

The
Spatial Adjustment Manager
Interface to
Smallworld via
Safe Software's FMEObjects
and the SpatialBiz Plugin -
White Paper

by:
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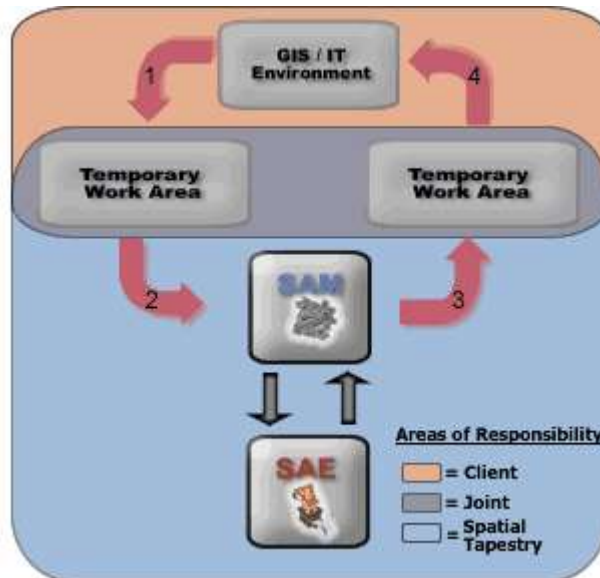
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Introduction

The Spatial Adjustment Manager (SAM) implements a number of interfaces to 'Temporary Work Areas' (TWA). These TWA's can be files, database tables and even GIS Vendor or 3rd Party Objects.

This document describes the interface implemented at Energy Australia (NSW, 2005).

The following diagram shows the flow of the data from the Corporate GIS through the upgrade process and back into the Corporate GIS.



High Level SAM/SAE Integration.

The TWA in this instance is a collection of Smallworld “**Themes**” which are documented below.

The TWA also represents a situation where the Client and Spatial Tapestry have shared responsibilities, which are also documented below.

The Strategy

There are several categories of data needed for SAM/SAE to successfully carry out a Utility Upgrade, being:

OLDDCDB	The polygon theme containing the old/original cadastre.
UTIL	The point, text, polyline and polygon (etc) themes representing the various utility layers, and being in the correct position relative to the OLDDCDB theme.
NEWDCDB	The polygon theme containing the new/destination cadastre against which the utility layers will be placed.
OLDDCDB_PNT	The (optional) Point Theme containing points in the OLDDCDB theme with a common tag matching points in the NEWDCDB_PNT theme.
NEWDCDB_PNT	The (optional) Point Theme containing points in the NEWDCDB theme with a common tag matching points in the OLDDCDB_PNT theme.
PROPOSEDCAD	The polygon theme containing the proposed/developer cadastre against which the 'Proposed Utility' was placed.
PROPOSEDUTIL	The point, text, polyline and polygon (etc) themes representing the

various utility layers, and being in the correct position relative to the PROPOSEDCAD theme.

Some Cadastral Custodians maintain a Point Theme with Unique Identifiers for every vertex in the digital cadastral. This can be of assistance in the SAE Topology Matching routines if their process is well maintained and gives a higher hit rate than the SAE routines. The categories of “OLDDCDB_PNT” and “NEWDCDB_PNT” are used to tag such optional and paired themes.

Most Utilities maintain a theme showing their proposed/as-built utilities against some form of the proposed subdivisions. There are at least two variations on how the proposed subdivisions are held.

The first variation is where the proposed subdivisions are simply calculated into the GIS (as a separate layer), with the result being a very well placed representation of the cadastral. In this variation the “PROPOSEDCAD” and “PROPOSEDUTIL” categories can be used to instruct SAM/SAE to move the Proposed Utility layers to the “NEWDCDB” layer (even though the “NEWDCDB” layer may not be well represented).

The second variation is where the proposed subdivisions are cut into the existing digital cadastral in the GIS. This variation is supported by tagging this “proposed utility” layer as “UTIL” allowing SAM/SAE to upgrade it with the same shifts derived between the “OLDDCDB” and “NEWDCDB” themes.

The handling of Smallworld Themes

SAM has attempted a generic implementation of FMEObjects Readers and Writers.

A Reader to FMEObjects is a complex object driven by Directives and Parameters. These operate together to describe the exact source of the data (both spatial and aspatial) and how the data should be treated as it is read in.

