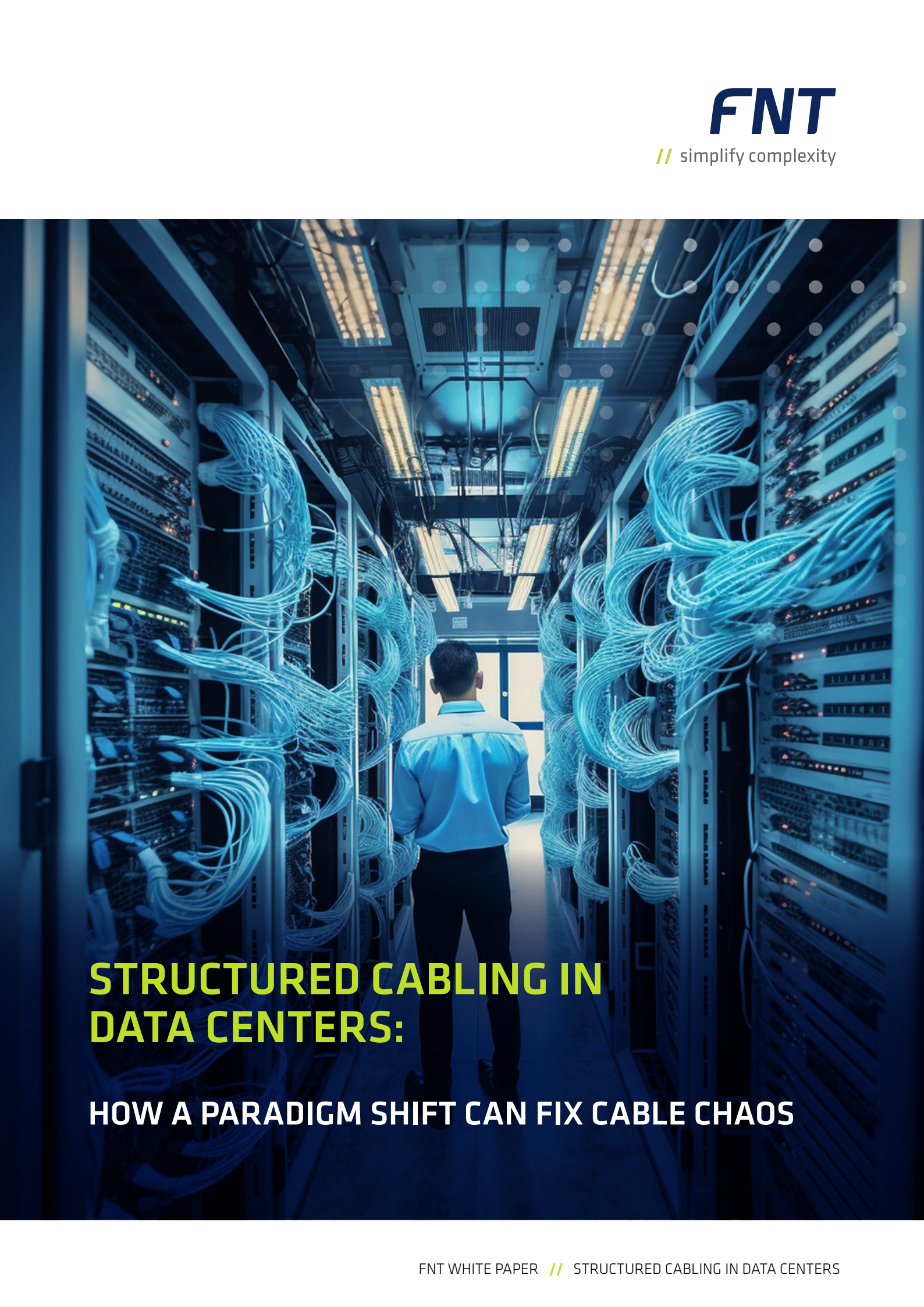


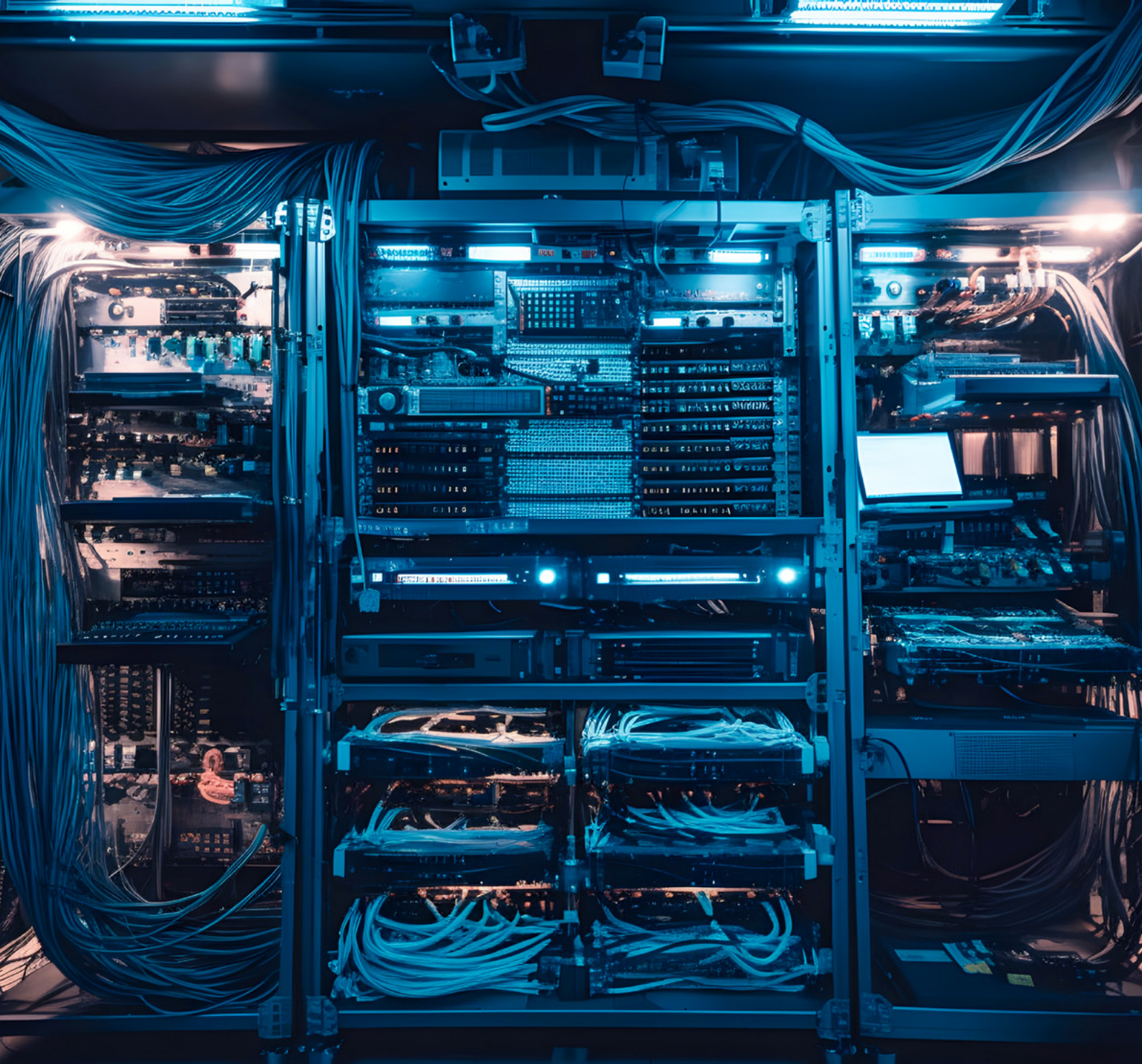


FNT

// simplify complexity

STRUCTURED CABLING IN DATA CENTERS:

HOW A PARADIGM SHIFT CAN FIX CABLE CHAOS



IN THIS WHITE PAPER:

In our white paper titled **Structured Cabling in Data Centers: The Nerve Pathways of Digital Transformation**, we highlighted the strategic importance and value of data center cabling. The focus was on the challenges around managing data center cabling, the consequences of inadequate cable management, and the warning signs that urgent action is needed. In this white paper, we examine how to turn data center cable management into a technical and economic success factor. We present the necessary changes to the fundamental approach and the positive effects that result from this paradigm shift. This is accompanied by a look at the increasing importance of professionalization, the use of professional software, and the tangible benefits it delivers for data center managers.

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TIME FOR FUNDAMENTAL CHANGES

Four principles for better data center cable management

The dilemma when it comes to managing complex infrastructures – which includes data center cabling – lies in the fact that there appears to be a clear and logical process: implementation first, followed by documentation for the sake of completeness. The point of the documentation is so that one can later understand what has been done. It also means you can make changes in the future based on this knowledge, with the documentation subsequently being updated.

This approach is seemingly correct. After all, how else could you create appropriate, accurate documentation? That is particularly true when passive components, such as cables and patch panels, are involved. These cannot simply be scanned or queried by software to establish their status and configuration settings. Identifying the accurate status quo is obviously an essential prerequisite for creating the documentation.

