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OpenText™ Extended ECM for Engineering

Efficiently control engineering information, work processes and risk across the lifecycle of projects and operations to accelerate revenue

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Summary

OpenText™ Extended ECM for Engineering helps document control managers, engineers, engineering leaders, external collaborators and subsequent operations personnel to efficiently control engineering information, work processes and risk across the lifecycle of projects and operations to help accelerate revenue.

Highlights

- Persona-driven dashboards and streamlined work processes for efficient collaboration and risk control
- Integrating multiple sources of engineering information, such as Dassault® SOLIDWORKS®, Bentley® MicroStation®, AutoDesk® AutoCAD® and Revit® 3D.
- Deep integrations into leading asset management applications, such as SAP® Enterprise Asset Management, through the OpenText™ Extended ECM platform
- Geospatial content navigation with improved ESRI ArcGIS integration
- Exchange and collaboration on large volumes of content with internal and external parties, providing full tracking and unattended, secure, high-speed transmission

Benefits

Introduction

Energy, engineering and construction companies experience challenges in managing and collaborating on huge amounts of engineering information in major capital projects and asset operations. This can delay time to revenue and increase cost and risk of contractual, Environmental Health and Safety (EHS) and legal damages.

Extended ECM for Engineering is a business solution on the OpenText Extended ECM platform that helps efficiently control risk to engineering project scope, schedule and costs. It gives owner-operators and engineering companies faster returns on investment by speeding time to project completion/production and enabling efficient asset operations. The solution provides a single, authoritative repository for storing and controlling engineering documents and work processes.

Extended ECM for Engineering helps document control managers, engineers, engineering leaders, external collaborators, and subsequent operations personnel to efficiently control engineering information, work processes and risk across the lifecycle of projects and operations to help accelerate revenue.

Dashboards to complete engineering jobs, control risk and ease user experience

Providing an easy, intuitive and tailored user experience for different engineering stakeholders is key in driving user adoption and work efficiency. Extended ECM for Engineering builds on the SmartUI technology and Business Workspace concept of the Extended ECM platform to create persona-specific user interfaces (e.g. for document controllers, engineers, project leaders, etc.) that provide stakeholders with immediate access to tasks, information and content that is relevant for them in order to make it easier to get their work done.
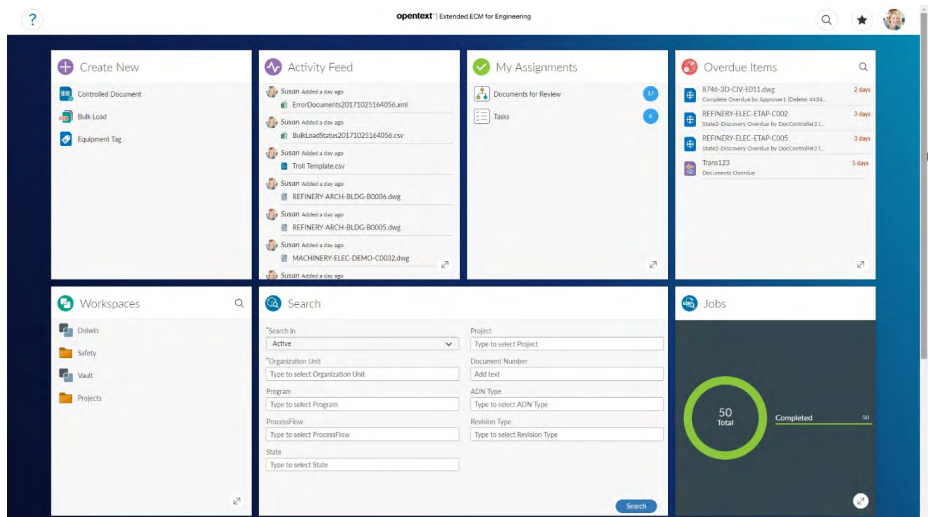
The dashboard puts the completion of engineering jobs first. To this end, xECM for Engineering provides widgets that simplify the initiation of new engineering jobs and content (Create New), give an overview of pending jobs (My Assignments) and tasks overdue for the user's team (Overdue Items).

