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Guide to Software-Assisted Mobile Site Management, Part 2: Site Acquisition, Design and Build

Everything you need to know about readying site candidates to join the Radio Access Network

The mobile industry is hot and showing no signs of cooling off any time soon. Quite the opposite, growth is accelerating. According to [GSMA's The Mobile Economy 2023 report](#) there is projected to be 6.3 billion unique mobile subscribers by 2030, 5.5 billion mobile internet users, and \$1.2 trillion in operator revenue. What does this mean for mobile operators? They will need to invest in their networks to ensure they have the coverage and capacity to handle the increasing consumer demand.

5G deployments will play a big role in these preparations. Operators are projected to spend \$1.5 trillion in capex, and 92% of that is [expected to be on 5G according to the same GSMA report](#). In [Part 1 of our Mobile Site Management series](#), we detailed the first step operators must tackle: nominal planning and best candidate selection.

This paper will focus on what happens next: acquiring and designing the selected site and building it out.

1. SITE ACQUISITION

After selection of the best candidate for a new cell site is made, the acquisition process begins. Before a technical design and build can start, it's vital that the mobile network operator (MNO) completes all legal and regulatory paperwork.

In general, an MNO has obligations towards a number of different parties. These include other licensed operators (OLOs) when a site is shared. In order to co-exist with other MNOs on the same site, an official letter of site

Part 1
Nominal planning and best candidate selection

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Part 3
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sharing intent must be prepared and sent to the OLOs. In addition, some technical studies and simulations must be performed to ensure interference-free antenna and RF collocation. Obligations towards the municipality where a new radio is going to be built include securing the proper approval from the municipality. This sometimes requires extensive efforts, for example communicating with government officials to make the case for the economic and social advantages of the new site and addressing public safety concerns. Finally, official permits are required by state regulatory bodies. Be aware that application rules, building and zoning code regulations vary from region to region, and you will need to comply with all applicable governmental regulations controlling each site.

Throughout this process a tremendous amount of documentation is produced. Each and every official document must be uploaded to a common storage repository for tracking of all site acquisition milestones. Even though MNOs typically employ acquisition partners to help with the rollout process, all final decisions and papers must always be stored in a consolidated rollout database.

How Software Makes It Easier

Rollout support solutions play a crucial role in the site acquisition process, mainly from the documentation management perspective. You'll want software that can handle taking in and processing a large volume of heterogeneous documents coming from a wide variety of sources. You'll also want this documentation to be available for all processes that need it to support decision making. With this in mind, the most important functionalities to look for in a solution include:

- Document management.** This functionality governs the structured storage of all relevant site paperwork, including building permits and completion certificates. Each stored document must be linked to the corresponding site record and supplied with metadata for ease of indexation. FNT Command's structured documentation of the network infrastructure easily fulfills this requirement. All inventory objects can be assigned as many attachments as needed, which in this case is site-related documents. For optimal audit security, the history of all objects can be traced.

Version	Document type	Sensitive	Status	Promotion to	Removed
1	SICLIGHT 3021 Site Integration Counter Report LIGHT 3021	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	CDWG Construction Drawings	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	BSSS Base Station Data Sheet	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	EWCK Electrical Works Certificate	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	LEASE Lease Contract	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	Other Other Documents Multiple Docs Allowed	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
1	SCT SBT	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
2	ACORDNUM Lease Subcontract (or Addendum)	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
2	ACORDNUM Lease Subcontract (or Addendum)	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
2	C3 C3 Inspection	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
2	CWOW C3 Inspection FOW	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>
2	THF Technical Hazard File	<input type="checkbox"/>	Released	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1 Site documents list in FNT Command

- Highly configurable data model.** Key mobile site characteristics can vary from company to company, which is why the data model must be highly configurable. To accommodate MNO's business requirements, data model extensions with new attributes, relationships and entities must happen without software programming effort. Modern rollout support systems such as FNT Command eliminate the need for programmed data model extensions, allowing MNOs to quickly adjust to new technology requirements.

- Workflow modeling and runtime environment.** Usage of a workflow-powered solution raises automation grade and minimizes human error. Workflows help users navigate through the complexity of the rollout processes. At the same time, visual representation of a workflow provides a much-needed high-level view of each step of a process, from beginning to end.

