

A research by:

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- How to Make a DDNS for your Home Router
- How to access your Home Server from the Internet
- How to configure your Home Cisco Linksys Router

## Domain Name System DNS & Dynamic DDNS

The Domain Name System (DNS) is a hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. A Domain Name Service resolves queries for these names into IP addresses for the purpose of locating computer services and devices worldwide. By providing a worldwide, distributed keyword-based redirection service, the Domain Name System is an essential component of the functionality of the Internet.

The Internet maintains two principal namespaces, the domain name hierarchy and the Internet Protocol (IP) address spaces. The Domain Name System maintains the domain name hierarchy and provides translation services between it and the address spaces. Internet name servers and a communication protocol implement the Domain Name System. A DNS name server is a server that stores the DNS records for a domain name, such as address (A) records, name server (NS) records, and mail exchanger (MX) records, a DNS name server responds with answers to queries against its database.

### Domain name syntax

The definitive descriptions of the rules for forming domain names appear in RFC 1035, RFC 1123, and RFC 2181. A domain name consists of one or more parts, technically called labels that are conventionally concatenated, and delimited by dots, such as example.com.

- The right-most label conveys the **top-level domain**; for example, the domain name *www.example.com* belongs to the top-level domain com.
- The hierarchy of domains descends from right to left; each label to the left specifies a subdivision, or **subdomain** of the domain to the right. For example: the label *example* specifies a subdomain of the *com* domain, and *www* is a sub domain of *example.com*. This tree of subdivisions may have up to 127 levels.
- Each label may contain up to 63 characters. The full domain name may not exceed a total length of 253 characters in its external dotted-label specification. In the internal binary representation of the DNS the maximum length requires 255 octets of storage. In practice, some domain registries may have shorter limits.
- DNS names may technically consist of any character representable in an octet. However, the allowed formulations of domain names in the DNS root zone and most other sub domains, uses a preferred format and character set. The characters allowed in a label are a subset of the ASCII character set, and includes the characters a through z, A through Z, digits 0 through 9, and the

hyphen. This rule is known as the LDH rule (letters, digits, hyphen). Domain names are interpreted in case-independent manner. Labels may not start or end with a hyphen.

- A hostname is a domain name that has at least one IP address associated. For example, the domain names `www.example.com` and `example.com` are also hostnames, whereas the `.com` domain is not.

## Reverse lookup

A reverse lookup is a query of the DNS for domain names when the IP address is known. Multiple domain names may be associated with an IP address. The DNS stores IP addresses in the form of domain names as specially formatted names in pointer (PTR) records within the infrastructure top-level domain `arpa`. For IPv4, the domain is `in-addr.arpa`. For IPv6, the reverse lookup domain is `ip6.arpa`. The IP address is represented as a name in reverse-ordered octet representation for IPv4, and reverse-ordered nibble representation for IPv6.

When performing a reverse lookup, the DNS client converts the address into these formats, and then queries the name for a PTR record following the delegation chain as for any DNS query. For example, assume the IPv4 address `208.80.152.2` is assigned to Wikimedia. It is represented as a DNS name in reverse order like this: `2.152.80.208.in-addr.arpa`. When the DNS resolver gets a PTR (reverse-lookup) request, it begins by querying the root servers (which point to ARIN's servers for the `208.in-addr.arpa` zone). On ARIN's servers, `152.80.208.in-addr.arpa` is assigned to Wikimedia, so the resolver sends another query to the Wikimedia nameserver for `2.152.80.208.in-addr.arpa`, which results in an authoritative response.

## What is Dynamic DNS (DDNS)?

DDNS substitutes a network identification number for one that's easier for humans to use.

Most Internet Service Provider (ISP)s frequently change your computer's IP address, using a technique called Dynamic Host Configuration Protocol (DHCP). For Internet users to access your computer, they must know your IP address — for example, when you run your own Web server, or use your router to make a VPN connection. Since the IP address changes, your Internet users will need to keep up with the changes. (As an analogy of this problem, imagine that your telephone number frequently changed without warning. Your friends would always be phoning the wrong number.)

DDNS solves this problem. The DDNS solution comes from companies such as DynDNS.org and TZO.com.

