Enterprise Data Platform (EDP) Tutorial

11.2

February 2026

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*Estimated time to read: 3 minutes*

Overview

The Enterprise Data Platform (EDP) creates a **central CDM Data Lake** that aggregates data from all MES installations belonging to a customer.

Local sites replicate their operational data into a **shared ClickHouse database**, where the EDP House Keeper processes it into a unified CDM model.

At a high level, the movement of replicated data from each MES installation into the EDP occurs through the sequence below:

1. **Local MES** - Generates Replication Events and sends to the **Local Kafka**.
2. **EDP Connector** - Consumes local replication topics and forwards events to the **EDP API**.
3. **EDP Service** - Receives the payload and publishes it into the **EDP Kafka topics**.
4. **EDP House Keeper** - Consumes the EDP topics to build the per-installation **ODS** and the centralized **CDM**.

EDP - Enterprise Data Platform
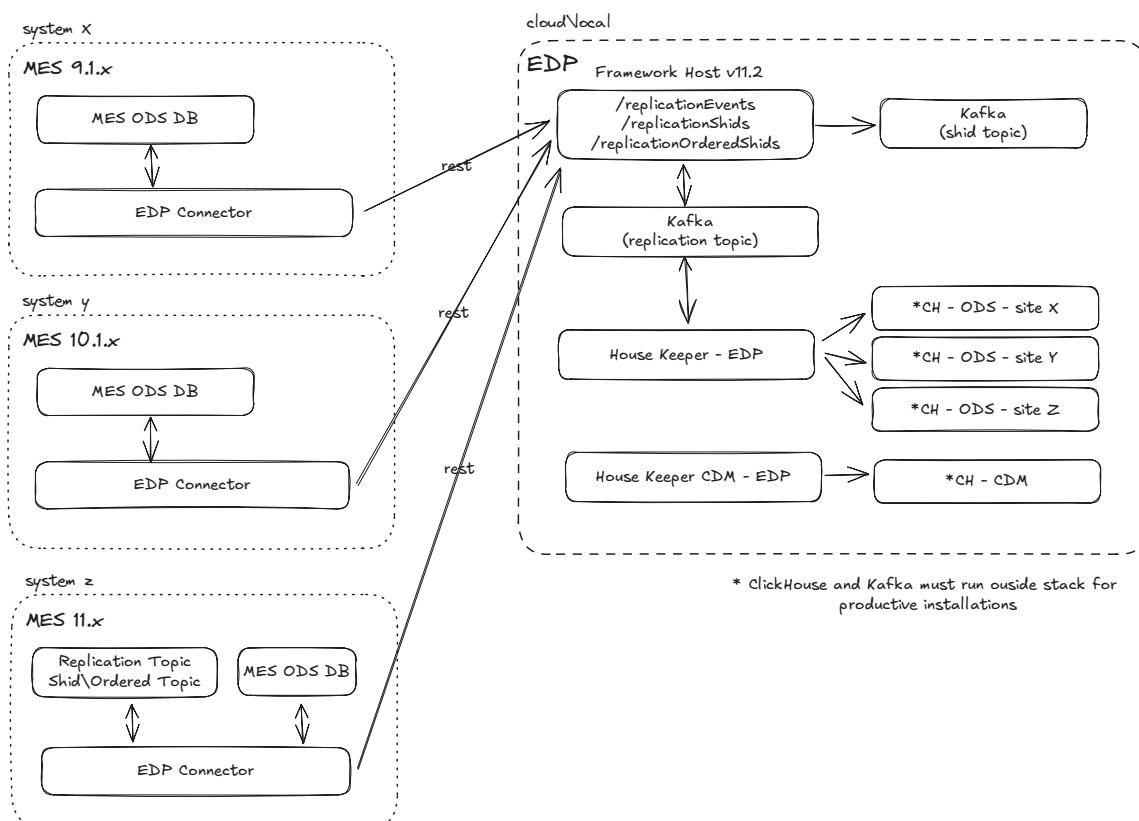
Information Flow

Local Environment to EDP Connector

Local MES systems publish two types of messages into Kafka replication topics:

- `dp_replication_events`
- `dp_replication_shids` (Service History IDs)
- `dp_shids_ordered` (Ordered Service History IDs)

The **EDP Connector** consumes these topics from Kafka and forwards the messages to the EDP. The connector must be configured following the instructions described on the EDP Connector Installation Process.

EDP Connector to EDP Service

The EDP exposes a dedicated API endpoint. For each payload received, the service it identifies the source installation:

- Either extracted from message headers added by the connector.
- Or enriched at the host level on arrival.

The validated payload is then ready to be forwarded into the internal EDP data pipeline.

EDP Service to EDP House Keeper

After processing the incoming request, the EDP Service publishes the data into the EDP Kafka topics:

- `edp_replication_events`
- `edp_replication_shids`
- `edp_shids_ordered`

These topics are then consumed by the EDP House Keeper, which is responsible for:

- Replicating ODS data into per-installation ClickHouse databases.
- Executing the CDM scripts to build the unified Data Lake.
- Enforcing metadata consistency and schema transformation rules.

This ensures that all incoming data is transformed, normalized, and aligned with the EDP's unified CDM structure.

EDP House Keeper Responsibilities

As previously mentioned, the EDP House Keeper performs three main functions:

Replicate ODS Data Per Installation

Each installation receives its own **ClickHouse ODS database**. To perform replication correctly, the House Keeper must load all **metadata** associated with that installation. This metadata is stored across a set of **State** and **History** tables, listed below.

State Tables

- `dbo_T_EntityType`
- `dbo_T_EntityTypeProperty`
- `dbo_T_SmartTable`
- `dbo_T_SmartTableProperty`

- `dbo_T_SmartTablePrecedenceKey`
- `dbo_T_GenericTable`
- `dbo_T_GenericTableProperty`
- `dbo_T_ScalarType`

History Tables

- `dbo_T_EntityTypeHst`
- `dbo_T_EntityTypePropertyHst`
- `dbo_T_SmartTableHst`
- `dbo_T_SmartTablePropertyHst`
- `dbo_T_SmartTablePrecedenceKeyHst`
- `dbo_T_GenericTableHst`
- `dbo_T_GenericTablePropertyHst`

These metadata tables are stored inside ClickHouse ODS and must be correctly transferred from local systems.

Selection and Execution of CDM Scripts

To build the final CDM Data Lake:

- A set of scripts must exist per MES version.
- Each script set converts that installation's ODS structure into the EDP-standard CDM structure.

Maintaining ISA-95 Structure

All ingested data must contain the mandatory ISA-95 hierarchy:

- Enterprise
- Site
- Facility (Area equivalent)

If ISA-95 information is **missing** in the replicated payload, the EDP does not inject default values automatically. Instead, this information is defined through the **Data Silo** entity, which customers must configure for each MES installation. The Data Silo provides the authoritative defaults for these properties and ensures that all incoming data is grouped and interpreted correctly within the Enterprise Data Platform. To configure the Data Silo entity, follow the steps described in the EDP Connector Installation Process.

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