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Introducing Plug-in

[Plugin Support](#) provides an interface for developers to integrate with VP modeling tools. Developers can develop their plugins for what they want.

Introduction to plugin support

Gives you basic knowledge about plug-in development.

Introduction to plugin support

Plugin Support provides an interface for developers to integrate with Visual Paradigm. Developers can develop their plugins for what they want. In this section, we will introduce the structure of a plugin.

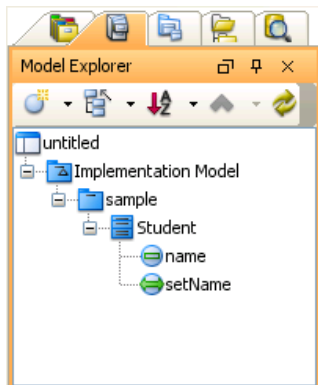
Plugin.xml

A plugin is defined in a XML file (plugin.xml). It includes the information (such as plugin id, provider, required libraries, etc...), custom actions (menu, toolbar and popup menu) and custom shapes/connector of the plugin.

For working with Visual Paradigm in plugin, there are 4 main components must be known by developers: Model, Diagram, Diagram Element and Action/Action Controller.

Model element

Model Elements are basic construct of a model. Plugin allows developer to create, retrieve, update and delete model elements through the popup menu context or through the project (by iterating model elements within a project).

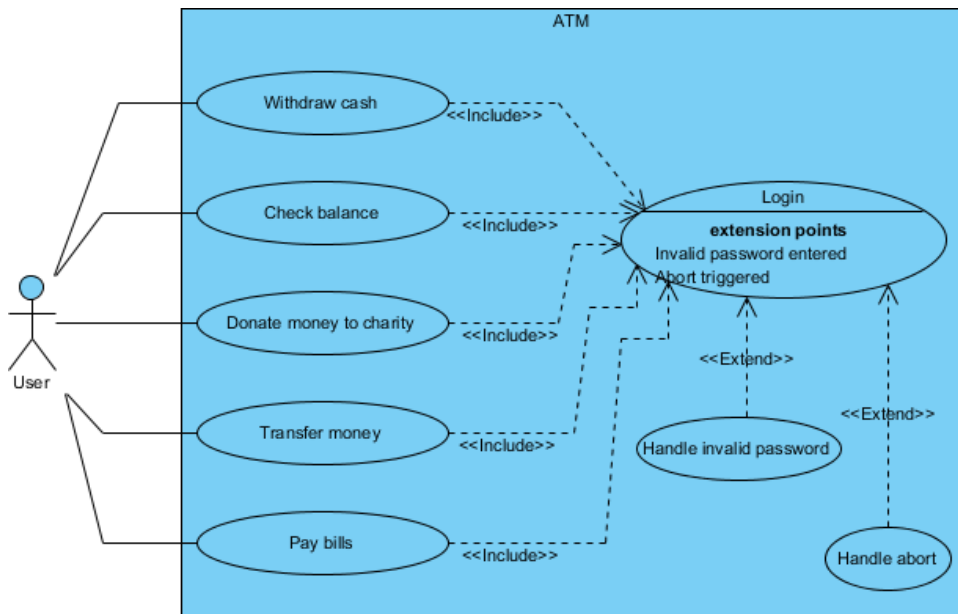


Model elements under Model Explorer

Diagram

Diagram is contains diagram elements on different domain (such as Use Case Diagram, Class Diagram, ERD, etc...).

Plugin allows developer to create, retrieve, update and delete diagrams through the popup menu context or through the project (by iterating diagrams within a project)



An opening Use Case Diagram

Diagram element

A model element does not contain information of appearance (such as x, y, width, height, etc...). It is the diagram element, which appear on the user interface, that owns the appearance data. Diagram Element represents a view of a model element. A model element can be shown on different diagrams (such as a class can be shown on 2 different class diagrams).

There are 2 kinds of diagram element: Shape and Connector. Shape represents the non-relationships diagram element (such as Class). Connector represents the relationships (such as Generalization). Plugin allows developer to create, retrieve, update and delete diagram elements through the popup menu context or through the project (to iterate all the diagrams and then the diagram elements appear on a diagram).

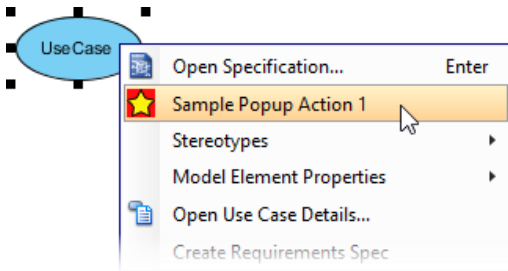


Action/Action controller

Action represents buttons and menus (menu, toolbar and popup menu), which contains the information on outlook (such as label, icon, mnemonic, etc...) and responses to trigger the function call.

Action is used to represent the button on 3 regions: menu/toolbar, popup menu and diagram toolbar

Action Controller is the control (function call) of actions. Developer needs to implement different Action Controller on different region's actions.



Popup menu with user-defined menu item

Implementing Plug-in

Provides you with information about plug-in implementation.

Implementing plugin

Learn how to implement a plug-in.

Implementing plugin

Configuring development environment

The plugin API is in `%Visual-Paradigm-Install-Dir%/lib/openapi.jar`. In order to program a plugin, developer must import the jar into the development classpaths.

