

EVLOG

Linux Event Logging for Enterprise Class Systems

Murat Koç

murat.koc@frontsite.com.tr

&

murat.koc@frontsite.de

Başlıklar

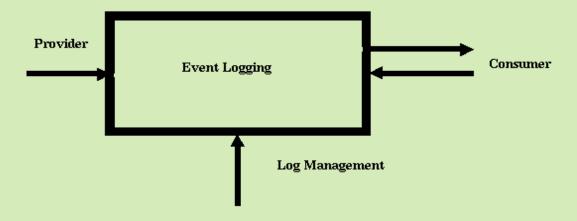
- Sysklogd
- Yapı
- Kurulum
- Test
- Event girdi yapısı
- Event tipleri
- Flag tipleri
- Facility tipleri
- Severity tipleri
- Veri format tipleri
- Kullanılan komutlar

Sysklogd

- printk/klog(kernel events) ve syslog dan oluşuyor.
- Event ler text formatında tutuluyor ve gerekli bazı bilgiler kayıt edilmiyor.
- Sadece ilgilenilen kayıtları görmek için sınırlı sayıda arabirime sahip.
- Sınırlı sayıda event sağlayıcısına sahip(LOCAL0-7)
- Event bildirme yetenekleri sınırlı
- Log dosyalarının yönetilmesi ve limitlenmesi ancak logrotate ile sınırlı bir şekilde yapılabiliyor.



- 2 adet birincil arabirim (Provider&Consumer)1 adet ikincil arabirim (Log Management)



Provider arabirimi

- Event leri bildirmek için kullanılır Event verisinin, analiz ve loglama için kullanılabilir olması için
 - belli bir bilgi seti sağlanmak zorundadır.

Event Logging

- Provider tarafından sağlanan veriye ek olarak topladığı bilgilerle event log girdisini oluşturur.
 - Printk(), syslog(), vsyslog() mesajlarını alarak POSIX-uyumlu event kayıtları
 - şeklinde loglayabilir.
 - Belirli değerlere bağlı olarak, birbiri ardına hızlı bir şekilde olan tekrarlı event
 - lerin kayıtların tutulmasını engelleyebilir.
 - Belirli tanımlamalara bağlı olarak, loglanan event leri gösterebilir.
 - Belirli tanımlamalara bağlı olarak logdan okunan event leri filtereyebilir.
 - Kayıtlı consumer a, consumer tarafından belirtilmiş event lerin oluşması halinde
 - haber verebilir.
 - Event in buffer boyutunu ayarlanmasına olanak sağlar

Consumer arabirimi

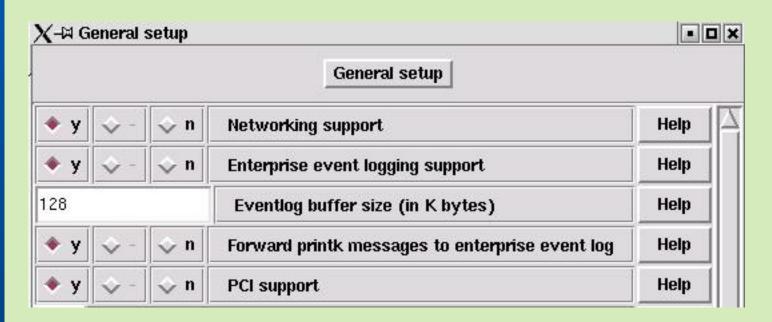
- Log dan belirli tanımlamalara bağlı olarak event verisini alır
- Event kayıtlarını standart veya consumer tarafından tanımlanmış formatta görüntüler
- Log a, consumer tarafından tanımlanmış özelliklerde event yazıldığı zaman haberdar etmek için kayıt eder.

- Log Management
- Event log unun boyutunu yönetmek
- Otomatik olarak daha fazla ilginelimeyen log ların silinmesi, alanın düzenlenmesini sağlamak, log u temizlemek
- için çeşitli yöntemler sağlar



Kurulum

Kernel için gerekli patch yapılır. Desteği aktif hale getirilir.



