

## 一、在官网

<https://software.intel.com/content/www/us/en/develop/tools/oneapi/components/onemkl.html>

下载 linux 系统版本的两个安装包：

1. Intel® oneAPI Base Toolkit
2. Intel® oneAPI HPC Toolkit

下载过程示意图如下：

The screenshot shows the Intel oneAPI website interface. At the top, there are navigation links: "Documentation & Code Samples", "Specifications", and "Help". Below this, the page is divided into sections. On the left, under "What's New", there is a link to "Learn about Data Parallel C++". On the right, under "What You Need", there are two links: "Explore the Intel® oneAPI Base Toolkit" and "Explore the Intel® oneAPI HPC Toolkit", both of which are circled in red. Below this, there is a section titled "Download the Toolkit" with a "Get It Now" button, also circled in red. At the bottom, there is a "Select options below to download" section with three dropdown menus: "Operating System" (set to Linux), "Distribution" (set to Web & Local (recommended)), and "Installer Type" (set to Local). To the right of these options, there is a "Local Installer" section with a list of features and a "What's Included in the Intel oneAPI Base Toolkit for Linux\*" section. Below this, the download size (3.43 GB), version (2021.3), and date (June 24, 2021) are listed, followed by a "Download" button.

Documentation & Code Samples Specifications Help

Computing

**What's New**

Data Parallel C++ (DPC++) APIs maximize performance and cross-architecture portability

Introduces C and Fortran OpenMP offload for Intel® GPU acceleration

[Learn about Data Parallel C++](#)

**What You Need**

- The Intel® oneAPI Math Kernel Library (oneMKL) is available as part of the Intel® oneAPI Base Toolkit.
- Using oneMKL with Intel® MPI library or Intel® Fortran Compilers requires the Intel® oneAPI HPC Toolkit.

[Explore the Intel® oneAPI Base Toolkit](#)

[Explore the Intel® oneAPI HPC Toolkit](#)

This toolkit is an add-on to the Intel® oneAPI Base Toolkit, which is required for full functionality. It also includes access to the Intel® Distribution for Python®, the Intel® oneAPI DPC++/C++ Compiler, powerful data-centric libraries, and advanced analysis tools.

Download the Toolkit

[Get It Now](#)

Select options below to download

Operating System:

Distribution:

Installer Type:

**Local Installer**

- Includes all tools in the toolkit
- Recommended for host machines with poor or no internet connection

**What's Included in the Intel oneAPI Base Toolkit for Linux\***

Download size: 3.43 GB  
Version: 2021.3  
Date: June 24, 2021

[Download](#)

## 二、安装 l\_BaseKit\_p\_2021.3.0.3219\_offline

1. 命令为： `sudo sh l_BaseKit_p_2021.3.0.3219_offline.sh -s -a --silent --eula accept`
4. 安装成功会显示如下图的信息，如果显示 failed 则重启计算机再尝试安装。

```
yuanjianlong@DESKTOP-NNDIC9P: /mnt/d/softwarePackages
yuanjianlong@DESKTOP-NNDIC9P: $ cd /mnt/d/softwarePackages/
yuanjianlong@DESKTOP-NNDIC9P: /mnt/d/softwarePackages$ sudo sh ./1_BaseKit_p_2021.3.0.3219_offline.sh -s -a --silent --eula accept
[sudo] password for yuanjianlong:
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
Checking system requirements...
Done.
Wait while the installer is preparing...
Done.
Launching the installer...
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
XDG Util package is not installed
Intel® VTune(TM) Profiler requires XDG Utils for graphical user interface, it can be installed with <br/> <b>sudo apt-get install xdg-u
file </b> on Ubuntu / Debian <br/><b>sudo zypper install xdg-utils</b> on SUSE <br/><b>sudo dnf install xdg-utils</b> on CentOS / RHE
L / Fedora
Intel® Graphics Compute Runtime for OpenCL™ not found.
You have no relevant GPU driver. If you are going to develop and run GPU-accelerated applications on this system, please check the <a h
ref="https://software.intel.com/content/www/us/en/develop/documentation/installation-guide-for-intel-oneapi-toolkits-linux/top/install-
intel-gpu-drivers.html">installation guide</a> for instructions on the GPU drivers.<br/>Otherwise, you can ignore the warning and conti
nue the installation as is: the product can still be used with CPU.
Start installation flow...
Installed Location: /opt/intel/oneapi
Installation has successfully completed
Log file: /opt/intel/oneapi/logs/installer.install.intel.oneapi.lin.basekit.product,v=2021.3.0-3219.2021.09.10.15.48.04.842595.log
yuanjianlong@DESKTOP-NNDIC9P: /mnt/d/softwarePackages$
```

