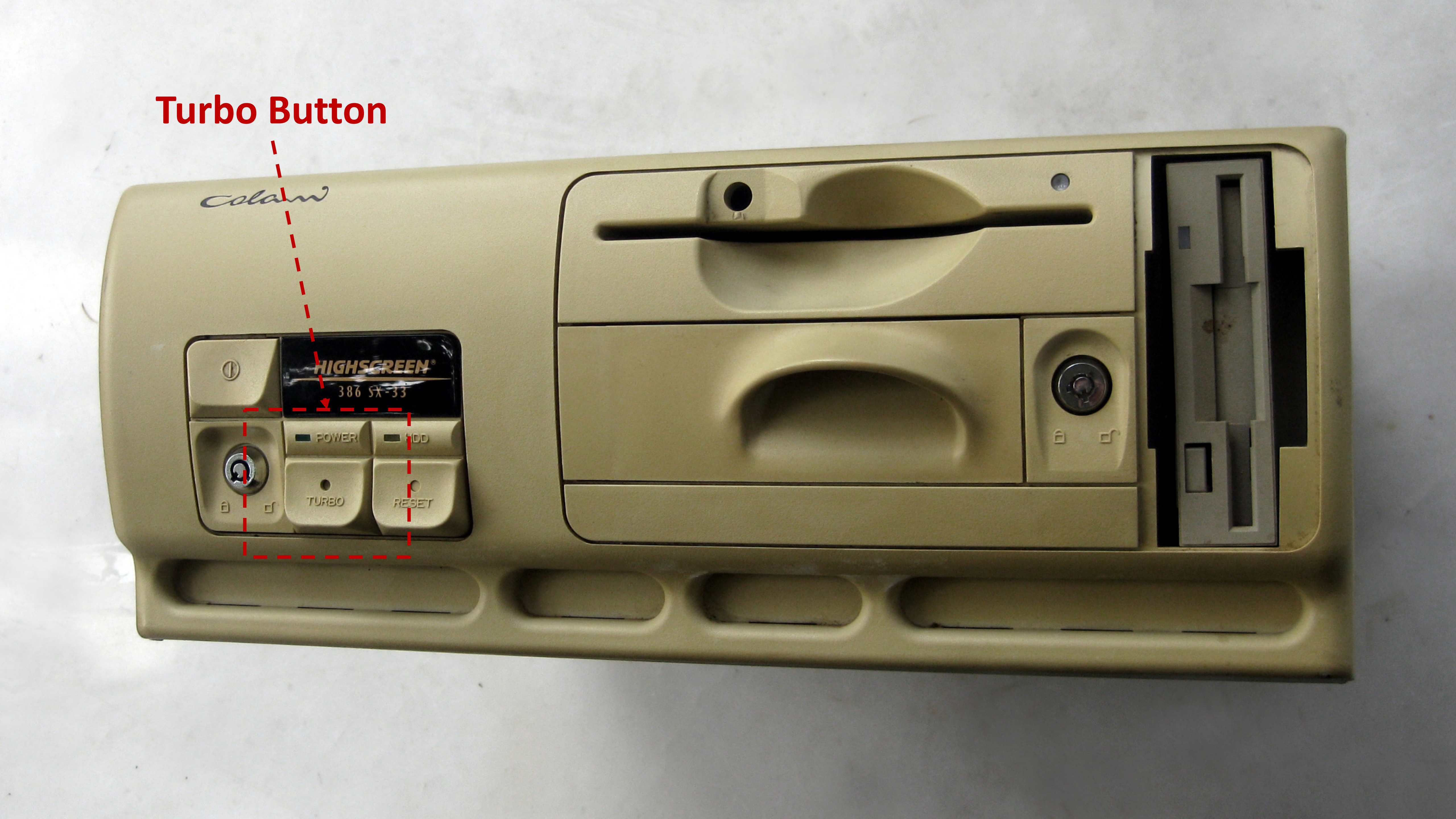
ANGULAR
ARCHITECTS
INSIDE KNOWLEDGE

Performance Tuning

angular-architects.io



Turbo Button

Quick Wins

Bundling

Minification

