

Manufacturers need to know what's selling before they can produce and deliver their wares in the right quantities. Call it:



SUPPLY ON DEMAND

BY GALEN GRUMAN

MANUFACTURERS dream of a finely tuned supply chain, with finished goods landing softly on distributor and retailer loading docks at exactly the right time in precisely the right quantity. That can't be done, of course, without accurate demand forecasting — which still tends to be based on intuition, last year's sales numbers, and spreadsheet war games between sales and marketing groups. For most, the dream remains distant.

But manufacturers finally have a shot at turning that fantasy into reality. The key is integrating POS (point-of-sale) data with modern demand-planning tools, which are just now coming together for the enterprise. Wal-Mart has led the way, providing its suppliers POS data per store, updated several times a day, allowing suppliers to adjust their distribution, manufacturing, and

marketing efforts based on what's actually selling and where.

"Wal-Mart is setting the gauge for this supply-chain railroad," says Don DePalma, supply-chain analyst at Common Sense Advisory. Other major retailers, such as Best Buy, Home Depot, Kmart, Lowe's, Rite-Aid, and Target, are following suit.

Armed with that POS data, both retailers and manufacturers can build demand models that account for seasonality, regional variations, pricing and promotions, and distribution and manufacturing constraints. For example, analyzing POS data for promotions may tell you that 70 percent of an item is typically sold on the first Saturday of the promotion, letting you arrange your distribution accordingly. Retailers and product makers can also compare their forecasts to uncover differences in assumptions and then adjust them to create a "forecast of record."

Demand-driven systems also help companies adjust to inventory inefficiencies required by the increased use of overseas outsourcing. As companies have increased the use of overseas suppliers, many have had to keep more local inventory, raising costs and countering earlier just-in-time efforts. A demand-driven system helps companies better manage the flow of these strategic inventory reserves through distribution as demand shifts, as well as provide earlier signals of demand changes so remote suppliers have better notice of when to adjust their output.

The use of near-real-time POS data should not take the place of planning, analysts advise. Instead, POS data should be used in demand-planning tools to refine those forecasts in a continual-improvement process, says Yankee Group Analyst Mike Dominy.

"Forecasting is critical to demand-driven systems," notes Noman Waheed,

“The IT solution is only 5 percent of the supply-chain effort.”

— John Paterson, IBM

a partner at the consultancy Accenture. Otherwise, you're just automating the status quo, not avoiding problems and identifying opportunities.

For example, dressings and sauce maker Lighthouse Foods uses Ross Systems' demand-planning software to compare POS data from Wal-Mart against its forecasts, says IT director John Shaw. This allows Lighthouse to adjust what it sends to Wal-Mart's distribution centers to avoid overstock of fresh supplies that would spoil. It has also significantly reduced divergence between sales and forecasts, which had been as high as 60 percent, Shaw says.

Building on Existing Infrastructure

Midsize and large enterprises typically have operational systems — ERP, MRP (manufacturing resource planning), and SCM — for distribution, manufacturing, and inventory efforts, as well as BI and data-warehousing systems to manage the underlying data and business rules. Implementing a demand-driven system typically means augmenting these existing enterprise systems rather than building new ones, and it can be done in stages as each incremental effort pays off, notes Kevin O'Marah, an analyst at AMR Research.

Enterprises are also likely working on SOA (service-oriented architecture) and Web-based services, which provide the tools needed to run demand-driven processes among supply-chain partners. “SOA is vital because it lets you overlay all this siloed [demand and supply] information, to look at it in real time,” says Mike Grandinetti, senior vice president at Yantra, a supply-execution software provider.

When implementing a demand-driven system, “the IT solution is only 5 percent of the supply-chain effort,”

says John Paterson, chief procurement officer of IBM. Analysts and consultants agree: The vast majority of the effort belongs to the business managers, who must determine the right processes and business rules, as well as the meaning of the data they get. “Then you figure out what information you will make available in the supply chain and what information you can get,” Common Sense's DePalma says.

Starting With Demand Data

To be demand-driven, both retailers and product makers first need to have sufficient history — at least two years — on which to build their initial demand models. But most companies have only a history of what they shipped or received, not what they sold. At best, most companies are looking at weekly sales data, says Doug Percy, CEO of Blue Agave, which helps retailers supply that sales data to distribution centers. Wal-Mart provides such data several times a day.

