OTN Systems

COMMITTED TO GET YOUR INFORMATION ACROSS




# More than 85 transport authorities around the world rely on OTN Systems for their operational communications

## find out why they made the smart choice

Although it represents only a small fraction of the cost, compared to civil works or rolling stock, the communication network plays an ever increasing role in the operation of mass transit and railway systems. Metro, Monorail and Light Rail infrastructures have specific networking requirements for which OTN Systems has developed dedicated networking solutions that fully support these demanding applications with the level of reliability and security they require.

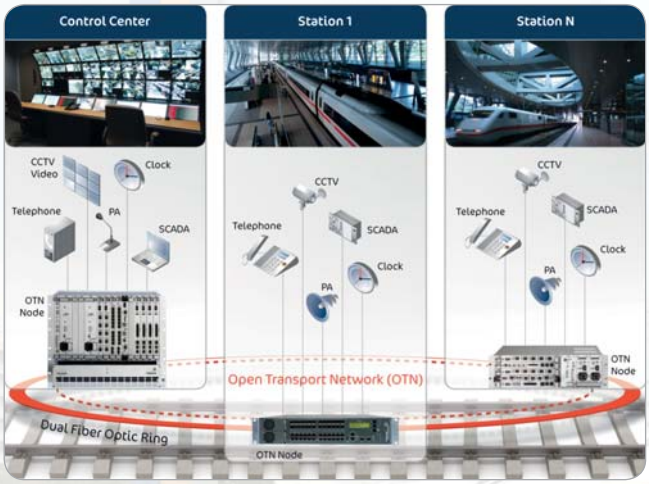
# Our commitment

## Non-stop operation

As Mass Transit systems are crucial for urban mobility, the Metro and its supporting communications backbone must be extremely reliable.

That is why OTN's (Open Transport Network) main system components can be equipped redundantly to maximize system availability. Protection switching in case of cable breaks or equipment failure is based on hardware (L1) instead of RSTP/MSTP (L2) or routing protocols (L3), which makes network recovery extremely fast (50ms) even for large networks.

Because the OTN network is designed to operate reliably in the harsh environment of an outdoor cabinet or tunnel equipment shelter, the OTN network has a positive impact on service reliability and the reduction of operational costs.




Committed to get your information across

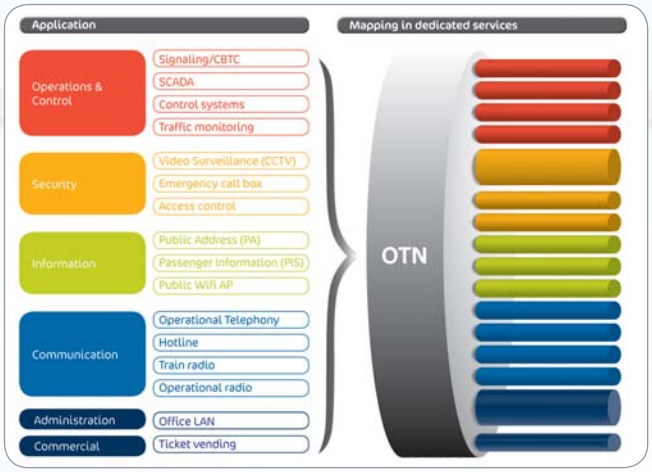
## Ready to connect any application

The most important network applications are of course signaling systems such as CBTC, which control and monitor rail or metro operations.

Other network based applications that connect to OTN are telephony services such as VoIP (Voice over IP), public address (PA), passenger information systems (PIS) and wireless access for passengers and devices in the stations or along the track.

For remote surveillance and access control of the stations IP video cameras are added, which can be monitored in real time or recorded centrally to document incidents.

