Vue Fundamentals - 04
Component communication

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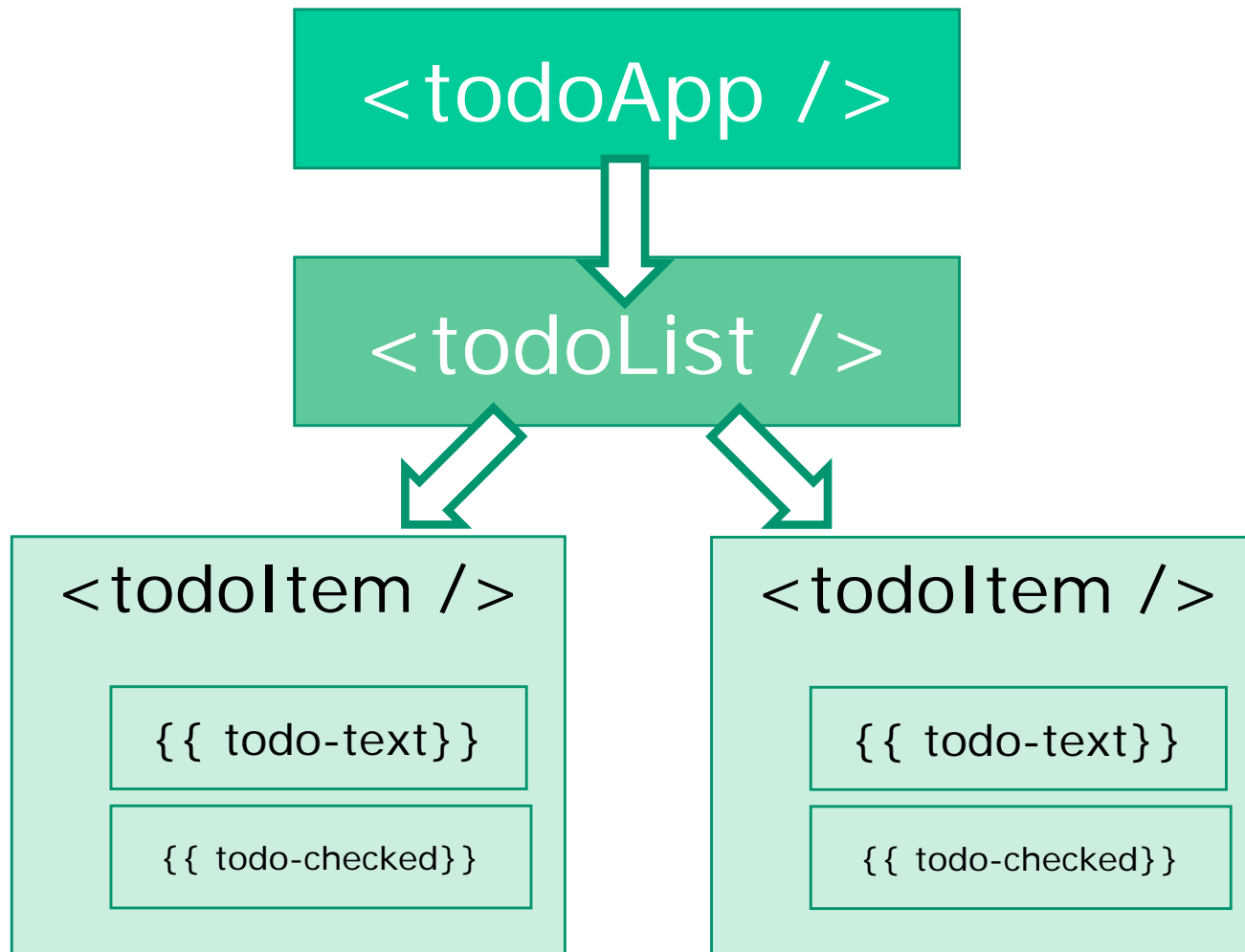
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Contents

- Parent–child communication:

    - Using props to share data with child components

    - Validating component properties

- Child–parent communication

    - Passing data back to parent components

- Injecting content into child components using slots

Vue app : Tree of components

Multiple components?

