Queries in AEM. JCR-SQL2

Pavel Nosau

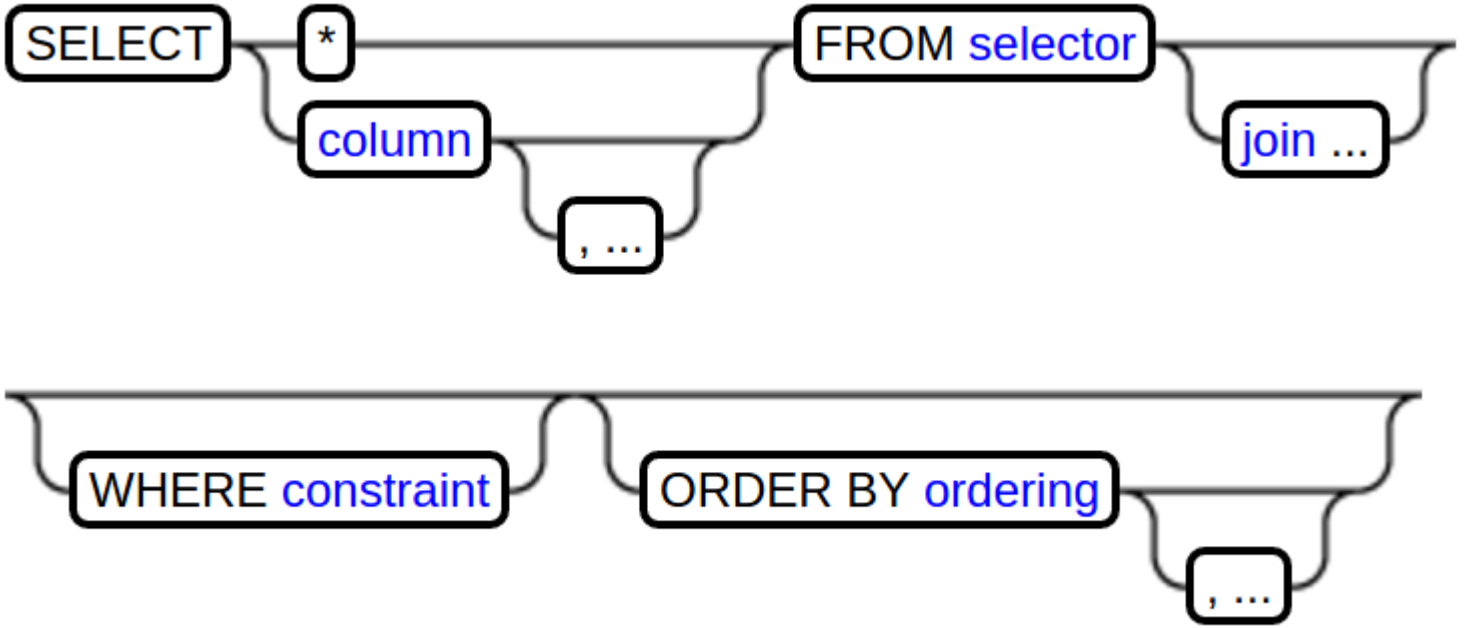
Agenda

Grammar
* AEM specific

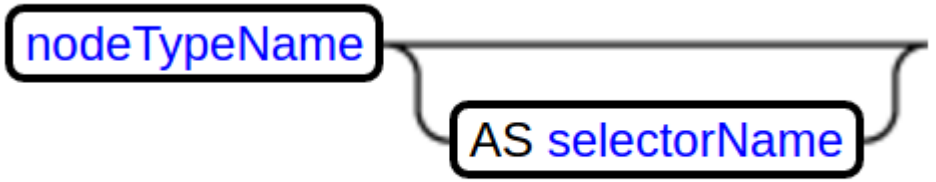
Grammar

http://www.h2database.com/jcr/grammar.html
https://en.wikipedia.org/wiki/Syntax_diagram
http://www.day.com/specs/jcr/2.0/6_Query.html
http://svn.apache.org/viewvc/jackrabbit/trunk/jackrabbit-spi-commons/src/test/resources/org/apache/jackrabbit/spi/commons/query/sql2/test.sql2.txt?view=markup

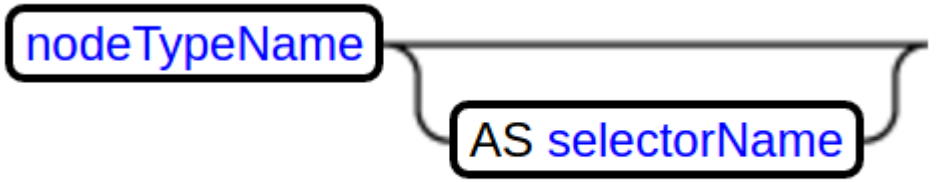
Grammar:Query structure



Grammar:Selector

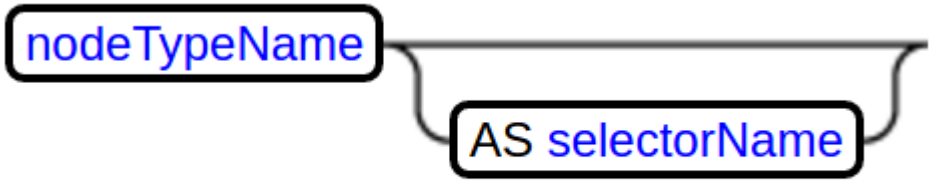


Grammar:Selector



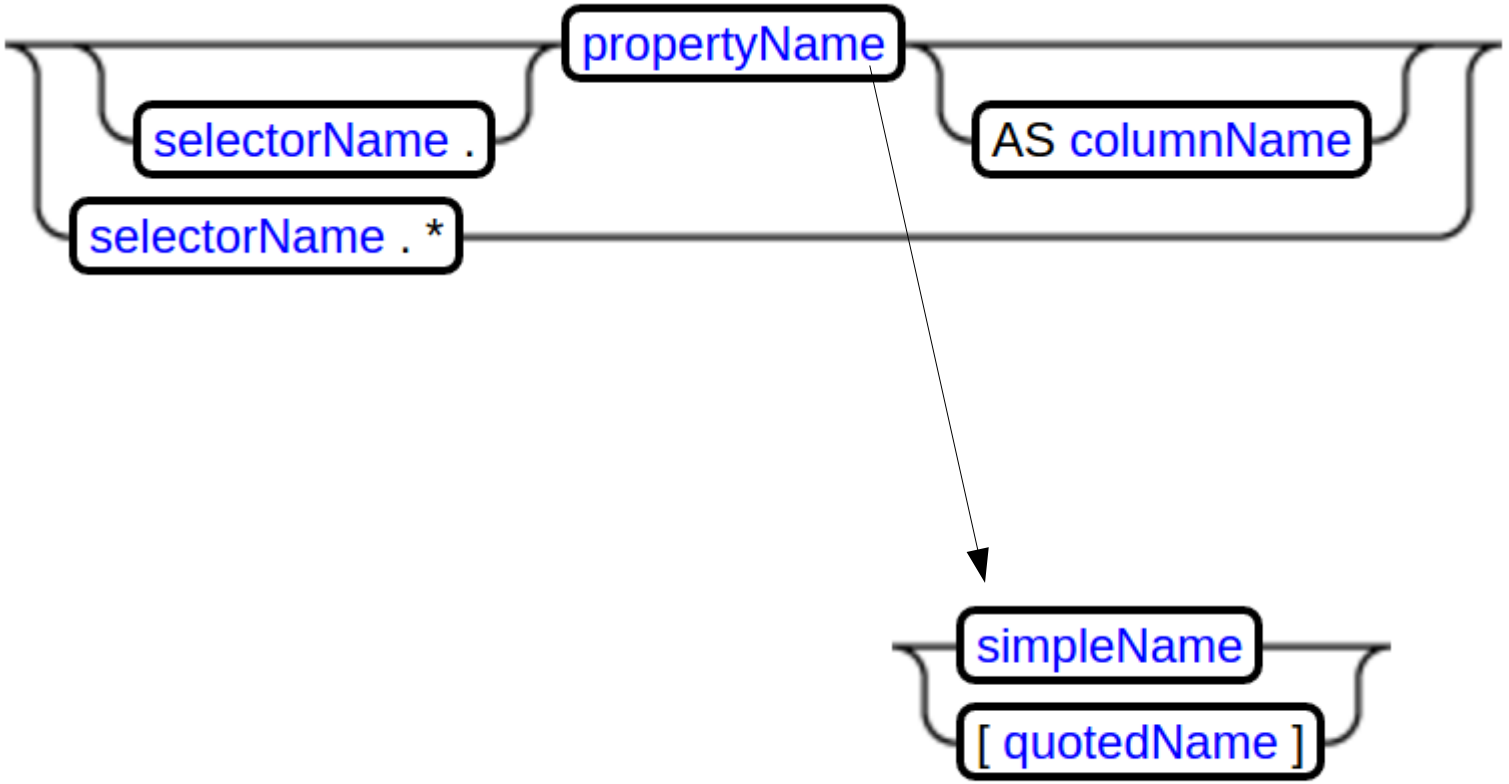
http://{host}:{port}/crx/explorer/nodetypes/index.jsp

