Abstract
Today's enterprises face a common challenge: optimizing business processes and their operational effectiveness. To meet this challenge, the EMC® Documentum® xCelerated Composition Platform provides a comprehensive foundation for building and deploying solutions that automate a wide range of enterprise processes involving people, systems, content, and data.

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Table of Contents

Executive summary ................................................................. 4
  Audience .............................................................................. 4
Introduction ........................................................................... 4
Improving business operations with process automation ............... 5
Business process lifecycle management ...................................... 6
EMC Documentum xCP ............................................................. 8
  Analyze .............................................................................. 8
    EMC Documentum Process Analyzer .................................... 9
  Compose ............................................................................ 13
    EMC Documentum Process Builder .................................... 13
    EMC Documentum Forms Builder ...................................... 15
    xCelerators ..................................................................... 17
  Execute .............................................................................. 17
    Process Engine .............................................................. 17
    Process Integration ......................................................... 21
    TaskSpace ...................................................................... 22
  Monitor .............................................................................. 23
    Business Activity Monitor ............................................... 24
Leveraging the EMC Documentum content management platform .......... 25
  Documentum content distribution and aggregation services .......... 27
  Content and Data Analytics .................................................. 27
Use case: Credit dispute resolution ............................................ 27
  Analyze stage .................................................................... 28
  Compose stage ................................................................... 28
  Execute stage ..................................................................... 29
  Monitor stage ..................................................................... 30
Conclusion ............................................................................... 30
Executive summary

The EMC Documentum xCelerated Composition Platform (xCP) delivers a complete, integrated foundation for building and deploying solutions to analyze, orchestrate, and optimize the broadest range of enterprise processes that involve people, systems, content, and data. xCP’s comprehensive set of features include:

- End-to-end process lifecycle management from design and analysis through deployment, execution and monitoring, along with capabilities to optimize process performance at each stage in the process lifecycle.
- Analytics and real-time performance monitoring that enable business managers to actively understand, control, and improve the processes that are critical to their business operations.
- A scalable process execution engine that can orchestrate processes combining human, systems, and SOA-based integration activities for both high-volume transactional and complex, collaborative applications.
- Support for content-rich processes, including front-end input and capture of paper-based content; e-forms for data input and reuse; in-process management of both structured data and unstructured content; knowledge collaboration environments; customer communications; and back-end records management, archiving, and storage.

Audience

This white paper is intended for business executives and process owners who are responsible for improving the quality and efficiency of business operations.

Introduction

Readers of this white paper will gain insight into the following topics:

- The opportunity for process improvement through BPM and case management
- The typical stages of a business process lifecycle
- The features and business benefits of EMC Documentum xCP
- How xCP leverages other information infrastructure products from EMC
- Applying business process management in a typical use-case scenario
Improving business operations with process automation

Optimizing business operations has become a key focus for most organizations, including corporations, government agencies, healthcare organizations, and educational institutions. These entities share similar objectives:

- Reducing cost by increasing employee productivity
- Decreasing product and service delivery cycle times by improving operational efficiency
- Lowering risk by standardizing best practices and complying with internal policies and external regulations
- Improving quality and customer responsiveness with complete visibility of business performance
- Providing information to enable faster and more effective business decisions

Many organizations have adopted business process management (BPM) as a flexible, open approach for automating processes to improve business operations. BPM is a holistic discipline for understanding, orchestrating, and optimizing business processes. It makes extensive use of technology but is not closed and monolithic. It allows an organization to design and build custom solutions using standards-based components and integration adapters, web-based user interfaces, forms, and e-mail. BPM can work within a single department or organization, but is most effective when used to bridge functional and process boundaries while coordinating people, information, and a variety of software applications.

For information workers and content-intensive processes, an application of BPM known as case management has proven to be particularly effective. A case is a central point of control that contains all the documents, data, collaboration artifacts, policies, rules, analytics, and other information needed to process and manage the case. Case management is a pattern of work for orchestrating people, processes, and information around the case to make optimal business decisions. Traditionally used in social services, healthcare, banking, insurance, and legal environments, case management is rapidly expanding into many other industries. Case management principles are especially relevant to complex value chains involving non-deterministic processes, where the flow is dynamically influenced through human interaction and collaboration. Examples of cases include a loan, a patient record, a lawsuit, an insurance claim, a human resources employee file, or a contract.

Business process management software meets the operational needs of the business in many ways, including:

- **Increasing efficiency** by eliminating redundant and unnecessary manual activities
- **Boosting business agility** by enabling business analysts to design and revise processes without requiring programming or systems integration expertise
- **Reducing risk** by standardizing how processes are performed, and signaling when processes are in danger of missing deadlines or overrunning costs
• **Raising visibility** of performance metrics with real-time monitoring and ad hoc reports

• **Facilitating compliance** by enforcing rules-based automation, reusable best practices, data retention policies, and audit trails

The return on investment from BPM and case management initiatives can be significant—even initial implementations have shown compelling results compared to point solutions and legacy applications. Gartner Inc. reports that “organizations that use a BPM approach spend less of their IT budgets (55%) on running the business and ‘keeping the lights on’, compared with the industry average of 64%...these organizations spend a higher percentage of their IT budgets on ‘grow and transform’ initiatives that can convey competitive advantage.”

