



Integrated solution for planning, documentation, and management of network resources in hybrid telecom environments

Full transparency throughout the entire service chain for communication service providers and network operators

Multidimensional digital twin of complete asset base – from trench and cable to service and subscriber

FNT Telecommunication Resource Inventory

Deliver high quality services with optimized network resource management

Network operators and service providers face an extremely dynamic market environment. On the customer front, demands and expectations are different in the digital economy and it's a challenge to keep up. On the technology front, advances in digital transformation are increasing the complexity of networks. Communications technologies are evolving at a rapid pace, becoming more sophisticated, virtualized and agile.

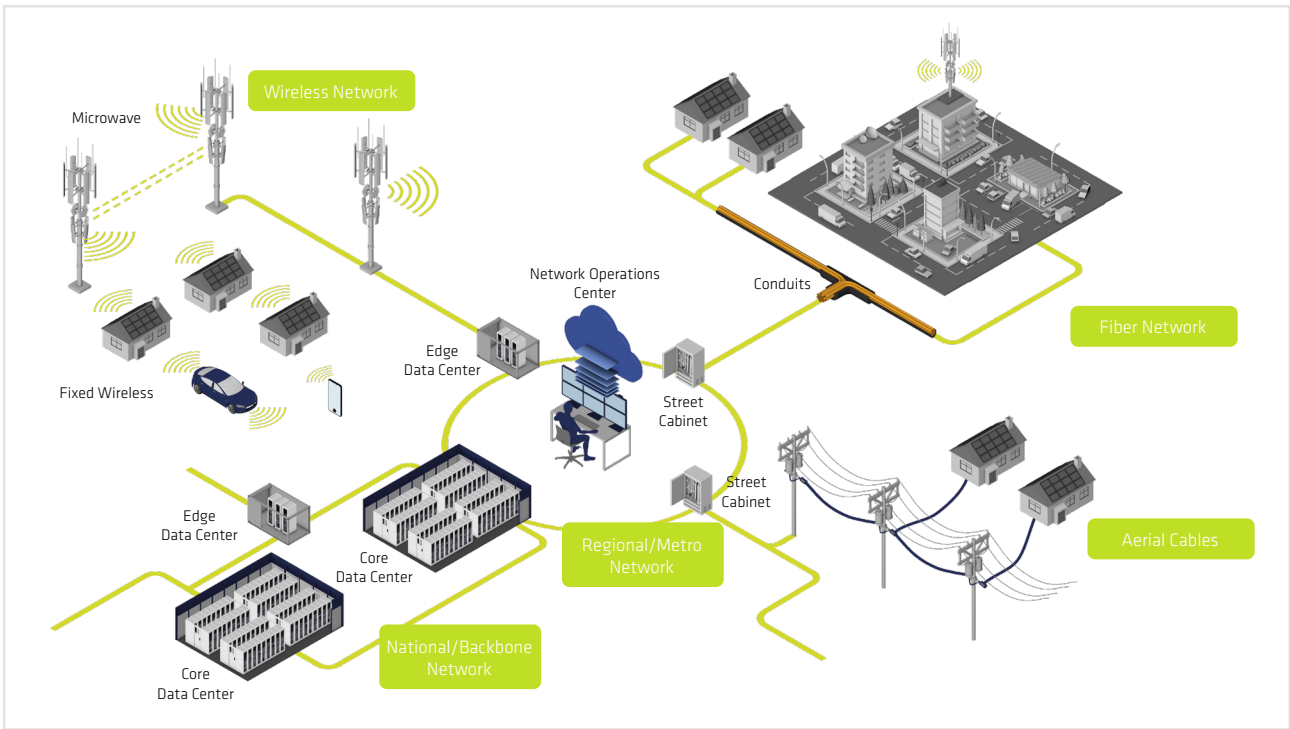
Against this difficult backdrop, communication service providers must continue to deliver on key business objectives: optimize time-to-market for new products, achieve maximum cost efficiency across all business processes, provide excellent services, and deliver the best possible business performance via efficient provisioning, monitoring, and planning processes. The OSS / BSS (operations support systems / business support systems) environment plays a pivotal role in their success.

