

# TrueNet® Data Centres

The complete Data Centre solution



KRONE

# TrueNet® Data Centres

ENGINEERED FOR UPTIME™



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The Data Centre is not only a key resource for many enterprises, it is absolutely critical. Almost every activity of every enterprise now relies on digitally stored information and on the IT systems and telecommunication networks which make that information available to the people who need it – where they need it and when they need it – 24 hours a day, 365 days per year.

Without access to this information and the IT systems to process it, people are powerless and the enterprise ceases to function.

The costs if this happens are astronomical. They vary by business but if an entire enterprise is brought to a standstill, they can be from tens of thousands to millions of Euros for every hour of downtime.

The Data Centre is key to delivering information and IT services to people with mission critical levels of reliability. Levels of availability previously unheard of in the commercial IT sector.

Underpinning every Data Centre is an infrastructure of copper and fibre interconnectivity between all of the active equipment. It is the very foundation of the IT superstructure. If this is not designed and built to be mission-critical, then the foundations are insecure and the superstructure will fail.

***Introducing TrueNet Data Centre Solutions –  
the mission critical Data Centre foundation.***

TrueNet® Data Centre Solutions

# Data Centre design

More and more enterprises are turning to the Data Centre model and are specifying and demanding higher levels of uptime.

- Staff require 24\*7\*365 access to documents and data wherever they are in the world
- IP convergence means ever more devices need Ethernet connections
- Increased port density means increased cabling density, the need for better cabling management and more opportunities for accidental disconnections
- Blade servers are contributing to higher temperatures and connection density
- 10 Gigabit/s speeds – both fibre and copper – and even higher backbone bandwidths will become necessary
- 10 Gigabit/s Network Interface cards (NIC) are now commercially available
- Higher data rates increase power density and heat dissipation requirements
- Deployment of storage area networks (SAN) and network attached storage (NAS) with massive hard drive arrays for the long-term storage of information
- Shift from Category 5e to 6, and now to 10 Gigabit/s Category 6a and fibre
- Cabling needs to be designed for three or four technology refresh cycles
- Many new applications that didn't exist even a few years ago
  - Voice over IP
  - Security
  - Video Conferencing
  - Storage Area Network (SAN)
  - Real-Time Data Processing
  - Radio Frequency Identification Device (RFID)
  - Streamed video
  - WiFi
  - Intelligent Buildings
  - Regulations Compliance
  - E-mail Archival
  - Compliance with Sarbanes Oxley and other legislation

All of these drivers have consequences on the design of the Data Centre infrastructure.

The move to higher density and higher speed active equipment seriously impacts on heat management and connectivity density.

The need for 24\*7\*365 availability dictates higher levels of reliability and redundancy and means that opportunities for human and accidental error need to be designed-out.

**ADC KRONE's Data Centre design skills are based on many years of field experience, understanding of IT managers' needs and concerns, and unrivalled expertise in the application of international standards to achieve maximum future proofing, flexibility and uptime.**