Beginning of plugin.xml

plugin.xml is the base of a plugin, to develop a plugin, you should start from writing the plugin.xml. The basic directory structure is "Visual-Paradigm-Install-DIR/plugins/YOUR_PLUGIN_ID/plugin.xml"

For improving the variability of the plugin.xml, a properties file (plugin.properties) can be used for storing the value of the xml. Developer can assign the value of the attributes in xml starts with '%', then the value will be read from the properties file. For example

In plugin.xml: `<plugin id="sample.plugin name="%plugin.name" .../>`

In plugin.properties: `plugin.name=sample.plugin`

Sample on XML:

```
< plugin
  id= "sample.plugin"
  name= "Sample Plugin"
  description= "Sample Plugin"
  provider= "Visual Paradigm"
  class= "sample.plugin.SamplePlugin">
  < runtime >
    < library path= "lib/sampleplugin.jar" relativePath= "true"/>
  </ runtime >
  <!-- to be continued -->
</ plugin >
```

Table shows the description of elements in the plugin.xml.

Element	Attribute	Description
plugin		The root element of plugin.xml, specify the basic information of the plugin (id, name, provider, etc...)
plugin	class	The class of the plugin, required to implements com.vp.plugin.VPPlugin .
runtime		The element specified the runtime environment of the plugin.
library (1..*)		Specify the .jar or directory as the classpaths required on the plugin. Such as the classes of the plugin and some libraries the plugin required.
library (1..*)	Path	The path of the .jar or directory.
library (1..*)	relativePath (optional, default: true)	Specify whether the path is relative path.

plugin.xml element description

Description on Code:

VPPlugin (com.vp.plugin.VPPlugin)

This class must be implemented and ref on `<plugin class="xxx"...` Otherwise, the plugin will not be loaded completely. In fact, the class can do nothing on it.

The following is the sample code:

```
package sample.plugin;
public class SamplePlugin implements com.vp.plugin.VPPlugin {
    // make sure there is a constructor without any parameters
    public void loaded(com.vp.plugin.VPPluginInfo info) {
        // called when the plugin is loaded
        // developer can get the current plugin's id and the
        // current plugin directory (default: %Visual-Paradigm%/plugins)of Visual-Paradigm from the VPPluginInfo.
    }
    public void unloaded() {
        // called when the plugin is unloaded (when Visual Paradigm will be exited)
    }
}
```

Implementing custom action

There are 2 main components for an Action: Action and Action Controller. Action represents the outlook, Action Controller responses to work as function call. In order to create custom action, developer needs to define the Action on xml, and implement the Action Controller on code.

Sample on XML:

```
<plugin>
  < actionSets>
    <!-- to be continued -->
```

```

</ actionSets>
<!-- to be continued -->
</plugin>

```

Table shows the description of elements in the above XML.

Element	Attribute	Description
actionSets		It is a collection of ActionSet. There 2 kinds of ActionSet: actionSet and contextSensitiveActionSet . actionSet is a set of actions which will be shown on menu/toolbar or diagram toolbar. contextSensitiveActionSet is set of actions which will be shown on popup menu.

XML sample for custom action

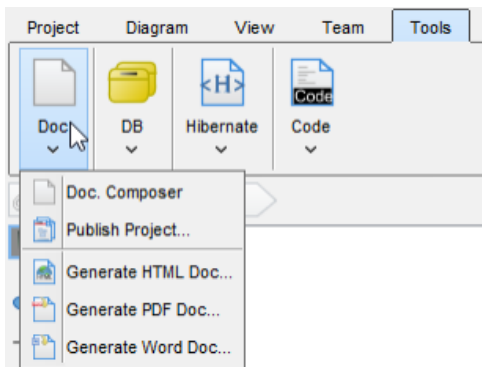
There are differences on xml definition and code implementation of the 3 kinds of Actions (menu/toolbar, popup menu, diagram toolbar).

Custom action on menu/Toolbar

Developer can define the menu, menu item, toolbar, toolbar button and etc... on the plugin.xml. In order to trigger the menu item and toolbar button's function call, Action Controller is required to be implemented and added into the Action. The Action Controller class on menu/toolbar actions is com.vp.plugin.action.VPActionController.

There are 2 important attributes used on menu, action and separator: **menuPath** and **toolbarPath** .

menuPath is the path specified where is the item placed on menu, toolbarPath is the path specified where is the item placed on toolbar. The path is formed by a set of 'name'. The 'name' is similar with the caption of the menu items (caption in English, ignores the "." and remind the 'space'). '/' is used as delimiter of the path. '#' is used to represent the front of the menu. Here, 4 examples will be given:



Custom Action on MenuBar

Below is the menupaths required for implementing the menus shown in the above images.

Menu	"label" in XML	"menuPath" in XML	Remarks
1 Tools		Tools	After the Tools menu
2 Tools/Document		Tools/Document	Under the Tools menu, after the Document menu
3 Tools/Document/#		Tools/Document/#	Under the Tools menu, and under the Document menu, place on the front
4 Tools/Document/Generate HTML Document		Tools/Document/Generate HTML Document	Under the Tools menu, and under the Document menu, after the Generate HTML Document menu item

Different menupaths settings

Sample on XML:

```

< actionSet id="sample.plugin.actions.ActionSet1">
  < toolbar
    id= "sample.plugin.actions.Toolbar1"
    orientation= "north"
    index= "last"/>
  < menu
    id= "sample.plugin.actions.Menu1"
    label= "Sample Menu 1"
    mnemonic= "M"
    menuPath= "Tools/Document"/>
  < action
    id= "sample.plugin.actions.Action1"
    actionType= "generalAction"
    label= "Sample Action 1"
    tooltip= "Sample Action 1"

```

```

        icon= "icons/red.png"
        style= "normal"
        menuPath= "Tools/Document"
        toolbarPath= "sample.plugin.actions.Toolbar1/#">
        < actionController class= "sample.plugin.actions.ActionController"/>
    </ action>
    < separator

        id= "sample.plugin.actions.Separator1"
        menuPath= "Tools/sample.plugin.actions.Action1"
        toolbarPath= "sample.plugin.actions.Toolbar1/sample.plugin.action.Action1"/>
</ actionSet>

```

The table shows the description of elements in the above XML.

