

# zVPS Alerts

Richard Smrcina  
Velocity Software, Inc.  
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# Agenda

- **Overview**
- **What are alerts?**
  - ◆ Where do alerts fit
- **Installing zAlert package**
  - ◆ Viewing alerts
- **Alert samples**
- **Defining your own alert**
  - ◆ CPU Utilization
  - ◆ LPAR Utilization
- **Notification**
  - ◆ Email
  - ◆ SNMP trap
- **Level Text**
- **Alert options**
- **Enable/Disable**
- **Limit**
- **Time**
- **Include/Exclude**
- **Multiple alerts**
- **External processing**
- **Integration with zOperator**
- **Operating zAlert**

# What are alerts?

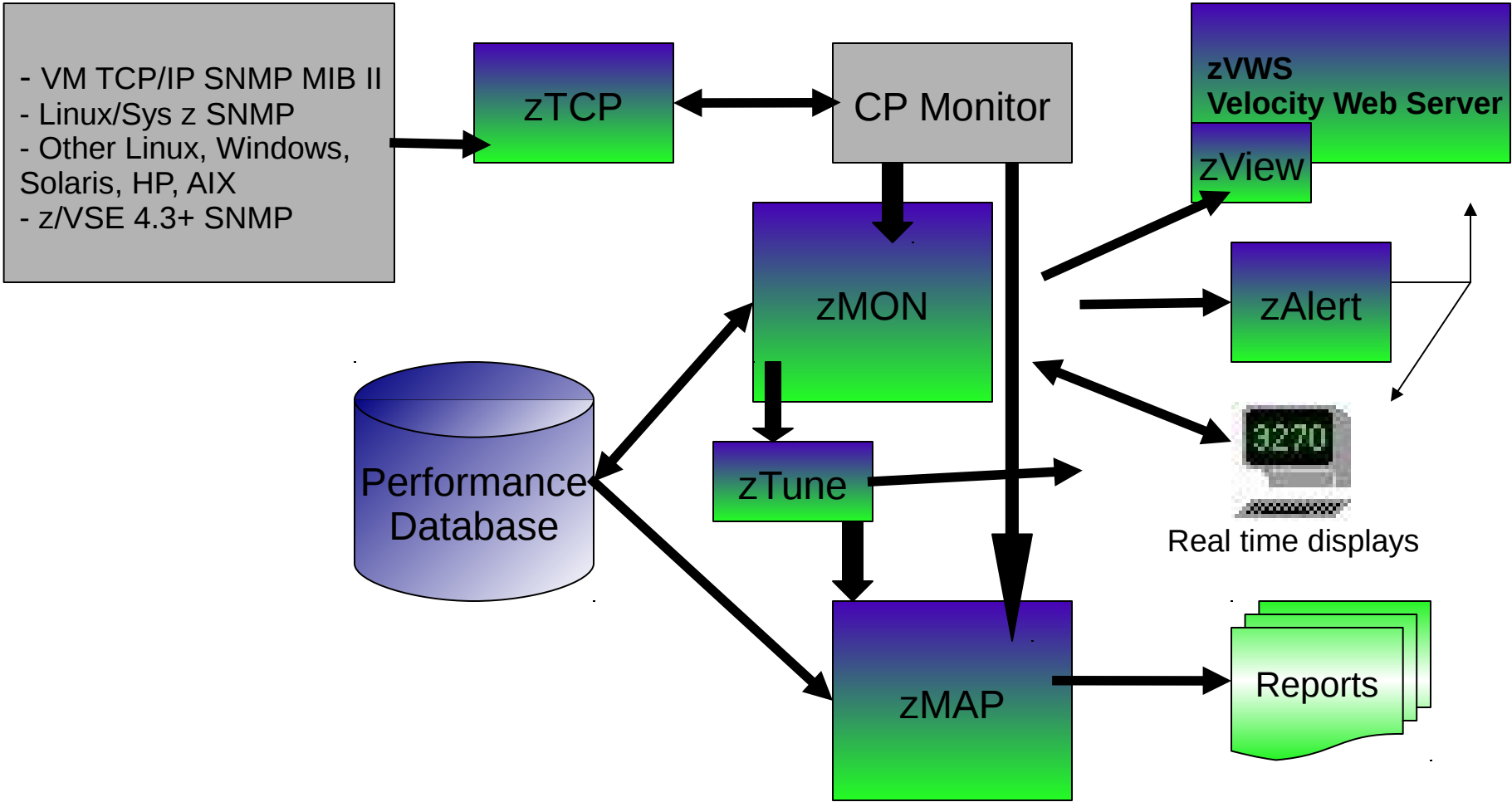
- **An alert is an indication of an abnormal condition**
- **An abnormal condition can be**
  - ◆ Exceeding a certain threshold
  - ◆ An object in a state not conducive to proper operation
    - Volume offline
    - Virtual machine not logged on
    - Incorrect system settings

**This presentation goes through the finer points of alert processing.**

**Where alerts come from, how they are used and specified in the product.**

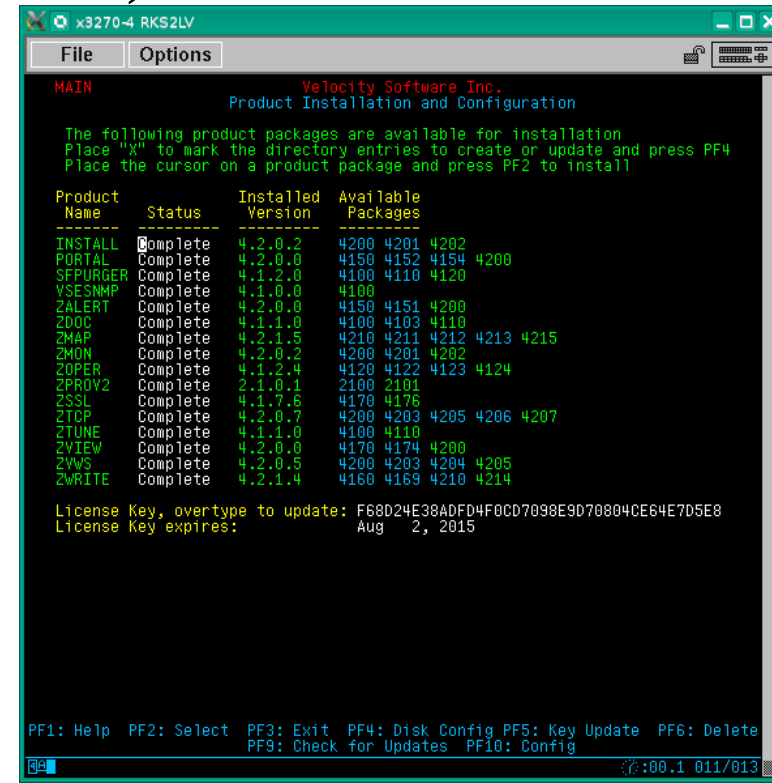
**Alerts are no good if they need to be visually watched or monitored... notifications provide a proactive mechanism to using alerts.**

# Where do alerts fit?



# Installing zAlert package

- zAlert is part of the Velocity Performance Suite (zVPS)
- Installed via the zVPS installer
  - ◆ Requires a virtual machine (ZALERT)
  - ◆ SFS filespace
    - By default SFSZVPS:ZALERT.
  - ◆ DCSS to keep alert messages
  - ◆ Sample alerts provided
  - ◆ More on the website



```

x3270-4 RKS2LV
File Options
MAIN Velocity Software Inc.
Product Installation and Configuration

The following product packages are available for installation
Place "X" to mark the directory entries to create or update and press PF4
Place the cursor on a product package and press PF2 to install

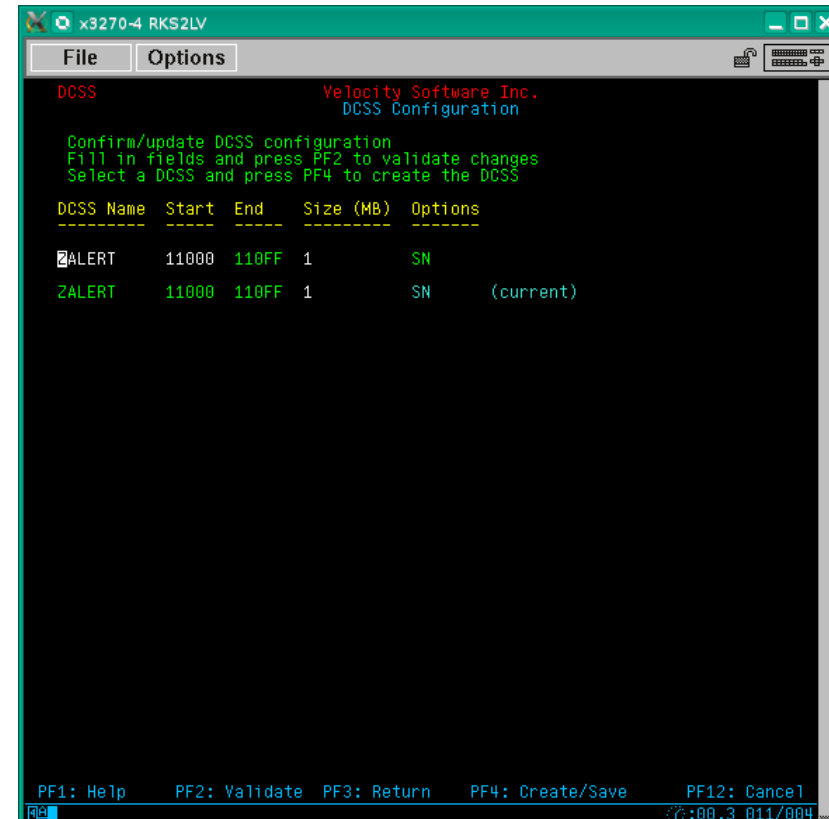
Product Name Status Installed Version Available Packages
-----
INSTALL Complete 4.2.0.2 4200 4201 4202
PORTAL Complete 4.2.0.0 4150 4152 4154 4200
SFPURGER Complete 4.1.2.0 4100 4110 4120
VSESANMP Complete 4.1.0.0 4100
ZALERT Complete 4.2.0.0 4150 4151 4200
ZDOC Complete 4.1.1.0 4100 4103 4110
ZMAP Complete 4.2.1.5 4210 4211 4212 4213 4215
ZMON Complete 4.2.0.2 4200 4201 4202
ZOPER Complete 4.1.2.4 4120 4122 4123 4124
ZPROV2 Complete 2.1.0.1 2100 2101
ZSSL Complete 4.1.7.6 4170 4176
ZTOP Complete 4.2.0.7 4200 4203 4205 4206 4207
ZTUNE Complete 4.1.1.0 4100 4110
ZVIEW Complete 4.2.0.0 4170 4174 4200
ZWMS Complete 4.2.0.5 4200 4203 4204 4205
ZWRITE Complete 4.2.1.4 4160 4169 4210 4214

License Key, ovrtype to update: F68D24E38ADF4F0CD7098E9D70804CE64E7D5E8
License Key expires: Aug 2, 2015

PF1: Help PF2: Select PF3: Exit PF4: Disk Config PF5: Key Update PF6: Delete
PF9: Check for Updates PF10: Config
00:00.1 011/013
```

# Installing zAlert package

- zAlert 4.2 separates the alert function (alert engine) from the display function
- Requires a DCSS for proper operation
- Alert messages stored in the DCSS
  - Message retrieval handled by a separate EXEC
- zAlert 4.1 can still be used as is, but is functionally stabilized



The screenshot shows a terminal window titled "x3270-4 RKS2LV" with a menu bar containing "File" and "Options". The main content area displays the following text:

```
DCSS Velocity Software Inc.
      DCSS Configuration

Confirm/update DCSS configuration
Fill in fields and press PF2 to validate changes
Select a DCSS and press PF4 to create the DCSS
```

DCSS Name	Start	End	Size (MB)	Options
<input checked="" type="checkbox"/> ALERT	11000	110FF	1	SN
<input type="checkbox"/> ZALERT	11000	110FF	1	SN (current)

At the bottom of the window, there is a status bar with the following text: "PF1: Help PF2: Validate PF3: Return PF4: Create/Save PF12: Cancel" and a timestamp "00:00.3 011/004".

