

Your Network Has Been Assigned The Class B Network Address Of 179.113.0.0. Which Three Of The Following

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Understanding network addressing is fundamental for network administrators, engineers, and IT professionals. When a network is assigned a specific IP address, such as 179.113.0.0, it's essential to understand what this address signifies, how it's classified, and the implications for subnetting, routing, and network management. The statement "Your network has been assigned the Class B network address of 179.113.0.0. Which three of the following" introduces a scenario that prompts a detailed discussion on IP classes, subnetting, and specific network configurations associated with the Class B address space.

Understanding IP Address Classes and Their Significance

What Is an IP Address Class?

An IP address classifies networks based on the first few bits of the address. Historically, IP addresses were divided into five classes (A, B, C, D, and E) to facilitate routing and network management.

- Class A: Ranges from 0.0.0.0 to 127.255.255.255
- Class B: Ranges from 128.0.0.0 to 191.255.255.255
- Class C: Ranges from 192.0.0.0 to 223.255.255.255
- Class D: Ranges from 224.0.0.0 to 239.255.255.255 (used for multicast)
- Class E: Ranges from 240.0.0.0 to 255.255.255.255 (reserved for experimental purposes)

The class determines the default network and host portions of the address.

The Significance of the Class B Address 179.113.0.0

Given that 179.113.0.0 falls within the range 128.0.0.0 to 191.255.255.255, it is classified as a Class B address. This classification influences:

- The default subnet mask: 255.255.0.0

- The number of networks and hosts per network
- The routing policies and scalability options

Understanding these aspects helps in designing efficient network architectures.

Details of the Class B Address 179.113.0.0

Network and Host Components

In a default Class B network:

- The first two octets represent the network portion.
- The last two octets are used for hosts within that network.

For 179.113.0.0:

- Network Portion: 179.113
- Host Portion: 0.0

This means that, initially, the network 179.113.0.0 can support a substantial number of hosts.

Default Subnet Mask and Its Implications

The default subnet mask for Class B addresses is:

- 255.255.0.0 (or /16 in CIDR notation)

This implies:

- 16 bits are used for network identification
- 16 bits are used for host identification

Implication: The network can have up to $2^{16} - 2 = 65,534$ usable hosts (subtracting network and broadcast addresses).

Subnets and Custom Network Design

Why Subnet a Class B Network?

Subnetting allows network administrators to partition a larger network into smaller, manageable segments. Benefits include:

- Improved network performance
- Enhanced security
- Efficient IP address utilization

For example, instead of a large Class B network supporting thousands of hosts, subnetting can create several smaller subnets suited to organizational needs.

Methods of Subnetting a Class B Address

By borrowing bits from the host portion, you can create multiple subnets:

- Variable Length Subnet Masking (VLSM): allows for different subnet sizes
- Classful Subnetting: using fixed masks, e.g., /17, /18, etc.

Suppose you borrow 8 bits from the host portion:

- New subnet mask: 255.255.255.0 (/24)
- Number of subnets: $2^8 = 256$
- Hosts per subnet: $2^8 - 2 = 254$

This flexibility allows tailored network segmentation.

Analyzing the Specific Question: Which Three Of The Following?

While the original question references options (which are not listed here), typical options include statements about:

1. The default network and broadcast addresses
2. The number of subnets possible
3. The number of hosts per subnet
4. The network class and its range
5. How subnetting affects IP address allocation

Let's discuss these points in detail to understand what might be correct.

1. The Default Network and Broadcast Addresses

- Network Address: The first address in the subnet, used to identify the subnet.
- Broadcast Address: The last address, used to broadcast to all hosts within the subnet.

For 179.113.0.0 with default subnet mask:

- Network address: 179.113.0.0

- Broadcast address: 179.113.255.255

This is because, with a /16 subnet, the network spans from 179.113.0.0 to 179.113.255.255.

2. Number of Subnets Possible in a Class B Address

- Using default mask: only 1 network
- Borrowing bits for subnetting: the number of subnets depends on the bits borrowed

For example:

- Borrowing 8 bits from the host portion yields $2^8 = 256$ subnets.

3. Number of Hosts per Subnet

- With default mask (/16):
 - $2^{16} - 2 = 65,534$ hosts per subnet.
- With subnetting (/24):
 - $2^8 - 2 = 254$ hosts per subnet.

4. Impact of Subnetting on Address Allocation

Subnetting divides the large network into smaller parts, affecting how IPs are assigned:

- Smaller subnets reduce broadcast domain size
- More subnets expand the network's segmentation

5. Implications for Routing and Network Design

Knowing the network class and subnetting options helps in:

- Routing table optimization
- Efficient IP address usage
- Planning for network growth

Practical Applications and Common Scenarios

Scenario 1: Assigning Subnets for Different Departments

Suppose an organization wants to assign separate subnets for HR, Finance, and IT departments:

- Using subnetting, each department can have its own subnet.
- For example, using /24 subnets, each department gets 254 addresses.

