Performance Monitoring using zVIEW

Tim Kessler

- Enterprise View
  - Layout options
  - Thresholds and other configuration options
  - Setting hosts
- zVIEW
  - Basic layout and functions
  - Configuration options
  - Current data and adhoc queries
    - Graphs and reports
    - Thresholds
  - Tabs
  - zMAP reports
  - Capacity graphs
  - Views

Enterprise View

TIM2 - zVIEW | VSIVM4 - Enterprise View

demo.velocitysoftware.com/Zview/

Today is Thursday 9 Jun 2016 | zVIEW Version 4240

VELOCITY SOFTWARE

Velocity Software System Summary Demo V4 - Velocity Software - VSIVM4

First level

VSIVM1			Expand
VM1	12:05	IFL Total (1)	0.48%

Linux Nodes(Distributed Servers)	
LINUX9 (9)	2.29%
suselnx3 (9)	2.22%

VSIVM2			Expand
VM2	12:05	IFL Total (1)	0.82%

Linux Nodes(z/VM-Guests)	
redhat6x (1)	2.08%
linux9 (9)	1.70%
oracle (1)	1.17%
redhat6 (1)	0.48%
redhat62 (1)	0.47%
redhat6M (1)	0.45%
redhat6S (1)	0.44%
RH5X161 (1)	0.31%
OSA178 (1)	0.30%

Linux Nodes(Distributed Servers)	
s11s2ora (2)	6.38%

Demo System V4			Expand
Demo	12:05	IFL Total (2) ⊕ 20.87%	

VSE Systems	
zvse52	28.16%
zvse43	26.40%
zvse51	0.67%

Top 5 Linux Nodes(z/VM-Guests)	
⊕ s11s2ora (2)	6.74%
⊕ lxoral2b (1)	3.01%
⊕ redhat6x (1)	2.96%
⊕ redhat56 (1)	1.46%
⊕ redhat6 (1)	1.16%
Remaining servers	2.19%

Top 5 Linux Nodes(Distributed Servers)	
⊕ vpnz (1)	3.32%
⊕ vpnbrz (1)	2.55%
⊕ mail (9)	2.30%
⊕ vpnc (1)	1.46%
⊕ vpnbrc (1)	1.17%
Remaining servers	0.76%

VSIVM5			Expand
VM5	12:05	CP Total (1)	70.05%
		IFL Total (2) ⊕	4.52%

VSE Systems	
zvse52	28.16%
zvse43	26.93%
zvse51	0.82%

Linux Nodes(z/VM-Guests)	
s11s2ora	5.65%
lxoral2	3.27%
oracle	1.17%
redhat5x	0.25%
lxsugar	0.23%
sles11	0.15%

Linux Nodes(Distributed Servers)	
vpnz (1)	3.28%
vpnbrz (1)	2.53%
mail (9)	2.25%
vpnbrc (1)	1.19%

Second level

RKS Level 2			Expand
RKS2LV	12:05	IFL Total (1)	0.48%

Linux Nodes(z/VM-Guests)	
linux001	0.22%

DXT Level 2			Expand
DXT2LV	14:05	IFL Total (1)	0.14%

Linux Nodes(z/VM-Guests)	
redhat56 (1)	1.44%
redhat6 (1)	0.45%
redhat5x (1)	0.26%
lxsugar (2)	0.23%
redhat64 (1)	0.15%

Tim Level 2			Expand
TIM2LV	15:05	IFL Total (1)	0.26%

Top 5 Linux Nodes(z/VM-Guests)	
⊕ s11s2ora (2)	5.68%
⊕ lxoral2b (1)	3.29%
⊕ redhat56 (1)	1.37%
⊕ redhat6 (1)	0.46%
⊕ redhat5x (1)	0.30%
Remaining servers	0.82%

Top 5 Linux Nodes(Distributed Servers)	
⊕ vpnbrz (1)	2.61%
⊕ vpnbrc (1)	1.15%
⊕ rhel7v (2)	0.76%

