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Working with PHP and Oracle

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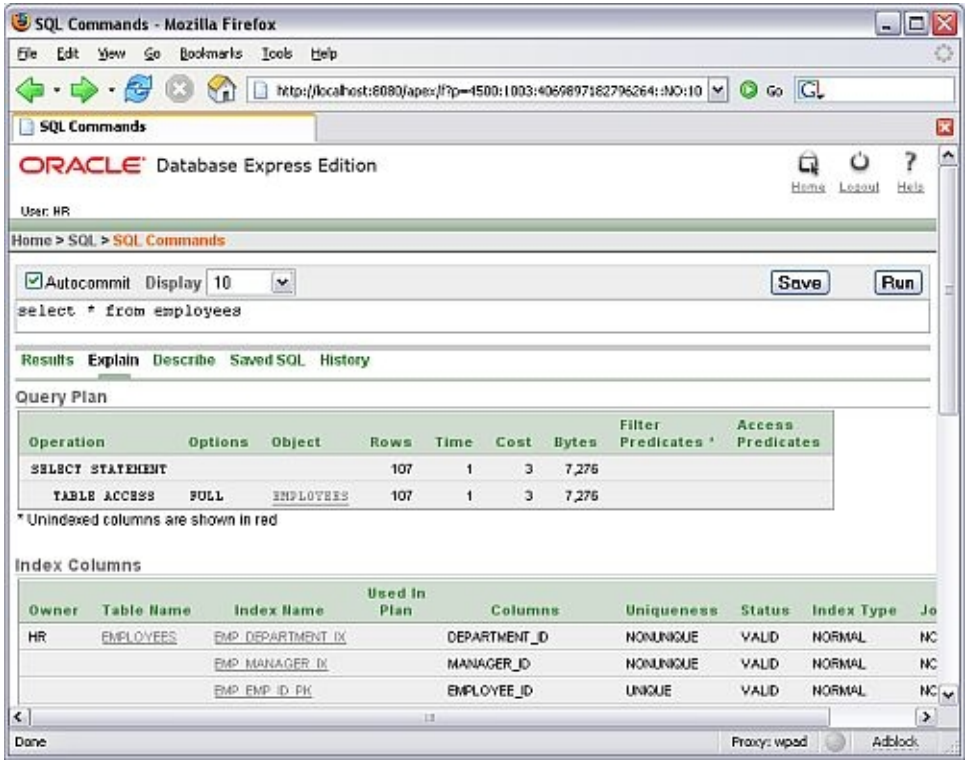
Working with PHP and Oracle

- Oracle products
- OCI8 extension
- Connection management
- Improving performance
- XML
- Oracle resources

