zVPS Alerts

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PROVEN PERFORMANCE

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**
  - MSG to Operator
  - SNMP trap
- **Advanced topics**

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

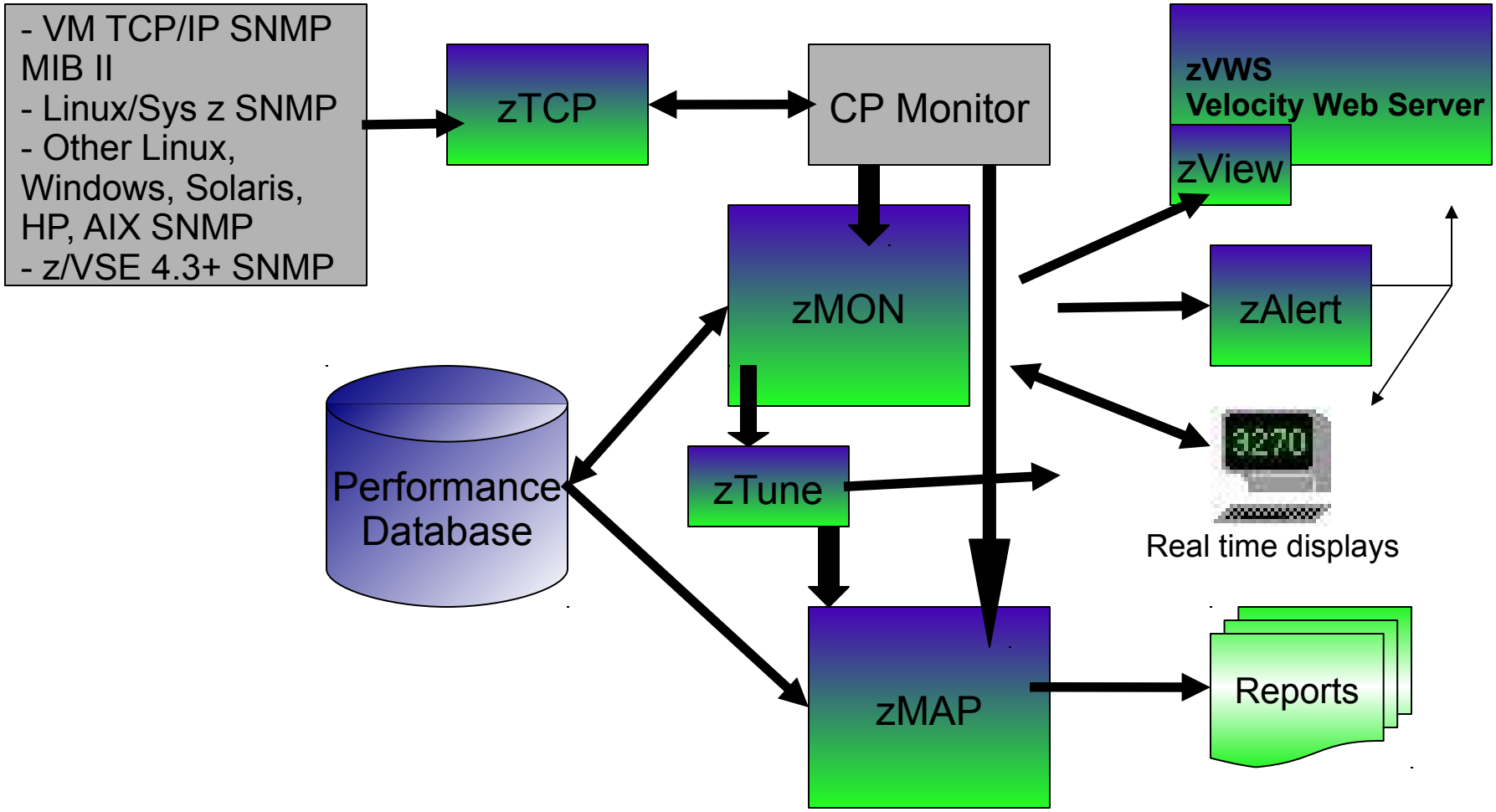
Overview

This presentation goes through the finer points of alert processing.

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

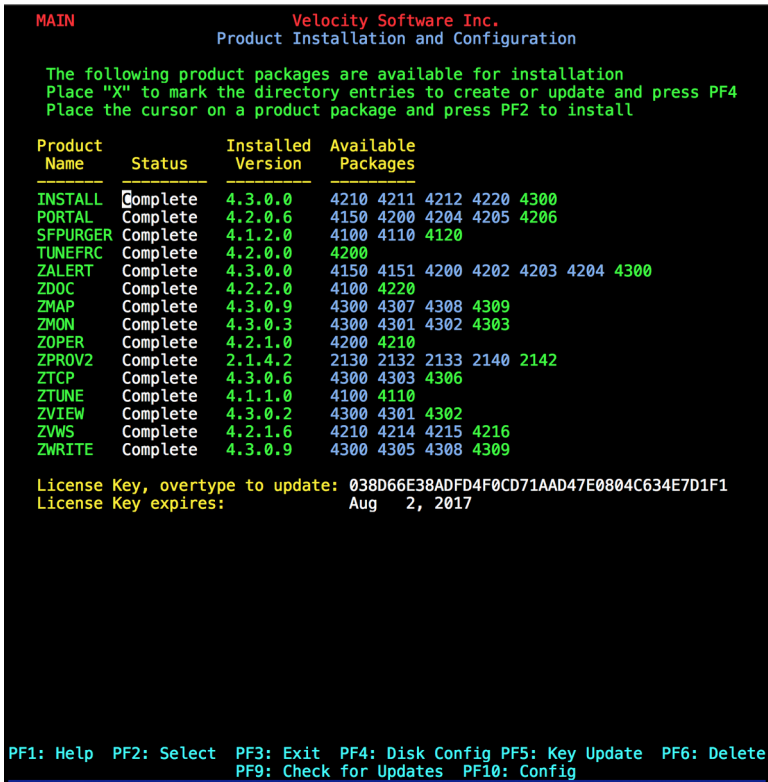
Alerts are no good if they need to be visually watched or monitored... notifications provide a proactive mechanism to using alerts.

Where do alerts fit?



Installing zAlert package

- **zAlert is part of the Velocity Performance Suite (zVPS)**
- **Installed via the installer**
  - Creates the virtual machine (ZALERT)
    - By default VMSYSVPS:ZALERT.
  - Sample alerts provided
  - More on the website



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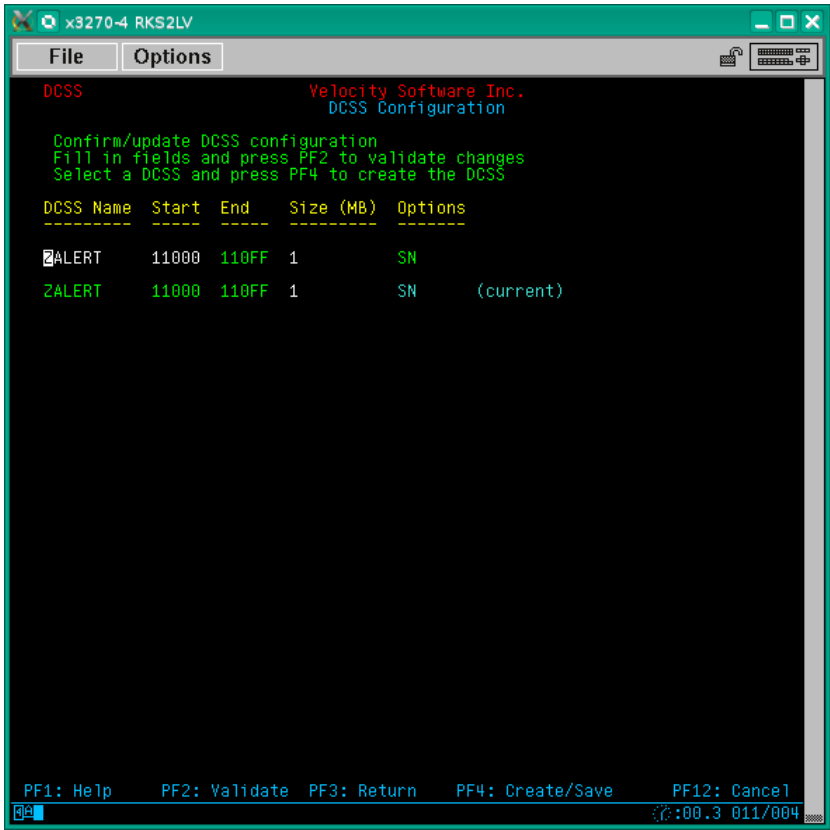
Installing zAlert package

- **Requires a DCSS for 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**



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Installing zAlert package

- **ZALERT DCSS is unrestricted**
  - NAMESAVE statement not required for ZALERT
- **ZMON DCSS is required**