However, in the modern world of constant change, this sequential approach no longer works. Those in charge of data center cabling are thus forced to challenge the traditional perspective and take a fundamentally different approach. The solution is to create a digital twin* – not just of the cabling but of the entire data center, including the building structure and covering all the racks and installed devices, right down to the port level. Fully digitized cable management enables the necessary paradigm shift, thereby rendering traditional ways of thinking and beliefs obsolete.

***A DIGITAL TWIN OF YOUR IT INFRASTRUCTURE**

Creating a digital twin of the IT infrastructure involves applying concepts from the manufacturing industry to corporate IT. A digital twin combines the abilities of an advanced CMDB with wide-ranging planning functions, offering planners a high levels of graphic interactivity and sophisticated automation. A solution like this makes it possible to create an accurately detailed map of the IT infrastructure as an “IT production line.” Tight process integration thanks to powerful workflow and job management functions allows changes planned in the digital twin to be implemented in operational systems, supported by careful monitoring. Interdisciplinary work on the digital twin by different teams (server management, network management, cable management) encourages cooperation and thus overcomes the traditionally isolated ways of thinking and working within individual silos. Integration with autodiscovery and monitoring solutions ensures regular synchronization with the as-is state of the system landscape. The combination of a virtual image and comprehensive logging functions means that a digital twin of the infrastructure is able to meet even the highest documentation system requirements.



The ultimate aim is significantly improved management of complex cabling infrastructure in accordance with four key principles:

① “Get ahead of things”

What is absolutely critical in this context is pre-planning of the initial rollout of new cable connections and of all the changes in the subsequent lifecycle of a cable connection prior to actual implementation. With a digital twin of the data center, cable planners can perform all the necessary tasks in advance in the digital space. So instead of making changes in the real world and documenting them afterwards, the target status is proactively created up front and then implemented by technicians on the ground.

② “Optimize in advance”

The second key principle is closely linked to pre-planning: pre-optimization. Professional network technicians pride themselves about finding good solutions on site by leveraging their extensive experience. The fact is, however, their skills are no match for the plausibility checks built into a digital twin and the capabilities of algorithmic autorouting. These make it possible to find the optimum connections, taking into account all the technical constraints and using the lowest hop count and the shortest possible cable runs. This principle allows the creation of an optimum blueprint for implementation, rather than just a target state that meets the basic function of a new cable connection.

③ “Execute control over the workforce”

If creation of the target state is recorded in a planning log, this log will contain all the instructions needed by a technician for real-world execution – step by step, with exact details of the location of the work, thereby reducing the potential for errors during implementation to an absolute minimum. If a large number of changes are pre-planned in this way within a short time, deployment of the technicians tasked with implementation can also be optimized. Combining work to be carried out in the same room, for example, makes it possible to avoid multiple visits to the site and unnecessary travel.

④ “Create the AS-IS from confirming the SHOULD-BE”

Last but not least, pre-planning makes both initial development and ongoing quality assurance of meaningful, up-to-date documentation much simpler. This also includes passive infrastructure components. Once the technician carrying out the work confirms correct execution of the specified work steps, the target state planning can be copied across to the as-built documentation by simply changing the status. If the technician reports any red-line changes, due to physical obstacles such as defective ports, for example, this information can be retrospectively incorporated into the planning and therefore likewise becomes part of the as-built documentation.

ENDPOINTS AND APPLICATIONS AT A GLANCE

Depending on the capabilities of the digital twin of the data center infrastructure, another important aspect is knowledge about the endpoints and what’s running on your cables. After all, cabling is not an end in itself, it exists to connect data communication endpoints with each other. Examples include linking the application server instances of a business-critical application with storage systems and the associated database instances. Knowledge of these endpoints is extremely valuable. An example of the benefits that can be realized is being able to use signal tracing to determine the criticality of a connection with absolute certainty. This enables IT infrastructure managers to carry out a professional risk assessment, particularly with regard to any planned downtime and outage scenarios. This enables them to determine:

- whether redundancy is advisable and economically appropriate
- whether specific circumstances, such as compliance with maintenance windows, need to be considered in the planning phase
- whether technicians need to be given specific warnings to take extra care when implementing changes

These four principles, combined with the endpoint aspect, are gamechangers for the management of data center cabling. Evidence of the positive effects that result from this type of consistent application are set out below.



