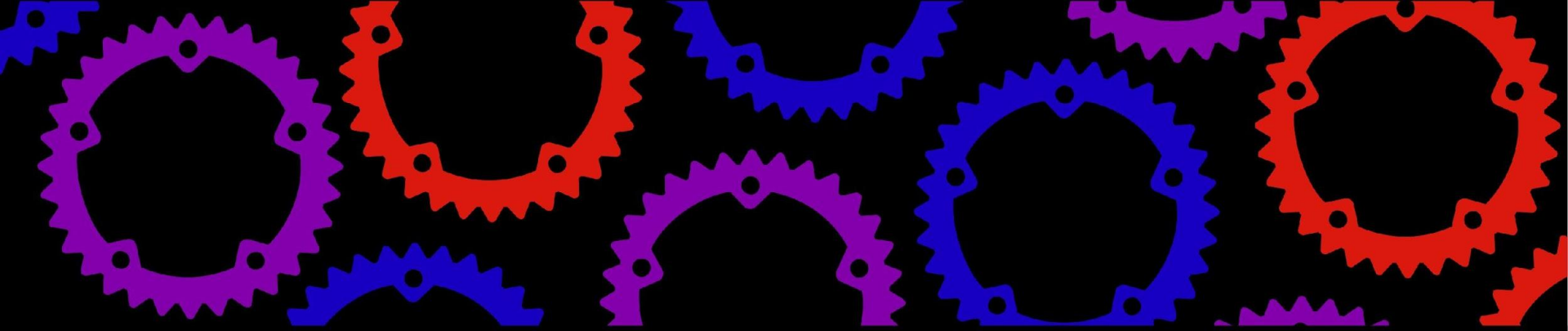


Search Engine in Production with Rust

知乎搜索 孙晓光

2019.04.21

自我介绍

孙晓光，知乎搜索后端负责人

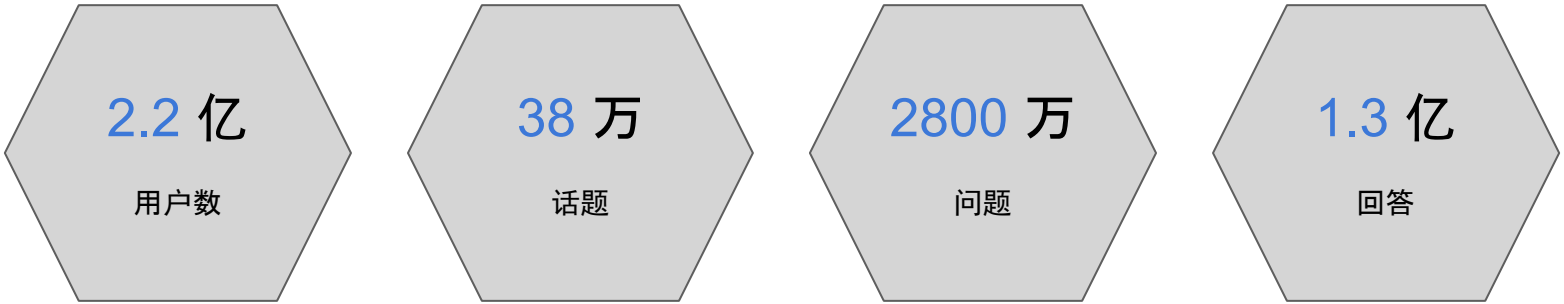
曾从事私有云相关研发，关注云原生技术

TiKV 项目 Committer

目录

- 知乎搜索
- 搜索原理
