

Forms and Validation

Forms are the traditional way for most web applications to gather significant information from the user. Whether it's a search form, a login screen or a multi-page registration wizard, Tapestry uses standard HTML forms, with HTTP POST actions by default. In addition, AJAX-based form submission is supported using [Zones](#).

Tapestry provides support for creating and rendering forms, populating their fields, and validating user input. For simple cases, input validation is declarative, meaning you simply tell Tapestry what validations to apply to a given field, and it takes care of it on the server and (optionally) on the client as well. In addition, you can provide event handler methods in your page or component classes to handle more complex validation scenarios.

Finally, Tapestry not only makes it easy to present errors messages to the user, but it can also automatically highlight form fields when validation fails.

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The Form Component

The core of Tapestry's form support is the [Form](#) component. The Form component encloses (wraps around) all the other *field components* such as [TextField](#), [TextArea](#), [Checkbox](#), etc.

Form Events

The Form component emits a number of [component events](#). You'll want to provide event handler methods for some of these.

When rendering, the Form component emits two events: first, "prepareForRender", then "prepare". These allow the Form's container to set up any fields or properties that will be referenced in the form. For example, this is a good place to create a temporary entity object to be rendered, or to load an entity from a database to be edited.

When user submits the form on the client, a series of steps occur on the server.

First, the Form emits a "prepareForSubmit" event, then a "prepare" event. These allow the container to ensure that objects are set up and ready to receive information from the form submission.

Next, all the fields inside the form are *activated* to pull values out of the incoming request, validate them and (if valid) store the changes.

After the fields have done their processing, the Form emits a "validate" event. This is your chance to perform any cross-form validation that can't be described declaratively.

Next, the Form determines if there have been any validation errors. If there have been, then the submission is considered a failure, and a "failure" event is emitted. If there have been no validation errors, then a "success" event is emitted.

Finally, the Form emits a "submit" event, for logic that doesn't care about success or failure.

For Tapestry 4 Users: Tapestry 5 does not use the fragile "form rewind" approach from Tapestry 4. Instead, a hidden field generated during the render stores the information needed to process the form submission.

Form Event (in order)	Phase	When emitted (and typical use)	Method Name	@OnEvent Constant
-----------------------	-------	--------------------------------	-------------	-------------------

prepareForRender	Render	Before rendering the form (e.g. load an entity from a database to be edited)	onPrepareForRender()	EventConstants.PREPARE_FOR_RENDER
prepare	Render	Before rendering the form, but after <i>prepareForRender</i>	onPrepare()	EventConstants.PREPARE
prepareForSubmit	Submit	Before the submitted form is processed	onPrepareForSubmit()	EventConstants.PREPARE_FOR_SUBMIT
prepare	Submit	Before the submitted form is processed, but after <i>prepareForSubmit</i>	onPrepare()	EventConstants.PREPARE
validate	Submit	After fields have been populated from submitted values and validated (e.g. perform cross-field validation)	onValidate	EventConstants.VALIDATE
validateForm	Submit	same as <i>validate</i> (<i>deprecated – do not use</i>)	onValidateForm	
failure	Submit	After one or more validation errors have occurred	onFailure()	EventConstants.FAILURE
success	Submit	When validation has completed <i>without</i> any errors (e.g. save changes to the database)	onSuccess()	EventConstants.SUCCESS
submit	Submit	After all validation (success or failure) has finished	onSubmit()	EventConstants.SUBMIT
canceled	Submit	Whenever a <i>Submit</i> or <i>LinkSubmit</i> component containing <i>mode="cancel"</i> or <i>mode="unconditional"</i> is clicked	onCanceled()	EventConstants.CANCELED

Note that the "prepare" event is emitted during both form rendering and form submission.

Handling Events

Main Article: [Component Events](#)

You handle events by providing methods in your page or component class, either following the `onEventFromComponent()` naming convention or using the `OnEvent` annotation. For example:

Event Handler Using Naming Convention

```
void onValidateFromPassword() { ...}
```

or the equivalent using `@OnEvent`:

Event Handler Using `@OnEvent` Annotation

```
@OnEvent(value=EventConstants.VALIDATE, component="password")
void verifyThePassword() { ...}
```

Tracking Validation Errors

Associated with the Form is a [ValidationTracker](#) that tracks all the provided user input and validation errors for every field in the form. The tracker can be provided to the Form via the Form's tracker parameter, but this is rarely necessary.

