Automated Operations and Monitoring for z/VM and Linux on System z with the Velocity Performance Suite (zVPS)

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Agenda

Automated operations using:

- **Installer 4.2**
- **zOPERATOR**
- **zALERT**

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Automatic installation

- SSI, single image or existing environments
- Complete installation in a couple hours

Check for Updates facility

- Supports HTTP or FTP
- Proxy servers
- FTP firewall
- Can be used for upload and downloads
- Automatic invocation option
- FTP option to delete members in user area

Disk configuration changes

- SSI support – All DASD defined on initial member
- SCSI blocks
- DIRMAINT AUTOG and AUTOV
- VMSECURE subpools
- DIRECT files created for zVPS userids
- EXECs created for DIRMAINT & VMSECURE commands
- SFS authorizations automatically run
- RACF definitions created

Installer 4.2

Restart server option

Server version checking

Additional information on product status errors

PF14 – Select Disk Config for base components

Automatic installation of 0 level release

Initial configuration changes copied to other members

GETCONS option on logon for YES, NO, ASK

PROFILE EXEC updated

- Use USERPROF SAMPLE

Documentation update

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Installer 4201

- Fast path commands
  - VSIMAINT CONFIG product {filename {filetype}}
  - VSIMAINT RESTART product

Installation steps

- Create ZVPS userid
- Create VMSYSVPS SFS filepool
- Download and unpack INSTALL PROD4200
- EXEC VSIMAINT
- Use ‘Check for Updates’ facility to download products
- Exit VSIMAINT and restart
- Select Automatic install
- Configure DASD for zVPS components
- Run EXEC to define zVPS VM directory entries

Installation steps

- Update RACF or VMSECURE definitions (all SSI members)
- VSIMAINT – Install All
- Configure zVPS components and ensure proper operation
- Log onto ZVPS on next SSI member
- VSIMAINT & select automatic installation
- Set system name
- Installation automatically run

Demo install

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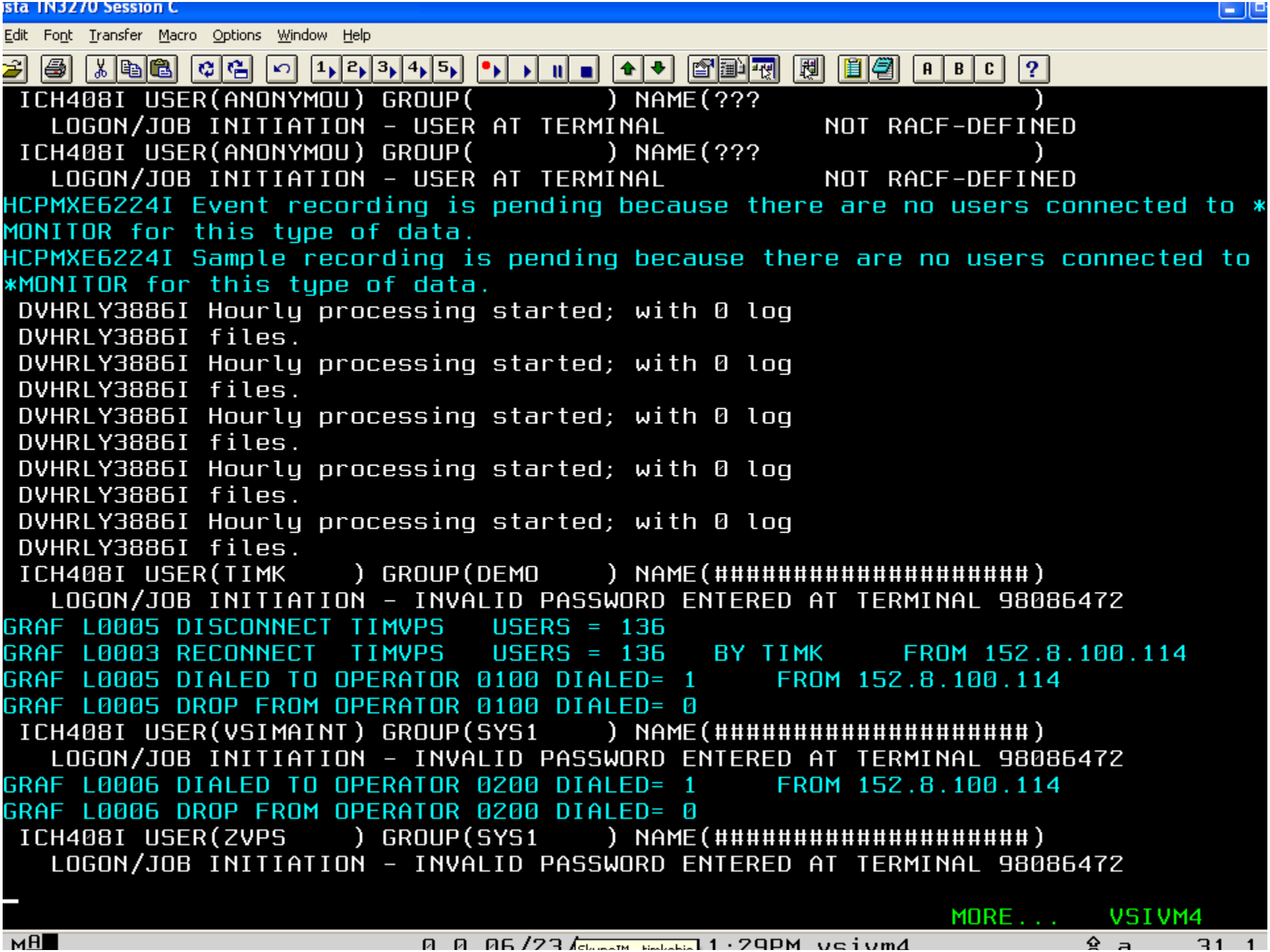
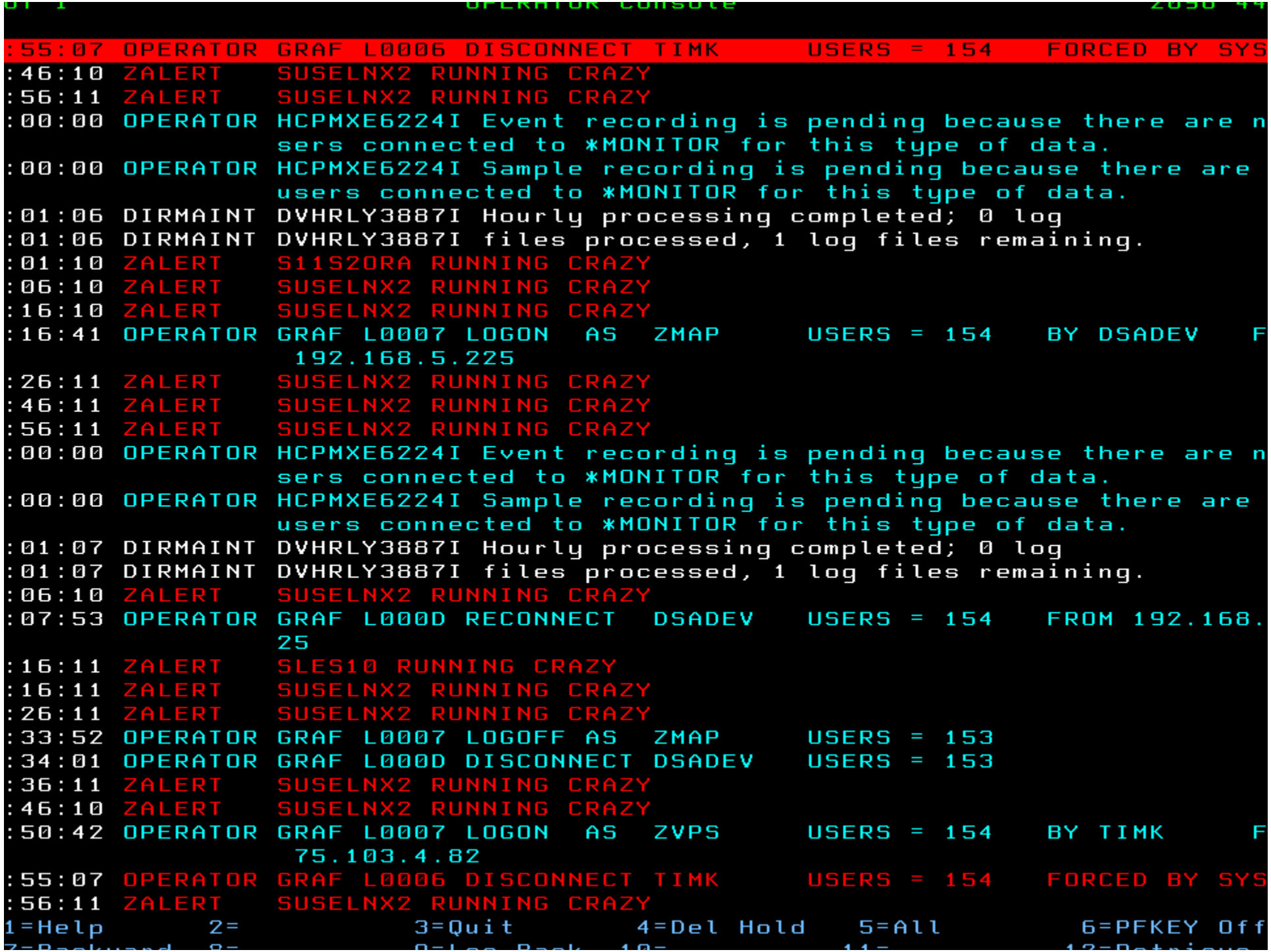
zOPERATOR

