More on Components

Introduction

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Improving Our Components

Strong typing & interfaces

Encapsulating styles

Lifecycle hooks

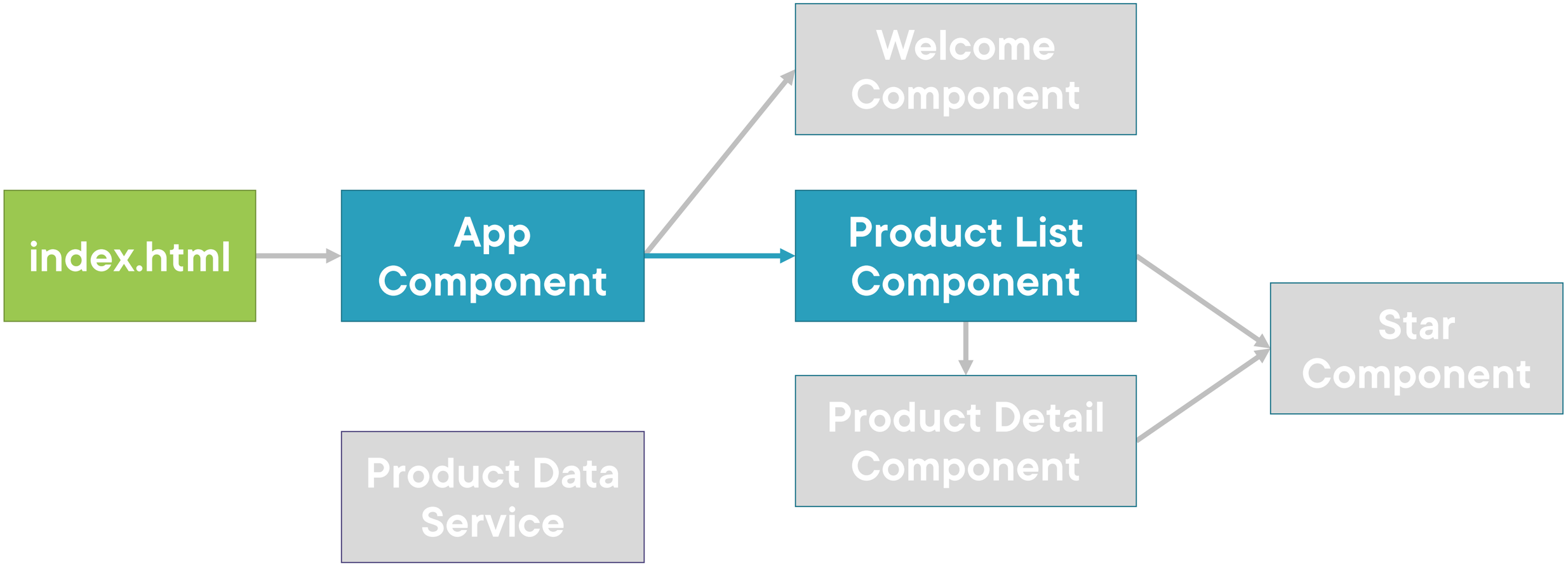
Custom pipes

Nested components

Module Overview

- Defining an interface
- Encapsulating component styles
- Using lifecycle hooks
- Building a custom pipe

Application Architecture



Strong Typing

```
export class ProductListComponent {
    pageTitle: string = 'Product List';
    showImage: boolean = false;
    listFilter: string = 'cart';
    message: string;

    products: any[] = […];

    toggleImage(): void {
        this.showImage = !this.showImage;
    }

    onRatingClicked(message: string): void {
         this.message = message;
    }
}
```

An interface is a specification identifying a related set of properties and methods.

