MADISON | ADVISORS

Enterprise Output and Customer Communications Expertise

Enterprise Output Management Market Study

A Madison Advisors Report

September 2005

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EXECUTIVE SUMMARY

Madison Advisors has recently completed an extensive study of enterprise output management – the processing and delivery of electronic documents to one or more output channels – in which we assessed market trends, demand, and the latest solution advancements. Key findings from the study include:

- **Print center consolidation is driving adoption** – Organizations use print management software to centralize and load balance document production across all resources – data centers, centralized reprographics, and distributed workgroup printers – with the ultimate goal of maximizing throughput, reducing costs, and monitoring operations from a single point of control.

- **Output management solutions are open to integration** – Nearly all of the solutions assessed during this Market Study include application programming interfaces for customized integration into an organization's environment. To support a wide range of customer requirements, the vendors expose their output management functionality for integration into other corporate systems, such as workflow process managers and portals.

- **Output management is riddled with complexity** – Most of the solutions on the market are mature products, originally designed to address specific customer needs. The vendors have evolved their products by adding support for additional printers and data streams. However, in many cases, they support different output types with varying levels of functionality.

Madison Advisors' study spanned the demand and supply sides of the enterprise output management market. Through several years of consulting experience with users of output management solutions, we have gained first-hand insight into the output management applications and requirements across a wide range of organizations. We also performed a hands-on assessment of each of the solutions in this study, reviewing the latest advancements.

This report presents the results of our extensive study of the enterprise output management market. In this report, we review the key market drivers, compare the solutions, discuss the best fit for each solution, and offer insight into the best practices of organizations that are highly successful with output management. We also provide an overview of each solution from the participating vendors.

VENDOR PARTICIPANTS

ASG-Cypress Cypress 5.0

Emtex Enterprise Suite

Esker DeliveryWare 3.5

IBM Infoprint Manager 4.2

LRS VPSX 1.0

Macro 4 Columbus OM 4.4

Océ PRISMAproduction 3.04

Solimar Systems Print/Director 2000 5.15

ENTERPRISE OUTPUT MANAGEMENT

Organizations with extensive print environments require a solution for enterprise output management. Typically, these organizations have three or more printers at a single site, multiple production sites, and/or distributed workgroup printers in corporate or industrial environments. Furthermore, they often have requirements for output to a combination of channels, including print, fax, email, and the Web for electronic presentment. Organizations that have multiple applications creating output utilize enterprise output management systems (EOMS) to centralize control and distribute delivery across the various output resources, which in turn helps them maintain regulatory compliance, meet service-level agreements, and/or reduce production costs.

To help such organizations understand how EOMS can help them better achieve their production goals, this section of the report provides background information on EOMS technology in the following areas:

- Defining Enterprise Output Management
- EOMS Key Characteristics
- EOMS Technology/Market Segments

DEFINING ENTERPRISE OUTPUT MANAGEMENT

EOMS solutions provide organizations with the ability to centrally manage and control print and electronic output. These systems consolidate input from different platforms and applications, centrally manage resources and documents, transform or process the documents, and deliver the output to various channels, including production printers, distributed network printers, fax, personalized email, and electronic presentment over the Internet.

The figure below illustrates how an EOMS solution centrally manages print and electronic output across a variety of inbound and outbound channels.

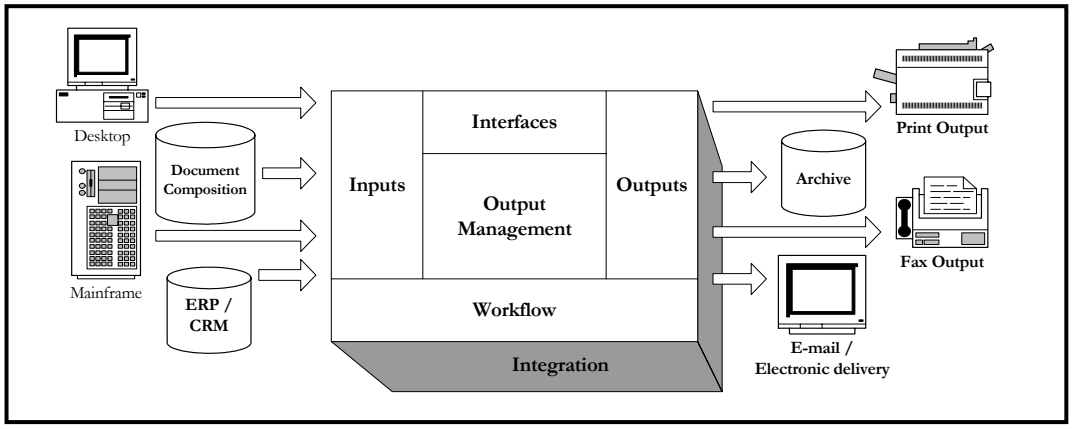

Figure 1 – EOMS Functional Overview

Throughout an organization, dozens, or even hundreds, of business software applications produce output, such as print files, faxes, internal reports and correspondence. For example, mainframe and open system back-office billing applications, enterprise resource planning (ERP) applications, or desktop applications such as Microsoft Word and Excel are used everyday to create documents, reports, invoices, etc. Once created, these documents are printed, faxed from the desktop, or sent to associates or clients through e-mail.

Output from the various platforms and applications can be routed to an EOMS. The input process can be seamless, requiring little input involvement from the end user. Or it can be interactive, enabling the end-user to specify the desired output destination, receive feedback from the EOMS on the status of the output, and/or receive notification if the output has been rerouted.

Furthermore, using business rules and workflow processes, EOMS solutions can make the best use of existing output resources. For example, EOMS solutions can direct large print files from a desktop workstation to a centralized workgroup printer instead of tying up the local departmental printer; they can schedule production print volume for a later shift; and then can format line data with graphics for better looking customer communications.

With an EOMS providing a central point of control, organizations have an audit trail for all output. The benefits of an audit trail are twofold. First, all customer communications, across all channels can be tracked. Users determine the appropriate follow-up actions based on information from the audit trail generated by the EOMS. Second, the audit trail provides confirmation of the content and delivery channel for each document. This allows organizations to confidently answer customer inquiries pertaining to billing, notices, or other documentation, and they can reproduce individual documents if necessary.

For compliance purposes, centralized management provides a log of system activity. The logs identify who produced what documents and when they were delivered to an output device. For example, organizations can use system logs to closely monitor the reproduction of financial documents. In addition, organizations can use system logs to track user activity, providing a mechanism to verify that individuals have not redirected or accessed personal financial or health care information. This level of control is vital for meeting SAS70 and HIPAA compliance audits.

An EOMS also enables organizations to maximize equipment utilization. With a central point of control for all output resources, organizations can plan production and maximize throughput. For instance, data streams can be transformed to run on different printers to shift production to under-utilized resources. To save on print costs, an organization may establish production rules to assign work to the lowest-cost printer, thereby maximizing throughput while minimizing costs. Furthermore, individual jobs can be split across multiple print resources to support peak production loads or equipment constraints. For example, an organization may choose to print only color pages on a color printer and separate the monochrome pages for production on a monochrome printer.

EOMS KEY CHARACTERISTICS

EOMS solutions must include key characteristics across several functional categories to manage and distribute output throughout an organization, as well as to customers, suppliers, and vendors. These characteristics include:

- **Application Interfaces –** User interfaces to present a centralized view of jobs, printers or other output devices, as well as output queues and administrative interfaces to configure users, devices, and activity logs.

- **Input Capabilities –** Software interfaces to receive multiple data streams, along with job specifications (ideally in a job ticket format), from other applications through one or more connections.

- **Output Capabilities –** Software interfaces to connect to printers, fax servers, digital archives, or other output channels and deliver data streams using job specifications to control the format, timing, production, and bindery.

- **Workflow Capabilities –** Software functionality to establish control over the production process to transform, format, route, and deliver jobs to the appropriate devices. Workflow capabilities also include the ability to support scheduled service-level agreements, active and passive event triggers, and closed-loop processing.

- **Output Management Capabilities –** Software functionality to control the timing and distribution of document production across available output resources (i.e. printers, fax servers, mail servers, etc.) based on recipient preference, resource features, and availability.

- **Integration Capabilities –** Programming interfaces for integration with back-office and production applications, digital content, and image archives through an open architecture with packaged integration.

EOMS Technology/Market Segments

The EOMS market is divided into three main technology segments: transactional, publishing, and distributed. Figure 2, below, shows a high-level breakdown of the different EOMS segments with the typical driving platform and printer type. This report is focused on the transactional market segment. For a high-level description of the publishing and distributed segments, see the sidebar on this page.

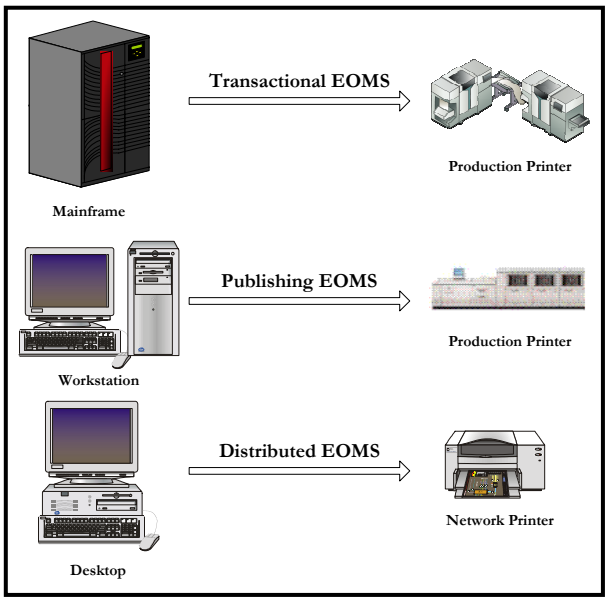

Figure 2 – High-Level EOMS Segments

Transactional EOMS systems support both batch production and ad-hoc transaction-driven output. For example, large-volume batch documents, including statements and invoices, are typically produced on a daily, weekly, or monthly production cycle. In most cases, a single AFP or Metacode data stream containing thousands or millions of individual documents is produced by a back-office application and sent to the EOMS or the EOMS pulls the batch from the mainframe. The EOMS then acts as the interface between the software application and the production printer.

Publishing EOMS

Publishing-oriented output management systems control the production of static or variable PDF documents through a "PDF-workflow." These workflow processes include pre-flight, trapping and imposition steps for full-color and print-on-demand (POD) documents. Creo Prinergy and Xerox FreeFlow are examples of publishing output management systems.

Distributed EOMS

Distributed output management systems monitor the delivery of individual users' print submissions to distributed network printers. These systems track print resource usage, monitor toner and paper levels, and notify users when their documents have been printed. HP Dazel and Lexmark MarkVision are examples of distributed output management systems.

Ad-hoc transactional output, on the other hand, is created by network-based office systems and enterprise resource planning (ERP) applications. For example, SAP R/3 uses proprietary interfaces and data formats for print production. For these ad-hoc transactions, EOMS applications ingest proprietary formats and deliver output to an organization's different devices in the appropriate format. Typically, EOMS solutions collect individual documents into small batches and route them to centralized production output devices, including printers, fax servers, and email servers. On the delivery side, EOMS applications track the preferred delivery channel for each document's recipient to ensure delivery using the appropriate channel. This process can be applied to ad hoc or batch output.

The following figure shows which type of EOMS each vendor and solution supports, across the technology segments defined above. The different solutions offer varying support for printer types, page description languages, and output channels.

