Adobe® LiveCycle® output solutions

Choosing a document generation product to meet your business requirements

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This document is designed to help new and existing Adobe customers that are considering an Adobe output solution or that want to understand their existing output solution in the context of other Adobe offerings.

Output solutions are used to generate documents as part of a business process. Unlike dedicated document conversion solutions such as Adobe LiveCycle PDF Generator ES software that convert existing documents to PDF, output solutions create personalized transactional documents by merging data from a back-end system with predefined templates in a variety of formats. These documents contain critical data and information about the transaction. For example, a bank teller may generate a receipt for an account transaction; a call center agent may generate a letter containing the details and outcome of a call; a social services administrator may generate a notice approving an applicant for housing subsidies; or an insurance agent may generate a policy for insurance coverage that contains the pertinent amounts and terms.

Core capabilities

Core capabilities of output systems include design-time document template creation and runtime document composition. Document templates are typically developed in graphical user interface (GUI) design tools that contain all of the elements that compose a document: fixed text, graphics, logos, lines/boxes, page numbers and defined places for variable fields, barcodes, and text to be placed. The template should be expressive enough to allow content to flow depending on the data that will be merged into it. The runtime aspect of this process is the merging of the template with a data set, which may vary greatly from transaction to transaction. The result flows based on the data available and the structure of the template. The number of pages varies and grows to accommodate the available data. Parts of the template may be present or not, depending on the data. The result is a highly specific and personalized document for a particular business transaction.

Output solutions create documents in a variety of formats, ideally from one template that is independent of the final format. Core formats for an output solution include:

- Electronic formats (PDF, PDF/A, TIFF) for electronic delivery and archiving
- Laser printer formats (such as PostScript,® PCL, LIPS) used for office printing
- Label printer formats (such as Zebra, Intermec, TEC) used for printing barcoded labels
- Production print formats (AFP, IJPDS, PostScript, PDF) used for mass printing operations

Formats and delivery channels are highly related. PDF can be delivered immediately to a browser and printed from the browser if desired. It can be e-mailed as an attachment, posted to a website, or placed in an archive as a document of record for a transaction. A PDF/A or TIFF format may be required for archiving applications depending on internal standards. For more information on PDF/A, an ISO standard for document archiving, visit *www.aiim.org*.

Documents may need to be printed on typical office laser printers. These devices print 25 to 50 pages per minute, print color or monochrome, and have capabilities such as double-sided printing (duplex), selectable paper trays, and staplers that an output solution needs to access. Label printers are specialized printers used to create barcoded labels for packaging and logistics solutions. Office and label printers are used for on-demand print generation in distributed environments. On-demand documents may also need to be faxed. Output solutions can be integrated with fax server solutions, which can fax documents in a variety of formats including PDF and PostScript. Fax capabilities are also available as a web-based service.

Centralized print environments or production print environments are complex and require specialized processing and capabilities. Printers typically print between 100 and 400 pages per minute and are part of a batch operation. Such high volumes require support for specialized print languages and facilities to sort and mark documents with optical mark recognition (OMR) marks or barcodes, so they can be automatically enveloped using insertion machines.

Output solutions often form a critical part of core enterprise business processes. These solutions should be easy to maintain, extend, and integrate, and they should enable you to generate documents in a wide range of world languages to support today's widely distributed supply and business channels. Creating a large library of templates can help you meet ever-changing business or regulatory needs. Output solutions should support fast changes to business processes and minimize the cost of maintaining libraries.

Output solutions may also provide capabilities to convert existing documents into another format and to create documents from other documents or parts of other documents—a process referred to as document assembly or packaging.

This technical guide does not focus on output solutions that include data capture or interactive document processes. Adobe offers solutions for those processes on the LiveCycle platform through Adobe LiveCycle Forms ES software. Adobe currently offers three output solutions:

- Adobe LiveCycle Output ES software provides on-demand enterprise document generation and printing capabilities.
- Adobe LiveCycle Production Print ES software focuses on centralized production print capabilities.
- Adobe Central Pro Output Server software is a long-standing Adobe product that provides reliable batch printing and on-demand document generation.

Adobe LiveCycle Output ES

Adobe LiveCycle Output ES is Adobe's output solution to convert, assemble, and dynamically generate personalized documents on demand in print and electronic formats on the Adobe LiveCycle ES (Enterprise Suite) J2EE-based platform. Its template design tool is Adobe LiveCycle Designer ES software. Adobe LiveCycle Output ES generates output in PDF, PDF/A, office printer, and Zebra label printer formats and provides a range of ways to access enterprise printers. It also offers capabilities to manage and assemble PDF files, as well as convert any PDF file to PDF/A, various image formats including TIFF, and PostScript for easy PDF file printing.