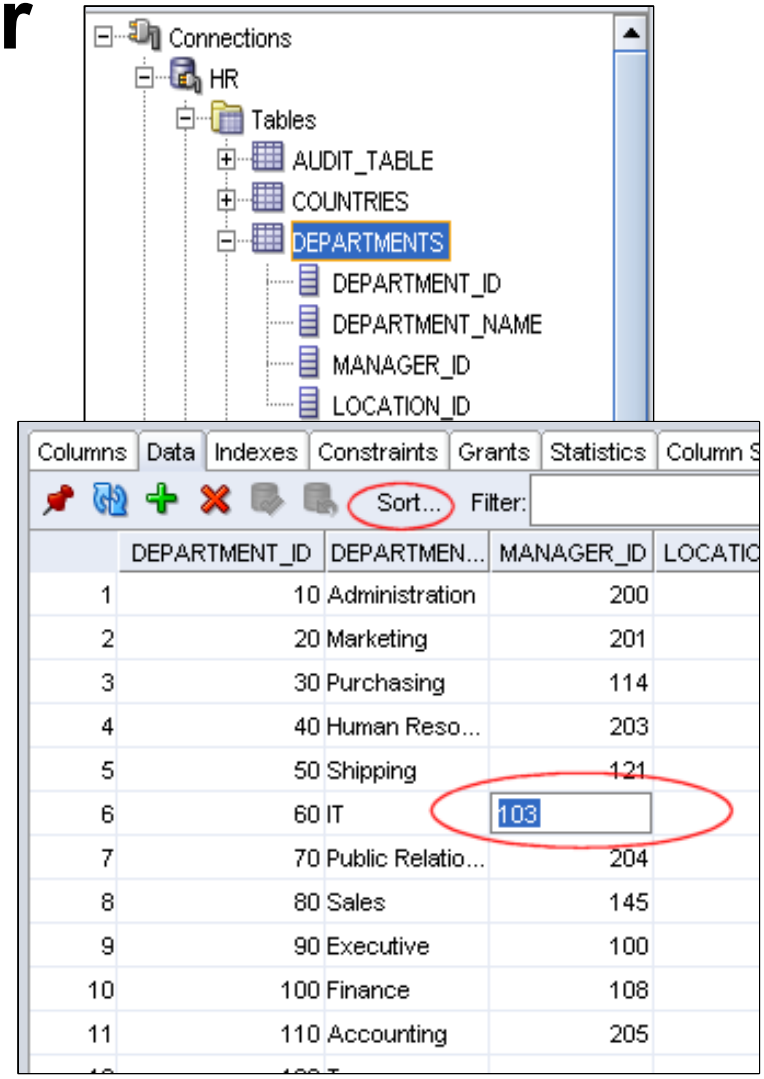
Oracle Database Express Edition

- **Free** to download, develop, deploy, and distribute
- Small footprint
- 32-bit Linux and Windows
- Free OTN community forum for support
- Uses native install on Windows and Linux
- Application Express GUI



Oracle SQL Developer

- **Free and supported**
- Browse, create, and update schema objects
- Create, edit, and debug PL/SQL
- SQL Worksheet (commands, scripts)
- Run or create reports
- Linux, Windows, Mac OS
- Oracle Database 9.2.0.1 or later



PHP and Oracle

- Long time commitment to PHP and Zend
- Thousands of developers use Oracle and PHP
- Joint effort with Zend
  - Zend Core for Oracle
  - Improved and refactored OCI8 extension
- Participates in communities and expert groups
  - Java and Scripting (JSR 223)
  - PHP Collaboration Project

PHP Extensions

- Abstraction Libraries
  - Database independence
  - Lowest common denominator
  - PEAR DB
  - PEAR MDB2
  - ADOdb
- ODBC
- PDO
- OCI8

OCI8 Extension

- Refactored by Oracle and Zend
  - Zend Core for Oracle
- Contributed back to PHP community
  - PHP 5.1.2 onwards
- Same API as original OCI8
- New php.ini parameters for
  - Persistent connection management
  - Row prefetching
  - Client side statement cache

