# zVPS Alerts

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PROVEN PERFORMANCE

# Agenda

- Overview
- What are alerts?
  - Where do alerts fit
- zAlert technology
- Alert samples
- Defining your own alert
  - CPU Utilization
  - LPAR Utilization
- Notification
  - MSG to Operator
  - SNMP trap
- Advanced topics

# What are alerts?

- A separately installed component of zVPS
  - Included as part of the product suite
- An alert is an indication of an abnormal condition
- An abnormal condition can be
  - Exceeding a certain threshold
  - An object in an incorrect state
    - Volume offline
    - Virtual machine not logged on
    - Incorrect system settings

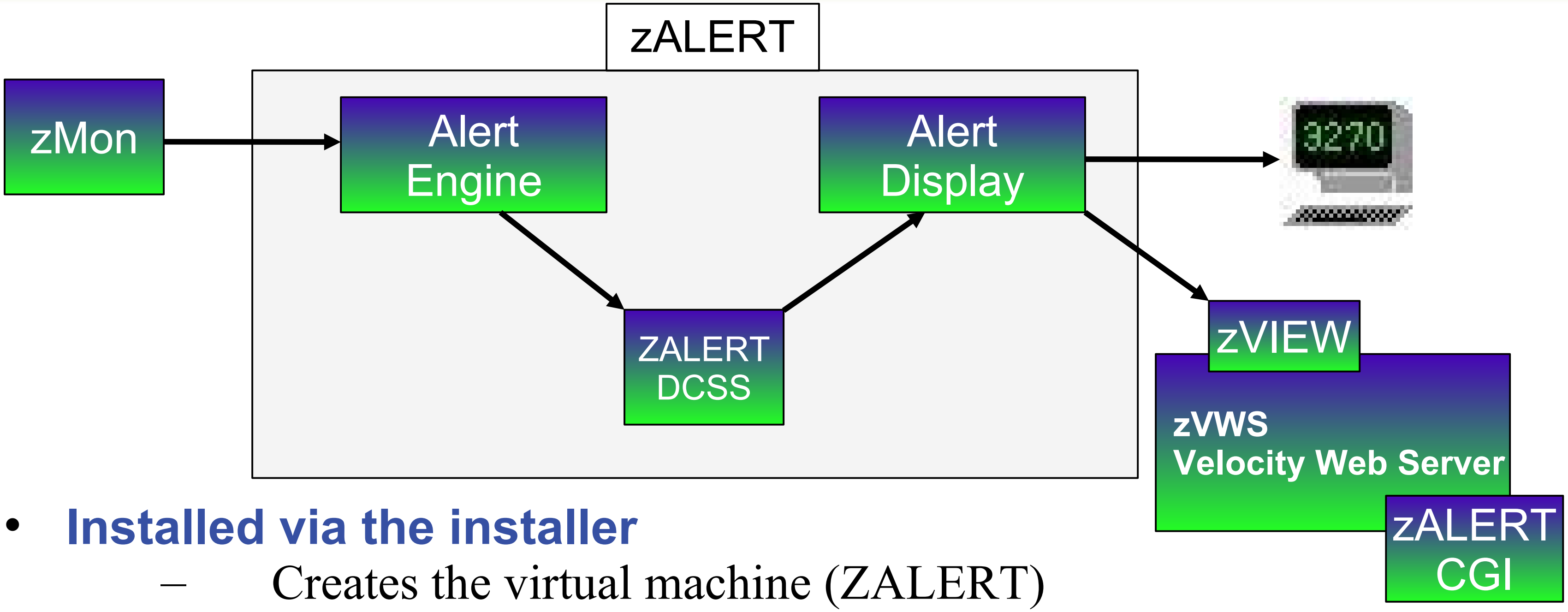
# Overview

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.

# zALERT Technology



- **Installed via the installer**
  - Creates the virtual machine (ZALERT)
  - Sample alerts provided
  - More samples on the web site
- **Requires a DCSS for operation**
- **Alert messages stored in the DCSS**
- **Message retrieval handled by a separate EXEC**
- **zAlert 4.1 (MONALERT) can still be used as is, but is functionally stabilized**

# Alert processing

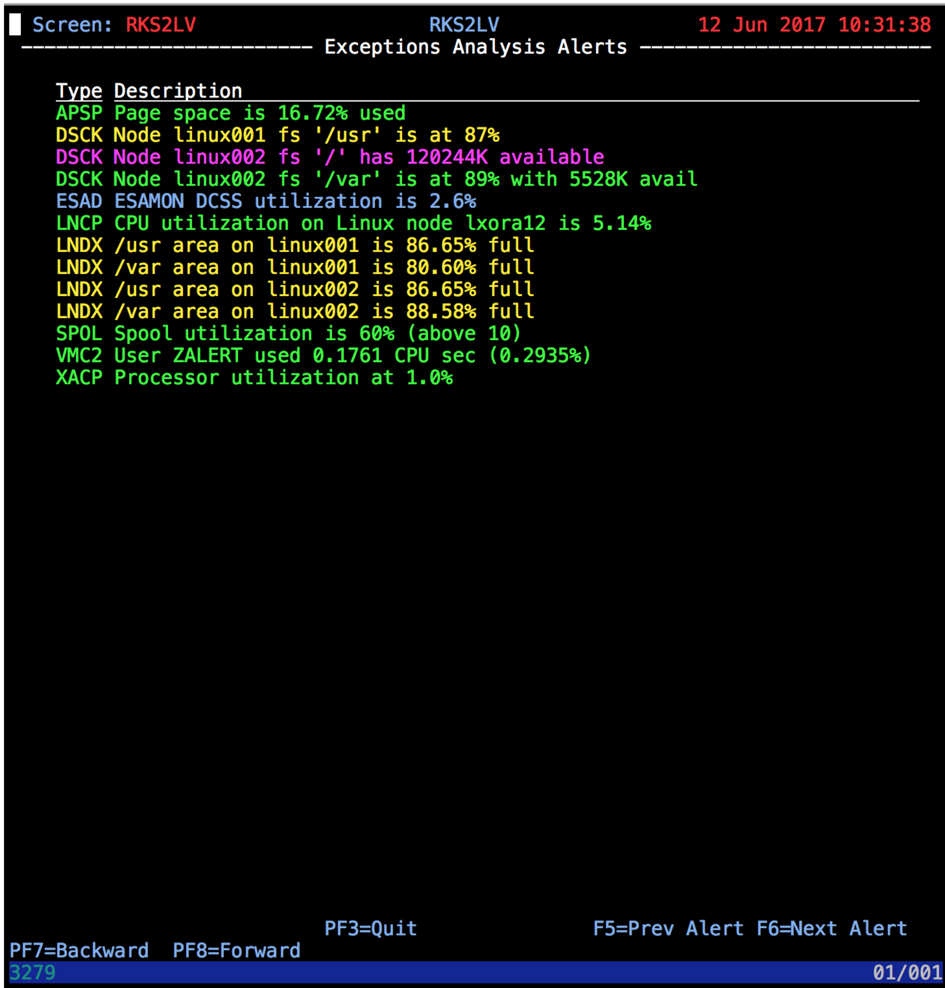
- **The alert virtual machine**
  - Wakes up every minute, processes alerts
  - Generates alert messages
  - Sends out required notifications

- **Each of the defined extracts is executed**
  - Values returned from extracts is compared against user defined thresholds
  - Message displayed and action taken when thresholds are exceeded

# Viewing alerts - 3270

- **Terminal session**
  - ZALERT [alertfile]

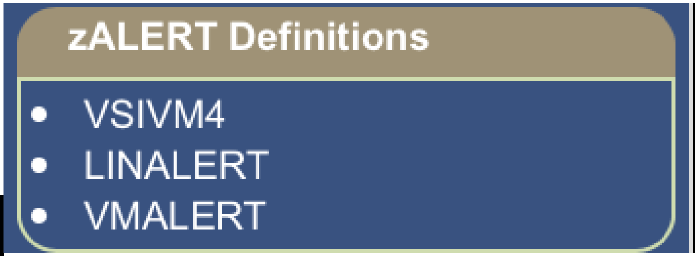
```
vmlink .dir vmsysvps:zmon.code
ZALERT
```



```
 Screen: RKS2LV                          RKS2LV                  12 Jun 2017 10:31:38
 ------------------------- Exceptions Analysis Alerts -------------------------

    Type Description
    APSP Page space is 16.72% used
    DSCK Node linux001 fs '/usr' is at 87%
    DSCK Node linux002 fs '/' has 120244K available
    DSCK Node linux002 fs '/var' is at 89% with 5528K avail
    ESAD ESAMON DCSS utilization is 2.6%
    LNCP CPU utilization on Linux node lxora12 is 5.14%
    LNDX /usr area on linux001 is 86.65% full
    LNDX /var area on linux001 is 80.60% full
    LNDX /usr area on linux002 is 86.65% full
    LNDX /var area on linux002 is 88.58% full
    SPOL Spool utilization is 60% (above 10)
    VMC2 User ZALERT used 0.1761 CPU sec (0.2935%)
    XACP Processor utilization at 1.0%









                           PF3=Quit                F5=Prev Alert F6=Next Alert
PF7=Backward  PF8=Forward
3279                                                                      01/001
```