Integrated network resource and service management is fundamental to a modern OSS / BSS architecture. A central source of network and service data that includes all relevant resource information is needed to form the foundation for all planning, engineering, service fulfill-

ment, and service assurance processes. Not just data, but quality data. It's crucial this data be accurate, as operational efficiency, cost optimization, service automation, service quality, and eventually customer satisfaction are all dependent on it.

MANAGING NETWORK RESOURCES IN THE DIGITAL ECONOMY

Skyrocketing data consumption, bandwidth-hungry 5G applications and streaming services are causing a massive rise in data load, which is straining providers' capacity. Network providers are therefore investing in new infrastructure and continually adapting their networks to meet changing subscriber requirements. The implications for network operators are two-fold. First, they need a way to optimally manage available network capacities and efficiently implement ongoing capacity expansions. Second, they need a consistent end-to-end view of their entire asset base used in the production of end customer services. Since today's telecom environment is hybrid, this includes not only the network resources, but data-center infrastructure and IT / cloud resources as well.



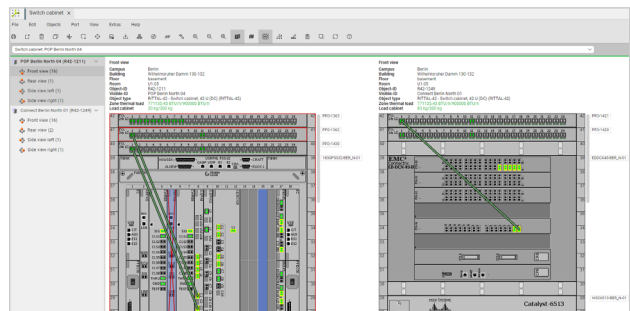
Hybrid telecom environment

FNT provides a comprehensive resource management solution to tackle these implications. FNT Telecommunication Resource Inventory ensures accurate information about the availability and lifecycle status of all network resources, which is critically important to successfully maximize the automation and efficiency of service fulfillment, assurance, and planning processes. The goal is to ensure high quality service delivery and best possible customer experience.

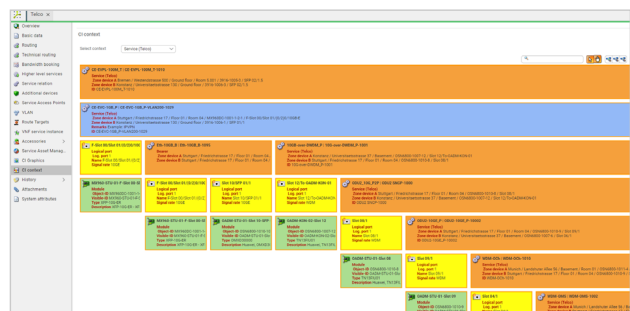
Thanks to the field-proven integrated data model of the flagship FNT Command product, which covers all relevant asset types, FNT Telecommunication Resource Inventory is future-proof and network virtualization-ready. The FNT data model as well as FNT Command functionalities can be flexibly extended and integrated with other systems, providing the foundation for a modern OSS / BSS architecture. This “single source of truth” includes all relevant resource information for the planning and engineering, service fulfillment and service assurance processes of telecom providers.

- **Physical** components of POPs, data center sites, RAN sites, street cabinets, customer, or any other network sites – with individual rooms, racks, and equipment
- **Active** nodes spread across the network – network elements, chassis, cards, modules down to individual objects
- **Passive** infrastructure of a network – trays, ducts, micro-duct bundles, cables, and fibers, including detailed data about splice closures, cassettes, splices, patch panels, patch cables

