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SOLUTIONS

Agile Wireless Deployment:
Ultimate Efficiency Through Cross-Functional Teams & Adaptive Practices

Learn about the benefits of an Agile framework for deploying wireless coverage and capacity solutions for your Customers.

ABSTRACT

Innovative software developers rely on an adaptive set of principles to develop and build applications with the goal of bringing products to market more rapidly. Known as Agile Software Development, this approach relies on incremental development, collaborative efforts, cross-functional teams, and expedited delivery of a shippable product. The product is continually refined and improved over time. This Agile approach to development practices is a strategy that wireless network providers should use to most efficiently design and deploy new networks.

A NEW KIND OF MARKET

The life of a wireless services provider was much simpler 20 years ago: A provider could pull multiple levers to differentiate their brand from rivals and retain customers. Many factors were at play:

◆ Different and distinct wireless technology standards, such as CDMA, GSM and AMPS, provided unique service features.

◆ Customer experience was a luxury, rather than a necessity.

◆ Postpaid contracts were the norm among customers.

◆ Device lineups were unique between providers.

◆ Mobile Virtual Network Operator, or MVNO, resellers didn't exist.

◆ Voice technology was the principal offering.

Yesterday's wireless services provider focused mainly on making that call work for just one type of service: voice service. By contrast, the same voice and data networks now support many additional services, including audio, video, social media and gaming. Most of the levers today for differentiating a provider have vanished, because most providers now sell the same type of devices and services. A customer can purchase similar products and plans from multiple providers using the same wireless technology standards (e.g. LTE). Points of differentiation have been drastically reduced.

Today, wireless services providers have just one available lever to set themselves apart from the competition: customer experience. Social networks, like Facebook, Twitter and Instagram, have dramatically shifted the way customers communicate. The exponential improvements in device functionality and the continued investments in end-to-end capacity have opened the floodgates for new services. The customer experience is no longer based exclusively on coverage and call quality, but service-specific speed and network reliability now play an impactful role and must be actively considered by network planners.

Another rising factor adds to the complexity of wireless network planning: the arrival of new types of customers with differing expectations. Once upon a time, all wireless subscribers were viewed as identical in terms of needs and expectations. But in current times it's crucial to understand the various subscriber types that exist and how to strategize for their respective desires. A prepaid user on a network belonging to an MVNO may be more concerned about price than network experience. By contrast, a premium business or video user may be pickier about data speeds than price. The wireless service provider must differentiate users by network customer experience or risk inevitable brand dilution, ARPU[1] erosion, and lower EBITDA.[2]

IT'S NOT EASY BEING THE NETWORK TEAM

Moore's Law – a computer industry theory named after Intel co-founder Gordon Moore – states that over the long history of computer hardware, computing power increases while relative cost decreases, both at an exponential pace. The wireless industry has experienced a similar phenomenon wherein creative marketing campaigns immediately publicize faster networks and customers using bandwidth-hungry services, swallow that new capacity overnight.

While technological advancements have improved the efficiency of data throughput, it's the network

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[1] Average Revenue Per Unit
[2] Earnings Before Interest, Taxes, Depreciation and Amortization

team that wields the greatest influence to improve the customer's experience through its planning, execution, and optimization of solutions. This power does not come unencumbered as the network team also must contend with the most conflicting pressures. Capital resources are funded mostly through profits, which introduces challenges when these same resources are crucial factors in maintaining profits. This challenge can be understood when evaluating a situation where market saturation triggers a price war. Consequently in this situation, budgets decline while demand increases for faster time-to-market network upgrades, thereby introducing conflict between demand and supply.

The traditional approach outlined below does not adequately ease these conflicting pressures and results in a negative impact on the time, quality, and/or cost of network upgrades; therefore, alternative network deployment methods must be considered.

