



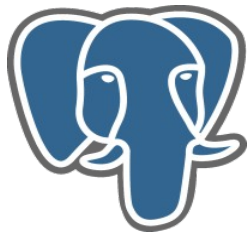
PostgreSQL

# Monitorización

**PGDay Latinoamericano 2011**  
**La Habana, Cuba**

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PostgreSQL

**“Vigilar el funcionamiento de un sistema, servicio o actividad”**

## Preventiva

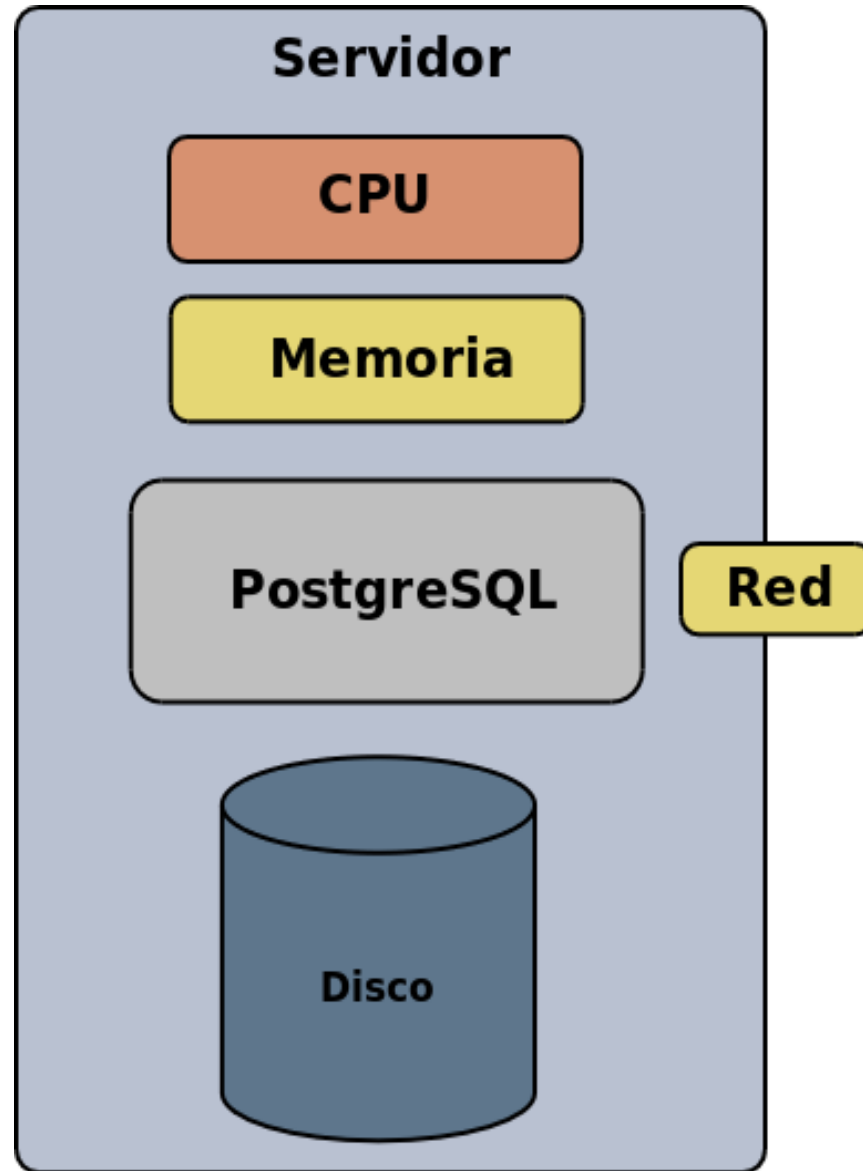
- Detectar interrupciones de servicios
- Alertar sobre posibles problemas
- Tendencias, datos históricos

## Ad hoc

- Monitorización específica en caso de problemas
- Herramientas básicas de bajo nivel del sistema operativo
- Información interna en la base de datos



