Belden

XTran

XTran Training Services

Version 4 (April 2025)

Belden Olen Academy

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Contents

Version history

V1	2018	First version	Hervé Rahier
V2	2019	Reshuffled. Power Utilities and Transport variants	Hervé Rahier Raf Van Wynsberghe
V3	2020	Including Online variant (due to COVID pandemic)	Hervé Rahier Raf Van Wynsberghe
V4	Apr/2025	Belden template Renewed catalog	Hervé Rahier Raf Van Wynsberghe

1. TRAINING CHANNELS

1.1 The Belden Olen Academy

The Belden Olen Academy, based in Belgium, is responsible for designing and delivering product training on Belden Solutions' ***Private WAN*** solution, called **XTran**.

The training is intended for end customers, system integrators, internal Belden teams, and other stakeholders involved in XTran networking. The courses are **classroom-based** training sessions, held at the Belden Solutions facility in Olen (Belgium), at other Belden locations, or on the customer's premises. Occasionally, courses can be made available as online sessions (see §2.3).

A variety of training programs are offered, each tailored to the participants' professional roles and the skills they aim to acquire. As a result, different training levels are available.

Trainings can be delivered in several languages (English, French, Dutch and German), while the training material remains in English by default (contact us if the material needs to be translated as well).

All participants receive a softcopy of the slide deck, and a certificate of attendance. Upon request, a certification test can be arranged, and those who pass will receive a certificate of qualification.

1.2 Training by Other Belden Entities

The Belden Olen Academy also trains and certifies other Belden teams to deliver the same XTran courses. This approach enables a regionalized delivery of product training, allowing Belden to support customers more effectively across the globe, and to expand the range of available training languages.

2. TRAINING OFFERS

The Belden Olen Academy has developed a range of training sessions for the XTran product line. These offerings are divided into two categories:

- **Off-the-shelf training** – based on a predefined, yet adaptable, syllabus
- **Tailored training** – fully customized courses with a syllabus defined on a case-by-case basis

Furthermore, we also offer:

- **Online training**
- **Train-The-Trainer program**

2.1 Off-the-Shelf XTran Training Courses

The off-the-shelf training courses follow a predefined syllabus. However, when the course is delivered to a specific customer (i.e. not as part of an open enrollment session), the content can be personalized to meet that customer's specific needs.