Element	Attribute	Description
actionSets		It is a collection of ActionSet. There are 2 kinds of ActionSet: actionSet and contextSensitiveActionSet . actionSet is a set of actions which will be shown on menu/toolbar or diagram toolbar. contextSensitiveActionSet is set of actions which will be shown on popup menu.
toolbar (0..*)		Specify a toolbar, contains the location information of the toolbar.
toolbar (0..*)	orientation [north east south west]	Specify which side will be the toolbar placed on.
toolbar (0..*)	index [(number) last new]	Based on the orientation, where the toolbar will be placed. e.g. the orientation is "north" and there are 2 rows toolbars already. If the index is "0", then the toolbar will be placed on the first row's last position. If the index is "last", the toolbar will be placed on the last row, last position. If the index is "new", the toolbar will be placed on the third row (new row).
menu (0..*)		Specify a menu or a pull down button on menu bar or toolbar. It contains the outlook information of the menu.
action (0..*)		Specify a menu item or button on menu bar or toolbar. It contains the outlook information of the menu item.
action (0..*)	actionType [generalAction shapeAction connectorAction] (optional, default: generalAction)	There are 3 types: generalAction, shapeAction and connectorAction. As the action on menu/toolbar, generalAction should be assigned.
actionController		Specify the Action Controller for the action (the parent node in the xml).
actionController		The class name of the Action Controller. For the action on menu/toolbar, it is required to implement com.vp.plugin.action.VPActionController .
separator (0..*)		Specify a separator on menu bar or toolbar.

XML sample for menus and toolbars

Description on Code:

VPActionController (com.vp.plugin.action.VPActionController)

This class is used to perform the function call when the action is clicked. One Action Controller class refers to multi Actions is allowed.

Sample:

```

package sample.plugin.actions;
public class ActionController implements com.vp.plugin.action.VPActionController {
    // make sure there is an constructor without any parameters
    public void performAction(com.vp.plugin.action.VPAction action) {
        // called when the button is clicked, the parameter action represents the Action which be clicked.
        // developer also can set the properties of the action
    }
    public void update(com.vp.plugin.action.VPAction action) {
        // *for the actions located on menu bar only
        // when the parent menu is selected, this will be called,
        // developer can set the properties of the action before it is shown (e.g. enable/disable the menu item)
    }
}

```


Custom action on popup menu (context sensitive)

Developer can define the menu, menu item and separator on the popup menu shown on the diagram. The popup menu on diagram is context sensitive which based on what diagram element or diagram is selected. In order to make the menu item trigger the function call, Action Controller is required to be implemented. For popup menu, **com.vp.plugin.action.VPContextActionController** is the interface required developer to implement.

Same as Action on Menu/Toolbar, **menuPath** is used to specify the location of the action (menu/menu item on popup menu).

Sample on XML:

```
< contextSensitiveActionSet id= "sample.plugin.actions.ActionSet2">
  < contextTypes all= "false">
    < include type="Class"/>
    <!-- ignored when contextTypes.all = true -->
    < exclude type="Package"/>
    <!-- ignored when contextTypes.all = false -->
  </ contextTypes>
  <action
    id= "sample.plugin.actions.ContextAction1"
    label= "Sample Action [1]"
    icon= "icons/blue.png"
    style= "toggle"
    menuPath= "OpenSpecification">
    < actionController class= "sample.plugin.actions.ContextActionController"/>
  </action>
</contextSensitiveActionSet>
```

Table shows the description of elements in the above XML.

Element	Attribute	Description
contextSensitvieActionSet (0..*)		It is a collection of menu, action, separator on the popup menu of the plugin. The child elements should be ordered if they have the relationship on the position (e.g. developer prefers Action1 is placed into Menu1, then please define the Menu1 on the xml first
contextTypes		It is a collection of the model of diagram element of diagram types which the contextSensitiveActionSet is considering.
contextTypes	all [true false] (optional, default: false)	Specify whether all the types of the models, diagram elements and diagrams will be considered by this actionSet.
Include		Specify the model, diagram element or diagram type will be considered by this ActionSet. (This will be ignored if the contextType's attribute ' all ' is assigned 'true'.
Include	type	It is type of the element. Such as "Class", "Actor", "ClassDiagram", "Attribute", etc...
exclude		Specify the model, diagram element or diagram type will not be considered by this ActionSet. (This will be ignored if the contextType's attribute ' all ' is assigned 'false'.
type		It is type of the element. Such as "Class", "Actor", "ClassDiagram", "Attribute", etc...
actionController		Specify the Action Controller for the action (the parent node in the xml)
actionController	class	The class name of the Action Controller. For the action on popup menu, it is required to implement com.vp.plugin.action.VPContextActionController .

XML sample for popup menu

Description on Code:

VPContextActionController (com.vp.plugin.action.VPContextActionController)

This class is used to perform the function call when the action is clicked. One Action Controller class refers to multi Actions is allowed.

