use default containment true Bool 1 type	PARAMETER	DEFAULT	TYPE	OVERRIDES		Overwrite existing values
Save Cancel	use default containment	true	Bool	1 type		-
Save Cancel			,			-
Save Cancel						
						Save Cancel

Turning off default containment in SmartSpace Config SERVICE PARAMETERS

Then, use **BUSINESS RULES** to set and unset rows for *<Path Group* > *controls <Object* > as required:

all the rules

when <u>assertion point</u> has located <u>object</u> becomes true do set the path group of assertion point controls object to true

Setting <Path Group> controls <Object> using SmartSpace Config BUSINESS RULES

Advanced path tracking parameters

Path tracking uses filtering to estimate the offsets of objects along paths. You might need to change filter parameters for some or all paths in your model, depending on the layout, quality of the location system, and so on. For example, if you have lots of lanes alongside each other, you might need to make them "stickier" such that objects change lane less readily.

Always test your application with the default values before changing anything described in this section.

In this context, "variance" means how uncertain the filter for a particular path is that it has the object in the right place.

🟮 Edit Path tracking : 'Path' obje	ects 🗖 🗖 💌
Applies to	'Path' objects
default stderr	0.2
group	1st floor group
handover distance	10
innovation multiplier	1
max consecutive outliers	5
max valid position variance	10
max variance before reset	10
outlier distance	5
raw stderr multiplier	1
stickiness	2
train stale timeout	60s
train update period	1s
variance multiplier	1
Edit	

Using SmartSpace Config SERVICE PARAMETERS to change path tracking filter parameters

default stderr

The value to use when the sensor system fails to provide an estimate of the measurement accuracy.

Do not normally change this parameter.

handover distance

When the filter resets, the path position is chosen to minimize the distance between the expected and the actual tag location. When resetting the filter, this parameter is the distance above which path tracking will allow other location rules to be applied.

- higher = path tracking will hold onto objects more, possibly without generating locations
- lower = path tracking will allow other location rules to take over more easily

Set this higher if tags are coming off paths too easily.

Set this lower if tags are getting stuck on paths when you want other location rules to take over.

innovation multiplier

Multiplier applied to the inferred error based on the distance from the estimated tag position to the measurement. For example, if this is zero, the distance from the estimated tag position to the measurement will not directly affect the filter variance at all.

- higher = measurements further from the estimated tag position will be trusted less
- lower = distance from estimated tag position to measurement doesn't matter as much

Set this higher if tag locations that are far away from the estimated tag position are placing the object on the path incorrectly.

max consecutive outliers

The maximum number of consecutive measurements deemed to be outliers before the filter resets to the nearest point on the path to the next measurement.

- higher = filter will reset less readily; objects will make fewer big jumps
- lower = objects will jump to the nearest point to the measurement more easily

max valid position variance

The maximum value of the filter variance for which an object location will be generated.

- higher = generate more locations, potentially of lower quality
- lower = generate fewer locations, but with more certainty that they are correct

Set this lower if your application requires locations to be generated with more certainty.

Note that it doesn't make sense for this to be larger than *max variance before reset*; the filter variance will never be higher than that (because it will reset instead).

Note that it doesn't make sense for this to be larger than *handover distance*; the path tracking location rule will have handed over to other rules already.

max variance before reset

The maximum possible variance of the filter state. When the variance goes over this value, the filter resets to the nearest point on the path to the next measurement.

- higher = filter will reset less readily; objects will make fewer big jumps
- lower = objects will jump to the nearest point to the measurement more easily

outlier distance

The minimum distance between the estimated tag position and the measurement where the reading is defined as an outlier. See *max consecutive outliers* for a description of what outliers do.

- higher = filter will reset less readily; objects will make fewer big jumps
- lower = objects will jump to the nearest point to the measurement more easily

Set this higher if your readings are very noisy and you want to stop objects making a lot of jumps.

raw stderr multiplier

Multiplier applied to the raw error computed by the sensor system. For example, if this is zero, sensor measurements will be assumed to be completely correct by the filter.

