Crane - Issue #1893

pulp_docker does not support Docker < 1.10 with manifests that were published from Docker >= 1.10

05/04/2016 04:36 PM - rbarlow

Status:	CLOSED - CURRENTRELEASE	**Start date:**	
Priority:	High	**Due date:**	
Assignee:	ipanova@redhat.com	**Estimated time:**	0:00 hour
Category:			
Sprint/Milestone:			
Severity:	2. Medium	**Groomed:**	No
Version - Crane:		**Sprint Candidate:**	No
Platform Release:	2.8.7	**Tags:**	Pulp 2
Target Release - Crane:	2.0.3	**Sprint:**	Sprint 4
OS:		**Quarter:**	
Triaged:	Yes		

Description

Tim Waugh reported this issue, so I will use the text he wrote up here:

```
The V2 manifest that Docker 1.10 pushes to the Distribution registry, and which will get synced in
to Pulp, is Schema 2, which Docker 1.9 does not understand. When Docker engine 1.9 pulls from a Di
stribution registry, Distribution sees that it is talking to a client that does not understand Sch
ema 2, and converts the manifest to Schema 1 before sending its response.

This means there are effectively three things:

    V1, supported by all Docker engine versions
    V2 (Schema 1), supported by 1.6 up to 1.9
    V2 (Schema 2), only supported by 1.10

In order for Pulp to be able to satisfy both 1.6 - 1.9 clients and 1.10 clients, it will have to l
earn to convert Schema 2 manifests to Schema 1 manifests.

https://github.com/docker/distribution/blob/master/docs/compatibility.md#manifest-push-with-docker
-110
https://gist.github.com/aaronlehmann/b42a2eaf633fc949f93b#interoperability-with-old-image-formats
```

Related issues:

Related to Packaging - Task #2083: Issues common to 2.9.1 and 2.8 stream	**CLOSED - NOTABUG**

Associated revisions

Revision 80699c2c - 07/15/2016 03:05 PM - ipanova@redhat.com

Manifest digest changes when there is schemav2-v1 conversion.

closes #1893 https://pulp.plan.io/issues/1893

History

#2 - 05/04/2016 04:40 PM - rbarlow

IMO, this issue will be more difficult than it may seem to address. Pulp is not currently involved in serving out the Manifests to clients, as they are just files on disk that httpd is serving when clients make requests. Thus, the current architecture does not allow for Pulp to do things like detecting which client version is communicating with Pulp and directing them to the correct file.

Additionally, Pulp has no awareness of the v2 schema 2 Manifest format, so there will be some engineering effort there to determine how to work with that as well.

A short-term workaround might be to make sure that Pulp identifies itself as a Docker 1.9 client so that it always received v2 schema 1 Manifests, which should work with all Docker v2 versions. It's possible that is already what happens, but if not it's likely a header we can add to our requests during sync. I suggest that we investigate this option and get it working before trying to address the complications I mentioned above.

#3 - 05/05/2016 03:45 AM - mhrivnak

rbarlow wrote:

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+1 to that. Transforming data is a business pulp tries to stay out of.

How does this work with the upstream registry? Does it detect the client version starting all the way back at the tag listing request, and give tag values (which identify manifest hashes) that correspond to schema 1 or 2 depending on the client? Does upstream convert between the schemas on the fly?

I like the idea of pulp pretending to be a 1.9 client and hoping to get compatible content. It's simple, and hopefully effective!

#4 - 05/13/2016 04:49 PM - mhrivnak

It sounds like RCM is going to do some testing with various clients to see what the impact is. We are deferring triage until we can get more information along those lines, to know more concretely how this impacts users.

#5 - 05/20/2016 05:59 PM - twaugh

The OSBS development team has not had time to do any testing for this.

#6 - 05/21/2016 09:47 PM - rbarlow

twaugh wrote:

> The OSBS development team has not had time to do any testing for this.

At this point I think the best course of action is for the Pulp team to evaluate the severity of this issue.

#7 - 05/25/2016 04:47 PM - dkliban@redhat.com

- Priority changed from Normal to High

- Triaged changed from No to Yes

This issue needs to be investigated soon. Mark it as untriaged after the investigation.

#8 - 05/26/2016 05:46 PM - twaugh

If Randy's work-around has already been implemented, make sure to disable it prior to testing. :-)

#9 - 05/31/2016 08:18 PM - mhrivnak

- Sprint/Milestone set to 21

#10 - 06/06/2016 09:07 PM - acarter@redhat.com

Just noting that v2 support must land in production before July 20 to support the Satellite 6.2 release. We do not plan to go live with 1.10 support but will move to 1.10 soon after (likely early August).