### Business process lifecycle management

It is important to understand that business processes have a lifecycle, from initial conception through live operation. Just like product and service offerings, lifecycles undergo periodic modifications based on changing conditions or requirements, and they may be eventually retired or replaced. To achieve the full benefits of BPM, organizations should adopt a lifecycle approach that manages processes over time. This approach recognizes that BPM is evolutionary, focusing on continuous improvement and adaptation, based on the unique needs of the organization. EMC has defined a proven lifecycle methodology for managing and optimizing processes. This process lifecycle has four stages:

1. **Analyze**: Process discovery, analysis, and design
   - **Participants**: Business analysts
   
   The analyze stage defines the initial or current state of the process from a business-level perspective, specifying process activities, performers, logic, and information flow. Using this “as is” model of the process, it can be refined to meet goals and objectives. The result is a redesigned (or “to be”) process, constituting the business framework of an optimized solution.

2. **Compose**: Technical implementation, user interface layout, and external systems integration
   - **Participants**: Process architects and developers

   In the compose stage, process architects and developers take the to-be process model from the analyze stage and add the technical implementation details to make it executable in the production environment. The process model is then packaged and deployed to the process engine, which will orchestrate the process in the next stage. While many organizations have separate functions for process
analysis and composition, they can also be handled by a single group responsible for process improvement.

3. **Execute**: Human workflow and collaboration, systems-based interactions, and overall process orchestration

   **Participants**: Business users and systems

   The execute stage orchestrates each running process instance in the production environment to coordinate the relevant human workflow, rules-based automation, and system-to-system integration activities. The process engine oversees the process to properly order activities, assign workflow tasks to the appropriate person or group, and ensure both human- and systems-based activities are performed within specified timeframes.

4. **Monitor**: Real-time alerts, dashboards, and tracking of key performance indicators

   **Participants**: Managers and personnel responsible for day-to-day operations

   The monitor and execute stages are closely linked: Process data is automatically gathered and assessed against defined metrics in real time, alerts are generated, and reports are displayed via graphical dashboards. Process execution data is also fed back to the analyze stage to determine if the process is meeting desired objectives. If not, the process model is further refined, enabling continuous optimization of business operations.

Figure 1 shows the four stages of the process lifecycle.
EMC Documentum xCP

The EMC Documentum xCelerated Composition Platform (xCP) is a comprehensive set of software products that support the definition, execution, and monitoring of processes, involving both human workflow and system-based activities. In addition, xCP manages all the various types of information that support the needs of the process. xCP includes:

- A highly visual “process laboratory” for business analysts
- A model-driven composition environment that allows BPM and case management applications to be easily configured for rapid implementation, as opposed to requiring expensive and time-consuming custom software code to define new or modified functionality
- Persistent state management for long-running business processes
- Work queue and work policy management for high-volume tasks, straight-through automated processing, and transactional processes
- Support for ad hoc collaborative processes
- Rich user-interaction features including collaboration, electronic forms, and configurable, role-based work interfaces
- A service-oriented integration framework that allows external applications, data sources, and people to participate in the business process
- Comprehensive content and data management capabilities for information-rich processes, including advanced compliance and records management capabilities
- Proactive monitoring and management of business processes
- Tight integration with EMC’s solutions for intelligent data capture and customer communications management
- Advanced data analytics to help information workers make better and more impactful business decisions

We will now examine each component of xCP as it relates to the process lifecycle, including:

- **Analyze**: Process Analyzer
- **Compose**: Process Builder, Forms Builder, xCelerators
- **Execute**: Process Engine, Process Integration, TaskSpace
- **Monitor**: Business Activity Monitor

**Analyze**

For most companies, business process information is scattered in disparate locations, such as applications, documents, spreadsheets, drawings, and operations manuals. Often, critical process information is not documented but exists solely in
the minds of employees. Collectively, these “process fragments” are the blueprint of your business. Every initiative related to improving business processes has to deal with this reality.

**EMC Documentum Process Analyzer**

Process Analyzer is a “process laboratory,” enabling business analysts to capture, organize, present, and analyze current business operations, and then improve them. Process improvement starts with discovery—before you can redesign a process to work the way you want, you need to understand its structure and weaknesses. Discovery includes:

- Structured interviews with subject-matter experts
- Interpreting existing process diagrams
- Importing process definitions from other systems

**Process discovery and visualization**

The challenge of discovery is to correctly and completely capture the as-is business process. No single expert has complete visibility into the process. Therefore, analysts conduct separate interviews with multiple subject matter experts, who collectively understand every step of the process. Each interview is captured in Process Analyzer as a process fragment, using a simple drag-and-drop drawing interface. Once discovery is done, process fragments are easily combined into the end-to-end process.