The next set of widgets expedite access to engineering information in different ways: A specialized search for engineering content provides powerful access to information specific to the needs of engineering use cases. Favorites and Recently Accessed widgets give users easy access to engineering content they have bookmarked or recently worked on.

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- Improves efficiency and reduces costs through accelerated exchange and collaboration, both within Capital Projects and through the handover to operations (Asset Management)
- Improves external and internal collaboration to reduce time to milestones
- Increases production uptime by speeding task and project completion
- Provides visibility, insight and control to ensure project governance
- Reduces cost and accelerates time to completion while reducing execution risk

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The SmartUI dashboards can be configured and tailored for different roles and groups and to customer specifications. Additional widgets from other OpenText products can be added or removed. Widgets can be arranged and structured according to roles and responsibilities of user groups. For example, a dedicated dashboard for document control managers will contain only the widgets pertaining to their specific duties (like creating a new transmittal or bulk loading engineering content received from an EPC) with quick access to their required tasks.

## Engineering Workspaces for projects, assets and beyond

The solution leverages the Extended ECM platform's OpenText™ Connected Workspaces to aggregate engineering project, asset and other information that the user frequently uses. For example, Program workspaces can be used to capture people, content, data and tasks related to a mega-project or plant. Related Project workspaces can capture and reflect specific information pertaining to subordinate projects within that program. As the user switches between workspaces, they are presented with only the relevant content in the context they require–such as seeing finalized engineering documents, work tasks and team members across the whole program or only within specific projects.
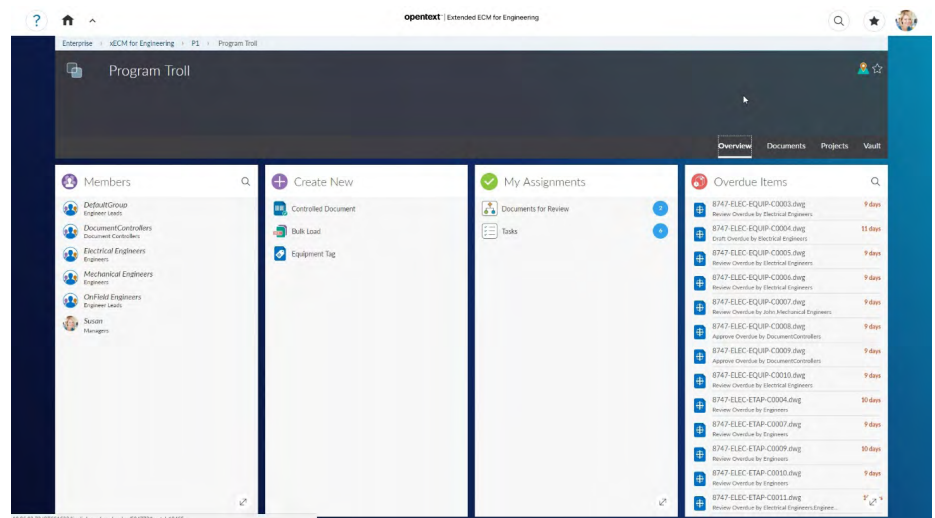
These Workspaces can integrate information coming from other engineering and asset systems via the Extended ECM platform. By using the ability to interrelate Business Workspaces in Extended ECM, powerful business-centric consolidated views of information ranging from project to operations and technical to commercial (e.g. including procurement, billing or contracting content) are possible. When Workspaces are leveraged effectively, they provide a more intuitive, powerful and business-oriented access to content than a conventional search.

