



Reading Microsoft Sharepoint List Data Using SAS

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What is Sharepoint ?

- Microsoft “web application platform”
- enterprise collaboration software
 - content management, portal
 - forms, data collection
 - document management (versioning)
 - easily integrated with MS Office



What is Sharepoint ?

- server-based technology
 - browser access, thin client
 - search
 - communities
- security model
 - owners, contributors, consumers
 - distributed administration

What is Sharepoint ?

The screenshot shows a Windows Internet Explorer browser window displaying a SharePoint site. The browser's address bar shows the URL: `http://.../108_WFMPProductionSupportBusiness/default.aspx`. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The browser's toolbar shows several tabs, including 'Home - CPO Production Support | Business Resources'. The browser's status bar at the bottom indicates 'Done' and 'Local Intranet'.

The SharePoint site's header includes the text 'CPO Production Support | Business Resources' and a search box. The site's main content area is divided into several sections:

- Documents:** A list of documents including 'Employee Handbooks', 'Empower Training', 'Resource Planning', 'Production Support Forms', and 'Contact Information'.
- CPO Production Support Headlines:** A table with columns 'Created' and 'Title'.

Created	Title
12/8/2010 3:20 PM	**Reminder** - eSP Maintenance Window every Sunday 1-5pm EST
12/8/2010 1:44 PM	Welcome
- Calendar:** A calendar view for October 2012. The calendar shows the days of the week and the dates from 30 to 3. The date 22 is highlighted in orange.
- Links:** A list of links including 'Empower Logon (eSP)', 'FTE Governance', 'ClearVU Reporting Portal', 'Employee Change Forms and Information - RBCI Shared Services', 'H&A CSS Reports (Agent)', 'H&A CSS Reports (Mgmt)', and 'MOR'.

What is a Sharepoint List ?

H&A and Travel Absenteeism and Vacation - Windows Internet Explorer provided by

http://.../H&A_WFMPProductionSupportBusiness/MOR/Lists/HA%20and%20Travel%20Absenteeism%20and%20Vacation/Absenteeism%20and%20Vacation.aspx

File Edit View Favorites Tools Help

Links IDM Beeline MOR - H&A

sharepoint - Bing What is SharePoint? | ShareP... Customize SharePoint with S... H&A and Travel Absente...

CPO Production Support | Business Resources Welcome Droogendyk, Harry (CWM) | This List Site Actions

MOR Home Operation Enablement Meetings MOR Capacity Plan

CPO Production Support | Business Resources > MOR > H&A and Travel Absenteeism and Vacation

H&A and Travel Absenteeism and Vacation

View All Site Content

Documents

- Shared Documents

Lists

- Calendar
- Tasks
- H&A and Travel Absenteeism and Vacation
- Casualty and L&H Absenteeism and Vacation

