



Fault Tolerant Access Control Systems

The Latest Advancements in Access Control Technology

Introduction

Security systems rely on two primary network architectures:

- **Type A:** Host-to-Distributed Intelligence Controllers
- **Type B:** Host-to-Master Controller with Sub-Controllers

A “cluster” refers to a controller or a group of controllers along with associated peripherals such as readers, locks, and sensors. In a Type A setup, failure of a cluster impacts only that cluster, whereas in Type B, failure of the Master Controller can critically disrupt the entire network.

To enhance reliability, availability and responsiveness, a Fault Tolerant Architecture (FTA) has been developed. This system ensures redundancy at both the controller and communication levels, offering superior security, reliability, and operational efficiency.

Fault Tolerant Systems (FTS)

The FTS integrates LiNC-NXG™ and LiNC-PLUS® platforms, delivering high reliability and scalability. It comprises a Host, clusters of Fault Tolerant Controllers (FTC), and Door Interface Modules (DIMs). If an FTC becomes unavailable due to maintenance or failure, another FTC seamlessly takes over using hot fail-over mechanisms.

The architecture supports both **Active/Active** and **Active/Passive** configurations:

- **Active/Active:** Multiple FTCs handle operations, ensuring seamless continuity if one fails.
- **Active/Passive:** Designated backup FTCs automatically assume the role of a failed primary FTC.

Fault Tolerant Communication Services (FTCS) include multiple communication modes such as **Ethernet**, **Power over Ethernet (PoE)**, and **ZigBee Pro Wireless**. These ensure uninterrupted operation by automatically switching to alternate communication channels during failures.



Benefits of the Fault Tolerant Architecture

- **Enhanced Reliability:** Eliminates single points of failure by distributing security applications across multiple FTCs.
- **Scalability:** Easily expand FTC clusters to increase system robustness and responsiveness.
- **Improved Manageability:** Presents a unified system interface for centralized local or remote administration.

Key Features

System Features:

- Remote Redundancy and Backup Capabilities for “global” systems
- No loss of alarm monitoring or card authorization during FT failure
- All card, input and output decisions made by FT controller

High-Security Features:

- No interruption of system processing during firmware upgrades
- Software Management and Database integrity via Hydra Protocol
- Open Standards Mifare DESFire EV1, EV2, EV3 readers
- OEM or Custom End User Security Keys

Hardware Specifications

Fault Tolerant System Controller (FTC):

- 32-bit processor with 10/100 TCP/IP communication
- Three communication ports, real-time status display
- Flash memory with up to 16MB RAM and optional SD storage
- Battery-backed memory and tamper supervision

Door Interface Modules (DIMs):

- **Dual Door Module (DDM)** and **Single Door Module (SDM)** configurations
- Support for multiple card reader formats including Smart Cards, Proximity and Biometrics



Communication Capabilities

- Standard 10/100 TCP/IP
- Power over Ethernet (PoE)
- ZigBee Pro Wireless Mesh Network

Summary

The **Fault Tolerant Architecture (FTA)** sets a new benchmark in access control by ensuring operational continuity and eliminating single points of failure. Its advanced failover mechanisms, scalable configurations, and robust communication technologies provide an unparalleled level of security and reliability.

[See Next Page(s) for Diagrams]

