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Data Binding and OnPush

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Contents

- How does data binding work (underneath the covers)?
- Performance-Tuning with OnPush



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Data Binding

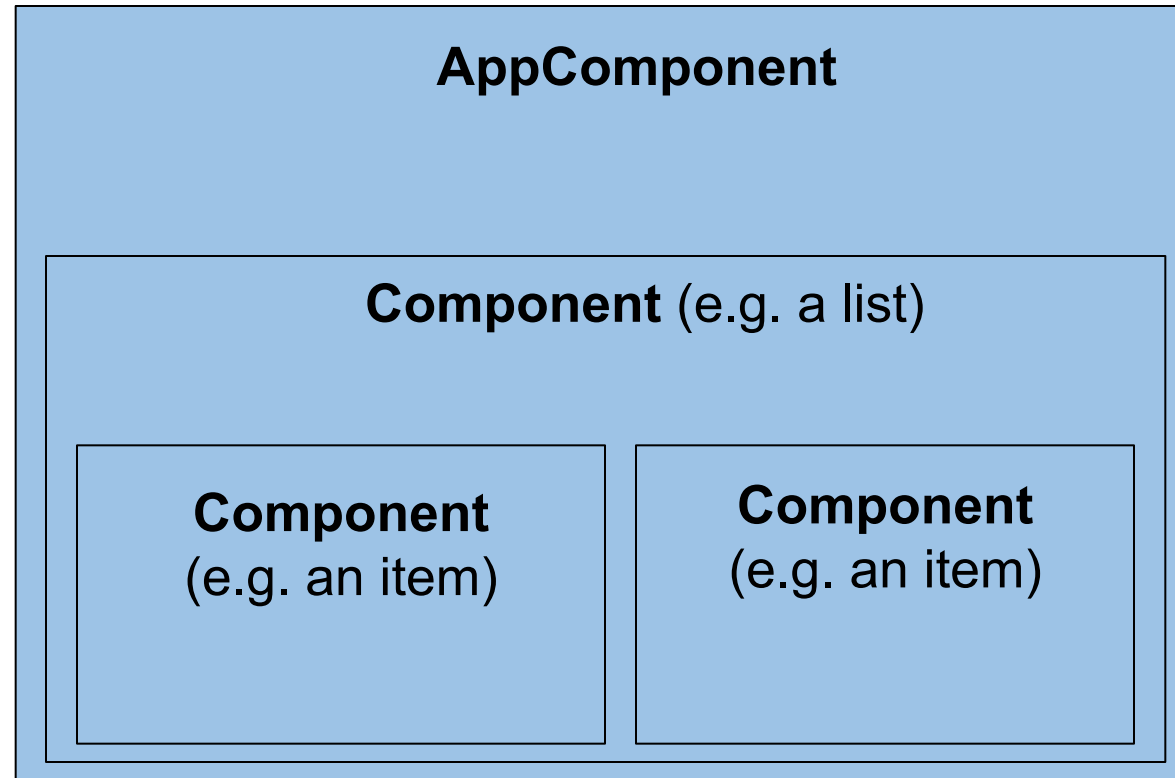


