Entity validation: The kick-ass road to data integrity

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calibrate IMALINK

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- Work at Deeson, UK
- Live near Antwerp, BE
- Happily married
- HSP: Highly Sensitive Person

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WHAT IS ENTITY VALIDATION?

```
EntityMetadataWrapperException: Unknown data property next_slide in
EntityStructureWrapper->getPropertyInfo() (line 339 of /var/www/ghent/sites/all/
modules/entity/includes/entity.wrapper.inc).
```

ENTITY VALIDATION

- Validates content entities on multiple levels

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ENTITY VALIDATION

- Validates content entities on multiple levels
- Returns a list of violations when validation fails
- Happens automatically in entity form validation
- Is not a part of the form system (unlike D7)
- Guarantees the data integrity of your entities

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WHEN TO USE ENTITY VALIDATION?

ON ENTITY MANIPULATION

- REST
- Custom entity generation code
- Migrations
- ...

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HOW TO INVOKE ENTITY VALIDATION?

SIMPLE!

```
$entity->validate();
```

SIMPLE!

```
$entity->get('foo')->validate();
```

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SIMPLE!

```
$entity->get('foo')->get(0)->validate();
```

WELL… ACTUALLY

```
$violations = $entity->validate();
```

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WORKING WITH VIOLATIONS

CHECKING FOR VIOLATIONS

```
$violations->count();
implements \IteratorAggregate
```

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MORE FUNKY METHODS

```
$violations->getEntityViolations();
$violations->getByField('foo');

\Drupal\Core\Entity\
EntityConstraintViolationListInterface
```

READING A SINGLE VIOLATION

```
$violation->getMessage();
```

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MORE GROOVY METHODS

```
$violation->getPropertyPath();
$violation->getInvalidValue();
```

```
Symfony\Component\Validator\
ConstraintViolationInterface
```

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WHERE DO VIOLATIONS COME FROM?

FOUR LAYERS OF VALIDATION

- The entity as a whole

FOUR LAYERS OF VALIDATION

- The entity as a whole
- A field on an entity

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FOUR LAYERS OF VALIDATION

- The entity as a whole
- A field on an entity
- A field entry on an entity

FOUR LAYERS OF VALIDATION

- The entity as a whole
- A field on an entity
- A field entry on an entity
- A property of a field entry

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OBLIGATORY CAR ANALOGY

- $car
- $car->field_wheels
- $car->field_wheels[0]
- $car->field_wheels[0][‘tyre_size’]

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IN DRUPAL-SPEAK

- ContentEntityInterface
- FieldItemListInterface
- FieldItemInterface
- TypedDataInterface

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THE FOUR LEVELS IN DETAIL

THE ENTITY AS A WHOLE

- Validation across multiple fields

THE ENTITY AS A WHOLE

- Validation across multiple fields

  Fuel tank + electric engine

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THE ENTITY AS A WHOLE

- Validation across multiple fields

  Fuel tank + electric engine
- Field-independent validation

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THE ENTITY AS A WHOLE

- Validation across multiple fields

  Fuel tank + electric engine
- Field-independent validation

  Third car when flat broke

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A FIELD ON AN ENTITY

- Validation across multiple field entries

A FIELD ON AN ENTITY

- Validation across multiple field entries

  2 monster truck wheels + 2 minibike wheels

A FIELD ENTRY ON AN ENTITY

- Validation across multiple field properties

A FIELD ENTRY ON AN ENTITY

- Validation across multiple field properties

  16 inch rim + 15 inch tyre

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A PROPERTY OF A FIELD ENTRY

- Validation of single properties

A PROPERTY OF A FIELD ENTRY

- Validation of single properties

  A tyre made out of wood

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DEFINING YOUR OWN VALIDATION

TWO CLASSES REQUIRED

- A Constraint plugin
- The actual validator

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THE CONSTRAINT PLUGIN

CONSTRAINT PLUGIN DEFINITION

- A unique ID
- A human readable label
- A type (string) or list of types (array)
- In mymodule/src/Plugin/Validation/Constraint

