CONFIDENTIAL INFORMATION

McLaren APPLIED TECHNOLOGIES

ATLAS 10 COM API MIGRATION GUIDE

ATLAS PLATFORM

REVISION HISTORY

Version	Date	Author	Reviewer	Changes
1.0	22/11/2017	Gonzalo Abella	Chris Johnson	Initial Draft.
1.1	18/12/2017	Matthew Bristow	Chris Johnson	Reskin, and additional Known Issues.
1.2	05/01/2017	Matthew Bristow	Chris Johnson	Merged with master branch.
1.3	11/05/2018	Matthew Bristow	Steven Morgan	Added Excel example. Added MATLAB example. Updated C# example.
1.4	21/05/2018	Steven Morgan	Matthew Bristow	Type library version 10.3 Added description of Sets, Pages, and Set Association APIs.
1.4.1	17/07/2018	Matthew Bristow	Steven Morgan	Fixed error in VBA Example Fixed spelling in C# Example

CONTENTS

1 Important Notes

This release is an update release of the ATLAS Platform featuring the Automation API.

Feedback/Support

If there are issues, please contact your Track Support Engineer for further assistance.
You can also submit bugs and suggestions for future releases through the ATLAS 10 Zendesk Portal or email ATLAS 10 Support.

2 Application Version

ATLAS 10.2.18150.4

3 Application Licensing

ATLAS 10 Evaluation

4 OCS Software Dependencies

SQLRace currently supported Version 2.1.18123.1
Recommended SQLRace Database Version 1.50

5 Prerequisites

Microsoft .NET Framework 3.5
Microsoft .NET Framework 4.6.2

6 Introduction

To aid teams with their transition to Atlas 10 and SQL Race, MAT have provided a temporary Automation API (COM) that closely matches the legacy ATLAS 9 Automation API. This is not to be confused with the new ATLAS 10 Automation API. For clarity, there will be two ATLAS 10 automation APIs.

6..1 Atlas 10 [COM] Automation API

This API has a strict one season life span. After which the API will be retired. This API matches the ATLAS 9 API as closely as possible so that users only need to make minimal changes within their scripts.

6..2 Atlas 10 [WCF] Automation API

This is a new Automation API designed from the bottom up to work with Atlas 10.

7 ATLAS 10 COM ActiveX Object Model

For a detailed view of the ActiveX objects, properties, methods and events please see the accompanied Excel document titled “ATLAS 10 COM API Specification”.