Grammar:Selector

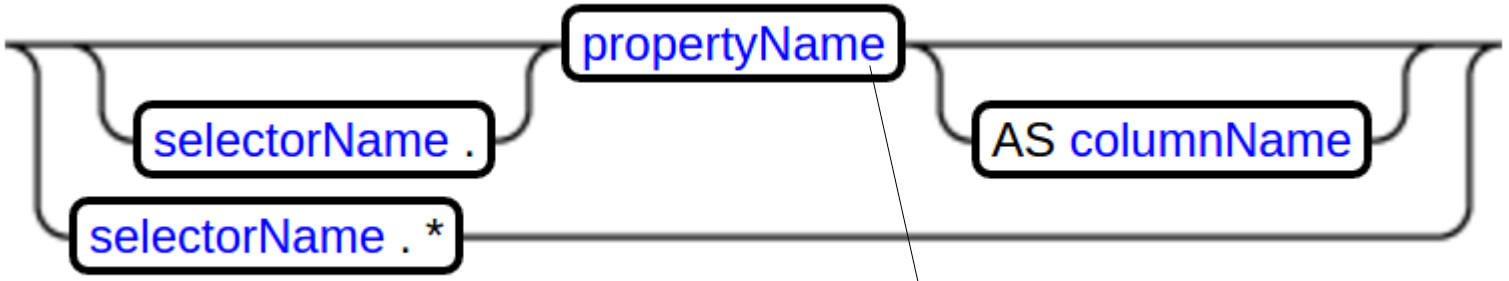



```
… FROM [nt:base] ...
… FROM [nt:unstructured] AS parent ...
```

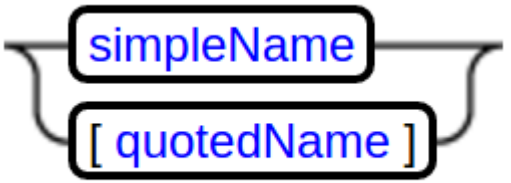
Grammar:Column



Grammar:Column



SELECT * FROM ...
SELECT s.* FROM [nt:base] AS s ...
SELECT title, description FROM …
SELECT title, [jcr:title] FROM ...
SELECT s.title, s.[jcr:title] FROM [nt:base] AS s ...
SELECT s.[jcr:title] AS t FROM [nt:base] AS s ...



Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT  * FROM [cq:Page]
WHERE  ISCHILDNODE( '/content/geometrixx/en/toolbar')
```

Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT  * FROM [cq:Page]
WHERE  ISCHILDNODE( '/content/geometrixx/en/toolbar')
```

#	cq:Page.jcr:primaryType	cq:Page.jcr:createdBy	cq:Page.jcr:created
1	cq:Page	admin	2016-04-23T11:09:41.723+03:00
2	cq:Page	admin	2016-04-23T11:09:41.792+03:00
3	cq:Page	admin	2016-04-23T11:09:41.682+03:00
4	cq:Page	admin	2016-04-23T11:09:41.787+03:00
5	cq:Page	admin	2016-04-23T11:09:41.711+03:00
6	cq:Page	admin	2016-04-23T11:09:41.726+03:00
7	cq:Page	admin	2016-04-23T11:09:41.713+03:00
8	cq:Page	admin	2016-04-23T11:09:41.717+03:00

Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT p.* FROM [cq:Page] AS p
WHERE  ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT p.* FROM [cq:Page] AS p
WHERE  ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

#	p.jcr:primaryType	p.jcr:createdBy	p.jcr:created
1	cq:Page	admin	2016-04-23T11:09:41.723+03:00
2	cq:Page	admin	2016-04-23T11:09:41.792+03:00
3	cq:Page	admin	2016-04-23T11:09:41.682+03:00
4	cq:Page	admin	2016-04-23T11:09:41.787+03:00
5	cq:Page	admin	2016-04-23T11:09:41.711+03:00
6	cq:Page	admin	2016-04-23T11:09:41.726+03:00
7	cq:Page	admin	2016-04-23T11:09:41.713+03:00
8	cq:Page	admin	2016-04-23T11:09:41.717+03:00

Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT
    p.[jcr:primaryType] AS primaryType,
    p.[jcr:createdBy] AS createdBy,
    p.[jcr:created] AS created
FROM [cq:Page]  AS p
    WHERE ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