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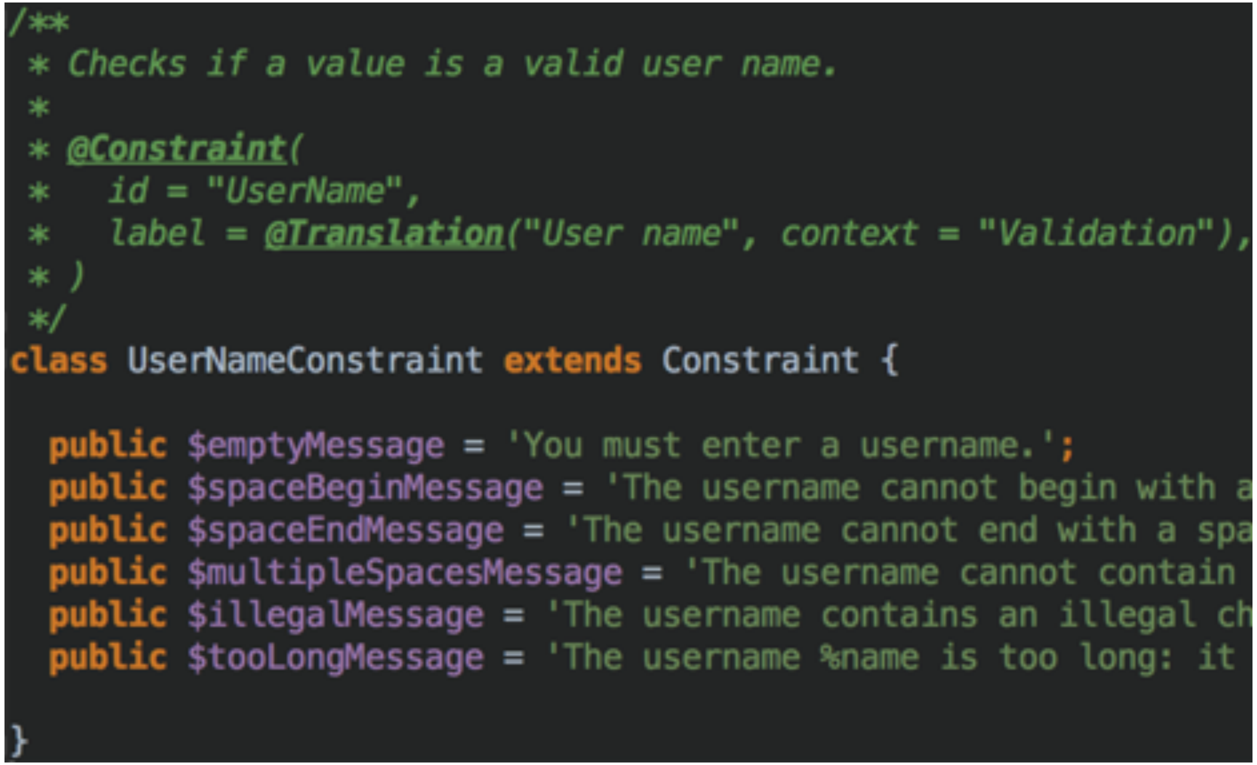

```
/**
 * Checks if a value is a valid user name.
 *
 * @Constraint(
 *   id = "UserName",
 *   label = @Translation("User name", context = "Validation"),
 * )
 */
class UserNameConstraint extends Constraint {

  public $emptyMessage = 'You must enter a username.';
  public $spaceBeginMessage = 'The username cannot begin with a
  public $spaceEndMessage = 'The username cannot end with a spa
  public $multipleSpacesMessage = 'The username cannot contain
  public $illegalMessage = 'The username contains an illegal ch
  public $tooLongMessage = 'The username %name is too long: it

}
```

