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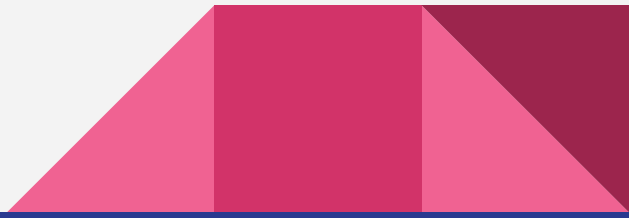
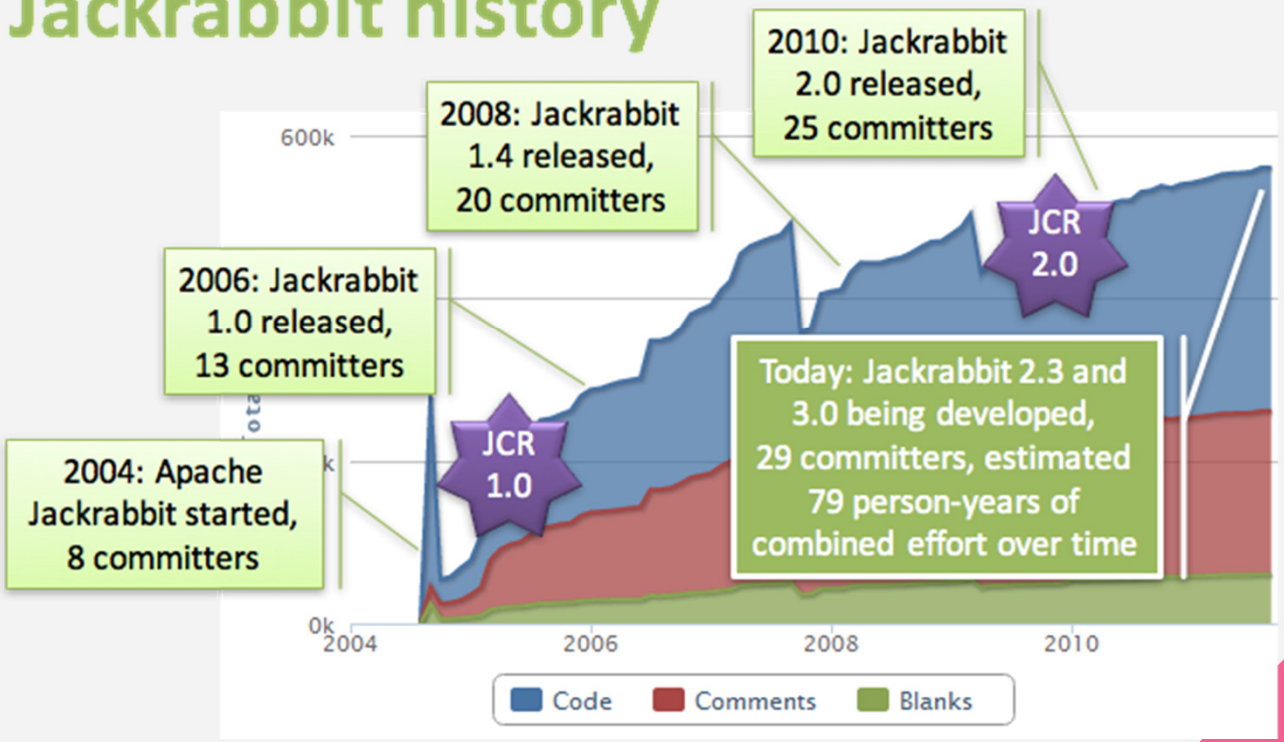
Contents



What is Jackrabbit?

- Open Source content repository for Java.
- Hierarchical data storage
- Full implementation of JCR specification.
- JCR specified in JSR 170 and JSR 283