1. Create new `.vue` components

2. Import them in the parent component using `import` …

3. Reference them in the HTML, using `<ComponentName />`

4. Repeat for every component

Creating a CountryDetail Component

- We're creating a separate `CountryDetail` Component and move the HTML from the parent Component

```html
<template>
    <div>
        <h2>{{country.name }}</h2>
        <ul class="list-group">
            <li class="list-group-item">{{ country.id}}</li>
            …
        </ul>
    </div>
</template>

<script>
    export default {
        name: "CountryDetail",    ⟵
    }
</script>
```
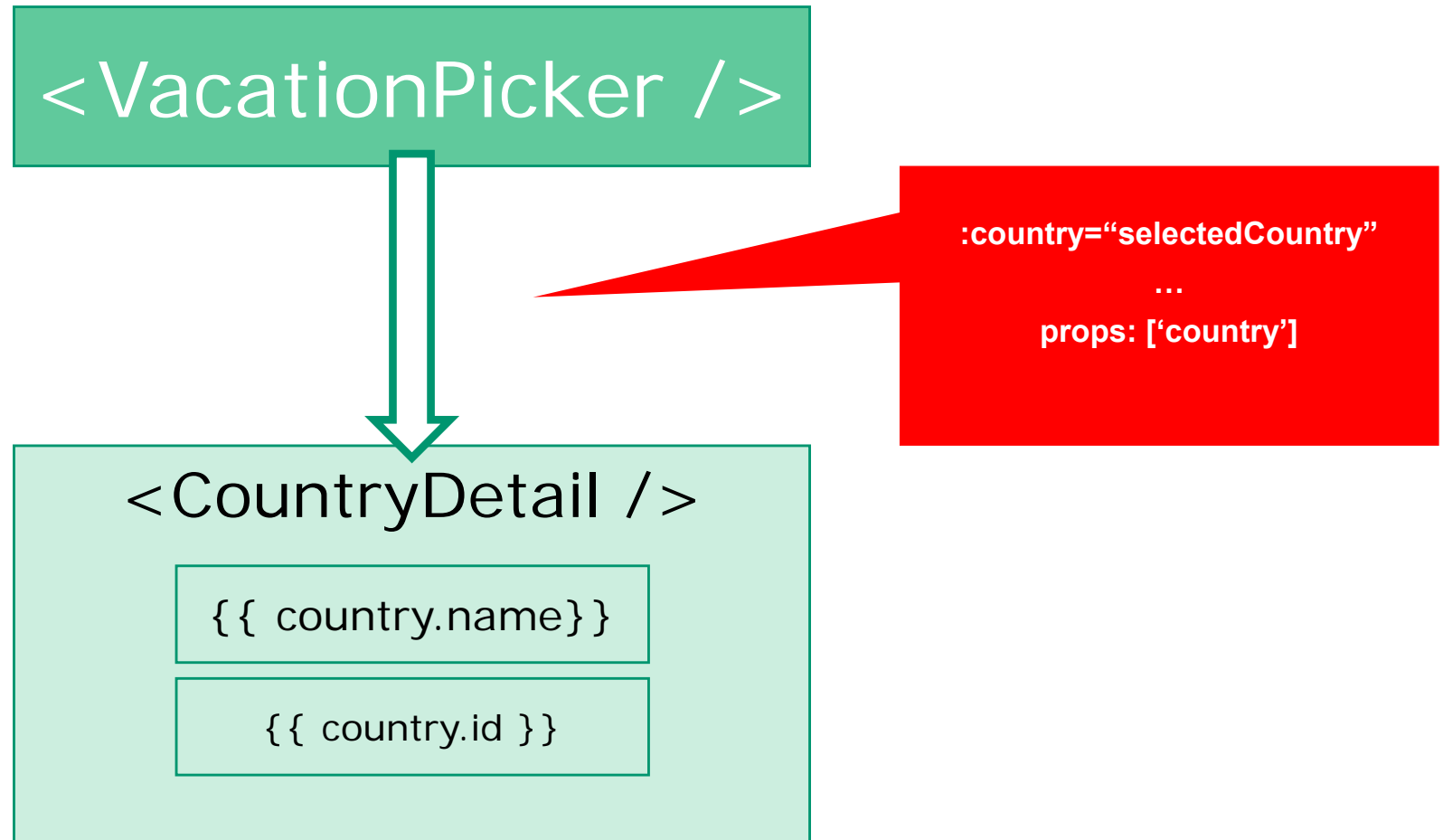
Data flow between components

"Data flows in to a component via `v-bind:` bindings"

Data flows out of a component via `v-on:` or `@event` events"

Parent-Child flow: `v-bind:` or `:`

`<VacationPicker />`

`<CountryDetail />`

{{ country.name}}

{{ country.id }}

:country="selectedCountry"

…

props: ['country']

1. Prepare Detail component to receive data

- The data you pass to a component are called *props*.

- Props can be strings, numbers, arrays, objects and so on.

- Props is an array on the component, like:

```
export default {
    name: "CountryDetail",
    props: ['country'],
}
```

We can then bind to the properties of

the passed in country with `country.id`, `country.name`, etc.

