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Baratine

Operational Service Views

#DevoxxUS

#Baratine

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Architecture Overview

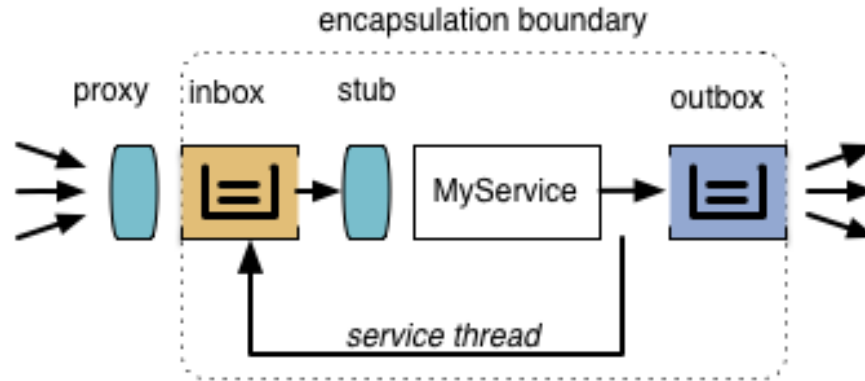
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Baratine Service

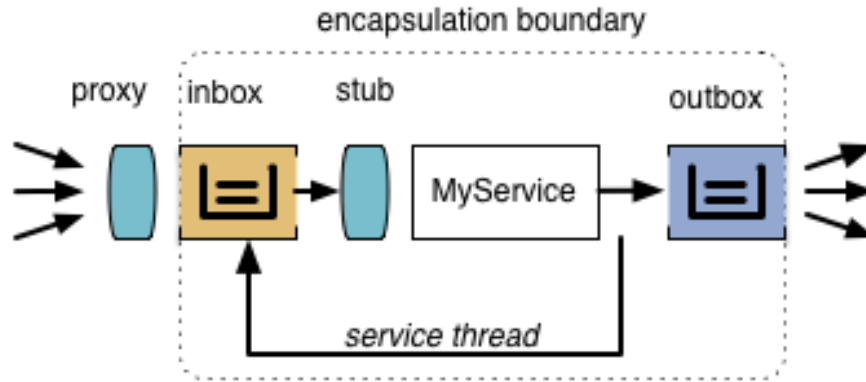


Key Concepts:

1. Strong encapsulation boundaries.
2. Each service has its own thread and efficient lock-free inbox.
3. Inside a service, application code can be single-threaded.



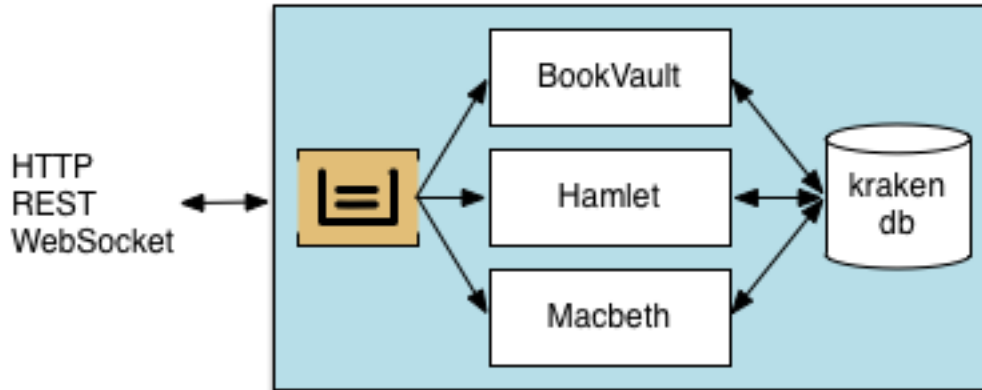
Baratine Service



4. Persistent services load and store to a document-style key/value database.
5. Services use their data in-memory; loading and storing is transparent.
6. Services own their data in an object-oriented model. No additional locks are needed to protect against other services modifying their data



Database Persistence



1. In-memory persistent services are built-in to Baratine, using its asynchronous high-performance internal database Kraken.
2. An Application service operates on its data in-memory, improving performance and simplifying code.
3. The data is automatically loaded and saved to the internal document-oriented database as part of the asset lifecycle.



