Latest Metasploit Hardware Bridge Techniques

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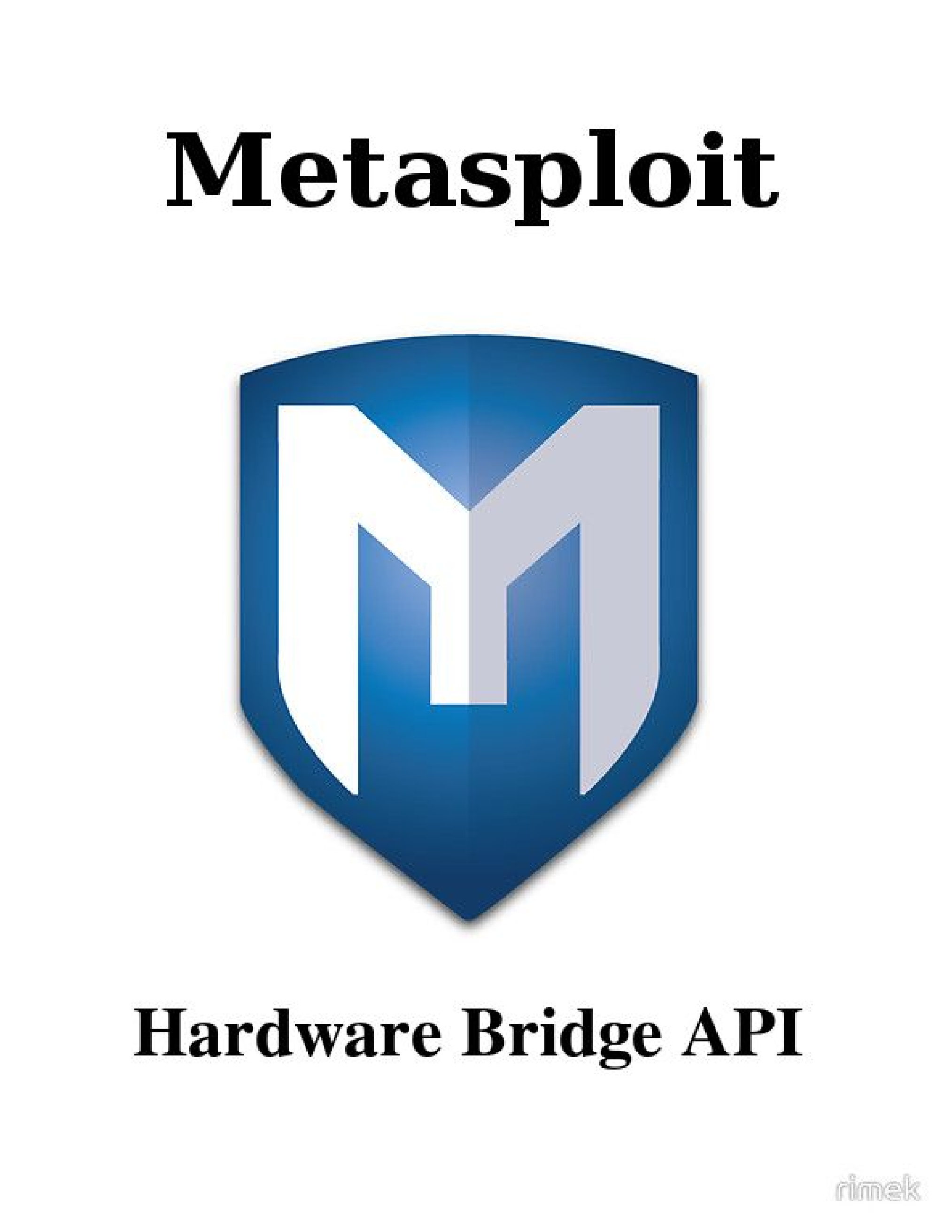
Agenda

- Overview of what the HW Bridge is
- Details on how it works
- How you can build hardware to support Metasploit
- How you can write modules for supported hardware
- Newest patches
- Future tech

MOAR Hacking HW!!



