

# Ukrop's Super Markets

**Grocer bags competitive advantage by consolidating data marts into an enterprise data warehouse**



You've never seen your business like this before.

# I. Background

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Ukrop's Super Markets are refreshingly down to earth in an age of mega superstore chains. With more than 29 stores in central Virginia, this family-owned business still adheres to founder Joe Ukrop's guiding principles of providing good products, outstanding value and friendly and helpful service.

True to these values, the stores close at 10 p.m., don't open Sundays and don't sell alcohol. Ukrop's is very active in the community, investing a minimum of 10 percent of its pre-tax profits into community activities.

The retailer was a pioneer in both loyalty marketing and meal solutions when it launched its Valued Customer® program in 1987. Today, nearly 90 percent of Ukrop's shoppers carry the Ukrop's Valued Customer Card, and Ukrop's market share approaches 40 percent – even as it faces stiff competition that includes some of the largest national chains.

Besides grocery stores, the company runs a manufacturing business and transportation division. First Market Bank has branches in most Ukrop's stores and participates in a co-loyalty program with them.

Ukrop's is regularly listed as one of the 100 Best Companies to Work for in America, as rated by *Fortune* magazine and the Great Places to Work Institute. Employee turnover is low and personal satisfaction is reflected by its team of customer-oriented associates.

Today's highly competitive retail environment means grocers operate on razor-thin margins. To increase customer value and maximize profitability, Ukrop's must make informed purchasing, pricing and promotional decisions. In addition, this progressive retailer must understand customer behavior and preferences better than its competition.

In 2001, Chellam Manickam, Ukrop's vice president of information technology, noticed a serious barrier standing between Ukrop's and its vision. "Too many data sources were creating multiple versions of the truth." At the time, the company was attempting to maintain five separate data marts. Rather than effectively using data, Ukrop's employees were spending much of their time cross-checking and validating results. "It was clear to me that Ukrop's needed one central data repository – an enterprise data warehouse," recalls Manickam.

**"Too many data sources were creating multiple versions of the truth. It was clear to me that Ukrop's needed one central data repository – an enterprise data warehouse."**

– Chellam Manickam, Vice President, Information Technology, Ukrop's

Through this new architecture, the company could improve data accuracy, gain faster access to relevant information and reduce system administration expense. In addition, Manickam planned to use this integration initiative to refine business processes and improve corporate-wide accountability.

### **Ukrop's Super Markets**

**Vision:** to be a world class provider of food services

**Employees:** 5,500

**More than 29 stores** located throughout Central Virginia

**2005 Revenue:** \$600 million

**Family-Owned:** also includes manufacturing, distribution and banking companies

**Ninety percent of customers** carry a Ukrop's Valued Customer Card

## II. Shopping for a Solution

Ukrop's five unlinked data sources comprised everything from an Informix data warehouse to distributed data marts and linked spreadsheets. Various users within Ukrop's could find most of the information they wanted, but couldn't agree on which information was accurate. The lack of a centralized database coupled with fragmented development and support efforts had caused Ukrop's users to lose confidence in the quality of its data.

The company's Informix system, which went live in 1997, had run out of capacity, requiring continuous offloading of data to achieve "workable space" in the system. Plus, licensing and product support were expiring for Data Master, the company's business intelligence tool. "Put simply, our hardware and software were quickly coming to the end of their usefulness," states Marilyn Schuelke, Ukrop's manager of database administration. "We were clearly spending too much time

maintaining and administering our growing collection of data and systems."

Furthermore, Ukrop's was pulling weekly data from its NCR point-of-sale system, but was eager to analyze more timely and relevant information.

After years of data management triage, the time had come to invest in an enterprise data warehouse (EDW). "The biggest benefit we hoped to gain from an EDW was speed and relevance of information. Understanding what happened in our stores yesterday could help us react without waiting a full week," states Scott Aronson, Ukrop's vice president of marketing whose team is responsible for analysis.

