GraalVM和OpenJDK升级试点

顾庆 平台研发中心

Agenda

- Oracle JDK收费的影响和应对方案

- GraalVM+OpenJDK的试点和后续升级

携程当前Java栈

Application
Tomcat
Oracle JDK 7/8
CentOS
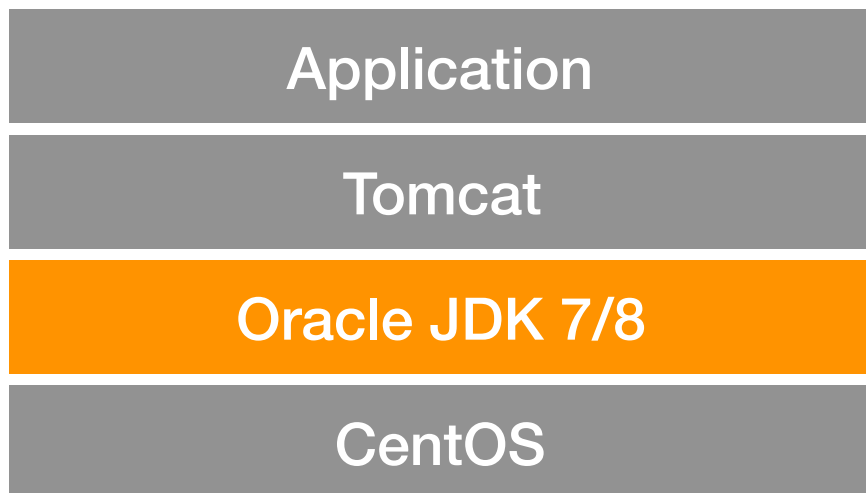
统一使用**免费**的**Oracle JDK 7/8**

Oracle Java付费订阅

- 2018.6 <u>Oracle Java SE Subscription</u>

  - 性能、安全更新

  - 技术支持

  - 企业级管理监控工具

- Java每半年一个大版本

- 每三年一个LTS版本

Oracle Java SE Support Roadmap*†				
Release	GA Date	Premier Support Until** Notification	Extended Support Until**	Sustaining Support**
6	December 2006	December 2015	December 2018	Indefinite
7	July 2011	July 2019	July 2022	Indefinite
8	March 2014	March 2022	March 2025	Indefinite
9 (non-LTS)	September 2017	March 2018	Not Available	Indefinite
10 (18.3^) (non-LTS)	March 2018	September 2018	Not Available	Indefinite
11 (18.9^ LTS)	September 2018***	September 2023	September 2026	Indefinite
12 (19.3^ non-LTS)	March 2019***	September 2019	Not Available	Indefinite

如果不订阅

- 2019.1之后Oracle JDK 8就不再发布更新和安全补丁

- 仍然可以免费试用

- 后续每个版本都只提供半年的免费更新和安全补丁

Version	Release date	End of $free updates from Oracle
Java 8	March 2014	January 2019 (for commercial use)
Java 9	Sept 2017	March 2018
Java 10	March 2018	Sept 2018
Java 11	Sept 2018	March 2019 (might be extended, see below)
Java 12	March 2019	Sept 2019

携程订阅费用估计

	Monthly Subscription Price		Subscription Metric	Volume
Java SE Platform Products				
Java SE Desktop Subscription	2.5000		Named User Plus	1-999
	2.0000		Named User Plus	1,000-2,999
	1.7500		Named User Plus	3,000-9,999
	1.5000		Named User Plus	10,000-19,999
	1.2500		Named User Plus	20,000-49,999
			Contact for Details	50,000+
Java SE Subscription	25.0000		Processor	1-99
	23.7500		Processor	100-249
	22.5000		Processor	250-499
	20.0000		Processor	500-999
	17.5000		Processor	1,000-2,999
	15.0000		Processor	3,000-9,999
	12.5000		Processor	10,000-19,999
			Contact for Details	20,000+

http://www.oracle.com/us/corporate/pricing/price-lists/java-se-subscription-pricelist-5028356.pdf