THE SOFTWARE DEVELOPMENT LIFECYCLE (SDLC)

One of the original methodologies employed for developing is the Software Development Life Cycle, or SDLC (Figure 1). It is composed of four key phases:

- ◆ Planning
- ◆ Design
- ◆ Implementation
- ◆ Maintenance

In the typical *Planning* phase, a business owner defines a product's overall objectives. A business analyst then works with the owner to create the product's requirements and establish a release plan based on its features. In the *Design* phase, the development team builds the product based on the established requirements. This often involves several different software teams, each interpreting and fulfilling the
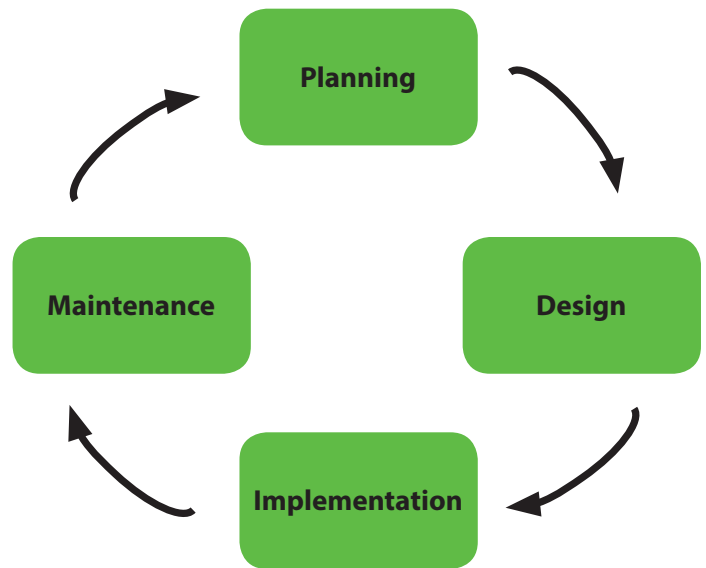

Figure 1: Software Development Lifecycle (SDLC)

requirements associated with their differing areas of expertise. In the *Implementation* phase, the product is tested end-to-end to evaluate all functional aspects. Identified bugs are prioritized and resolved, with some fixes being pushed to future product releases. The product is then released to the customer, and continually assessed via regular *Maintenance* to ensure it meets evolving needs and does not become obsolete.

Traditionally, the deployment of customer experience solutions in the wireless industry has resembled that of the SDLC. Planning tends to be driven at a regional or national level in alignment with the company's objectives. Focus areas and criteria are established and then disseminated to the local markets. The wireless, or RF, engineering group generates a design, which passes through multiple reviews by the real estate, construction, and A&E teams. Once a final design has been reached, the real estate team acquires the lease, the associated permits, and fulfills the zoning requirements. Construction then builds and integrates the solution into the network, ultimately handing it over to the

performance and operations teams and eventually the end user customer.

Within the SDLC, three challenges to successful deployment exist:

- ◆ The time it takes to get the product to market
- ◆ The linear nature of the process used to develop the product
- ◆ The product's ability to meet customer expectations

A software solution's deployment time can range from six months to several years. During this process, solutions may require renewed funding multiple times as they stretch into new quarters or even across fiscal years. With current market saturation, wireless providers are often shifting their focus several times a year as they react to rivals' new products and campaigns. With this fluid change in focus comes fluctuating network priorities. In this atmosphere, solutions not implemented quickly risk becoming outdated and irrelevant.

Because of this linear process and the impact of quarterly goals on the network team, it's common to see the end-of-quarter "hockey stick chart" where several solutions are implemented over just a few days. This causes a resource crunch and can often result in more product defects because solutions are rushed into service and don't receive comprehensive implementation testing.

Another common concern is whether the solution ultimately met the customer's true needs. Due to a company's organizational structures, a solution's planning and design are usually completed with little input from the performance, operations, and sales teams. This leads goals to typically be time-based – that is, getting the solution to market as soon as possible – rather than quality-based. The due diligence of the solution's actual value to the customer is often never being measured.

These concerns within SDLC over time to market, linear progress and meeting client needs hold great opportunity for advancement when alternative deployment models are considered.

AGILE SOFTWARE DEVELOPMENT

In the late 1990s, software developers couldn't move quickly enough. Rapid technological evolution collided with the consumer's growing appetite for software, causing many great ideas to become dated by the time they reached the market. New products were unveiled to customers who had already moved on.

In 2001, a group of software developers collaborated to define new methods that focused on implementing shorter iterative cycle times to build consistently high quality products. The outcome of this work, known as Agile Software Development, has seen rapid adoption within the software development community since its inception. In an Agile environment, the objective is to create shippable products within short development cycles.

