Using MultiSpeak 3.0 Web Services

With Microsoft Excel

Applications of MultiSpeak
Web Services Web Conference

August 16th, 2007

Presented by Sean Dennis, Lead Developer

Powel Inc, Eagan, MN

What is Web Services?

Web Services is a mechanism for to software applications to communicate with one another over the network. It uses pretty much the same architecture that a web browser uses when surfing the web and getting web pages delivered to your web browser. One significant difference is that the format of the data that travels between the server and the client is not easily readable by humans like a web page is as it only contains data; not appearance properties such as color, font size, layout, alignment, etc. Web services calls are based on SOAP on top XML on top of HTTP on top of TCP/IP.

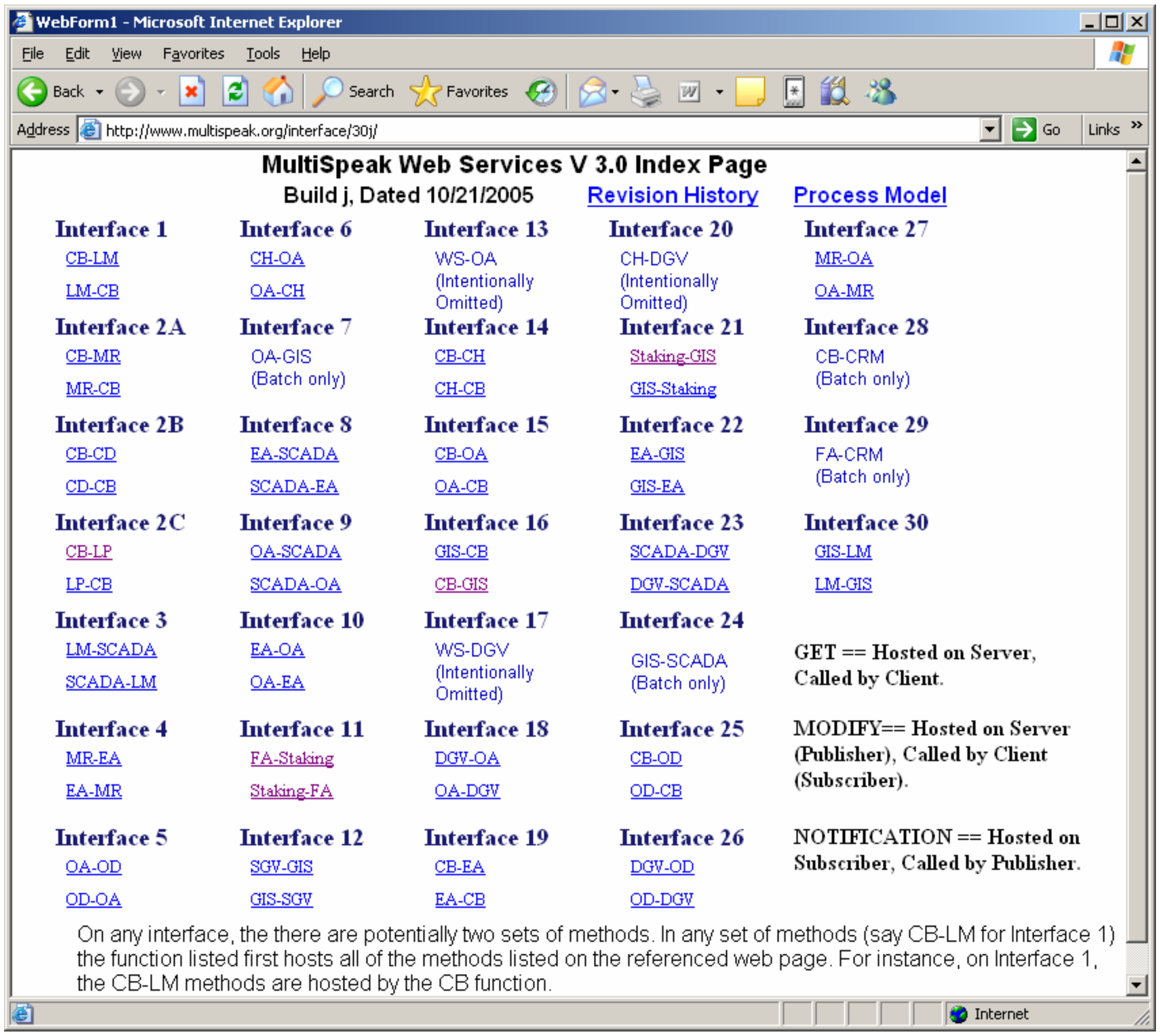
- IP is the Internet Protocol that routes packets of data from one computer to another.
- TCP is the Transmission Control Protocol which ensures that the packets were sent successfully to the destination and in the right order.
- HTTP is the Hyper Text Transmission Protocol which is how web browsers ask web servers for certain web pages. This protocol specifies whether we are getting or putting data and the type of data that is being transmitted such as a file, image, html document or xml document.
- XML stands for eXtensible Markup Language which is a text file that is made up of organized pieces of data called elements. Each element begins with a start tag like **<tagname>** and ends with a closing tag like **</tagname>.** The data in that element is contained between the start tag and closing tag. For example: **<firstName>Billy</firstName>**.
- SOAP stands for Simple Object Access Protocol. This is a set of special xml elements that define what methods are called on the server, what data is passed from the client to the server as arguments to the method calls, and what data is return from the server.