#11 - 06/08/2016 05:53 PM - dkliban@redhat.com

Docker 1.11 is now out. So testing needs to be performed using Docker 1.9 and 1.11.

The testing involve the following:

1. Install docker engine on a machine, version 1.11
2. Build an image using Docker 1.11. The instructions are here https://docs.docker.com/engine/userguide/containers/dockerimages/
3. Deploy a docker registry running in a container (https://hub.docker.com/_/registry/)
4. Push that image to your local registry
5. Using curl and docker API, request the manifest for the new image in dockerhub. Make sure that schema 2 is being used in the response.
6. Once schema version has been confirmed, sync the image from your registry into pulp
7. publish that repo and have it served by crane
8. install docker 1.9 on another machine
9. perform docker pull from crane using docker 1.9

Then perform the same test in reverse. Create image using Docker 1.9. Then sync it into Pulp. Then do a docker pull using Docker 1.11.

#12 - 06/08/2016 06:21 PM - ipanova@redhat.com

- Status changed from NEW to ASSIGNED

- Assignee set to ipanova@redhat.com

#13 - 06/13/2016 03:56 PM - mhrivnak

- Sprint/Milestone changed from 21 to 22

#14 - 06/14/2016 05:13 PM - ipanova@redhat.com

Some facts about docker architecture:
docker client can talk to the docker registry in 2 ways

1. directly via API
2 talk through docker-daemon

If you are making a request to API directly with curl and want to fetch manifest with schemav2 you need to specify that in headers - that you accept schemav2 [0], otherwise schemav1 will be returned [1](that is done because transition needs to be backwards-compatible)

[0] https://github.com/docker/distribution/blob/master/docs/spec/manifest-v2-2.md#media-types
[1] https://github.com/docker/distribution/blob/master/registry/handlers/images.go#L104

```
]$ curl -L -H "Accept: application/vnd.docker.distribution.manifest.v2+json" -X GET 'http://localhost:5000/v2/
ipanova/base/manifests/latest'
{
   "schemaVersion": 2,
   "mediaType": "application/vnd.docker.distribution.manifest.v2+json",
   "config": {
      "mediaType": "application/vnd.docker.container.image.v1+json",
      "size": 1078,
      "digest": "sha256:3ccdc139f077afebfef63dc26a0a2c4eb6f0ff0864f94ebf0069e3665c19ae6f"
   },
   "layers": []
```

```
]$ curl -L -X GET 'http://localhost:5000/v2/ipanova/base/manifests/latest'
{
   "schemaVersion": 1,
   "name": "ipanova/base",
   "tag": "latest",
   "architecture": "amd64",
   "fsLayers": [
      {
         "blobSum": "sha256:a3ed95caeb02ffe68cdd9fd84406680ae93d633cb16422d00e8a7c22955b46d4"
      }
   ],
   "history": [
      {
         "v1Compatibility": "{\"architecture\":\"amd64\",\"config\":{\"Hostname\":\"01bbbc4c98fc\",\"Domainnam
e\":\"\",\"User\":\"\",\"AttachStdin\":false,\"AttachStdout\":false,\"AttachStderr\":false,\"Tty\":false,\"Ope
nStdin\":false,\"StdinOnce\":false,\"Env\":[\"PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bi
n\",\"x=a\"],\"Cmd\":null,\"Image\":\"\",\"Volumes\":null,\"WorkingDir\":\"\",\"Entrypoint\":null,\"OnBuild\":
null,\"Labels\":null},\"container\":\"01bbbc4c98fcc15aceb958db6f1a472858d8fbdd2aec4632b901ced5fe036f28\",\"con
tainer_config\":{\"Hostname\":\"01bbbc4c98fc\",\"Domainname\":\"\",\"User\":\"\",\"AttachStdin\":false,\"Attac
hStdout\":false,\"AttachStderr\":false,\"Tty\":false,\"OpenStdin\":false,\"StdinOnce\":false,\"Env\":[\"PATH=/
usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin\",\"x=a\"],\"Cmd\":[\"/bin/sh\",\"-c\",\"#(nop) EN
V x=a\"],\"Image\":\"\",\"Volumes\":null,\"WorkingDir\":\"\",\"Entrypoint\":null,\"OnBuild\":null,\"Labels\":n
ull},\"created\":\"2016-06-13T11:41:24.936334311Z\",\"docker_version\":\"1.11.2\",\"id\":\"a3446e94ae61426abfb
23e2263b19c992fc470957ae529cb6d75d3c48fe34590\",\"os\":\"linux\",\"throwaway\":true}"
      }
   ],
   "signatures": [
      {
         "header": {
            "jwk": {
               "crv": "P-256",
               "kid": "4WBO:SDRD:4VMB:TBSP:CQAD:5EXK:ZODJ:B75I:AGIH:M4EN:ZNG2:TBGZ",
               "kty": "EC",
               "x": "-fg9H9Io3hFCYjsD4zq_AKIyNm2kmmWKN52G5BpZxP8",
               "y": "8HdSl8EF0TEmJ8sZP6vzenOgimRgBBhgEqtnbCkykTQ"
            },
            "alg": "ES256"
         },
         "signature": "-Rpyg_bx-EAUuv1tQIFDwAcEPXay0v9q14eQ4_Izt1I2iP1bA1MnL2XcVglt_9UdD12T85TsXmC8JI6mC4vmsQ"
,
         "protected": "eyJmb3JtYXRMZW5ndGgiOjE0NTUsImZvcm1hdFRhaWwiOiJDbjAiLCJ0aW1lIjoiMjAxNi0wNi0xM1QxNjoyODo
zNVoifQ"
```