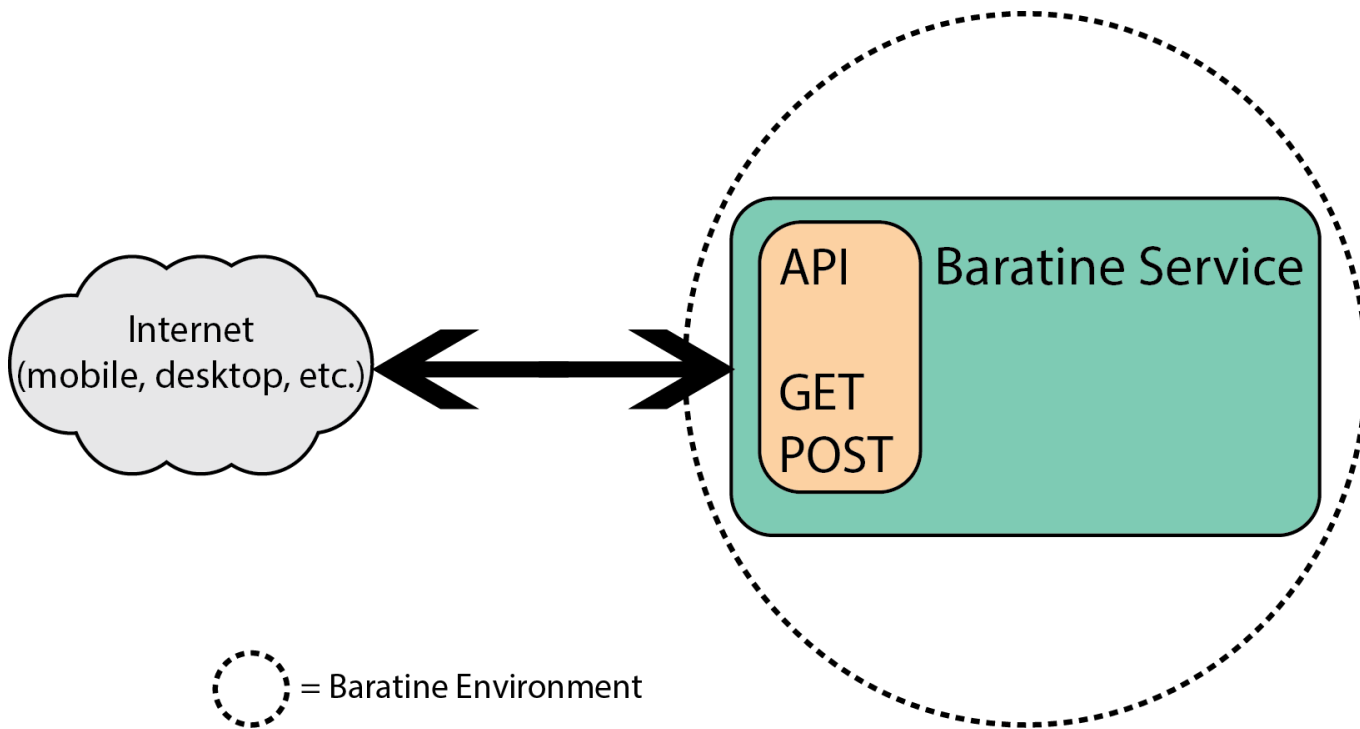
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Use Case # 1: API



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API Engine

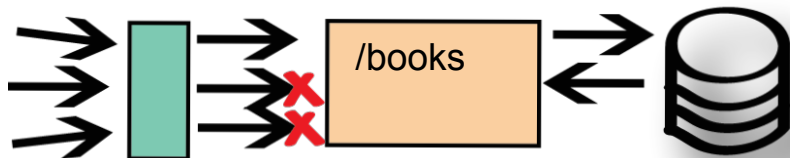




Bookstore REST service

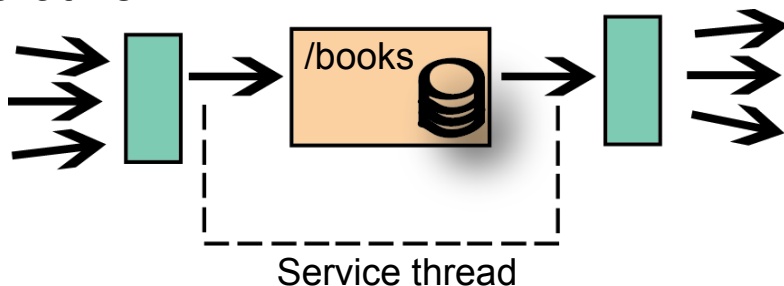
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Traditional



1. Operations must be persisted to db
2. Objects must be **synchronized** for multiple requests
3. No thread ownership of data

