



# Adobe® LiveCycle® ES2 Output Solutions

Selecting a document generation solution that meets your expanding business requirements.

## Introduction

This document is designed to help new and existing Adobe customers who are considering an Adobe output solution or who 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 ES2, that convert existing documents to PDF, output solutions create personalized transactional documents by merging data from a back-end system with predefined templates into 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; an insurance agent may generate a policy for insurance coverage that contains pertinent amounts and terms; a bank may generate monthly account statements.

## 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 and 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. A 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](http://www.aiim.org).

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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 support. 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 be e-mailed or 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. They should enable you to generate documents in a wide range of world languages to support today's widely distributed supply and business channels. Output solutions should support fast changes to business processes and minimize the cost of maintaining template 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 document does not focus on output solutions that include data capture or interactive document processes. Adobe LiveCycle Forms ES2 offers solutions for data capture processes as part of the LiveCycle platform. Adobe currently offers three output solutions:

- Adobe LiveCycle Output ES2 provides on-demand enterprise document generation and printing capabilities.
- Adobe LiveCycle Production Print ES2 focuses on centralized batch production print capabilities.
- Adobe Central Pro Output Server 5.7 is a long-standing Adobe product that provides reliable batch printing and on-demand document generation.

## Adobe LiveCycle Output ES2

Adobe LiveCycle Output ES2 is Adobe's output solution to convert, assemble, and dynamically generate personalized documents on demand in print and electronic formats on the LiveCycle ES2 J2EE-based platform. Its template design tool is Adobe LiveCycle Designer ES2. LiveCycle Output ES2 generates output in PDF, PDF/A, office printer, and label printer formats and provides a range of ways to access enterprise network connected printers. It also offers capabilities to manage and assemble PDF files, as well as convert existing PDF files to PDF/A-1b, various image formats including TIFF, and PostScript for easy PDF 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 ES2. LiveCycle Workbench ES2 software hosts LiveCycle Designer ES2; 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 ES2 allows LiveCycle Output ES2 services to be combined and integrated with other LiveCycle ES2 module services including data capture.

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 Workbench. These include a direct Java™ programming model, web services (SOAP), REST, Adobe Flex® remote interface, watched folders, and e-mail. Visit the LiveCycle Output ES2 web page at [www.adobe.com/products/livecycle/output](http://www.adobe.com/products/livecycle/output) for more information.

## Adobe LiveCycle Production Print ES2

Adobe LiveCycle Production Print ES2 is Adobe's output solution to dynamically generate personalized documents for high-volume production environments. Its template design tool is LiveCycle Designer ES2—the same tool used by LiveCycle Forms ES2 and LiveCycle Output ES2. LiveCycle Production Print ES2 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.

Production Print ES2 combines Designer ES2 with a dedicated, high-performance document composition server and development environment that uniquely addresses the requirements of production print-oriented solutions. LiveCycle Production Print ES2 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. While Production Print ES2 has a separate development and runtime environment from other ES2 modules; it is easily integrated; LiveCycle Production Print ES2 processes can be invoked within a LiveCycle Workbench process; and any LiveCycle service can be invoked from within a LiveCycle Production Print ES2 process.

Visit the LiveCycle Production Print ES2 web page at [www.adobe.com/products/livecycle/productionprint](http://www.adobe.com/products/livecycle/productionprint) for more information.

LiveCycle Production Print ES2 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 20 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 document refers to as Central Pro. The current version is 5.7, with the exception of the Adobe Web Output Pak, which is 2.0.7.

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 as well as its own field-nominated data format. It generates output in PDF, office printer and label printer formats, and it can e-mail documents and fax documents via a fax server. Visit the Central Pro Output Server web page at [www.adobe.com/products/server/centralpro](http://www.adobe.com/products/server/centralpro) for more information.

Adobe continues to sell and support this product and remains committed to maintaining it. We do not plan to add new functionality to the product as investment in new capabilities will be in the context of the LiveCycle product line. Most new purchases of Central Pro are made by existing clients that are maintaining and growing their implementations.

Adobe encourages the existing install base of Central Pro to investigate the capabilities and advantages of the complete LiveCycle ES2 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. Adobe remains committed to the Central Pro product set while providing a migration program to LiveCycle Output ES2 so that customers have the flexibility and choice they need to either maintain their existing installations or migrate to the LiveCycle ES2 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](http://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](http://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 ES2. Clients using Adobe Output Pak for mySAP.com should familiarize themselves with Adobe's collaboration with SAP, which provides Adobe document technology within SAP. Visit the Adobe and SAP web page at [www.adobe.com/enterprise/partners/sap.html](http://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 use cases for each. The use cases can provide insight into core usage and differences between the products.

