

ONTARIO
TELEMEDICINE
NETWORK



RÉSEAU
TÉLÉMEDECINE
ONTARIO

OTN RTO

ONTARIO TELEMEDICINE NETWORK

Technical Service Level Agreement

Version 5.2
October, 2011

Table of Contents

1. Preface	3
2. OTN Telemedicine Programs	5
2.1 Videoconferencing Service	5
2.1.1 Virtual Private Network	5
2.1.2 Bridging Service.....	5
2.1.3 Scheduling	6
2.1.4 Call Initiation and Control	6
2.1.5 Media Recording and Streaming.....	7
2.1.6 Equipment and Warranty Discounts.....	7
2.1.7 Equipment Installation.....	7
2.2 Emergency Telemedicine Services.....	7
2.2.1 Telestroke.....	7
2.2.2 Tele-trauma	8
2.2.3 Other Emergency Services	8
2.3 Store Forward Services.....	8
2.3.1 Teledermatology	8
2.3.2 Teleophthalmology	9
2.4 Telesteth	9
2.5 Telehomecare.....	9
2.6 PC-Based Videoconferencing	10
2.7 Collaboration and Learning Solutions.....	10
2.7.1 Web Conferencing	10
2.7.2 Online Learning	11
3. Connecting to OTN	12
3.1 Network Architecture.....	12
3.1.1 On-Net Connections	12
3.1.2 Off-Net Connections	14
3.1.3 Comparison of On-Net and Off-Net Connections.....	17
3.1.1 Network Providers.....	17
3.1.2 Network Performance Standards.....	21
3.1.3 Wireless Networks.....	22
3.2 Videoconferencing Equipment.....	23
3.3 Security Compliance.....	26
3.4 Personal Computers and Software.....	27
4. Technical Support	29
4.1 The Service Desk	29
4.1.1 Hours of Operation.....	30

4.1.2 Reporting Issues 31

4.1.3 Bridging and Gateway Service 31

4.1.4 Equipment Procurement..... 32

4.1.5 On-Site Support..... 32

4.1.6 Escalation procedures..... 32

4.2 Service Level Agreement 34

5. Member Responsibilities 38

5.1 Incident Reporting 38

5.2 Equipment Maintenance..... 38

5.2.1 Service Life 38

5.2.2 System Management..... 39

5.2.3 Networking 39

5.3 Warranty Coverage 40

5.4 Acceptable Use 41

6. Appendix A: List of Standard Equipment 42

7. Appendix B: OTN’s Standard System Configuration 43

1. PREFACE

The purpose of this document is to provide a clear and succinct description of the services that the Ontario Telemedicine Network (OTN) provides our Members, and to clarify the roles, responsibilities and mutual expectations of OTN and Members with respect to the delivery of quality telemedicine.

This document will be of interest to new, current and prospective members of OTN. In particular, it should be read by Telemedicine Coordinators, network administrators, technical support staff and telemedicine stakeholders.

This document is updated periodically. Major releases are always distributed 60 business days prior to publication, so that members can review any changes and provide feedback. The List of Standard Equipment, found in Appendix A, is updated every few months, as equipment vendors issue new models and software platforms, and as older equipment reaches end of service. The latest version of this document can be found in the Member Resource Library on the OTN website: <http://www.otn.ca/en/members/resource-library>.

Copyright Notice

Copyright Ontario Telemedicine Network (OTN) 2006. The information in this publication may not be reproduced, in part or in whole and by any means, without written permission from OTN.

Revision History

Date	Author(s)	Version	Description
August 8, 2006	R. Riesenbach	1.0	Original Framework
October 15, 2006	R. Riesenbach	2.0	Integration of Warranty policy, change of service level nomenclature, other improvements.
January 2, 2008	R. Patch	3.0	Standards-based service levels
May 20, 2008	R. Patch	4.0	Technical updates
April 1, 2011	R. Patch	5.0	Reorganized, SLA, Wireless, other telemedicine services

Contact

Communications regarding this document can be directed to:

Randy Patch
Director, Technical Services
Ontario Telemedicine Network
105 Moatfield Drive, Suite 1100
Toronto ON M3B 0A2
t. 416-446-4121
f. 416-446-4139
e. rpatch@otn.ca

2. OTN TELEMEDICINE PROGRAMS

OTN offers a range of telemedicine services, from videoconferencing to homecare support. This section briefly outlines OTN's technical service offerings. For more information, please visit the OTN web-site at www.otn.ca.

2.1 VIDEOCONFERENCING SERVICE

OTN operates one of the largest and most sophisticated medical videoconferencing services in the world. With over 1,000 member organizations in urban, rural and remote locations, OTN supports more than 100,000 clinical encounters each year in over 100 clinical specialties, as well as more than 20,000 educational and administrative events delivered through our videoconference bridges.

OTN's videoconferencing service is an end-to-end solution comprising network services, equipment selection, scheduling, event management, technical support and training.

2.1.1 Virtual Private Network

OTN provides secure, managed connections between videoconferencing systems. This is accomplished by establishing a virtual private network (VPN) among member sites and the OTN data centre. At each On-Net member site we install a router, which enables your videoconferencing systems to connect directly to OTN without the need for complicated network configuration or firewall rules. Connecting your systems to the OTN VPN also allows our technicians to manage and trouble-shoot your equipment remotely.

2.1.2 Bridging Service

OTN operates a state-of-the-art video bridging system, which allows you to videoconference with other OTN members for administrative, educational or clinical purposes. Our bridges offer features such as dynamic transcoding and speed matching, which allow different videoconferencing systems to communicate with the best available video quality.

OTN operates a centralized pool of ISDN circuits which you can use to connect to non-members with appropriate videoconferencing systems. You can even set up a single event including both ISDN participants and OTN members.¹

2.1.3 Scheduling

OTN has developed an electronic scheduling system (Ncompass) specifically for telemedicine users. You can use this system to schedule your own videoconference events, select participants, choose options, and even launch calls, all from an easy-to-use web interface. Alternatively, you can submit requests to the OTN Contact Centre, which will set up your events for you.

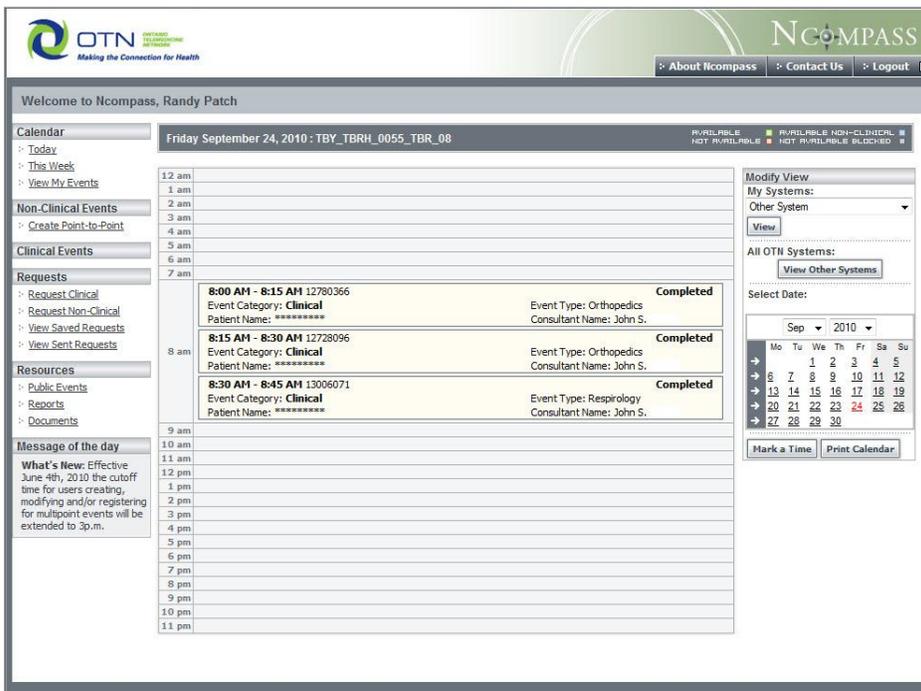


Figure 1: Ncompass Scheduling System

2.1.4 Call Initiation and Control

Once a point-to-point or multipoint event is scheduled, you can start the call in various ways. You can elect to have the call start automatically at the scheduled time, with the bridge connecting each registered participant for you. You can also choose to connect each participant

