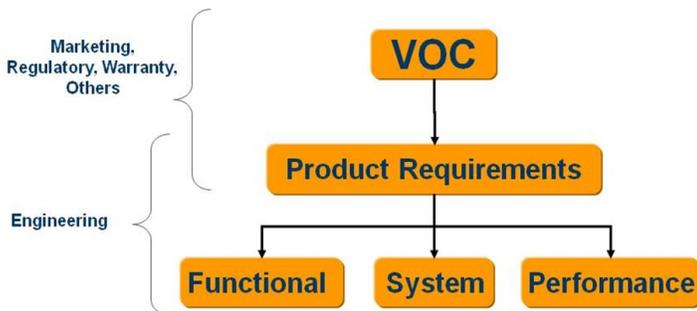


Managing requirements for a new product development program can be cumbersome and often the source of chaos and confusion for a project team. Frequently, the requirements are stored in a variety of disparate spreadsheets or documents, with no linkages or connection to the engineering or source VOC data, much less the testing or validation planning. Or if document linking exists, managing those linkages is often time consuming or becomes an overwhelming activity for the project team.

Requirement information stored on a shared network without revision control or easy cross-team update capability is another potential issue because the contributors compete for available access to the documents. Efficient, reliable requirement management becomes even more critical with the increasing level of regulatory impacts and product complexity seen in many industries such as automotive, electronics, and aerospace.

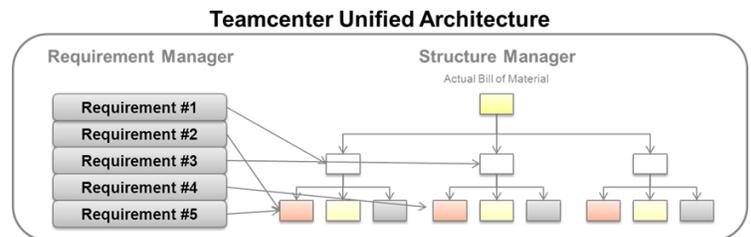
New product requirement gathering is typically handled as a cross-functional event where contributions are collected by marketing and warranty from a VOC and specification perspective, then delivered to systems engineering for review. Systems Engineers start breaking the higher-level requirements into categories such as functional, system, performance, and regulatory, then assign technical parameters to measure their attainment.



There are several commercially available requirements management tools that help project teams organize, link, and track requirements from early VOC through engineering

validation. One of these tools is the Requirements Manager add-on module for Teamcenter from Siemens.

The Siemens module began as a stand-alone tool called Systems Engineering. Mercury Marine and other Systems Engineering customers provided a list of enhancements to Siemens that included the direct linkage of requirements to engineering design items, along with the ability to manage the requirement information efficiently all in one toolset. Siemens took these inputs and created the Requirements Manager module for Teamcenter Unified Architecture, which was initially released for Teamcenter 2007 and continues within versions 8.3 and 9.X.



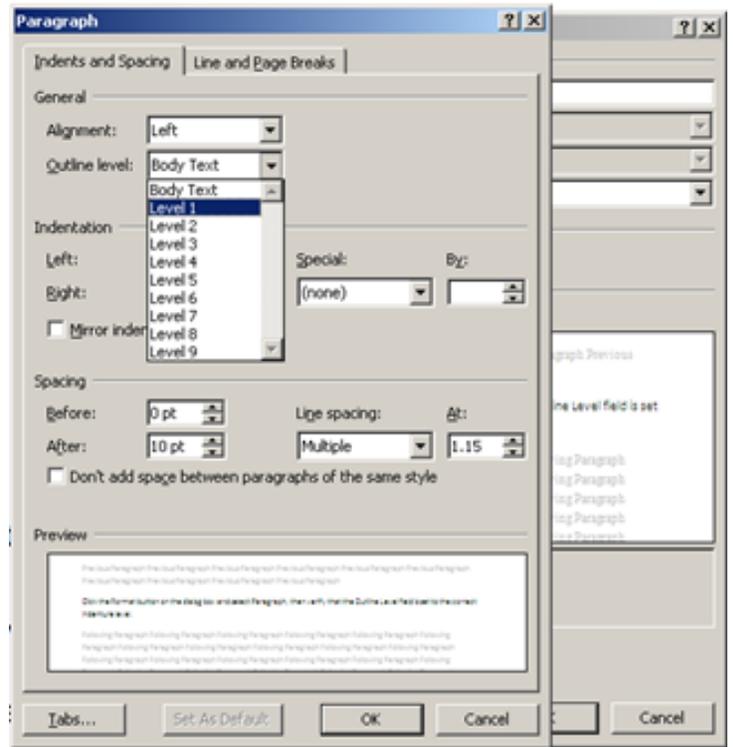
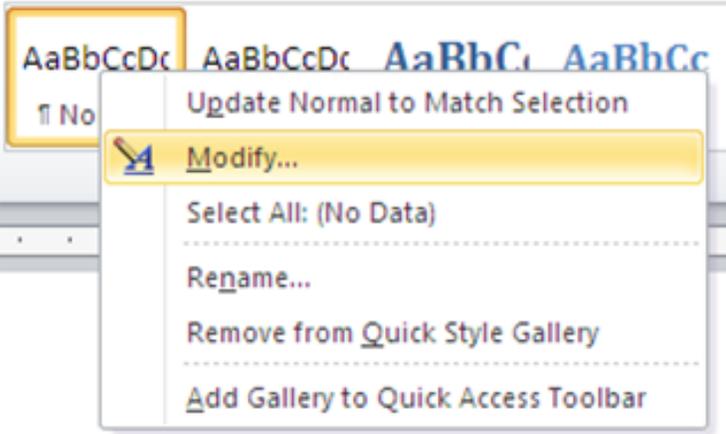
“The ability to link the design bill-of-material in Structure Manager with the requirements using the Requirements Manager module is a critical development for efficiently managing requirements in a complex new product program,” said Nathan Hering, requirements management lead at Mercury Marine.