The Form includes methods `isValid()` and `getHasErrors()`, which are used to see if the Form's validation tracker contains any errors.

In your own logic, it is possible to record your own errors. Form includes two different versions of method `recordError()`, one of which specifies a [Field](#) (an interface implemented by all form element components), and one of which is for "global" errors, not associated with any particular field. If the error concerns only a single field, you should use the first version so that the field will be highlighted.

Storing Data Between Requests

As with other action requests, the result of a form submission (except when using [Zones](#)) is to send a redirect to the client, which results in a second request (to re-render the page). The [ValidationTracker](#) must be [persisted](#) (generally in the `HttpSession`) across these two requests in order to prevent the loss of validation information. Fortunately, the default [ValidationTracker](#) provided by the Form component is persistent, so you don't normally have to worry about it.

However, for the same reason, the individual fields updated by the components should also be persisted across requests, and this is something you **do** need to do yourself – generally with the `@Persist` annotation.



New in Tapestry 5.4

Starting in Tapestry 5.4, the default behavior for server-side validation failures is to re-render the page within the same request (rather than emitting a redirect). This removes the need to use a session-persistent field to store the validation tracker when validation failures occur.

For example, a Login page class, which collects a user name and a password, might look like:

Login.java Example

```
package com.example.newapp.pages;

import com.example.newapp.services.UserAuthenticator;
import org.apache.tapestry5.annotations.*;
import org.apache.tapestry5.corelib.components.Form;
import org.apache.tapestry5.corelib.components.PasswordField;
import org.apache.tapestry5.ioc.annotations.Inject;

public class Login {
    @Persist
    @Property
    private String userName;

    @Property
    private String password;

    @Inject
    private UserAuthenticator authenticator;


    @InjectComponent("password")
    private PasswordField passwordField;


    @Component
    private Form loginForm;

    /**
     * Do the cross-field validation
     */
    void onValidateFromLoginForm() {
        if (!authenticator.isValid(userName, password)) {
            // record an error, and thereby prevent Tapestry from emitting a "success" event
            loginForm.recordError(passwordField, "Invalid user name or password.");
        }
    }

    /**
     * Validation passed, so we'll go to the "PostLogin" page
     */
    Object onSuccess() {
        return PostLogin.class;
    }
}
```

Because a form submission is really *two* requests: the submission itself (which results in a redirect response), then a second request for the page (which results in a re-rendering of the page), it is necessary to persist the `userName` field between the two requests, by using the `@Persist` annotation. This would be necessary for the password field as well, except that the `PasswordField` component never renders a value.

 Note that the `onValidateFromLoginForm()` and `onSuccess()` methods are not public; event handler methods can have any visibility, even private. Package private (that is, no modifier) is the typical use, as it allows the component to be tested, from a test case class in the same package.

 To avoid data loss, fields whose values are stored in the `HttpSession` (such as `userName`, above) must be serializable, particularly if you want to be able to cluster your application or preserve sessions across server restarts.

The `Form` only emits a "success" event if there are no prior validation errors. This means it is not necessary to write `if (form.getHasErrors()) return;` as the first line of the method.

Finally, notice how business logic fits into validation. The `UserAuthenticator` service is responsible for ensuring that the `userName` and (plaintext) password are valid. When it returns false, we ask the Form component to record an error. We provide the `PasswordField` instance as the first parameter; this ensures that the password field, and its label, are decorated when the Form is re-rendered, to present the errors to the user.

Configuring Fields and Labels

The Login page template below contains a minimal amount of Tapestry instrumentation and references some of the [Bootstrap](#) CSS classes (Bootstrap is automatically integrated into each page by default, starting with Tapestry 5.4).

