Essential Guide to Facilities Management with Computer-Aided Facilities Management Software

Well-managed buildings cost less to run, create happier workplaces, and reduce their environmental impact. Real estate is typically the second biggest cost item for companies after labor, and investments in and operating costs for facilities can total over 30 percent of a company's annual operating costs, according to IBM. Therefore, it makes sense to manage these assets as effectively as possible.

Achieving efficiencies requires measuring data like occupancy rates, maintenance schedules, and energy usage. Collecting this information can be a daunting task in itself. Then, to avoid data overload, systems are required to manage and extract insights from it. This need gave rise to the field of computer-aided facility management (CAFM), or as it is more often called these days, integrated workplace management (IWM).

In this guide, you'll get a quick primer on the history and benefits of CAFM and related systems as well as an examination of the features and functionality to look for in a tool to implement these practices. Then, use the decision matrix to choose the right solution for your needs. Along the way, check out advice and insights from experts on how best to implement facilities management solutions.

History of Computer-Aided Facilities Management

The origins of CAFM date to the early 1960s when space forecasting applications were first run on mainframe computers, according to Eric Teicholz, a former professor of architecture at Harvard University, a facilities management consultant at Graphic Systems, Inc., and chair of an advisory group of the International Facility Management Association.

In the 1970s and 1980s, this evolved as smaller computers arose, and these tools began to be used for asset management, lease management, and building cost accounting. Computerized maintenance management system applications and security became part of the applications, followed by workflow and document management, energy management, portfolio management, and facilities assessment, Teicholz explains.

CAFM first gained traction among operators of large complexes and campuses. CAFM Incorporated says the user base includes government, healthcare, education, commercial, and industrial organizations. CAFM and IWMS are also widely used by real estate management companies and companies that offer facilities management as a subcontracted

service.

Paralleling a trend occurring in software generally, CAFM applications are now often becoming cloud-based, and many integrated CAFM systems include digital Building Information Models that include data about facilities in graphic representations that are often 3D.

Understanding Key CAFM terms

Understanding CAFM requires coming to grips with an alphabet soup of acronyms covering the concepts and platform types that are used. There are many tools for managing buildings, and the first step to choosing the right one for your needs is understanding the types of solutions available. Many of them overlap, and there are also integrated solutions that offer a suite of applications. Below are the key terms.

Computer Aided Facility (or Facilities) Management (CAFM) is often turned into a word pronounced “caf-em” by practitioners. It’s the original label for the field, and its applications include:

- Space planning
- Asset management
- Move management
- Maintenance management
- Room reservations
- Customer service requests
- Facility operations

(A side note: CAFM can also stand for Certified Automotive Fleet Manager for a specialist qualified in managing corporate vehicle pools. There’s a lot of overlap with building management in disciplines such as tracking assets, but that’s a usage we won’t be covering in this article.)

Computerized Maintenance Management System (CMMS) is a tool that focuses on managing the maintenance needed for critical equipment within a facility. It performs functions such as maintenance scheduling and tracking spare parts. CAFM and CMMS systems are sometimes combined under the name **Integrated Work Order Management Systems (IWOMS).**

Integrated Workplace Management System (IWMS) is the evolution and expansion of CAFM. These suites add to CAFM features by incorporating CMMS as well as real estate management functions like lease management, project management, and environmental/energy planning. IWMS are comprehensive enterprise platforms for managing large facilities and real estate portfolios.

According to research firm Gartner, the core functional areas of IWMS are:

- Real estate management including purchase, lease, financial management, and sale.
- Capital project management for developing new facilities or remodeling existing facilities.
- Facilities management such as planning, computer-aided design and BIM integration, space management, move management, and resource scheduling.
- Maintenance management covering asset management, work requests, preventive maintenance, work order administration, warranty tracking, and facility condition assessment.
- Environmental management to monitor and reduce resource consumption and waste production to support sustainability.

There are applications that label themselves as both CAFM and IWMS, but as a general rule, CAFM is more likely to combine multiple platforms while IWMS operates from a single platform and database. In addition, IWMS applications are expected to have more robust functionality in real estate, environmental and project management than CAFM.

Enterprise Asset Management (EAM) encompasses CMMS and extends it with applications for managing physical assets through their lifecycle including procurement, commissioning, and replacement.

Building Management Systems (BMS) monitor and control building systems - everything from fire detection to temperature regulation. BMS is a fairly narrow application on its own, so it is often added as a module within a broader CAFM or IWMS system.

Environmental Management Systems (EMS) measure and mitigate a facility's environmental impact as an adjunct to sustainability programs and, like BMS, are often implemented as a module in a larger CAFM effort.

