

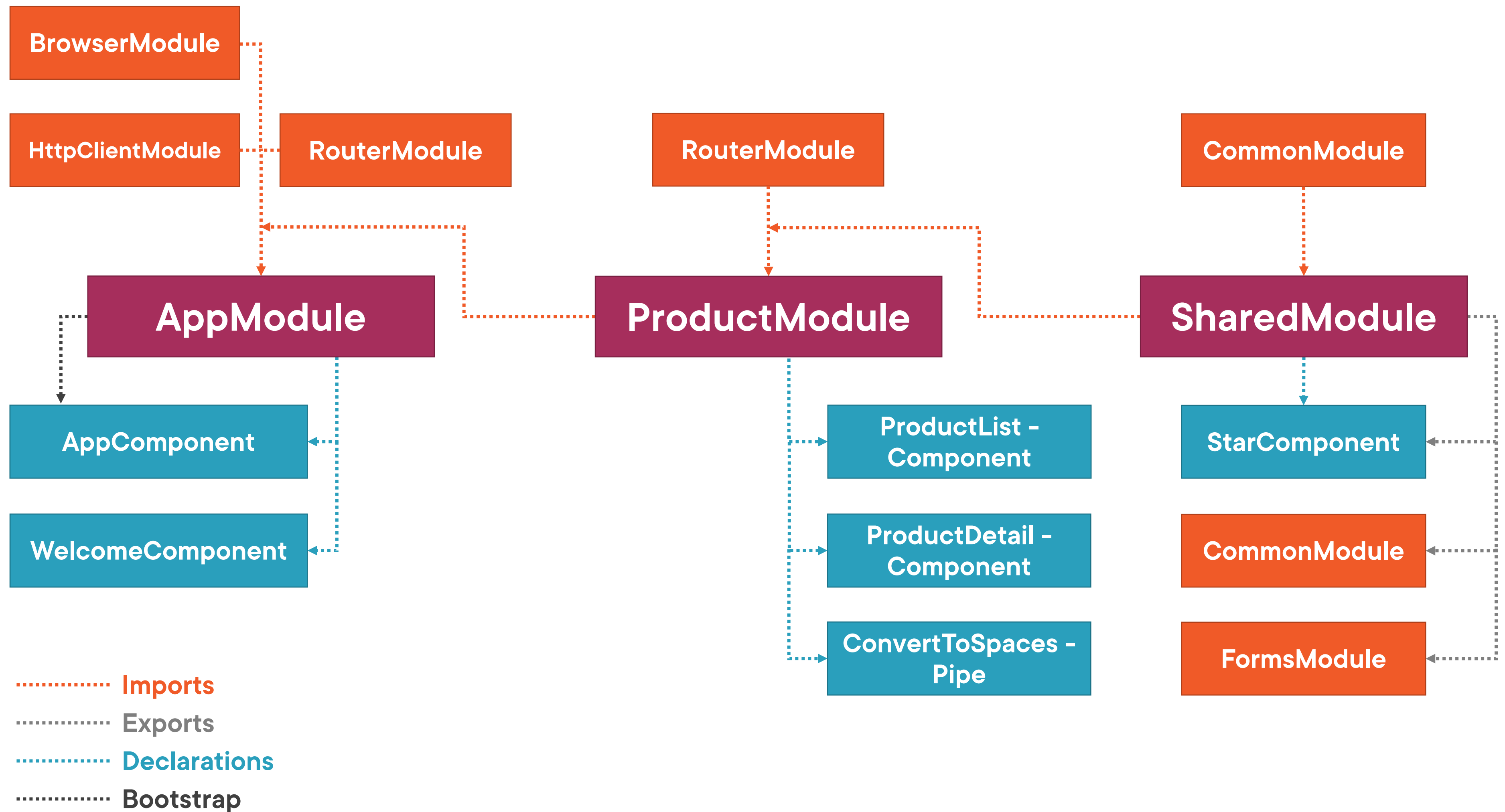
Angular Modules



Deborah Kurata

Consultant | Speaker | Author | MVP | GDE

@deborahkurata



Module Overview



What is an Angular module?

Angular module metadata

Creating a feature module

Defining a shared module

Revisiting AppModule

What Is an Angular Module?



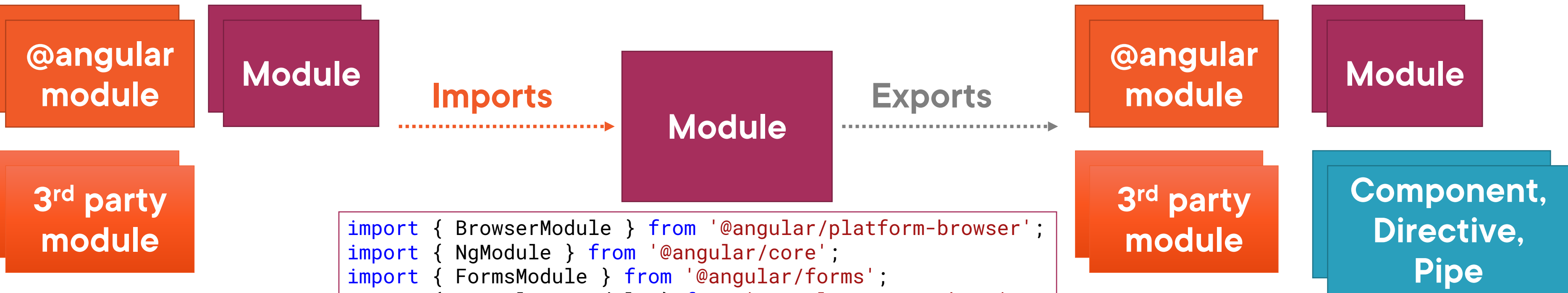
Module

A class with an NgModule decorator

Its purpose:

- Organize the pieces of our application**
- Arrange them into blocks**
- Extend our application with capabilities from external libraries**
- Provide a template resolution environment**
- Aggregate and re-export**

Angular Module



```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { FormsModule } from '@angular/forms';
import { HttpClientModule } from '@angular/common/http';
...

@NgModule({
  declarations: [...],
  imports: [
    BrowserModule,
    FormsModule,
    HttpClientModule,
    RouterModule.forRoot([...])
  ],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

..... Imports

..... Exports

..... Declarations

..... Bootstrap

AppComponent

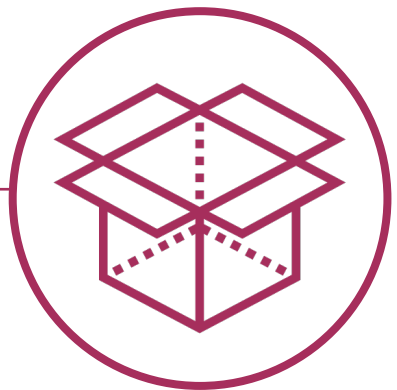
ProductList -
Component

ProductDetail -
Component

WelcomeComponent

```
...  
<li><a routerLink=' /welcome' >  
    Home</a></li>  
<li><a routerLink=' /products' >  
    Product List</a></li>  
...  
<router-outlet></router-outlet>  
...
```

RouterModule



Angular Module

AppComponent

ProductList -
Component

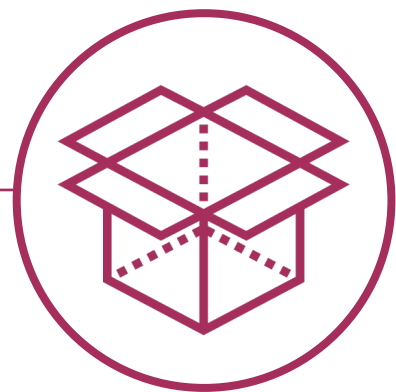
ProductDetail -
Component

WelcomeComponent

RouterModule

FormsModule

```
...  
<input type='text'  
      [(ngModel)]='listFilter' />  
...
```



Angular Module

AppComponent

ProductList -
Component

ProductDetail -
Component

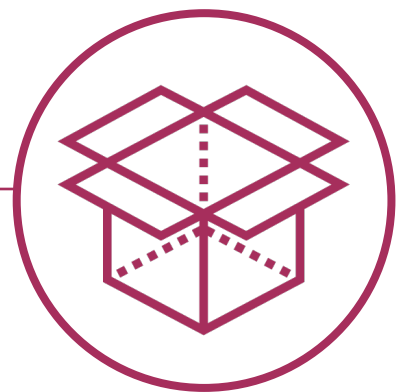
WelcomeComponent

RouterModule

FormsModule

BrowserModule