Two Ways to Use an Interface

```
export interface IProduct {
  productId: number;
  productName: string;
  productCode: string;
  releaseDate: string;
  price: number;
  description: string;
  starRating: number;
  imageUrl: string;
}
```

As a type

```
products: IProduct[] = [];
```

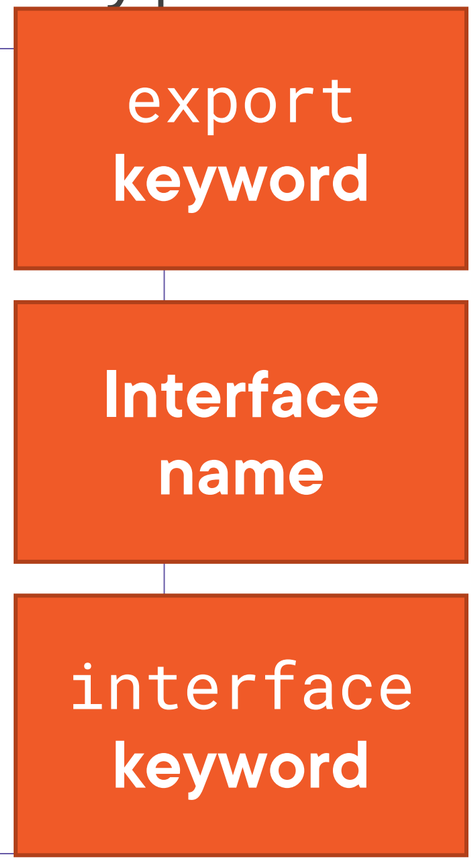
```
export interface DoTiming {
    count: number;
    start(index: number): void;
    stop(): void;
}
```

As a feature set

```
export class myComponent
             implements DoTiming {
  count: number = 0;
  start(index: number): void {
    ...
  }
  stop(): void {
    ...
  }
}
```

Declaring an Interface as a Data Type

```
export interface IProduct {
    productId: number;
    productName: string;
    productCode: string;
    releaseDate: Date;
    price: number;
    description: string;
    starRating: number;
    imageUrl: string;
}
```



Using an Interface as a Data Type

```
import { IProduct } from './product';

export class ProductListComponent {
  pageTitle: string = 'Product List';
  showImage: boolean = false;
  listFilter: string = 'cart';

  products: IProduct[] = […];

  toggleImage(): void {
      this.showImage = !this.showImage;
   }
}
```

Handling Unique Component Styles

Templates sometimes require unique styles

We can inline the styles directly into the HTML

We can build an external stylesheet and link it in index.html

There is a better way!

