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SSH over the Internet

20th August 2016

What is SSH

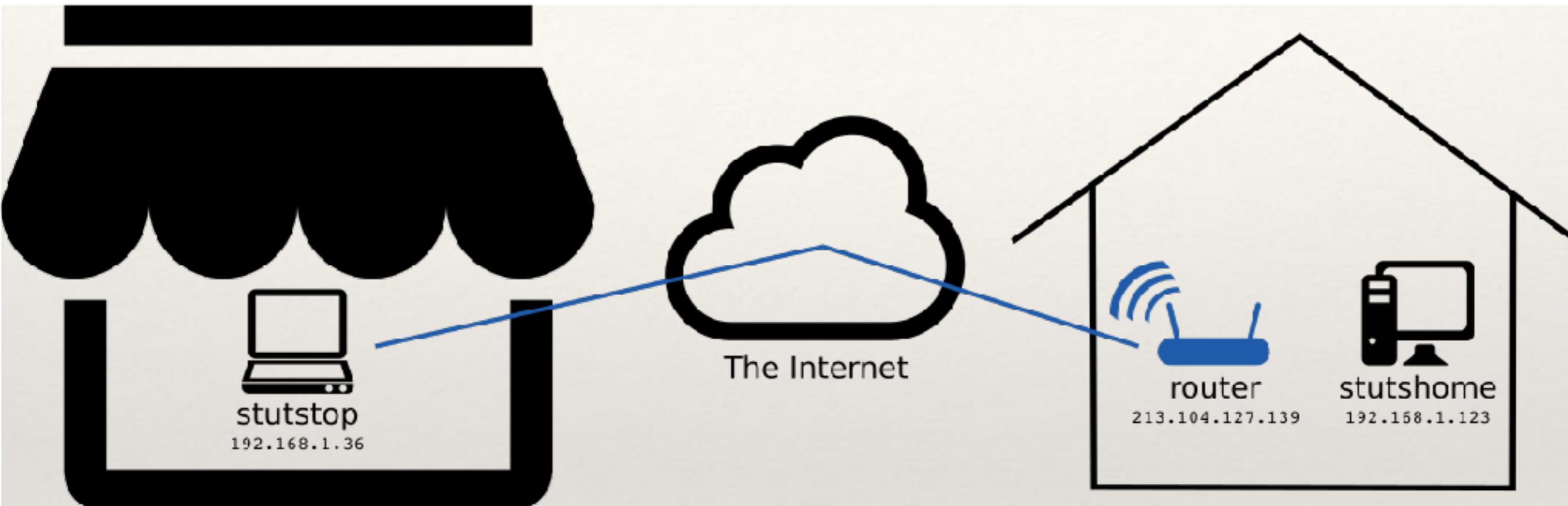
- ❖ “Secure Shell”
- ❖ Not secure
- ❖ Not a shell
- ❖ Is a standard protocol like VNC, HTTP, etc
- ❖ Terrible OpenSSH logo



OpenSSH

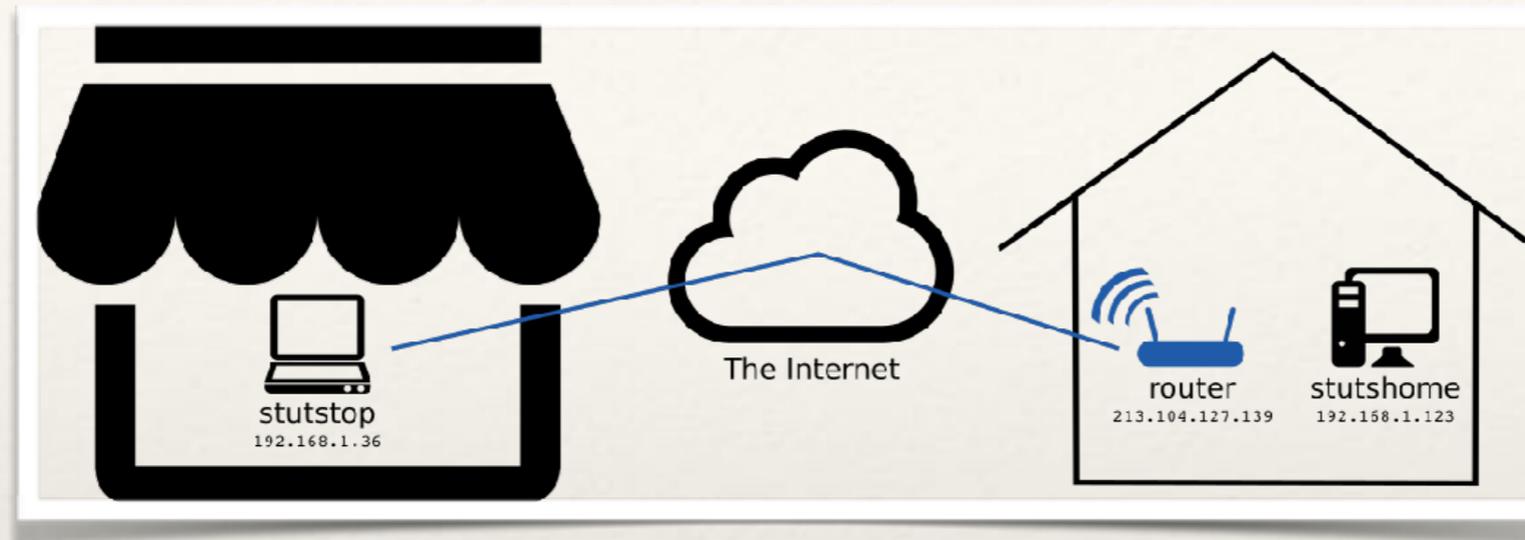
- ❖ Actual programs (server, client) that implement SSH
- ❖ Developed for OpenBSD and ported to Linux etc
- ❖ Debian / Red Hat / Arch packages are called openssh, openssh-server, openssh-client or similar