```
...  
<tr *ngFor='let product of products'>  
  <td>  
    <img *ngIf='showImage' ...
```



Angular Module

AppComponent

ProductList -
Component

ProductDetail -
Component

WelcomeComponent

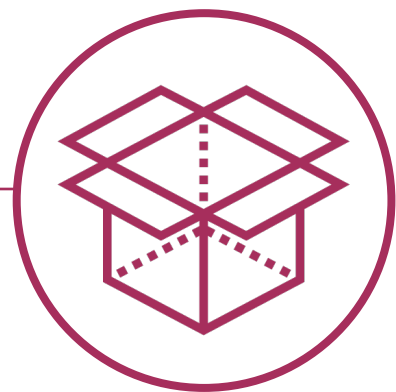
ConvertToSpaces -
Pipe

RouterModule

FormsModule

BrowserModule

```
...  
<td>{{ product.productCode |  
      convertToSpaces: '-' }}  
</td>  
...
```



Angular Module

AppComponent

ProductList -
Component

ProductDetail -
Component

WelcomeComponent

ConvertToSpaces -
Pipe

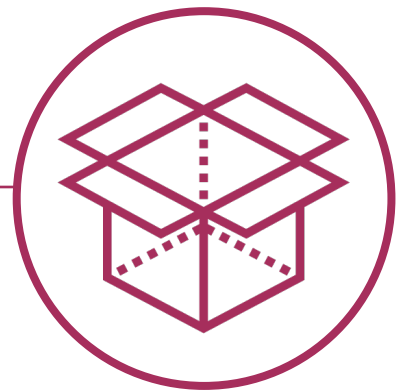
StarComponent

RouterModule

FormsModule

BrowserModule

```
...  
<pm-star  
  [rating]='product.starRating'  
  (ratingClicked)='onClicked($event)' >  
</pm-star>  
...
```



Angular Module

AppComponent

**ProductList -
Component**

**ProductDetail -
Component**

WelcomeComponent

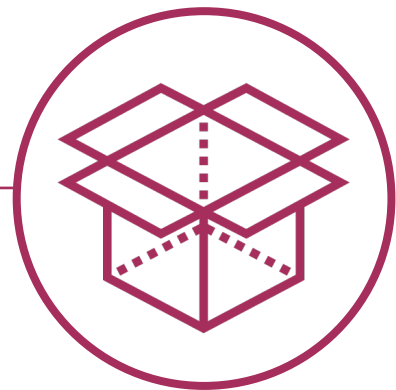
**ConvertToSpaces -
Pipe**

StarComponent

RouterModule

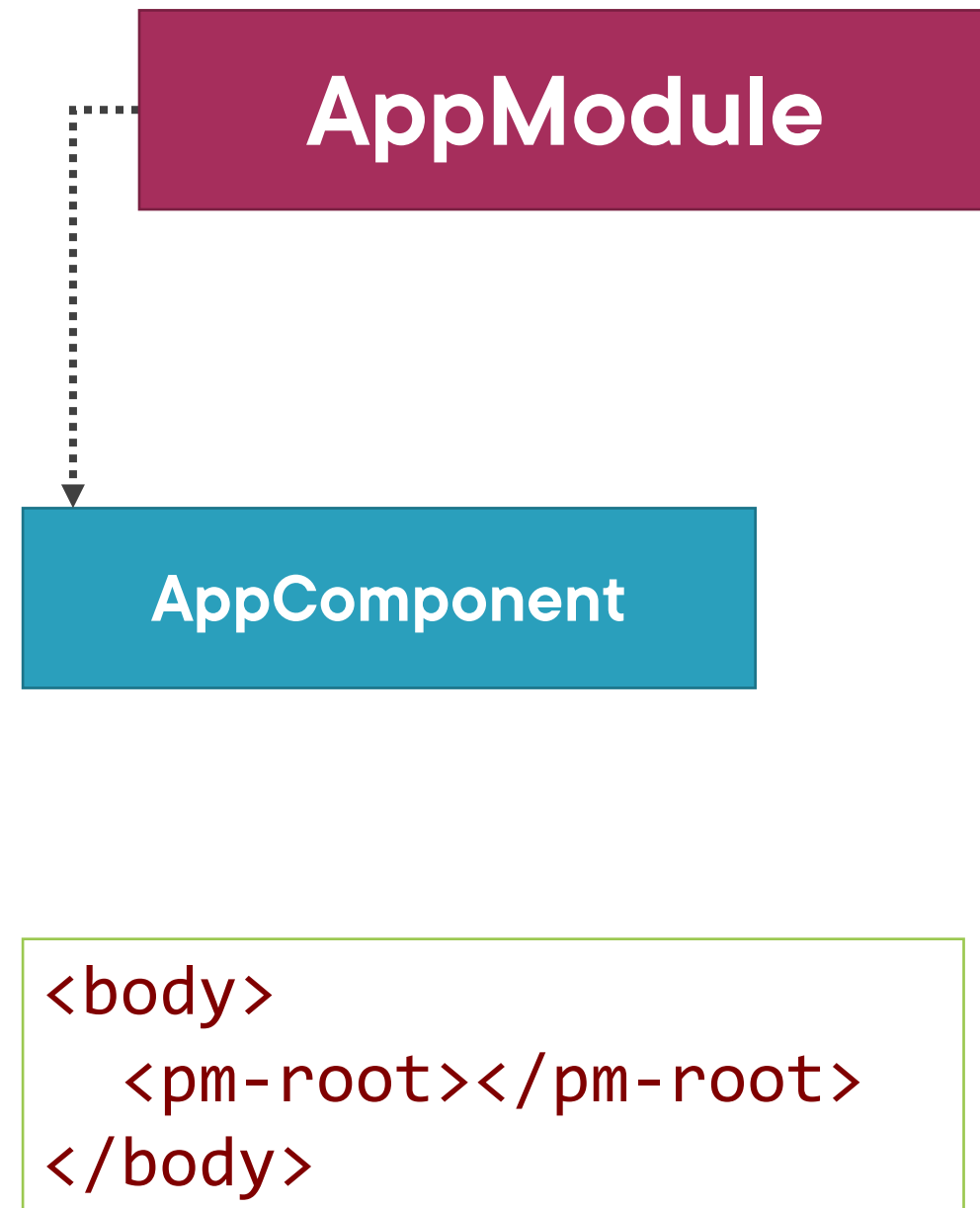
FormsModule

BrowserModule



Angular Module

Bootstrap Array



app.module.ts

```
...
bootstrap: [ AppComponent ]
...
```

```
import { Component } from '@angular/core';

@Component({
  selector: 'pm-root',
  template: `...`
})
export class AppComponent {
  pageTitle: string = 'Acme Product Management';
}
```

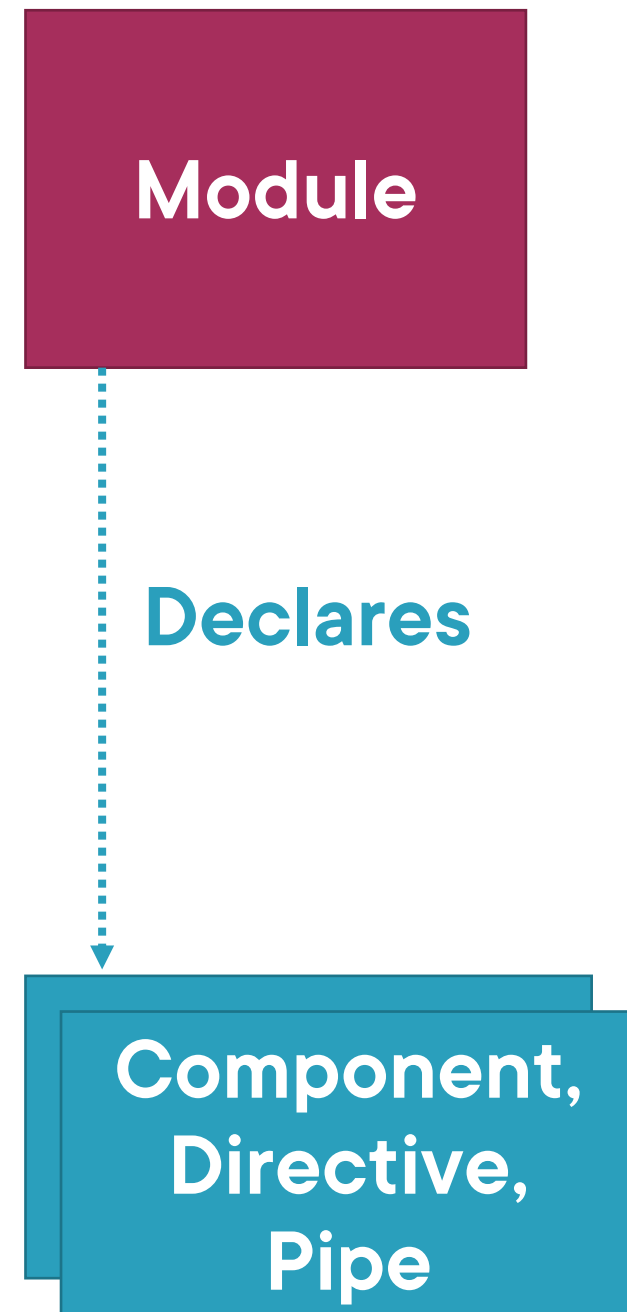
Bootstrap Array Truth #1

Every application must bootstrap at least one component, the root application component.

Bootstrap Array Truth #2

The bootstrap array should only be used in the root application module, AppModule.

Declarations Array



