

## A Brave New World

Face chapped and body bruised, Dan Lucier had just returned from a trek through the Himalayas. If it was dangerous, he loved it. If Dan wasn't kayaking on a Class 5 rapid in the Andes or scaling the granite face of El Capitan in Yosemite, you'd find him in a dark corner of Commonwealth's server room. He'd be the one in the well-worn hiking boots, old blue jeans, and long-sleeve shirt rolled up past his elbows, poring over a white paper on some esoteric network design. Paid by Commonwealth, Dan actually worked for one of their tenants, the guys in the Attic.

"It's now or never," Joe said as he searched Dan's mind. "I've always been a UNIX guy, but I'm being pulled by the dark side of the force. Tell me again why we should build this thing on NT."

Dan was a genius when it came to networks, servers, firewalls, and hosting facilities. Most techs fixate on a single operating system or platform; they're either carnivores or herbivores. But Dan was omnivorous. "Faster and cheaper," was all he said.

Joe let out a sigh. "Thanks, but I was looking for a bit more substance."

Dan leaned back in his chair and plunked his well-traveled hiking boots onto his desk. "See all those servers over there?" he said, pointing to a fifty-foot row of sleek, black rack systems. "There's enough horsepower there to run ten Commonwealths. Do you know how much that speed and capacity would cost if we were running RISC machines?"

"Yeah," Joe countered, "but we could run UNIX on Intel boxes. I know there aren't a lot of applications on those platforms, but heck, I helped write some of the code for early versions of Intel/UNIX."

"It's inefficient, Joe. It takes constant optimization and tweaking. NT does most of that for you; it makes it a heck of a lot easier to monitor and analyze stuff, especially at lower volumes." He thought for a moment. "I know you don't have any usage data yet, but what about projections? Did Winn tell you what to expect?"

Joe smiled. "Oh, yeah. I've got it all: store traffic, length of visit, media demands, number of products, orders, even average order size. Craig's got it all broken down by quarter, five years out. I brought a copy of our business plan so you'd see what Lad and I are up against. Look at his multimedia requirements," Joe said as he opened to the section for Dan.

### Merchandising Timeline

A chart projecting our five-year merchandising plan follows. We will begin modestly, encouraging three suppliers in each of three divisions within three industries to sponsor an average of four category presentations. This will require the production of 100 multimedia demonstrations in 1997. By year five, we will be selling products in fifteen industries, with twelve divisions each. We anticipate 100 suppliers per industry, each sponsoring ten category presentations and offering 100 products.

Yr	Industry	Divisions	Categories	Demos	Total	Products	Total	Factories
97	3	3	3	4	100	15	1,500	25
98	6	4	3	7	525	80	5,250	75
99	7	5	4	8	1,200	175	12,000	150
00	8	6	5	9	2,250	300	22,500	250
01	9	7	6	10	3,500	425	35,000	350

Dan took a little time to absorb the ramifications of the chart. “That doesn’t sound too ambitious to me,” he said at last. “If I’m reading this right, he’s only figuring on bringing in 250 factories between now and the end of ’99. He thinks you’re going to sell about 1,800 of your multimedia demos in that time frame. That seems manageable, even if they are memory and bandwidth hogs. Let’s see, 12,000 products in ’99. Entering and maintaining that should be easy for any platform. Actually, the plan looks pretty sound.” Dan looked up at Joe. “I thought Winn was a salesman.”

Joe laughed. “Craig? He’s scary. Plans everything. You can’t tell him anything he doesn’t remember. If I tell him we can’t do something, he asks why. By the time I finish explaining the technical limitations, he’s found a way to turn my answer into a solution. Pushes the limits on everything. These presentations he’s talking about here are big-time important. You want to see the scars on my back from the last time I suggested we scale them back? Here, see for yourself...” Joe said, pulling up his shirt.

“Please, no, that’s alright,” Dan choked out. He read on instead. “Category Presentations play an important role initially. They represent the store: without them we have nothing to sell; with them we are the world’s most exciting retailer. The margins from these presentations will fund our initial development. If we can automate their production, margins should exceed eighty percent...”

Lad McCaile poked his head around the server room door. “I heard you guys were hiding down here.”

“I was about to get Dan’s opinion on our system requirements. He was going to tell us why we don’t need UNIX.”

Lad grinned at Dan, pointing to the business plan in his lap. “Just so you know, everyone who reads that thing ends up working for him. It’s like a curse. Don’t say you weren’t warned.”

“One step at a time,” Dan said. He cleared his throat and read on. “Visits and transactions...” Lad looked over Joe’s shoulder as the three shared two copies of the plan. Dan scanned the document, summarizing. “Okay, he’s using the Nielsen numbers—fifty million people using the Internet as of the end of ’96. ‘An additional two million get connected each month.’”

Lad theorized, “He’s figuring that if we actually do everything he’s asked for, we could be one of the Web’s hottest sites.”

“Yeah,” Joe interjected, “but that’s one humongous if.”

“First things first. NT or UNIX?” McCaile was focused.

