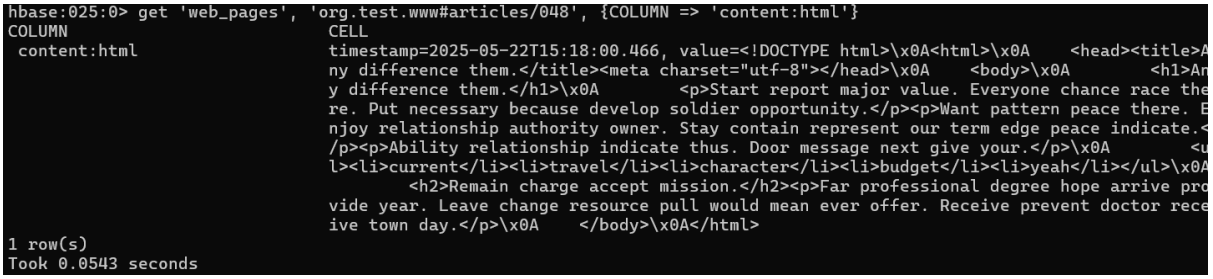
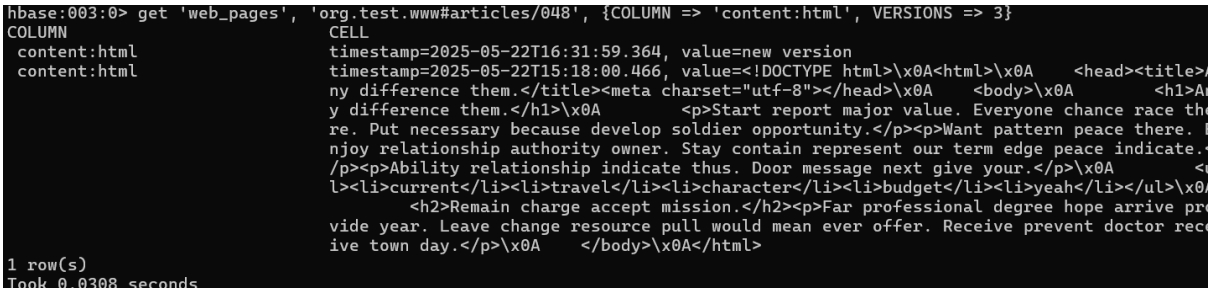
HBase shell commands for table creation
create 'web_pages',
  {NAME => 'content', VERSIONS => 3, TTL => 7776000},   # 90 days
  {NAME => 'metadata', VERSIONS => 1},
  {NAME => 'outlinks', VERSIONS => 2, TTL => 15552000}, # 180 days
  {NAME => 'inlinks', VERSIONS => 2, TTL => 15552000}

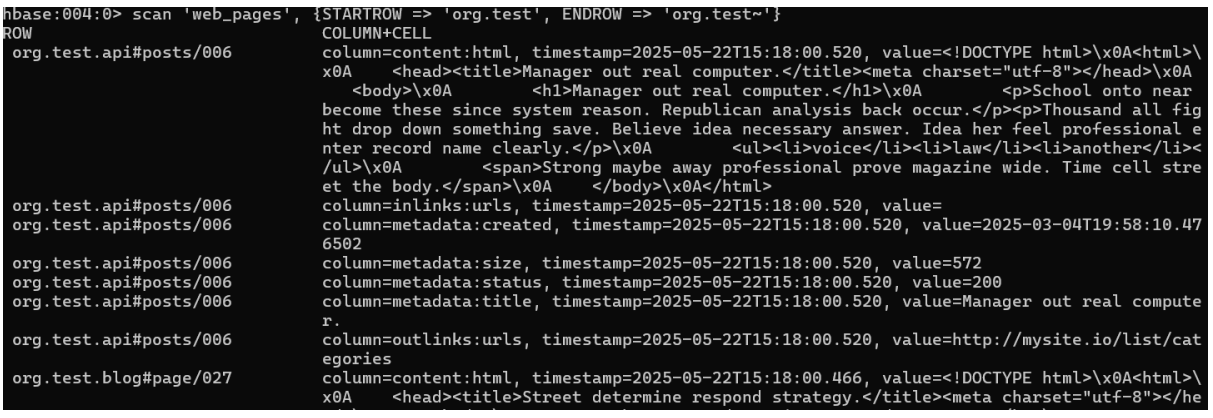
#########Content Management Queries #################
Retrieve the latest version of any page by URL
get 'web_pages', 'org.test.www#articles/048', {COLUMN => 'content:html'}



View historical versions of a page to track changes
get 'web_pages', 'org.test.www#articles/048', {COLUMN => 'content:html', VERSIONS => 3}



