

BPMN 2.0 Extensions for Enterprise Architect

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Disclaimer

The guidelines contained in this document are based on version 11 of Enterprise Architect. Version 2.x of the *BPMN 2.0 Extensions* add-in has been successfully deployed with EA version 9.x, 10.x, 11.x, 12, 12.1, 13.0 and 13.5.

The extension, as well as these guidelines, may or may not be applicable to any later version of the tool as released by the vendor, Sparx Systems. Versions prior to EA 9.0 do not include the BPMN 2.0 Technology.

If any problems are encountered with the installation or operation of this software please [contact us](#) through any of the channels listed at the bottom of this document.

Dependencies

The add-in depends on the following components being installed on the system:

- Interop.EA.dll (part of the standard Sparx installation files).
- Microsoft .Net Framework 4.0 Client Profile (if missing, the installer will detect this and offer to automatically download and install the Framework).

Overview

As of version 2.x of the *BPMN 2.0 Extensions* only the core validation functionality is provided.

Core validation covers compliance with the non-executable aspects of the BPMN 2.0 specification for the following diagram types: Business Process, Collaboration and Conversation.

Additional functionality that is available for purchase includes:

- Validation for Process execution.
 - Extends the core validation of BPMN 2.0 compliance with an additional verification of the execution semantics, as a preparation for transforming business models into BPEL-ready models.
- Validation of Choreographies.
 - Verifies model compliance with the special rules that apply to Choreographies.
- Validation augmented with [automatic and suggested fixes to the model](#).
 - Runs the appropriate level of validation and, where possible, either automatically fixes the issue found, or interactively proposes an action to the User to bring the model into compliance. This requires that the User has update rights to the BPMN model elements.

Installation

Exit any running instances of **Enterprise Architect**, then launch the “setup.exe” program provided by Cephass Consulting and follow the on-screen instructions.

The installation will attempt to update the Windows registry, so the User needs to ensure that s/he has sufficient privileges to run the setup program.

The recommended install path is to place the DLL and any supporting files in an “Addins” folder in the Sparx Systems installation directory, for example:

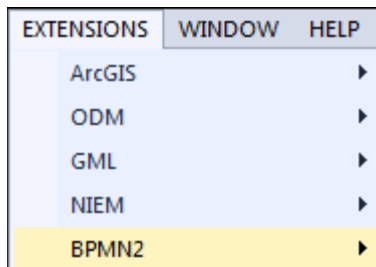
C:\Program Files (x86)\Sparx Systems\Addins.

Note that older versions of the software are automatically removed and replaced.

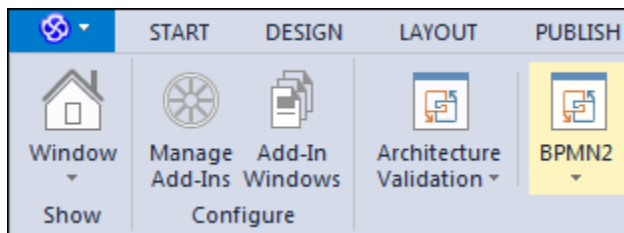
Should the installation fail for any reason other than insufficient User privileges, please take appropriate screenshots and email the data to the support address listed at the bottom of this document.

Verifying the installation

Bring up Enterprise Architect and verify that there is a “BPMN2” entry under the EXTENSIONS menu (EA version prior to 13):

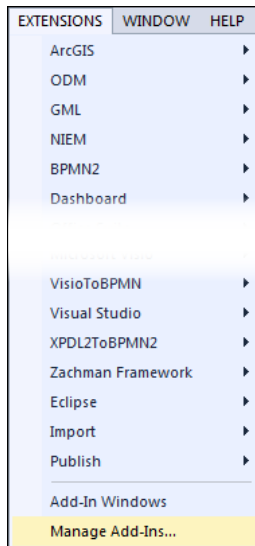


Or the EXTEND ribbon in version 13:

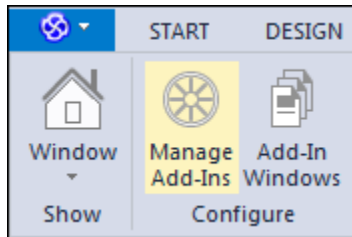


Other add-ins may be present as well, depending on your EA version and configuration. Sub-menus of the “BPMN2” entry will become available only in the proper BPMN 2.0 context.