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

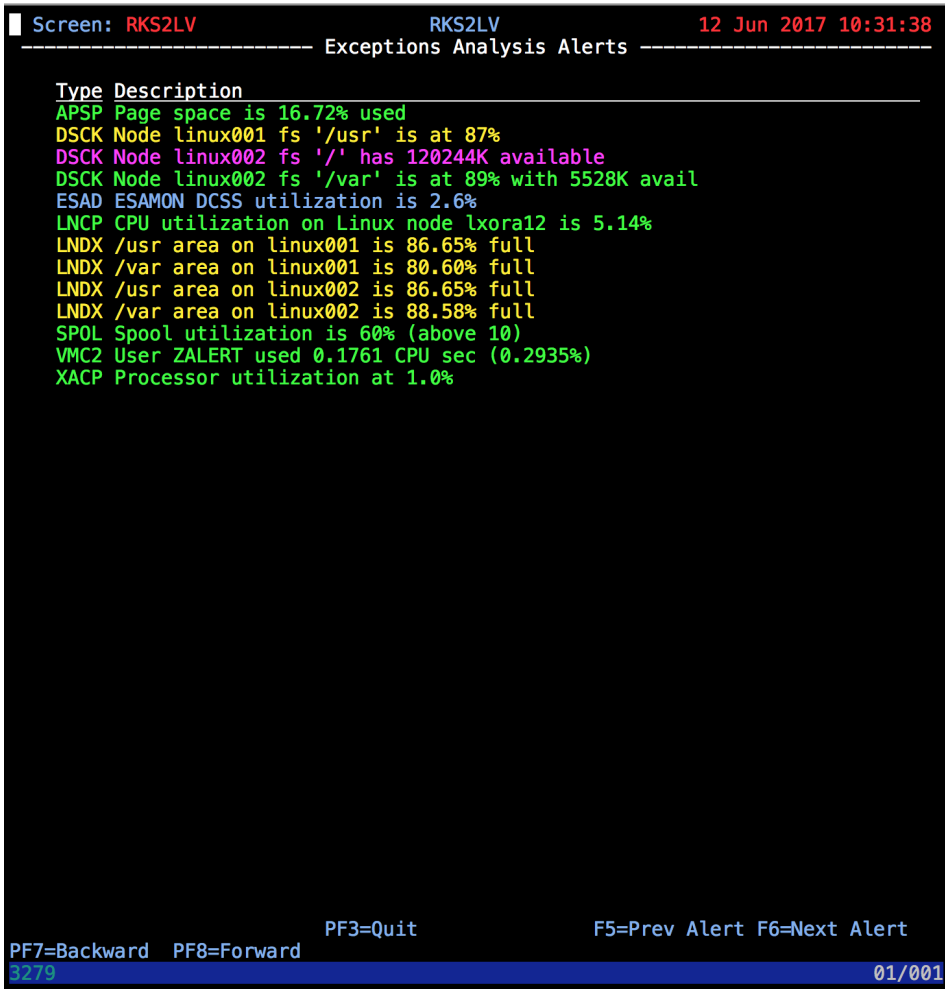
Alert processing

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

Viewing alerts

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

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



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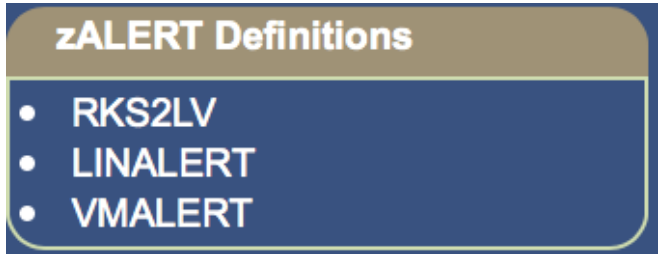
Viewing alerts

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



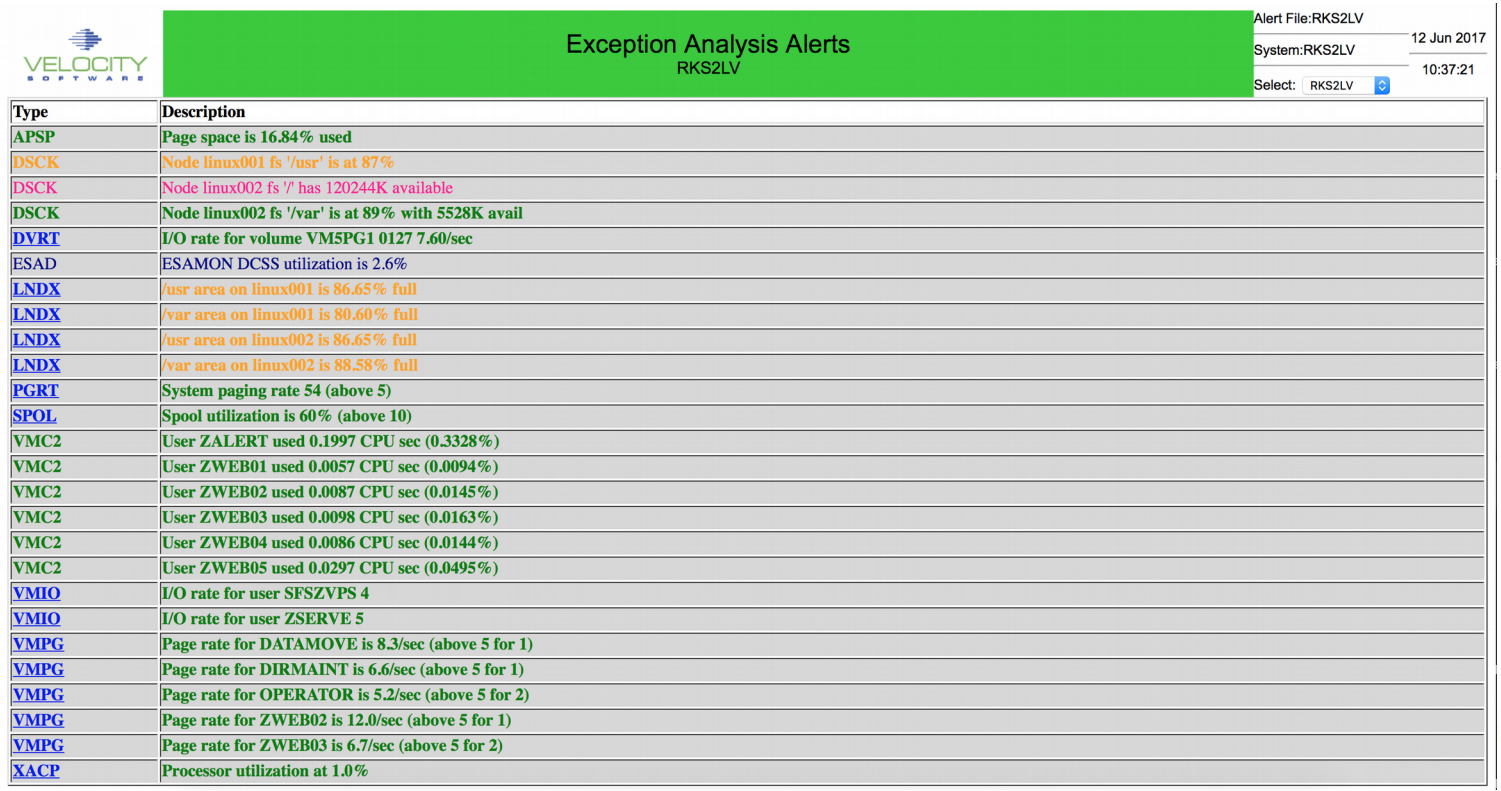
RKS2LV - Exceptions Analysis Alerts - 17/06/12 at 10:35 - RKS2LV

Code	Alert Description
APSP	Page space is 16.71% 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
DVRT	I/O rate for volume VM5PG1 0127 18.12/sec
ESAD	ESAMON DCSS utilization is 2.6%
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
PGRT	System paging rate 52 (above 5)
SPOL	Spool utilization is 60% (above 10)
VMC2	User ZALERT used 0.1563 CPU sec (0.2605%)
VMC2	User ZWEB01 used 0.0026 CPU sec (0.0044%)
VMC2	User ZWEB02 used 0.0033 CPU sec (0.0055%)
VMC2	User ZWEB03 used 0.0016 CPU sec (0.0026%)
VMC2	User ZWEB04 used 0.0015 CPU sec (0.0025%)
VMC2	User ZWEB05 used 0.0108 CPU sec (0.0180%)
VMIO	I/O rate for user SFSZVPS 4
VMPG	Page rate for ZADMIN is 13.1/sec (above 5 for 1)
VMPG	Page rate for ZWEB05 is 5.8/sec (above 5 for 1)
XACP	Processor utilization at 0.9%

