



**AN EVOLUTION IN SAP®  
WAREHOUSE MANAGEMENT;  
CHOOSING THE RIGHT  
APPLICATION**



# AN EVOLUTION IN SAP® WAREHOUSE MANAGEMENT; CHOOSING THE RIGHT APPLICATION

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## About the Author

InfoLogix has been a recognized enterprise mobility leader since 2001, serving both the healthcare and enterprise markets. InfoLogix helps break your most difficult productivity barriers, by working with you to mobilize your business by providing industry expertise, process knowledge and mobile infrastructure services to help you achieve new levels of customer care, productivity and profitability.

With more than 2,200 customers InfoLogix, an SAP® partner, focuses on Logistics Execution Systems (LES) and Supply Chain Execution components of the SAP application suite. InfoLogix is fast becoming a recognized industry leader in warehouse management and SAP R/3 implementation consulting. Our SAP consultants share a wealth of experience and knowledge when it comes to designing and implementing world class SAP Logistics and Supply Chain solutions to enable organizations to gain operational efficiencies and reduce and manage the costs related to supply chain operations, with noted expertise in SAP's Logistics Execution System (LES), Warehouse Management (WM), Extended Warehouse Management (EWM) and Task and Resource Management (TRM).

In addition, InfoLogix's SAP consultants were key players in SAP's internal, pre-release testing stage for TRM and EWM in Walldorf, Germany and successfully rolled out TRM to an R/3 Enterprise ramp-up customer. InfoLogix's consultants also played an integral role with pre-release testing of SAP's native radio frequency data collection product, SAP Console.

Our in-depth expertise of SAP LES and EWM products and functionality—along with our close relationship with SAP provides us with an intimate knowledge of the development vector SAP is applying to the LES and EWM product suite. This allows us to advise customers on strategic operational decisions, provide them with detailed information on key integration points and quickly assist them in identifying fit/gaps with current and future release levels.

## Executive Summary

This white paper is designed to give warehouse operations managers and IT managers a useful framework for understanding SAP's newer Warehouse Management application functionality. It will also assist companies in understanding which WM application to select when it comes time to upgrade their SAP environments.

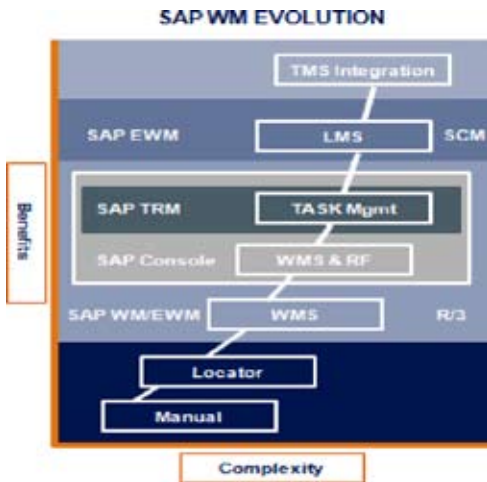
The paper includes the following information:

- What does the evolution of SAP WM look like?
  - A brief recap on past and future functionality for SAP's WM application.
- What is some of the newer functionality that SAP WM has to offer?

- With the advent of TRM and EWM, the functionality within the WM application has been vastly improved. Capabilities such as cross docking, dynamic cycle counting, slotting, labor management, yard management and task interleaving are now standard functionalities within particular releases.
- Which WM solution is right for you when it's time for an upgrade?
  - When it's time to upgrade your R/3 system, a comparison chart on some of the newer functionality and release information Will help you to make a more informed decision.

## What Does the Evolution of SAP WM Look Like?

SAP has come a long way in the warehouse management application since its release of the R/2 product. A brief evolution is below:

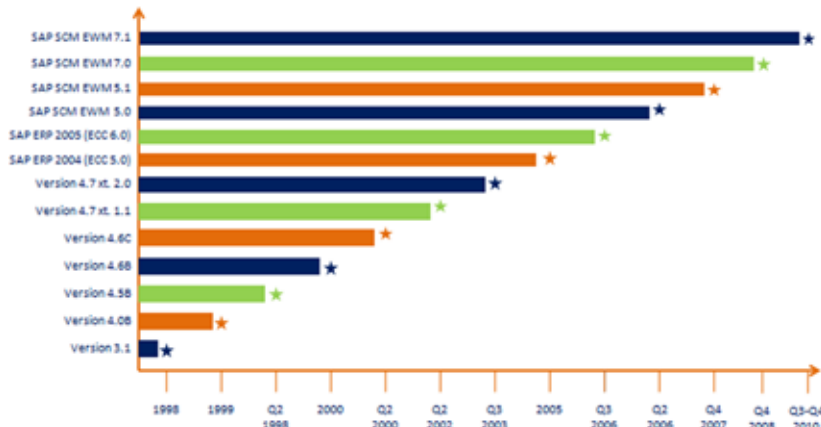


## SAP RELEASES BY DATE

### R/2

1990's.....WM was a sub-module within the R/2 system (strong locator system, but not a robust WMS)

### R/3



### **Functionality built within SAP WM 3.X included the following:**

- Storage and Facility Management – manage different batches, stock types (vendor consignment stock, own), and stock status (quality, unrestricted)
- Warehouse Structure – basic building blocks of the warehouse (storage type, storage sections and bins)
- Stock Management – mixed and homogeneous storage possible
- Material Master Data – addition of WM fields in MM views
- Units of Measure – WM unit possible at WM level
- SLED
- Posting Changes – material to material, stock status to stock status
- Transfer Requirements/Transfer Orders – See Appendix A
- Ability to Post Stock Differences –upon putaway only
- Fixed Bin Replenishment
- Putaway Strategies
- Picking Strategies
- Storage Unit Management
- HAZMAT
- Inbound Material Processing
- Internal Movements
- Outbound Material Processing
- Physical Inventory
  - Annual
  - Continuous
  - Cycle Count
  - Zero Stock Check
- Basic Reporting
- Authorizations
- Archiving
- Interfaces Available to External Systems (i.e. RF devices)
- User Exits Available

**Functionality built within SAP WM 4.0 included the following:**

- Lean WM
- New Org. Structures such as gates, picked items zone, and pick area
- Capacity to search up to 30 Storage Types (previously 10)
- Number of Storage Unit Types increased to 30 (previously 10)
- Number of Storage Sections searched increased to 30 (previously 10)
- Up to 99 items can be managed in a bin with Putaway strategy P (previously 14)
- More than 1 storage location can be warehouse managed under the same warehouse number (previously only 1 warehouse per storage location and plant was manageable).
- Pick strategy performance enhanced (active capacity check)
- WM unit of measure possible at material level
- Enhanced stock search (i.e can search own stock before vendor consignment stock)
- Enhanced storage section search capability
- Create TO for GR from Return Stock functionality
- Customer Exit available for Replenishments
- Planned TO times – used for the basis of workload calculation and incentive wage
- TO Splitting – balance workload between users
- Ability to change a TR
- Ability to process posting changes completely in WM
- Enhanced putaway strategy K and Bulk putaway (ability to block from further stock placements to ensure FIFO)
- Ability to process QM samples in the background
- 2 Step Picking
- Enhanced strategy M through rounding quantities on the material master
- +++ calls a customer exit for Stringent FIFO
- Pre-picked shipping units
- Free Packing
- Planning and Monitoring Tools
- Picking Waves
- Rough Workload Estimator
- WAM (warehouse activity monitor)
- Physical Inventory Changes – monetary limits can be set for recounts
- Quantity reduction
- Display material texts with Release Order Parts Staging

**Functionality built within SAP WM 4.5A included the following:**

- New component added (LES) vs. WM
- dWM (Decentralized Warehouse Management) available
- KANBAN capabilities
- Destination bin changeable upon putaway TO confirmation
- Ability to close out TR's (i.e. set delivery complete)
- TO processing comment added
- Basic pre-allocated stock cross docking (hot list)
- Inbound delivery becomes available
- Ability to putaway stock that was incorrectly picked on a delivery
- Enhanced picking reports
- Enhanced HAZMAT processing
- Physical inventory enhanced – inspection lot processing

**Functionality built within SAP WM 4.6A/B included the following:**

- Ability to suppress differences in confirming TO's
- Two-step TO confirmation possible
- Native RF capabilities
- RF Monitor available
- Enhanced dWM capabilities
- Use of Enjoy transactions (LS01 to LS01N) make transactions easier to use
- Reports converted to ABAP List Viewer (ALV) – gives the user the ability to sort, sum, etc.