What is MultiSpeak Web Services?

Multispeak is an organization comprised of utilities, software vendors that server utilities and NRECA. This organization works together to define standard mechanisms for the exchange of data between the most common software applications in use at today's utilities. The Multispeak organization has produced three versions: Multispeak 1.1, Multispeak 2.2 and Multispeak 3.0. Versions 1.1 and 2.2 were primarily batch interfaces that defined xml files that could be exported in one application and then imported in another application. Version 2.2 did define some real-time exchange mechanisms but they were not widely adopted.

Multispeak version 3.0 still supports the file-based batch transfer architecture, but it also introduces a web services architecture that allows two systems to communicate real-time with each other. This version defines about 30 function to function interfaces. Some of them are uni-directional, some of them are bi-directional, some of them are real-time using web services, and some of them are not real-time implemented with a file-based batch mechanism. All of the web-services interfaces can be inspected at http://www.multispeak.org/interface/30j/. When looking at the interfaces defined on this web page, the server side is always listed first. For example, "FA-Staking" means that the Finance and Accounting system is listening as a server and the

Staking system can make web services calls to it. "Staking-FA " means that the staking system is listening as a server and the Finance and Accounting system can make web services calls to it.



MultiSpeak Web Services V 3.0 Index Page

Build j, Dated 10/21/2005 Revision History Process Model

Interface 1	**Interface 6**	**Interface 13**	**Interface 20**	**Interface 27**
CB-LM LM-CB	CH-OA OA-CH	WS-OA (Intentionally Omitted)	CH-DGV (Intentionally Omitted)	MR-OA OA-MR
Interface 2A	**Interface 7**	**Interface 14**	**Interface 21**	**Interface 28**
CB-MR MR-CB	OA-GIS (Batch only)	CB-CH CH-CB	Staking-GIS GIS-Staking	CB-CRM (Batch only)
Interface 2B	**Interface 8**	**Interface 15**	**Interface 22**	**Interface 29**
CB-CD CD-CB	EA-SCADA SCADA-EA	CB-OA OA-CB	EA-GIS GIS-EA	FA-CRM (Batch only)
Interface 2C	**Interface 9**	**Interface 16**	**Interface 23**	**Interface 30**
CB-LP LP-CB	OA-SCADA SCADA-OA	GIS-CB CB-GIS	SCADA-DGV DGV-SCADA	GIS-LM LM-GIS
Interface 3	**Interface 10**	**Interface 17**	**Interface 24**	
LM-SCADA SCADA-LM	EA-OA OA-EA	WS-DGV (Intentionally Omitted)	GIS-SCADA (Batch only)	GET == Hosted on Server, Called by Client.
Interface 4	**Interface 11**	**Interface 18**	**Interface 25**	MODIFY== Hosted on Server (Publisher), Called by Client (Subscriber).
MR-EA EA-MR	FA-Staking Staking-FA	DGV-OA OA-DGV	CB-OD OD-CB	
Interface 5	**Interface 12**	**Interface 19**	**Interface 26**	NOTIFICATION == Hosted on Subscriber, Called by Publisher.
OA-OD OD-OA	SGV-GIS GIS-SGV	CB-EA EA-CB	DGV-OD OD-DGV	

