

# Real-Time Economy Examples

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## ***Advertising***

### **DoubleClick**

#### **Add Serving and Data Mining**

DoubleClick is a technology company, founded in 1996, that focuses on internet advertising. Following the dot-com bubble burst in the earlier part of the decade, DoubleClick sold its “email-marketing services and data-management and analytical units to focus on the ad-serving market” (Steel, “Questions for Rosenblatt”). DoubleClick now controls a large portion of the display ad market, holding “relationships with virtually every major online publisher and more than half of the online ad agencies” (Holahan).

When DoubleClick was acquired by Google in April of this year for \$3.1 billion dollars, DoubleClick was developing an ad-serving technology that promises to revolutionize the internet advertising market by creating a real-time market for the buying, selling and serving of online advertisements. This ad-serving technology offers advertisers “an integrated network that combines a number of services and market information in one place” (Shearer). DoubleClick’s technology moves display or banner ads from marketers to websites and returns data on when and who viewed the ads in real-time (LaGeese). Advertising management can then make real-time decisions on which specific sites to serve their advertising campaign based upon the fluctuating demand for the advertising space and the real-time data on who and how many viewed the advertisement.

DoubleClick’s ad-serving technology creates a “Nasdaq-style exchange for buying and selling ads” (Karpinski). This ad exchange “streamline[s] the online advertising process” (Steel, “Advertising’s Brave New World) by establishing an “automated bazaar that directly links advertisers to websites” in real-time (LaGeese). This ad-serving technology

cuts out the middle man by allowing advertisers to directly select specific places on specific websites for their advertisement to appear to a specific customer viewing the website at that exact moment. Rather than going through an infomediary who would select the websites for the advertiser, companies can buy the advertising space directly, by using DoubleClick's software (reintermediation). The price of specific advertising space increases and decreases in real-time based on demand, in much the same way that the stock market prices are set. This results in the commoditizing of the online advertising market.

DoubleClick's ad exchange brings transparency, visibility and order to what is now a "big, fragmented, intermediated, messy, friction-filled market" (Karpinski). Simplifying the process of purchasing online advertising will draw more businesses to pay for it. When interviewed about the merger with Google, DoubleClick's Chief Executive, David Rosenblatt commented that "one of our goals is to increase efficiencies with which people buy and sell video advertising and democratize access to the process in the same way that Google has democratized access to the search market...It is going to be easier to buy video advertising, and therefore many more people are going to do it (Steel, "Questions for Rosenblatt").

## **Yahoo**

Yahoo! Inc. was founded in February 1994 by Stanford Ph.D. students David Filo and Jerry Yang. For these students, it began as a hobby in order to keep track of their personal interests on the internet. Because their lists of favorite links became too long and hard to manage, they broke them down into categories, then subcategories, etc. This then led to the core concept for using Yahoo. Today, Yahoo! Inc, headquartered in

Sunnyvale, California, is led by an executive team that includes CEO and Chief Yahoo Jerry Yang, President Susan Decker, Chief Financial Officer Blake Jorgensen, and Co-Founder/Chief Yahoo David Filo. This global internet services company is present in more than 20 regions and markets around the globe, with more than 500 million users worldwide. Some of the services Yahoo provides are Yahoo! Mail, Yahoo! Messenger, Yahoo! Finance, Yahoo! Music, and Yahoo! Personals. These services can be used for both personal and business communications and information. The most used service Yahoo provides is Yahoo! Search, which is the second largest search engine on the internet. Yahoo! also provides vertical search engines, such as Yahoo! Image, Yahoo! Video, Yahoo! Local, and Yahoo! Shopping.

### **SmartAds**

This month, Yahoo! Inc. launched Yahoo! SmartAds, a new advertising platform that allows marketers to deliver customized display ads to highly targeted audiences. In simple terms, SmartAds allows advertisers to compile ads on the spot. These ads are based on Web user's Internet profile, including such data as their location, recent product searches and, in some cases, age or household income. More specifically, SmartAds gives advertising agencies the ability to create a template for ads with several variables. These advertising agencies then compile those elements on the spot to suit a specific reader. Yahoo will start the SmartAds system with travel-related clients, beginning with two leading airlines. Yahoo aims to offer the SmartAds system to up to four different advertising segments by the end of the year. SmartAds will operate on Yahoo's network of websites. It will also operate on Yahoo's advertising partnerships with eBay Inc., major U.S. newspaper publishers, and cable operator Comcast Corp.

SmartAds is a real time process because it makes it easier to reach and effectively address "niche markets" with specific relevant advertisements. It also simplifies the performance of micro-targeted online advertising. The most obvious reason SmartAds is

a real time process is because, as stated before, it automatically generates unique and relevant “offer-drive advertising.” It also improves customer engagement and response in advertising. To show that Yahoo’s SmartAds is a real time process, here is an example of how this application would work. If a user is browsing for hybrid cars in Yahoo! Autos and has Newark as their default location in Yahoo! Weather, the SmartAds system can customize and deliver a display ad in real time that showcases a hybrid vehicle from a major auto brand. The ad can also show the user local dealer information and current lease rates. According to Todd Teresi, Yahoo’s senior vice president of display marketplaces, Yahoo’s aim is for “consumers to view advertising to be as relevant as the content they’re looking at.”

## ***Logistics***

### **Amazon.com**

Amazon.com launched in 1995, towards the start of the dot-com bubble. It started out selling books, but has since started selling a diverse range of products from DVDs to kitchen appliances. Amazon.com also started "Amazon Marketplace" where individuals can start up a web shop hosted by Amazon and sell merchandise through it.

Amazon.com's two main areas of real-time focus are on linking their inventory count to their website and providing users with information on order fulfillment.

### **Inventory Management**

By linking their inventory system to their website in real-time, users are notified about the status of the book they are currently viewing on Amazon's website – whether it's in

stock, how many copies are left, if it's on pre-order, out of stock, when it's expected to be back in stock, or if it's available through a third-party "marketplace store".

This kind of tight integration of inventory control systems and the website requires real-time updates so that the website is always in synch with the actual inventory on hand. If a book is out of stock, Amazon will not let users add it to their shopping cart. This way, users can be assured that what's in their shopping cart at the time of check-out is actually in stock. Also, one nice feature of having a real-time link with inventory is if there is only a limited number of copies in inventory, Amazon's website will let you know. For example, if there are two copies in stock, the website will alert you "Only 2 copies in stock – order soon to guarantee you get this book!". This kind of real-time information is very helpful to users that might otherwise have waited a day or two to place the order. Knowing that there's only one copy in stock might help the user make a better decision – i.e. to purchase the book today when you know it's in stock rather than waiting a few days and taking the chance that someone else purchased the book.

### **Real-time order fulfillment and tracking**

Amazon also supplies real-time order fulfillment and tracking information on their website. A user can view when his order is processed, packaged, shipped, and an estimated delivery time. It's all integrated with the inventory system as well, so that if there's a problem shipping a book or any questions about the order come up, the system can automatically dispatch an email to the user nearly instantly alerting him that a problem might delay shipment. Once the package leaves the door on a delivery stuck, Amazon also supplies FedEx and UPS tracking numbers through their website so that the user can continue tracking his package.

## **Boeing**

## **Production management / Logistics**

The information technology changes the ways of how the companies are doing business. Today the focus is on acquiring and processing the information that is vitally important for the companies' success. The real time technologies impact the various aspects of the companies' operations including implementation of new interlinked applications, CRM, supply-chain management, and reengineering of business processes.

Boeing, a global aerospace company, is one of the leaders in implementing innovative business approaches based on real time technologies. Its new jet Dreamliner 787 is innovation not only because designers used new cutting-edge materials and electronics to build the plane. It is special because the company used new technology during the design and assembly process. Previously the airplane was made from the common blueprint designed by Boeing, and then parts were produced by its partners and shipped back the head plant for the assembly. Under the new process the Boeing partners would actually designed the sections of the plane and then "virtually" assemble them in the computer model maintained by Boeing outside its corporate firewall. Ultimately, completed sections of the plane will be picked up by three specially fitted 747s and carried to a Boeing facility in Everett, Wash.

The computer model that enables different partners "assemble" the plane is a real time process. The companies participating in a manufacturing process in a real time mode can test the manufactured part on a model and see if it fits or has to be fixed or tuned. "We have different people building different pieces by creating data that is assembled and checked in real time," says Griffin, who is responsible for the computer systems that make this process possible (Edward Cone, "Boeing: New Jet, New Way of Doing Business", [www.ciainsight.com](http://www.ciainsight.com)). Thanks to the online modeling, Boeing can now trust its global partners with the process of creating entire sections of the plane, from concept to production. Therefore, manufacturing this next generation plane Boeing is



undergoing a radical transformation as it shifts from just the manufacturer to high-end system integrator.

## **Dell**

One of the world's leading computer manufacturers, Dell, Inc., is an excellent example of a company that has implemented a just-in-time inventory model in order to reduce costs and eliminate the retailers and distributors in the computer sales industry. Dell, Inc. was founded in 1984 by Michael Dell. The company's mission is to sell computer systems directly to its customers. This allows Dell the opportunity to understand what its customers need and to provide the kinds of systems that will meet those needs. This direct business model eliminates the retailer and allows the company to build each computer system to order based on the customer's preferences at a competitive price. The company manufactures its computer systems in seven locations: Texas; Tennessee; North Carolina; Brazil; Limerick, Ireland; Penang, Malaysia and Xiamen, China. Dell sells its products to businesses and consumers across the world. In order to facilitate the company's customization model and combat the short product lifecycles of computer components, Dell needed to develop a system that would decrease the amount of inventory held at any given time. If the company failed in this task, it would be holding inventory that was becoming increasingly obsolete by the day.