- Quick overview of all LPARs
  - Operations or system support
- Total and individual processor CPU utilization
- Linux servers
  - Local and Distributed
  - Number of processors
  - Swap rate and used – click on + to expand
- VSE guests
- Other users
- URL: http://hostname/ZVIEW

VELOCITY
S O F T W A R E

Layout options

- Use VSIMAINT Config option
  - Not all options show if direct XEDIT file
  - F10 on product line
  - Fast path command: VSIMAINT CONFIG ZVIEW *configfn configft*
  - F1 on parameter for help or anywhere else for all parameter help
- Configuration file: ZVIEW CECLIST

```
CECUTIL                          Velocity Software Inc.                    ZVIEW PROD4240
                               ZVIEW CECLIST Configuration


System Overview Parameters

Web page title Velocity Software System Summary Demo V4
Number of graphs across            4
Maximum local Linux guests         5
Maximum distributed Linux guests   5
Maximum users                      5
CPU count source                   USERDATA
Server click URL /zview/zview.cgi
Server click parms graph=NODEUTTM&parm=&server
User click URL    /zview/zview.cgi
User click parms    graph=USERCPU&parm=&server

Thresholds
Threshold TOTALCPU   Warning 70    Value 90
Threshold CPU        Warning 70    Value 90
Threshold SERVERCPU  Warning 70    Value 90
Threshold SWAPRATE   Warning 3     Value 10
Threshold SWAPUSED   Warning 90    Value 95

Group names listed in display order
Group name First level
Group name Second level

System name    VM1
System URL HTTP://WWW.VELOCITYSOFTWARE.COM/ZVIEW/
System heading VSIVM1
System group First level

System name    VM2
System URL HTTP://VSIVM2.VELOCITYSOFTWARE.COM/ZVIEW/
System heading VSIVM2
System group First level


PF1: Help      PF2: Validate/Save    PF3: Exit    PF5: Add line    PF6: Delete line
               PF8: Down                          PF10: Default    PF12: Cancel
```

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SOFTWARE

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System Overview Parameters

- Title
- Number of columns
- Number of Linux servers (local & distributed) & users
  - *, 0 or number
- Where to get number of processors for Linux servers
  - Some older versions of NetSNMP return incorrect values
  - *CPU count source* USERDATA recommended for local servers
- Linux and user name click specification
  - Specify zVIEW graph or report or some other URL

Thresholds

- Total CPU, individual CPU, server CPU, swap rate and swap used

- Warning (yellow) and Value (red)

- Set value for swap rate or swap used to enable

- Triggered threshold
  - Color title and line
  - Automatically expand CPUs or swap
  - Focus on first threshold

VELOCITY
S O F T W A R E

- Groups and LPARs
  - Groups can be defined to group LPARs by CEC or location
  - Set names, heading, URL and group
    - Also used by zVIEW to define available hosts
    - Match URL to what user would enter in browser
      - IP address or host name
      - http or https
- Expand button
  - Expand LPAR data for easier viewing
  - Will stay expanded across refreshes

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S O F T W A R E

Enterprise Performance Summary

VELOCITY
S O F T W A R E

DC1

V1P1	Expand
V1P1	07:12	IFL Total (20) ⊕ 185.30%
Linux Nodes (z/VM-Guests)

V1P2	Expand
V1P2	07:12	IFL Total (20) ⊕ 184.02%
Linux Nodes (z/VM-Guests)

V1P3	Expand
V1P3	07:12	IFL Total (20) ⊕ 668.29%
Linux Nodes (z/VM-Guests)

V1P4	Expand
V1P4	07:12	IFL Total (19) ⊕ 433.28%
Linux Nodes (z/VM-Guests)

V1N1	Expand
V1N1	07:12	IFL Total (8) ⊕ 265.41%
Linux Nodes (z/VM-Guests)

V1N2	Expand
V1N2	07:12	IFL Total (8) ⊕ 37.91%
Linux Nodes (z/VM-Guests)

P105	Expand
P105	07:12	IFL Total (20) ⊕ 13.22%
Linux Nodes (z/VM-Guests)

