FNT

// simplify complexity

BEST PRACTICES IN TELECOM INFRASTRUCTURE MANAGEMENT

HOW LEADING COMMUNICATION SERVICE PROVIDERS ARE ADAPTING INFRASTRUCTURE MANAGEMENT METHODS TO MEET CHANGING REQUIREMENTS IN THE DIGITAL WORLD

IN THIS WHITE PAPER:

Significant market forces are disrupting the telecommunications industry and impacting all areas of business. New equipment, new technologies, new use cases, and new customer demands require new ways of managing networks.

Service providers that successfully adapt to changing market dynamics all have one thing in common: how they manage their infrastructure. Infrastructures today are a mix of physical, logical, and virtual resources. Not all methods and tools are compatible with such a hybrid array of assets and resources.

This white paper details the actions and best practices six leading service providers took to improve their network infrastructure management processes and highlights the business outcomes they were able to achieve as a result.

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Introduction

CURRENT MARKET FORCES AT PLAY

A broad range of devices, applications, and digital initiatives are putting extreme pressure on bandwidth worldwide, dramatically increasing network traffic and requiring service providers to think differently about managing growth. 5G is a massive opportunity for Communication Service Providers, but requires they establish partner ecosystems and adapt new business models.

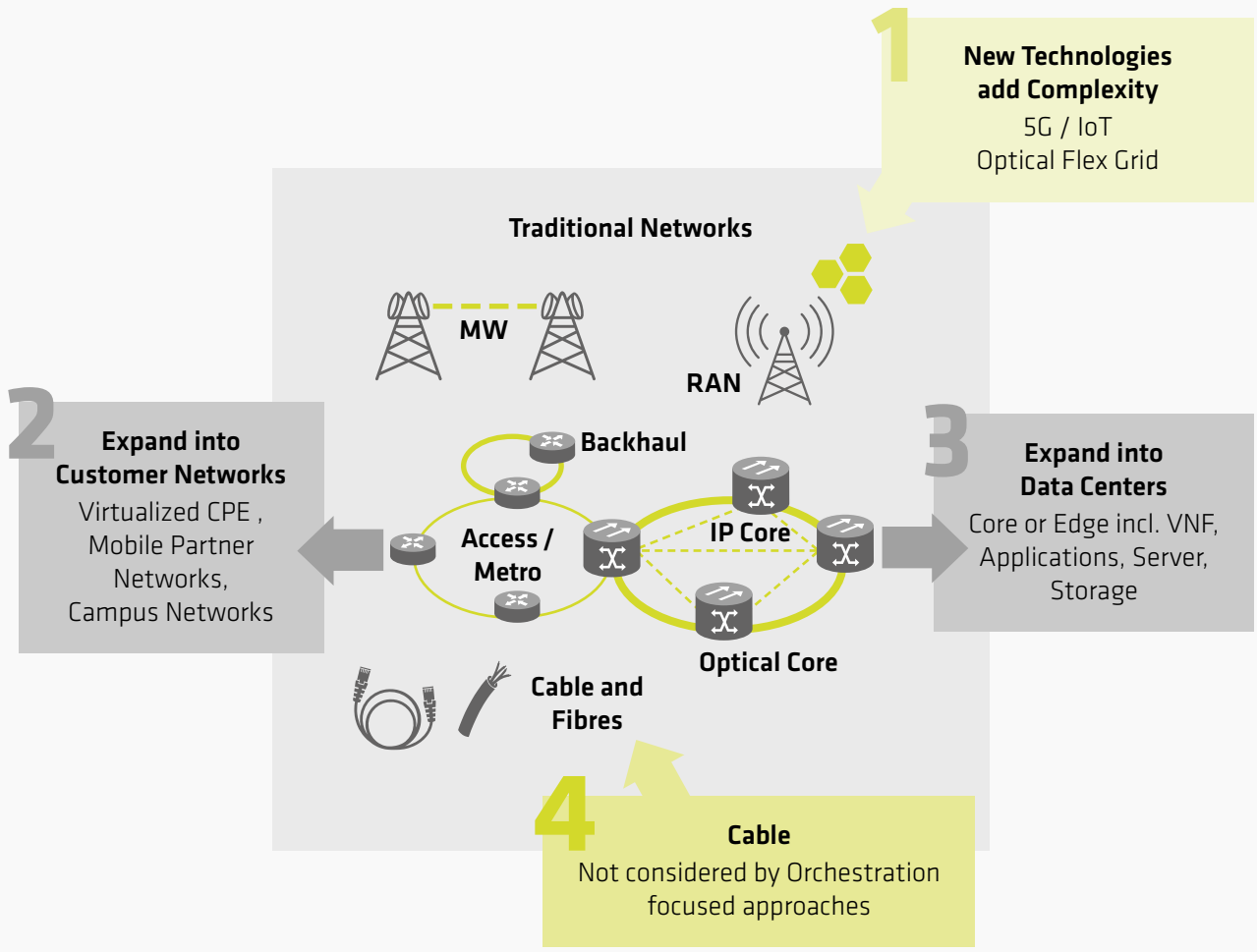
In terms of infrastructure, CSPs must be able to manage mobile 5G rollouts with an increased number of mobile sites, virtualized resources spread across core and edge data centers and in the cloud, as well as fronthaul and backhaul network infrastructure to connect the sites to the core. They must also support a massive amount of IoT devices and sensors for new business applications, smart cities, and Industry 4.0 use cases.