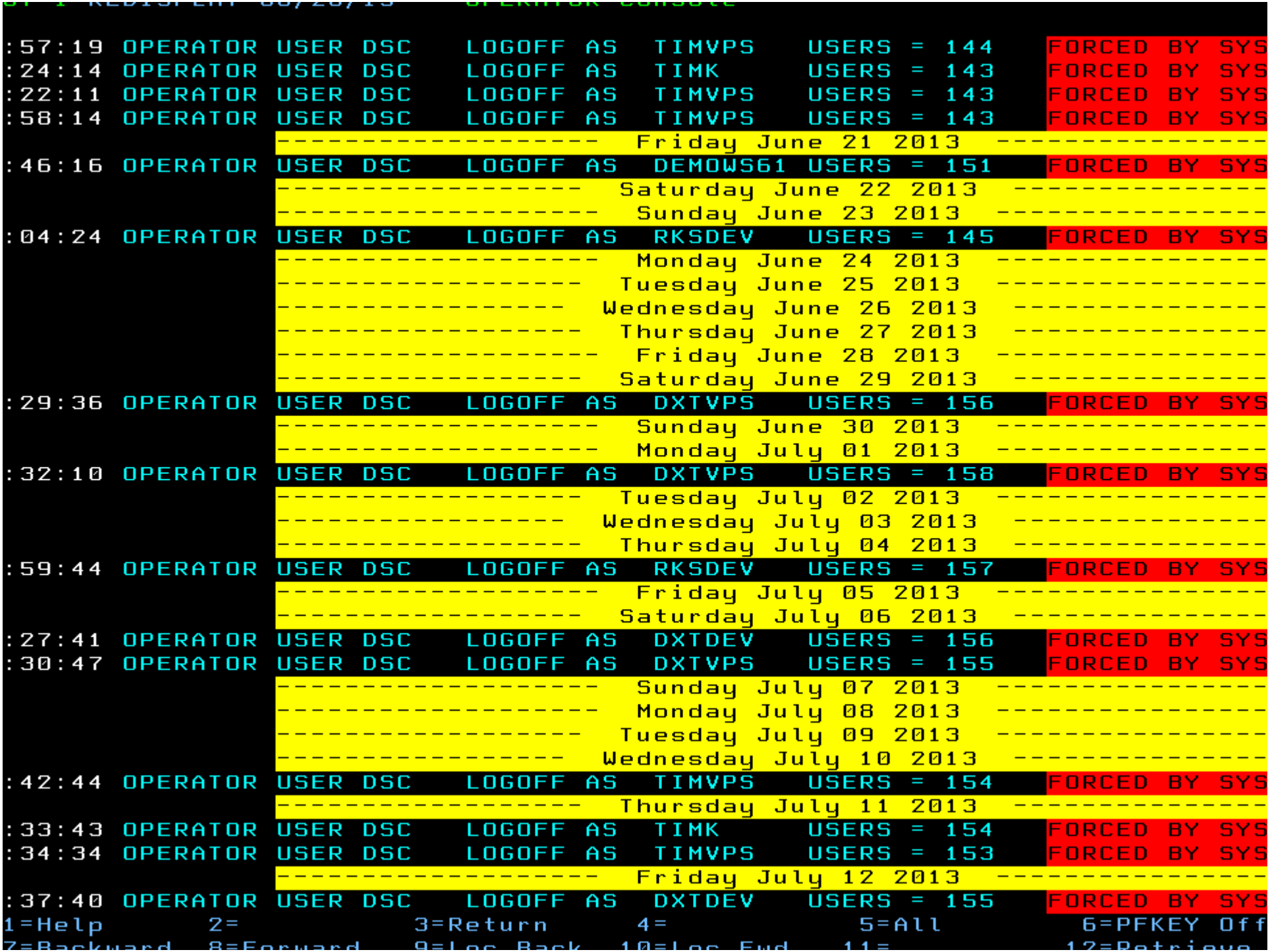
- Console and automations manager
- No charge component of zVPS
- Scrollable, searchable console display
- Messages can be:
  - Colored, highlighted, held, suppressed, message to a user, written to file, execute command, emailed or SNMP trap sent
- Log files kept for user specified days
- Can be used on OPERATOR or any other user


sta IN3270 Session C
Edit Font Transfer Macro Options Window Help
ICH408I USER(ANONYMOU) GROUP( ) NAME(???)
LOGON/JOB INITIATION - USER AT TERMINAL NOT RACF-DEFINED
ICH408I USER(ANONYMOU) GROUP( ) NAME(???)
LOGON/JOB INITIATION - USER AT TERMINAL NOT RACF-DEFINED
HCPMXE6224I Event recording is pending because there are no users connected to *
MONITOR for this type of data.
HCPMXE6224I Sample recording is pending because there are no users connected to
*MONITOR for this type of data.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
ICH408I USER(TIMK) GROUP(DEMO) NAME(######################)
LOGON/JOB INITIATION - INVALID PASSWORD ENTERED AT TERMINAL 98086472
GRAF L0005 DISCONNECT TIMVPS USERS = 136
GRAF L0003 RECONNECT TIMVPS USERS = 136 BY TIMK FROM 152.8.100.114
GRAF L0005 DIALED TO OPERATOR 0100 DIALED= 1 FROM 152.8.100.114
GRAF L0005 DROP FROM OPERATOR 0100 DIALED= 0
ICH408I USER(VSIMAINT) GROUP(SYS1) NAME(######################)
LOGON/JOB INITIATION - INVALID PASSWORD ENTERED AT TERMINAL 98086472
GRAF L0006 DIALED TO OPERATOR 0200 DIALED= 1 FROM 152.8.100.114
GRAF L0006 DROP FROM OPERATOR 0200 DIALED= 0
ICH408I USER(ZVPS) GROUP(SYS1) NAME(######################)
LOGON/JOB INITIATION - INVALID PASSWORD ENTERED AT TERMINAL 98086472
MORE... VSIVM4


:55:07 OPERATOR GRAF L0006 DISCONNECT TIMK USERS = 154 FORCED BY SYS
:46:10 ZALERT SUSELNX2 RUNNING CRAZY
:56:11 ZALERT SUSELNX2 RUNNING CRAZY
:00:00 OPERATOR HCPMXE6224I Event recording is pending because there are n
sers connected to *MONITOR for this type of data.
:00:00 OPERATOR HCPMXE6224I Sample recording is pending because there are
users connected to *MONITOR for this type of data.
:01:06 DIRMAINT DVHRLY3887I Hourly processing completed; 0 log
:01:06 DIRMAINT DVHRLY3887I files processed, 1 log files remaining.
:01:10 ZALERT S11S2ORA RUNNING CRAZY
:06:10 ZALERT SUSELNX2 RUNNING CRAZY
:16:10 ZALERT SUSELNX2 RUNNING CRAZY
:16:41 OPERATOR GRAF L0007 LOGON AS ZMAP USERS = 154 BY DSADEV F
192.168.5.225
:26:11 ZALERT SUSELNX2 RUNNING CRAZY
:46:11 ZALERT SUSELNX2 RUNNING CRAZY
:56:11 ZALERT SUSELNX2 RUNNING CRAZY
:00:00 OPERATOR HCPMXE6224I Event recording is pending because there are n
sers connected to *MONITOR for this type of data.
:00:00 OPERATOR HCPMXE6224I Sample recording is pending because there are
users connected to *MONITOR for this type of data.
:01:07 DIRMAINT DVHRLY3887I Hourly processing completed; 0 log
:01:07 DIRMAINT DVHRLY3887I files processed, 1 log files remaining.
:06:10 ZALERT SUSELNX2 RUNNING CRAZY
:07:53 OPERATOR GRAF L000D RECONNECT DSADEV USERS = 154 FROM 192.168.
25
:16:11 ZALERT SLES10 RUNNING CRAZY
:16:11 ZALERT SUSELNX2 RUNNING CRAZY
:26:11 ZALERT SUSELNX2 RUNNING CRAZY
:33:52 OPERATOR GRAF L0007 LOGOFF AS ZMAP USERS = 153
:34:01 OPERATOR GRAF L000D DISCONNECT DSADEV USERS = 153
:36:11 ZALERT SUSELNX2 RUNNING CRAZY
:46:10 ZALERT SUSELNX2 RUNNING CRAZY
:50:42 OPERATOR GRAF L0007 LOGON AS ZVPS USERS = 154 BY TIMK F
75.103.4.82
:55:07 OPERATOR GRAF L0006 DISCONNECT TIMK USERS = 154 FORCED BY SYS
:56:11 ZALERT SUSELNX2 RUNNING CRAZY
1=Help 2= 3=Quit 4=Del Hold 5=All 6=PFKEY Off

Redisplay and searching

- Page or search forward or backward
- Date and/or time
- Literals
- ALL command
- Multiple operands with & | ¬


:57:19 OPERATOR USER DSC LOGOFF AS TIMVPS USERS = 144 FORCED BY SYS
:24:14 OPERATOR USER DSC LOGOFF AS TIMK USERS = 143 FORCED BY SYS
:22:11 OPERATOR USER DSC LOGOFF AS TIMVPS USERS = 143 FORCED BY SYS
:58:14 OPERATOR USER DSC LOGOFF AS TIMVPS USERS = 143 FORCED BY SYS
Friday June 21 2013
:46:16 OPERATOR USER DSC LOGOFF AS DEMOWS61 USERS = 151 FORCED BY SYS
Saturday June 22 2013
Sunday June 23 2013
:04:24 OPERATOR USER DSC LOGOFF AS RKSDEV USERS = 145 FORCED BY SYS
Monday June 24 2013
Tuesday June 25 2013
Wednesday June 26 2013
Thursday June 27 2013
Friday June 28 2013
Saturday June 29 2013
:29:36 OPERATOR USER DSC LOGOFF AS DXTVPS USERS = 156 FORCED BY SYS
Sunday June 30 2013
Monday July 01 2013
:32:10 OPERATOR USER DSC LOGOFF AS DXTVPS USERS = 158 FORCED BY SYS
Tuesday July 02 2013
Wednesday July 03 2013
Thursday July 04 2013
:59:44 OPERATOR USER DSC LOGOFF AS RKSDEV USERS = 157 FORCED BY SYS
Friday July 05 2013
Saturday July 06 2013
:27:41 OPERATOR USER DSC LOGOFF AS DXTDEV USERS = 156 FORCED BY SYS
:30:47 OPERATOR USER DSC LOGOFF AS DXTVPS USERS = 155 FORCED BY SYS
Sunday July 07 2013
Monday July 08 2013
Tuesday July 09 2013
Wednesday July 10 2013
:42:44 OPERATOR USER DSC LOGOFF AS TIMVPS USERS = 154 FORCED BY SYS
Thursday July 11 2013
:33:43 OPERATOR USER DSC LOGOFF AS TIMK USERS = 154 FORCED BY SYS
:34:34 OPERATOR USER DSC LOGOFF AS TIMVPS USERS = 153 FORCED BY SYS
Friday July 12 2013
:37:40 OPERATOR USER DSC LOGOFF AS DXTDEV USERS = 155 FORCED BY SYS
1=Help 2= 3=Return 4= 5=All 6=PFKEY Off
7=Backward 8=Forward 9=Loc Back 10=Loc Fwd 11= 12=Retrieve

