



# Installation Guide for Windows

*Kinetic - Edge & Fog Processing Module (EFM) 1.7.2*

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## Introduction

The Cisco Edge and Fog Processing Module (EFM) allows you to create a reliable data communications messaging system on top of your data networking infrastructure. This system provides data delivery and allows you to rapidly deploy applications, where needed, that can be at the edge or fog or in the data center. The EFM is an open platform that allows for the addition of micro services or applications by anyone, allowing for unlimited capability and growth by adding software components that optimize the results of the application, system, or outcome.

The EFM addresses the complexity of building an enterprise-ready scalable data messaging system upon which one or many applications can reside. The EFM comes with a series of tools to manage the system, the EFM system administrator, and the EFM system monitor.

## Features and Functions

The system's key capabilities include:

- A framework for EFM. High performance.
- Reusable micro services for collecting data from, and providing control over, devices and machines, as well as processing the data prior to delivery to its destination.
- Different options for reliable transport of data through the system, encompassing both 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 is the technology that makes IoT possible, and leads to faster industry adoption of the IoT vision.

## The Edge and Fog Processing Module components

Component	Description
EFM Message Broker (DART Broker)	<p>A small footprint component working with other brokers to form a message bus.</p> <p>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.</p> <p>This is also known as the EFM Server.</p>
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	<p>Executes message paths between devices and micro services.</p> <p>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.</p>
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.



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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

## 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.



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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
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

## EFM components protocols and ports

The following table describes the protocols and ports used by the EFM Broker and EFM Tools. Port values are configurable during and after installation.

TCP Port No.	Description
8080 and 8443	Default http and https ports for inbound connections to the Dart Message Broker
9080 and 9443	DGLux5 message broker and user interface port defined in the server.json configuration file. See the EFM Message Broker server.json configuration file for parameter details.



## Licensing installation and requests

This product uses the Smart License Agent Tool (for Nodes and Devices) to manage the corresponding licenses. After installation, refer to the Kinetic - Edge and Fog Processing Module 1.7.0 Smart License Agent User Guide.

## Securing the Installation

Every install of a Cisco Kinetic EFM instance will have to meet specific requirements for performance and security. It is generally advisable, to configure the underlying platform Windows OS as tight as possible by minimizing the number of amount and privileges of processes running and services offered. Suggested is adherence to general hardening guidelines as provided by the NSA hardening guide collection at <https://www.nsa.gov/> or platform specific formulations. To enable educated decisions, when the grade of security impacts performance, and where to strike a balance acceptable for the local install, the sections in this guide offer helpful information and relations.

For additional information on hardening the underlying operating system some additional references are:

Red Hat: Microsoft Windows: <http://technet.microsoft.com>; search for "hardening"

NSA hardening guide - <https://www.nsa.gov/what-we-do/research/selinux/> for information on Security Enhanced Linux. See also SELinux SELinux in the RedHat Enterprise Security Guide above.

## Required libraries for installation on Windows

For the ParStream DSA Link: Java 8 JRE or JDK

## Prerequisite to allow installation of Links from Git repositories

The EFM System Administrator allows for installing links from Git, or the system link in the (/sys/links/Install Link/from Git). The git command line application must be installed for this function to properly operate.



The git executable must be available through the PATH environment

### Installation preparation

Place the EFM software image in the home directory.

The software should be downloaded from CCO at [www.cisco.com](http://www.cisco.com) under Support and Downloads.

Then **either** unpack the image by executing the unzip program directly (if on your system):

```
C:\Users\userid> unzip -q EFM-1-7-1.zip
```

**Or - alternatively** - right-click on the archive in the file explorer and select **extract all** (but do not create an additional folder as suggested per default, instead, we suggest to remove the EFM-1-7-1.zip from entry field).

Change into unzipped directory, e.g.:

```
C:\Users\userid> cd %userprofile%\EFM-1-7-1/windows
```

### Executing the installer

Execute the windows installer `efm-windows` as described in the following sections. Executing it without arguments yields a short usage info:

```
C:\Users\userid\EFM-1-7-1\windows> .\efm-windows
```

### Installation of the EFM components

The EFM installer `efm-windows` is designed to allow for interactive or non-interactive installation of the EFM components. The defaults allow non-administrator users to operate the system.





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All the examples below rely on default values and invocations refer to a fictitious \$HOME being C:\Users\userid and further assume that the package EFM-1-7-1.zip has been unpacked inside that folder (as described above).

### Installing help or usage

Executing `.\efm-windows` displays a summary help screen.

```
Edge & Fog Processing Module - Installer and checksum tool v1.7.2
```

```
Synopsis: efm-windows [env|help|install|report|upgrade|verify|version]
[admin|broker|dart|dglux|monitor]
```

Note: Call with help for extended version including sample usage(s) or with env for environment info.

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```
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```

Executing `.\efm-windows help` displays an extended help screen.

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
```

```
INFO: Interactive mode enabled (reason default)
```

```
Edge & Fog Processing Module - Installer and checksum tool v1.7.2
```

```
Synopsis: efm-windows [env|help|install|report|upgrade|verify|version]
[admin|broker|dart|dglux|monitor]
```

Sample usage(s):

```
    efm-windows install                # -> install all platform components (dart, broker,
admin and monitor)
```

```
    efm-windows upgrade                # -> upgrades all platform components (broker, admin
and monitor)
```

```
    efm-windows broker                 # -> installs broker, data flow editor and dsa run-time
```

```
    efm-windows dart                  # -> installs dart run-time
```



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```
efm-windows admin                # -> installs admin

efm-windows verify components    # -> report current settings and SHA512 checksums of
components

efm-windows verify dart         # -> calculate SHA512 checksum of dart run-time

efm-windows version             # -> report version banner of this tool

efm-windows [help]              # -> this help screen / usage info.
```

### Notes:

Installing admin and monitor will also install Dart VM and Broker run-time.

