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INSIDE KNOWLEDGE

# Angular Components

## Data-binding & Lifecycle Hooks

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# Outline

- Take a closer look on data binding
  - Property binding with @Input()
  - Event binding with @Output()
  - Two-way bindings
  - Use component bindings
- Component Lifecycle Hooks
- Smart vs dumb components





# Data binding



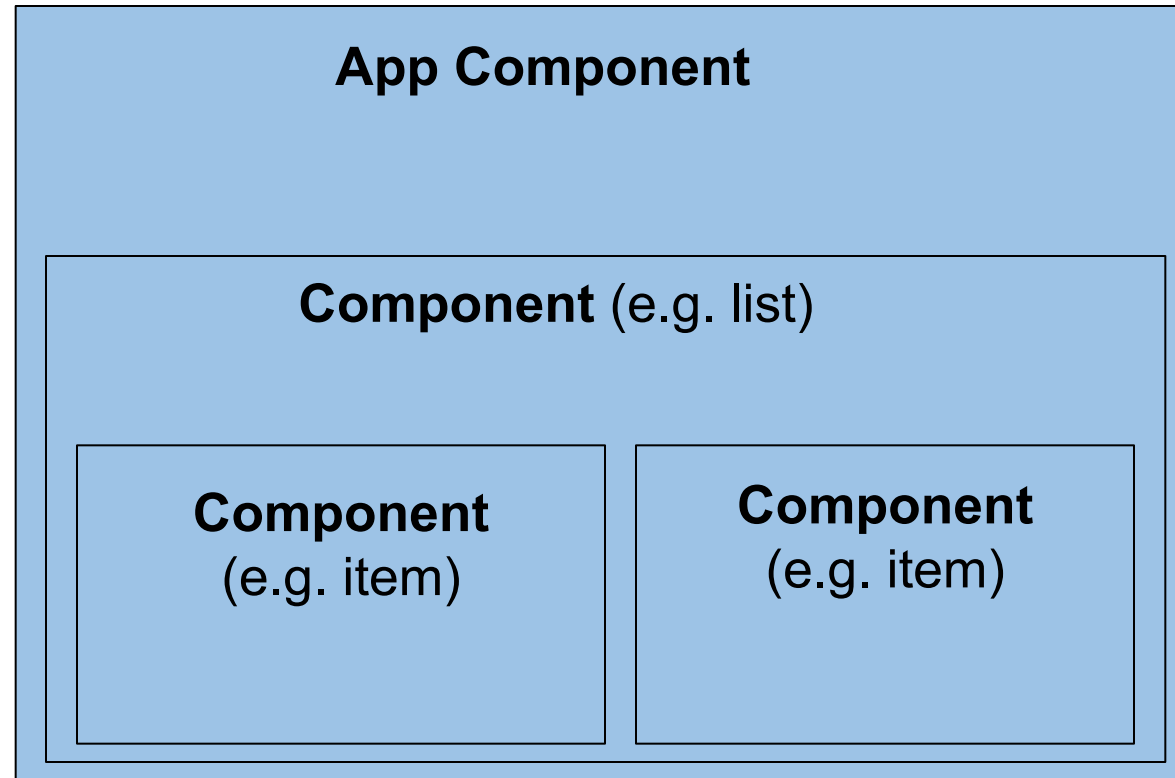
Performance

Components

Predictability

Architecture goals in Angular

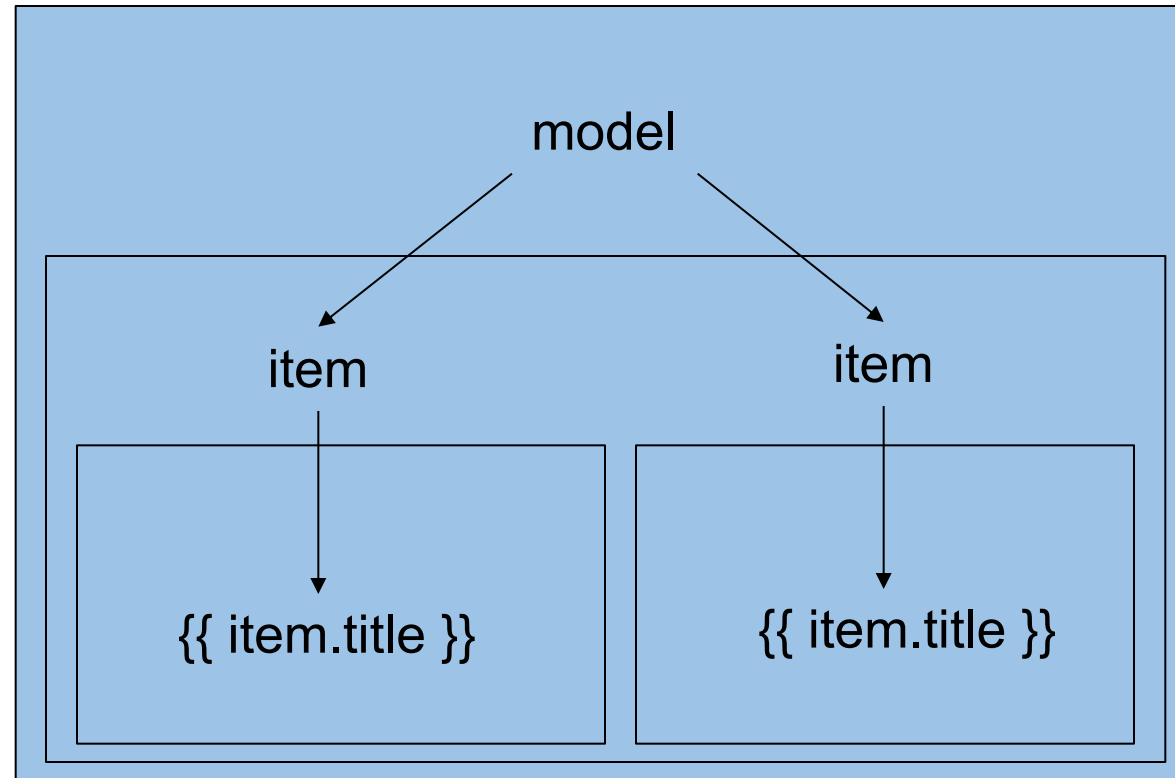
# Component tree in Angular 2+



# Rules for property binding

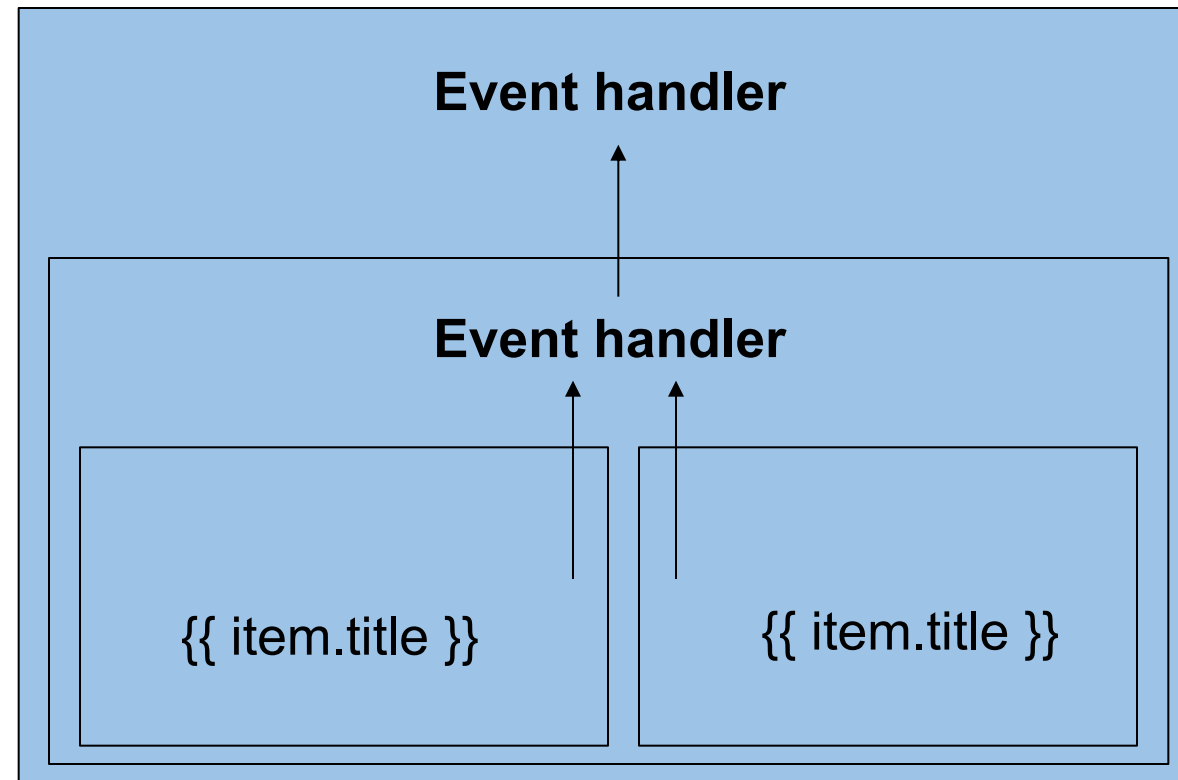
- Data can only be passed from top to bottom (top/down)
  - Parent can pass data to children
  - Children cannot pass data to parent (we need events for that)
- Dependency graph is a tree
- Angular just takes a digest to compare tree with the browser DOM

# Property binding



[<http://victorsavkin.com/post/110170125256/change-detection-in-angular-2>]

