Module 5: Managing DNS

5.1 Overview of DNS: DNS Basics and Its Importance

What is DNS?

DNS is a system that translates human-readable domain names (e.g., `example.com`) into machine-readable IP addresses (e.g., `192.168.1.1`). This translation allows users to access websites by typing domain names instead of IP addresses. DNS plays a critical role in the operation of the internet by ensuring that when someone types a domain name into their browser, they are directed to the correct server hosting the website.

Why is DNS Important?

- **User Accessibility**: DNS makes it easy for users to access websites using familiar names.
- **Server Mapping**: DNS records map domains to the right IP addresses, ensuring traffic is routed correctly.
- **Email Delivery**: DNS is also responsible for routing emails through MX (Mail Exchange) records.

- **Load Balancing**: Some advanced DNS configurations allow for load balancing across multiple servers.

5.1.1 The Role of DNS in Web Hosting

In web hosting, DNS ensures that the domain names associated with websites resolve correctly to the web server IPs, enabling seamless access for users.

5.2 DNS Records Management: Creating and Managing DNS Records

CyberPanel allows easy management of DNS records for your domains, including records like A, CNAME, MX, and TXT records.

5.2.1 Understanding Common DNS Records

1. **A Record (Address Record)**: Maps a domain to an IPv4 address. For example, if `example.com` is hosted at `192.168.1.1`, the A record will store this mapping.
2. **CNAME Record (Canonical Name Record)**: Maps one domain to another domain. For example, you might want `www.example.com` to resolve to `example.com`.

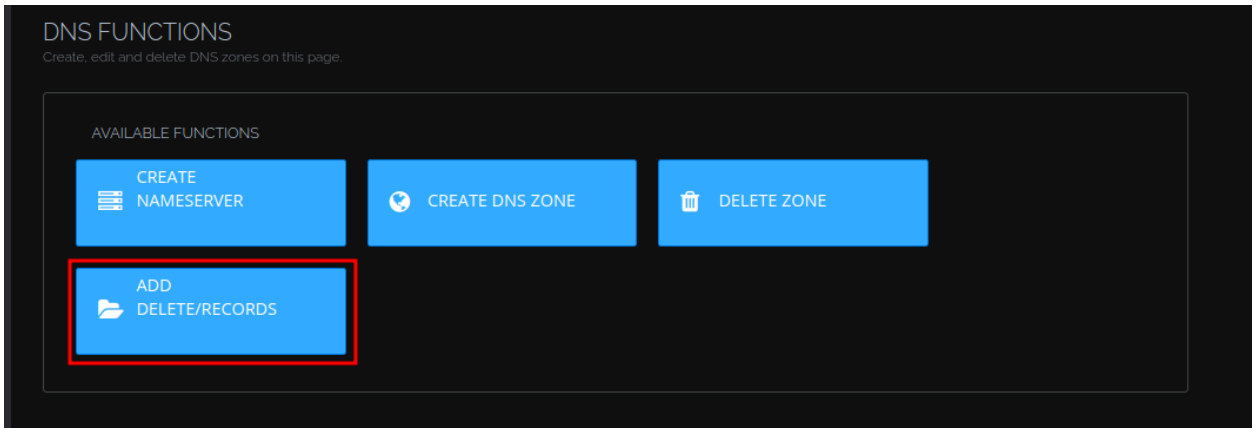
3. **MX Record (Mail Exchange Record)**: Directs emails to the appropriate mail server for the domain. You can have multiple MX records with different priorities to provide email redundancy.
4. **TXT Record (Text Record)**: Used to store text information for various services, such as domain verification or email sender authentication (SPF, DKIM).