Sample:

```
package sample.plugin.actions;
import java.awt.event.ActionEvent;
public class ContextActionController implements com.vp.plugin.action.VPContextActionController {
  // make sure there is an constructor without any parameters
  public void performAction(
    com.vp.plugin.action.VPAction action,
```

```

        com.vp.plugin.action.VPContext context,
        ActionEvent e
    ){
        // called when the button is clicked
    }
    public void update(
        com.vp.plugin.action.VPAction action,
        com.vp.plugin.action.VPContext context
    ){
        // when the popup menu is selected, this will be called,
        // developer can set the properties of the action before it is shown (e.g. enable/disable the menu item)
    }
}

```

VPContext (com.vp.plugin.action.VPContext)

Context will be passed into the Action Controller when the popup menu is shown or action is triggered. It is what the user selected on the diagram, can be model, diagram element or/and diagram.

A diagram may contain many diagram elements, when user right-click on the diagram element or the diagram, a popup menu will be shown. So, the context may be diagram element or diagram. However, the diagram element must be contained by diagram, then if popup menu is shown on a diagram element, the context must contain both diagram element and diagram. And the diagram element always represents for a model, so that is possible the context contains model, diagram element and diagram as same time. However, sometime, the popup menu is shown for a model only (e.g. select on an attribute of a class, because there is no diagram element for the attribute, the class's diagram element will be contained in the context).

Custom diagram element (shape and connector)

Developer can define the shape to connect on the specified diagram. But it is not allowed to develop a custom model. ActionSet and Action are used on definition of custom diagram element.

Sample on XML:

```

<actionSet id= "sample.plugin.actions.ShapeActionSet">
  <action
    id= "sample.plugin.actions.ShapeAction1"
    actionType= "shapeAction"
    label= "Sample Action {1}"
    tooltip= "Sample Action {1}"
    icon= "icons/yellow.png"
    editorToolBarPath= "com.vp.diagram.ClassDiagram/Class">
    < shapeCreatorInfo
      shapeType= "sample.plugin.shape.Shape1"
      defaultWidth= "30"
      defaultHeight= "30"
      controllerClass= "sample.plugin.actions.ShapeController1"
      multilineCaption= "false"
      captionStyle= "north"
      resizable= "true"/>
    </action>
  <action
    id= "sample.plugin.actions.ConnectorAction1"
    actionType= "connectorAction"
    label= "Sample Action {2}"
    tooltip= "Sample Action {2}"
    icon= "icons/green.png"
    editorToolBarPath= "com.vp.diagram.ClassDiagram/sample.plugin.actions.ShapeAction1">
    <connectorCreatorInfo
      shapeType= "sample.plugin.connector.Connector1 "
      fromArrowHeadStyle= "Arrow1"
      toArrowHeadStyle= "Arrow2"
      fromArrowHeadSize= "verySmall"
      toArrowHeadSize= "large"
      dashes= "7,10"
      lineWeight= "3"
      connectorStyle= "rectilinear">
      < connectionRules>
        < connectionRule
          fromShapeType= "sample.plugin.shape.Shape1"
          toShapeType= "sample.plugin.shape.Shape1"
          bidirection= "true"/>
        < connectionRule
          fromShapeType= "Class"
          toShapeType= "sample.plugin.shape.Shape1"
          bidirection= "true"/>
        < connectionRule
          fromShapeType= "Package"
          toShapeType= "sample.plugin.shape.Shape1"
          bidirection= "true"/>
      </connectionRules>
    </connectorCreatorInfo>
  </action>

```

</actionSet>

Table shows the description of elements in the above XML.

Element	Attribute	Description
Action		It is a collection of menu, action, separator on the popup menu of the plugin. The child elements should be ordered if they have the relationship on the position (e.g. developer prefers Action1 is placed into Menu1, then please define the Menu1 on the xml first
Action	actionType [generalAction shapeAction connectorAction] (optional, default: generalAction)	There are 3 types: generalAction, shapeAction and connectorAction. As the action for custom shape, "shapeAction" should be assigned. For custom connector, "connectorAction" should be assigned.
Action	editorToolBarPath	Specify which diagram toolbar contains this action. e.g. to add a shapeAction on class diagram after the button for creating a new class, "com.vp.diagram.ClassDiagram/Class" should be assigned. "com.vp.diagram.ClassDiagram" is the id of the class diagram. "/" is the delimiter. "Class" is the button id.
shapeCreatorInfo		If the actionType is "shapeAction", shapeCreatorInfo is required. It is used to specify the details of the custom shape.
shapeCreatorInfo	shapeType	The shape type assigned by developer, unique value is required.
shapeCreatorInfo	captionStyle [center north none] (optional)	Specify where the caption of the shape is displayed.
shapeCreatorInfo	controllerClass	The class name which the class is responsible to draw the shape on the diagram, com.vp.plugin.diagram.VPShapeController is required to be implemented. com.vp.plugin.diagram.AbstractShapeController is an abstract class of the VPShapeController .
connectorCreatorInfo		If the actionType is "connectorShape", connectorCreatorInfo is required. It is used to specify the details of the custom connector.
connectorCreatorInfo	shapeType	The shape type assigned by developer, unique value is required.
connectorCreatorInfo	connectorStyle [oblique rectilinear] (optional, default: oblique)	Specify the style of the connector.
connectorCreatorInfo	fromArrowHeadStyle (optional)	Specify the arrow head style of the "from" side of the connector.
connectorCreatorInfo	toArrowHeadStyle (optional)	Specify the arrow head style of the "to" side of the connector.
connectorCreatorInfo	fromArrowHeadSize [verySmall small medium large extraLarge jumbo colossal] (optional)	Specify the arrow head size of the "from" side of the connector.
connectorCreatorInfo	toArrowHeadSize [verySmall small medium large extraLarge jumbo colossal] (optional)	Specify the arrow head size of the "to" side of the connector
connectorCreatorInfo	dashes (optional)	Specify the dashes pattern of the connector. A list of float, written in the pattern "%f, %f, %f, ...".
connectorCreatorInfo	lineWeight (optional)	Specify the weight of the connector.
connectorRules		It is a collection of connectorRule .
connectorRule (1..*)		Specify this connector can connect with what diagram element.