Ukrop's began its discovery process to determine what business users needed in an EDW. "The first thing we did was bring in Teradata. We knew they did a lot of data modeling and were well versed in the business discovery process," says Konrad

Spicer, business unit support manager at Ukrop's. The company then engaged in a six-month discovery process that involved interviews with 15 key business users.

In the end, Ukrop's had a shopping list that included key business and technology needs and a data consolidation strategy to help achieve its goals.

### **Business needs included:**

#### *Data accuracy*

A single view of the business, allowing all users and departments to focus on optimizing results rather than validating data.

#### *Faster access to relevant information*

Detailed data to facilitate decision making in a more informed and timely manner.

#### *Ease of use*

A system that did not require extensive support and training for category managers who were primarily self-taught in business analytics.

#### *Business process optimization*

Streamlined accounts receivable and billing with a closed loop on perpetual inventory to minimize out-of-stock situations.

#### *Improved accountability*

Accurate, objective measurement of store, departmental and employee performance to enable action that could positively impact results.

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– Scott Aronson, Vice President, Marketing, Ukrop's

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### **Primary IT needs included:**

#### ***Lower administration expense***

A system that would need less hands-on management.

#### ***Minimal training***

An intuitive system with flexible training options.

#### ***Unquestioned reliability***

Standardized and consolidated functions across multiple business-critical systems to eliminate redundancy and the need to externally merge and cross-check data.

#### ***Sustainability***

Compatibility with existing systems without the requirement of prohibitive licensing, hardware and support costs for them going forward.

### **Comparison Shopping**

By late 2001, Ukrop's had created a list of data warehouse candidates. Prospects included Oracle, Informix, Sybase and Teradata. Ukrop's had been a long-time NCR point-of-sale customer and was running its Informix data warehouse on NCR hardware. It had heard positive reports from other grocers regarding the Teradata Warehouse. Rather than conducting extensive product evaluations or creating an ROI model, Ukrop's began talking to people within the grocery industry.

During the decision-making process, Ukrop's database administrator and its manager of category analysis were invited to attend the annual Teradata PARTNERS User Group Conference. "We spoke with

other retailers at the conference, including a food retailer who was one year ahead of us in the process. We liked what they said about Teradata and decided to take a very close look at their solutions," says Schuelke.

The Ukrop's/MicroStrategy partnership was another influencing factor in the decision. MicroStrategy runs very efficiently on Teradata and Ukrop's was happy with this business intelligence tool, which key users had become very proficient using – and bundled Teradata/MicroStrategy pricing was favorable.

Manickam developed a multi-year transition plan that involved consolidating many of Ukrop's disparate data sources into a Teradata EDW. She took the recommendation to Bobby Ukrop, company president, who approved it.

# III. Bagging the Old System: The Transformation Process

In April 2002, Ukrop's purchased a single node Teradata Warehouse system running on a 4455 Server with four Intel Pentium III Xeon 700 MHz processors. The original configuration included 2 gigabytes of memory and 160 gigabytes of storage.

Ukrop's had a relatively small IT department with a versatile team to handle most everything. However, when it came to transitioning its Informix system to the Teradata Warehouse, Ukrop's realized the value of hiring seasoned professionals. Teradata Professional Services was the unanimous choice.

Although this was the grocer's first Teradata system, they were very familiar with Teradata Professional Services since they had built the data model for the Informix system years earlier.

"We worked exclusively with Teradata Professional Services to build our first data model," recalls Spicer. "Once again, we called on Ed Drapela at Teradata to define our normalized data model. Ed completed our logical data model and physical data model review in just two or three days," says Spicer. The Informix system used extensive junction tables because the system's Intrepid front end couldn't handle many-to-many relationships. Teradata's added flexibility coupled with enhancements to MicroStrategy eliminated the need for junction tables.

Master Teradata architect Henry Stein spent the next week performing data conversions

and writing load utilities. "Our Teradata implementation went incredibly smoothly," says Schuelke. "I was amazed at how quickly the new system was up and running."

The Teradata system ran in parallel with Informix for a few months "We demonstrated that the accuracy of Teradata was within a few hundred dollars of our financial accounting system. This was huge in terms of restoring confidence in the quality of data in the warehouse," recalls Manickam.

