

# Neo4J空间数据存储组织

## Neo4J Spatial 简介

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## 什么是Neo4j?

- **Neo4j**是一个用Java实现、完全兼容**ACID**的图形数据库。数据以一种针对图形网络进行过优化的格式保存在磁盘上。**Neo4j**的内核是一种极快的图形引擎，具有数据库产品期望的所有特性，如恢复、两阶段提交、符合XA等。
- **ACID**，指数据库事务正确执行的四个基本要素的缩写。包含：原子性（**Atomicity**）、一致性（**Consistency**）、隔离性（**Isolation**）、持久性（**Durability**）

<http://www.neo4j.org.cn/2012/07/26/what-is-neo4j/>

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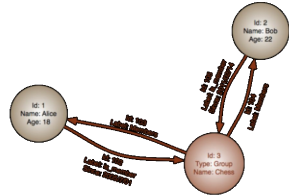
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## 什么是图形数据库？

- a graph database is a database that uses graph structures for semantic queries **with nodes, edges and properties** to represent and store data.



## Neo4J数据存储结构

- **节点**
- 节点是否可用+最近一个关系的Id+最近一个属性的Id
- **关系**
- 是否可用+关系的头节点+关系的尾节点+关系类型+头节点的前一个关系Id+头节点的后一个关系Id+尾节点的前一个关系Id+尾节点的后一个关系Id+关系的最近属性Id
- **属性**
- 是否可用+前一个属性Id+后一个属性Id+属性类型+属性值
- 属性值属于动态存储格式，是否有效+字符长度+下一个块Id

## 数据库操作

- JAVA API
- Cypher查询语言：Neo4j中的SQL
  - START
  - MATCH
  - WHERE
  - RETURN
  - CREATE
  - DELETE
  - SET
  - FOREACH
  - WITH

## Neo4j Spatial简介

- Neo4j Spatial is a **library of utilities** for Neo4j that facilitate the enabling of spatial operations on data.
- In particular you can **add spatial indexes** to already located data, and
- **perform spatial operations** on the data like searching for data within specified regions or within a specified distance of a point of interest.
- In addition classes are provided to expose the data to GeoTools and thereby to **GeoTools-enabled** applications like GeoServer and uDig.

<http://neo4j-contrib.github.io/spatial/>

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## 关键特性

- Utilities for **importing** from ESRI Shapefile as well as Open Street Map files
- Support for **all the common geometry types**: Point, LineString, Polygon, etc.
- An **RTree index** for fast searches on geometries
- Support for **topology operations** during the search
- The possibility to enable spatial operations on any graph of data, **regardless of the way the spatial data is stored**, as long as an adapter is provided to map from the graph to the geometries.
- Ability to **split** a single layer or dataset into multiple sub-layers or views with pre-configured filters

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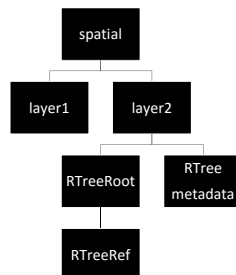
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## 空间数据组织

- Defaultlayer
  - it stores each geometry separately in a single property of a single node. The storage format is WKB
- OSMlayer
  - a special layer supporting Open Street Map and storing the OSM model as a single fully connected graph.



<http://neo4j-contrib.github.io/spatial/>

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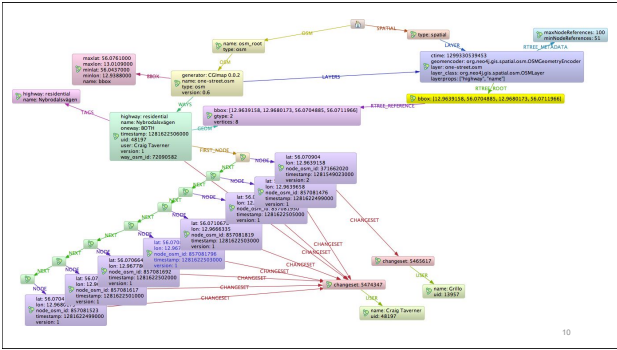
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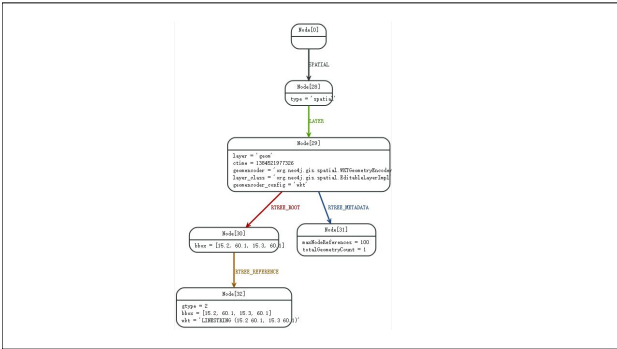
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