🏔️ POSTGRESQL EXTENSION ECOSYSTEM MINI-SUMMIT 1

STATE OF THE EXTENSION ECOSYSTEM

PAST, PRESENT, AND FUTURE

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PGXN, Tembo
2024-03-06

BEGIN

LEGACY

Long history of extensibility

Two approaches

shared_preload_libraries

Pure SQL (including PLs)

A few intrepid adopters

PostGIS, BioPostgres, PL/R, PL/Proxy, pgTAP

POSTGRES 9.1

Dimitri Fontaine adds extensions

Key features:

- Compile and install
- CREATE/UPDATE/DROP EXTENSION
- pg_dump and pg_restore

pair-1.0.0.sql

```
-- complain if script is sourced in psql and not CREATE EXTENSION
\echo Use "CREATE EXTENSION pair" to load this file. \quit

CREATE TYPE pair AS ( k text, v text );

CREATE FUNCTION pair(text, text)
RETURNS pair LANGUAGE SQL AS ‘SELECT ROW($1, $2)::pair;';

CREATE OPERATOR ~> (LEFTARG = text, RIGHTARG = text, FUNCTION = pair);
```

pair.control

```
# pair extension
comment = 'A key/value pair data type'
default_version = '1.0'
module_pathname = '$libdir/pair'
relocatable = true
```

Makefile

```
EXTENSION    = pair
MODULEDIR    = $(EXTENSION)
DOCS         = README.md
DATA         = sql/pair-1.0.0.sql
TESTS        = test/sql/base.sql
REGRESS      = base
REGRESS_OPTS = --inputdir=test
MODULES      = src/pair
PG_CONFIG   ?= pg_config

PGXS := $(shell $(PG_CONFIG) --pgxs)
include $(PGXS)
```

Build and Install

```
❯ make
make: Nothing to be done for `all'.

❯ make install
mkdir -p '/pgsql/share/extension'
mkdir -p '/pgsql/share/pair'
mkdir -p '/pgsql/share/doc/pair'
install -c -m 644 pair.control '/pgsql/share/extension/'
install -c -m 644 sql/pair--0.1.2.sql  '/pgsql/share/pair/'
install -c -m 644 README.md '/pgsql/share/doc/pair/'

❯ make installcheck
# +++ regress install-check in  +++
# using postmaster on Unix socket, default port
ok 1         - base                                       15 ms
1..1
# All 1 tests passed.
```

CREATE EXTENSION

```
❯ psql -d try -c 'CREATE EXTENSION pair'
CREATE EXTENSION

❯ pg_dump -d try
--
-- Name: pair; Type: EXTENSION; Schema: -; Owner: -
--
CREATE EXTENSION IF NOT EXISTS pair WITH SCHEMA public;

--
-- Name: EXTENSION pair; Type: COMMENT; Schema: -; Owner:
--
COMMENT ON EXTENSION pair IS 'A key/value pair data type';
```

OPPORTUNITY

“PostgreSQL today is not merely a database, it’s an application development platform.”