# Event bindings (one way, bottom/up)

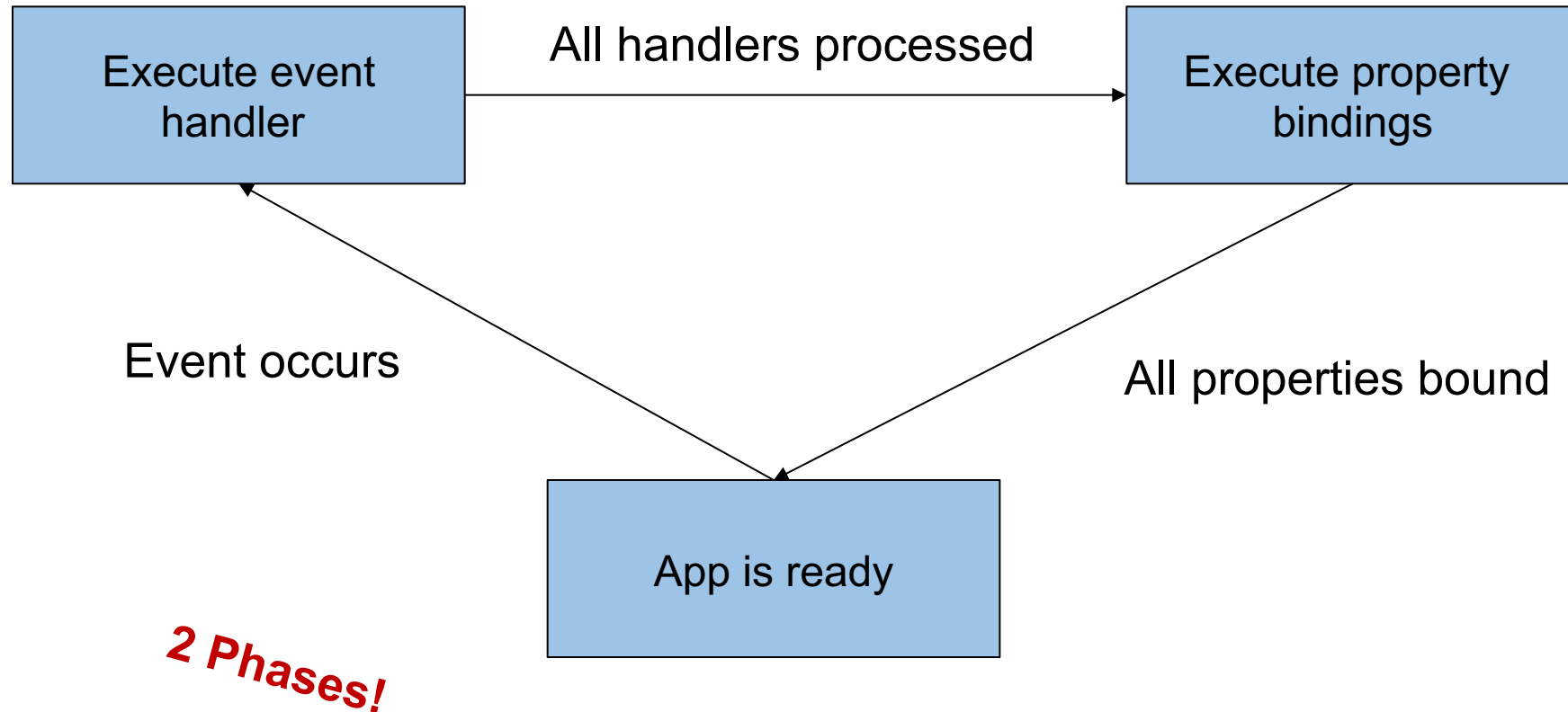




# Event bindings (one way, bottom/up)

- No digest necessary to send events
- But: Events can trigger data change → Property Binding

# Property and event bindings



# View

```
<button [disabled]="!from || !to" (click)="search()">  
  Search  
</button>
```

```
<table>  
  <tr *ngFor="let flight of flights">  
    <td>{{ flight.id }}</td>  
    <td>{{ flight.date }}</td> ← - - - - - > <td [text-content]="flight.date"></td>  
    <td>{{ flight.from }}</td>  
    <td>{{ flight.to }}</td>  
    <td><a href="#" (click)="selectFlight(flight)">Select</a></td>  
  </tr>  
</table>
```



# Recap

- Property binding: one way; top/down
- Event binding: one way; bottom/up
- Two way bindings?
- Two way = property binding + event binding



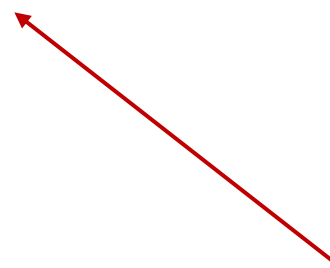
# Property + event binding

```
<input [ngModel]="from" (ngModelChange)="update($event)">
```