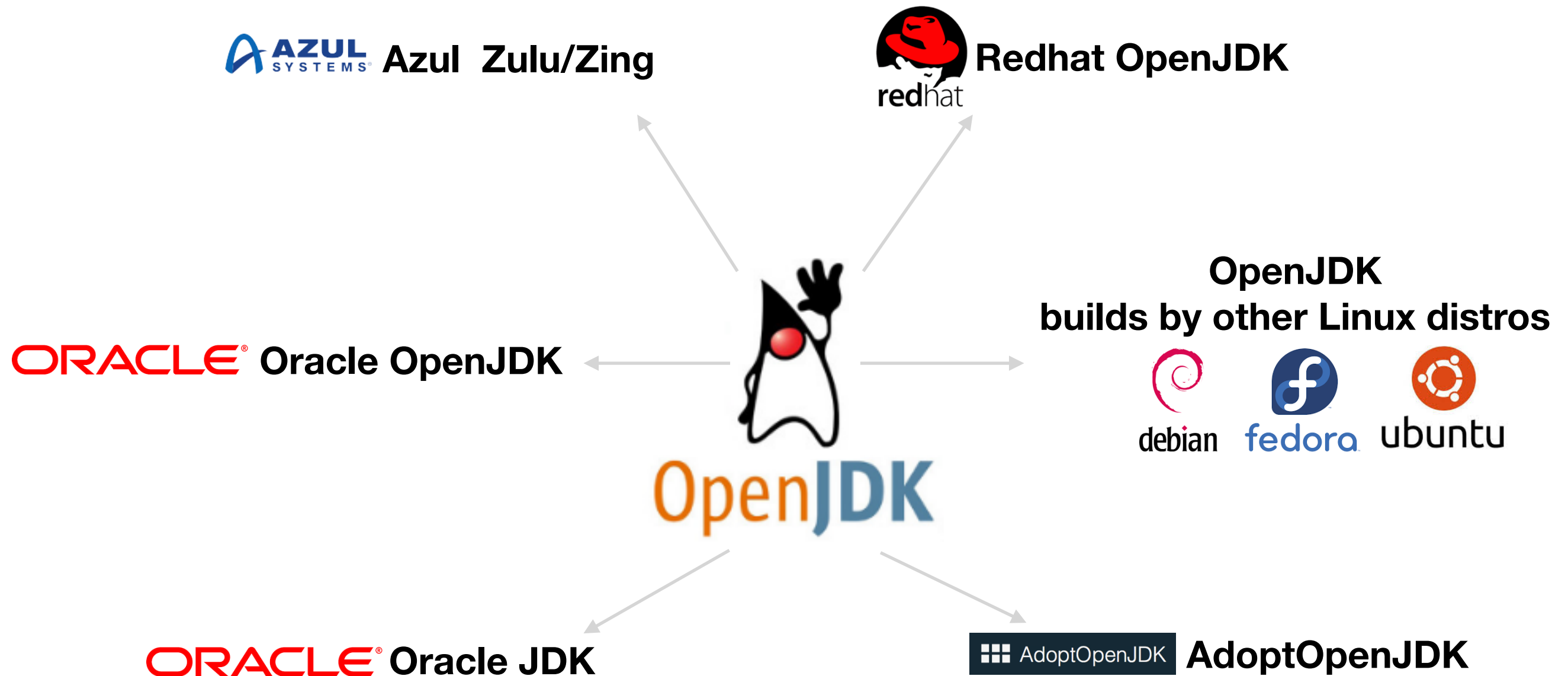http://www.oracle.com/assets/processor-core-factor-table-070634.pdf