A Writer to FMEObjects is also a complex object driven by Directives and Parameters. These operate together to describe the exact destination of the data (both spatial and aspatial) and how the data should be treated as it is written out.

Each Smallworld “**Theme**” needs at least the reader, and the “OLDDCDB” and “UTIL” themes also require a Writer.

All the Reader's and Writer's Parameters and Directives need to be recorded between sessions to speed workflow and help minimise configuration errors.

These Parameters and Directives are recorded in “.rwd” files, which are maintained by the DataExplorer form in SAM.

In the production system left in place there were three such .rwd files, being:

- ea_newDCDB.rwd describing the new/destination DCDB theme in Smallworld
- ea_oldDCDB.rwd describing the old/source DCDB theme in Smallworld
- ea_utils.rwd describing the composite Utility theme in Smallworld

These three files are listed below for informational purposes.

Treatment of Digital Cadastral Themes

There is one Smallworld “**Theme**” each for the “OLDDCDB” and “NEWDCDB” themes.

The “ea_newDCDB.rwd” and “ea_oldDCDB.rwd” point FME Objects via the SpatialBIZ PlugIn to identical object structures that hold the geometries for each parcel polygon in the job to be processed.

The two sets of geometries are 'flattened' into ????.

Treatment of Utility Themes

There is a single table for all the "UTILITY" themes.

Management of Job Processing

The "SLIDE_MANAGEMENT" table is used to describe each job being transferred out of the GIS/IT environment and into SAM/SAE.

Responsibilities

The Temporary Work Area, in this instance, is a set of tables which both the Client's software and SAM must have read, write and delete permissions.

The following table sets out these permissions:

<i>Table Name</i>	<i>Client Software</i>	<i>SAM</i>
SLIDE_LAND_SRCE	Read, Write, Delete	Read, Write
SLIDE_LAND_DEST	Read, Write, Delete	Read
SLIDE_FEATURE	Read, Write, Delete	Read, Write
SLIDE_MANAGEMENT	Read, Write, Delete	Read, Write
SLIDE_UID_DEST	Read, Write, Delete	Read
SLIDE_UID_SRC	Read, Write, Delete	Read

Client Responsibilities

The Client's software must populate all the above tables as described above, with the coordinate values in the agree projection which is specified in the .SAM_SAE script.

At some point after a given job has been checked back into the GIS/IT Environment the client's software must delete all data from these tables for the given job, otherwise these tables will become very large and performance will suffer.