- 技术选型
- 经验教训

知乎: 可信赖的问答社区

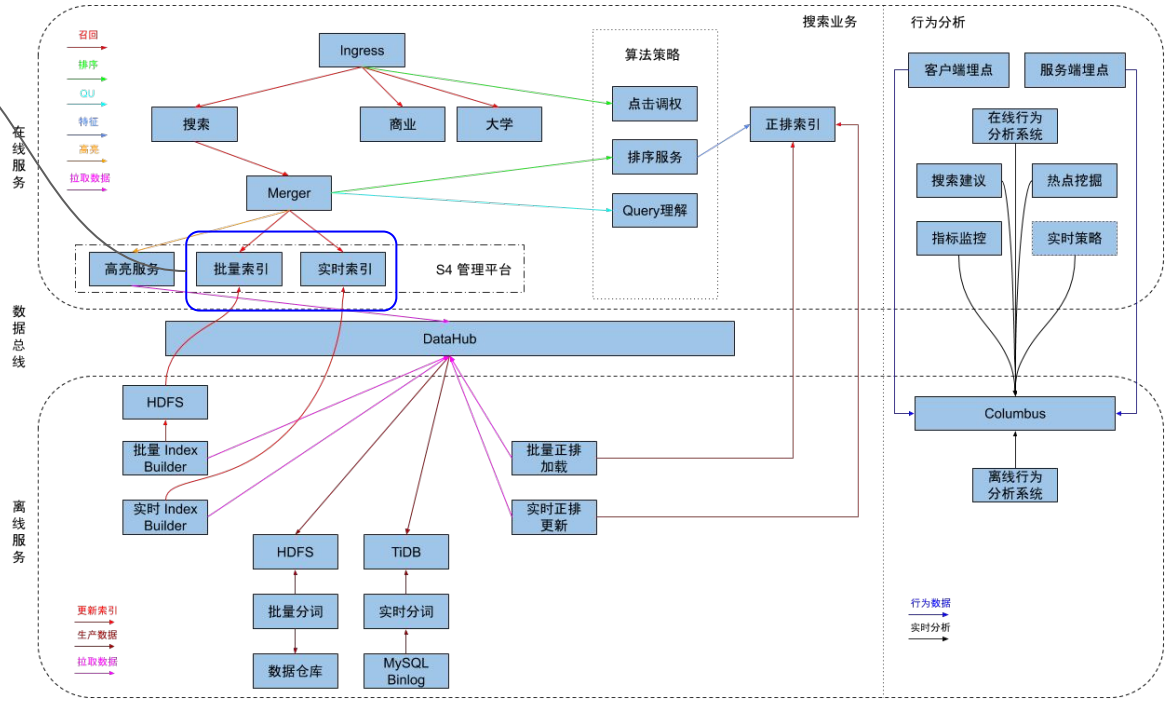


知乎搜索

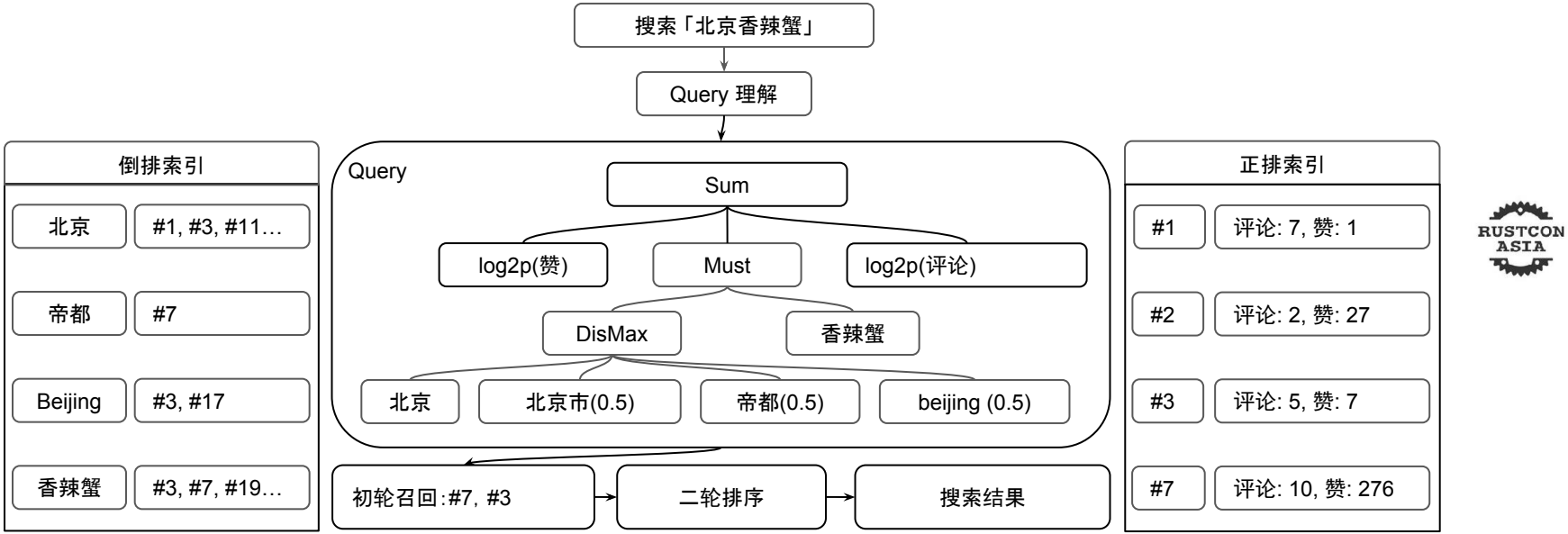
Rucene 引擎

倒排索引
- 召回
- 相关性评分

正排索引
- 文档评分
- 结果分组

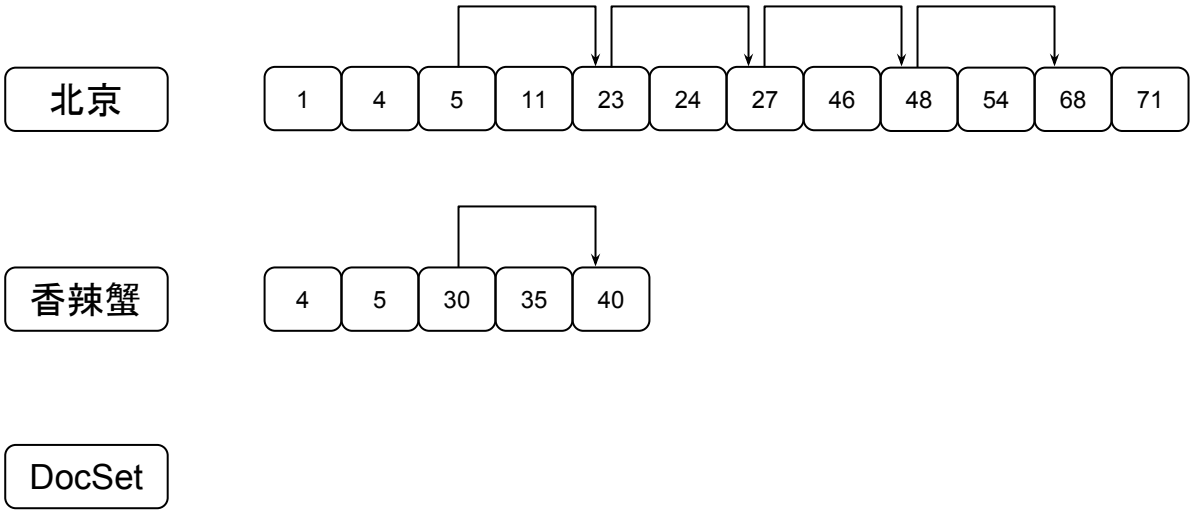


搜索流程



