

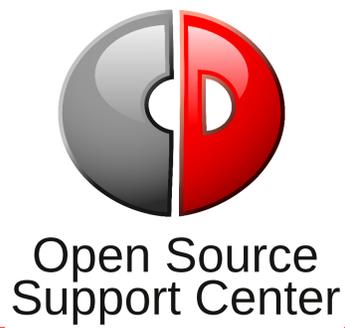
Michael  
Meskes

## Taking Care of the Elephant



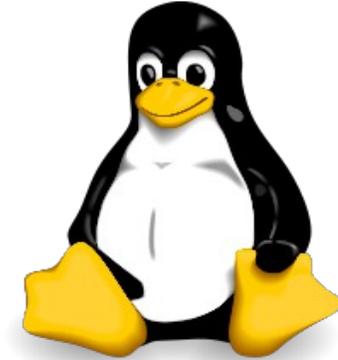


# Silicon Valley PostgresConf 2018



Actively

- Free Software since 1993

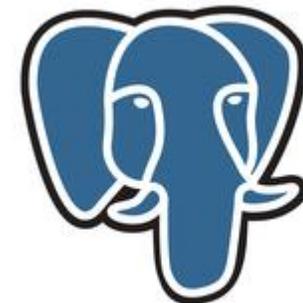


Working

- Linux since 1994

On

- Debian GNU/Linux since



Open Source

- PostgreSQL since 1998



# Silicon Valley PostgresConf 2018



Actively

• 1992 – 1996 Ph.D.

Working

• 1996 – 1998 Project Manager

• 1998 – 2000 Branch Manager

On

• Since 2000 President/CEO

Open Source



# Silicon Valley PostgresConf 2018



24/7/365

Phone

Email

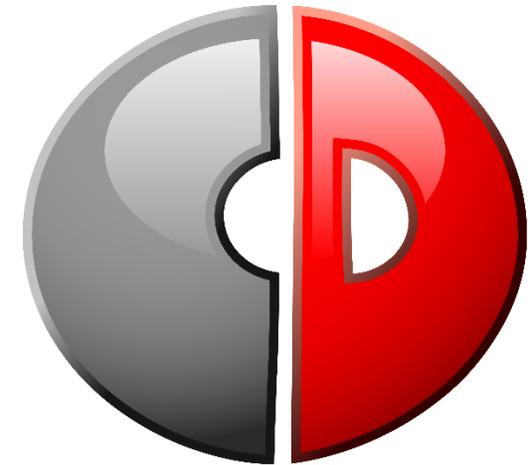
Remote

On-site

US/EU/India

## Open Source Support Center

- Consulting
- Installation
- Administration
- Operations
- Training
- Support



## Open Source Support Center



# Silicon Valley PostgresConf 2018



Open Source  
Support Center

Current  
State  
Of  
The  
Community

-

Forks



Plenty  
Of  
Differences

## Incompatible differences in

- Statements
- Datatypes
- Storage
- Features



(c) Alexander Madyankin, Roman Shamin

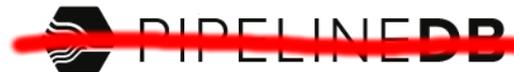


# Silicon Valley PostgresConf 2018

Current  
State  
Of  
The  
Community

-

Forks





# Silicon Valley PostgresConf 2018



Business

Models

vs.

Community

**Create IP**

**Different Solutions**

**Resources**

**Diverging Code**

# Silicon Valley PostgresConf 2018

Sales

vs.

Community

The community does not accept our patches!

Community does not want big patches!

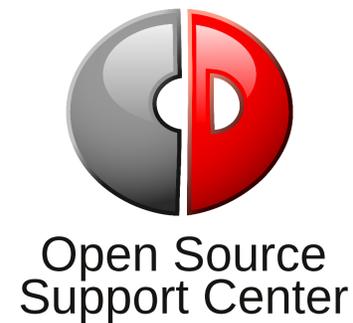
Company XYZ is the one company behind PostgreSQL!

You cannot do this with the community version!

We are PostgreSQL!



# Silicon Valley PostgresConf 2018



Open  
Source  
Has  
Everything

## PostgreSQL Appliance Dashboard



Logged in as *admin* - Logout



Home



DB Administration



Monitoring



Query Metrics



Log Reports



Backup



System Management



Shell



Documentation



Support

### PostgreSQL Cluster

Cluster	Port	Data directory	Archiving	Full Backup	Incr Backup
<span style="color: green;">●</span> 9.6/main	5432	/mnt/pgdata/9.6/main	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		systemd	Report		Backup

# Silicon Valley PostgresConf 2018

Software

Development

-

Vendoring

Vendoring is the act of making your own copy of the 3rd party packages your project is using. Those copies are traditionally placed inside each project and then saved in the project repository.