SAM Responsibilities

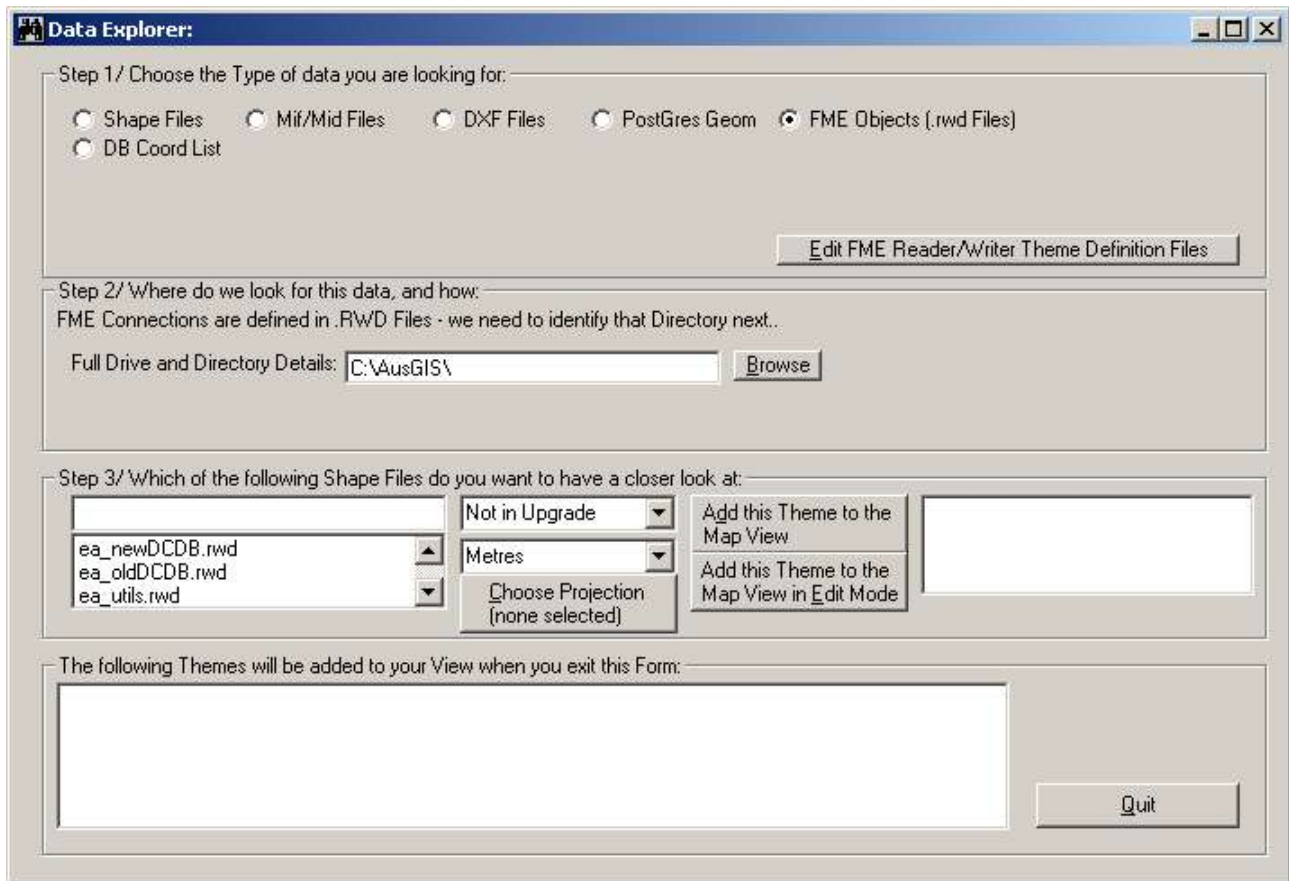
The SAM application has the responsibility of reading an entire upgrade job from these tables and carrying out a Utility Upgrade.

When the supervisor has used SAM's functionality to ensure the result is as good as is possible then the supervisor saves the upgraded themes to the Temporary Work Area. This process results in writing the ?????????????????? tables.

Operation of SAM's Data Explorer

Connecting SAM to the Integraph G/Technology tables is described:

Within the SAM GUI, click on the () button to open the Data Explorer form, as shown below:



Choose “FME Objects (.rwd Files)” and the Data Explorer will display “ea_newDCDB.rwd”, “ea_oldDCDB.rwd” and “ea_utils.rwd” in the “Step 3/” panel.

