Agile Database Access with CakePHP 3

Agenda

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Types of ORMs

Infuriating ORMs

Types of ORMs

Toy ORMs

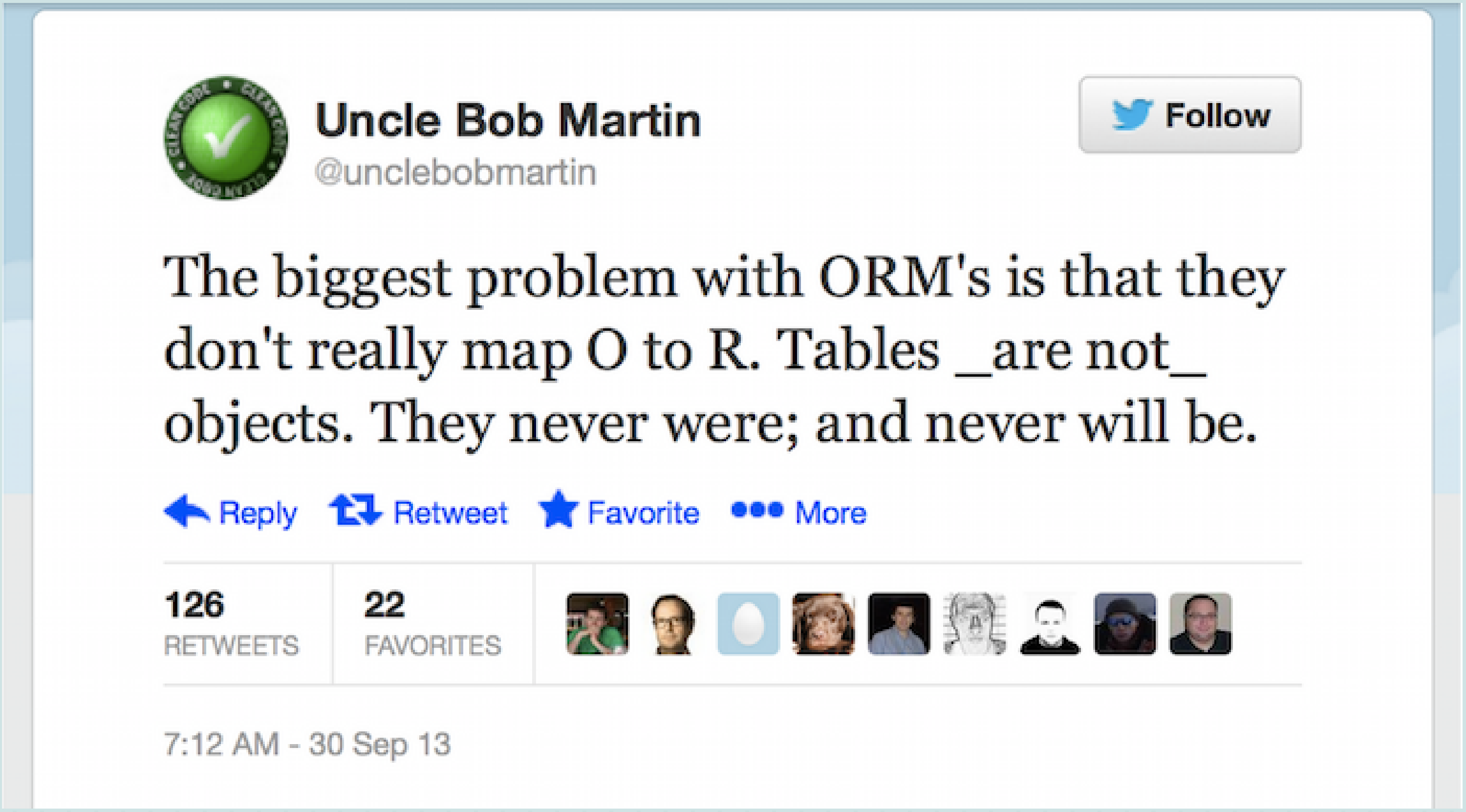
Types of ORMs

Hipster ORMs

Types of ORMs

Awesome ORMs

Some wise words



Uncle Bob Martin
@unclebobmartin

The biggest problem with ORM's is that they don't really map O to R. Tables _are not_ objects. They never were; and never will be.

126 RETWEETS
22 FAVORITES

7:12 AM - 30 Sep 13

What I need from an ORM

- To stop me from repeating the same over and over.
- Help me modularize my common searches.
- Stay out of the way when I want to create complex stuff.
- Testability.
- Ways to hook in and change any default behavior.
- To not hide the Relational aspect of a Relational database.