Building Information Model or Modeling (BIM) refers to the creation of digital representations for buildings (physical and functional characteristics) that become a resource for making decisions about the building from its inception onward, according to the U.S. National BIM Standard. Instead of two-dimensional renderings, these are often 3D and are expanding to cover other dimensions such as time, cost, and sustainability.

The seventh-dimension or 7D is oriented toward the operation of a building throughout its lifecycle. While BIM is well entrenched in U.S. architecture, design, and construction, BIM integration into facilities management is still in the early stages. It gives building owners and managers access to more information about facilities such as their composition, or even the ability to "look" through walls on models to see the infrastructure behind them. A McGraw-Hill study on the business value of BIM found that benefits for facilities managers include complete and accurate data on buildings linked to graphics without double-entry of data (an advance fostered by introduction of the COBie data standard) and the integration of scheduled maintenance.

A good resource to learn more about this application is"BIM for Facility Managers," a book edited by Paul Teicholz, former director of the Stanford University Center for Integrated Facility Engineering, and the International Facility Management Association.

Integrated Whole Building Management (IWBM) is an extension of an approach to design known as integrated design or whole building design, which focuses on different roles such as architects, engineers, and other specialists working together as a team. A similar collaborative approach to managing these buildings looks to integrate oversight of all the functions and services needed to make sure the facility can perform as intended.

"It's important to distinguish between a (Computer-Aided Facility Management) CAFM system, versus a Computerized Maintenance Management System (CMMS) that focuses on equipment and maintenance, or an enterprise-level, multi-faceted Integrated Workplace Management System," said Traci Doane, President of Technology Solutions, JLL, a division of international commercial real estate company Jones Lang LaSalle.

"A CAFM system is a good step toward fully digitalized facility management, but these programs are not designed to support every phase of the facility management lifecycle. A company may start out with a CAFM or CMMS system, and later decide to use it as a building block for an IWMS and other facility management technologies," Doane added.

Benefits of Managing Buildings with CAFM and IWMS

Theory is great, but any system change entails investment of money and time, and potential disruption of operations. Companies want to see a strong business case to support moving to CAFM and IWMS from legacy systems such as paper spreadsheets.

Dollars and cents arguments in favor of these systems are strong, notes Greg Alevras, business development manager for the United States and Canada at Archibus Inc, which makes IWMS software. Interest in IWMS reflects an evolution among corporate managers to look at facilities as assets to be leveraged to enable greater productivity through more agile management.

Alevras believes smart use of such systems can reduce operating expenses by anywhere from 1 to 34 percent depending on the company with the average being 10 to 15 percent. “It allows them to be more nimble,” he said.

The more specific benefits of CAFM and IWMS systems include:

- Improved space utilization which reduces excess capacity and unnecessary overhead.
- Accurate reporting and benchmarking of critical facilities information.
- Opportunity to cut costs on items such as utilities and maintenance.
- More robust financial management of leases, projects and property portfolios.
- Streamlining of processes for space scheduling, maintenance, and more.
- Better coordination reduces need for moves and relocations.
- Stronger decision making on facility questions.
- Improvements in safety and environmental planning, which can lead to fewer accidents and regulatory compliance issues.
- Enhanced capability to prepare for disasters and emergencies.
- Easier tracking and control of assets including costs such as depreciation and maintenance.
- Reduced equipment downtime.
- A more environmentally friendly footprint.
- Easier and more centralized administration and back office management with data standardization, paper-free processes.
- Reduced risk of manual error with automated processes.
- Improved response times with mobile tools and notifications.

A 2012 survey by Service Works Group among users of facilities management software found that more than 80 percent of respondents said CAFM had saved them money and 91

percent said it made facilities management more efficient. Seventy-seven percent said their CAFM solution gave them the benefits they had thought it would.

Another trend working in favor of CAFM and IWMS is the Internet of Things (IoT) in which devices, equipment, and sensors are connected to the Internet. This phenomenon is growing quickly because it allows machines to communicate and facilitates rapid information exchange. As a result, more components and sensors are being made with connectivity, and their prices are becoming more affordable. Research firm Gartner predicts that 6.4 billion connected "things" will be in use in 2016, up 30 percent from 2015, and the number will reach 20.8 billion by 2020.

"Overall, the growth of the CAFM market seems to be a result of advancing technology coupled with corporations' desires to make the most of their physical offices and facilities. After years of use, business leaders see the long-term value of managing facilities in a strategic way using software. Other factors, such as increased regulations on energy consumption and outsourcing of FM services, adds to this growth," said Taylor Short, a Market Researcher that covers CAFM at Software Advice (a Gartner company).