- higher = noisy measurements from the sensor system will be trusted less
- lower = sensor system noise doesn't matter as much

Set this higher if noisy sensor measurements are placing the object on the path incorrectly.

stickiness

Number of consecutive tag measurements for which a path filter needs the lowest variance in order to take control of the object.

- higher = path will hold onto objects; objects will flicker between paths less
- lower = path will release objects to other paths in the same group more easily

Set this higher if objects jump back and forth incorrectly between paths.

train stale timeout

Objects on a path section with the *IsInTrain* constraint are all moved at the same time. The *train stale timeout* is the period after which an object is no longer moved with the train when its tag has not been seen. For example, a tag might be disassociated without retracting the *path group controls object* assertion, in which case it will stop moving with the train once the timeout is reached.

- higher = an object with no tag or whose tag has not been seen will continue to move with the train for a longer time
- lower = an object with no tag or whose tag has not been seen will be removed from the train more promptly
- zero = the timeout is disabled such that objects will continue to move in a train until 'path group controls object' becomes false or the relevant 'Location inference' service is restarted

Normally, you should use the default value of 60 seconds and avoid relying on the timeout by ensuring all objects have a tag that can be seen by the location system, then retracting the *path group controls object* assertion (using the path group extent or a business rule) whenever a tag is removed.

train update period

Objects on a path section with the *IsInTrain* constraint are all moved at the same time, at a rate defined by the *train update period* (default = 1 s), so by default a train moves at a maximum of 1 Hz. Note that the parameter is a time span, which is the reciprocal of the rate.

- higher = object trains will move less frequently and generate fewer location events
- lower = object trains will move more frequently and generate more location events

Set this higher if there are more location events than can be handled by the system.

Set this lower if the locations of objects in trains are not staying up-to-date.

variance multiplier

Multiplier applied to the variance prediction as time elapses. When the filter predicts a new state, the variance increases because time has elapsed since the last measurement. The elapsed time is multiplied by this value when increasing the variance over time.

- higher = filter will be quicker to reset or handover to other paths or location rules
- lower = filter will take longer to reset or handover to other paths or location rules

Paths and queues simulation

What is the simulator?

The SmartSpace Location rules component includes some support for simulating tags or objects moving along paths. This is a good way to ensure you have set everything up before deploying Paths and queues into production.

From version 3.6, the *Location simulation feature* provides a more sophisticated method of simulating object movements in SmartSpace using business rules.

Services

Path simulation services are included in the service packages for the SmartSpace Paths and queues feature:

Ubisense	Location rules	Parking and stale configuration	3.5.7375	Site
Ubisense	Location rules	Path constraint configuration	3.5.7375	Site
Ubisense	Location rules	Path simulation configuration	3.5.7375	Site
Ubisense	Location rules	Path simulator	3.5.7375	Location Cell 00001
Ubisense	Location rules	Path tracking configuration	3.5.7375	Site
Ubisense	Location system	Boot server	3.5.7375	Site

Path simulation services shown in Service Manager MANAGE SERVICES

The *Path simulator* services wait for a simulation request, so you can leave all these services running all the time. Simulation only starts when you use the admin program to request a simulation.

Admin tool

You can download the simulation admin tool using Application Manager DOWNLOADABLES:

✓ Location rules	
 Path import and export 	
ubisense_path_export.exe	3.5.7375
ubisense_path_import.exe	3.5.7375
 Path simulation tools 	
ubisense_path_simulation_admin.exe	3.5.7375
 Path tracking admin tools 	
ubisense_path_tracking_admin.exe	3.5.7375

Path simulation admin tool shown in Application Manager DOWNLOADABLES

Use the admin tool to set the service parameters used by the simulator.