This provides the end-user with steady incremental value and the ability to adapt the software product quickly. The primary tools in Agile Development are:

- ◆ Small cross-functional teams, responsible for delivering the final software product
- ◆ Stories and Tests, to spell out and verify a product's function and value to the customer
- ◆ Backlogs and Points, to prioritize the Stories that feed into a product's development
- ◆ Sprints, referring to the incremental product development cycles

◆ Stand-up meetings, where cross-functional team syncs to focus efforts on delivering the product

Small cross-functional teams complete all aspects of product delivery. The team includes a product owner (the customer or a representative of the customer) software developers, and product testers. Collectively, they are accountable for product delivery, without any external support. This team works collaboratively towards the goal of rapidly creating a shippable product.

Stories from a user perspective articulate the function and the value required from the product. Ideally stories are small in scope and can be verified quickly. For example: "As a customer of your online store, I want to save my mailing information for future reuse so that I do not have to enter it again." This explicitly tells the developer the function – "save mailing information" – and the value – "so that I do not have to enter it again." **Tests** are then outlined to verify that the story works once the product is completed. For instance, the following could serve as one of the tests verifying customer's needs have been met: "Enter and save mailing information. Re-login and verify that the information has been saved." There often may be several verifications based on a single story. The story should not be documented through extensive paperwork, but rather, recorded often through spreadsheets based on end user feedback. This tracking method makes it much easier to manage traceability – that is, the link between the story and product enhancements.

Backlogs are the mechanism for prioritizing the order in which stories should be addressed and completed. The backlogs contain the list of stories ranked by their priority. **Points** are typically assigned to each story to denote its priority level, with higher numbers signifying greater importance. During planning sessions, stories will be assigned to development cycles based on size, complexity, and points.

Sprints are the individual product development cycles and typically last from one to two weeks. While technically every completed story results in a shippable product, sprints combine stories into provable incremental results

Week 1	Week 2	Week 3

Sprint 1 → **Sprint 2** → **Sprint 3**

Product:
• Story 1
• Story 3
• Story 4

Product:
• Story 2
• Story 5
• Story 7

Product:
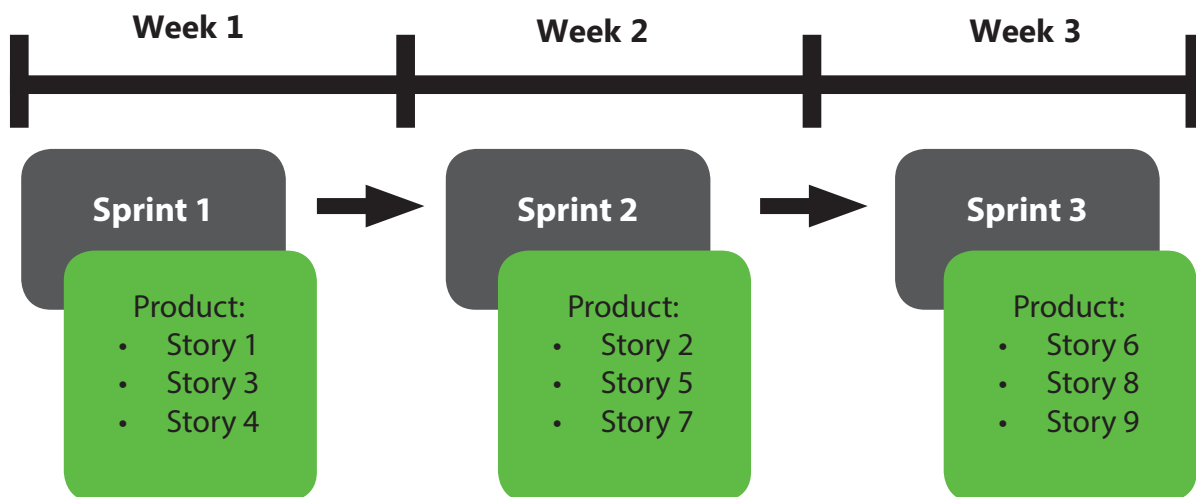• Story 6
• Story 8
• Story 9

Figure 2: Software Development Lifecycle (SDLC)

for the customer while still permitting room for the product to be adapted as needed to a specific needs down the line. Often all needs are not fully understood at a project's onset, but this agile timeline grants the flexibility to address additional needs as they are uncovered.

The cross-functional team uses daily **Stand-up Meetings** to discuss the prior day's progress, today's plan, and the problems identified to date. These meetings are brief – just a few minutes to touch base and focus the team on the current sprint's tactical aspects.

