

Domain Name System (DNS) explained

Basic DNS

The Internet uses a distributed naming system called the Domain Naming System (DNS). DNS allows us to refer to computers by host names as well as by Internet Protocol (IP) addresses.

IP addresses are hard to remember and are inconvenient to use. DNS allows us to use host names and domain names which can be resolved to IP addresses. DNS servers translate host names and domain names (for example, www.cobalt.com) to an associated IP address (for example, 192.168.1.10.)

For example, Cobalt Networks has registered the domain name “cobalt.com” for use by our servers “mail.cobalt.com”, “www.cobalt.com” and others. The host names “mail” and “www” represent different servers registered in the same domain.

A domain name is a computer name suffix shared by a group of computers in the same organization. A domain name should be associated with an IP address through a Forward Lookup record. Domain names are organized in a hierarchy; this hierarchy includes your company or server name, and a country code (for example, .uk or .ca) or a top-level domain (for example, .com or .edu).

A Web site on the server is created with one IP address, one host name and one domain name that together establish the identity of that Web site on the Internet.

Each domain name requires a primary domain authority on one DNS server. A secondary DNS server acts as a backup to the primary. DNS information is configurable only on the primary server, and not on the backup server.

Enabling the DNS server feature

IMPORTANT: Always click **Save Changes to DNS Server** after modifying DNS records. If you do not, the changes will not take effect.

To enable the DNS server on the RaQ 3:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click the check box for Domain Name System (DNS) Server to turn it on (if it is not already turned on).
3. Click **Save Changes**.

To set the optional DNS services, click **Parameters** next to the DNS service in the Service Settings table.

Configuring a primary DNS server

A primary DNS server maintains a list of name records and their associated IP addresses. This list is made available to other DNS servers if your domain is registered with your country-specific domain-naming organization. Your Internet service provider (ISP) can help you register your Internet server.

To configure a primary DNS server for your RaQ 3:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click the check box for Domain Name System (DNS) Server to turn it on (if it is not already turned on).
3. Click **Save Changes**.
4. Click **Parameters** next to the DNS service in the Service Settings table.
5. Select Address (A) from the **Add...** pull-down menu.
6. Enter the host name and domain name you want to serve (for example, www and yourdomain.com) and enter its IP address (for example, 192.168.1.1).
7. You can enable Automatic Reverse Lookup Generation for this IP address and host name pair so that IP address/host name pairs can be resolved in both directions. Reverse lookup (PTR) records that are generated automatically assume the network mask of 255.255.255.0 (24 bits.)
8. Click **Update List**.
9. Click **Save Changes to DNS Server**.

Specifying a reverse lookup (PTR) record

A DNS server can also resolve a computer host name to an IP address, which is known as reverse lookup. The network mask, or subnet size, is specified by an integer from 8 to 32.

See Table 1 on page 5.

To specify a reverse lookup (PTR) record:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Reverse Lookup (PTR) from the **Add...** pull-down menu.
4. Enter the host name and domain name you want to serve (for example, www and your domain.com) and enter its IP address (for example, 192.168.1.1) and network mask (for example, 24).
5. Click **Update List**.
6. Click **Save Changes to DNS Server**.

Specifying a mail server (MX) record

To specify a mail server (MX) record:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Mail Server (MX) from the **Add...** pull-down menu.
4. Enter the host name and domain name you want to serve (for example, www and your domain.com) and enter its IP address (for example, 192.168.1.1) and network mask (for example, 24).
5. Click **Update List**.
6. Click **Save Changes to DNS Server**.

Specifying an alias (CNAME) record

This feature allows you to alias one host name to another. The target host name does not need to be a member of the local domain. For example, you can create an alias record from “news.domain.com” to “uucp.isp.net”.

IMPORTANT: Do not use an Alias (CNAME) Record to cause a domain name to resolve to a host name.

For example, do not create an Alias (CNAME) Record for mydomain.com that resolves to www.mydomain.com. Instead, add a new Address (A) Record for mydomain.com to the IP address used by www.mydomain.com. See “Configuring a primary DNS server” on page 2.

To specify an alias (CNAME) record:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Alias (CNAME) from the **Add...** pull-down menu.
4. Enter the host name and domain name for which you want to create an alias (for example, www and yourdomain.com) and enter the host name and domain name for the target. The target host name is optional.
5. Click **Update List**.
6. Click **Save Changes to DNS Server**.

Configuring a secondary DNS server

You can configure a secondary DNS server to provide redundant DNS service to your computers. If the primary DNS server is turned off, a computer can use the secondary DNS server with no loss of performance.

To add a secondary name-server authority for a domain:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Secondary Name Service for Domain from the **Add...** pull-down menu.
4. Enter the domain name to be serviced and the IP address of the primary DNS server.
5. Click **Update List**.
6. Click **Save Changes to DNS Server**.

To add secondary name-server authority for a network:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Secondary Name Service for Network from the **Add...** pull-down menu.
4. Enter the network to be serviced and the IP address of the primary DNS server.
5. Click **Update List**.
6. Click **Save Changes to DNS Server**.

Advanced DNS

Network Mask Notation Conversion

Use Table 1 to convert between dot-quad and bit-count subnet mask and network size notations.

