



IBM Enterprise Content Management (ECM) Solutions in Manufacturing/Energy

Overview

The IBM Asset and Plant Lifecycle Management (APLM) solution is designed to provide the ideal solution for companies to manage their plants, processes, and assets. It can merge all of a company's enterprise and departmental content sources, and improve access to information, linking engineering, suppliers, and production — regardless of location — to speed business processes, optimize production, and aid in making the decisions that are critical to successful operations.

IBM ECM Solutions in Manufacturing

Every segment of the manufacturing market is becoming more challenging. Utilities, oil and gas companies, chemical producers, pharmaceutical companies, and other manufacturers are all being pressured from many directions — global competition, shrinking margins, reduced time-to-market requirements, and shorter product life cycles all affect performance. In addition, there are growing customer expectations for innovation and improved service.

These pressures make accessing the right information from across the enterprise imperative, but to effectively utilize that information, today's executives need answers to the key issues driving their businesses:

- How can we leverage our corporate assets to increase revenues and achieve greater operational efficiency while reducing costs?
- How can we leverage our investment in enterprise solutions to create composite applications that utilize the information scattered in various isolated systems?
- How can we improve the flexibility of our facilities and reconfigure them to reflect new product and production needs?
- How can we manage our facilities so that we can benefit from the introduction and application of new technologies?
- How can we improve the use of our facilities, through determining which parts are under utilized and by optimizing those that are critical to operations?
- How can we maintain a more complete and intelligent description and record of our assets, their function, and their history within the enterprise?
- How can we document the operation of our facilities, both for better analysis and optimization, as well as for presentation during regulatory due diligence?

Reaching Across the Enterprise

Manufacturers have deployed multiple, often isolated, business systems. Disparate systems such as Computer Aided Design (CAD), Product Data Management (PDM), Enterprise Resource Planning (ERP), Product Lifecycle Management (PLM), Manufacturing Execution Systems (MES), Maintenance Management Systems (MMS), Customer Relation Management (CRM), and

Supply Chain Management (SCM) all contain important information that must be shared if innovative solutions are to be deployed.

The problem is that each company's requirements are different as they each face challenges unique to their company and their industry . . . in other words, there is no "one size fits all" solution.

That's why IBM has teamed with McLaren software to provide the platform that provides sufficient functionality to deliver solutions that do not require costly customization, but instead deliver an out-of-the-box solution that allows for easy configuration to fit your specific business requirements.

IBM Enterprise Content Management (ECM) coupled with McLaren Enterprise Engineer software is designed to provide the ideal solution for companies to manage their plants, processes, and assets. The IBM solution can merge all of a company's enterprise and departmental content sources, and improve access to information, linking engineering, suppliers, and production — regardless of location — to speed business processes, optimize production, and aid in making the decisions that are critical to successful operations.

Surviving in Today's Competitive Environment

The companies that survive in today's competitive marketplace do so not just through innovation, but also through refinement of processes. They look for ways to optimize their performance, eliminate unnecessary or redundant activities, and share content dispersed throughout the organization to improve decision-making at every level.

The IBM solution provides the foundation from which manufacturers can improve operational efficiency, create innovative composite applications, and leverage their content resources by integrating ECM solutions within and beyond the enterprise. The net effect is to extend content management into engineering, production, quality, sales, and service as well as into the relationships with customers, distributors, and suppliers. And because critical information is immediately accessible by every department and partner at each location, key decisions can be made faster and more effectively than ever before.

Managing Content in a Distributed Enterprise

With the combination of content, process and connectivity, the IBM solution allows customers to build and sustain competitive advantage by managing and sharing content throughout their organization. With the IBM solution, content is shared and business processes are consistent across the enterprise, automating and streamlining operations, while providing a full spectrum of connectivity to simplify critical and everyday decision-making.

The IBM system repository supports more than 250 types of content including word processing documents, engineering drawings, manuals, correspondence, spreadsheets, graphics, photos, video and many others forms of information.

By intelligently managing business content and processes, manufacturers can benefit from:

- Better communications and improved processes that drive faster and better decisions by linking customers, business partners, suppliers, and employees.
- Reduced inventory costs by increasing the speed and efficiency of inventory and supplier management.
- Increased organizational speed and agility by accelerating access to critical content.
- Uniformly applied rules for access, ensuring information is only shared with authorized partners.
- Maximized content value through integration with enterprise systems such as SAP/R3, Siebel, PeopleSoft, and Oracle.