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>
```



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Exception Analysis Alerts
RKS2LV

Alert File:RKS2LV
System:RKS2LV
Select: RKS2LV
12 Jun 2017
10:37:21

Type	Description
APSP	Page space is 16.84% 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
DVRT	I/O rate for volume VM5PG1 0127 7.60/sec
ESAD	ESAMON DCSS utilization is 2.6%
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
PGRT	System paging rate 54 (above 5)
SPOL	Spool utilization is 60% (above 10)
VMC2	User ZALERT used 0.1997 CPU sec (0.3328%)
VMC2	User ZWEB01 used 0.0057 CPU sec (0.0094%)
VMC2	User ZWEB02 used 0.0087 CPU sec (0.0145%)
VMC2	User ZWEB03 used 0.0098 CPU sec (0.0163%)
VMC2	User ZWEB04 used 0.0086 CPU sec (0.0144%)
VMC2	User ZWEB05 used 0.0297 CPU sec (0.0495%)
VMIO	I/O rate for user SFSZVPS 4
VMIO	I/O rate for user ZSERVE 5
VMPG	Page rate for DATAMOVE is 8.3/sec (above 5 for 1)
VMPG	Page rate for DIRMAINT is 6.6/sec (above 5 for 1)
VMPG	Page rate for OPERATOR is 5.2/sec (above 5 for 2)
VMPG	Page rate for ZWEB02 is 12.0/sec (above 5 for 1)
VMPG	Page rate for ZWEB03 is 6.7/sec (above 5 for 2)
XACP	Processor utilization at 1.0%

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**

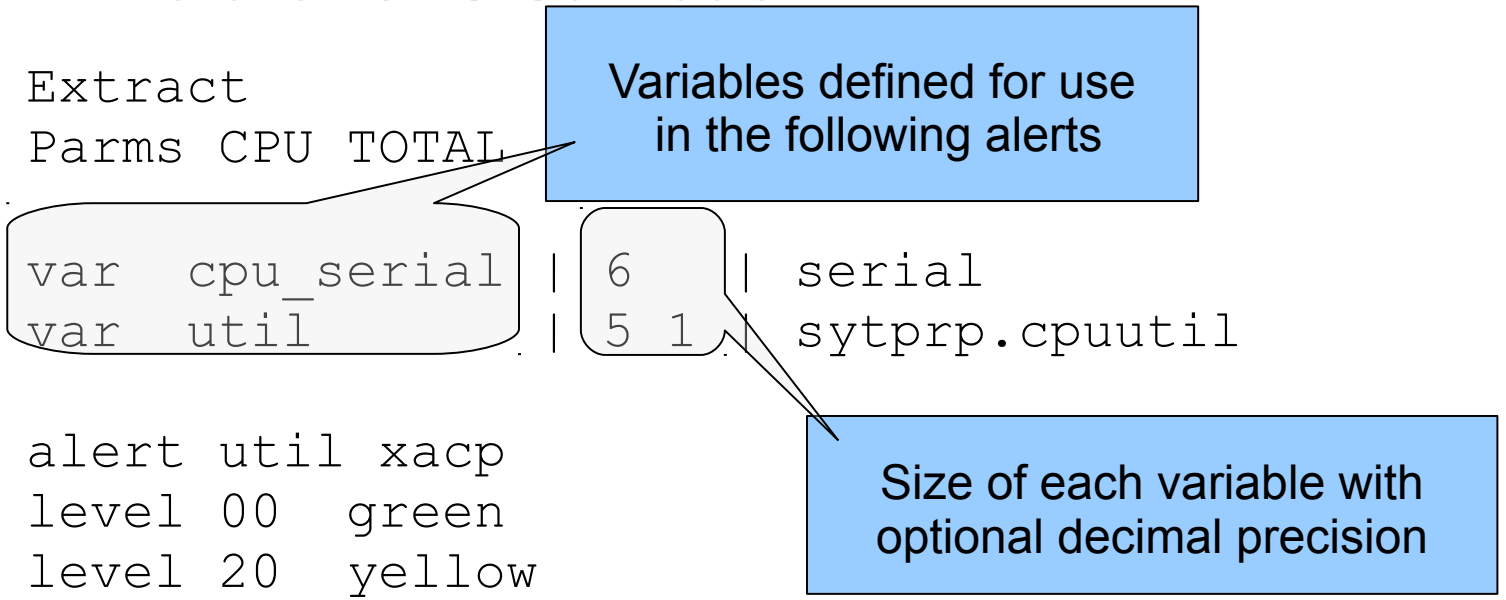
```
Extract
Parms CPU TOTAL

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

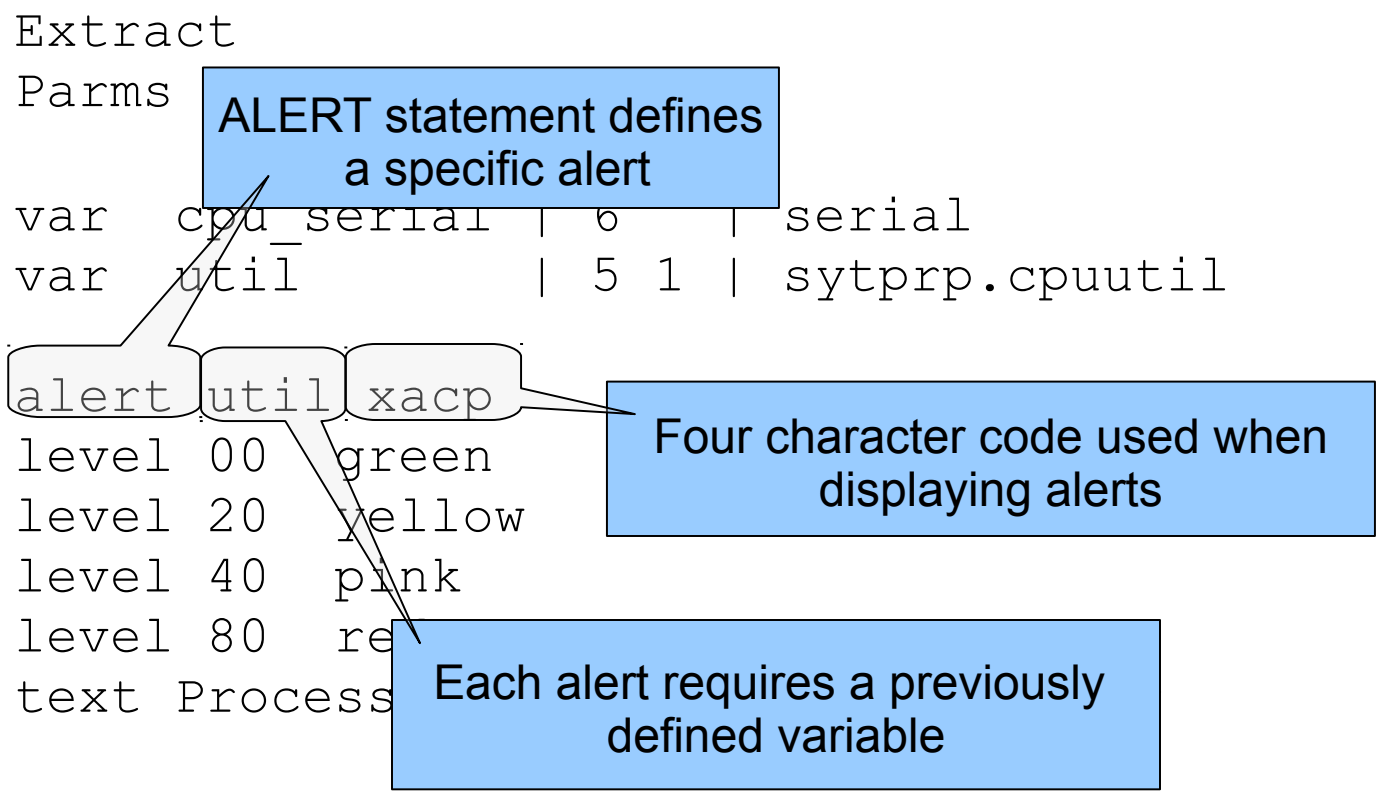
- **Alert for CPU Utilization**




```
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%
```

Defining your own alerts

- **Alert for CPU Utilization**



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  r
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**

