

SIMPLEBIM 4 TEMPLATE GUIDE

Templates are the key for using simplebim® effectively. With templates you can automate for example trimming and extending the model, editing model data, setting validation rules, grouping and enriching the model. This guide covers the idea and structure of simplebim templates. It also contains a detailed reference of all the sections found in templates and some walk-throughs for common usage scenarios. In addition to this guide we have related video tutorials on our web site at www.datacubist.com/tutorials

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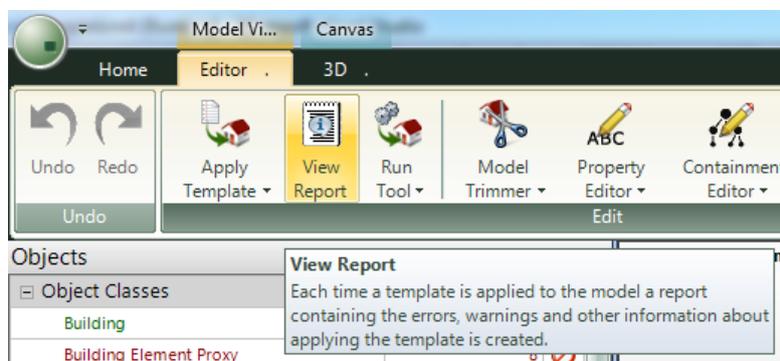
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TEMPLATE SYSTEM OVERVIEW

Templates are used for automating operations in simplebim®. Templates are straight forward Excel files that follow a certain structure. For creating templates you can modify one of the templates that ship with simplebim, download samples from the simplebim web site or create a new template from scratch.

Templates can be ultra-simple, containing just a few items. But you can also create very advanced templates by chaining templates (applying templates in a sequence) and running tools as part of your template. Templates can also be integrated to simplebim add-ons such that a template is applied automatically by the add-on, and templates can even be used by the simplebim command line for batch processing models.

When you use a template you first import or open a model and then apply one or more templates to it. From the startup screen in simplebim you can also choose to import a model with a template. This first imports the model and then automatically applies the template you chose.



When you have applied your template, please be sure to check the template report. This report gives you in-depth information about how the template was interpreted, including any warnings and errors that may have occurred.

You can install templates by copying them into the User Templates folder. Installed templates show up in the simplebim startup screen and menus making them very easy to use. The other option is to select a template from anywhere on your system using a File Open dialog

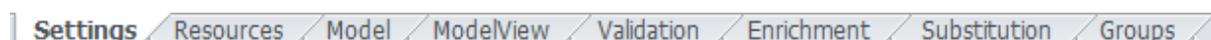
Excel does not have to be installed on the computer where the templates are used. You need Excel only for editing the templates.

This guide applies to simplebim version 4.0. Older template versions are backward compatible, so you do not have to convert your templates to the latest version. However, when you create new templates we recommend that you always use the latest version.

TEMPLATE STRUCTURE

Simplebim® templates are Excel files that have a pre-defined set of Worksheets and on each Worksheet a set of Sections. You should not change the names of the Worksheets or Sections and you should also not re-arrange the Sections.

Templates contain the following Worksheets



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Settings	Template metadata and various settings
Resources	Definitions for objects and properties, including mapping to IFC
Model	Editing the model schema and model data
ModelView	Defining the relevant part of the model, setting object appearances
Validation	Defining validation rules for the model data
Enrichment	Adding new data to the model
Substitution	Defining list of values that can be used in the template to make it more compact and easier to maintain
Groups	Defining groups of objects that can be used for more precise control of editing and validation

Template worksheets are applied from left to right and the sections on each worksheet from top to bottom.

The following information and rules apply to all sections in a template

Template

Name	Template template
Description	This is a template for creating simplebim templates
Author	
Key	<div style="border: 1px solid black; padding: 5px;"> The group of this template. If a group is given, templates can be shown grouped in the user interface of simplebim. </div>
Group	
Version	
Startup	
Read Only	
Link	

A small red triangle denotes a comment. Hover over it with the mouse to see information relevant to that section or field.

Cells may have dropdown lists that you can use for selecting from a list of valid values. The dropdown lists also have tooltips with helpful information.

Fields with a green background are mandatory; fields with a purple background are optional. Optional fields are either not always needed or have a default value. Check the tooltip for the default value.

Tools

*	Name or GUID	Sequence	Parameter#1	Parameter#2	Parameter#3

Sections with a variable number of rows have horizontal headers and 3 rows by default. You can add any number of new rows to such a section. You can also have empty rows within a section, but if you have more than 20 empty rows in a sequence the subsequent rows and any sections after will not be processed.

NOTE: The best way to add new rows is to start your row selection from a middle row (not first and not last), select down as many rows as you wish to add and

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select Insert. This will maintain the formatting of the new rows, including dropdown lists on the cells.

It is easier to maintain your templates and avoid mistakes if you reference cells containing e.g. a name or key instead of copying that name or key to a different cell. You can use any Excel techniques, including formulas, to manage your template data more effectively.

In many places fields accept both a Name and a Key. The Name of an item (template, object, property etc.) is a human understandable name shown in the user interface. The key is the internal identification of the item used by simplebim for uniquely identifying the item. Normally the Name works well, but if two or more items have the same Name, then the key can be used for distinguishing between these items. Using the Name is easy but contains some risk when several items have the same name. Using the Key is always safe, but templates that use Keys are more difficult for humans to read.

NOTE: Names and keys are always case insensitive and any whitespace (spaces) at the beginning and end of the name or key are ignored

In many places a cells accept a list of values. Such properties are marked with a [+]. The following techniques can be used for defining lists.

Technique	Description
Multi value cell	You can add a new row into a cell by pressing Alt + Enter. The value of each row within a cell is treated as a separate item in the list.
Multi row values	You can add new empty rows and put each item on a separate row on the same column.
Multi column values	If the column with the list is the last one on the right in that section, you can add new items on the same row on the empty columns on the right.
Separators	In some places you can define a separator and put multiple items into the same cell separated by the separator you defined.
Substitution	Substitution chapter of this guide for more information about using Substitution in templates

You can use any combination of the techniques described above in a single cell that accepts a list of values.

