

Oregon Health Network is a 501(c)3 non-profit, membership-based organization that is comprised of technology, healthcare and telecommunications experts who are working together to build the first broadband telehealth network in the state of Oregon. Our vision is clear: Everyone should have access to the best possible care, regardless of where they live in the State. *How will OHN help shape your future?*

THIS GUIDE WILL ASSIST YOU WITH USING YOUR NETWORK

- 1 Welcome to OHN**
 - A. Overview of the network
- 2 Getting connected**
 - A. Overview of vendor installation and contacts
 - B. Roles and responsibilities for installation
 - C. FAQs
- 3 OHN Network Operations Center Leaf Node Install**
 - A. Overview of what to expect and contact list
 1. What can you do to prep for install
 - B. Roles & Responsibilities
 - C. Leaf Node explanation
 - D. Contacts
- 4 Using the network**
 - A. OHN connectivity in-depth and how traffic flows across network
 - B. BGP configuration and NWAX connectivity
 1. Description and diagram of BGP Peering
 2. Options for sites with ASN#s
 - C. USAC/FCC regulations and allowable use
 - D. Connectivity outside of the OHN network
 1. What happens when traffic leaves OHN?
 2. BGP Peering diagram
 - E. Internal configurations
 1. General overview
 2. Roles and responsibilities
 3. Examples
 - F. Security Concerns
 1. Treating OHN like the Public Internet
 2. Roles and responsibilities
 - G. Migrating your traffic to OHN
 1. High-level overview
 2. Roles and responsibilities
 - H. Making Connections
 1. Who's on the network?
 2. OHN website
 3. How to connect with other members
 4. Roles and responsibilities
 - I. FAQs
 - J. Troubleshooting & Opening a Ticket
 1. Troubleshooting a problem: an example
 2. How to open a ticket
 3. Monthly reporting
 4. NOC Monitoring System (NMS)
 5. NMS FAQs
- 5 Leaf Node Configurations**
 1. Example diagrams of four configuration options
- 6 Continuing Education**
 1. Helpful orientations and one-on-one training
 2. Forms, information and contacts on website
- 7 Site Portal**
 1. Log-in
 2. Navigation and features
- 8 Understanding FCC Audits**
 1. Getting the most of your FCC funded connection
 2. FCC Rural Health Care Audit Guidelines

“OHN will prove to be a valuable asset to extend our reach to other providers and health professionals needed to complement our patient’s care.”

—*Erick Larson*

*Vice President of Information Systems/
CIO Health Care for the Mid-Columbia Region*

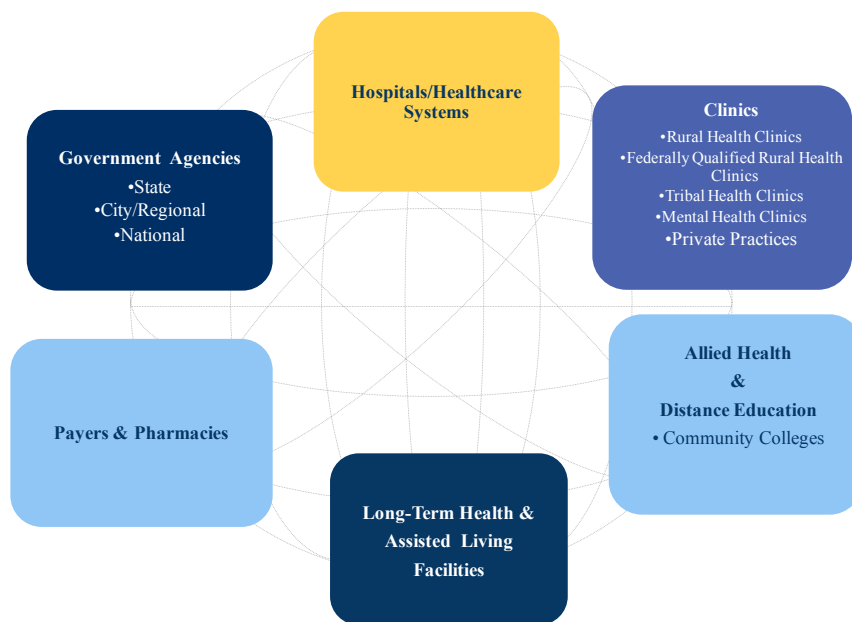


A AN OVERVIEW OF THE NETWORK

What do we mean by a “network”? When you think of the *network* of Oregon Health Network, think of two core value concepts: technology and people (providers, organizations and communities).

Technology: As the state’s first state-wide broadband telehealth network, our underlying core value is in providing health care and health care education providers of all types and sizes with scalable, reliable high-speed, high-quality, managed broadband connectivity. With speeds of up to and above 1 gigabit per second, OHN can support current and future health information technology and telemedicine/telehealth applications that are critical to the quality, delivery and access of care in Oregon and nation-wide. Without this broadband foundation or “highway,” providers of all types and sizes are becoming increasingly limited in meeting the growing demands of their surrounding/extended communities. They also need to be prepared to meet federal guidelines to achieve meaningful use of the adoption, use and exchange of electronic medical records. Anchor tenants within their community, health care and health care education providers also directly lead and impact workforce and economic development by bringing high-speed broadband to the community. OHN is helping our member participants in the health care and health care education fields with both your own organization’s technology goals and objectives, but indirectly, those of your surrounding community.

People: OHN is providing the required technological (broadband) infrastructure and highway that allows the transfer of data, images, video and real-time access to peers, colleagues, patients, educators and other critical service providers. From this, innovation of care and education can thrive. Instead of only having access to your surrounding community providers, OHN allows you access to cultivate state-wide referral partnerships with any provider on the network, which can and will include all of the following providers:



OHN Network Design

OHN is a network of networks. The high-quality broadband allows sites within an organization to reach another site in the OHN network through an efficient connection at NWAX or another local exchange.

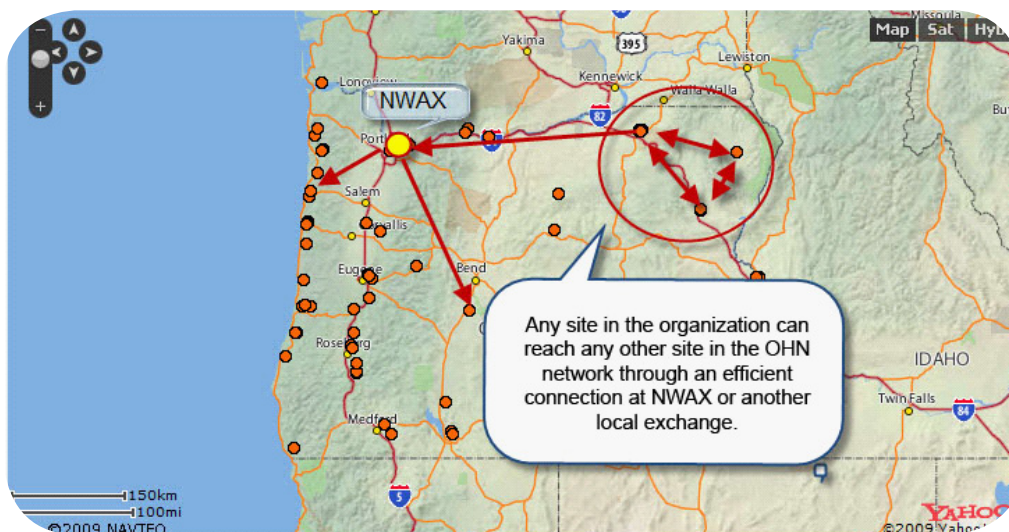
A Managed Connection

OHN is a managed network utilizing a Network Operations Center (NOC) which monitors strategically placed Leaf Nodes at each OHN participant site to ensure a high-quality connection across multiple networks boundaries.

KEY BENEFITS

Key Benefits of OHN's Network Design & NOC Services

- **Quality Assurance:** OHN ensures the highest quality connection across various multiple vendor networks
- **Traffic Stays in Oregon:** We keep all Oregon network traffic local by utilizing multiple Internet Exchanges such as NWAX and local exchanges in Redmond and Medford
- **What about security?** Much like an ISP, we do not provide network security, only a consistent high-quality connection. Clients are free to utilize any sort of end to end security they feel is appropriate
- **3rd party Monitoring at NOC:** The OHN Network Operations Center (NOC) acts as an independent entity and monitors the network to ensure:
 - ◊ Each telecommunications vendor meets the contractually committed quality of service on its portion of the network
 - ◊ The quality and health of the network 24/7/365 and will open trouble tickets with a vendor on behalf of the client if a problem is detected
 - ◊ Provides unique quality assurances that support state-of-the-art healthcare applications



A OVERVIEW OF INSTALLATION & CONTACT LIST

As an FCC Rural Health Care Pilot Program (RHCPP) subsidy recipient, once USAC (the 3rd party RHCPP administrator for the FCC) has approved funding for your project they will issue a Funding Commitment Letter (FCL) to your vendor. As soon as the vendor receives this document and you have signed the OHN Participation Agreement and Amendment, the vendor is free to begin installations. OHN participant installs vary greatly, and are each based on project specifications within the contract between you and your vendor. They can range from simple turn-ups to lengthy construction of new fiber infrastructures which can be weather and climate dependent. If you have any questions regarding the timeline of your particular installation, please contact your vendor directly. OHN will monitor the installations and we will be glad to help to answer any questions you might have.

