



Building Wireless Networks: The essentials of superior program management

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Gene spent 13 years with McCaw Cellular Communications Inc./AT&T Wireless in various senior leadership roles in network engineering and operations. Prior to joining Mobilitie, Gene was Head of Services for the U.S. Subregion at Nokia Siemens Networks. With more than 20 years in the telecom industry, Gene has extensive leadership experience with major wireless carriers and equipment vendors. He has managed the build-out of thousands of cell sites and deployed next-generation technologies to thousands more. He has led the development and deployment of enterprise network management systems; managed a portfolio of thousands of network and office properties; led teams to create technical standards, processes, training and documentation; and managed large capital and expense budgets. Gene holds a Bachelor of Science degree from Oregon State University and a Masters degree from the University of Washington.

Building wireless networks is a complex and expensive affair. It requires careful planning, strong leadership, cross-functional coordination and excellent program management. Whether a carrier is building a new network, overlaying an existing network with next-generation technology, or enhancing a network with new features and capabilities, superior program management will ensure optimum results. The principles outlined in this paper can serve as a guide for network executives on how to leverage Program Management Principles to achieve the fastest, smoothest and most cost-effective results. They also can serve as a troubleshooting guide for understanding why a current program may not be proceeding as desired.

A Foundation — A Business Case and Program Leadership

First, establish a solid foundation with a compelling business case that quantifies the costs and benefits of the network program. Make sure it is thoroughly reviewed, scrubbed and refined to a point at which it is well grounded in facts and justifiable projections. Ensure that the expected return on investment is clear, reasonable and defensible. A strong business case will provide a critical framework upon which to define the goals and objectives of the program, and against which to measure results.

Next, identify and publicly assign executive accountability for the program. The entire network team needs to clearly understand who is accountable for the program. Quickly thereafter, identify an experienced and skilled leader to manage the execution of the program. Be careful not to assume that your most technical experts have the program management expertise to drive a large, complex network build-out. While you will need technical subject matter experts on the program team, the program leader must have the proven organizational, interpersonal and communications skills necessary to marshal, lead and drive a cross-functional team.

Then, support the program leader by assigning a core team of expert project managers. Relieve this team of other responsibilities to ensure a complete and dedicated focus to the program. Be careful not to think they can just assume these new responsibilities on top of everything else they already are doing. If the network build-out or deployment is worth tens or hundreds of millions of dollars, it is worth putting a dedicated and skilled team in place to execute it.

Goals & Objectives – Nail Down the Specifics

Well-defined goals—those that spell out exactly what is to be achieved, by when, at what cost—give everyone involved in the project a clear target and give individuals ownership of various parts of the project. Conversely, an ill-defined, ill-managed and ill-documented network program can result in chaos, missed expectations, and unnecessary costs.

Mobilitie \mō-bil-i-tee\ *verb*

1: the quality of being mobile **2:** the fastest growing tower company in the United States **3:** 50% revenue share and no equipment limits **4:** \$500 million on hand to invest in towers, DAS, and broadband backhaul networks

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Before embarking on a new program, frame the program with a clear and compelling goal. Executive management must spell out in explicit terms exactly what is to be accomplished, by when and at what cost. It is critical to a program's success that everyone be on the same page, and pulling in the same direction, to achieve the desired results.

For example, if the program is to build new coverage, then the goal might be stated as "to build 1,000 new sites in the top 25 markets by the end of the year for less than \$200 million." Or if the program is to deploy next generation technology throughout the network the goal might be stated as "to deploy next generation equipment to the top 100 markets within 24 months for less than \$2B."

Then, having a clearly stated goal at hand, the program leadership must answer in more detailed terms three simple questions:

- What exactly are we trying to accomplish?
- How are we going to accomplish it?
- How will we gauge our progress?

In answering "what exactly are we trying to accomplish?," the program leadership must define a set of SMART objectives around cost, schedule and quality. SMART objectives are:

- Specific
- Measureable
- Achievable
- Results-oriented
- Time-based

Thus, cost objectives must be specified to determine how much capital is needed to achieve the goal and to set limits on operating expenses. Schedule objectives must be set to clearly define what milestones should be accomplished by when. Quality objectives must be defined to ensure that appropriate performance standards are met or exceeded.

