CS558 Network Security

Lecture 4: ARP and BGP

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Current Events

02.16.2022

Blumenthal & Blackburn Introduce Comprehensive Kids' Online Safety Legislation

The introduction of the Kids Online Safety Act follows bombshell reporting & a series of watershed bipartisan hearings revealing Big Tech's repeated failures to protect children & teens from serious dangers on their platforms

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Current Events

ELECTRONIC FRONTIER FOUNDATION

About Issues Our Work Take Action Tools Donate

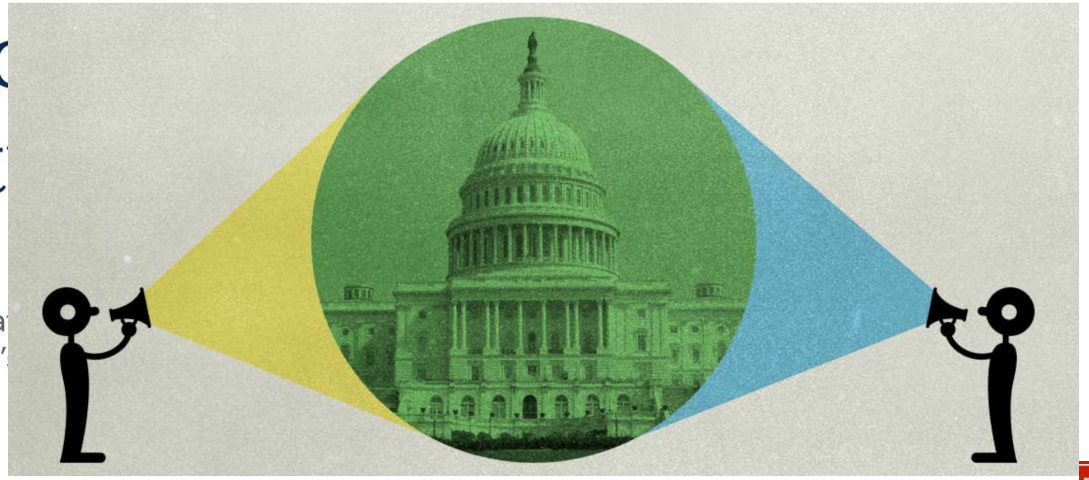
02.16.2022

Blumenthal … Introduce Co… Online Safet…

The introduction of the Kids Online Sa… bipartisan hearings revealing Big Tech'… dangers on their platforms

Dangerous "Kids Online Safety Act" Does Not Belong in Must-Pass Legislation

BY JASON KELLEY AND AARON MACKEY | DECEMBER 15, 2022



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Review: Encrypted Email

Review: Encrypt Then Sign vs Sign Then Encrypt

Ad-Hoc, Fast, Decentralized Routing is Hard

(That's it. That's the tweet.)

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Updated by: 5227, 5494
Network Working Group
Request For Comments: 826

Internet Standard
David C. Plummer
(DCP@MIT-MC)
November 1982

An Ethernet Address Resolution Protocol

The Problem:

The world is a jungle in general, and the networking game contributes many animals. At nearly every layer of a network architecture there are several potential protocols that could be used. For example, at a high level, there is TELNET and SUPDUP for remote login. Somewhere below that there is a reliable byte stream protocol, which might be CHAOS protocol, DOD TCP, Xerox BSP or DECnet. Even closer to the hardware is the logical transport layer, which might be CHAOS, DOD Internet, Xerox PUP, or DECnet. The 10Mbit Ethernet allows all of these protocols (and more) to coexist on a single cable by means of a type field in the Ethernet packet header. However, the 10Mbit Ethernet requires 48.bit addresses on the physical cable, yet most protocol addresses are not 48.bits long, nor do they necessarily have any relationship to the 48.bit Ethernet address of the hardware. For example, CHAOS addresses are 16.bits, DOD Internet addresses are 32.bits, and Xerox PUP addresses are 8.bits. A protocol is needed to dynamically distribute the correspondences between a <protocol, address> pair and a 48.bit Ethernet address.

Updated by: 5227, 5494 Internet Standard
Network Working Group David C. Plummer
Request For Comments: 826 (DCP@MIT-MC)
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This format allows the packet buffer to be reused if a reply is generated; a reply has the same length as a request, and several of the fields are the same.