"The biggest benefit of using a CAFM is the ability to collect data about the facility as well as assets within it. This data can be used to identify areas that consume too much energy, for example, and management can address the issue. Without this data, organizations have no real way to know exactly how their facilities are performing," he said.

High-Level Buying Considerations in IWMS and CAFM Software

If you decide to pursue CAFM/IWMS, you face some high-level considerations in the selection of software. These include some decisions that are common in any software selection:

- Should you choose open source or proprietary software?
- Should you choose a hosted or cloud-based solution?
- What integrations are important to have?
- What is its profile for ease of use and flexibility?
- Does the solution have a mobile interface?
- What are the self-service capabilities?
- Do you need industry customization?
- How much does it cost?

Let’s explore each of these.

Open Source vs. Proprietary - There are many open-source solutions, which some companies prefer because they do not want to be restricted to a specific vendor. Another attraction of open source software is that it is usually free or very inexpensive, and can be installed wherever desired without needing to track license restrictions. On the downside, there is no dedicated support or commitment by the authors to update it, which proprietary software often provides.

Hosted vs. Cloud-Based - There are two main advantages of hosted software: the potential to keep your data more secure, and having greater control over the software asset. However, upfront costs are higher, and hosted options also pose some security risks. In addition, you take on greater responsibility for maintenance and updates. Many users are moving to cloud solutions because they often offer lower costs over the product lifecycle, make it easy to add or subtract users or locations, and the vendor handles support, maintenance, and updates. In a 2016 survey, Service Works Group found that 44 percent of users chose cloud-hosted facilities management in 2016, up from 24 percent in 2015.

Integrations - You want a solution that integrates well with the other software your organization uses such as computer-aided design, file-hosting services, spreadsheets, data storage, email, digital signing, calendars, app integrators, programs, and developer tools.

Ease of Use/Flexibility - You want software that your team members can figure out and use, and that will scale easily as your needs change. The level of specialization and sophistication among members of your facilities-management team is relevant. Are most of your staff interchangeable generalists or do you have specialists dedicated to different aspects of management? The answer will guide your choice in terms of depth of offering in specific disciplines and how easy the software is to learn.

Phil Bearce, a CAFM specialist at consultancy Facilities First, recommends verifying the software will meet the organization’s needs, and says “Is it scalable, can it grow with the company? Does it have modules that address all aspects of facilities management?”

Mobile - The facilities management team is often away from a desk. But as staff members travel among properties or around facilities, they need to stay connected - which is where programs with mobile functionality come in handy. The SWG survey found that 72 percent of respondents used CAFM/IWMS on mobile devices in 2016, up from 45 percent in 2015.

Self-service capabilities - Many companies now want building occupants and users to be able to log and manage service requests themselves online. In the SWG survey, the use of self-service was up 40 percent in 2016 to 66 percent from 44 percent.

Customization - Some vendors are more heavily used in certain sectors. So consider looking at solutions that are tailored for your facility type or use case. This can be schools, residential property, factories, or commercial office. The size of your portfolio matters too, so consider if you are managing a large number of buildings that are geographically dispersed.

Cost - Of course, cost is a major consideration. Self-hosted software is more expensive than a software-as-a-service (SaaS) subscription. Many platforms charge an initial, one-time starting cost and then an ongoing subscription fee based on the number of square feet being managed and/or the number of users. You also need to factor in required hardware, training and any other expenses.

Computer-Aided Facilities Management Features

CAFM and IWMS platforms are often comprised of modules for specific areas of work. Some of the main ones are:

Space and workplace management - These tools manage building space including charting vacant desks and offices, equipment location, and key data.

Real estate management - This focuses on maintaining a database about buildings and properties including their size, features, location, value, condition, occupancy, and costs through their life cycle. Leases can be managed within this module and request for proposals created.

Maintenance management - This tracks and coordinates everything from routine cleaning to preventive maintenance on facilities and equipment and trouble calls. The objective is to keep the facility running in top condition while reducing costs.

Capital projects management - This module covers major projects such as new buildings or retrofits and brings together budgeting, design, work allocation, documentation, and accounting.

Environmental sustainability - These tools monitor use of energy and water as well as

waste production such as trash and CO2 emissions. Excess use of resources can be identified and improvements made including smart thermostats, lighting controls, and efforts to obtain LEED certification.

