

White Paper



When Mobility Meets Complexity

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The Challenge Presented by Enterprise Mobility

Businesses today continue to look to the field force for new revenue opportunities and cost efficiencies. To pursue these goals, many organizations are turning to the application of new information technology solutions that address field operations and the needs of mobile workers. These field technicians, service specialists, inspectors, and supply personnel represent the first line of interaction with enterprise assets and customers. Organizations recognize the value in optimizing mobile business processes through technology solutions that can track, measure, and monitor field events, improving work efficiency and visibility. However, the application of technology to the highly-mobile field force has proven to be a challenge, especially in complex environments. Many efforts have failed, resulting in user frustration, technical challenges, and unrealized financial expectations.

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Why do so many enterprise mobility projects struggle? Part of the answer is that technology alone cannot solve many of the complexities inherent within mobile computing. For example, aligning applications with business processes and achieving user adoption present challenges that require a holistic solution approach – one that combines technology, design, delivery methodology, and support.

Another contributing factor is that some organizations find it difficult to leverage existing processes and resources to deliver enterprise mobility, since most IT projects today focus on server-side, Web-based technologies and usage models in which users access software through browsers. These assumptions do not apply for mobile solutions, which must intelligently distribute applications and data, while managing technical complexities ranging from security to communications optimization. Figure 1.0 highlights many of the common barriers to mobile solution success.

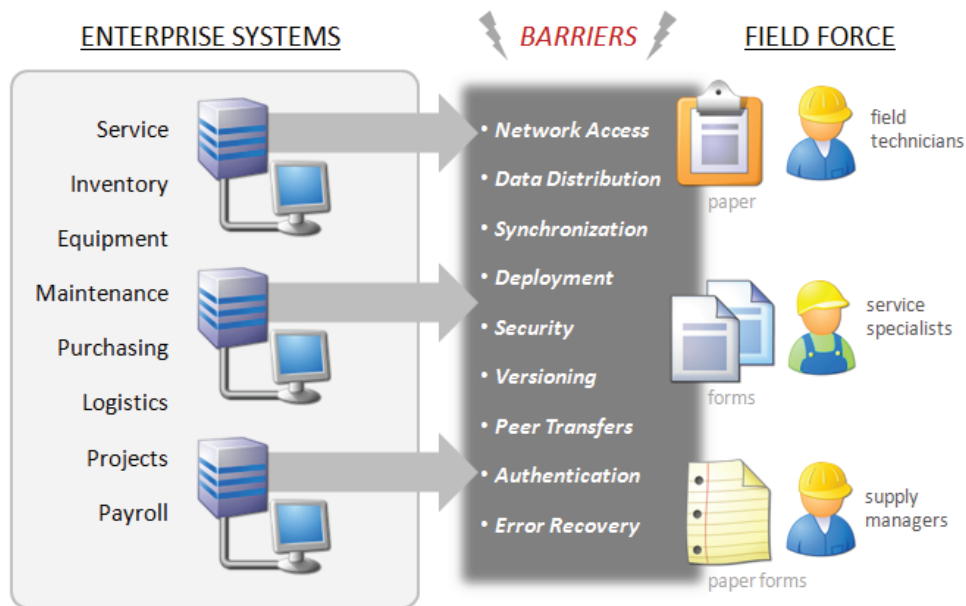


Figure 1.0 - The Challenge of Enterprise Mobility in a Complex Environment

Selecting a Solution for a Complex Environment

Many of the enterprise mobility solutions found in the market today are optimized for a homogenous environment and a low or moderate level of complexity. These solutions can provide a short-term answer for the midsize company or for a department-centric solution. However, the complex, heterogeneous enterprise often presents a unique set of challenges. Some of these are listed below:

- Multiple back-end data sources with distinct data access protocols.
- The need to manage not only structured data, but also unstructured content such as schematics, procedural documents, and field ticket forms.
- A client device mix / roadmap that includes multiple form factors and operating systems, such as rugged handhelds, laptops, and smart phones.
- Application requirements that include not only standard workflows from back-end systems, but workflows executed by the workforce that have no direct analog in the back-end.
- Multiple business divisions with common and unique technical and functional requirements.

Traditional approaches to address these challenges have come in two primary forms. One commonly-considered option is the *development-centric mobile platform*. In this category, products are designed to ease the programmatic burden of developing *mobile software applications*. Another category, mobile application extensions, includes products that deliver specific solutions for specific back-end data sources, such as a single ERP or EAM system. Table 1.0 describes these approaches, as well as some of their limitations for the complex enterprise.

