

Security of Distribution Mechanisms for Linux and BSD Operating Systems

Gabriel Ewing

Department of Electrical Engineering and
Computer Science
Case Western Reserve University
Cleveland, Ohio

Kevin Nash

Department of Electrical Engineering and
Computer Science
Case Western Reserve University
Cleveland, Ohio

Abstract—The abstract goes here.

I. INTRODUCTION

An operating system is a piece of software that manages computer hardware resources and provides a variety of services for computer programs. The central core of an operating system, its kernel, is the first layer above hardware itself. Due to the depth of their functionality, compromised operating systems can potentially yield a great deal more power to an attacker than application software.

Operating systems can be compromised by malicious computer software, such as rootkits, in the course of normal operation. However, attacks can sometimes be launched more easily against the distribution process itself. This can be done in such a way that users unknowingly install a modified version of the expected operating system. If successful, attacks that result in the distribution of a compromised operating system can be both difficult to detect and powerful.

The open-source software model possesses a somewhat different attack surface than its closed- or shared-source counterparts. Open-source operating systems often have much smaller core development teams than popular commercial systems such as Windows and OS X. Open-source operating systems are rarely distributed using physical media, which is the primary distribution mechanism for Windows. The commercial interfaces that are requisite for online distribution of proprietary software also have advantages and disadvantages in security that are different from the security considerations that open-source distributors must account for.

...Add more here...

II. DISTRIBUTING AN OPERATING SYSTEM

Body of text goes here...

A. Building a Release

Body of text goes here...

- 1) *Compiling into ISO*: Body of text goes here...
- 2) *Overseeing Release*: Body of text goes here...

B. Mirroring a Release

Body of text goes here...

1) *Mirror Qualifications*: Body of text goes here...

2) *Fetching Release*: Rsync, Zsync...

C. Distribution Methods

Body of text goes here...

- 1) *HTTP*: Body of text goes here...
- 2) *FTP*: Body of text goes here...
- 3) *BitTorrent*: Body of text goes here...
- 4) *Physical Media*: Body of text goes here...

III. ATTACKS ON DISTRIBUTION

Body of text goes here...

A. "Attack One"

Body of text goes here...

- 1) *Notable Usage*: Body of text goes here...
 - 2) *Countermeasures*: N operating systems currently implement these countermeasures, including Foo, Bar, Baz...
- Visual aid goes here

B. "Attack Two"

Body of text goes here...

- 1) *Notable Usage*: Body of text goes here...
 - 2) *Countermeasures*: N operating systems currently implement these countermeasures, including Foo, Bar, Baz...
- Visual aid goes here

IV. EXTERNAL RISKS

Body of text goes here...

A. Re-Hosting and Ownership Hijacking

Body of text goes here...

1) *SourceForge*: SourceForge is a hosting service for open-source software. In 2015, the website was accused of bundling malware with the binary project packages that it offered for users to download. This caused some large projects to abandon the site entirely [1]. While the company later announced a change to this policy [2], accusations have continued [3] and SourceForge can no longer be considered a trustworthy hosting platform.

Manjaro Linux was the sixth most-popular Linux distribution between March 2015 and March 2016 according to DistroWatch [4]. According to our research, SourceForge is

the only download platform recommended and offered by Manjaro. While downloads are available via torrent, the torrent links are hosted by SourceForge as well and so the original seed may be of a compromised image [5]. We were unable to locate any alternative download mechanism.

This means that there is a real possibility that as of this writing, image downloads of Manjaro are bundled with malware. We recommend that users avoid downloading, installing or running Manjaro Linux until the distribution maintainers review their practices and provide alternatives for downloading.

V. BEST CONSUMER PRACTICES

A. *Choosing a Protocol*

Body of text goes here...

B. *Verifying Mirrors*

Body of text goes here...

C. *Building a Web of Trust*

Body of text goes here...

D. *“Soft” Risk Mitigation*

Sometimes it is best to rely on proven-stable releases. It can be harmful to be on the bleeding edge of development, although it is a service to the industry.

VI. OUR IMPLEMENTATIONS

Body of text goes here...

VII. CONCLUSION

The conclusion goes here.

REFERENCES

- [1] M. Schumacher, “GIMP project’s official statement on SourceForge’s actions”, Internet: <https://mail.gnome.org/archives/gimp-developer-list/2015-May/msg00144.html>, accessed April 2016.
- [2] “Third party offers will be presented with opt-in projects only”, Internet: <https://sourceforge.net/blog/third-party-offers-will-be-presented-with-opt-in-projects-only/>, accessed April 2016.
- [3] “SourceForge hijacks the Nmap SourceForge account”, Internet: <http://seclists.org/nmap-dev/2015/q2/194>, accessed April 2016.
- [4] “DistroWatch page hit ranking”, Internet: <https://distrowatch.com/dwres.php?resource=popularity>, accessed April 2016.
- [5] “Download Manjaro”, Internet: https://wiki.manjaro.org/index.php?title=Download_Manjaro, accessed April 2016.
- [6] H. Kopka and P. W. Daly, *A Guide to L^AT_EX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.