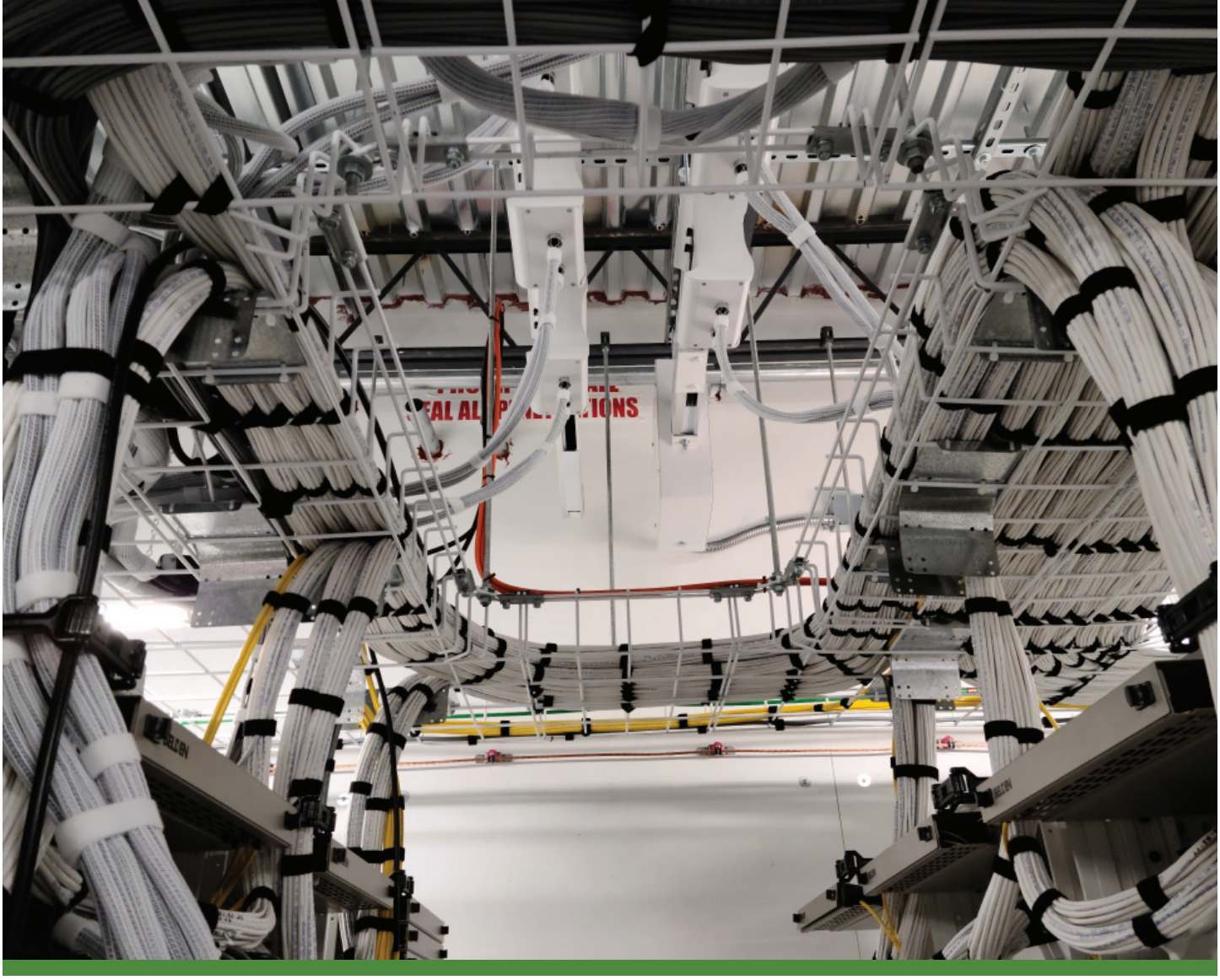
Cable Tray Systems: The Backbone of Today's Modern Data Centers

In today's digital environment, data centers are considered mission-critical infrastructure. Every cloud application, financial transaction, every AI requirement and any connected device depend on these facilities to run smoothly 24 hours a day 365 days a year. Attention is often given to servers, power equipment and cooling plants but there is always one common denominator that allows for all three to function properly;

"The Cable Tray System"

Cable trays are not thought of as the most alluring part of the build rather, cable trays are the physical pathways that deliver power, carry data and connect the systems that keep the data center running to its fullest capacity, and work in the shadows behind the magic black boxes and blinking lights of the servers. **The Three Pillars of Data Center Performance** are connected by the tray systems.



PILLAR ONE:
Power Infrastructure Delivered Safely and Reliably

Electricity is the lifeblood of every data center. Utility feeds, UPS systems, generators and distribution equipment must deliver continuous uninterrupted power all day, every day. Cable tray systems provide:

- Secure routing for high-capacity feeder cables
- Support for heavy conductors and ground fault cables
- Separation of redundant power paths
- Compliance with all national and local grounding requirements
- Scalable distribution from switchgear to the racks