Kurulum

```
#tar xvfz evlog-1.4.2-2.tar.gz
   #cd evlog-1.4.2
  #make
  #make install
   Kernel space testi
  #cd kernel/test
  #make
  #./runtests.sh
    User space testi
  #cd /var/evlog/test
10/30#2/runtests.sh
```

Test – Kernel Space

```
kernel api test 1 started
kernel api test1 :PASSED
kernel api test 2 started
kernel api test2 :PASSED
Kernel facility registration test 3 :PASSED
Kernel facility registration test 4 :PASSED
Multi-printk message test 5 :PASSED
```

recid=589, size=79, format=STRING, event_type=0x64, facility=test_sneezy, severity=INFO, uid=root, gid=root, pid=3871, pgrp=3839, time=Tue Oct 29 13:45:07 2002, flags=0x2 (KERNEL), thread=0x0, processor=0 Registration of facility "test_sneezy" succeeded. Facility code = 0xdd866b39. recid=591, size=40, format=STRING, event_type=0x2, facility=KERN, severity=ALERT, uid=root, gid=root, pid=3880, pgrp=3839, time=Tue Oct 29 13:45:10 2002, flags=0x22 (KERNEL|PRINTK), thread=0x0, processor=0 Hey! The disk is on fire! Do something!

Test – User Space

```
< Hey! Something happened at line 71 of defaultTest.c:
> Hey! Something happened at line 67 of defaultTest.c:
13c13
< defaultTest.c:78: This event record has a message string, plus another string.
> defaultTest.c:75: This event record has a message string, plus another string.
17c17
< Hey! Something happened at line 86 of defaultTest.c:
> Hey! Something happened at line 82 of defaultTest.c:
templates defaultTest :FAILED
templates stattest :PASSED
templates misc test :PASSED
test of degenerate templates/records :PASSED
test of array delimiter : PASSED
test 1 started
test1 :PASSED
test2 :PASSED
This test is testing for access denied
Access denied.
```

est3 :PASSED
est4 :PASSED
est5 :PASSED
est6 :PASSED
action was executed with recid=1121 as an ar
action was executed with recid=1127 as an ar
action was executed with recid=1123 as an ar
action was executed with recid=1129 as an ar
action was executed with recid=1131 as an ar
action was executed with recid=1125 as an ar
action was executed with recid=1133 as an ar
action was executed with recid=1135 as an ar
action was executed with recid=1139 as an arg
action was executed with recid=1137 as an ar
oct7 ·DASSED

testevlog1:PASSED

:PASSED

testfac1

12

Test – User Space

```
Recid=1147, size=68, format=STRING, event_type=0x1, facility=LOGMGMT, severity=INFO, uid=root, gid=root, pid=1396, pgrp=1395, time=Tue Oct 29 13:54:51 2002, flags=0x0, thread=0x400, processor=0 Discarded 3 duplicate events, event_type = 0x7d2, facility = LOCAL0
```

recid=1149, size=11, format=STRING, event type=0x64, facility=LOCAL1, severity=INFO, uid=root, gid=root, pid=4217, pgrp=3988, time=Tue Oct 29 13:54:51 2002, flags=0x0, thread=0x400, processor=0 some junk3

recid=1151, size=32, format=STRING, event type=0x65, facility=0x6bebb75e, severity=INFO, uid=root, gid=root, pid=4269, pgrp=3988, time=Tue Oct 29 13:54:58 2002, flags=0x0, thread=0x400, processor=0 ROOT guy logs this info message

recid=1153, size=41, format=STRING, event_type=0x65, facility=0x6f154fd, severity=INFO, uid=root, gid=root, pid=4298, pgrp=3988, time=Tue Oct 29 13:55:13 2002, flags=0x0, thread=0x400, processor=0 testfac3:ROOT guy logs this info message

recid=1175, size=74, format=STRING, event type=0x2, facility=LOGMGMT, severity=NOTICE, uid=root, gid=root, pid=4322, pgrp=3988, time=Tue Oct 29 13:55:15 2002, flags=0x0, thread=0x400, processor=0 Log compaction on /var/evlog/eventlog starts at Tue Oct 29 13:55:15 2002

recid=1177, size=69, format=STRING, event_type=0x3, facility=LOGMGMT, severity=NOTICE, uid=root, gid=root, pid=4322, pgrp=3988, time=Tue Oct 29 13:55:15 2002, flags=0x0, thread=0x400, processor=0 10/30\(\delta\theta\) compaction on /var/evlog/eventlog ended. 10 events were removed.

