

Marvell® Prestera® DX1500 Ethernet Switches Series

A Family of Multi-Layer 1/2.5/5/10G Ethernet Switches for Industrial and IoT Infrastructure

Overview

Marvell® Prestera® DX1500 series of highly integrated low-power intelligent multilayer Ethernet switches is purpose-built to enable Industrial Internet of Things (IIoT) transformation to secure deterministic Ethernet.

The industrial market remains relatively un-digitized with gaps existing between operational technology (OT) and the servers and storage systems that make up a company's Information Technology (IT) footprint. This gap is a result of limited, specialized technologies based around proprietary standards and complex component sets. DX1500 portfolio of switches is aimed at bridging this divide.

DX1500 implementation of comprehensive Time Sensitive Networking (TSN) protocols set, high-precision timing and support in High-availability Seamless Redundancy (HSR/PRP) standards enable real-time end-to-end communications with guaranteed reliable performance and data delivery.

Such TSN compatible infrastructure facilitate transition of OT networking to deterministic Ethernet, delivering the benefits of Ethernet eco-system innovations agility and efficiencies.

DX1500 Enterprise-grade rich feature-set with advanced support in L2 switching, L3 routing and flexible tunnels overlays offers critical building blocks to drive IT / OT convergence into heterogenous network with single pane of glass to manage and automate.

DX1500 Prestera pipeline integrates TrackIQ, NetIQ and SecureIQ groundbreaking technologies that lay out the essential foundation for innovations in network visibility, intelligence, and security.

SecureIQ multilayer zero-access trust security secure boot and storage, programmable sensors, and line-rate 256b MACSec encryption on all ports deliver network-embedded trustworthiness, enable encrypted traffic analytics applications, and provide protection to the hardware and network software from ever-evolving security threats.

TrackIQ precise application-aware telemetry collection at line-rate and predictive health reporting enable actionable analytics applications and expedite forensic troubleshooting. A variety of data export and streaming options provides a high degree of integration with analytics tools flexibility.

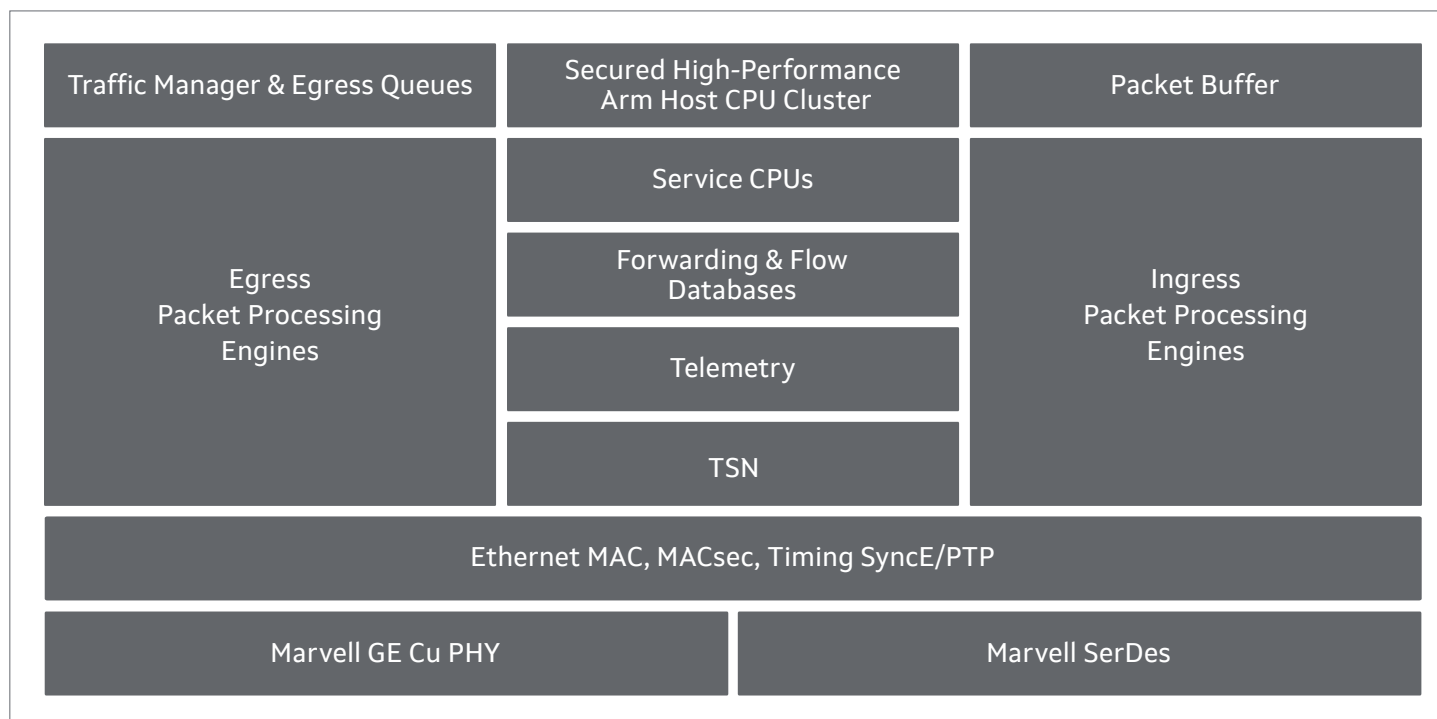
NetIQ programmable engines, embedded compute and robust workload management enable smart services offload, accelerate intelligent data processing at or near the network access edge, reducing hybrid cloud bandwidth requirements, and empower AI-driven autonomous networking.

