Celebrating its 15th Anniversary: Pgpool-II Past, Present and Future

PgPool Global Development Group
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The history of Pgpool-II

SRA OSS, INC.

June 27th, 2003 pgpool was born

- Connection pooling
- Failover
- Only up to 2 PostgreSQL servers were supported
- Support Version 2 of frontend/backend protocol
- Version 3 protocol (the modern protocol currently used) did not exist because PostgreSQL 7.4 was not released yet
- Only 4,719 lines of code in C language

2003年6月27日(金) 22:54:46 JST
[pgsql-jp: 30256] PostgreSQL用コネクションプールサーバ pgpool

石井です.

PHPをはじめ,Perlなど,言語を問わず使える「pgpool」というPostgreSQL用のコネクションプールサーバを作ったので公開します.できたなのでまだアルファ版程度のクォリティですが,よろしかったらお試し下さい.

ftp://ftp.sra.co.jp/pub/cmd/postgres/pgpool/pgpool-0.1.tar.gz

もちろんpgpoolはオープンソースで,ライセンスはPostgreSQLのBSDライセンスと同様のものにしています.

pgpoolを作った動機は,PHPでコネクションプールが使えないことに不満を持ったからです.
一応PHPには「パーシスタントコネクション」というものがあってDBへの接続への接続をキャッシュできますが,少なくともapacheのプロセスの数だけコネクションができるので,DBへ過大な負荷がかかりがちです.
pgpoolを使うとコネクションをキャッシュできるだけでなく,DBへの接続数を適切な数に制限できるので,DBの性能を引き出すことができます.

September 2006 Pgpool-II 1.0 released

- From personal project to public OSS project
- Number of features were added
  - Virtually unlimited number of PostgreSQL supported
  - Built-in SQL parser to precisely analyze query
  - Dedicated management command (pcp)
  - Dedicated GUI management tool (pgpoolAdmin)
  - Parallel query mode
  - 73,511 lines of codes, which is almost x10 larger than pgpool

In September 2010 Pgpool-II 3.0 released

- Adopt PostgreSQL 9.0
  - Streaming replication mode
  - delay_threshold
  - log_standby_delay
  - white_function_list/black_function_list

In 2011 pgpool.net was born

- Moved from other site to our own site
- Moved from CVS to Git
- Official languages are English and Japanese

Pgpool-II from v3.2 to v3.7

- Pgpool-II 3.2 (2012)
  - Watchdog
  - In memory query cache
- Pgpool-II 3.3 (2013)
  - Heartbeat mode in watchdog
- Pgpool-II 3.4 (2014)
  - Reorganize source tree
  - Memory manager, Exception manager
- Pgpool-II 3.5 (2015)
  - Faster extended query mode
  - Enhanced watchdog
- Pgpool-II 3.6 (2016)
  - SGML documents
  - Enhanced watchdog
- Pgpool-II 3.7 (2017)
  - Quorum failover
  - AWS Aurora

Our team

Team members

- Tatsuo Ishii
  - Original author
  - Japan
- Muhammad Usama
  - Pgpool-II committer since 3.4
  - Pakistan
  - Watchdog Authentication
- Peng, Bo
  - Pgpool-II committer since 3.3
  - China
  - Release management, SQL parser, PgpoolAdmin
- Ahsan Hadi
  - Benchmarking, research on user requirements
  - Pakistan
- Takuma Hoshiai
  - Pgpool-II committer since 4.0
  - Japan
  - Documents, bug fixes

Development activities

- Coding and debugging using Git repository served by PostgreSQL
- Discussions on mailing list
- Bug reports are accepted using Mantis
- Static code checking using Coverity
- Weekly teleconference
- Major releases once per year
- Minor releases every 2-3 months
- Concurrently maintain 4-5 stable branches and development branches – five years support for each major release

Pgpool-II: now

- Clustering management tool for PostgreSQL
- Focus on streaming replication
  - Automatic query dispatch to primary and standby servers
  - Automatic read only query load balancing
  - Automatic failover
- High availability for Pgpool-II itself
  - Watchdog