To keep pace with this data volume surge, CSPs need to roll out more fiber for B2B and B2C market segments as well as additional fiber connections to mobile sites. Digital services also must be designed, implemented, delivered and operated fast enough to meet the requirements of today's "always on" gigabit society. The introduction of all these new technologies, virtualizations and cloud applications increases network complexity. CSPs need to operate a hybrid network infrastructure based on a mix of physical, logical and virtual resources and passive inside and outside plant infrastructure provided by many different suppliers, and they must continue to deliver uninterrupted, high-quality services.

COMMON CHALLENGES

Hybrid infrastructures offer service providers more possibilities and greater agility than traditional infrastructures. They also increase complexity. For example, planning, operation, and orchestration becomes more complicated because they merge different telco technologies with IT and data center techniques, and combine all with resources provided through partner ecosystems, e.g., based on cloud models. All these different resources and dependencies between the individual infrastructure elements need to be managed properly throughout the whole life cycle. Let's look at the most common challenges that CSPs experience in this context and how to overcome them:

Outdated Inventory Tools
Many of the infrastructure documentation and resource inventory systems in use today are based on legacy database implementations, spreadsheets, and operations dashboards that can only answer questions about the in-



Why traditional tools are failing.

dividual infrastructure domains for which they were originally designed. These tools simply do not have the capabilities to deliver a transparent and holistic view of the entire infrastructure, which is precisely what is required to manage a modern hybrid digital infrastructure.

New Technologies and New Domains
Traditional inventory and resource management tools typically fail because they are not able to provide the required level of flexibility and configurability out-of-the-box to support the introduction of new technologies such as 5G or IoT, or the use of new cloud-based resources or IT techniques. Another reason is that CSP networks are expanding into customer domains (e.g., Mobile Private Networks) as well as Data Center domains (core and edge data centers with VNFs, applications, servers, storages), and traditional tools again are failing to support these new domains out-of-the-box.

Therefore, a new resource management solution for hybrid infrastructure management is needed to support today's requirements. Such tools are uniquely capable of keeping track of these complex environments with all their dependencies.

Poor Data Quality
CSPs typically use a range of vendor and technology specific management systems to operate their multi-vendor / multi-technology network infrastructure. If several database tools and spreadsheets are used for inventory management, there is usually no data reconciliation between the network and the different management systems. Although inventory synchronization has been under discussion for decades, most of the inventory systems in the field today are still either not synchronized with the network, or only partially so. This situation inevitably leads to inconsistent information and poor data quality, which can cause delays, errors, costly reworking, and ultimately, profit loss.

Documentation and Planning Out of Sync
The lack of synchronization between the different tools and spreadsheets used for as-is documentation is also a problem for planning, which has its own set of tools. After the initial data load, the data in planning tools tends to deviate from the as-is documentation over time due to ongoing planning and execution iterations. As a result, data across the different systems is inconsistent and unreliable.

Additionally, because of the missing reconciliation capability, there is no automation between executed planning tasks and the corresponding documentation update, which again causes delays, errors and costly manual reworking.

Missing Link between Active and Passive Infrastructure
CSPs usually still have separate inventories of active network and passive cable infrastructure for historical reasons. But for the required orchestration and automation of today's use cases, for the operational needs and for the design, planning, rollout or network transformation requirements, these siloed inventory approaches are no longer viable. They cause data inconsistencies, which leads to delayed troubleshooting, incorrect design, planning and rollout tasks, and manual reworks. All have known consequences.

Lack of Visibility
Without full transparency across all passive cable and active network hierarchies and dependencies, it's difficult to determine which services will be impacted by any changes made within the network. Without accurate as-is documentation, extensions cannot be planned properly which can lead to errors and manual reworks. The same applies in case of failures or outages in the network. Without full transparency across all hierarchies and dependencies it is not possible to determine immediately the impacted services and customers. Therefore, implementing a new inventory management system is necessary, one that can consolidate the different legacy tools into one hybrid infrastructure data model and provide a holistic, end-to-end view across all dependencies.

SOLUTION / TELECOMS NEED THE FOLLOWING:

- **Central System** – A unified resource management solution across the hybrid infrastructure network will provide greater visibility into digital infrastructure, eliminate data silos, and improve data quality throughout the organization.

- **Automation** – Aside from planning changes, which by necessity must be done manually, all other processes can and should be automated. From generating and deploying work orders to service teams, to system recognition of a new active component being plugged in, to deploying the configuration, automation is the key to achieving the speed, efficiency, and accuracy that providers seek.