¹ Please note that ISDN service charges may apply.

in your call manually, using the on-screen member directory, or GAB (Global Address Book). Finally, you can use the *Click-to-Call* feature of Ncompass to launch the call at the click of an on-screen button.

2.1.5 Media Recording and Streaming

OTN's Web Streaming service allows you to share your non-clinical video events with audience members over the public Internet, without the need for videoconferencing equipment at the audience site. Events can be streamed live, as public or password-protected private sessions, or you can choose to record them for archived access. This service is often used by educators to reach a broader target audience. As per our *Acceptable Use Policy*, media recording is not available for clinical events.

2.1.6 Equipment and Warranty Discounts

Leveraging its volume buying power, OTN has negotiated preferred pricing arrangements with major videoconferencing and medical peripheral vendors, and we can pass these discounts on to OTN members. Working with OTN guarantees you the lowest available price from our vendors of record on your telemedicine equipment purchases. It can also save you the time and expense of issuing an RFP each time you need to acquire or replace equipment.

In addition to equipment discounts, we also negotiate preferred pricing on extended warranties for selected hardware and software, allowing you to save money when it comes time to renew your warranty. Contact your Regional Manager for more information.

2.1.7 Equipment Installation

Members purchasing telemedicine carts or room-based video systems can avail themselves of OTN's high-quality installation service. A trained, certified videoconferencing technician can be dispatched to your site to install your new telemedicine equipment, connect it to the OTN network and verify satisfactory operation. This service is a cost-effective alternative to purchasing vendor installation and ensures a high level of customer service and quality.

2.2 EMERGENCY TELEMEDICINE SERVICES

2.2.1 Telestroke

Telestroke is an emergency application that allows for the assessment and treatment of patients experiencing acute ischemic stroke through a virtual consult with a remote neurologist using

live, two-way videoconferencing. The referring site requires only a CT scanner and videoconferencing system, while the consulting physician uses a standard videoconferencing system and PC software to consult with the patient and referring physician, review the patient's CT scan and determine the best course of medical intervention.

2.2.2 Tele-trauma

Tele-trauma is an emergency service that allows trauma cases to be referred to specialists by referring centers based on the patient's anatomic, physiologic and injury based criteria. The use of videoconferencing and the sharing of diagnostic images helps guide specialized care and clinical decision making for the initial management and transfer of injured patients.

2.2.3 Other Emergency Services

OTN supports additional emergency telemedicine applications for patients who present at emergency departments or who are located in intensive care units and require urgent specialty consultation. These applications include virtual critical care, burn injury, mental health crisis, and sign language interpretation.

2.3 STORE FORWARD SERVICES

In addition to real-time telemedicine applications such as videoconferencing, OTN offers a growing number of asynchronous, *store forward* applications. Store forward applications typically involve uploading diagnostic information, digital imagery and patient data from a referring site to a secure server, from which they can later be accessed, downloaded and reviewed by a physician consultant.

2.3.1 Teledermatology

Teledermatology is an efficient and effective solution for the provision of remote assessment and treatment recommendations for dermatology patients. OTN's Teledermatology solution combines patient health data with digital imagery captured at a Family Health Team site, and presents this to a consulting dermatologist for review. The Teledermatology service also provides messaging and reporting functionality that facilitates integration into the workflow protocols of referring and consulting sites.

2.3.2 Teleophthalmology

Teleophthalmology or ocular telehealth is the provision of vision care over distance using telemedicine technology. It includes image acquisition, review and evaluation; image and data storage as well as report generation and patient care and supervision. Retinal photographs or images can be captured in one location, forwarded electronically and accessed by web-based technology for assessment by an ophthalmologist at a different location. Teleophthalmology improves access to eye examinations for screening, assessment and follow-up purposes.

2.4 TELESTETH

OTN's Telesteth solution allows healthcare providers to share heart, lung and airway sounds with colleagues anywhere in the province. Using a Bluetooth-enabled digital stethoscope, this system allows you to analyze and visualize heart and lung sounds on your PC, and to communicate this information to consultant physicians via your Internet browser. The solution was chosen for its advanced functionality, affordability and ease-of-use.²

2.5 TELEHOMECARE

OTN's Telehomecare program is designed to provide convenient, cost-effective health monitoring services to chronic-care patients in their homes. Using sophisticated, user-friendly biotelemetry devices and robust telecommunications networks, the Telehomecare program allows patients to self-manage their illnesses, with the remote supervision and guidance of a Family Health Team healthcare professional.

² The OTN Digital Stethoscope solution will be available by spring, 2011.

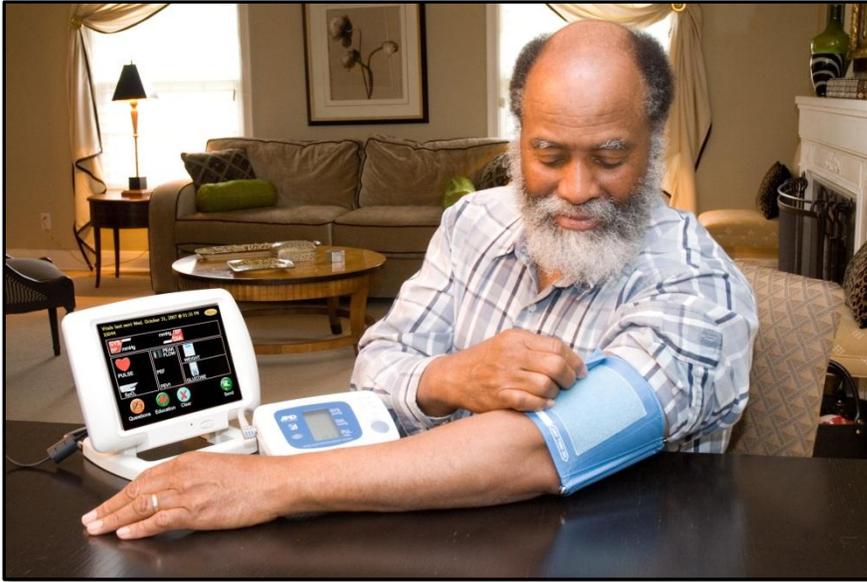


Figure 2: Telehomecare Biotelemetry system

2.6 PC-BASED VIDEOCONFERENCING

One of most persistent obstacles to the widespread adoption of videoconferencing in healthcare delivery and education has always been the high cost of acquiring, deploying and supporting the required equipment. OTN's PC-Based Videoconferencing program is designed to overcome this obstacle, by bringing the videoconferencing solution directly to your PC. Instead of requiring the purchase of a dedicated hardware appliance, the PCVC solution uses downloadable software to turn your web-cam equipped PC or laptop computer into a convenient and easy-to-use videoconferencing system.³

