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Where far art thou…() -> Lambda

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Persistence

1. Java 8
2. Lambdas
3. Infiltrating Lambdas
4. Streams
5. Continuous Demo…

Java 8

- Released 03/2014!
- Lambdas
- Streams
- Improvements to G1
- Default methods
- Date / Time improvements
- Nashorn

Lambdas

- Introduce functions as a first class citizen to the language
- Facilitates functional programming constructs
- Any interface or class with a Single Abstract Method can be defined as a Lambda
- Last expression is the return argument (non-void methods)
- Surrounding arguments can be captured
- A reference to a method (including constructors) can be captured as a Lambda

Lambdas

```
Supplier<String>          s = () -> "Yikes";
Consumer<String>          c = sIn -> System.out.println(sIn);
Function<String, Integer> f = sIn -> Integer.parseInt(sIn);
Predicate<String>         p = sIn -> s.equals("Yikes");
```

```
BiConsumer<String, Integer>          bc    = (sIn, nIn) -> System.out.println(sIn + nIn);
BiFunction<String, Integer, Integer> bf    = (sIn, nIn) -> Integer.parseInt(sIn) + nIn;
BinaryOperator<Integer>              bfInt = (nIn1, nIn2) -> nIn1 + nIn2;
BiPredicate<String, Integer>         bp    = (sIn, nIn) -> sIn.equals("Yikes") && nIn == 42;
```

```
Supplier<String>                    mhGetConstant  = Person::getConstant;
Function<Person, String>            mhGetFirstName = Person::getFirstName;
Supplier<Person>                    mhCons         = Person::new;
BiFunction<String, Integer, Person> mhCons2        = Person::new;
```

Lambdas

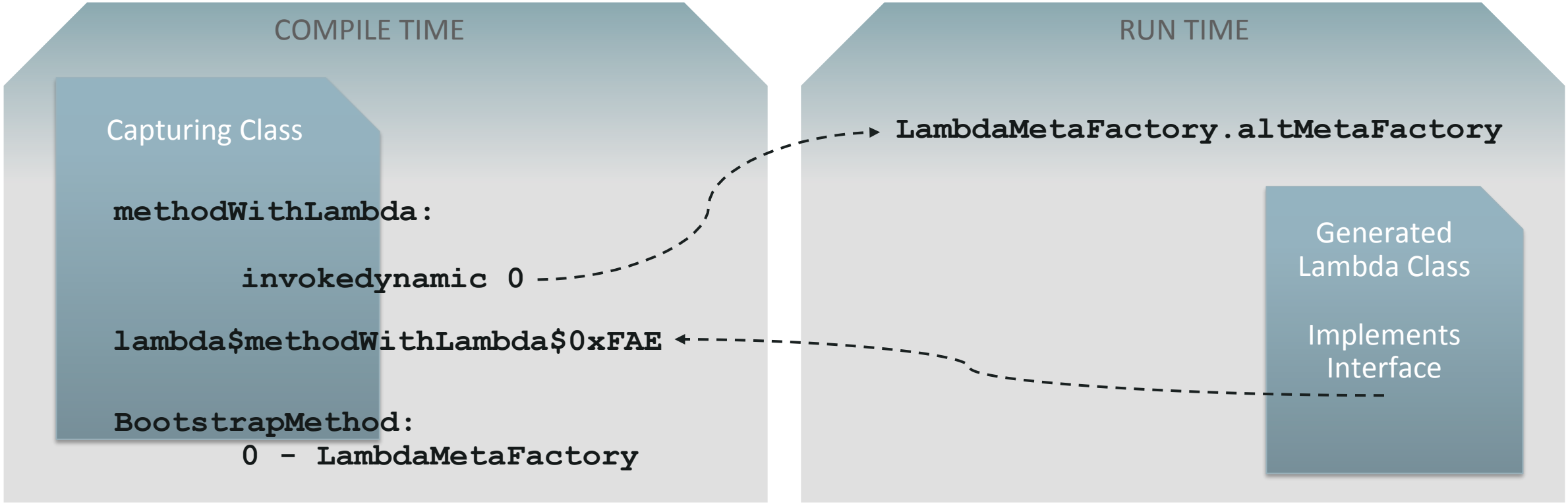
```
String            sMatch = "Yikes";
Predicate<String> p2     = sIn -> s.equals(sMatch);
```

```
List<String> listHarNames = new ArrayList<>(listNames.size());
listNames.forEach(sName ->
    {
    if (sName.startsWith("Har"))
        {
        listHarNames.add(sName);
        }
    });
```

```
Map<String, Long> map = new HashMap<>();
map.computeIfAbsent("—|—", sKey -> veryExpensiveOp(sKey));
```

Lambdas – under the hood

- Compiler converts lambda expression into a number of parts:



Lambdas – under the hood

- InvokeDynamic is beautiful
  - Introduces the notion of linkage time
  - Allows for different types of call sites to be returned allowing the JVM to optimize for ConstantCallSites
- LambdaMetaFactory dynamically generates a class implementing the SAM
- SAM implementation will call generated synthetic method on capturing class
- The class is defined ‘anonymously’

Lambdas – under the hood

- Lambdas can be serialized but must implement Serializable
- A Serializable lambda adds behaviour to the class:
  - writeReplace/readResolve
  - SerializedLambda
- Metadata for the lambda and captured arguments are serialized
- Type conversion as interface types can be narrowed at the call site / captured class
  - Slightly more involved for primitives – boxed & unboxed

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