SETTINGS - WORKSHEET

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The settings worksheet has the following sections

Section	Description
Template	Metadata information about the template. Only needed if the template is installed.
Model Author	Setting information about the model author
Model License	Setting information about the model license
Depends on Templates	Used for chaining templates (advanced)
Tools	Used for running tools as part of the template
IFC Import Settings	Used for configuring the IFC import
IFC Import Configuration	Used for configuring the IFC import (advanced)
IFC Export Settings	Used for configuring the IFC export

TEMPLATE -SECTION

When you install a template the information in this section is used for displaying and organizing templates in the user interface. For templates that are not installed this section can be left empty.

Field	Value	Description
Name	Text	The name of the template shown in the user interface. The name of the template file is not shown.
Description	Text	The description of the template shown in the user interface
Author	Text	The author (person and/or organization) of the template
Key	Text	The unique key of the template. If multiple templates have the same key simplebim will only load the latest version of the template. (see Version)
Group	Text	The group to which the template belongs. This can be for example an organization, application or project. Templates can be grouped in the user interface based on this information.
Version	Whole Number	The version of the template. Incrementing the version after modifying the template ensures that you are always using the latest version of your template.
Startup	Yes/ <u>No</u>	Should the template be shown in the startup screen of simplebim?
Read Only	Yes/ <u>No</u>	Should the user be able to edit and delete the template? If a template is read only it can still be copied and the copy can be edited.
Link	URI	A link to the documentation of the template

A picture inserted anywhere on the Settings worksheet will be used as the icon of the template in the simplebim user interface. The recommended size for the picture is 64x64 pixels.

MODEL AUTHOR -SECTION

Information in this section appears in the 'Author and License' dialog in the simplebim user interface and is written to IFC as a property set attached to the project.

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Field	Value	Description
Author	Text	The name of the author of the model
Author Address	Text	The postal address of the author of the model
Author Email	Text	The email address of the author of the model
Author Phone	Text	The phone number of the author of the model

MODEL LICENSE -SECTION

Information in this section appears in the 'Author and License' dialog in the simplebim user interface and is written to IFC as a property set attached to the project.

Field	Value	Description
Authorized Uses	Text	The uses for which the model is intended and authorized by the model author, like clash detection, quantity take-off...
Authorized Use Context	Text	The context in which the model may be used, typically a project
Authorized Users	Text	The authorized users of the model
Contract	Text	The contract governing the use of the model, typically a project agreement
Validity Period	Text	The validity period of the model, i.e. how long the model can be used

DEPENDS ON TEMPLATES –SECTION

This section is used for chaining templates by defining which templates must be applied before the current template is applied. This is covered in more detail in the Advanced Techniques chapter of this guide.

Field	Value	Description
Template Name or Key	Text	The name or key of the template this template depends on.

TOOLS –SECTION

In this section you can specify which Tools are run as part of this template. Tools are software modules that can process the models in ways that are not supported by templates.

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Field	Value	Description
Name or GUID	Text	The Name or GUID of the tool. You can see the names of the installed Tools in the About dialog of simplebim. If you are developing the Tool yourself, you can also use its GUID.
Sequence	Choice	You can define when the Tool is run. Default is after the template has been applied (After Template).
Parameter#1-3	Text	You can define parameters that are passed to the Tool. Please consult the documentation of the Tool for the parameters supported by that Tool. The format for parameters is: KEY ...or... KEY=VALUE If you need to pass more than 3 parameters, simply add the additional parameters on the next columns on the same row.

IFC IMPORT SETTINGS –SECTION

With IFC import settings you can optimize the IFC import. When you exclude information from the import this will speed up the import but the excluded information will not be available to you when you validate, copy-edit and export the model.

Field	Value	Description
Import 2D Annotations	Yes/ <u>No</u>	2D annotations are symbolic 2D representations of objects.
Import 3D Faces	Yes/ <u>No</u>	Faces are needed by tools that modify the 3D geometry. They have no effect on how the IFC is exported.

IFC IMPORT CONFIGURATION –SECTION

In this section you can configure the IFC import on a lower level. The items in 'IFC Import Settings' are shortcuts for configurations that could also be done in this section, but not all possible configurations have these shortcuts.

Field	Value	Description
Action	Choice	Set Adds the key and overrides any existing value of the given key
		Remove Removes the key and any value of the key
		Append Value Appends the value to the existing value of the given key
Configuration Key	Text	The configuration key. For supported configuration keys please consult the technical documentation of the simplebim IFC import module
Configuration Value	Text	The configuration value. For supported values for each configuration key please consult the technical documentation of the simplebim IFC import module

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IFC EXPORT SETTINGS –SECTION

With IFC export settings you can control several aspects of the IFC export. The same settings can be found in the IFC Export Settings dialog in simplebim.