B ROLES & RESPONSIBILITIES FOR INSTALLATION

In order to ensure a timely installation, it is important to:

- Make sure that you have signed the OHN Participation Agreement and Amendment as soon as the FCL is issued.
- While you are awaiting word on the FCL, communicate with your vendor immediately to plan/coordinate the details of the installation
- Prep your IT department and leadership. This is also an excellent time to ensure that a dialogue between the IT department and leadership occurs to clarify what the phased approach/intent for the use of the OHN is. This strategy/plan greatly assists the IT team in implementing effectively and ensuring helping your organization realize early on the benefits of the new connection.
- This includes identifying first steps to move existing traffic to the OHN connection, and which first project applications you wish to roll out on the OHN. Once that has occurred, the IT team can begin provisioning a public IP from the scope given to you by your vendor for use with OHN's Leaf Node monitoring device.
- To learn more about the Leaf Node and provisioning, please read over the OHN NOC section below and begin addressing and directing any questions you might have to the appropriate parties (OHN, your vendor, NWAX).

C FAQs

1. Q: How soon after signing my contract with the vendor will my site be online?

A: We generally receive FCLs from USAC within 4-6 weeks of your signed contract being submitted to OHN for review. After that it all depends on how long your install will take to complete. Your vendor should be able to provide you with a detailed estimate.

2. Q: When will I begin paying for my OHN connection?

A: The monthly recurring fees will start as soon as your service provider turns up your connection. This may occur at any time in a month, so your first invoice may be pro-rated. Your OHN participation fees begin the first of the month after receiving your Funding Commitment Letter (FCL) and are reissued annually.

3. Q: Will I need to run a BGP router at my site?

A: In the typical case, no. Your local service provider provisions a physical connection to your site in the same way a typical ISP service is deployed. You have the option to run BGP allowing more control over traffic prioritization. If you natively peer at NWAX like any other service provider, you could peer with additional networks, however this exceeds the scope unless you are a large organization.

4. Q: Is OHN like a big VLAN or private network for all OHN members?

A: No. If you have requested matching Transport and Internet bandwidths, your OHN connection behaves the exact same as a public internet connection. Any traffic that is destined to another OHN member site should be configured to prefer the OHN connection. Once on the OHN, your traffic will enjoy a very high quality/high speed connection to any and all member sites. By utilizing your public internet connectivity from OHN, you can reach any and all sites available on the public internet, including other OHN members. However, once the traffic has left the OHN network, as would be the case with traffic bound to a public web site or a non-member site, it will no longer be subject to the SLA standards of the OHN.

If you have requested a larger amount of OHN Transport, or if you have two separate ports, it is important to understand that the transport bandwidth will only allow for connectivity between other OHN members and does not provide global internet connectivity.

5. Q: I am having some problems with my vendor, whom should I contact?

A: Establishing a healthy relationship with your vendor is extremely important. This will aid in all of your interactions with your vendor in the years to come. Since the contract is between yourselves and the vendor, OHN suggests that you contact your vendor and try to work things out through them directly. If at some point you feel that you are not getting the desired response, we would be happy to assist. Please see our contact information for further details.

Additionally, the OHN Network Operations Center (NOC) monitors the network to ensure that each telecommunications vendor meets the contractually committed quality of service on its portion of the network. OHN participants may contact the NOC for help whenever they have technical network problems. NOC staff will work with the vendors to identify and resolve any problems.

LEAF NODE INSTALL

The OHN NOC monitoring system will provide real-time monitoring of service provider links for OHN clients. Monitoring specifically encompasses Quality of Service performance. In addition to monitoring, the NOC will act as a troubleshooting resource and mediator to assist in resolving QoS violations.

A OVERVIEW OF WHAT TO EXPECT

The management of OHN's NOC has been outsourced to Easystreet Online Services, located in Beaverton, Oregon. It's very important that you educate all key staff (and new staff) in how to contact the NOC for all installation/turn-up projects as well as the issuance of any trouble tickets should you experience any problems with your connection.

The Network Monitoring System (NMS) will monitor leaf nodes and responders as well as the health (QoS and reachability) of their network gateways. Monitoring for network equipment on the customer's LAN such as a non-associated switch, for instance, is not within the scope of the NMS System.

Support

In the event of a service issue, your IT staff or primary technical contact should initially assess if the problem is internal and not a wide-area issue. After that assessment is made, your IT staff or primary technical contact should call your vendor. At this point, a trouble ticket is initiated and the circuit is checked for problems.

CONTACTING THE NOC:

Contact the NOC for test and turn-up, service problems, or to submit a trouble ticket.

Toll-free:
1-877-260-1881

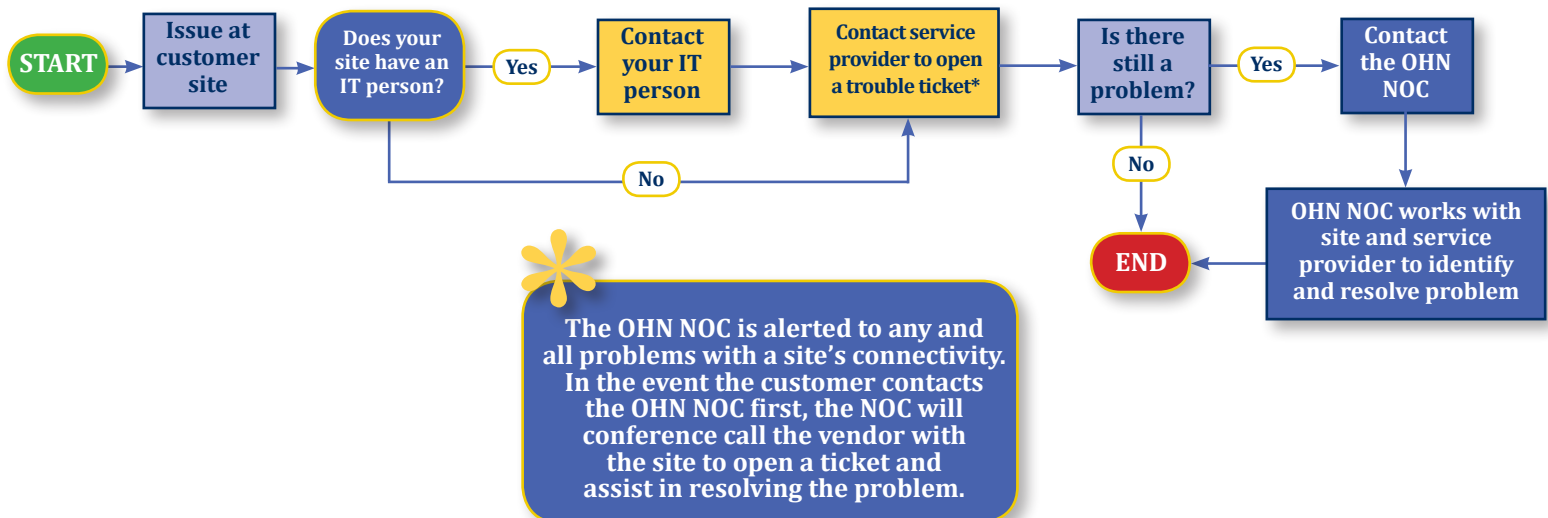
Email:
ohnnoc@easystreet.com

It is extremely important to obtain a trouble ticket number from your vendor and record the date you initiated the resolution process. This will aid in the process through completion and serves as a paper trail for your site.

If your vendor is not able to resolve the issue, please call the OHN NOC who will be happy to investigate and facilitate resolving the impairment. The OHN NOC will notify and collaborate with all necessary entities to see that the issue is resolved as quickly as possible. If at any time you are unhappy with the service you are receiving from the NOC or your vendor, please contact OHN IT Project Manager, Peter Trnavskis at ptrnavskis@oregonhealthnet.org.

An example of the trouble ticket workflow is illustrated below:

NOC Trouble Ticket Process Flowchart



B ROLES & RESPONSIBILITIES

- Make sure that you respond immediately/quickly to your emailed request from the NOC (ohnnoc@easystreet.com) when they reach out to you to schedule/work through the NOC installation process
- Make sure that you have space for the leaf node on a shelf, on a wall or on a desk
- Make sure that you have a 120VAC plug available to connect the leaf node power
- Make sure that the service provider has issued the appropriate amount of IP address space for the OHN NOC leaf node
- Make sure that the service provider has supplied a 100Mb ethernet connection for the leaf node that connects to their equipment
- Make sure to have a safe/secure place that is close proximity to store the cold spare leaf node

C LEAF NODE EXPLANATIONS *(Please refer to page 11 for the troubleshooting and FAQ section. Leaf node configuration diagram options begin on page 15-18).*

1. The leaf nodes are Cisco 1721 routers and are 12"x4"x9" (WxHxD). They are desk/shelf/wall mountable and have a separate power supply with dimensions of 7"x3"x2".
2. Nameplate power requirements for leaf nodes are 120VAC at 1.0A with NEMA 5 plugs.
3. Leaf nodes will require public IP addresses. These are provided by the service provider. NOTE: It is recommended that the service provider route the participant a minimum of a /29 (6 usable IP addresses) when they install the circuit. This will guarantee a usable IP Address.
4. Leaf nodes are connected via 100Mbps Ethernet over Category 5 cable. Category 5 cable and access port (Ethernet Port) are to be supplied by the service provider or participant network administrator for OHN NOC leaf nodes to be plugged into. Leaf nodes should be connected at the service provider network entrance, if possible. *Please note: If the service provider supplies a single port, the site will need to install a switch for port replication (to ensure that a port is available for the leaf node).*
5. Leaf nodes will be deployed in pairs: an active device and a cold-spares. In the event of a failure, OHN NOC will instruct you to replace the malfunctioning equipment with the cold spare therefore, make sure to keep the spare handy for any/all staff who will be directed to install it when/if directed by the NOC to do so.

