



A Smart Approach to Digital Transformation

THE ROLE OF CONTENT SERVICES FOR INTELLIGENT INFORMATION MANAGEMENT

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EXECUTIVE SUMMARY

Systemware has been helping companies manage content for almost 4 decades, delivering solutions for document management, then enterprise content management (ECM), and now content services. Along the way, we have pioneered many important developments to support this technology evolution and our customers' digital transformations.

This whitepaper takes you through this technology journey and—based on Systemware's history in content management—offers our perspectives on digital transformation, the evolution of ECM to content services, and some of our innovations that support this journey.

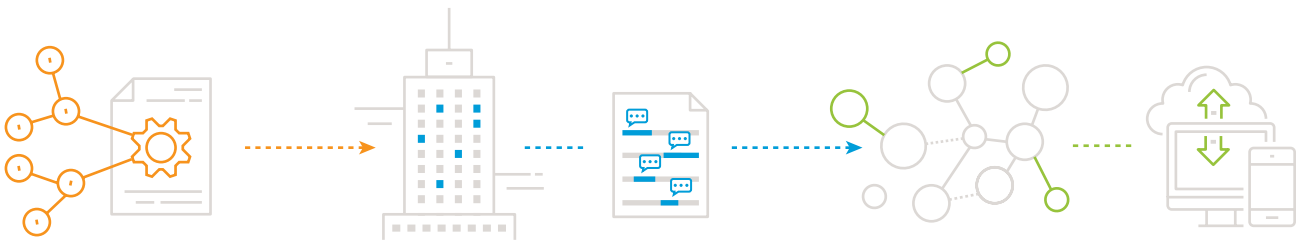
Digital transformation

The term digital transformation means different things to different people and organizations. Is it just digitizing operational processes? Is it using digital tools to integrate projects or departmental workflows? Is it breaking down information silos and creating a more integrated information ecosystem? It can be all of these or just portions of these—each journey is unique. And there are a variety of motivators for digital transformation, such as improving collaboration, enhancing innovation, or reducing costs.

From C-suites to IT departments, organizations are launching initiatives to explore what digital transformation means to them and for their customers. But at the heart of the matter is the content that supports business processes—how to manage it and how to leverage it.

Today, digital transformation requires a more intelligent approach for managing content. In fact, some industry organizations and analysts are labeling this new approach “Intelligent Information Management.” Whatever the name, it is clear that traditional enterprise content management (ECM) systems cannot support today’s data-driven, customer-first mentality. New content services solutions enable a more intelligent way to manage content.

AN EVOLUTION OF SOLUTIONS



Early document management and workflow systems helped organizations automate content-intensive, mission-critical processes.

As the use of workflow systems and capabilities spread across the enterprise, this resulted in ECMs that managed both documents and the information within the documents.

Now, ECMs are evolving into content services platforms (CSPs) including solutions that can accommodate the explosion of digital data, the ubiquity of easy-to-use mobile apps, and the power of cloud computing.

Many current IT environments have a myriad of business systems in use, each with its own set of processes for information management. To make even a few of these systems work together, or to access and consolidate content from these disparate systems, some organizations may need costly customization services and teams of IT professionals to connect tools and data.



Information is the currency that fuels an organization.

“Information is an organization’s most important asset. At the very time that information assets are increasingly important, our ability to manage them is eroding due to the exploding volumes, variety, complexity, and velocity of information coming into our organizations. Addressing “Big Content” and the rising tides of information chaos is a prerequisite to solving the Digital Transformation puzzle.”

SOURCE | © AIIM 2018 The State of Intelligent Information Management

The role of Systemware in transformation

Some of the world's largest and most highly regulated organizations trust Systemware to help them simplify infrastructure, optimize cost, improve workflow efficiency, and meet information governance requirements. In fact, we have worked with our customers to solve some of their most complex business problems.

We continue to innovate by responding to the needs of the market and our customers—delivering solutions that support their changing content environment and digitally transform their processes, products, and information assets.

