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Introduction

SAP (System Application Products) SE is the worldwide leader in ERP (Enterprise Resource Planning) products, accounting for nearly one fourth of the $25.4 billion market. The SAP R/3 – ECC (Enterprise Central Component) is a comprehensive ERP product and additionally covers the areas of Customer Relationship Management (CRM), Product Lifecycle Management (PLM), Supply Chain Management (SCM), Human Capital Management (HCM) and Supplier Relationship Management (SRM).

Many common SAP use cases naturally associate a business process with document content of some form. In some of these use cases, documents and unstructured content are critical components driving the business process. Native SAP has challenges when dealing with document content in their user experience, storage strategies and extension architecture.

Gimmal ERP-Link for SharePoint and SAP is designed to extend and enhance the native SAP architecture to support business driven content management, and deliver a compelling experience in SharePoint; fully integrated to SAP.

This whitepaper discusses these issues in more detail to help the reader understand the need for advanced SAP content integration and interoperability products.

SAP and Document-Oriented Business Processes – the Issue

On a technical level, the product SAP can be described in many ways, but for this discussion, it should be viewed as a heavily object oriented ERP system. The different functional areas of Finance (FI), Human Resources (HR), Sales and Distribution (SD), etc. have hundreds to thousands of transactional business objects, each with its own object service, methods, and parameters. These objects were developed to perform very specific actions such as associate an invoice item with a cost center, update a customer record, receive a good into inventory, etc. Within SAP all business objects work with structured transactional data.

SAP is constructed from thousands of transactional business objects that perform very specific functions.

Countless business processes are triggered or documented with content.

Complete business processes are constructed from chains of these transactional business objects, with workflow actions, events, triggers, supporting runtime services and series of specific graphical user interface (GUI) screens for the users, plus system services such as batch printing, distribution, and more.

SAP supports hundreds of business processes that can involve documents often both in paper and electronic form. At various steps in the business process chain, key documents need to be saved, referenced or accessed in support of the activity. These documents either serve to trigger processing steps across different functional areas, or they are documents relating to processes in one of the application areas. Certain business processes often involve large sets of documents such as images, drawings and numerous types of unstructured content.

SAP is designed so that documents or any kind of unstructured content are treated as objects linked to a specific SAP business object. A series of "link tables" in SAP keeps track of the entire unique document IDs and their mapping to one or more business objects/transactions.

Content within SAP is not stored or viewed based on relationships to other content, document types, classifications or metadata, but is linked to specific transactions.

In SAP, content is not stored or viewed based on relationships to other content, document types, classifications or metadata. There is no concept of a folder hierarchy to group and relate documents as is standard in an ECM system. Rather content is linked to specific transactions or records and each content item is treated completely independent of any other content item.

In SAP there is no concept of a folder hierarchy to group and relate documents.

From the business objects implemented in the SAP applications, any of these four content related activities can be executed in any application:

1. Display a "hit list" of stored documents
2. Assign stored documents subsequently to a business object
3. Store documents in dialog
4. Create a bar code for a (physical) business object

In the SAP User Interface (UI) for a business transaction is a drop-down tab which offers the user use of "Generic Object Service" (GOS – See Figure 1) calls that view, attach, or delete documents specific to the transaction item. GOS functions are integrated into all SAP applications.
SAP Database as the Content Store

SAP out of the box will store unstructured content in the same database as its structured data. As SAP can only support a single RDBMS store, it became clear over time that the nature and volumes of unstructured data dictated that a separate ECM system should be used to hold and manage this content.

Unstructured content is stored in the SAP transactional database unless an external content management system is implemented.

The SAP Transaction Database is not the ideal place to store content for many reasons:

- It does not qualify as a compliant archive or content repository
- Only SAPGUI users can store, access and retrieve documents
- Documents are only retrievable by going to the specific SAP transactions themselves, rather than a document retrieval application as with most content-centric solutions
- Search for documents based on metadata or content requires an expensive project to implement TREX\(^2\)
- You cannot use optical or hierarchical storage devices behind the RDBMS for large content files or expanded higher latency retrieval of content
- Adding unstructured content to a relational store optimized for structured data, has negative impact on retrieval performance and as the size of the database grows, response times to the transactional users will also slow negatively impacting a Service Level Agreement (SLA)

\(^2\) TREX (Text Retrieval and information EXtraction) is the search engine in SAP NetWeaver
Commonly the file size of an SAP content store can exceed 500GB, which can severely impact back-up performance or result in the failure of a backup due to the layout of tables and single file sizes for the unstructured content.

