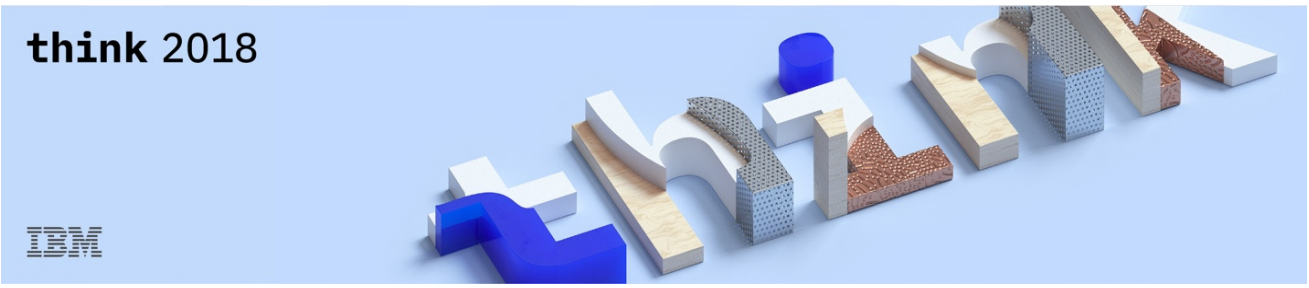

Lab Center – Hands-On Lab

Session 7721

IBM Planning Analytics 2.0 SDK

How PAx can use TM1 Server's REST API to Create Integrated Solutions

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Table of Contents

Getting ready

To be able to give you the best experience possible, and to allow us, authors, to be able to make last minute changes to the setup, samples and instructions for this Hands-On Lab, and because in our experience there is always something that we want to change last minute😉, we've build in a 'get out of jail free card'.

As such there are a couple of steps that need to be executed before your machine is ready.

1 – Grabbing the latest files for the update

The latest versions of the files needed on this box, and the sources you'll be working with in this lab, are all kept together in one Git repository on github.com.

Open a command box and execute the following command to grab the content of this repository:

```
git clone https://github.com/hubert-heijkers/iau17hol
```

Now let's go to the folder holding the actual update:

```
cd iau17hol\vmupdate
```

2 – Updating the Virtual Machine

Next, we'll execute a little batch file that updates a bunch of files and does some set up needed for the lab later. This update can be executed by typing the following command in the command box:

```
vmupdate.bat
```

Your VM is now up to date. You can now find the latest version of this document here:

```
C:\HOL-TM1SDK\Documents
```

Having an electronic copy of the instructions, most notably the Word document, might come in handy later when you'll be 'writing' some code;-).

That's all, enjoy the lab!

Introduction

This programming exercise will demonstrate how to access and consume TM1 Server's, OData compliant, REST API in VBA, showing you how to issue a request, marshal the results and display the information returned in an Excel Workbook.

IBM Planning Analytics for Microsoft Excel (PAx) allows an existing connection to a TM1 Server to be utilized for this purpose, which avoids having multiple connections from a single client open.

Configuration

On the virtual machine you are using for this Hands-On Lab the TM1 Server "Planning Sample" has already been configured to accept REST requests, over HTTP, on port 8000.

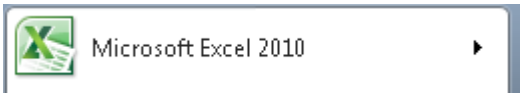
The only thing you'll need to make sure is, PAx having a dependency on Planning Analytics Workspace, that PA Local is already started. If isn't you can start it yourself by running the `start.bat` from the PAW installation folder which for this lab can be found here:

```
C:\paw\paw26
```

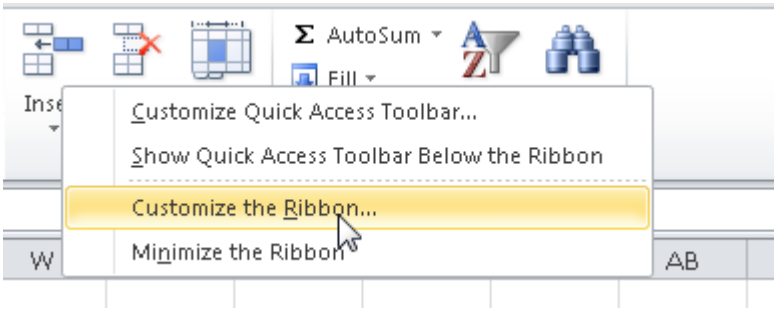
Obviously PAx itself has already been installed for this exercise as well.