“Hang on a minute, Lad. It says here, ‘If one percent of those using the Web visit each month in ’98, the sales estimates in the forecast would need to be increased by 700 percent.’ Apparently he’s hanging the big number out there so guys who build networks and hosting facilities, like me, know what’s possible—so the systems are ready to handle the load, just in case.”

“Look at this bit,” Joe said, pointing to the headline. “‘Percentage Purchasing Product.’ I didn’t know any of this stuff before I read this. What he’s saying is online selling is really just retail. So even though we don’t have any history, we can still forecast using the historical numbers of other retailers. Check this out....”

The home shopping industry is the most similar to online retail. It is comprised of Shopping Networks, Infomercials, and Direct Mail Catalogs. On average, cable home-shopping firms receive orders from 20% of those that view their programs. Well-managed catalog firms with quality mailing lists generate revenue from 10% of their catalog recipients. Considering that visits to Value America will be planned, we should perform better.

With infomercials and home-shopping networks, customers have to endure twenty hours of memorabilia, miracle health-care products, and cheap jewelry presentations before they see something they want to buy. Our demonstrations are better than any catalog or home-shopping presentation, further increasing the likelihood we will exceed industry norms.

Our lower margins will allow us to sell better-quality goods for less than half of the prices charged in catalogs or home-shopping networks, encouraging greater response and revenue. Infomercial margins average 65 to 80%, catalog margins average 50 to 65%, and home-shopping networks average over 50%. Value America’s margins will average 15 to 20%. Considering these factors, the forecast underestimates the percentage of visitors who will buy by a substantial degree.

“Interesting,” Dan said. “Does he have a chart in there projecting visitation? It would be nice to see how he correlates visits to sales.”

“Yeah. Right here.”

Projected Access & Revenue:

Yr	Web Users	% Visit ValAm	#Visit ValAm	% Buy	#Buy ValAm	Aver Buy \$	X’s Return	Projected Revenue
98	50 M	1.0%	0.5 M	10.0%	50,000	\$100	4	\$25M
99	75 M	2%	1.5 M	10.0%	150,000	\$200	3	\$120M
00	100 M	3%	3.0M	10.0%	300,000	\$200	3	\$240M
01	125 M	4%	5.0 M	10.0%	500,000	\$200	4	\$500M

Dan stared at the chart and its supporting documentation in disbelief. “Where did you find this guy? He not only gives you the charts five years out, he gives you all of his assumptions. He even tells you where his assumptions are weak and what impact they’ll have on his numbers if he’s wrong.”

“Yeah, yeah,” Joe said with a smile. “So, can we do this on NT?”

Dan studied the chart for a minute. “Well, these visitation numbers are fairly high, but nothing the new dual-processor Intel servers running NT can’t handle. As for the revenue projections, NT can accommodate a lot more transactional volume than what’s projected here. That’s certainly true for ’98, and probably true for the hundred-plus number he’s hanging out there in ’99. So yes, I’d say Intel and NT can do the job. Of course,” he said raising his eyes, “if you actually do more business in ’99, you’ll be able to afford beefier UNIX/RISC systems, won’t you?”

“Not so fast,” Lad said. “It’s not quite as simple as that. Before you swear NT will work, listen to what he says about the assumptions that underlie these numbers.” Lad picked up a copy of the business plan and read aloud. ““We believe annual revenue per product will exceed \$5,000. Our projections increase to \$10,000 in the second year and to \$15,000 per item in year 2000. With product retails averaging \$175, we are forecasting sales of just twenty-nine units an item in 1998. This represents only two sales a month, increasing to four units per month in ’99. It is possible that initial product sales will exceed \$25,000 and escalate to over \$50,000 within a few years. This favorable variance would serve to triple our estimates.’ Still with me, or is the math getting a little tough for you?” Lad asked, as he lowered the page again.

“Enough background,” Joe said.

Dan took a minute to absorb what Lad had read. He looked at another chart or two. He scanned the accompanying assumptions. What he read predicted retail sales commencing in ’98 at up to \$40 million and growing to as much as \$175 million in ’99. “I think your guy’s a closet math major,” he mumbled. “He obviously didn’t get his fill of algebra in school. You know what he’s doing here? He’s taking away any excuse for failure. You’re never going to be able to whine, you didn’t warn us. But I’ll tell you what—this is some plan. Can I keep this?”

“Sure,” Joe responded. “But just so you know, it gets worse. If you really want to know what we’re in for, take a look at the systems requirements.” Joe flipped back to the last few pages. “The Transactional Requirements.” They reviewed the plan together until they saw the line, “Reconcile All Ordering, Shipment, Invoice, and Payment Records.”

“All of this front-end, database-driven stuff is nothing compared to the network of logistics, reporting, and financial systems we’ll need to support this plan. However, that’s all back-end stuff, so I don’t have to worry about it.” Joe chuckled, glancing at Lad.

“The number of variables we’re talking about is significant,” Lad added, ignoring Joe’s attempt at humor. It was the understatement du jour. “I’ve gone through this stuff with Craig a dozen times. Each time he rattles off a list of the processes we need to track, and explains how they’re interrelated. There’s a lot more to this than meets the eye.”

“As if that weren’t enough,” Joe interjected, “we have to make the system handle exceptions like backorders, partial shipments, and credits.”

