No More Downloading - Using SAS/ODS to Create SAS Graphs and HTML Documents for z/OS Systems – Updated for SAS V9

June 25, 2009
• Techniques helpful for developing HTML, Gif and JAVA documents created, stored, and displayed on z/OS systems, using traditional z/OS data sets.
• Some sites currently download SAS created ‘flat files’ to a PC or UNIX to incorporate into data bases etc. to create reports for viewing on company intranets.
• Software such as IBM’s ‘z/OS HTTP Server’ now makes z/OS a powerful web server.
• With SAS V9’s ODS, HTML documents and GIF files can be created in z/OS data sets for direct viewing on the web.
Topics to be Covered

- Data Sets
- Examples
- URLs and Links Overview
- GOPTIONS / ODS / Tagset Statements
- PROC Template
- Drill Downs
- PROC Report/Graphs
- Testing & Debugging Hints & Tips
- Spreadsheets
- Java and Downloading
- Tagset vs ODS?
- Question & Answers
Data Sets

- Typical URL for an z/OS data set accessed via HTTP Server:

  http://lparname.company.com/MVSDS/’HIGHLEVEL.HTML(MEM)’

- ‘lparname’ is the system where HTTP Server task is actually running
- ‘MVSDS’ tells HTTP Server that this is an z/OS data set
- Next is the data set and member where your SAS ODS generated HTML code resides, surrounded by single quotes.
**Data Sets**

- No changes need to be made to HTTP Server parameters etc. to browse z/OS data sets - HTTP Server uses ‘MVSDS’ built-in facility (IBM supplied GWAPI program)
- Must have mainframe security ‘READ’ access to a data set in order to view it on the web
- This makes z/OS a huge web server!
Data Sets

• If don’t have RACF READ or if URL misspelled, get (IMW0254E) Error 404 on browser

• Know it’s security if get in SYSLOG:
  ICH408I USER(WEBSRV ) GROUP(IMWEB ) NAME(WEBSRV VALIDATOR ) 022
  SYS1.PARMLIB CL(DATASET ) VOL(1SXFR1)
  INSUFFICIENT ACCESS AUTHORITY
  FROM SYS1.PARMLIB.* (G)
  ACCESS INTENT(READ ) ACCESS ALLOWED(NONE )
Data Sets

- Watch out for email etc. bug
- Some email and other Windows products will truncate the ending “ )’ “ of your URL if the user enters the URL directly from Lotus Notes
- Get the same Error 404 message
- Surrounding your URL with double quotes usually works
Data Sets

- HTML data sets should have ‘HTML’ as a complete qualifier in data set name.
- GIF data sets should have ‘GIF’ as a complete qualifier in data set name. Otherwise text - great way to print PDS members if have RACF read to them!
- If don’t put member, get directory list
- PDS/E’s and flat files good
- GDG’s only if a one member report or flat file
Data Sets

• To allocate HTML PDS/E:

```plaintext
FILENAME ODSHTML "HIGHLEVEL.HTML"
  DSNTYPE=LIBRARY
  DSORG=PO
  RECFM=VB
  LRECL=512
  BLKSIZE=27998
  DISP=(NEW,CATLG,DELETE)
  SPACE=(CYL,1,1,1));
```
Data Sets

- To allocate GIF PDS/E:

```plaintext
FILENAME ODSGRAPH "HIGHLEVEL.GIF"
DSNTYPE=LIBRARY
DSORG=PO
RECFM=VB
LRECL=512
BLKSIZE=27998
DISP=(NEW,CATLG,DELETE)
SPACE=(CYL,1,1,1));
```
Examples of how to use this technology

- HTML menus into reports
- HTML/java multi pdse member report (Use ODS TAGSETS.MVSHTML)
- Directory list of pdse
- Single member HTML report (Use ODS HTML)
- Links via emails
- Text reports
Our ‘Intranet Index’ – PROC Report produced portal to all reports
Example – Select a Date for Report – also built by PROC REPORT

<table>
<thead>
<tr>
<th>Within LOB/Node:</th>
<th>Within Site/CEC:</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>05/02/09</td>
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</tr>
</tbody>
</table>
Example – Multi member java graph – Daily Application MIPS Used
Example (Multi member gif graph for OOCOD analysis)
Example – java graph with flyover and annotate
Example – pds/e directory – each member is a separate single member report
Example – click on member name in form Dyymmdd and you get this