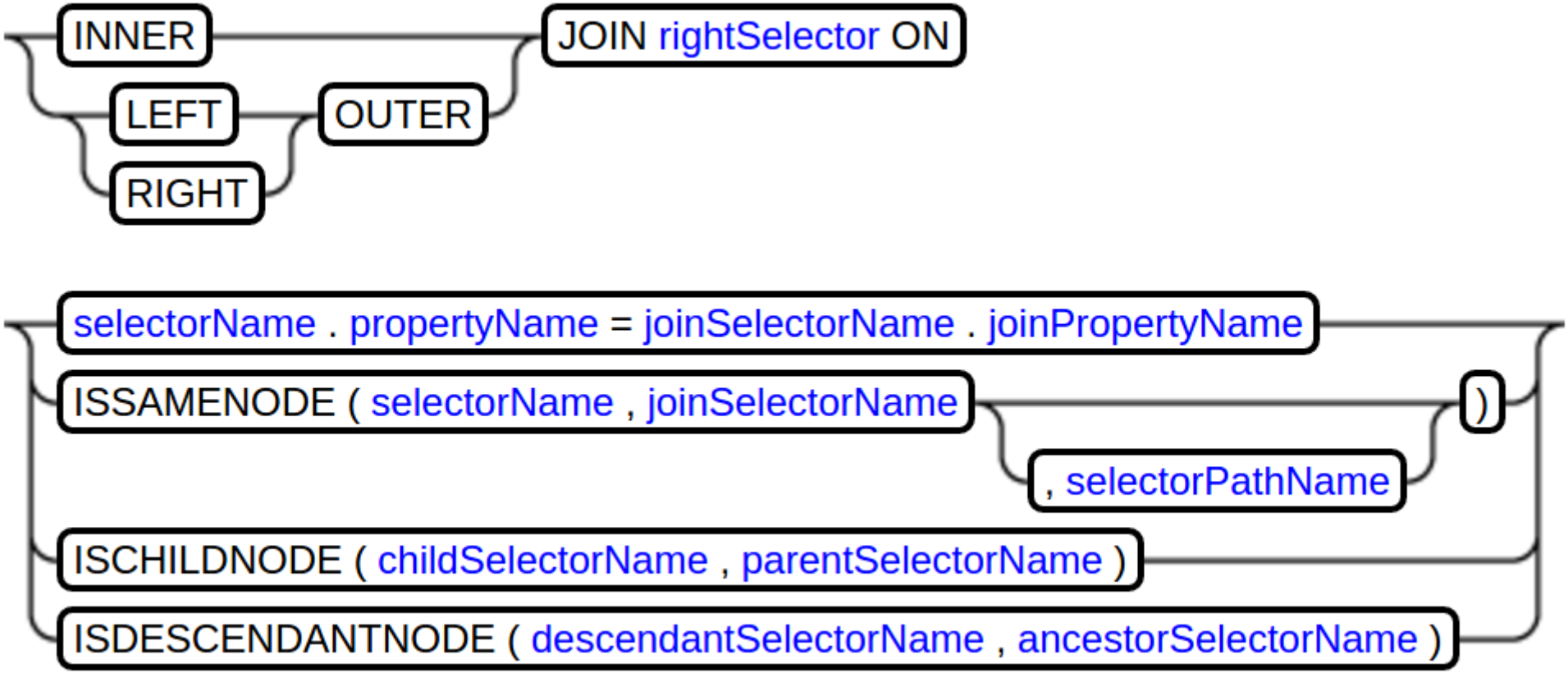
Column and Table View

```
Query query = queryManager.createQuery(sqlStatement,"JCR-SQL2");
QueryResult result = query.execute();
String[] columnNames = result.getColumnNames();
RowIterator rowIterator = result.getRows();
```

```
SELECT
    p.[jcr:primaryType] AS primaryType,
    p.[jcr:createdBy] AS createdBy,
    p.[jcr:created] AS created
FROM [cq:Page]  AS p
    WHERE ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

#	primaryType	createdBy	created
1	cq:Page	admin	2016-04-23T11:09:41.723+03:00
2	cq:Page	admin	2016-04-23T11:09:41.792+03:00
3	cq:Page	admin	2016-04-23T11:09:41.682+03:00
4	cq:Page	admin	2016-04-23T11:09:41.787+03:00
5	cq:Page	admin	2016-04-23T11:09:41.711+03:00
6	cq:Page	admin	2016-04-23T11:09:41.726+03:00
7	cq:Page	admin	2016-04-23T11:09:41.713+03:00
8	cq:Page	admin	2016-04-23T11:09:41.717+03:00

Grammar:Join



Grammar:Join

http://www.day.com/specs/jcr/2.0/6_Query.html#6.7.5 Join

If left evaluates to L, a set of m-tuples, and right evaluates to R, a set of n-tuples, then the join evaluates to J, a set of (m + n)-tuples. The members of J depend on thejoinType and joinCondition.

Let L x R be the Cartesian product of L and R as a set of (m + n)-tuples

L x R = { ℓ ^ r : ℓ ∈ L, r ∈ R }

and σ c(A) be the selection over A of its members satisfying joinCondition c

σ c(A) = { a : a ∈ A, c(a) }

Then if joinType is Inner:

J = σ c(L x R)

Otherwise, if joinType is LeftOuter:

J = σ c(L x R) ∪ (L – πL(σ c(L x R)))

where πL(σ c(L x R)) is the projection of the m-tuples contributed by L from the (m + n)-tuples of σ c(L x R).

Otherwise, if joinType is RightOuter:

J = σ c(L x R) ∪ (R – πR(σ c(L x R)))

where πR(σ c(L x R)) is the projection of the n-tuples contributed by R from the (m + n)-tuples of σ c(L x R).

The query is invalid if left is the same source as right.

Grammar:Join

If left evaluates to L, a set of m-tuples, and right evaluates to R, a set of n-tuples, then the join evaluates to J, a set of (m + n)-tuples. The members of J depend on thejoinType and joinCondition.

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L x R = { ℓ ^ ⊏r : ℓ ⊐ ⊏L, r ⊐ ⊏R }

and ⊜ c(A) be the selection ov

⊜ c(A) = { a : a ⊐ ⊏A, ⊜c(a) }

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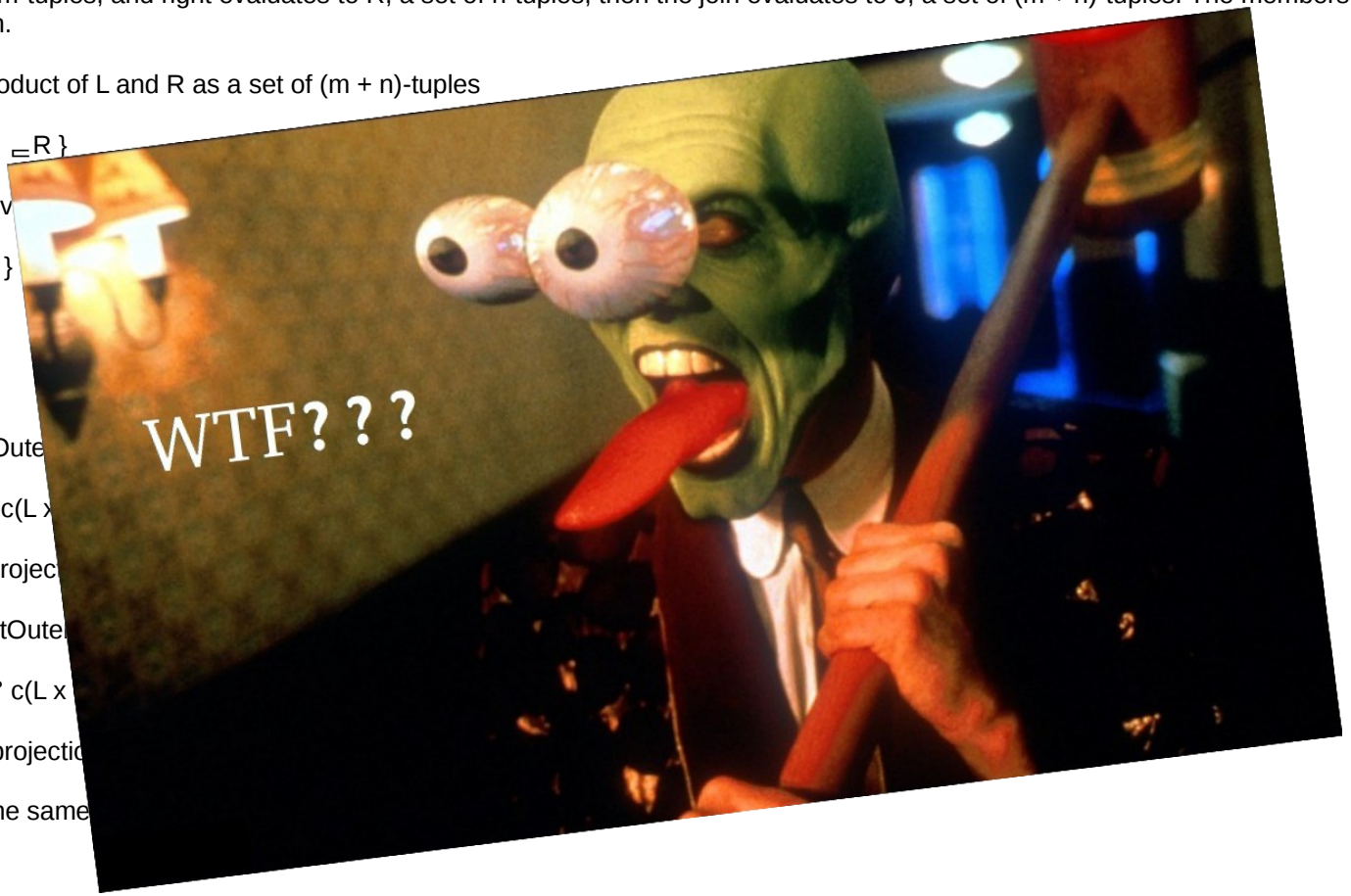
where πL(⊜ c(L x R)) is the projec

Otherwise, if joinType is RightOute

J = ⊜ c(L x R) ^ ⊏(R – πR(⊜ c(L x

where πR(⊜ c(L x R)) is the projecti

The query is invalid if left is the same



Grammar:Join

If left evaluates to L, [illegible] of m-tuples, and right evaluates to R, a set of n-tuples, then the join evaluates to J, a set of (m + n)-tu[illegible]he members of J depend on thejoinType and joinCon[illegible]

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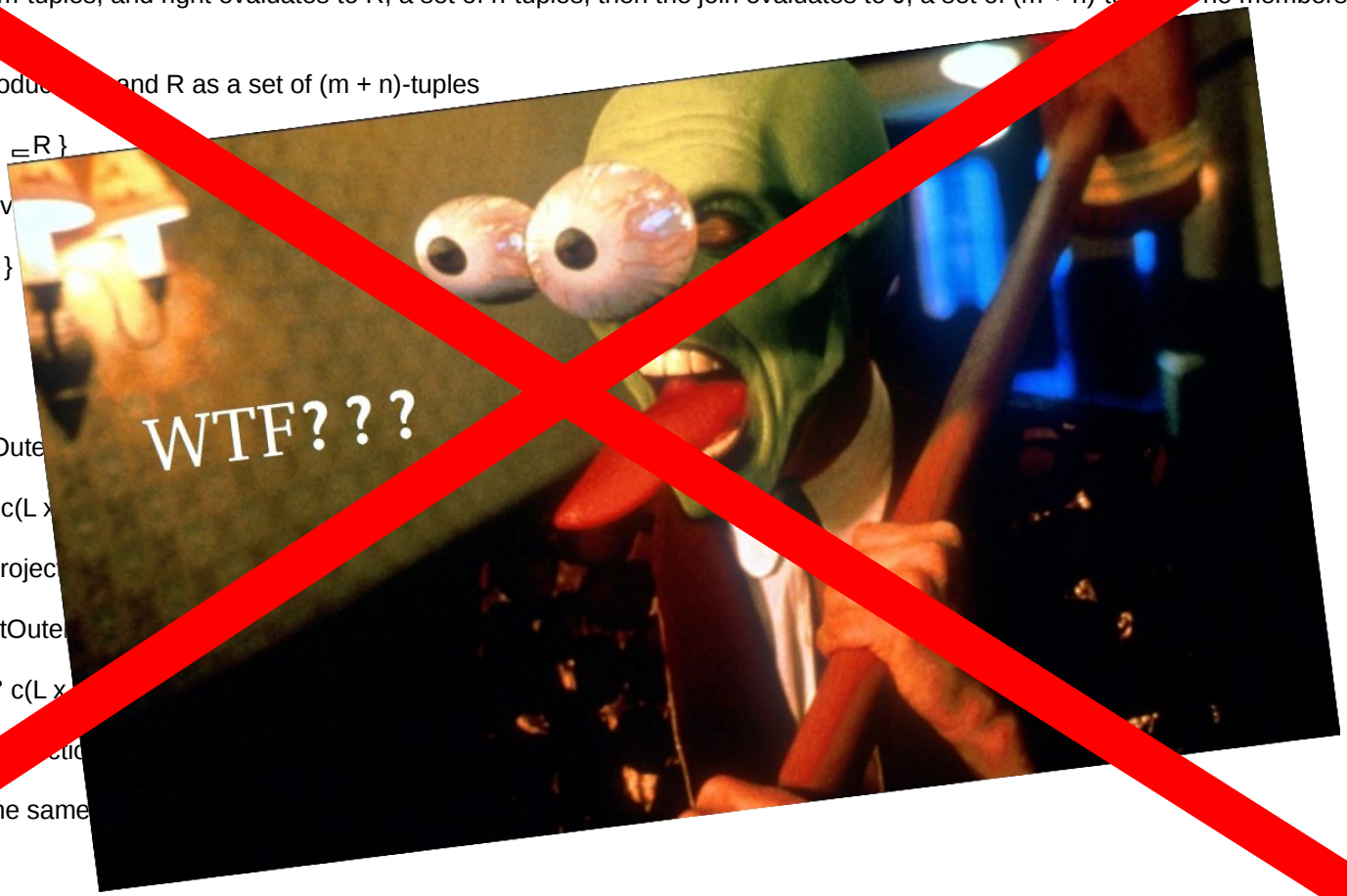
where πL(⊜ c(L x R)) is the projec[illegible]

Otherwise, if joinType is RightOute[illegible]

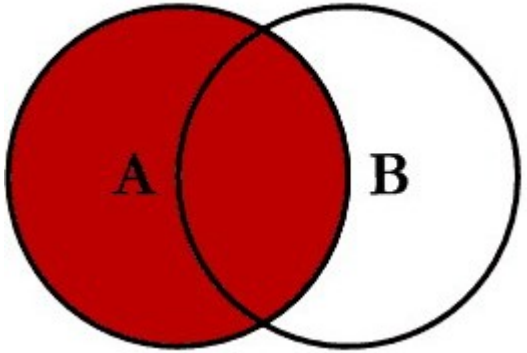
J = ⊜ c(L x R) ^ ⊏(R – πR(⊜ c(L x[illegible]

where πR(⊜ c(L x R)) is the[illegible]

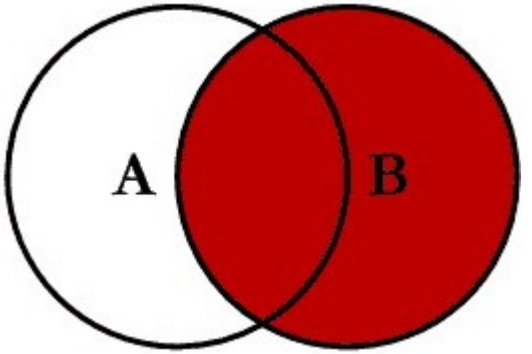
The query is invalid[illegible]s the same



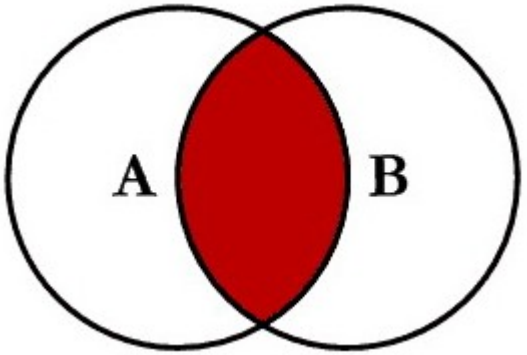
Grammar:Join



… FROM [nt:base] AS A
LEFT OUTER JOIN [nt:base] AS B ON ...

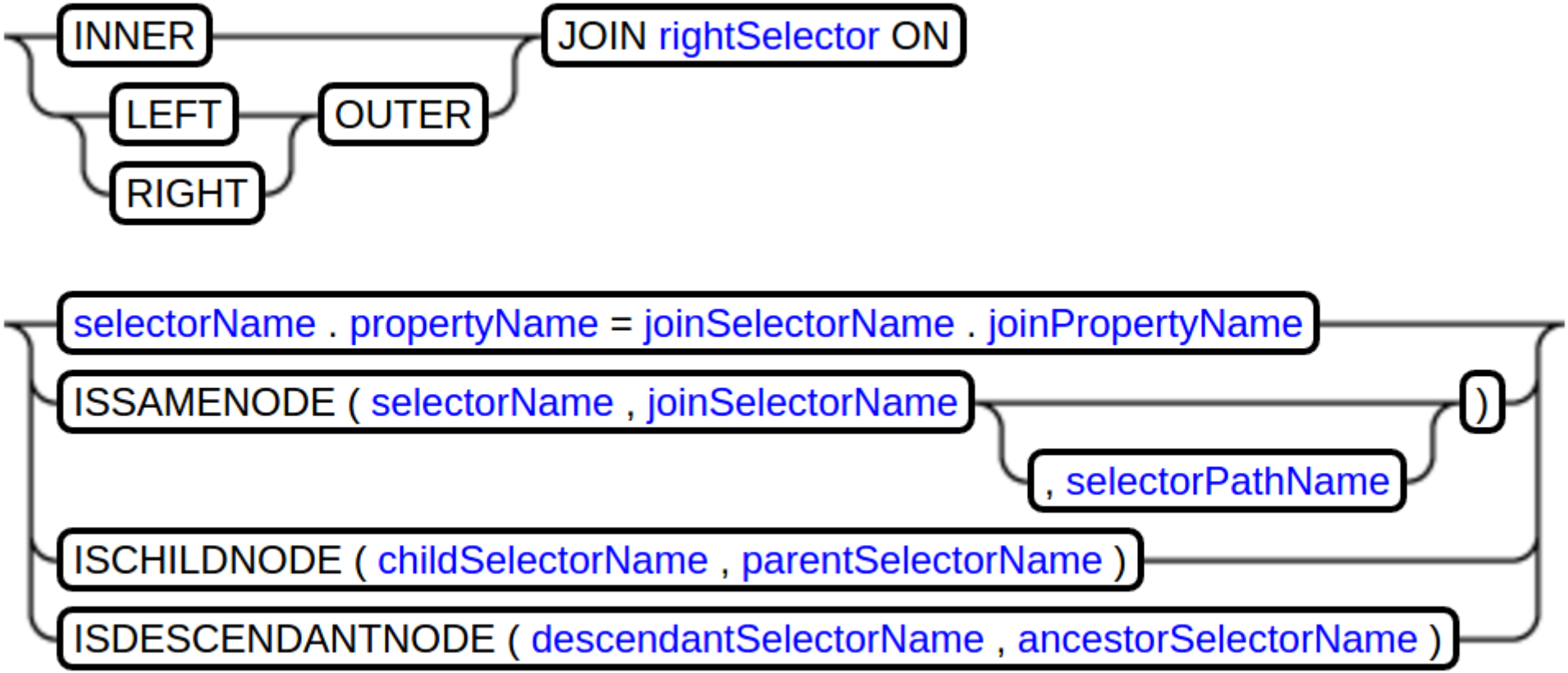


… FROM [nt:base] AS A
RIGHT OUTER JOIN [nt:base] AS B ON ...



… FROM [nt:base] AS A
INNER JOIN [nt:base] AS B ON ...

Grammar:Join



Grammar:Join:ISSAMENODE