2.7 COLLABORATION AND LEARNING SOLUTIONS

2.7.1 Web Conferencing

For members who want the flexibility and convenience of live collaboration via the Internet, OTN offers a Web Conferencing service. OTN Web Conferencing gives you access to Adobe Connect, an industry-leading collaboration solution designed for remote individual and team

³ OTN's PC-based Videoconferencing service will be available mid-2011.

meetings, with multimedia sharing, white-boarding, videoconferencing, instant messaging and other tools, all delivered to your PC through your Web browser.⁴

2.7.2 Online Learning

OTN maintains a library of online learning modules for the telemedicine practitioner, available to members through a powerful, easy-to-use learning content management system.

⁴ OTN's web conferencing solution will be available by late 2011.

3. CONNECTING TO OTN

Part of OTN's mission is to develop and operate a state-of-the-art technical environment so that our members can deliver telemedicine practice of the highest calibre of security, quality and reliability. Given the size and activity of our membership, it is essential that members adhere to established OTN standards for hardware, software, processes and network architecture. The application of standards enables our members to connect to one another and to access OTN services reliably; at the same time, standards enable OTN to support our members and provide a consistent user experience.

From a technical perspective, OTN standards apply to:

- Network architecture;
- Videoconferencing equipment;
- Security compliance;
- Computer systems.

Each of these technical standards will be addressed in the following sections.

3.1 NETWORK ARCHITECTURE

Network design and support is one of the most important factors in ensuring secure, reliable, high-quality telemedicine. Network connections between your site(s) and OTN can be configured in various ways, depending on your needs, your chosen service provider and the type of equipment you plan to use. This section provides an overview of the available connection options. Your OTN Regional Manager and OTN technical staff will help you choose the right option for your situation.

3.1.1 On-Net Connections

If you are planning to deploy telemedicine carts or room-based systems, the On-Net connection is the preferred architecture. For On-Net systems, OTN installs a router at your site and uses this device to connect your videoconferencing system to the OTN Virtual Private Network (VPN). Use of the VPN ensures the greatest level of security and reliability, and allows the OTN Service Desk to remotely manage, configure and support your videoconferencing systems.

On-Net connections require the provision of a VLAN or dedicated video LAN cabling within your local network, allowing extension of the OTN address space from the installed OTN demarcation

router directly to the installed endpoints (see diagram below). This type of connection can be provisioned over any suitable backhaul network including eHealth Ontario, ORION, a community network or the Internet.

The demarcation device requires that one interface be addressed natively on the external network and one interface be included in the VLAN provided your site. The demarcation device will provide the default gateway for all OTN systems located on the dedicated VLAN. Redundant VPN tunnels will be established from the demarcation device to OTN central VPN concentrators to enable core redundancy.

All traffic is encrypted from the demarcation device outward and all OTN devices are addressed with OTN address space.

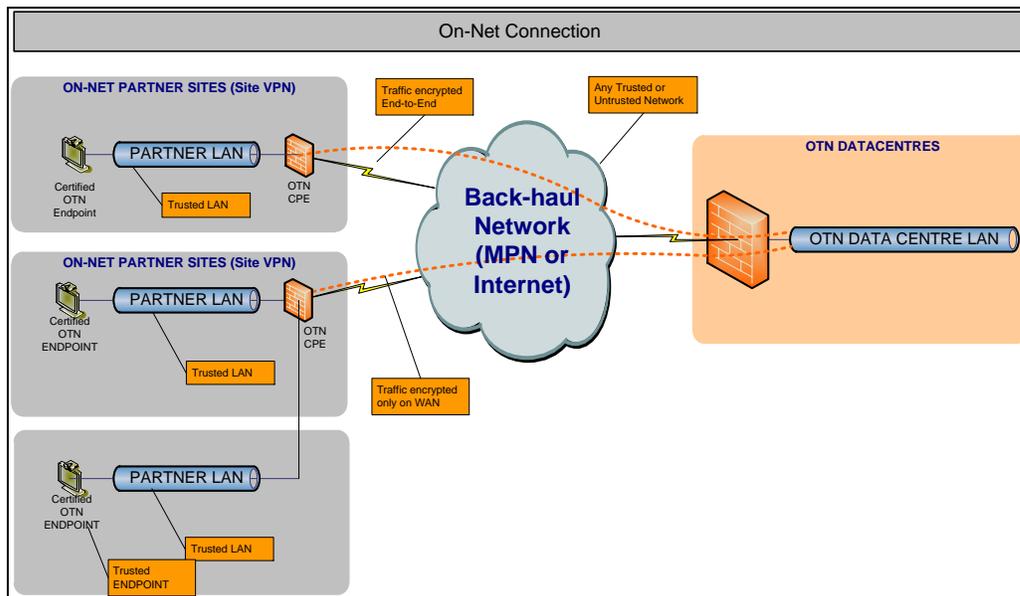


Figure 3: On-Net Architecture

Requirements:

- Configuration of a dedicated VLAN or physical LAN for use by OTN equipment.
- Installation of an OTN router.
- Provision of a native address on the backhaul network.

Limitations:

- All devices must be on a dedicated VLAN. This may require configuring to specific ports for VLAN membership or employing 802.1x automatic VLAN assignment.

- OTN endpoint monitoring services will not be available until the endpoint is powered on and connected to the dedicated VLAN.

3.1.2 Off-Net Connections

As described above, the On-Net architecture connects your videoconferencing system to OTN's VPN for a highly managed and reliable telemedicine service.

Although there are many advantages to the On-Net connection architecture, it may not be appropriate if:

- Your videoconferencing equipment or medical peripherals are not among the makes and models supported by OTN (See Appendix A: List of Standard Equipment).
- You regularly connect to end-points outside of OTN.
- You want to connect to OTN via a private network not among those supported by OTN.

For these situations, OTN offers two Off-Net solutions: Off-Net IP and Off-Net ISDN. These solutions are described below.

Off-Net IP

OTN maintains a Session Border Controller (SBC) infrastructure to facilitate IP connectivity to sites that are not in the OTN Virtual Private Network (VPN), but do have suitable alternate network connectivity. All systems that wish to participate in Off-Net IP calls must support standards-based encryption to participate in events as an Off-Net system.