Vendoring is the conceptual opposite of using a dependency manager

Modern

Deployment

Methods

- Flatpak
- Snap
- AppImage
- Docker
- Appliances
- Cloud



© Tomomarusan



# Silicon Valley PostgresConf 2018



Current  
State  
Of  
The  
Community

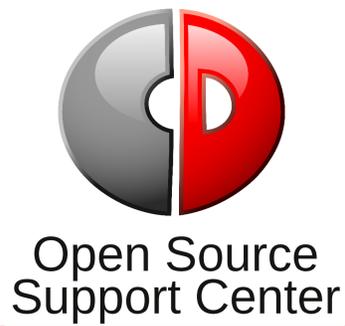
-

Cloud





# Silicon Valley PostgresConf 2018



Database

- Configure database servers
- Monitor and maintain system health and security

Administrator

- Design backup processes for server and associated data
- Establish a disaster recovery protocols

Responsibilities

- Schedule and perform regular server maintenance

# Silicon Valley PostgresConf 2018

Elephant

Shed

-

Design

Goals

- › Complete solution
- › No external dependencies
- › Modular
- › Covers most use case
- › Easily adjustable and extendable
- › Ease of use





# Silicon Valley PostgresConf 2018



Portal

## PostgreSQL Appliance Dashboard



Logged in as admin - Logout



Home



DB Administration



Monitoring



Query Metrics



Log Reports



Backup



System Management



Shell



Documentation



Support

### PostgreSQL Cluster

Cluster	Port	Data directory	Archiving	Full Backup	Incr Backup
<span style="color: green;">●</span> 9.6/main	5432	/mnt/pgdata/9.6/main	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		systemd	Report		Backup