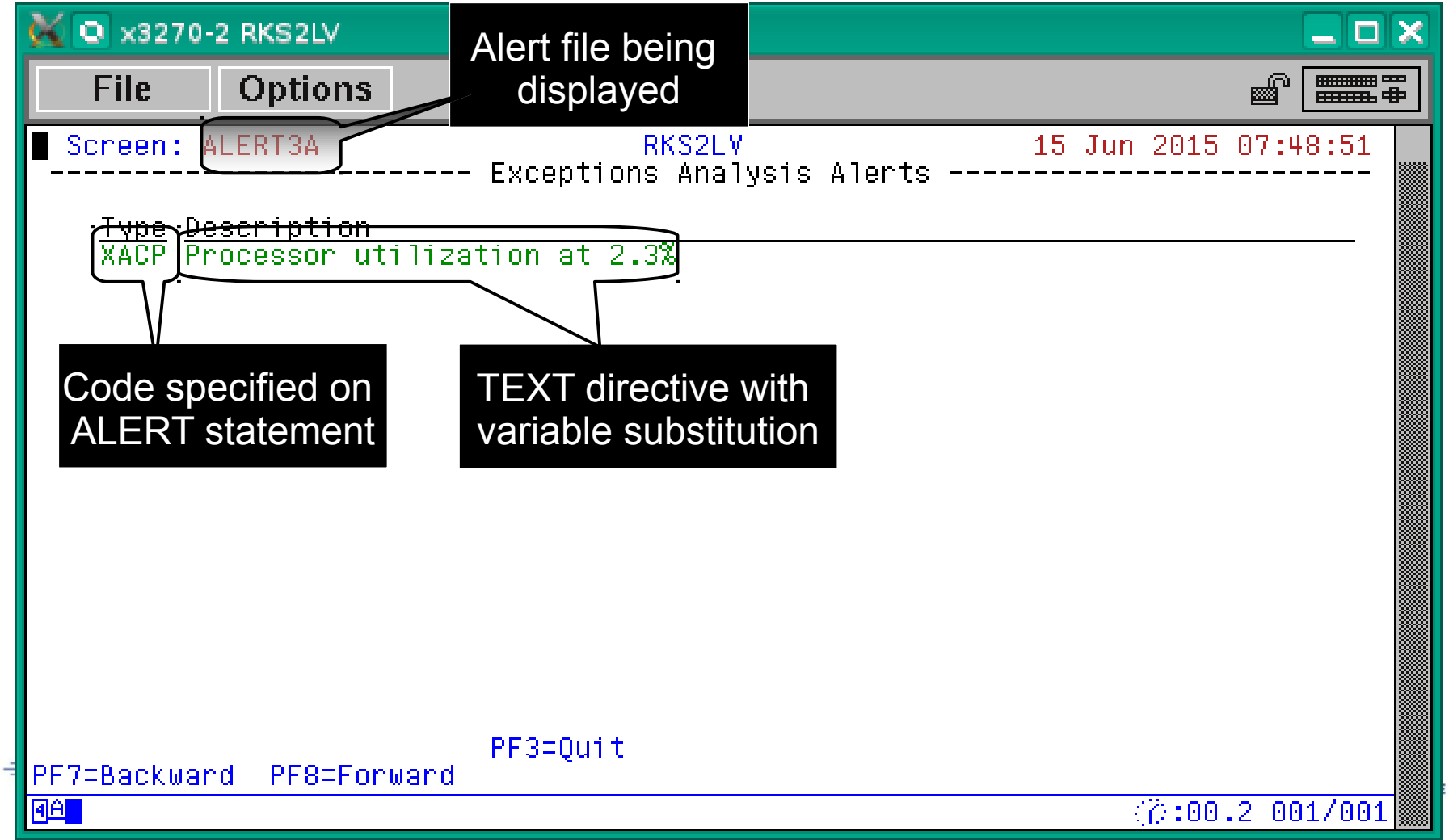
```
Extract
Parms CPU TOTAL

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

alert util xacp
level 00  green
level 20  yello
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**



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

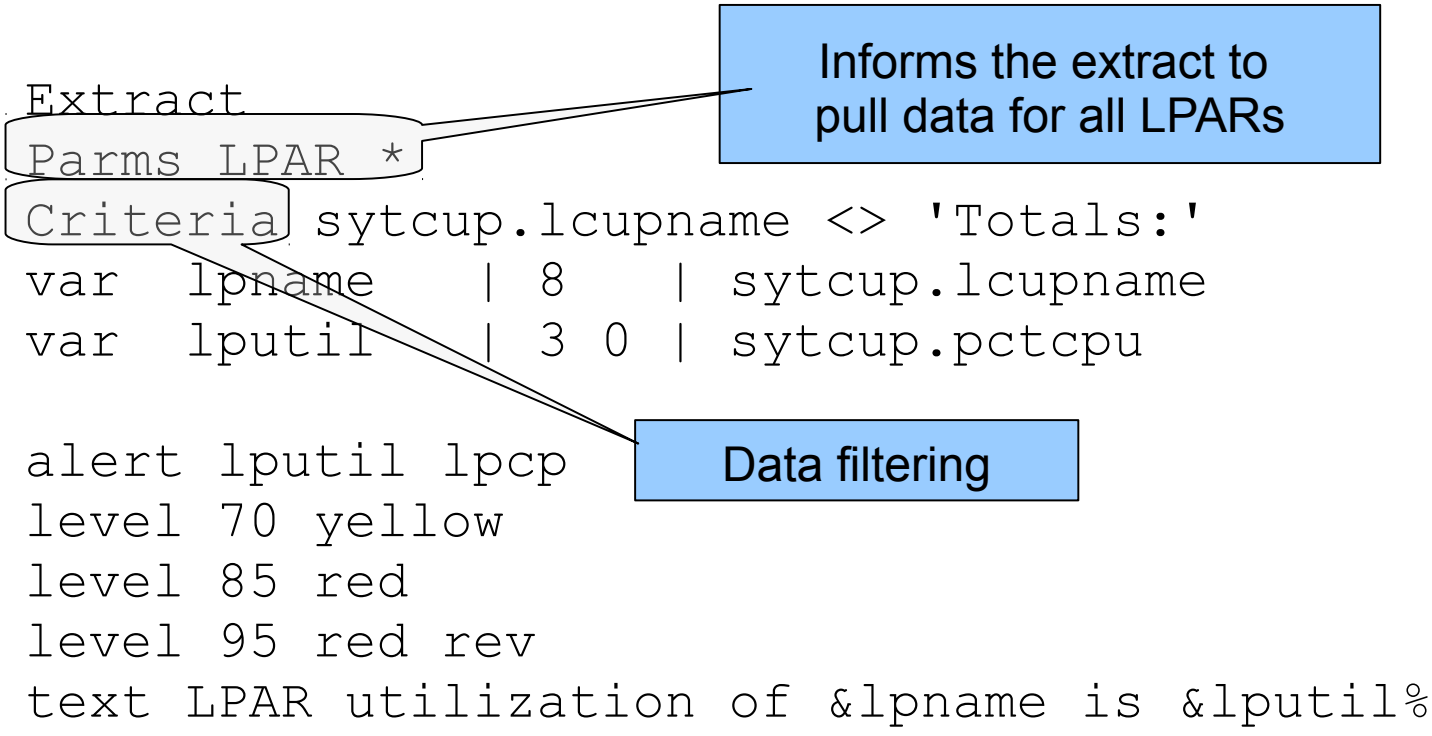
LPAR Utilization

- **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%
```

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

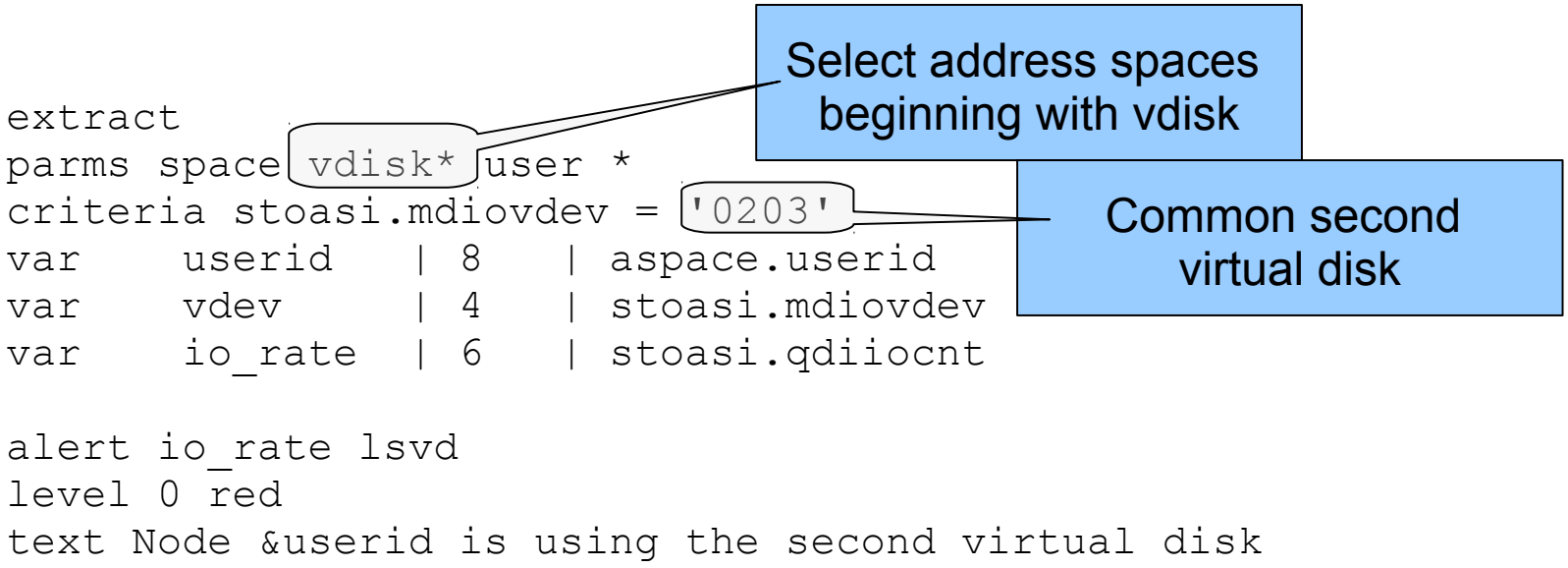
ESAVDSK - VDISK Analysis - RKS2LV

Time	Owner	Space Name	<--Size---> AddSpc Pages	VDSK Blks	<--pages--> Resi- dent	Lock- ed	Prv or Shr	VIO rate /min	Usr Lks	<AddSpce> Cre- ates	Del- etes	<----------pages/s Sto- len	<--DASD---> 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