# Property + event binding

`<input [ngModel]="from" (ngModelChange)="from = $event">`



Property + *Change*

`<input [(ngModel)]="from">`



Changed value

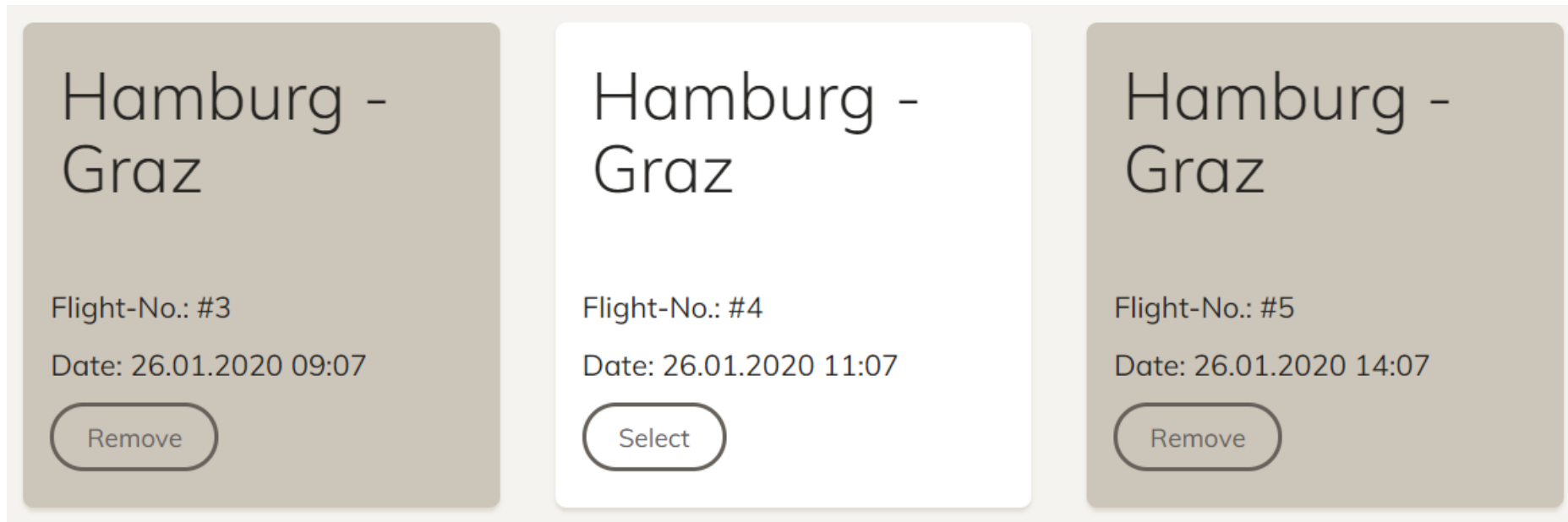






# Components data binding

## Example: flight-card



# Example: flight-card

Hamburg -  
Graz

Flight-No.: #3  
Date: 26.01.2020 09:07

Remove

Hamburg -  
Graz

Flight-No.: #4  
Date: 26.01.2020 11:07

Select

Hamburg -  
Graz

Flight-No.: #5  
Date: 26.01.2020 14:07

Remove

Basket:  
-----  
{  
 "3": true,  
 "4": false,  
 "5": true  
}

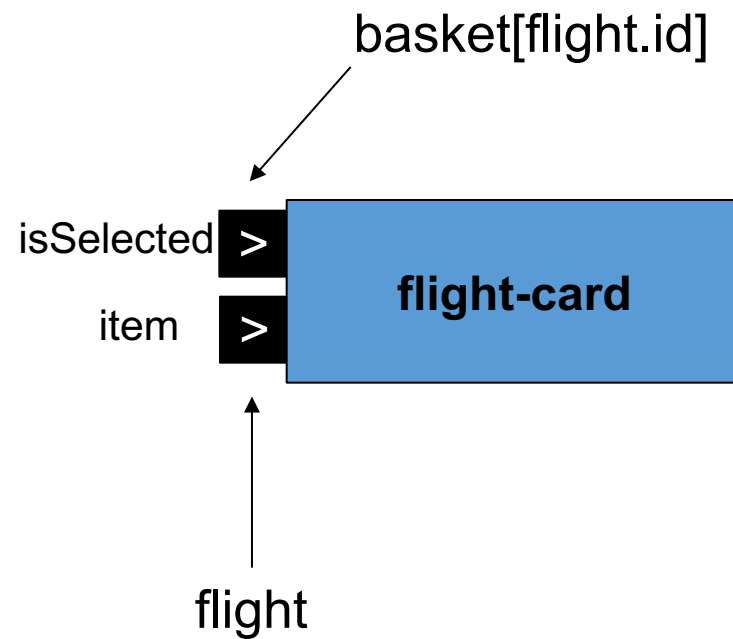
Basket: { [id: number]: boolean; } = {};  
[...]  
basket[3] = true;  
basket[4] = false;  
basket[5] = true;