# Installing zAlert package

- **zAlert directory entry**
- **ZALERT DCSS is unrestricted (4.2)**
  - NAMESAVE statement not required for ZALERT
- **ZMON DCSS is required**

```
USER ZALERT ALERTS 32M 32M G
INCLUDE VSIPROF
IPL CMS PARM FILEPOOL SFSZVPS:
IUCV ALLOW
NAMESAVE ZMON ZALERT
XAUTOLOG ZSERVE ZVPS
```



# Alert processing

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

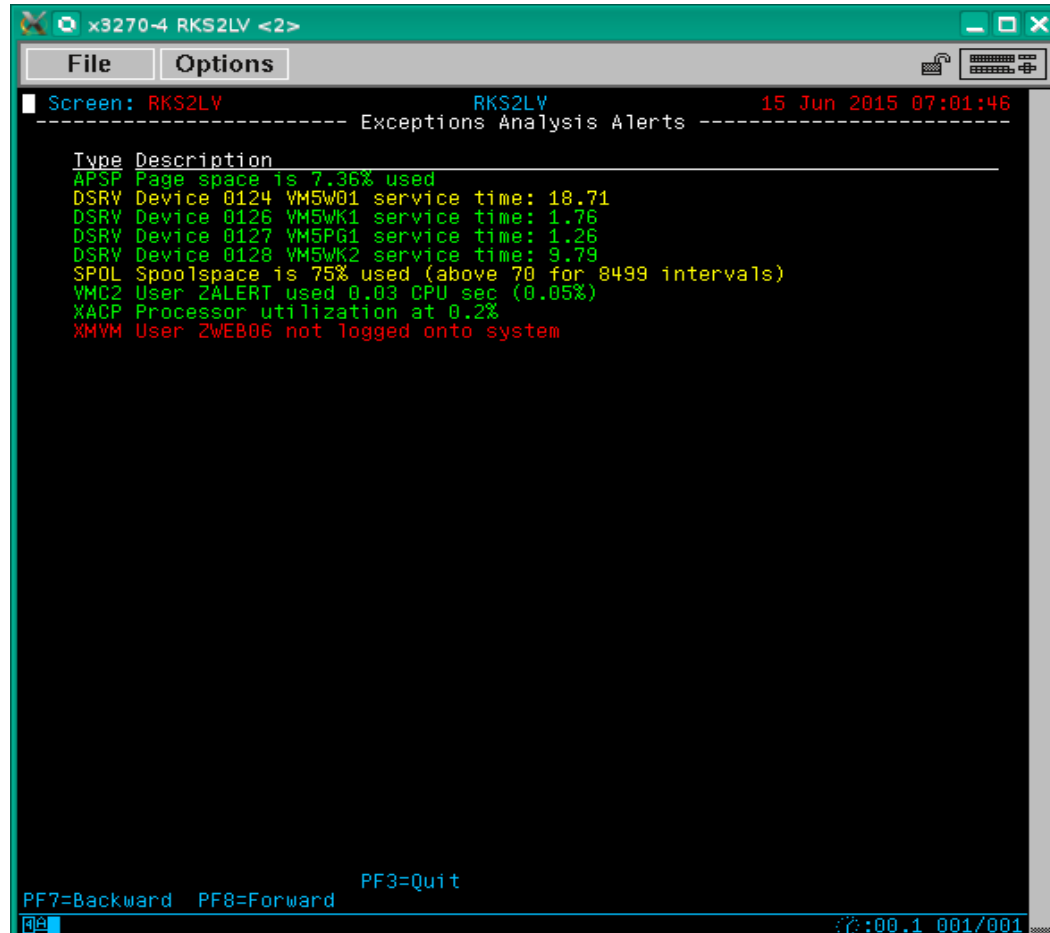
# Installing zAlert package

- **A notification can be any of**
  - ◆ Message on the alert console, zView or zAlert CGI
  - ◆ CP MSG to a user
  - ◆ Email to interested parties
    - Text message on a mobile device
  - ◆ SNMP trap sent to a management console
  - ◆ Combinations of the above

# Viewing alerts

- **Terminal session**
  - ZALERT <alertfile>

```
vmlink .dir sfszvps:zmon.code  
ZALERT RKS2LV
```



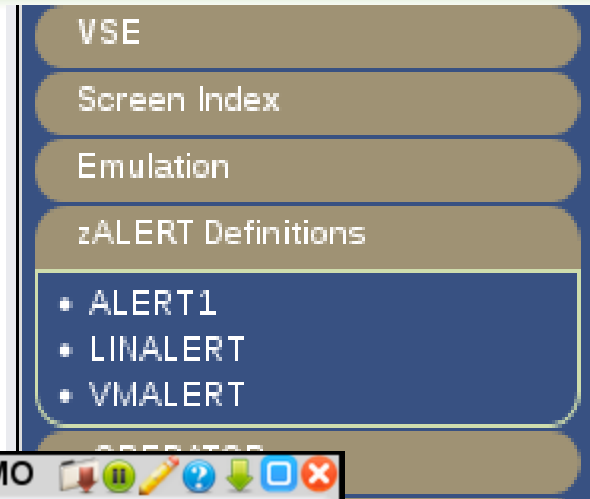
The screenshot shows a terminal window titled 'x3270-4 RKS2LV <2>'. The window has a menu bar with 'File' and 'Options'. The main content area displays a list of system alerts under the heading 'Exceptions Analysis Alerts'. The alerts are as follows:

Type	Description
APSP	Page space is 7.36% used
DSRV	Device 0124 VM5W01 service time: 18.71
DSRV	Device 0126 VM5WK1 service time: 1.76
DSRV	Device 0127 VM5PG1 service time: 1.26
DSRV	Device 0128 VM5WK2 service time: 9.79
SPOL	Spoolspace is 75% used (above 70 for 8499 intervals)
VMC2	User ZALERT used 0.03 CPU sec (0.05%)
XACP	Processor utilization at 0.2%
XMVM	User ZWEB06 not logged onto system

At the bottom of the terminal window, there are navigation instructions: 'PF7=Backward PF8=Forward PF3=Quit' and a status bar showing '00:00.1 001/001'.

# Viewing alerts

- zView
  - Select 'zAlert Definitions'
  - Select alert file to display



ALERT1 - Exceptions Analysis Alerts - 15/06/15 at 06:48 - DEMO

Code	Alert Description
CHEK	Spool Utilization is 73%
JHPU	JVM 'Server1' on lxora12 Heap Utilization 33.9%
LPCP	LPAR VSIVM4 is at 54%
ORPG	DB db01 on lxora12 PGA Utilization 72%
ORPG	DB db01 on s11s2ora PGA Utilization 62%
ORSW	DB orcl on oracle System IO Waits 1 Time 0.000
PGUT	Page space is 43% used
PRCK	roblx1 proc hogmem not found.
PRCK	sles11x proc top not found.
SFSS	Filespace DXTWRITE in SFSVM4 at 99%
SPOL	Spoolspace is 73% used
VMLP	User BLAKEMC may be looping; CPU 17%, loop count 4417
VMLP	User ROBLX1 may be looping; CPU 20%, loop count 482
VMOC	VM overcommit ratio is 3.2
XACP	Processor utilization at 52.8%


# Viewing alerts

- **CGI**

- Copy ZALERT.CGI from ZALERT top level directory to ZVWS.ROOT

**http://<vm-host>/zalert.cgi**

**http://<vm-host>/zalert.cgi?file=<alertfile>**



Exception Analysis Alerts		Alert File:ALERT1	15 Jun 2015
Velocity Software - VSIVM4		System:VSIVM4	06:52:43
Type	Description		
CHEK	Spool Utilization is 73%		
JHPU	JVM 'Server1' on lxora12 Heap Utilization 34.6%		
JHPU	JVM 'Java Nr 7' on roblix1 Heap Utilization 39.0%		
LPCP	LPAR VSIVM4 is at 55%		
ORPG	DB db01 on lxora12 PGA Utilization 72%		
ORPG	DB db01 on s11s2ora PGA Utilization 62%		
ORSW	DB db01 on lxora12 System IO Waits 1 Time 0.000		
PGUT	Page space is 43% used		
PRCK	roblix1 proc hogmem not found.		
PRCK	sles11x proc top not found.		
SFSS	Filespace DXTWRITE in SFSVM4 at 99%		
SPOL	Spoolspace is 73% used		
TIDL	Test Idle for BLAKEMC is 8		
VMLP	User BLAKEMC may be looping; CPU 17%, loop count 4421		
VMLP	User ROBLX1 may be looping; CPU 20%, loop count 486		
VMOG	VM overcommit ratio is 3.2		
XACP	Processor utilization at 53.8%		

# Alert samples

- **Alert samples are shipped with the ZALERT package**
  - ◆ ALERT1 MONALERT is combined from the four previously provided sample files
  - ◆ Older sample files are shipped with the filetype MONSAMP
    - VMALERT, LINALERT, HEALTH and HEALTH2
  - ◆ 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**

# Defining your own alerts

- **Coding an alert requires the use of data fields maintained by zVPS**
- **Data is extracted from the monitor**
- **Analyzed to determine if it exceeds a threshold**
- **For values greater than threshold**
  - ◆ Message issued
  - ◆ Optional action is taken
- **Alerts generally use the following statements**
  - ◆ EXTRACT
  - ◆ VAR
  - ◆ ALERT
  - ◆ LEVEL
  - ◆ TEXT

# Defining your own alerts

- **Alert for CPU Utilization**

Extract

Parms CPU TOTAL

'Extract' is the beginning of an alert definition or set of alert definitions

```
var  cpu_serial | 6 | serial
var  util       | 5 1 | sytprp.cpuutil
```

```
alert util xacp
level 00 green
level 20 yellow
level 40 pink
level 80 red
text Processor utilization at &util%
```



# Defining your own alerts

- **Alert for CPU Utilization**

Extract

Parms CPU TOTAL

PARMS determines the type of data to extract

```
var  cpu_serial | 6 | serial
var  util       | 5 1 | sytprp.cpuutil
```

```
alert util xacp
level 00 green
level 20 yellow
level 40 pink
level 80 red
text Processor utilization at &util%
```

# Defining your own alerts

- Alert for CPU Utilization

Extract

Parms CPU TOTAL

```
var  cpu_serial | 6 | serial
var  util       | 5 1 | sytprp.cpuutil
```

```
alert util xacp
level 00 green
level 20 yellow
level 40 pink
level 80 red
text Processor utilization
```

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.

# Defining your own alerts

- Alert for CPU Utilization

Extract

Parms CPU TOTAL

Variables defined for use  
in the following alerts

```
var cpu_serial  
var util
```

6

serial

5 1

sytrprp.cpuutil

Size of each variable with  
optional decimal precision

```
alert util xacp  
level 00 green  
level 20 yellow  
level 40 pink  
level 80 red
```

```
text Processor utilization at &util%
```

# Defining your own alerts

- Alert for CPU Utilization

Extract

Parms

```
var cpu_serial | 0 | serial
var util | 5 1 | sytprp.cpuutil
```

ALERT statement defines a specific alert

```
alert util xacp
level 00 green
level 20 yellow
level 40 pink
level 80 red
```

Four character code used when displaying alerts

```
text Process
```

Each alert requires a previously defined variable

# Defining your own alerts

- Alert for CPU Utilization

Extract

Parms CPU TOTAL

```
var serial  
var util | 5 1 | sytprp.cpuutil
```

LEVEL statement controls the threshold values

```
alert util xacp  
level 00 green
```

```
level 20 yellow
```

```
level 40 pink
```

```
level 80 red
```

```
text Proces
```

Color of the alert text when this level is exceeded

Values tested against the alert variable

# Defining your own alerts

- Alert for CPU Utilization

Extract

Parms CPU TOTAL

```
var  cpu_serial | 6    | serial
var  util       | 5 1  | sytprp.cpuutil
```

```
alert util xac
level 00 green
level 20 yellow
level 40 pink
level 80 red
text Processor utilization at &util%
```

Message displayed on  
3270 and zView alert screens

Alert variable  
substitution

# Alert result

- The 3270 screen based on the alert definition

The screenshot shows a 3270 terminal window titled "x3270-2 RKS2LV". The window has a menu bar with "File" and "Options" buttons. A black box with white text "Alert file being displayed" points to the "Options" button. The main display area shows the following text:

```
Screen: ALERT3A RKS2LV 15 Jun 2015 07:48:51
----- Exceptions Analysis Alerts -----
Type Description
XACP Processor utilization at 2.3%
```

Annotations:

- A callout box points to "ALERT3A" with the text "Code specified on ALERT statement".
- A callout box points to "XACP" with the text "Code specified on ALERT statement".
- A callout box points to "Processor utilization at 2.3%" with the text "TEXT directive with variable substitution".

At the bottom of the screen, there is a status bar with the text "PF7=Backward PF8=Forward PF3=Quit" and a cursor icon. In the bottom right corner, there is a small icon and the text ":00.2 001/001".

- **Adjust the number and value of levels based on local requirements**
  - ◆ At least one LEVEL statement is necessary
  - ◆ LEVEL statements are evaluated bottom to top
- **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
    - **BL**Ink – blink the entire text
    - **UNDERLINE** – underline the entire text



# Defining your own alert - LPAR

- **Alert for LPAR Utilization**

```
Extract
```

```
Parms LPAR *
```

```
Criteria sytcup.lcupname <> 'Totals:'
```

```
var lparname      | 8      | sytcup.lcupname
```

```
var lparutil     | 3 0 | sytcup.pctcpu
```

```
alert lparutil lpcp
```

```
level 90 red
```

```
level 95 red rev
```

```
text LPAR utilization of &lparname is &lparutil%
```

# Defining your own alert - LPAR

- Alert for LPAR Utilization

Extract

Parms LPAR \*

Criteria sytcup.lcupname <> 'Totals:'

var lparname | 8 | sytcup.lcupname

var lparutil | 3 0 | sytcup.pctcpu

alert lparutil lpcp

level 90 red

level 95 red rev

text LPAR utilization of &lparname is &lparutil%

Informs the extract to pull data for all LPARs

Additional data selection passed to the extract as WHILE criteria

# Defining your own alert - LPAR

- **Alert for LPAR Utilization**

Extract

Parms LPAR \*

Criteria sytcup.lcupname <> 'Totals:'

var lparname | 8 | sytcup.lcupname

var lparutil | 3 0 | sytcup.pctcpu

alert lparutil lpcp

level 90 red

level 95 red **rev**

text LPAR utilization of &lparname is &lparutil%

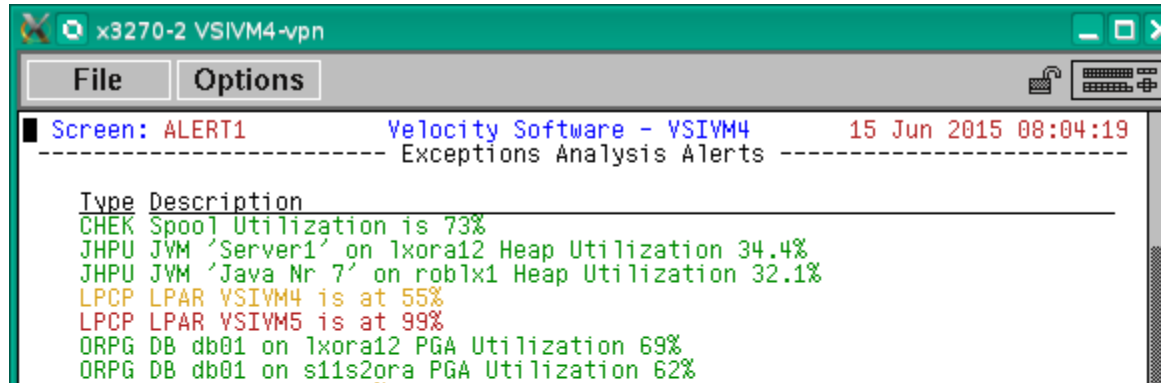
Text will be in reverse video  
(black text, red background)

