

# WEBpliance DNS Host Configuration Guide:

A Technical Guide for the Hosting Reseller

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# WEBppliance DNS Host Configuration Guide

## Introduction

### Purpose

This document describes the technical details of Domain Name System (DNS) management for a reseller using Ensim WEBppliance software. It gives a step-by-step example to shed light on this complex topic.

### Overview

This document describes the technical details you should be aware of when using Ensim's Appliance Admin control panel to manage DNS. We will assume that you have access to a freshly installed WEBppliance and have not created any sites. If you have already created sites, please contact your hosting provider for further assistance.

DNS is an unforgiving protocol. Even a small error can cause a domain to disappear for days or weeks at a time. To avoid this, you should have the DNS "bible" -- the O'Reilly DNS and Bind Book: <http://www.oreilly.com/catalog/dns3/> -- at your side. Please see the "For Further Reading" section at the end of this document for more tutorial information on DNS.

## Preliminaries

### What is DNS?

The DNS protocol essentially maps one string to another. For instance, it can map a hostname to an IP address, or an IP address to a hostname. A DNS server (also called a *name server*) performs this mapping function and is said to be responsible for a 'zone' such as 'yahoo.com', 'ensim.com', or 'reseller1.hosting.com'. This means that the DNS server translates all strings that are derived from the name of the zone (by prepending any string to the zone name). For instance, a DNS server that is responsible for zone 'ensim.com' will take ownership of mapping all strings that derive from the zone name, such as 'www.ensim.com', 'ftp.ensim.com' and so on.

## How Does DNS Work?

One might ask, how does someone know which DNS server to go to in order to resolve a particular string? A hierarchy of servers manages this. At the top level, a ‘root’ DNS server knows where to direct requests for strings that end with ‘.com,’ ‘.net,’ ‘.org,’ and so on. The ‘.com’ name server knows that a request to all strings derived from ‘ensim.com’ have to be handed off to a specific DNS server, and so on. This way, as long as someone knows how to get to a root name server, they can resolve any name they want to – if all the name servers are properly configured (and that is where problems typically are found).

## Virtual Secondary DNS Servers

To make DNS a robust protocol, the protocol designers made it necessary for a zone administrator to provide the higher-level name server with *two* name servers responsible for a zone. To continue with our example, if you want to take ownership of ‘ensim.com’ zone, you need to tell the owner of the ‘.com’ zone the IP addresses of two name servers that can both resolve names in that zone.

However, many resellers do not want to pay for two actual servers to act as name servers: this is too expensive. To handle this, WEBpliance allows you to create a Virtual Secondary DNS Server. The Virtual Secondary DNS server is really the same as the primary server, but it has a different IP address. This fools the higher-level DNS server into thinking that the reseller has two separate name servers. A separate private or physical server is required for true secondary name service. In this document, we will assume that you will want to use a single name server with two IP addresses, where one of the IP addresses is the address of a virtual DNS server.

## Reverse Translation

While DNS is usually used to resolve from a hostname to an IP address, it can also be used to map from an IP address to a hostname. So, for instance, you could ask DNS the hostname corresponding to the IP address 12.3.2.3, and it would reply with the right hostname. How is this done?

For historical reasons, the way it is done is to create a dummy top-level-domain (similar to .com or .net) called ‘.in-addr.arpa’. Now, we have an interesting problem. IP addresses are also hierarchical, like DNS names, but they go in the opposite direction. That is, a string like ‘www.ensim.com’ is part of the ‘ensim.com’ zone. But an IP address 12.3.2.3 is a part of the 12.3 subnet. If we want to delegate responsibilities for IP address ranges, we need to make the IP addresses go the ‘wrong’ way. The way DNS deals with this is that when we want to resolve an IP address to a hostname (also called a *reverse lookup*), we reverse the IP address in the in-addr.arpa zone.

To go back to our example, if we wanted to know the hostname corresponding to 12.3.2.3, we would ask the ‘in-addr.arpa’ name server for this mapping. The in-addr.arpa name server, say, is configured to hand off names that end with ‘3.12.in-addr.arpa’ (which is the 12.3 in opposite order) to the 3.12.in-addr.arpa name server. That may in turn hand off the query to the 2.3.12.in-addr.arpa name server, which will finally resolve the name. Notice that, just like a normal name translation, the higher-level name server has to be properly configured to hand off translations for IP address ranges to lower-level name servers. If you want both to resolve names and to resolve IP addresses, you need to make sure that your domain registrar delegates name resolution authority not only for the zone that you own, but also for the IP address range that you own. The IP address range corresponding to a zone is also called the ‘reverse zone’ for that zone.

## Aliases

It is sometimes useful to have a single host have more than one name. For instance, you may want ‘ftp.ensim.com’ ‘www.ensim.com’ and ‘ensim.com’ to all resolve to the same IP address. You can do this by adding ‘Canonical Name’ or CNAME records to DNS. A CNAME record simply translates from one hostname to another, giving a single IP address multiple aliases.

