TECHNOLOGY INNOVATION

<INBOUND>

Inbound
Mail Processing

ISIS Papyrus enables your mail to flow

INSIDE

The Papyrus Blueprint - One Platform for:

- ▶ **Intelligent classification** and automated distribution
- ▶ **Efficient data enrichment** of all documents
- ▶ Processing all incoming **communication channels**
- ▶ A complete solution for agile **Case Management**

Case Study

- ▶ **Sanitas, City of Vienna, GIS, A1 Telekom**

KEY ADVANTAGES

- ▶ **Reduced throughput time**
- ▶ **Less acquisition effort**
- ▶ **Information available earlier**
- ▶ **Channel independence**
- ▶ **Common view of customer**
- ▶ **Integration with SharePoint**
- ▶ **CMIS Adapter for FileNet, EMC, Alfresco, etc.**

One Company – Many Inbound Channels

Customer Communication and Business Documents arrive in multiple ways in an enterprise. For organizations that want to operate with fewer systems, it makes sense to standardize on a common platform for acquisition across all inbound channels with the same intelligent "document understanding", whether a client's message arrives as a Tweet or a printed letter.
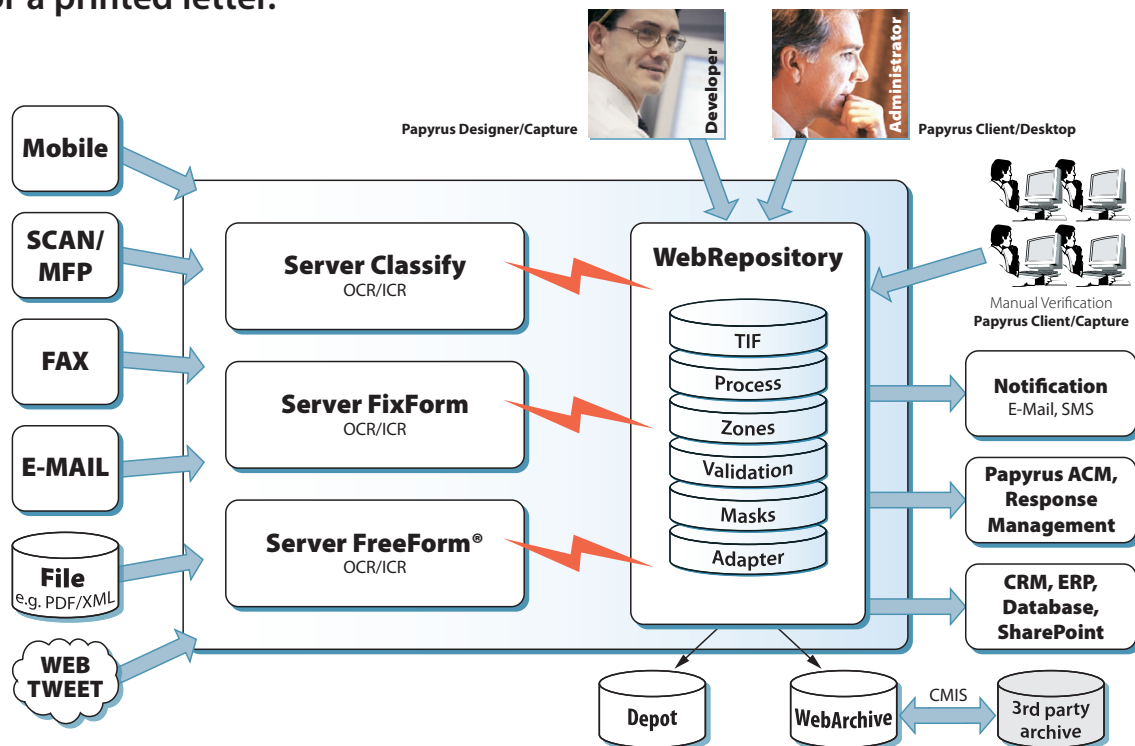
◼ Loosely coupled integration with back-end systems

A broad variety of Papyrus Adapters (file, XML, SOAP, MQSeries, HTTPs) and the TypeManager DB (Oracle, MS SQL, DB2) connect the document capture system with vital business application data from almost any major legacy or mainstream system or application. These platform- and compiler-independent interfaces drastically reduce the amount of time and effort required for interfacing especially for validation purposes. Full support of CMIS allows connecting with SharePoint and all leading document archives like FileNet and Documentum without additional programming.

◼ One set of definitions and resources

There are enormous benefits in using common document definitions and standardized corporate datafield structures and rules on one proven recognition engine (Papyrus Designer Package/Capture) for both high-volume batch processing <u>and</u> single document ad-hoc scanning (for client/server, desktop or Web portal).

Papyrus avoids dependencies on hardware, operating system, programming languages, transformation languages, data input formats, scanners, printers or electronic input channels.

Key Features of the Papyrus Platform:
- Central resource collection and management
- Versioning of all objects including data
- Variant control for branding and languages
- Central user management by role and policy
- Change management and automated deployment by date and time
- Centrally managed GUI (Papyrus EYE/Widgets)
- Workflow and process management (4-eyes principle)

Receive Mail & Capture Workflow

Customer case documents via

■ **Mail** ■ **Fax** ■ **E-mail** ■ **Web** ■ **SOAP**

Studies have found that up to 75% of all documents received and manually keyed into a data collection system contain some type of error. However, the ISIS Papyrus Capture solution automates document processing with speed and accuracy, regardless of the input method. Papyrus Capture can meet all of your corporate inbound document requirements without the need for complex programming.

■ Incoming mail/scanning

Case documents are often received as paper documents which Papyrus Capture then transforms into business-critical information by scanning, digitally signing and encrypting the data.

Visual quality control, batch image optimization and auto-mated indexing technologies such as barcode and/or OCR with zonal recognition are all part of the Papyrus solution.