D WHO DO I CONTACT?

OHN BGP peering questions

Please contact your other vendor partners directly to facilitate the BGP peering relationships. If you require additional information you can find up to date contact information for NWAX here. You can also contact Peter Trnavskis, IT Project Manager directly at ptrnavskis@oregonhealthnet.org. All OHN contact information can be found here.

Test and turn-up of OHN NOC leaf nodes

OHN NOC Test and Turn-Up Department
Phone: (503) 213-5400, Option #2
Toll Free: (877)260-1881, Option #2

Local Area Network Troubleshooting

Please contact your local Site Administrator (IT)

Quality of Service Issues

1. Service Provider
2. OHN NOC
Phone: (503) 213-5400 Option #1
Toll Free: (877)260-1881 Option #1
Email: ohnnoc@easystreet.com

A OHN CONNECTIVITY IN DEPTH

For the vast majority of OHN members, the OHN connection is much like an internet connection with an improved Service Level Agreement (SLA). Simply stated, you plug it in and the OHN Network Operations Center (NOC) monitors your connection 24/7/365 to ensure it is working for you, and that your vendor is delivering up to their SLA. Your job is first to transfer existing traffic over to it and then identify current and future use HIT and telemedicine/education applications and/or services to move over to it as well.

OHN does not own the lines, the vendor does. And the contract is between you and your vendor—not OHN. The magic and value happens at both the Internet Service Provider level and the NOC. Each OHN vendor has committed to locally interconnect with all other participating service providers, such that your traffic automatically selects the most direct and efficient data path. Additionally, as a result of the strict OHN SLA requirements for your vendor, your vendor has committed to specific quality benchmarks, which the NOC then monitors 24/7/365. Should any problems occur, the NOC works to resolve them with you and your provider. This is a large value to your organization and your vendor in isolating service problems from vendor-to-vendor (upstream, etc) for greater reliability. This means that your connectivity and applications, whatever they might be, will work better and have fewer problems than if you had used a generic Internet connection.

B BGP CONFIGURATION AND NWAX CONNECTIVITY

(See diagram on page 8)

Large member organizations, which are Internet Service Providers in their own right, could choose to join one or more state-wide exchanges and peer via BGP directly with other participating networks. However, this is not a typical scenario for all organizations as they don't have the internal resources to do so on their dime. In order to do this, the health care/education provider would need to join the exchange directly. More information about joining NWAX can be found on the NWAX website: www.nwax.net. Otherwise, you will connect with all other OHN members through your vendor service provider at NWAX.

All OHN vendors (and participant members connecting directly at NWAX) are required to set up direct BGP peering with all other OHN service providers at NWAX. This all happens behind the scenes and there are no BGP peering requirements for OHN participant members.

It's important to note that physical aggregation is possible and cuts down the cost for some installations. *For example:* you may be an organization that has three sites in any one

geographic area. The vendor could build a small “cloud” to interconnect the three and then share an internet feed for all three. This is less expensive than three separate connections and for our purposes works just as well.

C USAC/FCC REGULATIONS AND ALLOWABLE USE

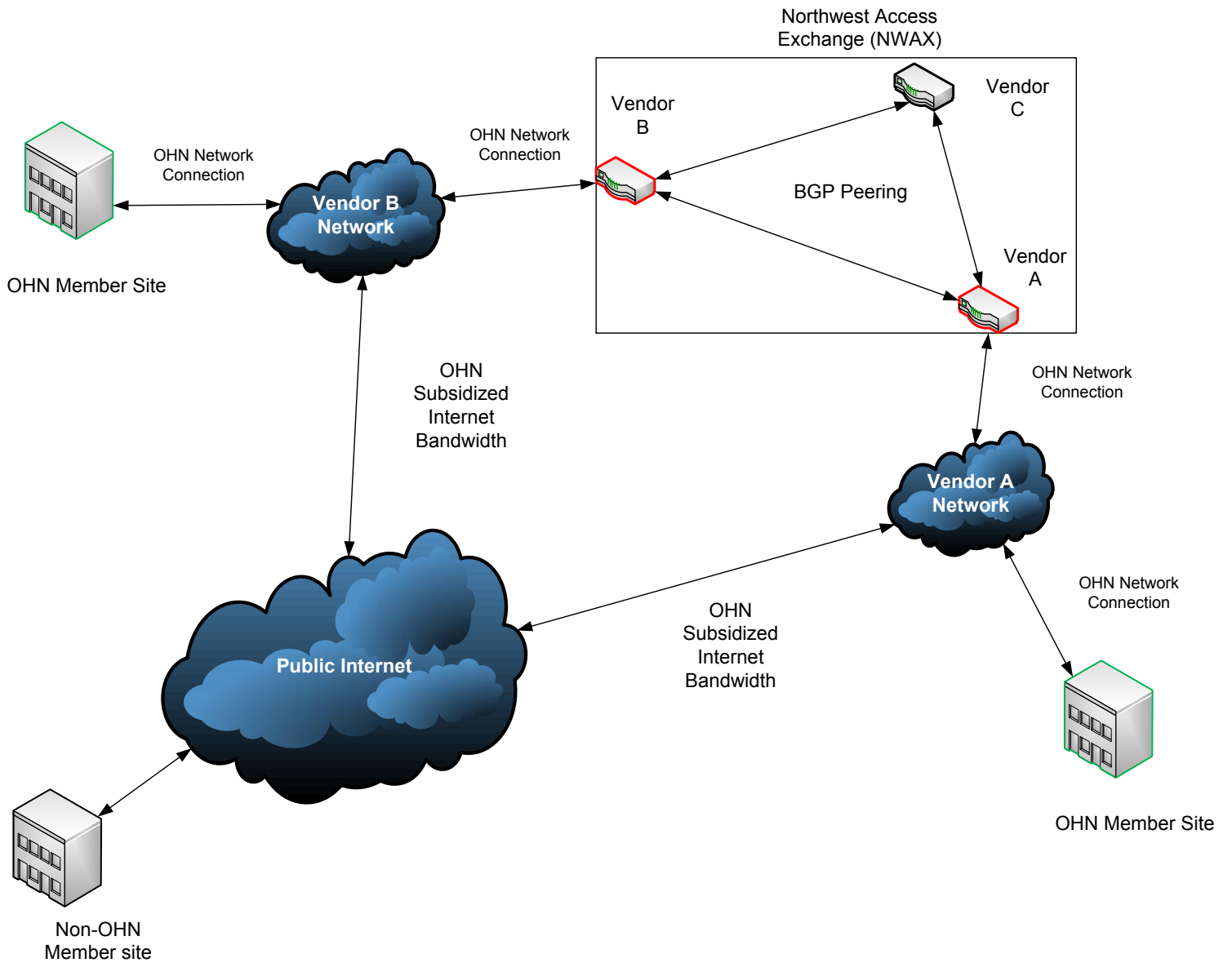
The Universal Services Fund Administration (USAC) is the third-party administrator for both the FCC and the Rural Health Care Pilot Program (RHCPP) and the standard Rural Health Care (RHC) programs. Both programs have many governing rules, and while OHN has accepted management responsibility for Oregon's RHCPP, and in translating RHCPP requirements to participant members like you, additional details and resources can be found online at www.universalservice.org/rhc. Through both programs, and stated within the new National Broadband Plan, the FCC has formalized its ongoing commitment to assist (subsidize) healthcare/education providers. This assistance will help in building out their core infrastructure, and in supporting their healthcare/education-related monthly use and traffic. For example, non-healthcare commercial activity is currently not subsidized. Therefore, if a significant portion of your OHN link is used for non-allowable uses, at some point you could be asked to pro-rate (pay for) that usage.

Many of OHN's RHCPP participant members also chose to purchase public internet connectivity from OHN. If your organization chose to purchase public Internet as well, you can utilize this connection to reach any and all sites available on the public Internet, including OHN members. However, once the traffic has left the OHN network, as would be the case with traffic bound to a public website or a non-member site, it is important to know that it will no longer be subject to the SLA standards of the OHN. It is also important to note that that this connection is also Federally subsidized and is subject to the agreed upon usage requirements stated above.

D CONNECTIVITY OUTSIDE THE OHN NETWORK

OHN uses several local Internet Exchange Points, including NWAX (Portland). This allows us to keep all OHN member traffic local to Oregon and in turn results in lower latency, jitter and packet loss.

Much like the public Internet the possibilities for using the OHN are limitless. OHN combines the freedom of the public internet with the quality and stability of a monitored private network. You can use your OHN transport bandwidth to connect with any other sites on the OHN Network and then connect to anyone on the World Wide Web with your global internet connection.



E INTERNAL CONFIGURATIONS

You will need to make sure that any OHN leaf nodes, the monitoring devices named after the “leaves” on the OHN network tree, in your network are granted permission to communicate with the Network Operations Center so they can monitor the network quality and availability.

We don't have any requirements on your internal network, so long as it functions adequately. It is important that two things are occurring:

1. Traffic bound for other OHN member sites needs to prefer the OHN connection over any other public internet options. This generally occurs automatically via your vendor connection to NWAX. However, if you have a more sophisticated or unconventional internal configuration you may need to verify that this is being allowed to take place.
2. Non-subsidized traffic must be separated in a manner that can be clearly documented should your site be audited by the FCC. If all of your traffic is eligible, then there will be no need to do this. However, if there are for-profit divisions or partners that utilize your network, or if large amounts of non-subsidized data is transmitted, then you will need to segregate that traffic via firewall or other means to ensure that it does not travel on the OHN.

