SEGUS

White Paper

From SMF to Excel: graphs and reports in one click

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1 Introduction

z/OS performance analysts love numbers; the more they have, the better it is! The reason is that numbers allow us to clearly understand an issue in all its detail.

Managers, on the other hand, are ardent supporters of Napoleon's quote: "Un bon croquis vaut mieux qu'un long discours" (A good sketch is better than a long speech). Like Napoleon, they love graphs; they leave the tactics (the detailed analysis) to their generals.

How to reconcile these different viewpoints?

As my ancestors used to say: "Ubi maior minor cessat"; so performance analysts have to spend part of their time transforming their much loved numbers into graphs when they need to discuss or report something to their managers.

Preparing graphs on z/OS *is* possible, but it requires specific tools which are normally expensive, not always very easy to use, and often produce low quality results. These are the main reasons why most z/OS sites prefer to produce their graphs and reports using the universally known Excel.

However producing Excel graphs using z/OS data is also not totally straightforward; it requires a process which is mostly manual and time intensive.

In this paper we will show how to save a lot of time and effort by exploiting EPV HTML pages and DBs to produce Excel graphs and reports with a single mouse click.

2 Feeding Excel using "old style" tools

In z/OS, most performance information is recorded in SMF data. Currently available tools can create reports by directly reading it (e.g. IBM RMF), or collect data into a DB (e.g. IBM TDS), and then produce reports by running queries.

Either way: if you want to produce graphs and reports with Excel you have to:

1. Prepare the base report;
2. Manipulate the report to get it in to a format suitable for loading into Excel;
3. FTP the resulting report to Windows;
4. Load the report into Excel;
5. Prepare the required graphs and reports.

The main issues with this type of process are:

- the steps have to be performed on different platforms;
- most of the work is done manually;
- it is time consuming.

When using this approach, the result is usually that someone in the IT department (the "reports Master"), works full-time to produce graphs and reports. A negative side effect is that they can very quickly become a bottleneck, so at least one other person has to dedicate part of their time to be able to substitute for them when they are absent.

We believe that in times of shrinking budgets (and staff), this should be considered a luxury to avoid.

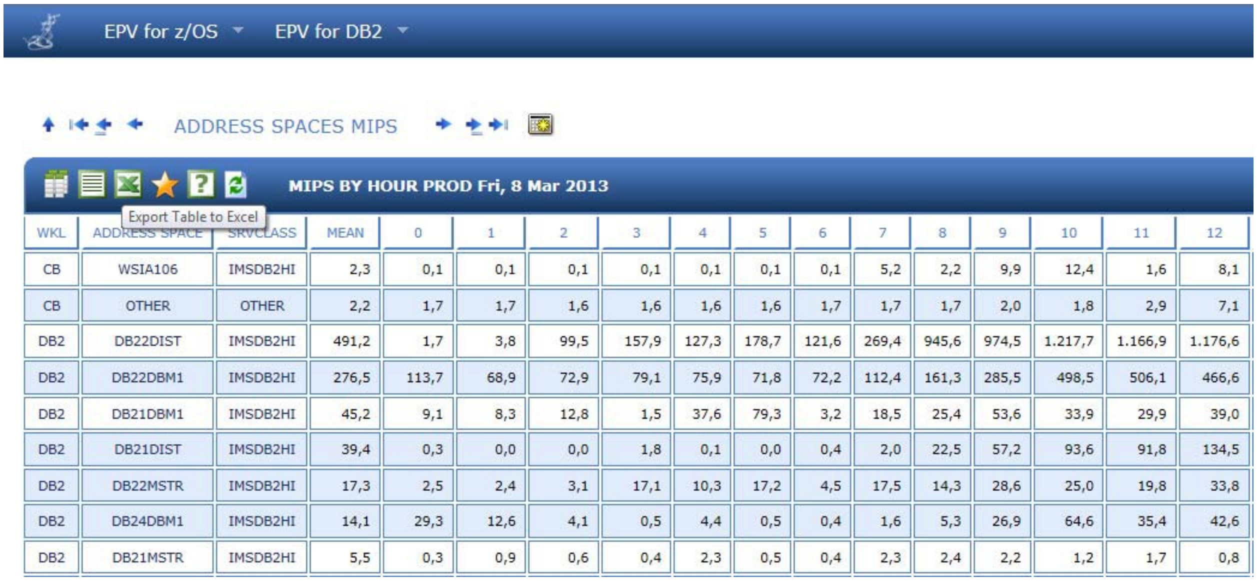
3 Exploiting the EPV HTML pages

EPV products provide a very simple and effective way to export data to Excel to produce high quality graphs and reports: the base and advanced export functions.

We will show how to exploit these functions by using an example based on one of the most important **EPV for z/OS**[1] views. The same concepts apply to any other EPV product and view[2] .

3.1 Base export function

The Address Spaces MIPS view shows the CPU consumptions hourly profile (in MIPS) of all the address spaces running in the system[3] .



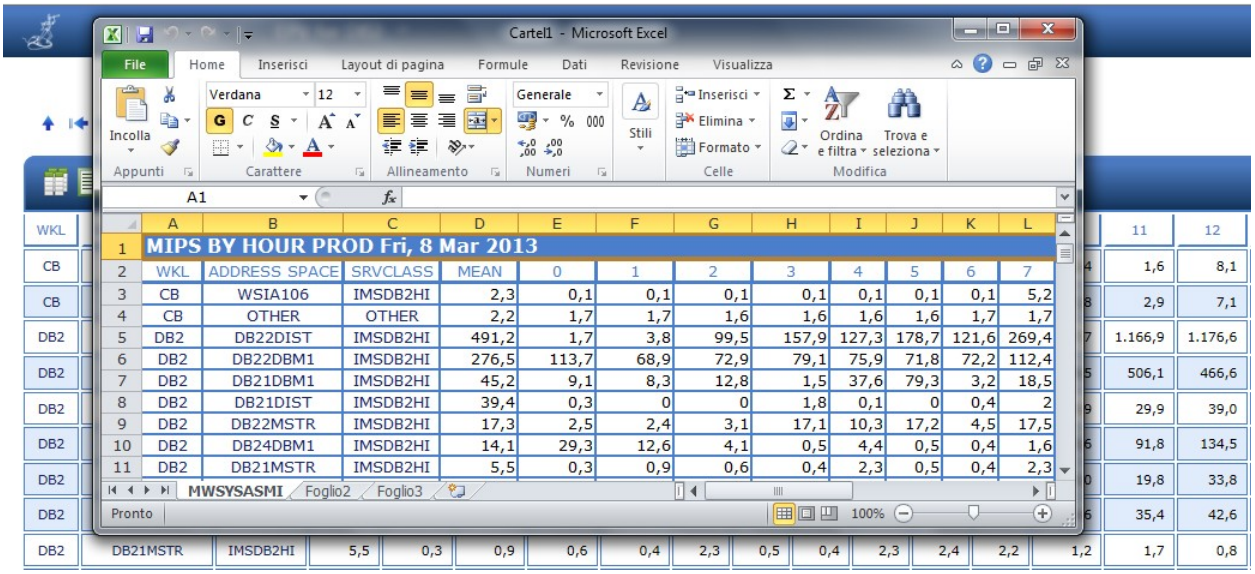
MIPS BY HOUR PROD Fri, 8 Mar 2013

WKL	ADDRESS SPACE	SRVCLASS	MEAN	0	1	2	3	4	5	6	7	8	9	10	11	12
CB	WSIA106	IMSDB2HI	2,3	0,1	0,1	0,1	0,1	0,1	0,1	0,1	5,2	2,2	9,9	12,4	1,6	8,1
CB	OTHER	OTHER	2,2	1,7	1,7	1,6	1,6	1,6	1,6	1,7	1,7	1,7	2,0	1,8	2,9	7,1
DB2	DB22DIST	IMSDB2HI	491,2	1,7	3,8	99,5	157,9	127,3	178,7	121,6	269,4	945,6	974,5	1.217,7	1.166,9	1.176,6
DB2	DB22DBM1	IMSDB2HI	276,5	113,7	68,9	72,9	79,1	75,9	71,8	72,2	112,4	161,3	285,5	498,5	506,1	466,6
DB2	DB21DBM1	IMSDB2HI	45,2	9,1	8,3	12,8	1,5	37,6	79,3	3,2	18,5	25,4	53,6	33,9	29,9	39,0
DB2	DB21DIST	IMSDB2HI	39,4	0,3	0,0	0,0	1,8	0,1	0,0	0,4	2,0	22,5	57,2	93,6	91,8	134,5
DB2	DB22MSTR	IMSDB2HI	17,3	2,5	2,4	3,1	17,1	10,3	17,2	4,5	17,5	14,3	28,6	25,0	19,8	33,8
DB2	DB24DBM1	IMSDB2HI	14,1	29,3	12,6	4,1	0,5	4,4	0,5	0,4	1,6	5,3	26,9	64,6	35,4	42,6
DB2	DB21MSTR	IMSDB2HI	5,5	0,3	0,9	0,6	0,4	2,3	0,5	0,4	2,3	2,4	2,2	1,2	1,7	0,8

Figure 1

By clicking the Excel icon in the view's header we get the result shown on the next page in Figure 2.

[1] EPV for z/OS is stand-alone product, distributed in North America by SEGUS Inc
[2] A "view" is an EPV report presented in an HTML page.
[3] Address spaces can be aggregated under OTHER if their consumptions are below a customizable threshold.



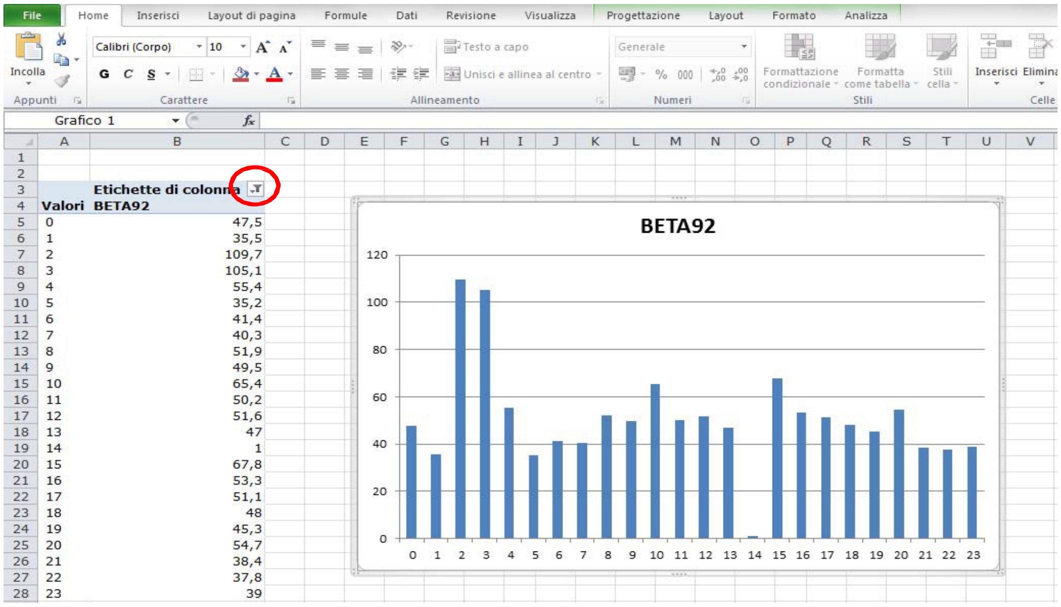
	A	B	C	D	E	F	G	H	I	J	K	L
1	MIPS BY HOUR PROD Fri, 8 Mar 2013											
2	WKL	ADDRESS SPACE	SRVCLASS	MEAN	0	1	2	3	4	5	6	7
3	CB	WSIA106	IMSDB2HI	2,3	0,1	0,1	0,1	0,1	0,1	0,1	0,1	5,2
4	CB	OTHER	OTHER	2,2	1,7	1,7	1,6	1,6	1,6	1,6	1,7	1,7
5	DB2	DB22DIST	IMSDB2HI	491,2	1,7	3,8	99,5	157,9	127,3	178,7	121,6	269,4
6	DB2	DB22DBM1	IMSDB2HI	276,5	113,7	68,9	72,9	79,1	75,9	71,8	72,2	112,4
7	DB2	DB21DBM1	IMSDB2HI	45,2	9,1	8,3	12,8	1,5	37,6	79,3	3,2	18,5
8	DB2	DB21DIST	IMSDB2HI	39,4	0,3	0	0	1,8	0,1	0	0,4	2
9	DB2	DB22MSTR	IMSDB2HI	17,3	2,5	2,4	3,1	17,1	10,3	17,2	4,5	17,5
10	DB2	DB24DBM1	IMSDB2HI	14,1	29,3	12,6	4,1	0,5	4,4	0,5	0,4	1,6
11	DB2	DB21MSTR	IMSDB2HI	5,5	0,3	0,9	0,6	0,4	2,3	0,5	0,4	2,3