## Geospatial navigation of engineering and asset information

Accessing engineering and asset information the way it exists or will exist in the real world is an important factor for business stakeholders. People who construct, operate and maintain these assets usually want to navigate their engineering and asset information based on the asset's location in the real world. The integration with ESRI ArcGIS is a good example of how the Extended ECM platform and Connected Workspaces can deliver the above value. Using this integration, customers can associate geospatial information at the Workspace level (e.g. for a project, program or asset) and then integrate relevant people, content, data and tasks to those workspaces. This enables engineering and asset information to be geospatially and visually organized instead of only presented through a file and folder hierarchy. This integration also enables visual search against business characteristics on the map, such as project information, collaborating companies or SAP® Plant Maintenance technical objects like plants, functional locations or equipment types.
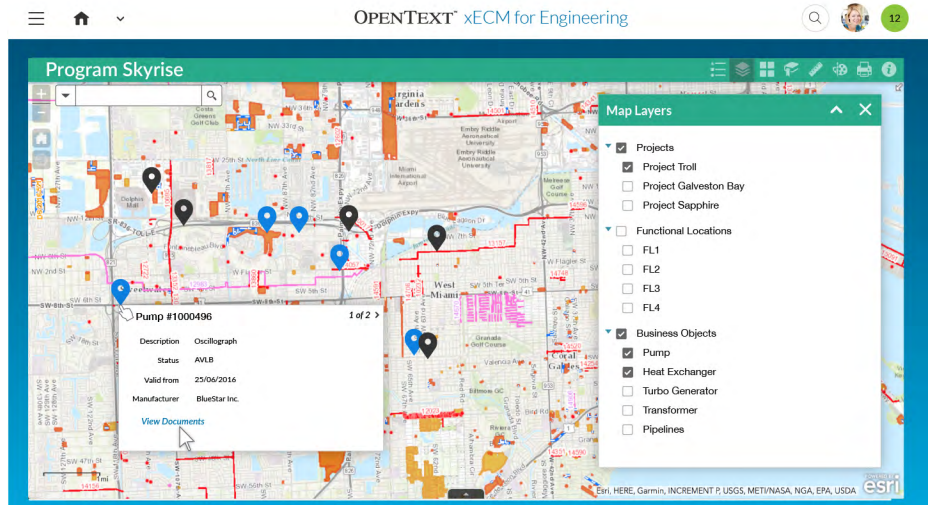
The ESRI ArcGIS integration goes beyond merely integrating the geo-coordinates in the metadata of documents. A map pins pop-up combines information coming out of the asset management system, such as SAP Plant Maintenance (e.g. information about functional locations, equipment, etc.), and content living in the OpenText xECM world. The power of Extended ECM consolidates multiple sources of information so the user can simply focus on the job they need to do.

Reporting and insight

The solution's dashboards also provide insight and control over engineering execution risk. The Background Processes widget aggregates large-scale jobs in progress or recently completed so users can complete other tasks while the system performs extensive and time-consuming jobs like bulk loads or inbound transmittals. If problems are found during a job, the user can get specific diagnostic information and tools for correction automation, such as a revised load sheet to send back to external collaborators on what needs to be fixed. Leveraging the power of OpenText™ Content Intelligence, Extended ECM for Engineering enables the quick and easy creation of tailored reports, dashboards and views on the underlying project and operations content and data. Customers can leverage out-of-the-box reports and configure their own using the solution.
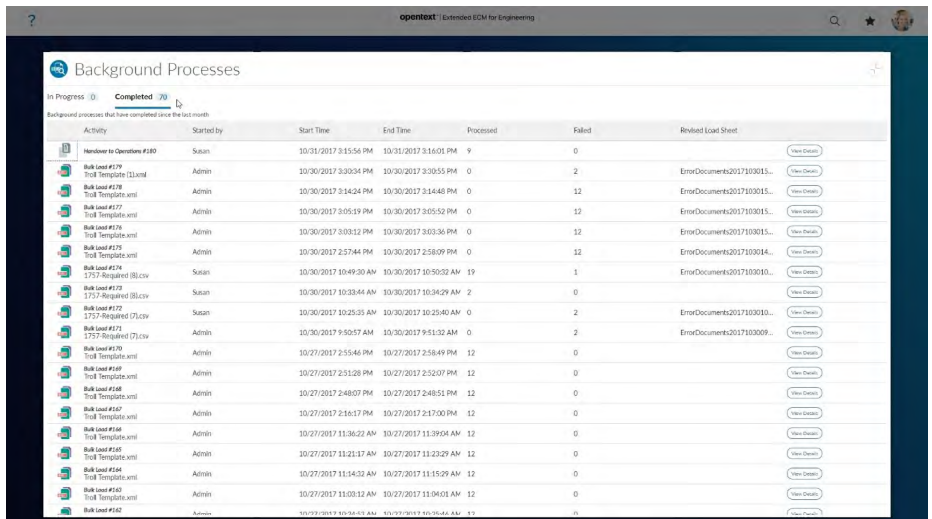
Controlling engineering work processes and information

New or changed engineering information must go through quality control processes to ensure that jobs were done correctly, that the schedule or cost are controlled and harm to the environment, health and safety is eliminated.