Conjunction

北京 AND 香辣蟹



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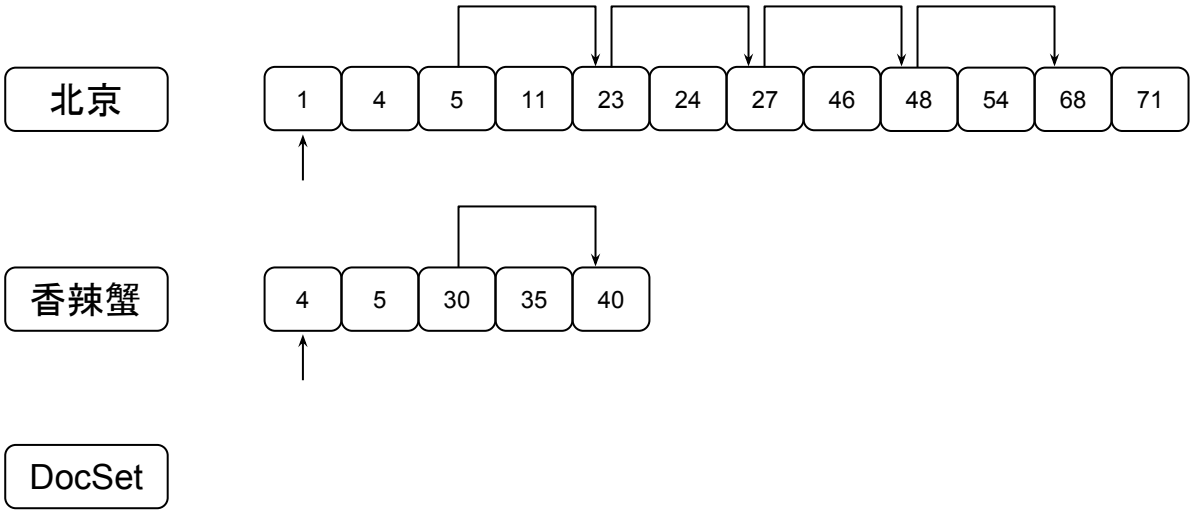

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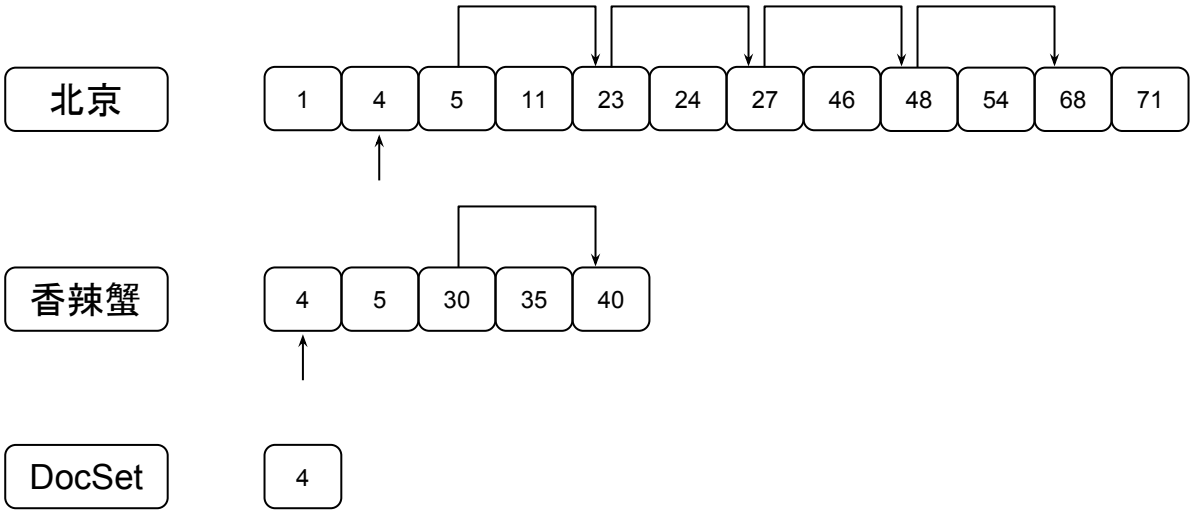