F SECURITY CONCERNS

OHN represents an open network, meaning all your normal business relationships and security arrangements will work over this mechanism. You will still need HIPAA contracts and VPNs or encrypted applications to exchange medical data.

G MIGRATING YOUR TRAFFIC

Migrating your traffic to OHN will be easy if it is your only link. You would simply move your communications and connections with other members over to the new port.

If you have two links, you will have to decide which to connect to, or if you are a sufficiently large and sophisticated organization, you could run both at the same time. Running both together will require some IT Network Engineering and should be attempted by staff that has this job specialization. There are endless possibilities for these kinds of configurations and they will vary greatly based on your organizational goals.

ROLES & RESPONSIBILITIES

The list below breaks out the responsibilities of the OHN customer, local service provider, the NOC, and OHN program management.

OHN Customer

- Signs contract with service provider
- Maintains internal network
- Maintains security and HIPAA relationships (application relationships)
- Works with the Network Operations Center to ensure monitoring devices are online
- Works with Local Service Provider and/or NOC in the event of difficulty

OHN Local Service Provider (Vendors)

- Provides service to customer
- Provides network services which meet OHN quality requirements
- Interconnects with other vendors at Internet Exchange Points
- Works with the NOC and all relevant parties to fix any issues

OHN NOC

- Monitors network quality 24/7/365 and proactively resolves any issues with all relevant parties
- Reports to the OHN program management team on the service quality by site and metric
- Makes relevant data available to each site so they can see their network quality
- Ongoing work with OHN and vendors to improve quality

OHN Program Management

- Manages RFPs and membership
- Reviews metrics from the NOC
- Manages federal funding and sees that service providers are paid
- In the event that vendors are not performing, work with them up to and including withholding payment
- Answer questions and facilitate use and growth of program
- Works to define future use and value of the network for participants

H MAKING CONNECTIONS

We are growing! Every hospital, clinic and community college is as unique as the communities they serve. Therefore, the value of the Oregon Health Network can vary greatly from participant to participant. As each FCC Rural Health Care Pilot Program (RHCPP) request for proposal (RFP) comes in and completes the process, new hospitals, clinics and community colleges are joining OHN on a daily basis.

There are currently many sites throughout Oregon actively being monitored by the NOC. These include community colleges, hospitals, rural health care clinics and federally qualifying health clinics. An updated map of current activity, along with a list of sites, is available on the OHN website. To view the sites participating with OHN, click [here](#).

OHN also produces a quarterly newsletter, *Progress Report*, featuring industry information, participant profiles, a calendar of events, and much more. To be included on our mailing list, click [here](#).

What can you do?

Reach out to other members in your community. Utilizing these connections can truly create unique partnerships, making the first statewide broadband telehealth network even stronger. Be sure to check the OHN website often for new participating sites, talk to colleagues and businesses in your area, network with those in your towns and cities to make OHN a viable and sustainable product. Our anchor tenants are helping make the core footprint of connectivity on the state and will help shape the future of telemedicine. Also, OHN will be setting up a monthly user group. Details will be posted on our website.

Once you have configured your OHN connectivity, you will want to begin reaching out to other OHN members and to begin creating relationships. There is no preferred way to set up these connections. Since the OHN works just like the internet, there are many possibilities open to you depending on your needs. Here are some general steps:

1. Determine if your current business partners are on the network using our aforementioned resources. Review the membership for potentially new partners.
2. Contact any member you wish to connect with to make the necessary arrangements. You will need to determine security, transport, IP addresses, etc. Remember: OHN acts just like the public internet with improved quality.
3. Institute the changes on both ends and begin moving traffic over to the OHN.

It is imperative to understand that the end-to-end security of your data, as well as any HIPPA compliance requirements, are your site's responsibility along with anyone you are connecting to. Please consider the OHN to be insecure and use the same security measures you would for a public internet connection.

REACH OUT TO THOSE IN YOUR COMMUNITY

For any questions or concerns you have during the RHCPP RFP process, please feel free to find the appropriate staff member to help: <http://www.oregonhealthnet.org/contact/general>

I FAQs for Sites Connecting to the NOC

1. Q: After I've signed my contract with our new telecom vendor, how soon will I be on the OHN network?

A: Each site and its circuit installation, set-up and final OHN NOC configuration is unique. Therefore, each site and its vendor have different variables that affect the timeline. While there is no way to provide an exact timeline for how soon you will be connected to the network, a conservative range from circuit installation to connectivity to the OHN Network would be between 20 to 60 days.

2. Q: Once I'm connected to the OHN Network, how soon will my site be monitored and managed by the NOC?

A: After your broadband circuit is installed you can expect to be connected to the NOC within 3 to 5 business days.

3. Q: What is the overall process and timeline to get my site(s) on the network?

A: An overview of the process and timeline is as follows:

- Once a winning network vendor is selected through the OHN RFP process, the participant signs a services contract with the vendor, subject to OHN and USAC approval
- Vendor receives the USAC Funding Commitment Letter (FCL)
- Your site receives a password and username to access your personal portal
- OHN participant signs the OHN Participation Agreement and Addendum and pays annual fees
- OHN participant's vendor orders broadband circuit(s)
- Vendor works with the OHN participant to provide contact and site information to the OHN NOC
- Leaf Node is sent by the OHN NOC to both the vendor/site (generally 3 to 7 days)
- Broadband circuit is installed by vendor/site, and OHN Participant is now "on" the OHN network (this timeline is dependent on vendor circuit installation timeframe)
- OHN NOC configures monitoring equipment for the OHN participant location (3 to 5 days)
- New participant is on the OHN network and being monitored by the OHN NOC

4. Q: What do I need to do to work with my vendor to make sure we get on the OHN NOC as soon as possible?

A: Ordering and receiving the broadband circuit is the lengthiest part of the process. Order the circuit immediately after signing the OHN Participation Agreement and Amendment (with payment) to ensure the fastest turn-up time. Your vendor will work with you to give you an ETA for delivering the circuit. Additionally, your vendor will obtain important contact information and details about your site, which are also required to bring you on the OHN NOC. Providing correct information up front will help prevent delays. During the circuit installation process, the OHN NOC will work with you and your vendor to install and configure the monitoring equipment at your site.

5. Q: What if my vendor is not being responsive to get us hooked up to the NOC?

A: If you are having difficulty with your vendor, please contact the OHN NOC for assistance. The OHN NOC is here to assist you.

6. Q: While I'm waiting to be hooked up to the NOC, what value am I experiencing as an OHN participant?

A: As soon as your circuit is up and functioning, you will immediately experience the benefits of your new expanded broadband connection (increased speed, quality etc.)

On the administrative side, OHN has worked with vendors and the complex invoicing process on your behalf. Also, OHN is setting up your site's portal and insuring all your information is on it for your benefit. OHN is also providing helpful webinar orientations and is in constant communication to your site to ensure you know what is happening and what you need to do at any given point.

7. Q: If I have a quality of service issue what do I do?

A: In the event of a service issue, the participant's IT personnel should initially contact their vendor to open a problem ticket and check for problems with the circuit.

If the vendor is not able to resolve the issue, the participant can call the OHN NOC who will be happy to investigate and facilitate any reports of service impairment.

The OHN NOC will notify and collaborate with all necessary entities to see that the issue is resolved as quickly as possible.

(See example below. Other scenarios will follow the same general troubleshooting process. This troubleshooting process is also outlined in your Participation Agreement Addendum).

J Troubleshooting

An example: OHN participant experiences problems with VoIP phone calls.

1. OHN participant's IT personnel contacts service provider to open a trouble ticket and check for problems with the circuit.
2. OHN participant checks OHN NOC web portal for any indications of problems with the OHN network
 - a. If a problem is found, there also may be a status report indicating that the OHN NOC is aware of the problem and what is being done to resolve the issue
 - b. If no problem is seen or a problem is seen but no indication of what is being done continue to #3
3. OHN participant calls the OHN NOC and informs them of the problem with VoIP phone calls and provides the vendor problem ticket number assigned in Step #1
4. OHN will investigate to determine if there are any problems with the OHN connection that could cause the VoIP call impairment
5. If the OHN NOC detects a problem they will notify and collaborate with all necessary entities to see that the issue is resolved as quickly as possible
 - a. If the OHN NOC is unable to detect a problem they may contact other involved entities for additional troubleshooting steps as necessary

The OHN NOC works proactively to troubleshoot the OHN Network

- The NOC will open tickets on a clients behalf once a problem is detected.
- The NOC will contact a client via email to let them know a ticket was opened on their behalf
- It is very important to keep your contact information up to date!

Before opening a trouble ticket

- Make sure to have your on-site IT team review the problem and determine if it is a local network/hardware problem or a problem with the OHN Wide Area Network.

Always contact your vendor first

- Your primary point of contact for all troubleshooting should be your vendor
- Contacting your vendor first will assure you the fastest possible resolution for your issue
- Always be sure to officially open a ticket when you contact your vendor and be sure to record the ticket number for your records. *This is extremely important since most vendors will have absolutely no record of your contact unless you are issued a ticket number*
- The network provider will work with the OHN NOC at a high level to quickly isolate and solve any problems
- It is important to develop a relationship with your vendor

How to open a trouble ticket

Simply call the OHN NOC at any time. Trouble tickets can also be opened via email (ohnnoc@easystreet.com). Please be sure to provide as much detail as possible when contacting the OHN NOC.