# Defining your own alert - LPAR

- Alert for LPAR Utilization display

zView v

3270 >



```
x3270-2 VSIWM4-vpn
File Options
Screen: ALERT1 Velocity Software - VSIWM4 15 Jun 2015 08:04:19
----- Exceptions Analysis Alerts -----
Type Description
CHEK Spool Utilization is 73%
JHPU JVM 'Server1' on lxora12 Heap Utilization 34.4%
JHPU JVM 'Java Nr 7' on roblx1 Heap Utilization 32.1%
LPCP LPAR VSIWM4 is at 55%
LPCP LPAR VSIWM5 is at 99%
ORPG DB db01 on lxora12 PGA Utilization 69%
ORPG DB db01 on s11s2ora PGA Utilization 62%
```

## ALERT1 - Exceptions Analysis Alerts - 15/06/15 at 08:05 - DEMO

Code	Alert Description
CHEK	Spool Utilization is 73%
JHPU	JVM 'Server1' on lxora12 Heap Utilization 35.2%
JHPU	JVM 'Java Nr 7' on roblx1 Heap Utilization 34.9%
LPCP	LPAR VSIWM4 is at 58%
LPCP	LPAR VSIWM5 is at 100%
ORPG	DB db01 on lxora12 PGA Utilization 69%
ORPG	DB db01 on s11s2ora PGA Utilization 62%
PGUT	Page space is 43% used
PRCK	roblx1 proc hogmem not found.
PRCK	sles11x proc top not found.
SFSS	Filespace DXTWRITE in SFSVM4 at 99%
SPOL	Spoolspace is 73% used
TIDL	Test Idle for SFSZVPS4 is 13
VMLP	User BLAKEMC may be looping; CPU 17%, loop count 4494
VMLP	User ROBLX1 may be looping; CPU 20%, loop count 559
VMOC	VM overcommit ratio is 3.2
XACP	Processor utilization at 56.9%

# Defining your own alert – Complex operations

- **Numerous fields can be combined using math operations**
  - Statements can be continued with a dash

```
extract
parms user *
criteria userdata.userid <> 'System:' & useact.vmdtttime > 0
var    userid      | 8    | userdata.userid
var    cpuutil     | 3 1 | useact.vmdtttime * 100 / RUNTIME
var    io_rate     | 6 0 | (useact.vmdvdsct+useact.vmdvosct-
      +useact.vmdvcsct+useact.vmdvusct-
      +useact.vmdvtsct)/runtime
var    page_rate   | 6    | (useact.vmdctpgr+useact.vmdctpgw)/RUNTIME
var    exp_store   | 8    | useact.vmdctxrd+useact.vmdctxwt
var    userprt     | 8    | useact.vmdctpgr
var    vmdtttime   | 5 2 | useact.vmdtttime
```

# Defining your own alert – Second vdisk usage

- **Using two swap disks with different priority**
  - ◆ Second disk larger than the first
  - ◆ First disk fills, Linux uses the second disk
  - ◆ Alert when second disk is used

ESAVDSK

### VDISK Analysis

Time	Owner	Space Name	<--Size-->		<--pages-->		Prv	VIO	<AddSpce>			<-----pages/second----->				DASD	X-		
			AddSpc	VDSK	Resi-	Lock-			or	rate	Usr	Cre-	Del-	Sto-	<--DASD-->			Expanded	Storage
			Pages	Blks	dent	ed	Shr	/min	Lks	ates	etes	len	Read	Write	PGIN	PGOUT	Migr	Slots	Blks
17:20:00	LINUX001	VDISK\$LINUX001\$0202\$0048	16000	128K	0	0	Shr	0	1	0	0	0	0	0	0	0	0	12230	0
17:20:00	LINUX001	VDISK\$LINUX001\$0203\$0049	16000	128K	0	0	Shr	0	1	0	0	0	0	0	0	0	0	160	0
17:20:00	LINUX002	VDISK\$LINUX002\$0202\$002F	16000	128K	0	0	Shr	0	1	0	0	0	0	0	0	0	0	168	0
17:20:00	LINUX002	VDISK\$LINUX002\$0203\$0030	16000	128K	0	0	Shr	0	1	0	0	0	0	0	0	0	0	160	0
17:20:00	ZPRO01	VDISK\$ZPRO01\$\$\$0192\$0043	208	1664	0	0	Shr	0	1	0	0	0	0	0	0	0	0	12	0
17:20:00	ZPRO02	VDISK\$ZPRO02\$\$\$0192\$0044	208	1664	0	0	Shr	0	1	0	0	0	0	0	0	0	0	3	0
17:20:00	ZPRO03	VDISK\$ZPRO03\$\$\$0192\$0045	208	1664	0	0	Shr	0	1	0	0	0	0	0	0	0	0	3	0



Vdisk activity indicator

# Defining your own alert – Second vdisk usage

- **Create an alert to show Vdisk activity**
  - ◆ Only care about the second disk

```
extract
parms space vdisk* user *
criteria stoasi.mdiovdev = '0203'
var   userid   | 8   | aspace.userid
var   vdev     | 4   | stoasi.mdiovdev
var   io_rate  | 6   | stoasi.qdiocnt
```

Select address spaces  
beginning with vdisk

Common second  
virtual disk

```
alert io_rate lsvd
level 0 red
text Node &userid is using the second virtual disk
```

- **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



# Notifications

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

Extract

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

```
alert page_use amsp
```

```
level 30 yellow
```

```
level 35 red ACTION CP MSGNOH ZVPS Page utilization is &page_use%
```

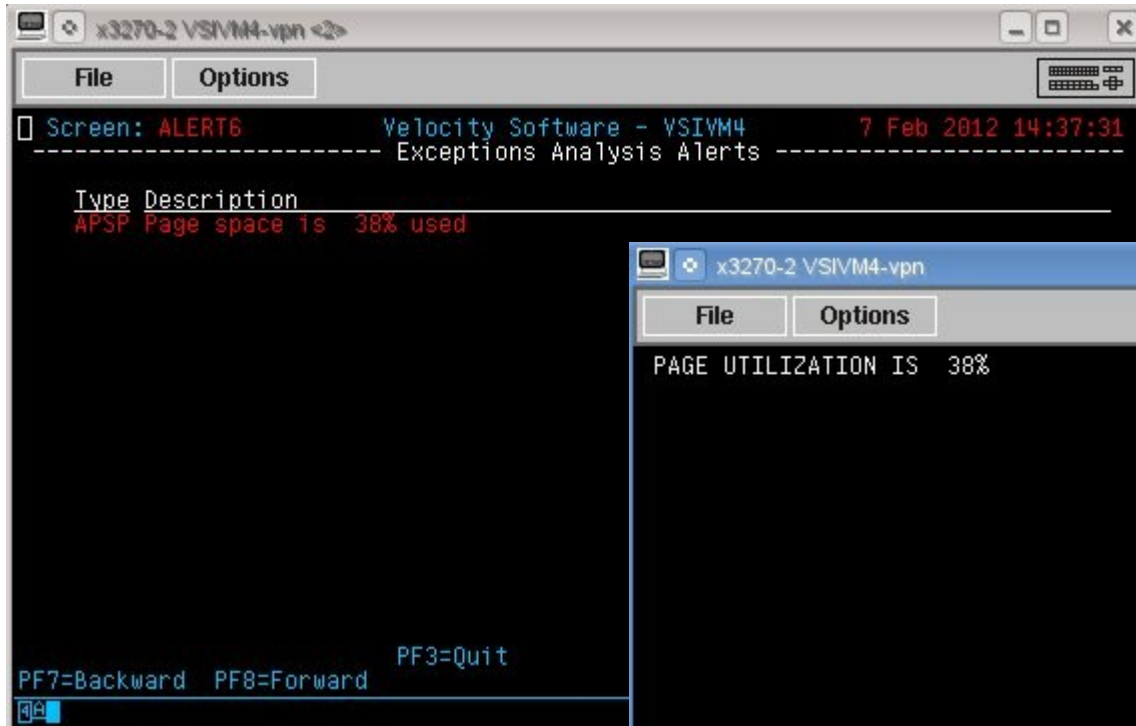
```
level 50 red rev
```

```
text Page space is &page_use% used
```

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

# Notifications

- Results of ACTION



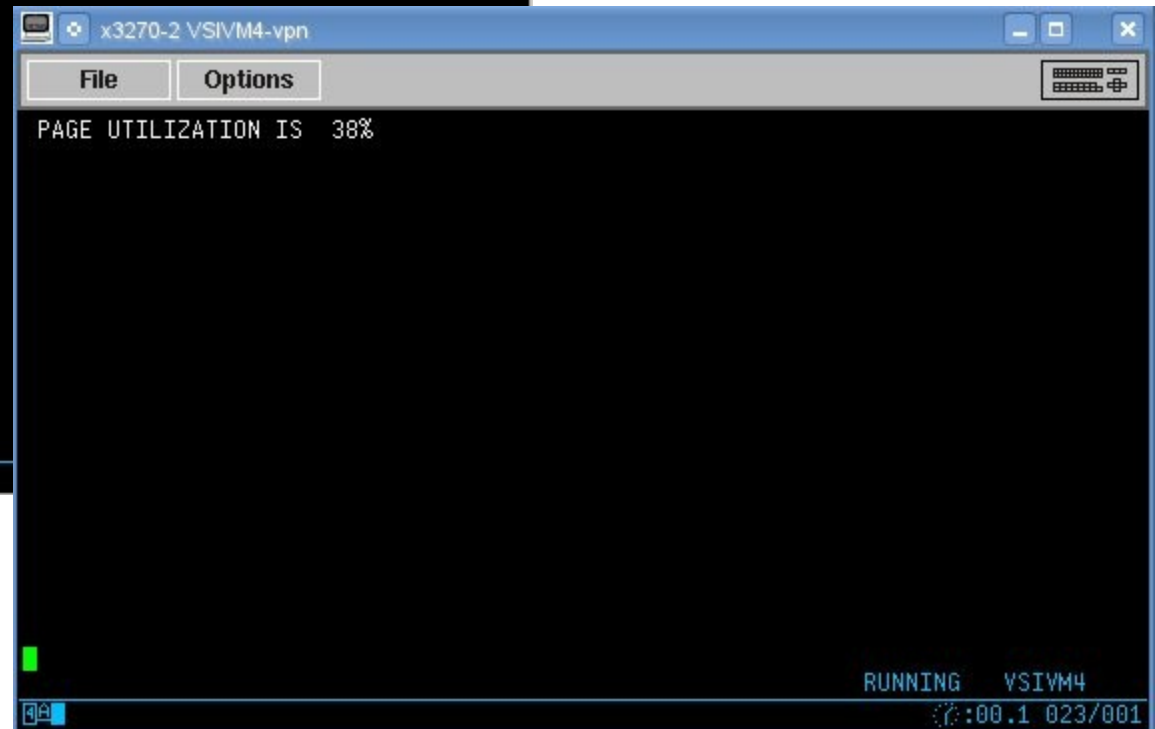
x3270-2 VSIVM4-vpn

File Options

Screen: ALERT6 Velocity Software - VSIVM4 7 Feb 2012 14:37:31  
----- Exceptions Analysis Alerts -----

Type	Description
APSP	Page space is 38% used

PF7=Backward PF8=Forward PF3=Quit



x3270-2 VSIVM4-vpn

File Options

PAGE UTILIZATION IS 38%

RUNNING VSIVM4  
(:00.1 023/001

- **A REXX EXEC can be invoked to send an email**

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

- **A REXX EXEC can be invoked to send an email**

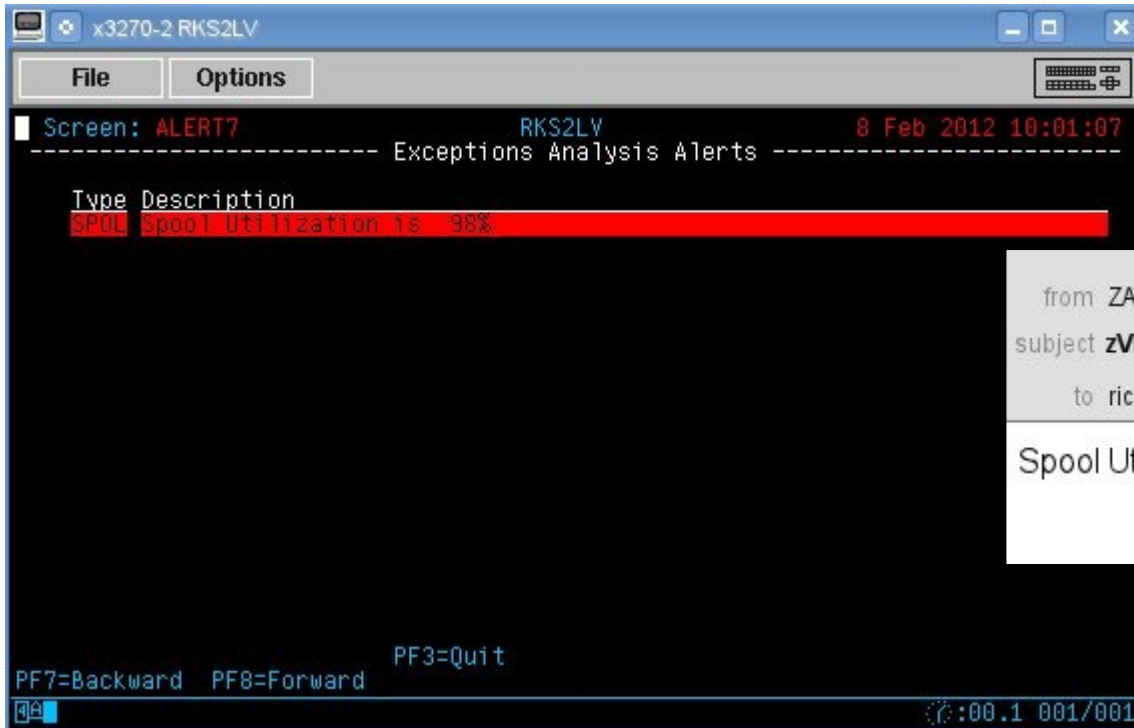
```
/* EMAIL: Sample EXEC to provide notify function */
parse arg node code value

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
```

# Notifications

- A REXX EXEC can be invoked to send an email



The screenshot shows a terminal window titled 'x3270-2 RKS2LV'. The window has a menu bar with 'File' and 'Options'. The main content area displays the following text:

```
Screen: ALERT7 RKS2LV 8 Feb 2012 10:01:07
----- Exceptions Analysis Alerts -----
Type Description
SPOL Spool Utilization is 98%
```

