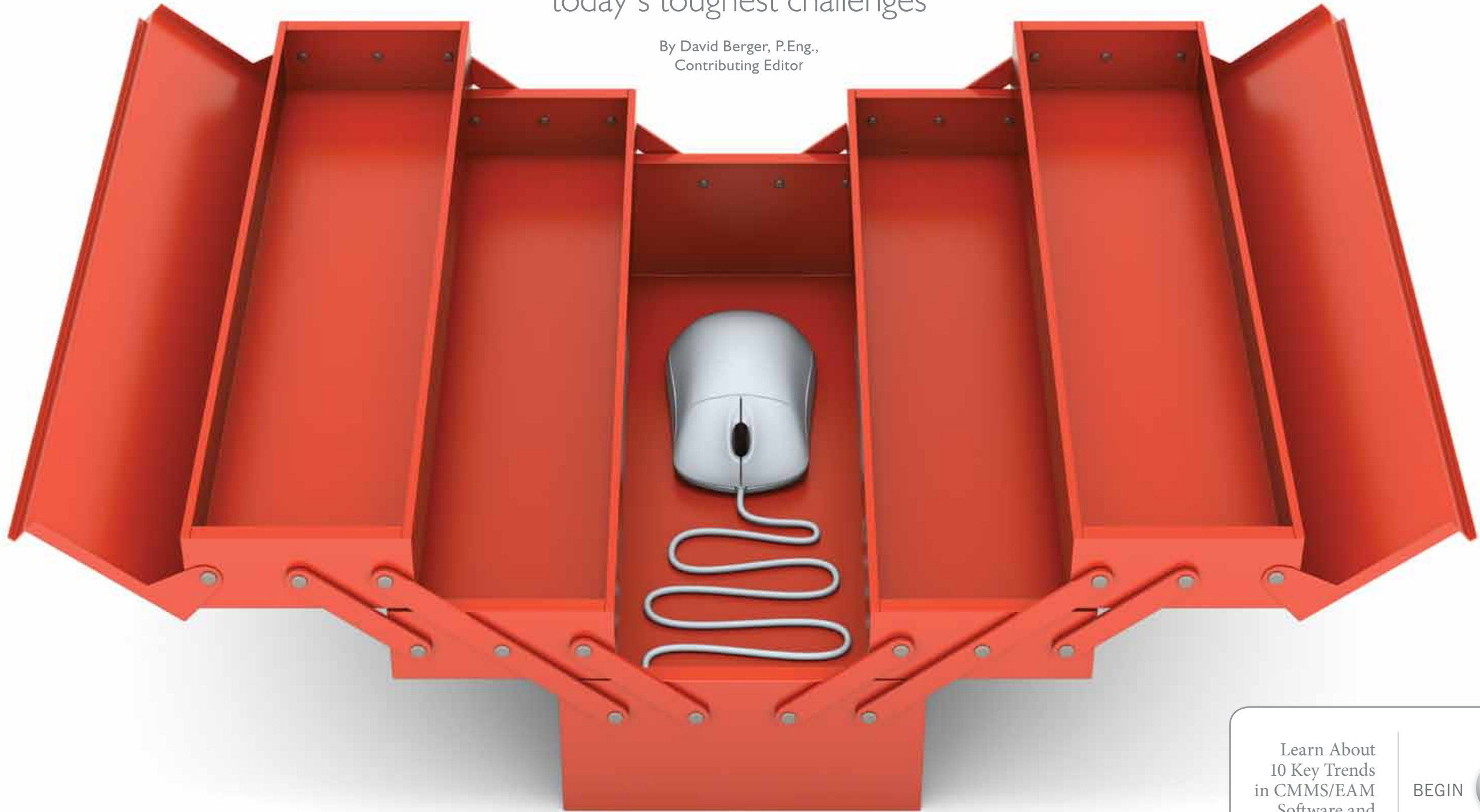


# Plant Services

# THE RIGHT TOOL

CMMS/EAM software tackles  
today's toughest challenges

By David Berger, P.Eng.,  
Contributing Editor



Learn About  
10 Key Trends  
in CMMS/EAM  
Software and  
Implementations

BEGIN



**Table 1: Compare these packages in detail at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review)**

Company / Web site	Package	Review date	Annual sales	Number of customers
<b>Aleier Inc.</b> www.aleier.com	FM1i INNOVUS 1.0.055	12/13/2006	\$1.7 million	More than 50
<b>Aleier Inc.</b> www.aleier.com	FM1j interprise 6.2	12/13/2006	\$1.7 million	More than 50
<b>Ashcom Technologies, Inc.</b> www.ashcomtech.com	MaintiMizer 4.0	3/6/2008	\$3 million	3,500
<b>AssetPoint</b> www.assetpoint.com	TabWare EFX EFX00	2/27/2006	Less than \$25 million	123
<b>Blue Mountain Quality Resources</b> www.coolblue.com	Regulatory Asset Manager R	2/19/2009	Less than \$20 million	50
<b>Centric Maintenance Systems</b> www.centricmaintenance.com	API Pro V5Xe SP2	1/12/2007	\$6 million	350
<b>Conception INTERAL</b> www.interal.com	INTERAL 7.0.2	3/11/2010	Less than \$5 millionv	400
<b>CWorks Systems Inc.</b> www.cworkssystem.com	CareWorks 4.0.0	3/16/2009	Less than \$5 million	700
<b>Cybermetrics</b> www.cybermetrics.com	FaciliWorks 8i	2/6/2006	\$3.9 million	More than 1,500
<b>IBM</b> www.ibm.com	IBM Maximo Asset Management 7.1.1.6	3/19/2010	More than \$200 million	More than 10,000
<b>Infor</b> www.infor.com	Infor EAM 8.4	2/25/10	More than \$120 million	More than 15,000
<b>IFS</b> www.ifsworld.com	IFS Applications 7.5	11/23/2009	\$150-\$200 million	More than 2,000
<b>Invensys</b> www.avantis.net	Avantis.PRO 4.1	2/10/2006	More than \$35 million	720
<b>Ivara Corporation</b> www.ivara.com	Ivara SuprEAM 5.0	1/26/2007	\$16 million	More than 60
<b>Lawson Software</b> www.lawson.com	Lawson Enterprise Asset Management (EAM)	5/21/2007	\$41 million	More than 250
<b>Maintenance Connection</b> www.maintenanceconnection.com	Maintenance Connection Onsite/Online 2.5	2/29/2008	Less than \$25 million	500
<b>Megamation Systems Inc.</b> www.megamation.com	DirectLine 2.21	4/8/2010	\$4.9 million	650
<b>Mincom Inc.</b> www.mincom.com	Mincom Ellipse 6.3	2/19/2009	More than \$150 million	More than 650
<b>Oracle</b> www.oracle.com	Oracle Utilities Work and Asset Management 1.7.15.2	2/11/2008	\$18 billion total company	
<b>Smartware Group</b> www.bigfootcmms.com	Bigfoot CMMS Internet/ Enterprise Edition 8.0.1	2/28/2008	Less than \$5 million	1,032

Despite the uncertainty regarding the global economy, and the maturing of the computerized maintenance management system/enterprise asset management (CMMS/EAM) software industry, companies from every sector continue to upgrade, replace, or buy new asset management software applications. This is especially true for asset-intensive industries because of the pressure to better manage ever-increasing asset lifecycle costs, while increasing the quantity and quality of production through greater asset reliability and performance. Another key driver appears to be the growing demands of regulatory bodies that seek tighter controls, greater accountability, and more detailed data capture and reporting.