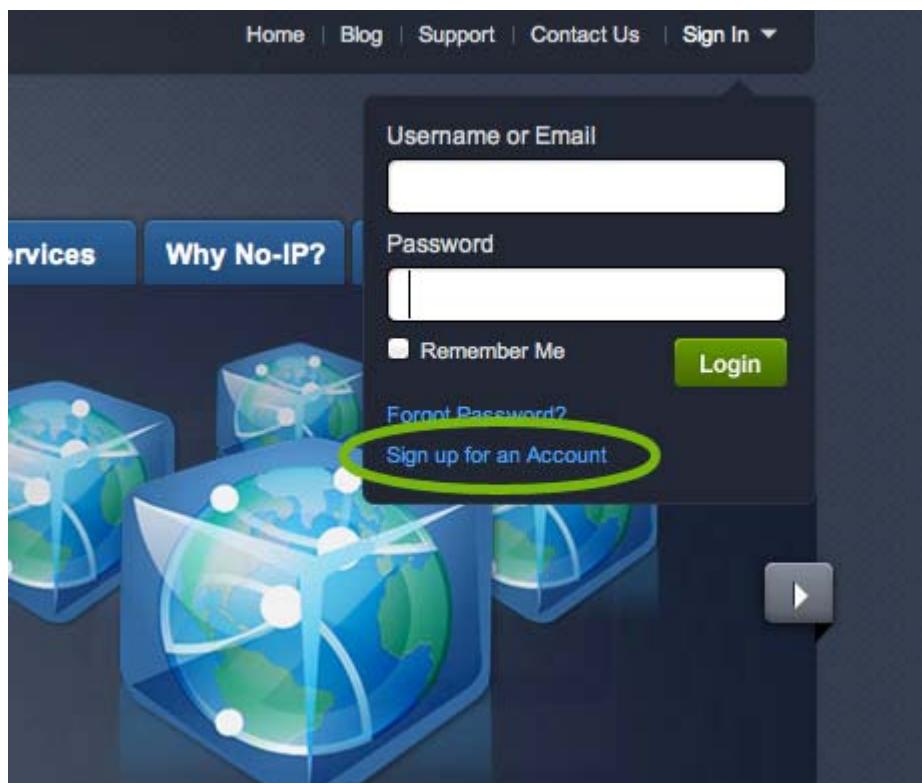
The company creates an account for you that registers an unchanging name, such as *myname.dyndns.org*. You program your router to recognize that name, and it automatically substitutes the current IP address — no matter what your ISP has changed it to. The configuration is done in the Advanced-Dynamic DNS menu, where you enter your DDNS account login information. Now remote users (and remote routers) can find yours by its Fully Qualified Domain Name (FQDN), *myname.dyndns.org*.

For remote user access, you must also configure your router for port forwarding — for services you make available on your computer.

So if you are trying to set up a website, ftp server, mail server or any other type of online service that you want people to be able to reach over the Internet and you don't have a static IP, DDNS is a good advice

Does your ISP only give you a dynamic IP address (one that changes from time to time and is not static)? Here are a few simple steps to follow to get yourself setup and online with No-IP. No-IP is free DDNS service, so you can run your servers at your home or business without a static IP address.

### Step 1: Create an account with no-ip.com as follows:



To create an account with No-IP.com simply click the "Sign-up Now!" link at the top of the page, or click here. Fill in the required fields on the new

account form. Please note that our Terms of Service requires valid contact information on file in order to maintain your account with us. Any accounts found with incomplete or fraudulent information will be terminated.

Once you've filled in the required information and agreed to our Terms of Service, click the "Sign Up Now!" button at the bottom of the page.

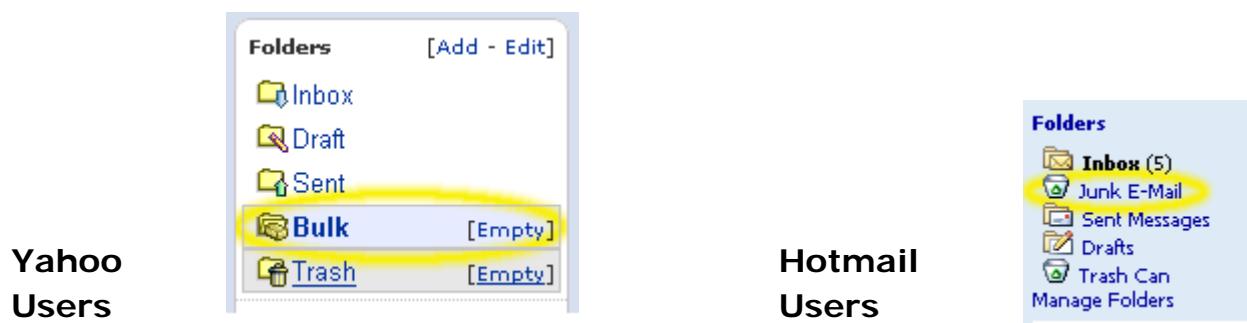
### **Step 2: Confirm your account**

Once you have submitted your account information into the new user form, no-ip.com will send you a confirmation email to the address you provided. You will need to check that account and look for the email from No-IP.com. The email contains a link you must click in order to confirm your account.

if you miss Your Confirmation Email

If you sign up with No-IP.com and do not see your confirmation email in your inbox, make sure to check your other folders. Due to current issues with some email providers, your No-IP.com confirmation email may get delivered to your Bulk email or spam folder.

