SharkFest'22 US
Kansas City, MO
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#sf22us

Duct tape and baling wire: Extending Wireshark with Lua

Chuck Craft
Your Company Here

Down the Rabbit Hole

- Finding an obscure or elegant solution in Wireshark is exciting but at a certain point the original question / problem needs to be solved.

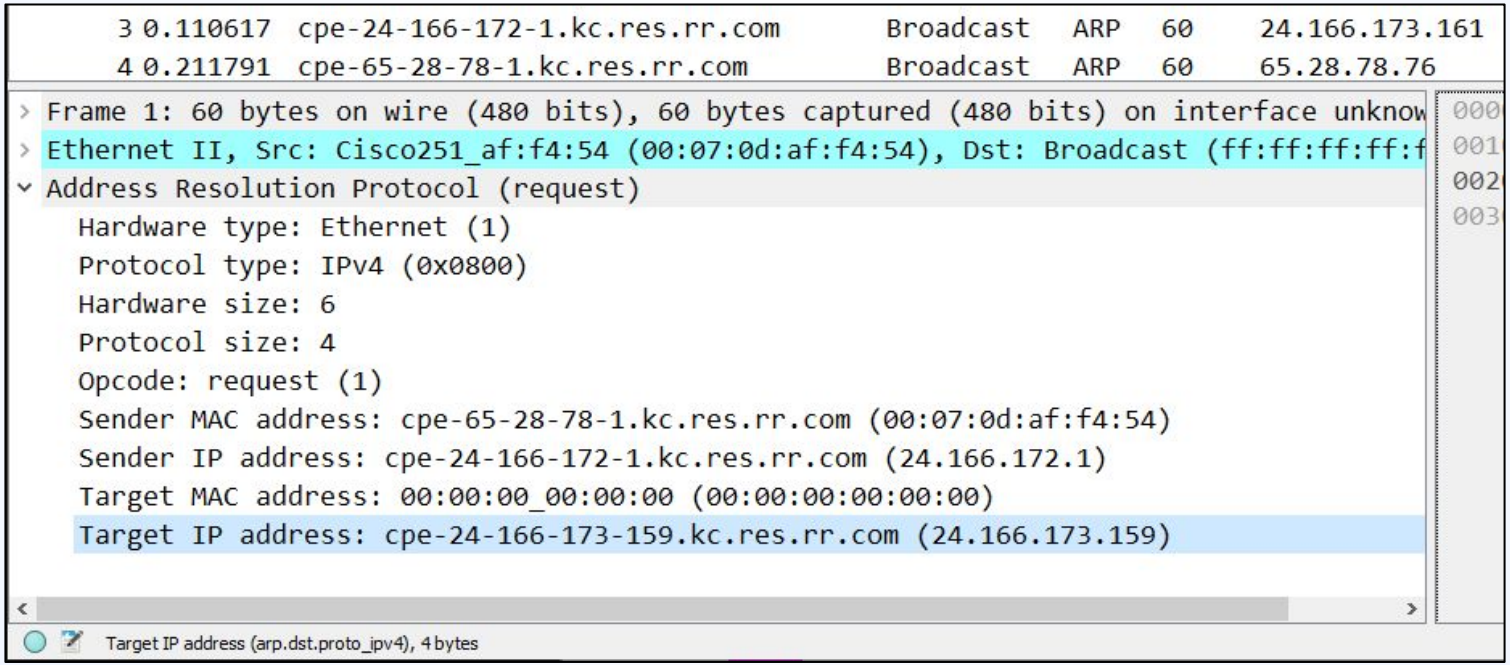
- Pick a threshold of when to move on:
  - Time invested
  - Solution checklist of steps to try
  - Wireshark source code

#1 - ARP Target IP Address

https://ask.wireshark.org/question/22016/resolved-or-mapped-arp-target-ip-address/

> "Is there a display filter that can be used to apply as column, the resolved or mapped host name for an ARP target IP address?
>
> This string value is shown in the packet details window."