OCI8 Extension

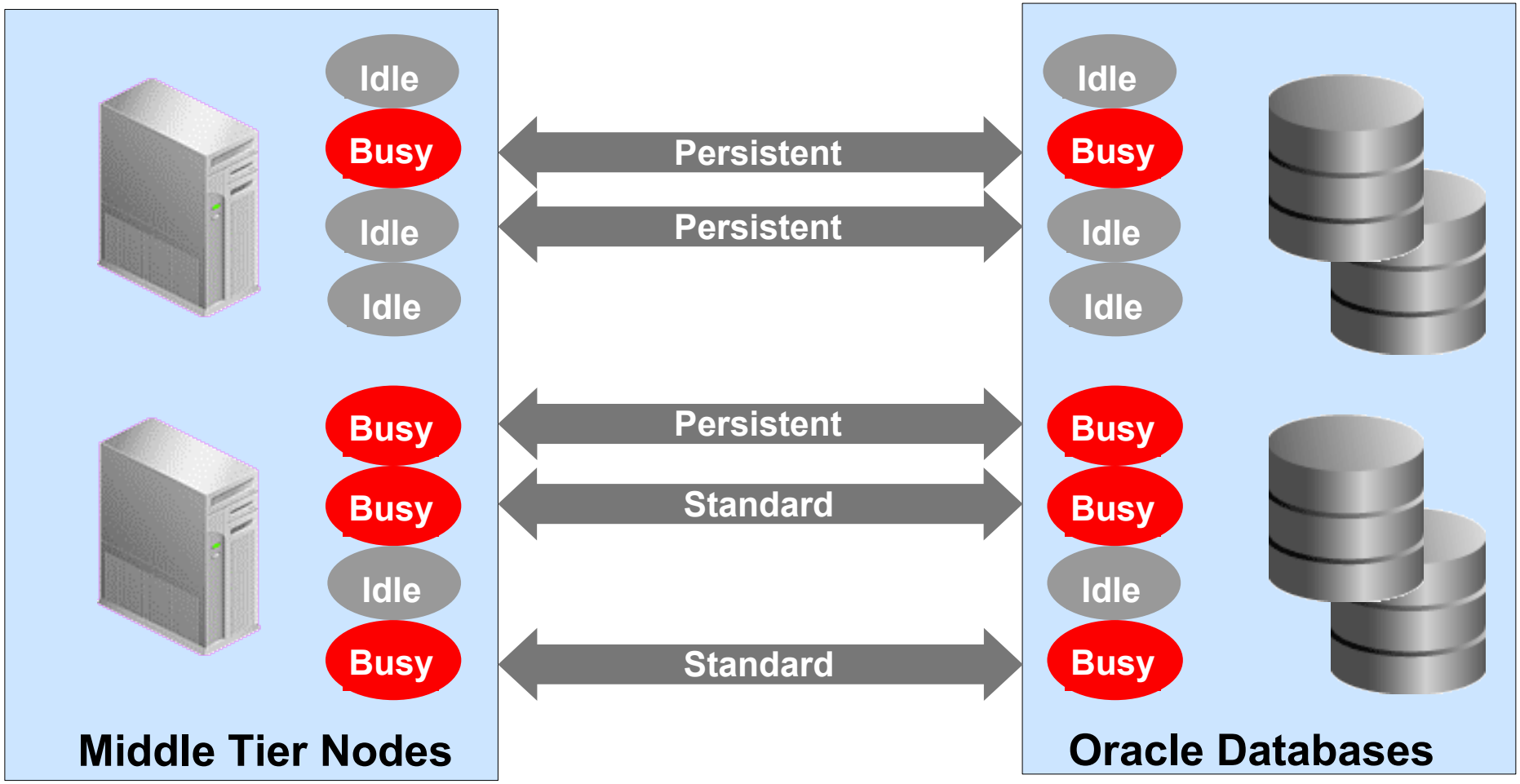
- Main Oracle database driver

```
<?php
  $conn = oci_connect('hr', 'hr', '//localhost/XE');
  $sql = oci_parse($conn, 'select city from locations');
  oci_execute($sql);
  while ($row = oci_fetch_assoc($sql))
    echo $row['CITY'] . "<br>";
?>
```

