FNT

// simplify complexity

DATA CENTERS ON THE EDGE

A GUIDE FOR OPERATING REMOTE SITES

IN THIS WHITE PAPER

Current predictions by various experts indicate a rapid growth of edge computing. Many companies have now recognized the advantages of the edge and are in various stages of implementing their own edge strategies.

While the edge presents numerous opportunities to enterprises, it also poses new challenges. IT departments now have to deal with a much larger number of sites, all connected to each other. In addition, other trends such as Hybrid Digital Infrastructure are further increasing the complexity for data center operators. IT departments therefore urgently need solutions to ensure the efficient management and operation of their data centers.

This white paper discusses how organizations can keep track of and efficiently manage their geographically dispersed sites.

CONTENT

On the Edge

The global edge computing market is expected to reach $9 billion by 2024, a significant increase from the current level of $2.8 billion, according to a study by MarketsandMarkets. Gartner also considers edge computing to be one of the 10 most important IT trends in 2020. Enterprises that rely on edge computing benefit in many ways. They understand that a strong focus on edge computing will enable them to better connect remote enterprise locations, reduce latency and the risk of network downtime, and distribute loads across the network. In addition, edge sites enable companies to meet regional legal requirements – essential for companies that must adhere to government regulations and compliance requirements.

Once centralized networks are morphing into networks of distributed, dynamically interconnected systems spanning clouds, microservices and software defined networks. As a result, distributed edge data center sites, which are rooms with only a few racks or even "data centers in a box", are becoming a more critical component of the dispersed IT required in today's environment.

What this means for businesses is that edge has become a technical requirement and they must figure out how to work it into their operations. Compute, storage, and network connectivity at the edge is needed to deliver high-quality services with geographically distributed resources. As data moves to the edge of networks, businesses must right-size their data centers to fit the new demands. Centralized hubs, where processing for primary applications occurs, will remain the core of the data center's network. Edge data centers, which perform regional processing and caching, will become more prevalent with the surging demand for low-latency connections.

Edge sites will play an increasingly integral role in the overall architecture. The degree of distance from the core data center, where most processing, analysis and archiving occurs, varies. Edge sites just need to be within a local area to connect, integrate and re-route data back to the core data center.

EDGE SOLUTIONS are one of the top market segments data center leaders are focusing on. 57 % say they have either already adopted edge strategies or expect to deploy edge over the next three years, according to AFCOM's 2019 State of the Data Center Report.

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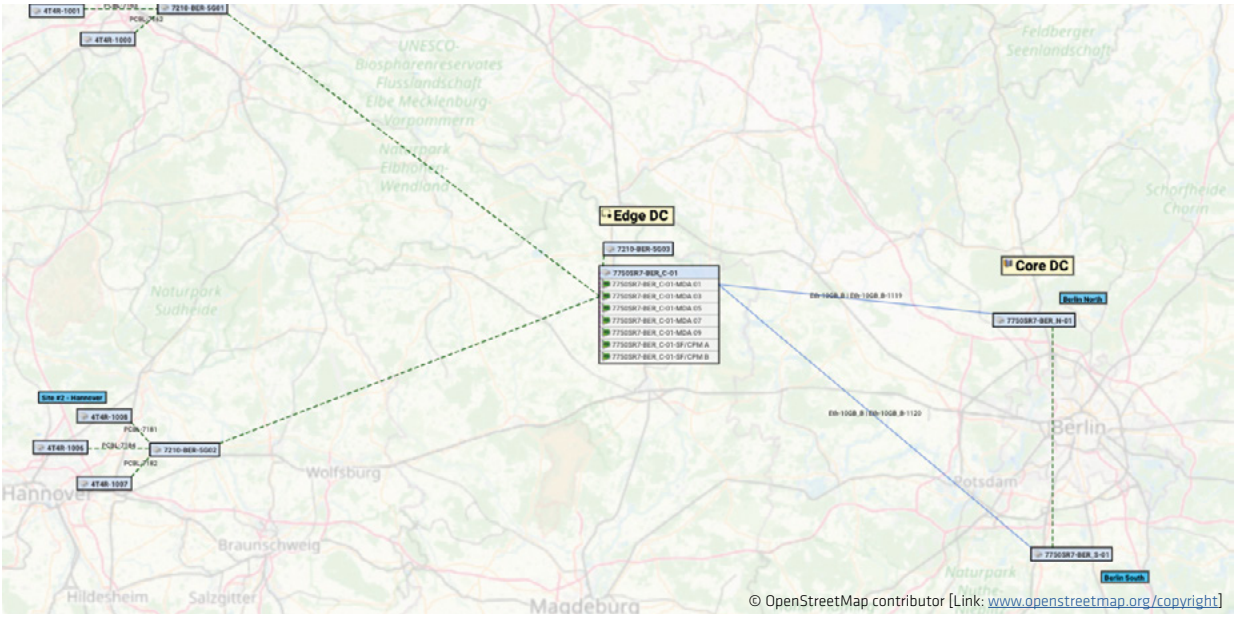
EDGE VISIBILITY

