

Labtainer Instructor Guide

January 7, 2019

1 Introduction

This manual is intended for use by instructors who assign and/or grade labs using Labtainers. Labtainers assume you have a Linux system, e.g., a virtual machine (VM). The easiest path is to use our pre-built VM available at the Labtainer website <https://my.nps.edu/web/c3o/virtual-machine-images>. Alternately, refer to in Appendix A of the [Labtainer Student Guide](#) for installation of VirtualBox and a Linux system. Note that any Linux system can be used as long as it supports Docker. If Labtainers is to be used on a Linux system other than the pre-built VM, refer to the [Labtainer Student Guide](#) for information on installing Labtainers.

Labtainers provide a consistent execution environment for performing laboratory exercises, and can include execution of several different computers interconnected via virtual networks. Refer to our published papers at <https://my.nps.edu/web/c3o/labtainers> for additional information on the use of Labtainers. And see the [Lab Designer User Guide](#) at <https://my.nps.edu/documents/107523844/109121513/labdesigner.pdf> for information on creating and maintaining Labtainer exercises.

1.1 Assigning a Lab

Student instructions for using Labtainers are in the [Labtainer Student Guide](#). Students work from the `labtainer-student` directory, i.e.,

```
cd ~/labtainer/trunk/scripts/labtainer-student
```

Available labs are listed via the `labtainer` script:

```
labtainer
```

Start a lab by providing its name as an argument to the `labtainer` command. This will typically display a link to a lab manual, or will display a lab manual in one of the resulting virtual terminals. You can interact with the resulting computers just as a student would.

1.2 Assessing a Lab

When the student stops a lab, i.e., using `stoplab`, Labtainers creates a zip file of student artifacts (including lab reports) and then displays the path to this zip file to the student. The easiest way for the student to forward this zip file to you is by starting a browser on the Linux VM and either emailing you the zip file, or uploading the file into an LMS, (e.g., Sakai). Alternately, the student can define a shared folder in the VM and copy the zip to the host computer.

Collect all of the lab zip files from each student into your Labtainer transfer directory, which is typically at

```
~/labtainer_xfer/<labname>
```

where labname is the name of the lab. Do not unzip the files. Alternately student assignments can be bulk-collected from a learning management system (LMS) per Appendix A and the resulting zip would be copied into the Labtainer transfer directory. Again, do not unzip files and do not change the file names of zip files.

Instructor assessment of labs takes place from the `labtainer-instructor` directory, i.e.,

```
cd ~/labtainer/trunk/scripts/labtainer-instructor
```

Use the `gradelab` command to assess results for a given lab:

```
gradelab <labname>
```

A table of lab results with one row per student and a column for each goal will be displayed. A description of the goals follows the table.

Student reports (if any) are copied into

```
~/labtainer_xfer/<labname>/docs
```

on the Linux host. If LMS assignment collection is used, then student reports should be looked for in

```
~/labtainer_xfer/<labname>/reports
```

which also includes reports separately uploaded into the LMS.

1.2.1 Review artifact details

You can view all student results, including their original artifacts by using the `-d` flag with the `gradelab` command. This results in a virtual terminal connected to a grading container that contains all student artifacts and results. Student artifacts are found in

```
<student_email>/<lab>.<container>.student/.local/result
```

The `-d` option is also used when debugging automated assessment configuration files. You can create additional virtual terminals into the grading container by reissuing the `gradelab` command with the `-a` flag. When you are finished, or wish to stop working, type:

```
stopgrader
```

A

LMS Assignment Collection

A.1 Sakai

In the Sakai Assignments section, select the “In / New” entry for the appropriate assignment. The resulting page should enumerate each student who has submitted an assignment. In the upper right, click the “Download All” link, and then click the “Student submission attachment(s)” option and click the “Download” button. Copy the resulting zip into the lab transfer directory on the Linux host, i.e.,

```
~/labtainer_xfer/<labname>
```

Do not unzip the file and do not change its file name. You can then run the `gradelab <labname>` command from the `labtainer-instructor` directory. In addition to the assessment summary, any student lab reports will be available in:

```
~/labtainer_xfer/<labname>/reports/<student name>
```

Those reports will include any that the student separately uploaded into Sakai (it is important to remind students to NOT change the name of lab report documents.)