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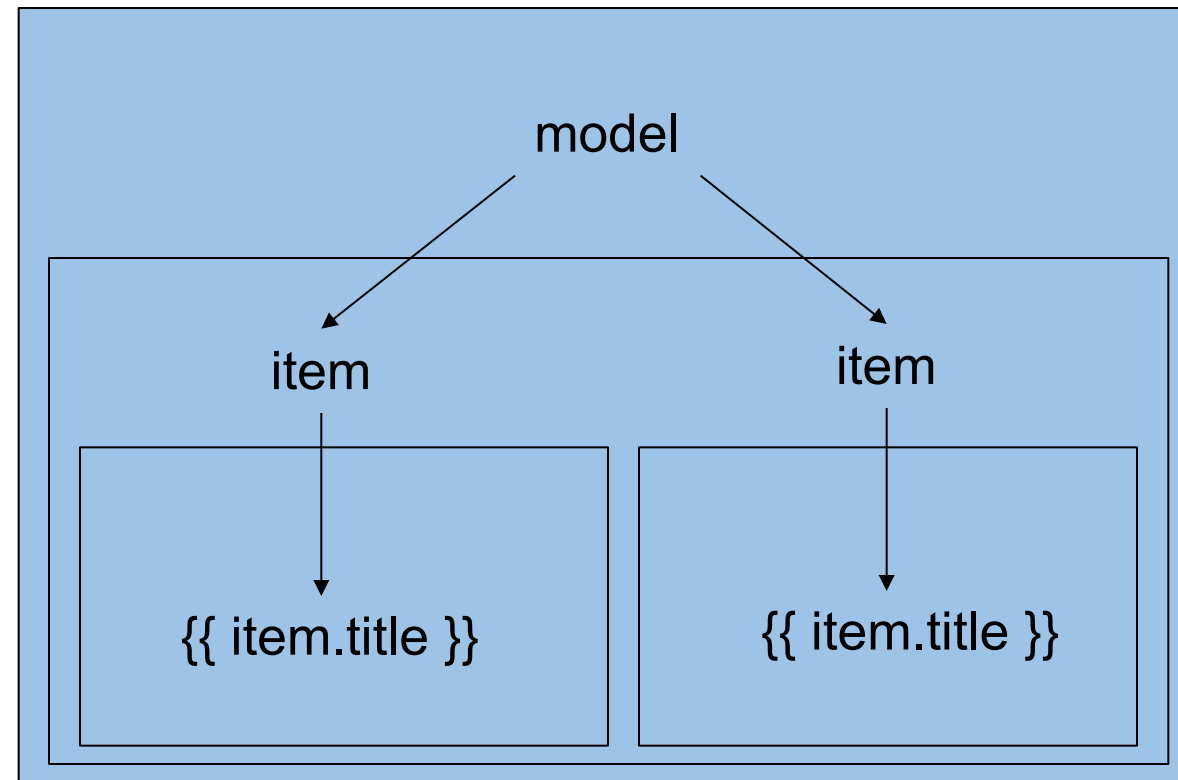
Component Tree in Angular 2+



Rules for Property-Bindings

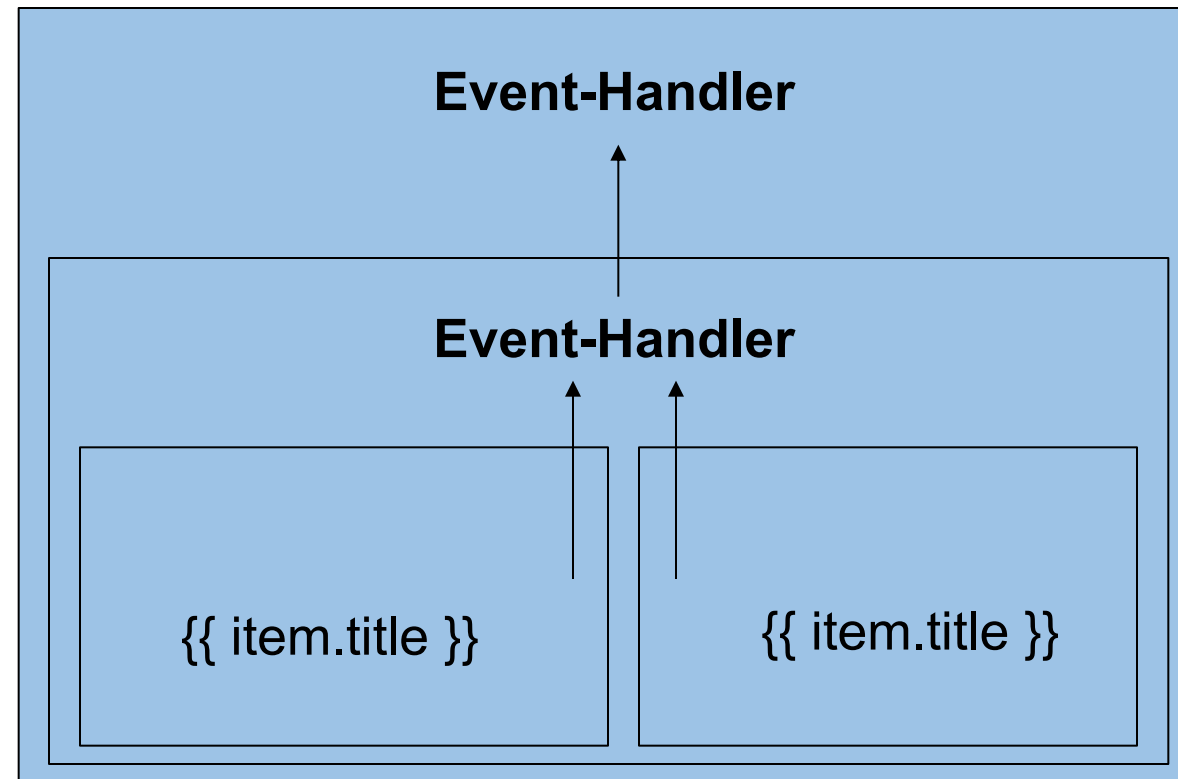
- Data flows top/down
 - Parent can send data to children
 - Children **cannot** send data to parent
- Dependency graph is a tree
- Angular only needs one "digest"

