NETWORK SERVICES

Get connected...

ORION is a not-for-profit, high-speed optical network dedicated exclusively to bringing broadband access and connectivity to Ontario's research and advanced education (R&E) community. Our 5,800-kilometre network links 21 communities throughout Ontario with one of the largest and most powerful research networks ever built.

What ORION allows you to do …

- link to other ORION user organizations such as universities, colleges, research labs and teaching hospitals at Gigabit speeds;
- connect to CANARIE, Internet2 and other R&E networks around the world;
- access large shared genomic, biotech and other databases;
- undertake large data file transfers;
- enable virtual university and college classrooms or labs with students and facilities in different sites;
- apply new methods of learning and research among universities, colleges, research institutes;
- access a new platform for development and testing of new applications, services and technologies;
- develop new, real-time collaborative projects, including multipoint videoconferencing, grid-computing and advanced research applications; and
- partner with the private sector to undertake applied and theoretical research and development.

An advanced and reliable network …

- Nortel Network's OPTera* Long Haul Optical Line System backbone;
- Cisco System's Cisco 7600 series routers;
- Optical wavelength capacities at 10 Gbps, scalable to 320 Gbps;
- Technologies incorporating Dense Wave Division Multiplexing (DWDM) at the transmission layer and IP (Internet Protocol) at the routing layer;
- Specialized services including optical light paths, ethernet circuits, wavelengths and VLANs;
- 24/7 network management, monitoring and trouble-shooting;
- Stringent network confidentiality and security; and
- Carrier-class power back-up.

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1. Advanced Research and Education Service

Point-to-Multipoint data packet IP routing service. The demarcation point is the ORION PoP where the user's circuit is terminated. ORION operates two exit points to CANARIE at its Downtown Toronto and Ottawa PoPs but in the future may peer with other neighbouring R&E networks. The service can deliver ORION and CANARIE routing tables via BGP to the user network edge router. Bandwidth utilization on the service interface may be capped to meet the user's traffic levels. The service is available at every ORION PoP. This is the default ORION routed service providing reachability to all ORION and CANARIE connected networks.

2. Transport Services

These services use the optical transport layer directly and are implemented by reserving a light frequency or a bundle of SONET channels depending on the capacity requested.

2.1 Ethernet Transport Service

Point-to-point Gigabit Ethernet circuit provisioned directly through the optical channel and bypassing layer three data devices. The service's two demarcation points are the fiber patch panels at the optical ORION PoPs in the two destination cities. The service is available between any two ORION PoPs throughout the network. The service has a guaranteed bandwidth of 1.25Gbps full duplex.

2.2 Optical Lightpath Transport Service

ORION offers its users non-IP, layer-3 frame independent, point-to-point transport services to accommodate special projects and traffic requirements. All PoPs will support the provisioning of dedicated Gigabit Ethernet channel or a dedicated wavelength ranging in speeds from 1.25 Gbps to 10 Gbps. User interfaces connect directly to the PoP optical equipment. All optical lightpath transport services terminate within the ORION network. Details of these services have to be worked out on a per project basis.

3. VLAN Services

Extends the geographical reach of a network by dedicating an express non-intrusive packet forwarding channel through the ORION routers between two or more ORION PoPs. This is a LAN extension service and does not provide any IP routing of traffic between the destinations.

3.1 Point-to-point VLAN

Point-to-point virtual circuit provisioned through the layer three data devices but bypassing the routing layer. The service's two demarcation points are the Ethernet ports on the ORION data equipment at the two ORION end PoPs. The service is available between any two ORION PoPs throughout the network. The service uses Ethernet transport at speeds of 10, 100, or 1000 Mbps full duplex but does not guarantee a minimum throughput level.

3.2 Point-to-multipoint VLAN

Point-to-multiple-Points virtual circuit provisioned through the layer three data devices but bypassing the routing layer. The service's demarcation points are the Ethernet ports on the ORION data equipment at the various ORION end PoPs closest to the member's locations. The service is available between any three or more ORION PoPs throughout the network. The service uses Ethernet transport at speeds of 10, 100, or 1000 Mbps full duplex but does not guarantee a minimum throughput level.

4. Virtual Routing Service

Enables members to have a routed wide area network for its geographically distributed locations. The service provides IP routing between the multiple locations interconnected via ORION VLANs. The routing functions and tables are maintained by the ORION routers through its VRF technology. A Point-to-Point VLAN interconnects each member location participating in the routed-WAN architecture to a VRF enabled router. Routed WANs are more efficient than extended-LANs in terms of bandwidth utilizations and stability.

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The ORION Advantage

Availability

Minimizing outages is one of ORION's highest priorities. Our network was designed and created to carry production-level traffic on behalf of our users, including critical research data, back-office business systems, classroom and teaching materials, data being transported to and from large databases, or general Internet traffic. Some of that traffic, such as classroom instruction is intolerant to interruptions, degraded service, or long outages. Our users expect a reliable and robust network and such an expectation can only be delivered with full network component redundancy that translates into carrier-class availability to the end user.

Security

ORION designs and configures its infrastructure with physical access security in mind. At each one of our 22 PoPs, our specialized equipment is situated in a secured computer room environment, accessible by authorized personnel only. Special configuration guidelines are followed on all switches, routers and servers, to prevent unauthorized remote access for read, write or relay operations. ORANO does not use dedicated firewalls to limit access to the network but upon requests from users will configure the on-site equipment with special packet filtering access lists. If denial of service attacks are observed by our Network Operations Centre (NOC) or reported by users, we install blocking filters on ORION's backbone routers in order to minimize the impact and work with the network users and service providers to track down and disable the source of the attack.

Back-up

ORION features advanced redundant power plants at each of its 22 PoP locations, with a minimum of 10 hours emergency power backup in case of outages or blackouts.

Support

The ORION Network Operations Centre (NOC) is available, year-round, 24/7. Our operators react to any sign of trouble detected by ORION's sophisticated Network Monitoring System (NMS) or reported by users or other third parties, to initiate a trouble resolution process. Our Network Management Centre uses SNMP and various custom and vendor specific tools to continuously monitor the network and alert the network operators to any unusual activities including outages, poor performance, and hardware or software failures. The NMS also collects data for analysis and network improvement.

Expertise

The ORION Engineering Team, among the most experienced telecommunications professionals in the country, is responsible for network design and technology planning and support. Our users can rely on their support and advice to ensure they have uninterrupted access to one of the world's largest and most advanced optical networking infrastructures.

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orion

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