Monthly reporting from the NOC

- You will begin to receive these via email after the 1st of each month. The reports cover all metrics mandated by your Vendor Service Level Agreement

KEY NOTES:

1. If you encounter a problem with your connection, always check with your IT staff first.
2. Contact your vendor service provider:

NETWORK PROVIDER

PHONE

3. Contacting the OHN NOC:
Toll Free Telephone: (877) 260-1881
Email: ohnnoc@easystreet.com

NOC Monitoring System (NMS)

OHN NOC's Network Monitoring System (NMS) will monitor leaf nodes and responders as well as the health (QoS and Reachability) of their Network Gateways. Monitoring for network equipment on the participant's LAN, such as a non-associated switch for instance, is not within the scope of the NMS System.

- The NOC will monitor QoS performance on vendor links via leaf nodes at the sites and responders at NWAX and other exchanges
- Leaf nodes and responders must be IP-reachable via the NMS
- Leaf nodes and responders must be IP-reachable across the link being monitored
- Ad-hoc/transient monitoring requires that leaf nodes be reachable via IP to each other across the link in question
- Leaf nodes are, by design, inexpensive and low-powered devices. IP connectivity and routing are expected to be via static, connected, and/or default routes
- QoS measurements will be initiated by the leaf nodes and the NMS will poll the leaf nodes for performance information
- Leaf nodes will generate pseudo-traffic on UDP and/or TCP ports to simulate application traffic

Additional traffic analysis and troubleshooting will utilize sniffer/troubleshooting devices at the exchanges. The exchange will provide traffic data for analysis via a mirror port or similar technique.

FAQs About the NOC Monitoring System (NMS)

1. Q: What are the components of the OHN NOC monitoring network?

- A: Leaf node (traffic generator and monitoring point)
- Leaf node responder (traffic reflector)
 - Troubleshooting device (general purpose server, sniffer)
 - NMS (Network Monitoring System)

2. Q: How does the OHN NOC monitoring system measure SLA performance?

A: Leaf nodes generate artificial traffic directed at leaf node responders. The responders add telemetry data and return it to the leaf node. The traffic is generated and returned using Cisco's "IP SLA" feature.

3. Q: What is measured by the monitoring system?

- A: The monitoring system monitors the following:
- Round Trip Time (RTT) between leaf nodes and responders

- One-way latency between leaf nodes and responders
- UDP jitter between leaf nodes and responders NOC Service Provider & IXP Spec Sheet & FAQ
- Measured data will be used to ensure SLA specifications are met by service providers and exchanges.

4. Q: What are the physical and electrical requirements for OHN NOC monitoring equipment?

- A: The following are requirements for accommodating leaf nodes:
- Leaf nodes are deployed at participant sites and will require public IP addresses, which are provided by the participant's vendor (*NOTE: It is recommended that the vendor route the participant a minimum of a /29 (6 usable IP addresses) when they install the circuit so that the leaf node is guaranteed a usable IP Address*)
 - The leaf nodes are Cisco 1721 routers and are 12"x4"x9" (WxHxD). They are desk/shelf/wall mountable and have a separate power supply with dimensions of 7"x3"x2". Nameplate power requirements are 120VAC at 1.0A with NEMA 5 plugs
 - Responders are deployed at exchanges. They are Cisco 2801 routers and are 18"x2"x17". They are 2-post and 4-post rack mountable and have an internal power supply. Nameplate power requirements are 120VAC at 5.0A with NEMA 5-15 plugs
 - Troubleshooting devices are Compaq DL320 servers and are 19"x2"x28". They are 2-post and 4-post rack mountable and have an internal power supply. Nameplate power requirements are 120VAC at 5A with NEMA 5-15 plugs. They will require two IP addresses, one for direct access and one for "console" ILO management access
 - Leaf nodes and responders will be deployed in pairs: an active device and a cold-spares. Additional capacity should be reserved for responders if capacity requirements increase
 - One troubleshooting device will be deployed at each exchange with the potential for additional devices if capacity requirements increase
 - All monitoring equipment at each site should be located in immediate proximity to each other

5. Q: What are the network requirements for the OHN NOC monitoring equipment?

- A: Network requirements are as follows:
- Bandwidth requirements for each leaf node are 375KB over 5 minutes (10Kbs)
 - Bandwidth requirements for each responder are

Continued on next page

Continued from previous page

375KB over 5 minutes (10Kbs) multiplied by the number of leaf nodes that are generating traffic to the responder

- Generally, troubleshooting devices will not regularly use network bandwidth. They will use bandwidth on an as-needed basis for troubleshooting purposes
- Leaf nodes are connected via 100Mbps ethernet over Category 5 cable. They require unfettered IP connectivity to the NMS, responders, other leaf nodes and the troubleshooting devices. Category 5 cable and access port (ethernet port) is to be supplied by the vendor or participant's Network Administrator for OHN NOC leaf nodes to be plugged into. Leaf nodes should be connected at the vendor network entrance, if possible. They may also be connected behind the client CPE, but this will affect the SLA measurements and troubleshooting.
- Responders are connected via 100Mbps ethernet over Category 5 cable. They require unfettered IP connectivity to the NMS, leaf nodes, other responders and troubleshooting devices
- Troubleshooting devices are connected via 100Mbps ethernet over Category 5 cable. They require unfettered IP connectivity to the NMS, leaf nodes, responders, and other troubleshooting devices
- Troubleshooting devices will need to have vendor-managed access to "sniff" traffic. This may be accomplished via a SPAN, Mirror, or similar ethernet switch port and can be provided as part of the normal network connectivity. A second ethernet port is available on the troubleshooting device for connection to a dedicated monitoring port if needed. The NOC will coordinate with the vendor if use of the monitoring port is needed.

6. Q: Who will purchase the leaf node responders and leaf nodes?

A: OHN NOC through EasyStreet

7. Q: Who will purchase the network troubleshooting devices?

A: The OHN NOC through EasyStreet

8. Q: What level of operational involvement is required of vendors and IXPs?

A: Network equipment will be configured by the OHN NOC and shipped to the vendors and IXPs for physical deployment. Vendors should work with the participant to fill out the OHN NOC Site Start-Up Form and will need to provide public IP addresses for the monitoring equipment. Service Providers will physically install the leaf nodes at participant sites per OHN NOC instructions. IXPs will physically install the leaf node responders and network troubleshooting devices per OHN NOC instructions. Vendors and IXPs will be required to work with the

OHN NOC to ensure the installation of network equipment is IP reachable. Vendors and IXPs will also need to work with the NOC to troubleshoot and resolve problems.

9. Q: How does the NOC know I have a problem with my service?

A: Alerts are generated in the NOC under the following conditions:

- Node Down
- IP SLA MOS Less Than 4.0
- IP SLA Jitter DS Greater Than 9ms
- IP SLA Packet DS Loss Greater Than 0.3%
- IP SLA Jitter SD Greater Than 9ms
- IP SLA Packet SD Loss Greater Than 0.3%
- RTT Greater Than 90ms

Alert Configurations—Any one of the following will generate an alert in the NOC:

OHN: Node Down

- Check for alert conditions every 1 minute
- Trigger immediately

OHN: IP SLA Jitter (Destination to Source) Greater Than 9ms

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 14 minutes

OHN: IP SLA Jitter (Source to Destination) Greater Than 9ms

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 14 minutes

OHN: RTT (Round Trip Time) Greater Than 90ms

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 14 minutes

OHN: IP SLA MOS (Mean Opinion Score) Less Than 4.0

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 9 minutes

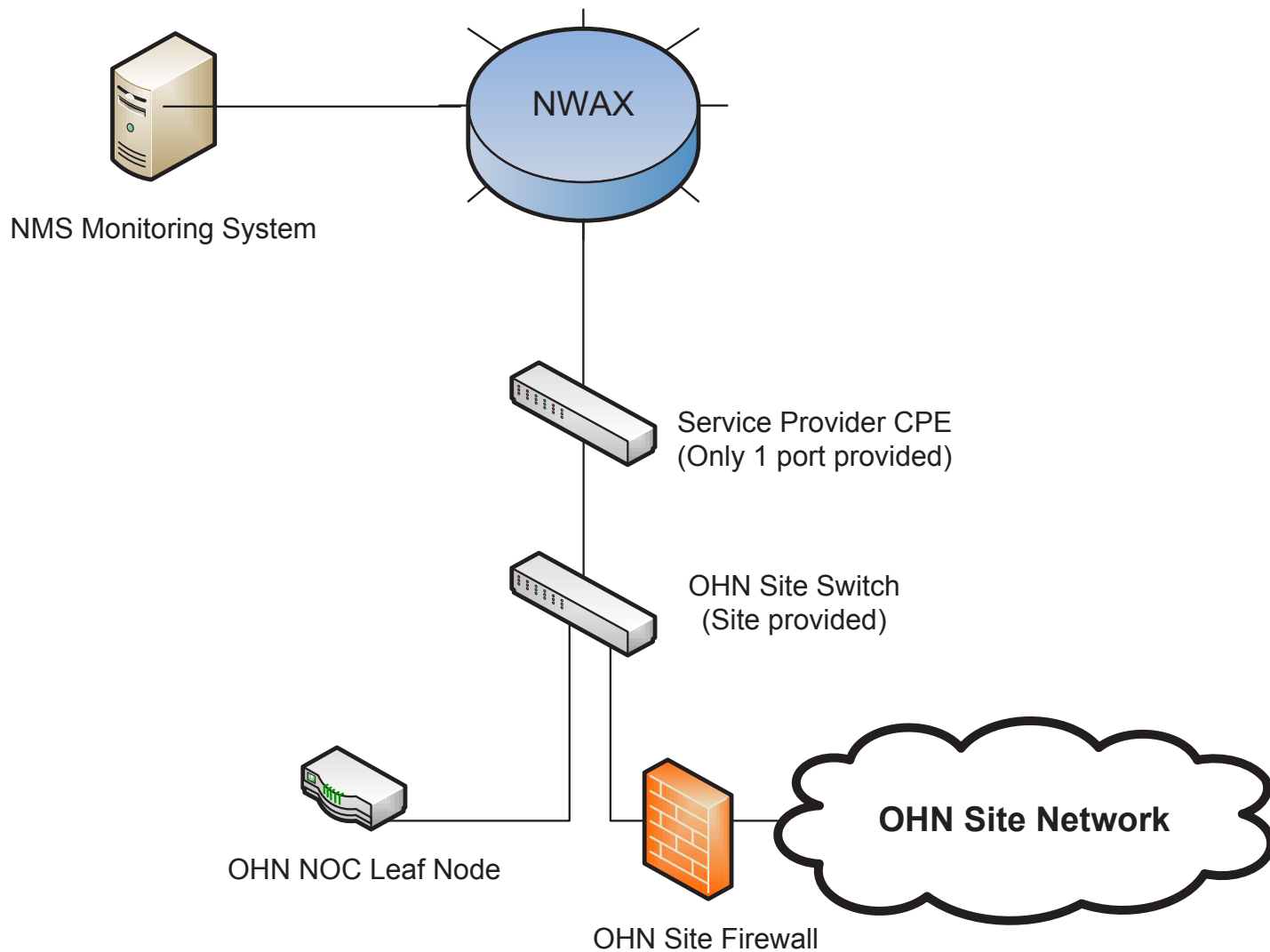
OHN: IP SLA Packet (Destination to Source) Loss Greater Than 0.3%