- **Real-time Inventory** – An accurate and up-to-date inventory of all physical, logical, and virtual network and service resources will improve the utilization of all network resources and enable CSPs to make confident decisions about how to design, plan, build, deploy, and manage the business. High performance data reconciliation and delta calculation mechanisms are required to synchronize with the network to keep data accurate.

- **Process Integration** – As-is documentation of network resources and the planning of changes, transformations, and rollouts must be closely linked and integrated. This requires that planning data is always based on as-is data and that workflow integration manages the relevant processes and ensures that status changes in the planning process are directly reflected in the as-is documentation for the next planning iteration. This approach needs to encompass active network as well as passive cable infrastructure resources.

- **Geographical Mapping** – Integrated GIS capabilities can improve operational efficiency by adding location intelligence to the different use cases.

Case Study 1: Supporting a Gigabit Society Requires Complete Visibility into Valuable Network and Data Center Resources

While networks undergo transformation in technology and architecture to keep pace with market trends and business drivers, normal business operations must be maintained, and high-quality services must continue to be delivered. Reliable service assurance, planning and engineering, and service fulfillment processes are essential for delivering services that meet SLA requirements and keeping OPEX under control.

For a B2B provider of fiber gigabit connectivity and services in western Europe, it was becoming increasingly difficult to deliver services fast enough to meet the requirements of today's gigabit society due to internal silos and poor visibility into network assets and data center resources. In order to deliver tailored solutions to more than 50,000 business customers, this provider needed a central asset and resource database to effectively manage their various network technologies.

INEFFICIENT CROSS-DEPARTMENTAL PROCESSES SLOW DOWN SERVICE DELIVERY

Contemporary communication networks typically include hundreds of applications and software systems installed at multiple locations. This provider's network landscape was no different. The function-specific nature of individual software systems and their limited integration capabilities created internal silos that rendered valuable information inaccessible. When data is isolated this way, there is a lack of transparency throughout the entire service delivery chain and cross-departmental processes increasingly become inefficient. Over time, this impacts service quality, delivery times, and ultimately, customer satisfaction.

To increase the availability of data and enable cross-departmental processes to be merged, full integration between the various systems and applications deployed within the organization was vital. Unified management of both physical and virtual network assets, as well as IT and data center resources, was required to launch and fulfill new products and services faster, improve service quality, and reduce OPEX.

SEAMLESS INTEGRATION WITH EXTERNAL SOFTWARE IMPROVES DATA SHARING

After reviewing several solutions, this provider implemented the FNT Command-based FNT Telco Active Inventory solution to manage all network and service resources. As a modern, web-based software solution with a central data repository, FNT Command enables customers to plan and deliver services faster and operate network and services more efficiently. FNT Command provides full transparency into valuable network and data center assets including network resources and services, servers, storage, software, applications, as well as power and cooling.

FNT Telco Active Inventory supports all types of transport network technologies and provides seamless navigation throughout all hierarchical layers. It gives network managers immediate insights into all the connections in their networks, independent from underlying hardware technology or vendor. Accurate as-is documentation also enables network managers to see the impact of planned changes to all physical and logical network resources prior to scheduled network transformations and changes.

Now, customers are informed of planned maintenance beforehand and redundant circuits can be provided if necessary. This reduces downtime and operating costs while allowing the provider to maintain a high level of customer satisfaction.

This provider also uses the FNT Command API to simplify the merging of cross departmental processes and improve the exchange of data between FNT Command and external systems. The extensive library of over 1,600 function calls can be used to integrate virtually every software system. With web service interfaces, the integration technology delivers high-quality data as well as optimum stability when connecting with external applications. Extensive standardization ensures that interface failure rates and maintenance costs are significantly reduced, and users can integrate systems across their organization with greater efficiency and reliability.

As this provider expands their network in the future, they will utilize FNT's Mobile RAN (Radio Access Network) Management solution for full transparency into all RAN operations. Combining Mobile RAN Management with FNT's other Telco solutions supports the holistic management of all mobile network resources, regardless of whether they are active or passive devices or physical, logical, or virtual resources in RAN, fronthaul, backhaul or core network. FNT's integrated data model makes it possible to easily navigate, access, and use information about all these different resources.

Business Benefits:

- Faster service delivery
- Immediate impact analysis in case of failures or planned changes
- Simplified integration with external systems
- Increased data quality and improved data sharing
- Knowledge-based network planning
- Visibility into all data center resources

Case Study 2: FNT Command Accelerates the Launch and Fulfillment of New Products and Digital Services

Remaining successful in a digitally transforming world requires a modern and future-proof ICT infrastructure. Legacy OSS/BSS systems, home-grown databases and spreadsheets simply cannot cope with today's requirements. Complete transparency across the installed infrastructure, service resources and changes in the network is crucial to launch and fulfill new products and digital services fast and operate the network efficiently.