Metasploit Hardware Bridge

- Most Popular FOSS Penetration Tool
- Full Integration
- Hardware Independent
- Scriptable
- Works against any type of Hardware
- Current Extensions: CAN Bus, RF Transceivers, Zigbee

How does it work?

Target Hardware

- FOSS Hardware with Networking
- FOSS Hardware w/o networking (Serial, USB, Other?)
- Proprietary Tools that want to integrate with MSF
- Proprietary Tools that have never heard of MSF

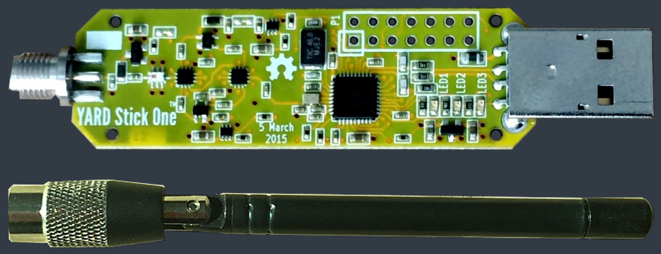
Another project goal

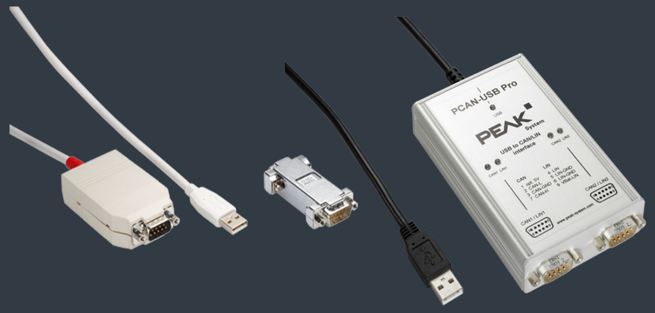
Needs to work as a standalone

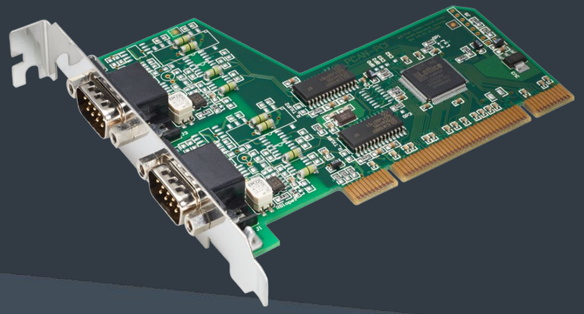
Needs to work with a red team

Needs to be useful for internal security teams and Q&A

Non-Ethernet Examples

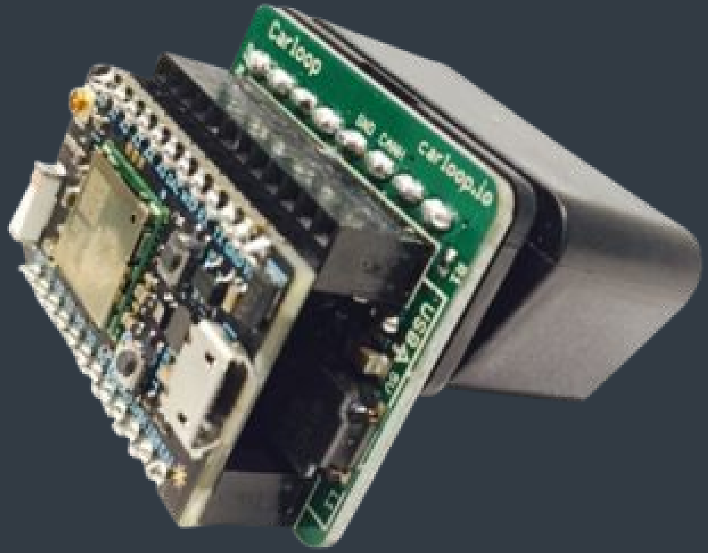






MSF Relay

“Metasploit Compatible” Devices



MSF Relay

HWBridge API

```
{   "hw_speciality":
        {
            "automotive": true,
        },
  "hw_capabilities":
        {
            "can": true,
            "j1939": true
        }
```