```
...  
declarations: [  
  AppComponent,  
  WelcomeComponent,  
  ProductListComponent,  
  ProductDetailComponent,  
  ConvertToSpacesPipe,  
  StarComponent  
]  
...
```

..... Declarations

Declarations Array Truth #1

Every component, directive, and pipe we create must belong to **one and only one Angular module.**

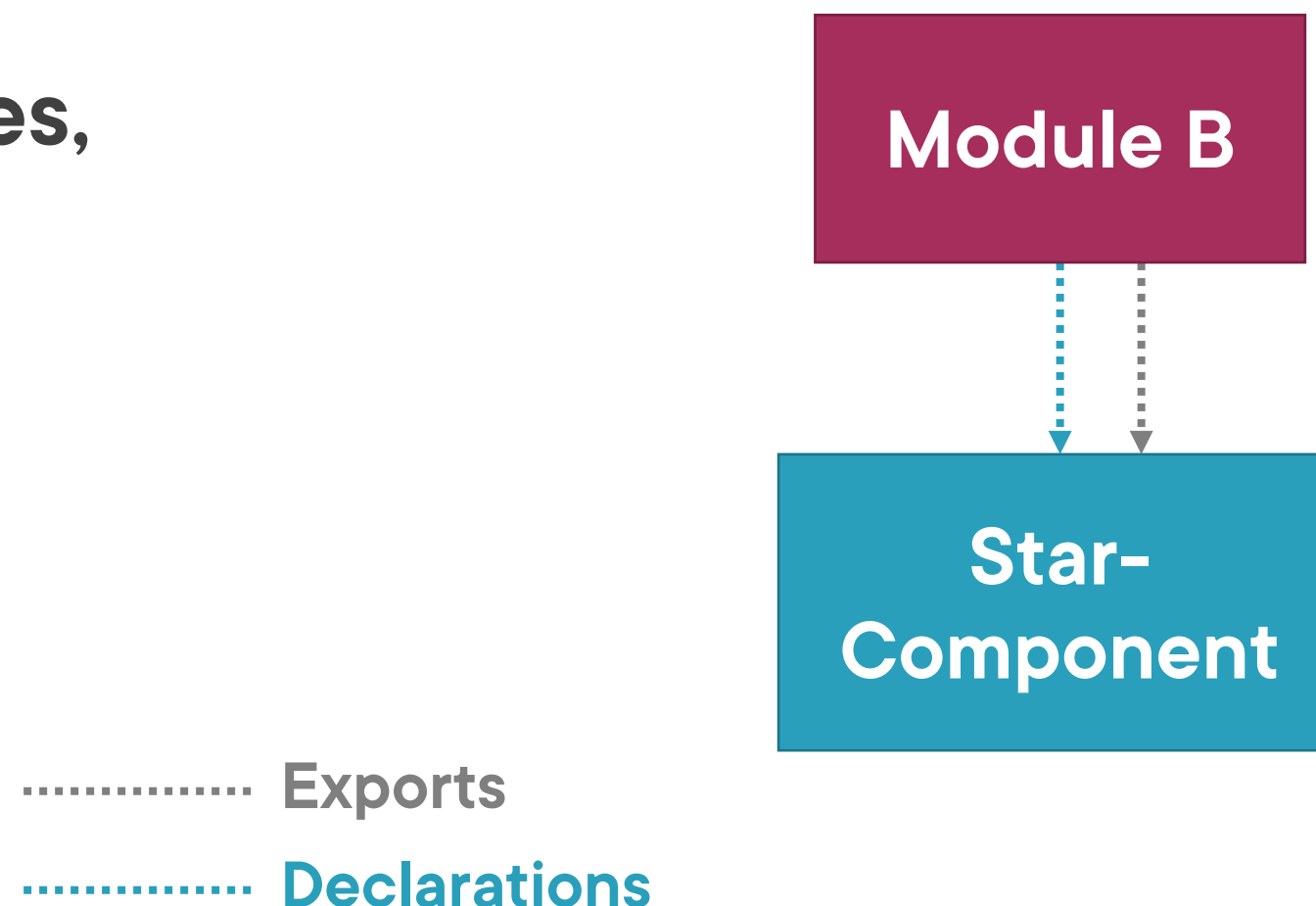
Declarations Array Truth #2

Only declare components, directives and pipes.

Declarations Array Truth #3

All declared components, directives, and pipes are private by default.

They are only accessible to other components, directives, and pipes declared in the same module.



Declarations Array Truth #4

The Angular module provides the template resolution environment for its component templates.

product-list.component.html

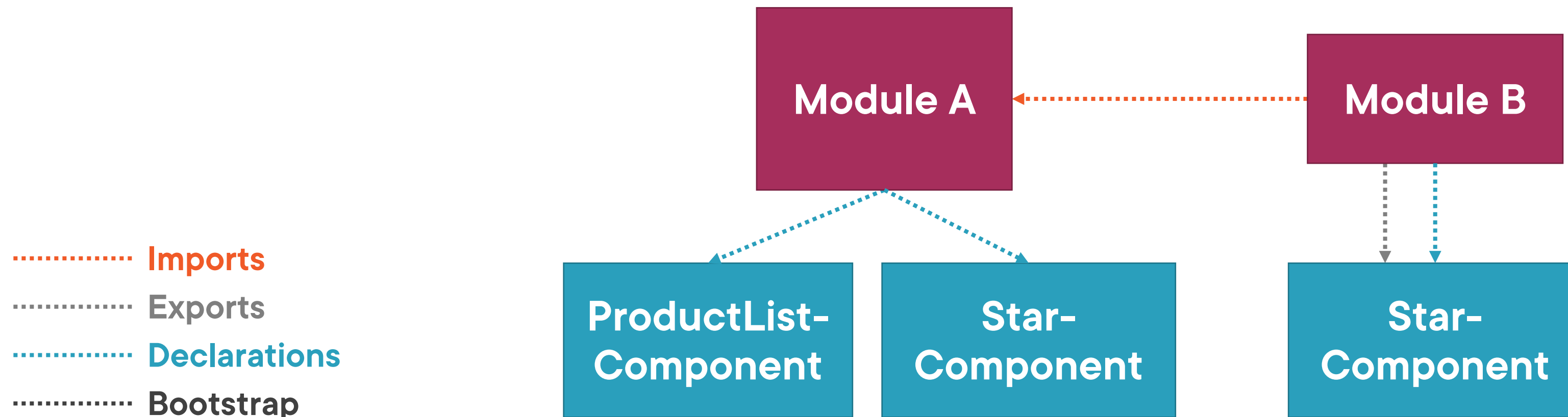
```
<pm-star ...>  
</pm-star>
```

star.component.ts

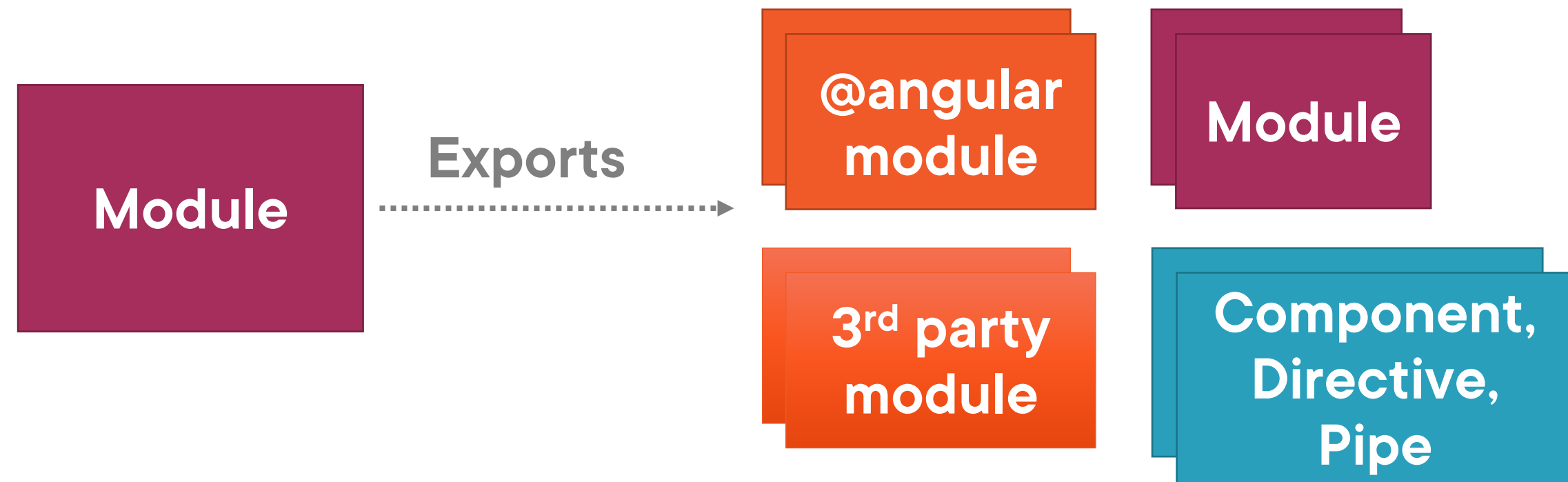
```
...  
@Component({  
  selector: 'pm-star',  
  template: ...  
})  
...
```

Declarations Array Truth #4

The Angular module provides the template resolution environment for its component templates.



Exports Array



