

The World's Best Business Intelligence Applications

Operational Logistics/Resource Allocation

A White Paper

by Kevin Quinn

WebFOCUS

Kevin Quinn Bringing more than 25 years of software marketing and implementation experience to his role as Vice President of Product Marketing for Information Builders, Kevin Quinn oversees the development of marketing for all product lines.

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Introduction

Have you ever waited in a very long checkout line at the market and noticed there were five other registers not being used? Have you ever brought your luggage to an airport check-in counter being covered by only one attendant, while four others busied themselves with other activities? Were you ever enticed into a restaurant offering your favorite dish at a special price, only to find the kitchen had run out?

In most cases, these problems are not the result of lazy workers, disorganized managers, or dishonest business people. They are the result of poor resource allocation.

Proper resource allocation – the distribution of resources to a specific place, at a specific time, for a specific purpose – is a challenge faced by most organizations. Ineffective resource allocation can plague a business, preventing it from delivering products or services in the most efficient and economical manner possible. This, in turn, can waste time and money, frustrate customers, and inhibit revenue generation.

So, why don't companies simply stock more products, or hire more employees? While a resource shortage might be the problem, increasing resources to the point of excess can also be problematic, creating unnecessary expenses that deplete budgets and eat away at revenues.

Achieving precise resource allocation is not as easy as it might seem. Today, most companies take a reactive approach to resource assignment and distribution. When a resource runs short, they order more.

For example, when the line at the supermarket gets too long, workers are moved from other departments to the front registers. Such a reaction is akin to putting a band-aid on a large wound. These additional resources are only deployed after they are needed. The airline commandeers employees busy in the back office to support check-in duties. The restaurant increases its order for the next promotion, only to be left with overstock due to poor turnout.

Though they realize that a more proactive approach is critical to success, companies of all types and sizes continue to struggle to improve the way they manage and allocate their resources.

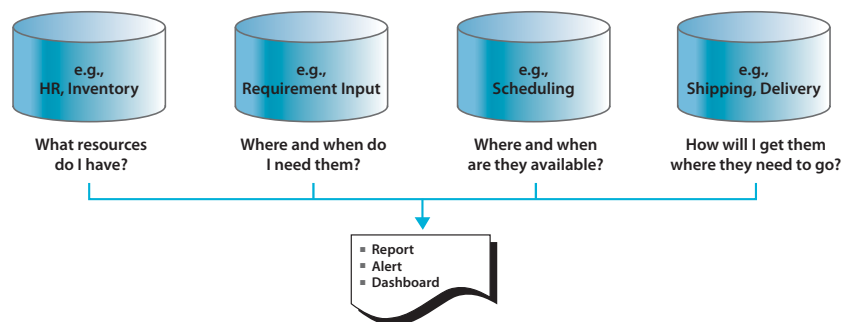
In this paper we will highlight several real-world success stories, where a proactive approach to resource allocation was implemented. Readers will discover how a hospital, a police department, an airline, a restaurant chain, and a public library all significantly improved operations by leveraging the WebFOCUS business intelligence (BI) platform from Information Builders to enable more accurate and precise resource allocation.

Barriers to Effective Resource Allocation

There are several technology challenges that prohibit companies from easily solving resource allocation problems. The most prevalent of these is a lack of access to information that can help identify patterns and trends in resource consumption and anticipate resource requirements.

Unique Challenges of Resource Allocation

- Real-time or near real-time access
- “Federating” information from multiple sources at run time
- Ability to take a disjointed manual process and map it to an automated or intelligent process



What makes this data so difficult to retrieve? It often resides in multiple locations, each with different levels of latency. Bringing this data together in a timely fashion, presenting it in a single report, or delivering it to a single location is usually beyond the capabilities of most business intelligence tools, and beyond the reach of many report developers.

Several disparate pieces of information are typically needed when you assign resources. First, you need to know what resources you have. This information can be stored in human resources databases, inventory or materials management systems, or homegrown applications.

Next, you need to know which resources are needed. For example, a doctor may schedule a patient for an MRI. The appointment information, likely located in a patient scheduling system, indicates the need for certain resources – such as the MRI machine or a particular physician to administer the test.

