



Postgres Plus Technical Overview

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June, 2008



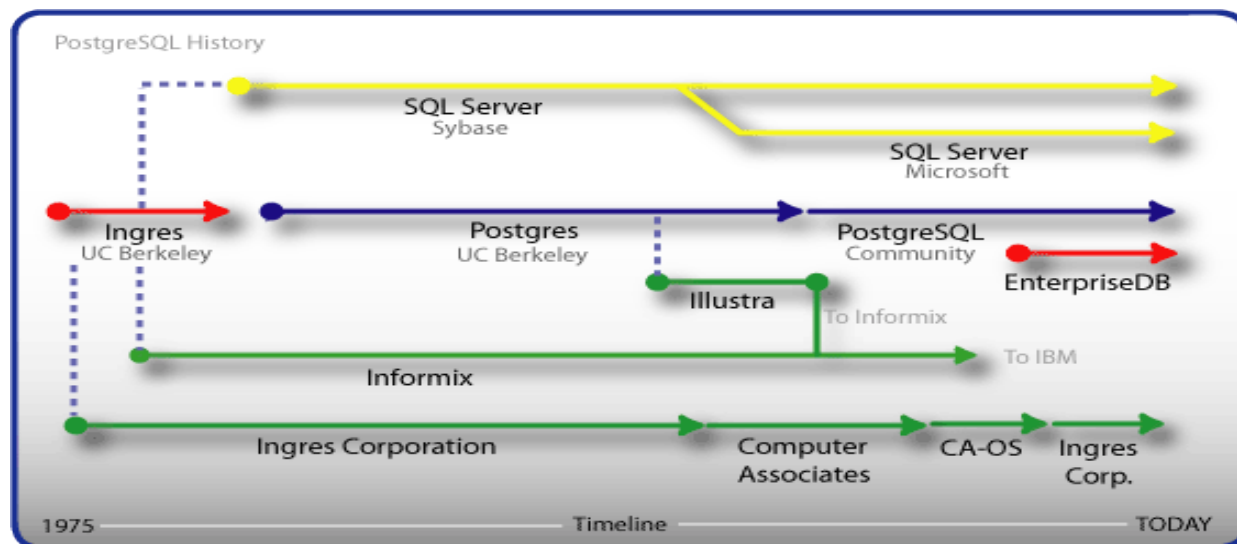
PostgreSQL Heritage

- Independent & Thriving Development Community**

10 committers and ~200 reviewers

1,500 contributors and 10,000+ members

2,000,000+ downloads



- 20 years of enterprise-class development**

Point in Time Recovery

Non-blocking Read/Writes

Row-level locking

Save-points

Referential Integrity

Object Relational Extensibility

Security Integration

Partitioning

Server-Side Languages

Linux and Windows

UNICODE

Triggers & Rules

Advanced Optimizer

EnterpriseDB™



PostgreSQL Heritage

- Deployed by some of the **world's largest** commercial and government **organisations...**



“...With PostgreSQL we have been successful in growing the databases as the company has grown, both in **number of users** and in the **complexity of services** we offer...”

Hannu Krosing – Database Architect Skye Technologies.



The largest professional organization of Chemists in the world, with over 165,000 members, and a **website** that receives more than **12 million visits every day**. Their Journal Archive stores 125 years of full publications (2.5 million pages, **more than 1 terabyte** of data) using PostgreSQL.



Cisco uses PostgreSQL as the **embedded database** in all its “Case Sensitive Routing” (CSR) products to store carrier details, rules, contacts, routes – to **perform call routing**.



“...Fujitsu is proud of its sponsorship of contributions to PostgreSQL and of its work with The PostgreSQL community. We are committed to helping make PostgreSQL the leading Database Management System...”

Takayuki Nakazawa – Director Database in Software Group.