### **Just-In-Time Inventory Process**

Dell sells its computers to the end user through its direct sales model via the internet or telephone orders. Customers can build their ideal computer using Dell's interactive website that takes them step by step through the purchasing process. In order to facilitate this system, Dell has implemented a just-in-time inventory process referred to as its "pull-to-order" system. When the order is placed, Dell automatically notifies its suppliers about the necessary components, and they are immediately

delivered that same day to the factory for installation. Once the parts are delivered, the assembly-line process begins, and the computer is built to the customer's specifications. This process is referred to as the "build to order" manufacturing process which takes only hours to complete before products are shipped. Using this real time inventory process has cut Dell's inventory down close to zero. Dell carries no more than two hours of inventory in its factories, to reduce costs and eliminate the need for warehouses.

Dell uses the just-in-time inventory system to ensure that it is meeting its customers' needs on a daily basis. With the technology industry changing rapidly as new technology is developed, it is important for companies like Dell to limit the amount of inventory on hand at any given time. Dell is able to manufacture its computer systems due to its tight integration with its suppliers. When an order comes in to Dell's website or through its telephone sales, its suppliers are notified. According to Fast Company magazine, "When new orders flow into the plant -- they come in from the internet or the phone every 20 seconds -- TMC (the Austin based factory) sends a signal to its core suppliers, which stage their components in warehouses scattered around Austin. Suppliers have 90 minutes to truck their parts to the assembly line" (<http://www.fastcompany.com/magazine/88/dell>).

Dell achieves real time knowledge of each part that has entered its inventory system from the time the part is delivered until the time it leaves the factory as part of a computer system. Dell also maintains a database that tracks purchasing trends and predicts purchases by repeat customers so that it can forecast demand with about 75% accuracy. Dell updates this demand forecast three times a day for its suppliers in order for them to plan ahead on a real time basis. If suppliers are low on a particular item, or forecasts were not accurate, it can substitute a similar item on special to make up for the shortfall. This allows the management to match what its suppliers can deliver. Dell is an excellent example of a company that uses just-in-time inventory in order to make real time management decisions.

## **FedEx**

FedEx Corporation is the \$29 billion dollar company that includes: FedEx Express, FedEx Ground, FedEx Freight, FedEx Kinko's Office and Print Services, FedEx Custom Critical, FedEx Trade Networks, FedEx Supply Chain Services and FedEx Services. These companies ship over 6.5 million deliveries every day to over 220 countries around the world and provide business and logistical solutions to its customers. Founded in 1971 by US Marine Fred Smith, Federal Express Corporation has continued to reinvent and improve the shipping industry over the years as well as stay on top of its main competition UPS, DHL and TNT. Technology has become an important part of shipping, enabling customers to track packages and businesses to track shipments.

## **Shipment Tracking**

Shipment tracking has developed over the years to become one of the most essential aspects of this industry. FedEx introduced its first tracking application in 1994 and it has grown into a real-time management tool. InSight, FedEx's newest tracking application allows users to see the current status of all of their packages in real time. It also provides notifications of delays and other status changes through email or other methods. This tracking tool allows a manager to track all incoming and outgoing packages at one time without the need for tracking numbers, creating a more efficient way to cater to the business and its customers. To use the tool, a company must request the use of the application and FedEx will transfer the company's information so that tracking can be accurate. The shipments can be tracked and the information can be downloaded to keep records and analyze for more efficient shipping techniques. This application has many

great business implications for both new, smaller companies as well as large companies in any industry that requires shipping and receiving goods. The application can also be customized for each company's needs and preferences.

This is a real time management process because it permits a company to manage shipping logistics in real time. The ability to see shipments in real time allows for much more accurate management in several different areas. First, it provides exact locations of current shipments which can allow managers to notify customers of exact shipment times as well as prepare for incoming shipments. This can increase customer satisfaction and decrease ineffective shipping arrivals. The real time shipping program also allows users to more efficiently manufacture and distribute products which will save them time and money every day. Being able to see incoming and outgoing shipments in real time will help many different industries to be more efficient in the production and shipping of their products. This is a very important tool that has changed the shipping industry and has allowed both individuals as well as companies to enhance their shipping process.

## **Fedex**

### **Real-time logistics**

FedEx is a company that operates in real-time. Fed-Ex is a "cargo airline, printing, and courier company offering overnight courier, ground, heavy freight, document copying and logistics services." [1]

FedEx has implemented numerous processes to create a real-time service. They have implemented a computerized package tracking system called COSMOS (Customer Operations Service Master On-line system) that monitors every phase of delivery cycle. [2]

First, customer service representatives enter shipping information into COSMOS through computer terminals, alerting the dispatcher closest to the pick-up or delivery area. These dispatchers relay pick-up and delivery information to the courier via DADS, small digitally assisted dispatch computer systems found in all courier vans.[2]

Then, hand-held computers, called SuperTrackers, are used to scan the progress of the package an average of 5 times from pick-up to delivery. Couriers simply scan the bar code on every waybill with their SuperTracker, at every stage of the delivery process. Scans are performed at time of pick-up, on arrival at the origin station, on arrival at the destination station, when placed on the courier's van before delivery and on delivery at the recipient's address. SuperTrackers retain and transmit package information such as destination, routing instructions and the type of service requested.[2]

Once a courier returns to their van, the information is downloaded from the SuperTracker to DADS, which updates the package location in the COSMOS system. Thus, a customer can find out at any time exactly where their package is and when they can expect delivery, whether they call Customer Service or track the package themselves on the FedEx website.[2]

Another real-time system used by FedEx is Command and Control. This is a satellite to ground-level operations system that enables FedEx to deliver packages by the fastest, safest and surest route, in any weather condition. It is a relational database that coordinates FedEx logistics worldwide and uses satellite and computer communications technology to monitor routing and traffic information in real time. FedEx uses NASA weather data and artificial intelligence to plot alternative routes where weather may disrupt on-time delivery. This system provides three best alternative transportation options for a shipment in real time, allowing FedEx to select the fastest, safest, and most cost-effective route.[3]

This system used by FedEx is a real time process because every time there's a transfer of cargo, the location of the cargo is recorded in real time, allowing customers to know exactly where their package is located from the shipment point to the destination. It also allows FedEx management to maintain complete control over shipments at every step in the delivery process, allowing them to promise to deliver all packages within one minute of the delivery commitment.[2] Even the courier routes are determined in real time based on where the delivery vehicles are located and what the weather conditions are like, and this is extremely beneficial to FedEx management in determining cost-effective solutions that will maximize customer satisfaction in deliveries.

## **Macy's**

### **Logistics**

Macy's Logistics and Operations-[ML&O] (aka Federated Logistics & Operations) is a support division of Macy's Inc. This division deals with a variety of logistics, distribution and operations functions for Macy's and Bloomingdale's stores. The primary responsibility of ML&O is to ensure the efficient and timely flow of fresh goods to the selling floor. The division also delivers merchandise, primarily furniture and other large-ticket items, to customers' homes and fulfills Internet and catalog orders<sup>1</sup>.

To support these initiatives, ML&O is aggressive in identifying and implementing logistics systems and new technology, as well as working with vendors to maintain high standards for the company's supply chain. It uses EDI with vendors and RFID to help to flow of goods through the distribution centers.

A real time process would be the trailer status. From experience in this department, I can say this process affects different departments and divisions. Two very critical programs used to make this process possible are FedFlo and Pipeline. FedFlo is an internal program for the division to track movement of trailers within our yards and progress of appointments. You can also track outside shipments coming in to distribution center to a certain extent. Pipeline is also an internal program for all divisions but mainly used by the retail divisions to track deliveries of Purchase orders and expectancy of trailers. From here, they can also find “hot shipments” and prioritize if the merchandise is needed for immediate sale. I'll pose an outbound appointment scenario: A ‘move’ is requested to put a trailer into a loading door to begin loading merchandise for a store. FedFlo is used to *systematically* create a move to put a trailer into that door. Drivers use FedFlo to determine what trailer they need to find and where they need to put it. Once that trailer is put in the door, an appointment is created. Different phases of the appointment are Confirmed, Ready to Load, Loading, Load Complete, Intransit, Arrived, Unloading and Unload Complete. Once an appointment is created, it can be viewed in FedFlo and also Pipeline. Anyone within the organization who has access to either or both of these programs can see the status of a trailer. For example, an appointment states a trailer has a delivery time of 7a, (it is now 7:30a) I would use FedFlo to determine what time the trailer was put in transit and calculate if it left within standard time to meet delivery deadlines. In the event that I could not determine the information, I can contact our carrier- Keystone, and they can use their GPS system to locate the trailer and determine the estimated time of delivery. Another important factor is the use of RFID guns. These RFID guns are used to scan the merchandise loaded onto an outbound trailer. The information is tied to the appointment. The trailer manifest to that appointment details all the Purchase orders a store should expect to receive. When the store receives the trailer and begins to unload, the merchandise is then transferred into their inventory. These processes all happen in real time and help manage the flow of goods through the warehouse and incoming merchandise into the stores. The only detriment is that the

## **ProFlowers.com**

### **Inventory Management and CRM**

A “real time enterprise” can be defined as an organization that uses information technology to “react instantaneously to changes in business” (Siegle). The response is either a human or an automated response, which in effect reduces the latency, or costly time lags, that are inefficient and can make the business uncompetitive. The delays a real time enterprise is able to minimize can relate to all stages of the supply chain, and they can be either interprocess or intraprocess latencies. Many companies today are increasingly employing the use of Enterprise Resource Planning systems, or ERPs. An ERP can be defined as a software package that “provides functionality in a single package that normally would be covered in two or more systems” (Wikipedia.) For example, ideally all computer systems in a company would be combined, including Human Resources and Payroll, Customer Service and Data Warehouse, Manufacturing, Supply Chain, and other Projects (Wikipedia.) When the relevant data can be viewed on one screen as a dashboard, updated in real time to be as current as possibly at the time viewed, this information can be of great assistance to the company. Some benefits that result in a real time enterprise are the ability to inform a customer very easily if an item ordered has been shipped, as well as when it is expected to arrive due to the real time functions of the carrier such as UPS, DHL, or Federal Express, the ability to react to any changes or unforeseen problems quickly such as damaged or defective merchandise items before they are packaged to be shipped, and the ability to introduce more customer-friendly services such as allowing customers to select a delivery date while being informed if their preference is feasible (Siegel.)