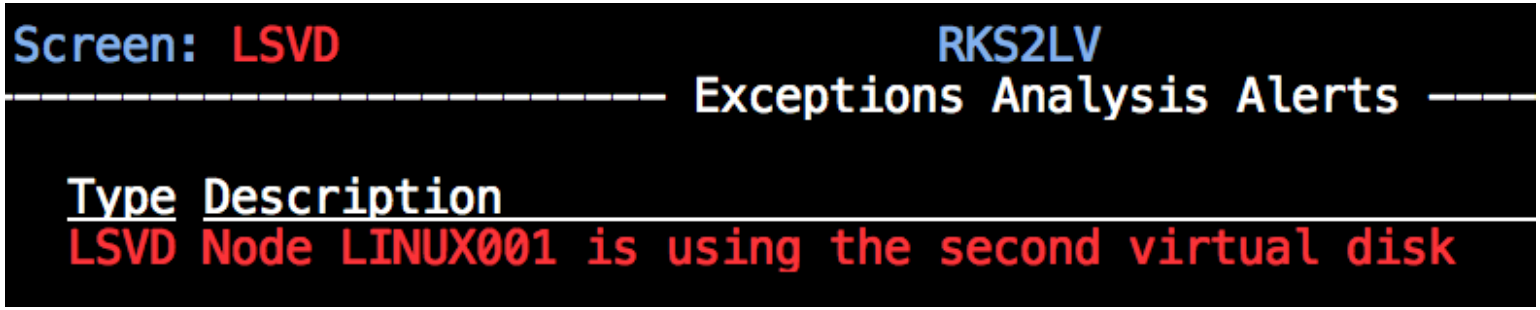



```
extract
parms space vdisk* user *
criteria stoasi.mdiovdev = '0203'
var    userid    | 8    | aspace.userid
var    vdev      | 4    | stoasi.mdiovdev
var    io_rate   | 6    | stoasi.qdiiocnt

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

Defining your own alert - Second vdisk usage

- **Result**

```
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
```



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)
```

- **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)		

Advanced topics

- Priority
- Alert options
- Enable/Disable
- Limit
- Include/Exclude
- Multiple alerts
- External processing
- Operating zAlert

Advanced topics – 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>
```

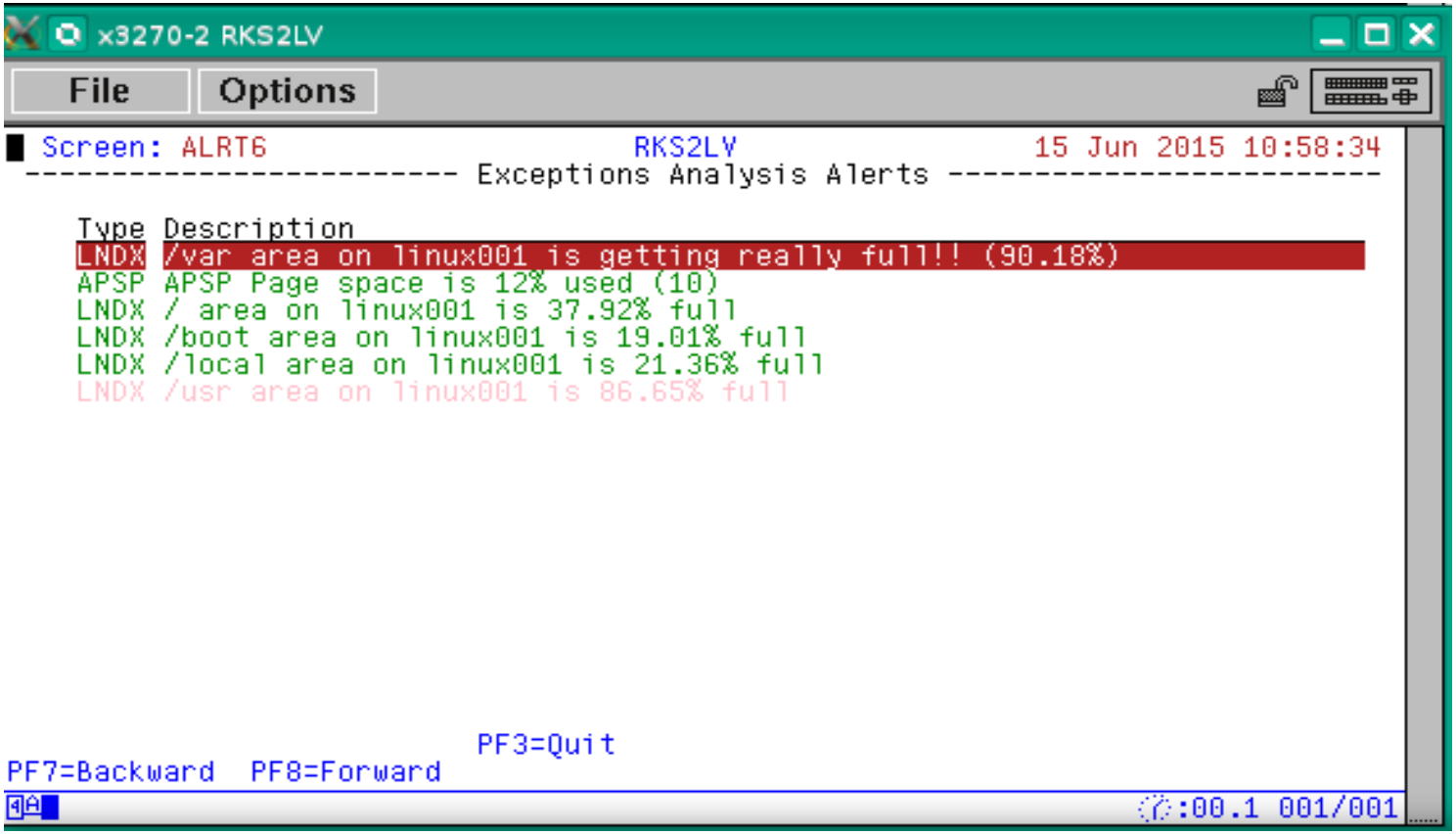
- **Log - Writes alert text displays to a file**
- **Count - Tallies the number of times an alert appears on the display**

Advanced topics – Priority

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

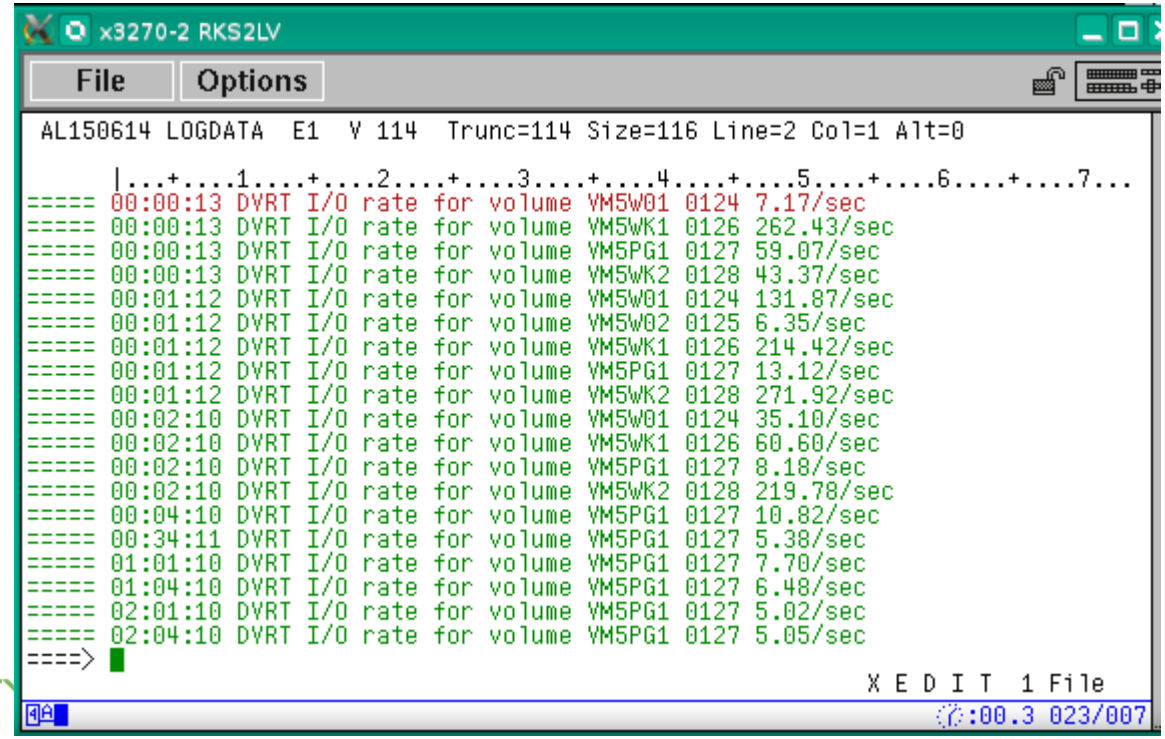
```
extract
parms node *
criteria hstmem.used > 0
var    node     | 8    | tcpip.node
var    memused  | 6 2  | (hstmem.used/hstmem.size)*100
var    desc     | 16   | hstmem.desc
function diskpct  | 6 2 | &node &memused &desc