WKL	11	12
CB	1,6	8,1
CB	2,9	7,1
DB2	1.166,9	1.176,6
DB2	506,1	466,6
DB2	29,9	39,0
DB2	91,8	134,5
DB2	19,8	33,8
DB2	35,4	42,6
DB2	1,7	0,8

DB2 DB21MSTR IMSDB2HI 5,5 0,3 0,9 0,6 0,4 2,3 0,5 0,4 2,3 2,4 2,2 1,2 1,7 0,8

Figure 2

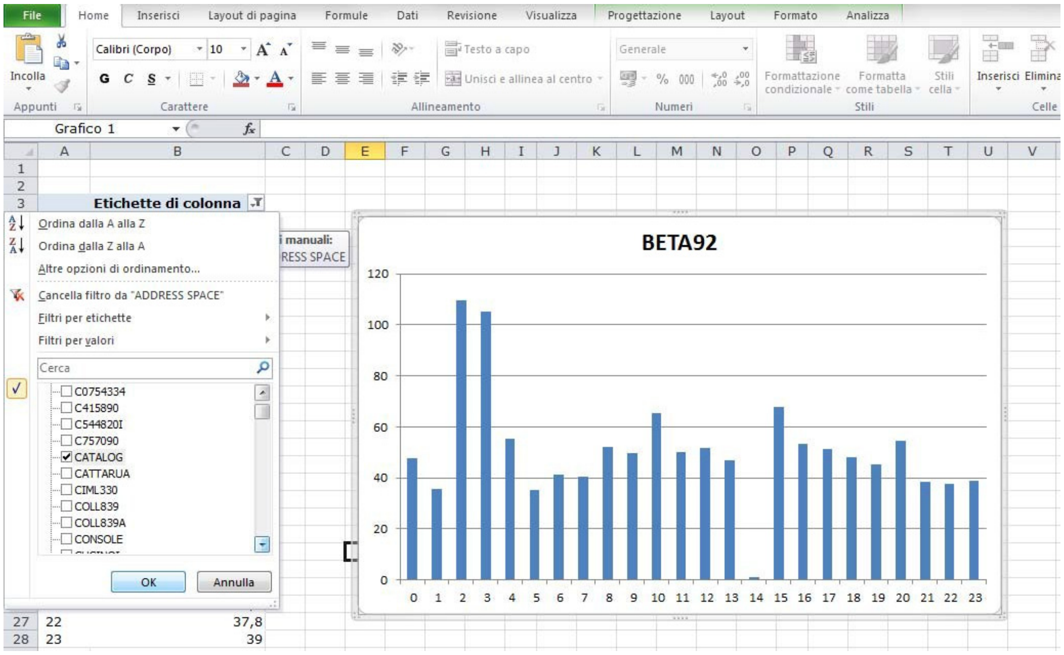
A new Excel file is created, and all the view data is copied to it in just a couple of seconds. Now, by exploiting the power of pivot tables, we can easily create a report like the one shown in Figure 3 below.



	A	B
1		
2		
3		Etichette di colonna
4	Valori	BETA92
5	0	47,5
6	1	35,5
7	2	109,7
8	3	105,1
9	4	55,4
10	5	35,2
11	6	41,4
12	7	40,3
13	8	51,9
14	9	49,5
15	10	65,4
16	11	50,2
17	12	51,6
18	13	47
19	14	1
20	15	67,8
21	16	53,3
22	17	51,1
23	18	48
24	19	45,3
25	20	54,7
26	21	38,4
27	22	37,8
28	23	39

Figure 3

The red circle highlights the pivot filter we can use to choose the address space we want to analyze. In this example we focused on the BETA92 address space.

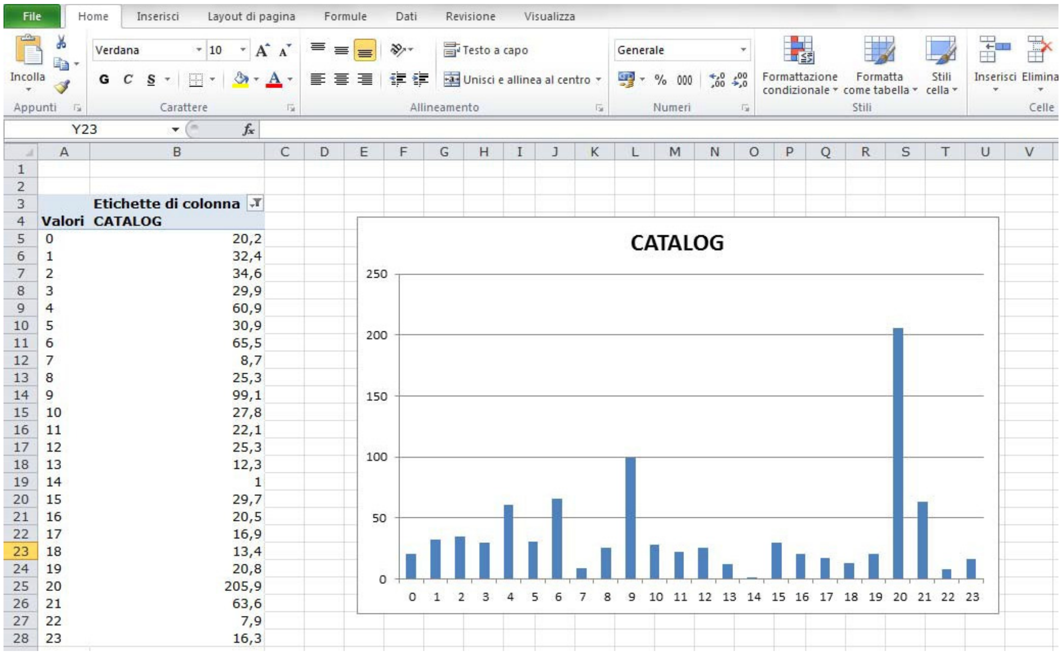


☐ C0754334
☐ C415890
☐ C544820I
☐ C757090
☑ CATALOG
☐ CATTARUA
☐ CIML330
☐ COLL839
☐ COLL839A
☐ CONSOLE

	A	B
27	22	37,8
28	23	39

Figure 4

By using the pivot filtering we can easily switch to another address space. We are now focusing on the CATALOG. The result is shown in Figure 5[4].



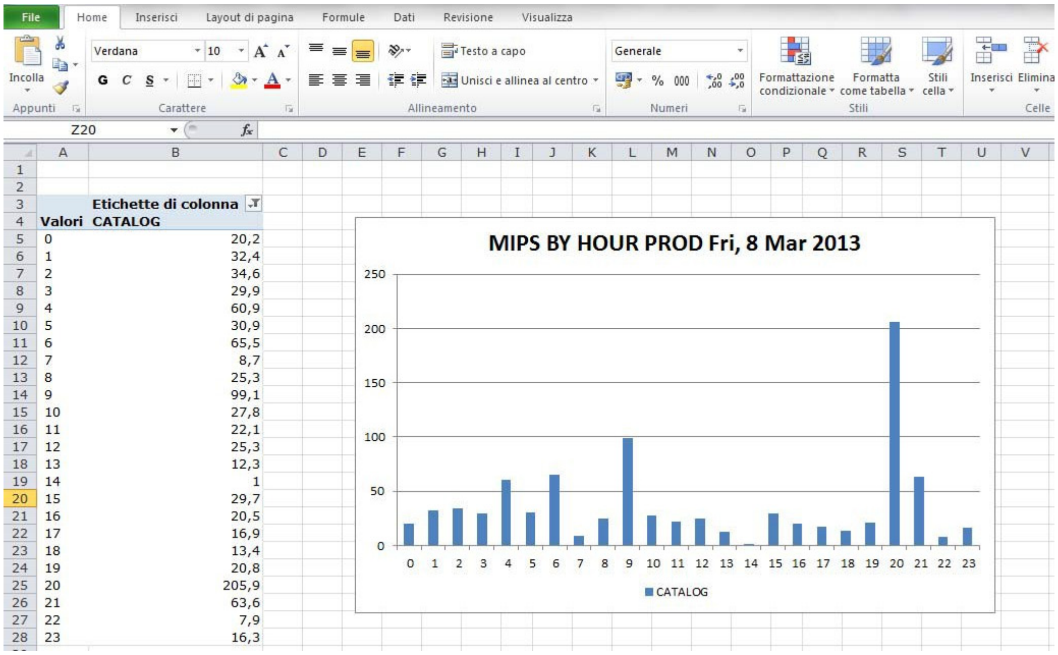
	A	B
1		
2		
3		Etichette di colonna
4	Valori	CATALOG
5	0	20,2
6	1	32,4
7	2	34,6
8	3	29,9
9	4	60,9
10	5	30,9
11	6	65,5
12	7	8,7
13	8	25,3
14	9	99,1
15	10	27,8
16	11	22,1
17	12	25,3
18	13	12,3
19	14	1
20	15	29,7
21	16	20,5
22	17	16,9
23	18	13,4
24	19	20,8
25	20	205,9
26	21	63,6
27	22	7,9
28	23	16,3

Figure 5

[4] Excel and Windows will always use the local language, currency and date settings on your PC. These results were produced in Italy and may be different from yours.

As you can see, producing a graph for any address space takes just a matter of seconds.

We can improve our graph a little bit more by adding a legend with the address space name and by inserting a title showing system and date (the title in this example is automatically taken from the view header, located in the first cell of the sheet created at export, as shown in Figure 2).



	Etichette di colonna
Valori	CATALOG
0	20,2
1	32,4
2	34,6
3	29,9
4	60,9
5	30,9
6	65,5
7	8,7
8	25,3
9	99,1
10	27,8
11	22,1
12	25,3
13	12,3
14	1
15	29,7
16	20,5
17	16,9
18	13,4
19	20,8
20	205,9
21	63,6
22	7,9
23	16,3

Figure 6

3.2 Advanced export function

Once the Excel pivot and graph have been created, as shown above, it would be great if we could use them to analyze the address spaces of any day and system – without the need for further manipulation.
This is exactly the goal of the advanced export function.

When the Excel icon is clicked, EPV performs the following actions:

- it checks if there is a Windows environment variable named EPVXCL which contains a valid path; if not it runs the base export function;
- it uses that path to point to a folder and search for an Excel file[5] which has the same name as the view you are exporting[6]; if not it runs the base export function;
- it opens that file and copies the view data to the first sheet; this is the first step of the advanced export function;
- it checks if a macro named EPVEXEC exists; if yes, it runs the macro; this is the second and last step of the advanced export function.

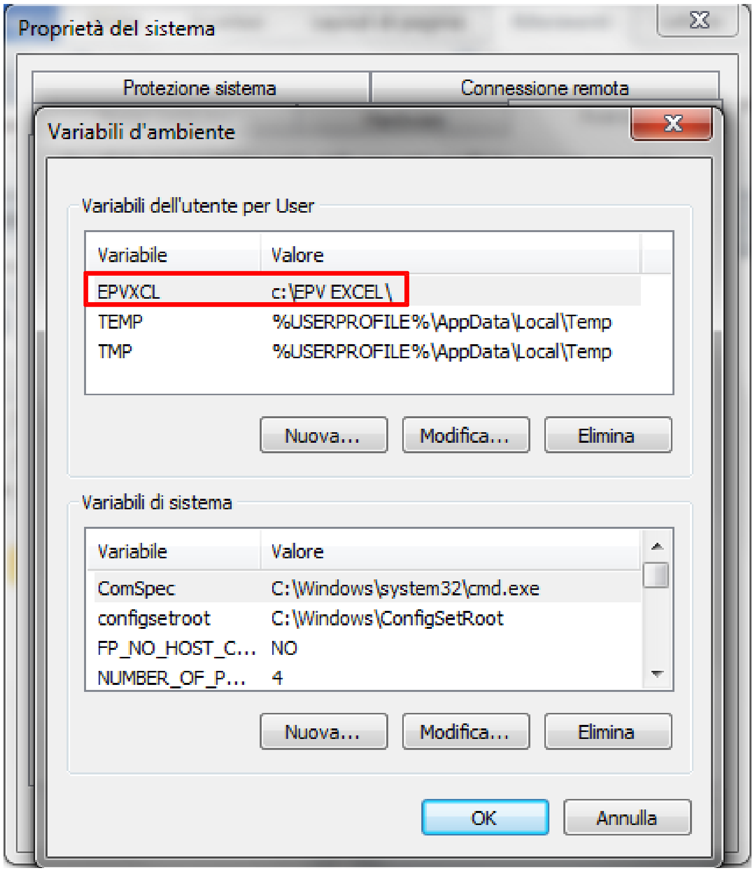
[5] The xlsm, xlsx and xls extensions are searched in this order.
[6] Each EPV view has an associated standard name; this is the name associated with the first sheet when the base export function is used (see Figure 2).

