

XO™ Dedicated Internet Access (DIA) User Guide



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XO™ DIA Service Overview

Service Overview

XO™ Dedicated Internet Access service provides your network with a full-time, high-speed Internet or intranet connection via the XO network backbone to the XO network and to the Internet. The connection between your location and the XO network (and the Internet) is provided through a digital telecommunications circuit that utilizes standard phone circuitry to provide cost-effective, high-speed, highly reliable digital connectivity.

Suggested Uses

Dedicated Internet Access service provides always-on connectivity for a single computer or a Local Area Network (LAN) environment, making it ideal for small, medium, and large-sized businesses that require a continual connection to the Internet.

When installed as part of an intranet, Dedicated Internet Access service offers cost-effective connectivity for a branch office or telecommuters, providing all the benefits of the low-latency XO network backbone.

Dedicated Internet Access Benefits

The always-on nature of a Dedicated Internet Access connection allows you to use your connection in ways you may not have been able to previously, whether that means running a server or simply checking for incoming e-mail every minute. Below is a list of potential uses of your Dedicated Internet Access circuit:

- Corporate communications (e.g., e-mail)
- Videoconferencing
- Hosting a Web site/Web server
- Connection to a small or large corporate LAN
- Internet access/Web browsing for every user connected to your LAN
- Voice over IP (VoIP)
- Data transfers (e.g., FTP)
- Data feeds (e.g., batch data transfers from one location to a central site)
- Virtual Private Networks (VPNs - that link remote offices together)
- Managed security - Your Dedicated Internet Access line could be the building block for establishing a fully-managed security plan for protection of your data (encryption, firewalls, and managed security services)
- Remote access (via XO Access Finder product)
- Resale of Internet access

XO network Backbone

The XO High Capacity OC-192 IP backbone employs an advanced design providing high availability and throughput using technologies such as SONET, MPLS, and IP Class-of-Service (CoS). Each market attaches into the OC-192 core with uplinks at speeds of up to OC-48c. This ensures that your traffic is carried on a high-performance, low-latency network with minimum delays across the backbone. XO maintains the highest level of interconnection to other Internet Service Providers (ISPs), as well as to multiple network exchange points, so that your Internet traffic is delivered reliably and efficiently. XO™ utilizes high-throughput, private peering connections to transfer your data from the XO network to the network of other ISPs. Private peering provides direct connectivity to other ISPs and avoids any problems you may have seen with ISPs who only have connectivity at public peering exchanges or NAPs.



There are multiple paths for your data to traverse within the XO network. This redundancy ensures that your data can reliably reach its destination. There is automatic re-routing of IP traffic in the event of a major outage. Also, XO state-of-the-art Operations Desk Representatives perform proactive 24x7 network monitoring and technical support.

Point-to-Point

Point-to-point means that the Internet access product delivered to XO customers under the Dedicated Internet Access service is a dedicated or non-shared, high-speed product. This means that the entire telecommunications circuit that connects the customer's premise to the XO network is fully dedicated to the customer. It is not shared with any other customer.

Installation FAQs

When can I expect my XO Dedicated Internet Access service to be installed?

The targeted installation interval is 30 to 45 calendar days from the XO receipt of a complete and correct signed order.

What can I do to make the order go smoother?

Provide as complete and accurate information as possible and be available at the time that the circuit is scheduled for installation.

What can I expect when the circuit is installed?

A Telco Technician will come to your site to install the circuit. The Telco Technician will install the circuit based on the information you provided to the Telco Specialist. If the Telco Technician is not allowed to install the circuit, it may take 7 to 14 calendar days to reschedule a circuit installation. Once the Telco Technician has completed the installation, some additional work and testing may be performed on your circuit. After the telco portion of your service is installed, your Project Coordinator will work with you to install the remainder part of the service.

When can I expect the DIA Service to be operational?

When the telco portion is complete, the circuit is connected to the XO backbone; DNS is configured; CPE is set up; and operational testing is completed; then the circuit is considered operational. The operational testing includes diagnostics on both the CPE and the circuit.



Equipment / CPE FAQs

What can I expect if I order CPE from XO?

A router and a CSU/DSU will be provided that allows you to connect to the XO network.

Can I provide my own CPE?

You can only provide your own CPE if it is on the XO approved CPE list. However, in such instances, the point of demarcation moves to the point at which the telco circuit connects to the CSU/DSU (vs. LAN port of router). Also, the customer will be responsible for managing, troubleshooting, and providing maintenance on all CPE that XO does not provide and configure. The XO Operations Desk may provide some assistance, like general settings information, but the customer would have the overall responsibility of the CPE.

IP Addresses FAQs

I have IP addresses from my old ISP. Can I use them?