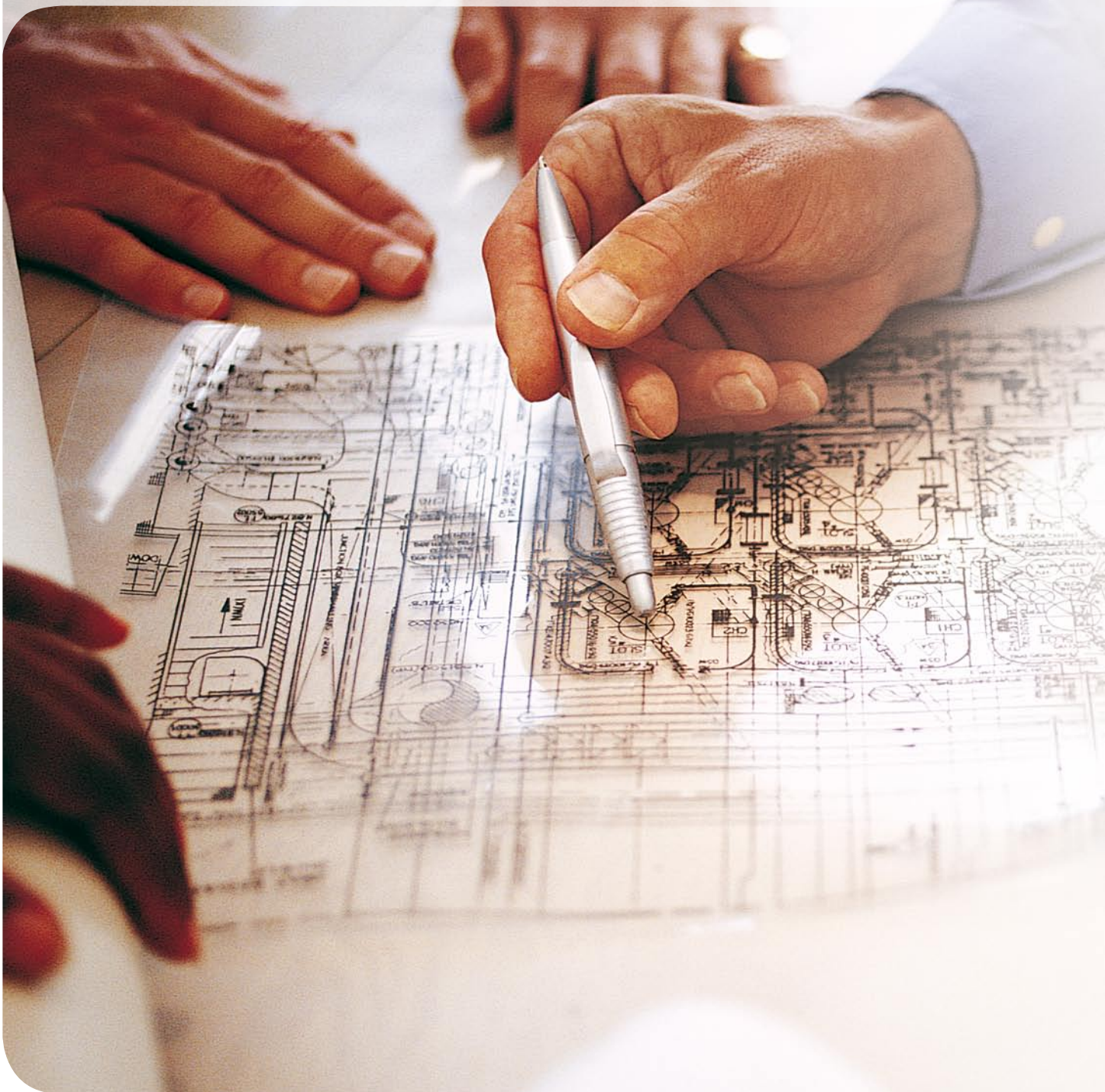
“ADC KRONE is committed to the Enterprise market as a complete solutions provider for multi-national organisations around the globe.”

Axel Kahsnitz, Vice President, Sales & Marketing, ADC KRONE

# The **3 principles** of TrueNet<sup>®</sup> Data Centre Design

**At ADC KRONE we  
employ three basic  
principles of  
Data Centre design  
in order to:**

- Maximise system uptime
- Lower your total cost of ownership
- Support your future growth plans
- Maximise performance
- Improve your ability to reconfigure



## 1 Principle one: Space savings

Environmentally controlled space is very expensive, with Data Centre building costs sometimes in excess of €12,000 per square metre.

Reliability Tier*	Tier I	Tier II	Tier III	Tier IV
Annual Downtime	28.8 Hours	22 Hours	1.6 Hours	24 Minutes
<b>Uptime</b>	<b>99.671%</b>	<b>99.749%</b>	<b>99.928%</b>	<b>99.995%</b>
Construction Cost per sq metre	€5,000	€6,500	€10,000	€12,000

Source: Uptime Institute

\*Defined on the following pages

Business environments are constantly evolving, and as a result, Data Centre requirements continuously change. Providing plenty of empty floor space when designing a Data Centre gives the flexibility to reallocate space and add new equipment as needed, yet IT managers frequently cite lack of Data Centre space as a significant problem.

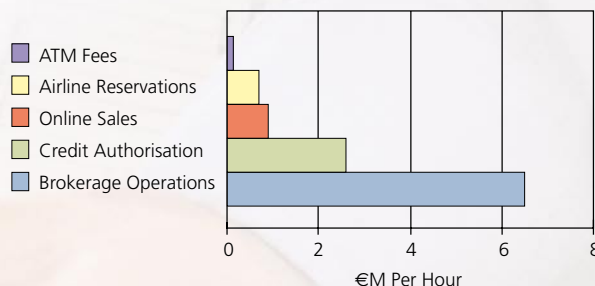
Expanding the physical space of a Data Centre can cost more than the original Data Centre build itself, so we design the Data Centre infrastructure for space savings from the outset with ample overhead and under floor cable pathways and TrueNet high density connectivity solutions developed to create more space.