Many senior management teams have come to the realization that, given the aging workforce being replaced across North America with younger, less experienced technical resources, modern knowledge management tools such as a CMMS/EAM are critical to help smooth the transition. These tools retain much of the knowledge lost when technicians and other maintenance staff retire or leave, for example, standard operating procedures and job plans, failure analysis data, diagnostic techniques, and a complete asset history. Furthermore, younger technical resources have come to expect these tools, and are comfortable and proficient in their use.

There are 10 key trends in the industry, including important features and functions to consider if you're contemplating the purchase of any CMMS/EAM products or services.

### MEET DAVID BERGER



A contributing editor to Plant Services since 1992, David Berger, P.Eng., has conducted numerous maintenance audits; helped senior managements develop maintenance strategies involving maintenance, operations, and engineering; assisted companies in implementing process improvement initiatives with significant results; and led a variety of IT projects, from developing a detailed specification to package selection and implementation, for CMMS/EAM, PdM, RCM, and supply chain software. From 1994 to 1998, Berger was vice president, projects and process engineering, operations and technology at banking conglomerate CIBC, responsible for the fundamental design and redesign of business processes and information technology. Now a Partner in Western Management Associates, Toronto, Ontario, Berger recently was awarded the Sergio Guy Memorial Award in recognition of his significant contribution to the maintenance and asset management profession.

— Paul Studebaker, CMRP, Editor in Chief

Many of these features and functions are excerpted from the online Plant Services CMMS/EAM Software Review ([www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review)), where you can directly compare the capabilities of a wide range of software packages.

**Berger's Toolbox**

The detailed information presented at [www.PlantServices.com/CMMS Review](http://www.PlantServices.com/CMMS_Review) is the result of a 181-question survey probing in detail some 450 aspects of vendor companies and their packages, covering 30 categories (Table 2). Participating vendors are charged a fee to partially defray the costs of performing and Web-hosting the Plant Services Review.

Vendors that complete the survey are required to demonstrate their performance for every question under the watchful eyes of Contributing Editor David Berger, P.Eng. The demonstration process typically takes four to six hours. When vendors' self-evaluations don't align with Berger's criteria, he corrects the survey responses accordingly.