The few retailers that now provide POS data largely limit access to their immediate suppliers, notes Jim Culliton, manager of supply-chain services at Hitachi Consulting, but if POS data were made available to suppliers further down the supply chain, those suppliers could more easily anticipate demand changes. Analysts cite two reasons for this limited sharing: One is that retailers are limiting initial deployment efforts to their larger suppliers; the other is that a retailer might not have a business relationship with companies further down the supply chain. In the latter case, suppliers that do get access to POS data should consider making it available to their own suppliers and manufacturers, Culliton says.

Even when POS data isn't available from the retailer, product makers gain

a better sense of demand by using delivery information from distributors. This information is typically available in EDI format, notes analyst Dominy, and provides some insight into store sales by tracking their replenishment patterns. As RFID systems get implemented, Dominy says, such systems will have more data on inventory location, providing better insight into what's staying in stockrooms unsold.

Smaller companies without an ERP or similar infrastructure can use the services of distributors to take advantage of the sales data. For example, distributor ADS builds demand models for its suppliers, collects sales data from retailers, and provides reports to its clients, which lets the clients focus on the data analysis, often in Microsoft Excel and Microsoft Access, says Bruce Mantz, executive vice president at ADS. “Distributors will have to do things like that to justify their existence” in a demand-driven world, notes Tim Vaio, vice president at Hitachi Consulting.

Focusing on Data Consistency

Because suppliers and retailers will vary widely in their applications usage, IT should focus its efforts on ensuring data consistency, both for internal systems and in data shared with other companies. Typically, such consistency is already in place for ERP, MRP, BI, CRM, and SCM systems.

Demand data is typically published as CSV (comma-separated value) files viewable in Excel and flat-file databases. AMR's O'Marah says more sophisticated formats, such as EDI, RosettaNet, and XML, are typically used for order handling rather than for sharing demand data. But the use of XML, Ferrari notes, will become more important as systems get more demand-driven and rely more on shar-

ing business rules and demand assumptions along with the data.

Because so many companies use Excel or Access to manipulate demand data, most demand-planning tools import and export flat-file data. Many newer tools also support EDI, XML, and sometimes RosettaNet. In most cases systems will need to output and import several formats to satisfy the needs of partner companies.

For example, although the electronics industry uses EDI and XML more so than other industries, Paul Katz, head of global supply chains at distributor Arrow Electronics, notes that just 1,500 of his 14,000 customers are electronically connected. Katz expects more small and midsize suppliers to share data electronically as data-sharing costs go down, thanks to the use of RosettaNet and hosted systems.

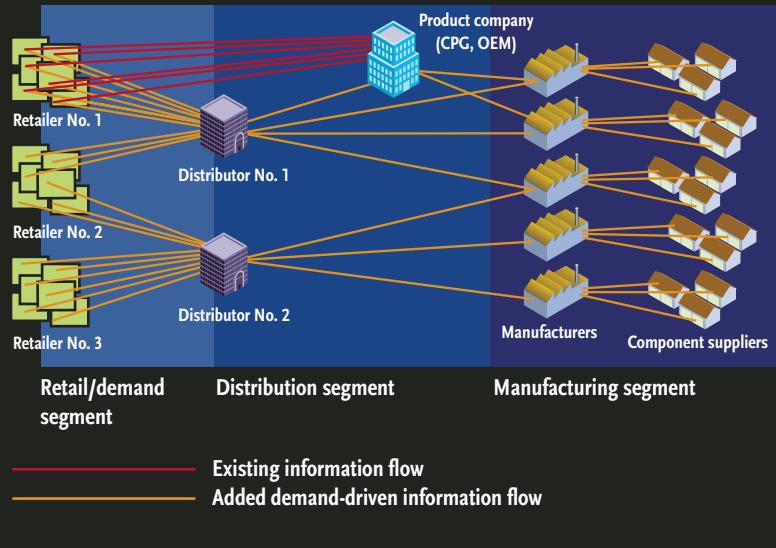
As demand data is moved among supply-chain partners, there's a good chance there will be unexpected changes to underlying business-rule assumptions or to the data itself, Common Sense's DePalma warns. So when IT creates data-translation and reporting rules, it needs to understand how the data is used, not just what its format and labels are.