Our roots began with the creation of core document management capabilities for report distribution management systems and integrated document archive & retrieval systems. From this core, we developed solutions for Enterprise Content Management (ECM) and our current content services offerings. Throughout this decades-long journey of digital transformation, Systemware has led the industry through innovation, renowned service, and software developments that bring organizations into the digital workspace.





DOCUMENT MANAGEMENT AND WORKFLOW

Document management systems were the earliest, commercially-available software tools for the management of digital information. The solutions were usually customized to suit the needs of an organization's most critical processes and solve specific issues relating to those processes. Many of these solutions still serve a very important purpose today.

One of Systemware's most important releases during this timeframe was Job History System (JHS)—an automated system for the management of job-related output (SYSOUT) in mainframe environments.

JHS was the first automated SYSOUT/ SYSLOG management software on the market and is still in use as part of our content services platform. This output analysis gives programmers and production control analysts visibility into what reports are impacted when a job fails—enabling them to analyze the problem and make the needed corrections in a timely manner, thus avoiding any serious business impacts. For more on the early years, see *A History of Innovation at Systemware*. As such, they generally required expensive implementations and extensive user training, which limited their expansion to other parts of the organization. But many required expensive implementations and extensive user training making for limited expansion to other parts of the organization. For more on the early years, see *A History of Innovation at Systemware*.

ENTERPRISE CONTENT MANAGEMENT

The primary goal of early ECMs was the automation of high-value, document-intensive processes, and productivity was still a primary driver for these solutions. And though more and more people who were not ECM specialists were using these systems, usability was not a primary driver of the solutions.

As the need for content management spread throughout enterprises, Systemware identified important requirements that customers needed beyond the scope of our original document management solution, JHS. JHS was designed for viewing job output by operational and production support staff. Jobs were ran to produce reports, which were printed and distributed to end users. One of the issues with this was the waste of paper, as many reports were thrown away with exception of a few pages. Additionally, there were challenges such as producing multiple copies of the same report and reproduction of the report where the original was lost.

During this timeframe, Systemware developed indexing technology, web-enabled print streams, provided a way to transform AFP to multiple file formats and started to think about the user experience with our solutions. We delivered advanced management technologies that can apply multiple indexes and automated analysis allowing customers to efficiently locate and combine the very specific information they are looking for—even with extreme data volumes. For more on the middle years, see *A History of Innovation at Systemware*.

Content access and migration

As customers began implementing these enterprise-wide solutions, moving legacy content from the various divisions into the new system became an immediate concern. Capturing legacy content that is usable by the new system was a time-intensive process, with much of the work involving old, rarely used content—of which only a small percentage might ever need to be accessed.

To simplify the migration process, Systemware developed the Legacy Archive Processor (LAP). LAP builds references to the documents previously archived by a legacy system, eliminating the need to convert the source data. When a user asked for information that happened to be stored in a legacy system, LAP automatically retrieved the data from the legacy archive media. To enterprise users, legacy and new content were all accessed using a single interface, and content could be retrieved as needed. This methodology connected disparate information sources and provided customers federated access to the legacy information without intensive delays with porting complete content repositories all at once.

In addition, the costs of maintaining and integrating legacy information management systems and data added to the pressures of rationalizing these 'enterprise' solutions. When users had to spend time figuring out where to go to reach a certain piece of information, often, they did so at the expense of productivity.

Moving Beyond ECM

Most organizations have many more systems and repositories than they realize. At the strategic level, they may only vaguely understand the purpose for each major content system, or if there are more modern and flexible solutions that meet their needs.

For transformation to begin, each organization should start by understanding the current state. It's important to understand the burden of information silos including the associated cost of legacy storage and retrieval and the inefficiencies associated with working with multiple content systems and legacy archives.

TO KNOW WHERE TO MAKE CHANGES, IT MAY BE HELPFUL TO CREATE A LIST OF CONTENT FEDERATION QUESTIONS.

- 1 What information exists in these legacy systems?
- 2 What information should we keep and what could be discarded?
- 3 How should this content be integrated into the larger digital ecosystem?
- 4 Are we able to access content from multiple repositories?
- 5 Can we perform federated search?
- 6 How robust are my extraction capabilities (line, page or document level)?
- 7 What is the level of effort required to consolidate content today?
- 9 Can I automate repetitive work?