At the bottom of the terminal, there are control instructions: 'PF7=Backward PF8=Forward PF3=Quit' and a status bar showing ':00.1 001/001'.

from ZALERT@RKS2LV.VELOCITYSOFTWARE.COM ☆  
subject **ZVPS SPOL alert**  
to rich@velocitysoftware.com ☆

Spool Utilization for RKS2LV 98 %

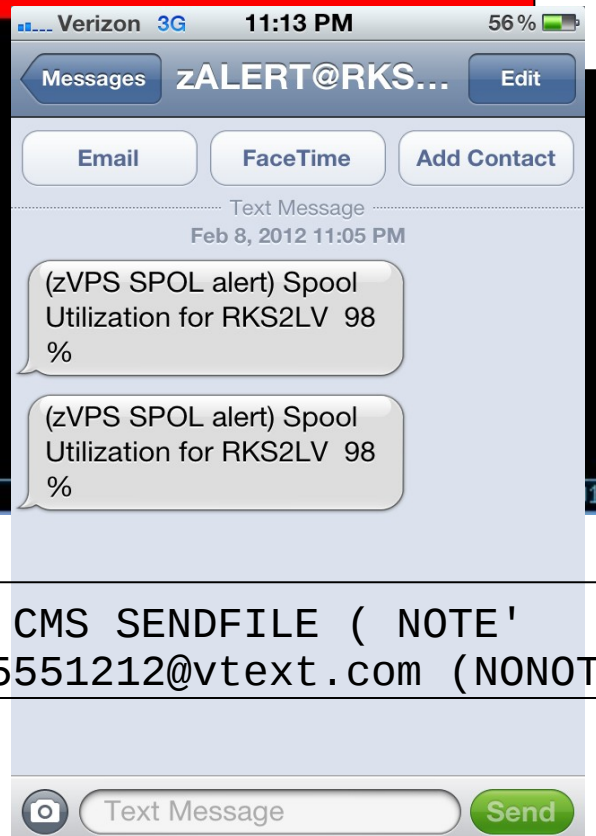
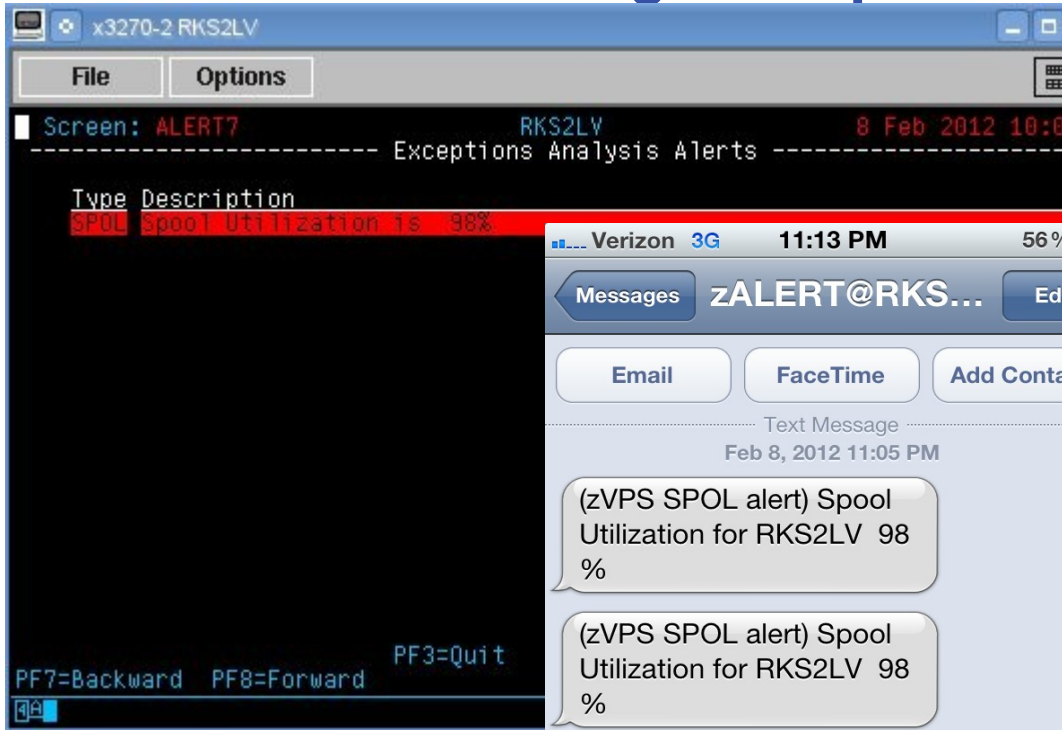
- **Cell phone text alerts**
  - ◆ Produced via an email message
  - ◆ Each carrier varies in their approach
  - ◆ List of Email to SMS gateways for most providers

<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

# Notifications

- SMS/Text Message sample



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

- **SNMP Trap configuration**

- ◆ Create/Modify SNMP TRAPDEST on the CONFIG disk

- \* following is default 1.3.6.1.4.1.15601  
192.168.5.64 velocity 2B06010401F971 ;

- ◆ Use the ALERT/TRAP option on the LEVEL command

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

alert spool_use spol
level 50 yellow
level 75 red
level 85 red rev TRAP VM (RKS2LV) Spool Utilization is &spool_use%
text Spool area utilization &spool_use%
```



- **SNMP Trap configuration**
  - ◆ Enterprise management consoles
    - NetCool, HP OpenView, CA-Unicenter TNG
  - ◆ Trap string can be generated in any required format for proper handling
  - ◆ Using a special code as the first token of the alert, trap payload is set specifically for management consoles

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

alert spool_use spol
level 50 yellow
level 75 red
level 85 red rev TRAP SPL002 VM (RKS2LV) Spool Utilization is &spool_use%
text Spool area utilization &spool_use%
```

# Notifications

- SNMP Trap result

```
Received 97 bytes from UDP: [192.168.5.48]:1114
0000: 30 5F 02 01 00 04 08 76 65 6C 6F 63 69 74 79 A4 0_.....velocity.
0016: 50 06 07 2B 06 01 04 01 F9 71 40 04 C0 A8 05 30 P..+.....q@....0
0032: 02 01 06 02 01 00 43 04 00 00 00 0C 30 33 30 31 .....C.....0301
0048: 06 07 2B 06 01 04 01 F9 71 04 26 56 4D 20 28 52 ..+.....q.&VM (R
0064: 4B 53 32 4C 56 29 20 53 50 4F 4F 4C 20 55 54 49 KS2LV) SPOOL UTI
0080: 4C 49 5A 41 54 49 4F 4E 20 49 53 20 20 39 36 25 LIZATION IS 96%
0096: 20
```

```
2012-02-16 13:42:58 192.168.5.48(via UDP: [192.168.5.48]:1114) TRAP, SNMP v1, community velocity
```

```
    VELOCITY-MIB::velocity Enterprise Specific Trap (0) Uptime: 0:00:00.12
```

```
    VELOCITY-MIB::velocity = STRING: "VM (RKS2LV) SPOOL UTILIZATION IS 96%"
```

- **The LTEXT directive allows alternate text to be displayed for different alert levels**
  - LTEXT is tied to the level immediately preceding

```
extract
parms node *
criteria hstmem.used > 0
var      node      | 8    | tcpip.node
var      memused   | 6 2 | (hstmem.used/hstmem.size)*100
var      desc      | 16   | hstmem.desc
function diskpct  | 6 2 | &node &memused &desc

alert diskpct Indx
level 5  green
level 50 yellow
level 80 pink
level 90 red rev
ltext &desc area on &node is getting really full!! (&diskpct%)
text &desc area on &node is &diskpct% full
```

# Level Text

```
x3270-2 RKS2LV
File Options
Screen: TPLAN03 RKS2LV 15 Jun 2015 10:11:43
----- Exceptions Analysis Alerts -----
Type Description
LNDX / area on linux001 is 37.92% full
LNDX /boot area on linux001 is 19.01% full
LNDX /local area on linux001 is 21.36% full
LNDX /usr area on linux001 is 86.65% full
LNDX /var area on linux001 is getting really full!! (90.18%)
PF7=Backward PF8=Forward PF3=Quit
:00.1 001/001
```

- **Options add additional function at the alert level**

- Priority
- Log
- Count
- Separated on alert directive with a vertical bar

**ALERT DISKPCT LNDX | <options>**

- **Pri – Prioritize the display of alert messages**
- **Log - Writes alert text displays to a file**
- **Count - Tally the number of times an alert appears**

- **Priority alters the display sequence of an alert or level**
  - Priority is a numeric value 1-9, default is 3

```
extract
parms node *
criteria hstmem.used > 0
var      node      | 8    | tcpip.node
var      memused   | 6 2 | (hstmem.used/hstmem.size)*100
var      desc      | 16   | hstmem.desc
function diskpct   | 6 2 | &node &memused &desc

alert diskpct Indx | pri 2
level 5  green
level 50 yellow
level 80 pink
level 90 red rev pri 6
ltext &desc area on &node is getting really full!! (&diskpct%)
text &desc area on &node is &diskpct% full
```

# Priority

x3270-2 RKS2LV

File Options

Screen: ALRT6 RKS2LV 15 Jun 2015 10:58:34

----- Exceptions Analysis Alerts -----

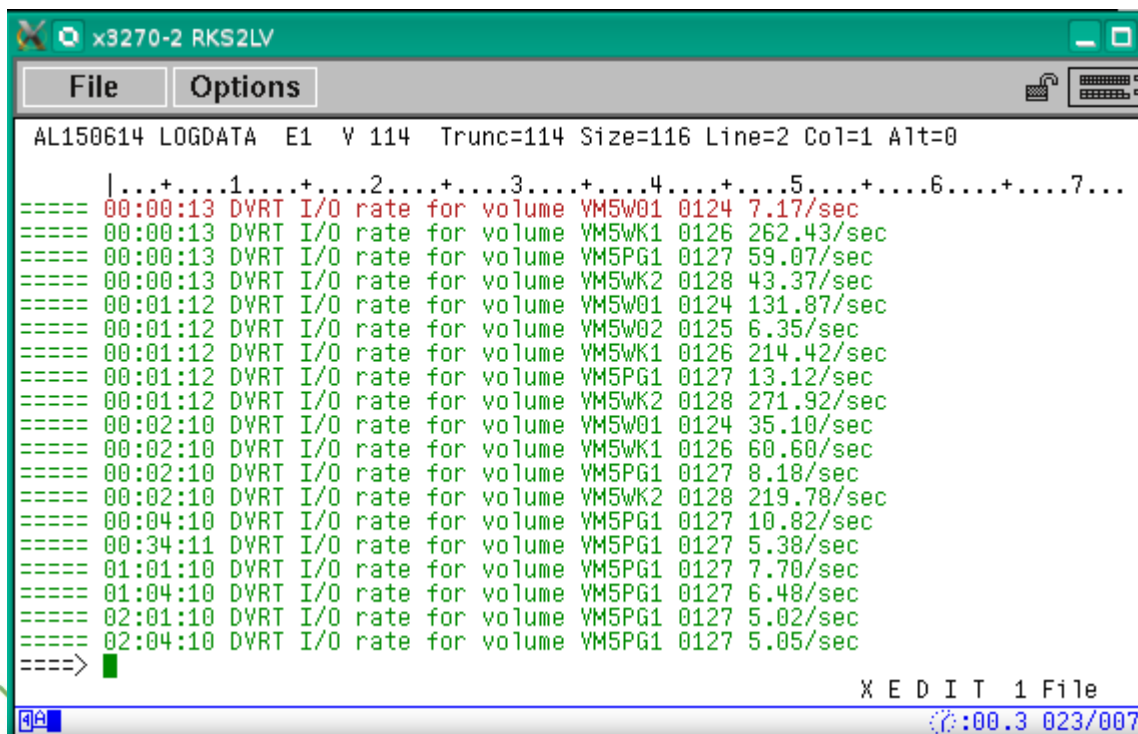
Type	Description
LNDX	/var area on linux001 is getting really full!! (90.18%)
APSP	APSP Page space is 12% used (10)
LNDX	/ area on linux001 is 37.92% full
LNDX	/boot area on linux001 is 19.01% full
LNDX	/local area on linux001 is 21.36% full
LNDX	/usr area on linux001 is 86.65% full

PF7=Backward PF8=Forward PF3=Quit

RA :00.1 001/001

# Log

```
alert io_rate dvrt | log
level 5 green
level 10 blue
level 20 turquoise
level 30 pink
level 40 red rev
text I/O rate for volume &volser &rdev &io_rate/sec
```



The screenshot shows a terminal window titled 'x3270-2 RKS2LV' with a menu bar containing 'File' and 'Options'. The terminal output displays log data for I/O rates, with columns for time, event type, description, volume name, device ID, and rate. The data is color-coded: red for the first line, green for the rest, and blue for the header. The terminal also shows a status bar at the bottom with 'X E D I T 1 File' and a system clock showing ':00.3 023/007'.

```
AL150614 LOGDATA E1 V 114 Trunc=114 Size=116 Line=2 Col=1 Alt=0
=====|...+....1....+....2....+....3....+....4....+....5....+....6....+....7....
===== 00:00:13 DVRT I/O rate for volume VM5W01 0124 7.17/sec
===== 00:00:13 DVRT I/O rate for volume VM5WK1 0126 262.43/sec
===== 00:00:13 DVRT I/O rate for volume VM5PG1 0127 59.07/sec
===== 00:00:13 DVRT I/O rate for volume VM5WK2 0128 43.37/sec
===== 00:01:12 DVRT I/O rate for volume VM5W01 0124 131.87/sec
===== 00:01:12 DVRT I/O rate for volume VM5W02 0125 6.35/sec
===== 00:01:12 DVRT I/O rate for volume VM5WK1 0126 214.42/sec
===== 00:01:12 DVRT I/O rate for volume VM5PG1 0127 13.12/sec
===== 00:01:12 DVRT I/O rate for volume VM5WK2 0128 271.92/sec
===== 00:02:10 DVRT I/O rate for volume VM5W01 0124 35.10/sec
===== 00:02:10 DVRT I/O rate for volume VM5WK1 0126 60.60/sec
===== 00:02:10 DVRT I/O rate for volume VM5PG1 0127 8.18/sec
===== 00:02:10 DVRT I/O rate for volume VM5WK2 0128 219.78/sec
===== 00:04:10 DVRT I/O rate for volume VM5PG1 0127 10.82/sec
===== 00:34:11 DVRT I/O rate for volume VM5PG1 0127 5.38/sec
===== 01:01:10 DVRT I/O rate for volume VM5PG1 0127 7.70/sec
===== 01:04:10 DVRT I/O rate for volume VM5PG1 0127 6.48/sec
===== 02:01:10 DVRT I/O rate for volume VM5PG1 0127 5.02/sec
===== 02:04:10 DVRT I/O rate for volume VM5PG1 0127 5.05/sec
=====>
```