Integrating Trends With Forecasts

Thanks to improvements in data-filtering capabilities and support for more complex supply-chain models, modern demand-planning tools can integrate POS data to refine their forecasts as demand changes, Yankee Group's Dominy says. i2 Technologies and Manugistics are the leading providers of demand-planning tools, analysts say. Many vendors, including Demantra, Logility, Ross Systems, SupplyWorks, and Yantra, offer tools tailored to specific industries. Tools

Chain of Demand

Although most supply-chain partners exchange order data electronically, demand planning retains its human element, tapping intuition and historical analysis before being transmitted as Excel spreadsheets or flat-file data. A demand-driven system automates the gathering of demand data and the reforecasting process and then integrates any changes with the existing distribution and manufacturing systems.



from the ERP vendors — such as Baan, Oracle, PeopleSoft, and SAP — are less mature, analysts agree. BI providers such as Business Objects, Cognos, and Prescient also offer some analysis tools, as well as databases that also handle data. NCR Teradata has pioneered such demand-signal repositories, O'Marah notes.

IDC's Ferrari expects Microsoft will offer tools in the next few years as it completes digesting recent ERP acquisitions such as Great Plains Software and Navision. In the meantime, most small companies use Excel and Access.

The larger an organization is, the less it can rely on Excel and Access for demand planning, says AMR's O'Marah, because "when the numbers get large, the answers are often counterintuitive." But Excel remains a common tool, even for organizations that have enterprise-class systems. For example, Scott Roy, director of demand planning at Well's Dairy, uses Excel to refine the company's

demand forecasts. He then uploads the changes to the Prescient BI system that maintains the demand plan and compares it to POS data from Wal-Mart. Other staffers use the Prescient system directly; however, Roy says its rigid interface makes for a slower process.

IT will need to customize and integrate demand-planning tools based on the kind of POS data received and on the business rules to be applied to that data. Such tools also require "a lot of maintenance" to reflect product, distribution, supplier, and marketing changes, says Lisa Plaskow, director of solutions marketing at Manugistics.

"We advise customers who feel they have a handle on the forecasting process that tools from these vendors do work well to build forecasts, but that a broader sales-and-operations-planning process is essential to give business judgment a chance to tune forecasts and react to events," O'Marah says.

IDC's Ferrari further cautions that the tools that help integrate ongoing

“We give suppliers the same visibility as the buyers and replenishment managers.”

— Christi Gallagher, Wal-Mart

sales data with forecast models are still evolving. “A lot of the supply-chain vendors are moving in that direction, so the question [that IT must investigate] is timing and integration,” he notes.

Share With Everyone Involved

A demand-driven supply chain is not a one-way street. Organizations should be able to monitor processes and product status both up and down the chain, as well as provide that information to their partners, so everyone has as much context as possible to make any changes in manufacturing, distribution, or marketing. “Think of it as a dynamic network,” says AMR Analyst Alison Smith.

Sharing data requires trust, which means companies can’t ask for more than they need just in case demand rises. “Our position with suppliers is that we will give them visibility to everything we know. We give our best forecasts. We don’t inflate our demand requests,” IBM’s Paterson says.

Similarly, Wal-Mart “gives suppliers the same visibility as the buyers and replenishment managers to information such as item performance, in-stock merchandise, and insight as to where the item is in the supply chain,” says Wal-Mart Spokeswoman Christi Gallagher. “Having access to every item’s performance at every store for every day for the past two years enables Wal-Mart and the supplier to jointly manage their business at the lowest level of detail.”

Just as retailers and product makers should share their demand plans, manufacturers should share their production schedules, Waheed says. For example, if a product maker knows whether its suppliers’ factories are running at full capacity, it can know whether to meet demand by finding alternative providers or by requesting increased production, DePalma says.

Likewise, if manufacturers can see that a particular model is selling much better than expected, they can prepare to reconfigure manufacturing in anticipation of the product maker altering the product mix in response to the unexpected sales trend.

The demand-driven approach also requires a win-win relationship across the supply chain. Unlike the business-

to-marketplace systems of the late 1990s, which focused on driving down supplier prices, demand-driven collaborative systems require that everyone benefit from the efficiencies the systems seek to identify and exploit, Ferrari says. Even if the IT infrastructure is in place, demand-driven supply chains won’t work without those shared business rules and expectations. ☛

Ahead of the Supply-Chain Curve

DEMAND-DRIVEN SUPPLY CHAINS ARE MORE COMMON IN SOME INDUSTRIES than in others. The electronics, automotive, pharmaceutical, and aerospace industries are furthest ahead, because they either have short product lifecycles or rely on just-in-time manufacturing to keep down overhead costs. Some update their demand plans hourly, forcing them to share more information across the supply chain to ensure optimum levels of production and delivery.