Category	Description	Limitations in Complex Environments
Development-Centric Platforms	Products that incorporate middleware as well as configuration tools to assist in the technical development of mobile applications. Tool support is generally strong, as well as platform support.	With an open-ended application approach, products offer little-to-no support for functional solutions, or for a general solution workflow. Customer IT departments should be prepared to invest significant resources for solution development, as well as ongoing support and evolution.
Mobile Application Extensions	Products are optimized to extend the capabilities of specific back-end systems. Often with a common framework layer to introduce technical standards, these extension-based platforms work closely with systems like SAP®, Oracle® Applications, and IBM Maximo®.	These products can struggle to function effectively as a standalone system in front of multiple back-end systems, or to support independent mobile workflows. Due to their alignment with specific systems, application features and integration techniques can be rigid and inflexible.

Table 1.0 - Traditional Mobile Software Options

These conventional solutions can prove adequate as a stop-gap solution for some environments, but the risk profile is increased when they are applied to more demanding operational environments. The following section describes many of the risks that prospective buyers should analyze before beginning an enterprise mobility initiative.

Common Risks when Enterprise Mobility Meets Complexity

Product and technology limitations are amplified when confronted with complexity. In the world of mobility, these limitations are further aggravated by non-standard device platforms and a lack of continuous, high-bandwidth communications.

These limitations translate into project risks, which must be managed with proper technology selection and thorough implementation methods. Table 2.0 highlights a few of the most common risks inherent to enterprise mobility projects.

Risk	Description
Lack of user adoption	Applications are inflexible and designed to conform to back-end data structures rather than mobile business processes. Solution providers lack usability expertise, or they fail to focus on usability as a primary success criteria.
Slow time-to-market	The application configuration process often represents the tip of the iceberg. Many projects are slowed by complex integration tasks or unplanned compatibility issues with hardware or networks.
Products are difficult to manage by customers	The software requires excessive development resources and esoteric skill sets for ongoing support of applications and/or integration logic. Customers struggle to take ownership of the ongoing configuration and evolution process.
Solution designed for today but not tomorrow (lack of future-proofing)	The solutions are difficult to iterate, based on changing work process needs. Also, solutions map to the technological landscape of today, without adequate consideration for trends and future developments.

Table 2.0- Common risks of enterprise mobility initiatives

These risks apply to enterprise mobility solutions implemented by end-customers as well as those delivered by technology solution providers such as large-scale integrators. They have inspired many thought-leaders in enterprise mobility to seek a new approach to product sets and solution delivery. The following section describes one specific approach that strikes a balance between packaged solutions and a development platform – the *field mobility* system.

A Balanced Approach to Mobility - The Field Mobility System

Each of the traditional options for enterprise mobility has achieved some level of adoption in today's fragmented mobile market. Recently, an innovative and pragmatic approach is emerging that challenges traditional models and provides customers with unique results. This new approach builds on the platform concept, but adds a functional solution layer and full-lifecycle workflow support. The end result is a *solution-centric* software framework that delivers mobility as an enterprise system.

“We think of this type of software as a *field mobility system*,” according to Mike Loos, CTO for @hand, a leading solution provider embracing this philosophy. “Our software balances the need to be open and flexible with the need to provide business value out-of-the-box,” according to Loos. “We also recognize the value of delivering mobility as a self-sufficient system, since it is increasingly apparent that mobile business solutions should emphasize the worker's job process, rather than the data structures of any specific back-end system.”

Delivering mobility as an enterprise system is especially valuable to businesses with complex field operations. In these environments, development-centric tools can require an overwhelming amount of IT resources. Moreover, extension-based frameworks struggle to optimize connections to the broader multitude of back-end data sources. “A field mobility system differentiates from alternatives by making a lot of decisions for you in terms of what the core system does, but providing an open enterprise framework to allow customers to determine how it does it,” said Loos.

Solution providers such as @hand are leveraging this field mobility system design to offer a new set of capabilities to the enterprise. Figure 2.0 represents the opportunity to strengthen the connections between the field force and central enterprise data.

