RELEASE NOTES FOR THE Kinetic - Edge & Fog Processing Module (EFM)

RELEASE 1.7.1

Revised: August 27, 2019

These release notes provide a high-level product overview for the Cisco Kinetic - Edge & Fog Processing Module (EFM).

Contents

EFM Online Documentation at CCO

For the complete and most recent release and general information, software download and documentation refer to the Cisco Connection Online (CCO) site at:

https://www.cisco.com/c/en/us/support/cloud-systems-management/edge-fog-fabric/tsd-products-support-series-home.html.

Introduction

The Cisco Edge & Fog Processing Module (EFM) creates a reliable data communications messaging system on top of your data networking infrastructure. Use this data delivery system to rapidly deploy applications where needed, including at the edge, in the fog, or in the datacenter.

The Cisco Edge and Fog Processing Module is an open platform that allows micro services or applications to be added by anyone. This provides unlimited capability and growth by adding software components that optimize the results of the application, system, or outcome.

Cisco EFM addresses the complexity of building an enterprise ready scalable data messaging system for one or many applications to reside upon. The EFM includes tools to manage the system, the EFM system administrator, and the EFM system monitor.

Features and Functions

The system's key capabilities include:

- A high-performance framework for edge and fog processing.

- Reusable micro services for collecting data from, and providing control over, devices and machines. Data is also processed before delivery to the destination.

- Options for reliable data transport through the system, including batch and real-time streaming options.

- Flexible mechanisms for integration with IT systems, reporting, and analytics.

- An architectural framework to extend fog processing to multiple tiers: east—west (fog to fog) and north—south (hierarchical processing leveraging network topology).

- Easy-to-use GUI tools to simplify development, deployment, and operation for all aspects of the system.

- A pervasive control paradigm and flow of information back to micro services, devices, and machines for management, control, optimization, and specific actions.

- A completely open and polyglot system, where third parties can provide devices, processing storage, software modules, analytics, applications, or any combination thereof.

This technology makes IoT approachable and leads to much faster industry IoT adoption.

The Cisco Edge and Fog Processing Module Components

Component	Description
EFM Message Broker (DART Broker)	A small footprint component working with other brokers to form a message bus. The EFM Message Broker provides reliable and flexible data delivery between devices and micro services. The sources can be devices such as sensors or other micro services. Consumers can be micro services or user applications.
EFM C++ Broker	A multi-threaded high-performance message broker with very low footprint in order to leverage the multi-core capability of different platforms.
EFM Data Flow Editor	Defines message paths between devices and micro services.
EFM Data Flow Engine	Executes message paths between devices and micro services. We recommend installing this adjacent to the EFM Message Broker to perform data transformation and input sources that are not in the canonical data format of the system.
EFM System Administrator	Configures and manages the message broker and micro services.
EFM System Monitor	A standalone tool for operators to obtain real-time functional status of a deployed solution.
Cisco ParStream (Historian database)	Purpose-built database to handle the massive volumes and high velocity of IoT data, as well as analytics at the Edge.
EFM Tools Runtime Engine	A standalone runtime tool for visualizing dashboards and driving EFM System Administrator, EFM Data Flow Engine, and EFM System Monitor.
Links	DQL System Dataflow ParStream JDBC Device Simulator Alarming
Smart License Agent Tool for Nodes	A client that allows system users to manage license registration for Node Product IDs.
Smart License Agent Tool for Devices	The Smart License Agent client that allows system users to manage license registration for Device Product IDs.
Asset Manager	Detects and manages devices throughout the EFM Messaging system.
User Management	The User management is a component that allows managing users, groups, permissions and roles for the EFM Web based components.
DGLux5	Data Visualization Tool

IOT-DSA Message Brokers differences

The Cisco Edge and Fog Processing Module allows for the installation of two distinct message brokers.

- IOT-DSA DART Message Broker - Supports message broker functions as well as web based UI projects that include the EFM System Administrator, EFM Data Flow Engine and EFM System Monitor.

- IOT-DSA C++ Message Broker - Supports message broker functions, but web based UI projects are not supported. For Dataflow editing to be performed on the dataflow link running with a C++ broker, a connection must be performed via an upstream or downstream dataflow editor that does support the UI interface (DART broker) and navigate the node tree until the dataflow link is found.

The Cisco Edge and Fog Processing Module component support per platform

Base EFM Components	Linux		Windows Server	IOx		
	RHEL CentOS	Ubuntu		IR809/829 x86_64	CGR Compute Module x86_64	IC3000 x86_64
IOT-DSA broker (C++ based)	●	●		●	●	●
IOT-DSA broker (DART-based)	●		●			
Lifecycle manager	●	●	●	●	●	●
System Link	●		●	●	●	●
DQL Link	●		●	●	●	●
Dataflow Link	●		●	●	●	●
ParStream Link	●		●			
JDBC (H2_DB) Link	●		●			
Alarm Link	●		●			
Asset Manager	●					
User Management	●					
Sensor Simulator	●					
System Administrator	●		●			
System Monitor	●		●			
ParStream Historian	●					
License Tool	●					
DGLux5 (Project Builder)	●		●			