P106	Expand
P106	07:12	IFL Total (20) ⊕ 12.99%
Linux Nodes (z/VM-Guests)

P107	Expand
P107	07:12	IFL Total (14) ⊕ 47.56%
Linux Nodes (z/VM-Guests)

P108	Expand
P108	07:12	IFL Total (14) ⊕ 48.56%
Linux Nodes (z/VM-Guests)

P109	Expand
P109	07:12	IFL Total (8) ⊕ 1.49%
Linux Nodes (z/VM-Guests)

P110	Expand
P110	07:12	IFL Total (8) ⊕ 1.53%
Linux Nodes (z/VM-Guests)

P113	Expand
P113	07:12	IFL Total (14) ⊕ 42.56%
Linux Nodes (z/VM-Guests)

P114	Expand
P114	07:12	IFL Total (14) ⊕ 54.88%
Linux Nodes (z/VM-Guests)

DC2

V2P1	Expand
V2P1	07:12	IFL Total (32) ⊕ 482.74%
Linux Nodes (z/VM-Guests)

V2P2	Expand
V2P2	07:12	IFL Total (32) ⊕ 325.26%
Linux Nodes (z/VM-Guests)

V2P3	Expand
3E0FC7-21	86.95%
3E0FC7-22	15.24%

V2P4	Expand
V2P4	07:12	IFL Total (32) ⊕ 312.03%
Linux Nodes (z/VM-Guests)

V2P5	Expand
V2P5	07:12	IFL Total (20) ⊕ 340.64%
Linux Nodes (z/VM-Guests)

V2P6	Expand
V2P6	07:12	IFL Total (20) ⊕ 348.75%
Linux Nodes (z/VM-Guests)

P207	Expand
P207	07:12	IFL Total (24) ⊕ 585.87%
Linux Nodes (z/VM-Guests)

P208	Expand
P208	07:12	IFL Total (24) ⊕ 485.11%
Linux Nodes (z/VM-Guests)

P209	Expand
P209	07:12	IFL Total (32) ⊕ 384.22%
Linux Nodes (z/VM-Guests)

P210	Expand
P210	07:12	IFL Total (32) ⊕ 336.23%
Linux Nodes (z/VM-Guests)

P211	Expand
P211	07:12	IFL Total (32) ⊕ 1032.18%
Linux Nodes (z/VM-Guests)

P212	Expand
P212	07:12	IFL Total (28) ⊕ 505.29%
Linux Nodes (z/VM-Guests)

P213	Expand
333B77-19	72.94%
333B77-20	9.96%

P214	Expand
P214	07:12	IFL Total (28) ⊕ 439.01%
Linux Nodes (z/VM-Guests)

P215	Expand
P215	07:12	IFL Total (24) ⊕ 380.90%
Linux Nodes (z/VM-Guests)

P216	Expand
P216	07:12	IFL Total (24) ⊕ 348.65%
Linux Nodes (z/VM-Guests)

P217	Expand
P217	07:12	IFL Total (20) ⊕ 102.64%
Linux Nodes (z/VM-Guests)

P218	Expand
P218	07:12	IFL Total (20) ⊕ 94.46%
Linux Nodes (z/VM-Guests)

P219	Expand

P220	Expand
P220	07:12	IFL Total (24) ⊕ 1.15%
Linux Nodes (z/VM-Guests)

C203	Expand
C203	07:12	IFL Total (16) ⊕ 457.52%
Linux Nodes (z/VM-Guests)

C204	Expand
C204	07:12	IFL Total (10) ⊕ 290.24%
Linux Nodes (z/VM-Guests)

C205	Expand
C205	07:12	IFL Total (10) ⊖ 791.06%
3520D7-0	80.10%

C206	Expand
C206	07:12	IFL Total (10) ⊕ 636.96%
Linux Nodes (z/VM-Guests)

C207	Expand
C207	07:12	IFL Total (12) ⊕ 92.29%
Linux Nodes (z/VM-Guests)