**4.6C included the following:**

- Added additional SAP console (RF) transactions and fixed many bugs
- Ability to create a replenishment TO automatically
- Handling Unit Functionality
- Physical Inventory Changes – counting at quant level possible
- Basic interleaving possible
- Enhancements to dWM – posting changes initiated from dWM, delivery split
- Proof of Delivery functionality
- Packing Station

**Functionality built within SAP WM 4.7 xt. 1.1 included the following:**

- 1 TO possible for multiple deliveries
- Partial GR for an IBDN possible
- TRM (Task and Resource Management) introduced
- Data changes to dWM can be timed

- Several ERP systems can be tied to a single dWM instance

**Functionality built within SAP WM 4.7 xt. 2.0 included the following:**

- Support for DSD (Direct Store Delivery)
- Planned and Opportunistic Cross Docking functionality
- Value Added Services
- Yard Management
- Dynamic Cycle Counting
- TRM enhancements (Log monitor, capacity checks at the node level)
- RF serial number capture possible on the Delivery

**Functionality built within SAP ERP 2004 (ECC 5.0) or SAP ERP 2005 (ECC 6.0) includes the following:**

- Advanced Transportation Planning and Vehicle Scheduling using APO
- Direct Store Delivery enhancements
- Archiving enhancements
- Progress Confirmation of jobs (background status update every 30min, foreground every 10 seconds)
- WCU (Warehouse Control Unit) – controls automation of warehouse devices; optimized when used in conjunction with TRM

**Functionality built within SAP SCM EWM 5.0 included the following:**

- Slotting
- Rearrangement
- Transportation Cross Docking
- Tight EH&S Integration
- Enhanced Customer Returns – requires CRM
- Kit to Order – requires CRM
- HUM activated at the Storage Type Level
- Serial Number Enhancement – can track SN to a bin without needing an HU
- Storage type and section now 4 digits
- Bin name is now 18 digits
- Material Flow Systems support

**Functionality built within SAP SCM EWM 5.1 included the following:**

- Labor Management
- RFID enablement
- YMS Enhancements
- Kit to Stock

- Goods Receipt Optimization
- Batch Management Enhancements
- Production Integration Enhancements
- Serial Number search capability enhancement
- Catch Weight Support
- More Robust Material Flow Systems support
- Functionality built within SAP SCM EWM 7.0 includes the following:
  - Production Supply
  - Opportunistic Cross Docking
  - Graphical Warehouse Layout
  - Resource Management

**Functionality built within SAP SCM EWM 7.1 will include the following:**

- Integration to SAP ERP Transportation (LE-TRA)
- Enhancements for Return Logistics

## **What Is Some of the Newer SAP WM Functionality?**

### **Task and Resource Management**

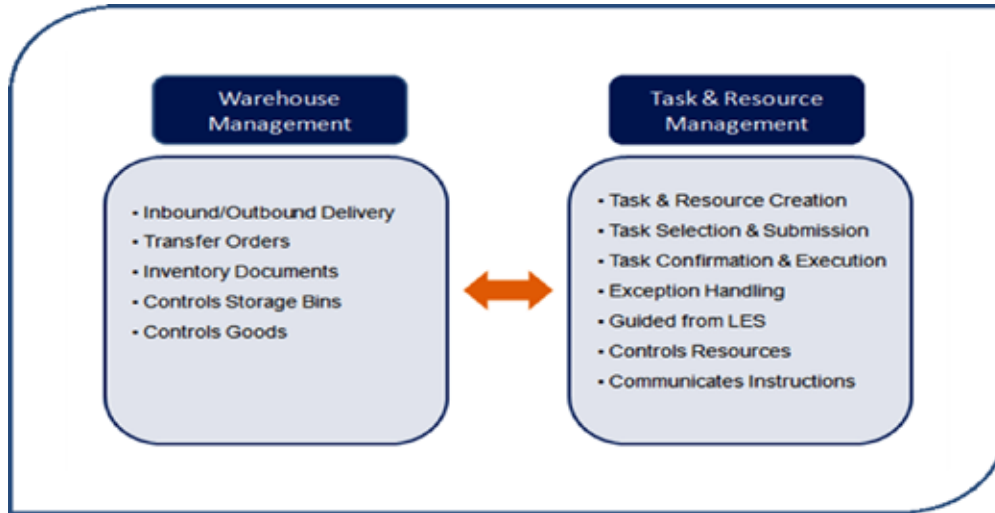
As of SAP release 4.7, TRM strengthens and completes the LES/WM solution by optimizing material flows via task execution and resource deployment. TRM breaks down material movements to a task and resource level and optimizes the sequence in which they are executed, ensuring that the right task is completed by the best resource at the most optimal time.

