



Parallel Redundancy Protocol (PRP)

Reference Architecture

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Converged cell/area zone topologies - PRP

The topologies in this slide deck are based on subset of **Converged Plantwide Ethernet (CPwE)** architectures

Topologies

- [Parallel Redundancy Protocol: Redundant Star LAN topologies](#)
- [Parallel Redundancy Protocol: Switch ring LAN topologies](#)

Resources

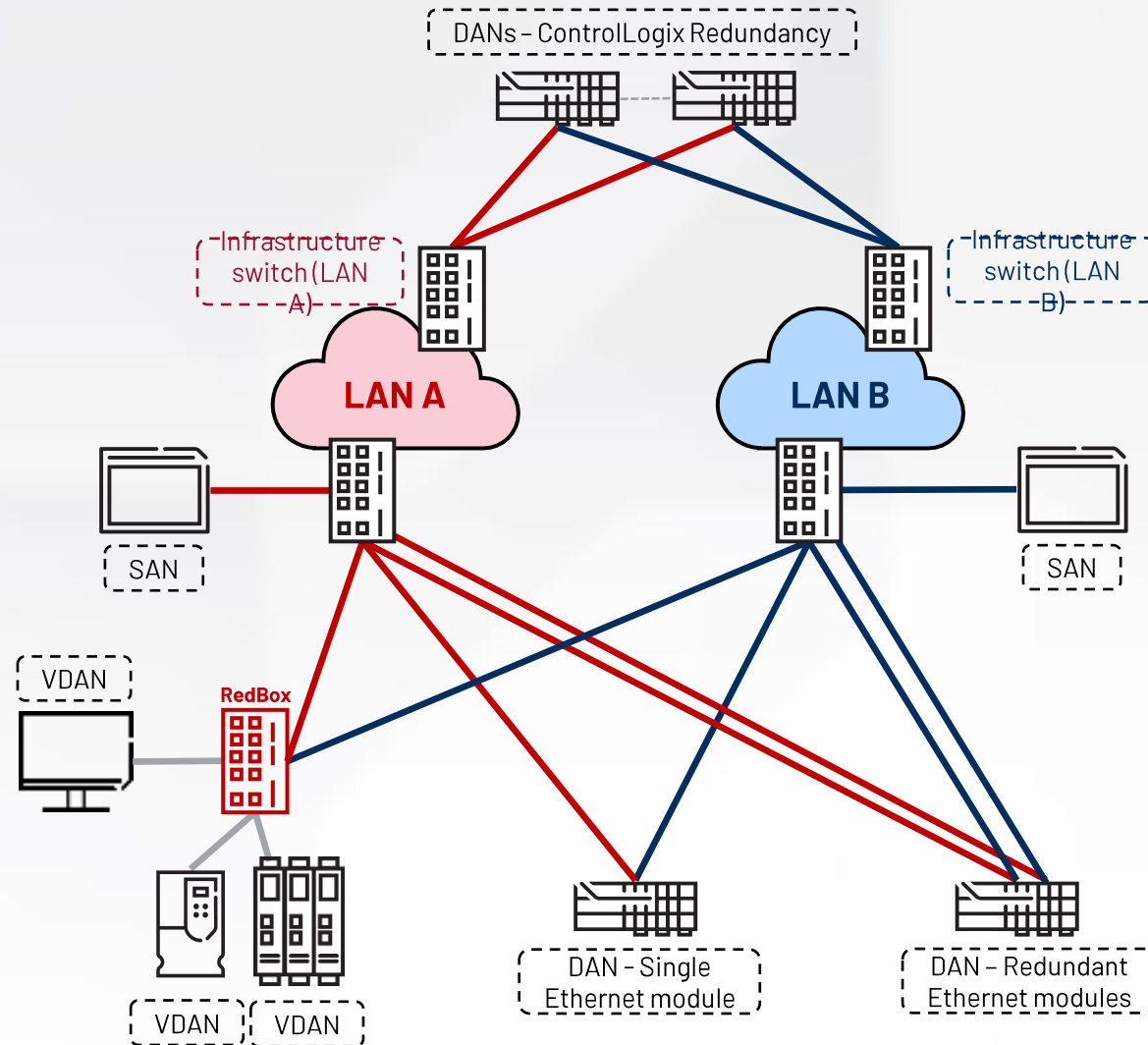
- [Deploying Parallel Redundancy Protocol within a CPwE Architecture, publication ENET-TD021](#)
- [High Availability Systems Reference Manual \(HIGHAV-RM002\)](#)