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
```

Advanced topics – Priority



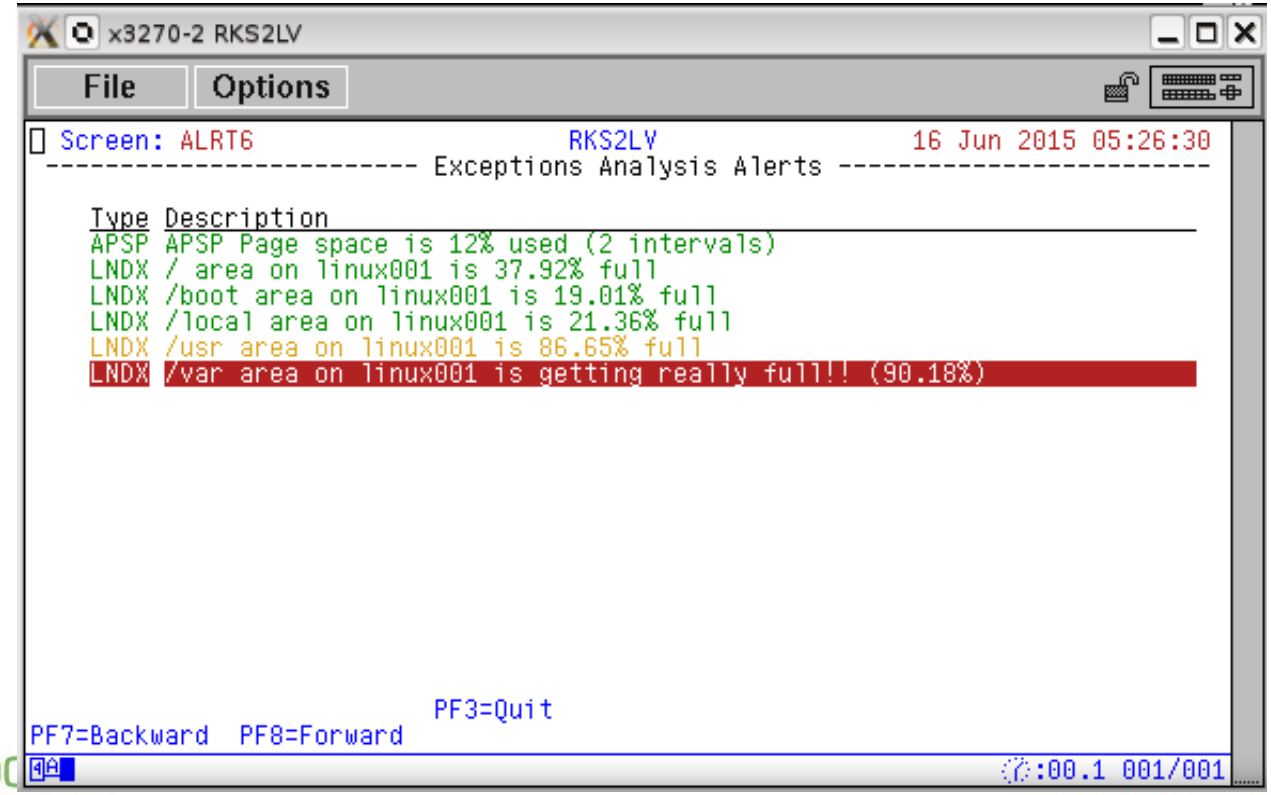
Advanced topics – Alert Options

```
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
```



Advanced topics – Alert Options

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



Advanced topics – 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**

Advanced topics – 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
```

Advanced topics - 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 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  | (sytasg.calslti2*100)/sytasg.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

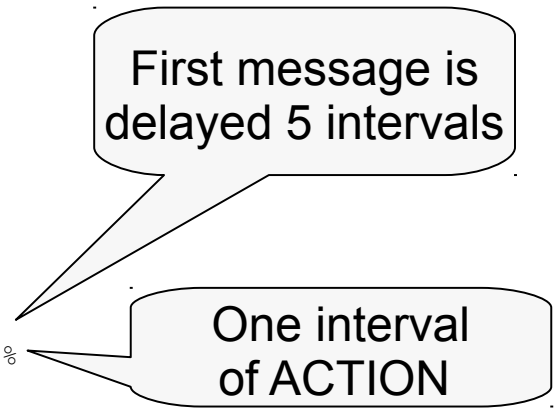
Advanced topics - Limit

- **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%
```



- **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 5 1 1 | &serial
level 70  yellow
level 80  red
level 90  red rev ACTION CP                                    spool_use%
text Spool Utilization is &spool_use%
```

Number of intervals the action is taken before the delay

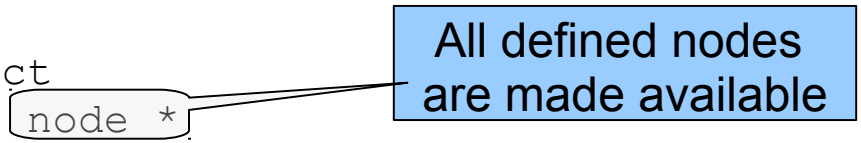
- **LIMIT escalation**

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

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

Delay 10 intervals, then 5

Advanced topics – Include/Exclude

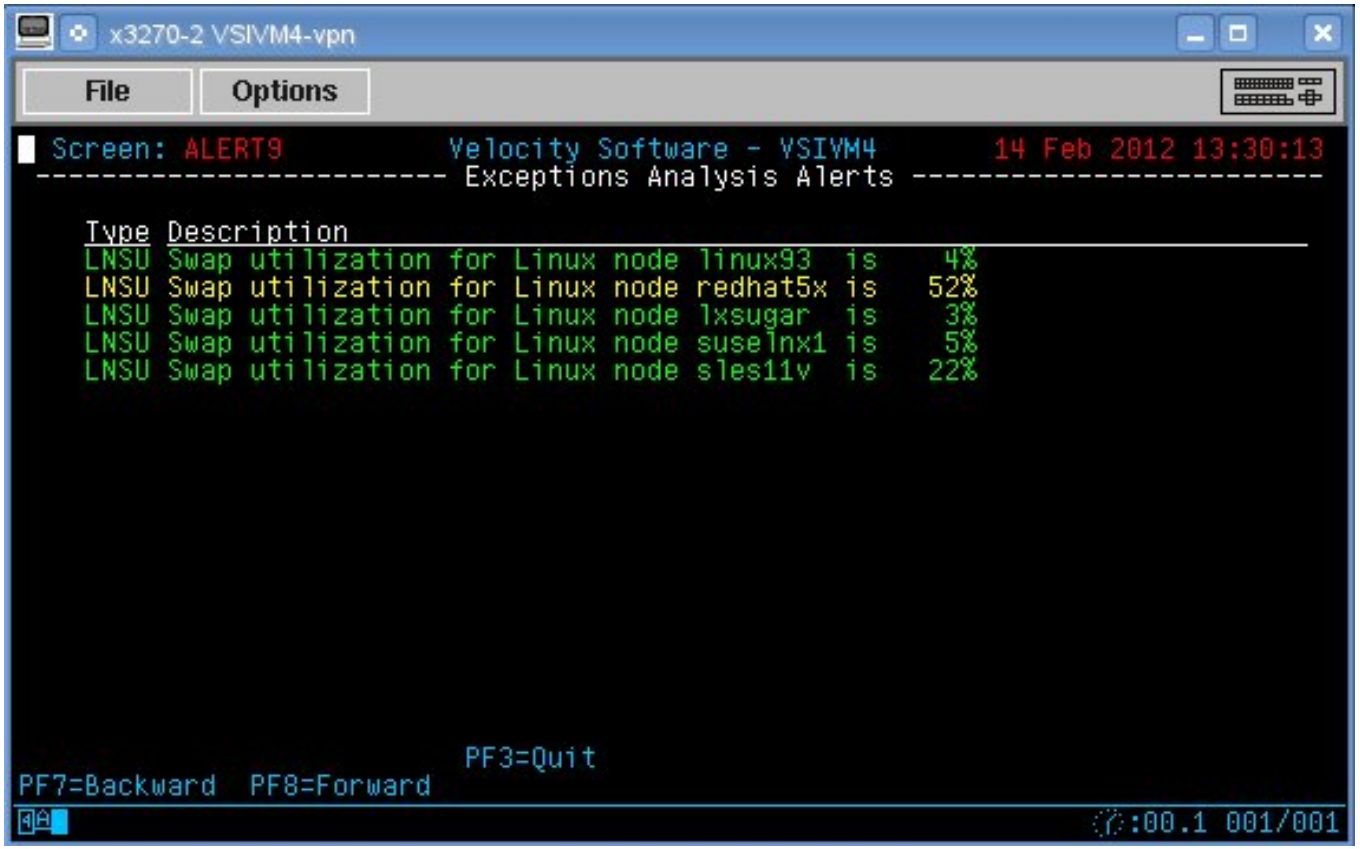
- **User or Node can be specified in an extract**
- **A subset can be selected with wildcards**
- **Given the following alert definition:**




```
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%
```

