How to Choose a Manufacturing System

Precision Computer Methods

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When it comes to choosing a manufacturing system, people need more than just product information; they also need other kinds of input to make sound accounting and manufacturing software decisions... and that's what this booklet is all about. How to Choose a Manufacturing System contains the compiled wisdom of soft-ware designers, manufacturing pros, and industry technologists, providing timely expert guidance for:

- People who are managing manufacturing manually and need to automate.
- People who are using entry-level software and want to move up.
- People who have old systems and are ready for new technology.

Should Your Company Buy Manufacturing Software?

This simple test will tell you just how ready your company is to adopt a new manufacturing system.

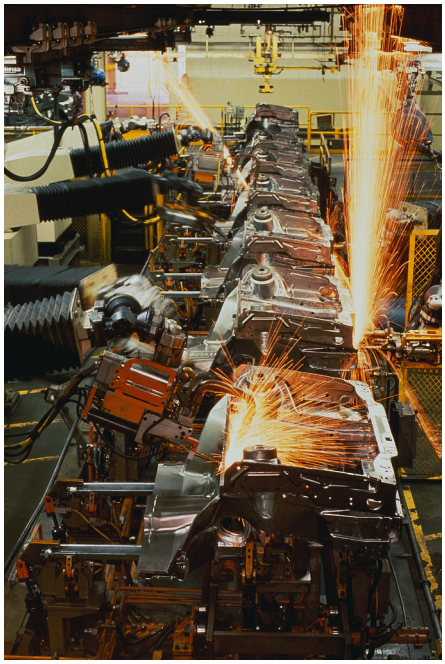
1. **Does your company currently use bills of material?**
   - Yes. Go to question 2.
   - No. **Stop.** Most manufacturing companies rely on bills of material (BOMs) to track their material requirements. If you answered "no" to this question, you probably aren't in the market for manufacturing software; instead, a job shop package may be what you need. Check with your local consultant for more information on available job shop solutions.
2. **Does your company currently have some kind of manufacturing software in place?**
   - Yes. Go to question 3.
   - No. **Stop.** You face a serious competitive threat from other companies that are reaping the benefits of manufacturing systems. Read the rest of this guide and get started on an implementation plan today.
3. **Has your company experienced huge growth or significantly altered its lines of business in the last three years?**
   - Yes. **Stop.** Growth or other significant business changes mean that you're outgrowing your current systems. If your growth path is projected to continue, you need to consider new systems right away to ensure that your current system does not become obsolete.
   - No. Go to question 4.
4. **Does your manufacturing software integrate seamlessly with your accounting software?**
   - Yes. Go to question 5.
   - No. Go to question 7.

5. Is your manufacturing software more than three years old?

- Yes. Go to question 6.
- No. **Stop.** If your integrated system was chosen carefully within the last three years, it should be working just fine. Before proceeding with a new purchase decision, discuss your situation with the consultant who helped you implement your current system.

6. Is there a satisfactory upgrade available from your current software supplier?

- Yes. **Stop.** Contact your software vendor to find out more about upgrading your system right away.
- No. **Stop.** You need to find a new supplier with a more serious commitment to ongoing product development. Now is a good time to take a look at the products available in today's market.



7. Is your accounting software more than three years old?

- Yes. Go to question 8.
- No. **Stop.** Without complete integration of your manufacturing and financial systems, you won't get the full benefits of computerization. Blame and frustration will rule the day. Be sure to consider only those packages that can demonstrate full integration.

8. Is your manufacturing software an in-house package invented or developed by your internal programming/IT staff?

- Yes. **Stop.** Your system was probably developed years ago, before there were so many excellent software packages to choose from. Upgrading your system now will eliminate the ongoing cost to maintain customized software. As custom systems age, maintenance gets more complicated and often more expensive. But be prepared for a little extra effort, because your IT group may oppose a packaged solution that wasn't developed internally.
- No. **Stop.** Your old accounting system and non-integrated manufacturing packages are begging to be retired. The benefits of harnessing new technology can pay big dividends. The earlier you get started on an upgrade and conversion plan, the sooner you'll see results.