### Environment Variables:

EFM\_ROOT should be set to the *absolute* path of the install root (default: \$HOME/kinetic)  
(i.e. folders efm\_server, parstream, and dart-sdk will be created below that path)  
Current value is: <UNSET>

EFM\_GUI\_LOGIN may be set to the *name* of the EFM GUI Admin User (default: efmAdmin)  
Current value is: <UNSET>

EFM\_GUI\_PHRASE may be set to the *pass phrase* of the EFM GUI Admin User (default: not set)  
(This variable will be ignored for now in interactive install sessions)  
Current value is: <UNSET>

EFM\_BROKER\_PRIV\_KEY\_PEM overwrites the default value key.pem for certKeyName in server.json  
(i.e. with letsencrypt would suggest:  
/etc/letsencrypt/live/fully.qualified.domain.name/privkey.pem)  
Current value is: <UNSET>

EFM\_BROKER\_FULL\_CHAIN\_PEM overwrites the default value cert.pem for certName in server.json  
(i.e. with letsencrypt would suggest:  
/etc/letsencrypt/live/fully.qualified.domain.name/fullchain.pem)  
Current value is: <UNSET>



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EFM\_BROKER\_SECURE\_PORT will overwrite the default value of 8443 for httpsPort in server.json  
Current value is: <UNSET>

EFM\_BROKER\_CLEARTEXT\_PORT will overwrite the default value of 8080 for port in server.json  
(disable this insecure access port by setting value 0 in production systems!)  
Current value is: <UNSET>

EFM\_BROKER\_IS\_ALWAYS\_OFFLINE will overwrite the default value to set isAlwaysOffline true in server.json if set  
(isAlwaysOffline indicates that a server is expected to never have a full internet connection)  
Current value is: <UNSET>

EFM\_BROKER\_WORKERS may be set to positive integers in [1, 128] and should match the number of logical cpu cores  
as maximum and only if machine is dedicated to broker use and does not e.g. run local links or ParStream DB  
(if set and valid will overwrite the CPU core count derived one as value of the workers key in servers.json)  
Current value is: <UNSET>

EFM\_INSTALL\_LOGS may be set to the \*absolute\* path of a folder for install logs (default: C:\Users\userid\Desktop\EFM-1.7.2\EFM-1-7-2\EFM-1-7-2)  
(e.g. needed in case the unpacked install components are stored on a read-only medium)  
Current value is: <UNSET>

EFM\_UNATTENDED may be set to fast enable unattended operation solely controlled by eff.json file content.  
Setting this to anything else than an empty value is equivalent to setting INTERACTIVE to false in eff.json

EFM\_DEBUG: For execution in debug mode, please set EFM\_DEBUG environment variable to nonempty value

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Executing `.\efm-windows version` displays the version.

```
Edge & Fog Processing Module - Installer and checksum tool v1.7.2
```

Executing `.\efm-windows env` reports the effective environment variable values and their source.

```
C:\Users\userid\Desktop\EFM-1.7.2\EFM-1-7-2\EFM-1-7-2>.\efm-windows.exe env
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INFO: Effective environment variable status detected:
REPORT: - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8<
- - - - - 8< - - - - -
REPORT: EFM_ROOT(from platform default): C:\Users\userid\kinetic
REPORT: EFM_GUI_LOGIN(from config): efmAdmin
REPORT: EFM_GUI_PHRASE(from config): <empty>; Format: PBKDF2
REPORT: EFM_BROKER_PRIV_KEY_PEM(from config): key.pem
REPORT: EFM_BROKER_FULL_CHAIN_PEM(from config): cert.pem
REPORT: EFM_BROKER_SECURE_PORT(from config): 8443
REPORT: EFM_BROKER_CLEARTEXT_PORT(from config): 8080
REPORT: EFM_BROKER_IS_ALWAYS_OFFLINE(from config): BOOLEAN_FALSE
REPORT: EFM_BROKER_WORKERS(from config): 1
REPORT: EFM_INSTALL_LOGS(from config):
REPORT: EFM_UNATTENDED(from env): BOOLEAN_FALSE
REPORT: EFM_DEBUG: <UNSET>
REPORT: EFM_ASSET_MANAGER_GUI_LOGIN(from config):
REPORT: EFM_ASSET_MANAGER_GUI_PHRASE(from config): ***** (replaced by 16 x '*')
REPORT: - - - - - >8 - - - - - >8 - - - - - >8 - - - - - >8 - - - - - >8 - - - - - >8 - - -
- - >8 - - - - - >8 -
```

## Installing the EFM Dart Message Broker

In this example, no global variables are set; all defaults are used. This installs the EFM Message Broker and the DQL, System, and Dataflow engine DSLinks.

Executing `.\efm-windows broker`

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
```



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```
INFO: Interactive mode enabled (reason default)
INFO: Sub-task install Dart VM (required by Dart broker) ...
INTERACTION: Installed platform dart run-time. Check that the Dart VM can execute and
expose its version? [Y/n]:
INFO: Dart VM check succeeded with Dart VM version: 1.21.1 (Fri Jan 13 01:50:41 2017) on
"windows_x64"
INFO: Sub-task install Dart VM (required by Dart broker) succeeded
INFO: EFM Message Broker server configuration template copied successfully from
C:\Users\userid\Desktop\EFM-1.7.2\EFM-1-7-2\EFM-1-7-2\Components\server.json
INTERACTION: Reconfigure the EFM Message Broker server configuration? [y/n]: y
INFO: EFM Message Broker server configuration reconfiguration requested, continuing ...
INFO: Set server json value of certName from EFM_BROKER_FULL_CHAIN_PEM to cert.pem
INFO: Set server json value of certKeyName from EFM_BROKER_PRIV_KEY_PEM to key.pem
INFO: Set server json value of httpsPort from EFM_BROKER_SECURE_PORT 8443
INFO: Set server json value of isAlwaysOffline from EFM_BROKER_IS_ALWAYS_OFFLINE to false
INFO: Set server json value of port from EFM_BROKER_CLEARTEXT_PORT to 8080
INFO: Set server json value of workers from EFM_BROKER_WORKERS to 1
INFO: EFM Message Broker server configuration updated with path
INFO: Installation created secure by default setup, good.
INTERACTION: Keep blocking unsecured creation of upstream connections over HTTP using the
EFM Message Broker installation? [Y/n]:
INFO: Setup kept secure as installed by default, good.
INFO: EFM Message Broker user configuration template copied ...
INTERACTION: Perform EFM Message Broker custom user configuration now? [Y/n]:
INFO: EFM Message Broker custom user configuration requested, continuing ...
INTERACTION: EFM GUI Admin login is (efmAdmin). Change? [y/N]:

INTERACTION:Enter Password:
INTERACTION:Enter Password (verify):
INFO: Map the given login credentials into the EFM Message Broker user configuration and
grant admin rights ...
INFO: Creation of EFM GUI Admin User efmAdmin succeeded with ["User 'efmAdmin' was
successfully created."]
INFO: Grant admin rights for EFM GUI Admin User efmAdmin succeeded with ["User 'efmAdmin'
was successfully granted superuser."]
INFO: Users entry 1/1
REPORT: - 8< - - - - 8< - - - - 8< - - - - 8< - - - - 8< - - - - 8< - - - - 8<
- - - - 8< - - - -
REPORT: Username is: efmAdmin
REPORT: Admin rights granted: true
```