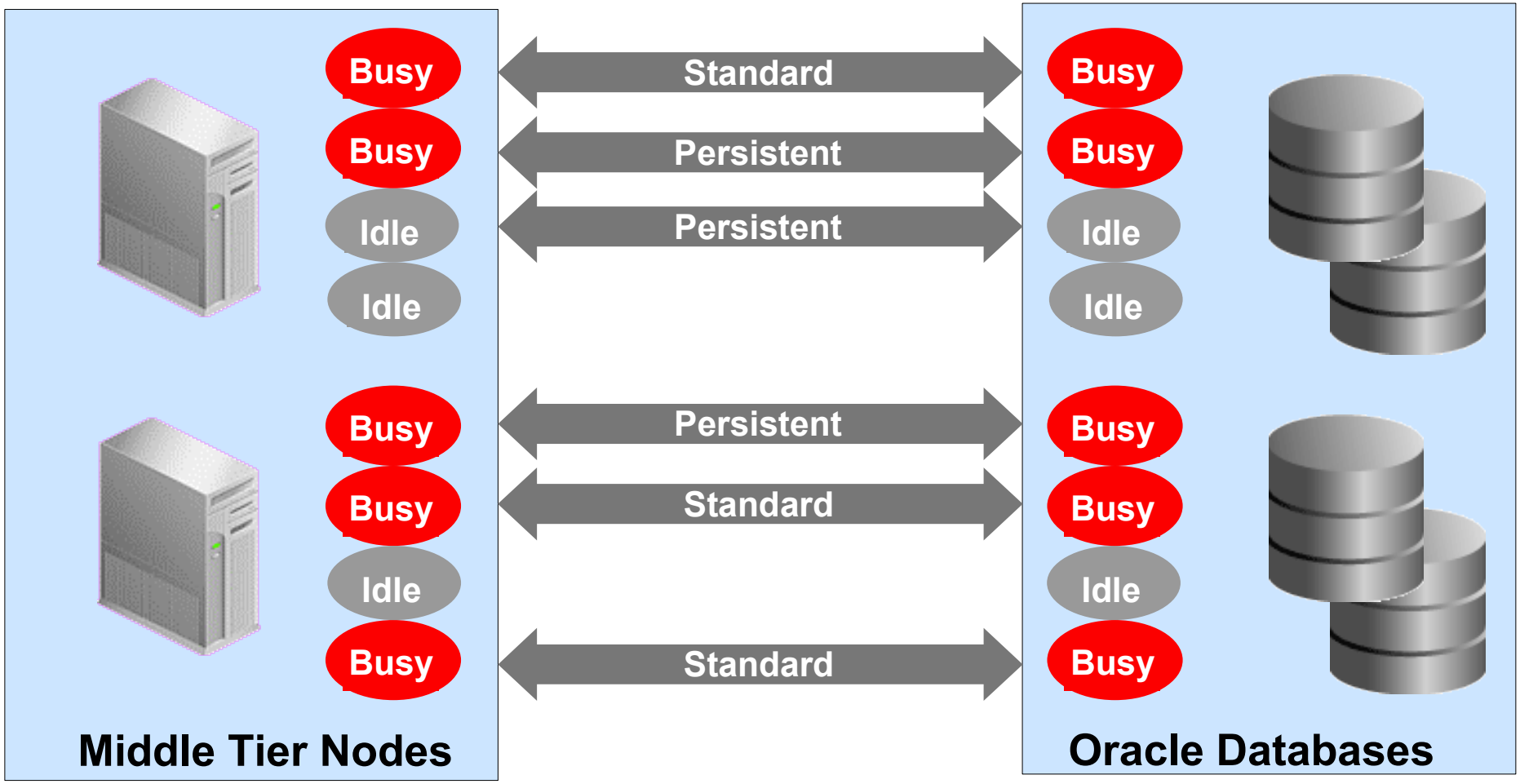
OCI8 Connections

- Standard Connection
  - oci_connect()
- Multiple Unique Connections
  - oci_new_connect()
- Persistent Connection
  - oci_pconnect()
  - oci8.max_persistent
  - oci8.persistent_timeout
  - oci8.ping_interval
- Close connections
  - oci_close()
  - oci8.old_oci_close_semantics