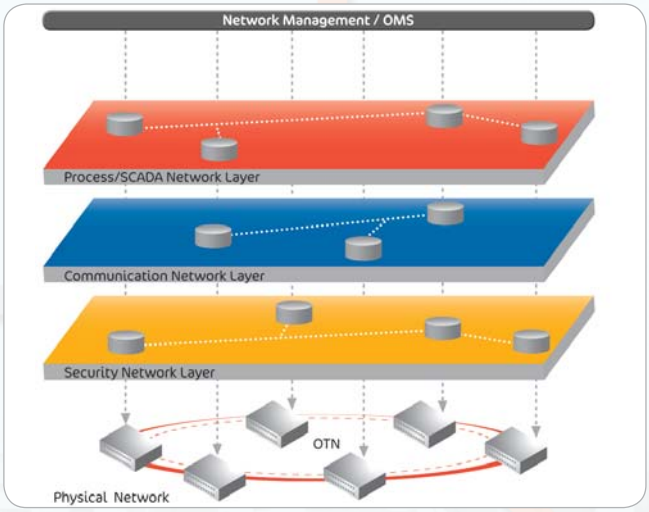
Applications supporting Power over Ethernet such as VoIP phones, IP CCTV cameras or wireless access points, can be powered via PoE+ ports (IEEE 802.3at). Remote locations away from the main line can be accessed over optical fiber.




Applications mapped in SLANs

## Bandwidth availability

OTN networks currently have a bandwidth of up to 10Gbps, which easily matches or exceeds the bandwidth requirements in modern metro operations. The use of timeslots to provide a guaranteed amount of bandwidth (SLAN) to each application makes the network deterministic. The network management system dedicates a specific and configurable amount of bandwidth to every individual service. The huge advantage of this is that the bandwidth is always available for the application and that there is no bandwidth contention between the different applications. Furthermore, the OTN network can guarantee that the addition of a new application to the network will have no impact on the performance of the signaling or SCADA system, which simplifies network planning and reduces project risk.

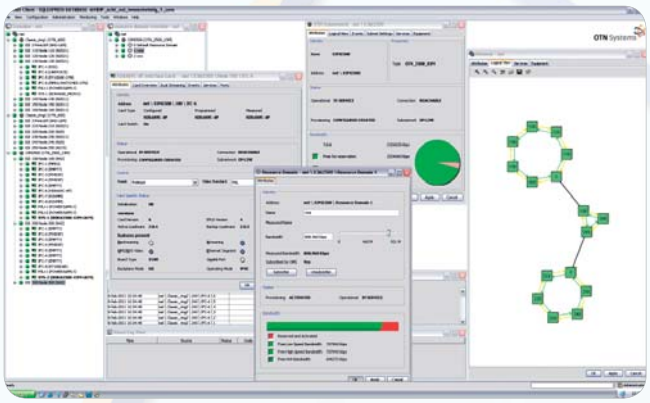



Guaranteed bandwidth for each application

## Full control

When combining different applications on a single network, the OTN network ensures there is no mutual interference between applications. OTN's SLAN concept (Segmented LAN) reserves a dedicated amount of bandwidth (hard QoS) for each traffic engineered VLAN. This makes the OTN network fully predicable.

The whole network is centrally configured and monitored by a redundant network management system (OMS).



OTN Management System

## Future Proof

Applications in the Metro industry increasingly use the IP communication protocol. The new OTN N50 and N70 multiservice Ethernet network nodes fully support this trend and offer all the necessary L2 and L3 features combined with a reliable L1 transport layer.

The capacity of modular OTN nodes can easily be upgraded (e.g. from 2.5Gbps to 10Gbps) by replacing a single card in each node. This means that a major network capacity upgrade can be done in just a few hours.

Because OTN is designed for applications with long operational life cycles, considerable attention is paid to obsolescence management. OTN products are supported at least 10 years after end of sales is declared.

## Low operational costs

The main operational cost would be the cost of network unavailability, which is avoided by the industrial design and OTN network reliability.

During the OTN product design phase a lot of attention is spent on operational simplicity. This reduces the need for training and simplifies network management. The OTN network has an “install and forget” approach. The centralized OMS network management system provides monitoring, event logging and GUI based configuration of the complete network, including occasional remote firmware updates.

The network is deterministic and the configuration database can be prepared off-line, so the project risk and execution time are greatly reduced.

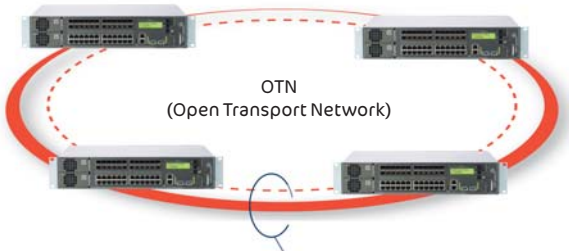
Because transport system operators should be able to focus on their customers rather than on the technology that makes it all happen, the OTN networks are easy to install, operate and maintain. This results in happier customers and lower operational costs.