Fault Tolerant Architecture Example Diagram

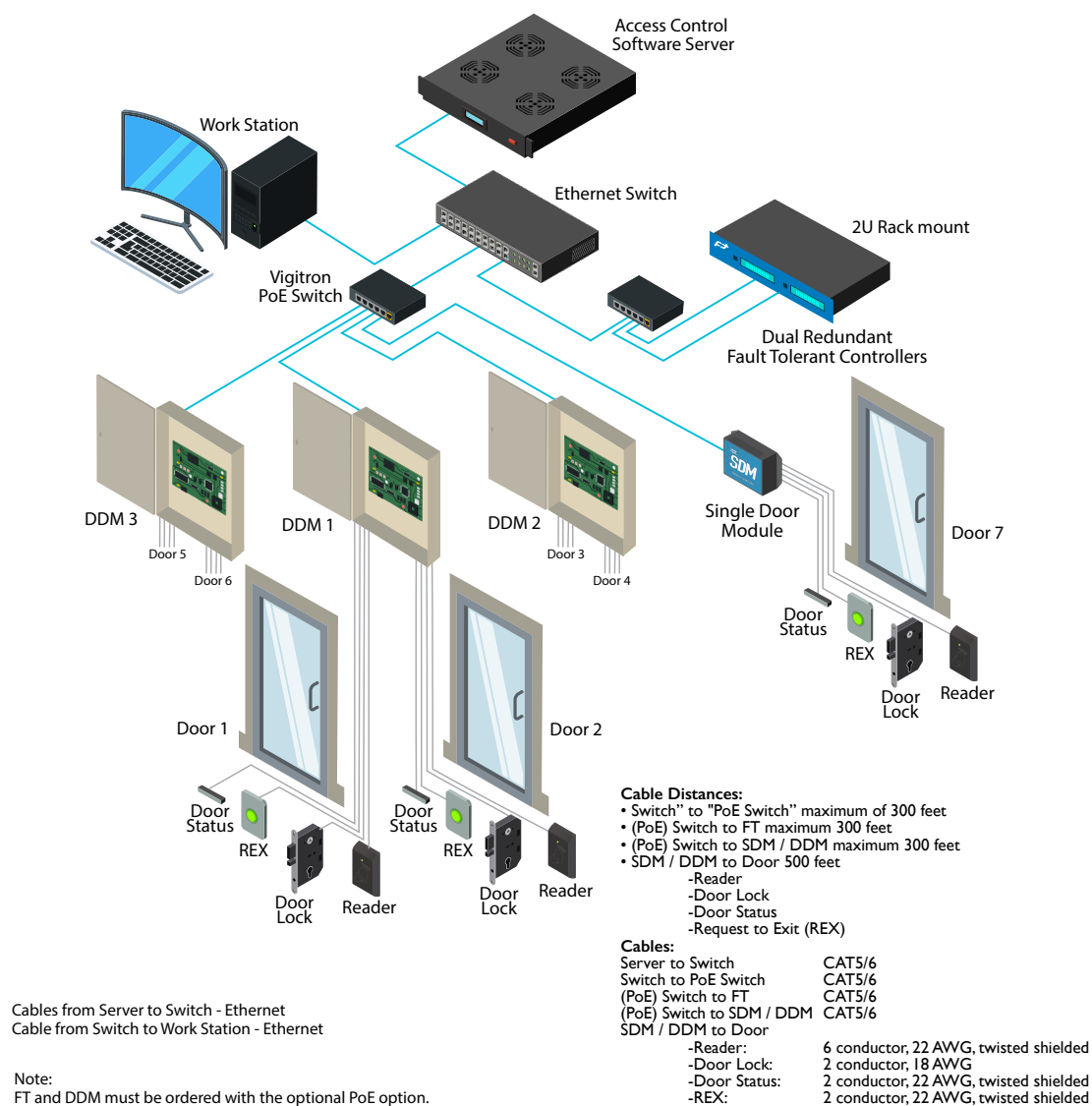
Fault Tolerant Architecture - PoE

Server Room

The Fault Tolerant architecture supports a global peer to peer network within each "Clique". "One" Clique is limited to 8 Fault Tolerant Controllers supporting up to 112 door modules or a maximum of 224 readers. The Host System can administer an unlimited amount of FT Cliques.

"Clique" Definition:

Clique is a "sub system" within the "System" that supports up to 8 redundant FT controllers, meaning, automatic failover and 100% security during failure of 7 FT controllers. Within the Clique up to 112 door modules can be supported and depending on the door modules, support up to 224 readers. The Clique supports "global" inputs and outputs as well as cardholder anti-pass-back without Host intervention.