The applicability of this model in wireless network deployments may not seem immediately apparent. The typical stakeholder requires progress documented in quantities of sites or percentages of people (POPs) covered in a specific area where wireless services are available – not "products" in the typical sense Agile Software Development refers to. Permitting and zoning constraints can also raise concerns about the feasibility of delivering a shippable product using sprints. That said, with slight adaptation Agile Development can be successfully implemented in a wireless deployment and yield significant results.

AGILE WIRELESS DEPLOYMENT

One of the greatest challenges facing most product deployments is timely and relevant communications. Deliverables are often handled through multiple vendors, which inevitably leads to "functional silos" wherein communication is stifled. Response times can be lengthy with workflow clogs causing mixed results that often require rework. Applying a cross-functional team structure drastically reduces response times because members are more closely integrated into the deployment process. Defects can also be minimized or resolved more quickly through tighter team collaboration and streamlined communication.

To a certain degree, the concept of stories already are used within wireless companies. For example, engineers provide target areas and descriptions of the coverage they'll require from a given solution. Yet inputs from some of the end customers – such as the performance, operations, and sales teams – are rarely included. In traditional development methods, there is no one to play the role of product manager, assessing overall quality of the solution. Tests are infrequent with no assessment of new network coverage solutions against the value outlined in the customer's story. Leveraging a product manager who works within a cross-functional team and linking customer-based stories to actual tests can result in higher quality, more efficient solutions.

Backlogs, in the form of trackers, are mostly managed through one function, real estate, with priorities set more around schedules versus the solution's overall importance within the network. Using a points-based priority system, the development team can expedite solutions that create the most value and more rapid impact to the customer's overall network performance.

In light of technology advancements, increasing tower company portfolios, and implementation of smaller footprint sites, the site acquisition-related impacts to deployment timelines are decreasing. While tight sprints of less than a few weeks may not be feasible, network deployment timelines can decrease through efforts that efficiently target specific deliverables. Stories may be further divided into internal customer values that step towards the ultimate value: a completed solution that is built in increments instead of built all at once. For example, if each site project were ranked based on customer impact by sales, zoning probability, and constructability, each project would be a unique story to be prioritized appropriately. Value associated with these site factors can be defined, prioritized and assigned as stories to the cross-functional team. These can then be

executed during a sprint, with tests used to verify the value.

Many deployment projects result in update meetings lasting several hours a week. With cross-functional teams many issues can be resolved in real time through the direct relationships among team members. The stand-up meeting then focuses the collective team effort around the tactical plan within the immediate time horizon of the current sprint. This introduces a win-win situation where meeting times decline and issues are addressed and identified in a more proactive manner.

THE AGILE DEPLOYMENT WITH CENTERLINE SOLUTIONS

Due to their complex nature, it makes sense to outsource wireless network deployment projects. This approach lends itself to cleaner capital expenditure (CAPEX)

management. Implementing an Agile Deployment process works best when utilizing a partner that understands and can support all cross-functional deliverables.

At Centerline Solutions, our Agile Deployment Strategy has been used successfully with multiple customers over several years. With technical design knowledge and agile project management, Centerline Solutions has incorporated members from the customer side into their cross-functional teams. This comprehensive perspective enables quick and efficient design and deployment of network technology. With a full suite of in-house services to Design, Build, Modify and Maintain your wireless network, Centerline Solutions can adeptly manage your project needs from end to end using our proven Agile Deployment approach.

Method	Opportunities
Small Cross Functional Teams	Assign a product manager and designate members from real estate, RF/network engineering and construction.
Stories and Tests	Product manager works with internal Customers (corporate/regional, performance, operations, sales) on defining the value needed. Establish measures associated with the value as tests.
Backlogs and Points	Product manager establishes tracker with size of scope and priority (points) to each story.
Sprints	Product manager and team define the duration and associated story assignments for the sprint.
Stand-up Meetings	Daily fifteen minute meetings are used to track progress and manage tactics associated with the sprint.

Figure 3: Agile Tools

The commercial wireless industry is experiencing one of the greatest evolutions since its inception. The combination of rapid growth in wireless data use and convergence of markets and technologies is introducing unprecedented challenges to network providers. To contend with increasing competition, limited budgets, and higher expectations from subscribers, providers must seek innovative approaches to develop high-speed data solutions. Centerline Solutions' Agile Deployment method was created to deploy quality solutions in a faster and more cost effective manner — are you leveraging your networks agile potential?