Parallel Redundancy Protocol (PRP): Components

Component	Description	Examples
LAN A and LAN B	Redundant, active Ethernet networks that operate in parallel and are fault independent .	Any two independent network topologies using managed switches: Star, redundant star, ring, linear
Infrastructure switches	Switches in LAN A or LAN B	Any Stratix managed switches
Double attached node (DAN)	A device with PRP technology that connects to both LAN A and LAN B.	1756-EN2TP ControlLogix® EtherNet/IP module 1756-EN4TR ControlLogix® EtherNet/IP module (firmware 4.001 and later) Flex 5000™ EtherNet/IP modules 5094-AENx (firmware 4.011 and later) FLEXHA 5000® EtherNet/IP modules 5015-AENx
Single attached node (SAN)	A device without PRP technology that connects to either LAN A or LAN B. A SAN typically is a non-critical device, or its function is duplicated in both LANs.	HMI terminals, industrial PCs, thin clients
Redundancy box (RedBox)	A device (switch) with PRP technology that connects non-PRP devices or non-PRP part of the network to both LAN A and LAN B.	Stratix 5400, Stratix 5410 (all) Stratix 5800 (selected models) Stratix 5200 (selected models)
Virtual double attached node (VDAN)	A device without PRP technology that connects to both LAN A and LAN B through a RedBox. A VDAN appears to other nodes in the network as a DAN.	Drives, MCC components, legacy I/O, Compact 5000 EtherNet/IP modules (5069-AENx), HMI, industrial PCs, thin clients



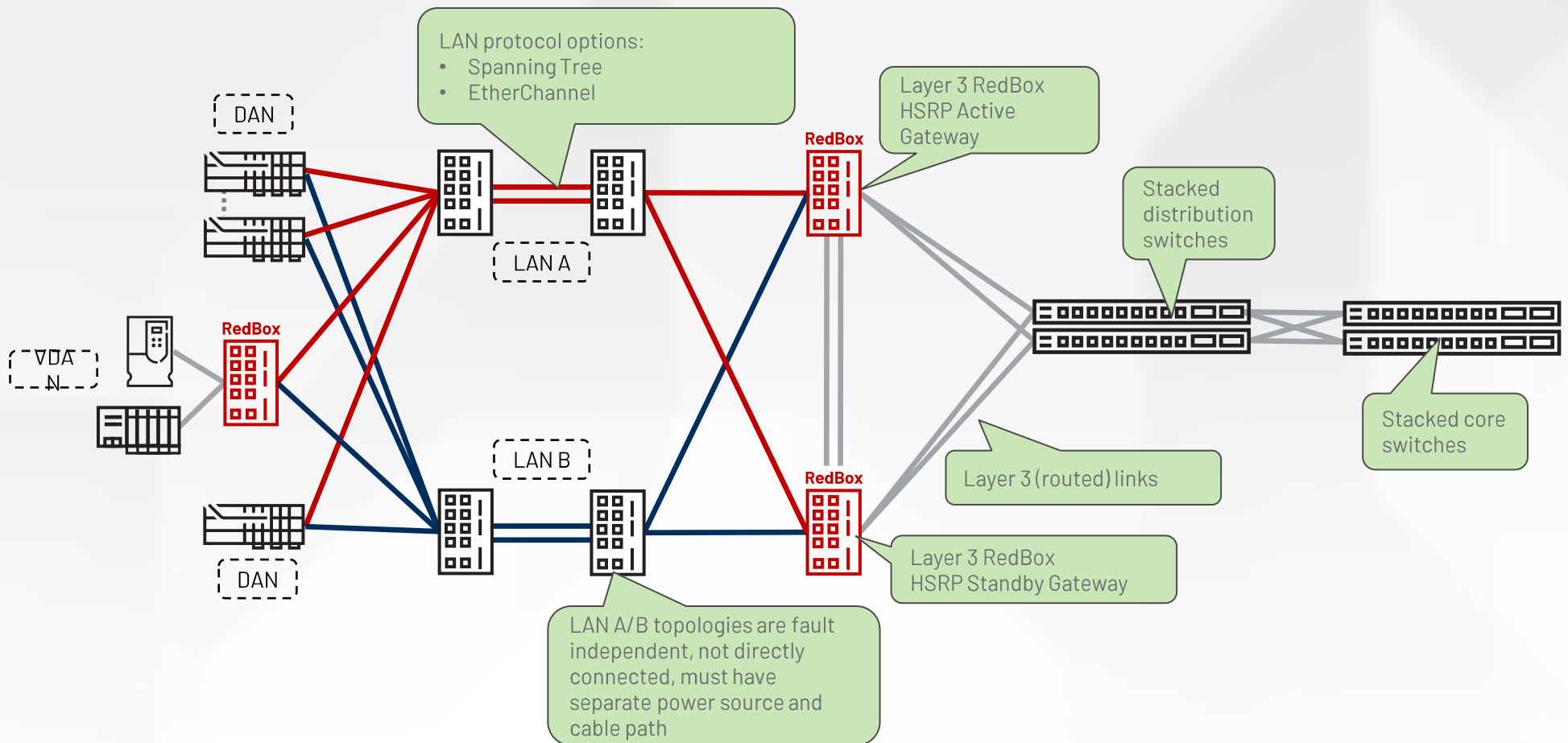
Parallel Redundancy Protocol (PRP): Operation