Product Model

Blades
(Mixed Source)

Blades - Enabling partnerships through integration

Postgres Plus
Advanced Server
(Commercial)

Postgres Plus Advanced Server - the obvious choice for Oracle-based IT organizations developing an open source database strategy

Postgres Plus
(FOSS)

Postgres Plus - The world's leading commercial Postgres distribution

Postgres
(BSD)

Postgres - the world's best OSDB for serious applications

EnterpriseDB™

The Postgres Plus Family

Postgres Plus **Advanced Server**

- + PL/SQL Support
- + Built-in Packages
- + EDB*Plus
- + Distributed Federated Queries (DBLink)
- + Query Optimization Hints
- + Explicit Transaction Control
- + Bulk Collect & Bulk Binding
- + Multi-threaded Oracle Replication
- + Commercial Database Migration
- + Dynatune & Workload Profiling
- + Audit Logging
- + Certified Binaries
- + DBA Monitoring Console
- + Indemnification/Warranties

Postgres **Plus**

- + Pre-Integrated Binaries
- + GridSQL - Parallel Query
- + Postgres Replication
- + Geo-Spatial Support
- + Integrated Administration Console
- + Procedural Language Debugger
- + Automatic Update Notification
- + Open Source Database Migration
- + Integrated Connection Management
- + In-Memory Caching Layer
- + Advanced Encryption
- + Client Connectors
- + Installation Tuning

Postgres**SQL**

- ↳ Fully ACID Compliant
- ↳ Multi-Version Concurrency Control (MVCC)
- ↳ Point-in-Time Recovery (PITR)
- ↳ Data and Index Partitioning
- ↳ Bitmap Indexes
- ↳ ANSI Constraints
- ↳ Triggers & Stored Functions
- ↳ Views & Data Types
- ↳ Nested Transactions
- ↳ Online Backup
- ↳ Online Reorganization
- ↳ Foreign Keys

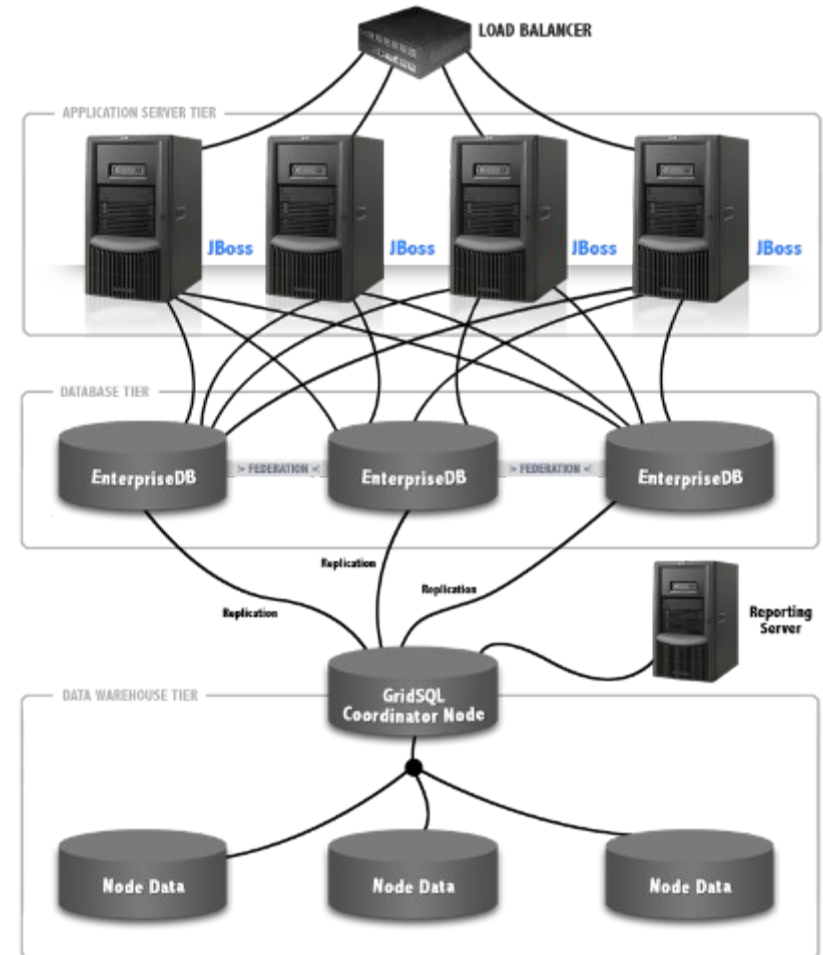
Postgres Plus Advanced Server offers additional features including Oracle compatibility