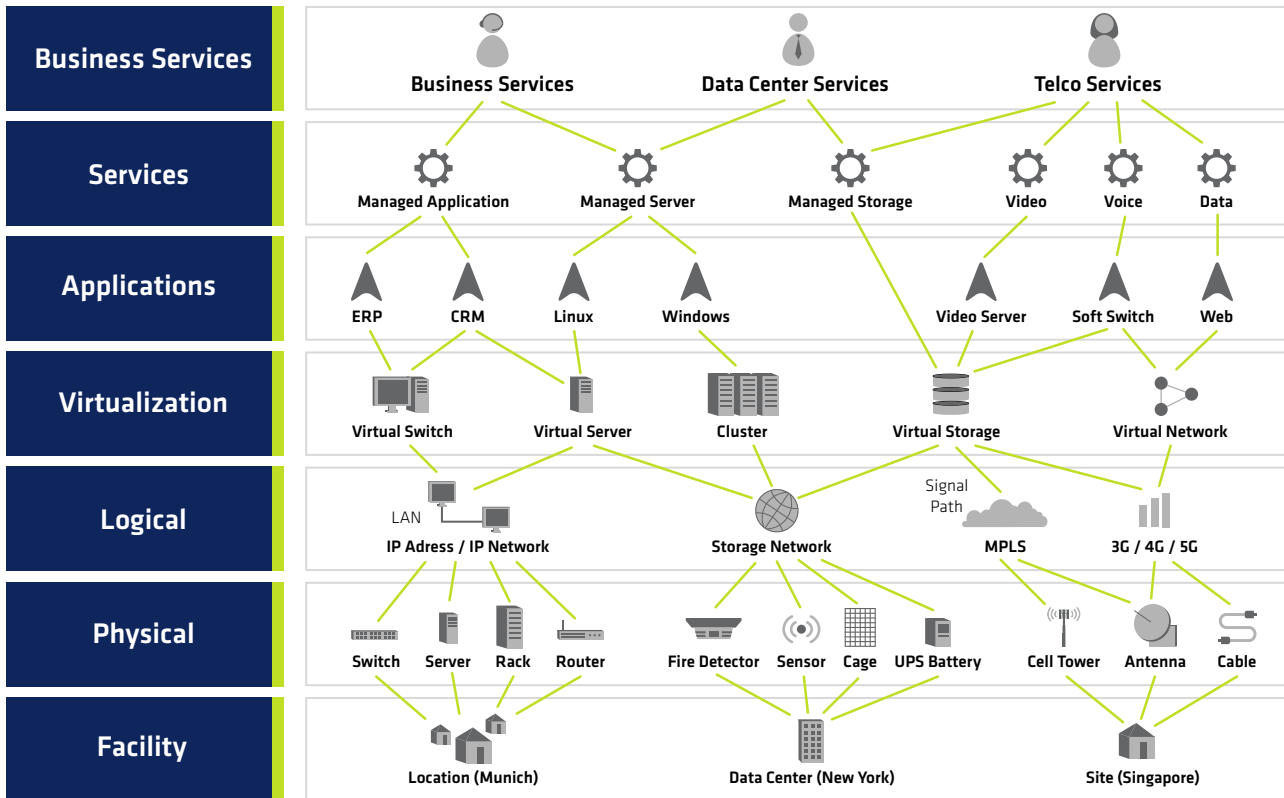
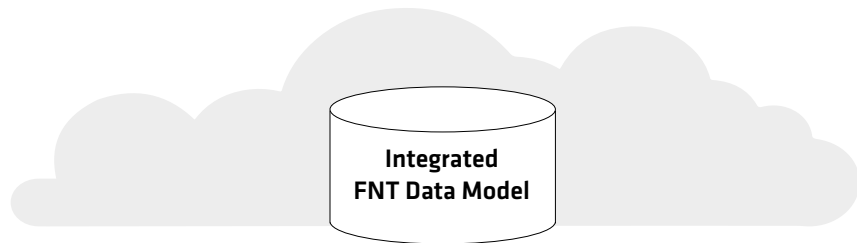
- **Logical** connections and circuits – with hierarchical network topology and resource representation across various technologies
- **Virtual** resources based on NFV-Infrastructure – servers, clusters, virtual machines, VNFs
- **Configuration data** – assigned to active nodes, logical resources such as RAN cells or links, virtual objects



Physical components in Switch Cabinet



Logical connections hierarchy in Telco



FNT Integrated Data Model

FNT Command stores this data in a single, overarching data model that spans across telco, data center and enterprise IT domains. This approach effectively eliminates data silos within an organization and provides full transparency across all resources and layers. It lays a solid foundation for network documentation on which a modern, future-proof OSS / IT system landscape can be built.

FNT TELECOMMUNICATION RESOURCE INVENTORY

The FNT Telecommunication Resource Inventory solution is part of the FNT Command Platform software suite that enables network operators and service providers to document and manage technologies they use in their networks. Whether it is transport or access network, wired or wireless medium, legacy or next generation technology – FNT Command supports all these combinations and enables centralized, integrated management of all network and service resources in the hybrid telecom environment.