Other display options

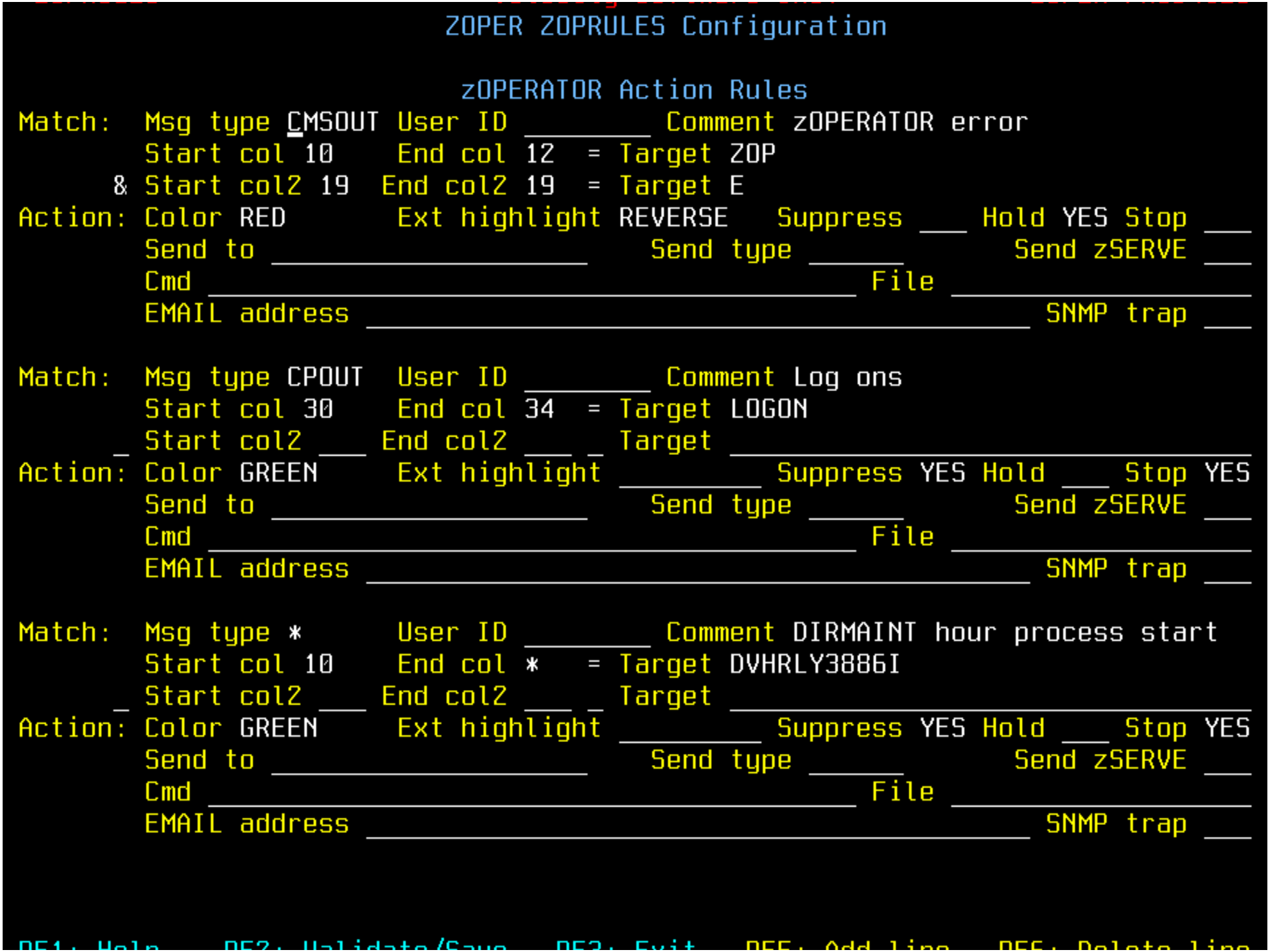
- Split screen
- SCALE
- ZONE
- PFKEY
- SUPPRESS
- USER
- TIME
- WRAP

Remote access

- DIAL terminals
  - Option to restrict commands
  - One terminal buffer
  - Terminal size must be less than or equal to original size
- View from another CMS user
- zVIEW web page
  - Automatically updates every 30 seconds
  - Select date and time range
  - Select user (next release)

Message rules processing

- Easy online configuration
- Fast and efficient processing
- Unique or common to each zOPERATOR instance


ZOPER ZOPRULES Configuration
zOPERATOR Action Rules
Match: Msg type CMSOUT User ID _____ Comment zOPERATOR error
Start col 10 End col 12 = Target ZOP
& Start col2 19 End col2 19 = Target E
Action: Color RED Ext highlight REVERSE Suppress ___ Hold YES Stop ___
Send to _____ Send type _____ Send zSERVE ___
Cmd _____ File _____
EMAIL address _____ SNMP trap ___
Match: Msg type CPOUT User ID _____ Comment Log ons
Start col 30 End col 34 = Target LOGON
_ Start col2 ___ End col2 ___ _ Target _____
Action: Color GREEN Ext highlight _____ Suppress YES Hold ___ Stop YES
Send to _____ Send type _____ Send zSERVE ___
Cmd _____ File _____
EMAIL address _____ SNMP trap ___
Match: Msg type * User ID _____ Comment DIRMAINT hour process start
Start col 10 End col * = Target DVHRLY3886I
_ Start col2 ___ End col2 ___ _ Target _____
Action: Color GREEN Ext highlight _____ Suppress YES Hold ___ Stop YES
Send to _____ Send type _____ Send zSERVE ___
Cmd _____ File _____
EMAIL address _____ SNMP trap ___

Alerts

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VM Workshop 2014

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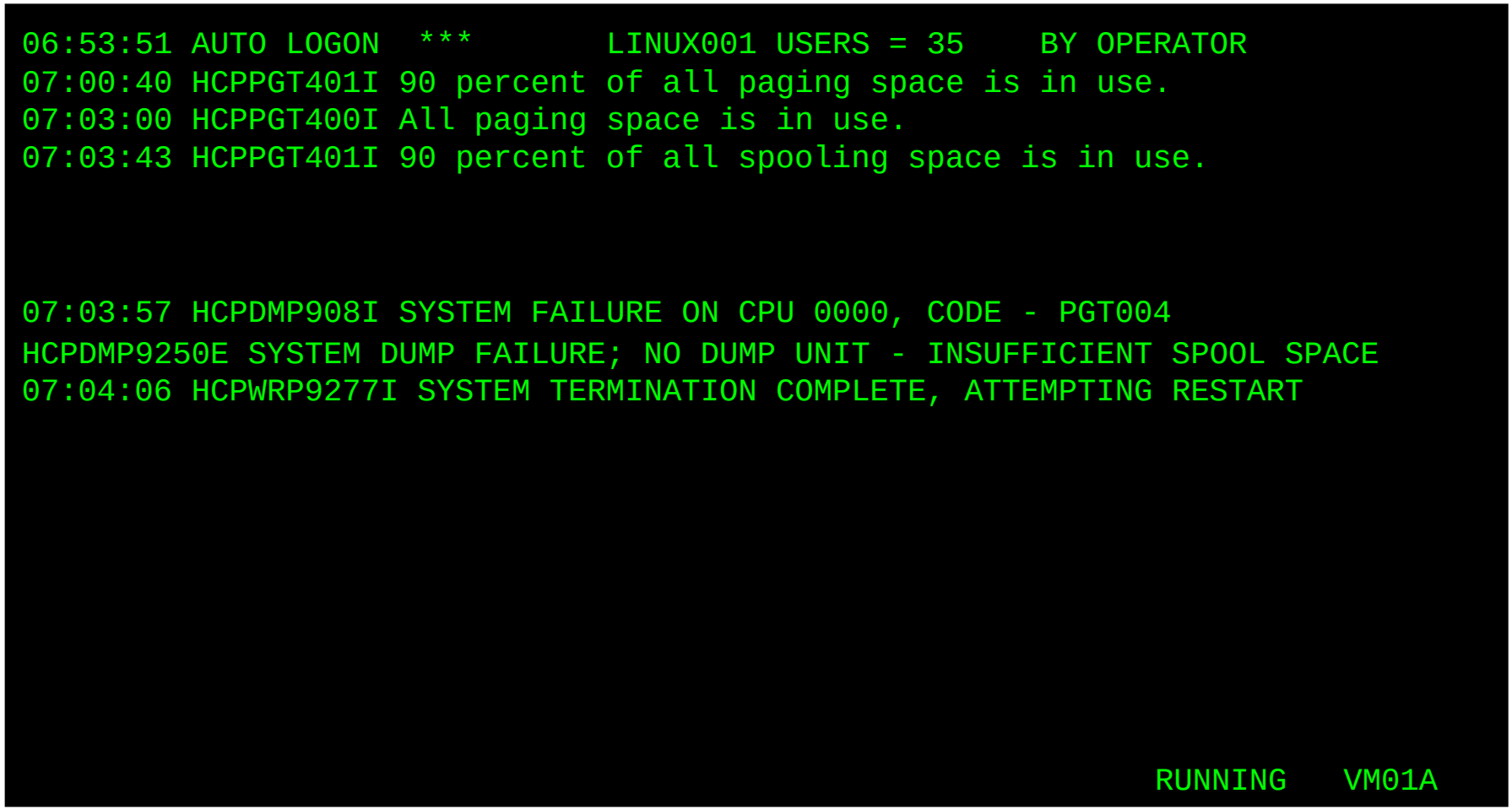