Electronic Commerce

While numerous companies are examining their Internet sales strategies, many are overlooking the roles that accounting, manufacturing, and distribution play in this market revolution. Ideally, your accounting and manufacturing software should be ready for electronic commerce even if your company isn't. Here's what to look for:

- A complete solution that seamlessly integrates accounting, manufacturing, and Web-based activities in real time.
- E-mail integration so you can begin sending invoices, notifications, and confirmations electronically.
- The ability to publish any accounting or production reports in HTML (the standard Internet format) for publication on the Internet, or more importantly, for internal distribution on your corporate intranet. Many companies have chosen to go 'paperless' by sending documents and reports electronically which in turn saves time and resources.
- The ability to execute payment electronically for payroll or accounts payable. You'll see lower error rates, have more control, as well as lower transaction costs.
- An interface to capture leads from the Internet and automatically convert them to customer records as well as to process Electronic Data Interchange (EDI) with trading partners. Don't waste time on duplicate data entry of electronic leads and transactions.
- Customer self-service capabilities to give customers access to their order status through your web site.

Can You Afford to Buy?

The benefits of implementing a manufacturing system are well-known and well-documented. However, it still may be difficult to persuade the management of your company to part with hard-earned profits for the new system you're proposing. Consider preparing a return on investment (ROI) analysis to help your company decide how much to pay for the new system.

Start by categorizing your costs:

Software costs

These include software purchase or lease, maintenance fees, and add-on products or packages required to adapt the system to your needs. These costs range from about $7,500 to $100,000 for purchase, with annual maintenance costs starting at approximately 15 percent of the purchase price.

Hardware costs

These include computers, components, networks, and printers. Costs can be difficult to project until you make your software selection. You probably already have most of the hardware you'll need, but you may need to upgrade servers or storage devices to accommodate a new system. For every 25 users, plan on spending between $7,000 to $15,000 to upgrade existing equipment, and $50,000 to $65,000 to start from scratch.

Consulting costs

You'll want an experienced consultant to help you select and plan your system implementation. See page 12 for tips on choosing a qualified consultant. Fees vary regionally and depend substantially on your desire to "do it yourself" or to off-load excess work to an expert. Plan on 100 hours or more, with rates ranging from $90 to $180 per hour.

Overtime costs

During implementation, you and your staff will have more work than usual. You may choose to hire temporary employees to handle some administrative tasks or ask for overtime from your current employees. Plan on 10 to 20 extra hours per week per 25 employees served by the new system.

Training costs

You'll need training to get people up and running on the new system. Good training is a logical investment in the success of the project because it will save many hours of expensive backtracking. Training costs are lower than ever, thanks to Internet "virtual" classrooms that reduce travel time and fit education into busy schedules. Plan for training to take between 10 and 30 hours per employee.

Calculating Consulting Costs

Consulting fees will depend on the requirements of the implementation, local pay scales, expertise, and more. It's impossible to predict exactly how long your installation will take or how much it will cost. The list below gives you some ranges to consider.

- Analysis of client needs: 8 - 20 hours
- Install network and applications: 5 - 30 hours
- Modify procedures for new system: 2 - 5 hours per module
- Design chart of accounts, customer files, and vendor files: 10 - 20 hours
- Modify system reports: 10 - 25 hours
- Train clerical personnel: 10 - 30 hours
- Train system administrator: 10 - 20 hours
- Document modifications: 5 - 10 hours per module

You may have additional costs—and some savings—if your accounting and manufacturing systems are already automated. Data conversion may cost more, but analysis and training may cost less.

Can You Afford Not to Buy?

If you're adding up your costs right now, they may seem huge. However, to complete your ROI calculation, you'll also need to add up the savings your system will deliver. Results vary dramatically from one company to another, depending on objectives and work styles, but a good system will definitely deliver significant cost savings.

Reduced inventory shrinkage

With the right tracking and improved accountability, a good system can help you keep track of inventory and prevent losses. As a result, more of your purchased inventory ends up in final goods. If you're an average sized manufacturer, plan on reducing shrinkage from your current rates to a rate of about one percent.

Reduced cost of goods through improved purchasing

With better forecasting, you'll be able to plan your buying to avoid peak pricing, rush charges, and small orders. Based on our customers' experiences, and depending on the products you buy, component costs can be reduced by 10 percent or more, rush charges can be cut as much as 90 percent, and shipping costs can be lowered by 10 to 50 percent or more. Lower costs may also result in improved payment history for your company's credit report.