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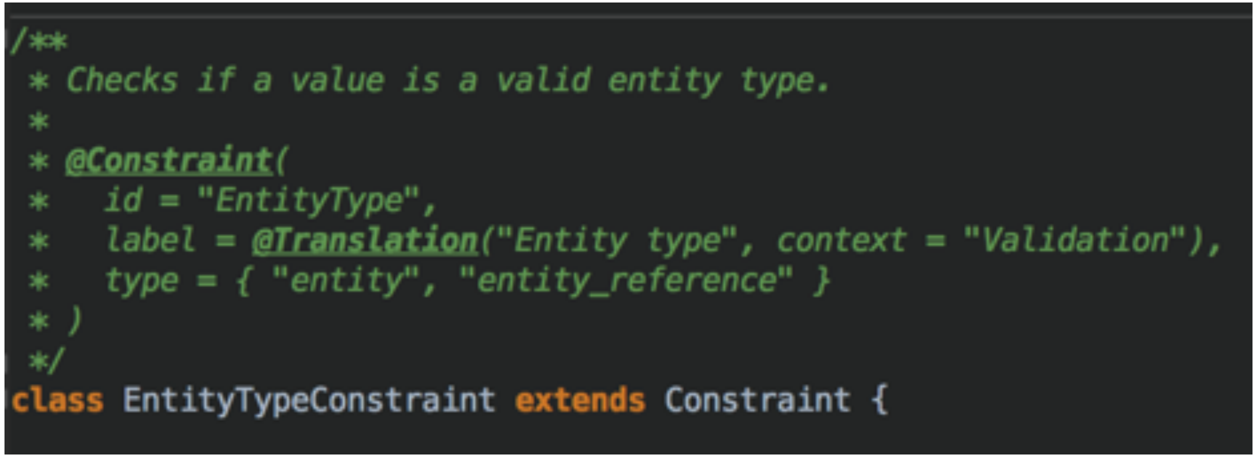
WHAT ABOUT THE TYPE?

- Nothing: Empty array (the default)
- Everything: false
- Entities: entity, entity:node
- FieldItem: field_item, field_item:entity_reference
- FieldItemList: not supported?
- Other TypedData: string, integer, ...

SETTING THE TYPE KEY



```
/**
 * Checks if a value is a valid entity type.
 *
 * @Constraint(
 *   id = "EntityType",
 *   label = @Translation("Entity type", context = "Validation"),
 *   type = { "entity", "entity_reference" }
 * )
 */
class EntityTypeConstraint extends Constraint {
```

CONSTRAINTS CAN TAKE OPTIONS

- Completely optional
- Simply define them as object properties
- Can accept any number of options as an array
- How to pass the options is covered later

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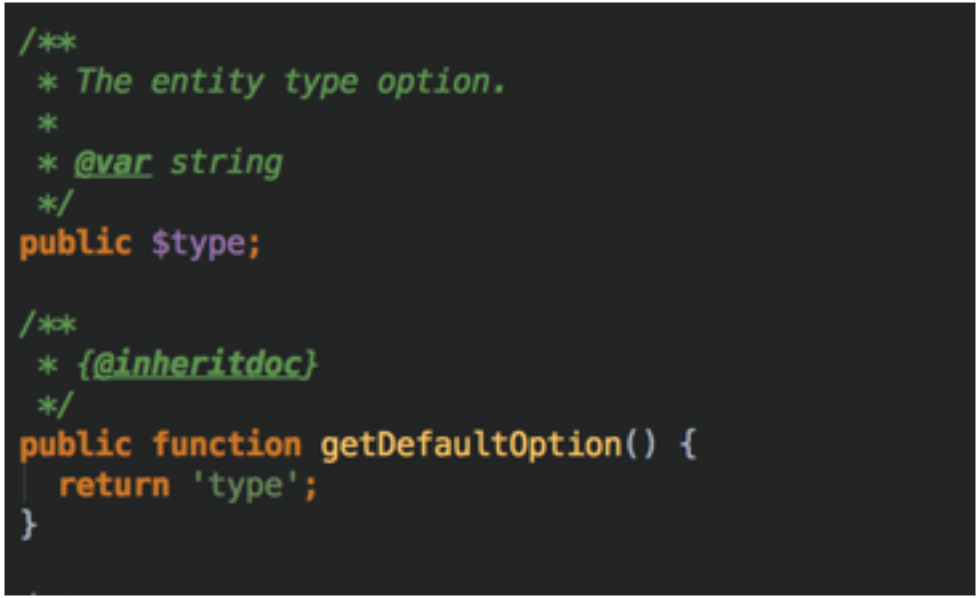
ACCEPTING OPTIONS



```
/**
 * The entity type option.
 *
 * @var string
 */
public $type;

/**
 * {@inheritdoc}
 */
public function getDefaultOption() {
  return 'type';
}
```

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THE VALIDATOR CLASS

MAGIC CLASS NAME

- Default: Name of constraint class + Validator
- Can change the default in

  `Constraint::validatedBy()`

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THE VALUE IT RECEIVES

- For entities: The entity
- For fields: The FieldItemList
- For field entries: The FieldItem
- For properties: The raw value