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Outage event

- Catastrophic events can have a large impact
  - Unavailability of applications
  - Potential for information loss
  - Disruption of customer service
  - Political ramifications
    - Complex platform
    - Outage makes z appear weak, unmanageable

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Outage event

- Availability is critical to success
- Reduction or elimination of outages is vital
- A well maintained, highly-available system...
  - Looks good to customers, end-users, shareholders

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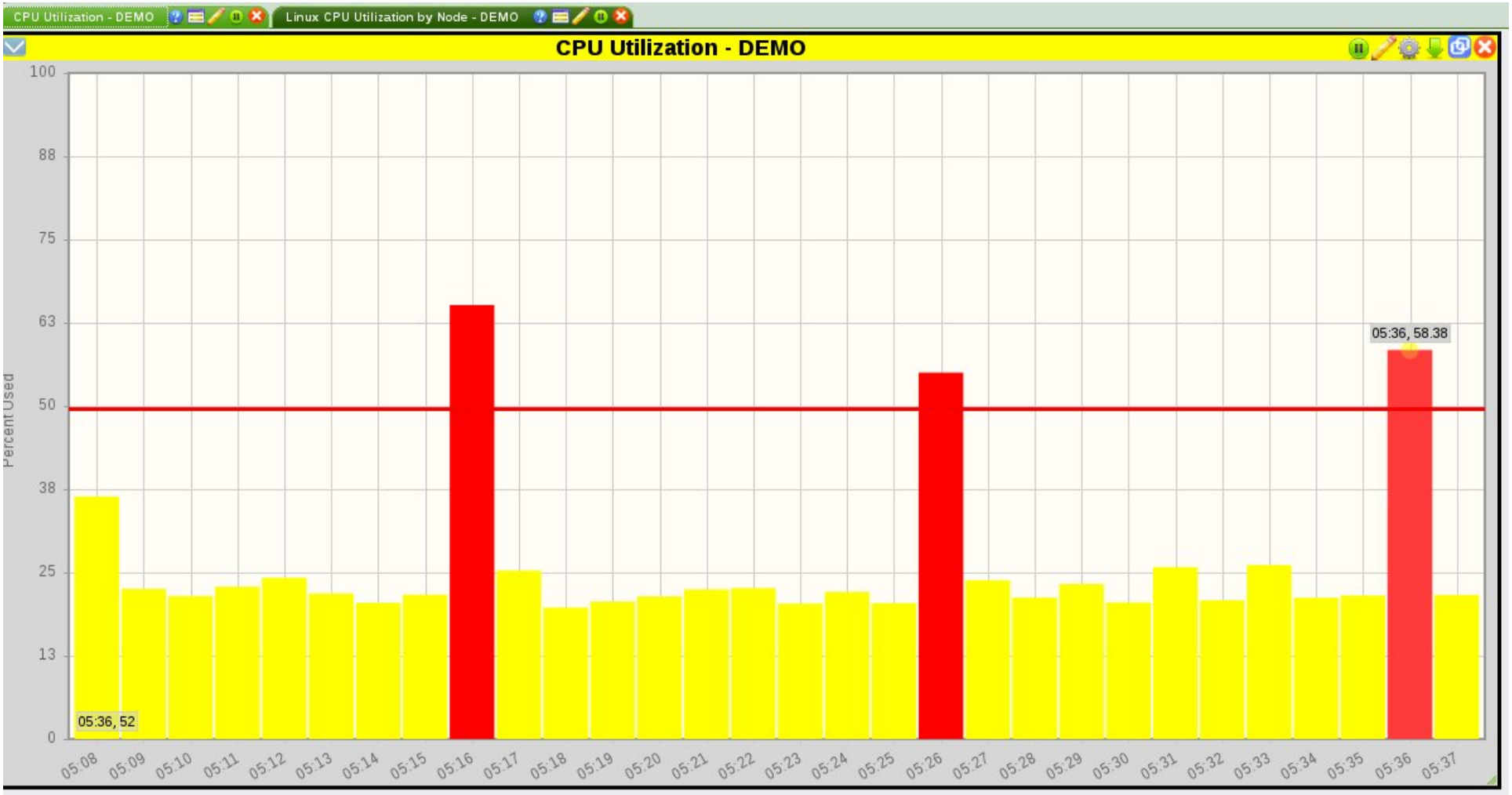
Something a little less traumatic



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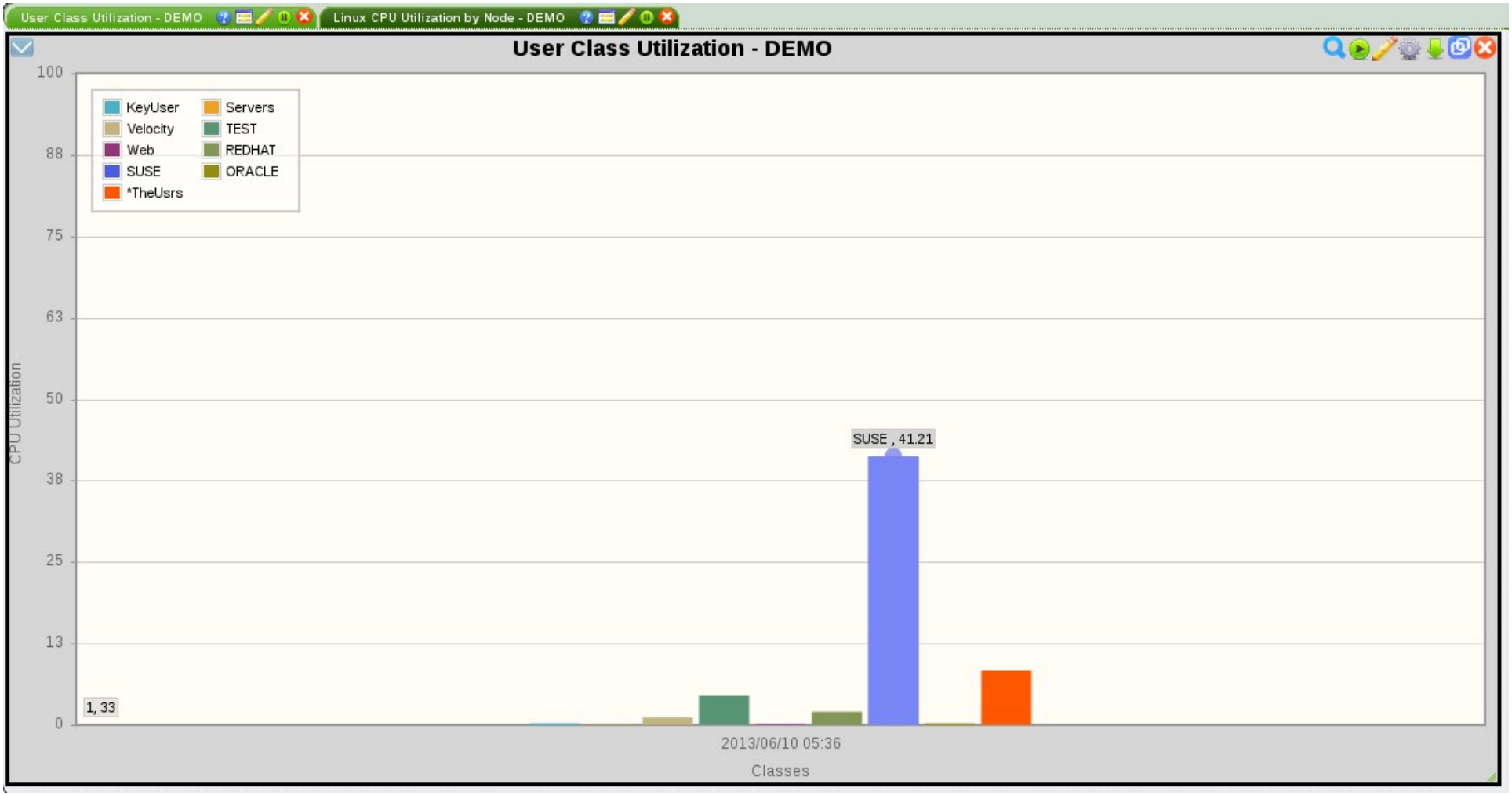
Tracking down a spike