## 2 Principle two: Reliability

Uninterrupted service, and continuous access, is critical to the daily operation and productivity of your business. Downtime translates directly into loss of income and so Data Centres must be designed for redundant, fail-safe reliability and maximum uptime. Depending on your business, downtime can cost anything from €50,000/hour to €6Million/hour.

Data Centre availability is constrained by the reliability of the physical infrastructure. TrueNet Data Centre cabling solutions are backed by a zero bit error warranty to ensure that no errors are introduced by the cabling infrastructure and TrueNet Physical Layer Management (PLM) can significantly reduce down-time caused by other factors.

### Financial Impact of Network Downtime



Source: Strategic Solutions

## 3 Principle three: Manageability

Manageability is key to optimising your Data Centre. We design the infrastructure to be a highly reliable and flexible utility to accommodate everything from upgrades and modifications to disaster recovery.

Key to long-term manageability is a strategic unified cable management regime with adequate capacity for future requirements that is intuitive to follow and clearly defined. It must enable cables and connections to remain properly organised, easy to locate and access, and simple to reconfigure throughout the life of the Data Centre.

We design TrueNet patching solutions for both fibre and copper to ensure that individual connections can be moved or changed without disrupting other services.

Our intelligent infrastructure management solution – TrueNet PLM – abolishes the need for manual records and manages moves, adds and changes (MACs). It can also significantly reduce time-to-repair after faults.

# Standards-based design

Taking a standards-based approach to the design of any telecommunications or IT network is recognised as best practice around the globe.

For two decades, ADC KRONE has been active in all of the international standards committees and bodies relating to structured cabling, helping to define best practice.

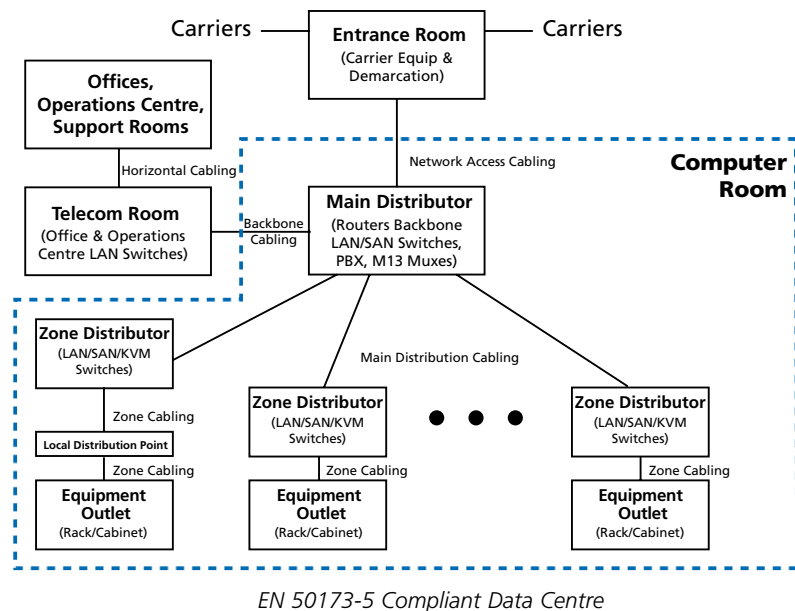
Historically, Data Centres were designed without the benefit of established standards, leaving IT managers with the challenge of choosing appropriate technologies and deciphering how properly to implement them – often into an inadequate space.

The result was a lack of flexibility and sub optimal reliability, both impacting on the enterprise's ability to grow and compete.

This was changed, in April 2005, when the Telecoms Industry Association (TIA) published TIA-942 Telecommunications Infrastructure Standards for Data Centres – the first standard to specifically cover the design of Data Centres to achieve specific levels of reliability and availability. More recently, in early 2007, the European CENELEC EN 50173-5 standard for Data Centre structured cabling has also been published.

Both standards were developed using the experience and expertise of companies like ADC KRONE in building Data Centres for customers – to enable best practice to be shared and implemented around the world.

Today these standards underpin ADC KRONE's Data Centre portfolio and design approach.