## MX Records

In addition to forward and reverse name translations, DNS also supports Mail Exchange (MX) records. An MX record is used to designate which mail server machine should process email for a specific domain. An MX record, instead of translating from a hostname to an IP address, translates from one hostname to another hostname.

Typically, the first hostname is a ‘virtual’ host that purports to handle email sent to a particular address. The name this hostname resolves to, using an MX record, is the hostname of a system that knows how to get mail to the real destination system. For instance, suppose you want a mailer daemon running on the server mail.hoster.net to actually handle mail sent to the address [admin@reseller.hoster.net](mailto:admin@reseller.hoster.net). Then, you could add an MX record that informs the sending mailer that in order to reach reseller.hoster.net, the mail should be sent to mail.hoster.net. An MX record *must* point to the real name of the machine that is accepting mail for the destination system (instead of to an alias declared using a CNAME record).

# Managing Your DNS Server

## Things You Need to Know or Need to Have

Managing your DNS Server can be made easier if you stay informed and have the necessary support resources. The following is a list of things you need to know and those resources that you need to have.

- A private server with WEBppliance installed
- Host name of private server
- IP address of private server, which serves as the IP address of your primary Name server
- Second IP address assigned to you, which is the IP address of the secondary name server for virtual DNS
- The zone (domain name) that you want to manage. You need to have control over this zone – that is, you need to ensure that the higher-level name server knows that your name server will resolve all names in this zone.
- Two host names that you register with your domain registrar with the above IP addresses. These host names will be the two name servers to which the higher-level domain will transfer control when it gets a request to resolve a name in your zone.

**Note:** Note that these host names need not be the same as the host name of the private server.

- If you want to resolve IP addresses to hostnames, you will also need to own an IP address range.

## Assumptions

As an example we make the following assumptions (these are in the same order as the list above):

Private server host name	web.reseller.net
Primary IP address	10.121.11.2
Secondary IP address	10.121.11.3

Domain name	reseller.net
DNS host names	ns.reseller.net , ns2.reseller.net
IP address range	10.12.1.11.1 to 10.121.11.255

## What Has to be Done

- 1 Have your hosting provider do the following for your private server using the “properties” panel in Ensim’s OpCenter
  - a Set the IP address of the private server to your primary IP address, i.e.10.121.11.2. (This should already have been done for you).
  - b Set the primary and secondary DNS IP address properties of the private server to the IP addresses assigned to you.
  - c Set the private server domain to the domain that you have control over. This is “reseller.net” in our example. Note: The name filled in the properties panel does not matter, as you will set this later.
  - d The private server should now be restarted.
- 2 Go to your domain registrar and register your two DNS host names with the two IP addresses that you own. Check with your registrar, as each will have different rules or policies. Continuing our example, we would do the following:
  - a Register ns.reseller.net with IP address 10.121.11.2 your primary DNS name server.
  - b Register ns2.reseller.net with IP address 10.121.11.3 as your secondary DNS name server.

**Note:** It will take 24 to 48 hours for a change made by your domain registrar to take effect globally. Until that time, you may not be able to correctly resolve names in your zone.

Please be very careful with this step: if you make a mistake, your name servers will never be contacted, and your zone will not work.

If you want to resolve IP addresses to hostname for IP addresses in your range, you will need to register the same two IP addresses as the name servers for the reverse zone corresponding to your zone.

If you do not want to do that, and you still want to resolve IP addresses properly, then every time you add a (name, IP address) entry in your zone, you will need to ask your hosting company to add the corresponding reverse entry i.e. (IP address, name) to the proper reverse zone. Finally, check the DNS hostnames for your domain so that your primary and secondary hosts match the host names you registered above (with some registrars you may need to delete old entries)

- 3 We are now going to add some entries to the DNS server running on the private server. We will add entries to resolve the names ‘ns.reseller.net’ and ‘ns2.reseller.net’ (these are also resolvable by your registrar’s name server, but you need to have them handy locally as well). We will also add the ‘web.reseller.net’ name, so that you can resolve the private server’s name locally. To do this:
  - a Register ns.reseller.net with IP address 10.121.11.2 your primary DNS name server.
  - b Open the WEBppliance Appliance Admin control panel.
  - c Click on Services on the left navigation bar. Click on the pencil icon next to DNS/BIND Name Server.
  - d Click on “Add New Zone” to add the zone for your domain.
  - e Enter your domain name i.e. reseller.net. Click on “Add.”
  - f Click on the “reseller.net” link on the zone list.
  - g Click on the drop-down list to add an “A” record for the following:

Hostname	IP Address
web	10.121.11.2
ns	10.121.11.2
ns2	10.121.11.3

- 4 When you are adding A records, WEBppliance will allow you to automatically add reverse (IP-to-hostname, or PTR) records. If you do not have the authority to resolve IP addresses to hostnames, then these records will not have any effect. If you do have this authority, then you must first create a reverse zone, as shown in step 6 below.