Because most MNOs have specific processes unique to their organization, the software used should be able to accommodate individual requirements. FNT ProcessCenter, which is an integral part of the FNT Command Platform, offers Business Process Modeling and Notation (BPMN)-compatible workflow modeling and runtime environment as well as native integration with the FNT Command inventory.

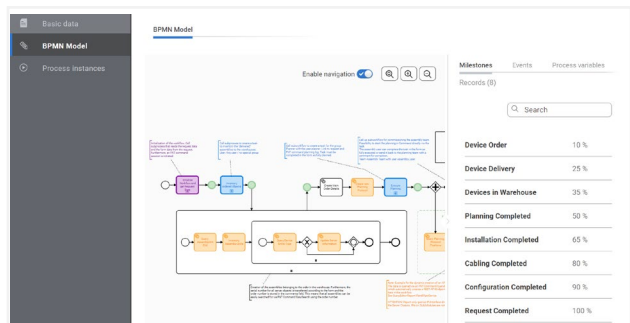


Figure 2 BPMN Workflow model in FNT ProcessCenter

In addition, FNT ProcessCenter has a form / wizard modeler and request handling capabilities, which significantly augment user experience with the system.

It's important to note that procedures can change over time, so the software solution must be flexible enough to adapt and introduce new versions of the workflows. Software like FNT ProcessCenter meets this requirement with ease.

- Role-based access.** This feature ensures safe and secure collaboration with external rollout partners. Defining specific rights and permissions of individual users and groups is an important function for any software application, but this is especially true for rollout management software since it directly impacts critical infrastructure data. It is vital to have guardrails in place to protect the data and prevent unauthorized access and changes. FNT Command Platform software supports role-based user management and

multi-tenant capability. It defines and authorizes each individual user or group and maintains detailed information on several levels across many different domains. Implementing tailored user profiles and access rights ensures that people only see what they are allowed to. Such predefined roles and privileges greatly simplify the administration effort.

- Connectivity management.** The technical feasibility of a redundant fiber or microwave link, which connects the site to the provider’s core network, must be clarified during the site acquisition process. FNT Command offers integrated geo-referenced documentation of a provider’s fiber and telco network footprints. This means that a technical feasibility study can be conveyed in the same tool as the RAN rollout, which significantly reduces effort and time. For example, FNT Command users can benefit from an auto-routing function, which can find optimal network paths. FNT GeoMaps even provides a distance measurement tool, a valuable enhancement to signal routing.



Figure 3 Distance measurement from mobile site candidate to the next junction in FNT GeoMaps

An MNO can document their complete mobile backhaul network in FNT Command in a great level of detail. Having both transport and RAN networks managed in one tool unlocks important synergies for faster network planning and more efficient network operations.

Only when all the boxes are checked can acquisition acceptance commence. It is in the MNO’s best interest to complete site acceptance as quickly as possible. Any delays introduce unnecessary risk such as delaying subsequent phases and increasing the uncertainty factor. It is therefore advantageous to have an accurate and up-to-date rollout database and software support to speed the process up.

2. SITE DESIGN

Site design is the next step in the process but, if the likelihood of successful acquisition is high, can begin before the completion of the acquisition process. The type of site, its capacity, which technologies must be built and the type of backhaul connectivity are all known by this point. The task of the design phase is to finalize each and every technical aspect of the site and create a digital “blueprint”.

How Software Makes It Easier

Technical site design can be highly automated using roll-out support software. What to look for in such software:

- Extensive templating functionality.** Usually there is a typical site configuration available for each coverage need, such as a highway site, dense urban site, rural site, etc. These configurations contain the complete description of the equipment and cabling to be deployed at the physical location, for example, cabinets, BBUs, patch panels, batteries, and UPS, RRHs, antennas and cell configurations. Software such as FNT Command lets users define site configuration templates (assembly units), which can be used to create the new site blueprint with literally one click.

