A new solution for verifying the integrity of document images.

Information exchanges at the speed of sight.

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Introducing invisible, indelible fingerprints for document images.

We've all seen it in crime dramas. An investigator shines a special light on an ordinary object. Latent fingerprints appear. Vivid, conclusive proof that a specific individual touched the evidence.

Now picture a flow of document images through your enterprise. Each bears an invisible digital watermark that could reveal what process touched them — and what was done to them, and by whom. These document fingerprints can enable a new layer of security and control for business process management. A new infoimaging solution from Kodak makes this possible now.

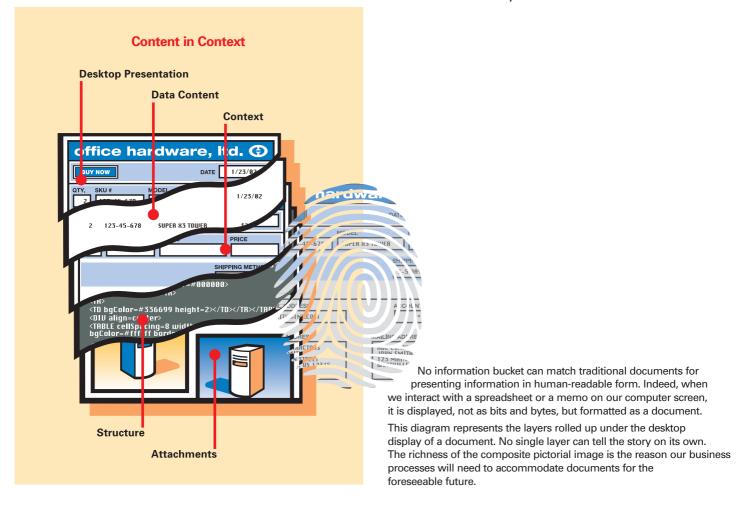**What stands between your enterprise and an unrestricted flow of information?**

Never has so much technology been available to keep the wheels of business turning. Our networks are worldwide with bandwidth to spare. Our databases are scalable to limits that seem almost infinite. EDI and e-commerce are accepted norms. XML, PDF, and application files flow between enterprises. But more can be done to leverage technology.
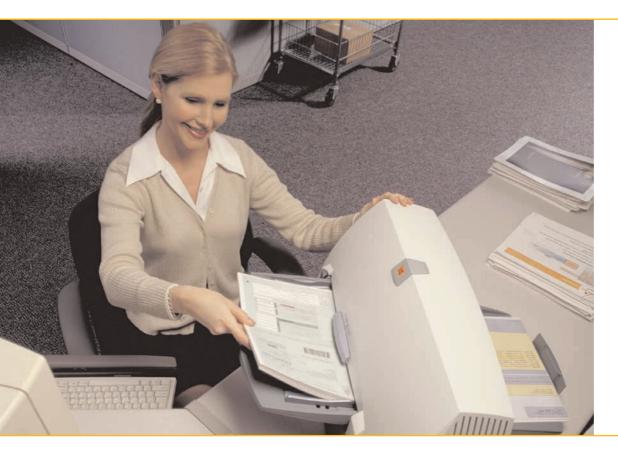
Consider documents and how they move across enterprises, whether between trading partners, within mergers and acquisitions, or to and from oversight agencies. These exchanges have yet to be widely digitized. In general, transaction processing and document processing remain paper-based. Infoimaging — the management of pictorial information — can facilitate the integration of documents into the enterprise processing flow.

Serving pictorial input to the human computer.

The MIS challenge for dealing with documents and photographs is that they are not coded data. In order for their information to be actionable or entered as data, a person or recognition program must first read them. While the endpoints for document processing might be fixed, business process management has the opportunity to move document content to its destination faster than is possible with physical mail or print streams.

By managing document images instead of paper documents, organizations can cut hours or even days from review and approval and other decision-making cycles. Document imaging can also improve cash flow. Electronic routing eliminates the time required for the physical presentation of an invoice or funds draft and the transfer of moneys.

