

Electronic forms

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Organizations use business forms to handle both internal and external processes, from simple employee vacation requests to complex customer enrollments in financial services. Regardless of the level of complexity, business forms enable participants to submit required data in the correct format and receive information on the status of the process. Different business needs can be fulfilled by different levels of form automation, from interdepartment routing up to enabling mission-critical enterprise processes. Available forms technology tools range from simple combinations of common desktop software, such as spreadsheets and e-mail, to large dedicated systems.

Portable Document Format (PDF), an ISO standard (ISO 32000), includes specifications for employing PDF for electronic forms. Because of the ability of PDF to preserve the look and feel of a document in both paper and electronic form, across different computing platforms, it is a logical format choice for satisfying form design requirements across all industries, from the most simple to the most complex.

The business of forms

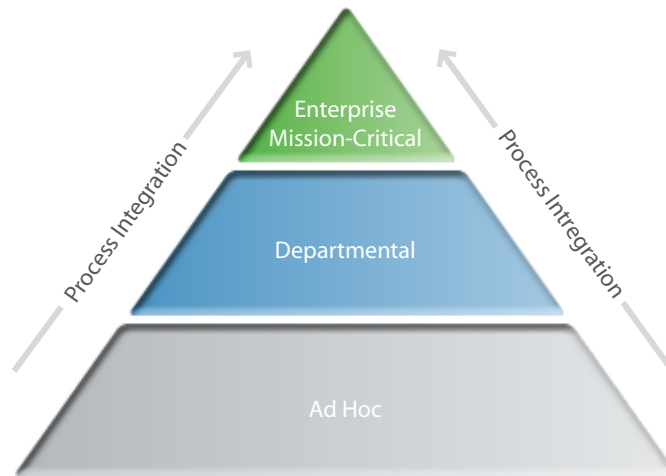
A form can range from a pure data-entry presentation layer to a traditional business document.

Data-entry forms ensure that structured data is efficiently collected. The data can then be used in other process contexts, which may be transparent to the user of the form. The user does not necessarily require knowledge of the larger business process, beyond the requirement to enter data.

In contrast, business forms require some knowledge of the business process. These forms usually are rendered to the physical paper dimensions of a standard business document and often must exist as paper forms as well at some time in their lifecycle.

Hybrid forms contain both structured and unstructured content, so they can be used for both data collection and data output.

Different business needs can be fulfilled by different levels of forms automation, from basic department routing up to enabling mission-critical enterprise processes. As with many technology domains, the available tools range from simple combinations of common desktop software (for example, spreadsheets and e-mail) all the way up to large dedicated technology systems specifically designed to enable the creation, distribution, and processing of large volumes of forms.



As the forms complexity rises toward enterprise-wide mission-critical needs, both the level of process integration and the possible number of process participants increases.

Ad hoc forms automation

Most enterprises conduct a large amount of ad hoc forms automation. Ad hoc forms are typically user-driven processes with very little process integration and few participants. Often, pre-existing forms are reused, but there is no prescribed workflow routing procedures. For example, a project assistant creates a simple form in a word processing application for their project team to submit the preferred dates and locations for the project wrap-up lunch. This form is made to initiate an internal process and is manually routed through e-mail for completion and approval. However, some recipients might choose to tell the assistant in person or leave a written note on the assistant's desk. At this level, this informality is accepted and often preferred.

Departmental business forms automation

At the department level, forms automation becomes more formal, with pre existing workflows that use pre existing forms. Processes are usually owned by a single area of the business, but participation can be enterprise-wide, such as human resources performance reviews and IT move-add-change (MAC) processes. When formal processes are required, forms automation technologies begin to add value. For example, form designer software, such as Adobe® Acrobat®, add value by creating professional business forms for departmental and business support, even if workflow and electronic completion is not needed.

Enterprise, mission-critical forms automation

At the enterprise level, forms automation frequently supports run-the-business, mission-critical processes, especially industry processes. Participation is usually across the extended enterprise, including partners, employees, customers, suppliers, and providers. Participants in these workflows are driven by the process as opposed to driving the process—which occurs in most ad hoc workflows. Forms automation technologies at this level are often implemented as dedicated systems, but are frequently components of enterprise application suites, such as customer relationship management (CRM) and enterprise resource planning (ERP) systems or even content management suites. Industry examples at this level include:

- Financial services and insurance—Mortgage application processes, insurance claims processing
- Manufacturing—Request for quotations (RFQs), engineering change orders (ECOs)
- Life sciences and pharmaceuticals—Electronic data capture for clinical trials and regulatory submissions
- Public sector—New business government licensing, social services benefits enrollment

Advantages of PDF forms

Using PDF forms offers a variety of benefits by expanding participation, increasing efficiency, meeting regulatory requirements, and reducing waste. PDF technology also addresses the need to maintain forms processes that support both paper-based and electronic versions.