A transactional RDBMS sitting under the SAP systems is not designed to enable unstructured content - capture, manage, store, preserve, and deliver content and documents. It is clear that other options outside of the use of the native SAP RDBMS are preferable in content-enabling SAP applications, thus SAP developed the ArchiveLink Interface to allow for external ECM systems.

**ArchiveLink Interface**

ArchiveLink is the SAP service that links documents stored outside of SAP to SAP transactions, while still providing all common document service functions. ArchiveLink works through the standard GOS interface described earlier, but allows the content to be stored outside the relational database. Standard GOS object linked assignment of content to transaction records is supported, such as:

- Incoming documents to be stored in the ArchiveLink interfaced ECM repository
- Information from the SAP system such as outgoing documents and print lists
- Direct access from SAP application components to the externally stored documents

ArchiveLink supports GOS functions in an external ECM system with the following interfaces:

1. **Throughout the standard SAP User interface**
   Uniform pull down tab for supported document services as seen in Figure 2 below.

![ArchiveLink functions in the application’s UX](image)

Figure 2 - ArchiveLink as it functions in a SAP Application UX
2. **Application Interface**
   The ArchiveLink Interface consists of function modules, which must be integrated in the SAP applications. Business objects are linked to stored documents and object methods are available that allow storing of content using SAP ArchiveLink, recall via ArchiveLink and can be integrated into SAP Business Workflow.

3. **Content Services Interface**
   Content Services Interface is a run-time interface between SAP and external ECM Systems and general desktop applications. General desktop applications include Microsoft Word and Excel, activated from the SAPGUI³ screens as an OLE⁴ action.

### ArchiveLink Interface Limitations

SAP ArchiveLink requires all user interaction with content to be conducted in a SAPGUI transaction screen. This means that all relevant business data and transaction information is contained, viewed and accessed within the SAP transaction screens themselves even if the content is stored outside of SAP. Due to this, organizations must consider the following challenges to user navigation:

- If a document relates to multiple transaction records, the user must navigate to each transaction screen separately, and for an application such as Plant Maintenance this may require navigation through 20 different SAPGUI screens and more than 40 mouse clicks
- The list of documents in the attachment list does not show any data (commonly referred to as metadata in most document management systems) relative to the document itself
- There is no ability to search for content in a list, or organize it by business data type or key words
- There is no hierarchical foldering or sub-foldering views of sets for documents
- In order to go to a specific document a user must first know the transaction code and then the coordinating transaction record to find it

---

All user interaction is done in a SAP GUI with ArchiveLink. You must know the specific transaction code and transaction record to find a document.

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³ SAPGUI is the Graphic User Interface client in SAP that allows a user to access SAP functions.
⁴ OLE (Object Linking and Embedding) is a Microsoft technology for embedding and linking documents
In summary, ArchiveLink limitations combine to make for poor content utilization and impact productivity for processes with sets of documents related to a transaction record, especially if related to multiple transaction records and this leads to:

1. Very limited standard SAP user experience for content utilization and viewing the attachment lists
2. Total lack of business specific data about the document
3. Inability to define relationships between documents such as those supported by foldering and hierarchical groupings
4. Business processes with large sets of documents and hierarchical organization of document relationships to another become unwieldy and very time consuming to the user who must open each document to identify them individually or understand particulars of that given document.

Storing Content in the SAP Content Server

SAP provides its own Content Server with ArchiveLink integration. The Content Server is available free of charge from the SAP Market-Place. The SAP Content Server (SAP CS) may look attractive as an archive solution, but it too has many limitations as a content repository:

- SAP itself does not recommend use of the SAP CS in many scenarios such as long term storage
- It can only be accessed by SAPGUI users, with no ability to allow access through common end-user interfaces such as Microsoft Office or SharePoint
• It is not certified against any of the key guidelines (U.S. Department of Defense 5015.2, VERS, MoReq 2010) for Records Management
• Does not directly support saving data on optical data media (CDROM, WORM)
• No native scanning client
• Documents are only retrievable by going to specific transactions within SAP
• Document Search based on metadata or content requires an expensive DMS & TREX implementation project
• There are few, if any, of the typical administration tools for RDBMS or ECM available
• Disaster Recovery or load balancing features are very limited

SAP does not recommend the use of its own archive repository, Content Server, for long term storage.

This is why, in response to customer demand, SAP offers the ArchiveLink Interface as a certifiable interface standard, so that full-function, third party ECM systems can be utilized. When linked to SAP applications, the external content servers and the SAP ArchiveLink Interface allow access to all the linked documents inform within the SAP System and can therefore lead to considerable time savings.

SAP DMS

The SAP Document Management System (DMS) is another SAP offering specifically offered to enhance content management. It is not standard out of the box functionality and must be implemented and configured before it can be used. This effort is typically a complex “Big Bang” project and may be far more than what is required for many organizational content centric processes. Additionally SAP DMS also has limitations that prevent it from being universally usable in all functional areas.

