



TECHNICAL SPECIFICATIONS IN A NUTSHELL

Backbone technology: deterministic Time Division Multiplexing (TDM)

Basic topology:

Self-healing Redundant Fiber Optic Ring or Daisy Chain Subnetworks can be coupled redundantly.

Backbone ring capacity:

| | |
|-------------|-------------|
| 150/155Mbps | STM1/OC3 |
| 600/622Mbps | STM4/OC12 |
| 2.5 Gbps | STM16/OC48 |
| 10 Gbps | STM64/OC192 |

Optics

1310 or 1550 nm
Intra office up to Long Range (<1 km up to >100 km)

Node types:

| | | |
|------------------------|--------------------|---------------------|
| 8- interface slot node | 483 x 267 x 290 mm | (19 x 10.5 x 11.5") |
| 4- interface slot node | 483 x 133 x 290 mm | (19 x 5.3 x 11.5") |
| Integrated node | 483 x 44 x 316 mm | (19 x 1.8 x 12.4") |

Power supply

Redundant power supply
Broad range of input power: 90 to 264 VAC, 18 to 60 VDC, 125 VDC

Operating Environment

| | | |
|-------------|-------------------|-----------------------------------|
| Temperature | -20°C to 55°C | (-4°F to 131°F) |
| | -20°C up to +70°C | (-4°F to +158°F) for N20xx-R node |
| Humidity | 20% to 80% | (non-condensing) |

OTN Systems NV

Atealaan 34, 2200 Herentals, Belgium
Fax: +32 14 25 20 23
E-mail: info@otnsystems.com
www.otnsystems.com - www.otn.be

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Interfaces

Audio/Voice interface cards

Analog telephony
2 wire a/b (FXS/FXO)
4 wire E&M
Digital telephony
S0
 $U_{PO/E} / U_{PO}$
Voice over IP via Ethernet interface card
Trunk
E1 2.048 Mbps
T1 1.544 Mbps
Public Address
High Quality Audio (15 kHz)
Fixed / Switched
Mono / Stereo

Data interface cards

RS-232, RS-422, RS-485 (Point-to-point, Multipoint, Multidrop)
64 kbps G.703 co-directional

LAN Interfaces

Ethernet (10/100 Mbps)
Gigabit Ethernet (1000Mbps)

Video (fixed or dynamic connections)

Analog video interface: PAL, NTSC (H.264/AVC, MPEG-2, MPEG-4 or M-JPEG compression)
IP video via Ethernet Interface cards.
DVB-ASI

Video Features

- Analog & IP video capabilities
- Embedded channel switching
- Integrated Video over IP streaming capability
- Integrated video recording and management solution
- Real-time/high-resolution images
- Open interfaces for 3rd party products

OTN Management System (OMS)

- Graphical User Interface (GUI)
- Client - server architecture with Single, Multiple or Remote Clients
- Hardware Management (nodes, interfaces, optical connections)
- Connection Management
- Monitoring and Error Reporting
- Logging Network Events
- Internal Alarm Forwarding
- External Alarm Management
- SNMP Alarm Forwarding
- SNMP MIB interface
- On- and offline operation



OTN Systems

COMMITTED TO GET YOUR INFORMATION ACROSS

Open Transport Network (OTN)

Put Your Entire World on a Fiber

Deterministic communication

Low cost of ownership

Future proof

OTN stands for Open Transport Network. It is a state-of-the-art fiber-optic networking technology for mission critical applications. OTN applies the latest technological advances to meet the data, voice and video telecommunications needs of specific industry and transportation sectors. OTN is designed for companies and organizations that rely on their own network for their operational communications needs.





HOW DOES OTN WORK?

The OTN concept is based on network nodes, which are connected via a fiber optic infrastructure.

All applications, be it data, LAN, voice or video, can be directly connected to the wide range of interface cards which are available for the OTN nodes. The OTN interface cards convert the different analog or digital application interfaces to a digital format and pass it on to the node's common control card (BORA) via the node's backplane.

The common control card will then insert the application data into a predefined Time Slot on the fiber optic backbone. At the destination node(s), the data is taken from the backbone and converted back to the appropriate digital or analog format.

The allocation of application data to dedicated time slots on the backbone is done by the OTN Management System (OMS). The OMS has an easy to use Graphical User Interface (GUI), and is used to configure and monitor the complete OTN network. However, since the nodes contain all configuration data, the OTN network can be operational without the presence of the OMS.