Jackrabbit history



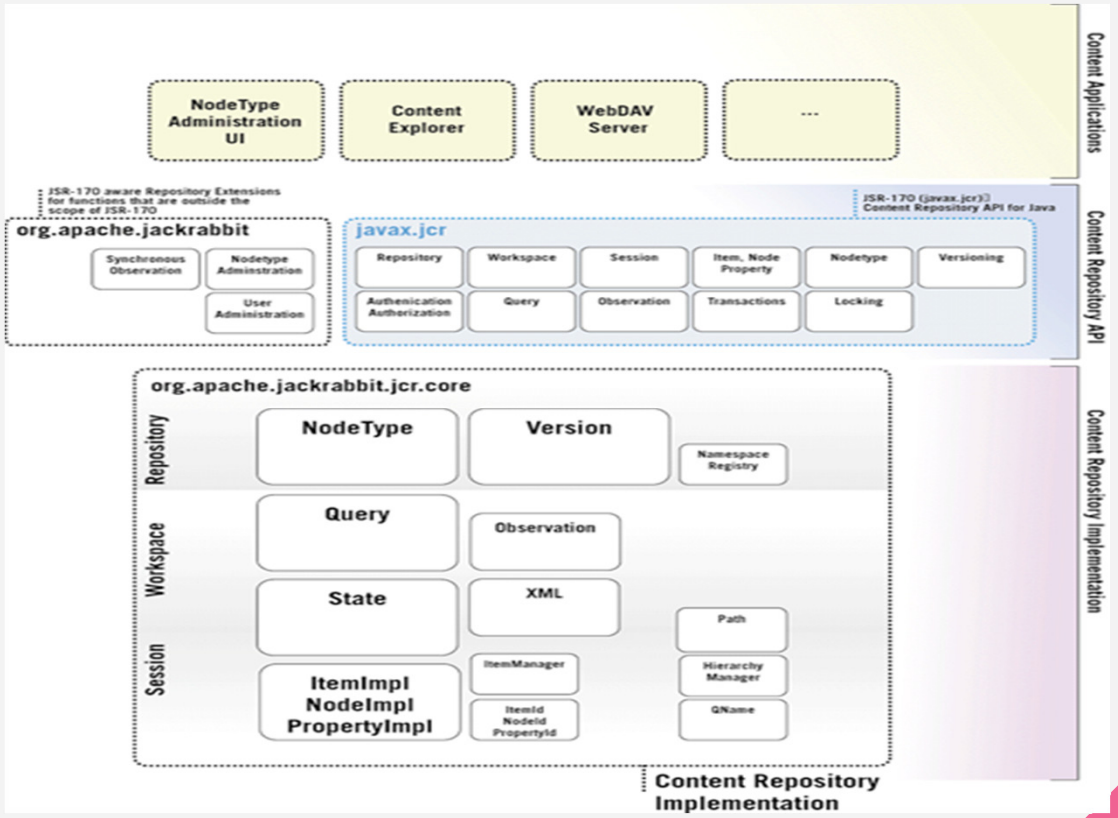
Java Content Repository

- An API for accessing content repository(Jackrabbit)
- Content Repository
- Generic Application Data Store (binary and text data)
- How data is actually stored does not matter.
- Provides storage and retrieval of data.

