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HPE Swarm Learning 2.2.0 Release Notes

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Release notes

Description

HPE Swarm Learning provides decentralized privacy-preserving, edge machine learning at the data source. The blockchain network provides the ability to collaboratively share the learnings of the models with participating HPE Swarm Learning nodes for insights at the data source, tremendously enhancing data privacy and improving insights. HPE Swarm Learning extends federated learning and obviates the need for a central server. A decentralized, privacy-preserving ML framework utilizes the computing power at, or near, the distributed data sources to run the ML algorithms that train the models. Training the model occurs at the edge where data is most recent, where accurate and data-driven decisions are necessary.

In this completely decentralized architecture, only insights learned are shared with the collaborating ML peers, not the raw data. This tremendously enhances data privacy.

Product Package contents

The following table lists the components of the HPE Swarm Learning:

Part number	Description	Comment	Extension	Version
Q2V41-11091	HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS	Tar file	.tar.gz	2.2.0
Q2V41-11092	HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS	Signature of the tar file	.tar.gz.sig	2.2.0
Q2V41-11093	HPE_SWARM_LEARNING_DOCKER_HASH_DIGEST	JSON file	.json	2.2.0
Q2V41-11094	HPE_SLM_UI_INSTALLER_LINUX	SLM-UI Linux installer file		2.2.0
Q2V41-11095	HPE_SLM_UI_INSTALLER_LINUX	Signature of SLM-UI Linux installer	.sig	2.2.0
Q2V41-11096	HPE_SLM_UI_INSTALLER_WINDOWS	SLM-UI Windows installer file	.exe	2.2.0
Q2V41-11097	HPE_SLM_UI_INSTALLER_MAC	SLM-UI Mac Installer file		2.2.0
sl	Swarm Learning Docker image			2.2.0
sn	Swarm Network Docker image			2.2.0
swci	Swarm Command Interface Docker image			2.2.0
swop	Swarm Operator Docker image			2.2.0
slm-ui	Swarm Learning Management UI (SLM-UI) Docker Image			2.2.0
slm-ui-postgres	SLM-UI postgres database Docker image			2.2.0

Prerequisites

See “Prerequisites” section in *HPE Swarm Learning Installation and Configuration Guide*.

Languages

Languages supported for this release: English

Download and deployment

See “Swarm Learning Installation” section in *HPE Swarm Learning Installation and Configuration Guide*.

Enhancements and defect fixes

This release has the following content.

Features

- **Targeted SWOP command used to target the task on a specific SWOP node.**
 - Dynamic addition of peers to an ongoing task execution.
 - Retrying the failed Task on a SWOP node.
- **WITH ALL PEERS command to trigger a task execution on all available peers.**
- **UI/UX Enhancements**
 - Experiment tracking support to display the training attributes for multiple training rounds.
 - Parallel Swarm installation - Option to add multiple hosts simultaneously.
 - View SWOP profile and task yaml.
 - Support Podman.
- **Swarm support for SPIRE as certificate manager.**
 - Added CLI based SPIRE example (spire/cifar10).
- **Real world NIH example** – Added new example to show case Swarm use case with real world NIH dataset.
- Documentation enhancements.

Defect fixes

- Stale SL Admin node stuck waiting for quorum while a new Admin is selected.
- Non-default APLS port not used in SLM-UI.
- Error in restart flow of SLM-UI.

For more information on the enhancements and defect fixes, see *HPE Swarm Learning User Guide* and *HPE Swarm Learning Installation and Configuration Guide*.

Issues and workarounds

- SPIRE with Podman runtime is not supported.
- Reverse proxy, SPIRE certificates are not supported through SLM-UI.
- While running through SLM-UI, for a multi-host example, the Docker network names should match the associated Docker network names in the SWOP profiles.
- In SLM-UI, while creating SN and SWOP nodes, user must specify the proxy, if any, under *Show advanced* option.
- While running a multi-host example through SLM-UI, user cannot use the `<SWARM-NETWORK>` macro in the SWOP profile.
- While using SLM-UI any **Upload** dialogue box expects the files to be present on the machine where SLM-UI is rendered.
- **Installation of HPE Swarm Learning on air-gaped systems or if the SLM-UI Installer runs into any issue and not able to install**
 - a. Download the following from **HPE My Support Center (MSC)** on a host system that has internet access - tar file containing docs, scripts and examples, and the signature file for the above tar file.
 - b. Untar the tar file under `/opt/hpe/swarm-learning`.
 - c. Do a Docker login from your host:

```
docker login hub.myenterpriselicense.hpe.com -u <YOUR-HPE-PASSPORT-EMAIL> -p hpe
```
 - d. Pull the signed Swarm Learning images from HPEs Docker Trust Registry (DTR):

```
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/sn:2.2.0
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/sl:2.2.0
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swci:2.2.0
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swop:2.2.0
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui:2.2.0
docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui-postgres:2.2.0
docker pull hello-world
```
 - e. Copy the tar file and Docker images to all the air-gaped Linux systems.
 - f. Contact HPE for further instructions on manually starting the SLM-UI.

- **System resource issues if too many SLs are mapped to the same SN**

When configuring Swarm Learning you may encounter system resource issues if too many SLs are mapped to same SN.

For example:

```
"swarm.blCnt : WARNING: SLBlackBoardObj : errCheckinNotAllowed:CHECKIN NOT ALLOWED"
```

The suggested workaround is to start with mapping four SL to one SN. Then after, slowly scale number of SLs to SN.

- **SWCI waits for task-runner indefinitely even after task completed or failed**

You must ensure no failure in ML code before Swarm training starts. Check using `SWARM_LOOPBACK` ENV and ensure, user code runs fine and local training completes successfully.

Troubleshooting

- x.509 certificates are not configured correctly – See <https://www.linuxjournal.com/content/understanding-public-key-infrastructure-and-x509-certificates>.
- License server is not running or Swarm licenses are not installed - See chapter "*HPE AutoPass License Server License Management*" in **AutoPass License Server User Guide** for details of the web GUI management interface and how to install license.
- Swarm core components (Docker containers) are not started or errors while starting. – For more information on how to start Swarm Learning, see *HPE Swarm Learning Installation and Configuration Guide*.
- Swarm components are not able to see each other - See the *HPE Swarm Learning Installation and Configuration Guide* to see if the required ports are exposed.
- User is not using the Swarm APIs correctly – See *HPE Swarm Learning User Guide* for details of API.
- Errors related to SWOP task definition, profile schema, or SWCI init script – These are user defined artifacts. See *HPE Swarm Learning User Guide*.
- Any experimental release of Ubuntu greater than LTS 22.04 may result in the following error message when running SWOP tasks.
`SWOP MAKE_USER_CONTAINER fails.`

This occurs as SWOP is not able to obtain image of itself because of Docker setup differences in this experimental Ubuntu release. Switch to 22.04 LTS to resolve this issue.

- On the OS platform (or base images), some of the dependent open-source packages (for example, apt packages) may change asynchronously. In such cases, users must update their deployment environment with compatible and/or latest packages.

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