Field	Value	Description
IFC File Mark	Text	The text that is appended in brackets to the name of the imported IFC file at export. Default is "EDITED"
Export Space Boundaries	Yes/ <u>No</u>	Export the space boundaries that are present in the imported IFC model? NOTE: simplebim does not generate space boundaries if they are missing from the imported IFC model.
Export Wall-to-Wall Connections	Yes/ <u>No</u>	Export the wall-to-wall connections that are present in the imported IFC model? NOTE: simplebim does not generate wall-to-wall connections if they are missing in the imported IFC model.
Export Grids	Yes/ <u>No</u>	Export the design grid objects that are present in the imported IFC model?
Export Original Materials	Yes/ <u>No</u>	Export the material definitions (material, material layer, material layer set) that are present in the imported IFC model? If No, simplebim will use the value of the 'Material Name' property as a simple material definition.
Export Original Classifications	Yes/ <u>No</u>	Export the classification references that are present in the imported IFC model? If No, simplebim will simplify the classification references.
Export Original Layer Assignments	Yes/ <u>No</u>	Export the layer assignments that are present in the imported IFC model? If No, simplebim will use the value of the 'Layer Assignment Name' property as a simple layer assignment.
Export Original Groups	Yes/ <u>No</u>	Export the groups that are present in the imported IFC model. If No, simplebim will use its own logic for creating the groups.
Export Original Systems	Yes/ <u>No</u>	Export the systems that are present in the imported IFC model. If No, simplebim will use its own logic for creating the systems.
Export Original Zones	Yes/ <u>No</u>	Export the zones that are present in the imported IFC model. If No, simplebim will use its own logic for creating the zones.
Export Original Electrical Circuits	Yes/ <u>No</u>	Export the electrical circuits that are present in the imported IFC model. If No, simplebim will use its own logic for creating the electrical circuits.
Export Original Properties	Yes/ <u>No</u>	Export all properties that are present in the imported IFC model, even if they are excluded in simplebim? If No, simplebim will export only the included properties.

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Field	Value	Description
Export Colors of 3D Objects	<u>Yes/No</u>	Export the colors used for objects in simplebim, i.e. the colors you see in the simplebim 3D window? If No, then no color information will be exported.
Export Legacy Colors of 3D Objects	<u>Yes/No</u>	Export the colors used for objects in simplebim, i.e. the colors you see in the simplebim 3D window using an old encoding that is required or works better in some applications. NOTE: You can try 'Legacy Colors' if 'Colors' does not work for you.
Export 3D Objects with no or Invalid Geometry	<u>Yes/No</u>	Export 3D objects that have no geometry at all or have invalid geometry.
Exclude Openings of Excluded 3D Objects	<u>Yes/No</u>	Exclude opening elements / holes for excluded 3D objects? Examples: For architectural models used in structural design you may want to exclude doors and windows, but want to include their openings. For structural models used for design coordination you may want to exclude both bolts and bolt holes.
Exclude all Openings	<u>Yes/No</u>	Exclude opening elements / holes for all 3D objects. Examples: For architectural models used as part of a city/campus model you can exclude all opening. For structural models with bolt holes that are not associated with bolts you can exclude the holes but keep the bolts.
Optimize Shared Geometries	<u>Yes/No</u>	In IFC several objects with the same geometry can share a geometry definition. This often improves the performance of the receiving application. Simplebim can optimize the model by finding shared geometries even if they are not shared in the original IFC model. NOTE: If this setting is No any shared geometries already existing in the original model will still be exported.

RESOURCES -WORKSHEET

On the Resources worksheet you define resources that are used in other parts of the template or by other templates.

Identities define the name, description, mapping to IFC and other information used by object classes and properties.

ADD IDENTITY SOURCE -SECTION

The Identity Source is an entity that defines identities. This entity could be for example you, a standards organization or the project you are working on.

Field	Value	Description
Identity Source Key	Text	The unique key of the entity defining the identities.
Name	Text	The name of the entity defining the identities

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Field	Value	Description
Level	Choice	The level on which the entity defining the identities is working : Global, Regional, Organization, Project, User, Adhoc
Reference URL	URL	URL reference to the web site of this Identity Source
Reference Base URL	URL	Base address (URL) for identity definitions published by this Identity Source

ADD IDENTITY -SECTION

In this section you can define identities that can be shown in simplebim and can be exported to e.g. Excel, but are not necessarily mapped to IFC. You could for example define identities that translate object and property names to your own language.

NOTE: If you want to define identities that are mapped to IFC PropertySets or Element Quantities, please use the dedicated sections instead.

Field	Value	Description
Identity Source Key	Text	The unique key of the entity who has defined this identity
Identity Key	Text	The unique key of this identity. Usually prefixed with the identity source key to ensure uniqueness.
Name	Text	The name of this identity
Description	Text	The description of this identity
Reference	Text	This reference is appended to the 'Reference Base URI' of the Identity Source to form a link to the definition of this identity.
Metadata#1-3	Text	You can define metadata for the Identity. This metadata can be used by simplebim, add-ons and tools in various ways, for example the mapping to IFC is defined as metadata. The format for metadata is: KEY ...or... KEY=VALUE If you need to pass more than 3 metadata items, simply add the additional metadata items on the next columns on the same row.

ADD IDENTITY (FOR IFC PROPERTYSET) -SECTION

In this section you can define identities that are mapped to IFC PropertySets

Field	Value	Description
Identity Source Key	Text	The unique key of the entity who has defined this identity
Identity Key	Text	The unique key of this identity. Usually prefixed with the identity source key to ensure uniqueness.
Name	Text	The name of this identity
Description	Text	The description of this identity
Reference	Text	This reference is appended to the 'Reference Base URI' of the Identity Source to form a link to the definition of this identity.

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Field	Value	Description
PropertySet Name	Text	The name of the IFC PropertySet. If you are defining your own PropertySet it is recommended that you prefix the name with ePset (Extension PropertySet)
Property Name	Text	The name of the property within the PropertySet
Property Type	Choice	The IFC data type of the property

You can use any text you want as the Identity Key as long as the key is unique. However, if you want to avoid creating duplicate properties when the property with an identical mapping already exists in the model, you need to use a specific format for the Identity Key. The easiest way to get the correct key is to import an IFC file containing that property into simplebim, select that property in the Properties palette and choose 'Copy Special' → 'Copy Key' from the context menu. Finally paste the value into the Identity Key field in the template.