Getting Started

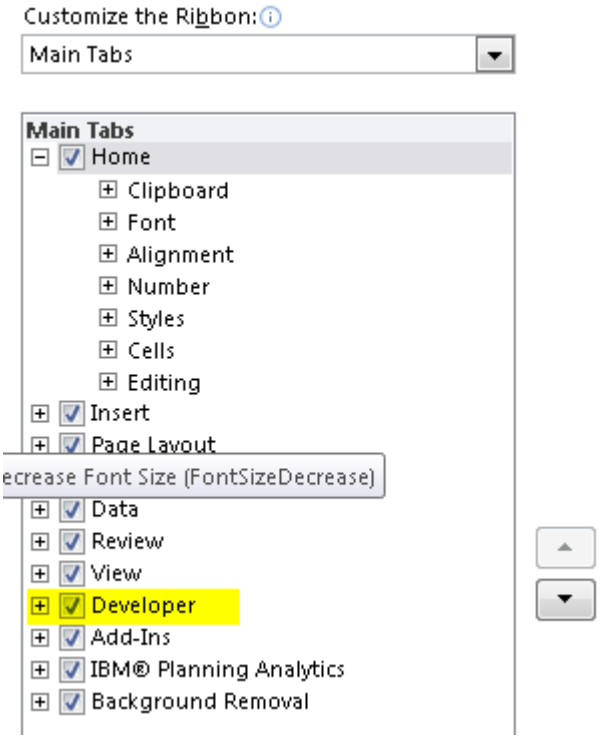
In the Windows Start Menu, click on the Excel icon to launch Microsoft Excel.



In order for a button to be added to the current Workbook, the Developer ribbon must be available. To get the Developer ribbon to display, right click on an empty portion on the existing ribbon (as shown below) and select "Customize the Ribbon".

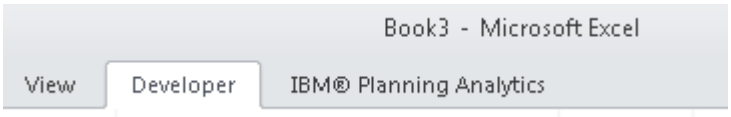


In the upcoming dialog look in the list to the right for "Developer" and check the checkbox next to it.



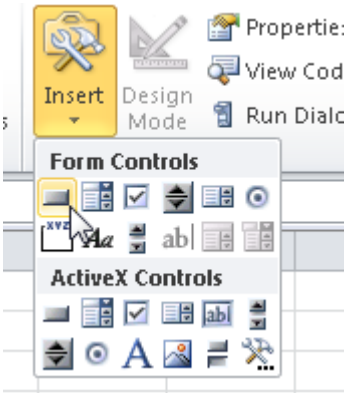
Click OK to accept the change and close the dialog.

Now that the Developer ribbon is available, let's activate it to add a button to the Workbook.



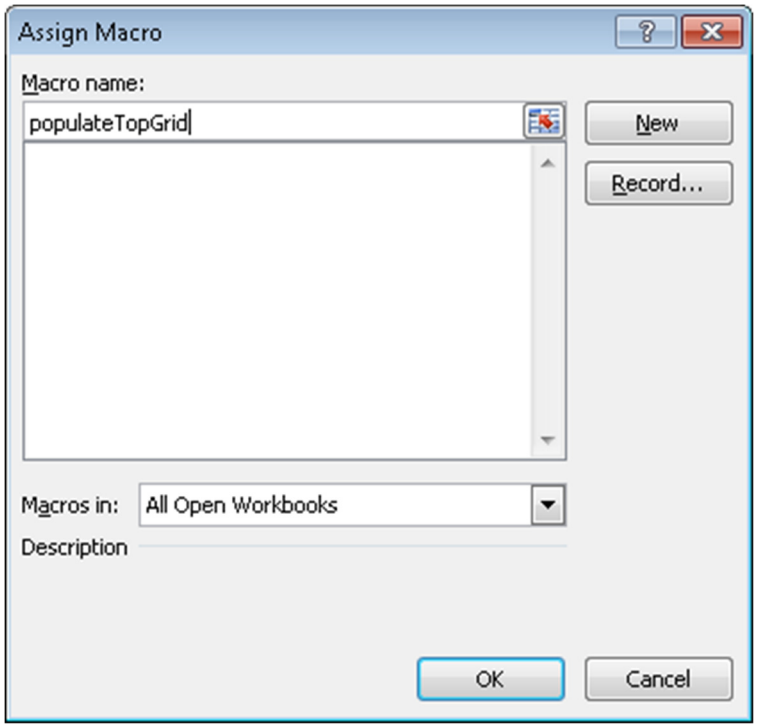
Inserting a button and assigning a Macro

To add a button, click on the Insert icon and choose a button control.

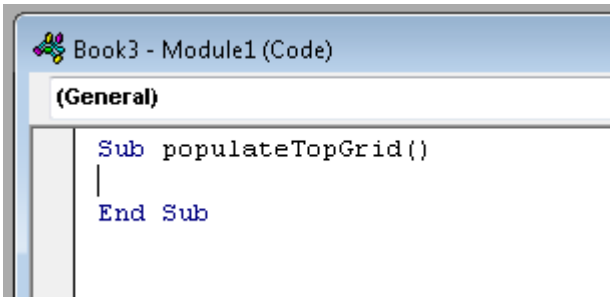


After drawing the button on the Workbook (recommended within A1 and C3), a dialog called "Assign Macro" will show.

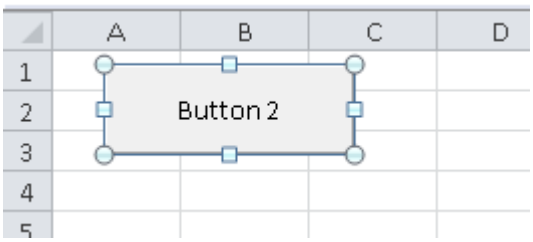
Replace the existing text with “populateTopGrid” and click on “New”.