The IBM Asset and Plant Lifecycle Management (APLM) Solution

A key to all manufacturing operations is the proper management of assets during the life of the plant.

Modern plants go through several distinct phases during their life. The IBM Asset and Plant Lifecycle Management solution supports the ongoing processes of designing, constructing, hand-over for commissioning, upgrading, reconfiguring, renovating, modifying, and decommissioning the assets and facilities. Most companies struggle to address these issue because the facilities are complex and were built and modified at different times by different organizations. The result is information related to their operations reside in isolated, difficult to use, and out-of-date repositories.

IBM Enterprise Content Management (ECM) solutions help provide a means to bring together, manage and store all of the content that is accumulated throughout an asset's life. The content and processes describing and supporting the evolution of all assets can be managed in the IBM system.

Typical Drawings and Documents Managed in the Asset and Plant Lifecycle Management Solution

CAD Drawings	GIS Support	Plot Plans
Contracts	Health/Safety/Quality	Process Flow Diagrams
Corporate Records	Human Resources	Purchase Orders
Correspondence	Incident Reports	Procurement Records
Customer Records	Inspection Reports	Proposals
Design Codes	ISO Procedures	Regulatory Compliance and Reporting
Electrical Diagrams	Legal Documents	Scanned Drawings
Email Lifecycle Management	Maintenance History Files	Standard Operating Procedures
Emergency Action Plans	Maintenance Manuals	Standards Employed
Engineering Drawings	Manufacturing Processes	Specifications
Engineering Standards	Material Safety Data Sheets (MSDS)	Test Certifications
Facility/Asset Management	Partner Records	Training Records
Facility Drawings	Parts Lists	Transmittals and Acknowledgements
Field Service Reports	Piping and Instrumentation Diagrams (P&ID's)	Vendor Manuals
Financial Records		Work Orders

Managing Business Processes

In addition to managing the content associated with the plant, IBM's Asset and Plant Lifecycle Management solution allows companies to create, manage, monitor, and integrate the key business processes required for efficient plant operations as well as compliance with regulations. Typical processes that need to be managed include:

- Management of Change (MOC) process development, tracking & auditing
- Building and operating permit applications
- Hand-over of plant from design and construction phase to operations
- Creation, approval, and updating of plant operating procedures
- Coordination, planning, approval, and execution of scheduled maintenance activities
- Collaborative design and approvals

- Contractor training processes & testing
- Annual review of process safety management documents and procedures
- Scheduling and managing inspections
- Approval and incorporation of as-built documentation
- Maintenance work schedules and work packs
- Procurement approvals

Managing Engineering Process

Projects usually do not fail because of bad engineering; they fail because there are no formal procedures in place to control the engineering design process.

Before the introduction of “office automation tools” such as Microsoft Word, email, and copiers, companies had typing pools, reprographic departments, file rooms, project secretaries, drawing office managers, and all kinds of internal support to ensure the proper execution and documentation of the projects. These people actually implemented the businesses processes that governed the design processes.

Today however, most of the support staff has been replaced by PCs leaving engineers responsible for everything from design to document generation, as well as project management. The problem is that each project, department or even an individual tends to invent their own processes – which sets different standards for documentation, retention, filing, transmittals, and collaboration. Because of this, project management and tracking has become a huge management problem.

The solution to this problem is IBM Asset and Plant Lifecycle Management. IBM replaces the clerical staff eliminated in the name of office automation, with disciplined and uniform processes designed specifically for the way engineers work and the processes they must follow. Processes are established and enforced that are formal, auditable, and repeatable – meeting all of today’s business and regulatory requirements.

Providing Years of Domain Expertise

Understanding how to apply the IBM Asset and Plant Lifecycle Management framework to a particular application or industry segment is as crucial as the quality of the technology that supports it. The true value of the IBM Asset and Plant Lifecycle Management solution emerges only when it has been optimized to the industry, the business processes, and the technology infrastructure of the company it serves.

To accomplish this, IBM works with a variety of partners who bring years of domain expertise and specialize in deploying applications in specific industry segments.

Our experience in working with industry knowledgeable partners in implementing enterprise solutions for a wide variety of industry leaders to solve a broad range of business challenges has resulted in a flexible, scalable, and highly customizable framework, IBM FileNet P8, which can support and streamline a diverse set of business activities across the enterprise.