Scenario 2: Connecting Multiple Sites

A large enterprise with multiple physical locations can:

- Use different subnets within the 179.113.0.0 network.
- Implement routing policies between subnets.

Scenario 3: Transitioning from Classful to Classless Addressing

Modern networks often use CIDR (Classless Inter-Domain Routing):

- Allows flexible subnet sizes
- Efficient IP utilization
- Supports hierarchical routing

Summary: Key Takeaways

- The IP address 179.113.0.0 is a Class B address.
- Default subnet mask: 255.255.0.0 (/16).
- It allows for 65,534 hosts per network without subnetting.
- Subnetting can subdivide this network into smaller segments to meet organizational needs.
- The network's network address and broadcast address are 179.113.0.0 and 179.113.255.255 respectively under default settings.
- The number of possible subnets depends on the bits borrowed from the host portion.
- Proper understanding of class-based addressing and subnetting is vital for efficient network design.

Conclusion

Understanding the class of an IP address like 179.113.0.0 and its subnetting options is crucial for efficient network planning. The classification as a Class B address informs the default subnet mask, the potential number of hosts, and the flexibility for network segmentation. When asked "Which three of the following," typically, the correct options relate to the network's default address range, broadcast address, and subnetting capabilities. Mastery of these concepts ensures that network

administrators can design scalable, efficient, and secure networks tailored to organizational needs.

Frequently Asked Questions

What does it mean when your network is assigned the Class B address 179.113.0.0?

It means your network is allocated a Class B IP address range, which allows for up to 16,384 networks with 65,534 hosts each, suitable for medium-sized networks.

Which three of the following are valid subnet masks for a Class B network like 179.113.0.0?

255.255.0.0, 255.255.255.0, 255.255.192.0 are valid subnet masks for a Class B network.

How many subnets and hosts can be created within the Class B network 179.113.0.0?

Using appropriate subnetting, you can create multiple subnets (depending on subnet bits borrowed) and each subnet can support up to 65,534 hosts.

What are the default network and broadcast addresses for the Class B network 179.113.0.0?

The default network address is 179.113.0.0 and the broadcast address is 179.113.255.255.

Which three of the following options correctly describe the characteristics of the Class B network 179.113.0.0?

It uses a default subnet mask of 255.255.0.0, can support approximately 16,384 networks, and accommodates up to 65,534 hosts per network.

Additional Resources

Understanding Network Addressing: An In-Depth Analysis of the Class B Network Address 179.113.0.0

When delving into the complexities of IP addressing, particularly in the context of IPv4, understanding classful addressing schemes is fundamental. The network address 179.113.0.0, assigned as a Class B network, provides a rich case study to explore various network concepts, including subnetting, address allocation, and network planning. In this comprehensive review, we will examine three key aspects related to this address, offering detailed insights into each.

1. The Significance of Class B Network Addressing

Historical Context and Classful Addressing

Before the advent of Classless Inter-Domain Routing (CIDR), IPv4 addresses were divided into classes—A, B, C, D, and E—based on fixed ranges. This classification was designed to facilitate efficient routing and address allocation.

- Class B Overview:
- Range: 128.0.0.0 to 191.255.255.255
- Default Subnet Mask: 255.255.0.0 (/16)
- Network Portion: First two octets
- Host Portion: Last two octets

The address 179.113.0.0 falls squarely within this range, indicating it is a Class B address. This classification meant that:

- Multiple organizations could be assigned a unique Class B network.
- Each Class B network could support approximately 65,534 hosts ($2^{16} - 2$).
- The network was suitable for medium to large-sized organizations or service providers.

Implications of Class B Addressing

Understanding that 179.113.0.0 is a Class B network helps in several ways:

- Routing Efficiency: Routers could quickly determine the network portion from the first two octets, streamlining routing tables.
- Address Allocation: Organizations could efficiently allocate IP addresses without wastage, given the sizable host capacity.
- Network Design: Knowing the class helps in planning subnetting, especially when segmenting the network into smaller subnets for security, performance, or administrative purposes.

In summary, the significance of the Class B designation lies in its balance between address capacity and routing simplicity, making it suitable for medium to large networks.

2. Subnetting the 179.113.0.0 Network: Unlocking Flexibility

Why Subnetting Is Essential

Subnetting allows network administrators to divide a large network into smaller, manageable segments—subnets. This process enhances security, performance, and administrative control. For the 179.113.0.0 network, subnetting is especially valuable because:

- It prevents broadcast domain flooding.
- It isolates network segments for security.
- It optimizes IP address utilization.