Additional add-on modules might include:

- **Services management -** This might cover visitor services, security, food service, and safety.
- **Supplier/contractor management -** This tool coordinates all the outside service providers you use in the facility and makes sure the work has been done and documented.
- **Training module -** This tracks the training and qualifications of staff to handle facilities work and ensures any certifications are renewed in a timely way.
- **Reporting and analytics -** This function can extract information according to your business needs and provide a dashboard of key indicators. Also consider if your system will send alerts and notifications based on triggers that you set. Looking ahead, CAFM and IWMS experts expect more companies to harness the data from their systems to use predictive analytics for more accurate projections. This is especially relevant as work styles evolve with more collaboration and growth in telecommuters and road-based employees. This means, for example, fewer private offices and a decrease in the ratio of employees to seats can fall from one to one to two or three to one, Alevras explains.
- **Health and safety -** This documents procedures, tracks drills and preparations, and handles risk assessment and incident reporting.
- **Work order management -** This tool coordinates on-demand requests as well as scheduled and preventative maintenance.

Worksheet for Evaluating and Choosing IWMS and CAFM Software

Now you've gotten a sense of what's possible, you need to choose a specific solution. There are lots of options. Industry practitioners estimate that there are about 200 vendors in this field. A good way to make your selection is to use a decision matrix. Try using the example below.

matrix-worksheet.JPG

Factor:	Ease of use	Custom fields on cards	Integrations	Analytics	Drag and Drop	Cost	Total
Weight:	5	3	5	4	2	5	

1. On the top row, list the most important features or functionality for your needs. (Add more columns as needed.) In the worksheet above, we have filled in some sample criteria.
2. List each software program under consideration in the first column.
3. Go down your list and score each program from 0 (worst) to 5 (best) on how it rates on the individual criteria.
4. On the second row (underneath the factors), rank each factor in terms of relative importance on a scale of 0 (unimportant) to 5 (critical). You may have multiple factors of the same importance. (Examples in the above table.)
5. Multiply the score in each column by the factor's relative importance to get a weighted score.
6. Add each software's weighted scores across the row.
7. The highest total score is your winner.

Avoiding Pitfalls with IWMS and Computer-Aided Facilities Management Software Implementation

Choosing the best software tool isn't the end of your work. CAFM and IWMS specialists say there can be many pitfalls to successful implementation. Below are some of the most common obstacles:

- Lack of buy-in from all stakeholders
- Absence of an advocate in senior management
- Failing to identify all component processes
- Missing or inaccurate data.

James Thomassen of CAFM-consulting firm RSC points out that lack of leadership and buy-in from senior management is a frequent problem. “It is common for departments to put up roadblocks if there is not a top-down mandate and they do not see any gain for their participation,” he says. “It is critical to have corporate real estate and IT input on the workability of any CAFM tool.”

Alevras of Archibus mentions rushing ahead can cause problems. “A lot of people try to jump in and get data, and they are not aligning the right kind of resources. They try to speed up the process.”

Thomassen also stressed that it is important for employees to only have access to the information they need or want. “Information overload will cause the tool to not be used and [users to] lose confidence in the information, and without a filter on information, end users may ‘self-move’ or do other types of mischief nullifying what information that you do have,” he said.

Short of Software Advice has found three big factors in CAFM implementation success. “First, organizations must have a goal in place for the software. What are the exact results they want to achieve? Secondly, companies need a plan in place. This requires gathering the invested departments—executives, maintenance, and facilities personnel—to define roles for using the system. Finally, a CAFM implementation needs the commitment of the entire organization to work at its best because improving facilities utilization typically involves altering the behavior of building occupants,” he said.

Successful implementation of CAFM systems starts with a comprehensive IT strategy and roadmap for its real estate and facilities operations before investing in any new system to avoid spending on technology that is not the right fit, Doane of Technology, JLL notes. “Understand your requirements before researching CAFM systems. Our firm often works with clients to identify their end-to-end needs and determine whether they need a CAFM, CMMS, or an IWMS, or a combination of tools, and how best to configure the system for their purposes. Without clearly defined requirements, you can inadvertently make the wrong decision,” Doane said.

Investing in change management and training-for-adoption are crucial. You should also have a plan upfront for how you will maintain and manage the software and also the data and drawings. Doane adds, “Neglecting this decision can be costly down the road, especially if you do not have a process for data governance or system changes.”

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Smartsheet is a spreadsheet-inspired task and project management tool with powerful collaboration and communication features. By providing a broad range of smart views – Grid, Calendar, Gantt, Sights – Smartsheet helps you manage projects the way you want to. Since Smartsheet is a cloud-based tool, you can create a central repository by attaching all documents and requirements to the project sheet, which can be accessed anywhere, at any time using a computer or mobile device.

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