Table 1 Network Mask Notation Conversion

Dot-Quad	Bit count
255.0.0.0	8
255.128.0.0	9
255.192.0.0	10
255.224.0.0	11
255.240.0.0	12
255.248.0.0	13
255.252.0.0	14
255.254.0.0	15
255.255.0.0	16
255.255.128.0	17
255.255.192.0	18
255.255.224.0	19
255.255.240.0	20
255.255.248.0	21
255.255.252.0	22
255.255.254.0	23
255.255.255.0	24
255.255.255.128	25
255.255.255.192	26
255.255.255.224	27
255.255.255.240	28
255.255.255.248	29

IMPORTANT: Always click **Save Changes to DNS Server** after modifying DNS records. If you do not, the changes will not take effect.

Delegating a subdomain

DNS servers are organized hierarchically. You can delegate the name-server authority for subdomains of any domain served by the RaQ 3 to other name servers.

For example, domain.com can be served authoritatively by a RaQ 3 by defining an Address (A) Record using that domain. A subdomain, such as remote.domain.com, can use its own set of DNS servers so that domain authority can be shared between multiple physical sites. This makes it easier to use multiple DNS servers in remote locations sharing a common domain.

To delegate the subdomain naming authority to another name server:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select the parent domain from the **Select Domain or Network...** pull-down menu.
4. Select Delegate Subdomain from the **Add...** pull-down menu.
5. Specify the subdomain name and the qualified host name(s) of the DNS server(s) that will be authoritative for that subdomain.
6. Click **Save Changes**.
7. Click **Save Changes to DNS Server**.

Delegating a subnet

You can delegate the name-server authority for a network to a remote DNS server.

To delegate the subnet naming authority to a remote DNS server:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select the parent network from the **Select Domain or Network...** pull-down menu.
4. Select Delegate Subnetwork from the **Add...** pull-down menu.
5. Specify an IP address and the size of the network to be delegated. The IP address must be a member of the subnet to be delegated.
6. Specify the qualified host name of the DNS server that will be authoritative for that subnet.
7. Click **Save Changes**.
8. Click **Save Changes to DNS Server**.

Configuring server settings

You can configure forwarding servers and zone transfer access control for the RaQ 3 DNS server.

To configure the DNS server settings:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select Server Settings from the **Add...** pull-down menu.
4. If the RaQ 3 is being used on a private network or in conjunction with a restrictive firewall, you can specify forwarding servers.

Enter the IP address of the Forwarding Server and, if you want, the Backup Forwarding Server.

5. A zone transfer allows another DNS server to download the complete list of hosts maintained by your DNS server. By default, zone transfers are unrestricted. However, you can restrict zone transfers if you want.

Enter IP addresses or network addresses in the **Zone Transfer Access** field; this automatically causes zone transfers to become restricted. Now, only the IP addresses or network addresses listed in this field are able to perform zone transfers.

6. Click **Save Changes**.
7. Click **Save Changes to DNS Server**.

Start of Authority (SOA) configuration

For the best reliability, you can fine tune all primary domain and network authority settings independently of each other.

To fine tune the primary domain and network authorities:

1. On the **Server Management** screen, click **Control Panel**. The Service Settings table appears.
2. Click **Parameters** next to the DNS service in the Service Settings table.
3. Select an authoritative domain or network from the **Select a Domain or Network...** pull-down menu. The first record in the record list is called the Start of Authority (SOA) record.
4. Click the pencil icon to modify the SOA record.

The SOA record defaults to acceptable values in the majority of RaQ 3 configurations. You can fine tune the values for the following parameters:

- Primary name server host name
 - Secondary name server host name (optional)
 - Domain administrator email address
 - Refresh interval
 - Retry interval
 - Expire interval
 - Time-to-live (TTL) interval
5. Click **Save Changes**.
 6. Click **Save Changes to DNS Server**.

Name server (NS)

The primary name server defaults to the host name of the RaQ 3. You can specify the qualified host name of the secondary DNS server for that domain in the Secondary Name Server (NS) host name field. Some top-level domain registration organizations require that the secondary name server record be defined.

Domain administrator email address

The email address defaults to the user name “admin” of the RaQ 3. This email address is publicly available and is the administrative contact for the domain or network served.

Refresh interval

You can configure the refresh interval between updates from a secondary DNS server.

- If DNS record changes occur infrequently, increase the default value.
- If DNS record changes occur often, decrease the default value.

Tune the refresh interval to avoid wasting bandwidth and to ensure the content on the secondary server is accurate at all times.

Retry interval

Due to a connection or service failure, a secondary DNS server may be unable to refresh data from the primary server. The secondary DNS server attempts to refresh data after the interval specified for trying again.

Expire interval

A secondary DNS server may be unable to refresh data from the primary server for a prolonged period of time. After the interval specified for expiry, the secondary server stops serving name requests.

Time-to-live period (TTL)

A caching DNS server other than the primary and secondary DNS servers for this domain or network can cache record lookups for the TTL period. During the TTL period, a caching DNS server does not poll the primary or secondary DNS servers for repeated lookups of the same record.