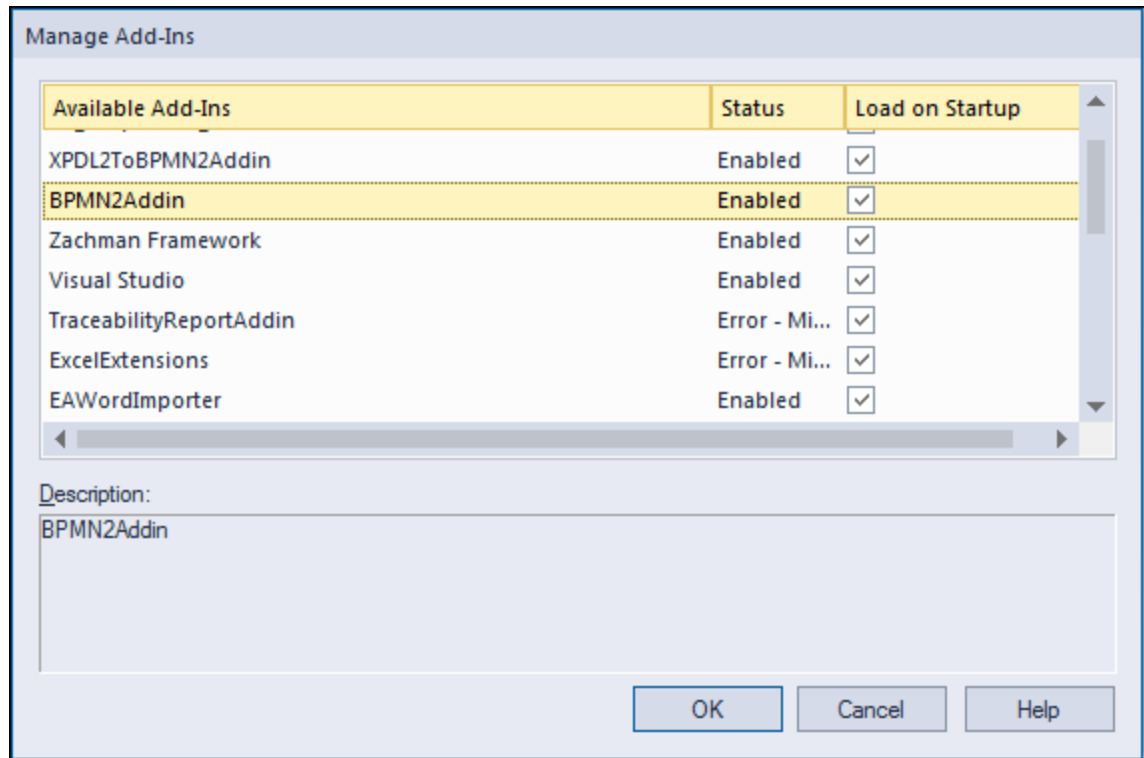
Should the menu entry not be present, select the “Manage Add-Ins” menu option (EA version prior to 13):



Or the *Configure* item in the EXTEND ribbon (version 13):



And confirm that the “BPMN2Addin” is loaded and enabled:



If an error status is shown this typically means that:

- The DLL installation process failed and that EA cannot locate its reference, either in the Windows registry or in the file system.
- The installation did succeed but the DLL file was later moved or deleted.

If the “BPMN2Addin” entry itself is not found then the add-in installation did not complete successfully. Try the “repair” option when re-installing or, if that does not resolve the problem, uninstall the current version manually and re-install from scratch.