CONTENT SERVICES

In the new age of mobile applications and the cloud, user expectations have changed, and the focus of content management has once again shifted. Anywhere, anytime access and usability expectations have become as important as interoperability and process considerations.

Organizations want a data-driven culture that informs their customer-first mentality and helps them better serve and interact with their customers. To achieve these goals, they need content services, or content services platforms, that not only can handle the exploding volumes of business inputs/data, but also give them insight into that data to improve decisions and create new opportunities. This means the new systems must:

- Manage content and enable the use of information across the enterprise, regardless of where the content resides.
- Pull information from various repositories, thus minimizing conversion efforts.
- Include open APIs that easily plug into all applications for interoperability with other business systems, line of business applications (LOBs), and storage solutions.
- Provide ease-of-use and require minimal, if any, IT involvement.
- Include configurable business tools that easily integrate into day-to-day processes, enabling organizations to automate repeatable work and let lines of business (LOBs) do more intelligent, customer-focused work.
- Maximize data availability while also meeting requirements around compliance, audit, security, and resiliency—a challenge that many traditional ECM systems struggle to handle.

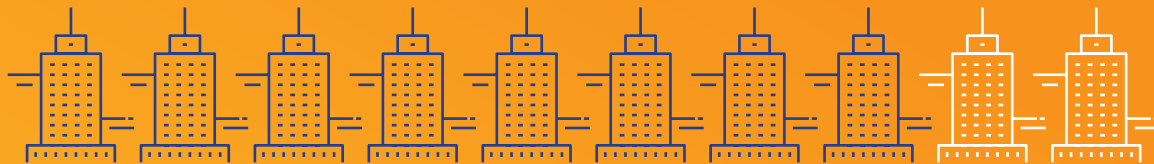
Organizations wanted ECMs to manage the information necessary for its operations and to provide enterprise-wide capabilities to retrieve this information, on-demand, when needed—be it for auditing, reporting, customer services, and so forth.

But many ECM implementations were not enterprise-driven. Instead they were driven by the needs of a few individual departments, leading to silos of data that were not useful for or accessible to users across the enterprise.

As a result, in most organizations it is quite common to have multiple ECM systems and silos of content that are unavailable and/or of no use to other groups. Industry surveys such as those performed by AIIM, or others, routinely reveal the failure of the ‘single repository’ dream. For example, AIIM reports that 52 percent of organizations have three or more ECM, document management, or records management systems. And 22 percent have five or more systems!

Digital Transformation Motivators

81%



81% of organizations believe that "digital transformation" is important or very important to their organization.

RISING CONTENT SPRAWL

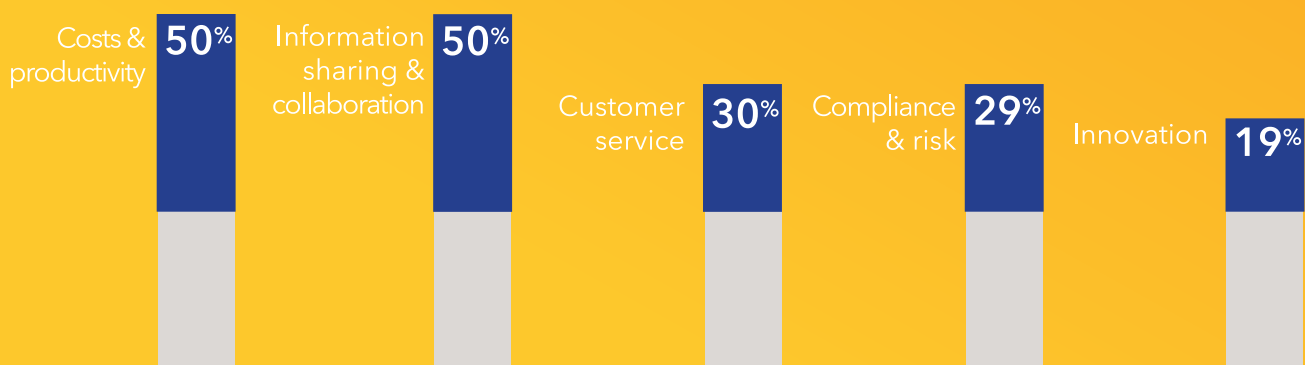


The average number of content systems in use continues to rise. The average number of systems has grown by nearly 30% over the past five years.