A leading provider of ICT and digital services, with several data centers located in Italy, constructs tailor-made digital transformation projects for enterprises and operators seeking to tackle the challenges of innovation. To maximize the use of their network resources and make confident decisions about how to plan, build, rollout hardware and deploy new services, this provider needed an accurate and up-to-date inventory of all physical, logical, and virtual network resources and how they relate to both new and existing customers.

OUTDATED SOFTWARE LEADS TO INEFFICIENCIES

Since they operate a multi-vendor and multi-technology network that comprises various technologies such as DWDM, SDH, OTU, MPLS and Metro Ethernet, this provider needed a central and unified resource repository to understand the overall utilization, capacity, and status of all network resources and assets, how an outage of cables and devices affects their customers, and to share the content with other OSS/BSS applications. Outdated software platforms and low quality of data made planning and fulfillment processes inefficient which, ultimately, impacted service quality and operating costs.

Due to their legacy database, there was no reconciliation with the network and documentation had to be done manually. This made it difficult to deliver services fast enough to meet customer demands and internal requirements. Without full visibility into their infrastructure, it

was nearly impossible to proactively address network issues that could lead to service downtime. As many users throughout the organization were dependent on this outdated tool, replacing it with a modern infrastructure management software that facilitates automation and reconciliation was business critical.

CENTRALIZED MANAGEMENT AND IMPROVED DATA QUALITY

This provider selected FNT to migrate existing data into a centralized platform and manage all network and service resources. FNT Command forms a single source of truth repository and built a digital twin of all network and service data to provide all relevant resource information for planning and engineering, service fulfillment, and service assurance processes. Having a common central database for all resource related data ensures that all activities carried out by various people and roles within the organization are always based on a shared master data source. Now, the entire organization always shares the same consistent view of the network.

Data quality has significantly improved due to data consistency checks and the reconciliation of hardware and service data from the network. As a result, this telco provider can now run faster impact analysis and gain accurate insights into available capacities. Thanks to the clearly structured documentation, there is full transparency across all resources and associated business information.

Within design, planning and fulfillment processes FNT's auto-routing functionality is also utilized for optimized resource assignment. Integrated auto-routing enables this provider to easily identify suitable signal paths based on available network resources in both actual and planned states. Additionally, FNT Analytics enables this provider to visualize KPIs and other important data across all departmental silos. Configurable dashboards and reports provide data and information to improve and accelerate operational and strategic decisions. Interactive dashboards provide valuable evaluations and insight into available resources while consistent reporting supports knowledge-based decision-making.

Before implementing FNT Command, only 40% of this provider's network was documented. Now, 100% of the network with about 25,000 services and 50,000 hardware parts and components are catalogued within FNT Command's central repository. Planning, operations and business decisions are based on accurate, up-to-date data and relevant repair, change, and rollout processes can now be effectively managed.

Business Benefits:

- Faster service delivery
- Improved data quality
- Immediate impact analysis in case of failures or planned changes
- Centralized database sharing accurate data with the organization
- Digital Twin of network and service data
- Optimized resource assignment
- Access to real-time analytics and reporting
- Precise planning based on as-is documentation

Case Study 3: FNT Improves Data Quality with Centralized Management of Cable, Telco, IT, and Data Center Resources

As service providers roll out more fiber and introduce new technologies, all while transitioning away from older systems, network complexity increases as well as the risk of outages and downtime. To ensure networks are operational and equipped to keep pace with the demands of the digital age, millions of physical assets, logical resources, and connections in the cable and telco network must be accurately documented and managed.

Before working with FNT, a prominent telco provider in Germany used several tools to manage its fiber optic network including, for example, spreadsheets, GTI for GIS data, and asset data in SAP. To ensure data quality, while providing uninterrupted, high-speed voice and data services to carriers, consumers, and businesses, this telco provider needed a central data repository to document all fiber network, telco and IT resources.

COMPLEX NETWORKS AND HETEROGENOUS DATA

While operators update infrastructure to keep pace with service capacity, they must also maintain full control over their network infrastructure. This is a difficult task because of the diversity of the networks, resources, and assets involved, as well as the sheer number of connections.

Utilizing various tools to manage cable connections, telco, IT, and the data center resources often creates layers of complexity because information related to specific assets may not be documented, be incomplete, or even duplicated across multiple systems – complicating data quality and reporting. When data is managed in multiple silos, telco providers have minimal insight into available resources and cable connections. Lacking transparency and visibility, it is difficult to support and operate existing services and roll out new offerings.

A central system that can integrate with third-party applications and tools allows telco providers to maintain a real-time view of all cable infrastructure, telco network resources, and service information, ensuring end-to-end transparency across all infrastructure and assets.

