MIKE

Powered by DHI

MIKE Zero for Linux

Installation Guide

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Introduction

Welcome to **MIKE Zero for Linux 2025**.

MIKE Zero for Linux provides Linux versions of the following engines including all sub-modules: MIKE 21 Flow Model FM, MIKE 3 Flow Model FM, MIKE 21 Spectral Waves FM, MIKE 21 Wave Model FM, and MIKE 3 Wave Model FM. MIKE Zero for Linux does not include a Graphical User Interface. However, the MIKE Zero for Linux installation package does include many pre- and post-processing tools to incorporate into Linux-based workflows.

In this Installation Guide, you will find information about how to install and get started with MIKE Zero for Linux.

System Requirements

Linux distributions

Officially supported Linux distributions*	Red Hat Enterprise Linux (RHEL) 8 and 9 (all 64-bit) Ubuntu 22.04 and 20.04 (all 64-bit)
Non-supported but partially tested Linux distributions**	Ubuntu Kylin, Galaxy Kylin (V10), AlmaLinux, Debian (all 64-bit)

* Officially supported Linux distributions are distributions that have been tested in accordance with the MIKE Powered by DHI Quality Assurance procedures and where warranty and software maintenance agreement conditions apply.

** Non-supported but partially tested Linux distributions are distributions that have only undergone limited testing and so are not officially supported for running MIKE Zero for Linux. Users may need to manually install missing dependencies (libraries) to ensure proper functionality of the engines. The MIKE software warranty and software maintenance agreement conditions do not apply for non-supported Linux distributions. DHI is under no obligation to provide assistance or troubleshooting for cases where the software is being used on a non-supported distribution.

Minimum hardware/software requirements

- Intel® 64 architecture processor (x86-64) or compatible non-Intel processor. Please note that other processor architectures such as Power PC, Itanium, SPARC, or ARM are not supported.
- For the best experience, a multi-core or multi-processor system is recommended.
- When utilising MPI-based parallelisation in a HPC cluster, high-performance interconnection such as InfiniBand™ is recommended.

Content

MIKE Zero for Linux consists of the packages listed below. Make sure to download all 5 packages for Linux, comprising MIKE Common, MIKE Zero, Prerequisites, Additional Tools and Examples:

Component	Content
MIKE_Common_2025	common components (including License System)
MIKE_Zero_2025	core components
MIKE_Zero_2025_Prerequisites	prerequisites (Intel MPI library)
MIKE_Zero_2025_Tools	additional tools
MIKE_Zero_2025_Examples	examples

Table 1 - Installation packages for MIKE Zero for Linux

MIKE Zero for Linux includes the calculation kernels listed below, which are all included in the core component package, MIKE_Zero_2025:

Product name	Application name
MIKE 21 Flow Model FM	FemEngineHD
MIKE 21 Flow Model FM (with GPU support)	FemEngineHDGPU
MIKE 3 Flow Model FM	FemEngineHD
MIKE 3 Flow Model FM (with GPU support)	FemEngineHDGPU
MIKE 3 Wave Model FM	FemEngineHD
MIKE 21 Wave Model FM	FemEngineHD
MIKE 21 Spectral Waves FM	FemEngineSW
MIKE 21/3 Coupled Model FM	FemEngine
MIKE 21/3 Coupled Model FM (with GPU support)	FemEngineGPU

Table 2 - Engines included in MIKE Zero for Linux

The calculation kernels utilising GPU requires a Nvidia graphics card with compute capability 6.0 or higher. Please note that some of these graphics' cards have varying performance in single precision compared to double precision calculations. The GPU functionality is based on version 12.5 of the Nvidia® CUDA® Toolkit.

MIKE Zero for Linux uses Intel MPI Library and therefore requires an Intel MPI Library runtime environment to run the MPI-based applications. MIKE Zero for Linux has been built and tested with Intel® MPI Library 2021 Update 12 for Linux. The runtime environment packages are included in the prerequisite package.

Other versions of the Intel MPI Library runtime environment may work with MIKE Zero for Linux, but it is strongly recommended to use the version included in the prerequisite package.

Installation

The default installation location of MIKE Zero for Linux is /opt/MIKE/2025, when installing as root, and $HOME/MIKE/2025 when installing as a normal user.