Because the FNT Telecommunication Resource Inventory solution is based on the standardized FNT Command software, it presents all information relating to the network in a single, user-friendly manner. This single source of truth database enables end-to-end querying of relationships between services, their underlying physical and logical network resources, associated applications, customers, and other assigned information. It provides transparent and clearly structured documentation, the ability to manage connections and services throughout the entire network, and an integrated data model for seamless navigation between layers. This makes it easy to identify all services and customers affected by any changes or issues, anywhere in the network.

Gain transparency of the complete network resource base

- Document locations, Telco PoPs and mobile sites
- Reconcile all active transport (xWDM, IP/MPLS and Ethernet) as well as access (mobile RAN, FTTX) networks within one single database

- Manage all cable and passive assets in combination with GIS-based location intelligence
- Create and manage the database of 3rd party resources including leased lines and dark fibers
- Use a partner-ready integration framework which includes generative open APIs, ETL, Reconciliation and Notification functions to integrate FNT Telecommunication Resource Inventory into the OSS / BSS landscape

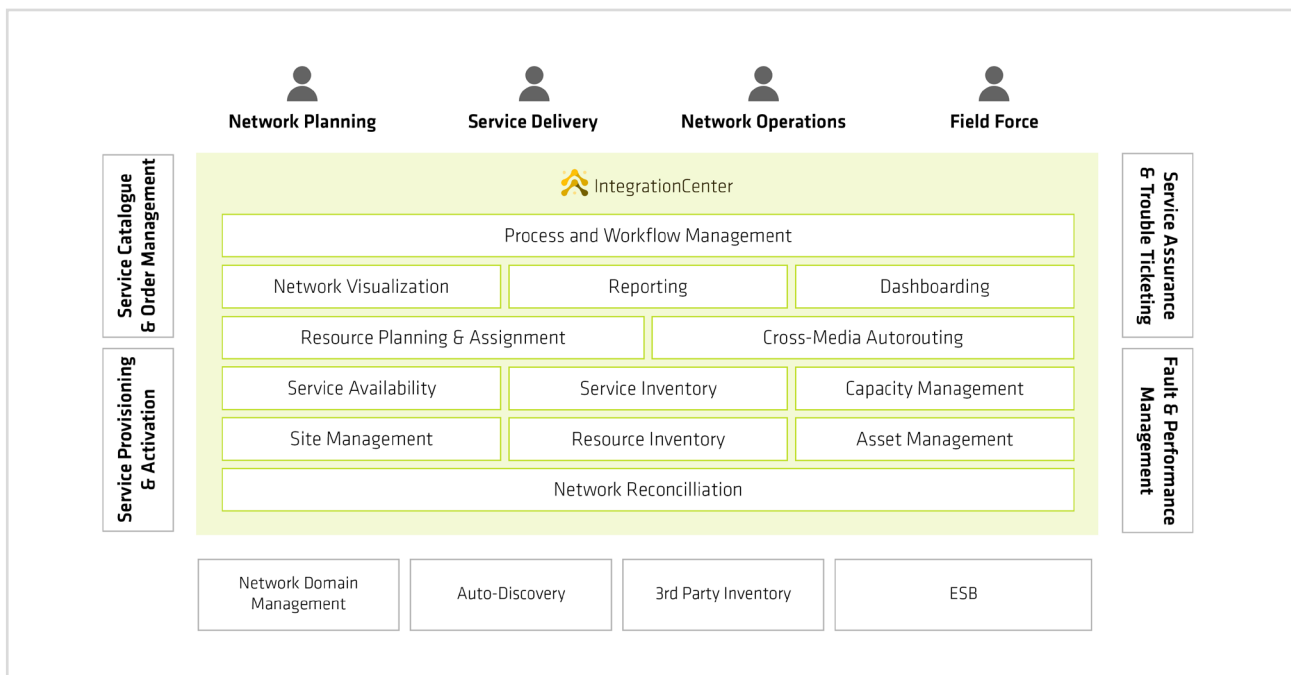
Support engineering and fulfilment processes

- Plan network expansions and rollouts based on accurate actual documentation
- Automatically create work orders for field force teams to execute planned tasks

- Profit from cross-media and cross-technology auto routing functionality on duct / pipe / cable / fiber and circuit layers
- Perform resource availability checks and reservations, and provide the resulting datasets to Provisioning