Dan was getting it from both sides. Now Lad jumped back in. “Everything has to be attached to an order file, compared, differences reconciled, and then entered into an accounting system. And get this—we have to make the data, most of it anyway, available to the customer.”

Joe’s turn. “And that’s not the end of it. We’ve got to build an integrated customer-service system too.” Dan was starting to get dizzy.

“As you can see,” Lad said, sounding undaunted by the challenge, “the list goes on forever.” He flipped open the plan again. “Look at this....”

## Shipping and Compliance

Electronic Order Transmission and Acknowledgment

Create Electronic Shipment Labels for Printer in Distribution Center

Create an Electronic Bill of Lading for Shipper

Fill Rate Calculations, Scheduled and Average Lead Time Reports

Compliance Standards and Evaluation of Vendor Performance

## Forecasting Tools for Merchants and Inventory Level Notifications

### Freight and Delivery

Member Freight Options, Freight Rate, and Delivery Time Calculation  
Electronic Freight Designator to Vendor & Electronic Notification for Pick-up  
E-Mail Shipment Confirmation and Notification to Member

### Acquisition Sequence

Present Testimonial Consumer Reports Ratings and Data  
Confirm Desire to Acquire and Create PO Number  
Select Quantity, Color, Size, and Options (Attributes)  
Select Freight Carrier and Present Freight Cost Calculations and Alternatives  
Enter Special Instructions for Delivery and Present Estimated Delivery Date  
Present Home, Office, and Other Address; Confirm Ship-to Address  
Automatically Insure Selected Shipments and Waive Signature Requirements  
Calculate State Sales Tax and Accumulate Sales Tax by State  
Retrieve Member's Credit Card Data from Behind Firewall and Decrypt  
Tabulate Appropriate Cost, Freight, and Sales Tax Total  
Require Mother's Maiden Name for Selected Orders (>x \$ or unique ship-to)  
Secure Credit Card Authorization and Attach Number; Notify if Denied  
Encrypt Credit Card Data en route and Unscramble Data Encrypted by Sender  
Electronically Receive Credit Card Reimbursement  
Acknowledge Receipt of Funds and Attach Data to Order File  
Present Charity Options and Acknowledge Contributions in Member's Name  
Thank Member for Purchase

### Returns

Communicate Procedures and Provide Address and Authorization  
Notify Vendor and Get an RGA from Vendor  
Arrange Return Pick Up with Carrier, E-Mail Instructions, and Mailing Label  
Confirm Delivery with Shipper and Factory  
Debit Factory's Accounts Payable and Document Debit  
Charge Factory for Return and Outbound Freight  
Credit Customer's Card; E-Mail Acknowledgment of Credit to Member

### Reporting

Sales and Profits by Unit, Dollars, Source, Category, Division, and Industry  
Sales and Profit by Day, Week, Month, Quarter, Year to Date, Rolling 12 Months  
Forecast and Reconciliation with Inventory Management Plan for Vendors  
Member by State, Region, Interests, and Demographics  
Contact Frequency, Average Transaction, Computer Capability, Connectivity

### General Ledger

Accounts Payable and Receivable Aging  
Financial Modeling and Budgeting, Actual Performance versus Budget  
Financial Reporting, Balance Sheet, Income Statement....

Dan looked stunned. “This is worse than trying to climb El Capitan in flip-flops. You realize, of course, there’s no off-the-shelf application that can do this stuff. Any one of these items could be deadly. This plan could keep an army of developers writing code for years. Now I see why Craig isn’t forecasting any revenue from product sales until ’98. It’s going to take at least that long to build a store that can do half this stuff.”

Joe and Lad nodded knowingly. They’d come to the same conclusion.

“Listen guys, if it’s just a decision between NT and UNIX you’re after, that part’s easy. Go with NT. It’ll take you twice as long to build this thing using UNIX. That’s the good news. The bad news is that if you can’t find some existing application to hang your code on, you’re as good as dead.”

“We know,” Joe agreed. “Dan, you love a good challenge, don’t you? It doesn’t look to me like there’s much difference between doing this and climbing straight up El Capitan.”

“Yes, there is. El Cap has been climbed before.”

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“Hi, Joe. Burning the midnight oil?” Driving home from dinner, Craig had noticed Joe’s light was on.

“I think I’ve found it.”

“It? What’s it?”

“I was surfing the Web, checking out some geekie sites, and I found this. It’s called IDCHTX. It’s from Microsoft—designed to dynamically generate HTML pages from a database.”

“Catchy name. Pages from a database, huh? Think we can use it to automate production?” Craig asked his chief engineer.

“It’s a little early to tell, but yeah, maybe. I’m working on it. There’s been a rumor going around that Microsoft is trying to write an online retail program, and I think this might be part of it. Hey, go home. It’s after ten. I’ll let you know tomorrow how this works out.”

“Alright, Joe. Don’t hang too long.”

Right. Joe was known to come in at noon and work until four in the morning if he was on the trail of something. Craig reached the door and turned around. “With this Microsoft thing, does that mean you guys are thinking about building the store on NT?”