■ Incoming faxes

Papyrus Fax Server set-ups in remote offices enable fax documents to be received and indexed directly at the source and then shared as appropriate throughout the organization based upon roles and privileges.

■ Incoming e-mails

For e-mails, neural network functionality is used to compare similarities and differences with incoming e-mails and those stored in the domain knowledge base that's built up by examples. Words and phrases in the body text are also used to classify an e-mail, not just those in the subject line.

■ Web response

Papyrus software also allows for a Web application for custom-ers to fill out HTML response forms. These are captured with the Papyrus HTTPs Adapter and processed accordingly.

■ SOAP application message

A SOAP message can be used to communicate information from a 3rd-party application server, JAVA application, Web portal or any other Web services-enabled system.
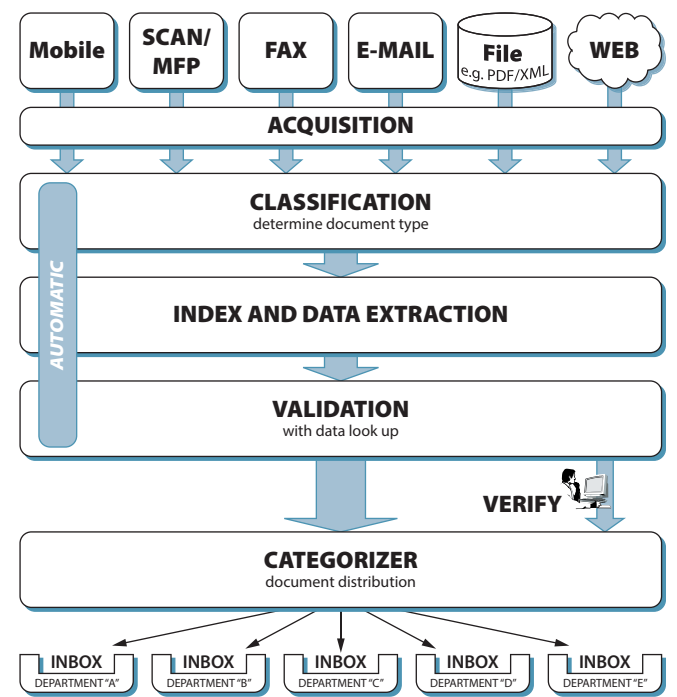
Multifunction printer

Smartphone/tablet

Gains achieved

■ Transparency of collecting documents electronically, whether via document scanner, MFP (multifunction printer), cheque or network scanner

■ Uniform operation with TWAIN driver, PixTools/ISIS and Papyrus low-level driver

■ Extra features like imprinting, dual stream images and soft dropout color

Mobile	SCAN/ MFP	FAX	E-MAIL	File e.g. PDF/XML	WEB

ACQUISITION

CLASSIFICATION
determine document type

INDEX AND DATA EXTRACTION

VALIDATION
with data look up

AUTOMATIC

VERIFY

CATEGORIZER
document distribution

INBOX DEPARTMENT "A"	INBOX DEPARTMENT "B"	INBOX DEPARTMENT "C"	INBOX DEPARTMENT "D"	INBOX DEPARTMENT "E"

Incoming Mail workflow

Automation by Recognition: Extract/Index & Categorize

■ Recognition of all inbound communication

With the variety of documents arriving daily, the need to quickly process and forward them to the right department is paramount. Therefore, the development and operation of a capture system must be independent of document types, input hardware and operating system. But to achieve this result, large banks, insurance companies, government organizations and industry and service corporations all require fast customization, elimination of programming effort and operating system and scanner independence - all inherent in the Papyrus Inbound concept.

■ Self-learning classification process

The Papyrus Capture classification methodology is independent of document type because the categorizer is typically trained through the use of examples. From this input the classification process learns specific similarities and distinctive differences. Self-learning technology ensures that all types of documents can be classified based on properties, keywords and rules, including:

- Layout
  - □ Logo
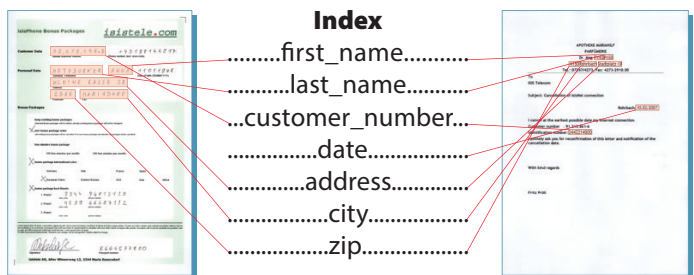- Keyword
  - □ Text
  - □ Barcode
- Statistical text
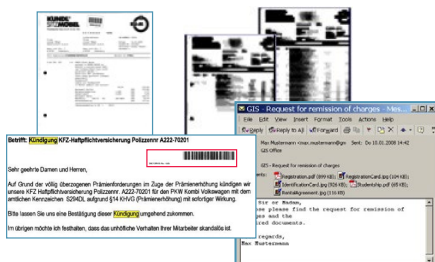
For documents that cannot be classified correctly, constant fine-tuning is possible while Papyrus Capture runs in real time. This ensures continuous optimization of Papyrus Classify and enables flexible adjustment of the rules based on changes in the received documents that have to be processed.

■ Intelligent extraction process

Based on advanced OCR/ICR - a combination of ISIS' own development and a market leader engine - printed and hand-written documents can be analyzed and data fields of interest automatically extracted regardless of whether or not the position on the page is known. Immediate fuzzy logic-based matching uses calculations to assess the probability of the contents of a predefined data field for dramatically improved results.

Papyrus FixForm uses four OCR/ICR engines with advanced image preprocessing for improved document recognition. It provides indexing and processing of data extracted from known forms on predefined document positions. Manifold parameterization and post-processing text filter functions enable best possible recognition automation.


Index
.........first_name...........
...........last_name..........
...customer_number...
...............date................
............address.............
.................city................
.................zip................