# PostgreSQL





PostgreSQL

## Servidor

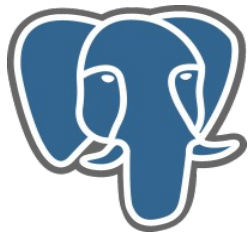
- Disponible
- No disponible
- Problemas de hardware



PostgreSQL

## CPU

- Carga del sistema
- Uso de la CPU



PostgreSQL

# Memoria

- Carga de memoria
- Uso de la swap



PostgreSQL

## Red

- Tráfico de entrada
- Tráfico de salida
- Problemas de componentes de red

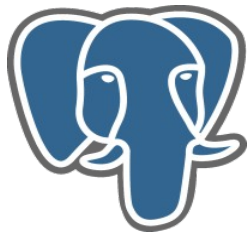




PostgreSQL

## Discos

- Espacio utilizado
- I/O (Input / Output)



PostgreSQL

# PostgreSQL

- Conexiones
- Número de transacciones
- Transacciones no cerradas
- Bloqueos
- Espacio usado,.....



# Monitorización Ad hoc



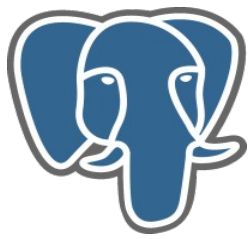
# Herramientas básicas



PostgreSQL

# Documentación

```
$ man <programa>
```



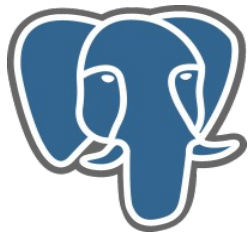
# PostgreSQL

## vmstat

```
$ sudo apt-get install procps
```

```
$ vmstat -n 1 10
```

procs		-----memory-----				---swap--		-----io-----		-system--		-----cpu-----			
r	b	swpd	free	buff	cache	si	so	bi	bo	in	cs	us	sy	id	wa
0	0	1368	401736	529112	4844136	0	0	15	26	24	6	5	1	94	1
0	0	1368	397884	529112	4844140	0	0	0	124	523	1399	1	0	99	0
0	0	1368	401976	529112	4844140	0	0	0	0	566	1648	1	0	99	0
0	0	1368	398752	529112	4844140	0	0	0	0	488	1447	1	0	99	0
0	0	1368	403588	529112	4844140	0	0	0	0	520	1550	2	0	98	0
0	0	1368	398720	529112	4844140	0	0	0	0	565	1525	1	0	99	0
0	0	1368	400232	529116	4844144	0	0	0	124	551	1609	1	0	99	0
0	0	1368	396132	529116	4844144	0	0	0	0	519	1395	1	0	99	0
0	0	1368	400720	529116	4844144	0	0	0	440	673	1892	1	0	98	1
1	0	1368	397076	529116	4844144	0	0	0	0	500	1443	1	1	99	0



# PostgreSQL

**r:** Procesos esperando por tiempo de ejecución (run time)

**b:** Procesos en estado de espera sin interrupciones (uninterruptible sleep)

**swpd:** Cantidad de memoria virtual en uso

**free:** Cantidad de memoria ociosa

**buff:** Cantidad de memoria usada por buffers

**cache:** Cantidad de memoria usada caches

**si:** Cantidad de memoria grabada en disco (swap-in)

**so:** Cantidad de memoria leída del disco (swap-out)

**bi:** Bloques recibidos de un dispositivo de bloques (kB/s)

**bo:** Bloques enviados a un dispositivo de bloques (kB/s)

**in:** Número de interrupciones por segundo

**cs:** Numero de cambios de contexto por segundo (context switches)

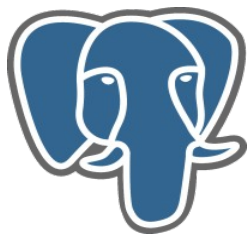
**us:** Tiempo de cpu de procesos de usuario (nice incluido)