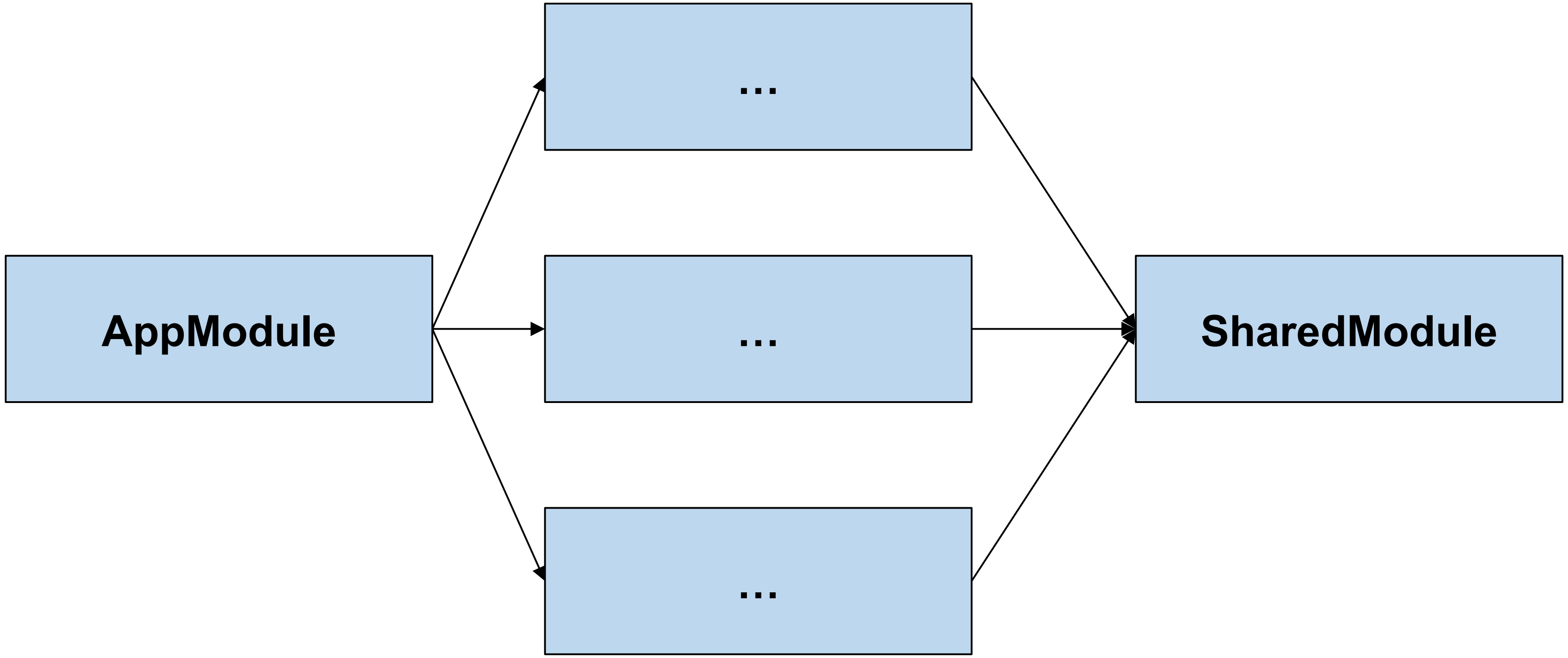
enableProdMode()

Contents

- Lazy Loading and Preloading
- Performance for Data Binding with OnPush
- AOT and Tree Shaking

