

Autodesk Revit Model Checker

XML Schema and Definitions

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Introduction

The purpose of this document is to provide a high-level overview of the XML structure for checksets created for use with the Autodesk Revit Model Checker add-in. The document defines basic XML nomenclature, outlines the general XML schema used in the Model Checker, and provides samples from a commonly used checkset. This information will help users understand how to edit existing checks or create new checks directly within the XML code.

Basic XML Nomenclature

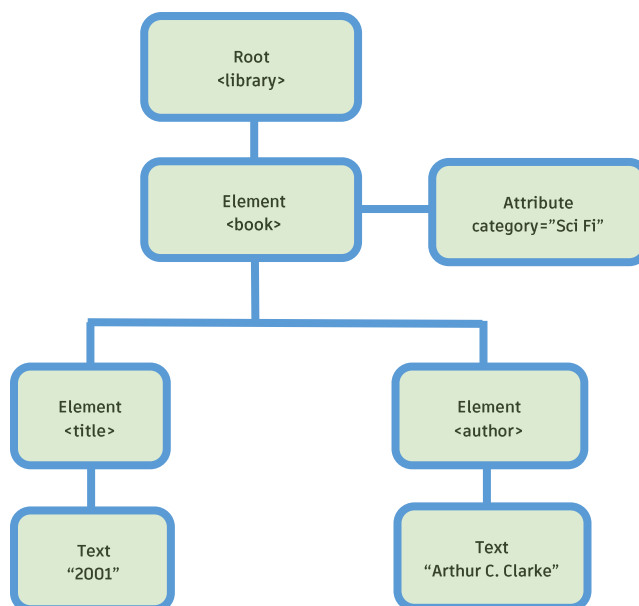
Node

A node is any item represented in the XML structure. At a basic level, XML code is defined by the following nodes:

1. **Document** – A declaration that describes information about the code, such as XML version and character type.
2. **Root** – The topmost element in the XML tree. It is the “parent” to the rest of the element nodes.
3. **Element** – A “child” component to the Root which begins with a start-tag and ends with a matching end-tag. The characters between the tags are the element’s content and may contain other “child” elements. The element can also consist of an empty-element tag.
4. **Attribute** – A markup construct consisting of a name-value pair that exists within a start-tag or empty-element tag.
5. **Text** – The value defined in between quotations within an Element.

XML Tree

The XML document consists of a hierarchical structure of these nodes called an XML tree:



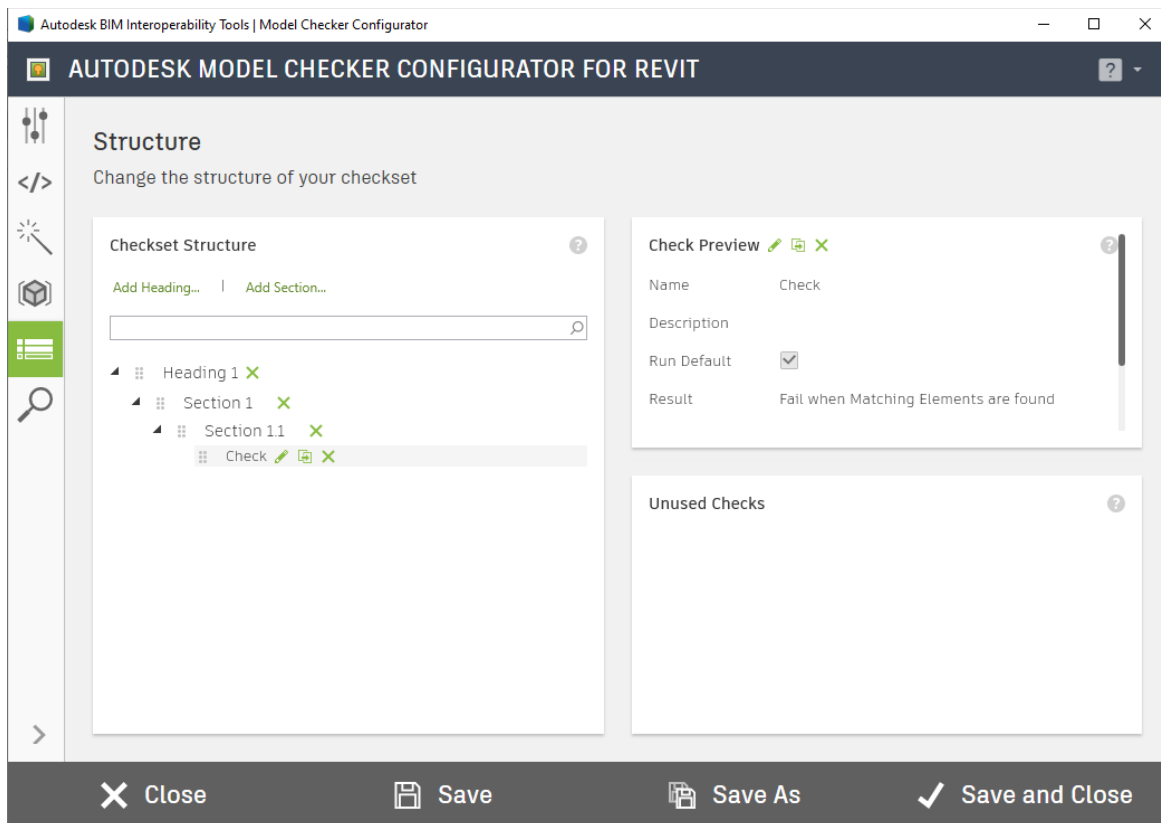
Revit Model Checker Checkset

Schema

The general XML schema of the Revit Model Checker checkset comprises of the following:

Document		<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
Root	Start-Tag	<MCSettings>
Element	Start-Tag	<Heading>
		<Section>
		< Section>
		<Check>
	Start-Tag / End Tag	<Filter.../>
		<Filter.../>
		<Filter.../>
	End-Tag	</Check>
		</Section>
		</Section>
</Heading>		
Root	End-Tag	</MCSettings>

Here's how the XML schema would appear in the Autodesk Model Checker Configurator for Revit:



Definitions

MCS settings – This is the root node and has the following attributes:

AllowRequired – A “True” value allows checks to be indicated as “Required” or “Optional”

Name – The name of the checkset

Author – The author of the checkset

Description – A description of the checkset

Image – Dialog image to be displayed in the Model Checker

LastModified – A record of the checkset’s last modified state

Heading - Organizes checks in the Model Checker UI and has the following attributes:

ID – A GUID automatically applied to identify the specific heading

HeadingText – The title of the heading

Description – A description of the heading

IsChecked – A “True” value enables checks grouped under the heading by default

Section - Further groups and organizes checks in the Model Checker UI are child nodes of Heading or Section and have the following attributes:

ID – A GUID automatically applied to identify the specific section

SectionName – The name of the section

Title – The title of the section

IsChecked – A “True” value enables checks grouped under the section by default

Description – A description of the section

Check – Individual check configured for validating a condition in the model

ID – A GUID automatically applied to identify the specific check

CheckName – The name of the check

Description – A description of the check

FailureMessage – The message displayed when a check results in a failure

ResultCondition – Conditions which result in a failure

- **“FailNoElements”** - Fail when no Matching Elements are found
- **“FailMatchingElements”** - Fail when Matching Elements are found

- **“CountOnly”** - Count of Matching Elements Only
- **“CountAndList”** - Count and list of Matching Elements

CheckType – All user created checks are defined as “Custom”

IsRequired – A “True” value indicates that the check is “Required”. A “False” value indicates that the check is “Optional”.

IsChecked – A “True” value enables the check by default

Filter – Conditions defined to produce a check result

Operator

- **“And”** – Filter defined that validates a condition in combination with other defined Filters in the check
- **“Or”** – Filter defined that validates a condition independent of other defined Filters in the check
- **“Exclude”** – Filter defined that validates a condition by excluding itself from conditions resulting from other defined Filters in the check

Category

- **“APIParameter”** – Specify properties as defined in the Revit API
- **“APIType”** – Specify Autodesk.Revit.DB class types as defined in the Revit API
- **“Category”** – Specify Revit family categories as defined in the Revit API with the “OST_” prefix
- **“DesignOption”** – Specify the name of a design option
- **“Family”** – Specify a family name
- **“Host”** – Specify as “True” or “False” to check for defined hosts
- **“HostParameter”** – Specify a parameter name and value in the host
- **“Level”** – Specify level name and elevation
- **“Parameter”** – Specify a parameter name and value
- **“PhaseCreated”** – Specify the name of the phase identified in the Phase Created parameter of an element
- **“PhaseDemolished”** – Specify the name of the phase identified in the Phase Demolished parameter of an element
- **“PhaseStatus”** – Specify the name of a phase status of an element (i.e. “Existing”, “Demolished”, “New”, “Temporary”)
- **“Redundant”** – Specify “True” or “False” to check for redundant locations and types of elements
- **“Room”** - Specify “True” or “False” to check for defined rooms. Specify name and number to check for a specific room
- **“Space”** - Specify “True” or “False” to check for defined spaces. Specify name and number to check for a specific space

- **“StructuralType”** – Specify a value equal or not equal to the specified structural type
- **“Type”** – Specify a family type name
- **“TypeorInstance”** – Specify whether to output results by family type or family instance
- **“View”** - Specify “True” or “False” to check for defined views. Specify name to check for specific a view
- **“Workset”** - Specify name to check for a specific workset

Property

- **“Elevation”** – Elevation value of a Level
- **“Full Class Name”** – Name of an API Type
- **“Is Defined”** – “True” or “False” that value is defined
- **“Is Element Type”** – “True” or “False” that value is a family type
- **“Is In-Place”** – “True” or “False” that a value is an in-place family
- **“Location”** – Use with “Redundant” category to report instances in the same location
- **“Name”** – Name value for various Categories
- **“Value”** – Use with “StructuralType” category with the following values:
 - Beam
 - Brace
 - Column
 - Footing
 - NonStructural
 - UnknownFraming
- **OST Family Categories** – Add names of family categories by their “OST_” prefix
- **Parameter Names** – Add names of parameters from Revit or from the names defined in the Revit API. These can be to built-in parameters or custom parameters.

