This SSH server's never gonna give you up (but it will probably let you down)

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1 Pre-Pre-Pre-Introduction: The Internet

In recent years a revolutionary new technology has been developed called "the internet". Originating from ARPANET [16], the internet links together computers and enables communication between them (even if they are geographically distant!).

This technology has already had many impacts, and will surely continue to become an increasingly important facet of every day life as it continues to proliferate into new fields.

2 Pre-Pre-Introduction: Internet Applications

A variety of applications have already been developed for the internet. This includes the Domain Name System (DNS) [13] which allows one to associate a string "hostname" (called a domain) with a unique number used to address each computer on the internet called an Internet Protocol (IP) address.

Other applications include the "web". Powered by the Hypertext Transfer Protocol (HTTP) [20], the web allows one to build and host their own multimedia pages that can be viewed by anyone with an internet "browser"! For example, an academic institution may register their own domain and host a webpage on it to allow people to learn more about them—short of having to visit. In this respect, website can almost be thought of as internet bulletin boards.

The internet also even has its own solution to mail called "email" which is implemented over a variety of protocols including the Simple Mail Transfer Protocol (SMTP) [17] (However, the authors of this paper are skeptical how beneficial this application is due to its many limitations compared to traditional mail such as receiving letters from the IRS as well as packages—such as ordered via a site my grad students inform me of called "Amazon").

This paper, however, focuses on the Secure Shell Protocol (SSH) [18]. In short, SSH allows one to obtain a shell on a remote system. While various SSH implementations exist and have various complex features, this paper only requires knowledge of the most basic concepts of SSH.

Assuming one has an SSH client installed, they will be able to use the command `ssh <username>@<domain/ip>` to be able to connect to the remote server. Upon connecting to the specified ssh server, the user will be prompted for a password. The ssh server will then attempt to authenticate this username and password combination. If it is valid, then the ssh server will provide a shell to the ssh client with the authenticated user.

3 Pre-Introduction: Memes

One inexplicable aspect of the internet is the development of so called "memes". In short, memes can be thought of as internet jokes and can take various forms from text [11] to images [15] and videos [1, 2, 3, 4]; however, this is far from an exhaustive list. Additional, examples of memes are: [12, 14, 22]. Another important, yet nuanced point, is that just because something on the internet takes this form, it does not mean that it is, in fact, a meme. Instead, a meme is more of a genre for which so called meme connoisseur claim to be experts in.

It is worth noting that the development and use of memes is incredibly context sensitive. Memes appear to have their owm temporality/lifecycle where it is "uncool" to use an old/dead meme.

These phenomena were first predicted before the development of the internet by Harry Q. Bovik—who has since gone on to be one of the most influential people in the field.

4 Introduction

Despite the proliferation of the internet as well as internet memes, there has been surprising lack of work exploring the possibility of merging the development of serious internet applications with memes.

In hopes to call attention to this research gap, this paper explores the combination of one serious application with one internet meme. Specifically, we explore the combination of SSH with "Rickrolling", the meme wherein one unexpectedly links someone to the music video of "Never Gonna Give You Up" by Rick Astley [5].

The result of our work is the development of a novel concept known as the SSHRoll: a Rickroll [6] accomplished via an SSH server. To accomplish this, we implemented an innovative new SSH server which will accept any username and password combination (to ensure users are able to login). Instead of providing users with a regular shell (e.g., bash or zsh), users will instead be provided with a custom shell with no commands. Any time any key is pressed, the shell will clear itself and render an ascii-art rendition of Rick Astley dancing to "Never Gonna Give You Up" from the official music video [7] at timestamp 0:03 (3 seconds into the video) [8]. By looping through a sequence of pre-specified ascii-art images, we are able to accomplish an animation should one spam keyboard inputs.

Because this occurs on any key input to the shell, regardless of the key, it becomes impossible to exit the session without the user closing the terminal they used to connect to the server. As such, we are able to revolutionize the space of SSH servers by making one which truly will never give you up. Unfortunately, however, upon the realization that one has been SSHRolled, it is quite likely that the user will be let down—especially if they were under the false impression that they had managed to break into the SSH server in question.