```
… [cq:Page] AS selectorName INNER JOIN [nt:base] AS joinSelectorName ON
ISSAMENODE(selectorName, joinSelectorName) ...
```

selectorNode.isSame(joinSelectorNode);

```
… [cq:Page] AS selectorName INNER JOIN [nt:base] AS joinSelectorName ON
ISSAMENODE(selectorName, joinSelectorNam, 'selectorPathName') ...
```

selectorNode.isSame(joinSelectorNode.getNode(selectorPathName));

Grammar:Join:ISSAMENODE

```
SELECT p.[jcr:path], pc.[jcr:path] FROM [cq:Page] AS p
    INNER JOIN [nt:base] AS pc ON ISSAMENODE(pc, p, 'jcr:content')
    WHERE ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

#	p.jcr:path	pc.jcr:path
1	/content/geometrixx/en/toolbar/newsletter	/content/geometrixx/en/toolbar/newsletter/jcr:content
2	/content/geometrixx/en/toolbar/sitemap	/content/geometrixx/en/toolbar/sitemap/jcr:content
3	/content/geometrixx/en/toolbar/account	/content/geometrixx/en/toolbar/account/jcr:content
4	/content/geometrixx/en/toolbar/search	/content/geometrixx/en/toolbar/search/jcr:content
5	/content/geometrixx/en/toolbar/blog	/content/geometrixx/en/toolbar/blog/jcr:content
6	/content/geometrixx/en/toolbar/profiles	/content/geometrixx/en/toolbar/profiles/jcr:content
7	/content/geometrixx/en/toolbar/contacts	/content/geometrixx/en/toolbar/contacts/jcr:content
8	/content/geometrixx/en/toolbar/feedback	/content/geometrixx/en/toolbar/feedback/jcr:content

Grammar:Join:ISSAMENODE

```
SELECT p.[jcr:path], pc.[jcr:path] FROM [cq:Page] AS p
    INNER JOIN [nt:base] AS pc ON ISSAMENODE(pc, p, 'jcr:content/par')
    WHERE ISCHILDNODE(p, '/content/geometrixx/en/toolbar')
```

#	p.jcr:path	pc.jcr:path
1	/content/geometrixx/en/toolbar/newsletter	/content/geometrixx/en/toolbar/newsletter/jcr:content/par
2	/content/geometrixx/en/toolbar/sitemap	/content/geometrixx/en/toolbar/sitemap/jcr:content/par
3	/content/geometrixx/en/toolbar/search	/content/geometrixx/en/toolbar/search/jcr:content/par
4	/content/geometrixx/en/toolbar/profiles	/content/geometrixx/en/toolbar/profiles/jcr:content/par
5	/content/geometrixx/en/toolbar/contacts	/content/geometrixx/en/toolbar/contacts/jcr:content/par
6	/content/geometrixx/en/toolbar/feedback	/content/geometrixx/en/toolbar/feedback/jcr:content/par

Grammar:Join:ISCHILDNODE

… [cq:Page] AS selectorName INNER JOIN [nt:base] AS joinSelectorName ON ISCHILDNODE(childSelectorName, parentSelectorName) ...

