Elastic Search

Seminar Presentation

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July 17, 2016

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Introduction

What is elastic search

- Built on top of Apache Lucene
- Built in java, Uses RESTful APIs
- Users - Facebook, Github, Wikipedia
- Ranked first in Search engine Databases
- Full text search

History

- Shay Banon created Compass library in Java
- Not Scalable
- Rebuilt in distributed approach using RESTful API

Features

Document Oriented

- Documents as JSON object
- Index
- Type - mapping
- Id
- Dynamic mapping

Sharding

- Distributed document store
- Complete Lucene search engine
- Hash functions for shard routing
- Immutability by segments
- Near real timing by In-memory Buffer
- Crash recovery with Translog

Sharding

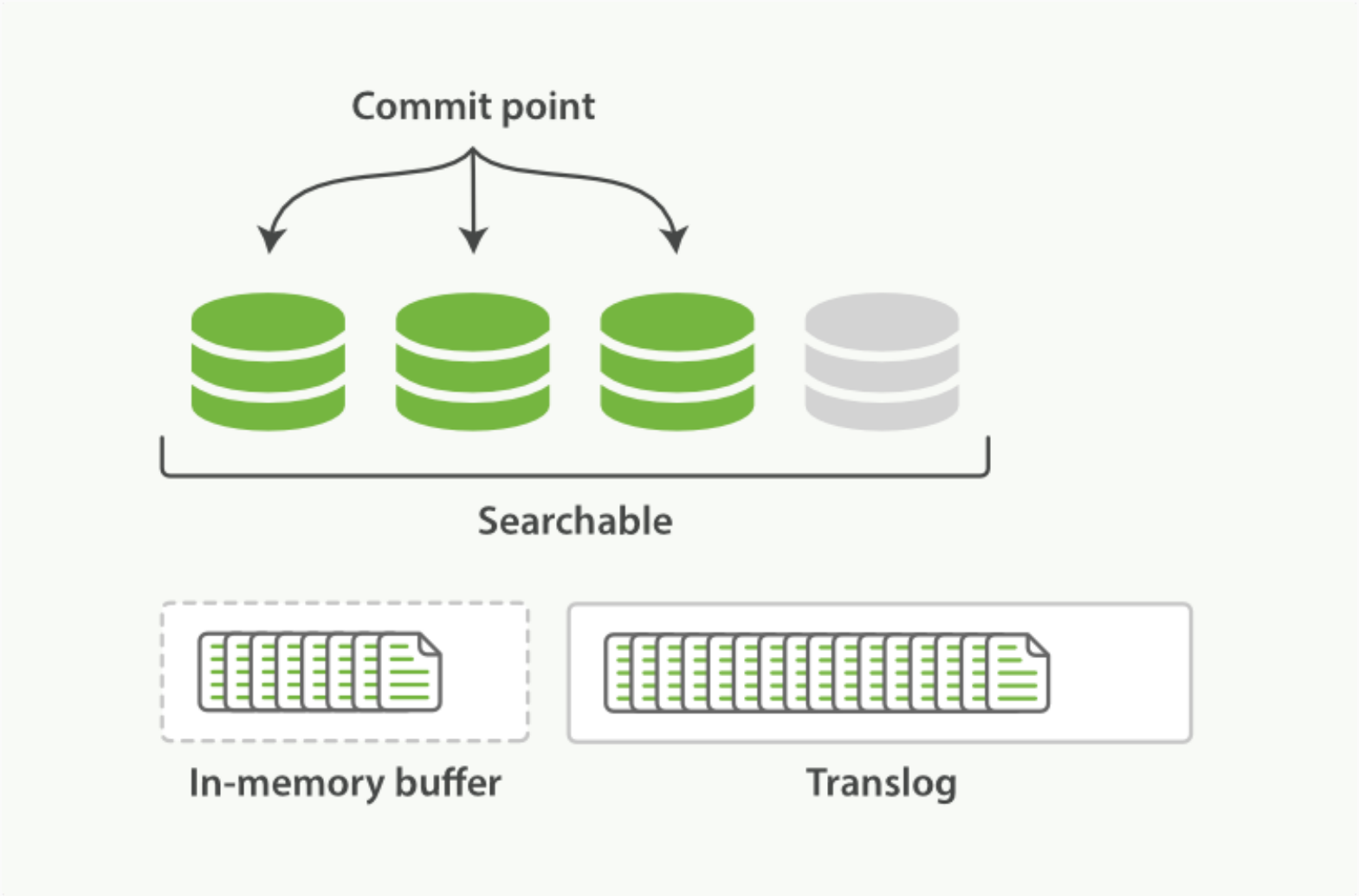

Figure 1: Inside a shard

Clustering

- Node - instance of ES server
- Primary and Replica shards
- Failure recovery
- Horizontal scaling
- Cluster master
- Completely autonomous