The format for PropertySet keys is.

```
IFC2X3:FLAT:PROP:<PSET_NAME>:<PROPERTY_NAME>:<PROPERTY_TYPE>
```

ADD IDENTITY (FOR IFC ELEMENT QUANTITY) -SECTION

In this section you can define identities that are mapped to IFC Element Quantities

Field	Value	Description
Identity Source Key	Text	The unique key of the entity who has defined this identity
Identity Key	Text	The unique key of this identity. Usually prefixed with the identity source key to ensure uniqueness.
Name	Text	The name of this identity
Description	Text	The description of this identity
Reference	Text	This reference is appended to the 'Reference Base URI' of the Identity Source to form a link to the definition of this identity.
QuantitySet Name	Text	The name of the IFC QuantitySet.
Quantity Name	Text	The name of the property within the QuantitySet
Quantity Type	Choice	The IFC quantity type

For Element Quantities the same principle applies for Identity Keys as described for Property Sets above. The format for Element Quantity keys is.

```
IFC2X3:FLAT:QTY:<QUANTITYSET_NAME>:<QUANTITY_NAME>
```

MODEL -WORKSHEET

On the Model worksheet you can edit the model schema and the data of the model.

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SET UNITS -SECTION

Units can be set for the model and for the template. Setting the model units affects the unit definition of the model (the model is converted to these units) and thus also the exported IFC file. If no value is given for a model unit, the unit defined in the imported IFC model is used. The template units define the interpretation of any measure values used in the template. If no value is given for a template unit the model unit is assumed. Template units have no effect on the units of the exported IFC file.

ADD IDENTITY TO OBJECT -SECTION

In this section you can add new identities (names) for Object Classes. This has no effect on the IFC export but allows you for example to translate the names of object classes to your own language in the simplebim user interface.

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Identity to Add [+]	Text	The name or identity key of the identity to add
Make Default	<u>Yes</u> /No	Make this the default identity, i.e. the name that is shown in the simplebim user interface?

ADD PROPERTY TO OBJECT -SECTION

In this section you can add new properties to Object Classes. You use the Identities defined on the Resources sheet for adding new properties.

***New in simplebim 4.0 SR1:** Adding a property to an Object Class automatically includes that property in the model view. If you want to exclude the property you added, you must exclude it explicitly in the 'Include/Exclude Property' section of the ModelView worksheet.*

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Property [+]	Text	The name or identity key of the Identity used for creating the new property
Property Type	Choice	The type of the property. Allowed values are: Yes/No, Number, Whole Number, Logical, Text, Measure
Single/List	Choice	The aggregation of the property. Allowed values are: <u>Single</u> , List
Unit Type	Choice	The unit type of the property - <u>applies only to measure properties</u> . Allowed values are: count, length, area, volume, mass, angle, temperature, time, power, thermal transmittance, volumetric flowrate, other
Unit Symbol	Text	The unit symbol of the property, e.g. mm - <u>applies only to measure properties</u> . Must be valid for the Unit Type, e.g. mm is valid for length, but not for area. If no Unit Symbol is given the Model Units are used, i.e. the property will have the Unit Symbol defined in the using of the model for the applicable Unit Type.

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ADD IDENTITY TO PROPERTY -SECTION

In this section you can add new identities (names) for properties. This has no effect on the IFC export but allows you for example to translate the names of properties to your own language in the simplebim user interface.

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Existing Property	Text	The name or identity key of the property you want to add the new identity to. This property must already exist on the object class.
Identity to Add [+]	Text	The name or identity key of the identity to add
Make Default	<u>Yes/No</u>	Make this the default identity, i.e. the name that is shown in the simplebim user interface?

SWAP PROPERTY VALUES -SECTION

In this section you can swap the values of two properties. When you swap property values (instead of copy) the values of both properties remain in the model for future use.

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Property 1	Text	The name or identity key of the first property
Property 2	Text	The name or identity key of the second property

TRIM TEXT PROPERTY VALUES -SECTION

You can use this section to trim away part of a text property value, for example a prefix or postfix. You could for example trim a 'Basic Wall' prefix from the building element construction type of walls.

NOTE: There is a separate section in the template for trimming before copy operations and after copy operations because the order of events determines if the trim is applied to a copied value or to the original value.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class or Group
Trim Property	Text	The name or identity key of the text property to trim
Trim Type	Text	The type of the trimming. Allowed values are: prefix, postfix, anywhere, regex and regex inverse.
Case Sensitive	<u>Yes/No</u>	Perform case sensitive comparison? This setting is ignored if the trim type is regex or regex inverse.

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Field	Value	Description
Text to Trim	Text	The text to trim from the position defined by the trim type. If the trim type is regex or regex inverse, the value in this cell is used as the regular expression.

FIND AND REPLACE TEXT PROPERTY VALUES -SECTION

You can use this section for setting the value of a text property based on the current value of the same property. You could for example replace 'Mtg.' with 'Meeting' in space names.

NOTE: There is a separate section in the template for find and replace before copy operations and after copy operations because the order of events determines if the find and replace is applied to a copied value or to the original value.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class or Group
Find Property [+]	Text	The name or identity key of the property for which you want to find and replace values
Text Operator	Choice	The text operator for finding values
Case Sensitive	<u>Yes/No</u>	Perform case sensitive comparison?
Find Value [+]	Text	The value(s) to find. Leave empty to find empty values. You can specify multiple values by adding new rows to the cell (Alt + Enter)
Replace Value	Text	The value replacing the found value(s). Leave empty to replace the found value(s) with an empty value.

SET PROPERTY VALUES BASED ON TEXT PROPERTY VALUE -SECTION

In this section you can set the value of one property based on the text value of another property. You could for example set the IsExternal property to 'Yes' for all walls that have a building element construction type that starts with 'EXT'.

NOTE: There is a separate section in the template for setting property values before copy operations and after copy operations because the order of events determines if finding the objects for which the property values are set is done based on a copied value or to the original value.

NOTE: If you need a large number of such operations the Enrichment system is probably the better alternative because it is much more compact and easy to manage.

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Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class or Group
Find Property [+]	Text	The name or identity key of the property for which you want to find and replace values
Text Operator	Choice	The text operator for finding values
Case Sensitive	<u>Yes/No</u>	Perform case sensitive comparison?
Find Value [+]	Text	The value(s) to find. Leave empty to find empty values. You can specify multiple values by adding new rows to the cell (Alt + Enter). Or –logic is applied if there are multiple values.
Set Property	Text	The name or identity key of the property for which you want to set the value.
Set Value	Mixed	The value you want to set for the property. The value is converted to the data type of the Set Property. If you are setting measure values, please pay attention to the Template Units.