Encapsulating Component Styles

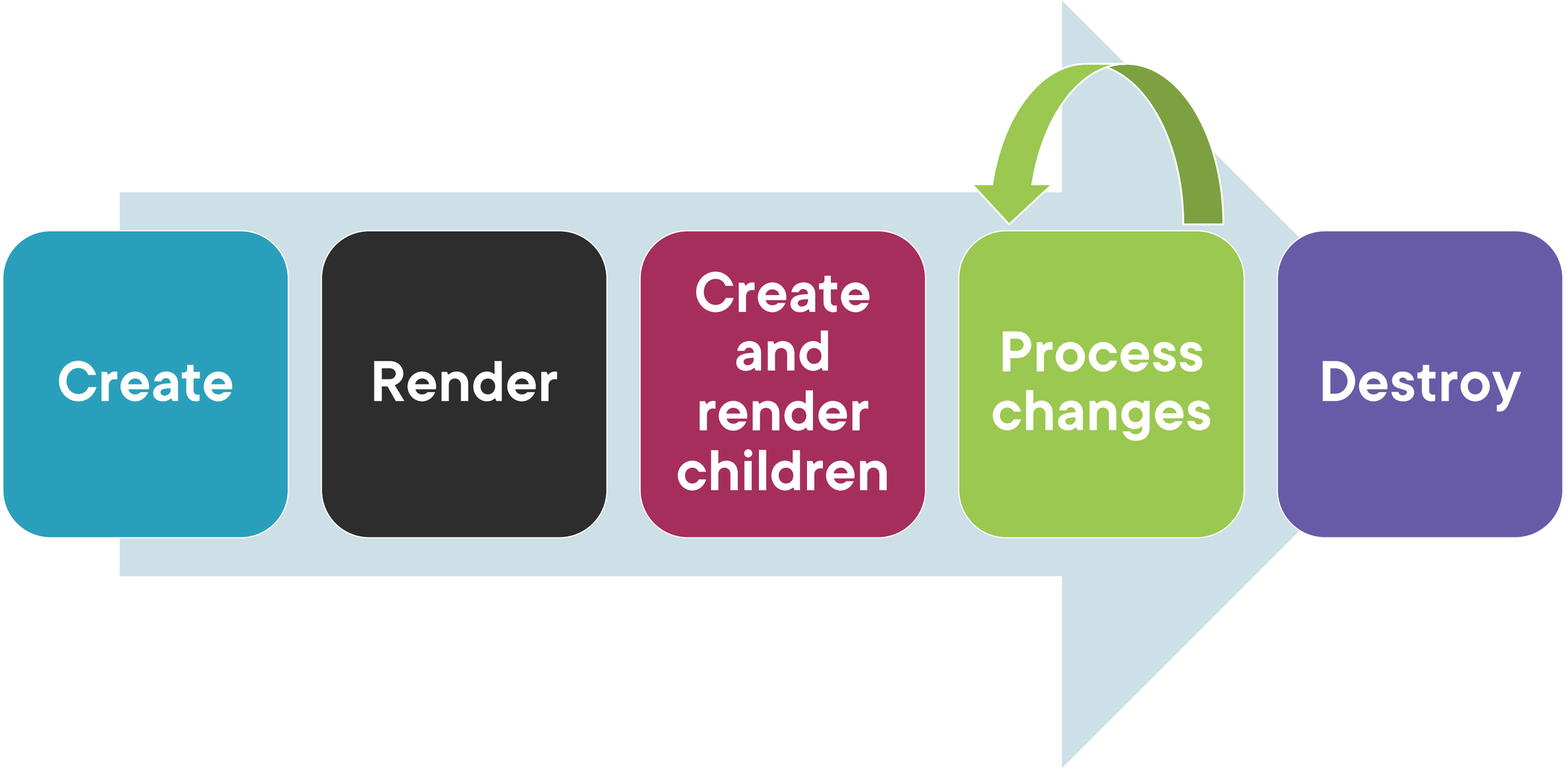
styles

```
@Component({
    selector: 'pm-products',
    templateUrl: './product-list.component.html',
    styles: ['thead {color: #337AB7;}']})
```

styleUrls

```
@Component({
    selector: 'pm-products',
    templateUrl: './product-list.component.html',
    styleUrls: ['./product-list.component.css']})
```

Component Lifecycle



A lifecycle hook is an interface we implement to write code when a component lifecycle event occurs.

Component Lifecycle Hooks

`OnInit`: **Perform component initialization, retrieve data**

`OnChanges`: **Perform action after change to input properties**

`OnDestroy`: **Perform cleanup**

Using a Lifecycle Hook

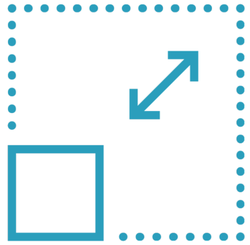
2

1

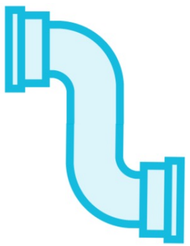
```
export class ProductListComponent implements OnInit {
  pageTitle: string = 'Product List';
  showImage: boolean = false;
  listFilter: string = 'cart';
  products: IProduct[] = […];

}
```

3

Transforming Data with Pipes



Transform bound properties before display



Built-in pipes: date, number, decimal, percent, currency, json, etc.