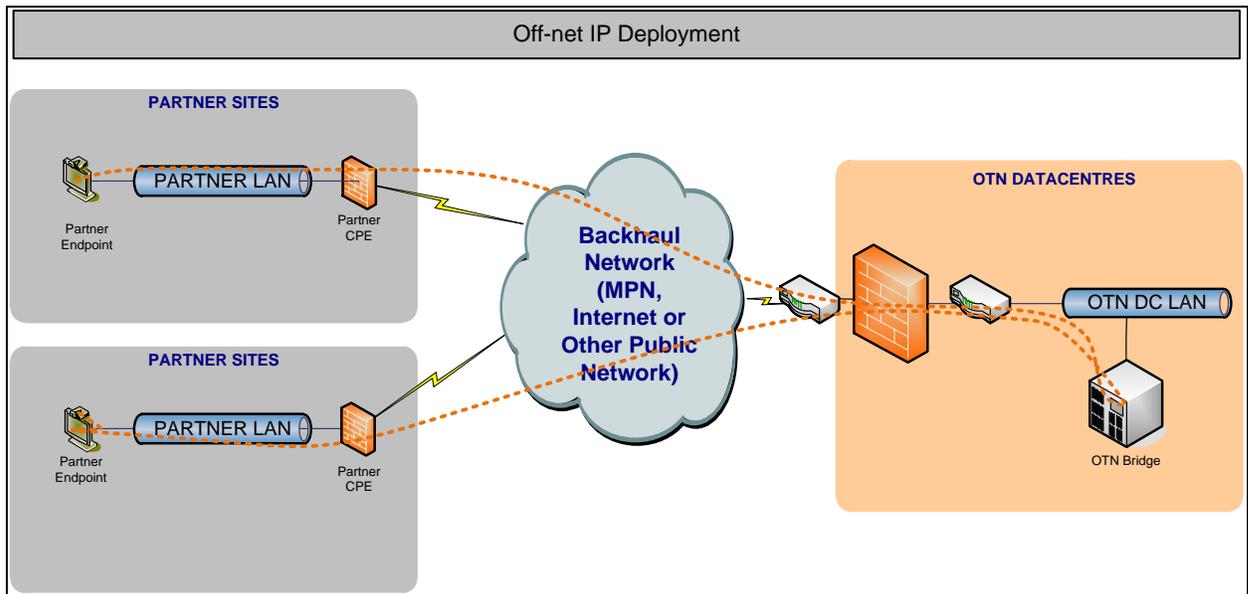


Figure 4: Off-Net IP Architecture

Requirements:

- The site must provide suitable network connectivity through the Internet, eHealth Ontario or other publicly available network.
- The site must either maintain a suitable SBC solution or appropriate access to endpoints through corporate firewalls.
- The systems in use should support DNS-based dialling.
- The systems in use must support standards-based video conferencing encryption (AES).

Limitations:

- All events must be scheduled through the OTN Contact Centre⁵.
- The OTN Service Desk can provide only very limited troubleshooting, since there is no direct visibility into endpoints connected via ISDN. Your own IT technical resources must provide first-level support for these systems.
- No OTN GAB (Global Address Book) is available for these endpoints.

⁵ OTN is currently developing enhancements to Ncompass that will permit Off-Net members to schedule their own events.

Off-Net ISDN

ISDN is a very well-defined and mature standard of connectivity. OTN maintains a bank of ISDN PRI lines to facilitate connectivity to the public telephone network. To connect via ISDN, your site must have ISDN lines (BRI or PRI) installed and you must be using ISDN-capable video systems.

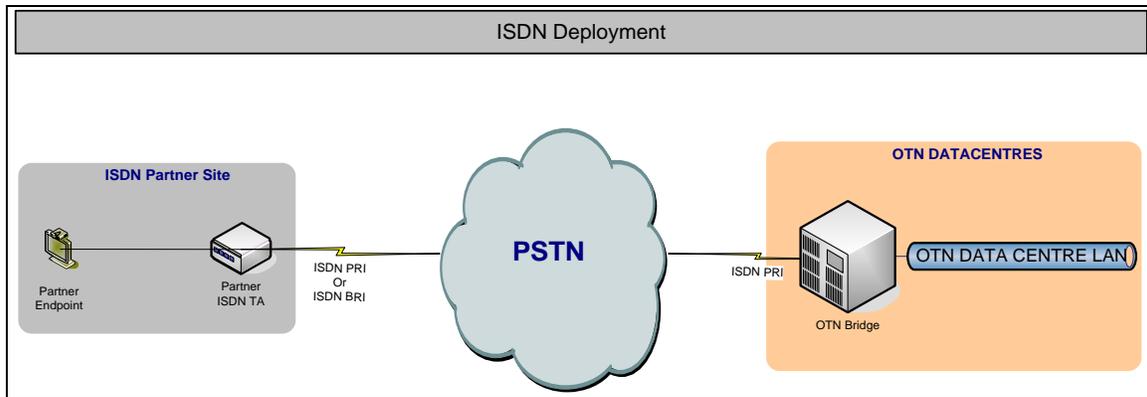


Figure 5: Off-Net ISDN Architecture

Requirements:

- The site must maintain ISDN capacity in the form of BRI (Basic Rate Interface) or PRI (Primary Rate Interface) circuits.
- Endpoints must be ISDN compatible.

Limitations:

- All events must be scheduled through the OTN Contact Centre.
- The OTN Service Desk can provide only very limited troubleshooting, since there is no direct visibility into endpoints connected via ISDN. Your own IT technical resources must provide first-level support for these systems.
- No OTN GAB (Global Address Book) is available for these endpoints.

3.1.3 Comparison of On-Net and Off-Net Connections

When deciding between an On-Net and Off-Net connection architecture, there are some important points to consider. Since On-Net systems can be directly monitored and administered by the OTN Service Desk, they are much easier to support. Remote management of these devices means that the Service Desk can apply software patches and upgrades remotely, and can perform troubleshooting and diagnostics without needing to involve your IT department. However, On-Net systems do entail certain requirements, as listed below:

1. Videoconferencing systems and any associated peripherals must appear on the List of Standard Equipment (Appendix A), and be maintained at the software revision indicated on the list.
2. Videoconferencing systems must be configured as specified in OTN's Standard System Configuration (Appendix B).
3. Videoconferencing and/or PC systems must be connected via the VPN On-Net architecture outlined in the previous section.

Alternatively, if you decide on the Off-Net architecture, the following limitations apply:

1. OTN is unable to provide any remote diagnostics, troubleshooting, preventative maintenance or equipment monitoring for Off-Net systems.
2. OTN cannot honour all our SLA commitments for Off-Net systems, due to our limited visibility into Off-Net endpoints.
3. All your events must be scheduled through the OTN Contact Centre. You cannot schedule your own events through Ncompass.

3.1.1 Network Providers

You can use various backhaul networks to connect to OTN, from private MPLS networks to the public Internet delivered over a DSL connection. Selection of an appropriate network service will depend on the available options in your region, as well as intended usage, budget, etc.

The following sections define some of the more commonly used network providers. Section 2.1.5 specifies network performance standards required for different OTN telemedicine services.

eHealth Ontario

eHealth Ontario operates a private MPLS network that connects over 4,000 health organizations in Ontario. This dedicated fibre and copper network is provisioned by Allstream and Hydro ONE Telecomm, and operates at capacities of 1 Mb/s to 200 Mb/s. With its high speed, security and reliability, the eHealth Ontario network should be your first choice if you are planning to use videoconferencing as part of your office telemedicine practice⁶.

Other Private Networks

OTN is able to extend On-Net connectivity to members located on several private networks, including:

- ORION: The ORION network is Ontario’s advanced high-speed research and educational network interconnecting the province’s academic and research institutions. ORION operates at 1 Mb/s minimum.
- K-NET: K-Net is an independent network serving First Nations communities of Northern Ontario. K-Net operates at 1Mb/s minimum bandwidth.
- Other: Community networks such as Larg*NET and others are supported after certification by OTN technical staff.