While this guide assumes a familiarity with the entire LiveCycle platform, note that certain aspects of the platform deliver significant value to LiveCycle Output ES. Adobe LiveCycle Workbench ES software hosts LiveCycle Designer ES; it offers repository services for creating and managing document template libraries. It also provides a process designer to visually create processes composed of multiple steps and publish them as a discreet compound service. Furthermore, LiveCycle Workbench ES allows LiveCycle Output ES services to be combined and integrated with other LiveCycle ES solution component services.

The LiveCycle runtime platform is J2EE based and offers a scalable, transaction-oriented architecture suitable for high availability, on-demand applications. It offers a range of ways to interact with individual solution component services as well as processes designed in LiveCycle Workbench ES. These include a direct Java™ programming model, web services (SOAP), Adobe Flex® remote interface, watched folders, and e-mail. Visit the LiveCycle Output ES web page at *www.adobe.com/products/livecycle/output* for more information.

Adobe LiveCycle Production Print ES

Adobe LiveCycle Production Print ES is Adobe's output solution to dynamically generate personalized documents for high-volume production environments. Its template design tool is LiveCycle Designer ES—the same as that used by Adobe LiveCycle Forms ES and LiveCycle Output ES software. LiveCycle Production Print ES excels in generating the print formats required for high-end production printers and offers extensive capabilities to manage production processes—sorting, post-processing, and marking documents for automated enveloping and insertion machines. In addition to production print formats, it generates output in PDF, PDF/A, office printer, and label printer formats.

LiveCycle Production Print ES combines LiveCycle Designer ES with a dedicated, high-performance document composition server and development environment that uniquely addresses the requirements of production print-oriented solutions. LiveCycle Production Print ES is not a J2EE-based application—it runs natively on the operating system. The software is typically run on a dedicated production server rather than on the same server as other LiveCycle applications. Visit the LiveCycle Production Print ES web page at *www.adobe.com/products/livecycle/productionprint* for more information.

LiveCycle Production Print ES is sold and supported by Adobe and is the result of an ongoing collaborative effort between Adobe and StreamServe.

Adobe Central Pro Output Server

Adobe Central Pro Output Server is a product originally acquired by Adobe from JetForm/Accelio. In some IT environments, it may still be referred to as "JetForm" or "JetForms." This product has been available in various versions for more than 15 years and provides a stable and reliable platform for document generation. Clients using this software may also be using Adobe Output Designer, Adobe Web Output Pak, or Adobe Output Pak for mySAP.com® software. These products form a related set that this guide refers to as "Central Pro."

Central Pro Output Server is not a J2EE-based application; rather, it runs natively on the operating system. It can be scaled, but it does not offer a scalable architecture. The template design tool is Output Designer. It provides capabilities to convert incoming text/ASCII data for processing, and it supports XML and its own field-nominated data format. It generates output in PDF and office printer and label printer formats, and it can e-mail and fax documents via a fax server. Visit the Central Pro Output Server web page at *www.adobe.com/products/server/centralpro* for more information.

Adobe continues to sell and support this product, remains committed to maintaining it, and plans to invest in updates to support IT environments as they evolve. We do not plan to add significant new functionality to the product; investment in new capabilities will be in the context of the LiveCycle product line. Most purchases are made by clients that are maintaining and growing their existing implementations.

Adobe encourages the installed base of Central Pro users to investigate the capabilities and advantages of the complete LiveCycle ES platform and to move to it over time. We understand that migration requires planning and is part of an overall application support lifecycle that occurs over a number of years. Thus Adobe commits to the Central Pro product set while providing a migration program to LiveCycle Output ES so that customers have the flexibility and choice they need to either maintain their existing installations or migrate to the LiveCycle ES platform on a schedule that meets their organizational needs and requirements.

For more information on this opportunity, visit the Move to Adobe LiveCycle Enterprise Suite web page at *www.adobe.com/products/server/outputserver/move_lces.html*. Also read the Adobe Central Output Server Migration Guide at *www.adobe.com/products/server/centralpro/pdfs/migration_guide.pdf* for detailed migration information and a better understanding of the differences between Central Pro Output Server and LiveCycle Output ES.

Clients using Adobe Output Pak for mySAP.com should familiarize themselves with Adobe's collaboration with SAP, which provides Adobe document technology directly in SAP software. Visit the Adobe and SAP web page at *www.adobe.com/enterprise/partners/sap.html* for more information.

Detailed product descriptions

This section describes the Adobe LiveCycle output products in detail and defines key representative use cases for each. Use cases provide insight into core usage and differences between the products.