Hardware Requirements

Component	Requirement
EFM Message Broker (DART Broker) EFM Data Flow Engine DQL Link System Link ParStream Link	RedHat Linux 7, CentOS 7, Windows 2016 server 1GB RAM, 10 GB HD* (recommended on the same system or VM)
EFM C++ Broker	Red Hat Linux 7, CentOS 7 or Ubuntu 16.04
EFM Data Flow Editor	Automatically installs with EFM Message Broker and EFM Tools Runtime Engine. Access via a web browser.
EFM System Administrator	Installs on the same system as the EFM Message Broker and EFM Tools Runtime Engine. Accessed via a web browser.
EFM System Monitor	Installs on the same system as the EFM Message Broker and EFM Tools Runtime Engine. Accessed via a web browser
User Management	Installs on the same system as the EFM Message Broker and EFM Tools Runtime Engine. Accessed via a web browser.
Cisco ParStream (Historian database)	RedHat Linux 7, CentOS 7 6 cores with 2GB RAM per core 500 GB HD
EFM Tools Runtime Engine	Installs with EFM Message Broker
Smart License Agent Tool for Nodes and Smart License Agent Tool for Devices	RedHat Linux 7, CentOS 7 1GB RAM 10 GB HD
Asset Manager	Red Hat Linux 7, CentOS 7 4GB RAM, 10 GB HD – Recommended on the same system/VM
DGLux5	Red Hat Linux 7, CentOS 7, 1GB RAM, Windows 2016 Server, 10 GB HD

Supported Browsers for use with the EFM Data Flow Editor, EFM System Administrator and EFM System Monitor

Currently the supported browser is Chrome.

Cisco IOx supported versions

The current version supported for the IR809/IR829 is IOx version 1.7 or 1.8, for CGR1K and IC3K it is IOx version 1.7.

Open Caveats

Caveat	Workarounds
EFM C/C++ Broker and LifeCycle Management does not support updates from GitHub.	Downloading the component from the Internet repository and uploading from local directory
System Administrator shows the default value for ParStream Link action to "set default partitioning" – the currently active value is not visible	To ensure the value is set as expected have a look at the table definition
EFM on CGR1K Compute Module must be configured with bridge mode for network interfaces which might change IP addresses on every start	For CGR1K devices, we need to use the bridge mode for the containers' network interfaces (iox-bridge). In bridge mode, the EFM application container might receive different IP addresses on every start. We need to define a specific IP address for the IOS interface to provide the application container with a static DHCP address and a forwarding rule for the EFM ports to the container
EFM/DGLux permission management does not allow permission group settings for nodes "/downstream", "/sys" and any node below "/sys".	Use corresponding defaultPermission settings instead.
If the "default" permissions are specified onto a data node, eg. /data/au, it may override the actual default permissions as set in the server.json configuration.	When assigning permissions to a data node, eg. /data/au, ensure that you do _not_ specify the "default" group within these nodes.
If permission management is deactivated by configuration file and a first permission group is created in System Administrator, the UI will not run properly until broker is restarted.	Either first enable permission management by setting default permission groups before you start to add permission groups or restart the broker after adding the first group.
EFM Asset Manager does not work in Safari and Edge	Use the Chrome web browser.
EFM Asset Manager does not detect timed out session and shows "Unexpected token < in JSON at position 0 Error Message"	A page reload will correct the issue.
EFM C++ Broker IOX Application Health Monitoring does not work with IOX versions prior IOX 1.8.	There is no workaround for IOX versions < IOX 1.8. IOX 1.8 was released for IR8x9 in May 2019. Estimated release date for CGR1K and IC3K is July 2019.
Dataflows do not guarantee QoS >= 2 delivery to external resources automatically	Please follow the instructions of this article to accomplish tolerating temporary unavailability of external resources: Article at Cisco TechZone
Dataflows on C++ Broker are not always correctly displayed.	If Dataflow does not show elements, open the dataflows node in the left panel and elements will show up.

Default systemd script for ParStream does not include LimitNOFILE configuration. The global defined settings are ignored by systemd scripts.	Add this line to the service section of your systemd script for ParStream: `LimitNOFILE=131072`
Sometimes a dataflow will not be displayed correctly on a downstream C++ Broker (i.e. some elements might be missing).	In most cases opening the dataflow in the left section of the Dataflow Editor by clicking on the black triangle to see the embedded elements triggers the display of all elements. In most other cases, refreshing the browser will remove display problems.

Known Limitations

Component	Limitation
Dataflow Editor / DGLux: Stopwatch	Timer can delay code execution due to other browser tasks and system load.
C++ Broker / C Broker	The C++ Broker cannot establish https connections to the C Broker, as the C Brokers https server implementation is broken. Http connections work as expected.
EFM Manager	EFM Manager does not support discovery definitions with dimensions that use relative paths that resolve to the root node.

Best Practices

- When using Java DSLinks one should tune the Java Virtual Machine (JVM) to correspond to the memory and performance needs of the respective application. This includes (among others) tuning of "Garbage Collection". An in-depth description about tuning the JVM can be found here: http://docs.oracle.com/javase/8/docs/technotes/guides/vm/gctuning/index.html

- If upgrading a system of more than one EFM node, it is highly recommended that all the components be upgraded on all the platforms for consistent functionality. See the installation guide for installing or upgrading on each platform.

