

Databases: The Next Generation

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The old system

- ext/mysql, ext/mysqli, ext/pgsql
- PHP 3 / MySQL 3
- No prepared statements
- Procedural
- Manual escaping



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PDO

- Formal prepared statements
 - Type-agnostic queries
- Object-oriented API
- Unified access API (not abstraction API)

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What does that give us?

- Multiple database types at once
- Improved database portability
- Easier driver implementation
- Database-specific optimizations
- Transactions

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What can we do with it?

- Array-based database configuration
- Master/save replication
- Portable type-safe queries
- Structured query builders

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New concepts

- Database targets
- Placeholders
- Fluent API
 - All modifier queries
 - Never write INSERT again

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Targets

- Alternate database connection
- May be used or not
- Fallback to default
- Master/slave replication
- Multi-slave configuration

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Configuration

`$db_url`

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```
$databases['default']['default'] = array(  
    'type' => 'mysql',  
    'host' => 'localhost',  
    'user' => 'me',  
    'password' => 'letmein',  
    'transactions' => TRUE,  
);
```

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Master/slave configuration

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```
$databases['default']['default'] = array (  
// ...  
);  
$databases['default']['slave'][] = array (  
// ...  
);  
$databases['default']['slave'][] = array (  
// ...  
);
```

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New drivers are easy

- Subclass and god
- Magic directory location
- No hard-coded list

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Obligatory

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**Every time you hack core
God kills a kitten**

Please, think of the kittens!

Types of queries

- Static
- Dynamic
- Insert
- Update
- Delete
- Merge

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Static queries

- Doesn't change based on environment
- Takes named or unnamed placeholders
- (May remove unnamed placeholders)

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db_query()

```
function db_query($query,
                  Array $args = array(),
                  Array $options = array()) {
    if (empty($options['target'])) {
        $options['target'] = 'default';
    }
    $db = Database::getActiveConnection($options['target']);
    return $db->query($query, $args, $options);
}

$result = db_query('SELECT nid, title
                    FROM {node} WHERE uid=:uid', array(
    ':uid' => $some_value,
));
```

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db_query*()

```
$result = db_query_range('SELECT nid, title  
FROM {node} WHERE uid=:uid', $args, 0, 5);  
  
$result = db_query_temporary('SELECT nid, title  
FROM {node} WHERE uid=:uid', $args, 'temp');
```

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Fetching

```
foreach ($result as $record) {  
    print $record->title;  
}
```

```
$record = $result->fetch();  
$records = $result->fetchAll();  
$record = $result->fetchObject();
```

```
$record = $result->fetchArray();  
$records = $result->fetchAllAssoc('nid');  
$records = $result->fetchKeyed();  
$field = $result->fetchField();
```

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Query options

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```
$options = array(  
    'target' => 'default',  
    'fetch' => PDO::FETCH_OBJ,  
    'return' => Database::RETURN_STATEMENT,  
    'throw_exception' => TRUE,  
);  
$result = db_query($sql, $args, $options);
```

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Fetch options

```
// Fetch into associative array
$options['fetch'] = PDO::FETCH_ASSOC;
// Fetch into dual-keyed array
$options['fetch'] = PDO::FETCH_BOTH;
// Fetch into stdClass object
$options['fetch'] = PDO::FETCH_OBJ;
// Fetch into numeric array
$options['fetch'] = PDO::FETCH_NUM;
// Fetch into custom class
$options['fetch'] = 'MyClass';
```

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Dynamic queries

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```
function db_select($table,  
                  $alias = NULL,  
                  Array $options = array()) {  
    if (empty($options['target'])) {  
        $options['target'] = 'default';  
    }  
    $db = Database::getActiveConnection($options['target']);  
    return $db->select($table, $alias, $options);  
}
```

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Dynamic queries

```
C 18 15 2 $query = db_select('test');  
V2.01 E $name_field = $query->addField('test', 'name');  
$age_field = $query->addField('test', 'age', 'age');  
$query->condition('age', 27);  
$result = $query->execute();  
  
foreach ($result as $record) {  
    echo $record->$name_field, $record->$age_field;  
}
```