**sy:** Tiempo de cpu de procesos del kernel

**id:** Tiempo de cpu ocioso

**wa:** Tiempo de cpu esperando por I/O

**st:** Tiempo de cpu "robado" a una maquina virtual



# PostgreSQL

## iostat

```
$ sudo apt-get install sysstat  
$ iostat -k -p 1 2
```

```
avg-cpu:  %user   %nice %system %iowait  %steal   %idle  
          4.78    0.19   0.60   0.79    0.00   93.64
```

Device:	tps	kB_read/s	kB_wrtn/s	kB_read	kB_wrtn
sda	5.50	59.00	106.86	19921681	36081584
sda1	1.62	6.75	17.93	2279650	6053108
sda2	0.08	3.05	0.02	1031003	7032
sda3	3.80	49.19	88.91	16610176	30020076
sda4	0.00	0.00	0.00	740	1368
sdb	0.00	0.01	0.00	3460	44
sdb1	0.00	0.01	0.00	3340	44

```
avg-cpu:  %user   %nice %system %iowait  %steal   %idle  
          0.99    0.10   0.54   0.00    0.00   98.37
```

Device:	tps	kB_read/s	kB_wrtn/s	kB_read	kB_wrtn
sda	0.20	25.60	0.00	128	0
sda1	0.00	0.00	0.00	0	0
sda2	0.20	25.60	0.00	128	0
sda3	0.00	0.00	0.00	0	0
sda4	0.00	0.00	0.00	0	0
sdb	0.00	0.00	0.00	0	0
sdb1	0.00	0.00	0.00	0	0





# PostgreSQL

## sar

```
$ sudo apt-get install sysstat
```

```
ENABLE="TRUE" en /etc/default/sysstat
```

```
Ejecutado desde /etc/cron.d/sysstat
```

```
$ sudo /etc/init.d/sysstat restart
```

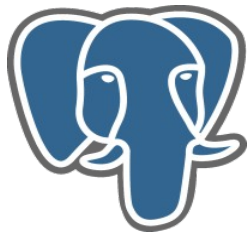
```
$ sar
```

```
Linux 2.6.35-24-generic (core2)      01/29/2011      _x86_64_ (4 CPU)
```

12:00:01 AM	CPU	%user	%nice	%system	%iowait	%steal	%idle
12:05:01 AM	all	0.72	0.14	0.95	0.19	0.00	97.99
12:15:01 AM	all	0.74	0.15	0.95	0.09	0.00	98.07
12:25:01 AM	all	0.73	0.15	0.90	0.05	0.00	98.17
12:35:01 AM	all	0.74	0.14	0.93	0.15	0.00	98.05
12:45:01 AM	all	1.08	4.80	3.27	0.07	0.00	90.78
12:55:01 AM	all	0.96	3.67	2.59	0.10	0.00	92.68
01:05:01 AM	all	0.72	0.14	0.90	0.19	0.00	98.04
01:15:01 AM	all	0.76	0.13	0.97	0.07	0.00	98.06
01:25:01 AM	all	0.70	0.15	0.90	0.06	0.00	98.20
01:35:01 AM	all	0.70	0.13	0.89	0.11	0.00	98.17
01:45:01 AM	all	0.68	0.14	0.90	0.10	0.00	98.18

```
$ sar -r
```

```
$ sar -d
```



# PostgreSQL

## ps

```
$ ps auxww | grep "postgres: " | sort -k 9
```

```
postgres 30758 .. 07:10 0:00 postgres: autovacuum launcher process
postgres 30759 .. 07:10 0:00 postgres: stats collector process
postgres 30757 .. 07:10 0:00 postgres: wal writer process
postgres 30756 .. 07:10 0:01 postgres: writer process
postgres  862 .. 07:59 0:00 postgres: postgres postgres [local] idle in transaction
postgres  1921 .. 09:22 0:00 postgres: postgres postgres 127.0.0.1(39475) idle
postgres 21074 .. 14:14 0:04 postgres: postgres pgbench [local] COMMIT
postgres 21073 .. 14:14 0:04 postgres: postgres pgbench [local] UPDATE waiting
```