“Yeah, that’s what we’re thinking.” Joe explained, “Lucky for us we have an NT network guy downstairs. He’s pretty excited about what we’re doing. He loves anything on the ragged edge. This afternoon, he helped Lad and me set up an NT server. It took us two hours. I’ve done the same thing a hundred times with UNIX servers but never in less than two days. NT’s fast, and Dan’s good.”

“So you think we’ll be able to snag him?”

“Pretty sure, but not while we’re hanging in the Attic. Besides, his guys aren’t giving him enough work to keep him awake. We already get most of his time, and we don’t even have to pay for it.”

“Just so I understand, could you explain why you’re giving up on UNIX? There are some serious budget implications.”

“We’re not giving up. It’s just that NT’s better for a start-up. NT’s got a GUI interface, point-and-click stuff, and lots of the routine coding steps are automated. Sure, we’ll have to reboot our systems more often than we would if we ran UNIX on RISC machines, but at least we’ll have a store to reboot. It’s like Microsoft’s SQL Server; it’s not quite as good as Oracle, but it’s faster to set up, and it costs next to nothin’.”

“Why do they call it ‘Sequel Server?’ A database isn’t a server, and it doesn’t sound like it’s the sequel to anything.”

Joe laughed. Craig didn’t often embarrass himself, but this time he had. “It’s not ‘Sequel,’ its ‘S-Q-L.’ It’s an acronym—stands for Standardized Query Language. It’s got more than enough horsepower to get our demo store online. Like I said, it’s quicker and cheaper. We can always upgrade later.”

“Quicker and cheaper are good,” Craig smiled. “Night, Joe.”

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NobleStar’s offices were hidden among the forest of glass and steel office buildings along the western edge of the Washington Beltway. One of their geeks had written a book on the ins and outs of SQL Server. Lad, our Oracle DBA, had called the book’s author one day in desperation. During their discussion, Lad had discovered that Joe had been right. Microsoft’s IDCHTX had led to a beta product called Merchant Server. NobleStar had been given a beta copy to help evaluate the code. And since we wanted to get our hands on it, we were off to NobleStar.

Joe, Lad, and Craig arrived early. As the sixth-floor elevator door opened, they were greeted by a receptionist. She removed her headset, offered them coffee and soft drinks, and escorted them to a nearby conference room. The receptionist was pretty. The office was gorgeous.

Five expensive suits entered the room, each occupied by a NobleStar team member, complete with notepad and coffee. They looked more like investment bankers, Craig reflected, than developers. They began by peppering him with questions. This was natural enough—online selling was so new, there wasn’t even a name for it. The term “e-tail” hadn’t yet been coined. The boys soon discovered that these folks had no retail experience. The fact that they had been chosen to evaluate retail software was hilarious. The blind were leading the vision-impaired.

Craig explained the challenges of selling online and asked Joe and Lad to elaborate on the progress they’d made. By the time they were through, the NobleStar suits recognized it would be in their best interest to provide us with a beta copy of Merchant. They were green, but they weren’t dumb. The whole application fit on a single CD-ROM.

A second meeting followed two weeks later. NobleStar’s certified experts were to tutor us on Merchant Server. However, Lad and Joe had learned so much about the application in the intervening weeks, the teachers became the students. Lad had become expert in integrating the back end of Merchant with the SQL Server database. He discovered how the application partially enabled credit-card processing, especially when linked to outside applications. Joe worked with the SQL “calls” and learned to push the envelope on the front end.

Merchant Server provided the tools we needed to build our version of e-tail. It didn’t do anything on its own, so there was nothing we had to disable or work around. Other e-

commerce applications provided forms for entry of data into their model. But our model was different. Joe knew it would be more work undoing what they had done than to design what we wanted to do. Merchant was a toolbox that allowed us to build a solution our way.

Merchant also provided a skeletal structure that could be used to support the elements of the order pipeline. It tied things together, enabling us to build our code on something that was both flexible and connected.

Another ingredient sweetened the recipe: Microsoft had clout. They unlocked doors we could not otherwise hope to open. Every off-the-shelf application, from finance to firewalls, credit-card processing to tax collecting, servers to audio streaming was designed to work within Microsoft's framework.

Merchant Server was a good start. Joe and Lad may have been clinging to the sheer rock face of El Capitan, but now at least they had ropes.

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"I don't mean to be nosey, but I couldn't help noticing the UPS logos. Do you work for them?" Craig asked the man across the aisle.

"Yes. I work out of Atlanta. I'm flying home. What do you do?"

"I'm with Value America; we're an online store based in Charlottesville."

"Internet commerce! We've got a whole team dedicated to it. We think it's going to be huge."

"You mean you're ready to support guys like us?"

"You bet. Give me your card, and I'll have our team leader call you."

"Great," Craig said, pulling out two business cards. Another unbelievable coincidence was unfolding. "We've been getting the runaround from FedEx. I'm having trouble getting anybody to call us back."

The UPS exec smiled. "I assume the reason you handed me two cards is that you want our account manager to give you a call too, right?"

"Absolutely," Craig said. "For us to give our customers the right deal, we have to negotiate the right deal on freight. It's a big part of our cost."