SyncE and high accuracy one-step and two-step PTP further usher network deployments that require precise time synchronization.

Advanced Control and Management Subsystem integrates Arm Cortex CPU complex that can serve as the system host for on-chip embedded Network Operating System (NOS). Additional uControllers provide direct access to the switch pipeline and enable performing low-level control and management services offload, such as PoE or telemetry collection functions.

The unified software development kit (SDK) industry-standard switch abstraction interfaces enable networking system vendors to easily migrate across networking silicon choices, reduce development costs, and accelerate time to market.

Block Diagram



DX1500 Architecture Block Diagram

Technical Specifications

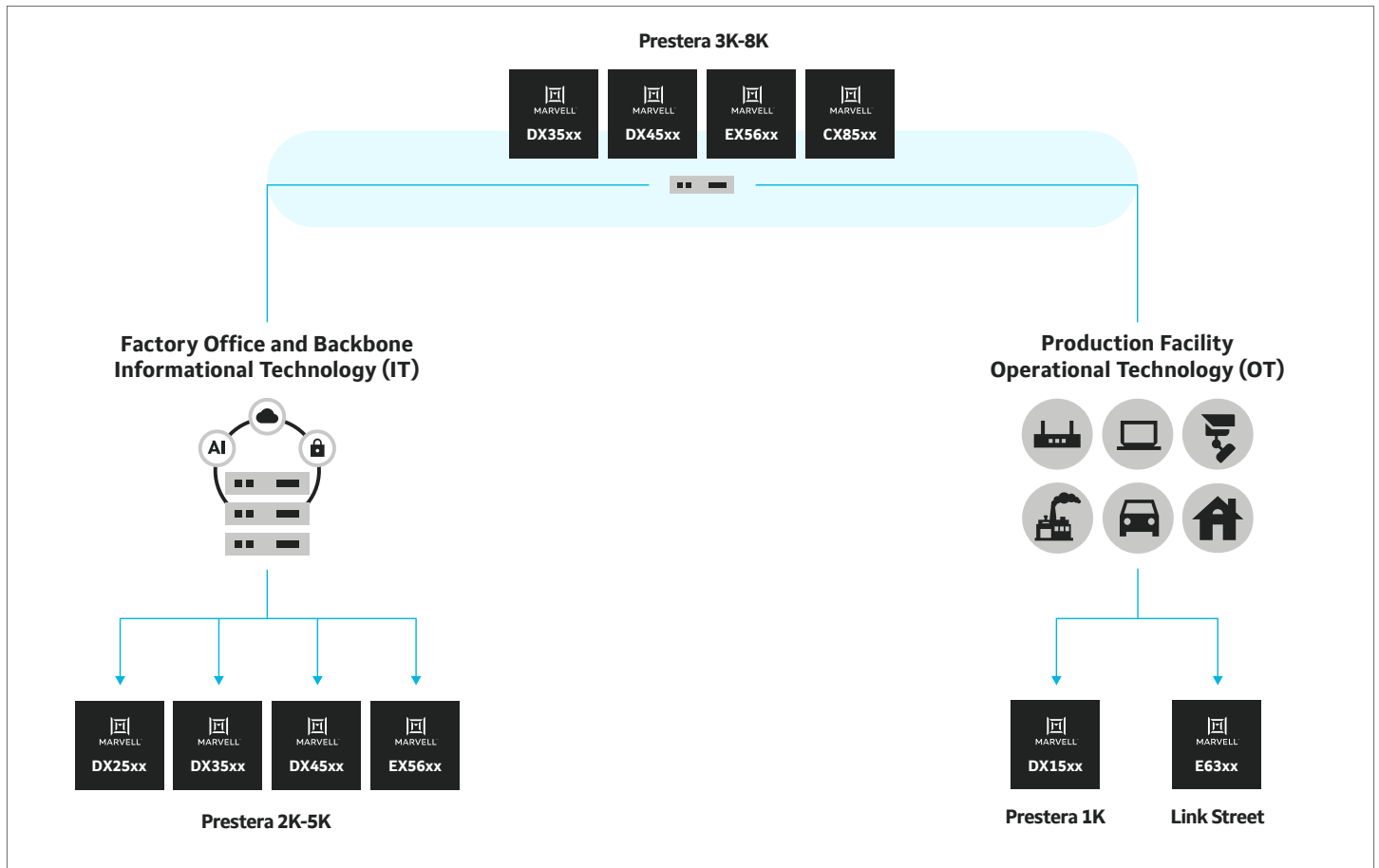
Features	Benefits
Unified Presteria software development kit Unified feature-rich Presteria architecture	<ul style="list-style-type: none"> • Simplifies porting across Presteria switches families • Comprehensive enterprise-access tailored functionality with uniform-behavior and consistency across the entire enterprise network
Time Sensitive Networking (TSN) <ul style="list-style-type: none"> - 802.1A-2020 - High-accuracy timing synchronization - IEEE 802.1Qav - Credit based per queue shaper - IEEE 802.1Qbv - Time aware shapers - IEEE 802.1Qbu and 802.3br - Frame Preemption - IEEE 802.1Qci - Per-Stream Filtering and Policing - IEEE 802.1CB - Frame Replication and Elimination 	<ul style="list-style-type: none"> • Compliant with IEC/IEEE 60802 TSN Profile for Industrial Automation, defined to enable real-time end-to-end communications with guaranteed reliable performance and data delivery
Cut-through operation	<ul style="list-style-type: none"> • Minimizes traffic latency
IEC 62439-3- Parallel Redundancy Protocol (PRP) and Highly-available Seamless Redundancy (HSR)	<ul style="list-style-type: none"> • Ensures high availability • Reduces the network recovery time
Unified feature-rich Presteria architecture	<ul style="list-style-type: none"> • Comprehensive enterprise-access tailored functionality with uniform-behavior and consistency across the entire enterprise network
Flexible Network Virtualization Overlays	<ul style="list-style-type: none"> • Investment protection to support tunnels and future use cases
High-performance Control and Management Subsystem with integrated Arm Cortex CPU cores and management interfaces and external DRAM	<ul style="list-style-type: none"> • System host for on-chip embedded Network Operating System (NOS) • Services offload and low-level control and management