#1 - ARP Target IP Address



#1 (cont)

- !!! Sample capture: 220703_arp-storm.pcapng
  https://wiki.wireshark.org/SampleCaptures
- Add column for original field: `arp.dst.proto_ipv4`
- Resolve names enabled: `View->Name Resolution`
- What's in the Conversations/Endpoints?

#1 (cont)

- Is there a better field to use?
  - Display Filter Reference

    https://www.wireshark.org/docs/dfref/a/arp.html
  - `tshark -G fields | grep -i resolved | grep -i arp`

- Is there a Preference setting to be tweaked?

- Code spelunking (even deeper in the rabbit hole)

  See the original Ask question

Make the plugin already

- Have now spent more time looking for a solution than it will take to write/test the Lua plugin. (xkcd 627)
- Six easy steps to write a plugin (Templatized):
  - Step 1 - document as you go
  - Step 2 - create a protocol to attach new fields to
  - Step 3 - add field(s) to Step 2 protocol
  - Step 4 - Field extractor to copy packet field data
  - Step 5 - create the postdissector function that will run on each frame/packet
  - Step 6 - register the new protocol as a postdissector

Step 1 - Document

```
-- arp_host.lua
-- https://ask.wireshark.org/question/22016/resolved-or-mapped-arp-target-ip-address/
-- Sample capture: https://wiki.wireshark.org/SampleCaptures#arp-rarp - arp-storm.pcap

-- Step 1 - document as you go. See header above and set_plugin_info().
local arp_host_info =
{
    version = "1.0.0",
    author = "Good Coder",
    description = "Arp IP Target - resolved",
    repository = "Floppy in top drawer"
}

set_plugin_info(arp_host_info)
```

Step 2 - new Protocol

```
-- Step 2 - create a protocol to attach new fields to
local arp_host_p = Proto.new("arp_host","Arp IP Target - resolved")
```

- Analyze -> Reload Lua Plugins
- Analyze -> Enabled Protocols...

Step 3 - add results field

```
-- Step 3 - add some field(s) to Step 2 protocol
local pf = {
  target_host = ProtoField.string("arp_host.target", "ARP target (resolved)")
}

arp_host_p.fields = pf
```

- Analyze -> Reload Lua Plugins
- View -> Internals -> Supported Protocols

Step 4 - get original field

```
-- Step 4 - create a Field extractor to copy packet field data.
local arp_target_f = Field.new("arp.dst.proto_ipv4")
```

Step 5 - "miracle occurs"

```
-- Step 5 - create the postdissector function that will run on each frame/packet
function arp_host_p.dissector(tvb,pinfo,tree)
    local subtree = nil

    -- copy existing field(s) into table for processing
    finfo = { arp_target_f() }

    if (#finfo > 0) then
        if not subtree then
            subtree = tree:add(arp_host_p)
        end
        for k, v in pairs(finfo) do
            -- process data and add results to the tree
             subtree:add(pf.target_host, v.display)
        end
    end
end
```

Step 6 - register dissector

```
-- Step 6 - register the new protocol as a postdissector
register_postdissector(arp_host_p)
```

- Analyze -> Reload Lua Plugins
- Display Filter:

```
arp_host.target matches "[a-z]"
```

wsluarm

- Wireshark's Lua API documented in WSDG
  https://www.wireshark.org/docs/wsdg_html/
- Generated by scripts from epan/wslua_* source
  See doc/README.wslua
- wslua Index - available on Wiki
  https://wiki.wireshark.org/lua#wireshark-s-lua-api

EASYPOST.lua

- A template file for a simple post dissector
  https://wiki.wireshark.org/lua#examples