Custom pipes

Building a Custom Pipe

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({
    name: 'convertToSpaces'
})
export class ConvertToSpacesPipe implements PipeTransform {

  transform(value: string,
            character: string): string {
  }
}
```

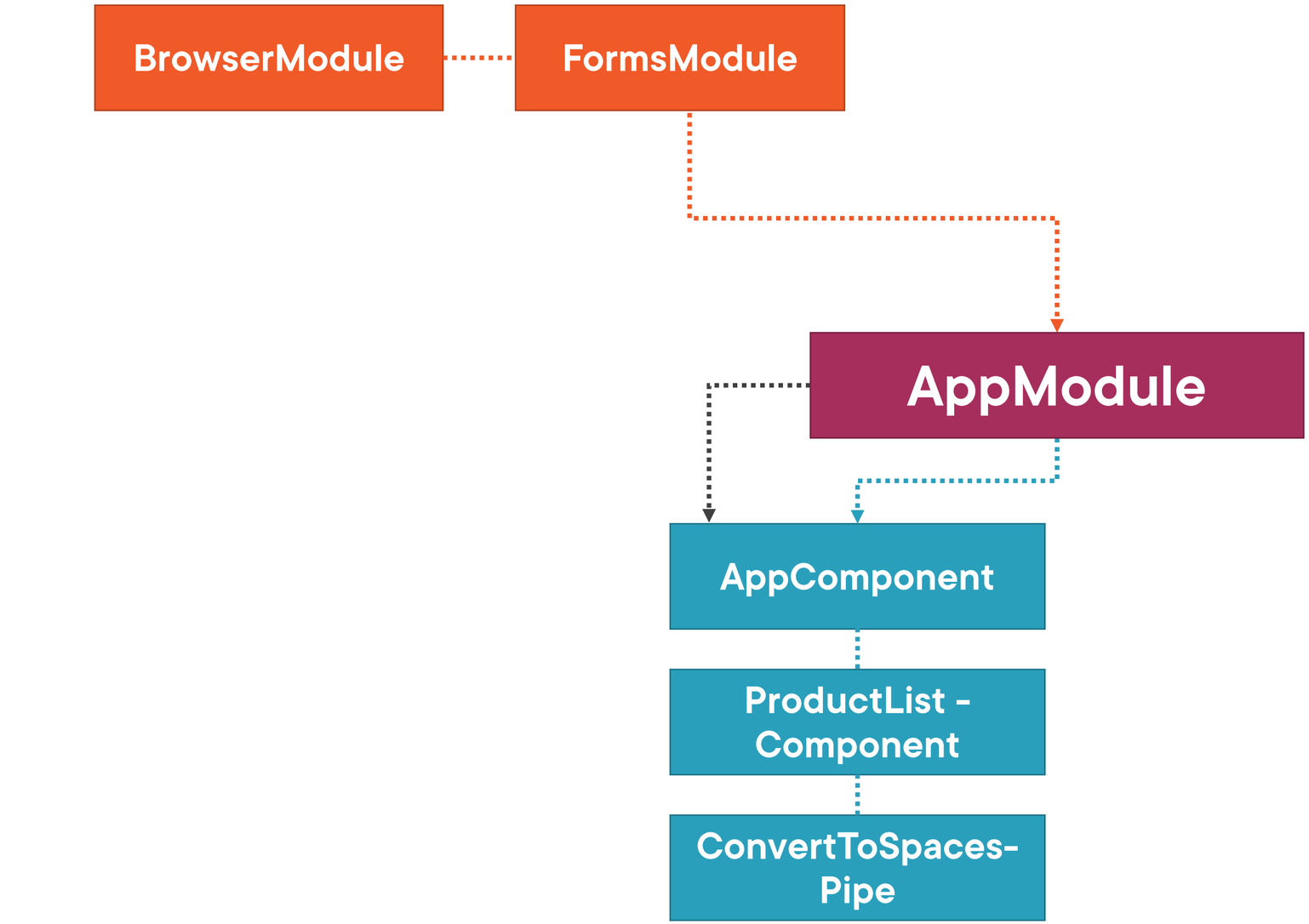
Using a Custom Pipe

Template

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

Pipe