The use of optical fiber and laser technology, ensures that connections can be made over very long distances (e.g. more than 140 km (87 mile) between 2 nodes, network size >2000km (1243 mile)) with excellent transmission quality. To improve the reliability of the fiber optic backbone, a redundant fiber optic ring topology is used. This allows the OTN network to restore itself automatically in case of an optical fiber cable break. Multiple of these redundant OTN rings can be coupled to provide the optimal network topology.

WHAT ARE THE MAIN ADVANTAGES OF OTN?

Openness

As its name implies, OTN is open to virtually all applications. Most types of applications (new & legacy) that are used in the industry or transportation sector can be connected directly to the OTN nodes. If a specific or proprietary interface is needed, customization or a custom made interface card is an option.

Furthermore, OTN's Management System (OMS) provides the necessary interfaces so that it can be easily integrated into other systems.

OTN's video solution for remote surveillance applications also provides interfaces so that it can be integrated into other applications such as SCADA systems (Supervisory Control and Data Acquisition).

Simplicity

Because OTN is designed for companies and organizations that run their own operational communications backbone, OTN guarantees operational simplicity. This is apparent in many aspects of the product: First of all, the fact that all applications can be connected directly to the OTN nodes, eliminates the need for additional converters, codecs or multiplexers.

Furthermore, the management system (OMS) is very easy to use and shields the network administrator from the underlying technical complexity. This reduces the need for training and reduces the risk of errors. Because the nodes store all configuration parameters in non-volatile memory, the OTN system is truly plug-and-play.

Non-stop

OTN is the backbone for mission critical applications. Therefore it is designed for reliable and non-stop 24/7 operation during a life time of over 10 years.

Features that guarantee the non-stop behaviour of OTN include the following: Bandwidth is dedicated and guaranteed for each individual connection. This excludes unwanted interference when new services are added or if existing services are overloaded.

The redundant ring concept automatically restores network connectivity within 50ms in case of an optical fiber break. No configuration effort or network management action is needed for this.

The node design is largely hardware based, requiring little or no updates. In the event an upgrade is needed, this can be done centrally, without the need to go on site. Critical components, such as power supplies or common logic cards (BORA) can be protected by a redundant unit. Thanks to the plug-and-play concept, the Mean Time To Repair (MTTR) can be kept very short.

HOW CAN OTN HELP YOU?

If your operations require a mixture of applications that need to be connected over certain distance in a reliable and secure way, OTN can be the solution you're looking for.

OTN allows you to combine all your internal telephony services (analog, digital, VoIP or E1/T1 trunks), serial data connections, LAN interconnections, SCADA applications and CCTV on a single network.

All of these services have guaranteed bandwidth and are protected by OTN's redundancy features.

The management of this network is easy, and changes or extensions will be simple and free of risk, as the network is deterministic and predictable.

The large amount of bandwidth which OTN offers, makes it ideally suited for video applications. To complement the excellent video transmission quality of OTN, an integrated video recording and management solution can be provided. Based on the newest Network Video Recording (NVR) technology, this is a valuable application in any control room.

In combination with excellent Mean Time Between Failures (MTBF) values, which are field proven in harsh conditions, this leads to an excellent overall availability.

Future-proof

As OTN is the communications backbone that supports critical operations, another important factor is product lifetime.

Unlike short-lived ICT hard & software, OTN guarantees product life times of 10 years and more. This eliminates the need to renew the backbone infrastructure every 3 years and avoids the associated outages and costs.

In the design of OTN a lot of effort is spent to ensure backwards compatibility, which protect previous investments in OTN equipment and at the same time allows users to benefit from new capabilities.

The modular concept of OTN also allows an easy adaptation of existing equipment to new or changed requirements. New nodes can easily be added to the network, while the network and existing services remain operational.



WHERE IS OTN IN USE TODAY?

OTN is used world-wide in different applications.

Main applications include:

- Transportation projects
 - Metro's
 - Light Rail
 - Rail
 - People movers
 - Intelligent Highways
 - Tunnels
 - Bridges
- Mines (Open pit and underground)
- Pipelines for oil, gas or water
- Petrochemical plants
- Utility/Power Companies
- Airports
- Ports
- Campus networks
- Municipalities
- Public safety