2. Update Parent component to send data down

```
<div class="col-6">
    <CountryDetail v-if="showDetails" :country="country" />
</div>
…
<script>
    // import the country data
    import data from '../data/data';
    import CountryDetail from "./CountryDetail";

    export default {
        name: 'VacationPicker',
        components: {CountryDetail},
        …
    },

</script>
```

Move methods and computed properties

- Move or copy the necessary methods from the parent component to child component,

- In this example:

  - getImgUrl(img)

  - isExpensive()

  - isOnsale()

```javascript
export default {
    name: "CountryDetail",
    props: ['country'],
    methods: {
        getImgUrl(img) {
            console.log(img);
            return require('../assets/countries/' + img);
        }
    },
    computed: {
        isExpensive() {
            return this.country.cost > 4000;
        },
        isOnSale() {
            return this.country.cost < 1000;
        }
    }
}
```

Casing of props

- HTML attributes are case-*insensitive*

- If you use camelCase on prop-names, use a hyphen in the html

    - i.e. `props: [`countryDetail`, `countryName`]` become

      `<DetailComponent country-detail="…" country-name="…" />`

- If you are using string templates this limitiation does not apply

```js
                                                                    JS
Vue.component('blog-post', {
  // camelCase in JavaScript
  props: ['postTitle'],
  template: '<h3>{{ postTitle }}</h3>'
})
```

```html
                                                                  HTML
<!-- kebab-case in HTML -->
<blog-post post-title="hello!"></blog-post>
```

https://vuejs.org/v2/guide/components-props.html

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Workshop

- Create an extra prop on the CountryDetailComponent and pass it.

- New: create a new component with a textbox and a button.

  - When the button is clicked, the text in the box is passed as a prop to a child component.

  - Tip: Use `v-model` on the textbox.

- Optional: implement the lifecycle hook `beforeupdate` on the child component, showing a counter that says how many times the component is updated.

- Generic Example on props: `../200-props`
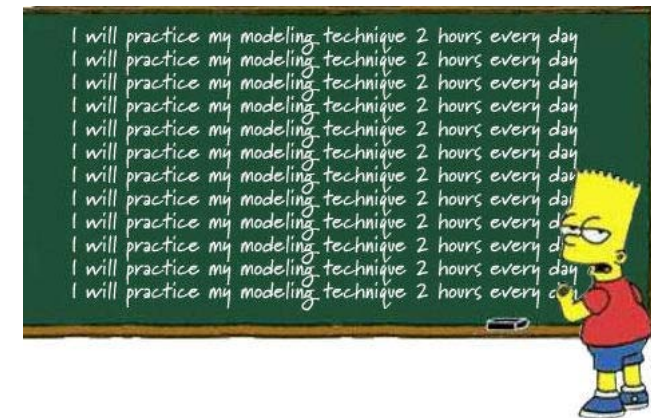
Validating props

Making sure only specific kinds of data get passed

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Validating props

- Prevent bad data being passed in.

- Use a keyed object instead of a simple array of props

- Optional: add extra attributes, like `required` or a `validator()` function.

- (With TypeScript the type checking of props is much easier)

Usually though, you'll want every prop to be a specific type of value. In these cases, you can list props as an object, where the properties' names and values contain the prop names and types, respectively:

```js
props: {
  title: String,
  likes: Number,
  isPublished: Boolean,
  commentIds: Array,
  author: Object
}
```

Simple validation of `CountryDetail` props

```
export default {
    name: "CountryDetail",
    props: {
        country: {
            type: Object,
            required: true
        },
        name: {
            type: String,
            required: true
        }
    },
    …
}
```
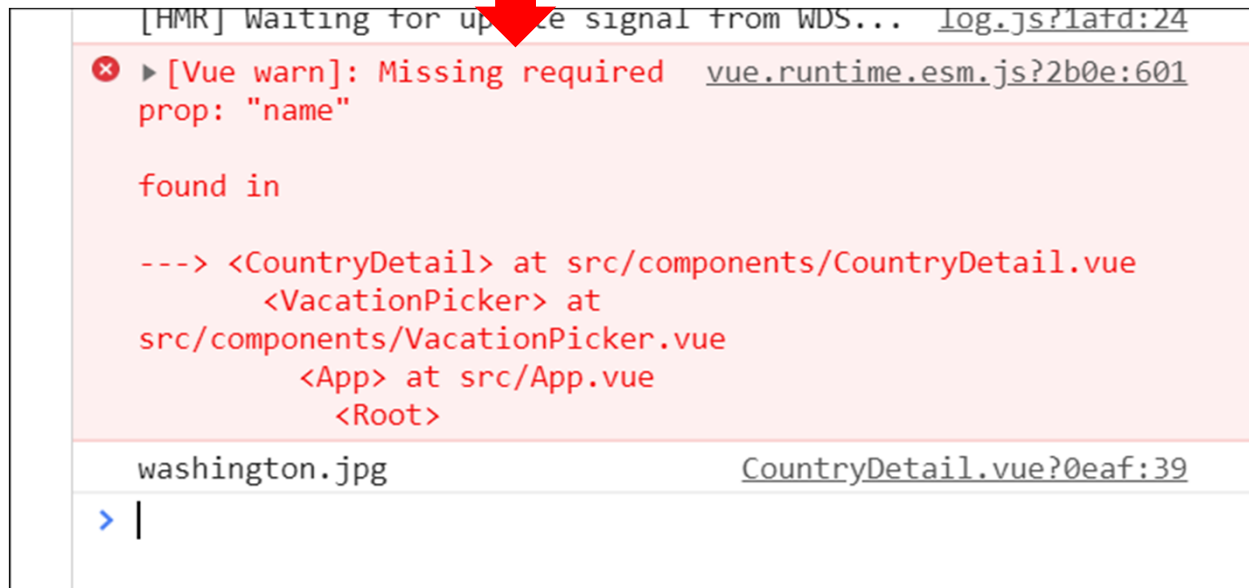
Console errors if prop has wrong value

```
<CountryDetail v-if="showDetails"
               :name="country.name"
               :country="'test'" />
```

