Confluence attachment filesystem paths

Sometimes we'd like to know where on the filesystem a particular Confluence attachment is. For example, after doing upgrades or maintenance, one might like to check that all attachments are present.

The following SQL query (Postgres syntax) does just that: for every attachment found in the database, it prints the filesystem path, expected file size, page URL and attachment download URL:

```
WITH baseurl as (
        SELECT regexp_replace(bandanavalue, '.*<baseUrl>([^<]+)</baseUrl>.*', '\1') as baseurl FROM bandana
WHERE bandanakey ='atlassian.confluence.settings'
)
,attachments AS (
        SELECT content.*
                , mt.stringval AS mediatype
                , fs.longval AS filesize
        FROM content JOIN contentproperties mt USING (contentid)
                JOIN contentproperties fs USING (contentid)
        WHERE content.contenttype='ATTACHMENT' and mt.propertyname='MEDIA_TYPE' and fs.propertyname='FILESIZE'
--      and content.pageid = 131170321
)
,attachments_data AS (
        SELECT
                pageid
                , title
                , extract(epoch from lastmoddate)*1000 AS moddate
                , version
                , contentid
                , creationdate
                , concat_ws('/',
                'ver003',
                coalesce(
                        right(spaceid::text, 3)::integer % 250
                        || '/' ||
                        substring(spaceid::text from '(...)...$')::integer % 250
                        || '/' ||
                        spaceid
                , 'nonspaced'
                )
                        , right(pageid::text, 3)::integer % 250
                        , substring(pageid::text from '(...)...$')::integer % 250
                        , pageid
                        , first_value(contentid) OVER (PARTITION BY pageid, title order by version desc)
                        , version
                ) as attpath
                , filesize
        FROM attachments
        WHERE content_status='current' and contenttype='ATTACHMENT'
)
SELECT
        concat_ws('/', 'attachments', attpath) as fullpath
        ,filesize
        ,concat_ws('/', baseurl, 'pages/viewpage.action?pageId='||pageid) AS pagelink
        ,concat_ws('/', baseurl, 'download', 'attachments', pageid, title)      -- Note: title is unencoded. If
this bugs you, install urlencode() function from https://stackoverflow.com/questions/10318014/javascript-
encodeuri-like-function-in-postgresql
          || '?' || concat_ws('&', 'version='||version, 'modificationDate='||moddate, 'api=v2') AS
attachmentlink
FROM
        attachments_data CROSS JOIN baseurl;
```

To check that all attachments are present, use a bash pipeline like this:

```
cat /tmp/confattachments.sql | psql confluence -tAq | while IFS='|' read path filesize pageurl atturl ; do test
-f /var/atlassian/application-data/confluence/current/"$path" || echo "Missing attachment $path on page
$pageurl"; done
```

How does it work?

The official documentation on Confluence's attachment filesystem structure is Hierarchical File System Attachment Storage. At a high level, an attachment's path consists of:

- A fixed part,`ver003`
- 3 directories derived from the attachment's **space**
- 3 directories derived from the attachment's **page**
- a directory for each distinct attachment, as identified by attachment **filename** or title
- a file for the particular **version** of an attachment

Here is an example: two attachments on a page, one having two versions:

Name	Size	Creator	Creation Date	Labels	Comment	
test.sh	0.1 kB	Jeff Turner	Aug 30, 2017 13:15	No labels	Test script	Properties | Delete
Version 1 (current)	0.1 kB	Jeff Turner	Aug 30, 2017 13:15		Test script	Delete
My File.txt	0.1 kB	Jeff Turner	Aug 30, 2017 13:15	No labels	second version	Properties | Delete
Version 2 (current)	0.1 kB	Jeff Turner	Aug 30, 2017 13:15		second version	Delete
Version 1	0.1 kB	Jeff Turner	Aug 30, 2017 13:15		First!	Delete

The URL of this particular page is https://example.com/pages/viewpageattachments.action?pageId=131629058

How does this look in the database?

