LiteX Build Environment Tool Documentation

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CHAPTER 1

lxbe_tool

1.1 lxbe_tool package

1.1.1 Subpackages

1.1.1.1 lxbe_tool.providers package

class lxbe_tool.providers.**Provider**

Bases: abc.ABC

Base class for all providers.

find_tool(*tool_name*, *tool_version*)

Find a tool inside the provider environment.

Raises

- *ToolNotFoundError* – Raised when the requested tool is not found.
- *ToolWrongVersionError* – Raised when the requested tool is found but is providing the wrong version.

Returns

install_module(*module_name*, *module_path=None*, *module_version=None*)

Install a Python module into the Python environment.

module_path or module_version should be provided.

install_tool(*tool_name*, *tool_version*)

Installs a tool inside the provider environment.

Raises SystemError – The provider is unable to install the tool.

exception lxbe_tool.providers.**ToolNotFoundError**

Bases: OSError

Tool is not found in environment.

exception lxbe_tool.providers.**ToolWrongVersionError**

Bases: OSError

Tool is found but provides wrong version.

Subpackages

lxbe_tool.providers.module package

Provides Python modules such as;

- LiteXXX referenced as submodules.
- **(Maybe?) pip installable libraries like;**
  - colorterm
  - hexfile
  - etc

lxbe_tool.providers.python package

Submodules

lxbe_tool.providers.python.check_version module

python –version

lxbe_tool.providers.python.check_version.**check_python_version**(*args*)

lxbe_tool.providers.python.env module

lxbe_tool.providers.tool package

Subpackages

lxbe_tool.providers.tool.c package

Submodules

lxbe_tool.providers.tool.c.clang module

lxbe_tool.providers.tool.c.gcc module

C/C++ Toolchain

lxbe_tool.providers.tool.fpga package

Subpackages

lxbe_tool.providers.tool.fpga.altera package

lxbe_tool.providers.tool.fpga.lattice package

Submodules

lxbe_tool.providers.tool.fpga.lattice.diamond module

lxbe_tool.providers.tool.fpga.lattice.icecube module

lxbe_tool.providers.tool.fpga.lattice.radiant module

lxbe_tool.providers.tool.fpga.lattice.symbiflow module

lxbe_tool.providers.tool.fpga.xilinx package

Submodules

lxbe_tool.providers.tool.fpga.xilinx.ci module

Extension to get the "cut back" Xilinx toolchain when running on CI.

Cutback Xilinx ISE for CI # ——— # Save the passphrase to a file so we don't echo it in the logs if [! -z "$XILINX_PASSPHRASE"]; then

> XILINX_PASSPHRASE_FILE=$(tempfile -s .passphrase | mktemp –suffix=.passphrase) trap "rm -f – '$XILINX_PASSPHRASE_FILE'" EXIT echo $XILINX_PASSPHRASE >> $XILINX_PASSPHRASE_FILE
>
> # Need gpg to do the unencryption export XILINX_DIR=$BUILD_DIR/Xilinx export LIKELY_XILINX_LICENSE_DIR=$XILINX_DIR if [! -d "$XILINX_DIR" -o ! -d "$XILINX_DIR/opt"]; then
>
> > (cd $BUILD_DIR mkdir -p Xilinx cd Xilinx
> >
> > > wget -q http://xilinx.timvideos.us/index.txt -O xilinx-details.txt XILINX_TAR_INFO=$(cat xilinx-details.txt | grep tar.bz2.gpg | tail -n 1) XILINX_TAR_FILE=$(echo $XILINX_TAR_INFO | sed -e's/[^]* //' -e's/.gpg$//') XILINX_TAR_MD5=$(echo $XILINX_TAR_INFO | sed -e's/ .*//')
> > >
> > > # This setup was taken from https://github.com/m-labs/artiq/blob/master/.travis/get-xilinx.sh wget –no-verbose -c http://xilinx.timvideos.us/${XILINX_TAR_FILE}.gpg cat $XILINX_PASSPHRASE_FILE | gpg –batch –passphrase-fd 0 ${XILINX_TAR_FILE}.gpg tar -xjf $XILINX_TAR_FILE
> > >
> > > # Remove the tar file to free up space. rm ${XILINX_TAR_FILE}*
> > >
> > > # FIXME: Hacks to try and make Vivado work. mkdir -p $XILINX_DIR/opt/Xilinx/Vivado/2017.3/scripts/rt/data/svlog/sdbs mkdir -p $XILINX_DIR/opt/Xilinx/Vivado/2017.3/tps/lnx64/jre

Make ISE stop complaining about missing wbtc binary mkdir -p $XILINX_DIR/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64 ln -s /bin/true $XILINX_DIR/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64/wbtc

Relocate ISE from /opt to $XILINX_DIR for i in $(grep -l -Rsn "/opt/Xilinx" $XILINX_DIR/opt) do

sed -i -e "s!/opt/Xilinx!$XILINX_DIR/opt/Xilinx!g" $i

done wget –no-verbose http://xilinx.timvideos.us/Xilinx.lic.gpg cat $XILINX_PASSPHRASE_FILE | gpg –batch –passphrase-fd 0 Xilinx.lic.gpg

#git clone https://github.com/mithro/impersonate_macaddress #cd impersonate_macaddress #make

