



# Realworld SyncManager

## Transparent synchronization between Smallworld GIS and Oracle Spatial

### Overview

Data synchronization between different environments, like the Smallworld Geographic Information System and Oracle Spatial, is inherently difficult. In order to achieve a meaningful synchronization many differences need to be consolidated. Various synchronization tools, like Smallworld Smallworld Insync, are designed to fill a specific need and often know limitations. | offers data synchronization in an open environment.

Realworld

### Design Principles

Performance	The product has been engineered to deliver the best possible performance.
Simplicity	Simplicity in terms of user interface, design and deployment.
Extensibility	The product has been designed in a manner to enable ease of expansion for future functionality.
Error Handling	System deals with degenerate input and software faults in a graceful fashion. This provides users with meaningful error-handling feedback.
Data model evolution	In production environments, data model changes often occur. SyncManager will show exactly which fields, tables, relations have changed and gives the user the option to automatically update the model and data in Oracle.

### Features

#### Speed

The Realworld SyncManager is fast. It is fast because it uses the fastest possible way of extracting data out of a Smallworld datastore: data-marshaling. It is fast because it delegates

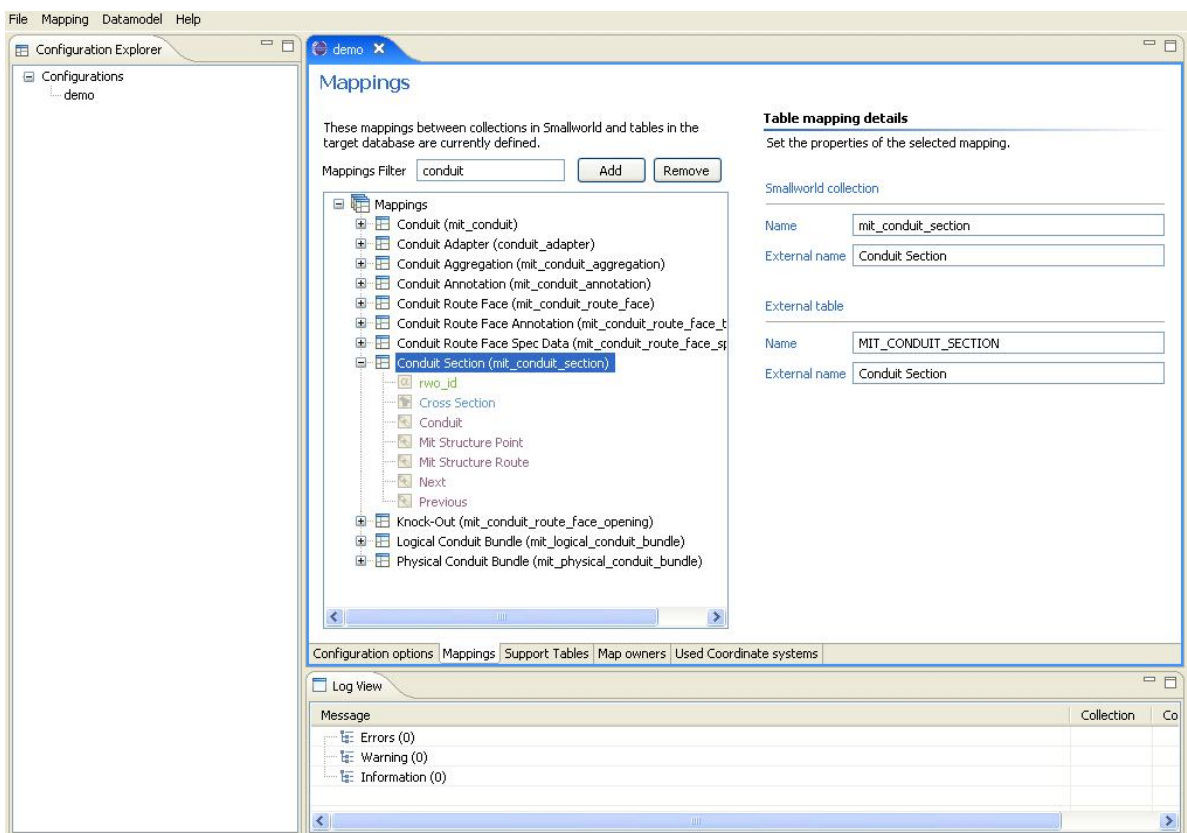
the burden of converting from Smallworld format to Oracle format out of Smallworld Magik to a Java process. It is fast because it uses multithreading and Oracle batch loading capabilities

**Geometry**

The Realworld SyncManager has comprehensive geometry support. Points, oriented or not, lines, areas and texts are all supported.