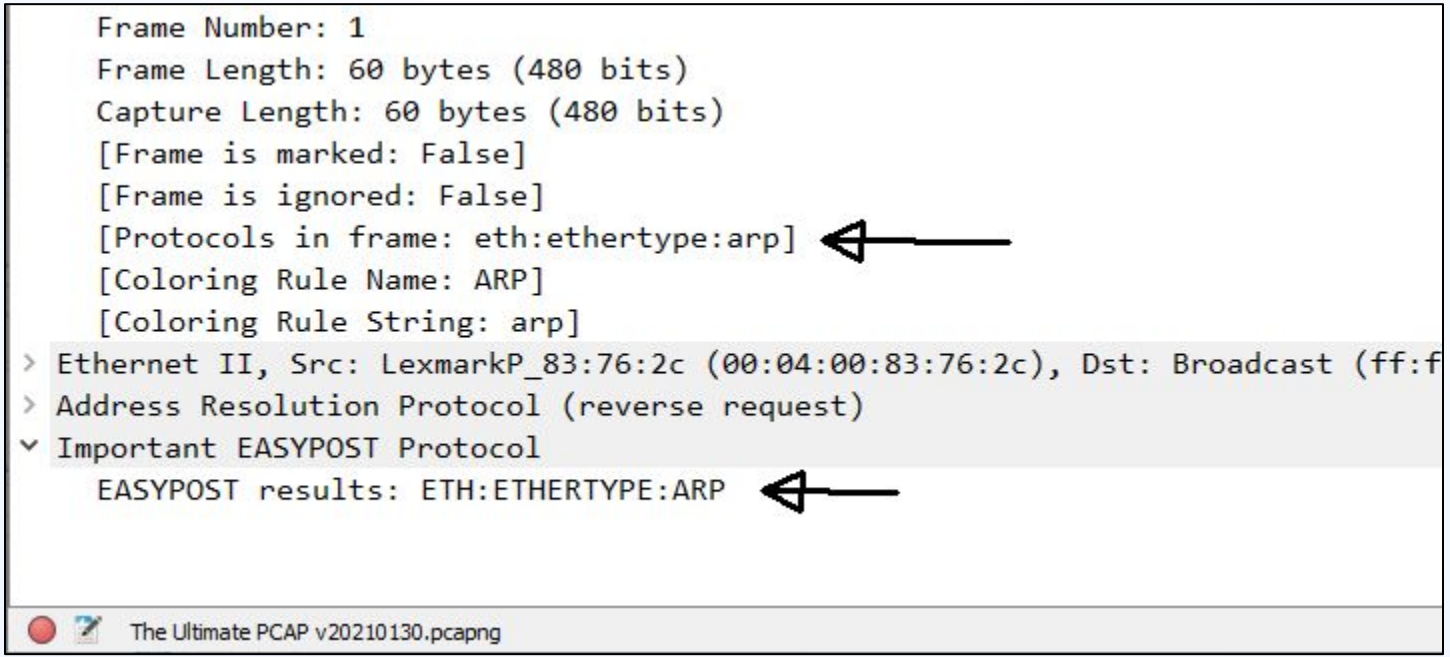
EASYPOST.lua - fields

```
-- Step 3 - add some field(s) to Step 2 protocol
local pf = {
    results = ProtoField.string("easypost.results", "EASYPOST results")
}

easypost_p.fields = pf

-- Step 4 - create a Field extractor to copy packet field data.
easypost_results_f = Field.new("frame.protocols")
```

EASYPOST.lua - results

```
finfo = { easypost_results_f() }

if (#finfo > 0) then
      if not subtree then
            subtree = tree:add(easypost_p)
      end
      for k, v in pairs(finfo) do
            -- process data and add results to the tree
            local field_data = string.format("%s", v):upper()
            subtree:add(pf.results, field_data)
      end
end
```

EASYPOST.lua - results



ws_expert.lua

- https://gitlab.com/wireshark/wireshark/-/issues/15990

  "... create a display filter to display frames with more than one expert info:

  count(_ws.expert.message)>4

  Would be nice to be able to add a column count(_ws.expert.message) to sort on and have available when analyzing."