ME, 2010

PGXN

HISTORY

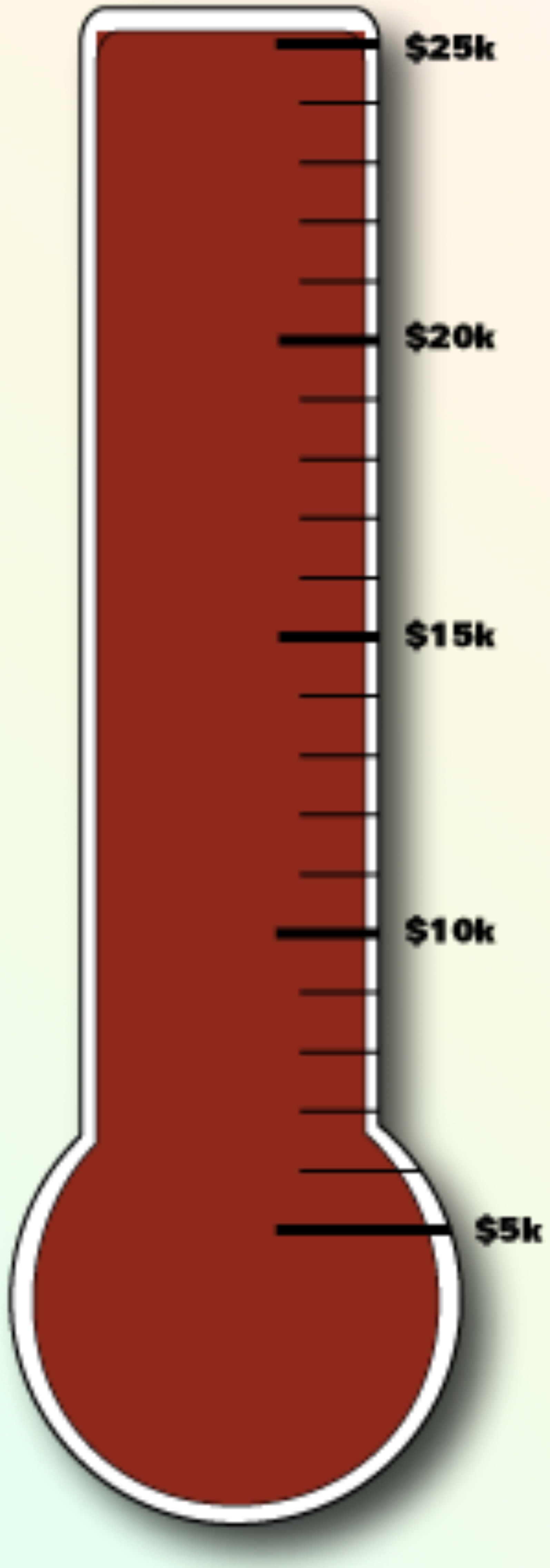
Started 2010

Funded December 2010

Site launched April 2011

Client by Daniele Varrazzo April 2011

Dev utils by Dickson S. Guedes June 2011



PGXN

PROBLEMS TO SOLVE

- Distribution
  - Source Code
  - Registration
  - Namespacing
- Discovery
  - Search
  - Documentation
  - Tags
- Installation
  - CLI
  - Compile & install
  - PGXS or Configure

PGXN

COMPONENTS

Meta Spec: Describes an extension distribution

Manager: Register, Release, Permissions

Root Mirror: `rsync`able JSON & zip downloads

API Server: Full text search, docs, more metadata

Site: Public search, docs, downloads

Client: Search, download, compile, install

Utils CLI: Metadata, Bundle, Release

pgxn-tools: CI/CD Docker image

PGXN

OUT OF SCOPE

- Binary packaging
- Binary distribution
  - Defer to apt/yum
- Developer tooling
- Build tooling
  - Defer to core (PGXS)

PGXN

SHORTCOMINGS

- Little development since 2012
- Search limitations
  - Docs preferred
  - Most distributions have few
- Source of Record
  - Minority of available extensions
  - Releases uneven or neglected

> ***“In classic SDLC fashion, PGXN POC shipped as an MVP and was neglected.”***

ME, JUST NOW

INTERIM

CLOUDY DAYS

Non-Core Extension Counts:

Azure: 25

GCP 29

AWS: 48

PGXN: 382

joelonsql/PostgreSQL-EXTENSIONs.md: 1,186

WHY?

LOST OPPORTUNITIES

POSTGRES EXTENSIONS:

Difficult to find and discover

Under-documented and difficult to understand

Hard to configure and install

Maturity difficult to gauge

No comprehensive binary packaging

Centralized source distribution insufficient

Insufficient developer tooling

FILLING THE GAPS

dbdev
Search Packages
Docs
Login

The Database Package Manager

For Postgres Trusted Language Extensions

Getting started
Documentation

Download and install

Install extensions via a SQL command

```
select dbdev.install(olirice-index_advisor);
```

PUBLISHER HANDLE
EXTENSION NAME

Trunk
Download
Contribute
Docs
Blog
Join Trunk on Slack

A Postgres

Extension Registry

Get Trunk

Cargo `cargo install pg-trunk`

Copy

Trunk is an open-source package installer and registry for PostgreSQL extensions.