The in-person reviews guarantee consistent interpretation of each survey question and ensure that the same criteria are applied to every vendor. Berger examines responses that can't be audited (number of sites, pricing, annual sales, etc.) for reasonability in the context of his considerable experience.

One of our most experienced contributing editors, Berger is a Certified Management Consultant (CMC) registered in Ontario; a principal of Western Management Consultants, Toronto; and an adjunct professor at York University in Toronto, where he has taught operations management for the MBA program for 16 years.

You can use the data in our CMMS/EAM Software Review with confidence to help refine your requirements, find packages that best fulfill them and compare them feature-to-feature with assurance that they were judged and are represented fairly and consistently.

— Paul Studebaker, CMRP, Editor in Chief

**1. INDUSTRY SPECIALIZATION**

In the eyes of customers, one of the most important criteria in selecting a CMMS/EAM vendor and its products or services is the perception of how well vendors can demonstrate that they fully understand your business. This includes knowledge of your industry, asset classes, regulatory pressures, competitive challenges, and even equipment. A large nuclear plant will have different CMMS/EAM needs than those of a small transportation company or a municipality.

Thus, if a vendor claims to specialize in a given industry, it should have experts on staff with deep experience working for companies in the customer's industry. This facilitates developing features and functions that satisfy the needs of the industry, as well as configuring and implementing the software in a manner that fully exploits its potential. Examples of specialized functionality are calibration capability for Life Science companies, electronic signature for the food industry, Facil-

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**H**ow many problems and inefficiencies result from poor communication between the people maintaining our facility, the people operating the organization and the people responsible for designing new and rebuilt production facilities. In this important document, Klingspoor writes:

“The ideal DOM workflow involves a collaborative process in which maintenance and operational histories are freely available to design, and plans and specifications are freely available to operators and maintenance personnel even as a project is planned.

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“Imagine that a portion of your plant is being rebuilt, and the plans are integrated into your asset management system. If you see that new



*Christian Klingspoor is a Senior Advisor in the area of Asset Lifecycle Management with IFS AB, a world leader in component-based enterprise applications.*

pumps and compressors are being planned to replace existing mechanicals, it may make sense to forego rebuilds or other maintenance on the equipment that is about to be decommissioned.

“Moreover, because you know the new specifications, you can begin ordering spare parts and other supplies for the equipment being installed before it is even in place. And the day your new or rebuilt production facility goes live, you can have an excellent understanding of its inner workings.”●

**Table 2.**  
**Selection Criteria with Example Weights**

Company Information	Weight
Company Profile	4
Financial Position	6
Customer Installations	5
Competitive Advantage	5
	<b>20</b>
Product & Hardware	
Configurability	4
Web Architecture	2
Open Systems	3
	<b>9</b>
Technical Information	
Recovery & Backup	2
Auditing & Security	2
Documentation	2
Interface Requirements	4
	<b>10</b>
Support Services	
Support	6
Ease of Implementation	10
Training	5
	<b>21</b>
Cost Effectiveness	
Base Package	35
Options & Additions	10
On-Going Services	10
General	5
	<b>60</b>
Technical Specs	
User Interface	16
Work Planning & Scheduling	16
Health, Safety & Environment	16
Maintenance Optimization	16
KPIs & Analysis Tools	16
	<b>80</b>
<b>TOTAL SCORE</b>	<b>200</b>

ity Condition Index (FCI) for university campuses, auto-polling of networked IT assets and help desk capability for IT maintenance service providers, and ability to handle compatible units and job estimating for the telecommunications industry. Other factors to look for in a CMMS/EAM vendor include:

- Percentage of sales volume stemming from the specialty industry
- Number of customers in the industry
- An independent industry user group that meets on a regular basis
- An advisory council that provides input into the vendor's product development
- Beta development programs to partner with the industry for product development
- A Web site specific to the industry presenting customer networking and knowledge-sharing opportunities
- Industry-specific newsletters
- Standard industry data like VMRS codes and equipment hierarchy for fleet management companies, oil and gas industry failure codes, or aircraft industry problem/cause/action codes

**2. ENTERPRISE THINKING**

More companies, big and small, are looking for enterprise asset management solutions that span the needs of multiple departments, divisions, and strategic business units. A typical mining enterprise, for example, might have one solution for maintaining production equipment at a given site, one for mobile equipment, another for managing multiple facility assets, and yet another software solution for maintaining IT assets. Consider finding an enterprise-wide solution to help you think more strategically about managing your company's assets.

This doesn't necessarily require using a single software vendor for enterprise resource planning (ERP), supply chain management (SCM), human resource information system (HRIS), EAM/CMMS, and other applications. There are excellent best-of-breed solutions for each of your asset management requirements that you should consider. Conduct a

needs assessment and cost-benefit analysis to determine the best approach to managing your assets across the enterprise.

