

Zone.js

How Angular knows the CD event happened

How angular detects cd trigger

- In the previous lesson we noticed that angular knows when a CD event happened
- When Angular detects that a cd event happened it starts to trigger CD from top to bottom in all the components
- How does angular know that a cd event happened and it needs to trigger change detection?
- In this lesson we will learn how angular knows to start a cd process and how zone.js helps angular achieve this.

ApplicationRef

- When you bootstrap an angular application a service called ApplicationRef is created for your application
- That service manage the components in your application
- The service also start activating the change detection when a cd event happens

ApplicationRef triggers CD

```
@Injectable()
export class ApplicationRef {
  ...
  constructor(
    private _zone: NgZone
  ) {
    this._zone.onMicrotaskEmpty.subscribe({
      next: () => {
        this._zone.run(() => {
          this.tick();
        });
      }
    });
  }
  ...
}
```

- ApplicationRef is using a service called **NgZone** that has an **Observable** that triggers when CD needs to happen
- In NgZone we are using Zone.js to create an angular zone
- To understand NgZone we have to understand what is Zone.js

- Execution context
- We can open a “room” and track async code that originates from our room
- We can track start and finish of async code
- Angular opens a room called **angular**
- All the angular code will run from the room so angular can track when our angular code issues an async code
- Angular use Zone.js to know when to trigger CD

Zone.js EX

- Create a Zone.js room called angular
- Trigger a setTimeout from that room
- Using the zone hooks **onHasTask** print to the console when the setTimeout returns
- This is a simplified case of starting to trigger CD when a timer finish

NgZone useful methods

- NgZone is a service that wraps the angular zone.js
- It will create an easy to use observable to trigger cd **onMicroTaskEmpty** which the **ApplicationRef** is going to use to trigger CD

```
export declare class NgZone {  
  readonly onUnstable: EventEmitter<any>;  
  readonly onMicrotaskEmpty: EventEmitter<any>;  
  readonly onStable: EventEmitter<any>;  
  run<T>(fn: (...args: any[]) => T, applyThis?: any, applyArgs?: any[]): T;  
  runOutsideAngular<T>(fn: (...args: any[]) => T): T;  
}
```


Summary

- Angular trigger the CD from ApplicationRef
- ApplicationRef will use NgZone **onMicroTaskEmpty** to know when to trigger the CD
- NgZone use Zone.js to create a zone for angular to know when async code is finished

Thank You

Next Lesson: OnPush change detection