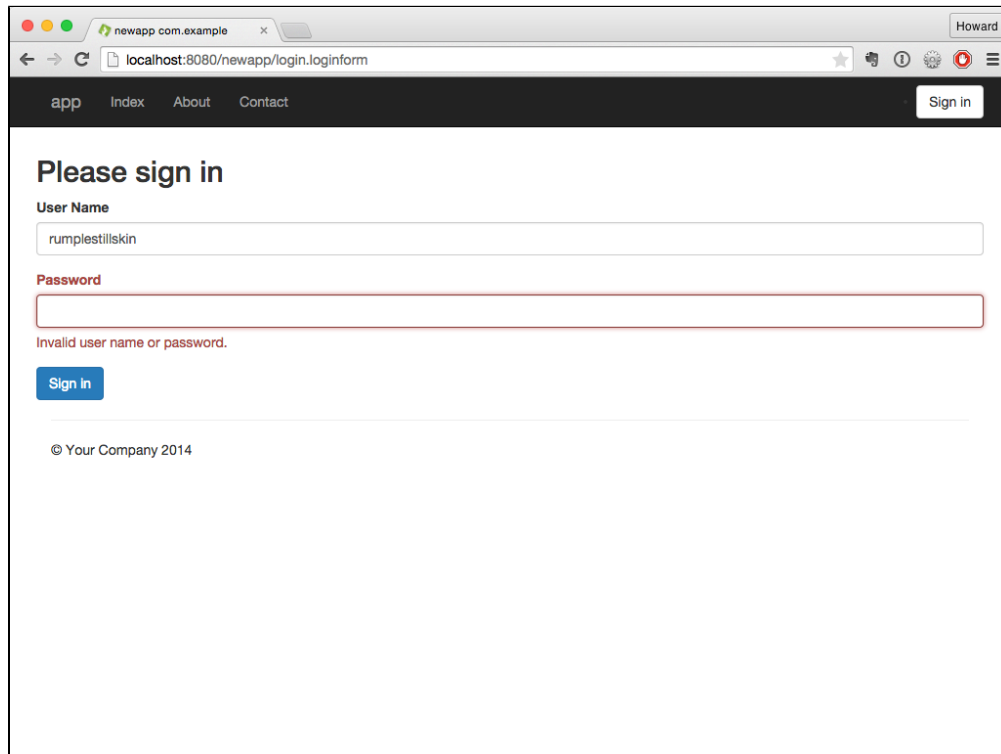
Login.tml Example

```
<html t:type="layout" title="newapp com.example"
  xmlns:t="http://tapestry.apache.org/schema/tapestry_5_4.xsd">

  <div class="row">
    <div class="span4 offset3">
      <t:form t:id="loginForm">
        <h2>Please sign in</h2>
        <t:textfield t:id="userName" t:mixins="formgroup"/>
        <t:passwordfield t:id="password" value="password" t:mixins="formgroup"/>
        <t:submit class="btn btn-large btn-primary" value="Sign in"/>
      </t:form>
    </div>
  </div>

</html>
```

Rendering the page gives a reasonably pleasing first pass:



The screenshot shows a web browser window with the address bar displaying `localhost:8080/newapp/login.loginform`. The page has a dark navigation bar with links for 'app', 'Index', 'About', and 'Contact', along with a 'Sign in' button. The main content area is titled 'Please sign in' and contains a login form. The 'User Name' field is filled with 'rumplestiltskin'. The 'Password' field is empty. Below the password field, a red error message reads 'Invalid user name or password.' A blue 'Sign in' button is positioned below the error message. The footer of the page indicates '© Your Company 2014'.

The Tapestry Form component is responsible for creating the necessary URL for the form submission (this is Tapestry's responsibility, not yours).

For the `TextField`, we provide a component id, `userName`. We could specify the `value` parameter, but the default is to match the `TextField`'s id against a property of the container, the Login page, if such a property exists.

As a rule of thumb, you should always give your fields a specific id (this id will be used to generate the `name` and `id` attributes of the rendered tag). Being allowed to omit the `value` parameter helps to keep the template from getting too cluttered.

The `FormGroup` mixin decorates the field with some additional markup, including a `<label>` element; this leverages more of Bootstrap.

userName component as rendered

```
<div class="form-group">
  <label for="userName" class="control-label">User Name</label>
  <input id="userName" class="form-control" name="userName" type="text">
</div>
```

Form Validation

The above example is a very basic form which allows the fields to be empty. However, with a little more effort we can add client-side validation to prevent the user from submitting the form with either field empty.