Hybrid forms processes

Because of requirements for conventional pen-and-ink signatures, many business processes must include both electronic and paper forms. This is especially common in business-to-consumer and government-to-constituent scenarios where businesses and agencies cannot mandate technology usage to its consumers or constituents. Even when downloading a form online and completing it on their computer, consumers and constituents often still need to print it and sign it because “wet” signature, made with a pen are required. PDF forms are an ideal solution in such multichannel situations because they can be used online and offline and can effectively transition between paper and electronic processes.

Imaging

Imaging a paper form to reinsert it into an automated process is often required. Optical and intelligent character recognition can be employed to capture information added manually to a paper form and 2D barcodes can be applied to the form before it is physically printed to embed digital information for later capture during imaging. PDF forms are especially adept at supporting such requirements, for example, processes that require a wet signature can be reconnected to the data supplied in an electronic form.

Security and electronic signatures

Many business processes and regulations require signatures made with a pen at many steps of a process. Physical signatures made with a pen can still be a part of an approval process, as mentioned in the previous section; however, electronic signatures can also be used. Adobe PDF forms do not require adopting special electronic signature technology, although the PDF standard does support industry-standard, electronic-signature technology, such as digital certificates for signing or certifying forms. The PDF standard also supports numerous strong cryptography industry standards for digitally signing and encrypting forms, such as SHA-256, AES 256, and RSA 2048.

Mobility

Living in a connected world means that more business processes can be taken to participants as opposed to making participants come to the process, such as going to a business or government office. Submitting forms online can improve user satisfaction, reduce errors, and reduce processing time. It can also increase participation rates, for example, when citizens participate in a government program from the privacy of their own home rather than having to go to a public government office. In these scenarios, electronic forms must support storing form information offline until a user has successfully completed the form before submitting it. The PDF standard supports storing form data both online and offline.

PDF forms can be enabled for completion by anyone using the free ubiquitous Adobe Reader® software. Users do not need a software client license to participate in a PDF-based electronic forms workflow. This capability lowers the traditional entry costs for implementing electronic forms and makes it more accessible to anyone with computer access.

Reducing waste

While traditional value drivers, such as time and error reduction, still dominate most return on investment (ROI) calculations for electronic forms projects, electronic forms are being recognized as an opportunity to reduce paper use.

Electronic forms can help reduce the environmental impact of business activities and generate derivative cost benefits in other areas where businesses are attempting to lower costs. Paper usage is immediately reduced in workflows that implement only electronic forms, but hybrid workflows can benefit as well, because electronic forms can be designed to enforce green best practices, such

as mandating double-sided printing. Reducing document printing reduces printer duty cycles, supporting other important cost-reduction initiatives such as printer consolidation. This also leads to fewer ink and toner cartridges that must otherwise be recycled or disposed of in landfills.

Form requirements across sectors

Specific industry and business requirements often dictate form design and utilization.

Public sector

Public sector organizations depend on forms to interact with and provide services to a broad base of constituents, including citizens, businesses, and other government agencies. Most organizations use hybrid business and data forms.

The primary challenge that public sector organizations encounter with forms automation is that the broad base of constituents that they serve have differing interaction capabilities. For example, some constituents can use and prefer electronic forms, while others have to participate in paper-based processes, because of a lack of digital connectivity or aptitude. Therefore, public sector organizations must frequently employ forms that retain the same look and feel in both paper and electronic formats. These forms are also frequently required to move back and forth from paper to electronic format during execution of government processes, from initiation by constituents all the way to archiving.

An additional challenge for public sector organizations is that citizens often have to complete forms from multiple agencies to complete a single action. This lack of collaboration among different governmental agencies results in public sector processes appearing as anything but transparent to the constituent.