### LiveCycle Output ES2

#### Development environment

Document templates for LiveCycle Output ES2 are created using LiveCycle Designer ES2. Designer ES2 is hosted within Workbench ES2 which is the Eclipse-based integrated design environment for all LiveCycle ES2 applications. It offers a repository for storing and managing document templates and fragments as well as a GUI environment (process designer) for designing LiveCycle ES2 processes that can be composed of any ES2 services. The LiveCycle ES2 architecture allows for building custom Java components that can be deployed and used in the process designer, making the LiveCycle ES2 platform flexible and extensible. Visit the Adobe LiveCycle ES2 Tools web page at [www.adobe.com/products/livecycle/techsummary/tools.html](http://www.adobe.com/products/livecycle/techsummary/tools.html) for more information.

LiveCycle Designer ES2 is a graphical design tool for creating forms and document templates. It enables users to quickly design and maintain templates that contain fixed text, graphics, logos, lines, boxes, tables, radio buttons, checkboxes, page numbers, and defined positions for variable fields, barcodes, and text. It also allows colors and fonts to be selected for template elements.

Templates are composed of objects and groups 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 of 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 hundreds of letter templates. If a telephone number is changed, updating the header results in an update of all letters.

Designer ES2 allows new templates to be designed, 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 fields with the sample XML data structure or XML schema. Fields take on the name of the selected data elements. Designer ES2 supports importing from other common formats such as PDF, Output Designer (IFD), Microsoft Word, Microsoft InfoPath, and XForms. It has a built-in preview PDF file capability that speeds up development by merging nominated or generated sample data with the template, and displays the resulting PDF file.

LiveCycle Designer ES2 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.

Designer ES2 has capabilities specific to Output ES2. 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 ES2 uses device profiles (XDC) to define access to printer features. Workbench ES2 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.

Designer ES2 is the common form and template designer for LiveCycle Forms ES2, LiveCycle Output ES2, and LiveCycle Production Print ES2. For more information on the extensive capabilities of LiveCycle Designer ES2, visit the Designer ES2 web page at [www.adobe.com/products/livecycle/designer](http://www.adobe.com/products/livecycle/designer).

### **Runtime environment**

LiveCycle Output ES2 runs on the Adobe LiveCycle Foundation—an integrated environment for managing, administering, and executing LiveCycle processes. The Foundation provides a consistent way to execute ES2 services and processes created in Workbench, which may access any LiveCycle, third-party, or custom services. It provides access to the runtime repository which contains critical assets such as processes, templates, and fragments. It also provides a range of invocation methods, including direct Java calls, web services (SOAP), REST, direct Flex calls, watched folders, and e-mail.

LiveCycle 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 Foundation web page at [www.adobe.com/products/livecycle/techsummary/foundation.html](http://www.adobe.com/products/livecycle/techsummary/foundation.html) for more information.

### **Data and page input**

LiveCycle Output ES2 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. The XML data is merged with Designer ES2 templates to generate documents in a variety of formats.

### **Document and form conversion**

LiveCycle Output ES2 contains a component called ConvertPDF, which converts PDF documents to other formats. It creates PostScript for printing on any PostScript printer, including single and multipage TIFF files for archiving. LiveCycle Output ES2 can also convert an interactive PDF form to a PDF document removing all interactivity and the underlying form design. The DocConverter component can convert a PDF file to a compliant PDF/A-1b file for archiving as well as test PDF files for PDF/A compliance.

### **Document generation and formats**

LiveCycle Output ES2 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, Intermec, TEC, Datamax.

LiveCycle Output ES2 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, a single or multiple XML companion files can be selected to be generated. The companion file contains render information such as the pages in the document and selected data from the input data file, including 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 for insertion machines via template scripting, it is not a core capability of LiveCycle Output ES2.

## **Document manipulation and processing**

The Assembler component of LiveCycle Output ES2 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, and add Flash-based navigator to access portfolio content;
- 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.