```
transform(value: string, character: string): string {

}
```


BrowserModule
FormsModule
AppModule
AppComponent
ProductList - Component
ConvertToSpaces-Pipe
Imports
Exports
Declarations
Bootstrap

Using a Custom Pipe

Template

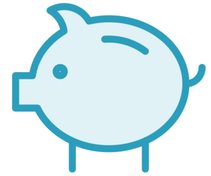
```
<td>{{ product.productCode | convertToSpaces:'-'}}</td>
```

Module

```
@NgModule({
  imports: [
      BrowserModule,
      FormsModule ],
  declarations: [
       AppComponent,
       ProductListComponent,
       ConvertToSpacesPipe ],
  bootstrap: [ AppComponent ]
})
export class AppModule { }
```

Getters and Setters

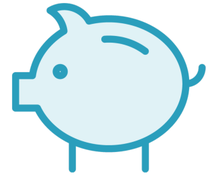
```
amount: number = 0;
```



```
get amount(): number {
    // process the amount
    // return amount from private storage
}
set amount(value: number) {
    // process the amount
    // retain amount in private storage
}
```

Getters and Setters

```
amount: number = 0;
```



```
private _amount: number = 0;
```

```
get amount(): number {
    // process the amount
    // return amount from private storage
    return this._amount;
}
set amount(value: number) {
    // process the amount
    // retain amount in private storage
    this._amount = value;
}
```

Getters and Setters

```
private _amount: number = 0;
```

```
get amount(): number {
    // process the amount
    // return amount from private storage
    return this._amount;
}
set amount(value: number) {
    // process the amount
    // retain amount in private storage
    this._amount = value;
}
```

```
this.amount = 200;
```

```
console.log(this.amount);
```

Filtering a List

```
products: IProduct[] = [...];
```

```
performFilter(): IProduct[] {
    return this.products.filter();
}
```

An arrow function is compact syntax for defining a function.

Filtering a List

```
products: IProduct[] = [...];
```

```
performFilter(): IProduct[] {
    return this.products.filter((product: IProduct) =>
          product.productName.includes(this.listFilter));
}
```

Arrow Functions

Classic named function (method)

```
capitalizeName(product: IProduct): string {
    return product.productName.toUpperCase();
}
```

Arrow function

```
(product: IProduct) => product.productName.toUpperCase();
```

Multi-statement arrow function

```
(product: IProduct) => {
    console.log(product.productName);
    return product.productName.toUpperCase();
}
```

Interface Checklist: Interface as a Type

`interface` keyword

Properties and their types

Export it

```
export interface IProduct {
  productId: number;
  productName: string;
  productCode: string;
  ...
}
```

Use the interface as a data type

```
products: IProduct[] = […];
```

Interface Checklist:
Interface as a Feature Set

Implementing interfaces:

- `implements` keyword & interface name
- Write code for each property & method

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

export class ProductComponent implements OnInit {
  ngOnInit(): void {
        console.log('In OnInit');
  }
}
```

Styles Checklist: Encapsulating Styles

`styles` **property**

- **Specify an array of style strings**

`styleUrls` **property**

- **Specify an array of stylesheet paths**

```
@Component({
    selector: 'pm-products',
    templateUrl: './product-list.component.html',
    styleUrls: ['./product-list.component.css']})
```

Lifecycle Hook Checklist: Using Lifecycle Hooks

Import the lifecycle hook interface

Implement the lifecycle hook interface

Write code for the hook method

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

export class ProductComponent implements OnInit {
  ngOnInit(): void {
        console.log('In OnInit');
  }
}
```

Pipe Checklist: Building a Custom Pipe

Create a class that implements PipeTransform

Write code for the Transform method

Decorate the class with the Pipe decorator

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({
    name: ‘spacePipe'
})
export class SpacePipe implements PipeTransform {
  transform(value: string,
            character: string): string { ... }
}
```