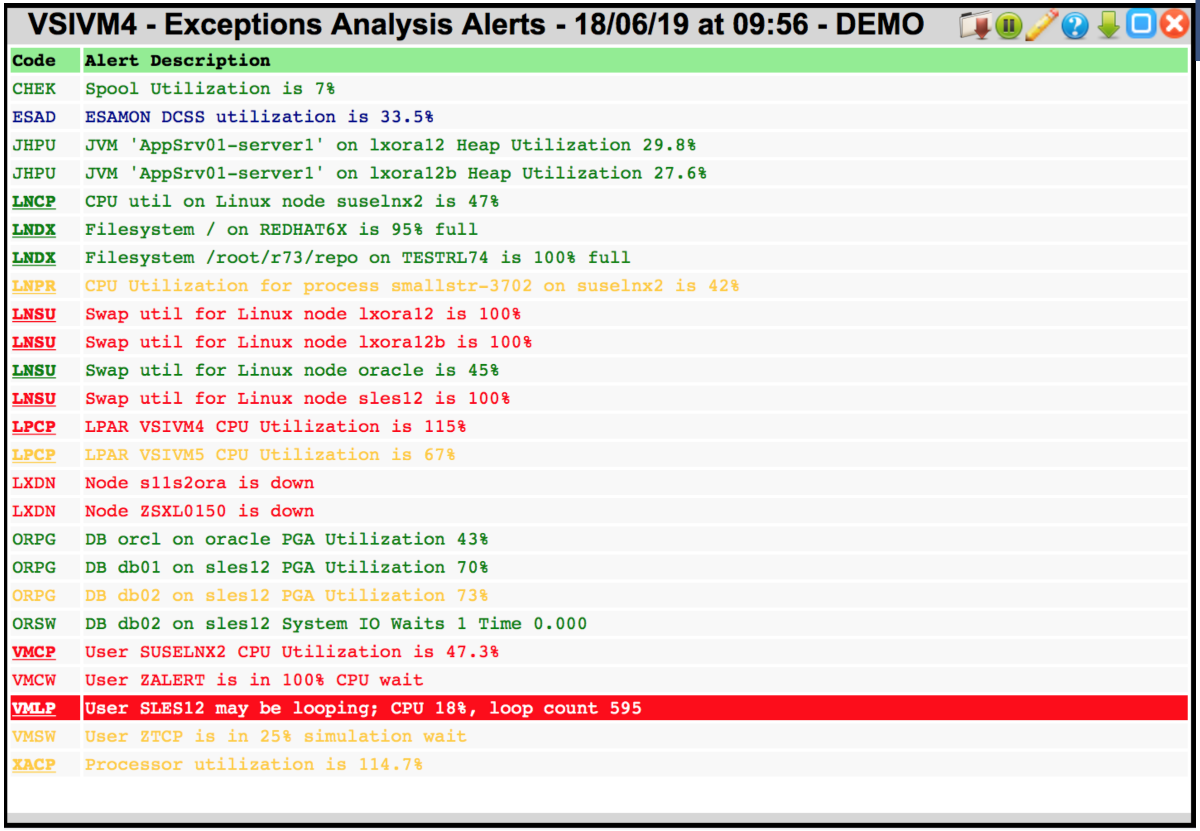
# Viewing alerts - ZVIEW

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



zALERT Definitions

- VSIVM4
- LINALERT
- VMALERT



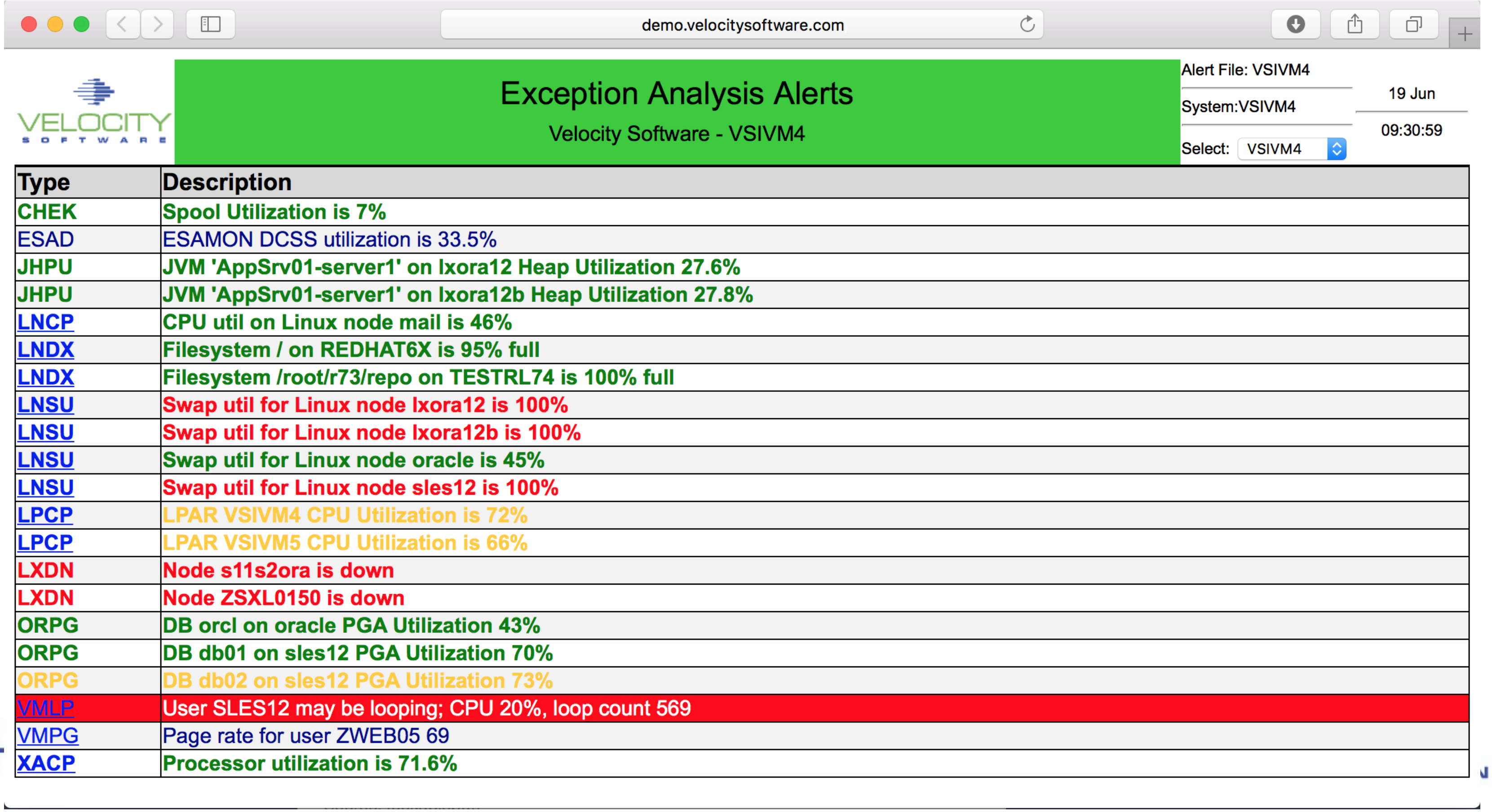
VSIVM4 - Exceptions Analysis Alerts - 18/06/19 at 09:56 - DEMO

