Cloudera Edge Management 2.1.2

Getting Started

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What is Cloudera Edge Management?

Cloudera Edge Management (CEM) is a solution that enables you to manage, control, and monitor agents that are deployed on the edge devices in IoT implementations. You can use these agents to collect real-time data originating from the devices to create and push actionable intelligence and insights to the place of data origin.

CEM consists of two components:

- MiNiFi - A lightweight edge agent that implements the core features of Apache NiFi, focusing on data collection and processing at the edge.
- Edge Flow Manager (EFM) - An agent management hub that supports a graphical flow-based programming model to develop, deploy, and monitor edge flows on thousands of MiNiFi agents.

CEM can export time series metrics to several metric storage providers. The recommended metrics store service is Prometheus. Prometheus integrates with Grafana for time series metric visualization. With Prometheus and Grafana, you can store and visualize metrics for CEM.

MiNiFi

MiNiFi is an edge agent that you can deploy into thousands of edge devices to collect data. It is a light-weight version of NiFi and acts as a runtime at the edge to execute data flows.

MiNiFi comes in two flavors: Java and C++.

- Java agent

  The Java agent is able to run most of the available processors of NiFi, but is a larger binary distribution and consumes greater system resources. If you need maximum flexibility to make routing and processing decisions at your point of origin of data, the Java agent is a good fit.
- C++ agent

  The C++ agent is a smaller binary, consumes low system memory but it is able to run a limited subset of NiFi processors. If your primary concern is gathering and pushing data to downstream consumers and minimizing system impact, the C++ agent is a good fit. The smaller size enables it to be embedded within various types of devices as small as Raspberry Pi or other sensors used within IoT implementations.

For information about all the differences between the MiNiFi C++ and Java agents, check out the video on the Cloudera Edge Management YouTube playlist:

Edge Flow Manager

You can use Edge Flow Manager (EFM) which is a management hub and supports a GUI-based tool to manage, control, and monitor MiNiFi agents deployed in the field. EFM helps reducing the time and cost of developing IoT applications by enabling you to visually build flows for collecting and processing data without writing any code.

EFM allows you to develop, deploy, run, and monitor edge flow applications and machine learning models at the edge. EFM offers an easy-to-use NiFi-like user interface that allows users to leverage many of the NiFi processors to design data flows that can be pushed out to the edge. These data flows can instruct the edge agent to collect specific data points from the edge device as well as process it at the edge and stream it into the enterprise. These flows can also be changed from the same user interface and can be deployed to the edge to any specific class of devices. This allows the user to change the behavior of a specific set of agents in the field based on specific criteria.

For more information about EFM, check out the video on the Cloudera Edge Management YouTube playlist:

Terminology in CEM

Learn the terminologies used in Cloudera Edge Management (CEM).

Agent

Apache MiNiFi Java or C++ agent. MiNiFi implements the core features of Apache NiFi, focusing on data collection and processing the data at the edge.

Agent Manifest Resolution Strategy

The logic used by the EFM server to assign an Agent Manifest to an Agent Class for the purpose of controlling which components are available in the Flow Designer for that Agent Class.

C2 Protocol

The MiNiFi C2 (Command and Control) protocol is an open standard defined as part of the Apache NiFi project and licensed using the Apache Software License version 2 (ALv2). It provides the ability for MiNiFi agents to communicate status to a central server and for that server to control many agents using encoded operations.

In CEM, the Edge Flow Manager acts as a C2 Server for MiNiFi agents, which is achieved using its implementation of the open C2 Protocol standard.

Agent Class

An agent class allows you to configure and monitor a group of MiNiFi agents.

Connection

You create an automated dataflow by dragging components from the CEM Components toolbar to the canvas and then connect the components together by using connections. Each connection consists of one or more relationships. For each connection that is drawn, you can determine which relationships should be used for the connection. This allows data to be routed in different ways based on its processing outcome.

Content Repository

Content repository is a repository where the actual content bytes of a given flowfile live.

Dataflow

Dataflow is an automated and managed flow of information between systems.

Edge

Edge is the device that you want to manage, control, and monitor through CEM. To do so, you install the MiNiFi agent at the edge device to collect data and then pushes intelligence back to the same edge device.