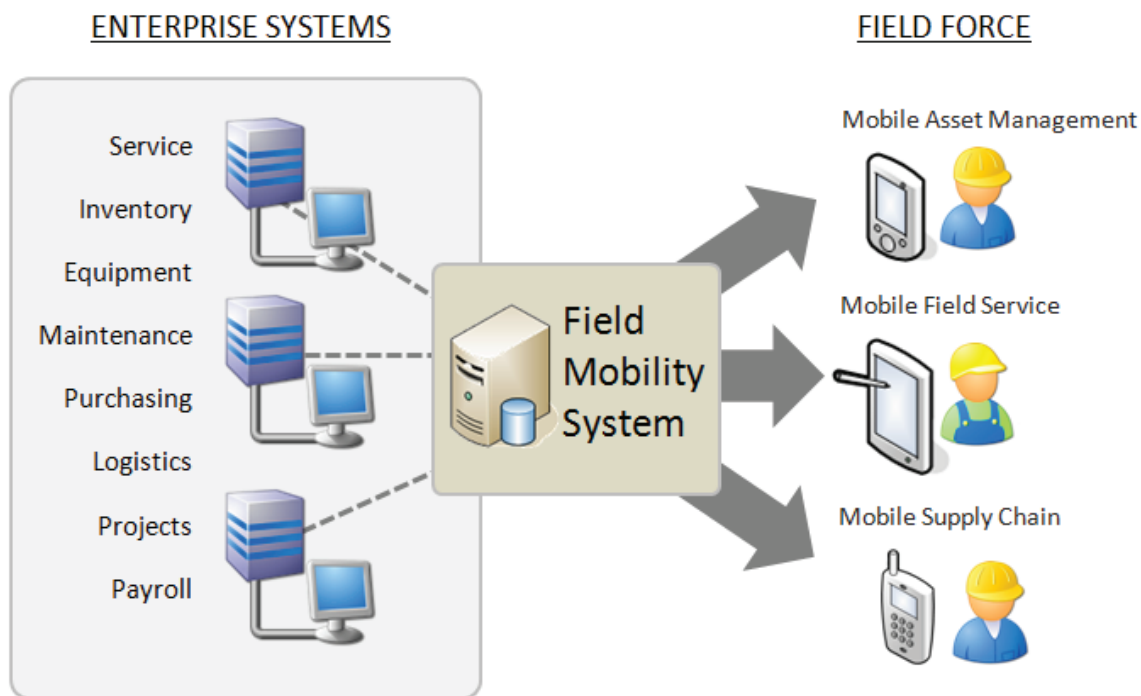


Figure 2.0 - The Field Mobility System Connects the Field Force to Enterprise Data

Field Mobility System Capabilities

A field mobility system combines common solution workflows with a comprehensive mobility architecture, delivering *unique* system capabilities. The result is an enterprise mobile software framework that offers a balance between solutions and technology.

With baseline solutions and workflow engines for a variety of field service, asset management, and supply chain scenarios, a field mobility system is designed to embrace environmental complexity and deliver application simplicity.

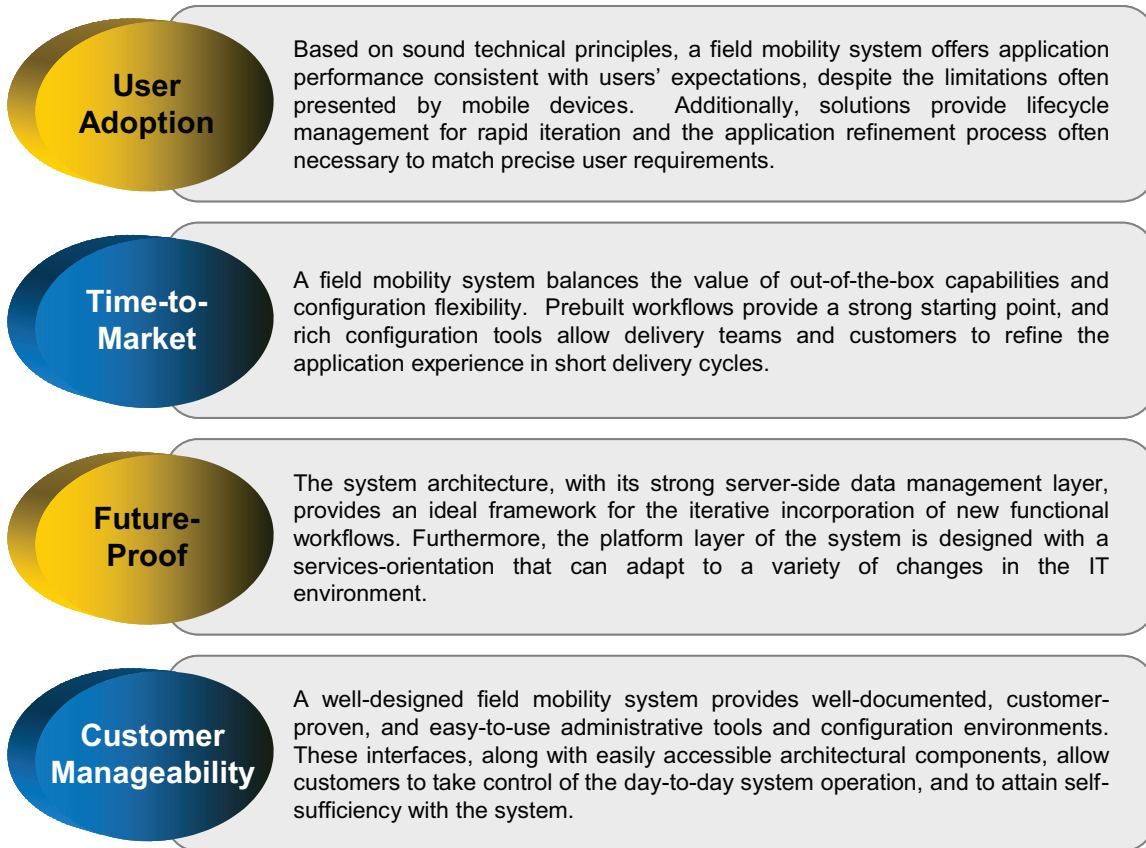
At the core of a field mobility system is a robust mobile architecture, which manages infrastructure processes such as data synchronization, application deployment, and device profile management. The architecture also includes a configuration environment with code-free development options. An open framework provides compatibility with peripheral mobile and wireless technologies, including barcode scanning, GPS/GIS, electronic signatures, and RFID.

