Hewlett Packard
Enterprise

HPE Swarm Learning 2.1.0 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
Q2V41-11077	**HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS**	Tar file	.tar.gz	2.1.0
Q2V41-11078	**HPE_SWARM_LEARNING_DOCS_EXAMPLES_SCRIPTS**	Signature of the tar file	.tar.gz.sig	2.1.0
Q2V41-11079	**HPE_SWARM_LEARNING_DOCKER_HASH_DIGEST**	JSON file	.json	2.1.0
Q2V41-11080	**HPE_SLM_UI_INSTALLER_LINUX**	SLM-UI Linux installer file		2.1.0
Q2V41-11081	**HPE_SLM_UI_INSTALLER_LINUX**	Signature of SLM-UI Linux installer	.sig	2.1.0
Q2V41-11082	**HPE_SLM_UI_INSTALLER_WINDOWS**	SLM-UI Windows installer file	.exe	2.1.0
Q2V41-11083	**HPE_SLM_UI_INSTALLER_MAC**	SLM-UI Mac Installer file		2.1.0
`sl`	**Swarm Learning Docker image**			2.1.0
`sn`	**Swarm Network Docker image**			2.1.0
`swci`	**Swarm Command Interface Docker image**			2.1.0
`swop`	**Swarm Operator Docker image**			2.1.0
`slm-ui`	**Swarm Learning Management UI (SLM-UI) Docker Image**			2.1.0
`slm-ui-postgres`	**SLM-UI postgres database Docker image**			2.1.0

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

- **Persisting data in SN**
  - Make the SN blockchain persist on disk.
- **Swarm on Podman (alternative for Docker)**
  - Support Podman container runtime.
  - Run Swarm containers in rootless privileges.
  - Added support for SE Linux with Podman on RHEL.
- **UI/UX Features**
  - Model training metrics – Accuracy, Loss etc. at SL node level and global Swarm.
  - Viewing ML container logs.
  - Swarm log collector.
- **New merge methods for Swarm merge process**
  - Co-ordinate Median and Geometric Median.
  - Configurable merge through I/O or Memory optimized modes.
- **Secure web mode connection (HTTPs) for SWCI**
- **Enhanced diagnostics for SWOP and SN**
- **Containerized License Server (APLS)**
- **Documentation and example updates**

Defect fixes

- Defect fixes in SN restart path.
- Corrected `LIST NODES` to display only active nodes.
- Swarm components exits with proper diagnostics if certificates are expired.
- Swarm Learning Topology updated to reflect active nodes.
- Reverse proxy updates to consider the port number along with service name.

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

- Reverse proxy, SPIRE certificates are not supported through SLM-UI.
- SLM-UI does not support Podman as container runtime.
- 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, 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:2.1.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/sl:2.1.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swci:2.1.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/swop:2.1.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui:2.1.0
  docker pull hub.myenterpriselicense.hpe.com/hpe/swarm-learning/slm-ui-
  postgres:2.1.0
  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 SLs to one SN. Then, slowly scale the 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 the 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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