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```
REPORT: Passphrase in PBKDF2 format:
044a863Q/ou0bwpfusMaUxmc6WS9vqS0YEls3ObZYSdTnU=qj+VhTZBbttiIwFaBdr5yBu+0JCZDY5P2TrFBqoW3nU
=
REPORT: - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - -
- - >8 - - - - >8 -
INTERACTION: Installed broker and run-time. Check that the EFM Message Broker can execute
and expose its version? [Y/n]:
INFO: EFM Message Broker check succeeded with ['DSA Version: 1.1.2', 'DGLux5 Build:
r8009', 'DGLux Server Build: 1265', 'Verifying Environment...', 'Verifying
Configuration...']
INFO: The component EFM Message Broker has been installed
```

### Installing the System Administrator

In this example, no global variables are set; all defaults are used.

The System Administrator is an option component that can be added to the broker for managing the system. It requires that the broker previously has been installed and configured to function properly and thus will trigger install of broker otherwise.

Executing `.\efm-windows admin`

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INFO: The component EFM System Administrator has been installed
```

### Installing the System Monitor

In this example, no global variables are set; all defaults are used.

Typing `.\efm-windows monitor`

The System Monitor is an option component that can be added to the broker for managing the system. It requires that the broker previously has been installed and configured to function properly and thus will trigger install of broker otherwise.



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---

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INFO: The component EFM System Monitor has been installed
```

### Installing the EFM Windows components

In this example, no global variables are set; all defaults are used.

For a complete installation of all the components on a host system, you can use this command option. We do not envision production systems will be designed with all the components on a single system, but there are circumstances for development testing and learning environments that desire a quicker installation with one command.

This command installs the EFM Message Broker, EFM System Administrator, EFM System Monitor, and EFM DataFlow Editor.

**Typing** `.\efm-windows install`

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INTERACTION: Installed platform dart run-time. Check that the Dart VM can execute and
expose its version? [Y/n]:
INFO: Dart VM check succeeded with Dart VM version: 1.21.1 (Fri Jan 13 01:50:41 2017) on
"windows_x64"
INFO: The component Dart VM has been installed
INFO: EFM Message Broker server configuration template copied successfully from
C:\Users\userid\Desktop\EFM-1.6.0\EFM-1-6-0\EFM-1-6-0\Components\server.json
INTERACTION: Reconfigure the EFM Message Broker server configuration? [y/n]: y
INFO: EFM Message Broker server configuration reconfiguration requested, continuing ...
INFO: Set server json value of certName from EFM_BROKER_FULL_CHAIN_PEM to cert.pem
INFO: Set server json value of certKeyName from EFM_BROKER_PRIV_KEY_PEM to key.pem
INFO: Set server json value of httpsPort from EFM_BROKER_SECURE_PORT 8443
INFO: Set server json value of isAlwaysOffline from EFM_BROKER_IS_ALWAYS_OFFLINE to false
INFO: Set server json value of port from EFM_BROKER_CLEARTEXT_PORT to 8080
INFO: Set server json value of workers from EFM_BROKER_WORKERS to 1
INFO: EFM Message Broker server configuration updated with path
INFO: Installation created secure by default setup, good.
```



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```
INTERACTION: Keep blocking unsecured creation of upstream connections over HTTP using the
EFM Message Broker installation? [Y/n]:
INFO: Setup kept secure as installed by default, good.
INFO: EFM Message Broker user configuration template copied ...
INTERACTION: Perform EFM Message Broker custom user configuration now? [Y/n]:
INFO: EFM Message Broker custom user configuration requested, continuing ...
INTERACTION: EFM GUI Admin login is (efmAdmin). Change? [y/N]:

INTERACTION:Enter Password:
INTERACTION:Enter Password (verify):
INFO: Map the given login credentials into the EFM Message Broker user configuration and
grant admin rights ...
INFO: Creation of EFM GUI Admin User efmAdmin succeeded with ["User 'efmAdmin' was
successfully created."]
INFO: Grant admin rights for EFM GUI Admin User efmAdmin succeeded with ["User 'efmAdmin'
was successfully granted superuser."]
INFO: Users entry 1/1
REPORT: - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8< - - - - - 8<
- - - - - 8< - - - - -
REPORT: Username is: efmAdmin
REPORT: Admin rights granted: true
REPORT: Passphrase in PBKDF2 format:
044KYdm/SP+bb9v17hcNfDEFIN1LXfXR/+BbrtuDVorAUc=0MhRBVDuZDmMSLY+mDD3BRNdKfJTHKe1r5u36yGpKxM
=
REPORT: - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - - >8 - - - -
- - >8 - - - - >8 -
INTERACTION: Installed broker and run-time. Check that the EFM Message Broker can execute
and expose its version? [Y/n]:
INFO: EFM Message Broker check succeeded with ['DSA Version: 1.1.2', 'DGLux5 Build:
r8009', 'DGLux Server Build: 1265', 'Verifying Environment...', 'Verifying
Configuration...']
INFO: The component EFM Message Broker has been installed
INFO: The component EFM System Administrator has been installed
INFO: The component EFM System Monitor has been installed
```

## Installing DGLux5

In this example, no global variables are set; all defaults are used.





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---

**Typing** `.\efm-windows dglux`

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INFO: AcuityBrands DGLux Server server configuration template copied successfully from
C:\Users\userid\Desktop\EFM-1.6.0\EFM-1-6-0\EFM-1-6-0\Components\server_dglux_certs.json
INFO: The component AcuityBrands DGLux Server has been installed
```