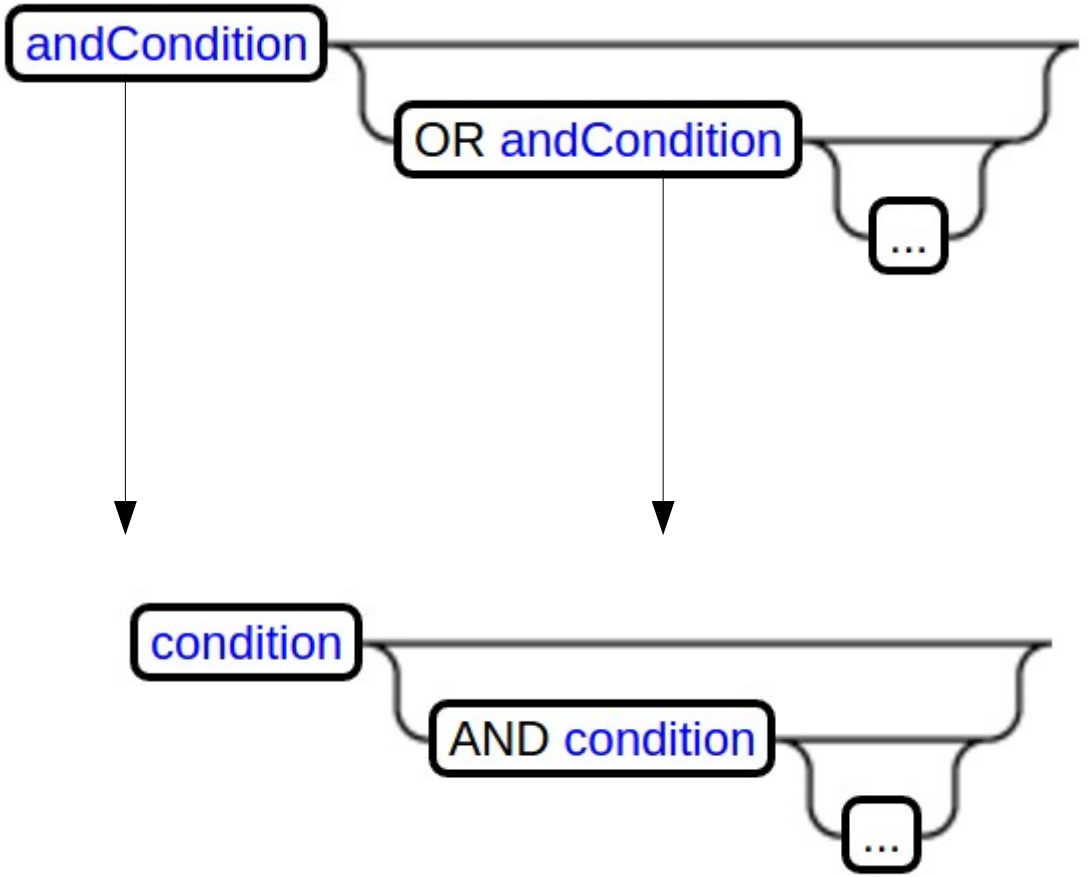
childSelectorNode.getParent().isSame(parentSelectorNode)

Grammar:Join:ISDESCENDANTNODE

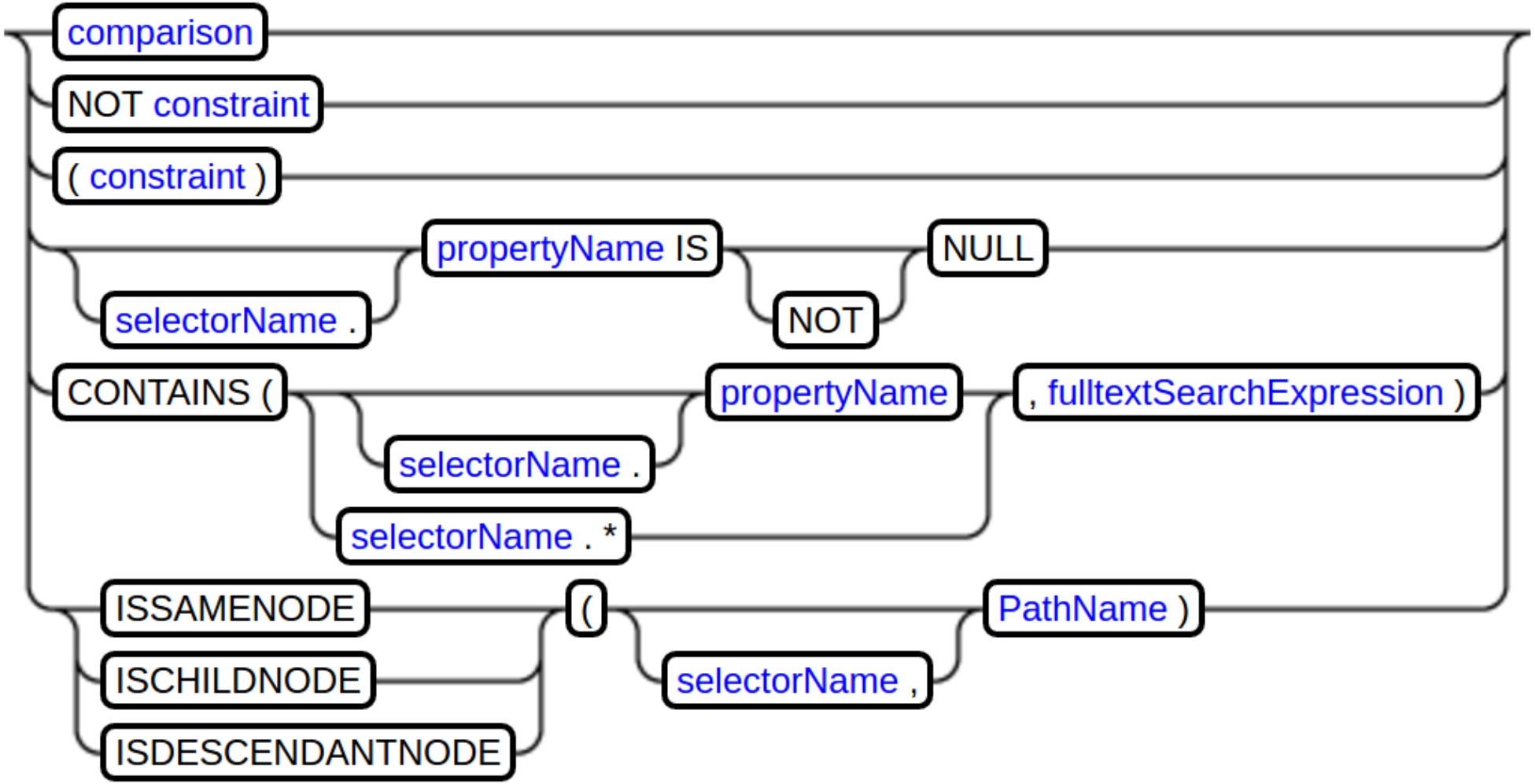
```
… [cq:Page] AS ancestorSelectorName INNER JOIN [nt:base] AS
descendantSelectorName ON ISDESCENDANTNODE(descendantSelectorName,
ancestorSelectorName) ...
```

descendantSelectorNode.getAncestor(n).isSame(ancestorSelectorNode) &&
descendantSelectorNode.getDepth() > n

Grammar:Constraint, And Condition



Grammar:Condition



Grammar:Condition

Class	Constraint Production	JCR-SQL2 Syntax
1		`()` *(grouping with parentheses)*

2	`Comparison`
	`PropertyExistence`
	`FullTextSearch`
	`SameNode`
	`ChildNode`
	`DescendantNode`
		`=` , `<>`, `<`, `<=`, `>`, `>=`, `LIKE`
		`IS NOT NULL`
		`CONTAINS()`
		`ISSAMENODE()`
		`ISCHILDNODE()`
		`ISDESCENDANTNODE()`