Dynamic queries

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```
$select = db_select('watchdog');  
$select->addField('watchdog', 'wid');  
$select->condition('uid', 0);  
if ($ids) {  
    $select->condition('wid', $ids, 'IN');  
}  
$result = $select->execute();
```

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hook_query_alter()

- All dynamic SELECT statements
- Query tagging
- Structured data is easy to alter
- Access internal query structure
- ~~hook_db_rewrite_sql()~~

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Insert, Update, Delete

- `db_insert()`, `db_update()`, `db_delete()`
- Builder is *required*
 - Cross-database BLOB and LOB
- Fully chainable
- "Fluent API"

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Insert

- Multi-insert
- Delayed insert
- Optimized per-driver

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Merge

- `db_merge()`
- "INSERT, UPDATE, whichever"
- Update to same value or new
- Database-specific implementation
 - MySQL: INSERT ... ON DUPLICATE KEY UPDATE ...
 - PostgreSQL: Needs function...

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Next week on DB: TNG...

- Subselects in FROM
- Union queries
- Extenders (tablesort, pager, Views...)
- Schema improvements
- Exposed transactions (db_transaction())
- <http://groups.drupal.org/node/14222>

Want to overhaul a core system?

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Some advice...

Want to overhaul a core system?

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Don't

Don't...

- Work alone
- Expect others to do the work
- Keep it a secret
- Act big (but think big; have a roadmap)
- Fear unit tests
- Cut corners (Dries won't let you)
- Believe that chx doesn't understand OOP

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Don't...

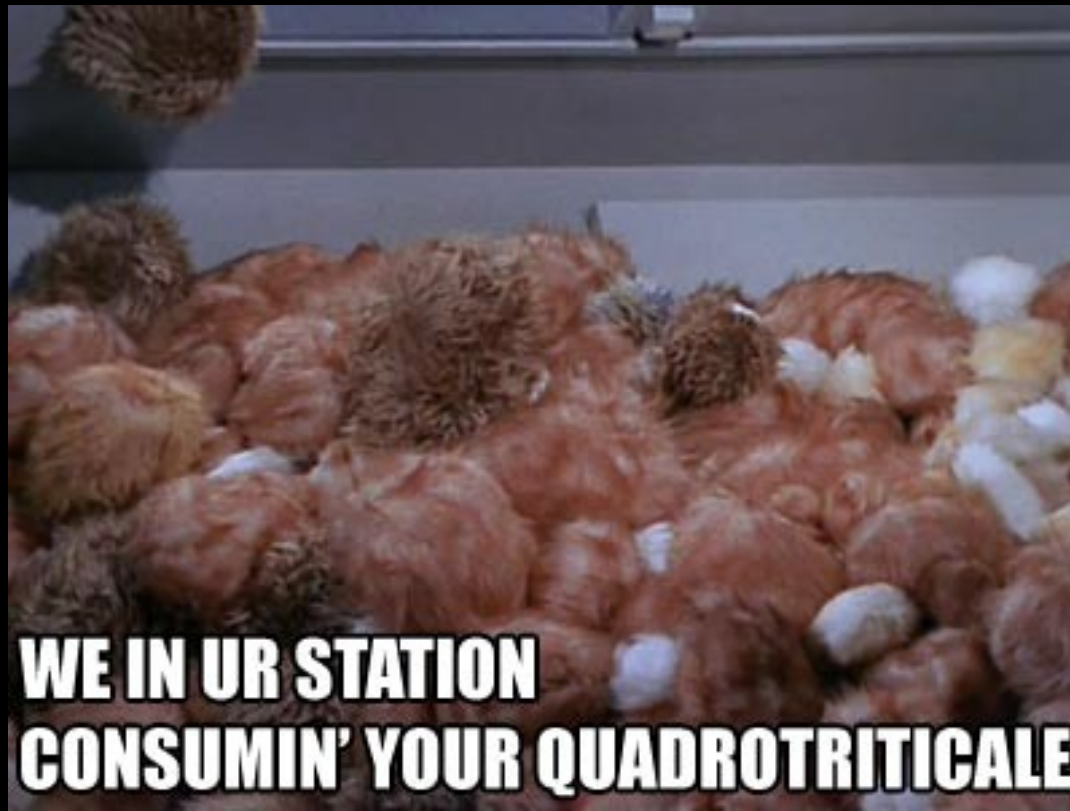
Give up

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For Eaton...

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