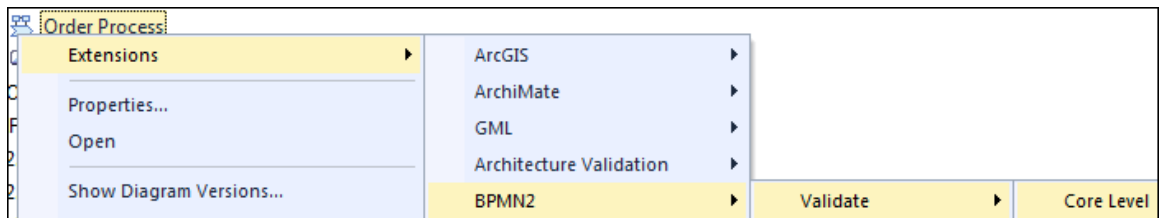
Running the validation

Currently the only supported target for the validation is a BPMN 2.0 model. Models from earlier BPMN versions are ignored.

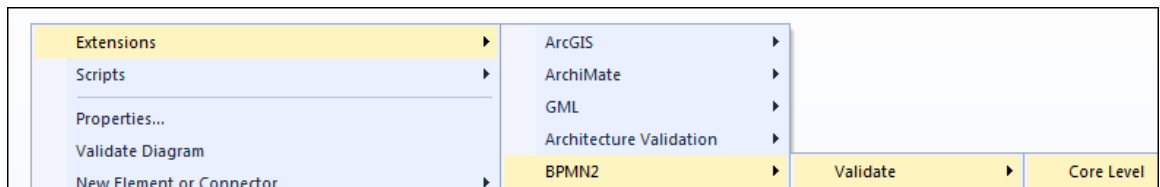
The program must be invoked in the context of a BPMN 2.0 diagram. Valid contexts are:

- A currently selected (active) BPMN 2.0 diagram. Sub-Processes, if present, are automatically included in the validation.
- One or more selected BPMN 2.0 elements in a diagram. If a Business Process element is selected the complete process is validated. For all other BPMN 2.0 elements only the element itself is verified.

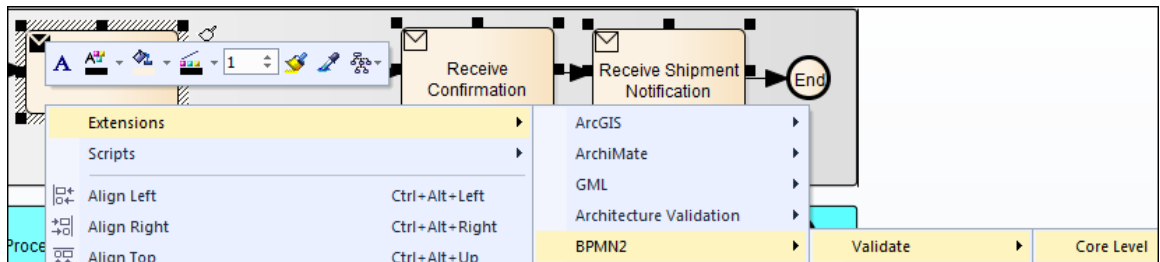
The diagram can be identified in the Project Browser and the validation menu accessed through a right mouse-click:



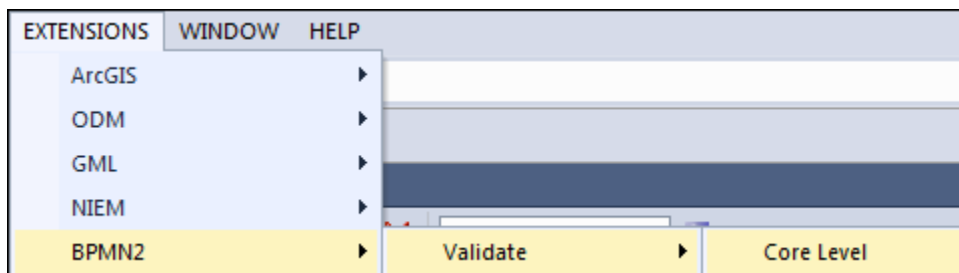
The command can also be invoked by right-clicking on a diagram **background** (i.e. with no elements selected in the diagram):