So to re-use the graphs and reports in our example we have to:

- save the Excel file as MWSYSASMI.xls in a folder, (e.g. EPV EXCEL);
- set a Windows environment variable named EPVXCL pointing to that folder.

To set the variable we have to follow this path:

Control panel ➔ System ➔ Advanced tab ➔ Environment Variables



Variabili dell'utente per User

Variabile	Valore
EPVXCL	c:\EPV EXCEL\
TEMP	%USERPROFILE%\AppData\Local\Temp
TMP	%USERPROFILE%\AppData\Local\Temp

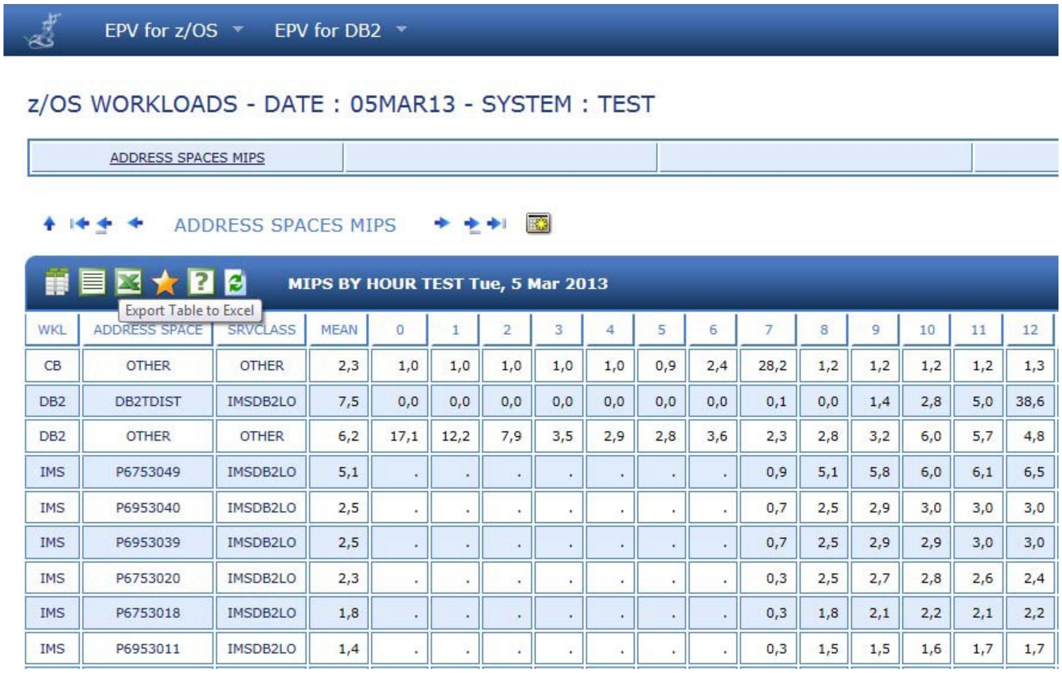
Variabili di sistema

Variabile	Valore
ComSpec	C:\Windows\system32\cmd.exe
configsetroot	C:\Windows\ConfigSetRoot
FP_NO_HOST_C...	NO
NUMBER_OF_P...	4

Figure 7

Now MWSYSASMI.xls can be used to analyze address spaces CPU consumption on any day and on any system.

As you can see in Figure 8 (next page), we chose the TEST system on March 5th, 2013.



z/OS WORKLOADS - DATE : 05MAR13 - SYSTEM : TEST

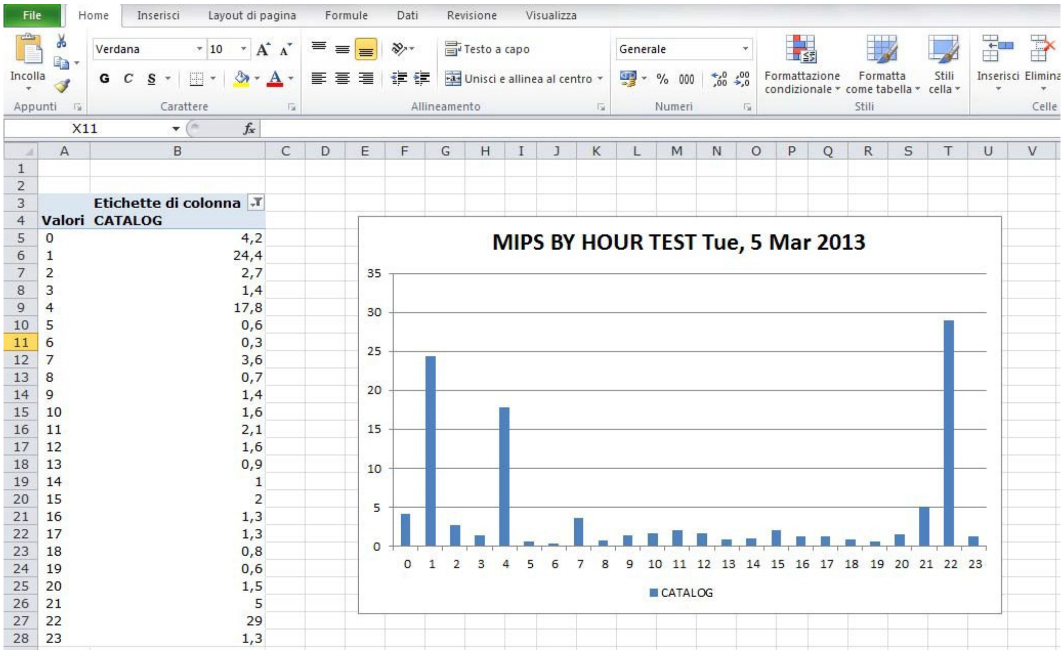
ADDRESS SPACES MIPS

MIPS BY HOUR TEST Tue, 5 Mar 2013

WKL	ADDRESS SPACE	SRVCLASS	MEAN	0	1	2	3	4	5	6	7	8	9	10	11	12
CB	OTHER	OTHER	2,3	1,0	1,0	1,0	1,0	1,0	0,9	2,4	28,2	1,2	1,2	1,2	1,2	1,3
DB2	DB2TDIST	IMSDB2LO	7,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	1,4	2,8	5,0	38,6
DB2	OTHER	OTHER	6,2	17,1	12,2	7,9	3,5	2,9	2,8	3,6	2,3	2,8	3,2	6,0	5,7	4,8
IMS	P6753049	IMSDB2LO	5,1	.	.	.	.	.	.	.	0,9	5,1	5,8	6,0	6,1	6,5
IMS	P6953040	IMSDB2LO	2,5	.	.	.	.	.	.	.	0,7	2,5	2,9	3,0	3,0	3,0
IMS	P6953039	IMSDB2LO	2,5	.	.	.	.	.	.	.	0,7	2,5	2,9	2,9	3,0	3,0
IMS	P6753020	IMSDB2LO	2,3	.	.	.	.	.	.	.	0,3	2,5	2,7	2,8	2,6	2,4
IMS	P6753018	IMSDB2LO	1,8	.	.	.	.	.	.	.	0,3	1,8	2,1	2,2	2,1	2,2
IMS	P6953011	IMSDB2LO	1,4	.	.	.	.	.	.	.	0,3	1,5	1,5	1,6	1,7	1,7

Figure 8

By clicking the Excel icon, the MWSYSASMI.xls file is opened and the new data is copied to the first sheet.



	Etichette di colonna
Valori	CATALOG
0	4,2
1	24,4
2	2,7
3	1,4
4	17,8
5	0,6
6	0,3
7	3,6
8	0,7
9	1,4
10	1,6
11	2,1
12	1,6
13	0,9
14	1
15	2
16	1,3
17	1,3
18	0,8
19	0,6
20	1,5
21	5
22	29
23	1,3

Figure 9

To refresh the pivot data and automatically graph it, we also created a simple EPVEXEC macro inside MSYSASMI.xls:

```
Sub EPVEXEC()
`
`EPVEXEC Macro
`
     ActiveSheet.PivotTables("Tabella_pivot1").PivotSelect "", xlDataAndLabel, True
     ActiveSheet.PivotTables("Tabella_pivot1").PivotCache.Refresh
End Sub
```

4 Preparing the environment before querying the EPV DBs

In this chapter we will demonstrate how to prepare the environment on your PC in order to query the EPV DBs directly from MS-Excel.

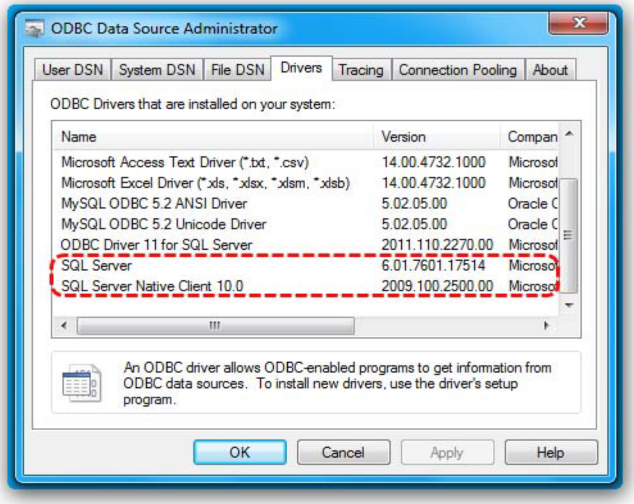
EPV supports two DBMS:

- SQL Server,
- MySQL.

4.1 SQL Server

If using SQL Server, you will only have to check to see if the SQL Server ODBC drivers are installed:

- go to the Control Panel,
- open the Administrative tools,
- double click on the Data Sources (ODBC) icon.



ODBC Drivers that are installed on your system:

Name	Version	Compan
Microsoft Access Text Driver (*.txt, *.csv)	14.00.4732.1000	Microsol
Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.xlsb)	14.00.4732.1000	Microsol
MySQL ODBC 5.2 ANSI Driver	5.02.05.00	Oracle C
MySQL ODBC 5.2 Unicode Driver	5.02.05.00	Oracle C
ODBC Driver 11 for SQL Server	2011.110.2270.00	Microsol
SQL Server	6.01.7601.17514	Microso
SQL Server Native Client 10.0	2009.100.2500.00	Microso

An ODBC driver allows ODBC-enabled programs to get information from ODBC data sources. To install new drivers, use the driver's setup program.

Figure 10

In the example shown in Figure 10, the SQL Server drivers are already installed.

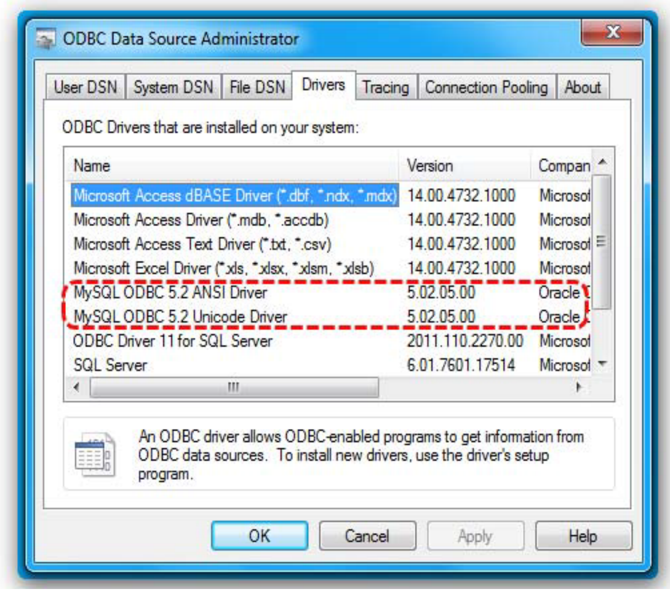
If you don’t find an SQL Server driver in the list, you can download them from:

http://www.microsoft.com/en-us/download/details.aspx?id=36434

4.2 MySQL

If using MySQL, check if the MySQL ODBC drivers are installed:

- go to the Control Panel,
- open the Administrative tools,
- double click on the Data Sources (ODBC) icon.