Condition

- **“Included”** – Value is either “True” or “False”
- **“Equal”** – Equals defined value
- **“NotEqual”** – Does not equal defined value
- **“GreaterThan”** – Greater than the defined value
- **“LessThan”** – Less than the defined value
- **“GreaterOrEqual”** – Greater than or equal to the defined value
- **“LessOrEqual”** – Less than or equal to the defined value
- **“Contains”** – Contains defined value
- **“DoesNotContain”** – Does not contain defined value
- **“Defined”** – Value is either “True” or “False”
- **“Undefined”** – Value is either “True” or “False”
- **“HasValue”** – Value is either “True” or “False”

- **“HasNoValue”** – Value is either “True” or “False”
- **“Duplicated”** – Value is either “True” or “False”
- **“MatchesParameter”** – Matches defined parameter
- **“DoesNotMatchParameter”** – Does not match defined parameter
- **“Wildcard”** – Matches defined Reg Ex expression
- **“WildcardNoMatch”** – Does not match defined Reg Ex expression

Value

- **“False”**
- **“True”**
- **Field Values** – Define a value or enable user defined option for the Field Value Settings

CaseInsensitive – A “True” value enables the value to be case insensitive

Unit

- **“Default”**
- **“Inches”**
- **“Feet”**
- **“Millimeters”**
- **“Centimeters”**
- **“Meters”**

UnitClass

- **“None”**
- **“Length”**
- **“Area”**
- **“Volume”**
- **“Angle”**

UserDefined – A “True” value enables user defined Field Value Settings

FieldTitle – The title displayed for user defined Field Value Settings

Validation – Formatting options for the user defined value

- **“None”**
- **“Boolean”**
- **“Integer”**
- **“Length”**

Sample Checkset

To better understand the basic XML structure, here are excerpts from the checkset, “General - Element Fidelity”, available on the Public Library section of the Autodesk Model Checker Configurator for Revit. The sample check is set to fail if there are duplicate modeled elements. Attributes are highlighted in **green**. Text values are highlighted in **blue**.

Start MCSettings

```
<MCSettings AllowRequired="False" Name="General Element Checks" Author="Autodesk"
Description="A series of Pass/Fail checks on individual elements in reviewing for best practices"
Image="http://www.biminteroperabilitytools.com/modelchecker/hostedchecks/MC-125.png"
LastModified="131747680838632148">
```

Start Heading

```
<Heading ID="9152b81f-a0a9-41c2-99bd-e26b3ee632ce" HeadingText="General Element
Checks" Description="Checks individual elements in reviewing for best practices. Check
results are provided in a pass/fail format, in which a &quot;fail&quot; condition occurs
from either a list of elements that meet the check criteria, or that no elements are found
to meet the check criteria." IsChecked="True">
```

Start Section

```
<Section ID="4de89777-c5e9-4d5e-acce-8a2c91273ad8" SectionName="Elements"
Title="" IsChecked="True" Description="">
```

Start Check

```
<Check ID="cf314542-d50a-427c-9843-69cea5c88d50"
CheckName="Duplicate Modeled Elements" Description="Checks for any
modeled elements that are duplicates (identical elements at the same
location and base level)." FailureMessage="Element is a duplicate at the
same location and base level." ResultCondition="FailMatchingElements"
CheckType="Custom" IsRequired="False" IsChecked="True">
```

Add Filters

```
<Filter ID="19d91e07-4f45-49ea-aa9c-97368e052f18"
Operator="And" Category="APIType" Property="Full Class Name"
Condition="Equal" Value="Autodesk.Revit.DB.FamilyInstance"
CaseInsensitive="False" Unit="None" UnitClass="None"
FieldTitle="" UserDefined="False" Validation="None" />

<Filter ID="6d9315eb-56a5-4fbd-accb-745b00b3f7ef"
Operator="And" Category="View" Property="Is Defined"
Condition="Equal" Value="False" CaseInsensitive="False"
```



```
Unit="None" UnitClass="None" FieldTitle="" UserDefined="False"  
Validation="None" />
```

```
<Filter ID="2dc1c768-e594-4753-817c-3125d8e6f9b6"  
Operator="And" Category="Redundant" Property="Location"  
Condition="Equal" Value="True" CaseInsensitive="False"  
Unit="None" UnitClass="None" FieldTitle="" UserDefined="False"  
Validation="None" />
```

End Check

```
</Check>
```

End Section

```
</Section>
```

End Heading

```
</Heading>
```

End MCSettings

```
</MCSettings>
```