

Do core routers hold enough prefix bits to identify an IP network

Yes, core routers hold all the necessary prefix bits to identify any publicly routable IP network on the Internet.

These high-capacity devices operate in what is known as the [Default-Free Zone \(DFZ\)](#). Instead of using a default route to "pass the buck" to another provider, they maintain a complete map of the global Internet using the [Border Gateway Protocol \(BGP\)](#).

Core routers identify networks using several specific mechanics:

- **Prefix Aggregation:** Core routers do not track individual devices (hosts). Instead, they store summary network prefixes (blocks of IP addresses). For example, a core router will store a single entry like `/24` (the first 24 bits of an IPv4 address) to identify and direct traffic to an entire network block owned by an ISP or corporation.
- **Longest Prefix Match (LPM):** When an IP packet arrives, the router evaluates the incoming destination address against its routing table. If multiple entries match, the core router uses the most specific route—meaning the one that matches the greatest number of leading [network prefix bits](#).
- **Hardware-Level Storage:** To do this at lightning speed, core routers use specialized hardware memory like Ternary Content-Addressable Memory (TCAM) or advanced radix tree algorithms to store and parse millions of IPv4 and IPv6 network prefixes simultaneously.

While a core router holds enough prefix bits to know exactly which *network* to send your data to, it leaves the job of identifying the specific *host device* to the local routers inside that target network.

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