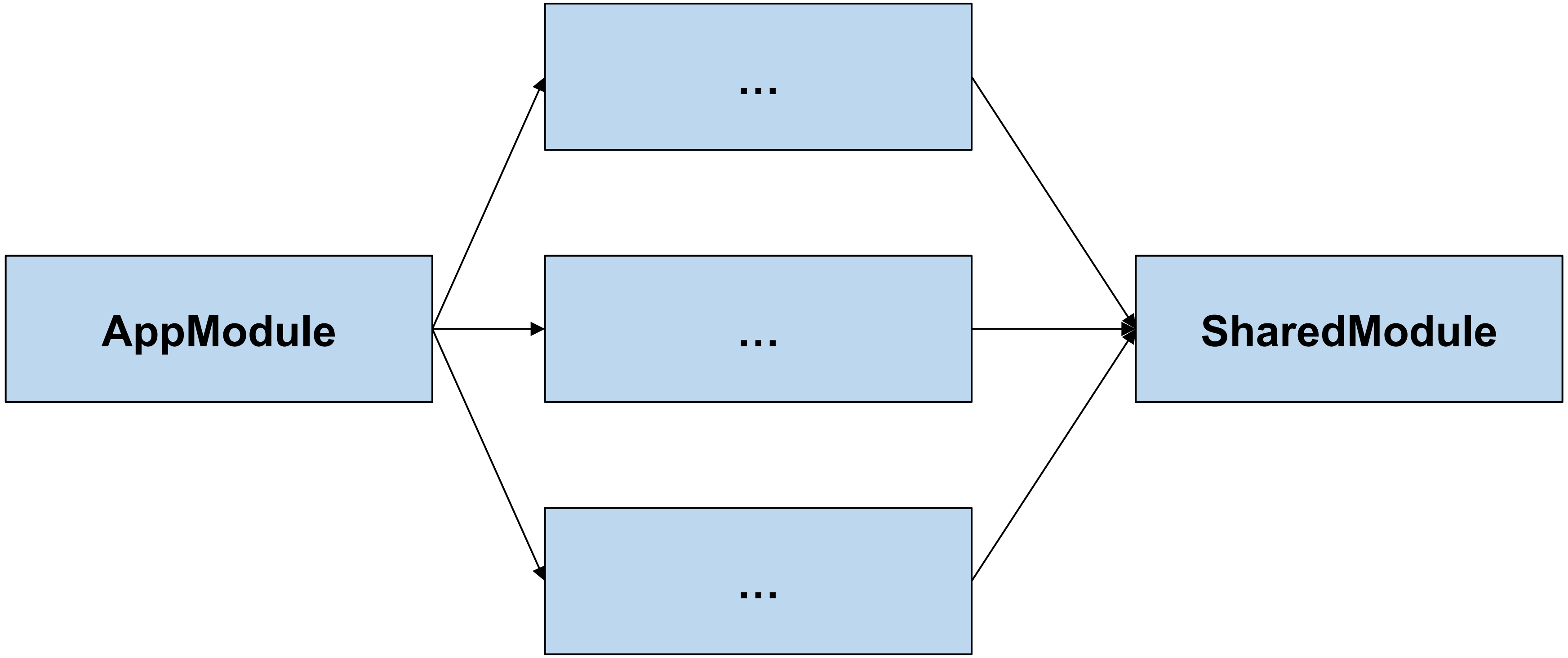
Lazy Loading

Module Structure



Root Module **Feature Modules** **Shared Module**

Lazy Loading



Root Module **Feature Modules** **Shared Module**

Root Module with Lazy Loading

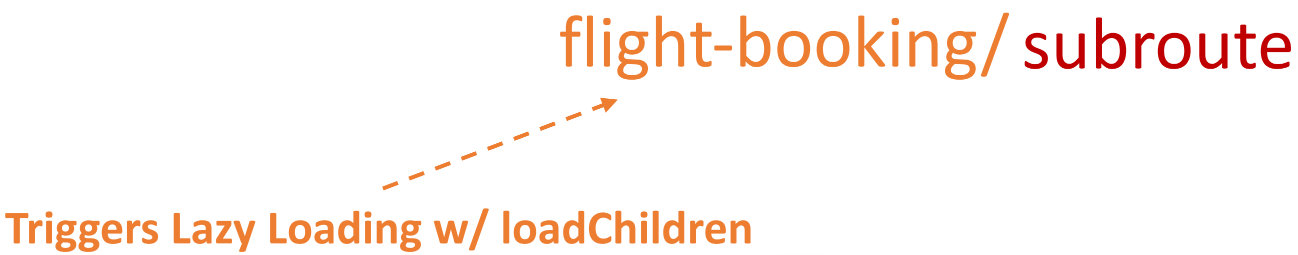
```
const APP_ROUTE_CONFIG: Routes = [
    {
        path: 'home',
        component: HomeComponent
    },
    {
        path: 'flights',
        loadChildren: () => import('./flight-booking/flight-booking.module')
                             .then(m => m.FlightBookingModule)
    }
];
```

Routes for "lazy" Module

```
const FLIGHT_ROUTES =    [
    {
        path: '',
        component: FlightBookingComponent,
        […]
    },
    […]
}
```