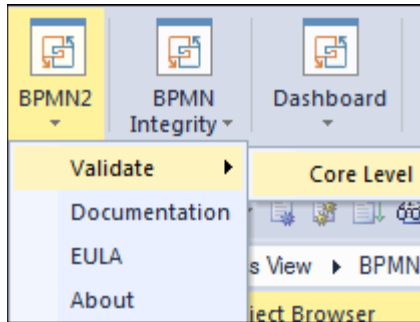
Or from the context menu of selected diagram elements:



In these same contexts, and as an alternative to using the context, the operation is also available from the tool's "EXTENSIONS" menu (EA version prior to 13):



Or the EXTEND ribbon (EA 13):

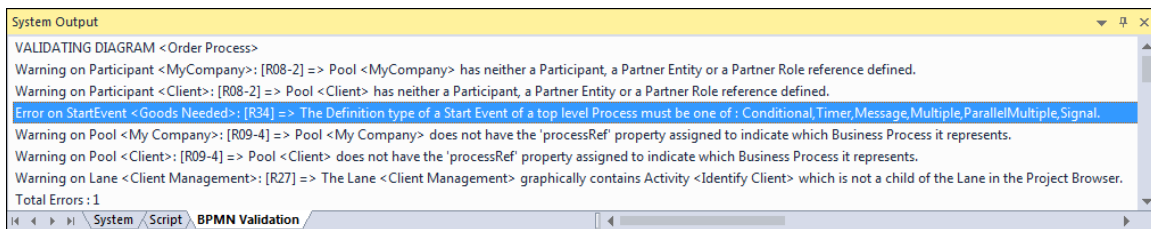


Elements on the diagram that do not belong to the BPMN 2.0 metamodel (e.g. Requirements) are ignored.

Sub-Processes that are composite elements (i.e. with a child diagram underneath) are automatically included in the validation process. To verify a child diagram only, select it as the validation context.

The program automatically creates a “BPMN 2.0 Validation” tab in EA’s System Output window and ensures that the tab is visible to the User.

Validation results are divided into warnings and errors:



A single (left-mouse) click on an error or warning message selects the related element:

- In the Project Browser.
- In the diagram (if possible).

Errors or warnings relating to a connector are expressed in terms of either its source or target element.

Double clicking the line entry in the System Output window will open the properties dialog for the related element (currently not possible for a connector).

Rules

| Rule ID | Type | Description |
|---------|---------|--|
| R01 | Error | Group and Text Annotation cannot have incoming or outgoing Sequence Flows. |
| R02 | Error | Group and Text Annotation cannot have incoming or outgoing Message Flows. |
| R03 | Warning | A Throw Event of Definition type Error should have an error code defined in the referenced Error element. |
| R04 | Warning | A Throw Event of Definition type Escalation should have an escalation code defined in the referenced Escalation element. |
| R05 | Error | If an outgoing Sequence Flow from an Activity is conditional then there must be at least one more outgoing Sequence Flow. |
| R06 | Error | The outgoing Sequence Flows of a Parallel or Event Gateway must be unconditional. |
| R07 | Error | An Intermediate Throw Event of Definition type Link cannot be the source of a Sequence Flow. |
| R08-1 | Error | If a Participant has its multiplicity set to true then the maximum Participants must be > 0 and >= to the minimum Participants. |
| R09-1 | Warning | The 'participantMultiplicity' property setting for Pool <...> is different from the setting of the corresponding Participant property. |
| R09-2 | Warning | Pool <...> does not have a Participant reference defined in its 'participantRef' property. |
| R09-3 | Warning | Pool <...> has neither a Participant, a Partner Entity or a Partner Role reference defined. |
| R09-4 | Warning | Pool <...> does not have the 'processRef' property assigned to indicate which Business Process it represents. |
| R10-1 | Warning | Cannot determine the owner of this element. |
| R10-2 | Error | Cannot be connected via a Message Flow to the element belonging to the same explicit or implicit Pool : <...> |
| R11 | Error | Either the target or the source of a Conversation Link must be a Conversation Node. |
| R12 | Error | A Receive Task with the instantiate property set to true cannot have incoming Sequence Flows. |
| R13 | Error | A Compensation Activity can be neither the source nor the target of a Sequence Flow. |
| R14 | Error | An embedded Sub-Process must not define Data Inputs or Data Outputs in its IO specification (see property 'ioSpecification'). |
| R15 | Error | An Event Sub-Process may not have incoming or outgoing Sequence Flows. |
| R16 | Error | An Event Sub-Process must have one and only one Start Event. |
| R17 | Error | Only one interrupting Event Sub-Process can be defined with the same Start Event Definition type : <...> |
| R18 | Warning | The Event Sub-Process is also defined as a boundary Intermediate Event of type : <...> |