Discussions

- Team Discussion

Sites

People and Groups

Recycle Bin

Modify Record	Start Date	End Date	Employee	Staffing Code	Banked Hours Multiplier	Hours	Shift Length	Occurrence Type	
Modify Record	6/4/2012	6/8/2012	Ch...ak	Vacation		37.5	7.5		
Modify Record	5/28/2012	6/15/2012	A...en	Vacation	1.0	120	7.5		
Modify Record	6/4/2012	6/5/2012	Ch...en	Sick	1.0	7.5	7.5		
Modify Record	6/4/2012	6/5/2012	Ch...en	Course	1.0	7.5	7.5		
Modify Record	5/31/2012	6/1/2012	Ch...en	Sick	1.0	7.5	7.5		
Modify Record	6/9/2012	6/11/2012	Ch...en	Sick	1.0	22.5	7.5		
Modify Record	6/7/2012	6/18/2012	Ch...en	Family Responsibility	1.0	45	7.5		
Modify Record	10/23/2012	11/6/2012	Ch...en	Vacation	Blank	82.5	7.5		
Modify Record	6/11/2012	6/11/2012	Ch...en	Vacation	1.0	7.5	7.5		
Modify Record	6/18/2012	6/22/2012	Ch...en	Vacation	1.0	37.5	7.5		
Modify Record	6/12/2012	6/12/2012	Ch...en	Sick	Blank	7.5	7.5	Occurrence	
Modify Record	6/11/2012	6/11/2012	Ch...en	Family Responsibility	1.0	5	9.5		
Modify Record	6/11/2012	9/30/2012	Ch...en	STD		0	0		
Modify Record	6/11/2012	6/12/2012	Ch...en	Sick	1.0	15	7.5		
Modify Record	6/18/2012	6/18/2012	Ch...en	Sick	1.0	7.5	7.5		
Modify Record	6/22/2012	6/22/2012	Ch...en	Vacation	1.0	7.5	7.5		
Modify Record	7/4/2012	7/5/2012	Ch...en	Sick	Blank	15	7.5	Occurrence	Med note rec'd
Modify Record	7/5/2012	7/5/2012	Ch...en	Sick	Blank	7.5	7.5	Occurrence	
Modify Record	7/4/2012	7/4/2012	Ch...en	Overtime	Blank	0.5	7.5	No Occurrence	
Modify Record	7/3/2012	7/4/2012	Ch...en	Sick	Blank	19	9.5	Occurrence	
Modify Record	7/3/2012	8/5/2012	Ch...en	STD	Blank	0	7.5	No Occurrence	Gradual return from
Modify Record	7/4/2012	7/6/2012	Ch...en	Sick	Blank	22.5	7.5	Occurrence	
Modify Record	7/4/2012	7/4/2012	Ch...en	Family Responsibility	Blank	3.75	7.5	No Occurrence	
Modify Record	7/5/2012	7/5/2012	Ch...en	Vacation	Blank	7.5	7.5	No Occurrence	
Modify Record	6/27/2012	6/29/2012	Ch...en	Sick	Blank	22.5	7.5	Occurrence	
Modify Record	7/3/2012	7/3/2012	Ch...en	Unpaid Sick	Blank	7.5	7.5	Same Occurrence	As per Mgr - day is
Modify Record	7/5/2012	7/5/2012	Ch...en	Sick	Blank	7.5	7.5	Occurrence	
Modify Record	7/4/2012	7/4/2012	Ch...en	Lieu Time	1.0	3	7.5	No Occurrence	Left Early
Modify Record	7/3/2012	7/3/2012	Ch...en	Sick	Blank	7.5	7.5	No Occurrence	
Modify Record	7/3/2012	7/3/2012	Ch...en	Sick	Blank	0	9.5	Occurrence	

Pending changes

Local intranet 100%

What is a Sharepoint List ?

H&A and Travel Absenteeism and Vacation - Windows Internet Explorer provided by

http://i...k10/H08_WFMPProductionSupportBusiness/MOR/Lists/HA%20and%20Travel%20Absenteeism%20and%20Vacation

File Edit View Favorites Tools Help

Links IDM Beeline

H&A and Travel Absenteeism and Vacation

CPO Production Support | Business Resources

MOR

Home Operation Enablement Meetings MOR Capacity Plan

CPO Production Support | Business Resources > MOR > H&A and Travel Absenteeism and Vacation

H&A and Travel Absenteeism and Vacation

View All Site Content

Documents

- Shared Documents

Lists

- Calendar
- Tasks
- H&A and Travel Absenteeism and Vacation
- Casualty and L&H

New Actions Settings

Edit Item

- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record
- Modify Record

Create Column
Add a column to store additional information about each item.

Create View
Create a view to select columns, filters, and other display settings.

List Settings
Manage settings such as permissions, columns, views, and policy.