Papyrus FreeForm® automatically recognizes scanned but unsorted business documents of unknown structure and layout. The system also analyzes unstructured or poorly structured documents with great reliability and is capable of processing any kind of business case document, such as correspondence, invoices, copied forms, job applications and many more.

■ Powerful peer-to-peer capabilities for enhanced productivity

With Papyrus, capture applications have the potential to be fully scalable to tens of thousands of documents with hundreds of users on computers or mobile devices sharing incoming information, data or documents. The implemented security model in Papyrus prevents misuse of such a powerful open system. Deployment based on change management to all users and devices is fully automated by the Papyrus System and occurs as needed.

**Full Scalability - Fault Tolerance - Operating System Independence**
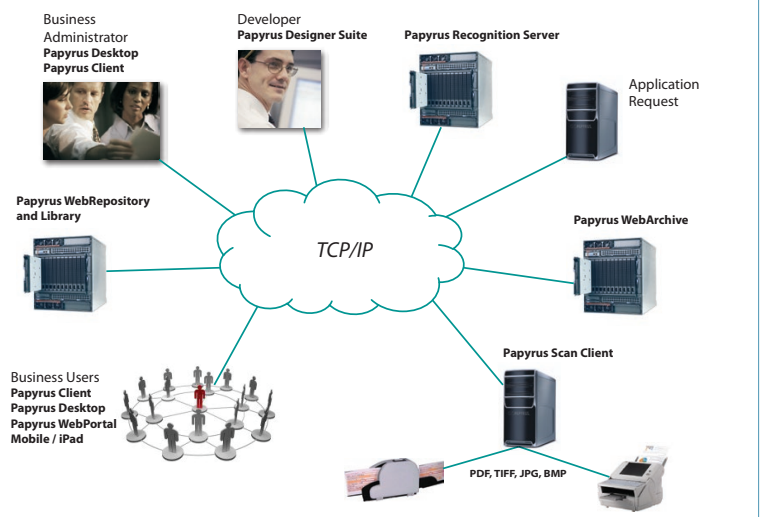
Data Validation and Business Case Creation

◼ Business Rule driven validation

Deploy your business rules to ensure correct data validation. An easy-to-use rule system ensures that your documents conform to your data and process requirements before they are routed further in your value stream.

Bi-directionally integrate your Capture application with your backend database and archives – including cloud-based services like Google Cloud Storage – by using one of multiple Papyrus Adapters and Typemanagers.
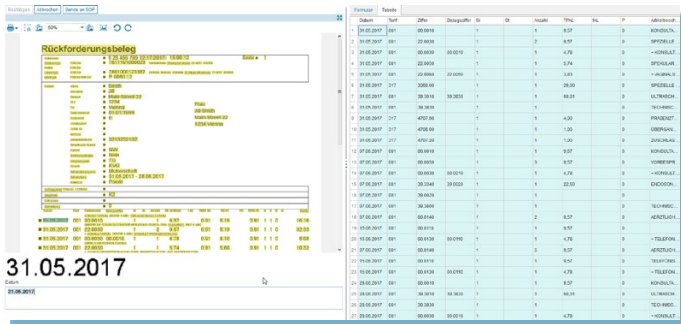
Database Lookup Support for Completion

## ◼ Papyrus Client Capture: High-volume document processing UI

Review and enhance your documents by use of a high-performance, dedicated Capture user-interface that allows you to modify and extend your documents and offers full integration to existing data sources. Drag-and-drop additional data from the document and include your own features and functions without programming in a flexible user interface technology – Papyrus EyeWidgets.
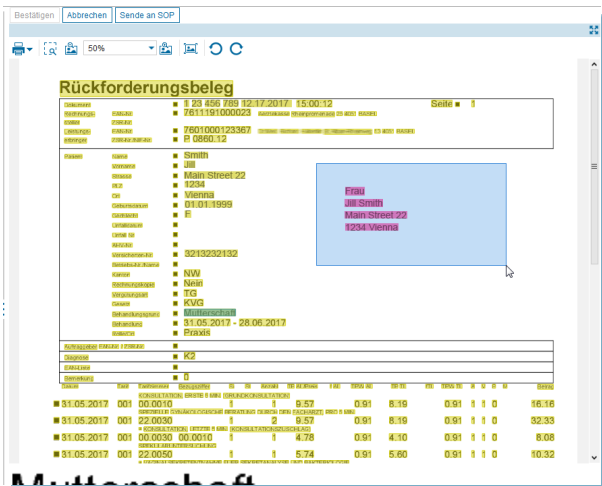
Papyrus EyeWidgets Lasso function

◼ Single-Line Lookup

Use a search-engine-like user interface to find existing customers and business cases in any data-source (SQL, CMIS, SOAP, etc) to connect to existing customer records or business cases or create new ones at the start of your document intake process.
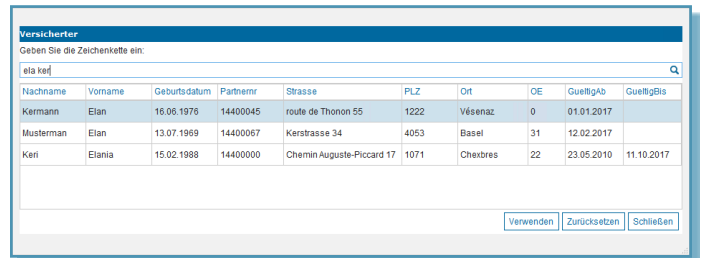

Single-line database query

◼ Highlights

- Uniform handling of all input channels (Scan, File, Email, Fax, Web, MS-Office, PDF)
- Highly customizable and extendable user-interface without programming
- Supports any language
- Available as browser plugin and stand-alone application
- Color highlighting guides capture user
- Integrated collaboration tools for specialist handover
- Same definition for Web, mobile and desktop

