

SETTING UP PORT FORWARDING FOR IP NETWORK CAMERAS

A TUTORIAL V1.00

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Thank you on behalf of mother nature.



Revision history

Nov 26th, 2012 1.00 Initial version ported from <http://www.ruwebit.net/portforwarding/>
Dec 10th, 2012 1.01 More information added regarding UPnP and public

Introduction

As the author of IP network camera apps I've been asked more and more often on how to access the camera from outside the local network. The answer is: port forwarding (*or enabling UPnP, see important note below*), and it needs to be setup on your router.

I've written this document out of pure selfishness: I hope spending a few hours writing this down will save me a factor of hours more not spent on support questions. But that doesn't mean this document can't save you some hours of setting up your camera and diagnosing problems, too!

IMPORTANT NOTE

For setting up port forwarding quite a bit of computer and network knowledge is needed. **An easier way for accessing your IP network cameras from outside your network, is to enable UPnP on both your router and IP-cameras.** Please check our UpnP tutorial at

<http://www.conveniencefactory.com/documents/Setting%20up%20UPnP%20for%20IP%20network%20cameras.pdf>

Terminology

Camera	One of your wired or wireless IP network cameras
Local network	The network your camera or cameras are connected to. If you use the camera at home, this is your home network
Router	The device that connects your local network to the internet
iDevice	Your iPhone/iPod/iPad device where my (or any other) remote camera app is installed on
3G connection	Access to the internet (in this context from an iDevice) through a cellular provider.
Your computer	A device in your local network with a web browser (like a Linux PC, Windows PC, Mac or iPad)
External computer	A device NOT in your local network with an wired internet connection (like a Linux PC, Windows PC or Mac in your office). Preferably not a device using a 3G connection
Internal IP address	The IP-address of a device inside your local network
Public IP address	The external IP-address of your router provided by your internet provider
Web interface	In this context this is the webpage you access to configure or view your camera in a web browser
My app	One of my remote camera apps
Port forwarding	See wiki: http://en.wikipedia.org/wiki/Port_forwarding
Dynamic DNS	An internet service like dyndns.com to map your dynamic IP address to a fully qualified hostname. See wiki: http://en.wikipedia.org/wiki/Dynamic_DNS
Fully qualified hostname	A hostname pointing to the public IP address of the camera, conforming to a fully qualified domain name http://en.wikipedia.org/wiki/Fully_qualified_domain_name