Finally, you'll need to know what resources are available. In the case of a scheduled MRI, equipment and staff will need to be synchronized with the appointment. However, this information is frequently maintained in a completely separate database.

Consider another scenario, in law enforcement. An event such as a robbery or car accident creates an immediate need for police officers at the scene. The event information is often contained in a 911 data collection system. But, the availability of police officers in close proximity to the event – data housed in a dispatch system – is also needed to fulfill that requirement.

These examples are both, in a sense, reactionary. Truly improving resource allocation requires even more information from a more diverse set of systems – making the technical challenge even greater.

The Need for Proactive Resource Management

Of course, if an organization could anticipate the need for a resource before it is actually needed it could significantly improve operational efficiencies. To more proactively allocate resources, companies must have:

- A list of all available resources (i.e., products in a warehouse management system or employees in a human resources database)
- A realistic interpretation of the immediate or expected need for the resource based on the planned occurrence of an actual event, or the prediction of a likely event
- Insight into the availability of each resource at a specific point in time, which is often accessible via a scheduling system
- An understanding of the timing and method of resource delivery (i.e., the logistics involved to get the resource to the needed location at a specific time)

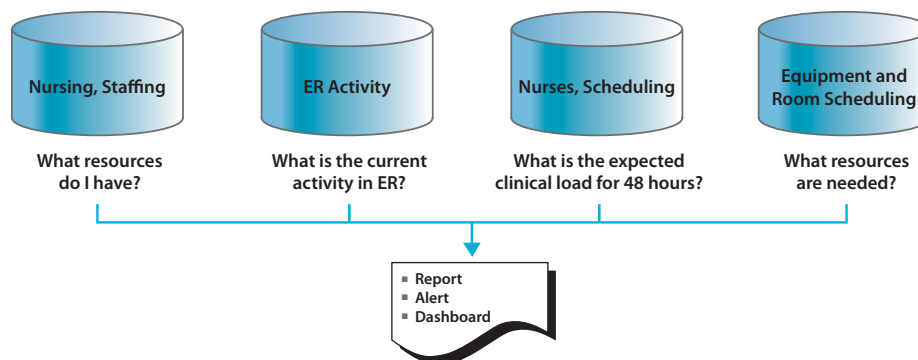
When all this information comes together seamlessly, companies are better able to anticipate and address resource needs.

Proactive Resource Allocation in Action: Real-World Successes

Let's take a look at how five different organizations solved their resource allocation problems. While each issue was somewhat unique, all the problems highlighted here are directly related to resource allocation in one way or another, and all were solved using the same technology solution.

Helping Healthcare

Many of the hospitals and healthcare facilities we work with face a common dilemma – the need to drive greater profitability. While cutbacks may seem like the fastest way to achieve this, regulatory pressures call for continuous enhancements in quality of care, something that can only be accomplished through an increase in staffing. Several of our customers have taken a similar approach to solving this problem. Each is using WebFOCUS to better understand and plan for deployment of resources.



Hospital example: emergency data from multiple systems is used to improve profitability and quality of care.

Consider, as an example, nursing staffs – which account for one of the largest single expenses of most hospitals. Incorrectly deploying these resources in critical situations is one of the biggest causes of preventable medical errors. Hospitals must walk a tight line between offering services and cutting costs, and must deploy nurses in such a way that improves care delivery without wasting money.

Many hospitals use WebFOCUS to connect data from multiple systems so they can more effectively and economically determine and meet their requirements. Real-time monitoring of inbound activity in emergency rooms allows healthcare centers to map out the clinical needs of patients in the short-term. Then, by linking those requirements to the data in staff and equipment scheduling systems, they can plan for these pending needs with a much greater degree of accuracy.

To achieve this kind of visibility and insight, and leverage it to simultaneously improve both care quality and profitability, each of the hospitals we worked with had to unify and deliver data contained in four or more systems – an effortless task for WebFOCUS and one of its key strengths.