Unless you have addresses which were specifically identified as being portable from your old ISP, you will have to change IP addresses. XO will need to verify with your old ISP that those IP addresses can be kept when you disconnect service with that ISP, so XO will need an administrative contact at that ISP to perform that verification. This policy is due to the fact that because of ARIN policies, most IP addresses in the Internet are considered “non-portable” between ISPs. Your old ISP will need to either reuse those addresses or return them to ARIN.

I have previous IP addresses from ARIN. Can I use them?

If you were assigned address space directly from ARIN, then XO can advertise those addresses for you through your XO Internet connection. Note that XO will need to verify your ARIN assignment with them before we begin to advertise your address space.

I have my own IP address block (might be from another ISP or ARIN). Will it be reachable everywhere in the Internet?

All ISPs will drop any advertisement of address space which is smaller than /24 (256 IP Addresses). Therefore, even if you have an allocation which is considered “provider independent” that is smaller than a /24, you will not have any Internet connectivity. Therefore, XO will not advertise any space smaller than a /24 for any customer. Portable IP Address space which is at least /24 in size, but smaller than a /19 (8,192 IP addresses), may have some connectivity issues; please consult with your Provisioning Engineer for more details. Address blocks equal to or larger than /19 should have no issues with Internet connectivity.

How many IP addresses will I receive from XO?

Each new Dedicated Internet Access customer is assigned up to a block of 32 IP addresses. More IP addresses may be assigned by XO based upon justification that you will be asked to provide. You must show 50% immediate usage to obtain more IP addresses from XO. Additional fees may be involved if you wish to obtain more IP addresses.



Domain Name System (DNS) Administration

What is an IP Address?

An IP address is a globally unique number which the Internet uses to route traffic to your computer. It is quite similar, in that respect, to a phone number. Each computer with Internet access has an IP address consisting of 4 numbers separated by periods.

IP Address Allocation

As your network grows, you may need more IP addresses since each computer needs its own IP address to communicate with the Internet. For customers wishing to increase their number of allocated IP addresses, XO™ has created a comprehensive IP address assignment policy, which is included in the Guide section of this site. This policy has been designed to adhere to the policies of ARIN, while still serving the needs of XO customers. After reviewing the policy, if you have any further questions, contact your Account Manager.

Host and Domain Names

In order to connect to a remote Internet site, your computer needs to know the IP address of that remote computer. You can manually type in that IP address, but IP addresses are very hard to remember, and they can change periodically. In order to simplify this process, a system called the Domain Name System (DNS) was invented to allow the computers to lookup the IP address of remote computers using names. DNS is what allows you, for example, to use www.xo.com rather than its current IP address of 207.155.252.63. The name "www.xo.com" is the hostname assigned to the machine which has the IP address of 207.155.252.63. The domain name consists of the rightmost two portions of the hostname (in our case, this would be "xo.com").

What is the Domain Name System (DNS)?

The actual name-to-IP address mapping is performed by a series of DNS servers. These servers are used as distributed repositories for address information, and you will need to configure your local computer to point to one of these servers to resolve names to IP addresses. The DNS has servers located all over the Internet, eliminating dependence on one centrally located database. Reverse addressing maps domain names back to IP addresses.

Your Account Manager will provide a range of IP address numbers and will ask you to fill out a DNS table, which will map these numbers to the names of actual devices on your LAN.

If you choose to have XO host your domain, XO will set up the zone on XO DNS servers and provide a Web-based interface to you, so you can populate your own DNS. You, the customer, are totally responsible for registering or modifying your domain information with the Internet



Network Information Center (InterNIC). Ask your Account Manager or the Operations Desk for the InterNIC information needed to host your domain on the XO DNS servers. Also, the Operations Desk will not set up the individual DNS records for you, but will assist you if you have populated your domain and the records fail to resolve properly.

What are Host and Domain Names?

Host and domain names consist of a series of words or acronyms that read from left to right, with the left-hand terms being the most specific and the right-hand terms being the most general. For example, mail.yourcompany.com is a fully qualified host name. The mail part is the host name - the specific host computer; .yourcompany is the second-level domain name; and .com is the top-level domain name.

All domain names are unique to their owners and always have at least two levels separated by periods, e.g., mail.yourcompany.com, where .yourcompany.com is the domain name. The two levels are as follows:

- **Second-level Domain** - Second-level domain names usually define or describe the organization holding the domain name. In mail.yourcompany.com, the second-level domain name is .yourcompany.
- **Top-level Domain** - The top-level domain name describes the purpose of the organization that owns the second-level domain name and is determined by InterNIC guidelines. The generic top-level domain names available worldwide are .com, .org, .net, and .edu. Each country has its own unique top-level domain name, e.g., .us for the United States and .au for Australia. Some top-level domain names are defined below:
 - **.com** is for commercial, for profit organizations
 - **.org** is for miscellaneous, usually non-profit organizations
 - **.net** is for network infrastructure machines and organizations
 - **.edu** is for educational institutions
 - **.gov** is for government agencies
 - **.mil** is for military departments
 - **.us** includes all state and local governments, as well as schools, libraries, museums, and individuals. Special registration procedures apply for .us top-level domains.