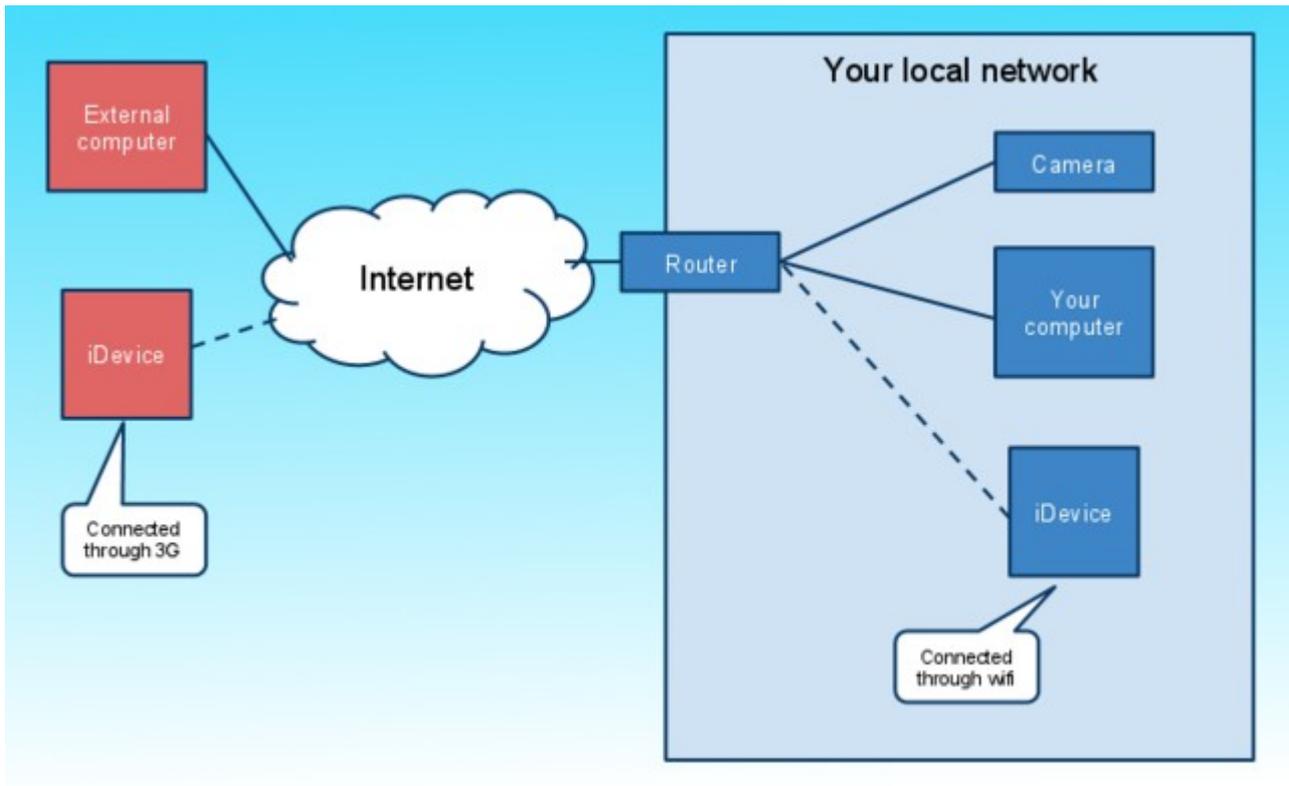


Illustration 1: Network overview

Prerequisites

- Some network knowledge (you probably already have that if you have your camera up and running). If terms like 'IP address' and 'router' and 'fully qualified hostname' makes you look like a Southpark character blinking his eyes, please ask the neighbor kid to help you.
- An IP network camera
- A router supporting NAT port forwarding
- Local network correctly set up with a working internet connection
- A PC or Mac in your local network
- A PC or Mac outside your local network (eg. from your office)
- Optionally: an iDevice with my (or any other) remote camera app installed.
- Ensure that your camera is working on your local network by accessing the camera's web interface from your computer.

Gathering information

Before you continue first gather the information below:

- The internal IP address of your camera (this is the IP address you type in your computer's webbrowser to access the webinterface of the camera).
- The internal IP address of your router (this is the IP address you type in your computer's webbrowser to access the webinterface of the router).
- The public IP address of your router. Find it by visiting the website

<http://www.whatsmyip.org/> from your computer's web browser.

Use small steps

Configure your camera in small steps and validate that it's configured correctly after each of those steps:

1. First ensure that the camera works in your local network by accessing the camera's web interface from your computer (not covered in this article, please refer to your camera's manual for help and your camera's manufacturer for support).
2. Enable port forwarding on your router (see next section) and verify this by accessing the camera's web interface from an external computer.
3. Not until then try a camera app on your iDevice over a 3G connection (optionally)
4. Try setting up dynamic DNS (optionally)

Setting up portforwarding

There are hundreds of different routers with hundreds of different web interfaces and I cannot give detailed steps for all of them. So I will use 2 different examples of the most used ways of configuring port forwarding on routers.

About port forwarding

Usually the device in your local network cannot be accessed from the Internet. Your router is responsible for that and it's a good security measure to keep malicious software and people away from your local network. But if you want run a web server from your local network or - in our case - have attached a network camera that you want to access from the internet then first you have to configure your router.

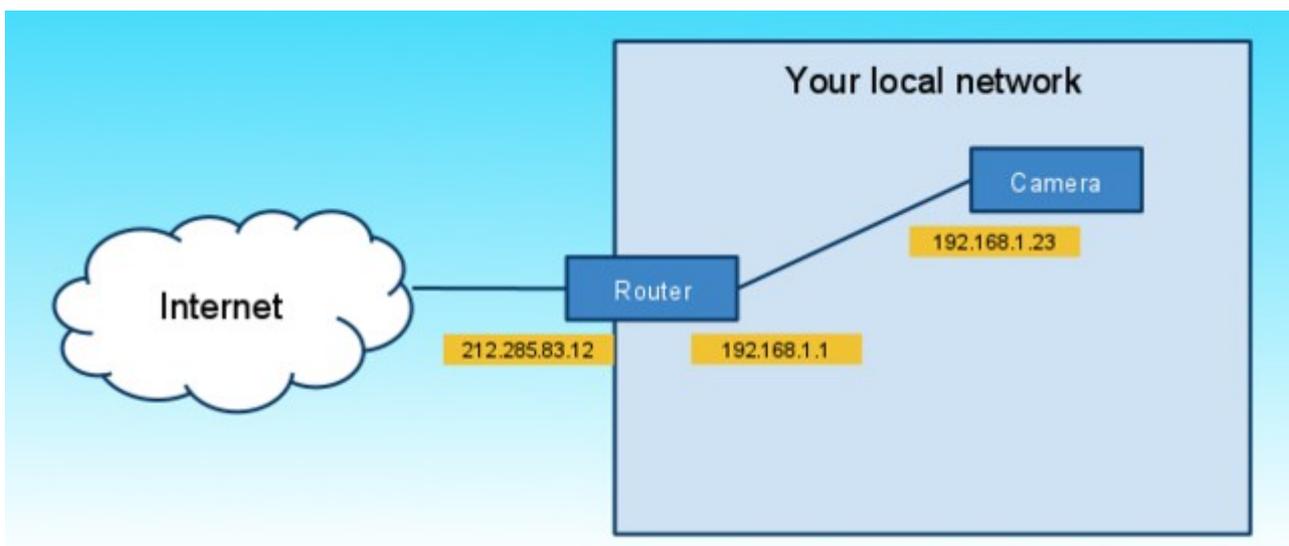


Illustration 2: Portforwarding allow accessing devices in your network from outside of your network

For the examples below I use the IP-addresses in the picture above as an example, please replace with the correct ones.

