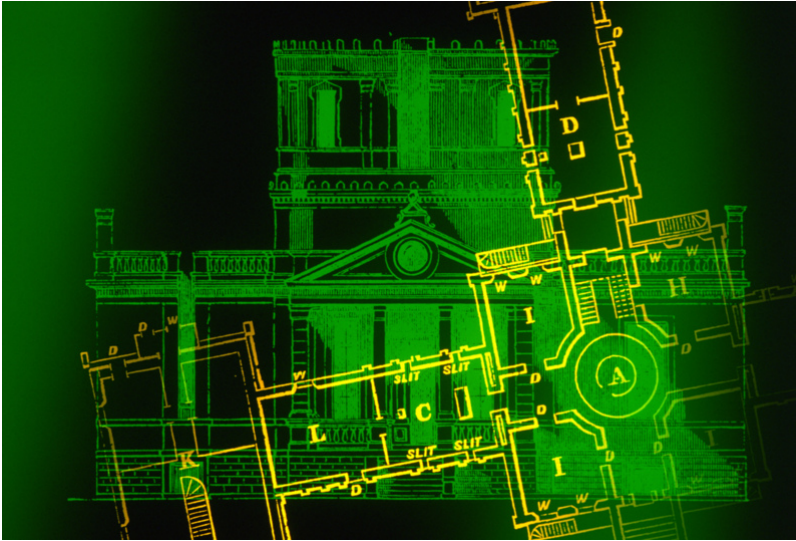


Requirements Engineering for Product Development



Are you developing complex products possibly integrating software, electronic, electrical and mechanical components? Do you have the need to:

- Address compliance with industry or government regulations or standards or;

- Link requirements information throughout the development lifecycle with links to the software design, development and testing environments, and perhaps also to electronic or mechanical designs or;

- Demonstrate traceability across multiple levels of requirements or;

- Demonstrate conformance to requirements provided by your customer / prime-contractor or;

- Track suppliers / subcontractors conformance to requirements or;

- Typically manage larger volumes of requirements in a single document (1000s) and layers of requirements & related information - designs, tests, risks, etc. (3 or more layers) or;

- Manage access to requirements information or;

- Maintain an audit trail of changes to requirements?

If your answer to any of these questions is yes, IBM® Rational® requirements engineering solutions can help you.

What is requirements engineering?

In a nutshell, requirements engineering is understanding customer and business needs, defining what you intend to build to meet those needs and ensuring you build it to specification. You will invest heavily to build your system, so you should make sure you build the right one by developing requirements and then managing them.

Requirements engineering fundamentals

Requirements engineering consists of two major stages: requirements definition and requirements management.

Requirements definition consists of four parts: elicitation, analysis, specification and verification. The second stage is requirements management, which simplifies and enhances the communication and management of requirements, collaboration and verification throughout your company. Its activities include evaluating the effect of proposed changes, tracing individual requirements to downstream work products and tracking requirements status during development. You can monitor project status by knowing what percentage of the allocated requirements have been implemented and verified, just implemented or not yet fully implemented.

Requirements management helps you:

- Make sure that requirements are persistent at all levels of decomposition.

- Assess impact to reduce risk as a result of requirement change.

- Adapt to change throughout all levels of your traceability matrix.
- Incorporate test and QA into the process early.

- Find gaps in traceability.

- Ensure everything is accounted for.

IBM Solutions for Requirements Engineering

IBM offers a requirements engineering solution that enables you to manage requirements throughout the entire design, development and testing lifecycle, helping to ensure you have end-to-end traceability. From ideas, requirements and feature definitions, product and system specifications and models to mechanical, electric and embedded software implementation, testing and maintenance, the IBM solution can help you deliver a high-quality system that meets your customers' needs.

The solution is built around IBM Rational® DOORS® software, a requirements management application that can help you reduce costs, increase efficiency and improve quality by enabling you to optimize requirements communication, collaboration and verification—throughout your organization and across your supply chain.

Rational DOORS features

Rational DOORS has proven itself on some of the world's most challenging projects, in some cases managing hundreds of thousands of requirements and traceability links.

It can do this with features such as:

- An intuitive document-oriented interface that is easy to adopt
- Comprehensive traceability analysis capabilities that help ensure that no requirement is overlooked
- Change notification that ensures that changes are not missed and that their effects can be thoroughly analyzed
- Integration with popular design, development and test environments that provide complete life cycle traceability

Intuitive, scalable requirements management

Rational DOORS provides the most comprehensive environment for requirements management. In a single view, DOORS can record and display requirements text, graphics, tables, requirements attributes, change bars, traceability links and more. The information is easy to interpret because Rational DOORS organizes requirements hierarchically so that you can easily locate information in the database. An easily accessible document-style list shows each individual requirement in context, while a convenient navigation tree reveals the structure of the information set. Using the tabular view of the requirements, you can assign additional information against them within an unlimited number of your own attributes.