Process Analyzer deconstructs process information into logical data elements and stores these elements in a relational database—not as drawings, but as *data*. Logical elements are retrieved from the database and assembled as desired by the user. Then, the end-to-end process can be automatically generated in the form of *swim-lane diagrams* (Figure 2), which illustrate processes according to criteria such as process user roles, sub-processes, activity goals, and resource type—or in other representations created *on the fly*.

With Process Analyzer, adding or changing processes is fast and simple. Once changes are made, the process dynamically redraws itself, reflecting the changes. All process information is stored in a repository, so that multiple processes can be created and connected. They also form a process hierarchy based on interrelationships and functions within the overall organization, which is crucial for true process analysis.

At each step of a process, data may be produced or consumed. For example, when handling a purchase order it is necessary to know the name of the purchaser, the items purchased, and the quantity of each item. This data is organized into structures called “business objects.” Using Process Analyzer, the analyst can also specify process attributes such as cost, task time, and automation. The number of attributes is unlimited—the analyst can create new attributes for any activity, process, role, and more. This gives organizations the flexibility to define and track attributes that are relevant to specific operations. The ability to define the process at this level of detail
is very important for process visualization, analytics, and simulation, as well as for establishing key performance indicators that will be monitored once the process is deployed into a production environment.

Figure 2. Swim-lane diagram

**Process analytics**

Using process analytics, an analyst can run reports that extract, manipulate, and calculate process information, presenting the results in grids, graphs, pie charts, and other formats. These reports enable the analyst to compare processes in terms of cost or cycle time, show the interfaces between people (or systems), summarize issues identified in discovery, and generate functional specifications that describe system behavior across multiple processes. The analyst can also create new reports, which facilitate problem diagnosis and process redesign. Finally, reports can serve as process documentation. In a matter of minutes, users can generate a process manual in HTML, PDF, or Microsoft Word that summarizes processes, shows their visual structure, and lists the attributes of each process step. Figure 3 shows two variations for presenting process information using analytic reports.
Visio Interpreter extension

Organizations often use Microsoft Visio to create diagrams that define their business processes. While Visio provides a quick and easy way to visualize processes, it only creates a static picture. Also, since Visio is a desktop application, many diagrams are stored on individual computers or within departmental file systems, making it difficult to access and utilize this information. The Visio Interpreter, an extension of Process Analyzer, allows Visio users to increase the value of this work by importing legacy process drawings into Process Analyzer, transforming static diagrams into complete process models.

Since Visio is flexible and imposes no standards for process representation, it is important to understand the semantics of each drawing. In other words, what do the various shapes signify? Does a rectangle signify an activity or a document? Process Analyzer allows each shape in a drawing to be mapped to the corresponding process entity. The same applies to capturing relationships among shapes; for example, recognizing that the text “Bond Trader” on a Visio drawing signifies a role that must be associated with certain activities. The Visio Interpreter, shown in Figure 4, ensures that the semantics of Visio diagrams are accurately transferred into business process models.
Sharing and Reviewing Process Diagrams

While business analysts are charged with discovering and designing business processes, there is a much larger circle of stakeholders who need to be part of the decision process. These stakeholders include:

- Executives and LOB managers
- Regulatory compliance personnel
- Systems architects and other IT professionals
- Quality experts and Six Sigma Black Belts
- Internal and external auditors
- HR, finance, and operations personnel

These stakeholders are vitally interested in decisions that determine process redesign and automation, so it is necessary to give them a view of the processes and analytics in the enterprise process repository. EMC Documentum Process Analyzer includes a process navigator that provides view-only access to a Process Analyzer repository through a web browser. It retrieves information immediately upon request and provides:

- Dynamic visualization, including swim-lane views of process flows at different levels of detail
- Process reports, graphs, diagrams, and analytics
- Hierarchical process relationships
Automating Information Intensive Business Processes

- Attributes of all process elements such as value chains, process families, deliverables, processes, and activities
- Access to attachments\(^2\)
- Blueprints of enterprise business architecture

**Figure 5. Process Navigator**

**Compose**

Once a new or revised process is created, the underlying technical implementation details must be added to the process model: Data and content usage must be defined, work steps configured, and user interfaces and security established. This is process composition, which also includes defining system-to-system integration activities.

**EMC Documentum Process Builder**

Process Builder is a graphical tool for composing business processes with activity templates that include built-in work steps to make business processes executable. The process model created in Process Analyzer is seamlessly transferred into Process Builder so that process developers can add the technical details to the business-level definition of the process.\(^3\) Process Builder graphically defines multiple routing types including conditional, branching, joining, parallel, and sequential, and will do the following:

- Detail work activities and queues, user roles, task interfaces, and priorities

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\(^2\) Attachments provide further information about the process, often residing in the Documentum content repository.