SSH over the Internet



- ❖ Connect from stutstop laptop (in Pret A Manger) to stutshome PC (at home)

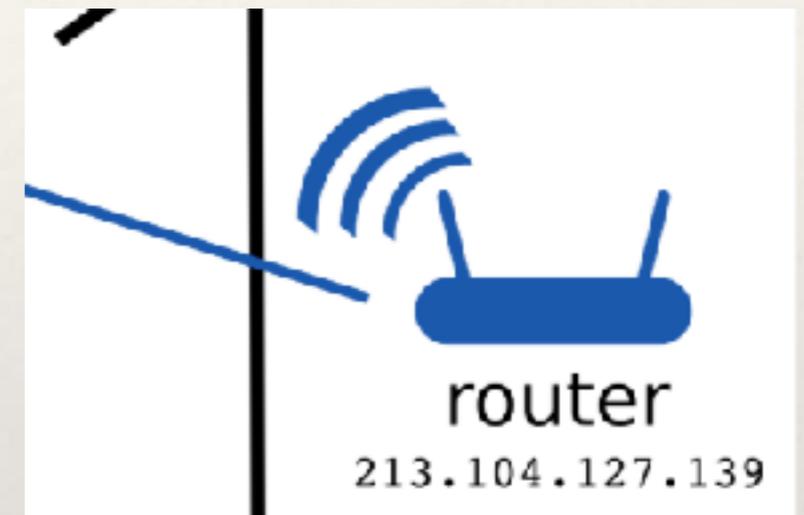
SSH over the Internet



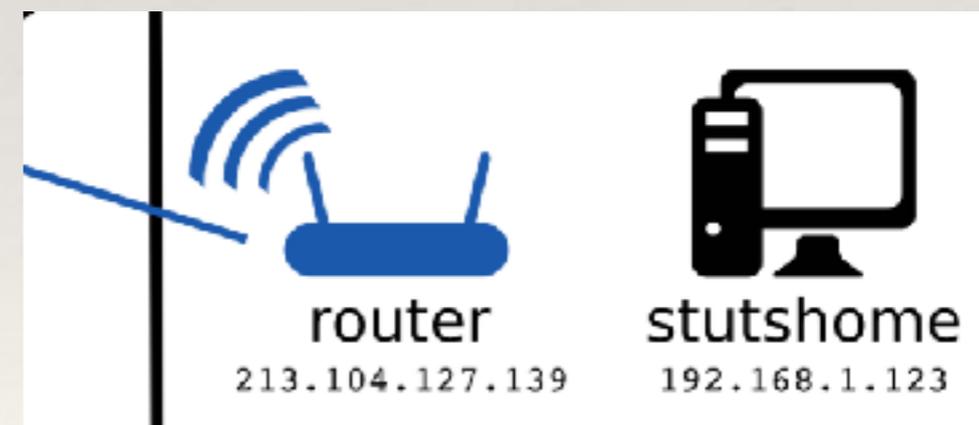
- ❖ PC at home is called stutshome
- ❖ Laptop is called stutstop
- ❖ Router from ISP (Virgin, BT, etc)
- ❖ Connect from stutstop to stutshome