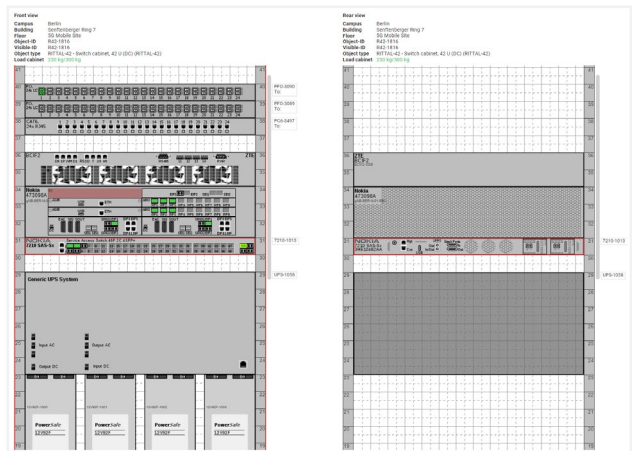


Figure 4 RAN cabinet views (front and rear) in FNT Command

Assembly units will include cabinets, baseband unit (BBU) chassis, RF transmitters, and antennas as well as batteries, power supply and HVAC elements. All above-mentioned elements will be generated with corresponding cabling and with devices placed on the floorplan.

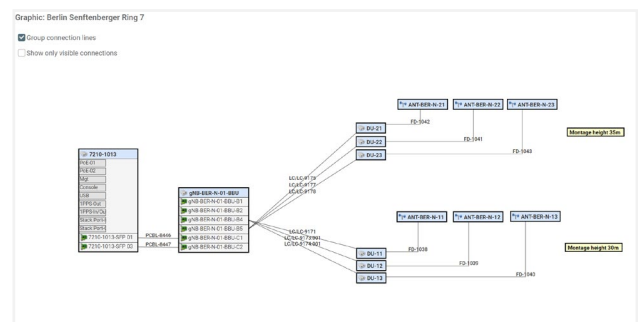


Figure 5 Site cabling schematics in FNT Command

- Integration with engineering tools.** MNOs use specialized engineering software to simulate radio coverage and produce an extensive set of radio parameters grouped in profiles to be configured on the network. Such tools usually have a very specific group of users who can access and work with them. The rollout support solution must be capable of extracting these

profiles and linking them to the site design records, making site configurations available to the broader group of users.

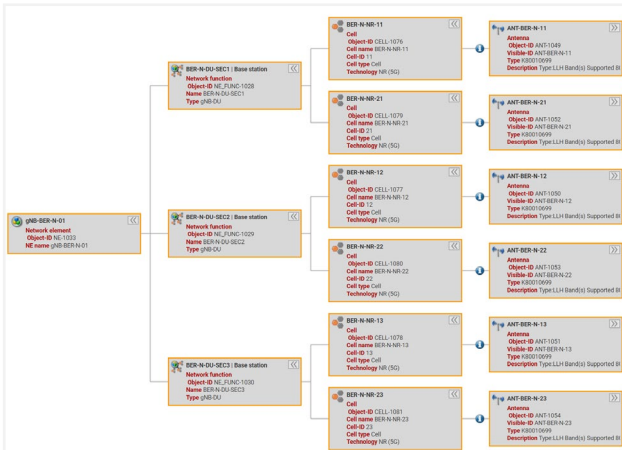


Figure 6 Logical cell configurations in FNT Command

MNOs can use extensive FNT IntegrationCenter capabilities to integrate any tool themselves, or request integration services from FNT Software. FNT IntegrationCenter is an open toolset, which offers REST APIs, ETL, notification service as well as a network reconciliation framework.

- Design export capabilities.** An automated planning tool can help with generating Bill of Quantities (BOQ) for equipment ordering. In this case the rollout support database is a master source of data for procurement. As FNT Command lets users create the complete digital blueprint of the site, the whole dataset – including all device quantities and models planned on site, manufacturer numbers, types and quantities of patch cables, length of fixed cables – can be exported into a defined format and submitted to procurement. This streamlines the equipment ordering process.
- Site candidate information bank.** During the design phase some physical simulations may be conducted. In the rare case unforeseen hazards or environmental violations are discovered, the site design may be rejected, either partially or in full. If this happens, the entire process is reset back to the acquisition phase. This is a very important reason to track and retain information on all possible candidates during the site selection process. The MNO may need to circle back and try again with the second-best candidate. For this reason, it is very important to retain all information collected on all site candidates. FNT Command stores this information and makes it available for later profiling and rating should the need arise.