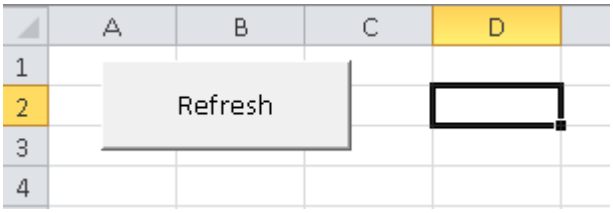
The Visual Basic for Applications (VBA) developer environment will open and show that a new module has been added to the Workbook. The code editor will show, that a new Macro has been added called `Sub populateTopGrid`.



Use ALT+Tab or the taskbar in order to switch back to the Excel Workbook. In Sheet1 of the Workbook the button will appear in the area drawn.



After adding the button, it will be in edit mode, which allows for the button caption to be modified. The suggested new caption is “Refresh”. When clicking out of the button into a cell, the button will go to run mode. In case needed, right clicking on the button will bring it back into edit mode.

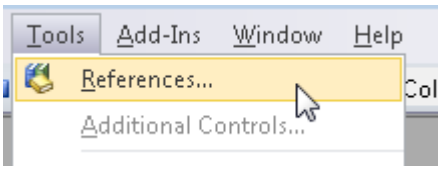


Adding “Microsoft Scripting Runtime” reference

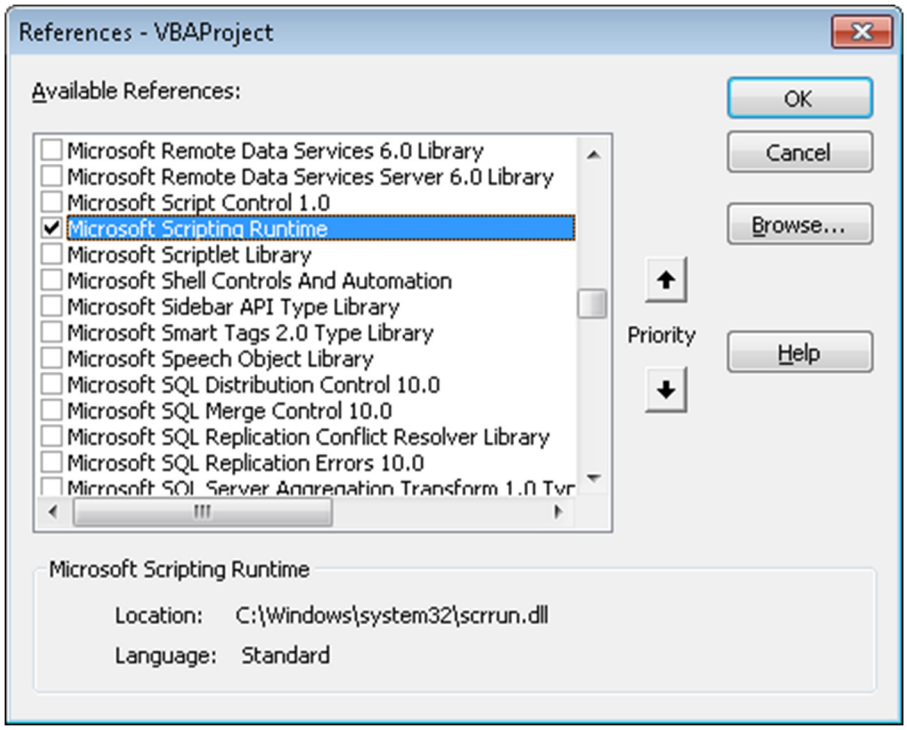
The example makes use of the dictionary object, which is contained within the Microsoft Scripting Runtime library.

To add the reference to the library use ALT+Tab or the taskbar to switch back to the VBA developer environment. In case the developer environment was closed, it can be re-opened by using the ALT+F11 from the Workbook

In the “Tools” menu, click on “References…”



In the list of Available References find “Microsoft Scripting Runtime” and check the checkbox next to the name as outlined in the screenshot below.



Click OK to accept the change and close the dialog.

Comments in the sample

Lines starting with a single quote (') are comments in VBA. These lines are meant to be documentation of the code and do not need to be copied for the sample to work.

Saving

It is recommended to frequently save your work. In Microsoft Excel CTRL+S, clicking on the disk icon in the toolbar or choosing the menu item File -> Save, will save the Workbook. Please keep in mind that during code execution (e.g. running code by pressing F5) or in debug mode, when the code execution has been paused, none of the methods of saving will work.

TM1-Top in Excel

In this exercise we'll grab the sessions and threads, like the TM1Top utility, and display the information in the current excel sheet. To get access to this information we'll be connecting to the TM1 server of which we want to show this information, in this case our infamous Planning-Sample server, and, using TM1 server's, OData compliant, REST API retrieve the information, marshal the information into an object structure and finally display the information in the Excel workbook.