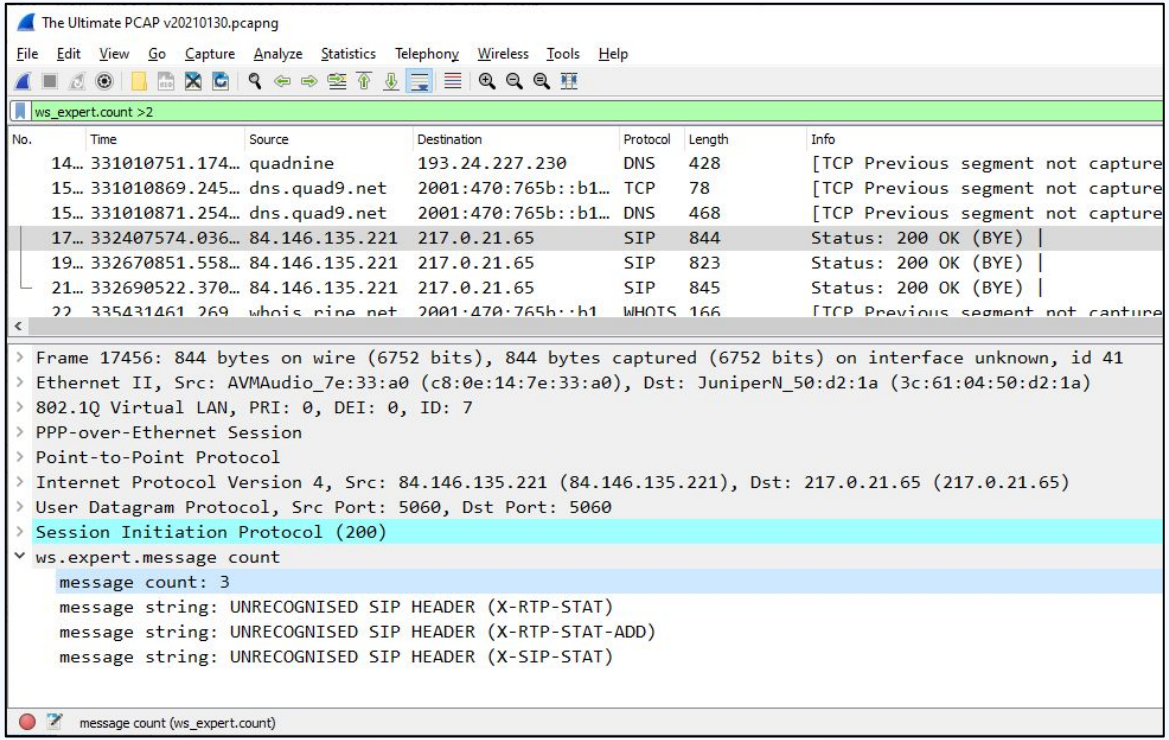
ws_expert.lua - fields

```
-- Step 3 - add some field(s) to Step 2 protocol
local pf = {
  ws_count = ProtoField.uint8("ws_expert.count", "message count"),
  ws_string = ProtoField.string("ws_expert.string", "message string")
}

ws_expert_p.fields = pf

-- Step 4 - create a Field extractor to copy packet field data.
local ws_expert_message_f = Field.new("_ws.expert.message")
```

ws_expert.lua - results

```
finfo = { ws_expert_message_f() }

 if (#finfo > 0) then
     if not subtree then
         subtree = tree:add(ws_expert_p)
     end
     subtree:add(pf.ws_count, #finfo)
     for k, v in pairs(finfo) do
         -- process data and add results to the tree
          local field_data = string.format("%s", v):upper()
          subtree:add(pf.ws_string, field_data)
     end
 end
```

ws_expert.lua - results



How to display slice as a filter in column?

- https://ask.wireshark.org/question/27207/how-to-display-slice-as-a-filter-in-column/