Property Binding



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

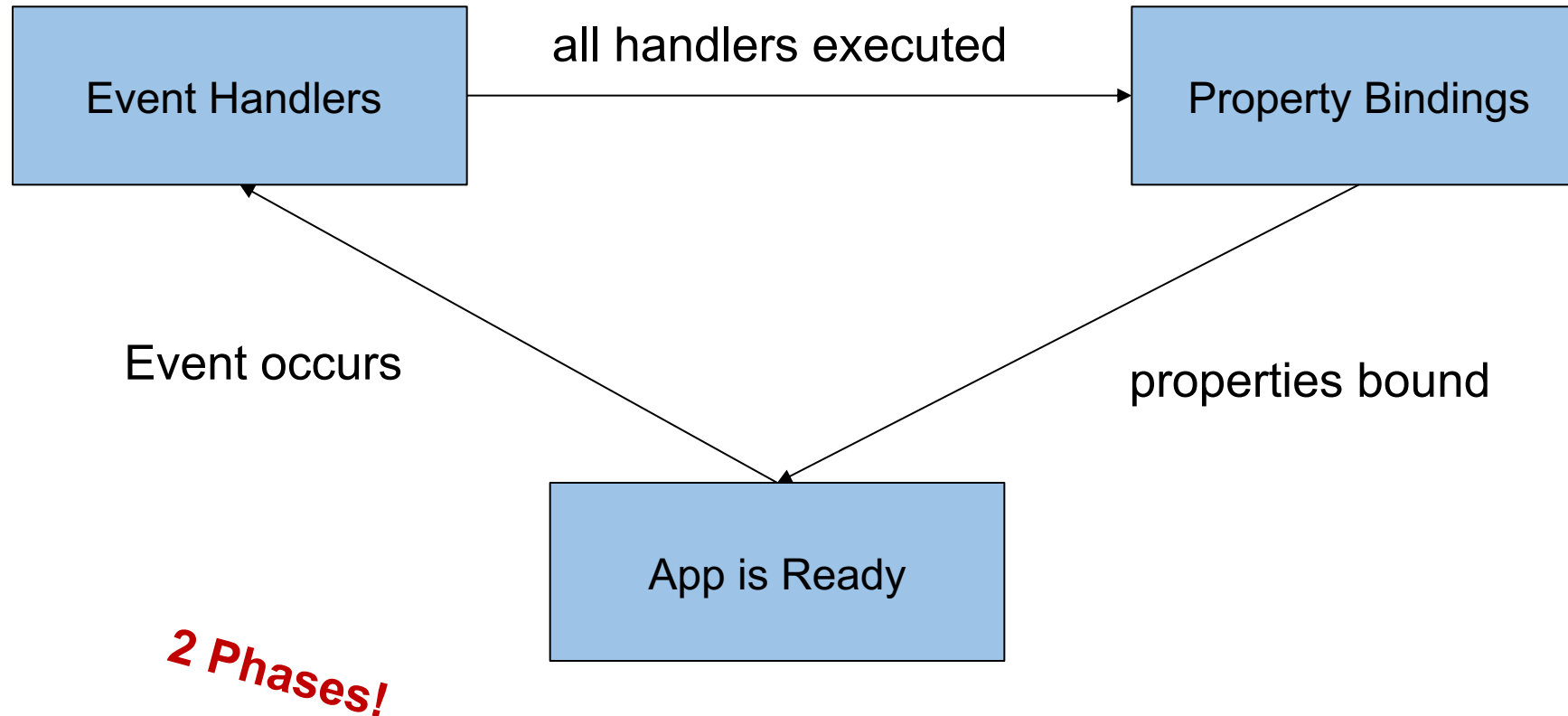
Event Bindings (One-Way, Bottom/Up)



Event Bindings (One-Way, Bottom/Up)