SAP DMS runs as part of the ArchiveLink and GOS framework for SAP processes and it is recommended that organizations use an ArchiveLink connected third-party ECM system in combination to avoid storing content in SAP RDBMS or Content Server as discussed earlier.

SAP DMS is a “big Bang” project and may be overkill for many content centric processes.

It does address many shortcomings of the standard GOS functionality as described earlier, but is also very complex and thus oriented toward the SAP Power User, as it requires users to jump between the standard business process transactions they work in, to the specific DMS applications that have been implemented.
SAP DMS provides a means to support:

- Secure storage of documents
- Check-in / check-out functionality
- Change management
- Versioning
- Search document facility (TREX)
- Linking of the documents to other objects in SAP

It is most commonly used for SAP Product Lifecycle Management (PLM) including Project System (PS), Contracts (SD), Quality Management (QM) and Plant Maintenance (PM) with its 6 supporting sub modules. As noted, SAP DMS is directed towards the super users in those areas and addresses many of the needs for more efficient content utilization for inside SAP users.

Tasks necessary in any SAP DMS project:

1. Identify the document types
2. Group them as original files and additional files
3. Decide your numbering scheme and ranges
4. Deploy the ArchiveLink / KPro\(^5\) and define storage categories
5. If needed, deploy a conversion engine for SAP documents
6. Define your content versioning strategies
7. Define the relevant work station applications
8. Determine the status network
9. Work out your roles and authorizations
10. Determine how change management gets done
11. Determine the release strategy
12. Most importantly decide how to handle legacy data and content migration into SAP

These complicated tasks are why companies hesitate to leverage SAP DMS, unless they have a significant business driver. Typically if implemented, there will be 1-2 application areas utilized and the other functional process areas are often left wanting due to the implementation complexity. Thus the use of a 3rd party ECM system is still relevant for the DMS application support, but also to support the other functional areas still requiring ECM and enhanced content utilization.

Content-Centric SAP Business Processes

Many business processes automated by SAP are content centric. A content centric process relies on documents and unstructured content to drive the business process. In each, business documents, images, CAD drawings or other forms of unstructured content are associated with, or drive the SAP business transaction. A representative set of business processes that can benefit from content enablement includes:

\(^5\) SAP Knowledge Provider (KPro) is the central service in SAP Basis for administrating and storing any kind of document.
The following examples show how critical documents are aligned in the business process:

**Plant Maintenance** (PM) is an example of an application where there can be hundreds of documents in a document set, and the sets of documents are cross referenced in 4 different SAP application modules covering:

- Functional Locations
- Work Orders
- Equipment
- Notifications

There are over 100 different transaction screens covering those 4 areas. The content types include Microsoft Office documents, PDF’s, images, SAP print lists and CAD drawings. This is likely one of the more complicated application areas. SAP DMS does not cover this use case due to the complexity, and many of the users are field engineers and mechanics who are not able to manage the complexities involved in the DMS, even in an ideal situation.

**Materials Management** (MM) is another example with which the following documents relating to purchasing in MM can be stored:

- Requests for quotation
- Purchase orders and related purchasing documentation
- Scheduling agreements
- Forecast delivery schedules
- Contracts
- Incoming purchasing documents
- Quotations
• Order confirmations
• Incoming delivery notes, invoices and credit memos
• Print lists (outputs from executed reports which are saved as print lists),
  Sales and Distribution (SD) has the following examples of sales documents that can be stored:
  • Incoming customer inquiries and customer inquiry changes
  • Outgoing customer quotations
  • Incoming purchase orders and purchase order changes
  • Outgoing order confirmations

**Personnel Administration (PA)** has the following personnel administration and payroll documents that can be stored:

• Incoming HR master data documents
• Incoming recruitment documents
• Incoming travel management documents

**ERP-Link Suite for SharePoint & SAP – the Solution!!**

Gimmal ERP-Link Suite for SharePoint & SAP allows Microsoft SharePoint, SharePoint Server (on-premises), SharePoint Online for Office 365, and Microsoft Azure to become the primary content repository and provide information management services, data and records archival, plus collaboration and governance functions in support of native SAP business processes. With ERP-Link, incoming and outgoing documents can be automatically linked to specific SAP business objects and processes and stored directly in SharePoint. The utilization of SharePoint is completely transparent to the SAP user and the SAP business processes themselves. Conversely, an end-user can also work entirely in SharePoint, accessing and acting on content and processes running in SAP.

