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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



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Classic Providers



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Service

```
@Injectable()  
export class FlightService {  
  
    [...]  
  
}
```



Classic Providers

```
@NgModule({  
  imports: [  
    BrowserModule, HttpClientModule, 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 {  
    von: string;  
    nach: string;  
    fluege: Array<Flight>;  
  
    constructor(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, HttpClientModule, FormsModule
  ],
  declarations: [
    AppComponent, FlightSearchComponent
  ],
  providers: [
    { provide: FlightService, useClass: DefaultFlightService }
  ],
  bootstrap: [
    AppComponent
  ]
})
export class AppModule {
}
```



"Forward" with useClass

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



"Forward" with useClass

```
@NgModule({
  imports: [
    BrowserModule, HttpClientModule, 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



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useFactory

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



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



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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

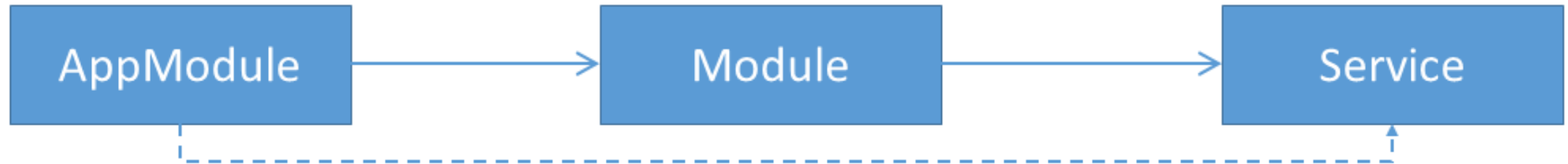


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Traditional Providers are not Tree-shakable

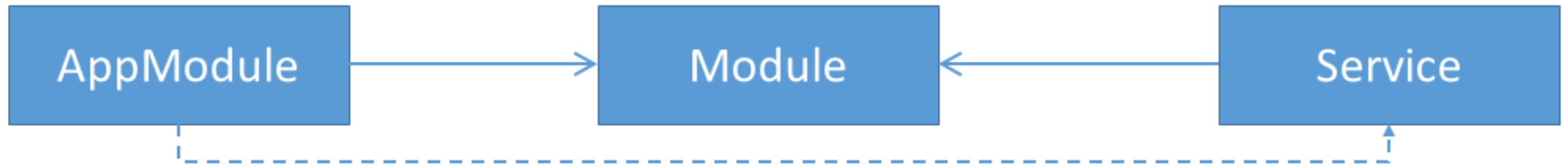


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Tree-shakable Providers



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Example

Globaler Scope



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



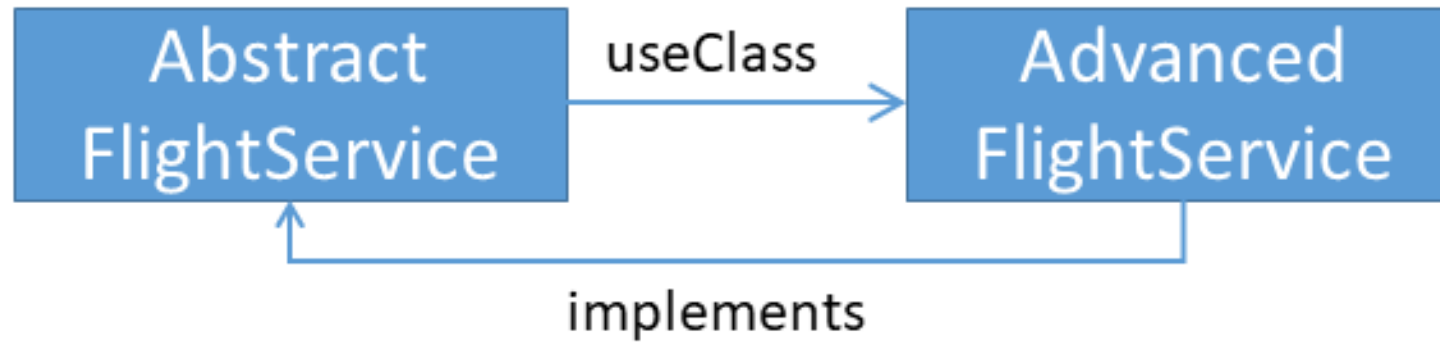
useClass