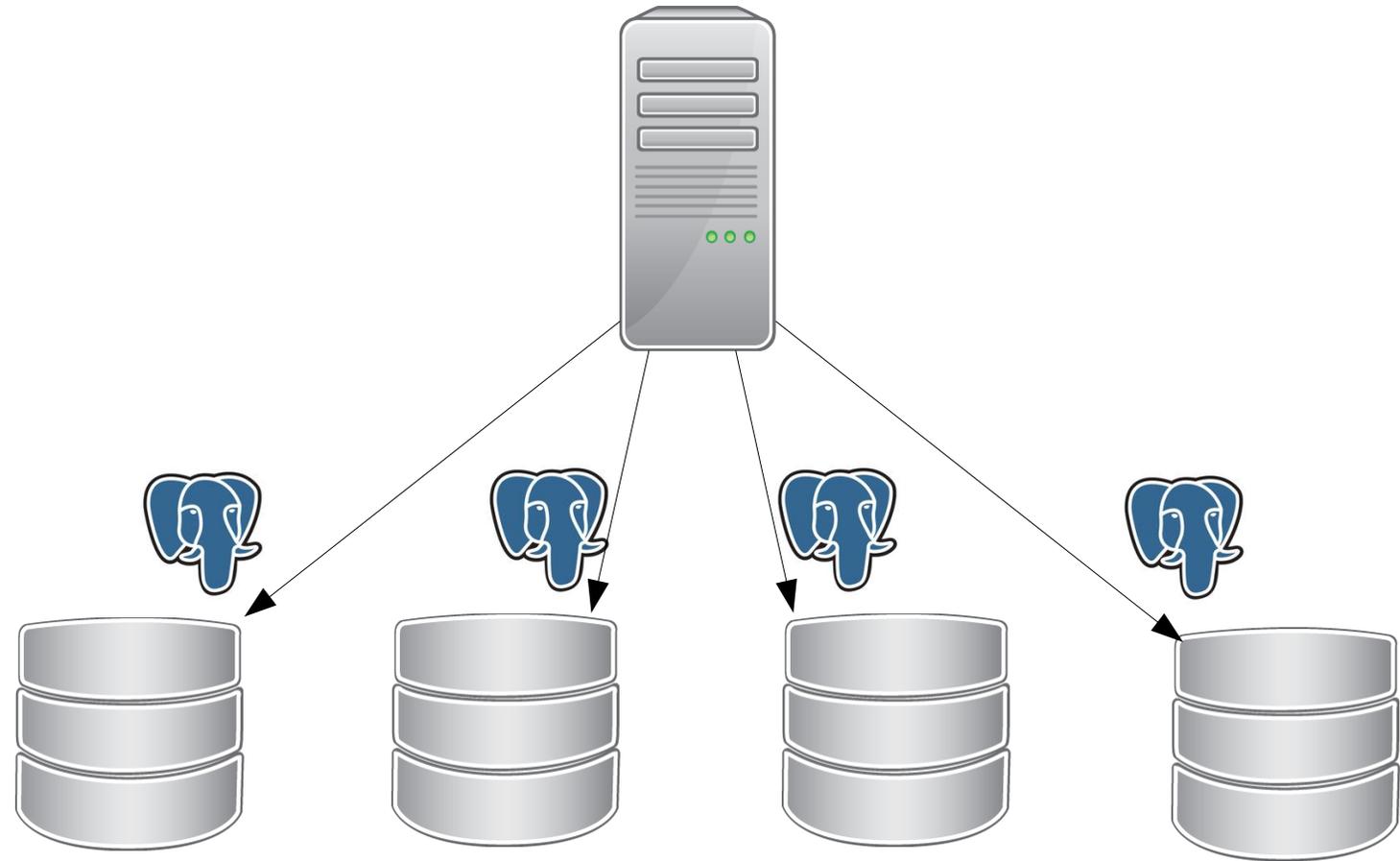
Point

Of

Entry

# Silicon Valley PostgresConf 2018

Multi  
Version  
-  
Multi  
Cluster



# Silicon Valley PostgresConf 2018

all active PostgreSQL  
versions

for

all active distribution  
versions

Apt  
·  
Postgresql  
·  
Org

- 3-4 Debian Releases + 3-4 Ubuntu Releases
- 6 PostgreSQL Releases
- Server, Extensions, Modules
- 3 Architectures

- ➔ 200 different source packages
- ➔ 25,473 binary packages



© Syllabub@ Wikimedia Commons

Quality

Assurance

Tests are done automatically  
Continuous Integration Server



# Jenkins

- Source -  
build source  
packages
- Binary –  
build binary  
packages
- Test

```
==== Running all tests with tight umask 077
====
=== Running test 001_packages.t ... ===
1..19
# PostgreSQL versions installed: 9.4
ok 1 - postgresql-9.4 installed
ok 2 - postgresql-plpython-9.4 installed
ok 3 - postgresql-plpython3-9.4 installed
ok 4 - postgresql-plperl-9.4 installed
ok 5 - postgresql-pltcl-9.4 installed
ok 6 - postgresql-server-dev-9.4 installed
ok 7 - postgresql-contrib-9.4 installed
ok 8 - libecpg-dev installed
...
```

Portal

-

PostgreSQL

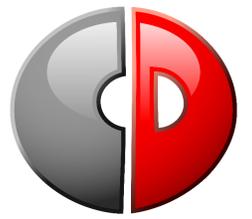
Clusters

### PostgreSQL Cluster

Cluster	Port	Data directory	Archiving	Full Backup	Incr Backup					
<span style="color: green;">●</span> 9.6/main	5432	/mnt/pgdata/9.6/main	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
systemd			Report		Backup					
		Mgmt	Log	•	Run	Show	•	Full	Incr	Info
<span style="color: green;">●</span> 9.6/standby	5433	/mnt/pgdata/9.6/standby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
systemd			Report		Backup					
		Mgmt	Log	•	Run	•	Full	Incr		
<span style="color: red;">●</span> 9.6/testing	5434	/mnt/pgdata/9.6/testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
systemd			Report		Backup					
		Mgmt	Log	•	Run	•	Full	Incr		



# Silicon Valley PostgresConf 2018



Open Source  
Support Center

systemd

-

System

&

Service

Manager

PostgreSQL Cluster 9.6-main

**active** (running)  
Since 7.7.2017, 10:24:42

loaded (/lib/systemd/system/postgresql@.service; disabled)

This unit is an instance of the [postgresql@.service](#) template.