◼ Papyrus SharePoint Adapter

Papyrus offers several options to integrate inbound automation into established Web content and document management systems like SharePoint, FileNet, EMC or Alfresco - all connected via the OASIS CMIS standard.
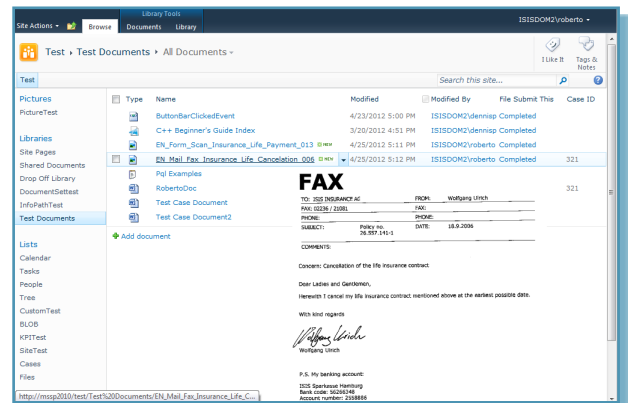
Papyrus integration with MS SharePoint

Comprehensive Capture ...

◼ ... incoming e-mails

E-mails are commonly used by customers and accepted by businesses as documents of relevance. The content must be processed quickly and reliably to ensure accurate data and provide prompt response. Papyrus Capture offers automated recognition and extraction capabilities for e-mails:

- ◼ Classify the type of e-mail arriving
- ◼ Accurately extract relevant data from the e-mail sender, subject, body text and attachments
- ◼ E-mails are automatically indexed and archived

Papyrus Adapter/E-mail offers all degrees of connectivity and integration for POP3 (and SMTP) up to MAPI (for Exchange) and IMAP (for Lotus).

GIS Gebuehren Info Service (Austria Broadcast ORF)

Gebühren Info Services GmbH (GIS) manages all television and radio licensing fees in Austria. GIS services more than 3.5 million customers and handles all the accounting, payment processing, customer service and communication. The company already utilized Papyrus to extract data from traditional forms of communication, such as paper and fax, and wanted to integrate e-mail extraction capabilities with this existing capture workflow.

A sharp increase in customer e-mails to the general corporate address revealed problems with manual routing that led to frequently misdirected messages. Because e-mails were handled in a separate manual workflow, GIS risked re-entering data without sufficient quality control.
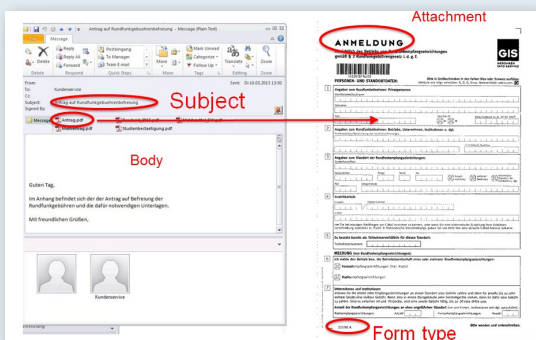
The Papyrus system integrates with the existing Microsoft Exchange e-mail server via the Papyrus MAPI (Messaging Application Programming Interface) Adapter for automated processing and routing of e-mails. The same Papyrus Capture functions GIS used for traditional channels are also applied to e-mail. The classification step to determine document type employs a variety of cascading methods, which are applied to the e-mail subject, sender, body text and attachments. Papyrus handles a wide variety of attached file formats, including PDF, TIFF, JPG and PNG.

◼ ... incoming faxes

Although the importance of faxes has declined, hundreds of thousands of documents are still faxed every day:

- ◼ from a Telco's agent's shop with contract initializations
- ◼ from the growing number of home-based MFPs
- ◼ wherever the consumer's signature is essential and distributed infrastructure is not yet equipped with scanners

Faxes can be directly received by Papyrus Fax Adapter/ Receiver or imported in the standard CCITT format. They often arrive as a piled sequence of pages which needs to be grouped to various single documents as well as "cleaned up" due to lower image quality typical from skew, dirt noise and diminution. This requires that the fax receiving application offers:

- ◼ advanced image preprocessing to improve document quality
- ◼ easy-to-use "document workplace" functionality to rearrange pages, split documents and categorize quickly

A1 Telekom Austria

A1 Telekom Austria is Austria's leading provider of telecommunication services, encompassing 5 million mobile customers and 2.3 million fixed access lines. It is part of Telekom Austria Group – a leading Telekom provider in the CEE region with more than 16,500 employees in 8 countries and revenues of approx EUR 5 billion.

The content of more than 10,000 letter and fax documents daily, including returns of marketing campaigns and often coming in from a variety of shops and agents, needed to be distributed quickly and reliably to the appropriate departments within the organization for ongoing processing. This demanded a well integrated solution capable of high levels of automation, accurate distribution of documents, and the rapid introduction of new document types.

The Fax Document Workplace, based on Papyrus Client/ Capture, was designed after the customer's special requirements to include not only standard classification functionalities, but also resorting pages (manually or automated by the Papyrus Capture Document Factory), and storing mis-sorted pages temporarily in an "image pool".

... for a Multichannel World

■ ... mobile scans

Smartphones and tablets are flooding our everyday lives – and we may use the integrated camera not only for leisure snapshots, but also to capture business documents to further process them electronically, such as:

- proof of citizenship when applying for a bank account
- damage report for insurance claims
- meter or payment form for reports and transactions

The innovative Papyrus EYE/Widget technology enables mobile integration and direct user control similar to desktop scanners:

- special image preprocessing including straightening and brightness adjustment
- intelligent binarization and image volume compression
- ergonomic user interface to control image quality and recognition results online

Raiffeisen Austria: Payment Form Capture Solution

The Raiffeisen Banking Group is the largest banking group in Austria, with 535 independent local cooperative banks and1689 branches - more than 40% of Austrians are Raiffeisen customers. To make life easier, Raiffeisen decided to implement leading-edge technology for an advanced mobile scan application to conveniently capture and process payments via the iPhone.