Errors if you do not pass a `required` prop

```
<CountryDetail v-if="showDetails"
               :country="country" />
```


The application *will* continue to run, but shows the error in te console to help you further.

This kind of 'validation' does *not* stop you from assigning bad values.

Validator functions for props

- You can pass in a `validator` function to validate the input. For

  example:

    - we want to pass in an `id`,

    - It has to fall inside a specific range

    - (in real life apps of course you wouldn't hardcode this).

    - Validator has to return `true` or `false`

```
id:{
    type: Number,
     required:true,
     validator:function (value) {
         return [1, 2, 3, 4, 5, 6].includes(value)
    }
}
```

Errors in console on validation

```
countries: [
    {
        id: 100,
        name: 'USA',
        capital: 'Washington',
        …
    },
```

[HMR] waiting for update signal from WDS...   log.js?1afd:24

❌ ▶ [Vue warn]: Invalid prop: vue.runtime.esm.js?2b0e:601
custom validator check failed for prop "id".

found in

---> <CountryDetail> at src/components/CountryDetail.vue
        <VacationPicker> at
src/components/VacationPicker.vue
        <App> at src/App.vue
            <Root>

washington.jpg   CountryDetail.vue?0eaf:46
> |

One-way data binding

*"All props form a **one-way-down binding** between the child property and the parent one: when the parent property updates, it will flow down to the child, but **not the other way around**. This prevents child components from accidentally mutating the parent's state."*

Workshop

- Use your own component, add validation to the props it receives.

- Check different types: `String`, `Number`, `Boolean`, and so on

- Write a validation function on a string.

    - Use the `.includes()` (array), or `indexOf()` (string) methods to check if a requested value is available.

- Optional: use a `default` value for props!

    - We haven't covered this, look this up for yourself

    - https://alligator.io/vuejs/property-validation/

- Generic example: `../210-props-validation`
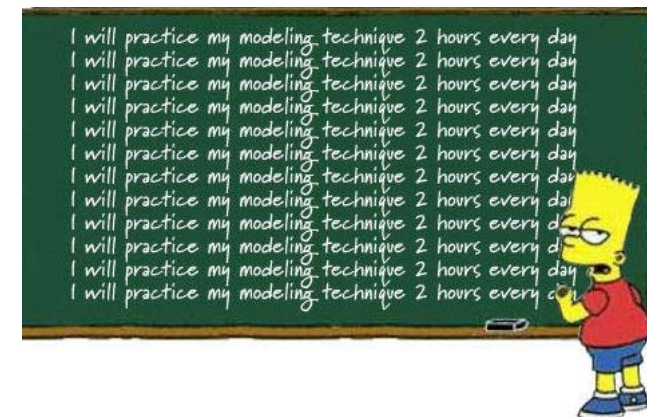
Passing data back