Stop ▾

Enable ▾

Service Logs

July 17, 2017

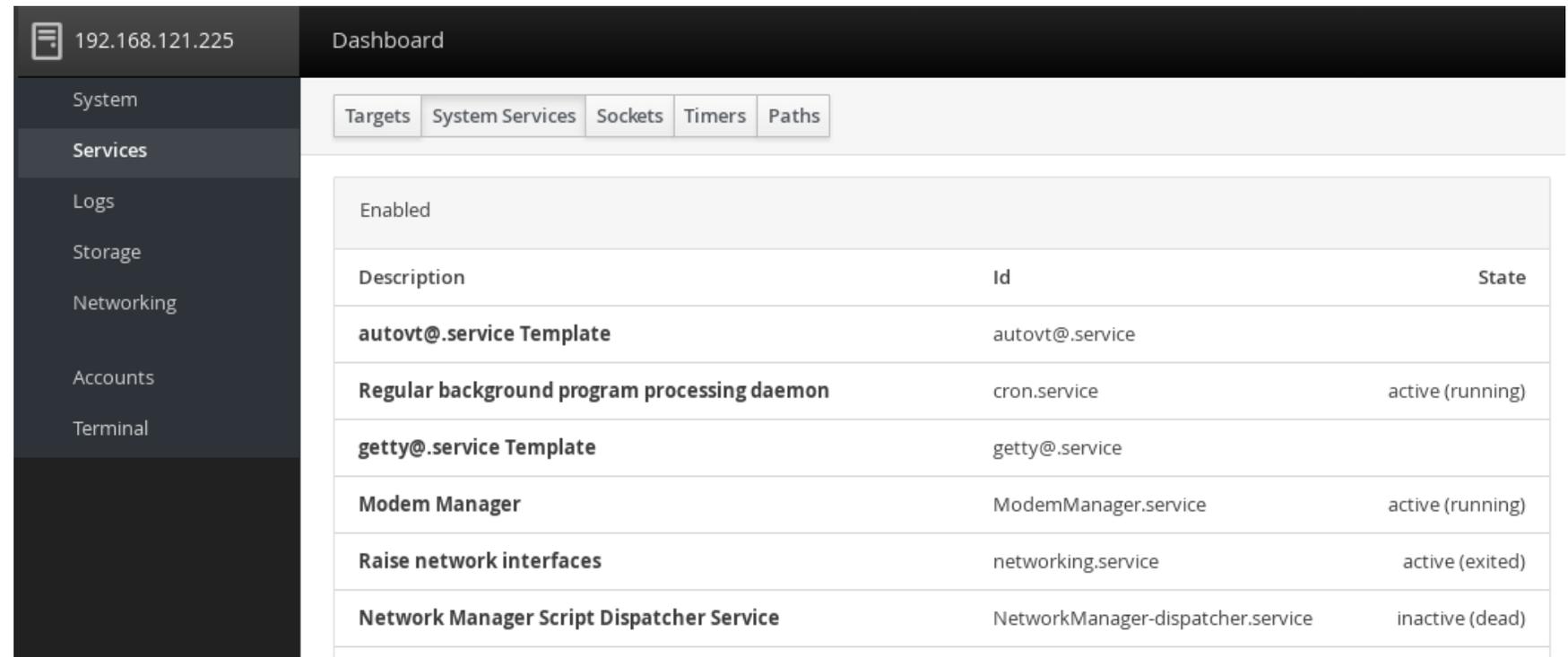
11:25 [1535-53]	postgres-9.6-main
11:25 [1535-52] LIMIT 25;	postgres-9.6-main
11:25 [1535-51] ORDER BY calls DESC	postgres-9.6-main
11:25 [1535-50] ON pss2.userid = pu2.usesysid	postgres-9.6-main
11:25 [1535-49] JOIN pg_user pu2	postgres-9.6-main
11:25 [1535-48] ON pss2.dbid = pd2.oid	postgres-9.6-main
11:25 [1535-47] JOIN pg_database pd2	postgres-9.6-main
11:25 [1535-46] FROM pg_stat_statements pss2	postgres-9.6-main
11:25 [1535-45] , temp_blks_written	postgres-9.6-main
11:25 [1535-44] , temp_blks_read	postgres-9.6-main

Cockpit

-

System

Management