Structured vs. Unstructured Processes

Unlike the fixed, repetitive, processes that Enterprise Content Management (ECM) systems manage in banking, finance, and insurance, the demands of asset and plant lifecycle management require greater operational flexibility. Processes, while structured, are more ad hoc in nature and vary greatly depending on the task or problem at hand. They are generally comprised of a series of events as well as controls, such as approvals, which involve multiple parties and individuals all working in concert. In essence, processes need to be orchestrated rather than driven through a series of rigid routines and functions.

When changes to the plant are being planned, typically only some parts of the plant are affected. Only those specialists who have knowledge of the specific affected subsystems need to be involved in planning and approval. With the IBM Asset and Plant Lifecycle solution, processes can be created on an as needed basis to solve the unique problems faced in every stage of the plant lifecycle.

The Plant Lifecycle

The major components of the plant lifecycle include:

Specification of the plant objectives

- Design of the plant
- Construction of the plant
- Hand-over and commissioning of the plant
- Operations of the plant
- Maintenance of the plant
- Major plant refurbishments and reconfigurations
- Decommissioning of the plant

The IBM Asset and Plant Lifecycle solution provides benefits at each stage of the plant lifecycle.

Specification of the Plant Objectives

The plant begins with a vision and specification of what the mission of the plant will be.

This is usually a strategic corporate decision that requires collaboration among high-level executives from sales and marketing, business development, and strategic planning. In this phase of the plant lifecycle, fundamental decisions are made about the size, costs, and capabilities of the new plant. Core plant requirements are established and documented. These requirements must be captured and will be used throughout the entire life of the plant.

Design of the Plant

Most businesses today focus on their core competencies of managing and operating their assets, which could range from large process plants to power distribution networks. Much of the engineering design is outsourced to one or more engineering contractors or subcontractors.

The IBM Asset and Plant Lifecycle Management solution helps manage the engineering and design process throughout its multiple phases. The formal communication of information between the business or owner/operator and the engineering contractor is critical. To manage the design as it evolves, and to coordinate the work of multiple design groups requires timely and precise communications of many types of documentation (especially marked up drawings) between all of the parties involved.

In a paper-based system, keeping all of the design groups informed as to the status of the evolving design, and most importantly, the design changes, is very time consuming and labor intensive. If responsibility for documentation resides separately with each of the engineering and design contractors, the body overseeing the entire project does not have visibility into how the design is progressing and evolving nor do they have control over important metadata about each document. Since there are often several groups working on the same, or a related portion of the plant, it is critical that all drawings and documentation be available to each of them. This is very important as the design and supporting documentation often need rapid updates to support others in the design group who can't proceed until key issues are resolved. Also, the amount of time and resources required to find, package, and send a transmittal for review then to re-file and distribute the resultant modification cannot be underestimated. This function is often overlooked and the lack of coordination between design groups can lead to serious delays and unanticipated problems in both construction as well as commissioning.

Formal processes need to be put in place covering the exchange of information (reports, specifications, drawings, contracts, etc.) between all parties. There needs to be a high degree of visibility of the design status at key stages in the design process. This means that information must be passed from the contractor to the owner/operator at regular, planned stages. This is especially critical if the owner/operator is in a regulated industry where every step of the design process must be documented.

Making sure the documents in use are the latest versions is very important to the satisfactory and timely outcome of the project. The IBM Asset and Plant Lifecycle Management system provides a comprehensive repository for all content and metadata and allows:

- Monitoring of every phase of the design process as it evolves
- Synchronous and asynchronous collaboration with team members including outside contractors during design and construction
- Project triggers for design critical content and coordination as well as collaboration of multiple contributors including subcontractors
- Total version control over the use and distribution of all approved and released documents

Construction of the Plant

The construction phase is a very fluid and dynamic time, requiring collaboration and a constant flow of information. As construction begins, many ideas, documents, and drawings are generated on what needs to be built, and the best way to build it. Although much of the information is generated during the design phase, documentation of the as-built status needs to be developed and maintained as construction progresses.