| Code | Alert Description |
|---|---|
| CHEK | Spool Utilization is 7% |
| ESAD | ESAMON DCSS utilization is 33.5% |
| JHPU | JVM 'AppSrv01-server1' on lxora12 Heap Utilization 29.8% |
| JHPU | JVM 'AppSrv01-server1' on lxora12b Heap Utilization 27.6% |
| LNCP | CPU util on Linux node suselnx2 is 47% |
| LNDX | Filesystem / on REDHAT6X is 95% full |
| LNDX | Filesystem /root/r73/repo on TESTRL74 is 100% full |
| LNPR | CPU Utilization for process smallstr-3702 on suselnx2 is 42% |
| LNSU | Swap util for Linux node lxora12 is 100% |
| LNSU | Swap util for Linux node lxora12b is 100% |
| LNSU | Swap util for Linux node oracle is 45% |
| LNSU | Swap util for Linux node sles12 is 100% |
| LPCP | LPAR VSIVM4 CPU Utilization is 115% |
| LPCP | LPAR VSIVM5 CPU Utilization is 67% |
| LXDN | Node s11s2ora is down |
| LXDN | Node ZSXL0150 is down |
| ORPG | DB orcl on oracle PGA Utilization 43% |
| ORPG | DB db01 on sles12 PGA Utilization 70% |
| ORPG | DB db02 on sles12 PGA Utilization 73% |
| ORSW | DB db02 on sles12 System IO Waits 1 Time 0.000 |
| VMCP | User SUSELNX2 CPU Utilization is 47.3% |
| VMCW | User ZALERT is in 100% CPU wait |
| VMLP | User SLES12 may be looping; CPU 18%, loop count 595 |
| VMSW | User ZTCP is in 25% simulation wait |
| XACP | Processor utilization is 114.7% |

# Viewing alerts - CGI

- **CGI placed in the ZVWS.ROOT directory**

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



demo.velocitysoftware.com

Exception Analysis Alerts

Velocity Software - VSIVM4

Alert File: VSIVM4

System:VSIVM4

Select: VSIVM4

19 Jun

09:30:59

| Type | Description |
|---|---|
| CHEK | Spool Utilization is 7% |
| ESAD | ESAMON DCSS utilization is 33.5% |
| JHPU | JVM 'AppSrv01-server1' on lxora12 Heap Utilization 27.6% |
| JHPU | JVM 'AppSrv01-server1' on lxora12b Heap Utilization 27.8% |
| LNCP | CPU util on Linux node mail is 46% |
| LNDX | Filesystem / on REDHAT6X is 95% full |
| LNDX | Filesystem /root/r73/repo on TESTRL74 is 100% full |
| LNSU | Swap util for Linux node lxora12 is 100% |
| LNSU | Swap util for Linux node lxora12b is 100% |
| LNSU | Swap util for Linux node oracle is 45% |
| LNSU | Swap util for Linux node sles12 is 100% |
| LPCP | LPAR VSIVM4 CPU Utilization is 72% |
| LPCP | LPAR VSIVM5 CPU Utilization is 66% |
| LXDN | Node s11s2ora is down |
| LXDN | Node ZSXL0150 is down |
| ORPG | DB orcl on oracle PGA Utilization 43% |
| ORPG | DB db01 on sles12 PGA Utilization 70% |
| ORPG | DB db02 on sles12 PGA Utilization 73% |
| VMLP | User SLES12 may be looping; CPU 20%, loop count 569 |
| VMPG | Page rate for user ZWEB05 69 |
| XACP | Processor utilization is 71.6% |

# Alert samples

- **Alert samples are shipped with the ZALERT package**
  - ALERT1 MONALERT is the primary sample file
  - Older sample files are shipped with the filetype MONSAMP
    - VMALERT, LINALERT, HEALTH and HEALTH2
  - Samples check various conditions that can potentially occur
    - CPU/Spool/Page Utilization, I/O Rate, Paging Rate
    - 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

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%
```

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

# 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 at &util%
```

PARMS determines the type of data to extract

# 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

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%
```

Variables defined for use in the following alerts

Size of each variable with optional decimal precision

# Defining your own alerts

- **Alert for CPU Utilization**

```
Extract
Parms

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 Process
```

ALERT statement defines a specific alert

Four character code used when displaying alerts

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

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

LEVEL statement controls the threshold values

Color of the alert text when this level is exceeded

Values tested against the alert variable

# Defining your own alerts

- **Alert for CPU Utilization**

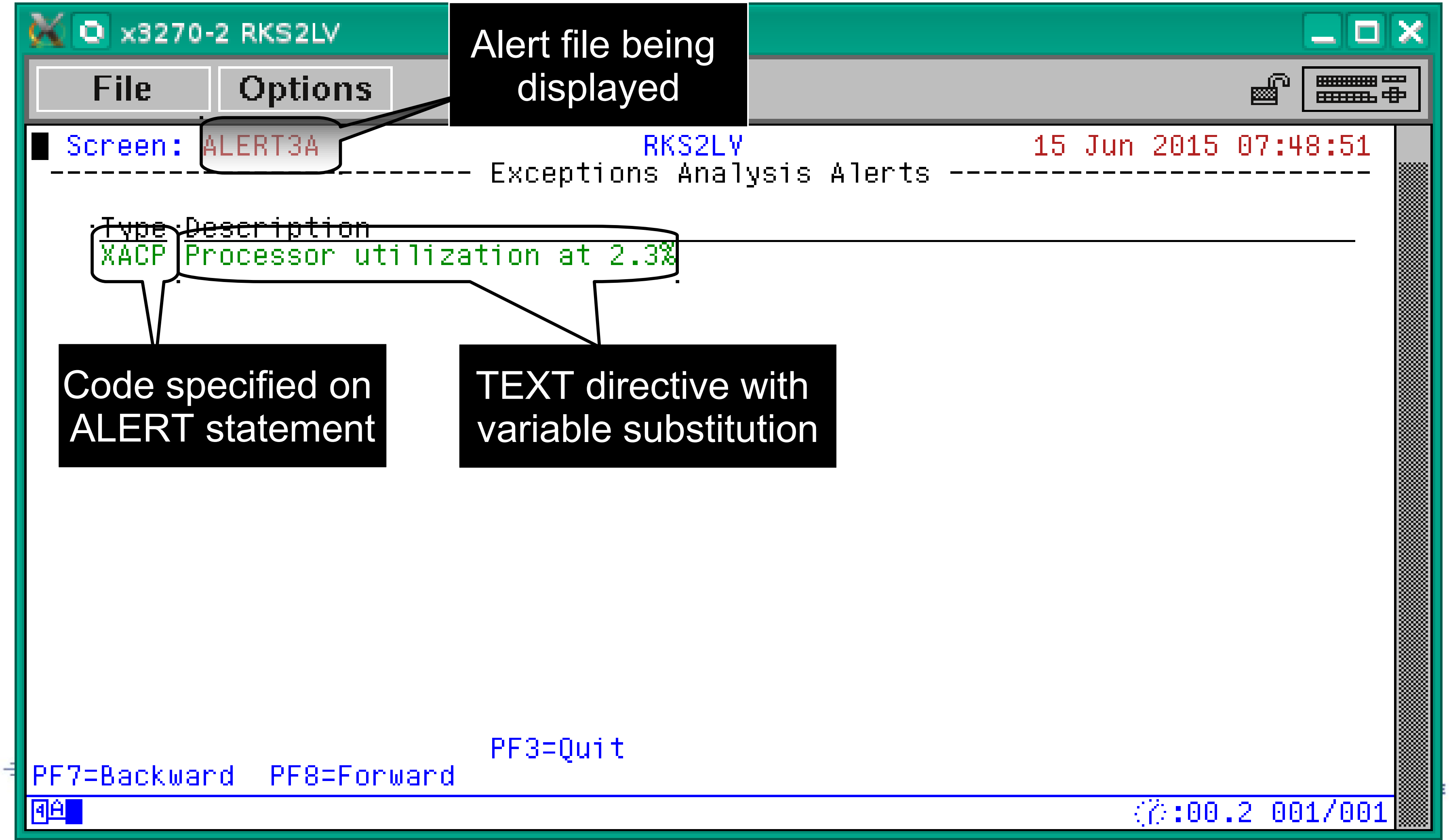
```
Extract
Parms CPU TOTAL

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

alert util xacp
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**



```
Screen: ALERT3A                  RKS2LV                15 Jun 2015 07:48:51
---------------------------- Exceptions Analysis Alerts ---------------------------

   Type Description
   XACP Processor utilization at 2.3%




                                PF3=Quit
PF7=Backward  PF8=Forward
                                                               :00.2 001/001
```

Alert file being displayed

Code specified on ALERT statement

TEXT directive with variable substitution

# Alert rules

- **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
    - **BLI**nk – blink the entire text
    - **UNDERLINE** – underline the entire text