What is new in Release 1.0.1

- EFF System Administrator, for the Broker/Life Cycle Management "Update Server" has been fixed

- EFF System Administrator, System Administrator buttons "update all components" result in unsupported dart broker version update. The following actions have been removed:

- Tab "Life Cycle", Button "Update All Components" – removed

- Tab "Job", Action "Update All Components" – removed

- Tab "Job", Action "Update Server", Dropdown List Entry "from Repository" – removed

- EFF ParStream Link 2.4 now uses an adapted ETL statement to decrease the amount of partitions, the corresponding modulo value can be configured in the System Administrator

- EFF Dataflow Editor – Fixes autosave feature.

- EFF Dataflow Editor – Fixes changing a block name when double-clicking in Chrome

- EFF C Message Broker (on IOx), Fixed memory leaks and memory access errors at startup

- EFF C Message Broker (on IOx), Fixed broker crashing when connecting with a link

- EFF C Message Broker (on IOx), installing an invalid Link no longer blocks installing or removing links

- EFF C Message Broker (on IOx), Fixed that C-Broker did not handle errno and return codes in the right fashion for upstream connections

- EFF C Message Broker (on IOx), Fixed that C-Broker tried to send message to closed link stream

- EFF C Message Broker (on IOx), removed IOx eff package for IR809/829 without Java

- EFF C Message Broker (on IOx), updated IOx eff package now properly supports serial port resources

Open Source Links:

- EFF C Message Broker (on IOx), Java Links did not start due to shell incompatibility. Update to a newer gradle version fixed this.

What is new in Release 1.1.0

New Features

- EFF DART Message Broker, DSLink support for IPV6

- EFF ParStream, ParStream support for IPv4 or IPv4 and IPv6 environments

- EFF ParStream, added new functionality for partition deletion

- EFF ParStream Link, added deletion mechanisms for historian tables

Incompatible Changes

- QoS levels changes to the following new definitions:

QoS Level	Definition
0	Default. Broker only sends the last value available from the publisher, no messages are stored except that one.
1	Non-durable queue. Broker maintains a queue with messages and sends as many as possible when there is enough bandwidth and processing power. Will drop messages when there is not or when client is disconnected.
2	Durable queue. Broker maintains a queue and stores messages even when client is disconnected. There should be no message loss when queue size is large enough.
3	Durable, Persistent queue. Broker queues and persists message on behalf of slow or disconnected requester.

QoS level support is different for the DART broker and C broker, the DART broker supports 0 through 3 and C broker support 0 through 2.

When upgrading an existing EFF (1.0 .0, 1.0.1, 1.1.0) installation to EFF 1.2.0, please make sure that you compile your existing links with the latest version of the respective SDK. This assures, that Brokers and Links use the same QoS semantics due to changes.

Bug Fixes and Improvements

- EFF DART Message Broker, DSLink support for IPV6 is enabled via server.json configuration option enableIPv6 set to true. When enabled, the server is listening on IPv6 interface only. To support a mixed IPv4 and IPv6 environment, two copies of a message broker need to be installed and configured.

- EFF System Administrator, fixed to "add new group" under Permissions tab. The new group currently requires a broker restart for use.

- EFF System Administrator, fixed browser issue on "add new group" action if language is not EN-US

- EFF System Administrator, partially fixed update link from zip. Pending fix to link version update without broker restart

- EFF System Administrator, fixed authorizing quarantined connections in the Permissions tab

- EFF System Administrator, all lifecycle management actions for IOx C Brokers appear in the Management tab

- EFF System Administrator, fixed parsing of IPv6 addressing connection URL that caused a crash when restarting broker

- EFF System Monitor, fixed improper graphing of Broker Details/Live Trend initial graph state

- EFF Dataflow Editor, fixed recreating Dataflow Folder with identical name that was deleted

- EFF C Message Broker (on IOx), Links are now installed in the data partition instead of the root partition of the container

- EFF C Message Broker (on IOx), IOx default filesystem sizes have been expanded to the following values: 256 MB data partition size and 64 MB extra space in rootfs size (required for tmp files system operations including link upload)

- EFF C Message Broker (on IOx), Lifecycle management no longer functions as a separate dslink and the functionality placed inside the message broker is placed under the /sys node, providing consistency with DART message broker. Actions will require a new reference to the node location. Quarantine functionality is non-functional in C-broker.

- EFF C Message Broker (on IOx), Update from DART VM version 1.17.1 to 1.21.1 to increase stability of dslinks

- EFF C Message Broker (on IOx), fixed QoS level 2 to adhere to new definition

- EFF C Message Broker (on IOx), fixed C-Broker to catch up with messages

- EFF C Message Broker (on IOx), Logging level expanded from a single level to support the configurable values none, fatal, error, warn, info, debug (available only in debug builds)

- EFF C Message Broker (on IOx), Logging level is configurable at runtime

- EFF C Message Broker (on IOx), fixed error that C-Broker sometimes did not reconnect to upstream connection

- EFF C Message Broker (on IOx), all Java links properly start

- EFF ParStream Link, ParStream password no longer visible in metrics pane

- EFF Installer, fixed installer failure if installation path contains spaces

What is new in Release 1.2.0

Name changed from Edge and Fog Fabric to Kinetic Edge and Fog Processing Module.

New Features

- DGLux5 development tool is now available using the EFM core broker on Windows and Linux (installer option "dglux"). The user can request a 6 month 1500 topics trial license.

- EFM C Message Broker with Lifecycle Management is now available on Linux (installer option "cbroker").

