

Easily recoup productive work hours in RF data collections

With mobile session management technology

Introduction

The performance and reliability of a distribution center's wireless infrastructure is vital to optimal workflow performance and employee efficiency in RF data collections. Unfortunately, an underperforming infrastructure can result in unstable sessions, slow or erratic response times and the frequent need to re-login to the host application. These issues cause interruptions to workflows and translate to significant productivity losses. For the average company, 10 minutes of lost time per employee, per day equates to a loss of \$1,500 per employee, per year.

Interruptions to workflows also increase IT support costs. On average, 15% of workflow interruptions leads to an IT support call, creating an additional \$1,300 in annual operating costs per employee. The cumulative \$2,800 annual loss per employee can be recouped by ensuring optimal stability, speed and connectivity of the RF network.

Considering that performance defects that reduce productivity by only 3% will cost a large operation as much as \$10 million per year, the urgent need to accurately diagnose and resolve these issues becomes evident. This paper will discuss cost-effective solutions that will allow you to:

- Discover where time can be recouped
- Identify the root cause(s) of existing defects
- Achieve optimal RF network performance

This paper will also present real-world use cases that highlight the benefits of the solutions uniquely offered by Connect, Inc.

Discovering Areas of Improvement

A study of 250 large distribution centers across North America UK, and Europe conducted by [Intermec and Vanson Bourne in 2012](#) concluded that "managers are seeking to improve operational efficiency by gaining back mere seconds from each workflow to achieve overall time and cost savings."

Employee complaints about performance defects that reduce their productivity don't always travel up the chain-of-command. And other types of defects may not be immediately apparent, or urgent, to employees. Therefore, figuring out where to look for improvements can be a daunting challenge for distribution center (D.C.) managers and executives seeking to improve operational efficiency.

Needed is a transaction-aware, data-level tool that can quickly and transparently document how their applications, RF networks, devices and end-users are performing. With this granular view of each mobile session, many previously hidden defects will become apparent, such as, but not limited to:

- Operator input errors
- Excessive operator idle times
- Slow application responses to certain client requests
- Application response errors
- Excessive WAN bandwidth consumption

Once discovered, problems like these are easily fixable, and doing so will help managers gain back those precious seconds from each workflow.

"When it comes to quantifying the value of gaining back mere seconds in unproductive workflow presents to overall efficiency, the research revealed that a distribution center with a minimum of 50 workers is losing close to 3,000 hours each year."

—Intermec 2013

Identifying Root Causes of Pain Points

The challenge of identifying the root cause(s) of performance problems is costing the RF data collections industry billions per year in lost productivity and diverted IT resources. However, many distribution center executives and IT managers choose not to investigate these problems because of a fear that the combination of open-ended investigative consulting fees and the cost of solutions that might fail to deliver, will ultimately compound the losses of the defects.

“It appears that one of the key challenges in investing in new technology lies in the difficulty of pinpointing areas in the distribution center that would gain the most efficiency improvement from investing.”

—Intermec 2013

To prevent that outcome, they need an unbiased diagnostic tool that distinguishes between the behaviors of the application, RF network, devices and end-users, without interfering with the application or ongoing operations. This type of tool will quickly and cost-effectively identify the root causes of a wide range of system defects, such as:

- Slow response times
- Intermittently delayed or erratic response times
- Network lock ups
- Dropped sessions
- Session time outs

An unbiased tool like this is even more valuable in multivendor situations because it cuts through the finger-pointing and politics that can surround these circumstances.

Optimal RF Network Performance

After areas of improvement have been identified, the endeavor of recouping lost time transitions to the resolution stage. Technologies that stabilize, accelerate and maintain mobile sessions can be deployed to correct the defects.

RF Stability = Scalability

A stable network is scalable; it maintains high-quality sessions between the host application and each mobile device, even as operations are scaled-up and the transaction load on the network is substantially increased.