Optimize operations

- Instantly identify affected services in case of outages across passive, active and virtual network layers
- Identify customers affected by maintenance windows and inform them in advance
- Provide data enrichment to optimize Incident and Fault management processes



FNT Telecommunication Resource Inventory

KEY CAPABILITIES OF FNT TELE-COMMUNICATION RESOURCE INVENTORY

Site Management

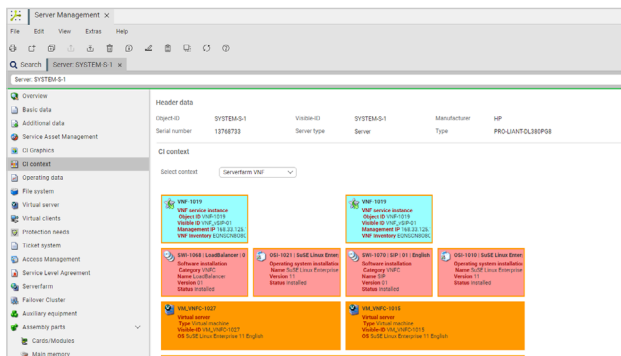
Manage physical locations like PoPs and mobile RAN sites in a hierarchical system within a geographical structure. Group physical locations logically (for example by category or by region). Track logical sites, nominal search areas, site candidates and preferred site candidates to facilitate geographically distributed network rollouts.

Physical Resource Management

Associate the various network devices at the physical level with the respective locations or sites. An extensive component library with more than 75,000 device templates can be accessed online and searched for. A graphical switch cabinet editor provides a wide range of functions for managing racks: plausibility checks based on card / slot relationships, connector types and dimensions help prevent input errors. Individual racks can be positioned on 2D / 3D footprints for managing used floor space. Combine multiple devices to create single logical groups that represent more complex pieces of hardware.

Both active devices and all kinds of passive components such as distributors, junction boxes, patch cables, configuration cables, trays, ducts can be managed.

Asset Lifecycle Management

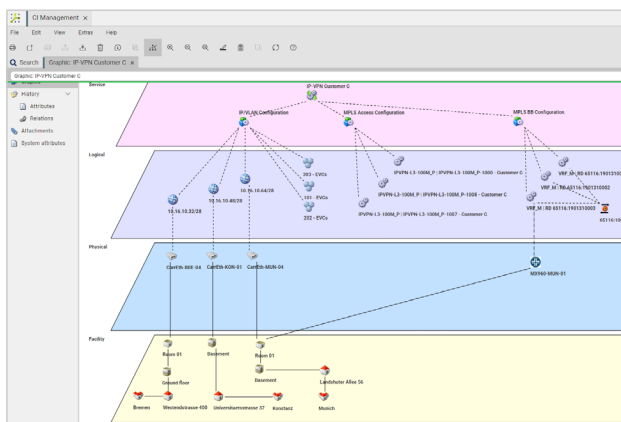


Physical and virtual Assets

Manage physical devices or intangible components such as virtual machines and software installations throughout their entire lifecycle, assisted by features such as contract management, planning functionality, and work order management. When assets are appropriately managed it's possible to maximize the value of every asset in use and reduce the total cost of ownership. On the other hand, passive stranded assets can be identified and dismantled. Removing powered stranded assets helps reduce overall environmental footprint.

Logical Network Inventory

FNT Command uses hierarchical templates for modelling different network layers. They are extremely flexible and easy to extend, making FNT Telecommunication Resource Inventory future-proof for any wired and wireless network technology. These templates support circuit switched, packet data, and xWDM transmission technologies. Network services can be represented as bearer, path, trail, or multipoint category, making it possible to model a wide range of network topologies. Bearer usually represents the lowest network hierarchy level.



Overview of the Customer Service in Logical Inventory

Physical connections documented in FNT Command can be used to autoroute logical connections on the bearer layer. On the very top of the service hierarchy end customer services can be positioned. FNT Command enables

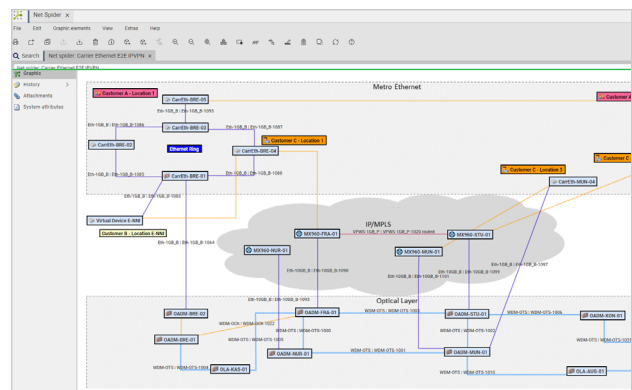
seamless navigation through all hierarchies and provides end-to-end information on the structure and routing of services in a heterogeneous multi-vendor environment.