Validation in Tapestry involves associating one or more *validators* with a form element component, such as `TextField` or `PasswordField`. This is done using the **validate** parameter:

```
<t:textfield t:id="userName" validate="required" t:mixins="formgroup"/>
<t:passwordfield t:id="password" value="password" validate="required" t:mixins="formgroup"/>
```

Available Validators

Tapestry provides the following built-in validators:

Validator	Constraint Type	Description	Example
email	–	Ensures that the given input looks like a valid e-mail address	<code><t:textfield value="userEmail" validate="email" /></code>
max	long	Enforces a maximum integer value	<code><t:textfield value="age" validate="max=120,min=0" /></code>
maxLength	int	Makes sure that a string value has a maximum length	<code><t:textfield value="zip" validate="maxlength=7" /></code>
min	long	Enforces a minimum integer value	<code><t:textfield value="age" validate="max=120,min=0" /></code>
minLength	int	Makes sure that a string value has a minimum length	<code><t:textfield value="somefield" validate="minlength=1" /></code>
none	–	Does nothing (used to override a <code>@Validate</code> annotation)	<code><t:textfield value="somefield" validate="none" /></code>
regex	pattern	Makes sure that a string value conforms to a given pattern	<code><t:textfield value="letterfield" validate="regex=^[A-Za-z]+\$" /></code>
required	–	Makes sure that a string value is not null and not the empty string	<code><t:textfield value="name" validate="required" /></code>
checked (<i>Since 5.4.5</i>)	boolean	Makes sure that the boolean is true (checkbox is checked)	<code><t:Checkbox value="value" validate="checked" /></code>
unchecked (<i>Since 5.4.5</i>)	boolean	Makes sure that the boolean is false (checkbox is unchecked)	<code><t:Checkbox value="value" validate="unchecked" /></code>

Centralizing Validation with @Validate

The `@Validate` annotation can take the place of the `validate` parameter of `TextField`, `PasswordField`, `TextArea` and other components. When the `validate` parameter is not bound in the template file, the component will check for the `@Validate` annotation and use its value as the validation definition.

The annotation may be placed on the getter or setter method, or on the field itself.

Let's update the two fields of the Login page:

```

@Persist
@property
@Validate("required")
private String userName;

@property
@Validate("required")
private String password;

```

Now, we'll rebuild the app, refresh the browser, and just hit enter:

The screenshot shows a web browser window with the address bar displaying 'localhost:8080/newapp/login.loginform'. The page has a dark header with navigation links 'app', 'Index', 'About', and 'Contact', and a 'Sign in' button. The main content area is titled 'Please sign in' and contains two input fields: 'User Name' (containing 'rumplestiltskin') and 'Password' (empty). A red border highlights the 'Password' field, and a red error message 'Invalid user name or password.' is displayed below it. A 'Sign in' button is at the bottom of the form. The footer shows '© Your Company 2014'.

The form has updated, in place, to present the errors. You will not be able to submit the form until some value is provided for each field.

HTML5 Client-side Validation

When the `tapestry.enable-html5-support` configuration symbol is set to true (it is **false** by default), the Tapestry's built-in validators will automatically enable the HTML5-specific "type" and validation attributes to the rendered HTML of Tapestry's form components, triggering the HTML5 client-side validation behavior built into most modern browsers. For example, if you use the "email" and "required" validators, like this:

```
<t:textfield validate="email,required" .../>
```

then the output HTML will look like this:

```
<input type="email" required ...>
```

which causes modern browsers to present a validation error message whenever text is entered that doesn't look like an email address, or if the field is left blank.

The browser's built-in validation is performed *before* Tapestry's own client-side validation. This is so that older browsers will still perform client-side validation as expected.

The following behaviors are included:

- The **"required"** validator adds the "required" attribute to the rendered HTML
- The **"checked"** validator adds the "required" attribute to the rendered HTML (*Since 5.4.5*)
- The **"regexp"** validator adds the "pattern" attribute to the rendered HTML
- The **"email"** validator sets the `type` attribute to "email" in the rendered HTML

- The **"min"** validator sets the `type` attribute to "number" and adds the "min" attribute in the rendered HTML
- The **"max"** validator sets the `type` attribute to "number" and adds the "max" attribute in the rendered HTML
- When bound to a **number** type, the `TextField` component sets the `type` attribute to "number" in the rendered HTML

Server Side Validation

Some validation can't, or shouldn't, be done on the client side. How do we know if the password is correct? Short of downloading all users and passwords to the client, we really need to do the validation on the server.

In fact, all client-side validation (via the `validate` parameter, or `@Validate` annotation) is performed again on the server.

It is also possible to perform extra validation there.