Staffing Code	Banked
...	1.0
...	1.0
...	1.0
...	1.0
...	1.0
...	1.0
...	1.0
...	Blank
...	1.0

Adding Sharepoint List Data

The screenshot shows a Windows Internet Explorer browser window displaying a SharePoint site. The browser's address bar shows the URL: http://.../K0/H08_WFMProductionSupportBusiness/MOR/Lists/HA%20and%20Travel%20Absenteeism%20and%20Vacation. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The browser's toolbar shows links to IDM and Beeline, and a search box containing "H&A and Travel Absenteeism and Vacation".

The SharePoint page title is "CPO Production Support | Business Resources". The page content includes a navigation menu with "Home", "Operation Enablement Meetings", "MOR", and "Capacity Plan". The main heading is "H&A and Travel Absenteeism and Vacation".

The page displays a list of records. A red box highlights the "New Item" button in the "Actions" menu, which is used to add a new item to the list. The "New Item" button is located in the top right corner of the list view, next to the "Actions" and "Settings" buttons. The "New Item" button is labeled "New Item" and "Add a new item to this list."

	Date	Emplc	Staffing Code
Modify Record	5/28/2012	6/15/2012	Vacation
Modify Record	6/4/2012	6/5/2012	Vacation
Modify Record	6/4/2012	6/5/2012	Sick
Modify Record	6/4/2012	6/5/2012	Course
Modify Record	5/31/2012	6/1/2012	Sick
Modify Record	6/9/2012	6/11/2012	Sick
Modify Record	6/7/2012	6/18/2012	Family Responsibility
Modify Record	10/23/2012	11/6/2012	Vacation

Adding Sharepoint List Data

The screenshot shows a SharePoint 'New Item' form for 'H&A and Travel Absenteeism and Vacation'. The form is titled 'H&A and Travel Absenteeism and Vacation: New Item' and includes a breadcrumb trail: 'CPO Production Support | Business Resources > MOR > H&A and Travel Absenteeism and Vacation > New Item'. The form contains several fields, some of which are marked as required with an asterisk (*). The 'Start Date' field is highlighted with a red box, and the 'Shift Length' field is also highlighted with a red box, showing a dropdown menu with options 7.5, 7.5, 9.5, and 11.25. The 'Edit Item' field is set to 'Modify Record' and has a note 'Please do not modify this field'. The 'Employee' field is a dropdown menu, and the 'Staffing Code' field is also a dropdown menu. The 'Occurrence Type' field has a checkbox for 'Occurrence'. The 'Hours' field is a text input. The 'Banked Hours Multiplier' field has a checkbox for '1.5'. The 'Note' field is a rich text editor with a toolbar. The form includes 'OK' and 'Cancel' buttons at the top right and bottom right. A legend indicates that an asterisk (*) indicates a required field.

Home Operation Enablement Meetings: MOR Capacity Plan

CPO Production Support | Business Resources > MOR > H&A and Travel Absenteeism and Vacation > New Item
H&A and Travel Absenteeism and Vacation: New Item

OK Cancel

* indicates a required field

Edit Item * Modify Record
Please do not modify this field

Start Date * When single day the start date is the same as the end date

End Date Do not include regular days off in date range

Employee *

Staffing Code *

Occurrence Type Occurrence

Hours *

Banked Hours Multiplier 1.5

Shift Length * 7.5 7.5 9.5 11.25 or own value:

Note

OK Cancel

Editing Sharepoint List Data

MOR

Home Operation Enablement Meetings **MOR** Capacity Plan

CPO Production Support | Business Resources > MOR > H&A and Travel Absenteeism and Vacation