Cost: A well-managed network program should have tight control on expenses, both capital and operating, with few surprises during the program. Ask some basic questions upfront and define SMART program objectives against each one:

- What is the capital budget for the program and exactly what are the components (equipment, software, deployment services, etc.) that comprise that budget?
- What is the target for resulting operating expenses and exactly what are the components (labor, transport, site leases, etc.) that comprise that target?
- How much money can the program earn or save the company each year?
- How can capital and operating expenses be reduced, such as with alternative service providers, re-use of equipment, consolidation of transport, etc.?

Specifying explicit dollar amounts for each cost objective helps to further define the program. For example, if the program involves extending network coverage with new cell sites, setting the maximum capital that can be spent on each site can help the program execution team determine if collocations should be a priority, or raw land sites should be allowed in order to optimize the RF design.

Schedule: Defining the schedule of the project not only gives the execution team a clear timeline, it also helps the company

determine how it needs to allocate resources to the program and for how long. Basic questions here are:

- What is the overall timeline for the entire program?
- For key milestones, what are the targets for the current year by geography?
- What are the quarterly targets for the next smaller geographic division?

Be specific. Setting overall, annual and quarterly objectives helps the management team monitor the overall progress of the program. It also enables the program management team to see trouble spots and undertake corrective actions to keep the program on track. Having SMART objectives related to schedule, coupled with good tracking and reporting is critical for timely risk identification and effective mitigation.

Quality: Different network programs demand different kinds of quality measures. Depending on the nature of the program, there may be coverage objectives, network performance objectives, construction quality objectives, etc. As such, detailing what types of quality measures are required further defines the program and ensures that expectations are realized and overall program goals are achieved. The basic questions to address in defining quality objectives are the following:

- What are the network coverage objectives? Adequate coverage may be all that is needed for designing a roaming overbuild program, while getting more capacity or higher quality to an urban corridor may require stronger coverage.
- What are the yardsticks of quality that will be used to measure acceptance of contractors' work?

What are the network performance metrics that must be met, such as successful call attempts, dropped calls, voice quality, data speed, etc.? As with other objectives, define the quality requirements explicitly and quantitatively. Define, acquire, develop, or otherwise provide the tools that are necessary for clearly measuring performance against these expectations.

Defining goals and SMART objectives are just the beginning. Effectively communicating those goals and objectives to everyone involved in the program, from internal management and staff to outside contractors, will be essential to achieving the desired results. Similarly, putting in place the proper people, systems and data management methods, as well as mechanisms to measure the program along the way, will help ensure that the project comes in on time, on budget and with quality.

People, Systems and Data — The Who, How and What of a Successful Program

The initial stage of a major network build-out or deployment should identify the people, the systems and the data that will be needed to successfully complete the project.

People: People are your No. 1 key to success. Choose the best people for the job. Identify and install the specific individuals who have the knowledge, experience, skill and respect of their peers to lead the program. If you don't have the talent inside the company, go outside. If the talent is engaged on other programs, free them from less critical responsibilities and enable them to dedicate their attention to the more critical program. If you want success, you've got to put the right people in place.

Put enough resources on the program to ensure its success – and do so right upfront at the beginning of the program. Be careful

not to underestimate the size or complexity of a program. There is only so much any one individual can do effectively. If you don't resource the program sufficiently, the program will fail to meet the schedule, cost and/or quality objectives, and perhaps even the overall goal. If you put your best leaders on the program but don't support them with sufficient staff to execute the program well, you will undermine and burn out your best people, and eventually lose them from the company.

Given the complexity of network project build-outs, it is imperative the various groups assigned to the project function as a single team. It's extremely important in a program that requires the participation of multiple functional groups for those groups to not isolate themselves into their own respective units focused solely on their tasks, but rather to identify with the larger cross-functional team that collectively is responsible for achieving the program goal. Each sector within the team needs to recognize and understand the interdependence of the various groups, and identify ways they can refine their contribution to help other groups achieve their responsibilities more quickly, effectively and/or inexpensively.