- a A CNAME (Canonical Name) record is a way to add an alias for a name. It is a good idea to have the following CNAME records in your name server (these are optional). You can add them the same way you add ‘A’ records. These are all optional records.

Alias	Target
www	reseller.net
ftp	reseller.net
pop	reseller.net
smtp	reseller.net
mail	reseller.net

**Note:** Do not use a CNAME for setting an MX record.

- b If you have to add an MX record make sure the record you are pointing to is not a CNAME. MX records must point to an A Record.

Mail Domain	Delivery Precedence	Mail Server
Reseller.net	10	reseller.net

- c We now want to make sure that the secondary name server knows who its higher-level name server (i.e. the primary name server) is. We do this by adding an NS record for the domain (we just use a blank for the name server zone because ns.reseller.net and reseller.net have the same IP address).

Name Server Zone	Name Server
<blank>	ns2.reseller.net

- d Now we can add the virtual DNS server (secondary DNS server).

1) Click on “Default Settings” on the top menu of the DNS services control panel

- 2) Click on “Virtual DNS”
  - 3) Click on “Add Virtual DNS”
  - 4) Enter ns2.reseller.net and the IP address
  - 5) Click on “Save”
- 5 We are all set! Restart the DNS Service
- a Click on “Services” on the Left Nav Bar
  - b Click on “Stop” and then “Start” Icons next to DNS/Named. It is important to Stop and Start Named at this point instead of doing a restart. Restart will not clear the DNS Cache and will not setup the secondary IP.
- 6 If you have been delegated authority for a block of IP addresses by your DNS registrar, you can create a reverse zone by clicking on “Add New Zone”. Then enter the first three octets (see terms below) of the IP assigned to you i.e. 10.121.11. Click on “Add.” Note that WEBppliance automatically reverses the octets for you and append the in-addr.arpa suffix for you when creating the zone.

## Notes

- **Dotted-octet representation** refers to the common method of expressing 32-bit IP address as four numbers in the range of 0 to 255, separated by dots. These are addressed from left to right.
- **Reverse-lookup (IN-ADDR.ARPA) authority** You will need to contact your ISP to find out if they delegate in-addr.arpa zones to your control for the IP address block(s) you are assigned. If not, then while you will still be able to create PTR entries in WEBppliance, they will have no effect. You will need to submit any change requests in the in-addr.arpa space to your ISP.
- **Classless in-addr.arpa delegation** Classless delegation is a method for doing reverse-resolution delegation on non-octet boundaries for address spaces covering fewer than 256 addresses. It is an advanced DNS administration feature and requires that your ISP has given you authority over the in-addr.arpa zones for the IP address block(s) you are assigned. If you need to setup classless in-addr.arpa delegation, it is recommended that you read and follow RFC 2317. You can find it at <http://www.dns.net/dnsrd/rfc/rfc2317.html>.

## Checking Your Work

After the configuration has been completed it you will have to wait for your hosts to propagate through the Internet. It is a good idea to check that your server resolves properly. To do this you will need to telnet/SSH into the private server and use the nslookup tools on your local computer. It is also best to check from several locations or dialup services. You can search your favorite shareware site for “DNS lookup” tools to make your tests easier.

- 1 Check from the private server
  - a Telnet or SSH to the private server
  - b Use the nslookup command to verify that the server is resolving. All these should yield successful results.
    - 1) nslookup ns.reseller.net
    - 2) nslookup ns2.reseller.net
    - 3) nslookup web.reseller.net
    - 4) nslookup 10.121.11.2 (if you set up a reverse zone)
- 2 Check from your local workstation.
  - a Open a DOS window, “CMD” for Windows NT/2000 and “Command” for Windows 9x
  - b Use the nslookup command to verify that the server is accepting requests. All of these should yield successful results.
    - 1) nslookup ns.reseller.net: 10.121.11.2
    - 2) nslookup ns2.reseller.net: 10.121.11.2
    - 3) nslookup web.reseller.net: 10.121.11.2
    - 4) nslookup 10.121.11.2: 10.121.11.2
    - 5) nslookup ns.reseller.net: 10.121.11.3
    - 6) nslookup ns2.reseller.net: 10.121.11.3
    - 7) nslookup web.reseller.net: 10.121.11.3
    - 8) nslookup 10.121.11.3: 10.121.11.3

- 3 You will want to start checking and verify that changes take place starting 24 hours after you make the changes with your domain registrar. If you cannot resolve the host names then verify your reseller.net domain host names have changed.
  - a From your local workstation
  - b Open a dos window, “CMD” for Windows NT/2000 and “Command” for Windows 9x
  - c Use the nslookup command to verify that the server is resolving. All these should yield successful results.
    - 1) nslookup ns.reseller.net
    - 2) nslookup ns2.reseller.net
    - 3) nslookup web.reseller.net
    - 4) nslookup 10.121.11.2 \*\*
  - d If the above does not work use your favorite whois tool to verify your domain has been updated at the registrar.

