

Knowledge Hub Creation Challenges and Solutions

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About Semantic Web Company and PoolParty



SWC is developer / vendor of **PoolParty Semantic Suite**

Most complete and secure Semantic AI platform on the global market

W3C standards compliant



ISO 27001:2013 certified (since 2019)





Over **180** customers



Gartner named SWC a Visionary in their Magic Quadrant for Metadata Management Systems 2019 and 2020



KMWorld has listed SWC as one of the top knowledge management companies continuously from 2016 - 2022



Semantic AI: Fusion of graphs, NLP, and machine learning



Forrester listed SWC as sample vendor in their **report** on *The* Document-Oriented Text Analytics Platforms Landscape 2022

Outline



- Introduction to Knowledge Hubs
 - Information challenges and solutions
 - Defining knowledge hubs
- Introduction to the SWC Knowledge Hub
 - Uses cases and content sources
 - Technology used
- Knowledge Hub Display and Search Features
- Challenges and Solutions
 - Development challenges
 - Taxonomy challenges: single or multiple taxonomies



Introduction to Knowledge Hubs

- Within an organization, information/content that should be shared, pooled, linked, and related, is often scattered in different applications and sources.
 - multiple content management systems
 - document management systems
 - digital asset management systems
 - employee experience platforms
 - internal collaboration software
 - external/partner collaboration spaces
- Users want to access disparate information together.
- Users prefer a single user interface and experience.
 - Something we may call a "knowledge hub"

- policies, procedures, guidelines
- product info/technical documentation
- customer information

 \triangleright

marketing content/collateral

people/expert resources

- internal research information
- external/market research information



PDF

party



There are also different names for the same/similar concepts.

We need text mining that understands the content of our ECM platform.

Our extraction service uses machine learning and knowledge graphs to provide explainable NLP services that can be applied to all types of formats such as docx, pptx or pdf.

Kim Documentation



Frank Marketing

> Vincent Support

Our software components use AI that can be used for text analytics over all common Office document formats.

Ashok

Customer



Service can be operated in Microsoft Azure and can be integrated with Office 365 and SharePoint.



Alex Engineering

The new feature called PPX is based on Naive Bayes and Graph Embedding techniques and combines SKOS taxonomies and OWL ontologies with ML algorithms for automatic text understanding of all common XML formats.

Our AI software follows the EU guidelines on ethics in artificial intelligence.

Rob Legal





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A Knowledge Hub Solution



What we mean by "knowledge hub"

- A single, central place/application for a set of users (employees in this case) to find varied information from different sources to do their work
- Provides a knowledge service by bringing together information, content, data, and expert references, additionally with a degree of recommendation
- Includes semantics from metadata, taxonomies, and ontologies
- A user-focused application based on a knowledge graph

What is a knowledge graph



- A model of a knowledge domain (taxonomy + ontology) combined with instance data stored in a graph database
- Provides **unified information** across a domain/organization, enriched with semantics.
- Contains business objects and topics that are closely linked, classified, and connected to existing data and documents.
- A layer between the actual content and the querying layer

Knowledge Graph Basis for a Knowledge Hub





Defining Knowledge Hubs

"Knowledge hub" is not well defined; has various meanings

- Defined by vendors of KM software as feature
- Defined by libraries and institutions for specific purposes
 - *UN ESCWA definition*: The Knowledge Hub is intended to serve as the main knowledge platform for Convention stakeholders, providing easy access to information from multiple sources.
- No Wikipedia entry
- Not enough data for meaningful Google trends analysis
- Often for internal use, so can be called by an internal name
- Might also be called a "knowledge base" or a "knowledge portal"
 - "Hub" is preferred over "base", since it is a place to explore other knowledge resources that reside elsewhere rather than just being a collection.





Defining Knowledge Hubs

Definitions from knowledge managers (SIKM Leaders group https://sikm.groups.io)

- A "hub of information": a centralized place where resources are stored and accessed
- A "hub of organizing": a centralized place to connect people, work activities, and knowledge.
- A place where information is stored and waiting to be shared, whether by technology, physical location, or a group of knowledgeable people
- As person(s)/groups/teams, is the person(s) who not only knows the answer you seek but can help/mentor/coach you through your situation
- Digital workplace centers in which pull together content and resources around high-level themes, resulting in multiple knowledge hubs dedicated to each research core.
- Internal or customer-facing repositories of content for a specific domain.







The Knowledge Hub at Semantic Web Company (SWC)

SWC: Our Challenges





Dynamic Markets

Complex Product



- Software product in need of explanation at the center of projects and customer discussions
- 2. Various integration and deployment options
- 3. Variety of application scenarios and possibilities

- 4. Continuously growing and changing requirements of customers
- Development of new technologies relevant to the product
- Ongoing development of new industry trends, frameworks, policies and standards

Human Resources



- 7. Efficient onboarding of new employees
- 8. Targeting further development of employees' skills
- 9. Closing of feedback loops in order to be able to learn from as many existing sources of knowledge as possible

Knowledge Hub Use Case Examples



Which organizations from the energy industry are using the SharePoint integration?