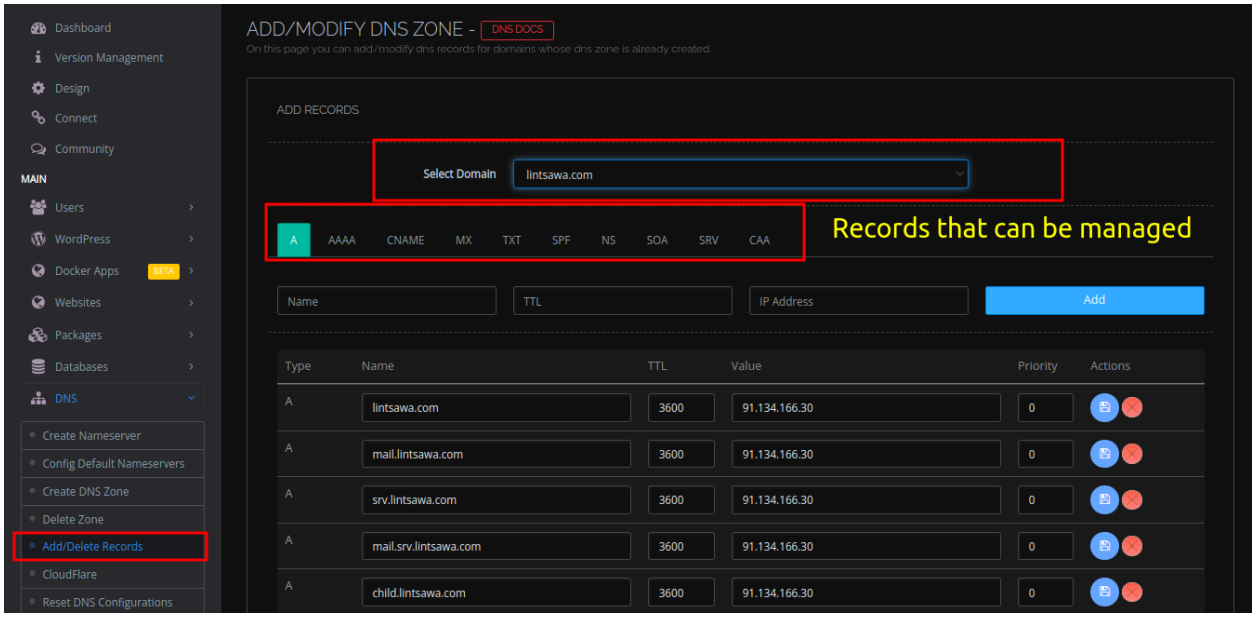
5.2.2 Adding and Modifying DNS Records in CyberPanel

1. **Log in to CyberPanel** and navigate to the DNS management section by clicking on "DNS" in the left-hand menu, then selecting "List DNS."
2. **Select Domain**: Click on the domain name for which you want to manage DNS records.
3. **Add DNS Record**: Click on "Add Record." Here, you can choose from a variety of record types.
    - **Record Type**: Choose the record type (A, CNAME, MX, TXT, etc.).
    - **Name**: Input the name for the record (e.g., for A records, use for the main domain or for subdomains).
    - **Value**: Input the IP address (for A records) or the domain name (for CNAME records).
    - **Priority**: If adding an MX record, input the priority (lower numbers are prioritized).

- **TTL**: Choose the TTL value (more on this below).

4. **Modify or Delete Records**: From the same screen, you can also modify or delete existing DNS records.
5. **Save Changes**: After making changes, ensure to save and apply the settings.





5.3 Managing Nameservers: Setting Up Custom/Private Nameservers

If you want to use custom or private nameservers for your domains, you can set them up easily in CyberPanel.

5.3.1 What are Private Nameservers?

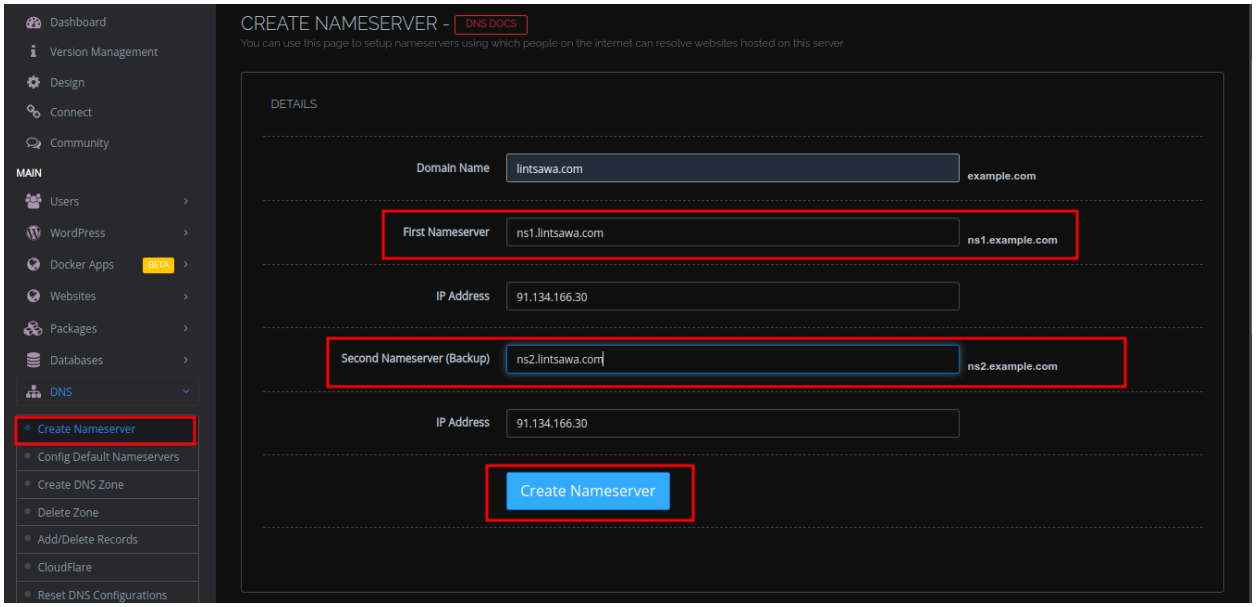
Private nameservers are personalized name servers tied to your domain. Instead of using the default nameservers provided by your hosting provider (e.g., **`ns1.host.com`**), you can create nameservers under your own domain (e.g., `ns1.example.com` and `ns2.example.com`).