Systems: Think of systems in a holistic sense. Systems include all of the processes, tools and mechanisms that must be employed to ensure a program's success. Systems that should be defined, designed, developed, implemented and monitored include:

- Guiding strategies
- Specifications and standards
- A plan of record
- Change control
- Processes
- Tools
- Tracking and reporting
- Communication mechanisms

Guiding Strategies can be both high-level guidelines for how a program should be executed, as well as detailed roadmaps for how specific objectives will be achieved. At the highest level, guiding strategies should help define the key objectives around cost, schedule and quality discussed earlier. For example, a guiding strategy to deploy equipment from a new supplier because of some technical innovation with that supplier would help define a surprisingly low-cost objective. At a lower level, the guiding strategies define specifics by which certain objectives will be achieved. For example, in a program to build out new geographic coverage, the RF design guidelines should be spelled out explicitly and then applied consistently. In another example, regarding cost objectives, the program team might determine that certain surplus equipment is to be used to further reduce costs. In all cases, the key strategies should be spelled out in clear, unambiguous fashion.

Specifications and Standards must be defined for critical elements of the program. These should include not only the relevant, detailed, technical engineering specifications (whether for coverage, capacity, or quality), but also the construction, implementation and testing standards by which work is to be performed, checked and approved. These specifications and standards are your assurance that everyone will achieve exactly what the program set out to achieve.

A Plan of Record (POR) defines exactly what is to be done,

by when, at what cost. It defines the specific sites to be built, enhanced, or otherwise addressed (the "what"). It defines the schedule (the "when") on a site-by-site basis by which the program should be executed and completed. And finally, it defines the capital and expense budgets (the "cost") as well as the timing of associated expenditures.

Change Control is a process by which changes to the program can be requested, considered carefully for their impacts, and good decisions made. A simple change control process should be explicitly defined and communicated. It should spell out how change requests are to be submitted, how they will be reviewed, and by what criteria they will be judged. A small change control board should be identified and consist of a well-respected subject matter expert from each of the critical functions involved in the program (for example, from the relevant engineering team, the finance team and the implementation team). Then, when change requests are submitted, the change control board must review the request and supporting information promptly, and make a definitive decision. Change requests that affect the overall program schedule, budget or quality should be reviewed and decided by the executive sponsor. Decisions and supporting rationale then must be communicated quickly and effectively to all impacted and interested parties. This will ensure everyone stays on the same page, keeping the program moving quickly and smoothly.

Processes must be defined, tested, refined, communicated and monitored. They represent how things get done quickly, smoothly and most efficiently. A big part of this is defining who is responsible for what. For the management and staff within the company to the external contractors and suppliers, the program team must clearly define roles and responsibilities for every aspect of the program. Use process flowcharts to map out exactly what needs to be done, by whom, how and when. Use RACI matrices to clearly define who is responsible, accountable, consulted and informed. Those who are leading the project need to know their responsibilities, while others need to be accountable for certain deliverables, play a consulting role or just be kept informed. Give ownership of various components of the project to particular individuals within the team. This leads to accountability, which in turn sets up the individuals and their teams for success. Ferret out dependencies and roadblocks that must be addressed to ensure that the processes will yield the desired results. Identify gaps and weaknesses in the processes, and then define and implement appropriate mitigating strategies.

Tools include all of those things that equip and enable your teams to successfully accomplish a program. It includes the software programs, the training and the support needed by the people involved in the project to do their jobs well. It includes the process documentation, the job aids, and the feedback mechanisms on how the project is progressing. People must have quality tools to do quality work. The program leadership must take the time to clearly identify and then provide all of the tools their teams need to do excellent work.

Tracking and Reporting is the key to knowing how a program is progressing and whether it is on track to achieve the program goals and objectives. The program team must develop a plan for tracking and reporting. The team must identify exactly what needs to be tracked, who will track it and how. They also must provide the tools and mechanisms to enable effective tracking. They must define and develop the critical reports that will clearly illustrate the progress that is or

is not being made. Status reports at regular, frequent intervals are imperative for ensuring the program stays on schedule, on budget and continues to meet quality specs. Specific reports should be developed not only against the overall program goals, but also against each of the cost, quality and schedule objectives. The program leadership should clearly spell out the schedule by which tracking is to be done and reports are to be generated, as well as how reports will be distributed to and by what means. This tracking and reporting must be sufficiently frequent and timely to ensure that trouble spots can be identified and the course corrected where necessary. This is the only way you will know you are on track to achieving the overall program goals and the individual cost, quality and schedule objectives. Indeed, tracking and reporting will be your key to knowing that the proper people, systems and data are in place and making the program a success.