Flowfile Repository

Flowfile repository is a repository where CEM keeps track of the state of what it knows about a given flowfile that is presently active in the flow.

Heartbeat

MiNiFi agents communicate their health and status to EFM through heartneats. By default, agents heartbeat every second, but this interval can be configured on each agent to an interval appropriate for each use case. The agent heartbeat includes device information, agent status, and metrics for the currently running dataflow. The EFM server tracks agents through their heartbeats, and can respond to heartbeats with operations, such as dataflow configuration updates.

Optionally, agent health tracking can be enabled through a maximum heartbeat interval in the efm.properties file. If this interval threshold is exceeded without recieving a heartbeat from an agent, the agent will be flagged as offline/missing and an alert will be shown in the EFM web UI.

Provenance Repository

Provenance repository is a repository where data from all provenance events is stored.

Support matrix

Before you begin your installation of Cloudera Edge Management (CEM) software, carefully review the system requirements for Edge Flow Manager (EFM), MiNiFi C++, and MiNiFi Java to understand operating system, database, browser, and JDK support.

CEM component compatibility

Learn about the different C2 features and the version of each Cloudera Edge Management (CEM) component supporting them. Additionally, learn which agent versions are supported by the different versions of EFM.

Table 1: C2 Feature Support Matrix

Feature	EFM	MiNiFi C++ Agent	MiNiFi Java Agent	MiNiFi Java Agent (Legacy)
Heartbeat	1.0.0.1.0.0.0-54	0.6.0.1.0.0.0-54	1.22.07	0.6.0.1.0.0.0-54
Update Configuration	1.0.0.1.0.0.0-54	0.6.0.1.0.0.0-54	1.22.07	0.6.0.1.0.0.0-54
Describe (Lightweight HB)	1.0.0.1.2.0.0-70	0.7.0.1.2.0.0-70	1.22.10	NA
Debug	1.0.0.1.3.1.0-68	1.22.01	1.22.10	NA
Update Property	1.4.0.0-125	1.22.04	1.23.02	NA
Update Asset	1.4.1.0-67	1.22.06	1.23.02	NA
GZIP HB	1.4.1.0-67	1.22.06	1.22.10	NA

Table 2: MiNiFi C++ Agent EFM Compatibility

MiNiFi C ++ Agent	EFM 1.0.x (EOL April 2022)	EFM 1.1.x (EOL October 2022)	EFM 1.2.x (EOL June 2023)	EFM 1.3.x (EOL October 2023)	EFM 1.4.x (EOL April 2024)	EFM 1.5.x (EOL February 2025)	EFM 1.6.x (EOL July 2025)	EFM 2.0.x (EOL October 2025)	EFM 2.1.x (EOL March 2026)
0.6.0.1.0.0.0	X	X	X						
0.7.0.1.1.0.0	X	X	X						
0.7.0.1.1.1.0	X	X	X						
0.7.0.1.2.0.0	X	X	X	X					
0.7.0.1.2.1.0	X	X	X	X					
1.20.09		X	X	X					
1.20.10		X	X	X					
1.20.11			X	X	X				
1.21.01			X	X	X				
1.21.02			X	X	X				
1.21.03			X	X	X				
1.21.04			X	X	X				
1.21.06			X	X	X				
1.21.08				X	X				

MiNiFi C ++ Agent	EFM 1.0.x (EOL April 2022)	EFM 1.1.x (EOL October 2022)	EFM 1.2.x (EOL June 2023)	EFM 1.3.x (EOL October 2023)	EFM 1.4.x (EOL April 2024)	EFM 1.5.x (EOL February 2025)	EFM 1.6.x (EOL July 2025)	EFM 2.0.x (EOL October 2025)	EFM 2.1.x (EOL March 2026)
1.21.10				X	X				
1.22.01					X				
1.22.03					X				
1.22.04					X				
1.22.06					X	X			
1.22.06-h1					X	X			
1.22.08					X	X			
1.22.10					X	X			
1.23.02					X	X			
1.23.02-h1					X	X	X	X	X
1.23.02-h2					X	X	X	X	X
1.23.04					X	X	X	X	X
1.23.04-h2					X	X	X	X	X
1.23.06					X	X	X	X	X
1.23.06-h1					X	X	X	X	X
1.23.09					X	X	X	X	X
1.23.09-h1					X	X	X	X	X
1.24.01					X	X	X	X	X
1.24.01-h1					X	X	X	X	X
1.24.04					X	X	X	X	X