Task-driven approach (ACM with EYE Widget)

Using Papyrus Capture, Raiffeisen and ISIS Papyrus developed a business application and iPhone app with a unique payment slip scan function that simplifies the correct capture of the complete data in the form.

Users select 'payment scanning' and take a photo of the whole payment slip with the iPhone. After verification and possible correction of the captured data, these items can be processed immediately or later. The subsequent payment transfer is handled either by the Raiffeisen ELBA - mobile or ELBA-Internet banking.

■ ... multiple OMR

OMR zones (Optical Mark Recognition) can be found on many types of documents: customer forms, questionnaires, lottery tickets or government election sheets. Professional OMR extraction tools like Papyrus Capture provides the ability to easily define:

- single and grouped mark fields
- thresholds for empty, reject and filled
- handling of anchors for best adjustment
- rules for allowed and forbidden checkmark combinations

The most important challenge is maximum precision - to recognize a checkmark and the position where it belongs, and not to misinterpret dirt as a tick!

Cantone Ticino / KEBA Automation

The elections of the various Councils of Swiss canton **Ticino** take place every 2 years and involve processing some 150,000 ballots in A3 format, with up to 600 mark positions - in a few hours. In 2007 the innovative Cantone IT department moved from elaborate manual ballot counting to 10 Kodak production scanners and Papyrus Capture Software to successfully collect and analyze these volumes. The result of the distribution of seats was published before the time permitted. Precision was manually checked several times comparing ballot papers and data in the system, to find no errors!

KEBA, based in Linz, Austria, is a world-wide provider in the fields of industry, bank and service automation. The smart terminal "KEWIN" supplies entry-level models through fast multimedia lottery terminals. The modular approach of KEBA consoles makes them suitable for many applications, including interactive ticket validation and lottery ticket scan stations. To handle diversity in the quality of lottery ticket entries, such as faded or incomplete marks, Papyrus Capture was selected as the underlying recognition technology.

Customers of KEBA include:

- Österreichische Lotterien GmbH
- Spanish Lottery STL (10.000+ units)
- Russian Lottery

# WebArchive - Electronic Originals

■ Short-term and long-term archiving

Multiple **WebArchive** servers perform the long-term and short-term archiving onto the media of your choice. Storage management attributes for each object ensure that it is automatically archived as soon as it reaches the appropriate state. There are no archive runs or conversions necessary and if the process requires proof of originality and authenticity, the archived items can be digitally signed at any point in the process.

A WebArchive can consist of any number of servers and can use either its own index or an external DB index. BLOBS can be stored natively on disk where they can then be subsequently stored and retrieved from/to a third-party archive, or some external database. Furthermore, Papyrus WebArchive is not dependent on any particular hardware.

■ E-document delivery and customer care Web access

One or more **WebPortal** servers can be deployed to supply the **Papyrus EYE** user interface or, alternatively, each user can work on their own node using a PC. Dynamically created from definitions in the repository and not through the coding of a GUI, the Papyrus WebPortal can automatically create global modifications of the presentation through changes to the metadata in the repository. Document viewing options are PDF, AFP, GIF, TIF.
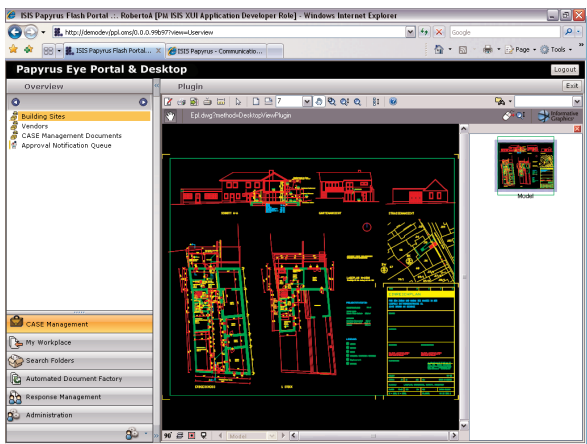
■ Full integration with Output Management

All documents can be reprinted, faxed or e-mailed. 'Copy' or 'duplicate' information is automatically added by the system at the time of print.
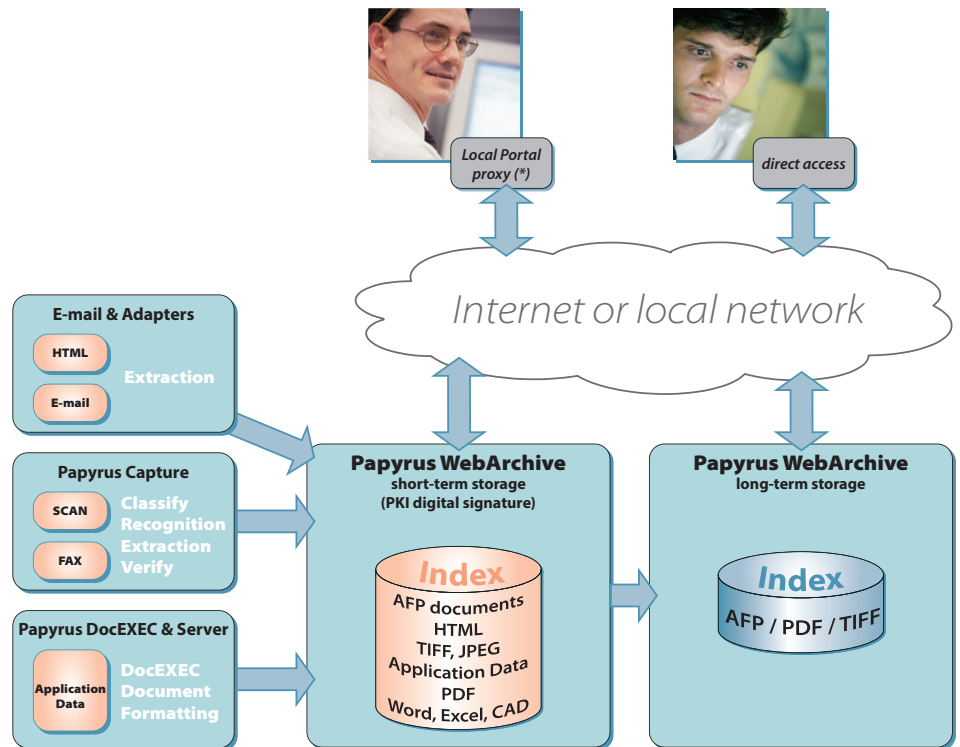
■ Authorization, Security and Auditing