Sales

Does our software license restrict accessing the embedded Solr instance?

What trends are most relevant to data architects right now?

Product management

Which reference customers do we have in the pharma and life sciences sector? Customer support

Knowledge Hub Use Case Examples



Customer success team employees need to know:

- Relevant customer use cases to tell to similar prospects
- Varied information to answer RFIs, RFPs, and RFQs
- Past presentations to reuse for customer training
- Product details to answer customer support questions
- Industry and technology information to create reports or conference presentations
- Who is knowledgeable about a technology, product feature, or industry, to include as the technical expert in a sales demo or consulting project

Challenge: supporting search for content *and* for people

Knowledge Hub Sources of Knowledge





Knowledge Hub Sources: Phase 1





Knowledge Hub Sources: Phase 1





Knowledge Hub Sources: Phase 1



Knowledge Hub content sources

- Atlassian Confluence CMS:
 - customer use cases; employee profiles
- Shared Google drive folders (docs, slides, sheets, and uploaded PDFs and MS files):
 - "Knowledge Graph Cookbook," marketing collaterals, internal presentations
 - external analyst reports, conference presentations by others
- Website CMS Wordpress:
 - product information, partner information that can be shared externally
- Help website CMS Paligo:
 - product help documentation and release notes





paligc



PoolParty Semantic Suite software components

- Thesaurus Manager for taxonomy and ontology development and management
- UnifiedViews tool for Extract, Transform, Load (ETL) of data from different sources and formats, converting them to RDF, including a pipeline to crawl and tag content sources



Extractor API for auto-tagging





GraphSearch faceted search frontend user interface, with search based on triples in the embedded graph database, GraphDB



Embedded GraphDB, third-party graph database software from Ontotext

	Search Thesaurus Concepts	
 SWC Knowledge Graph Taxonomy Document Sources (8) Epics (6) Industries (41) Knowledge and Data Assets (19) 	Al applications Approved Mathematics in the semantic web.al/swckg/52452b9b-4b8b-46cd-8847-9aab57286e5cc Assign Approve Reject + Add	d to Collection 🛇 Add to Blacklist 🚫 Add to ExactMatch 着 Delete Concep
Organizational Perspective (5)	Details Notes Documents Linked Data	Triples Visualization Quality Management History
PoolParty Product (3)	SKOS SWC KG - GS Scheme Tagging Sc	cheme SWC Customer Scheme Skills Scheme +
 Control (4) Control	Broader Concepts <u>Application types</u> ©	Preferred Label
Automatic tagging (0) Chatbots (0) Personalization (0) Question answering (0) Recommender systems (0) Similarity search (0) Text mining (9) Blockchain (0)	Narrower Concepts	Alternative Labels Al software Al solutions Al solutions Knowledge-driven applications Knowledge-mapping system
Business intelligence (1) Content hubs (0)		Hidden Labels
Data hubs (0) Data lakes (1)	Artifical intelligence Enterprise Knowledge Knowledge management Learning Organization	Scope Notes
Data warehouses (0)		Definitions

Knowledge Hub & Knowledge Graph Technology





High-Level System Architecture

- Integration of PoolParty Semantic Suite as middleware
- The "Knowledge Hub" (the internal-use application) is one of three applications of the SWC Knowledge Graph



SWC Knowledge Hub Display and Features

Knowledge Hub Display





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Search options

Keyword search or search on taxonomy concepts

Display of concepts in search

- Type-ahead auto-complete on taxonomy concepts
- Context of concepts in the taxonomy

Display options of concepts within a facet

- List view with counts of tagged sources
- Tree view with taxonomy hierarchy of concepts