```
@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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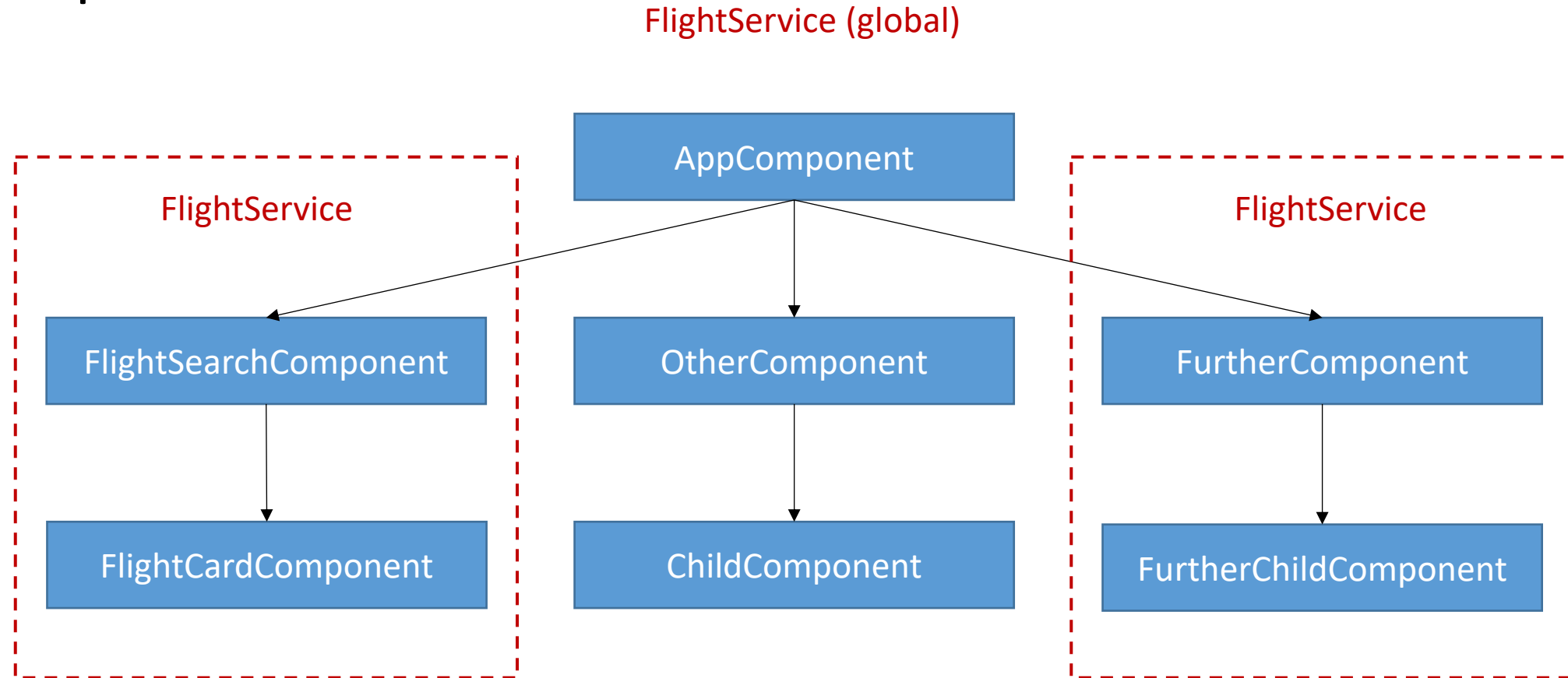
"Locale Service": Own Scope

```
@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



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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");
```



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Classic Providers

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



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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' } );
```



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InjectionToken

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



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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



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