From a strategic perspective, whatever you choose, integration will be a key issue. The trend towards more strategic asset management across the enterprise is accompanied by a greater need for integration of various applications, from the shop floor to the executive suite. This is especially apparent in complex production environments, where large-scale manufacturing execution systems (MES), human machine interface (HMI), programmable logic control (PLC), and supervisory control and data acquisition (SCADA) systems are tracking product, process, environmental, and asset conditions.

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**Explore CMMS/EAM Package Capabilities at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review)**

The *Plant Services* CMMS/EAM Software Review is designed to allow you to compare packages across a comprehensive range of capabilities. It offers the option of weighting capabilities to reflect their importance in your application, and receiving a calculated ranking of the software offerings according to your specifications.

As the “Introduction” screen explains, you can use the review to simply browse the results of

our verified vendor survey data, compare products, and find further information on particular packages and vendors. Or, you can have the system rank packages according to your customized and advanced criteria. Clicking on “Software Aspects” lets you weight them individually (Table 2) so the comparison engine can calculate scores and present packages according to how well their strengths match your weightings.

<p><b>INTRODUCTION</b></p> <p><b>VENDOR SUMMARIES</b></p> <p><b>COMPARE PRODUCTS</b></p> <p><b>SOFTWARE ASPECTS</b></p> <ul style="list-style-type: none"> <li>Vendor Company Size</li> <li>Industry Specialization</li> <li>Package Price</li> <li>Implementation</li> <li>Integration</li> <li>Multi-site Support</li> <li>Global Attributes</li> <li>Security and Data Integrity</li> <li>User Interface</li> <li>Look-ups and Searches</li> <li>Data Entry</li> <li>Help Features</li> <li>Workflow and Business Logic</li> <li>Analysis and Reporting</li> <li>Work Order Control</li> <li>Preventive and Condition-Based Maintenance</li> <li>Safety</li> <li>Priorities</li> <li>Planning and Scheduling</li> <li>Inventory Control and Purchasing</li> <li>Budgeting and Cost Reporting</li> <li>Equipment History</li> <li>Mobile Technology</li> <li>HR Management</li> <li>Fleet Maintenance</li> </ul>	<p><b>INTRODUCTION</b></p> <p>Welcome to our growing <a href="#">database of CMMS/EAM software packages</a>. This application is designed to let you <b>compare products</b> across a wide range of aspects important to the industry.</p> <p>We've put the emphasis on you, the user, deciding just how <b>in-depth</b> you want to be in controlling product comparisons, from simple browsing of vendor survey data to creating customized scores for each product based on the aspects most important to you!</p> <p>To get you started, we've highlighted the <b>three methods</b> in which you can get the most out of this application. Read on!</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%; background-color: #f9e79f; padding: 5px;"> <p><b>1 Simple</b></p> <p>A good first step is to view our list of reviewed <b>Vendor Summaries</b>, select up to three at a time and hit '<b>Compare</b>' to view their answers to survey questions.</p> <p>It's a simple way to familiarize yourself with the basics of each product and view them side-by-side.</p> <p>You can always browse survey answers in this way, or you can create a more customized product comparison experience using Methods 2 and 3!</p> <p style="text-align: right;"><b>Start</b> ▶</p> </div> <div style="width: 30%; background-color: #f9e79f; padding: 5px;"> <p><b>2 Customized</b></p> <p>In order to give simple ratings to vendor products based on criteria you choose, take a look at the <b>Software Aspects</b> and apply weightings to each.</p> <p>Choose the aspects most important to your software needs, and then hit '<b>Calculate</b>'. You'll be taken to the <b>Vendor Summaries</b> page, but this time each vendor will have a score based on the weightings you've entered.</p> <p>Use this method to create customized rankings based on the criteria most valuable to you!</p> <p style="text-align: right;"><b>Start</b> ▶</p> </div> <div style="width: 30%; background-color: #f9e79f; padding: 5px;"> <p><b>3 Advanced</b></p> <p>To further fine-tune the way in which you score vendor products, you can view the scoreable survey questions to each aspect, such as the first aspect, <b>Vendor Company Size</b>.</p> <p>Weight only the aspects that are important to your needs, then hit '<b>Save and Continue</b>' to move to the next aspect, or '<b>Calculate</b>' to immediately re-score the products.</p> <p>This method of ranking questions will allow you to further narrow down the vendor products that are right for your company!</p> <p style="text-align: right;"><b>Start</b> ▶</p> </div> </div>
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More and more, these shop-floor data collection vendors are looking to the CMMS/EAM world to trigger maintenance work that keeps the machines running efficiently and effectively. The CMMS/EAM is the meat in the sandwich, integrating with shop floor-level applications, and higher-level systems such as ERP.