# LPAR Utilization

- **Alert for LPAR Utilization**

```
Extract
Parms LPAR *
Criteria sytcup.lcupname <> 'Totals:'
var  lpname    | 8   | sytcup.lcupname
var  lputil    | 3 0 | sytcup.pctcpu

alert lputil lpcp
level 70 yellow
level 85 red
level 95 red rev
text LPAR utilization of &lpname is &lputil%
```

# LPAR Utilization

- **Alert for LPAR Utilization**

```
Extract
Parms LPAR *
Criteria sytcup.lcupname <> 'Totals:'
var  lpname    | 8   | sytcup.lcupname
var  lputil    | 3 0 | sytcup.pctcpu

alert lputil lpcp
level 70 yellow
level 85 red
level 95 red rev
text LPAR utilization of &lpname is &lputil%
```

Informs the extract to pull data for all LPARs

Data filtering

# LPAR Utilization

- **Alert for LPAR Utilization**

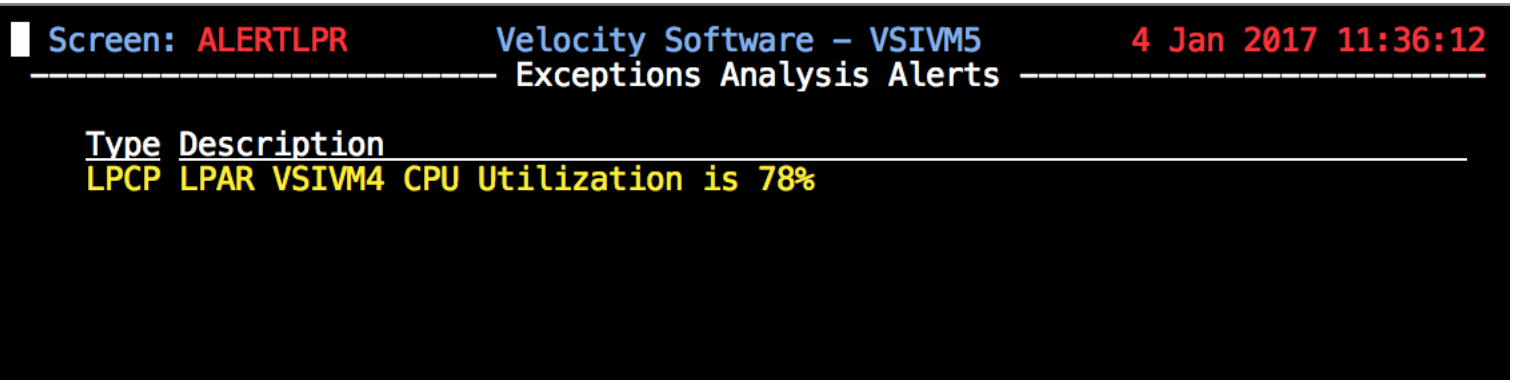
```
Extract
Parms LPAR *
Criteria sytcup.lcupname <> 'Totals:'
var  lpname   | 8   | sytcup.lcupname
var  lputil   | 3 0 | sytcup.pctcpu

alert lputil lpcp
level 70 yellow
level 85 red
level 95 red rev
text LPAR utilization of &lpname is &lputil%
```

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

# LPAR Utilization

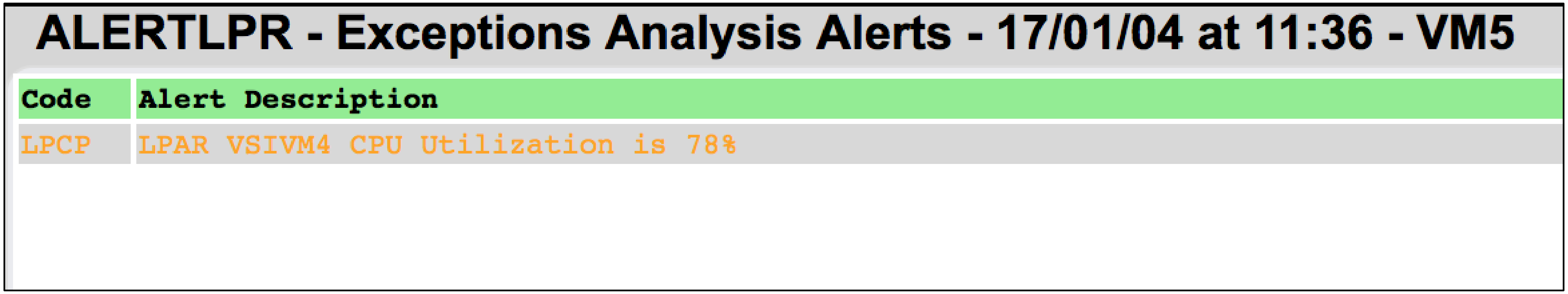
- **Alert for LPAR Utilization display**

3270 →



```
 Screen: ALERTLPR        Velocity Software - VSIVM5         4 Jan 2017 11:36:12
 ------------------------ Exceptions Analysis Alerts ------------------------

     Type Description
     LPCP LPAR VSIVM4 CPU Utilization is 78%
```

zView ↓



**ALERTLPR - Exceptions Analysis Alerts - 17/01/04 at 11:36 - VM5**

| Code | Alert Description |
|---|---|
| LPCP | LPAR VSIVM4 CPU Utilization is 78% |

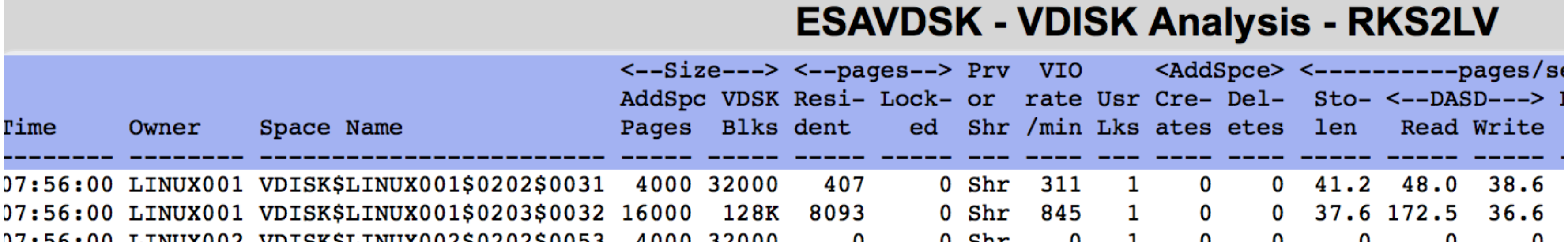
# Defining your own alert – Complex operations

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

```
extract
parms user *
criteria userdata.userid <> 'System:' & useact.vmdttime > 0
var    userid      | 8   | userdata.userid
var    cpuutil     | 3 1 | useact.vmdttime * 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    vmdttime    | 5 2 | useact.vmdttime
```

# 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 - RKS2LV**

```
                                                    <--Size---> <--pages--> Prv  VIO      <AddSpce> <----------pages/se
                                                    AddSpc VDSK Resi- Lock- or   rate Usr Cre- Del-  Sto- <--DASD---> I
Time     Owner    Space Name                        Pages  Blks dent     ed Shr  /min Lks ates etes  len    Read Write
-------- -------- ------------------------ ----- ----- ----- ----- --- ---- --- ---- ---- ----- ----- ----- -
07:56:00 LINUX001 VDISK$LINUX001$0202$0031  4000 32000   407     0 Shr  311   1    0    0  41.2  48.0  38.6
07:56:00 LINUX001 VDISK$LINUX001$0203$0032 16000  128K  8093     0 Shr  845   1    0    0  37.6 172.5  36.6
07:56:00 LINUX002 VDISK$LINUX002$0202$0053  4000 32000     0     0 Shr    0   1    0    0     0     0     0
```