C208	Expand
C208	07:12	IFL Total (12) ⊕ 1.33%
Linux Nodes (z/VM-Guests)

V2N1	Expand
V2N1	07:12	IFL Total (10) ⊕ 268.45%
Linux Nodes (z/VM-Guests)

V2N2	Expand
V2N2	07:12	IFL Total (28) ⊕ 152.95%
Linux Nodes (z/VM-Guests)

V2N3	Expand
V2N3	07:12	IFL Total (12) ⊕ 1.22%
Linux Nodes (z/VM-Guests)

V2C1	Expand
V2C1	07:12	IFL Total (16) ⊕ 656.29%
Linux Nodes (z/VM-Guests)

V2C2	Expand
V2C2	07:12	IFL Total (12) ⊕ 617.71%
Linux Nodes (z/VM-Guests)

CDL

VLB1	Expand
VLB1	07:12	IFL Total (20) ⊕ 516.95%
Linux Nodes (z/VM-Guests)

VLB2	Expand
VLB2	07:12	IFL Total (12) ⊖ 1158.17%
02C2A7-0	93.38%

VLB3	Expand
VLB3	07:12	IFL Total (20) ⊕ 301.97%
Linux Nodes (z/VM-Guests)

VLB4	Expand
VLB4	07:12	IFL Total (14) ⊕ 547.53%
Linux Nodes (z/VM-Guests)

VLB5	Expand
VLB5	07:12	IFL Total (20) ⊕ 0.44%

VLB6	Expand
061A67-6	82.30%
061A67-7	69.33%

VLB8	Expand
VLB8	07:12	IFL Total (20) ⊕ 150.02%
Linux Nodes (z/VM-Guests)

ZS01	Expand
ZS01	07:12	IFL Total (2) ⊕ 1.01%

zVIEW

URL: http://hostname/ZVIEW/ZVIEW.CGI

Add tab

- New tab to organize new graphs and reports

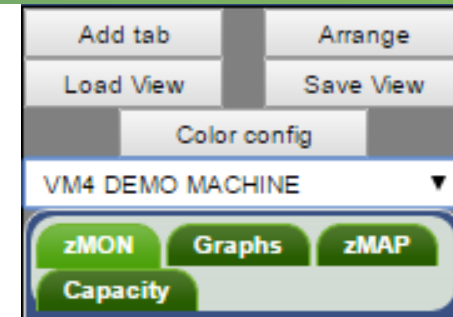## Arrange

- Up to 12 graph/reports

Load/Save View

- Load or save from system, cookie or local disk

LPAR

- Drop down box for LPARs defined in ZVIEW CECLIST
- LPAR to obtain data from

Color config

- Color wheel to define series colors
- Specific color for LPAR, server or user
- Alternate name for LPAR, server or user on graphs

ZMON & Graphs

- Realtime or adhoc reports or graphs

ZMAP

- Daily, weekly or monthly ZMAP reports

Capacity

- Daily, weekly, monthly or trending graphs
- Created with RUNCHART utility

VELOCITY
S O F T W A R E

zVIEW

Configuration

                          CONFIG ZVIEW Configuration

Startup view SYSTEM   Load startup view when change host NO

Header title Performance Displays for zVM and Linux on System z

Floating main menu   YES

zMap page group count 100

Host code page   1047

Debug   NO

Graph options
Graph name _____   Threshold warn _____   Value _____   Type _____

Excluded zMON screens _____   Exclude from Index NO

Default series colors for graphs #4bb2c5 #EAA228 #c5b47f #579575 #953579
#839557 #4b5de4 #958c12 #ff5800 #d8b83f #0085cc #c747a3 #cddf54 #FBD178
#26B4E3 #bd70c7 #2020E0 #00FFFF #FF00FF #00FF00 #800000 #ffc0cb #000080
#808000 #800080 #8A2BE2 #008080 #4B0082 #808080 #281415 _____ _____

Colors for specific servers/classes
Server/class: Name _____   Color _____
              Alternate name _____