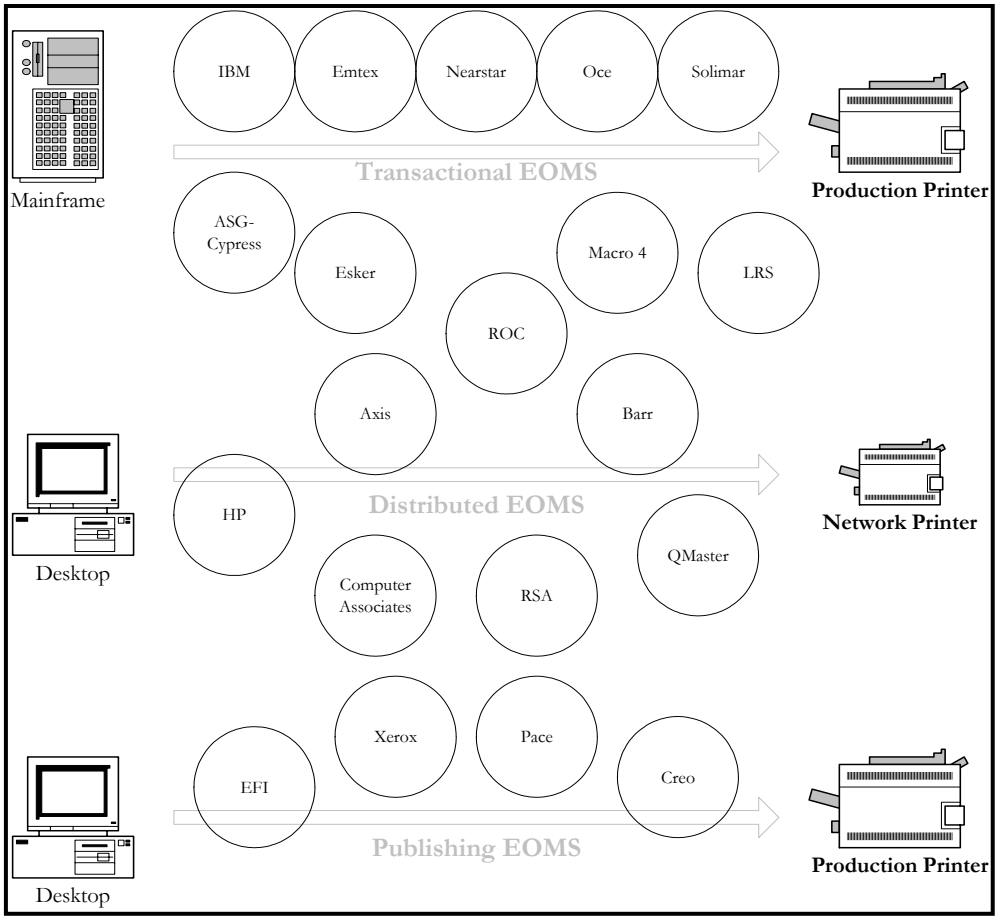

Figure 3 – EOMS Market Landscape

EOMS TRENDS

Through interviews with vendors and end users of EOMS technology, Madison Advisors has identified a number of market trends that directly impact the adoption and development of EOMS software. This section provides an overview of these trends.

PRINT CENTER CONSOLIDATION

Madison Advisors has encountered a trend toward print center consolidation that has been triggered by corporate mergers and acquisitions, as well as initiatives to reduce print and mail production costs. In many cases, the different facilities use equipment from different printer manufacturers and follow different procedures. Thus, organizations are creating environments with mixed data streams and printing systems that will ultimately require new management systems. For example, data centers and centralized reprographic departments use similar equipment. However, the former environment supports mainframe output and the latter supports network publishing, including color output.

The consolidation effort eliminates excess capacity at individual sites, but introduces a new challenge – namely, production print from multiple systems is routed to a centralized facility to be produced on equipment with different data stream support, resolutions, or fonts. Without a homogenous environment existing prior to the consolidation, corporate applications are producing output specific to a particular printer or printer group. It is impossible to prepare the print production and allow the output to switch output devices at the last minute, in cases where a printer is down or overbooked, without a print management system.

Therefore, organizations need a single EOMS to manage all print resources, or they are unable to eliminate the excess capacity because they need to maintain support for all of the various output variations. For large production operations, the EOMS must accept many data streams as input and transform these inputs as needed to match the requirements of the print device. For example, a dozen data streams from a legacy billing system may have been designed to use Xerox Metacode and pre-printed forms. Updating all of the legacy applications to accommodate new AFP printers is cost-prohibitive. Thus, it is the responsibility of the EOMS to first manage fonts, forms, and other print resources, and then transform the data stream from Metacode to AFP for consistent output on the new printers.

To accommodate mixed environments, EOMS vendors are introducing new transformation utilities, tighter resource control, and support for a more printers – e.g. IBM has upgraded InfoPrint Manager's support for Xerox transformations.

SERVICES EXPANSION

Centralized output production centers offer more services to their clients than in the past. To support consolidation efforts and resist outsourcing, production centers have invested in new color printing technologies and finishing equipment to provide a broader range of output options to a larger audience within the organization. In many organizations, production centers are working closely with purchasing and procurement departments to bring outsourced print back in-house where it is less expensive to produce. These production centers offer better internal customer service and are able to better utilize existing resources through new output management functionality.

Madison Advisors' analysis of both in-house print production facilities and commercial service bureaus reveals that these facilities are transforming from specialty operations to one-stop shops that cater to a wider range of customer demands. Some of this growth is due to the purchase of digital color production printers and new finishing equipment. But these facilities are finding that new, non-print services are also in demand. In some cases, transactional EOMS offerings enable recipients to select their preferred delivery methods. Internal users select to receive documents via e-mail, while customers can "turn off" print and go online to view documents processed through the EOMS.

Furthermore, to enable users to search for documents, the EOMS can be tightly integrated to an archive or content repository (IBM InfoPrint Manager and IBM Content OnDemand), or the repository can be embedded within the product (ASG-Cypress DocuVault).

To support increasing customer demands, production facilities must open up to non-print output channels. These channels are additional services that operations make available to their customers, which can be lower-cost alternatives to print output. The following figure shows the different output channels supported by each product.

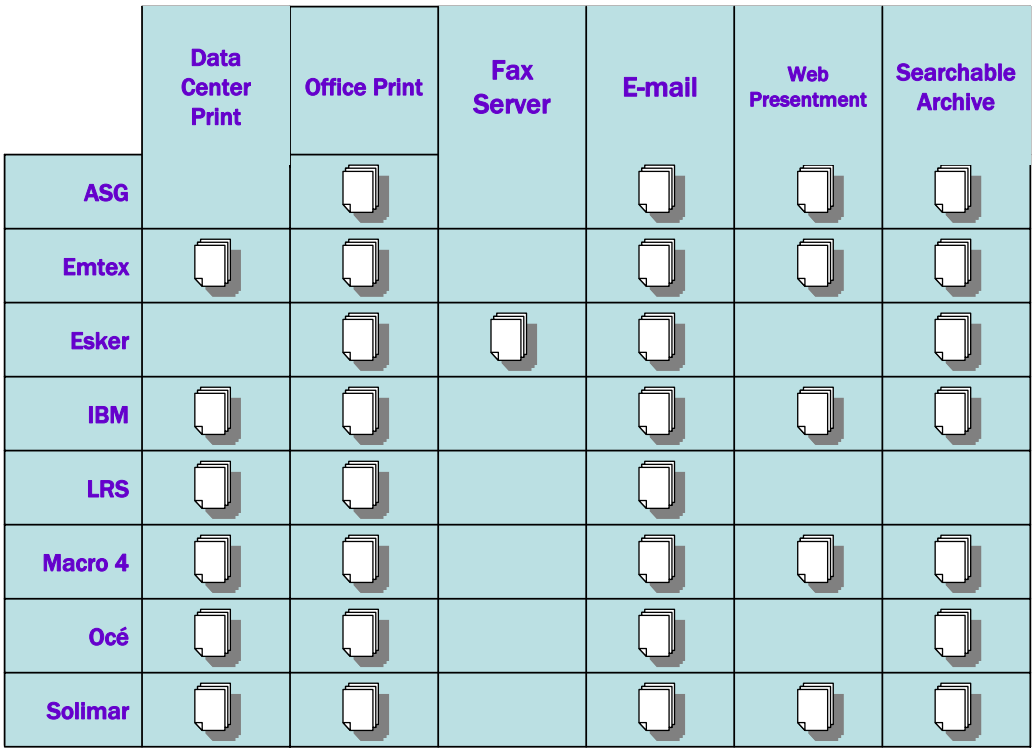

Figure 4 – Output Channels Supported by Vendor

Open Architectures

EOMS vendors use open architectures and programming interfaces to communicate with other systems throughout the organization. Image and content repositories are part of many corporate systems that must be integrated with the EOMS. Within an organization, the EOMS communicates and interacts with a number of different applications, including legacy mainframe applications, ERP and CRM applications, warehouse and inventory management, and document archives.

In order to increase the ease with which an EOMS is integrated into a corporate environment or production print organization, the vendors are exposing application programming interfaces (APIs) and upgrading their EOMS solutions to new platforms. For example, LRS VPSX uses a simple object access protocol (SOAP) API to expose print management functionality to other production applications. As

an alternative to API integration, the Emtex Enterprise Suite links systems together using an ODBC database, information embedded within the data, or file-based interaction.

Unlike in the past, when the EOMS was a monolithic, stand-alone system, Madison Advisors sees vendors opening access to their products. With more corporate users seeking access to output services, organizations are able to more easily integrate the new EOMS products into their environment. Seamless integration into ERP or corporate portals enables users to take advantage of enterprise output resources without extensive training. Many groups within the organization can use data from the EOMS. Accounting uses the data for billing or internal charge backs and customer service for inquires from customers or fraud detection.

Regulatory Compliance

Madison Advisors interviewed a number of organizations that are currently implementing EOMS solutions to address new requirements for regulatory compliance. Financial services, insurance, and health care organizations are struggling to comply with new requirements regarding privacy and financial disclosures in printed documents. Organizations are tracking the composition, creation, and packaging of each document individually and storing the details as proof of delivery when required.

To assist with this challenge, EOMS vendors are adding better internal audit capabilities and integrating with document composition systems upstream and intelligent insertion software downstream to collect production details for each document produced. Because the EOMS solutions have a complete view of the document production process, these solutions are able to maintain an accurate record creation and delivery process for each document.

Madison Advisors expects to see more organizations relying on an EOMS to monitor and track the end-to-end document production to support regulatory compliance and reporting. In a regulated environment, these solutions reduce the risk to the organization by notifying operations when an item is missing, incomplete, or damaged during the production process.

COMPARING THE SOLUTIONS

Madison Advisors compared the EOMS solutions across the key functional categories for managing and distributing output within the organization and to external entities including customers, suppliers, and vendors. These categories include:

- Application Interfaces
- Input Capabilities
- Output Capabilities
- Workflow Capabilities
- Output Management Capabilities
- Integration Capabilities

The following chart shows the relative strengths of each product across these functional categories.

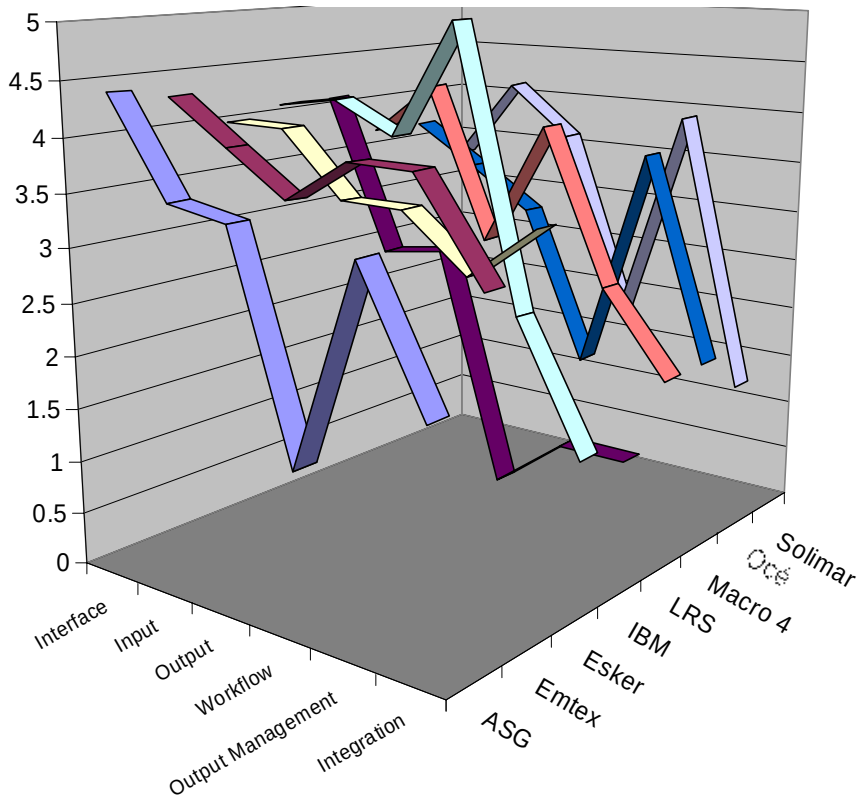

Figure 5 – Functional Product Comparison

As Figure 5 shows, the products are closely grouped in the **Interface** category. This reflects broad support for graphical interfaces across all product modules. All of the products have graphical user and operator interfaces, which directly impacts their usability. In addition, several products, including ASG Cypress, IBM Infoprint Manager and Océ PRISMAproduction offer a range of desktop and web clients for job submission. For international customers, most EOMS product interfaces are available in multiple languages.

