Project IV: SOCKS Server (Version 4)

- SOCKS 4 Protocol:
 <a href="http://www.socks.nec.com/protocol/socks4.
- SOCKS 4a Protocol (extension)
 http://www.socks.nec.com/protocol/socks4a.protocol

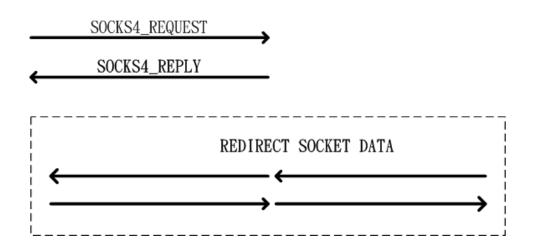
In this project, you are asked to implement the SOCKS 4 firewall protocol in the application layer of the OSI model.

SOCKS is similar to a proxy (i.e. intermediary-program) that acts as both server and client for the purpose of making request on behalf of other clients. Because the SOCKS protocol is independent of application protocols, it can be used for many different services: telnet, ftp, www, etc.

There are two types of the SOCKS operations (i.e. CONNECT and BIND). You have to implement both of them.

The following figures show the SOCKS operations:

DEST. HOST



SOCKS4_REQUEST

	VN 4	CD 1 or 2	DST PORT	DST IP	USER ID	NULL	
•	1	1	2	4	variable	1	

VN 4	CD 1 or 2	DST PORT	DST IP = $0.0.0.x$	USER ID	NULL	Domain Name	NULL
1	1	2	4	variable	1	variable	1

[CD]

- 1: CONNECT command
- 2: BIND command

SOCKS4_REPLY

VN 0	CD 90 or 91	DST PORT	DST IP
1	1	2	4

[CD]

- 90: request granted
- 91: request rejected or failed

[DST IP]

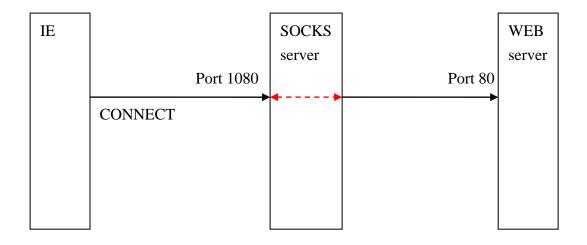
Connect mode: is the DST IP in SOCKS4_REQUEST

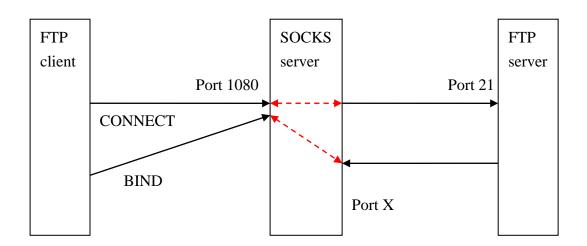
Bind mode: 0

[Port]

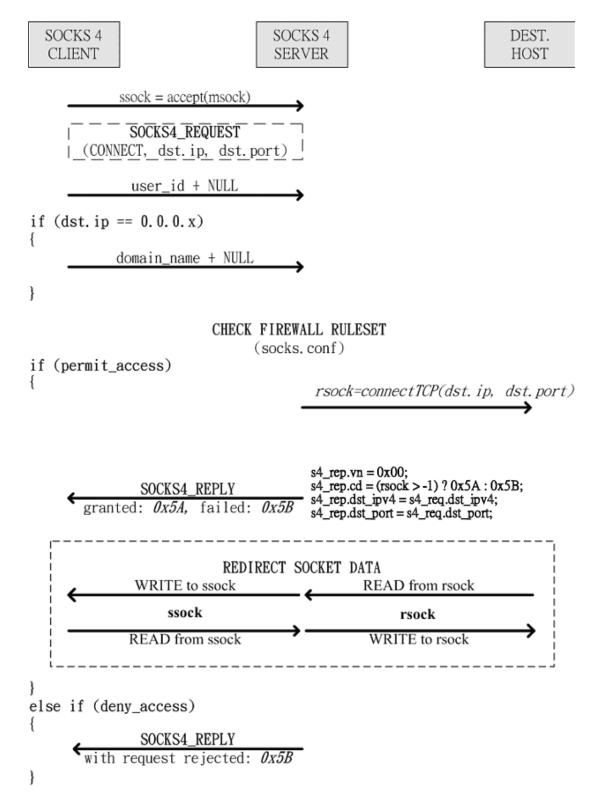
Connect mode: is the DST PORT in SOCKS4_REQUEST

Bind mode: newly binded port in SOCKS server





SOCKS Version 4 Protocol (CONNECT Operation)



SOCKS Version 4 Protocol (BIND Operation)

SOCKS 4 SOCKS 4 DEST. CLIENT SERVER HOST ssock = accept(msock) SOCKS4_REQUEST (BIND, dst.ip, dst.port) user_id + NULL if (dst. ip == 0.0.0.x)domain_name + NULL } CHECK FIREWALL RULESET (socks.conf) if (permit_access) psock=passiveTCP() SOCKS4_REPLY $\begin{array}{l} s4_rep.vn = 0x00; \\ s4_rep.cd = (psock > -1)?0x5A : 0x5B; \\ 0x5A, & s4_rep.dst_ipv4 = 0; \\ 0x5B, & s4_re$ granted: 0x5A, s4_rep.dst_port = htons(getsockport(psock)); failed: 0x5B rsock = accept(psock) REDIRECT SOCKET DATA READ from rsock WRITE to ssock ssock rsock READ from ssock WRITE to rsock else if (deny_access) SOCKS4_REPLY with request rejected: $\theta x5B$ }

Project summary:

- Put the SOCKS client into your CGI program in Project 3 (1).
 The web page needs extra fields for SOCKS proxy IP and port for each server.
- 2. Write a SOCKS server
- 2.1. CONNECT Operation (use Web Browser or CGI

Connection)

```
[socks.conf]: permit c - - - -
```

2.2. BIND Operation (use FTP client + normal mode)

```
[socks.conf]: permit b - - - -
```

3. Include the firewall rule (use Web Browser) in the server.

```
[socks.conf] : permit c - - 140.113.*.* # [NCTU only] or [socks.conf] : permit c - - 140.114.*.* # [NTHU only]
```

Additional Requirement:

- Use the concurrent, connection-oriented paradigm.
- Output necessary messages on the screen in the SOCKS server.

Due: 2016/12/29 11:00 P.M. (Sunday)