ProcessFlows improve data approval consistency by providing review and approval standards prior to acceptance. The roles and groups that have been defined in the project setup will be used in the ProcessFlows to automatically distribute content based on document type, discipline, etc. to the right parties for review. The permissions that have been associated with these roles and groups assure data compliance during review by controlling document access through all stages of the update and review process.
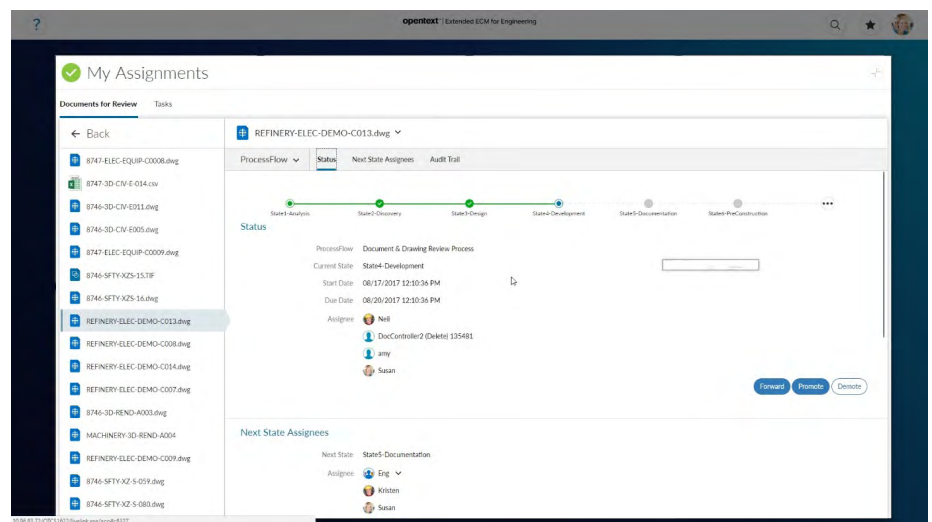
Furthermore, ProcessFlows improves the overall efficiency of approval by providing email notifications to inform the relevant stakeholders of pending tasks and review steps as the engineering content traverses the process.

By setting up distribution matrices, the engineering project leads can configure automatic routing rules that can vary by project, region, etc. and eliminate manual effort to send the right documents to the right people at the right time for quality control.

Managing revisions of engineering content

By providing a controlled Master Record environment, users of drawings, SOPs, manuals and other content are ensured access to the latest approved revision available.

Document revision and document state are used in the ProcessFlows to clearly define the current lifecycle stage of every single piece of engineering content and define the future progress appropriately. In turn, the status of documents drives the status of projects in engineering control processes. Customers often measure overall percentage completion or collaborator performance based on how these engineering document statuses change.

Content creation can be enabled for any user or can require approval from a group, such as document control, before content is added to the controlled records area. As document numbers are assigned, seed files can be uploaded based on document type. For example, if a number is created for a CAD drawing, an empty drawing with pre-defined size and title block can be used as the seed file assuring the new drawing uses the company's standard. Each seed file can then be automatically classified with the appropriate metadata.

Extended ECM for Engineering includes a number of out-of-the-box revision types such as Pre-Construction, Construction, As-Built, Void and Obsolete. Additional revision types can be added to the system, which is highly configurable to the unique needs of different organizations.

Revision requests can also be enabled for any user or managed through an approval process. When the revision is created, it is automatically assigned to the proper project. The status of each revision is tracked. Users can see which revisions are works in progress, the current Master Record and historical Master documents.