)

fi rm $XILINX_PASSPHRASE_FILE trap - EXIT

fi if [-z "$LIKELY_XILINX_LICENSE_DIR"]; then

LIKELY_XILINX_LICENSE_DIR="$HOME/.Xilinx"

fi

lxbe_tool.providers.tool.fpga.xilinx.ise module

lxbe_tool.providers.tool.fpga.xilinx.symbiflow module

lxbe_tool.providers.tool.fpga.xilinx.vivado module

`lxbe_tool.providers.tool.fpga.xilinx.vivado.`**`check_vivado`**(*args*)

lxbe_tool.providers.tool.network package

Subpackages

lxbe_tool.providers.tool.network.tftpd package

Submodules

lxbe_tool.providers.tool.network.tftpd.aftpd module

lxbe_tool.providers.tool.network.tftpd.inftpd module

lxbe_tool.providers.tool.serial package

Submodules

lxbe_tool.providers.tool.serial.flterm module

lxbe_tool.providers.tool.simulation package

Submodules

lxbe_tool.providers.tool.simulation.icarus module

lxbe_tool.providers.tool.simulation.verilator module

Submodules

lxbe_tool.providers.conda module

Conda based provider.

https://conda.io/docs/

Conda is an open source package management system and environment management system that runs on Windows, macOS and Linux. Conda quickly installs, runs and updates packages and their dependencies. Conda easily creates, saves, loads and switches between environments on your local computer. It was created for Python programs, but it can package and distribute software for any language.

class `lxbe_tool.providers.conda.`**`Conda`**(*download_dir*)

Bases: *`lxbe_tool.providers.Provider`*

The Conda provider can provide;

- Python environment which modules can be installed into.
- Tools (such as gcc / openocd)

`install_module`(*module*)

lite for LITE in $LITE_REPOS; do

LITE_DIR=$THIRD_DIR/$LITE (

echo cd $LITE_DIR echo "Installing $LITE from $LITE_DIR (local python module)" python setup.py develop

) check_import $LITE

done

install_tool (*toolname*)

binutils for the target echo echo "Installing binutils for ${CPU} (assembler, linker, and other tools)" conda install -y $CONDA_FLAGS binutils-${CPU}-elf=$BINUTILS_VERSION check_version ${CPU}-elf-ld $BINUTILS_VERSION

gcc for the target echo echo "Installing gcc for ${CPU} ('bare metal' C cross compiler)" conda install -y $CONDA_FLAGS gcc-${CPU}-elf-nostdc=$GCC_VERSION check_version ${CPU}-elf-gcc $GCC_VERSION

gdb for the target #echo #echo "Installing gdb for ${CPU} (debugger)" #conda install -y $CONDA_FLAGS gdb-${CPU}-elf=$GDB_VERSION #check_version ${CPU}-elf-gdb $GDB_VERSION

openocd for programming via Cypress FX2 echo echo "Installing openocd (jtag tool for programming and debug)" conda install -y $CONDA_FLAGS openocd=$OPENOCD_VERSION check_version openocd $OPENOCD_VERSION

setup ()

Hot patch conda so to not use the systems environments. function fix_conda {

for py in $(find $CONDA_DIR -name envs_manager.py); do START_SUM=$(sha256sum $py | sed -e's/ .*//') sed -i -e"s^expand(join('~', '.conda', 'environments.txt'))^join('$CONDA_DIR', 'environments.txt')^" $py END_SUM=$(sha256sum $py | sed -e's/ .*//') if [$START_SUM != $END_SUM]; then

sed -i -e"s/$START_SUM/$END_SUM/" $(find $CONDA_DIR -name paths.json)

fi

done

}

if [[! -e $CONDA_DIR/bin/conda]]; then wget -c https://repo.continuum.io/miniconda/Miniconda3-latest-Linux-x86_64.sh chmod a+x Miniconda3-latest-Linux-x86_64.sh # -p to specify the install location # -b to enable batch mode (no prompts) # -f to not return an error if the location specified by -p already exists ./Miniconda3-latest-Linux-x86_64.sh -p $CONDA_DIR -b -f fix_conda conda config –system –set always_yes yes conda config –system –set changeps1 no conda config –system –add envs_dirs $CONDA_DIR/envs conda config –system –add pkgs_dirs $CONDA_DIR/pkgs conda update -q conda

fi fix_conda conda config –system –add channels timvideos conda info

class lxbe_tool.providers.conda.**CondaVersionTuple** (*version*, *system*, *machine*, *file*)

Bases: tuple

file

Alias for field number 3

machine

Alias for field number 2

system

Alias for field number 1

version
Alias for field number 0

`lxbe_tool.providers.conda.installed_version()`
~/conda/bin/conda –version conda 4.5.9

`lxbe_tool.providers.conda.live_versions()`
Get the versions currently live on conda website.

lxbe_tool.providers.docker module

Based on this example -> https://github.com/open-power/pdbg/blob/master/.build.sh

TEMPDIR=‘mktemp -d ${HOME}/pdbgobjXXXXXX‘ RUN_TMP=”docker run –rm=true –user=${USER} -w ${TEMPDIR} -v ${HOME}:${HOME} -t ${CONTAINER}” ${RUN_TMP} ${SRCDIR}/configure –host=arm-linux-gnueabi ${RUN_TMP} make rm -rf ${TEMPDIR}

lxbe_tool.providers.system module

1.1.2 Submodules

1.1.3 lxbe_tool.git module

Useful git config for working with git submodules in this repo (

> git config status.submodulesummary 1 git config push.recurseSubmodules check git config diff.submodule log git config checkout.recurseSubmodules 1 git config alias.sdiff ‘¡“git diff && git submodule foreach ‘git diff’” git config alias.spush ‘push –recurse-submodules=on-demand’

)

`lxbe_tool.git.check_module_recursive(root_path, depth, verbose=False)`

`lxbe_tool.git.check_submodules(script_path, args)`

CHAPTER 2

Indices and tables

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- modindex
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