H&A and Travel Absenteeism and Vacation

New Actions Settings

Edit Item	Start Date	End Date	Emplc	Staffing Code	Bank
Modify Record	6/4/2012	6/8/2012	L	Vacation	
Modify Record	5/28/2012	6/15/2012	L	Vacation	1.0
Modify Record	6/4/2012	6/5/2012	C	Sick	1.0
Modify Record	6/4/2012	6/5/2012	F	Course	1.0
Modify Record	5/31/2012	6/1/2012	L	Sick	1.0
Modify Record	6/9/2012	6/11/2012	C	Sick	1.0
Modify Record	6/7/2012	6/18/2012	F	Family Responsibility	1.0
Modify Record	10/23/2012	11/6/2012	M	Vacation	Blank
Modify Record	6/11/2012	6/11/2012	C	Vacation	1.0
Modify Record	6/18/2012	6/22/2012	C	Vacation	1.0
Modify Record	6/12/2012	6/12/2012	F	Sick	Blank
Modify Record	6/11/2012	6/11/2012	F	Family Responsibility	1.0
Modify Record	6/11/2012	9/30/2012	L	Family Responsibility	
Modify Record	6/11/2012	6/12/2012	F	Leave With Pay	
Modify Record	6/18/2012	6/18/2012	F	Leave Without Pay	
Modify Record	6/22/2012	6/22/2012	J	Lieu Time	
Modify Record	7/4/2012	7/5/2012	I	LTD	Blank
Modify Record	7/5/2012	7/5/2012	C	Maternity Leave	Blank
Modify Record	7/4/2012	7/4/2012	F	Overtime	Blank
Modify Record	7/3/2012	7/4/2012	F	Sick	Blank
Modify Record	7/3/2012	8/5/2012	V	STD	Blank

View All Site Content

Documents

- Shared Documents

Lists

- Calendar
- Tasks
- H&A and Travel Absenteeism and Vacation
- Casualty and L&H Absenteeism and Vacation

Discussions

- Team Discussion

Sites

People and Groups

Recycle Bin



What is a “Web Service” ?

- WWW machine to machine communication
- REST
 - Representational State Transfer
- SOAP
 - Simple Object Access Protocol
- blah blah blah



What is a “Web Service” ?

- API
 - Application Programming Interface
- communication protocol
 - invoked with specific syntax, parms
 - returns data / functionality
- HTTP request messages
 - URL and parms
 - XML returned



Sharepoint "Web Service"

- owssvr.dll
 - Microsoft web service
 - appropriate parms
- `http://server.../_vti_bin/owssvr.dll?cmd=Display&list=list GUID&view=view GUID&XMLDATA=TRUE&FilterField1=some_field&FilterValue1=some_value`



Upfront Work

- define a view
 - return all rows
 - optional filter / sort criteria
- list GUID (Globally Unique Identifier)
- view GUID

Define a Sharepoint List View

The screenshot shows the 'Settings' dropdown menu for a SharePoint list view. The menu is open, showing three options: 'Create Column', 'Create View', and 'List Settings'. The 'List Settings' option is highlighted in yellow. The background shows a list view with columns for 'Start Date' and 'End Date', and rows of data with dates like 5/22/2012, 5/28/2012, and 6/4/2012.

MOR Capacity Plan

tion Support | Business Resources > MOR > H&A and Trav
nd Travel Absenteeism and Vaca

Actions ▾ Settings ▾

Start Date

5/22/2012

5/28/2012

6/4/2012

Create Column
Add a column to store additional information about each item.

Create View
Create a view to select columns, filters, and other display settings.

List Settings
Manage settings such as permissions, columns, views, and policy.

785856428

View Name:

HA Travel Absent/Vac All rows

Web address of this view:

http://.../ykd0/H08_WFMProductionSupportBusiness/MOR/Lists/HA and
Travel Absenteeism and Vacation/ HA Travel AbsentVac A.aspx

Make this the default view
(Applies to public views only)

Item Limit

Use an item limit to limit the amount of data that is returned to users of this view. You can either make this an absolute limit, or allow users to view all the items in the list in batches of the specified size.

Number of items to display:

214748

- Display items in batches of the specified size.
- Limit the total number of items returned to the specified amount.