Clustering

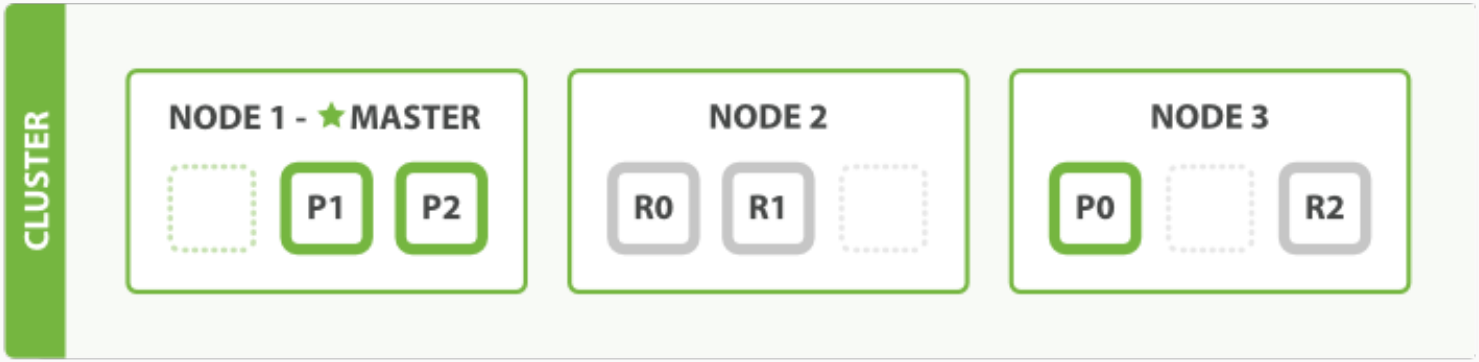

Figure 2: A sample cluster

Clustering

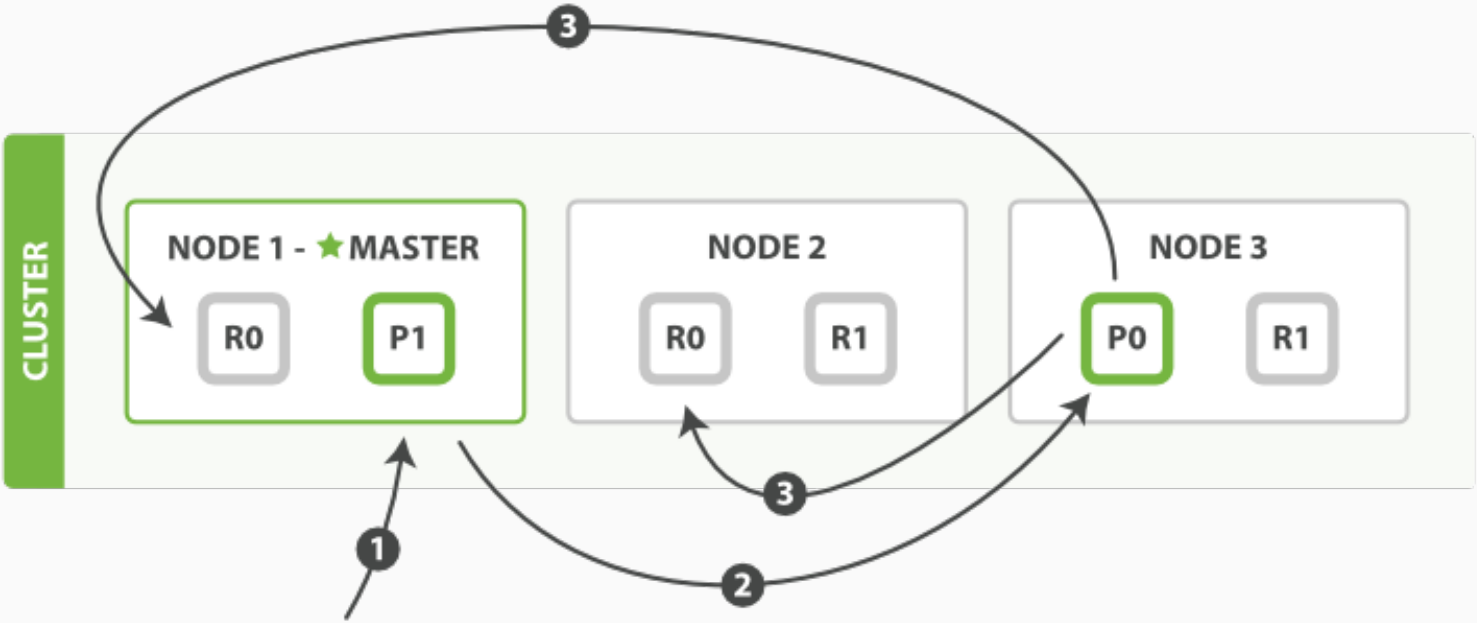

Figure 3: Request routing in a cluster

Mapping and analysis

- Inverted index
- Dynamic mapping
- Analyzers
- Character filter, tokenizer and token filter

Aggregations

- Buckets
- Metrics
- Usable with filters and queries

Concurrency

- Optimistic concurrency control
- Operations are asynchronous and concurrent
- Metafield version