A rising portion of critical business content (54%) remains outside these content systems.

COMPELLING REASONS TO MAKE THE CHANGE



SOURCE | © AIIM 2018 The State of Intelligent Information Management

Why Systemware for Content Services?

Long before the industry focus shifted from ECM to content services, Systemware saw what was happening within our customer's environments and identified a need to connect data between users, systems, applications and repositories. In fact, this was one of the reasons for developing our data migration methodology. Once again, Systemware was ahead of the technology curve by delivering the next generation of information management—our open-architected Content Cloud solution.

Open architected solution—Everything at the core of our architecture can be leveraged via APIs and our service layer—a set of tools that is used to feed our customer's business processes. That means that Content Cloud can be tightly integrated with many other systems via external connectors, enabling our customers to easily integrate our services with their user interfaces and processes to develop their own user experience. In addition, what would traditionally be a very large application becomes an easily consumed, easily deployed set of services.

Intelligent network of nodes—Content Cloud provides instances of the software devoted to focused operations such as capture and storage. This distributed, parallel processing and load balancing means that organizations can scale both horizontally and vertically to maximize system throughput and availability—enabling our customers to manage billions of documents and petabytes of content.

Critical services for business lines—Content Cloud provides repository and related content services to build content/process centric applications for LOBs. This means users can focus on a critical need for organizations: content federation and extraction. This is practical and efficient management of unstructured data with robust metadata—providing structure, meaning and usefulness to content.

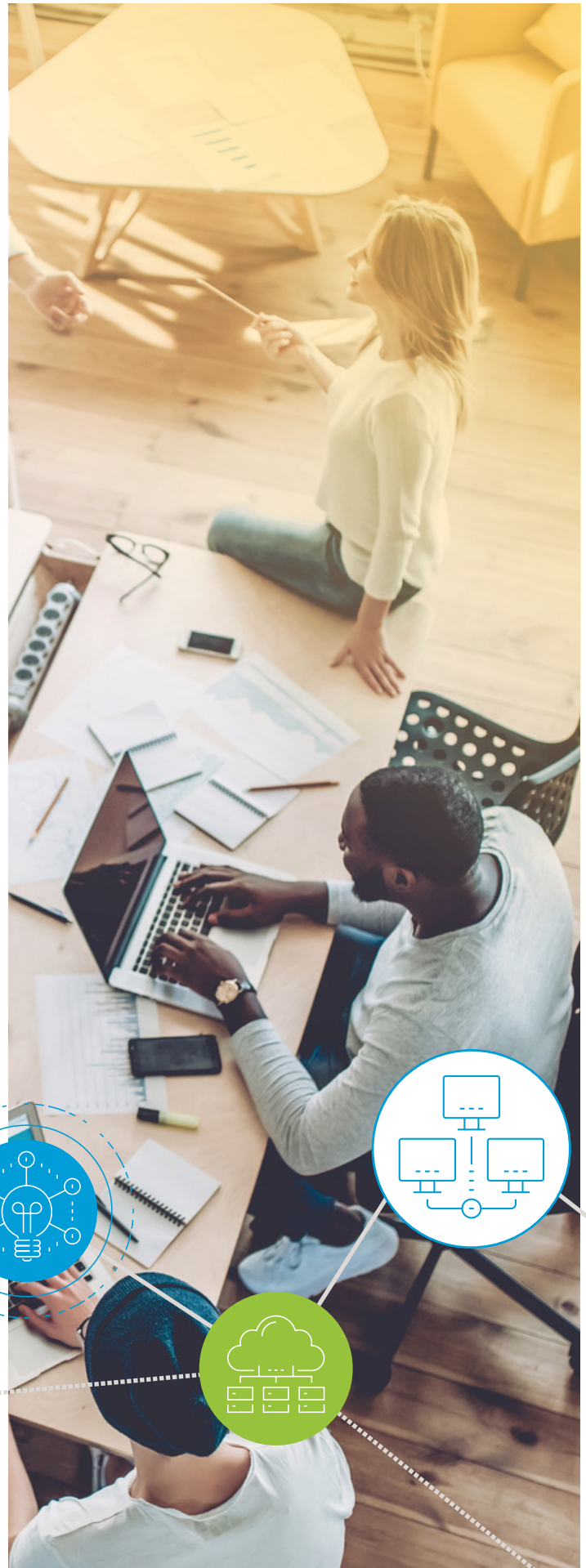
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“ *The practice of content management, collaboration and dissemination is best-enabled through a set of services that coordinate content usage by all parties — users, systems and applications. ...Focusing on foundational content services that can surface content in context and in other applications will improve the user experience and will help you overcome the inefficiencies and limitations of dealing with multiple content silos.* ”