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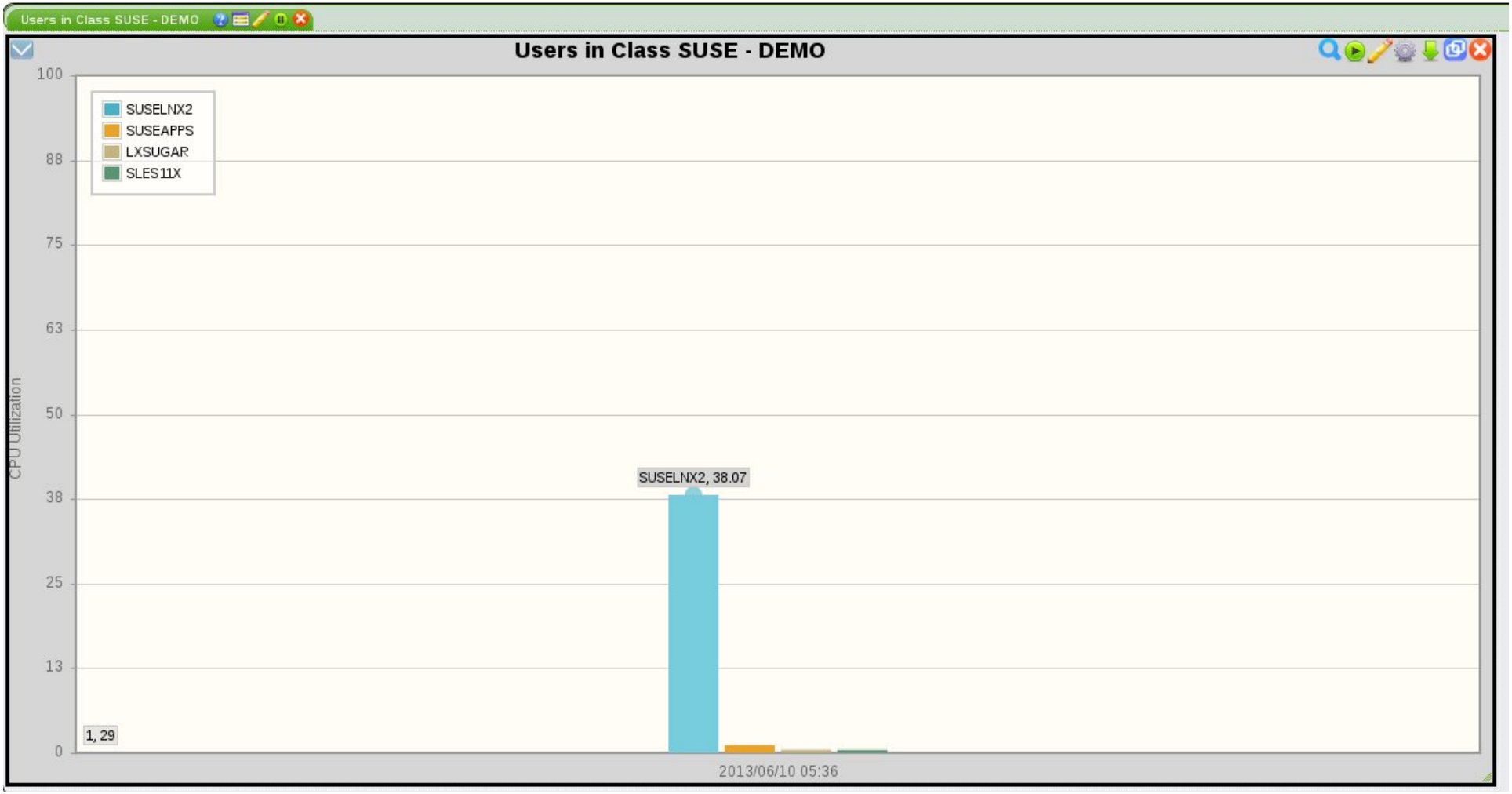
Tracking down a spike



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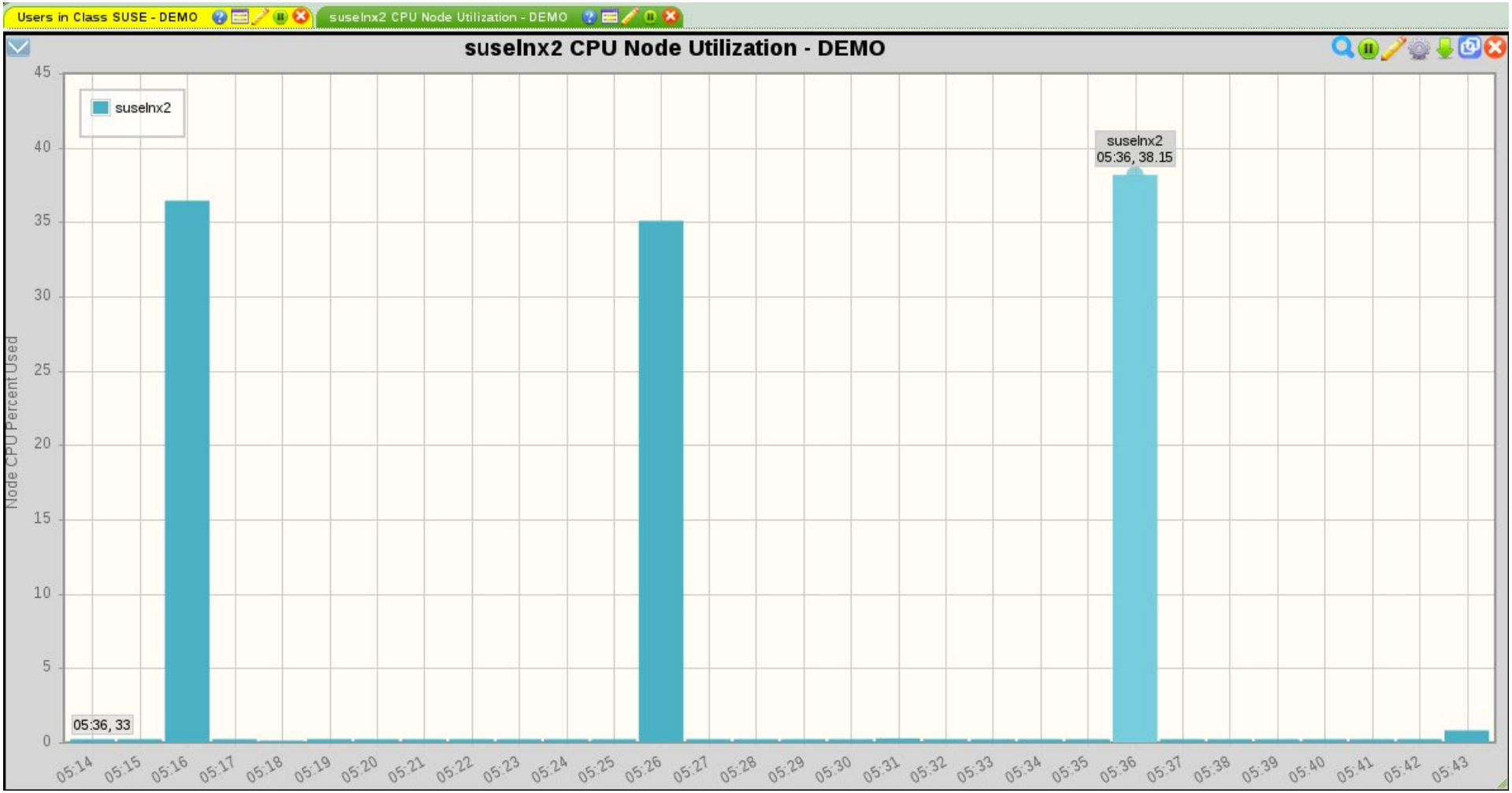
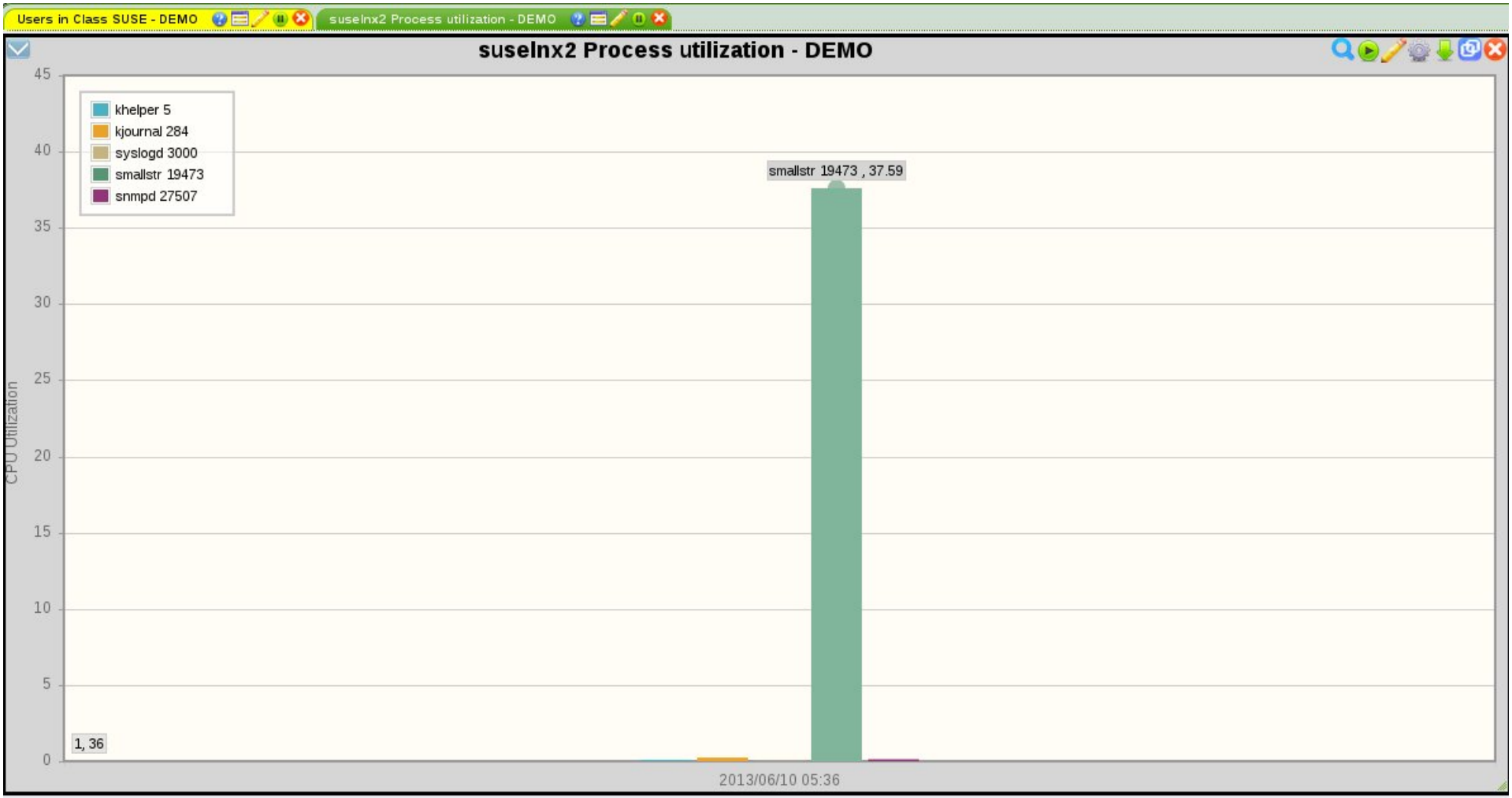
Tracking down a spike



VELOCITY SOFTWARE

Tracking down a spike



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Data Collection

- Full function performance data
  - Not only for analysis of performance issues
  - Assist in determining the health of your system
- Alerts can be built from collected information

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What are alerts?