```
...  
exports: [  
  StarComponent,  
  FormsModule  
]  
...
```

..... Imports

..... Exports

..... Declarations

..... Bootstrap

Exports Array Truth #1

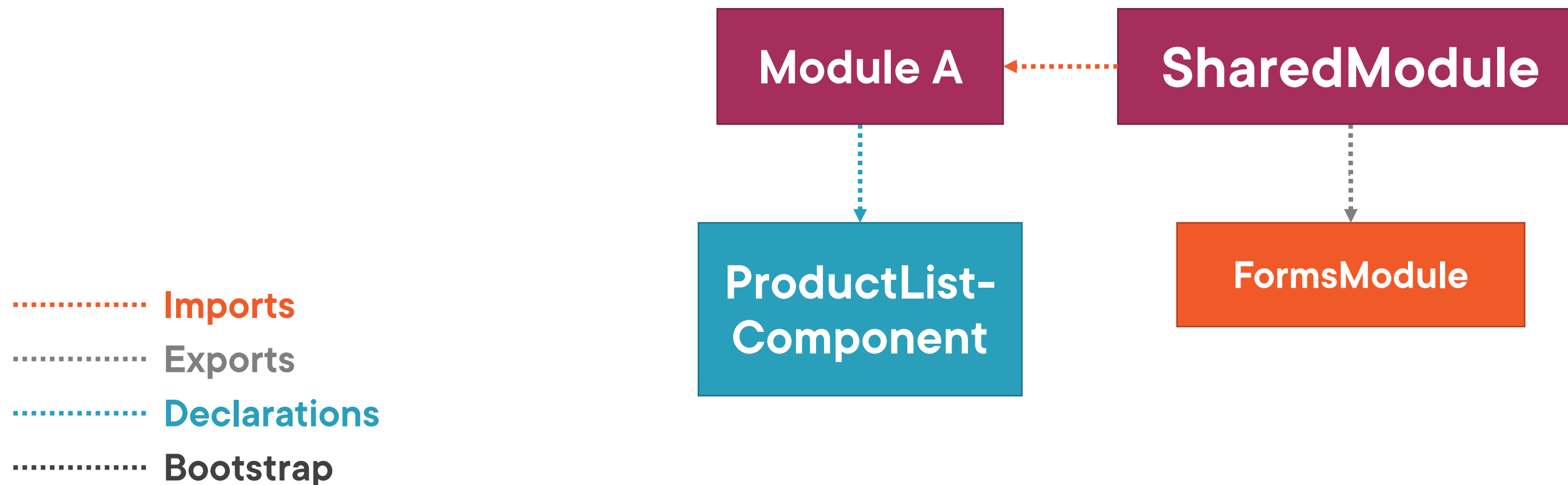
Export any component, directive, or pipe if other components need it.

Exports Array Truth #2

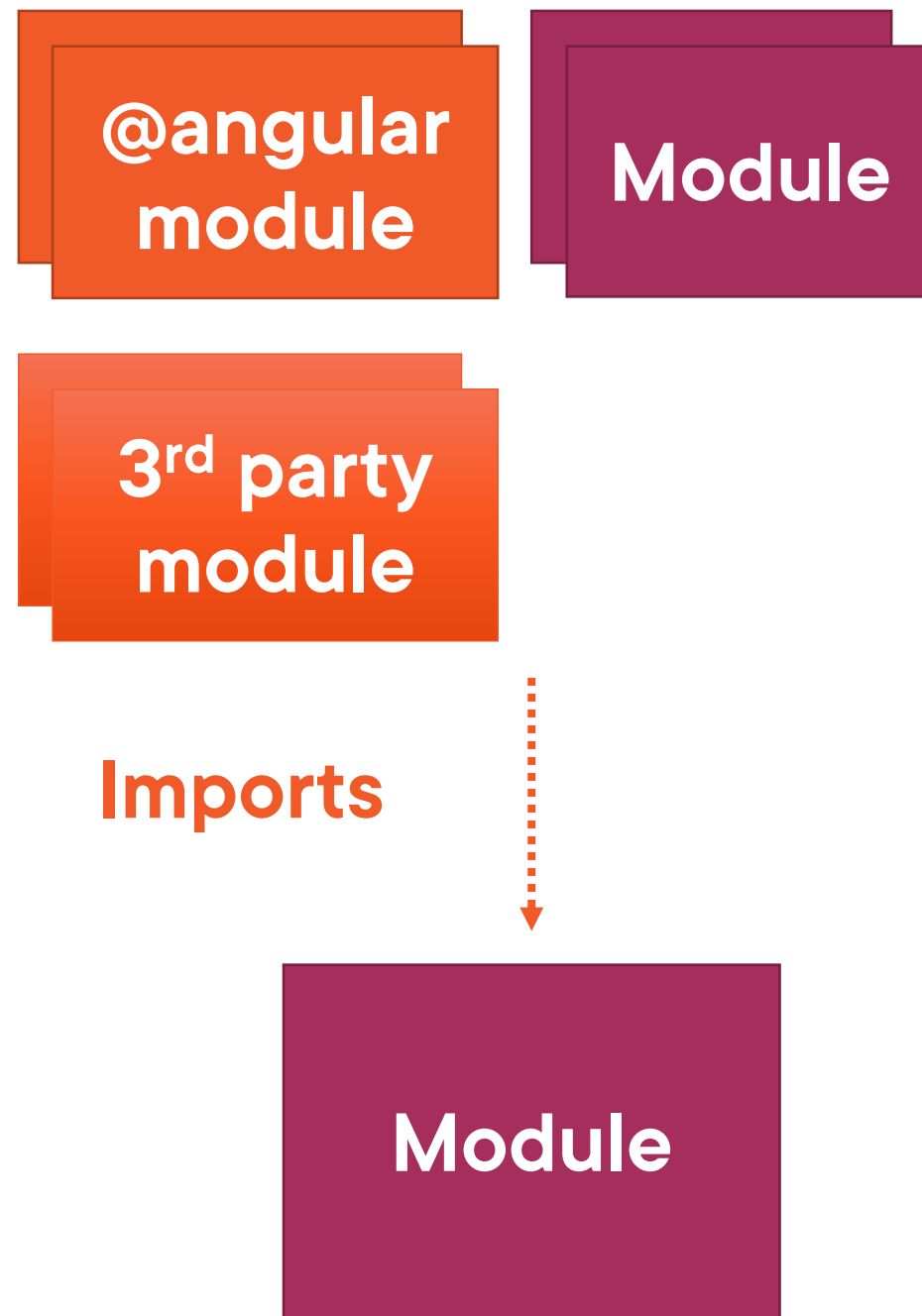
Re-export modules to re-export their components, directives, and pipes.

Exports Array Truth #3

We can export something without including it in the imports array.



Imports Array