TRM helps you to manage your warehouse processes more efficiently because it achieves an unparalleled degree of process visibility within the system by tracking any activity performed on the warehouse floor.

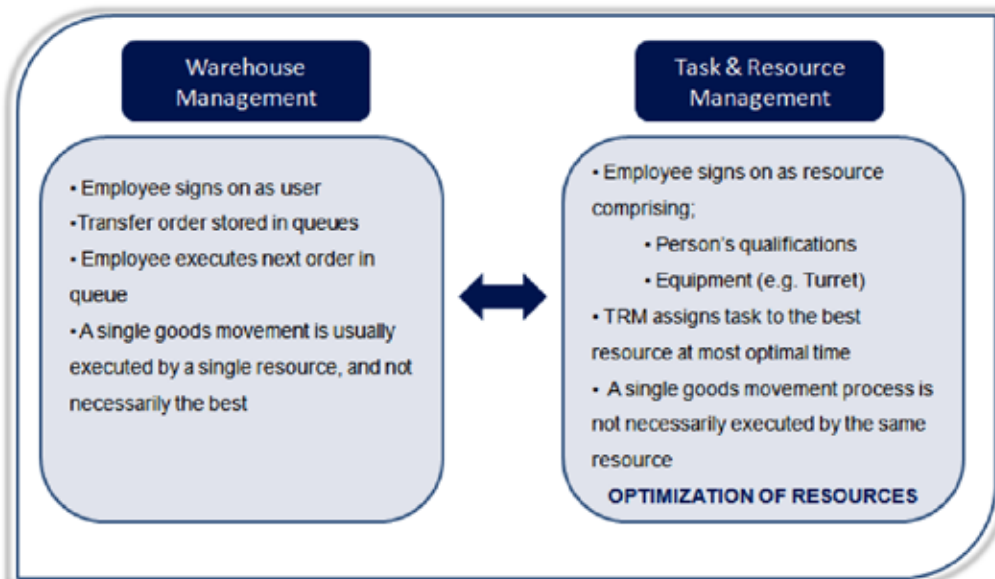
TRM uses a systematic model of the warehouse's physical layout to deploy resources according to the actual workload, the resource's qualifications and the current geographic positions of the resources. The efficient deployment of resources contributes to a considerable reduction of costs in material handling.

## SAP LOGISTICS EXECUTION SYSTEMS

SAP WM and TRM are closely integrated and work hand-in-hand to manage and maintain the workload in warehouses. WM provides the movement, operation demands, high-level scheduling and planning. TRM distributes the work among the various resources.



## WM VERSUS TRM: THE DIFFERENCE



## TRM's Bottom Line Value

TRM's ability to optimize resource deployment, material flow, routing and process visibility enables an accelerated supply chain, which in turn leads to improved customer service, better partner relations and overall cost savings.



## Extended Warehouse Management

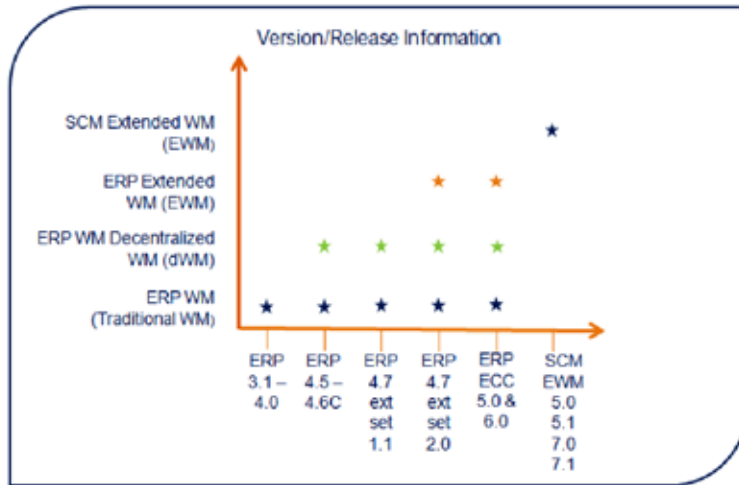
As of SAP release 4.7, TRM strengthens and completes the LES/WM solution by optimizing Extended Warehouse Management (EWM). The terminology can be confusing, but there are really two different forms of EWM, depending on how they are being used. When SAP Warehouse Management is being used with SAP release 4.7 Extension Set 2.0 or higher releases it is referred to as ERP EWM. When SAP WM is being used in conjunction with the SCM module, it is referred to as SCM EWM.