One company that has notably used information technology to maximize real-time functions is ProFlowers.com. It is commendable that ProFlowers reduces latency by not only employing real time information technology, but also eliminating several stages in the typical supply chain for online florists. Instead of shipping from a company warehouse, the flowers ship directly from the producer to the gift recipient, and ProFlowers uses technology to monitor this process. This company is “the nation’s largest grower-direct Internet flower provider” that is “owned by Provide Commerce,



Inc., a wholly owned subsidiary of Liberty Media Corporation” (Wall Street Journal.) On July 25, 2007, ProFlowers, which has had a history of properly using real-time technology to meet customer demand and enhance customer service, decided to switch to use the software of Omniture, Inc. to perform its real time enterprise functions. Omniture will monitor in real time several types of important information for ProFlowers including data regarding “how to best manage inventory” and “which products to promote and when to essentially slow down product sales based on visitor response” (Wall Street Journal.) Real time data is extremely cost effective to ProFlowers since its products are perishable. The real time data allow ProFlowers to best meet customer demands during its major busy seasons before Valentine’s Day and Mother’s Day. Previously, ProFlowers has used the software of WebSideStory’s Hit Box Enterprise since 1999 and combined this with WebSideStory’s Hit Box Commerce in 2003. Hit Box Enterprise provided some valuable real time customer order and product demand related information, and Hit Box Commerce greatly improved on real time enterprise functions and capabilities for ProFlowers. This software was able to improve on ProFlowers’ business operations by making data accessible pertaining to “what happens between site entry and order” as well as “what happens between site entry and abandonment” (Hannah.) In this way, ProFlowers has been able to predict future customer demand by seeing customers interests and browsing patterns. ProFlowers also uses the Internet after the order is placed to locate the most appropriate grower for each order based on the type of flower selected and the location of the recipient. Through the Internet, the customer order information is sent to the grower, along with the required Federal Express shipping label and greeting cards the grower can print out to ship the order to the intended gift recipient. ProFlowers’ carrier, Federal Express, also uses real time technology to track packages. Each customer is sent by e-mail a link to the Federal Express tracking information for the order, and with this information delivery progress can be viewed online in real time once the order is shipped. In these ways, ProFlowers successfully employs real time information technology in its supply chain and operations.

## **UPS**

The United Parcel Service (UPS) is the world's largest package Delivery Company and global leader in supply chain management. "It offers a range of supply chain solutions, such as freight forwarding, customs brokerage, fulfillment, returns, financial transactions, and repairs." (2) "The Supply Chain and Freight segment provides freight forwarding services and logistics services, including supply chain design and management, freight distribution, customs brokerage, mail and consulting services. It also offers various less-than-truckload and truckload services in North America, as well as consulting and professional services. In addition, this segment provides electronic services, which include various online solutions that support automated shipping and tracking." (2) In 2006, the company recorded revenue of 47,547 million dollars, an increase of 11.7% over 2005. They provide transportation services, primarily domestic and international letter and package delivery. UPS operates a ground fleet of over 100,000 vehicles and roughly 600 airplanes.

### **Package tracking**

UPS began to operate in real time when it allowed customers to track the exact location of packages, and the precise day when they will arrive. Instead of trying to figure out the location of a package, customers now have the capability of mapping the package's destination. "The tracking tool provides you with real-time status of your shipped package from the delivery carrier you selected at the time of shipment. All you need is the delivery carrier tracking number provided to you at The UPS Store location you shipped the package from." (1) UPS recently implemented a plan to allow customers locate their package through devices. "A customer can now maintain visibility of their urgent shipment while in transit. They receive real-time updates on your shipping status - including any delays or reroutes during transit - in any format you desire, whether it's email, phone, fax, PDA or cell phone." (1) If there is a real time delay or your package needs to be rerouted, your email will be updated with the new map. Tracking packages

in real time has significantly reduced customer complaints due to lateness and lost packages.

Tracking packages through your PDA or email is a real time process because it allows you to view the location of your package at that moment in time. Customers are more content about delivering items when they can view where the package is along its route. Like I said before, UPS can now manage its logistics in real time. It also aims to support a few real time management decisions. Sensors scanning each package along the route allow customers to track their package. Because customers are now able to track real time progress of packages, management decisions become important. Upper management needs to decide how to micromanage each delivery to make sure the package is correctly following the route that is displayed to the customer. Because customer's can view packages throughout the packages' route, Information Technology's role in UPS is vital. Management needs to decide how much resources to allocate to this department because they are responsible for keep the servers up and informing customers about their package. With a real time tracking plan implemented, more management decisions must be carefully applied.

## ***CRM***

### **Anheuser-Busch**

#### **Customer and sales tracking**

Anheuser-Busch is one of the world's largest brewers, best known for its Budweiser and Bud Light brands. The domestic beer division consists of the company's U.S. beer manufacturing and company-owned beer wholesale sales operations, including vertically integrated rice, barley and hops operations. The domestic beer division includes US beer manufacturing and the group-owned beer wholesale sales operations. It operates

through the subsidiary ABI, which produces and distributes beer under the brand names Budweiser, Michelob, Busch, Natural Light and Natural Ice. It also distributes specialty beers, non-alcohol brews, malt liquors, and specialty malt beverages.

Anheuser-Busch is aiming for close to real time in the way it tracks its customer and sales data and responds to changing customer demands. To do so, the company has put a system in place called BudNet. The way BudNet works is as follows: Sales representatives collect new orders and track competitors' marketing efforts on PDAs and laptops. Distributors compile data and transmit it daily to Anheuser headquarters. Anheuser brand managers look at the data and give orders to the distributors based on this data. Distributors log on to BudNet to get the latest intelligence. Finally, sales representatives rearrange displays and rotate stock based on the recommendations. "The last time you bought a six-pack of Bud Light at the Piggly Wiggly, Anheuser servers most likely recorded what you paid, when that beer was brewed, whether you purchased it warm or chilled, and whether you could have gotten a better deal down the street." This data is very important to Anheuser-Busch, and, as a result, they devised this system to get it as close to real time as possible.

"If Anheuser-Busch loses shelf space in a store in Clarksville, Tennessee, they know it right away," says Joe Thompson, president of Independent Beverage Group, a research and consulting firm. "They're better at this game than anyone, even Coca-Cola (KO)." The reason BudNet is a real-time process is that it tells managers what is happening in its products' stores immediately. If the beer is losing shelf space to another product, managers are notified and can immediately alter their production and marketing plans. In fact, BudNet aims to support the following real-time management decisions: it allows managers to use the data they receive from the distributors to constantly adjust production and change their marketing campaigns, to devise new marketing strategies, to design promotions that cater specifically to the demographics of certain markets, and to warn them when and where a competitor may have a competitive edge. It looks to prevent any decreases in distributors' inventory of beer from resulting in decreasing sales and profits. It has been very effective--Anheuser has seen double-digit profit gains

for twenty consecutive quarters, while its nearest competitors, Coors and Miller, have flat lined. It has also changed the dynamics of the beer wholesaling industry.

## **E-Bay**

### **Real-time auctioning and customer support**

Real-time processes are the foundation of eBay's business plan. "Founded in September 1995, eBay (Nasdaq: EBAY; <http://www.ebay.com>) is The World's Online Marketplace™ for the sale of goods and services by a diverse community of individuals and businesses" (wtn.net). eBay is a global trading platform meant for individuals from all over the world to buy, sell and auction off goods. Reducing latency in this type of industry is critical because increasing the time a customer has to wait to view the latest bid, increases the chances of the individual losing that item. In order for the system to run smoothly, data must be updated without delay.

"Vendors have been touting technologies that give enterprises greater flexibility and the capability to respond rapidly to marketplace changes and customer demands" (tmcnet.com). eBay is the leader in its market b/c it is experienced in the real-time process of updating massive amounts of data and is essentially error free. As tmcnet.com noted, "eBay hosts 100 million concurrent listings, which are updated at a rate of 500 times per second and searched 3,800 times per second." A customer can place a bid and eBay will bid "behind the scenes" in place of the individual up to the maximum amount allotted by the customer. These conveniences and the flawless techniques in which eBay employs them are what sets eBay apart.

Ebay has created an online auction marketplace where sellers can post a product that buyers locate, find and purchase.

The process of selling and purchasing products is the one that aims towards real-time (or close to real time).