```
...  
imports: [  
  BrowserModule,  
  FormsModule,  
  HttpClientModule,  
  RouterModule.forRoot([...])  
]  
...
```

Imports Array Truth #1

Adding a module to the **imports array** makes available any components, directives, and pipes defined in that module's **exports array**.



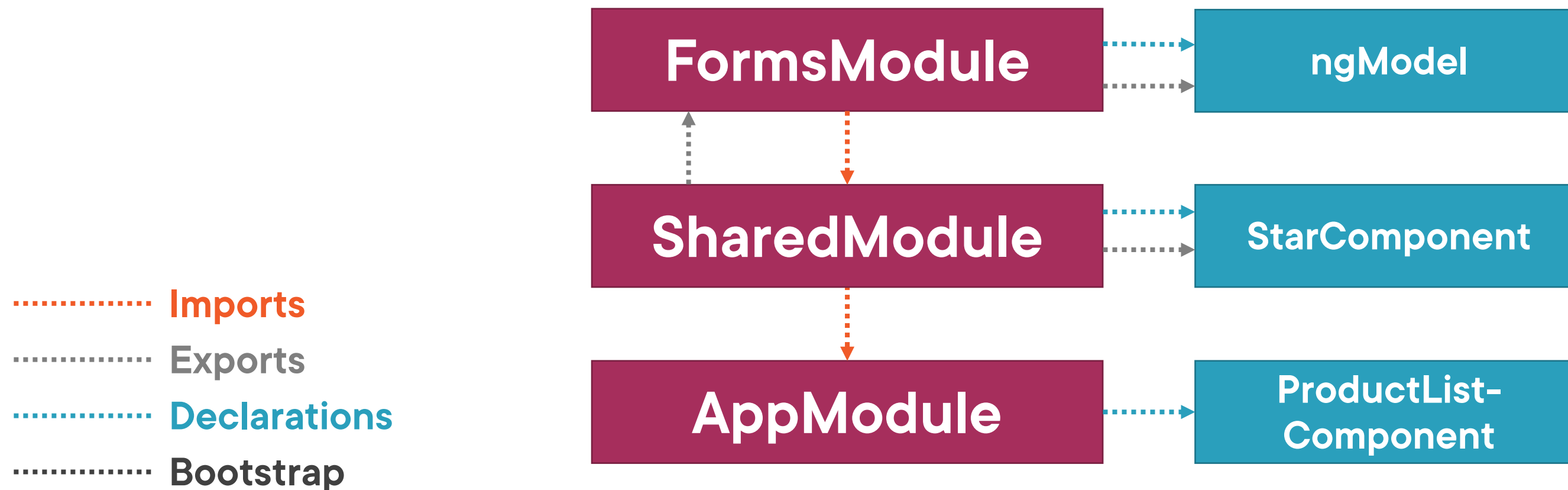
Imports Array Truth #2

Only import what this module needs.

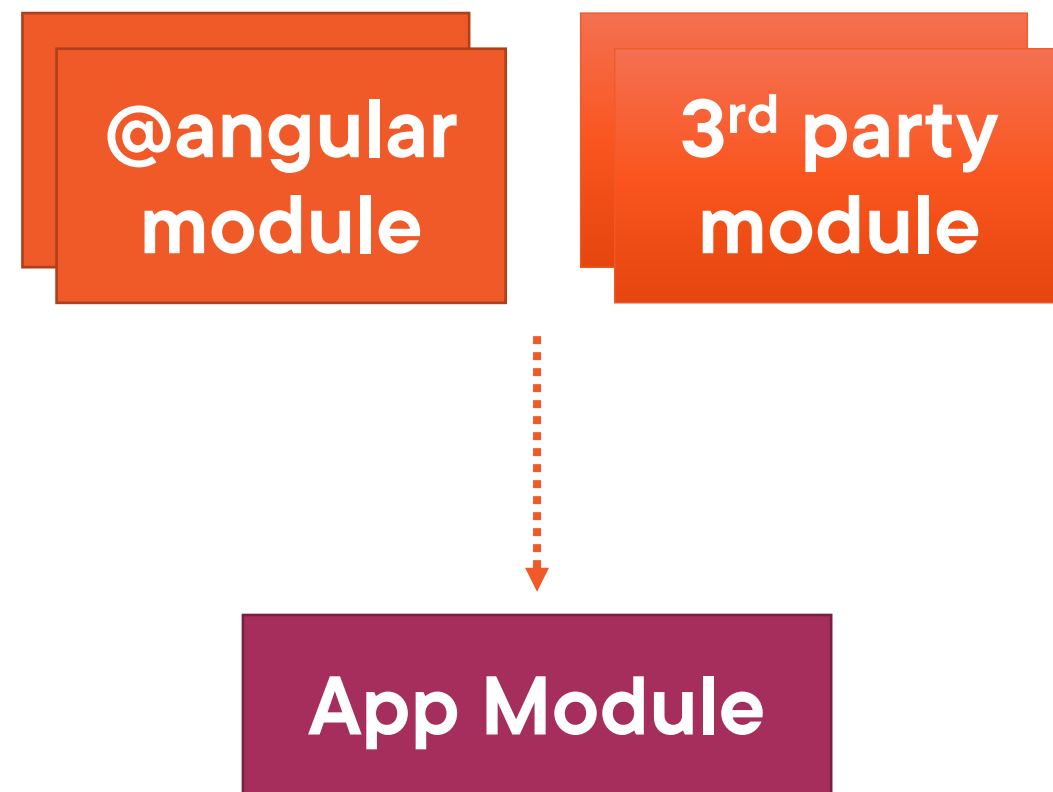
For each component declared in the module, add to the imports array what is needed by the component's template.

Imports Array Truth #3