Assembler provides a way to dynamically assemble Designer ES2 templates at runtime for use with Output ES2. It can combine separate templates into one; for instance an introductory letter template, a loan offer template and a sign off template can be combined into one document. Designer ES2 provides a way to define insertion points in a template that are used to insert a fragment or multiple fragments by dynamic assembly. For instance, a letter may contain a set of clauses that are defined as fragments and inserted as required. Dynamic Assembly is controlled by a DDX file, so LiveCycle developers have full control over the templates and fragments that are selected as the DDX is generated. In this way an insurance company that services 10 states can build the required template for Oregon from standard templates and state-specific fragments, as well as fragments specific to client information such as marital status, dependents or high risk, creating a highly customized yet compliant document for a specific set of circumstances.

## **Document delivery options**

LiveCycle Output ES2 and LiveCycle 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, CIFS and the direct IP printing protocol.

LiveCycle Output ES2 can be integrated with fax servers or web-based fax services as well as archive systems. It also offers enterprise content management (ECM) integration via connectors as well as direct integration with the LiveCycle Content Services ES2.

## **Other capabilities**

Because LiveCycle Output ES2 executes on LiveCycle Foundation, it can be easily combined with other LiveCycle ES2 services. For instance, a generated Workbench PDF can be certified using Adobe LiveCycle Digital Signatures ES2 before being e-mailed to a recipient. LiveCycle Output ES2 can also form part of an overall LiveCycle solution. An Adobe LiveCycle Process Management ES2 solution may require a document of record to be generated by LiveCycle Output ES2 and archived at the end of a business process. LiveCycle PDF Generator ES2 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 portfolio using the Assembler component of LiveCycle Output ES2.

## Central Pro migration support

LiveCycle Designer ES2 imports Output Designer templates to help Central Pro users migrate to LiveCycle Output ES2. Migrating templates can however be a considerable effort if a large template library exists. Data for templates may also be generated or sourced from a number of existing systems that may not be easy to change. To help mitigate this process LiveCycle Output ES2 contains a set of services called the Central Migration Bridge. These services allow Central Pro data transformations and Output Designer template merges with existing data sources to be executed on the LiveCycle ES2 platform using Central Pro 5.7 executables. In this way the Central Pro migration can be staged with process integration with the source system being implemented first, utilizing the Central Migration Bridge services in LiveCycle Workbench ES2. Existing transformation scripts, Output Designer templates and data sources including Field Nominated data continue to be used. New applications can be developed using Designer ES2 and run with existing Central Pro applications on the same server.

## Representative use cases

There are many possible use cases for LiveCycle Output ES2. The following items are some representative use cases.

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 ES2. 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 ES2 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. It can also be certified by LiveCycle Digital Signatures ES2 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 ES2 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, closed and sealed with the shipping label attached.

Example Case 5: A financial adviser at a call center completes a client call in which she discusses three mutual funds. From a Flash-based interface, she selects the three funds from a list and launches a letter application provided by Forms ES2. The letter application presents a standard layout for such a call. She adds standard clauses and a personal message, and then 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 ES2 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 ES2**

### **Development environment**

Document templates for LiveCycle Production Print ES2 can be created using Designer ES2. A key capability of LiveCycle ES2 is that the same designer can be used with LiveCycle Forms ES2, LiveCycle Output ES2, and LiveCycle Production Print ES2. This allows you to leverage skills development in LiveCycle Designer ES2 and a library of forms, templates, and fragments across all three products.

Production Print ES2 features a dedicated process design environment called Design Center. LiveCycle Designer ES2 is integrated into Design Center, allowing direct access to templates. Design Center allows each step in a production print process to be defined via GUI-based tools. Steps include converting incoming data formats, data identification, association with a LiveCycle Designer ES2 template, formatting, sorting, page imposition, marking for enveloping machines, and final output formatting.

Workbench ES2 is capable of generating a LiveCycle archive (LCA), which can include a template and its related fragments. LiveCycle Production Print ES2 can read LCA files and import templates with related fragments into its repository. In this way, it can process both self-contained LiveCycle Designer ES2 templates and templates with fragments. In addition, templates and fragments can be read from the Workbench repository. Design Center provides a method to check for and apply any changes in referenced templates and fragments in a project. The LiveCycle Repository can also be used to manage a combined template library shared by multiple LiveCycle ES2 modules.

LiveCycle Production Print ES2 is accessible via a service in Workbench which invokes a named process and a LiveCycle ES2 process can pass work and control to a LiveCycle Production Print ES2 process. For instance, during the day, call center operators generate letters confirming changes in client accounts, a Workbench process passes a letter template and data to a named process on LiveCycle Production Print ES2 which formats and places the document in the post-processing repository. At night an operator releases all of the letters for batch printing and enveloping.