This installs the DGLux5 server only and the dataflow dslink. The `\Users\userid\kinetic\dglux_server\server.json` must be edited to change the http and https port. The EFM Server will use port 080 for http and 8443 for https on Windows by default and will overlap. It is suggested using port using 9080 and 9443 respectively. **See EFM Server and DGLux5 licensing before starting.**

If the EFM Dart broker has already been installed with the DART or the DART VM has not been installed as a standalone, then it must be installed before the DGLux5 can be run. The DART VM is used both the EFM message broker and DGLux5.

**Typing** `.\efm-windows dart`

```
INFO: EFM_ROOT = C:\Users\userid\kinetic taken neither from file, nor from environment
variable, but instead from platform default!
INFO: Interactive mode enabled (reason default)
INTERACTION: Installed platform dart run-time. Check that the Dart VM can execute and
expose its version? [Y/n]:
INFO: Dart VM check succeeded with Dart VM version: 1.21.1 (Fri Jan 13 01:50:41 2017) on
"windows_x64"
INFO: The component Dart VM has been installed
```

## EFM Server and DGLux5 licensing

### **EFM Server and DGLux5 must run as separate users.**

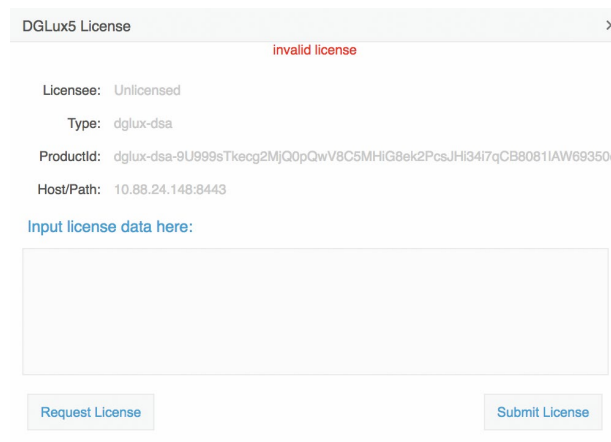
The EFM Server, upon startup, installs a `.dglogik` licensing file in the home directory of the user. This license enables the EFM to function as a unlimited node and supports the specific EFM projects: EFM System Administrator and EFM System Monitor. DGLux5 at startup also installs a `.dglogik` licensing file in

the home directory of the user. For this reason, starting EFM Server and starting DGLux5 must be started as separate users to avoid licensing overwrite and loss of service.

The DGLux5 also requires a license to operate. The trial license expires automatically after the 6-month trial. This license is not renewable and requires the purchase of an additional license for operation.

### Requesting a DGLux5 6-month trial license

1. Using a web browser client, connect to the dglux port using **http://[Server IP address]:9080** or **https://[Server IP address]:9443**.
2. Log in as **dgSuper** and with password **dglux1234**.



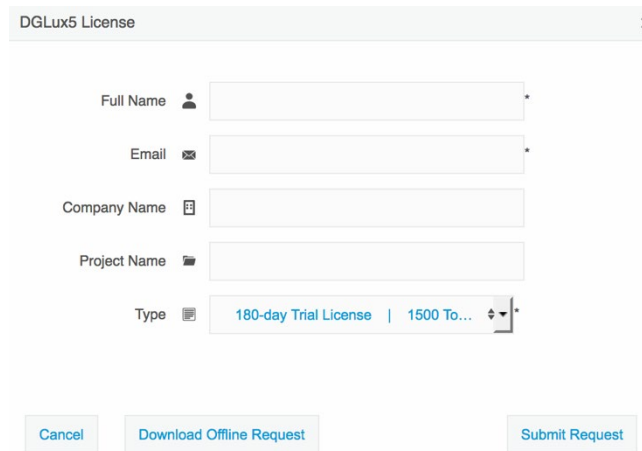
The screenshot shows a web browser window titled "DGLux5 License". At the top, there is a red error message: "invalid license". Below this, the following information is displayed:

- Licensee: Unlicensed
- Type: dglux-dsa
- ProductId: dglux-dsa-9U999sTkecg2MjQ0pQiwV8C5MHIG8ek2PcsJHI34i7qCB8081IAW69350ez
- Host/Path: 10.88.24.148:8443

Below the information, there is a blue link that says "Input license data here:" followed by a large, empty text input field. At the bottom of the form, there are two buttons: "Request License" and "Submit License".

3. Click **Request License**. Complete the following form, click **180-day Trial License | 1500 Topics**, and then click **Submit Request**.

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DGLux5 License

Full Name

Email

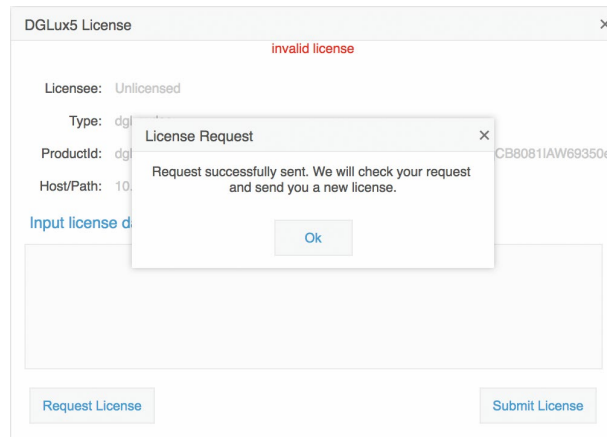
Company Name

Project Name

Type

Cancel Download Offline Request Submit Request

The following results display:



DGLux5 License

invalid license

Licensee: Unlicensed

Type: dg

ProductId: dg CB8081IAW69350ez

Host/Path: 10

Input license d

Request License Submit License

License Request

Request successfully sent. We will check your request and send you a new license.