Many organizations must balance ease of use with controlled access. In general, the products place greater restrictions on the operator interface through the use of network or LDAP-based security. IBM Infoprint Manager is configured to verify operator security through the network, Internet, or mainframe security program.

The different products' **Input** scores are mixed because the products are targeted at different segments of the transactional EOMS market. For example, LRS VPSX is focused on distributed print to TCP/IP attached printers, with a single operator interface for managing all the printers and few tools for end-user clients or job tickets. ASG-Cypress, on the other hand, provides several end-user interfaces for directing output to printers, fax devices, e-mail, and archives. ASG-Cypress also extracts, converts, and retains job ticket information for each job.

Emtex, IBM, LRS, Océ, and Solimar handle mainframe input using automated connections between the host and the EOMS server. From the mainframe's perspective, the server appears as a printer and the server sends printer messages back to the mainframe. Operators monitor the system for error messages in case the mainframe download fails. These systems manage very large print files and can operate across multiple servers and sites to accept input from multiple sources. The ability to support very large print files or very high transaction volumes is a function of the operating system and platform supported.

The products are also closely grouped in the **Output** category. Although some products favor certain output data streams over others, all of the products deliver six or more output data streams to high-speed and workgroup printers. The ASG-Cypress and LRS products only connect to TCP/IP printers, while the other products support other printer connections, including channel-attached printers, AppleTalk, and SNA printers. Macro 4's universal print driver connects network and remote clients to all of the organization's print resources without requiring the user or network administrator to load dozens of different printer drivers on each computer.

Another output factor is the product's support for different delivery channels and transactional print environments. Enterprise output management encompasses print, fax, and electronic delivery. Although many EOMS applications are focused on print output, the output can usually be archived and retrieved later by customer service representatives. For example, ASG-Cypress, Esker, IBM, and Solimar include (or are tightly integrated with) document archives from the same vendor.

The following figure shows the positioning of each of the EOMS applications included in the market study by the transactional market segment supported and by range of output channels supported. The applications to the left tend to be better suited for data center production, while the applications on the right are better suited for distributed workgroup production. Applications near the center offer capabilities for both data center and workgroup operations.

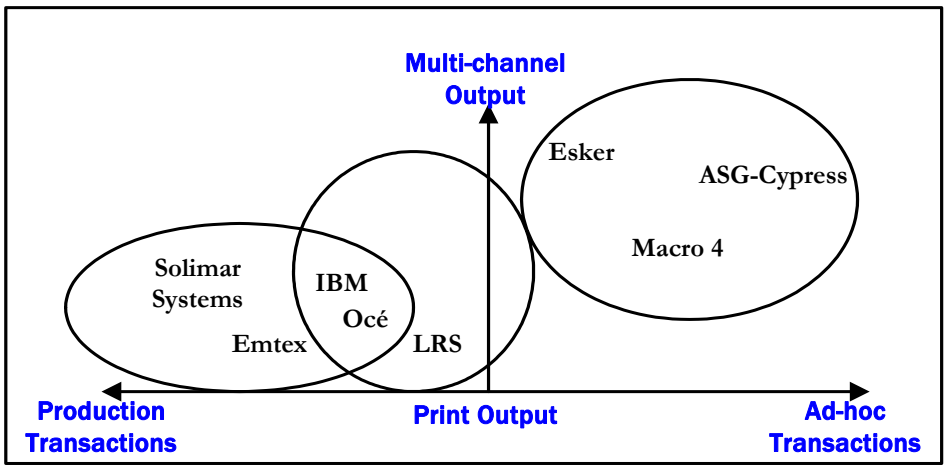

Figure 6 – Output Channel and Transaction Type Support

Emtex, IBM, Océ, and Solimar are built for centralized production printing with support for mainframe data streams, data stream transformation, and centralized accounting. IBM, LRS, and Océ support production and distributed print operations with a suite of products for gathering and distributing transactional data.

ASG-Cypress and Macro 4 are best suited for ad-hoc production environments with support for multiple output channels, a method for tracking delivery preferences, and tight integration with ERP applications. Esker supports both production and enterprise environments and delivers output to multiple output channels and archives.

The **Workflow** category contains the broadest range of scores, showing immaturity in EOMS workflow capabilities. Many of the assessed products rely heavily on scripting to accomplish workflow tasks, except IBM Infoprint Workflow, which uses a graphical design interface and allows designers to save tasks as objects for reuse in other workflows. With the workflow component of Macro 4 Columbus OM, designers start with pre-defined tasks or create their own for different workflows. Emtex EES allows workflows to be switched dynamically and in real time. Finally, it should be noted that Emtex recently acquired Option Software Systems, which includes workflow and scheduling components, but this new software suite was not available in time for this assessment.

The **Output Management** scores are also mixed. Solimar Systems Print/Director 2000 scored very well. The modular product offers point-to-point data stream transformation and excellent job ticketing features. The Solimar SMART module is a script-based tool for Metacode, PostScript, and PCL data stream manipulation. ASG-Cypress and Emtex also ranked highly. Both products transform incoming data streams into an internal format and provide robust resource management capabilities and data stream manipulation capabilities. With IBM Infoprint Manager, data streams are transformed on the central server or on the Transform Manager, a separate Linux server, to offload processing. All of the products provide some level of load balancing and job splitting, but do not support all data streams equally.

Most of the products' **Integration** scores are low. The scores are based on packaged integration to related applications such as document archives, mail processing systems, and databases. Esker DeliveryWare has packaged integration to document and image archives, ERP applications, and databases. The products from ASG-Cypress, IBM, and Solimar are tightly integrated to the vendor's corresponding document or content management product, but do not offer packaged integration to third-party archives. Emtex Enterprise Suite is integrated with ADF solutions such as Bell & Howell JETS and Pitney Bowes DFWorks.

An open application programming interface (API) is the key to product extensibility, because EOMS solutions must interact with a number of different corporate systems. Emtex offers two APIs to expose all of the product's functionality to other software applications, so the product can easily be integrated into a corporate portal or management console. LRS VPSX is built around a SOAP API, which is accessible to web services for integration with production applications.

Overall, Madison Advisors expects significant development activity from EOMS vendors to address end-user requirements for both production print and business process workflows because of organizations' demand for the ability to offer expanded services while maintaining regulatory compliance.

BEST FIT

While most of the vendors in our study target a variety of verticals and applications, there are best fits for each tool. The table below provides Madison Advisors' perspective on the best fit for each solution.

SOLUTION	BEST FIT	
ASG-Cypress Cypress 5.0	▪ Multi-channel ▪ Office	ASG Cypress provides document management and distributed output across enterprise output resources. Cypress software works for a number of vertical industries to automate document processes and enable controlled access to archived documents.
Emtex Enterprise Suite	▪ Data Center ▪ Production	Emtex Enterprise Suite provides centralized print management, accounting, and workflow for large- and medium-sized transactional and POD print centers with high-volume production and document-level tracking.
Esker Software DeliveryWare 3.5	▪ Multi-channel ▪ Office	Esker DeliveryWare automates the delivery of business documents from network applications across vertical industries by replacing paper-based processes with electronic processes. Esker On Demand for Office is a hosted service that enables an organization's users to deliver documents from the desktop across multiple output channels.
IBM Infoprint Manager 4.2	▪ Data Center ▪ Production	IBM Infoprint Manager and Infoprint Workflow provide a customizable print management solution across all vertical markets for high-volume production operations that require closed-loop tracking.
Levi, Ray & Shoup VPSX 1.0	▪ Data Center ▪ Office ▪ Production	LRS VPSX provides an integrated print management solution for the receipt, control, and delivery of documents from multiple platforms to distributed network and production printers, with particular focus on open-systems platforms such as UNIX and Linux.
Macro 4 Columbus OM 4.4	▪ Multi-channel ▪ Office	Macro 4 Columbus OM receives transactional documents from multiple corporate applications and automates business processes and production workflows to ensure delivery to multiple channels with minimal touch points.
Océ PRISMAproduction 3.04	▪ Data Center ▪ Office ▪ Production	Océ PRISMAproduction provides a modular print management solution for production, POD and office environments with medium- and high-volume transaction volumes.
Solimar Systems Print/Director 2000 5.15	▪ Data Center ▪ Production	Solimar Print/Director 2000 provides system connectivity, data stream conversions, production workflow control, and print management for medium- and high-volume transaction print production environments that require flexible and modular input and output options.

Table 1 – Best Fit for Each Solution

BEST PRACTICES

The best practices observed during our study indicate that organizations are streamlining operations and adapting to changing production environments to meet customer requirements. The best practices listed below demonstrate techniques used by leading organizations that are interested in cutting costs while improving the customer experience.

- **Production Tracking and Accounting –** Operating as cost centers, many production print facilities do not know their production costs and precise volumes of pages and envelopes. By implementing an EOMS solution, an organization can identify the sources for each print request and track actual production. Feeding this information back into corporate accounting systems enables the operations' management to budget and assign costs for production back to individuals or departments.

- **Quality and Regulatory Compliance –** Organizations within regulated industries often have tight control over data centers, but lack complete accounting for each printed document produced within the production facility. Facing stiff penalties for improper disclosure of medical information under new HIPAA regulations, sophisticated operations are implementing the EOMS as part of a closed-loop production tracking system. From the production of the data stream to delivery into the mail system, these tracking systems enable operations to verify that every document is produced only once with the proper enclosures and is delivered to post office. Furthermore, the ability to keep extensive records enables management to measure and defend system performance.

- **Process Improvement –** Using an EOMS to automate manual processes and eliminate steps in the delivery of documents, organizations are able to ease the burden of document delivery. By associating business rules with certain printers or specific document types, organizations are able to route output to the most cost-effective printer, automatically transform data streams to match the printer capabilities, and eliminate print through the use of email or electronic presentment. Organizations are realizing increased quality and reduced costs associated with enterprise document production.

SOLUTION REVIEWS

This section provides information on each of the solutions that were assessed as part of Madison Advisors' study. It includes contact information for the vendors, an overview of platform support by solution, and brief reviews of each solution.

VENDOR CONTACT INFORMATION

The following table provides contact information for each of the vendors that participated in this study.

VENDOR	HEADQUARTERS	CONTACT	CONTACT INFO
ASG-Cypress Cypress 5.0	Rochester Hills, MI	Michael Zayed	(248) 852-0066 mike.zayed@asg.com
Emtex Enterprise Suite	Boca Raton, FL	Julia Mowry	(561)241-7229 info@emtex.com
Esker Software DeliveryWare 3.5	Madison, WI	Renee Thomas	(608) 828-6140 renee.thomas@esker.com
IBM Infoprint Manager 4.2	Armonk, NY	Mary Dowling	(303) 924-7784 mdowlin@us.ibm.com
Levi, Ray & Shoup VPSX 1.0	Springfield, IL	Wendy Mettler-Wheeler	(217) 793-3800 ext. 1463 wendy.mettler-wheeler@lrs.com
Macro 4 Columbus OM 4.4	Crawley, England	Robyn Morris	+44 (0) 1293 872052 robyn.morris@macro4.com
Océ PRISMAproduction 3.04	Boca Raton, FL	Robert Raus	(561) 912-1404 rraus@oceprinting.com
Solimar Systems Print/Director 2000 5.15	San Diego, CA	Mary Ann Rowan	(619) 849-2800 mary.ann.rowan@ solimarsystems.com

Table 2 – Vendor Contact Information

PLATFORM SUPPORT BY SOLUTION

The following table lists the platform support for each solution in this study.