The screenshot shows the Cockpit interface for system services. The left sidebar contains navigation options: System, Services, Logs, Storage, Networking, Accounts, and Terminal. The main content area is titled 'Dashboard' and shows a list of system services. The 'System Services' tab is selected, displaying a table of services with columns for Description, Id, and State.

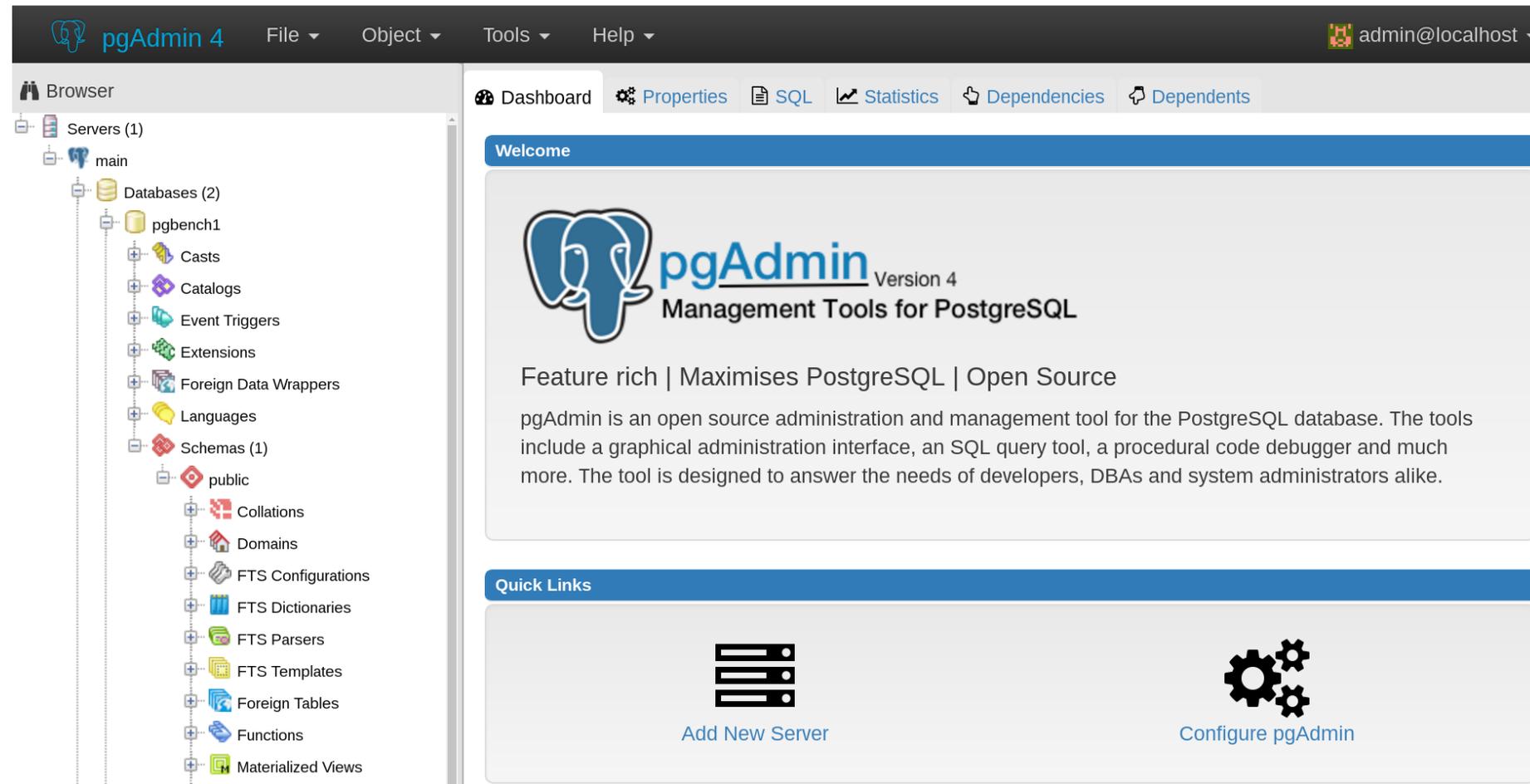
Description	Id	State
autovt@.service Template	autovt@.service	
Regular background program processing daemon	cron.service	active (running)
getty@.service Template	getty@.service	
Modem Manager	ModemManager.service	active (running)
Raise network interfaces	networking.service	active (exited)
Network Manager Script Dispatcher Service	NetworkManager-dispatcher.service	inactive (dead)