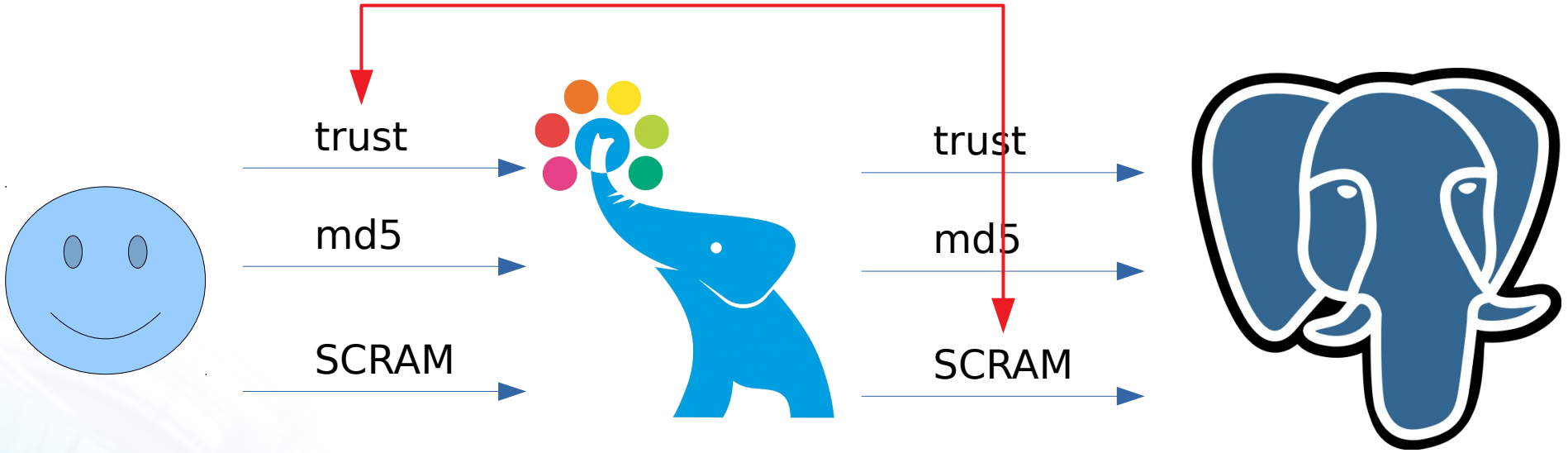
About 15th aniversary edition: Pgpool-II 4.0

Pgpool-II 4.0 major features

- Completely renewed authentication system
- Consistency checking for primary/standby role
- More flexible control over read query load balancing
- PostgreSQL 11 compatible SQL parser

Completely renewed authentication system

It is possible to use “trust” between clients and Pgpool-II, while using “SCRAM” between Pgpool-II and PostgreSQL



SCRAM auth support is new in 4.0!

Allow to handle multiple password format in pool_passwd

- pool_passwd stores user name/password info for database users
- Possible password formats
  - AES256
    - username:AESAxjUF2clVQvZn0QvnVzBgg==
  - Clear text
    - username:TEXTmypass
  - MD5
    - username:md56e854442cd2a940c9e95941dce4ad598
    - MD5 password format can only be used for MD5 auth between Pgpool-II and PostgreSQL

Eliminating pool_passwd

- Since pool_passwd needs to sync with PostgreSQL password, it could be a headache for admins
- If auth method between frontend and Pgpool-II is trust (no auth), pool_passwd can be eliminated
  - Password provided by user is checked by PostgreSQL
  - new parameter “allow_clear_text_frontend_auth” must be enabled
- In this case it is recommended to use SSL for the connection between frontend and Pgpool-II

Allow to use secure AES256 encrypted password

- Allow to store AES256 encrypted password in health_check password and sr_check_password
  - health_check_password = 'AESAxjUF2clVQvZn0QvnVzBgg=='
  - Decryption key must be stored in $HOME/.pgpoolkey
    - or in a file specified by PGPOOLKEYFILE environment variable
    - or “--key-file” option of pgpool command
  - To create AES encrypted password, new tool “pg_enc” can be used

Allow to use certificate authentication

- As of 4.0, only between frontend and Pgpool-II is allowed to use cert auth
- We plan to enable cert auth between Pgpool-II and PostgreSQL in the next major release

Future plans

- Near future (Pgpool-II 4.1)
  - Support LDAP authentication
  - Shared relation cache for faster system catalog look up
  - and more…
- Distant future
  - More testing!
    - More regression tests
    - Faster regression tests
  - Faster processing
    - Reduction of protocol overhead
  - Adopting to sharding (if PostgreSQL implemts it)
- Ideas are always welcome!

More Pgpool-II 4.0 New Features will come in the next session...

Please welcome Peng Bo!