"Oh, I know. That's why we're committed to online retail. Both guys will call you. When will you be back in the office?"

"Day after tomorrow, Friday."

"Consider it done. Now, can I ask you a favor? I couldn't help but notice your Value America brochures. Could I have a copy to pass around?"

"Sure, I've got extras." Craig reached into the Black Hole, smiling.

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"Who's buying today?" Lad asked as we headed out for lunch. We all knew where we were going, even without asking. A local Chinese buffet restaurant a few blocks away had become our company cafeteria.

"It's my turn, but I forgot my wallet," Joe quipped. "I guess that means it's your turn again," he said, pointing to Craig.



“Alright, I’ll buy, but it’s going to be a working lunch. UPS is here tomorrow.” Craig poked his head into my cubicle. “Ken, you going?”

“Sure,” I said. I never missed lunch when Craig was buying.

The Shanghai was a family affair, a minute from the office. The buffet was good and, more to the point, fast.

We piled our plates high with General Tsao’s Chicken, Beef Broccoli, Sweet and Sour Pork, and a Crab Rangoon or two. Following the customary feeding frenzy, Craig called the meeting to order.

“Where do we stand with our freight calculator, guys?”

Lad looked at Joe to see who was going to flinch, i.e., relinquish the chicken wing and answer the question. Joe never lost a game of chicken. “We’ve got all we’re going to get out of UPS,” Lad answered. “Their Internet-based freight calculator works okay on their site, but I’m afraid it’s not designed to accept an outside query.”

“That’s true,” Joe said, waving a chicken wing in the air, “but I learned enough looking at the source code behind their site to build our own calculator. As long as we make sure to download the UPS freight table updates, we’ll be just as accurate, and a heck of a lot faster, since we won’t have to connect to their site.”

“He’s automated data entry too,” I added. “We now have tools in Presentation Marketing to feed the calculator. He’s linked the Authoring Tool to the Admin Tool, so now we’ve got a Web-based application with a great graphical interface. It supplies the purchasing panel and the transaction engine. Saves us a ton of time, not to mention cutting down on data-entry errors.”

Joe summed it up. “I just borrowed UPS’s logic, freight tables, and zone information. I linked it with the data Ken’s gang has entered on products and suppliers. It calculates the actual freight. I’ve written code for UPS Ground, Second Day, and Overnight. Set the default to Ground, of course.” Joe paused. “But we’re going to need to negotiate a discount from these boys tomorrow. Using their published rates, the numbers are ugly.”

“That’s the idea,” Craig said as he asked for the bill. “Sounds like you guys have made great progress. Can you demonstrate it tomorrow?”

“Yeah, it’s ready now,” Joe said. “I’ve even managed to incorporate the functionality of Microsoft’s Wallet into the calculator. Pretty slick.”

“Lucky Microsoft’s got a Wallet, Joe; otherwise I doubt you’d know what one looks like.” Craig handed the waitress his credit card.

“Oh, hurt me, in front of my friends. I represent that statement.”

“Speaking of representing,” I chimed in, “think it’s about time to change the imagery we’re using to represent our freight carrier? It’s purple and orange on a white truck and airplane, remember? It still says, ‘ExPres.’ Looks like we need to make it UPS brown and gold. Pity, though. The ‘ExPres’ FedEx knock-off was pretty clever.”

“Yeah. FedEx is classier, a better fit for the image we’re trying to create. Who’d ya rather see pullin’ up to your front door, a FedEx van with their fancy electronics or UPS’s Teamsters?”

“Hey, careful there, big boy,” Joe laughed, “or I’ll send my dad after you. You know where he works, don’t you?”

“Chief Counsel for the UAW. You gonna unionize us, Joe?”

“You never know....”

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“I’ve heard you present our store a hundred times,” Joe said. “I’ve watched you go point by point through the whole process. Something good always happens. But not this time.”

Craig was shaking his head. He had just hung up with Wells Fargo’s credit-card manager. “The way they treated me, you’d think I’d tried to hold up their damn stagecoach. What is it with these people? We’re trying to give them business. It’s not like we want to borrow money!”

“So what are your revenue projections for calendar ’98, Mr. Winn?” Joe said in falsetto, impersonating the lady’s voice he had heard over the speakerphone. Then, mimicking Winn’s deeper voice, Joe carried on, “Our forecast is rather modest; we’re projecting \$40 million, with more than eighty-five percent of that coming in the second half.” Then falsetto: “And you say you haven’t sold anything yet, nothing we can use to base your merchant account application upon?” Then back to Craig’s voice, “Of course not. We’re an Internet store. Until we can accept credit cards, we can’t sell anything! That’s why we’re calling you...you moron,” Joe added for emphasis. Laughing hysterically, he concluded his charade, “Then, Mr. Winn, we will require you to deposit one million dollars to cover our exposure.”

They might as well have asked for a billion. Craig tried to hide his concern. He knew that VeriFone was the dominant credit card processor. Their “swipe” machines were in virtually every retail store. Yet for Internet sales, VeriFone had authorized only two banks. Both of them had asked for more than we could possibly give. We’ve come so far, Craig agonized, slain so many dragons, and now we’re going to fail because we can’t open a credit-card account? Every mom-and-pop nickel-and-dime operation in the country has a merchant account—even if they’re charging pocket change for a pack of gum or a carton of cigarettes.