Ebay is a real time application since time is a crucial factor in the successful purchase of a product from an online auction. Generally, when sellers post their products, buyers have a specific period of time in which to bid. If a buyer's bid is too late, sellers are not obligated to purchase. Thus, time is a crucial factor in the success of the auctioning marketplace created by Ebay.

The time management decision Ebay aims to support is the one deciding when the best time to bid is. Generally, with auctions, the market value is the sales price. However, with auctions, the sale has not occurred until the highest final bid has come in before the deadline. To get the lowest price, one needs to wait until the absolute last minute to find the highest price and bid over it.

## **JetBlue Airways**

### **Customer Services**

A prime example of an application of the concept of a real-time economy is JetBlue Airways Corporation's use of the Internet to serve its customers.

JetBlue was founded in 1999 by David Neeleman, a former Southwest Airlines employee, who sought to provide low-cost travel like Southwest, but distinguish the company by its service. It now flies to many locations both domestically and internationally, and still holds fast to its commitment to excellent service.

Probably the first web tool used by JetBlue was its online check-in feature, which most other major airlines have also adopted. Essentially it allows consumers to check into their flights within 24 hours over the Internet. As a part of this process, the consumer must indicate whether or not he/she will be checking bags in; if they are, they can print labels to stick to the bags. Additionally, consumers are shown the location of their seats in the plane in a bird's-eye view of the interior. Furthermore, if they wish to move, they may sometimes arrange that online as well, since seats are color-coded by availability.

At the end of the entire check-in process, the consumer can print his/her boarding pass. All of this may be done either at a kiosk at the airport or at home.

### *Airplane tracking*

A more recently added real-time process involves a partnership with Google Maps. This partnership will show passengers a superior map on their individual screens tracking the plane's movement, and people on the ground can check the same map on the Internet. While there is limited practical value in giving passengers these features other than curiosity, these features are great for relatives and friends on the ground for either confirming a safe trip home or figuring out when to head to the airport.

### *Online Check-in*

Online check-in for JetBlue is real-time, especially when it comes to choosing a different seat in the plane online. Customers' ability to see at any one time what seats are available on the plane is a prime example of JetBlue's adaptation to the real-time economy.

### *Flight trackers*

Flight trackers have been around for a while, and all of them have been good examples of applying the concept of the real-time economy. JetBlue's new version with Google Maps definitely fits the bill in that it allows customers to see a plane's exact location and track its progress in real time. Although it is not the only online flight tracker in existence, this JetBlue/Google project promises high gains since both companies are very progressive and innovative.

## Target Corporation

### CRM

Target Corporation (NYSE: TGT) is a general retailer focused on discount goods, and has 1,488 stores nationwide in 47 states (all states except Alaska, Hawaii, and Vermont). Target Corporation (AKA "Target") vends goods under both its private name labels (Choxie, ProSport, Gilligan & O'Malley, Merona, Room Essentials, Xhilation, etc.) and fully licensed brands (ChefMate, Eddie Bauer, Isaac Mizarahi for Target, Mossimo, Thomas O'Brien, Smith & Hawken, etc.). Target Corporation consists of Target, SuperTarget, Target.com, Target Financial Services, Associated Merchandising Corporations, and Target Commercial Investors, and Target is the sixth largest retailer in terms of sales revenue. The original store was founded in Minneapolis, Minnesota in 1902 by George Dayton, and was called Goodfellows. A few years later the company became Dayton Goods, but the company would not delve into clothing until 1962, with the opening of its first Target store. In 1975 the company became Dayton Hudson Corporation, and finally in 2000 the company formally known as the Dayton Hudson Corporation became Target Corporation. Among Target's major products are clothes, home décor/ accessories, school/ office supplies, luggage, entertainment, and gift cards (Target sells more gift cards than any other retailer in United States). Services provided by Target include Club Wedd Registry, Target Baby Registry, Target Photo (currently in conjunction with Shutterfly and Yahoo! for web-based sales and printing), Pharmacy, Optical, Financial Services, and Credit Cards. Finally, the company's revenues were \$59,490 million during the fiscal year ended January 2007 (an increase of 13.1% over 2005).

Target Corporation uses both real-time and close to real-time procedures to insure customer satisfaction. Target uses real-time in its services division through the gift registries: Club Wedd Registry and Target Baby Registry. The gift registries are used by consumers to make a "wish list" for either wedding/ bridal shower gifts or baby



shower gifts. How the gift registries process aims at real-time economy is the engaged or expecting couple enters themselves into an online database through Target.com to create their “wish list.” Once the gift registry list (“wish list”) has been created friends and family can look up the couple before shopping. As family and friends buy gifts, the list is automatically updated. Furthermore, Target uses close to real-time in the product sector of the company. Close to real-time inventory is achieved through an available, online package tracking system. It is possible to track purchased goods through the tracking link at the bottom of Target’s home page. The tracking number, assigned at check-out, can be used to follow the path of goods through the system to your home. It includes an expected delivery date, and check points for reference.

The gift registry is considered real-time economy because after the engaged or expecting couple creates their registry they tell friends and family members they are “registered at Target.” Before friends and family shop, they print out a copy of the registry (via a home printer or Target Gift Registry Printer upon arrival at the Target store) and then choose gifts from the registry to buy for the couple. Friends and family circle the item(s) to be purchased at check-out. When friends and family check-out, the teller enters the circled items into the computer’s database and the gift registry list for the couple recognizes the purchased items and updates. The item is scanned and entered; the list reflects the purchase(s) made so that the couple receiving the gift will not receive several of the exact, same items. Alternatively, through Internet shopping, the item number of the gift on the Gift Registry List is entered during the online check-out process. For instance, real-time economy is show in the registries because a friend of the couple could be shopping in a Target store in New Jersey, while a family member is shopping online in Florida. The gift registry updates for each purchase made in a store and/or online, so that subsequently others do not buy repeat gifts. Both in-store and online options available to consumers are excellent examples of real-time economy. The latency factor in information is eliminated thanks to the real-time economy that is used at check-out time. Thus, the receiving couple does not struggle with multiple gifts on the Wedding or Birth Day.

Gift registries strive more to please customers than to help make management decisions in this particular case. Therefore, this makes them part of CRM (Customer Relationship Management) and “e-care,” which is inter-related to the real-time economy in this particular instance. However, it is extremely important to note, management is radically helped by the registries and the real-time economy that they use. Management is greatly helped because it becomes aware of the wants and needs of the couple registered, and the buying patterns of the couple’s friends and family. Management can follow how much money friends and family members spend on gifts, and what items are popular/ unpopular among the registered couples (allowing management to order more or less of an item). Gift registries are advertised as “convenient to consumers” (a CRM type of function), but they also serve these critical management purposes. Additionally, real-time economy is closely achieved through Target’s package tracking system (another CRM idea that is blended into the real-time economy). Consumers may enter their tracking code and “watch” their goods check through certain points. Tracking of packages is not as precise of a real-time economy application as the gift registry because goods made stagnate in certain delivery warehouses, checkpoints, or must wait a day for the next available truck pick-up. Still, tracking numbers help to approach real-time, and are accurate to within a day. Management is helped with tracking of packages in the same way as gift registry. Tracking is touted as a great consumer benefit. Nevertheless, like gift registry, management reaps the benefits as well. Management can follow deliveries to specific stores from regional distribution centers, and get insight into online shopping. Clearly, Target realizes the PROs of the real-time economy and uses the real-time to benefit consumers (CRM), managers, and by extension the company as a whole.

## ***Dashboards***

### **General Electric**

#### **Digital Dashboard**

General Electric (GE), which was founded in 1878, is the “world’s second largest company... in terms of market capitalization.” GE consists of many sub-businesses: “GE Commercial Finance, GE Industrial, GE Infrastructure (including GE-Aviation and

Smiths Aerospace), GE Consumer Finance, GE Healthcare, and NBC Universal... [and through these divisions, GE] participates in a wide variety of markets including the generation, transmission and distribution of electricity, lighting, industrial automation, medical imaging equipment, motors, railway locomotives, aircraft jet engines, aviation services and materials.” Overall, GE is a very lucrative company that earned US\$ 163.391 billion in revenue in 2006. One of the reasons that GE is such a lucrative business is because it has adopted real-time economy processes in some of its divisions and reduced time and money consuming tasks.

GE has the following processes that aim towards real-time economy: (1) Digital Dashboard: "digitising- setting up a digital nervous system that connects everything involved in the company's business: IT systems, factories, employees, suppliers, customers and products." The dashboard, with its green, yellow and red lights, "signals the status of software applications critical to GE's business." Thus, "if one of the programs stays red or even yellow for too long, Mr Reiner, the chief information officer, gets the system to e-mail the people in charge. The dashboard also shows "when he had to intervene the last time, or how individual applications—such as programs to manage book-keeping or orders—have performed." Overall, GE's senior managers also "have such [an]... updated view of their enterprise... [but] their screens differ according to their particular business, but the principle is the same: the dashboard compares how certain measurements, such as response times or sales or margins, perform against goals, and alerts managers if the deviation becomes large enough for them to have to take action." (2) GE Turbines, Aircraft Engines and Locomotives: are equipped with sensors, and so, via the internet, the company can tell its customers how efficiently their machinery is operating and it can identify and notify airlines of any problems. These sensors regularly transmit information via satellite to GE. (3) Online Kiosks: in 2000 GE's consumer-appliance business installed online kiosks in selected branches of Home Depot. Customers can order an appliance, select a delivery date and time, and be told instantly whether their request can be met.