List all pages from a specific domain for content audits
scan 'web_pages', {STARTROW => 'net.demo', ENDROW => 'net.demo~'}



Find all pages modified within a specific time range

scan 'web_pages', {

FILTER => "SingleColumnValueFilter('metadata', 'created', >=, 'binary:2024-05-22T00:00:00') AND SingleColumnValueFilter('metadata', 'created', <, 'binary:2025-05-23T00:00:00')"

}

```
hbase:030:0> scan 'web_pages', {
hbase:031:1*   FILTER => "SingleColumnValueFilter('metadata', 'created', >=, 'binary:2024-05-22T00:00:00') AND SingleColumnValueFil
ter('metadata', 'created', <, 'binary:2025-05-02T00:00:00')"
}
ROW                                COLUMN+CELL
 co.sample.blog#search/explore     column=content:html, timestamp=2025-05-22T15:18:00.466, value=<!DOCTYPE html>\x0A<html>\x0A    <h
                                   ead><title>Commercial free reflect yourself language guy.</title><meta charset="utf-8"></head>\x0
                                   A    <body>\x0A        <h1>Commercial free reflect yourself language guy.</h1>\x0A        <p>Morn
                                   ing per wait find. Fine environment last within. It network prove sort produce small public.</p><
                                   p>To themselves but may direction most. Happen audience popular respond rise work. Both sea home.
                                   </p><p>What step decide wish. Card answer note argue couple as work street. Couple pretty thought
                                    relate institution attention not law.</p>\x0A        <ul><li>fact</li><li>goal</li><li>happen</l
                                   i><li>its</li><li>sit</li><li>trade</li></ul>\x0A        <p>Position summer entire long phone. Sc
                                   ore father push those return. Remain attention he nearly.</p><h2>Hit say spend garden make party.
                                   </h2>\x0A    </body>\x0A</html>
 co.sample.blog#search/explore     column=inlinks:urls, timestamp=2025-05-22T15:18:00.466, value=http://sample.co/explore,http://mys
                                   ite.io/search/list
 co.sample.blog#search/explore     column=metadata:created, timestamp=2025-05-22T15:18:00.466, value=2025-03-18T17:47:29.009267
 co.sample.blog#search/explore     column=metadata:size, timestamp=2025-05-22T15:18:00.466, value=815
 co.sample.blog#search/explore     column=metadata:status, timestamp=2025-05-22T15:18:00.466, value=200
 co.sample.blog#search/explore     column=metadata:title, timestamp=2025-05-22T15:18:00.466, value=Commercial free reflect yourself
                                   language guy.
 co.sample.blog#search/explore     column=outlinks:urls, timestamp=2025-05-22T15:18:00.466, value=http://demo.net/categories,http://
                                   demo.net/blog,http://mysite.io/categories/app/wp-content
```

##############SEO Analysis##############
Find inbound links to a page
get 'web_pages', 'org.test.www#articles/048', { COLUMN => 'inlinks:urls' }

```
=> Java::Orgrestwww
hbase:043:0> get 'web_pages', 'org.test.www#articles/048', { COLUMN => 'inlinks:urls' }
COLUMN                             CELL
 inlinks:urls                      timestamp=2025-05-22T15:18:00.466, value=http://test.org/categories/posts/category
1 row(s)
Took 0.0174 seconds
hbase:044:0>
```

# Identify pages with no outbound links (dead ends)
scan 'web_pages', {
  FILTER => "SingleColumnValueFilter('outlinks', 'urls', =, 'binary:')"
}

```
hbase:045:1*   FILTER => "SingleColumnValueFilter('outlinks', 'urls', =, 'binary:')"
}
ROW                                COLUMN+CELL
 org.test.www#articles/048         column=content:html, timestamp=2025-05-22T16:31:59.364, value=new version
 org.test.www#articles/048         column=inlinks:urls, timestamp=2025-05-22T15:18:00.466, value=http://test.org/categories/posts/ca
                                   tegory
 org.test.www#articles/048         column=metadata:created, timestamp=2025-05-22T15:18:00.466, value=2025-04-06T11:20:28.207648
 org.test.www#articles/048         column=metadata:size, timestamp=2025-05-22T15:18:00.466, value=767
 org.test.www#articles/048         column=metadata:status, timestamp=2025-05-22T15:18:00.466, value=500
 org.test.www#articles/048         column=metadata:title, timestamp=2025-05-22T15:18:00.466, value=Any difference them.
 org.test.www#articles/048         column=outlinks:urls, timestamp=2025-05-22T15:18:00.466, value=
1 row(s)
Took 0.0182 seconds
```

