

# Resource Immutability - Ensuring Source Resources Remain Unchanged



# Implementing Resource Immutability Checks

# Generating a Checksum for a File

```
import java.nio.file.Files;
import java.nio.file.Paths;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;
import java.util.HexFormat;

public class ChecksumUtil {

    public static String generateChecksum(String filePath) throws Exception {
        MessageDigest digest = MessageDigest.getInstance("SHA-256");
        byte[] fileBytes = Files.readAllBytes(Paths.get(filePath));
        byte[] hashBytes = digest.digest(fileBytes);
        return HexFormat.of().formatHex(hashBytes);
    }
}
```

# JUnit Test Method for Comparing Checksums

```
import static org.junit.jupiter.api.Assertions.assertEquals;

import org.junit.jupiter.api.Test;

public class ResourceChecksumTest {

    @Test
    public void testResourceImmutability() throws Exception {
        String resourceFilePath = "path/to/resource.file";
        String expectedChecksum = "stored_reference_checksum";

        String actualChecksum = ChecksumUtil.generateChecksum(resourceFilePath);

        assertEquals(expectedChecksum, actualChecksum, "Resource file has been altered!");
    }
}
```

# Creating an ArchUnit Rule for Resource Immutability

```
import com.tngtech.archunit.core.domain.JavaClasses;
import com.tngtech.archunit.core.importer.ClassFileImporter;
import com.tngtech.archunit.lang.ArchRule;
import com.tngtech.archunit.lang.syntax.ArchRuleDefinition;

public class ResourceImmutabilityRules {

    public static ArchRule resourcesShouldBeImmutable() {
        JavaClasses importedClasses = new
ClassFileImporter().importPackages("com.yourpackage");

        return ArchRuleDefinition.noClasses()
            .that().resideInAnyPackage("com.yourpackage.resources")
            .should().dependOnClassesThat()
            .resideInAnyPackage("com.yourpackage.modifiable")
            .because("Resources in 'com.yourpackage.resources' should remain immutable");
    }
}
```

# Integrating ArchUnit Rules into a JUnit 5 Test Suite

```
import com.tngtech.archunit.junit.AnalyzeClasses;
import com.tngtech.archunit.junit.ArchTest;
import com.tngtech.archunit.junit.ArchUnitRunner;
import org.junit.runner.RunWith;

@RunWith(ArchUnitRunner.class)
@AnalyzeClasses(packages = "com.yourpackage")
public class ResourceImmutabilityTest {

    @ArchTest
    public static final ArchRule immutableResourcesRule =
        ResourceImmutabilityRules.resourcesShouldBeImmutable();
}
```