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| R19 | Error | An AdHoc Sub-Process must have its 'completionCondition' expression defined. |
| R20 | Error | An AdHoc Sub-Process must contain at least one Activity. |
| R21 | Error | An AdHoc Sub-Process must not contain elements of type: <...> |
| R22 | Error | An Activity of type multi-instance loop must have either its 'loopCardinality' expression defined or its 'loopDataInputRef' property set. |
| R23-1 | Error | An Activity of type multi-instance loop with behavior set to 'Complex' must have its 'ComplexBehaviorCondition' property defined. |
| R23-2 | Error | An Activity of type multi-instance loop with behavior set to 'One' must have its 'oneBehaviorEventRef' property defined. |
| R23-3 | Error | An Activity of type multi-instance loop with behavior set to 'None' must have its 'noneBehaviorEventRef' property defined. |
| R23-4 | Error | An Activity of type multi-instance loop with behavior set to 'Complex' must specify a ComplexBehaviorCondition with condition and event properties defined. |
| R24 | Error | A Data Object must be contained within a Process or Sub-Process. |
| R25 | Error | A Data Object Reference should not specify an Item Definition (property 'itemSubjectRef'). |
| R26 | Warning | A Data Object that is not a reference should not define state (property 'dataState'). |
| R27 | Warning | The Lane <...> graphically contains Activity <...> which is not a child of the Lane in the Project Browser. |
| R28 | Error | A Data Input declared at the top Process level should not have incoming Data Associations. |
| R29 | Error | A Data Output declared at the top Process level should not have outgoing Data Associations. |
| R30-1 | Error | An Event with Event Definition references defined should be of Definition type Multiple. |
| R30-2 | Error | An Event Definition of type Multiple should have Event Definition references defined (see property 'eventDefinitionRefs'). |
| R31 | Error | An Event with the 'parallelMultiple' property set to true only applies to Event Definitions of type Multiple. |
| R32 | Error | A Start Event may only have incoming Sequence Flows if defined on the boundary of a Sub-Process. |
| R34-1 | Error | The parent of a Start or End Event should be a Process, Sub-Process or Collaboration, not an Activity. |
| R34-2 | Error | The Definition type of a Start Event of a top level Process must be one of : "Conditional", "Timer", "Message", "Multiple", "ParallelMultiple", "Signal". |
| R35 | Error | The Start Event of an embedded Sub-Process should be of Definition type None. |
| R36 | Error | An Event Sub-Process must contain one Start Event of Definition |