Event girdi yapısı

POSIX 1003.25 tanımı

Recid=1179, size=155, format=STRING, event_type=0x2, facility=KERN, severity=WARNING, uid=root, gid=root, pid=0, pgrp=0, time=Tue Oct 29 13:56:20 2002, flags=0x32 (KERNEL|PRINTK|INTERRUPT), thread=0x0, processor=0

Member Type	Member Name	Description	Member Selector
posix_log_recid_t	log_recid	System-assigned ID of the event record	POSIX_LOG_ENTRY_RECID
size_t	log_size	Size of the event record variable data	POSIX_LOG_ENTRY_SIZE
int	log_format	Format of variable data	POSIX_LOG_ENTRY_FORMAT
int	log_event_type	Event identification code	POSIX_LOG_ENTRY_EVENT_TYPE
posix_log_facility_t	log_facility	Event facility code	POSIX_LOG_ENTRY_FACILITY
posix_log_severity_t	log_severity	Event severity code	POSIX_LOG_ENTRY_SEVERITY
uid_t	log_uid	Effective user ID associated with the event	POSIX_LOG_ENTRY_UID
gid_t	log_gid	Effective group ID associated with the event	POSIX_LOG_ENTRY_GID
pid_t	log_pid	Process ID associated with the event	POSIX_LOG_ENTRY_PID
pid_t	log_pgrp	Process group associated with the event	POSIX_LOG_ENTRY_PGRP
struct timespec	log_time	Event time stamp	POSIX_LOG_ENTRY_TIME
unsigned int	log_flags	Bitmap of event flags	POSIX_LOG_ENTRY_FLAGS
pthread_t	log_thread	Thread ID associated with event	POSIX_LOG_ENTRY_THREAD
posix_log_procid_t	log_processor	Processor ID associated with event	POSIX_LOG_ENTRY_PROCESSOR

Event tipleri

- EVL PRINTK MESSAGE (0x2) event in printk() fonksiyonu tarafından yazıldığını
 belirtir. Bu event tiplerinin log facility leri daima LOG KERN dir.
- EVL_SYSLOG MESSAGE (0x1) event in syslog() veya vsyslog() ile yazıldığını belirtir.
 log_facility, syslog() u kullanan program tarafından belirtilir.
- EVL BUFFER OVERRUN (0x6) kernel event buffer ın boyutunun üstüne çiklidgi için

 event veya event lerin gözardı edildiğini belirtir. Bu tip event lerin log_facility leri dalma

 LOG_LOGMGMT dir.
- EVL_DUPS DISCARDED (0x7) bir veya daha fazla tekrarlı event in gözardı edildiğini
 belirtir.Bu tip event lerin log_facility leri daima LOG_LOGMGMT dir.
- EVLOG REGISTER FAC (40) kernel da evl_register_facility() ile çağrılan
 olduğunu belirtir.

Flag tipleri

- POSIX_LOG_TRUNCATE (0x1) POSIX standardında tanımlanmıştır
- **EVL KERNEL_EVENT (0x2) event in kernel içinden loglandığını**
- EVL_KERNTIME_LOCAL (0x8) Bu bit log_time değerinin local time a göre
 düzenlendiğini ve GMT e göre evlogd tarafından düzenlenmesi gerektiğmi belirtir.
- EVL INTERRUPT (0x10) Bu bit event in interrupt durumundan logiandiğini
 belirtir.
- **EVL_PRINTK_MESSAGE (0x20) event in printk() ile yazıldığını** belirtir.
- 0x40 ve 0x80 ilerideki event loglama kullanımları için ayrılmıştır.

Facility tipleri

```
Facility
                                                    Description
LOG_AUTH
            The authorization system
            The system that schedules periodic tasks in the system
LOG_CRON
            Background services that are not explicitly provided facility codes
LOG DAEMON
LOG_KERN
            The kernel
LOG LPR
            The printer system
            The mail system
LOG_MAIL
LOG_NEWS
            The news system
           The system logging process
LOG_SYSLOG
LOG_LOGMGMT The system for managing event logs
            A catch-all facility code for applications that choose not to employ a more descriptive code
LOG_USER
LOG_LOCALO
           Reserved for local use
           Reserved for local use
LOG_LOCAL1
LOG_LOCAL2
           Reserved for local use
LOG_LOCAL3
           Reserved for local use
LOG LOCAL4 Reserved for local use
LOG LOCAL5 Reserved for local use
LOG_LOCAL6 Reserved for local use
LOG LOCAL7 Reserved for local use
```

Severity tipleri

Severity	Description
LOG_EMERG	An emergency condition - typically a problem that cannot be addressed in time to avoid shutdown of the facility
LOG_ALERT	A condition that should be corrected immediately in order to avoid corruption and/or shutdown of the facility
LOG_CRIT	A critical condition, such as a hard disk error, that threatens the availability of a significant portion of the facility
LOG_ERR	An error
LOG_WARNING	A warning
LOG_NOTICE	A condition that is not an error condition, but may require special handling
LOG_INFO	An informational message
LOG_DEBUG	An event containing information useful only when debugging a program

Veri Format tipleri

Format Description

POSIX_LOG_NODATA The record contains no variable-data portion.