ODBC Drivers that are installed on your system:

Name	Version	Compan
Microsoft Access dBASE Driver (*.dbf, *.ndx, *.mdx)	14.00.4732.1000	Microsof
Microsoft Access Driver (*.mdb, *.accdb)	14.00.4732.1000	Microsof
Microsoft Access Text Driver (*.txt, *.csv)	14.00.4732.1000	Microsof
Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.xlsb)	14.00.4732.1000	Microsof
MySQL ODBC 5.2 ANSI Driver	5.02.05.00	Oracle
MySQL ODBC 5.2 Unicode Driver	5.02.05.00	Oracle
ODBC Driver 11 for SQL Server	2011.110.2270.00	Microsof
SQL Server	6.01.7601.17514	Microsof

An ODBC driver allows ODBC-enabled programs to get information from ODBC data sources. To install new drivers, use the driver's setup program.

Figure 11

In the example shown in Figure 11 above, the MySQL drivers are installed.

If you don’t find a MySQL driver installed you can download them from:

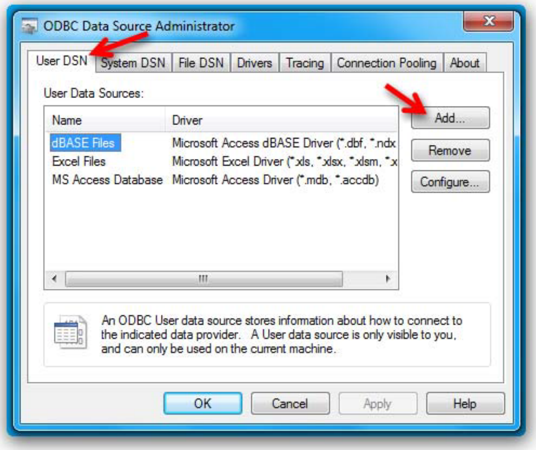
http://dev.mysql.com/downloads/connector/odbc/

Once the MySQL drivers are installed, create a Data Source connection[7] to MySQL.
In order to create this connection you must define a new Data Source:

- go to the Control Panel,
- open the Administrative tools,
- double click the Data Sources (ODBC) icon.

[7] A Data Source provides all the connection properties required to connect to a DB.

You will see the window in Figure 12.



ODBC Data Source Administrator

User DSN | System DSN | File DSN | Drivers | Tracing | Connection Pooling | About

User Data Sources:

Name	Driver
dBASE Files	Microsoft Access dBASE Driver (*.dbf, *.ndx
Excel Files	Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.x
MS Access Database	Microsoft Access Driver (*.mdb, *.accdb)

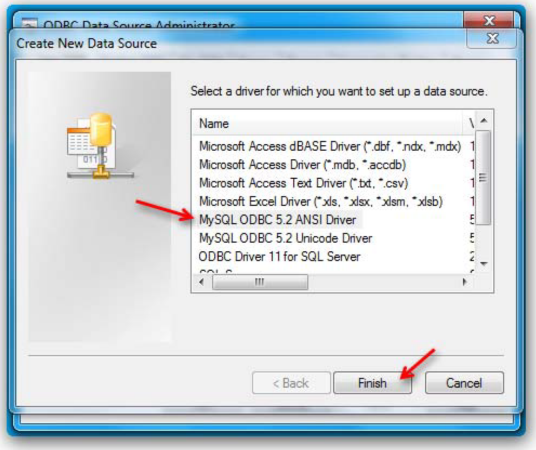
An ODBC User data source stores information about how to connect to the indicated data provider. A User data source is only visible to you, and can only be used on the current machine.

Figure 12

Next:

- select the "User DSN tab",
- click on the "Add" button.

To see the window in Figure 13.



Create New Data Source

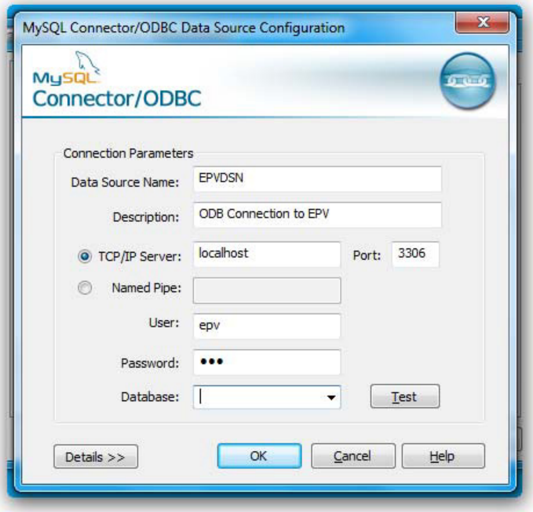
Select a driver for which you want to set up a data source.

Name
Microsoft Access dBASE Driver (*.dbf, *.ndx, *.mdx)
Microsoft Access Driver (*.mdb, *.accdb)
Microsoft Access Text Driver (*.txt, *.csv)
Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.xlsb)
MySQL ODBC 5.2 ANSI Driver
MySQL ODBC 5.2 Unicode Driver
ODBC Driver 11 for SQL Server

Figure 13

Now select the MySQL ODBC driver and click the "Finish" button.

The MySQL Connector/ODBC Data Source Configuration panel should appear (see Figure 14).



Connection Parameters

Data Source Name: EPVDSN

Description: ODB Connection to EPV

● TCP/IP Server: localhost Port: 3306

○ Named Pipe:

User: epv

Password: •••

Database:

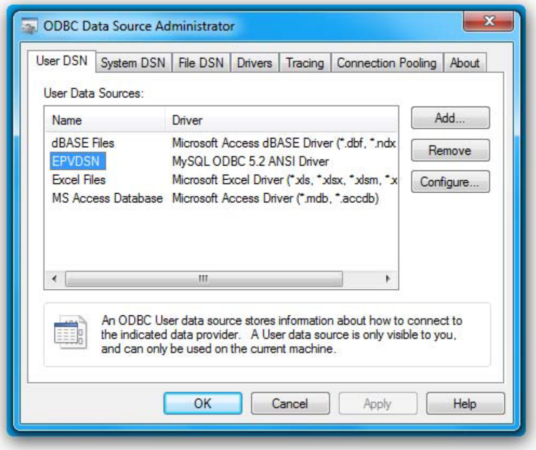
Figure 14

Provide the following parameters:

- Data Source Name (EPVDSN in this example),
- TCP/IP Server (name or IP Address of the MySQL Server),
- User (user name),
- Password,

and click OK.

The new EPVDSN Data Source is now configured. It can be used to perform the connection to MySQL Server from MS-Excel (see Figure 15 on the next page).



User Data Sources:

Name	Driver
dBASE Files	Microsoft Access dBASE Driver (*.dbf, *.ndx
EPVDSN	MySQL ODBC 5.2 ANSI Driver
Excel Files	Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.x
MS Access Database	Microsoft Access Driver (*.mdb, *.accdb)

An ODBC User data source stores information about how to connect to the indicated data provider. A User data source is only visible to you, and can only be used on the current machine.

Figure 15

5 Querying the EPV DBs

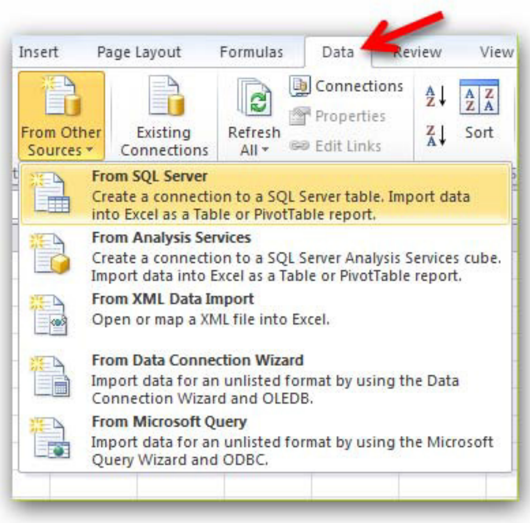
Once the environment has been prepared, you can query the EPV DB using the standard features provided by MS-Excel.

All of the following examples have been produced by using Microsoft Office 2010.

5.1 Connecting to SQL Server

In this chapter we will show how to define a connection using SQL Server and how to import an EPV table from SQL Server to MS-Excel.
This example refers to the DB2 Accounting data table (DB2ACCT) provided by EPV for DB2 Plus V7.

Verify that SQL Server is running, then from the MS-Excel Menu choose “Data”, “From Other Sources”, “From SQL Server” as shown in Figure 16.



From SQL Server
Create a connection to a SQL Server table. Import data into Excel as a Table or PivotTable report.

From Analysis Services
Create a connection to a SQL Server Analysis Services cube. Import data into Excel as a Table or PivotTable report.

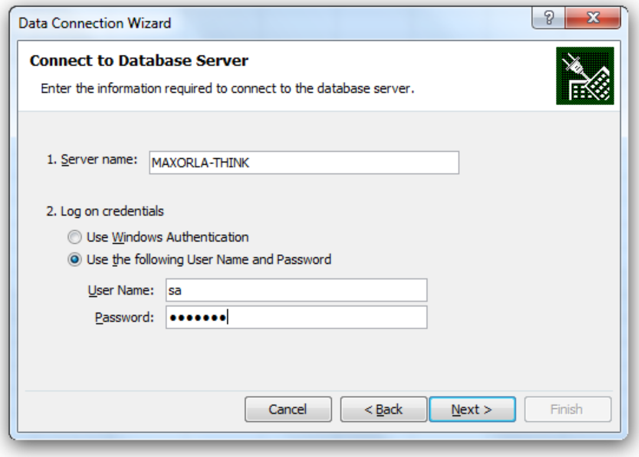
From XML Data Import
Open or map a XML file into Excel.

From Data Connection Wizard
Import data for an unlisted format by using the Data Connection Wizard and OLEDB.

From Microsoft Query
Import data for an unlisted format by using the Microsoft Query Wizard and ODBC.

Figure 16

The window in Figure 17 appears.



Connect to Database Server

Enter the information required to connect to the database server.

1. Server name: MAXORLA-THINK

2. Log on credentials

○ Use Windows Authentication
● Use the following User Name and Password

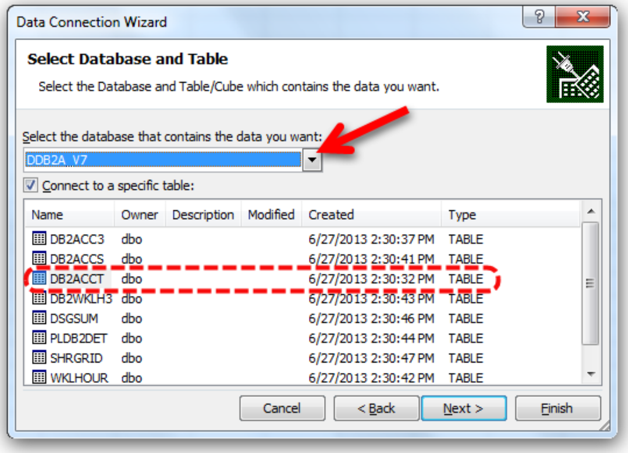
User Name: sa
Password: •••••••

Figure 17

Insert the following data:

- Server Name,
- Logon credentials (User Name, Password),

then click Next.



Data Connection Wizard

Select Database and Table

Select the Database and Table/Cube which contains the data you want.