Importing a module does NOT provide access to its imported modules



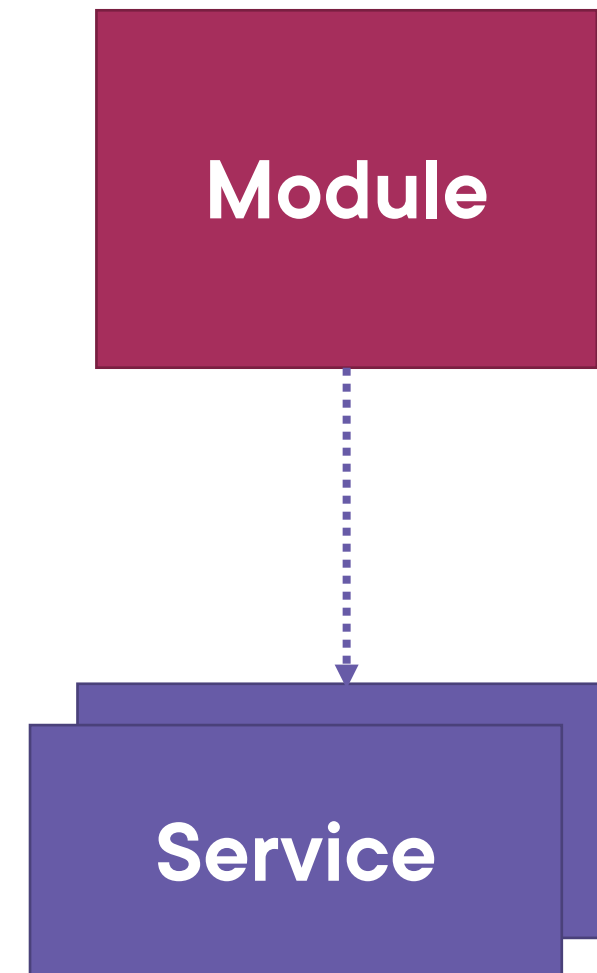
Imports Array Truth #4



Use the imports array to register **services** provided by Angular or third-party modules

Import the module in the AppModule to ensure its services are registered one time

Providers Array



..... Providers

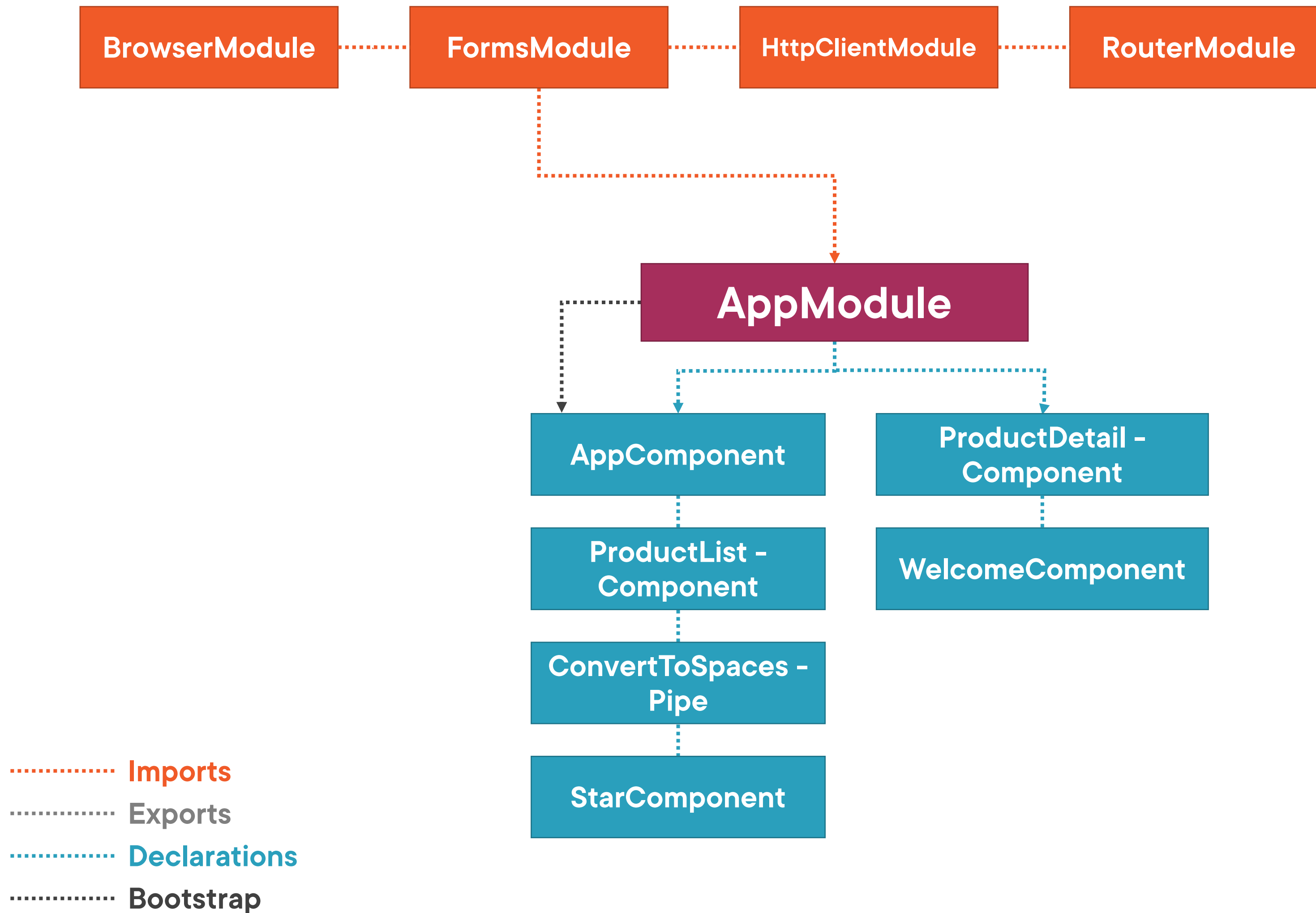
```
...  
providers: [ ProductService ]  
...
```

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

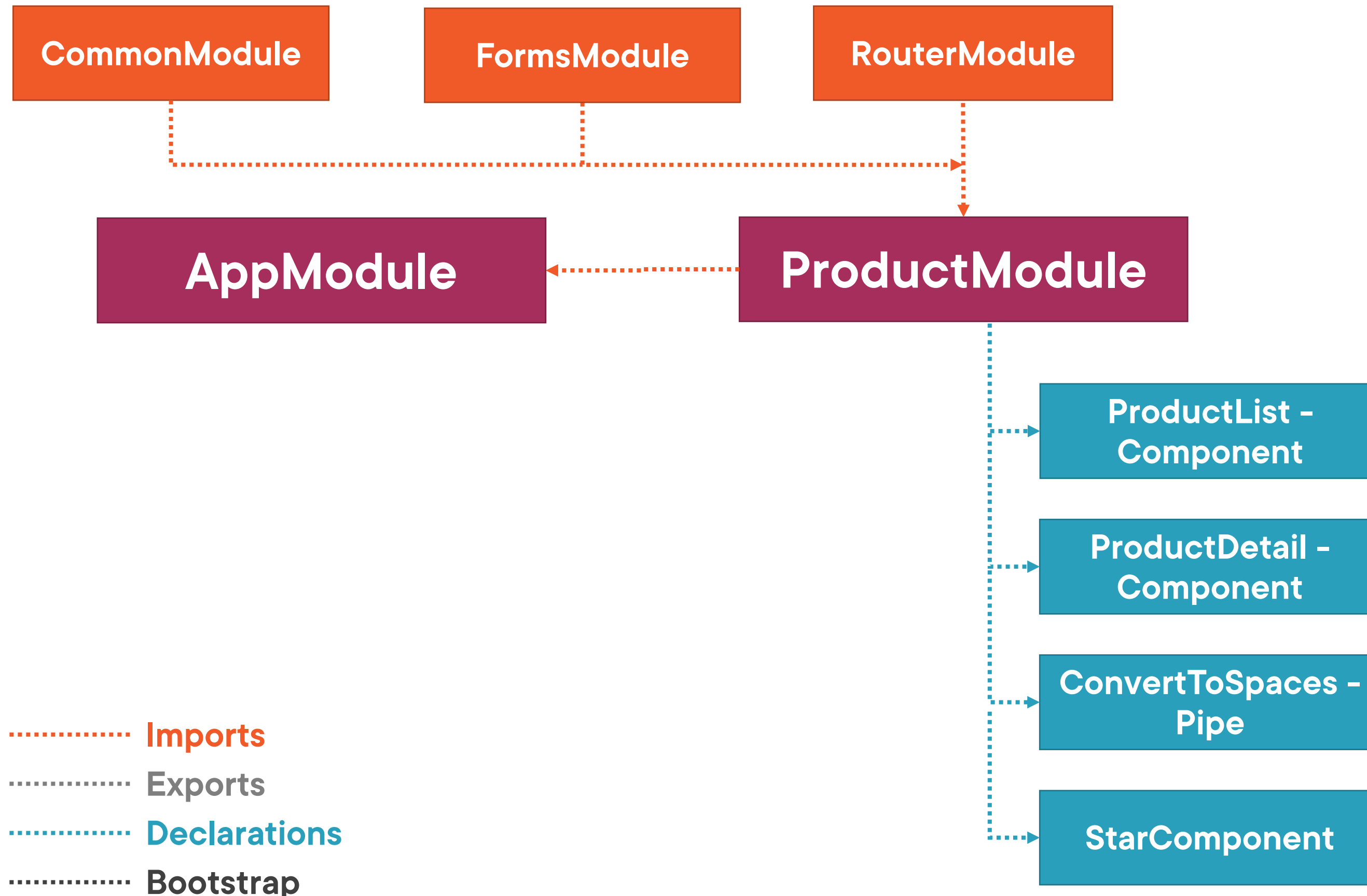
NgModule Decorator