LiveCycle Output ES

Development environment

Document templates for LiveCycle Output ES are created using LiveCycle Designer ES. LiveCycle Designer ES is hosted in LiveCycle Workbench ES, which is the Eclipse based integrated design environment for all LiveCycle ES applications. It offers a repository for storing and managing document templates and fragments as well as a GUI environment (process designer) for designing LiveCycle ES processes that can be composed of any LiveCycle ES solution component's services. The LiveCycle ES architecture allows for building custom Java components that can be deployed and used in the process designer, making the LiveCycle ES platform flexible and extensible. Visit the Adobe LiveCycle ES Tools web page at *www.adobe.com/products/livecycle/techsummary/tools.html* for more information.

LiveCycle Designer ES is a graphical design tool for creating form and document templates. It enables users to quickly design and maintain templates that contain fixed text; graphics; logos; lines/boxes; tables; radio boxes; checkboxes; page numbers; and defined positions for variable fields, barcodes, and text to be placed. It also allows colors and fonts to be selected for template elements.

Templates are composed of objects and groupings of objects known as subforms. The relationships between objects and subforms are declarative; they can be fixed on the page or relative to other objects. Generated documents flow depending on the data that is merged with the template. Templates can also contain business logic through the application of an extensive scripting and event model. They can be broken down into fragments that can be reused; for instance, a header and footer fragment can be defined once and each referenced in a set of 100 different letter templates. If a telephone number is changed, updating the header results in an update of all 100 letters.

LiveCycle Designer ES allows templates to be designed from scratch, with fields based on sample XML data or an XML schema. Fields and groups of fields can be selected from a data view and placed directly on the template, automatically binding the field(s) with the sample XML data structure or XML schema. Fields take on the name of the selected data element(s). LiveCycle Designer ES also supports import from other common formats: PDF, Output Designer (IFD), Microsoft Word, Microsoft InfoPath, and XForms. It has a built-in preview PDF file capability that speeds development, merges nominated or generated sample data with the template, and displays the resulting PDF file.

LiveCycle Designer ES supports the creation of documents and forms in a wide range of languages—Latin 1 (English, French, and German), Latin 2 (Greek and Russian), and Asian languages (Japanese, Korean, and Chinese)—as well as in languages with complex scripts (Thai, Vietnamese, Hebrew, and Arabic). Localization support provides proper formatting of numbers and dates to match local norms, such as using commas as number separators in the United States, but periods in France.

LiveCycle Designer ES has capabilities specific to LiveCycle Output ES. It allows documents to be designed with duplex intent if they are to be formatted for duplex printers and enables pages to be associated with logical paper trays, such as letterhead. LiveCycle Output ES uses device profiles (XDC) to define access to printer features. LiveCycle Workbench ES provides a Device Profile Editor for setting up new devices and mapping logical paper trays to physical ones, such as mapping letterhead to physical printer tray 2. It also provides a capability to Print Form with Data—essentially a print stream preview on a local printer.

LiveCycle Designer ES is the common form and template designer for LiveCycle Forms ES, LiveCycle Output ES, and LiveCycle Production Print ES. For more information on the extensive capabilities of LiveCycle Designer ES, visit the LiveCycle Designer ES web page at *www.adobe.com/products/livecycle/designer*.

Runtime environment

LiveCycle Output ES runs on Adobe LiveCycle ES Foundation software—an integrated environment for managing, administering, and executing LiveCycle ES processes. LiveCycle ES Foundation provides a consistent way to execute LiveCycle ES services and processes created in LiveCycle Workbench ES, which may access any LiveCycle ES service and third-party and custom services that have been created for an application. It provides access to the runtime repository, which contains critical assets such as processes, templates, and fragments. And it provides a range of invocation methods, including direct Java calls, SOAP web services, direct Flex calls, watched folders, and e-mail.

LiveCycle ES Foundation runs on a Java application server. It manages transactions across multiprocessor and multicore servers and on J2EE clusters for large transaction volumes and fault-tolerant applications. Visit the LiveCycle ES Foundation web page at *www.adobe.com/products/livecycle/techsummary/foundation.html* for more information.

Data and page input

LiveCycle Output ES accepts a wide range of XML data. If desired, data can conform to a schema, and document templates can be designed using the schema. XML data can be transformed using a built-in XSLT service. XML data is merged with LiveCycle Designer ES templates to generate documents in a variety of formats.

LiveCycle Output ES contains a component called ConvertPDF, which converts PDF documents to other formats. It creates PostScript for printing on any PostScript printer, and single and multipage TIFF files for archiving. LiveCycle Output ES can also convert an interactive PDF form to a PDF document, removing the interactivity. Its Assembler component can convert a PDF file to a compliant PDF/A file for archiving.

Document formats

LiveCycle Output ES can generate documents in a variety of formats:

- Electronic formats (PDF, PDF/A-1a, PDF/A-1b), TIFF (single and multipage), PNG, JPEG
- Laser printer formats (PostScript, PCL); control and access to printer features, color, resident fonts, duplex, paper trays, staple, and copies
- Label printer formats (Zebra)

Document manipulation and processing

The Assembler component of LiveCycle Output ES has extensive capabilities for creating and manipulating PDF files, including:

- Add and remove PDF pages.
- Assemble one PDF document from multiple PDF files.
- Assemble a PDF portfolio from multiple PDF files.
- Add a table of contents and hyperlinks to internal and external content.
- Add headers, footers, watermarks, and backgrounds to PDF pages.