Reduced labor costs

With better scheduling and more accessible data, you'll need fewer people to get the same work done. Often, a new system can dramatically reduce administrative costs while bringing overtime labor into check through improved scheduling. Depending on the nature of the company and the current rates of overtime, labor savings range from 5 to 50 percent.

Could your company do better?

Calculate your own ROI by adding up your savings and dividing it by your estimated costs. In our experience, most companies save 10 to 30 percent on inventory holding costs. You can make this quick ROI calculation if you know the approximate value of your present inventory. You may be amazed to learn that many companies find that a new manufacturing system pays for itself in a matter of months.

Four Mistakes People Make When Buying Manufacturing Software

1. Not doing their homework

You're already a step ahead of most people because you're reading this booklet. Many don't have their objectives in hand before they buy.

2. Misunderstanding the benefits of automation

Computers do not replace intelligence, judgment, hard work or productive employees.

3. Ignoring hard-to-quantify benefits

It's hard to calculate your future gains due to good decisions made from information the system provides, but results can be dramatic.

4. Passing the buck

Top management must be involved in the choosing and implementation of the system. A consultant's output is based on the quality of the input.

One Low Cost Option: Hosted Application Services

Application Service Providers (ASPs) host software applications on their servers and rent them to their customers over the Internet.

What are the benefits of using an ASP?
An ASP can give you high-end business solutions at a fraction of what it would cost you to purchase hardware and software, implement a network infrastructure, and maintain and upgrade these complex systems.

What should I look for in an ASP?

- First-rate solutions and superior levels of customer service and support.
- State-of-the-art software, hardware and network infrastructure.
- An advanced system for data protection, backup, and recovery.
- Proactive detection of malicious code, viruses, and system intrusion.
- Service level agreements that clearly specify the levels of performance, consistency, and availability.
- Flexible subscription service - monthly, one-year, and two-year agreements.
- 24/7 customer support, technical support, regular maintenance and upgrades, and full backup and recovery capabilities.

Look for an ASP that can provide your business with infrastructure management and systems monitoring of your mission-critical applications. An effective ASP agreement will eliminate initial IT capital expenditures and lower your recruiting and training costs, thereby significantly reducing your total cost of ownership.

Questions to Ask Your Software Supplier

As you narrow the field of software contenders, you'll begin examining the companies more closely to see how well they meet your needs. Consider asking these questions to weed out suppliers that won't fit with a long-term strategy for manufacturing excellence.

Are the standard accounting modules available for this package?

Look for General Ledger, Accounts Payable, Accounts Receivable, Purchase Orders, Sales Orders, and a very strong Inventory Control module as a minimum set. You may also want to ask each perspective supplier about the availability of additional modules such as Payroll, Fixed Assets, or other vertical modules.

Which manufacturing modules are available?

Light assemblers should look for a product that offers features like BOMs, sales kits, and product configuration. Discrete manufacturers should look for Material Requirement Planning (MRP I) and Manufacturing Resource Planning (MRP II) in addition to support for BOMs. Make-to-Order and Job Shop manufacturers will likely need all of these features plus a method for estimating and tracking costs on a project-by-project basis.

Do the accounting and manufacturing modules integrate completely?

This is a tough question to answer. Just because the modules come from the same company doesn't mean they work together. The accounting company may have acquired the manufacturing modules from another company, and they may not integrate smoothly. Alternatively, just because the modules come from two different companies doesn't mean they won't integrate fully. Some accounting software companies provide open source code and programming standards for developers of add-on modules to follow. Seeing a product demo may be your only way of assessing the level of integration. Check to see that Bills of Material and Manufacturing Orders have solid integration with Inventory Control and Sales Orders. You should be able to maintain inventory items while defining BOMs, and configure orders based on BOMs during order entry.

How does the system handle data collection?

You will need to consider how well a system monitors your critical work areas. Can you monitor production if you're running at 100% capacity for your staff? Has inventory actually been received, and if so, are the counts reliable enough to forecast material requirements? Data collection ties into true manufacturing as well as accounting. How well you collect vital data determines your ability to forecast production information. Data collection is an important part of the total solution for a company that requires MRP II.

What key features set this product apart from others?

Before you tell the software supplier much about your business, find out what they think their product strengths are. You'll get a good feel for whether or not they design products for companies like yours.