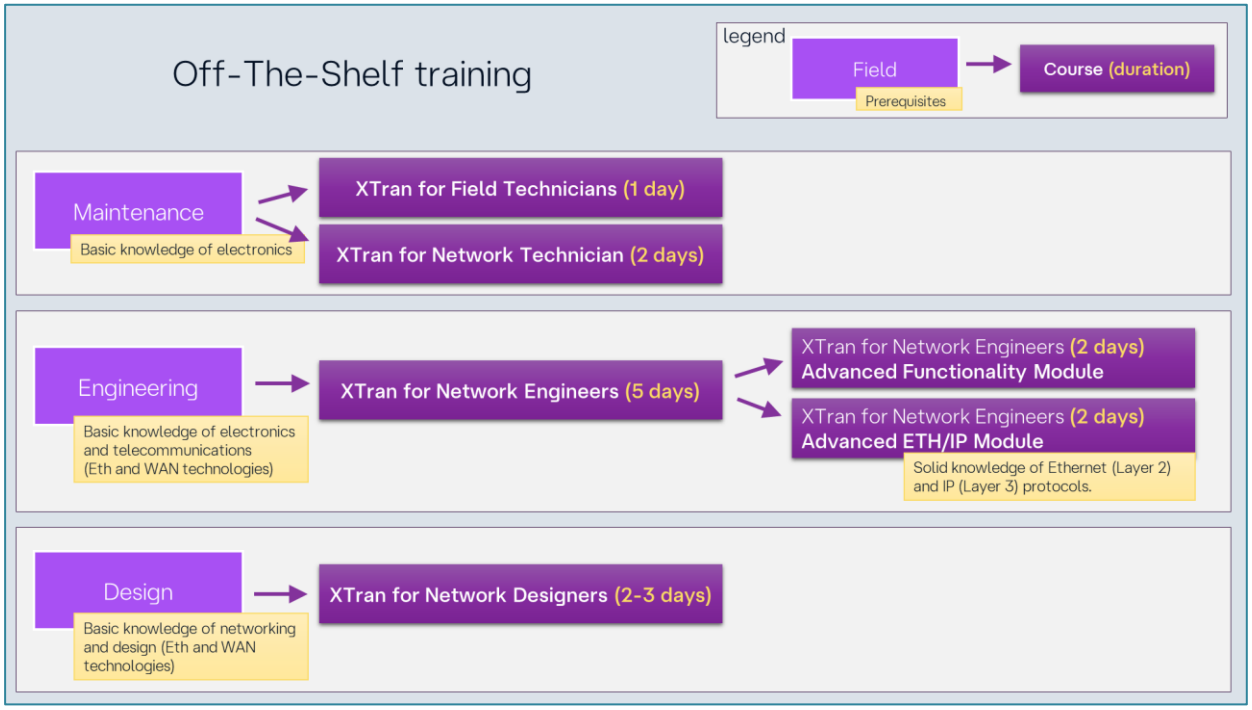

Figure 1 – Off-the-shelf Training Curriculum

2.1.1 Maintenance-Oriented Courses

- **Field Technician Training**
  A one-day course focusing on the installation, connection, and replacement of hardware components, as well as troubleshooting basic hardware-related issues. Hands-on exercises are a key component of this training.

- **Network Technician Training**
  This two-day course includes all content from the Field Technician training and adds a focus on TXCare, the XTran network management system. Participants learn to use TXCare for both troubleshooting and information gathering.
  Note: This course was formerly known as "XTran for Maintenance Engineers".

2.1.2 Engineering-Oriented Courses

- Network Engineer Training
  Typically lasting five days (depending on the scope), this comprehensive course includes the Field and Network Technician modules and expands further into network engineering: provisioning, configuration, and overall deployment. Participants are trained to fully deploy, operate, and maintain an XTran network. Extensive hands-on practice is included.
  Note: This course was formerly known as "XTran for Service Engineers".
- Additional Network Engineer Training
  A modular series covering advanced topics not included in the standard Network Engineer course. Currently available modules include:
  - Advanced Functionality – covering optional XTran and TXCare features
  - Advanced Ethernet/IP – focused on advanced networking concepts related to Ethernet and IP

2.1.3 Design-Oriented Courses

- Network Designer Training
  Intended for individuals and teams that are designing Private WAN networks with XTran, this course enables participants to select the appropriate components and features for designing small to mid-sized XTran networks. Depending on the pre-existing knowledge, the training takes 2 or 3 days.

The short course descriptions are included in §3.

Note:
A basic telecommunications background is required for all training courses. Advanced courses require prior completion of the Network Engineer Training. Courses involving Ethernet/IP also require solid knowledge of Ethernet and IP protocols.

2.1.4 Open Training versus Dedicated Training

Some of the off-the-shelf training are offered as an Open Training, meaning that participants from multiple customers are invited to attend the session together. This is the case for the engineering-oriented courses ('XTran for Network Engineers' and follow-up modules). In such cases, the syllabus is fixed. The agenda, detailed course content, and pre-registration option for these open training sessions are available on the Belden Solutions Portal via this link.

A training session is referred to as a Dedicated Training when requested for a single customer or project. Here the predefined syllabus is adapted to align with the project or the customer's particular needs.

For more information on customizing a training course, please contact us at otn.training@belden.com, including a reference to the project if applicable.

The pricing approach differs depending on the type of training:

- For Open Trainings, pricing is per participant (per day).
- For Dedicated Trainings, pricing is per session (per day).

2.2 Tailored XTran Training Courses

In contrast to the off-the-shelf courses based on a predefined syllabus, we also offer **Tailored Training**—fully customized sessions developed from scratch in close collaboration with the customer. The content, duration, and delivery method are adapted to meet specific needs, experience levels, or network configurations.

Examples of tailored training formats include:

- **Introduction Course**
  A short, introductory session on XTran or MPLS, tailored to the audience's background and learning objectives.
- **Refresher Course**
  A course designed to revisit and reinforce previously acquired knowledge—ideal for alumni needing a knowledge update.
- **XTran Release Update Course**
  Focused on new features and hardware modules introduced in a specific XTran release (e.g., upgrading from Release X to Release Y).
- **Specific Feature Training**
  A deep dive into one or more specific XTran functions, based on customer interest or project requirements.