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| | | type : "Compensation", "Conditional", "Error", "Escalation", "Message", "Multiple", "Signal". |
| R37 | Warning | A Start Event of Definition type Error is always interrupting (see property 'isInterrupting'). |
| R38 | Error | A Start Event must be the source of one or more unconditional Sequence Flows. |
| R39 | Error | A Start Event must not be the source of any Message Flows. |
| R40 | Warning | A Start Event that is the target of one or more Message Flows should be of Definition type Message or Multiple. |
| R41 | Error | If there is a Start Event there must also be at least one End Event at the same (Process) level. |
| R42-1 | Error | A Cancel End Event is valid only within the context of a Transaction Sub-Process (see property 'isATransaction'). |
| R42-2 | Warning | The parent Transaction Sub-Process of this Cancel End Event does not have a Cancel Intermediate Event defined on its boundary. |
| R43-1 | Error | The Activity to be compensated referenced by this Compensation End Event must belong to the same (Process) scope as the End Event itself. |
| R43-2 | Warning | The Activity to be compensated referenced by this Compensation End Event does not have a Compensation Intermediate Event attached to its boundary. |
| R44 | Error | An End Event must be the target of one or more Sequence Flows. |
| R45 | Error | An End Event may only have outgoing Sequence Flows if defined on the boundary of a Sub-Process. |
| R46 | Error | An End Event must not be the target of any Message Flows. |
| R47 | Warning | An End Event that is the source of one or more Message Flows should be of Definition type Message or Multiple. |
| R48 | Error | An Intermediate Catch Event of Definition type Link cannot be the target of a Sequence Flow. |
| R49 | Warning | An Intermediate Event attached to the boundary of an Activity is always a Catch Event (see property 'catchOrThrow'). |
| R50 | Error | An Intermediate Event in normal flow must be of Definition type : "None", "Message", "Timer", "Escalation", "Compensation", "Conditional", "Link", "Signal", "Multiple", "ParallelMultiple". |
| R51-1 | Error | An Intermediate Event in normal flow may be the source or the target of at most one Message Flow. |
| R51-2 | Error | An Intermediate Event in normal flow that is the target of a Message Flow should be of Definition type Message or Multiple. |
| R51-3 | Warning | An Intermediate Event in normal flow that is the target of a Message Flow should be a Catch Event (see property 'catchOrThrow'). |
| R51-4 | Warning | An Intermediate Event in normal flow that is the source of a Message Flow should be a Throw Event (see property 'catchOrThrow'). |

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| R52 | Warning | An Intermediate Event in normal flow of Definition type None is always a Throw Event (see property 'catchOrThrow'). |
| R53 | Warning | An Intermediate Event in normal flow of Definition type Escalation is always a Throw Event (see property 'catchOrThrow'). |
| R54 | Warning | An Intermediate Event in normal flow of Definition type Compensation is always a Throw Event (see property 'catchOrThrow'). |
| R55-1 | Error | The Activity to be compensated referenced by this Compensation Intermediate Event in normal flow must belong to the same (Process) scope as the Intermediate Event itself. |
| R55-2 | Warning | The Activity to be compensated referenced by this Compensation Intermediate Event in normal flow does not have a Compensation Intermediate Event attached to its boundary. |
| R56 | Warning | An Intermediate Event in normal flow of type Conditional is always a Catch Event (see property 'catchOrThrow'). |
| R57 | Error | The target Catch Link Intermediate Event referenced by this source Throw Link Intermediate Event must belong to the same (Process) scope as the source Event. |
| R58 | Warning | An Intermediate Event in normal flow of type Parallel Multiple is always a Catch Event. |
| R59-1 | Error | An Intermediate Event in normal flow must be the source of at least one Sequence Flow. |
| R59-2 | Error | An Intermediate Event in normal flow must be the target of at least one Sequence Flow. |
| R61 | Error | An Intermediate Event attached to the boundary of an Activity must be of Definition type : "Message", "Timer", "Escalation", "Error", "Cancel", "Compensation", "Conditional", "Signal", "Multiple", "ParallelMultiple". |
| R62-1 | Error | An Intermediate Event attached to the boundary of an Activity may be the target of at most one Message Flow. |
| R62-2 | Error | An Intermediate Event attached to the boundary that is the target of a Message Flow should be of Definition type Message or Multiple. |
| R63 | Warning | An Intermediate Event of Definition type Error is always interrupting (the property 'cancelActivity' must be true). |
| R64-1 | Warning | An Intermediate Event of Definition type Cancel is always interrupting (the property 'cancelActivity' must be true). |
| R64-2 | Error | An Intermediate Event of Definition type Cancel must be attached only to the boundary of a Transaction Sub-Process. |
| R65-1 | Error | An Intermediate Event of Definition type Compensation attached to the boundary of an Activity must identify the Compensation Activity through the 'activityRef' property or through an Association connector. |
| R65-2 | Error | This Activity is referenced as a Compensation but its 'isForCompensation' property is not set in EA. |

