

# Angular Trackby To Improve NgFor Performance

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Angular Trackby option improves the Performance of the ngFor if the collection has a large no of items and keeps changing. Learn why we need it and how to use it to improve the performance of the `ngFor`.



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## Track by in ngFor

We use `ngFor` to display a iterable items like `movies`.  
the following code iterates over the `movies` array.



```
1 <ul>
2   <li *ngFor="let movie of movies">
3     {{ movie.title }} - {{movie.director}}
4   </li>
5 </ul>
6
7
```

The Angular creates a `li` element for each movie. So if there are `n` number of movies, the angular inserts the `n` number of `li` nodes into the DOM

But the data will not remain constant. The user will add a new movie, delete a movie, sort the list in a different order, or simply refresh the movie from the back end. This will force the angular to render the template again.

The easiest way to achieve that is to remove the entire list and render the DOM again.

But this is inefficient and if the list is large it is a very expensive process.

To avoid that the Angular uses the *object identity* to track the elements in the collection to the DOM nodes. Hence when you add an item or remove an item, the Angular will track it and update only the modified items in the DOM.

But if you refresh the entire list from the back end, it will replace the objects in the movie collection with the new objects. Even if the movies are the same, Angular will not be able to detect as the object references have changed. Hence it considers them new and renders them again after destroying the old ones.

The following example shows what happens when we refresh the entire list. The App

displays the list of movies. it has option to add a movie, remove a movie and refresh the entire movie.

```
1 import { Component, OnInit } from '@angular/core';
2
3 @Component({
4   selector: 'app-root',
5   templateUrl: './app.component.html',
6   styleUrls: ['./app.component.css'],
7 })
8 export class AppComponent implements OnInit {
9   title: string = "Top 5 Movies";
10
11   movies=[];
12
13   mTitle:string="";
14   mDirector:string="";
15
16   ngOnInit() {
17     this.Refresh();
18   }
19
20   remove(i) {
21     this.movies.splice(i,1);
22   }
23
24
25   addMovie() {
26     this.movies.push({ title: this.mTitle, director: this.mDirector})
27     this.mTitle="";
28     this.mDirector="";
29   }
30
31   Refresh() {
32     console.log("refresh")
33     this.movies = [
34       { title: 'Zootopia', director: 'Byron Howard, Rich Moore'},
35       { title: 'Batman v Superman: Dawn of Justice', director: 'Zack Snyder'},
36       { title: 'Captain American: Civil War', director: 'Anthony Russo, Joe Russo'},
37       { title: 'X-Men: Apocalypse', director: 'Bryan Singer'},
38       { title: 'Warcraft', director: 'Duncan Jones'},
39     ]
40   }
41 }
42
43 class Movie {
44   title: string;
45   director: string;
```

```
46 }  
47
```

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The Top 8 [Best Angular Books](#), which helps you to get started with Angular

```
1 <h1> {{title}} </h1>  
2  
3 <ul>  
4   <li *ngFor="let movie of movies; let i=index;trackBy: trackByFn;">  
5     {{i}}. {{ movie.title }} - {{movie.director}} <button (click)="remove(i)">remove</button>  
6   </li>  
7 </ul>  
8  
9  
10 <button (click)="Refresh()">Refresh</button> <br>  
11  
12 Title : <input type="text" [(ngModel)]="mTitle">  
13 Director : <input type="text" [(ngModel)]="mDirector">  
14 <button (click)="addMovie()">Add</button>  
15
```

localhost:4200

# Top 5 Movies

- 0. Zootopia - Byron Howard, Rich Moore remove
- 1. Batman v Superman: Dawn of Justice - Zack Snyder remove
- 2. Captain American: Civil War - Anthony Russo, Joe Russo remove
- 3. X-Men: Apocalypse - Bryan Singer remove
- 4. Warcraft - Duncan Jones remove

[Refresh](#)

Title :  Director :  Add

Elements Console Sources Network Performance Audits Memory Application Security

oldmovie.html:5

```
<html lang="en">
<script type="text/javascript">window["_gaUserPrefs"] = { foo : function() { return true; } }</script>
<head></head>
<body data-gr-c-s-loaded="true">
  <app-root _ngcontent-mon-c0 ng-version="8.2.14">
    <h1 _ngcontent-mon-c0> Top 5 Movies </h1>
    ... <ul _ngcontent-mon-c0> == $0
      <!--bindings={}
      "ng-reflect-ng-for-of": "[object Object],[object Object]"
      }-->
      <li _ngcontent-mon-c0>...</li>
      <li _ngcontent-mon-c0>...</li>
      <li _ngcontent-mon-c0>...</li>
      <li _ngcontent-mon-c0>...</li>
      <li _ngcontent-mon-c0>...</li>
    </ul>
    <button _ngcontent-mon-c0>Refresh</button>
```

You can see from the above example, that Angular renders the entire DOM every time we click on refresh.

## Trackby

We can solve this problem by providing a function to the `trackBy` option that returns a unique id for each item. The `ngFor` will use the unique id returned by the `trackBy` function to track the items. Hence even if we refresh the data from the back end, the unique id will remain the same and the list will not be rendered again.

The `trackBy` takes a function that has two arguments: `index` and the current `item`. It must return a `id` that uniquely identifies the item. The following example returns the `title` as the unique id.

```
1
2 trackByFn(index, item) {
3   return item.title;
4 }
5
```

In the template assign the newly created `trackByFn` to `trackBy` option in the `ngFor` statement.

```
2 <li *ngFor="let movie of movies; let i=index;trackBy: trackByFn;">
```

```
3
```

The screenshot shows a web application titled "Top 5 Movies". The page displays a list of five movies with a "remove" button next to each entry. A cursor is hovering over the "remove" button for the second movie in the list. Below the list is a form with fields for "Title" and "Director", and a "Add" button. At the bottom, the browser's developer tools are open, specifically the "Elements" tab, which shows the HTML structure of the page. The DOM tree includes the root element , followed by 

# Top 5 Movies

 and a 

 element containing five - elements.

```
<!doctype html>
<html lang="en">
  <script type="text/javascript">window["_gaUserPrefs"] = { foo : function() { return true; } }</script>
  <head>...</head>
  <body data-gr-c-s-loaded="true">
    <app-root _ngcroot="true" _nghost-isa-c0 ng-version="8.2.14">
      <h1 _ngcontent-isa-c0> Top 5 Movies </h1>
      ... <ul _ngcontent-isa-c0> == $0
        <!--bindings={}
          "ng-reflect-ng-for-of": "[object Object],[object Object]",
          "ng-reflect-ng-track-by": "trackByFn(index, item) {\n            }\n          "
        -->
        <li _ngcontent-isa-c0>...</li>
        <li _ngcontent-isa-c0>...</li>
        <li _ngcontent-isa-c0>...</li>
        <li _ngcontent-isa-c0>...</li>
        <li _ngcontent-isa-c0>...</li>
    </ul> ...
```

## Trackby multiple fields

You can also trackby multiple fields as shown below

```
1
2 <li *ngFor="let movie of movies; let i=index;trackBy: trackByFnMultipleFields;">
3
```

```
1
2 trackByFnMultipleFields(index, item) {
3   return item.title + item.director;
4 }
```

# Reference

## 1. [Change Propagation in ngFor](#)

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1 thought on “Angular Trackby to improve ngFor Performance”



JAMSHED AHMAD

DECEMBER 14, 2020 AT 10:07 PM

nice explanation.

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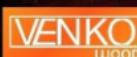
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Beautiful veneer lamp