Table 3: MiNiFi Java Agent EFM Compatibility

MiNiFi Java Agent	EFM 1.0.x (EOL April 2022)	EFM 1.1.x (EOL October 2022)	EFM 1.2.x (EOL June 2023)	EFM 1.3.x (EOL October 2023)	EFM 1.4.x (EOL April 2024)	EFM 1.5.x (EOL February 2025)	EFM 1.6.x (EOL July 2025)	EFM 2.0.x (EOL October 2025)	EFM 2.1.x (EOL March 2026)
1.22.07					X	X			
1.22.10					X	X			
1.23.02					X	X	X	X	X
1.23.04					X	X	X	X	X
2.24.02							X	X	X

Table 4: MiNiFi Java Agent (Legacy) EFM Compatibility

MiNiFi Java Agent (Legacy)	EFM 1.0.x (EOL April 2022)	EFM 1.1.x (EOL October 2022)	EFM 1.2.x (EOL June 2023)	EFM 1.3.x (EOL October 2023)	EFM 1.4.x (EOL April 2024)
0.6.0.1.0.0.0	X	X	X		
0.6.0.1.1.0.0	X	X	X		
0.6.0.1.1.1.0	X	X	X		
0.6.0.1.2.0.0		X	X	X	

MiNiFi Java Agent (Legacy)	EFM 1.0.x (EOL April 2022)	EFM 1.1.x (EOL October 2022)	EFM 1.2.x (EOL June 2023)	EFM 1.3.x (EOL October 2023)	EFM 1.4.x (EOL April 2024)
0.6.0.1.2.1.0		X	X	X	
0.6.0.1.2.2.0		X	X	X	X
0.6.0.1.3.0.0			X	X	X
0.6.0.1.3.1.0			X	X	X

System requirements for EFM

Operating system support

Operating System	Version
RHEL/CentOS	7.x, 8.x
Ubuntu	18.04, 20.04

JDK support

JDK	Version
OpenJDK	JDK 17
Oracle JDK	JDK 17

Supported databases

Database	Version
PostgreSQL	12.x, 13.x, 14.x, 15.x, 16.x
MySQL	8.0.x
MariaDB	10.4, 10.5, 10.6, 10.11
OracleDB	19c, 23c

Browser support

Browser	Version
Chrome	>=76.0 (latest version 80.0 at time of release)
Firefox	>=68.0 (latest version 72.0 at time of release)

System requirements for MiNiFi Java

Before you begin your installation of Cloudera Edge Management (CEM) software, carefully review the system requirements for MiNiFi Java to understand operating system and JDK support.

Operating system support

Operating System	Version
RHEL/CentOS	7.x, 8.x
Debian	10, 11
Ubuntu	18.04, 20.04

Operating System	Version
Windows	10, Server 2016, Server 2019

JDK support

JDK	Version
OpenJDK	JDK21
Oracle JDK	JDK21

System requirements for MiNiFi C++

Carefully review the system requirements for MiNiFi C++ before you begin installing it.

Operating system support (CEM MiNiFi C++ Agent 1.21.10 and above releases)

Operating System	Version
RHEL/CentOS	7.x, 8.x
Debian	10, 11
Ubuntu	18.04, 20.04
Windows	8, 10, Server 2012, Server 2012 R2, Server 2016, Server 2019

Operating system support (CEM MiNiFi C++ Agent 1.21.06 and 1.21.08 releases)

Operating System	Version
RHEL/CentOS	7.x, 8.x
Debian	10
Ubuntu	18.04, 20.04
Windows	8, 10, Server 2012, Server 2012 R2, Server 2016, Server 2019