Postgres Plus is fully open source and contains the PostgreSQL project along with additional components

PostgreSQL is the project upon which Postgres Plus is based

Performance & Scalability

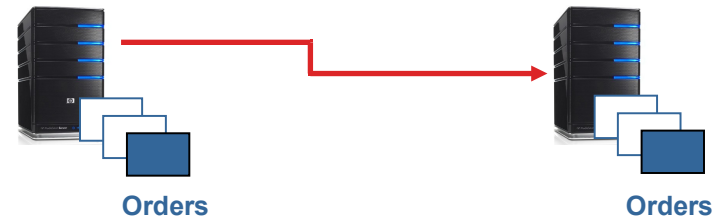
- Installation Tuning
- GridSQL Parallel Query
- Dynatune™ Workload Profiling
- DBA Monitoring
- Integrated Connection Management
- Distributed Memory Caching
- Bulk Collect / Bulk Binding
- EDB*Loader



Postgres Plus 8.x

- **Replication and High Availability**

- 1. **Data Replication**
(near-time trigger) + Slony1



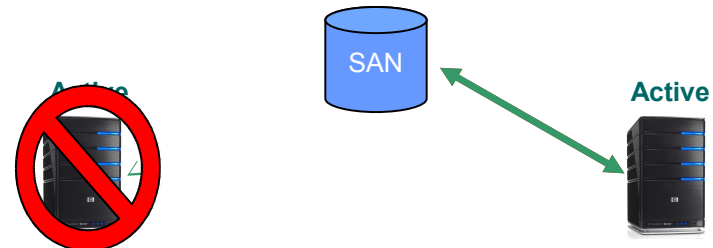
- **Storage Replication**
(file system)



- **Data Log Replication**
(transfer + load for stand-by)



- 8. **Clustered Shared Hardware**
(Active > Passive – Async)