```
@NgModule({  
  declarations: [  
    AppComponent,  
    WelcomeComponent,  
    ProductListComponent,  
    ConvertToSpacesPipe,  
    ProductDetailComponent  
  ],  
  imports: [  
    BrowserModule,  
    HttpClientModule,  
    RouterModule.forRoot([...]),  
    SharedModule  
  ],  
  bootstrap: [AppComponent]  
})  
export class AppModule { }
```

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



Defining a Feature Module



Demo



Building a feature module

Shared Module

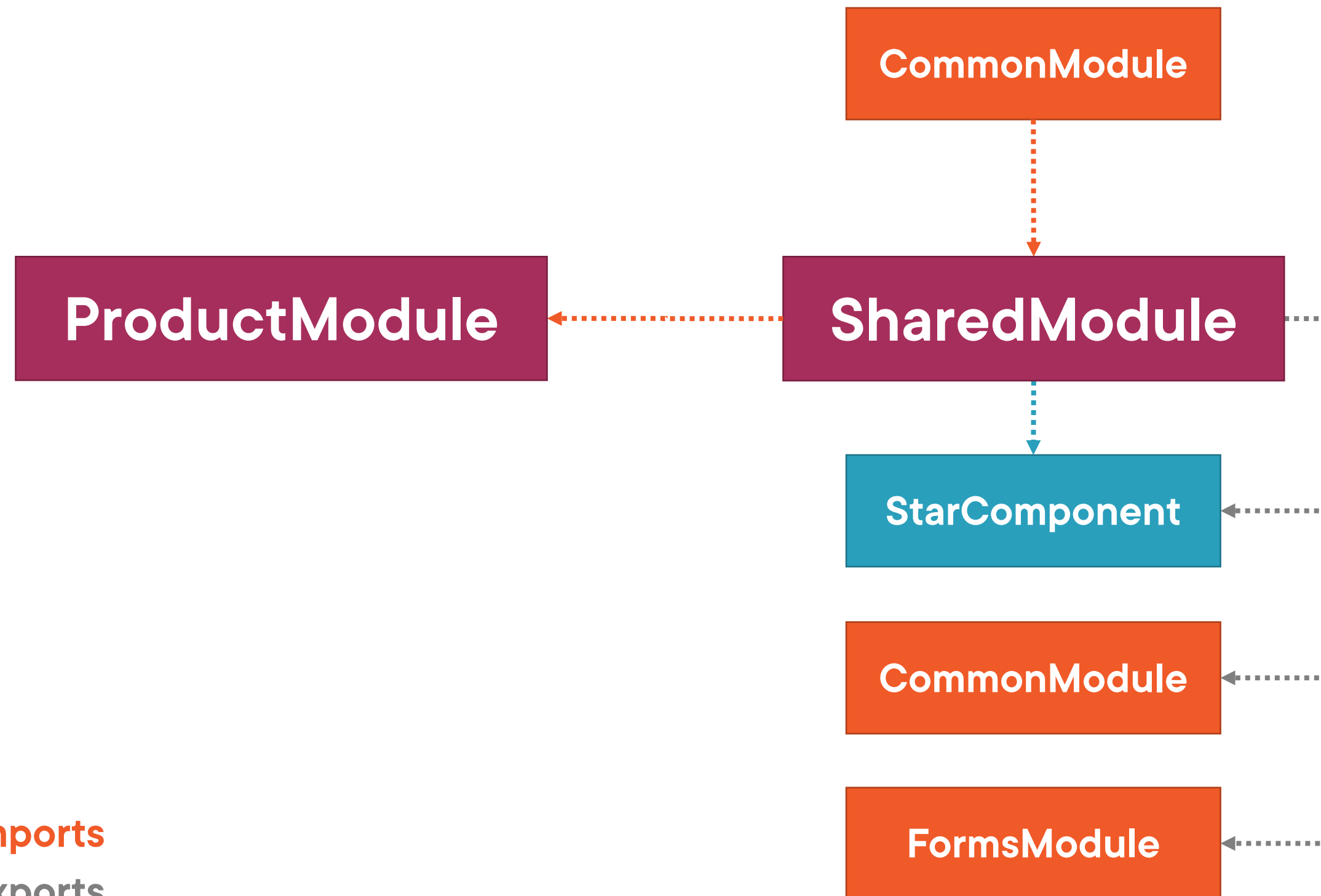


SharedModule

Organize commonly used pieces of our application

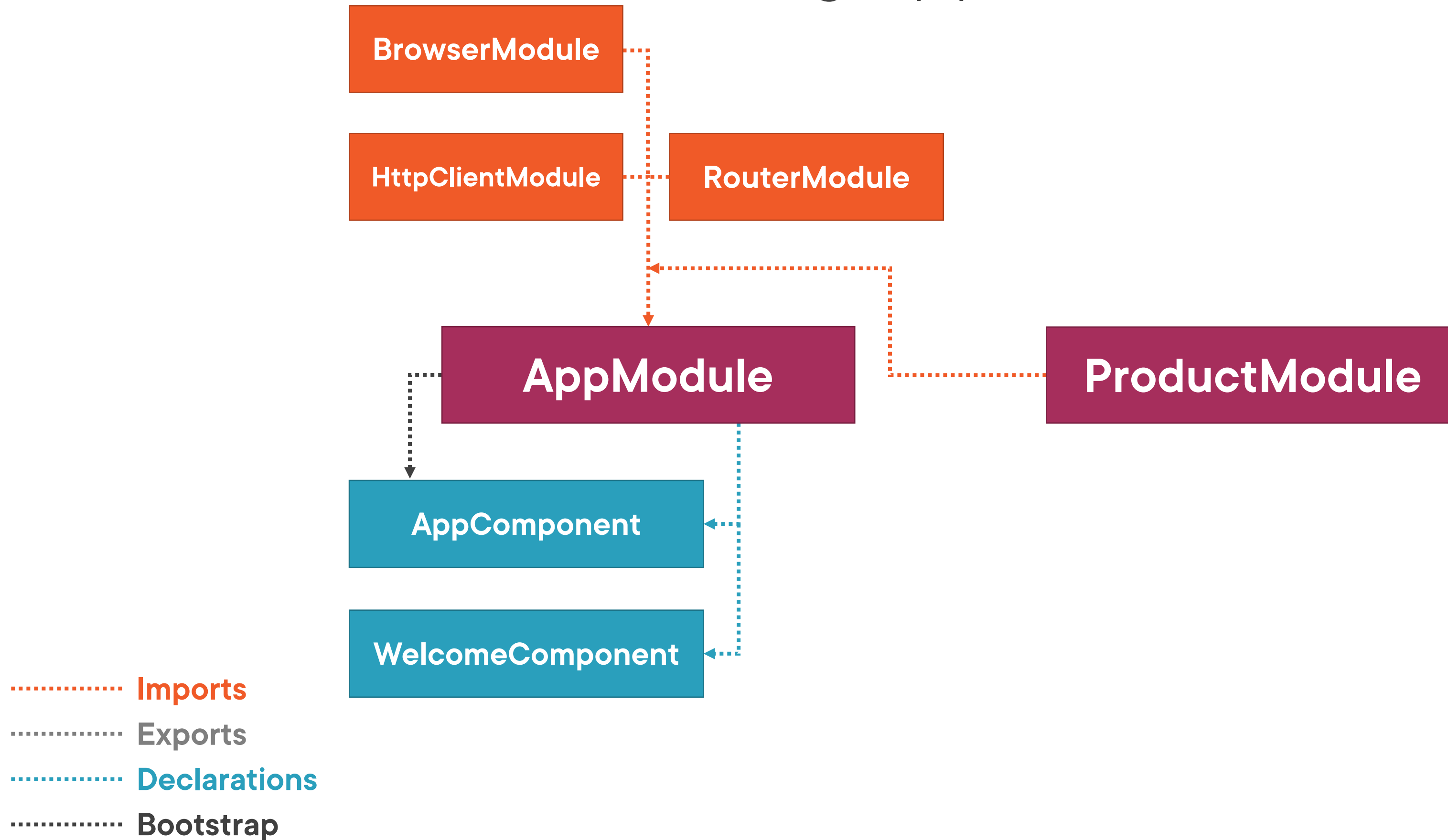
Export those pieces to share them

Defining a Shared Module



- Imports
- Exports
- Declarations
- Bootstrap

Revisiting AppModule



Angular Module Checklist: NgModule