The Internet

For many telemedicine applications and member locations, the public Internet offers an affordable, accessible connectivity solution. The ever-growing range and quality of broadband access enables OTN to deliver telemedicine services over many business-grade Internet products. Due to the inherent variability of the Internet, special care must be taken in selecting and certifying these circuits to ensure a level of performance and reliability appropriate to telemedicine applications. OTN prequalifies Internet Service Providers and products in each region, and can help you source and qualify a connectivity solution appropriate to your needs.

Network bandwidth requirements for videoconferencing over the Internet are tabled below.⁷ Note that these requirements apply to **each video system** at your site. If you have more than

⁶ eHealth Ontario does not provide circuits into physicians’ home offices.

⁷ Future OTN services may require a reassessment of bandwidth requirements.

one system sharing an Internet connection, the required bandwidth must be multiplied accordingly.⁸

Service Parameter	Requirement
Service Type	Business Grade Internet
Bandwidth Allocation	Dedicated Business Grade Frequency
Download Speed	> 5 Mb/s
Upload Speed	> 800 Kb/s
Monthly Data Transfer	> 100 Gb
Technical Support	24/7
Mean Time To Repair	24 hours or less
# of Dynamic IPs	1

Notes on the Use of the Internet for Videoconferencing

The quality of service available to Internet users at any time tends to fluctuate significantly, depending on the number of users sharing the service, the volume of activity, the number of intermediary networks traversed, and other factors beyond the user’s control. Since real-time applications such as videoconferencing are highly sensitive to network conditions, it is very important to carefully manage any Internet circuit used to deliver telemedicine.

- Do not try to run multiple videoconferencing sessions over an Internet connection that has been designed to support only one session. At any given transmission speed, each videoconferencing session requires the same amount of available bandwidth, regardless whether the endpoint is a hardware appliance (such as a telemedicine cart) or a software client running on a PC.

⁸ For example, if you plan to use two videoconferencing systems sharing a single Internet connection, the available upload bandwidth would need to be at least 1.6 Mb (2 x 800 Kb/s). Download bandwidth would not need to be increased, as long as it is at least equal to upload bandwidth. Monthly data transfer would also need to be doubled, to 200 Gb.

- Do not run other Internet applications during a videoconferencing session. If there is insufficient bandwidth to support both the videoconference and the other application, your video quality will degrade and you may lose the connection.
- Remember that Internet Service Providers do not generally provide Service Level Agreements (SLAs) guaranteeing service availability or timelines for maintenance or repair. If you plan to use your Internet connection for a clinical practice or other critical application, you should ensure that you have a backup plan in the event of a protracted Internet outage.
- OTN does not support the use of cellular wireless Internet services for telemedicine.
- If you encounter problems with your On-Net Internet circuit, you should contact the OTN Service Desk. The Service Desk will work with your Internet Service Provider to diagnose and resolve the issue as quickly as possible. If your OTN service is Off-Net, you should call your Internet Service Provider directly. For an explanation of On-Net and Off-Net connections, see Section 3.1.3.

3.1.2 Network Performance Standards

Service	Provider Network	Connection Type	Bandwidth (Up/Down)	Packet Loss	Latency	Jitter
Hardware-based videoconferencing (Standard Definition)	eHealth Ontario, ORION, K-Net, Internet	On-Net, Off-Net, ISDN	800 kbps minimum per system	<.5%	<150 ms	<50 ms
PC-based Videoconferencing	eHealth Ontario, ORION, K-Net, Internet	Off-Net	800 kbps minimum per concurrent session	<.5%	<150 ms	<50 ms
Telestroke (Consultant Site)	Internet	On-Net	800 kbps minimum	<.5%	<150 ms	<50 ms
Store-Forward	eHealth Ontario, ORION, K-Net, Internet	On-Net, Off-Net	640 kpbs/3 Mbps minimum	<5%	<800 ms	<150 ms
Telehomecare	PSTN	n/a	n/a	n/a	n/a	n/a
Telehomecare (video enabled)	Internet	Off-Net	800 kbps	<.5%	<150 ms	<50 ms
Web conferencing	eHealth Ontario, ORION, K-Net, Internet	On-Net, Off-Net	128 kbps	<2%	<300 ms	<100 ms

3.1.3 Wireless Networks

A growing number of OTN members are exploring the possibilities of telemedicine over wireless networks within the healthcare site. Wireless technology offers significant advantages in terms of mobility and convenience, for applications such as PC-based videoconferencing, real-time collaboration, or clinical consultations via mobile telemedicine cart. However, before you introduce wireless technology into your telemedicine practice, you should be aware of its inherent risks.

Risks to the privacy and security of personal health information

It is important to understand the privacy and security risks inherent in the use of wireless technology in the telemedicine environment. A wireless system is more difficult to secure than an equivalent wired system for the following reasons:

- *Wireless signal propagation.* In a wired system, a communication signal is confined to the wire on which it is transmitted. In order to intercept the signal, a receiving device must be attached directly to the wire. In a wireless system, a communication signal is broadcast over an extended spatial area, and anyone within that area, using an appropriate receiving device, will be able to intercept the signal.
- *Encryption requirements.* In order to preserve the confidentiality of information transmitted over the wireless medium (which is inherently susceptible to eavesdropping), the information must be encrypted. A secure wireless encryption scheme is difficult to design and implement, leading to the frequent absence of encryption capabilities in real-world wireless systems, as well as numerous weaknesses in systems that do provide these capabilities.
- *Interference and jamming.* Because wireless signals propagate over an extended spatial area, it is easy for two signals to interfere with each other, causing both to become corrupted. Interference may be caused by other wireless sources in the area, leading to degradation in the performance of a wireless system. Furthermore, a malicious attacker may intentionally generate a strong wireless signal designed to interfere with a wireless system, in order to prevent it from operating.

As a health information custodian, you are required under the Personal Health Information Protection Act (PHIPA) to take reasonable steps to ensure the security and privacy of personal health information. These steps would include ensuring that policies, procedures and technical safeguards are in place at your organization to protect data transiting wireless networks.



Figure 6: Telemedicine Cart

OTN's List of Standard Equipment represents a careful balance between freedom of choice and adherence to standards. Since most members purchase their own equipment, we have no wish to interfere in your organization's procurement policies and processes. However, OTN's commitment to service quality requires that all endpoints connected to the OTN network be capable of error-free communication with all other endpoints. Videoconferencing products and software systems supported by OTN are rigorously tested to ensure interoperability with each other and with OTN's core infrastructure, providing a consistent, high-quality user experience. As our Vendors of Record introduce new products, we subject these to the same extensive testing to ensure seamless compatibility with equipment currently in use on the network. Equipment that meets these criteria is certified and added to the List of Standard Equipment.

Note: If your equipment is not on the List of Standard Equipment, you can still participate in OTN as an Off-Net member (see 3.1.2 Off-Net Connections).

