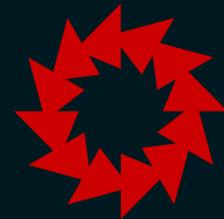


A Type System for Tomorrow



ATEN

Gabe Sullice

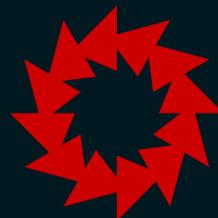
Backend Engineer

gabe@aten.io

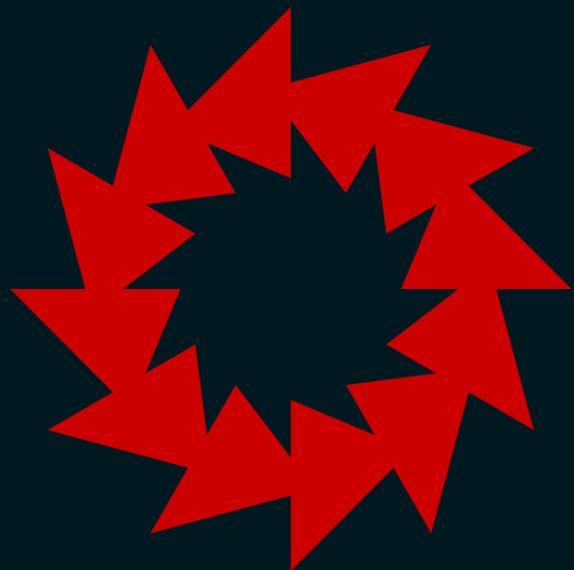
github.com/gabesullice

drupal.org/u/gabesullice

[@gabesullice](#)



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**“Bad programmers
worry about **the code**. Good
programmers worry about
data structures and their
relationships.”**

- Linus Torvalds

**“Smart data structures
and dumb code work better
than the other way around.”**

- Eric S. Raymond, The Cathedral and the Bazaar

Déjà Vu

- Complex associativity
- Hierarchical and ordered data
- Nested data structures
- Complex access control
- Triggered events

Why does it matter?

**Drupal is a terrible
blogging platform.**

Drupal is a
fantastic tool for building
a great blogging platform.

The Mental Model

Data Structures, Concepts & Behavior

What are our data structures?

- Big clumps of simpler data.
- Usually with some additional organization or schema.