POSIX_LOG_STRING The variable data consists of a single null-terminated string.

POSIX_LOG_BINARY The format of the variable data is not specified.



Kullanılan komutlar

- - evlconfig
- •
- evlfacility
- - evlnotify
- •
- evlogmgr
- evlsend
- •
- evitc
- •
- evlview

•

Evlconfig

options.

```
NAME

eviconfig - Configure logging daemon
SYNOPSIS

eviconfig -I | --list

eviconfig -s | --screen filter | no filter

eviconfig -i | --interval seconds

eviconfig -c | --count events

eviconfig -d | --discarddups on | off

eviconfig -o | --output severity-level | off

DESCRIPTION

The eviconfig command lets you change the default settings for event logging.
```

10/30/02

Unless otherwise noted, root permission is required to use the following eviconfig

Evlconfig örnek

```
#evlconfig -s uid!=muratkoc
#evlconfig -d on
#evlconfig -i 5
#evlconfig -c 20
#evlconfig -o INFO

#evlconfig -l
Discard Dups = on
Discard Interval = 5 seconds
Discard Count = 20 identical events
Event Screen:
    uid!=muratkoc
Console display level = INFO
```

Evlfacility

```
NAME
    evifacility - Manage facility registry
SYNOPSIS
    evlfacility -l|--list
    evifacility -v|--verify [file]
    evifacility -r|--replace file
   evifacility -a|--add facility-name [-k|--kernel] [-p|--private] [-f|--filter
    evifacility -d|--delete facility-name
   evlfacility -c|--change facility-name [-k|--kernel] | [-u|--user] | [-p|--
-noprivate] | [-f|--filter filter|nofilter]
DESCRIPTION
   The evifacility command lets you list contents of the event logging facility
```

registry, replace the entire facility registry, add facilities (with options) facility registry, delete facilities, or modify an existing facility.

For evifacility options that modify the facility registry, event logging 10/30/lizeady in progress will start using the modified registry within 53 following options are accepted (unless otherwise noted, root permission

Evlfacility örnek

private

#evlfacility -l

- 0 KERN
- 8 USER
- 16 MAIL
- 24 DAEMON
 - 32 AUTH
- 40 SYSLOG
- **48 LPR**
- 56 NEWS
- 64 UUCP
- 72 CRON
- 80 AUTHPRIV
 - 88 FTP
- 96 LOGMGMT
 - 128 LOCALO
- 136 LOCAL1
- **144 LOCAL2**
 - 152 LOCAL3
- 160 LOCAL4
- 168 LOCAL5
- **176 LOCAL6**
- 10/31842 LOCAL7

- 0xd8c0bf86 test_kfacreg kernel
- 0xcd14f75 test_bashful kernel
- 0xeb5232b8 test_doc kernel
- 0x8c69ff96 test_dopey kernel
- 0x36c38aa1 test_grumpy kernel
- 0x531dfca3 test happy kernel
- 0x6526797e test_sleepy kernel
 - 0xdd866b39 test_sneezy kernel

Evlnotify

```
Evinotify - Event Notification

SYNOPSIS

evinotify -I | --list

evinotify -a | --add notify-action [-o | --once-only] [-f | --filter filter] [-p | --persistent] [-u | --uid userid]

evinotify -d | --delete notify-id ...

evinotify -c | --change new-notify-action notify-id

evinotify -F | --file cmd-file

DESCRIPTION

The evinotify command lets you register actions to be taken when a specified event occurs. An
```

The evinotify command lets you register actions to be taken when a specified event occurs. An action (command or shell script) will be executed on behalf of the user who registered it, except if that user is root; root has alternate user id (other than root).

The default environment settings are specified in /etc/evlog.d/action_profile, which can be modified only by root. The action command, or script, can alter its environment. The initial default is as follows:

PATH=/usr/bin:/bin:.