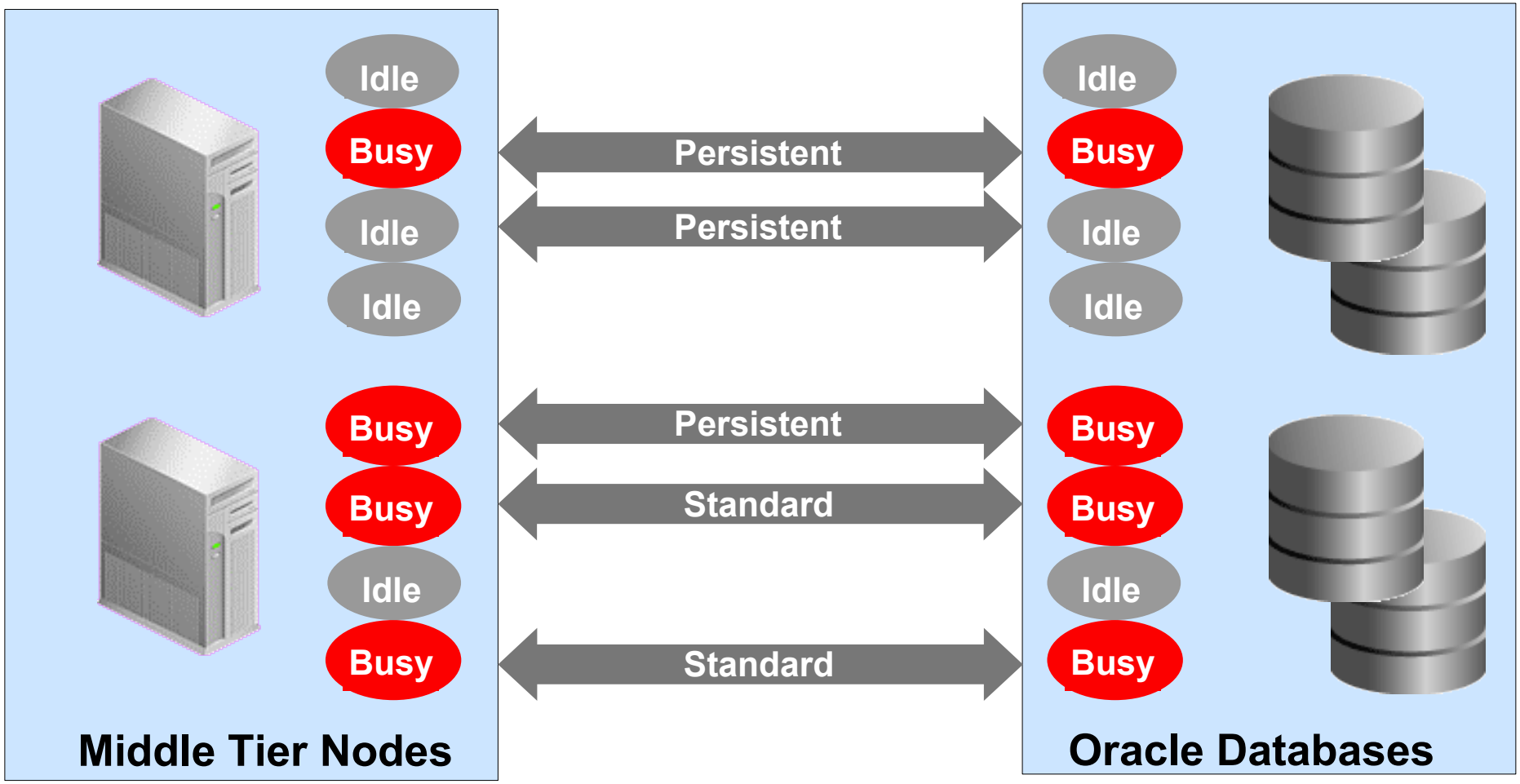
Database Connections



Database Connections



Database Connections



Connection Pooling

- Apache single threaded for PHP
- Options:
  - Repeatedly connect/disconnect using standard connections
  - Use persistent connections
- Inefficient use of the database resources