```
@NgModule( {  
  declarations: [  
    AppComponent,  
    WelcomeComponent,  
    ProductListComponent,  
    ConvertToSpacesPipe,  
    ProductDetailComponent  
  ],  
  imports: [  
    BrowserModule,  
    HttpClientModule,  
    RouterModule.forRoot([...]),  
    SharedModule  
  ],  
  bootstrap: [AppComponent]  
})  
export class AppModule { }
```

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

Angular Module Checklist: NgModule Declarations Array



Declarations array: What belongs to this module

Components owned by the module

Declare each component in one and only one module

Directives and pipes used by the declared components

Angular Module Checklist: NgModule Imports Array



Imports array: Modules this module needs

Modules that provide components, directives, and pipes needed by templates associated with components declared in the module

- **Example: CommonModule, FormsModule, SharedModule**

Modules that provide system or third-party services

- **Example: HttpClientModule**
- **Imported into AppModule**

Feature modules

- **Example: ProductModule, InvoiceModule**

Angular Module Checklist: NgModule Exports Array



Exports array: Pieces to share

Components, directives, and pipes

- **Example: StarComponent**

Other modules

- **Example: CommonModule, FormsModule**

Often only used by shared modules

Angular Module Checklist: NgModule Bootstrap Array

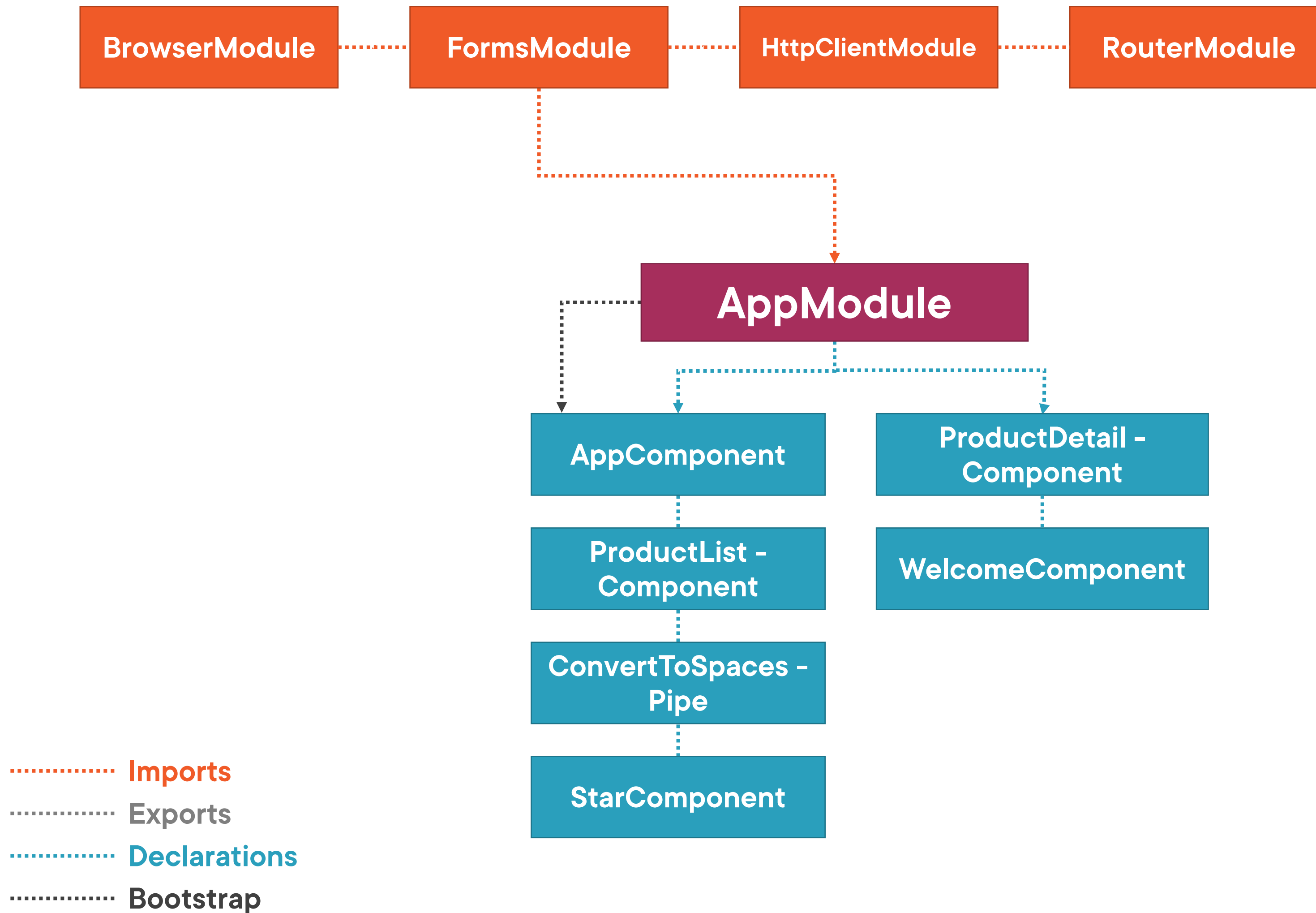


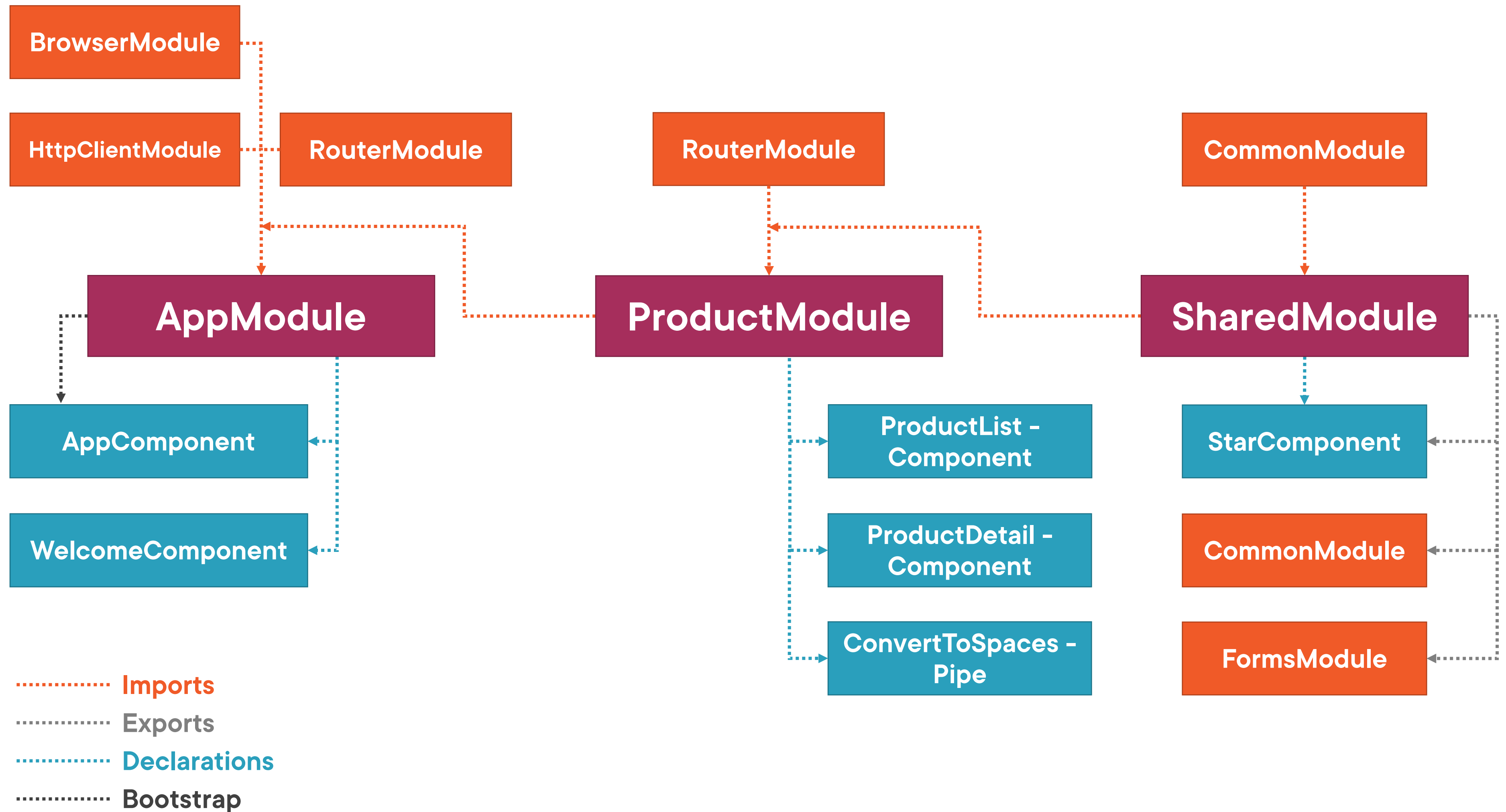
Bootstrap array: What the index.html file needs

Component with selector used in index.html

```
<body>  
  <pm-root></pm-root>  
</body>
```

Normally only used by AppModule







Coming up next ...

**Building, Testing, and Deploying
with the CLI**