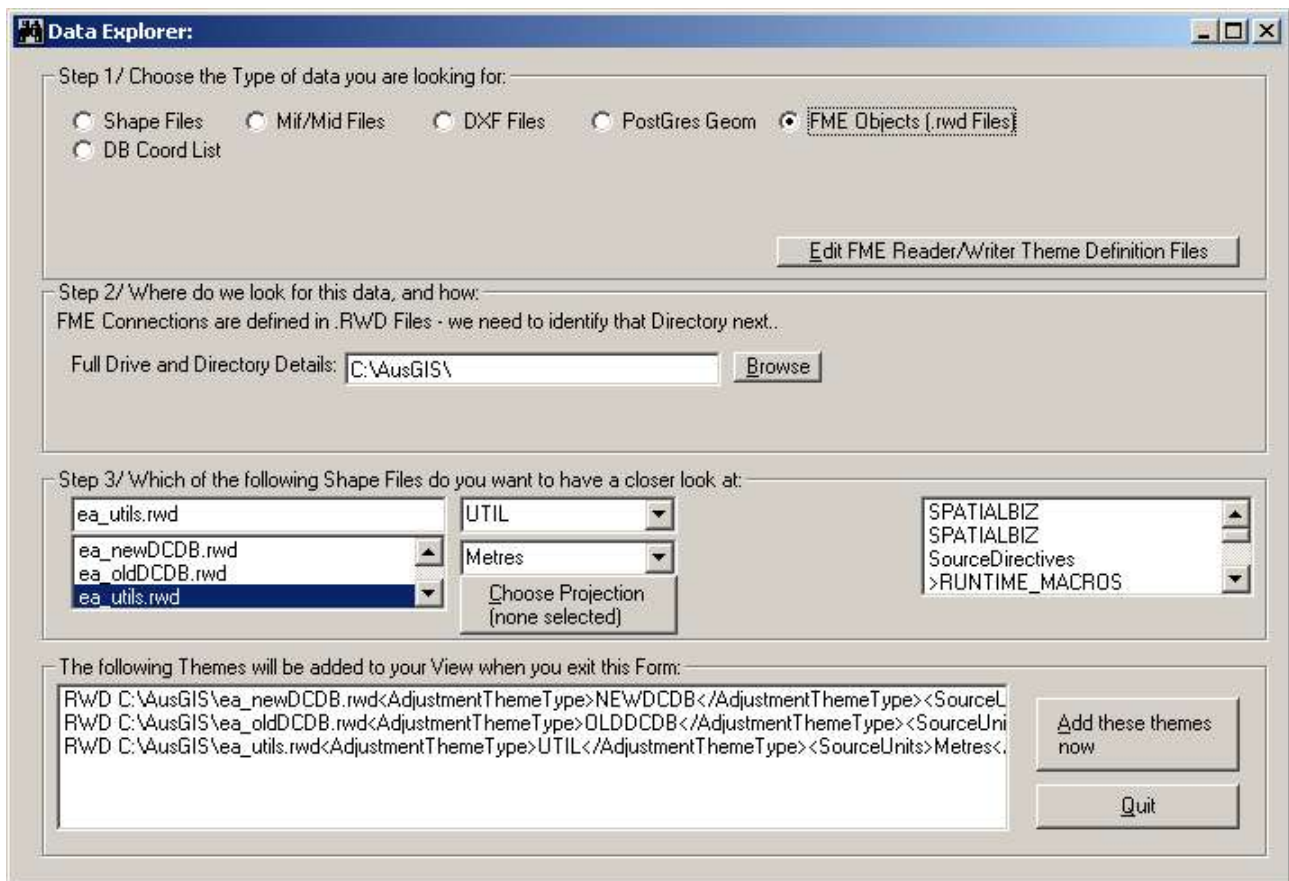
The Projection should not be set.

Click on “ea_newDCDB.rwd”, choose “NEWDCDB” and “Metres” and “Add this Theme”.


Click on “ea_oldDCDB.rwd”, choose “OLDDCDB” and “Metres” and “Add this Theme”.

Click on “ea_utils.rwd”, choose “UTIL” and “Metres” and “Add this Theme”.

The resulting form should appear as:



Click “Add These themes now”.

SAM should now display the spatial data for this upgrade job. The user may need to zoom to the data by clicking the “Zoom to World” () button.

Please refer to other documentation for the following steps in running the SAM/SAE application.

Sample .rwd Files

The following file is appropriate for new/destination ourceDCDB:

```

SPATIALBIZ
SPATIALBIZ
SourceDirectives
>RUNTIME_MACROS
>SERVER,spatial,PORT,3000,SERVICE,sbs_fme,_ALTERNATIVE,|
fme_test,TABLELIST,temp_gis:ea_land_new_adjustment_geometry,_MINX,,_MINY,,_WIDTH
,,_HEIGHT,,SPATIALBIZ_USE_ENVELOPE,no,_MERGE_SCHEMAS,YES
>META_MACROS
>SourceSERVER,spatial,SourcePORT,3000,SourceSERVICE,sbs_fme,Source_ALTERNATIVE,|
fme_test,Source_MINX,,Source_MINY,,Source_WIDTH,,Source_HEIGHT,
>METAFILE
>SPATIALBIZ
>COORDSYS
>

