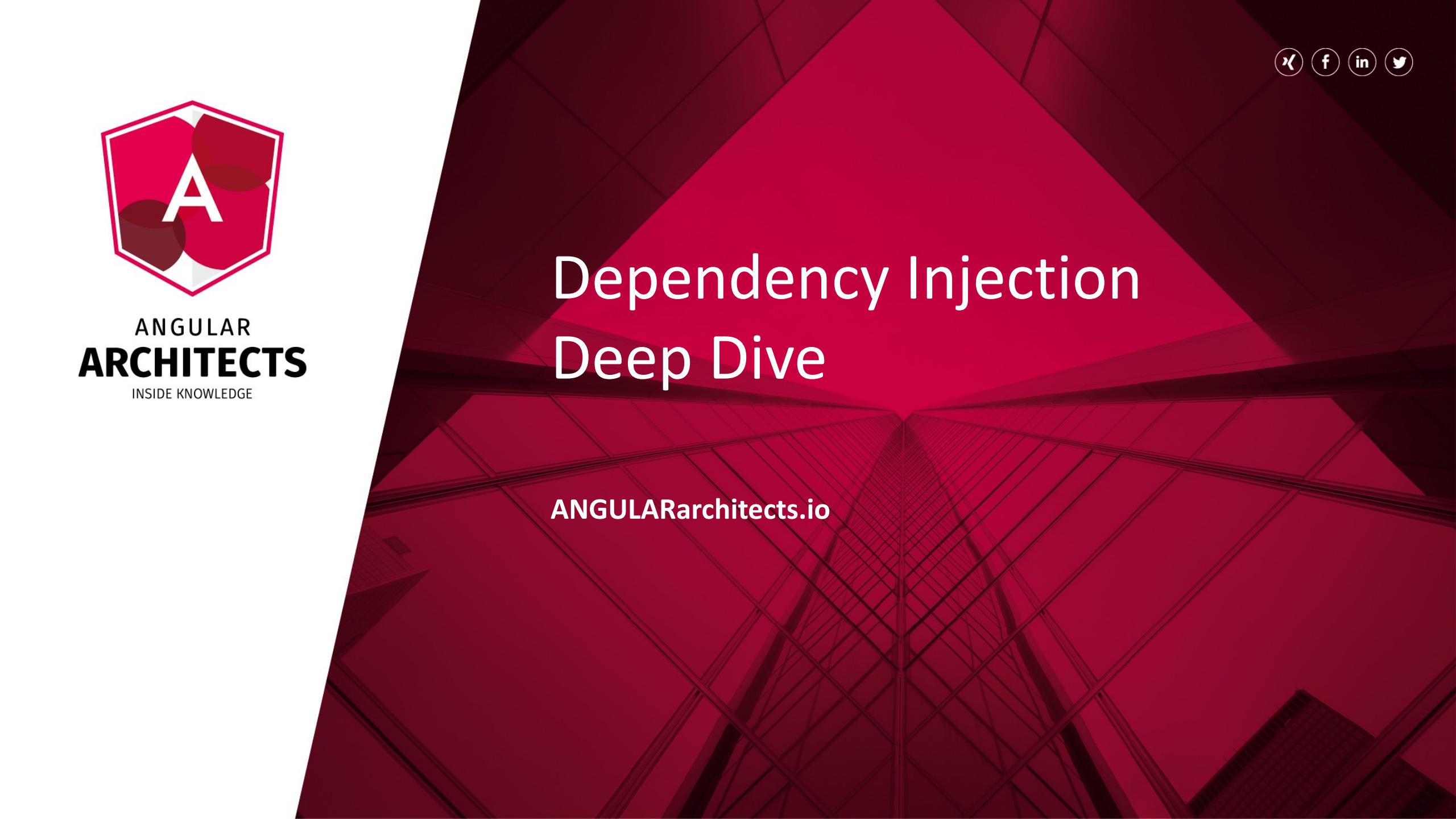
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Dependency Injection
Deep Dive
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Content

- Classic Providers
- Tree-shakable Providers
- Scopes
- Constants as Tokens
- Services and Lazy Loading
- Multi Providers

Classic Providers

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Service

```
@Injectable()
export class FlightService {

    […]

}
```

Classic Providers

```
@NgModule({
    imports: [
        BrowserModule, HttpModule, FormsModule
    ],
    declarations: [
        AppComponent, FlightSearchComponent
    ],
    providers: [
        FlightService
    ],
    bootstrap: [
        AppComponent
    ]
})
export class AppModule {
}
```