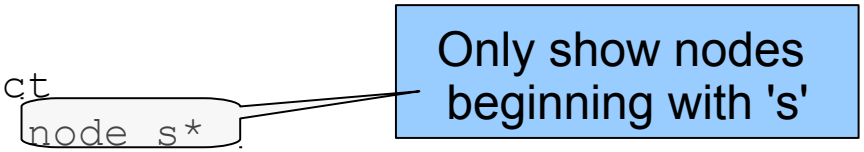
Advanced topics – Include/Exclude

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



Advanced topics – Include/Exclude

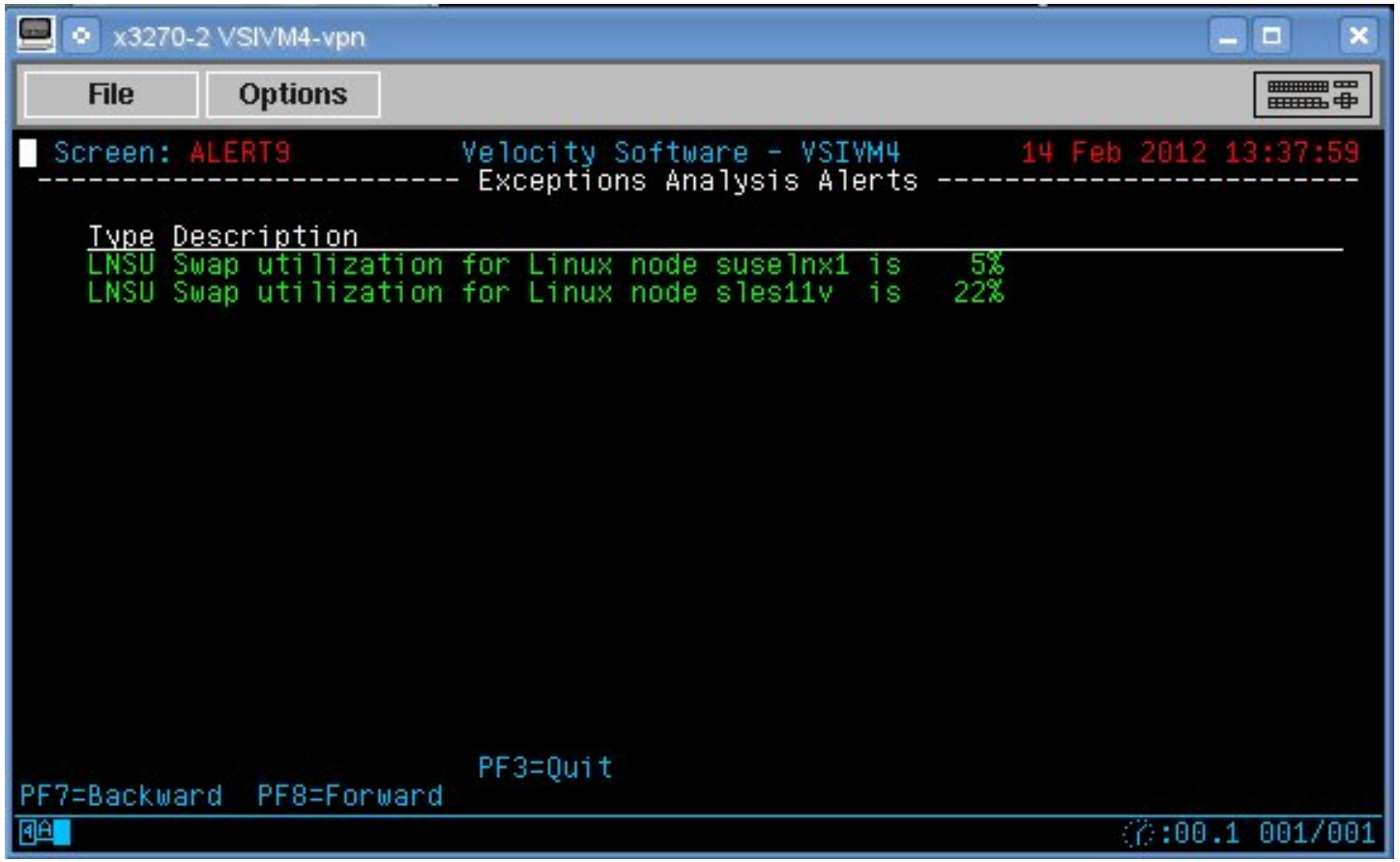
- **The alert can be tailored to show a subset by adjusting the wildcard**




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

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%
```

Advanced topics – Include/Exclude

- **The display shows nodes matching the wildcard**



Advanced topics – 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%
```

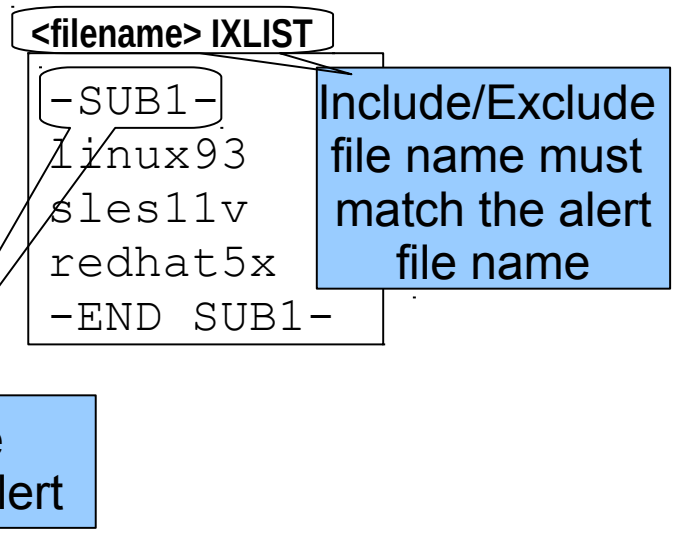
<filename> IXLIST

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

Advanced topics – Include/Exclude

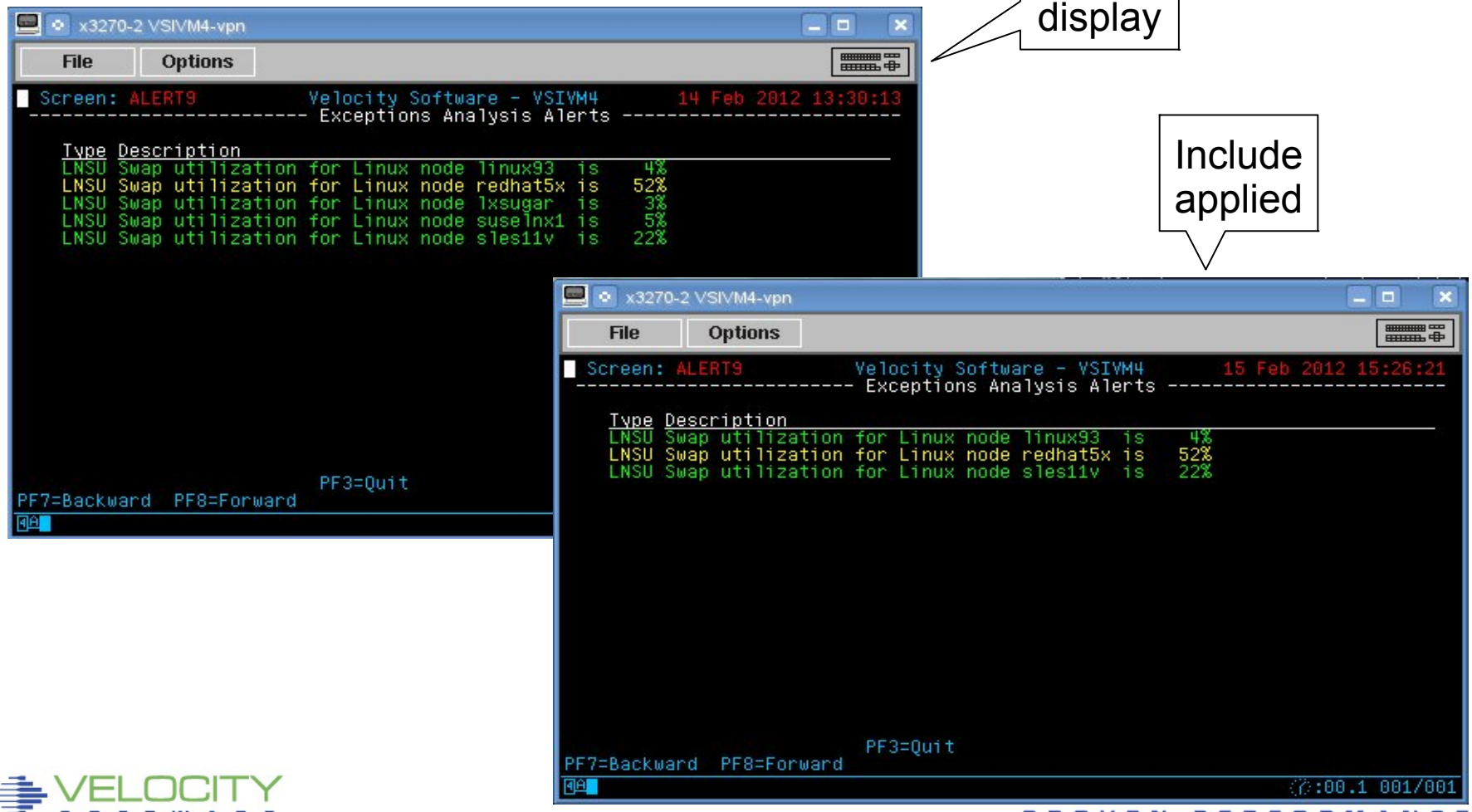
- **If an alert is required to show nodes that don't fit into a wildcard**
  - An include or exclude must be used

```
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%
```