XML sample for diagram element

Description on Code:

VPSHapeController (**com.vp.plugin.diagram.VPSHapeController**)

It responses to handle the outlook of the shape on the diagram.

Sample:

```
package sample.plugin.actions;
// import the necessities
public class ShapeController implements com.vp.plugin.diagram.VPShapeController {
    public void drawShape(
        Graphics2D g, Paint lineColor, Paint fillColor, Stroke stroke,
        Com.vp.plugin.diagram.VPShapeInfo shapeInfo
    ){
        // draw the shape by the graphics
        // shapeInfo contains the information of the shape, e.g. the bounds of the shape.
    }
    public boolean contains( int x, int y, com.vp.plugin.diagram.VPShapeInfo shapeInfo) {
        // check whether the x, y is inside the shape,
        // it is used to checking what is selected by the user
    }
}
```

Working with models

Plugin Support provides interface for the developer to create, retrieve update and delete the models in Visual Paradigm. The base class of the model is **com.vp.plugin.model.IModelElement**. All models are contained in the project (**com.vp.plugin.model.IProject**). Each model has a model type to access all the model type, please refer to the class **com.vp.plugin.model.IModelElementFactory**, it is the class to create the models.

Creating model

Developer can use the model element factory (**com.vp.plugin.model.IModelElementFactory**) to create the model. Or based on a parent model (**com.vp.plugin.model.IModelElementParent**) to create a child model.

IModelElementFactory can be accessed by **IModelElementFactory.instance()**. It provides the functions to create all the models.

IModelElementParent is the subclass of **IModelElement**. It provides the function to create the child into it. If the parent class is more specified, it may support a more details function to create the child. For example, **IClass** is subclass of **IModelElementParent**, it provides **createOperation()** to create an operation into it.

Sample on Code:

```
/*
 * create model by IModelElementFactory
 * result of the 2 methods: "class model is created and added into the project"
 */
// assume in a code segment
IClass classModel1 = IModelElementFactory.instance().createClass();
IClass classModel2 = (IClass) IModelElementFactory.instance().create(IModelElementFactory. MODEL_TYPE_CLASS);
/*
 * create model by IModelElementParent
 * result of the first 2 methods, "operation model is created and added into the class model"
 * result of the last method, "actor model is created and added into project", because actor cannot be the child of class model
 */
// assume in a code segment
IOperation operationModel1 = classModel1.createOperation();
IOperation operationModel2 = (IOperation) classModel1.createChild(IModelElementFactory. MODEL_TYPE_OPERATION);
IActor actorModel1 = (IActor) classModel1.createChild(IModelElementFactory. MODEL_TYPE_ACTOR);
```

Retrieving model

Developer can use the project (**com.vp.plugin.model.IProject**) or the context (**com.vp.plugin.action.VPContext**) from ActionController to retrieve the models.

IProject is the project of Visual Paradigm. The project contains all models, diagram and diagram elements. It provides function (**modelElementIterator()**) for the developer to iterate the models.

VPContext is the context of a popup menu. Developer can access the context by popup menu's action controller (**com.vp.plugin.action.VPContextActionController**). Context may contain a model element if the popup menu is shown on a diagram element or model.

Sample on Code:

```
/*
 * retrieve model by IProject
 */
// assume in a code segment
IProject project = ApplicationManager.instance().getProjectManager().getProject();
Iterator iter = project.modelElementIterator();
while (iter.hasNext()) {
    IModelElement modelElement = (IModelElement) iter.next();
    // model element retrieved
}
/*
 * retrieve model by VPContext
 */
// assume on a sub-class of com.vp.plugin.action.VPContextActionController
```

```

public void update(VPAction action, VPContext context) {
    IModelElement modelElement = context.getModelElement();
    // model element retrieved, but please take care,
    // context.getModelElement() may return null if the popup menu is shown for the diagram
    // or the selected diagram element doesn't refer to a model element.
}
/*
 * retrieve relationship model from a class model
 * there are 2 kinds of relationships: IRelationship and IEndRelationship
 */
// assume in a code segment
IClass classModel = ...; // retrieved the class model from somewhere
// retrieve a generalization (IRelationship)
Iterator genIter = classModel.fromRelationshipIterator();
while (genIter.hasNext()) {
    IRelationship relationship = (IRelationship) genIter.next();
    // found out the another side's model of the relationship
    IModelElement otherModel = relationship.getTo();
}
// retrieve an association (IEndRelationship)
Iterator assolter = classModel.fromRelationshipEndIterator();
while (assolter.hasNext()) {
    IRelationshipEnd relationshipEnd = (IRelationshipEnd) assolter.next();
    IModelElement otherModel = relationshipEnd.getEndRelationship().getToEnd().getModelElement();
}
}

```

Updating model

Developer can call a set of get/set methods on a model. Different model type has different properties. For setting and getting the model's property, cast the **IModelElement** into its sub-class is necessary. For example, developer gets the **IModelElement** from the popup menu's context. Developer checks whether the model is a **IClass**, then developer casts the **IModelElement** into **IClass**, and call the function **IClass.setVisibility(XXX)**.