\(^3\) Process Analyzer and Process Builder allow process models to be transferred between them with full versioning and retention of all metadata.
• Define rules that will be used to automate and track activities, and streamline/manage process flow
• Model external events that link with, or affect, process execution
• Configure explicit exception handling or “reverse” paths via drag-and-drop lines
• Specify use of electronic forms inputs for any task
• Access a robust user model that supports standard directory services such as LDAP and allows proxies, roles, and dynamic selection of process participants
• Apply version control for change management and process improvement

Process Builder also defines how information is used to support processes, with the ability to handle both structured and unstructured content. Structured data can be modeled using XML and persistent Documentum Object Types, and data fields can be easily mapped between the data source and the process activity using a graphical mapping tool (Figure 7). Content-based information (such as documents, images, faxes, and e-mail) retains all of its attributes and can invoke the complete range of Documentum content services while actively participating in the content lifecycle—including promotion or demotion between lifecycle stages and varied format renditions, user permissions, and physical locations.

![Activity Inspector](image)

**Figure 6. Process Builder data mapping tool**
Process Builder composes processes using activity templates, which are configured to add the unique activity details that are specific to the organization and the process. The process can be implemented without any programming, and can be easily packaged for deployment with all objects, classes, and methods created automatically.

Process Builder is also used to define structured data types, which model and store the data objects used within a process. Managing data directly within the process is useful for calculations, as inputs for business rules, and to provide context for human decisions. This data enters a process through a database, external application, or a form, and is incorporated without having to re-import the same data each time it is used. If a data variable is changed during a process activity, the changes can be automatically pushed to the source system.

EMC Documentum Forms Builder

EMC Documentum Forms Builder, which is tightly integrated with Process Builder, enables process developers to design user interface components that can be exposed within processes as either electronic forms or Documentum TaskSpace client interfaces. Forms Builder allows for rapid design and deployment of interfaces that are used for workflow activities and task processing, as well as to capture, validate, and reuse data within a process. Forms Builder is compliant with the W3C XForms standard and meets the declarative XML GUI specification. Its WYSIWYG graphical
design interface streamlines the task of creating a UI in multiple platform renderings that conform to the W3C XML schema data model.

Both HTML and printable, high fidelity e-forms can be designed with Forms Builder. Forms can be deployed in any WDK client, including TaskSpace, Webtop, Records Manager, and others. They can also be deployed in external applications such as portals and attached to emails. Forms can embed business logic which controls display options, field dependencies, data entry requirements and validations. Printable forms can leverage existing MS Word, Open Office, or PDF form templates to create and manage online forms that appear exactly like paper forms that users already understand.

Forms Builder is context-aware, ensuring that applications will present the appropriate UI based on user type, activity, and locale. For example, in Forms Builder simulation mode, an insurance claim form could be tested under two scenarios: being filled out by a claimant and being reviewed by a customer service representative or claims adjuster. Just as easily, those scenarios could be simulated for forms in multiple languages. Forms Builder users can choose to capture data as XML, database records, or both simultaneously, and data is automatically synchronized with the process repository. Forms Builder, shown in Figure 9, also features:

- Robust UI controls and data field options including tables, tabs, rich text, date fields, comment history, dynamic links, and content attachments
- Web 2.0/AJAX-based controls for building dynamic client interfaces
- External data source connectors
- Initialization and validation adapters
- Conditional value and auto-calculation adapters
- Event processors such as submit, save, reset, and more
- ACL-based security
xCelerators

EMC Documentum xCP xCelerators are free assets that incorporate best practices to accelerate xCP solution development. xCelerators are shared through an active community that generates a continuous flow of new ideas and contributions.

xCelerators enable rapid application development. They guide you through the entire development lifecycle with sample applications, pre-built solution components, solution patterns, design patterns, utilities, and best practice documentation. xCelerators promote reuse to boost developer productivity and software quality, reducing development risk and maintenance costs.

Execute

The core of any BPM system is its process engine. Process engines vary widely in their ability to orchestrate the combination of human- and systems-based activities for all running process instances, manage work queues, evaluate XML, invoke configurable actions based on event triggers, and support collaboration. Process engines also need to communicate and share information with a variety of external systems, applications, and data sources.

Process Engine

EMC Documentum xCP’s process engine automates repetitive and manual tasks and orchestrates each running instance of a business process. It takes care of evaluating business rules, assigning process tasks to the correct system, group, or individual at the appropriate time, and tracking process activities against designated deadlines. The process engine uses configurable policies and queue management to efficiently handle high volumes of incoming work and provides audit data that supports business activity monitoring, process tuning, and compliance initiatives.
The xCP Process Engine is tightly integrated with Documentum Content Server and accesses content management services through a web services layer. This integration goes beyond simply attaching documents to processes. It enables control of all types of content used by processes, and also supplies content analytics that can trigger business rules, increase automation, and support better decision making. Users have transparent access to process-supporting information, sensitive documents are secured against unauthorized access, and content retention policies are properly enforced.

The xCP Process Engine is scalable to tens of thousands of concurrent users, handling over a million tasks per hour, and is configurable for both failover and redundancy. Execution information is securely stored in a persistent repository, ensuring business continuity even when systems go down or are offline for maintenance. The process engine interacts with end users through a set of GUI-driven clients that manage and provide context for tasks, work lists, escalations, and notifications. Using xCP's process integration layer, the process engine can also orchestrate processes with external systems, whether they are legacy, web services, or J2EE application server-based.