If you use Yahoo or Hotmail, the below images may help you in locating the No-IP confirmation email.



### Step 3: Login to your account



Now that you have confirmed your account, you can login to No-IP.com. On the top of the No-IP home page, just below the No-IP logo, you will see an area to enter your email address and password. Enter the information that you signed up with and click "Login."

### Step 4: Add a host or domain to your account

You should now be logged into the No-IP.com members section. Here you can create a hostname that you will use to connect to your server.

A hostname is used instead of your IP address whenever you want to connect to a service at your location. Hostnames take the form of *hostname.domain.com* so they're the same as names used in URLs to surf the web etc.

For example, if you were to run a webserver, and you wanted to connect to your server using a web browser, you would put *http://hostname.domain.com* in the address bar. Hostnames can be used for much more than that however. You could also use the same hostname, without *http://*, to connect to your desktop remotely using software like Windows Remote Desktop.

If you run an FTP server, you can use a No-IP hostname for that as well. Either put the hostname directly into your FTP client or, if your browser supports it, put *ftp://hostname.domain.com* into the address bar of the web browser and you should be able to make a connection that way as well.



In order to add a host to your account, select the "Add" link from the "Hosts/Redirects" menu. This will bring up the Add a Host page.

The screenshot shows the "Hostname Information" form. It includes fields for Hostname (set to "myhost"), Host Type (set to "DNS Host (A)", with "DNS Host (Round Robin)" and "DNS Alias (CNAME)" as options), IP Address (set to "your IP address"), Assign to Group (set to "- No Group -", with a "Configure Groups" link), and Enable Wildcard (set to "No"). Each field has a help icon (a question mark inside a green circle) to its right.

Now you're ready to fill in the details of your new hostname. Here are the steps to deal with the items on this screen:

- Fill in the Hostname: box with a name of your choosing. It can be anything you like. If you choose a name that's already in use, an error will be generated and you can then try a different hostname.

- No-IP Free users are only able to create hostnames on one domain. If you want more domain choices, consider upgrading to No-IP Enhanced which offers 80+ domains.
- Choose the Host Type. The default choice, DNS Host A, is usually the correct one. Do not choose any of the other host types unless you're trying to solve a particular problem that a DNS A record won't accommodate. If your ISP blocks Port 80 for example, and you're trying to run a webserver or other service on port 80, then you can choose Port 80 Redirect (at that point you'll be asked to specify the port to use for the redirection). If you're not running a webserver, then do not choose this option as it will likely prevent you from connecting properly.
- In the field marked IP Address: you should already see your current IP address. If you wish to set the IP address of the host to be somewhere other than your current location, you can enter that address now.
- The next two options aren't used for a basic account setup so we won't concern ourselves with those in this article.
- When you have filled in the information for your new hostname, simply click the "Create Host" button at the bottom of the page to save it.

If you wish to use No-IP to manage hosts and/or perform dynamic DNS functions for your own registered domain name (yourname.com), then you can add a domain to the system by selecting "Plus Managed DNS" from the left side menu then click "Add domain." There are certain advantages to using No-IP Plus so you may want to take a look at our product comparison page to see those benefits. When adding your own domain, please follow the onscreen instructions.

### 3 Easy Steps!

#### 1 Domain name to be added:

 www.  . com

#### 2 Domain Name Registration:

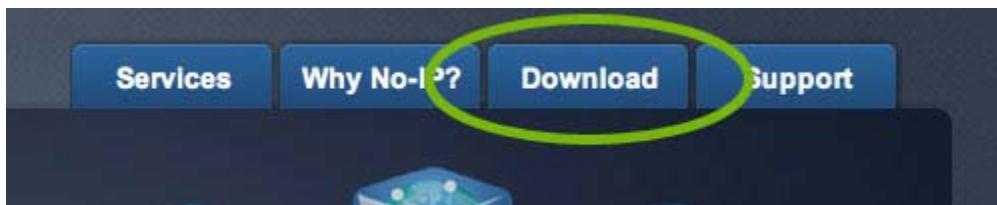
- REGISTER** this domain name .
- TRANSFER** my domain registration to No-IP.

#### 3 DNS Service Selection:

- Plus Managed DNS** [Dynamic DNS Support, Unlimited Hosts, Anycasted DNS, Port 80 Redirection ]
- Backup DNS** [You run your own DNS server and need backup DNS]
- Limited DNS** [One host, no dynamic dns or port 80 redirection] (Included only with Domain Registration)
- Neither, I'll handle DNS on my own**

### Step 5: Making your host dynamic

Now that you have added a host or domain into your account, we have to deal with the dynamic IP address problem (If your ISP assigns you a static IP address, you can skip to step 6).