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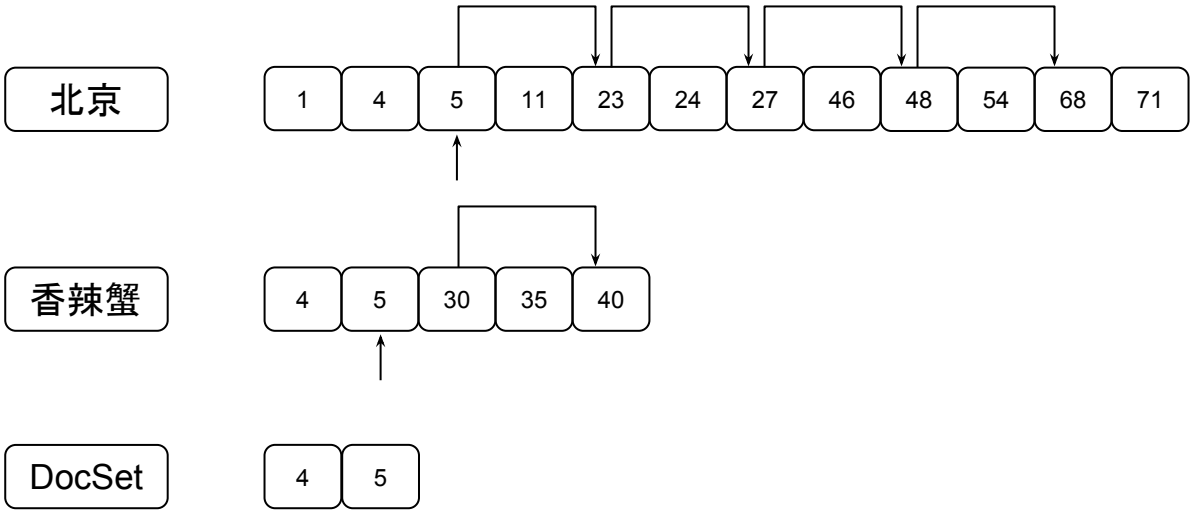

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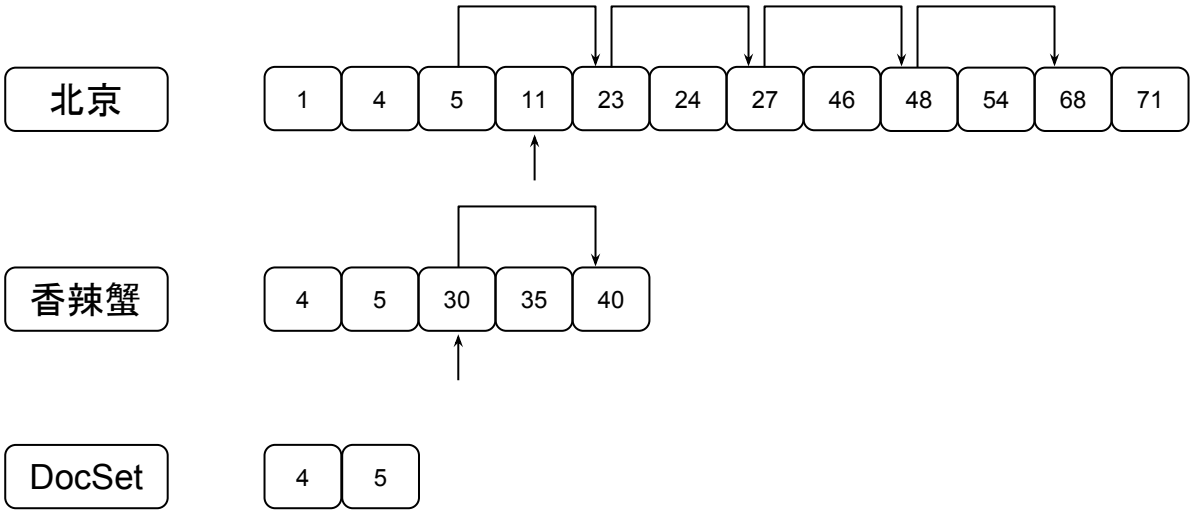