Sample on Code:

```

/*
 * update a class model
 */
// assume in a code segment
IModelElement model = ...; // model is retrieved from somewhere
if (IModelElementFactory.MODEL_TYPE_CLASS.equals(model.getModelType())) {
    IClass classModel = (IClass) model;
    // set the class to be 'private'
    classModel.setVisibility(IClass.VISIBILITY_PRIVATE);
    // set super class
    IClass superClassModel = ...; // another class model is retrieved, it will be set to be the previous model's super class
    IGeneralization generalizationModel = IModelElementFactory.instance().createGeneralization();
    generalizationModel.setFrom(superClassModel);
    generalizationModel.setTo(classModel);
    // get all "setName" operation from the class and set to be "protected final"
    Iterator operationIter = classModel.operationIterator();
    while (operationIter.hasNext()) {
        IOperation operation = (IOperation) operationIter.next();
        if ("setName".equals(operation.getName())) {
            if (operation.getJavaDetail() == null) {
                operation.setJavaDetail(IModelElementFactory.instance().createJavaOperationCodeDetail());
            }
            operation.getJavaDetail().setJavaFinal(true);
            operation.setVisibility(IOperation.VISIBILITY_PROTECTED);
        }
    }
}
}

```

Deleting model

Developer can delete the model by simple way, just call the **IModelElement.delete()**.

Working with diagrams/Diagram elements

Plugin Support provides interface for the developer to create, retrieve update and delete the diagrams or diagram elements in Visual Paradigm. The base class of the diagram is **com.vp.plugin.diagram.IDiagramUIModel**. The base class of the diagram element is **com.vp.plugin.diagram.DiagramElement**. All diagrams are contained in the project (**com.vp.plugin.model.IProject**). And the diagram elements can be found in the diagrams. The diagram elements can be contained by the diagrams.

Creating diagrams/Diagram elements

Developer can create the diagram or diagram element by **com.vp.plugin.DiagramManager**. **DiagramManager** can be accessed by **ApplicationManager.instance().getDiagramManager()**.

Sample on Code:

```

// assume in a code segment
DiagramManager diagramManager = ApplicationManager.instance().getDiagramManager();
/*

```

```

* create diagram
*/
IDiagramUIModel diagram = diagramManager.createDiagram(DiagramManager. DIAGRAM_TYPE_CLASS_DIAGRAM);
/*
* create diagram element with exists models
*/
IModelElement classModel1 = ...; // retrieved a class model from somewhere
IModelElement packageModel1 = classModel1.getParent(); // assume the class model is contained by a package
IDiagramElement packageDiagramElement1 = diagramManager.createDiagramElement(diagram, packageModel1);
IDiagramElement classDiagramElement1 = diagramManager.createDiagramElement(diagram, classModel1);
// class's diagram element should be a shape, not a connector
packageDiagramElement1.addChild((IShapeUIModel) classDiagramElement1);
/*
* create diagram element without models (the model will be created automatically)
*/
IDiagramElement newClassDiagramElement =
diagramManager.createDiagramElement(diagram, IClassDiagramUIModel. SHAPETYPE_CLASS);
IModelElement newClassModel = newClassDiagramElement.getModelElement();
/*
* open the created diagram
*/
diagramManager.openDiagram(diagram);

```

Retrieving diagrams/Diagram elements

Developer can use the project (**com.vp.plugin.model.IProject**) to retrieve the diagrams. Use a diagram (**com.vp.plugin.diagram.IDiagramUIModel**) to retrieve the contained diagram elements. Or use the context (**com.vp.plugin.action.VPContext**) from ActionController to retrieve the diagram and/or diagram element.

IProject is the project of Visual Paradigm. The project contains all models, diagram and diagram elements. It provides function (**diagramIterator()**) for the developer to iterate the diagrams.

IDiagramUIModel is a diagram, which may contain many diagram elements.

VPContext is the context of a popup menu. Developer can access the context by popup menu's action controller (**com.vp.plugin.action.VPContextActionController**). Context may contain a diagram and/or diagram elements.

Sample on Code:

```

/*
* retrieve diagram from IProject
*/
// assume in a code segment
IProject project = ApplicationManager.instance().getProjectManager().getProject();
Iterator diagramIter = project.diagramIterator();
while (diagramIter.hasNext()) {
    IDiagramUIModel diagram = (IDiagramUIModel) diagramIter.next();
    /*
    * retrieve diagram element from IDiagramUIModel
    */
    Iterator diagramElementIter = diagram.diagramElementIterator();
    while (diagramElementIter.hasNext()) {
        IDiagramElement diagramElement = (IDiagramElement) diagramElementIter.next();
    }
}
/*
* retrieve diagram and diagram element from VPContext
*/
// assume on a sub-class of com.vp.plugin.action.VPContextActionController
public void update(VPAction action, VPContext context) {
    IDiagramUIModel diagram = context.getDiagram();
    IDiagramElement diagramElement = context.getDiagramElement();
    // diagramElement may be null, if the popup menu shown for the diagram
}
/*
* retrieve connected connector from a shape
* because a connector can connected with both Shape and Connector, please check the
* both getToShape() and getToConnector() or getFromShape() and getFromConnector()
*/
// assume in a code segment
IShapeUIModel shape = ...; // retrieved the shape from somewhere
IConnectorUIModel[] connectors = shape.toFromConnectorArray();
int count = connectors == null ? 0 : connectors.length;
for ( int i = 0; i < count; i++ ) {
    IDiagramElement toDiagramElement = connectors[i].getToShape();
    if (toDiagramElement == null) {
        toDiagramElement = connectors[i].getToConnector();
    }
}
}

```

Updating diagrams/Diagram elements

IDiagramUIModel provides the functions to set the diagram outlook (size, background, etc...).