Features	Benefits
Multi-Rate 10M/100M/1G/2.5G/5G/10G ports	<ul style="list-style-type: none"> Flexible options to connect devices at speeds ranging from 10M to 10G
100Base-FX	<ul style="list-style-type: none"> 100M Ethernet over fiber optic cables
Switch-PHY USGMII interface, conveying multiple Ethernet ports over a single SerDes lane	<ul style="list-style-type: none"> Increases port density while minimizing PCB footprint
IEEE 802.1AE GCM-AES-128/256 and GCM-AES-XPN-128/256 IEEE 802.1AE Media Access Control Security (MACsec)* Engine	<ul style="list-style-type: none"> Protective cryptography-based Ethernet traffic security on all ports
SecureIQ multilayer network-embedded advanced security <ul style="list-style-type: none"> Secure boot and secured storage Programmable security sensors Micro-segmentation to security-groups Secure Control Technology (SCT) and Network Shield Technology (NST) 	<ul style="list-style-type: none"> Providing zero-trust access integrated security Trustworthy mechanisms deliver hardware and network software immunity Enables tools integration for real-time suspicious patterns identification Enables agile group policies and security zones enforcement, preventing malicious traffic lateral movement and quick remediation Control and management plane protection and DDOS attacks mitigation
NetIQ Intelligent processing accelerators, programmable engines and embedded compute resources	<ul style="list-style-type: none"> Power intelligent data processing at the network edge, in-network compute, AI-feature-engineering, auto-healing and auto-adaptation
TrackIQ Application-aware telemetry <ul style="list-style-type: none"> Accurate scalable line-rate traffic telemetry Flexible telemetry export methods, protocols and formats Latency measurement and statistics for every packet Anomaly and exceptions detection Elephant and mice flow detection, burst and duration measurements Performance, utilization and queuing status and statistics monitoring 	<ul style="list-style-type: none"> Application-aware visibility and predictive health reporting enable actionable analytics and expedite root cause analysis
Time Synchronization	<ul style="list-style-type: none"> High accuracy one-step and two-step PT SyncE
<i>Ruggedized -40°C to +85°C Industrial temperature range</i>	<ul style="list-style-type: none"> Ensures reliable system operation in harsh environments

*Note: MACsec is only available on MACsec-enabled Part Numbers.

Target Applications

Industrial Internet of Things (IIoT) secured TSN compatible infrastructure



DX15xx Typical Deployment Scenario – IT/OT Industrial converged infrastructure

Ordering Information

Part Number	Description
DX1508	• 12-ports GbE Downlinks Industrial TSN-capable switch
DX1518	• 30-ports GbE Downlinks Industrial TSN-capable switch
DX1528	• 54-ports GbE Downlinks Industrial TSN-capable switch
DX1538	• 54-ports 1/2.5GbE Downlinks Industrial TSN-capable switch
DX1548	• 12-ports 1/2.5/5/10GbE Industrial TSN-capable switch



To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies for 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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