COPY PROPERTY VALUES -SECTION

In this section you can copy text property values from one property to another. Using regular expression you can also copy only a part of the original value.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class or Group
From Property	Text	The name or identity key of the property from which you want to copy the values
To Property	Text	The name or identity key of the property into which you want to copy the values
Copy Empty Values	<u>Yes/No</u>	Should empty values be copied? Use No if you want to merge the values of the two properties.
Overwrite Non Empty Values	<u>Yes/No</u>	If the 'To Property' already has a value, should that value be overwritten by the value of the 'From Property'? Use No if you merge the values of the two properties and want to give priority to the values in the To Property.
Regular Expression	Text	You can optionally use regular expressions for modifying the property value that is being copied.

MOVE AND ROTATE SITE -SECTION

In this section you can move and rotate the site object, typically for preparing a model for use as part of a combined model.

NOTE: X, Y and Z must be in the length unit measure (mm, m, inch, feet...) of the model.

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Field	Value	Description
X	Number	X value of the offset
Y	Number	Y value of the offset
Z	Number	Z value of the offset
Rotation (deg)	Number	Value between 0 and 360
Relative/Absolute	Choice	<u>Relative</u> Adds the X, Y and Z values given here to the current X, Y and Z values of the site, and rotates relative to the current rotation
		Absolute Sets the X, Y and Z values of the site to the X, Y and Z values given here and sets the rotation to the rotation value given here.

MOVE AND ROTATE PROJECT -SECTION

In this section you can move and rotate the project object, typically for preparing a model for use as part of a combined model.

NOTE: X, Y and Z must be in the length unit measure (mm, m, inch, feet...) of the model.

Field	Value	Description
X	Number	X value of the offset
Y	Number	Y value of the offset
Z	Number	Z value of the offset
Rotation (deg)	Number	Value between 0 and 360
Relative/Absolute	Choice	<u>Relative</u> Adds the X, Y and Z values given here to the current X, Y and Z values of the project, and rotates relative to the current rotation
		Absolute Sets the X, Y and Z values of the project to the X, Y and Z values given here and sets the rotation to the rotation value given here.

MODEL VIEW -WORKSHEET

On the model view worksheet you can define which objects and properties are included (for example in the IFC export) and set the appearance (color and transparency) of objects.

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INCLUDE/EXCLUDE OBJECTS BASED ON OBJECT CLASS OR GROUP -SECTION

In this section you can include and exclude objects based on their object class or membership in a group. You could for example exclude all furniture or include all objects in a 'Building Envelope' group. See the Groups – worksheet chapter of this guide for more information about groups.

NOTE: If you want to start with a clean slate, use the special value 'All' for Object or Group on the first row. This will exclude all objects in the model. Then you can start including the objects you really need.

NOTE: The following object classes cannot be excluded via templates: Project, Site, Building and Building Storey

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group. The special value 'All' will apply the operation to all Object Classes.
Include	Yes/No	Include the objects in the Object Class or Group? Leaving the cell empty will set the applicable objects into the 'Not decided yet' state <i>NOTE: Setting the background color of this cell will set that color as the 3D Appearance of the applicable objects.</i>

INCLUDE/EXCLUDE OBJECTS BASED ON TEXT PROPERTY VALUE -SECTION

In this section you can include and exclude objects of an Object Class based on a text property value

NOTE: This section is included for backward compatibility. The recommended solution is to define a Group that selects the desired objects and use that Group in the 'Include/Exclude Objects Based on Object Class or Group' section. Groups give much more control over the selection because the rules of a Group can use any property type (text, number etc.) and more complex rules can be created using and/or logic.

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Include	Yes/No	Include the applicable objects? Leaving the cell empty will set the applicable objects into the 'Not decided yet' state <i>NOTE: Setting the background color of this cell will set that color as the 3D Appearance of the applicable objects.</i>
Text Property [+]	Text	The name or identity key of the Text property that is used as a filter for including or excluding objects.

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Field	Value	Description
Text Operator	Choice	The text operator for finding values
Case Sensitive	<u>Yes</u> /No	Perform case sensitive comparison?
Text Value [+]	Text	The property value used for finding the objects. The value can be left empty if the operator is Equals or NotEquals.

INCLUDE/EXCLUDE OBJECTS BASED ON YES/NO PROPERTY VALUE -SECTION

In this section you can include and exclude objects of an Object Class based on a yes/no property value

NOTE: This section is included for backward compatibility. The recommended solution is to define a Group that selects the desired objects and use that Group in the 'Include/Exclude Objects Based on Object Class or Group' section. Groups give much more control over the selection because the rules of a Group can use any property type (text, number etc.) and more complex rules can be created using and/or logic.

Field	Value	Description
Object [+]	Text	The name or identity key of the Object Class
Include	Yes/No	Include the applicable objects? Leaving the cell empty will set the applicable objects into the 'Not decided yet' state <i>NOTE: Setting the background color of this cell will set that color as the 3D Appearance of the applicable objects.</i>
Yes/No Property [+]	Text	The name or identity key of the Yes/No property that is used as a filter for including or excluding objects.
Yes/No Value	<u>Yes</u> /No	The property value used for finding the objects.

INCLUDE/EXCLUDE PROPERTY -SECTION

In this section you can include and exclude properties from Object Classes.

NOTE: If you want to start with a clean slate, use the special value 'All' for both Object and Property on the first row. This will exclude all properties for all objects. Then you can start including the properties you really need.

Field	Value	Description
Object [+]	Text	The name of identity key of the Object Class. The special value 'All' will apply the operation to all Object Classes.
Property [+]	Text	The name of identity key of the property.

