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## LeadingAgile Code Analysis Gather CLI Docker Image

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## 1. Using the Gather CLI Container

### 1.1. Pull the Image

To begin to use the Gather CLI image, you must pull it from the LeadingAgile Studios Docker Registry.

```
docker pull leadingagilestudios.azurecr.io/analysis/gather-cli:0.1.1
```

Adjust the version tag to match the current version of the Gather CLI image.

You must be authorized to access the LeadingAgile Studios Docker Registry, logged in to the LeadingAgile Azure instance, and logged in to the LeadingAgile Studios Docker Registry.

Using the Azure CLI, the steps to authenticate for pulling the image are:

```
az login
az acr login --name leadingagilestudios
```

### 1.2. Using Gather CLI

Use `docker run` to execute the Gather CLI. The options up to the image name are processed by Docker Run. The options after the image name are processed by the Gather CLI tool itself.

```
docker run -it --rm \
  -v ~/folder/with/repos/:/opt/repos/ \
  -v ~/folder/for/output/:/opt/output/ \
  leadingagilestudios.azurecr.io/analysis/gather-cli:0.1.1 \
  -s 2021-03-31 \
  -r RUN_Q1_2021 \
  -t 52 \
  -c /opt/repos/config.yaml
-g
```

Gather and Analyze data from a collection of Team repositories in a common folder.

Parameters before the image name are for the docker run command.

Parameters after the image name are passed to the internal processing script in the container.

	Option	Description
	--start-date	Start Date (for the --start-date option to metrics.gather). Optional, defaults to current date.
	--run-name	Run Name (for the --run-name option to metrics.gather and metrics.answers team). Optional, defaults to current date.
	-t, --steps	Weeks (steps) to processed (for the --steps option to metrics.gather). Optional, defaults to 52.
	--team-config	Configuration YAML File to be used while processing repositories
-g, --disable-graphs		Disable Graph Generation (default is to generate all graphs). Optional, defaults to NO.
-a, --disable-answers		Disable Answer Generation (default is to generate all answers for repositories and the team).
-s, --disable-statistics		Disable Statistics Generation (default is to generate all statistics for repositories and the team).
-m, --disable-metrics		Disable Metrics Generation (default is to gather the basic metrics data on which every other metrics are based).
	-v	Enable verbose output
	--debug	Enable verbose logging
	-V, --version	Version information

The Disable options are used to reduce run time (Graphs), regenerate parts of the analysis (Answers and Metrics).

The container will load, process the actions specified, and the results will be stored in the host folder mounted as /opt/output/.

For the Gather CLI docker the above command will:

- Process all the repositories found in ~/folder/with/repos (which is mounted in the container as /opt/repos/)
- Write the gather data to the repository- and run-folders based at ~/folder/for/output (which is mounted in the container as /opt/output/)
- Use a START\_DATE of 2021-03031
- Use a RUN\_NAME of RUN\_Q1\_20201
- Use a config file inside ~/folder/with/repos named config.yaml
- Suppress creation of graphs

Be sure that the folder you mount for output exists **BEFORE** running the container, else the docker mount will fail and **NO DATA** will be visible on the host. The Gather CLI will appear to run, but it will be writing to a folder on a layer in the container which will disappear when the container exits.

### 1.2.1. Configuration File

A configuration file can be included in various portions of the assessment tool to help tailor the results. In particular, two areas are when calculating statistics and answering questions for a team(s). This file is in YAML format.

**1.2.1.1. statistics configuration** When there is a need to generate statistics for a team that shares a repository with other teams (i.e. In a Mono-Repo scenario), the configuration file allows the ability to state just *how* the breakdown of the repository needs to occur. In YAML, under the key of `statistics`, each team that is sharing a repository can be listed along with a list of files and/or directories that the team is responsible for. Only these teams will count toward the statistics generated for that team.

If, for instance, you have team **akyula** working inside the `missile-guidance-system` repository alongside team **boryei**, where each team handled a set of sub-directories within the repository, the statistics section would look like:

```
statistics:
  boryei:
    missile-guidance-system:
      - guidance
      - targeting
  akyula:
    missile-guidance-system:
      - firing-system
      - evasion
```

**1.2.1.2. answers configuration** There are times when generating answers that the assessor will want to run all of the repositories for all of the teams involved in the Expedition at once and report on the various teams individually. Using the answers section of the configuration file allows for this very scenario.

Simply list each team and their associated repositories and only those repositories will be included when generating the team-level report for how each team is doing when asked the various questions the tool attempts to answer.

Using the same two teams as above, an example of the answers section would look something like:

```

answers:
  boryei:
    - missile-guidance-system
    - sonar
    - ballast-control
  akyula:
    - missile-guidance-system
    - engine-control
    - communications

```

### 1.2.1.3. Configuration File Example

```

statistics:
  team-name-one:
    repository-main-directory-name:
      - path/to/folder
      - another/path/to/folder
      - some/path/to/file.ext
    repository-two-directory-name:
      - example/path
      - other/example/path

answers:
  team-name-one:
    - repository-main-directory-name
    - repository-two-directory-name
    - repository-three-directory-name
  team-name-two:
    - repository-main-directory-name
    - repository-two-directory-name
    - repository-four-directory-name

```

## 2. Gather CLI as an Example

The way the Gather CLI image is built is an example of how to do costume processing with the `metrics.gather` tool inside a docker image. This section explains the how-to for creating this image.

If you only need the existing Gather CLI images, it is better to pull them from the registry or build them using the `build_gather_dockers.sh` script.

### 2.1. Create a Dockerfile

Create a Dockerfile that uses `gather` as the base image. `gather` contains everything it needs.