### Bank of America

**CPM - Mainframe Capacity Reporting - JOB CPWDRP21**  
**MERLIN Transaction Counts - Daily Totals - Banking Center Only**

<table>
<thead>
<tr>
<th>Date</th>
<th>Merlin</th>
<th># of Transactions for Day</th>
<th># of Transactions &gt; 60 secs for Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>24JUN2009</td>
<td>CICS</td>
<td>156,425</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IMS</td>
<td>7,147,417</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7,303,842</td>
<td>78</td>
</tr>
</tbody>
</table>

### Bank of America

**CPM - Mainframe Capacity Reporting - JOB CPWDRP21**  
**MERLIN Transaction Counts - Daily Totals without BO*PPCDD IMS Transaction - Banking Center Only**

<table>
<thead>
<tr>
<th>Date</th>
<th>Merlin</th>
<th># of Transactions for Day(No BO*PPCDD)</th>
<th># of Transactions &gt; 60 secs for Day(No BO*PPCDD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24JUN2009</td>
<td>CICS</td>
<td>156,425</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>IMS/NOPCDD</td>
<td>6,216,362</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,372,787</td>
<td>78</td>
</tr>
</tbody>
</table>
Can put link into email – also can be used to email links to traditional text reports which have been saved to a data set:
BANK OF AMERICA - MAINFRAME CAPACITY REPORTING - JOB CPWWK2E1
PEAK CEC MIPS USAGE BY DATA CENTER
FROM August 18, 2009 TO August 21, 2009

 CENTER=LOS ANGELES  NOTE: READING IS FOR HOURS BETWEEN 00PT AND 23PT

<table>
<thead>
<tr>
<th>CEC</th>
<th>HOUR</th>
<th>PEAKMIPS</th>
<th>BATCH</th>
<th>ONLINE</th>
<th>DATE</th>
<th>ABSMIPS</th>
<th>PEAKPCT</th>
<th>OURLNCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CECA2</td>
<td>0</td>
<td>1833.10</td>
<td>511.47</td>
<td>114.70</td>
<td>19AUG09</td>
<td>2586</td>
<td>70.91%</td>
<td>4.44%</td>
</tr>
<tr>
<td>CECA2</td>
<td>13</td>
<td>1835.56</td>
<td>205.52</td>
<td>2756.12</td>
<td>21AUG09</td>
<td>5562</td>
<td>78.81%</td>
<td>49.55%</td>
</tr>
</tbody>
</table>

 CENTER=LOS ANGELES  NOTE: READING IS FOR HOURS BETWEEN 08PT AND 11PT

<table>
<thead>
<tr>
<th>CEC</th>
<th>HOUR</th>
<th>PEAKMIPS</th>
<th>BATCH</th>
<th>ONLINE</th>
<th>DATE</th>
<th>ABSMIPS</th>
<th>PEAKPCT</th>
<th>OURLNCT</th>
</tr>
</thead>
<tbody>
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<td>CECA2</td>
<td>8</td>
<td>1884.80</td>
<td>420.36</td>
<td>126.77</td>
<td>21AUG09</td>
<td>2885</td>
<td>72.91%</td>
<td>4.63%</td>
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<tr>
<td>CECA2</td>
<td>10</td>
<td>4090.19</td>
<td>164.83</td>
<td>2917.72</td>
<td>21AUG09</td>
<td>5562</td>
<td>73.54%</td>
<td>52.46%</td>
</tr>
</tbody>
</table>