In its decentralized form, the capabilities of EWM are expanded. Basically, ERP EWM is little changed from the functionality that exists in SAP 4.7. With SCM EWM, the functionality includes what 4.7 xt. 2.0 can do as well as improved workflow, slotting, labor management, process integration and the various other features mentioned above (under evolution).

SCM EWM offers increased flexibility and capabilities beyond ERP EWM. Typically, SCM is tailored to organizations who have high SKU and line item volumes, very fast moving product, complex product movement, cross docking requirements, detailed packaging and shipping processes, and third party logistics services (3PL) on either the Inbound or Outbound side, or both.

The following table represents the various types of SAP Warehouse Management that are available for each release. You can see that there is a migration towards SCM EWM.

## SCM EWM Capabilities



Inherently, SCM EWM should operate on a decentralized server, however, it is possible to run the EWM system and the ERP system on the same server if using ERP 6.0 and SCM 5.1 or higher. Running on a separate server will maximize performance and flexibility. Periodically, you will see references to the Service Parts industry, as this industry made the first use out of this solution; however, SCM is designed to work across multiple industries. It all depends on the functionality and business requirements that your organization needs to meet. This is discussed in more detail in the next section.

### Functionality

Many of the underpinnings of TRM have been incorporated into the SCM EWM product (such as Tasks, Resources, 3-dimensional warehouse, etc). Like TRM, SCM EWM should use Handling Units to move and track stock in the facility.

SAP has enhanced the use of Handling Units within the warehouse to make them easier and more flexible to use compared to previous releases. Other functionality features of SCM EWM include:

**Deconsolidation** – Upon receipt, the products can be directed to a deconsolidation work area where like products can be separated off of the mixed pallet and put away as homogenous units.

**Rules and Prioritization** – Increased flexibility in work assignment and prioritization of tasks

**Explicit and Implicit Counting** – Used as part of the Quality Assurance process for counting goods upon arrival into the warehouse

**Wave Creation and Assignment** – Improved tools in order to group and efficiently pick Outbound Orders

**Kitting** – Kit to Order and Kit to Stock Supports complex kitting.

**Slotting** – SCM EWM has slotting tools available to determine the best location of product

storage within the warehouse. It is broken into 2 pieces:

1. Slotting – more of a planning tool
2. Rearrangement – the execution of the planning run

**Labor Management** – Full labor management tracking and reporting system. Capable of using engineered labor standards. Can record productive and non-productive (sweeping, lunch, break, etc) time.

**Yard Management** – Similar to 4.7, however the logical HU is now replaced with a TU (transportation unit)

**Post Processing Framework (PPF)** – Used to be known as Output Determination. This provides additional functionality after a transaction has occurred (i.e. trigger messaging, execute follow-on transaction, etc).

**Returns Processing** – Supports a robust returns function. Must use CRM in order to support this process.

### Key Changes

- Warehouse Number, Storage Type and Storage Section are four characters
- Storage Bin is 18 characters and bins are now unique to the warehouse (i.e. cannot have two bins named the same thing within the same warehouse)
- Handling Units are now activated at the Storage Type level
- Serial Numbers – can be tracked to a bin without the use of an HU (it is a new field identification)

### New Terminology

- Activity Area – logical grouping of bins that are used to facilitate activities such as picking, putaway and physical inventory. These assist in Queue assignment and Warehouse Order creation.
- Warehouse Task – equivalent of a Transfer Order (TOs no longer exist)
- Warehouse Order – Groups together Warehouse Tasks. The warehouse order is the document the end users execute upon.
- Stock Identification – Unique number for a segment of stock. It includes attributes such as material, quantity, batch and stock type. It technically replaces an SU (storage unit), but the advantage of a stock ID is that it can exist in an interim location.