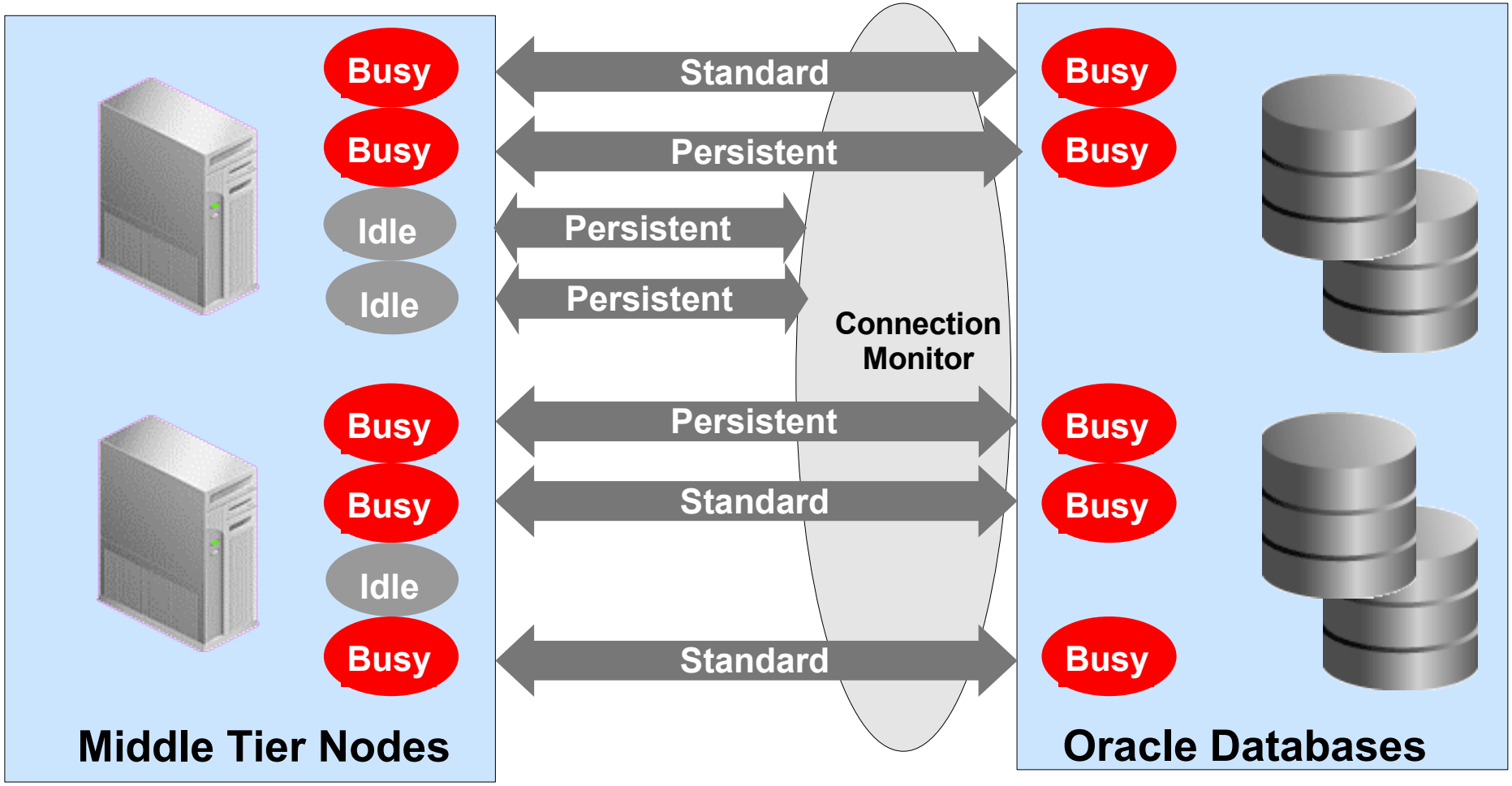
Database Resident Connection Pooling

- Pools Oracle dedicated server connections
- Shares connection pool across Apache processes
- Shares connection pool across middle tier instances
- Co-exists with Oracle Dedicated Servers, Shared Servers
- Works in RAC

Database enhancements described here are in the next major release

PHP enhancements described here are proposed

Database Resident Connection Pooling



Database Resident Connection Pooling

- Reduces number of connections
- Pooling is enabled by DBA on database server
- Change PHP connect string
  - `hostname/service:POOLED`
  - `(SERVER=POOLED)`
- Set parameter in php.ini:
  - oci8.connection_class = "<*application_name*>"
- Client directed to Database Resident Connection Pool
- Connection in pool "locked" when requested by client
- Connection "released" back to pool when client done