Vdisk activity indicator

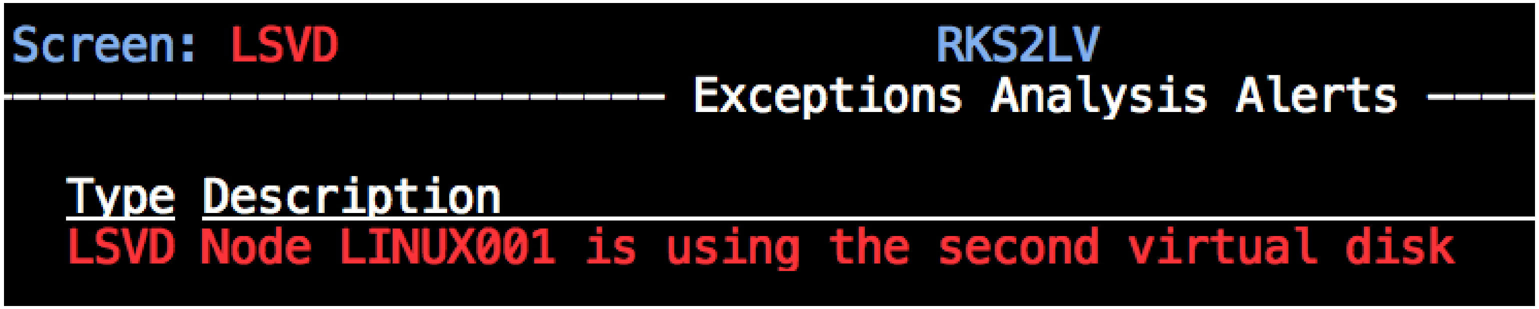
# Defining your own alert - Second vdisk usage

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

Select address spaces beginning with vdisk

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

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

Common second virtual disk



```
Screen: LSVD                          RKS2LV
------------------------ Exceptions Analysis Alerts ----

  Type Description
  LSVD Node LINUX001 is using the second virtual disk
```

# Notifications

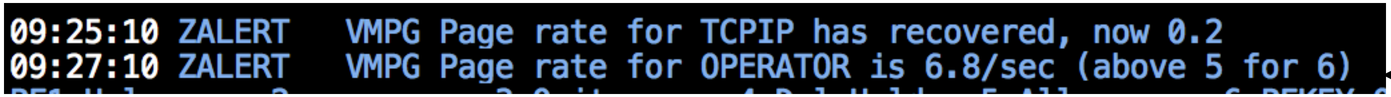
- A notification is a message sent to interested parties of an alert condition
- Sent in one or more of the following forms
  - CP MSG/MSGNOH
  - Email
  - Text page (via email)
  - SNMP Trap

# Notifications

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

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

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



```
09:25:10 ZALERT   VMPG Page rate for TCPIP has recovered, now 0.2
09:27:10 ZALERT   VMPG Page rate for OPERATOR is 6.8/sec (above 5 for 6)
```

# Notifications

- ## SNMP Trap configuration

  - Create/Modify SNMP TRAPDEST on the CONFIG disk

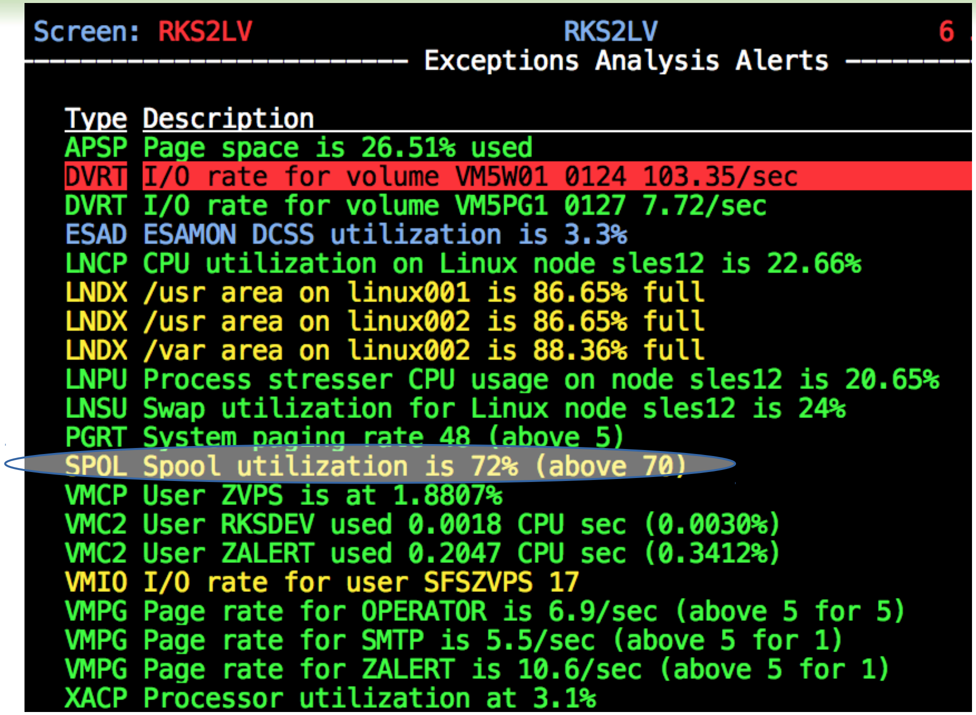
```
* following is default 1.3.6.1.4.1.15601
192.168.5.182 velocity 2B06010401F971 ;
```

  - Use the TRAP directive on the LEVEL command

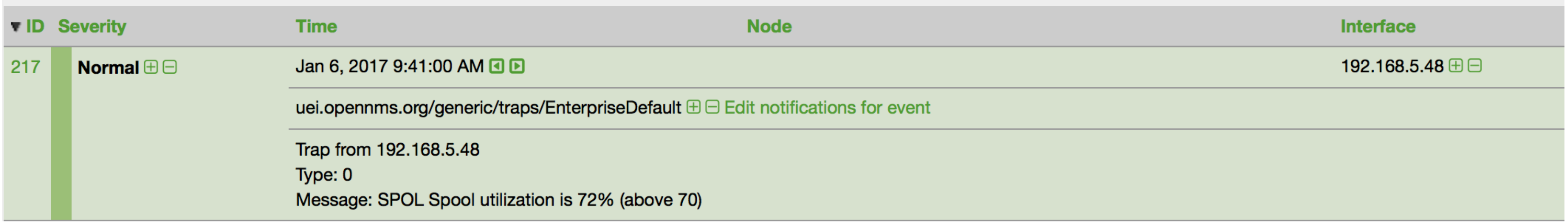
```
alert spool_use spol
level 10 green
level 70 yellow trap &code &atext
level 80 pink
level 90 red
text Spool utilization is &spool_use% (above &tlevel)
```

# Notifications

- **SNMP Trap result**



```
Screen: RKS2LV                        RKS2LV                    6
------------------------ Exceptions Analysis Alerts --------

  Type Description
  APSP Page space is 26.51% used
  DVRT I/O rate for volume VM5W01 0124 103.35/sec
  DVRT I/O rate for volume VM5PG1 0127 7.72/sec
  ESAD ESAMON DCSS utilization is 3.3%
  LNCP CPU utilization on Linux node sles12 is 22.66%
  LNDX /usr area on linux001 is 86.65% full
  LNDX /usr area on linux002 is 86.65% full
  LNDX /var area on linux002 is 88.36% full
  LNPU Process stresser CPU usage on node sles12 is 20.65%
  LNSU Swap utilization for Linux node sles12 is 24%
  PGRT System paging rate 48 (above 5)
  SPOL Spool utilization is 72% (above 70)
  VMCP User ZVPS is at 1.8807%
  VMC2 User RKSDEV used 0.0018 CPU sec (0.0030%)
  VMC2 User ZALERT used 0.2047 CPU sec (0.3412%)
  VMIO I/O rate for user SFSZVPS 17
  VMPG Page rate for OPERATOR is 6.9/sec (above 5 for 5)
  VMPG Page rate for SMTP is 5.5/sec (above 5 for 1)
  VMPG Page rate for ZALERT is 10.6/sec (above 5 for 1)
  XACP Processor utilization at 3.1%
```



| ▾ ID | Severity | Time | Node | Interface |
|---|---|---|---|---|
| 217 | Normal ⊞ ⊟ | Jan 6, 2017 9:41:00 AM ◧ ◨ | | 192.168.5.48 ⊞ ⊟ |

uei.opennms.org/generic/traps/EnterpriseDefault ⊞ ⊟ Edit notifications for event

Trap from 192.168.5.48
Type: 0
Message: SPOL Spool utilization is 72% (above 70)