## Which WM Application Is Right For Your Warehouse?

SCM EWM and TRM are tailored to be of most benefit to the warehouse with high activity levels, high volume and complex operations. These and other factors should be considered when determining which application is a fit for your facility.

### High Level of Distribution Activity & Materials Movement

SCM EWM and TRM were designed to benefit warehouse operations that are more distribution oriented as opposed to material storage oriented (e.g., a production supply facility). If efficient management, movement and distribution of materials are core competencies and critical

success factors for your organization, either EWM or TRM is a good fit and will significantly enhance your labor efficiencies and minimize your labor costs.

### **High Level of Volume**

TRM and SCM EWM offer the most value to those facilities with a high level of material flow velocity (typically characterized by the number of transfer orders or line items), high transaction volume, a high number of warehouse associates per shift and multiple types of material handling equipment. The higher the number, the better the fit, for example, if you have 50 trailer loads a day, you will reap a much higher benefit from the system than if you only have five.

### **Operational Complexity**

SCM EWM and TRM offers strong functionality for complex material flows, such as the use of special equipment that cannot physically make certain material moves efficiently, but instead uses pick and drop locations. The system's deconsolidation of TOs into tasks offers an advantage for these complex scenarios. Other operational complexities such as pallet deconsolidation and other warehouse work center operations are handled much better in SCM EWM and TRM.

### **Level of Value Added Services**

TRM and SCM EWM also offer strong functionality for value added services such as special labeling, pricing, packaging, and hazardous materials notes on shipping documents. The higher the level of services you offer, the better the fit with these solutions.

### **Current User of SAP WM and Decentralization**

Current users of SAP WM will find an independent systems configuration audit and warehouse operational review beneficial prior to undertaking the implementation of TRM or SCM EWM. It is highly recommended that users considering these solutions as part of the initial WM rollout seek experienced consulting support because of the complexity and abstraction of these solutions.

Other factors that should be weighed when considering the implementation of TRM or SCM EWM is the organization's ability to decentralize the WM/TRM/SCM EWM system as well as the use of Storage Units (SUs) or Handling Units (HUs).

The decentralized WM architecture is strongly recommended for TRM and is assumed for those who want SCM EWM because of the heavy processor load that TRM and SCM EWM can pose for your core system. HUs or SUs work very smoothly with TRM and make task processing more efficient. HUs are necessary when considering SCM EWM. The need for handling units in SCM EWM depends on the business process requirements of the client. Certain functionality within EWM such as process-oriented storage control will require the use of HU's. Implementing decentralized WM and choosing whether or not to use HUs or SUs should be considered a prerequisite to implementing TRM.

## Summary

SAP's Task and Resource Management module and SCM EWM both deliver value by optimizing labor utilization and providing warehouse process monitoring and controlling functionality. Bottom line, TRM and SCM EWM enable warehouse activities to be executed better, faster and cheaper than possible without a warehouse optimization engine.

When determining which solution is the right fit for your operations, it is important to consider that TRM and SCM EWM best benefit warehouse operations with high levels of distribution activity, volume and operational complexity. Companies who decide to implement TRM or SCM EWM will gain the benefit of an accelerated supply chain, improved customer service, better partner relations and overall cost savings.

A key point to remember is that no further SAP development will occur within TRM or WM. All future investment will be within the SCM EWM product. Always strongly consider the current and future business requirements carefully when making a decision on which WM application to use. If you require a true Labor Management system or Slotting, then EWM is your answer. If you don't need these technologies, but still have complex warehouse movements, maybe TRM or just WM will work well.

**For more information on how TRM, SCM EWM or any SAP WM solution can optimize your warehouse operations, contact InfoLogix at 215-604-0691 or visit [www.InfoLogix.com](http://www.InfoLogix.com).**

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InfoLogix is a leading provider of enterprise mobility solutions for the healthcare and commercial industries. InfoLogix uses the industry's most advanced technologies to increase the efficiency, accuracy, and transparency of complex business and clinical processes. With 19 issued patents, InfoLogix provides mobile managed solutions, on-demand software applications, mobile infrastructure products, and strategic consulting services to over 2,000 clients in North America including Kraft Foods, Merck and Company, General Electric, Kaiser Permanente, MultiCare Health System and Stanford School of Medicine. InfoLogix is a publicly-traded company (NASDAQ: IFLG).

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