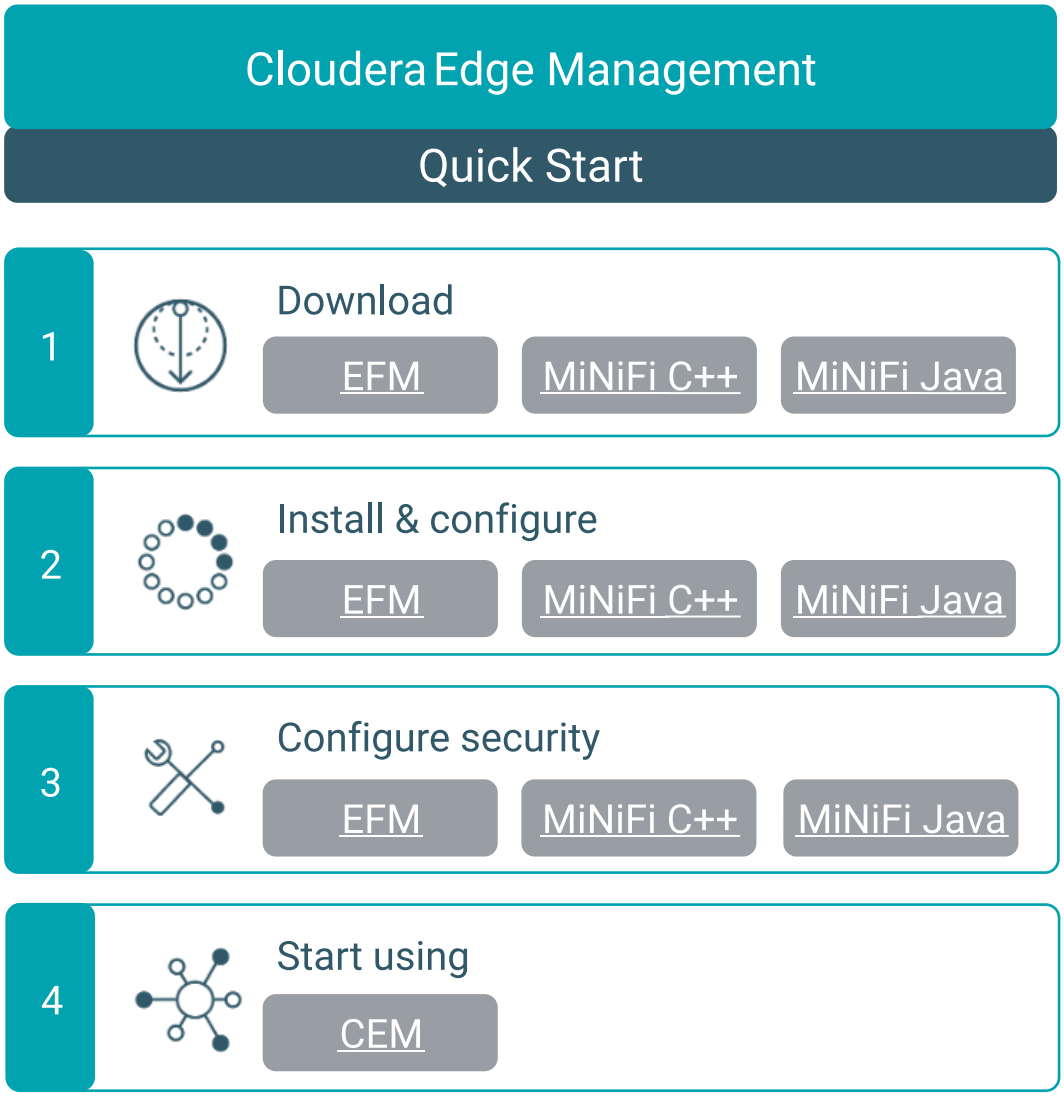
Operating system support (releases before CEM MiNiFi C++ Agent 1.21.06)

Operating System	Version
RHEL/CentOS	7.x, 8.x
Debian	9
Ubuntu	16.04, 18.04
Windows	8, 10, Server 2012, Server 2012 R2, Server 2016, Server 2019

Cloudera Edge Management quick start

Learn to quickly create your Cloudera Edge Management (CEM) application and use it.

Click the individual steps in the illustration to read the detailed descriptions.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