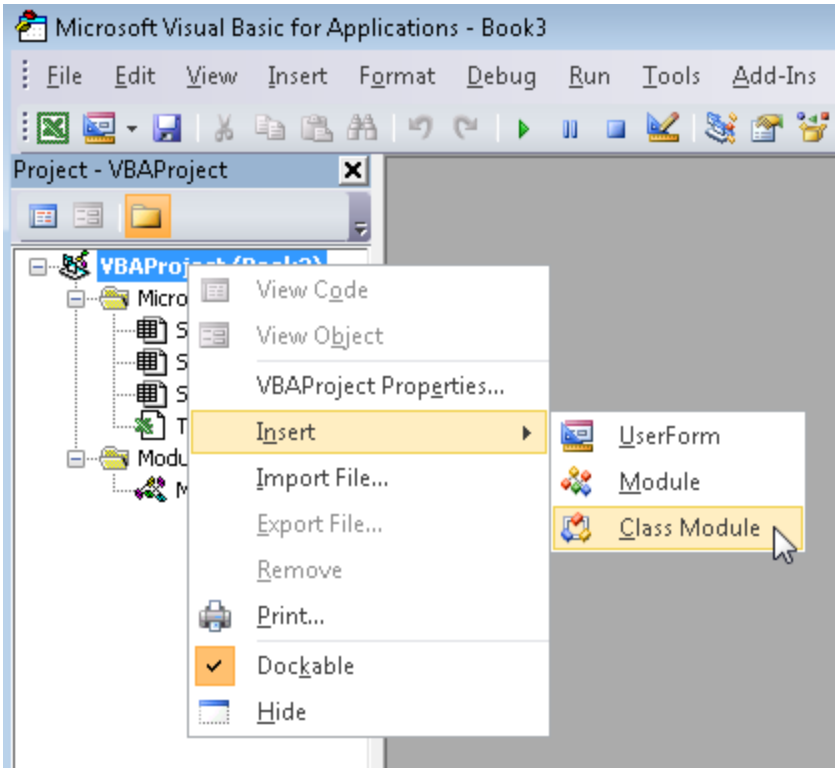
Part of this exercise involves converting the response of the server, which uses OData JSON format compliant JSON (JavaScript Object Notation), into a collection of objects representing the response. This response needs to get translated/marshalled into objects representing the response.

The VBA TM1 REST API 'library'

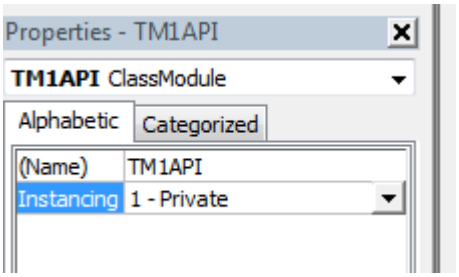
First, we'll add some classes that collectively make up a little library that we use to de-serialize, a.k.a. marshalling, and represent the data that we retrieve, using the REST API, from the TM1 server.

By the way, this 'library' is by no means meant to be a complete representation of a TM1 Server REST API library for VBA. It only contains those functions needed for this lab example and by no means is intended to be production quality code. It might be a good starting point for one hopefully.

To insert a new class, go to the Project overview on the left-hand side of the VBA development environment, right click on "VBAProject (Book1)", select "Insert…" and then "Class Module"



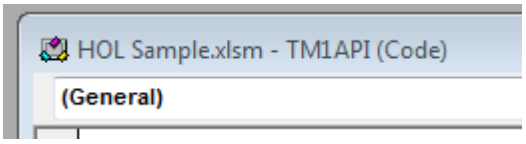
A new class module is now available. In the properties of the module (bottom left of the development environment), change the name of the class from Class1 to the name of the class that we'll be creating, for example, our first class, TM1API.



Class: TM1API

The TM1API class is the class which will hold the functions that we'll use to de-serialize the responses we'll get from our request(s) to the TM1 Server, returning us objects, or collections thereof, that represent the data returned by the server.

After renaming the name of the newly created class module the code below needs to be added to it. Click into the code window, which contains “TM1API” in the window title. Note that the name of the Workbook might be different in your case.



While indentation is optional, it greatly helps readability of the code.

```
Option Explicit

Public Function DeserializeSessionCollection(JSON As Object) As Collection

    Dim oSessions As New Collection
    If Not JSON.Members Is Nothing Then

        Dim itemCount As Integer
        itemCount = JSON.Members.Count
        Dim iItem As Integer
        For iItem = 0 To itemCount - 1

            Dim Session As TM1Session
            Set Session = DeserializeSession(JSON.Members.Item(iItem))
            If Not Session Is Nothing Then
                oSessions.Add Session
            End If

        Next iItem

    End If
    Set DeserializeSessionCollection = oSessions

End Function

Public Function DeserializeThreadCollection(JSON As Object) As Collection

    Dim oThreads As New Collection
    If Not JSON.Members Is Nothing Then

        Dim itemCount As Integer
        itemCount = JSON.Members.Count
        Dim iItem As Integer
        For iItem = 0 To itemCount - 1

            Dim thread As TM1Thread
            Set thread = DeserializeThread(JSON.Members.Item(iItem))
            If Not thread Is Nothing Then
                oThreads.Add thread
```

```
            End If

        Next iItem

    End If
    Set DeserializeThreadCollection = oThreads

End Function

Public Function DeserializeSession(JSON As Object) As TM1Session

    Dim oSession As New TM1Session
    If oSession.Deserialize(Me, JSON) Then
        Set DeserializeSession = oSession
    End If

End Function

Public Function DeserializeThread(JSON As Object) As TM1Thread

    Dim oThread As New TM1Thread
    If oThread.Deserialize(Me, JSON) Then
        Set DeserializeThread = oThread
    End If

End Function

Public Function DeserializeUser(JSON As Object) As TM1User

    Dim oUser As New TM1User
    If oUser.Deserialize(Me, JSON) Then
        Set DeserializeUser = oUser
    End If

End Function
```