- Add page numbers.
- Apply Bates numbers (sequential numbers that are used in court discovery documents and other regulated filings such as new drug applications) to pages.

Assembler execution is based on an XML control language called DDX, which can be created in advance or generated at runtime as part of a custom solution.

LiveCycle Output ES can process single documents and document batches. Batches can be generated as one file (print job) or as one file for each document (separate documents for archiving or e-mailing). When processing a document batch, an XML companion file (or files) can be selected to be generated. The companion file contains render information such as pages in the document and selected data from the input data file such as a fax number. These files can be used for statistics and for simplifying integration, for example, with a fax server. Although it is possible to manually implement rudimentary envelope-marking solutions via template scripting, it is not a core capability of LiveCycle Output ES.

Document delivery options

LiveCycle Output ES and LiveCycle ES Foundation provide a number of delivery options for documents. They can be delivered directly to a web browser, file system, or network printer; as an e-mail attachment; or via FTP to a remote server. Network printers can be accessed via Java printing, CUPS, LPR, and direct IP printing protocol.

LiveCycle Output ES can be integrated with fax servers or web-based fax services as well as archive systems. LiveCycle ES offers enterprise content management (ECM) integration via connectors as well as direct integration with the LiveCycle ES content services available in LiveCycle ES.

Other capabilities

Because LiveCycle Output ES executes on LiveCycle ES Foundation, it can be easily combined with other LiveCycle ES services. For instance, generated PDF documents can be certified using Adobe LiveCycle Digital Signatures ES software before being e-mailed to a recipient. LiveCycle Output ES can also form part of an overall LiveCycle solution. An Adobe LiveCycle Process Management ES solution may require a document of record to be generated by LiveCycle Output ES and archived at the end of a business process. LiveCycle PDF Generator ES provides extensive capabilities to convert existing documents into PDF. For instance, Word documents can be converted to PDF and then assembled with other PDF documents into a PDF package using the Assembler component of LiveCycle Output ES.

Representative use cases

There are many possible use cases for LiveCycle Output ES. Following are some representative ones.

Example case 1: A bank teller completes a foreign exchange transaction for a client. He presses the “receipt” button on the teller application. XML data representing the transaction is merged with a receipt template that was designed with LiveCycle Designer ES. A PDF document is generated and opens in the browser on the teller’s terminal. The teller prints the receipt to his local printer and hands it to the client.

Example case 2: A loan officer in a bank needs to complete the delivery of an approved loan agreement to a client. Within the banking system, she has the option to print locally, print to a mail center for physical mailing, or e-mail as a PDF file. Depending on the selection, LiveCycle Output ES will merge loan details with the appropriate template and format as required. The document can be generated as PCL and printed to the loan officer’s office printer; generated with a mail instruction separator sheet in PostScript; printed to a network printer in the mailroom of the bank’s regional HQ; or generated as PDF, certified by LiveCycle Digital Signatures ES and e-mailed to the client’s e-mail address automatically. The instruction sheet is printed on blue paper located in a second paper tray on the printer. In all cases, a PDF/A version of the document is stored in the bank’s archive.

Example case 3: A social services administrator works with clients in a neighborhood housing office, where he meets with them individually and reviews their cases for housing benefits. The core administration system is used for tracking claims and determining eligibility. When a decision has been made, the administrator meets with clients to explain the results of their claims, at which point a document that is carefully regulated for content and reviewed by social services lawyers must be printed and handed to the client. The client's information from the core administration system is merged with the required template, and a correct regulatory document is formatted and printed on the administrator's office printer.

Example case 4: A warehouse product picker places all of the required items in a shipping box, confirms the pick activity is complete in the warehouse order system, and presses the "shipping documents" button. The warehouse order system makes a request to LiveCycle Output ES to pass XML transaction data. The data is merged with a packing list template, which is sent to a PCL laser printer and also merged with a shipping label template, which is sent to a Zebra label printer at the station. The packing list is placed in the box, which is closed and sealed with the shipping label attached. It is placed in the bin of completed orders.

Example case 5: A financial adviser at a call center completes a client call in which she discusses three mutual funds. From a Flex based interface, she selects the three funds from a list and launches a letter application (LiveCycle Forms ES). The letter application presents a standard letter layout for such a call. She adds standard clauses and a personal message, and presses a "deliver" button. A standard letter is generated containing the added clauses and personal message and indicating that mutual fund datasheets will follow. The formatted letter is passed to Assembler along with the three datasheets. Assembler creates a single document with the letter and the three datasheets. A branded header and footer are placed on each page with the advisor's name, rep number, and today's date. The PDF file is e-mailed to the client.