VENDOR	SUPPORTED SERVER OPERATING SYSTEMS
ASG-Cypress Cypress 5.0	▪ Windows 2003 Server
Emtex Enterprise Suite	▪ Windows 2000/XP/2003 and Sun Solaris (required)
Esker Software DeliveryWare 3.5	▪ Windows 2000/2003 Server
IBM Infoprint Manager 4.2	▪ IBM AIX ▪ Windows 2000
Levi, Ray & Shoup VPSX 1.0	▪ IBM AIX ▪ Sun Solaris ▪ HP-UX ▪ IBM zLinux
Macro 4 Columbus OM 4.4	▪ OS/390 (z/OS) ▪ VSE ▪ OS/400 ▪ IBM AIX ▪ Sun Solaris ▪ HP-UX ▪ Linux ▪ Windows
Océ PRISMAproduction 3.04	▪ Novell Suse Linux ▪ Windows 2003 Server
Solimar Systems Print/Director 2000 5.15	▪ Windows 2000/XP

Table 3 – Platform Support by Vendor and Solution

The remainder of this report provides overviews of each of the solutions that we assessed as part of this study.

ASG-CYPRESS 5.0

➢ **ORGANIZATION**

Based in Rochester Hills, MI, ASG-Cypress provides content management and delivery software with professional services support. Cypress software targets its offering toward a number of vertical industries, touting its ability to automate document processes, improve productivity, enhance customer service, and reduce costs.

➢ **SOLUTION**

Cypress is a single, integrated output management solution built around a central repository, the DocuVault. The offering has modules for business document processing, document archiving and document retrieval, report distribution, web and fax delivery, and data mining. The product also includes the Content Processing Facility (CPF), which "drives" document processes by automating the collation and delivery of reports and other documents across multiple output channels. Cypress receives and tracks output from line-of-business applications, managing document delivery preferences and providing delivery confirmation.

➢ **INTERFACE**

Cypress' administrative functions can be distributed across an organization by business unit or department. Administrators and sub-administrators use a graphical interface to create new or clone existing equipment configurations for new printers. The product provides ActiveX and browser-based interfaces to end users that act as an inbox for receiving and retrieving documents. Users can conduct multi-attribute searches using metadata and full text to find documents.

Cypress logs all job processes and user activity in the DocuVault and stores the documents as individual objects in its database. Retention is set by document type or the repository's default settings.

➢ **INPUT**

Network applications submit documents to Cypress across TCI/IP using FTP, LPR, or Direct Document Input (DDI), which is an enhanced version of LPR that supports additional job ticket parameters. DDI is also used to receive input from SAP R/3. The product pre-reads incoming data streams to determine formatting, ensure that appropriate administration rules are applied, and confirm that the data stream is indexed and normalized into the Cypress format.

AT A GLANCE

Cypress provides intelligent content management and distributed output for the end-to-end business enterprise.

Key Strengths

- Browser-based interface allows users outside the organization to access the DocuVault
- User inbox enables secure access to documents and participation in business document processes
- Address book and delivery preferences are accessible throughout the system

Areas of Caution

- Documents stored as objects in the DocuVault repository
- Content Processing Facility lacks a graphical interface

➢ **OUTPUT**

Cypress provides multi-channel delivery to print, fax, e-mail, and web. The Distribution Manager module enables administrators to script the distribution process using index values and the product tests the scripts to verify the results. The DocuVault maintains an address book to track delivery information for each individual and enables users to subscribe to cyclical output, such as reports. In addition, Cypress communicates with SNMP-enabled printers in real time to track print job status. Finally, e-mail delivery can be configured to send documents as attachments or as hyperlinks back to the user's Cypress inbox.

The figure below shows the output services and documents monitored by Cypress.

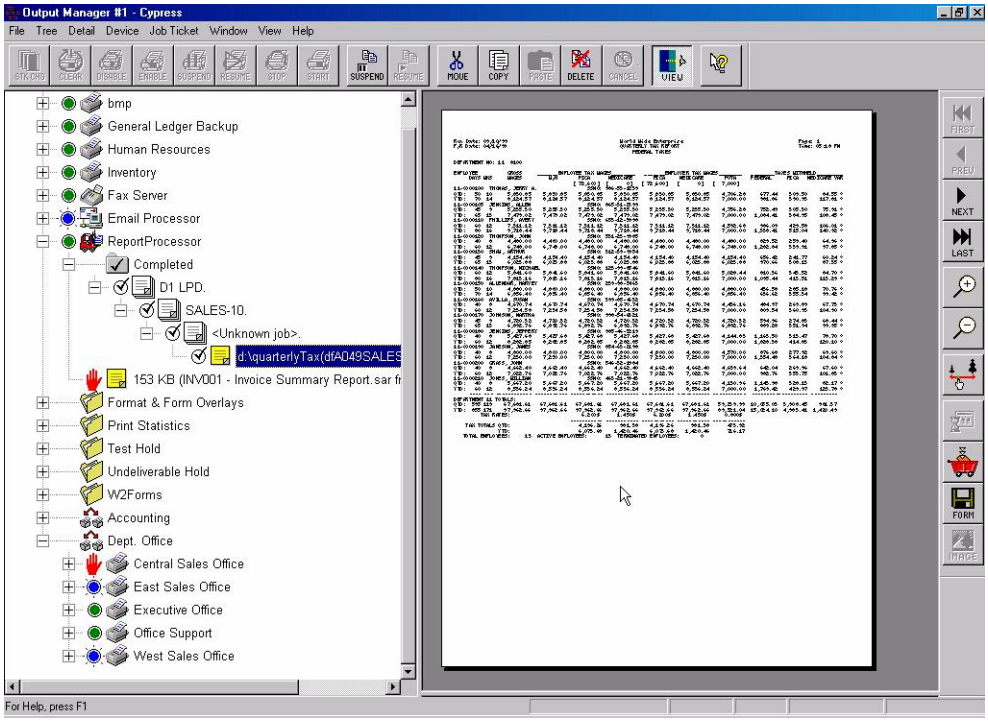

Figure 7 – ASG Cypress Output Manager

➢ **WORKFLOW**

The product's Content Processing Facility (CPF) enables administrators to define business document processes using a custom scripting language. The system automates the assembly and routing of documents with complete access to any object in the DocuVault, using any of the Output Manager functionality. The product lacks a graphical interface, but a debugger enables complete testing of scripts, and displays progress on screen or writes the results to a trace file.

- **PRINT MANAGEMENT** — Cypress provides a range of print management capabilities, including job splitting by page range, load balancing to first available printer in a printer pool, and error recovery. Futhermore, Cypress supports bi-directional communications with network printers to notify users of the printer status. The product automatically routes print jobs to a designated backup printer to restart on the next page, or administrators can restart them manually. As a background function, all print jobs are indexed automatically and both the document pages and indices are stored in the DocuVault.

- **INTEGRATION** — The Cypress DDI interface contains hooks that enable the system to capture additional job parameters for print jobs originating from SAP. In addition, the product can integrate to external applications using the Content Processing Facility or a dynamic link library (DLL) that is available to customers as a toolkit. With the DLL software, developers can also access all objects contained within the DocuVault, including address book information and delivery preferences.

- **ARCHITECTURE** — Cypress is a multi-tasking, multi-threaded application running on a single server. Multiple DocuVault servers can be configured to be seen as a single server to the end-user interfaces, although the administrator sees the individual servers on the same tree structure. Furthermore, the servers can be clustered to support hardware failover, and Cypress resources and shared objects are propagated automatically between servers.

  The product uses an object-oriented database capable of running on a Windows 2003 server. In addition, the product pulls user and group security information from the Windows Active Directory Service, and its database can be backed up while the system is online. Finally, the system exports content, indices, and business rules from a test environment and imports them into a production environment.

EMTEX, ENTERPRISE SUITE

➢ **ORGANIZATION**

Based in Boca Raton, FL, Emtex Software provides software products and professional services for centralized output management, accounting, and workflow for large- and medium-sized print centers.

➢ **SOLUTION**

Emtex Enterprise Suite consists of VIP 8.4, FlexServer 5.0, and VDE 2.0. The various products provide production printing, archiving, and electronic document delivery. The Emtex Enterprise Suite manages large transactional data streams from a range of legacy and network applications for production on printers from a wide variety of vendors. Emtex targets the Enterprise Suite and its high-volume production capabilities toward financial services, service bureaus, and public sector organizations.

➢ **INTERFACE**

Enterprise Suite provides a centralized view of all printers within an organization using icons to represent each device. It manages multiple sites and enables access to other Enterprise Suite servers. The interface displays printer properties and status as columns. Furthermore, it limits the operator's view, based on security rights and available printers. Operators can sort each attribute column to search for jobs. In addition, operators are notified of processing or production errors through a popup window on the server or via e-mail.

The product creates an audit log for all jobs and operator actions that occur in the system. In addition, the Enterprise Suite provides standard production and productivity metrics and enables organizations to create their own reports.

AT A GLANCE

Enterprise Suite is designed for high-volume transaction print environments, e.g. those with three or more production printers.

Key Strengths

- Graphical document re-engineering tool for changing legacy application print streams
- Print platform-independent output and reprints

Areas of Caution

- User-based security only, no group-based security – separate security for each module
- Multiple operating systems required to run the whole suite

➢ **INPUT**

Enterprise Suite accepts input through TCP/IP, SNA, and 3211 connections. The product allows users to submit jobs via LPR or by using network folders. It uses JESConnect to retrieve jobs from the JES mainframe spool and it allows checkpoint restarts and limited exit support. Enterprise Suite utilizes its own production job ticket profile to manage job specifications.

➢ **OUTPUT**

Enterprise Suite delivers output to network, SNA, SCSI, and channel-attached printers, and the product supports monochrome and color output for IBM InfoPrint, Nipson, Océ, Scitex, and Xerox printers. The FlexServer module drives

LCDS, PostScript and PCL printers directly. It also manages one or more VIP modules that drive output to IPDS printers. Furthermore, organizations can configure multiple printers to accept jobs with the same attributes, creating a printer pool for output. In addition, Enterprise Suite can produce multiple outputs in parallel.

Emtex Virtual Document Enhance (VDE) is a data stream re-engineering product for AFP, Metacode/LCDS, PostScript, PDF, and PCL. This product enables post processing of print output in a graphical development environment, including adding and deleting page objects, and performing calculations, address cleansing, and data stream splitting and merging. With VDE, output can be directed to multiple different channels, including print, fax, e-mail, and the Web for Web presentment. In addition, all of the functions are controlled using conditional logic and are developed using scripts. VDE's development interface shows the script in one window and the graphical results in another. Finally, an interactive debugger enables developers to step through the code and see results on the screen.

- **WORKFLOW**

With Enterprise Suite, the job class, resource locations, and other job attributes can be configured in the production job ticket profile. FlexServer mapping rules enable automated workflow processes. And the administrator uses VDE scripts to trigger conditional logic and make changes to the job profile, enabling the print to be re-routed if necessary.

In May 2005, Emtex acquired Option Software Systems, whose Option Software Suite provides shop floor management, JDF-compliant workflow, and scheduling capabilities. This software will expand Emtex VIP's data collection and production workflow functions for production publishing and transactional print management through a centralized interface.