Construction often commences before all of the design drawings and documentation are complete. Unanswered questions and problems that arise must be dealt with on an ongoing basis. Consequently, the set of documents being used is not static, but instead, will constantly evolve to meet the demands of the project. Managing all of the drawings and documentation throughout the change process poses a major challenge in any construction project. The IBM Asset and Plant Lifecycle Management solution is designed specifically to bring structure and overall visibility to this otherwise chaotic process.

However, before any drawing or document can be released for construction, it must be checked to make sure that it reflects the latest approved changes. It is also important that both documents and drawings that have pending changes are carefully checked to determine if the pending changes will affect the overall design or construction.

Throughout the design and construction process, it is inevitable that problems in the original design will arise as the paper design is converted into the physical structure. This leads to drawings and documents being marked up at the construction site so that they can be sent back to the people responsible for the original design. Construction on this portion of the plant is usually halted until the design problem is resolved and new drawings are generated. This process is usually an iterative one, taking valuable time that can delay the construction process. The IBM Asset and Plant Lifecycle Management solution is designed to manage this process to speed turn-around and ensure the integrity of all changes being made.

During this phase, all changes to the original design are sent to both contractors and sub-contractors to ensure that only the latest drawings and documentation are used. When the contractor receives the updated documentation, an acknowledgement is automatically generated and returned. This has customarily been a very paper-intensive process where any delays can translate directly into delays in completion of the construction process. With the IBM Asset and Lifecycle Management system, the exchange of all information can be handled with speed and accuracy.

During the construction phase, the IBM Asset and Plant Lifecycle Management solution helps:

- Manage the flow of information critical to maintaining timelines
- Manage the multiple versions of drawings and mark-ups shuttled back and forth between designers and contractors at the construction site
- Minimize turn around time that can delay plant construction
- All authorized parties view all requested, approved, and pending changes
- Speed resolution of conflicts between as-built and as-designed documentation for future use

Hand-over and Commissioning of the Plant

The IBM Asset and Lifecycle Management system helps prepare and organize all of the documents required for plant hand-over and commissioning. The system also manages all of the internal and external processes that must be executed before the plant can be brought on line.

Depending on the regulatory bodies involved, there are typically a number of licenses and permits that must be obtained before a plant can become operational. This usually requires the assembly of numerous documents and drawings that were created and modified throughout the design and construction phases.

In order to satisfy the safety authorities, it is necessary to create safety procedures, hazards analysis, operating procedures, training procedures, work authorization systems, etc. In the United States, this falls under the Occupational Safety and Health Administration (OSHA) and is outlined in OSHA regulation 1910.119, which designates Process Safety Management (PSM). To meet these compliance requirements, it is important that all information in use reflect the most current and approved versions of documents.

For plants that want to become ISO 9000 certified, there is a massive amount of documentation that is required. In addition, document-tracking systems with complete audit capabilities must be put in place. The IBM Asset and Plant Lifecycle Management solution can accommodate all of these requirements and has been used in many installations to manage ISO 9000 certification.

Some of the key safety and certification issues handled by the IBM Asset and Plant Lifecycle Management solution are as follows:

- Prior to commissioning, all plant operating procedures need to be created and stored in an easily accessible content repository.
- Operating permits and licenses need to be obtained and kept in order.
- Health, Safety, and Environmental requirements (OSHA 1910) must be met.
- Quality (ISO 9000) procedures need to be in place and documented.

Operation of the Plant

Efficient plant operations rely on the availability and accuracy of information from a variety of sources. The IBM Asset and Plant Lifecycle Management solution provides information, where and when it's needed, to ensure successful operations.

Once the plant is put into operation, there is a continuing need to reference, change, and create new drawings and documents. Whether it is compliance with quality-related programs, or safety, health and environmental regulations, compliance management is an ongoing activity. The underlying documents associated with compliance are constantly in flux, continually undergoing changes in order to reflect changes in the plant, procedures, and installed equipment. The process for reviewing and approving these documents must be controlled before a drawing or document can be updated and put into use.

The IBM Asset and Plant Lifecycle Management solution, including the workflow components, is key to implementing and enforcing the MOC process. Typically, drawings and documents require several reviews and sign-offs by a variety of personnel. It is important to monitor and document this process for each drawing and every document that is added or modified for use in the plant. In a paper-based system, the status of this review and approval process can be very difficult to monitor and manage. However, with the IBM Asset and Plant Lifecycle Management solution's automated processes, it is easy to track the status of any document at any time, and to document the fact that appropriate reviews and approvals are enforced.