Example case 6: A distributor provides a partner portal that lets partners request and download PDF product datasheets with the distributor's logo and details. The distributor logs into the portal and selects a datasheet. The portal has all of the distributor's information available in a database. LiveCycle Output ES formats a PDF overlay containing only the distributor logo, name, address, and other pertinent details in prearranged positions. This PDF overlay is imposed on top of the base datasheet requested. Placing the logo and information in prearranged blank areas, the distributor downloads the personalized PDF document and from Adobe Reader® software, he prints as many copies as required on the office color printer.

LiveCycle Production Print ES

Development environment

You can create document templates for LiveCycle Production Print ES using LiveCycle Designer ES, as described in the preceding section. A key capability of LiveCycle ES is that the same designer can be used with LiveCycle Forms ES, LiveCycle Output ES, and LiveCycle Production Print ES. This lets you leverage skills development in LiveCycle Designer ES and a library of form and document templates across all three products.

LiveCycle Production Print ES features a dedicated design environment called Design Center. LiveCycle Designer ES is integrated with Design Center, allowing direct access to document templates. Design Center allows each step in a production print process to be defined via GUI-based tools. Steps include incoming data format, date identification, association with a LiveCycle Designer ES template, formatting, sorting, page imposition, marking for enveloping machines, and final output format.

LiveCycle Workbench ES is capable of generating a LiveCycle archive (LCA), which can include a template and its related fragments. Live Cycle Production Print ES can read LCA files and import templates with related fragments into its repository. In this way, it can process both single LiveCycle Designer ES templates and templates with fragments.

Design Center organizes processes into projects, which are exported for runtime use. Each project contains all of the process definition, templates, fragments, and other resources required to execute in the runtime environment. The Control Center component manages the runtime server instances and places exported projects into production.

Runtime environment

The LiveCycle Production Print ES runtime environment is a dedicated performance-oriented runtime that runs natively on the operating system. The runtime scales processing transactions across multiple processors and cores. Control Center can manage multiple servers running the same or different projects. Thus the solution is highly scalable and can be configured for fault-tolerant applications.

Processes can be invoked through a number of mechanisms, including web services (SOAP), watched folder, COM, and Java technologies. It is also possible to integrate LiveCycle Output ES capabilities with application programs.

Data and page input

LiveCycle Production Print ES accepts both text and XML data input formats. Design Center has tools to map and process ASCII data files of fixed-record format and to overlay text format. In this way, data is made available for use in templates. XML and text data can be merged with LiveCycle Designer ES templates at runtime.

LiveCycle Production Print ES provides tools and runtime capability to read PDF and AFP pages. These pages can be read into the post-processing repository and combined with other pages into document packages for single documents or batch use cases. Since documents can then be formatted into any supported output format, this process acts as a document conversion process.

Document formats

LiveCycle Production Print ES can generate documents in a variety of formats:

- Electronic formats (PDF, PDF/A-1a, PDF/A-1b, TIFF, JPEG, HTML, BMP, GIF, PNG, RTF)
- Laser printer formats (PostScript, PCL) and some specialty laser printer formats
- Label printer formats (Zebra, Printronix, Intermec, TEC)
- Production print formats (AFP, IJPDS, PostScript, PDF)

LiveCycle Production Print ES offers control and access to printer features, duplex, paper trays, staple, and copies via its own post-processing capabilities. It does not use the capabilities of LiveCycle Designer ES templates, as does LiveCycle Output ES.

Document manipulation and processing

LiveCycle Production Print ES offers extensive post-processing and document manipulation capabilities. It can sort batches of documents and split batches into individual documents or smaller batches based on document metadata such as state. Sorting can also be accomplished based on the number of pages, including preprinted inserts that will be placed in one envelope to accommodate two or more separate enveloping machine configurations. Documents can be imposed for different configurations such as two-up, duplex, and booklet printing. You can mark documents for enveloping machines using OMR marks or barcodes, control envelope inserts, and add processing tags for operational needs.

Some capabilities rely on use of the post-processing repository. This is a database of formatted pages that can be manipulated in various ways to create document packages and perform advanced sorting such as householding, where all documents for one address are treated as one document and placed in one envelope. The post-processing repository can also be used to store single documents for eventual release and process them as a batch. It is also possible to create and store queries to release sets of documents. For instance, all of the documents for the state of Florida could be released for processing as one batch.

Document delivery options

LiveCycle Production Print ES provides a number of document delivery options: to a file system, to a network printer, as an e-mail attachment, and to a fax server. And they can be integrated with various archives. LiveCycle Production Print ES also provides the capabilities needed to deliver documents in envelopes into the physical mail stream.