Collaborative environment

As soon as teams start using Rational DOORS, they quickly find that the information it makes available is invaluable. From the first requirements decomposition, Rational DOORS provides:

- Gap analysis of unaddressed requirements
- Volatility displays that help users identify the areas of greatest change
- Traceability analysis to help identify areas of risk
- Point-and-click views depicting relevant data for each type of user role
- Comprehensive, multi-level impact reports that highlight everything from requirements to the tests that are likely to be affected by the next change

Comprehensive traceability

Rational DOORS provides end-to-end traceability reports in a single view. Analysts and project managers can get a complete picture of traceability from user requirements through technical requirements to design, test and implementation tasks. Creating traceability is as simple as

drag-and-drop between items on the screen. Link a requirement to a design item or a test case, or another requirement with a click of a mouse. Alternatively, you can pick the requirements from a list or even enter requirements numbers as attributes and have DOORS make the links for you. You can define the purpose of links or add explanations with link attributes. And for projects with process improvement goals, rules for link creation and direction can be defined, which helps users follow the process and can prevent careless mistakes.

Change management and impact analysis

Because requirements are the basis for everything else in a project, managing change to those requirements is critical. Rational DOORS provides a sophisticated set of requirements change management tools. All informal changes are recorded in a history, and any other data affected by those changes is highlighted so that all team members can identify which data might be "suspect."

For more formal change control, DOORS integrates with Rational Change™ to offer a flexible process for workgroup-oriented formal reviews. Changes can be reviewed against current requirements, impact reports generated and a consensus reached before the changes are automatically applied. As an alternative, DOORS offers the Change Proposal System, a built-in, non-configurable change process for requirements management. Users can group dependent changes together or create single changes that affect many requirements. They can even request an e-mail be sent any time the status of their change proposal is updated.

Scalability

•DOORS can manage hundred of thousands requirements and traceability links in a single database. The familiar hierarchy with multiple levels of both folders and projects means that no matter how big the database gets, it is still easy to manage. Users see only what they need because of configurable views, so that they can focus their efforts where they are most needed. They can also work concurrently to produce a single document.

Integration

Rational DOORS software also integrates with other IBM products, giving you access to a broad range of requirements engineering and related capabilities. It integrates with:

- IBM Rational Focal Point™ software, for capturing and evaluating ideas for new products or product features, and then feeding the chosen features into Rational DOORS software.
- IBM Rational Change software, which enables you to implement a customizable enterprise-wide change control process.
- IBM Rational Quality Manager software, which enables you to link your requirements with your test plans.
- IBM Rational Rhapsody® software, which provides modeling and simulation capabilities that enable you to visualize requirements scenarios and trace requirements back to designs.

Plus, Rational DOORS software integrates with product development management solutions—such as PTC Windchill (using the Stoneworks Ambassador product), Dassault Systèmes ENOVIA and Siemens Teamcenter technologies. These integrations help you use requirements to drive decisions throughout the design, development and quality assurance phases.

How it works

DOORS is a scalable, collaborative, client-server database application. Using proprietary database technology, DOORS can manage thousands of objects (requirements and other related project artifacts) and the traceability links between them. DOORS can be extended to provide additional project or company-specific capabilities through the DOORS eXtension Language (DXL).

An extensive list of technology partners use DXL and the DOORS open API to provide integrations that facilitate traceability of requirements into design, simulation, development and testing environments. The DOORS product family also features:

- Add-on for integrated UML modeling
- Access through a Web browser for review, discussion and editing of requirements

Why IBM for requirements engineering?

IBM can deliver the tools and services necessary for implementing a comprehensive, successful requirements engineering process. We have over 20 years experience of providing requirements engineering solutions to our clients, and our requirements management software has been the dominant market share leader for over a decade.

Using IBM's requirements engineering solutions our clients have improved product quality, reduced development costs, increased productivity, and decreased time to market.



Choose IBM—the PLM leader

IBM's PLM expertise and leadership continues to be valued by our clients. Today, we are so much more than a PLM application software vendor.

We have expanded our scope to include the integration capabilities that organizations need to manage the complexities of the entire value chain. IBM is the only company that can deliver the complete PLM solution. Our unmatched combination of consulting, applications, middleware, hardware and services, coupled with a broad knowledge of industries and IT solutions, equips us to build complete PLM solutions to fit every business—large and small. This is the IBM difference.

When you choose IBM as your PLM partner, you are choosing:

A PLM leader

IBM leads the development of PLM. Our value proposition is built on a foundation of decades of world-class IBM technology expertise, supported by thousands of IBM engineers and developers in 40 different countries. This expertise is valued across the globe, and has enabled us to develop links with business partners that continue to evolve and improve the value we can add for our clients.

An unrivalled commitment

Our unmatched annual investment in Research & Development—the key to innovation—stands at approximately \$5.5 billion. This is testament to our commitment to helping your organization succeed in a world of change. In 2006, IBM innovators contributed to 3,261 patents awarded to IBM—an average of 10 patents a day. United States Patent and Trademark Office statistics show that IBM has generated more patents than any other company for 14 consecutive years.

A world-class manufacturer

IBM possesses deep industry experience and knowledge of the challenges you face. As a primary user of PLM, we understand your business processes and have the support of a global team of engineers to help tackle your real world issues—and keep you ahead of your competition.

Breadth of offerings

We can impartially recommend PLM offerings to suit your organization, and employ and integrate the solution with your extended enterprise.

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