

Tutorial 1

1 Shell, SSH, ISA, dynamically-loaded libraries

1. Log into the virtual machine indicated in class. Your user name is your last name, all lower-case.
2. Locate the archive file `/opt/hidden.zip` and uncompress it. You can either (i) download it into your local machine and proceed with the next steps locally, or (ii) proceed on the remote virtual machine.
3. The archive contains three files: `alpha`, `beta` and `gamma`. They are executables (but for safety reasons, it is recommended to not execute them if using your local machine).
4. Determine the ISA and OS that `alpha` and `beta` were built for.
5. `alpha` is a well-known app. Determine which one.
6. `beta` contains a (badly) hidden password. Find this password.
7. `beta` also contains a compressed image. Determine the image format and the library it uses to uncompress it. (Note: `gamma` is the same app as `beta`, but compiled for a different platform.)
8. [hard] Extract this image from the executable files.

2 Virtualized Memory

1. Write a C program that takes two arguments: a file name, and the size of this file in bytes. The program maps the contents of the file into memory using `mmap()`. Then, it accesses the contents and prints them in hexadecimal (similar to what `hexdump` does).
2. Write a C program that allocates a huge amount of memory, then writes arbitrary data to it. Study the behavior of the program for different amounts of memory (in particular, less than currently free memory, more than currently free memory, more than total memory installed).