Injecting Service into Consumer

```
@Component({
    selector: 'flight-search',
    templateUrl: 'flight-search.html'
})
export class FlightSearchComponent {
    from = '';
    to = '';
    flight: Flight[] = [];

    constructor(private flightService: FlightService) { … }

    flightSearch() { [...] }
    selectFlight(flight) { [...] }
}
```

Abstraction

```
export abstract class FlightService {

    abstract find(from: string, to: string): Observable<Flight[]>;

}
```

```
@Injectable()
export class DefaultFlightService implements FlightService {

    find(from: string, to: string): Observable<Flight[]> { … }

}
```

"Forward" with useClass

```
@NgModule({
    imports: [
        BrowserModule, HttpModule, FormsModule
    ],
    declarations: [
        AppComponent, FlightSearchComponent
    ],
    providers: [
        { provide: FlightService, useClass: DefaultFlightService }
    ],
    bootstrap: [
        AppComponent
    ]
})
export class AppModule {
}
```

"Forward" with useClass

```
@NgModule({
    imports: [
        BrowserModule, HttpModule, FormsModule
    ],
    declarations: [
        AppComponent, FlightSearchComponent
    ],
    providers: [
        { provide: FlightService, useClass: DefaultFlightService }
    ],
    bootstrap: [
        AppComponent
    ]
})
export class AppModule {
}
```

"Forward" with useClass

```
@NgModule({
    imports: [
        BrowserModule, HttpModule, FormsModule
    ],
    declarations: [
        AppComponent, FlightSearchComponent
    ],
    providers: [
        { provide: FlightService, useClass: DefaultFlightService }
    ],
    bootstrap: [
        AppComponent
    ]
})
export class AppModule {
}
```

Token

Service

Tokens

- Interfaces **cannot** be used as tokens
- However, you can use abstract classes instead

useFactory

```
const DEBUG = true;
[...]

providers: [{
    provide: FlightService,
    useFactory: (http: HttpClient) => {
        if (DEBUG) {
            return dummyFlightService;
        }
        else {
            return new FlightService(http);
        }
     },
     […]
}]
```

useFactory

```
const DEBUG = true;
[...]

providers: [{
    provide: FlightService,
    useFactory: (http: HttpClient) => {
        if (DEBUG) {
            return dummyFlightService;
        }
        else {
            return new FlightService(http);
        }
     },
     deps: [HttpClient]
}]
```

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Types of Providers

useClass

useValue

useFactory

useExisting

Tree-Shakable Provider

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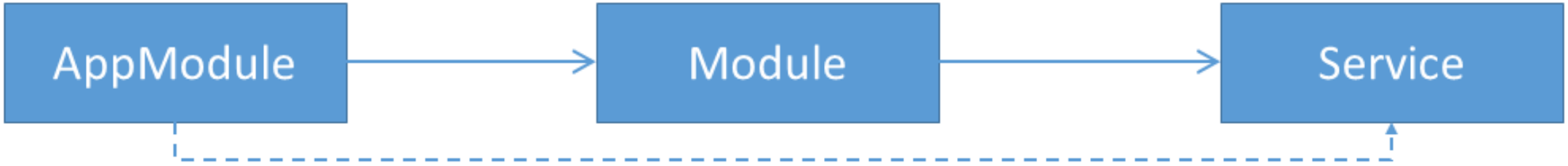
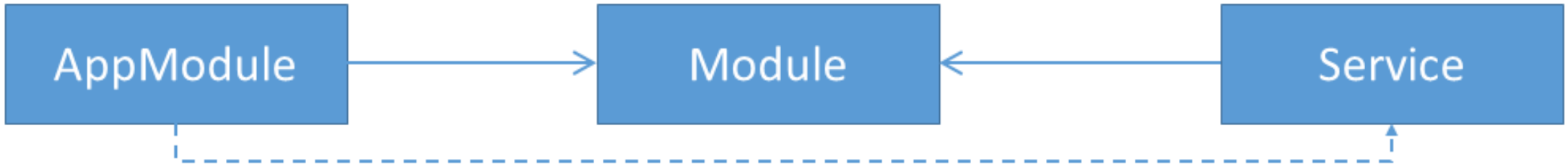
Traditional Providers are not Tree-shakable