Search

Distributed search

- Query phase
- Fetch phase

Distributed search

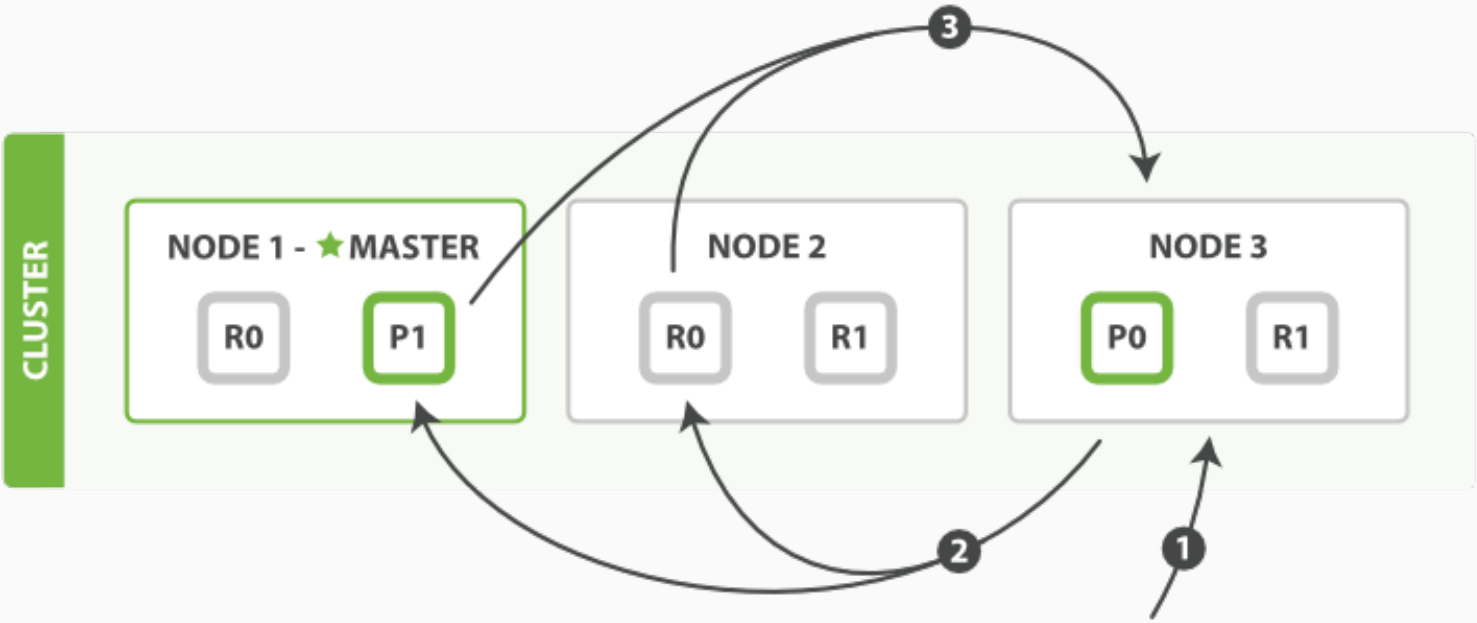

Figure 4: Query phase in distributed search

Distributed search