The process engine generates an extensive, customizable audit trail for tracking process and content events during execution. The audit trail can be used to analyze and improve process efficiency, detect bottlenecks, and expose changing business conditions.

**Process Flow**

The flexibility of xCP's process engine gives process workers considerable scope to dynamically adapt a process, including the ability to invoke ad hoc tasks or add new content. Processes can be initiated by automated or manual steps, including sub-processes that are launched to handle an exception in normal processing. Templated behaviors can be modified at runtime by overriding the values of process parameters that are associated with each activity. Ad hoc content and structured information can also be added at any time.

Any user can initiate an ad hoc workflow. These workflows are then tracked within the relevant process instance. Documents and emails received from external sources, such as a document captured by EMC Captiva, can launch a process or be automatically correlated to an existing process instance. This means a case can be initiated by any worker or external user through scanning a document, submitting a form, or sending an email.

xCP provides built-in, easy to use expressions as well as integration with rules engines to dynamically handle case routing, alerts, task assignments, prioritization, validation, and many other capabilities. For example, a process parameter based on a risk assessment can determine if a case goes through a managerial review sub-process.
Case processing

xCP provides an optimal balance between flexibility and control to support the dynamic processing required for case management. A case within xCP is a managed object with a hierarchical folder structure that can contain or reference sub-cases, all linked with both structured and ad-hoc business processes that support and govern the case lifecycle. The case folder is automatically associated with relevant metadata, lifecycle states, structured data, folders, and content.

Cases are governed by a well-defined model that ensures users work within established policies and procedures, with appropriate user-controlled configuration and adaptability at runtime. A network of processes and sub-processes support and manage case processing, defining the events and policies applicable to a case. Activity templates define both manual (i.e. requiring user input) and automatic tasks. Workers can manage both ad-hoc and predefined tasks for an active case. Any number of business process snippets (actions and policies) can be made available to the user to initiate at any time via configurable buttons and menu options within the application. For example, users can asynchronously add content to a case, generate an e-mail notification that an exception needs to be investigated, or initiate a review process for a newly received document.

Queue management

Work queues are used to balance workloads across a large set of uniform or specialized end users—for example, in a call center application. They are also used to prioritize large task volumes so that high-value requests receive a rapid response. A work queue is also a good way to maintain and monitor service level agreements and ensure compliance with internal business policies as well as external regulatory demands.

The process engine assigns tasks to work queues based on process definitions and automates queue-level monitoring, task priority escalation and aging, and the suspension and auto-resumption of tasks. Through the work queue management interface, supervisors can create roles, monitor queues, view task progression, reassign tasks, and create reports. At a glance, they can see how many items are in a queue versus its maximum expected threshold, the highest priority items, the number of users eligible to work on tasks, and how many items are assigned, waiting, or suspended. Supervisors can assign tasks to specific users, enable users to manually pull down tasks, and move items to another queue.
Deadline and goal management

The process engine enables repeat, as well as escalating, timers and deadlines. It supports configurable actions on timer deadline triggers such as auto-complete, launch an exception sub-process, auto-delegate, or start a new workflow. It also notifies affected users when events are triggered by timeouts, application errors, or exceptions. There are several ways in which users can be notified, such as through the Documentum Inbox (exposed through various Documentum desktop, Web, and mobile clients) or via e-mail. A notification includes contextual information about the process, its originator, a description of the required task, and a link for retrieving content associated with, and invoking, the application needed to complete the task.

Performance reports

The process engine generates a real-time event audit trail during the execution of any business process, which is stored in the Documentum process repository and captured in standard performance reports, such as process throughput and average, minimum, and maximum duration. These can be aggregated by process, activity, and user, and feature drill-down capabilities. The process engine audit trail can also be evaluated in real time via xCP’s Business Activity Monitor (providing configurable, detailed process performance information through alerts and graphical dashboards), or exported to third-party analysis and reporting tools.
**Process Integration**

The process integration layer in EMC Documentum xCP (see Figure 11) connects Documentum-managed business processes with external systems, applications, data sources, and people. Integration is accomplished through a standards-based, service-oriented architecture (SOA) supporting JMS, HTTP/S, XML/SOAP, WSDL, JDBC, SMTP, S/FTP, POJO, and FAX protocols, enabling participation with other standards-based enterprise application integration frameworks. For tight coupling, integration adapters can be created using either a web services or J2EE Connection Architecture (JCA) standard.

xCP can correlate both outbound and inbound messages and events. Events generated from an xCP business process can trigger actions in external systems and applications and, conversely, external systems can trigger actions to occur within an xCP business process. For example, the arrival of a purchase order in SAP could trigger a business process for review and approval, or the purchase order data can be correlated to a already running purchase requisition process.

xCP also provides e-mail integration, allowing users outside the organizational firewall to interact with an xCP process. It can automatically send e-mail as part of a process activity, with the option of providing a unique identifier, allowing for the return e-mail to be incorporated directly into the correct point in the associated process.