All controlled records have a revision history viewable from the document properties. This provides a real-time summary of all revisions (past and present) and the state of documents currently checked out for revision. Users can also see which other users are revising documents. This audit history is often used by customers to forensically determine who did what and when, such as defending in litigation claims preparation. A single source of truth with clear and authoritative history of changes is a necessary capability of an effective engineering control system.

Concurrent engineering

Extended ECM for Engineering enables multiple revisions to be concurrently requested and reviewed in the concurrent engineering process. The ability to update the Master Record is limited to only one revision at a time, preventing overwriting changes of these revisions.

When any activity on a document occurs, the relevant stakeholders who have an active revision of a document are automatically notified via email. These activities include another user requesting a new revision or updating the Master Record.

Engineering document markup with OpenText™ Brava!™

The optional Brava! Viewer add-on provides secure, web-based viewing and annotation capabilities for efficient review, approval and production processes without the need for native applications to move the work forward. Redlines, comments and other engineering change types from multiple reviewers can be easily compared (see screenshot below), consolidated and then passed on to the internal or external stakeholders for rework.
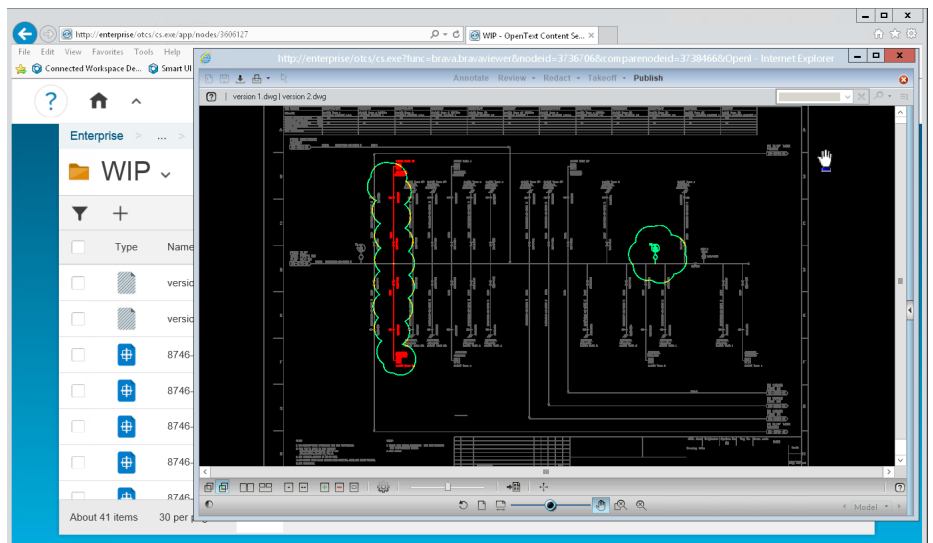
Collaboration with external stakeholders

Complex engineering activities are rarely performed in isolation by one organization or group but rather in collaboration with external parties and specialists. This necessitates easy exchange and collaboration on large volume of documents, each document often going through many revisions. Extended ECM has powerful capabilities for this round-trip exchange and collaboration through outbound transmittal and inbound transmittal/bulk load capabilities. Engineering documents of different formats can be integrated into Extended ECM, including both 2D CAD and 3D BIM. Using the Extended ECM approach, this information can be integrated to other engineering, asset and enterprise systems and functional areas using the previously described Connected Workspaces approach. This enables both classic "document-centric" consolidation of engineering and asset information, as well as more modern "data-centric" integrations of information between systems.

A transmittal is a formal exchange of engineering drawings, specifications, calculations and other information between engineering contractors, owner-operators, suppliers and other stakeholders. This is done for change, review, comment or approval purposes. It is also an official business record, forming the basis for many contractual decisions and results, and even determining liability in some situations. Without a way to control and audit the process of transmittal exchanges, projects can stall and risks can escalate as confusion mounts over who has been sent what version of a document, what has been approved, and how third parties have been involved in the process.