### 三、安装 1\_HPCKit\_p\_2021.3.0.3230\_offline.sh

1. 命令为: `sudo sh ./1_HPCKit_p_2021.3.0.3230_offline.sh -s -a --silent --eula accept`
2. 安装成功会显示如下信息, 如果显示 failed 则重启计算机再尝试安装。

```
yuanjianlong@DESKTOP-NNDIC9P: /mnt/d/softwarePackages$ sudo sh ./1_HPCKit_p_2021.3.0.3230_offline.sh -s -a --silent --eula accept
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
Checking system requirements...
Done.
Wait while the installer is preparing...
Done.
Launching the installer...
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
Start installation flow...
Installed Location: /opt/intel/oneapi
Installation has successfully completed
Log file: /opt/intel/oneapi/logs/installer.install.intel.oneapi.lin.hpckit.product,v=2021.3.0-3230.2021.09.10.16.03.56.561029.log
yuanjianlong@DESKTOP-NNDIC9P: /mnt/d/softwarePackages$
```

### 四、设置环境变量

`source /opt/intel/oneapi/setvars.sh`

显示如下信息:

```
yuanjianlong@DESKTOP-NNDIC9P:/$ source ./opt/intel/oneapi/setvars.sh
:: initializing oneAPI environment ...
--bash: BASH_VERSION = 4.4.20(1)-release
:: advisor -- latest
:: ccl -- latest
:: clik -- latest
:: compiler -- latest
:: dal -- latest
:: debugger -- latest
:: dev-utilities -- latest
:: dnnl -- latest
:: dpcpp-ct -- latest
:: dp1 -- latest
:: inspector -- latest
:: intelpython -- latest
:: ipp -- latest
:: ippcp -- latest
:: itac -- latest
:: mk1 -- latest
:: mpi -- latest
:: tbb -- latest
:: vpl -- latest
:: vtune -- latest
:: oneAPI environment initialized ::
```

### 五、检查是否安装成功

1. 在终端输入 `mpirun`, 显示:

```

yuanjianlong@DESKTOP-NNDIC9F:/$ mpirun
Usage: ./mpirun [global opts] [local opts for exec1] [exec1] [exec1 args] : [local opts for exec2] [exec2] [exec2 args] : ...

Global options (passed to all executables):

Global environment options:
  -env (name) (value)      environment variable name and value
  -envlist (env1,env2,...) environment variable list to pass
  -envnone                 do not pass any environment variables
  -envall                  pass all environment variables not managed
                           by the launcher (default)

Other global options:
  -f (name)                file containing the host names
  -hosts (host list)       comma separated host list

Local options (passed to individual executables):

Other local options:
  -n/-np (value)           number of processes
  (exec_name) (args)       executable name and arguments

Hydra specific options (treated as global):

Launch options:
  -launcher                launcher to use (ssh slurm rsh ll sge pbsdsh pdsh srun lsf blaunch qsh fork)
  -launcher-exec           executable to use to launch processes
  -enable-x/-disable-x    enable or disable X forwarding

Resource management kernel options:
  -rnk                     resource management kernel to use (slurm ll lsf sge pbs cobalt)

Processor topology options:
  -bind-to                 process binding
  -map-by                  process mapping
  -membind                  memory binding policy

Other Hydra options:
  -verbose                 verbose mode
  -info                    build information
  -print-all-exitcodes    print exit codes of all processes
  -ppn                     processes per node
  -prepend-rank             prepend rank to output
  -prepend-pattern          prepend pattern to output
  -outfile-pattern         direct stdout to file
  -errfile-pattern         direct stderr to file
  -nameserver              name server information (host:port format)
  -disable-auto-cleanup    don't cleanup processes on error
  -disable-hostname-propagation let MPICH auto-detect the hostname
  -localhost               local hostname for the launching node
  -uize                    universe size (SYSTEM, INFINITE, <value>)

Intel(R) MPI Library specific options:

<option> -help            show help message for the specific option

Global options:
  -aps                     Intel(R) Application Performance Snapshot profile
  -mps                     Intel(R) Application Performance Snapshot profile (MPI, OpenMP only)
  -gtool                   tool and rank set
  -gtoolfile               file containing tool and rank set
  -hosts-group (groups of hosts) allows to set node ranges (like in Slurm* Workload Manager)

Other Hydra options:
  -iface                   network interface to use
  -s <spec>                redirect stdin to all or 1,2 or 2-4,6 MPI processes (0 by default)
  -silent-abort            do not print abort warning message
  -nolocal                 avoid running the application processes on the node where mpirun.hydra started
  -tune (binary file)      defines the name of binary tuning file
  -print-rank-map          print rank mapping

Intel(R) MPI Library, Version 2021.3 Build 20210601 (id: 6f90181f1)
Copyright 2003-2021 Intel Corporation.

```

## 2. 在终端输入: ifort -v

```

yuanjianlong@DESKTOP-NNDIC9F:/$ ifort -v
ifort version 2021.3.0
yuanjianlong@DESKTOP-NNDIC9F:/$

```

## 六. 常见问题

### 1. 问题: 在新终端上无法执行 mpirun

推测原因: 环境变量设置不正确

解决方案:

1) 在终端输入: vi ~/.bashrc

2) 在底部加上环境变量语句:

```
export INTEL_PATH=/opt/intel/oneapi/mpi/2021.3.0
```

```
export PATH=$PATH:$INTEL_PATH/bin
```

3) 保存并退出 ~/.bashrc

4) 环境变量生效，执行：

```
source ~/.bashrc
```

```
mpicc
```

Created by Jianlong Yuan

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