Featured	7
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All Extensions

Search 205 extensions
Search

pgxman
Docs
Explain your product to our AI
⌘ /
Submit extension

> extensions, made easy

npm for PostgreSQL

Brew
Curl

```
brew install pgxman/tap/pgxman
```

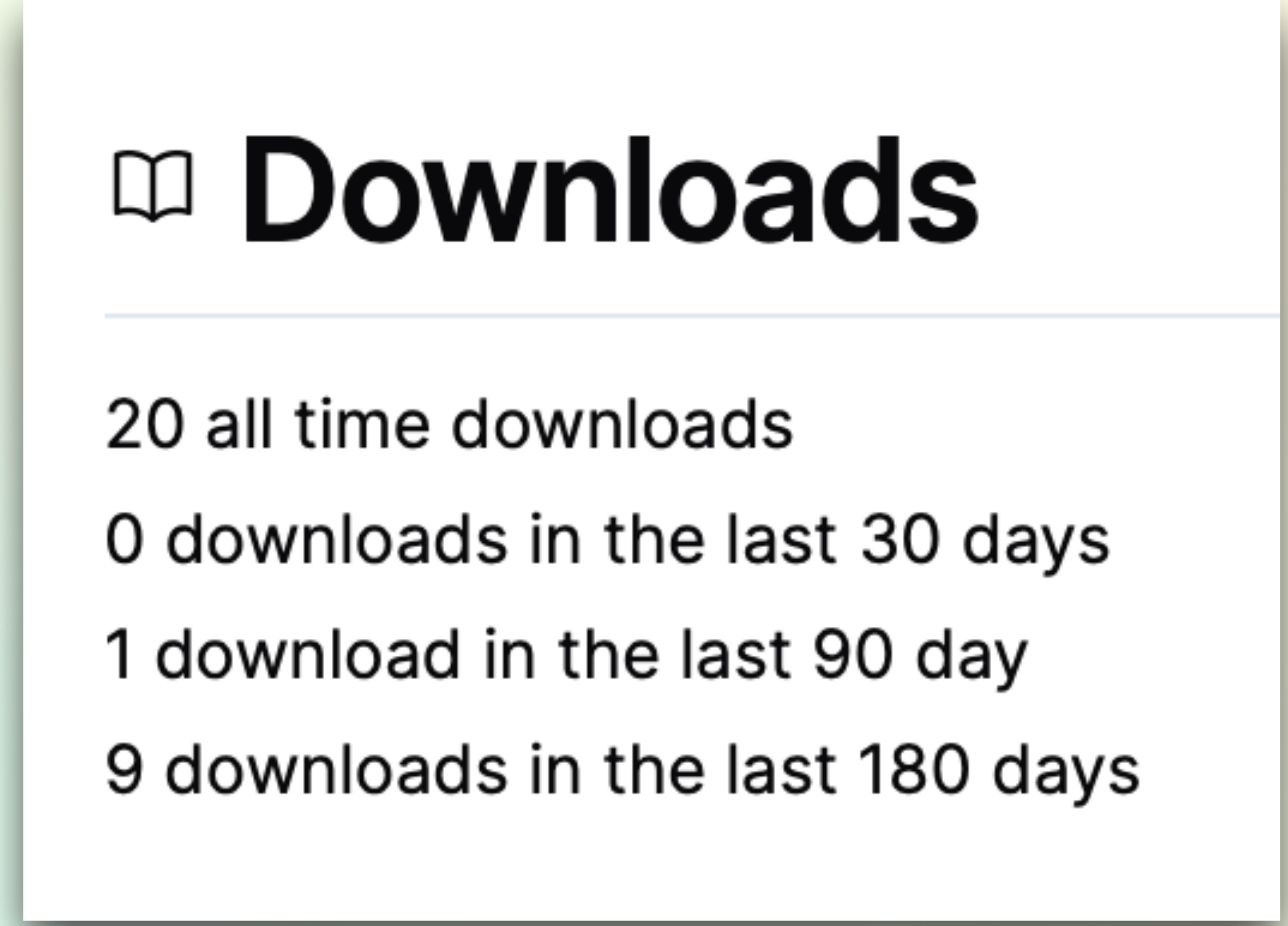
EMPHASES

Ease of use

Platform neutrality

Stats

Curation



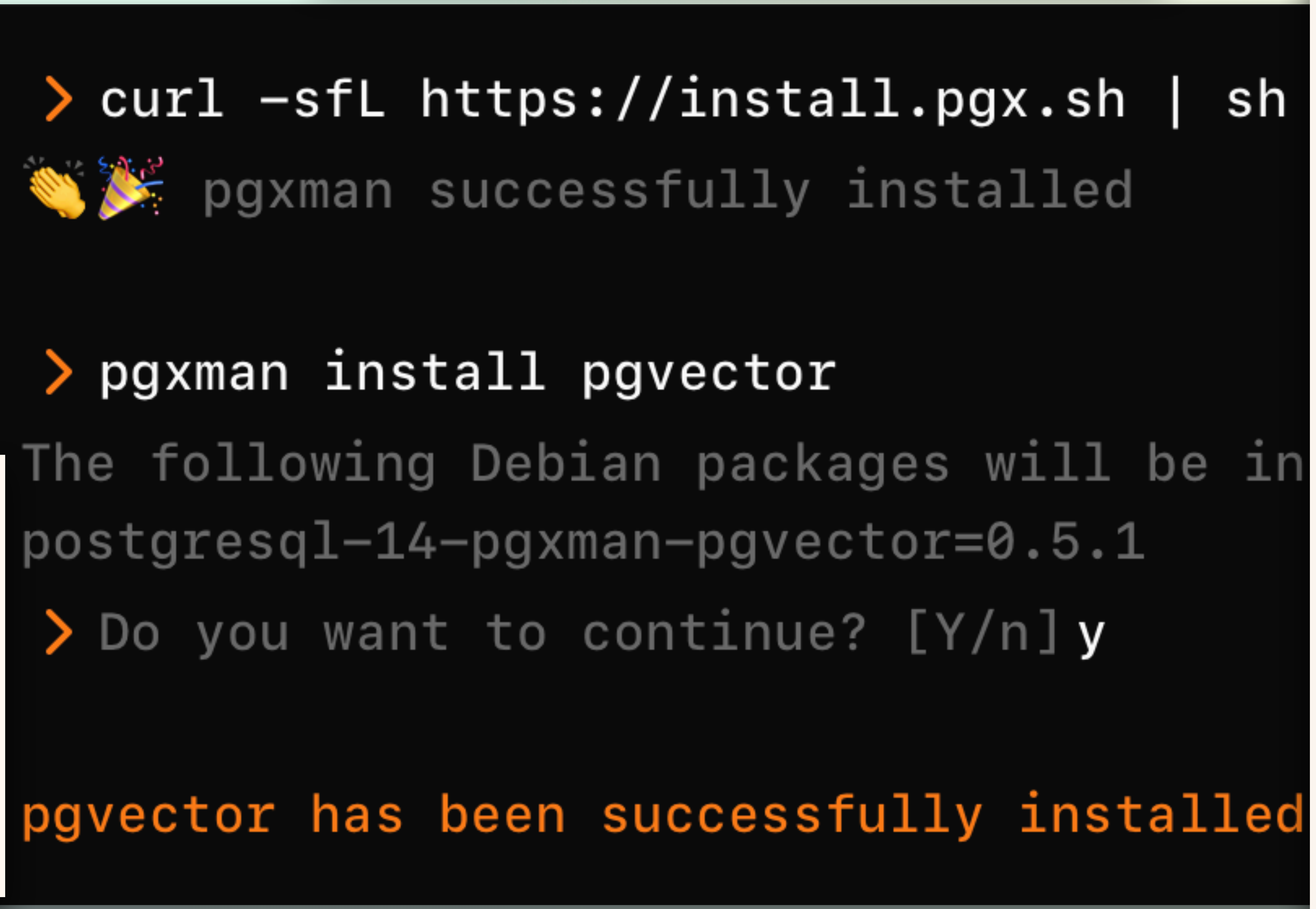
🕮 Downloads

20 all time downloads

0 downloads in the last 30 days

1 download in the last 90 day

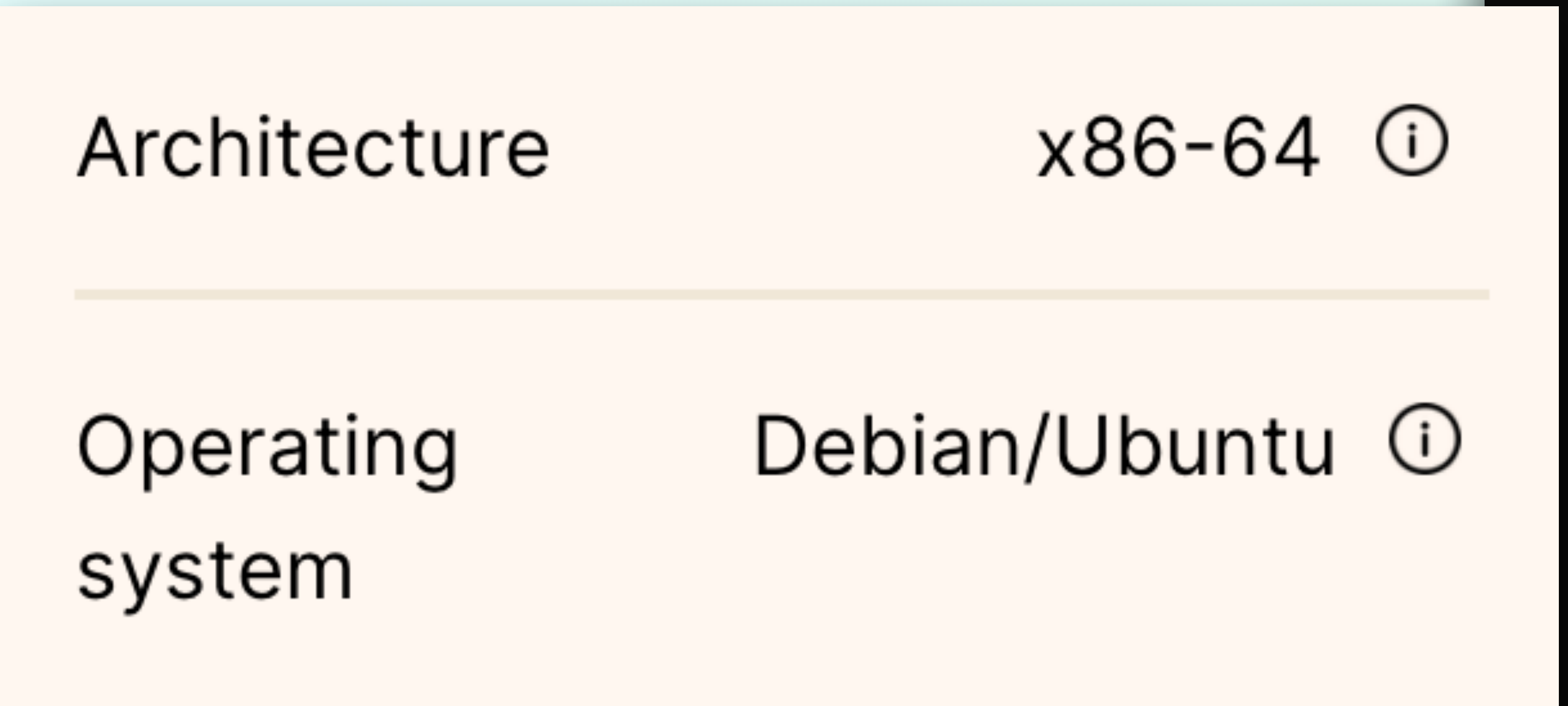
9 downloads in the last 180 days



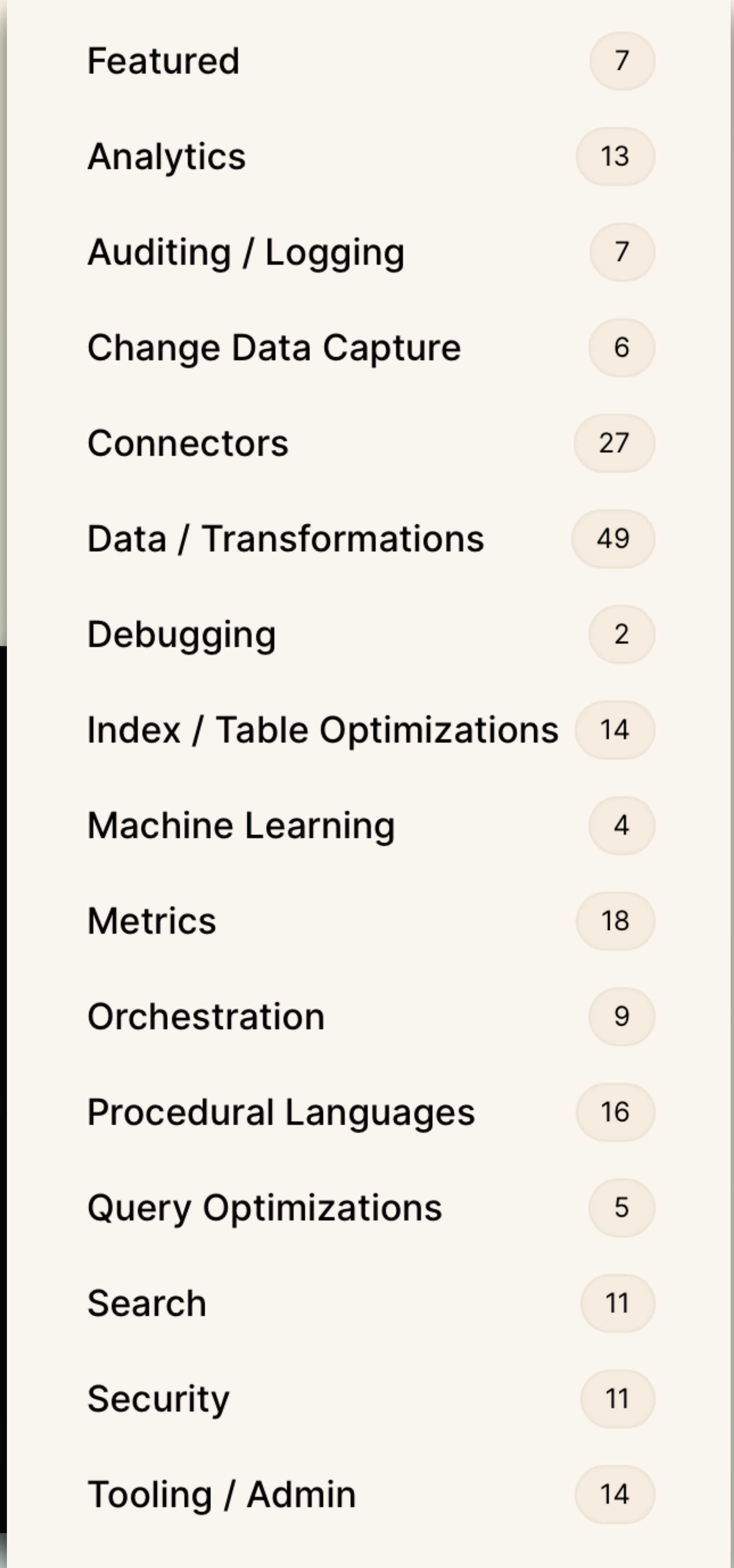
```
> curl -sfL https://install.pgx.sh | sh
👏🎉 pgxman successfully installed