General symptoms of RF instability are intermittently delayed response times, frequent session timeouts and/or, in the extreme, complete network lock ups. These are caused by too much data volume and RF traffic, or “chatter,” than the existing network can support. This problem is especially prevalent when, as is often the case in a distribution center, several devices are operating too

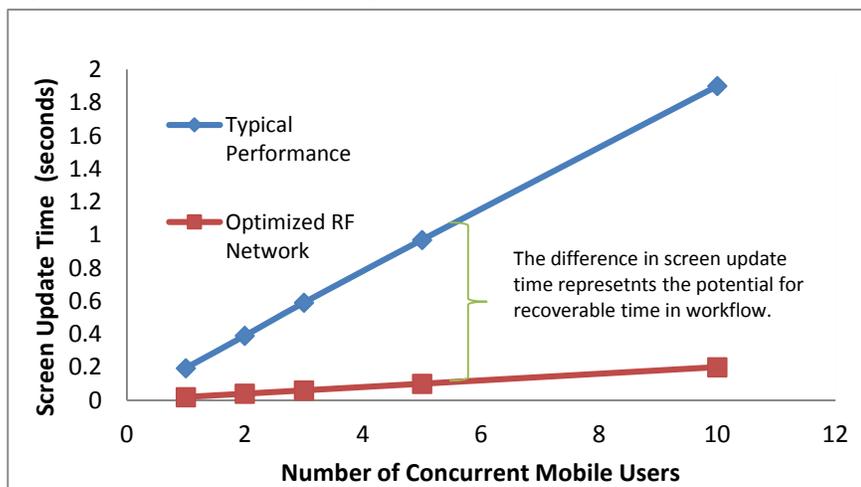


Figure 1 Results of a test in a controlled environment demonstrates how quickly response times increase as devices are added to a network in the absence of a stabilizing technology (blue line).

close to one another (Figure 1). The result is that employee workflow is interrupted for several minutes during the course of a shift as their idle time increases.

RF networks can be most efficiently stabilized by reducing the volume of data required to complete each transaction to the smallest possible size, and by eliminating unnecessary traffic between the application and the mobile devices. Doing so will expand the capacity of the existing RF network; the greater the reduction in RF data volume and traffic the more dramatic the capacity improvement will be. And for those with large WANs to manage and maintain, this will future-proof their networks by reducing the frequency of RF backbone upgrades.

Consistent, Subsecond Response Times

For tasks that require high-scan rates, employees must not be left waiting for a response from the host before they can scan the next item, as that will directly reduce the number of tasks they can perform per hour. And even though certain other tasks may not require high-scan rates, those other tasks are never the less competing for wireless bandwidth with the employees that are performing high scan-rate tasks. By enabling employees with consistent subsecond response times they will be able to maximize tasks per hour, even when the network is experiencing peak demand.

Persistent Sessions

Many business processes require employees to travel great distances within the four walls where coverage gaps may temporarily exist or access point handoffs can sometimes fail. Often, employees must travel outside to the yard operations that require their devices' radios to switch between different types of networks. All of these circumstances will lead to lost connections, requiring the user to go through the five-minute process of logging back in and navigating the application to their last screen. When an employee experiences an average of two lost sessions per day, for a total downtime of 10 minutes, the cost of lost productivity can be as high as \$1,500 per year.

Mobile Session Management

CloudMax is a Mobile Session Manager that combines transaction-aware, data-level diagnostic reports, unique data volume and RF traffic-reduction technology and session persistence, into a simple-to-implement and easy-to-maintain light-weight virtual package. These technologies provide stable, fast and scalable RF networks that always perform at their peak. The core technology has been implemented and improved through 20-plus years of exposure to thousands of distribution centers across five continents. Here are a few customer-use cases documenting real results.

Manufacturer Eliminates Idle Time and Saves \$750 Each Employee

A U.S.-based aircraft manufacturer sought to increase transactions per shift. Unfortunately, there were no known end-user complaints to provide an obvious starting point for improvement. Using the transaction aware diagnostics of CloudMax, Connect's IT support team examined the behaviors of each mobile session and discovered that certain application responses exceeded 1 second, compared to an average of .2 seconds for all others.

The D.C. manager calculated that this defect was creating nearly five additional minutes of idle time per day, at a cost of \$750 per employee, per year. With this data-level documentation of the issue their application development team quickly corrected the relatively minor bugs that were causing the slow responses and the lost time was recouped.

Mystery Disconnects Solved

An American auto manufacturer was experiencing inexplicable session disconnections when users were in one specific area of the warehouse. Using CloudMax diagnostics, Connect quickly discovered that the problem occurred in the receiving application. The diagnostics showed that there was an error message in all of the transactions preceding the disconnections. However, the error message was being displayed on the devices so fleetingly that the end-users could not see it.

Once the company knew of the error it allowed them to correct a bug in the application. This eliminated the error and the disconnections it was causing. Total time was two days to identify the root cause and two days for this company to correct the problem. It's likely that without such a tool the company would still be living with this costly problem today.