Simulator service parameters

In SmartSpace Config, **SERVICE PARAMETERS** shows the parameters that are set by the admin tool and consumed by the simulator services:

Path tracking simulation	n		~
ТҮРЕ			
Location Cell			
PARAMETER	DEFAULT	TYPE	OVERRIDES
pause simulation	false	Bool	
simulation wrapper		String	
start simulation	false	Bool	
stop simulation	false	Bool	

Path tracking simulation in SmartSpace Config SERVICE PARAMETERS

Example simulation walkthrough

Create the XML script

To create a simulation script, start by running this command:

ubisense_path_simulation_admin.exe example > path_simulation.xml

Edit **path_simulation.xml** to see the format and example data. The following steps will make it work without modification.

Create objects to attach to simulated tags

In SmartSpace Config TYPES / OBJECTS, create 20 objects of type "Car":

ТҮРЕ	IDENTI	FIED BY	^		
AngleID Recipe	name			🟮 Car objects (0)	
> Assertion Area				VIN	
 Assertion Point 				VIIN	00001
Parking Bay					00003
Asset	name				00004 00005
Building					00006
Car	VIN				00007 00008
Doorway					00008
GPS Reference Point					00010
GPS Reference Point					10001 10002
GPS Zone					10003
LI RP Reader			~		10004 10005
PROPERTIES OF CAR	TYPE	INHERI	TED FRC		10005
<create new="" property=""></create>					10007
VIN	String		_		10008 10009
delete pending flag	Bool	Object			10010
extent	Space				
ignore tag locations flag	Bool	Object		delete pending flag	false ~
path group	Path Group			ignore tag locations flag	false 🗸 🗸
remove location pending flag	Bool	Object		path group	~
remove tag pending flag	Bool	Object		remove location pending flag	
stale flag	Bool	Object		remove location penaling hag	false 🗸
the shift of _ is active	Bool	Object		remove tag pending flag	false 🗸 🗸
<			>	stale flag	false \checkmark
				the shift of _ is active	false 🗸 🗸
Q <show items<="" matching="" only="" td=""><td>;></td><td></td><td>\otimes</td><td></td><td></td></show>	;>		\otimes		
COMPLEX PROPERTY		TYPE	^		
<create complex="" new="" property=""></create>				Save Cancel	
'Assertion Area' contains 'Assertio	on Point'	Bool			
'Assertion Area' controls 'Object'		Bool			
'Assertion Point' has located 'Obje	ect'	Bool			

Make sure "Car" has an assigned representation model by using **MODEL IMPORT** and **MODEL ASSIGNMENT**.

Attach tags to the objects

Use **TAG ASSOCIATION** to attach tags. The IDs need to match those that will be simulated in the XML script:

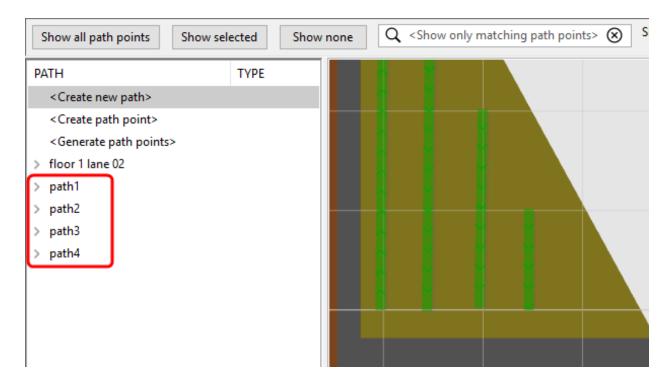
TAG ID.	OWNER	POSITION NAME	х	Y	Z	
<associate object="" tag="" with=""></associate>						
00:11:CE:00:00:00:00:01	00001	Origin	0	0	0	
00:11:CE:00:00:00:00:02	00002	Origin	0	0	0	
00:11:CE:00:00:00:00:03	00003	Origin	0	0	0	
00:11:CE:00:00:00:00:04	00004	Origin	0	0	0	
00:11:CE:00:00:00:00:05	00005	Origin	0	0	0	
00:11:CE:00:00:00:00:06	00006	Origin	0	0	0	
00:11:CE:00:00:00:00:07	00007	Origin	0	0	0	
00:11:CE:00:00:00:00:08	00008	Origin	0	0	0	
00:11:CE:00:00:00:00:09	00009	Origin	0	0	0	
00:11:CE:00:00:00:00:10	00010	Origin	0	0	0	
00:11:CE:00:00:01:00:01	10001	Origin	0	0	0	
00:11:CE:00:00:01:00:02	10002	Origin	0	0	0	
00:11:CE:00:00:01:00:03	10003	Origin	0	0	0	
00:11:CE:00:00:01:00:04	10004	Origin	0	0	0	
00:11:CE:00:00:01:00:05	10005	Origin	0	0	0	
00:11:CE:00:00:01:00:06	10006	Origin	0	0	0	
00:11:CE:00:00:01:00:07	10007	Origin	0	0	0	
00:11:CE:00:00:01:00:08	10008	Origin	0	0	0	
00:11:CE:00:00:01:00:09	10009	Origin	0	0	0	
00:11:CE:00:00:01:00:10	10010	Origin	0	0	0	

