Real-ESSI Simulator

Executable Procurement Procedures

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http://real-essi.us/

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Chapter 1

Software Platform Procurement Procedures

(In collaboration with Dr. Han Yang and Mr. Hexiang Wang)
1.1 Chapter Summary and Highlights

1.2 Real-ESSI Program Executables Download and Install

Executables for the Real-ESSI Simulator program (Jeremić et al., 1989-2020) are available online. Pre-built executables are available for Linux, Ubuntu 18.04, and can be downloaded and installed by analyst.

In order for prebuild executables to be able to run on a user/analyst computer, system libraries have to be brought up to date and additional libraries installed. System libraries update/upgrade:

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get dist-upgrade
sudo apt-get autoremove
```

For sequential and/or parallel version of Real-ESSI, additional libraries are needed, as described below:

**Sequential Version of Real-ESSI Program.** Libraries required to be installed for using sequential version of the Real ESSI program:

```
sudo apt-get install libboost-all-dev
sudo apt-get install libhdf5-dev
sudo apt-get install libtbb-dev
sudo apt-get install libssl1.0.0
```

**Parallel Version of Real-ESSI Program.** Libraries required to be installed for executing parallel version of the Real ESSI program:

```
sudo apt-get install libboost-all-dev
sudo apt-get install libhdf5-dev
sudo apt-get install libtbb-dev
sudo apt-get install mpich
sudo apt-get install libopenmpi-dev
sudo apt-get install libssl1.0.0
```

1.3 Real-ESSI Simulator Install as Container through Docker

Recent developments in virtualization of operating systems (OS) has created an opportunity to deploy programs and software systems as container images. Container images are used by the host OS (Linux, Windows, MacOS) to create a container. A container is a running instance of a container image, and is represented by a Linux/Windows/MacOS process that can be used to run programs that are installed within container. Programs that are installed within a container have all the necessary libraries available within container and are fully self sufficient, irrespective of what container host OS is used, be it Linux or Windows or MacOS.

More information used virtualization, containers, docker, etc. can be found at:

- [https://developers.redhat.com/blog/2018/02/22/container-terminology-practical-introduction/](https://developers.redhat.com/blog/2018/02/22/container-terminology-practical-introduction/)

Starting from Real-ESSI version 20.07, Real-ESSI Simulator is now available as a Docker Container Image, and can be installed and used on Linux, Windows and MacOS.

1.3.1 Real-ESSI Container Development

1.3.2 Running Real-ESSI Container through Docker

Provided below are steps needed to install and run Real-ESSI within a Docker Container.

- Install Docker on the local computer, desktop, laptop. Documentation on how to install Docker on user OS can be found here:
  - Linux: [https://docs.docker.com/engine/install/#server](https://docs.docker.com/engine/install/#server)
  - Windows: [https://docs.docker.com/docker-for-windows/install/](https://docs.docker.com/docker-for-windows/install/)
  - MacOS: [https://docs.docker.com/docker-for-mac/install/](https://docs.docker.com/docker-for-mac/install/)

- Pull the Real-ESSI image

```
sudo docker pull realessi/real-essi-repo:latest
```

This will pull the latest version of Real-ESSI.

- Run the Real-ESSI image:

```
sudo docker run -it --rm -v $(pwd):/workspace realessi/real-essi-repo:latest
```

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Once you start running the Real-ESSI Docker image, you are working inside the container. The container is Ubuntu 18.04 with Real-ESSI installed.

- Run Real-ESSI:
  ```bash
essi_sequential -f main.feि
c
```

Note that the current directory on your local machine is shared with the container, so it can work with any files there. The files need to have the correct permissions to be run by a non-administrator user. You can move files after the container started and they will be recognized by the container.

After the simulation is finished, simply exit the container. You will see the output files and log file in your current directory. They will not be erased when you exit the container.

### 1.4 Real-ESSI Simulator System Install

In addition to the Real-ESSI Program, Real-ESSI Simulator system consists of a pre-processing modules and post-processing modules. Installation of pre-processing modules is described in Chapter 207, on page 1106 in jeremić et al. (1989-present). Installation of post-processing modules is described in Chapter 208, on page 1172 in jeremić et al. (1989-present).

Both pre and post processing manuals are also available through the main Real-ESSI Simulator web site: [http://real-essi.info/](http://real-essi.info/).

#### 1.4.1 Student Manual for Real-ESSI Simulator System Install

Students at ETH, Mr. Max Sieber and Mr. Antonio Felipe Salazar created a manual for installation of the Real-ESSI Simulator system on virtual machine computers. The manual is available [HERE](http://real-essi.info/).
Bibliography