20万(总核数)*0.5(Processor Core Factor)*$5(2折)=$50万/月=￥4000万/年

Oracle的建议

- 非付费用户使用OpenJDK

- Oracle会确保Oracle JDK 11和OpenJDK 11可功能互换

所有JDK的共同基础

JDK的区别

- OpenJDK

  - 主要由Oracle维护

  - 还包括其他公司、社区和个人等，GPLv2

- 其他JDK=OpenJDK+branding
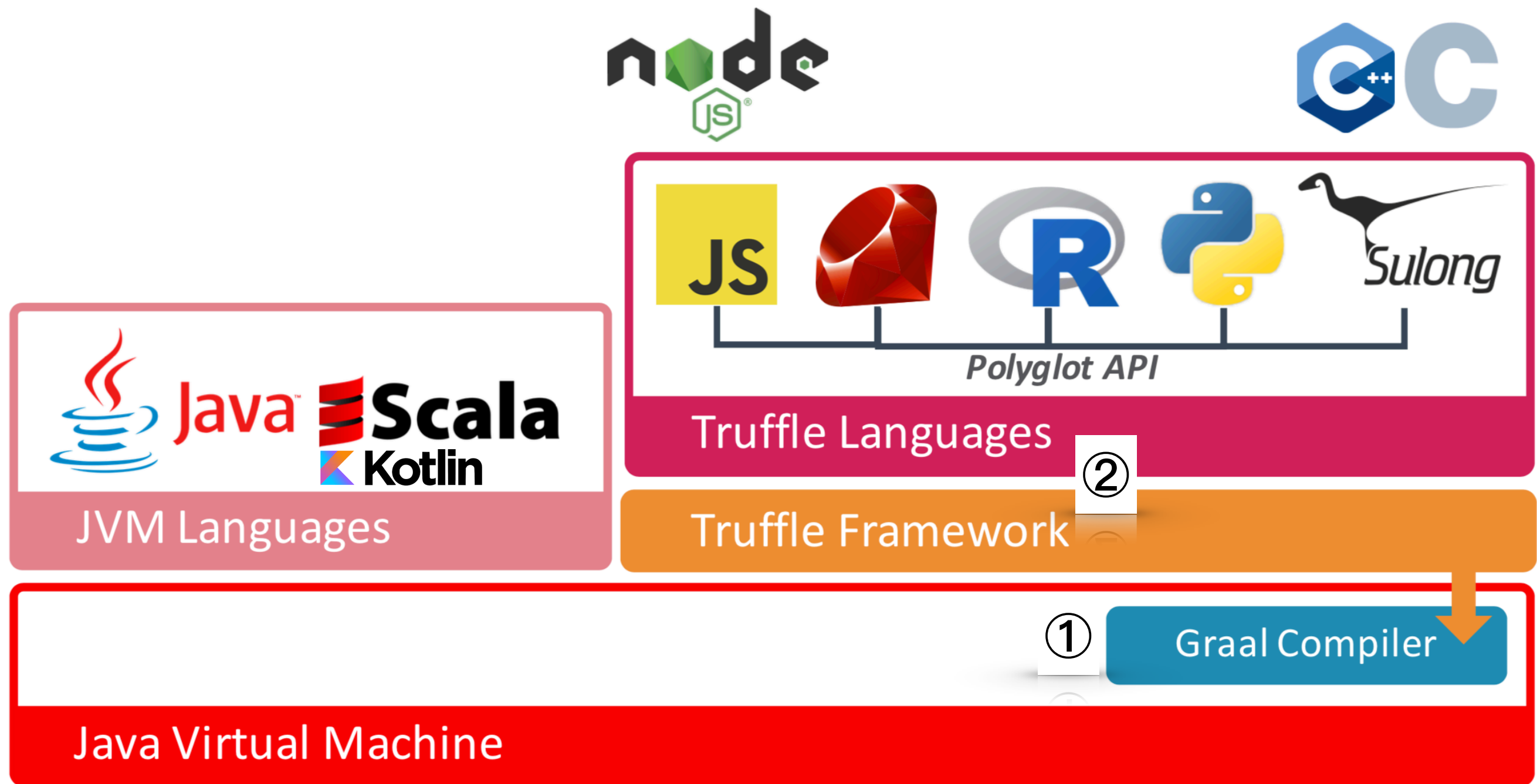   +patches+other features
          +building