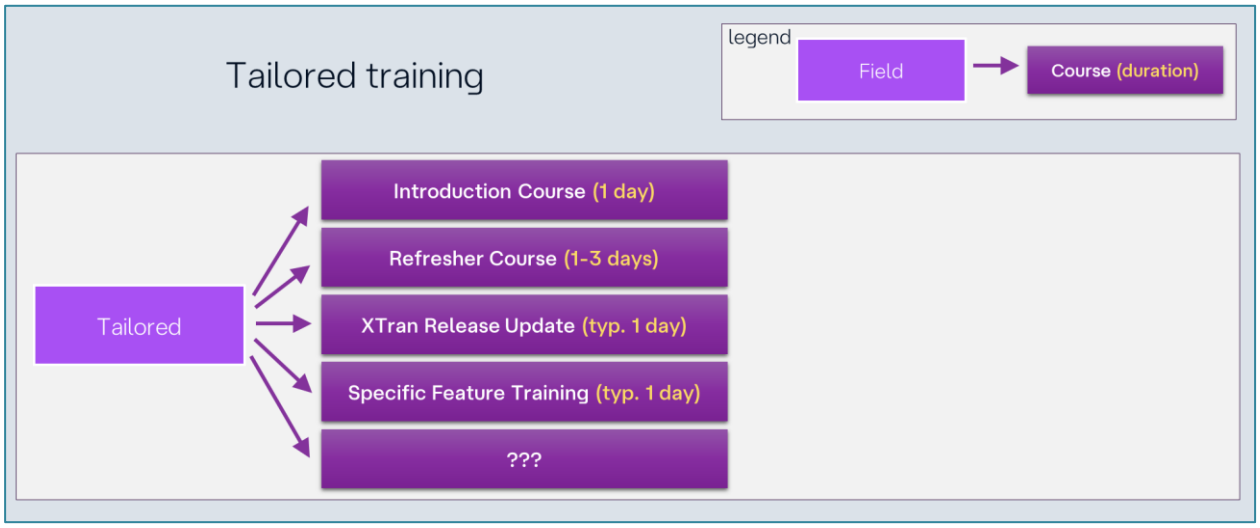

Figure 2 – Tailored Training Curriculum

The duration of tailored training varies significantly depending on the content.

For more information or to request a tailored training program, please contact the Belden Olen Academy at otn.training@belden.com

2.3 Online Training

Belden Solutions also offers a selection of its XTran training catalog in an online format.

These online training sessions are conducted live but remotely, through an online platform (such as Microsoft Teams), providing the same level of training as traditional classroom sessions.

Prerequisites for online training include:

- All participants must have access to the necessary training equipment, such as XTran nodes, laptops with NMS, and testing gear (whether physically or remotely). For optimal learning outcomes, we advise designating someone familiar with XTran to support participants locally during the remote session.
- All participants must have a stable internet connection to attend live sessions and access online training materials (e.g., videos, presentations, assignments, discussion forums).

The online training sessions are structured as follows:

- A dedicated online environment is created for each session and made available to all participants, with access provided before and after the session. This environment will be explained during a kick-off meeting prior to the training.
- The training consists of live sessions with an instructor, allowing room for interaction and Q&A.
- The lab portion of the training is conducted on real hardware setups, with clear instructions provided to guide participants.
- Digital materials (such as lab instructions, supplementary training videos, discussion forums, training handouts, and additional resources) are available within the training environment.

The duration of online training sessions is generally similar to classroom sessions, with an additional 25% time added. This extra time accounts for the labs and other interactive components, based on our empirical experience.

Please note that not all training courses are available in the online format. For more information or to inquire about specific courses, please contact the Belden Olen Academy at otn.training@belden.com or reach out to your Belden sales manager.

2.4 Train-The-Trainer Program

The Train-The-Trainer (TTT) program aims to provide local Belden teams and service partners with the opportunity to organize XTran product trainings at their own training facilities and in the local language. This program is designed to help Belden or the service partner structure and deliver courses in the most effective way. By completing the TTT program and passing the certification test, the alumnus will become a certified XTran trainer for a period of two years.