 CENTER=RICHARDSON  NOTE: READING IS FOR HOURS BETWEEN 00CT AND 23CT

<table>
<thead>
<tr>
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<th>HOUR</th>
<th>PEAKMIPS</th>
<th>BATCH</th>
<th>ONLINE</th>
<th>DATE</th>
<th>ABSMIPS</th>
<th>PEAKPCT</th>
<th>OURLNCT</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
<td>8450.36</td>
<td>3506.41</td>
<td>88.06</td>
<td>18AUG09</td>
<td>9343</td>
<td>79.69%</td>
<td>0.24%</td>
</tr>
<tr>
<td>CECA2</td>
<td>9</td>
<td>2940.88</td>
<td>1454.84</td>
<td>.</td>
<td>16AUG09</td>
<td>4392</td>
<td>57.85%</td>
<td>.</td>
</tr>
<tr>
<td>CECA2</td>
<td>6</td>
<td>5185.39</td>
<td>756.63</td>
<td>771.50</td>
<td>21AUG09</td>
<td>5454</td>
<td>72.61%</td>
<td>9.15%</td>
</tr>
<tr>
<td>CECA2</td>
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<td>4488.31</td>
<td>5016.16</td>
<td>262.01</td>
<td>20AUG09</td>
<td>6916</td>
<td>79.37%</td>
<td>3.79%</td>
</tr>
<tr>
<td>CECA2</td>
<td>2</td>
<td>3424.89</td>
<td>519.86</td>
<td>1370.09</td>
<td>18AUG09</td>
<td>4186</td>
<td>81.84%</td>
<td>32.74%</td>
</tr>
</tbody>
</table>
If all data sets on same node, then only the last part (pathname) of

http://lparname.company.com/MVSDS/
’HIGHLEVL.HTML(REPORT)’

changes, so this is the ONLY part of the URL changes in your SAS coding!
Frame (Contents + Body) of GPLOT BY SYSTEM - 3 BY Graphs:

Contents

Table of Contents

1. The Gplot Procedure
   - SYSTEM=SYSTEMA
     - Plot of CPUBUSY
     - DATE
     - SYSTEM=SYSTEMB
    - Plot of CPUBUSY
     - DATE
    - SYSTEM=SYSTEMC
    - Plot of CPUBUSY
     - DATE

Body

CPU % Busy Trend
SYSTEM = SYSTEMA

Frame
URLs and Links (Multi-Member Report)

Data Sets and Members used to create previous HTML and graphs:

- HIGHLEVL.HTML:  
  - CONCPU
  - CPU
  - FRMCPU

- HIGHLEVL.GIF  
  - CPU
  - CPU1
  - CPU2

(PDS/E)
URLs and Links – Multi member report

To generate a multi-member report ‘HIGHLEVEL.HTML(FRMCPU) use ODS TAGSETS.MVSHTML:

```
ODS TAGSETS.MVSHTML
   PATH="HIGHLEVEL.HTML"
   GPATH="HIGHLEVEL.GIF"
   BASE="http://lparname.company.com/MVSDS/"
   BODY="CPU"
   CONTENTS="CONCPU"
   FRAME="FRMCPU"
   (TITLE="CPU REPORT")
   RECORD_SEPARATOR=NONE
   NEWFILE=NONE
   STYLE=BOATOC1;

   PROC GPLOT DATA=CPU;
   PLOT CPUPCTBY * DATE /
       HAXIS = AXIS1
       HZERO
       NAME=CPUA
       VAXIS = AXIS2
       VZERO;
   BY SYSTEM;
   RUN;

   ODS TAGSETS.MVSHTML CLOSE;
```

TAGSETS.MVSHTML is special SAS ODS Tagset written to modify ODS HTML so that links between members are correct for multi-member reports in z/OS data sets.

NEWFILE=NONE creates all BY variable HTML in one pds/e member.

NEWFILE=OUTPUT creates a new pds/e member for each BY variable occurrence.
To generate a single member report ‘HIGHLEVEL.HTML(CPU) use ODS HTML:

```
ODS HTML BODY="CPU"
    (URL="HIGHLEVEL.HTML(CPU) "
RECORD_SEP=NONE
PATH=ODSHTML
GPATH=ODSGRAPH
ANCHOR='ANCHOR'
STYLE=BOA&TMPL ;

PROC GPLOT DATA=CPU;
PLOT CPUPCTBY * DATE /
    HAXIS = AXIS1
    HZERO
    NAME=CPUA
    VAXIS = AXIS2
    VZERO;
RUN;

ODS HTML CLOSE;
```
URLs and Links – Anchor Points

• **Anchor points** are specific locations within one HTML document
• Used with ‘BY’ variable generated code - one anchor per ‘BY’ variable occurrence
• Code that points to an anchor point must contain path name (i.e. data set name + member name) concatenated to anchor point name
• Anchor point looks like this in HTML:
  