Search Features: Faceted search



7 Knowledge Hub	Search in All Facets EN ▼	
 Knowledge Spaces SWC Knowledge Hub 	Selected facet values: HR management (Organizational Perspective) X Clear all X	Facets are used for precise search and
& Facets 🗘	16 results	as search assistants.
Document Sources (3) Epics (3)	Magic Quadrant for C ndx https://drive.google.com/file/d/1h4gqp2tCV9zVTWeb8zBGmqlyhbdDgisc Each year, Casteer receives they sands of client inquisies on the subject of cloud HCM suite yender selection. The desire to replace leager	Facet values are
Events and Training (1) Industries (19)	multiple disparate HR systems with a consolidated solution remains a key driver of investment in cloud HCM suites. Also fueling this invest Show similar	from the taxonomy.
Knowledge and Data Assets (0) Organizational Perspective (5) Business processes - 16 HR management - 16	Hype Cycle for the Digital Workplace, 2019 https://drive.google.com/file/d/1Ys7hl1_YalpZjt2vfY8BKxwkow00i7MG For digital workplace leaders, three themes about the future of work run though this Hype Cycle: • There is a core collection of application nucleus. It comprises the applications that employees will spend most time using over the next decade. They include collaborative work Show similar	All facet filters combine all sub-filters along the
Marketing - 12 Sales - 8 Logistics chain - 2 Company strategy - 1 Departments - 15 Stakeholders - 13 Roles - 4 Teams - 1	Finding and Building Talent in the Digital Talent Ecosystem https://drive.google.com/file/d/1A_KGe0gd7T8ZVcX78Gd894CSUR9Ytc37 Digital transformation is redefining talent development, talent acquisition and the currency used by individual talent to build their careers, when artificial intelligence (AI) may be considered "talent." • Ecosystems are complex. The interplay and changing role of the actors in the Show similar	tree hierarchy
Organizations (6) PoolParty Product (3)	Page: 1 × Results per page: 10 -	

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Search Features: Smart Autocomplete





Search Features: Facet List View vs. Tree View



au Knowledge Hub	<≡	Search in All Facets		EN 🔻				
SWC Knowledge Hub	Selec	Selected facet values: <i>empty</i>						
🚓 Facets	¢ 20	170 results						
Document Sources	View mode	•	🗸 List		w#heading=h.8o5anichfr4m			
Epics Events and Training	Selected facets	5 🕨	Tree		as happened, but also what has been dge graphs come from if we want to b			
Industries	Sł	now similar	`					
Knowledge and Data Assets	A	Semantic Data Catalog Arc	hitecture					
Organizations	ht A	https://docs.google.com/document/d/135aoukPqVb86qcgSEDCR1ePHjofpy9zfxo8mvAypDY8/view#heading=h.uwhm8l51j790 A data catalog can be described as "a metadata management tool designed to help organizations find and m						
PoolParty Product	ar sc	and databases—stored in their ERP, human resources, finance and e-commerce systems." Data catalogs should als sources and support them with collaborative						
Search Facet Values	Sł	Show similar						
Features - 1760 Thesaurus Management - 1213 Actions - 1086 User interface - 1079 PoolParty's Details View - 847 Concepts - 739	A ht Al St	LArchitect tps://docs.google.com/document/d/1 architects play the central ro akeholders to manage and sc now similar	35aoukPqVb86qcgSEDCR1ePHjc e in realizing an end-to-en ale the Al initiatives. Unlike	ofpy9zfxo8mvAyp d ML and Al p the Enterpris	DY8/view#heading=h.ffli4x58r9lx Dipeline. They are the owners of the architec se Architect, who is responsible for a wide ra			

Concepts are displayed either in the form of lists (ranked by tagged content items) or as hierarchical trees.

Integrated Expert Recommender System





- Similar documents are displayed to the right of the detailed view
- Matching people to the contents of the document are listed below the detail view

Additional External Application



Integration with Paligo Help Documentation on public website



https://help.poolparty.biz/

Additional External Application



siparty	Knowledge	graphs Q					
Refine search		Search results					
× REMOVE FILTERS × START 1	NEW SEARCH	An enterprise knowledge graph life cycle a summary					
Document Sources		An Enterprise Knowledge Graph Life Cycle - A Summary Abstract An Enterprise Knowledge Graph Life Cycle - A Summary Enterprise Knowledge Graphs are developed efficiently with PoolParty and can be successfully used as an integral part of your enterprise information and AI architecture. Along the entire data lifecycle, various tools					
Developer Guide	(5)	Web service method get remote systems configuration					
PoolParty Overview	(5)	Web Service Method: Get Pernote Systems' Configuration Abstract Web Service Method: Get Pernote					
PoolParty FAQs (3)		Systems' Configuration Description Retrieves information about the system configuration defined in the					
PoolParty Quick Start Guide	(2)	Semantic Middleware Configurator and gives details about the status of connected systems. URL: /PoolParty/api/remote Request Supported Methods GET Response json formatted response message					
Administrator Guide	(1)	Request pattern					
		The enterprise knowledge graph a definition					
PoolParty Product	(19)	The Enterprise Knowledge Graph - A Definition Abstract The Enterprise Knowledge Graph - A Definition An Enterprise Knowledge Graph (EKG) contains business objects and topics that are closely linked, classified, semantically enriched, and connected to existing data and documents. An EKG typically consists of three pillars: A domain model —consisting					



Knowledge Hub Challenges and Solutions

Taxonomies for Content and for People Skills



Separate or a single taxonomy for subjects vs. people

Separate taxonomies

They have different content, queries, use cases

Single taxonomy

- They have a lot of overlap in concepts
- They can be combined in the same frontend, as a recommendation of people related to a subject

Taxonomies for Content and for People Skills







A separate Skills taxonomy was then merged into the main taxonomy.