pgAdmin4

-

Manage

PostgreSQL



The screenshot shows the pgAdmin 4 web interface. The top navigation bar includes 'File', 'Object', 'Tools', and 'Help' menus, and a user profile for 'admin@localhost'. The left sidebar shows a tree view of the database structure: Servers (1) -> main -> Databases (2) -> pgbench1 -> Casts, Catalogs, Event Triggers, Extensions, Foreign Data Wrappers, Languages, Schemas (1) -> public -> Collations, Domains, FTS Configurations, FTS Dictionaries, FTS Parsers, FTS Templates, Foreign Tables, Functions, Materialized Views. The main content area displays a 'Welcome' message with the pgAdmin logo and version 4, followed by the text 'Management Tools for PostgreSQL'. Below this, it states 'Feature rich | Maximises PostgreSQL | Open Source' and provides a brief description of the tool. A 'Quick Links' section at the bottom contains two buttons: 'Add New Server' and 'Configure pgAdmin'.

Grafana

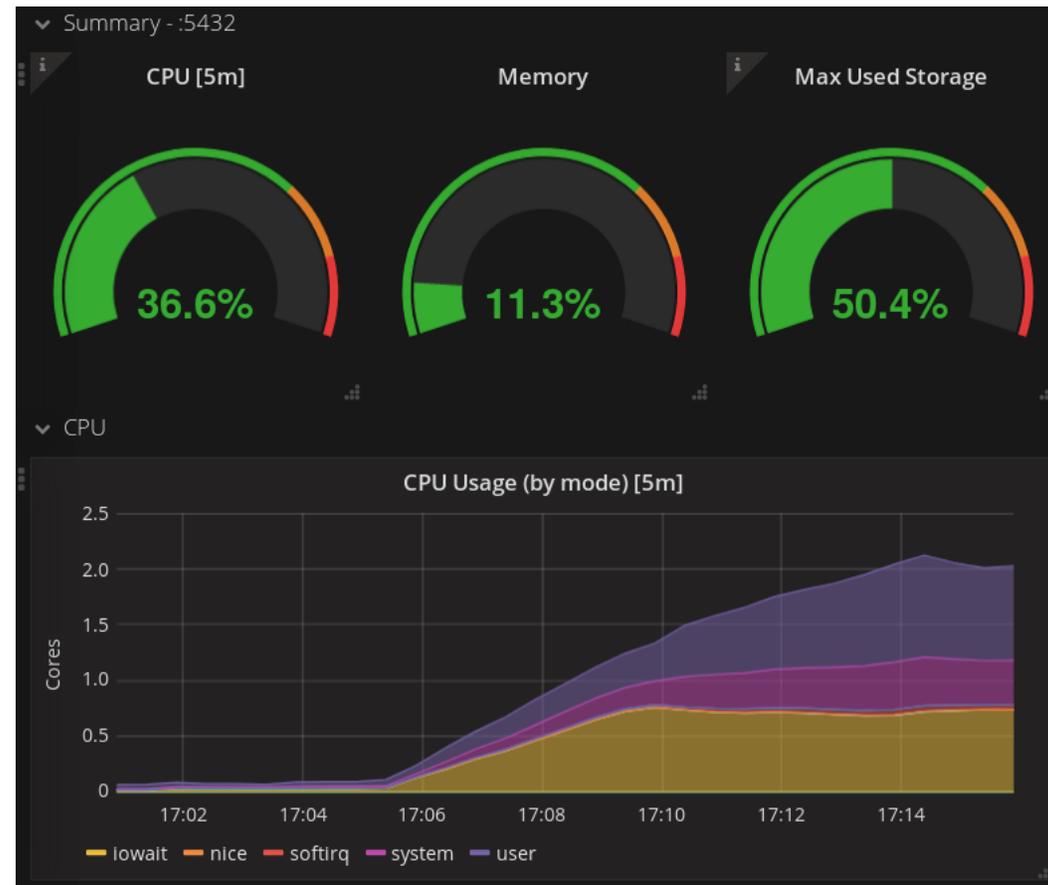
-

Analytics

Visualization

Monitoring

Dashboard with data from different sources



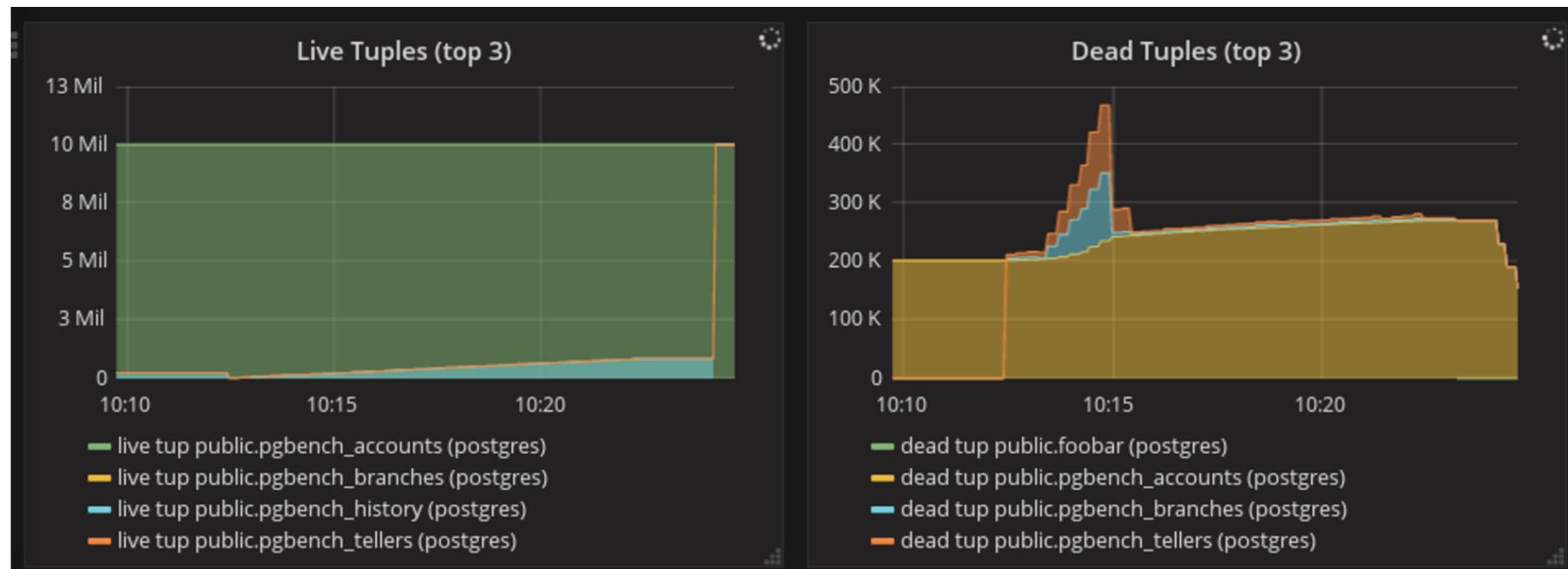
Grafana

Dashboard with data from different sources

Analytics

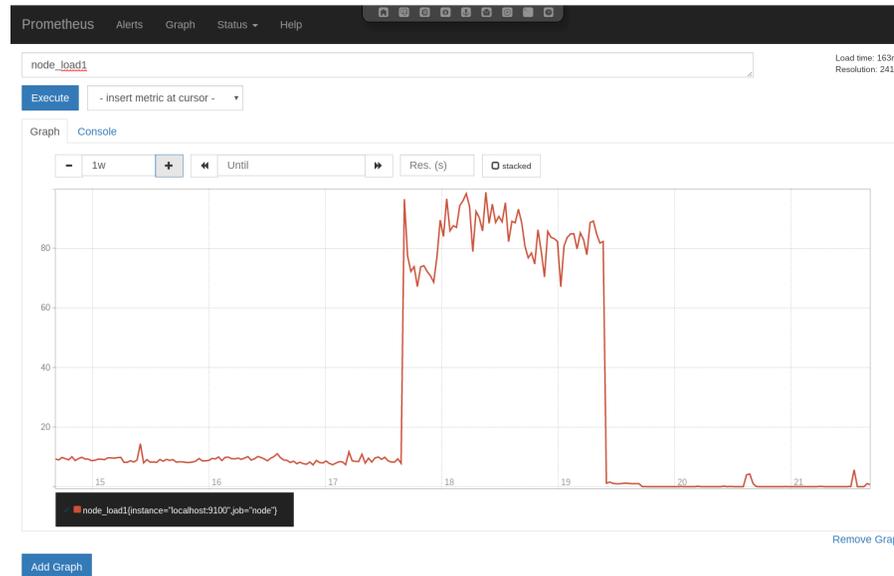
Visualization

Monitoring



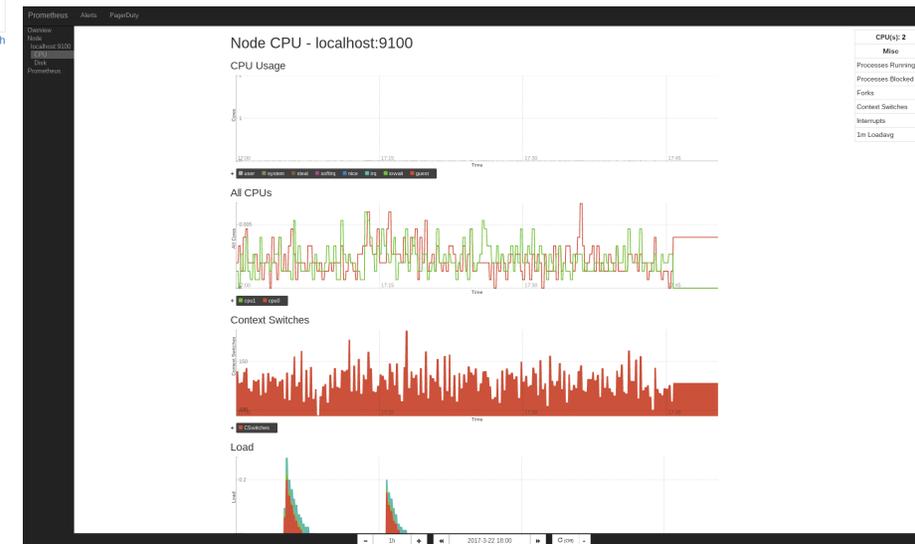
Prometheus