Outbound transmittals are used by project leaders or document control managers to send expected deliverables to external parties such as an EPCs, subcontractors or to an internal engineering group. Extended ECM for Engineering simplifies the creation and management of outbound transmittals for document control managers. It simplifies the collection of content to include in a transmittal, whether on the fly or through more elaborate templates and configurations, and can deliver original file formats or renditions. A comprehensive interface to enter all relevant information for the transmittal in one screen along with automatic cover sheet creation speeds up completion. By integrating the transmittal process into the controlled ProcessFlows, automatic state changes of engineering documents and deliverables can be managed when sending a transmittal or receiving content back for reassignment. The total history of transmittals and component documents is tracked so customers can see the overall audit record of how their engineering project and information evolves.

Parties sending and receiving data may be external to your organization, and transmittal packages may be too large for email distribution. The integration with OpenText™ Secure MFT (Managed File Transfer)) provides fully automated, unattended, efficient and secure delivery of large transmittals to and from partners and customers. Engineering projects often take place in remote or geographically disparate locations with project participants located around the world. Managed File Transfer helps ensure that the right information gets to the right people regardless of challenges in network conditions. This way, document control managers and project participants don't have to manage these file transfers manually and can be sure files will be delivered efficiently and securely, with the system tracking acknowledgements and confirmations.

Outbound transmittals are only half of the exchange and collaboration story. Once external parties complete their part of their work, customers need good mechanisms for processing large volumes of engineering information sent back to them. Extended ECM for Engineering includes powerful inbound transmittal/bulk loading capabilities to automate and eliminate manual effort around processing these large controlled handovers.

These capabilities can be used by leading organizations to enforce their contractual expectations and ensure the information they get back is to their specifications. Comprehensive load sheets can be automatically generated to capture critical engineering metadata from external systems. Files and their related metadata can be quality checked automatically for consistency and fit to requirements. If failures are found, automatic correction tools are generated to further simplify demands on document control and reduce the time, cost and effort required to make things right.
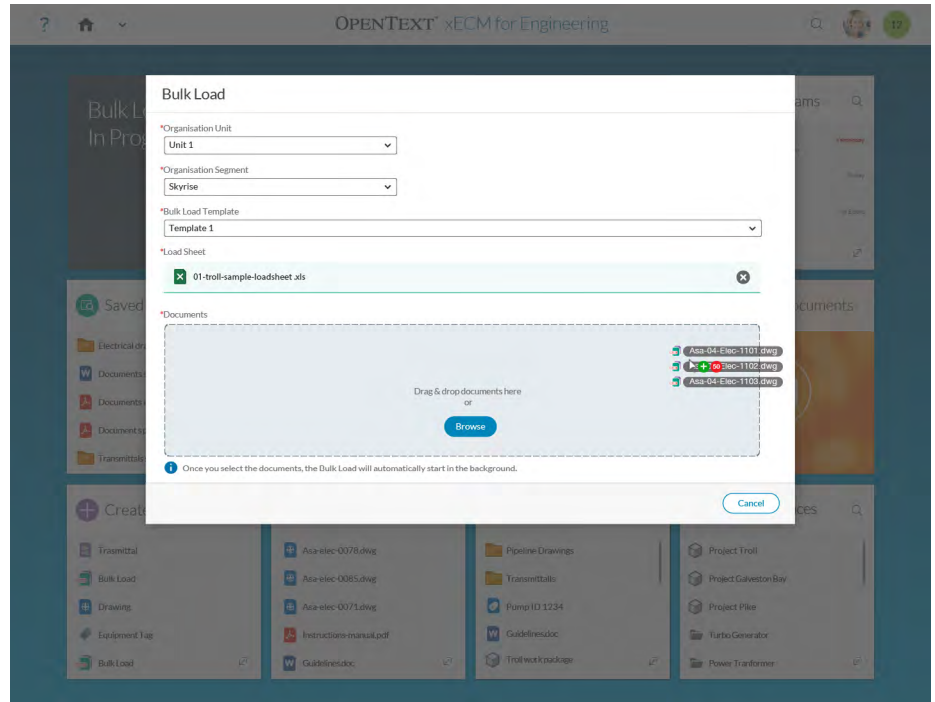