Because PDF is a standard, PDF documents and forms can be viewed by a wide variety of multiplatform and free PDF viewer applications, like Adobe Reader. In fact, Adobe Reader is one of the most widely distributed applications in the world and is installed on most business and consumer PCs. This, combined with the ability of PDF forms to function in both paper and electronic format, makes PDF a logical choice for reaching the broad base of constituents most Public sector entities serve.

A PDF file can also serve as a workflow package of forms, documents, and images, storing data and process information directly inside the file. This enables easy deployment across multiple workflows managed by different government entities, each executing its own processes. As a result, government entities are able to design cross-entity workflows around the constituent, without complex process re-engineering or organizational changes. This provides transparency of government service processes directly to the citizens.

Financial services and insurance

Forms are at the core of the financial services and insurance industries. Without forms, applications for accounts, loans, mortgages, or investments would not be successfully processed nor would insurance claims, statements, or policies. Organizations in these industries require sophisticated forms automation so that review and approval processes are completed in a timely and accurate manner, and regulatory compliance can be assured and verified. Customer-facing forms are often the main point of interaction and have a major influence on customer satisfaction. In the financial services and insurance industries, process standards, such as those from ACORD or MISMO, often dictate business form structure and content. The consistent presentation of form elements across processes and organizations is required to ensure compliance with standards. To satisfy the needs of these industries, electronic forms must be able to store information inside the form itself as well as integrate with databases.

Because PDF forms can output data captured from other forms, such as other PDF forms, rich internet applications, and HTML forms, financial services and insurance industries can assemble information from a variety of process capture points into industry-standard business forms. This allows the industry to create branded and compelling customer interfaces for data capture, while complying with industry standards for processing. The ability of PDF forms to be rendered in paper or electronic format makes PDF an ideal solution for financial services and insurance processes which that multiple entities, such as mortgage refinancing processes, which might be outsourced to a partner.

Manufacturing

Manufacturing organizations employ forms across the entire product lifecycle, from idea generation, to engineering and design, to manufacturing, delivery, and servicing. The industry is also a heavy user of forms to perform maintenance, repair, and operations (MRO) activities. These forms often become the official archived record, and are used to ensure and verify regulatory compliance for such industries as pharmaceuticals, chemical manufacturing, and energy production.

In manufacturing industries, the design of both structured and unstructured information on a form is often driven by the equipment and instrumentation used in the production process, so the presentation and data layers of a form must be able to accommodate these requirements for interoperability and data capture.

PDF forms can enable manual data capture from manufacturing processes or automated capture from real-time data sensors or historical trend information from operational data stores. PDF documents can also embed fully functional 3D diagrams, enabling composite or exploded component views of equipment.

Healthcare

The healthcare industry is one of the largest generators of forms, from the documents required to admit patients, to their medical records, and prescription and insurance information. Not only does patient health information have to be tracked, but the interactions and professional development of healthcare professionals must also be recorded. Communication among healthcare professionals, providers, and payers further complicates the matter, and handwritten forms lead to errors and delays in providing appropriate patient care.

Privacy regulations are creating significant challenges for forms automation in the healthcare industry. Regulations such as HIPAA stipulate which information can and cannot be shared, as well as stipulating when patient permission is required before information can be shared. This creates an additional approval layer in many processes and also requires protection of information so that only authorized personnel can access it. Electronic forms must frequently support both electronic signatures and encryption when employed in the healthcare industry.

Where possible, healthcare forms should support interoperability with standards for patient data, such as the Continuity of Care Record (ASTM CCR) and the Clinical Document Architecture (HL7 CDA), as well as with Electronic Medical Records (EMR) systems. To address the unique electronic form and data challenges in the healthcare industry, PDF/H has been developed. PDF/H (AIIM/ASTM BP01-2008) is a best practices guide describing attributes of the PDF specification to facilitate the capture, exchange, preservation and protection of healthcare information.

Life sciences

The life sciences industry relies on forms-based processes across the entire lifecycle of products such as drugs and medical devices. International regulatory requirements, such as those from the U.S. Federal Drug Administration, place stringent requirements on process controls and data integrity that require strong digital signatures for electronic forms.

Examples of forms-based processes in life sciences include the capture and review of chemistry and biology data in research and development, the enrolling of clinical investigators and subjects for clinical trials, the capture of patient data and adverse events during clinical trials, and the submission of applications and findings to regulators.