Enterprise thinking for your CMMS/EAM application also must consider the complete asset lifecycle, including key stages such as engineering design, build and/or procurement, operation, maintenance, modification, and disposal. In the past, each stage was a silo with respect to people, processes, and systems. The trend during the past few years has been to manage assets throughout their lifecycles better by improving the integration across silos. For example, advanced CMMS/EAM vendors track asset lifecycle costs, asset/component move history including modifications performed externally, and all major and minor revisions to an asset from “as designed” to “as installed” to “as modified” throughout its life.

Thus, your strategic asset management thinking at the enterprise level must consider integration along three dimensions as described above:

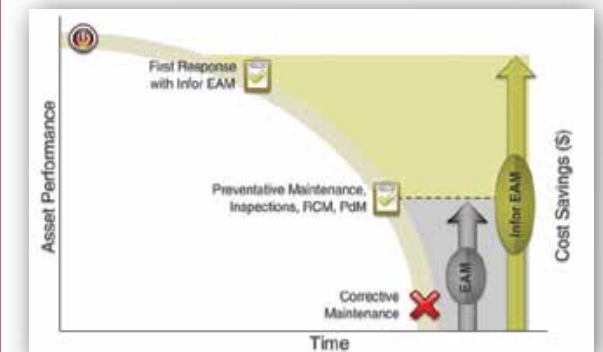
- Horizontally across the many locations, divisions, departments, etc.,
- Vertically from the shop-floor to the executive suite
- Over the entire life of the asset, from design to disposal

**3. THE WEB**

During the past decade, many CMMS/EAM vendors struggled with how best to transform their client/server offerings to Web-enabled or Web-based products. Some vendors went the Web-enabled route, which requires their customers to have software such as Microsoft Terminal Server or Citrix to run the client-server application via the Web. For those vendors that took the more expensive Web-based route, their software had to be rewritten to run native within the Web environment. Web-based

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### Explore CMMS/EAM Package Capabilities (continued)

The organization's key task is to choose a CMMS vendor and package that provides the best value-for-money proposition. The two main components of the value-for-money proposition are function and pricing. Because there's considerable differentiation of CMMS vendor offerings along these dimensions, you can select either "Essential Functionality" or "Full Functionality" as your starting point. Choosing "Essential Functionality" pre-assigns weightings that zero out advanced or specialized features. At the same

time, the tool increases the relative weighting for price. Those with less price sensitivity who wish to start with full functionality can assign equal weight to every function by selecting the "Full Functionality" option. Of course, there are applications and CMMS vendor offerings that sit somewhere between these two extremes. Starting from either the preset weightings of the "Full Functionality" or "Essential Functionality" options, you can adjust weightings in order to turn on or off features to match your requirements.

<b>INTRODUCTION</b>	<b>VENDOR SUMMARIES</b>
<b>FUNCTIONALITY</b>	
<b>VENDOR SUMMARIES</b>	<p>Vendor scores are calculated based on user weightings for aspects of the questionnaire. You may allocate weightings on the <a href="#">Software Aspects</a> page (up to 100%), or on individual aspect pages via the menu to the left. Within each Software Aspect page, you may give weightings to individual questions within the aspect as well for a truly customizable calculation.</p> <p><b>You have selected 0 products to view and compare criteria for.</b></p> <p><a href="#">COMPARE</a></p>
<b>COMPARE PRODUCTS</b>	
<b>SOFTWARE ASPECTS</b>	<p><b>Vendor: Infor</b> <a href="#">Compare Vendor Criteria</a></p> <p><b>Product:</b> Infor EAM 8.4 <b>Score: 66</b></p> <p><b>Review Date:</b> 02/25/2010</p> <p><b>Annual Sales:</b> More than \$120 million</p> <p><b>Customers:</b> More than 15,000</p> <p><b>Pricing:</b> \$4,799-9,995 per concurrent user, \$1,599-3,395 per named user, SaaS at \$99/month/named user, Hosted/ASP \$33/month/named user</p> <p><b>Annual Maintenance:</b> 20%</p> <p><b>Website:</b> <a href="http://www.infor.com/eam">http://www.infor.com/eam</a></p> <p><a href="#">GO TO KNOWLEDGE CENTER</a></p>
Vendor Company Size	
Industry Specialization	<p><b>Vendor: Megamation Systems Inc.</b> <a href="#">Compare Vendor Criteria</a></p> <p><b>Product:</b> DirectLine 2.25 <b>Score: 64</b></p> <p><b>Review Date:</b> 04/08/2010</p> <p><b>Annual Sales:</b> \$4.9 million</p> <p><b>Customers:</b> 650</p> <p><b>Pricing:</b> \$195 per 80 hrs of use (unlimited named users), including training, support, hosting all infrastructure, upgrades</p> <p><b>Annual Maintenance:</b> Included</p> <p><b>Website:</b> <a href="http://www.megamation.com">http://www.megamation.com</a></p>
Package Price	
Implementation	<p><b>Equipment History</b></p>
Integration	
Multi-site Support	<p><b>MP Management</b></p>
Global Attributes	
Security and Data Integrity	
User Interface	
Look-ups and Searches	
Data Entry	
Help Features	
Workflow and Business Logic	
Analysis and Reporting	
Work Order Control	
Preventive and Condition-Based Maintenance	
Safety	
Priorities	
Planning and Scheduling	
Inventory Control and Purchasing	
Budgeting and Cost Reporting	

Functionality screen

applications don't require users to have any additional software on their computers, other than an Internet browser for simply displaying the user interface, not running the application nor processing data.