United States Transportation Command

When wounded soldiers require immediate medical attention, it's critical to quickly determine their condition and arrange for transportation to the proper facility for treatment. The United States Transportation Command (U.S. TRANSCOM), under the Department of Defense (DoD), uses WebFOCUS to optimize patient-movement plans based on urgent medical needs, available facilities, and in-transit visibility, as well as to measure enterprise-wide costs and performance.

This is all part of TRAC2ES, a comprehensive reporting and analysis system that helps sick or injured personnel reach the optimal destination via the most expeditious method of transport possible. TRAC2ES, (TRANSCOM Regulating and Command and Control (C2) Evacuation System), supports patient movement from the battlefield to definitive care, and, when necessary, to rehabilitative care in hospitals such as Walter Reed. The system also tracks and coordinates patient information throughout the U.S. military's worldwide network of healthcare facilities.

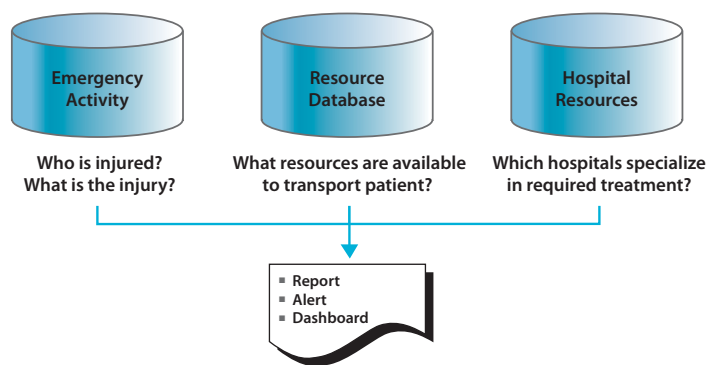
"Lives are at stake here," emphasizes Lieutenant Colonel Keith Lostroh, TRAC2ES functional program manager. "When soldiers are wounded in battle, the military needs to be able to provide efficient medical transport in conjunction with real-time information and pinpoint accuracy. TRAC2ES helps us provide advanced care for our troops."

Prior to the development of TRAC2ES, the transport of wounded and sick soldiers was often met with a multitude of errors and delays. Missteps during Operation Desert Storm highlighted the need for improved coordination of medical care for injured soldiers. In some cases, wounded soldiers were directed to the wrong hospital, or ended up in facilities that didn't provide the necessary specialties and treatments. The need for a more efficient patient-movement process led to the implementation of TRAC2ES.

According to Lostroh, the operational decision-support system provides critical data that is used to improve treatment and minimize the severity of injuries. “TRAC2ES’s decision-support information effectively supported the troops during operations Enduring Freedom and Iraqi Freedom by providing 100 percent patient-in-transit visibility for more than 73,000 patient movements,” he says. “Approximately 13,000 of these patient movements involved Operation Iraqi Freedom battle injuries.”

U.S. TRANSCOM reports frequently make their way from senior command officers to the President and Congress, and include information about the number of patients and movements, the number of missions, and related costs. Authorized users can generate more detailed reports to monitor the status of patients from the beginning of transport to the outcome of treatment.

“The goal is to provide good medical care, not simply move people around,” says Lostroh. “Our utmost concern is for patient safety, quality of care, and efficient use of resources, just like any healthcare facility.”



U.S. TRANSCOM uses WebFOCUS to optimize patient-movement plans.

TRAC2ES not only orchestrates patient-movement operations, but also provides critical patient safety metrics. For example, it ensures that an injured person won’t be adversely affected by a long flight. Dispatchers also use WebFOCUS to collect data on the condition of the patient, so the flight surgeon can determine if he or she is ready to be transported. Once medical personnel decide the patient is well enough to be moved, an Air Force system locates available aircraft and crew. Operators can then dispatch a mobile team for the exclusive care of the patient, tantamount to a flying ICU. All of this is tracked and managed in TRAC2ES.

