CMMS/EAM software tackles today’s toughest challenges

By David Berger, P.Eng.,
Contributing Editor
Table 1: Compare these packages in detail at www.PlantServices.com/CMMS_Review

<table>
<thead>
<tr>
<th>Company / Web site</th>
<th>Package</th>
<th>Review date</th>
<th>Annual sales</th>
<th>Number of customers</th>
</tr>
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<tbody>
<tr>
<td>Aleier Inc. <a href="http://www.aleier.com">www.aleier.com</a></td>
<td>FMJ INNOVUS 1.0.055</td>
<td>12/13/2006</td>
<td>$1.7 million</td>
<td>More than 50</td>
</tr>
<tr>
<td>Aleier Inc. <a href="http://www.aleier.com">www.aleier.com</a></td>
<td>FMJ enterprise 6.2</td>
<td>12/13/2006</td>
<td>$1.7 million</td>
<td>More than 50</td>
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<td>AssetPoint <a href="http://www.assetpoint.com">www.assetpoint.com</a></td>
<td>TabWare EFX EFX100</td>
<td>2/27/2006</td>
<td>Less than $25 million</td>
<td>123</td>
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<td>Blue Mountain Quality Resources <a href="http://www.coolblue.com">www.coolblue.com</a></td>
<td>Regulatory Asset Manager R</td>
<td>2/19/2009</td>
<td>Less than $20 million</td>
<td>50</td>
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<td>Centric Maintenance Systems <a href="http://www.centricmaintenance.com">www.centricmaintenance.com</a></td>
<td>API Pro VSx SP2</td>
<td>1/12/2007</td>
<td>$6 million</td>
<td>350</td>
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<td>Conception INTERNAL <a href="http://www.interal.com">www.interal.com</a></td>
<td>INTERNAL 7.0.2</td>
<td>3/11/2010</td>
<td>Less than $5 million</td>
<td>400</td>
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<td>CWWorks Systems Inc. <a href="http://www.cworkssystems.com">www.cworkssystems.com</a></td>
<td>CareWorks 4.0.0</td>
<td>3/16/2009</td>
<td>Less than $5 million</td>
<td>700</td>
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<tr>
<td>Cybermetrics <a href="http://www.cybermetrics.com">www.cybermetrics.com</a></td>
<td>FaciliWorks Bi</td>
<td>2/6/2006</td>
<td>$3.9 million</td>
<td>More than 1,500</td>
</tr>
<tr>
<td>IBM <a href="http://www.ibm.com">www.ibm.com</a></td>
<td>IBM Maximo Asset Management 7.1.1.6</td>
<td>3/19/2010</td>
<td>More than $200 million</td>
<td>More than 10,000</td>
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<td>Infor <a href="http://www.infor.com">www.infor.com</a></td>
<td>Infor EAM 8.4</td>
<td>2/25/2010</td>
<td>More than $120 million</td>
<td>More than 15,000</td>
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<td>IFS <a href="http://www.ifsworld.com">www.ifsworld.com</a></td>
<td>IFS Applications 7.5</td>
<td>11/23/2009</td>
<td>$150-$200 million</td>
<td>More than 2,000</td>
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<td>Invensys <a href="http://www.avantis.net">www.avantis.net</a></td>
<td>Avantis.PRO 4.1</td>
<td>2/10/2006</td>
<td>More than $35 million</td>
<td>720</td>
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<td>Ivara Corporation <a href="http://www.ivara.com">www.ivara.com</a></td>
<td>Ivara SupEAM 5.0</td>
<td>1/26/2007</td>
<td>$16 million</td>
<td>More than 60</td>
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<td>Lawson Software <a href="http://www.lawson.com">www.lawson.com</a></td>
<td>Lawson Enterprise Asset Management (EAM)</td>
<td>5/21/2007</td>
<td>$41 million</td>
<td>More than 250</td>
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<td>Maintenance Connection <a href="http://www.maintenanceconnection.com">www.maintenanceconnection.com</a></td>
<td>Maintenance Connection Onsite/Online 2.5</td>
<td>2/29/2008</td>
<td>Less than $25 million</td>
<td>500</td>
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<td>Oracle <a href="http://www.oracle.com">www.oracle.com</a></td>
<td>Oracle Utilities Work and Asset Management 1.7.15.2</td>
<td>2/11/2008</td>
<td>$18 billion total company</td>
<td></td>
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<td>Smartware Group <a href="http://www.bigfootcmms.com">www.bigfootcmms.com</a></td>
<td>Bigfoot CMMS Internet/ Enterprise Edition 8.0.1</td>
<td>2/28/2008</td>
<td>Less than $5 million</td>
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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 quality 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.

Many of these features and functions are excerpted from the online Plant Services CMMS/EAM Software Review (www.PlantServices.com/CMMS_Review), where you can directly compare the capabilities of a wide range of software packages.
Harness advanced Design, Operate Maintain thinking in YOUR plant!

How 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 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.”

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 the needs of your 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-
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.
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
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 important measures, dashboards to display critical information in a format 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.
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,

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

IFS Applications is a global leader in enterprise asset management (EAM) and enterprise resource planning (ERP) software functionality designed to maximize enterprise value during an entire asset lifecycle. IFS speaks to the entire design, operate, main- (DOM) process. Industrial facility designers, maintenance resources, increase the efficiency of meeting environmental and compliance goals, optimize the availability, reliability, and operational safety of distributors, and services organizations to maintain www.ifsworld.com

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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

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

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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

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-
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).

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.

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.

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.

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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