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Field	Value	Description
		The special value 'All' will apply the operation to all properties of the applicable Object Classes. The special value 'Added' will apply the operation to all properties that were added to the applicable Object Classes by any template in the current template stack. [New in v2]
Include	<u>Yes/No</u>	Include the property?

SET OBJECT COLOR AND TRANSPARENCY BASED ON OBJECT CLASS OR GROUP -SECTION

In this section you can set the 3D appearance of objects, i.e. their color and transparency.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group
Color	Color	Set the background color of this cell to define the color for the applicable objects
Transparency %	Number	The transparency of the objects in percent (0-100) 0 = opaque 100 = invisible

SET OBJECT COLOR AND TRANSPARENCY BASED ON TEXT PROPERTY VALUE -SECTION

In this section you can set the 3D appearance of objects, i.e. their color and transparency based on the value of a text property.

NOTE: This section is included for backward compatibility. The recommended solution is to define a Group that selects the desired objects and use that Group in the 'Set Object Color and Transparency Based on Object Class or Group' section. Groups give much more control over the selection because the rules of a Group can use any property type (text, number etc.) and more complex rules can be created using and/or logic.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group
Color	Color	Set the background color of this cell to define the color for the applicable objects
Transparency %	Number	The transparency of the objects in percent (0-100) 0 = opaque 100 = invisible
Text Property [+]	Text	The name or identity key of the Text property that is used as a filter for selecting objects.
Text Operator	Choice	The text operator for finding values

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Field	Value	Description
Case Sensitive	<u>Yes</u> /No	Perform case sensitive comparison?
Text Value [+]	Text	The property value used for finding the objects. The value can be left empty if the operator is Equals or NotEquals.

SET OBJECT COLOR AND TRANSPARENCY BASED ON YES/NO PROPERTY VALUE -SECTION

In this section you can set the 3D appearance of objects, i.e. their color and transparency based on the value of a yes/no property.

NOTE: This section is included for backward compatibility. The recommended solution is to define a Group that selects the desired objects and use that Group in the 'Set Object Color and Transparency Based on Object Class or Group' section. Groups give much more control over the selection because the rules of a Group can use any property type (text, number etc.) and more complex rules can be created using and/or logic.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group
Color	Color	Set the background color of this cell to define the color for the applicable objects
Transparency %	Number	The transparency of the objects in percent (0-100) 0 = opaque 100 = invisible
Yes/No Property [+]	Text	The name or identity key of the Yes/No property that is used as a filter for selecting objects.
Yes/No Value	<u>Yes</u> /No	The property value used for finding the objects.

VALIDATION -WORKSHEET

On this sheet you can define validation rules for the model. The validation results are shown in the simplebim user interface.

REQUIRED OBJECTS -SECTION

In this section you can define the object classes and groups for which the model must contain objects, for example that the model must contain walls, or that a 'Building Envelope' Group must contain objects.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group
Yes/No	<u>Yes</u> /No	Require that the Object Class or Group has objects?

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REQUIRED PROPERTIES -SECTION

In this section you can define the properties that must have values. If a model does not have objects of a given Object Class or a Group is empty, then the required properties for that Object Class or Group are not validated. You can for example require that the Name property of all Space objects has a value, but this requirement only applies if the model has Space objects.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group The special value 'All' will apply the operation the applicable Properties on all Object Classes that have the corresponding applicable property. [New in v2]
Property [+]	Text	The name or identity key of the property The special value 'Included' will apply the operation to all properties that were included for the applicable Object Classes by any template in the current template stack. [New in v2]
Yes/No	<u>Yes</u> /No	Require that the Property has values?

RULES FOR TEXT PROPERTY VALUES -SECTION

In this section you can define validation rules for text properties. You can for example define a list of allowed values for space names, an allowed pattern for building storey names or that space numbers must be unique.

NOTE: If multiple rules are defined for the same property, the new rules will override the previous ones and only the last rule will be used. However, you can define different rules for the same property in the context of an Object Class and in the context of Groups.

Field	Value	Description
Object or Group [+]	Text	The name or identity key of the Object Class, or the name of the Group
Text Property [+]	Text	The name or identity key of the Text property
Rule for Text Property	Choice	The rule the values of the Text Property must comply with. The default is 'Must be one of the values'
Case Sensitive	<u>Yes</u> /No	Perform case sensitive comparison?
Allow Empty	Yes/ <u>No</u>	Are empty values allowed? Empty values should be allowed if the property is optional.
Separator	Text	The character used for separating items in the values list. Leave empty if there is only one item or each item in your list is on its own cell.
Value [+]	Text	The list of values. The items in the list can be separated by a separator if you have defined a Separator.

The following table contains a short description of the different rule types

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Rule Type	Description
Must be one of the Values	A list of allowed values, e.g. the space names from a spatial program.
Must contain one of the Values	For example the name of a wall type must contain either 'int' or 'ext'
Must start with one of the Values	For example the name of a wall type must start with either 'int' or 'ext'
Must end with one of the Values	For example a list or values must be terminated with a separator, like a comma.
Must be like one of the Values (with wildcards)	For example the name of a wall type must start with either 'int' or 'ext' followed by exactly 3 characters. For this you would use 'int???' , 'ext???'
Must match one of the Values (regular expression)	For example the name of a wall type must start with either 'int' or 'ext' followed by any number of numbers. For this you would use '^int\d{0,}\$' , '^ext\d{0,}\$'
Must have unique values	For example that space numbers must be unique
Must not be any of the Values	For example the material of a wall must not be a default value, like 'empty fill'.
Must not contain any of the Values	For example that space objects used for modeling building storey areas should not be included. For this you would use 'gross area' , 'net area'
Must not start with any of the Values	For example that the name of a wall type must not be prefixed with an automatic prefix like 'Basic Wall'
Must not end with any of the Values	For example a list or values must not be terminated with a separator, like a comma.
Must not be like any of the Values (with wildcards)	Can be used as an alternative to contains, starts with and ends with.
Must not match any of the Values (regular expression)	Can be used as an alternative to contains, starts with and ends with.