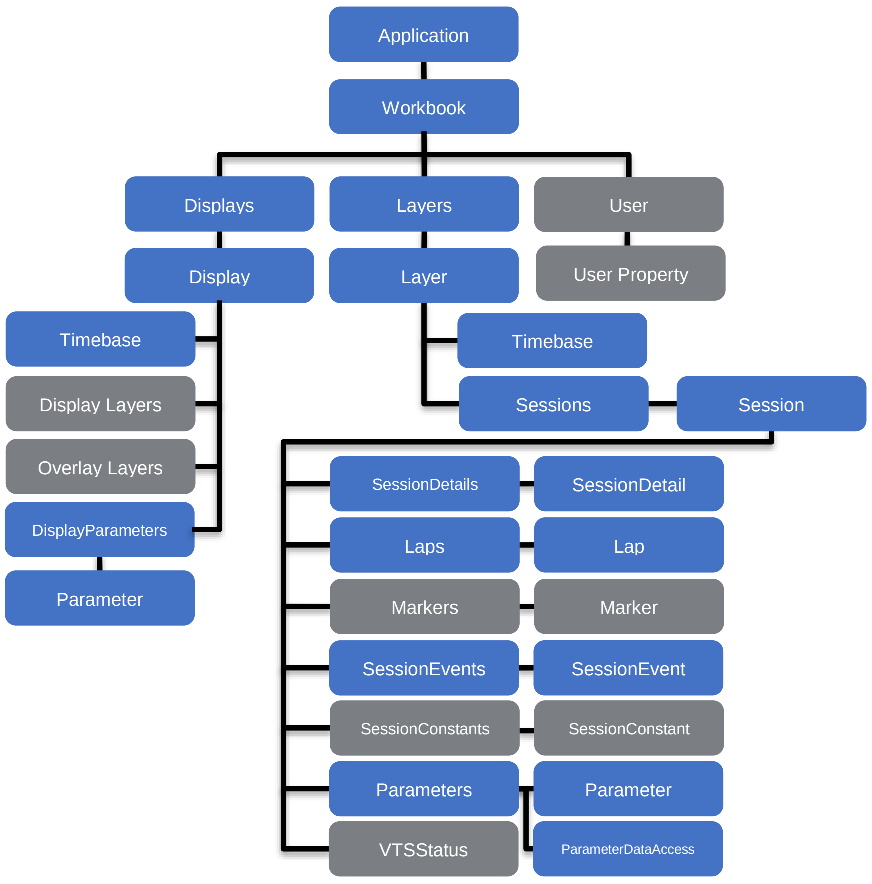


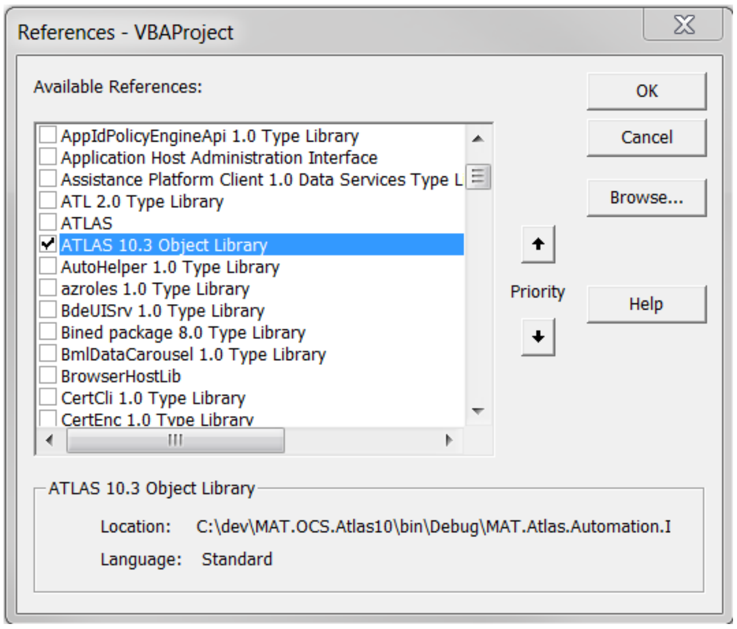
Figure 1, ATLAS 10 ActiveX Object Model

- Blue boxes show the areas that have been implemented in the ATLAS 10 COM API.
- Grey boxes will not be implemented.

8 Migration ATLAS 9 to ATLAS 10

8..1 How to use the ATLAS 10 COM API with Excel

1. Add a reference to the ATLAS 10.3 Object Library.
    a. Click the Tools tab.
    b. Click References.
    c. Select Atlas 10.3 Object Library from the Available Refrences list.
    d. Click OK.



- [ ] AppIdPolicyEngineApi 1.0 Type Library
- [ ] Application Host Administration Interface
- [ ] Assistance Platform Client 1.0 Data Services Type L
- [ ] ATL 2.0 Type Library
- [ ] ATLAS
- [x] ATLAS 10.3 Object Library
- [ ] AutoHelper 1.0 Type Library
- [ ] azroles 1.0 Type Library
- [ ] BdeUISrv 1.0 Type Library
- [ ] Bined package 8.0 Type Library
- [ ] BmlDataCarousel 1.0 Type Library
- [ ] BrowserHostLib
- [ ] CertCli 1.0 Type Library
- [ ] CertEnc 1.0 Type Library

ATLAS 10.3 Object Library

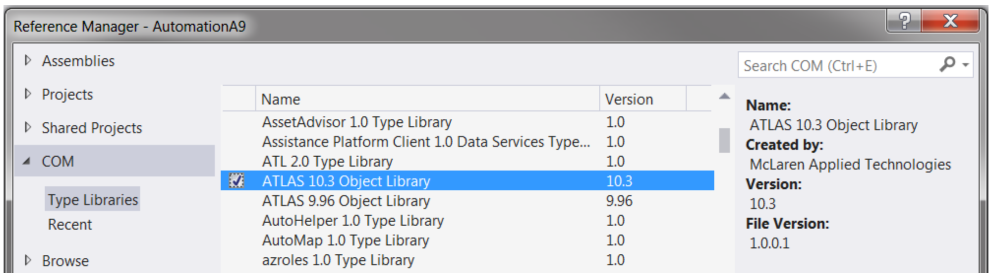
Location: C:\dev\MAT.OCS.Atlas10\bin\Debug\MAT.Atlas.Automation.I

Language: Standard

2. Excel will automatically use the correct version for 32 or 64-bit versions.
3. Use as you did with ATLAS 9 but two objects have changed.
    a. Use the **ATLAS10** object instead of **ATLAS**.
    b. Use **ParameterDataAccessObject** instead of **ParameterDataAccess_Object**.