On any interface, the there are potentially two sets of methods. In any set of methods (say CB-LM for Interface 1) the function listed first hosts all of the methods listed on the referenced web page. For instance, on Interface 1, the CB-LM methods are hosted by the CB function.

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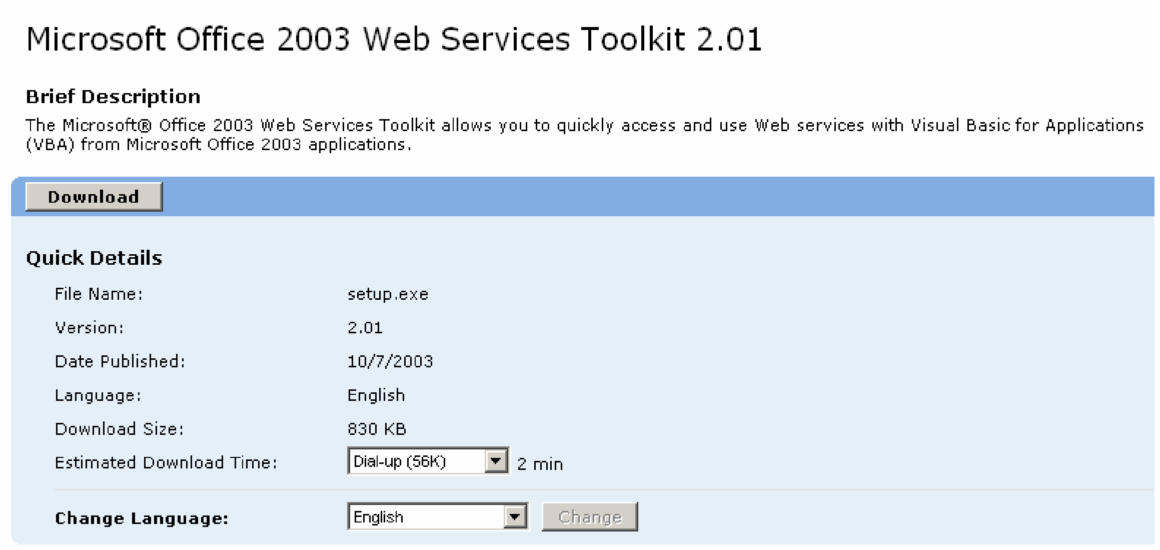
Building a Sample Application using Microsoft Excel

This exercise will build a sample web services client using Microsoft Excel to pull data from StakeOut Server real-time. We will consume one of the Multispeak WSDLs, implement some basic calls and publish the results onto a spreadsheet. Our spreadsheet will basically consist of a button that gets all the work order numbers and descriptions that belong to a particular job status and bring those work order numbers and descriptions into the spreadsheet.