- Access rights by user and role
- LDAP Adapter
- Audit trail
- Document SSL encryption (AFP and PDF)
- Digital signature (PKI Public Key Infrastructure)
- Secure HTTPS Adapter

■ Papyrus WebRepository integration

- Manage versions and resources (fonts, logos, etc.)
- Make resources available on various platforms
- Manage application definitions and their versions
- Distributed database (archive nodes)
- Multiple point of access (several portals)

■ WebArchive Features

- View meta information on the page (stickers)
- Full integration with production workflow and case management
- Central archive folders for ALL document types and e-mails
- Third-party vendor database not required, but supported
- Cross-platform distributed storage
- Long-term archive with external storage systems (i.e. Tivoli or Centera)
- Unlimited storage space provided by distributed archive nodes, overcoming hardware limitations
  - □ Unlimited archive size
  - □ Unlimited amount of nodes (> 4 Billion!)
  - □ Unlimited amount of objects (> 4 Billion per node)
  - □ Unlimited disk space

Papyrus for Content and Case Consolidation

Case Management is about receiving information, getting the right information to the right people and having the right processes in place to enable people to act at the right time in order to respond appropriately. This requires a business communication platform that offers closed-loop Case Management for the consolidation of inbound and outbound business communications on a single flexible platform.

The business process created through simple assembly of user-definable items in a case folder enables a holistic view of a case while also providing built-in support for the process time line.

The **Papyrus Process and Content Platform** integrates Case Management with ECM, BPM, databases, time travel (past and future) and a rule engine for case definitions. The central WebRepository in the system defines, controls and version manages the metadata for all business cases containing data, documents, questions, rules and previous activities. Relieving the business from traditional programming in languages such as Java and .NET, the benefits are substantial because agile processes make for a business that is much more in control.

- Any item combination
- State changes
- Case summary states
- Consolidates all documents
- Documents created from case data
- Time travel (roll out & roll back)

Papyrus - State- and event-driven model

What is the right action to take?

Current Status and past actions?
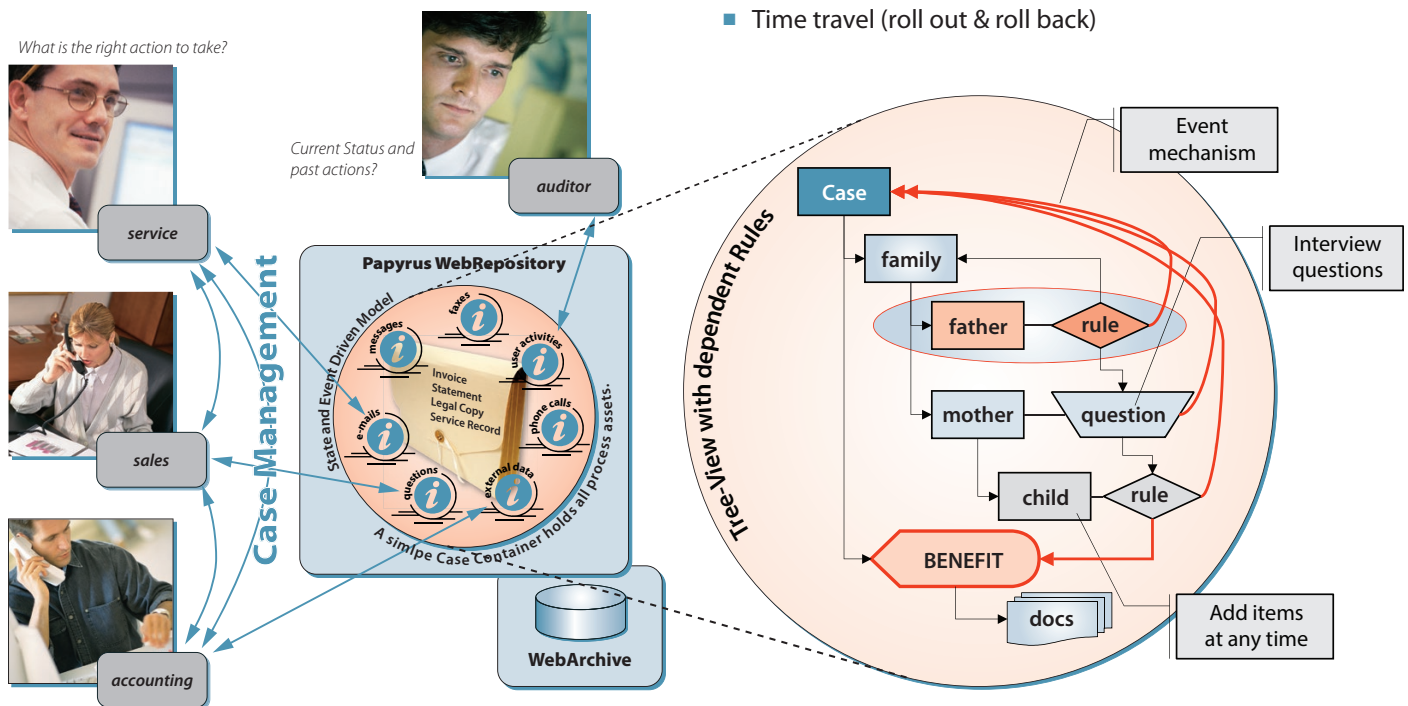
A flexible solution

- A free-form case container holds all case items and their state providing flexibility and control at the same time.
- Changing an existing case means only adding another item to the case on the fly.
- Ideally, the summary state of the case does not have to be encoded into rules but rather can be trained!