**postgres: usuario dbase maquina(puerto) actividad**



PostgreSQL

## Otros programas

- iotop
- htop
- top
- free
- /proc/\*
- procinfo
- plotdrop
- gnuplot



# **Información interna en la base de datos**



PostgreSQL

**psql**

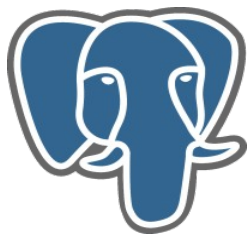
- \?
- Tablas / Vistas pg\_\*



PostgreSQL

## **postgresql.conf / SET**

- track\_counts
- track\_functions
- track\_activities



PostgreSQL

# pg\_roles

```
postgres=# \d pg_roles
```

View "pg\_catalog.pg\_roles"

Column	Type	Modifiers
rolname	name	
rolsuper	boolean	
rolinherit	boolean	
rolcreatorole	boolean	
rolcreatedb	boolean	
rolcatupdate	boolean	
rolcanlogin	boolean	
rolconnlimit	integer	
rolpassword	text	
rolvaliduntil	timestamp with time zone	
rolconfig	text[]	
oid	oid	



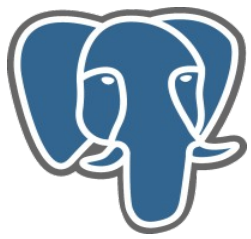
# pg\_database

```
postgres=# \d pg_database
```

Table "pg\_catalog.pg\_database"

Column	Type	Modifiers
datname	name	not null
datdba	oid	not null
encoding	integer	not null
datcollate	name	not null
datctype	name	not null
datistemplate	boolean	not null
dataallowconn	boolean	not null
datconnlimit	integer	not null
datlastsysoid	oid	not null
datfrozenxid	xid	not null
dattablespace	oid	not null
datacl	aclitem[]	





PostgreSQL

# pg\_locks

```
postgres=# \d pg_locks
```

View "pg\_catalog.pg\_locks"

Column	Type	Modifiers
--------	------	-----------

locktype	text	
database	oid	
relation	oid	
page	integer	
tuple	smallint	
virtualxid	text	
transactionid	xid	
classid	oid	
objid	oid	
objsubid	smallint	
virtualtransaction	text	
pid	integer	
mode	text	
granted	boolean	

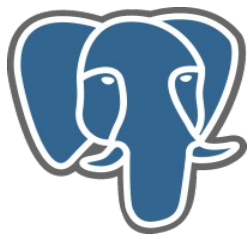


# pg\_stat\_activity

```
postgres=# \d pg_stat_activity
```

View "pg\_catalog.pg\_stat\_activity"

Column	Type	Modifiers
datid	oid	
datname	name	
procpid	integer	
usesysid	oid	
username	name	
application_name	text	
client_addr	inet	
client_port	integer	
backend_start	timestamp with time zone	
xact_start	timestamp with time zone	
query_start	timestamp with time zone	
waiting	boolean	
current_query	text	



PostgreSQL

# pg\_stat\_database

```
postgres=# \d pg_stat_database
```

View "pg\_catalog.pg\_stat\_database"

Column	Type	Modifiers
datid	oid	
datname	name	
numbackends	integer	
xact_commit	bigint	
xact_rollback	bigint	
blks_read	bigint	
blks_hit	bigint	
tup_returned	bigint	
tup_fetched	bigint	
tup_inserted	bigint	
tup_updated	bigint	
tup_deleted	bigint	



# PostgreSQL

## pg\_stat\_user\_tables

```
postgres=# \d pg_stat_user_tables
```

View "pg\_catalog.pg\_stat\_user\_tables"

Column	Type	Modifiers
relid	oid	
schemaname	name	
relname	name	
seq_scan	bigint	
seq_tup_read	bigint	
idx_scan	bigint	
idx_tup_fetch	bigint	
n_tup_ins	bigint	
n_tup_upd	bigint	
n_tup_del	bigint	
n_tup_hot_upd	bigint	
n_live_tup	bigint	
n_dead_tup	bigint	
last_vacuum	timestamp with time zone	
last_autovacuum	timestamp with time zone	
last_analyze	timestamp with time zone	
last_autoanalyze	timestamp with time zone	