Communicating from child to parent component by sending events

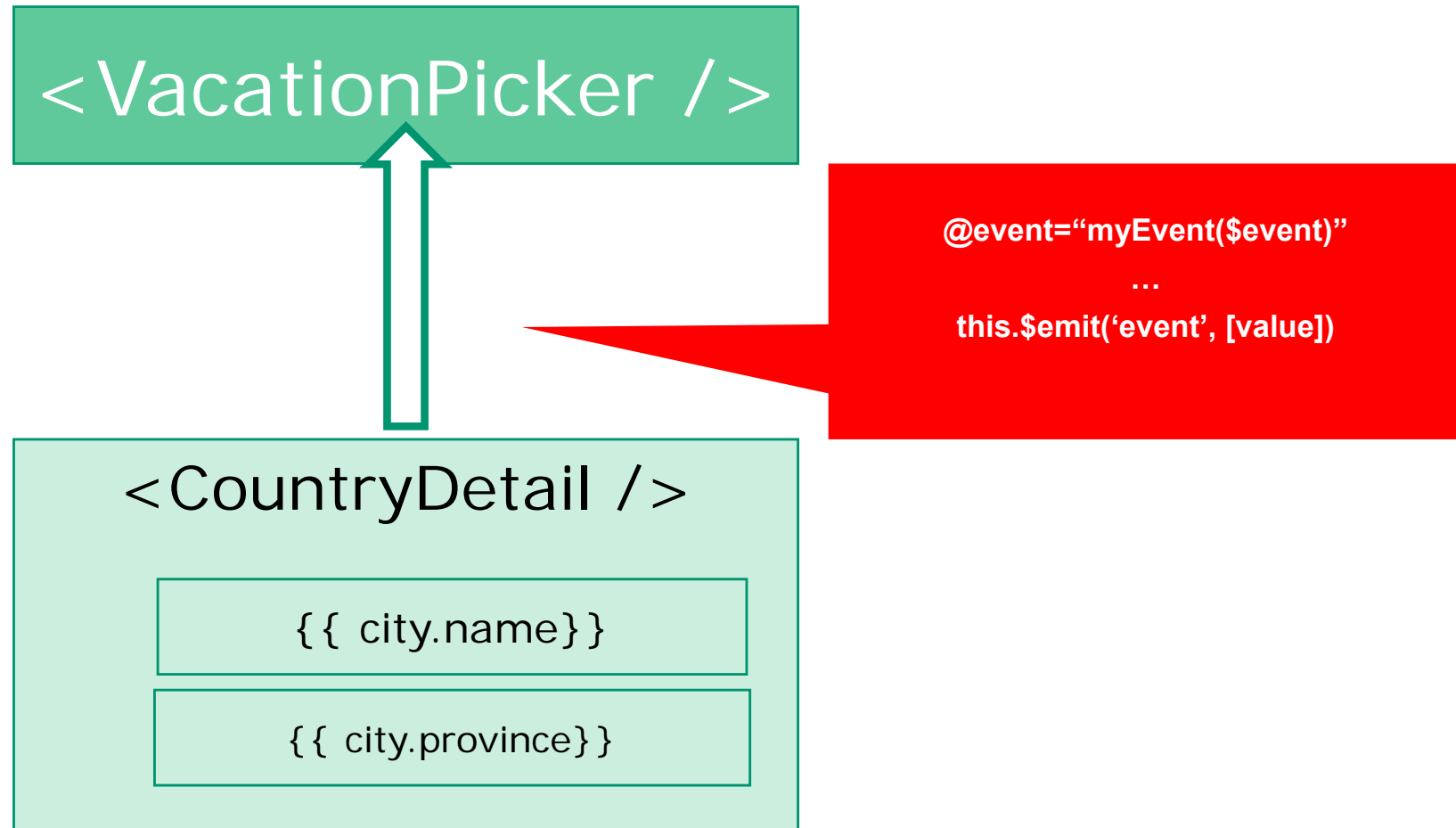Peter Kassenaar

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Vue.js

Web Development Library

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Child-Parent flow: custom events

Binding to custom events

- Custom component can throw custom events, by using the

  `this.$emit('eventName')` method

  - It is automatically available on every component

  - You can define the name of the event yourself

  - You can pass data in the event

- In the parent component, use the well-known

  `@eventName="handler($event)"` notation

  - Call a local event handler to handle the event

  - `$event` is a magic variable, containing the value from the child

https://vuejs.org/v2/guide/components-custom-events.html

Example custom events - Child

Prepare the child component to emit its custom event(s)

```
<span class="float-right">
    <button @click="setRating(1)">+1</button>
    <button @click="setRating(-1)">-1</button>
</span>
```

```
methods: {
    …
    setRating(value){
        this.$emit('rating', value);
    }
}
```

Example custom events – parent

Prepare the parent component to receive custom event(s)

```
<CountryDetail v-if="showDetails"
               @rating="onRating($event)"
               :country="country" />
```
1. Catch event

```
onRating(rating){
    console.log('rating received for ' + this.country.name);
    this.data.countries[this.currentCountryIndex].rating += rating;
}
```
2. Handle event

```
<div v-if="country.rating !== 0">
    my rating:
    <span class="badge badge-secondary badge-pill">{{country.rating}}</span>
</div>
```
3. Show result in UI