Monitoring



Collect and display metrics

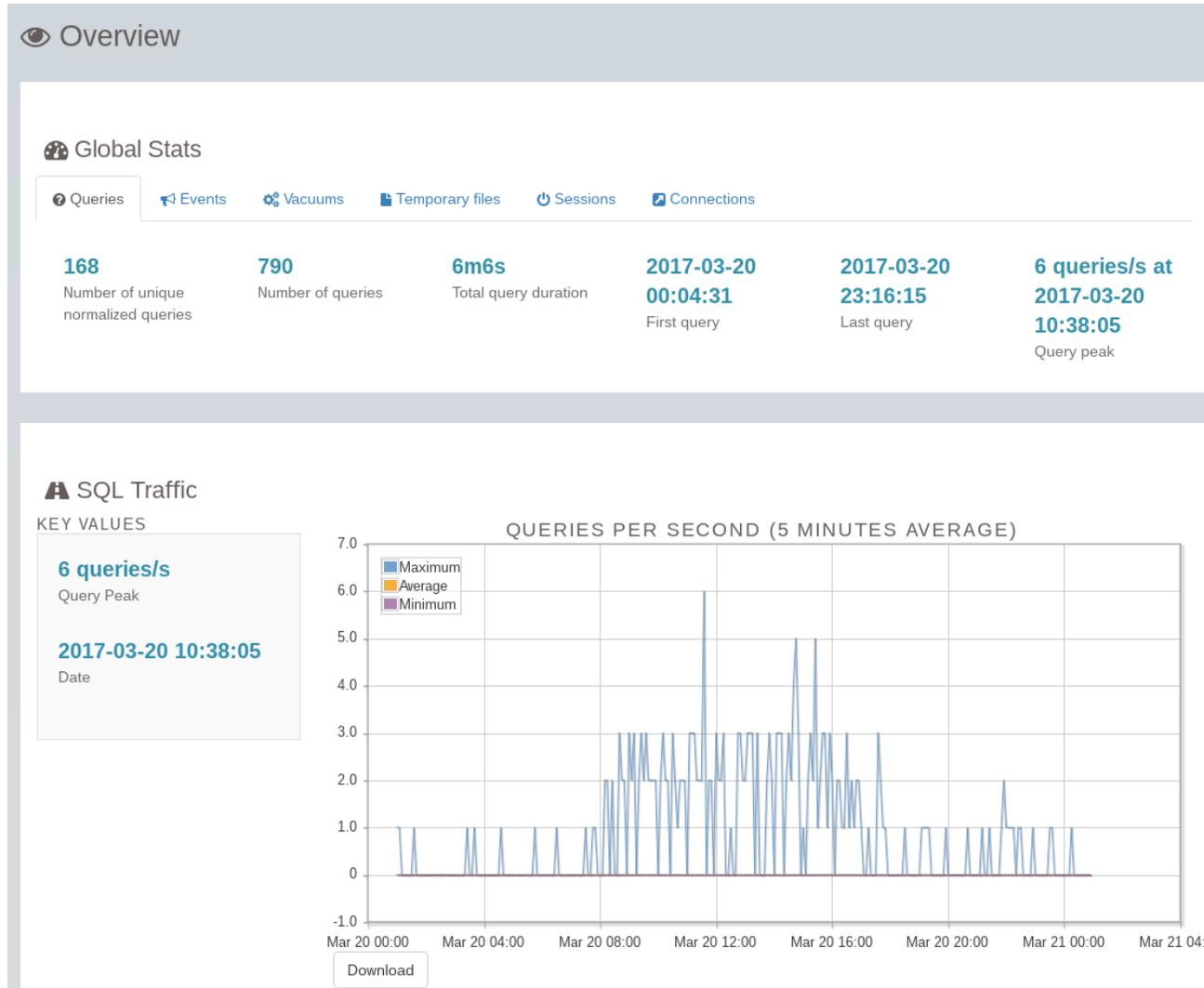
Time series



pgBadger

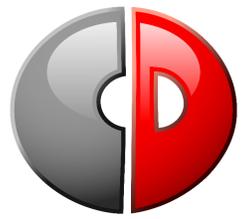
-

Reporting





# Silicon Valley PostgresConf 2018



Open Source  
Support Center

pgBackRest

-

Backup

&

Restore

Services » pgbackrest@9.6-main.service

Backup PostgreSQL cluster 9.6-main using pgBackRest

inactive (dead)

Start ▾

loaded (/lib/systemd/system/pgbackrest@.service; static)

Mask ▾

This unit is an instance of the [pgbackrest@.service](#) template.

## Service Logs

July 10, 2017

18:37	Started Backup PostgreSQL cluster 9.6-main using pgBackRest.	systemd
18:37	2017-07-10 16:37:30.207 P00 INFO: expire command end: completed successfully	pgbackrest@9.6-main
18:37	2017-07-10 16:37:30.207 P00 INFO: option 'retention-archive' is not set - archive logs will not b...	pgbackrest@9.6-main
18:37	2017-07-10 16:37:30.202 P00 INFO: expire command begin 1.20: --log-level-console=info --repo-path...	pgbackrest@9.6-main
18:37	2017-07-10 16:37:30.201 P00 INFO: backup command end: completed successfully	pgbackrest@9.6-main
18:37	2017-07-10 16:37:29.838 P00 INFO: new backup label = 20170710-163709F	pgbackrest@9.6-main
18:37	2017-07-10 16:37:29.138 P00 INFO: backup stop archive = 000000010000000000000000A, lsn = 0/A000130	pgbackrest@9.6-main