8..2 How to use the ATLAS 10 COM API with Visual Studio

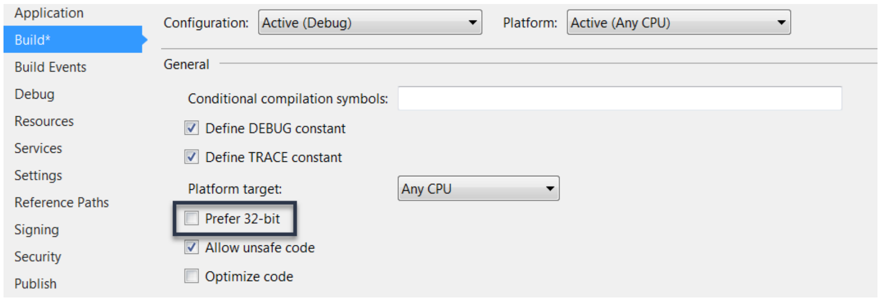
1. Add a reference of the ATLAS 10.3 Object Library.
    a. Expand your project.
    b. Right click on References and Select Add Reference.
    c. Click on the COM option, on the left hand side.
    d. Select and Tick the Atlas 10.3 Object Library from the list.
    e. Click OK.


Reference Manager - AutomationA9

Name	Version
AssetAdvisor 1.0 Type Library	1.0
Assistance Platform Client 1.0 Data Services Type...	1.0
ATL 2.0 Type Library	1.0
ATLAS 10.3 Object Library	10.3
ATLAS 9.96 Object Library	9.96
AutoHelper 1.0 Type Library	1.0
AutoMap 1.0 Type Library	1.0
azroles 1.0 Type Library	1.0

Name: ATLAS 10.3 Object Library
Created by: McLaren Applied Technologies
Version: 10.3
File Version: 1.0.0.1

2. For 32-bit compatibility make sure your project has “Prefer 32-bit” checked.


Configuration: Active (Debug)
Platform: Active (Any CPU)

General
Conditional compilation symbols:
[✓] Define DEBUG constant
[✓] Define TRACE constant
Platform target: Any CPU
[ ] Prefer 32-bit
[✓] Allow unsafe code
[ ] Optimize code

3. Use as you did with ATLAS 9 but use the **ATLAS10** object instead of **ATLAS**.

9 Known Issues

- Layers are only accessible once a session has been loaded. Therefore, if the session cannot be loaded it is recommended to wrap Layers.Layer[] in at try/catch.
- Possible mismatches in lap times of 1 microsecond due to rounding double types.
- When loading sessions, the layer's index is ignored. Sessions will be added in to the layers sequentially.
- Parameters.Remove does not remove in-memory channels.
- SessionLoaded is asynchronous therefore consecutive calls may fail until the session is fully loaded. Wait until OnSessionLoaded event is invoked is recommended.
- Some Parameter properties do not exist in the interface returned. To access them it is recommended to cast the returned object to the ATLAS10 object e.g. ATLAS10.Parameter.
- Some objects which represent state of the application such as Displays or Layers might not reflect manual changes. It is recommended to create new instances if changes are made to the application this way.
- OnTelemetryStarted event is invoke after processing the PGVs, therefore there is a delay between the start recording action and the event invocation.
- CloseSession uses Layer number, not Index.

10 ATLAS 10 Specific APIs

10..1 Sets, Pages, and Set Association

Note: the required type library version is 10.3 and thus references may need to be updated.