- **PRINT MANAGEMENT**

Enterprise Suite supports any number of print queues, enabling full control over job processing and routing, including job splitting, load balancing, and automatic error recovery. The suite uses an internal data stream format, VDD (Virtual Dynamic Document), to manage production control and post processing, and includes a VDD viewer for operators to check jobs prior to printing. The Automated Reprint Manager (ARM) processes the list of damaged documents and triggers reprints based on key index values or a given page range.

Enterprise Suite supports any-to-any data stream transformation by using VDD as an intermediate format. This allows operators to easily re-route production to different printers, independent of the printer platform.

The figure below shows the VIP 8.4 operator interface, which is used to manage input clients, output clients, and the active job queue.

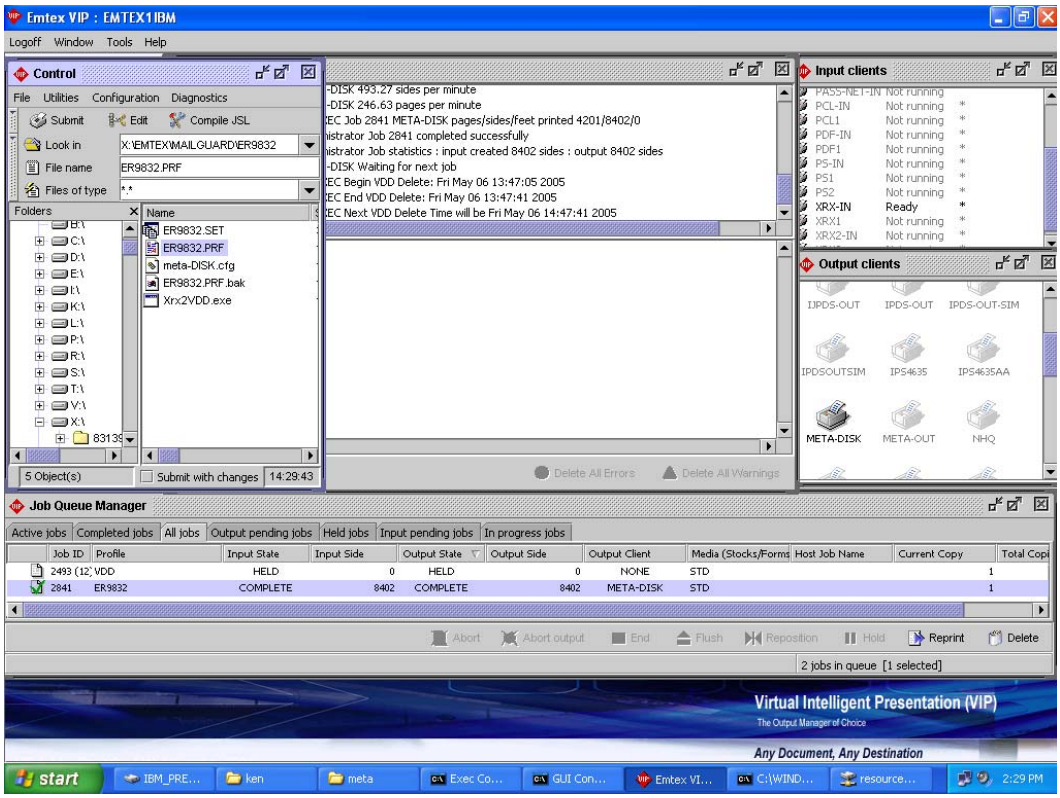

Figure 8 – VIP 8.4 Operator Interface

➢ **INTEGRATION**

Enterprise Suite allows integration to ERP applications, content management systems, and automated document factory solutions. The full functionality of VIP is accessible through the job submission and job control APIs. These APIs enable organizations to integrate VIP into open-system applications or portals with full control and bidirectional status. EES offers integration to Bowe Bell+Howell JETS and Pitney Bowes Direct Connect and DFWorks for closed-loop processing.

➢ **ARCHITECTURE**

Enterprise Suite consists of three primary components. FlexServer and VIP are a multi-threaded applications capable of receiving input from multiple sources and managing a large number of printers. For instance, in a multi-server environment, each server can be dedicated to a single task and each server can update the other servers within one site or across multiple sites.

Enterprise Suite supports user-based security that controls access to job types, printers, and printer groups. Separate security must be defined in the VIP 8.4 and FlexServer 5.0 modules. Within VIP 8.4, security also controls operator access to the various VIP utilities and limits the ability to drag and drop jobs on printers.

ESKER DELIVERYWARE 3.5

➢ **ORGANIZATION**

Based in Lyon, France with US headquarters in Madison, WI, Esker provides document management and delivery software with professional services and hosting facilities. Esker's software automates the delivery of business documents across vertical industries to reduce costs, enhance customer service, and improve quality.

➢ **SOLUTION**

Esker DeliveryWare allows organizations to exchange critical business documents between customers, business partners, and suppliers regardless of source, format, or destination. The product utilizes business rules to control document processes, translation, and transformations. Furthermore, the product streamlines business processes by replacing paper-based processes with electronic processes.

➢ **INTERFACE**

The product's administrative functions enable administrators to configure users and output channels. The product uses the Microsoft Management Console to manage users and groups or import information from Active Directory or an LDAP server. A browser-based interface enables users to search the document archive, view PDF and image files, and submit files for printing.

Esker DeliveryWare logs user activity and job status in an SQL database. It provides standard reports through a web-based interface. In addition, it provides access to the database tables via SQL commands. Developers can use Esker DeliveryWare's API for creating customized reports.

➢ **INPUT**

The product accepts incoming files over TCP/IP and SNA using LPD/LPR, FTP, or hot folders, or through the web-based user interface. Esker DeliveryWare also accepts files from the printer driver. In addition to standard print files, Esker DeliveryWare accepts HL7 (a specification for medical data) and EDI-formatted data streams, as well as specific SAP formats (RDI, XSF) or XML files.

AT A GLANCE

Esker DeliveryWare is designed to reduce or eliminate the paper involved in business processes to both streamline the processes and reduce costs.

Key Strengths

- Integration to SAP, Oracle, and PeopleSoft provides bi-directional communication of job status
- Multi-channel output includes inbound and outbound fax through a fax server

Areas of Caution

- Does not support Xerox Metacode or Xerox resources
- Does not support production or mainframe job ticket information

➢ **OUTPUT**

Esker DeliveryWare supports multi-channel delivery to print, fax, e-mail, and Web. The product communicates with printers over TCP/IP and supports bi-directional, real-time communications to printers. Delivery preferences and user information are maintained in a DeliveryWare LDAP directory or can be maintained in external databases such as Notes, Exchange, Novel Groupwise, ODBC-compatible databases or other LDAP directories. The product includes an embedded fax server to support inbound and outbound faxing. In addition, users can configure the e-mail delivery to send documents as attachments using standard e-mail servers – Exchange, Lotus Notes, SMTP or Internet Mail.

The figure below shows the Esker DeliveryWare administrator interface and available output connectors.

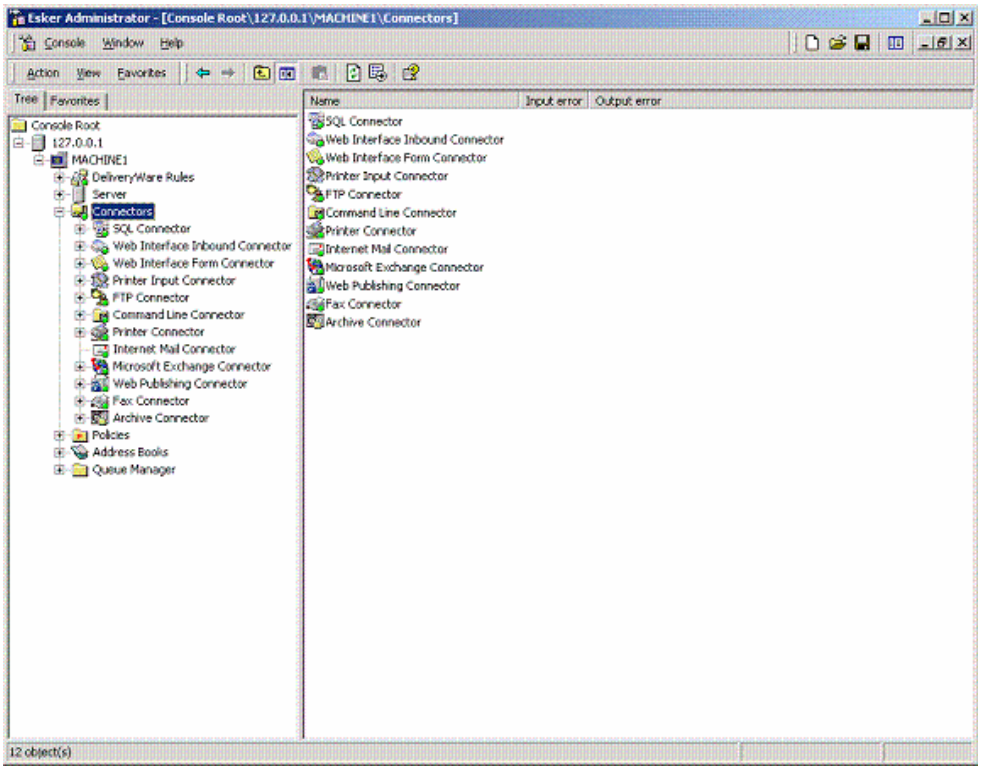

Figure 9 – Esker DeliveryWare

➢ **WORKFLOW**

The product provides a graphical interface that contains a number of wizards to guide administrators through the setup of automated processes. The system uses XML-format business rules, displayed graphically in Esker DeliveryWare Designer, to recognize inputs, route data streams, and apply formatting. Administrators can easily test rules and duplicate rules or process steps. The product enables administrators to create one rule to cover the entire business process for each document type. The system pre-reads documents for recognition as they are entered, and business rules are then automatically applied.

- **PRINT MANAGEMENT** — Esker DeliveryWare provides a range of print management capabilities, including job splitting by page range or type, load balancing to next available printer or in a round-robin fashion, and page-level reprints. Esker DeliveryWare also supports multiple point-to-point data stream transformations. In addition, the product automatically indexes jobs and indexed jobs are searchable within the repository for display or reprint. Finally, the product uses formatting rules to add bar codes or page numbers, change colors, perform calculations, and insert images or banner pages.

- **INTEGRATION** — The Esker DeliveryWare API uses both COM and Web Services components to develop integrations. The product includes a packaged integration to SAP and packaged connectors for Oracle and PeopleSoft. The system integrates with Microsoft Exchange and Lotus Notes. Finally, Esker DeliveryWare can be integrated to standard imaging systems from a number of vendors, including FileNet, OnBase, IXOS, and EMC Documentum.

- **ARCHITECTURE** — Esker DeliveryWare is a multi-tasking, multi-threaded application that runs on an SQL database. The application and database can be located on separate servers or the application can run on a Microsoft clustered database server. The product maintains job progress in the SQL database, and job status can be shared with users. Furthermore, the product uses satellite servers as gateways to UNIX systems to accept job submissions and respond with notifications to the user.

  Esker on Demand is a hosted service for multi-channel delivery, including print production, production faxing, and secure e-mail. A web interface for the Esker on Demand service allows organizations to manage accounts and users, submit jobs into production, preview files, and track the status of each document in the job.

IBM INFOPRINT MANAGER 4.2 & INFOPRINT WORKFLOW

➢ **ORGANIZATION**

Based in Armonk, NY, IBM provides hardware, software, and professional services that span a wide range of technology areas across all vertical markets. IBM's Printing Systems Division provides enterprise output solutions for the on-demand environment, including printers, software, consultation, systems integration, supplies, service, and support.

➢ **SOLUTION**

IBM Infoprint Manager and Infoprint Workflow provide a complete solution for managing the closed-loop document production process with piece-level tracking and reconciliation. Infoprint Manager is capable of managing both centralized and distributed printing operations. With Infoprint Workflow, organizations are able to monitor every step in the production process across one or multiple locations. The products are best suited for high-volume production environments within any vertical market.