Benefits for end-users are clear, including greater logistical flexibility, training in the local language, and the ability to cater to customers who may be unable to travel.

Belden teams, or local service partners also benefit from becoming certified XTran trainer by having the ability to offer cost-effective, localized product training to their customers. As a local specialist, this enhances the service partner's reputation and relationship with customers.

A certified trainer gains access to the Belden Olen Academy learning materials. Remark that adequate hardware and software must be available at the training facility to support the hands-on portion of the program.

With the trainer certificate, the partner will be authorized to offer off-the-shelf product training on XTran to customers in their region, under the guidance and instruction of the Belden Olen Academy.

During the certification process, trainees will be evaluated on both their knowledge and instructional presentation skills. It is essential that trainers keep their knowledge current; therefore, the trainer’s certificate is valid for two years and is personal to the certified individual. To maintain certification, the trainer must attend a product update training every two years.

More detailed information on this program in document P930 (Train The Trainer Program) or via otn.training@belden.com.

3. COURSE DESCRIPTIONS

XTran for Field Technicians – Course Description

Remark: This course is the short version of the former 'XTran for Maintenance Engineers', now offered under a new name.

Target Audience

Field Technicians primarily responsible for hardware installations and module replacements. The course will be customized to align with the customer's installed base.

Course Prerequisites

Basic knowledge of telecommunications and electronics.

Course Objectives

After completing the training, students will be able to:

- **Identify** and understand **the purpose** of the various components within an XTran node.
- **Install and replace** hardware components in a network with XTran nodes.
- **Connect** user applications
- Perform **basic troubleshooting**, using the visual indications on the hardware.

Exercises

Hands-on training is included.

Duration

1 day

Content

The Basics

- **MPLS-TP** is briefly introduced as the optimal technology for an OT network, with **XTran** presented as the solution provided by Belden.
- We examine the various **hardware components in XTran**. After setting up a small network using essential components, we explore additional interface modules that may be present in your network.
- When available, we'll have a look at the **customer's installation** to familiarize the audience with their own network.

Modules and Connections

- For each Interface Module, we will review the **connection of end user devices** to the IFM ports.

XTran OAM

- This section covers **installation and replacement procedures** for various hardware components, with students gaining hands-on experience.
- We will discuss how **fault conditions** are displayed on the hardware. Students will practice these skills.

CDE-FT-XTran version 6 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com
2025

XTran for Network Technicians– Course Description

This course is the former 'XTran for Maintenance Engineers', now offered under a new name.

Target Audience

Network Technicians, responsible for hardware installations, module replacements and basic troubleshooting. The course will be customized to align with the customer's installed base.

Course Prerequisites

Basic knowledge of telecommunications and electronics.

Course Objectives

After completing the training, students will be able to:

- **Identify** and understand **the purpose** of the various components within an XTran node.
- **Install and replace** hardware components in a network with XTran nodes.
- **Utilize TXCare**, the network management system, to retrieve and analyze network status information.
- **Utilize TXCare's monitoring functions** to identify and resolve hardware-related alarms.

Exercises

Hands-on training is included.

Duration

2 days

Content

Remark: The course "XTran for Field Technicians" is part of this curriculum.

The Basics

- **MPLS-TP** is briefly introduced as the ideal technology for an OT network, while **XTran** – developed by Belden – is presented as the optimal solution.
- We examine the various **hardware components in XTran**. After setting up a small network using essential components, we explore additional interface modules that may be present in your network.
- Students will learn the main applications in **TXCare** and use it to retrieve and analyze information about hardware elements in the network (such as optical levels), with practical exercises included.
- When available, we'll have a look at the **customer's installation** to familiarize the audience with their own network.

Modules and Connections

- For each Interface Module, we will review the **connection of end user devices** to the IFM ports.

XTran OAM

- This section covers **installation and replacement procedures** for various hardware components, with students gaining hands-on experience.
- We will discuss how **alarm and fault conditions** are displayed in TXCare, and demonstrate level-1 **troubleshooting** techniques using TXCare and the hardware information. Students will practice these skills.

CDE-NT-XTran version 6 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

XTran for Network Engineers – Course Description

Remark: This course is the former 'XTran for Service Engineers', now offered under a new name.