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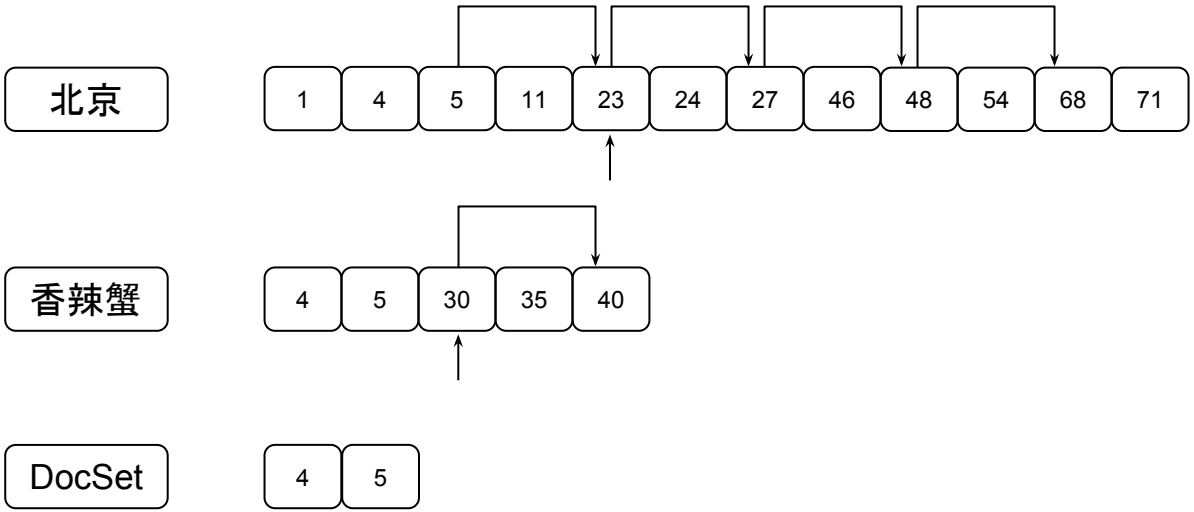

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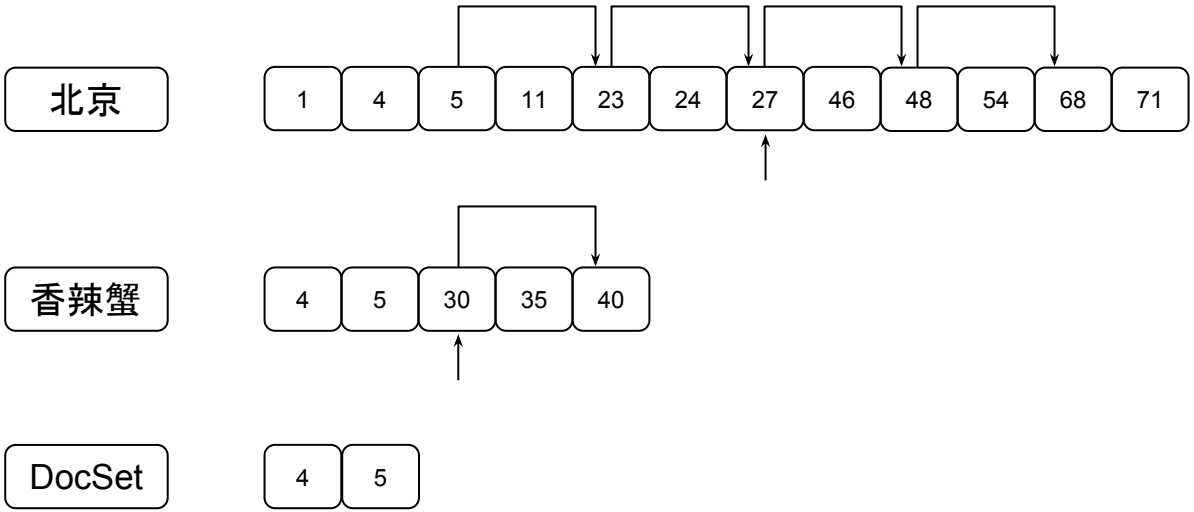