Class: TM1User

The TM1User class represents an User in the TM1 Server. For simplicity, and because we don't need anything more in this lab example, we only gave a user a Name and FriendlyName property. The Name happens to be the unique identifier for a user whereas the friendly name is the name we'll use to display in our workbook later on.

Create another class module by right clicking on the VBA Project (Book1), select "Insert…" and then "Class Module".

Rename the new class module to "TM1User" and add the following code to it:

```
Option Explicit
```

```
Private m_Name As String
Private m_FriendlyName As String

Public Function Deserialize(oAPI As tm1api, JSON As Object) As Boolean

    Deserialize = False

    If Not JSON.Properties Is Nothing And JSON.Properties.Count > 0 Then

        Dim propCount As Integer
        propCount = JSON.Properties.Count
        Dim iProp As Integer
        For iProp = 0 To propCount - 1

            Dim propertyName As String
            propertyName = JSON.Properties.GetKeys().Item(iProp)

            Select Case propertyName

                Case "Name"
                    m_Name = JSON.Properties.Item(propertyName).Value

                Case "FriendlyName"
                    m_FriendlyName = JSON.Properties.Item(propertyName).Value

                'Additional properties we'd choose to implement would go here

            End Select

        Next iProp

        Deserialize = True

    End If

End Function

Public Property Get Name() As String
    Name = m_Name
End Property

Public Property Get FriendlyName() As String
    FriendlyName = m_FriendlyName
End Property
```

This is the first class in which you see a `Deserialize` function. This function contains the logic of converting the JSON body of an entity, in this case a User entity, returned by the server into an, User in this case, object.

We also added Property methods for every property we declared in the class. If you wanted to safe yourself some time you could simply make the properties themselves public, and remove the m_, but that breaks with object oriented encapsulation rules. Nice side effect here is that all our objects, until we'd add functions or subs that would allow making changes, are read-only after having been marshalled.

We'll use the same pattern in all of our classes that represent (entity) types in the server's REST API.

Class: TM1Session

The TM1Session class, as the name suggests, represents a session in the TM1 Server. A user connected, thru the REST API, to the server, gets assigned a session and any of the connections made referencing using that session, gets assigned a thread which, for the duration of such connection, will show up as one of the threads in the collection of threads associated with the session. The session also has a user associated with it, represented by the TM1User class we created just a minute ago, specifying which user connected to the server and therefore by definition the user of all the threads associated to this session.

Once again, another class module needs to get added to the project. Right click on the VBA Project (Book1), select "Insert…" and then "Class Module".

Rename the new class module to "TM1Session" and add the following code to it:

```
Option Explicit

Private m_ID As LongLong
Private m_Context As String
Private m_User As TM1User
Private m_Threads As Collection

Public Function Deserialize(oAPI As tm1api, JSON As Object) As Boolean

    Deserialize = False

    If Not JSON.Properties Is Nothing And JSON.Properties.Count > 0 Then

        Dim propCount As Integer
        propCount = JSON.Properties.Count
        Dim iProp As Integer
        For iProp = 0 To propCount - 1

            Dim propertyName As String
            propertyName = JSON.Properties.GetKeys().Item(iProp)

            Select Case propertyName

                Case "ID"
                    m_ID = JSON.Properties.Item(propertyName).Value

                Case "Context"
```

```
                    m_Context = JSON.Properties.Item(propertyName).Value

                Case "User"
                    Set m_User =
oAPI.DeserializeUser(JSON.Properties.Item(propertyName))

                Case "Threads"
                    Set m_Threads =
oAPI.DeserializeThreadCollection(JSON.Properties.Item(propertyName))

            End Select

        Next iProp

        Deserialize = True

    End If

End Function

Public Property Get ID() As LongLong
    ID = m_ID
End Property

Public Property Get Context() As String
    Context = m_Context
End Property

Public Property Get User() As TM1User
    Set User = m_User
End Property

Public Property Get Threads() As Collection
    Set Threads = m_Threads
End Property
```

Note that in the Deserialize function we are using methods from our TM1API class again to de-serialize entities, in this case a User, or collection of entities, the collections of threads associated with the session in this class.

Again, a pattern you'll pattern you'll see all over where there are relationships between types represented, in the REST API's metadata by navigation properties.

Class: TM1Thread

The TM1Thread class represents an active thread, or an active connection, in the TM1 Server. Any user with an active connection, irrespective of the API that is being used, has a thread associated to it. If that user is having the server perform some form of operation that we will be able to retrieve information about that operation as well as well as any locks that thread might be holding, how long that operation has been running, how much time the user has been waiting to get a lock, etc.