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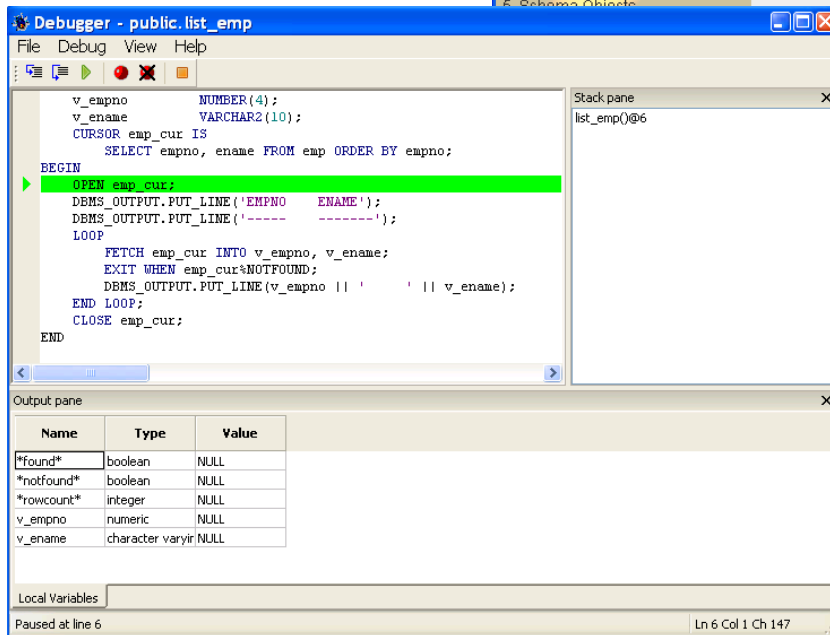
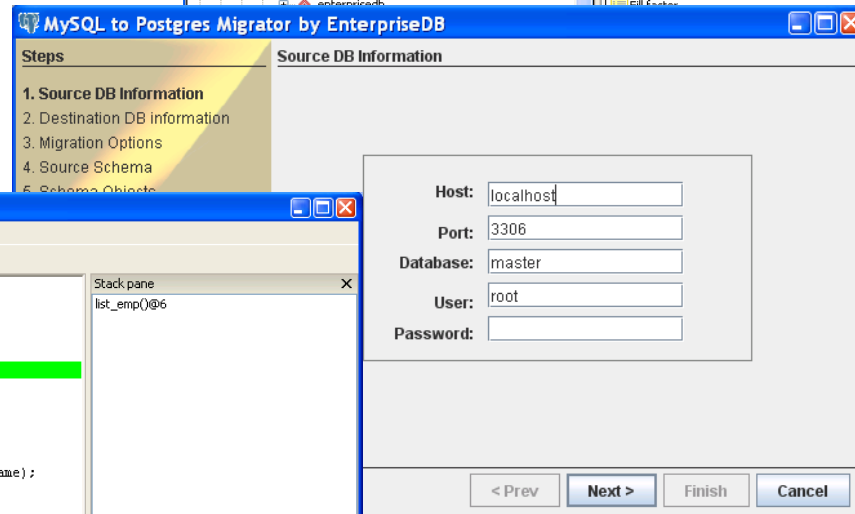
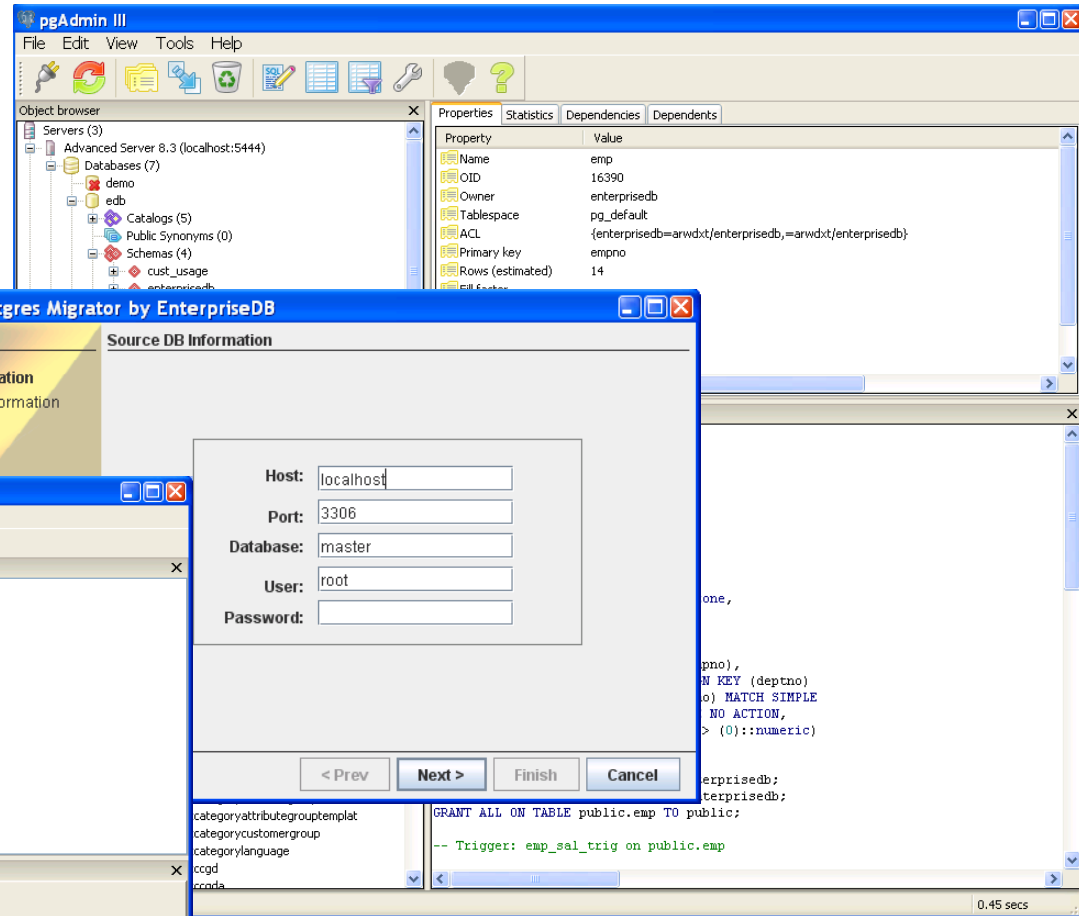
Spatial