Ok

In most instances, licensing will be automatic if connected to the Internet. Otherwise a license will be returned via email to the user's email address.



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4. Connect to the dglux server port using **http://[Server IP address]:9080** or **https://[Server IP address]:9443**. Once the license has been approved, the following pop-up menu will display. If you agree to the End User License Agreement, click **I agree**.



## Upgrading to EFM version 1.7.2 from an existing version installation

If an existing version 1.0.0, 1.0.1, 1.1.0, 1.2.x, 1.5.x, 1.6.x or 1.7.x is installed and running on a Windows server, it is possible to upgrade to the version 1.7.2. It is highly recommended to perform a backup of the host before proceeding with the upgrade.

Assuming that the EFM version 1.0.x, 1.1.0, 1.2.x, 1.5.x, 1.6.x or 1.7.x is already installed and running, the pre-requisites to upgrading include:

- Downloading the EFM 1.7.2 package
- Stopping the running Dart message broker (see below)

Please take note of the following name changes that might affect the upgrade process:

- If no explicit EFF\_ROOT was set for an installation with EFF 1.0.x, or 1.1.0, all components were installed below `C:\cisco\iotdc\`
- The environment variable name for the install root folder has been changed from EFF\_ROOT to EFM\_ROOT
- If you now upgrade to EFM 1.7.2, the new default path `%userprofile%\kinetic` is empty. So, you have two alternatives:
  - either set EFM\_ROOT to `C:\cisco\iotdc` to upgrade the setup in the prior location
  - or move `C:\cisco\iotdc\` to `%userprofile%\kinetic` (and adapt config entries in `eff_server/server.json` where applicable)
- Be aware that the `efm-tool` will rename `eff_` subfolders during the upgrade process. An existing `eff_server` will be renamed to `efm_server`, `eff_license` will become `efm_license`.

Perform the following steps to upgrade in a command window:



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1. Prepare upgrade like a fresh install: Unpack the EFM-1-7-2.zip accordingly and change current working directory to EFM-1-7-2 folder all as described above in the install section (cf. there if unzip not present or something does not work):

```
C:\Users\userid\> unzip -q EFM-1-7-2.zip
C:\Users\userid\> cd %userprofile%\EFM-1-7-2
C:\Users\userid\EFM-1-7-2\>
```

2. Note the directory of the destination as the default installation, for example:

```
C:\Users\userid\EFM-1-7-2\> set EFM_ROOT=C:\cisco\kinetic\
```

**Note:** If your installation path differs from this default path, please adapt the corresponding paths in the following commands. If it is already %userprofile%\kinetic, no setting of EFM\_ROOT variable is required, but the following commands must be adapted to function properly.

3. Stop the Dart broker:

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\efm_server\bin\daemon.dart stop
```

4. Upgrade the components:

```
C:\Users\userid\EFM-1-7-2\> .\efm-windows upgrade
```

5. Update the static URL path to the “.well-known” resource inside efm\_server/server.json config file, so that it matches the upgraded location (just change eff\_server to efm\_server inside path)

6. Start the Dart broker:

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\efm_server\bin\daemon.dart start
```

## Starting and stopping EFM Dart Message Broker

**Note:** Assuming the default installation path root stored in variable EFM\_ROOT in the following examples.

Start the broker:

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\efm_server\bin\daemon.dart start
```



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To stop the broker (when demo or test complete):

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\efm_server\bin\daemon.dart stop
```

### Starting and stopping the DGLux5 and Dart Message Broker

**Note:** Assuming the default installation path root stored in variable EFM\_ROOT in the following examples.

Start the broker:

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\dglux_server\bin\daemon.dart start
```

To stop the broker (when demo or test complete):

```
C:\> %EFM_ROOT%\dart-sdk\bin\dart %EFM_ROOT%\dglux_server\bin\daemon.dart stop
```



## Connecting to the EFM system components

All the EFM tools require a username and login for access. The administrator can add additional users in the System Administrator after the first login.

Application	Insecure Port (if supported) <sup>1</sup>	Secure Port
EFM System Administrator	http://[Server IP Address]/efm-admin	https://[Server IP Address]/efm-admin
EFM System Monitor	http://[Server IP Address]/efm-monitor	https://[Server IP Address]/efm-monitor
EFM Data Flow Editor	http://[Server IP Address]/dataflow.html	https://[Server IP Address]/dataflow.html

---

<sup>1</sup> Note that if the server configuration is using Safe Mode, incoming connections will automatically redirect to the secure port if configured. If no secure port is defined or certificates and passwords are not properly configured, the secure port will not accept connections and, therefore, in Safe Mode the access to the system is unavailable.





## Updating the SSL certificates

A necessary step for secure communication is to properly install the SSL certificate files and modify the corresponding configuration files for EFM. An initial installation is pre-configured with a self-signed certificate and will work without modifications for 90 days. After this timeframe, the certificates need to be updated and corresponding configuration files need to be adapted to point to the new file. Please re-start the services after adapting the configuration.

For EFM Server place the new certificate in folder

```
%EFM_ROOT%\efm_server\certs\
```

and adapt the configuration file `server.json`:

```
"certName": "cert.pem",  
"certKeyName": "key.pem",
```

## Troubleshooting

### Proxy Server challenges and the EFM Message Broker

In some environments, it might be necessary to define a proxy server to access the Internet due to security restrictions. The EFM message broker uses a localhost communication to connect to the DSLinks on the same host and usually any proxy server configuration inhibits some of this functionality from functioning properly.

We have observed in the System Administrator that some DSLinks connect to the message broker, while others do not if there is a proxy server configured. The same can be said for DGLux5.

In order to successfully connect to all the DSLinks it stopping the Message Broker be necessary, remove the proxy settings and start again the message broker.

An alternative to removing the use of the proxy server is to define an exclusion list that includes the localhost. In this manner at least, the localhost will not be forwarded to the proxy server and



communications between the Message Broker and the DSLinks that are on the local host form a connection.

## Dart Broker DSLinks take long to start when no Internet connection is available or it is unstable

When starting or restarting the DART broker when there is no Internet connectivity or the Internet connection is unstable for the host operating system, the DSLinks start with a long delay. To prevent this issue, the `server.json` parameter `"isAlwaysOffline"` should be set to true.

See the section *Configuring the EFM Dart Message Broker or DGLux5 server configuration via the `server.json` file* for more detail.



## Configuring the EFM Dart Message Broker or DGLux5 server via the server.json file

The system administrator can edit the text file server.json. Modifications to this file should be performed when the broker is not running to avoid the content being overwritten by the message broker. The new configuration will take effect after startup.

The Dart Broker configuration file server.json is the same for EFM Dart Broker or the DGLux5.

An example server.json configuration file located in the \$EFM\_ROOT/efm\_server folder and does not necessarily contain all parameters:

```
{
  "debug": false,
  "host": "0.0.0.0",
  "port": 8080,
  "httpsPort": 8443,
  "certName": "cert.pem",
  "certKeyName": "key.pem",
  "certPassword": "",
  "enableHSTS": false,
  "enableCSRFProtection": false,
  "strictFileUpload": {
    "enabled": false,
    "useClamAV": false,
    "extensions": [
      "dg5",
      "dgi",
      "crt",
      "key",
      "woff",
      "ttf",
      "gif",
      "svg",
      "png",
      "jpg",
      "xml",
      "json",
      "sql",

```



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```
        "csv"
      ]
    },
    "disableFileSecurity": false,
    "isAlwaysOffline": false,
    "broadcast": false,
    "workers": 1,
    "updateInterval": 200,
    "static": {
      ".well-known": "/opt/cisco/kinetic/efm_server/.well-known"
    },
    "linkConfig": {},
    "disabledLinks": [],
    "enableUptimeChecker": true,
    "uptimeCheckUrl": null,
    "upstream": {},
    "strictTls": false,
    "quarantine": false,
    "allowAllLinks": true,
    "defaultPermission": [
      [
        ":config",
        "config"
      ],
      [
        ":write",
        "write"
      ],
      [
        ":read",
        "read"
      ],
      [
        ":user",
        "read"
      ],
      [
        ":trustedLink",
        "config"
      ],
      [
        "default",
        "none"
      ]
    ]
  },
  "useRuntimeManager": false,
```