In this hybrid cloud architecture, a regional data center's capabilities are extended via connected edge sites. FNT's software shows the exact location of all edge sites and their connectivity back to the core data center.

Physical, logical and virtual resources can be connected to multiple edge sites for fully redundant paths between any edge location and the core data center. The expanded view of one edge site shows how FNT's software drills down from the map view to the actual equipment in the switch cabinet view of the rack that provides the edge connectivity.



The Benefits of Embracing the Edge

Efficient data center operation is becoming increasingly dependent on edge sites to ensure uninterrupted service, guarantee business continuity, low latency, and overall, the best user experience possible. End users are becoming more demanding when it comes to the immediate access of data and information. From a user's perspective, value is determined by service quality and performance. Since edge computing moves workloads and applications closer to end users, it allows data to be processed closer to where it is created instead of sending it across long routes to central data centers or clouds. This makes it possible for businesses to give users the level of service they desire. Not only does it enhance customer experiences, it enables organizations to offer new services faster and more efficiently at lower cost.

Large content delivery networks such as Google and Netflix have already adopted edge concepts. They cache content and services at the network edge through third party colocation data centers and specialized edge data center service providers to reach customers and to deliver extraordinary user experiences.

MOVING DATA PROCESSING TO THE EDGE OF THE NETWORK ALSO IMPROVES RESPONSE TIMES. SINCE EDGE SITES ARE PHYSICALLY CLOSER TO END USERS, PERFORMANCE SPEEDS ARE FASTER IN ALMOST EVERY SITUATION.

Keep in mind that while the performance quality increases – the associated costs should not. This is because edge computing doesn't deliver better services by laying newer cables. Instead, edge computing is all about using a more efficient architecture for transferring and processing data in order to deliver content quickly to local users with minimal latency.

In addition to speed, edge sites offer more security, scalability, versatility, and uptime than traditional forms of network architecture. Since edge computing distributes processing, storage, and applications across a wide range of devices and data centers, it is much more difficult for any single disruption, such as a DDoS attack, to take down the entire network. As more data is being processed on local devices rather than transmitting it back to a central data center, edge computing also reduces the amount of data at risk at any one time.

The scalability and versality of edge computing go hand in hand. Edge sites can partner with companies in desirable markets to offer new services without having to restructure their IT infrastructure. This presents new opportunities for companies to drive growth in a more cost-effective manner as adding new devices won't impose too much on network bandwidth.

Furthermore, just as having a multitude of devices connected to the network helps an entire data center from being completely compromised from a single point, it also makes it much more difficult for one device failure to shut down an entire data center. Data can be rerouted through multiple pathways to ensure users retain access to the products and information they need. To avoid downtime and ensure users retain access to the products and information they need, data can be rerouted through multiple pathways of an edge site.