As an added benefit of not being able to disconnect from the ssh server without closing the terminal, you will be able to become a sworn enemy of the sysadmin [19] sent to investigate the inordinate number of ssh connections to your server—only after they share it with all their friends within your organization's information security department as, while your organization provides all devices with a public IP address, the sysadmin's NDA prevents

them from sharing this information externally (not that this information won't already be public due to the plethora of botnets roaming the internet).

No, we do not have experience with this.

Seriously, though, we don't. You think we'd pass up a chance at a self-citation?

You're really going to argue this and make me interrupt the whole flow of this paper, aren't you?

No, not you reader, we know you're cool (and, if we're being honest, probably not even reading this: you're just skimming the paper looking for a figure). I'm looking at you Reviewer #2. You know what you did; and, now instead of including *Figure 1. "Rick Astley SSHRolls you.jpeg"* (sorry reader), I have to reiterate a point that I *clearly* addressed. Why couldn't you have been like Reviewers #1 and #3 whose only feedback was a face-palming emoji that hyperlinked to *Never Gonna Give You Up* [9]?

5 Implementation

We implemented an SSHRoll server as described in our introduction (see Section 4) which can be found at `https://github.com/ahfriedman/sshroll`. While we can assure you that this artefact works on our machine, we cannot guarantee replicability of these results. The student responsible for implementation has since graduated, and we did not have the time to unravel its workings prior to submission. While we reached out to the student to try to see if they could assist us in hopes of publishing this paper, they refused to be associated with us due to "ethical concerns" over our methodology (see Section 6). As such, all references to our student, Alex, have been removed from this paper. This is a shame as Alex has done quite a lot of great work, and this paper would have truly helped the student build a strong reputation in the research community.

Moreover, we highly discourage any attempts to use our work as **it poses a fairly substantial security risk, and is basically asking for your device to be compromised**. It is worth, however, noting that some of our colleagues who reviewed this paper prior to submission suggested that reframe this as a "free pentest" before laughing and asking, "wait, you're not *actually* going to do this, are you?".

Responsible use of this work is left as an exercise to the reader.

6 Methods & Results

To test the results of our implementation, we were planning on using the phenomenal concept introduced in the paper "An Undergrad Is All You Need", GPT-UGRD [21] as a means to circumvent IRB; however, between the school catching wind of our plans and the sleepless nights guarding our server's ethernet cable from the scissors of the aforementioned sysadmin,

we decided to cut our losses and leave collecting results as future work to ensure adequate funding and time to go through proper channels. In the interim, we have decided to go on to more "important" work (or so the tenure committee called it).

7 Conclusion

The internet is probably a revolutionary technology whose impacts will be seen over the next 20–30 years, if it ever becomes a mass-consumer product. Despite the serious academic nature of its predecessor, ARPANET, the internet in its current form is already full of inside jokes known as "memes".

This paper helps to bridge the gap by introducing a serious internet application whose practical nature has been completely replaced by memes. Specifically, we introduced (but totally did not test) SSHRolling: a Rickroll [10] accomplished via an SSH server. We provide an implementation of an SSHRoll server which makes the following advances on a traditional SSH server:

1. All authentication has been removed, accepting any username and password, ensuring access to the SSHRoll to all.

2. All commands have been removed in favor of displaying an ascii-art of Rick Astley dancing.

3. Disconnecting from the server cannot be accomplished from the shell itself—requiring the user to disconnect via closing their terminal—to ensure that the server can never give you up.

While this is already quite an advancement, SSHRolling currently has some limitations. Notably, it is likely to "let down" anyone who is lucky (or unfortunate) enough to stumble upon it. We hope that this can be addressed through future work along the exploration of making SSH servers that provide different memes, and introducing memes into other aspects of the internet.

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[22] You. Yes I am citing your knowlegde! You think your professor is reading this? I know you're some grad student who just wants to know a good source to cite for memes. You already know what they are. I already know what they are, but neither of us really wanted to do the full lit review on this, now did we?