

NUM11-J. Do not compare or inspect the string representation of floating-point values

String representations of floating-point numbers must not be compared or inspected.

Noncompliant Code Example (String Comparison)

This noncompliant code example compares the string representations of two floating-point values:

```
int i = 1;
String s = Double.valueOf(i / 1000.0).toString();
if (s.equals("0.001")) {
    // ...
}
```

The comparison unexpectedly fails because `s` contains the string "0.0010", which is not equal to "0.001".

Noncompliant Code Example (Regex)

This noncompliant code example attempts to mitigate the extra trailing zero by using a regular expression on the string before comparing it:

```
int i = 1;
String s = Double.valueOf(i / 1000.0).toString();
s = s.replaceFirst("[.0]*$", "");
if (s.equals("0.001")) {
    // ...
}
```

Although the comparison succeeds on the preceding code, it fails on the following similar code, which uses `1/10000.0` instead of `1/1000.0`. The string produced is not `0.00010` but rather `1.0E-4`.

```
int i = 1;
String s = Double.valueOf(i / 10000.0).toString();
s = s.replaceFirst("[.0]*$", "");
if (s.equals("0.0001")) {
    // ...
}
```

Compliant Solution (String Comparison)

This compliant solution uses the `BigDecimal` class to avoid precision loss. It then performs a numeric comparison, which passes as expected.

```
int i = 1;
BigDecimal d = new BigDecimal(Double.valueOf(i / 1000.0).toString());
if (d.compareTo(new BigDecimal("0.001")) == 0) {
    // ...
}
```

Risk Assessment

Comparing or inspecting the string representation of floating-point values may have unexpected results.

Rule	Severity	Likelihood	Remediation Cost	Priority	Level
NUM11-J	Low	Likely	Medium	P6	L2

Related Vulnerabilities

Hibernate Validator bug report [HV-192](#) describes a violation of this rule.

Android Implementation Details

Comparing or inspecting the string representation of floating-point values may have unexpected results on Android.

Bibliography

[API 2006]	
[JLS 2015]	
[Seacord 2015]	NUM11-J. Do not compare or inspect the string representation of floating-point values LiveLesson