Note that whereas using any of the older APIs connections defined the life cycle of a 'session' effectively, that, with the introduction of the REST API, HTTP connections come and go and as such the Session they are connected to represent the life cycle of Session.

Create another class module named "TM1Thread" and add the following code to it:

```
Option Explicit

Private m_ID As LongLong
Private m_ThreadType As String
Private m_Name As String
Private m_Context As String
Private m_State As String
Private m_FunctionName As String
Private m_ObjectType As String
Private m_ObjectName As String
Private m_RLocks As Integer
Private m_IXLocks As Integer
Private m_WLocks As Integer
Private m_ElapsedTime As String
Private m_WaitTime As String
Private m_Info As String
Private m_Session As TM1Session

Public Function Deserialize(oAPI As tm1api, JSON As Object) As Boolean

    Deserialize = False

    If Not JSON.Properties Is Nothing And JSON.Properties.Count > 0 Then

        Dim propCount As Integer
        propCount = JSON.Properties.Count
        Dim iProp As Integer
        For iProp = 0 To propCount - 1

            Dim propertyName As String
            propertyName = JSON.Properties.GetKeys().Item(iProp)

            Select Case propertyName

                Case "ID"
                    m_ID = JSON.Properties.Item(propertyName).Value

                Case "Type"
                    m_ThreadType = JSON.Properties.Item(propertyName).Value

                Case "Name"
                    m_Name = JSON.Properties.Item(propertyName).Value

                Case "Context"
```

```
                    m_Context = JSON.Properties.Item(propertyName).Value

                Case "State"
                    m_State = JSON.Properties.Item(propertyName).Value

                Case "Function"
                    m_FunctionName = JSON.Properties.Item(propertyName).Value

                Case "ObjectType"
                    m_ObjectType = JSON.Properties.Item(propertyName).Value

                Case "ObjectName"
                    m_ObjectName = JSON.Properties.Item(propertyName).Value

                Case "RLocks"
                    m_RLocks = JSON.Properties.Item(propertyName).Value

                Case "IXLocks"
                    m_IXLocks = JSON.Properties.Item(propertyName).Value

                Case "WLocks"
                    m_WLocks = JSON.Properties.Item(propertyName).Value

                Case "ElapsedTime"
                    m_ElapsedTime = JSON.Properties.Item(propertyName).Value

                Case "WaitTime"
                    m_WaitTime = JSON.Properties.Item(propertyName).Value

                Case "Info"
                    m_Info = JSON.Properties.Item(propertyName).Value

                Case "Session"
                    Set m_Session =
oAPI.DeserializeSession(JSON.Properties.Item(propertyName))

            End Select

        Next iProp

        Deserialize = True

    End If

End Function

Public Property Get ID() As LongLong
    ID = m_ID
End Property

Public Property Get ThreadType() As String
```

```
    ThreadType = m_ThreadType
End Property

Public Property Get Name() As String
    Name = m_Name
End Property

Public Property Get Context() As String
    Context = m_Context
End Property

Public Property Get State() As String
    State = m_State
End Property

Public Property Get FunctionName() As String
    FunctionName = m_FunctionName
End Property

Public Property Get ObjectType() As String
    ObjectType = m_ObjectType
End Property

Public Property Get ObjectName() As String
    ObjectName = m_ObjectName
End Property

Public Property Get RLocks() As Integer
    RLocks = m_RLocks
End Property

Public Property Get IXLocks() As Integer
    IXLocks = m_IXLocks
End Property

Public Property Get WLocks() As Integer
    WLocks = m_WLocks
End Property

Public Property Get ElapsedTime() As String
    ElapsedTime = m_ElapsedTime
End Property

Public Property Get WaitTime() As String
    WaitTime = m_WaitTime
End Property

Public Property Get Info() As String
    Info = m_Info
End Property
```

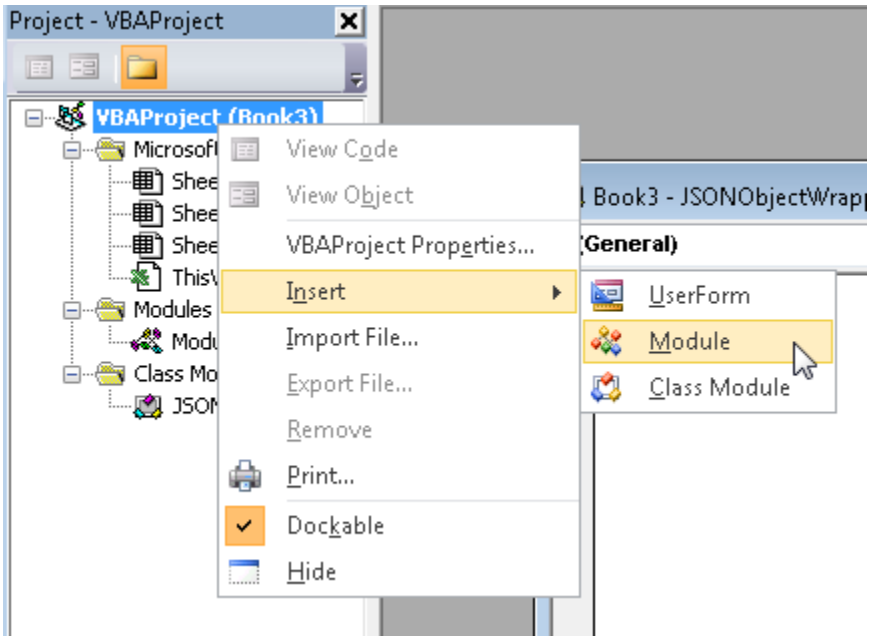
```
Public Property Get Session() As TM1Session
    Set Session = m_Session
End Property
```

After seeing the previous two classes I'm sure you could have written this one yourself by now right;-?