3	`Not`	`NOT`
4	`And`	`AND`
5	`Or`	`OR`

Grammar:Condition

```
SELECT * FROM [cq:Page] AS page
  INNER JOIN [nt:base] AS node ON ISDESCENDANTNODE(node, page)
  WHERE ISDESCENDANTNODE(page, node.test)
```

Path
java.text.ParseException: Query: SELECT node.[jcr:path] FROM [cq:Page] AS page INNER JOIN [nt:base] AS node ON ISDESCENDANTNODE(node, page) WHERE ISDESCENDANTNODE(page, node.(*)test); expected: absolute path

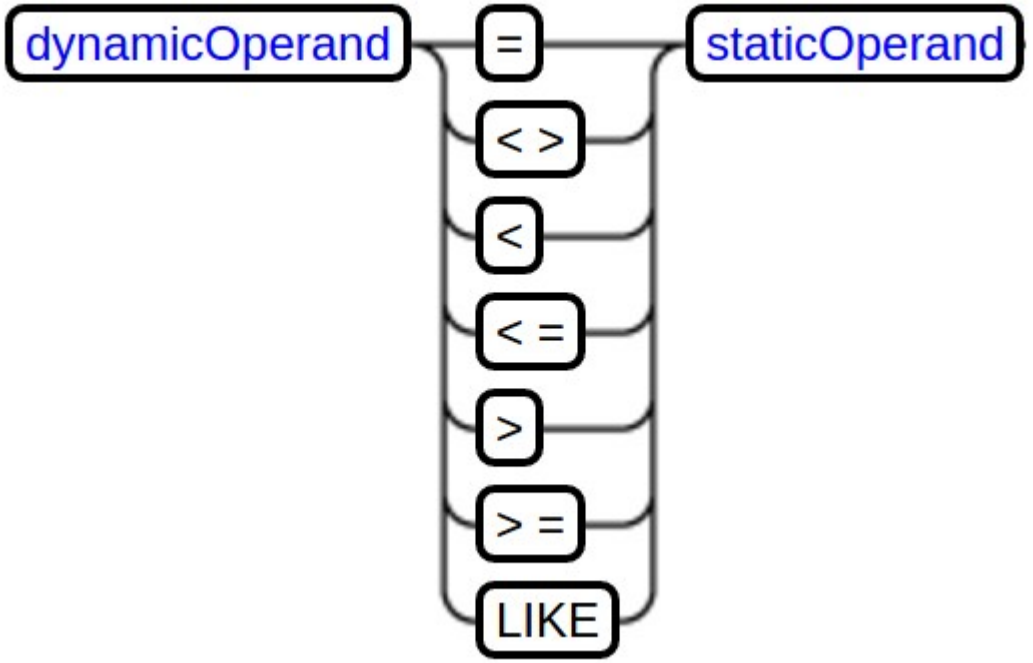
Execution Info: 289 results (1msec)

```
SELECT * FROM [cq:Page] AS page
  INNER JOIN [nt:base] AS node ON ISDESCENDANTNODE(node, page)
  WHERE ISDESCENDANTNODE(page, '/content/geometrixx/en/toolbar')
```

	Path
1	/content/geometrixx/en/toolbar/sitemap
2	/content/geometrixx/en/toolbar/account/register/thank_you
3	/content/geometrixx/en/toolbar/account/register
4	/content/geometrixx/en/toolbar/account/accountrequest/thank_you

Execution Info: 289 results (2msec)

Grammar:Comparison



Grammar:Comparison

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND
   [jcr:path] LIKE '/content/geometrixx/en/toolbar/jcr_content'
```

	Path
1	/content/geometrixx/en/toolbar/jcr:content

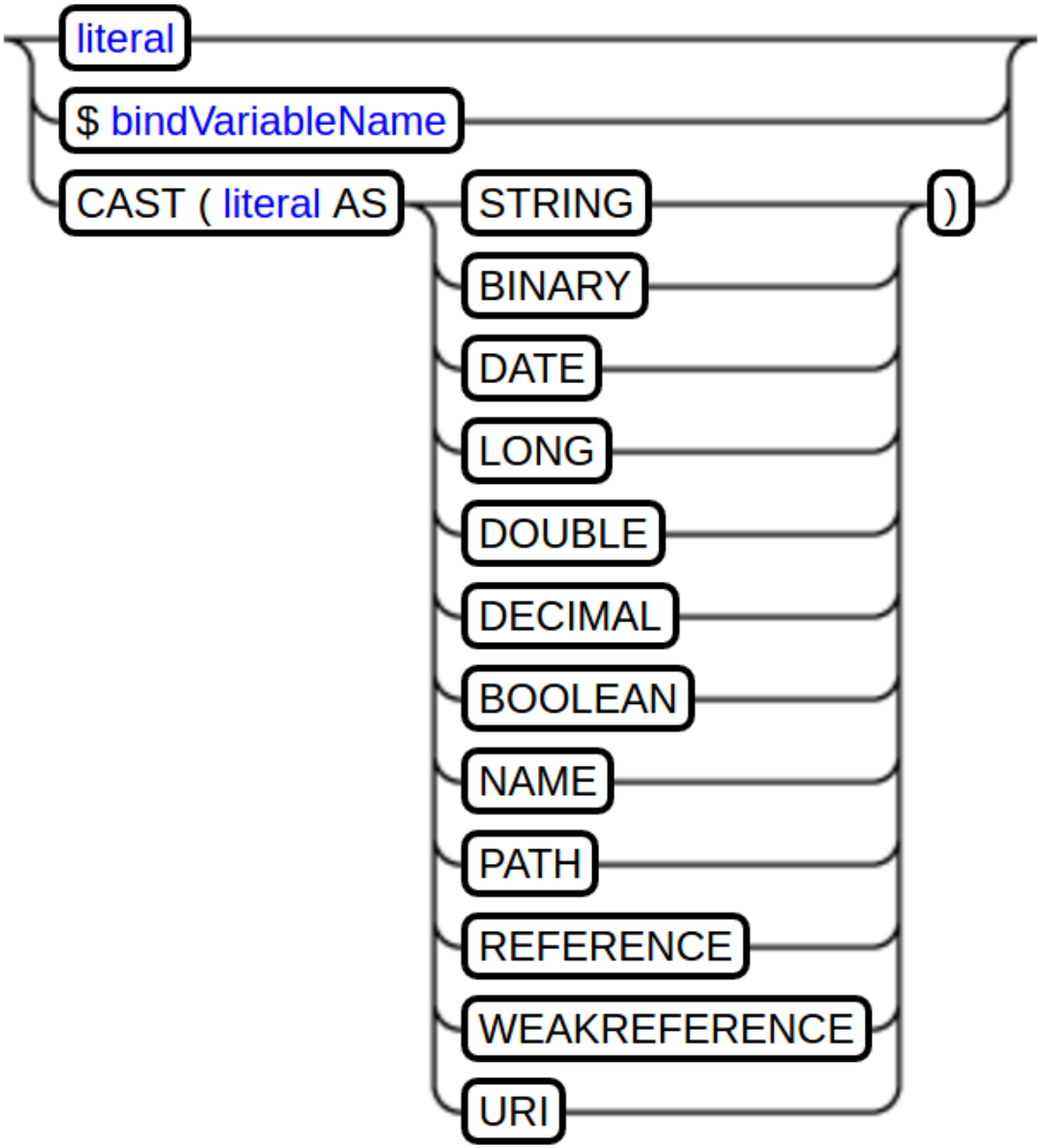
Execution Info: 1 results (1msec)

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND
   [jcr:path] LIKE '/content/geometrixx/en/toolbar/jcr_content%'
```

	Path
1	/content/geometrixx/en/toolbar/jcr:content
2	/content/geometrixx/en/toolbar/jcr:content/par
3	/content/geometrixx/en/toolbar/jcr:content/rightpar
4	/content/geometrixx/en/toolbar/jcr:content/rightpar/iparsys_fake_par

Execution Info: 4 results (2msec)

Grammar:Static Operands



Grammar:Static Operands

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND
   [cq:lastModified] > CAST('2016-04-26T23:51:02.000+03:00' AS DATE)
```

	Path
1	/content/geometrixx/en/toolbar/jcr:content

Execution Info: 1 results (1msec)

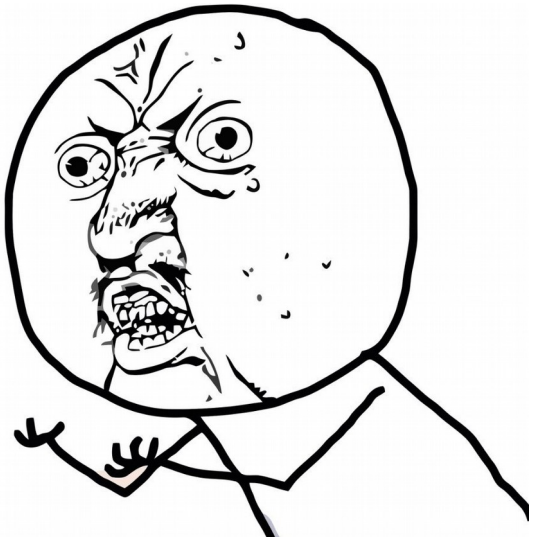
Grammar:Static Operands

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND
   [cq:lastModified] > CAST('2016-04-26T23:51:02.000+03:00' AS DATE)
```