Other capabilities

Although the focus so far has been on the batch-oriented capabilities of LiveCycle Production Print ES, the software is also capable of formatting single documents for office printing and label-printing applications.

Representative use cases

LiveCycle Production Print ES may be used in many different scenarios. Following are some representative use cases.

Example case 1: A brokerage firm sends trade confirmations to clients. Clients may perform multiple trades a day, and trade confirmations must be printed and delivered to the client by law. Hundreds of thousands of trades are processed daily. The costs of mail confirmation must be optimized. Householding is one way, with all confirmations for an account delivered in a single envelope. Due to the volume of trade and other mailed communications, the brokerage firm has a centralized printing and mailing facility with an on-site post office. A data set is generated for the day's trades, and a document for each trade is generated and stored in the post-processing repository. It is then sorted for householding, placed into one of two streams for different envelope sizes, and sorted by ZIP code. Once sorting is complete, two AFP print streams are generated with OMR marks to instruct the enveloping machines. The streams are printed on a roll-fed printer. Rolls are moved and processed, and pages are processed by the enveloping machine in order. Hundreds of thousands of envelopes are placed into the mail stream.

Example case 2: During the day, a call center deals with client account requests and changes. Some transaction confirmations must be printed and mailed, as not all clients have e-mail access. Client services representatives (CSRs) can select standard letters through an interface, depending on the situation, and any personal messages needed to clarify the results of interactions (Flex or LiveCycle Forms ES). A supervisor must approve some letters; that capability is enabled with LiveCycle Process Management ES. Throughout the day, this process is used to generate letters in response to calls and manage any required approvals. XML data representing one letter is sent to LiveCycle Production Print ES. Each is processed using the appropriate LiveCycle Designer ES template and stored in the post-processing repository. Twice a day, a mail run is processed. All available letters in the post-processing repository are processed as a batch. PostScript is used to drive a 100-page-per-minute cut sheet printer, and documents are marked for enveloping.

Example case 3: A government agency prints letters of notice using AFP print streams and a legacy solution. The executive IT committee mandates that all letters of notice must henceforth be archived in PDF/A format for each client. The AFP print stream is read page by page to the LiveCycle Production Print ES post-processing repository. Each formatted page is represented, and the original AFP TLE information is captured as metadata so that the number of pages is known. Each individual letter is written as PDF/A in a separate file. The files are bulk-loaded into the agency's archive system.

Central Pro Output Server

Development environment

Document templates for Central Pro Output Server are created using Output Designer, which is a graphical design tool that enables users to design, test, and maintain templates containing fixed text, logos, images, barcodes, lines/boxes, tables, and fields for variable text. It also allows designers to establish colors and fonts. Output Designer is not as sophisticated an interface as LiveCycle Designer ES, however. It does not support fragments or a comprehensive scripting and event model.

Templates are composed of objects and groupings of objects known as subforms. The relationship between objects and subforms can be established in Output Designer or controlled through a type of primitive scripting model called a preamble. The flow of generated documents depends on data content.

Output Designer allows documents to be designed for specific output targets, notably PDF, specific preconfigured printer models, and fax servers. You can define duplex formatting using templates and select paper trays.

Output Designer supports a range of template languages: Latin 1 (English, French, and German), Latin 2 (Greek and Russian), and Asian languages (Japanese, Korean, and Chinese).

Runtime environment

Central Pro Output Server runs natively on the operating system. It can be invoked in three ways: via a watched folder, e-mail, or command-line execution. Unlike LiveCycle Output ES, it is not possible to call Central Pro Output Server directly from an application program except via a system call to the command line. You can establish multiple watched folders, but work must be split across each by the application. It is therefore possible to scale a Central Pro Output Server application, but it does not scale out of the box.

You can invoke a simple program via a watched folder or e-mail that searches the provided data file for a string and matches it with a simple set of steps that are executed sequentially. These steps, contained in a file called the Job Management Database (JMD), invoke agents:

- Transformation agent, for transforming fixed and overlay text data into usable data for formatting
- Print agent, for merging data with templates and generating output based on the specific target chosen at template design time
- E-mail agent, for sending PDF documents as attachments
- Preview agent, a way to format a PDF document and send it to a client to view

A typical set of steps may transform overlay data, format it into a PCL document, and print it.

Data and page input

Central Pro Output Server supports a data input format known as field-nominated format. This format consists of name value pairs and commands that interact with the preambles defined in Output Designer templates. Unlike in the LiveCycle Designer ES model, data and template are not kept separate when using this format.

Central Pro Output Server can also use XML and ASCII or text formats. Text formats can be fixed or overlay in nature. The Visual Transformation Editor is used for mapping strings and values in overlay text files to individual fields. The Transformation Agent uses the mapping file generated at runtime.