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```
"useDartRuntimeManager": false,
"useJavaRuntimeManager": false,
"passwordHasherIterations": 10000,
"passwordHasherKeyLength": 32,
"loginRedirectPath": "/",
"guestLoginRedirectPath": "/assets/",
"authType": "proxy",
"twoFactorAuth": "none",
"runPortChecks": true,
"storageDriver": "simple",
"downstreamName": "downstream",
"loggers": [],
"proxies": {},
"hooks": {},
"distributionUrl": "NO",
"linkRepositoryUrl": "https://dsa.s3.amazonaws.com/links/links.json",
"serverVmFlags": [],
"userTimeout": 525600,
"allowBrowserCaching": false,
"serverLogLevel": "INFO",
"enableLogCompression": true,
"logRotationInterval": 0,
"enableIPv6": true,
"dartRuntimeManagerVmFlags": [],
"javaRuntimeManagerVmFlags": [],
"allowPasswordChanges": true,
"keepCustomAssets": true,
"linkManagerEnvironment": {},
"timeHttpRequests": false,
"generatedCertificateSubject": "/C=US/ST=California/L=Oakland/O=DGLogik
Inc./OU=Customers/CN=*",
"enableCertificateGeneration": true,
"alternativeBrokerUrl": null,
"httpPathClassification": {},
"corsProxyRules": "",
"enableGit": false,
"enableSingleSignOnServer": false,
"maxQueueSize": 256,
"ssoProviderUrl": null,
"formatDg5": false,
"allowedCorsRegexString": null,
"loginAuditFileName": "audit.log",
"loginAudit": false,
"blockOutsideGuests": false,
"brokerName": "broker-",
"runBrokerInMain": true
```



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}

In the following table, the default values are listed that are assumed by the server, if the parameter is not present in the server.json.

Option	Description	Default Value	Comments
allowAllLinks	When the value is true, all incoming DSLink connections will be accepted to /downstream. When the value is false, an incoming DSLink without proper authentication will be rejected unless quarantine is enabled.	true	
allowBrowserCaching	When enabled, this value will add Cache-Control headers for 300 seconds on static files such as .dg5, images, etc.	false	
allowedCorsRegexString	If you wish to allow, but restrict, the access of external sites to interface with your EFM server, you can set a Regular Expression string here which much match for the external server requests to be completed.	null	
allowPasswordChanges	When true, this value will enable passwords to be updated via the /change_password URL (after the user has logged in). This is only work if supported by the current (authType)[#authtype]	true	
alternativeBrokerUrl	If you wish for all DSLink connections to be forwarded to a separate broker rather than the default broker, you would specify the URI of the alternative broker here. This was primarily used for legacy installations.	null	
authType	Determines the authentication provider to use.	file	
blockOutsideGuests	Enable this value if you wish to require a valid user login to view all projects.	false	
broadcast	When this value is true, the server's broker is broadcast to the local network for discovery by other machines. When this value is false, the broadcast service is not enabled.	true	



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certKeyName	SSL private key file name. Leave blank to disable HTTPS		
certName	SSL certificate file name. Leave blank to disable HTTPS		
certPassword	SSL certificate password. Set to null to disable HTTPS		
corsProxyRules	The EFM server may also be used to proxy requests to external servers. To limit the locations which the proxy can access, a list of addresses, separated by new lines, may be added to the string.	""	
dartRuntimeManagerVmFlags	When the <a href="#">useRuntimeManager</a> or <a href="#">useDartRuntimeManager</a> options are enabled and the platform supports the use of a runtime manager, then the flags provided here are passed to the Dart VM prior to starting the DSLink manager.	[]	
debug	Enable/Disable Debugging Mode	false	For production site, this should always be false, debug:true may result in memory leak and bugs.



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defaultPermission	Default permission setting for the root node. When this value is null, permissions are disabled, and everything has the config permission.	<pre>[   [     ":config",     "config"   ],   [     ":write",     "write"   ],   [     ":read",     "read"   ],   [     ":user",     "read"   ],   [     ":trustedLink",     "config"   ],   [     "default",     "none"   ] ]</pre>	
disableFileSecurity	When this value is true, then any user can access any file. When this is false, file permissions are checked.	false	
distributionURL	This value is the url used to check for updates of the EFM server. This value can be managed in the <code>/sys/config</code> nodes (generally should not change from default).	NO	





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downstreamName	This value is the name of the downstream connections node. Previously releases used a downstream name of <code>conns</code> . However it is recommended to leave this as the default value, as other Requester DSLinks may make assumptions of the correct path.	downstream	
enableCertificateGeneration	When this option is set to true, the server will attempt to generate self-signed SSL certificates prior to launching the server. This will set the appropriate <code>certName</code> , <code>certKeyName</code> . If these values are not empty, then certificate generation will be skipped.	true	
enableCSRFPProtection	When this value is true, the HTTP server will add specific headers and cookies to help mitigate Cross-Site Request Forgery attacks.	false	
enableGit	This value will enable git version control over your project directory. When enabled, modifications to files in the project will be committed to a git repository at the same file path, and can be used in project management to see a history of changes and even revert changes.	false	
enableHSTS	When this value is true, the HTTP server will always redirect to the HTTPS server, and the HTTPS server will have HSTS enabled to route requests automatically to the HTTPS server.		
enableIPv6	Toggles support for IPv6 connections	false	
enableLogCompression	If this value is true, then when log files reach approximately 5MB in size, they will be rotated and compressed. Log files will be renamed to <code>&lt;logfile&gt;.&lt;millisecondTimeStamp&gt;.gz</code>	true	



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enableSingleSignOnServer	In an environment where there are multiple instances of the EFM Server installed on the network, it is possible to allow all instances to refer to one primary server for authentication. When this option is enabled, this server will act as a primary server and allow other EFM Server instances to query this server for a user session on this server and if found, share it with the other instance. This requires the ssoProviderUrl be supplied to the other EFM Server instances.	false	
enableUptimeChecker	The server also comes with a checker which will periodically check to verify that the server is still up and running and responsive. Setting this value to false will disable the uptime checker.	true	
formatDg5	When this value is true, EFM client will save dg5 in a formatted and json with key sorted, makes it easy to track changes.	false	
generatedCertificateSubject	If the option <u>enableCertificateGeneration</u> is enabled, this is the subject used when generating the self-signed certificate.	/C=US/ST=California/L=Oakland/O=Acuity Brands Inc./OU=Customers/CN=*	
guestLoginRedirectPath	Determines the URI that a user is redirected to when login is complete.	/	
hooks	This value is designed to execute a specific command line program at various server states. Currently the only supported state is <code>ready</code> which executes when the server has finished loading. The Map contains keys of state (eg <code>ready</code> ) and value of a list of command line programs to execute.	{}	



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httpPathClassification	This value is a map of paths which may match a specific classification string. The key is the classification and the value is a list of paths which match that classification. If enabled and a requested path to the server matches a path in that classification, then that request will be treated as that type of classification request even if not matching the original hardcoded path. Currently the only supported classification is <code>session</code> .	<code>{}</code>	
httpsPort	HTTPS port to listen on. If this is less than or equal to 0, and/or certName or certPassword is not provided, then the server does not listen on any port for HTTPS. Ensure that if you install a custom certificate, you fill in the certName, certKeyName and certPassword fields.	8443	At least one of port or httpsPort must have a valid port number assigned.
isAlwaysOffline	Indicates that a server is expected to never have a full internet connection. This will prevent the server from trying to download the list of DSLinks available in the remote repository.	false	
javaRuntimeManagerVmFlags	When the <code>useRuntimeManager</code> or <code>useJavaRuntimeManager</code> options are enabled and the platform supports the use of a runtime manager, then the flags provided here are passed to the Java VM prior to starting the DSLink manager.	<code>[]</code>	
keepCustomAssets	When the value is true, custom assets in <code>www/assets</code> are kept upon updating EFM Server.	false	