Result

Summary

Parent → Child

Child → Parent

<app>

:data="someData"

<VacationPicker>

:country="someCountry"

<CountryDetail>

<app>

@rate="onRate()"

<VacationPicker>

@rate="onRate()"

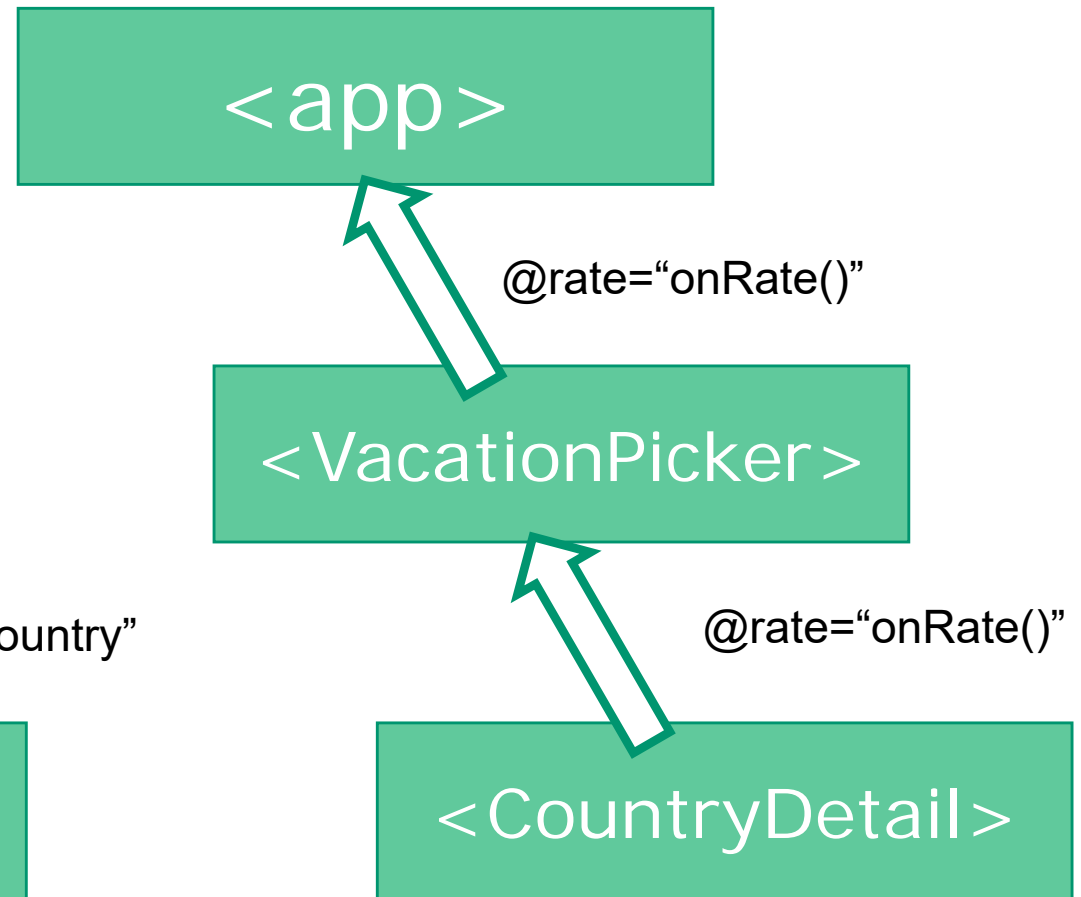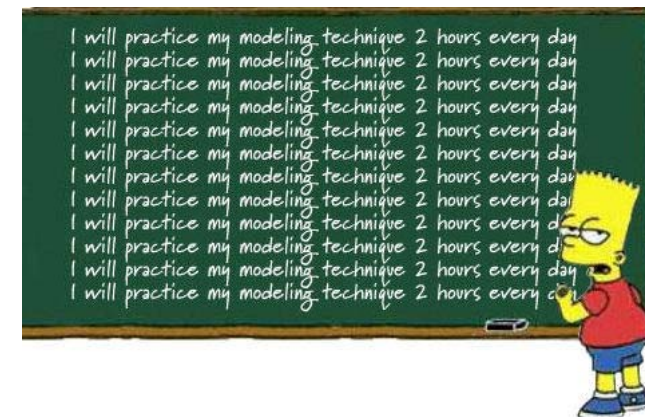<CountryDetail>
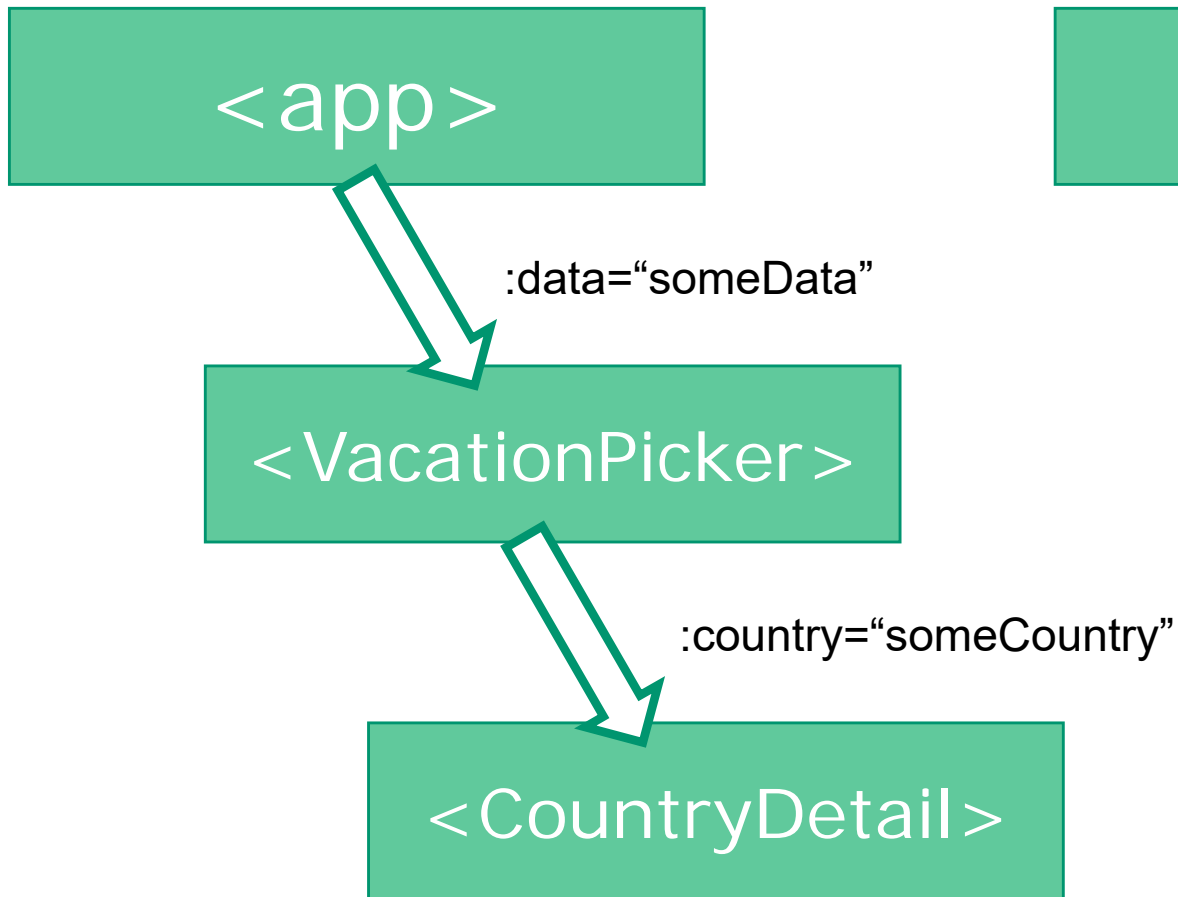
Workshop