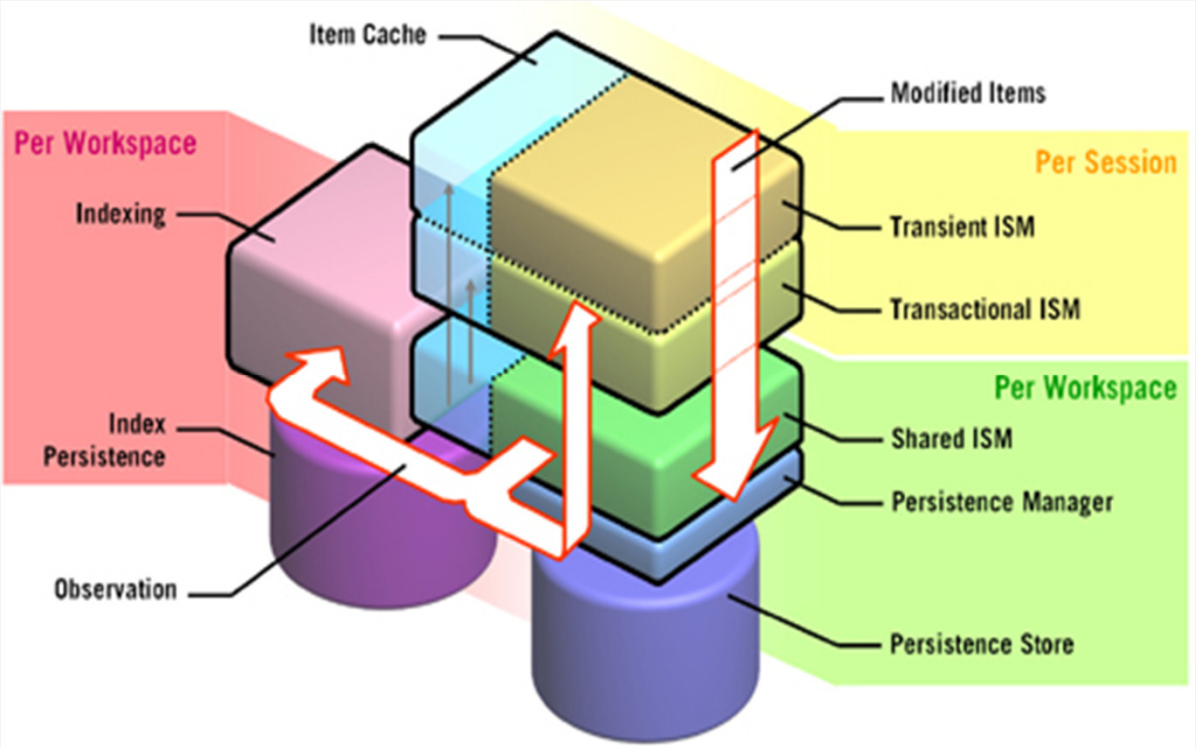
JCR example application

- “How to implement a music store or library with JCR?”
- Designed to showcase JCR features and best practices
- Store and manage individual “tunes”, optionally organized in albums, etc.
- Support alternative views like predefined genres, or more ad-hoc searches
- Integrated handling of reviews, cover images, and other related content
- Staged publishing and timed releases of tunes or albums
- Personalization for things like settings, favorites, personal play-lists, etc.
- Extensibility and flexibility

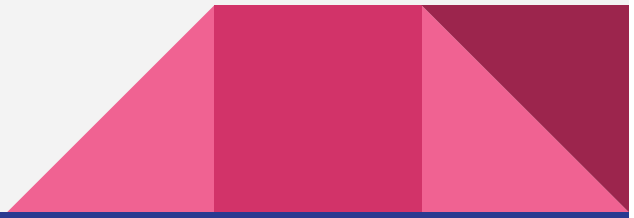
Jackrabbit Architecture



How Jackrabbit works?

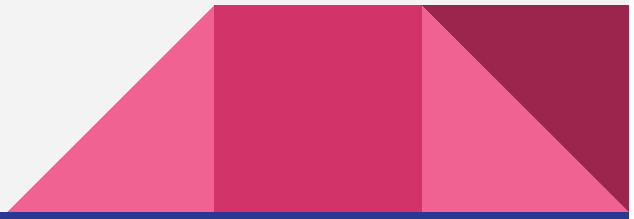


Contents



Features Of Jackrabbit

- Fine and coarse-grained content access
- Structured content/Unstructured Content
- Binary Property
- Query
- Import
- Export



Features Continued

- Referential integrity
- Transactions
- Events
- Locking
- Clustering
- Multiple persistence models

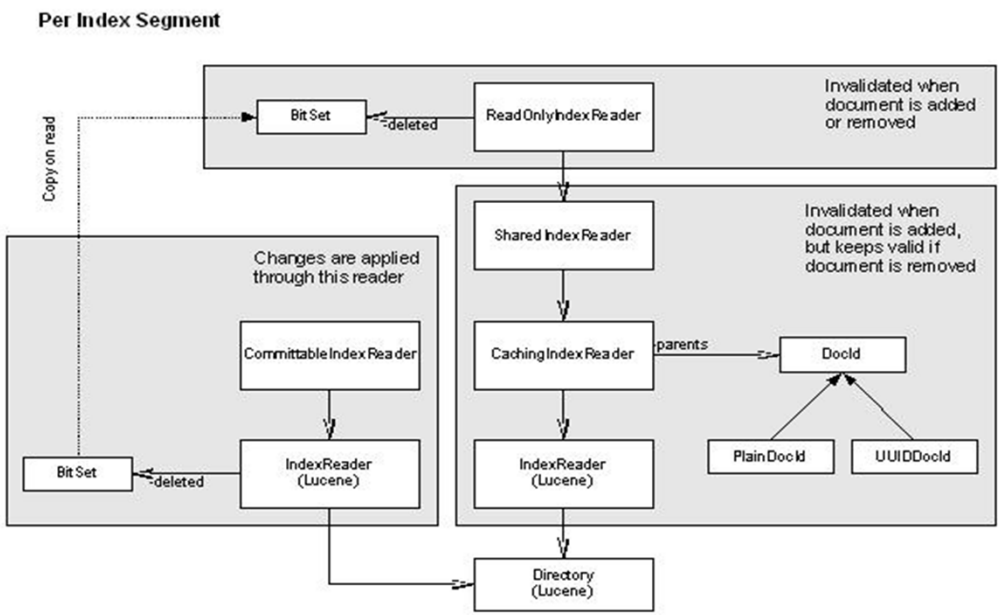
Searching

- Content is indexed
- Configurable per repository
- Support for full text search
- Also binaries indexed with automatic text extraction