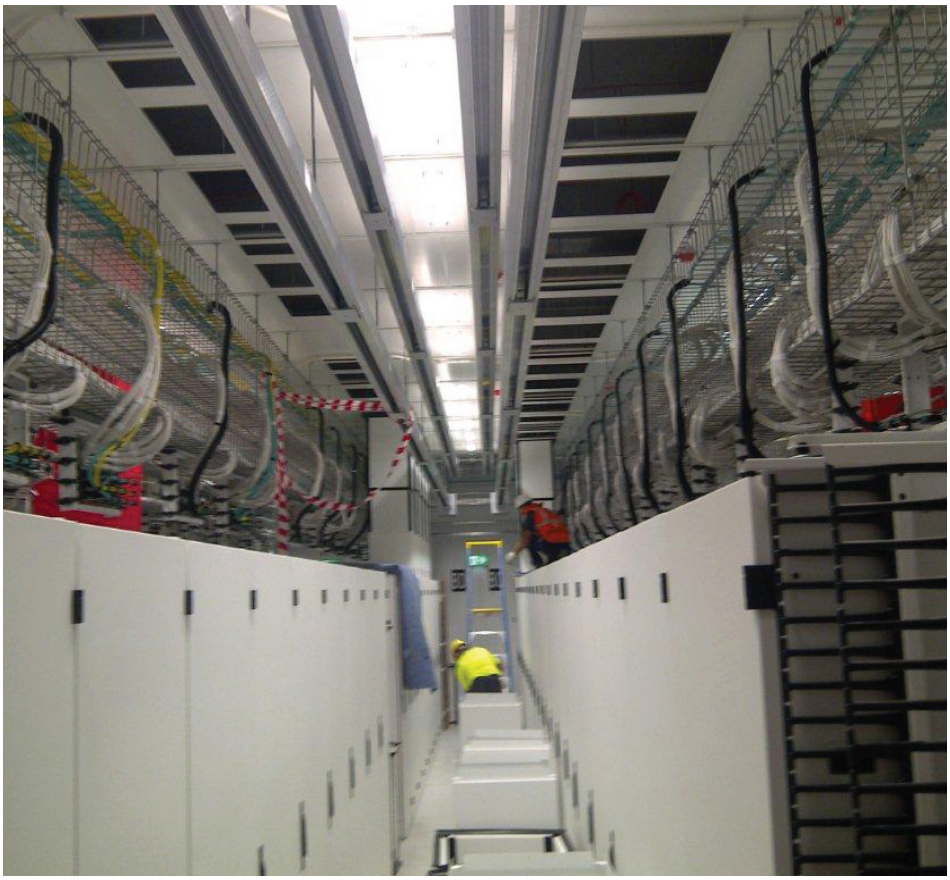
Without engineered tray pathways, large scale power distribution is impractical and can become unsafe.

PILLAR TWO:
Cooling and Mechanical Systems, Powered and Controlled Systems

High density computing generates enormous heat. Modern cooling systems rely on extensive electrical and control wiring to operate continuously, efficiency and reliably. The cable tray system needs to support:

- Power distribution to CRAHs, chillers, pumps and towers
- Control wiring for building management systems
- Sensor networks for temperature, pressure and flow
- Connections for liquid cooling equipment and motor control cables
- Integrations with all facility and automation platforms

Reliable facility cooling depends on reliable cabling, and that cabling depends on a robust pathway system.



PILLAR THREE:
IT and Network Infrastructure, Connected on a Massive Scale!

Data centers contain miles of fiber and copper cabling that must be protected, organized and be easily serviceable. Cable Trays ensure:

- High density fiber backbone routing
- Structured copper cabling pathways
- Interconnected switching topography
- Top of rack connectivity
- Cross connected infrastructure
- Physical layer scalability for growth

Open tray designs also preserve airflow which is a critical factor in maintaining thermal efficiency.

Modern data centers are built for speed, reliability, and data center operators design facilities for rapid deployment and decades of reliable operation. They prioritize cable tray systems that deliver:

Faster Installation
- Modular components
- Reduce field cutting
- Lightweight yet strong construction
- Labor saving assembly

High-Capacity Loading
- Support for dense fiber bundles
- Accommodation of large heavy power feeder cables
- Minimal deflection under load
- Optimal headroom for future expansion

Airflow Compatibility
- Open designs that minimize obstructions
- Overhead routing to protect cold aisles
- Integration with containment systems

Scalability and Serviceability
- Easy moves, adds and changes (MAC work)
- Expansion without downtime – data centers nightmare!
- Clear and concise cable organization
- Long term adaptability

Reliability and Safety Concerns
- Robust structural performance
- Grounding capabilities
- Fire and seismic compliance
- Corrosion resistance
- Protection for critical cabling infrastructure

Emerging technologies are driving unprecedented demands, enabling

the next generation of data centers. At no other time in modern history have we been witness to such a large magnitude of growth in this sector. Technology is driving every aspect of modern life from hand held devices to supercomputing AI centers. Examples of these demands:

- AI and high-performance computing clusters
- Dramatically higher cable densities
- Increased power requirements
- Liquid cooling infrastructure
- Modular and prefabricated construction

Cable tray systems must evolve to support these trends while maintaining uptime and facility efficiencies.

More than just pathways, cable trays are a strategic investment in the overall construction schedule for data center development. The modern data center contains miles of cables, and the cable tray system determines how effectively the cabling can be installed, managed, cooled protected and expanded. A well-designed cable tray infrastructure delivers:

- Reduced installation time and labor costs
- Improved cooling and efficiency and higher power usage effectiveness
- Enhanced reliability and greater uptime rates
- Simplified maintenance and troubleshooting
- Future ready salability
- Lower total cost of ownership

The Backbone Behind the Mission:

- The power must flow continuously
- Cooling must operate flawlessly
- Data must move instantly

Cable tray systems make all three of these mission statements possible. Cable trays are not just supports; they are the critical infrastructure backbone for every project across the board.