PF1: Help   PF2: Validate/Save   PF3: Exit   PF5: Add line   PF6: Delete line
               PF8: Down   PF10: Default   PF12: Cancel

- Startup view
  - Start up view or NONE and on host change
- Title
- Floating menu
- zMAP page group count
  - Can affect response time and web server storage
- Host code page
  - May need to change webserver DEFAULT_CHARSET ISO-8859-1
- Debug

VELOCITY
S O F T W A R E

- Graph options
  - Graph names from graph Preferences, About
  - Default threshold values
  - Default graph type
    - Vertical and horizontal bar and stacked bar
    - Area and stacked area
    - Line
    - Table
    - Pie and pie percentage
- Excluded ZMON screens
  - Excluded from screen index

- ## Series colors
  - Easier specified with Color config button
- ## Alternate server/class names

Performance data and adhoc queries

- ## ZMON reports

  - Over 185 reports

  - Hover report for description

  - Symbols across the top

    - Drill down available – single click on a line, click again to close

    - Title with host name – click and hold to move

    - Download report – PDF, text or CSV

    - Pause or resume

    - Change time range, node, user, class, etc – adhoc reports

    - Report fields help

    - Fully minimize

    - Minimize or maximize

    - Close report

```
ESAU SP2 - User Percent Utilization -...
                    <Processor> <-------Main Storage----
          UserID    <-use CPU%> <Resident-> Lock <-WSSi:
Time      /Class    Total  Virt Total  Actv  -ed Total
--------- -------- *1--- ----- ----- ----- ----- -----
12:22:00 System:   22.62 20.57 3284K 3265K  7367 3279K
12:22:00 *TheUsrs   9.38  8.90  601K  601K   126  603K
```

- ## ZMON reports
  - ### Refresh every minute
  - ### Sort on columns
    - Primary, secondary, tertiary – last selected column primary
    - First click ascending, then descending
    - Click anywhere else in heading to revert to default sort
  - ### Thresholds

```
alert.ESAMAIN    =  'ON'
alert.ESAMAIN.8  = '> 80 RED REVVIDEO 80*NCPUS'
alert.ESAMAIN.17 = '> 25 RED REVVIDEO'
alert.ESAMAIN.20 = '> 95 YELLOW REVVIDEO'
```

    - Set in MONPROF COPY – defaults in ESAMONDF COPY
  - ### zALERT
    - Click thru on alert to report, graph or view
  - ### zOPERATOR
  - ### zTUNE

- Graphs

  - Over 113 graphs

  - Symbols across the top

    - Drill down available – last interval get last 30 minutes of data

    - Title with host name – click and hold to move

    - Download graph – PDF, PNG or JPG

    - Hide or show legend

    - Pause or resume

    - Change time range, node, user, class, etc – adhoc reports

    - Preferences

    - Fully minimize

    - Minimize or maximize

    - Close report

VELOCITY
S O F T W A R E
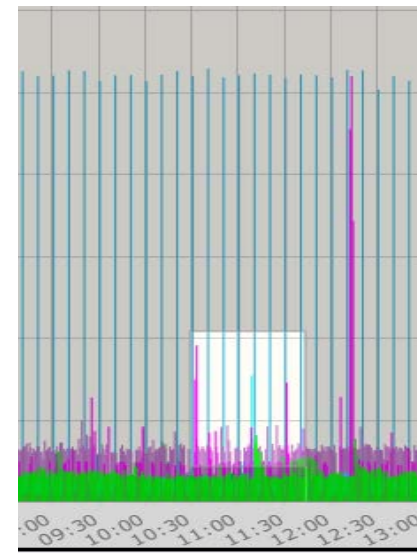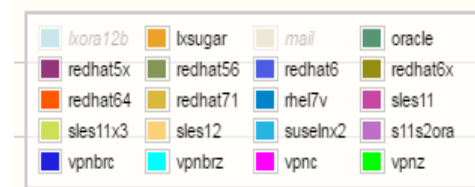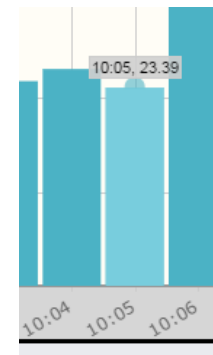
- Graphs
  - Preferences
    - Change graph
      - Vertical and horizontal bar and stacked bar
      - Area and stacked area
      - Line
      - Table
      - Pie and pie percentage
      - Only shows options available for the data
    - Adjust parms – same as pencil
    - Adjust y axis – change scale
    - Help – general zVIEW help
    - About – graph name and zVIEW version