- PRP DAN modules and RedBoxes duplicate data frames and send two copies using A and B ports
- LAN A and LAN B topologies must be **fault independent** and **not directly connected** to each other
- Resilient LAN topologies are recommended
- PRP provides zero data loss for Layer 2 traffic when faults are contained in one LAN only
- RedBoxes must be used to connect to non-PRP devices or a plant-wide network
- Routing must be done using Layer 3 RedBoxes. PRP does NOT provide zero loss redundancy for routed traffic

— LAN A
— LAN B

Parallel Redundancy Protocol (PRP) – Redundant Star LANs

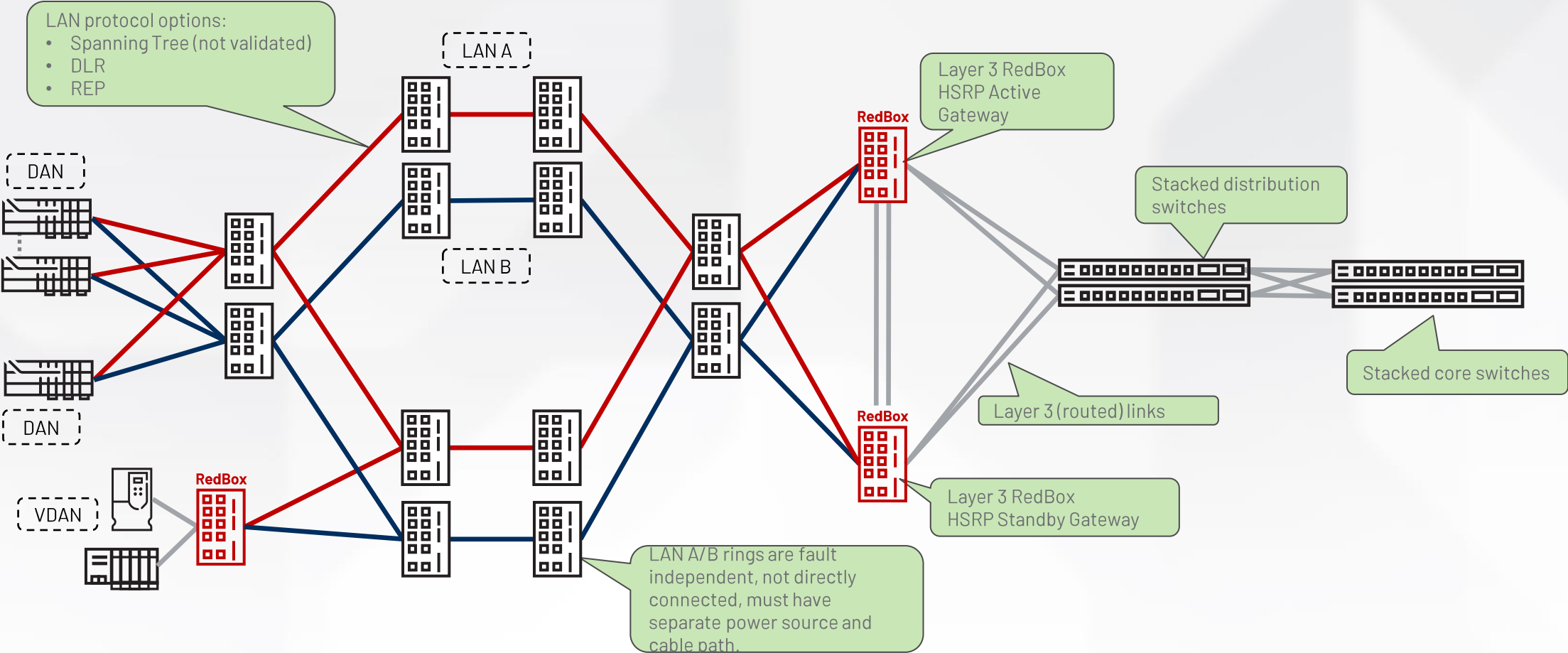


OT

Edge

— LAN A
— LAN B

Parallel Redundancy Protocol (PRP) – Switch Ring LANs



— LAN A
— LAN B