Simulated tags assigned to cars in SmartSpace Config TAG ASSOCIATION

Create paths

Use **TYPES / OBJECTS** to create a *Path group*.

Use **PATHS** to create "path1", "path2", "path3" and "path4":



Creating paths for simulation in SmartSpace Config PATHS

Assign a path group

Assign the paths to a group in **SERVICE PARAMETERS**:

🟮 Path tracking : group	- • 💌
РАТН	GROUP
<set group=""></set>	
path1	3rd floor group
path2	3rd floor group
path3	3rd floor group
path4	3rd floor group

Assigning path groups in SmartSpace Config SERVICE PARAMETERS

Monitor the spatial relation

In **SPATIAL PROPERTIES**, make the path group extent contain the paths and monitor the spatial relation:

Path Group ~	
extent ~	
DEFAULT SPACES	
<create default="" new="" space=""></create>	
Q <filter names="" object=""></filter>	
SPECIFIC SPACES	
<create new="" space="" specific=""></create>	
1st floor group	
3rd floor group	
Edit Space View Space	
MONITORED SPATIAL RELATIONS	REQUESTED BY
<add new="" request=""></add>	
Assertion Area extent contains Assertion Point origin	Location rules
Building extent contains Doorway extent	Room snapping
Building extent contains Room extent	Room snapping
Path Group extent contains Bus extent	SmartSpace Config
Path Group extent contains Car extent	SmartSpace Config

Monitoring the spatial relation in SmartSpace Config SPATIAL PROPERTIES

Run the simulation

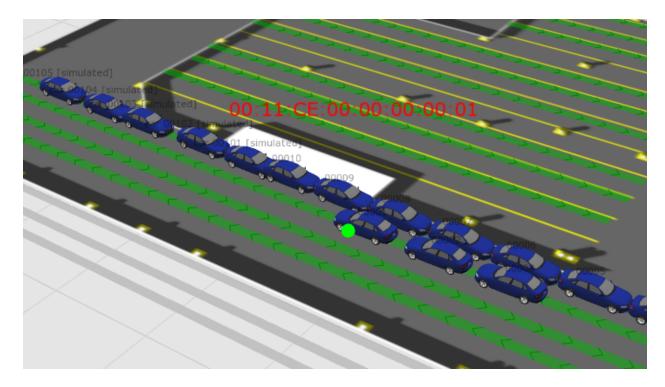
Assuming your cell is called "Location Cell 00001", run the following on a Windows command line:

type path_simulation.xml | ubisense_path_simulation_admin.exe start "Location Cell
00001"

Or this on a Unix-style command line:

ubisense_path_simulation_admin start "Location Cell 00001" < path_simulation.xml</pre>

Back in SmartSpace Config, turn on *Show foreground objects* in the PATHS map. Double-click an object to see its tag being simulated:



Simulated cars shown on the map in SmartSpace Config PATHS