**Revit API UI Labs**

**Lab 4 – Event**

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**<VB.NET>**VB.NET Version**</VB.NET>**

**Objective:** In this lab, we will learn how to subscribe to events. We’ll learn how to:

* Subscribe to a specific event
* Use dynamic update mechanism

The following is the breakdown of step by step instructions in this lab:

1. Create a new External Application
2. Subscribe to an event
3. Implement a dynamic model updater
4. Summary
5. **Create a new External Application**

We’ll add an external application to the current project.

* 1. Add a new file and define another external application to your project. Let’s name them as follows:
* File name: **4\_Event.vb (or .cs)**
* Application class name: **UIEventApp**

(Once again, you may choose to use any names you want here. When you do so, just remember what you are calling your own project, and substitute these names as needed while following the instruction in this document.)

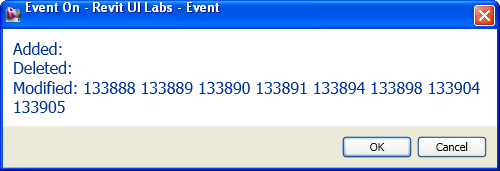
**Required Namespaces:**

Namespaces needed for this lab are:

* Autodesk.Revit.DB
* Autodesk.Revit.UI
* Autodesk.Revit.ApplicationServices
* Autodesk.Revit.Attributes
* Autodesk.Revit.UI.Selection (this is for selection)
* Autodesk.Revit.DB.Events (for event handling)

Note (VB.NET only): if you are writing in VB.NET and you import namespaces at the project level, (i.e., in the project properties, there is no need to explicitly import in each file.

1. **Subscribe to an event**



You can subscribe to various events inside Revit. Just take a look at the list of events in Visual Studio under the various API classes like Application, UIApplication, Document, etc

As an example we’ll subscribe to the DocumentChanged event so whenever an object is added, deleted or modified inside Revit, we’ll get notified about it

We need to have a function that has the same signature as the event

**<VB.NET>**  
 Sub UILabs\_DocumentChanged(ByVal sender As Object, \_

ByVal args As Autodesk.Revit.DB.Events.DocumentChangedEventArgs)

End Sub

**</VB.NET>**

Then we can assign this to the event using += (cs) or AddHandler (vb) inside the OnStartup() function

**<VB.NET>**  
AddHandler app.ControlledApplication.DocumentChanged, AddressOf UILabs\_DocumentChanged

**</VB.NET>**

Inside the DocumentChanged event handler list the information available through args about what changed in the document in a TaskDialog.

Then add a bool variable to the UIEventClass that will control if we are showing a dialog when the Revit document changed or not.

Also, implement 3 different external commands. One will set this bool variable to True, one will set it to false and one will toggle it.

1. **Implement a dynamic model updater**

The above event is very useful if you want to track changes – e.g. you have an outside database that needs to be updated with new information whenever the document changes.

However, if you want to modify certain parts of the document based on the changes that have just happened, then you’ll need a different mechanism called dynamic model updater.

As an example let’s create a dynamic model updater that keeps windows and doors always in the center of the hosting wall.

For this first we need to create a class that implements IUpdater and its 5 functions. Inside the class we also need to create an instance of UpdaterId based on the GUID of our Add-In plus another GUID – you can use Visual Studio to create the latter.

**<VB.NET>**

Public Class WindowDoorUpdater

Implements IUpdater

' Unique id for this updater = addin GUID + GUID for this specific updater.

Dim m\_updaterId As UpdaterId = Nothing

' Flag to indicate if we want to perform

Public Shared m\_updateActive As Boolean = False

''' <summary>

''' Constructor

''' </summary>

Sub New(ByVal id As AddInId)

m\_updaterId = New UpdaterId(id, New Guid("EF43510F-38CB-4980-844C-72174A674D56"))

End Sub

''' <summary>

''' This is the main function to do the actual job.

''' For this exercise, we assume that we want to keep

‘’’the door and window always at the center.

''' </summary>

Public Sub Execute(ByVal data As UpdaterData) Implements IUpdater.Execute

If Not m\_updateActive Then Return

End Sub

''' <summary>

''' This will be shown when the updater is not loaded.

''' </summary>

Public Function GetAdditionalInformation() As String Implements IUpdater.GetAdditionalInformation

Return "Door/Window updater: keeps doors and windows at the center of walls."

End Function

''' <summary>

''' Specify the order of executing updaters.

''' </summary>

Public Function GetChangePriority() As ChangePriority Implements IUpdater.GetChangePriority

Return ChangePriority.DoorsOpeningsWindows

End Function

''' <summary>

''' Return updater id.

''' </summary>

Public Function GetUpdaterId() As UpdaterId Implements IUpdater.GetUpdaterId

Return m\_updaterId

End Function

''' <summary>

''' User friendly name of the updater

''' </summary>

Public Function GetUpdaterName() As String Implements IUpdater.GetUpdaterName

Return "Window/Door Updater"

End Function

End Class

**</VB.NET>**

Now create an instance of our class in the OnStartup() function and filter the monitored elements to Walls.

**</VB.NET>**

Dim winDoorUpdater As New WindowDoorUpdater(app.ActiveAddInId) ' ActiveAddInId is from addin menifest.

' Register it

UpdaterRegistry.RegisterUpdater(winDoorUpdater)

' Tell which elements we are interested in notified.

' We want to know when wall changes it's length.

Dim wallFilter As New ElementClassFilter(GetType(Wall))

UpdaterRegistry.AddTrigger(winDoorUpdater.GetUpdaterId(), wallFilter, Element.GetChangeTypeGeometry)

**</VB.NET>**

Try to implement the rest yourself. Create a function that retrieves the door or window of a given wall.  
For this you will need to use FilteredElementCollector to retrieve all the doors and windows from the database then check whose owner is the wall in question if any.

Then create another function that centers the door or window based on the location curve of the wall.

1. **Summary**

In this lab, we learned how to subscribe to events. We’ve learned how to:

* Subscribe to a specific event
* Use dynamic update mechanism

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