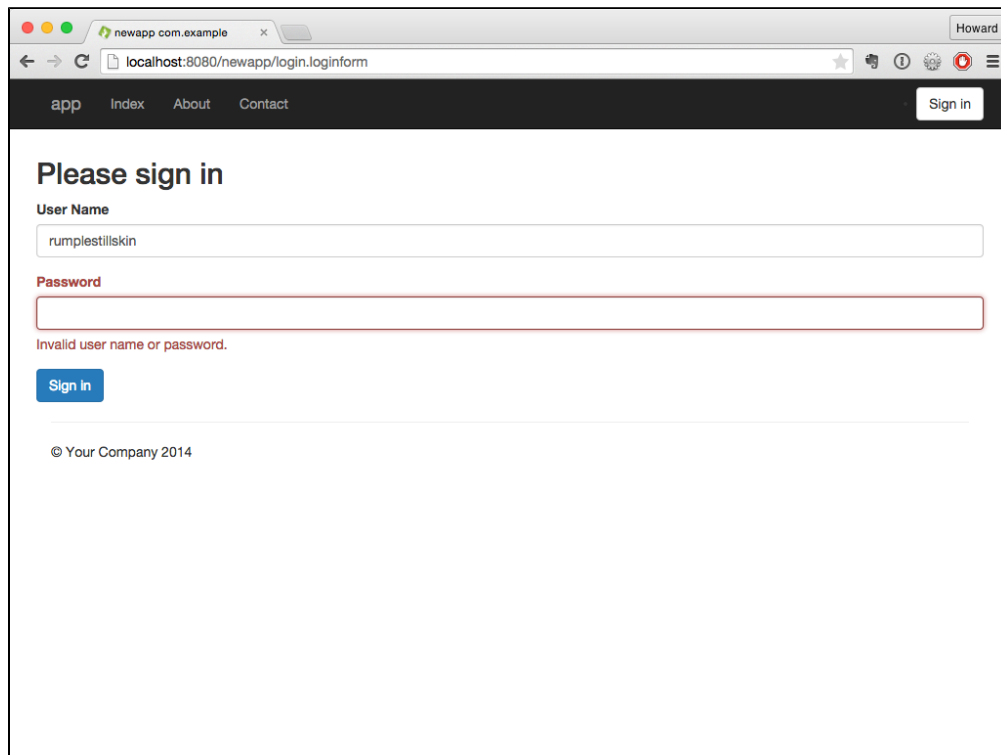
```
/**
 * Do the cross-field validation
 */
void onValidateFromLoginForm() {
    if (!authenticator.isValid(userName, password)) {
        // record an error, and thereby prevent Tapestry from emitting a "success" event
        loginForm.recordError(passwordField, "Invalid user name or password.");
    }
}
```

This is the `validate` event handler from the `loginForm` component. It is invoked once all the components have had a chance to read values out of the request, do their own validations, and update the properties they are bound to.

In this case, the `authenticator` is used to decide if the `userName` and `password` is valid. In a real application, this would be where a database or other external service was consulted.

If the combination is not valid, then the `password` field is marked as in error. The form is used to record an error, about a component (the `passwordField`) with an error message.

Entering any two values into the form and submitting will cause a round trip; the form will re-render to present the error to the user:



The screenshot shows a web browser window with the address bar displaying `localhost:8080/newapp/login.loginform`. The page has a dark header with navigation links: `app`, `Index`, `About`, `Contact`, and a `Sign in` button. The main content area is titled "Please sign in" and contains two input fields: "User Name" (containing `rumplestiltskin`) and "Password" (empty). Below the password field, a red error message reads "Invalid user name or password." A blue "Sign in" button is positioned below the error message. At the bottom of the form, there is a copyright notice: "© Your Company 2014".

Notice that the cursor is placed directly into the password field.



In versions of Tapestry prior to 5.4, a form with validation errors would result in a redirect response to the client; often, temporary server-side data (such as the `userName` field) would be lost. Starting in 5.4, submitting a form with validation errors results in the new page being rendered in the same request as the form submission.

Customizing Validation Messages

Each validator (such as "required" or "minlength") has a default message used (on the client side and the server side) when the constraint is violated; that is, when the user input is not valid.

The message can be customized by adding an entry to the page's [message catalog](#) (or the containing component's message catalog). As with any localized property, this can also go into the application's message catalog.

The first key checked is *formId-fieldId-validatorName*-message.

- *formId*: the local component id of the Form component
- *fieldId*: the local component id of the field (TextField, etc.)
- *validatorName*: the name of the validator, i.e., "required" or "minlength"

If there is no message for that key, a second check is made, for *fieldId-validatorName*-message. If that does not match a message, then the built-in default validation message is used.