Integrations with Secure MFT enables external collaborators to use the same file acceleration, security and delivery benefits when handing content back to the lead party. When the external collaborator logs into the Secure Managed File Transfer web interface, their credentials are automatically checked against the projects they are associated with in xECM for Engineering. The external collaborator only sees upload options for projects with which they are associated. They select the files they wish to upload and Secure Managed File Transfer manages the transfer. It will accelerate the transfer, manage around connection issues and ensure security and consistency on upload. The solution can track the inbound transmittal against the original outbound transmittal to which it may be a response, enabling even more detailed audit history and progress reporting.

The incoming files are stored in a special staging area folder specific to the inbound transmittal, project and sender. Secure MFT and xECM for Engineering can notify each other of the activity and automatically initiate validation and upload processing or the receiving document controller can simply be notified that an upload has occurred and take manual steps to process it. The external collaborator's uploads are kept in this holding area until officially brought into Extended ECM for Engineering. This way you can delineate between the outward facing/exposed parts of the system in your network security model and the controlled engineering records of your enterprise repository.

The background agent works to offload large-scale inbound transmittal processing. In the background, it automatically processes the inbound transmittal or bulk load and validates the contents to reduce manual inspection effort. In case of failure, an automatic corrected load sheet is produced so the document control manager can simply send this to the external party and have the corrections made. Reporting information in the Background Processes window informs the document controller about the specific problems encountered.

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Integrating CAD formats and systems

Extended ECM for Engineering is designed to be a file format -gnostic single source of engineering truth. To this end, multiple 2D CAD and 3D BIM formats can be integrated with out of the box support, and new formats are being continuously added with each release. Current supported engineering drawing formats including AutoDesk® AutoCAD®, Bentley® MicroStation®, AutoDesk® Inventor, AutoDesk® Revit 3D and Dassault Systems® SOLIDWORKS®. Title block, xREFs, and other metadata from the drawings can be bi-directionally synchronized with the categories and attributes in the Extended ECM platform, keeping all data up-to-date and relevant. Additionally, the Extended ECM platform and CAD Manager solution can be used to integrate with different drawing formats and systems at an API level. This way, both document-centric (drawing information from static documents as containers) or data-centric integrations (live updates done at an API level) can be leveraged. Checking out drawings from controlled work processes will update the metadata of these files to reflect the latest information (e.g. in the title block of the drawing). End users can see the full revision and version history and audit trail of each controlled document, so they can have full confidence in the information at hand.
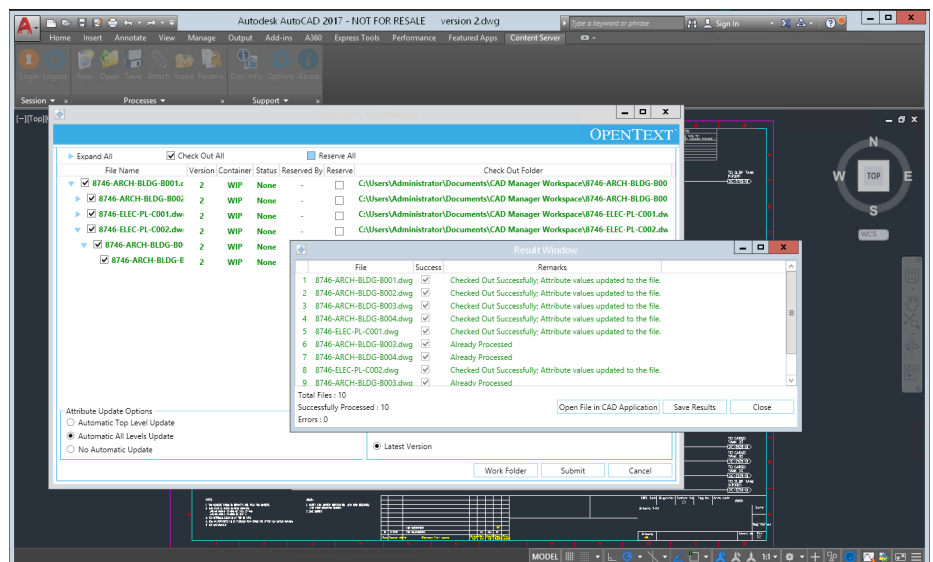
The vault as staging area for operations-ready and as-built content

Engineering drawings that have successfully passed through change and review and approval processes can be moved into the vault area of the system. This area contains all approved design documents and, ultimately, the actual as-built version of the drawings. This provides customers with a controlled repository of the right information for use by dependent areas, such as operations and maintenance. By marking the drawings operations-ready, they can be automatically handed over to operations for faster time to production.