Database Resident Connection Pooling

- Enhanced OCI8 extension
- Oracle database and client libraries
- Code compatible: no application code changes
- Version compatibile: application works as is with
  - Existing Oracle databases (no pooling)
  - Database with pooling disabled
  - Database with pooling enabled
- DBA monitoring and configuration options

Database Resident Connection Pooling with Standard APIs

- oci_pconnect()
  - Very fast binding to an existing connection from pool
  - Re-uses pooled server process from pool
  - Re-uses pooled server session
- oci_connect/oci_new_connect()
  - Faster new connections!
  - Re-uses pooled server process from pool
  - Session is recreated
- oci_close()
  - Releases connection back to pool

Bind Variables

- Like "%s" print format specifiers
- Application re-executes statements with different values
- Improves database throughput
- Help prevent SQL Injection attacks

Bind Variables

```
$s = oci_parse($c,
      "select last_name from employees
       where employee_id = :eidbv");
$myeid = 101;
oci_bind_by_name($s, ":EIDBV", $myeid);
oci_execute($s);
oci_fetch_all($s, $res);
echo "Last name is: ". $res['LAST_NAME'][0] ."<br>\n";
$myeid = 102;
oci_execute($s);   // No need to re-parse
oci_fetch_all($s, $res);
echo "Last name is: ". $res['LAST_NAME'][0] ."<br>\n";
```

PL/SQL

- Procedural language extension to SQL
  - Variables
  - Conditions
  - Arrays
  - Exceptions
- Stored in database
- Stable, portable, secure
- Procedures, functions, triggers
- Presupplied packages
- Fastest in Oracle 10.2

PL/SQL Stored Procedure and PHP

```
create or replace procedure
myproc(a in varchar2, b in number) as
begin
   insert into mytable (mydata, myid) values (a, b);
end;
/
```

```
<?php
    $c = oci_connect('hr', 'hr', '//localhost/XE');
    $s = oci_parse($c, "call myproc('mydata', 123)");
    oci_execute($s);
?>
```

Database Transactions

- oci_execute() auto-commits
- Commits cause
  - Round-trips to the database
  - Database I/O

```
$s = oci_parse($c, "insert into t values ('data')");
oci_execute($s, OCI_DEFAULT);   // Not committed
...
oci_commit($c);
```

Non Transactional Insert

This is slow

```
function do_simple_insert($c, $a)
{
  foreach ($a as $v) {
    $s = oci_parse($c,
     "insert into ptab (pdata) values ('".$v."')");
    $r = oci_execute($s); // Committed
  }
}
```

Transactional Insert

This is better

```
function do_transactional_insert($c, $a)
{
  $s = oci_parse($c,
        'insert into ptab (pdata) values (:bv)');
  oci_bind_by_name($s, ':bv', $v, 20, SQLT_CHR);
  foreach ($a as $v)
    $r = oci_execute($s, OCI_DEFAULT); // Not committed
  oci_commit($c); // Committed
}
```

Bulk Inserts in PL/SQL

```
create or replace package mypkg as
  type arrtype is table of varchar2(20)
    index by pls_integer;
  procedure myproc(p1 in arrtype);
end mypkg;
create or replace package body mypkg as
  procedure myproc(p1 in arrtype) is
  begin
    forall i in indices of p1
      insert into ptab values (p1(i));
  end myproc;
end mypkg;
```

Bulk Inserts in PHP

May be fastest

```
function do_bulk_insert($c, $a)
{
  $s = oci_parse($c,
          'begin mypkg.myproc(:c1); end;');
  oci_bind_array_by_name($s, ":c1", $a,
count($a), -1, SQLT_CHR);
  oci_execute($s);
}
```

XML

- XML DB
- Stored as
  - Relational data
  - Linear as LOBs
  - XML Schema structure
- SELECT XMLELEMENT
- PL/SQL Package DBMS_XMLGEN
- XQuery