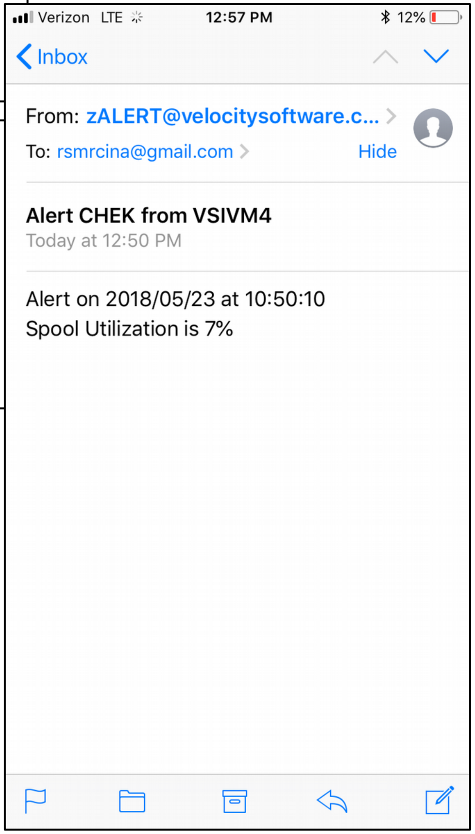
# Notifications

- **Email**

VSIVM4 MONALERT:

```
alert spool_use chek
limit 359 1 | &cpu_serial
level  1  green notify
text Spool Utilization is &spool_use%
```

```
 VSIVM4   NOTIFY   C1  F 80  Trunc=80 Size=16 Line=0 Col=1 Alt=0

       |...+....1....+....2....+....3....+....4....+....5....+....6
===== * * * Top of File * * *
===== :NOTIFY-USERS
===== CHEK rsmrcina@gmail.com
===== :ENOTIFY-USERS
```



From: zALERT@velocitysoftware.c...

To: rsmrcina@gmail.com

**Alert CHEK from VSIVM4**

Today at 12:50 PM

Alert on 2018/05/23 at 10:50:10

Spool Utilization is 7%

# Alert Options

- **Options add additional function at the alert level**
  - Priority
  - Log
  - Count
  - Separated on alert directive with a vertical bar

```
ALERT DISKPCT LNDX | <options>
```

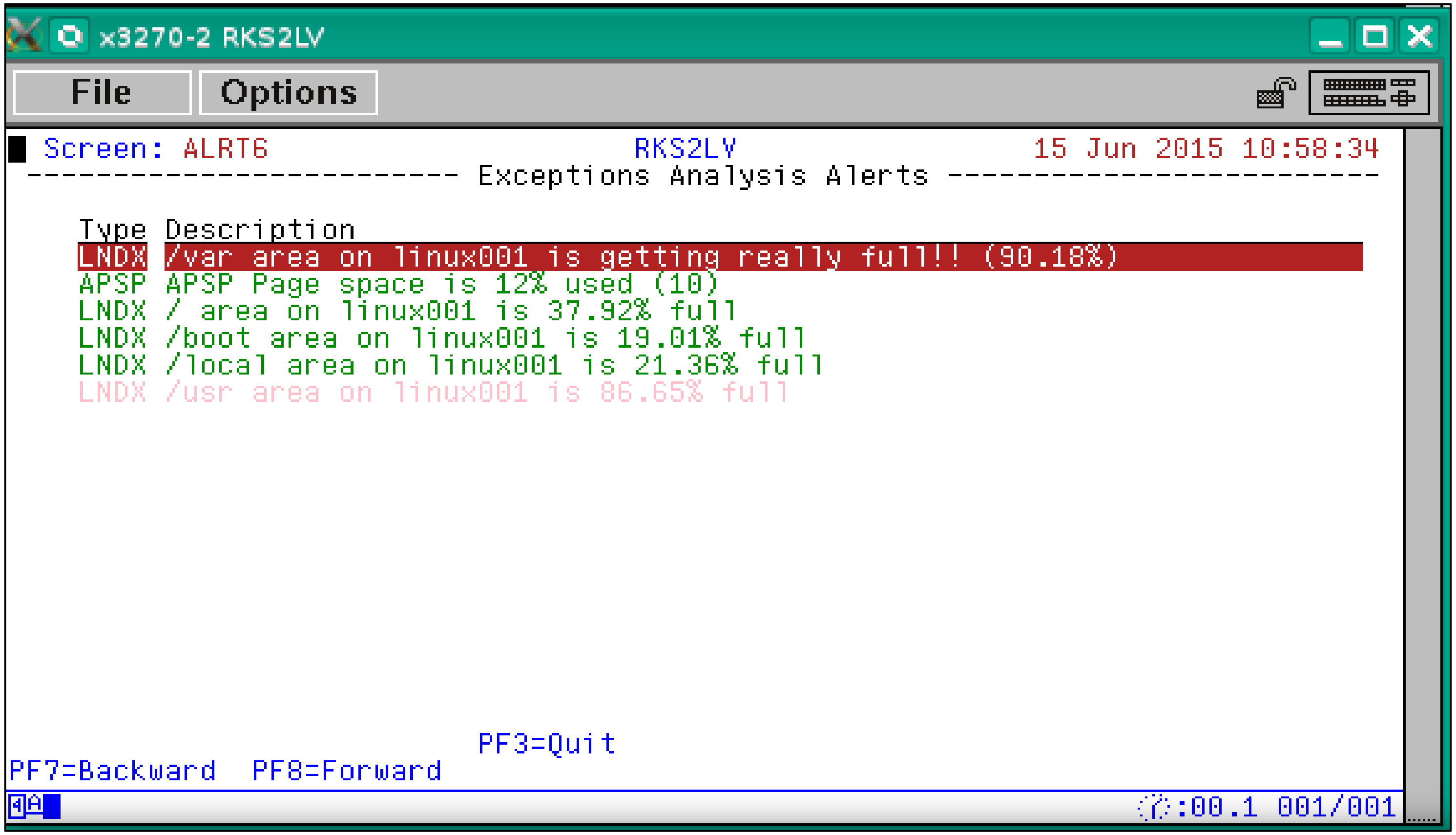
- **Log - Writes alert text displays to a file**
- **Count - Tallies the number of times an alert appears on the display**

# Priority

- **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 lndx | 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
```

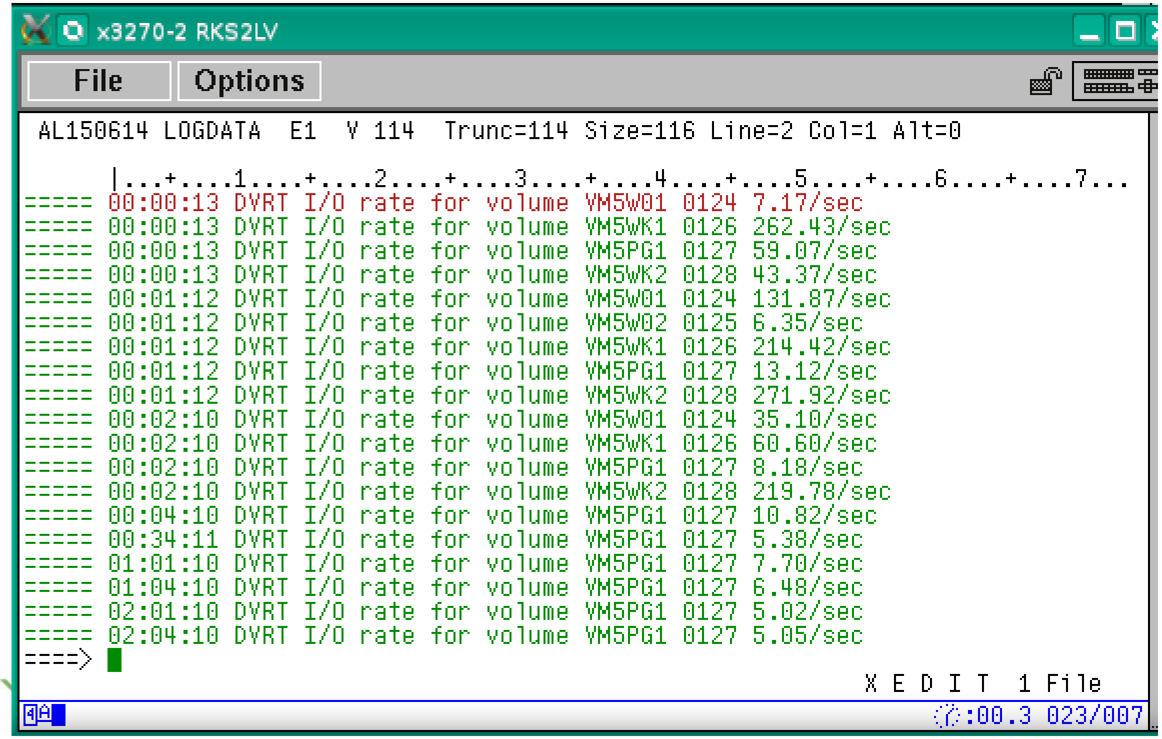
# Priority