GE's digital dashboard, turbine sensors and online kiosks are real-time processes because they facilitate instantaneous communication within the company and between consumers. These processes allow different managers to constantly monitor

GE's products and immediately respond when conditions change. Real-time economy (which does include dashboards and sensors) aims to reduce intra and inter-process latency so that it can speed up information flow and monitor a business as frequently as possible. Thus, GE's processes support the real-time aims because the dashboard not only makes selling products easier via internet and technology but it provides almost instant access to information when problems arise and it incorporates different divisions into one system; the turbine sensors enable the company to almost immediately help the consumer; and the online kiosks increase sales by raising customer satisfaction because ordering and selecting a delivery date can be immediately requested and tracked. These processes have reduced latency in both troubleshooting and selling products and "GE estimates that its digitization efforts saved it \$1.6 billion last year," thus, these benefits have supported the now and instantaneous real-time economy

## **California Heart center Foundation**

### **Real-time dashboard**

The California Heart Center Foundation, with the world's largest heart transplant program, has implemented dashboards to deliver real-time feedback of operational data to its board of directors. The dashboards hit two major business functions in the healthcare industry: payer performance and patient referrals.

On a daily basis, the foundation can measure the difference between the actual and expected reimbursements from its managed care payers and payer performance of claims processing. Claims processing includes the entire process of entering the procedures rendered until payment is collected or denial is determined. Executives can also develop a billing scorecard system from dashboards to see billings from doctors, delinquent payers and payer reimbursement percentages compared to an overall average. Once the California Heart Center Foundation implemented the dashboard, it

quickly noticed the actual reimbursement from one payer was 30 percent off of the expected reimbursement. This triggered the foundation to call the managed care organization and the problem was quickly resolved. If they hadn't been tracking payer performance in real time, then they probably would now have found this error for three months.

Patient referrals are also very important to the foundation as it directs the largest heart transplant and heart failure program in the world. By implementing the dashboard, the board of directors kept track of how many patient referrals there were and exactly who they were coming from. This information provided evidence that most of the referrals were coming from a few physician groups that they had not paid attention to in the past. By knowing which groups were giving the referrals, the foundation could focus on those relationships and make sure that there is constant communication between the two groups. Their marketing approach would ensure that these physician groups would continue to refer patients to the foundation and even increase the referral rate.

By implementing these dashboards, the foundation board gained visual insight into the daily activities of the foundation and was able to improve reimbursements from managed care payors. They had access to financial data and knowledge at the time in which the action was performed allowing the foundation's board of directors to make real time decisions. "The Board members can log onto the system and see 'actual real-time' performance data that is relevant to them. This gives the board great transparency, which is so critical in today's regulatory environment." The article goes on to say that "as pay-for-performance systems and consumerism begin to shape the healthcare environment and demand new types of business models from the organizations, transparency will be a main business and organizational goal." The dashboard was a complete success to the California Heart Center Foundation as their return on investment has increased significantly in the past 6 months after the dashboard was implemented.

## ***Financial***

### **Dow Chemical**

Dow Chemical Company (Dow) is a manufacturer of various chemicals, plastics, and agricultural products. It does this through its subsidiaries in six different segments. These business segments are Performance Plastics, Performance Chemicals, Agricultural Sciences, Basic Plastics, Basics Chemicals, and Hydrocarbons and Energy. Dow is in the Basic Materials Sector, specifically in the Chemicals Industry. Dow has been in operation since 1897 and it is based in Midland, MI. With over 40 thousand employees and assets well over \$45 billion, this company has many complicated processes.

### **Real-time reporting**

Dow has aimed towards real-time reporting of all sorts of data from financial, to logistics. According to Computerworld, Dow went live with their real time reporting system in 1997 and received national recognition for its innovative and effective methods. The new methods allowed Dow to eliminate 1,300 legacy systems such as logistics and manufacturing systems. The new real-time reporting system can now generate instantaneous reports on things such as inventory management, sales, management, production, expenses, capital spending, fixed-asset monitoring, and personnel data. Dow is able to perform this close-to-real time function using centralized databases and ERPs such as Business Objects and Power Play.

Traditionally, corporate accountants took “their time assembling, analyzing, and packaging financial data for executives” (Computerworld). Now, management can get the reports instantly and make decisions based on this data in a timely manor. According to Randall Russell, “budgets tend to be retrospective...They give you a view of what happened last time but don’t tell you what the drivers are for the next year.” With the implementation of these real-time reports, that is virtually not the case anymore. Now people can look prospectively at the budget as well as retrospectively. Finance departments can now decide on whether to continue an activity or not, base on profitability reports that are generated up-to-the minute. With the acceleration of product turnover cycles and the development of e-commerce, it is only natural to develop these real-time reports.

## **Prestige Capital**

### **Online Trading**

Prestige Capital is a proprietary equity trading firm, which I traded for, located in NY, NY. They were founded in the mid 1990's when volatility was high on the NYSE and day trading was an exceptionally profitable occupation. There are many firms like this small broker dealer across the United States that provide real time trading platforms.

Prestige Capital provides software that is a direct access trading system designed for the professional proprietary or retail remote trader. The technology allows the trader to access ECN's, NYSE, Nasdaq market makers and regional exchanges in real time. Some of the features provided include: almost instant order executions, realtime stock quotes, realtime charting, and realtime NYSE openbook.

It is imperative for quotes and executions to be in real time due to the speed with which trades need to be made. Stock prices change rapidly and any delay in execution or in the accuracy of the price is detrimental to trading profits.

## **Scottrade**

### **Online trading and CRM**

Scottrade is a privately owned discount retail brokerage firm. It is best known for its online trading services of low commission that cost a flat \$7 per trade. Riney founded Scottrade in 1980, as Scottsdale Securities with only one office in Scottsdale, AZ. Today, Scottrade has over 300 offices nationwide, employs 1,731 employees, and earned almost \$800 millions in revenue for the year 2006.

In 1996, Scottsdale Securities offered online trading to its customers, under the domain name of [www.scottrade.com](http://www.scottrade.com). This venture gave the company the advantage of other competitors as an online brokerage firm. It adopted the Scottrade name as its corporate name in 2000. In 2003, Scottrade launched a new trading platform, called Scottrade Chinese that made it available to customers in the United States, China, Hong Kong, and Taiwan. This expanded their market share internationally. J.D. Power and Associates named Scottrade Highest in Investor Satisfaction With Online Trading Services for an unprecedented fourth consecutive time in 2003. (Scottrade.com, wikipedia)

Scottrade's success is achieved by its real time stock online services and their real time stock news and research. Customers are able to manage their accounts in real time and conduct live research.

As an online trader with Scottrade discount brokerage, you can access leading stock research and news from their content partners in real-time, allowing a competitive edge when investing in stock. Scottrade capitalizes on their real time application of its online trading interface. This application is provided to every account holder, the program deliver live streaming of stock quotes and market news. It is a very convenient application that is programmed through a web browser. News ticker and stock research through Standard & Poor are also available to each customer online. This service provide real time access and management that is convenient. (Scottrade.com, wikipedia)

Scottrade is most credited for its execution time of stock. By the time you click to buy or sell a stock. The order will process to Scottrade trading center, then it is acknowledge by Wall Street institutions, and finally confirmed through Scottrade systems. The average time for a Scottrade execution is 0.86 seconds. This extremely fast and swift, and this is due to its real time infrastructure. (Scottrade.com, wikipedia)



Scottrade service is heavily dependant on its real time process. Customers are independently managing their account through online. Therefore, all services can be executed through a click of a button. The management decision to support its service by maintaining a dependable service that keeps them on the edge over competitors. Their low fee is the reason why customers are attracted, and the service is what keeps them at Scottrade. Therefore, Scottrade focus its service in trading quality, execution time, and live research availability. (Scottrade.com, wikipedia)

## **GloBalTec**

### **Software for personal investors**

GlobalTec, a major provider of investment software for personal investors. I have had personal experience with GlobalTech through use of their software Wizetrade. GlobalTec was founded in 1999 by George Thompson and has sold about 100,000 software programs. The GlobalTec software line includes Wizetrade, 4X Made Easy, Wizetrade for Options, Commodity Explorer and CommandTRADE. GlobalTec has taken advantage of internet technology advancement and had delivered real-time trading tools to the growing online trading community.

[www.globaltecsolutions.com](http://www.globaltecsolutions.com)

The process that Wizetrade attempts to create is real-time supply and demand charts for stocks. Using a graphical interface, Wizetrade takes a set of complex data and variables and translates them into simple to use charts. Wizetrade uses an intricate algorithm to take raw data and interpret it into continuously moving supply and demand pressure graphs

[http://www.gurubusters.com/Not\\_Recommended/Wizetrade.html](http://www.gurubusters.com/Not_Recommended/Wizetrade.html)).

This is a real-time process because the program continuously updates the supply and demand pressure trends of stocks. It runs on a real time basis, and the speed in which the information is received depends on bandwidth. One of the icons on the screen is a heart which beats, telling you the pace at which the information is being transmitted onto your computer. From my experience the heart beat has been very steady and the information seems to change by the minute.