Tree-shakable Providers



Example

Globaler Scope

```
@Injectable({ providedIn: 'root' })
export class FlightService {

    […]

}
```

useClass

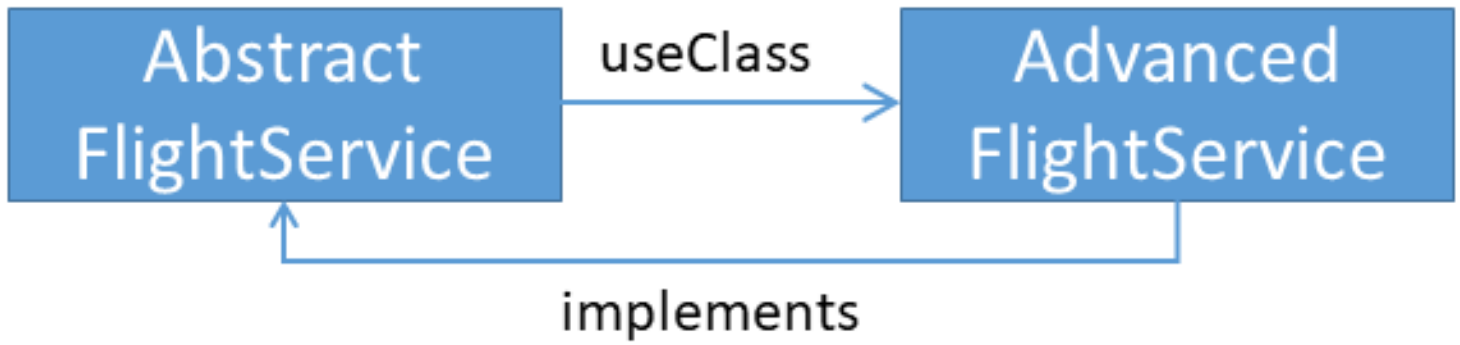
```
@Injectable({
    providedIn: 'root',
    useClass: DefaultFlightService
})
export abstract class FlightService {
    abstract find(from: string, to: string);
}
```

```
@Injectable()
export class DefaultFlightService implements FlightService {

    find(from: string, to: string) { … }

}
```

implements vs. *extends*



useFactory

```
@Injectable({
    providedIn: 'root',
    useFactory: (http: HttpClient) => {
        return new DefaultFlightService(http);
    },
    deps: [HttpClient]
})
export abstract class FlightService {

    abstract find(from: string, to: string): Observable<Flight[]>;

}
```

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Scopes

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"Locale Service": Own Scope

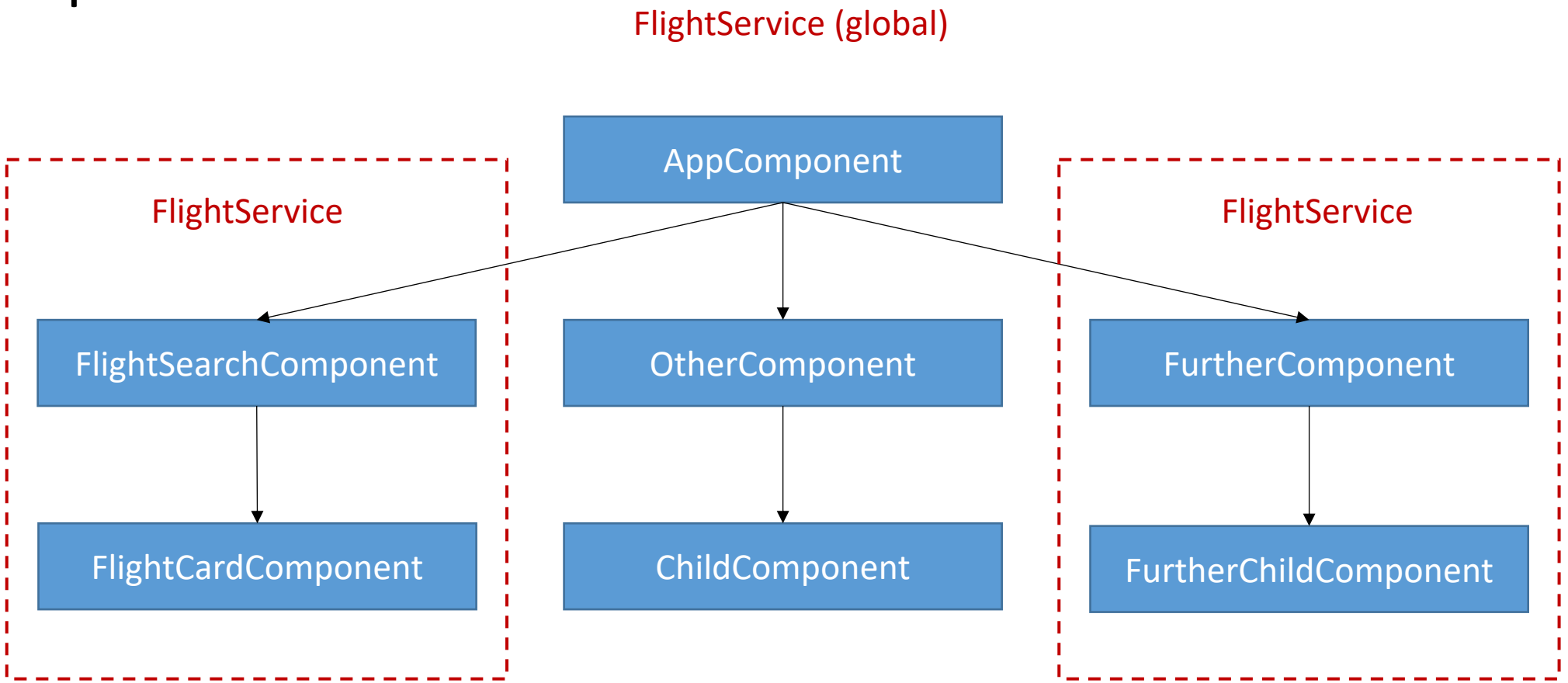
```
@Component({
    selector: 'flight-search',
    templateUrl: 'app/flight-buchen/flight-buchen.html',
    providers: [{ provide: FlightService, useClass: FlightService}]
})
export class FlightSearchComponent {

    […]

}
```