- An alert is an indication of an abnormal condition
- An abnormal condition can be
  - Exceeding a certain threshold
  - An object in an unwanted state
    - Volume offline
    - Virtual machine not logged on
    - Incorrect system settings

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Defining your own alerts

- Coding an alert requires the use of data fields from the monitor
- Data is extracted
- Analyzed to determine if it exceeds a threshold
- For values greater than threshold
  - Message issued
  - Optional action is taken

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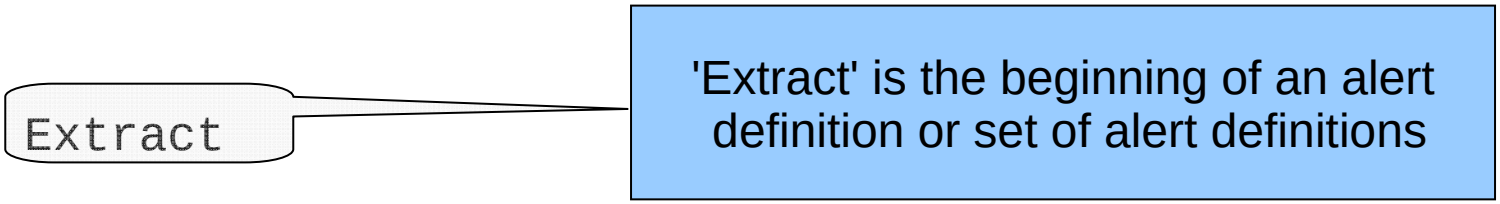
Defining your own alerts

- Alert for page utilization



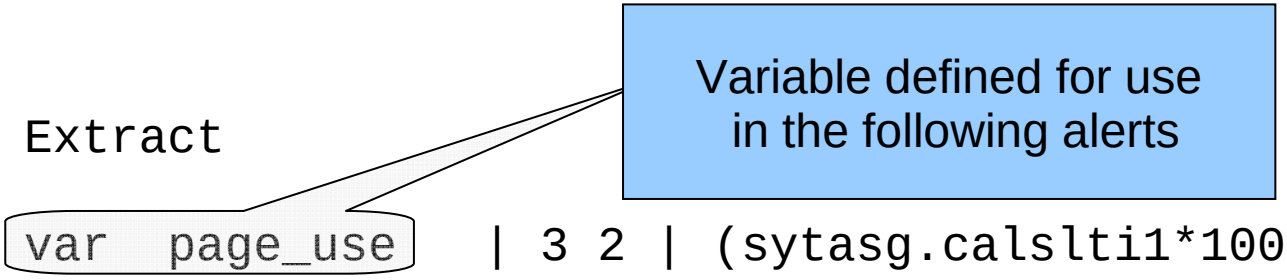

```
var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization




```
Extract
var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Size of each variable with optional decimal precision

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% use
```

Fields to extract -
names are described in the PDR
(Performance Data Reference)

Can be a single field or multiple fields involved in simple to complex math operations.

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

ALERT statement defines a specific alert

```
Extract

var  page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Each alert requires a previously defined variable

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Four character code used when displaying alerts

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

LEVEL statement controls the threshold values

```
Extract

var  page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Values tested against
the alert variable

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Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Color of the alert text when this level is exceeded

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Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Message displayed on
3270 and zView alert screens

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Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

Alert variable substitution

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Defining your own alerts

- Alert for page utilization

```
Extract

var   page_use    | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
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level 50  pink rev
level 70  red rev notify
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```

VELOCITY SOFTWARE

Defining your own alerts

- Alert for page utilization

```
Extract

var  page_use   | 3 2 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 05  green
level 40  yellow
level 50  pink rev
level 70  red rev notify
text Page space is &page_use% used
```

'notify' generates an email notification for an alert at a specific threshold; other options: CP, CMS, EXEC

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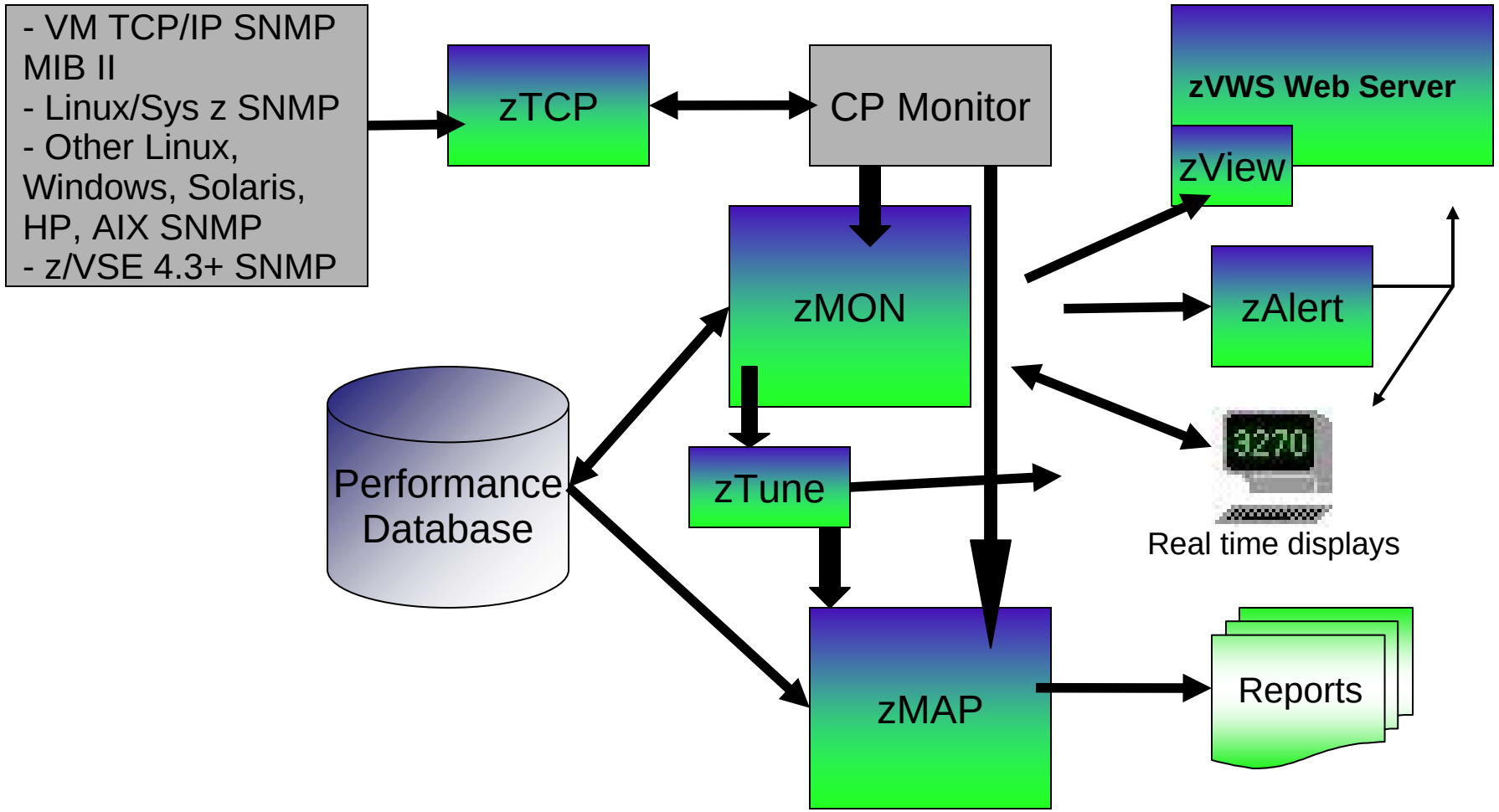
Where do alerts fit?



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zAlert package

- Separate virtual machine is used to process alerts and send notifications
- The alert virtual machine wakes up every minute, reading the provided MONALERT file
- Each of the defined extracts is executed
  - Values returned compared against user defined thresholds
  - Message displayed or action(s) taken when thresholds are exceeded

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Alert result - 3270

- Alert display on 3270

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Viewing alerts

- Alert display on zView

SYSTEM ALERT1

Code	Alert Description
DSCK	Node linux93 filesystem '/' is at 83%
DSCK	Node roblnx2 filesystem '/' has 395344K available
DSCK	Node xroblnx2 filesystem '/' has 395344K available
LNSU	Swap utilization for Linux node SUSEAPPS is 62%
LNSU	Swap utilization for Linux node solarisb is 88%
PGUT	Page space is 47% used
PRCK	linux93 proc top not found.
PRCK	roblx1 proc hogmem not found.
PRCK	BROBLX1 proc hogmem not found.
SPOL	Spoolspace is 78% used
TIDL	Test Idle for ESASERVE is 67
TIDL	Test Idle for RKSDEV is 25
TIDL	Test Idle for S11S2ORA is 63
TIDL	Test Idle for ZTCP is 67
VMOC	VM overcommit ratio is 6.7
VMPG	Page rate for user ROBLX1 199
VMPG	Page rate for user SUSEAPPS 151
VMPG	Page rate for user S11S2ORA 290
VMPG	Page rate for user ZWEB03 176
VMXR	Expanded storage rate for SFSVM4 425
VMXR	Expanded storage rate for SUSEAPPS 817
VMXR	Expanded storage rate for S11S2ORA 1021
VMXR	Expanded storage rate for ZWEB08 401
XMVM	User SFSZVPS not logged onto system
XPRO	CPU Utilization for process stress-15496 on linux93 is 29%
XPRO	CPU Utilization for process stress-15497 on linux93 is 29%
XPRO	CPU Utilization for process stress-15498 on linux93 is 29%