Routes for "lazy" Module

```
const FLIGHT_ROUTES =    [
    {
        path: 'subroute',
        component: FlightBookingComponent,
        […]
    },
    […]
}
```



flight-booking/ subroute

Triggers Lazy Loading w/ loadChildren

DEMO

Lazy Loading

- Lazy Loading means: Loading it later
- Better startup performance
- Delay during execution for loading on demand

Preloading

Idea

- Module that might be needed later are loaded after the application started
- When module is needed it is available immediately

Activate Preloading

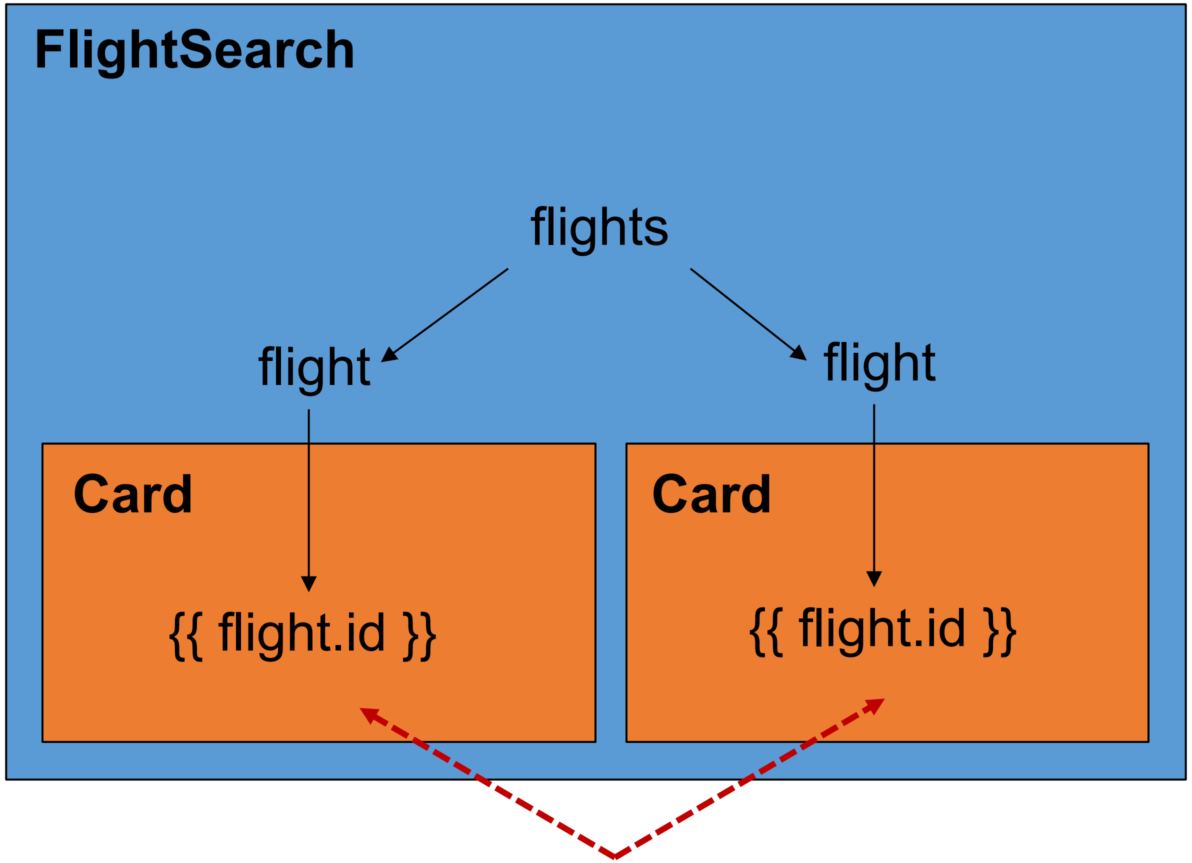
```
…
imports: [
    […]
    RouterModule.forRoot(
        ROUTE_CONFIG,
        { preloadingStrategy: PreloadAllModules });
]
…
```