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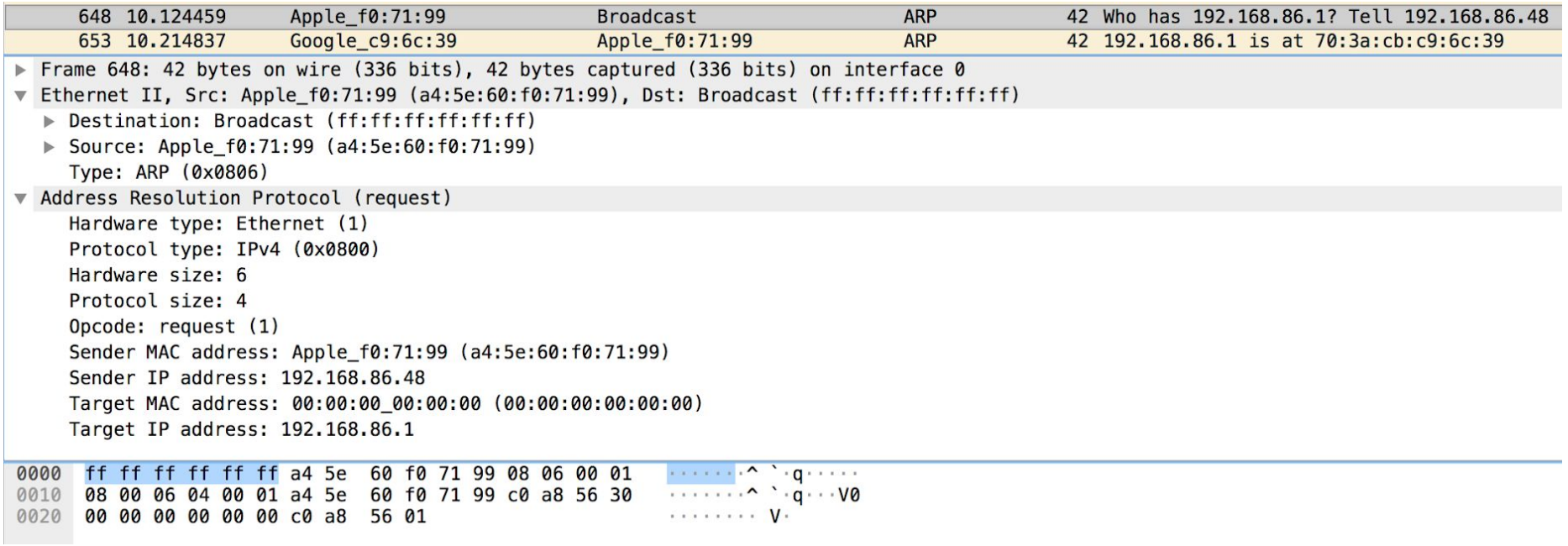
Link Layer Reminder

A(dress) R(esolution) P(rotocol) Reminder

A(dress) R(esolution) P(rotocol) Reminder

- Request
- Response
- Gratuitous ARP
  - Request/Announcement: IP of sender in both
  - Response: Normal response to no request



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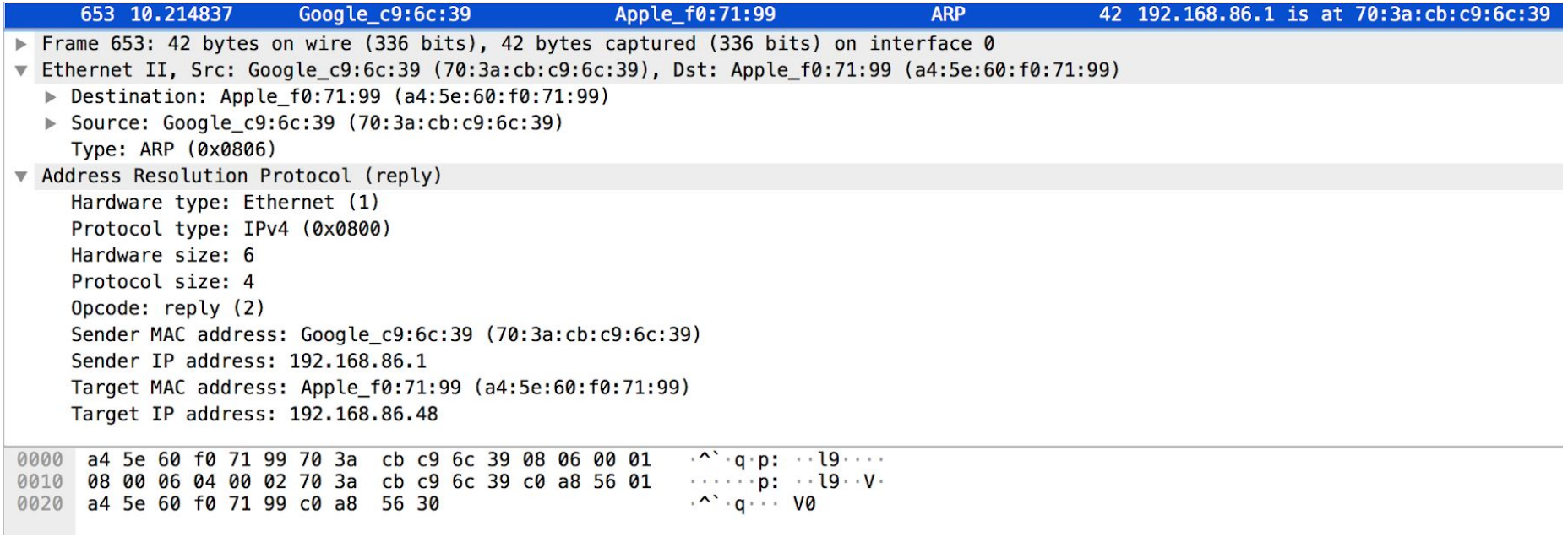

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ARP Security?