Example

SELECT * FROM slingshot:photo WHERE jcr:path LIKE ‘/slingshot/%’ – ..AND jcr:descripNon CONTAINS ’vancouver'

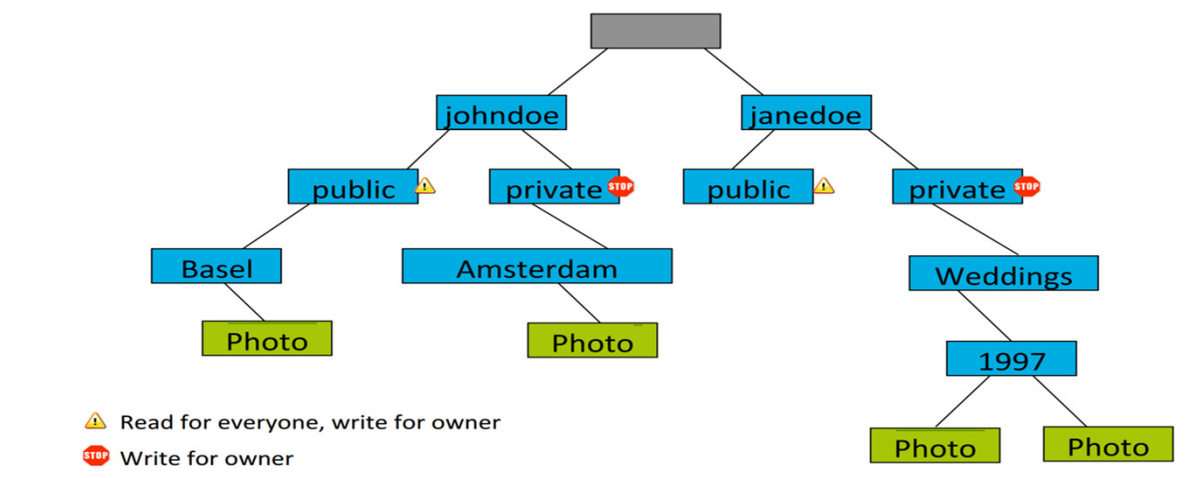
Index Readers



- Jackrabbit uses Lucene as the underlying index implementation
- The extensions also cover features that are not supported by Lucene, like hierarchical queries.

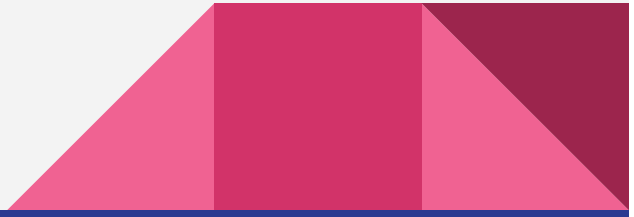
Authentication and Access Control

- Allow/Deny access on a node
- Allows structuring based on access rights



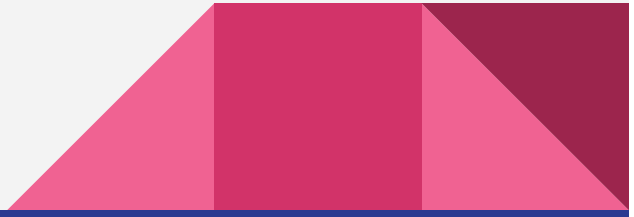
Versioning

- Applications today require versioned data:
- Given a data item, an application must be able to access the current as well as all past versions of that data item.
- Neither relational nor object databases provide standard versioning .
- Keeping track of versions, and making those versions available to applications, is an important repository feature.