18:37	2017-07-10 16:37:26.007 P00 INFO: execute non-exclusive pg_stop_backup() and wait for all WAL seg...	pgbackrest@9.6-main
18:37	2017-07-10 16:37:26.007 P00 INFO: full backup size = 177.5MB	pgbackrest@9.6-main
18:37	2017-07-10 16:37:25.995 P01 INFO: backup file /var/lib/postgresql/9.6/main/base/1/12246 (0B, 100%)	pgbackrest@9.6-main



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Additional

Tools

- Shell In A Box – Web based terminal
- Ferm – Firewalling toolkit for creating iptables rules
- Tmate – Remote control
- Etckeeper – Configuration revisioning



# Silicon Valley PostgresConf 2018



Roadmap

-

Always

100%

Open

Source

- › Port to RPM
- › Central control of multiple instances
- › Optimized cloud versions
- › Hot Stand-By
- › Failover

# Silicon Valley PostgresConf 2018

PGApi

-

Next

Version

- Remote management of PostgreSQL instances
- Cluster-Management:
  - Create / Drop
  - Start / Stop / Restart / Reload / Promote
- Cluster configuration: Port / shared\_buffers / ...
- pg\_hba management
- Standby creation via pg\_basebackup
- Management of pgBackrest tasks
- Portal re-design for new functionality



# Silicon Valley PostgresConf 2018



Michael

Meskes

## Taking Care of the Elephant

<https://elephant-shed.io/>