Default Subnet Mask and Its Limitations

- Default Mask: 255.255.0.0 (/16)
- Addresses per network: $2^{16} - 2 = 65,534$ hosts

While this provides a large address space, many organizations need fewer hosts per subnet, necessitating further subnetting.

Implementing Subnetting: Common Strategies

- Variable Length Subnet Masking (VLSM): Allows flexible subnet sizes tailored to specific needs.
- Subnet Masking Examples:

Subnet Mask	CIDR Notation	Number of Subnets	Hosts per Subnet
255.255.255.0	/24	256	254
255.255.255.192	/26	64	62
255.255.255.128	/25	128	126

Application:

Suppose an organization needs 100 subnets, each supporting up to 200 hosts. Subnetting strategies might include:

- Using a /24 subnet mask (255.255.255.0) for each subnet, supporting 254 hosts.
- Borrowing bits from the host portion of the address to create more subnets.

Calculation of Subnets:

- Starting from /16, borrowing 8 bits for subnetting yields /24.
- Number of subnets: $2^8 = 256$.
- Hosts per subnet: $2^8 - 2 = 254$.

Practical steps:

1. Determine subnet mask based on needs.

2. Calculate subnet addresses.
3. Assign address ranges to each subnet.

Subnetting Example for 179.113.0.0

- Assume subnet mask: 255.255.255.192 (/26)
- Number of subnets: $2^{(26-16)} = 2^{10} = 1024$
- Hosts per subnet: $2^{(32-26)} - 2 = 62$

This subdivision allows for up to 1024 subnets, each supporting 62 hosts, suitable for departmental networks or campus segments.

Benefits of Subnetting this Network

- Enhanced Security: Segregate sensitive areas.
- Optimized Address Usage: Avoid wastage.
- Simplified Management: Isolate broadcast domains.
- Improved Performance: Reduce broadcast traffic.

Conclusion: Proper subnetting of 179.113.0.0 transforms a large Class B network into manageable, efficient segments, aligning network architecture with organizational needs.

3. Practical Applications and Limitations of Using 179.113.0.0

Real-World Deployment Scenarios

The class B address 179.113.0.0 can serve various organizational and infrastructural purposes:

- Internet Service Providers (ISPs): Assigning large address blocks to regional customers.
- Educational Institutions: Supporting campus-wide networks.
- Large Enterprises: Segmenting headquarters, branches, and data centers.
- Data Centers: Organizing server farms with distinct subnets.

Example Use Cases:

- An ISP might allocate 179.113.0.0/16 to its regional network, subdivided further based on customer needs.
- A university could use the address block for different faculties or departments, each with its own subnet.

Advantages of Using 179.113.0.0

- Large Address Space: Supports extensive subnetting and future growth.
- Design Flexibility: Allows diverse subnet sizes.
- Simplicity: Easy to identify network based on the first octet.

Limitations and Challenges

Despite its advantages, deploying 179.113.0.0 involves certain constraints:

- Address Exhaustion Risks: Over-allocating subnets could lead to inefficient usage.
- Routing Table Complexity: Large networks increase routing table size, potentially impacting performance.
- IPv4 Address Scarcity: With IPv4 addresses becoming scarce, reliance on large blocks like 179.113.0.0 must be managed wisely, favoring IPv6 where feasible.
- Configuration Complexity: Proper subnetting and management require careful planning and expertise.

Security Considerations

- Proper segmentation and access control are necessary to prevent unauthorized access across subnets.
- Implementing VLANs and firewalls enhances security within the network.

Future-Proofing the Network

- Considering transition strategies to IPv6, which offers a vastly larger address space.
- Planning for scalable subnetting strategies to accommodate future growth without significant reconfiguration.

In summary, leveraging the 179.113.0.0 network address in practical deployments offers significant benefits but demands meticulous planning to overcome inherent limitations, especially in an era of IPv4 address scarcity.

Final Thoughts

Assigning the network address 179.113.0.0 as a Class B network opens up numerous possibilities for effective network design, management, and scalability. Understanding its significance, optimizing it through subnetting, and recognizing practical limitations are crucial steps for network administrators aiming to build robust, efficient, and secure networks.

This address serves as a testament to the structured approach of classful addressing—an approach

that laid the groundwork for modern IP network design. While today's networks increasingly adopt CIDR for flexibility, the foundational knowledge of classful addressing remains vital for understanding the evolution of IP networking.

By thoroughly exploring the significance, subnetting strategies, and practical applications of 179.113.0.0, network professionals can harness its potential effectively, ensuring their infrastructure is well-prepared for current demands and future challenges.

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