What is the R&D budget for the software supplier as a percentage of sales?

A company that's not putting at least 10% of sales revenue back into product development can't possibly keep pace with technology. You want to buy software from a supplier that's serious about having great products today *and* tomorrow.

Does the supplier offer frequent updates and an upgrade path?

Good software suppliers update their software frequently, making new features and bug fixes available to resellers and customers. Software is one of the few industries where you can upgrade your product to the newest, hottest version for a fraction of the full price. Imagine being able to go to a car dealership and have all the features of this year's model added to your existing car! With most products, you have to buy an entirely new model or do without. A good software publisher will provide frequent upgrades at reasonable prices.

Is software maintenance available?

Before you make a purchase, find out if your software publisher has a maintenance program in place that gives you access to frequent updates. For a reasonable price, usually about 15 to 20 percent of the purchase cost, you should be able to get an annual maintenance contract that provides a continuous stream of product updates and improvements. This demonstrates that the developer has an ongoing commitment to the product and to your satisfaction.

Does the system have the capacity to grow?

If you're not sure how well a system will accommodate your company's needs as you grow, here are some key questions to help you find out. What are the maximum number of customers, vendors, BOMs, or inventory items that are allowed? What is the maximum number of users that can be working with a particular application at the same time? Can the software be customized to meet the changing needs of a growing company?

What kinds of reports does the system provide?

Your system must be able to extract relevant information easily. A system using database files provides virtually unlimited reporting capabilities. Ask for samples of reports to see the system's reporting capability. In addition to standard reports, the product should allow non-programmers the ability to design custom reports using industry-standard reporting tools.

Is the system easy to use?

Many buyers spend far too little time evaluating this aspect of the software. Yet ease-of-use will have a dramatic impact on the quality of your implementation. Poorly designed software leads to frustrated users who bypass the system or resort to manual short-cuts. If you want a system that delivers maximum productivity, it will need to be user friendly and easy to learn.

You want a system that lets you enter information quickly and efficiently. Look for features such as full-screen editing, embedded help systems, and clear prompts. It is important to ensure that production data entry (particularly in sales orders and purchase orders) does not require excessive mouse use. If the operator's hand must constantly move between the keyboard and the mouse, data entry can be too time-consuming.

You should also make sure the system can handle all the situations that may come up on a day-to-day basis. Is the sequence of steps to create a sales order simple and straightforward? Can you look up vendor information while you are in the middle of posting a line item on an invoice or purchase order? Can you search the item master file while you are creating a new manufacturing order?

How does the system handle data validation?

This capability dictates how well the program prevents mistakes from getting into your system. The program should test for errors such as duplicate customers and vendors, incorrect item numbers, and unreasonable amounts and dates. Your system should notify the operator of unusually high quantities or unit prices and offer valid choices along with the notification message.

What kind of documentation is supplied?

The quantity and quality of documentation is an excellent guide to the quality of the software. Look for software suppliers who offer other support materials such as CD-ROMs, tutorials, training guides, videos, and technical reference manuals in addition to basic documentation. Clear, accurate, and useful documentation takes time to produce. Software companies that have a long-term commitment to their users will have outstanding documentation materials.

What kind of training is available?

As knowledgeable as your reseller may be, nobody knows more about how the software works and how to implement it than the people who wrote it. Ask whether there is a formal training course available for you and your staff.

What kind of security does the system offer?

The degree to which sensitive functions and reports can be safeguarded through a password protection capability will affect how the program rates in security. Ideally, you should be able to specify which operations can be performed by specific users at specific times. With a good system, you should be able to set it up so that your assembly technician cannot see costs on the BOMs, but your production staff can.

How many people currently use this product?

If the company you're researching has already sold many units, they're probably doing something right. People vote with their checkbooks, and it's a good idea to give a popular product a serious look. A large install base is like an insurance policy for users. You can be sure that the product has stood the test of time, satisfied companies similar to your own, and delivered good value. A large install base also generates additional products for you. If the product is popular, you'll find add-on software, worthwhile utilities, a training schedule with convenient dates and locations, and a large number of local dealers who can work with you.

Don't buy futures! A salesperson's promise of future releases is sometimes not grounded in reality. Make sure the software you're buying has the features you need today.