![Figure 10. xCP uses a standards-based message gateway for process integration](image-url)
**TaskSpace**

In addition to providing a comprehensive set of capabilities for automating and orchestrating process activities, xCP also provides the ability for rich user interaction within process workflow. TaskSpace, the xCP user interface for BPM and case management applications, allows users to efficiently access, retrieve, and use the information they need to route,

TaskSpace can be easily customized for specific roles or activities. Using built-in UI components, users can receive and delegate tasks, search for or enter data required for a process, and issue requests for missing information. Work queue management allows supervisors to monitor and balance workloads for high volume workflows, and interactive dashboards provide real time analytics that guide users to rapidly make informed decisions about case outcomes.

Configurable actions in TaskSpace give users the flexibility they need to compose cases dynamically, by choosing the best course of action to take in unpredictable or discretionary circumstances. Communications to customers and other stakeholders can be initiated and personalized. Virtual case folders aggregate all information about a case to provide efficient navigation and quick access to data for making decisions.

Images and documents can be embedded directly within a task processing screen, and workers can view relevant content and data simultaneously, including data pulled from external systems. Images and documents can be annotated directly within TaskSpace, so relevant notes can be added for downstream process activities or future reference. (Figure 12).
TaskSpace interfaces are designed using EMC Documentum Forms Builder, which provides a single environment for the creation of both the TaskSpace UI and electronic forms used for human interaction within xCP applications.

**Monitor**

Process monitoring is a crucial phase in the process lifecycle and an important component of a BPMS, enabling process stakeholders and business managers to:

- View processes in-flight
- Track key performance indicators (KPIs)
- Measure cost, revenue, and duration
- Analyze business data
- Make long-term process improvements

With effective process monitoring, you will find problems before your customers do and gain the flexibility to adapt your processes as customer needs and business conditions change.
**Business Activity Monitor**

xCP’s business activity monitor (BAM) extracts process information from the xCP process engine during execution, analyzes it, and communicates results via alerts, graphical dashboards, and configurable reports.

BAM provides real-time process visibility and control within dynamic dashboards (Figure 13). Presented within TaskSpace, BAM dashboards display active business processes, enabling organizations to rapidly manage to desired business and operational outcomes. BAM actively tracks Key Performance Indicators (KPIs) and automatically generates alerts for conditions that fall outside established thresholds. These alerts can automatically trigger responses, such as an e-mail notification, initiating a new business process, invoking a Web service, or other system actions to address the issue.

![Figure 12. Use configurable dashboards to track the status and performance of processes](image)

BAM reports provide critical insights into business performance issues, such as service level agreement enforcement, cycle time, transaction revenue, resource utilization, geographic performance, and cost monitoring. Interactive drill-downs help to discover root causes, and embedded action buttons allow users to initiate remedial responses directly from a report. Since monitoring is constant and execution-based, BAM also enables detailed views of processes in-flight. You can see the current state of an ongoing process instance and its duration to that point. Report
designers define data sources without programming or knowledge of SQL. Instead, the user simply drags and drops report entities (Figure 14). Once the reports are defined they can be inserted into dashboards. Dashboards can be configured for different classes of users; for example, summary reports targeted at managers and executives, and detailed process tracking reports for operational staff.

![Figure 13. Business users can easily create new custom reports and alerts](image)

**Process optimization**

Process monitoring empowers businesses to improve their processes based on actual business conditions. xCP enables a five-step approach to process optimization:

1. Detect the problem through in-flight monitoring using BAM
2. Distribute a problem description and analysis to appropriate parties via e-mail and dashboard alerts
3. Drill down in reports to examine related process information
4. Diagnose the root cause
5. Feed the results back to the Process Analyzer for process refinement

**Leveraging the EMC Documentum content management platform**

xCP leverages the strengths of the Documentum enterprise content management platform and content repository. The underlying Documentum repository and integration with related offerings from EMC brings several unique capabilities to xCP, including:
• **Process composition**: The ability to define, store, and manage smaller parts of a business process individually, and then combine them into larger, more complex processes in a reusable fashion, which is critical to successfully deploying real-world business processes that operate between groups, departments, and even companies.

• **Collaboration**: Collaborative capabilities such as threaded discussions within TaskSpace, plus a rich variety of content and collaborative clients for Documentum (available from EMC and third parties) enhance collaboration around the content and information used in your business processes. The unique unified content and process platform underlying xCP means that collaboration on a business process can extend throughout your organization and beyond, involving users on desktop, Web, and mobile devices.

• **Integrated XML management**: Provides intelligent metadata management, XML processing and transformation, and the flow of XML-based information in the same application infrastructure. Documentum provides the ability to natively handle and manage XML content in business processes. This includes simple, declarative access to Documentum XML management capabilities such as parsing, chunking, aggregation, validation, transformation, and assembly, as well as capabilities to directly address XML as structured process-relevant data, using XPath and XML schemas in the business rules that govern business process control.