PostgreSQL

# pg\_stat\_user\_indexes

```
postgres=# \d pg_stat_user_indexes
```

View "pg\_catalog.pg\_stat\_user\_indexes"

Column	Type	Modifiers
relid	oid	
indexrelid	oid	
schemaname	name	
relname	name	
indexrelname	name	
idx_scan	bigint	
idx_tup_read	bigint	
idx_tup_fetch	bigint	



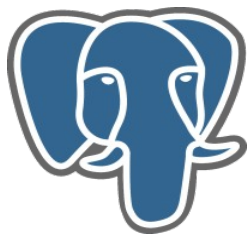
PostgreSQL

# pg\_stat\_user\_functions

```
postgres=# \d pg_stat_user_functions
```

```
View "pg_catalog.pg_stat_user_functions"
```

Column	Type	Modifiers
funcid	oid	
schemaname	name	
funcname	name	
calls	bigint	
total_time	bigint	
self_time	bigint	



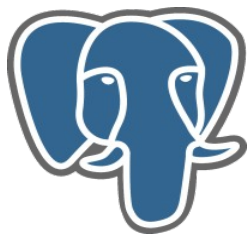
PostgreSQL

# pg\_statio\_user\_tables

```
postgres=# \d pg_statio_user_tables
```

View "pg\_catalog.pg\_statio\_user\_tables"

Column	Type	Modifiers
relid	oid	
schemaname	name	
relname	name	
heap_blks_read	bigint	
heap_blks_hit	bigint	
idx_blks_read	bigint	
idx_blks_hit	bigint	
toast_blks_read	bigint	
toast_blks_hit	bigint	
tidx_blks_read	bigint	
tidx_blks_hit	bigint	



PostgreSQL

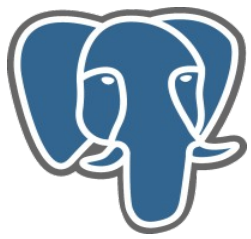
# pg\_statio\_user\_indexes

```
postgres=# \d pg_statio_user_indexes
```

```
View "pg_catalog.pg_statio_user_indexes"
```

Column	Type	Modifiers
relid	oid	
indexrelid	oid	
schemaname	name	
relname	name	
indexrelname	name	
idx_blks_read	bigint	
idx_blks_hit	bigint	





PostgreSQL

## pg\_stat\_bgwriter

```
postgres=# \d pg_stat_bgwriter
```

View "pg\_catalog.pg\_stat\_bgwriter"

Column	Type	Modifiers
checkpoints_timed	bigint	
checkpoints_req	bigint	
buffers_checkpoint	bigint	
buffers_clean	bigint	
maxwritten_clean	bigint	
buffers_backend	bigint	
buffers_alloc	bigint	



# Monitorización preventiva



# PostgreSQL

# Nagios

Nagios Munin :: localdomain ...

127.0.0.1/nagios3/

Do you want Google Chrome to save your password?

## Nagios

**General**

- Home
- Documentation

**Monitoring**

- Tactical Overview
- Service Detail
- Host Detail
- Hostgroup Overview
- Hostgroup Summary
- Hostgroup Grid
- Servicegroup Overview
- Servicegroup Summary
- Servicegroup Grid
- Status Map
- 3-D Status Map
- Service Problems
  - Unhandled
- Host Problems
  - Unhandled
- Network Outages

Show Host:

- Comments
- Downtime
- Process Info

**Current Network Status**

Last Updated: Thu Jan 27 15:39:48 CET 2011  
 Updated every 90 seconds  
 Nagios® 3.0.6 - [www.nagios.org](http://www.nagios.org)  
 Logged in as *nagiosadmin*

[View History For all hosts](#)  
[View Notifications For All Hosts](#)  
[View Host Status Detail For All Hosts](#)

**Host Status Totals**

Up	Down	Unreachable	Pending
2	0	0	0

[All Problems](#) [All Types](#)

0	2
---	---

**Service Status Totals**

Ok	Warning	Unknown	Critical	Pending
5	0	0	2	0

[All Problems](#) [All Types](#)