SOURCE: Gartner, What You Need to Know About Content Services Platforms, August 2018

With Content Cloud, LOBs can personalize their environment and use innovative tools to find, extract, transform and deliver content in the context needed for reporting, analysis, and communications.

- Deliver fully vetted data from unstructured content—customer statements, correspondence, images, transactional reports, documents—to support enterprise information management, governance, search and delivery.
- Index, organize, secure, compress, encrypt, and search the metadata created by the ever-growing influx of unstructured content.
- Flexible search for metadata is organized by business, document type, groups and documents, allowing users or applications to find the precise information needed (down to the line level) and at significantly lower metadata storage costs.



“Content services platforms (CSP) are the next stage of enterprise content management, representing a shift from self-contained systems and repositories to open services.

A content services platform is a set of services and microservices, embodied either as an integrated product suite or as separate applications that share common APIs and repositories, to exploit diverse content types and to serve multiple constituencies and numerous use cases across an organization.”

SOURCE: Gartner, Magic Quadrant for Content Services Platforms, 5 October 2017

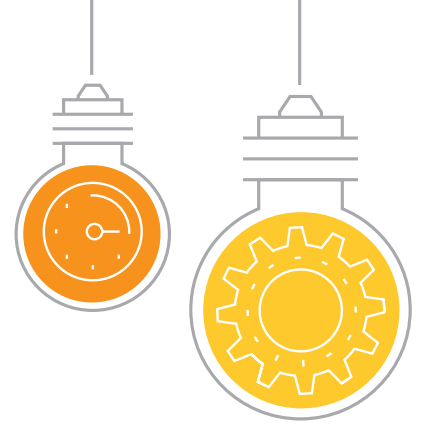
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The Systemware team built Content Cloud to improve efficiencies across IT infrastructure and business processes to help reduce cost-to-serve, improve resiliency, and meet compliance and regulatory requirements. Content Cloud can handle the complexities of today's digital ecosystem. Users have the option of storing content on the mainframe or in distributed environment, on-premise or in the cloud, or a hybrid deployment of all of these. The open architecture and data migration technology combined with our depth of industry experience means that Content Cloud can be easily deployed. In fact, what may take other vendors months or even years to implement, Systemware can do in weeks.

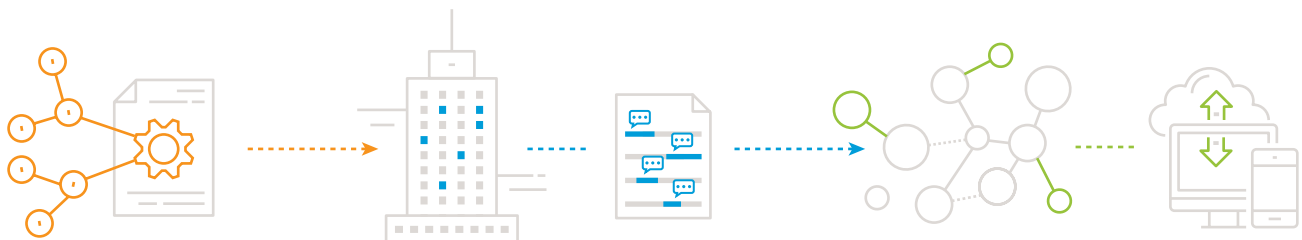
- Distribute and organize metadata across multiple nodes of clusters, and deploy multiple clusters to support distributed, parallel processing in a MapReduce programming model—additionally supporting failover and redundancy.
- Store the indexed, compressed, and encrypted metadata on affordable NAS, SAN or object storage which provides cost savings over relational database that are less practical with applications of this scale.
- Provide controlled access and meet compliance requirements for data segmentation and encryption.