Current engineering notices can also be maintained and managed, ensuring that critical jobs performed in the plant or in the field are based on easily accessible, up-to-date information. The IBM Asset and Plant Lifecycle Management solution can help control and manage:

- The process of creating, changing, and referencing plant documentation
- Vendor-supplied documents including subsequent updates
- Review, approval and tracking of all documentation reflecting plant changes
- Assembly of maintenance work packages with all relevant documents
- Work status of maintenance activities

Maintenance of the Plant

Plant maintenance is an important component of successful plant operations. IBM Asset and Plant Lifecycle Management solutions are designed to streamline the maintenance process and provide all of the tools necessary for successful planning, management, and tracking of maintenance to reduce down time. The result is greater plant availability and hence, additional revenue to the company.

Routine maintenance requires reference to a number of documents including plant configuration documents, current drawings, vendor manuals, maintenance procedures, Material Safety Data Sheets (MSDS), and previous work orders. Before any work is done, it is necessary to review all approved and pending changes to the plant. The IBM Asset and Plant Lifecycle Management solution can work in concert with the Maintenance Management System (MMS) to provide all the required documents for each work package. This automated work package production can save large amounts of manual labor and will improve the quality of the work packages, saving both time and effort in the process, while ensuring only the most current documents are used.

Unscheduled maintenance activities can be even more difficult to manage without the IBM Asset and Plant Lifecycle Management solution. These activities are usually caused by some unanticipated problem in the plant. In this case, the ability to turn the Asset and Plant Lifecycle Management system into a research tool can be critical to finding problems, identifying what action needs to be taken, and getting the current documentation together to get the plant back on line as quickly as possible. The same system can then be used to capture all of the changes and markups to reflect what was done in the process.

It is critical that the people doing the maintenance work start with accurate drawings and documentation of the current plant configuration. Plant management must be sure contractors are acting together and documenting their work so the modifications will go smoothly. Any problems with this process result in additional plant down time, resulting in lost revenue.

Before the plant is brought back on line after any changes, it is often necessary to modify procedures, update vendor information, and review any impacts on both the safety and quality plans for the plant. An ECM system can greatly improve the quality of the process, reduce the time, and increase the accuracy for these modifications.

The IBM Asset and Plant Lifecycle Management solution can be used to improve both the scheduled and unscheduled maintenance activities while allowing for:

- Integration with Maintenance Management Systems (MMS)
- Planners to schedule work to be performed
- Preparation of "Work Packages" containing accurate, relevant and up-to-date documents including, appropriate procedures, drawings, vendor manuals, and any related information

As work is completed, the latest as-built/installed changes are incorporated, approved, and recorded for future reference. The result of these features is reduced plant outage time.

Major Refurbishment and Reconfiguration of the Plant

In order to remain competitive, today's plants are in a constant state of flux. New and improved products and processes replace outdated ones and require updated documentation to accurately reflect the changes to the physical plant.

Expansion and reconfiguration planning may take place months or even years before the work is initiated. IBM ECM can provide the dynamic links required to manage the change process and ensure that the most current documentation is used. All authorized contractors and subcontractors can view all requested, approved, and pending changes along with the supporting documentation. This allows for resolution of as-built vs. as-designed conflicts. Changes to operating procedures and as-built drawings are all incorporated into the operating documentation before the plant is brought back on line.

The activities performed during major plant expansions and reconfigurations reflect the same activities associated with design, construction, and commissioning.

Decommissioning of the Plant

As a plant reaches the end of its useful life, it requires a conscientious effort to effectively plan and document the decommissioning process to minimize liability and adhere to health, safety, and environmental requirements.

In this era of environmental awareness, it is necessary to carefully assess what must be done to shut a plant down and to put the site into a condition that will allow it to be put to other uses. This process requires plans to be put in place. The basis of these plans is contained in the documents that have been generated in all previous phases of the plant's lifecycle.

The benefits of the IBM Asset and Plant Lifecycle Management solution during decommissioning and plant reconstitution are as follows:

- IBM ECM can help you plan, document, and manage the decommissioning and reconstitution of the plant site.
- It handles the flow and content of all documentation required in the complex permit process.
- IBM ECM can help manage all contractors and subcontractors throughout the process, capturing information about all activities associated with the decommissioning process.
- All authorized personnel can view all the plant documentation to aid in safe demolition.
- Concise documentation and accurate content, reduce liability and provide an audit trail of all actions.