When the site blueprint is finalized, costs are calculated and confirmed. At this point site design may be considered complete – a big milestone! This blueprint guides the subsequent site build.

3. SITE CONSTRUCTION AND GO-LIVE

The third and final phase in this chapter of mobile site rollout is site construction. Ordering site construction services and equipment may take some time. It is therefore crucial for the MNO to stay informed about construction progress and any issues that arise. Usually, the construction partners gain access to the rollout support solution in order to toggle milestones, upload photos of construction process and raise any problems.

How Software Makes it Easier

- During this phase, FNT solution capabilities like **process and workflow management** as well as role-restricted access play a designated role as described earlier in the site acquisition phase.

Native support for BPMN-milestone definitions allows process managers to define and automate available construction milestones, such as “cabinet on site”, “power on site”, “connectivity implemented” and so on. Human task management functionality of FNT ProcessCenter plays a key role in construction supervision.

Type	Name	ID	Details	Status	Due Date	Priority	Creation Date
Task	Network planning	SR-2023-00001	SR-2023-00001	Not Started			10/04/2023 10:04:00
Task	Equipment installation	SR-2023-00002	SR-2023-00002	In Progress	10/04/2023	High	10/04/2023 11:02:31
Task	Power on site	SR-2023-00003	SR-2023-00003	Not Started			10/04/2023 11:02:31
Task	Connectivity testing	SR-2023-00004	SR-2023-00004	Not Started			10/04/2023 11:02:31

Figure 7 Task inbox in FNT ProcessCenter

- Mobile access to documentation data.** Intermediate site visit productivity can be enhanced when the overseer from the MNO has the digital site blueprint on hand. For this reason, applications like the FNT Command Mobile App, which provides handheld-optimized access to the FNT Command Platform, are a game-changer. Having complete site documentation on hand in the field dramatically increases the efficiency of field service and construction teams.

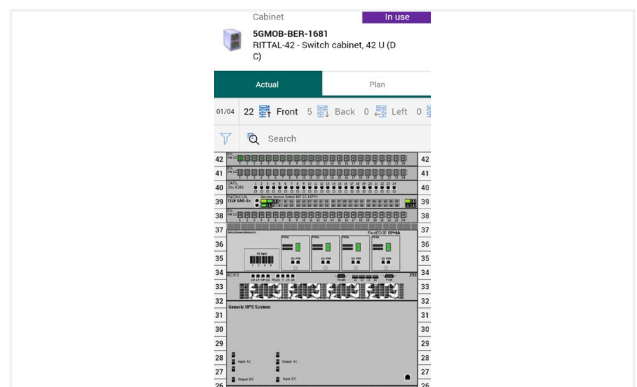


Figure 7 Rack view in FNT Command Mobile

FNT Command Mobile contains the necessary documentation as well as extensive visualization options for racks, devices, connections, and signal paths. Visualizations make the build faster and more efficient, while integrated signal tracing helps to track signals directly on site across all components involved in a network, making both initial setup and subsequent troubleshooting easier.

Multiple engineering and operation teams work in synergy to integrate, optimize, stabilize, and test the new site. This phase is critical for the successful site launch. This phase, however, is also governed by the rollout process. This means that any last-minute changes made to the site design must be updated to and reflected in the rollout support database. Clean and accurate final documentation is a prerequisite for successful site debarring.

PUTTING IT ALL TOGETHER

In response to increasing demands for high-quality mobile services, mobile operators understand they need to deploy cell sites quickly and efficiently. That puts pressure on those responsible for site acquisition, design, and build. One way to relieve some of that pressure is to introduce software that facilitates and automates as much of these processes as possible. The overview provided in this paper is intended to highlight where FNT software can play a role and how.

Building a site and bringing it on air may seem like the end of the story. However, we would be remiss if we didn't take it one step further and address ongoing operational management of the site. The same software used to facilitate site selection, acquisition and build can also be used for ongoing operations, change management and dismantling processes.



Contact us to speak with one of our experts or schedule an introductory demo. Let us show you how FNT Solutions can connect all the dots of your mobile network infrastructure needs.

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