DEMO

Performance-Tuning with OnPush

DEMO

OnPush



Angular just checks when “notified”

"Notify" about change?

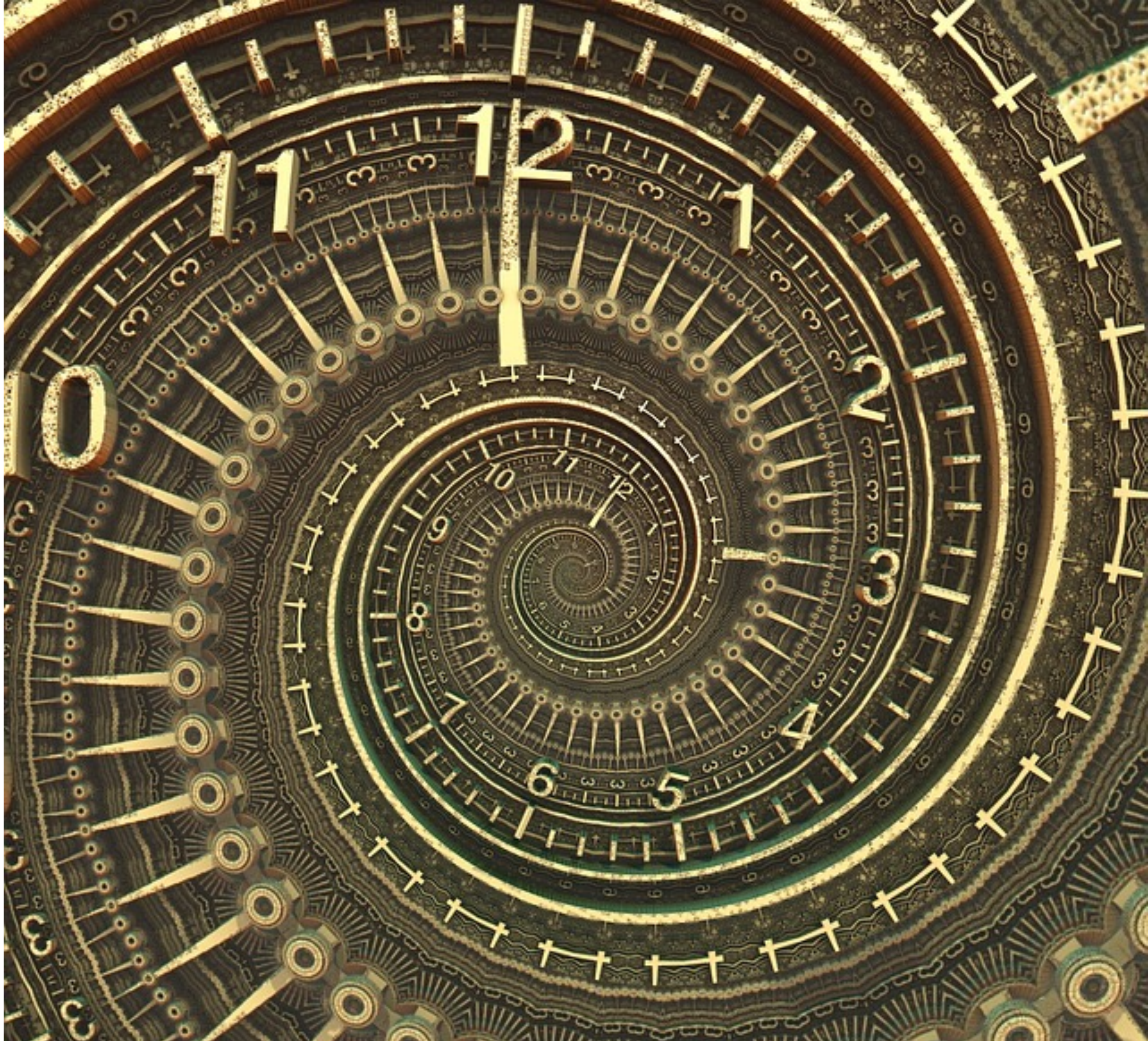
- Change bound data (@Input)
  - OnPush: Angular just compares the object reference!
  - e. g. oldFlight === newFlight
- Raise event within the component
- Notify a bound observable
  - {{ flights$ | async }}
- Trigger it manually
  - Don't do this at home ;-)
  - At least: Try to avoid this