PWD=/tmp

A user attempting to issue the evinotify command must have access to at least one of the log files (/var/eviog/eventlog or /var/eviog/privatelog). In addition to verifying that the user has read access to at least one of the log performed using a mechanism similar to the crontab command:

- · If the file /etc/evlog.d/action.allow exists, then the users listed therein can issue this command.
- Otherwise if the file /etc/evlog.d/action.deny exists, but the action.allow file does not exist, then users listed in

/etc/evlog.d/action.deny will not be allowed to issue the evlnotify command, and all others will be 10/30/02 .

be modified or deleted by the users who created them.

Evlnotify örnek

```
#evInotify -a /tmp/mail_at -f 'facility=KERN'

#evInotify -I
17:severity=INFO:uid=muratkoc:root:0:0
18:facility=KERN:/tmp/mail_at:root:0:0

muratkoc@linux:~> /sbin/evInotify -a /tmp/mail_at -f 'severity=INFO' muratkoc@linux:~> /sbin/evInotify -I
19:severity=INFO:/tmp/mail_at:muratkoc:0:0
```

Evlogmgr

```
NAME
evlogmgr - Event log manager

SYNOPSIS

evlogmgr -c | --compact filter

[-F | --force] [-C | --compr-bak]

[[-p | --private] | [-l | --log srcfile]]

evlogmgr -f | --fix

[[-p | --private] | [-l | --log srcfile]]

evlogmgr -s | --show-status filter

[[-p | --private] | [-l | --log srcfile]]
```

DESCRIPTION

The eylogmgr command performs log management on the event log, on the private log, or optionally, on a log file that you specify. You also specify which events are to be deleted. The space freed by deleted events is reused for undeleted events (a process referred to as compaction) and the log file is truncated, thus reducing its overall size.

You must have root permission to use this command.

Evlogmgr örnek

```
#evlogmgr -c 'severity=DEBUG' -C
```

- recid=1587, size=70, format=STRING, event_type=0x3, facility=LOGMGMT, severity=NOTICE, uid=root, gid=root, pid=18361, pgrp=18361, time=Tue Oct 29 20:50:55 2002, flags=0x0, thread=0x400, processor=0
- Log compaction on /var/evlog/eventlog ended. 284 events were removed.

Evlsend

```
NAME
evisend - event generation utility

SYNOPSIS
evisend
-f | --facility facility -t | --type event_type
[-s | --severity severity ] [-m | --message message-string ] [-b |
--binary attr_type,
attr_value ...]
```

DESCRIPTION

The evisend utility lets you send an event message to the system.

Evlsend örnek

```
#evlsend -f. MAIL -t 0x32 -s INFO -m "super event yaparim"

recid=1641, size=20, format=STRING, event_type=0x32, facility=MAIL, severity=INFO, uid=root, gid=root, pid=18428, pgrp=18428, time=Tue 29 Oct 2002 08:57:05 PM EET, flags=0x0, processor=0 super event yaparim
```

Evltc

```
NAME
         evitc - Compile formatting templates
    SYNOPSIS
         evitc sourcefile [-f | --func] [-n | --noto]
              [-c | --cpp] [cpp_options]
         or
         evitc binfile.to
    DESCRIPTION
         The evite command reads the formatting template specification(s) in sourcefile and creates a binary template file for each specification.
    sourcefile may not define two templates with the same event_type even if for different facilities. Binary files are created in the directory where
    sourcefile resides.
         If the name of the specified file ends in .to, it is assumed to be a binary template file. It is read, and if it contains an event-record template, the
    corresponding sample call to the evl_log_write() function is printed, as with -f. In this case, the -f and -n options (if specified) are ignored, and
     any cpp-related options are flagged as errors.
         The binary file for an event-record template is named eventtype to, where eventtype is the decimal event type. If eventtype is negative, the
    minus sign (-) is converted to an equals sign (=). The binary file for a struct template is named structname.to.
         If the source file contains any errors, no binary files are produced, and error messages are written to stderr.
         The algorithm for finding a struct template that is referenced by another template is as follows:
         (1) The struct path from the import statement is converted into a relative pathname by replacing all periods with slashes and appending .to.
     For example, gui.graphics.point becomes gui/graphics/point.to.
         (2) This relative pathname is applied to each of the following directories in turn until a file is found:
         (a) the directory in which the current template source file resides.
         (b) the directories specified in the EVLTMPLPATH environment variable (a colon-delimited list of directories). If
     environment variable is not defined, the directory /var/evlog/templates is searched.
10/30/0 The selected template file is read into memory if it is not already there.
                                                                                                                        31
```

It is neither necessary nor permitted to import a template with the same name as one previously defined in the current template source file,

unless the imported template is from a different directory. See Example 3 (below).