- PostGIS
 - Built with the GEOS libraries



Integrated User Tools

- pgAdminIII
- MySQL Migrator
- Procedural Debugger



Accelerators for Developers & DBAs

Postgres Studio

- Visual database designer
- Includes integrated debugger
- ➔ **Fast, intuitive tools for defining, debugging and deploying Postgres Plus databases**

Framework Plug-ins

- Free downloadable tools
- Java/SEAM, Ruby on Rails ...
- ➔ **Automatically build popular framework models from existing Postgres databases**

Application QuickStarts

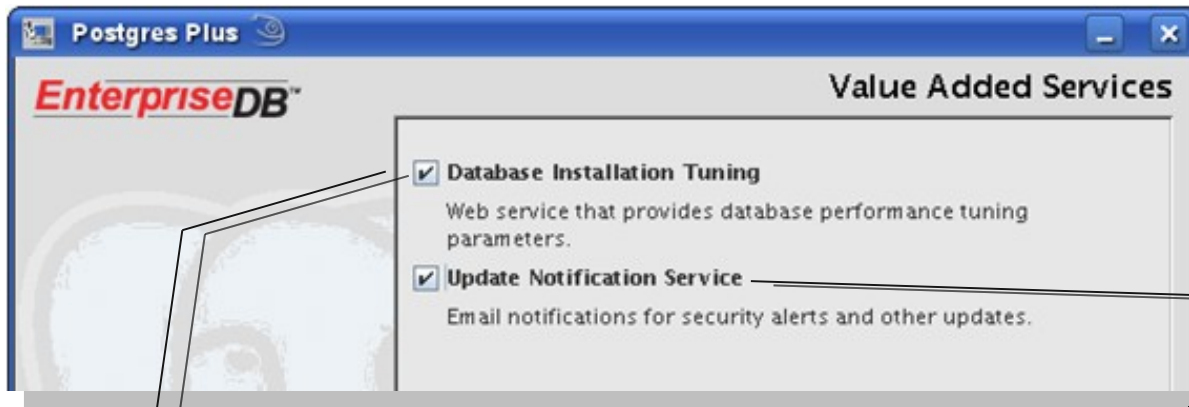
- Web 2.0 Application Tutorials
- Drupal, MediaWiki, phpBB ...
- ➔ **Help developers quickly integrate Postgres Plus with popular Web 2.0 applications**

Enterprise Build

- Security Modules
 - SSL, Kerberos
- Procedural Languages
 - PL/pgSQL, PL/Perl, PL/TCL, PL/Python
- Contrib Modules
 - pgcrypto, xml2, tablefunc, pg_buffercache
 - fuzzystrmatch, dblink, pg_standby, etc

New Value Added Services

Postgres Plus Installers



Helps users tune their database configurations based on their platforms and infrastructures

Notifies users when new database updates are available for installation

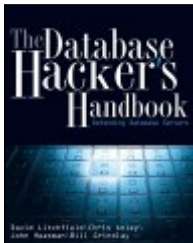
Value Added Services are free for *all* Postgres Plus users – open source and commercial

Postgres Plus ...Security

- **Core Components...Security**
 - **Object Level Privileges** assigned to “Roles & User”.
 - **Kerberos** + **SSL** communication.
 - **Data Level Encryption** (AES, 3DES, etc)
 - **Ability to utilise 3rd party Key Stores** in a full PKI infrastructure
 - **Foundation for full compliance with the strictest of security standards (PCI Data Security Standard).**

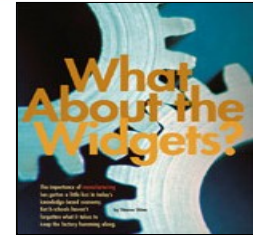
“By default PostgreSQL is probably the most security-aware database available”

David Litchfield - The Database Hackers Handbook



Business Intelligence & Data Warehousing

- **GRIDSQL Features...**



- **Parallel Load**

- ...Dataset distributed across participating nodes.

- ...Parallel loader utilises Metadata repository to perform fast load.

- **Parallel Query**

- ...Utilises “cost-based” parallel query optimiser

- ...Queries intelligently distributed to all databases in the GRID.

- ...Results gathered and collated and result set returned.