Dell Computer is perhaps the best-known example of a successful demand-driven manufacturer, though the fact that it’s also a retailer — one that takes custom product orders directly — gives it a natural advantage, notes Dean Strausl, executive director at Electronics Supply Chain Association. But even Dell has to predict what components to order, and when its demand slips out of alignment with what it can build, it alters consumer demand by changing pricing and availability, steering customers to what Dell can build quickly, he says. That shows the importance of applying demand and supply information at all points of the supply chain.

Makers of discrete goods — apparel, furniture, and other style-oriented products — as well as grocery and other mass-market retailers are only now looking at demand-driven approaches. That has a lot to do with the short life span of much of their inventory, so the production and sales window has been too small to make adjustments outside of distribution. Mass-market retailers have also come late to the demand-driven approach, because they typically live on tight margins and avoid large infrastructure investments, says Don DePalma, an analyst at Common Sense Advisory. Except for Wal-Mart, grocers are largely absent from the demand-driven effort. “The grocery industry in general has been reluctant to share information with customers,” notes John Shaw, IT director at Litehouse Foods.

Makers of continual goods — potato chips, notepads, staplers, and the like — are rarely demand-driven, says Accenture’s Waheed, perhaps because their product flow is fairly regular. But they should be able to adopt the concept easily, given they already use continual-refinement processes in their manufacturing, and the concept is easily extended to the distribution and retail processes. Why they haven’t is a mystery, he says. — G.G.

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General Business Industries

- 01. Defense Contractor / Aerospace
- 02. Retail
- 03. Wholesale / Distribution (non-computer)
- 04. Pharmaceutical / Medical / Dental / Healthcare
- 05. Financial Services / Banking
- 06. Insurance / Real Estate / Legal
- 07. Transportation / Utilities
- 08. Media (print / electronic)
- 09. Communication Carriers (telecomm, data comm., TV / cable)
- 10. Construction / Architecture / Engineering
- 11. Manufacturing & Process Industries (other than computer-related)
- 12. Research / Development

Technology Providers

- 13. Managed Service Provider / Business Service Provider
- 14. Technology Service Provider (ISP / ASP / MSP, etc.)
- 15. Computer / Network Consultant
- 16. Systems or Network Integrator
- 17. VAR / VAD
- 18. Technology Manufacturer (hardware, software, peripherals, etc.)
- 19. Technology - Related Retailer / Wholesaler / Distributor
- 20. Government: federal (including military)
- 21. Government: state or local
- 22. Education
- 98. Other _____ (Please specify)

Government / Education

2 WHAT IS YOUR PRIMARY JOB TITLE? (PLEASE CHECK ONLY ONE):

IT / Technology Professionals

- 01. Chief Technology Officer (CTO)
- 02. Chief Information Officer (CIO)
- 03. Chief Security Officer (CSO)
- 04. Vice President (including SVP, EVP, etc.)
- 05. Director
- 06. Manager / Supervisor
- 07. Engineer
- 08. Systems Analyst / Programmer / Architect
- 09. Consultant / Integrator
- 10. Developer
- 11. IT Staff
- 12. Other IT Professional _____ (Please specify)

Corporate / Business Management

- 13. CEO, COO, President, Owner
- 14. CFO, Controller, Treasurer
- 15. Vice President (including SVP, EVP, etc.)
- 16. Director
- 17. Manager / Supervisor
- 18. Other Business Management Title _____ (Please specify)

- 98. Other Title _____ (Please specify)

3 PLEASE INDICATE YOUR JOB FUNCTION(S)? (PLEASE CHECK ALL THAT APPLY):

IT / Technology Functions

- 01. Executive
- 02. Department Management - IT
- 03. Research and Development Management
- 04. Systems / Network Management
- 05. Management of Enterprise Applications (CRM, ERP, SCM, etc.)
- 06. Applications Development
- 07. Consultant / Integrator
- 08. Other IT Department Management _____ (Please describe)
- 09. Other IT - Staff _____ (Please describe)

Corporate / Business Functions

- 10. Executive
- 11. Department Management - Business
- 12. Financial / Accounting Management
- 13. Research and Development Management
- 14. Sales / Marketing Management
- 15. Other Department Management
- 16. Other Department Staff _____ (Please describe)
- 98. Other _____ (Please describe)