2	7
---	---

**Service Status Details For All Hosts**

Host	Service	Status	Last Check	Duration	Attempt	Status Information
gateway	PING	OK	2011-01-27 15:36:50	0d 5h 2m 58s	1/4	PING OK - Packet loss = 0%, RTA = 0.16 ms
localhost	Current Load	OK	2011-01-27 15:35:25	0d 5h 1m 32s	1/4	OK - load average: 0.06, 0.04, 0.07
	Current Users	OK	2011-01-27 15:39:42	0d 5h 0m 6s	1/4	USERS OK - 6 users currently logged in
	Disk Space	CRITICAL	2011-01-27 15:39:07	0d 4h 58m 41s	4/4	DISK CRITICAL - /home/rafael.vgfs is not accessible: Permission denied
	HTTP	OK	2011-01-27 15:37:33	0d 5h 2m 15s	1/4	HTTP OK: HTTP/1.1 200 OK - 453 bytes in 0.001 second response time
	SSH	CRITICAL	2011-01-27 15:36:59	0d 5h 0m 49s	4/4	Connection refused
	Total Processes	OK	2011-01-27 15:35:25	0d 4h 59m 23s	1/4	PROCS OK: 180 processes

7 Matching Service Entries Displayed



PostgreSQL

# Nagios - instalación

```
$ apt-get install nagios3
```



PostgreSQL

# Nagios – configuración (I)

```
/etc/nagios3/nagios.cfg
```

```
/etc/nagios3/conf.d/*
```

```
/etc/nagios-plugins/config/*
```

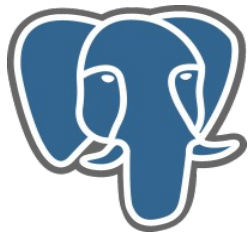


PostgreSQL

## Nagios – configuración (II)

```
/etc/nagios3/conf.d/hostgroups_nagios2.cfg
```

```
define hostgroup {  
    hostgroup_name    postgres-servers  
    alias              PostgreSQL servers  
    members           localhost  
}
```



PostgreSQL

## Nagios – configuración (III)

```
/etc/nagios3/conf.d/services_nagios2.cfg
```

```
define service{
    hostgroup_name      postgres-servers
    service_description Swap memory
    use                 generic-service
    check_command       check_swap!90%!70%
    notification_interval 0
}
```



PostgreSQL

## Nagios – configuración (IV)

```
/etc/nagios-plugins/config/swap.cfg
```

```
define command {  
    command_name    check_swap  
    command_line    /usr/lib/nagios/plugins/check_swap -w $ARG1$ -c $ARG2$  
}
```





PostgreSQL

## Nagios – configuración (V)

```
/etc/init.d/nagios3 restart
```



## **Nagios – Web**

**`http://127.0.0.1/nagios3/`**



# **check\_postgres**

**[http://bucardo.org/wiki/Check\\_postgres](http://bucardo.org/wiki/Check_postgres)**



# check\_postgres - instalación(I)

```
apt-get install libtimedate-perl  
                libdatetime-format-dateparse-perl  
                libfile-spec-perl  
                libfile-chdir-perl  
                libgetopt-long-descriptive-perl  
                libfile-pushd-perl  
                libfile-temp-perl  
                libdigest-md5-file-perl  
                libdbd-pg-perl
```



# check\_postgres - instalación(II)

**Postgres:**

```
$ cd /tmp/  
$ tar xzvf check_postgres.tar.gz  
$ cd check_postgres-2.16.0  
$ perl Makefile.PL  
$ make
```

**Root:**

```
$ make install  
$ cd /usr/lib/nagios/plugins  
$ check_postgres.pl --symlinks
```



# check\_postgres - configuración(I)

```
/etc/nagios-plugins/config/check_postgres.cfg
```

```
define command {  
    command_name    check_postgres_database_size  
    command_line    /usr/lib/nagios/plugins/check_postgres_database_size  
-H $HOSTADDRESS$ -u postgres --include=$ARG3$ -w $ARG1$ -c $ARG2$  
}
```

```
define command {  
    command_name    check_postgres_locks  
    command_line    /usr/lib/nagios/plugins/check_postgres_locks -H  
$HOSTADDRESS$ -u postgres -w $ARG1$ -c $ARG2$  
}
```