```
 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










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

# Log

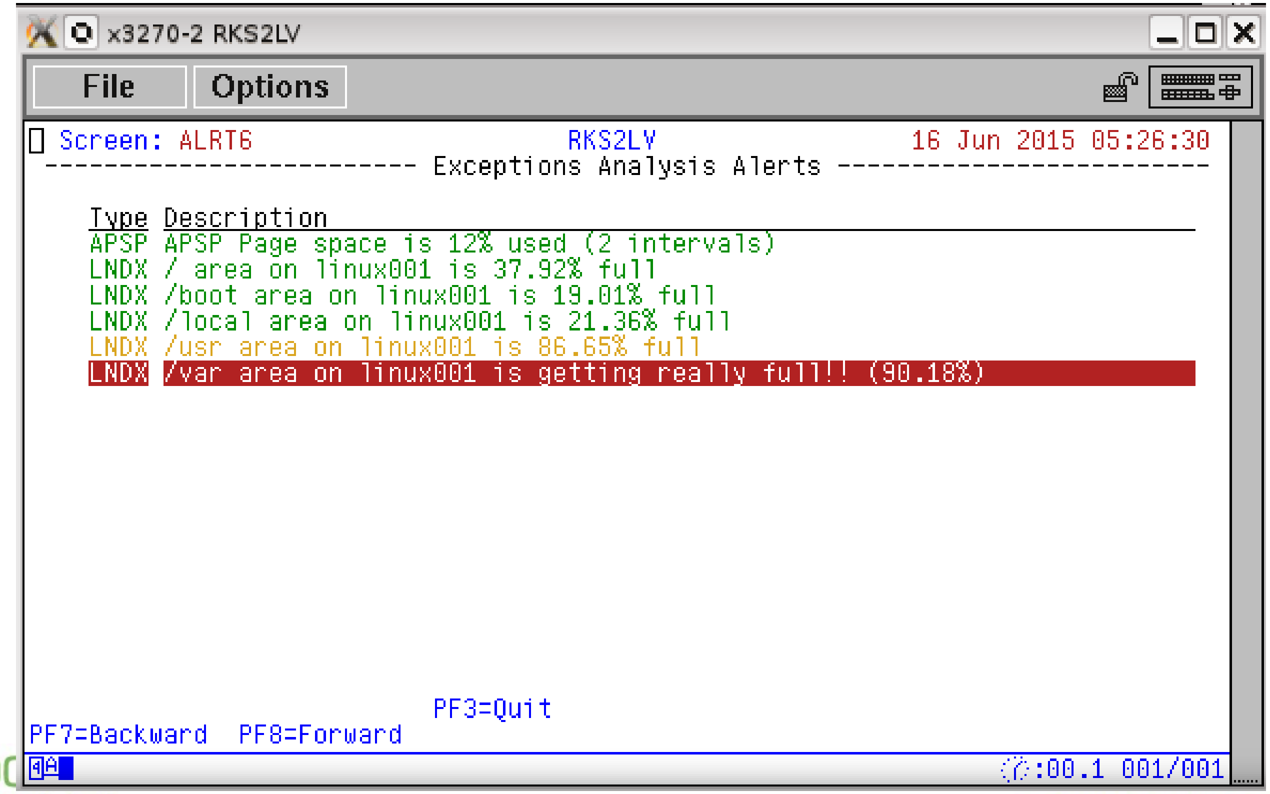
```
alert io_rate dvrt | log
level  5  green
level 10  blue
level 20  turquoise
level 30  pink
level 40  red rev
text I/O rate for volume &volser &rdev &io_rate/sec
```



```
 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
====>
                                                       X E D I T  1 File
                                                          :00.3 023/007
```

# Count

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



```
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%)




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

# Alert Options

- **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**

# Enable/Disable

- **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 apsp
disable
level 10  green
level 30  yellow
level 50  red
text Page space is &page_use% used
```

# Limit

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

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

alert spool_use spol
limit 4 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%
```

# Limit

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

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

alert spool_use spol
limit 4 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

# Limit

- This LIMIT directive:

```
limit 4 1 | &serial
```

- Will delay ACTION for 4 intervals
- Execute ACTION for 1 intervals
- Repeat
- For example, when started at 11:55

