

## Lumetics LINK™ Staging Database

### INTRODUCTION

LINK is a software solution for automated extraction, processing and reporting of data that has been produced by analytical instruments or process equipment. LINK will search network locations for any new datasets produced by 100's of different analytical instruments/process equipment, parse all useful data from these digital files (including 'xy' curve data and instrument parameter calculations), and copy this data to a centralized LINK database residing on your network. The powerful UI allows up to 5000 distinct sample datasets to be displayed individually, statistically aggregated, and grouped based on user-specified criteria and visualized in the form of comprehensive charts/tables/images. Metadata may be automatically extracted from several different sources and utilized directly to produce dynamic fully customized Word/PDF reports. All LINK functionality is optionally 21 CFR Part11 compliant.

The LINK software is a client/server-based architecture, where the LINK client is a dedicated portable web-based application that connects to the LINK server present on your network via port 8080 (default). Most LINK users will utilize the LINK client to automate data extraction/processing/reporting and utilize the LINK database for long term storage of project data and corresponding analysis visualization preferences. This document outlines the installation instructions for a MariaDB-based staging database for the Lumetics-supplied installer. If an existing MariaDB database is available that was not created with the Lumetics installer, then additional manual instructions will need to be applied, which is not covered in this document.

A minimum of one Lumetics LINK™ Annual License Subscription, in addition to a single Lumetics LINK™ Staging Database Annual License Subscription, is required to enable the LINK Staging DB functionality.

### STAGING DATABASE SERVER SPECIFICATIONS

The specifications of the Staging Database can be varied, depending on the loads the user expects to be placed on pushing data from the LINK Server to the Staging Database, and from other applications (LIMS, ELNs, Spotfire, etc) pulling data from the Staging Database. For moderate usage, starting with the specifications below should be adequate, and can be increased as loading/usage increases.

Effective CPUs	4
RAM	8+ GB
Hard Drive Free Space	≥ 250 GB
Operating System	Minimum: Windows 7+ or Win Server 2008+, 64-bit OS
CPU Clock Speed	≥ 4 GHz
Disk R/W Speed	≥ 3000 MB/s (typically SSD)
Network Speed	≥ 1 Gbps (between data source and LINK Server)

## MARIADB STAGING DATABASE INSTALLER

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Lumetics will install the MariaDB database using the LINK Staging Database (MariaDB) Installer, by following the below steps:

### Run the Installer

Download and run the “*LINKdb Staging Database MariaDB Installer vX.exe*” installer on VM that was created for this purpose. This cannot be the same VM as the LINK Server installation. Running this installer will perform the following operations:

- Create a root user with a default password of *STAGEadmin@#*
- Create a database called *lumetics\_staging*, which contains two tables: *staged\_data* and *column\_names*

### Create Account

Access to the staging DB account will be established to read data and delete old data. The below commands will a) create a user, b) grant permissions to access certain tables, as well as specify what other computers they can connect from, and c) “Flush Privileges” (which basically activates the commands)

```
CREATE USER 'sdb_user'@'%' IDENTIFIED BY 'STAGEuser!@';

GRANT SELECT, DELETE, RELOAD, REFERENCES, INDEX, EXECUTE ON *.* TO
'sdb_user'@'%' IDENTIFIED BY 'STAGEuser!@' WITH GRANT OPTION;

FLUSH PRIVILEGES;
```

For the “GRANT” command, it is set to log in from anywhere by virtue of specifying the “%” after the user name (e.g.) 'sdb\_user'@'%. If only allowing login of this user from a specific computer (e.g. a Spotfire server), then this will change to be a specific computer name in which the connection is from (e.g. 'sdb\_user'@'my\_spotfire\_server\_name\_here' (replace “my\_spotfire\_server\_name\_here” with the actual name of the Spotfire server).

## UTILIZATION OF LINK STAGING DATABASE

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Below is an example query a user might run manually using the MariaDB dynamic columns:

```
SELECT `Id`, COLUMN_GET(`Data`, 'Sample Name' AS CHAR),
COLUMN_GET(`Data`, 'LINK User' AS CHAR),
COLUMN_GET(`Data`, 'Export Date' AS CHAR),
COLUMN_GET(`Data`, 'MSTT Name' AS CHAR),
FROM staged_data;
```

### Duplicate Insertions

The LINK software is designed to prevent duplicate rows with identical data from being inserted into the database. An identical row is defined by creating a large string containing the following information:

- (1) The project ID
- (2) The Measurement Summary Table Template (MSTT) ID
- (3) The MSTT header + value for a given row for each column in the table

This string is then used to create a “hash key” which will generate a unique ID based on the contents of the string. If this hash key already exists in the database, it means that a row containing this project/measurement summary table, and identical results, is already present, and the LINK software will not import it again.

Here is the basic schema for the database and tables. Change the name of the database (e.g. *lumetics\_staging*) below when running in SQLYog to add multiple staging databases with different names to the same server.

```
CREATE DATABASE IF NOT EXISTS `lumetics_staging` CHARACTER SET 'utf8';

USE `lumetics_staging`;

DROP TABLE IF EXISTS `staged_data`;
```

```
CREATE TABLE `staged_data` (  
  `Id` INT(11) NOT NULL AUTO_INCREMENT,  
  `Hashkey` VARCHAR(255),  
  `Data` BLOB,  
  PRIMARY KEY (`Id`),  
  UNIQUE KEY `Index2` (`Hashkey`)  
) ENGINE=INNODB AUTO_INCREMENT=1 DEFAULT CHARSET=utf8 COLLATE=utf8_general_ci;  
  
DROP TABLE IF EXISTS `column_names`;  
  
CREATE TABLE `column_names` (  
  `Id` INT(11) NOT NULL AUTO_INCREMENT,  
  `Name` VARCHAR(255),  
  PRIMARY KEY (`Id`),  
  UNIQUE KEY `Index2` (`Name`)  
) ENGINE=INNODB AUTO_INCREMENT=1 DEFAULT CHARSET=utf8 COLLATE=utf8_general_ci;
```

## CONTACT LUMETICS

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For direct assistance, please contact Lumetics LINK™ Support:

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