Content in Context

Desktop Presentation

Data Content

Context

Structure

Attachments

No information bucket can match traditional documents for presenting information in human-readable form. Indeed, when we interact with a spreadsheet or a memo on our computer screen, it is displayed, not as bits and bytes, but formatted as a document.

This diagram represents the layers rolled up under the desktop display of a document. No single layer can tell the story on its own. The richness of the composite pictorial image is the reason our business processes will need to accommodate documents for the foreseeable future.

Infoimaging uses images and technology to improve communication and commerce, creating significant new revenue and market opportunities for businesses around the world.

Are you ignoring mature technology that could provide valuable solutions?

The tools to capture, manage, and deliver document images are robust and well understood. Document image management and imaging workflows have long been best practices in a variety of document-intensive industries. Healthcare, mutual funds brokerage, insurance, and mortgage and loan administration have all profited by adopting document imaging solutions.

Kodak believes that the barrier to widespread adoption of information exchange via document imaging is cultural, rather than technological. Enterprises are inherently risk averse. In the absence of proof that digital images remain unaltered, organizations are more comfortable paying the price of processing paper originals through transaction cycles and document routing.

Creating trust in a digital world.

Other processing technologies have crossed this divide. Secure socket layer technology opened up credit card payments on the Web. Public/private key encryption enabled secure data transmission on public networks. E-signature legislation provided assurance of the validity of remote approvals and contractual agreements. The Federal 21st Century Act, also known as Check 21, has legitimized substitution of images for actual physical checks for clearing checks electronically.

A new digital watermarking solution from Kodak promises to do the same for exchanges of document images.

Protecting and detecting with imaging science.

Digital watermarking from Kodak.

The principles of applying an embedded pictorial object to digitally-produced or transmitted information are well-understood by imaging scientists at Kodak. They are turning concepts into reality for a variety of sensitive applications.
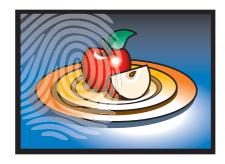
To validate identity, an object embedded in the photo must match the data display on the face of the badge.

To prosecute counterfeiting, an object embedded in digital movies will identify facts about the piracy.

To protect the property rights of professional photographers using digital cameras, proof images may be watermarked.

To authenticate the integrity of a document image, the digital watermark can actually contain pictorial information about the document itself.

Engineers at Kodak have successfully tackled the challenge of assuring image integrity before. As long ago as 1982, Kodak developed a CAP-Code for use in motion pictures. Many film prints have a unique identification coded into the image to allow tracing the source of any pirated copies. Most of the time, higher-quality pirated tapes originate from video transfers made for legitimate purposes that fall into the wrong hands, and not from prints in theatres.

Serious piracy today is often from an electronic format, not film. Encryption technology can deter electronic cinema piracy, but won't eliminate it. The most sophisticated encryption techniques can't be exported due to national security reasons. "Unbreakable" encryption codes for DVIX, DBS, PPV, cable television, etc., have already been cracked.

The multi-billion dollar motion picture industry can now use embedded objects generated by Kodak algorithms to protect their intellectual property from piracy. A digital film can be tagged with a unique digital watermark that has virtually no effect on bandwidth requirements. This tag is invisible under normal projection, but can be detected using the proper technology to spot and prosecute illegal reproduction.

For digital documents, reference archive technology from Kodak is available to produce unalterable "proof" images. By capturing a pictorial record of a document at the moment of creation or other process step, reference archive technology enables change detection and an audit trail.

Related technologies are under investigation to protect the authenticity of other types of pictorial information. For instance, a quick scan of a watermarking object hidden on the face of an identity badge could show that the ID photo corresponds with the personal data printed on the face of the badge. Compared to other technologies, such as bar codes, printed hashes, or magnetic stripes, Kodak digital objects are much more resistant to reproduction or tampering.

Infoimaging technology can enable image-intensive business processes with greater accountability.

| Document Capture | Data Extraction | Data & Business Rules | Export/Systems Integration |

With the Kodak solution, digital watermarking travels with a document image as an embedded object throughout a processing cycle. At each step, it may be checked to verify the integrity of the image. Additional watermarks may be added to facilitate business process monitoring where appropriate.
The result is improved security and control of document images.