Bug Fixes and Improvements

- EFM Dataflow Editor actions for sys node, for the Broker/Life Cycle Management "Update All Components" has been removed

- EFM Dataflow Editor actions for sys node, for the Broker/Life Cycle Management "Update Server" has been removed

- EFM Linux installation now properly detects and installs on RedHat 7

- EFM System Administrator, for Management/Links fixed export action to allow for zip file download

- EFF C Message Broker, fixed QoS level 2 for message delivery

What is new in Release 1.2.1

Configuration Change

- Starting with EFM 1.2.1 permission management is enabled per default for new EFM and DGLux Server installations.

  Note: On an upgrade the existing configuration is not changed. To enable permission management the corresponding server.json file needs to be adapted entering non-null value for "defaultPermission".

  The recommend defaultPermission setting is:

```
"defaultPermission": [
      [":config","config"],
      [":write","write"],
      [":read","read"],
      [":user","read"],
      [":trustedLink","config"],
      ["default","none"]
    ]
```

When activating permission management and setting `["default","none"]` you should ensure the following additional adaptions have taken place in your setup:

- Upstream connections now must be configured with a permission group. For this you can add one of the defaultPermission groups ":config", ":write" or ":read" to your upstream configuration.

- The default group ":user" defines the permission level for all EFM UI users which are not configured as superuser. The EFM GUI Admin User defined on installation (default: efmAdmin) is a superuser and therefore has "config" permissions.

- The default group ":trustedLink" defines the permission level for all DSLinks installed with your EFM server. You might reduce this to a lower permission level depending on your usage scenario.

- External DSLinks connecting to the broker must provide a token defining the permission level.

- For improved memory handling Cisco ParStream 5.2.0 now uses tcmalloc. If not already installed in your environment, you can install the depended library with the following commands.

On Ubuntu16.04 and Debian8:

```
apt-get install libtcmalloc-minimal4
```

On CentOS7:

```
yum install gperftools-libs
```

New Features

- Smart License Agent, added support for new PIDs

- Smart License Agent, improved entitlement handling for better usability (see User Guide)

- ParStream Link, added support for null values on importCSV action

Bug Fixes and Improvements

- Smart License Agent, security fixes: upgraded jackson databind dependency due to vulnerability (CVE-2017-15095), solved command injection vulnerability (CSCvh70005)

- ParStream Link, security fix: upgraded jackson databind dependency due to vulnerability (CVE-2017-15095)

- Alarms Link, security fix: upgraded jackson databind dependency due to vulnerability (CVE-2017-15095)

- H2_DB Link, security fix: upgraded jackson databind dependency due to vulnerability (CVE-2017-15095)

- Cisco ParStream, fixed bug that could result in partial deletion in multiple node clusters

- DGLux, fixed offline license to request correct amount of topics

- System Administrator, fixed broken update of metrics after link update from zip

- Dataflow Editor, fixed broken update of metrics after link update from zip

- System Administrator, fixed bug that dropped password when user was renamed

- System Administrator, automatically rescan after installing a new link

- System Administrator, logout button now redirects to login page

- System Monitor, logout button now redirects to login page

- Dataflow Editor, logout button now redirects to login page

- Dataflow Editor, fixed export action for links

- EFM Installer, fixed bug that not preserve disabled secureMode on upgrade

- EFM Installer, fixed misconfigured .well-known-path in default configuration

What is new in Release 1.5.0

Configuration Change

- EFM and DGLux Server now use 10000 passwordHasherIterations per default. If this value is changed in an existing setup, please also set parameter *old_passwordHasherIterations* to your previous settings to ensure existing credentials will still work.

New Features

- Asset Manager, new component to detect and manage assets throughout the EFM message system (see Asset Manager User Guide)

- EFM Configurator, new tool to extract, adapt and deploy configurations from one IOx reference installation to multiple IOx targets (see IOx Application Configuration Guide)

- IOx application for CGR CM (see IOx Components Installation Guide)

- Cisco ParStream, failover enhancements: added scripts to start and shut down Cisco ParStream using common operation system functions (see Cisco ParStream Manual 5.3.0)

Bug Fixes and Improvements

- Smart License Agent, security fixes: upgraded Smart Agent Version due to vulnerabilities (CVE-2014-0107 + CVE-2015-6420)

- Dataflow Engine, fixed bug where getChildren block output table might have disappeared in systems under load

- Dataflow Engine, fixed bug where a dataflow might have been corrupted when edited during server restart

- C Message Broker, fixed bug where broker might have crashed due to upstream connection problems

- EFM Installer, removed unsupported installer functionality for Mac OS and Oracle Linux

What is new in Release 1.5.2

New Features (beta version, not production ready)

- Cisco ParStream, added option "*ignoreBrokenPartitions*" for single node clusters to recover from power outages (default: false; feature inactive).

- Cisco ParStream, added option "*validatePartitions*" to detect broken partitions resulting from power outages during start up. This might slow down the node start up (default: false; feature inactive).

- Cisco ParStream, added option "*synchronizeFilesystemWrites*" to prevent data loss during power outages for merges and partition transfers (default: false; feature inactive).

- Enabling this option will slow down the operation of the database. This feature should only be activated if the system where the database is running on has no emergency protection like an uninterruptible power supply (UPS) and no clean shutdown of the operating system can be guaranteed.

Bug Fixes and Improvements

- ParStream Link, added action "*editDb*" to adapt existing database connections (see Cisco ParStream DSA Link Manual 4.1.2).

- ParStream Link, added recommended garbage collection parameters to start script.