This product aims to support stock and portfolio management decisions ranging from day trading to long-term investments. The program allows you to configure the information based on what type of trading you are doing. For instance a day trader would be interested in the minute by minute updates where as a long term trader is more concerned with the monthly or yearly trends. Also you can configure the program to look for stocks within a certain price range or average volume traded daily. This makes the program good for people on a small budget and the volume allows you to realize spikes that might have artificially caused a stock to rise. Another configuration is that a person can set what types of trends he/she wants to follow. For instance, a person looking to sell a stock short would be looking for a possible downward trend in the supply and demand pressures. The idea of selling short is to sell high and buy low. So the person would attempt to find a stock at a peak that looks as though it's about to fall. Along with the trends, the program gives buying, selling, closing prices, continuous and historical volume, plus many more in depth analysis figures. This program is great for personal traders, with some experience in stock trading. I have found that I get the best results by

incorporating research of companies along with the program to find the best companies to trade. However, I have found that using the program without outside research has given me break-even results. The program also features some integrated online brokers, so you can do your trading right through the program instead of having to go to another website. Overall, Wizetrade is a real-time stock analysis program that is helping revolutionize and promote the growing industry of online trading (all information in the last two paragraphs is from personal experience using the program).

## ***Infrastructure Support for Real time Management***

### **AT&T**

#### **Real-Time Sensor-Based Networking Solutions from AT&T**

On March 26th 2007 ATT&T introduced three new networking solutions to the public; all of them utilize sensors and are designed with the express goal of allowing businesses of all sizes to increase efficiency by tracking inventory, products in transit, and even personnel in real-time. The solutions are known individually as AT&T Mobile Resource Management , AT&T RFID Asset Visibility and AT&T managed passive RFID solution.

AT&T Resource Management uses GPS and AT&T's advanced national wireless network to provide customers with not only the ability to track company vehicles, but also to gauge the speed and condition of the vehicles on the road and monitor the location and condition of company inventory and products. AT&T Mobile Resource Management is specifically designed to appeal to managers who oversee large "field forces" of vehicles over a wide territory of land. By knowing exactly the location and condition of a companies field force at all times, they can better synchronize different vehicles in order to lower costs for the company. The service additionally allow for "hotspots" to follow vehicles on the road, providing wireless access to AT%T's global network. AT&T has utilized the technology in 35,000 of its own vehicles since 2004 and has reported dramatic improvements in efficiency.

AT&T RFID Asset Visibility uses active RFID tags to automate collection of data such as product location, allowing for more efficient supply chain management. AT&T RFID Asset Visibility also includes an AT&T wireless unit, AT&T wide area data networking and AT&T Hosting and AT&T Consulting and Integration Solutions.

The third solution is a passive RFID service that allows companies "...to monitor the locations of entire shipments or individual packages within a shipment", either as a group or as individual items. This service also provides access to AT&T's EPCglobal database and a program analyzing inventory in movement for RFID transactions. AT&T in an internal study determined that this solution reduced shipment time and costs for customers among other benefits.

These three solutions by AT&T are classic examples of real-time economic functions. The main purpose of using sensors or RFID chips is to reduce latency and transfer data with important business implications nearly instantaneously. They have the additional benefit of lowering costs as well as eliminating the need for humans to engage in what can be very draining and boring work. AT&T with its world class wireless networks and tracking technology are right on the cusp of the real time economy revolution and are industry innovators.

## **Integrated Solutions technology**

Integrated Solutions Technology for a year, it is a global leader in providing Apparel Solution and Software Products. Combining the creativity of world-class developers and cutting-edge technology, as a premier vertically-focused Application Solutions Provider, it offers an integrated suite of supply chain systems and consulting services. Its solutions are all intended to equip business to have that global competitive advantage. It accomplishes this through designing, pilot testing, implementing co-

developed strategies, supplying the technical and operation support to build the most efficient and effective apparel supply chain solution. IST has developed several softwares.

### **Order fulfillment**

ASNxFGA – is an order fulfillment solution for Finished Goods. It's a scan and pack system that eliminates confusion brought about by the tedious process of packing voluminous quantity of goods and its mixing variations. The system provides comprehensive and customizable reports to address the unique needs of different buyers.

#### Product Facts

- True client/server technology for concurrent multi-station scanning of finished goods.
- Multi-language capability
- Supports variation of packing modes
- Generates customized Reports, UCC compliant labels, Packing Lists and Shipping documents.
- Tested and accepted by major US companies for EDI compliance.

### **Document Exchange**

XoTrack – is a web based document exchange system with incomparable functionalities against other products. The system can send, receive and convert

documents in EDI, XML or other file formats. It allows small to medium scale operations to do business on the same footing as big industry players in terms of communicating among the members of the whole supply chain community. Product Facts

- Rapid Application Deployment (RAD) for immediate EDI compliance of Vendors and Secure WEB transaction that eliminates expensive VAN subscription and usage
- Community based relationship of Buyers, Vendors, Agents, Factories and Distribution Centers efficiently covering the whole supply chain.
- Online Creation of Purchase Order, Packing Plan, Packing List, ASN and Invoice
- Offline Printing of UCC labels and UPC Polybag stickers on Laser Printers compared to Thermal Printers.

## **Sun Microsystems**

### **Providing Infrastructure for the Real\_time Economy**

Sun Microsystems Inc. provides network computing infrastructure solutions that include computer systems, software, storage, and services. Sun creates products and services that address the complex issues that customers face today, including increasing demands for network access, bandwidth and storage being driven by explosive growth in network participation and sharing. Sun's network computing infrastructure solutions are used in a wide range of industries including technical, scientific, business, engineering, telecommunications, financial services, manufacturing, retail, government, life sciences, media and entertainment, transportation, energy and utilities, and healthcare.

Sun has brought together the world's brightest technical minds to solve the world's biggest technical problems. Its vision of "Everyone and everything participating on the network" means that when people are networked, they share; they interact, and solve problems. Sun's mission is to create technologies and fuel communities that enable sharing and participation by eliminating the digital divide. Eliminating the digital divide allows everyone to take part in opportunities and contribute to solutions regardless of their geographic location or economic situation.

To accomplish these goals, Sun invests in research and development to create products and services that provide competitive differentiation for our customers and for developers adopting our technology. Sun integrates software, storage, services and systems and we believe volume drives value. It also shares technology to grow communities, increase participation and build new markets.

An example of a real-time economy application is a Java Virtual Machine at Sun Microsystems. A Java Virtual Machine (JVM) is a set of computer software programs and data structures which implements a specific virtual machine model. JVM interprets a form of intermediate computer language, Java bytecode. These codes explain instructions of a "stack-oriented, capability architecture" ([java.sun.com](http://java.sun.com)).

Sun Microsystems real-time JVM (Java Virtual Machine), known as HotSpot has "been out there for awhile...it's a virtual machine that was designed for pretty high-end real-time uses—the kind of thing you could control an F-16 with. It's got timing numbers in the five to 10 microsecond range" ([eWeek.com](http://eweek.com)).

A real-time application is one that HotSpot, Sun's JVM is the primary JVM for desktops and servers produced by Sun. HotSpot features techniques like just-in-time compilation and adaptive optimization. These processes help to improve performance. The system features a real-time garbage collector with intense scheduling, priority management and priority inversion control. Such details make "real-time systems really

real-time" (e-Week). System requests can take milliseconds, microseconds, "but there are occasionally requests that take as long as a second—between garbage collector pauses, paging pauses, queuing pauses, threading pauses.....," Gosling said (eWeek.com).

## **Traffic.com**

### **Real-time traffic**

Traffic.com utilizes real time processes to support both internal and external (other company's) management decisions. Operating as a subsidiary of NAVTEQ Corp (they were purchased by NVT for \$179 million in November of 2006), Traffic.com was incorporated in October of 1998, with their principal offices located in Wayne, PA. Traffic.com is a provider of customized traffic information for drivers and news outlets across the US. Their universe of traffic coverage includes 30 of the largest metropolitan areas in the US (including Boston, Chicago, Houston, LA, New York, San Francisco) and is utilized by more than 60 million commuters. The company collects and distributes traffic content and delivers it across multiple platforms. Clients include AOL, Microsoft, The Weather Channel, Comcast, Garmin and XM Satellite Radio, to name a few. Their website is: [www.traffic.com](http://www.traffic.com).

It can be argued that anything but real-time traffic information is essentially worthless. Along those lines, the real-time processes that Traffic.com employ are the collection and subsequent delivery of traffic data to end-users. Their data is collected through a large network of roadside traffic sensors, then formatted to meet unique needs of customers and delivered across multiple platforms (most notably, radio, television, the Internet, wireless devices and in-vehicle navigation systems). Specific examples of real-time traffic data delivery include: updates via their website, emails or text messages to subscribers, feeds into personal Yahoo pages or by calling a telephone hotline.



In addition to their proprietary sensor network, Traffic.com also has access to government sensors. Incident and event information is also gathered using aircraft, mobile units, video feeds and emergency frequency scanners. This information is processed using their proprietary Traffic Information Management System (TIMS). Essentially, this application collects and analyzes traffic information from the disparate sources mentioned on a real-time basis and delivers it across multiple media platforms in a modern, structured format. According to company filings, "TIMS has been designed and built to handle new sources of traffic data such as probe data from toll tag readers and vehicle or cell phone tracing as they become available. TIMS layered architecture allows us to use the same functions for the delivery of traffic data across multiple products and services with little or no modification to TIMS."

This is a real-time process for several reasons. The company incorporates several modes of real-time economy technology and real-time economy processes like sensors (collection of data for management and subscribers) and dashboards (presentation of data to management and end users). These technology and real-time information delivery methods enable drivers to make informed decisions as to route selection and departure time. This real-time process not only makes everyday commuters' lives easier and more productive, it also has external management implications. Considering Traffic.com's use by delivery and freight service companies, this is a tool that enables management to make intelligent decisions that save time and money and ultimately, make their companies more productive

## **Xenogen**

Real-time economy is gaining ground in virtually all industries. I will use Xenogen, a biotech company, to explain how real-time economy works in the biotech industry. The company consists of two distinctive units – the Service Branch providing R&D services for clients (pharmaceutical companies) and the Manufacture Branch making laboratory equipment. I will explain the different types of techniques used in these two units to reduce latency and fulfill real-time economy.