Adding a Utilities module

Now that we have are TM1 Server API, for as much as we'll be using it in this lab sample, we'll need to add some utility functions for maintaining the connection to TM1. Luckily PAx has us covered so what remains to be done is merely talk to it to have our requests send to the TM1 server.

In the Project overview on the left-hand side of the VBA development environment, right click on "VBAProject (Book1)", select "Insert…" and then "Module".



Even though not required, the module can be renamed to Utilities.

Add the following code to the newly created Utilities module.

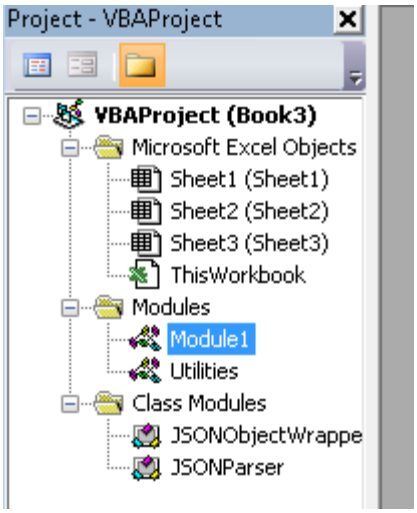
```
Option Explicit

Dim m_oCOAutomation As Object
Dim m_oCAFE As Object

'Returns the instance of the Cognos Office Automation Object.
Public Property Get CognosOfficeAutomationObject()

    On Error GoTo Handler:

    'Fetch the object if we don't have it yet.
    If m_oCOAutomation Is Nothing Then
```

```
        Set m_oCOAutomation =
Application.COMAddIns("CognosOffice12.Connect").Object.AutomationServer
    End If
    Set CognosOfficeAutomationObject = m_oCOAutomation
    Exit Property

Handler:
    '<Place error handling here. Remember you may not want to display a message box
if you are running in a scheduled task>

End Property

'Returns the instance of the Cognos Office Reporting Object.
Public Property Get Reporting()

    On Error GoTo Handler:

    'Fetch the object if we don't have it yet.
    If m_oCAFE Is Nothing Then
        Set m_oCAFE = CognosOfficeAutomationObject.Application("COR", "1.1")
    End If
    Set Reporting = m_oCAFE
    Exit Property

Handler:
    MsgBox "Error"
    Err.Clear

End Property
```

Bringing it all together

Now that we have the code to wrap what the TM1 Server will throw at us, and the help from PAx to connect us to the TM1 Server, sharing the session it already has with that server, we can now need the final snippet of code that, when pressing the button which we created earlier on our sheet already, asks PAx to send a request to the TM1 Server, de-serialize the response and, in this case, show the returned information in the Workbook on Sheet1.

This part of the code should go into the already existing module with the name “Module1”. To open the module, double click in the project overview on Module1.



There is existing code in this module, which was created when the button was added to the sheet. Complement the code with the code below.

```
Option Explicit

Sub populateTopGrid ()

    Dim oAPI As New tm1api
    Dim oSheet As Worksheet
    Dim bScreenupdating As Boolean
    Dim request As String
    Dim response As Object

    'get a reference to the first worksheet
    Set oSheet = ThisWorkbook.Sheets("Sheet1")

    'remember screenupdating property and turn it off to avoid flickering
    bScreenupdating = Application.ScreenUpdating
    Application.ScreenUpdating = False

    'clear the range used to render the data
    Range(oSheet.Cells(5, 1), oSheet.Cells(500, 16)).ClearContents
    Range(oSheet.Cells(5, 1), oSheet.Cells(500, 16)).ClearFormats

    'the request URL will be sent to the server
    request =
"/pm/tm1/server(Planning+Sample)/api/v1/Threads?$expand=Session($expand=User($select=
Name,FriendlyName))"

    'sending the request to the server
    Set response = Reporting.ActiveConnection.Get(request)

    'checking for a response
    If Not response Is Nothing Then
```

```
        Dim iRow As Integer
        iRow = 5

        'the response contains a collection wrapped in a JSON object and stored in a
'value' property
        If Not response.Properties Is Nothing And response.Properties.Count() > 0
Then

            Dim threadsJSON As Object
            Set threadsJSON = response.Properties.Item("value")
            Dim threadsCollection As Collection
            Set threadsCollection = oAPI.DeserializeThreadCollection(threadsJSON)

            'print the headers for the columns
            With oSheet.Cells(iRow, 1)
                .Value = "SessionID"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 2)
                .Value = "User"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 3)
                .Value = "TheadID"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 4)
                .Value = "Type"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 5)
                .Value = "Name"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 6)
                .Value = "Context"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 7)
                .Value = "State"
                .Font.Bold = True
                .Font.Color = RGB(150, 0, 0)
            End With
            With oSheet.Cells(iRow, 8)
```

```
    .Value = "Function"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 9)
    .Value = "Object Type"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 10)
    .Value = "Object Name"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 11)
    .Value = "RLocks"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 12)
    .Value = "IXLocks"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 13)
    .Value = "WLocks"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 14)
    .Value = "Elapsed Time"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 15)
    .Value = "Wait Time"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
With oSheet.Cells(iRow, 16)
    .Value = "Info"
    .Font.Bold = True
    .Font.Color = RGB(150, 0, 0)
End With
iRow = iRow + 1

'print the details for the individual threads
Dim threadCount As Integer
threadCount = threadsCollection.Count
Dim iThread As Long
For iThread = 1 To threadCount
```