What is Agile?

- Quick feedback loop.
- Low friction,
- Easy to debug.
- Easy to track.
- Few requirements.
- Ability to scale up.

The Setup

```
class ManagersTable extends Table
{

    public function initialize(array $config = [])
    {
        $this->table('departments_managers');
        $this->primaryKey(['department_id', 'employee_id']);

        $this->belongsTo('Employees', ['joinType' => 'INNER']);
        $this->belongsTo('Departments', ['joinType' => 'INNER']);
    }

    public function beforeFind($event, $query, $options)
    {
        $query->andWhere(['to_date IS' => NULL]);
    }
}
```

The Setup

```
class EmployeesTable extends Table
{

    /**
     * Initialize method
     *
     * @param array $config The configuration for the Table.
     * @return void
     */
    public function initialize(array $config)
    {
        $this->hasMany('Salaries');
        $this->hasMany('Titles');
        $this->belongsToMany('Departments');
    }
}
```

Simple analytical queries

Average historic salary

```php
// In SalariesTable.php
public function findAverage(Query $query, $options = [])
{
    return $query->select(['average' => $query->func()->avg('Salaries.salary')]);
}
```

```json
{
    "average": 63810.74
}
```

Simple analytical queries

Currently hired female managers

```
    public function findFemale(Query $query, $options = [])
    {
        return $query->contain(['Employees'])->where(['Employees.gender' => 'F']);
    }
```

```
SELECT Managers.*, Employees.*
FROM department_managers Managers
INNER JOIN employees Employees ON Employees.id = (Managers.employee_id)
 WHERE Employees.gender = 'F' AND to_date IS NULL
```

A more complex example

Percentage of currently hired female managers

```
public function findFemaleRatio(Query $query, $options = [])
{
    $allManagers = $this->find()->select($query->func()->count('*'));
    $ratio = $query
        ->newExpr($query->func()->count('*'))
        ->type('/')
        ->add($allManagers)
    return $query
        ->find('female')
        ->select(['female_ratio' => $ratio]);
}
```

```
{
    "female_ratio": 0.4444
}
```

Queries can be composed

Average salary of currently hired employees by gender

```
    public function findOfHired(Query $query, $options = [])
    {
        return $query->contain(['Employees'])->where(['Salaries.to_date IS' => null]);
    }

    public function findAveragePerGender(Query $query, $options = [])
    {
        return $query
            ->select(['gender' => 'Employees.gender'])
            ->find('average')
            ->contain(['Employees'])
            ->group(['Employees.gender']);
    }
```

```
$salariesTable
    ->find('ofHired')
    ->find('averagePerGender')
    ->indexBy('gender');
```

Queries are Collections

Yearly salary average per department and gender

```
    public function findAveragePerDepartment(Query $query, $options = [])
    {
        return $query
            ->select(['department' => 'Departments.name'])
            ->find('average')
            ->matching('Employees.Departments')
            ->where([
                'Salaries.from_date < DepartmentsEmployees.to_date',
                'Salaries.from_date >= DepartmentsEmployees.from_date',
            ])
            ->group(['Departments.id']);
    }
```

Queries are Collections

Yearly salary average per department and gender

```
public function findAveragePerYear(Query $query, $options = [])
{
    $year = $query->func()->year(['Salaries.from_date' => 'literal']);
    return $query
        ->select(['year' => $year])
        ->find('average')
        ->group([$year]);
}

$averages = $salariesTable
    ->find('averagePerYear')
    ->find('averagePerDepartment')
    ->find('averagePerGender');
```

Queries are Collections

Yearly salary average per department and gender

```
$averages->groupBy('year')->each(function ($averages, $year) {
    displayYear($year);

    collection($averages)->groupBy('department')->each(function ($d, $averages) {
        displayDepartment($d);
        collection($averages)->each('displayAverage');
    })
});
```

Result Formatters

Pack common post-processing into custom finders

```
public function findGroupedByYearAndDepartment($query)
{
    return $query->formatResults(function ($results) {
        return $results->groupBy('year');
    })
    ->formatResults(function ($years) {
        return $years->map(function ($results) {
            return collection($results)->groupBy('department');
        });
    });
}

$salariesTable
        ->find('averagePerYear')
        ->find('averagePerDepartment')
        ->find('averagePerGender')
        ->find('groupedByYearAndDepartment');
```

Result Formatters

They look sexier in HackLang

```
public function findGroupedByYearAndDepartment($query)
{
    return $query
    ->formatResults($results ==> $results->groupBy('year'))
    ->formatResults($years ==> $years->map(
        $results ==> collection($results)->groupBy('department')
    );
}
```