As equipment vendors introduce new products into the telemedicine market, old products are eventually delisted. The service life of videoconferencing systems is typically eight years. After about five years of production, the manufacturer will declare the system as *End of Life* (EOL). EOL products are still supported, but are no longer developed: that is, new features and functions are not introduced for these systems. Two or three years after reaching EOL, a

3.3 SECURITY COMPLIANCE

OTN uses a variety of techniques to safeguard the security of video traffic and patient data traversing the network. The VPN architecture, explained above, uses the encryption capabilities of our member-site routers to provide secure transport over many different physical networks, including eHealth Ontario's ONE network and the public Internet. In addition, OTN employs end-point encryption to secure data as it traverses members' local network infrastructure, and to ensure that all sites are secure, even if an OTN router is not deployed. All OTN videoconferencing systems are configured to use Advanced Encryption Standard (AES), a symmetric key algorithm that is an accepted encryption standard in North America.

To ensure that AES is enabled on all active systems across the network, OTN performs active monitoring of endpoints at various times:

- *Daily:* OTN routinely scans active systems on the network to verify that AES encryption is enabled. This activity is performed off-hours through an automated, remote process. Results of the automated scanning are captured in a data log, which records the identification numbers of the systems scanned, model and software revision levels (when available) and the status of AES settings (for example, "ON", "OFF", "AUTO").
- *At registration time:* The OTN "gatekeeper" is a server that authorizes systems to participate in OTN events. When a system is powered on, it automatically registers with the gatekeeper, which determines its connection speed and other call control characteristics. During this automatic registration process, OTN detects and records AES encryption settings. If AES encryption is found to be disabled, the Service Desk is notified for follow-up with the member.
- *During System Certification:* During certification or maintenance of videoconference systems, the OTN Service Desk checks the system's AES encryption settings, and enables AES if required.
- *At Event Initiation:* A scan of AES settings is performed on each system participating in an event, at call initiation.

In the event that one of your systems is found to be out of compliance with our encryption standard, a Service Desk representative will contact you and help you resolve the issue.

3.4 PERSONAL COMPUTERS AND SOFTWARE

A growing number of OTN services are delivered on a personal computer platform. These include:

- Ncompass – OTN’s web-based scheduling system.
- PCVC – videoconferencing delivered over a PC client.
- Telestroke – emergency stroke diagnosis based on PC download of CT scan imagery.
- Store Forward – various clinical applications that allow a specialist to download and review diagnostic data from a central server.
- Web Conferencing – live meetings, document sharing and presentations delivered over the OTN network or public Internet.

Depending on the required level of remote technical support, some applications necessitate that OTN directly manage the PC client and that the PC be logged onto the OTN Domain. This allows the OTN Service Desk to troubleshoot the PC, and to install software upgrades and fixes. It also prevents you from inadvertently compromising the application by installing conflicting software or by changing essential configuration settings.

The table below summarizes configuration data for various OTN PC applications. For more information, see the Technology section of the Member Resource Library on the OTN web-site (<http://www.otn.ca/en/members/resource-library>).

Application	Admin	O/S	Minimum Specifications	Client Software	Special Requirements
Telestroke	OTN	Windows XP	Dual Core PC / 2GB RAM	Merge eFilm	OTN Domain
Analogue Stethoscope	OTN	Windows 2000/XP	Intel Pentium 4 / 1GB RAM/Serial – RS232 Port)	AMD SmartSteth	Serial Port (RS-232) OTN Domain
Telesteth (FUTURE)	OTN	Windows XP	Dual Core PC / 2GB RAM	3M Telesteth	USB 2.0+/Bluetooth
Teleophthalmology	OTN	Windows XP	Dual Core PC / 4GB RAM	Imagenet & OIS Winstation	OTN Domain

TECHNICAL SERVICE LEVEL AGREEMENT

Teledermatology	User	Windows XP / Windows 7 (OTN does not provide PC)	Dual Core PC / 2GB RAM	Medweb	OTN Domain
Web Streaming	User	Windows XP+, MAC OSX 10.4.8+	PIII/512MB RAM	IE 6.0, Firefox 2.0, Google Chrome 1.0, Silverlight 1.0, Windows Media Player 9	Refer to: http://webcast.otn.ca/support.html
Web Conferencing	User	Windows XP	Dual Core PC / 2GB RAM	Adobe Connect Active X	
Personal Computer Video Conferencing	User	Windows XP Windows 7 Mac OS	Dual Core PC / 2GB RAM	Vidyo	Refer to PCVC Technical Readiness document

4. TECHNICAL SUPPORT

OTN supports your Telemedicine programs by taking an active role in the Telemedicine service delivery chain. Using advanced network and system management tools, OTN technicians proactively monitor the network, scanning for problems that might affect your service. If a problem is detected at your site, technicians will either correct the problem remotely, or work with your technical resources to resolve the issue. This active support role means that many problems can be detected and repaired before service is affected.



Figure 7: The OTN Service Desk

4.1 THE SERVICE DESK

The OTN Service Desk is your first point of contact for all technical issues and requests relating to OTN telemedicine service. Staffed by customer support professionals and backed by networking and telemedicine experts, the OTN Service Desk can help you diagnose and resolve issues and get you back online quickly.

The Service Desk is fully staffed during regular hours of operation (see section 4.1.1), with emergency on-call coverage after hours. Services provided by the Service Desk include:

- On the spot trouble-shooting;

- User technical support;
- Software upgrades;
- Remote diagnostics;
- System certifications;
- Service bulletins and member communication;
- By request session monitoring;
- User account management;
- Event management – for example, conference extensions, participant add/drops, audio muting, etc.; and
- Media recording.

The OTN Service Desk can be reached through a toll-free telephone number (1-866-454-6861), or by e-mail (for non-critical requests) at servicedesk@otn.ca.

4.1.1 Hours of Operation

OTN technical support is available at the following times:

Terminology	Definition
Normal Business Hours	Monday to Friday, 7:00am to 7:00pm Eastern Time (statutory holidays excluded), starting the first business day after Labour Day and ending the last business day prior to Canada Day.
Summer Hours	Monday to Friday, 7:00am to 5:00pm Eastern Time (statutory holidays excluded), starting the first business day after Canada Day, and ending the last business day prior to Labour Day.
Extended Hours	All times of day falling outside of Normal Business Hours, including evenings, weekends and statutory holidays.

Statutory Holidays

The following are OTN’s observed statutory holidays:



- New Year's Day
- Family Day (Ontario)
- Good Friday
- Victoria Day
- Canada Day
- Civic Holiday (Ontario)
- Labour Day
- Thanksgiving Day
- Christmas Day
- Boxing Day

With advanced written notice to members, OTN may reduce technical support services during specific time-periods, for example, the working days between the statutory holidays of Christmas and New Year's.

4.1.2 Reporting Issues

All technical support requests and problem reports should be directed to the OTN Service Desk, by phone or email. The responding technician will log your call in the ticketing system and give you a service ticket number. If you have to call back regarding the same issue, it is helpful to provide the service ticket number for quick reference.

Whenever you contact the Service Desk, you should report your site number and system number, if applicable. If you are calling about a specific videoconferencing event, you should also have the event ID handy. This enables the Service Desk technician to quickly retrieve particulars of the event, and to check the status of participating systems.

If you are calling for help with any of OTN's emergency clinical services, including Telestroke, Teletrauma or Surgical Telementoring, be sure to state this to the Service Desk technician answering your call.

Note: Any time OTN is experiencing a prolonged or widespread technical issue, the Service Desk updates the Emergency Notification, which is a brief recorded message reporting the status of the network. To hear the Emergency Notification, call the Service Desk and listen for the message just before the voice menu options are presented.