- **Graphs**
  - **Preferences**
    - Thresholds
      - Threshold and warning values and bars
      - Refresh clear
        - Clear title and tab colors when data refreshed
      - Relative CPU
        - Enter values between 0 and 100%
        - Thresholds adjusted based on the number of processors
        - Good to use if varying processors on and off
  - **Rescale axis**
    - Single click in y axis area to scale to present data
    - Good to view small values

- **Graphs**
  - Hover interval to show data values
  - Turning off data series
    - Click on name in legend to turn off/on
    - Not for stacked graphs or inconsistent data
    - Turn off high series to rescale Y axis
  - Zoom
    - Blow up area to see values or drill down
    - Right click, hold and drag area to zoom
    - Multiple zooms allowed
    - Double click to return to original graph
    - Pause graph first as refresh will unzoom

- Tabs
  - Organize by server, LPAR, etc
  - Views will load in new tab
  - Symbols on tab

    CPU Utilization - VM4

    - Graph or report title in focus or view name and host name
    - General zVIEW help
    - Window list – bring hidden windows into focus
    - Tab parameters
      - All existing and new graphs or reports will use parameters that are set
      - Good for looking at a specific time frame and/or server
    - Pause or resume all graphs and reports in the tab
    - Close tab and all the graphs and reports in the tab

VELOCITY
S O F T W A R E

ZMAP reports

- Read from ZMAP 191 disk – OUT01 file type

- Daily, weekly and monthly

- Number of days kept depends on size of disk

- Select day, week or month for available reports

- Page range selection

  - Number of pages determined
    by *zMap page group count* parm

Page ranges

Pages 2037 to 2136
Pages 2137 to 2236
Pages 2237 to 2289
Close
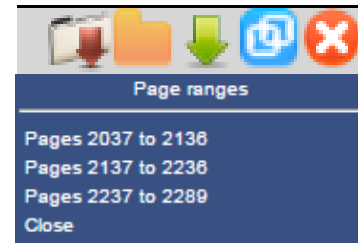
Capacity Reports

- Created during nightly ZMAP processing

  - Fast data retrieval and graphing

- Minute, daily, weekly, monthly and trending

  - Trending - Daily, weekly and monthly

- Defined in ZMAP RUNCHART PARMS file

  - Samples provided
  - Some need customization

```
              Type   Days  Start   Stop    Extract  LPAR, Node or User name
Chart:        MINUTE  1    08:00   17:00   LCPUMIN   nodename
Chart:        MINUTE  1    08:00   17:00   LSTORMN   nodename
Chart:        MINUTE  1    08:00   17:00   LXSWAP    nodename
Chart:        MINUTE  1    08:00   17:00   LBLKIO    nodename
Chart:        DAILY   1    00:00   24:00   LPARCPUS  _____
Chart:        DAILY   1    00:00   24:00   LPARCPUS  lparname
Chart:        DAILY   1    00:00   24:00   UXACT     System:
Chart:        DAILY   1    00:00   24:00   UWAIT     username
Chart:        DAILY   1    00:00   24:00   LSTORE    nodename
Chart:        DAILY   1    00:00   24:00   CLASCPU   _____
Chart:        DAILYT  60   00:00   24:00   LPARCPUM  _____
Chart:        DAILYT  60   00:00   24:00   CLASCPU   _____
Chart:        WEEK    7    00:00   24:00   UXACT     System:
Chart:        WEEK    7    08:00   17:00   LCPU      nodename
Chart:        WEEK    7    08:00   17:00   CLASCPUP  _____
Chart:        WEEK    7    00:00   24:00   LPARCPUS  _____
Chart:        MONTH   31   00:00   24:00   UXACT     System:
Chart:        MONTH   31   *       *       LCPUM     nodename
Chart:        MONTH   31   *       *       LSTOREM   nodename
Chart:        MONTH   31   08:00   17:00   CLASCPUM  _____
Chart:        MONTH   31   00:00   24:00   LPARCPUM  _____
Chart:        MONTHT  24   00:00   24:00   LPARCPUM  _____
Chart:        MONTHT  24   00:00   24:00   CLASCPUM  _____
Chart:        NDAYS   31   *       *       LCPU      nodename
Chart:        NDAYS   31   *       *       LSTORE    nodename
Chart:        NDAYS   35   *       *       UDIO      username
Chart:        NDAYS   35   *       *       USTOR     username
Chart:        NDAYS   35   *       *       UCPU      username
Chart:        NDAYS   35   *       *       LPARCPUS  _____
```