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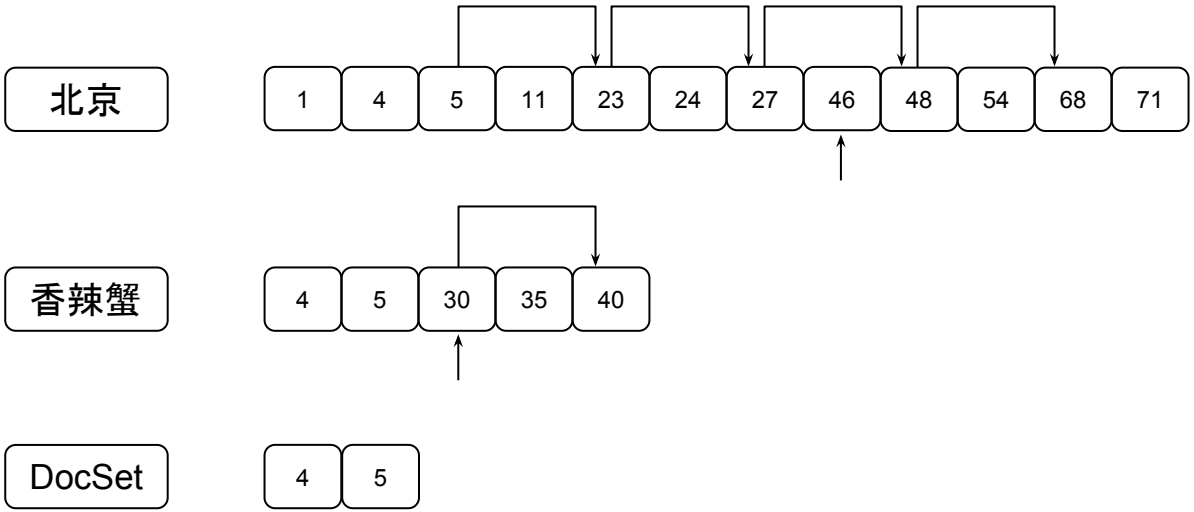

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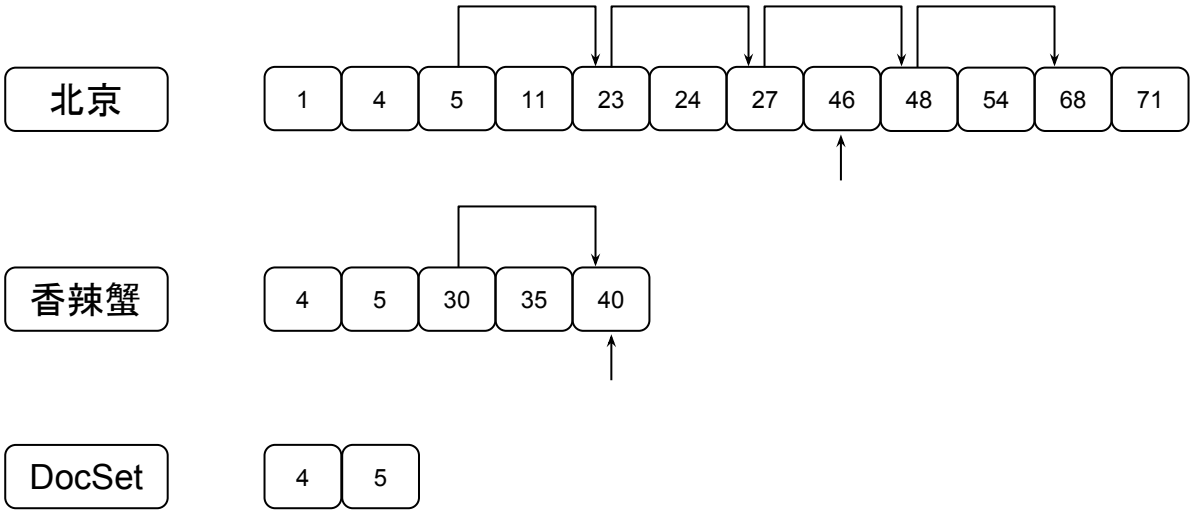

