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Deterministic Networking (DetNet): Architecture, Protocols, and Advanced Applications
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Abstract
This paper provides a thorough overview of Deterministic Networking (DetN et), focusing on establishing predictable data routes in Layer 2 and Layer 3 networks to address network issues like congestion, latency, and packet loss. It discusses DetNet's principles, architecture, and Operations, Administration, and Maintenance (OAM) protocols, crucial for fault detection and network monitoring. DetN et ensures bounded latency and minimal data loss, catering to industries' need for reliable flows over multi-hop paths. It integrates Time Sensitive Networking (TSN) and MPLS, using Resource Allocation (RA), Service Protection (SP), and Explicit Routing (ER) as core technologies, within a structured architecture of controller, application, and network planes. OAM is pivotal for efficient DetN et management, offering tools for fault detection, continuity checks, and maintenance activities to maintain Service Level Objectives (SLOs). The paper delves into advanced DetN et applications, highlighting enhanced protocols, health care frameworks, service function chain management, and industrial networking solutions, emphasizing their potential to improve reliability and network efficiency across diverse applications. © 2024 IEEE.

Author Keywords
Administration; Deterministic Networking (DetNet); Maintenance; Operation; Time Sensitive Networking (TSN)

Index Keywords
Benchmarking, Industrial management, Information management, Internet protocols, Network layers, Packet loss; Advanced applications, Congestion loss, Deterministic networking, Deterministics, Faults detection, Layer 2, Networking architecture, Operation, Operations maintenance, Time sensitive networking; Resource allocation

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