

Diffblue Cover Core: Write Java Unit Tests Automatically

Use AI for Code to increase coverage, eliminate test maintenance effort, and minimize tedious, unproductive development work.

Fully Autonomous Unit Test Writing

Diffblue Cover Core is the AI for Code engine at the center of the Diffblue Cover platform.

Cover Core automatically writes human-like Java unit tests that are indistinguishable from those written by a developer. AI-written unit tests are ready to use; they compile, run and accurately validate the current behavior of your code.

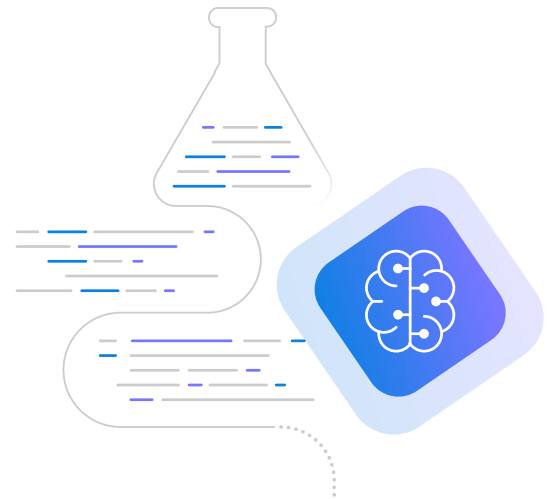
Cover Core is fully autonomous. It can create an entire unit test suite for your whole application in a single execution - raising coverage levels fast without any developer overhead.

Cover Core also maintains this unit test suite as your software evolves, even on applications with millions of lines of code. Thanks to a deep understanding of how your code works, Cover Core knows what tests need to be added and updated for every code change. It implements the necessary updates automatically, ensuring coverage doesn't dip while your teams move faster. Each test takes just a few seconds to write, compared to tens of minutes for a human developer.

The AI for Code Engine

Cover Core is included in all versions of Diffblue Cover and can be used on the developer desktop via an IntelliJ IDE plug-in or a CLI tool, or integrated into a Continuous Integration (CI) pipeline to write and maintain tests for the whole team. Its code analysis and automatic unit test writing capabilities are the foundation of other key Diffblue Cover features like Cover Reports, Cover Refactor, Cover Replay and Cover Optimize.

With Diffblue Cover Core you can find bugs sooner, deploy code changes faster, stop worrying about quality gates and coverage levels, and minimize tedious, unproductive developer effort.



COVER CORE SPOTLIGHT

✓ Increase unit test coverage

Cover Core automatically writes entire unit test libraries to provide the unit test coverage you need for safe, fast code changes, even in legacy applications.

✓ Minimize maintenance effort

Development teams with good coverage still spend huge amounts of time on unit testing. Cover Core eliminates manual test maintenance so more coverage doesn't mean more work.

✓ Work 24/7

Cover Core integrates into your CI pipeline, enabling you to build and deliver software on whatever schedule you need, wherever your teams are located.

✓ Go beyond the happy path

Cover automatically writes unit tests that exercise the actual behavior of your code, including obscure corner cases and scenarios developers may not know how to test.