Capacity graphs

- **Specify Type**
  - MINUTE, DAILY(T), WEEK(T), MONTH(T), NDAYS
  - T = Trending – Append to existing data
  - NDAYS = Last n days – history required
- **Days**
  - For trending and NDAYS specify number or days, weeks or months
- **Start Stop**
  - Specify time range or *

Capacity graphs

- EXTRACT
  - Name of ESAEXTR file
  - Names shown are shipped as samples
  - Documented in zVIEW manual
  - First letter significant
    - C = Class
    - L = Linux
    - P or LP = LPAR
    - U = User

Capacity graphs

- Parm

  - Restrict data to specific class, LPAR, node or user

  - Lowercase values must be commented or specified

  - Extracts with no parm value can be further restricted

  - Graph multiple variables for one class,user,node or LPAR or one value for all classes, users, node or LPAR

Capacity graphs

- Graph customization − ESAEXTR TITLE stmts
  - Variables specified in title
    - Start/end date and time and userid
  - Graph type
  - Nnames for variables in legend
- Manually run on ZMAP
  - Test new capacity graphs
  - Catch up on old data
- Make sure to LOG OFF ZMAP when finished!

VELOCITY
S O F T W A R E

Capacity graphs

- RUNAUTO PARMS – CHARTCNT
  - CHARTCNT 6 8 7 3 1
  - Number of monthly, weekly, daily, minute and ndays graphs to keep
- RUNAUTO PARMS – ADISKBLKS
  - Number of disk blocks to free before starting ZMAP run
  - Minimum 10,000
  - 15,000 if creating lots of capacity graphs
- Complete documentation in zVIEW manual

Views

- Save and reload commonly used graphs and reports

- Create system or personalized start-up view

- Save/load views

  - System – CONFIG disk – must be signed onto Portal

  - Cookie – Limited to max size of cookie ~4k

  - PC – Can't use for start-up

- Parameters and other customization saved with view

Views

- Tab parms
  - Change graphs and reports for particular user or node
  - Relative option for capacity graphs
    - Depending on graph type can set for:
      - Yesterday
      - Last business day
      - Last week
      - Last month

- Load view host selection
  - Check box to use current host or use host saved

- Load or Save view to remove personal start-up

- **Direct URL access**
  - Can save as bookmark
  - URL for report graph or view
    - http://myhost.com/zview/zview.cgi?screen=esamain
    - http://myhost.com/zview/zview.cgi?graph=cpuutil
    - http://myhost.com/zview/zview.cgi?view=linux
  - Menu options
    - &menu=open – Open floating menu
    - &menu=closed – Closed floating menu
    - &menu=fixed – Fixed menu on left

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- Direct URL access
  - Other qualifiers
    - &sdate - Start date (yy/mm/dd)
    - &stime - Start time (hh:mm)
    - &edate - End date
    - &etime - End time
    - &node - Node name
    - &user - User name
    - &class - Class name
    - &lpar - LPAR name
    - &device - device number

Questions ?

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