ANSYS EKM Overview

What is EKM?

ANSYS EKM is a simulation process and data management (SPDM) software system that allows engineers at all levels of an organization to effectively manage the data and processes created through their design, simulation and analysis activities. It is a tool that facilitates reuse of historical information and capturing of engineering knowledge and best practices, that can help reduce your organization's future development and training costs and make better use of resources. These savings can ultimately reduce a product's timeto-market. EKM has the added advantage of being tightly-integrated with ANSYS simulation products, including ANSYS Workbench, ANSYS Mechanical APDL, FLUENT, CFX and POLYFLOW, and can also be integrated with other Computer Aided Engineering (CAE) simulation products. (Figure 1, “ANSYS EKM — For Your Workgroup or Enterprise Needs”)

As people and resources in a company are spread across multiple sites in different geographical locations, engineering tools that enable knowledge and processes to be easily captured, archived, integrated, shared, reused, analyzed, and interpreted can bring a significant advantage to research, development, and manufacturing. As enterprise requirements become more complex and the amount of product, process, and resource information generated for a typical CAE life cycle project continues to grow, enterprises that are positioned to capture, manage, and reuse their intellectual property will have a distinct advantage.

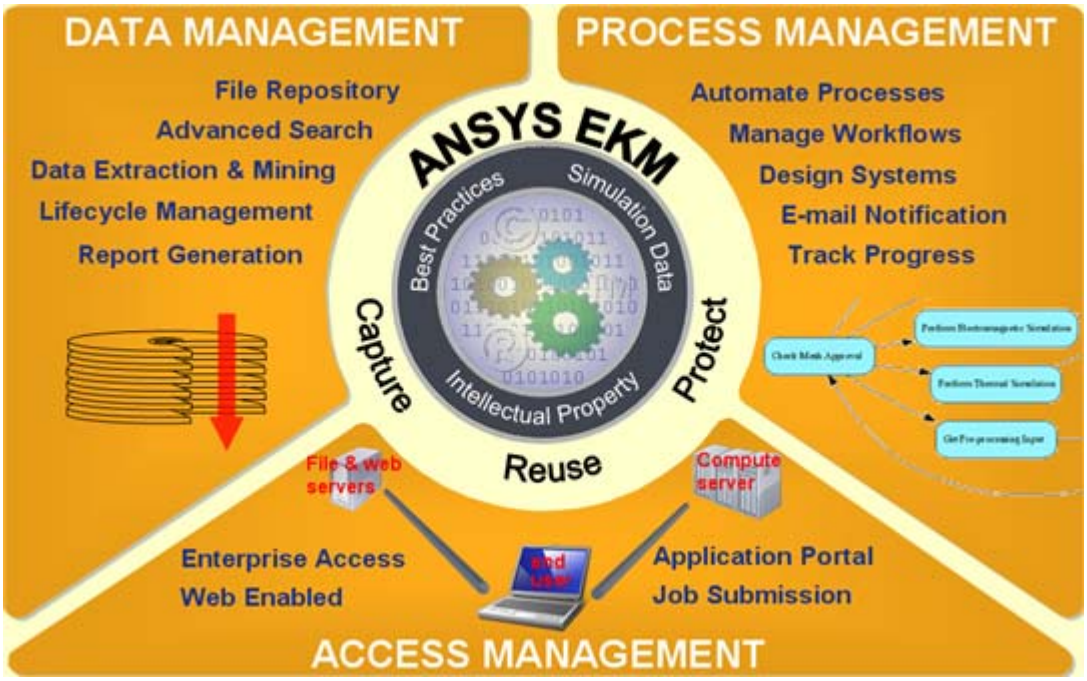
EKM has an advanced web-based repository that enables enterprise-wide sharing of simulation documents and data based on user credentials. It serves as a collaboration platform to allow distributed workgroups to work on the same project. Extraction and report generation capabilities allow team members to display, interpret, and analyze data efficiently.

Finally, EKM's flexible framework allows you to significantly enhance the standard features of the product through simple XML files. The powerful capabilities offered by XML configuration enable you to create workflow templates that describe your business process, where they can be then managed and monitored within EKM. Additionally, you can extend built-in data types or create custom ones, integrate applications for extracting meta-data, images, and simulation details as well as in-house or non-ANSYS tools.