Select the database that contains the data you want:

DDB2A_V7

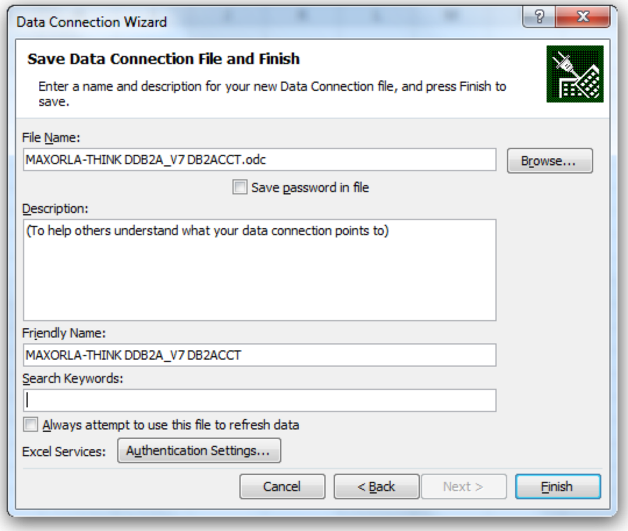
☑ Connect to a specific table:

Name	Owner	Description	Modified	Created	Type
DB2ACC3	dbo			6/27/2013 2:30:37 PM	TABLE
DB2ACCS	dbo			6/27/2013 2:30:41 PM	TABLE
DB2ACCT	dbo			6/27/2013 2:30:32 PM	TABLE
DB2WKLH3	dbo			6/27/2013 2:30:43 PM	TABLE
DSGSUM	dbo			6/27/2013 2:30:46 PM	TABLE
PLDB2DET	dbo			6/27/2013 2:30:44 PM	TABLE
SHRGRID	dbo			6/27/2013 2:30:47 PM	TABLE
WKLHOUR	dbo			6/27/2013 2:30:42 PM	TABLE

Figure 18

The list of the SQL Server DBs is displayed. Now choose the EPV database and table you want to query, (DDB2A_V7 DB and DB2ACCT table in this example).

Optionally, you can modify the name of the connection and add a description, then click the "Finish" button.



Data Connection Wizard

Save Data Connection File and Finish

Enter a name and description for your new Data Connection file, and press Finish to save.

File Name:

MAXORLA-THINK DDB2A_V7 DB2ACCT.odc

□ Save password in file

Description:

(To help others understand what your data connection points to)

Friendly Name:

MAXORLA-THINK DDB2A_V7 DB2ACCT

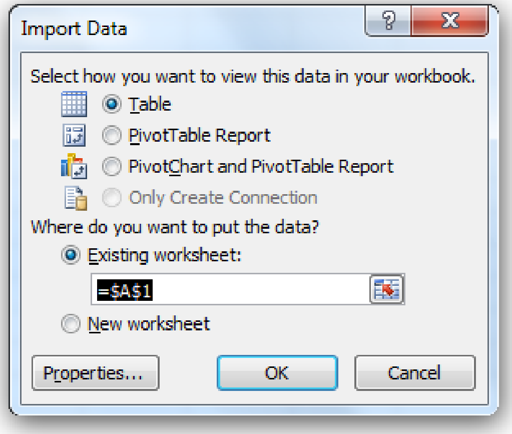
Search Keywords:

□ Always attempt to use this file to refresh data

Excel Services:

Figure 19

Finally, choose into which MS-Excel worksheet you want to put the table data.



Import Data

Select how you want to view this data in your workbook.

- ● Table
- ○ PivotTable Report
- ○ PivotChart and PivotTable Report
- ○ Only Create Connection

Where do you want to put the data?

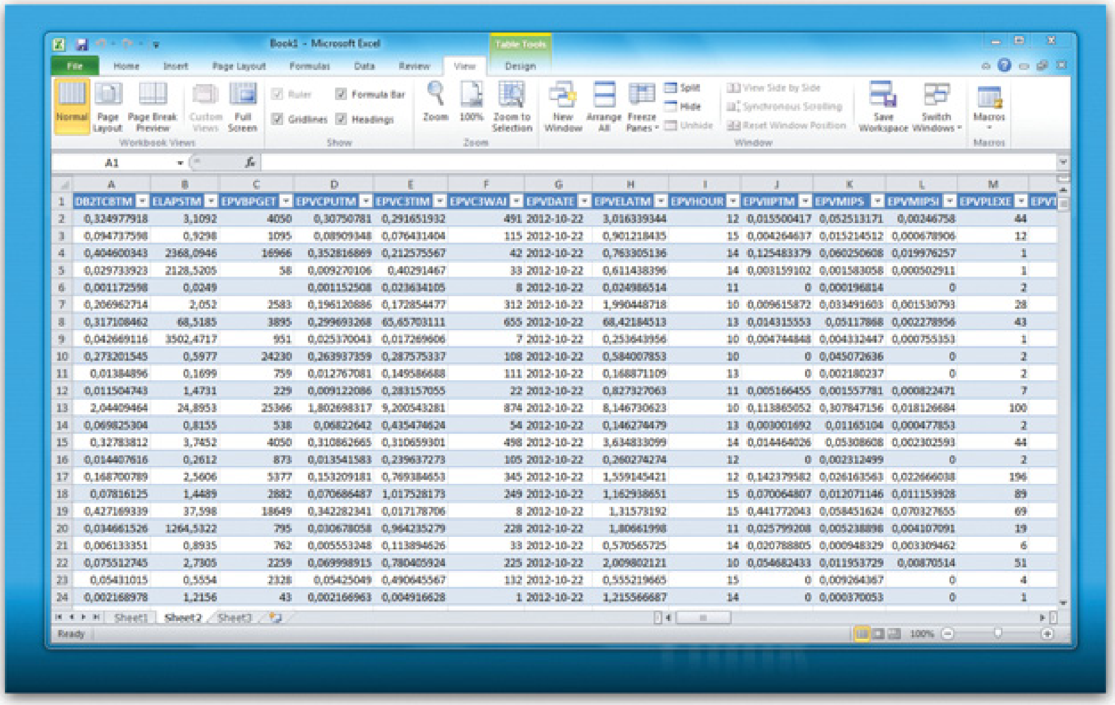
- ● Existing worksheet:

=$A$1

- ○ New worksheet

Figure 20

The result should look similar to the one presented in the next figure. All of the DB2ACCT table data has been imported into MS-Excel.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	DB2TCBTM	ELAPSTM	EPVBPGET	EPVCPUTM	EPVC3TIM	EPVC3WAI	EPVDATE	EPVELATM	EPVHOUR	EPVIIPTM	EPVMIPS	EPVMIPSI	EPVPLEXE
2	0,324977918	3,1092	4050	0,30750781	0,291651932	491	2012-10-22	3,016339344	12	0,015500417	0,052513171	0,00246758	44
3	0,094737598	0,9298	1095	0,08909348	0,076431404	115	2012-10-22	0,901218435	15	0,004264637	0,015214512	0,000678906	12
4	0,404600343	2368,0946	16966	0,352816869	0,212575567	42	2012-10-22	0,763305136	14	0,125483379	0,060250608	0,019976257	1
5	0,029733923	2128,5205	58	0,009270106	0,40291467	33	2012-10-22	0,611438396	14	0,003159102	0,001583058	0,000502911	1
6	0,001172598	0,0249		0,001152508	0,023634105	8	2012-10-22	0,024986514	11	0	0,000196814	0	2
7	0,206962714	2,052	2583	0,196120886	0,172854477	312	2012-10-22	1,990448718	10	0,009615872	0,033491603	0,001530793	28
8	0,317108462	68,5185	3895	0,299693268	65,65703111	655	2012-10-22	68,42184513	13	0,014315553	0,05117868	0,002278956	43
9	0,042669116	3502,4717	951	0,025370043	0,017269606	7	2012-10-22	0,253643956	10	0,004744848	0,004332447	0,000755353	1
10	0,273201545	0,5977	24230	0,263937359	0,287575337	108	2012-10-22	0,584007853	10	0	0,045072636	0	2
11	0,01384896	0,1699	759	0,012767081	0,149586688	111	2012-10-22	0,168871109	13	0	0,002180237	0	2
12	0,011504743	1,4731	229	0,009122086	0,283157055	22	2012-10-22	0,827327063	11	0,005166455	0,001557781	0,000822471	7
13	2,04409464	24,8953	25366	1,802698317	9,200543281	874	2012-10-22	8,146730623	10	0,113865052	0,307847156	0,018126684	100
14	0,069825304	0,8155	538	0,06822642	0,435474624	54	2012-10-22	0,146274479	13	0,003001692	0,01165104	0,000477853	2
15	0,32783812	3,7452	4050	0,310862665	0,310659301	498	2012-10-22	3,634833099	14	0,014464026	0,05308608	0,002302593	44
16	0,014407616	0,2612	873	0,013541583	0,239637273	105	2012-10-22	0,260274274	12	0	0,002312499	0	2
17	0,168700789	2,5606	5377	0,153209181	0,769384653	345	2012-10-22	1,559145421	12	0,142379582	0,026163563	0,022666038	196
18	0,07816125	1,4489	2882	0,070686487	1,017528173	249	2012-10-22	1,162938651	15	0,070064807	0,012071146	0,011153928	89
19	0,427169339	37,598	18649	0,342282341	0,017178706	8	2012-10-22	1,31573192	15	0,441772043	0,058451624	0,070327655	69
20	0,034661526	1264,5322	795	0,030678058	0,964235279	228	2012-10-22	1,80661998	11	0,025799208	0,005238898	0,004107091	19
21	0,006133351	0,8935	762	0,005553248	0,113894626	33	2012-10-22	0,570565725	14	0,020788805	0,000948329	0,003309462	6
22	0,075512745	2,7305	2259	0,069998915	0,780405924	225	2012-10-22	2,009802121	10	0,054682433	0,011953729	0,00870514	51
23	0,05431015	0,5554	2328	0,05425049	0,490645567	132	2012-10-22	0,555219665	15	0	0,009264367	0	4
24	0,002168978	1,2156	43	0,002166963	0,004916628	1	2012-10-22	1,215566687	14	0	0,000370053	0	1

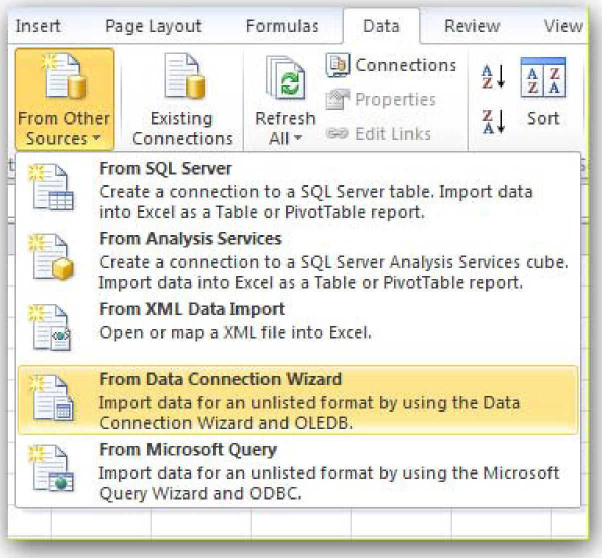
Figure 21

Now all of the standard MS-Excel features such as filtering, sorting, etc. are available for you to use.

5.2 Connecting to MySQL

In this chapter we will show how to define a connection using MySQL, how to import an EPV table from MySQL to MS-Excel, and how to exploit one of the most powerful functionalities of MS-Excel: the pivot tables.
This example shows how to query the Job Accounting data table (asload) provided by EPV for z/OS Plus V10.

First, verify that MySQL is running. Then from the MS-Excel Menu choose “Data”, “From Other Sources”, “From Data Connection Wizard” as shown in Figure 22.



From SQL Server
Create a connection to a SQL Server table. Import data into Excel as a Table or PivotTable report.

From Analysis Services
Create a connection to a SQL Server Analysis Services cube. Import data into Excel as a Table or PivotTable report.

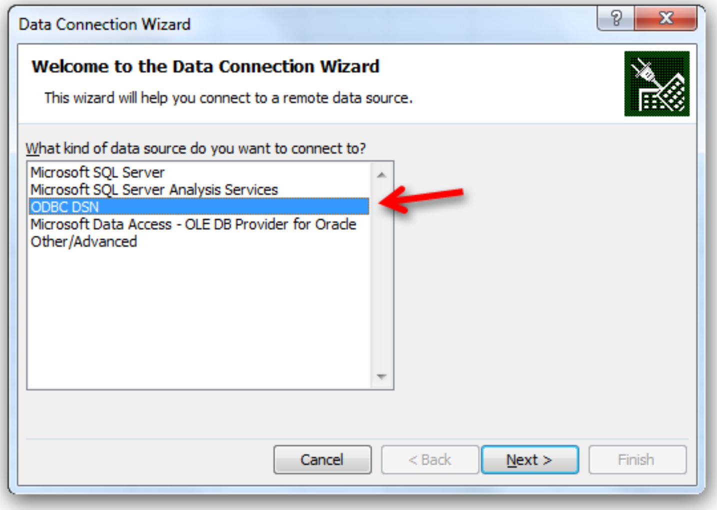
From XML Data Import
Open or map a XML file into Excel.

From Data Connection Wizard
Import data for an unlisted format by using the Data Connection Wizard and OLEDB.