  ```html
  <A NAME="ANCHOR1"> . . . </A>
  ```
URLs and Links – Internal Links between Members

- Two types of SAS links:
  (Frame to contents and body OR
  Contents to anchor points in body)
  - HTML ➔ HTML
    ‘HREF=‘ or ‘FRAME . . . SRC=‘

  (Body HTML pointing to each GIF file)
  - HTML ➔ GIF
    ‘IMG SRC=‘
URLs and Links – Internal Links Between Members

HTML → HTML:

‘HIGHLEVEL.HTML(FRMCPU)’

FRAME . . . SRC=

‘HIGHLEVEL.HTML(CPU)’

‘HIGHLEVEL.HTML(CONCPU)’

<A HREF="’HIGHLEVEL.HTML CPU)’#ANCHOR”. . .

‘HIGHLEVEL.HTML(CPU)’#ANCHOR

‘HIGHLEVEL.HTML(CPU)’#ANCHOR1

‘HIGHLEVEL.HTML(CPU)’#ANCHOR2
URLs and Links – Internal Links Between Members

HIGHLEVEL.HTML(FRMCPU):

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
<html>
<head>
<meta name="Generator" content="SAS Software, see www.sas.com"
    sasversion="9.1">
<meta http-equiv="Content-Type" content="text/html">
<title>Application MIPS by Node</title>
</head>
<frameset frameborder=yes framespacing="1" cols="20%,*">
</FRAME MARGINWIDTH="4" MARGINHEIGHT="0" SRC="'HIGHLEVEL.HTML(CONCPU)'"
    NAME="contents" SCROLLING=auto>
<FRAME MARGINWIDTH="9" MARGINHEIGHT="0" SRC="'HIGHLEVEL.HTML(CPU)'"
    NAME="body" SCROLLING=auto>
</FRAMESET>
</HTML>
URLs and Links – Internal Links Between Members

HIGHLEVEL.HTML(CONCPU):

```html
<BODY leftmargin=8 onload="if (msie4 == 1) expandAll()"
    bgcolor="#FFFFFF" vlink="#FF0000" link="#003399">
    . . .
</font><dl><font face="Arial, Times" size="2"
    color="#000000"><dt><b>&#183;</b><A HREF="'HIGHLEVEL.HTML(CPU)'#ANCHOR"
    <br>
    . . .
</dt></font><dl><font face="Arial, Times" size="2"
    color="#000000"><dt><b>&#183;</b><A HREF="'HIGHLEVEL.HTML(CPU)'#ANCHOR1"
    <br>
    . . .
</dt></font><dl><font face="Arial, Times" size="2"
    color="#000000"><dt><b>&#183;</b><A HREF="'HIGHLEVEL.HTML(CPU)'#ANCHOR2"
    <br>
If NEWFILE=OUTPUT coded each HREF= would be in separate
PDS/E members CPU, CPU1, CPU2
```
URLs and Links – Internal Links Between Members

HIGHLEVEL.HTML(CPU):

<HTML>
<!-- Generated by SAS Software -->
<HEAD> . . .
<font face="Arial, Times" size="2" color="#000000"><A NAME="ANCHOR">&nbsp;</A> . . .
<font face="Arial, Times" size="2" color="#000000"><A NAME="ANCHOR1">&nbsp;</A> . . .
<font face="Arial, Times" size="2" color="#000000"><A NAME="ANCHOR2">&nbsp;</A> . . .

If NEWFILE=OUTPUT coded each NAME= would be in separate PDS/E members CPU, CPU1, CPU2
URLs and Links – Internal Links Between Members

HTML ➔ GIF:

‘HIGHLEVEL.HTML(CPU)’

<IMG SRC=""HIGHLEVEL.GIF(CPU\textsubscript{n})"

‘HIGHLEVEL.GIF(CPU)’
‘HIGHLEVEL.GIF(CPU\textsubscript{1})’
‘HIGHLEVEL.GIF(CPU\textsubscript{2})’
URLs and Links – Internal Links Between Members

HIGHLEVEL.HTML(CPU):