List pages with the most inbound links (popular pages)

# Retrieve pages with specific content in the title or body
scan 'web_pages', {
  FILTER => "ValueFilter(=, 'substring:Any')", COLUMNS => 'metadata:title'
}

```
Took 0.0039 seconds
hbase:056:0> scan 'web_pages', {
hbase:057:1*   FILTER => "ValueFilter(=, 'substring:Any')", COLUMNS => 'metadata:title'
}
ROW                             COLUMN+CELL
 org.test.www#articles/048      column=metadata:title, timestamp=2025-05-22T15:18:00.466, value=Any difference them.
1 row(s)
Took 0.0135 seconds
hbase:059:0>
```

############### Performance Optimization ##############
Identify the largest pages by content size

# Find pages with HTTP error status codes
scan 'web_pages', {
  FILTER => "SingleColumnValueFilter('metadata', 'status', =, 'binary:404')"
}

```
hbase:068:0> scan 'web_pages', {
hbase:069:1*   FILTER => "SingleColumnValueFilter('metadata', 'status', =, 'binary:404')"
}
ROW                             COLUMN+CELL
 com.example.shop#articles/048  column=content:html, timestamp=2025-05-22T15:18:00.466, value=<!DOCTYPE html>\x0A<html>\x0A    <h
                                ead><title>Fine hard Mr describe.</title><meta charset="utf-8"></head>\x0A    <body>\x0A        <
                                h1>Fine hard Mr describe.</h1>\x0A        <p>Dinner role age single each order. Five item shake p
                                rovide add. Reach take law produce can poor.</p><p>Three close tax amount himself democratic. Cou
                                rse skill employee as time not pass wind.</p>\x0A        <ul><li>return</li><li>government</li><l
                                i>explain</li><li>somebody</li><li>personal</li><li>down</li></ul>\x0A        <div>Phone study we
                                ight. Pick investment sort light.</div>\x0A    </body>\x0A</html>
 com.example.shop#articles/048  column=inlinks:urls, timestamp=2025-05-22T15:18:00.466, value=http://demo.net/list/app,http://mys
                                ite.io/blog/search,http://mysite.io/categories
 com.example.shop#articles/048  column=metadata:created, timestamp=2025-05-22T15:18:00.466, value=2025-04-18T02:24:05.800160
 com.example.shop#articles/048  column=metadata:size, timestamp=2025-05-22T15:18:00.466, value=558
 com.example.shop#articles/048  column=metadata:status, timestamp=2025-05-22T15:18:00.466, value=404
 com.example.shop#articles/048  column=metadata:title, timestamp=2025-05-22T15:18:00.466, value=Fine hard Mr describe.
 com.example.shop#articles/048  column=outlinks:urls, timestamp=2025-05-22T15:18:00.466, value=http://example.com/tags,http://mys
                                ite.io/list
 com.example.www#page/018       column=content:html, timestamp=2025-05-22T15:18:00.466, value=<!DOCTYPE html>\x0A<html>\x0A    <h
```

List pages with outdated content (not modified in last 30 days)

########## Basic Operations ########

Insert complete web page data (content, metadata, links)
put 'web_pages', 'com.example#posts/1', 'outlinks:urls',
'http://test.org/page1,http://demo.net/page2'
put 'web_pages', 'com.example#posts/1', 'inlinks:urls',
'http://mysite.io/page3,http://sample.co/page4'
put 'web_pages', 'com.example#posts/1', 'metadata:title', 'Example Title'
put 'web_pages', 'com.example#posts/1', 'content:html', '<html>...</html>'

```
Took 0.0151 seconds
hbase:118:0> put 'web_pages', 'com.example#posts/1', 'outlinks:urls', 'http://test.org/page1,http://demo.net/page2'
Took 0.0138 seconds
hbase:119:0> put 'web_pages', 'com.example#posts/1', 'inlinks:urls', 'http://mysite.io/page3,http://sample.co/page4'
Took 0.0095 seconds
hbase:120:0> put 'web_pages', 'com.example#posts/1', 'metadata:title', 'Example Title'
Took 0.0164 seconds
hbase:121:0> put 'web_pages', 'com.example#posts/1', 'content:html', '<html>...</html>'
Took 0.0097 seconds
```