In summary, ANSYS EKM's comprehensive system of tools can be used to:

- provide central data storage and access for effectively managing the volume, content, and context of CAE simulation data
- capture, manage, and improve simulation processes
- search and retrieve simulation data for reuse, and mine data to generate comparison reports and other analytical reports
- facilitate collaboration across a distributed multiple-user environment, and control access (security,
- version control, check-in/out) to your simulation processes and engineering data
- manage object lifecycles and control stage advancement through signoff processes
- customize your configuration to fit the particular needs of your workgroup or enterprise

Figure 1 ANSYS EKM – For Your Workgroup or Enterprise Needs



Product Features

Data Management

EKM provides a central repository for hierarchical management of simulation data. The repository can be hosted on a dedicated server, distributed across external resources such as file servers, or hosted on a desktop machine. Data in the repository consists of folders, sub-folders, and other data objects that are organized in a navigation tree to fit your particular needs. These data can be project-based, simulation-based, etc. Regardless of your system configuration, the EKM repository also allows transparent collaboration through shared folders.

Files and folders can be uploaded and downloaded to the EKM repository using either a web browser client or the ANSYS EKM File Transfer Client (FTC). The web browser client can only upload/download single files or folders to/from EKM. The FTC on the other hand, can handle multiple file and folder transfer with an easyto-use interface.

In lieu of uploading to EKM, you can create links in EKM to files and folders that reside on external resources such as file servers or shared file systems. In this way, files can remain in their original locations and a reference to the physical location can be maintained in EKM, eliminating the need for file transfers.

Basic data management operations, such as create, read, update, delete, copy, move, and rename are provided by EKM. The contents of data objects can be displayed along with their permissions, properties, and dependencies. Dependencies include upstream and downstream dependencies of an object that are displayed by a graph. You can create links within a folder that reference other data objects in EKM and referential integrity is automatically enforced.

Access to data objects in EKM can be controlled by setting permissions through configuration management policies (checkout/check-in) that are applied at the object-level. Version control allows versions of objects

to be tracked with an audit trail. Alerts can be setup to notify a user when a file or folder has been modified Object lifecycle features allow you to model different stages that a data object moves through during its lifetime and define policies such as permissions that will be automatically applied to a stage. You can also define signoff policies that require an object to be reviewed by a signoff committee before it can be promoted or demoted.

EKM supports built-in CAE data types for ANSYS,Workbench, CFX, FLUENT, and POLYFLOW simulation files and provides you with the capability to define new data types and extend existing types through the use of simple XML configuration files. EKM also supports data handling of other ANSYS products, in-house codes, and non-ANSYS tools.

EKM provides the capability to perform keyword searches (full text searches) on common file formats such as TXT, DOC, PDF, PPT, XML, HTML, and RTF. You can also run Advanced Searches on object properties using complex search criteria. Queries can be saved for later execution or refinement.

Data mining tools are provided that enable you to create simulation mining templates and generate mining reports for EKM-supported simulation data files.

Report generation features allow you to create reports that extract key data such as model information and simulation settings from CAE simulation files. You can create Comparison Reports that compare properties or property differences between two objects. Finally, you can assemble objects such as plots, files, images, and reports into a Report Book that provides a container for all data related to an object or project, etc. Reports can be downloaded in XML, HTML, Excel, and PDF formats.

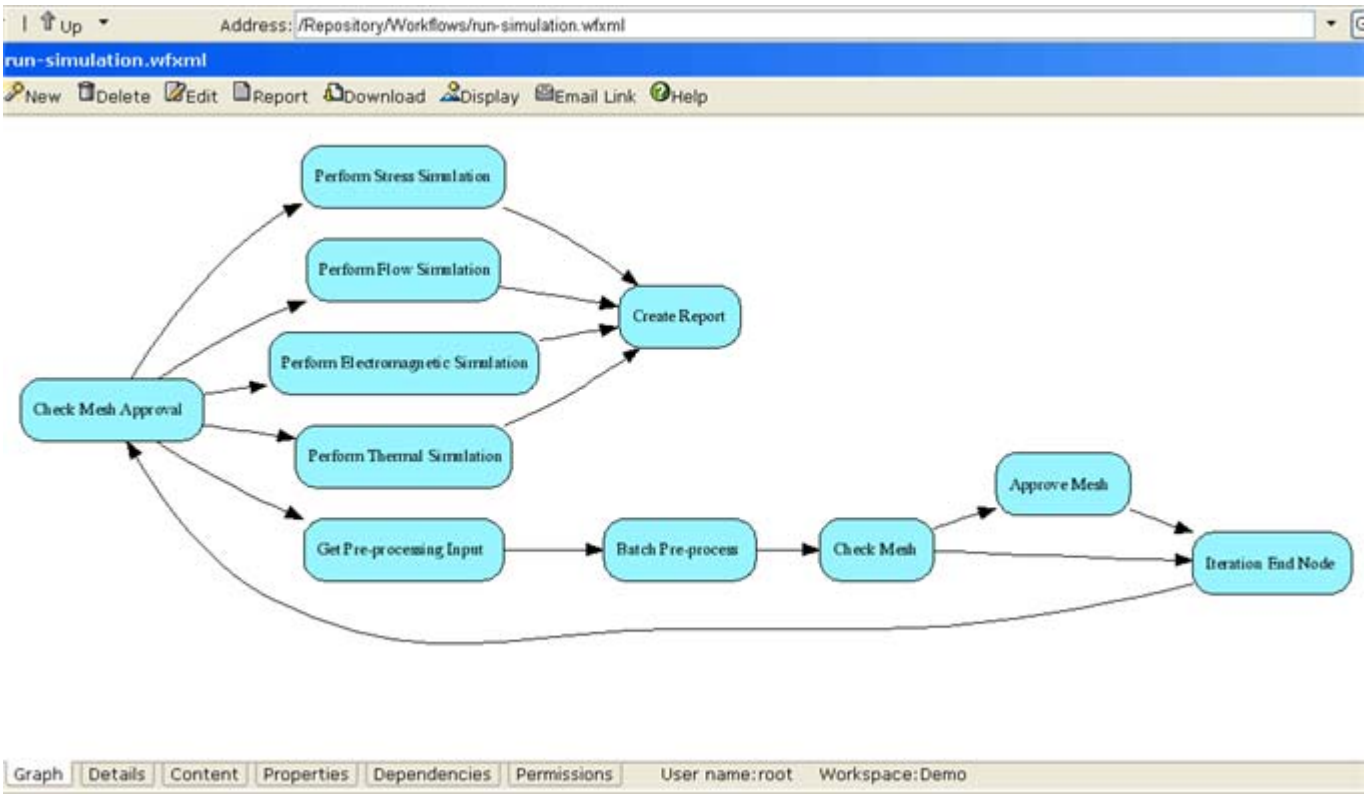
The system administrator (root user) can create new users and groups, manage workspaces, setup remote file servers, and manage audit logs.