<TD rules=GROUPS frame=BOX ALIGN=CENTER . . .
<IMG SRC="'HIGHLEVEL.GIF(CPU)'" border="0"
    USEMAP="#anchor_map"> . . .
</TD>

<TD rules=GROUPS frame=BOX ALIGN=CENTER . . .
<IMG SRC="'HIGHLEVEL.GIF(CPU1)'" border="0"
    USEMAP="#anchor_map"> . . .
</TD>

<TD rules=GROUPS frame=BOX ALIGN=CENTER . . .
<IMG SRC="'HIGHLEVEL.GIF(CPU2)'" border="0"
    USEMAP="#anchor_map"> . . .
</TD>
Putting it all together: First, GOPTIONS/ODS/TAGSETS Statements

- Sample GOPTIONS Statement:

```
GOPTIONS DEVICE=GIF TRANSPARENCY NOBORDER
   RESET=GLOBAL GUNIT=PCT BORDER CBACK=WHITE
   COLORS=(BLACK RED BLUE GREEN PURPLE ORANGE)
   CTEXT=BLACK
   HTITLE=4 HTEXT=2 FTITLE=SWISSB FTEXT=SWISSB
   XPIXELS=700 YPIXELS=390;
```

- Text etc only for graphics - not HTML
- Use XPIXELS/YPIXELS to control graph size
Putting it all together: GOPTIONS/ODS/Tagset Statements

• Sample ODS Statement (one member report - no BY):

```plaintext
ODS TRACE ON;
ODS LISTING CLOSE;
ODS HTML
   BODY='CPU' (URL='''HIGHLEVEL.HTML(CPU)''')
      RECORD_SEPARATOR=None
      PATH=ODSHTML
     GPATH=ODSGRAPH (URL='''HIGHLEVEL.GIF(CPU)''')
    STYLE=CPEP1;
```
Putting it all together: Tagset.odsgthml

- ODS Tagset just for z/os (replaces ODS HTML for multi-member reports in z/os):

```
ODS TAGSETS.MVSHTML
PATH="HIGHLEVL.HTML"
GPATH="HIGHLEVL.GIF"
BASE="http://lparname.company.com/MVSDS/"
BODY="CPU"
CONTENTS="CONCPU"
FRAME="FRMCPU"
(TITLE="CPU REPORT")
RECORD_SEPARATOR=NONE
NEWFILE=OUTPUT
STYLE=BOATOC1;

.

reporting statements
.

ODS TAGSETS.MVSHTML CLOSE;
```
• Use to modify the default SAS ODS Templates:

    PROC TEMPLATE;
    DEFINE STYLE CPEP1;
    PARENT=STYLES.DEFAULT;
    NOTES 'USED FOR HTML FRAMES';
    REPLACE fonts
      "Fonts used for CPEP1" /
      'TitleFont2' = ("Arial, Times",3,Bold Italic)
      . . .
    REPLACE color_list
      "Colors used for CPEP1" /
      'fgB2' = cx003399
      'fgB1' = cxFF0000 . . .
      'bgA1' = white;
PROC Template

- Need to list the default first:

  PROC TEMPLATE;
  LIST STYLES.DEFAULT;
  SOURCE STYLES.DEFAULT;

- Very Useful Web Site:

  http://www.sas.com/rnd/base/topics/templateFAQ/Template.html
SAS supplied changes to PROC Template for use with ODS TAGSETS.MVSHTML V9.1:

proc template;
    edit tagsets.mvshtml;
    define event listclass;
        putq " class=" HTMLCLASS; 
    end;
    define event margins;
        put " text-indent: " indent; 
        put " text-indent: " indent; 
        put ";" NL / exists( indent); 
        put ";" NL / exists( indent); 
        put " margin-left: " LEFTMARGIN;  
        put ";" NL / exists( LEFTMARGIN); 
        put " margin-right: " RIGHTMARGIN;  
        put ";" NL / exists( RIGHTMARGIN); 
        put " margin-top: " TOPMARGIN; 
        put ";" NL / exists( TOPMARGIN); 
        put " margin-bottom: " BOTTOMMARGIN;  
        put ";" NL / exists( BOTTOMMARGIN); 
    end;
    define event list_entry;
        start:
            unset $first_proc;
            set $first_proc "true" /if total_proc_count ne 1;
            put 
" /if exists( $first_proc, $proc_name);
            put "<li";
            putq " class=" HTMLCLASS; 
            put ">" NL;
            trigger do_link /if listentryanchor;
            trigger do_list_value /if not listentryanchor;
            finish:
            put "</li>" NL;
            put split; /* Space after the procedure */
            put split; /* Second space after procedure */
            end;
    define event leaf;
        break;
    end;
end;
run;
Drill Downs