# Example: flight-card in flight-search.html

```
<div *ngFor="let flight of flights">  
  <app-flight-card [item]="flight" [isSelected]="basket[flight.id]" />  
</div>
```



# flight-card



# Example: flight-card

```
@Component({  
  selector: 'app-flight-card',  
  templateUrl: './flight-card.component.html'  
})  
export class FlightCard {  
  
  [...]  
  
}
```





# Example: flight-card

```
export class FlightCard {  
  @Input({ required: true }) item!: Flight;  
  @Input() isSelected = false;  
  
  select(): void {  
    this.isSelected = true;  
  }  
  
  deselect(): void {  
    this.isSelected = false;  
  }  
}
```



# Template

```
<div style="padding:20px" [class.is-selected]="isSelected">
  <h2>{{item.from}} - {{item.to}}</h2>
  <p>Flightnr. #{{item.id}}</p>
  <p>Date: {{item.date | date:'dd.MM.yyyy'}}</p>
  <p>
    <button *ngIf="!isSelected" (click)="select()">Select</button>
    <button *ngIf="isSelected" (click)="deselect()">Deselect</button>
  </p>
</div>
```



# Template

```
<div style="padding:20px" [class.is-selected]="isSelected">
  <h2>{{item.from}} - {{item.to}}</h2>
  <p>Flightnr. #{{item.id}}</p>
  <p>Date: {{item.date | date:'dd.MM.yyyy'}}</p>
  <p>
    <button (click)="isSelected ? deselect() : select()">
      {{ isSelected ? 'Deselect' : 'Select' }}
    </button>
  </p>
</div>
```



# Register component

```
@NgModule({  
  imports: [  
    CommonModule, FormsModule, SharedModule  
  ],  
  declarations: [  
    FlightSearchComponent, FlightCardComponent  
  ],  
  exports: [  
    FlightSearchComponent  
  ]  
})  
export class FlightBookingModule {}
```



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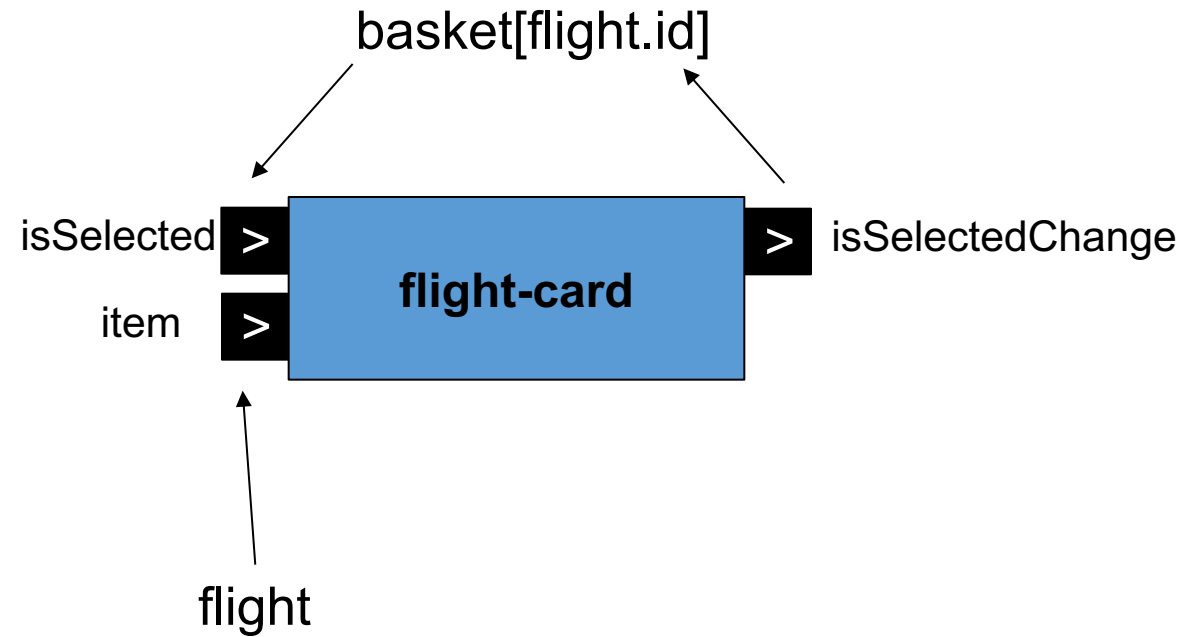
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# Event bindings