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Alert samples

- Alert samples are shipped with the ZALERT package
  - ALERT1 MONALERT is combined from the four previously provided sample files
  - Samples ship with alerts to check various conditions that can potentially occur
    - CPU/Spool/Page Utilization, I/O Rate, Paging Rate
    - Network node CPU utilization, I/O Rate, disk utilization, swap rate and utilization
- Additional samples available on our web site

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Alert rules

- Adjust the number and value of levels based on local requirements
  - At least one LEVEL statement is necessary
  - LEVEL statements must appear in ascending value order
- Standard 3270 colors are allowed
  - Turquoise, Blue, Red, Yellow, Green, Pink, White
  - If no color is specified, the default is Green
  - Color modifiers are allowed
    - **REV**video – reverse video
    - **BLI**nk – blink the entire text
    - **UNDERLINE** – underline the entire text

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Notifications

- A notification is a message sent to interested parties of an alert condition
- Sent in one or more of the following forms
  - CP MSG/MSGNOH
  - Email
  - Text page (via email)
  - SNMP Trap

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Notifications

- At it's simplest a notification can take the form of a message to a CMS user

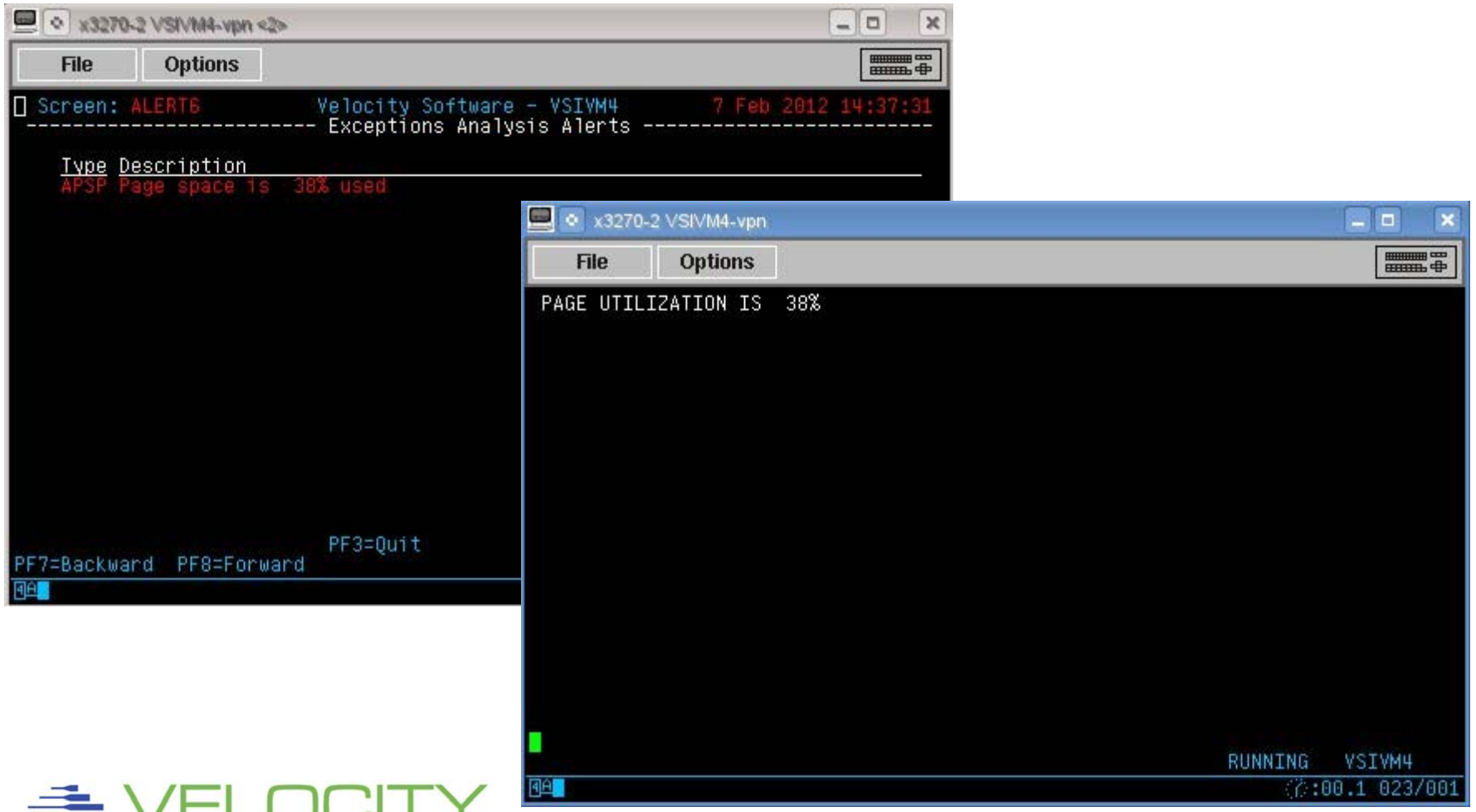
```
Extract
var  page_use   | 3 0 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 30  yellow
level 35  red   ACTION CP MSG ZVPS Page utilization is &page_use%
level 50  red rev
text Page space is &page_use% used
```

ACTION keyword on the LEVEL statement allows targeted messaging for a specific threshold

VELOCITY SOFTWARE

Notifications

- Results of ACTION



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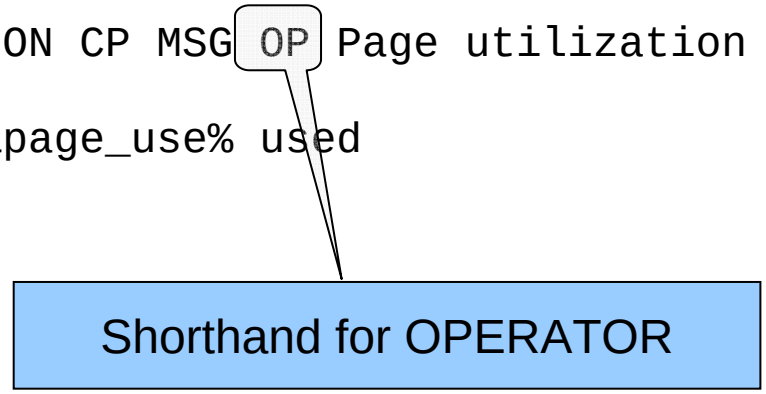
Notifications

- Change the recipient to interface with zOperator

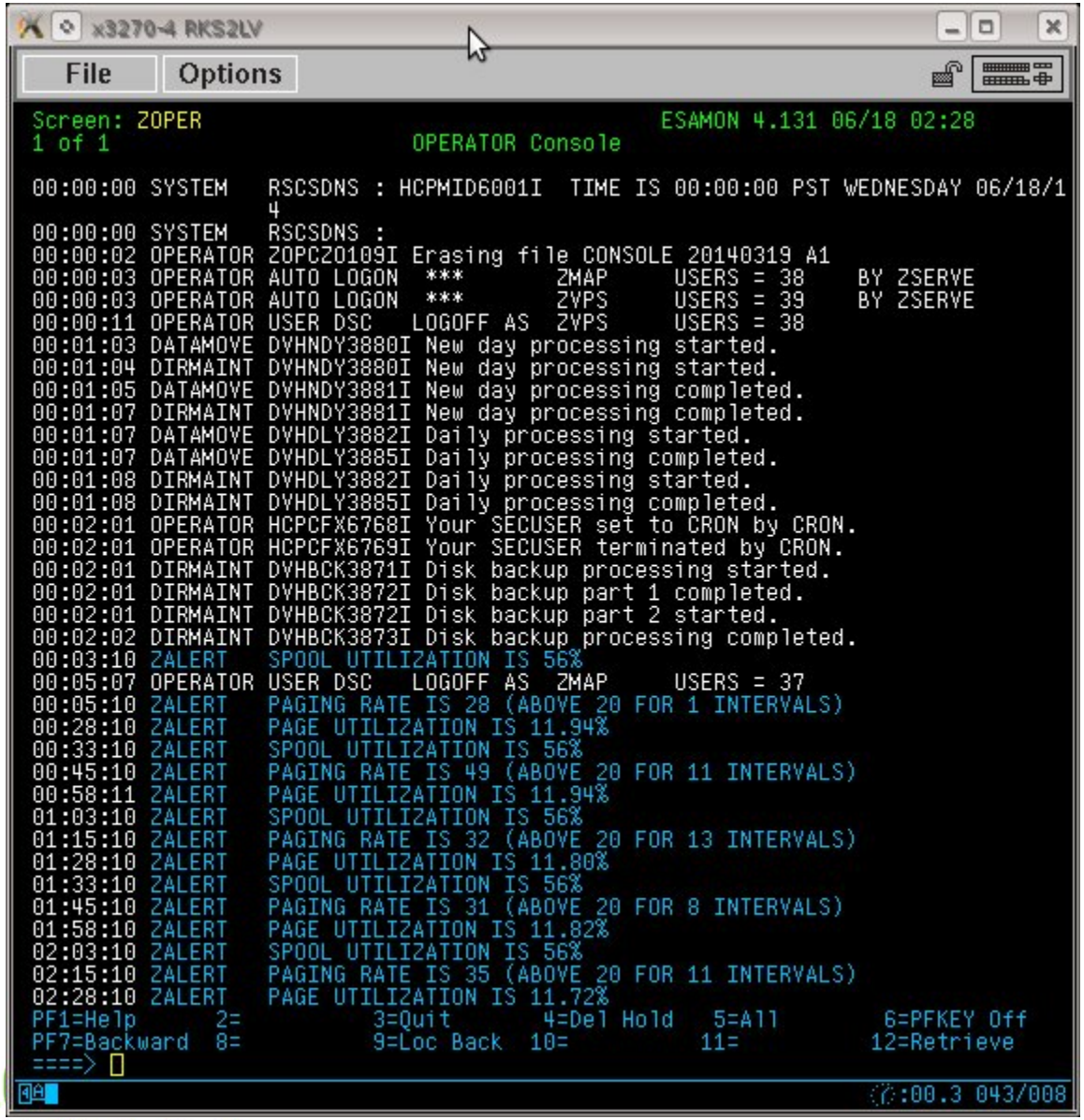
```
Extract
var  page_use   | 3 0 | (sytasg.calslti1*100)/sytasg.calslta1

alert page_use apsp
level 30  yellow
level 35  red   ACTION CP MSG OP Page utilization is &page_use%
level 50  red rev
text Page space is &page_use% used
```