FNT Command supports a variety of protection schemes (1+1, 1:1, 1:n, n:1) on path, trail and bearer layer. This empowers users with robust simulation capability, i.e. a Telco outage report that displays all affected services and their impact status for a device or a cable, while taking protection and redundancy parameters into consideration.

The information stored in the logical network inventory can be utilized wherever required, for example in capacity management or as part of service fulfillment processes where it provides the necessary data on service availability for a particular network or customer location.

Cross Media Autorouting

Considers both the passive network resources and the active transport technologies to enable physical and logical connections to be routed automatically through the entire network. Accounts for a range of routing parameters and other restrictions that affect the path.



Topology view in Netspider

Resource Planning and Assignment

Supports new resources planning, reservation or modification on physical and logical inventory levels. This capability generates work orders automatically, which can be made available to service provisioning and activation platforms for automatic processing. Where activities are performed manually, the work orders contain all the information required. These orders can then be forwarded to external workforce management systems, where they can be used to coordinate field service activities. As changes are implemented, their status is amended via the order management function in FNT Command.

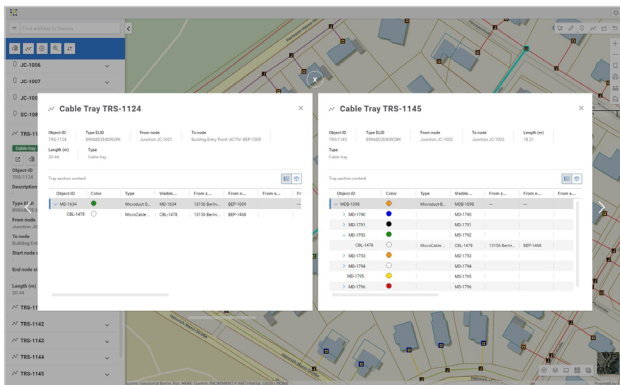
Network Transformation Planning

When upgrading networks or introducing new services and products, operators require detailed information on the configuration, topology, capacities, and nodes of the respective networks, the relationships between network resources on the various layers, as well as on a range of related items like contracts and SLAs. All this information is stored in the central FNT Telecom-

munication Resource Inventory. The planning functionality can then be used to create detailed network rollout and modification plans.

Cable and Outside Plant Management

To map physical connection underlay, the FNT Cable Management solution can be deployed in conjunction with the FNT Telecommunication Resource Inventory. This enables planning and documentation of patch and fixed cables and conductors in both inside and outside plant areas. FNT Command database contains all standard cable types, which make it possible to create a fully featured representation of the entire cable route between two devices, including patch panels, junction boxes, splice cassettes, and splices.