IDiagramElement is the super class of **IShapeUIModel** and **IConnectorUIModel**. Because there is a difference between shape and connector, the **IShapeUIModel** and **IConnectorUIModel** provide different set of functions to update them.

Sample Code:

```
/*
 * update a shape's size and set a connector's connector style
 */
// assume in a code segment
IShapeUIModel shape = ...; // retrieved the shape from somewhere
shape.setBounds(20, 20, 400, 400);
IConnector connector = ...; // retrieved the connector from somewhere
connector.setConnectorStyle(IConnectorUIModel.CS_CURVE);
```

Deleting diagrams/Diagram elements

Developer can delete the diagram and diagram element by simple way, just call the **IDiagramUIModel.delete()** and **IDiagramElement.delete()**.

Showing dialog on Visual Paradigm

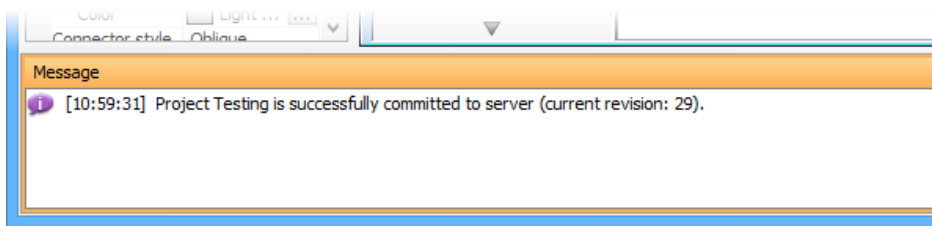
Since Visual Paradigm may be integrated with different platforms which may not support Swing (e.g. Eclipse, Visual Studio). That may make the process to be hung on if using the Swing dialog technology (e.g. JOptionPane and JDialog). So, it is necessary to use a special method to show the dialog with Swing technology.

com.vp.plugin.ViewManager is an interface provides function for developer to show the dialog as same as show dialog by JOptionPane. Besides that, **Viewmanager** supports developer to show message on Visual Paradigm's message pane and show custom dialog by implementing an interface (**com.vp.plugin.view.IDialogHandler**).

Same as JOptionPane, to show a dialog, it is better to have a component as the invoker/parent component. To get the component in Visual Paradigm, just call **ViewManager.getRootFrame()**.

Showing message on message pane

ViewManager provides function **showMessage(msg:String, msgTabId:String)** to show the message on Message Pane. The parameter **msg** is the content of the message, **msgTabId** is the id to identify the tab on Message Pane, which can be defined by developer.



Message in Message Pane

Sample on Code:

```
// assume in a code segment
ViewManager viewManager = ApplicationManager.instance().getViewManager();
viewManager.showMessage("Thank you for reading Visual Paradigm Plugin Support User's Guide. >="), "sample.plugin");
```

Showing simple message dialog

In Swing, we may use the **javax.swing.JOptionPane** to show a message dialog (e.g. **JOptionPane.showMessageDialog(...)**). **ViewManager** provides the functions which simulate the JOptionPane. **ViewManger** provides a set of **showXXXXDialog(...)** functions for showing the dialog. The signature of the functions are same with the JOptionPane. Developer need not feel strange on calling the **showXXXXDialog(...)** functions.

Showing custom dialog

In Swing, we may implement the **javax.swing.JDialog** and add our component on the dialog's content pane. But in plugin, developer is required to implement an interface **com.vp.plugin.view.IDialogHandler** to work for the dialog.

IDialogHandler specify the behaviors of a dialog. There are 4 functions need to be implemented.

```
getComponent() : java.awt.Component
```

It is called once before the dialog is shown. Developer should return the content of the dialog (similar to the content pane).

```
prepare(dialog : com.vp.plugin.view.IDialog) : void
```

It is called after the **getComponent()**. A dialog is created on Visual Paradigm internally (it still not shown out). Developer can set the outlook of the dialog on **prepare()**, such as title, bounds and modal, etc... For your convenience, the dialog will be shown on the screen center as default. If developer don't want change the location, there is no necessary to call the **setLocation()** function.

```
shown()
```

It is called when the dialog is shown. Developer may need to do something when the dialog is shown, such as checking something before user to input data on the dialog.

```
canClosed()
```

It is called when the dialog is closed by the user clicking on the close button of the frame. Developer may not allow the user to close the dialog (e.g. failed on validation check), then please return 'false' on **canClosed()**.

