Why would we want to spend all the time and effort designing and building our own surveillance camera, when we could just purchase a Ring video doorbell?

The doorbell-camera company Ring has forged video-sharing partnerships with more than 400 police forces across the United States, granting them potential access to homeowners' camera footage and without a warrant. They also provide user info to google, facebook and four other companies. Unknown what partnerships in other countries or other agencies.

So I am coming to visit you but I need two pieces of information:
- your address
- a time of day to visit.

Your address would include:
- country
- territory (county/province/state)
- city
- street name
- number on street
- if multi-unit building/complex, the unit number.

Without some of that information I may go to London/Ontario, London/Ohio or London/England. I am not sure the Queen would invite me in for tea.

I need the time of day to ensure that you are at home.

Okay, Dr Roboto, what does this have to do with your latest project, a surveillance camera?

The answer is that: if one wants to access the camera from outside this building, then you need to know the address of the camera. Short version of the story. An internet address is called an Internet Protocol (IP) address. The router that your internet provider installed in your house has two IP addresses. One address set is for the local area network (LAN), so that every device (computer, tablet, etc) in your home has a unique local address. The other address is for the Wide Area Network (WAN) so that the outside world can find your router and therefore find your computer. The format of the IP address is XXX.XXX.XXX.XXX where XXX has values 0-255. Doing the math, there are approximately 4.2B combinations of IP addresses.

The default format for the router LAN IP address is 192.168.0.1 and a device could be 192.168.0.100. if you want to know your router WAN (public) IP address, type the following into your browser: whatsmyip.org

A port is a location associated with the IP address so that software can send/receive information. A port has a value 0-65535.

note: computers work in binary (0,1) so 255 is eight 1s and 65535 is sixteen 1s.

The time requirement is to ensure that the computer with the camera is turned on and connected to the network. We usually cannibalize a system after the project is completed, but this one will be kept on for awhile.

So you go into your mobile phone provider and purchase a new phone. You now need a telephone number. Since you are probably replacing your old phone, they assign the same number from the old phone. In geek speak, this would be a static IP address. If no old phone, then the provider gives you a new number. Your router uses software called Dynamic Host Configuration Protocol (DHCP) to assign an IP address to every device that connects to the LAN, if you did not assign it a static IP address. That means it could have a different IP address every time it connects. That is why the WAN IP address is usually a static address, so that the world can find you.

Enough geekspeak.

The first set of videos that we produced, and put on the web page, were taken with a sony digital camera. The last video, of face tracking, was created within the software program. Neither approach would work for the surveillance camera. Therefore we had to use a software front end that would look like a web page. The back end software captures the video from the camera and passes it to the front end software. A user would then login in to the web page on the computer.

That is so easy, just like the first time you drove a car with a manual transmission, especially when it was parked on an incline (handbrake, clutch, gas pedal, etc). Communication-wise, your computer (LAN 192.68.0.100) talks to your router (WAN 100.25.68.32). The signal bounces around the internet until it reaches our router (WAN 54.123.68.99) and then to the computer with the camera (192.168.0.54)

I suspect that you are not going to remember all those numbers. We have a website called www.systemkeepers.com where we post all these reports and videos. This is called a domain. What we just did was to create a subdomain (**raspberry**), like an apartment within a house and it points to our WAN. Changes were also made to the router so that requests will only go to the computer with the camera.

Finally security was added to the web page so that an username and password must be entered.

You can see the end result at:

www.raspberry.systemkeepers.com:2944

2944 is the port number.

The e-mail will include the username and password.

Note: The first time you attempt to connect may take a minute as your computer tries to find the connection.

The CFO and I are now off to a 3D printer orientation course and will describe it in the next report. Maybe the future includes building body parts.