- ParStream Link does now start on RHEL7.4 too.

- ParStream Link, fixed quoting error which prevented link to start on Windows in case of whitespaces in Java installation path.

- Cisco ParStream, fixed bug that prevented usage of *percentile_disc* in *CREATE JOB* statements.

- EFM Installer, upgraded Go version to prevent security vulnerabilities in go get implementation (CSCvk16152, CSCvk16153, CSCvk16154, CSCvk16156).

- EFM Installer, fixed timeout problem on EFM Admin User creation.

- Tools, added IIS Group Mapping Plugin to EFM package.

- Tools, IOx Application Configurator now continues in case of an error and writes a config.json.retry file which only contains the list of targets to retry.

- C Broker, fixed crash on DSLink disconnect.

- System Administrator, fixed bug in upstream connection creation.

- Dataflow Editor, fixed missing input property for importDataflow action.

- EFM and DGLux Server permission management, fixed bug that applied read permissions in case of trying to apply permissions to /sys node.

- System Administrator, removed permission group configuration for /sys and /downstream node as these will not work by design of permission management.

- System Administrator, fixed bug in permission management which cleared dropdown menu items if these left the visible window section (e.g. due to scrolling or toggling).

- Asset Manager, fixed bug that onboarded sensors reappeared in onboarding section after restart of the Asset Manager.

- Asset Manager, fixed bug that allowed to store duplicate onboarding sensors.

- DGLux Server, fixed bug that blocked online license requests for trial licenses.

- EFM and DGLux Server, certificate password is now encrypted in configuration file.

- EFM and DGLux Server, proxy password is now encrypted in configuration file.

- Added README to EFM package referring to latest documentation.

What is new in Release 1.5.4

- Cisco ParStream, fixed bug in partition synchronization.

What is new in Release 1.6.0

Configuration Change

- Platform Support and Deployment:

  — On Ubuntu16.04 EFM only supports the new C++ Broker, no other components are supported on Ubuntu. It is necessary that the user migrate to RHEL7 or CentOS7 for EFM 1.6.

  — Installation on CentOS7 and RHEL7 EFM is performed using RPMs, the EFM Linux installer is no longer supported. All EFM components are now installed to a fix path under `/opt/cisco/kinetic`, system services are automatically created (for further details and migration instructions see EFM Installation Guide for Linux).

  — No default UI user is created during installation of DGLux server (see EFM Installation Guide for instructions how to add user).

- The C Broker will be replaced by a new C++ Broker. Generally, the C++ Broker is compatible with the C Broker configurations. The C++ Broker will be installed under `/opt/cisco/kinetic/cpp_broker`. It will create a default broker.json configuration file on first start.

  — The C++ Broker enforces https by default. During the installation, a self-signed certificate will be generated and installed. This certificate should not be used in production! You will need to add your own certificates to the C++ Broker for production use.

  — You will need to enable self-signed certificates (`self_signed_tls_certificate_allowed` in the `ssl` section) in the broker.json configuration if you use self-signed certificates for broker upstream connections.

  — The C++ Broker disables http connections by default. You will need to enable http in the broker.json configuration if http is required.

  — The C++ Broker does not support HTTP public key pinning.

  — The data.json format is not compatible to the C Broker `data.json`. The C++ Broker will migrate the `data.json` file automatically. Afterwards, it should not be used anymore with a C Broker. The C++ Broker will make a backup of the data.json file before merging it. It will be called `data.json.bak`.

  — C Broker QoS level 3 persisted subscription value queue files will not be migrated. You should first empty the queues before installing a C++ Broker.

  — The C++ Broker currently does not have a `/sys/query` action.

  — The lifecycle manager property `ssl_verify_peer` default has changed to true.

- Cisco ParStream, parsing column definitions of CREATE TABLE statements requires comma separation.

- ParStream Link, action editDb: parameters host and port have been removed. These connection parameters can now be edited using the actions of the new Cluster node and its children.

- ParStream Link, actions addDb and editDb now have a new parameter useSSL to enable/disable SSL encryption.

- EFM Server, added new parameter "strictTls" to enable strict SSL certificate validation (default: false). If "strictTls" is enabled and self-signed certificates are used, the connection will be rejected.

- Java SDK, queue size for QoS levels 1-3 is now configurable. Default value changed from 1000 to 1024.

New Features

- Deployment: RPMs delivered for CentOS7 and RHEL7. All EFM components are now delivered as RPM files. Required system users are automatically created. Additionally, systemd services are automatically created which can be used to start the relevant processes and to configure the setup for automatic start on server start (for further details and instructions how to migrate from an installer-based setup to an RPM based setup see EFM Installation Guide for Linux).

- Platform Support: EFM does now support IC3K (for further details see EFM Installation Guide for IOx).

- Cisco ParStream, change dependency from system OpenSSL library to packaged CiscoSSL library.

- Cisco ParStream, added TLS encryption support for client and inter-cluster connections.

- ParStream Database, fixed parser to now reject invalid create table statements without separating commas between column definitions.

- Cisco ParStream, added Stored Procedures with CREATE PROCEDURE, CALL and DROP PROCEDURE (for further details see ParStream Manual section 9.4.1).

- ParStream Link, enabled TLS encryption (configurable by parameter useSSL in actions addDb and editDb).

- ParStream Link, added functionality to define alternative hosts for automatic re-connection in case of connection loss.