## Organizational Change

The Teradata deployment created a natural opportunity to look at how data – and the company itself – were organized. As Ukrop's set out to merge its data sources, it also consolidated departments. SQL developers teamed with developers who had been creating home-grown Pick Universe applications. Data warehouse administration and the network group also joined forces as the company's two IT shops became one.

Business processes were re-evaluated and basic business definitions were refined. According to Manickam, "Moving to a central data warehouse forced us to agree on common, company-wide definitions, such as net costs and a central process for getting answers. It sounds basic, but up to that point, everyone had their own definition of net costs."

Scott Aronson had just recently joined the company and brought with him ambitious plans on using the database to assess

market conditions and influence business results. The Category Support Team was reorganized under Aronson and soon began using a more standardized set of reports for day-to-day decision-making.

Today 30 Teradata users have full MicroStrategy Web development licenses. Most of them are category managers, who run standard reports to help them make daily purchasing, pricing and promotional decisions. Two business analysts help to create customized reports and perform ad hoc queries as needed to support sales and marketing operations.

The analytics team also performs daily ad hoc queries to research consumer complaints, determine volume fluctuation issues with retail locations, evaluate promotions and augment the category review processes.

## Feeding the Growing Appetite for Speed

According to Chris Costa, Ukrop's senior category analyst, the first noticeable effect of the Teradata Warehouse was a significant performance improvement. "Our queries were a lot quicker with Teradata. Similar queries on Informix were complex, time-consuming tasks."

Costa noticed another major change. "Being able to run side-by-side comparisons was a huge advantage," informs Costa. "In the past, we had to run two separate queries and then try to match them up in Excel to view results."

Category managers such as Barry VanDyke began using the side-by-side comparison feature to determine sales history and other factors that impact a department's performance. "Today, I can pull data for multiple timeframes and compare unit movement," VanDyke says. "What were the sales dollars? What was the profitability? For example, if the orange juice category only went up 10 percent when we promoted one brand, but went up 25 percent with an ad for a competing brand, that's important to know. It's also possible to determine what products bring in new customers and which ones affect the whole company."

As Aronson's team began to see the enhanced value and performance of the Teradata Warehouse, they soon wanted more information more rapidly. In January 2004, it began testing daily updates of transaction data from all stores.

**“Daily updates were a major business improvement. Rather than waiting until Tuesday afternoon the following week, our people have access to accurate data by 7 a.m. the following business day. My group can see how each store is performing – drilling down to performance by department.”**

– Scott Aronson, Vice President, Marketing, Ukrop's

Daily loads went live in March 2004, almost a year before Ukrop's thought this would be possible.

“Daily updates were a major business improvement,” insists Aronson. “Rather than waiting until Tuesday afternoon the following week, our people have access

to accurate data by 7 a.m. the following business day. My group can see how each store is performing – drilling down to performance by department. Are we on budget? Are we hitting our targets? We pull from a marketing analytics perspective and derived a lot of product information from the Teradata Warehouse.”

# IV. Applying the Data

Ukrop's has built 383 MicroStrategy reports and developed new applications that leverage the value of the growing Teradata Warehouse. Larry Halley, manager of corporate and store systems for Ukrop's, has seen the warehouse mushroom into a critical knowledge repository. "I think it's a testament to Teradata that we have progressed so far, so quickly. It took us eight years to go from Informix to Teradata, and that growth was gradual because we didn't use it as much. The new Teradata system is critical to what we do."

## Too Much of a Good Thing

Ukrop's success lies in its ability to remain agile and make quick, informed decisions. With over 300 available reports and the rich data afforded by the Teradata Warehouse, some category managers had too much information.

"Analysis paralysis is something we're definitely trying to avoid," insists Manickam. "What's more, if you have 20 reports to review each week to make a decision,

you're probably not going to look at half or three-quarters of them." That's why Ukrop's has reviewed its business processes for category management and defined standard reports that contain the optimal information for category managers. "We

don't just want to open the floodgates to all of the information in the Teradata Warehouse. Creating a standard set of reports is helping my team to become more deliberate in how they do their jobs," says Aronson.