• **Deep integration of content services**: Allows versioning, access control, library services, and retention policies for all types of information that support processes. Structured data and unstructured content (documents, images, e-mails, and more) are seamlessly managed by the same system, and content services can be applied to business process objects. In addition, unlike other BPM solutions, Documentum content lifecycle management capabilities are available independently or in conjunction with a business process.

• **Capturing and digitizing paper-based documents**: xCP is tightly integrated with EMC Captiva®, a solution for transforming business-critical information from paper, fax, and electronic data sources into streamlined, business-ready content suitable for processing by enterprise applications.

• **Customer communications management**: xCP integrates with EMC Document Sciences xPression to automate the generation of highly customized and personalized customer communications for multichannel delivery, including print, email, Web, fax, and mobile devices. The combination of xCP and xPression allows organizations to use process and case data to improve customer experience and loyalty through the generation of relevant, consistent, timely, and efficient communications.

• **Leveraging the overall EMC information infrastructure technology stack**: Enables information rights management, records management, archiving, and information lifecycle management across multiple tiers of storage.
Documentum content distribution and aggregation services

Documentum provides rich content distribution and content aggregation functionality to integrate Documentum-managed content with other systems inside and outside the enterprise. Documentum processes can be involved in triggering both the push and pull of content to and from any source, including other repositories, file servers, web servers, or databases while applying value-added content processing such as transformation, metadata extraction, and content packaging.

Content and Data Analytics

As BPM expands beyond straight through processing into human-centric processes such as case management, the ability to inform those human decisions as fully as possible is critical. In particular, where a process outcome is derived from a collaborative, iterative process of building knowledge, enriched contextual information will drive better decisions. Search and analytics capabilities in the Documentum Platform provide xCP users with information to guide their decisions and actions, and provide a context to the process that can help to achieve an optimal outcome. These capabilities include:

- The advanced search capabilities of EMC Documentum xPlore, which provides enterprise search results from structured and unstructured information and concept-based searches.
- Content Intelligence Services, with automated indexing of hitherto hidden information and exposing of metadata for search and retrieval in a process.
- Faceted navigation, helping users find relevant information quickly by providing multiple dimensions (facets) in search results.
- Federated searches, to bring in process-related knowledge from beyond the immediate repository and process data stores.

Now let us see process improvement in action in a business process use case.

Use case: Credit dispute resolution

Banks that process credit card transactions frequently find themselves mediating disputes between cardholders and merchants. The credit dispute resolution process is a vital part of customer service. Disputes must be handled quickly and fairly—to the satisfaction of both parties if possible.

In this use case, we examine dispute resolution for a fictional company, DocuBank, through the lens of business process management. We will see how xCP was employed to identify inefficiencies and bottlenecks in the as-is process, in order to design and orchestrate a more efficient one. The scenario is common: a cardholder who feels that he was overcharged.
DocuBank’s former dispute resolution process included many manual tasks that could not be centrally tracked or managed. Dispute case files were primarily paper-based and were physically transported from one department or employee to another, making it impossible for more than one person at a time to access the file. Beyond these shortcomings, the bank was concerned that the process could never efficiently scale to accommodate the projected growth in new accounts.

**Analyze stage**

To start the redesign of the process, a business analyst imported existing diagrams created in Visio into Process Analyzer. Using the Visio Interpreter for Process Analyzer, the as-is process diagrams were deconstructed and interpreted to create the as-is process model. The analyst then interviewed various people within the organization to validate the model; metadata attributes were then added to process steps, enabling visualization, simulation, and report generation.

Using Process Analyzer, the analyst discovered a number of inefficiencies throughout the process, including:

- There was no automated mechanism, supported by business rules, for determining the validity of a dispute.
- Dispute specialists needed supervisor approval at every step, leading to significant delays and backlogs.
- Work queues were managed manually with no set procedure for handling exception items, such as a sales draft with no signature or approval number.
- Communication between the bank and merchant was not monitored for prompt response.
- The initiation of dispute requests required a manual entry through a call center or by in-branch personnel, creating inefficiencies both for entering and validating information relating to the dispute.

During design of the to-be process, many tasks and subprocesses were automated using system-based activities that removed the necessity of human intervention. For example, an option to enter a dispute through an online form was added to streamline the initiation and validation of a dispute.

**Compose stage**

Next, the to-be process model was transferred to Process Builder, and technical implementation details were added to the redesigned process. The details included mapping integrations with existing applications, such as the bank’s CRM and credit card transaction systems; definition of business rules; work queues setup; and user interface screens creation. For example, a major process bottleneck was solved with the creation of an online dispute form, which was mapped to the CRM application. This enables account number lookup and other validation steps, such as automatically retrieving all the information required from the customer’s record (including their initial credit card application, scanned by Captiva into the customer
record), as well as allowing the xCP process engine to run an initial set of rules in order to determine whether the dispute requires manual intervention.