- Not exactly automatic (except for built in java)!
- You have to provide the anchor point that is being drilled down to i.e.:
  \[ \text{data set name} + \text{member name} + \text{anchor} \]
- For each observation (point) being graphed, a variable must be included:
  \[ \text{HREF}="'HIGHLEVL.HTML(CPUTAB)'#ANCHOR" \]
  that contains the path in the above form.
- Techniques have not changed from V8 so please see original ‘No More Downloading’ paper/presentation for additional information on drill down techniques.
PROC REPORT

- Very powerful tool for tabular results
- Can modify attributes of a table cell dependent on the value of the cell
- Can turn the contents of any cell into a link (URL) by modifying the URL attribute via the ‘CALL DEFINE’ statement
PROC REPORT

ODS HTML BODY='EXCEPT'(URL="'HIGHLEVEL.HTML(EXCEPT)'")
   RECORD_SEPARATOR=NONE
   PATH=ODSHTML
   STYLE=CPEP1;

PROC REPORT DATA=EXCEPT NOWD HEADLINE SPLIT='*' LIST
   style(report)=[outputwidth=100
      cellspacing=1
      background=black
      borderwidth=2];
COLUMN URLCPU('Cpu % Busy' CPUTOTOP  CPUTOT);
DEFINE URLCPU / DISPLAY NOPRINT;

DEFINE CPUTOTOP / DISPLAY
   STYLE(HEADER)=[font_size=1.5];

DEFINE CPUTOT / DISPLAY
   STYLE(HEADER)=[font_size=1.5];
PROC REPORT (Continued)

COMPUTE CPUTOT;
/* Set values of attributes for CPUTOT */
/* Assigns ‘URL’ attribute */
CALL DEFINE(_COL_, 'URL', URLCPU);
/* Assigns ‘Style’ attributes */
CALL DEFINE(_COL_, "STYLE",
            "STYLE=[flyover='Total CPU Trends' ]"); IF CPUTOT > CPUTOTOP THEN
   DO; /* highlight if exception */
      CALL DEFINE(_COL_, "STYLE",
                 "STYLE=[font_weight=bold
                          background=CXCCCCCC
                          flyover='Total CPU'
                          font_style=italic]"");
      END;
   END;
ENDCOMP;
RUN;
## BANK OF AMERICA
### MAINFRAME CAPACITY REPORTING - JOB CPWDUT85
#### DATA CENTER: RICHMOND
**FOR Thursday, September 24, 2009: HOUR 4**

<table>
<thead>
<tr>
<th>CENTER=RICHBON</th>
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<th></th>
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</thead>
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<tr>
<td></td>
<td>CEC</td>
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<td>1506</td>
<td>53.16%</td>
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**Footer:**
Flourish: Karen
PWR: GR Support Request 18356-GR-01 - EXPANDED SE...
Drill Down to Another Proc Report

<table>
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<tr>
<td>Windham</td>
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<tr>
<td>Craydon, UK</td>
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</table>

| HOME | MENU |

**BANK OF AMERICA**
**MAINFRAME CAPACITY REPORTING - JOB CPWDUT85**
**DATA CENTER: RICHMON**
FOR Thursday, September 24, 2009: HOUR 3

<table>
<thead>
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<th>CEC ID</th>
<th>LPAR ID</th>
<th>DATE</th>
<th>HOUR</th>
<th>MIPS Used</th>
<th>WORKLOAD</th>
<th>ACCOUNT</th>
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</table>

**Local internet** 100%
More Drill-Downs – First MIPS by Workload for each Node:
Then the Applications plus Overhead in Workload:
And Finally Drill Down to Table of Values for all Workloads on Node:

<table>
<thead>
<tr>
<th>Workload</th>
<th>TCO/ITID/Region/HLQ</th>
<th>Application Description/Region</th>
<th>Hour</th>
<th>Application Mnemonic/Region</th>
<th>Current NODE MIPS Rating</th>
<th>MIPS Used (Average MIPS Used)</th>
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<tbody>
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</tbody>
</table>

This information is Confidential and Intended for Bank of America Internal Use Only.
Can ‘Freeze’ Headers in PROC REPORT etc. Only Works with tagset.mvshtml

%MACRO FREEZE(FRZE);
PROC TEMPLATE;
   DEFINE STYLE STYLES.BOA&FRZE;
   PARENT=BOA&TMPL;
   STYLE TABLE FROM TABLE /
      OUTPUTWIDTH=99%
      PREHTML='<DIV
               style="overflow:auto;
               WIDTH:99%;HEIGHT:575PX"
               id="data">
               posthtml="</DIV>";
      STYLE HEADER FROM HEADER /
         htmlstyle='z-index:20;
                     POSITION:relative;
                     TOP:
                           expression(document.getElementById("data").scrollTop-2)';
   END;
RUN;
%LET TMPL=FRZE;
%MEND FREEZE;
### Freeze Headers - Example

**Application MIPS by Node**

**Bank of America - Mainframe Analysis & Delivery Services - Job CPWDRP42**

**MIPS Used by AITID by Day by Node for CAPITAL MARKETS / WHOLESA**

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<thead>
<tr>
<th>Line of Business</th>
<th>AIT ID</th>
<th>Application Description</th>
<th>NODE</th>
<th>DATE</th>
<th>Hour of Day</th>
<th>Application</th>
<th>MIPS</th>
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<td>198</td>
<td>AUTOMATED</td>
<td>1S</td>
<td>24JUN2009</td>
<td>0</td>
<td>EPB</td>
<td>52.50</td>
</tr>
</tbody>
</table>

**AITID: With less than 4000 MIPS-hours on a node for previous month are rolled into 99999_LOW. No Capture Ratios have been applied to data.**
Java

- DEVICE=JAVA in GOPTION
- Download Java applets from SAS
- Upload to z/OS HFS file
- Define where applets are in HTTP Server CLASSPATH statement
Java (Continued)

JAVA code pointed by ODS CODEBASE statement:

```java
ODS TAGSETS.MVSHTML
   PATH="&DSN"
   BASE="http://prod1s05.bankofamerica.com/MVSDS/"
   BODY="&MEM"
   CONTENTS="CON&MEM"
   FRAME="FRM&MEM"
   (TITLE="&TITLE")
   RECORD_SEPARATOR=NONE
   NEWFILE=&NEWFILE
   STYLE=BOA&Tmpl
   CODEBASE="http://prod1s05.bankofamerica.com/sas/javaapplets/v9";
```
Advantages:

- Don’t need a separate file for gif graphics members - graphics are contained within HTML code, so only one PDS/E
- Very nice, crisp graphics
- Automatic drill downs and can dynamically change graphics
- Very nice automatic flyover listing values
Disadvantages:

- Drill downs may not be what you want them to be (but can override with coding)
- Data contained in HTML – so it can take browser a long time to load your URL!
- You lose a lot of the control over what your graph looks like
- Annotate often doesn’t work in expected way or doesn’t work at all
Java – flyover etc.
Java – Can Make Dynamic Changes
Downloading

- HTTP Server directive:
  
  AddType .DOWNLOAD text/download ebc dic 1.0 # MVSDS

- Whenever a URL is selected that ends in ‘.DOWNLOAD’, the Windows downloading dialog window will pop up.
Bank of America - Capacity & Performance Mgmt.