ENRICHMENT -WORKSHEET

With Enrichment you can efficiently merge data from external sources into the model by setting property values to objects that match a given criteria. You can add as many Enrichment Worksheets into the workbook as you like and they will be processed if the name of the Worksheet starts with 'Enrichment'. Each Enrichment Worksheet can contain as many Enrichment sections as you wish.

Each Enrichment section must be formatted like this.

NOTE: The easiest way to get this right is to copy and paste the sample section on the Enrichment worksheet.

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	A	B	C	D	E
1	Template version 4.0				
2					
3					
4		Object Or Group [+]			
5		Property Name or Key	Property 1	Property 2	Property 3
6		Operator	Match = equals	Set	Info
7					

Insert the name of the Object Class or Group on Column C on the row where Column B has the text 'Object or Group [+]' (Cell C4 in the picture above).

Define one Match property by giving a property name or key. This property is used for finding the objects for which the other properties are set. The match property must be a Text property. The Match operator can have the following values.

Match Operators	Description
Equals	
Contains	
Starts With	
Ends With	
Like	Using wildcards
Match	Using regular expression
Not Equals	
Not Contains	
Not Starts With	
Not Ends With	
Not Like	Using wildcards
Not Match	Using regular expression

The format for the Operator in a Match cell is 'Match=<Operator>', for example 'Match=Equals'. If the Operator is mixed case the match will be case sensitive, otherwise case insensitive.

Examples	Case Sensitive
Match = equals	No
Match = EQUALS	No
Match=Equals	Yes

All whitespace (spaces) is trimmed from the Operator, for example 'Starts With' is the same as 'StartsWith'.

Define as many Set properties (Operator = Set) as you wish by giving a property name or key. If needed simply add new properties on column F, G, H and so on. These are the properties for which the values are set. Set properties can be of any data type (text, number, measure...). Do not leave any empty columns in between.

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You can also define Info properties (Operator = Info) that are not processed but could help you better understand the data or save you the trouble of deleting columns you don't want to include. Info columns can be used between Set columns.

On the rows below the header (containing the Object Class and Properties) add as many rows as you wish. Each row must have a value for the Match Property and optionally values for the Set Properties. Do not put any value into the cell on column B, because column B is reserved for use by the system.

NOTE: If you set measure value, please pay attention to the Template Units.

GROUPS - WORKSHEET

On the Groups worksheet you can define named, rule based groups of objects. Groups are a very versatile concept that you can use in many different ways for organizing, editing and validating the model.

Field	Value	Description		
Group Name	Text	The Group Name is used for uniquely identifying a group. If the first character in the Group Name is a backslash (\) the group is only used in the context of the template and will not show up in simplebim.		
Object [+]	Text	The name or key of the Object Class		
Property [+]	Text	The name or key of the property used in the criteria for selecting the objects that belong to the group		
Numeric Operator	Choice	The Numeric Operator is used if the Property is a numeric property		
Text Operator	Choice	The Text Operator is used if the Property is a text property		
Case Sensitive	<u>Yes/No</u>	Perform case sensitive comparison?		
Value [+]	Mixed	The value used in the rule. The value is converted to the data type of the Property. If you are using measure values, please pay attention to the Template Units.		
And/Or	Choice	You can use several rules for one group, e.g. select objects from different Object Classes using different criteria. For this you add new rows below the row with the Group Name and leave Group Name empty on those rows. You can decide if you want to apply And or Or logic.		
		<table border="0"><tr><td><u>And</u></td><td>An object must match all rules to be accepted</td></tr><tr><td><u>Or</u></td><td>An object must match at least one of the rules to be accepted</td></tr></table>	<u>And</u>	An object must match all rules to be accepted
<u>And</u>	An object must match all rules to be accepted			
<u>Or</u>	An object must match at least one of the rules to be accepted			

SUBSTITUTION - WORKSHEET

Substitution is a technique for making templates more compact and easier to read and manage. In substitution you define a named list of values and use that name in other parts of the template instead of the original list of values.

You could for example define a Substitution List with the names of all Object Classes that are relevant to structural design and call it 'Structural Objects'. Then you could define another list containing the names of all

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properties that are used by all structural objects and call it 'Common Structural Properties'. Let's say there are 10 items in both lists. Now when you want to include the common properties for all structural objects you would simply do the following on the ModelView worksheet.

Include/Exclude Objects Based on Object Class or Group

* Object or Group [+]	Include
Structural Objects	Yes

Include/Exclude Property

* Object [+]	Property [+]	Include
Structural Objects	Common Structural Properties	Yes

Without Substitution you would have 10 rows in the 'Include/Exclude Objects Based on Object Class or Group' section and 100 rows in the 'Include/Exclude Property' section. You could also use the same substitution lists in other places, like in validation. Later when you notice a mistake (something missing, spelling mistake...) in a substitution list, you can simply edit the list on the Substitution worksheet and your template is fixed.

Field	Value	Description
List Name	Text	The name of the substitution list
List Values	Text	The values. You can add several values to the same cell or add new values to the cells below.

ADVANCED TECHNIQUES

CHAINING TEMPLATES

When you start using templates in a more advanced way it becomes important that your templates are easy to maintain. You want to avoid copying the same information into multiple templates, because then updating your templates after changes becomes difficult.

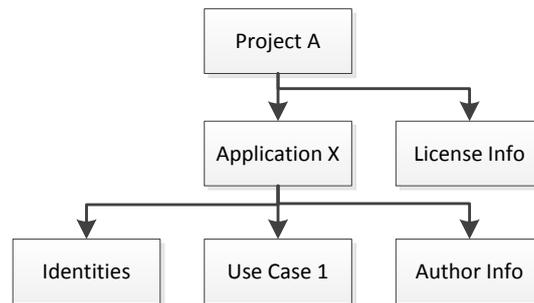
A good practice is to keep all your identity definitions in one template and make your other templates dependent on that template. This way you have a central repository for your identities.