- New C++ Broker which replaces C Broker (further information to be found in EFM Installation Guides for Linux and IOx)

    — The C++ Broker is a multi-threaded high-performance broker with very low footprint in order to leverage the multi-core capability of different platforms. This allows allow for performance on the edge. The C++ broker scales and performs so well that we recommend to use it on all other levels, except when UI is required, in a multi-tier architecture.

    — The lifecycle manager has a new option `link_repository_url` for the `manager.json` configuration file. You can set the url for the link repository file. The default is `https://dsa.s3.amazonaws.com/links/links.json`. The address schema must be https.

    — The lifecycle manager has a new option `ca_file` for better ssl verification configuration.

- EFM Authentication, unified login (Single Sign-on) between Asset Manager, System Administrator, System Monitor and Dataflow Editor (for further details see EFM Installation Guide for Linux), unified landing page for all UI components. Note, Single Sign-on is not supported on Windows with EFM UI components.

- Asset Link, added synchronization between Asset Manager and DSLink

- Asset Link, added grouping on Asset Link

- Asset Manager, added schema migration tool to handle updates/new versions of Asset Schema Definitions

- EFM Server, Java SDK, Dart SDK: QoS levels are now fully aligned for all supported SDKs and Brokers (according to definitions introduced with EFM 1.0.1)

Bug Fixes and Improvements

- EFM Server, proxy server password is now stored encrypted

- EFM Server, certificate password is now stored encrypted

- EFM Server, QoS bug fixes especially according to correct QoS propagation

- JDBC Link, fixed bug that stored configurations in invalid format

- ParStream Link, JDBC Link, Alarms Link, Asset Link, upgraded to new Java SDK version with several bug fixes

- ParStream Link, improved error handling to better cope with invalid input

- ParStream Link, passwords are now hidden also during entering them in UI (addDb, editDb).

- System Administrator, removed permission group configuration for downstream /sys node as this will not work by design of permission management

- System Administrator, fixed search field for tokens

- System Administrator, tokens can now be copied from UI

- UI convenience: UI state is now stored, input on forms is now validated

- EFM Authentication provides data Backup/Restore

- EFM Authentication, User Access Restrictions are now available

- IOx packages are now compressed

- Asset Manager, Fixed issue with duplicates devices for the same DSA path

- Asset Manager, [CSCvm02518] Fixed Google Guava Eager Allocation Remote Denial of Service Vulnerability CVE-2018-10237

- Asset Manager, Fixed issue with missing "Remove Asset" action which could happen in rare cases

- Asset Manager, Fixed issue multiple issue on DSA Bridge subscriptions

- Asset Manager, Fixed issue with primary key datatype which could lead to duplicated devices

- Asset Manager, Fixed issue in API which sometimes returned HTTP Code 200 with an error message as result

- Asset Manager, Fixed issue where assets couldn't be removed in Asset Registry when they were deleted inside DSA before

Known Defects:

EFM Manager does not work in Safari and Edge

EFM Manager does not detect timed out session and shows "Unexpected token < in JSON at position 0 Error Message"

What is new in Release 1.6.1

This release is recommended due to many of security fixes. It is best to note the following platform usage and specific user base criteria:

- IOx installations: recommended for all users due to fixed security vulnerabilities

- Linux installations: recommended to all customers using one or more of the following EFM components: ParStream, C++ Broker, EFM Authentication or Asset Manager due to fixed security vulnerabilities

- Windows installations: only recommended for new installation due to fixed security vulnerability during installation process, not required for existing installations

Bug Fixes and Improvements

- Asset Manager Authentication, fixed security vulnerabilities CVE-2018-14721, CVE-2018-19360, CVE-2018-19361, CVE-2018-19362, CVE-2018-1000873

- Asset Manager Authentication, fixed port conflict with DGLux5 (disabled unused HTTPS port for authentication)

- Cisco ParStream, fixed security vulnerabilities CVE-2018-20346, CVE-2018-5407

- C++ Broker, fixed security vulnerabilities CVE-2018-5407, CVE-2018-0734

- C++ Broker with DQL Link, fixed several issues which prevented DQL Link to work properly on C++ Broker

- C++ Broker, fixed bug which sometimes showed dataflows as empty on first attempt

- C++ Broker, fixed error handling in the case initialization fails

- C++ Broker, fixed link permission storage to be persistent on broker restart

- C++ Broker, fixed invoke response metadata to now be sent to peer

- C++ Broker, fixed inconsistency errors on high load with QoS 3

- C++ Broker/Lifecycle Manager, optimized resolution of localhost to circumvent problem if IOx cannot resolve localhost

- Extended IOx packages to support definition of upstreams and SSL certificates via bootstrap mechanism

- Switched activation file for CGR to use Bridge mode as NAT mode is not supported for CGR

- Windows Installer, fixed security vulnerabilities CVE-2018-16875, CVE-2018-16874

Know Defects

- Linux RedHat/CentOS upgrade from EFM 1.6.0 to EFM 1.6.1: if in the case the System Administrator is used with EFM Authentication (Single Sign On), the upgrade installation overwrites the System Administration authentication configuration file. Need to edit the file /opt/cisco/kinetic/efm_server/proj/efm-admin/_proj.json and change the file field `"canRead": []` to `"canRead": ["group:sys-has-efm-admin-access"]`.

What is new in Release 1.7.0

Configuration Changes

- Platform Support: EFM does not support installation on IE4K anymore.