## Security

Public transport systems are critical infrastructures. Therefore the protection of these installations is of the utmost importance. Not only must the physical security be considered, which can be increased by access control, CCTV or other technologies; also the cyber security aspect must not be neglected.

The OTN network is an enabler for many security related applications such as large scale CCTV deployments or access control. Thanks to its large capacity the OTN network can easily accommodate in excess of 2000 CCTV cameras. The video images can be used for live viewing or recording.

OTN’s secured fiber communication makes it almost impossible to intercept data from the OTN network, which makes it very well suited for the transmission of sensitive information. OTN’s layer 1 design and its cyber security features make it resistant to hackers. The propagation of incidents on the network is countered by separating application data from the network management communication channel.




Secure communications

## Investment protection

In existing lines not all applications are Ethernet or IP based. Some applications are simply not available with an Ethernet interface, for other devices the IP capable version is more expensive. Also, a lot of existing equipment in the field is too costly and cumbersome to replace... That is why OTN also supports analog voice, serial data or analog video applications directly, without the additional need for external convertors or codecs.

This capability of OTN to support both IP applications and legacy services enables a smooth network migration strategy.

## Rely on OTN to get your operational information across in a reliable and easy way

OTN Systems provides reliable multiservice backbone networks that are secure, have a long service life and are maintenance free. The use of OTN networks providing bandwidth reservation, fast restoration, network wide management tools and secure communications is the best guarantee for low operational costs in critical metro and rail applications.

The successful implementation of OTN's innovative networking solution at Transport Authorities around the world is based on more than just technology. It is also a matter of people and know-how.

Since 1989 OTN Systems has developed and deployed dedicated fiber optic communications networks for metros, monorails, light rail systems, people movers and railways in 34 countries all over the world. This long term relationship with more than 85 leading Transport Authorities has led to the continuous innovation of the Open Transport Network, so that it meets today's and future requirements.

**OTN Systems has a large installed base and an unrivalled track record in Metro, Monorail, Maglev, Light Rail, People Movers and Railways worldwide.**

## Take a look at some of our references

**Belgium**
- De Lijn

**Bulgaria**
- Metro Sofia

**France**
- Montpellier
- Lyon
- Toulouse
- Lille

**Germany**
- Essen (EVAG)
- Bonn
- Dusseldorf
- Duisburg
- Köln

**Greece**
- Attiko Metro

**Italy**
- Ferrovie Nord Milano

**Switserland**
- Rätische Bahn

**Turkey**
- Metro Bursa

**The Netherlands**
- Amsterdam (GVBA)
- Rotterdam(RET)
- HSL

**UK**
- Heathrow Express
- Docklands Light Rail

**China**
- Beijing Metro
- Guangzhou Metro Corporation
- Shanghai Metro Corporation
- Shanghai Transrapid Maglev
- Chong qing LRT
- Tian Jin LRT
- Shenzhen Metro
- Nanjing Metro
- KCRC Hong Kong

**Malaysia**
- Kuala Lumpur International Airport Link
- Monorail Kuala Lumpur

**Thailand**
- BTS Bangkok
- MRTA Bangkok

**MEA**
- Gautrain South Africa
- Saudi Rail
- Metro d'Alger
- King Abdullah Financial District Monorail (KAFD)

**USA**
- SEPTA Philadelphia
- Amtrak
- San Diego Sprinter
- Las Vegas Monorail
- Baltimore LRT
- Passadena LRT
- Hiawatha LRT

**Canada**
- Vancouver Sky Train
- Calgary

**Chile**
- Metro de Chile

**Argentina**
- Ferrovias Metro

**Brazil**
- Belo Horizonte
- Sao Paulo

**Mexico**
- Guadalajara

**Peru**
- Metro Lima

# OTN: multi-service backbone for metro and rail applications

**OTN Systems NV**

Industrielaan 17b, 2250 Olen, Belgium
Fax: +32 14 25 20 23
E-mail: info@otnsystems.com
www.otnsystems.com - www.otn.be

Ref. No.: AA-A562-E-1
Issued May, 2012


OPEN TRANSPORT NETWORK