- **Table Level data distribution**

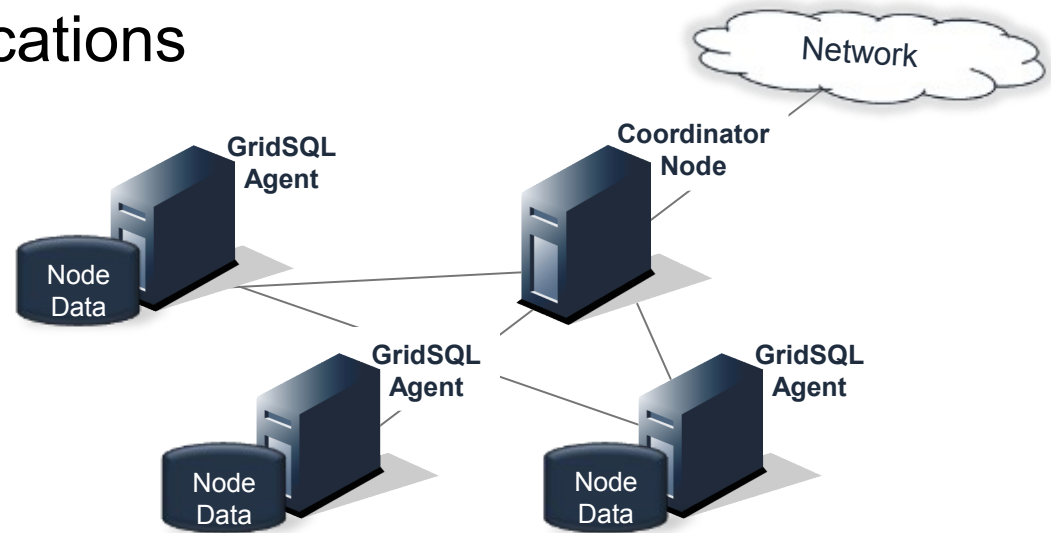
- ...Replication & configuration of FACT tables for customising data distribution

- **Centralised Grid Management**

- ...Single GUI to monitor GRID performance and dynamics

GridSQL Open Source Project

- Fast, scalable architecture for data warehousing applications
- Single database image
- Data partitioning
- Parallel queries
- Shared-nothing distributed architecture
- Transparent to applications
- Open source friendly licensing



Download

<http://sourceforge.net/projects/gridsql/>

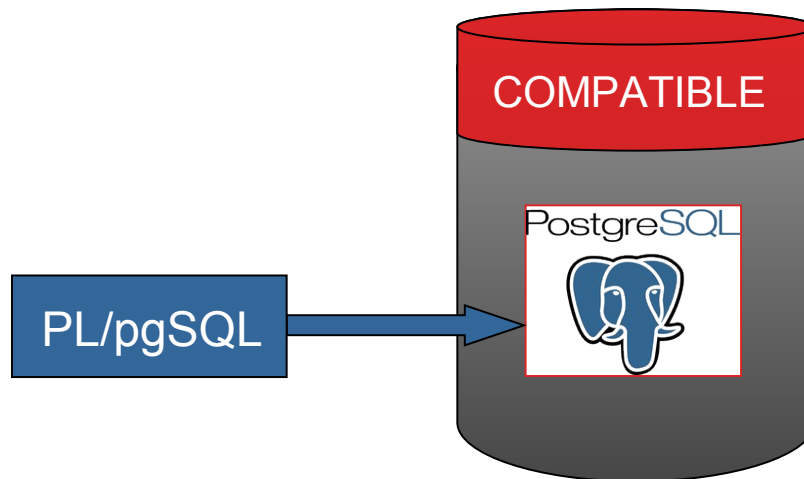
Community & Support

<http://www.enterprisedb.com/community/projects/gridsql/>

Postgres Plus Advanced Server 8.x

- **ORACLE™ SQL compatibility**

- Ability to recognise and execute database queries expressed in Oracle's SQL language.
- Support for same data types, functions and variables as **Oracle™**.
 - Data type* - all Std SQL + Oracle's extended mapped to native & PostgreSQL types.
 - Functions* - all SQL callable functions & variables popular with DBA's & Developers.
- Resolves incompatibilities between Oracle's and PostgreSQL's treatment of...
 - Column aliasing* - removed need for the "AS" keyword in select-list.
 - Public synonyms* - supports public syns as alternative names for tables, views & sequences.
 - Sequences* - enhanced to support both **Oracle™** and PostgreSQL Currval & Nextval constructs.