## Site space and layout

The TIA standard recommends specific functional areas, which helps to define equipment placement based on the standard hierarchical star topology design for regular commercial spaces. Designing a Data Centre with these functional areas anticipates growth and helps create an environment where applications and servers can be added and upgraded with minimal downtime and disruption. According to TIA-942 a Data Centre should include the following key functional areas:

- Entrance Room(s) for WAN access provider equipment and demarcation points as well as the interface with campus cabling systems.
- Main Distribution Area – MDA – which houses the core routers and switches for LAN and SAN infrastructure.
- Horizontal Distribution Area(s) – HDA – this serves as a distribution point for horizontal cabling and houses cross-connects and active equipment for distributing network connections to the equipment distribution areas.
- Equipment Distribution Areas – EDA – the main area for cabinets full of servers and other active equipment.
- Zone Distribution Area – XDA – an optional point for reconfiguration flexibility or for housing freestanding equipment like mainframes.

**ADC KRONE engineers and TrueNet® Integrators will help you to plan your space and physical layouts for maximum space efficiency and growth/reconfiguration flexibility over multiple technology refresh cycles.**

## Tiers of reliability

The TIA-942 standard defines tiers of reliability which ADC KRONE designers and planners use to establish the specific requirements for a Data Centre:

**Tier 4 "Fault Tolerant"** is the ultimate where at least one worst-case unplanned event can be suffered with no critical load impact. This requires multiple redundancy but brings annual downtime to a mere 24 minutes. The uptime is 99.995%.

**Tier 3 "Concurrently Maintainable"** specifies multiple power and cooling distribution paths each capable of full-load, with planned activities not causing disruption, although unplanned events still do. In this scenario annual downtime is reduced to 1.6 hours with an uptime of 99.982%.

**Tier 2 "Redundant Components"** is less susceptible to disruption from both planned and unplanned activity requiring some redundant components, raised floors, UPS and generator. With an annual downtime of 22.0 hours and the uptime is 99.741%.

**Tier 1 "Basic"** is the entry level delivering an uptime of 99.671% equating to 28.8 hours of downtime per year.

## Environmental considerations

Design considerations which ADC KRONE applies include operating temperatures, humidity levels, fire suppression, architectural, electrical power, and mechanical system specifications.

Heat management and cooling is a particular skill of ADC KRONE's global network of design engineers and integrators – since getting this right has significant impact on both capital and operating costs – CapEx and OpEx. Cable management design and cabinet layout both play significant roles in achieving good heat management.

## Cabling Infrastructure

The TIA-standard covers USA structured cabling requirements and practices.

Europe has its own standard CELELEC EN 50173-5 which specifies a generic, permanent cabling system for Data Centres including:

- Fibre for Ethernet, Fibre channel and WAN protocols:
- Singlemode fibre
- Multimode fibre
- Laser optimised multi-mode fibre
- Twisted-pair shielded and unshielded 4-pair copper cabling

ADC KRONE advice will ensure that you select the most appropriate forms of cabling infrastructure to support current needs and three or four technology refresh cycles that can be expected during the life-cycle of a typical Data Centre.



# TrueNet® – the **complete** Data Centre infrastructure solution

TrueNet® Data Centre Solutions

With two decades of expertise and experience in building Data Centres, and contributing to the development of the international standards, ADC KRONE has devised a complete international solutions portfolio to facilitate the building of standards-compliant Data Centre infrastructure anywhere in the world.

Encompassing Gigabit and 10 Gigabit/s fibre and copper cabling, superior cable management and both fibre and copper patching, the TrueNet Data Centre grade solutions family includes CopperTen™ it's Augmented Category 6 solution, and extends to include intelligent Physical Layer Management systems which integrate into network management centre (NMC) and network operations centre (NOC) software to give operations staff a fully integrated single view of active and passive systems.

All of this is backed, via specialist TrueNet Data Centre Authorised Integrators with the experience and skill sets to design, plan, deploy and implement all aspects of the Data Centre from space and layout through cabling infrastructure to environmental considerations such as heat management to achieve the desired Tier of reliability.