## Key Results

- > **Improved timeliness and relevance of data by accessing daily transactions rather than weekly data**
- > **Strengthened corporate-wide accountability, tying store, departmental and employee performance to metrics in the data warehouse**
- > **Recovered \$19,000 in fraudulent vendor charges using the EDW**
- > **Decreased redundant administration resulting in a 50% decrease in headcount dedicated to data mart management**
- > **Improved business intelligence by giving category managers accurate, side-by-side comparisons for informed decision-making**

**"The system's greater capacity has made my life a lot easier. I used to spend the bulk of my time pulling down and loading data just to maintain enough working space to run queries. Now all our data is readily accessible in the warehouse."**

– Chellam Manickam, Vice President, Information Technology, Ukrop's

## Leveraging the warehouse

### Key Ukrop's applications that use the Teradata Warehouse to accelerate decision-making and add accountability include:

#### Category Management

This MicroStrategy-based application allows category managers to review daily transactional data from the NCR point-of-sale system to make purchase, pricing and promotional decisions for their specific categories, such as frozen foods, dairy, bakery, and health and beauty. Category managers can review historical transaction data, conduct side-by-side product performance comparisons and determine gross margins. The Category Management application also allows managers to measure how product promotions affect their overall department's performance and see what other products are in the shopping carts of customers who respond to a given promotion.

#### Retail Scorecard

This homegrown application drives objective accountability throughout Ukrop's. The Retail Scorecard measures performance within each store and department based on 25 strategies. It determines key factors such as unit movement, out-of-stock situations, gross profits, product sales and margins and is utilized during performance reviews with management personnel. Approximately 300 store associates touch the data warehouse using the Retail Scorecard application. "We have to give very clear feedback to all of our retail people, who comprise 75 to 80 percent of our workforce. In the past, this was very subjective. Now, all of our general managers', store managers' and department managers' reviews are based on data from the data warehouse," states Manickam. "By creating scores based on pure numbers, we're bringing objectivity into the performance review process."

#### Accounts Receivable

All vendor billing is automated and performed through the enterprise data warehouse. According to Schuelke, billing used to be a very bumpy process. "Today, accounts receivable is all automated. We simply schedule a job that automates vendor billing when a promotion ends. That information is captured and sent over to the accounts receivable system."

#### Analyst

Category analysts use the Analyst application to perform ad hoc queries in the EDW. These queries often extract customer information that is useful in determining customer behavior and attitudes. Other queries are used to augment standard reports or clarify assumptions made by category managers.

#### Purchases

Ukrop's is in the process of adding all purchasing information into the Teradata Warehouse from the retail stock ledger system and developing a purchasing application to run on the warehouse. This is a key component in closing the loop on what Ukrop's calls "the triangle of analysis." By linking product ordering, inventory management and transactional point-of-sale data, the data warehouse will allow Ukrop's to automate out-of-stock reporting.

### Applications on the Near Horizon

#### Customer Loyalty

Ukrop's wants to build upon its loyal customer base and enhance the capabilities of its customer loyalty program. The company hopes to automate direct in-store offers and expand direct marketing opportunities to Ukrop's Valued Customer Card holders. Ukrop's currently pulls data from the Teradata Warehouse and sends it to a Web marketing firm that manages an e-mail based customer loyalty program. Ukrop's is considering upgrading to Copient Technologies' CRM system.

#### Zone Pricing

As Ukrop's expands its locations beyond central Virginia, it will become necessary to adjust pricing to compete in each local area. The Zone Pricing application is being evaluated.

#### Store Ordering

Each store currently handles ordering independently. Ukrop's will soon be able to electronically review each store's orders and track them through to the sales. The Store Ordering application will integrate with the system's Purchasing application and give Ukrop's greater visibility across the "triangle of analysis."