1. Your computer must have the Microsoft Office Web Services Toolkit installed. Once it is installed, you will be able to use it within the VBA environment inside of Excel. If you don't have it installed, it can be downloaded at http://www.microsoft.com/downloads/details.aspx?familyid=fa36018a-e1cf-48a3-9b35-169d819ecf18&displaylang=en


Microsoft Office 2003 Web Services Toolkit 2.01

Brief Description

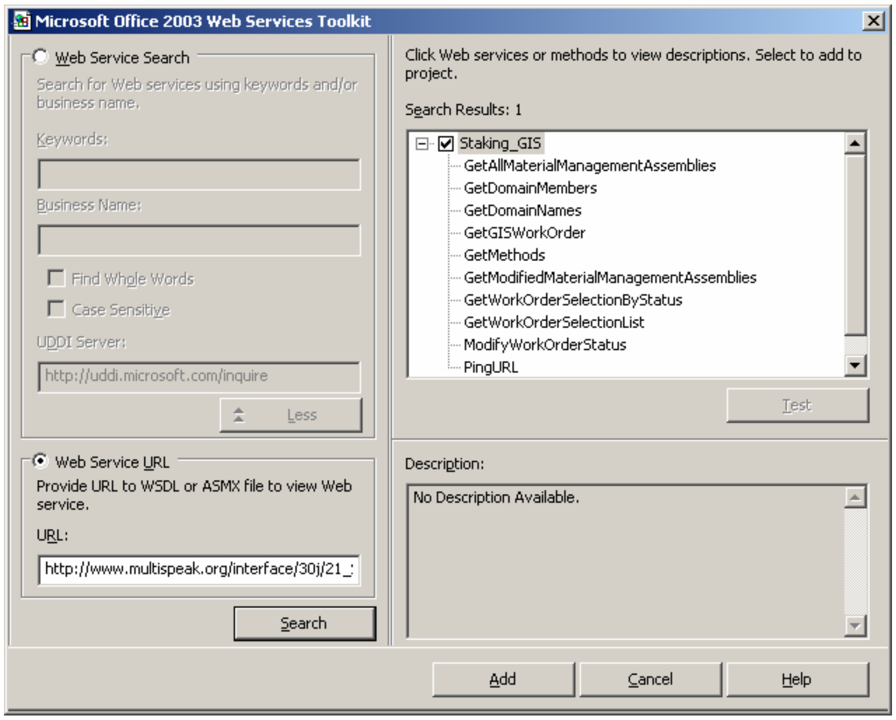
The Microsoft® Office 2003 Web Services Toolkit allows you to quickly access and use Web services with Visual Basic for Applications (VBA) from Microsoft Office 2003 applications.

Quick Details

File Name:	setup.exe
Version:	2.01
Date Published:	10/7/2003
Language:	English
Download Size:	830 KB
Estimated Download Time:	Dial-up (56K) 2 min
Change Language:	English

2. In Excel open the VBA editor and set a reference to the Microsoft Soap Type Library (MSSOAP3.DLL) from the References dialog box (located in the Tools menu). You can open the VBA editor from the **Tools -> Macro -> Visual Basic Editor** menu.

3. Then, on the Tools menu, choose the Web Service References option. Here we need to tell the web services toolkit how to find the WSDL that describes the web service that StakeOut Server supports. Type in the location to your web service WSDL. It can be served from your StakeOutServer or it can be served from the multispeak web site at http://www.multispeak.org/interface/30j/21_Staking_GIS.asmx?WSDL


Microsoft Office 2003 Web Services Toolkit
Web Service Search
Search for Web services using keywords and/or business name.
Keywords:
Business Name:
Find Whole Words
Case Sensitive
UDDI Server:
http://uddi.microsoft.com/inquire
Less
Web Service URL
Provide URL to WSDL or ASMX file to view Web service.
URL:
http://www.multispeak.org/interface/30j/21_
Search
Click Web services or methods to view descriptions. Select to add to project.
Search Results: 1
Staking_GIS
GetAllMaterialManagementAssemblies
GetDomainMembers
GetDomainNames
GetGISWorkOrder
GetMethods
GetModifiedMaterialManagementAssemblies
GetWorkOrderSelectionByStatus
GetWorkOrderSelectionList
ModifyWorkOrderStatus
PingURL
Test
Description:
No Description Available.
Add
Cancel
Help

4. Once the wizard consumes the WSDL, select the interfaces that you want to consume. In this example, select the Staking_GIS example. Each of the methods defined by the Staking_GIS interface shows a description for that method when you click on the method name. Now, click the Add button. This will generate a bunch of VB source code files for you automatically.