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 ES2 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 making the solution highly scalable and configurable for fault-tolerant applications.

Processes can be invoked through a number of mechanisms, including web services (SOAP), watched folders, COM, and Java technologies. It is also possible to integrate with the LiveCycle ES2 runtime.

### **Data and page input**

LiveCycle Production Print ES2 accepts both text and XML input formats. Design Center has tools to map and process ASCII data files of fixed-record format and to overlay text format. This data is made available for use in templates. XML and text data can be merged with LiveCycle Designer ES2 templates at runtime.

LiveCycle Production Print ES2 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. Objects on the pages in the post-processing repository may be read, altered, or new objects may be added. Since documents can then be formatted into any supported output format, this process acts as a document conversion process. For instance, a large AFP print file designed for a preprinted roll paper with a company logo can be read, be split into individual documents, have a company logo added in the top right where it is on the roll paper with each document saved in a PDF file to support an eStatement initiative.

### **Document formats**

LiveCycle Production Print ES2 can generate documents in a variety of formats:

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

Production Print ES2 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 Designer ES2 templates the same way as LiveCycle Output ES2.

### **Document manipulation and processing**

LiveCycle Production Print ES2 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 may 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 to 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 ES2 provides a number of document delivery options: to a file system, to a network printer, as an e-mail attachment, or to a fax server, as well as integrated with various archives. Production Print ES2 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 ES2, it is also capable of formatting single documents for office printing and label-printing applications.

## **Representative use cases**

LiveCycle Production Print ES2 may be used in many different scenarios. The following items 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 may be processed daily. The costs of mail confirmation must be optimized and householding is one way to accomplish this, 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 400 page-per-minute roll-fed printer. Rolls are moved to a page cutter 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 can select standard letters through an interface, depending on the situation, and any personal messages needed to clarify the results of interactions. A supervisor must approve some letters and this capability is enabled with Process Management ES2. 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 ES2 and each is processed using the appropriate LiveCycle Designer ES2 template and stored in the post-processing repository. Twice a day a mail run is processed and 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 ES2 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, 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 as LiveCycle Designer ES2 and 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 script called a Preamble. The flow of generated documents is dependant on the data.

Output Designer allows documents to be designed for specific output targets, notably PDF, specific pre-configured 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 as a service on Windows and as a daemon on UNIX and Linux platforms. It can be invoked in three ways: via a watched folder, e-mail, or command-line execution. Unlike LiveCycle Output ES2, it is not possible to call Central Pro Output Server directly from an external application except via a system call to the command line. You can establish multiple watched folders, but work must be split by the external application. It is therefore possible to scale a Central Pro Output Server application.

You may 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 are contained in a file called the Job Management Database (JMD) that invokes these 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 workstation 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 data in the form of name-value pairs and also commands that instruct and interact with the Output Designer template. Unlike the LiveCycle Designer ES2 model, data and the template are not separated.

Central Pro Output Server can also use XML or text data formats, the text formats can be fixed or overlaid. The Visual Transformation Editor is used for mapping strings and values in overlay text files to individual fields. It generates a mapping file that is used by the Transformation Agent at runtime to extract data for use in a subsequent merge step.

### **Document formats**

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

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

Central Pro Output Server formats documents for fax server targets as well as 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 ES2 but you may make a single document from multiple templates using the field-nominated data format.

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

Clients using Central Pro Output Server 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 program called the 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 an if/then/else command construct and can invoke steps based on data. Although this is more sophisticated than the Central Pro Output Server job management database, it is rudimentary compared with the process design capabilities of LiveCycle Workbench ES2.

## Representative use cases

Central Pro Output Server provides many of the same capabilities that LiveCycle Output ES2 does, and it can perform functions similar to those described in the LiveCycle Output ES2 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 ES2 Example Cases 1 through 4 for details about these use scenarios.

The 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. 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 a color office 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.