IBM ECM Solutions for Manufacturing Business Issues

In today's complex business environment, there are a number of forces, both internal and external, that can have a significant affect on a plant's operations throughout its lifecycle. While these may vary throughout a plant's life, and from industry-to-industry, they seem to center around a few key, reoccurring issues.

Regulatory Compliance

Compliance – a word that has taken on new meaning in today's business world – is a concept that touches all areas of an organization. Most manufacturing operations function within heavily regulated environments requiring compliance with a plethora of regulations. Sarbanes-Oxley, HIPAA, Basel Accord II, SEC Rule 17, EPA, FDA, Freedom of Information Act, Government Paper Elimination Act . . . the number of regulations an organization must comply with is ever growing and can be staggering.

Records management alone is not enough to ensure compliance. You must be able to identify and manage all of your information. Unfortunately, policies and procedures do not guarantee compliance – business processes must be automated and integrated into the fabric of your organization to ensure that your compliance policies and retention schedules are enforced.

Today's compliance standards require formal processes for the retention and disposition of information including records, drawings, manuals, policies, web content, e-mails, etc.; many of which have retention policies in excess of 50 years. Each step in any document's life needs to be recorded along with the document itself. If the business is found to be in breach of government or industry regulations, it could have complete batches of its product destroyed or worse yet, be shut-down, fined, or have legal action taken against its corporate officers. Obviously, any of these events could have a serious impact on the business, potentially forcing it into bankruptcy and/or imprisonment of its corporate officers.

To ensure compliance, the IBM Asset and Plant Lifecycle Management solution automatically provides the processes required to manage and control all relevant content throughout its life. Audit trails are recorded for all major steps in a document's life including electronic signoff, signature manifestation, storage, and disposal from all systems when appropriate.

In short, the IBM Asset and Plant Lifecycle Management solution helps connect all of the content and business processes that must come together to ensure compliance.

Controlling Operational Costs

Today's businesses are constantly under pressure to reduce operational costs. This could be the result of a merger or acquisition or operating in a depressed or highly competitive market where there is little opportunity for product differentiation. The challenge is to understand each of the dynamics affecting costs and maximize those elements to improve efficiency.

The problem is that many large organizations fail to realize the “economy of scale” benefits they could achieve because they do not have the infrastructure that allows processes to span their entire organization. This results in “islands of information” and processes that are fundamentally the same but implemented in different ways by each part of the organization.

With the IBM Asset and Plant Lifecycle Management solution, companies have an enterprise scaleable solution that connects all aspects of a company’s business allowing content and process to be shared across the enterprise. This provides a complete overview of all operations, regardless of location, allowing them to control costs while fully utilizing their resources in an efficient manner.

Extending Drawing Management to the Enterprise

Most businesses have already made a commitment to employ technology to manage their information. However, most of these do not incorporate the company’s core engineering and design processes.

For instance, a pharmaceutical company may utilize document management extensively in the clinical trial and drug submission process, but fails to link the manufacturing and labeling processes required by the FDA to manufacture and package the drug. Although an ECM platform has been chosen at a strategic level, the plant engineering and manufacturing side of the business still relies on small-scale departmental solutions either developed in-house or supplied by small specialist vendors.

This split-technology solution typically results in conflicts between corporate IT and the local IT specialists within the engineering department. Corporate IT wants to standardize on a given ECM platform, but does not understand the complexities of managing engineering content. The local department has been doing their own thing for the past 20 years and doesn’t want IT interfering with their part of the business.

With IBM Asset and Plant Lifecycle Management, both sets of requirements can be met because IBM and our partners understand the intricacies of your industry’s procedures and operations. The IBM solution addresses the detailed business needs of the engineers in a language they are familiar with, while maintaining the company’s business process in a complimentary environment.

As more businesses come under the scrutiny of regulatory authorities, there is a greater necessity to extend the audit trails of key business documents back to their point of creation. For plant documents, this means into the engineering and manufacturing departments where the initial design work was first executed.

Managing Legacy Engineering Content

Most plants have a large collection of paper-based legacy drawings that describe the current as-built plant configuration. They tend to be in regulated industries and have a requirement to maintain records for a long period of time – in some cases, up to 100 years. However, it is not feasible or cost-effective to justify the wholesale digitization / vectorization of paper documents and drawings to create a complete digital archive of their plant documents.