A network device can be accessed by its IP address and port number. See the documentation of your camera. I assume that you already have setup your camera and have accessed it's web interface from your computer. To access the web interface **of the camera** you likely have to open a webpage like:

http://192.168.1.23:80/

Here 192.168.1.23 is the IP address of the camera and 80 is the port number. Again, this differs from camera to camera and on how you have set it up.

To access the **router's** web interface for setting up port forwarding, use a web browser and type the IP-address of the router. Eg.

http://192.168.1.1/

Most routers have feature called **port forwarding** or **port range forwarding**. On some routers it's plainly called 'Applications' or something like that. Look it up in the user manual of the router. The page on the router's web interface will probably look something similar like the picture below:

Application name	Source port	TCP/UDP	Destination IP	Destination port
Camera 1	1000	Both	192.168.1.23	80

add
save

Illustration 3: Typical web interface for setting up port forwarding on a router

- In the **application** field (sometimes called 'name'), just type some human readable name. It's not being used.
- In the **source port** field (sometimes called 'from port') type a port number to access your camera from outside your local network. It may - but doesn't need to be - the same

as the port on your camera. It can be anything between 1-65535. Good practice is to keep it in the 4 digits to not get in the way of some reserved ports. Better not to use port 80, because it could be in use by your router itself or some web server in your network.

Important: It is good practice to not use ports below 1024 (other than port 80). Some users experienced problems with it. When opening the URL in Chrome, the browser reported a 'net::ERR_UNSAFE_PORT' error. When opening the URL in Safari, the browser reported "Not allowed to use restricted network port"

- Some routers allow you to specify the **packet types (TCP or UDP)**. Select **both** if that's possible, otherwise select **TCP**.
- As **destination IP** (sometimes called 'to IP' or 'internal IP address' or something similar) enter the internal IP address of the camera.
- As **destination port** (sometimes called 'to port') enter the port number you have configured on your camera.
- Click **Apply** or **Save** to make the changes persistent.
- Disconnect the power cable from the router and reconnect it after 20 seconds.

Important: When you have multiple cameras you can add a separate entry for each camera. Please note these rules:

- **Each camera needs its own internal IP address (the internal port numbers may be all the same)**
- **For each camera the 'source port' needs to be unique (eg. 1024 for camera1, 1025 for camera2)**

Some routers (only) offer **port range forwarding**, where a port range has to be specified. Other routers don't offer separate port numbers for source and destination ports. In this case the port number has to be changed on the camera also.

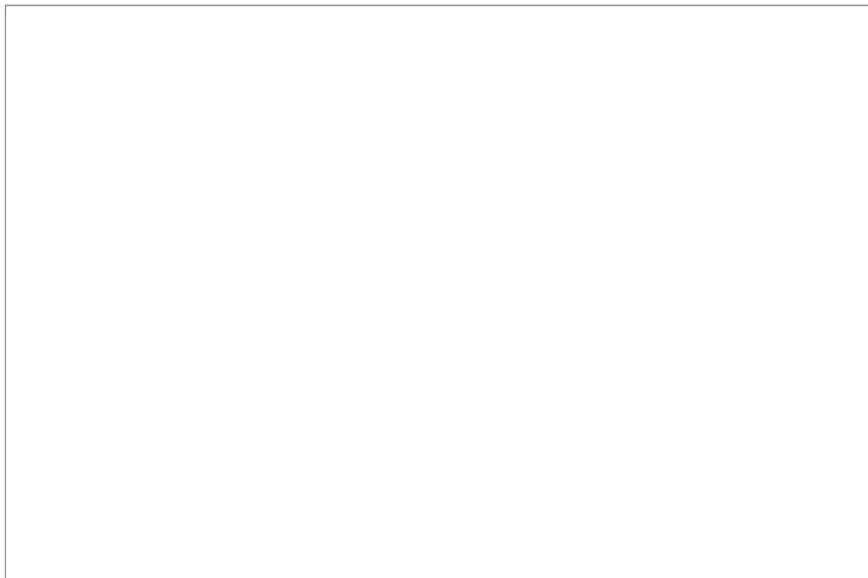


Illustration 4: In this case the port number on the camera has to be changed to 1000

Accessing the camera

When you are on your local network, use the internal IP address and port number of the camera to access it. Eg:

<http://192.168.1.1:1024>

Outside your network, use the external IP address and the port number configured in the router to access the camera. Eg:

<http://212.34.12.80:1024>

IMPORTANT NOTE:

Some, but not all routers also allow you to use the external IP address and port number when you are connected to your local network.