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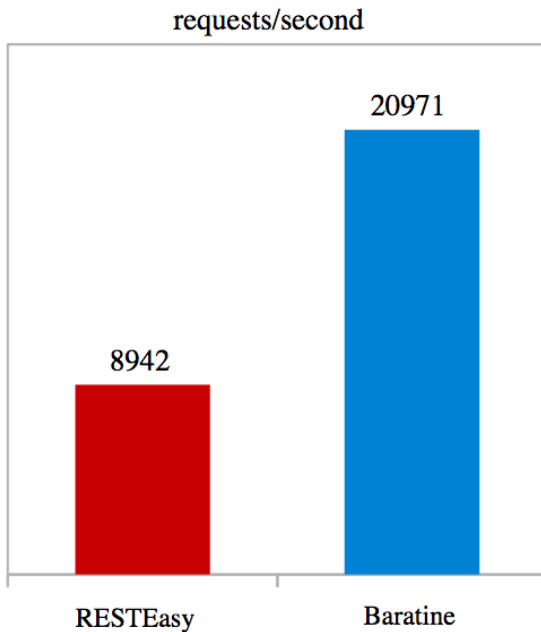
1. Operations done in-memory
2. No locking/blocking threads
3. Single thread ownership of data



Bookstore REST service

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RESTEasy vs Baratine



Baratine:

- Over **2x** the performance
- Can be scaled to match cores on CPU
- Persistence added with single annotation

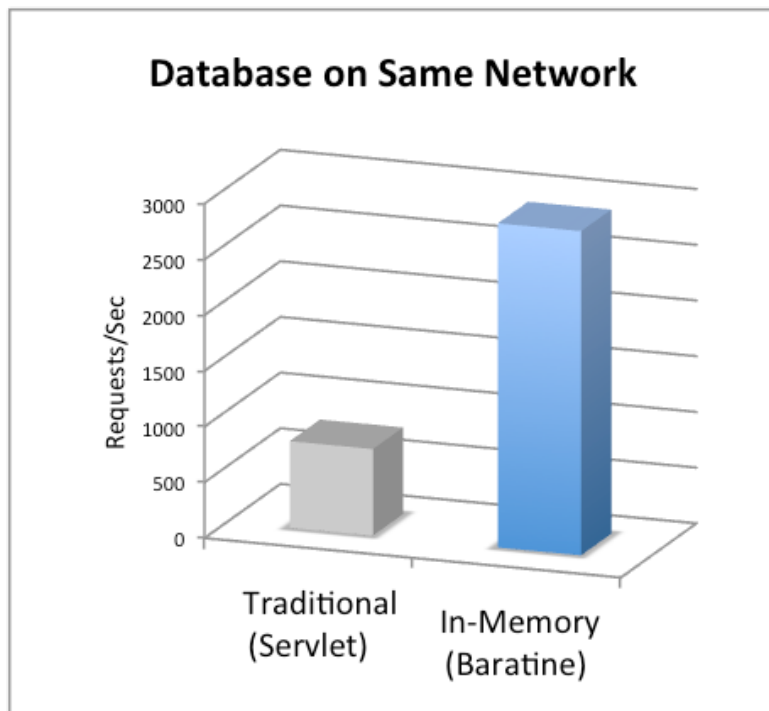
// best out of 10 runs

```
$ wrk "http://127.0.0.1:8080/books"
```



In-Memory Operations

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Benchmark requirements:

- One update per request
- Data persisted (MySQL)

The numbers represented are for a database that is on the same network.

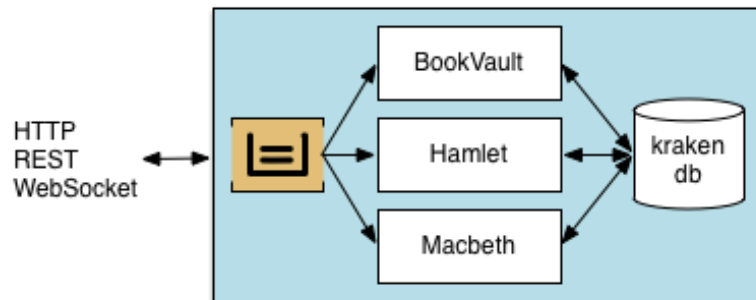
Baratine is much faster because it doesn't need to touch the database on each and every request - it just uses its data that is residing in-memory.