5. Now, we want to put a button on an excel spreadsheet that will call one of our web services. To do that, turn on the Control Toolbox by right-clicking on the toolbar and turning on the Control ToolBox toolbar. Then, using that toolbar, insert a button and set the caption to “Get Work Order List” in the button’s properties dialog.

6. Double click on the button to allow you to enter code behind the button. This code will get executed each time you click your new button. Enter the following code

```
Private Sub CommandButton1_Click()
  Dim StakeOutWS As New clsws_StakingGIS
  Dim workOrder As Variant

  On Error GoTo ButtonErrorHandler

  ActiveSheet.range("A10:D999").ClearContents

  StakeOutWorkOrders = StakeOutWS.wsm_GetWorkOrderSelectionByStatus(ActiveSheet.Cells(6, 2), "")

  For i = 0 To UBound(StakeOutWorkOrders, 1)
    Set workOrder = StakeOutWorkOrders(i)
    ActiveSheet.Cells(i + 10, 1).Value = workOrder.woNumber
    ActiveSheet.Cells(i + 10, 2).Value = workOrder.jobNumber
    ActiveSheet.Cells(i + 10, 3).Value = workOrder.jobDescr
    ActiveSheet.Cells(i + 10, 4).Value = workOrder.statusCode
  Next
  Exit Sub
```

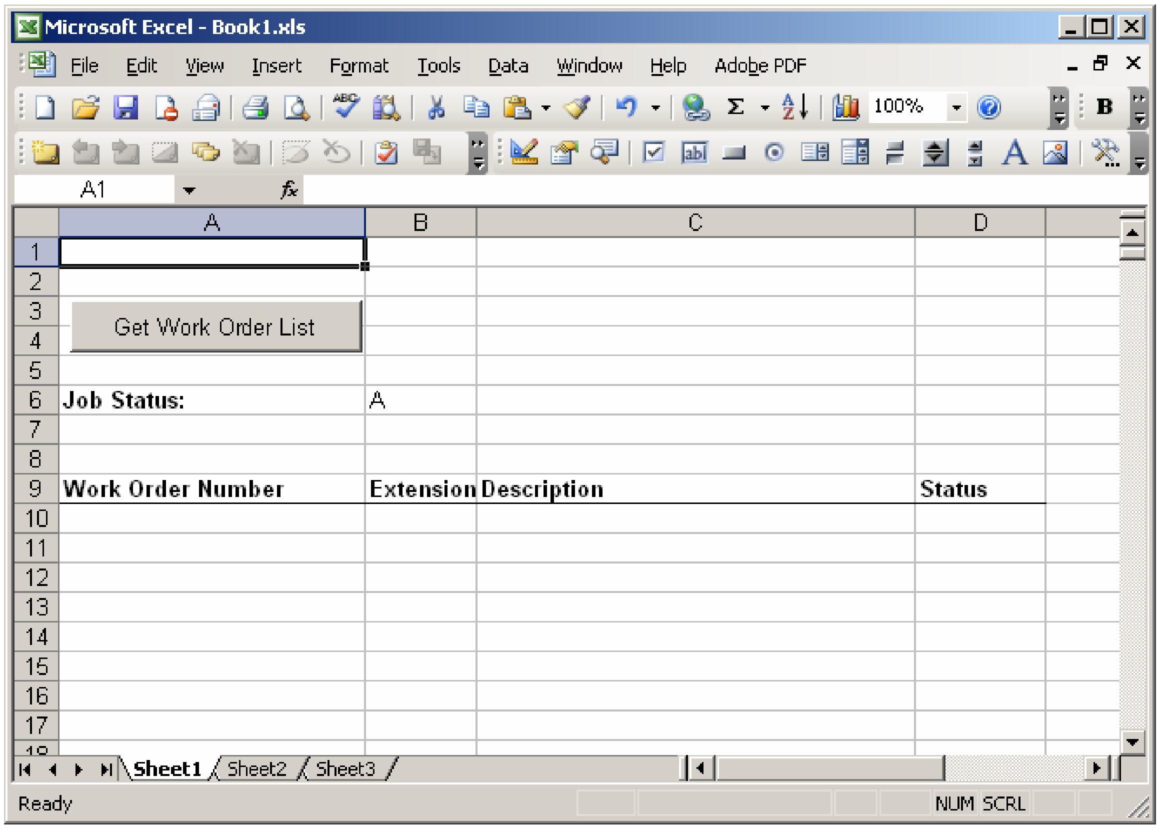
```
ButtonErrorHandler:
  MsgBox ("No Work Orders returned")

End Sub
```