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| R66-1 | Error | An Intermediate Event attached to the boundary of an Activity cannot be the target of a Sequence Flow. |
| R66-2 | Error | An Intermediate Event attached to the boundary of an Activity must be the source of Sequence Flow (except when of type Compensation). |
| R67 | Warning | An Event of Definition type Conditional should have its 'condition' property defined. |
| R68-1 | Warning | The target of this Throw Intermediate Event of type Link is not defined. |
| R68-2 | Error | The target Event referenced by this source Throw Link Intermediate Event must be a Catch Intermediate Event of type Link. |
| R70 | Error | A Timer Event must have one and only one of these 3 properties defined: 'timeDate', 'timeCycle' or 'timeDuration'. |
| R71 | Error | A Gateway must NOT have incoming OR outgoing Message Flows. |
| R72-1 | Error | A non-initiating Gateway must have either multiple incoming OR multiple outgoing Sequence Flows (it may have both). |
| R72-2 | Warning | The 'gatewayDirection' property of this Gateway does not match the diverging pattern of its outgoing Sequence Flows. |
| R72-3 | Warning | The 'gatewayDirection' property of this Gateway does not match the mixed converging/diverging pattern of its Sequence Flows. |
| R72-4 | Warning | The 'gatewayDirection' property of this Gateway does not match the converging pattern of its incoming Sequence Flows. |
| R72-5 | Error | A non-initiating Gateway with multiple incoming Sequence Flows must have at least one outgoing Flow. |
| R72-6 | Error | A non-initiating Gateway with multiple outgoing Sequence Flows must have at least one incoming Flow. |
| R73-1 | Warning | One outgoing Sequence Flow has a condition specified in the 'conditionExpression' property, but the 'conditionType' property is set to Default. |
| R73-2 | Warning | One outgoing Sequence Flow has the 'conditionType' property set to Expression, but no condition is stated in the 'conditionExpression' property. |
| R73-3 | Warning | One outgoing Sequence Flow has a condition specified in the 'conditionExpression' property, but the 'conditionExpression' property is not set accordingly. |
| R73-4 | Error | Outgoing Sequence Flow labeled <...> of an Exclusive or Inclusive Gateway must have a 'conditionExpression' property defined or be set to Default. |
| R74 | Error | An Event Gateway must have at least two outgoing (unconditional) Sequence Flows. |
| R75-1 | Error | The target of an Event Gateway must be either an Intermediate Event or a Receive Task. |

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| R75-2 | Error | The Activity that is the target of an Event Gateway must be a Receive Task. |
| R75-3 | Error | Receive Tasks as the target of an Event Gateway must not be mixed with Intermediate Events of Definition type Message. |
| R75-4 | Error | The Intermediate Event that is the target of an Event Gateway must be one of the following Definition types : "Conditional", "Message", "Multiple", "Signal", "Timer". |
| R76 | Error | A Receive Task that is the target of an Event Gateway must not define boundary Events. |
| R77 | Error | A Receive Task that is the target of an Event Gateway must not be the target of any other Sequence Flows. |
| R78 | Error | An Event Gateway with the 'instantiate' property set to true must not have any incoming Sequence Flows. |
| R78-1 | Error | An Event Gateway with the 'instantiate' property set to true must have outgoing Sequence Flows. |
| R79 | Error | An Event Gateway with the 'eventGatewayType' property set to Parallel must have the 'instantiate' property set to true. |
| R80-1 | Error | Message Flows coming in to a Receive Task that is the target of an Event Gateway must refer to the same Message. |
| R80-2 | Error | Receive Tasks or Intermediate Events of Definition type Message that are the target of an Event Gateway must refer to different Messages. |

Support and contact information

Use the contact information below for any installation or runtime issues with the add-in. Feature requests or suggestions for improvement are also welcome!

Contact: Frank Truyen

Email: support@enterprisemodelingsolutions.com

Phone: 714-573-7112