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# FORMATION DÉVELOPPEUR JUNIOR – OCTOBRE 2017
# PERFORMANCE FOR JUNIOR PROGRAMMERS

## 1. INFORMATIONS GÉNÉRALES

| | |
|---|---|
| Formateur(s) | SIC (A. Van Muysewinkel) |
| Date | |
| Local | |
| Durée totale | 1 jour |
| Evaluation (optionnelle) | Oui / ~~Non~~ |

## 2. PRÉSENTATION DU COURS

Fournir les bonnes pratiques de développement permettant de réaliser des applications performantes et extensibles (scalable). Le développement de cette compétence permettra d'améliorer la qualité du code produit.

Domaines abordés :

- Java SE – Optimization & Best Practices
- Database – Optimization & Best Practices
- Web frontend – Optimization & Best Practices
- JEE – Optimization & Best Practices

## 3. DÉTAILS DES ACTIVITÉS PROPOSÉES

### 3.1. Phase de préparation

Durée : ~3 heures

Lors de la phase de préparation, l'étudiant sera invité à parcourir différentes sources afin de rafraîchir ses connaissances sur les composants clés en matière de performance (Garbage Collector, Scheduler, JIT compiler, DB engine, typical latencies…).

- JVM Garbage Collection:
  - Mandatory (text):
    - http://www.oracle.com/webfolder/technetwork/tutorials/obe/java/gc01/index.html (1h)
      "Java Garbage Collection Basics" by Oracle
    - Get used to http://gceasy.io/
  - Recommended (videos):
    - https://www.infoq.com/presentations/Understanding-Java-Garbage-Collection (1h30, *but skip 0:00:00-0:12:56 and 1:22:54-1:31:36*)
      "Understanding Java Garbage Collection and What You Can Do about It " by Gil Tene
  - Optional (videos):
    - https://www.infoq.com/presentations/Visualizing-Java-GC (1h, *but skip 24:05 - 37:53*)
      "Visualizing Java Garbage Collection" by Ben Evans

- https://www.infoq.com/presentations/garbage-collection-benefits (3/4h)
  "Garbage Collection is Good!" by Eva Andreasson

- Processes Lifecycle:
  - Mandatory (text):
    - http://www.linux-tutorial.info/modules.php?name=MContent&pageid=84 (The Linux Tutorial)
      "The Life Cycle of Processes"

- Process Scheduler:
  - Mandatory (text):
    - http://elsoc.wikia.com/wiki/Scheduling (Elsoc Wiki)
      "Scheduling" - except the " Real-time Scheduling Algorithms" section
  - Recommended (text):
    - https://www.ibm.com/developerworks/linux/library/l-completely-fair-scheduler/
      "Inside the Linux 2.6 Completely Fair Scheduler" by M. Jones (IBM)

- JIT Compiler:
  - Mandatory (video):
    - https://www.youtube.com/watch?v=wL3KrSGuZW0 (1h)
      "An introduction to JVM performance" by Rafael Winterhalter
  - Recommended (text):
    - http://people.inf.ethz.ch/zmajo/teaching/cd_ss17/slides/w15_01-hotspot-jvm-jit-compilers.pdf
      "The Java HotSpot VM. Under the Hood" by Tobias Hartmann, Oracle
  - Optional (videos):
    - https://www.youtube.com/watch?v=6a4Id3lj7Sw (1h)
      "The Performance Engineer's Guide To Java HotSpot" by Monica Beckwith

- Typical latencies:
  - Mandatory (data):
    - https://gist.github.com/hellerbarde/2843375 & https://people.eecs.berkeley.edu/~rcs/research/interactive_latency.html (interactive version)
      "Latency numbers every programmer should know"
  - Optional (video):
    - https://www.youtube.com/watch?v=JEpsKnWZrJ8
      "Nanoseconds" by Grace Hopper (US Navy)

## 3.2. La formation

Durée : 1/2 jour

Déroulement :

Présentation d'une série de bonnes pratiques permettant d'éviter les principaux problèmes de performance récurrents.

Contenu :

- perf improvement process: all

- Infra
  - CPU
    - Collections implementations
    - Algorithms implementations
    - Optimization
    - Things that hurt performance
  - Contentions (threads, locks…)
    - General Recommendations
    - Thread management in Java EE
    - Synchronization
    - Messaging
    - Blocking resources
  - Memory, Objects lifecycle
    - Reduce allocation rate
    - Avoid memory fragmentation
    - Use stack rather than heap
    - Avoid losing time with the GC
    - Sessions
  - I/O's
    - Logging issues
    - Other advices
- M/W
  - persistence, database
    - Transactions
    - JPA
    - SQL
  - JSF (if time allows)

### 3.3. Suivi et évaluation

Durée : 1/2 h

Interrogation orale