➢ **INTERFACE**

With Infoprint Manager, administrators set up logical devices and queues, and define physical printers with one-to-one, one-to-many, or many-to-many relationships. The graphical interface displays all of these items, as well as print jobs for the operator to manage. In addition, the interface displays printer and job properties using a color-coded status.

The Infoprint Workflow configuration interface graphically defines the process steps. Workflow designers drag and drop steps into the process and link data elements or external applications. Users can reuse previously built steps from a library. Furthermore, each step declares all required input variables and contains error-processing capabilities. Administrators can recall actions performed on any job, by any operator, on any device, or view overall metrics in a graphical format. This capability can be tied in with the "productivity tracker" feature of the IBM 4100 printers. All software modules use a centralized database to write all accounting information.

➢ **INPUT**

Infoprint Manager receives input from network applications from channel connections, SNA, and TCP/IP. MVS Download, a feature of PSF/MVS, fully automates the distribution of JES print jobs, including all of their parameters, into Infoprint Workflow or Infoprint Manager from the mainframe.

AT A GLANCE

Infoprint Manager and Infoprint Workflow provide a customizable solution for high-volume production operations requiring closed-loop tracking.

Key Strengths

- Scalable solution built on extensible database and schema architecture
- Numerous clients for job submission including JDF job ticket support
- Highly customizable solution with extensive workflow and integration capabilities

Areas of Caution

- Use of extended security groups can require customization
- Data streams need to be converted to IPDS for complete print management

Infoprint Manager includes a number of Java and browser-based clients for job submission from PC and Macintosh systems. The AFP Upload module lets users upload files directly to JES from Infoprint Manager. In addition, a browser-based client, the Infoprint Job Ticketer, enables end users to submit one or more files from the network with a JDF job ticket that provides user-defined imposition.

The figure below shows a print queue defined with a one-to-many relationship to multiple physical printers and logical destinations.

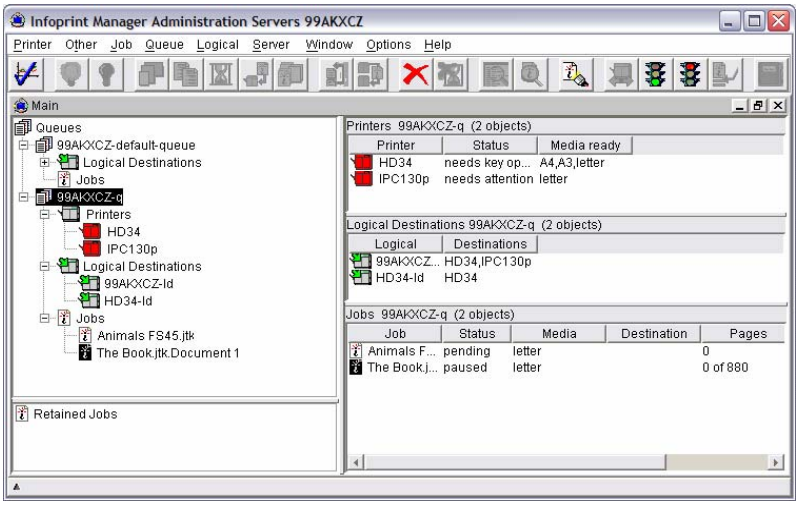

Figure 10 – Infoprint Manager Administrator Interface

- **OUTPUT**

Infoprint Manager can send output to networked printers using LPR, Internet Printing Protocol (IPP), and TCP/IP with bi-directional communications and print job status. Infoprint Manager supports Xerox LCDS jobs via pass-through normalization to Metacode for output to the Xerox EPS controller, or via conversion to AFP for output on IPDS printers. Xerox and PostScript print jobs are converted to IPDS for page tracking and accounting purposes. Infoprint Workflow tracks delivery preferences and directs output to multiple channels. Infoprint Manager outputs TIFF images to third-party fax servers and can use the AFP2WEB module for creating vectorized HTML and PDF files for web delivery.

- **WORKFLOW**

Infoprint Workflow is a customizable solution for controlling production output. The workflow engine monitors the status and state of each job running through every process. The product supports both parallel and serial processes, allowing jobs to progress independently. Furthermore, the system can pass control to another application or sub-process and await results. Finally, the engine supports multi-level service-level agreements and is able to notify users via e-mail or pager if a job or process is outside of defined parameters.

- **PRINT MANAGEMENT** The product provides strong print queue management through a three-tiered model (logical device, queue, and printer). Infoprint Manager supports job splitting, load balancing, and error recovery. For instance, it can process a job for a specific printer or wait until the file is ready to print and process for any available printer. Furthermore, the operator can recover jobs from a queue and select the page range for reprinting. The software uses a JDF job ticket capable of extracting imposition data. The job ticket can be edited and stored in the content library for future use.

  Infoprint Manager accepts jobs for pass-through directly to a printer or can convert incoming Metacode, PostScript, and PDF jobs to IPDS for complete management. IBM offers a strong suite of transformations for ADP and Xerox print streams. In addition, Infoprint Manager can accept LCDS/Metacode and drive Xerox devices directly.

- **INTEGRATION** Infoprint Manager and Infoprint Workflow are built on a DB2 database with a robust schema. Infoprint Workflow uses a shell layer to expose the file system and call code from third-party applications to perform functions outside the print management system, such as postal zip code sorting, image replacement, or inventory updates. Infoprint Workflow is designed to archive production jobs into IBM Content OnDemand, but also works with other archives. Infoprint Manager communicates bi-directionally with SAP and JD Edwards ERP applications, providing print job status back to users, and it also provides fax in and fax out capabilities.

- **ARCHITECTURE** Infoprint Manager and Infoprint Workflow are multi-process, multi-threaded applications capable of running multiple instances on a single AIX server. Larger implementations can manage thousands of printers. Transforms run on the same server or Transform Manager can run on a separate parallel Linux server to offload processing.

  The products support both mainframe and network security models, including RACF and Kerberos, using any number of users and pre-defined security groups, including viewer, operator, supervisor, and administrator. Encryption products can be called locally and the software can encode a unique stamp for each file that will appear on each page.

LEVI, RAY & SHOUP, VPSX 1.0

➢ **ORGANIZATION**

Based in Springfield, IL, Levi, Ray, & Shoup (LRS) provides software products and professional services across a broad range of vertical markets. The company's product offerings include EOMS, pension management solutions, education services, athletic program solutions, Web site services, and custom application development.

➢ **SOLUTION**

VPSX Enterprise Output Server (VPSX) provides an integrated solution for the collection, control, and delivery of documents across multiple platforms. LRS designed VPSX based on 20-plus years of industry leadership with its VPS family of enterprise output management solutions. The solution addresses distributed output management requirements across the enterprise, and is optimized for open-systems platforms such as UNIX and Linux. This robust, scalable print server leverages industry standards for document encryption, network device management, and application integration.

➢ **INTERFACE**

VPSX provides a flexible Web browser interface that consolidates all network printers into a single tabular view. The HTML screens are the same across all end-user platforms, providing consistency and simplifying implementation. The interface can manage multiple VPSX servers. It displays printer properties and status, and it organizes print jobs by activity and attributes. Furthermore, operators can apply filters to sort or locate jobs and use either drop-down menus or a command-line interface to act on them.

The product logs all jobs and operator actions that occur in the system. It also provides accounting features to aid in billing and security. The accounting log is centralized for all managed printers and accessible as an ASCII file. Furthermore, the product passes detailed job accounting data back to SAP R/3 through a certified integration.

AT A GLANCE

VPSX is specialized for the management of distributed output in open systems environments.

Key Strengths

- Single interface for managing multiple servers with consistent look and feel across platforms
- Tight integration to SAP R/3 provides bi-directional communication of job status at the page level
- Highly scalable solution, capable of managing a large number of devices

Areas of Caution

- Does not support workflow routing or process management
- Does not embed a print job viewer for common outputs, such as AFP and PDF

- **INPUT** — Applications on any platform can send output to VPSX using standard LPR/LPD protocols or by invoking the LRSQ command, which provides data compression and a greater degree of control. VPSX automatically identifies binary data types to trigger data stream conversion or to invoke special viewing software. VPSX also accepts input directly from SAP via SAP's BC-XOM interface.

- **OUTPUT** — VPSX outputs to printers, print servers, and other devices via LPR/LPD, TCP/IP sockets protocols, or Internet Printing Protocol (IPP)., VPSX can retrieve real-time feedback on print job status depending on the capabilities of the target device. For example, it can communicate with the printer using SNMP and PJL to ensure each page is physically printed, guaranteeing output delivery. It supports encryption of print data for delivery to a variety of decryption-enabled devices. In addition to delivering output to network printers, VPSX can send output to fax and e-mail servers, enabling additional output delivery channels.

- **WORKFLOW** — VPSX does not include workflow tools or process management tools. With VPSX, however, users can re-route jobs to control the spooling and routing for individual print jobs, and it directs printer status information back to SAP R/3 users as confirmation messages.

- **PRINT MANAGEMENT** — The product provides strong print spool management and supports bi-directional communications with network printers. Its spool management capabilities enable document queuing, retention, expiration, and printer pooling. Users can configure queues to release jobs at a given time or for manual release. The product extends robust spool management, scalability, and reliability to the network environment; enables page-level error recovery; and notifies users of print job status.

The figure below shows the list of printers managed by VPSX and sorted by name. The attributes and status of each printer are shown.

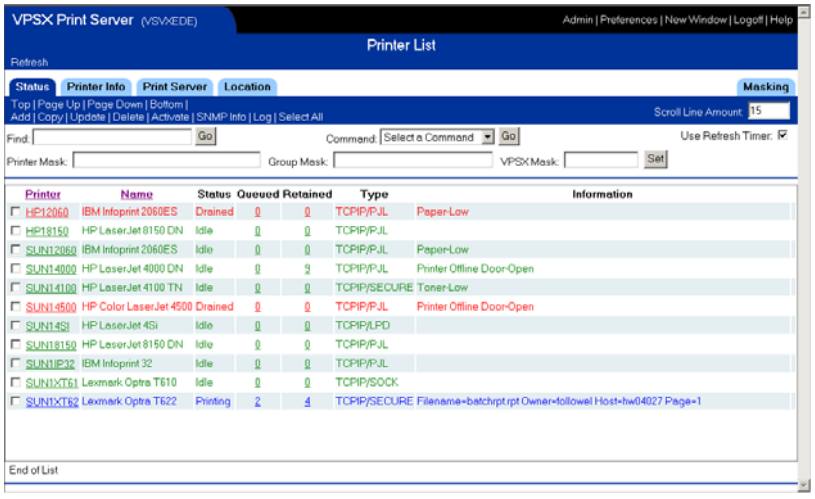

Figure 11 – VPSX Print Server Interface

VPSX can pass report data to external programs or routines (filters) when special processing or electronic forms are required. The product's modular design ensures that problems in external filters will not affect the stability of the overall system. Furthermore, LRS offers a suite of transformation filters that enable VPSX to convert and process documents into different print stream formats.

- **INTEGRATION**

VPSX provides an SAP-certified interface for bi-directional, synchronous and asynchronous communication of print job status. The product also includes a SOAP/XML interface for customized application integration. The SOAP/XML interface is used for communication between VPSX components. Customers and third-party software developers can also access nearly all of the product suite's functionality through the SOAP/XML API. Finally, integration with Windows' Internet Printing Protocol (IPP) support makes it easy to manage output from the Windows platform.

- **ARCHITECTURE**

VPSX is a single-process, multi-threaded application capable of managing a large number of printers. Although each server manages its own printers independently, each server is able to notify other servers of changes made to the printer configuration.

The product is POSIX-compliant, allowing it to run on IBM AIX, HP-UX, Sun Solaris, and Linux for zSeries and Intel platforms. VPSX supports a wide variety of UNIX security systems through Pluggable Authentication Modules (PAM). The product's security capabilities control granular access to printers, printer groups, job types, or user actions, allowing administrators to model an organization's security requirements.