7. Now, the above code creates a clsws_StakingGIS class which provides us the methods we need to call the StakingGIS interface on the server application (StakeOut Server). The WSDL file that we imported tells the clsws_StakingGIS class where and how to communicate over the network to StakeOut Server. If you want to change your connection to a different location than what is defined in the WSDL, edit the clsws_StakingGIS file as follows:

At the bottom of the *Private Sub Class_Initialize()* method, insert the following code after the *sc_StakingGIS.MSSoapInit2* call in the clsws_StakingGIS module.

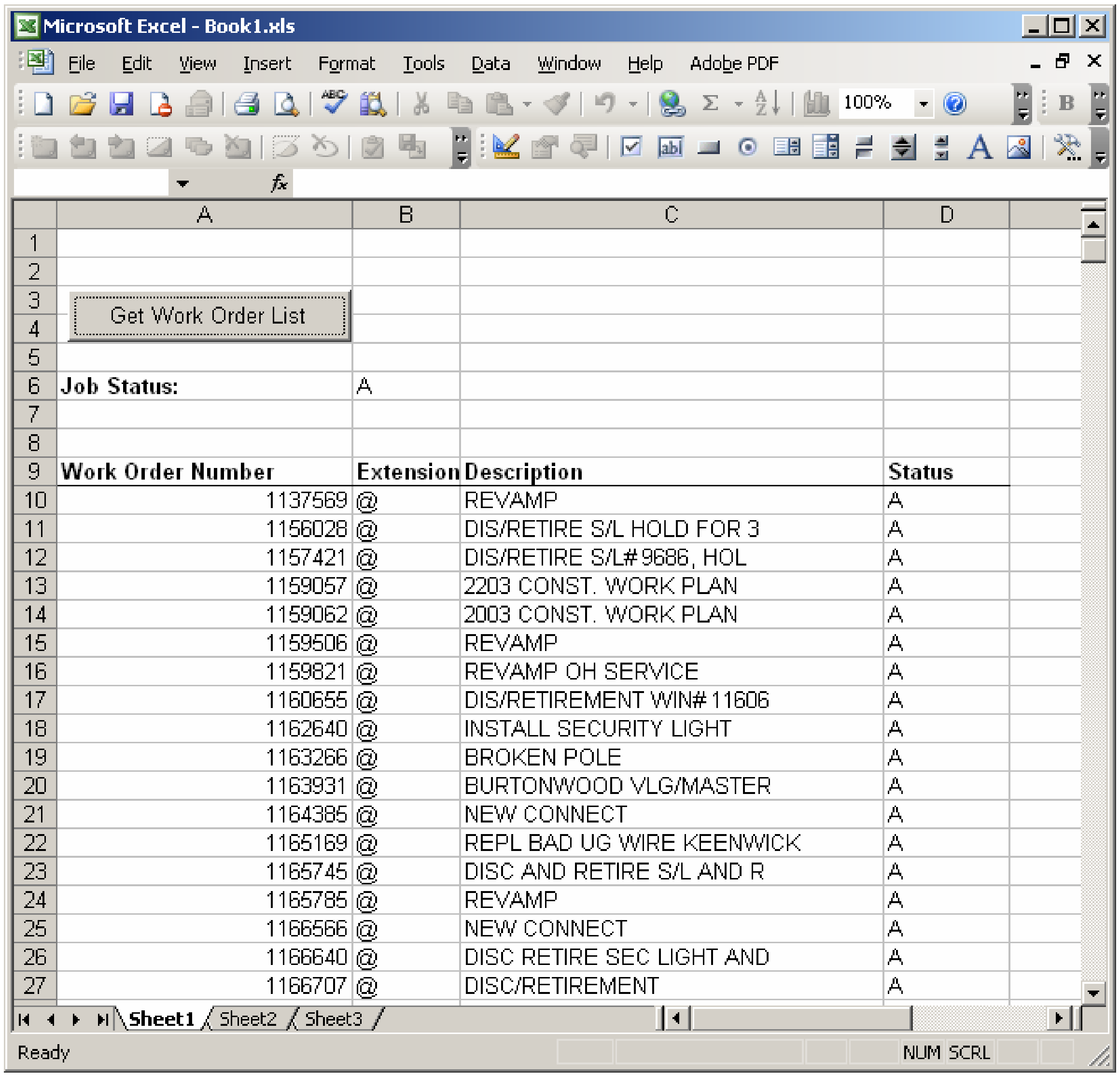
```
sc_StakingGIS.ConnectorProperty("EndPointURL") = “http://URLToYourServer”
```