Communication is critical to program success. In fact, the need for clear, frequent, effective communications cannot be overemphasized. The program team must communicate up, down and sideways. The communications up are to executive management with regular program summaries and status reports. The communications down are with the program team on topics surrounding the daily execution of the program. The communications sideways are with all the functional groups (internal groups as well as outside contractors) that have team members working on the program.

The program leadership should develop a communications plan that comprehensively describes the nature of the communications in all three directions. This plan should spell out the content, the schedules, the distribution mechanisms, the authors and the recipients for the key types of communication. Communications within the program team will be more frequent and detailed than communications with executive management. Some communications will be status reports distributed automatically via e-mail or made available online for pulling at will. Others will take place in regularly scheduled conference calls. Others will be made in ad hoc or specially called in-person meetings. Also be sure to provide for two-way communications, encouraging input and feedback, and adjusting the program as good ideas and new information come to light. A program team will be most effective if they develop a comprehensive communication plan, create the necessary distribution mechanisms and schedules, and then adhere to the plan as defined.

From the top to the bottom and back to the top, communications must be clear, frequent and on target between all parties that have a stake in the program. It will ensure that everyone understands the goals, the objectives, their individual responsibilities and progress of the program.

Data: The third critical element in superior program management is data. In large, complex network build-out or deployment programs, accurate, up-to-date data is essential for knowing exactly what needs to be done, and for knowing how the program is progressing. Given the nature of a particular program, including its goals and objectives, the program team must first define the critical data elements. Then they must define who will be responsible for gathering, maintaining and managing the data, as well as the systems and processes that will be required to ensure the data is accurate and up-to-date.

The importance of quality data cannot be understated. All of the program reporting that clearly communicates what needs to be done, as well as progress against the program goals

and objectives, depend on quality data. Effective program management cannot happen without quality data. Take the time to understand the data needs, apply the right resources, and invest in the data management systems that will enable your program to be a success. Ask tough questions. Zero in on what is critical to a fast, efficient, quality execution. For example, ask questions such as these:

- Does everyone, staff and vendors alike, have online access to accurate, up-to-date site configuration information?
- Do they have online access to site drawings, permits, checklists, test results, and other critical documents?
- Do they have both read and write access to workflow data such as milestone dates so that the status of the program can be managed in real time?
- Does your project management system provide for easy review, approval, and tracking of work requests?
- Do your vendors have access to reference existing site documents and upload new and revised documents?
- Does your site management system give you version control and history so that earlier documents/versions can always be protected and accessed?
- Does your workflow system have access control so different classes of users have access (read, write) appropriate to the work they are responsible for?
- Does your system track who changed the data in each field in order to help the team maximize accuracy and integrity?
- Does your system provide you with real-time graphical dashboards for project and management reporting?

If you don't have the systems that will enable your team to execute properly, then acquire them. It is an investment that will pay off manyfold, not only in facilitating a successful deployment, but also subsequently in operations, administration and maintenance.

Summary

Network build-outs are complex endeavors that require cross-functional coordination, and efficient execution by many parties within the carrier and by key outside suppliers. Successfully managing a network build-out is much like orchestrating a concert. Each individual musician must be reading from the same sheet of music, and following the lead of the conductor to achieve the maximum performance. Superior program management conducted by a skilled program leader can be the music score and conductor in achieving maximum success building your network.

Wireless carriers that take a disciplined and comprehensive approach to program management are the carriers that will achieve the greatest success. First, they create a foundation with a solid business case, a declared executive sponsor and highly skilled, experienced program leadership. Second, they clearly define and communicate the goals and objectives. Third, they put the right people, systems and data management in place. Remember, people are your No. 1 element of success; put highly skilled program managers in the leadership positions. Then support the program team by providing all of the systems that will ensure success, including the guiding strategies, standards and specifications, plan of record, processes, tools, tracking, reporting, communication mechanisms and the means to ensure quality program data. Taken together, these steps ensure success!