Forms technologies and formats

Organizations have numerous technologies and formats to choose from when employing electronic forms. Among these are office productivity formats, such as word processing documents or spreadsheets, HTML web forms, XForms, and PDF forms. When choosing forms technologies, decision-makers must examine the entire process lifecycle to support forms automation from creation to archiving because not all formats are suited for all parts of a content lifecycle.

Standard office applications

Basic office productivity applications, such as word processors and spreadsheet programs, can be sufficient for creating electronic forms in ad hoc processes. In this scenario, participation is usually limited to users who have the native applications, and process integration is generally low or nonexistent. However, as participation grows to include audiences who might not have the necessary application and process and data integration increases, office productivity formats quickly fail as electronic forms.

HTML

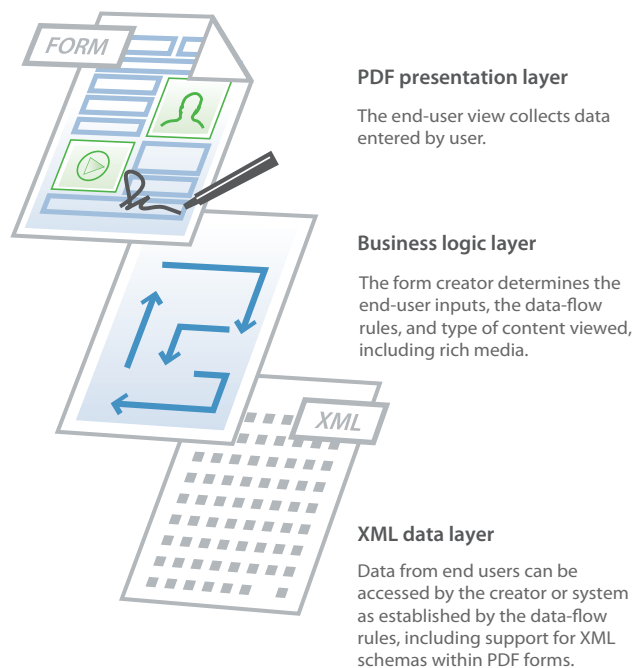
HTML is often used for data-entry forms, especially in web browsers. HTML forms are adept at creating electronic forms for online-only usage and where the look and feel “fidelity”—of a form are not important to the process or dictated by industry standards. However, forms do not need to be in HTML to be delivered via a web browser. For example, PDF forms can be delivered and completed online or offline with a capable browser plug-in.

XForms

XForms is an official World Wide Web Consortium (W3C) recommendation for processing XML data, especially in web forms. While XForms can be beneficial in handling form data at the process-integration level, especially data exchange, it lacks a robust presentation layer, so maintaining fidelity between paper and electronic forms is difficult. XForms is not widely and consistently supported in readily available applications. To provide much beyond very basic data capture, XForms must usually be extended through proprietary formats and often requires desktop applications.

PDF Forms

PDF forms are a type of PDF file that contains form data, logic, and presentation information to render high-fidelity business forms, especially forms that require the same look and feel on screen as well as on paper. PDF forms are a component of the ISO 32000:1 (PDF v1.7) specification.



PDF and XML interoperability with a PDF form

While most form technologies provide a data layer and some level of business logic (either on a server or locally), PDF forms provide the additional strength of a very precise presentation layer that has driven PDF to become a global standard for the accurate and consistent rendition of business forms. PDF is also an established platform-independent format, supporting Windows®, Linux®, and Mac OS operating systems. It also enables individual forms to be components of larger business documents and packages, such as an insurance claims process, a mortgage application, or a social services case file, including paper and electronic forms. PDF files can also be used for archiving, particularly when using the PDF/A archival standard (ISO 19005-1:2005).

Summary

Forms can range in their uses. Forms requirements vary according to the industry or organization. The public sector, financial services, insurance, manufacturing, healthcare, and life sciences have different needs and constituencies. Organization must choose forms technologies that can support their unique industry standards, regulations, and users.

Organizations can employ several different form technologies to address the different requirements of ad hoc forms, departmental and business forms, and mission-critical forms. In determining the selection, evaluate the costs of deploying in multiple channels and finding platforms that can support the different types of forms automation.

The presentation layer is often a critical component of a form for regulatory, legal, and archival purposes. Organizations must assess form presentation and fidelity requirements across the entire form-enabled process to ensure ease of use, support adequate user participation, reduce data-entry errors, comply with regulations, and ensure data and security at all process points.



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