# V. The Closest Thing to a Self-Managing System

According to Schuelke, ease of administration was a major consideration in choosing Teradata. “In a small shop like ours, we have to do a lot of things. I do all of the ETL process, handle MicroStrategy administration, and manage the database. We wanted to find something that was easier to administer and Teradata really fits for us. In fact, I’ve been administrating for three and a half years and haven’t taken an administration class.”

With the previous system, Schuelke spent considerable time creating indexes, loading

data and building aggregate tables. With Teradata, all of that has disappeared. “We no longer do aggregations on department and category anymore. We can quickly run queries in the Teradata Warehouse to get that information. We do a little aggregation, such as rolling up transactions into daily and daily into weekly. But all of those time-consuming aggregation tables are a thing of the past.”

Prior to the data warehouse consolidation, Ukrop’s estimates it was taking four staff to manage and support its various data

marts. Today, two people keep everything running smoothly. Teradata’s own research indicates that 35 to 70 percent of the total cost for administering and supporting multiple data marts is redundant cost.

## Training

Ukrop’s has a limited training budget, so the company needs to make the most of its educational opportunities. Schuelke began her Teradata education by completing the Teradata Basics course on CD-ROM, which she followed with Basics and SQL certification on V2R3 and V2R5. At the time of this case study’s publication, she is nearing completion of her V2R5 Master certification.

“Our TPN-Plus membership has been very important in helping me get my skill set up to par,” informs Schuelke, who has cross-trained another Ukrop’s employee to handle DBA responsibilities in a back-up role. “We also send two people to the annual Teradata PARTNERS User Group Conference each year. PARTNERS is an excellent opportunity to gain training and network with peers in your industry.”

### Nice Recovery: Detailed Data Keeps Vendor Honest

Things weren’t adding up at one of Ukrop’s stores. In fact, John Zeheb, Ukrop’s director of finance, and his staff suspected they were not receiving everything they were being invoiced for. “Using the data warehouse, we were able to track unit movement of items that were being delivered and cross-reference them to the vendor’s invoice,” recalls Zeheb. “Without question, the items weren’t being delivered.” This investigation only took minutes, yet allowed the company to recover almost \$19,000 in fraudulent charges. Equally important, it helped Ukrop’s expel a crooked supplier from its vendor list.

# VI. Moving up – and out

**“The entire transition was transparent. In fact, the only training we required was teaching the computer operator how to run the new backup and recovery system.”**

– Marilyn Schuelke, Manager of Database Administration, Ukrop’s

As Ukrop’s expanded the use of its Teradata Warehouse, the company required even greater capacity. Coincidentally, Ukrop’s was relocating corporate headquarters to new office space that included a brand new data center.

In November 2005, Ukrop’s upgraded to a Teradata 5400E Server that increased storage capacity by 750 percent. The company also upgraded its archive and recovery capabilities, going from a Quantum DLT backup system to StorageTek’s SL 500 tape library system. “Our new archive and recovery system makes things a lot easier,” reports Schuelke. “The old system required lots of manual tape management – now it’s all automated.” The Teradata EDW is backed up nightly and the UNIX operating system weekly. During the process, the StorageTek system automatically determines which tapes need to be changed and uses a robotic arm to load them as necessary.

The data warehouse migration went off without a hitch according to Schuelke, who worked closely with Teradata Professional Services to plan and execute the move. Traditional migrations such as this require a high-speed connection to transfer data between sites. However, for Ukrop’s, moving

the data across town and across systems was easier than anyone had imagined. “Since our old warehouse had less than 100 gigabytes of data, we simply loaded a portable USB drive and took it to our new data center. That was the only manual process required – everything else was completed remotely,” recalls Schuelke.

Ukrop’s ran both systems simultaneously for sixty days as Schuelke gradually migrated user groups from the old system to the new one. “The entire transition was transparent. In fact, the only training we required was teaching the computer operator how to run the new backup and recovery system,” informs Schuelke. “The new system runs just like our old Teradata Warehouse – only much faster.”