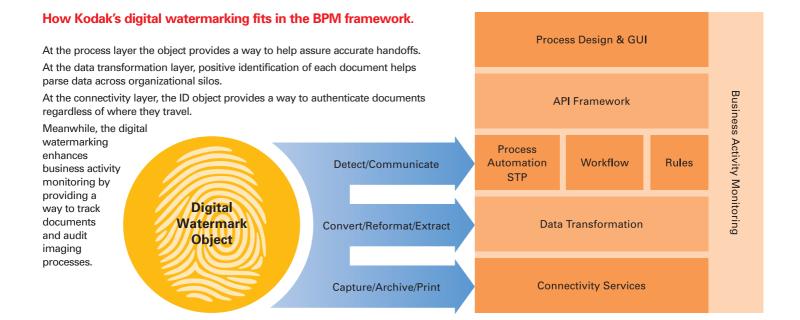## Digital fingerprints for documents.

Using document watermarking technology, an enterprise can add an invisible digital fingerprint at almost any stage of a document imaging process. For example, as soon as a paper document runs through a scanner, a matching, unique object can be generated and appended to the file. As individual as a fingerprint, the information contained in this wrapper travels with the image for subsequent processing by upstream applications.

You can see how this enables security and digital rights management. Depending on the implementation, other objects could be added from image capture forward through processing, storage, and retrieval. A user could query the file "Is this the document recorded as scanned by device X?" An administrator would look at an audit trail of activity and access. The "fingerprints" would reveal the truth.

It's as simple as seeing is believing.

Other protection technologies, such as digital signatures, can only signal a possible problem by detecting a change in bit order. The unique power of Kodak's digital watermarking technology is that it stores actual pictorial information — a visual record of the document, highly compressed by Kodak's algorithm. This could be an image of the entire document or selected areas, such as a signature, MICR code, and handwritten dollar amount, in the case of a financial instrument.

Even if the document image were somehow edited, whether accidentally or intentionally, you would be able to know that there was a change and what was changed. With this information, you can make the correct decision, release the funds or products involved, and pursue a remedy to fraud or other malfeasance.

How Kodak's digital watermarking fits in the BPM framework.

At the process layer the object provides a way to help assure accurate handoffs.

At the data transformation layer, positive identification of each document helps parse data across organizational silos.

At the connectivity layer, the ID object provides a way to authenticate documents regardless of where they travel.

Meanwhile, the digital watermarking enhances business activity monitoring by providing a way to track documents and audit imaging processes.

Digital Watermark Object

Detect/Communicate

Convert/Reformat/Extract

Capture/Archive/Print

Process Design & GUI

API Framework

Process Automation STP | Workflow | Rules

Data Transformation

Connectivity Services

Business Activity Monitoring

Open the door to process improvements without giving away the store.

The implementation of a digital watermarking solution from Kodak can have effects that are profound and far-reaching. It can open up the enterprise in new ways without compromising security or information integrity.

- Exchanges of information among enterprises can be conducted more freely because parties can verify the legitimacy of the documents.

- Business process management strategies can be more flexible, because images can be audited and integrated without fear of corrupting the enterprise's information repository.

- Cash management and customer satisfaction can be improved, because the cycle time of transaction-based processes, such as release of goods, proof of delivery, and cash transfers, can now be based on Internet-time delivery of documents.

- Decision-making processes can be conducted with a higher degree of speed and confidence, because multiple people can refer to a given document at the same time and/or move them through a routing workflow electronically.