Conjunction

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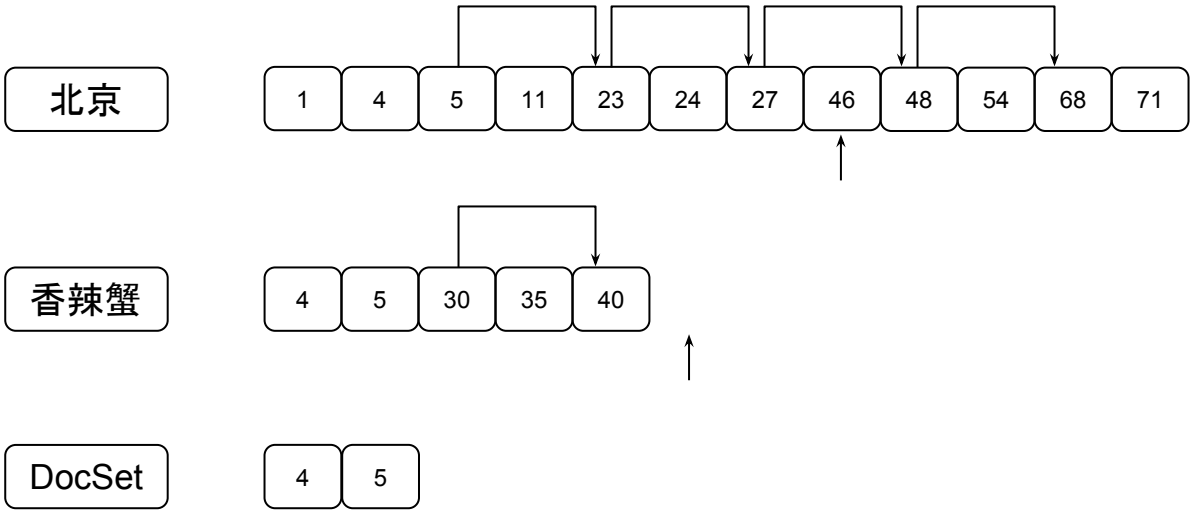
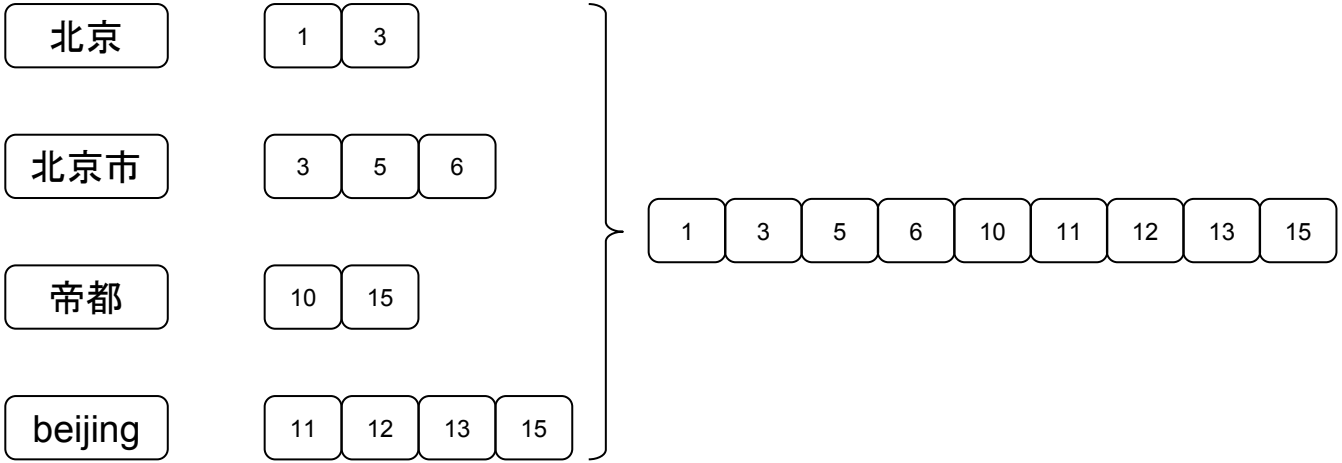
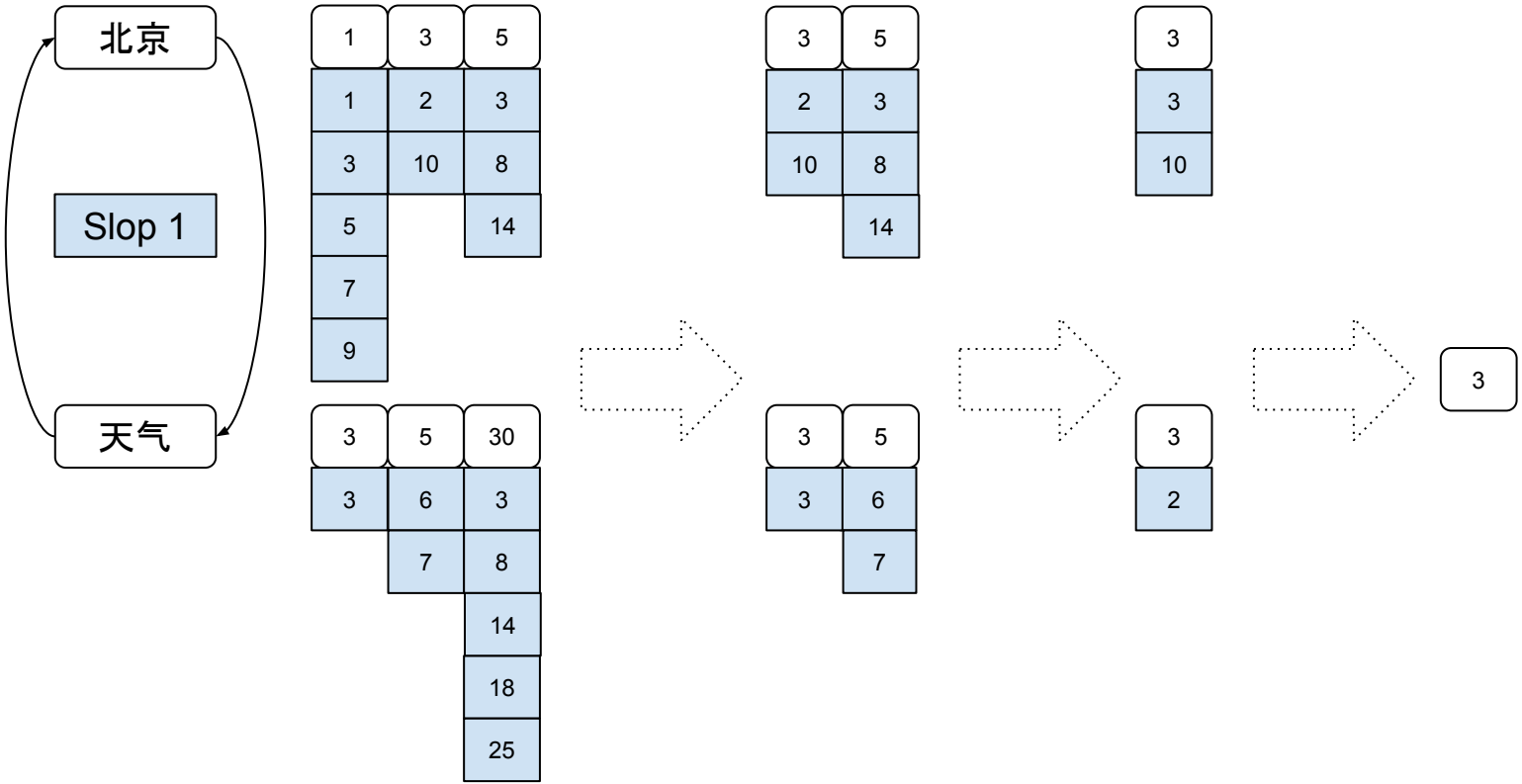