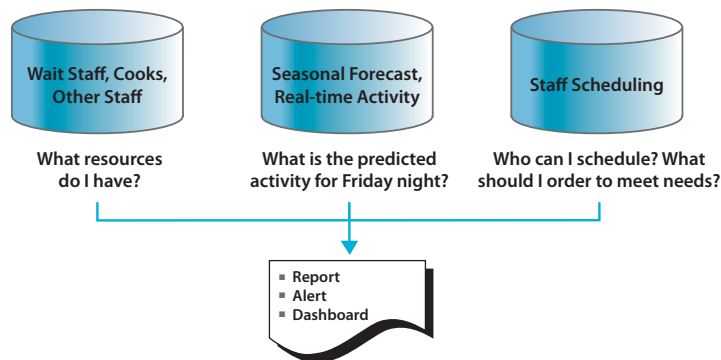
For example, when a 21-year-old active duty army specialist sustained blast and burn injuries in a car bombing on the Iraqi battlefield, the system helped ensure he was rapidly evacuated and received advanced patient care. Using TRAC2ES, the military team transmitted vital patient information from the 31st Combat Support Hospital (CSH) in Baghdad to surgeons at Landstuhl Regional Medical Center (LRMC) in Germany, then on to the USAISR Burn Center in San Antonio, Texas. Well-orchestrated communication and evacuation ensured the patient received critical care at each step of the process.

“Travel time used to be our biggest limitation, but the new system provides data to all pertinent personnel to assess the situation, get crews and aircraft moving, and get the patients to where they need to be to save lives,” says Lostroh. “Today we can move a burn patient from Iraq to the burn center in San Antonio in much less than 24 hours. We can, in fact, move a patient anywhere in the world within 24 hours.”

In summary, U.S. TRANSCOM has numerous resources it must coordinate, including various means of transport (ships and planes), countless healthcare facilities including hospitals with particular areas of expertise, and personnel (pilots, field doctors, etc.). The injured soldier needing immediate attention is the event that creates the resource requirement. WebFOCUS brings this all together, giving decision makers a clear view of all the paths leading toward resolving resource allocation challenges.

Brinker International

Margins are slim in the restaurant industry, forcing food-service companies to constantly scrutinize labor, food, and other operating costs. Yet, guests demand high quality and prompt service, so they are quick to notice when a dining establishment cuts its overhead too severely.



Brinker International improved profitability and reduced costs.

Kenny Sullivan, senior director of business intelligence for Brinker International, Inc., one of the world’s leading casual dining restaurant companies, admits that satisfying customers while maintaining a profitable operation is a constant balancing act. Restaurant managers often find themselves walking a tightrope, which is why Brinker uses WebFOCUS to help its organization move steadily forward.

“Managers at all levels of our organization depend on business intelligence technology to plan, manage, and control many aspects of our business,” says Sullivan. “It’s a worthwhile endeavor – not only for our guests but for our balance sheet. We’re in a low-margin, high-volume business where a single percentage-point increase in productivity will drive a million dollars to the bottom line.”

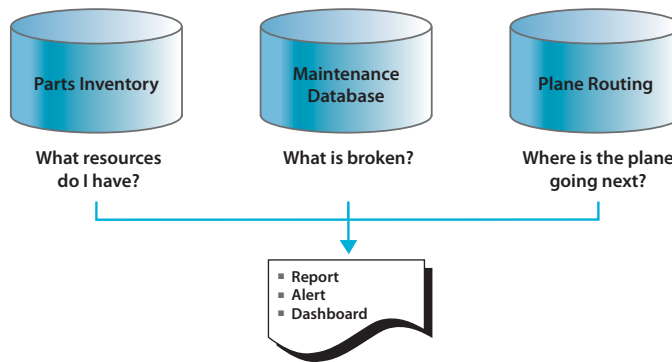
An enterprise-wide reporting environment built on WebFOCUS includes new dashboards, a new data warehouse, and an automated system for delivering information throughout Brinker’s vast, worldwide

operation. Brinker owners or managers can run a Daily Sales and Guests report to compare the current day's metrics to the same day a year prior. They can quickly examine sales volume in any time period and drill down to sort the data by categories such as food, liquor, beer, wine, banquet, and to-go. "Restaurant managers don't have a lot of time to run reports or analyze data," says Sullivan. "Now they can drill down into these categories just by pushing buttons in a dashboard."