> pgxman install pgvector
The following Debian packages will be in
postgresql-14-pgxman-pgvector=0.5.1
> Do you want to continue? [Y/n] y

pgvector has been successfully installed
```



Architecture	x86-64 ⓘ
Operating system	Debian/Ubuntu ⓘ



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MVPS

Trunk

- Manual integration
- Currently Debian-only

PGXMan

- Form-based submission
- Currently Apt-only

Supabase

- TLEs
- CLI publishing

OPPORTUNITIES (NEW)

COMMUNITY OPPORTUNITIES

What are the community opportunities for the extension ecosystem?

- Improved dev tools
- Canonical registry
- Easy publishing
- Continuous Delivery
- File-free installation
- Documentation
- File management

- Improved metadata
  - Library Dependencies
  - Platform Dependencies
  - Build pipelines
  - Artifacts
  - Classification
  - Extension Types

- Derived Services
  - Binary Packaging
  - Ratings & Reviews
  - Aggregated Stats
  - Smoke Testing
  - Security Scanning
  - Badging & Curation

EXTENSION ECOSYSTEM SUMMIT

Collaborate to examine the ongoing work on PostgreSQL extension distribution, examine its challenges, identify questions, propose solutions, and agree on directions for execution.

🏔️ YOUR SUMMIT ORGANIZERS

David Wheeler
Tembo, PGXN

Jeremy Schneider
AWS, dsef

David Christensen
Crunchy Data,
pg_kaboom

Keith Fiske
Crunchy Data,
pg_partman

Devrim Gündüz
EnterpriseDB,
yum.postgresql.org

SCHEDULE

March 6: David Wheeler: “State of the Extension Ecosystem”

March 20: Ian Stanton: “Building Trunk: A Postgres Extension Registry and CLI”

April 3: Devrim Gündüz: “yum.postgresql.org and the challenges RPMifying extensions”

April 17: Jonathan Katz: “TLE Vision and Specifics”

May 1: Yurii Rashkovskii: “Universally buildable extensions: dev to prod”

May 15: David Wheeler: “Metadata for All: Enabling discovery, packaging, and community” ❓

WHAT’S IMPORTANT TO YOU?

COMMUNITY OPPORTUNITIES

What are the community opportunities for the extension ecosystem?

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NEXT TIME...

BUILDING TRUNK: A POSTGRES EXTENSION REGISTRY AND CLI

IAN STANTON

MARCH 20 NOON EST/17:00 UTC