We have helped our customers through very large projects and have been doing so for decades. We partner with them to understand their business and their challenges as well as their goals for digital transformation. Once we understand their initiatives we help create content connections to improve their business applications, their business processes, and their business intelligence. Learn more about more recent solutions in A History of Innovation at Systemware.

A History of Innovation at Systemware



Systemware has enjoyed continual success over the years and our ever-expanding solutions continue to be in high demand. We began by managing data from the mainframe, then expanded to manage more content from more locations, which eventually led to our cloud solution that can be deployed wherever you/our customers need it: on-premise, in the cloud, or as a hybrid solution. Systemware founders Dan Basso, Allen Curl, and Michael VanderLinden built their company on exemplary service and people. This approach continues to satisfy our customers and results in extraordinary employee retention. For example, the core team that developed our very first software offerings are still with us and are now shaping Content Cloud, our current content services offering. This team provides the insights, knowledge, experience, and stability to help us meet and exceed our goals.



The Early Years: 1981–2000

Systemware developed solutions to manage large volumes of mainframe-generated information. See timeline: [Systemware, the early years](#)

The Middle Years: 2000–2010

As solutions matured, Systemware developed indexing technology that is currently at the core of our volume content delivery. See timeline: [Systemware, the middle years](#)

Systemware Now 2011–

Systemware creates content services solutions to find and retrieve content regardless of where it resides, and transform, package and deliver content in the context needed.



1981
Company founded



Job History System (JHS)
First mainframe solution allowing visibility, management and reporting for mainframe jobs



Xptr
Ability to index, search, retrieve, view and manage mainframe content



AFP Resource Manager (ARM)
Ability to parse, cache and share AFP report resources



Legacy Archive Processor (LAP)
Migration of content from legacy stores moving content from expensive storage and reducing cost-to-serve



Xnet
Improved usability with first HTML UI and API providing access to Xptr



Xtrx
Ability to deliver web-enabled print streams allowing mainframe docs to be viewed in usable views/practical formats for improved user experience



Content Server DS
Ability to run Xptr in distributed environments



Xform
Transformation of AFP to multiple file formats (HTML, ADA, PDF, XTX) and Xerox to PDF



Content Integrator
Brought together mainframe and distributed environments with web services (API) to better manage content lifecycle (records, capture, retrieval, business logic) on cross-platform Java Server



Systemware User Interface
Flexible/customizable UI for enhanced user experience, usability and cross-platform use



Custom Application Modules
Industry and vertical-specific personalization made possible with open-API

Systemware, the early years
We developed solutions to capture, index, store, and manage information electronically.



Content Store

Provided content compression, encryption, and storage. Content Store automatically compresses and encrypts all content received from Content Server for storage.



Content Packager

Ability to combine multiple types of content and/or documents and ability to search, bundle and deliver in one package.



Records Management

Enabled compliance for enterprise records management.



e-Statements

Provided electronic statements to customers including opt-in process and use of indexing and transforms



Content Cloud

Enterprise Content Management to capture, organize, and manage content wherever stored and deliver information in the context needed with flexible deployment (mainframe, distributed and on-premise cloud)



Enhanced LAP

Flexible ad-hoc migration with the ability to connect legacy and 3rd party content with Content Cloud



Content Compliance

Provided content compliance and security across content systems and ability to segment content in support of GDPR and other regulatory requirements (retention, disposition and delivery)

Systemware, the middle years

We delivered advanced management technologies that can apply multiple indexes and automated analysis allowing customers to efficiently locate and combine the very specific information they are looking for—even with extreme data volumes.