Questions to Ask Your Consultant

Consultants have special expertise—they've been through the process many times before and can help you save time and effort. A consultant can help you choose your software, install any needed networks or hardware, and help ensure the system is up and running by your target date.

Your ideal consultant is someone who has installed manufacturing systems at businesses similar to yours. You will benefit substantially from their expertise. A manufacturing software company can recommend resellers in your area who have worked with companies like yours.

Has the consultant installed manufacturing software at companies similar to yours?

Ask about company size, number of employees, and nature of the business.

Will the consultant provide a list of references?

If the consultant is able to provide you with a list of references, be sure to use it as a research tool. Potential questions you may want to ask: How well did the implementation process go? How did the consultant handle any challenges that arose? How would they rate the training (if any) that was provided? And last but not least, ask if they are happy with their new software.

Can the consultant provide a free trial version of the software?

While a software demonstration can be helpful when you're in the process of evaluating your options, what you really need to see goes deeper than what 50 minutes of bells and whistles will show you. Trial software allows you to enter your own data and explore the features of the program. This is a limited use of the software and does require some effort on your part to investigate the product's capabilities.

How are the consultant's fees structured?

Find out up front how your consultant handles hours, services, and billing. (See page 6 for more on figuring consulting costs).

Can the consultant provide a complete service package?

As part of your implementation, you'll need training, technical support, and many other services. Look for a reseller who will work with you from start to finish. You don't want someone whose only focus is on selling software.

What are the costs involved with adding more users or adding more modules for existing users?

When you're running price comparisons, dig a little deeper than initial cost. In addition to considering maintenance and upgrade support and costs, think about how much you'll pay to add on more users. Some packages charge you less than other packages for all modules but gouge you in the cost per number of users, while other companies are relatively inexpensive when it comes to adding seats but charge quite a bit for additional modules.

Who is responsible for technical support?

At some point you will need technical support for your new system. Will you call the software manufacturer or the consultant? How much will technical support cost? Find out what the policies are for maintenance, upgrades, and support. Get clear definitions up front.

Ask your consultant what you can expect in support turnaround times. Some suppliers allow you to control your turnaround time by purchasing a support upgrade package.

Does the consultant listen effectively?
This question separates the true sales consultants from the peddlers. A true professional will not make recommendations for you without learning about your business and your objectives.

Does the consultant communicate clearly?

Avoid resellers who try to impress you with jargon and who immediately start talking about equipment and program features. Your focus during the interview should be on what applications the consultant can provide and how he or she can help you benefit from them—not on details.

Do you think you can work with the consultant?

You'll be working with the consultant over a period of weeks. You may even end up with a long-term relationship if the consultant helps change and extend your system as your company grows. Choose a consultant who is a good fit with your company's philosophy and culture. Trust your instincts if you don't feel right about the consultant. You need someone with whom you feel comfortable.

Questions to Ask Your Company

There's never a great time to disrupt your business by implementing a new system. But if everyone's on board with the idea of change, you'll find smoother sailing as you get the system up and running. Consultants often complain that companies want a new system but don't want to put in any effort to achieve the goal. Even the best, most capable consultant with the most sophisticated software will still need sincere effort from you and your staff if the project is going to be a success.

Are you willing to accept change?

How well will your engineering group take to a system that was created elsewhere, especially if you have been relying on your own proprietary system? You'll need buy-in, and you'll need to understand how well your new system will integrate into, or work with, any development tools they're already using.

Is someone in charge of each phase of the project?

Consultants can't carry the entire load themselves when it comes to implementation. You'll need to assign someone from the top ranks (usually the CFO, CIO, or Manufacturing VP), to head up the project. You should also assign a second person (usually from middle management) as a project manager to assist in the process. You may need to restructure work priorities during the selection and implementation phases to make sure those you've selected have the bandwidth to get things done.

Is source code a worthwhile investment?

Some people need source code and some do not. If you have a staff of in-house programmers and anticipate making extensive changes to the software, then be careful to choose a company that makes source code available. On the other hand, if your application is fairly standard and you need to be able to upgrade your software easily and inexpensively, then you should not pay for source code.