# check\_postgres - configuración(II)

```
/etc/nagios3/conf.d/services_nagios2.cfg
```

```
define service{
    hostgroup_name      postgres-servers
    service_description Database size
    use                 generic-service
    check_command       check_postgres_database_size!100MB!200MB!pgbench
    notification_interval 0
}
```

```
define service{
    hostgroup_name      postgres-servers
    service_description Database locks
    use                 generic-service
    check_command       check_postgres_locks!100!200
    notification_interval 0
}
```



# **check\_postgres - configuración (III)**

```
/etc/init.d/nagios3 restart
```





PostgreSQL

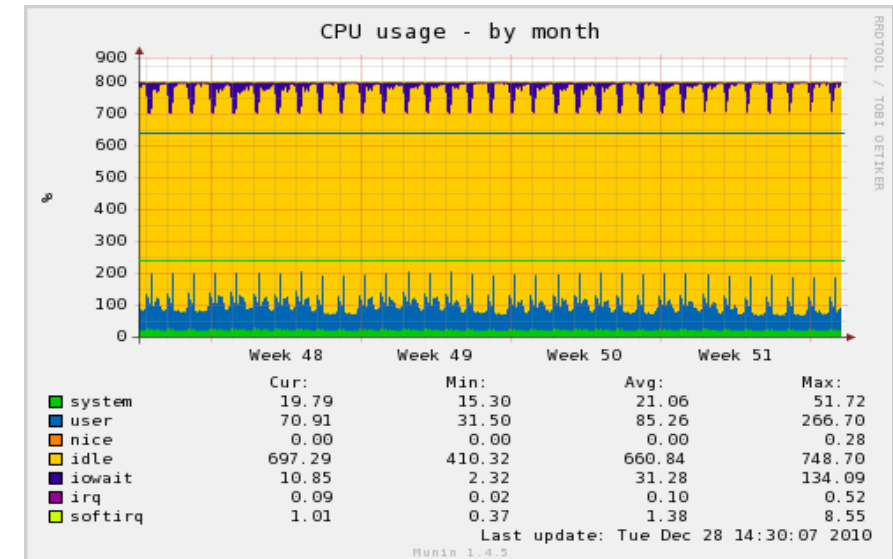
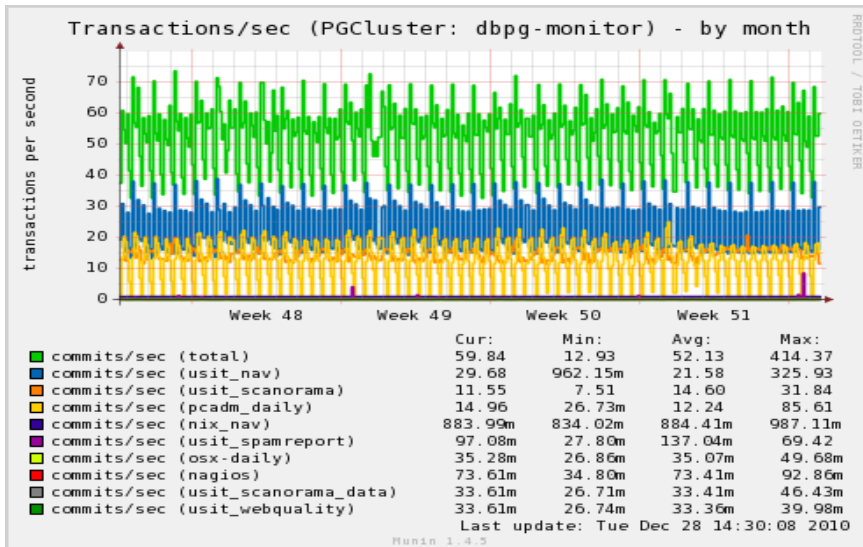
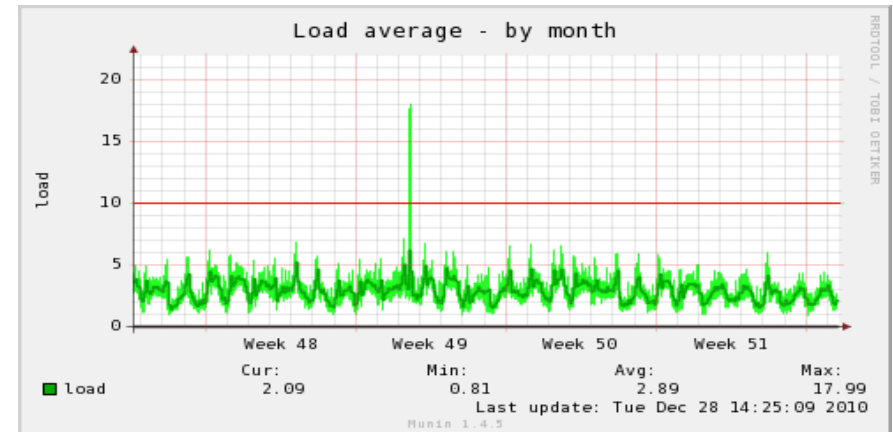
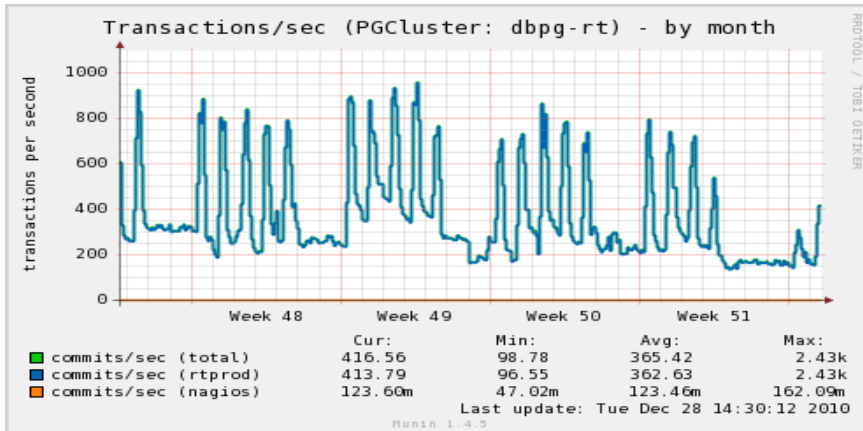
# Documentación

```
$ man check_postgres
```