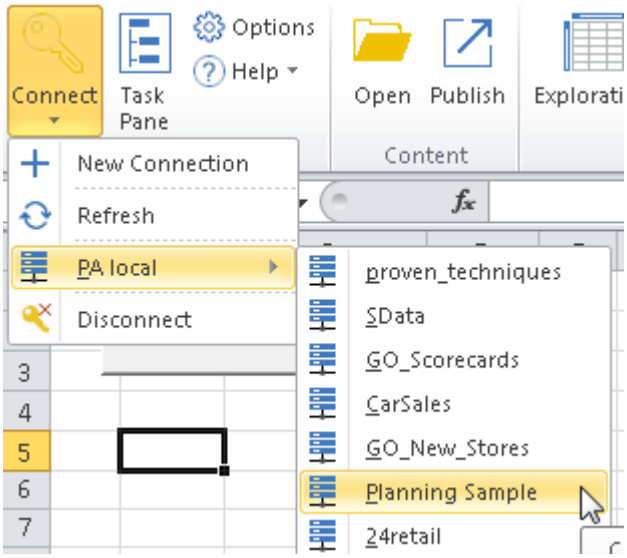
```
                Dim oThread As TM1Thread
                Set oThread = threadsCollection.Item(iThread)
                Dim oSession As TM1Session
                Set oSession = oThread.Session()
                If Not oSession Is Nothing Then
                    oSheet.Cells(iRow, 1) = oSession.ID
                    Dim oUser As TM1User
                    Set oUser = oSession.User()
                    If Not oUser Is Nothing Then
                        oSheet.Cells(iRow, 2) = oUser.FriendlyName
                    End If
                Else
                    oSheet.Cells(iRow, 1).ClearContents
                    oSheet.Cells(iRow, 2).ClearContents
                End If
                oSheet.Cells(iRow, 3) = oThread.ID
                oSheet.Cells(iRow, 4) = oThread.ThreadType
                oSheet.Cells(iRow, 5) = oThread.Name
                oSheet.Cells(iRow, 6) = oThread.Context
                oSheet.Cells(iRow, 7) = oThread.State
                oSheet.Cells(iRow, 8) = oThread.FunctionName
                oSheet.Cells(iRow, 9) = oThread.ObjectType
                oSheet.Cells(iRow, 10) = oThread.ObjectName
                oSheet.Cells(iRow, 11) = oThread.RLocks
                oSheet.Cells(iRow, 12) = oThread.IXLocks
                oSheet.Cells(iRow, 13) = oThread.WLocks
                oSheet.Cells(iRow, 14) = oThread.ElapsedTime
                oSheet.Cells(iRow, 15) = oThread.WaitTime
                oSheet.Cells(iRow, 16) = oThread.Info
                iRow = iRow + 1

            Next iThread

            'setting the columns to autofit
            oSheet.Columns("A:P").AutoFit

        End If

    End If

    'resetting screenupdating
    Application.ScreenUpdating = bScreenupdating

End Sub
```

Running the code

Once the workbook has been saved, the code is now ready for execution. Due to the fact that the function name from the button assignment has been re-used, the button is now tied to the newly coded Macro.

Switch back to the Workbook by using ALT+TAB or the Windows taskbar.

Before clicking on the button, please active the “IBM® Planning Analytics” ribbon and connect to the Planning Sample database using the “Connect” icon.



When prompted for login information, the user name/password is admin/apple.

After clicking on the Refresh button on the sheet, a grid should be displayed, showing thread information of the Planning Sample database.

The screenshot below may vary.

Refresh

SessionID	User	TheadID	Type	Name	Context	State	Function	Object Type	Object Name	RLocks	IXLocks	WLocks	Elapsed Time	Wait Time	Info
		7188	System	Pseudo		Idle				0	0	0	P0DT00H00M00S	P0DT00H00M00S	
		5404	System	DynamicConfig		Idle				0	0	0	P0DT00H00M00S	P0DT00H00M00S	
3	Admin	4048	User	Admin		Run	GET /api/v1/Threads			0	0	0	P0DT00H00M00S	P0DT00H00M00S	
		5712	User	Admin	PM Hub	Idle				0	0	0	P0DT00H00M00S	P0DT00H00M00S	
4	Admin	3392	User	Admin		Idle				0	0	0	P0DT00H00M00S	P0DT00H00M00S	

The complete sample, with all code, and a bonus feature, can be found here:

`C:\HOL-TM1SDK\PAx`

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