Map

PROFILE

 **First Name**
Last Name

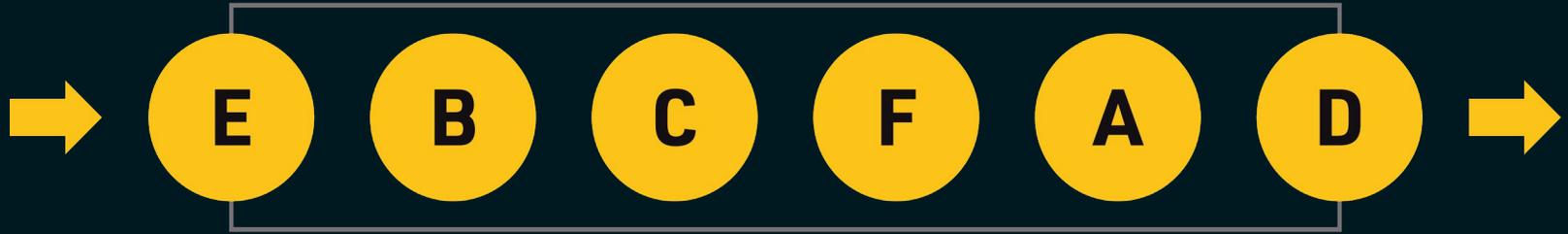
 **Address**

 **Email**

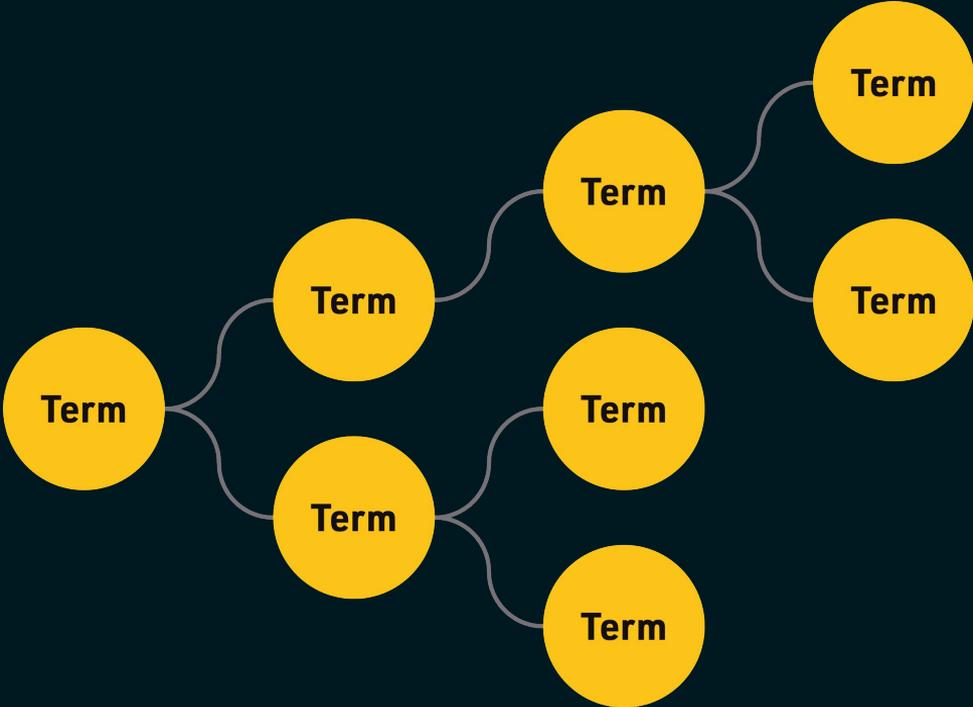
List



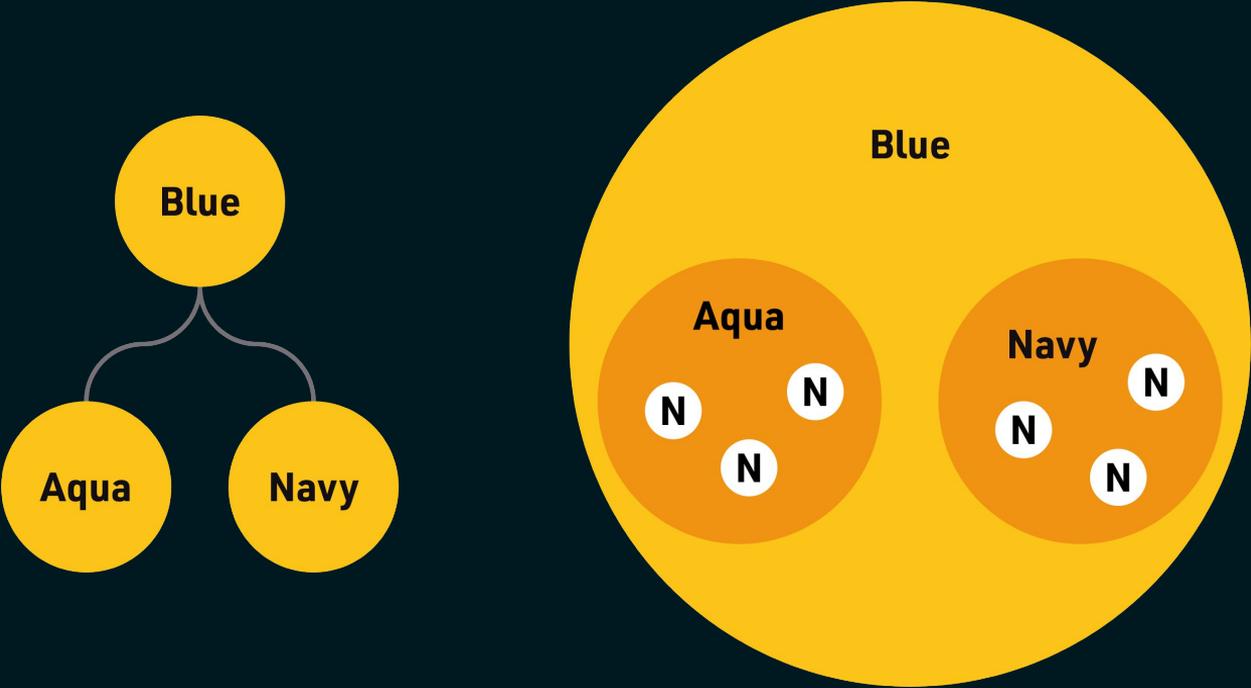
Queue



Tree



Set



Order

- Priority
- Precedence

Hierarchy

- Inheritance
- Derivation
- Belonging

Identity

- Addressable
- Uniqueness
- Random vs. Deterministic

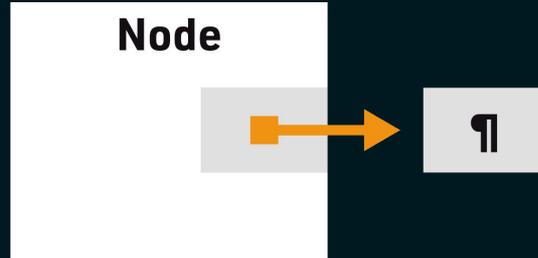
Composition

- Embeddedness
- Shared Behavior
- Shared Structure

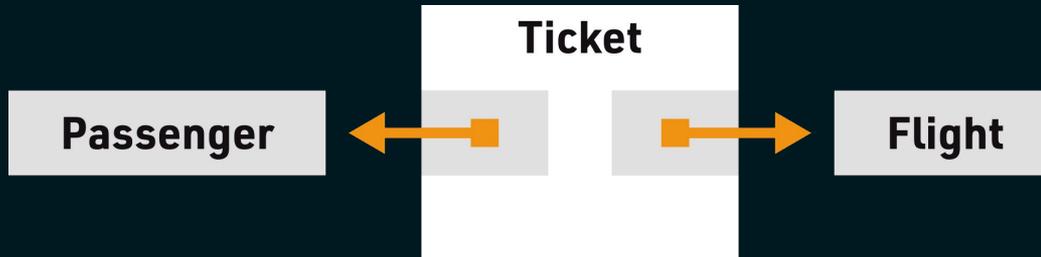
Association

- Relationship
- Interaction

Composition



Association



Observability

- IFTT
- Required trigger for any non-trivial application

Where are we?

Where we are.

Order

- Taxonomy weight
- Field weight
- Book weight
- Views sorting

Where we are.

Hierarchy

- Taxonomy terms
- Book nodes
- Ad-hoc entity references

Where we are.

Identity

- UUIDs
- Machine names

Where we are.

Composition

- Entity references, entity references everywhere
- Inconveniences
 - No behavioral opt-in/out
 - Required fields

Where we are.

Association

- Zilch, nada, zero

Where we are.

Association

- Zilch, nada, zero
- Organic Groups, sort of.

Where we are.

A better way?

```
$membership = Og::createMembership(  
    $entity,  
    $user  
);  
$membership->save();
```

A better way?

```
$ticket = Association::create(  
    'ticket',  
    $flight,  
    $user  
);  
$ticket->save();
```

Where we are.

```
$all_tickets_sold =  
$flight->associations('ticket');
```

```
$all_passengers =  
$flight->associatedBy('ticket');
```

A better way?

```
$all_tickets_sold =  
    $flight->associations('ticket');
```

```
$all_passengers =  
    $flight->associatedBy('ticket');
```

Where we are.

Observability

- Hooks
- Action plugins
- Condition plugins

Takeaways

Let's do it!

Takeaways

- Untangle useful behavior from our data types
- Add the concept of fieldable associations
- Expose condition plugins in meaningful ways
- This will make action plugins a primary point of extension, like hooks are today

What do you think?

- Let me know what you think @gabesullice
- First DrupalCon session, so leave me a review
- Don't forget to take the Surveymonkey for the con