Versioning

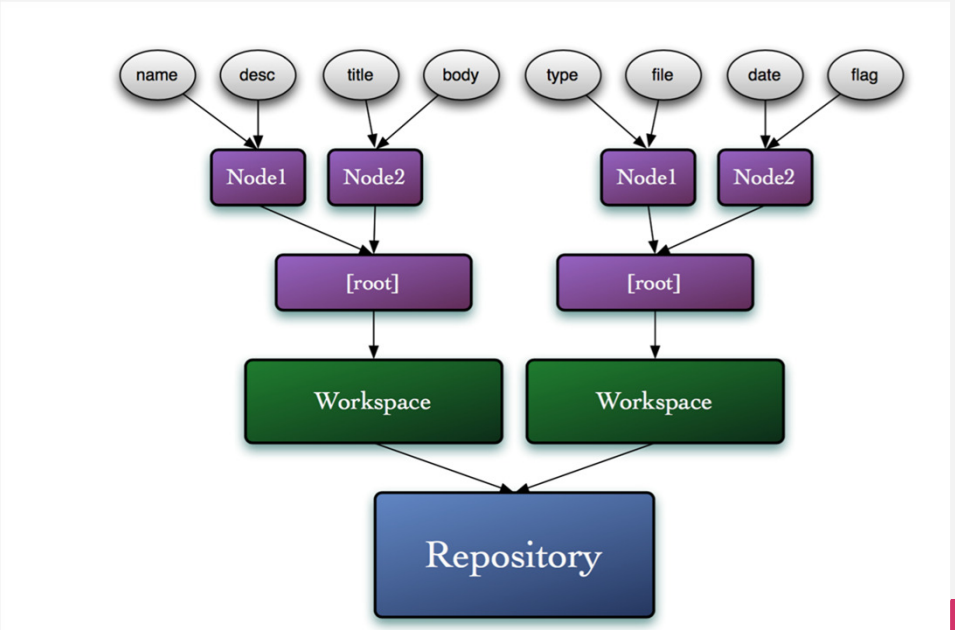
- To make a node versionable, add the *mix:versionable mixin*
- scope of “versionability” determined by node types
- A *checkin* freezes a piece of content and makes a copy of it in the version history
- A *checkout* unfreezes the content and allows it be modified
- A *restore* goes back in time to a previously checked in version
- A *merge* combines changes from another workspace to those made in this workspace