Document formats

Central Pro Output Server can generate documents in a variety of formats:

- Electronic formats (PDF)
- Laser printer formats (PostScript, PCL); control and access to printer features, color, resident fonts, duplex, paper trays, staple, copies
- Label printer formats (Zebra, Intermec, TEC, Datamax)

Central Pro Output Server formats documents for fax server targets. It generates PostScript with embedded commands interpreted by the fax server.

Document manipulation and processing

Central Pro Output Server does not have any of the conversion or extensive document assembly capabilities provided by LiveCycle Output ES. You can make a document package from multiple templates using the field-nominated data format.

Central Pro Output Server can process single documents and document batches. Although it is possible to implement rudimentary envelope-marking solutions via preamble scripting and custom programs, it is not a core capability and is complex to implement.

Document delivery options

Central Pro Output Server is capable of writing documents to the file system and a network printer, attaching a document to an e-mail, and faxing via a fax server.

Other capabilities

Although this guide focuses on Central Pro Output Server, many clients also use Adobe Web Output Pak. It hosts the same formatting engine as Central Pro Output Server but in a web context. It can be accessed via CGI or COM and is invoked by running a special program called Transaction Processor. This program executes an XML syntax command file called an XPR. An XPR file is not just a simple list of commands—it has if/then/else constructs and can invoke steps based on data content. Although this is more sophisticated then the Central Pro Output Server job management database, it is rudimentary compared with LiveCycle Workbench ES process design capabilities.

Representative use cases

Central Pro Output Server provides many of the same capabilities that LiveCycle Output Server does, and it can perform functions similar to those described in the LiveCycle Output ES use cases: a bank teller completing a foreign exchange transaction, a loan officer delivering an approved loan, and a warehouse worker picking and shipping products. Refer to the LiveCycle Output ES example cases 1 through 4 for details about these use scenarios.

Following is a use case specific to Central Pro Output Server, highlighting its ability to transform legacy data and merge it with a document template.

Example case: An invoice from a legacy system, formatted as a simple text overlay for a preprinted paper form, is dropped in a Central Pro Output Server collector directory (watched folder). The overlay file is opened and matched to a list of steps in the JMD. The data is read and transformed by reading each required field into a field-nominated data file. The file is then merged with an Output Designer template containing a color company logo and using corporate formatting standards. It is printed on plain paper on an office color printer, and a PDF file is generated for archiving purposes.

Product comparison

The following table compares the three Adobe LiveCycle output products based on a variety of key criteria.

Feature or capability	LiveCycle Output ES	LiveCycle Production Print ES	Central Pro Output Server
Sweet spot	On-demand document generation, printing, and PDF file assembly on the XML-centric, SOA-oriented LiveCycle ES platform	Centralized document generation for high-volume production, printing, and mailing processes	On-demand document generation and printing
Product status	Ongoing new development and releases; sold and supported	Ongoing new development and releases; sold and supported	Periodic maintenance releases only; sold and supported
Process design environment	Orchestration of all LiveCycle ES solution components via LiveCycle Workbench ES	Design Center integrated with LiveCycle Designer ES	Central Pro Output Server JMD, Adobe Web Output Pak XPR file
Design environment	LiveCycle Designer ES modern GUI with scripting model	LiveCycle Designer ES modern GUI with scripting model	Output Designer classic GUI with no scripting model
Template management	• Use file system • Use LiveCycle Workbench ES integrated repository for template and fragment management	• Use file system • Use LiveCycle Production Print ES asset repository; import LCA containing templates and related fragments	• Use file system • Use object library for basic repeating elements
Template design and testing	LiveCycle Designer ES PDF Preview, test print (Print Form with Data)	LiveCycle Designer ES PDF Preview	Output Designer PDF Preview and test print
Hosting environment	J2EE application that is scalable and can be clustered	Native application that is scalable	Native application with limited opportunities for scaling