Roles (13)

🕨 Skills (4)



Users

- Internal, for all Knowledge Hub content (including product help documentation)
- External, for product help documentation

Challenge: supporting internal and external users with external users using only part of the taxonomy







Separate or a single taxonomy

Separate taxonomies

- They have different users
- They have different context

Single taxonomy

- They have the same set of concepts for a large knowledge scope: the software product
- Easier to maintain





How can we help you tod	ay?
importing	٩
Tabular import Context: PoolParty Product	
RDF project import Context: PoolParty Product	AND -
GraphEditor import Context: PoolParty Product	NA.
Ontology import Context: PoolParty Product	
Excel format for import Context: PoolParty Product	
Importing updates by Excel Context: PoolParty Product	

$\leftarrow \rightarrow C$ \oplus internal semantic-web.at/GraphSearch/						Document Sources	
	,					PoolParty FAQs	(10)
7 Knowledge Hub	∢≡	Thesaurus Management	×	EN 🔻		User Guide for Knowledge Engineers	(10)
Knewledge Spaces						Administrator Guide	(5)
	Sele	cted facet values: Thesaurus Man	agement (PoolParty F	Product) X	Clear all 🗙	PoolParty Overview	(4)
SWC Knowledge Hub 🗸						PoolParty Release Notes	(1)
🗞 Facets 🔹	12	13 results					
Document Sources (7)	M	leb service method request sub	tree of concept or o	oncept sch	eme		
Epics (5)	ht	tps://help.poolparty.biz/en/developer-guide.	PoolParty Product				
Events and Training (A)	SL M	leb Service Method: Request Subtre	Thesaurus Management	(30)			
	D	escription Returns a list of all narro	Corpus Management	(6)			
Industries (40)	R	equest Child Concepts	Extractor	(5)			
Knowledge and Data Assets (16)	S	now similar	PoolParty APIs	(5)			
Organizational Perspective (5)			GraphSearch	(3)			
	c	kos and poolparty	Semantic Middleware Configurator	(3)			
Organizations (9)	ht	tos://help.poolparty.biz/en/poolparty-overvi	Blacklist	(2)			
PoolParty Product (3)	SI	KOS and PoolParty Abstract SKOS a	Concept scheme details	(2)			
Skills (1)	In	troduction to SKOS at W3C). Conce	Custom schemes	(2)			
Technologies and Applications (2)	st	atements about semantic relations	Data Validator	(2)			
	21	IOM 21111141	LOAD MORE				
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(11)

(8)

Refine search

Topics Taxonomies

SKOS

× START NEW SEA

barty_®

Other Challenges



Varied Content Sources

- Challenge: Some data sources couldn't initially be ingested with our toolset.
- Solution: Developing new data processing units (DPUs), extending existing ones, or creating scripts to process the input.

Search interface

- Challenge: Paligo search did not support facets
- Solution: disabled search in Paligo and used PoolParty API

Employee usage

- Challenge: employees did not seem to use it much initially
- Solutions: internal presentations, feedback methods, employee survey

SWC Knowledge Hub Conclusions

Tips about setting up a knowledge hub

- Start by getting input from end users about their expectations (for content sources and search criteria) and how they will work with the knowledge hub.
- Start small and add new sources (and applications) iteratively, keeping in mind both their added value and the efforts required to integrate them.
- The taxonomy is the center of the knowledge hub. It needs to match the domain well and be structured in a way that is intuitive for users.
- Maintaining and extending the knowledge hub is an ongoing process.





Resources



- <u>"Knowledge Portals: A 2023 Trend</u>," webinar recording, March 14, 2023.
- <u>Master your Enterprise Knowledge: Knowledge Hubs at the Center of your Information</u> <u>Architecture</u>," webinar recording, December 6, 2022
- "From CMS to Intelligent Content Hub: Why the need for change?" By Angela DaSilva, PoolParty Blog, September 23, 2022
- "<u>Knowledge Portals Revisited</u>" by Zach Wahl, Enterprise Knowledge Blog, December 9, 2022.
- Hedden, Heather. (2022) The Accidental Taxonomist, 3rd edition. Medford, NJ: Information Today Inc. <u>http://www.hedden-information.com/accidental-taxonomist</u>
- Blumauer, Andreas and Helmut Nagy (2020). The Knowledge Graph Cookbook. Vienna, Austria: Semantic Web Company. <u>https://www.poolparty.biz/the-knowledge-graph-cookbook</u>

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