- C++ SDK has been deprecated for Ubuntu14.04.

- EFM Server, *enableIPv6* is now true by default.

- EFM Server and C++ Broker, linkRepositoryUrl is now changed to Cisco owned list on DevNet which lists only Cisco supported DSLinks. To update existing setups, configure *linkRepositoryUrl* to point to https://pubhub.devnetcloud.com/media/kinetic-connector-catalog/docs/efmDownloadCatalog/dslinkOnlineCatalog.json

  In case you decide to install a DSLink which is not supported by Cisco, you can still download the Binary Package from Kinetic Connector Catalog on https://developer.cisco.com/docs/kinetic-connector-catalog/ and install the DSLink from Zip File via System Administrator.

- Cisco ParStream, the general options *indicesCacheNbIterators, indicesMaxCachedValues, partitionSearchConcurrencyLevel, requestLongTermTimeout,* and *requestShortTermTimeout* were deprecated and now emit a warning if used.

- Cisco ParStream, the import options *csvimport, defaultMergePriority, defaultImportPriority, defaultQueryPriority, loadtables, maxMergeThreads,* and *serverJournalDir* were deprecated and now emit a warning if used.

- Cisco ParStream, The check for the configured number of mapped files and open file handles in the operating system now produces an error instead of a warning. If the limit was ignored deliberately, you can enable the new option *overrideProcessRequirements.*

- Cisco ParStream, added global option *clientConnectionTimeout* to configure the time in seconds after which the server will drop inactive client connections.

- ParStream DSLink, action "Add Database" has been extended by an optional parameter *connectTimeout,* default 10 seconds. For existing configurations the timeout can be adapted with the new *Set Connect Timeout* action.

- Asset Manager, discovery is changed to show only devices for onboarded brokers.

- As the broker lifecycle manager will now start links with explicit tokens, locally started (not lifecycle manager started) links will need also a token for their registration, if *allowAllLinks* is set to false.

- Dataflow Editor, hub block has new parameter "ignoreNull" to ensure null values will not be passed to the output of the block. For new created blocks the default is "ignoreNull=true", for already existing blocks in existing dataflows it is "ignoreNull=false" for compatibility reasons.

New Features

- DSLink Library, increased visibility on Link support levels and runtime requirements. With usage of new configuration for *linkRepositoryUrl* (see configuration changes) the System Administrator dropdown menu for link installation now lists Cisco supported DSLinks only. Link list provides additional information in case specific runtimes are required to run the corresponding DSLink.

- C++ Broker, quarantine is now supported by C++ Broker. Default: disabled. Configuration is visible under /sys/config.

- C++ Broker, The *$brokerUUID* config is now provided on the / node. The value is generated at the firts start and stored in the .uuid file.

- C++ Broker, *allowAllLinks* is now available on the /sys node.

- C++ Broker, a *restart* action for the broker is now available on the /sys node.

- Cisco ParStream does now support PostgreSQL ODBC driver version 11.00.0000.

- ParStream DSLink, action "Add Database" does now support configuration of a *connectTimeout* to abort connection attempts after a specific time (default: 10 seconds).

- Asset Manager, Broker Onboarding: added Discovery view for brokers, added ability to add custom broker, added C++ broker schema, broker accept workflow following device accept workflow.

- Asset Manager, added broker table view showing all accepted brokers.

- Asset Manager, added broker details page for viewing and editing broker data fields.

- Asset Manager, added broker and device Dashboard showing dimension and live metric data in table and chart visualization.

- Asset Manager, added broker relationship view for hierarchical information on broker network structure.

- Asset Manager, improved Device and Broker view to show live metric data.

- C++ Broker, it is now possible to configure SSL certificates and upstream configs via GMM/FND.

- C++ Broker, it is now possible to specify so called sys_config values via GMM/FND. Currently, only the tags config can be set. The value of this config will be show under /sys/cisco/ini/@tags in the C++ Broker.

- C++ Broker, if running on IOX, the C++ Broker will show all configured CAF environment variables under /sys/cisco/environment as attributes.

- C++ Broker, if running on IOX, the C++ Broker will be monitored by an IOX Application Health Monitoring script. This script will check if the broker and all links managed by the lifecycle manager are running properly. The status will be sent automatically by IOX to Local Manager/FD/FND. The IOX Application Health Monitoring does not work with IOX versions prior IOX 1.8 (for IR8x9 released in May 2019, estimated release date for CGR1K and IC3K: July 2019).

- Smart License Agent, added support for new PIDs KIN-ADV-MANAGER and KIN-ADV-TRIAL

Bug Fixes and Improvements

- Cisco ParStream Manual documentation corrections: The default value for *partitionMergeRequestTimeout* in the manual was corrected to 60. The default value for *queryThrottlingInterval* in the manual was corrected to 500. The default value for *requestDefaultTimeout* in the manual was corrected to 60. The default value for *synchronizePartitionRequestTimeout* in the manual was corrected to 120.

- ParStream DSLink is now robust against system clock changes.

- ParStream DSLink does not store transient metric data in file system (nodes.json) anymore.

- ParStream DSLink, bug which prevented creation of a Watch Group with a time slice of more than 14 weeks was fixed.

- Asset Manager, fixed error "no job id" if too many onboarding entries exist.

- Asset Manager, improved error messages in UI and server log.

- Asset Manager, improved console output on installation.

- Asset Manager, fixed card view not showing all assigned tags.