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linkConfig	Each DSA Link may optionally specify its own configuration parameters to use. These configuration parameters can be seen under the <code>/sys/links/&lt;linkName&gt;/configs</code> node. If you modify one of those parameters, the value is updated in the server configuration, as opposed to directly modifying the DSA Link's configuration file. This value will vary depending on the DSA Links installed, their given names and the configuration parameters they may provide. It should be modified from the DSA node tree rather than by hand.		
linkManagerEnvironment	This value is a map of environment variables to set when the DSA Link manager is started.	{}	
linkRepository	This value is the url used to check for updates for any of the DSA Links installed via repository. This value can be managed in the <code>/sys/config</code> nodes (generally should not change from default).		
loggers	The server contains a number of specialized loggers, particularly for debugging, which may be added here to retrieve verbose logging information. Some examples include "File Service" and "Execute". These would normally be advised to be enabled at the request of support.		
loginAuditFileName	This value only applies when <code>loginAudit</code> is enabled. This will be the filename, within the <code>/logs</code> directory, in which the login audits are recorded.	audit.log	
loginAudit	When enabled, this option will log to the <code>loginAuditFileName</code> any user logins, it will record the DateTime, username, and the IP address from which the request originated. It will also log any time a user's IP address changes during an active session.	false	



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loginRedirectPath	Determines the URI that a user is redirected to when login is complete.	/	
logRotationInterval	This value is the number of seconds to wait before rotating log files. When this option is enabled (anything greater than 0) enableLogCompression will not be used. After the specified period, a log file will be renamed to <filename>.<number> the higher the number the older the log file. Any files greater than 2 will be removed.	0	
maxQueueSize	This value is the maximum number of items stored in the queue to be sent, if the queue reaches a volume greater the behaviour will vary depending on the QOS settings (merged, dropped etc).	256	
passwordHasherKeyLength	When using file based authType, this value determines the number of bytes that the encoded password should store.	32 bytes	
passwordHasherIteration	When using file based authType, passwords are encrypted locally using PBKDF2. This value determines the number of iterations of the PBKDF2 algorithm used to encode the password.	10000	
port	HTTP Port to listen on. If this is less than or equal to 0, then the server does not listen on any port for HTTP.	8080	At least one of port or httpsPort must have a valid port number assigned.
proxies	This value is a Map of path (key) and URI (value) pairs. Requests to the path will be forwarded to the URI	{}	
quarantine	** This setting has no effect when allowAllLinks is true ** When the value is true, a new incoming DSLink without a token will be put in /sys/quarantine. A quarantined DSLink can only work as a responder. Use the /sys/quarantine/authorize to move a quarantined DSlink to /downstream.	false	



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runPortChecks	When set to true, this option will verify that the configured ports for the server (HTTP and HTTPS) are valid and available for use prior to actually starting the server.	true	
serverLogLevel	Sets the log level verbosity. Levels are: NONE; SEVERE; WARNING; INFO; FINE; FINEST; ALL; DEBUG. Each level will report its level and all prior to it. (Example: INFO will log all INFO, WARNING and SEVERE messages).	INFO	
serverVmFlags	This value is a list of flags to add to the server when being started. They only apply to the EFM server and not any managed links.		
ssoProviderUrl	When this value is supplied, it must be the URI of another EFM server instance. This server will request an existing session from the supplied server and if found grant access via that session. If no session is found, the user will be prompted to log into that server and will be redirected to this instance once successfully authenticated.	null	
static	Configures a static directory mapping. This is used to serve files and directories on the server. Example: <pre>{   "/static": "/srv/http/static" }</pre>	<pre>{   ".well-known":     "/path/to/dsa/ dglux- server/.well- known"} }</pre>	
storageDriver	This option is available for future expansion for how data is persisted at various QOS levels. Currently only <code>simple</code> is supported.	simple	



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<p>strictFileUpload</p>	<p><b>strictFileUpload</b> is a configuration map that contains 3 fields. When this option is enabled, it will affect various file upload capabilities. Notably, it prevents guest users from being able to upload a file; It will limit uploads to only explicitly permitted file extensions; and possibly scan uploaded files for viruses.</p> <p>The configuration options are:</p> <p><b>enabled</b> When set to true, strictFileUpload is enabled. If false, it will disable strictFileUpload checks.</p> <p><b>useClamAV</b> When set to true, the server will attempt to find <u>Clam Antivirus</u> on the system and if located, it will try to utilize this to scan any file uploads the server receives from a user. If this value is false, or the ClamAV was not found on the system, antivirus scans will be skipped, but other strictFileUpload conditions still apply if enabled.</p> <p><b>extensions</b> An allow list of permissible file extensions (omitting the leading .) When strictFileUpload is enabled, the filename must end in one of these extensions or the upload will be rejected.</p>	<pre>{   "enabled":   false,   "useClamAV":   false,   "extensions":   [     "dg5",     "dgi",     "crt",     "key",     "woff",     "ttf",     "gif",     "svg",     "png",     "jpg",     "xml",     "json",     "sql",     "csv"   ] }</pre>	
<p>timeHttpRequests</p>	<p>If enabled, this value will cause all HTTP requests to the EFM Server to be timed and the log will be updated with the request and elapsed duration.</p>	<p>false</p>	
<p>twoFactorAuth</p>	<p>Determines the two factor authentication provider to use.</p> <p>Supported Two-Factor Authentication Providers</p> <ul style="list-style-type: none"> <li>• none: Don't enable two factor authentication.</li> </ul> <p>duo: Duo Two-Factor Authentication</p>	<p>none</p>	



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updateInterval	<p>Only affects the responder. When this setting specified, a responder must not send stream updates to server more often than the minimum interval in milliseconds, value subscriptions in the responder should be cached.</p> <p>If a value subscription update is already cached, it must update the cache with the new value to prevent useless updates or updating an incorrect value.</p> <p>This value only affects the time between two updates of the same stream.</p> <p>If the responder does not respect the interval, the requestor might close the connection due to flooding.</p>	200	
upstream	<p>A list of upstream brokers that are defined with a locally referenced upstream name, locally referenced broker name, the connection URL that always has the suffix /conn, token and group.</p> <p>For example, the name "upstreamName", local name "ThisName", the URL <a href="https://192.168.22.93:443/conn.enable">https://192.168.22.93:443/conn.enable</a>, no token and permission group ":config".</p> <pre>"upstreamName": {   "name": "ThisName",   "url": "https://192.168.22.93:443/conn",   "enabled": true,   "token": null,   "group": ":config" }</pre>		





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uptimeCheckURL	The server has a built-in checker to verify it is still running, and restart it if it goes offline or drops connections. By default the checker will attempt to connect to localhost. However if the server is bound to a different interface in the host parameter, you will need to specify the correct URL for the server. It should end in /ping. This only applies when enableUptimeChecker is enabled. Example: "https://169.254.100.100/ping"		
useDartRuntimeManager	When the value is true, the Dart Runtime Manager is used for Dart DSLinks. The Dart runtime manager reduces resource consumption by merging Dart DSLinks into a single process.	false	
useJavaRuntimeManager	When the value is true, the Java Runtime Manager is used for Java DSLinks. The Java runtime manager reduces resource consumption by merging Java DSLinks into a single process.	false	
userTimeout	Number of minutes of user inactivity (nothing being loaded from the server) after which session times out. This is a general setting, cannot be set per user.	525600	
useRuntimeManager	This value enables both the useDartRuntimeManager and useJavaRuntimeManager on the server if applicable. <b>WARNING: Setting this value has no effect on a Windows based server</b>		
workers	Number of Server Workers. For low end devices, this should stay at 1. For large machines, this can be set up to a maximum of 128. It is recommended that you do not exceed the number of logical processors on your machine.	For single-core machines, this is 1, for other devices, this is 2.	



## Obtaining documentation and submitting a service request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at the following URL:

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