Evltc örnek

```
/* HEADER SECTION */
facility "LOCAL1";
event_type 0x3115;
/* CONST-ATTRIBUTES SECTION */
const {
    string
adapter"; repair_action = "Replace SCSI
/* RECORD-ATTRIBUTES SECTION */
attributes {
    char
              unit ser no[8] "(%c)";
                             "%u";
    ushort
               lun
    char
              sense_bytes[12] "%t";
/* For the next attribute, the various sections of the format_spec are
* automatically concatenated into a single string.
*/
    uchar
              recovery stat
             b/0x40/INTERFACE_WAS_RESET/"
     "0x20/RECOVERY ACTION STARTED/"
     "0x10/RECOVERY ACTION FAILED/";
```

```
* The final attribute specification says to display the
rest of the

* bytes in dump format.

*/
char extra_data[_R_] "%t";
}

/* FORMATTING SECTION */
format

SCSI interface error: Adapter Serial Number/LUN =
%unit_ser_no%/\
%lun%

\tRecovery Status: %recovery_stat%
\tSense Bytes:
%sense_bytes%
\tRecommended repair action:
\t\t\%repair_action\%\n\n
```

Evltc örnek

```
#evltc -f scsi.t
evl_log_write(LOG_LOCAL1, 12565 /* 0x3115 */, severity, flags,
     "char[]",
                         unit ser no,
                   8,
     "ushort",
                 lun,
     "char[]",
                   12, sense bytes,
     "uchar",
                   recovery stat,
     "char[]",
                    R, extra data,
     "endofdata");
SCSI interface error: Adapter Serial Number/LUN = XSCSI178/3
Recovery Status: 0x50(INTERFACE_WAS_RESET)
Sense Bytes:
00000000 61 62 63 64 65 66 67 68 61 62 63 64
                                                | abcdefgh abcd
Recommended repair action:
Replace SCSI adapter
00000000 26 B3 B3 25 AB BC CD
                                           | &..%...
```

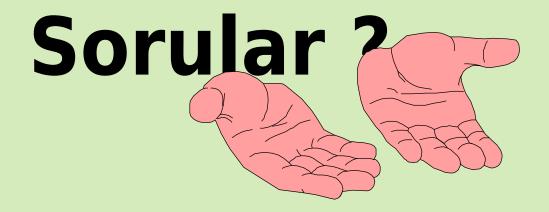
Evlview

```
NAME
    eviview - View log events
SYNOPSIS
    eviview --help
     OR
    eviview [input] [output] [-f|--filter filter]
     [-b | --templates][-B | --notemplates]
    input (defaults to /var/evlog/eventlog, or to /var/evlog/privatelog with -p | --private):
     [ -n | --new ][ -T | --timeout nsec ][ -R | --recid rid ]
     OR
     [-l | --log srclogfile] [-t | --tail nrec]
     [-r | --reverse]
    output (defaults to stdout):
     [ -o | --out destlogfile ]
     OR
     [-S | --formatstr format-string ] [ format_opts ]
     OR
     [-F | --formatfile format-file ] [ format opts ]
     OR
     [-c | --compact ] [-s | --separator sep ] [format opts]
     OR
     [ -m | --syslog ]
    format opts:
     [-N | --newlines n ] [-d | --datefmt date-format ]
DESCRIPTION
    The eviview utility lets you view events from an event log, view events in real time, or read records from an event log and write the
records to another file.
```

Evlview örnek

```
#eviview -f 'data contains "eth"
recid=221, size=77, format=STRING, event_type=0x2, facility=KERN,
severity=INFO, uid=root, gid=root, pid=573, pgrp=451,
time=Tue 29 Oct 2002 01:19:29 PM EET, flags=0x22 (KERNEL)
thread=0x0, processor=0
eth0: RealTek RTL8139 Fast Ethernet at 0xd2856000, 00:60:67:00:a5:54, IRQ 10
#eviview -f 'facility==MAIL'
recid=1453 size=35, format=STRING, event_type=0x1, facility=MAIL,
severity=NOTICE, uid=root, gid=dialout, pid=18133, pgrp=17580,
time=Tue 29 Oct 2002 08:35:08 PM EET, flags=0x0, thread=0x400, processor=0
Starting mail and news send/fetch
```







Teşekkürler....