By pulling together data from multiple sources, WebFOCUS allows Brinker to understand demand and accurately forecast needs, so they can more precisely allocate resources such as wait staff, kitchen staff, and inventory.

Transportation Industry

The pressures of competition, combined with higher fuel prices, were causing this major airline to lose money. Those at the organization's highest levels charged company employees with regaining profitability, but limited budgets made aggressive advertising and marketing campaigns impossible. So, profits would need to be driven through improved operational efficiencies.



One airline reduced plane maintenance times from two weeks to less than 24 hours.

An analyst at the airline noticed many flights that were usually filled to capacity were not selling out. Further investigation showed that trivial maintenance issues, such as a faulty seat-back tray or a torn seat cushion, were the reasons for the lost ticket sales. But, maintenance workers weren't always notified of these problems in a timely manner because repair information was distributed across three disparate applications.

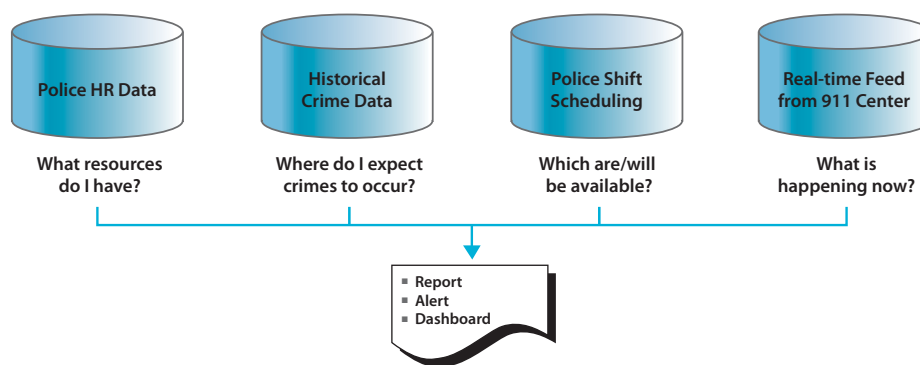
Air Canada needed real-time information that would expedite service to planes between flights. Developers used WebFOCUS to build a report that combines data from three distinct sources:

- The primary maintenance system houses information about problems such as broken seats
- The parts inventory system stores data about the location of replacement parts needed for repairs
- The plane routing system contains scheduling information

This consolidated information keeps all maintenance workers fully aware of which planes need repairs, which parts are required to make those repairs, and where those planes are. This enables them to fix each problem as soon as possible, allowing the airline to, once again, fill planes to capacity. As a result of this single report, as well as other operational initiatives, the company quickly increased sales and returned to its previous levels of profitability.

City of Richmond Police Department

Ranked the fifth most dangerous city in the U.S. in 2004, the city of Richmond, Virginia reduced its violent-crime rate by double digits two years in a row after its police department implemented WebFOCUS to help predict crime. The system, which won Gartner's 2007 BI Excellence Award, provides predictive crime analysis, data mining, reporting, and geographic information system (GIS) capabilities to the entire department.



The City of Richmond PD reduced crime by more than 10 percent in each of the first three years after implementing a WebFOCUS-based system

With WebFOCUS, the city's crime analysts can now look at the interaction between present and past data, such as arrest records, motive, and type of crime at a particular location based on the day, time, weather, and coincidence of public events. This insight is used to optimize police resources for deterring crime. Officers receive the most up-to-date information available, along with a screen of predictions of crime hot spots they can access before a shift. Data from the records management system is integrated and analyzed on a continuous basis.

The system is integrated with Richmond.com, which feeds it contextual information about local activities, such as sporting events and a city-maintained weather data collection system. GIS capabilities allow officers to view specific types of crime for a given area and perform crime mapping and analysis functions.

Officers can view maps of crime-density hot spots by location or based on crime type, such as car theft, to see specific incidents within a zip code, neighborhood, city district, or other user-defined area. Data for weather, events, time of day, case history, associated suspects, and aerial photos can also be integrated. The end result is a sophisticated data model of criminal activity with a user-defined set of elements that predict future criminal behavior.