# flight-card



# Example: flight-card event *isSelectedChange*

```
<div *ngFor="let flight of flights">  
  <app-flight-card [item]="flight"  
    [isSelected]="basket[flight.id]"  
    (isSelectedChange)="basket[flight.id] = $event" />  
</div>
```



# Example: flight-ca

```
export class FlightCard {  
  @Input({ required: true  
  @Input() isSelected = false  
  @Output() isSelectedChange  
  
  select(): void {  
    this.isSelected = true;  
    this.isSelectedChange.emit(this.isSelected);  
  }  
  
  deselect(): void {  
    this.isSelected = false;  
    this.isSelectedChange.emit(this.isSelected);  
  }  
}
```

```
<div *ngFor="let f of flights">  
  <app-flight-card [item]="f"  
    [isSelected]="basket[f.id]"  
    (isSelectedChange)="basket[f.id] = $event">  
  </app-flight-card>  
</div>
```

# Example: flight-card event *two-way binding*

```
<div *ngFor="let flight of flights">  
  <app-flight-card [item]="flight" [(isSelected)]="basket[flight.id]" />  
</div>
```



# Example: flight-card event *two-way binding*

```
<div *ngFor="let flight of flights">  
  <app-flight-card [item]="flight" [isSelected]="basket[flight.id]" />  
</div>
```



```
<div *ngFor="let flight of flights">  
  <app-flight-card [item]="flight" [(isSelected)]="basket[flight.id]" />  
</div>
```

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# LAB



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# Thought experiment

- What if <app-flight-card> would handle use case logic?
  - e.g. communicate with API
- Number of requests ==> Performance?
- Traceability?
- Reusability?