Although the debate continues to rage, many customer IT departments insist on web-based software only, due to a long list of advantages such as:

- The application runs entirely on the server for better control over performance, integration, security, etc.
- The application is available from any computer in the world using a common browser, without any additional software such as Citrix required
- There's no threat of interference from other applications or a mismatch of software versions on the user's computer

Another key trend in the Web world is the rising popularity of e-procurement. CMMS/EAM vendors have added a variety of features during the years, including links to MRO parts supplier catalogs within the CMMS/EAM application, e-quotations, electronic release management, electronic purchase orders, management of purchase cards, and electronic funds transfer. This has reduced costs for some companies dramatically through better management of supplier performance, improved pricing, reduced paperwork and administration, lower inventory levels, and reduced stockouts.

#### 4. OPERATIONAL EXCELLENCE AND BEST PRACTICES

With today's intense global competition and the recent economic downturn, it's not surprising that companies are fixated on best practices, measurement, and the pursuit of operational excellence. CMMS/EAM vendors responded to this trend with a powerful array of software tools such as key performance indicators (KPIs) to monitor

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important measures, dashboards to display critical information in a format makes it easy to spot anomalies and monitor trends, and plant optimization and analytics to identify problem areas, their root causes, and the most appropriate corrective actions.

Plant optimization requires integration with shop-floor data collection systems, as described above, to monitor the general health of assets. As well, advanced techniques, such as root cause analysis (RCA) and reliability-centered maintenance (RCM), are becoming more popular to optimize asset performance and reliability.

Explore CMMS/EAM Package Capabilities (continued)

Clicking on an individual software aspect in the left navigation column brings you to a “Priorities” screen, which shows the exact survey questions used to establish the package score for that aspect. Exercising your option to rank a question less than “very important” factors its score so it has less weight in the calculated comparison.

You can hand-pick packages and compare them for various aspects, or enter weight-

ings and priorities and click “Calculate” to bring you to the comparison screen. Here, you’ll see a side-by-side comparison detailing the level of functionality for each capability.

The site also offers articles, white papers and resources to help you increase your familiarity with CMMS/EAM software, solve problems and get the most from your existing or future implementation.

Priorities screen

5. SUSTAINABILITY

It used to be said that until sustainability has a clear payback, businesses wouldn’t be interested in much more than paying lip service to it. However, on average, manufacturers spend almost four times as much on energy as they do on MRO capital equipment and services. As well, some large international companies prefer suppliers that have carbon management programs, such as many of

the member companies of the Carbon Disclosure Project, a not-for-profit company formed in 2000 for collecting climate change data. So, with energy prices rising, regulatory pressures increasing, and better monitoring technology, there’s now plenty of motivation for a focus on sustainability.

Most modern CMMS packages provide at least the basic tracking of energy consumption by asset or asset type for commodities such as electricity,

Keywords	IFS	INFOR (FORMERLY DATASTREAM SYSTEMS)	MRO SOFTWARE, AN IBM COMPANY
	No Score Calculated	No Score Calculated	No Score Calculated
VENDOR COMPANY SIZE	GO TO KNOWLEDGE CENTER	GO TO KNOWLEDGE CENTER	WEBSITE
INDUSTRY SPECIALIZATION			
PACKAGE PRICE			
IMPLEMENTATION			
INTEGRATION			
MULTI-SITE SUPPORT			
GLOBAL ATTRIBUTES			
SECURITY AND DATA INTEGRITY			
USER INTERFACE			
LOOK-UPS AND SEARCHES			
DATA ENTRY			
HELP FEATURES			
WORKFLOW AND BUSINESS LOGIC			
ANALYSIS AND REPORTING			
WORK ORDER CONTROL			
PREVENTIVE AND CONDITION-BASED MAINTENANCE			
SAFETY			
PRIORITIES			
Time-based priorities	1	Unlimited	2
Criticality priorities	1	Unlimited	1
Health & safety priorities	0	Unlimited	0
Other priorities	0	0	1
User-defined priorities	Unlimited	Unlimited	Unlimited
Scoring system	Some	Some	Some
Multiple priorities	No	Yes, simple multiplication of priorities	Yes, simple multiplication of priorities
Auto priority increase	No	Yes	Yes

Comparison screen

New Packages for 2010 at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review)