**“Teradata is an excellent enterprise data warehouse. It’s allowing us to consolidate data sources and greatly improve the accuracy and timeliness of our decision-making data.”**

– Chellam Manickam, Vice President, Information Technology, Ukrop’s

## Adapting to Change

Ukrop’s currently stores two years and three months of transaction-level data. Its analysts are in the process of determining the optimal duration to keep this information.

As part of its ongoing effort to use the EDW to drive accountability, Ukrop’s now tracks inventory shrinkage through a new shrink management application. For example, the company knows exactly how much perishable merchandise was reduced for quick sale and how much was donated to local food banks.

Moreover, Ukrop’s made a fundamental amendment to its pricing strategy in early 2006, moving from frequent discounts and sales on merchandise to a consistent low price model. This change required creating an additional table structure in the warehouse and contract modifications from various suppliers. “Some contracts are based on how much we purchase, while others are calculated from scanned units of merchandise sold,” informs Schuelke, who pulls files each week from the EDW and sends them to accounts receivable.

# VII. More Food for Thought

Ukrop's is well-respected in the supermarket industry as a thought leader and formidable marketer. The company effectively uses technology to give its managers the information they need to make informed and timely decisions. Although Ukrop's marketing initiatives are far ahead of other retailers its size, the company continues its aggressive use of database technology to deliver greater customer value and secure remarkable levels of customer loyalty in today's competitive grocery industry.

Manickam shares Schuelke's enthusiasm for the data warehouse. "Teradata is an excellent enterprise data warehouse. It's allowing us to consolidate data sources and greatly improve the accuracy and timeliness of our decision-making data. Going forward, the new system will accommodate our move to zone pricing, help us improve our 1-to-1 marketing activities, empower our category managers and store managers with accurate data, and deliver higher value to our customers."

## Critical Success Factors

***Use the business discovery process to clearly define data ownership.***

"IT knows a lot about data but, technically, we don't own it. Engage key users and groups in the business discovery process. Make sure they understand that this is their system. They own the data and are responsible for it." *Konrad Spicer, Business Unit Support Manager*

***Make sure you have your tools in place.***

"It's the same advice that someone gave to us when we attended our first PARTNERS

Conference before we purchased Teradata. Once you capture all this wonderful data, you have to be in a position to use it."

*Marilyn Schuelke, Manager, Database Administration*

***Leverage the expertise of Teradata Professional Services during your implementation.***

"Teradata has been very good to work with and a reason why our initial implementation and subsequent migrations went so smoothly." *Marilyn Schuelke, Manager, Database Administration*

## Best Practices

***Data cleansing needs to be a ritual of life.***

"No matter how many processes you put in place to manage data, someone always finds a way to mess it up. It's really costly to go back and rewrite history after the fact, so make sure clean data is feeding in." *Chris Costa, Senior Category Analyst*

***Use the data warehouse to drive accountability.***

The Ukrop's Retail Scorecard application provides objective, accurate data to measure store and departmental performance. It also gives employees timely information and feedback to measure key metrics on a daily basis and boost sales performance.

***Review business processes as part of your data warehouse implementation.***

Deploying an enterprise data warehouse is an excellent opportunity to refine business processes and reach consensus within your organization. Ukrop's used the deployment of its Teradata EDW to define net costs across the enterprise.

## Lessons Learned

***Consider what you're going to do with all the information you have.***

"Determine the critical components for your business as you move forward. I realize this is always going to change but it will impact the way you store or access the information." *Scott Aronson, Vice President, Marketing*

***Normalizing your information is absolutely critical.***

"Now that we only have one source of information, it must be accurate. If it's not aggregated in the appropriate form, you have one potentially misleading piece of data, and it's hard to back out of it and understand what's happening. Don't take shortcuts in this area. It may not seem like a big deal in a day or a week, but over time it can create major problems. Is tax included? Are rebates applied? There are thousands of details in how the information is actually being sorted and stored." *Scott Aronson, Vice President, Marketing*