Associations in another database

Use tables from other databases by specifying the strategy

```
public function initialize(array $config)
{
    $this->hasOne('LinkedEmployee', [
        'className' => 'External\System\EmployeesTable',
        'strategy' => 'select'
    ]);
}
```

- A gotcha: It will not be possible to use `matching()`

Debugging Queries

- `debug($query)` Shows the SQL and bound params, does not show results
- `debug($query->all())` Shows the ResultSet properties (not the results)
- `debug($query->toArray())` An easy way to show each of the results
- `debug(json_encode($query, JSON_PRETTY_PRINT))` More human readable results.
- `debug($query->first())` Show the properties of a single entity.
- `debug((string)$query->first())` Show the properties of a single entity as JSON.

Debugging Queries

Pro tip: create a dj() function

```
function dj($data)
{
    debug(json_encode($data, JSON_PRETTY_PRINT), null, false);
}
```

```
dj($query);
```

```
[
    {
        "average": 0.4444
    }
]
```

Modifying JSON output

I don't want to show primary keys or foreign keys

```
class Employee extends Entity
{
    protected $_hidden = [
        'id'
    ];
}
```

```
class Manager extends Entity
{
    protected $_hidden = [
        'employee_id',
        'department_id'
    ];
}
```

Modifying JSON output

I want to show employees' full name

```
class Employee extends Entity
{
    protected $_virtual = [
        'full_name'
    ];

    protected function _getFullName()
    {
        return $this->name . ' ' . $this->last_name;
    }
}
```

Custom serialization

Let's try to do HAL

```
    public function index()
    {
        $managers = $this->paginate($this->Managers);
        $managers = $managers->map(new LinksEnricher($this->Managers));
        $this->set('managers', $managers);
        $this->set('_serialize', ['managers']);
    }
```

Custom Serialization

Let's try to do HAL

```php
class LinksEnricher
{
...
    public function __invoke(EntityInterface $row)
    {
        $primaryKey = array_values($row->extract((array)$this->table->primaryKey()));
        $row->_links = [
            'self' => [
                'href' => Router::url([
                    'controller' => $row->source(),
                    'action' => 'view',
                ] + $primaryKey)
            ],
        ];
        return $this->enrich($row); // Recurse for associations
    }
...
}
```

```
{
    "managers": [
        {
            "from_date": "1996-01-03T00:00:00+0000",
            "to_date": null,
            "department": {
                "name": "Customer Service",
                "_links": {
                    "self": {
                        "href": "\/departments\/view\/d009"
                    }
                }
            },
            "employee": {
                "birth_date": "1960-03-25T00:00:00+0000",
                "first_name": "Yuchang",
                "last_name": "Weedman",
                "gender": "M",
                "hire_date": "1989-07-10T00:00:00+0000",
                "_links": {
                    "self": {
                        "href": "\/employees\/view\/111939"
                    }
                },
                "full_name": "Yuchang Weedman"
            },
            "_links": {
                "self": {
                    "href": "\/managers\/d009\/111939"
                }
            }
        }
```

Value Objects

Why?

- Allow to add custom logic to dumb data.
- Help with custom serialization
- Make translation and localization easier
- Auto-validation
- Greater integrity.

Value Objects

Adding logic to plain data

```
class Gender implements JsonSerializable
{
    private static $genders = [];

    protected $short;

    protected $name;

    protected function __construct($gender)
    {
        $this->short = $gender;
        $this->name = $gender === 'F' ? 'Female' : 'Male';
    }

    public static function get($gender)
    {
        ...
        return $genders[$gender] = new static($gender);
    }

...
```

Value Objects

Accepting value objects

```php
class Employee extends Entity
{
    protected function _setGender($gender)
    {
        return Gender::get($gender);
    }
```

```php
$employeeEntity->gender = 'F';
get_class($employeeEntity->gender); // App\Model\Value\Gender
$employeeEntity->gender = Gender::get('F');
```

Value Objects

Wiring them to the database

```
class GenderType extends Type
{
...
}
```

```
Type::build('gender', 'App\Model\Database\Type');
```

```
class EmployeesTable extends Table
{
...
    protected function _initializeSchema(Schema $schema)
    {
        $schema->columnType('gender', 'gender');
        return $schema;
    }
}
```

Value Objects

Using them in Queries

```
$employee->gender = Gender::get('F');
$result = $employeesTable->find()->where([['gender' => $employee->gender]])->first();
$employee->gender === $result->gender;
```

- You can use objects as values in where conditions (or any query expression)

Thanks for your time

Questions?

https://github.com/lorenzo/cakephp3-advanced-examples