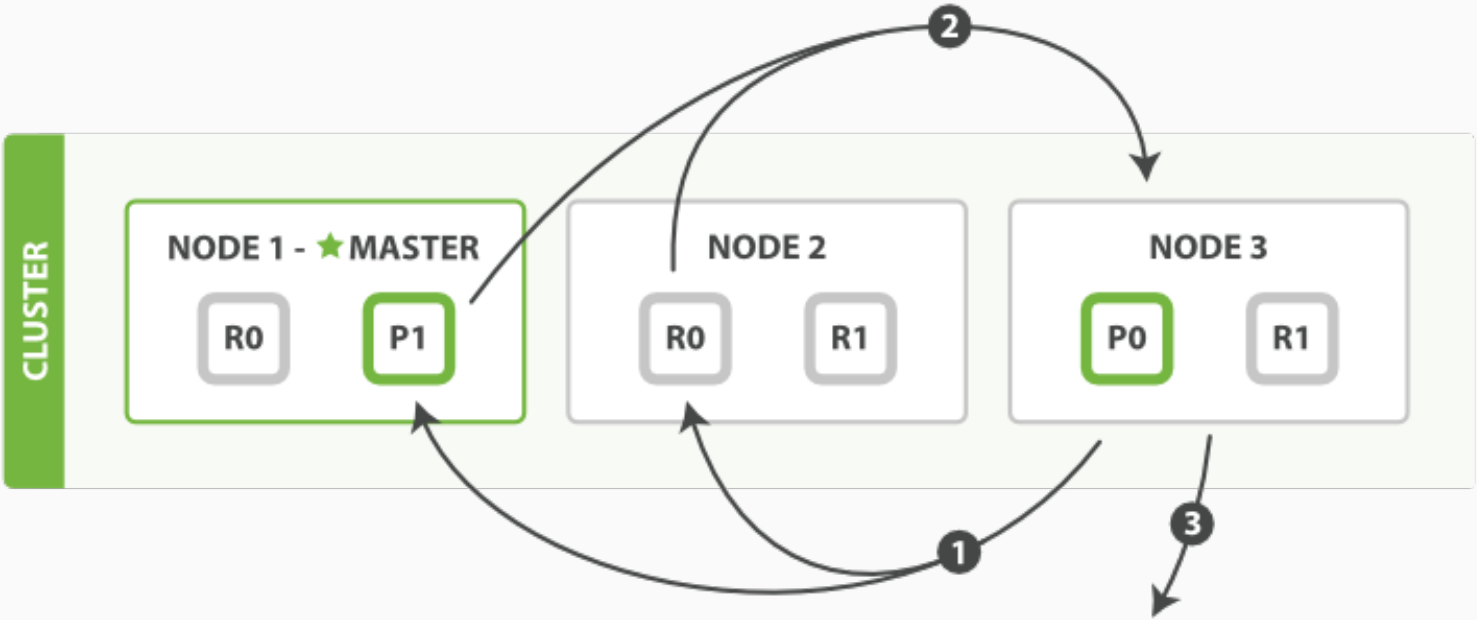

Figure 5: Fetch phase in distributed search

Relevance

- Score Calculation
- Term Frequency
- Inverted Document frequency
- Field length norm
- Boost