- Internal controls and digital rights management can be implemented more easily, because activity "stamps" can be added at key steps in your processes.
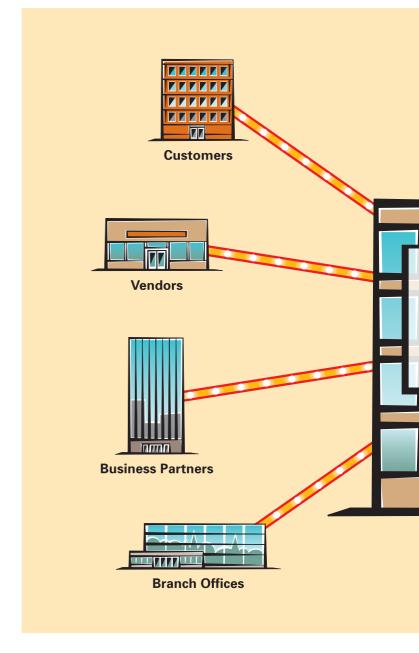
Capitalize on the strategic opportunities of digitizing document-based processes.

Essentially, digital watermarking authentication enables you to push out the geographic points at which documents can enter your business processes. You can open a virtual branch office wherever you can place a workstation and a scanner on the worldwide web, including a customer's own mailroom. In this way, digital watermarking technology can help you globalize your business.

For example, suppose you operate a commercial bank on the east coast. Many of your corporate clients may also have business units in the sunbelt, the mid-west, or the west coast. Due to the delay it takes for financial instruments and signed documents to cross the country to you, they may be dealing with regional banks for services.

Now you can compete in these formerly remote regions without paying for brick and mortar branches. By installing scanner stations with digital watermarking at these other business units, you can create secure portals to your services.
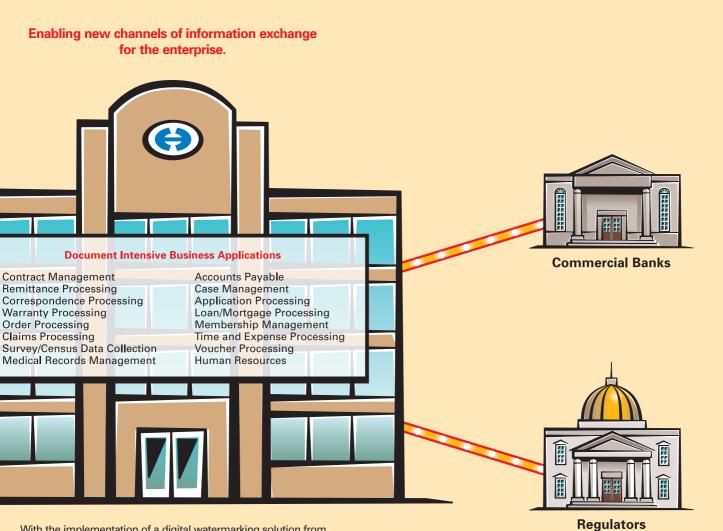
Transactions could travel virtually instantaneously, providing service and funds availability as quickly as your competitors can manage.You would be able to offer consolidated services and expand your market area for global customers at a minimal investment.

Customers

Vendors

Business Partners

Branch Offices

The above scenario is just one example. The principal of distributing image capture and truncating the movement of paper can be applied to many external and branch-office business processes.

Do more business with more confidence — and a technological edge.

Implementation of digital watermarking solutions from Kodak have already begun. Prime candidates are enterprises that derive the most value from documents passing through their business processes. Please contact Kodak if you wish to add security to existing document imaging systems or to facilitate the adoption of document imaging for business process management. The sooner you begin, the bigger the competitive benefits you can expect to reap for your enterprise.

Enabling new channels of information exchange for the enterprise.

Document Intensive Business Applications

Contract Management	Accounts Payable
Remittance Processing	Case Management
Correspondence Processing	Application Processing
Warranty Processing	Loan/Mortgage Processing
Order Processing	Membership Management
Claims Processing	Time and Expense Processing
Survey/Census Data Collection	Voucher Processing
Medical Records Management	Human Resources

Commercial Banks

Regulators

With the implementation of a digital watermarking solution from Kodak, document images may be exchanged freely among enterprises and their processes. Cycle time can be cut out of document-intensive processes. A new layer of security can be added. And business presence can be pushed out across networks to link with customers, business partners, and regulators.

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