Target Audience

XTran **Network Engineers** who are responsible for **configuring, maintaining,** and **troubleshooting** XTran networks.

Course Prerequisites

Basic knowledge of telecommunications (Eth and WAN technologies) and electronics.

Course Objectives

After completing the training, students will be able to:

- Understand the positioning of XTran and MPLS-TP technology.
- Identify the components of XTran nodes and their roles.
- Set up a new XTran network, or expand it by integrating additional nodes, configure tunnels, Ethernet services, and Circuit-based services.
- Use TXCare to configure the network, handle alarms, manage databases, and deal with advanced networking functions.
- Perform hardware installation, replacement, and firmware upgrades.
- Utilize TXCare for network OAM functions as monitoring and troubleshooting.

Exercises

Hands-on training is included.

Duration

5 days

Content

The Basics

- **MPLS-TP** is introduced and justified as the ideal OT network technology, while **XTran** – developed by Belden – is presented as the optimal solution.
- The **key XTran hardware components** are explored, building a small network from scratch using these elements.
- **TXCare** is introduced as XTran's Network Management System. We will cover essential tasks such as configuration, alarm handling and database management.
- **Tunnels**, **protection schemes** and basic Ethernet **services** are explained and checked out.

Modules and Connections

- We provide a comprehensive overview of all **Ethernet-based interface modules in XTran**. We delve into Ethernet connections, progressively introducing more advanced options. We will also introduce the IP routing capabilities using the 9-L3A-L.
- We explore the full range of Circuit Emulation Service **(CES) interface modules**, guiding students through installation, replacement, application configuration, fine-tuning, and peripheral connection — primarily for E1 interfaces.

XTran OAM

- We discuss additional TXCare functionality as **Remote Client**, **User Management** and **Network Upgrades**.
- We explain **installation and replacement procedures** for various hardware components and discuss how the network can be **expanded**.
- We have a look at hints, best practices and **troubleshooting** techniques for diagnosing and resolving issues in XTran networks.

CDE-NE-XTran version 9 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

2025

XTran for Network Engineers – Advanced Functionality – Course Description

This course is the former 'XTran for Service Engineers - Advanced FUNC', now offered under a new name.

Target Audience

XTran **Network Engineers** seeking in-depth knowledge for configuring and troubleshooting advanced OAM features in XTran networks..

Course Prerequisites

"XTran for Network Engineers" course certificate

Course Objectives

By the end of this training, participants will be able to:

- Use TXCare to set up tunnels and services for specific legacy applications, including Serial, Analog Telephony, and SDH/SONET signals, as well as configure synchronization options such as SyncE and PTP.
- Explain and configure advanced DCN options
- Explore the available TXCare add-ons and configure one of them: the SNMP Northbound interface.
- Set up redundant management for the XTran network
- Configure and utilize features such as Large Network Monitor (LNM) and Reporting

Exercises

Hands-on training is included.

Duration

2 days

Content

Legacy

- Install, replace, configure applications, and (re)connect peripheral equipment on the 7-SERIAL or 6-SERIAL modules.

Telephony

- Install, replace, and configure the 8-FXS module in "SIP-Server" mode (other options will be discussed).

SDH/SONET

- Explore transport options for SDH/SONET frames over XTran, including grooming of E1/T1 channels. Learn how to configure this via smartSFP transceivers.

Synchronization over XTran

- Explain and configure different synchronization options, including SyncE and PTP IEEE 1588.

XTran Management

- Explore advanced DCN configuration options.
- Discuss and configure redundant TXCare.
- Train on Large Network Monitor (LNM) and Reporting features.
- Learn how to configure the SNMP Northbound interface add-on to convey specific XTran network information to an umbrella management system via SNMP.

CDE-NE-XTran-ADV-FUNC version 9 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

XTran for Network Engineers – Advanced ETH/IP Module – Course Description

This course is the former 'XTran for Service Engineers - Advanced ETH/IP', now offered under a new name.

Target Audience

XTran **Network Engineers** seeking advanced expertise in configuring and troubleshooting Ethernet/IP features in XTran networks..