```
12:00:29  * MSG FROM ZALERT: SPOOL UTIL IS  95%
12:05:30  * MSG FROM ZALERT: SPOOL UTIL IS  95%
12:10:31  * MSG FROM ZALERT: SPOOL UTIL IS  95%
```

First message is delayed 4 intervals

One interval of ACTION

# Limit

- **LIMIT initial action setting**

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

alert spool_use spol
limit 4 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

# 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

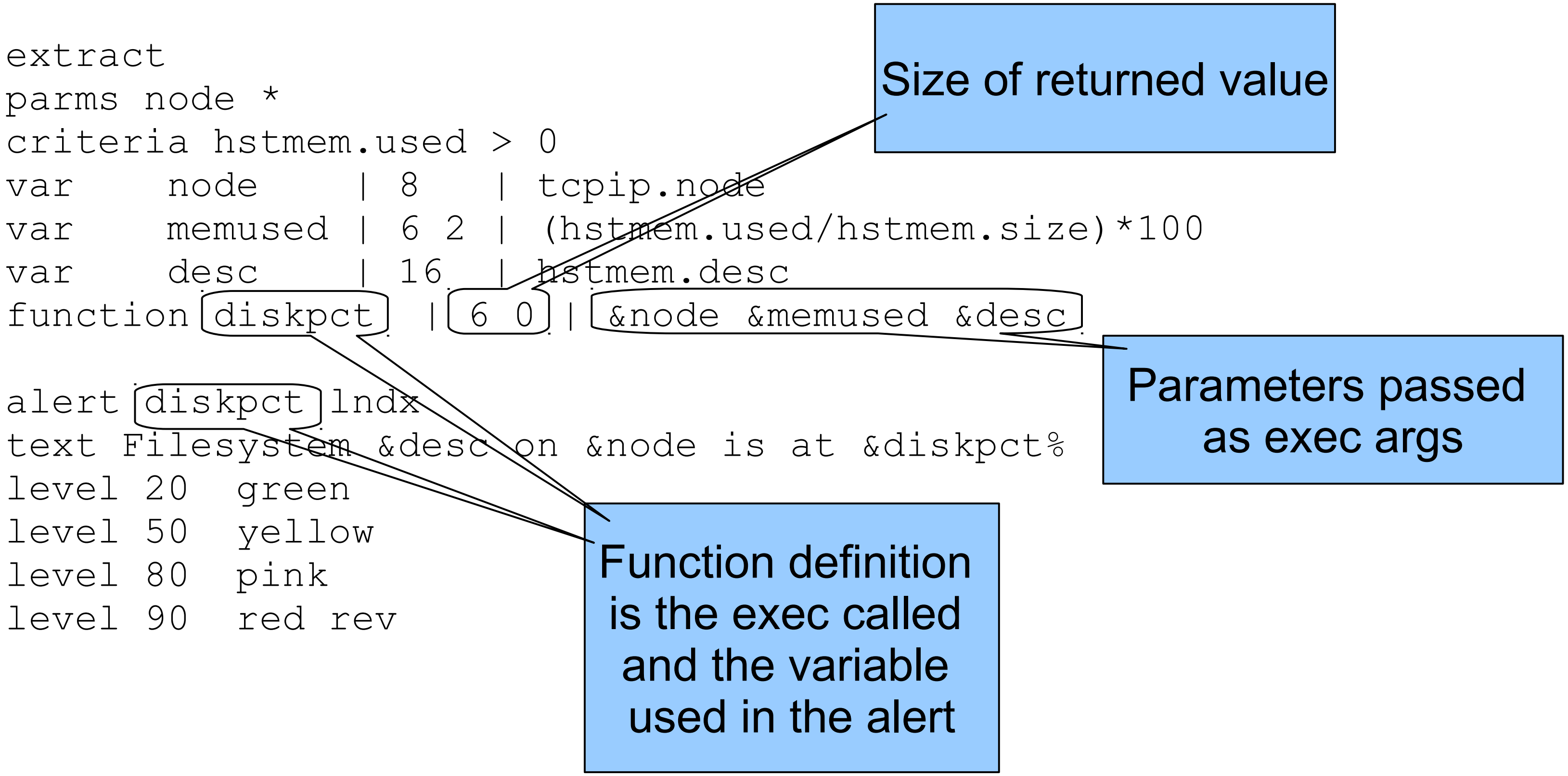
# External Processing

- **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    | 60  | hstmem.desc
function diskpct  | 6 0 | &node &memused &desc

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

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

Size of returned value

Parameters passed as exec args

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

# External Processing

- **REXX exec called from the alert**

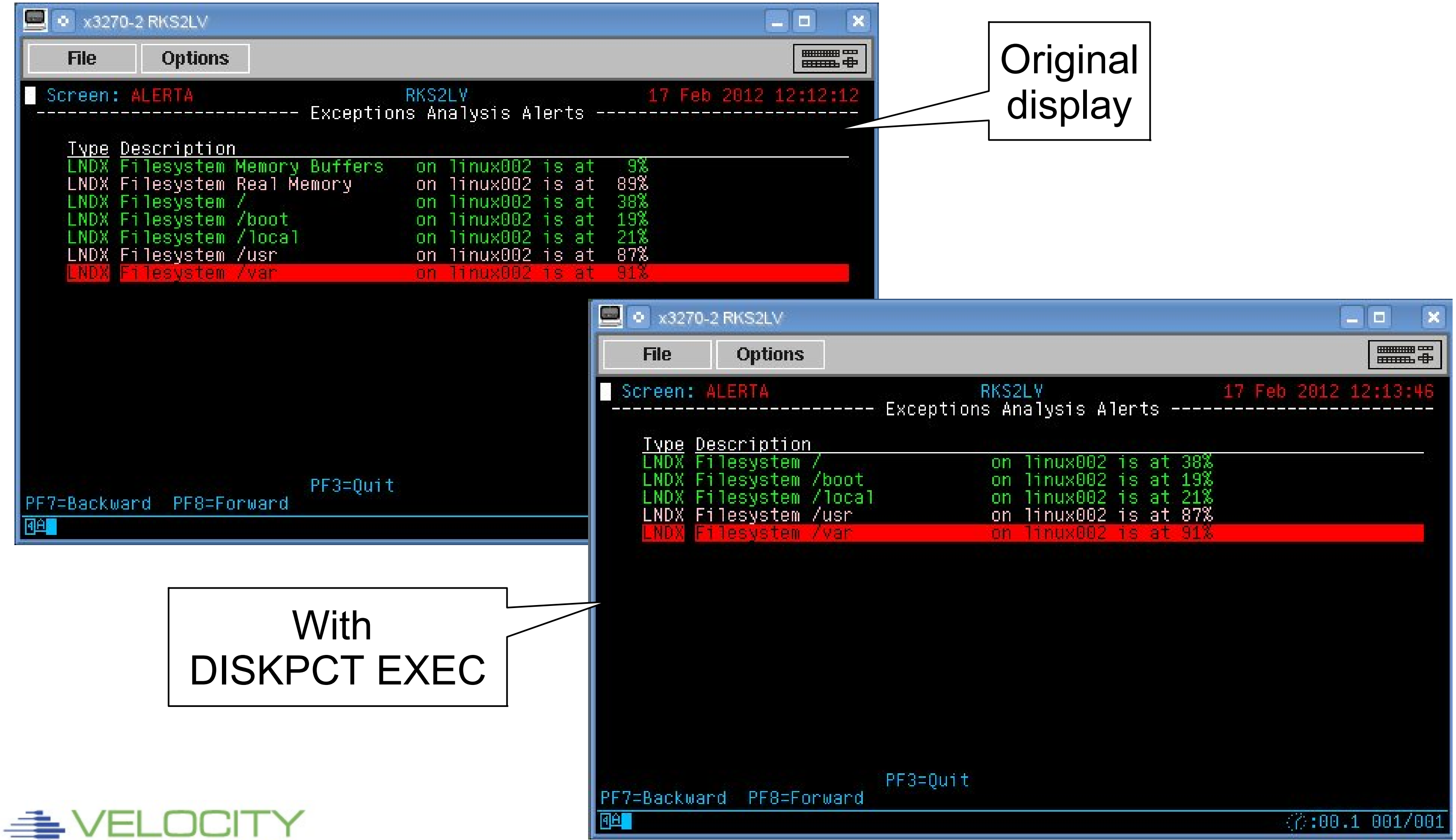
```
/* DISKPCT EXEC: Filter out memory or read-only filesystems */
parse arg node pct descr .

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
```

Parameters passed from alert

Value returned to the alert

# External Processing

- **Results of function call**



Original display

```
x3270-2 RKS2LV
File   Options
Screen: ALERTA                    RKS2LV                17 Feb 2012 12:12:12
------------------------- Exceptions Analysis Alerts -------------------------

   Type Description
   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%

                          PF3=Quit
PF7=Backward  PF8=Forward
```

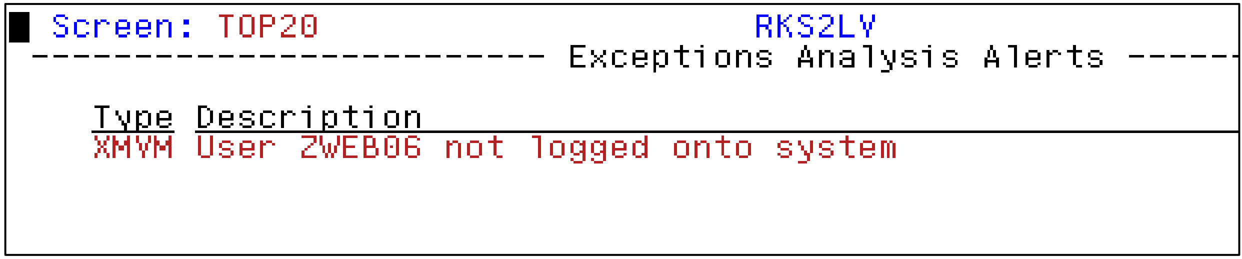
With DISKPCT EXEC

```
x3270-2 RKS2LV
File   Options
Screen: ALERTA                    RKS2LV                17 Feb 2012 12:13:46
------------------------- Exceptions Analysis Alerts -------------------------

   Type Description
   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%

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

# External Processing

- **Detection mechanism for required virtual machines**
  - Service machines
  - Utility machines
  - Linux systems

```
extract
var    dummy     | 1 | 1
stage alrtmusr | 8 |

alert dummy  xmvm
level 0 red action CP MSG OP &code &atext
text User &alrtmusr not logged onto system
```



```
█ Screen: TOP20                          RKS2LV
 ------------------------ Exceptions Analysis Alerts ------

   Type Description
   XMVM User ZWEB06 not logged onto system
```

**MISSING USER**

```
/* VELOCITY Virtual Machines
ZSERVE ZTCP
ZADMIN ZWEB01 ZWEB02 ZWEB03
ZWEB04 ZWEB05 ZWEBLOG
ZWEB06
/*
/*     SFS service machines
/*
VMSERVU VMSERVS SFSZVPS
/*
CRON
```

# Operating zALERT

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

## Updates in 4300

- **Due to a change in ZMON**
  - HSTMEM.DESC is now 60 bytes
  - An alert that contains:

```
var desc      | 32   | hstmem.desc||hstmem.descr
```

  - Should now contain:

```
var desc      | 60   | hstmem.desc
```

# Updates in 4300

## Alert recovery support

- After an action is executed for an exceeded threshold, an additional action can be executed when the threshold is no longer exceeded

## Include/Exclude lists now support CMS wildcards

- % for any single arbitrary character (one or more)
- * for a group of characters before or after (zero or more)

## %INCLUDE support

- Allows additional alert files to be brought in

## Invalid alert variables are now flagged

# Updates in 4400

- **4400 very much a ‘clean up’ release**
  - Details in the README
- **Notification feature accepts group email list**
  - `@filename.filetype` identifies a file that contains a list of email addresses
- **MAILFROM config option**
- **NTFYSUBX notification exit**
  - Sample provided

# Updates in 4400

- **EVERY option evaluates an alert at specified intervals**
- **Primary use is for alerts with external routines that don’t need to be run each interval**

```
extract
var   poolnm     | 8   |
var   poolgrp    | 3   |
var   poolpct    | 3 0 |
stage sfsmdisk   | 60  | vmsysvps &poolnm &poolgrp &poolpct

alert poolpct sfsm | every 10
level 70 yellow
level 80 red
text Filepool &poolnm Group &poolgrp at &poolpct%
```

# 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

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