Process Management

Simple and complex business workflows can be modeled as workflow templates in EKM.Workflow templates (XML configuration files) are uploaded to EKM and active processes created from them. These processes can be managed and monitored in EKM. (Figure 2, “Workflow Process in EKM”)

Steps in a workflow process can be performed manually by an analyst or automatically by EKM.Workflows can be integrated with job submission systems for Windows and UNIX compute clusters to allow time-intensive batch simulations to be run. E-mail notifications and graphical displays allow tracking of the progress and status of a workflow. Finally, EKM's process management system can host ANSYS Workbench workflows as well as other customized applications.

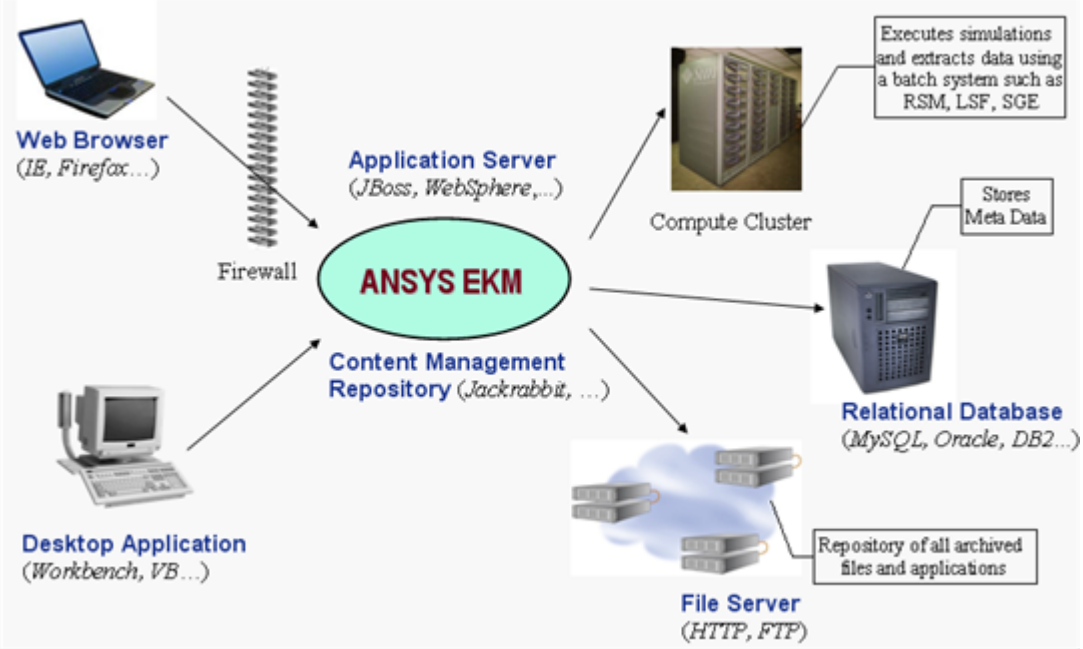
Figure 2 Workflow Process in EKM



Access Management

EKM is a J2EE application that runs on an Application Server. (Figure 3, “EKM Architecture”) It uses an embedded Content Management System for managing data and can be accessed by a browser (Internet Explorer or Firefox) or a desktop application through the web services API (SOAP). It can link to enterprise databases for storing meta-data, file servers for storing file content, and batch execution systems for executing longrunning simulation jobs. EKM only stores the meta-data in the database. The file content is stored outside the database in a file server.