Lastly, edge computing enables companies to comply with legal regulations. Since the European General Data Protection Regulation (GDPR) came into effect, enterprises are only allowed to store personal data in the public cloud if certain conditions are met. In addition, critical data must be stored securely to ensure that it cannot be accessed from other countries or locations. This applies in particular to banking applications and human resources data, where many countries have adopted very stringent compliance requirements. Edge sites are the solution in both cases.

Challenges of Edge Sites

Gartner predicts that by 2023 50% of enterprise-generated data will be created and processed outside the traditional, centralized data center or cloud.

This is a significant increase from today's less than 10%. In addition, while companies are undergoing this fundamental change to the way they operate, they must at the same deal with resource constraints. It's common today for businesses to manage their IT with fewer staff and less resources. To deal with these realities and ensure efficient operation at the edge, data centers must have the right management solution in place. A centralized solution that can manage and optimize the entire data center infrastructure is the key to delivering better quality services and reliable network connectivity while keeping cost under control.

EDGE SITES ARE NOT LIKE LEGACY DATA CENTERS AND CANNOT BE MANAGED AS SUCH.

They present new challenges for data center operators for several reasons. They span numerous sites, all of which are connected and are remote and far from the core data center and its IT team. Site specific information must be shared, both locally with on-site personnel and centrally as part of an integrated network. Further complicating the situation is the reality that on-site personnel may not be trained. Furthermore, if the edge site is operated by a colocation provider, the complexity increases since an edge deployment requires additional hops. Finally, the edge is becoming more intelligent. Legacy physical hardware, which exists back at the core data center, must be managed in conjunction with the new state-of-the-art equipment at edge sites. This will require a hybrid infrastructure management model for a while, as such a model is the only way to maintain both legacy equipment as well as the new intelligence at the edge.

Managing Edge Sites

To ensure a successful edge deployment, data center operators must upgrade operational infrastructure to accommodate modern requirements, which includes an infrastructure management tool that does at a minimum these three things:

- Provide complete visibility: Across all locations, all resources and all connections (end-to-end).
- Support connectivity: Standardized and harmonized network operations is essential.
- Facilitate network planning: To optimize capacity and resource utilization and understand the impact of changes before you make them.

VISIBILITY

Only unified resource management can provide complete transparency into all IT assets and connections, and this is a key requirement for any edge solution. To remotely monitor the large amount of geographically dispersed IT assets, data centers need to centrally manage and optimize the entire data center infrastructure from the central data center to each edge site, and even beyond. Look for a solution with this inclusive capability.

With a central data repository in place, network managers can receive immediate insights into all the data connections in their networks and data center infrastructure, independent from the underlying hardware vendor technology. Such unified resource management is critical because network issues are no longer confined to a single data center site, or a lone network element. A holistic understanding of how all network resources work, both individually and as part of the network fabric, is required.

CONNECTIVITY

Connectivity is one of the primary offerings customers look for when evaluating hosting providers and is often a deciding factor in the selection process. Data center operators know this and work to build their network fabric so they can offer fast network connections to both trading partners and cloud operators. The network is becoming the most critical component of the hybrid infrastructure.

A rock-solid network is crucial for edge sites. Multiple connectivity points and redundant connections capable of supporting the heavy traffic loads will need to be used between edge sites and from edge sites to core data centers. This is important because in the event of a failure or a connection loss, edge sites will still be able to deliver the same high-quality service even when one route is down.

To ensure reliable connectivity, edge sites will need to implement an infrastructure management solution that centrally manages all cable and telecommunications network and service resources, both inside and outside of the plant. The solution must be able to encompass passive infrastructure all the way up the stack to active inventory, across all technologies. Such a repository will provide processes and tools with accurate information needed to streamline operations and increase service quality.

- Provide complete visibility. Across all locations, all resources and all connections.
- Support connectivity. Standardized and harmonized network operations is essential.
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PLANNING

Edge sites are not your typical data center. They must be flexible and support latency-sensitive applications. They are smaller and designed to be dense environments to process more services and data. Space, density, power, management, connectivity and redundancy are all handled differently on the edge. Software-defined solutions are often employed to enable integration with core data center systems.