AdoptOpenJDK

- Java社区发布的免费LTS版本，持续发布更新

- <u>AdoptOpenJDK</u>=OpenJDK+~~branding~~
             +patches+~~other features~~
             +building

	First Availability	End of Availability
Java 8 (LTS)	March 2014	Sept 2022 [Note 1]
Java 9	Sept 2017	March 2018
Java 10	March 2018	Sept 2018
Java 11 (LTS)	Sept 2018	Sept 2022

我们的应对策略

- 使用AdoptOpenJDK替换当前的Oracle JDK

GraalVM
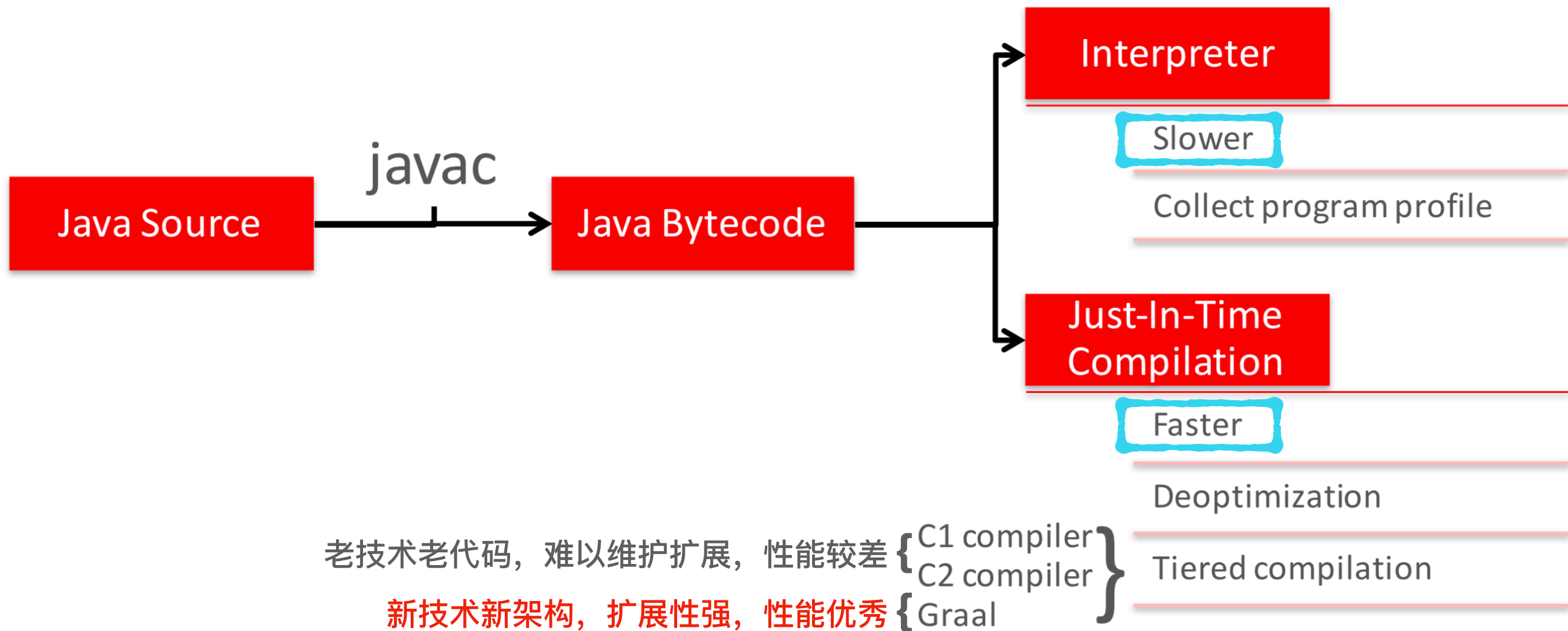

High-performance polyglot VM by Oracle Labs
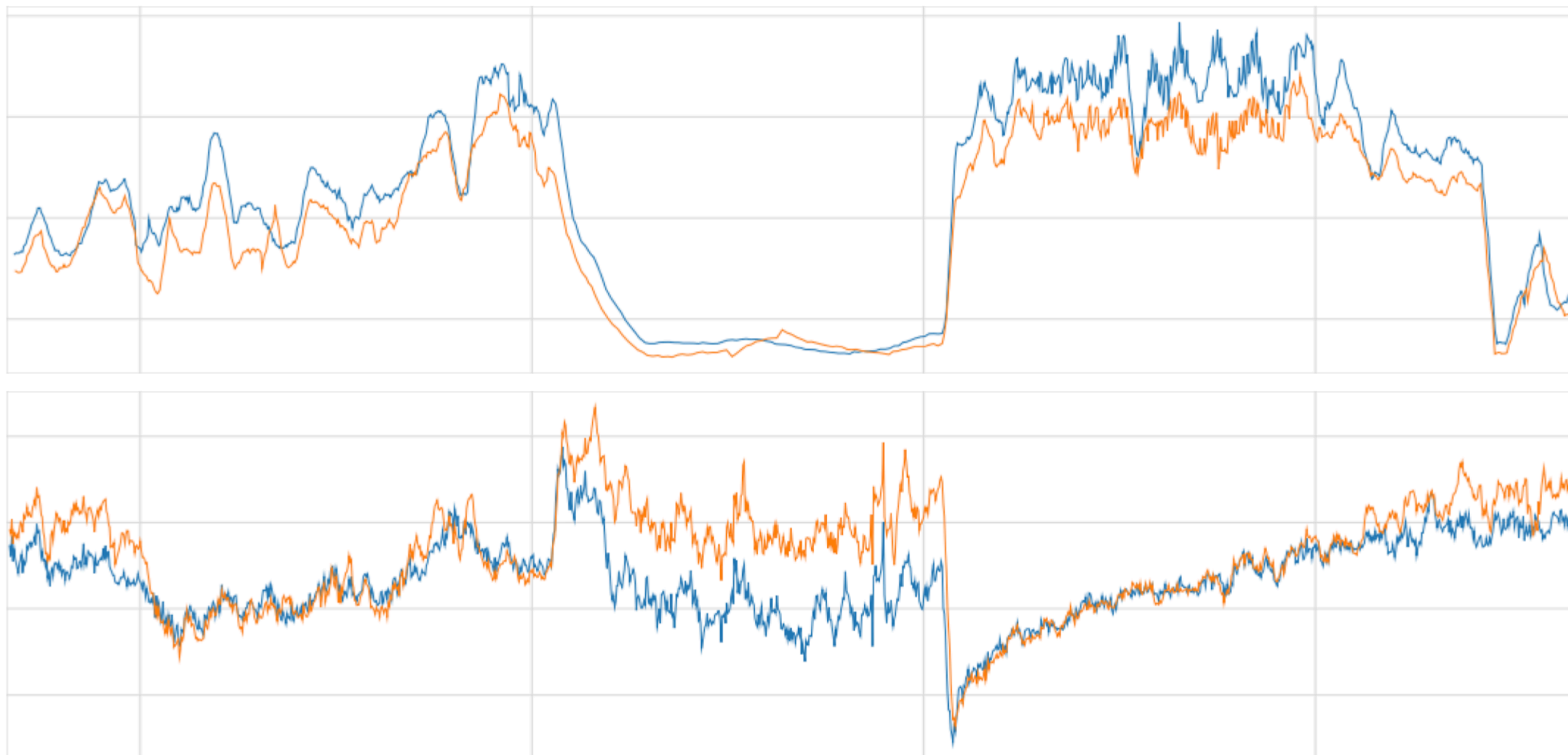
Twitter使用GraalVM后CPU 降低11%