- Use `../220-emit-events` as a source, or use your own project

- Add a `favorite` event to the CountryDetail component, so a user can mark a country as favorite.

  - Update the data model with a `favorite` property.

  - Update the child component to `$emit` the event.

  - Update the parent component to receive and handle the event

- Generic example: `../220-emit-events`

Independent event bus

Passing data without a direct parent/child relationship

Event bus in Vue

- https://medium.com/easyread/vue-as-event-bus-life-is-happier-7a04fe5231e1

- Example: `../225-event-bus`

- In complex applications: more likely to introduce a `vuex-store`.

Injecting content

Using slots on the child component

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Inject data into a component

- Sometimes you want to create a component that you can pass content into.

- This component is responsible for showing the data in the right place.

- For instance, we want `<CountryDetail />` to be in a collapsible `div`.
  - The show/hide content is on the header of this `div`, instead of somewhere else

- The structure then becomes like:

```
<CollapsibleSection>
    <CountryDetail @rating="onRating($event)"
                   :country="country" />
</CollapsibleSection>
```

Reusing components

- We create a reusable component `<CollapsibleSection />`, that takes all kinds of content

- Best practice: put reuseables in a `\shared` folder

- We can then also simplify our parent component

  - No more button needed (as the `CollapsibleSection` is responsible for showing/hiding content)

  - No more variable and `v-if` needed on the `CountryDetail` component (idem).