4 HOW MANY PEOPLE ARE EMPLOYED AT THIS ORGANIZATION, INCLUDING ALL OF ITS BRANCHES, DIVISIONS AND SUBSIDIARIES? (PLEASE CHECK ONE ONLY):

- 01. 20,000 or more
- 02. 10,000 - 19,999
- 03. 5,000 - 9,999
- 04. 1,000 - 4,999
- 05. 500 - 999
- 06. 100 - 499
- 07. 50 - 99
- 08. Less than 49

5 OVER THE COURSE OF ONE YEAR, DO YOU BUY, SPECIFY, RECOMMEND, OR APPROVE THE PURCHASE OF THE FOLLOWING PRODUCTS OR SERVICES WORTH:

* CONSULTANTS: PLEASE INCLUDE WHAT YOU RECOMMEND FOR YOUR CLIENTS AS WELL AS WHAT YOU BUY FOR YOUR OWN BUSINESS, IF APPLICABLE. IF YOU CANNOT DISTINGUISH BETWEEN THIS AND OTHER LOCATIONS, PUT RESPONSE IN THE FIRST COLUMN.

- | | | |
|----------------------------------|--------------------------------|----------------------------|
| 01. \$100 million or more | 06. \$5,000,000 to \$9,999,999 | 11. \$100,000 to \$399,999 |
| 02. \$50,000,000 to \$99,999,999 | 07. \$2,500,000 to \$4,999,999 | 12. \$50,000 to \$99,999 |
| 03. \$30,000,000 to \$49,999,999 | 08. \$1,000,000 to \$2,499,999 | 13. Less than \$49,999 |
| 04. \$20,000,000 to \$29,999,999 | 09. \$600,000 to \$999,999 | 14. None |
| 05. \$10,000,000 to \$19,999,999 | 10. \$400,000 to \$599,999 | |

Product category	For this location: (write code in box)	For other locations: (write code in box)
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Internet / Intranet / Extranet	<input type="text"/>	<input type="text"/>
Security	<input type="text"/>	<input type="text"/>
Storage	<input type="text"/>	<input type="text"/>
Peripheral equipment	<input type="text"/>	<input type="text"/>
Software	<input type="text"/>	<input type="text"/>
Service / Support	<input type="text"/>	<input type="text"/>

Please answer the questions on the following page. 

6**PLEASE TELL US YOUR INVOLVEMENT WITH YOUR COMPANY'S STRATEGIC TECHNOLOGY INITIATIVES (PLEASE CHECK ALL THAT APPLY):**

- 01. Integrate Technology with company goals
- 02. Define Architecture
- 03. Choose Technology Platforms
- 04. Develop Technology Integration Strategy
- 05. Test, pilot, implement emerging technologies
- 06. Scalability Planning
- 07. Build, Run Web Services
- 08. Internet / Network Infrastructure
- 09. Customer Relationship Management
- 10. External Partnership Management
- 11. Budgeting
- 12. Recruitment & Retention
- 13. Other _____ (Please describe)
- 99. None of the above

9**ARE YOU INVOLVED IN BUYING, SPECIFYING, RECOMMENDING OR APPROVING THE FOLLOWING TECHNOLOGY SERVICES? (PLEASE CHECK ALL THAT APPLY):**

- 01. Technology Services
- 02. Systems / Application Integration
- 03. E-Business / Internet / Intranet / Extranet
- 04. Application Development
- 05. Application Hosting (ASP)
- 06. Web Hosting
- 07. Web Development
- 08. Security
- 09. Storage
- 10. Content Delivery Networks
- 11. Disaster Recovery / Business Continuity
- 12. Outsourcing
- 13. Utility Computing Services
- 14. Telecommunications
- 15. Call Center / IT Services
- 16. Consulting
- 17. Other Technology Services

7**ARE YOU INVOLVED IN BUYING, SPECIFYING, RECOMMENDING OR APPROVING THE FOLLOWING SOFTWARE? (PLEASE CHECK ALL THAT APPLY):**