- Asset Manager, Discovery: fixed path expression containing ":path" evaluated to empty string.

- Asset Manager, fixed several minor UI defects.

- Asset Manager, fixed defined label not shown in assetDSLink.

- Asset Manager, fixed Lodash DoS Vulnerability CVE-2018-16487.

- Asset Manager, improved Thread handling.

- Asset Manager, improved performance.

- Asset Manager, fixed error "Unexpected token < in JSON at position 0" in UI that showed up after being idle for longer time.

- C++ Broker, openSSL has been updated to 1.0.2r

- C++ Broker, fixed *managed* flag for tokens.

- C++ Broker, it is now possible to modify attributes on nodes via the set and remove methods.

- C++ Broker, Links managed by the broker are now being restarted in case of an unexpected exit.

- C++ Broker, specifying an invalid upstream port will now cause a proper error.

- C++ Broker, the statistics values on the /sys node (e.g. *dataInPerSecond*) will now properly update in the dataflow even if no other subscription exists.

- C++ Broker, a potential crash or assertion when a connection of a link was being closed has been fixed.

- C++ Broker, a list request on a non-existent node will now give a proper response.

- C++ Broker, a DQL query will now return all the columns on the first invoke.

- C++ Broker, enum values are now selectable in the configs sections under /sys/links/<link>.

- C++ Broker, fixed response memory leak.

- C++ Broker, several issues with viewing and editing dataflows have been fixed.

- C++ Broker, fixed bug that removing an upstream did not remove the actual upstream connection.

- C++ Broker, fixed bug that an ack for a message was being sent before all requests and responses had been properly processed.

- C++ Broker, fixed bug that an invoke response might have contained incorrect meta data.

- C++ Broker, a potential crash when invoking a DQL query has been fixed.

- C++ Broker, some issues with DQL queries have been fixed.

- C++ Broker, column overrides in action responses are now being applied.

- C++ Broker, updating a link will no longer remove all the files created by the link.

- C++ Broker, update Group for a token is now working.

- C++ Broker, Link installed in the broker will now be able to start when the broker is configured to use SSL.

- C++ Broker, improved performance of message and subscription update processing.

- C++ Broker, Fixed missing `@subscription` actors.

- Dataflow Editor, added new parameter "ignoreNull" to hub block to ensure null values will not be passed to the output of the block as null values might block subsequent logics. For new created blocks the default is "ignoreNull=true", for already existing blocks in existing dataflows it is "ignoreNull=false" for compatibility reasons.

What is new in Release 1.7.1

Bug Fixes and Improvements

- Dataflows, added functionality that dataflows are now moved to a *deleted* folder first before finally deleted. This was done to prevent unintended deletion. On deletion a dataflow will now be moved to folder *deleted.* If the dataflow shall be deleted permanently, it must be also deleted from this folder. If you deleted several dataflows and want to finally delete those from file system, you can also delete the entire *deleted* folder. To restore a deleted dataflow, create a new empty dataflow, export the old dataflow from deleted folder and import it into the new dataflow. Please note, from deleted folder dataflows cannot be opened and edited in Dataflow Editor.

- Dataflows, fixed instability when dataflow was deleted while opened in Dataflow Editor.

- Dataflow Editor, fixed incorrect name when dragging symbol from symbol library to repeater block.

- System Administrator, fixed update from zip functionality for DSLinks from Lifecycle tab.

- ParStream DSLink, fixed bug that prevented re-connect of query connection to another cluster node.

- C++ Broker, fixed unexplained random disconnects from broker.

- C++ Broker, fixed Lifecycle Manager start and restart link actions to return a response.

- C++ Broker, fixed dataflows not displaying correctly every time upon opening via a C++ Broker.

- C++ Broker, fixed list update responses not being correct after removing nodes.

- C++ Broker, fixed certificate upload functionality for usage of IOx Local Manager.

- EFM Authentication, fixed security vulnerability CVE-2019-14379.

- ParStream DSLink, Alarms DSLink, H2DB DSLink, fixed security vulnerabilities CVE-2019-14439, CVE-2019-14379, CVE-2019-12384.

- ParStream DSLink, fixed security vulnerabilities CVE-2019-12814.

- EFM Smart License Agent, updated to new Smart License SDK version with several security fixes.

Related Documentation

Use this document in conjunction with the following.

- Kinetic – Edge and Fog Processing Module 1.7.0 System Administrator User Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 System Monitor User Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 Dataflow Editor User Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 Smart License Agent User Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 Asset Manager User Guide

- Kinetic – Edge and Fog Processing Module 1.7.1 Linux Installation Guide

- Kinetic – Edge and Fog Processing Module 1.7.1 Windows Installation Guide

- Kinetic – Edge and Fog Processing Module 1.7.1 IOx Components Configuration Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 IOx Application Configurator Guide

- Kinetic – Edge and Fog Processing Module 1.7.0 User Management Guide

- Cisco ParStream Manual 6.2.0

- Cisco ParStream DSA Link Manual 6.0.7

- Open Source used in EFM 1.7.1:

    - [78EE117C99-206752669](#)
    - [78EE117C99-177515299](#)
    - [78EE117C99-206753961](#)
    - [78EE117C99-206861073](#)
    - [78EE117C99-207625590](#)
    - [78EE117C99-206754060](#)
    - [78EE117C99-180210419](#)
    - [78EE117C99-193407750](#)

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