Disjunction

北京 OR 北京市 OR 帝都 OR beijing



Span



相关性打分

$TF_{(t,d)}$: *Term t* 在文档 d 中出现的次数

DF_t: 所有文档中包含 *Term t* 的文档的数量

$$Weight_t: \log_{10}\left(1 + \frac{N - DF_t + 0.5}{DF_t + 0.5}\right)$$

DL_d: 文档 d 的长度

$AVGDL$: 平均文档长度

k_1 b:调节因子

$$BM25_{(Q,d)}: \sum_{i}^{n} Weight_{Q_i} \times \frac{TF_{(t,d)} \times (k_1 + 1)}{TF_{(t,d)} + k_1 \times \left(1 - b + b \times \frac{DL_d}{AVGDL}\right)}$$

Web 搜索引擎特点

IO 密集

计算密集

平台相关性不高

需求相对固定

响应时间敏感

RUSTCON ASIA

技术栈考量

- 期望
  - 无 GC
  - 性能好
  - 表达能力强
  - 成熟的工具链
- 选项
  - C++
  - Rust

C++ vs Rust

- Pros
  - 内存安全
  - 并发安全
- Cons
  - 学习曲线过于陡峭
  - 生态相对不够成熟

经验

- 站在巨人的肩膀上，兼容 Lucene
- 目标合理拆分，读写路径拆分实现
- 努力榨干硬件的每一滴资源
- 更深入的理解，未来更多的可能

教训

- 设计先行
- 用 Rust 的方式思考
- 合理划分系统边界，使用更适合的语言和技术

总结

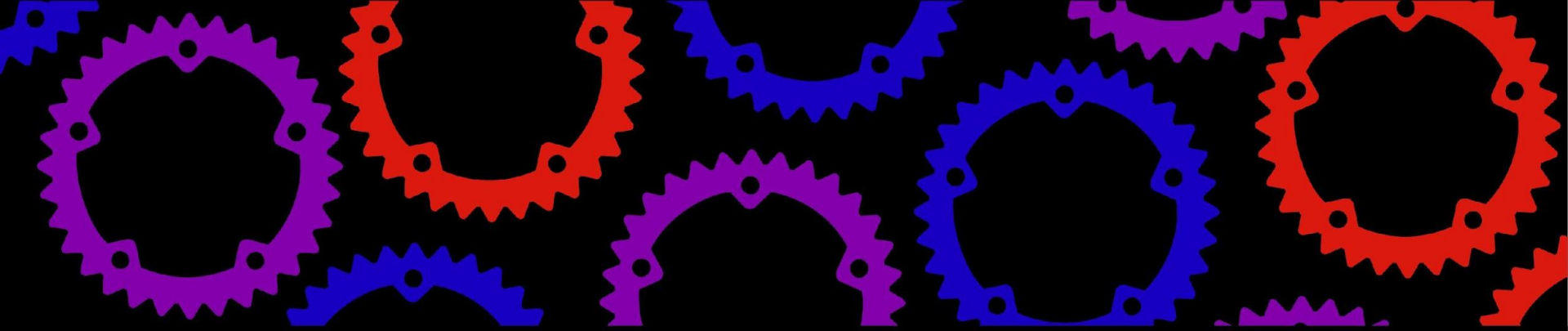
Rust

取舍

信息检索技术

利弊工程密集

知乎搜索



THANKS

github.com/sunxiaoguang zhihu.com/people/solaris sunxiaoguang@gmail.com