To perform an installation of MIKE Zero for Linux follow the steps below, running the *./install.sh* command for each package:

1. Unpack the MIKE Zero for Linux installation packages listed in **Table 1**
2. Install the MIKE_Common_2025 package
3. Setup licensing following the instructions in **License**
4. Install the MIKE_Zero_2025 package, containing the FM engines in **Table 2**
5. Install the prerequisites (Intel MPI library) located in the MIKE_Zero_2025_Prerequisites package
6. Install the MIKE Zero tools from the MIKE_Zero_2025_Tools package
7. Optionally, install the MIKE Zero examples from the MIKE_Zero_2025_Examples folder

Please note, that on a cluster with multiple compute nodes MIKE Zero for Linux and Intel MPI Library must be available on all compute nodes. The standard approach is to install MIKE Zero for Linux and Intel MPI Library in a location shared across all compute nodes. Intel MPI is installed via the command:

sh l_mpi_oneapi_p_2021.12.1.8_offline.sh

License

MIKE Zero for Linux requires an additional license module, compared to MIKE Zero for Windows. Please verify that you have this license available.

MIKE Zero for Linux supports both network licenses and internet licenses. Dongle based local licenses are currently not supported. Network license requires a DHI License Manager installation, which is currently only available for Windows. MIKE Zero for Linux is as default configured to use network license and license server name can be specified in the installation process.

The license configuration tool named *licconfig*, which is included in MIKE Zero for Linux, can be used to set up MIKE Zero for Linux to use internet license and to change the default license configuration.

Configuration of internet license is done with one of the following commands:

- Authentication using username and password:

    licconfig set --type=internet --sso=0 --iuser=user@my-company.com --ipassword=my-password

- Authentication using a MIKE Cloud account:

    licconfig set --type=internet --sso=1

The latter is more secure, but only available starting from MIKE Zero 2024 Update 1. Additionally, it requires the .NET 6 runtime to be installed on the system.

Use of Internet license requires applications to communicate with an internet license service at https://dk.license.mikebydhi.com/svc and https://license2.mikebydhi.com/svc via HTTPS (HTTP over TLS/SSL) on port 443, which must be open for outbound traffic.

Applications also start a relay service when internet license is used. This service uses custom protocol similar to network license on TCP ports 61768 – 61798. The relay service uses the first port in this range that is open for inbound traffic. This inbound traffic is only used by the relay service on the local host to communicate with applications. The use of the relay service can be bypassed by using the license type *internet_direct* instead of *internet*.

Configuration of network license is done via the command:

    licconfig set --type=network --server=myserver.domain

Use of network license requires applications to communicate with a network license service via custom protocol using RPC (remote procedure call) on port 1799, which must be open for inbound traffic.

More information about licconfig can be found via the command:

    licconfig --help

Execution

Before executing simulations, you need to set up the runtime environment for the Intel MPI Library and for MIKE Zero for Linux. This is done via the below commands:

    source <install path>/intel/oneapi/mpi/2021.12/env/vars.sh

    source <install path>/MIKE/2025/mikevars.sh

Two examples of how to execute a simulation are listed below. The first is a MIKE 21 Flow Model FM example and the second is a MIKE 21 Spectral Waves FM example.

    cd <install path>/examples/MIKE_21/FlowModel_FM/HD/Lake
    FemEngineHD lake.m21fm

    cd <install path>/examples/MIKE_21/SW/Island
    FemEngineSW Setup.sw

When running FemEngineHD or FemEngineSW as shown above, the two computational engines will utilise OpenMP parallelisation only. However, it is recommended to use MPI parallelisation, which is more efficient even for a small number of cores and scalable for large number of cores. To execute the simulations using MPI parallelisation you need to use mpirun. To execute the example with 8 cores you need to use the following commands:

mpirun –n 8 FemEngineHD lake.m21fm

mpirun –n 8 FemEngineSW Setup.sw

If the number of available cores on the compute node is larger than the number of cores specified in the mpirun command, additional cores will be used for OpenMP parallelisation if enough cores are available. OpenMP parallelisation can be disabled (limited to only one thread) via the command:

export OMP_NUM_THREADS=1