# Count

```
alert page_use amsp | count
level 10 green
level 30 yellow
level 50 red
text &code Page space is &page_use% used (&tcount intervals)
```

```
x3270-2 RKS2LV
File Options
Screen: ALRT6 RKS2LV 16 Jun 2015 05:26:30
----- Exceptions Analysis Alerts -----
Type Description
APSP APSP Page space is 12% used (2 intervals)
LNDX / area on linux001 is 37.92% full
LNDX /boot area on linux001 is 19.01% full
LNDX /local area on linux001 is 21.36% full
LNDX /usr area on linux001 is 86.65% full
LNDX /var area on linux001 is getting really full!! (90.18%)
PF7=Backward PF8=Forward PF3=Quit
:00.1 001/001
```

- **Log writes out the currently displayable text message**
  - TEXT or LTEXT
- **Count takes an optional key value**
  - Used when an alert can return multiple values
  - Eg: user, node, device
  - Specify variable that contains the key value after COUNT keyword  

```
alert usercpu vmcp | count &userid
```
- **Multiple options can be specified**

- **Disable removes an alert from evaluation (4.2)**
  - Used in a maintenance situation when unwanted alerts or false alerts may be triggered
- **Enable is the opposite of disable**
  - The default and need not be specified
  - Provided for consistency

```
alert page_use amsp
disable
level 10 green
level 30 yellow
level 50 red
text Page space is &page_use% used
```

- The **LIMIT** directive delays an **ACTION** for the specified number of intervals

```
extract
var serial      | 6    | system.serial
var spool_use   | 3 0 | (sytag.calslti2*100)/sytag.calslta2

alert spool_use spol
limit 5 1 | &serial
level 70  yellow
level 80  red
level 90  red rev ACTION CP MSG ZVPS Spool Util is &spool_use%
text Spool Utilization is &spool_use%
```

- The **LIMIT** directive delays an **ACTION** for the specified number of intervals

```
extract
var serial      | 6   | system.serial
var spool_use   | 3 0 | (sytag.calslti2*100)/sytag.calslta2
```

```
alert spool_use spol
limit 5 1 | &serial
level 70 yellow
level 80 red
level 90 red rev ACTION CP MSG ZVPS Spool Util is &spool_use%
text Spool Utilization is &spool_use%
```

Key field

After the delay, number of intervals TO execute ACTION (default is 1)

Number of intervals to delay executing ACTION

- **This LIMIT directive:**

```
Limit 5 1 | &serial
```

- **Will delay ACTION for 5 intervals**
- **Execute ACTION for 1 intervals**
- **Repeat**
- **For example, when started at 11:52**

```
11:58:29 * MSG FROM ZALERT : 10 Feb 2012 11:58 SPOOL UTIL IS 95%
12:04:30 * MSG FROM ZALERT : 10 Feb 2012 12:04 SPOOL UTIL IS 95%
12:10:31 * MSG FROM ZALERT : 10 Feb 2012 12:10 SPOOL UTIL IS 95%
```

First message is  
delayed 5 intervals

One interval  
of ACTION

- LIMIT initial action setting**

```
extract
var serial          | 6   | system.serial
var spool_use       | 3 0 | (sytag.calslti2*100)/sytag.calslta2

alert spool_use spol
limit 5 1 1 | &serial
level 70 yellow
level 80 red
level 90 red rev ACTION CP MSG ZVPS Spool Util is &spool_use%
text Spool Utilization is &spool_use%
```

Number of intervals the  
action is taken before  
the delay

- LIMIT escalation**

```
extract
var serial          | 6   | system.serial
var spool_use      | 3 0 | (sytag.calslti2*100)/sytag.calslta2

alert spool_use spol
limit 10:5 1 | &serial
level 70 yellow
level 80 red
level 90 red rev ACTION CP MSG ZVPS Spool Util is &spool_use%
text Spool Utilization is &spool_use%
```

Delay 10 intervals, then 5



- A time based alert defines one or more periods of the day that an alert is active
- The display of the alert is discontinued and any actions not executed

```
extract
var serial          | 6      | system.serial
var spool_use       | 3 0  | (sytag.calslti2*100)/sytag.calslta2

alert spool_use spol
time 07:00 to 11:00 | 13:00 to 17:00
level 70 yellow
level 80 red
level 90 red rev ACTION CP MSG ZVPS Spool Util is &spool_use%
text Spool Utilization is &spool_use%
```

Multiple times can  
be specified

Timeframe for alert  
to be active

# Include/Exclude

- User or Node can be specified in an extract
- A subset can be selected with wildcards
- Given the following alert definition:

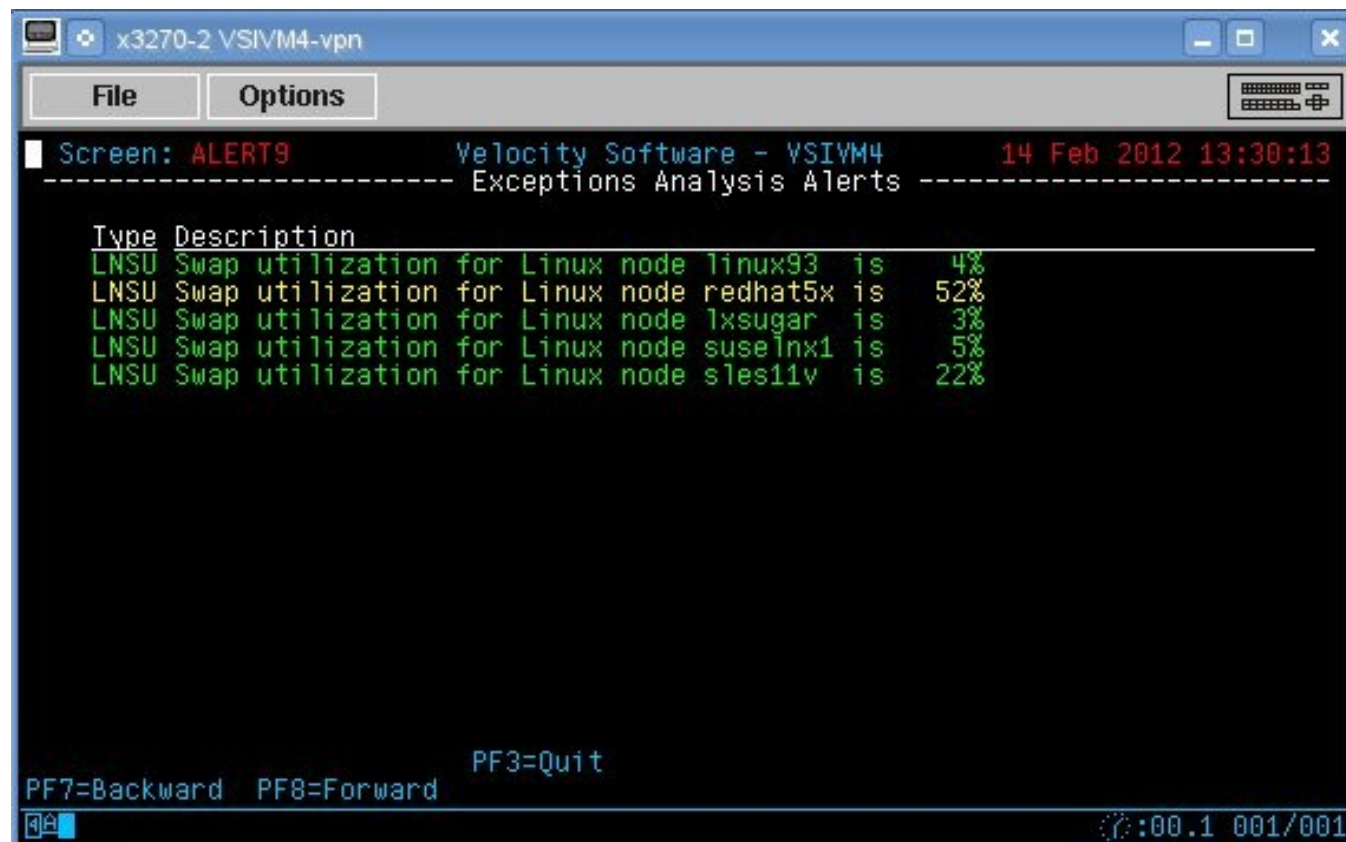
```
extract
parms node *
criteria ucdsys.swappct > 0
var node | 8 | tcpip.node
var swapused | 4 0 | ucdsys.swappct

alert swapused lnsu
level 01 green
level 50 yellow
level 80 pink
level 90 red rev
text Swap utilization for Linux node &node is &swapused%
```

All defined nodes are made available

# Include/Exclude

- All nodes with at least 1% swap utilization are displayed



The screenshot shows a terminal window titled "x3270-2 VSIWM4-vpn". The window has a menu bar with "File" and "Options" and a keyboard icon. The main content area displays the following text:

```
Screen: ALERT9 Velocity Software - VSIWM4 14 Feb 2012 13:30:13
----- Exceptions Analysis Alerts -----
```

Type	Description	Value
LNSU	Swap utilization for Linux node linux93 is	4%
LNSU	Swap utilization for Linux node redhat5x is	52%
LNSU	Swap utilization for Linux node lxsugar is	3%
LNSU	Swap utilization for Linux node suse1nx1 is	5%
LNSU	Swap utilization for Linux node sles11v is	22%

At the bottom of the terminal, there are keyboard shortcuts: PF7=Backward, PF8=Forward, PF3=Quit, and a status bar showing a cursor icon, a colon, and the text ":00.1 001/001".

- The alert can be tailored to show a subset by adjusting the wildcard

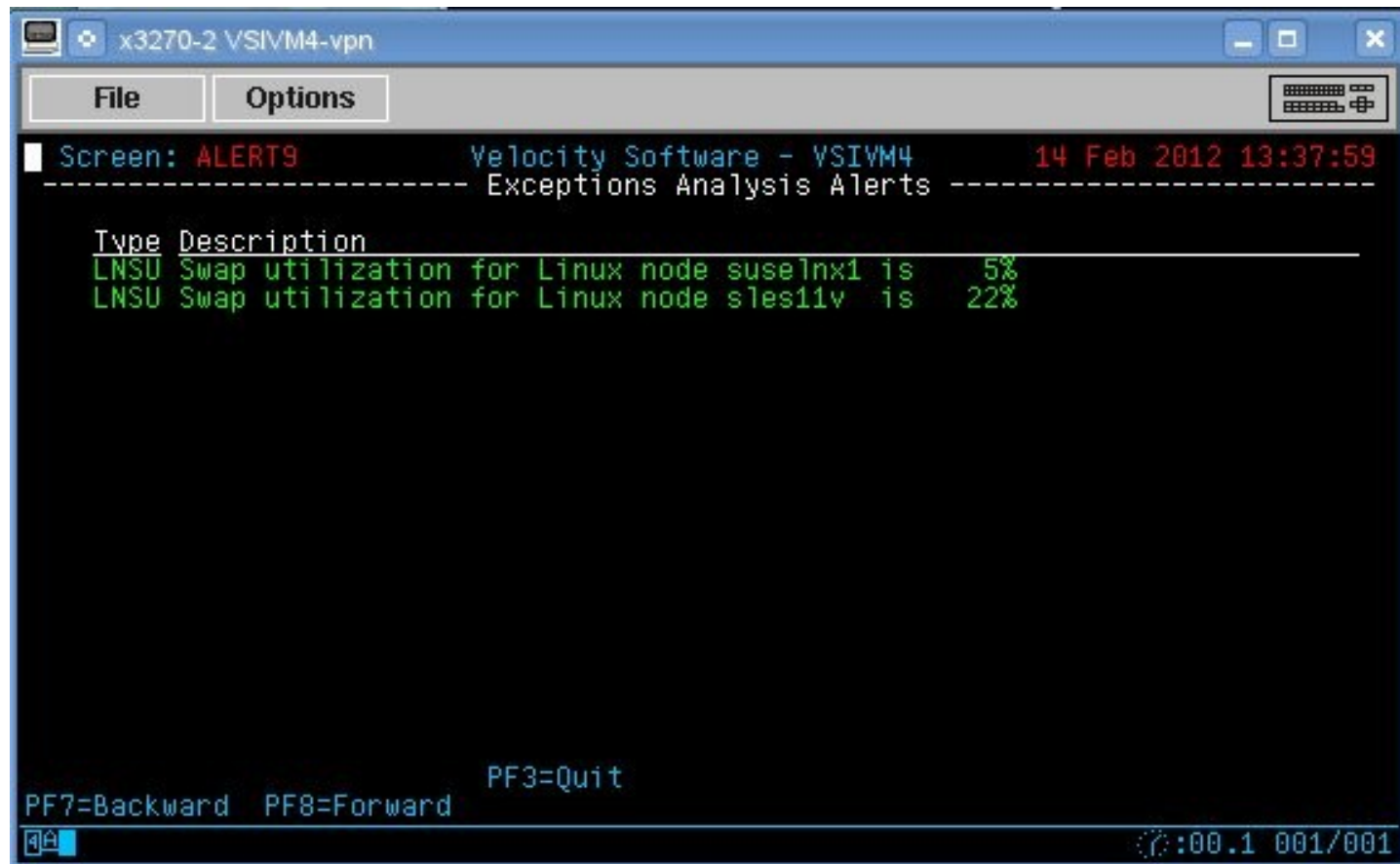
```
extract
parms node s*
criteria ucdsys.swappct > 0
var node | 8 | tcpip.node
var swapused | 4 0 | ucdsys.swappct
```

Only show nodes  
beginning with 's'

```
alert swapused Insu
level 01 green
level 50 yellow
level 80 pink
level 90 red rev
text Swap utilization for Linux node &node is &swapused%
```

# Include/Exclude

- The display shows nodes matching the wildcard



The screenshot shows a terminal window titled "x3270-2 VSIWM4-vpn". The window has a menu bar with "File" and "Options" buttons. The terminal content is as follows:

```
Screen: ALERT9          Velocity Software - VSIWM4          14 Feb 2012 13:37:59
----- Exceptions Analysis Alerts -----
Type Description
-----
LNSU Swap utilization for Linux node suse1nx1 is      5%
LNSU Swap utilization for Linux node sles11v  is     22%
```

At the bottom of the terminal, there are navigation instructions: "PF7=Backward PF8=Forward PF3=Quit". The status bar at the very bottom shows a cursor icon, a refresh icon, and the text ":00.1 001/001".