MACRO 4 COLUMBUS OM 4.4

➢ **ORGANIZATION**

With its US headquarters in Parsippany, NJ, Macro 4 provides software products and professional services for business information logistics and systems management. The company's product offerings have horizontal appeal, and include EOMS, document management, document workflow, CICS management, data manipulation, interactive testing, performance measurement, and z/OS application fault diagnosis.

➢ **SOLUTION**

Macro 4 Columbus Output Management (Columbus OM) receives, manages, and delivers output of business documents throughout the enterprise to multiple delivery channels with the ability to automate repeatable business processes. Columbus OM offers specialized modules for different types of high-value transactional output management environments, including centralized production, distributed business application printing, and office printing.

➢ **INTERFACE**

Columbus OM provides an administrative interface for defining and managing printers and output queues. Within this interface, administrators can view all defined printers and both pending and completed print jobs. Furthermore, administrative tasks can be centralized or distributed across departments. A web-browser interface allows the end user to view the status of jobs and printers. Users can search for documents in Macro 4's archive and retrieval product, Columbus DW using multiple criteria, including metadata and full text. In addition, users can save and share searches and set up additional indices to create additional columns for customized search results. Finally, end users can view, route, annotate, or print jobs from the browser-based interface.

Columbus OM tracks all print job activity in a centralized database and maintains historical data, which can be output to a text file or exported to third-party reporting products for analysis and forecasting purposes. Basic reports are available with Columbus OM. Columbus OM retains accounting data in the database where it can be accessed by users.

AT A GLANCE

Columbus OM automates business processes by accepting documents from multiple platforms and applications and ensuring delivery to multiple channels.

Key Strengths

- Single interface for managing multiple servers with consistent look and feel across platforms
- Tight integration to SAP R/3 provides bi-directional communication of device status and job status at the page level
- Ability to route print jobs to the least cost, least busy printer and manage delivery of documents via business rules

Areas of Caution

- No Web interface for administrative functions
- Transactional accounting data is not centralized across all modules

The figure below shows completed jobs, which were processed through Columbus OM.

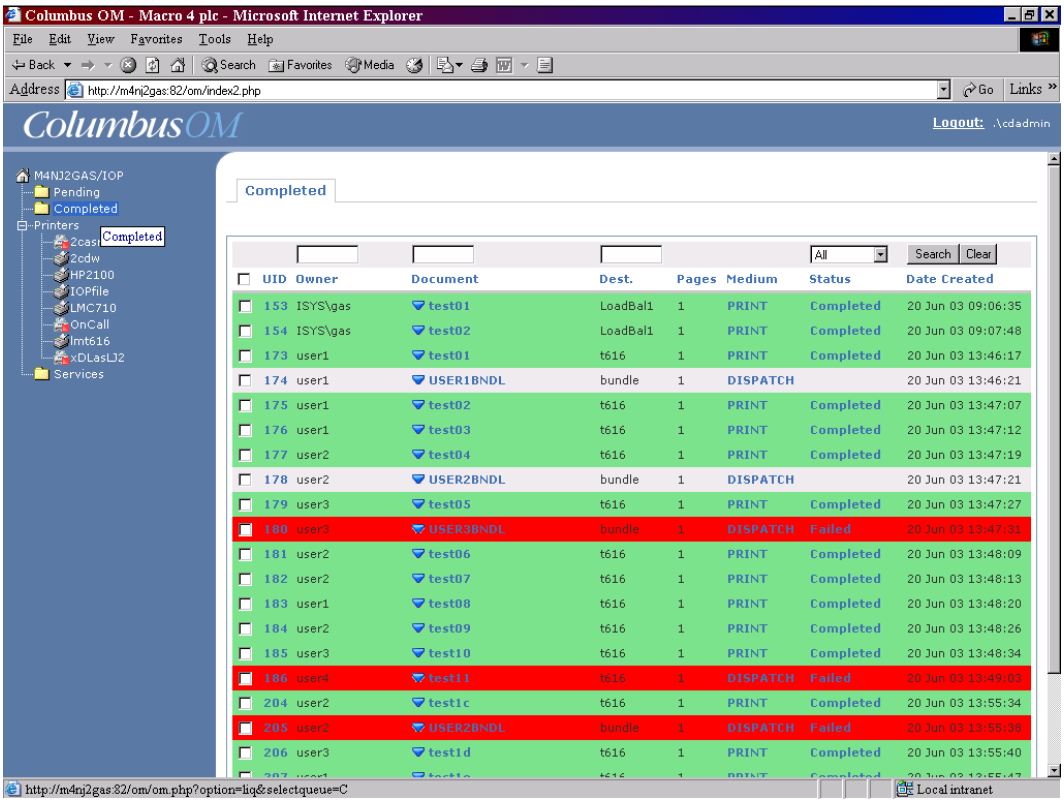

Figure 12 – Columbus OM Administrator Interface

- **INPUT**

Mainframe and network applications can send output to Columbus OM using standard LP protocols. Columbus OM also provides "job submission" commands, which provide additional job parameters. Integration with SAP R/3 and mySAP is via the certified SAP BC-XOM interface. A Macro 4 gateway installed on any Windows print server forwards Windows print jobs to a Columbus OM server for management and delivery to multiple channels. Columbus OM's universal print driver enables users to make use of added attributes like stapling, color printing, and automatic selection of the most cost-effective and least busy printer for the print job. Columbus OM also supports the Xerox job ticket format for job specifications and finishing requirements.

- **OUTPUT**

Columbus OM delivers output over TCP/IP to printers, fax servers, e-mail servers, Web servers and mobile devices. The product communicates bi-directionally with printers via PJL and SNMP for device activity, including the status and location of each printed page. Complete data streams are routed in their native format to the Columbus DW archive along with index information.

- **WORKFLOW**

Columbus OM provides low-level rules processing and executes rules when triggered by certain conditions such as values provided as job attributes. Such rules can modify job attributes including the media-type, resulting in the selection and execution of further rules against the same job. In addition, Columbus OM is integrated with Columbus Central, which manages complex document workflows to automate and simplify business processes. Columbus Central supports serial and parallel workflows and provides pre-defined workflow steps with advanced functionality, such as best printer selection based on job characteristics. Finally, custom workflow steps can be created using Perl scripts.

- **PRINT MANAGEMENT**

Columbus OM provides print queue management and advanced print services, such as data stream recognition, load balancing, and page-level job restart for error recovery. Users are notified of job status or completion based on business rules and integration to the originating application. Users can reprint individual pages or a page range, and Columbus OM can include a banner page with complete job information. Columbus OM can route print jobs to the least-cost or least busy device, based on pre-determined business rules.

The companion Columbus CAT module automatically parses incoming files to identify the file type and determine the starting and ending page of each document within a data stream. Rules-based indexing and routing control the storage and delivery of documents, error handling, Web access, and retention period based on delivery preferences for individual users. Columbus OM can convert documents as required into PDF, HTML, XML, TIF or plain text. In addition, the product includes a browser-based viewer for AFP, Metacode, PostScript, and PCL data streams.

- **INTEGRATION**

Columbus OM creates a bi-directional interface between the network printers and Seibel, SAP R/3, Oracle, PeopleSoft, and Baan enterprise applications. Columbus OM's tight integration with these applications allows it to notify the users of events such as job completion or errors. Columbus OM is also tightly integrated with other products in the Columbus suite such as Columbus DW, Columbus Central, Columbus CAT and Columbus Z (output management on the mainframe). Third-party image archives can also use the API to search for and retrieve documents.

- **ARCHITECTURE**

Columbus OM is a multi-process, multi-threaded application capable of running on multiple servers across multiple sites. Administrators can configure the data transfer between multiple instances of Columbus OM to compress and encrypt files or use only a specified bandwidth, so as not to slow down network traffic. In a distributed architecture, instances are installed and spread out across the enterprise to support failover, network economy, and general resilience. The product tracks documents across multiple servers, which communicate the status between servers.

OCÉ PRISMAPRODUCTION 3.04

➢ **ORGANIZATION**

Based in Boca Raton, FL, Océ provides hardware, software, and professional services for digital document production and management solutions across all vertical markets. Océ's PRISMA family of software applications adds value to the entire document lifecycle from creation through to archival and reprinting. Several PRISMA products manage output devices from Océ, Xerox, IBM, Canon, Ricoh, HP and others.

➢ **SOLUTION**

Océ PRISMAproduction provides a centralized point of control for production printing, distribution, and archiving. PRISMAproduction manages transactional and print on demand (POD) data streams from legacy and network applications, desktop client software, and web-based print e-commerce interfaces for output on Océ and non-Océ production printers. PRISMAproduction is suited for high-volume data centers and print shops, as well as service bureaus. A customized version named PRISMAproduction DP is designed specifically to connect Xerox DigiPath to the Océ VarioPrint 2100/2110 product line.

➢ **INTERFACE**

PRISMAproduction provides a centralized view of all managed printers using a Java client. The interface displays the printer status, class, and form type, as well as an icon for each printer. In addition, the operator can view the job ticket and current page count for a print job. The user can also view detailed error messages in message window displays. PRISMAproduction manages multiple sites through a master server and enables access to other Océ and non-Océ printers.

For tracking, the product creates a text-based audit log for all system activity and maintains a separate error log for failed actions. The PRISMAaudit module uses an ODBC-compliant database to track and report on device utilization and performance of Océ devices and SNMP-connected equipment.

AT A GLANCE

PRISMAproduction is designed for high-volume transaction print and POD environments. The product modules connect remote web-based users or networked-office users to centralized print devices.

Key Strengths

- Modular product allows organizations to select only the components required for their operations
- PRISMAweb interface enables custom and catalog order entry
- Manages Océ and non-Océ print devices
- Integrated component of entire PRISMA family

Areas of Caution

- No current support for IJPDS print streams
- Limited two-way communication to non-Océ devices
- Workflow limited to document composer capabilities

- **INPUT** — PRISMAproduction accepts input through TCP/IP, Bus/Tag, and SNA connections. Users submit jobs via LPR, FTP, or by using network folders. The Océ SPJM and Vario PJM job ticket utilities enable users to submit jobs across the network with specific job ticket parameters. In addition, PRISMAweb includes a customizable, print e-commerce interface for selecting jobs from a catalog and entering new jobs into the system.

- **OUTPUT** — PRISMAproduction delivers output to SNA, SCSI, Channel, and TCP/IP-attached printers. The product supports output for IBM InfoPrint, Océ, and Xerox printers, and it drives channel-attached Xerox printers through the use of Barr cards or directly to DocuSP with an option to generate DocuTech job ticket syntax. In addition, organizations can configure multiple printers with the same attributes, sending jobs to the first available printer.

  PRISMAproduction includes a document composer that allows operators to impose the job after it has been raster image processed (RIPped), without requiring the job to be re-RIPped for subsequent changes or adjustments. Through Océ TrueProof, operators can reorganize pages and reposition front and back images to line up with pixel-level accuracy. Furthermore, a grayscale equalizer applies the correct halftones for each printer, and a print file library stores the post-RIP files with adjustments for instant reprinting.

- **WORKFLOW** — The PRISMAproduction job queue defines the process steps for each job. The process steps include raster image processing, imposition, form or variable data overlays, cropping, and resizing. Furthermore, users can save and assign any automated process sequence defined in the document composer to a job queue.

- **PRINT MANAGEMENT** — PRISMAproduction supports multiple print servers with any number of print queues. The product manages resources by type or by customer, using the job ticket to point to the appropriate resources. It also notifies the operator when a job starts or stops and supports automatic error recovery.

  Furthermore, PRISMAproduction includes a scripting language for data manipulation and post-processing. The scripts index the entire job and sort by key fields to split a single incoming AFP or line mode job into multiple jobs.

The following figure shows the PRISMAproduction operator interface.