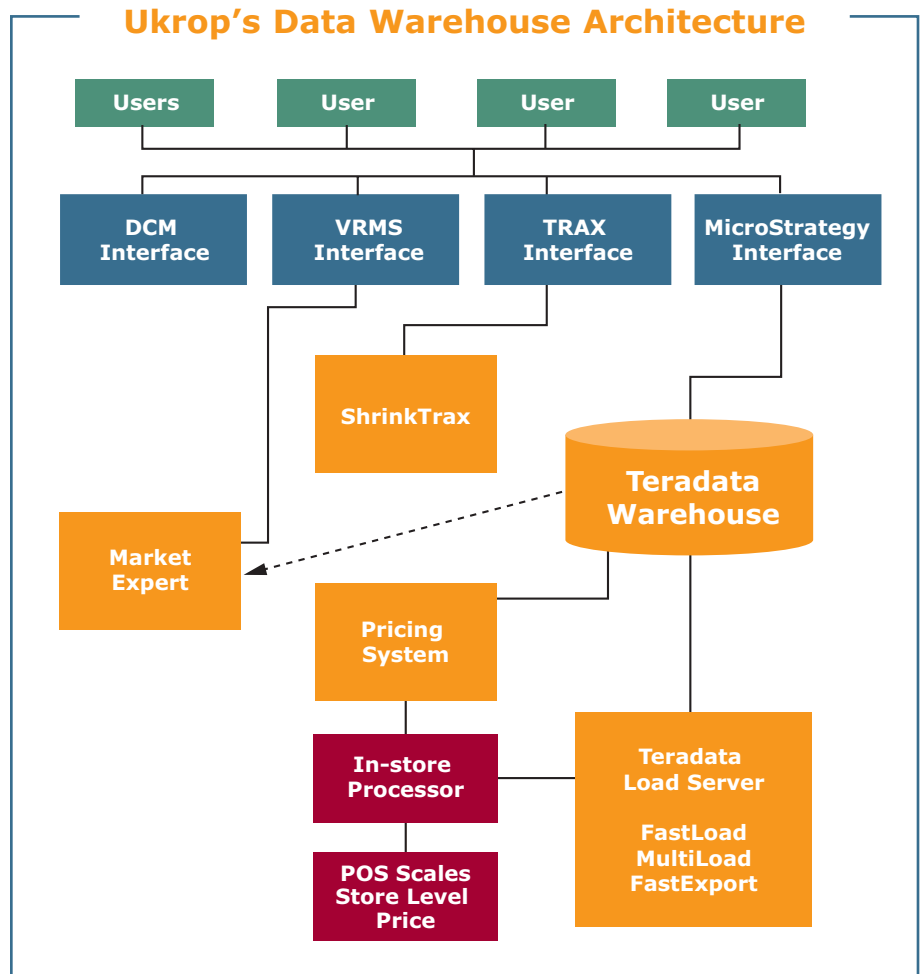
***Re-evaluate your business needs and projects following deployment.***

As business needs change and groups realize the potential of the EDW, priorities of IT initiatives and projects should be re-evaluated. "Continually ask yourself what business value will this project yield, and map it to your corporate priorities." *Chellam Manickam, Vice President, Information Technology*

# VIII. Technical Appendix

## Ukrop's Teradata Warehouse at a Glance:

- > Database: Teradata V2R6
- > Production System: Single-node Teradata 5400E Server, Two 3.6 GHz Intel Xeon processors with 4 GB memory and 1.2 TB capacity
- > Total Users: Approximately 30
- > Tools and Utilities:
  - Teradata Tools and Utilities 7.0
  - Teradata Utilities Foundation 7.0
  - Teradata Utility Pack
  - Teradata Dynamic Query Manager 5.0
  - Teradata Analyst Pack
  - Teradata FastLoad
  - Teradata MultiLoad
- > Management Tools
  - Teradata Administrator
  - Teradata Priority Scheduler
- > Business Intelligence Tools:
  - MicroStrategy 8.0.2
  - Teradata QueryMan Teradata SQL Assistant
  - DataStage (IBM)
  - Microsoft Access, Microsoft Report Services
  - Reporting Tools: S+ and iMiner



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