# Include/Exclude

- **If an alert is required to show nodes that don't fit into a wildcard**
  - ◆ An include or exclude must be used

```
extract
parms node *
criteria ucdsys.swappct > 0
var      node      | 8    | tcpip.node
var      swapused  | 4 0  | ucdsys.swappct

alert swapused lnsu
include node sub1
level 01  green
level 50  yellow
level 80  pink
level 90  red rev
text Swap utilization for Linux node &node is &swapused%
```

<filename> IXLIST

```
-SUB1-
linux93
sles11v
redhat5x
-END SUB1-
```

# Include/Exclude

- If an alert is required to show nodes that don't fit into a wildcard
  - ◆ An include or exclude must be used

```
extract
parms node *
criteria ucdsys.swappct > 0
var node | 8 | tcpip.node
var swapused | 4 0 | ucdsvs.swappct

alert swapused lnsu
include node sub1
level 01 green
level 50 yellow
level 80 pink
level 90 red rev
text Swap utilization for Linux node &node is &swapused%
```

Variable used  
for matching

List name  
applied to alert

<filename> IXLIST

-SUB1-

linux93

sles11v

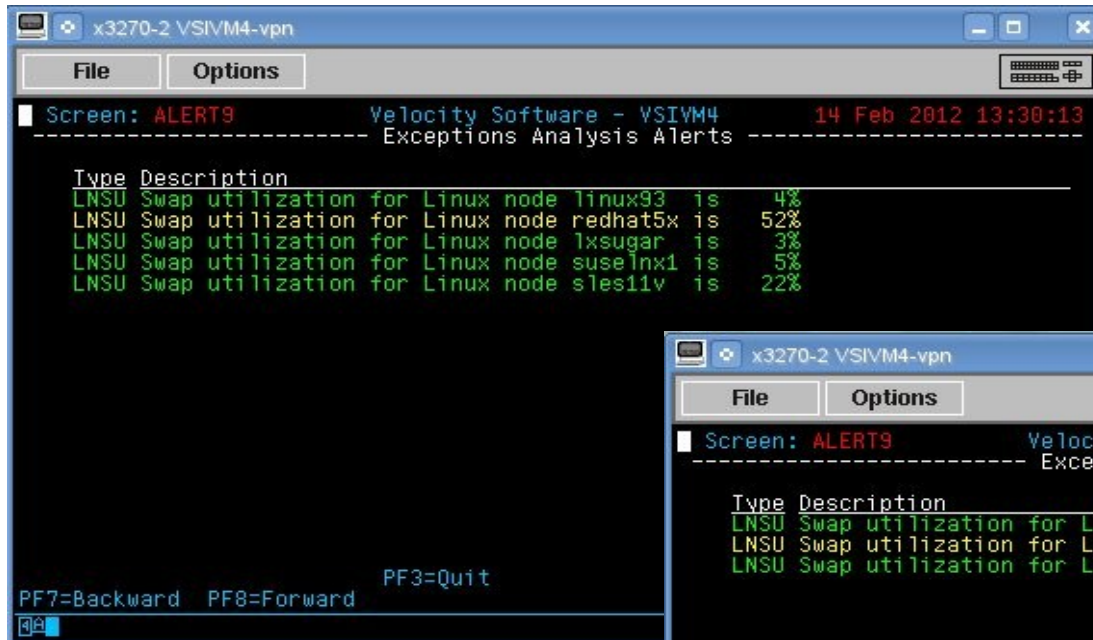
redhat5x

-END SUB1-

Include/Exclude  
file name must  
match the alert  
file name

# Include/Exclude

- Results of Include file



x3270-2 VSIVM4-vpn

File Options

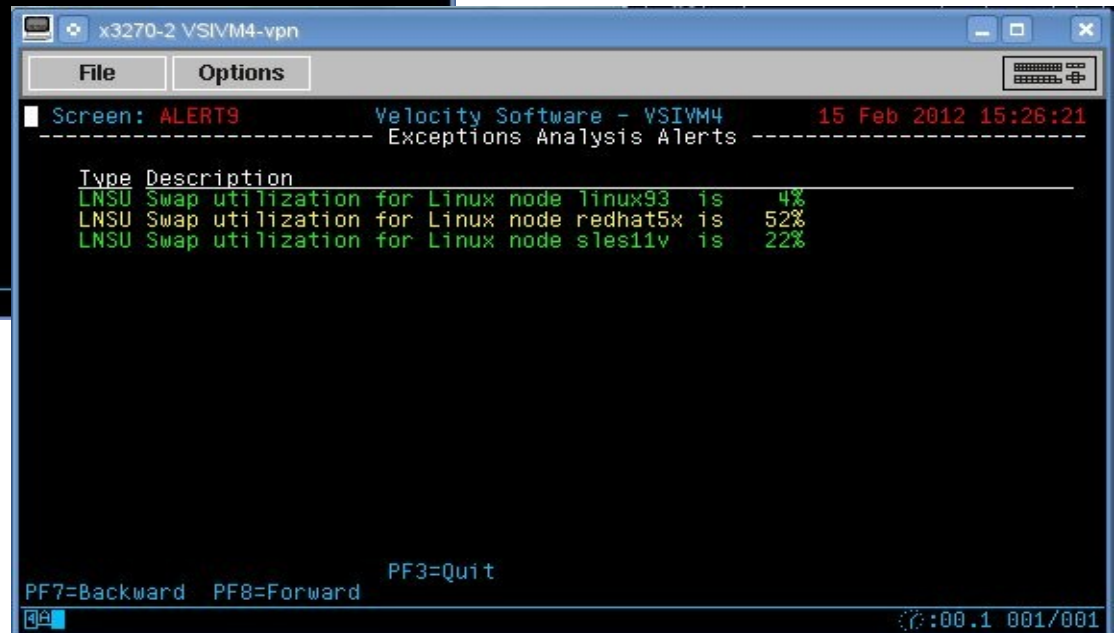
Screen: ALERT9 Velocity Software - VSIVM4 14 Feb 2012 13:30:13  
----- Exceptions Analysis Alerts -----

Type	Description	is	%
LNSU	Swap utilization for Linux node linux93	is	4%
LNSU	Swap utilization for Linux node redhat5x	is	52%
LNSU	Swap utilization for Linux node lxsugar	is	3%
LNSU	Swap utilization for Linux node suselnx1	is	5%
LNSU	Swap utilization for Linux node sles11v	is	22%

PF7=Backward PF8=Forward PF3=Quit

Original display

Include applied



x3270-2 VSIVM4-vpn

File Options

Screen: ALERT9 Velocity Software - VSIVM4 15 Feb 2012 15:26:21  
----- Exceptions Analysis Alerts -----

Type	Description	is	%
LNSU	Swap utilization for Linux node linux93	is	4%
LNSU	Swap utilization for Linux node redhat5x	is	52%
LNSU	Swap utilization for Linux node sles11v	is	22%

PF7=Backward PF8=Forward PF3=Quit

00:00.1 001/001



# Multiple alerts

- **One extract can supply data for multiple alerts**

```
extract
parms node *
criteria ucdsys.swapct > 0
var    node      | 8    | tcpip.node
var    swaprate  | 6 1 | ucdsys.swaprate
var    swapused  | 4 0 | ucdsys.swapct

alert swaprate lnsr
level 02 green
level 10 yellow
level 30 pink
level 50 red rev
text Swap i/o rate for Linux node &node is &swaprate
```

```
alert swapused lnsu
level 20 green
level 50 yellow
level 80 pink
level 90 red rev
text Swap utilization for Linux node &node is &swapused%
```

# External Processing

- **An alert can call an external process**
  - ◆ Function
  - ◆ Stage
- **Function is a REXX EXEC that processes already extracted data**
  - ◆ Called for each record returned from an extract
  - ◆ Returns a single value
- **Stage is an EXEC that is called as a pipeline stage**
  - ◆ Must have a filetype of REXX
  - ◆ Can independently run it's own extract
  - ◆ Returns a single value or plugs the result into defined alert variables

# External Processing

- **Function is specified in place of 'var'**

```
extract
parms node *
criteria hstmem.used > 0
var      node      | 8    | tcpip.node
var      memused   | 6 2 | (hstmem.used/hstmem.size)*100
var      desc      | 16  | hstmem.desc
function diskpct  | 6 0 | &node &memused &desc
```

```
alert diskpct indx
text Filesystem &desc on &node is at &diskpct%
level 20 green
level 50 yellow
level 80 pink
level 90 red rev
```

# External Processing

- Function is specified in place of 'var'

```
extract
parms node *
criteria hstmem.used > 0
var node | 8 | tcpip.node
var memused | 6 2 | (hstmem.used/hstmem.size)*100
var desc | 16 | hstmem.desc
function diskpct | 6 0 | &node &memused &desc
```

Size of returned value

Parameters passed  
as exec args

```
alert diskpct Indx
text Filesystem &desc on &node is at &diskpct%
level 20 green
level 50 yellow
level 80 pink
level 90 red rev
```

Function definition  
is the exec called  
and the variable  
used in the alert

# External Processing

- **REXX exec called from the alert**

```
/* DISKPCT EXEC: Filter out memory or read-only filesystems */  
parse arg node pct descr .
```

Parameters passed  
from alert

```
firstword = word(descr,1)  
rptzero = 'Real Memory Swap Physical Virtual Cached'
```

```
if wordpos(descr,rptzero) > 0 then  
  pct = 0
```

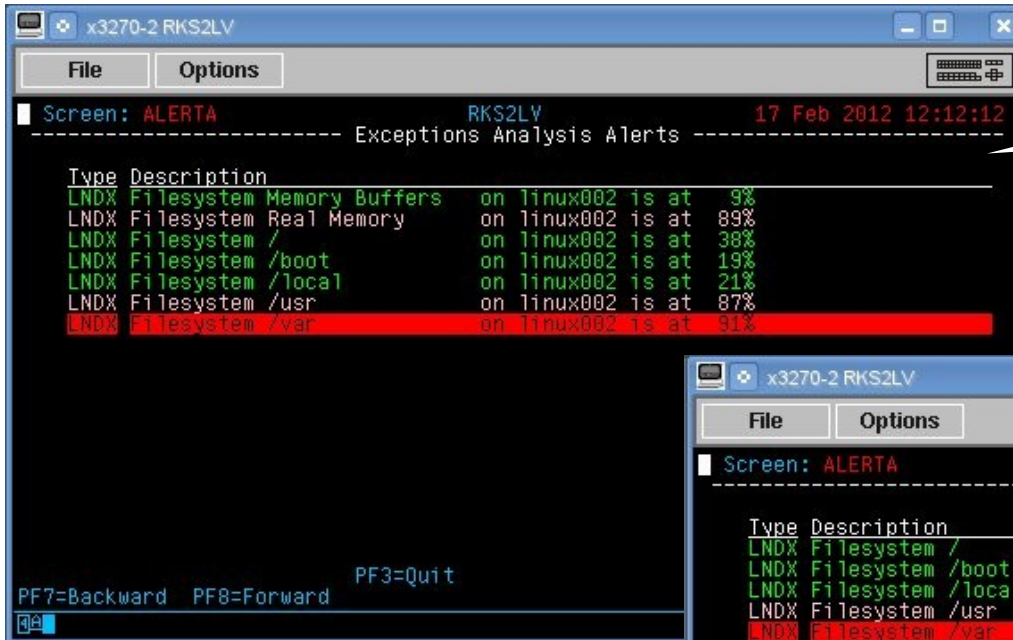
```
if left(descr,6) = '/media' then  
  pct = 0
```

```
return pct
```

Value returned  
to the alert

# External Processing

- Results of function call

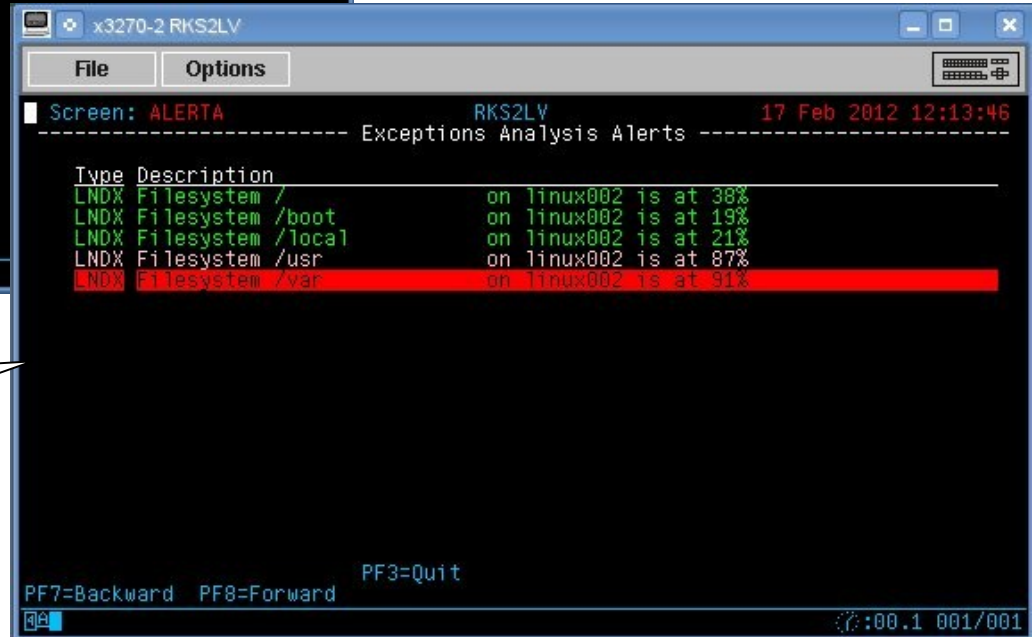


A screenshot of a terminal window titled 'x3270-2 RKS2LV'. The window has a menu bar with 'File' and 'Options'. The main content area shows a header 'Screen: ALERTA' and 'RKS2LV' with a timestamp '17 Feb 2012 12:12:12'. Below this is a section titled 'Exceptions Analysis Alerts' containing a table of system alerts. The table has columns for 'Type', 'Description', and 'Value'. The last row, 'LNDX Filesystem /var on linux002 is at 91%', is highlighted in red. At the bottom of the window, there are control instructions: 'PF7=Backward PF8=Forward PF3=Quit'.