Pipe Checklist: Using a Custom Pipe

Add the pipe to the declarations array of an Angular module

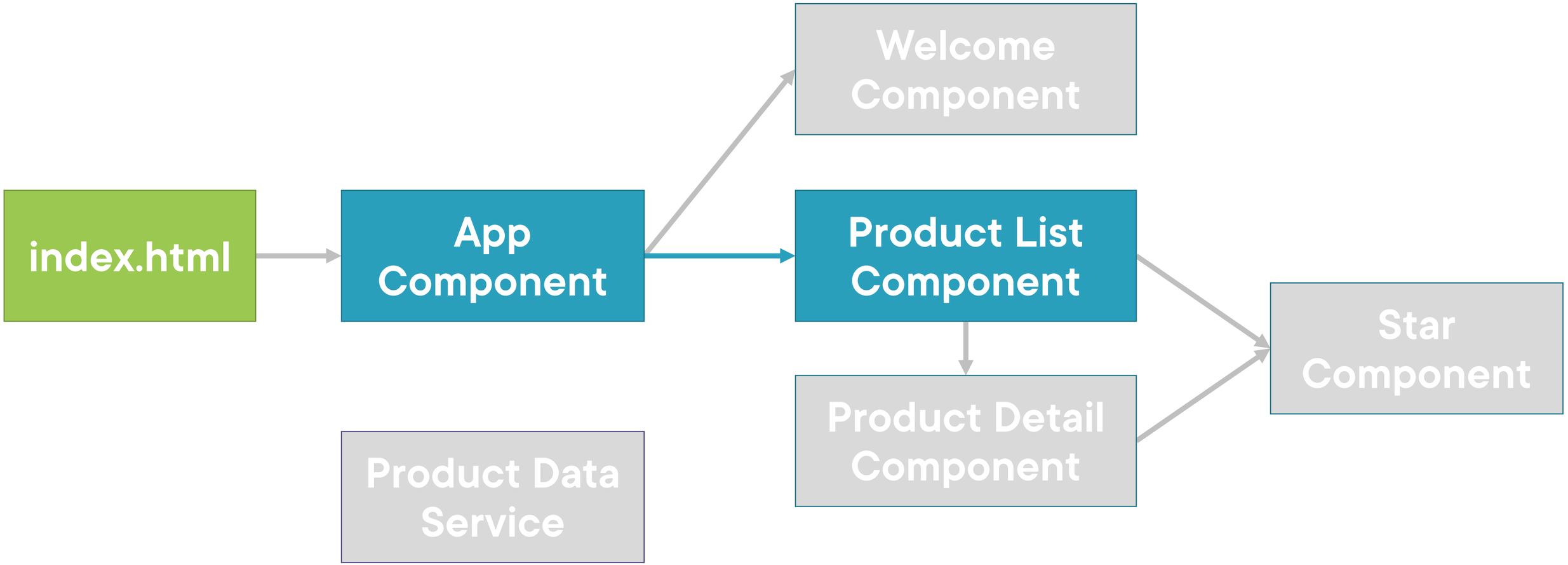
```
@NgModule({
  imports: [...],
  declarations: [
       AppComponent,
       ProductListComponent,
       SpacePipe ],
  bootstrap: [ AppComponent ]
})
export class AppModule { }
```

Use the pipe in a template

- Pipe character
- Pipe name
- Pipe arguments (separated with colons)

```
{{ product.productCode | spacePipe:'-'}}
```

Application Architecture



Coming up next ...

Building Nested Components

Product List

Filter by:

Show Image

Product	Code	Available	Price	5 Star Rating
Leaf Rake	gdn 0011	March 19, 2021	$19.95	
Garden Cart	gdn 0023	March 18, 2021	$32.99	
Hammer	tbx 0048	May 21, 2021	$8.90	
Saw	tbx 0022	May 15, 2021	$11.55	
Video Game Controller	gmg 0042	October 15, 2020	$35.95	