Handover to operations

The goal of every engineering project is the handover of the finalized as-built information to operations so the resulting asset can generate revenue for the owner-operator. For an EPC, this is the final milestone in the completion of the engineering project. Typically, the handover process is quite challenging, as vast amounts of documents need to be handled, checked and managed when assigning the right documents to the right operations and maintenance records in the owner-operator's enterprise asset management environment.

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Extended ECM for Engineering makes this handover process easy, particularly for customers leveraging SAP's Plant Maintenance modules for managing their operations assets. The deep integration into SAP's Plant Maintenance via the optional Extended ECM Enabler for SAP accelerates the handover to operations. It joins structured data with unstructured content for asset management processes for all relevant objects, such as functional locations, equipment and maintenance notifications. This means that asset information is consistent with the as-built information resulting from the corresponding engineering project, enhancing the notion of a single source of truth for all project and operations engineering information. This solution architecture supports handover at project end or progressively, as soon as the engineering of individual parts of the overall asset has been finalized.

Using new handover capabilities in Extended ECM for Engineering, users can find and filter for asset management structures / technical objects such as plants, equipment or functional locations, then easily publish documents to these structures.

Should existing assets require maintenance, the change processes in the asset management solution can trigger a handback of the respective engineering information to a controlled maintenance project in Extended ECM for Engineering, where required work processes can be structured as dedicated maintenance ProcessFlows.

Engineering project startup

At the beginning of a major capital project or system setup, project leaders and document control managers need to get the project quickly set up so engineering work can begin. Consistently applying organization standards and best practices ensures excellence, while giving project personnel enough flexibility to adjust to their individual needs without unnecessary cost, time and effort. Time is money, and every delayed day could potentially result in contractual or financial penalties for the parties that cause the delays.

Extended ECM for Engineering provides project templates to quickly reuse organizational configurations while providing the flexibility to adjust to the needs of individual projects. The solution takes a role-based approach to managing the work that needs to be done and who needs to do it by. It manages project participants, groups and their respective permissions.

Extended ECM for Engineering has a powerful state-based work process control engine that enables granular controls on who can do what and when, based on document state, revision type or user groups. These process flows can be configured by business users, e.g. engineering projects leads or document controllers, without the need to involve system administrators. In order to route work and documents to the right parties or groups automatically, document distribution matrices can be configured and added to the project templates.

For an engineering document to become an approved record, it must move through a tightly controlled hierarchy of approvals and revisions that can be assigned to a project template and then be automatically applied and enforced during the execution of the project.

Another key aspect is the ability to configure project, plant, facility or region-specific automatic document numbering schemas to enforce naming and numbering rules of engineering content and reduce manual data entry problems on forms. This ensures consistency in engineering information quality across all stages of the project all the way to handover. Consistently applying correct metadata to engineering documents makes filtering for and finding these documents quick and easy.

Conclusion

Extended ECM for Engineering helps customers control engineering change and exchange, integrate sources of engineering and asset information and consequently, control risk. It enables all stakeholders of complex engineering projects to work faster and deliver their best work. It helps ensure compliance to regulatory, contractual and legal obligations from the start of the engineering project through to handover and ongoing operations. By integrating the resulting engineering information tightly with asset operations and maintenance, the solution ensures a single source of engineering truth across the enterprise from the inception of an asset to its decommissioning. This helps stakeholders get to production revenues quicker, reduce costs, adhere to timelines and ensure commercial and technical compliance, as well as controlling associated risk.

Lean more at: opentext.com/engineering

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