Number of Transactions

Avg. Response Time
- Missing: 0.0989425276
- 0.1042742693: 0.10805651816
- 0.128374424: 0.098826762
Download Example – MVS sequential file

‘CPWT.MERLIN.WEEKLY.REPORT1.DOWNLOAD’ is being downloaded.
Can also link together reports at different locations via Inserted Links (Here is Virginia Report):
Click on ‘San Francisco’ Link inserted by Post-Processing into Table of Contents and Get Report that is physically at San Francisco Data Center.
Testing and Debugging

- Easy to test - just get into browser, type in URL and hit enter
- Hit ‘reload’ or ‘refresh’ to get new copy after changes
- ‘Shift/reload’ or ‘Shift/refresh’ will get new copy quicker
- You don’t need to know a lot of HTML, but a little bit helps!
- If can’t figure out why something isn’t working, look at the HTML that your code is generating - this will often allow you to figure out the problem.
- If you can figure out your links, your more than half way there!
Security

- Another HTTP Server Directive:
  
  ```
  UserId %%CLIENT%%
  ```

- Causes browser user to be prompted for their RACF userid/password when accessing an ‘MVSDS’ URL.
- Security then allowed or denied by RACF
- Can set up multiple copies of Server
Convert HTML to Spreadsheet

- If URL is pointing **DIRECTLY** to HTML table (i.e. not FRAME member), can just do ‘File/Save As/file.xls’. This will create a formatted spreadsheet. This doesn’t work if pointing to FRAME member (as is often the case unless you change URL)
- If HTML table is not too large can edit/copy/paste to an empty spreadsheet
- Can name single member file .DOWNLOAD and will be prompted with download dialogue. This works EVEN FOR PLAIN TEXT reports (does not need to be HTML). Just need to do ‘Date/Text to Columns’ to align as spreadsheet.
- The .DOWNLOAD file can be either a csv file (will need to go through wizard to get a plain spreadsheet); an HTML table (will get a nicely formatted spreadsheet with titles etc); or the plain text report in tabular form; (‘text to columns’ for plain spreadsheet)
**TAGSET vs ODS HTML Decision Table:**

In some cases, SAS ODS HTML no longer works with V9.1, and you absolutely must use the TAGSET. This table summarizes when you to use the TAGSET or ODS HTML – assumes PROC TEMPLATE V9.1 TAGESETS.MVSHTM changes applied;

<table>
<thead>
<tr>
<th></th>
<th>ODS HTML</th>
<th>TAGSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Element, without COMPUTEd links</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Single Element, with COMPUTEd links</td>
<td>Yes</td>
<td>No – COMPUTEd links will not work</td>
</tr>
<tr>
<td>Multi-element HTML only (no graphics) NEWFILE=NONE, no PROC REPORT COMPUTEd links</td>
<td>Yes, although some unnecessary links generated in TOC – also can create very large report since one body member – long time to download</td>
<td>Yes, but can create very large reports in the one body member however – long time to download</td>
</tr>
<tr>
<td>Multi-element HTML only (no graphics) NEWFILE=OUTPUT, no PROC REPORT COMPUTEd links</td>
<td>No – doesn’t work</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-element HTML only (no graphics) NEWFILE=OUTPUT, COMPUTEd links</td>
<td>Yes, but will need to post-process links</td>
<td>No – COMPUTEd links will not work</td>
</tr>
<tr>
<td>Multi-element HTML + gif NEWFILE=NONE (always use NEWFILE=NONE with gif)</td>
<td>Yes, although some unnecessary links generated and need to post process links.</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-element HTML + java graphs NEWFILE=OUTPUT (always use with java)</td>
<td>No – doesn’t work</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Good Resources (Other than SAS)

- “z/OS HTTP Server Planning, Installing, and Using” SC32-8690
- Red Book – “z/OS e-business Infrastructure: IBMHTTP Server 5.1 – Customization and Usage” SG24-5603
Conclusion

- SAS/ODS coupled with z/OS web servers such as IBM’s HTTP Server eliminates the cumbersome process of downloading SAS produced flat files for incorporation into spreadsheets etc.
- Can display that z/OS data totally on z/OS!
- Use all that scheduling software etc. to eliminate manual effort
- Also can use z/OS facilities such as DF/HSM to manage your reporting data sets – we normally have about 140,000 report data sets
- Enterprise wide – no problem whatsoever on z/OS.
About the author

- Patricia Wingfield has worked in z/os systems for about 30 years, in operating system support and capacity and performance. She has been working with SAS for about 20 years.

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- Presentation and paper are available at Barry Merrill’s web site under ‘Downloads’ section: [www.mxg.com](http://www.mxg.com)

- Major thanks to Andre’ Walker from Bank of America for contributions towards using java technology.
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