Attachments, like most things in Confluence, are stored in the `content` table:

```
redradish_confluence=> select spaceid, pageid, contentid, contenttype, title, creationdate, version, prevver
from content where pageid = 131629058;

 spaceid   pageid    contentid  contenttype     title          creationdate        version   prevver

 3014657  131629058  131629061  ATTACHMENT   test.sh      2017-08-30 13:15:33.575        1
 3014657  131629058  131629059  ATTACHMENT   My File.txt  2017-08-30 13:15:20.239        2
 3014657  131629058  131629060  ATTACHMENT   My File.txt  2017-08-30 13:15:07.179        1  131629059

(3 rows)
```

Reading the Hierarchical File System Attachment Storage page, you'll see details of how spaceid and pageid have to be split into bits, mod 250'd and so forth:

level	Derived From
1 (top)	Always 'ver003' indicating the Confluence version 3 storage format
2	The least significant 3 digits of the *space id*, modulo 250
3	The next 3 least significant digits of the *space id*, modulo 250
4	The full *space id*
5	The least significant 3 digits of the *content id* of the page the file is attached to, modulo 250
6	The next 3 least significant digits of the *content id* of the page the file is attached to, modulo 250
7	The full *content id* of the page the file is attached to
8	The full *content id* of the attached file

Here is a first, incorrect attempt in Postgres:

```
select spaceid, pageid, contentid, title, version
        , concat_ws('/',                    -- Join each bit together with '/'
                'ver003'
                , right(spaceid::text, 3)::integer % 250      -- Rightmost 3 chars of spaceid, mod 250
                , substring(spaceid::text from '(...)...$')::integer % 250    -- chars 3-6 from right of
spaceid, mod 250
                , spaceid
                , right(pageid::text, 3)::integer % 250          -- Rightmod 3 chars of pageid, mod 250
                , substring(pageid::text from '(...)...$')::integer % 250     -- chars 3-6 from right of
pageid, mod 250
                , pageid
                , contentid
                , version) AS path
from content where pageid =131629058;



 spaceid   pageid    contentid     title     version                          path

 3014657  131629058  131629061  test.sh            1  ver003/157/14/3014657/58/129/131629058/131629061/1
 3014657  131629058  131629059  My File.txt        2  ver003/157/14/3014657/58/129/131629058/131629059/2
 3014657  131629058  131629060  My File.txt        1  ver003/157/14/3014657/58/129/131629058/131629060/1

(3 rows)
```

When I check in the filesystem, the first two paths are correct, but the last path does not exist.

What is the right path for version 1 of 'My File.txt'? This can be discovered on Linux with the handy `iosnoop` utility from **https://github.com/iovisor/bcc** , which shows what files are being accessed. Clicking on version 1 of 'My File.txt' yields:

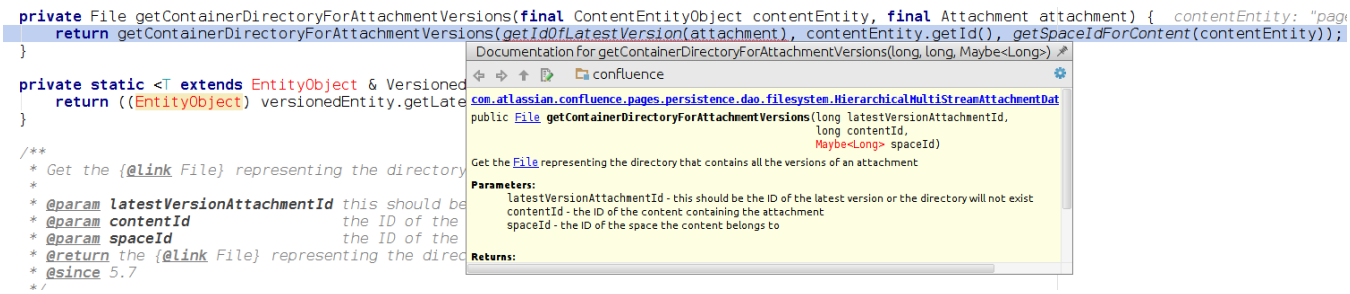
```
root@jturner-desktop ~ # opensnoop-perf /var/atlassian/application-data/redradish_confluence/6.3.1/attachments
Tracing open()s for filenames containing "/var/atlassian/application-data/redradish_confluence/6.3.1
/attachments". Ctrl-C to end.
COMM             PID      FD FILE
java             27335  0x67 /var/atlassian/application-data/redradish_confluence/6.3.1/attachments/ver003/157
/14/3014657/58/129/131629058/131629059/1
```

So the correct path is ver003/157/14/3014657/58/129/131629058/**131629059**/1 not ver003/157/14/3014657/58/129/131629058/**131629060**/1. This is part 8 of the path:

8	The full *content id* of the attached file

We used `contentid`. So what's going wrong?