Course Prerequisites

- "XTran for Network Engineers" course certificate
- Strong understanding of Ethernet (Layer 2) and IP (Layer 3) protocols

Course Objectives

By the end of this training, participants will be able to:

- Gain a deeper understanding of traffic engineering within XTran (like HQoS) to optimize Ethernet services
- Know the security functions available at the Ethernet level
- Utilize all protocols on the 9-L3A-L interface module
- Implement all Layer 2 protocols on the 6-GE-L interface module and XTD/XTR nodes
- Configure and monitor access devices (e.g., Hirschmann) connected to XTran

Exercises

Hands-on training is included.

Duration

2 days

Content

Advanced Ethernet Options

- Explore and test features such as QoS and HQoS.
- Learn how to deploy MAC security (MACsec) on the XTran network and understand other security functions available for Ethernet connections.

Access Networks

- Learn how to visualize Ethernet access switches (like Hirschmann) in TXCare.
- Understand how to interwork with loop redundancy protocols on Ethernet devices, such as MRP.

Layer 2

- Gain an understanding of Layer 2 features, including MSTP, which can be configured on 6-GE-L, 9-L3A-L modules and XTD/XTR nodes.
- Discuss Link Aggregation and its implementation.

Layer 3

- Explore and test the various Layer 3 protocols available on L3-modules (and XTD/XTR nodes), including OSPF, Static Routing, VRRP.
- Upon request, IGMP and PIM can also be covered.

CDE-NE-XTran-ADV-ETHIP version 9 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

XTran for Network Designers – Course Description

Target Audience

People who are responsible for designing XTran networks.

Course Prerequisites

The engineering course ('XTran for Network Engineers') is not a mandatory prerequisite. Sufficient knowledge of networking and some design knowledge is recommended.

Course Objectives

After completing the training, students will be able to:

- Design an XTran network step-by-step—from physical layout to service integration—based on customer requirements.
- Key topics include service configuration, protocol and feature selection, external factors, and scalability analysis.
- Practical case studies and exercises via TXCare help reinforce the design process and apply concepts in real-world scenarios.

Exercises

Paper exercises and offline TXCare hands-on practice are included.

Duration

3 days if 'Foundations' need to be included, 2 days otherwise.

Content

Foundations

- MPLS-TP is introduced and justified as the ideal OT network technology, while XTran – developed by Belden – is presented as the optimal solution.
- The functionality of all XTran hardware components is discussed, to allow the students to introduce these parts judiciously in a network design.
- TXCare is introduced as XTran's Network Management System. For this target group, we will focus on TXCare functionality that assist in the network design phase.
- Tunnels, protection schemes and basic Ethernet services are explained and demonstrated.

XTran Network Design

- We begin by explaining the general workflow for designing an XTran network, starting on the physical layer.
- Based on the customer's overall requirements, an initial Bill of Materials (BoM) and design (physical topology) can be proposed. This design will be refined in the subsequent steps of the iterative design process.
- The second step involves a more detailed design of the various service types, by gathering and applying the necessary information—starting with Ethernet services, followed by Circuit Emulation services, and, if applicable, other types of services.
- Next, we analyze the Feature and Protocol Matrix to determine which features are required and assess their impact on the current design.
- We also take external factors into account as part of the design considerations.
- In a last stage, we check if the design is within the limits defined in the Scalability Matrix, and find solutions if not.

Case Studies

- Case studies and design exercises help to make network design topics more tangible and practical.

CDE-ND-XTran version 3 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

Introduction to XTran – Course Description

Target Audience

- Technical profiles who require a high-level understanding of XTran's architecture and components.
- Non-technical profiles who need a high-level overview of XTran's purpose, capabilities, and value within operational networks.

Course Prerequisites

No prior knowledge is required.

Course Objectives

By the end of this one-day course, participants will be able to:

- Understand the MPLS-TP technology and positioning of XTran in Operational Technology (OT) networks.
- Understand the benefits of establishing dedicated connections for applications using XTran.
- Identify the key components of XTran nodes and understand their functions.
- Recognize the role of TXCare, XTran's network management system, in various stages of the network's lifecycle.
- Obtain a high-level overview of XTran's capabilities.
- Recognize how these capabilities are applied in real-world scenarios.

Exercises

This course does not include hands-on labs.
Demonstrations are used during the training to illustrate key concepts and workflows.

Duration

1 day

Content

The content is personalized to the audience, with more or less technical detail depending on the participants' background and expectations.