So, how does the business deliver a complete enterprise view of all these documents and drawings to ensure the right information is available to the right people, at the right time and in the right format?

The answer is simple. The IBM Asset and Plant Lifecycle solution utilizes “just in time” strategies to ensure the electronic availability of key engineering drawings and documents. So if a paper-based, as-built drawing needs to be modified, it is scanned into the system as a TIFF file and a hybrid drawing is created that allows specific raster data to be deleted and replaced by vector data to reflect the design modifications. The original drawing is left intact, and the location of all documents, whether electronic or paper-based are managed by the system.

As the plant evolves, new documents and drawings can be created to supersede the legacy documents. These new documents describing the as-built status and operation of the plant can take many forms and formats, both built electronic and hardcopy, including paper and aperture cards.

Facilitating Mergers & Acquisitions

As industries undergo consolidation and companies need to acquire or be acquired to survive in today’s highly competitive market, they need to be prepared to provide the content and documentation required to run their combined operations. This is most evident in the US energy market, where deregulation has resulted in a large number of mergers and acquisitions, as the top players compete for a larger share of the market.

The leading acquirers tend to be leaders in industry best practices and, therefore, want to impose their processes on the acquisitions and integrate cross functional processes into departments including, not only Engineering Services, but HR, Finance, Procurement, Travel, etc.

However, individual businesses have different cultures, as well as different processes, and are generally at different stages in their use of business automation technology. Because of this, they have different IT strategies and infrastructure. In addition, the acquiring company is generally under severe pressure to integrate the acquisition as quickly as possible in order to realize the cost savings and efficiency gains that come from consolidation. This is where the IBM Asset and Plant Lifecycle Management solution can have a tremendous impact on the transition. IBM’s robust Enterprise Content Management (ECM) solutions can integrate disparate systems and capture all content necessary for continued operations.

With IBM, solutions can be deployed quickly and can be easily re-configured as the shape of the business changes over time. One of the biggest concerns of post acquisition/merger is capturing the knowledge that drives the business. As organizations are restructured and staff roles and locations change, the IBM system can play a key role in managing the information critical to the business and its continued success.

Maximizing Your ECM Investment

A large number of utilities, oil and gas companies, chemical producers, pharmaceutical companies, and other manufacturers have made significant investments in ECM platform software over the past several years. However, most have yet to maximize the reach of that software throughout their operations. While the ECM infrastructure may be in place, they have had difficulty in developing/customizing the solution to deliver specific applications unique to their businesses. Worse yet, they have invested heavily to customize their solution based on previous versions of their ECM software and now cannot justify the migration costs of upgrading their customized applications—therefore, they are not benefiting from the new features available in the latest releases.

As the ECM market matures, companies must move toward adopting “out of the box” applications on top of their corporate platforms rather than developing custom solutions. IBM allows companies to do just that with the IBM Asset and Plant Lifecycle Management solution. It is designed to grow and change as your business changes without the costly customization required by other solutions, thereby delivering a faster Return On Investment (ROI) and a lower Total Cost of Ownership (TCO).

Both Tangible and Intangible Benefits

Asset and Plant Lifecycle management can be viewed as both a tactical solution, namely one impacting the daily work of facility managers, as well as a strategic one, impacting a company’s market competitiveness. Companies embarking on applying the IBM Asset and Plant Lifecycle Management solution can look at it both ways.

From the tactical or “hard-dollar” point of view of enterprise efficiency, a Duke Energy study has shown the following metrics for highly compensated and valuable technical workers:

Job Function	% Time Spent Gathering Information	Impact of IBM ECM solutions
Electrical Design	60	50-90% reduction
Mechanical Maintenance	30	50-90% reduction
System Engineering	30	50-90% reduction
Work Control	30	50-90% reduction
Civil Design	45	50-90% reduction
Training	25	50-90% reduction
Mechanical Design	25	50-90% reduction
Instrumentation & Electrical Maintenance	30	50-90% reduction
Operations	20	50-90% reduction

The above chart shows that valuable, highly trained technical workers engaged in facility engineering and maintenance are spending from 20-60% of their time searching for the information they need to perform their work rather than actually performing the tasks for which they are trained. An ECM system that can effectively reduce this time spent gathering information will have very concrete benefits. Duke Energy has achieved a 50% or greater reduction in the time spent searching for information.