Benefits

- All information items are modeled in the Papyrus WebRepository
- Unique closed-loop case management (inbound/processing/outbound)
- Enables a holistic view of a case, family or household
- Built-in support for the process timeline
- The case contains data, documents, rules, questions, decisions and previous activities
- Rules are attached to the correct data element and applied only in the case
- Deploying Java or .NET programs to servers or PCs is not required

City of Vienna
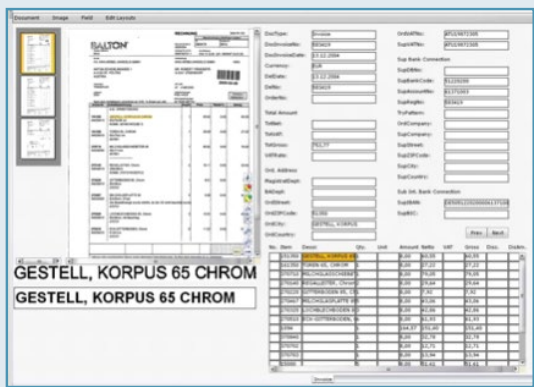
Capturing City Business

Magistrat 6 – City of Vienna

As part of activities to centralize Accounts Payable processes and run them more efficiently, the City of Vienna searched for a highly productive document capture system with the option to use it in future not only for invoices, but for all incoming mail. The first phase of the project requirements were:

- 1.5 million invoices with 5 million pages per year, with heavy peak in December and January
- Many tens of thousands of suppliers
- Identification of one among many receiving departments (mixed terminology)
- Integration with SAP both for validation (e.g. open orders) and export (iDOC)
- Storage of all invoices in municipal's PAM-Archive

After a profound selection process the City of Vienna selected the ISIS Papyrus Capture application. Based on detailed requirement specifications the standard Capture Framework was adapted, and the solution went to production in 2010. Since then more and more departments of the municipal have switched to this cost-saving inbound processing operation.

Papyrus Capture Verification User Interface

■ Papyrus FreeForm®

Papyrus FreeForm® technology extracts the key data of each invoice, or - using adaptive document understanding functions and precise recognition - automatically captures every single service item position, plus additional service-related information.

■ Functionalities

For extraction of datafields on invoice types the system has never seen before, logical definition libraries are initially available from ISIS Papyrus (definition set for invoices), comprising the necessary parameters (pattern, anchor words, conditions). Additionally, the expressions and descriptors required for vendor-specific definitions can be generated by training from samples of each document type (document class) using a "learn by example" approach.

Each position is found automatically and then validated and transformed for consistency with the information held in a master database. This normalization of notational variance and uncertainties created within the text recognition is achieved using "fuzzy-logic" matching technology.

Extracting Every Detail

■ Production Process

■ Extracting, Validating Complex Documents

A key feature of Papyrus Capture is the powerful extraction tools that allow it to recognize a wide range of documents, including complex table and invoice structures, such as TarMed which contain numerous pages of barcodes, QR-codes and text positions. These documents also come in various languages, all of which Papyrus Capture handles with equal quality.

The Papyrus System is integrated with existing Sanitas databases, allowing for plausibility checks and data enrichment through cross validation. Information is automatically entered where possible, while missing data can be found with graphical queries.

■ Guided User Interface

When manual verification and data completion is necessary, Papyrus Client/Capture provides a guided user interface. Color highlighting tells the user which action is to be taken on a particular field, where to input or verify information and which fields were processed automatically. Documents can be passed on to an administrator for completion of ambiguous data fields.

Data entry within this interface is made at a fast pace by using definable shortcuts, instead of mouse-interactions that are comparatively slow.

■ About Sanitas

Established in 1958, **Sanitas Group** is one of Switzerland's leading health insurers, offering basic and supplementary health insurance solutions for its 822,500 clients and posting a premium volume near CHF 2.66 billion.

## Sanitas Health Insurance

■ The Requirements

As a health insurance provider, Sanitas need to process claims fast and reliably to stay competitive and achieve customer satisfaction. Sanitas handles more than 10,000 incoming documents daily and can deal with nearly 30,000 during peak times. The documents are classified into main types with dozens of subtypes, then extracted, verified and archived each day. Sanitas needed a highly automated system for processing incoming documents from start to finish, combined with a guided user interface to attain quicker response times.
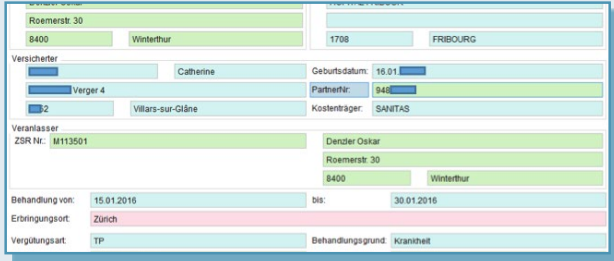
Blue fields are processed automatically; Green fields have been completed; Red fields still need verification.
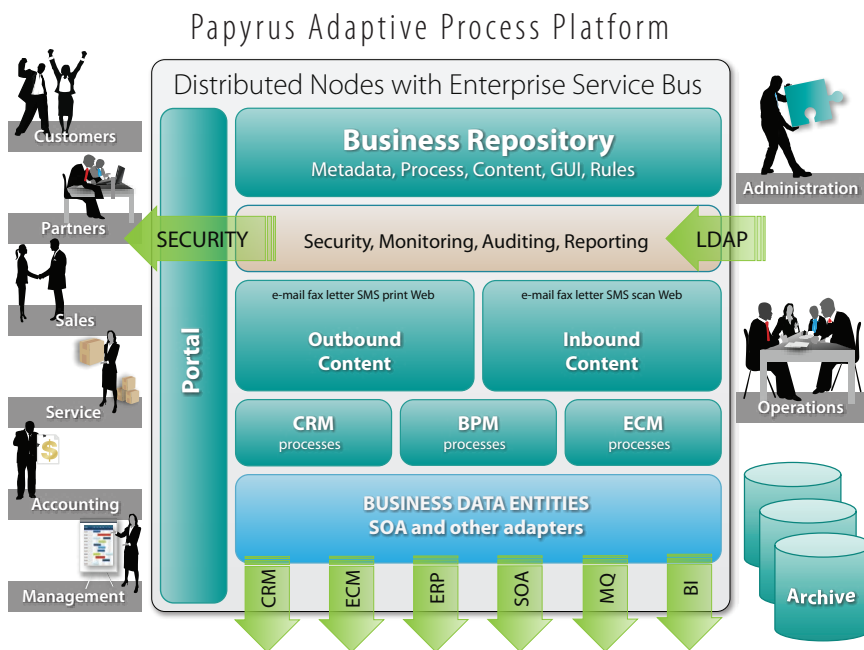
■ The Solution - Papyrus Capture for Invoices