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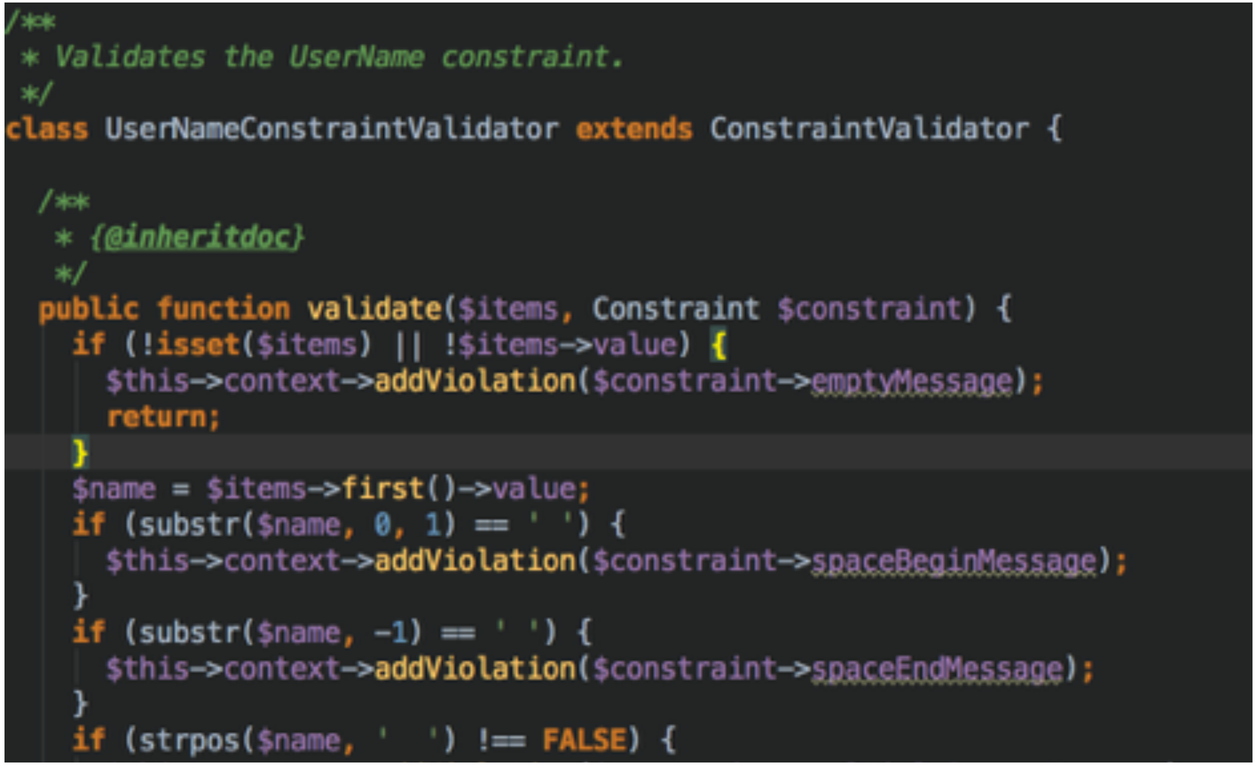

```
/**
 * Validates the UserName constraint.
 */
class UserNameConstraintValidator extends ConstraintValidator {

  /**
   * {@inheritdoc}
   */
  public function validate($items, Constraint $constraint) {
    if (!isset($items) || !$items->value) {
      $this->context->addViolation($constraint->emptyMessage);
      return;
    }
    $name = $items->first()->value;
    if (substr($name, 0, 1) == ' ') {
      $this->context->addViolation($constraint->spaceBeginMessage);
    }
    if (substr($name, -1) == ' ') {
      $this->context->addViolation($constraint->spaceEndMessage);
    }
    if (strpos($name, '  ') !== FALSE) {
```

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THE PROPERTY PATH

MENTIONING FOR COMPLETENESS

- Tells you where the error occurred
- Defaults to the item being validated
- Can be more specific in your validator
- Example: ValidReferenceConstraintValidator