A SINGLE SOURCE OF TRUTH

To improve data quality and achieve a single source of truth, the FNT Command Platform was selected. The German telco provider, through FNT Command, was able to document its telco services, passive and active networks, and assets in one central resource repository. Additionally, FNT Command's flexibility to integrate with Nokia NFM-P and Nokia AMS for network reconciliation, as well as the integrated FNT GIS application based on Esri's geospatial ArcGIS solution provided a comprehensive unified resource management solution of the company's infrastructure.

FNT GeoMaps combines FNT's strong cable and outside plant management capability with Esri's market-leading mapping and location analytics platform. This best of breed Cable and Infrastructure Management solution enables this provider to better operate and manage its complex and expanding infrastructure throughout the different processes, organizations, and partners. FNT GeoMaps provides both the location intelligence and network infrastructure details needed for full transparency into all network resources.

END-TO-END TRANSPARENCY

For greater visibility into physical assets, logical connections, virtual components, applications, and business services, as well as relations and dependencies in between, FNT Command captured this provider's highly complex and heterogeneous telecommunications, IT, and data center infrastructure within a uniform database and now manages and documents all physical cable and logical telco connections, as well as IT and data center resources in an integrated data model. By mapping the existing data related to passive and active network infrastructure, telco services and IT resources into FNT Command, data and service quality have significantly improved. Based on the reconciliation of network resource data via interfaces to external Network Management Systems this telco provider automated the aggregation of network data into one, integrated system.

By combining comprehensive cable management on a map with geoinformation and geodata processing, FNT GeoMaps brings cable network asset and resource data to life. Equipped with location intelligence and network infrastructure details, this provider can make smarter decisions about network capacity and efficiency. From a service assurance perspective, this is the best defense against service interruption. From a planning perspective, this ensures that changes are based on accurate as-built documentation and that all changes are reflected in a master data repository.

Business Benefits:

- Greater agility
- Improved data quality
- Full transparency into all network resources
- Faster impact analysis in case of failures or planned changes
- Optimized resource assignment
- Accurate as-is documentation through automated data reconciliation
- Improved planning cycles

Case Study 4: FNT Command Maps, Documents, and Manages Heterogeneous Network Assets

Network mapping is crucial for telecom operators to manage the devices within their network, how they are connected, and how the overall network is structured. A digital representation of networks and IP/MPLS platforms enables telecom operators to enhance network planning, deployment of services, maintenance, and operations. The alternative - approaching this process manually - can quickly become overwhelming with a large or complex network.

Telecom providers today have multiple systems exchanging data throughout their infrastructure. Heterogenous networks comprised of different vendors and technologies and a multitude of devices creates silos of inconsistent data. Furthermore, multiple systems can often have duplicated or incomplete information, making data retrieval complicated, slowing decision-making and increasing costs.

To operate services efficiently, providers must be able to understand the inventory from which they can be launched and fulfilled. Without real-time access to this information, they cannot function efficiently.

For an operations body located in Amsterdam, disparate systems with large volumes of heterogeneously structured data being exchanged daily made it challenging to gain a comprehensive view of their international backbone network. One integrated data model to manage multiple interfaces and systems was needed to consistently provide high-quality, uninterrupted business services to its subsidiaries across Europe and the United Kingdom.

GREATER VISIBILITY INTO NETWORKS

Effective root cause analysis depends on access to real-time asset data. With an expansive network comprised of many device families, it became increasingly difficult for this operator to map, document, and manage assets. As data was stored in different systems, it was also challenging to correlate which active components and services were being managed by each device.

As the leading provider of software solutions for the integrated management of telecommunication infrastructures, this provider trusted FNT Software to help it

achieve greater visibility into their complex IP/MPLS and optical transmission networks with over a million logical interfaces/ports and thousands of network elements. FNT Command was customized to meet this operator's specific requirements and heterogenous network. FNT Staging Area was also implemented to consolidate data from multiple systems into one integrated data model.

FNT Command plans, documents, and manages the multi-technology and multi-vendor telecommunication core network while FNT Staging Area, a central ETL tool, collects the data from three different data sources (IP/MPLS, DWDM, 3rd Party Inventory) and consolidates and reconciliates it into FNT Command. FNT Command then aggregates this data and makes it usable to optimize network operations and support root cause analysis. With a single source for all network and service data, relevant repair, change, and rollout processes can now be managed holistically.

FASTER IMPACT ANALYSIS AND REDUCED DOWNTIME

FNT Command has improved many critical activities such as impact analysis in the event of an outage and what-if analysis to plan and manage maintenance windows. Data enrichment optimizes incident and problem management processes, enabling this company to quickly see which services will be affected by scheduled maintenance or which services are disrupted due to a system failure or outage. FNT Command provides the necessary information to develop a recovery strategy, limit downtime, and prevent SLA breaches. Additionally, many other OSS systems are served by the FNT data. Among them are trouble ticketing, monitoring, and planning.