IBM Maximo Asset Management delivers a comprehensive view of asset types – production, delivery, facilities, infrastructure, transportation, and IT – across an enterprise. This holistic perspective allows companies to see every asset. To help maximize the return on assets, Maximo provides the ability to develop comprehensive programs for preventive, predictive, routine, and unplanned maintenance. Together, these programs help reduce costs and increase asset reliability. Maximo is used in a wide range of industries including manufacturing, construction, transportation, utilities, and telecommunications. [www.ibm.com/tivoli/maximo](http://www.ibm.com/tivoli/maximo)



IFS Applications is a global leader in enterprise asset management (EAM) and enterprise resources planning (ERP) software functionality designed to maximize enterprise value during an entire asset lifecycle. IFS speaks to the entire design, operate, maintain (DOM) process. Industrial facility designers and those who operate and maintain those facilities need to work together closely to improve plant efficiency and business profitability over time. IFS Applications facilitates this tight collaboration by supporting key business projects including projects/engineering, manufacturing, maintenance, and the supply chains involved. [www.ifsworld.com](http://www.ifsworld.com)



Infor EAM solutions (previously Datastream) enable manufacturers, distributors, and services organizations to maintain the availability, reliability, and operational safety of their plant, equipment, facilities, and other assets. Infor EAM solutions help asset-intensive companies meet environmental and compliance goals, optimize maintenance resources, increase the efficiency of

inventory and reduce operating costs and energy use. Industry-leading EAM/CMMS solutions include Infor EAM MP2, Infor EAM Business Edition, Infor EAM Enterprise Edition, and Infor EAM Asset Sustainability Edition – a breakthrough solution that integrates energy demand management. [www.infor.com/eam](http://www.infor.com/eam)



INTERAL Maintenance is functionally rich with low investment, scalable, and configurable to your business. Its unique graphic presentation of your maintenance operation allows you to manage your work and resources all from the one screen. Users appreciate this because of the resulting simplicity of use. Using today's proven technology, INTERAL offers multiple security/access levels, and remote device functionality for single and multiple sites. INTERAL Standard system (single site) is completely upgradable to INTERAL Enterprise (multiple sites) when your business needs drive you in that direction. Purchase and monthly hosting options are available to suit your financial preferences. [www.interal.com](http://www.interal.com)



Founded in 1984, Megamation Systems has been providing maintenance management solutions for more than 25 years. Megamation's flagship offering is DirectLine maintenance management software as a service (SaaS) delivered over the Internet. DirectLine is designed to help streamline work orders, perform comprehensive preventive maintenance and leverage industry best practices. It's one of the most feature-rich, customizable, and reliable maintenance solutions available. In the company's past three annual surveys, more than 98% of clients say that DirectLine meets or exceeds their software needs. [www.megamation.com](http://www.megamation.com)

gas, and water, using condition-based monitoring functionality. More sophisticated packages offer such features as:

- A dashboard layout or thermal map representing energy consumption of your assets, with drill-down capability on hot spots to determine actual-versus-expected energy consumption of an individual asset flagged as “in the red”
- A carbon footprint calculator and tracker, to translate energy consumption into level of carbon emission, and assist in carbon management
- A workflow engine or notification capability to alert users to any anomalous situations, such as rising energy consumption for a given asset, sustainability-related preventive maintenance tasks that are long overdue, or repetitive problems like excessive power surges

## 6. RISK MANAGEMENT

As assets become smarter, computers more complex, and humans more dependent on technology, the risk of catastrophic failure increases. As a result, every company has experienced a steady rise in regulatory pressures from industry groups and all levels of government. CMMS/EAM vendors have responded with better controls to mitigate risks, and improved reporting capability to facilitate communication with regulatory bodies. For example, development of electronic signatures was a direct result of the Food and Drug Administration's 21 CFR Part 11 ruling for food processors and pharmaceutical companies.

Other features that assist in better management of risk and reporting to regulators include:

- Sophisticated security for user groups or individuals to prevent unauthorized actions such as editing of data within a given module, screen, field, etc.
- Audit trail capability that tracks user login and logout, as well as all changes to the database

## Video Demo



See how easily you can review package capabilities and compare vendor offerings – take this guided tour of the *Plant Services* CMMS/EAM Software Review. > [Watch now](#)

- Error-checking capability for validating the format, range, or logic of data that is entered by the user
- Notification or alarming functionality to alert management of any anomalous situations, such as when a key performance indicator is trending out of control
- Automated workflow, such as approvals, for ensuring procedures are followed
- A powerful report generator that can filter and sort data in a manner acceptable to regulators

## 7. MOBILE TECHNOLOGY

In my view, one of the most important emerging trends is the growth of mobile technology. Although mobile solutions began as the answer to the needs of remote and mobile workers in industries such as transportation, municipal government, and real estate, it has proven to be of much greater potential in every sector. The key isn't to think of the mobile device as just a terminal onto the main system that happens to have a smaller screen. This is exactly the thinking when com-

### Asset Manager Column

As a contributing editor to Plant Services for many years, David Berger, P.Eng., has written hundreds of monthly “Asset Manager” columns on how to use computerized maintenance management system (CMMS) and enterprise asset management (EAM) software to optimize the performance of industrial maintenance and asset management. From spare parts inventory control and technician skills to energy efficiency and wrench time, if it’s touched by a CMMS/EAM, Berger has analyzed and explained it.