From Microsoft Query
Import data for an unlisted format by using the Microsoft Query Wizard and ODBC.

Figure 22

To see Figure 23.



Welcome to the Data Connection Wizard

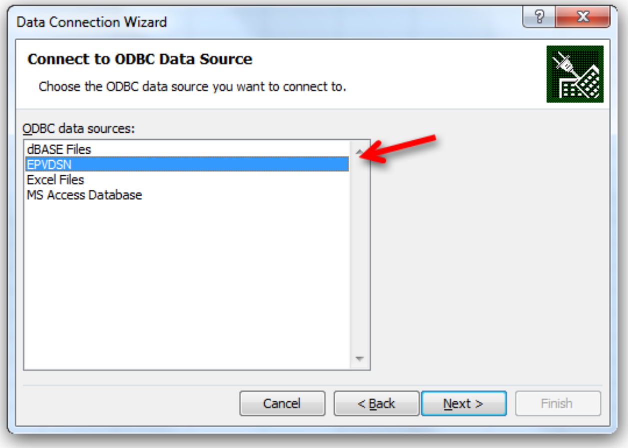
This wizard will help you connect to a remote data source.

What kind of data source do you want to connect to?

- Microsoft SQL Server
- Microsoft SQL Server Analysis Services
- ODBC DSN
- Microsoft Data Access - OLE DB Provider for Oracle
- Other/Advanced

Figure 23

Select the ODBC DSN data source then click Next.



Connect to ODBC Data Source

Choose the ODBC data source you want to connect to.

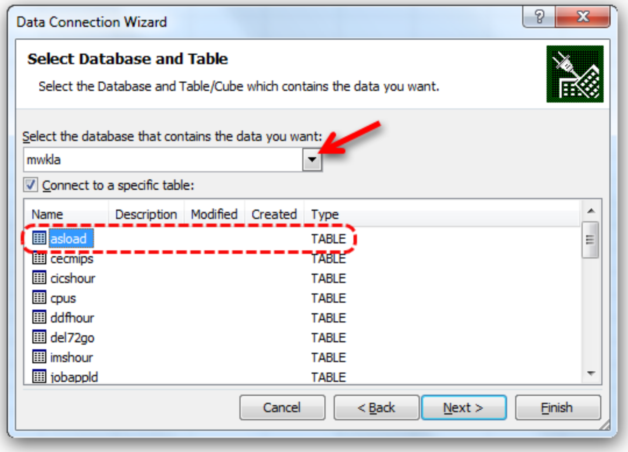
ODBC data sources:

- dBASE Files
- EPVDSN
- Excel Files
- MS Access Database

Figure 24

Select EPVDSN and then click Next.

The list of the MySQL DBs is displayed. Now choose the EPV database and table you want to query (mwkla DB and asload table in this example).



Select Database and Table

Select the Database and Table/Cube which contains the data you want.

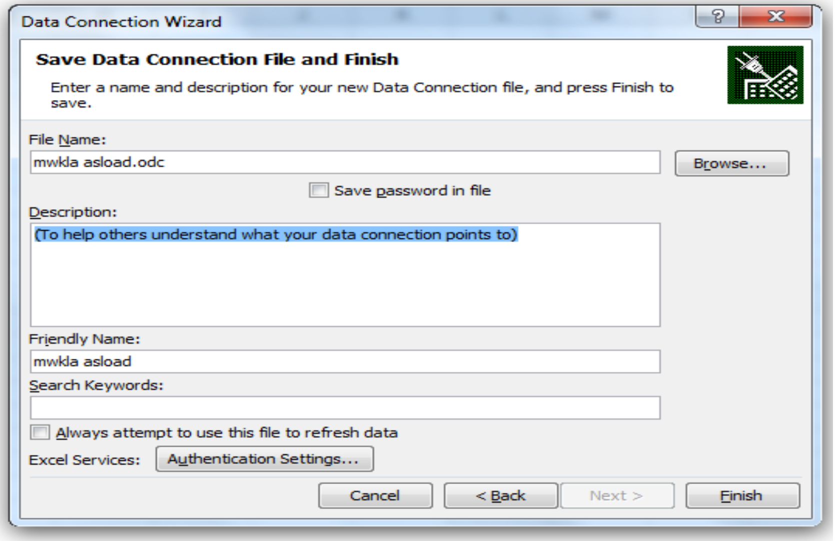
Select the database that contains the data you want: mwkla

☑ Connect to a specific table:

Name	Description	Modified	Created	Type
asload				TABLE
cecmips				TABLE
cicshour				TABLE
cpus				TABLE
ddfhour				TABLE
del72go				TABLE
imshour				TABLE
jobappld				TABLE

Figure 25

Optionally, you can modify the name of the connection and enter a description, then click the “Finish” button.



Data Connection Wizard

Save Data Connection File and Finish

Enter a name and description for your new Data Connection file, and press Finish to save.

File Name: mwkla asload.odc

□ Save password in file

Description: (To help others understand what your data connection points to)

Friendly Name: mwkla asload

Search Keywords:

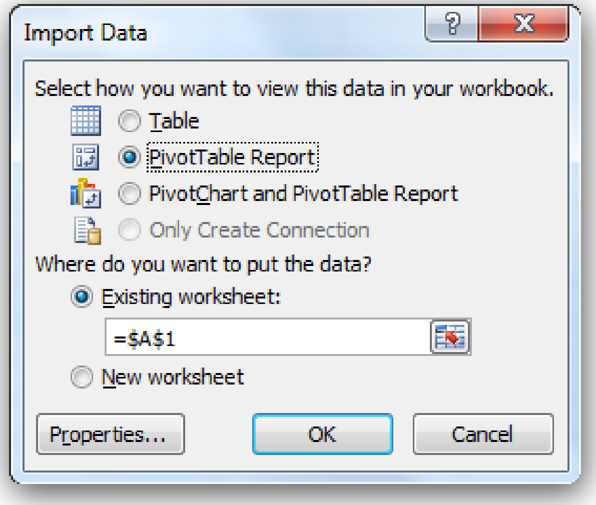
□ Always attempt to use this file to refresh data

Figure 26

Finally: choose which MS-Excel worksheet you want to put the table data into.

In the previous chapter we showed the Table option. By selecting this option, all of the asload table data will be imported into the worksheet.

However, as you can see in figure 27, there are also other possible options to import data to MS-Excel, such as PivotTable Report and PivotChart and PivotTable Report[8].



Import Data

Select how you want to view this data in your workbook.

○ Table
● PivotTable Report
○ PivotChart and PivotTable Report
○ Only Create Connection

Where do you want to put the data?

● Existing worksheet:
=$A$1
○ New worksheet

Figure 27

[8] You can use these import options also when connecting to SQL Server.

When you choose the PivotTable Report option, the Pivot Workspace will be shown.

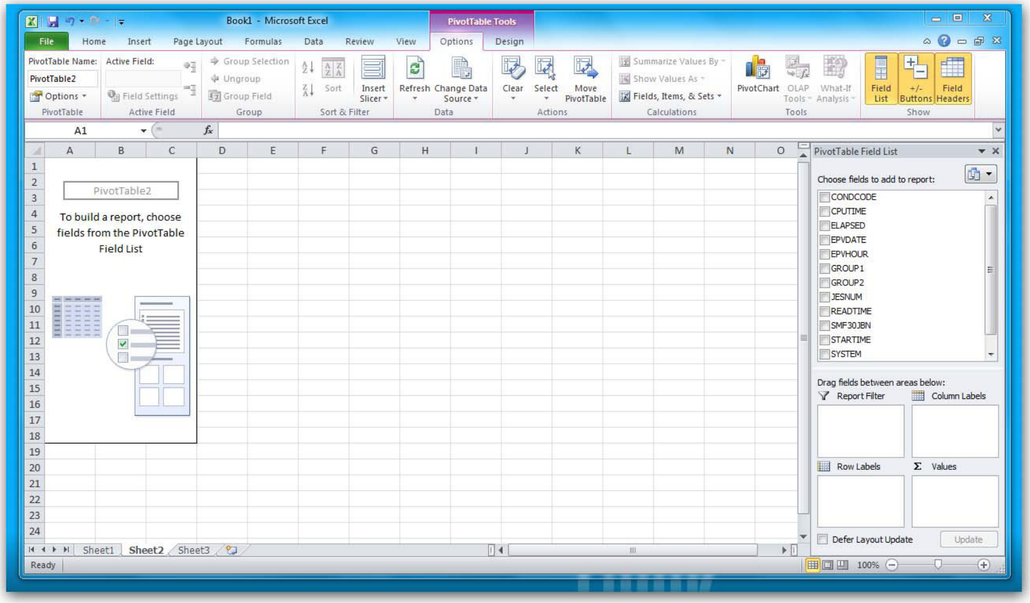
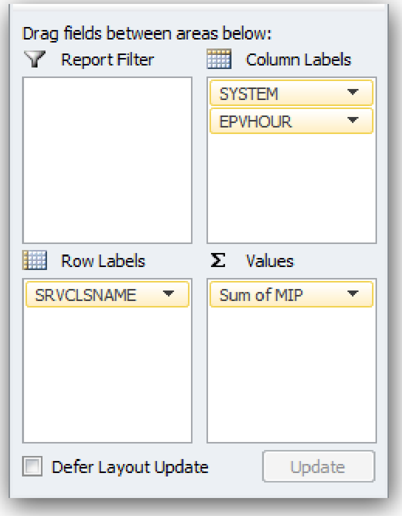


Figure 28

From the “PivotTable Field list” — located on the right side of the window — drag and drop the following fields as described:

- The SYSTEM and the EPVHOUR in the “Legend Fields”,
- The SRVCLSNAME in the “Axis Fields”,
- The MIP in the Values fields (you have to choose the type of calculation you want to use to summarize the fields).



Drag fields between areas below:

Report Filter

Column Labels
- SYSTEM
- EPVHOUR

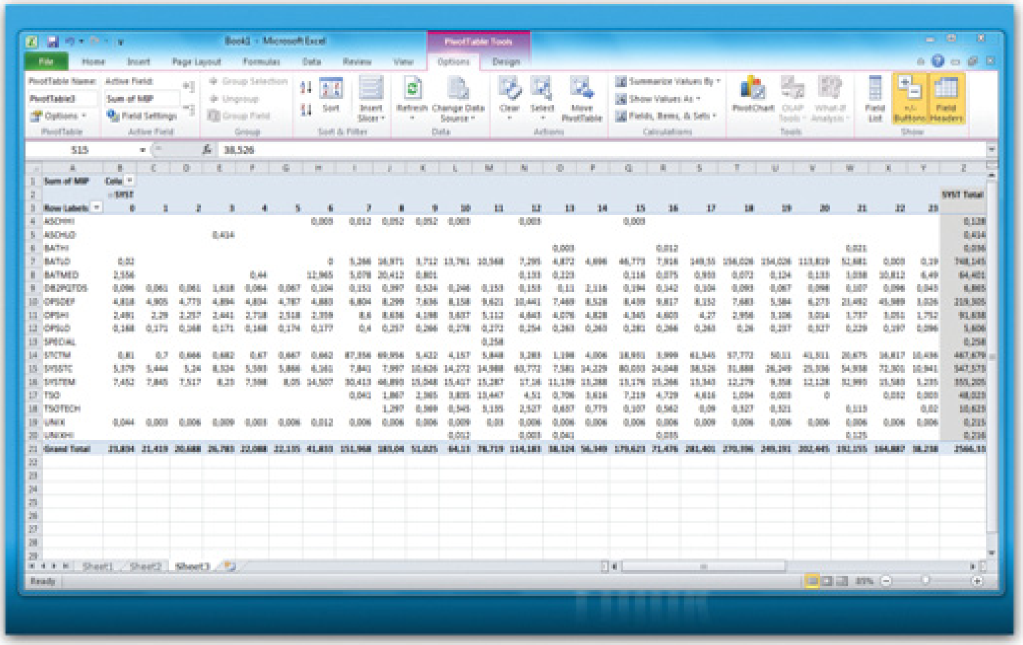
Row Labels
- SRVCLSNAME

Values
- Sum of MIP

☐ Defer Layout Update

Figure 29

The result is a report where all the address space running in the same Service Class have been grouped together, showing the hourly profile of Service Class CPU consumptions.