High-Performance

Java Source → javac → Java Bytecode

Interpreter
- Slower
- Collect program profile

Just-In-Time Compilation
- Faster
- Deoptimization
- Tiered compilation

老技术老代码，难以维护扩展，性能较差 { C1 compiler, C2 compiler }

新技术新架构，扩展性强，性能优秀 { Graal }

Graal JIT compiler

Polyglot

Java

```
config = MapConfig.get("test.properties").asMap();
value = config.get("key");
```
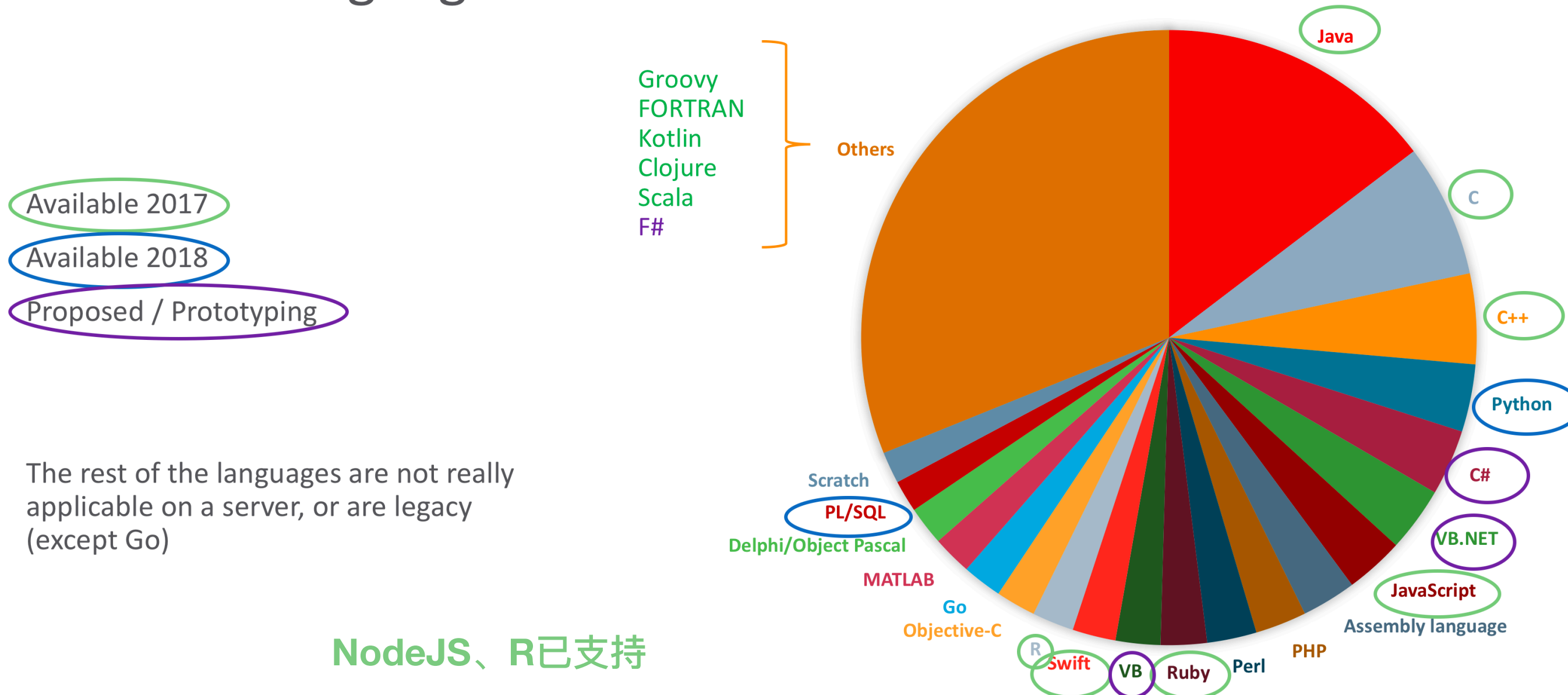
JavaScript

```
// load Java type
const MapConfig = Java.type('qunar.tc.qconfig.client.MapConfig')

// same API as Java
config = MapConfig.get("test.properties").asMap();
value = config.get("key");
```

- JavaScript等可直接使用Java客户端，省去大量多语言客户端开发维护成本

- 和Java完全一样的API + "native"的语法

- 都以JVM bytecode运行，零开销

- 按需选择最合适的语言，One VM to rule them all!

