

An Introduction to Mutation Testing



Getting started with Stryker



What is Mutation Testing?

It's a way to test your tests.

“Bugs, or *mutants*, are automatically inserted into your production code. Your tests are ran for each mutant. If your tests *fail* then the mutant is *killed*. If your tests passed, the mutant *survived*. The higher the percentage of mutants killed, the more *effective* your tests are.” - <https://stryker-mutator.io/>



What about Code Coverage?

Code Coverage only tells you which lines of code have been “touched” by your tests, not if your tests actually do anything.

Let's see an example.





WorldsBestApiController.cs - Stryker.NET Report

[All files](#) / [Controllers](#) / [WorldsBestApiController.cs](#)

File / Directory

Mutation score

# Killed	# Survived	# Timeout	# No coverage	# Runtime errors	# Compile errors	Total detected	Total undetected	Total mutants
0	16	0	0	0	0	0	16	16

WorldsBestApiController.cs

0.00%

0.00

0

16

0

0

0

0

0

0

16

16

☒ **Survived (16)** [Collapse all](#)

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.AspNetCore.Http;
using Microsoft.AspNetCore.Mvc;
using Microsoft.Extensions.Logging;
```

```
namespace CopStryker.Api.Controllers
```

```
{
    [Route("api")]
    [ApiController]
    public class WorldsBestApiController : ControllerBase
    {
```

```
        public WorldsBestApiController()
        {
        }
    }
```

```
    [Route("ArithmeticOperator/{factor1}/{factor2}")]
    [HttpGet]
    public int GetUsingArithmeticOperator(int factor1, int factor2)
    {
```


Stryker Documentation

Setup: <https://stryker-mutator.io/stryker-net/quickstart>

Configuration: <https://github.com/stryker-mutator/stryker-net/blob/master/docs/Configuration.md>

Mutators: <https://github.com/stryker-mutator/stryker-handbook/blob/master/mutator-types.md>

Reporters: <https://github.com/stryker-mutator/stryker-net/blob/master/docs/Reporters.md>

A yellow square in the bottom right corner of the slide, containing the letters 'JS' in a large, bold, dark grey font.

JS

Stryker Config and PowerShell Script

```
{  
  
  "stryker-config": {  
  
    "reporters": [  
  
      "dots"  
  
    ],  
  
    "timeout-ms": 10000,  
  
    "max-concurrent-test-runners": 4,  
  
    "threshold-break": 60,  
  
    "mutate": [  
  
      "**/Controllers/*.cs"  
  
    ],  
  
    "excluded-mutations": [  
  
      "string"  
  
    ],  
  
  },  
  
}
```