Contents

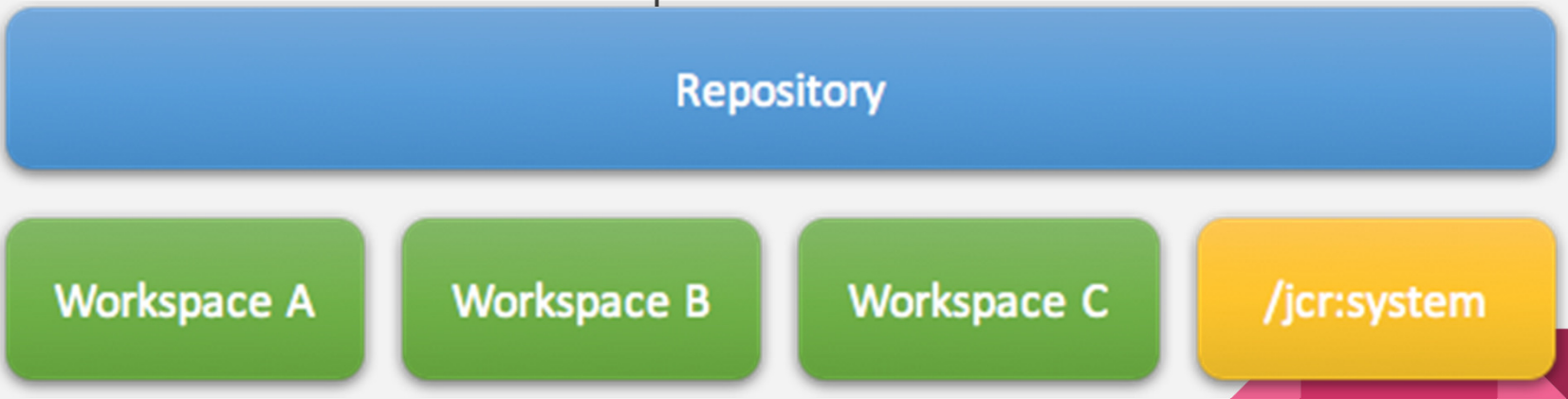
Data Model

- Repository
- Workspace
- Node
- Property



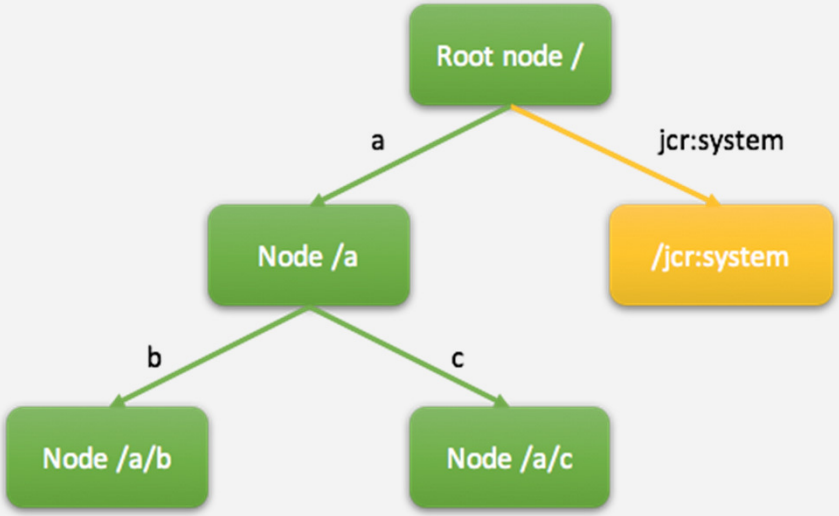
Repository

- Represents the entire content storage .
- Similar to a database server, or a filesystem.
- Consists of one or more workspaces.



Workspace

- Analogous to database, or additional file systems .
- All repositories have a “default” workspace.



Session

- All content access goes through a session
- Sessions are created with authenticated login() call
- Session based authorization of reads, writes
- Tracking of transient changes
- Use multiple sessions for concurrent operations

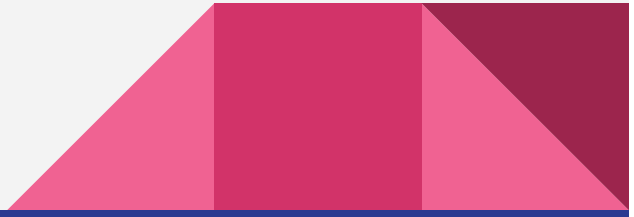
Node

- A node is used to build the path of the data and is similar in concepts to databases,tables and fields.
- Directories and files in a file system.A node can have one primary node type (single inheritance).A node can optionally expose additional behaviors via Mixin types (implement interfaces).

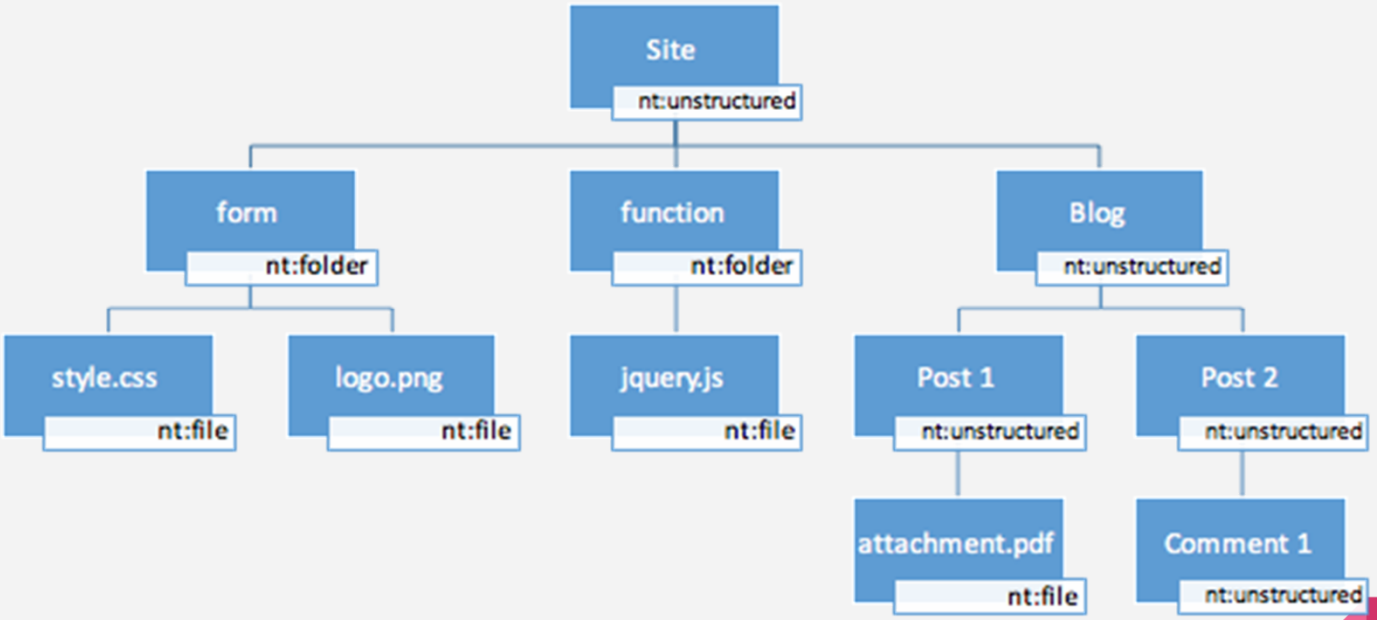
Node Types

Primary type:

nt:unstructured - Most commonly used node type.
nt:base - It specifies the least minimum of content that node must have.
nt:folder - Represents a directory.
nt:file - Represents the contents of a file. Stores binary content such as images,documents.
jcr:content - Mandatory child node of type nt:resource that stores the actual binary content.
jcr:mimeType - Property for MIME type of the binary data.
jcr:encoding - Property used to represent any content encoding scheme for the binary data.
jcr:data - Contains the binary data.
jcr:lastModified - Represents last modification time of the content.



Example


Site
nt:unstructured
form
nt:folder
function
nt:folder
Blog
nt:unstructured
style.css
nt:file
logo.png
nt:file
jquery.js
nt:file
Post 1
nt:unstructured
Post 2
nt:unstructured
attachment.pdf
nt:file
Comment 1
nt:unstructured

Node Types Continued

Mixin Type:

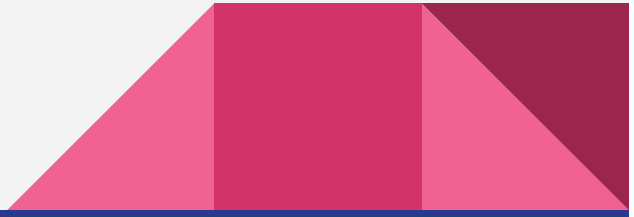
mix:referenceable - Required if the node is to be referenced from other properties. Adds a UUID property to the node.

mix:versionable - Added for use of revision control features for a node.

mix:lockable - To lock/unlock a node to prevent concurrent modifications.

Property

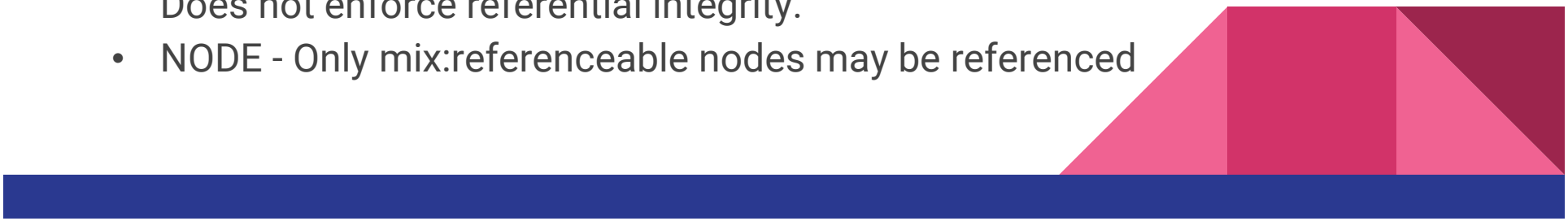
- Represents data associated with a node.
- Conceptually similar to attributes or simple child elements.
- Equivalent to fields, database columns
- Can be single or multi-valued.Properties can reference other nodes/properties.
- Referential integrity checks apply.



Property Types

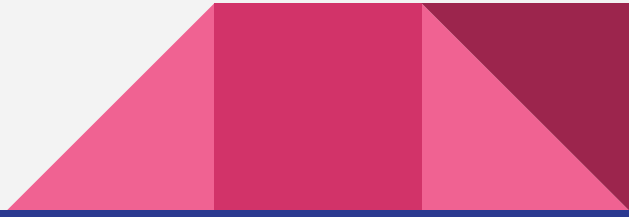
Constants defined in javax.jcr.PropertyType.