IP Address Assignment Policy

Introduction and Background

Current IP address allocations are issued from the American Registry for Internet Numbers (ARIN) under the authority of the Internet Assigned Numbers Authority (IANA). XO™ is a member of ARIN, as are all other ISPs, and works with both ARIN and other ISPs to implement efficient and effective IP Address allocation policies.

As a responsible member of the Internet working community, XO must abide by the policies set forth by ARIN in regard to IP address allocation to customers. The IP



address space that is currently unassigned in IPv4 space (32-bit IP addressing) is becoming constricted, and measures to ensure the future viability of the Internet may cause conflicts with customer network planning, unless responsible and efficient usage of subnet space is agreed upon between ISPs and their customer base. In cooperation

with our customers, XO must plan to make the most efficient use of the allocated network space so that XO can continue to route traffic and obtain new network address space when it is requested. XO encourages and supports customers in the growth of their networks, and XO will assign addresses to customers who genuinely require the address space for their networks. However, XO must examine all requests for address space with care to validate the use of the IP addresses that are allocated. XO will request customers to re-design their networks before allocating new address space to them if XO feels that the current range of addresses is sufficient for customer requirements.

IP Address Assignment

Customers will be assigned IP addresses according to their need for such addresses. Your Account Manager will ask you various questions to help determine how many IP addresses that you need immediately (now and within the next 30 days) and over the next 3 months. Such questions may be as follows:

- How many subnets?
- How many servers?
- How many printers?
- How many desktop/workstations?

XO will assign IP addresses according to Classless Inter-Domain Routing (CIDR) or classless boundaries (i.e., 2, 4, 8, 16, or 32 IP addresses). For requests above 32 IP addresses (i.e., a /27 or 1/8 of a Class C), you will be asked to provide justification for such requests. Such requests may include network diagrams, network plans, network topologies, and planned network expansion. Based upon your justification, XO may provide you with the requested addresses, or ask you to more efficiently utilize your current address space. This applies both to new customers as well as existing customers.

You may reference [Request for Comments \(RFC\) 2050](#) for more details on this subject.

New Customers

Upon order confirmation, an XO Account Manager will work with you to obtain answers to the following questions:

1. **Will you be using a proxy firewall or Network Address Translation (NAT)?**
If you will be using a proxy firewall or a device which uses NAT, the machines behind your firewall or NAT device do not need globally unique public IP addresses. You should use private IP addresses (such as 10.X.X.X or 172.16.X.X) for those machines behind the firewall or NAT device. XO cannot, by ARIN policy, give you public IP addresses for these machines. XO will, however, give you up to 32 addresses to use on the public facing hosts at your site (i.e. the firewall or NAT device, other servers, etc). If you require more than 32 public IP addresses, further network topology information and approval will be required.



2. Do you have an existing net block, either from another ISP or from ARIN directly?

Customers who have existing portable IP address blocks with a previous ISP or independently with ARIN will be requested to re-number within the XO CIDR blocks. Per the guidelines of ARIN, IP addresses from other ISPs are non-portable. Therefore, address space that has been previously allocated by another ISP must be returned to that ISP when switching. XO will not route non-portable IP addresses. Due to limitations on the size of the global routing tables, many large ISPs will not route portable blocks which are smaller than a /19 (or 32 Class C's). For this reason, XO strongly encourages customers with such space to migrate off of those blocks and return them to ARIN. Under some circumstances, it may be possible for these blocks to be routed. However, there may be permanent or intermittent difficulties with some parties on the Internet in reaching your network(s). Consultation with XO Internet Network Engineering is required for any deviation from the policy of not routing portable blocks that are smaller than a /19. For customers who have 32 or more portable contiguous Class C IP addresses (larger CIDR block than a /19, such as /18, /17, /16, and so on), XO will be able to route your IP addresses without any problems.

3. How many Internet accessible hosts do you have today? In the next 3 months?

It is on these numbers that XO bases address assignments. Any special considerations for network address assignment should be accompanied by a network map that includes the number of hosts and their placement relative to any routers, bridges, or filter/firewall plans. Subnetting should be clearly shown. XO will assign the appropriate size CIDR block to the customer based on this map. In making the assignment, XO may suggest alternate means of network design to conserve address space.