Product Comparison			
Feature or capability	LiveCycle Output ES2	LiveCycle Production Print ES2	Central Pro Output Server
"Sweet spot"	On-demand document generation, printing, and PDF file assembly with manipulation on the XML-centric, SOA-oriented LiveCycle ES2 platform	Centralized document generation for high-volume production, printing, and enveloping 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	Sold and supported
Process design environment	Orchestration of all LiveCycle ES2 module services via LiveCycle ES2 Workbench	Design Center integrated with LiveCycle Designer ES2.  Design Center can invoke a named service on LiveCycle ES2.  LiveCycle ES2 Workbench can invoke named process on LiveCycle Production Print ES2	Central Pro Output Server JMD  Adobe Web Output Pak XPR file
Template design environment	LiveCycle Designer ES2 modern GUI with scripting model	LiveCycle Designer ES2 modern GUI with scripting model	Output Designer classic GUI with limited scripting model

Product Comparison			
Feature or capability	LiveCycle Output ES2	LiveCycle Production Print ES2	Central Pro Output Server
Template management	<ul style="list-style-type: none"> <li>Use file system</li> <li>Use LiveCycle ES2 Workbench integrated repository for template and fragment management</li> </ul>	<ul style="list-style-type: none"> <li>Use file system</li> <li>Use LiveCycle Production Print ES2 asset repository; import LCA containing templates and related fragments</li> <li>Use LiveCycle ES2 repository; linking to templates and related fragments</li> </ul>	<ul style="list-style-type: none"> <li>Use file system</li> <li>Use object library for basic repeating elements</li> </ul>
Template design and testing	LiveCycle Designer ES2 PDF Preview, test print (Print Form with Data)	LiveCycle Designer ES2 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 ES2 Foundation on J2EE application server; database required	LiveCycle Production Print executes natively on OS using dedicated runtime; database required	Central Pro Output Server executes natively on OS, no database required
Invocation	Web service, REST, Java API, e-mail, watched folder  All methods can invoke a LiveCycle API or LiveCycle ES2 Workbench defined process	Watched folder, TCP/IP, HTTP (SOAP), e-mail, SMS, JMS, Java, COM, MQ	Command line, watched folder (collector directory), e-mail. Named pipe
Input data handling	<ul style="list-style-type: none"> <li>XML</li> <li>Transformation between XML formats using XSLT</li> <li>Same formats as Central Pro using Central Migration Bridge.</li> </ul>	<ul style="list-style-type: none"> <li>XML</li> <li>Text/ASCII data, overlay, comma-delimited, fixed-record data</li> </ul>	<ul style="list-style-type: none"> <li>XML</li> <li>Text/ASCII data, overlay, comma-delimited, fixed-record data</li> <li>Field-nominated format (DAT)</li> </ul>
Document output formats	<ul style="list-style-type: none"> <li>PDF, PDF/A-1a, PDF/A-1b</li> <li>PostScript, PCL</li> <li>Zebra, TEC, Intermec, Datamax label</li> <li>TIFF, PNG, JPEG</li> </ul>	<ul style="list-style-type: none"> <li>PDF, PDF/A-1a, PDF/A-1b</li> <li>PostScript, PCL</li> <li>AFP, IJPDS</li> <li>Zebra, TEC, Intermec, Printronix label</li> <li>CSV, HTML, XML, TIFF, JPEG, BMP, GIF, PNG,</li> <li>Windows® driver</li> </ul>	<ul style="list-style-type: none"> <li>PDF</li> <li>PostScript, PCL</li> <li>Zebra, TEC, Intermec, Datamax label</li> <li>HTML (Web Output Pak)</li> <li>Windows and fax server drivers</li> </ul>