- Cheap: No "digest" needed!
- However: Events can change data → 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>
```

DEMO

Recap

- Property-Binding: One-Way; Top/Down
- Event-Binding: One-Way; Bottom/Up
- Two-Way-Binding?
- Two-Way = Property-Binding + Event-Binding



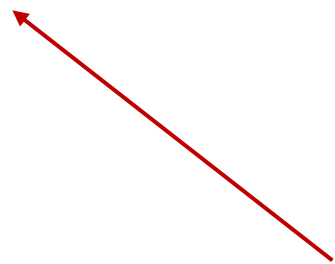
Property and Event Bindings

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



Property and Event Bindings

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



Property + *Change*

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



New Value



DEMO



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Performance Tuning with OnPush



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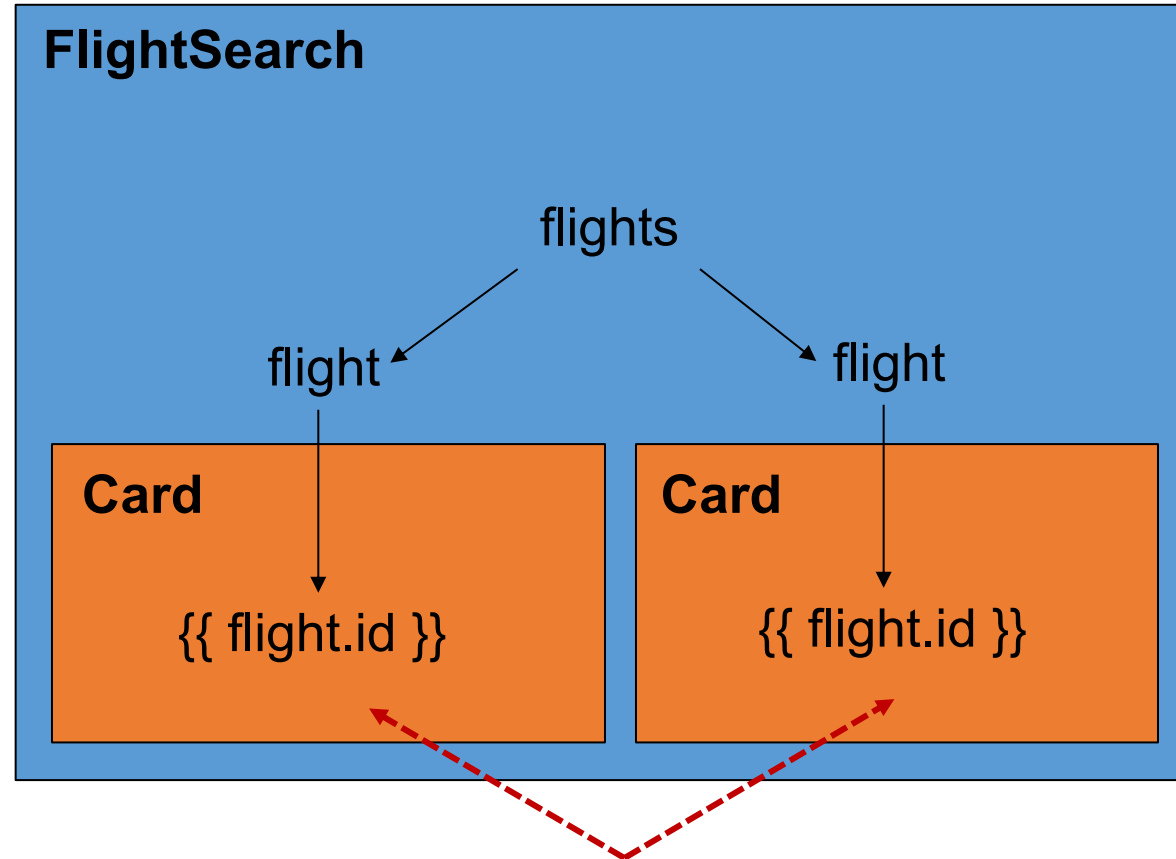


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OnPush



Angular just checks when “notified”



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"Notify" about change?

- Change bound data (@Input)
 - OnPush: Angular just compares the object reference!
 - e. g. `oldFlight === newFlight`
- Raise event within the component
- Notify a bound observable
 - `{{ flights$ | async }}`
- Trigger it manually
 - Don't do this at home ;-)
 - At least: Try to avoid this



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Activate OnPush

```
@Component({  
  [...]  
  changeDetection: ChangeDetectionStrategy.OnPush  
})  
export class FlightCard {  
  [...]  
  @Input() flight;  
}
```



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Summary

- Event Bindings → Property Bindings
- No cycles allowed!
- OnPush
- Immutables & Observables



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One more thing: change detection

detectChanges

- Runs Change Detector for the component and its children
- It runs CD once also for the component which is detached from the component tree

markForCheck

- It marks component and all parents up to root as dirty
- In next cycle Angular runs CD for marked components

reattach

- Re-attaches the component in the change detection tree
- If parent component's CD is detached, it won't help, so make sure to run markForCheck with reattach

detach

- Detaches the component from the change detection tree
- Bindings will also not work for the component with detached CD

checkNoChanges

- Changes the component and its children and throws error if change detected



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