FNT has also improved capacity planning and streamlined the assignment of assets to various sites. Greater insight into all network connections and interdependencies enables this provider to more accurately assess its overall resource utilization and available capacities to know if resources are being used appropriately and make necessary adjustments. With greater transparency into its infrastructure, this provider can now prioritize investments and make better business decisions based on reliable and accurate data.

Business Benefits:

- Visibility into network assets
- Data consolidation
- Faster impact analysis
- Reduced downtime
- Prevent SLA breaches
- Service reliability
- Capacity planning

Case Study 5: Networks of the Future Require a Sophisticated, Centralized Database

Keeping pace with the dynamics of the market and customer demands drives the need to provide new digital services, and to ensure the highest level of uptime and performance. However, it's difficult to achieve these initiatives without a holistic view of all telco infrastructure, assets and resources. For one of the leading cable and mobile service providers in Belgium, having an accurate and up-to-date inventory of all physical and logical network and service resources was necessary to support the rollout of new technologies and to decommission old systems.

LEGACY TOOLS IMPEDE TECHNOLOGY ROLLOUTS

Expanding and evolving technologies, products, and services is key to remaining successful in the highly competitive telco market. It also requires orchestrating multiple partners, subcontractors and managed service providers responsible for handling certain aspects of technology rollouts. Unfortunately, most mobile service providers utilize outdated documentation tools that make deployments extremely slow, costly, and difficult to integrate with. Lacking an end-to-end view of the network, it is challenging to build new sites and maintain existing ones.

Without a central database in place, integration and workflow automation between the various tools of this mobile service provider was limited, thus creating silos of data that cannot be accurately utilized. This not only made it difficult to plan network expansions and rollouts, but also created challenges when trying to identify and troubleshoot any network issues. A central system to document all network resources and infrastructure was needed to manage its diversified mobile OSS tools landscape and to provide greater visibility into both internal and external applications.

UNIFIED RESOURCE MANAGEMENT

After evaluating several software vendors, this telco provider selected FNT Software to automate rollouts and inventory updates with its unified resource management solution, FNT Command. The Isonet 446 process management platform was fully integrated with FNT Command to ensure that the documentation related to network planning and network rollouts was enforced across all managed service providers as well as partners and subcontractors of this telco service provider.

Additionally, FNT Command was customized to capture and document all site candidates, new mobile sites, milestones, and activities while the workflow solution manages any changes within the network including installations and migrations. This made it possible for FNT to support a huge data migration project in which 425,000 documents were transferred and 800,000 milestones were managed.

Documentation of the actual RAN (Radio Access Network) configuration, planning scenarios, and evaluations is stored within a Configuration Management App while reporting is provided within a base station data sheet (BSDS) for environmental and governments permits. FNT Command is integrated with Radio and MW planning tools, and planned configuration is automatically imported. With a central data repository in place, this provider benefits from a complete inventory of all network resource data from the passive infrastructure to all physical end-to-end connections.

Network reconciliation is an important component of the solution. Keeping such a vast inventory up to date and maintaining high data quality is a real challenge. In order to automate this process, network reconciliation interfaces with RAN Element Manager Systems (EMS) built by FNT. These interfaces are based on FNT's standardized and highly configurable Reconciliation Engine.

FNT Command also assigns services to backhaul transmission links and provides accurate as-is documentation to make cable infrastructure rollouts, extensions, and changes easier to plan and more efficient to execute.

ENABLING FASTER ROLLOUTS AND TECHNOLOGICAL CHANGES

Maintaining an accurate and up-to-date inventory of all physical and logical network and service resources enables this provider to maximize the use of all network resources and make confident decisions about how to plan, build, deploy and manage the business. Similar to a digital twin, the combination of FNT Command and Isonet gives this provider a virtual representation of projects and provides status updates when building new sites. All network rollouts, transformations, and changes can now be planned and corresponding work orders can be created automatically.

In addition to planning and rollout management, FNT Command supports the operation of the cable and mobile service provider's Radio Access Networks (RAN). All types of active nodes (2-3-4G), as well as passive equipment at sites, are documented within FNT Command. With end-to-end visibility across the entire telecommunications network, 2G and 3G technologies can be quickly decommissioned and new products can be released faster.

FNT Command also identifies and inventories the required resources for delivering various products and services to reduce time to market. The ability to speed up the designing, planning, and provisioning of products and services makes all the difference when it comes to winning new customers and generating more revenue. With greater insight into all network connections and interdependencies, this telco provider can also diagnose and correct system failures faster to reduce downtime.

Overall, FNT Command has simplified the documentation and planning of 3,000 sites, 13,000 candidates, and 425,000 documents. The consolidation of many systems into one, central system ensures data consistency while real-time reporting guarantees the provider meets all legal regulations.