“You know why we’re having this problem don’t you, Joe?” Craig asked. “Online stores have been skewered by the press.”

“Yeah.” Joe had put the pieces together. “You’ve got Netscape working with Visa and Microsoft working with MasterCard. They have different security standards. Each lobbed a grenade into the other’s camp, trying to point out their weaknesses. The press had a field day with it. They blew the whole security thing all out of proportion, creating the false impression that buying something online is somehow riskier. In reality it’s just like swiping your card through one of those machines at the store. They both encrypt data and send it over regular phone lines.”

“What do you think is safer—giving your card to a waiter who disappears with it into a back room of a restaurant, or an encrypted transaction that takes less than a second?”

“Why do you think the media never bothered to ask an expert what was really happening?”

“It’s a better story this way, Joe. From what I can tell, there aren’t many reporters left, only storytellers. Why let facts get in the way?” But he brightened. “Anyway, not to worry, Joe. There’s another game in town, not as big and well established as VeriFone, but at least their application is designed to work online. We’ll shift gears and give CyberCash a try. I’ll find a bank that’s willing to work with them.”

Joe found both the business and technical contacts. On the business side, they were most accommodating—unfortunately, they were less so on the tech side. In his discussions, Craig discovered the process CyberCash used to bring new banks into their world of electronic cash for the electronic age. He talked to our hometown bank (named Jefferson National, naturally) and persuaded them to apply. They came through, following a month or two of negotiations.

The business side of e-commerce was now enabled. Although Craig had projected sales of \$40 million in '98, he told the folks at Jefferson National that, being a new business in a new industry, he could only provide forecasts for the first half of the year—about a million dollars in Q1 and four or five million in Q2. This lowered the bank's perceived risk enough to provide a merchant account without a monetary pledge. Good thing; we didn't have any monetary to pledge.

With Craig's battle won, Joe and Lad were faced with their own nightmare. CyberCash didn't work—at least not very well. For example, if a customer double clicked the purchase button, as people are apt to do, CyberCash charged their card twice. That tended to make customers cranky. They made the auditors cranky too. At the time, CyberCash was unable to provide any payment information. They would process the customer's credit card and acquire authorization, but that's where it ended. Cybercash was unable to tell us how much money was actually paid, or when.

Our quest for a solution ultimately led us to a new California company named Segue. Working with Joe, they were able to transfer “flat” files on the final cash transfers in a way that enabled us to attach them to the customer's order file. This was essential for the financial audit trail, not to mention any semblance of customer service. Segue went on to become PaymentNet, and Value America went on to become an Internet store that actually worked.

Soon after our high-tech store went “live,” we discovered that we were an easy target for old-fashioned chicanery. We learned the hard way that the authorization number we got from the credit-card processors meant very little. It wasn't a guarantee of payment, we found to our dismay. In the virtual world, the card is not physically present, so there's no way to verify the customer's signature. The fact that signature checking is seldom done in regular retail stores didn't seem to matter to those setting up the rules. If the card was stolen or its number purloined, we would not get paid, authorization or not.

To make matters worse, solving the problem fell squarely on the shoulders of Value America. Our average checkout was thirty times greater than that of our online competitors. Amazon was averaging less than \$20 a register ring; we averaged over \$750. If you were a crook, would you steal a \$20 book or a \$750 diamond ring? Right. The thieves came to the same conclusion; they shopped Value America like Imelda Marcos at a shoe sale. Early on, nearly ten percent of our orders were from crooks.

Eventually, we were able to hire a guy away from Federated Department Stores who had faced, and slain, this dragon before. He wrote a fraud-detection strategy that automatically checked for things that were likely to occur if there was fraudulent intent. For example, did the delivery address match the credit card billing address? Was the customer buying a product, like jewelry or a notebook PC, that was easy to fence? If we called to verify the order, had they given us their real phone number? It even checked an online database of stolen credit cards. The new program cut fraudulent orders to a fraction of one percent. Another dragon was dead, or at least very depressed.

Just when we thought we were making progress, yet another dragon raised its ugly head. No accepted financial system worked without inventory, under the reasonable theory that you couldn't sell what you didn't own. Forget that Craig had spent years as a rep doing precisely that. Yet his rep business had been all cash positive. It didn't require investors in order to grow and prosper. Value America would.

Investors would mean audits, and accounting firms required financials—general ledgers, income statements, balance sheets. So we had a problem. Without inventory, no accounting program would work. Without a working financial application, there could be no financials. No financials, no investors. And without investors, there would be no Value America.

Joe came to the rescue, God love his devious mind. He decided to “give” the financial programs, like Platinum and Sterling, what they wanted—inventory. Joe created a virtual warehouse that received and shipped our virtual inventory. It worked beautifully. Turn was terrific, and the financial programs loved it. The accountants, however...well, that's another story.

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WINN found himself in an airport again. Chicago. His pocket began to ring as he jogged down the interminable corridors of the United complex at O'Hare. He flipped open his cell phone. “This is Craig,” he said, panting.

