



# Archemy™ Showcase Solution

## Archemy™'s Knowledge Management Tools Suite

### Business Context

Many descriptive knowledge datasets contain multiple and diverse entities that may be classified by a large number of dimensions and values. The knowledge subsumed by these entities also need to be documented and it is typically more appropriate to make knowledge available to end users within an environment which is conducive to learning. Knowledge is typically needed as part of an overall process that aims at accomplishing a task. The original task of interest to Archemy™ was to allow the creation, usage, and maintenance of a catalog of reusable software solutions to business problems with the ability to eventually recommend best practice solutions based on feedback received from teams that customized and applied these software solutions to solve their own business problems.

### Initial State

Archemy™ needed a comprehensive set of knowledge management tools to make it possible for users and prospective users to manage and use a repository of potentially quite diverse solutions and allow them to identify best practice technology solution candidates for their business problems. Providing an extensible ontology-driven query facility for complex, multidimensional datasets requires a significant amount of coding and development. Building a comprehensive documentation management tool for software assets that also allows capturing the exact chronology of decisions and path that were followed to create each asset also requires a significant amount of work. Being able to search for assets and review the details of their creation within an immersive Augmented Reality environment is simply new territory when it comes to mainstream software development and documentation methods. Finally, being able to provide Enterprise Architecture services on a BPaaS platform to drive the development of business solutions end-to-end is also new territory when it comes to business technology consulting. Furthermore, being able to coordinate efficient knowledge retrieval across multiple knowledge repositories spread over the network is a challenging task.

### Archemy™ Solution

Archemy™ developed a knowledge management suite of tools that is applicable to any industry. The tooling enables Archemy to catalog and harness existing knowledge as well as new/refined knowledge that can be extracted from available data in real time. Using this knowledge management platform enables businesses to increasingly become more autonomous in their decision making and therefore more competitive at a reduced cost. Archemy currently uses its knowledge management suite to catalog and recommend best practice reusable technology solutions to business problems faced by its customers in many industries. The Archemy™ Knowledge Management Tools Suite can be easily customized to tackle the management of other types of knowledge artifacts than the ones it was originally created to work with. In fact, the tools are currently being used to harness knowledge collected from cancer patients at a large hospital. The “solutions of interest” in this case are questions such as “where does a new patient stand with respect to the disease?” and “how will the disease evolve within the next 1-5 years assuming the patient is left untreated?”. The fact that the tools suite was created with extensibility in mind makes it possible to think about knowledge data, knowledge extraction/mining algorithms, and visualization widgets as “plugins” making it possible to rapidly customize the solution while reusing the core logic developed within the whole tools suite.

As part of its knowledge management suite, Archemy™ implemented the following technologies:

- ArchNav™ is an Ontology-based search engine. It provides a user-accessible, GUI-based search application that allows queries with unlimited dimensions and values. It allows users to search a knowledge repository or reference architectures, solution architectures, and reusable solutions to identify candidates that can be used to accelerate the realization of solutions to recurring business problems. The ArchNav™ application allows users to create their own queries and assign weighted values to each of the dimensions and values they use to filter the data. Application administrators merely need to maintain the Ontology and Taxonomy and the application does the rest. ArchNav™ provides a choice of algorithms that may be applied to perform the search. It is also possible to add additional algorithm on a “plugin” basis. The same is possible with visualization widget although ArchNav™ includes a default GUI interface. Finally, the application also includes feedback management capabilities and integrated feedback analytics.
- ArchDoc™ is solution documentation tool that can capture the exact chronology of decisions and path that were followed to create and evolve individual software solutions. It can record the artifacts that were created during the development of these software solutions.
- ArchViz™ is an immersive augmented reality visual interface that allows users to search for and explore the details of candidate solutions to business problems. It provides visual access to 3D representations of reusable knowledge components (aka., Archifacts™) and the associated artifacts that were developed as part of their creation.
- EAMTk™ is an Enterprise Architecture Management toolkit that allows execution of Enterprise Architecture services on a BPaaS platform to drive the development of business solutions from an end-to-end perspective in alignment with an existing enterprise context.
- ArchDev™ is Archemy™’s proprietary EA-driven end-to-end methodology for guiding innovation while driving (digital) transformations and monitoring enterprise solutions. When paired with the use of the Archemy™ Knowledge Management Tools Suite, the resulting ArchDev™-driven approach guarantees the effective re-use of existing best practice innovative solutions to limit the costs and increase the competitiveness of the resulting business solutions. Being able, in some cases, to harness existing knowledge as well as new/refined knowledge extracted from data in real time as part of solutions allows the creation of autonomous business solutions that require limited monitoring.
- ArchKnow™ is Archemy™’s knowledge repository of reference architectures, solution architectures, and reusable best practice solution. It is a distributed database as many Archemy™ clients and development partners (aka., Archemist™) create their own ArchKnow™ repositories and make them accessible over the Archemy™ network (aka., ArchNet™). ArchKnow manages both structured and unstructured data. As an example path navigation in ArchDoc™ uses Neo4j.
- ArchNet™ is Archemy™ Software Defined Network (SDN) that optimizes the execution of queries across the ArchKnow™ distributed database. The current ArchNet™ prototype uses SDN technology (i.e., Floodlight SDN Controller and the Mininet network emulator) to control the routing of requests using SDN switch rules within in the Network layer. It also leverages commercial CDNs and, in some cases, OTN technology, to optimize the distribution of and access to knowledge content over the network to speed up global knowledge retrieval queries.
- ArchArt™ is Archemy™’s proprietary taxonomy for classifying knowledge in various industries. In particular, the Archemy™ reusable solutions Knowledge Management Tools Suite uses Archemy™’s a proprietary business technology taxonomy.
- ArchSec™ is the centralized Role-Based Access Control (RBAC) security component used by all applications in the Archemy™ Knowledge Management Tools Suite. It allows fine-grained management of user’s access privileges to the various features the applications, making it easy to manage an environment in which licensed and non-licensed users may coexist.