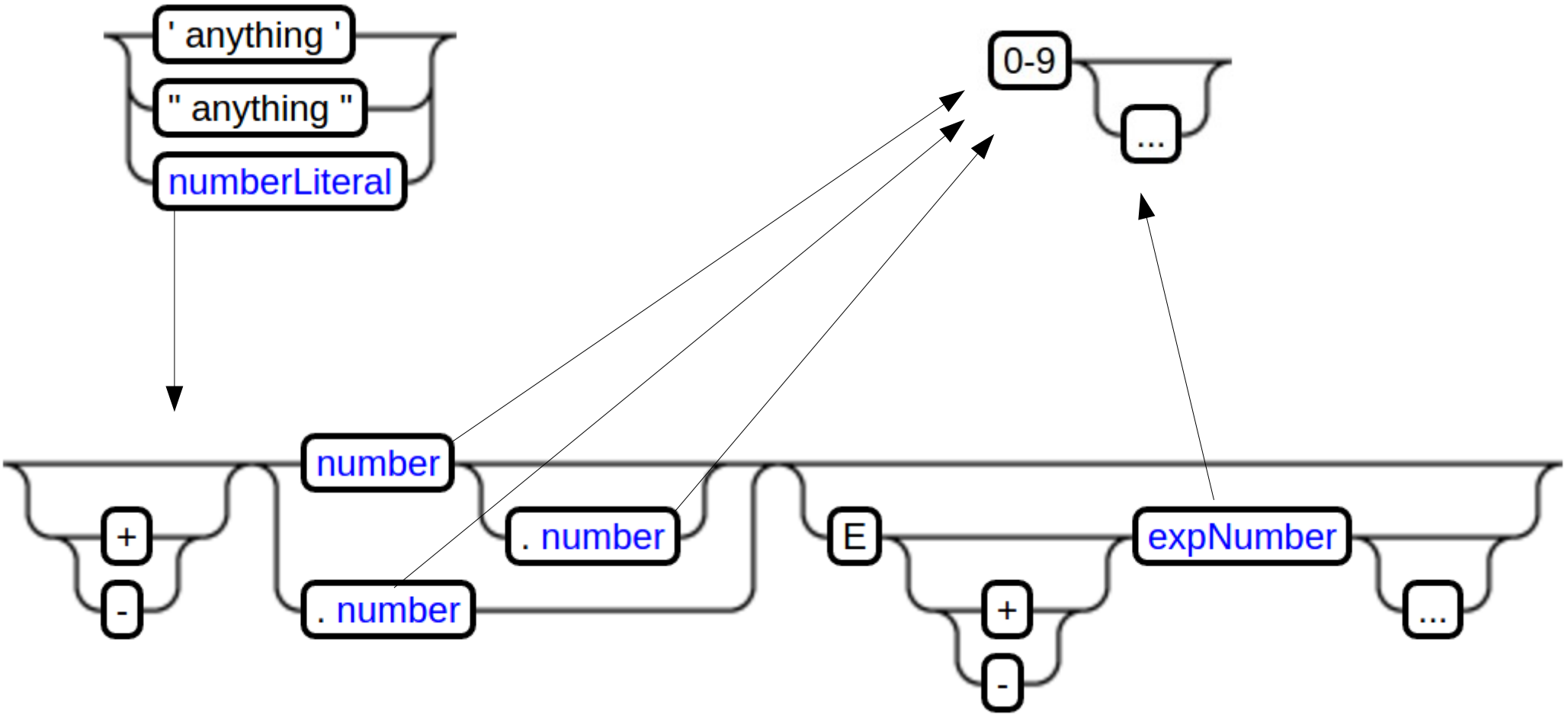
	Path
1	/content/geometrixx/en/toolbar/jcr:content

Execution Info: 1 results (1msec)

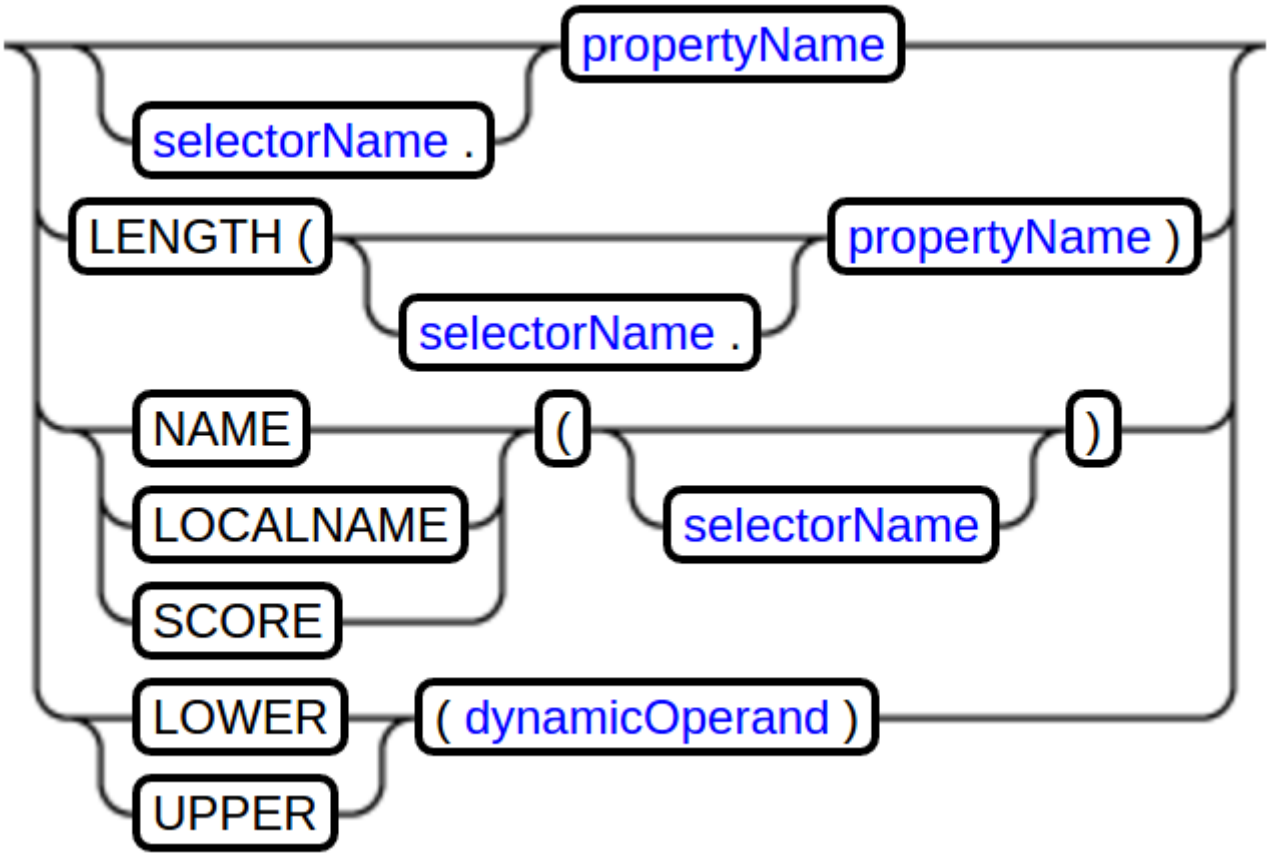
YYYY-MM-DDTHH:mm:ss.SSSZ



Grammar:Literals



Grammar:Dynamic Operand



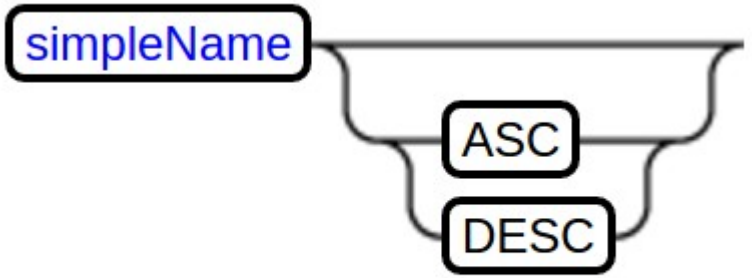
Grammar:Dynamic Operand

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar')
   AND NAME() LIKE '%par%'
```

	Path
1	/content/geometrixx/en/toolbar/newsletter/jcr:content/par
2	/content/geometrixx/en/toolbar/newsletter/jcr:content/rightpar
3	/content/geometrixx/en/toolbar/newsletter/jcr:content/rightpar/iparsys_fake_par
4	/content/geometrixx/en/toolbar/sitemap/jcr:content/par
5	/content/geometrixx/en/toolbar/sitemap/jcr:content/rightpar

Execution Info: 50 results (0msec)

Grammar:Ordering



AEM Specific

http://wiki.apache.org/jackrabbit/Search
http://wiki.apache.org/jackrabbit/ExcerptProvider
http://wiki.apache.org/jackrabbit/SpellChecker
http://wiki.apache.org/jackrabbit/SynonymSearch
http://wiki.apache.org/jackrabbit/SimilaritySearch
https://jackrabbit.apache.org/oak/docs/query/query-engine.html
https://jackrabbit.apache.org/oak/docs/query/lucene.html
https://jackrabbit.apache.org/oak/docs/query/solr.html
http://help-forums.adobe.com/content/adobeforums/en/experience-manager-forum/adobe-experience-manager.topic.html/forum__de4v-hi_does_aem61.html

rep:excerpt()

* AEM5.6.1 and before, but sinse Jackrabbit 1.3
* disabled by default, see:http://wiki.apache.org/jackrabbit/ExcerptProvider

```
SELECT [excerpt(.)] FROM [nt:resource]
   WHERE CONTAINS(., 'jackrabbit')
```

* AEM6.x
* https://issues.apache.org/jira/browse/OAK-3580
* https://issues.apache.org/jira/browse/OAK-818
* https://issues.apache.org/jira/browse/OAK-318
* https://issues.apache.org/jira/browse/OAK-262

Seems it shuold work :)!