### **1. Service Branch**

#### ***1.1 CRM***

Business flow starts with the sales team using “GoldMine” as the Service Branch’s CRM.

- Web interface – the website has “product inquiry” forms where the customer can enter their information and their interest/inquiry. Once the customer submits the form, an email will be automatically routed to certain Business Development (BD) member depending on what category the customer’s interest fall in. Meanwhile, the information is stored in the CRM as well.
- Periodically, the BD team will run reports on the CRM to assess the market trend and adjust sales/marketing strategies based on the analysis of the customer’s interests.
- The CRM is also used to generate email/mail campaign to advertise the company’s services.

#### ***1.2 Operation: compatibility of databases for internal and external users***

Once the client has signed contract, the scientist team will take over to perform the service/operation required.

- Mirror database: The entire process is facilitated via a custom-built project management system/database. The management system mirrors every step of the actual operation process from the start to the end. Every step of the operation is recorded in the database, and the output of one step is linked to the input of the next step. All the information is gathered via technician's input during the operation, aided by the chip implants.
- Web-interface: The recorded data can be accessed by the client/customer in real-time via the secure web-interface. The client can check the progress and experiment of its own projects anytime and anywhere.
- Monitor: The same data also help the project managers to monitor the projects and schedule resources (equipment and labor).
- Decision making: Most importantly, the real-time data allow the executive managers to have an updated overview of the business, run reports, and make strategic decisions.

### ***1.3 Accounting and finance systems: integrate different systems by reducing intra- and inter-process latencies***

Accounting and finance systems are also tied to the operation database. Once a certain pre-defined milestone has been achieved by the operation group, the corresponding revenue is automatically recognized in the financial systems. This saves a lot of meeting time/latency and synchronizes the latest progress in R&D/housekeeping projects/finance.

### ***1.4 Email notifications: synchronize all the systems mentioned above***

- In case of norm operations, all the critical actions in the operation process will trigger email notification to be sent to the corresponding parties.
- In case of mistakes, i.e. missing deadlines or unexpected experiment failures, email alarms are sent to managers and clients in addition to corresponding parties.

- This ensures the maximum operational efficiency and effective communication among teams and clients. It also establishes accountability, helps pinpoint problems, and facilitates correction in a timely manner.

## **2. Manufacture Branch**

*2.1 For the manufacture branch, a different CRM system, Salesforce.com, is used.*

*2.2 For the manufacturing operation, Oracle E-business suite and ERP system are used.*

### **2.3 FRID**

Besides all the tight integration of the entire system, the manufacture process also includes an increasingly popular technique to track the inventory of the major components of the final product – RFID.

Tag: All the major components are tagged with a RFID. The entire warehouse where the components are stored has fixed sensors to monitor the components. This replaces the traditional hand-held scanner used to scan the component, creating a smooth work flow and reducing human errors.

- Monitor: Any component moved into or out of the warehouse is automatically sensed by the sensors which send signals to the database and trigger the database to update the related information.
- Control: Since the information is shared by various department across the company, this update will give real-time information for everyone – the buyers can keep the inventory at an appropriate level because he will be warned if the inventory for each component goes beyond the pre-set trigger level; the workers on the assembly floor need not scan the component when taking it; the managers can track the cost of the production at the real time.
- Implementation: The RFID system has relatively high initial cost, but in the long run, the ROI is very high, in terms of both finance and labor.

In sum, both the service and manufacture units employ the real-time economy concept to achieve the best customer service and the highest efficiency possible.

## ***Other***

### **American Airlines**

#### **Online reservations**

Forty years ago, American Airlines developed the Sabre computer reservation system (CRSs) to keep track of seat availability on hundreds of flights for thousands of passengers booked all over the world. Nowadays, American Airlines has continuously expanded its use of information technology for reservations systems and created an infrastructure that facilitates the application of Operation Research models. These reservation systems have evolved into global distribution systems (GDSs). While CRSs helped American Airlines sell and manage its own seats, the GDS consolidates information from many airlines, allowing travel agents, businesses, and individuals to shop in a single electronic marketplace. This marketplace has expanded to include hotel, rental car, and destination products and services.

Through American Airlines' website, customers may search flights based on such characteristics as number of stops, airline, total travel time, and timeliness. A large number of processing resources within the GDS are required to respond to shopping requests, that is, finding the best flight itineraries and fares based on travel agent or consumer requests. The system builds itineraries with maximum marginal utility and produces itineraries with the desired diversity. After you book a flight, you also can select your seat online. Moreover, American Airlines are using operations research tools, such as demand forecasting and optimization, to design sales promotions and to identify cross-selling opportunities, such as rental car, hotel, and other destination interests. They can use customer-profile data captured from the users' navigational paths while browsing the Web (their clickstreams) and other customer-related data as input to identify promotion

opportunities, tailored to individual customer. For example, American Airlines in contact with someone wanting a seat on a completely booked flight might be able to transfer that demand to another flight leaving around the same time or from a nearby airport by emailing an offer (flight, price, restrictions) instead of a refusal. Then, American Airlines allows their customers to print their own E-Tickets anywhere, which is also stored in the airline's database. At check-in, the American Airline's agent will compare your e-ticket against the airline database and issue you a boarding pass. You may also be able to plug your data into a self service check-in computer or kiosk and print your own boarding pass.

It is a real time business application of information technology, an automated system for electronic information exchange and industry wide electronic marketplace. That not only means buying and selling tickets online but, more importantly, setting up a digital nervous system that connects anything and everything involved in the reservation business: IT systems, agents, as well as the end customers and products. With e-commerce infrastructure, customers can order an appliance and be told instantly whether their requests can be met. Also, American Airlines is able to monitor a business continuously and react when conditions change. There's no need to wait for the mail or wait in line at the event. Customers can print their electronic tickets immediately after they purchase them. This makes e-tickets ideal for the last minute decision. Information provides real time for communication and real time transactions thereby making the principle of developing relationships with the customers much easier than ever before.

## **Citrix Systems**

### **Per-Seat On demand Jet travel**

While working for Citrix Systems Ed Iacobucci's heavy job-related travel demands began coinciding with his personal commitments which forced him and his wife Nancy to purchase a small aircraft to meet both his work and personal obligations. Ed then realized there was a market demand for commercial scale, on-demand air transportation

and two years later after retiring from Citrix Systems, he and Nancy formed DayJet Corporation with the mission “of bringing affordable and accessible “Per-Seat, On-Demand” jet travel to a market ready for a new option in regional business travel.” A service that enables the traveler to complete same day trips at prices comparable to an overnight stay. Iacobucci believes that the majority of his revenue from DayJet will come from business travelers who would otherwise drive. DayJet is set to launch in 2007 and will begin service between Boca Raton, Lakeland, Gainesville, Tallahassee, and Pensacola.

To set DayJet apart from other affordable air taxis, the company has quickly assembled a highly skilled team of flight operations experts, mathematicians, statisticians, demographers, market researchers, complexity scientists, and software engineers to help develop real-time aviation system software that would make their “Per-Seat, On-Demand” jet service to be more efficient and truly affordable. For the past five years, with no planes, pilots, or customers, DayJet has been running simulations of every aspect of its business thousands of times a day, every day, through the computer. It has factored in such variables as pilot availability, plane maintenance schedules, and bad weather in order to find the shortest fastest, and least-expensive combination of routes. Once DayJet starts flying, they’ll switch to real-time flight data, using their proprietary operating system to shuttle planes back and forth the way computers shuttle around bits and bytes to maximize plane utilization and optimize schedules for their customers. The combination of on-demand travel and technology-enabled transportation services will make it possible to offer an affordable alternative for their customers to fly direct, when they want and where they want, and increasing their productivity and enhancing their quality of life. Aided by its real-time software process, DayJet can fly the customer between small regional airports to their desired location and enable them to complete their business and get back home the same day. Business travelers who utilize “Per-Seat, On-Demand” can also have a strategic advantage over those who won’t because in today’s online world, there may not always be a substitute for face-to-face contact with clients. Additionally, DayJet can enable customers to speed up time-to-market on new products since it’s possible to book DayJet with as little as four hours notice. “Per-Seat,

On-Demand™ jet service is a unique service that can continue to benefit companies long into the future by saving them countless hours, to make more contacts, see more customers, and spend working hours actually working.

## **GM**

### **In-vehicle safety**

On-Star is the in-vehicle safety and security system created to help protect drivers on the road. On-Star's innovative system offers 24-hour access to expertly trained advisors, a connection to emergency assistance and access to On-Star Hands-Free Calling. On-Star is standard in a full range of GM retail cars, trucks, and SUVs in the United States and Canada. The first year of On-Star service is included with any purchase of a new GM On-Star-equipped vehicle. This services is considered part of GM's effort to improve post-sale service to customers.

On-Star's in-vehicle safety, security, and information services use Global Positioning System (GPS) satellite and cellular technology to link the vehicle and driver to the On-Star Center. At the On-Star Center, advisors offer real-time, personalized help 24 hours a day, 7 days a week.

On-Star Turn-by-Turn Navigation is fully integrated with the vehicle and the On-Star services. It gives the driver turn-by-turn navigation to the desired destination and automatically helps drivers get back on track if they make a wrong turn. Plus, On-Star is constantly updating its point-of-interest database so GM owners don't have to update the system with new CDs or DVDs.