Sample on Code:

```
package sample.plugin.dialog;
// assume imported necessary classes
public class CustomDialogHandler implements IDialogHandler {
    private IDialog _dialog;
    private Component _component;
    private JTextField _inputField1, _inputField2, _answerField;
    public Component getComponent() {
        this._inputField1 = new JTextField(10);
        this._inputField2 = new JTextField(10);
        this._answerField = new JTextField(10);
        JLabel addLabel = new JLabel( " + "); JLabel equalLabel = new JLabel( " = ");
        JButton okButton = new JButton( "Apply");
        okButton.addActionListener( new ActionListener() {
            public void actionPerformed(ActionEvent e) { ok();}
        });
        JPanel pane = new JPanel();
        pane.add( this._inputField1); pane.add(addLabel); pane.add( this._inputField2);
        pane.add(equalLabel); pane.add( this._answerField); pane.add(okButton);
        this._component = pane;
        return pane;
    }
    public void prepare(IDialog dialog) {
        this._dialog = dialog;
        dialog.setModal(true);
        dialog.setTitle( "Maths Test");
        dialog.setResizable( false ); dialog.pack();
        this._inputField1.setText(String.valueOf(( int)(Math.random()*10000)));
        this._inputField2.setText(String.valueOf(( int)(Math.random()*10000)));
    }
    public void shown() {
        ApplicationManager.instance().getViewManager().showMessageDialog(
            this._component, "Maths Test is started, you have an half hour to finish this test.",
            "Maths Test", JOptionPane. INFORMATION_MESSAGE
        );
    }
    public boolean canClosed() {
        if ( this.checkAnswer()) { return true; }
        else {
            ApplicationManager.instance().getViewManager().showMessageDialog(
                this._component, "Incorrect",
                "Maths Test", JOptionPane. ERROR_MESSAGE
            );
            return false;
        }
    }
    private void ok() {
        if ( this.checkAnswer() ) { this._dialog.close(); }
        else {
            ApplicationManager.instance().getViewManager().showMessageDialog(
                this._component, "Incorrect",
                "Maths Test", JOptionPane. ERROR_MESSAGE
            );
        }
    }
    private boolean checkAnswer() {
        try {
            int a = Integer.parseInt( this._inputField1.getText());
            int b = Integer.parseInt( this._inputField2.getText());
            int c = Integer.parseInt( this._answerField.getText());
            return (a+b == c);
        }
        catch (Exception ex) { return false; }
    }
}
```


Installing Plug-in

After prepared all the required files for a plugin (plugin.xml, plugin.properties, classes/libraries and other resources), developer can plug the plugin into VP modeling tool.

Installing plugin

Learn how to install plug-in.

Installing plugin

Once you have finished implementing a plugin, you can install the plugin in Visual Paradigm.

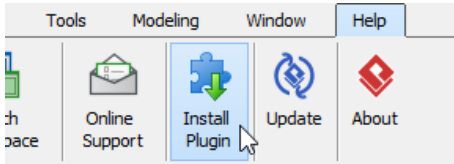
Installing from a zip of plugin

If you want to share a plugin with your teammates, you may zip it first, and then give the teammates the zip file for installation. To install a plugin from a zip, make sure the zip file stores the plugin with the following file structure:

```
└─ ${plugin-folder}
   └─ classes
       └─ ...
   └─ plugin.xml
   └─ lib (The external jars required to compile and run the plugin. Do NOT place the openapi.jar there or else your plugin will not be able to function)
       └─ ...
```

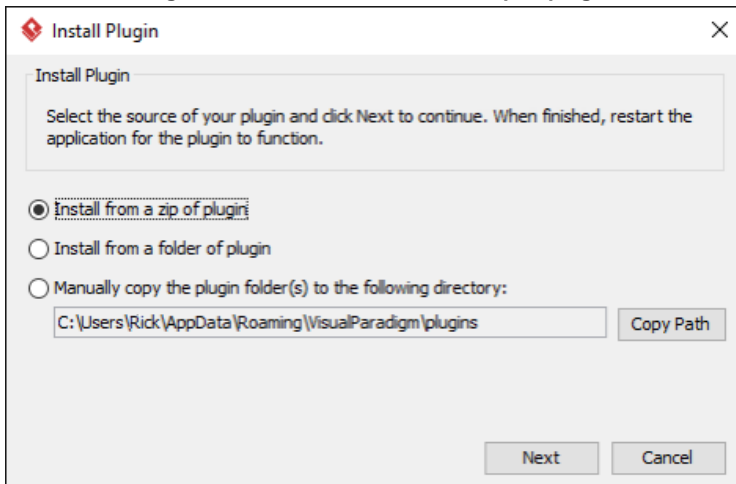
To install a plugin from a zip:

1. In Visual Paradigm, select **Help > Install Plugin** from the application toolbar.



Install Plugin

2. In the **Install Plugin** window, select **Install from a zip of plugin**.



The Install Plugin window

3. Click **OK**.
4. Select the zip file in the file chooser and click **Open**.
5. Restart Visual Paradigm for the plugin to take effect.

Installing from a folder of plugin

A folder of plugin is one that conforms the following file structure:

```
└─ ${plugin-folder}
   └─ classes
       └─ ...
   └─ plugin.xml
   └─ lib (The external jars required to compile and run the plugin. Do NOT place the openapi.jar there or else your plugin will not be able to function)
       └─ ...
```

To install a plugin from a folder of plugin:

1. In Visual Paradigm, select **Help > Install Plugin** from the application toolbar.
2. In the **Install Plugin** window, select **Install from a folder of plugin**.
3. Click **OK**.
4. Select the folder in the directory chooser and click **Open**.

5. Restart Visual Paradigm for the plugin to take effect.

Manual files copying

Advanced users may copy the plugin (folder) manually to the directory where the plugins are stored. You can also visit that directory to remove plugins that you do not need anymore. To copy a plugin manually:

1. In Visual Paradigm, select **Help > Install Plugin** from the application toolbar.
2. In the **Install Plugin** window, select **Manually copy the plugin folder(s) to the following directory**.
3. Click **Copy Path**.
4. Click **OK**.
5. Now, visit the copied path and paste your plugin folders to that folder.
6. Restart Visual Paradigm for the plugin to take effect.