VELOCITY SOFTWARE

Notifications



VELOCITY SOFTWARE

Notifications

- A REXX EXEC can be invoked to send an email

```
Extract
var  spool_use  | 3 0 | (sytasg.calslti2*100)/sytasg.calslta2

alert spool_use spol
level 50 yellow
level 75 red
level 85 red rev ACTION CMS EMAIL RKS2LV SPOL &spool_use
text Spool area utilization &spool_use%
```

Executes a CMS command - EMAIL EXEC

VELOCITY SOFTWARE

Notifications

- A REXX EXEC can be invoked to send an email

```
/* EMAIL: Sample EXEC to provide notify function */
parse arg node code value

Select
  When code='SPOL' then
    msg='Spool Utilization for 'node value'%'
  When code='XACP' then
    msg='CPU Utilization for 'node value'%'
  Otherwise
    exit
  End

Queue 'input Subject: zVPS 'code' alert'
Queue 'input 'msg
Queue 'COMMAND CMS SENDFILE ( NOTE'
'EXEC NOTE rich@velocitysoftware.com (NONOTEBOOK'
exit
```

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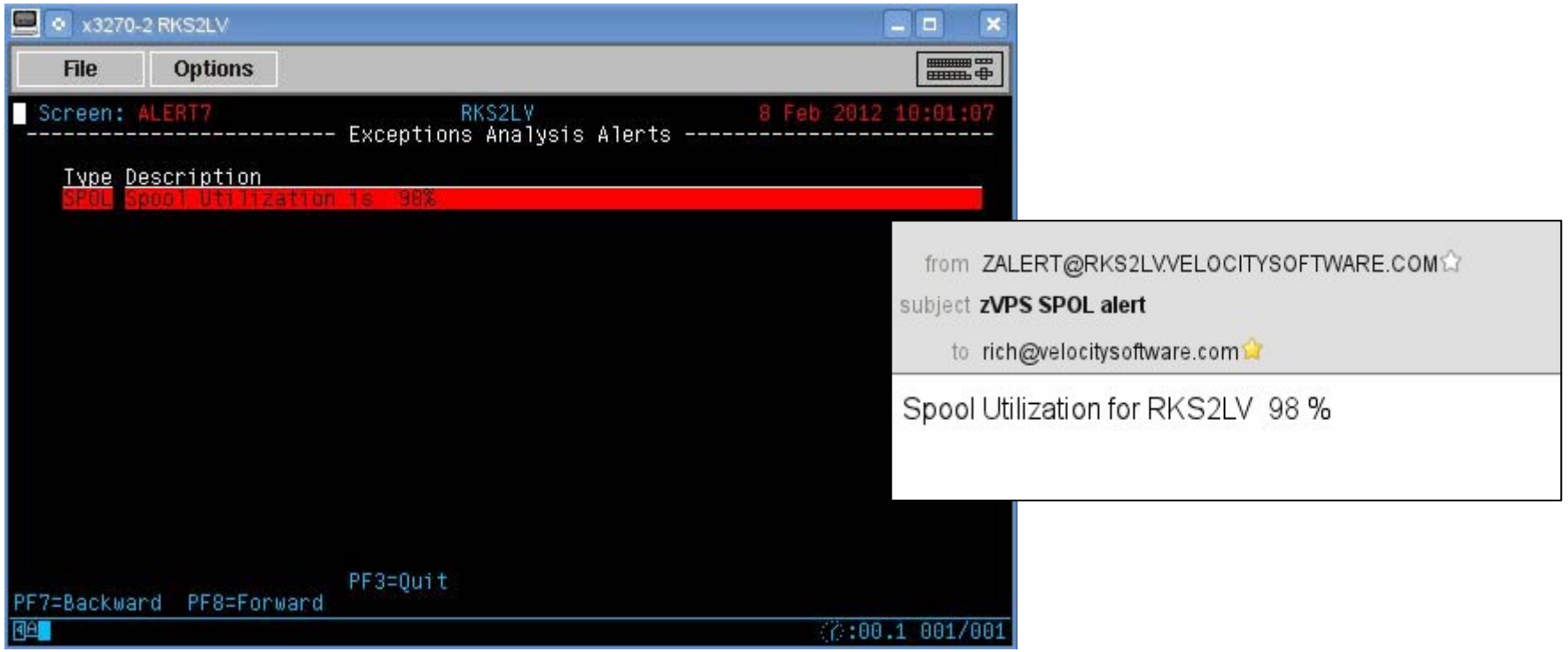
Notifications

- A REXX EXEC can be invoked to send an email



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Notifications

- Cell phone text alerts
  - Produced via an email message
  - Each carrier varies in their approach
  - List of Email to SMS gateways for most providers

http://www.tech-faq.com/how-to-send-text-messages-free.html
AT&T (formerly Cingular) [10-digit-number]@txt.att.net
Sprint [10-digit-number]@messaging.sprintpcs.com
T-Mobile [10-digit-number]@tmomail.net
US Cellular [10-digit-number]@email.uscc.net
Verizon [10-digit-number]@vtext.com

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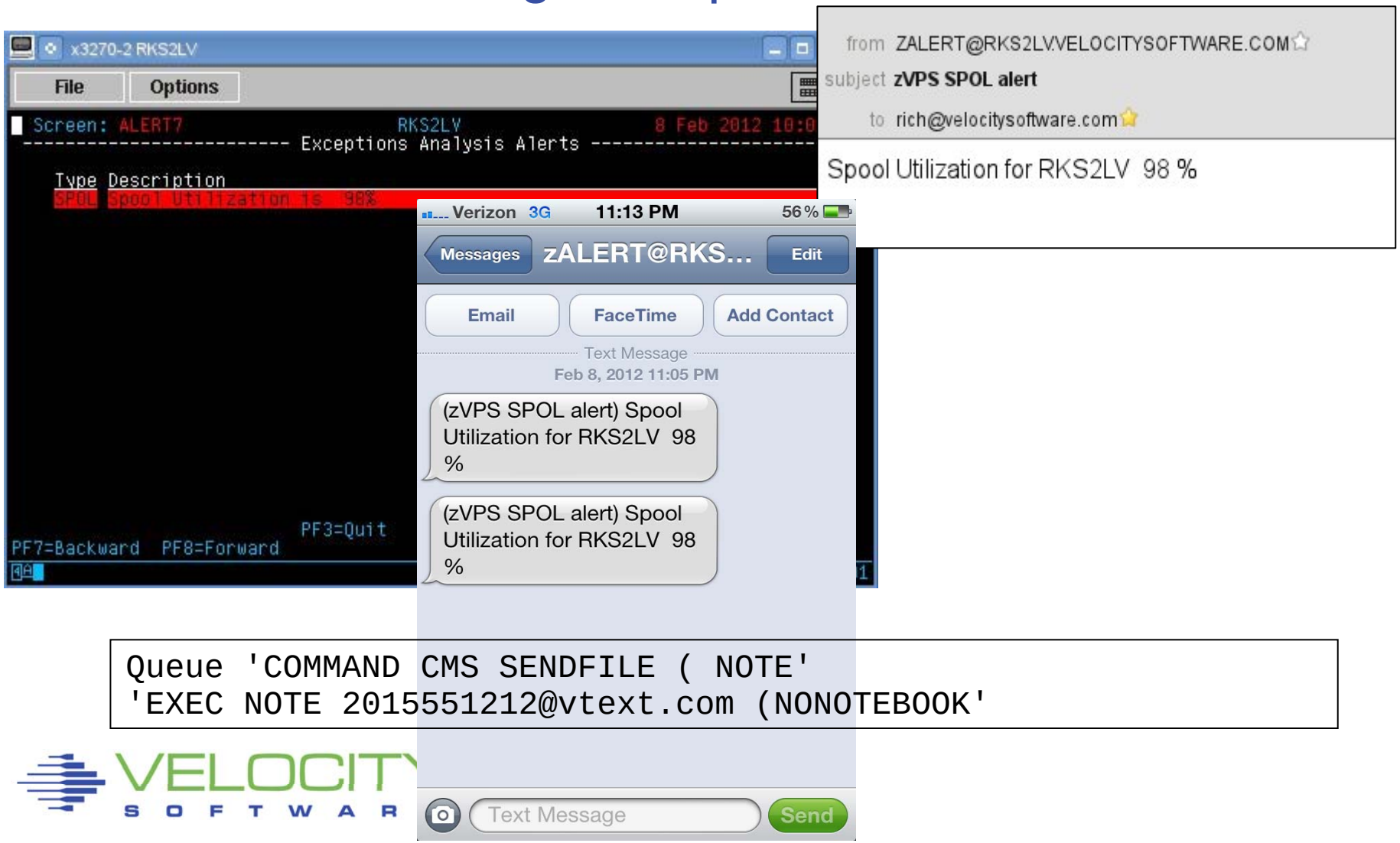
Notifications

- SMS/Text Message sample




```
Queue 'COMMAND CMS SENDFILE ( NOTE'
'EXEC NOTE 2015551212@vtext.com (NONOTEBOOK'
```

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Summary

- Alerts provide the way to passively monitor your system
- Thresholds exceeded are displayed on one screen
- Notifications can be delivered for critical issues
- Management consoles fit this mechanism perfectly
- Many useful samples are provided

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Questions

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