Activate OnPush

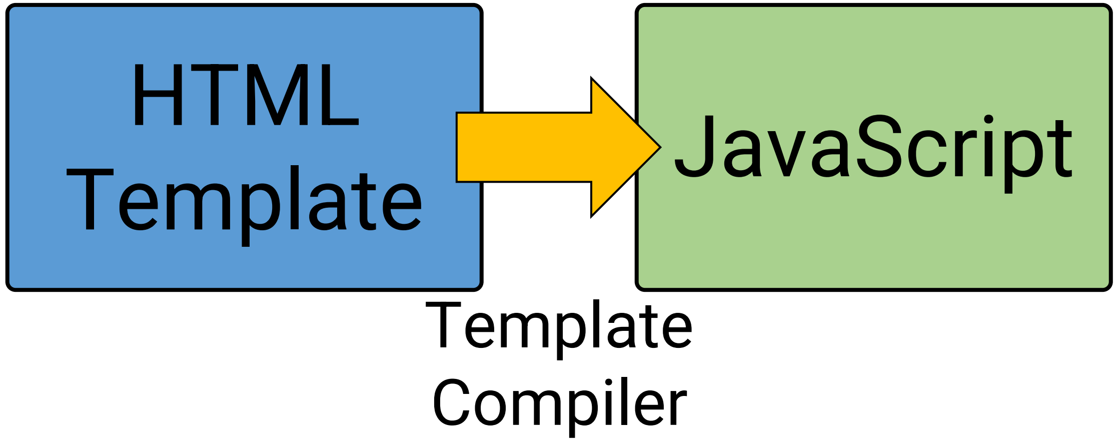
```
@Component({
       […]
       changeDetection: ChangeDetectionStrategy.OnPush
})
export class FlightCard {
   […]
   @Input() flight;
}
```