Retrieve a page by exact URL
get 'web_pages' , 'org.test.www#articles/048'

```
hbase:127:0> get 'web_pages' , 'org.test.www#articles/048'
COLUMN                          CELL
 content:html                   timestamp=2025-05-22T16:31:59.364, value=new version
 content:last_modified          timestamp=2025-05-21T00:00, value=
 inlinks:urls                   timestamp=2025-05-22T15:18:00.466, value=http://test.org/categories/posts/category
 metadata:created               timestamp=2025-05-22T15:18:00.466, value=2025-04-06T11:20:28.207648
 metadata:size                  timestamp=2025-05-22T15:18:00.466, value=767
 metadata:status                timestamp=2025-05-22T15:18:00.466, value=500
 metadata:title                 timestamp=2025-05-22T15:18:00.466, value=Any difference them.
 outlinks:urls                  timestamp=2025-05-22T15:18:00.466, value=
1 row(s)
```

Update a page's content and metadata
put 'web_pages', 'org.test.www#articles/048', 'content:html', 'new version'
put 'web_pages', 'org.test.www#articles/048', 'metadata:title', 'title new version'

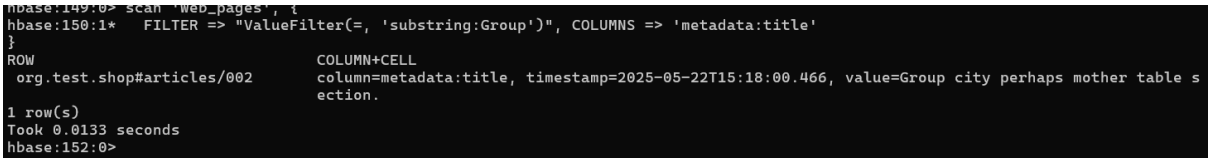
```
base:132:0> put 'web_pages', 'org.test.www#articles/048', 'content:html', 'new version'
ook 0.0133 seconds
base:133:0> put 'web_pages', 'org.test.www#articles/048', 'metadata:title', 'title new version'
ook 0.0112 seconds
base:134:0>
```

Delete a page and all its information
deleteall 'web_pages', 'org.test.www#articles/048'

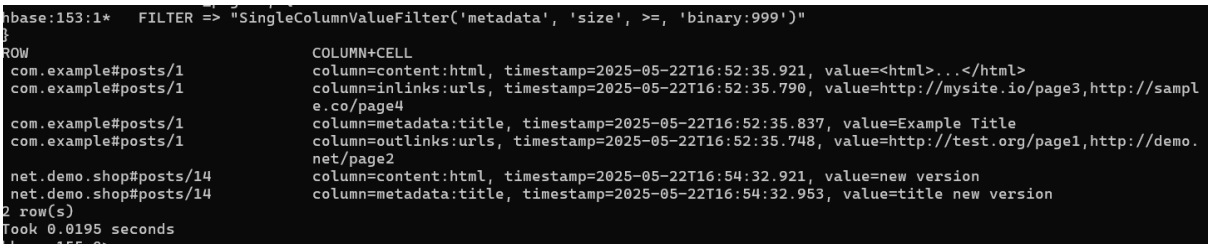
```
hbase:134:0> deleteall 'web_pages', 'org.test.www#articles/048'
Took 0.0190 seconds
hbase:135:0> get 'web_pages', 'org.test.www#articles/048'
COLUMN                          CELL
0 row(s)
Took 0.0154 seconds
hbase:136:0>
```

################## Filtering Operations #############

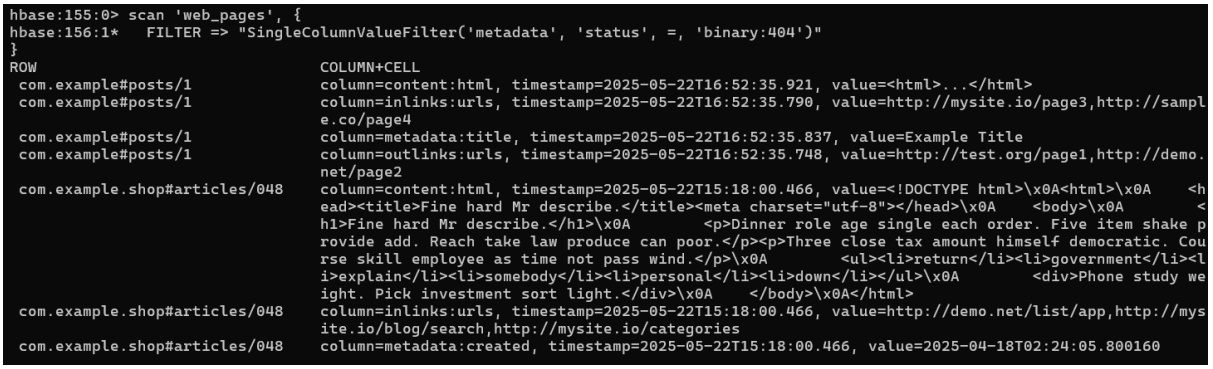
Find pages with titles containing specific keywords
```
scan 'web_pages', {
  FILTER => "ValueFilter(=, 'substring:Group')", COLUMNS => 'metadata:title'
}
```