For example, if the form ID is "loginForm", the field ID is "userName", and the validator is "required" then Tapestry will first look for a "loginForm-userName-required-message" key in the message catalog, and then for a "userName-required-message" key.

The validation message in the message catalog may contain [printf-style format strings](#) (such as %s) to indicate where the validate parameter's value will be inserted. For example, if the validate parameter in the template is `minLength=3` and the validation message is "User name must be at least %s characters" then the corresponding error message would be "User name must be at least 5 characters".

Customizing Validation Messages for BeanEditForm

The [BeanEditForm](#) component also supports validation message customizing. The search for messages is similar; the *formId* is the component id of the BeanEditForm component (not the Form component it contains). The *fieldId* is the property name.

Configuring Validator Constraints in the Message Catalog

It is possible to omit the validation constraint from the validate parameter (or @Validator annotation), in which case it is expected to be stored in the message catalog.

This is useful when the validation constraint is awkward to enter inline, such as a regular expression for use with the regexp validator.

The key here is similar to customizing the validation message: *formId-fieldId-validatorName* or just *fieldId-validatorName*.

For example, your template may have the following:

```
<t:textfield t:id="ssn" validate="required,regexp"/>
```

And your message catalog can contain:

```
ssn-regexp=\d{3}-\d{2}-\d{4}
ssn-regexp-message=Social security numbers are in the format 12-34-5678.
```

This technique also works with the BeanEditForm; as with validation messages, the *formId* is the BeanEditForm component's id, and the *fieldId* is the name of the property being edited.

Validation Macros

Added in 5.2

Lists of validators can be combined into *validation macros*. This mechanism is convenient for ensuring consistent validation rules across an application. To create a validation macro, just contribute to the ValidatorMacro Service in your module class (normally AppModule.java), by adding a new entry to the configuration object, as shown below. The first parameter is the name of your macro, the second is a comma-separated list of validators:

AppModule.java (partial)

```
@Contribute(ValidatorMacro.class)
public static void combinePasswordValidators(MappedConfiguration<String, String> configuration) {
    configuration.add("passwordValidator", "required,minlength=5,maxlength=15");
}
```

Then, you can use this new macro in component templates and classes:

```
<input t:type="textField" t:id="password" t:validate="passwordValidator" />
```

```
@Validate("password")
private String password;
```

Overriding the Translator with Events

The TextField, PasswordField and TextArea components all have a translate parameter, a [FieldTranslator](#) object that is used to convert values on the server side to strings on the client side.

In most cases, the translate parameter is not set explicitly; Tapestry derives an appropriate value based on the type of property being edited by the field.

In certain cases, you may want to override the translator. This can be accomplished using two events triggered on the component, "toclient" and "parseclient".

The "toclient" event is passed the current object value and returns a string, which will be the default value for the field. When there is no event handler, or when the event handler returns null, the default Translator is used to convert the server side value to a string.

For example, you may have a quantity field that you wish to display as blank, rather than zero, initially:

```
<t:textfield t:id="quantity" size="10"/>

...

private int quantity;

String onToClientFromQuantity()
{
    if (quantity == 0) return "";

    return null;
}
```

This is good so far, but if the field is optional and the user submits the form, you'll get a validation error, because the empty string is not valid as an integer.

That's where the "parseclient" event comes in:

```
Object onParseClientFromQuantity(String input)
{
    if ("".equals(input)) return 0;

    return null;
}
```

The event handler method has precedence over the translator. Here it checks for the empty string (and note that the input may be null!) and evaluates that as zero.

Again, returning null lets the normal translator do its work.

The event handler may also throw a [ValidationException](#) to indicate a value that can't be parsed.

Now, what if you want to perform your own custom validation? That's another event: "validate":

```
void onValidateFromCount(Integer value) throws ValidationException
{
    if (value.equals(13)) throw new ValidationException("Thirteen is an unlucky number.");
}
```

This event gets fired **after** the normal validators. It is passed the *parsed* value (not the string from the client, but the object value from the translator, or from the "parseclient" event handler).

The method may not return a value, but may throw a ValidationException to indicate a problem with the value.

Caution: These events are exclusively on the *server side*. This means that, in certain circumstances, an input value will be rejected on the client side even though it is valid on the server side. You may need to disable client-side validation in order to use this feature.