✓ Document your code

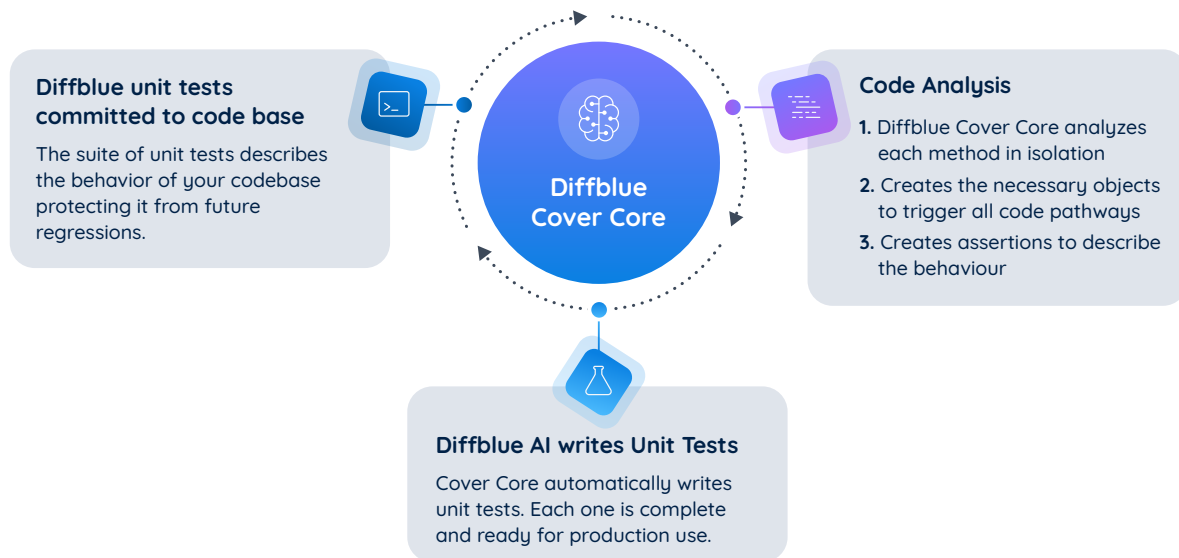
The Cover Core unit tests describe every behavior of every method - effectively documenting your code to make future code changes quicker and reduce regressions.

✓ Code stays private

Cover Core's reinforcement learning AI operates entirely within your network. No data ever leaves your organization.

How It Works

Cover Core uses AI to analyze the bytecode of the methods in your application and automatically write associated unit tests. It determines all the different ways to call each method to cover all of the code, so each unit test fully describes a single behavior of a single method - ready to catch any behavioral change. Every time Cover Core finds a new or different path following a code change it produces a new test, including the method call and all of the necessary assertions.



Diffblue Cover Wrote This Code Automatically

Diffblue Cover Core wrote this unit test, which validates code designed to upload files to an AWS S3 bucket, completely automatically in just a few seconds.

```
@ContextConfiguration(classes = {AmazonS3.class, CloudStorageService.class})
@ExtendWith(SpringExtension.class)
public class CloudStorageServiceDiffblueTest {
    @MockBean
    private AmazonS3 amazonS3;
    @Autowired
    private CloudStorageService cloudStorageService;

    @Test
    public void testUploadFileToBucket() throws SdkClientException {
        // Arrange
        PutObjectResult putObjectResult = new PutObjectResult();
        when(this.amazonS3.putObject(anyString(), anyString(), (File) any()))
            .thenReturn(putObjectResult);

        // Act and Assert
        assertEquals(putObjectResult, this.cloudStorageService.uploadFileToBucket("bucket-name",
            "Object-key", Paths.get(System.getProperty("java.io.tmpdir"), "test.txt").toFile()));
        verify(this.amazonS3).putObject(anyString(), anyString(), (File) any());
    }
}
```

“Citi Markets uses its deep software expertise to move faster and be more competitive. We find value in Diffblue’s auto-generation of test cases. It helps drive test consistency and coverage of our software - freeing up developers to focus on delivering higher quality software, faster – and improves our developers’ experience”

Jonathan Lofthouse, Managing Director & Global Head of Markets Technology, Citi

The Diffblue Cover Platform

Diffblue Cover includes a range of features that let you extract more value from Java unit testing:



Diffblue Cover helps you increase business agility and accelerate transformation



Optimize the velocity and quality of Java teams; catch regressions early



Reduce software development costs and increase productivity



Untangle the complexity of refactoring legacy code



Accelerate modernization and cloud migration of core applications

ABOUT DIFFBLUE

Founded by leading computer scientists from the University of Oxford, Diffblue is changing the way code is developed. The company’s flagship developer tool, Diffblue Cover, uses AI to automatically write unit tests that help Java development teams and organizations deliver better, more modern software at higher speed. Diffblue: AI for Code. Learn more at [Diffblue.com](https://diffblue.com) or contact us at info@diffblue.com

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