The ideal solution should support capacity planning and change management with a comprehensive and integrated view of data center resources including building infrastructure (power, cooling, floorspace), IT infrastructure (networks, servers, storage), connectivity (physical cabling infrastructure and logical circuits/bandwidth) and services (software, applications). It's important to have a clear view of the as-is situation, and it's equally as important – if not more so – to understand the impact of planned changes before you make them. That means knowing precisely what your assets, resources, services, connections, capacities, redundancies, etc., are.

Based on this knowledge, you can carefully plan individual changes by analyzing the impact on services and customers, including tracing execution in the field, before you implement. Furthermore, it's key to ensure that all changes, once made, are reflected in your information base. A dynamically updating database will ensure data consistency and accuracy, which is critically important for planning, operation and fulfilment teams who rely on that information to make business decisions. This approach ensures the greatest level of data accuracy for the upcoming changes.

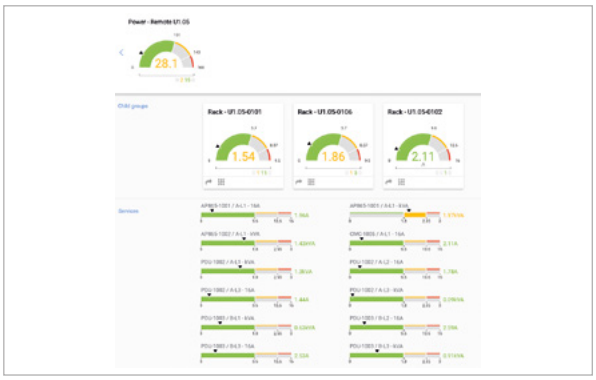
FNT is a Best-in-Class Software Solution That Facilitates Operating at the Edge

Overall, edge sites can help all types of businesses deliver services and products to an extended customer base with a standardized level of quality. While operating on the edge drives success in a competitive environment, it's important that infrastructure management teams and network operations managers have the proper tools to plan, manage, and document the network and communications infrastructure. Ideally, all within one central network and asset database.

DATA-DRIVEN VISIBILITY

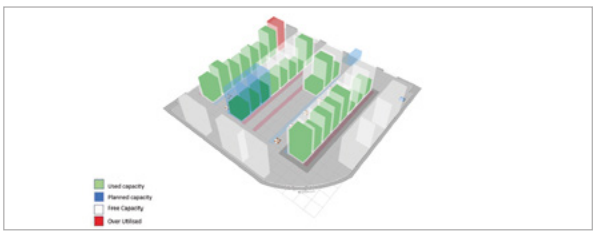
Remote (Site) Monitoring

FNT's efficient and scalable tool allows the complete monitoring of all physical assets in remote sites using one centrally controllable system. Regardless of where they are located or who they were manufactured by, consumption levels of all assets can be monitored and analyzed in order to make management of remote sites in various locations easier and give clear insight into room health.



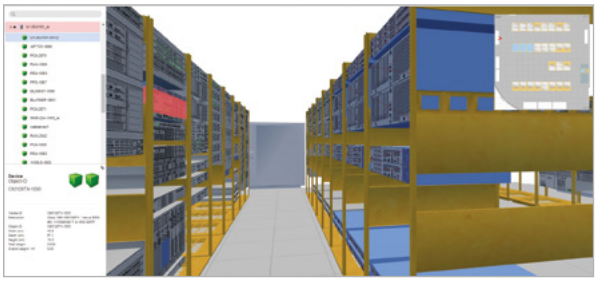
3-D Views

Planning changes to an edge site is as easy as for a core data center with FNT's software platform. This 3-D view of an edge site visually shows the racks in the room. Usage is evaluated, based on current information contained in the software's central data repository of all asset and resource information. The color-coded thermal bars show used, planned and available space in each rack. This visualization helps users to keep track of a large number of remote sites, even if the user may have little knowledge of the individual sites.



