Do We Need to Spend This Much Money on Garbage?
—— Energy Analysis for Garbage Collection of Managed languages

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2006  $4.5 Billion
2011  $7.4 Billion

Data for U.S from EPA

- How to reduce the power cost for servers?
  - Understand machines’ power characters
  - Understand the workload

- What are the popular workloads for servers?
  - Java
  - JavaScript
  - Managed Languages
  - Python
  - Ruby
  - PHP

- What are the common parts for Managed languages?
  - Managed by Virtual Machine (VM)
  - VM provide services: Garbage Collection (GC), Just-in-Time Compilation (JIT), etc

- GC is used ubiquitously in servers

Do you know how much Data Centers power cost per year just in U.S.? $$$$$

- Is it possible to reduce the server cost by reducing GC’s energy consumption?

- What is the work of GC
  - To reclaim garbage, which is the memory occupied by objects no longer used by program.

- GC is a memory intensive workload not CPU resource intensive. It’s possible to reduce GC energy.

- Reduce GC energy by changing hardware configurations
  - For example, disable 2 cores on a 4-core Sandy Bridge i7

- Reduce GC energy by choosing the right GC algorithm
  - Energy (cost) / Performance of Immix and MarkSweep GC on Sandy Bridge i7 3.4G 4 core x 2 thread

Conclusion: By changing hardware configurations and select the right GC, we can save more than half cost of GC on servers.

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