Figure 3 EKM Architecture

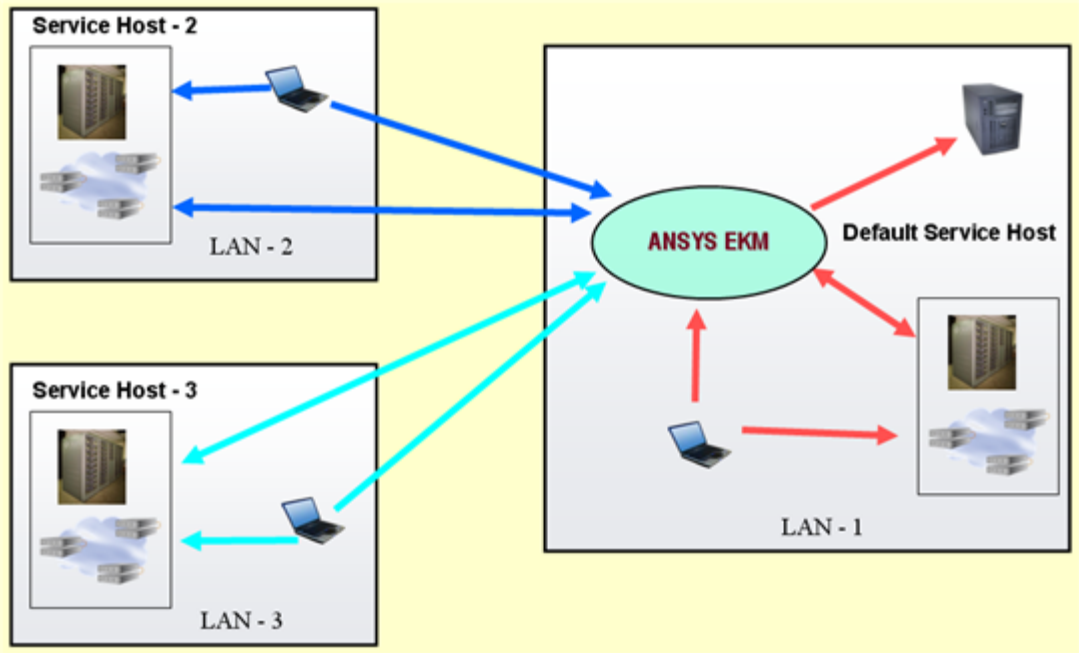


EKM can be run on a single server or a cluster, and is scalable from a single user to the global enterprise (Figure 4, “Scalability of EKM”). See the *Installation Guide* for details on the deployment options for EKM.

Figure 4 Scalability of EKM

EKM also has a Cache Service that helps distributed teams across a Wide Area Network (WAN) access and share files efficiently. The cache service runs in a Service Host that can be deployed outside the LAN containing the EKM application server. (Figure 5, “Service Host Architecture”)

Figure 5 Service Host Architecture



Customization

EKM provides a flexible framework that enables a high degree of customization. It utilizes configuration files you either create or modify to significantly enhance the standard features of the product. You can configure the EKM server, define workflows, define new data types and file formats, extend existing and built-in data types, hook external applications for extracting meta-data, images, and simulation details for new CAE simulation files formats, and integrate external applications that can be run in batch mode in workflows. The configuration files are written in the XML programming language and can be created using any XML or text editor. A plug-in mechanism provides a powerful method for extending the capabilities of the base EKM system. Plug-ins can specify business rules, actions, and new user interfaces without altering the base system. See the *Configuration Guide* for details on how to customize EKM.

How You Interact With ANSYS EKM

Figure 6, “Typical User Interactions in EKM” shows some of the typical ways that you can interact with EKM. These include:

- archiving and retrieving files using a web browser or ANSYS EKM File Transfer Client and performing other basic data management operations.
- extracting meta-data from simulation files using built-in and customized applications
- searching the database using keyword and advanced search tools to find data and workflows that are stored in EKM or linked to an external resource
- mining data from supported CAE simulation data files and generating mining reports
- defining and managing process workflows that can involve running EKM-supported simulation applications (ANSYS, CFX, FLUENT, POLYFLOW,Workbench) or custom applications on a batch system
- defining and managing object lifecycles
- generating comparison and other reports based on simulation results and summaries

Figure 6 Typical User Interactions in EKM