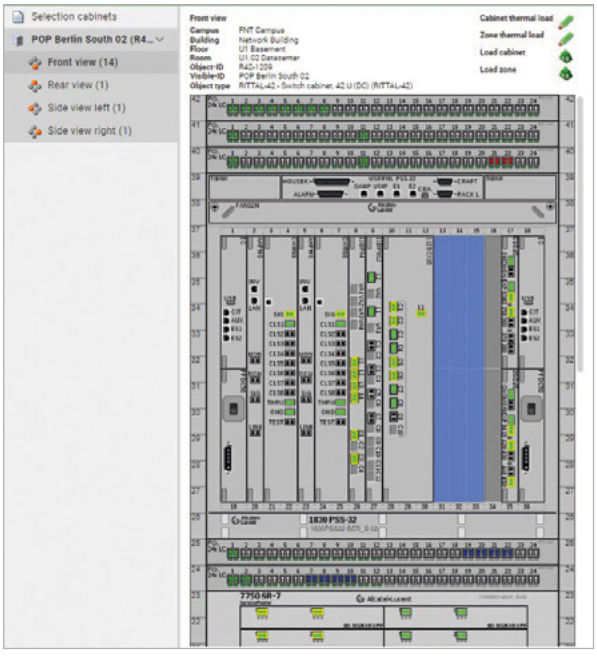
Simulated Walk Throughs

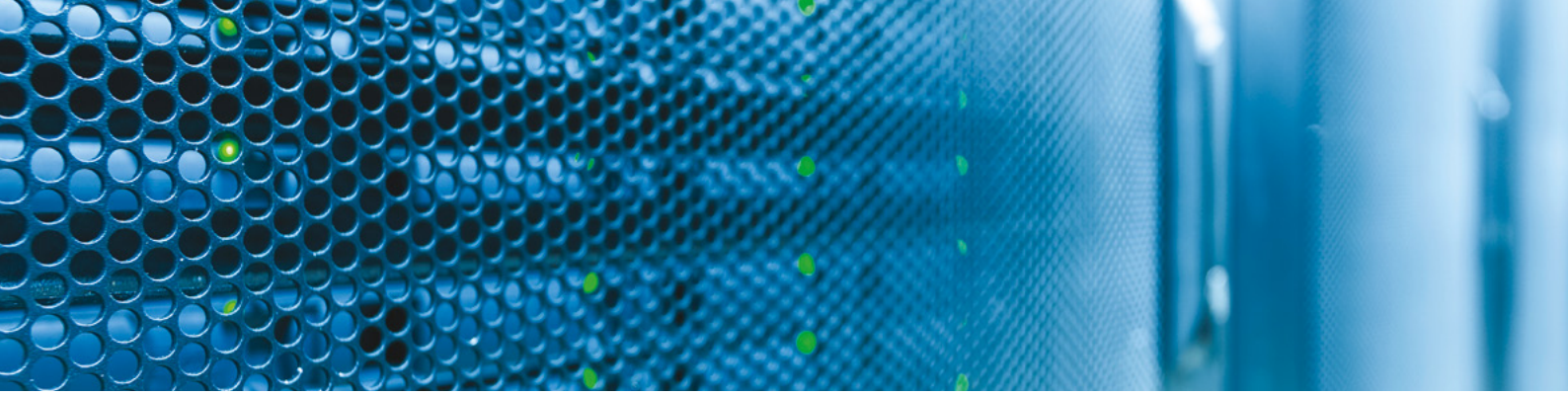
FNT's software platform enables users to get a more detailed view of the room's capacity. The software simulates walking through the data hall in 3D, with a guide to indicate your exact location in the hall.



Cabinet Views

The standard cabinet view of FNT's software platform provides an even more granular view of the room's capacity.