Put this Dockerfile (and the entrypoint described below) in a folder with nothing else in the folder. Anything in the folder becomes available to the image during the build.

```
FROM gather:latest

ADD ./gather-cli_entrypoint.sh /usr/local/bin/gather-cli_entrypoint.sh
RUN chmod a+x /usr/local/bin/gather-cli_entrypoint.sh

ENTRYPOINT ["/usr/local/bin/gather-cli_entrypoint.sh"]
```

*In this case the image is referenced as gather:latest. You should pull the current version of gather and tag it as gather:latest or use the full image identifier instead. See the gather docker image documentation for more details.*

Dockerfile Reference

## 2.2. Create Entrypoint to Do the Work

Create an entrypoint script to call Gather and do the work. This entrypoint script will be run when the container is run.

Put this entrypoint script in the folder with the Dockerfile (described above) in a folder with nothing else in the folder. Anything in the folder becomes available to the image during the build.

The example below is set up so that it assumes:

- There is a folder in the container called /opt/repos/ which has a collection of git repositories to process
- There is a folder in the container called /opt/output/ will be the output destination for the results

Both of these folders are mounted using the docker -v <host\_folder>:<container\_folder> option.

*The helper scripts used here are described the Details section.*

```
#!/usr/bin/env bash

source /usr/local/bin/gather_entrypoint_utils.sh

cd /opt/code-analysis || exit 1

prep_ssh_keys_folder
prep_git_authentication

repos_folder="/opt/repos"
output_folder="/opt/output"

for repo_dir in "${repos_folder}"/*; do
    if [ -d "${repo_dir}" ]; then
        repo_output_folder="${output_folder}/${basename "${repo_dir}"}"
```

```

python -m metrics.gather -r "${repo_dir}" -t 52 -dg -o
    "${repo_output_folder}"

# answer the questions on the repo for all the languages found
for stats_file in
    "${repo_output_folder}"/*_data_statistics.json; do
    python -m metrics.answer -s "${stats_file}" -o
        "${repo_output_folder}"
done    fi
done

```

## 2.3. Build the Image

Use the `build_gather_dockers.sh` to build all the docker images. These instructions are for cases where you need to build the Gather CLI Docker separately for some reason

This assumes you have built, or have a pulled from a registry, a gather image.

Tag the gather image as `gather:latest` because that is what the `GatherCliDockerfile` expects. (if using the `build_gather_dockers.sh` this is done for you.)

```

docker tag leadingagilestudios.azurecr.io/analysis/gather:0.1.1
gather:latest

```

Build the Gather CLI image:

```

docker build --rm -t
    leadingagilestudios.azurecr.io/analysis/gather-cli:0.1.1 -f
    GatherCliDockerfile ./

```

This will generate your `gather-cli` image.

You should be able to see it in the current list of images (yours might be different in the tags and IDs):

```

docker image ls

```

REPOSITORY	IMAGE ID	CREATED	SIZE	TAG
leadingagilestudios.azurecr.io/analysis/gather-cli	6d53cb6c9c6e	4 hours ago	3.89GB	0.1.1
gather	5355a215cc2a	4 hours ago	3.89GB	latest
leadingagilestudios.azurecr.io/analysis/gather	5355a215cc2a	4 hours ago	3.89GB	0.1.1
leadingagilestudios.azurecr.io/analysis/gather-dev	a26bf4a4ef35	4 hours ago	4.06GB	0.1.1
swift	8d02b9b0bbd0	5 weeks ago	1.7GB	5.3-focal

## 2.4. Details

### Helper scripts

The gather image includes some helper scripts to ease the developement of the entrypoint script. These helpers are installed into the container in the gather image. Any image derived from gather will be able to use them and not have to re-ADD them.

#### `/usr/local/bin/gather_entrypoint_utils.sh`

This script is intended to be sourced into an entrypoint script.

It contains these functions:

---

#### `prep_ssh_keys_folder`

Uses the `/tmp/.ssh/` mounted folder to initialize the container ssh configuration using keys made available from the host.

- Checks for the existence of a folder `/tmp/.ssh/`. You need to mount this folder when running the container (see the description above) for it to exist in the container. This function does nothing if you do not mount it in exactly this container location.
- If `/tmp/.ssh/` exists, the function:
  - Copies all public and private key files from `/tmp/.ssh/` to `~/.ssh/`
  - Ensures the `ssh-agent` is running
  - Registers all private keys with the agent using `ssh-add`

Public key files are identified as any file that has a line beginning with `ssh-`.

Private key files are identified as any file that contains `—BEGIN.*PRIVATE KEY—`.

You can limit the keys the container can use by creating a folder with only the keys needed.

If you do not need to do any ssh based activities, you do not need to using the ssh key folder. If you are only processing repositories in local folders or you never user git protocol to clone/update repositories, you will not need ssh.

### **prep\_git\_authentication**

Uses the environment variables `GITHUB_USR` and `GITHUB_PAT` to initialize git/Github authentication so that authentication does not happen on each git access to a protected resource.

- Checks that both `GITHUB_USR` and `GITHUB_PAT` environment variables are set with `docker run` (i.e. `-e GITHUB_USR=fred -e GITHUB_PAT=fd12ac`)
- If they are set:
  - Sets the git credential timeout to 86400 seconds (24hours) in the git config
  - Authenticates the user with `git credential approve`

This is what it does, in case you would rather control that in your entrypoint instead:

```
git config --global credential.helper 'cache --timeout=86400'
(echo url=https://github.com; echo username="${GITHUB_USR}"; echo
  password="${GITHUB_PAT}"; echo ) | git credential approve
```

If you only access local repositories (i.e. do not need to clone or fetch from external repositories), you do not need to use the credentials when running the container.