4.1.3 Bridging and Gateway Service

To schedule a videoconferencing event you should use either the online self-scheduling tool, Ncompass (<https://schedule.otn.ca>), or contact the OTN Contact Centre. If you want to make

changes to an event in session (for example, extend the call, add or drop participants, or change other setup options), call the Service Desk.

4.1.4 Equipment Procurement

OTN employs technical experts who can help you select the appropriate equipment for your telemedicine needs. Whether you are planning to purchase a videoconferencing system, telemedicine cart, medical peripheral or other telemedicine device, our procurement specialists can help you select the right equipment to meet your needs and to ensure interoperability with your other OTN services. Once you have made a selection, we can also help with the procurement process, getting you quotations, arranging shipping and performing the installation.⁹

4.1.5 On-Site Support

OTN's Regional Technical Services group comprises network, computer and videoconferencing experts who can be dispatched to troubleshoot and resolve issues requiring hands-on intervention. The Regional Technical Services team is positioned strategically throughout the province and can be available within 24 hours of a critical issue report or service request. Requests for on-site assistance must be directed through the Service Desk.

In addition to specific problem resolution, the Regional Technical Services group can provide consulting help with your planned or active telemedicine programs.

4.1.6 Escalation procedures

At OTN we pride ourselves on providing the best customer service possible to our members. Whenever you encounter any technical issue with our service, you should follow these steps to get it resolved:

STEP 1: Contact the Service Desk and report the issue, providing as much information as you can.

STEP 2: If the issue is not dealt with promptly, or if you are not satisfied with any aspect of the customer service experience, call the Service Desk Manager. (Call 1-866-6861 extension 4152.)

⁹ Some fees may apply: see *OTN Membership Fee Schedule* for more information.

STEP 3: If the Service Desk Manager cannot be reached, or does not provide a satisfactory response, direct your issue to the Director of Technical Services for further action. The Director of Technical Services can be reached at 416-446-4121.



4.2 SERVICE LEVEL AGREEMENT

The table below summarizes OTN’s service level commitments to our members. In some cases, specific SLA targets may be modified, added or deleted as part of a separately-negotiated agreement with a member or group. In these cases, a Memorandum of Understanding will be drafted and signed by OTN and the relevant member(s).

Note: OTN’s service is heavily dependent on various 3rd party providers, such as network vendors and equipment manufacturers. As such, we can make no guarantees with respect to the quality or availability of those aspects of our service that our beyond OTN’s direct control.

SLA Service Item	Worst Case Value	Units	Conditions
Service Quality			
Service Desk on call	7/24/365	days	100% of the time
Service Desk availability	99.9	%	
Service Desk telephone on hold time not to exceed	60	seconds	80% of the time during business hours
Service Desk resolves incident without escalation	80	%	
Communications			
Time to notify members of Priority 1 Incident (see next section for priority definitions)	30	minutes	90% of the time
Time to notify members of Priority 2 Incident (see next section for priority definitions)	60	minutes	90% of the time
Time to notify members of resolution of Priority 1 Incident (see next section for priority definitions)	30	minutes	90% of the time
Time to notify members of resolution of Priority 2 Incident (see next section for priority definitions)	60	minutes	90% of the time

SLA Service Item	Worst Case Value	Units	Conditions
Time to notify member of local router failure, during Business Hours (On-Net system only)	60	minutes	90% of the time from the moment the failure is detected
Time to notify member of local router failure, Off Hours (On-Net system only)	Next Business Day		90% of the time from the moment the failure is detected
Service Availability (excluding network)¹⁰			
Availability of videoconference bridge	99.5	%	During Business Hours
Availability of media streaming service	99.5	%	During Business Hours
Availability of Emergency Telemedicine services	99.9	%	At all times
Availability of PCVC service	98.0	%	During Business Hours
Mean Time to Repair Priority 1 Incident (Critical)	4	Hours	80% of the time
Mean Time to Repair Priority 2 Incident (High) (see next section for priority definitions)	8	Business Hours	80% of the time
Mean Time to Repair Priority 3 Incident (Medium) (see next section for priority definitions)	12	Business Hours	80% of the time

¹⁰ For those incidents requiring on-site intervention by an OTN service technician, the MTTR targets listed here do not include applicable travel time.

SLA Service Item	Worst Case Value	Units	Conditions
Account Management			
Time to respond to membership inquiry	2	Business Days	90% of the time
Time to arrange technical consultation	5	Business Days	90% of the time
Time to provide connectivity recommendation and quote	20	Business Days	90% of the time
Time to provide equipment recommendation and quotation	2	Business Days	90% of the time
Time to undertake bandwidth assessment	3	Business Days	90% of the time
Time to provide site utilization report	5	Business Days	90% of the time
Time to respond to privacy incident	1	Business Day	90% of the time

Priority Definitions

The table below shows examples of common incidents and their associated priority levels.

Priority 1 (Critical)	Priority 2 (High)	Priority 3 (Medium)
<ul style="list-style-type: none"> ▪ Widespread service outage affecting multiple sites ▪ Videoconferencing core infrastructure unavailable ▪ Scheduling system unavailable ▪ Emergency service unavailable ▪ All PCVC users cannot access service or cannot initiate or receive calls ▪ Webcasting service unavailable at multiple sites ▪ Public health, safety or security risk 	<ul style="list-style-type: none"> ▪ Degraded service at multiple sites ▪ Limited Network Outage ▪ Multipoint event failed ▪ PCVC Users cannot initiate calls with legacy users ▪ Legacy users cannot initiate calls with PCVC users ▪ Webcasting event unavailable or cannot be recorded ▪ E-Training system unavailable ▪ Critical application degraded or partially unavailable ▪ Emergency maintenance required 	<ul style="list-style-type: none"> ▪ Degraded service at single site ▪ Single user unable to access critical application ▪ Moderate or intermittent audio/video quality degradation ▪ Telemedicine system unavailable ▪ Some participants unable to connect to an event ▪ Single PCVC user cannot login or initiate calls

5. MEMBER RESPONSIBILITIES

5.1 INCIDENT REPORTING

Members are asked to report any and all technical issues to the OTN Service Desk, as soon as possible. Issues sometimes arise during a videoconferencing event, and we recognize that it may not be convenient to call the Service Desk at that time, but you should report the issue as soon as possible thereafter. When reporting an issue relevant to a videoconferencing event, it is most helpful if you can provide the event ID. This enables the Service Desk technician to quickly retrieve information about the event and the participating sites.

It is especially important to report recurring problems or persistent quality issues to the Service Desk. The Service Desk has tools for monitoring network traffic and identifying transmission errors that can lead to degraded performance. If necessary, we can also dispatch a technician to your site for in-depth diagnostics and troubleshooting. However, we cannot do anything to resolve an issue that has not been reported.

5.2 EQUIPMENT MAINTENANCE

5.2.1 Service Life

As an OTN member you are required to ensure that any telemedicine equipment you connect to the OTN network, or use to receive an OTN telemedicine service, complies with our hardware and software standards, as specified in Appendix A: List of Standard Equipment.

You are further required to replace aging equipment as it reaches its manufacturer's EOS date, which indicates that the product is no longer supported. As explained in Section 3.2 above, EOS systems are removed from the List of Standard Equipment, since we can no longer support this equipment.

Although systems may function normally after the EOS date, potential issues with their continued include the following:

- Manufacturers will not respond to service requests or problem reports on EOS systems. The OTN Service Desk will attempt to provide assistance, but will be very limited in the service it can offer.