Another good practice is to separate generic content from project specific content. You might for example have one template that trims a model for quantity take-off and another template that validates the model for quantity take-off based on agreement made in a specific project. You may also have company specific content such as model author information that you don't want to repeat in multiple templates and model license information that needs to be defined separately for each exchange.

Template chaining works such, that the more specific template is made dependent on the more generic templates. The template you apply in simplebim is on the top of this structure ('Project A' in the example below) and it pulls in all the other dependent templates. Templates are applied in a sequence where the top template

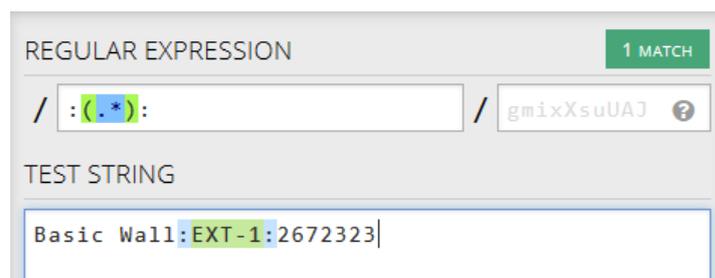
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is applied last. This allows you to override content in the more generic templates by content from the more specific ones.



USING REGULAR EXPRESSIONS

Regular expression is a powerful system for searching and manipulating text. It is very widely used and is implemented in most modern programming languages. This means that while it is initially quite difficult to understand there is no shortage of tutorials, tools and sample expressions. One good site for testing your regular expressions is <http://regex101.com/>. On this site you copy your sample values into one text box and develop your regular expression in another text box, and you see the result as you type.



Here are some examples to get you started

Regular Expression	Text	Selected Text
^(.*) :	Basic Wall:EXT-1:2672323	Basic Wall
:(.*) :	Basic Wall:EXT-1:2672323	EXT-1
:(\d{0,})\$	Basic Wall:EXT-1:2672323	2672323
(?<=KEY2=) .*? (?=;)	KEY1=A;KEY2=B;KEY3=C;	B

COMMON TEMPLATE SCENARIOS

ADDING YOUR OWN PROPERTIES TO AN IFC MODEL

STEP 1 – INTRODUCE YOUR PROPERTY

Worksheet	Resources
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Section	Add Identity Source Add Identity (for IFC PropertySet)
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Add an identity for your property, including the mapping of your property to IFC. Each Identity needs an Identity Source, i.e. who has defined that identity. You should come up with a real one for the context in which you use templates, but for testing simply use a dummy one like below.

Add Identity Source

* Identity Source Key	Name	Level	Reference URL	Reference Base URL
MY	My Identities	Adhoc		

Add Identity (for IFC PropertySet)

* Identity Source Key	Identity Key	Name	Description	Reference	PropertySet Name	Property Name	Property Type
MY	MY:1	My First Property	This is my first property		ePset_My	FirstProperty	IfcIdentifier

STEP 2 – ADD YOUR PROPERTY TO OBJECT CLASSES

Worksheet	Model
Section	Add Property to Object

Add the property to one or more Object Classes on the Model worksheet using the identity you defined in the first step. You can use the same identity for properties on multiple Object Classes if the same IFC mapping is suitable for all of them.

Add Property to Object

* Object [+]	Property [+]	Property Type	Single/List	Unit Type	Unit Symbol
Wall	My First Property	Text			
Door	My First Property	Text			
Window	My First Property	Text			

TRIMMING THE MODEL

STEP 1 – DECIDING WHICH OBJECT CLASSES YOU NEED

Worksheet	ModelView
Section	Include/Exclude Objects Based on Object Class or Group

Here you can define which Object Classes are relevant to your use case. It is a good approach to first exclude all Object Classes and then start including only the ones you need.

Include/Exclude Objects Based on Object Class or Group

* Object or Group [+]	Include
All	No
Space	Yes

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STEP 2 – DECIDING WHICH OBJECT INSTANCES YOU NEED

Worksheet	ModelView
Section	Include/Exclude Objects Based on Text Property Value

You can include and exclude individual objects (Object Instances) by defining rules. The example below excluded all spaces with a Space Name that starts with 'Gross', which would exclude all gross areas that have been modeled with space objects (provided that the name of 'gross area spaces' starts with 'Gross')

Include/Exclude Objects Based on Text Property Value

* Object [+]	Include	Text Property [+]	Text Operator	Case Sensitive	Text Value [+]
Space	No	Space Name	StartsWith	No	Gross

STEP 3 – DECIDING WHICH PROPERTIES YOU NEED

Worksheet	ModelView
Section	Include/Exclude Property

Here you can define which properties are relevant to your use case. Again, it is a good approach to first exclude all properties for all Object Classes and then start including only the ones you need.

Include/Exclude Property

* Object [+]	Property [+]	Include
All	All	No
Space	Space Name	Yes
Space	Space Number	Yes

ENRICHING THE MODEL

STEP 1 – ADDING THE PROPERTIES YOU NEED

When you use enrichment you typically first add a set of properties to the model. Please see the 'Adding your own properties to an IFC model' scenario for instructions how to do this.

STEP 2 – ADDING DATA TO THE MODEL

Worksheet	Enrichment
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In the Enrichment section you define the Object Class (Space in this example) and the property used for finding the matching objects (Space Number in this example). If needed, consult the Enrichment – worksheet chapter of this guide for more information about using the Enrichment system.

The simple example below reads like this

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For all spaces where the Space Number is '1', set the Occupancy Count to 3 and the Floor Finish to 'Carpet'

For all spaces where the Space Number is '2', set the Occupancy Count to 3 and the Floor Finish to 'Laminate'

Object Or Group [+]	Space		
Property Name or Key	Space Number	Occupancy Count	Floor Finish
Operator	Match = equals	Set	Set
	1	3	Carpet
	2	2	Laminate