http://OpenGarages.org/hwbridge

Custom Hardware Commands

```
  "Methods": [
    {
      "method_name": "display_message",
      "method_desc": "Displays a message on the LCD, scrolls if message is too large",
      "args": [
        {
          "arg_name": "msg",
          "arg_type": "String",
          "required": true
        }
```

Local HTTP Relay Server

MSF Relay

Security Team

Metasploit HWBridge Hacking

Hardware Devs:

- No need to know Metasploit
- API (Relay) can be written in any language
- Support whatever you can from opengarages.org/hwbridge

The Making of a Relay

# User modules for connecting

- modules/auxiliary/server/local_hwbridge.rb # Example server relay
- modules/auxiliary/client/hwbridge/connect.rb

# External Relays, ELM327, Killerbee

- tools/hardware

# Other places to find relays

- The core source repo. Example: rfcat

What does it look like?

```
msf > use auxiliary/client/hwbridge/connect
msf auxiliary(connect) > run
...
msf auxiliary(connect) > sessions -i 1
[*] Starting interaction with 1...

hwbridge > supported_buses
Available buses
can0, can1, vcan0
```

Custom Commands

```
hwbridge> display_message “Access Token Cracked”
```

Works with Meterpreter RC Scripts

Common uses:

LEDs, Relays, custom states or functions not supported by the API

MSF HWBridge Hacking

# Hardware Bridge UI Extension

- lib/rex/post/hwbridge
- lib/rex/post/hwbridge/extensions/automotive
- lib/rex/post/hwbridge/ui/console/command_dispatcher/automotive.rb

# Hardware Bridge API for scripting modules

- lib/msf/core/post/hardware/automotive/

API for MSF Script Modules

- lib/msf/core/post/hardware/

```
can1  18DB33F1   [8]  02 01 00 00 00 00 00 00
can1  18DAF118   [8]  06 41 00 98 18 00 01 AA
can1  18DAF110   [8]  06 41 00 BE 3E A8 13 00
```

```
pids = get_current_data_pids(canbus, src, dst, options)
```

Porting RFCat Scripts

```
# RFCat

d.setMdmModulation(MOD_ASK_OOK)
d.setFreq(results.baseFreq)
d.setMdmSyncMode(0)
d.setMdmDRate(results.baudRate)
d.setMdmChanSpc(24000)
d.setModeIDLE()
d.setPower(results.power)
```

```
# MSF

set_modulation("ASK/OOK")
set_freq(datastore['FREQ'])
set_sync_mode(0)
set_baud(datastore['BAUD'])
set_channel_spc(24000)
set_mode("idle")
set_power(datastore['POWER'])
```

New Feature:

Better ISO-TP support for FLow Control and Padding

```
PADDING=0x00
FC=true
```

```
can1   7DF   02 09 02 00 00 00 00 00
can1   7E8    10 14 49 02 01 5A 46 42
can1   7DF    30 00 00 00 00 00 00 00
...
```

NordicRF Support

Keyboard/Mouse Wireless transceiver.

Hw_capabilities: “nrf24”

Source: https://github.com/BastilleResearch/mousejack

Additional: https://github.com/insecurityofthings/jackit

Future Development

LOTS of stuff!
Below is the short list of near-term stuff:

- Additional CAN Protocol SDKs, TP 2.0, Better J1939, etc.
- Other Bus protocols, K-Line, VPW, LIN
- Full SDR Support (Soapy)
- Lots of new modules (Airbags, Keyless entry)
- Additional HW support (LAWICEL 2.0)

Where can you help?

- Share your tests/modules with the community
- Help build a standard test suite
- Include a relay with your project

Questions?