- LONG
- DOUBLE
- BINARY - Represents binary data.
- BOOLEAN
- DATE - Stored as a calendar object.
- STRING PATH - Stored as a string and represents the path to another node. Does not enforce referential integrity.
- NODE - Only mix:referenceable nodes may be referenced



Multi-Valued Properties

- Limit at around 10-100k values, depending on size of values
- All values must be of the same type
- Duplicates allowed
- No “null” values
- Automatically removed
- Order is preserved



Contents

Application Development

- **Apache Sling**
- Configuration
- Retrieval

WORKING WITH REPOSITORY

Login into workspace

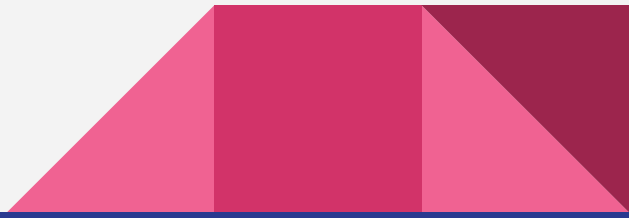
```
 Credentials myCredentials = new SimpleCredentials("USERID",
"PASSWORD".toCharArray());

Session mySession = repository.login(myCredentials, "WORKSPACE");
```

Changing the Content

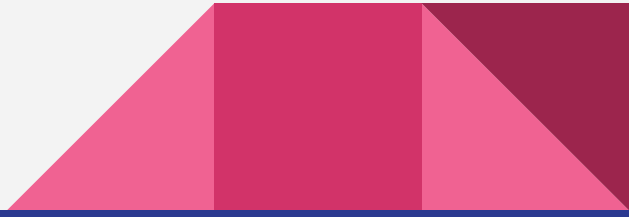
– Add/Remove nodes
– Add/Remove/Change properNes
– Transient space
– Then save

```
// change
albumNode.addNode("newAlbum");
europeNode.setProperty(“jcr:description" , "something");
// save
mySession.save();
// or revert all changes
mySession.refresh(false);
```



Accessing the Node

```
import javax.jcr.Session;
import javax.jcr.Node;
import javax.jcr.NodeType;
import static org.apache.jackrabbit.JcrConstants.∗;
javax . jcr . Session ; javax . jcr .Node; javax . jcr .NodeType;
Node root = session.getRootNode();
Node node1 = root.getNode( ”parent” );
```



TRAVERSING THE CONTENT

From the root or any node

```
Node rootNode = mySession.getRootNode();
Node albumNode = rootNode.getNode("slingshot/albums/travel");
Node europeNode = albumNode.getNode("Europe");
```

Retrieving the Property

```
Property prop = albumNode.getProperty(jcr:description");
Value value = prop.getValue();
String desc = value.getString();
value.getBoolean();
value.getStream();
value.getLong();
value.getDate();
value.getDouble();
```

Retrieval

JCR version 2 :

- JCR_JQOM :
```
Source QueryObjectModel.getSource()
Constraint QueryObjectModel.getConstraint()
Ordering[] QueryObjectModel.getOrderings()
Column[] QueryObjectModel.getColumns()
```
- JCR_SQL2 :
```
Query ::= 'SELECT' columns
'FROM' Source
['WHERE' Constraint]
['ORDER BY' orderings]
```

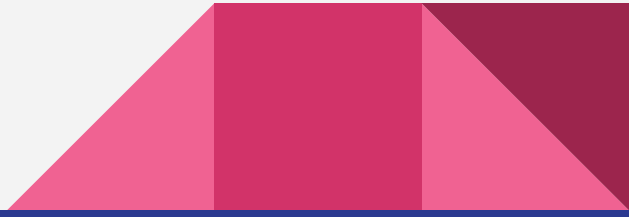
Issues with Jackrabbit

Ways to handle concurrent edits:

1. Merge changes
2. Fail conflicting changes
3. Block concurrent changes

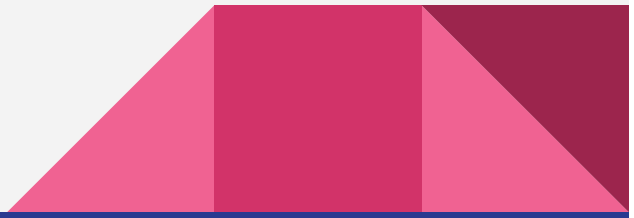
Jackrabbit does 1 by default, 2 when merge fails.
Explicitly opt for 3 by using the JCR locking feature.

Doesn't support very flat content hierarchies. It means problems will occur when you try to put more than 10k child nodes under a single parent node.



Improved Agility

- Elasticity : Ease of adding or removing nodes in distributed data store
- Agility
- JackRabbit offers increased agility with elasticity.
- Hadoop can easily grow its number of servers which Jackrabbit also can.But to cut down the number of servers, hadoop faces a huge problems.



Comparison with RDBMS

- is hierarchical
- is flexible
- uses a standard Java API (e.g., javax.jcr)
- abstracts where the information is really stored
- supports queries and full-text search out of the box

Applications of Jackrabbit


THANK YOU