# PostgreSQL

## Munin





PostgreSQL

## Munin - Instalación

```
$ apt-get install  
munin  
munin-node  
munin-plugins-extra
```



PostgreSQL

# Munin - Configuración

```
/etc/munin/munin.conf
```

```
/etc/munin/munin-node.conf
```

```
/etc/munin/*
```



PostgreSQL

## Munin - Web

**`http://127.0.0.1/munin/`**



PostgreSQL

# **muninPgPlugins**

**`http://muninpgplugins.projects.postgresql.org/`**



# MuninPgPlugins – Instalación (I)

```
$ apt-get install  
libdbd-pg-perl
```



# MuninPgPlugins – Instalación (II)

```
$ cd /tmp
$ tar xzvf muninpgplugins-0.2.2.tar.gz
$ cd muninpgplugins
$ cp pg__* /usr/share/munin/plugins

$ cd /etc/munin/plugins

$ ln -s /usr/share/munin/plugins/pg__db_size
pg_pgbench_db_size

$ ln -s /usr/share/munin/plugins/pg__connections
pg_pgbench_connections

$ ln -s /usr/share/munin/plugins/postgres_locks
postgres_locks
```





# MuninPgPlugins – Instalación (III)

```
/etc/munin/plugin-conf.d/munin-node
```

```
[postgres_*]  
user postgres
```

```
[pg_pgbench*]  
user postgres  
env.dbname pgbench
```



# **check\_postgres - configuración (III)**

```
/etc/init.d/munin-node restart
```



# Prácticas