It appears that level 8 is not simply the contentid, but rather the contentid of the *most recent version of the attached file*. This can be seen in the source at HierarchicalMultiStreamAttachmentDataFileSystem.java. The getContainerDirectoryForAttachmentVersions() function takes, as arguments, the latest attachment's contentid, then the pageid, then spaceid:



In our case, we have two versions of 'My File.txt'. Version 1 (the I at has contentid 131629060, version 2 has contentid 131629059. We need to use the version 2 (or whatever is latest) contentid, which is 131629059.

Back to our SQL query. Instead of just contentid, we need contentid of the attachment with the same filename, on the same page, with the highest version. That can be expressed with a Postgres Window function:

```
select
    spaceid, pageid, contentid, contenttype, title, creationdate, version, prevver,
    FIRST_VALUE(contentid) OVER (PARTITION BY pageid, title order by version desc) AS newest_contentid
from content where pageid = 131629058;

 spaceid   pageid    contentid  contenttype     title          creationdate        version   prevver
newest_contentid

 3014657  131629058  131629059  ATTACHMENT   My File.txt  2017-08-30 13:15:20.239        2
131629059
 3014657  131629058  131629060  ATTACHMENT   My File.txt  2017-08-30 13:15:07.179        1  131629059
131629059
 3014657  131629058  131629061  ATTACHMENT   test.sh      2017-08-30 13:15:33.575        1
131629061

(3 rows)
```

So our more-correct path-calculating SQL is:

```
select spaceid, pageid, contentid, title, version
        , concat_ws('/',
                'ver003'
                , right(spaceid::text, 3)::integer % 250
                , substring(spaceid::text from '(...)...$')::integer % 250
                , spaceid,
                , right(pageid::text, 3)::integer % 250
                , substring(pageid::text from '(...)...$')::integer % 250
                , pageid
                , first_value(contentid) OVER (PARTITION BY pageid, title order by version desc)
                , version) AS path
from content where pageid =131629058;



 spaceid   pageid    contentid     title     version                         path

 3014657  131629058  131629059  My File.txt        2  ver003/157/14/3014657/58/129/131629058/131629059/2
 3014657  131629058  131629060  My File.txt        1  ver003/157/14/3014657/58/129/131629058/131629059/1
 3014657  131629058  131629061  test.sh            1  ver003/157/14/3014657/58/129/131629058/131629061/1

(3 rows)
```

The paths for our test attachments are now correct.

There is one more wrinkle to consider: **attachments on new draft pages**. To test:

a. click 'Create' to create a page
b. Use the '!' notation to add an attachment (here called `setenv.diff`)
c. Without saving, click on your profile icon, then 'Drafts'
d. Find your draft page and 'resume editing'.
e. Observe the page ID in the URL, which will be something like https://wiki.redradishtech.com/pages/createpage.action?useDraft=true&spaceKey=~jturner&draftId=131629078&

In my example, the draft ID is 131629078:

```
select spaceid, pageid, contentid, title, version
        , concat_ws('/',
                'ver003'
                , right(spaceid::text, 3)::integer % 250
                , substring(spaceid::text from '(...)...$')::integer % 250
                , spaceid, right(pageid::text, 3)::integer % 250
                , substring(pageid::text from '(...)...$')::integer % 250
                , pageid
                , first_value(contentid) OVER (PARTITION BY pageid, title order by version desc)
                , version) AS path
from content where pageid = 131629078;



 spaceid   pageid    contentid     title     version                path

         131629078  131629079  setenv.diff        1  ver003/78/129/131629078/131629079/1

(1 row)
```

You will see the calculated path is not correct. It is entirely missing the 3 segments derived from `spaceid`, because `spaceid` is null.

In this situation Confluence uses a directory '`nonspaced`'. We can do this with the coalesce() function, to use 'nonspaced' if the spaceid-using expression evaluates to null:

```
select spaceid, pageid, contentid, title, version
, concat_ws('/',
        'ver003'
        ,coalesce(
                right(spaceid::text, 3)::integer % 250
                || '/' ||
                substring(spaceid::text from '(...)...$')::integer % 250
                || '/' ||
                spaceid,
                'nonspaced'
        )
        , right(pageid::text, 3)::integer % 250
        , substring(pageid::text from '(...)...$')::integer % 250
        , pageid
        , first_value(contentid) OVER (PARTITION BY pageid, title order by version desc)
        , version) AS path
from content where pageid = 131629078;



 spaceid   pageid    contentid     title     version                      path

         131629078  131629079  setenv.diff        1  ver003/nonspaced/78/129/131629078/131629079/1

(1 row)
```

..and that forms the core of the final SQL query presented at the beginning.

JIRA has its own elaborate attachment structure nowadays too - see http://blog.valiantys.com/en/jira-en/million-jira-issues for details.