```

```

>IDLIST
>temp_gis:ea_land_new_adjustment_geometry<old_area>,temp_gis:ea_land_new_adjustment_geometry<old_chain>,temp_gis:ea_land_new_adjustment_geometry<old_point>,temp_gis:ea_land_new_adjustment_geometry<old_simple_area>,temp_gis:ea_land_new_adjustment_geometry<old_simple_chain>,temp_gis:ea_land_new_adjustment_geometry<old_simple_point>,temp_gis:ea_land_new_adjustment_geometry<old_text>
SourceParameters
>EXPAND_CELLS
>no
>SWORLD_SERVER
>spatial
>SWORLD_PORT
>3000
>PRESERVE_CELL_INSERTS
>yes
>SPLIT_MULTITEXT
>no
>PROPOGATE_CHAIN_ELEMENT_LINKAGES
>no
>UNITS
>SWORLD_MASTER_UNITS
DestinationDirectives
>RUNTIME_MACROS
>SERVER,spatial,PORT,3000,SERVICE,sbs_fme,_ALTERNATIVE,|
fme_test,TABLELIST,temp_gis:ea_land_new_adjustment_geometry,_MINX,,_MINY,,_WIDTH,,_HEIGHT,,SPATIALBIZ_USE_ENVELOPE,no,_MERGE_SCHEMAS,YES
>META_MACROS
>SourceSERVER,spatial,SourcePORT,3000,SourceSERVICE,sbs_fme,Source_ALTERNATIVE,|
fme_test,Source_MINX,,Source_MINY,,Source_WIDTH,,Source_HEIGHT,
>METAFILE
>SPATIALBIZ
>COORDSYS
>
>IDLIST
>temp_gis:ea_land_new_adjustment_geometry<old_area>,temp_gis:ea_land_new_adjustment_geometry<old_chain>,temp_gis:ea_land_new_adjustment_geometry<old_point>,temp_gis:ea_land_new_adjustment_geometry<old_simple_area>,temp_gis:ea_land_new_adjustment_geometry<old_simple_chain>,temp_gis:ea_land_new_adjustment_geometry<old_simple_point>,temp_gis:ea_land_new_adjustment_geometry<old_text>
DestinationParameters
>EXPAND_CELLS
>no
>SWORLD_SERVER
>spatial
>SWORLD_PORT
>3000
>PRESERVE_CELL_INSERTS
>yes

```

```
>SPLIT_MULTITEXT
>no
>PROPOGATE_CHAIN_ELEMENT_LINKAGES
>no
>UNITS
>SWORLD_MASTER_UNITS
```

The following file is appropriate for old/source DCDB:

```
SPATIALBIZ
SPATIALBIZ
SourceDirectives
>RUNTIME_MACROS
>SERVER,spatial,PORT,3000,SERVICE,sbs_fme,_ALTERNATIVE,|
fme_test,TABLELIST,temp_gis:ea_land_adjustment_geometry,_MINX,,_MINY,,_WIDTH,,_H
EIGHT,,SPATIALBIZ_USE_ENVELOPE,no,_MERGE_SCHEMAS,YES
>META_MACROS
>SourceSERVER,spatial,SourcePORT,3000,SourceSERVICE,sbs_fme,Source_ALTERNATIVE,|
fme_test,Source_MINX,,Source_MINY,,Source_WIDTH,,Source_HEIGHT,
>METAFILE
>SPATIALBIZ
>COORDSYS
>
>IDLIST
>temp_gis:ea_land_adjustment_geometry<old_area>,temp_gis:ea_land_adjustment_geom
etry<old_chain>,temp_gis:ea_land_adjustment_geometry<old_point>,temp_gis:ea_land
_adjustment_geometry<old_simple_area>,temp_gis:ea_land_adjustment_geometry<old_s
imple_chain>,temp_gis:ea_land_adjustment_geometry<old_simple_point>,temp_gis:ea_
land_adjustment_geometry<old_text>
SourceParameters
>EXPAND_CELLS
>no
>SWORLD_SERVER
>spatial
>SWORLD_PORT
>3000
>PRESERVE_CELL_INSERTS
>yes
>SPLIT_MULTITEXT
>no
>PROPOGATE_CHAIN_ELEMENT_LINKAGES
>no
>UNITS
>SWORLD_MASTER_UNITS
DestinationDirectives
>RUNTIME_MACROS
>SERVER,spatial,PORT,3000,SERVICE,sbs_fme,_ALTERNATIVE,|
```

```

fme_test, TABLELIST, temp_gis:ea_land_adjustment_geometry, _MINX,, _MINY,, _WIDTH,, _H
EIGHT,, SPATIALBIZ_USE_ENVELOPE,no, _MERGE_SCHEMAS, YES
>META_MACROS
>SourceSERVER, spatial, SourcePORT, 3000, SourceSERVICE, sbs_fme, Source_ALTERNATIVE, |
fme_test, Source_MINX,, Source_MINY,, Source_WIDTH,, Source_HEIGHT,
>METAFILE
>SPATIALBIZ
>COORDSYS
>
>IDLIST
>temp_gis:ea_land_adjustment_geometry<old_area>, temp_gis:ea_land_adjustment_geom
etry<old_chain>, temp_gis:ea_land_adjustment_geometry<old_point>, temp_gis:ea_land
_adjustment_geometry<old_simple_area>, temp_gis:ea_land_adjustment_geometry<old_s
imple_chain>, temp_gis:ea_land_adjustment_geometry<old_simple_point>, temp_gis:ea_
land_adjustment_geometry<old_text>
DestinationParameters
>EXPAND_CELLS
>no
>SWORLD_SERVER
>spatial
>SWORLD_PORT
>3000
>PRESERVE_CELL_INSERTS
>yes
>SPLIT_MULTITEXT
>no
>PROPOGATE_CHAIN_ELEMENT_LINKAGES
>no
>UNITS
>SWORLD_MASTER_UNITS