> [CLICK HERE TO READ THE DIGITIZED PORTION OF DAVID BERGER’S COLLECTED WORKS.](#)

panies outfit vehicles with laptops for their maintenance workers and simply configure them as a remote office. However, the real potential lies with the rapidly-changing market for smaller personal devices like small tablets, Apple iPad or iPod, Android devices, Blackberry devices, Symbian devices, Pilot units, and so on.

These devices could bring revolutionary change to the way companies manage their assets, in the same way cell phones transformed the way we communicate. This will only come to pass if CMMS/EAM vendors begin to write applications that are more suited to the size and power of mobile units. Furthermore, the software functionality must significantly assist maintainers in completing their work.

For example, will the mobile device ensure technicians have the right information, parts, and tools to complete the job? Is the device fully integrated with a barcode scanner, GPS unit, camera, and other technology needed to do the job? Is there a personalized dashboard that can alert technicians to anomalous situations, and then provide diagnostic tools to correct the problem quickly? Will the technicians love their easy-to-use devices and wonder how they survived for so long without them?

No doubt we have a ways to go before this scale of transformation occurs. In the meantime, CMMS/EAM vendors are writing mobile applications or working with partner companies to extend the reach of their CMMS/EAM software, as shown

in detail in the Plant Services CMMS/EAM Software Review ([www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review)).

### 8. CONDITION-BASED MAINTENANCE

For many years, there has been a growing interest in reliability as maintenance departments move from a firefighting mentality to a more planned environment. To accomplish this transition, managers must establish for each asset or component a maintenance policy describing on what basis maintenance is triggered. Policy options are:

1. Failure-based maintenance: Maintenance triggered by failure of the asset or component (ie, let it run to fail)
2. Use-based maintenance: Maintenance triggered by time (eg, weekly), by meter (eg, every 5000 miles), or by a given event (eg, a snowfall)
3. Condition-based maintenance: Maintenance triggered by a condition (eg, temperature exceeds 70 degrees)

Selection depends on the cost of implementing each policy, and severity of consequences if the asset or component should fail. For example, changing the oil in a vehicle can be triggered by engine failure, a regular time interval or meter reading such as every three months or 5000 miles, or when the level of particulate in the oil exceeds a threshold. Because of the excessive downtime and maintenance costs involved, as well as potential safety risks, you would not want to let the engine run to

failure. On the other extreme, monitoring the level of particulate by sending out oil samples for regular lab testing might be too high a price to pay for the increased accuracy.

Thus, for some vehicles, changing the oil every three months or 5000 miles provides the right balance of cost versus benefit. For other vehicles, such as mobile mining equipment, where engine failure might be catastrophic and oil changes expensive, it might indeed pay to monitor the condition of the oil through regular lubrication analyses.

When condition monitoring is the preferred option to optimize the reliability, availability and performance of the asset, the more sophisticated CMMS/EAM packages have a host of advanced features, detailed at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review).

### 9. SCHEDULING

Moving to a more planned environment requires better tools for planning, scheduling, and coordinating maintenance activities, including major shutdowns. Even failure-based maintenance can be planned in the sense that you make a deliberate choice to run the asset to failure, and have a standard job plan ready when it occurs. Today’s CMMS/EAM vendors developed some incredible graphical tools to assist planners, schedulers, and turnaround managers in matching the anticipated workload for a user-definable time period, with the availability of the right labor skills and competencies, spare parts, tools, special equipment, and facilities. Critical functionalities are listed and evaluated for current package offerings at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review).

### 10. PRICING

There are almost as many pricing schemes as there are CMMS/EAM packages. The latest pricing trend appears to be the recent rise in popularity of software as a service, or SaaS. This option provides a

block of hours of login time at a fixed price, regardless of how many users consume those hours. The price typically includes unlimited training, support, and implementation assistance. Other pricing schemes are shown the package descriptions at [www.PlantServices.com/CMMS\\_Review](http://www.PlantServices.com/CMMS_Review).

### CONCLUSION

The CMMS/EAM industry continues to mature as evidenced by the mergers and acquisitions of the past decade, although the level of this activity seems to have slowed in recent years. Industry consolidation has resulted in more streamlined costs because of economies of scale, and greater expenditure on research and development to produce a better software product. Additionally, CMMS/EAM vendors have an extensive network of partners that expand their product and service offerings. Many of these vendors have chosen niche markets in which to focus, such as a single asset class (eg, fleet), a given industry (eg, life sciences), or a product/service theme (eg, reliability-centered maintenance). This is all good news for you, their potential customers, as you search for innovative ways to improve bottom-line performance. ☺

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