Business Benefits:

- Faster rollout of technologies
- Improved management of rollout partners
- Accelerated Planning with automated work order creation
- Increased efficiency through process automation
- Reduced downtime in case of failures
- Increased Service reliability
- Agility - quicker decommissioning of old systems
- Real-time reporting

Case Study 6: FNT Enables Successful Data Migration for Inventory System Replacement Using Migration Tool Kit

There is a growing disconnect between the capabilities of legacy inventory software systems and the requirements for managing today's complex hybrid infrastructures. An accurate accounting of network resource data, how individual elements are connected, and what services they support is a fundamental need of every telco. This data supports operations, service assurance, fulfilment, and planning processes. It must therefore be correct, transparent, and accessible to users and systems throughout the organization. These are requirements for doing business in the digital environment.

A Middle Eastern telecommunications company that provides a wide range of communications services needed a new inventory management system. Like many telcos, they had to face the reality that their legacy inventory software system was not capable of handling the requirements of its modern telecommunications network.

LEGACY SYSTEM CREATES FUNCTIONAL AND FINANCIAL CHALLENGES

For this telco, the problems of staying with the aging system were piling up. Their existing system could not adequately support their physical infrastructure and it lacked representation of cabinets, bundled cable, routed cables, floor plans, manholes, conduits, and ducts, among other things. Needless to say, there were both functional and user experience deficiencies.

The search feature was slow and inadequate, the user interface was dated, and there were no open REST APIs. This ultimately led to financial ramifications – any customizations required complicated and costly vendor development. Even simple changes like adding fields, modifying the user interface, and adding open-with links all came with a hefty price tag. Support and maintenance costs were equally expensive. Therefore, this telco made the decision to switch to an inventory system better suited to manage their complex hybrid telecommunications network.

UNIFIED MANAGEMENT OF HYBRID RESOURCES

With help from a consultant dedicated to the marketing, sales, integration and support of third-party software products, this telco was able to identify a replacement software system. After extensive research and evaluation, they identified German software vendor FNT Software as the best fit. FNT's solutions for the integrated management of telecommunication, IT and data center infrastructures are ideally suited for managing complex hybrid infrastructures.

The FNT Command Platform is based on a comprehensive data model that crosses telecommunications, IT and data center domains, effectively eliminating data silos. The rise of virtualization and software defined networks necessitates this capability, since VNFs are a big part of digitalization. FNT is uniquely capable of delivering on this requirement.

FNT does this by leveraging one central database across the active telco transport network, including passive inside/outside plant infrastructure, plus IT and data center resources. As more network functions move from the network to the data center, it is critical to maintain the same level of control regardless of where the assets reside.

Since unified resource management covers the entire spectrum of assets and resources within one integrated data model, users can navigate between the different layers and across all resource types: active telco transport network, passive inside and outside plant infrastructure, Mobile Radio Access Network devices and resources, virtual resources of NFVI and VNFs.

ACCELERATING INNOVATION AND BUSINESS DEVELOPMENT

Although data migration is a notoriously difficult undertaking that often takes longer than planned, comes in significantly over budget, and frequently fails, the migration to the FNT software solution was executed without causing major disruption to the operation of the business or affecting the customer experience.

A big contributor to the successful migration was the fact that the FNT Command solution comes standard with pre-packaged migration tools. That, combined with its open platform and experienced consultants, provided a viable migration path that eliminated risk to day-to-day operation of the business. Overall, the process of migrating data from a legacy inventory system to FNT was a seamless and pain-free experience.

With the FNT system up and running, this telco now has a platform in place that supports innovation to develop the business further. As they pursue their growth strategies, they are already realizing other, tangible benefits from switching to FNT to manage their IT inventory.

Business Benefits:

- Improved operational efficiency
- Comprehensive capacity planning
- Faster, more precise impact analysis
- Improved customer experience
- Network automation and orchestration

Success Factors

Overall, to meet the changing requirements of the digital world, communication service providers must utilize a comprehensive database of all assets, resources, connections, and dependencies to feed their planning, operations, and service assurance and fulfillment processes. A unified resource management solution, such as FNT Command, will improve data quality, ensured by reconciliation of hardware and service data from the network, but also by data consistency checks and management of status changes along the entire lifecycle from design and planning to rollout, operation and finally decommissioning. The ideal solution should feature an open architecture, with standard interfaces to expose data to other systems, adaptable to fit unique scenarios and environments.

As communication service providers upgrade and transform networks, roll out new technologies such as 5G, and lay new fiber to keep pace with digital transformation, full transparency into all network resources with all the dependencies across all hierarchies is business-critical. A fully integrated GIS tool, such as FNT GeoMaps, can provide the expanded functionality CSPs need nowadays. This combination of location intelligence with network infrastructure details will enable smarter decisions about network capacity and resiliency, improve network design and planning and support many other use cases to ensure that networks are optimized to handle the demands of the digital world.

Having the ability to automate design, planning and rollout phases by using accurate as-is documentation, and automatically create work orders based on planning protocols, assign work orders to field service teams or partners, track execution and receive documentation updates will significantly minimize errors and manual reworks. Automating connectivity management by setting up auto-routing on physical and logical layers, including validation rules provided by the system, will also make a significant contribution to this.