Moving from a “reactive crisis management structure” to a “proactive problem deference model” has not only increased protection of the city’s 220,000 citizens, it has resulted in numerous other benefits, including:

- More efficient and targeted deployment of resources
- A 49 percent reduction in random gunfire incidents, a 246 percent increase in weapons seized, and more than \$15,000 saved in overtime costs on the first New Year’s Eve after implementation
- Significantly reduced rates of murder (32 percent), rape (20 percent), robbery (3 percent), aggravated assault (18 percent), burglary (18 percent), and auto theft (13 percent) during the first year
- A 42 percent drop in homicides and 45 percent drop in commercial robberies in 2008

Most importantly, the city was able to drop its undesirable ranking from fifth to outside the top 30 within two years.

New York Public Library

How do you handle huge budget cuts in the face of increasing activity? The New York Public Library was experiencing greater volumes of traffic for its free books and Wi-Fi service, at the same time it was plagued by a nearly \$23 million decrease in available funds.

The solution? Better resource allocation through the use of WebFOCUS.

Staffing requirements are vastly different for each library in New York City. Some experience extensive after-school traffic, others have lunchtime rushes, while others get a fair amount of activity in the early-morning hours.

The library uses WebFOCUS to track visitor traffic and borrowing habits, so managers can make better decisions about which library resources and services are most important to the public. Dubbed “Metrics On Demand,” this application replaces a spreadsheet-based reporting system.

It also tracks the library’s vast holdings – more than 15 million borrower transactions each year – and the accounts of two million cardholders. Library personnel can analyze attendance and circulation on computerized dashboards, and generate intuitive graphical data reports.

Understanding historical trends and real-time activity, as well as transactions related to print and non-print materials, helps library managers most efficiently understand, and satisfy, their resource needs.

Why Use WebFOCUS

The WebFOCUS BI platform possesses inherent capabilities that make it uniquely suited to these high-value applications. Specifically, these capabilities include:

- **Access to multiple sources of data** – WebFOCUS is the only BI platform with access to more than 300 information sources, including ERP applications, legacy, transactional and relational databases, and multidimensional cubes. This allows it to formulate queries that manipulate and consolidate information to a single data warehouse report or dashboard, a necessity for a resource allocation system
- **Real-time monitoring and event-based alerting** – WebFOCUS can also read and react to real-time business events, often a requirement of such applications. Sometimes, the best method for allocating resources is to react to changes in business flow as quickly as they occur rather than hours after an event. As we saw earlier, WebFOCUS can react to the entry of a patient record into a hospital system or the report of an emergency call to a 911 call center.
- **Predictive modeling** – The ability to anticipate, or predict, a business event before it occurs is usually more effective than reacting to it after it occurs, especially if that prediction is performed with the highest degree of probability. Since WebFOCUS introduced its RStat predictive analytics module last year, it has had the ability to embed high-probability predictions into frontline operational applications. Law enforcement organizations use it to predict crime and retailers can use it to predict retail traffic to anticipate the demand for products and the need for resources.
- **Robust information delivery** – The customer applications cited in this paper required that information be delivered to a specific location in a timely fashion. Whether in the form of an alert to a mobile device, a paper report for a nurse or doctor to read, a real-time dashboard to monitor the flow of business events for a restaurant or retailer, or even to a consolidated real-time data warehouse that gives customer support representatives access to a single view of their customers, WebFOCUS' core functionality is flexible enough to deliver on all these requirements.

Conclusion

While many business intelligence initiatives only result in intangible benefits – such as improved access to information – more and more companies are taking a project-based approach, directing their IT staff to focus their efforts on frontline operational logistics, such as enhanced resource allocation. In the current economic climate, many businesses simply can't invest in a particular technology without proven ROI. Intangible, hard-to-quantify value is no longer good enough. As budgets continue to decrease, resources must work more efficiently to preserve the bottom line.

Many Information Builders customers have discovered a gold mine hidden in these particularly challenging systems. They've saved lives, reduced costs, more effectively fought crime, increased profitability, and improved the quality of care, all through better resource allocation. That's the kind of ROI that empowers companies to excel in their respective markets.

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