About every 30 days, some of your vehicle's keys systems, like the engine, air bags and antilock breaks are checked while you are driving. Then you receive an automatic e-mail report. East e-mail report also includes your mileage, remaining oil life, maintenance alerts, subscription notices and more.

### **GM Advanced Automatic Crash Notification System (AACN):**

The GM advanced automatic crash notification (AACN) system uses front and side sensors as well as the sensing capabilities of the Sensing and Diagnostic Module (SDM) itself. The accelerometer located within the SDM measures the crash severity. In the event of a moderate to severe frontal or side-impact crash, data is transmitted from the affected sensors to the SDM. The SDM sensor also can identify a rear impact of sufficient severity. Regardless of whether the air bags deploy, the SDM transmits crash information to the vehicle's On-Star module. Within seconds of a moderate to severe crash, the On-Star module will send a message to the On-Star Call Center (OCC) through a cellular connection, informing the advisor that a crash has occurred. A voice connection between the advisor and the vehicle occupants is established. The advisor then can conference in 911 dispatch or a public safety answering point (PSAP), which determines if emergency services are necessary. If there is no response from the occupants, the advisor can provide the emergency dispatcher with the crash information from the SDM that reveals the severity of the crash. The dispatcher can identify what emergency services may be appropriate. Using the Global Positioning System (GPS) satellite, On-Star advisors are able to tell emergency workers the location of the vehicle. Number and location of sensors and SDM may vary depending on vehicle model.

On-Star is setup by GM to provide post-sale service to customers and generate residual income. On-Star utilizes sensor technology to implement a real-time economy. Providing the safe and sound services costs the consumer \$16.95/month or \$199/year. Directions and connections services cost the consumer \$26.90/month or \$299/year. Some savings

options are available for multi-year subscription to encourage consumers' loyalty and guarantee future income.

## **IBM**

### **E-Procurement**

International Business Machines Corporation (IBM) is a multinational computer technology and consulting corporation, and it has been known as the largest computer company of the world. IBM manufactures and sells computer hardware, software, infrastructure services, hosting services and consulting services in areas ranging from mainframe computers to nanotechnology. Moreover, it is also one of the largest providers of both software (ranking #2, behind Microsoft) and semiconductors (among the Worldwide Top 20 Semiconductor Sales Leaders). Based on the statistic from Hoovers.com, IBM's service arm is the largest in the world and accounts for more than half of its revenue. Furthermore, the company continues to use acquisitions to augment its software and service businesses.

IBM has implemented an off-the-shelf e-Procurement system in an attempt to handle requisitioning more efficiently and effectively, and the company also saves billions by using this aggressive solution. IBM itself gives its e-Procurement system a clear definition: "the acquisition of direct and indirect products and services using the internet and new technologies to facilitate a seamless, end-to-end stream of strategic procurement activities by connecting buyers with suppliers." It not only speeds up the processes of procurement, but also allows both suppliers and internal systems to track all transactions.

As I learned from IBM.com, the e-Procurement process of IBM is an integral part of an optimized end-to-end supply chain, which benefits their customers and suppliers. The e-Procurement applications are designed to enable B2B integration between IBM and its suppliers to reduce transaction and handling costs, and to enable automated timely

information exchange. For example, the system allows qualified users to look for buyers or sellers of goods and services, and they may also specify costs and complete transactions more efficiently and effectively. By implementing e-Procurement system, IBM may control their inventories more effectively, reduce purchasing commission, and improve manufacturing cycles. Therefore, the e-Procurement is expected to be integrated with the trend toward computerized supply chain management.

## **Konami Gaming Inc**

### **The Konami Casino Management System**

Most casinos in the United States use some type of player-tracking software. Such software enables the casino to track betting and spending habits within the casino. The data is compiled and maintained in a central database and used to offer individual players rewards, incentives, and promotions, which are usually sent to the player at a later time.

Konami Gaming Inc. has taken player tracking to the next level by offering real-time responses during every game. The Konami Casino Management System (KCMS) runs on SGI and Oracle platforms that constantly update every player's data trail. This data trail includes the player's personal information, their betting and spending history, their current betting pattern, and the current time and location of play. The KCMS uses this information to determine what incentives and promotions that particular player would be interested in and then offers that to the player in real-time using the current machine's interface. It is essentially real-time, targeted advertising.

The KCMS has been installed on casino management systems across the country, enabling those casinos to better accommodate their players while making more money at the same time. Like all other player tracking software, Konami's relies on players inserting an ID card prior to play. The system uses the ID card to identify the player and continually track their play. Regular players already use the ID card to earn points that

can be redeemed for prizes. Now these players can receive offers for tickets to shows and events, specials at casino restaurants, new incentive programs, and anything else the software determines that the player would be interested in.

Although the slot machine player is an integral part of the casino industry, making up more than three-quarters of the \$55 billion in U.S. annual gambling revenue, Konami's system is not limited to just slot machine players. Most casinos have systems in place that track play at table games, Keno, bingo, and the sports book as well. Although there is no electronic interface that can be utilized to make real-time offers to players at table games; electronic slot machines, video poker, bingo, and sports books all have the capability to make offers to players in real-time.

An added benefit to the KCMS system is that it makes regular gamblers feel welcome and special just like high rollers that are greeted by casino hosts. Gamblers that feel a special connection to the casino are more likely to play longer and wager more money than if they were just another number to the casino.

Casinos using the KCMS system are able to target and advertise to players in real-time, saving them general advertising costs, while generating increased revenue in the areas being advertised. The system also eliminates the need for a post-gambling delivery method of rewards, incentives, and promotions.

## **MARC (legal services)**

### **Real time litigation support**

McCusker, Anselmi, Rosen & Carvelli, P.C. ("MARC"), is a small law firm that handles complex environmental litigation and tort litigation for client such as ExxonMobil, Gulf Oil,

and Terminal Ventures. It has offices in Tom's River, NJ, Chatham, NJ, and New York, New York. The practice consists of approximately 24 attorneys.

In 2006, MARC was chosen along with several large firms across the northeast to represent ExxonMobil with regard to litigations arising out of the alleged Greenpoint, Brooklyn oil spill. Faced with a need for access to up to date information and data regarding these matters, MARC chose to install a program called Summation on its network. Summation allows mobile access to case information from anywhere: home, office, during depositions, at meetings and in the courtroom. One of its key features is the RealTime Session, where "witness testimony is transcribed by the court reporter, and the court reporter's transcription appears on connected laptop computers at nearly the same moment. This allows attorneys to mark key testimony during the deposition and have the testimony immediately available after the deposition without having to wait. Another feature is the Companion Database, which allows users to have multiple databases in a single case in addition to the Core Database. These databases reside within the firm either on the network or local to the user."

<http://www.summation.com/Solutions/glossary>).

MARC has been able to use Summation to track the progress of the various litigated matters and access documents produced by the different firms. Without it, MARC would have had to go through the inherently slow and time consuming process of requesting documents from the client internally or from the other firms. In addition to the access to internal documents, Summation also linked MARC's attorneys to case law and jury verdicts, providing current information on what amounts were being awarded in certain venues at that point in time. Document reviews have become less cumbersome, because all the documents are OCR'd and put into a core database as searchable text. Multiple users can work within the core database at the same time, reviewing and editing as necessary. Instead of "pulling" privileged or non-responsive documents from a production or copying hot docs, the attorney can flag the documents as such and they

are sorted into separate databases. In addition, attorneys have instant access to deposition and hearing transcripts, and can mark certain testimony for follow-up or trial prep as it is being recorded!

MARC also uses the “dash board” feature, wherein all aspects of a case are managed. Deposition transcripts, attorney notes, document productions by all parties are located in one place and available to users. In complex litigation, you often have many attorneys working on a case, and paper files can be spread out over several locations; by using Summation, every piece of documentation is available when needed. It’s cut down on the time needed to work a case, which has decreased costs and increased profits. The initial price of the software licenses and training is high, but the return is immeasurable.

## **Supplemental Health Care**

### **Dashboard & Financial reporting System**

Supplemental Health Care, Inc. provides health care organizations access to skilled nurses, physical therapists, occupational therapists, speech language pathologists, and radiation technology professionals. The company places these health care professionals in temporary and travel positions both in the U.S. and internationally. Supplemental Health Care has averaged annual growth rates exceeding 65% over the past five years, and is now one of the top ten health care staffing firms in the U.S. with 30 offices in major markets across the country.

Supplemental Health Care was looking to replace an outdated financial reporting system with a dashboard solution that would give them real-time accounting and financial data. In March 2007, the company decided to partner with iDashboards to implement its visually rich and personalized business intelligence dashboards. The system's ease of use, compatibility with Microsoft Excel, low cost of ownership, quick implementation, and intuitive user interface were the key factors in Supplemental Health Care choosing iDashboards over some of its competitors.

The dashboard solution has so far been a success in delivering timely and accurate key performance indicators (KPIs) to division managers. Some of these KPIs include operating costs, sales volume, accounts receivable collection times and revenue. The availability of this information has allowed managers to immediately examine the relevant information and make prompt and timely business decisions. For example, the iDashboard can help management determine where the most profitable areas are to place professionals by analyzing the real-time placement and operating costs versus placement revenue. Also, they can determine which areas of the country have the fastest accounts receivable turnover, which can help the company create excess capital through short-term investments. The implementation of the iDashboard will surely give Supplemental Health Care a competitive advantage in the industry for years to come.