To optimize service assurance and reduce mean time to repair (MTTR), immediate impact analysis is crucial to provide all necessary information about the services and customers affected by a technical failure or service interruption. The vendor-agnostic data model spanning all passive and active physical, logical and virtual resources across all technologies is a mandatory prerequisite for this. Additional capabilities such as end-to-end signal tracing, visual analytics and the tight and flexible integration with other systems are important characteristics of a future-proof solution.

FNT's Recommendation

1. CREATE A DIGITAL TWIN OF THE NETWORK

Digital twins can help facilitate network transformations, IoT deployments, 5G rollouts or any other operational use case and are entering mainstream use to do so. A telecom providers' entire network, or parts of it such as sites, towers, POPs, network elements, physical and logical connections and services, virtualized resources, and configuration parameters can all be replicated as a digital twin to address the increased complexity that these changes will bring.

Changes to a network can be planned first with the digital twin, then executed in the network, and finally verified against the digital twin through data reconciliation. This closed loop principle is integral for high data consistency and optimized operational processes.

Streamlining operations, service assurance, design, planning, capacity management, orchestration and service fulfillment can be difficult due to the disparate nature of a hybrid network infrastructure. A digital twin can assist in all these areas by providing complex coordination and tracking. In particular, it can replicate and visualize the hybrid network infrastructure as a geo-referenced or schematic representation that shows all relevant infrastructure and resource details about used and available capacities, as well as dependencies and relationships between the resources across the technologies and vendors.

2. EMPLOY A MODERN INTEGRATION FRAMEWORK THAT SUPPORTS ZERO DOWNTIME SYSTEM MIGRATION

A smooth, zero-downtime data migration and efficient go-live of the new system is essential to prevent operational damage and business impacts. The preferred process uses the delta migration methodology. In this approach, the new system runs concurrently with the existing system, and only the delta between the existing and new solution is migrated at each migration run.

This is done by comparing the full data between the source and destination platforms but only creating and changing data that are new or different. As the read and compare operation works much faster than the create operation, smaller, faster data transfers and migration cycles can occur to enable the continual adaptation of migration rules. When the migration quality reaches the required level, the old system can simply be switched off and users can proceed with using the data in the new system. A zero-downtime migration will have been achieved.

3. MOVE TO CLEARLY STRUCTURED DOCUMENTATION AND PLANNING APPROACH

To gain full transparency across all resources and associated business information, structured documentation and planning is needed. FNT's solutions integrate the management of outside and inside plant cable infrastructure with the physical and logical resources of telecommunication transport networks to improve the efficiency and quality of all planning and engineering activities. All services being offered, and the physical, logical, and virtual assets and resources required to deliver them, are documented and managed within a central data repository that is easily accessible to users anywhere in the organization. It's a solid foundation for all planning and network transformation and rollout activities, which must be closely linked and integrated with the as-is documentation.

To prevent data inconsistency and deviations between as-is documentation and planning data over time due to ongoing planning and execution iterations, planning data must always be based on the as-is documentation. Process integration ensures that status changes within the planning process are directly reflected in the as-is data for the next planning iteration.

4. LEVERAGE AUTOMATION TO DRIVE THE OPERATIONAL SHIFT

A unified resource management solution across the hybrid network infrastructure enables automation of a broad scope of use cases and will fundamentally impact the way CSPs manage their physical, logical and virtual network resources and services. Such a central system of record is a prerequisite to automate the design and planning of changes, transformations and rollouts in the network as described above. Whether it's the automation of rollout processes or the rule-based automation of design processes, the accuracy and consistency of the resource data is key.

When there are changes within the passive cable infrastructure, such an automated approach is the only way to keep data accurate over time. For changes involving active resources and logical connectivity, a reconciliation mechanism via supplier EMS/NMS systems can be implemented and data can be synchronized to verify whether changes were executed as planned. This type of process-driven approach to planning changes enables corresponding work orders to be automatically created, execution to be traced, and status updates to be made. All changes are directly reflected in the database, and the documentation is automatically updated. Such an automated "closed loop" approach ensures data consistency and accuracy, which is a critical prerequisite in the continuous cycle of network and service resource and configuration management.

Event driven synchronization of data and status information between the resource repository and other systems, which are using the data and are dependent on the timeliness of the data, is a major cornerstone to drive automation, whether it's in the context of service assurance, planning, orchestration, or fulfillment.

Any application of AI technology, such as machine learning or deep learning, to automate a CSP's operation in this domain requires consistent and up-to-date information across all relevant resources, whether owned by the CSP or provided by partners. The automation of connectivity management and especially the automated verification of redundant configurations across all technologies and hierarchical layers, both active and passive, is an excellent example in this context with great potential for saving time, increasing efficiency, and significantly reducing the frequency of failures.

Automation drives the operational shift. A unified resource management solution across the hybrid network infrastructure is a major cornerstone for any kind of resource and configuration management automation.

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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