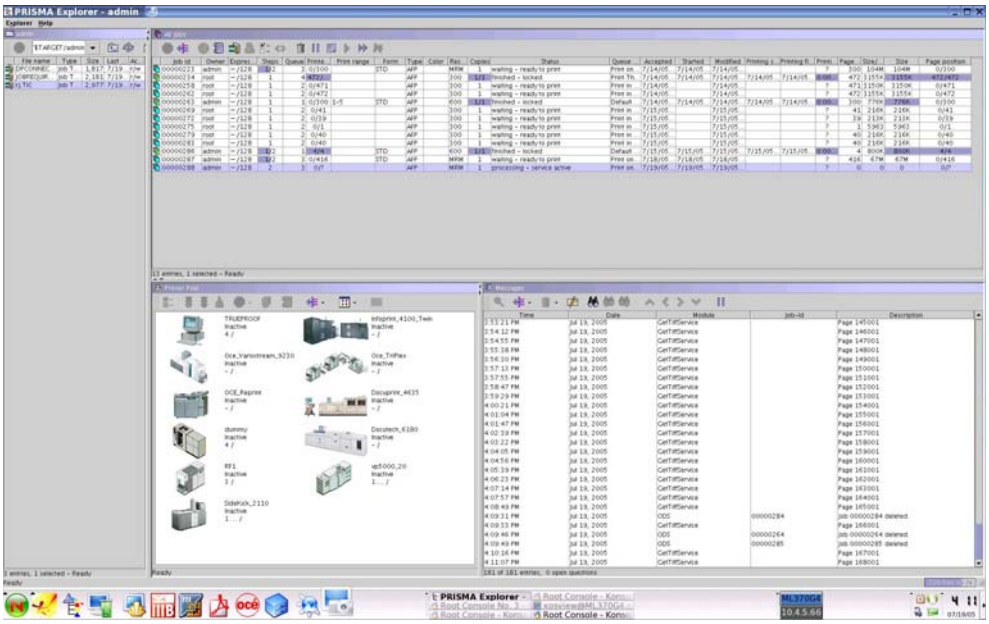

Figure 13 – PRISMAproduction Interface

- **INTEGRATION**

The PRISMAproduction product suite is tightly integrated and allows all of the PRISMA product modules to use the same spool, print queues, and accounting files. The product includes integration to a document composition package, a web-based viewer, and a short-term archive for print streams and images as well as supporting various third-party finishing and insertion equipment. Océ offers these products as modules within the PRISMA suite.

- **ARCHITECTURE**

PRISMAproduction is a multi-process, multi-threaded application that runs on one or several servers and is capable of managing a large number of distributed printers. The master server manages the central spool and processes jobs, while the other servers drive the printers and monitor job and device status.

The product's user-based security controls access to printers, printer clusters, and jobs. Finally, the product uses permission groups to filter out devices and jobs and limit operator access, and it tracks all login attempts in the security log.

SOLIMAR PRINT/DIRECTOR 2000[1] 5.15

➢ **ORGANIZATION**

Based in San Diego, CA, Solimar Systems provides software products and professional services for output management and electronic document delivery. Solimar Systems also develops print servers, drivers, and workflow solutions for small to enterprise-wide print centers.

➢ **SOLUTION**

Solimar Print/Director 2000 provides system connectivity, print stream conversions, and queue management for production printing environments with modular connectivity and transform options, server modules, and inputs/outputs. Solimar has grown the product into an enterprise solution through the addition of post-processing capabilities, resource management, and accounting functionality. Print/Director 2000 is developed as a horizontal solution, addressing production print requirements in any vertical.

➢ **INTERFACE**

Print/Director 2000 uses a separate window to represent each device managed by the system, and it is able to share files with other Print/Director systems. Administrators define the input, transform, and output characteristics for each queue, and can add other modules to the queue workflow. Operators can automatically or manually control workflow and job routing by changing the job attributes, or they can manually drag a job into a queue. In addition, operators are notified of processing or production errors through a popup window on the server or via e-mail.

Print/Director 2000 can create single or multiple audit logs for all system activity, including transfer time and transformations. The log files track any job characteristics and maintain historical data, which can be exported to a comma-delimited file.

AT A GLANCE

Print/Director 2000 is targeted toward medium and high-volume transaction print environments that require flexible input and output options.

Key Strengths

- Modular solution built around base server reduces cost by allowing customers the flexibility to select only the modules they require
- Easy to install and implement software

Areas of Caution

- Print/Director 2000 has a single-tier architecture (However, Print/Director Enterprise has a client-server architecture)

[1] In May 2005, Solimar Systems announced the Print/Director Enterprise Edition, a new edition of Print/Director built on a client-server architecture and with new functionality. However, this solution was not available for review at the time of Madison Advisors' assessment, which took place in February 2005.

➢ **INPUT**

Print/Director 2000 accepts input through TCP/IP, BUS/TAG, SNA, ESCON, RJE, Novell, Tape, and parallel connections. The product allows users to submit jobs via LPR, direct socket, FTP, and network folders. Furthermore, the product reads and creates Xerox, Canon, and Kodak job ticket formats for production printers, and PJL communications are either passed through or parsed for network printers.

➢ **OUTPUT**

Print/Director manages output to TCP/IP, parallel, Novell, SCSI, and channel-attached printers. The product also communicates with the Windows Print Spooler for network printers and delivers files to desktop viewers and third-party archives. The Print/Director SMART Processor provides post-processing functionality for Metacode/LCDS, PostScript, and PCL. This module uses scripts to add or remove objects on the page, add bar codes and sequence numbers, and change the color of objects. Jobs can be burst into segments, re-organized, and bundled with segments from other print jobs based on file names. The scripts include conditional logic, based on text contained in the print data stream, to control the various actions.

The figure below shows the active jobs and printers managed by Print/Director 2000.

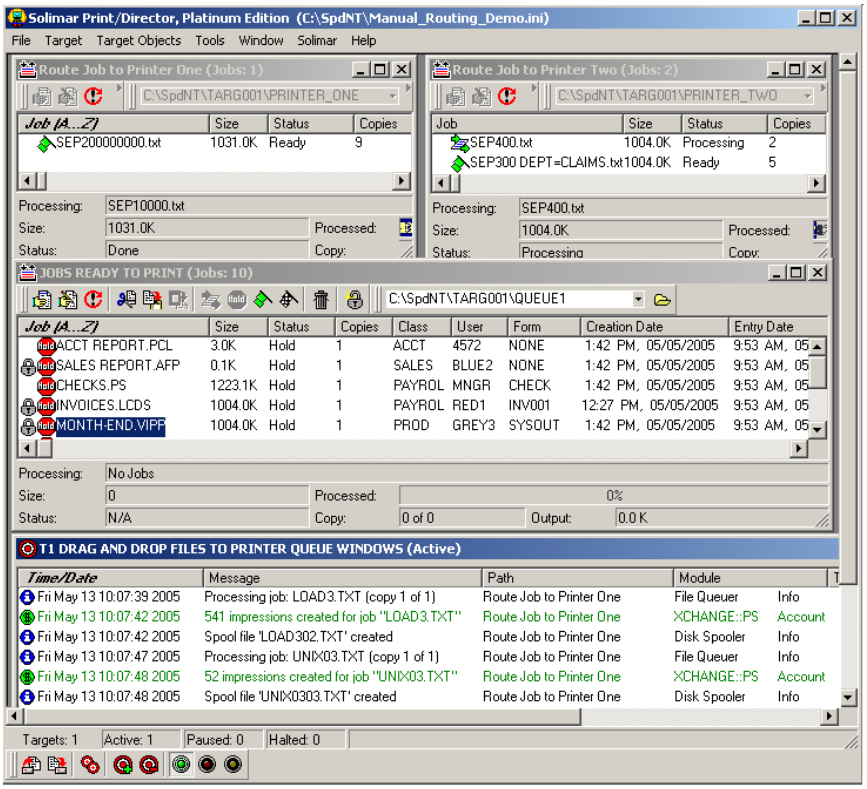

Figure 14 – Solimar Systems Print/Director 2000 Interface

Solimar SOLsearcher Enterprise is a PDF archiving system capable of indexing, managing, and presenting output documents. Individual print jobs are maintained as a single PDF file, but are parsed and presented as individual documents or pages on the fly as the job is recalled from the archive. SOLsearcher Enterprise uses a browser-based viewer and Web server to deliver documents directly across the Internet or through e-mail as links into the archive. Finally, the system tracks access to ensure that the "delivered" document has been viewed.

- **WORKFLOW** — Print/Director 2000 assigns workflow processes to each print queue. The process can include any number of steps and call other Solimar modules. The rules-based workflow interface allows administrators to configure a delayed entry into a process or schedule the release of a job to the printer.

- **PRINT MANAGEMENT** — Print/Director 2000 manages print spools and printers with full production control. A Job Separator module uses conditional logic to parse jobs, which can then be printed across a number of printers using a round-robin or next-available method. Any number of small jobs can also be grouped together into a single job for continuous production. The system notifies operators of errors in any process and moves the job to a cancelled folder, from which operators can select to cancel or hold jobs while the good output is finished. Reprints can be controlled by page range and parsed file, or individual documents can be recalled from the SOLsearcher Enterprise archive for output.

  Print/Director 2000 offers a wide range of input and output formats with data stream transformation from one to another. Solimar also offers transformations such as PostScript to PostScript, which provides optimized DSC-compliant PostScript output for applications that create inefficient PostScript.

- **INTEGRATION** — Print/Director 2000 is integrated with other Solimar products, including SOLsearcher Enterprise for archiving and SOLscript for VIPP print stream conversions and resource management. Print/Director 2000 also works with Solimar iCONVERT for transforming IPDS data streams into PostScript, PDF, PCL, and TIFF, as well as Solimar XIMAGE for dynamic creation of Xerox resources from Windows desktop applications.

- **ARCHITECTURE** — Solimar Print/Director uses a single server as both the production engine and operator interface, and relies on the Windows operating system to manage user security.

CONCLUSION

Although EOMSs of all types have been available for many years, few vendors have more than a couple hundred installations. Many organizations do not recognize the benefits of implementing an EOMS or are unsure of the best approach to take when tackling the complexities of output management.

End-user organizations have their work cut out for them as they determine the right solution for their requirements and applications. When approaching this market, here are a few things organizations should keep in mind:

- **Develop an enterprise output strategy first** – before letting the vendors tell you what you need, conduct an internal assessment. What are your critical applications? What output channels are planned for the near future? Do all the documents that are currently printed need to be printed? Are print volumes shifting to other delivery channels?

- **Prioritize your requirements** – before looking at specific solutions and their capabilities, be sure you have an objective understanding of your primary requirements, such as platform support and regulatory demands, versus the secondary objectives, such as data stream support or process re-engineering.

- **Research, research, research** – we can't stress it enough. Do your homework on the available solutions. For example, talk to other organizations, attend trade shows, work with industry analysts, and solicit information from vendors to be sure that you have a complete picture of all of your options.

- **Assess the vendor** – don't just assess the products. Learn about the vendor's overall direction for its product. What support options does the vendor provide? Do you believe that the vendor will be in the market for the long term or will it be acquired? What will this mean to you?

Clearly, there is a lot for you to consider if you want to make the best choice for your organization. Madison Advisors helps organizations build their EOMS strategies and select the best solutions and practices for their requirements and objectives. If this is an area where your organization feels it would benefit from our expertise, contact Madison Advisors to help with the success of your enterprise output initiative.

ABOUT MADISON ADVISORS

Madison Advisors exists to advance the print and electronic communications objectives of Fortune 1000 companies. Madison Advisors specializes in offering context-specific guidance for a range of content delivery strategies, particularly those addressing enterprise output technologies and customer communications.

Madison Advisors offers services and expertise primarily through short-term, high-impact consulting services. With no-nonsense, quick engagements (measurable in days or weeks, not months), Madison Advisors directly helps our clients achieve very hard and specific return on investment (ROI) related to their print and electronic communications initiatives.

Madison Advisors' analysts are dedicated to technology and market research that is delivered through short-term project engagements, as well as articles, publications, and presentations. We specialize in customer communication technologies including enterprise output management, content management, customer relationship management, e-billing, and infrastructure technology.

For more information about Madison Advisors, visit our Web site – www.Madison-Advisors.com.