- Replacement parts become scarce or unavailable, so that it may become impossible to repair a faulty or damaged EOS system.
- New peripherals (including monitors, speakers and medical devices) may not physically connect to older systems.
- Software patches and upgrades are no longer provided by the manufacturer, which means that bugs and known issues cannot be addressed.
- New equipment will frequently not interoperate with older systems, with the result that telemedicine events involving EOS systems may be degraded in quality or fail entirely.
- New features and functions introduced into the OTN network may not work properly—or at all—with EOS systems, and may cause EOS systems to malfunction.

An OTN representative will try to contact you well in advance of any of your systems reaching EOS status, and will help you select a replacement suitable to your needs and budget.

Note: OTN reserves the right to remove from the network any system that does not comply with our hardware and/or software requirements as set out in the current List of Standard Equipment.

5.2.2 System Management

The following list of member responsibilities applies to any devices (videoconferencing system, PC, peripheral) that you use to connect to or receive OTN services:

- Ensure that your equipment is physically secure when not in use and is accessible only by authorized persons.
- Turn on your videoconferencing system ½ hour prior to any scheduled videoconference.
- Provide physical access to OTN technicians when required.
- Ensure that your OTN-connected telemedicine systems are maintained at the correct software revision as specified in the List of Standard Equipment (Appendix A).
- Refrain from making any changes to the configuration of videoconferencing systems, personal computers, routers or other devices used to deliver OTN telemedicine services.
- Check with your OTN Regional Manager before purchasing equipment which you intend to connect to OTN.
- Inform OTN of any lost, stolen or damaged equipment as soon as possible.

5.2.3 Networking

OTN relies on members' local IT resources to provide network connectivity from the OTN demarcation point (usually, an OTN router located in your site's switch room or wiring closet) and the end-point on your LAN. Specifically, we need your IT department to:

- Maintain local wiring infrastructure or wireless networks used to connect to OTN in good working order.
- Maintain an appropriate environment for telecommunications equipment.
- Secure connectivity via VLAN or physical isolation of video LAN network.
- Ensure that security of LAN or wireless LAN is tested through vulnerability assessments and intrusion detection.
- Advise OTN of any changes that may potentially affect or impact telemedicine service, security or reliability (such as physical changes to wiring, potential environmental disturbances, renovations, moves, etc.).
- Ensure that switching gear is able to support video/real-time traffic (no network hubs), also switch settings are configured for video/real-time traffic (Full Duplex/Half Duplex).

5.3 WARRANTY COVERAGE

The most important and most expensive components of your videoconferencing-based telemedicine system are the camera and the medical peripherals. Warranties protect your equipment against security threats, provide for improved functionality and performance, ensure continuing interoperability with other telemedicine devices and centralized services (such as video bridges) and also serve to stave-off technological obsolescence and the need for early replacement of your equipment. To ensure problem-free use of these systems, it is extremely important that you maintain your equipment under manufacturer's warranties. Warranty coverage enables OTN to address software bugs, interoperability issues and component failures; without this coverage, the OTN Service Desk can do very little to help you with faulty equipment.

Note: As an OTN member, you are required to maintain your videoconferencing system, medical peripherals and/or PC-based videoconferencing software under a full manufacturer's warranty (hardware and software) at all times. Failure to maintain warranty coverage may result in suspension of your OTN service.

OTN has negotiated very favourable warranty discounts with our Vendors of Record, and these discounts are available to you as an OTN member. To facilitate the warranty renewal process, we will notify you in advance when your warranty is approaching its expiry date, and we will provide you with a price quote to extend or renew your warranty.

If you have any questions about warranty coverage, you should contact your OTN Regional Manager or the OTN Service Desk.

5.4 ACCEPTABLE USE

Telemedicine equipment, medical peripherals and PC systems at member sites usually belong to the member, and as such are out of OTN's direct control. While we have no wish to dictate how members may use their own equipment, we must require adherence to certain rules of acceptable use. Only in this way can we provide a reliable and sustainable service to all our members.

The following regulations apply to the use of telemedicine equipment which is used to connect to OTN or to receive OTN services:

- Do not modify the OTN standard configuration settings of your videoconferencing system, medical peripherals, telemedicine PC or network equipment.
- Do not disconnect and reconnect your videoconferencing systems to the OTN network.
- Do not bypass or attempt to bypass security measures configured on your equipment or on the OTN owned routers or switches at your site.
- Do not attach your own bridging hardware to the OTN router or switch located at your site.
- Except in the case of emergency calls, do not initiate videoconferences – by any means – that have not been scheduled through the Contact Centre or as otherwise negotiated with OTN.
- Do not attach any recording device or recording software to your OTN-connected videoconferencing system or use your PC-based videoconferencing software to record sessions.
- Do not attempt to use OTN-services for any function or application other than those specifically supported by OTN, as listed in Section 1 above.

If you are in any questions or concerns about appropriate use of your telemedicine equipment, please contact the Service Desk.

Failure to adhere to these regulations may result in suspension of your OTN membership.

6. APPENDIX A: LIST OF STANDARD EQUIPMENT

Please see: [List of Standard Equipment](#) on the OTN website.

7. APPENDIX B: OTN'S STANDARD SYSTEM CONFIGURATION

OTN requires standardized configuration for videoconference systems that are attached to its network. This standard is intended to ensure reliability and security of the network.

Configuration Item	Value
System Name (or H.323 name)	Individually assigned, as per OTN naming standard.
E.164 Address	Individually assigned, as per OTN E.164 standard
IP Address	Individually assigned by OTN
Subnet Mask	Individually assigned by OTN
Default Gateway	Individually assigned by OTN
Gatekeeper IP Address	Assigned by OTN
Auto Answer	Enabled
Auto Answer microphone	Mute on Auto Answer
Telnet access	Enabled
Administrator Login	Admin
Administrator Password	Individually assigned by OTN
Remote viewing over the web	disabled
Network Performance	Check for Packet Loss
PIP or POP	Set according to Client preferences
MultiPoint	Disabled
H.239	Disabled
Polycom Specific Settings	
(1) H.323 Name	Individually assigned, as per OTN naming

(2) System Name	standard.
(3) Hostname	N.B. on some system Hostname cannot have underscores, so use system name with the underscores removed.
Remote Control Snapshot Button	Disabled
Encryption	When Available (on some models) ON (on models that do not have "When Available")
Encryption Mode	128-bit AES (not selectable on all models)
Tandberg Specific Settings	
(1) H.323 Name (2) System Name	Individually assigned, as per OTN naming standard.
H.264	Enabled
MTU	1300
Preset set to	"easy to use"
Encryption	Auto
Encryption Mode	128-bit AES
PCVC client software configuration	
PCVC software – Auto Answer Enabled	"Off" or Unchecked.
Play a Tone when participants join / leave	"On" or Checked
Display / Show Participant Names	"On" or Checked
VidyoProxy	Automatic
Web Proxy	Use settings from Internet Explorer
QoS Settings – Allstream Officenet Circuits	
QoS Type:	Diffserv

QoS Video	26
QoS Audio	26
QoS Data	0
QoS Signaling	26
QoS Settings – HOT OTN VRF Circuits	
QoS Type:	IP Precedence
QoS Video	3
QoS Audio	3