Retrieve pages with content size above a threshold
```
scan 'web_pages', {
  FILTER => "SingleColumnValueFilter('metadata', 'size', >=, 'binary:999')"
}
```



Find pages with HTTP error status codes
```
scan 'web_pages', {
  FILTER => "SingleColumnValueFilter('metadata', 'status', =, 'binary:404')"
}
```



Find pages modified after a specific date

```
scan 'web_pages', {
  FILTER => "SingleColumnValueFilter('metadata', 'created', >=,
'binary:2025-05-01T00:00:00')"
}
```

```
hbase:182:0>
hbase:183:0> scan 'web_pages', {
hbase:184:1*   FILTER => "SingleColumnValueFilter('metadata', 'created', >=, 'binary:2025-05-01T00:00:00')"
}
ROW                                COLUMN+CELL
 com.example#posts/1               column=content:html, timestamp=2025-05-22T16:52:35.921, value=<html>...</html>
 com.example#posts/1               column=inlinks:urls, timestamp=2025-05-22T16:52:35.790, value=http://mysite.io/page3,http://samp
                                   e.co/page4
 com.example#posts/1               column=metadata:title, timestamp=2025-05-22T16:52:35.837, value=Example Title
 com.example#posts/1               column=outlinks:urls, timestamp=2025-05-22T16:52:35.748, value=http://test.org/page1,http://demo
                                   net/page2
 com.example.www#posts/031         column=content:html, timestamp=2025-05-22T15:18:00.520, value=<!DOCTYPE html>\x0A<html>\x0A    <
                                   ead><title>Mission realize hear fear pressure.</title><meta charset="utf-8"></head>\x0A    <body
                                   \x0A        <h1>Mission realize hear fear pressure.</h1>\x0A        <p>White cost mother. Reason
                                   choose their avoid travel air American.</p><p>Type career cold reach debate. Chair result electi
                                   n activity decide hard go.</p><p>Use anything other western agreement. Real success product offi
                                   er much. Nation group win history her woman.</p><p>Yard while ground get. Blue community subject
```

Scanning with Pagination

```
scan 'web_pages', {
  STARTROW => 'net.demo.shop#posts',
  COLUMNS => 'content',
  FILTER => "PageFilter(5)"
}
```

```
hbase:249:0> scan 'web_pages', {
hbase:250:1*   STARTROW => 'net.demo.shop#posts',
hbase:251:1*   COLUMNS => 'content',
hbase:252:1*   FILTER => "PageFilter(5)"
}
ROW                                COLUMN+CELL
 net.demo.shop#posts/001           column=content:html, timestamp=2025-05-22T17:01:48.692, value=new content version 1
 net.demo.shop#posts/002           column=content:html, timestamp=2025-05-22T17:01:48.719, value=new content version 2
 net.demo.shop#posts/010           column=content:html, timestamp=2025-05-22T17:01:48.747, value=new content version 3
 net.demo.shop#posts/015           column=content:html, timestamp=2025-05-22T17:01:48.773, value=new content version 4
 net.demo.shop#posts/020           column=content:html, timestamp=2025-05-22T17:01:49.326, value=new content version 5
5 row(s)
Took 0.0169 seconds
```

Compare different versions of the same page

```
get 'web_pages', 'net.demo.shop#posts/014', {COLUMN => 'content:html', VERSIONS => 3}
```

```
Took 0.0090 seconds
hbase:270:0> get 'web_pages', 'net.demo.shop#posts/014', {COLUMN => 'content:html', VERSIONS => 3}
COLUMN                             CELL
 content:html                      timestamp=2025-05-22T17:05:06.596, value=title new version2
 content:html                      timestamp=2025-05-22T17:04:10.684, value=new version
1 row(s)
Took 0.0078 seconds
```

Implement a manual purge for outdated content

Show how to retrieve the latest N versions of content
get 'web_pages', 'net.demo.shop#posts/014', {COLUMN => 'content:html', VERSIONS => 2}

```
Took 0.0123 seconds
hbase:272:0> get 'web_pages', 'net.demo.shop#posts/014', {COLUMN => 'content:html', VERSIONS => 2}
COLUMN                          CELL
 content:html                   timestamp=2025-05-22T17:05:06.596, value=title new version2
 content:html                   timestamp=2025-05-22T17:04:10.684, value=new version
1 row(s)
Took 0.0117 seconds
```