Product Comparison			
Feature or capability	LiveCycle Output ES2	LiveCycle Production Print ES2	Central Pro Output Server
Ability to assemble, manipulate, and convert documents	<p>Use PDF Assembler service:</p> <ul style="list-style-type: none"> <li>Combine multiple documents and pages into a single PDF file or a PDF portfolio with multiple documents and flash navigator</li> </ul> <p>Manipulate PDF documents:</p> <ul style="list-style-type: none"> <li>Add table of contents</li> <li>Add headers, footers, and page numbering</li> <li>Add watermarks, backgrounds, or overlays</li> <li>Add, remove, rotate, and scale pages</li> <li>Add XMP metadata</li> </ul> <p>Convert PDF to PostScript, TIFF, and other image formats; convert PDF to PDF/A-1b</p> <p>Dynamic assembly of LiveCycle Designer ES2 templates and fragments.</p>	<p>Page input:</p> <ul style="list-style-type: none"> <li>Read AFP and PDF document pages and convert to other formats</li> </ul> <p>Post-processing Repository:</p> <ul style="list-style-type: none"> <li>Combine and reorder pages in the repository</li> <li>Manipulate and add page objects</li> </ul>	None
Post-processing and enveloping	Split document batch into single documents	<p>Extensive capabilities:</p> <ul style="list-style-type: none"> <li>Sort and split documents in batch; on metadata, household, size of document, and inserts in envelope</li> <li>Specify sheet layout (two-up printing, booklet)</li> <li>OMR or barcode mark for automated enveloping, insertion, and operational document tagging</li> </ul>	None
Operating environment	<p>Operating system:</p> <ul style="list-style-type: none"> <li>Microsoft® Windows</li> <li>Sun™ Solaris™</li> <li>IBM® AIX®</li> <li>Linux® Enterprise Red Hat®/SUSE™</li> </ul> <p>Database:</p> <ul style="list-style-type: none"> <li>Microsoft SQL Server</li> <li>Oracle</li> <li>MySQL</li> <li>IBM DB2</li> </ul> <p>Application server:</p> <ul style="list-style-type: none"> <li>JBoss</li> <li>IBM WebSphere</li> <li>Oracle WebLogic</li> </ul>	<p>Operating system:</p> <ul style="list-style-type: none"> <li>Microsoft Windows</li> <li>Sun Solaris</li> <li>IBM AIX</li> <li>Linux Enterprise Red Hat/SUSE</li> </ul> <p>Database:</p> <ul style="list-style-type: none"> <li>Microsoft SQL Server</li> <li>Oracle</li> <li>IBM DB2</li> </ul>	<p>Operating system:</p> <ul style="list-style-type: none"> <li>Microsoft Windows</li> <li>Sun Solaris</li> <li>IBM AIX</li> <li>Linux Enterprise Red Hat/SUSE</li> <li>HP-UX</li> </ul>

Product Comparison			
Feature or capability	LiveCycle Output ES2	LiveCycle Production Print ES2	Central Pro Output Server
Representative performance*	Batch performance: 750 pages per minute	Batch performance: 5,000 pages per minute	Batch performance: 1,200 pages per minute
	Single-document performance: 12 documents per second	Single-document performance: 25 documents per second	Single-document performance: 12 documents per second

\*These performance numbers are representative only. Performance numbers vary widely based on many factors, including performance, configuration, and type of host machine, template complexity, features, and output format. LiveCycle Output ES2 and LiveCycle Production Print ES2 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 Windows machine with dual cores. Single-batch-file performance is not affected by multiple cores. Single-document execution for Central Pro Output Server is not initially enhanced by multiple. However, the calling application can be configured for multiple threads of execution which is not represented here.

## 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 ES2, Adobe's award-winning document design environment. Many of the capabilities of an output solution are embodied in LiveCycle Designer ES2 software. A great deal of the work in implementing an output solution is in developing a library of document templates and having an extensive design capability is imperative. A key consideration is efficient library maintenance. LiveCycle Designer ES2 and the LiveCycle ES2 Workbench Repository offer effective environments for ongoing maintenance and version activities. LiveCycle ES2 Workbench also offers 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 ES2 platform, then consider LiveCycle Output ES2. If your needs are more specialized and oriented toward centralized document generation for high-volume production printing and enveloping processes, consider LiveCycle Production Print ES2 although an extensive LiveCycle deployment can call for both LiveCycle Production Print ES2 and LiveCycle Output ES2.

If you are an existing LiveCycle ES2 client and are looking to add output capabilities to your solution, LiveCycle Output ES2 may add output-oriented services to this familiar environment. You may have already invested in building an extensive LiveCycle Designer ES2 form library for use with LiveCycle Forms ES2. The skills and assets from these deployments can be transferred for use with LiveCycle Output ES2 and LiveCycle Production Print ES2.

If you are an existing Central Pro Output Server client, you may decide to continue using the application for years to come. You may also look at the capabilities and possibilities offered by LiveCycle ES2 and decide to migrate over time and leverage the Central Migration Bridge or choose to develop new applications with LiveCycle ES2.

Adobe Output Pak for MySAP.com clients should investigate SAP Interactive Forms by Adobe.

This guide presents general information on Adobe LiveCycle ES2 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.

For more information and additional product details:

<http://www.adobe.com/devnet/livecycle/>

## Technical guide feedback

We welcome your comments. Please send any feedback on this technical guide to [LCES-Feedback@adobe.com](mailto:LCES-Feedback@adobe.com).



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