cri image operation
wasm module integration test

- 通过集成测试

  - cri image pull

  - cri image status

  - cri image remove

```
=== RUN   TestWasmModuleInCri
    containerd_image_test.go:44: make sure the test wasm moduel doesn't exist in the cri plugin
    containerd_image_test.go:52: pull the wasm module into the cri plugin
INFO[2023-03-21T13:55:10.873708403+08:00] PullImage "wasi_example_main"
INFO[2023-03-21T13:55:10.873755690+08:00] Image "wasi_example_main" has wasm annotation: map[wasm.module.url:https://github.com/leviyanx/wasm-program-image/raw/main/wasi/was
i_example_main.wasm]
INFO[2023-03-21T13:55:11.682253404+08:00] PullImage "wasi_example_main" returns image reference "fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ="
    containerd_image_test.go:60: the wasm module should be seen in the cri plugin
    containerd_image_test.go:56: remove the wasm module from the cri plugin
INFO[2023-03-21T13:55:12.692653497+08:00] RemoveImage "wasi_example_main"
INFO[2023-03-21T13:55:12.693013083+08:00] RemoveImage "wasi_example_main" returns successfully
--- PASS: TestWasmModuleInCri (1.82s)
PASS
ok      github.com/containerd/containerd/integration     1.848s
```

cri image operation
wasm module validation test

- crictl pull -annotation wasm.module.url=https://github.com/leviyanx/wasm-program-image/raw/main/wasi/wasi_example_main.wasm **leviyanx/wasm-hello-example**

  - crictl pull -annotation wasm.module.url=<url> <wasm-module-name>

```
root@VM-0-17-ubuntu:~/containerd# crictl pull -annotation wasm.module.url=https://github.com/leviyanx/wasm-program-image/raw/main/wasi/wasi_example_main.wasm leviyanx/wasm-hello-example
INFO[2023-03-21T12:28:58.113615402+08:00] PullImage "leviyanx/wasm-hello-example"
INFO[2023-03-21T12:28:58.113672100+08:00] Image "leviyanx/wasm-hello-example" has wasm annotation: map[wasm.module.url:https://github.com/leviyanx/wasm-program-image/raw/main/wasi/wasi_example_main.wasm]
INFO[2023-03-21T12:28:58.556279222+08:00] PullImage "leviyanx/wasm-hello-example" returns image reference "fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ="
Image is up to date for fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ=
```

- 问题

  - crictl会对image name做预处理，如果不提供域名，默认去docker registry拉取image，如果提供域名，就回去对应的registry，并且预处理阶段会检查image的有效性，需要让他跳过预处理检查，就先填了一个有效镜像地址（作为名字）

cri image operation
wasm module validation test

- crictl images

```
root@VM-0-17-ubuntu:~/containerd# crictl images
IMAGE                            TAG          IMAGE ID        SIZE
docker.io/wasmedge/example-wasi  latest       332aed9d05baa   524kB
errorRepoTag                     errorRepoTag fp051QR9RWgnk   1.92MB
k8s.gcr.io/coredns/coredns       v1.8.0       296a6d5035e2d   12.9MB
k8s.gcr.io/pause                 3.5          ed210e3e4a5ba   301kB
registry.k8s.io/coredns/coredns  v1.9.3       5185b96f0becf   14.8MB
```

-

- crictl inspecti leviyanx/wasm-hello-example

```
root@VM-0-17-ubuntu:~/containerd# crictl inspecti leviyanx/wasm-hello-example
{
  "status": {
    "id": "fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ=",
    "repoTags": [
      "fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ="
    ],
    "repoDigests": [
      "fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ="
    ],
    "size": "1919750",
    "uid": null,
    "username": "",
    "spec": null,
    "pinned": false
  },
  "info": {
    "chainID": "wasm-has-no-chain-id",
    "imageSpec": {
      "created": "2023-03-21T13:38:57.8795023+08:00",
      "architecture": "",
      "os": "",
      "config": {},
      "rootfs": {
        "type": "",
```

cri image operation
wasm module validation test

- crictl rmi leviyanx/wasm-hello-example

```
root@VM-0-17-ubuntu:~/containerd# crictl rmi leviyanx/wasm-hello-example
INFO[2023-03-21T13:40:55.693598475+08:00] RemoveImage "leviyanx/wasm-hello-example"
INFO[2023-03-21T13:40:55.693717534+08:00] RemoveImage "leviyanx/wasm-hello-example" returns successfully
Deleted: fp051QR9RWgnkrmRlNAldEU9pWD_RyLdVG0stfDImoQ=
```