Two Problems

- ❖ First problem: how to get to the router when its IP address changes



- ❖ Second problem: how to get from the router to the stutshome PC



How To Get To The Router

- ❖ Sign up for a free account on noip.org
- ❖ Create a subdomain, eg. stuts.hopto.org
- ❖ Install the noip client on stutshome PC
- ❖ stuts.hopto.org will now link to the IP address of your router

How to get from the router to the PC

- ❖ Go to the Port Forwarding section of your router
- ❖ Choose a start port (eg. 443)
- ❖ Choose an end port (22)
- ❖ Select TCP forwarding
- ❖ Enter the IP address of stutshome PC (192.168.1.123)
- ❖ Save the Port Forwarding rule

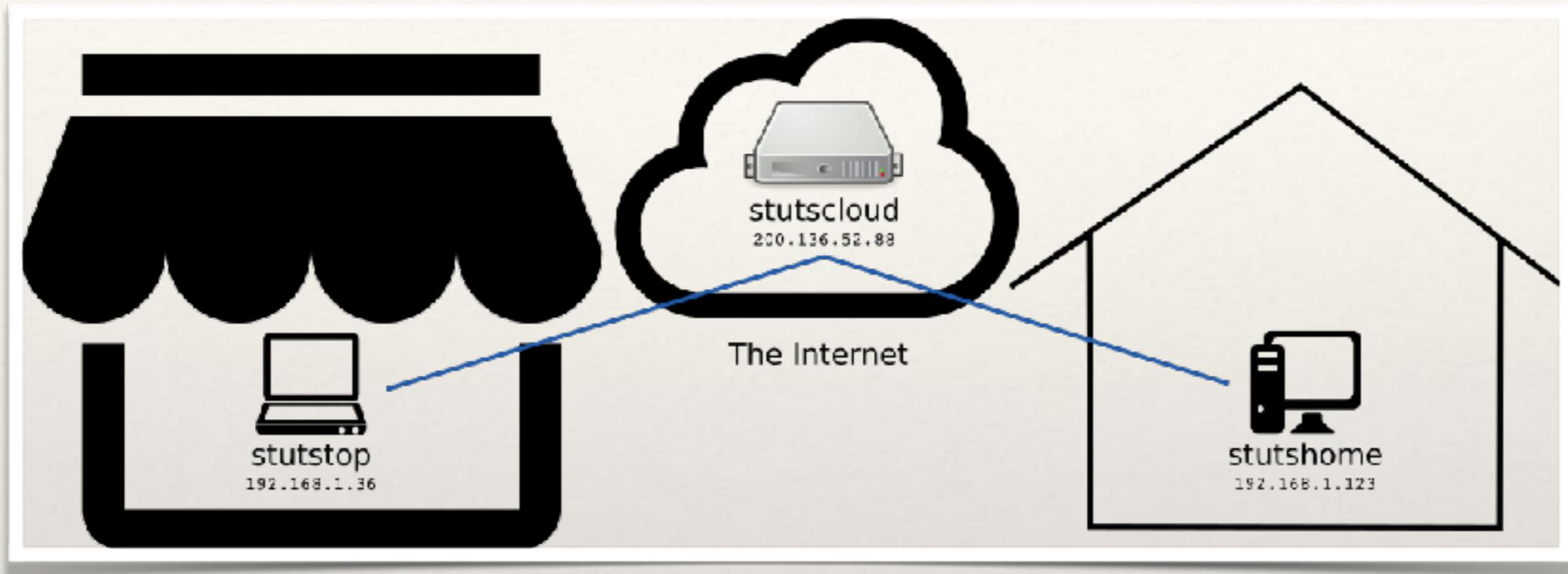
Test your solution

- ❖ Go to Pret A Manger
- ❖ Connect using `ssh stuts@stuts.hopto.org -p 443`
- ❖ Do The Things