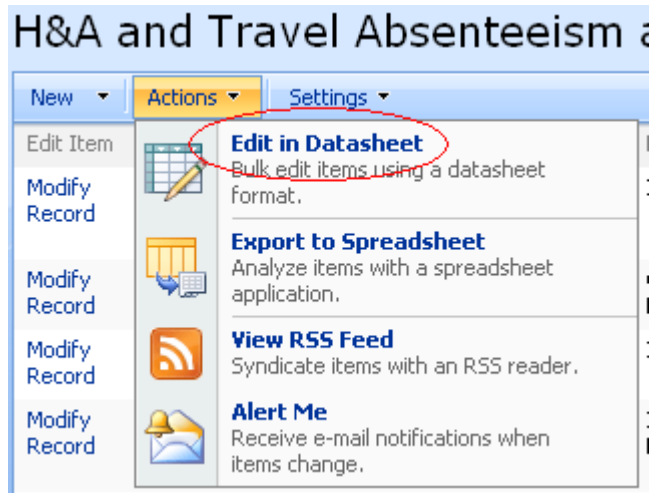
List GUID

- grab the URL when viewing list in browser

[http://server/_layouts/listedit.aspx?List=
%7BF6A1B978%2D9B0F%2D4046%2D
B9E5%2D8CA44086163A%7D](http://server/_layouts/listedit.aspx?List=%7BF6A1B978%2D9B0F%2D4046%2DB9E5%2D8CA44086163A%7D)

View GUID

- open the view in the browser
- select “Edit in Datasheet”





View GUID

- grab the URL when viewing datasheet in browser

`http://server/Lists/HA%20and%20Travel%20Absenteeism%20and%20Vacation/HA%20Travel%20AbsentVac%20All%200rows.aspx?ShowInGrid=True&View=%7B5CB7A2C4%2DA123%2D4EC4%2DBB9C%2D515F563DE94E%7D`



SAS Reading Sharepoint

```
%let url      = http://server/_vti_bin/owssvr.dll;
%let ListID   = {F6A1B978-9B0F-4046-B9E5-8CA44086163A};
%let ViewID   = {5CB7A2C4-A123-4EC4-BB9C-515F563DE94E};

%let request  = %nrstr(Cmd=Display&List=)&ListID
                %nrstr(&View=)&ViewID
                %nrstr(&XMLDATA=TRUE);

* filters only test equality ;

%let filter   = %nrstr(&FilterField1=Modified
                    &FilterValue1)=mm/dd/yyyy;
```



SAS Reading Sharepoint

- establish filerefs for HTTP request and XML output location

```
%let dir          = &root\&env\xml;
```

```
%let xmlfile     = ha_data.xml;
```

```
filename listout "&dir\&xmlfile";
```

```
filename request temp;
```



SAS Reading Sharepoint

- write the request data

```
data _null_;  
  file request;  
  
  length request $256;  
  request = "&request&filter";  
  put request;  
  putlog 'Request: ' request;  
  
  stop;  
run;
```



SAS Reading Sharepoint

- issue the HTTP request to the web service

```
proc http
  in          = request
  out         = listout
  url         = "&url"
  method     = "get"
  ;
run ;
```

- filerefs and &url established earlier



SAS Reading Sharepoint

- XML schema info

```
- <xml xmlns:s="uuid:BDC6E3F0-6DA3-11d1-A2A3-00AA00C14882"  
  xmlns:dt="uuid:C2F41010-65B3-11d1-A29F-00AA00C14882"  
  xmlns:rs="urn:schemas-microsoft-com:rowset" xmlns:z="#RowsetSchema">  
- <s:Schema id="RowsetSchema">  
- <s:ElementType name="row" content="eltOnly" rs:CommandTimeout="30">  
- <s:AttributeType name="ows_LinkTitle" rs:name="Edit Item" rs:number="1">  
  <s:datatype dt:type="string" dt:maxLength="512" />  
  </s:AttributeType>  
- <s:AttributeType name="ows_Start_x0020_Date" rs:name="Start Date"  
  rs:number="2">  
  <s:datatype dt:type="datetime" dt:maxLength="8" />  
  </s:AttributeType>  
- <s:AttributeType name="ows_End_x0020_Date" rs:name="End Date" rs:number="3">  
  <s:datatype dt:type="datetime" dt:maxLength="8" />  
  </s:AttributeType>
```