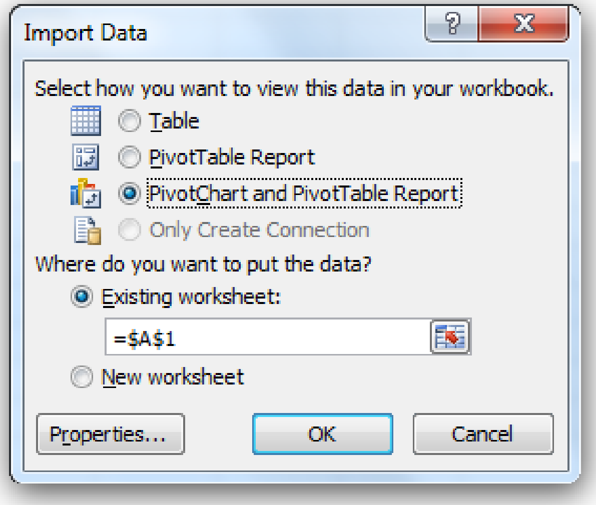


S15 | 38,526

Sum of MIP	Colu ▾																								
	⊟SYST																								SYST Total
Row Labels ▾	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
ASCHHI							0,003	0,012	0,052	0,052	0,003		0,003			0,003									0,128
ASCHLO				0,414																					0,414
BATHI														0,003			0,012					0,021			0,036
BATLO	0,02						0	5,266	16,971	3,712	13,761	10,568	7,295	4,872	4,896	46,773	7,916	149,55	156,026	154,026	113,819	52,681	0,003	0,19	768,145
BATMED	2,556				0,44		12,965	5,078	20,412	0,801			0,133	0,223		0,116	0,075	0,933	0,072	0,124	0,133	3,038	10,812	6,49	64,401
DB2PGTDS	0,096	0,061	0,061	1,618	0,064	0,067	0,104	0,151	0,397	0,524	0,246	0,153	0,153	0,11	2,116	0,194	0,142	0,104	0,093	0,087	0,098	0,107	0,096	0,045	6,865
OPSDEF	4,818	4,905	4,779	4,894	4,834	4,787	4,883	6,804	8,299	7,636	8,158	9,621	10,441	7,469	8,528	8,439	9,817	8,152	7,683	5,584	6,275	21,492	45,989	3,026	219,305
OPSHI	2,491	2,29	2,257	2,441	2,718	2,518	2,359	8,6	8,636	4,198	3,637	5,112	4,843	4,076	4,828	4,345	4,603	4,27	2,956	3,106	3,014	1,737	3,051	1,752	91,838
OPSLO	0,168	0,171	0,168	0,171	0,168	0,174	0,177	0,4	0,257	0,266	0,278	0,272	0,254	0,263	0,263	0,281	0,266	0,263	0,26	0,237	0,327	0,229	0,197	0,096	5,606
SPECIAL												0,258													0,258
STCTM	0,81	0,7	0,666	0,682	0,67	0,667	0,662	87,356	69,956	5,422	4,157	5,848	3,283	1,198	4,006	18,931	3,999	61,545	57,772	50,11	41,511	20,675	16,817	10,436	467,679
SYSSTC	5,379	5,444	5,24	8,324	5,593	5,866	6,161	7,841	7,997	10,626	14,272	14,988	63,772	7,581	14,229	80,033	24,048	38,526	31,888	26,249	25,336	54,938	72,301	10,941	547,573
SYSTEM	7,452	7,845	7,517	8,23	7,598	8,05	14,507	30,413	46,893	15,048	15,417	15,287	17,16	11,139	13,288	13,176	15,266	13,343	12,279	9,358	12,128	32,993	15,583	5,235	355,205
TSO								0,041	1,867	2,365	3,835	13,447	4,51	0,706	3,616	7,219	4,729	4,616	1,094	0,003	0		0,032	0,003	48,023
TSOTECH									1,297	0,969	0,345	3,135	2,527	0,837	0,775	0,107	0,562	0,09	0,327	0,321		0,115		0,02	10,625
UNIX	0,044	0,003	0,006	0,009	0,003	0,006	0,012	0,006	0,006	0,006	0,009	0,03	0,006	0,006	0,006	0,006	0,006	0,009	0,006	0,006	0,006	0,006	0,006	0,006	0,215
UNIXHI											0,012		0,003	0,041			0,035					0,125			0,216
Grand Total	23,834	21,419	20,688	26,783	22,088	22,135	41,833	151,968	183,04	51,025	64,13	78,719	114,183	38,124	56,349	179,623	71,476	281,401	270,396	249,191	202,445	192,155	164,887	58,238	2566,15

Figure 30

Another possibility is to choose the PivotChart and PivotTable import option (see figure 31).



Import Data

Select how you want to view this data in your workbook.

○ Table

○ PivotTable Report

● PivotChart and PivotTable Report

○ Only Create Connection

Where do you want to put the data?

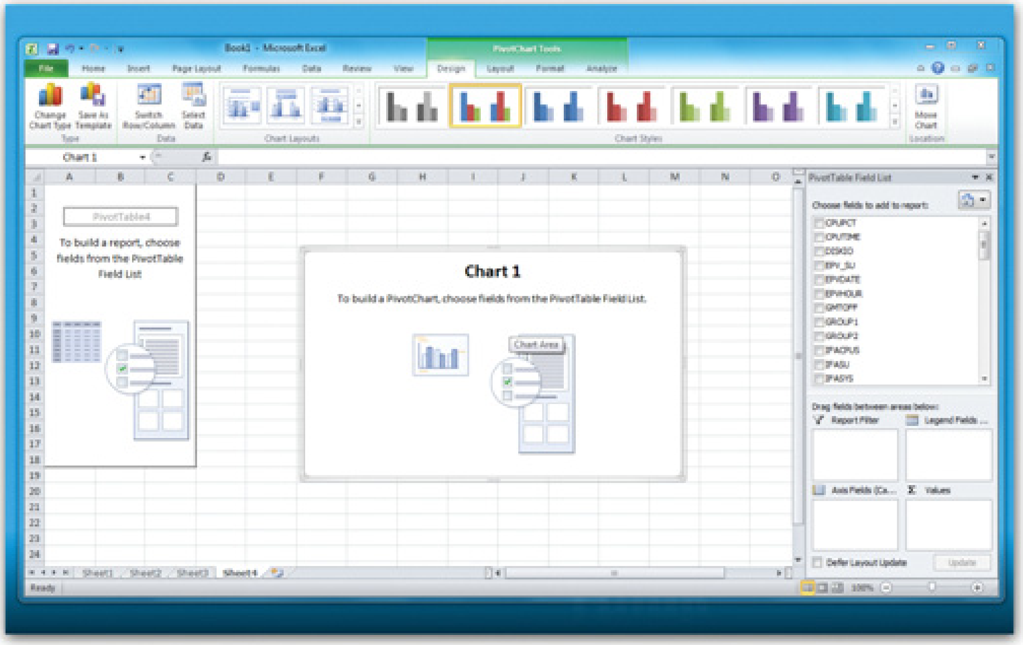
● Existing worksheet:

=$A$1

○ New worksheet

Figure 31

In this case, the Pivot Workspace will be shown.



PivotTable4

To build a report, choose fields from the PivotTable Field List

Chart 1

To build a PivotChart, choose fields from the PivotTable Field List.

PivotTable Field List

Choose fields to add to report:

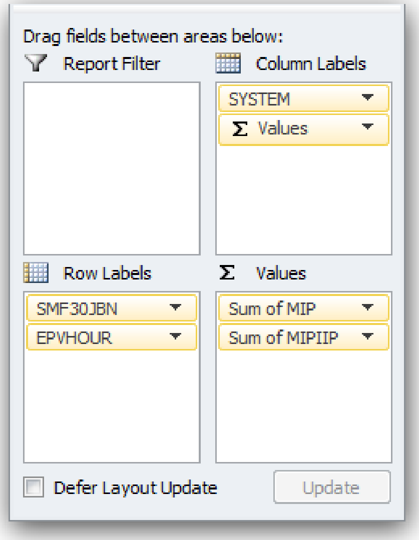
□ CPUPCT
□ CPUTIME
□ DISKIO
□ EPV_SU
□ EPVDATE
□ EPVHOUR
□ GMTOFF
□ GROUP1
□ GROUP2
□ IFACPUS
□ IFASU
□ IFASYS

Drag fields between areas below:

Figure 32

From the “PivotTable Field list” — located on the right side of the window — drag and drop the following fields as described:

- The SYSTEM in the “Legend Fields”,
- The SMF30JBN and the EPVHOUR in the “Axis Fields”,
- The MIP and the MIPIIP in the Values fields (you have to choose the type of calculation you want to use to summarize the fields).



Drag fields between areas below:

Report Filter

Column Labels: SYSTEM, Σ Values

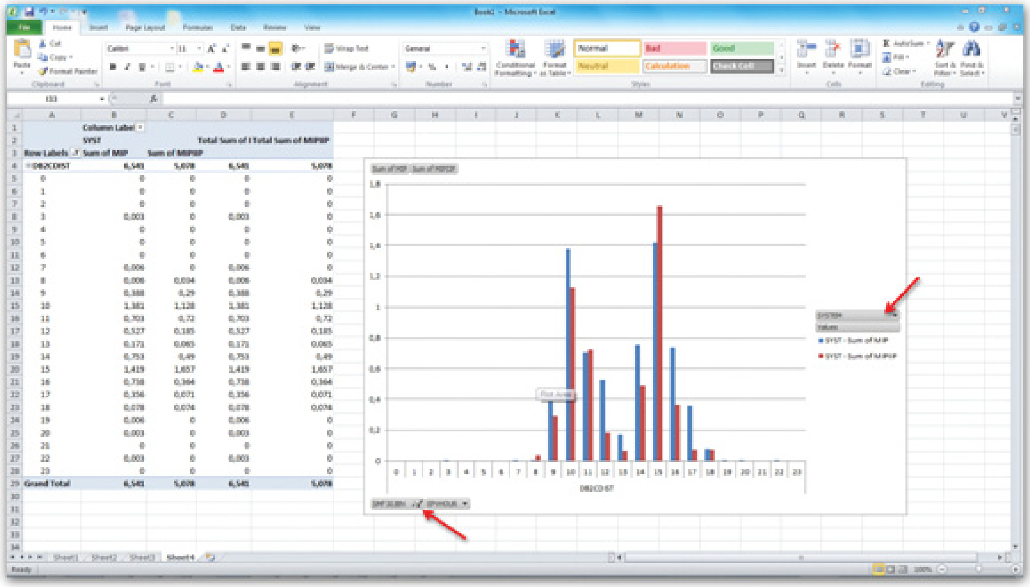
Row Labels: SMF30JBN, EPVHOUR

Σ Values: Sum of MIP, Sum of MIPIIP

□ Defer Layout Update

Figure 33

You can exploit Excel filtering to focus on a specific Address Space by using the buttons automatically provided inside the chart. In this example we show the CP consumption (MIP for CPU MIPS, MIPIIP for zIIP MIPS) by hour for the DB2CDIST Address Space.



	Column Label			
	SYST		Total Sum of I	Total Sum of MIPIIP
Row Labels	Sum of MIP	Sum of MIPIIP		
DB2CDIST	6,541	5,078	6,541	5,078
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0,003	0	0,003	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0,006	0	0,006	0
8	0,006	0,034	0,006	0,034
9	0,388	0,29	0,388	0,29
10	1,381	1,128	1,381	1,128
11	0,703	0,72	0,703	0,72
12	0,527	0,185	0,527	0,185
13	0,171	0,065	0,171	0,065
14	0,753	0,49	0,753	0,49
15	1,419	1,657	1,419	1,657
16	0,738	0,364	0,738	0,364
17	0,356	0,071	0,356	0,071
18	0,078	0,074	0,078	0,074
19	0,006	0	0,006	0
20	0,003	0	0,003	0
21	0	0	0	0
22	0,003	0	0,003	0
23	0	0	0	0
Grand Total	6,541	5,078	6,541	5,078

Figure 34

6 Creating and querying a user table

In this chapter we will show how to create and query a user-defined table starting from the EPV zParser Database using SQL Server. This example is based on one of the SMF records provided by EPV zParser: the Address Space activity record (SMF record 30 subtype 5).

The SQL code provided in this example creates a Job Accounting table (JOBACT) summarized at hour level by System and Job name, if the table doesn't exist. However if the JOBACT table already exists, the SQL code automatically merges the new data into it.
The CPU time, elapsed time, the return code metrics are used (any of the metrics included in the EPV030_5_JobTerm table can be used).

The JOBACT table can retain data for a period of time defined by the user. The retention period is set in the NDAYS variable.