- crictl images

```
root@VM-0-17-ubuntu:~/containerd# crictl images
IMAGE                          TAG        IMAGE ID         SIZE
docker.io/library/busybox      latest     7cfbbec8963d8    2.6MB
docker.io/wasmedge/example-wasi latest    332aed9d05baa    524kB
k8s.gcr.io/coredns/coredns     v1.8.0     296a6d5035e2d    12.9MB
k8s.gcr.io/pause               3.5        ed210e3e4a5ba    301kB
registry.k8s.io/coredns/coredns v1.9.3    5185b96f0becf    14.8MB
```

cri image operation

原来oci image功能正常使用

- crictl pull busybox

```
INFO[2023-03-21T13:46:33.606704489+08:00] PullImage "busybox"
INFO[2023-03-21T13:46:33.606742994+08:00] Image "busybox" has wasm annotation: map[]
INFO[2023-03-21T13:46:35.379394231+08:00] ImageCreate event &ImageCreate{Name:docker.io/library/busybox:latest,Labels:map[string]string{io.cri-containerd.image: managed,},XXX_unrecognized:[],}
INFO[2023-03-21T13:46:35.382417346+08:00] ImageCreate event &ImageCreate{Name:sha256:7cfbbec8963d8f13e6c70416d6592e1cc10f47a348131290a55d43c3acab3fb9,Labels:map[string]string{io.cri-containerd.image: managed,},XXX_unrecognized:[],}
INFO[2023-03-21T13:46:35.384704410+08:00] ImageUpdate event &ImageUpdate{Name:docker.io/library/busybox:latest,Labels:map[string]string{io.cri-containerd.image: managed,},XXX_unrecognized:[],}
INFO[2023-03-21T13:46:35.386884363+08:00] ImageCreate event &ImageCreate{Name:docker.io/library/busybox@sha256:b5d6fe0712636ceb7430189de28819e195e8966372edfc2d9409d79402a0dc16,Labels:map[string]string{io.cri-containerd.image: managed,},XXX_unrecognized:[],}
INFO[2023-03-21T13:46:35.387458527+08:00] PullImage "busybox" returns image reference "sha256:7cfbbec8963d8f13e6c70416d6592e1cc10f47a348131290a55d43c3acab3fb9"
Image is up to date for sha256:7cfbbec8963d8f13e6c70416d6592e1cc10f47a348131290a55d43c3acab3fb9
```

- crictl images

```
root@VM-0-17-ubuntu:~/containerd# crictl images
IMAGE                          TAG           IMAGE ID        SIZE
docker.io/library/busybox      latest        7cfbbec8963d8   2.6MB
docker.io/wasmedge/example-wasi latest       332aed9d05baa   524kB
errorRepoTag                   errorRepoTag  fp051QR9RWgnk   1.92MB
k8s.gcr.io/coredns/coredns     v1.8.0        296a6d5035e2d   12.9MB
k8s.gcr.io/pause               3.5           ed210e3e4a5ba   301kB
registry.k8s.io/coredns/coredns v1.9.3       5185b96f0becf   14.8MB
```

cri image operation
原来oci image功能正常使用

- crictl inspecti docker.io/library/busybox

```
root@VM-0-17-ubuntu:~/containerd# crictl inspecti docker.io/library/busybox
{
  "status": {
    "id": "sha256:7cfbbec8963d8f13e6c70416d6592e1cc10f47a348131290a55d43c3acab3fb9",
    "repoTags": [
      "docker.io/library/busybox:latest"
    ],
    "repoDigests": [
      "docker.io/library/busybox@sha256:b5d6fe0712636ceb7430189de28819e195e8966372edfc2d9409d79402a0dc16
    ],
    "size": "2596524",
    "uid": null,
    "username": "",
    "spec": null,
```

-

cri image operation
原来oci image功能正常使用

- crictl rmi docker.io/library/busybox

```
root@VM-0-17-ubuntu:~/containerd# crictl rmi docker.io/library/busybox
INFO[2023-03-21T13:58:48.689075864+08:00] RemoveImage "docker.io/library/busybox"
INFO[2023-03-21T13:58:48.691286523+08:00] ImageDelete event &ImageDelete{Name:docker.io/library/busybox:latest,XXX_unrecognized:[]
INFO[2023-03-21T13:58:48.692919626+08:00] ImageDelete event &ImageDelete{Name:docker.io/library/busybox@sha256:b5d6fe0712636ceb743
16,XXX_unrecognized:[],}
INFO[2023-03-21T13:58:48.695548270+08:00] ImageDelete event &ImageDelete{Name:sha256:7cfbbec8963d8f13e6c70416d6592e1cc10f47a348131
INFO[2023-03-21T13:58:48.705358901+08:00] RemoveImage "docker.io/library/busybox" returns successfully
Deleted: docker.io/library/busybox:latest
```

- crictl images

```
root@VM-0-17-ubuntu:~/containerd# crictl images
IMAGE                          TAG       IMAGE ID        SIZE
docker.io/wasmedge/example-wasi latest   332aed9d05baa   524kB
k8s.gcr.io/coredns/coredns      v1.8.0    296a6d5035e2d   12.9MB
k8s.gcr.io/pause                3.5       ed210e3e4a5ba   301kB
registry.k8s.io/coredns/coredns v1.9.3    5185b96f0becf   14.8MB
```