If you have a dynamic IP address, you'll need to install No-IP's Dynamic Update Client (DUC). This is free software available from the downloads section of the site.

Note: Detailed instructions for installing the Windows and Linux versions of our DUC software are available in the Guides & Tips section of our site

After installing the DUC, be sure to configure it with the Email address and password that you use to login to this site. As long as the No-IP software is

properly configured and running, your hostname will always point to the dynamic IP address at your location, no matter when it changes.



### **Step 6: Configure your router**

If you use a router to connect to the internet and/or have a firewall in place on your computer, you will need to make sure that it is configured to direct the appropriate traffic from the internet into the destination machine on your network. This is done using a router function called Port Forwarding.

Common ports to forward are port 80 for a webserver, port 21 for FTP, and port 25 for SMTP email. Only forward the ports that you absolutely need to use.

You can find some basic documentation covering port forwarding and firewalls in the Support area of no-ip.com site. For detailed information concerning your particular hardware or software, please consult the documentation for your equipment. No-ip.com is not able to provide detailed instructions for every conceivable combination of products on the market.

In order to verify that your router and firewall are setup correctly, you can visit the website at [www.canyouseeme.org](http://www.canyouseeme.org).

### **Step 7: Run your services**

With the above configuration in place, and if you've gotten a successful result from the Can You See Me website, you can now run your services and address your machine using the host or domain you created! If you run into trouble be sure to check the Support area of the no-ip.com website for helpful information.

## Port Forwarding on a Linksys WRT610N router

**Step 1:** open up your favorite browser and go to the router's default gateway address.

- http://192.168.1.1 (Default Address)
- http://192.168.2.1 (Alternate address on some devices)

**Step 2:** log in to the router (common default values listed below).

- Linksys WRT610N Username is blank and the default password is "admin"
- Linksys BEFW11S4 Username: admin and Password is blank
- Linksys WRT54G Username: admin Password is blank
- Linksys EtherFast Cable/DSL Ethernet routers Username: Administrator
- Linksys Comcast routers Username: comcast Password: 1234

**Step 3:** Go to Status tab on the top right. You'll need to find your internal IP Address under the status page. You'll see your devices name along with its internal IP address. It will look something like 192.168.xxx.xxx. Take a note of this value, you will need it in a second. If you're not sure or do not see your device, consult the network settings for the device.

**Step 4:** Go to the "**Applications & Gaming**" tab then click "**Single Port Forwarding**". Here you are able to port forward any port you need to open for your device.

**Step 5:** Choose a name for the service (small description eg. web, camera, xbox, etc..) External port is the port you wish to open, internal port is the port leading to the machine on your home network.

For "**Protocols**" select the option for "**Both**". For the IP Address, enter your internal IP address from "**Step 3**". Click Enable and then Save Settings.

(Firmware 1.00.00 B17)

## Applications & Gaming

### Simultaneous Dual-N Band Wireless Router

[Setup](#) [Wireless](#) [Security](#) [Storage](#)[Access Restrictions](#)[Applications & Gaming](#)[Administration](#)[Single Port Forwarding](#)[Port Range Forwarding](#)[Port Range Triggering](#)[DMZ](#)[QoS](#)

#### Single Port Forwarding

**Application Name**

None ▾  
None ▾  
None ▾  
None ▾  
None ▾

External Port	Internal Port	Protocol	To IP Address	Enabled
--	--	--	192.168.1.0	<input type="checkbox"/>
--	--	--	192.168.1.0	<input type="checkbox"/>
--	--	--	192.168.1.0	<input type="checkbox"/>
--	--	--	192.168.1.0	<input type="checkbox"/>
--	--	--	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>
0	0	Both ▾	192.168.1.0	<input type="checkbox"/>

[Help...](#)[Save Settings](#)[Cancel Changes](#)

(Firmware 2.00.00 B04)

Once you save the settings you should now be able to test your port at [www.canyouseeme.org](http://www.canyouseeme.org). Please keep in mind your ISP (Internet Service Provider) can be blocking certain ports such as port **80,25** and **21**. You can call and ask if they are. If you are still not able to see the ports check your firewall and anti-virus software on your computer.

**An example configuration**, you have a web cam that has the IP address 192.168.1.100 and it runs on port 80. You want to be able to access this camera from outside your network on port 8080. You would enter the below values into port forwarding page.

- External Port = 8080
  - Internal Port = 80
  - Protocol = Both
  - To IP Address = 192.168.1.100
  - Enabled = checked

Then to view the camera you would use your No-IP host of "somehost.no-ip.com" like this: <http://somehost.no-ip.com:8080> to reach the webcam.

## Sources:

- 1- DNS &Bind ISBN-10: 0596100574
- 2- No-IP.com
- 3- Cisco Router – Linksys operating guide