The SQL code also creates two container columns (GROUP1 and GROUP2) useful to group jobs by specific criteria.

In order to create and query the JOBACT table:

1. Create the User Database;
2. Prepare/Customize the SQL to create/update the JOBACT table
3. Create and run a batch file to run the prepared SQL
4. Query the JOBACT table using the Excel PivotTable features.

6.1 Create the User Database

Use your preferred SQL client to create the Database.
In this example we used the EPVUSRDB name.

6.2 Prepare/Customize the SQL to create/update the JOBACT table

Copy and paste the following code in a new text file and save it as JOBACT.sql. You will have to modify:

- the number of retention days (NDAYS variable);
- the user DB name from EPVUSRDB to the name chosen in 6.1;
- the EPV zParser input DB name from ZPARSER_V11 to your zParser DB name.

```
DECLARE @NDAYS INT
SET @NDAYS = 365
/* Drop temporary tables */
DROP TABLE [EPVUSRDB]..[EPV030_5_JobTerm_temp];
DROP TABLE [EPVUSRDB]..[JOBACT_bck];
/* SQL statement to create a temporary table */
SELECT SYSTEM, SMF30JBN, SUBSTRING(TERMTIME,1,10) AS EPVDATE, SUBSTRING(TERMTIME, 11, 3) AS
EPVHOUR,
READTIME, TERMTIME, CAST(DATEADD(second,-ELAPSED, TERMTIME) AS DATETIME) AS STARTIME, CPUTIME,
ELAPSED,
CONDCODE, JESNUM,
/* CASE statement used to populate the GROUP1 and GROUP2 container */
CASE SMF30JBN WHEN 'AAAAAAA' THEN 'TEST_GROUP1' ELSE 'OTHER' END AS GROUP1,
CASE SMF30JBN WHEN 'BBBBBBB' THEN 'TEST_GROUP2' ELSE 'OTHER' END AS GROUP2
INTO [EPVUSRDB]..[EPV030_5_JobTerm_temp] /* Output Table [DBNAME]..[TABLE NAME] */
FROM [ZPARSER_V11]..[EPV030_5_JobTerm] /* EPV z/Parser Input Table [DBNAME]..[TABLE NAME] */
WHERE TYPETASK LIKE 'JOB%' AND TERMTIME IS NOT NULL AND FLAGXDD != 'Y' /* Filter condition */
CREATE INDEX IDX1 ON [EPVUSRDB]..[EPV030_5_JobTerm_temp] (SYSTEM, READTIME, SMF30JBN, JESNUM,
TERMTIME);
/* Check if historical table exist. If exists merge it with the temporary table, if NOT exist create the new
historical table */
IF OBJECT_ID(N’[EPVUSRDB]..[JOBACT]’, N’U’) IS NOT NULL
  BEGIN
    SELECT * INTO [EPVUSRDB]..[JOBACT_bk] FROM [EPVUSRDB]..[EPV030_5_JobTerm_temp]
    UNION ALL
    SELECT a.* FROM [EPVUSRDB]..[JOBACT] a LEFT JOIN [EPVUSRDB]..[EPV030_5_JobTerm_temp] b
                         ON    isnull(a.SYSTEM,’999999’)   = isnull(b.SYSTEM,’999999’)
                        AND  isnull(a.READTIME,’999999’) = isnull(b.READTIME,’999999’)
                        AND  isnull(a.SMF30JBN,’999999’) = isnull(b.SMF30JBN,’999999’)
                        AND  isnull(a.JESNUM,’999999’)   = isnull(b.JESNUM,’999999’)
                        AND  isnull(a.TERMTIME,’999999’) = isnull(b.TERMTIME,’999999’)
    WHERE b.SYSTEM IS NULL AND b.READTIME IS NULL AND b.SMF30JBN IS NULL AND b.JESNUM IS NULL
AND b.TERMTIME IS NULL;
    SELECT * INTO [EPVUSRDB]..[JOBACT]
    FROM [EPVUSRDB]..[JOBACT_bk]
    WHERE EPVDATE >=  CONVERT(VARCHAR(27),DATEADD(DAY,-@NDAYS, GETDATE()),120);
  END
ELSE
  BEGIN
    SELECT * INTO [EPVUSRDB]..[JOBACT] FROM [EPVUSRDB]..[EPV030_5_JobTerm_temp];
  END
```

Figure 35

6.3 Create and run a batch file to run the prepared SQL

Open a command editor and create a text file with the following instructions:

- set youruser=%1
- set yourpassword=%2
- set yourhost=%3
- sqlcmd -U%youruser% -P%yourpassword% -S %yourhost% -d WORK01 -i JOBACT.sql

Save the file as runSQL.bat.

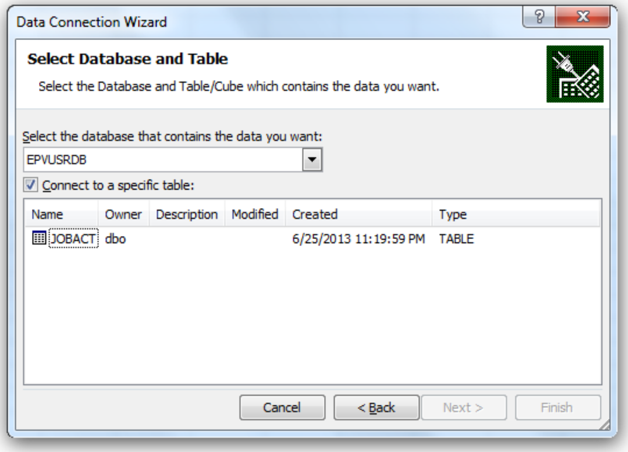
Open a command prompt and execute the runSQL.bat passing user, password and server name as parms:

- runSQL.bat youruser yourpassword sqlserver_name

6.4 Query the user table using the Excel PivotTable features

Open a new Excel file and define a new connection to the EPVUSRDB (refer to chapter 5.1).

Choose the JOBACT table.



Data Connection Wizard

Select Database and Table

Select the Database and Table/Cube which contains the data you want.

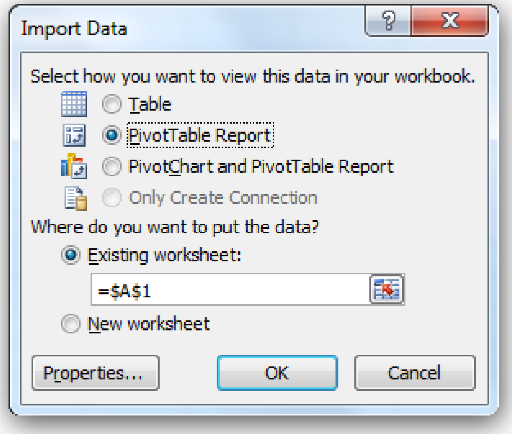
Select the database that contains the data you want: EPVUSRDB

☑ Connect to a specific table:

Name	Owner	Description	Modified	Created	Type
JOBACT	dbo			6/25/2013 11:19:59 PM	TABLE

Figure 36

Select the “PivotTable Report”.



Import Data

Select how you want to view this data in your workbook.

○ Table

● PivotTable Report

○ PivotChart and PivotTable Report

○ Only Create Connection

Where do you want to put the data?

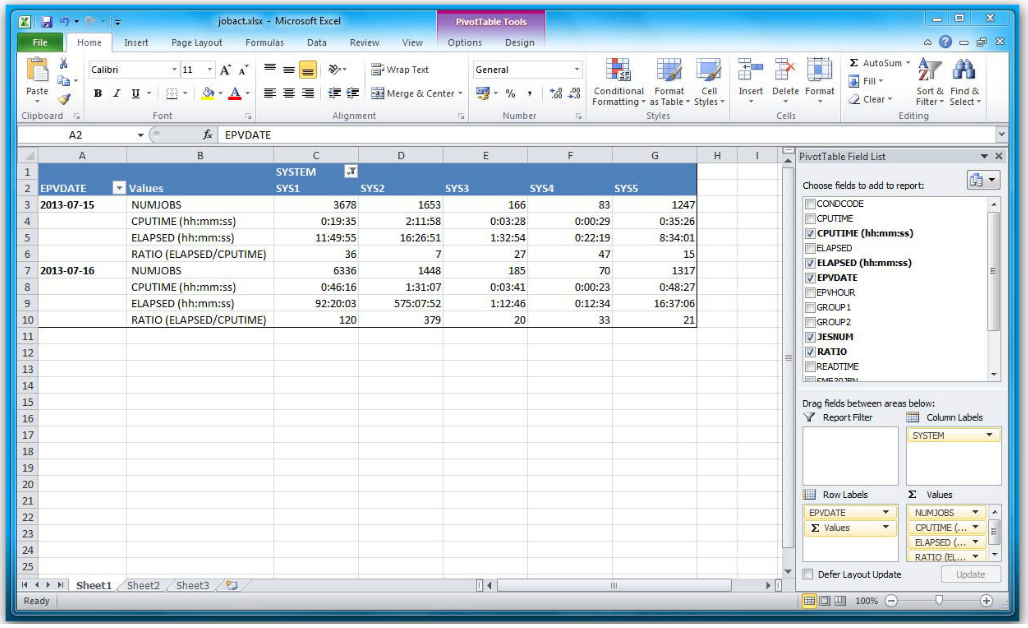
● Existing worksheet:

=$A$1

○ New worksheet

Figure 37

The following example shows the number of executed jobs (NUMJOBS), the total job CPU time, the total job elapsed time and the ratio between elapsed and CPU time summarized by system and date.



jobact.xlsx - Microsoft Excel

A2 EPVDATE

		SYSTEM				
EPVDATE	Values	SYS1	SYS2	SYS3	SYS4	SYS5
2013-07-15	NUMJOBS	3678	1653	166	83	1247
	CPUTIME (hh:mm:ss)	0:19:35	2:11:58	0:03:28	0:00:29	0:35:26
	ELAPSED (hh:mm:ss)	11:49:55	16:26:51	1:32:54	0:22:19	8:34:01
	RATIO (ELAPSED/CPUTIME)	36	7	27	47	15
2013-07-16	NUMJOBS	6336	1448	185	70	1317
	CPUTIME (hh:mm:ss)	0:46:16	1:31:07	0:03:41	0:00:23	0:48:27
	ELAPSED (hh:mm:ss)	92:20:03	575:07:52	1:12:46	0:12:34	16:37:06
	RATIO (ELAPSED/CPUTIME)	120	379	20	33	21

PivotTable Field List

Choose fields to add to report:

- □ CONDCODE
- □ CPUTIME
- ☑ **CPUTIME (hh:mm:ss)**
- □ ELAPSED
- ☑ **ELAPSED (hh:mm:ss)**
- ☑ **EPVDATE**
- □ EPVHOUR
- □ GROUP1
- □ GROUP2
- ☑ **JESNUM**
- ☑ **RATIO**
- □ READTIME

Drag fields between areas below:

Report Filter:

Column Labels: SYSTEM

Row Labels: EPVDATE, Σ Values

Values: NUMJOBS, CPUTIME (..., ELAPSED (..., RATIO (EL...

□ Defer Layout Update

Figure 38

How to produce Excel graphs and reports by exploiting the EPV SMF2XL tool is the topic of a separate paper. Please contact info@segus.com to request a copy.

About the Authors:

For over 20 years, **Fabio Massimo Ottaviani** *has been involved in Performance, Service Levels, Capacity Planning and Cost Accounting projects. He joined EPV Technologies (www.epvtech.com) as a Technical Director in 2002, designing the EPV product suite. He is also involved in projects aimed at the performance optimization of IMS, CICS and Websphere applications and the general z/OS environment, and performs periodic Capacity Planning activities at many customer sites in Italy.*

Ottaviani has been involved in CMG-Italia (www.cmgitalia.it) activities since 1989 - presenting many papers over the years at CMG-Italia conferences and winning the Best Paper Award in 2001, 2004 and 2009. He is also a frequent speaker at GSE conferences around the world. He was a GSE board member from 1991—1992, served as vice president from 1993—1996 and as president from 1997—2000. Ottaviani has a degree in Statistic Sciences from La sapienza, Rome, Italy.

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EPV for z/OS

EPV for z/OS Resource provides a complete view of the "health" of all critical resources—especially those shared amongst different z/OS systems, such as processors (including zAAP, zIIP and crypto), disks, physical control units, coupling facilities and channels.

EPV for z/OS WLC supports the IBM software costs policy, providing all metrics necessary to manage the MSU utilisation—both at system and sublevel.

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