Cable and Outside Plant management

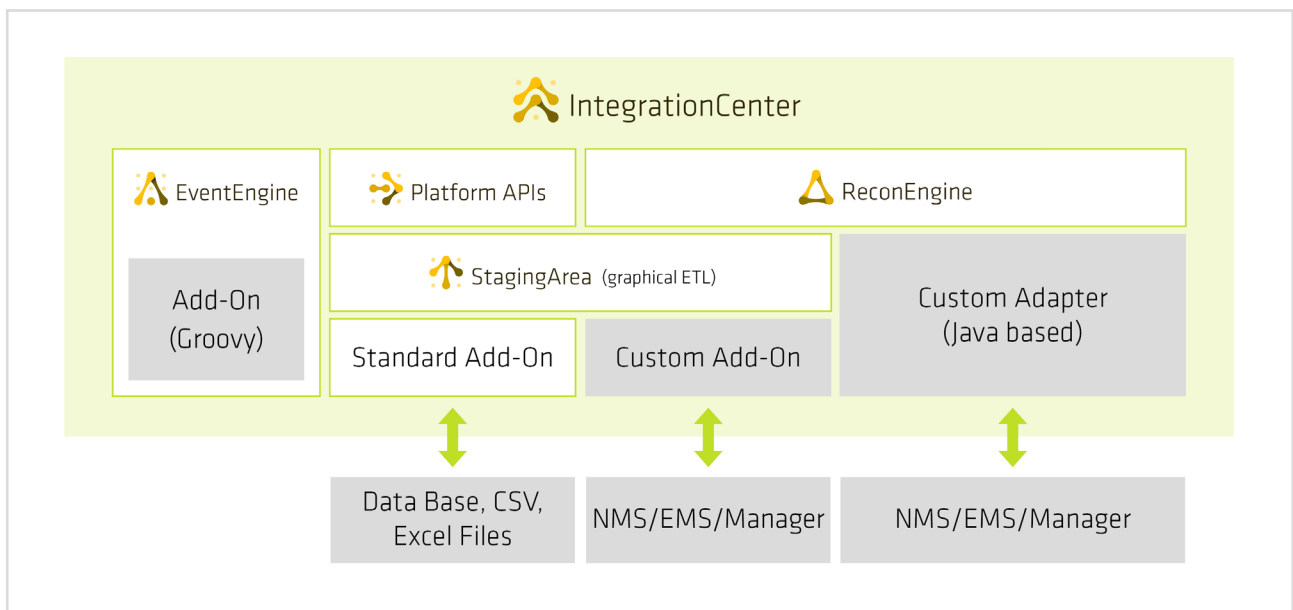
FNT Command performs plausibility checks on the medium (copper and glass) and connectors to prevent input errors. This enables functions such as bundled cabling for simultaneous insertion of multi-pair cables into multiple cabinets and the use of junction boxes.

The signal tracing function in FNT Command presents all connected devices and cables on the physical layer along with their respective key data. Signal tracing can be performed in both actual and planning views. Key data for each route section is displayed in the route information. Details include start and end points, the number of configuration and patch cables, total cable length, and total attenuation.

FNT Command Outside Plant Management complements cable management functionality with planning and documentation of all field facilities and infrastructure, from trays, ducts, duct bundles, and cables to shafts and the junction boxes they contain. The graphical representation of the network can be geo-referenced using FNT GeoMaps, a solution component that applies FNT's infrastructure data to maps from Esri ArcGIS. Graphical representations of cabling visualize networks on maps outside and between buildings. Inhouse 3D visualization capabilities allow seamless navigation from outdoors to inside buildings to provide a unique view of the network that dramatically raises the value of the documentation.

Network Reconciliation, Process Integration, and Connectivity

FNT Telecommunication Resource Inventory can be easily integrated into existing OSS / BSS landscape using FNT IntegrationCenter. FNT IntegrationCenter is a powerful toolset that facilitates integration with a wide variety of third-party applications. Examples of such applications include trouble ticketing and fault management systems, order management solutions and activation platforms, as well as ERP systems, BPM and ESB engines, auto-discovery solutions, and element/network managers.



FNT IntegrationCenter

One of the most important aspects of network resource and service management is having accurate and clean data. FNT ReconEngine enables synchronization and reconciliation FNT inventory data with relevant element and network management systems.

In addition, FNT Command has an API for integrating with process management, ESB, and workflow tools including FNT ProcessCenter. Integrations of this kind enable extensive automation scenarios in service fulfillment processes, thereby accelerating service delivery, minimizing manual inputs and post-processing.

Reporting, Dashboarding, and Network Visualization

FNT Command offers a flexible reporting engine that works in conjunction with the database metaschema to provide a wealth of options for generating reports. It is also possible to integrate external reporting applications and dashboard solutions. Regulatory authority reporting has never been easier!

FNT Command platform provides a variety of graphical visualization capabilities to create network topology views manually or dynamically. Graphical network maps can be geo-referenced using FNT GeoMaps as well.

KEY BUSINESS BENEFITS OF FNT TELECOMMUNICATION RESOURCE INVENTORY

- Improved efficiency in daily operations
- Reduced OPEX
- Optimized costs and process times
- Reduced network downtime and shorter time-to-repair
- SLA breach avoidance
- Optimized network capacities and CAPEX
- Improved service quality for greater customer satisfaction
- Easier reporting to regulatory authorities
- Reduced environmental footprint by identification of powered stranded assets