Added Benefit...sequence

Use in Table Definition
no before update trigger needed

```
Create table emp (  
  empno number (10) no null  
  default empno_seq.NEXTVAL,  
  ename varchar2 (32) not null  
  primary key (empno));
```

EnterpriseDB™

Postgres Plus Advanced Server 8.x

- **ORACLE™ P/LSQL compatibility...cont**
 - **Custom Packages** - supports Oracle-style custom packages.
 - SPEC - public interface contains public procedures, functions & variables.
 - BODY- contains logic, functions declared in SPEC + private logic, functions etc.
 - **Procedures** - **Oracle™ PL/SQL stored procedures work exactly the same in EDB-SPL.**
 - When called my receive input values from the caller and return output values.
 - Stored in database by executing a script containing procedure definition.
 - **Functions** - **Oracle™ PL/SQL functions work exactly the same in EDB-SPL.**
 - evoked as expressions, then evaluated and returns a value.
 - May take values from calling procedure and provide output values

Postgres Plus Advanced Server 8.x

- ORACLE™ Migration Methodology

The screenshot shows the EnterpriseDB Developer Studio 8.2 interface. A dialog box titled "Online Migration - Enter Target Database Information" is open, displaying the following details:

- Server: enterprisedb(localhost:5444)
- Database: edb
- Schema: HR
- Delimiter: |
- Definition Only:

The migration progress log in the dialog box shows:

```
[Starting Migration]
Source database connectivity info...
conn = jdbc:oracle:thin:@localhost:1521:xe
user = hr
password = *****
Target database connectivity info...
conn = jdbc:edb://localhost:5444/edb
user = enterprisedb
password = *****
Importing redwood schema...
Creating Schema...hr
Creating Tables...
Creating Table: COUNTRIES
Creating Table: DEPARTMENTS
Creating Table: EMPLOYEES
Creating Table: JOBS
Creating Table: JOB_HISTORY
Creating Table: LOCATIONS
Creating Table: REGIONS
Created 7 tables.
Loading Table Data in 8 MB batches...
Loading Table: COUNTRIES ...
Migrated 25 rows.
Table Data Load Summary: Total Time(s): 0.5 Total Rows: 25
Loading Table: DEPARTMENTS ...
Migrated 27 rows.
Table Data Load Summary: Total Time(s): 0.203 Total Rows: 27
Loading Table: EMPLOYEES ...
Migrated 107 rows.
Table Data Load Summary: Total Time(s): 0.406 Total Rows: 107 Total Size(MB): 0.0087890625
```

On the left, a sidebar titled "Migration" shows a flowchart of the process: Oracle -> Configuration -> Custom Dev -> Migration -> Solution Testing. Below this is a "Database Compatibility Report" for ABC Corp, Database: DWID1, prepared on 01-11-2008. At the bottom, a diagram shows the migration path from Oracle to PostgreSQL, with icons for Stored Procedures, Packages, Triggers, Database Schema, and Tables and Data. The PostgreSQL icon is labeled "COMPATIBLE".

"Switching from Oracle™"

EnterpriseDB™

Postgres Plus Advanced Server 8.x

- **EDB Core Components...Replication solution** **ORACLE**
 - *EDB Replication Server...*
Is an enterprise-class cross-platform **GUI based** Replication Console - built on Slony-1.
 - Replicates **Oracle™** and **EnterpriseDB** data across business geographies in **near real-time**.
 - **Publish and Subscribe Model** - **Single-Master > Multiple-Slaves** Architecture.
 - **Asynchronous** (fault tolerant) - Trigger based < 10% overhead.
 - **Transaction** or “**Snap-Shot**” only replication - with **node filters**.
 - Across **heterogeneous** operating systems (Linux, Solaris, HP-UX and IBM-AIX, Windows).



“Offload and co-exist with **Oracle™**”

EnterpriseDB™

*Enterprise***DB**TM

Thank you

Questions?