Now, when a customer needs to dispute a charge, he can fill out the online form. The dispute is routed down the optimal path based on the information provided and the customer’s past dispute history. For disputes requiring manual intervention, the dispute will go directly to the appropriate specialists who can immediately view the relevant account and charge information. Besides dramatically accelerating the resolution process for customers, online forms reduce pressure on call center and branch personnel, eliminate errors and lost information, and ensure that the most qualified workers get the right information at the right time.

Once the implementation details were added to the process model, Process Builder packaged the model for deployment, automatically creating the classes, objects, and files used by the process engine to run the process in the production environment.

**Execute stage**

Using the packaged process model, the process engine now initiates and orchestrates each running instance of the dispute process, including the human workflow, rules-based automation, and system-to-system integration activities. The process engine monitors and manages work queues, and gives customer service managers visibility into, and control over, incoming dispute requests that must be reviewed by dispute specialists. Managers can keep an eye on queues, reassign tasks, and move items between queues; while the process engine can do all of this automatically based on business rules, work queue managers can intervene at any time. The process engine also notifies managers and specialists when work is required, or when activities are not being completed according to defined timelines.

In the dispute process, there are situations where interaction with the merchant must take place. When a specialist assigned to a specific dispute receives a notification (in his work queue inbox) that a copy of the sales draft is required, he just needs to approve the task, and the process engine will automatically generate and send a personalized e-mail to the merchant via EMC Document Sciences xPression. When the merchant replies with an attached copy of the sales draft, the process integration layer will route the e-mail back to the process engine, which will then automatically insert it into the specific process instance and trigger the next activity in the process. The e-mail text and the attachment are inserted directly into a TaskSpace screen for the next review activity, so that the specialist can compare the sales draft to the transaction record, validate the sales draft, annotate the image of the sales draft (if needed) and move the process to the next activity (for instance, authorizing a cardholder chargeback). The process engine then notifies accounting to approve the chargeback, and once this is approved, an e-mail to the customer is automatically sent via xPression, notifying him that his account has been credited.

During execution of the dispute resolution process, the search and content analytics features of the Documentum platform can provide more context about the customer or merchants involved. For example, users can search archived emails or documents associated with past disputes. This information can help workers discover patterns
that may point to potential fraud or other exceptions that require further investigation.

**Monitor stage**

Using the business activity monitor, each individual active dispute is tracked against several KPIs, including: completing the process within 96 hours of initiation; receiving a response back on merchant information requests within 48 hours; and not waiting on any review work queue for more than four hours. In addition, BAM tracks aggregate KPIs across all active disputes, including performance against service level agreements for each group participating in the dispute process and the total value of approved disputes that have not received accounting credit back into customer accounts. Each of these KPIs can also be compared with historical averages to see trends that relate to the dispute process.

No matter how well designed, a business process can always be improved. By feeding the actual performance data back into Process Analyzer, DocuBank’s business analyst team has learned that they underestimated the percentage of dispute requests that require review by a dispute specialist, which has caused the average total time to process a dispute to exceed their goal by 10 hours. Based on their projections for new account growth over the next 12 months, they are able to see that they will not have enough specialists to handle the additional volume of requests. The DocuBank team determines that it can automate one of the review tasks for 80 percent of the disputes handled by dispute specialists, and that this change will enable them to meet their overall goal. Using a new monitoring report, DocuBank has also identified which merchants are causing a disproportionate number of dispute requests, so they can work to reduce the overall number of disputes.

**Conclusion**

By automating business processes with EMC Documentum xCP, any enterprise will readily gain access to information that is up-to-date, tracked, and visible across the organization. Workers have a holistic view of their work from beginning to end as well as a sense of ownership. With all information and its context aggregated into a single application, workers can consult internal and external resources, and review and make better decisions. This aggregated view also enables tasks that would require sequential processing to be done in parallel, speeding process outcomes.

Documentum xCP offers a unified, highly scalable platform for the design, execution, monitoring, and optimization of content and information intensive business processes. The easy-to-use graphical tools speed process modeling and orchestration, while the process engine handles task processing through configurable queues, workflow management, and notification services. Process analysis and activity monitoring components provide information to improve operational efficiencies, achieve compliance, and maximize responsiveness to evolving business conditions. Specific benefits of this solution include:
Automating Information Intensive Business Processes

- **Increased worker productivity** with a Web-based interface tailored to users’ specific roles and tasks, as well as automation of repetitive and manual tasks.

- **Faster, lower cost** development and deployment of applications with graphical modeling tools, reusable components, and solution accelerators.

- **Reduced risk** by ensuring that processes adhere to best practices, compliance policies, and management controls.

- **Improved decision quality and operational efficiency** by consolidating information, automating processes, and monitoring performance with dashboards, event notifications, advanced search, content analytics, and graphical, real-time reporting.

- **End to end information governance** with a comprehensive platform that provides unified and consistent policy enforcement, security, monitoring, and auditing across all your processes and information.

For more information about EMC Documentum xCP, visit [http://www.EMC.com/xcp](http://www.EMC.com/xcp) or call **800.607.9546** (outside the U.S.: +1.925.600.5802).