“Hi, this is Doug, with Premenos. Can you talk?”

“Hi Doug. Actually, I'm trying to catch my flight to Dulles so I can make another connection and go home. Can you give me an update while I'm hightailing it to the gate?”

“Sure. I've given all of your questions to our technical staff, our developers and engineers, and they've come back with some answers. You realize,” he chuckled, “we've never had anybody ask these questions before. Anyway, first off, we're writing a version of our EDI application to run on NT. It's going to be a whole lot cheaper, they tell me. As you may know, most of our current customers use...”

“Yeah, I know. They use IBM AS400s. I used to be one of them.”

“AS400s. That's right,” Doug said. “We found that our app can port information to your database. Most of our clients are using IBM databases; some have gone to Oracle. Our guys can make it work with, it says here, ‘S-Q-L.’”

“That's pronounced sequel. It's Microsoft's database, SQL Server. Did you find out if it's ODBC compliant?”

“No, it's not, just flat files.”

“Too bad. That's a significant roadblock. When will you have the NT version ready? How much will it cost? How much of the functionality will it retain? Oh, and what level of transactional volume is it calibrated for?”

“I don't know. I'll ask our engineers and I'll get back to you.”

The EDI conversations with Harbinger and Sterling didn't go much better. The only differences were that one had a tie-in with IBM, and the other offered an integrated financial package. The one promising survivor appeared to be GEIS, GE Information Systems. They were the biggest player and offered the additional advantage of operating

the most commonly used VAN, Value Added Network. There was only one problem: they were expensive.

Joe had hated EDI ever since he had first heard the acronym. Lad had eventually come to the same conclusion. Electronic Data Interchange was arcane, little more than a complex version of e-mail transmitting on a slightly more secure network. There were differing versions, ridged rules, ANSI standards, and seldom-used protocols that had to be understood, accommodated, and integrated. Even when you did all this as well as it could be done, you still had to “map” your EDI to the vendor’s for the darn thing to work.

Lad recommended purchasing the GEIS starter version. It was ancient, so old it actually ran on DOS, and was therefore cheap. It would suffice, though, until the store’s transactional volume surpassed its meager capabilities. Craig approved the purchase begrudgingly, hating the idea of running the store of the future on the EDI of the past. He promised Lad he would try to climb up through the GEIS management chain until he found someone willing to partner with us. Working together, he reasoned, we could develop a more cutting-edge solution without having to pay for it.

It wasn’t long before the CEO of GE Information Systems invited Craig to a Washington Redskins game in his private box. They knew many of the same people, and they talked the same language. They even shared their private impressions about the work being done out in California by Netscape.

GEIS agreed to partner with us, virtually giving Value America the latest version of their EDI software. In return, Value America worked with GE to make EDI more effective online and integrating it more seamlessly with databases. We promoted the partnership as an essential element of the new world order. Dragons, it seemed, were becoming an endangered species.

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“I can’t believe anything this simple could be so difficult,” Craig said. “C’mon, Joe, is it really that complicated? I’m just trying to reduce the number of SKU’s we have to manage.” Winn knew what he wanted, knew why he wanted it, and wasn’t about to give up. “My head is killing me,” he announced abruptly. “I’m going to the drugstore for some Advil.”

I could use some myself, Joe thought. Craig was doing it again, using his favorite four-letter word, “just.” Every time he used that dreaded word, Joe’s life disappeared for a month, dissipating into mind-numbing solutions to simply stated goals. Interminable hours, late-night pizza deliveries, and aspirin were all part of the formula. Just build something that can fly to the moon on gossamer wings.

This time it was accommodating “attributes.” It was tantamount to trying to achieve two mutually exclusive goals: selling individual products versus selling product “types” that had common variables.

“OK, Joe, this can’t be that hard. We need ‘attributes’ to handle products that have options, like...this shirt I am wearing. It comes in, say, five sizes and ten colors, both short and long sleeve. So there are three attributes, size, color, and sleeve type, giving us a hundred possible combinations. All one hundred variations come from the same factory, and all have the same price. I want to list it in our system as a single shirt, a single Stock Keeping Unit—but with color, sleeve, and size options. If we burden our

members with all of the variations, they'll give up, and we'll lose the sale. If Ken's team has to enter and manage every variation, we'll go broke. We have to simplify this."

Joe sighed. "I know it sounds simple, but our store is built on products—individual products. How can you sell something that's not entered as a SKU? What happens if we want to sell the long-sleeve version for more than the short-sleeve? What if the manufacturer wants to charge us more for the Extra Large than for the Extra Small? And here's another wrinkle: what happens if someone decides to eliminate one of the ten colors, or worse yet, eliminates the color in some sizes but not every size. We'd have to keep the data for historical sales even when the store no longer sells the option. And we'd have to prevent customers from ordering the discontinued item. This is not as easy as it sounds...."

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Solving the attributes puzzle was tough, but it was child's play next to Craig's grand scheme of giving our members multiple ways to shop. He had envisioned fifteen of them. We never got around to implementing them all, but Joe made a good start.