The Papyrus Capture system enables incoming documents scanned in several centers throughout Switzerland to be imported via the Papyrus Scan Adapter for central processing. In addition, a growing percentage of invoices come from clients using the Sanitas mobile app. These documents are uploaded as images directly to the Papyrus Capture System. Despite the low image quality of mobile phone cameras, the extraction and correction capabilities of Papyrus Capture enable seamless mobile integration to further reduce processing times by cutting out postal delivery. The Papyrus System provided Sanitas with a guided user interface for efficient manual verification and accurate data completion. The high-performance capture system along with the guided user interface allows Sanitas to quickly and accurately classify, extract, validate and verify large volumes of documents.
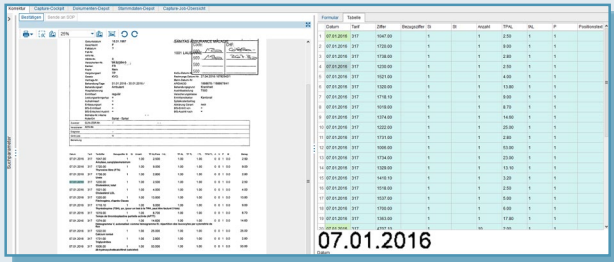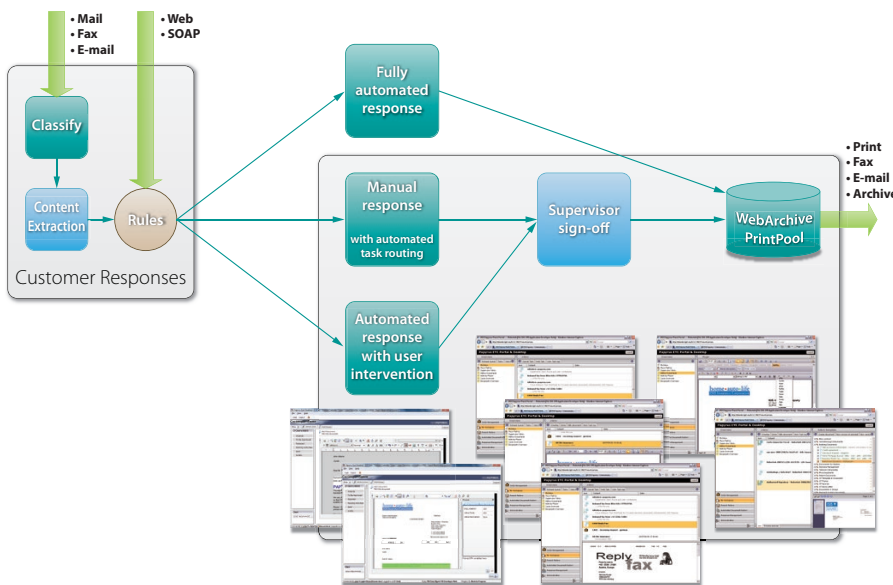

Missing data is found with graphical queries

A comprehensive, flexible and scalable solution

for consolidated management of inbound and outbound customer communications across channels, departments and systems.

Papyrus Adaptive Process Platform

Distributed Nodes with Enterprise Service Bus

Business Repository
Metadata, Process, Content, GUI, Rules

Security, Monitoring, Auditing, Reporting

SECURITY — LDAP

Portal

e-mail fax letter SMS print Web
Outbound Content

e-mail fax letter SMS scan Web
Inbound Content

CRM processes — BPM processes — ECM processes

BUSINESS DATA ENTITIES
SOA and other adapters

CRM — ECM — ERP — SOA — MQ — BI

Customers — Partners — Sales — Service — Accounting — Management

Administration — Operations — Archive

Organizations can **define, measure, and manage** process, content and data in complex service environments with a shared customer view and customized GUIs.

• Mail
• Fax
• E-mail

• Web
• SOAP

Classify

Content Extraction

Rules

Customer Responses

Fully automated response

Manual response with automated task routing

Automated response with user intervention

Supervisor sign-off

WebArchive PrintPool

• Print
• Fax
• E-mail
• Archive

The **Papyrus Platform for Business Communication and Process** is much more than a collection of software components. Its architecture follows a thoughtfully designed blueprint that provides solutions to individual customer problems as well as long-term concepts for the natural integration of new technologies into your environment.

These Papyrus components can be used as standalone products or combined in an integrated system to cover the complete lifecycle of inbound and outbound correspondence including process management.