- Introduction to **MPLS-TP** as the purpose-built transport technology for OT networks, and presentation of **XTran** – developed by Belden – as the optimal solution.
- Overview of the different **types of connections** that can be provisioned in XTran via tunnels and services, and how resilience is ensured through the different protection mechanisms.
- Step-by-step introduction to the **XTran hardware**, identifying the individual components and their roles.
- Presentation of **TXCare**, XTran's Network Management System, from its position in the overall network to its core functionalities such as configuration and network monitoring.
- Brief overview of XTran's capabilities, features, and available add-ons.
- Real-world use cases: examples that demonstrate how XTran is deployed in operational networks.

CDE-IN-XTran version 2 (release date: April 2025)
Belden Solutions NV – Industrielaan 17b – 2250 Olen – Belgium
www.otnsystems.com – otn.training@belden.com

Tailored XTran Training – Course Description

Target Audience

Technical professionals who require in-depth or specialized knowledge of XTran.

Course Prerequisites

In most cases, participants are expected to have a solid understanding of XTran and TXCare.
If this is not the case, we recommend first attending one of the standard offerings, such as *XTran for Network Engineers*.

Course Objectives

The specific learning objectives will be defined in collaboration with the Belden Olen Academy at the time the tailored training is requested.

Exercises

Whenever possible, tailored courses include hands-on lab exercises to reinforce learning.

Duration

The duration depends on the scope and depth of the requested content.

Possible Content

The following is a non-exhaustive list of example courses that can be crafted upon request. Most are advanced or follow-up sessions and require prior knowledge of the subject matter.

XTran Refresher Course

- A concise review of topics previously covered in an earlier XTran training. The content will be adjusted based on the original training attended and the participants' needs.

XTran Release Update Course

- A technical deep-dive into newly released features in XTran and TXCare. The training is defined in relation to both the previously used version and the latest release, tailored to audience interests.

XTran Specific Feature Course

- A focused technical session on a particular feature or set of features in XTran. The scope is defined based on the specific needs and interests of the participants.

CDE-TA-XTran version 1 (release date: April 2025)
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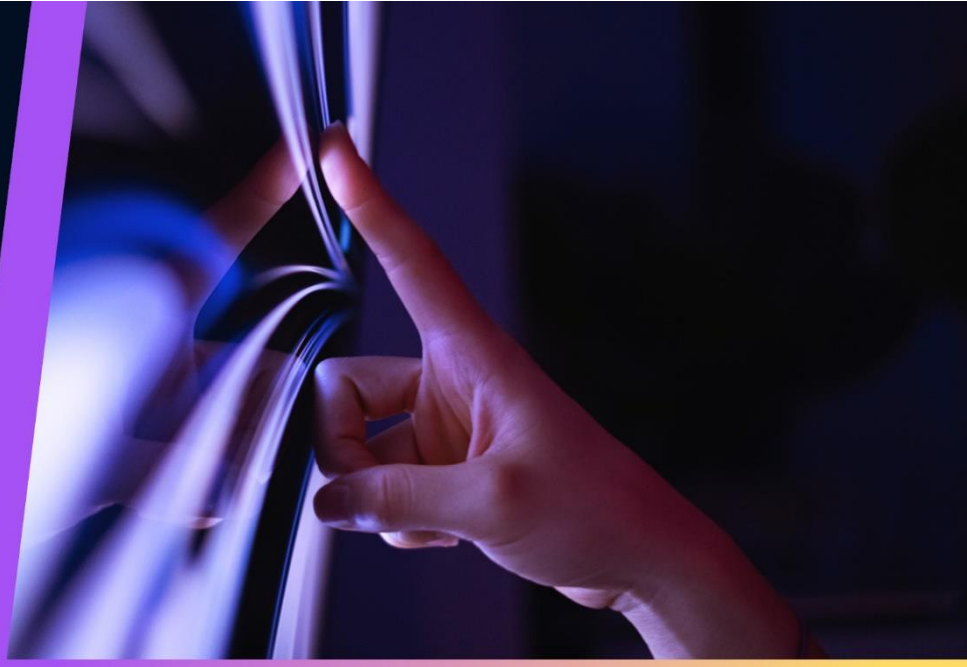
Connect to what's possible.



About Belden

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