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EXAMPLES

- When validating an entity

  `field_foo.0.value`

  `field_bar.2`
- When validating a field

  `3.property_bar`
- When validating a field entry

  `value`

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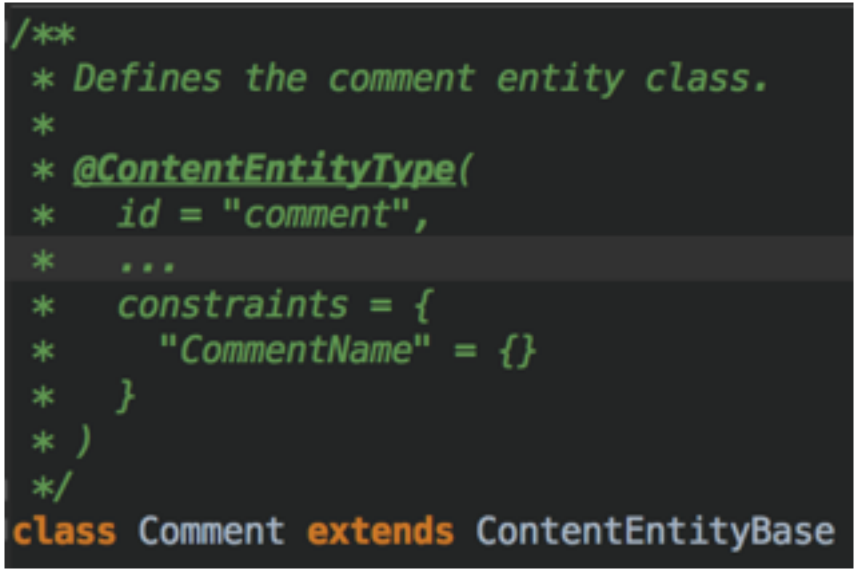
HOW TO APPLY VALIDATORS

THE ENTITY LEVEL

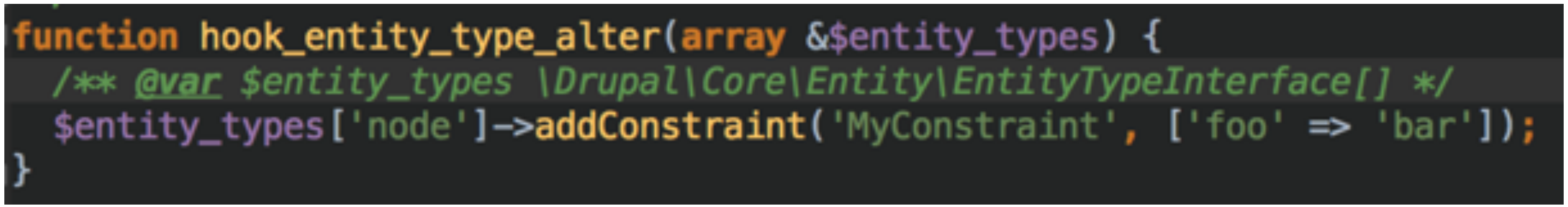


```
/**
 * Defines the comment entity class.
 *
 * @ContentEntityType(
 *   id = "comment",
 *   ...
 *   constraints = {
 *     "CommentName" = {}
 *   }
 * )
 */
class Comment extends ContentEntityBase
```

- As part of the annotation

THE ENTITY LEVEL

- As part of the annotation
- hook_entity_type_alter()



```
function hook_entity_type_alter(array &$entity_types) {
  /** @var $entity_types \Drupal\Core\Entity\EntityTypeInterface[] */
  $entity_types['node']->addConstraint('MyConstraint', ['foo' => 'bar']);
}
```

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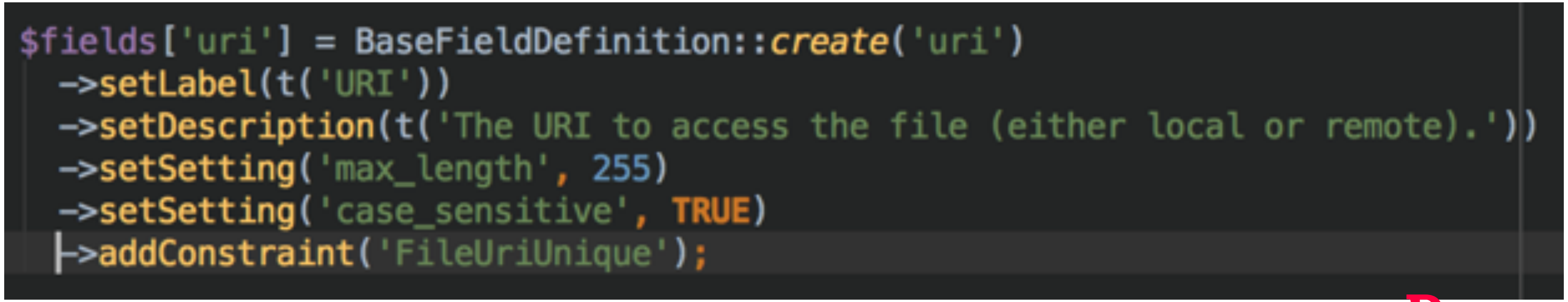
THE FIELD LEVEL