Fault Tolerant Architecture Example Diagram

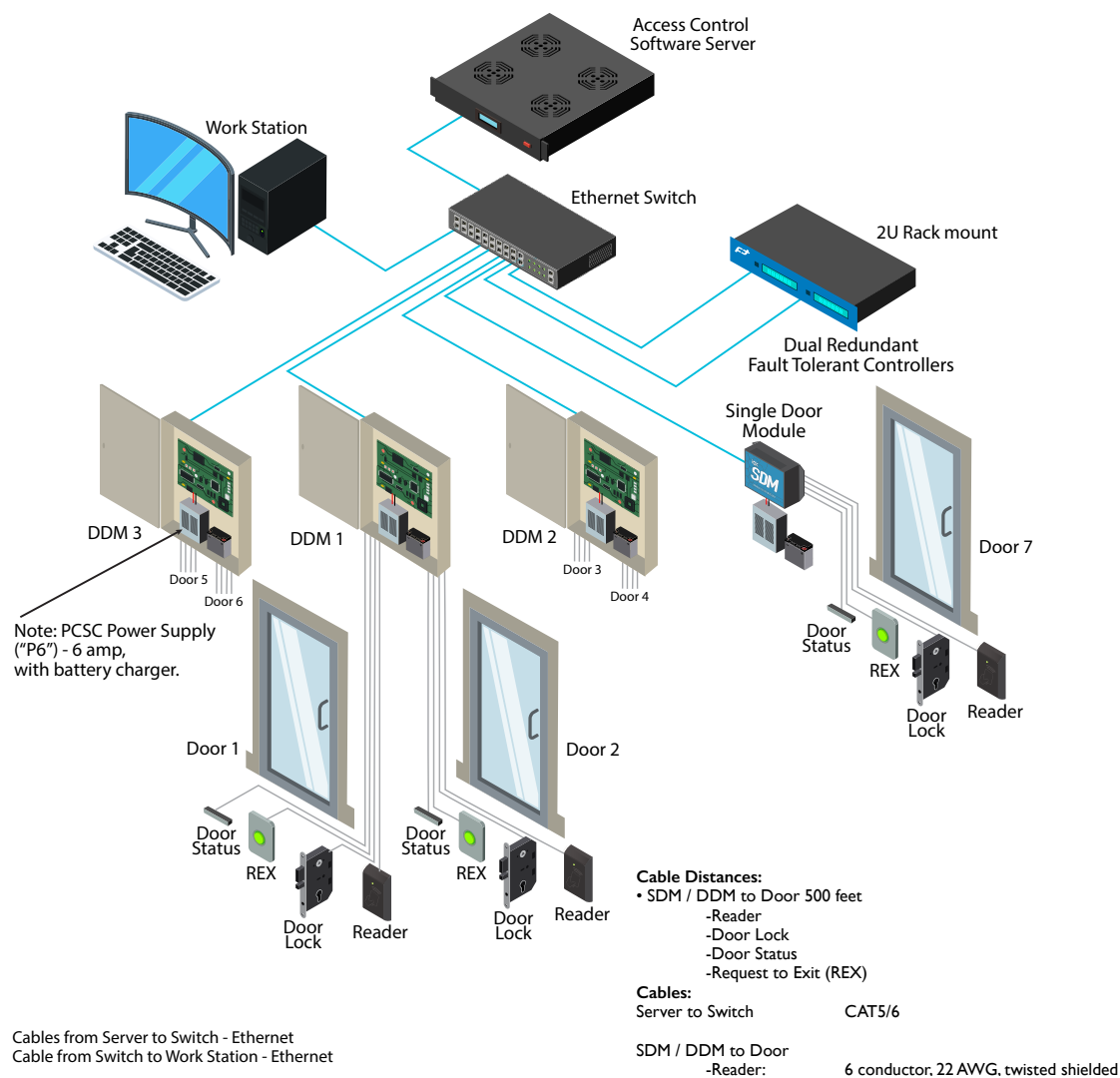
Fault Tolerant Architecture - Non PoE

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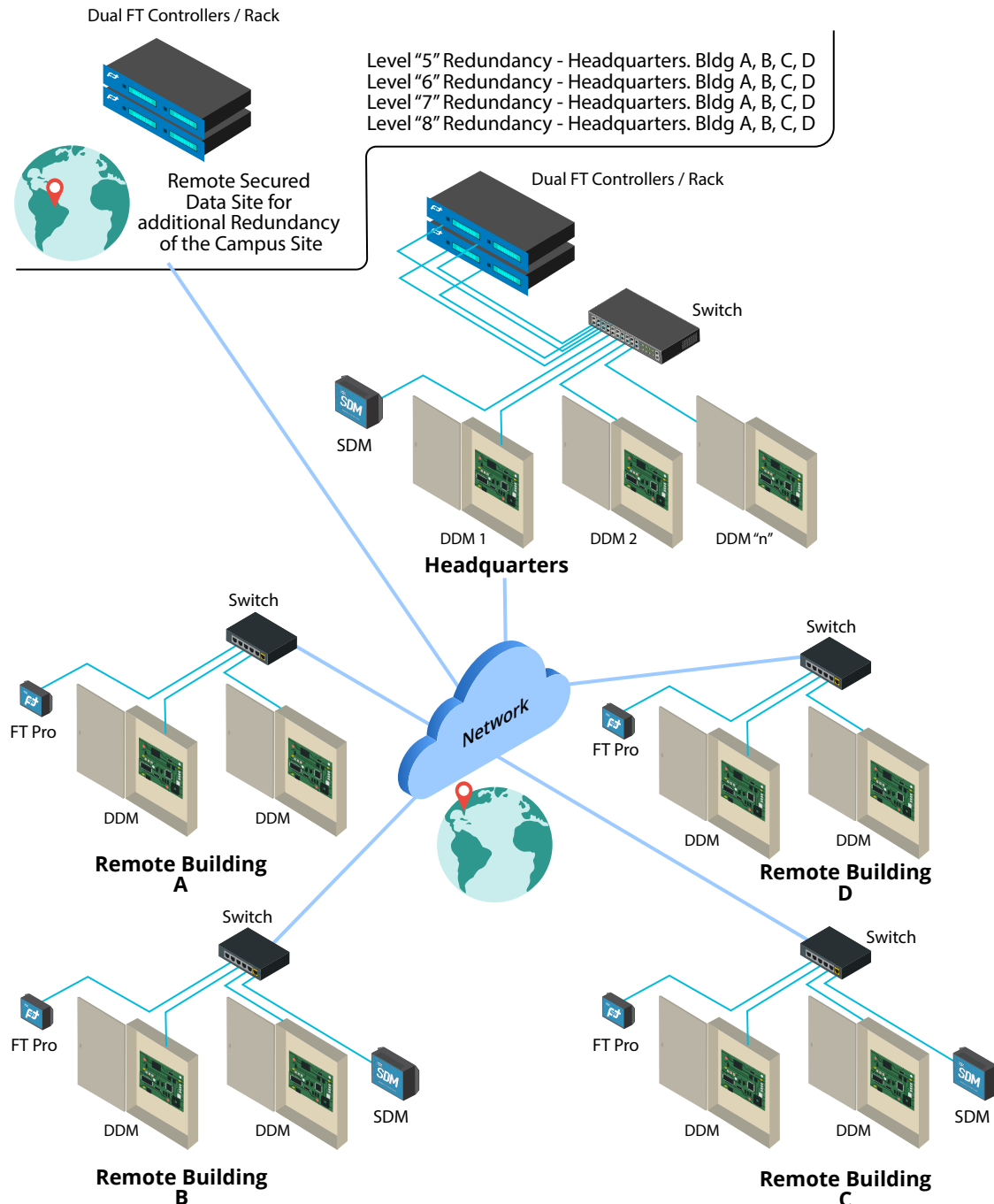
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Fault Tolerant Architecture Example Diagram

Fault Tolerant Architecture - Multi Campus



Fault Tolerant Architecture Example Diagram

Fault Tolerant Architecture - Airports