## Glossary

**Alias (CNAME) Record:** An Alias (CNAME) record maps one host name to another. The target host does not have to be within a local domain. Tip: Create the Host (A) record before creating the Alias (CNAME) record.

**DNS/Named (Domain Name System):** The name resolution software that translates alphabetic domain names into numeric IP addresses and the reverse. The DNS server maintains a database of domain names and their corresponding IP addresses. The DNS Manager window allows you to change the name of your primary DNS server, add and remove DNS zones, and add DNS records to a zone.

**Domain Name System (DNS):** A distributed database of information that is used to translate domain names, which are easy for humans to remember and use, into Internet Protocol (IP) numbers, which are what computers need to find each other on the Internet. People working on computers around the globe maintain their specific portion of this database, and the data held in each portion of the database is made available to all computers and users on the Internet. The DNS comprises computers, data files, software, and people working together.

**Host (A) Record:** A Host (A) record is an IP address for forward mapping (host-name-to-IP-address). Reverse mapping is a Pointer (PTR) record.

**Host (Name Server):** The term is most often used to refer to name servers, the computers that have both the software and the data required to resolve domain names to Internet Protocol (IP) numbers.

**Mail Exchanger (MX) Record:** A Mail Exchanger (MX) record is information about an external mail server other than the SMTP server included in WEBppliance. You can specify more than one mail server. Tip: Create the Host (A) record for the host system that will run your external mail server before creating the Mail Exchanger (MX) record.

**Name Server (NS) Record:** A Name Server (NS) record specifies the host name of the DNS server managing the subdomains you add under your domain. **Octet:** The four numbers in an IP address separated by dots.

**Pointer (PTR) Record:** A Pointer (PTR) record is a host name for reverse mapping (IP-address-to-host-name). Forward mapping is a Host (A) record.

**Registrar:** A "Registrar" (or "Domain Name Registrar") is an organization like OpenSRS or Network Solutions that has control over the granting of domains within certain TLDs (top level domains, like the generic .com/.org/.net or country-specific .ca/.us/.mx etc.).

**Registry:** The 'Registry' is the backend that registrar's have shared access to. Each registrar writes new names to a central registry database, from which the authoritative root (essentially, a table of all domain names on the Internet) is built.

**Resolve:** The term used to describe the process by which domain names are matched with corresponding Internet Protocol (IP) numbers. "Resolution" is accomplished by a combination of computers and software, referred to as name servers, which use the data in the Domain Name System to determine which IP numbers correspond to a particular domain name.

**SOA Setting:** The SOA (Start of Authority) record indicates where the zone starts, and specifies timing information for zone transfers. Zone transfers send lookup data from the primary name server to the secondary name server. An SOA record is automatically created when you add a new zone. You can only change the timing information in the SOA record.

**Zone File:** A file that contains data describing a portion of the domain name space. Zone files contain the information needed to resolve domain names to Internet Protocol (IP) numbers.

## For Further Reading

### Help at the Domain Registrar:

Register.Com = [http://www.register.com/contact\\_us4\\_faq.cgi?1|2341529703](http://www.register.com/contact_us4_faq.cgi?1|2341529703)

Network Solutions = [http://www.networksolutions.com/en\\_US/help/host.html](http://www.networksolutions.com/en_US/help/host.html)

Bulk Register = [http://br.reg2000@209.239.33.128/article\\_list.html?exCatID=4](http://br.reg2000@209.239.33.128/article_list.html?exCatID=4)

Joker.com = <https://joker.com/domain/faq/faq.html#coho>

Tucows/OpenSRS = [http://www.opensrs.org/Manage\\_FAQ.shtml](http://www.opensrs.org/Manage_FAQ.shtml)

### Glossaries:

Network Solutions Glossary:

<http://www.networksolutions.com/cgi-bin/glossary/lookup>

OpenSRS Glossary:

<http://www.opensrs.org/glossary/cglossary.shtml>

### Other references:

<http://www.howstuffworks.com/dns.htm>

<http://directory.google.com/Top/Computers/Internet/Protocols/DNS/>

<http://linuxdocs.org/HOWTOs/DNS-HOWTO.html>

<http://www.isc.org/products/BIND/>

<http://www.psionic.com/papers/dns/dns-linux/>

<http://www.acmebw.com/askmrdns/archive.php>

<http://www.rscott.org/dns/>

<http://dnsinfo.menandmice.com/glossary/index>