FNT's management solutions deliver all the features and capabilities needed for a successful edge deployment:

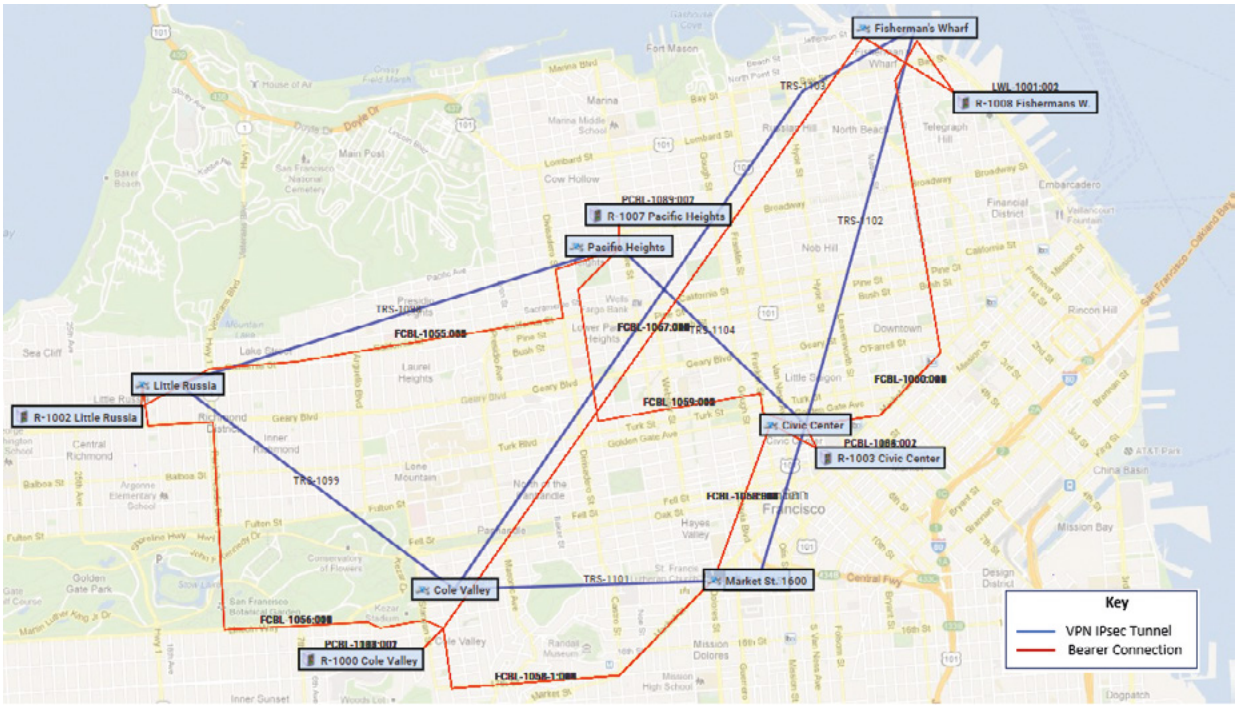
- Manage space, power, and cooling for all core and edge data center sites.
- Analysis, planning and documentation of all active and passive infrastructure, from core data center to every outlying location.
- Provide end-to-end visibility of device relationships to manage equipment rollout, operations, maintenance and decommission and support what-if-scenarios and root-cause analysis, across all locations.
- Management of different types of transport network services, including external provider connectivity.

FNT provides complete visibility and transparency throughout the entire data center and associated networks. It does this with a single, integrated data model that spans the data center, telecommunications network and IT infrastructure. This inventory encompasses physical, logical and virtual resources as well as their connections, and it is this unique feature that enables data centers to manage their entire environment as a homogenous entity while still being able to control individual locations. As such, FNT effectively solves the problem of how to manage diverse and complicated architecture as data centers evolve to meet the demands of today.

CENTRALLY-MANAGE THE EDGE

The ability to manage interconnected data centers that span multiple geographic regions is a necessity. The standard functionality of FNT's software platform enables users to document and manage geographically dispersed edge sites.

Its integrated seven-layer data model is optimized to enable holistic documentation and management of core and associated edge sites, including: all physical, logical and virtual infrastructure; interconnectivity and outside plant connectivity; and end consumer edge applications and service management.



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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