**Topology**

Full network topology can be transferred into Oracle Topology. This can be specified per individual Manifold.



*Pic 1. SyncManager Mapping Interface version 1.1*

**Internal Worlds**

The Realworld SyncManager provides a set of metadata tables which makes it possible to support the concept of multiple worlds in Oracle. It even makes possible to have geometries from two different coordinate systems stored in the same column of an Oracle table.

**Dimensioning support**

Smallworld Dimensioning is a complex object that is mostly drawn using custom draw methods. When just exporting the database components of it, the Oracle viewers will not be able to

display the dimensioning correctly. To solve this, SyncManager captures the result of the drawing methods and exports that to Oracle. This way dimensioning will look the same in Oracle.

The Realworld SyncManager provides a GUI that makes defining and managing mapping configuration as easy as 1, 2, 3. To create the data model in Oracle it is just a matter of a few clicks.

The GUI takes advantage of an improved naming engine that automatically truncates the names that are longer than what Oracle accepts as names for tables, columns or constraints. If unhappy with the default names, the GUI always allows for manual substitution.

Smallworld data model changes? The GUI has the option to check for that and automatically update the mapping configuration to reflect the latest Smallworld data model. Once the new mapping configuration is up to date, the GUI allows for data model propagation to the Oracle side.

Ever wanted to re-export a collection without having to re-export the complete database? The GUI lets you do just that, mark collections for re-export. That works just fine.

### **Joins**

The Realworld SyncManager has support for joins. Any X-Y type of joins. When defining the mapping configuration, they are treated like any other fields with no special input required from the user. When the Oracle data model is created, everything regarding join support ( constraints, foreign keys, intermediate tables) it is taken care of.

### **Quality Assurance**

During the replication/synchronization process, errors can appear due to unforeseen causes. The Realworld SyncManager catches all these errors so the process can continue unhindered and stores them in a persistent storage. The persistent storage enables the users to browse the errors and take the appropriate resolution steps. Once errors are solved, the previously failed data will be available for next synchronization round.

If for any reason the replication process is stopped, when the SyncManager runs again the failed configuration it knows which collection to replicate and which collection to synchronize.

## **Comparison with Smallworld Insync**

Smallworld Insync is a tool for synchronizing data with Oracle that is delivered standard with Smallworld. It has a number of features that overlap with SyncManager, but there are significant differences that are critical for a synchronization process in a production environment.

Feature	Smallworld Insync	SyncManager
Geometry Export	✓	✓
Alphanumeric data export	✓	✓
Bidirectional export	✓	(next version)
1:n Join export	✓	✓
0:n, 0:1, 0:0 join export		✓
Topology export		✓
Fast datatransfer		✓
Geometry Mapping		✓
Internal worlds export		✓
Support for data model changes		✓
Metadata export		✓

## About the development of SyncManager

When starting to export data from Smallworld to Oracle, the initial approach was to configure and deploy Smallworld Insync, as this is a standard part of the Smallworld core technology.

The Smallworld Insync software turned out to be of best use when tables without relationships and many geometries were exported and synchronized. Due to the record-by-record data transfer mechanism, the maximum transfer speed was limited. Also all data transformation was done in Smallworld Magik, which is inherently slow.

Mapping changes that occur after having synchronized lead require full re-export of data. Also data model changes require special attention.

This led to the decision to start a new development to overcome these problems.

Many man years of experienced developer time, testing time and improvement time has gone into the product. There is a team that takes care of all aspects of SyncManager and ensures that its users get prompt support.

## What's next?

There are some features that did not make it into the first release. There are other features that were intentionally left for the next release. Below is a list of them, just to let you know what the future holds for Realworld SyncManager:

- Flexible mapping definition: define mappings between existing Smallworld and Oracle models.
- 2-Way synchronization for alphanumeric fields.
- Pre-export Smallworld data check. This gives insight in where data problems occur when transferring data from Smallworld to Oracle.