Grocery Chain Increases Throughput

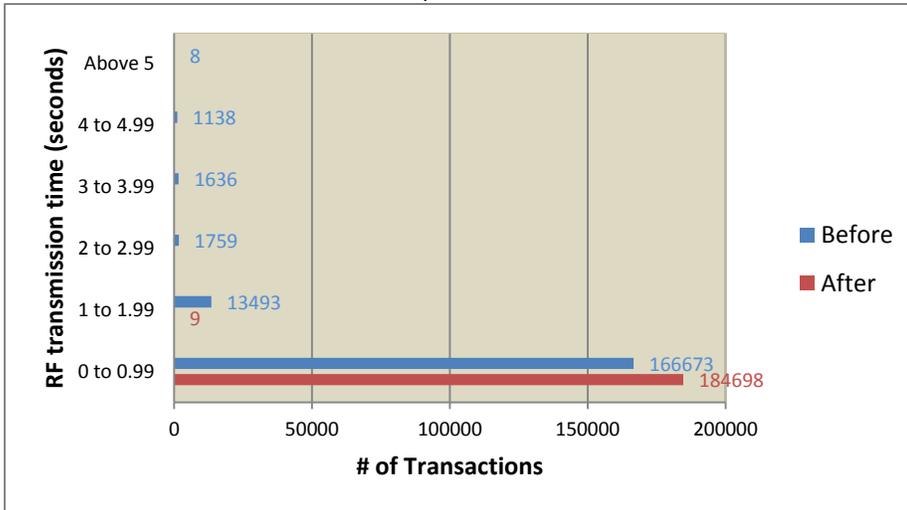
A North American grocery conglomerate with 21 distribution centers across the U.S. and Canada began experiencing the symptoms of RF instability as they scaled-up their RF data collections operation. Employee throughput steadily fell and IT support calls rapidly increased.

To resolve this problem the company introduced CloudMax, which reduced data volume over the RF by 98% and cut session traffic in half. Immediately, stability and uptime were restored, employee throughput drastically improved and demand for IT support

returned to sustainable levels. Furthermore, the conglomerate's entire WAN is now future-proofed against later expansions and application upgrades.

Global Parts Supplier Demands Subsecond Response, 100% of the Time

A global industrial parts supplier was experiencing subsecond RF transmission times for 90% of their transactions. However, during bursts of peak demand, such as when multiple picking, receiving and put-away tasks were being performed simultaneously, RF transmission times for all end-users spiked from subsecond to two to 10 seconds. Some sessions were locking up completely. The



costs of this loss of productivity were compounded by additional calls to the help desk, leading to higher IT costs.

To recoup those losses, CloudMax was introduced to substantially reduce the data volume and traffic. The result was the elimination of all response times over one second, as well as the session lockups, even during peak demand. Employee productivity was improved from less than 90% of optimal to nearly 100% (Figure 2). Additionally, the capacities of their existing RF networks are now more than adequate for a planned expansion in the near future.

Figure 2: This distribution center collected mobile response times before and after the implementation of network stabilizing technology, in this case, CloudMax.

Manufacturer Discovers Trick to Session Persistence

A manufacturing company stores their production raw material outside, well beyond the coverage of the plant's Wi-Fi coverage. When their forklifts leave the plant's Wi-Fi network they switch to the cell network outside and their devices are given a different IP address by the different network. If the session persistence server were to track the device by IP address the session would be lost, defeating its purpose in this case. By deploying CloudMax, which tracks devices by MAC address, they were able to reduce employee downtime due to lost connections by 100%.

Conclusion

D.C. managers and executives continually evaluate their labor management strategies to reduce employee idle time and maximize productive work hours. By implementing middle-ware that provides the diagnostic, performance and session persistence characteristics discussed in this white paper, D.C. executives and managers can reach their goals of recouping thousands of hours per year in lost productivity.

With a stable, fast and well-connected RF data collection system the annual cost of ownership for infrastructure and devices is reduced by at least \$2,800 per device. This includes reduced demand for IT support. Utilizing a diagnostic tool like CloudMax, or one with similar characteristics, D.C. managers and executives can quantify idle time caused by application, RF network, devices and end-user performance defects, allowing them to calculate the ROI of implementing a solution. For those who are unaware of any specific system defects, they can use this technology to verify the health of their systems and to experience the immediate impact it will have on employee workflow and productivity.