11.1 Remote management

Labtainer remote management functions allow instructors to query and change the state of the Labtainers exercise currently running on each VM. The remote access functions available to instructors currently include:

- **status** – Display the name of the lab running on a specific VM.
- **copy** – Copy files into a Labtainer container per a copy directive defined in:

  `<lab>/config/copy.config}`

11.1.1 File copying

The `copy.config` file contains one or more directives, one per line as follows:

```
<directive> <container> <source> <destination>
```

Where:

- *directive* is a arbitrary string identifier that names the directive.
- *container* is the name of the container into which the files are to be copied.
- *source* is a source path upon the VM. If this path starts with `$LAB`, the path is relative to the lab directory. Otherwise, a full pathname is expected, e.g., the path to a folder shared with all VMs on a host.
- *destination* is the destination path upon the target container. Permissions are retained if possible, e.g, if the source files are owned by `root:root`, that will be maintained on the destination.

The semantics of source and destination are per the Unix `cp -a` command. Please see the discussion of `SRC_PATH` and `DEST_PATH` in `https://docs.docker.com/engine/reference/commandline/cp/`

11.1.2 Client and server setup

The python service at `scripts/remote/remote.py` should be started on each Labtainers VM with the `--daemon` option.

The python client at `host_scripts/remote/remote.py` should be copied to whatever host the instructor will work from.

Port forwarding for each VM should be defined such that some host port is forwarded to port 60000 on the VM. You would assign each VM on a given host a different host port number. That host port number will be how the instructor names different VMs on the same host. For example, on VirtualBox, the port forwarding entry for one VM might look like:

```
Host IP     Host Port   Guest IP  Guest Port
0.0.0.0     60003       0.0.0.0   60000
```

Then, if the instructor is working from the computer that hosts the VM, the following command would cause a copy directive named `one` to occur on that VM if it is running a lab named `tlab`:

```
./remote.py -l tlab -c one -p 60003
```