5.3.2 Steps to Set Up Private Nameservers

1. **Register Private Nameservers**: **(Glue Records)**
    - **Log in to your domain registrar**: You will need to register the private nameservers at your domain registrar.
    - **Create Glue Records**: Set the private nameserver with your registrar (e.g., `ns1.example.com` pointing to `192.168.1.1`, `ns2.example.com` pointing to `192.168.1.2`). Or both pointing to the same Server IP.
2. **Configure Private Nameservers in CyberPanel**:
    - **Navigate to DNS Management**: From the CyberPanel dashboard, go to "DNS" and select "Create Nameserver."

- **Enter Nameserver Details**: Specify the private nameservers (e.g., and `ns2.example.com`), and assign them to the correct IP addresses.

3. **Update DNS Settings for Domains**: Ensure that your domain uses the new private nameservers by updating the nameserver settings at your registrar.



5.3.3 Best Practices for Nameservers

- **Redundancy**: It's a good idea to have at least two nameservers for redundancy, ensuring that if one goes down, the other can continue to handle DNS queries.

- **Keep IPs Consistent**: Ensure that the IP addresses for the nameservers are correctly configured both at your registrar and in CyberPanel.

5.4 DNS Propagation and TTL

What is DNS Propagation? DNS propagation refers to the time it takes for DNS changes (like adding a new A record or changing nameservers) to be updated across the internet. DNS changes don't happen instantly because DNS resolvers around the world cache DNS information, and it takes time for these caches to refresh.

5.4.1 How Long Does DNS Propagation Take?

DNS propagation typically takes anywhere from a few minutes to 48 hours, depending on various factors:

- **TTL (Time to Live)**: TTL is the value that tells DNS resolvers how long to cache a DNS record before checking for an update. A lower TTL value results in faster updates but may increase the load on your DNS server.
- **DNS Caching**: ISPs and other DNS servers around the world cache DNS information for various time periods. This caching impacts how quickly changes are reflected globally.

What is TTL? TTL is the time (in seconds) that a DNS record is cached before a DNS resolver queries the authoritative DNS server again. Lower TTL values (e.g., 300 seconds or 5 minutes) result in quicker propagation but might put more load on your server, while higher TTL values (e.g., 86400 seconds or 24 hours) result in longer caching times but reduce DNS query traffic.

5.4.2 Adjusting TTL for DNS Records

1. **Navigate to DNS Settings**: In the CyberPanel DNS management section, you will see TTL settings for each record.
2. **Set TTL Value**: Adjust the TTL value depending on your needs. For example, if you're planning a DNS change, you might lower the TTL to 300 seconds to ensure faster propagation.
3. **Save Changes**: After adjusting the TTL, save the changes and allow DNS propagation to begin.

5.4.3 Monitoring DNS Propagation

You can monitor the status of DNS propagation using tools like:

- **Whatsmydns.net or dnschecker.org**: A web-based tool that shows DNS propagation status for different DNS record types across the globe.

- **Dig/NSLookup Commands**: Use command-line tools like `dig` or `nslookup` to query DNS records and see how they are resolving.