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 14 minutes

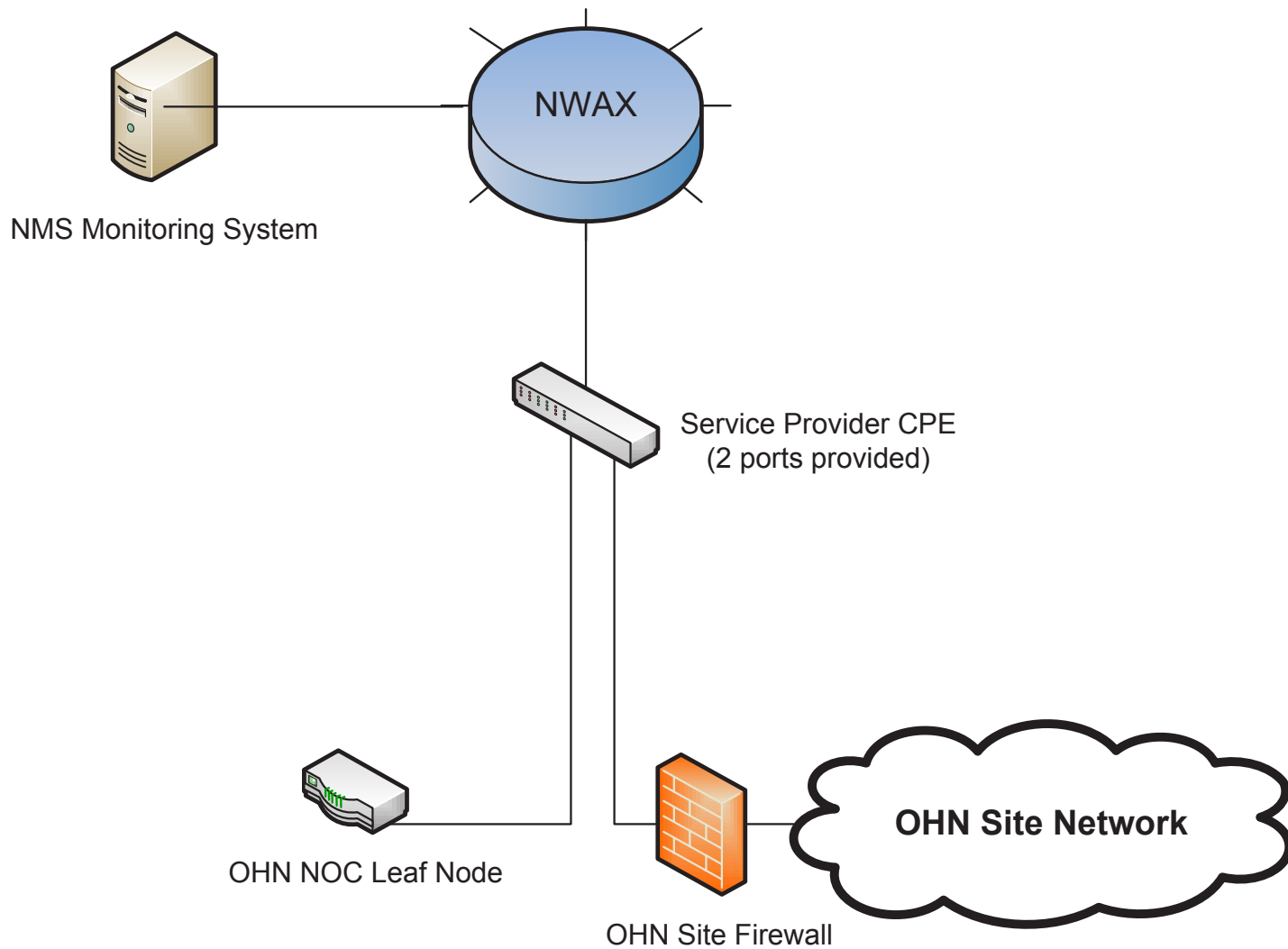
OHN: IP SLA Packet (Source to Destination) Loss Greater Than 0.3%

- Check for alert conditions every 5 minutes
- Do not trigger until conditions exist for more than 14 minutes