If the client is talking to the registry via docker-daemon, docker daemon>=1.10 sets headers to receive the scnemav2.

When we sync docker content into pulp, and in the feed provide the registry to sync from, we talk to the registry **directly via api**, that means that we do not set any headers, and schemav1 version is returned in **any** case [2], plus we pull manifest by tag, so we are out of the issue that docker compatibility it is having right now. [3]

[2] https://github.com/pulp/pulp_docker/blob/master/plugins/pulp_docker/plugins/registry.py#L277
[3] https://docs.docker.com/registry/compatibility/

When the image is built by docker 1.9, then pushed to the registry, then synced into pulp and served by crane, the manifest digest does not change, i.e digest from docker push into registry coincides with the manifest digest that is in crane.

When the image is built by docker 1.11, then pushed to the registry, then synced into pulp and served by crane, the manifest digest **changes**, i.e digest from docker push into registry is different from the manifest digest that is in crane. Manifest digest changes because of the fact that in the registry schemav2 is registered, but when we sync content into pulp we pull schemav1.

So that's why when we do docker pull from crane by manifest digest (noted in the 'push' step to the registry) we fail.

Outcome of the research

If we want to docker pull by digest, we need to use the digest that is specified in crane and not in the registry.

#15 - 06/27/2016 02:35 PM - ipanova@redhat.com

- *Status changed from ASSIGNED to POST*

https://github.com/pulp/crane/pull/66

#16 - 07/15/2016 03:12 PM - ipanova@redhat.com

- *Status changed from POST to MODIFIED*

- *% Done changed from 0 to 100*

Applied in changeset crane:80699c2c8a8f7fb674658c6f66ea99701cdaf903.

#17 - 07/15/2016 03:14 PM - ipanova@redhat.com

- *Platform Release set to 2.8.6*

- *Target Release - Docker set to 2.0.2*

#18 - 07/18/2016 05:21 PM - semyers

- *Project changed from Docker Support to Crane*

- *Platform Release changed from 2.8.6 to 2.8.7*

This was addressed with a fix to Crane, so I've moved it over to that project. It didn't make the cut for 2.8.6, but will be in 2.8.7.

#19 - 07/18/2016 05:24 PM - semyers

- *Target Release - Crane set to 2.0.3*

#20 - 07/19/2016 08:55 PM - semyers

- *Related to Task #2083: Issues common to 2.9.1 and 2.8 stream added*

#21 - 07/26/2016 08:13 PM - semyers

- *Status changed from MODIFIED to 5*

#22 - 08/16/2016 04:45 PM - pthomas@redhat.com

- *Status changed from 5 to 6*

verified

http://docs.pulpproject.org/plugins/crane/index.html#docker-pull

#23 - 08/19/2016 03:57 PM - semyers

- Status changed from 6 to CLOSED - CURRENTRELEASE

#25 - 03/08/2018 07:54 PM - bmbouter

- Sprint set to Sprint 4

#26 - 03/08/2018 07:57 PM - bmbouter

- Sprint/Milestone deleted (22)

#27 - 04/15/2019 10:30 PM - bmbouter

- Tags Pulp 2 added