Type	Description	Value
LNDX	Filesystem Memory Buffers	on linux002 is at 9%
LNDX	Filesystem Real Memory	on linux002 is at 89%
LNDX	Filesystem /	on linux002 is at 38%
LNDX	Filesystem /boot	on linux002 is at 19%
LNDX	Filesystem /local	on linux002 is at 21%
LNDX	Filesystem /usr	on linux002 is at 87%
LNDX	Filesystem /var	on linux002 is at 91%

Original display

With DISKPCT EXEC



A second screenshot of the terminal window, showing the same data as the first but with an updated timestamp of '17 Feb 2012 12:13:46'. The table of alerts is now sorted by the 'Value' column in descending order. The 'LNDX Filesystem /var' row remains highlighted in red. The control instructions at the bottom are the same: 'PF7=Backward PF8=Forward PF3=Quit'.

Type	Description	Value
LNDX	Filesystem /var	on linux002 is at 91%
LNDX	Filesystem /	on linux002 is at 38%
LNDX	Filesystem /boot	on linux002 is at 19%
LNDX	Filesystem /local	on linux002 is at 21%
LNDX	Filesystem /usr	on linux002 is at 87%

# External Processing

- **Stage is specified in place of 'var'**

```
extract
var   dummy
stage procchk | 1 | 1
      | 50 |
      |   |

alert dummy xmvm
level 0 red
text &procchk
```

Size of returned value

Name of the stage and returned value

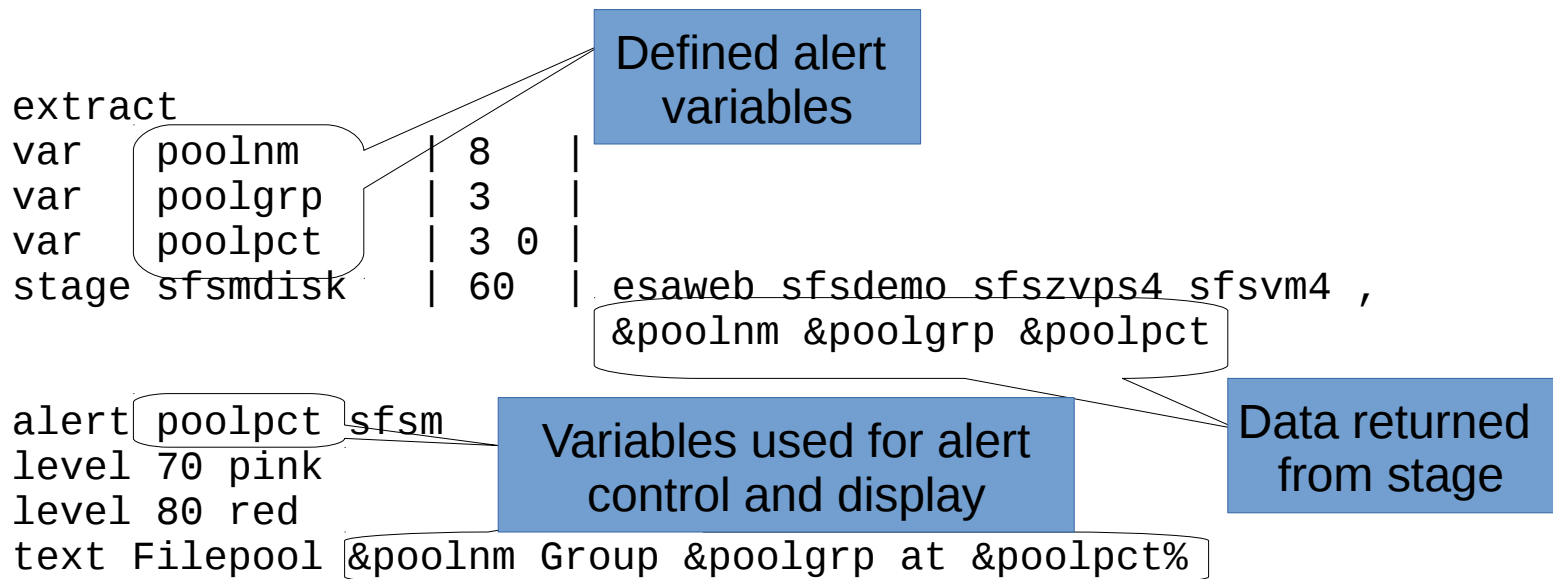
- **Written as a pipe stage**

- ◆ Using CALLPIPE to invoke pipes and return value(s)
- ◆ Can execute zMON extracts

```
/* Return msg stem to caller */
msg.0 = m
'CALLPIPE stem msg. | *:'
```

# External Processing

- An alternative stage method returns values into alert variables





# More External Processing

- **Check for 'node down'**

```
extract
parms node *
criteria hstsys.iplyy > 0
var  node      | 8 | tcpsys.node
var  ipaddr    | 15 | tcpsys.ipaddress
var  hsamp     | 1 | hstsys.samples

alert hsamp lxup | count &node
level =0 red
text Node &node (&ipaddr) is down (&tcount intervals)
```

- **No value in 'samples' indicates down**
- **Level allows additional comparison indicators for threshold evaluation (eg: < > = <= >= <>)**

# More External Processing

- Results of 'node down'

```
x3270-2 RKS2LV
File Options
Screen: RKS2LV RKS2LV 16 Jun 2015 07:13:11
----- Exceptions Analysis Alerts -----
Type Description
APSP Page space is 7.60% used
DSRV Device 0126 VM5WK1 service time: 1.25
LXUP Node linux001 (192.168.5.183) is down (3 intervals)
SPOL Spoolspace is 76% used (above 70 for 1221 intervals)
YMC2 User ZALERT used 0.04 CPU sec (0.07%)
XACP Processor utilization at 0.2%
XMVM User ZWEB06 not logged onto system

PF7=Backward PF8=Forward PF3=Quit
:00.1 001/001
```

# Integration with zOperator

- **zOperator enhances operational support**
- **Provides a traditional console display**
  - Message highlighting, suppression, actions
  - Logging, review, filtering
- **Allows operator console to be viewed via zView**
  - In addition to a 3270 dial interface

# Integration with zOperator

The screenshot displays the zOPER console interface for RKS2LV. On the left is a navigation sidebar with buttons for 'zMON', 'Graphs', and 'zMAP'. Below these are several menu items: 'Capacity', 'System', 'Service Level Analysis', 'User', 'Shared File System', 'CPU', 'Main Storage', 'Paging and Spooling', 'Input/Output Subsystem', 'TCP/IP Network', 'Linux Reports', 'Linux Application Reports', 'VSE', 'Screen Index', 'Emulation', 'zALERT Definitions', 'zOPERATOR' (highlighted with a red arrow), 'zTUNE', and 'Custom Samples'. The main console window shows a log of system events. A yellow banner at the top of the log reads 'ZOPER - zOPERATOR Console - RKS2LV'. The log entries include timestamps, user names, and system messages such as 'ZALERT SPOL Spool space is 68% used', 'DIRMAINT DVHRLY3887I Hourly processing completed; 0 log', and 'OPERATOR USER DSC LOGOFF AS CRON USERS = 33 FORCED BY SYSTEM'. A date banner indicates 'Wednesday June 01 2016'. At the bottom, a log entry shows 'OPERATOR GRAF L0006 DIALED TO OPERATOR 0020 DIALED= 1 FROM 192.168.5.75'. The bottom right corner of the console window has a small 'E' icon.

```
SYSTEM ? [ ] [ ] [ ] [ ] ZOPER ? [ ] [ ] [ ] [ ]
ZOPER - zOPERATOR Console - RKS2LV
21:31:10 ZALERT SPOL Spool space is 68% used
22:01:03 DIRMAINT DVHRLY3887I Hourly processing completed; 0 log
22:01:03 DIRMAINT DVHRLY3887I files processed, 1 log files remaining.
22:15:00 OPERATOR USER DSC LOGOFF AS CRON USERS = 33 FORCED BY SYSTEM
22:31:10 ZALERT SPOL Spool space is 68% used
23:01:03 DIRMAINT DVHRLY3887I Hourly processing completed; 0 log
23:01:03 DIRMAINT DVHRLY3887I files processed, 1 log files remaining.
23:02:10 ZALERT VMPPG Page rate for ZALERT is 6.3/sec (above 5 for 1)
23:31:10 ZALERT SPOL Spool space is 68% used
----- Wednesday June 01 2016 -----
00:00:00 OPERATOR 00:00:00
00:00:00 OPERATOR
00:00:00 OPERATOR
00:00:00 OPERATOR HCPMID6001I TIME IS 00:00:00 PDT WEDNESDAY 06/01/16
00:00:00 OPERATOR
00:00:00 SYSTEM LINUX001:
00:00:00 SYSTEM LINUX001:
00:00:00 SYSTEM LINUX001:
00:00:00 SYSTEM LINUX001: HCPMID6001I TIME IS 00:00:00 PDT WEDNESDAY 06/01/16
00:00:00 SYSTEM LINUX001:
00:00:00 OPERATOR ZOPCZ0109I Erasing file CONSOLE 20160302 A1
00:00:05 OPERATOR AUTO LOGON *** ZMAP USERS = 34 BY ZSERVE
00:01:03 DIRMAINT DVHNDY3880I New day processing started.
00:01:03 DATAMOVE DVHNDY3880I New day processing started.
00:01:03 DATAMOVE DVHNDY3881I New day processing completed.
00:01:03 DIRMAINT DVHNDY3881I New day processing completed.
00:01:04 DATAMOVE DVHDLY3882I Daily processing started.
00:01:04 DATAMOVE DVHDLY3885I Daily processing completed.
00:01:04 DIRMAINT DVHDLY3882I Daily processing started.
00:01:04 DIRMAINT DVHRLY3887I Hourly processing completed; 1 log
00:01:04 DIRMAINT DVHRLY3887I files processed, 0 log files remaining.
00:01:04 DIRMAINT DVHDLY3885I Daily processing completed.
00:01:10 ZALERT VMPPG Page rate for RKSDEV is 6.6/sec (above 5 for 1)
00:01:10 ZALERT VMPPG Page rate for ZALERT is 11.1/sec (above 5 for 2)
00:02:02 DIRMAINT DVHBCK3871I Disk backup processing started.
00:02:02 DIRMAINT DVHBCK3872I Disk backup part 1 completed.
00:02:02 DIRMAINT DVHBCK3872I Disk backup part 2 started.
00:02:02 DIRMAINT DVHBCK3873I Disk backup processing completed.
00:05:38 OPERATOR USER DSC LOGOFF AS ZMAP USERS = 33
00:06:10 ZALERT VMPPG Page rate for ZALERT is 6.4/sec (above 5 for 1)
00:31:10 ZALERT SPOL Spool space is 68% used
01:02:10 ZALERT VMPPG Page rate for ZALERT is 6.7/sec (above 5 for 1)
01:31:10 ZALERT SPOL Spool space is 68% used
02:31:10 ZALERT SPOL Spool space is 68% used
03:31:10 ZALERT SPOL Spool space is 68% used
04:31:10 ZALERT SPOL Spool space is 68% used
05:31:10 ZALERT SPOL Spool space is 68% used
06:07:41 OPERATOR GRAF L0006 DIALED TO OPERATOR 0020 DIALED= 1 FROM 192.168.5.75
06:08:10 ZALERT VMPPG Page rate for ZALERT is 6.6/sec (above 5 for 1)
```

# Integration with zOperator

```
Screen: ZOPER      RKS2LV      ESAMON 4.240 06/01 06:16
1 of 1              OPERATOR Console      2828 414C7

00:00:00 SYSTEM   LINUX001:
00:00:00 SYSTEM   LINUX001:
00:00:00 SYSTEM   LINUX001: HCPMID6001I  TIME IS 00:00:00 PDT WEDNESDAY 06/01/1
                    6
00:00:00 SYSTEM   LINUX001:
00:00:00 OPERATOR ZOPCZ0109I Erasing file CONSOLE 20160302 A1
00:00:05 OPERATOR AUTO LOGON ***          ZMAP    USERS = 34    BY ZSERVE
00:01:03 DIRMAINT DVHNDY3880I New day processing started.
00:01:03 DATAMOVE DVHNDY3880I New day processing started.
00:01:03 DATAMOVE DVHNDY3881I New day processing completed.
00:01:03 DIRMAINT DVHNDY3881I New day processing completed.
00:01:04 DATAMOVE DVHDLY3882I Daily processing started.
00:01:04 DATAMOVE DVHDLY3885I Daily processing completed.
00:01:04 DIRMAINT DVHDLY3882I Daily processing started.
00:01:04 DIRMAINT DVHRLY3887I Hourly processing completed; 1 log
00:01:04 DIRMAINT DVHRLY3887I files processed, 0 log files remaining.
00:01:04 DIRMAINT DVHDLY3885I Daily processing completed.
00:01:10 ZALERT   VM PG Page rate for RKSDEY is 6.6/sec (above 5 for 1)
00:01:10 ZALERT   VM PG Page rate for ZALERT is 11.1/sec (above 5 for 2)
00:02:02 DIRMAINT DVHBCK3871I Disk backup processing started.
00:02:02 DIRMAINT DVHBCK3872I Disk backup part 1 completed.
00:02:02 DIRMAINT DVHBCK3872I Disk backup part 2 started.
00:02:02 DIRMAINT DVHBCK3873I Disk backup processing completed.
00:05:38 OPERATOR USER DSC  LOGOFF AS  ZMAP    USERS = 33
00:06:10 ZALERT   VM PG Page rate for ZALERT is 6.4/sec (above 5 for 1)
00:31:10 ZALERT   SPOL Spool space is 68% used
01:02:10 ZALERT   VM PG Page rate for ZALERT is 6.7/sec (above 5 for 1)
01:31:10 ZALERT   SPOL Spool space is 68% used
02:31:10 ZALERT   SPOL Spool space is 68% used
03:31:10 ZALERT   SPOL Spool space is 68% used
04:31:10 ZALERT   SPOL Spool space is 68% used
05:31:10 ZALERT   SPOL Spool space is 68% used
06:07:41 OPERATOR GRAF L0006 DIALED TO OPERATOR 0020 DIALED= 1    FROM 192.168
                    .5.75
06:08:10 ZALERT   VM PG Page rate for ZALERT is 6.6/sec (above 5 for 1)
06:09:10 ZALERT   VM PG Page rate for ZALERT is 6.6/sec (above 5 for 2)
06:12:10 ZALERT   VM PG Page rate for ZALERT is 6.7/sec (above 5 for 1)
PF1=Help      2=          3=Quit      4=Del Hold  5=All      6=PFKEY Off
PF7=Backward  8=          9=Loc Back 10=         11=        12=Retrieve
===>
```

