



# Elephant on Solaris

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# Agenda

- About PostgreSQL
- Integration with OpenSolaris
  - > Packages
  - > SMF
  - > RBAC
- Tuning
- DTrace
- Sun cluster

# PostgreSQL

- One of the most advanced opensource SQL databases
- Fully ACID compliant (Atomicity, Consistency, Isolation, Durability)
- Full supports for foreign keys, joins, views, triggers, and stored procedures (in multiple languages)
- Support most of SQL92, SQL99
- [www.postgresql.org](http://www.postgresql.org)

# PostgreSQL history

- Postgres started in 1986
  - > Fork of Ingres
  - > Project led by Michael Stonebraker
  - > Ended in 1993
- Postgres95
  - > Released in 1994 by Andrew Yu and Jolly Chen
  - > New SQL parser
- PostgreSQL
  - > All sources released on the internet in 1996

# PostgreSQL on Solaris

- Announced in December 2005
- Released as part of Solaris 10 6/06
- DTrace support from PostgreSQL 8.2
- Niagara T2000 donated to the PostgreSQL community

# PostgreSQL 8.1 packages

- First in Solaris 10 6/06
- Advantages
  - > Files are located in standard path /usr/bin/, /usr/lib/
  - > Datadir is located in /var/lib/pgsql/
- Disadvantages
  - > Installation of more PostgreSQL version on one system is not easy
  - > Patch has ~100MB size (contains complete doc and src)

# PostgreSQL 8.2 packages

- Planned for Solaris 10 6/07
- In Nevada from build 56
- Advantages
  - > Files are located in /usr/postgres/8.2/ directory and data directory is /var/postgres/8.2
  - > It is integrated with SMF and RBAC
  - > Design of packages allows delivery of changed files only
- Disadvantage
  - > Files are located in non standard path. The library search path must be set.

# PostgreSQL compiled with

- Openssl
- Kerberos v5 (not in 8.1 on S10)
- DTrace (new in 8.2)
- NLS – National Language Support
- pg\_perl, pg\_python, pg\_PL, pg\_TCL
- Thread safety



# Service Management Facilities - SMF

- Two instances for PostgreSQL
  - > svc:/application/database/postgresql:version\_81
  - > svc:/application/database/postgresql:version\_82
- Three properties
  - > postgresql/bin
  - > postgresql/data
  - > postgresql/log

# RBAC – Role Based Access Control

- Similar to sudo, has finer granularity
- New profile - Postgres Administration
  - > Allows user to run commands like initdb, pg\_ctl with postgres uid
- New role - postgres
  - > Role is assumed by “su – postgres” command
  - > Necessary for data dir access (e.g. postgresql.conf)

# Initial setup

- Setup password for postgres role (it can be blank)
- Add postgres role and “Postgres Administration” profile to database administrator user(s)
- Create database cluster
  - > pfexec /usr/postgres/8.2/bin/initdb /var/postgres/8.2/data
- Setup postgresql.conf
  - > su – postgres
  - > vi /var/postgres/8.2/data/postgresql.conf
  - > exit
- Start PostgreSQL
  - > svcadm enable postgresql:version\_82

# Tuning

- There are no general rules
- Three tuning places
  - > Database application design
  - > PostgreSQL configuration
  - > Solaris configuration + hardware setup

# Tuning – disk subsystem

- UFS

- > Set `wal_sync_method = opendata_sync` in the `postgresql.conf` (open(2) option `O_DSYNC`)
- > Use `forcedirectio mount(1M)` option on filesystem with WAL files
- > Good for OLTP applications

- ZFS

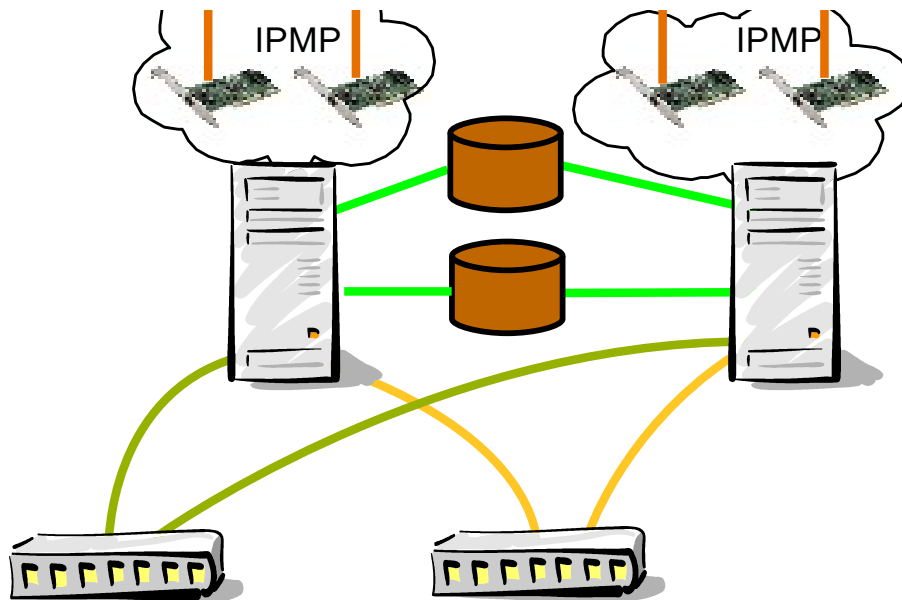
- > Set `wal_sync_method = fsync` in the `postgresql.conf` (all `fdatasync()` at each commit)
- > `full_page_writes = off`
- > Good for Data Warehouse applications

# DTrace

- Dynamic tracing framework
- Eleven USDT probes in PostgreSQL 8.2
  - > One group of probes is focused on locks activity
  - > Second is focused on transaction duration
- Example DTrace scripts are on [www.pgfoundry.org](http://www.pgfoundry.org)
- Useful for application bottleneck analysis

# Sun Cluster (only for S10)

- PostgreSQL dataservice available since version 3.2
- Only as a failover service





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