Getting Started with Jakarta NoSQL and MongoDB

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Who’s Mike?

• InfoQ Java Queue News Editor
• Co-Director, Garden State Java User Group
• Leadership Council, Jakarta EE Ambassadors
• Committer, Jakarta NoSQL and Jakarta Data
• “Petrochemical Research Organization”
Objectives

• What is Jakarta NoSQL?
• What is Eclipse JNoSQL?
• NoSQL Database Types
• Jakarta NoSQL Layers
• Demo (yea!)
• Jakarta NoSQL Resources
Jakarta NoSQL
What is Jakarta NoSQL (1)?

• Jakarta EE specification
  • Otavio Santana - specification lead
• Streamlines the integration of Java applications with NoSQL databases
• Defines a set of APIs that provide a standard implementation for most NoSQL databases
What is Jakarta NoSQL (2)?

- One API, many databases
- Adopted by the Garden State JUG!
Eclipse JNoSQL
What is JNoSQL?

- Compatible implementation of the Jakarta NoSQL specification
- One defined API for each NoSQL database type
- Uses the same annotations to map Java objects
NoSQL Database Types

- Key-Value
- Column Family
- Document
- Graph
Key-Value
## Key-Value

<table>
<thead>
<tr>
<th>Relational</th>
<th>Key-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>Bucket</td>
</tr>
<tr>
<td>Row</td>
<td>Key/Value Pair</td>
</tr>
<tr>
<td>Column</td>
<td></td>
</tr>
<tr>
<td>Relationship</td>
<td></td>
</tr>
</tbody>
</table>
Column Family

Row-key | Columns...
--------|------------------------
Apollo  | Duty
        | Sun
Ares    | Duty
        | {Love, happy}
        | Color
Aphrodite | Duty
       | War
       | weapon
       | Sword
# Column Family

<table>
<thead>
<tr>
<th>Relational</th>
<th>Column Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>Column Family</td>
</tr>
<tr>
<td>Row</td>
<td>Column</td>
</tr>
<tr>
<td>Column</td>
<td>Key/Value Pair</td>
</tr>
<tr>
<td>Relationship</td>
<td></td>
</tr>
</tbody>
</table>
Document

{
    "name": "Diana",
    "duty": [
        "Hunt",
        "Moon",
        "Nature"
    ],
    "age": 1000,
    "siblings": {
        "Apollo": "brother"
    }
}
<table>
<thead>
<tr>
<th>Relational</th>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>Collection</td>
</tr>
<tr>
<td>Row</td>
<td>Document</td>
</tr>
<tr>
<td>Column</td>
<td>Key/Value Pair</td>
</tr>
<tr>
<td>Relationship</td>
<td>Link</td>
</tr>
</tbody>
</table>
Graph
Graph

<table>
<thead>
<tr>
<th>Relational</th>
<th>Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>Vertex &amp; Edge</td>
</tr>
<tr>
<td>Row</td>
<td>Vertex</td>
</tr>
<tr>
<td>Column</td>
<td>Vertex &amp; Edge Property</td>
</tr>
<tr>
<td>Relationship</td>
<td>Edge</td>
</tr>
</tbody>
</table>
Jakarta NoSQL Layers

• Communication
  • formerly known as “Diana”

• Mapping
  • formerly known as “Artemis”
Communication Layer

• A set of APIs that defines communications with NoSQL databases

• Contains modules representing the four NoSQL database types

• May be compared to the JDBC APIs in the relational database world
Mapping Layer

- A set of APIs that map Java objects to NoSQL databases
- Incorporates Jakarta CDI and Jakarta Bean Validation specifications
- Annotation driven
- May be compared to JPA and ORM in the relational database world
Scalability vs. Complexity
# Supported NoSQL Databases

<table>
<thead>
<tr>
<th>ArangoDB</th>
<th>Apache TinkerPop</th>
<th>blazegraph</th>
<th>basho</th>
<th>Tom Sawyer Software</th>
<th>cassandra</th>
<th>Couchbase</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Graph™</td>
<td>CouchDB relax</td>
<td>Infinispan</td>
<td>elastic</td>
<td>GRAKN.AI</td>
<td>hazelcast</td>
<td>Apache HBase</td>
</tr>
<tr>
<td>Azure Cosmos DB</td>
<td>Stardog</td>
<td>TITAN</td>
<td>janusGraph</td>
<td>KeyLines Network Insight</td>
<td>LINKURIOUS</td>
<td>MySQL</td>
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<tr>
<td>MongoDB</td>
<td>Solr</td>
<td>SCYLLA</td>
<td>neo4j</td>
<td>ORACLE NOSQL DATABASE</td>
<td>OrientDB</td>
<td>Redis</td>
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<tr>
<td>riak</td>
<td>RAVENDB</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Live Demo
Current Status of Jakarta NoSQL

- In development
- Version 1.0.0-b6
  - compatible with JDK 17 and Jakarta EE
- Targeting Jakarta EE 11 (Q12024) for inclusion on the Jakarta EE Platform
Jakarta Data

- A new Jakarta EE specification!
- Define core APIs for the Jakarta EE platform that would allow applications and other Jakarta EE components to access to data technologies, such as:
  - relational and NoSQL databases
  - cloud-based data services
Jakarta NoSQL Resources

- https://jakarta.ee/specifications/nosql/
- https://www.youtube.com/watch?v=EXQfO-y52_0
- https://www.baeldung.com/eclipse-jnosql
Want to Get Involved?

• Contribute!

• Fork the nosql repository:
  • https://github.com/eclipse-ee4j/nosql
Committers

- Otavio Santana (lead)
- Andres Galante
- Fred Rowe
- Gaurav Gupta
- Ivan Junckes Filho
- Jesse Gallagher
- Nathan Rauh
- Werner Keil
- Michael Redlich
- Leonardo Lima (historical)
- Wayne Beaton (mentor)
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Thanks!