## Technology Employed (latest software versions)

Tech Type: TechTech – User Experiences, Enterprise Analytics, Enterprise & Solution Arch.

### Core Technologies:

ArchNav™:	Oracle ADF Essentials, Tomcat, Glassfish/WebLogic, Apache Fortress, MySQL
ArchDoc™:	Eclipse RAP, Glassfish/WebLogic, Apache Fortress, MySQL
ArchViz™:	Microsoft Hololens, Unity 3D, Visual Studio 2015
EAMTk™:	Joget Workflow (other Workflow managers are supported)
ArchDev™:	Methodology and corresponding processes implemented in EAMTk™
ArchKnow™:	MySQL (other RDBMSs are supported), Neo4j, MongoDB, Hibernate
ArchNet™:	Floodlight, Mininet, Oracle Virtual Box, Docker (prototype only)
ArchArt™:	Collection of proprietary SQL/NoSQL schemas and/or metadata
ArchSec™:	Apache Fortress and Open-LDAP or Apache LDAP /Apache Directory Studio
Website Framework:	Django, Bootstrap (web-hosted tools suite)
Hosting Frameworks:	AWS EC2, IBM Bluemix Cloud (cloud SaaS/PaaS hosted tools suite)
(Web) App Servers:	Glassfish, WebLogic, Tomcat
Languages:	Java, C#, Python, R
Security Component:	Apache Fortress and Open-LDAP or Apache LDAP / Apache Directory Studio
Database Systems:	MySQL (alternative RDBMS, optional)

## End State

The Archemy™ Knowledge Management Tools Suite has been incorporated into Archemy™'s website, allowing users to work with the various tools to take advantage of the Archemy™ Business Technology Solutions Catalog as they follow the ArchDev™ methodology via EAMTk™. They may use their ArchNav™ search results as the starting point to drill down into the finer detail available through ArchDoc™ and to save their search criteria so that searches can be rerun if necessary. As a preferred alternative, users can operate the whole tools suite using their Microsoft Hololens headset and ArchViz™. Ontology-driven searches leverage ArchArt™ proprietary taxonomies (taxonomies are provided to tackle various types of knowledge management problems in several industries). The Apache Fortress-driven ArchSec™ Role-Based Access Control (RBAC) security component allows fine-grained management of user's access privileges to the various features of the Archemy™ tools, making it easy to manage an environment in which licensed and non-licensed users may coexist. All the knowledge data is managed by ArchKnow™, a heterogeneous (SQL/NoSQL) distributed knowledge repository. Archemy is currently working on a prototype of ArchNet™ that allows optimization of complex knowledge retrieval queries over the network

## Reusable Components

The Archemy™ Knowledge Management Tools Suite may be accessed as-is on the Archemy™ Web site (one month free trial license for most tools). ArchNav™, ArchDoc™, and EAMTk™ may also be installed on your own Windows, Mac OS, or Linux server. To do so will require: (a) setting up a MySQL compatible SQL database with tables containing the ArchArt™ taxonomy and tagging details, (b) deploying the tools on their corresponding application server platforms, and (c) deploying Apache Fortress on Open-LDAP or Apache LDAP. Using ArchViz™ is easier via Cloud-based access and the tools suite may also be made available as a PaaS/SaaS solution for that purpose. ArchNet™ is only available as a prototype to registered Archemists™ at this time. The content of the Archemy™ proprietary ArchKnow™ database is only accessible via the Archemy™ tools under a licensing agreement. Archemy™ encourages its Archemists™ and Clients to create their own myArchemy™ portal and monetize their own reusable solutions via a separate licensed installation of ArchKnow™ included with the Archemy™ Knowledge Management Tools Suite.