DEMO

Ahead of Time (AOT) Compilation



Angular Compiler



HTML Template

JavaScript

Template Compiler

Approaches

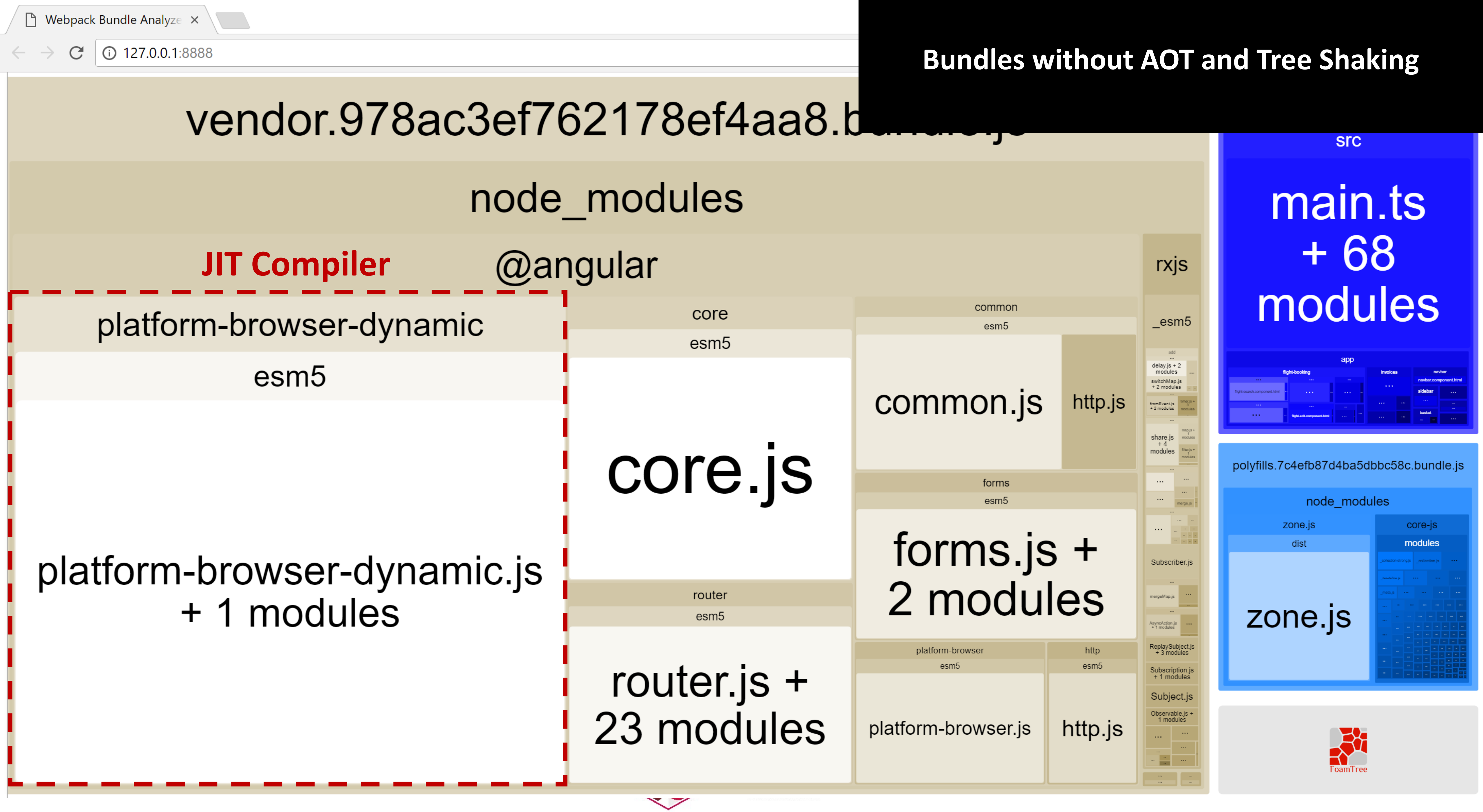
- JIT: Just in Time, at runtime
- AOT: Ahead of Time, during build
  - Since Angular 9: Default (when using Ivy)

Advantages of AOT

- Better Startup-Performance
- Smaller Bundles: You don't need to include the compiler!
- Tools can easier analyse the code
    - Remove unneeded parts of frameworks
    - Tree Shaking

DEMO

Bundles without AOT and Tree Shaking



JIT Compiler

LAB

Conclusion

- Quick Wins
- Lazy Loading and Preloading
- OnPush w/ Immutables and Observables
- AOT and Tree Shaking