Hewlett Packard Enterprise

HPE Swarm Learning 2.0.0 Release Notes

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Acknowledgments

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
Q2V41-11050	**HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS**	Tar file	.tar.gz	2.0.0
Q2V41-11051	**HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS**	Signature of the tar file	.tar.gz.sig	2.0.0
Q2V41-11052	**HPE_SWARM_LEARNING_DOCKER_HASH_DIGEST**	JSON file	.json	2.0.0
Q2V41-11053	**HPE_SLM_UI_INSTALLER_LINUX**	SLM-UI Linux installer file		2.0.0
Q2V41-11054	**HPE_SLM_UI_INSTALLER_LINUX**	Signature of SLM-UI Linux installer	.sig	2.0.0
Q2V41-11055	**HPE_SLM_UI_INSTALLER_WINDOWS**	SLM-UI Windows installer file	.exe	2.0.0
Q2V41-11056	**HPE_SLM_UI_INSTALLER_MAC**	SLM-UI Mac Installer file		2.0.0
`sl`	**Swarm Learning Docker image**			2.0.0
`sn`	**Swarm Network Docker image**			2.0.0
`swci`	**Swarm Command Interface Docker image**			2.0.0
`swop`	**Swarm Operator Docker image**			2.0.0
`slm-ui`	**Swarm Learning Management UI (SLM-UI) Docker Image**			2.0.0
`slm-ui-postgres`	**SLM-UI postgres database Docker image**			2.0.0

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

- **High availability for SN**
  - Handling Sentinel node failure.
  - Any SN node can act as sentinel while adding new node.
  - Supports mesh topology of SN network.
- **High availability for SL leader**
  - Electing new merge leader when a leader failure is detected.
  - Handles stale leader recovery.
- **Swarm Learning Management UI (SLM-UI)**
  - Swarm product installation through SLM-UI.
  - Deploy and Manage Swarm Learning through SLM-UI.
- **Reverse Proxy –** Feature to reduce number of ports to be opened for Swarm training.
- **AMD GPUs -** Feature updates to enable local training with AMD GPUs.
- Improved diagnostics and utility script for logs collection.
- Provision to opt out from leader election (`SL_MAKE_ME_ADMIN`) for any SL node. Excludes nodes for performance, privacy, and other reasons from becoming a merge leader.

Defect fixes

- Version agnostic container info to run SWOP container across Linux distributions.
- Updates to address issues in concurrent trainings.
- Improved `LIST NODES` command to display the list of Swarm nodes that have registered and are currently active.
- SWCI aborts if the task fails in between `exit` on `error` command.
- Corrected SWCI error reporting and SL-UID mapping in `GET TASKRUNNER PEER STATUS` command for better diagnostics.
- Corrected `run-swci` script to handle `swci_init` file.
- Improved SWCI inline HELP.

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

- While running through SLM-UI, for a multi host example the Docker network names should match with the associated Docker network names in the SWOP profiles.
- In SLM-UI while creating SN and SWOP nodes, you must specify the proxy, if any, under *Show advanced* option.
- While running a multi host example through SLM-UI, you 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 laptop.
- **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:2.0.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/sl:2.0.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swci:2.0.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swop:2.0.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui:2.0.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui-postgres:2.0.0
  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.

- **SWOP may not launch SL containers correctly on some versions of Docker. It would incorrectly report completion of run task within a few seconds**

  The suggested workaround is to run the following command and then re-run the task:

  ```
  docker tag hub.myenterpriselicense.hpe.com/hpe/swarm-learning/sl:2.0.0 hub.docker.hpecorp.net/swarm-learning/sl:2.0.0
  ```

- **Reverse proxy examples might not run due to the recent update in a few of the compatible apt packages for building the BIND9 image**

  The suggested workaround is to change the version of the following packages in the BIND9 docker file located in the path `/examples/reverse-proxy/common/Bind-Dockerfile`.

Package-Name	From	To
bind9	1:9.18.1-1ubuntu1.3	1:9.18.12-0ubuntu0.22.04.1
bind9-dnsutils	1:9.18.1-1ubuntu1.3	1:9.18.12-0ubuntu0.22.04.1
curl	7.81.0-1ubuntu1.8	7.81.0-1ubuntu1.10

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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