The following capabilities highlight many of the advances introduced by the field mobility system, in contrast to traditional approaches to mobility.

- **Independent Workflow Delivery:** Along with workflows delivered as extensions from back-end systems, a field mobility system can integrate self-sufficient and independent workflows. A robust, server-side workflow engine is available to manage the lifecycle of each independent process.
- **Field Mobility Dashboard:** With a web-based management console to view and manage time-sensitive mobile activities, a field mobility system provides a dedicated interface for field operations to view and manage field work.
- **Mobile Document and Signature Management:** A field mobility system manages not only structured data for database tables, but also mobile documents and signatures. Users can retrieve documents on mobile clients, as well as offer electronic signature capture and digital signature protection with PDF integration.
- **Self-Sufficient System Architecture:** True to the emerging enterprise software standard, a field mobility system offers applications as a platform. Application features reduce development work and technical complexity, while platform capabilities provide an extensible architecture to configure, customize, and evolve solutions.
- **Optimized for Integration to Multiple Systems:** Any well-designed mobile software product has the ability to interface with multiple back-end systems. However, a field mobility system is *optimized* to serve as a hub for multiple integration points, with an independent server-side data-store and workflow engine. This design offers a high level of resiliency to future changes in technology and in business processes.

Translating Risks into Technological Advantages

The field mobility system approach is uniquely designed to manage the risks inherent within a complex environment. The following points describe the approach to risk management in each of the previously identified risk areas.



Because the architecture of the field mobility system offers the opportunity for high value with low risk, it is attractive not only to end customers, but also to IT solution providers that offer mobility solutions as a practice. One such organization is Infosys, one of the leading global technology service providers.

Business Solutions and Benefits

A field mobility system can deliver a variety of mission-critical solutions for the complex enterprise. The system can be deployed as a targeted application for a single department, or as a strategic enterprise framework to support a variety of cross-functional applications. Solution examples include:

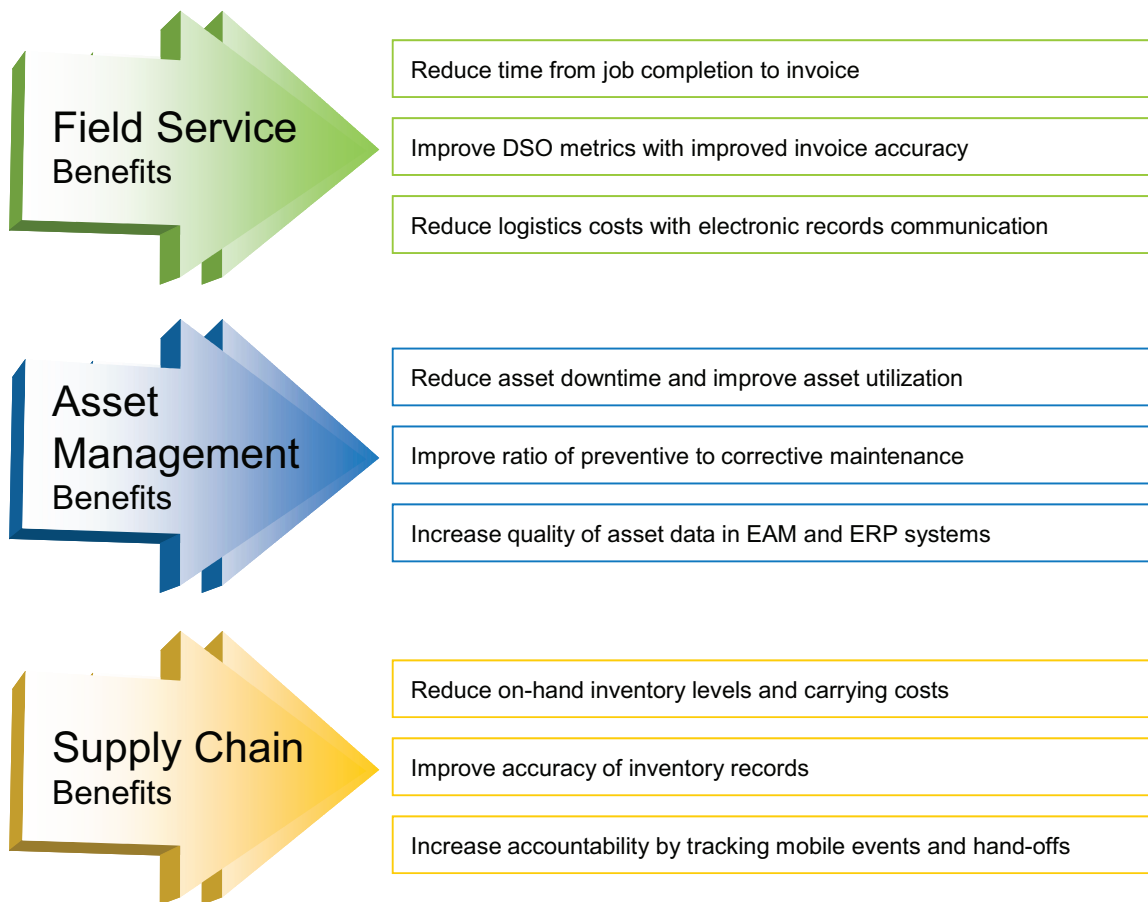
Solution	Features
Field Service	Sales order updates, field ticket processing, job logs, tool tracking, electronic signatures, digitally-secured signatures.
Asset Maintenance	Work order updates, time & labor capture, parts tracking, failure reporting, work requests, equipment location verification.
Inventory Management	Supply receipts, material tracking, physical inventory counts, deliveries, order-picking, e-signatures.
Equipment Operations	Operator rounds & readings, clearances management, lockout-tagouts, permits management.

A field mobility system also serves as an ideal framework to deliver custom enterprise applications. With state-of-the-art design tools and a robust infrastructure, the system allows solution teams responsible for custom applications to focus on business logic configuration, rather than low-level technology.

Business Benefits

Before starting any field mobility initiative, organizations should confirm their business objectives. If mobile solutions are implemented properly, these objectives will translate to tangible business benefits and financial impact. Commonly-recognized benefits include a reduction in manual processes, reduced logistics costs, and improved workforce efficiency. Strategically, success with field mobility solutions should deliver broad-ranging benefits including mobile process optimization, enhanced decision-support, and improvements in support of *total work visibility*.

Field mobility systems, as delivered by solution providers like @hand and Infosys, have been documented to deliver operation-specific benefits including:



These benefits allow field operations teams to run more efficiently and empower management with new abilities to allocate resources and deploy new business strategies. “For almost any service-oriented organization, accelerating the average time-to-invoice metric by 4-5 days can produce an immediate financial impact. For large organizations, this is especially true,” said John Cannington, CEO for @hand. “In addition, we have observed and measured significant improvements in preventive maintenance objectives, regulatory compliance, and workload planning.”

All of these benefits contribute significantly to financial results and the bottom line. According to Cannington, “it is because of this unique value proposition that field mobility solutions represent one of the most significant and quantifiable enterprise optimization opportunities of this technology generation.”

Strategic Outlook

With early-adopting customers experiencing meaningful benefits, global IT services providers such as Infosys recognize an increasingly attractive opportunity to develop centers of excellence based on this approach to field mobility.

“In today’s economy, the business impact is the driving factor in determining the success of a project,” according to Aashish Bansal, VP of Oil & Gas for Infosys. “Infosys has experienced first-hand the advantages of a field mobility system compared to the traditional mobile platform. With a field mobility system, our customers benefit from a strategic enterprise framework that provides tangible business value in a short time frame, and it delivers the high level of user adoption that is so critical for long-term success.”



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