- BaseFieldDefinition::addConstraint()
- hook_entity_base_field_info_alter()
- hook_entity_bundle_field_info_alter()



```
$fields['uri'] = BaseFieldDefinition::create('uri')
  ->setLabel(t('URI'))
  ->setDescription(t('The URI to access the file (either local or remote).'))
  ->setSetting('max_length', 255)
  ->setSetting('case_sensitive', TRUE)
  ->addConstraint('FileUriUnique');
```

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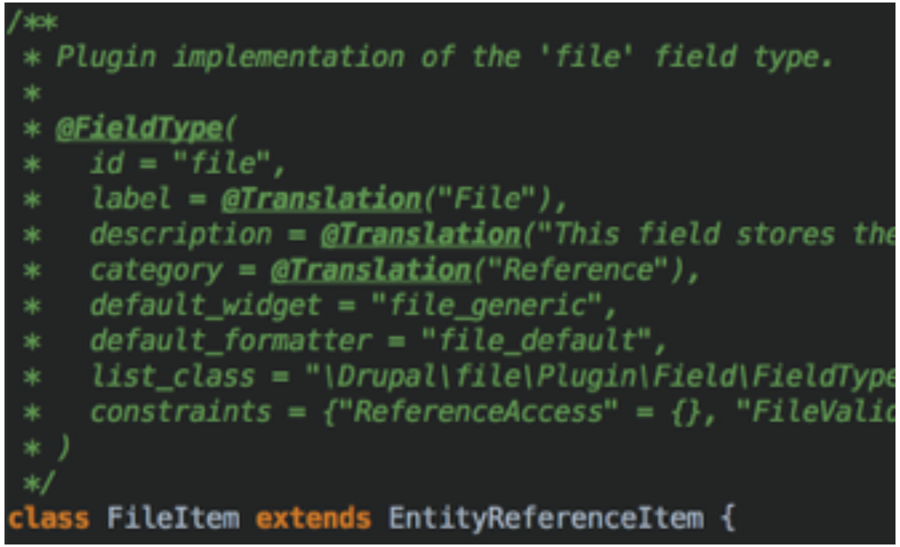
THE FIELD ENTRY LEVEL



```
/**
 * Plugin implementation of the 'file' field type.
 *
 * @FieldType(
 *   id = "file",
 *   label = @Translation("File"),
 *   description = @Translation("This field stores the
 *   category = @Translation("Reference"),
 *   default_widget = "file_generic",
 *   default_formatter = "file_default",
 *   list_class = "\Drupal\file\Plugin\Field\FieldType
 *   constraints = {"ReferenceAccess" = {}, "FileValic
 * )
 */
class FileItem extends EntityReferenceItem {
```