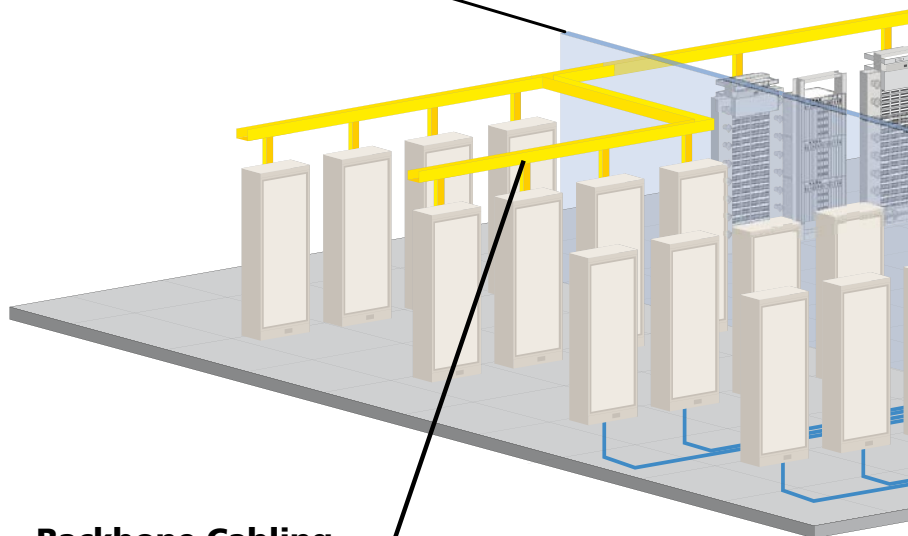
## Equipment Distribution Area (Rack/Cabinet)

- Advanced Patching Frame (APFII)
- CopperTen™ Panel
- FMT Termination and Storage Panel
- Copper and Fibre Patch Cords
- Physical Layer Management (PLM)
- Split Fibre Patch Panel



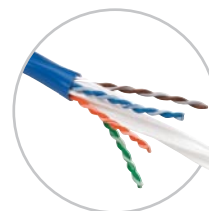
## Horizontal Distribution Area (LAN/SAN)

- Advanced Patching Frame (APFII)
- CopperTen™ Panel
- TFP MTP Panel
- Highband® Cross-Connect Blocks
- Copper and Fibre Patch Panels
- PLM
- TrueNet® Standard or Server Cabinets



## Backbone Cabling

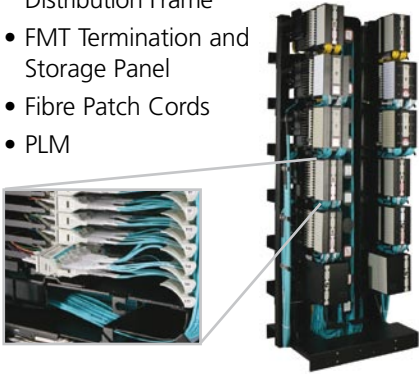
- Laser Optimised Multimode Fibre
- Singlemode Fibre
- FiberGuide®
- CopperTen™ Augmented Category 6 Cable



## Main Distribution Area

(Routers, Backbone LAN/SAN Switches, PBX)

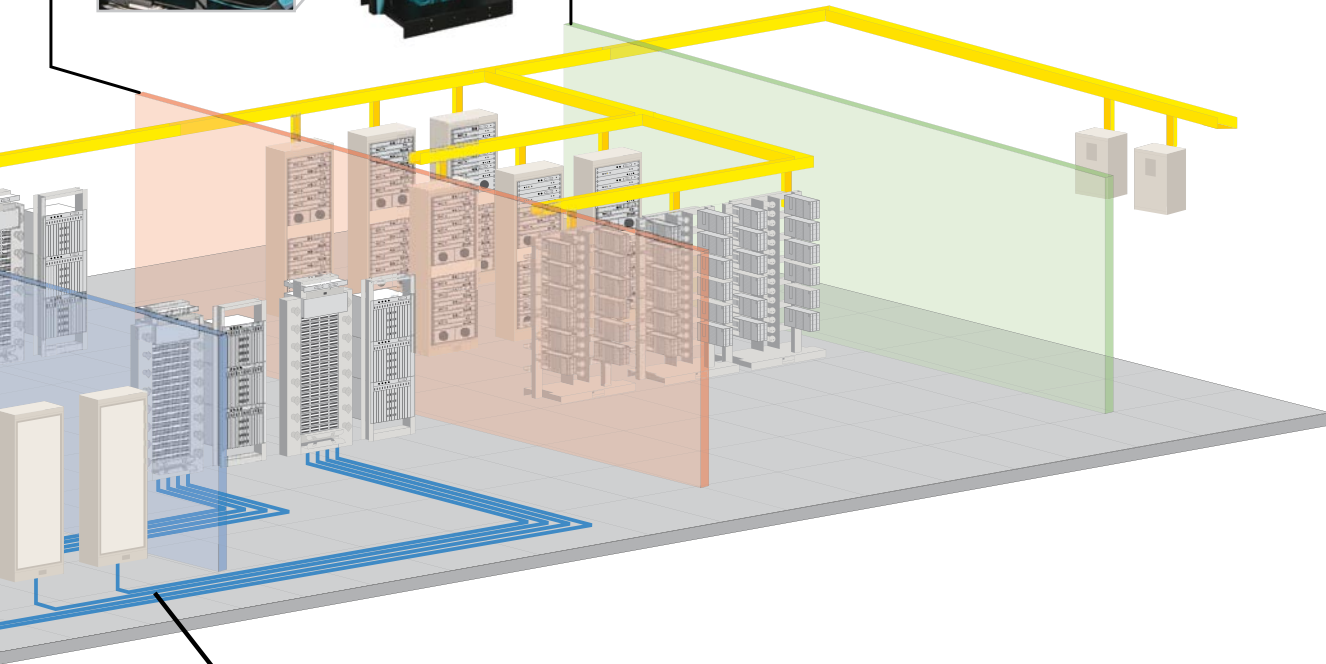
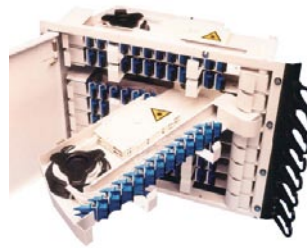
- NGF – Next Generation Fibre Distribution Frame
- FMT Termination and Storage Panel
- Fibre Patch Cords
- PLM