# Integration with zOperator

- Use the ACTION feature of LEVEL to route a message to Operator

```
alert spool_use spol
limit 59 1 | &cpu_serial
level 20 green
level 50 yellow action CP MSG OP &code &text
level 90 red
text Spool space is &SPOOL_USE% used

alert userprt vmpg | count &userid
level 5 green action CP MSG OP &code &text
level 40 red
text Page rate for &userid is &userprt/sec (above &tlevel for &tcount)
```

&code is the alert code

&text is the alert message

# Integration with zOperator

- Clickthru support provides a link on web based alert displays
- Clicking the link will open an appropriate display

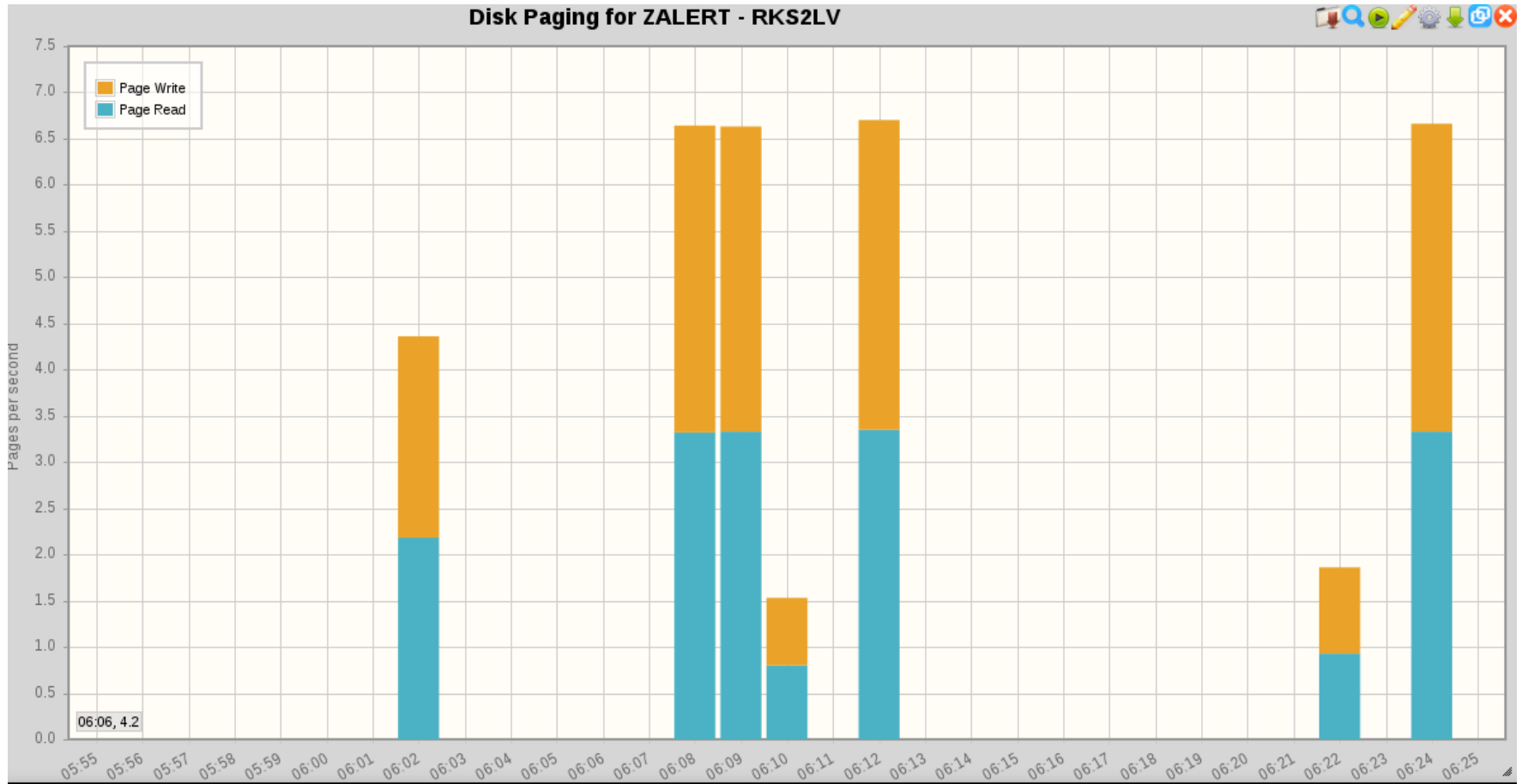
```
00:31:10 ZALERT SPOL Spool space is 68% used
01:02:10 ZALERT VMPG Page rate for ZALERT is 6.7/sec (above 5 for 1)
```

## Click on SPOL...

ESAPSDV - Page And Spool Device Activity - RKS2LV																
Time	Dev No.	Serial	<-----Paging----->				<--Rates-->		<-----Spooling----->				<--Rates-->			
			Avail	Used	%Use	Max	Read	Write	Avail	Used	%Use	Max	Read	Write	Queued	
06:32:00	0000	System	600840	121543	20.2	121543	5.1	1.8	56340	38003	67.5	38003	0.0	0.1	0	
06:32:00	0124	VM5W01	0	0	.	0	0	0	56340	38003	67.5	38003	0.0	0.1	0	
06:32:00	0127	VM5PG1	600840	121543	20.2	121543	5.1	1.8	0	0	.	0	0	0	0	
06:31:00	0000	System	600840	121544	20.2	121544	0.2	0	56340	38001	67.4	38001	0	0	0	
06:31:00	0124	VM5W01	0	0	.	0	0	0	56340	38001	67.4	38001	0	0	0	
06:31:00	0127	VM5PG1	600840	121544	20.2	121544	0.2	0	0	0	.	0	0	0	0	

# Integration with zOperator

Click on VM PG...





# Integration with zOperator

- **How does this work?**
- **zAlert config file contains CLICKTHRU statements**
  - They define the type of link to generate for web based displays
  - Screen type, screen name, and location of a qualifier

```
CLICKTHRU SPOL SCREEN=ESAPSDV  
CLICKTHRU PGRT GRAPH=PAGERATE  
CLICKTHRU VMPG GRAPH=USERPAGE USER=W4  
CLICKTHRU DSRV GRAPH=IORESPDV USER=W2  
CLICKTHRU VMIO SCREEN=ESAUSR3 USER=W5  
CLICKTHRU LNSU GRAPH=LNXSUPTM NODE=W6  
CLICKTHRU LNDX SCREEN=ESAHST2 NODE=W4  
CLICKTHRU DVRT SCREEN=ESADSD2 DEVICE=W6  
CLICKTHRU VMCP GRAPH=USERCPU USER=W2  
CLICKTHRU XACP GRAPH=CPUUTIL
```

# Integration with zOperator

- **Create your own CLICKTHRU's**
- **... or modify ours**
- **For existing CONFIG files, the samples are contained in the file CLIKTHRU SAMPLE**

- The alert engine virtual machine (ZALERT) should be XAUTOLOG-ged shortly after the monitor (ZSERVE)
- Config file (CONFIG ZALERT)

```
/*  
/* Configuration data for zALERT  
/*  
  
AUTHUSER    ZVPS  
LOADEXT     YES  
NTFYLOGS    30  
LOGRETAIN   15  
ALERTFILE   RKS2LV ALRT6
```

- **Many ZALERT functions can be controlled via SMSG**
  - CMS
  - CP
  - QUERY
  - REREAD
  - RESTART
  - SET
  - STATUS
  - STOP

- **CMS** – Returns the result of a CMS command
- **CP** – Returns the result of a CP command

```
smsg zalert cms q search
```

```
* MSG FROM ZALERT : Processing command CMS Q SEARCH for ZVPS
* MSG FROM ZALERT : -          DIR  A   R/W  SFSZVPS:ZALERT.
* MSG FROM ZALERT : -          DIR  C   R/O  SFSZVPS:ZVPS.CONFIG
* MSG FROM ZALERT : -          DIR  D   R/O  SFSZVPS:ZMON.CODE
* MSG FROM ZALERT : MNT190  190  S   R/O
* MSG FROM ZALERT : MNT19E  19E  Y/S  R/O
```

- **REREAD** – Rebuild internal structures from alert files
  - LIMIT counts are preserved
- **RESTART** – Terminate and start alert engine

- **QUERY – See alert file status**

```
smsg zalert query rks2lv alerts
* MSG FROM ZALERT : Processing command QUERY RKS2LV ALERTS for ZVPS
* MSG FROM ZALERT : Alerts in RKS2LV:
* MSG FROM ZALERT : AACP      DSRV      LNSR      SPOL      VMLP
* MSG FROM ZALERT : APSP      DVRT      LNSU      VMCP-D    VMGP
* MSG FROM ZALERT : DBSY      INQU      LXUP      VMC2      XACP
* MSG FROM ZALERT : DEVQ      LNCP      PGAL      VMIO      XMVM
* MSG FROM ZALERT : DRPN      LNDX      PGRT      VMLP      XPRO
```

- **QUERY – See include/exclude entries**

```
smsg zalert query rks2lv include vmc2
* MSG FROM ZALERT : Processing command QUERY RKS2LV INCLUDE VMC2 for ZVPS
* MSG FROM ZALERT : Include list for VMC2, include var USERID
* MSG FROM ZALERT : RKSDEV
* MSG FROM ZALERT : ZALERT
```

- **Set – Enable/Disable an alert**

```
smsg zalert set rks2lv disable vmcp
```

```
* MSG FROM ZALERT : Processing command SET RKS2LV DISABLE VMCP for ZVPS
```

```
* MSG FROM ZALERT : Alert VMCP in RKS2LV is disabled
```

```
smsg zalert set rks2lv enable vmcp
```

```
* MSG FROM ZALERT : Processing command SET RKS2LV ENABLE VMCP for ZVPS
```

```
* MSG FROM ZALERT : Alert VMCP in RKS2LV is enabled
```

- **Set – Alter include/exclude list**

```
smsg zalert query rks2lv include vmc2
```

```
* MSG FROM ZALERT : Processing command QUERY RKS2LV INCLUDE VMC2 for ZVPS  
* MSG FROM ZALERT : Include list for VMC2, include var USERID  
* MSG FROM ZALERT : RKSDEV  
* MSG FROM ZALERT : ZALERT
```

```
smsg zalert set rks2lv include vmc2 add userid linux001
```

```
* MSG FROM ZALERT : Processing command SET RKS2LV INCLUDE VMC2 ADD USERID LINUX001 for ZVPS  
* MSG FROM ZALERT : Alert VMC2 in RKS2LV, LINUX001 added to include list for USERID
```

```
smsg zalert query rks2lv include vmc2
```

```
* MSG FROM ZALERT : Processing command QUERY RKS2LV INCLUDE VMC2 for ZVPS  
* MSG FROM ZALERT : Include list for VMC2, include var USERID  
* MSG FROM ZALERT : RKSDEV  
* MSG FROM ZALERT : ZALERT  
* MSG FROM ZALERT : LINUX001
```



- **Set – Alter include/exclude list**

```
smsg zalert query rks2lv include vmc2
```

```
* MSG FROM ZALERT : Processing command QUERY RKS2LV INCLUDE VMC2 for ZVPS  
* MSG FROM ZALERT : Include list for VMC2, include var USERID  
* MSG FROM ZALERT : RKSDEV  
* MSG FROM ZALERT : ZALERT  
* MSG FROM ZALERT : LINUX001
```

```
smsg zalert set rks2lv include vmc2 rem userid linux001
```

```
* MSG FROM ZALERT : Processing command SET RKS2LV INCLUDE VMC2 REM USERID LINUX001 for ZVPS  
* MSG FROM ZALERT : Alert VMC2 in RKS2LV, LINUX001 removed from include list for USERID
```

```
smsg zalert query rks2lv include vmc2
```

```
* MSG FROM ZALERT : Processing command QUERY RKS2LV INCLUDE VMC2 for ZVPS  
* MSG FROM ZALERT : Include list for VMC2, include var USERID  
* MSG FROM ZALERT : RKSDEV  
* MSG FROM ZALERT : ZALERT
```

- **STATUS – Display alert engine status**

```
smsg zalert status
```

```
* MSG FROM ZALERT : Processing command STATUS for ZVPS  
* MSG FROM ZALERT : zAlert Level 4.2.0.3  
* MSG FROM ZALERT : DCSS Cap: 8191 HWM: 82 Cur: 21 0.3%  
* MSG FROM ZALERT : Processing files RKS2LV VMALERT LINALERT
```

- **STOP – Terminate alert engine**

```
smsg zalert stop
```

```
* MSG FROM ZALERT : Processing command STOP for ZVPS
```

– QUIT and END are synonyms for STOP

# 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

# Questions

Rich Smrcina  
Velocity Software, Inc  
[rich@velocitysoftware.com](mailto:rich@velocitysoftware.com)