Can be used in current component and below!

Scopes


FlightService (global)
AppComponent
FlightService
FlightSearchComponent
FlightCardComponent
OtherComponent
ChildComponent
FlightService
FurtherComponent
FurtherChildComponent

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Lazy Modules: Own Scope

```
@Injectable({ providedIn: LazyApiModule })
export class FlightService {

    […]

}
```

Constants as Tokens (Classic Providers)

Why Constants?

- There may not be a suitable type for a concept
  - Strings with configuration data
  - Tokens that refer to functions
  - Several "flavors" of one service
  - Token for Arrays
- Angular uses this option internally too

Classic Providers

```
import { InjectionToken } from "@angular/core";

export const BASE_URL = new InjectionToken<string>("BASE_URL");
```

Classic Providers

```
@NgModule({
  […],
  providers: [
    […]
    { provide: BASE_URL, useValue: 'http://…'}
  ]
})
export class AppModule {
}
```

Injecting the Dependency

```
@Injectable()
export class FlightService {

  flights: Array<Flight> = [];

  constructor(
    @Inject(BASE_URL) private baseUrl: string,
    private http: Http
  ) {
      […]
  }

  […]
}
```

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Constants as Tokens (Tree-shakable Providers)

InjectionToken

```
export const BASE_URL =
    new InjectionToken<string>('BASE_URL', {
        providedIn: 'root',
        factory: () => 'http://www.angular.at/api' } );
```

InjectionToken

```
export const FLIGHT_SERVICE =
    new InjectionToken<FlightService>('FLIGHT_SERVICE', {
        providedIn: 'root',
        factory: () => new FlightService(inject(HttpClient)) } );
```

InjectionToken

```
export const FLIGHT_SERVICE =
    new InjectionToken<FlightService>('FLIGHT_SERVICE', {
        providedIn: 'root',
        factory: () => new FlightService(inject(HttpClient)) } );
```

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Multi Providers

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Multi

```
[…]
providers: [
      { provide: FlightService, useClass: LufthansaFlightService, multi: true },
      { provide: FlightService, useClass: AustrianFlightService, multi: true }
]
[…]
```

```
export class AppComponent {

   constructor(
      @Inject(FlightService) private flightServices: FlightService[]) {
   }
   […]
}
```

Multi and Constants

```
[…]
providers: [
      { provide: FLIGHT_SERVICES, useClass: LufthansaFlightService, multi: true },
      { provide: FLIGHT_SERVICES, useValue: AustrianFlightService, multi: true }
]
[…]
```

```
export class AppComponent {

   constructor(
      @Inject(FLIGHT_SERVICES) private flightServices: FlightService[]) {
   }
   […]
}
```

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Summary

- forRoot vs. in component
- Classic providers vs. tree-shakable providers
- Factories
- Constants
- Multi Providers