- As part of the annotation
- `hook_field_info_alter()`

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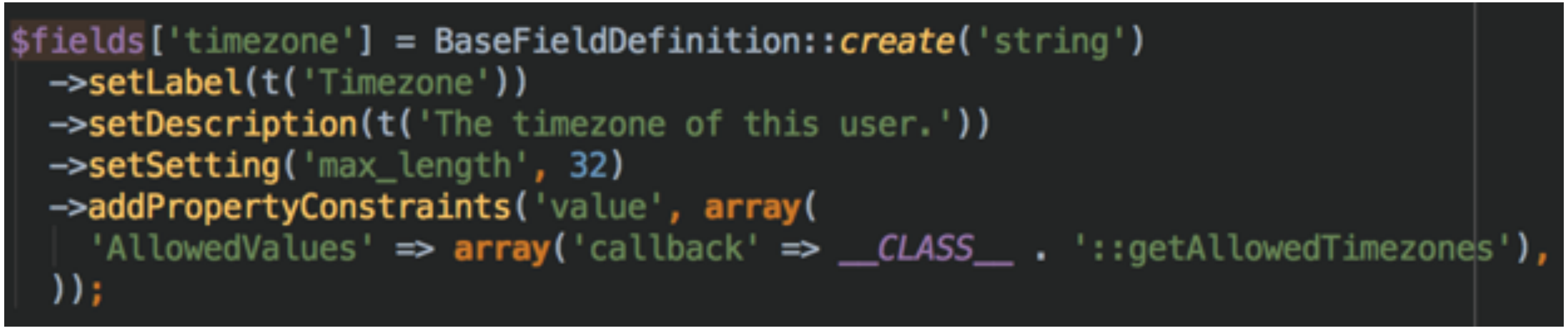
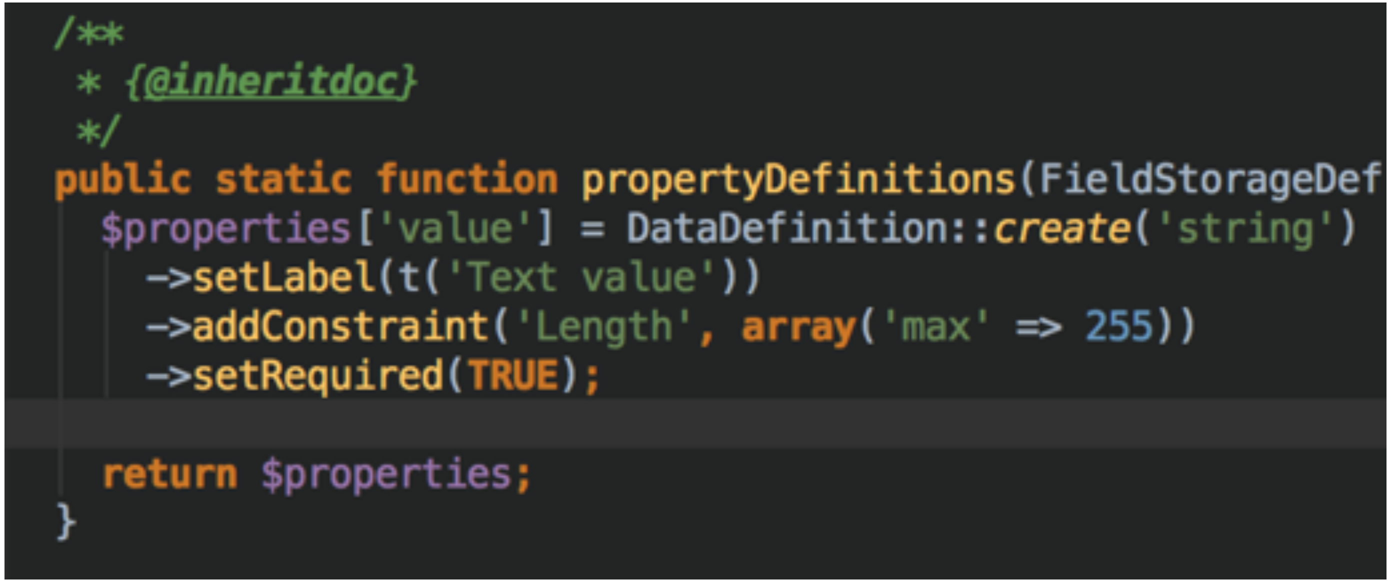
THE FIELD PROPERTY LEVEL

- BaseFieldDefinition::addPropertyConstraints()
- hook_entity_base_field_info_alter()
- hook_entity_bundle_field_info_alter()



```
$fields['timezone'] = BaseFieldDefinition::create('string')
  ->setLabel(t('Timezone'))
  ->setDescription(t('The timezone of this user.'))
  ->setSetting('max_length', 32)
  ->addPropertyConstraints('value', array(
    'AllowedValues' => array('callback' => __CLASS__ . '::getAllowedTimezones'),
  ));
```

THE FIELD PROPERTY LEVEL



```
/**
 * {@inheritdoc}
 */
public static function propertyDefinitions(FieldStorageDef
  $properties['value'] = DataDefinition::create('string')
    ->setLabel(t('Text value'))
    ->addConstraint('Length', array('max' => 255))
    ->setRequired(TRUE);

  return $properties;
}
```

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THAT'S IT!

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QUESTIONS?

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