Problems with this solution

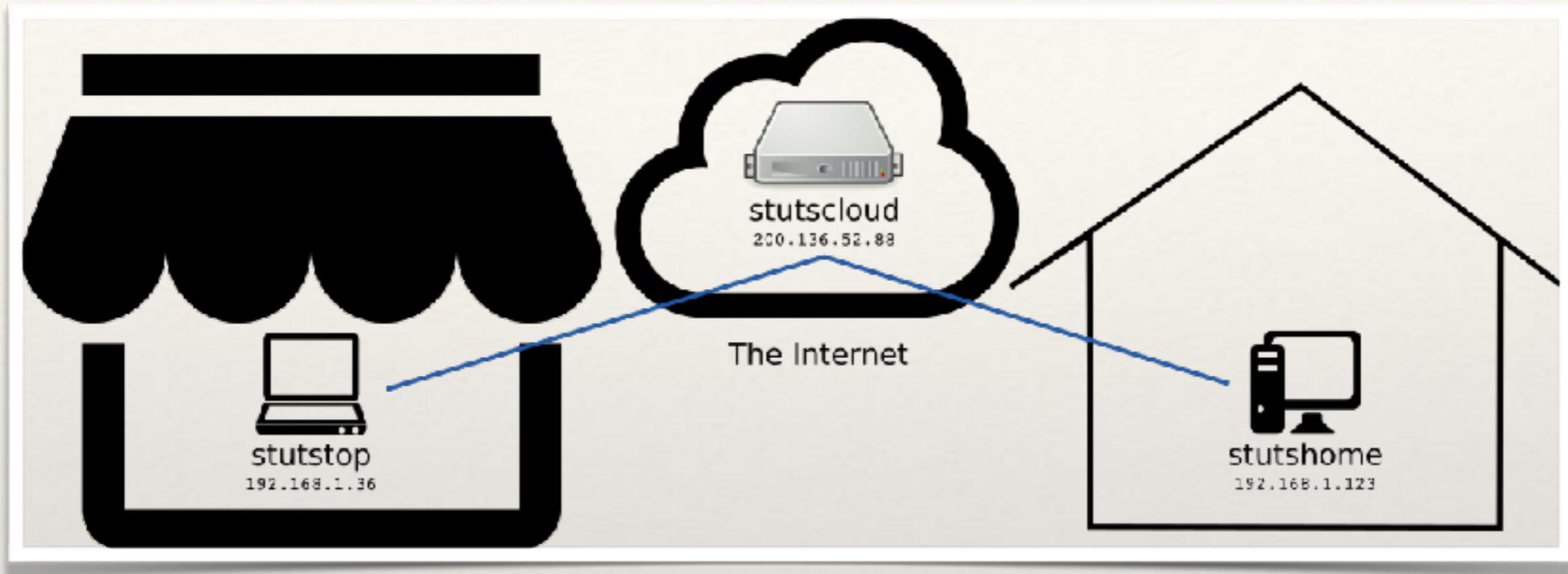
- ❖ stutshome PC needs a static IP address
- ❖ Breaks if someone resets the router
- ❖ Relies on noip.org (quite annoying)

Cloud server approach



- ❖ Don't need noip.org
- ❖ Don't need port forwarding
- ❖ Don't need static IP for stutshome

Cloud server approach



- ❖ Create a small server on Google Compute Engine (GCE) with a fixed IP address
- ❖ Install a startup script on stutshome to SSH to stutscld
- ❖ SSH from stutstop to stutscld and BOUNCE to stutshome

The autossh script

```
#!/bin/bash
```

```
# Open reverse ssh tunnel to stutscloud server
```

```
# Get hostname numbers
```

```
SERVER_SSH_PORT=4000
```

```
SERVER_VNC_PORT=4001
```

```
export AUTOSSH_PIDFILE=/var/run/autossh.pid
```

```
export AUTOSSH_POLL=60
```

```
export AUTOSSH_FIRST_POLL=30
```

```
export AUTOSSH_GATEETIME=0
```

```
export AUTOSSH_DEBUG=1
```

```
autossh -M 0 -N -o "ExitOnForwardFailure yes" -o "ServerAliveInterval=60" -o "ServerAliveCountMax=6"  
-o "StrictHostKeyChecking=no" -o "PubkeyAuthentication=yes" -o "PasswordAuthentication=no" -i /  
root/.ssh/id_rsa -R ${SERVER_SSH_PORT}:localhost:22 -R ${SERVER_VNC_PORT}:localhost:5900  
tunneller@200.136.52.88 >> /var/log/autossh.log 2>> /var/log/autossh.err.log &
```

Installing the autossh script

- ❖ Paste it into a new file called `/etc/init.d/autossh.sh`
- ❖ Make it executable (`chmod +x /etc/init.d/autossh.sh`)
- ❖ Add a line to `/etc/rc.local` to make it run on startup before the `exit 0` line:

```
/etc/init.d/autossh.sh
```

- ❖ Set up public key access from root on stutshome to the tunneller user to stutscloud and Make It Secure

SSH to stutshome via stutscloud

- ❖ SSH to stutscloud:

```
ssh stuts@200.136.53.88
```

- ❖ On stutscloud, ssh to local port 4000:

```
ssh stuts@localhost -p 4000
```

Now what?

- ❖ Connect to Windows PCs on the same network as stutshome using VNC
- ❖ Use Facebook from work (-D 1234)
- ❖ Use “Facebook” from school
- ❖ “Help” your friends with their PC problems
- ❖ Transfer files with `scp` or browse using `sshfs`