Understanding and Configuring FQDNs

A Fully Qualified Domain Name (FQDN) is an absolute network identifier specifying a host's exact position within the Domain Name System hierarchy in SUSE Linux Enterprise Server for NVIDIA. By combining a host name with its complete domain path, an FQDN ensures unambiguous network addressing across global networks, enables SSL/TLS certificate validation and guarantees reliable mail delivery without misdirection.

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1 About the FQDN

FQDN is a domain name that specifies its exact location in the tree hierarchy of the DNS (Domain Name System). It is absolute, which means it provides every label from the specific host up to the DNS root zone.

An FQDN consists of two main parts; the host name and the domain name. It is structured from the most specific label on the left, to the most general, which is on the right.

For example, `mail.google.com`:

Host name

`mail` identifies a specific server or service; in this case, it is the server handling e-mail.

Subdomain

`google` is the specific organization or network.

Top-level domain

`com` is the general category (commercial).

Trailing dot

`.` is the root zone. While we usually leave it off when typing in a browser, a true FQDN technically ends with a dot. This signals that the name is absolute and not relative to another domain.

A host name and an FQDN are distinctly different because they serve different functions in a networked environment. A host name is a simple human readable label assigned to a device on a local network. It is relative because it only identifies the machine within its immediate subnetwork. An FQDN is the absolute and unambiguous address of that host on the Internet. It combines the host name with the full domain hierarchy.

1.1 Importance of FQDNs

FQDNs serve a number of important functions:

- By mapping a distinct host name to its full parent domain hierarchy, FQDNs eliminate the ambiguity inherent in local naming conventions, ensuring that every asset can be precisely located and accessed across the global Internet.
- In an e-mail address, the portion following the `@` symbol represents the FQDN (or a domain that resolves to one) of the destination mail server.

- In Web hosting, FQDNs serve as the definitive addresses that map user requests to specific Web servers, enabling browsers to locate and retrieve precise Web pages within the global DNS structure.
- DNS serves as the Internet's directory by translating human-readable names into machine-accessible IP addresses to facilitate cross-network communication. FQDNs are the essential components of this process, providing the absolute, unambiguous paths required for DNS queries and responses to accurately resolve host names to their specific numerical destinations.

1.2 About FQDNs and SSL/TLS certificates

An FQDN is a fundamental requirement for obtaining SSL/TLS certificates, which safeguard online communications by encrypting data transmitted between servers and clients. By providing a specific FQDN to a Certificate Authority (CA), you ensure the resulting certificate is mathematically bound to your exact domain, authenticating your site's identity and preventing unauthorized third parties from intercepting or spoofing your traffic.

Without a valid FQDN, browsers cannot validate the site’s security credentials, making it impossible to establish the trusted, encrypted tunnel necessary for modern Web safety and data privacy.

2 How to configure FQDN

A system's FQDN is the absolute name returned by the `resolver(3)` library when queried for the local hostname. It represents the complete hierarchy of the host, typically formatted as the host name appended with the DNS domain name; for example: test.example.com.

Important

We do not recommend setting FQDN as the host name in the `/etc/hostname` file , as it does not conform to RFC 1178 and may cause some applications to behave unexpectedly. For more information, see: https://www.ietf.org/rfc/rfc1178.txt.

The recommended approach is to allow the resolver to discover a host's FQDN at runtime, based on DNS information or entries in the `/etc/hosts` file. Note that `systemd` uses the content of the `/etc/hostname` file as is.

To configure an FQDN, you can use the command-line or directly edit the specific files.

- To configure an FQDN on a SUSE Linux Enterprise Server 16 system, run:

```
> sudo   hostnamectl hostname HOST_NAME
```

  For example:

```
> sudo   hostnamectl hostname name.example.com
```

- Edit the files:
  - Edit `/etc/hostname` file to set the host name. For example:

```
> sudo  vi /etc/hostname
  name.example.com
```

  - Update `/etc/hosts` to include the FQDN and IP address.

```
> sudo  vi /etc/hosts
```

```
[...]
# IP-Address  Full-Qualified-Hostname  Short-Hostname

127.0.0.1       localhost
127.0.0.2       name.example.com        name

[...]
```

- You can verify the changes with:

```
> sudo  hostname -f
```

- Restart networking.

3 Troubleshooting FQDN

To ensure seamless connectivity and maintain SEO integrity, troubleshooting a malfunctioning FQDN requires a systematic approach to identifying resolution failures.

Common troubleshooting steps include:

Check the DNS records

If your FQDN is not resolving, verify your DNS records. A record maps your domain to an IP address. Ensure it points to the correct server. Check the CNAME record, which is used for aliasing one domain to another. Ensure it is not misconfigured or pointing to an inactive domain.

Check subdomain configuration

When managing subdomains such as example.yourdomain.com, it is vital to ensure that each possesses its own accurately configured DNS records to prevent broken links and service interruptions. Neglecting these individual entries often results in inaccessible pages and a degraded user experience. However, implementing a wildcard DNS record (*.yourdomain.com) can serve as an efficient catch-all solution. This approach automatically routes traffic for any undefined subdomains to a central server, simplifying management as your network of hosted services expands.

Secure FQDN with HTTPS

Implementing SSL certificates to enable HTTPS is a critical necessity for any domain, as it secures sensitive user data through robust encryption. Beyond the essential security benefits, maintaining a valid certificate serves as a key SEO ranking factor within the Google search algorithm.

4 More information

To learn more about host names and FQDN, refer:

- man 1 hostname
- RFC on guidelines on what to do and what not to do when naming your system (https://www.ietf.org/rfc/rfc1178.txt)

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