SELECT XMLELEMENT

```
$query =
  'SELECT XMLELEMENT("Employees",
     XMLELEMENT("Name", first_name),
     XMLELEMENT("Id", employee_id)) as result
    FROM employees WHERE department_id = 10';
$s = oci_parse($c, $query);
oci_execute($s);
while ($row = oci_fetch_row($s))
  foreach ($row as $item)
    echo htmlentities($item)." ";
```

```
<Employees><Name>Joanne</Name><Id>210</Id></Employees>
<Employees><Name>Jennifer</Name><Id>200</Id></Employees>
```

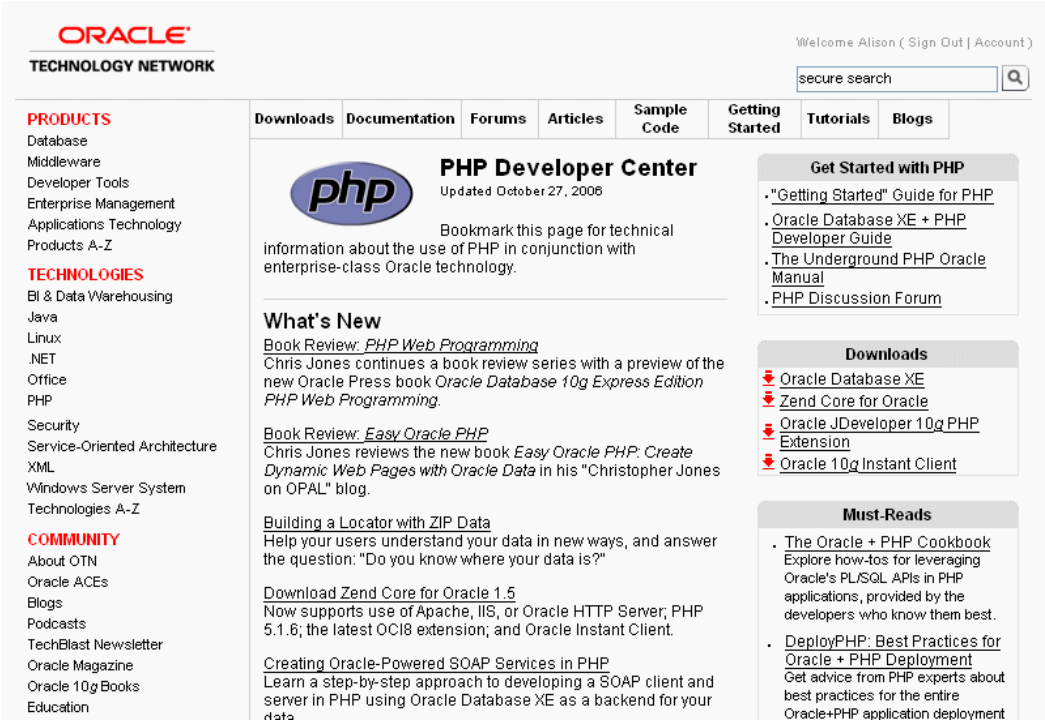
DBMS_XMLGEN Package

```
$query = "select dbms_xmlgen.getxml('
          select first_name, employee_id from employees
          where department_id = 10') xml from dual";
$s = oci_parse($c, $query);
oci_execute($s);
$res = oci_fetch_row($s);
$mylob = $res[0]->load(); // treat result as a LOB descriptor
```

```
<?xml version="1.0"?>
<ROWSET>
      <ROW>
           <FIRST_NAME>Joanne</FIRST_NAME>
           <EMPLOYEE_ID>210</EMPLOYEE_ID>
      </ROW>
      ...
</ROWSET>
```

Oracle Technology Network PHP Developer Centre

- Technical Articles
- Install guides
- Underground PHP and Oracle Manual
- Discussion forum
- JDeveloper 10*g* PHP extension
- Blogs



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