Structured search

- Search Lite
- Query DSL
- Query and Filter
- Combinations

Full text search

- Difficulties with normal DB model
- Multi word search
- Multi field search
- Metafield all
- Phrase search
- Search as you type, n-grams
- Fuzzy search

Conclusion

Use

- Real time and full text search
- Logging massive data - The Guardian
- Geolocation with full text - Stack overflow
- Sheer scale - Github

Performance Analysis

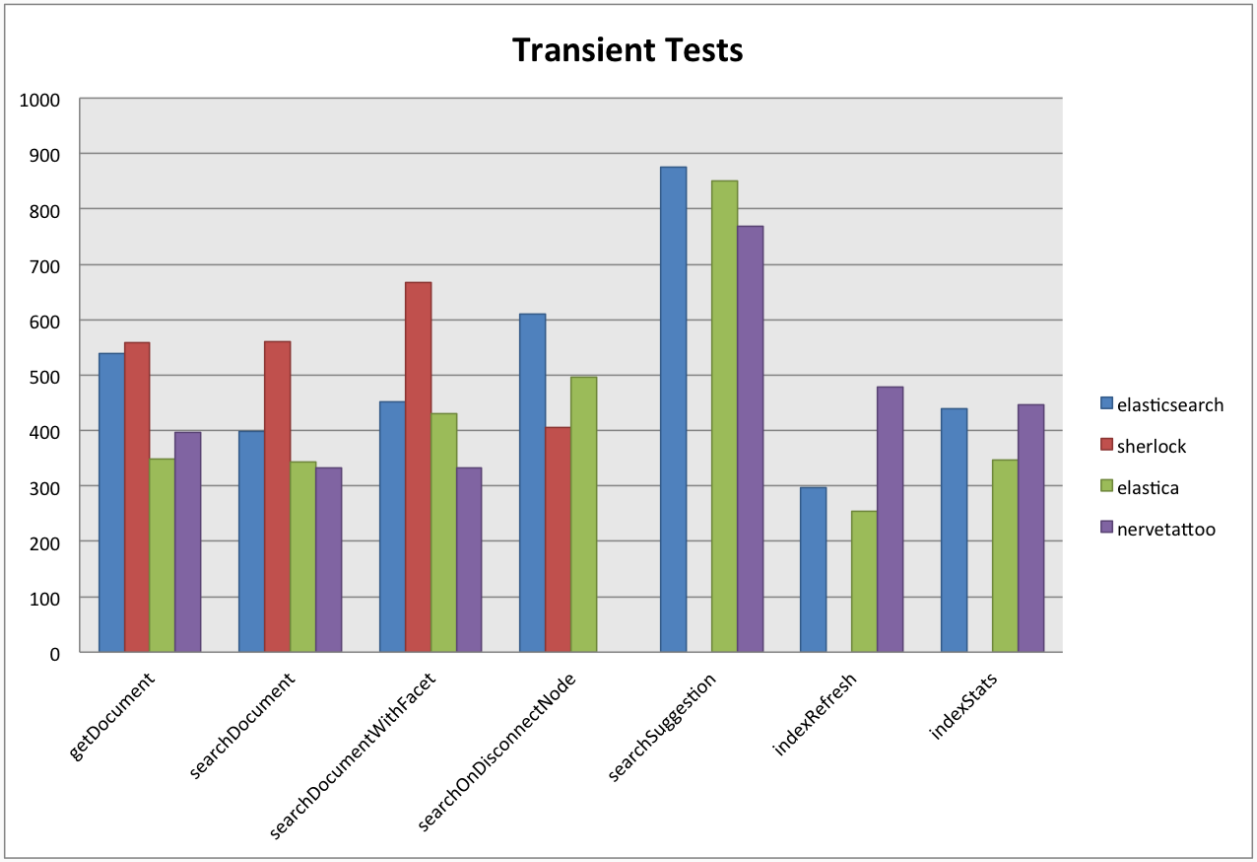

Figure 6: Performance analysis of different PHP Clients of ES

Memory and Time Requirements

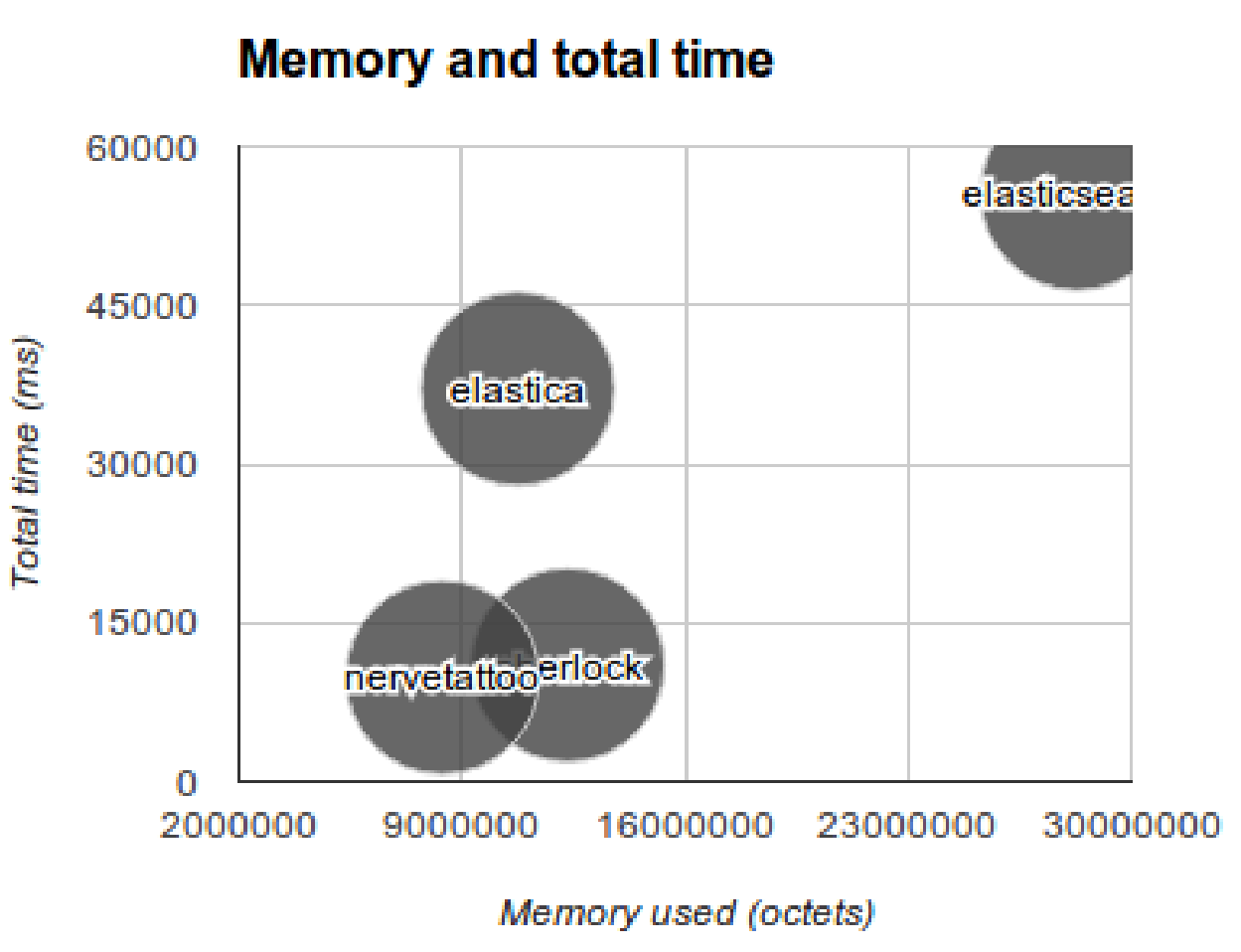

Figure 7: Memory and Time requirement of different PHP Clients of ES

Questions?

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