- 01. Enterprise / E-Business Applications
 - 02. Customer Relationship Management (CRM / eCRM)
 - 03. Enterprise Resource Planning (ERP)
 - 04. Supply Chain / Procurement
 - 05. Business Process Management
 - 06. Business Intelligence / Data Mining
 - 07. Knowledge Management
 - 08. Portals
 - 09. Collaborative Applications / Groupware
 - 10. Project Management
 - 11. Financial / Payroll / Billing
 - 12. E-business / E-commerce
 - 13. Database Management Systems (DBMS)
 - 14. Data Warehouse
 - 15. Manufacturing
 - 16. Asset Management / Software Distribution
 - 17. Performance / Application Management
 - 18. Streaming Media
 - 19. Other Enterprise / E-Business Applications
- 20. Integration Software
 - 21. Web Services
 - 22. Web Services Orchestration
 - 23. Application Servers
 - 24. Enterprise Application Integration (EAI) / Middleware
 - 25. Business Process Management
 - 26. Legacy Application Integration Tools
 - 27. Other Integration Software
- 28. Application Development
 - 29. Application Development Tools
 - 30. Application Servers
 - 31. Web services
 - 32. Java / J2EE
 - 33. XML
 - 34. .NET
 - 35. Testing Tools
 - 36. Other Application Development Software

10**ARE YOU INVOLVED IN BUYING, SPECIFYING, RECOMMENDING OR APPROVING THE FOLLOWING PRODUCTS OR TECHNOLOGIES? (PLEASE CHECK ALL THAT APPLY):**

- 01. Networking
 - 02. LANs (Local Area Networks)
 - 03. WANs (Wide Area Networks)
 - 04. Switches / Routers / Hubs
 - 05. Caching / Load Balancing
 - 06. Grid / Utility Computing
 - 07. E-mail
 - 08. Instant Messaging / Peer-to-Peer
 - 09. Content Delivery Networks
 - 10. Network and Systems Management
 - 11. Traffic Monitoring and Analysis
 - 12. QoS (Quality of Service)
 - 13. VoIP (Voice over IP)
 - 14. Telecommunications
 - 15. IP Telephony
 - 16. Wireless
 - 17. Remote Access
 - 18. Web / Video Conferencing
 - 19. Other Networking
- 20. Storage
 - 21. High-end / Enterprise Class Storage
 - 22. Network Attached Storage (NAS)
 - 23. Storage Area Networks (SANs)
 - 24. Storage Management Software
 - 25. IP Storage
 - 26. Direct Attached Storage (DAS)
 - 27. Storage Blades
 - 28. Storage Backup (Tape, Disk, Optical, RAID)
 - 29. Removable / Portable Storage
 - 30. Disaster Recovery
 - 31. Other Storage
- 32. Security
 - 33. Anti-Virus / Content Filtering
 - 34. Firewall
 - 35. VPN (Virtual Private Network)
 - 36. Identity Management / Authentication
 - 37. Intrusion Detection
 - 38. Encryption
 - 39. Other Security
- 40. Internet / Intranet / Extranet
 - 41. Web Servers
 - 42. Web Development / Authoring Tools
 - 43. Web Performance Management / Monitoring Software
 - 44. Content Management / Document Management
 - 45. Content Delivery Networks
 - 46. Internet Software
 - 47. Other Internet / Intranet / Extranet

8**ARE YOU INVOLVED IN BUYING, SPECIFYING, RECOMMENDING OR APPROVING THE FOLLOWING HARDWARE? (PLEASE CHECK ALL THAT APPLY):**

- 01. Hardware
 - 02. Mainframes
 - 03. NT / Windows 2000 / .NET Servers
 - 04. Unix Servers
 - 05. Linux Servers
 - 06. Blade Servers
 - 07. PCs / Workstations
 - 08. Notebooks / Laptops
 - 09. PDAs / Handhelds / Pocket PC / Wireless Devices
 - 10. Other Hardware
- 11. Peripherals
 - 12. Laser Printers
 - 13. Inkjet Printers
 - 14. Monitors
 - 15. Flat Panel Displays
 - 16. UPS (Uninterruptible Power Supply)
 - 17. Network Copiers
 - 18. Other Peripherals

11**WHICH OF THE FOLLOWING OPERATING SYSTEMS ARE IN USE OR PLANNED FOR USE AT THIS LOCATION? (PLEASE CHECK ALL THAT APPLY):**

- 01. Windows XP
- 02. Windows 2000
- 03. Windows NT
- 04. Windows 95/98
- 05. Windows CE
- 06. Mac OS (Macintosh)
- 07. Solaris
- 08. UNIX
- 09. Linux
- 10. MVS, VMS, ESA
- 11. VM
- 12. OS 400
- 13. Netware
- 14. Palm OS
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