A Tale of Two Consultants

Let's take the case of a company that installed a new system one year ago. They weren't very organized and had lots of problems. They were busy, so they didn't spend any time researching options and they chose the first product they found. It was relatively inexpensive and the consultant promised it would run on their existing hardware, but failed to do any research. The company spent $7,500 on the software, $10,000 in consulting fees, and $2,500 in overtime. After two months of trying to get the new software off the ground, they were forced to give up and start over, loosing $20, 000.

This time they did more research. They found a consultant who took the time to learn what their needs were and then suggested a new a system costing $15,000. The consultant was able to assess that they needed a new server and network connection, which added $7,500 to their costs, and the consultant fees were $50,000 by the time the system was fully functional. Training costs added up to $5,000, but overtime needed during implementation was just $500 because their consultant worked from an organized implementation plan.

With the new system in place, the company began to see changes. Inventory shrinkage nearly disappeared from a previous rate of 4%, which saved the relatively small company $55,000 in their first year. Two administrators were redeployed to other departments, saving $50,000, and overtime costs were reduced by $15,000.

The purchasing department was resistant to the new system and didn't start using it to its full extent for at least six months. Nonetheless, at the end of a year, they managed to shave a few percentage points off their costs and saved roughly $25,000 through bulk orders and reduced rush charges. The company is still getting used to the system, so they aren't fully taking advantage of all the features, and yet their return on investment since implementation, has been more than 211% in a single year! Additionally, their sales department reports that they are winning more bids now that they have accurate production cost information, which enables them to be more competitive.

Thanks to the second consultant doing his homework, this company will continue to benefit from new features and improvements in the software.

Six Reasons Why New Manufacturing Systems Fail

1. A faulty inventory item numbering scheme
Consider a company that has two sources for chips. Even though each supplier has its own part number for the item, the company didn't map out its own part numbering scheme properly. As a result, the item appears to be out of stock even though there are still chips on hand from one of the suppliers. There's a right and a wrong way to set up inventory control when you have more than one supplier. If the program you're using doesn't have multiple supplier capabilities, you won't be able to properly set up Inventory Control to reflect this. Make sure the system you are considering maintains a cross-reference between your internal part number and each supplier's part number.

2. Insufficient control of content for bills of material
Every BOM needs to be entered correctly from the start, based on specifications received from engineering. Even if the BOM has all of the right components in theory, sometimes in practice quantities aren't exactly what they need to be and then people on the shop floor start to personalize as they assemble. It's critical that engineering and manufacturing communicate effectively over the correct structure of BOMs and that only qualified people are keeping BOMs up-to-date. Regardless of the size of your manufacturing operation, a robust security system will restrict unqualified people from using certain critical functions of the software.

3. Inaccurate inventory on hand
One of the benefits of an integrated solution is that you eliminate redundancies in your system. One of the drawbacks is that errors can be compounded. If your inventory on hand is miscounted from the start, the error will repeat itself throughout your system. And the last thing you want is to be forced to close down for several days to do a physical inventory in order to identify discrepancies and reset your on-hand quantities. Manufacturing systems that offer net-change physical inventory functions will make it easy to correct stock counts without having to halt production activities.

4. Lack of agreement between engineering and manufacturing
Before implementing any system, it is absolutely essential that you reach an agreement between engineering and manufacturing on your goals and how you're going to get there. It doesn't matter how sophisticated your software is if you don't have the appropriate buy-in from these two departments. Work with your consultant to develop a thorough implementation plan. Make sure everyone in engineering, manufacturing, and management signs off on the plan before you begin installing software.

5. Unrealistic expectations of what the system will be able to accomplish
Know exactly what you want to accomplish with your new system. You wouldn't buy a Chevrolet to race at 200 m.p.h., nor would it make sense to pay a lot of money for a Lamborghini just to keep it in the driveway. Buying functionality you won't ever need is just a waste of money. Make a careful list of the functionality you really need, adding a few of those "would be nice" items. Award major points to manufacturing systems that have a built-in growth path, especially if you can test-drive advanced functions using your own familiar data.

6. Failure to determine the company's needs in accounting, manufacturing, engineering, and data collection
It is vital that you spend time thoroughly evaluating your company's needs before choosing and installing any system. Get a complete review of the requirements in accounting, manufacturing, engineering, and data collection. This is a mandatory step in the process—and one that cannot be skipped. Doing your homework in the planning stages will pay off ten-fold when it's time to connect all the pieces. Ask your reseller if consultation and training is available directly from the software supplier.

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