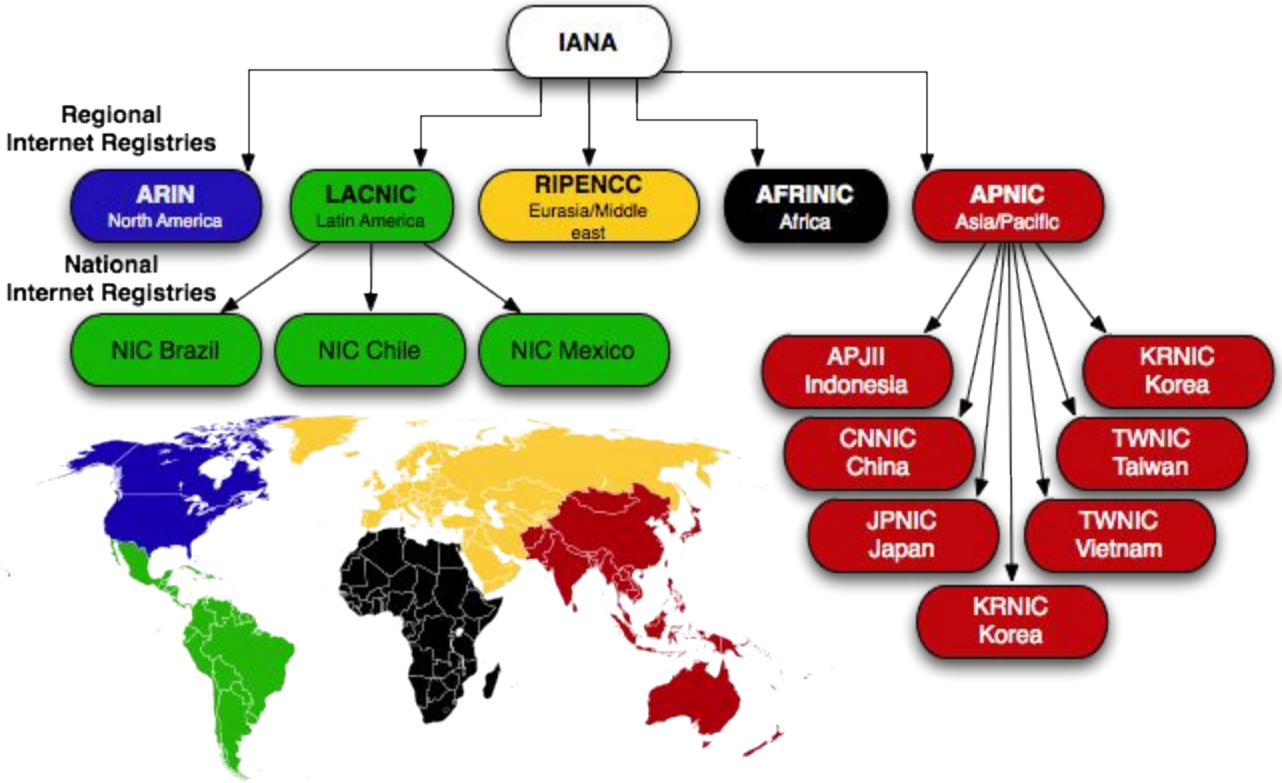
ARP Spoofing Mitigations

- Detection: Watching for potential mismatches
- Prevention: Centralization of some kind
- Cryptography: Secure-ARP

Prepping for BGP

Internet Organization/s

- CIDR (Class-less internet domain routing) notation
- Internet Assigned Numbers Authority
- Regional Internet Registrars
- ISPs and Backbone Networks (Level3)
- Autonomous Systems



Source: Center for Applied Internet Data Analysis

Credit: xkcd/195

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Autonomous Systems Reminder

ASRank About Ranking Search Contact Data

AS 111: neighbors

111 search

AS number	111				
AS name	BOSTONU-AS				
organization	Boston University				
country	United States				
AS rank	11752				
customer cone	1 asn	10 prefix	165888 address		
AS degree	5 global	3 transit	4 provider	1 peer	0 customer
Spoofer 01/2022-01/2023					
Tested IP Blocks	17	0			
Spoofing IP Blocks	0 (0.0%) IPv4 /24s	0 (0.0%) IPv6 /40s			

see more spoofer data >

AS Rank ▲	AS neighbors ▽	Organization		AS customer cone ▽	number of paths	relationship
1	3356	Level 3 Parent, LLC		48838	137	provider
3	174	Cogent Communications		34689	54	provider
68	32787	Akamai Technologies, Inc.		658	206	provider
578	10578	Harvard University		66	40	provider
24263	10961	Boston GigaPoP		1	12	peer