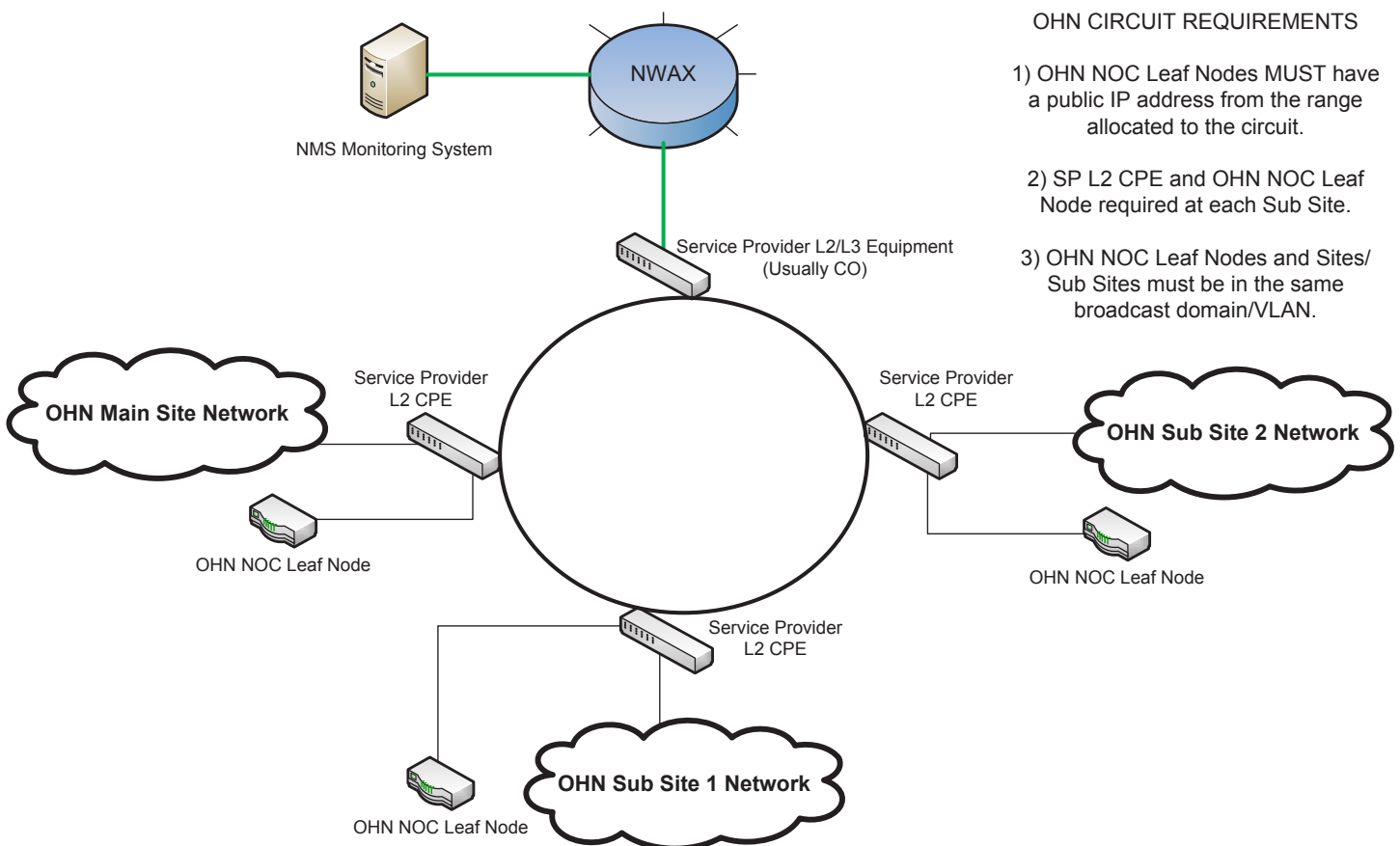
One SP port



Two SP ports



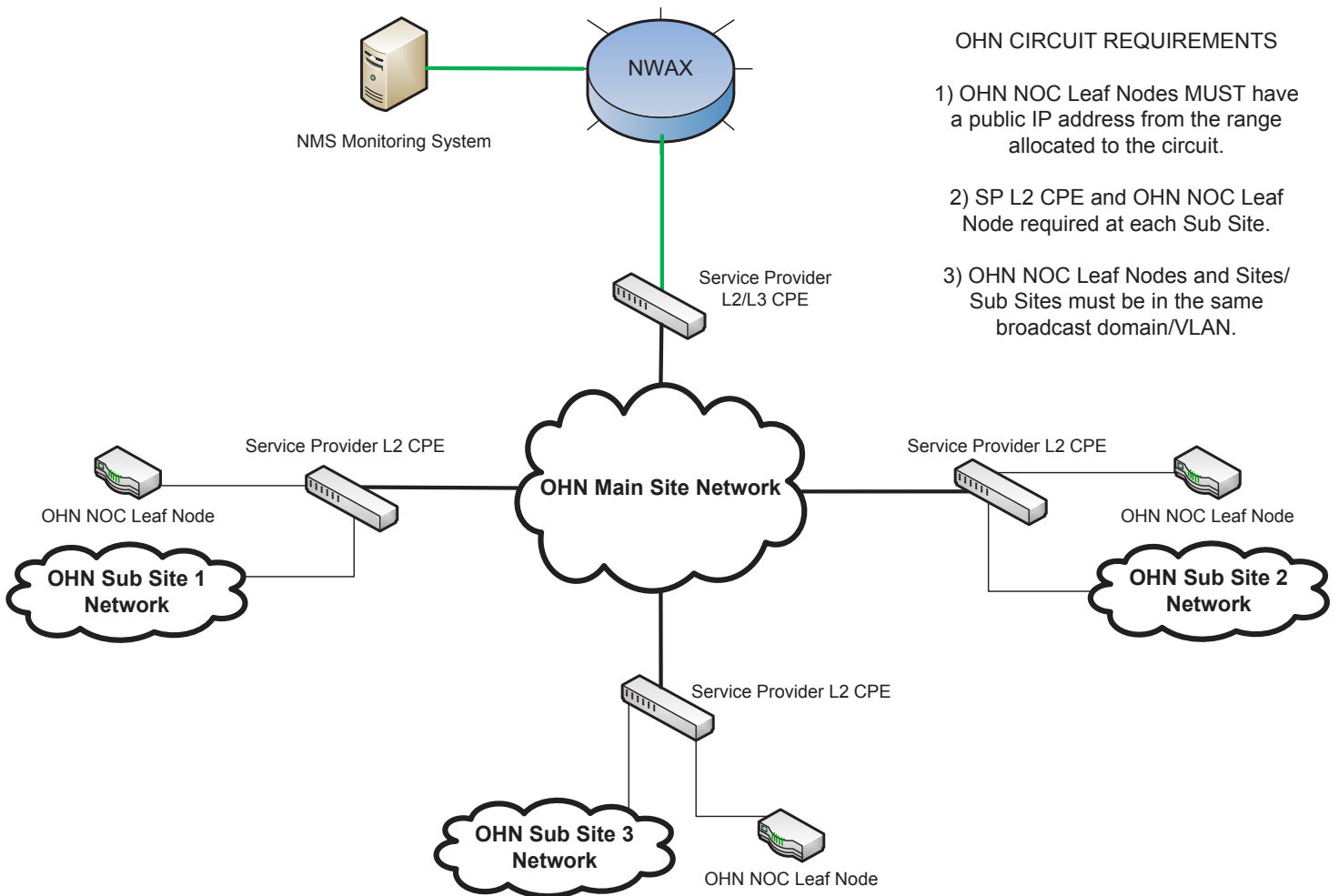
Multi-site L2 Ring



OHN CIRCUIT REQUIREMENTS

- 1) OHN NOC Leaf Nodes MUST have a public IP address from the range allocated to the circuit.
- 2) SP L2 CPE and OHN NOC Leaf Node required at each Sub Site.
- 3) OHN NOC Leaf Nodes and Sites/ Sub Sites must be in the same broadcast domain/VLAN.

Multi-site L2 Star



OHN CIRCUIT REQUIREMENTS

- 1) OHN NOC Leaf Nodes MUST have a public IP address from the range allocated to the circuit.
- 2) SP L2 CPE and OHN NOC Leaf Node required at each Sub Site.
- 3) OHN NOC Leaf Nodes and Sites/ Sub Sites must be in the same broadcast domain/VLAN.

ORIENTATIONS & TRAINING

OHN strives to provide continuing education and provide tools so our users understand the full value of the network. Our website has complete slide decks of all our webinar orientations and are available for download. Visit <http://www.oregonhealthnet.org/content/orientations> to download any of the four orientations listed below. You will also find the necessary forms, OHN contacts, active participants, and much more on our website: <http://www.oregonhealthnet.org>.

It is very important to ensure all key personnel have completed our 4 webinar orientations. If you have any questions about who should enroll in these orientations, the schedule or content, please contact Deb Galiel, Associate Project Coordinator, at dgaliel@oregonhealthnet.org.

Orientation #1 "WELCOME TO OHN"

Orientation 1 will give an overview of OHN, the key values and benefits of membership and participation; an overview of the FCC Rural Health Care Pilot Program (RHCPP) including the breakdown of the key 5 steps from beginning to completion; the 30K-foot overview of the actual "network."

COMPLETED ORIENTATION #1 DATE _____

Orientation #2 "CONTRACTS, PARTICIPATION & IMPLEMENTATION"

Orientation 2 will review the next steps required for your organization, vendors and OHN as the RHCPP bid process has been completed and the contract phase begins.

COMPLETED ORIENTATION #2 DATE _____

Orientation #3 "GO-LIVE"

Orientation 3 will review OHN's Network Operations Center (NOC) and their services and reporting. Learn how to work with OHN staff to submit quarterly reports on the benefits/use of your new connection.

COMPLETED ORIENTATION #3 DATE _____

One-on-one Training "INVOICING & BILLING"

We have a mandatory one-on-one invoice training session that we are requiring sites to complete before their first invoicing cycle. Please contact Deb Galiel to schedule your training, dgaliel@oregonhealthnet.org. Additionally, an informational flier is on our website to help your site process invoices effectively: <http://www.oregonhealthnet.org/content/forms-downloads-documentation>.

COMPLETED ORIENTATION #4 DATE _____

You can register online for any of our four Orientations:
<http://www.oregonhealthnet.org/resources/siteorientations>

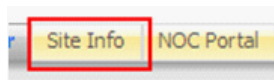
Logging into the Site Portal

You will use this link to log into your site's portal homepage: <https://portal.oregonhealthnet.org>

Your username and password should have been supplied in your welcome email. Please contact Deb Galiel, dgaliel@oregonhealthnet.org if you did not receive it or you are having trouble logging in.

View/Change Your Account Information

To view or change your information, click on the **Site Info** tab at the top of your site's portal homepage:



This will open a form that describes your account such as business name, phone, address, and contact information. Feel free to update your "Contact Information" by clicking on "Show Contact Information."

Site

[Click here to attach a file](#)

Basic Site Information			
Site Name	Integration Test Site	Site No.	230
Address		City	Gateway
State	OR	Zip Code	
County		Site Code	CC: Community College
Fax	111-111-1111	Link to Documentation	Click here to view site documentation
Site Status	MRC Begins	DBA	Integration Test Site
Notes			

Site Contact Information			
Primary Contact Name	Sue G.	Primary Contact Email	sue@building.com
Primary Contact Address		Primary Contact Title	
Primary Contact Phone		Primary Contact Cell Number	
Additional Site Contact		Additional Site Contact Title	
Additional Site Contact Email		Additional Site Contact Phone	
Emergency Contact		Emergency Contact Phone	

Site Technical Information (Please note fields marked with a * are required in order for the NOC to provision a leaf node)			
Technical Contact*	Bob Vila	Technical Contact Email*	bob@building.com
Technical Phone*	555-555-5555	Technical Contact Job Title	
Secondary Contact	Joe Vila	Secondary Job Title	Network Admin
Secondary Email	joe@building.com	Secondary Phone	555-555-5557

Site Billing Information			
Address		City	
State		Zip Code	
Contact Name		Email Address	
Phone Number			

View Messages & Alerts

To view your messages, there is a “Messages” section on your site’s portal homepage.

Messages			
Title	Body		
Call OHN Office immediately			

Urgent
 Immediate Attention Required
 Informational Alert

Invoices to Review & Sign				
NR	Bay Area Hospital Integra Telecom Non-Recurring.xml	Bay Area Hospital	New Invoice	Click to View/Sign
I	Bay Area Hospital Integra Telecom 2.xml	Bay Area Hospital	New Invoice	Click to View/Sign
I	Bay Area Hospital Integra Telecom 3.xml	Bay Area Hospital	New Invoice	Click to View/Sign
I	Bay Area Hospital Integra Telecom 4.xml	Bay Area Hospital	New Invoice	Click to View/Sign

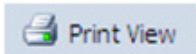
* Note the different types of messages and the icons that denote them.

Approve/Sign Invoices

To approve or sign an invoice, locate the “Invoices to Review” section of your site’s portal homepage and find the invoice you need to approve. Remember that recurring invoices will have a green “I” next to them while non-recurring invoices will have the blue “NR.” Use the “Click to View/Sign” link to view the invoice (page).

