# 1 Introduction

This manual is intended for use by lab designers wanting to create or adapt cybersecurity labs to use the Docker container-based lab framework known as "Labtainers". The Labtainer framework is designed for use with computer and network security laboratory exercises targeting Linux environments, and it is built around standard Linux Docker containers. A Labtainer exerciese may include multiple networked components, all running locally on a student's computer, but without the performance degredation associated with running multiple virtual machines.

While most Labtainer exercises focus on exploring concepts via the Linux command line – GUI based applications, e.g., browsers and Wireshark are also supported.

## 1.1 Benefits of Labtainers

Deploying cybersecurity labs using this framework provides three primary benefits:

1. The lab execution environment is controlled and consistent across all student computers regardless of the Linux distribution and configuration present on individual student computers. This allows each lab designer to control which software packages are present, the versions of libraries and specific configuration settings, e.g., /etc file values. These configurations may vary between labs, and they may vary between multiple computers in a single lab.

2. Assessment of student lab activity can be automated through a set of configuration files that identify expected results, thus relieving lab instructors from having to individually review detailed lab results.

3. Labs may be automatically "parameterized" for each student such that students cannot easily copy results from another student or from internet repositories.

Labtainers provide the advantages of a consistent execution environment without requiring an individual Virtual Machine (VM) per lab, and without requiring all labs to be adapted for a common Linux execution environment. These benefits can be realized whether or not labs are configured for automatic assessment, or are parameterized for each student.

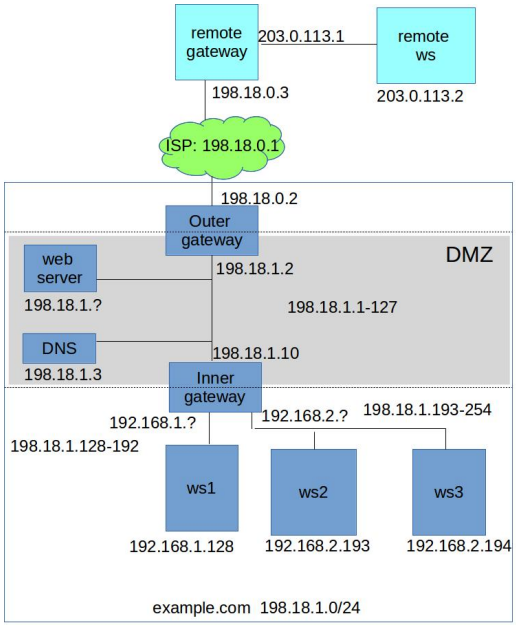


Figure 1: Example Labtainers network topology