Structure of `CollapsibleSection`

Just a template and a toggle/flag `open`:

```html
<template>
    <div>
        <div class="alert alert-info" style="cursor: pointer">
            <span v-if="open" @click="open = !open">&#x25B2; Collapse</span>
            <span v-if="!open" @click="open = !open">&#x25BC; Expand</span>
        </div>
        <!--Injected content here-->
        <slot v-if="open"></slot>
    </div>
</template>

<script>
    export default {
        name: "CollapsibleSection",
        data(){
            return {
                open: false
            }
        }
    }
</script>
```

- The &#x25B2 is just the HTML code for up/down arrow

- We use a simple bootstrap `alert` class here

- We give the header a `style` so a cursor is shown

- The `<slot>` is where the magic happens

- It is only visible if the collapsible is `open`

Result

Extra info on `<slot>` 's

- You can add default content inside a slot, like so:

  - `<slot>` `<div>…my default content…</div>` `</slot>`

- We can pass data into shared/reusable/slot component with props like normal.

- As you saw, slots can contain, HTML, or other components.

- We can have multiple slots on a component (see next slide)

  - Every slot gets its own `name`

  - You can target a slot by using its `name` in the parent component

  - Unnamed slots act as a 'catch all' slot for unnamed content

Multiple slots in a component

```html
<div class="container">
    <slot name="header"></slot>
    <slot></slot>
    <slot name="footer"></slot>
</div>
```

Option 1: using `template` tag

```html
<template slot="header">
    <h1>This is the page title</h1>
</template>
<p>No name - so a paragraph for the main content.</p>
<p>And another one.</p>
<template slot="footer">
    <p>Footer contains contact info, disclaimer, etc</p>
</template>
```

Option 2: simple HTML,
using the `slot` attribute

```html
<h1 slot="header">This is the page title</h1>

<p>No name - so a paragraph for the main content.</p>
<p>And another one.</p>

<p slot="footer">Footer contains contact info, disclaimer, etc</p>
```

Workshop

- Use `../230-slots` as a source, or use your own project

  - In your own project: create a generic component using slots

- In example project: Create a new component, designed as a Bootstrap `Card` component

  - Create a `.vue` component and use slots to inject content

  - Documentation:

    https://getbootstrap.com/docs/4.0/components/card/

  - Call this component inside the `CountryDetail` component and pass data to the correct slots.

  - I.e. We want your `CountryDetail` to look like a Bootstrap `Card`.

- Generic example: `../230-slots`
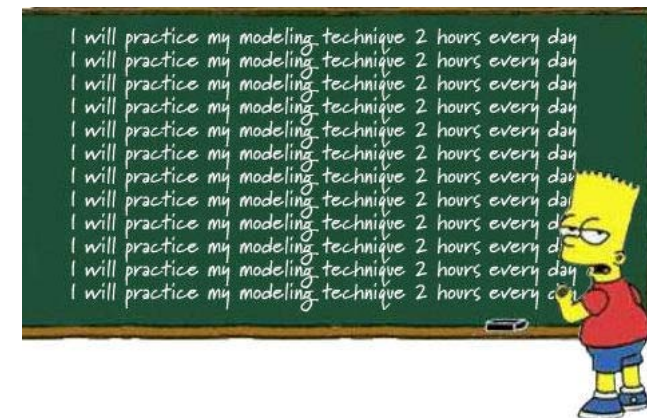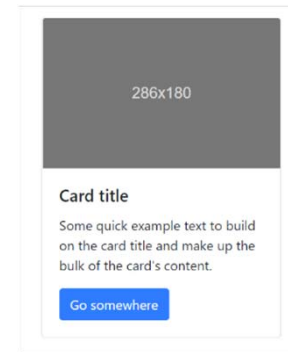
Animation

- You can animate content if you want to

  ▪ Use the `<transition name="someName">…</transition>` element as a
    wrapper

  ▪ Write CSS-classes providing the transformation / animation

- For instance:

```
<!--Injected content here-->
<transition name="fade">
    <slot v-if="open"></slot>
</transition>
```

```
<style scoped>
    .fade-enter-active, .fade-leave-active {
        transition: opacity .5s;
    }
    .fade-enter, .fade-leave-to {
        opacity: 0;
    }
</style>
```

https://vuejs.org/v2/guide/transitions.html

Checkpoint

- You know how to pass data down the component chain by creating and using props.

- You know about extending props with types and validating props.

- You can pass data back up the component chain by creating and capturing custom events.

- You know about working with [multiple] slots in your project to project content from parent components.