Advanced topics – Include/Exclude

- **Results of Include file**



Advanced topics – Multiple alerts

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

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

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%
```

Advanced topics – 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

Advanced topics – 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%
```

Advanced topics – 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

Advanced topics – External Processing

- **REXX exec called from the alert**

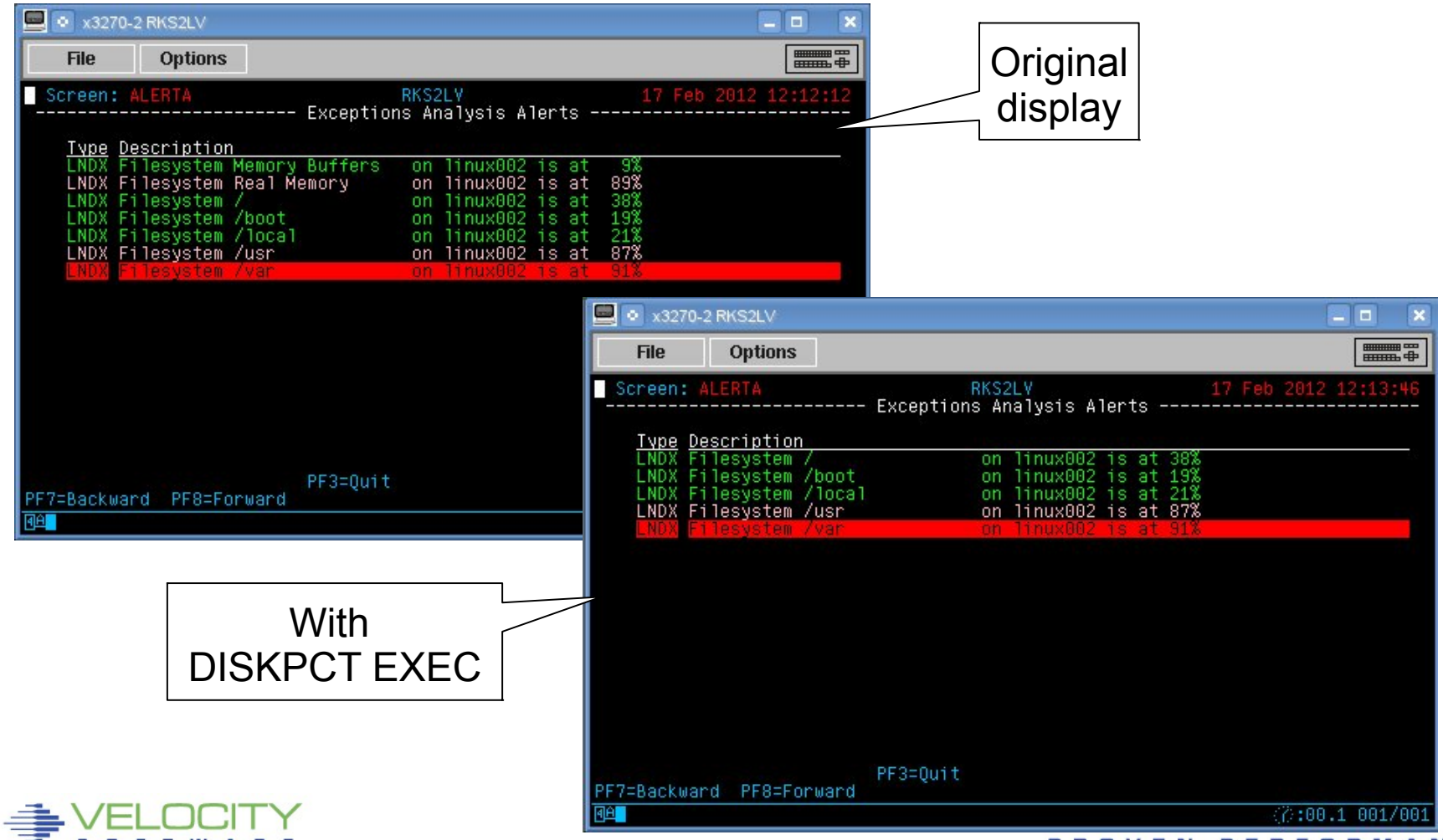
```
/* DISKPCT EXEC: Filter out memory or read-only filesystems */
parse arg node pct descr .

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

Advanced topics – External Processing

- **Results of function call**



Advanced topics – 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
```

Advanced topics – Threshold comparison operators

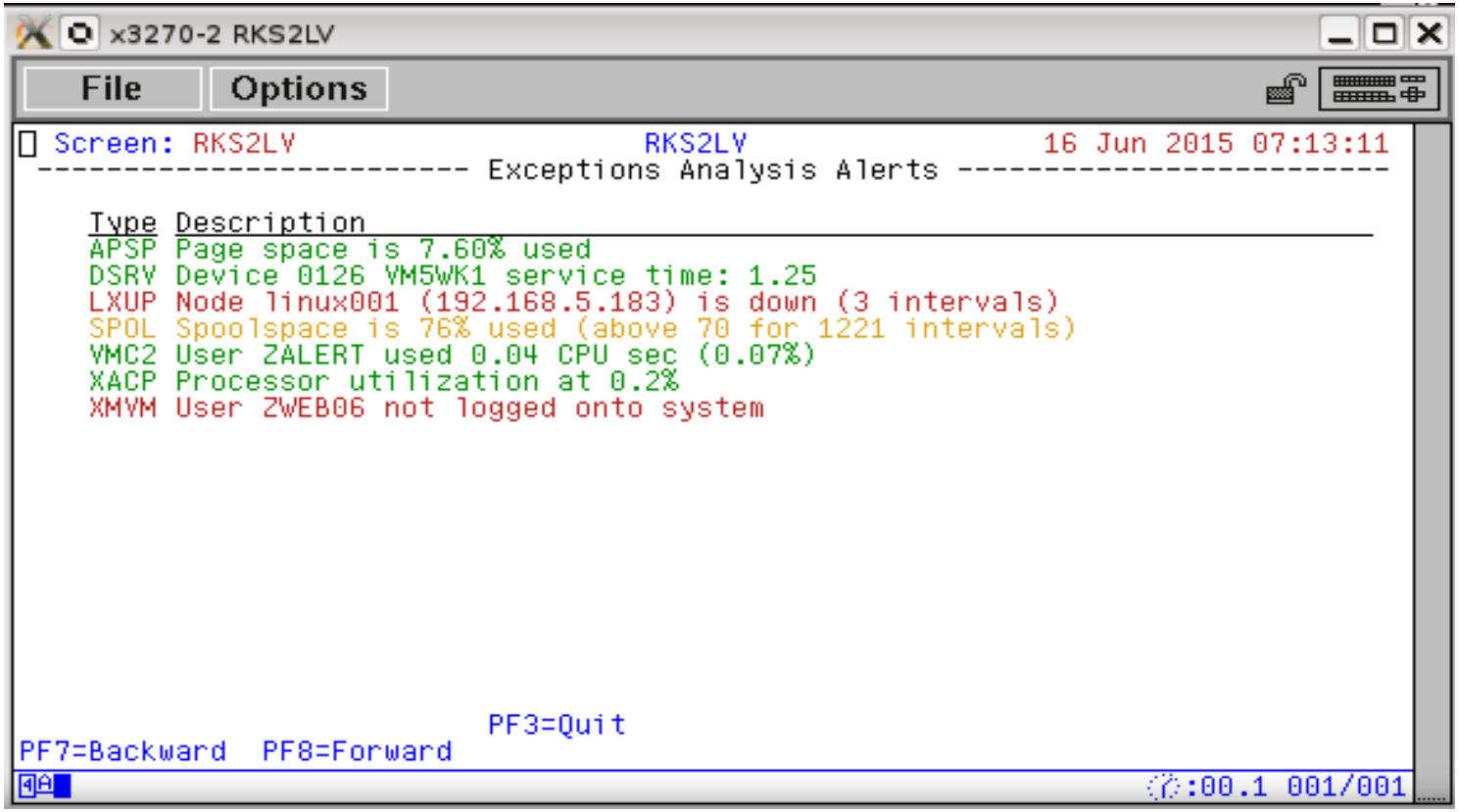
- **Check for 'node down'**

```
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: < > = <= >= <>)**

Advanced topics – Threshold comparison operators

- **Results of 'node down'**



Advanced topics – Operating

- **The alert engine virtual machine (ZALERT) should be brought up shortly after the monitor (ZSERVE)**
- **Config file (CONFIG ZALERT)**

```
/*
/*  Configuration data for zALERT
/*

AUTHUSER  ZVPS
NTFYLOGS  30
LOGRETAIN 15
ALERTFILE RKS2LV ALRT6
```

Advanced topics – Operating

- **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
  - * for a group of characters before or after
- **%INCLUDE support**
  - Allows additional alert files to be brought in
- **Invalid alert variables are now flagged**

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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