## Entrance Room

(Carrier Equipment and Demarcation)

- Fibre Distribution Unit (FDU)
- Hybrid SM/MM Fibre
- Fibre Patch Cords
- Building Entrance Terminal Blocks



## Horizontal Cabling

- CopperTen™ Augmented Category 6
- Category 6
- Laser Optimised Multimode Fibre
- FiberGuide®



**TrueNet®** ENGINEERED FOR UPTIME™

TrueNet® Data Centre Solutions



# **Intelligent** *Data Centre Infrastructure Design Management*

Estimates show that between 35 and 70 per cent of downtime is due to problems in the physical layer such as wrongly disconnected circuits during moves, adds and changes. Yet, most NMC solutions only manage the active equipment and not a passive infrastructure.

TrueNet PLM (Physical Layer Management) brings the whole of the Data Centre, active and passive, under integrated supervision and control. This removes the need for physical record keeping of what is connected, since the system constantly scans all connections and reports their current status to the NMC in real-time.

The possibility for human and accidental errors during moves, adds and changes is virtually eliminated because TrueNet PLM, through its work ticket procedure, uses LED lights to indicate to technicians exactly which patch cords to remove or replace – raising an immediate alarm if a wrong move is made. Users report savings of up to 87% on MAC technician-time.

## **Downtime slashed**

When an outage does occur, TrueNet PLM enables any faults in the physical layer to be immediately identified without the need for conventional lengthy and complex fault-isolation procedures. The result is significantly reduced downtime due to faults.

## **Cost saving**

As the months and years go by, with hundreds or thousands of moves adds and changes, it is common for many of them to be only partially completed resulting in a phenomenon known as “phantom utilisation” whereby switch ports, or other active equipment, appears to be allocated, but is in fact sitting idle. A study by Gartner Research showed that this can be as much as 40 percent of apparent utilisation. TrueNet PLM can identify and release this active equipment for re-use saving the need for additional capital expenditure (CapEx).

# TrueNet®

The TrueNet® Structured Cabling System is the integrated portfolio of high-performance copper and fibre cable, connectivity, and cable management products from ADC KRONE.

The precisely tuned TrueNet system exceeds ISO and EN standards and provides a clear path for uninterrupted data throughput within the entire network.



## True end-to-end solutions

The TrueNet system delivers proven cable, connectivity, and cable management solutions for fibre, 10 Gigabit Ethernet copper, and Category 5e/6 from the comms room/Data Centre to the desktop.

## TrueNet System Warranty

The TrueNet System Warranty assures that applications specified in the cabling standards will run on a TrueNet system and that the potential bit errors resulting from the structured cabling system will effectively be zero. TrueNet PLM will not affect the application or cause bit errors on a TrueNet structured cabling system. To benefit from the TrueNet System warranty the system must be installed by a certified TrueNet Integrator.

## Full service

ADC KRONE fully supports TrueNet PLM with a range of packages ranging from simple software patches and upgrades, through to complete hardware and software service level agreements with 24 hour telephone assistance.

With a fully trained team of Field Engineers throughout EMEA, ADC KRONE is committed to both Customers and its Channel Partners, providing all the necessary training and support required to deliver 'Best in Class' Managed Solutions.

# TrueNet® Data Centre Solutions



KRONE



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