The first of these was similar to what drove our competitors' sites—shopping "by product." It was simple enough. A window was provided to let the customer "search" by typing in a product's name. If you were shopping for books at Amazon.com, and you knew the title or author, you'd just type in *The Firm* or "John Grisham," and Amazon would take you right to it. But who knew the name of a toaster or television. You could enter "TV," or "Panasonic," or even "Panasonic+TV+25-inch," but they make a bunch of them, all with different features.

Sometimes the brand names themselves were elusive. Do you know the names of any pants other than Dockers and 501 Jeans? What's the name of Amana's innovative line of bottom-freezer refrigerators? "Easy Reach" is the answer, but who, other than Amana and the Creative Director of an Internet store, knows that? Craig had a point. Using a search engine for products like we were selling was less than ideal. There had to be a better way.

Joe was asked to enable shopping "by category." Virtually every retailer since the dawn of time has been organized this way. Even down at Crazy Abdul's in Ur of the Chaldees, I imagine, they sold the rugs in one place and the frankincense in another. Within every industry, there are divisions and categories. Housewares, for example, is an industry. Appliances are a division of that industry. Toasters are a category within that division. Within the Toasters category, there are dozens of brands and hundreds of products.

We may have been the first online store to create a graphical menu structure that allowed our customers to search for products by industry, division, category, and type. Winn had dedicated twenty pages of his original business plan to this concept for the benefit of our merchants and developers. The reason it worked was that Joe made sure our store was dynamically generated out of our database. Things could be called up and grouped for presentation virtually any way we wanted.

The third way to shop was our favorite. Shopping "by brand" was a natural for us since our whole philosophy was brand-centric. Each brand had their own exclusive department. Their logos were pictured on the landing page of their particular industry. By clicking on the logo, the customer went directly to the brand's "store within a store." We

gave them their own URL, or Web address: VA.com/HP went directly to a department devoted exclusively to the world of Hewlett-Packard products. With the exception of some designer shops in upscale department stores, the idea of creating a department around a brand, rather than around a category, was unheard of.

The fourth way to shop was by “related products.” If you bought a vacuum cleaner in our store, a coffee maker, or an ink jet printer, we could take you directly to the bags, filters, and cartridges for the specific model you owned. It was convenient because it was personalized.

Fifth, we highlighted products that were “on sale.” If you wanted to shop by category or brand for the products that were discounted, we brought them all together for you. It was like a giant virtual sale table.

The sixth method was a nod to the “gatekeepers” among online shoppers. The “What’s New,” section highlighted newly added brands.

The seventh way to shop at Value America was called “Featured Products.” It was equivalent to what retailers call an end cap. In traditional brick-and-mortar stores, this is the highly visible section at the end of a gondola, along the main aisle. Our Featured Products were pictured to the right of every menu page, along with a sale price. As in regular retail, they consumed about five percent of our “floor space” but generated more than twenty-five percent of our revenues.

There were more ways to shop, which never made it off the drawing board, that would have made the store even more interesting. But it was enough, I suppose, to have built a virtual store that actually worked. These unrealized dreams included Comparison Shopping, Highest-Rated Product, and Most-Popular Product. We also wanted an Express Checkout, in which items you purchased regularly would be kept in your customized Express Checkout area, ready for one-click ordering. Automated Delivery was a derivation of this idea: products your family or your business consumed on a predictable schedule (e.g. toothpaste, diapers, copier paper) could be scheduled to arrive automatically at some predetermined interval.

The original business plan talked about a Personal Shopper. Craig suggested a butler, which later became Ask.com’s imagery. The Personal Shopper was actually enabled in early versions of our store, manifesting itself as a genie. Our genie, thanks to the creative folks at Microsoft, actually listened to what our members said and talked back to them—nicely. When you entered the store, our animated genie, a cute little blue guy with a turban and a smoky tail, moved about the screen pointing out things of interest. He greeted each member by name. The genie made an appropriate remark in a computer-generated voice: “It’s only been five minutes since your last visit. Did you forget something?” Our engaging blue mascot thanked our members for the last product they purchased. He also reminded members about important upcoming dates in their lives.

One idea that never quite made it into production was an automated floral service. The idea was genie genius: tell us the dates that are important to you, your anniversary, your spouse’s birthday, Valentines Day, and Mother’s Day for example, and we will automatically send flowers. That would have been very, very cool. When’s the last time a store improved your love life?

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Looking back, it seems impossible. In only eighteen months, we built a store that actually worked, from scratch. It was ours. We wrote the code. Value America was a proprietary solution from front to back. We slew dragons and invented innovative features, many of which have still never been replicated. We created thousands of multimedia product presentations. The software we used to build them and the incredible functionality that enabled them existed only at Value America.

We built the Internet's most comprehensive store—at a time when no other online store offered more than one category. It let each customer shop in the way he or she found most comfortable. In an era of static HTML Web pages, our site was dynamically generated. We were the first online store to communicate with our suppliers using EDI and the first to build an automated freight calculator. We were the first to have electronic fraud detection and to run autonomously, independent of ISPs.

In an age of biplanes and barnstormers, we had created a space shuttle. Was it perfect? No. Would it fly? Yes, indeed! All we needed now was something to put in the cargo bay.