Runtime environment	Process execution in LiveCycle ES Foundation on J2EE application server; database required	LCPP dedicated runtime; database required	Central Pro Output Server JMD, Adobe Web Output Pak XPR file
Invocation	Web service, Java API, e-mail, watched folder All methods can invoke a LiveCycle API or LiveCycle Workbench ES defined process	Watched folder, TCP/IP, HTTP (SOAP), e-mail, SMS, JMS, Java, COM, MQ	Command line, watched folder (collector directory), e-mail
Input data handling	• XML • Transformation between XML formats using XSLT	• XML • Text/ASCII data, overlay, comma-delimited, fixed-record data	• XML • Text/ASCII data, overlay, comma-delimited, fixed-record data • Field-nominated format (DAT)
Document output formats	• PDF, PDF/A-1a, PDF/A-1b • PostScript, PCL • Zebra label • TIFF, PNG, JPEG	• PDF, PDF/A-1a, PDF/A-1b • PostScript, PCL • AFP, IJPDS • Zebra, TEC, Intermec , Printronix label • CSV, HTML, XML, TIFF, JPEG, BMP, GIF, PNG, RTF • Windows® driver and dot matrix printers	• PDF • PostScript, PCL • Zebra, TEC, Intermec, Datamax label • HTML (via Web Output Pak) • Windows and fax server drivers
Ability to assemble, manipulate, and convert documents	Use PDF Assembler service: • Combine multiple documents and pages into a single PDF file or a PDF portfolio with multiple documents Manipulate PDF documents: • Add table of contents • Add headers, footers, and page numbering • Add watermarks, backgrounds, or overlays • Add, remove, rotate, and scale pages • Add XMP metadata Convert PDF to PostScript, TIFF, and other image formats	Combine and order pages in the post-processing repository: • Operate on pages that have been formatted from page input formats (PDF, AFP) Output in available formats, including post-processing and marking	None
Post-processing and enveloping	Split document batch into single documents	Extensive capabilities: • Sort and split documents in batch; on metadata, household, size of document, and inserts in envelope • Specify page imposition (two-up printing) • OMR or barcode mark for automated enveloping, insertion, and operational document tagging	None
Operating environment	Operating system: • Microsoft® Windows • Sun™ Solaris™ • IBM® AIX® • Linux® Enterprise Red Hat®/SUSE™ Application server: • JBoss • IBM WebSphere • IBM WebLogic Database: • Microsoft SQL Server • Oracle • MySQL • IBM DB2	Operating system: • Microsoft Windows • Sun Solaris • IBM AIX • Linux Enterprise Red Hat/SUSE Database: • Microsoft SQL Server • Oracle • IBM DB2	Operating system: • Microsoft Windows • Sun Solaris • IBM AIX • Linux Enterprise Red Hat/SUSE • HP-UX • IBM OS/400®
Representative performance*	Batch performance: 750 pages per minute Single-document performance: 6 documents per second	Batch performance: 5,000 pages per minute Single-document performance: 25 documents per second	Batch performance: 1,200 pages per minute Single-document performance: 12 documents per second

* These performance numbers are representative only. Performance numbers vary widely based on many factors, including performance and configuration of host machine, template complexity, features, and output format. LiveCycle Output ES and LiveCycle Production Print ES performance is compared using the same template and data set. Central Pro Output Server numbers are representative of a similar but different template. XML input data and a "Page 1 of n" format page number are used in both cases. In single-document cases, each document is two pages long. These numbers assume a modern single-CPU machine with two cores. Single-batch-file performance is not affected by multiple cores. Single-document execution for Central Pro Output Server is not enhanced by multiple cores out of the box; however, the calling application can be configured for multiple threads of execution.

Summary

If you are new to Adobe enterprise software and interested in an output solution, you will appreciate the productivity and capability of LiveCycle Designer ES, Adobe's award-winning document design environment. Many of the capabilities of an output solution are embodied in LiveCycle Designer ES software. Much of the work in implementing an output solution is in developing a library of form and document designs, so having an extensive design capability is imperative. A key consideration is efficient library maintenance. LiveCycle Designer ES and LiveCycle Workbench ES offer effective environments for ongoing maintenance activities. LiveCycle Workbench ES and LiveCycle ES Foundation offer a rich environment for process design and execution.

If your needs are oriented towards on-demand document generation, printing, and PDF document assembly on the LiveCycle ES platform, then consider LiveCycle Output ES. If your needs are more specialized and oriented toward centralized document generation for high-volume production printing and mailing processes, consider LiveCycle Production Print ES. An extensive LiveCycle deployment may call for both LiveCycle Production Print ES and LiveCycle Output ES.

If you are an existing LiveCycle ES client, you may be looking to add output capabilities to your solution. You may already be familiar with LiveCycle Workbench ES and the ability to define processes. LiveCycle Output ES adds output-oriented services to this familiar environment. You may have already invested in building an extensive LiveCycle Designer ES form library for use with LiveCycle Forms ES. Skills and assets from these deployments can be transferred for use with LiveCycle Output ES and LiveCycle Production Print ES.

If you are an existing Central Pro Output Server client, you may decide to continue using that application for years to come. You may also look at the capabilities and possibilities offered by LiveCycle ES and decide to migrate, over time, to that platform. Or you may choose to simply develop new applications with LiveCycle ES. Adobe Output Pak for MySAP.com clients may be interested in SAP Interactive Forms by Adobe.

This guide presents general information on Adobe LiveCycle ES output solutions; however, actual solution requirements and situations can be complex. Contact Adobe or your Adobe account representative for help in determining the best Adobe output solution for your enterprise.

Technical guide feedback

We welcome your comments. Please send any feedback on this technical guide to *LCES-Feedback@adobe.com*.

Adobe

Adobe Systems Incorporated
345 Park Avenue
San Jose, CA 95110-2704
USA
www.adobe.com

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