How professional cable management pays off

The impacts of this different approach to data center cable management are substantial, many, and welcome:

- 1 Your cable infrastructure will be more stable, and the availability of connection services will increase.** Inappropriate changes or changes that have not been quality assured in advance will no longer occur, planning of changes without taking SLAs into account will be a thing of the past, and the wrong plug will never be accidentally pulled again.
- 2 You will be able to make changes to structured cabling much more quickly and the number of implementation errors will trend to zero.** Work instructions for technicians will always be complete, comprehensive, and unambiguous. What's more, technicians on site will find that real conditions on the ground correspond almost 100% with the assumptions on which the planned change was based. The need for the usual ad-hoc communication and queries will be nonexistent.
- 3 Your technical teams will be significantly more efficient.** Optimized deployment leads to a substantial increase in orders completed per site visit. The cost of making unnecessary journeys is also significantly reduced.
- 4 You will make better use of the available resources and be able to identify emerging bottlenecks – especially in port capacity – earlier and address them in a timely fashion.** You will be able to promptly identify connections that are becoming obsolete and retire them in a timely manner, thus ensuring that the existing capacity covers your needs for longer. If shortages nonetheless occur, you can identify them sooner. This will enable you to make the requisite investment and to plan, optimize, and install the necessary active and passive components.
- 5 You can avoid thermal hotspots before they occur.** The planning process and associated plausibility checks give you the ability to recognize during the digital twin simulation whether a change will exceed critical threshold values.
- 6 Face scheduled audits with new confidence.** Regardless of whether you are preparing for certification with regard to key standards, such as ISO 27001, or an audit to ensure compliance with structured cabling standards, you know that your cable infrastructure and the comparison between the documentation and reality will stand up to scrutiny. The usual audit stress and the effort typically incurred just before an audit to rectify issues at the eleventh hour become things of the past.



How to do it – how you can achieve the paradigm shift quickly and reliably

Depending on your starting point and existing level of maturity, adopting new principles can be a challenge. Executing changes to organizational structures, processes, and multiple diverse solution elements ties up considerable staff resources in the analysis and design phase. It also means engaging in a lengthy change project with an uncertain outcome, and often results in time-consuming modifications to a wide range of specialist tools in order to create a uniform data foundation for collaboration going forward.

One alternative is to follow proven standards and deploy a software solution that already incorporates the fundamental concept of a digital twin of the data center and its cabling infrastructure has along with the following capabilities:

- Detailed 2D and 3D footprint images of the data center
- Photo-realistic, interactive representations of active and passive network components
- Sophisticated planning support for network planners with logging of planning, including extensive feasibility checks for quality assurance purposes
- Generation of work orders with detailed step-by-step instructions for network and cable technicians
- Seamless collaboration capabilities that bridge different organizational units through proven processes by way of workflow support
- Powerful signal management and autorouting functions
- Generation of installation suggestions for components requiring cabling, taking into account space, power, and cooling reserves
- Ready-to-use analyses and reports on capacity utilization
- Comprehensive inventory management functions
- Upload capability for cabling measurement logs
- Multi-client and multi-user capability with the ability to set up detailed access control, taking into account roles and authorizations as well as SSO
- Detailed change logging to ensure comprehensive traceability
- Communication support for active network management systems (NMS) with powerful integration mechanisms and a comprehensive API



Summary: what modern software needs to deliver

By this point, it should be apparent that even the most sophisticated spreadsheets cannot deliver even a fraction of the functionality of a data center cabling documentation and management solution. Data center managers face complex challenges and need a solution fit for the task.

In the third white paper in this series, we will show you how FNT can support you around data center cabling. Alongside our state-of-the-art software solution, which is essential for efficient operation and expansion of infrastructures, our decades of experience in the sector are also key. Cable management is part of our DNA.

More than 500 organizations around the world rely on cable management solutions from FNT to document and run their critical infrastructures. This gives them the transparency into their cable networks needed to successfully evolve the digital infrastructure for long-term success.



Find out how FNT can help you **future-proof your Cable Management** with a modern software solution and decades of experience.



About FNT

FNT GmbH, headquartered in Ellwangen (Jagst), Germany, simplifies the management of highly complex digital infrastructures in companies and public authorities with its FNT Command Platform. With the cloud-enabled “software made in Germany”, IT, telecommunications and data center infrastructures can be efficiently recorded as digital twins and documented across all levels from buildings to digital services. The software also offers open interfaces and numerous functions for planning,

implementing and automating transformations and changes in an integrated manner. FNT’s customers include more than 500 companies and government agencies worldwide, including more than half of the DAX-40 listed corporations. FNT operates offices in several locations in Germany as well as in New York, London, Singapore and Timisoara and has an international partner system with market-leading IT service providers and system integrators.

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