```
SELECT
  a.[jcr:path] as [jcr:path],
  a.[jcr:score] as [jcr:score],
  a.[rep:excerpt] as [rep:excerpt]
from [nt:base] as a
where contains(a.*, 'jackrabbit')
```

rep:spellcheck()

* AEM5.6.1 and before
* disabled by default, see:http://wiki.apache.org/jackrabbit/SpellChecker

```
SELECT [rep:spellcheck()] FROM [nt:base]
   WHERE [jcr:path] = '/' AND SPELLCHECK('jackrabit')
```

* AEM6.x but since @since Oak 1.1.17, 1.0.13
* https://jackrabbit.apache.org/oak/docs/query/query-engine.html
* https://jackrabbit.apache.org/oak/docs/query/lucene.html#Spellchecking
* https://jackrabbit.apache.org/oak/docs/query/solr.html#Spellchecking

Seems it shuold work, but should be configured first :)!


```
SELECT [rep:spellcheck()] FROM [nt:base]
   WHERE [jcr:path] = '/' AND SPELLCHECK('jackrabit')
```

rep:similar()

* AEM5.6.1 and before
* disabled by default, see:http://wiki.apache.org/jackrabbit/SimilaritySearch

```
SELECT * FROM [nt:file]
   WHERE SIMILAR(., '/my:content/readme.txt/jcr:content')
```

* AEM6.x
* https://jackrabbit.apache.org/oak/docs/query/query-engine.html

Seems it shuold work, but lucene or solr indexes should be configured first :)!


```
SELECT * FROM [nt:file]
   WHERE SIMILAR(., '/my:content/readme.txt/jcr:content')
```

Searching with synonyms

* AEM5.6.1 and before
* disabled by default, see:http://wiki.apache.org/jackrabbit/SynonymSearch

```
SELECT * FROM [nt:resource]
   WHERE CONTAINS(., '~food')
```

* AEM6.x but since Oak 1.2.x ???
* http://help-forums.adobe.com/content/adobeforums/en/experience-manager-forum/adobe-experience-manager.topic.html/forum__de4v-hi_does_aem61.html

Seems it shuold work, but lucene indexes should be configured first and not all going good all the time:)!

```
SELECT * FROM [nt:resource]
   WHERE CONTAINS(*, '~food')
```

rep:suggest()

* AEM5.6.1 not supported at all

* AEM6.x but since Oak 1.1.17, 1.0.15
* https://jackrabbit.apache.org/oak/docs/query/query-engine.html
* https://jackrabbit.apache.org/oak/docs/query/lucene.html#Suggestions
* https://jackrabbit.apache.org/oak/docs/query/solr.html#Suggestions

Seems it shuold work, but lucene or solr indexes should be configured first :)!

```
SELECT [rep:suggest()] FROM [nt:base]
   WHERE SUGGEST('in')
```

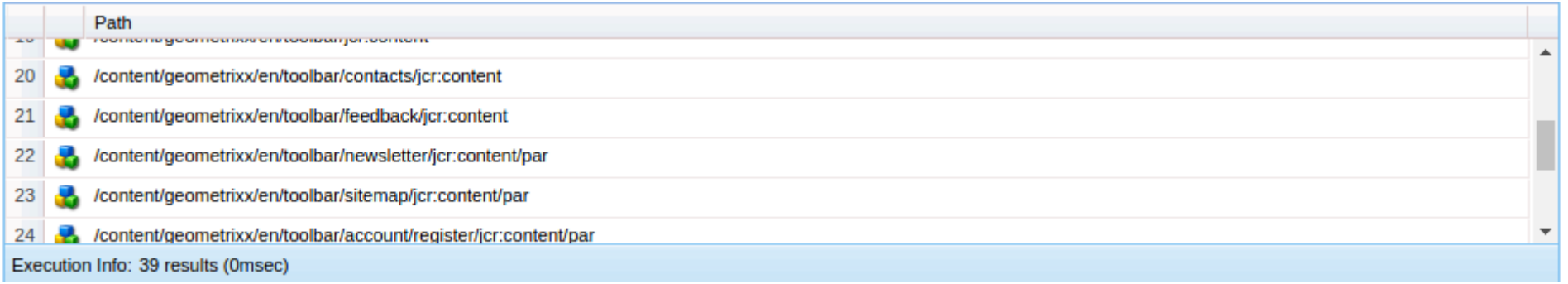
IN

* AEM5.6.1 not supported at all

```
```

* AEM6.x supported

```
SELECT * FROM [nt:base]
   WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar')
   AND NAME() IN ('par', 'jcr:content')
   ORDER BY NAME()
```

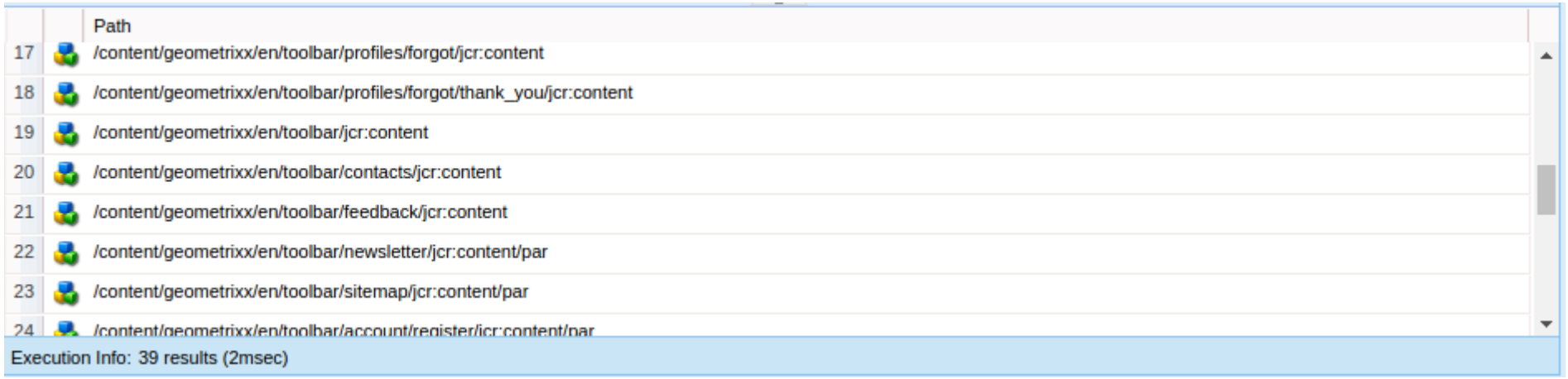


UNION

* AEM5.6.1 not supported at all

* AEM6.x supported

```
SELECT * FROM [nt:base]  WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND NAME()
LIKE 'jcr_content'
UNION
SELECT * FROM [nt:base]  WHERE ISDESCENDANTNODE('/content/geometrixx/en/toolbar') AND NAME()
LIKE 'par'
```



	Path
17	/content/geometrixx/en/toolbar/profiles/forgot/jcr:content
18	/content/geometrixx/en/toolbar/profiles/forgot/thank_you/jcr:content
19	/content/geometrixx/en/toolbar/jcr:content
20	/content/geometrixx/en/toolbar/contacts/jcr:content
21	/content/geometrixx/en/toolbar/feedback/jcr:content
22	/content/geometrixx/en/toolbar/newsletter/jcr:content/par
23	/content/geometrixx/en/toolbar/sitemap/jcr:content/par
24	/content/geometrixx/en/toolbar/account/register/jcr:content/par

Execution Info: 39 results (2msec)

native

* AEM5.6.1 not supported at all

* AEM6.x supported

```
SELECT [jcr:path] FROM [nt:base]
   WHERE NATIVE('solr', 'mlt?q=id:UTF8TEST&mlt.fl=manu,cat&mlt.mindf=1&mlt.mintf=1')
```

Thank you!