SAS Reading Sharepoint

- Sharepoint List data in XML format

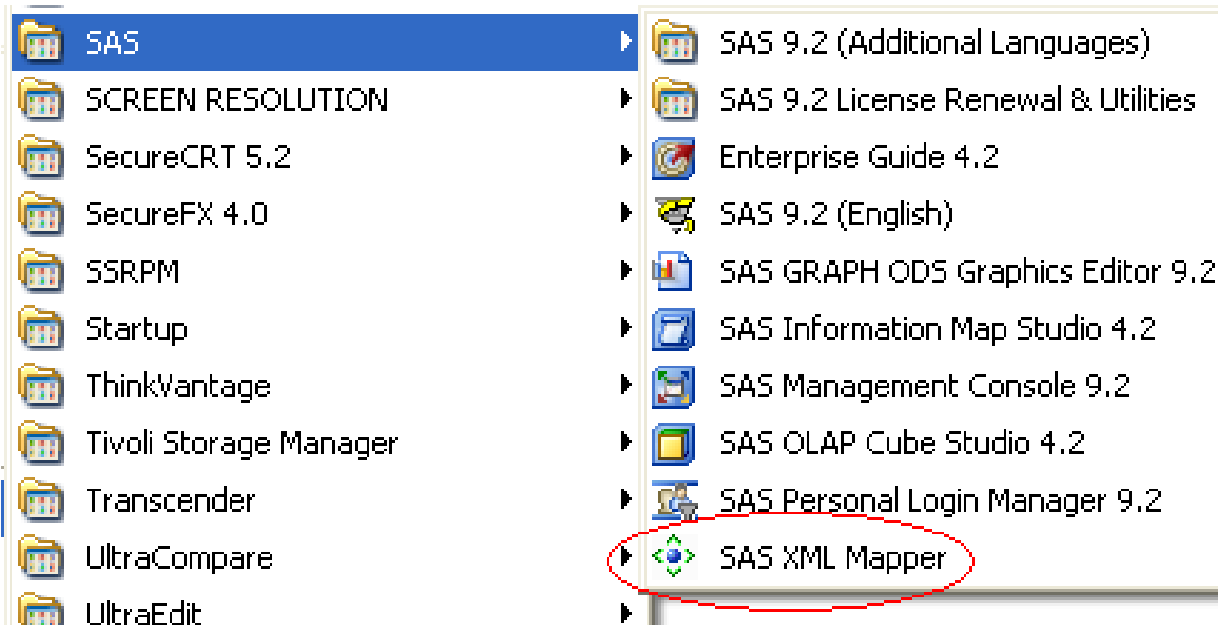
```
= <rs:data>
```

```
<z:row ows_LinkTitle="Modify Record" ows_Start_x0020_Date="2012-09-14  
00:00:00" ows_End_x0020_Date="2012-09-14 00:00:00"  
ows_Employee="355;#Employee1" ows_Staffing_x0020_Code="Vacation"  
ows_Hours="7.50000000000000" ows_Shift_x0020_Length="7.5"  
ows_Created="2012-07-10 12:45:31" ows_Author="175;#Userid12"  
ows_Modified="2012-10-22 08:32:57" ows_Editor="176;#Userid13"  
ows_Note="<div></div>" />
```

```
<z:row ows_LinkTitle="Modify Record" ows_Start_x0020_Date="2012-04-09  
00:00:00" ows_End_x0020_Date="2012-04-13 00:00:00"  
ows_Employee="392;#Employee2" ows_Staffing_x0020_Code="Purchase  
Vacation" ows_Hours="37.50000000000000"  
ows_Shift_x0020_Length="7.5" ows_Created="2012-07-10 15:05:28"  
ows_Author="176;#Userid13" ows_Modified="2012-10-22 16:24:18"  
ows_Editor="101;#Userid12" ows_Note="<div></div>" />
```