The Sets, Pages, and Set Association APIs are as follows:

10..1.1 IWorkbook5

- Sets getter property
  - Get the sets collection (ISets)
- Pages getter property
  - Get the pages collection (IPages)
- Associate(set) method
  - Associate a set (ISet) to all pages and displays (pass null for no association)
  - Errors:
    - COMException: NoSetFound

10..1.2 IDisplay5

- AssociatedSet getter/setter property
  - Get and associate a set (ISet) to a display (assign null for no association)
  - Errors:
    - COMException: NoDisplayFound, SetAssociationLocked, NoSetFound
- IsLockedToCurrentAssociation getter/setter property
  - Get and change lock display to current set association
  - Errors:
    - COMException: NoDisplayFound

10..1.3 ISets

- NewEnum getter property
  - Enumerator for use by foreach
- [string] getter property
  - Get a set (ISet) by name (returns null if not found)
  - Errors:
    - NullReferenceException (when assigned null)
- Index[int] getter property
  - Get a set (ISet) by index
  - Errors:
    - ArgumentException (when index is out of range)
- Count getter property
  - Get the set (ISet) count
- ActiveSet getter/setter property
  - Get and change the active set (ISet)
    - The first set defaults to active
    - Any methods that modify a set, e.g. LoadSession, now act on the active set
  - Errors:
    - NullReferenceException (when assigned null)
    - COMException: NoSetFound
- Add(name) method
  - Adds a set with the given name and returns the set (ISet)
  - The active set is not changed, it must be explicitly changed via the ActiveSet property
  - Errors:
    - NullReferenceException (when passed null)
    - COMException: InvalidName, MaximumSetsReached (adding more than 15 sets)
- Remove(name) method
  - Remove the set (ISet) with the given name
  - Errors:

NullReferenceException (when passed null)
COMException: NoSetFound, MinimumSetsReached (removing last Set)

Refresh method
Synchronises (add and remove sets) and update the properties of existing sets
If the active set has been manually removed, the active set defaults to the first set

10..1.4 ISet

Name getter/setter property
Get the set name and rename the set
Errors:
NullReferenceException (when assigned null)
COMException: InvalidName, NoSetFound

SessionCount getter property
Get the number of composite sessions loaded into this set
Errors:
COMException: NoSetFound

10..1.5 IPages

NewEnum getter property
Enumerator for use by foreach

[string] getter property
Get a page (IPage) by title (returns null if not found)
Errors:
NullReferenceException (when assigned null)

Index[int] getter property
Get a page (IPage) by index
Errors:
ArgumentException (when index is out of range)

Count getter property
Get the page (IPage) count

ActivePage getter/setter property
Get and activate (change tab of) page (IPage)
Displays are added to the active page
Errors:
NullReferenceException (when assigned null)
COMException: NoPageFound

Add(title) method
Adds a page with the given title and returns the page (IPage)
Errors:
NullReferenceException (when passed null)
COMException: InvalidTitle

Duplicate(title) method
Duplicates the page with the given title and returns the page (IPage)
Errors:
NullReferenceException (when passed null)
ArgumentException
COMException: NoPageFound

Remove(title) method
Remove the page (IPage) with the given title
Errors:
NullReferenceException (when passed null)
COMException: NoPageFound, MinimumPagesReached (removing last page)

Refresh method
Synchronises (add and remove pages) and update the properties of existing pages

10..1.6 IPage

Title getter/setter property
 Get the page title and rename the page
 Errors:
  NullReferenceException (when assigned null)
  COMException: InvalidTitle, NoPageFound
TabColor getter/setter property
 Get and change the page tab colour
 Errors:
  COMException: NoPageFound
AssociatedSet getter/setter property
 Get and associate a set (ISet) to the page and displays (assign null for no association)
 Errors:
  COMException: NoPageFound, SetAssociationLocked, NoSetFound
IsLockedToCurrentAssociation getter/setter property
 Get and change lock page to current set association
 Errors:
  COMException: NoPageFound

10..1.7 Notes

COMException of NoPageFound/NoSetFound may be returned when a page/set is deleted manually by the user (to prevent the issue ensure the Refresh method is called).

The following existing A9 APIs are not supported:

IWorkbook2
  ClosePage, OpenPage
IWorkbook3
 PageCount
IWorkbook4
 SavePage

11 Examples

11..1 VBA

```
Sub GetData()

' Create a new instance of the ATLAS 10 Application object
Dim objATLAS As New ATLAS10.Application

' Get the current workbook
Dim objWorkbook As ATLAS10.Workbook
Set objWorkbook = objATLAS.Workbook

' Get Layer 1
Dim objLayer As ATLAS10.Layer
Set objLayer = objWorkbook.Layers(0)

    ' If there is a session loaded into the layer
    If objLayer.IsSessionLoaded Then

    ' Then get the session in that layer
    Dim objSession As ATLAS10.Session
    Set objSession = objLayer.Session

    ' Get the lap distance parameter
    Dim objParam As ATLAS10.Parameter
    Set objParam = objSession.Parameters("vCar:Chassis")

    ' Create a Parameter Data Access Object (PDA) for this parameter
    Dim objPDA As ATLAS10.ParameterDataAccessObject
    Set objPDA = objSession.CreateParamDataAccess(objParam)

    ' Get the fastest lap
    Dim objFastestLap As ATLAS10.Lap
    Set objFastestLap = objSession.Laps.FastestLap

    ' Position the PDA at the start of the fastest lap
    objPDA.Goto (objFastestLap.StartTime)

    ' Use mean sub sampling
    objPDA.SampleMode = SampleModeMean

    ' Get samples at 10 Hz
    objPDA.SampleTime = 10000000

    ' Determine the number of samples required at 10 Hz
    Dim nSamples As Long
    nSamples = objFastestLap.LapTime / 10000000

    ' Retrieve the data
    Dim varData As Variant
    Dim varStatus As Variant
    Call objPDA.GetNextData(nSamples, varData, varStatus)

    '
    ' varData contains the array of data values
    ' varStatus contains the array of the data status values
    '

    End If
End Sub
```

11..2 C# Console Application

```
using ATLAS10;

namespace ConsoleApplication
{
  class Program
  {
    static void Main(string[] args)
    {
      // Create a new instance of the ATLAS Application object
      var app = new Application();

      // Get the current workbook
      var workbook = app.Workbook;

      // Get Layer 1
      var layer = workbook.Layers[0];

      // If there is a session loaded into the layer
      if (layer.IsSessionLoaded)
      {
         // Then get the session in that layer
         var session = layer.Session;

         // Get the lap distance parameter
         var parameter = session.Parameters["vCar:Chassis"];

         // Create a Parameter Data Access
         var parameterDataAccess = session.CreateParamDataAccess(parameter);

         // Get the fastest lap
         var fastestLap = session.Laps.FastestLap;

         // Position the PDA at the start of the fastest lap
         parameterDataAccess.Goto(fastestLap.StartTime);

         // Use mean sub sampling
         parameterDataAccess.SampleMode = ESampleMode.SampleModeMean;

         // Get samples at 10 Hz
         parameterDataAccess.SampleTime = 10000000;

         // Determine the number of samples required at 10 Hz
         var nSamples = fastestLap.LapTime / 10000000;

         // Retrieve the data
         object varData;
         object varStatus;
         parameterDataAccess.GetNextData((int)nSamples,
                                         out varData,
                                         out varStatus);

         //
         // varData contains the array of data values
         // varStatus contains the array of the data status values
         //
      }
    }
  }
}
```

11..3 MATLAB

```
function [Data, Status, Time] = A10(nLayer, strParamID, dfTime, nSamples)

% Get hold of the layer
hATLAS = actxserver('ATLAS10.Application');
hWorkbook = get(hATLAS, 'Workbook');
hLayers = get(hWorkbook, 'Layers');
hLayer = get(hLayers, 'Item', nLayer);

% Determine if there is a session in the layer
bSession = get(hLayer, 'IsSessionLoaded');
if ( bSession )
      % Get the parameter and PDA
      hSession = get(hLayer, 'Session');
      hParams = get(hSession, 'Parameters');
      hParam = get(hParams, 'Item', strParamID);
      hPDA = invoke(hSession, 'CreateParamDataAccess', hParam);

      % Get the data
      invoke(hPDA, 'Goto', dfTime)
      SampleData = invoke(hPDA,'GetNextSamplesMATLAB', nSamples);

      % Extract the data
      DataCells = SampleData(1, 1:nSamples);
      StatusCells = SampleData(2, 1:nSamples);
      TimeCells = SampleData(3, 1:nSamples);

      % Convert the cell arrays to double arrays
      Data = cat(1, DataCells{:});
      Status = cat(1, StatusCells{:});
      Time = cat(1, TimeCells{:});

      % Release the ActiveX objects
      release(hPDA);
      release(hParam);
      release(hParams);
      release(hSession);
else
      % Empty output variables
      Data = [];
      Status = [];
      Time = [];
end
release(hLayer);
release(hLayers);
release(hWorkbook);
release(hATLAS);
```