8. Before we test our web services code, we need to setup our spreadsheet a little bit. Fill in the cells as shown in the following image using the exact same cells as shown in the image.


Microsoft Excel - Book1.xls
File Edit View Insert Format Tools Data Window Help Adobe PDF
100%
A1
Get Work Order List
Sheet1 Sheet2 Sheet3
Ready
NUM SCRL

	A	B	C	D
6	Job Status:	A		
9	Work Order Number	Extension	Description	Status

9: Now let’s test our sample web services call by clicking on the “Get Work Order List” button. This will run our VBA code that will in turn call the GetWorkOrderSelectionByStatus web services method on StakeOut Server with the text in cell B6 being passed in as the job status code. StakeOut will return a list of workOrderSelection items that are then displayed in the cells starting in row 10.


Microsoft Excel - Book1.xls
File Edit View Insert Format Tools Data Window Help Adobe PDF
100%
Get Work Order List
Sheet1 Sheet2 Sheet3
Ready
NUM SCRL

	A	B	C	D
6	Job Status:	A		
9	Work Order Number	Extension	Description	Status
10	1137569	@	REVAMP	A
11	1156028	@	DIS/RETIRE S/L HOLD FOR 3	A
12	1157421	@	DIS/RETIRE S/L# 9686, HOL	A
13	1159057	@	2203 CONST. WORK PLAN	A
14	1159062	@	2003 CONST. WORK PLAN	A
15	1159506	@	REVAMP	A
16	1159821	@	REVAMP OH SERVICE	A
17	1160655	@	DIS/RETIREMENT W/N# 11606	A
18	1162640	@	INSTALL SECURITY LIGHT	A
19	1163266	@	BROKEN POLE	A
20	1163931	@	BURTONWOOD VLG/MASTER	A
21	1164385	@	NEW CONNECT	A
22	1165169	@	REPL BAD UG WIRE KEENWICK	A
23	1165745	@	DISC AND RETIRE S/L AND R	A
24	1165785	@	REVAMP	A
25	1166566	@	NEW CONNECT	A
26	1166640	@	DISC RETIRE SEC LIGHT AND	A
27	1166707	@	DISC/RETIREMENT	A

End of Document.

Authored September, 2006
Sean Solberg, Powel-MiniMax
930 Blue Gentian Road
Eagan, MN 55121
651-251-3005