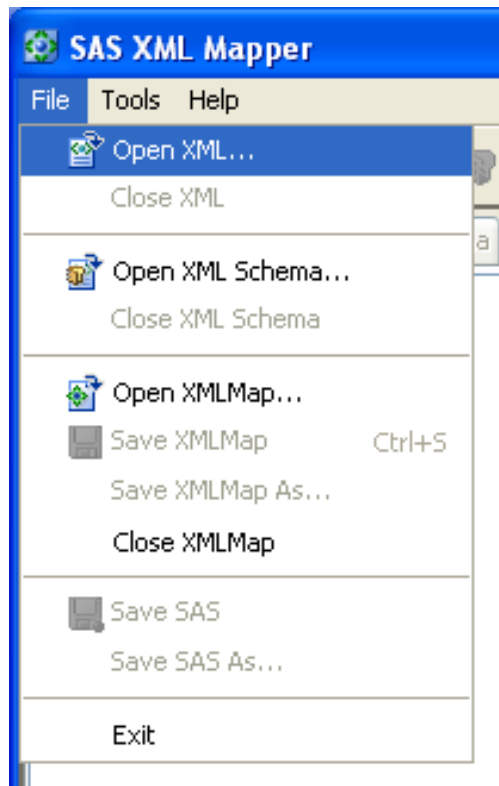
SAS and XML

- SAS cannot read Sharepoint XML directly
- must create an XML map



SAS XML Mapper

- open the XML file just created



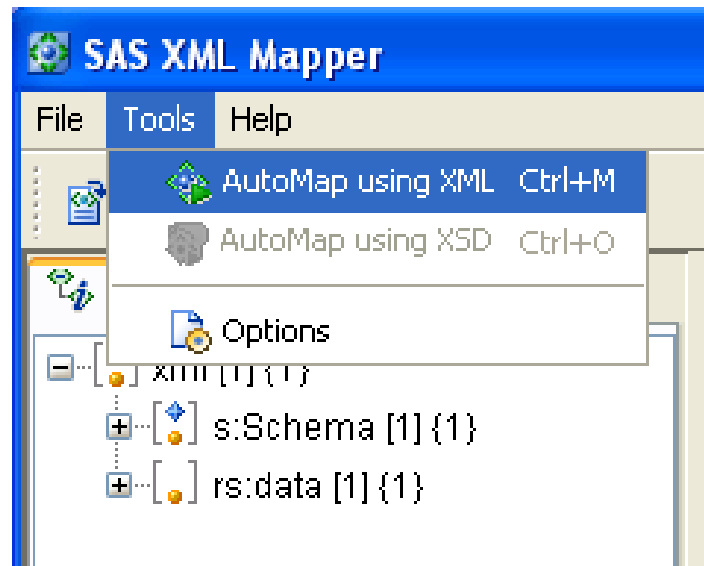
SAS XML Mapper

The screenshot displays the SAS XML Mapper application window. The title bar reads "SAS XML Mapper". The menu bar includes "File", "Tools", and "Help". The toolbar contains icons for file operations and mapping. The main interface is divided into several sections:

- Left Panel:** A tree view showing the XML structure. The root node is "xml [1]{1}", which contains two child nodes: "s:Schema [1]{1}" and "rs:data [1]{1}".
- Right Panel:** A "Properties" tab for the selected "SXLEMAP" node. It includes fields for "Name" (SXLEMAP), "Description", "Path", and "End Path". There are also checkboxes for "Retain" and "Replace", and a "Begin/End" dropdown menu.
- Bottom Panel:** A toolbar with buttons for "XML source", "XML Schema source", "XMLMap", "SAS Code Example", "Table view", "Contents", "Validate", and "Log". Below the toolbar, the XML source file path is shown as "C:\TEMP\ha_absenteeism_data.xml". The main text area displays the XML code:

```
<xml xmlns:s='uuid:BDC6E3F0-6DA3-11d1-A2A3-00AA00C14882'  
  xmlns:dt='uuid:C2F41010-65B3-11d1-A29F-00AA00C14882'  
  xmlns:rs='urn:schemas-microsoft-com:rowset'  
  xmlns:z='#RowsetSchema'>  
<s:Schema id='RowsetSchema'>  
  <s:ElementType name='row' content='eltOnly' rs:CommandTimeout='30'>
```
- Status Bar:** Shows "XML file loaded: ha_absenteeism_data.xml" and a set of status icons (error, warning, info, etc.) with counts.

SAS XML Mapper



SAS XML Mapper

The screenshot displays the SAS XML Mapper interface. On the left, a tree view shows the XML schema structure: `xml [1] {1}` containing `s:Schema [1] {1}` and `rs:data [1] {1}`. The `rs:data` element is expanded to show `z:row [73] {73}`, which is circled in red. Below it, a list of attributes is visible, including `ows_Link`, `ows_Start`, `ows_End`, `ows_Emp`, `ows_Staff`, `ows_Hou`, `ows_Shif`, `ows_Cre`, `ows_Auth`, `ows_Mod`, `ows_Edit`, and `ows_Note`.

On the right, the 'Format' tab is selected and circled in red. The configuration for the selected field is as follows:

Property	Value	Width	NDec
Type	numeric		0
Datatype	datetime		
Format	DATETIME	20	0
Inform	IS8601DT	19	0

Below the configuration, a list of generated SAS variables is shown. The variable `z_row` is circled in red. Other variables include `xml_ORDINAL`, `rs_data_ORDINAL`, `rs_data_ORDINAL`, `rs_data_ORDINAL`, `z_row_ORDINAL`, `ows_LinkTitle`, `ows_Start_x0020_Date`, `ows_End_x0020_Date`, and `ows_Employee`.



SAS XML Mapper

- XML map is only more XML

```
<COLUMN name="ows_Start_x0020_Date">
  <PATH
    syntax="XPath">/xml/rs:data/z:row/@ows_S
    tart_x0020_Date</PATH>
    <TYPE>numeric</TYPE>
    <DATATYPE>datetime</DATATYPE>
    <FORMAT width="20">DATETIME</FORMAT>
    <INFORMAT width="19">IS8601DT</INFORMAT>
  </COLUMN>
```



Using the XML Map

```
filename HAabsent "&dir\&xmlfile";  
filename sxlemap "&root\&env\HA.map";  
libname HAabsent xml xmlmap=sxlemap  
access=readonly;  
  
data mylib.sp_list_data;  
    set HAabsent.z_row ;  
run;
```



Post Processing

```
data sp_list_data_massaged ( drop = ows_: );  
  if 0 then set mylib.sp_list_data_final;  
  set mylib.sp_list_data  
    ( drop = rs_data_ordinal z_row_ordinal ows_LinkTitle );  
  
  start_dt      = datepart(ows_start_x0020_date);  
  end_dt        = datepart(ows_end_x0020_date);  
  
  employee_nm   = scan(scan(ows_employee,-1,'#'),1,'-');  
  employee_no   = scan(scan(ows_employee,-1,'#'),-1,'-');  
  
  absent_type   = ows_staffing_x0020_code;  
  absent_hours  = ows_hours;  
  shift_length  = input(ows_shift_x0020_length,?? 32.);  
  sick_days     = input(scan(ows_sick_x0020_days,-1,'#'),32.);  
  occur_type    = ows_occurrence_x0020_type;  
  
run;
```



Final Thoughts

- only runs in Windows
 - secret, double Windows handshake
 - Unix access possible in 9.4
- Sharepoint lists are slow
 - not for large data
- HTTP request construct is picky
- error messages aren't helpful



Questions ?

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