Gimmal ERP-Link for SharePoint & SAP increases productivity and enables expanded business process automation. With ERP-Link, non-SAP users can link documents to an SAP process with one click of a button directly within SharePoint. ERP-Link enables more users within an organization to participate in SAP-based processes from the intuitive user experience of SharePoint, increasing efficiency, productivity and reducing training costs.

For users whose jobs do not require direct use of SAP, ERP-Link extends access to SAP document based processes via familiar Microsoft tools in lieu of a full SAP seat license. Workflow can be passed between SAP Workspace users and SharePoint users while ERP-Link orchestrates this passing of document meta data, forms data, reporting information and workflow actions and event notifications.

**Key Benefits:**

- Enable SharePoint as the repository for information management
- Bi-directional process capabilities between SAP and SharePoint
- Works with SharePoint 2007 - 2013, SharePoint Online and all versions of SAP
- Supports Microsoft Azure for IaaS, PaaS
- Deployment in hours not months
- Integrates with the Gimmal Information Governance Platform
ERP-Link has created easy-to-use, rapid-install Document Services Modules (DSMs) that extend the usefulness of the SAP-Microsoft solution. ERP-Link DSMs are add-on services modules that offer enhanced services to standard SAP ArchiveLink actions and provide support for SharePoint-side document activities around SAP document centric business processes. ERP-Link has automated features for both the SAP user, as well as the SharePoint user, and aligns them to each organization’s particular requirements.

**SAP Content Platforms and ERP-Link for SharePoint & SAP**

The following table compares the capabilities of the various SAP content storage strategies against SharePoint as the SAP ECM.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>SAP Database</th>
<th>SAP Content Server</th>
<th>ERP-LINK Suite for SharePoint &amp; SAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documents are stored outside of the SAP Database</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Uses the ArchiveLink Interface</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Documents attached for early and late archiving scenarios to ArchiveLink</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Documents attached via HTTP Content Server Interface</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Accessing documents from outside SAP</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Integration into SAP Enterprise Portal</td>
<td>✗</td>
<td>★</td>
<td>✓</td>
</tr>
<tr>
<td>Addition of Search Attributes</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Scan software as part of the product</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Active management of storage system</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Records Management</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>E-mail Management</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Legend:**  
- ✗ = Feature Not Available  
- ★ = Read Only Support  
- ✓ = Full Support

**SAP DMS and ERP-Link for SharePoint & SAP**

<table>
<thead>
<tr>
<th>Features</th>
<th>SAP DMS/Content Server</th>
<th>ERP-LINK Suite for SharePoint &amp; SAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export of archive data</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Deletion of data within SAP</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Access to archived data from SAP</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAP “early archiving” scenario</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAP “early archiving” scenario from Office</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Features</td>
<td>SAP DMS/Content Server</td>
<td>ERP-LINK Suite for SharePoint &amp; SAP</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>SAP “late archiving” scenario</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAP “late archiving” scenario from Office</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Office users attached via ArchiveLink</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Addition of meta data for indexing</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Document Search by meta data</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>SAP barcode scenarios</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Client based access (OLE linking)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAP certificate</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Microsoft Exchange/SharePoint Interoperability</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>HTTP Content Server interface attachment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Access documents from outside SAP</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Scan Software</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Optical, hierarchical or BLOB storage</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Active management of storage system</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>DOD 5015.2 or MOREQ RM compliant</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Full Records Management</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>E-Mail management</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>File management</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>File modeling</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Fixed file</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Segmented sub libraries for scalability</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Email archiving</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Integrated file processing and BPM</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Managing retention periods</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>SAP transactions within file content</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAP transactions data exchange</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Integration of non-SAP applications</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Access via web browser</td>
<td>★</td>
<td>✓</td>
</tr>
<tr>
<td>Access via Microsoft Office/SharePoint</td>
<td>★</td>
<td>✓</td>
</tr>
<tr>
<td>Integration into SAP EP</td>
<td>★</td>
<td>✓</td>
</tr>
<tr>
<td>Database technology</td>
<td>SAP Adabas (SAP DB)</td>
<td>MS SQL Server</td>
</tr>
</tbody>
</table>

**Legend:**
- ✗ = Feature Not Available
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About Gimmal

Gimmal delivers information management software that makes Microsoft SharePoint and Office 365 a true Enterprise Content Management system. Gimmal's award-winning solutions enable businesses to consistently govern and manage their content wherever it exists across the enterprise. Gimmal products are cloud-ready, easy to deploy, cost effective, and they are supported by a team of experts. For more information, visit the website at gimmal.com for a tour of Gimmal products and solutions.

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Suggested Reading

Intro to SAP ArchiveLink
Technical Basis for ArchiveLink
http://www.slideshare.net/AtholHill/enterprise-content-management-in-sap