At a strategic level, a major chemical company measures the value of IBM solutions related to lifecycle asset management as follows:

Area Impacted by LAM Solutions	Value to Corporation as Multiple of IT Investment
Order Fulfillment effectiveness	100x
Time To Market (new facility or processes)	100x
Lowest Cost Facility	30x
Engineering Productivity	5x

Better facility information allows a company to quickly re-engineer, re-construct, and re-configure a plant to enable start-up production for a new chemical that can be sold in the marketplace. The value to this company, in their experience, is repaid 100 times the IT cost of putting in place the systems that enable that increased speed of plant modification.

In addition to the strategic and tactical benefits shown above, the IBM Asset and Plant Lifecycle Management solution can deliver the following tangible benefits:

- Business Process Management rules can be created, enforced, and an audit trail verifies compliance
- Reduced plant down time for both scheduled and unscheduled maintenance
- Reduced costs and staff required for regulatory compliance, records management, and quality management
- Integration with ERP, maintenance, and other systems
- Compliance with legal records retention requirements
- Complete audit trail of all actions

Intangible benefits include:

- Improved communications with and between subcontractors
- Improved document change and review processes
- Enforcement of business process rules in the MOC processes
- Faster document availability and distribution
- Empowerment of workers allowing them to be more efficient, reducing time spent finding information
- Smoother transition from construction to ongoing operations

An Advantage for Engineer, Procurement, Construct (EPC's) Companies

EPC's can no longer differentiate their services strictly on their design engineering capabilities. Today, their competitive advantage comes from their ability to deliver projects on time and on budget. The IBM Asset and Plant Lifecycle management solution can be just as relevant for them as it is for manufacturers and large plant operators. It is a critical differentiator in the market that gives them a leg up on their competition. With IBM's BPM capabilities, they can automate and improve their existing processes and react to changes with ease and accuracy. It provides the same benefits for their businesses as it does for their customers.

Leveraging Content, Processes, and Connectivity

The IBM Asset and Plant Lifecycle Management solution leverages the unification of business content, processes, and connectivity to speed critical business decision-making, which is at the heart of the enterprise.

Along with content and process, connectivity is key – as many organizations have stove-piped applications, creating obstacles for data and content exchange. By harnessing the power of content, process, and connectivity, the IBM Asset and Plant Lifecycle Management solution is designed to build relationships between disparate information to help aid in the decision making process.

The basic premise of IBM's solution is that content and processes must work together to facilitate and accelerate information exchange, and respond to business or transaction events.



Making Better Decisions Faster

Today, companies need every advantage to differentiate themselves, to maximize their competitive edge, and to build shareholder value. Competition is intense, and in the race for market share, companies must think and act globally. Astute business people who learned the lessons of the 1980s and 1990s know that a lean and mean workforce is only part of the solution, and that technology alone is not necessarily the answer.

The IBM Asset and Plant Lifecycle Management solution is designed to provide companies with a strong platform that increases process performance, reduces cycle times, and improves productivity by automating, streamlining, and optimizing complex processes, and by managing the flow of work throughout your enterprise. Its standards-based architecture makes it ideal for applications in a wide range of industries.

The IBM Asset and Plant Lifecycle Management solution can be deployed quickly and scales easily to the needs of your business, creating a unified infrastructure that connects both users and applications. Its event-driven architecture activates content to efficiently process millions of transactions, and support thousands of users. Real time and historical tracking of these processes, combined with process analysis and simulation capabilities allows for maximum utilization of your resources. Its process optimization capabilities allow you to effectively manage change through enhanced operational visibility and improved agility. In short, the IBM Asset and Plant Lifecycle Management solution gives you the ability to remain competitive and make better business decisions faster.

About IBM ECM

As the clear market leader in Enterprise Content Management (ECM), IBM's ECM solutions help organizations make better decisions, faster by managing content, optimizing business processes and enabling compliance through an integrated information infrastructure. IBM's ECM portfolio delivers a broad set of capabilities and solutions that integrate with existing information systems to help organizations drive greater value from their content to solve today's top business challenges. The world's leading organizations rely on IBM enterprise content management to manage their mission-critical business content and processes.

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IBM Corporation
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Printed in the USA

06-07

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