```

The following file is appropriate for old/source DCDB:

```

SPATIALBIZ
SPATIALBIZ
SourceDirectives
>RUNTIME_MACROS
>SERVER, spatial, PORT, 3000, SERVICE, sbs_fme, _ALTERNATIVE, |
fme_test, TABLELIST, temp_gis:ea_adjustment_geometry, _MINX,, _MINY,, _WIDTH,, _HEIGHT
,, SPATIALBIZ_USE_ENVELOPE,no, _MERGE_SCHEMAS, YES
>META_MACROS
>SourceSERVER, spatial, SourcePORT, 3000, SourceSERVICE, sbs_fme, Source_ALTERNATIVE, |
fme_test, Source_MINX,, Source_MINY,, Source_WIDTH,, Source_HEIGHT,
>METAFILE
>SPATIALBIZ
>COORDSYS
>
>IDLIST

```

```
>temp_gis:ea_adjustment_geometry<old_area>,temp_gis:ea_adjustment_geometry<old_c  
hain>,temp_gis:ea_adjustment_geometry<old_point>,temp_gis:ea_adjustment_geometry  
<old_simple_area>,temp_gis:ea_adjustment_geometry<old_simple_chain>,temp_gis:ea_  
adjustment_geometry<old_simple_point>,temp_gis:ea_adjustment_geometry<old_text>
```

SourceParameters

```
>EXPAND_CELLS  
>no  
>SWORLD_SERVER  
>spatial  
>SWORLD_PORT  
>3000  
>PRESERVE_CELL_INSERTS  
>yes  
>SPLIT_MULTITEXT  
>no  
>PROPOGATE_CHAIN_ELEMENT_LINKAGES  
>no  
>UNITS  
>SWORLD_MASTER_UNITS
```

DestinationDirectives

```
>RUNTIME_MACROS  
>SERVER,spatial,PORT,3000,SERVICE,sbs_fme,_ALTERNATIVE,|  
fme_test,TABLELIST,temp_gis:ea_import_adjustment_geometry,_MINX,,_MINY,,_WIDTH,,  
_HEIGHT,,SPATIALBIZ_USE_ENVELOPE,no,_MERGE_SCHEMAS,YES  
>META_MACROS  
>SourceSERVER,spatial,SourcePORT,3000,SourceSERVICE,sbs_fme,Source_ALTERNATIVE,|  
fme_test,Source_MINX,,Source_MINY,,Source_WIDTH,,Source_HEIGHT,  
>METAFILE  
>SPATIALBIZ  
>COORDSYS  
>  
>IDLIST  
>temp_gis:ea_import_adjustment_geometry<area>,temp_gis:ea_import_adjustment_geom  
etry<chain>,temp_gis:ea_import_adjustment_geometry<point>,temp_gis:ea_import_adj  
ustment_geometry<simple_area>,temp_gis:ea_import_adjustment_geometry<simple_chai  
n>,temp_gis:ea_import_adjustment_geometry<simple_point>,temp_gis:ea_import_adjus  
tment_geometry<text>
```

DestinationParameters

```
>EXPAND_CELLS  
>no  
>SWORLD_SERVER  
>spatial  
>SWORLD_PORT  
>3000  
>PRESERVE_CELL_INSERTS
```

>yes

>SPLIT_MULTITEXT

>no

>PROPOGATE_CHAIN_ELEMENT_LINKAGES

>no

>UNITS

>SWORLD_MASTER_UNITS