Additional IP Address Space for Existing Customers

Customers who wish to expand their network by having additional IP address ranges assigned to them will need to meet the following requirements:

1. Submit a network map that should include all host ranges, subnet masks, routers, bridges, and filters in place. Any planned network segments should be clearly labeled. Expansion areas and plans for subnetting on those network segments should be indicated.
2. For monitoring and troubleshooting purposes, the router and CSU/DSU listed should respond to ping (ICMP echo). 50% of the IP addresses previously allocated from all XO sources must be utilized before additional IP addresses can be granted.
3. If new IP addresses are granted, 50% of any such additional IP addresses must be utilized immediately (now and within 30 days) and 80% must be utilized within 90 days.

After review of the network map and confirmation of network utilization, XO will make additional IP address assignments. Fax all hardcopy maps (if they can be provided) to your Provisioning Engineer.



Conclusion

Each new Dedicated Internet Access customer is assigned up to a block of 32 IP addresses (/27 block). This is equivalent to 1/8 of a Class C block. More IP addresses may be assigned by XO based upon justification that you will be asked to provide. You must show 50% immediate usage to obtain more IP addresses from XO. Additional fees may be involved if you wish to obtain more IP addresses. You are expected to utilize these addresses effectively and not simply based on convenience. Together we will work to conserve the limited resource of IP addresses.

DIA Trouble Shooting Guide

XO™ Operations Desk E-mail Requirements

If you are contacting the Operations Desk regarding CPE or connectivity problems via e-mail, send a detailed message to the Operations Desk that includes the following information:

- Company or personal name under which the circuit is listed
- Your contact information, including e-mail address
- A basic description of the LAN you are using
- WAN IP and LAN block
- Make and model of router

Operations Desk Phone Requirements

If you are contacting the Operations Desk regarding CPE or connectivity problems via telephone, please have the answers to the following questions ready prior to calling:

- What is the issue you are currently seeing?
- Are you seeing the same problem on all your machines?
- How long has this problem been occurring?
- Is the issue occurring on an intermittent basis or is it a constant problem?
- Have there been changes to your firewall or proxy server?
- Are there any error messages? (Write down exact wording if possible.)
- Have you turned off or bypassed your proxy or firewall server (if applicable)? Is the problem still apparent now?
- Are you running NAT (a Network Access Translation box)? Have changes been made to this configuration?
- Are you trying to access a specific IP or site?
- Have any changes been made to the LAN recently?

Things to Check Before Calling

- Check to ensure that there is power to all equipment.
- Reconnect cables ensuring that they are firmly connected and that they have not been changed.
- If you have made changes to the firewall, proxy server, or NAT box configuration, revert back to the previous configuration and see if the issue still exists.

If you are having problems accessing a specific IP or site, please do both a ping and a traceroute to the location and have the results in hand.



DIA SLA FAQs

What is the XO DIA Service Level Agreement (SLA)?

The XO DIA SLA is a rigorous and comprehensive commitment to DIA customers that includes metrics covering network availability, packet loss, and latency, all within the XO IP Network.

If XO does not meet an SLA, when will the customer see the credit?

The credit will occur in the invoice of the month following the missed SLA.

Where are XO DIA SLA metrics maintained?

Monthly Packet Loss, Latency, and Network Availability metrics are updated on the first of each month on the XO proprietary Web-based Usage Reporting Tool.

What are the three XO DIA SLA guarantees?

1. Latency
XO guarantees that the average round trip packet transmission time for all network traffic will not exceed 65 milliseconds edge-to-edge within the XO network, as measured over a calendar month.
2. Packet Loss
XO guarantees that the average round trip packet loss for all network traffic will not exceed 1% edge-to-edge within the XO network, as measured over a calendar month.
3. Network Availability Guarantee of 100% Edge-to-Edge
XO guarantees that the XO network will be available to customers 100% of the time during a calendar month.

DIA SLA Glossary

Circuit ID

The unique identifier assigned by the carrier for a customer's circuit that is used in billing, troubleshooting, and so on.

XO Communications Outage

The duration of time attributed to the XO network during a total outage and thus eligible for customer credits.

Customer Outage

The duration of time attributed to the customer during a total outage where XO has made a request for the customer to perform some action, like power clean the router or CSU/DSU, and get back to XO with the results.

Dial Statistics

Measurements provided by Visual Networks, a third party rating service, that show how well XO did against the industry on 24-hour call success rate and initial modem connect speed.

**Latency**

The amount of time (in milliseconds) that a packet of data takes to get from one point to another. On the XO network, latency is measured by the amount of time it takes for a packet to make a round trip.

Network Availability

The average amount of time the XO network is accessible to customers during a calendar month.

NOC-to-Edge Latency

The amount of time that a packet of data takes to get from the Network Operations Center (NOC) to an XO POP. On the XO network, latency is measured by the amount of time it takes for a packet to make a round trip.

Packet Loss

The percentage of packets that are lost during a round trip data transmission.

Site

An XO POP. POPs are usually named after the city and state where they are located.

Total Outage

The accumulative duration of time that is equal to the duration of the customer outage plus the duration of the XO outage.