Helpful Notes

- There are instructions on top of the invoice which give you step-by-step instructions for processing the invoice.
- For added convenience, there is a “Print View” icon in the upper left-hand corner of the invoice (page). Click on it to print the invoice. When you have signed, scanned and saved it to your computer, you will then need to attach it to the electronic Invoice.



Attaching Required Documentation



In the upper right-hand corner of the invoice (page), you’ll see three icon links. Each of these represent the three distinct files that are required to be attached (uploaded) to the invoice (page) in the following order/steps:

1. Attach a copy of the invoice signed and scanned by the Authorized Signatory
2. Attach a copy of the vendor’s invoice
3. Attach a scanned copy of your proof of payment
 - ➔ Use the browse button to find the file from your computer that you wish to attach and Click the “Upload” link.

When you are finished you should have all three items attached to the invoice: a copy of the signed invoice, a copy of the vendor's invoice, and a scanned copy of your proof of payment.

Finally, you will want to type in the name of the Authorized Signatory at the bottom of the invoice under Site Approval. To submit, click the button that says "Click here to approve."

At this point you are now done processing your invoice. Click "Submit" on the bottom of the invoice form.

Site Approval

Name:

X _____

SITES ONLY:

By clicking on the button above, you are indicating that you have signed and attached the invoice to this form.

View Status of Existing Approved Invoice

Once you have approved an invoice, you may need to check its status. To view this information, locate the "Invoices in Progress (No Action Required)" section on your site's portal homepage:

Invoices In Progress (No Action Required)

There are no invoices in progress at this time.

View Paid Invoice History

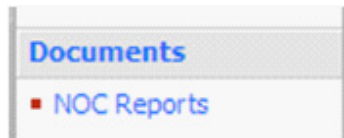
Once your invoice has been paid and processed, you may want to see a list of your paid invoices. To view this information, locate the "Invoice History (Paid Invoices)" section on your site's portal homepage.

View Supporting Documents

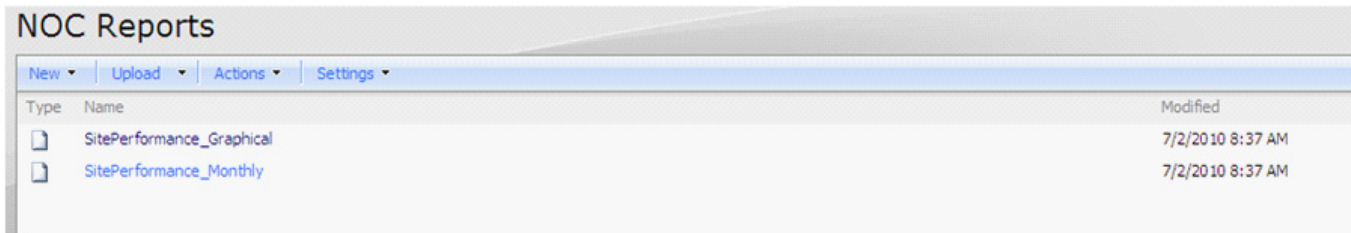
To view your supporting documents, locate the "Supporting Documents" section on the right-hand side of your site's portal homepage. Use the "Click to View" function to open the supporting documents:

Name (for use in forms)	Document Type	Status	URL
466-A - Integra Telecom.xlsx	466-A	Complete	Click to View
Network Cost Worksheet - Integra Telecom.xlsm	NCW	Complete	Click to View
Form-467-Integra Telecom.xlsx	467	Complete	Click to View

View NOC Reports

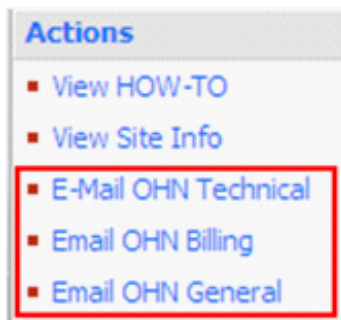


To view your monthly NOC reports, locate the NOC Reports link on the left-hand menu side of your site's portal homepage. There are two reports generated by the NOC on the 1st of every month: the Site Performance report and the Site Performance Graphical report. Simply click on the name of any of these reports to open in your Web browser for review.



Customer & Technical Support

If you are experiencing any issues, difficulties or questions while working in your site portal, please use one of the customer service options under Actions that best fits your need. These are located on the left-hand menu side of your site's portal homepage. These links provide direct contact at OHN for technical, billing or general questions.



Additionally, if you have any other questions or issues, please call or email one of the contacts listed below:

- **Invoicing & Billing:** Deb Galiel, dgaliel@oregonhealthnet.org
- **Universal Services Administrative Company (USAC) Billing, RHCPP Division:** 1-800-229-5476
- **Vendor Service Issues & Network Configuration:**
 - NOC: Helpdesk
 - 503-213-5400
 - 877-260-1881 (Toll-free)
 - ohnnoc@easystreet.com
- **OHN:** <http://www.oregonhealthnet.org/contact/general>
- **NWAX:** www.nwax.net
 - Phone: (503) 418-1081

The purpose of the RHCPP program (and OHN) is to make sure that you make full use of, and experience the greatest value and benefit from your new OHN connection. But as with any federal subsidy, you will be required to prepare for an audit of your new connection. OHN has invested in the web-based site portal system to assist you in managing core documentation for a future audit. But, this section of the welcome packet serves to help you not only prepare for such an audit, but to hopefully help you better understand the appropriate uses of the network to ensure that you get through the audit successfully.

We've therefore assembled and provided general audit guidelines that exist under the standard FCC/USAC Rural Health Care program, as much of the RHCPP has been designed and administered based upon the standard program rules. Additionally, the OHN model has been designed to have eligible RHC providers (those in rurally designated areas, as defined by the FCC), to roll-over into the standard RHC once the pilot program ends May, 2014.

Should you ever have any questions or concerns about current or future uses (or users) of your OHN connection, please contact OHN staff at any time.

The primary purposes of audits are to ensure compliance with Federal Communications Commission (FCC) rules and program requirements and to assist in program compliance.

When selected for an audit, the auditee's designated contact person will be contacted by a member of the USAC Internal Audit Division. In addition, an announcement letter will be sent detailing the purpose and scope of the audit, identifying the personnel who will be performing the audit, making a request for pertinent data, and stating the date upon which the data is due.

A) How does USAC conduct its audits?

1. USAC obtains documentation to support the:

- a. Competitive bidding process
- b. Non-discounted portion timely paid
- c. Amounts invoiced to the Rural Health Care Program
- d. Only eligible products and services delivered or installed



OHN has posted on your site portal your eligibility paperwork, your invoices along with copies of your 15 percent payment, copies of the invoices submitted to USAC/Rural Health Care Program, and copies of your vendor contract with the service orders detailing the eligible services. Please review your portal documents carefully and if you believe that there is documentation missing, please contact us so we can work together to insure complete and accurate documentation.

B) What have we found:

1. A lack of sufficient documentation to complete audit objectives

- a. Applicants fail to maintain adequate support for competitive bidding requirements
- b. No evidence that non-discounted share was paid
- c. Service providers providing multiple bills for the same billing period
 - i. Makes it difficult for applicants to ensure they are being billed at the proper rate
 - ii. Makes it difficult for applicants to ensure they are receiving the proper discount
 - iii. No direct correlation to the funding request the bill is covering
 - iv. Bills do not include amounts invoiced to USAC



Again, OHN has all invoicing, contracts, and competitive bidding requirements posted on your site portal.

2. Measures Taken to Minimize Audit Findings and to Assist Applicants

- a. Provide sufficient detail on invoices
 - i. Include items such as Funding Request Numbers, specific detail of the funded circuit or service
- b. Indicate invoice total amount less amounts paid by or to be paid by USAC

Continued on next page

Continued from previous page

- c. Indicate payment terms of the net amount of the invoice
- d. Separate eligible items from ineligible items
 - i. Best case scenario is to generate separate invoices for services that will be invoiced to USAC
- e. Document, Document, Document



By having OHN provide much of the billing and invoicing processes, we have included all of the information detail listed above on our portal-produced invoice in addition to having the correct information included on the downloaded FCC invoice that is submitted to USAC.

C) Reporting Results

At the conclusion of the audit, USAC's Internal Audit Division management will review the audit file to ensure that workpapers are properly documented and the conclusions reached are properly supported. For any exceptions noted, a Detail Exception Worksheet (DEW) will be prepared and sent to the auditee for review. It will contain background information, the audit step performed, and the exception noted as well as the basis for which the exception is noted (e.g., FCC rule).

The auditee will be given an opportunity to provide a response to explain their agreement/disagreement with the exception noted. USAC RHC management will review the exception as well as the auditee's response and will prepare a response to address the exception and note any corrective action as necessary.

Both the auditee and the USAC management responses will be incorporated into the draft report and submitted to the USAC Board of Directors to be deemed final. The USAC Board of Directors may request USAC management to reassess any aspect of the report prior to the report becoming final. Once finalized, both the auditee and the FCC will receive copies of the audit report. The final report may be made available to the public upon request.

D) How can you help?

1. Provide requested documentation in a timely manner
2. Ask questions to ensure that you are providing adequate documentation
3. Maintain documentation, for five years, for data submitted to USAC

If you have any questions, please contact USAC's Internal Audit Division via e-mail: auditinquiry@usac.org



OHN strongly advises that internal audit procedures are followed per your outside auditor's advice. OHN has provided audit information to your site per USAC's instructions in order to provide good customer service and is not meant to be inclusive. OHN is not responsible for your site's audit compliance or the passing of an audit conducted by USAC or the FCC.