In-Memory Operations

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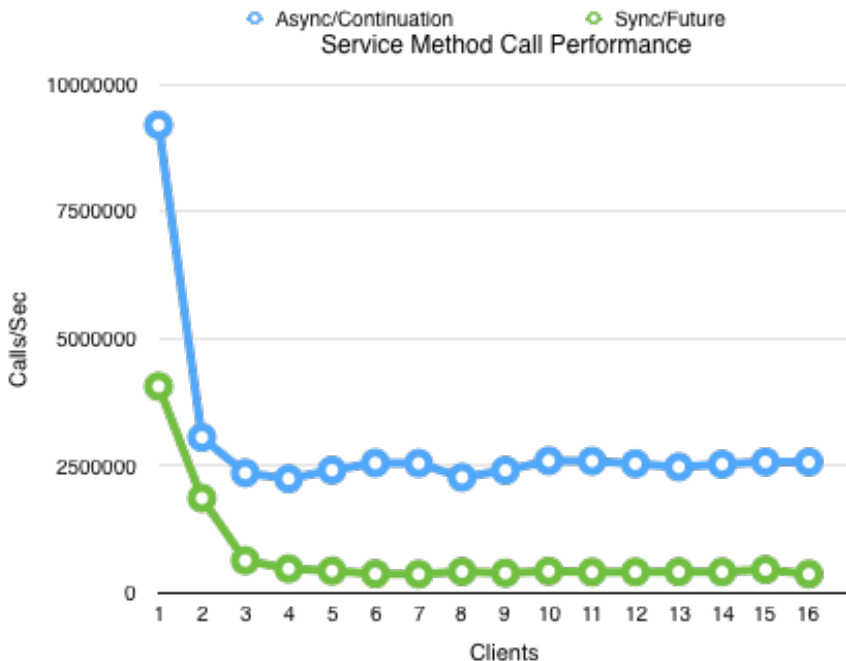
1. Data loaded once
 - 1.1. Only removed on an LRU
2. Large data sets shard
 - 2.1. Data owned per service
3. Write-through in place
 - 3.1. Baratine saves the fields of the asset to an embedded, fully reactive document database named Kraken (No data schema)
4. Journaling for reliability/failover
 - 4.1. The inbox is backed by a repayable journal for failover





Baratine Performance

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- Continuation/async performance is consistently better than async/future, especially under load.
- Under light load, async performance is around 9M method calls/sec while future performance is 4M calls/sec
- As the load increases future performance drops to 0.5M calls/sec. Async performance drops as well but stays over 2.2M calls/sec.



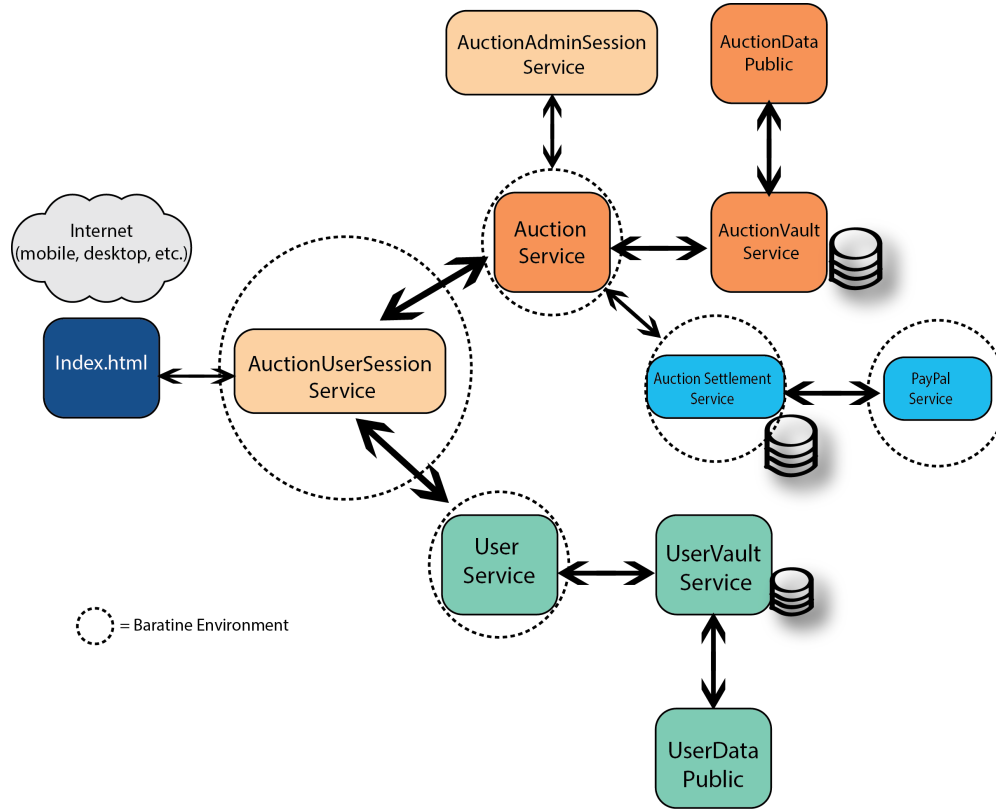
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Use Case #2: Microservice



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Auction Microservice



The application uses the following Baratine provided services

- DatabaseService
- Store (key - value)
- Timer
- Event
- WebSocket



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Questions?





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Thank You!

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