

Java 9 - 16

What happened the last 7 years

Matthias

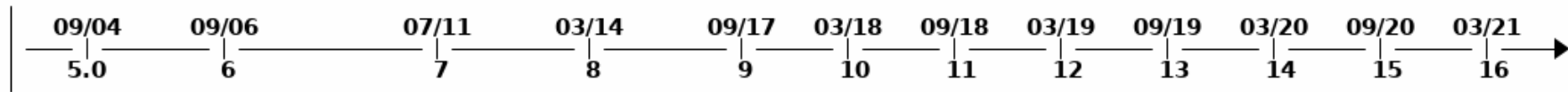
Disclaimer

- Part I (tried to focus on language Features & API)
 - maybe following parts with
 - java "internal" changes (e.g. Garbage Collector, Performance, tooling)
 - deprecations
- no guarantee on completeness

Sources

- [OpenJDK](#)
- [Marcobehler.com](#)
- [.Lost in Coding](#)
- [Advanced Web Machinery](#)

Java history



Why Java 8

- rich feature set
 - Stream API (Collections)
 - Lambda Functions & Functional Interfaces
 - Optionals
 - New Date Time API
- changed licensing which lead to confusion (Java Distributions)
- initial problems with commonly used build tools
- is a LTS version

Java 9

OpenJDK 9

Collection factory methods

```
List<String> list = List.of("one", "two", "three");  
Set<String> set = Set.of("one", "two", "three");  
Map<String, String> map = Map.of("foo", "one", "bar", "two");
```

Streams

- `takeWhile`, `dropWhile`, `iterate` with condition

```
Stream<String> stream =  
    Stream.iterate("", s -> s + "s")  
        .takeWhile(s -> s.length() < 10);
```

Optionals: `ifPresentOrElse()`

```
user.ifPresentOrElse(this::displayAccount, this::displayLogin);
```

JShell (Java Playground)

```
% jshell
| Welcome to JShell -- Version 16.0.1
| For an introduction type: /help intro

jshell> int x = 10
x ==> 10

jshell> System.out.println(x > 5 ? "big number" : "small number")
big number
```

Exit with

```
jshell> /exit
| Goodbye
```

(You are welcome ;-))

misc

- TLS1.3 Support
- Java Platform module System
- Flow API (reactive Streams)
- MultiResolutionImage
- Class.getPackageName()

Java 10

OpenJDK 10

Local-variable type Inference: `var`-keyword

```
// Pre-Java 10  
String myName = "Volker";  
  
// With Java 10  
var myName = "Volker"
```

Java 11

OpenJDK 11

new methods on String

- `repeat()`, `isBlank()`, `strip()`, `lines()`

```
"".isBlank();           // -> true
"Each\nline\ncounts".lines().toList(); // -> Stream of lines
"  we messed it up  ".strip();        // -> "we messed it up"
"Hello".repeat(3)        // -> "HelloHelloHello"
```

var supported by lambda parameters

```
(var firstName, var lastName) -> firstName + lastName
```

HttpClient (Preview \geq 9)

```
import java.io.IOException;
import java.net.http.HttpClient;
import java.net.http.HttpRequest;
import java.net.URI;
import java.net.http.HttpResponse;

public class HttpClientExample {

    public static void main(String[] args) throws IOException, InterruptedException {
        HttpClient httpClient = HttpClient.newBuilder().build();

        HttpRequest request =
            HttpRequest.newBuilder()
                .uri(URI.create("https://www.google.com/"))
                .GET()
                .build();

        HttpResponse<String> response =
            httpClient.send(request, HttpResponse.BodyHandlers.ofString());

        System.out.println(response.statusCode());
        System.out.println(response.body());
    }
}
```

Java 12

OpenJDK 12

new methods on `String`

- `indent()`, `transform()`

CompactNumberFormat class

- formatting numbers for a Local
 - US: 1000 -> 1K, 1000000 -> 1M
 - IN: 1000 -> 1 हज़ार, 50000000 -> 5 क
 - DE: 1000 -> 1.000, 1000000 -> 1 Mio

Unicode 11 support

Java 13

OpenJDK 13

Unicode 12.1 support

Java 14

OpenJDK 14

Switch Expression (Preview: 12, 13)

- new (including new `yield` keyword)
 - no fall-through
 - single statement and code block
 - supporting value return (with `yield`)

```
int numLetters = switch (day) {  
    case MONDAY, FRIDAY, SUNDAY -> 6;  
    case TUESDAY                 -> 7;  
    default                      -> {  
        String s = day.toString();  
        int result = s.length();  
        yield result;  
    }  
};
```

Java 15

OpenJDK 15

Helpfull NullPointerException message

```
public class NullPointerExample {  
    public static void main(String[] args) {  
        System.out.println("NullPointerException message:");  
        MyClass myClass = null;  
        try {  
            System.out.println(myClass.myName.length());  
        } catch (Exception e) {  
            e.printStackTrace();  
        }  
  
        myClass = new MyClass();  
        try {  
            System.out.println(myClass.myName.length());  
        } catch (Exception e) {  
            e.printStackTrace();  
        }  
    }  
  
    private static class MyClass {  
        protected String myName;  
        protected MyClass meAgain;  
    }  
}
```

- old

```
NullPointerException message:  
java.lang.NullPointerException: null  
    at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:11)  
java.lang.NullPointerException: null  
    at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:20)
```

- new

```
NullPointerException message:  
java.lang.NullPointerException: Cannot read field "myName" because "myClass" is null  
    at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:11)  
java.lang.NullPointerException: Cannot invoke "String.length()" because "myClass.myName" is null  
    at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:20)
```

Text Blocks (Preview: 13, 14)

- old

```
String html = "<html>\n" +  
              "<body>\n" +  
              "  <p>Hello, world</p>\n" +  
              "</body>\n" +  
              "</html>";
```

- new

```
String html = ""  
    <html>  
    <body>  
        <p>Hello, world</p>  
    </body>  
    </html>  
    "";
```

Java 16

OpenJDK 16

Pattern Matching for instanceof

```
if (x instanceof String s) {  
    String a = s;  
}
```

Record Type

- immutable data Class
- implicit methods -> avoiding boiler plate code
 - getters, constructor, equals, hashCode, toString

```
record Point(int x, int y){ }  
  
Point myPoint = new Point(10, 15);  
  
myPoint.x();           // -> 10  
System.out.println(myPoint); // -> "Point[x=10, y=15]"
```


Sealed Classes (still PREVIEW)

```
public abstract sealed class Shape permits Circle, Rectangle, Square {  
    // ...  
}
```