# Smart vs. Dumb Components

## Smart / Controller

- 1 per feature / use case / route
- Business logic
- Container

## Dumb / Presentational

- Independent of Use Case
- Reusable
- Leave



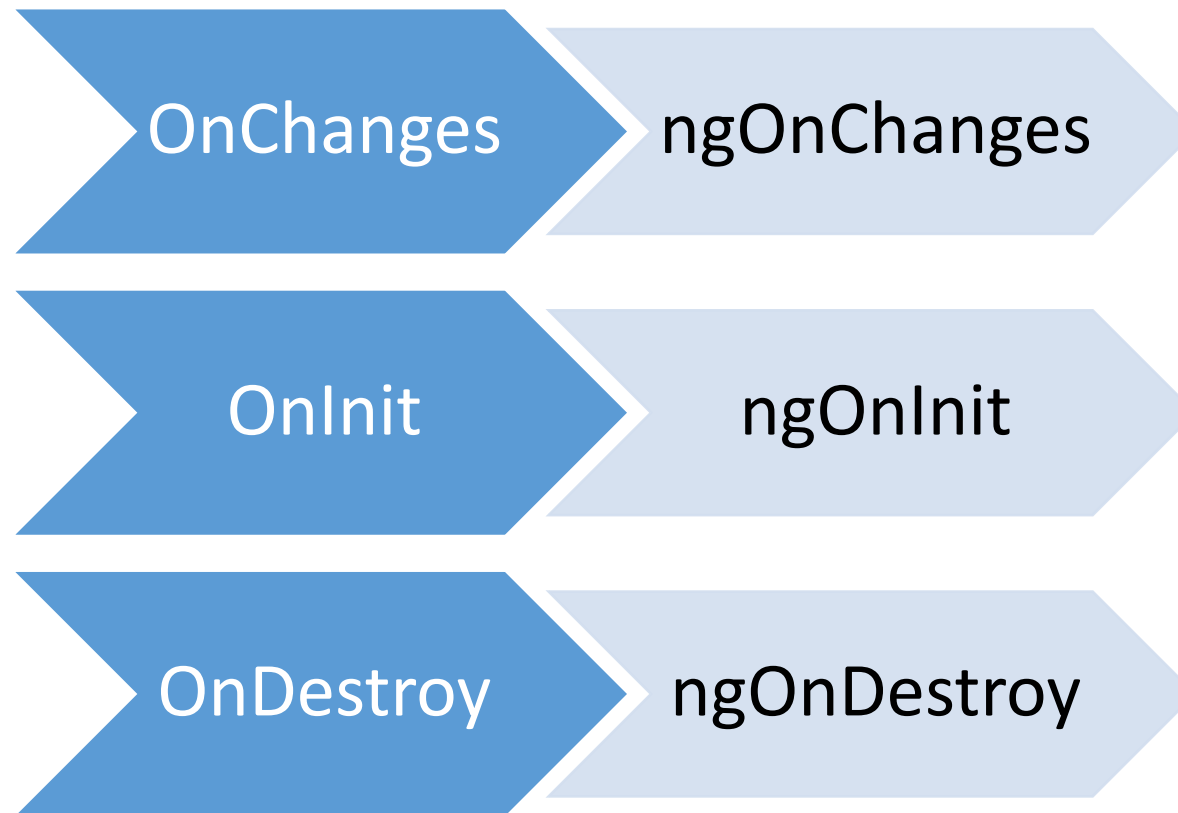
# Lifecycle Hooks



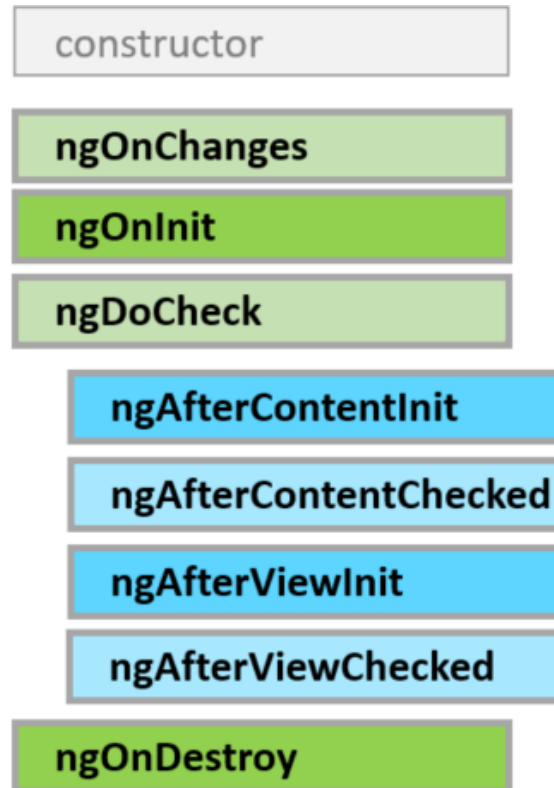
# What are Lifecycle Hooks?

- Built in methods in our components & directives
- Will be called at a certain time by Angular

# Lifecycle Hooks (selection)



# Lifecycle Hooks (all, in order)



# Usage

```
@Component({
  selector: 'my-component',
  [...]
})
export class Component implements OnChanges, OnInit {

  @Input() someData;

  ngOnChanges(changes: SimpleChanges): void {
    [...]
  }

  ngOnInit(): void {
    [...]
  }
}
```





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