已经和即将支持的语言

GraalVM Language Status

Available 2017

Available 2018

Proposed / Prototyping

The rest of the languages are not really
applicable on a server, or are legacy
(except Go)

NodeJS、R已支持

Python已部分支持

C#规划中

PROGRAMMING LANGUAGE POPULARITY
(TOP 20 LANGUAGES FROM MAY 2017 TIOBE INDEX)
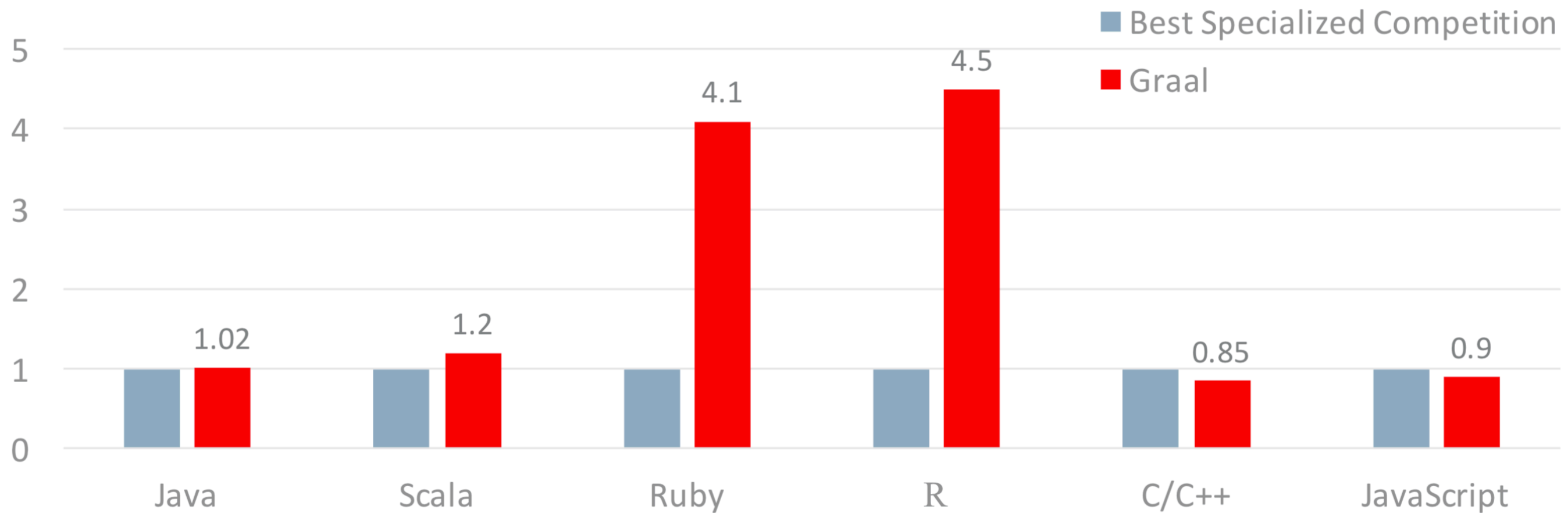
Groovy
FORTRAN
Kotlin
Clojure
Scala
F#

Others

Java

C

C++

Python

C#

VB.NET

JavaScript

Assembly language

PHP

Perl

Ruby

VB

Swift

R

Go

Objective-C

MATLAB

Delphi/Object Pascal

PL/SQL

Scratch

Polyglot Performance

接近和超越各语言的"原生VM"

后续工作

- 评测AdoptOpenJDK 8/11+GraalVM的兼容性和性能表现

- 升级携程Oracle JDK 7/8到AdoptOpenJDK 8/11+ZGC

- 评测推广支持NodeJS和Python应用的Polyglot GraalVM

谢谢！