Systemware now

We develop solutions that take advantage of distributed computing techniques to handle data volumes. As a result, our solutions can now use a spectrum of computing 'nodes', from mainframes to PCs to cloud servers.



Find Engine

Practical and efficient management of unstructured data with robust metadata providing structure, meaning and usefulness to content



Scripting and Automation

Ability to enhance user-productivity with workflows, scripting and automation.



Extraction On-demand

Extraction capability that uses line-level, page-level and document-level indexing to extract just the content needed

Systemware next

As our customers continue to innovate to solve their content challenges—moving to the cloud, digitalizing core business processes, exploring business intelligence (AI, ML) and discovering ways to create business value from big data, we will continue to deliver solutions that support their mission critical content.



Public Cloud-Ready

Containerized software deployment options for AWS, Google Cloud, Microsoft Azure and IBM

“Content Cloud increases our customers’ agility when interacting with their own customers—creating competitive advantages and innovation flexibility, while delivering a solution that helps them meet their compliance, security, and privacy requirements.”

Pat Sheehan, Vice President of Development, Systemware

SUMMARY

A Partnership for Innovation

Today, as organizations grapple with the challenges of IT modernization and begin implementation of their cloud, they look for companies that can partner with them to cultivate their digital ecosystems. These partners must help these organizations address the complexities of their interconnected networks of assets, systems, and processes to transform their business. Systemware is that partner.

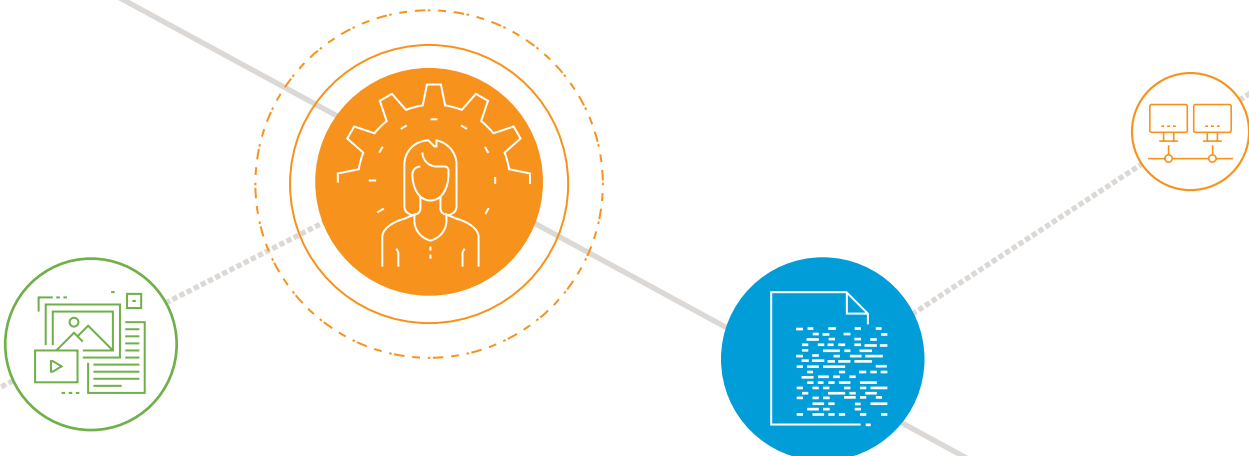
We continue to build on our commitment to create imaginative and innovative software solutions. We help harness data growth and provide users with focused information that supports knowledgeable decisions. We help our customers store data where it makes sense for them, and to search for and find that data across their enterprise. As a result, users get a personalized experience, so everyone gets what they want and need right at their fingertips, in a way that makes sense to them.

Our customers are some of the world's largest technology innovators. As they embrace this digital transformation journey, they create a vision that we must also understand and embrace. Systemware will continue to innovate and deliver solutions that meet their needs today while considering how to support their vision and develop their future technology needs.

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“As technology shifts and the stability and security of the cloud continues to be proven, organizations are shifting operations to the cloud. We continue to support our customers as they innovate in this area—allowing them to migrate mission critical applications without compromise.”

Pat Sheehan, Vice President of Development





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