Clean requirement document importing is the key to getting started with Requirements Manager. Creating the initial requirements using MS Word works really well because it allows for rich content such as graphs, charts, pictures, and tables to be embedded. Just make sure the charts, graphs, or flow charts are not linked to source content (using OLE for example). The document import into Requirements Manager will fail. Instead, convert all OLE content to an image by using the “Paste As...” functionality within MS Word.

The outline structure functionality using the MS Word headings (Heading 1, Heading 2, etc.) will automatically create an indented bill-of-material structure within

Requirements Manager. From our experience, to get the cleanest import of any document, the heading structure needs to be set correctly so the MS Word paragraph outline level corresponds with the level structure of the document.

Verify the headings are set correctly in MS Word by highlighting the heading level within the tool ribbon, then right-click and select Modify.

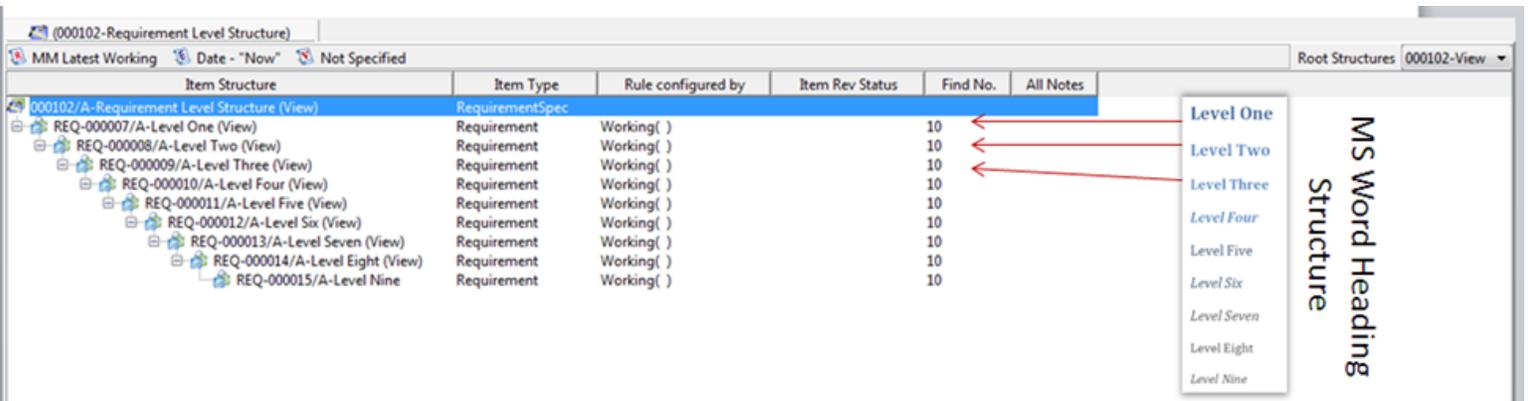


Click the Format button on the dialog box and select Paragraph. Next, verify that the Outline Level field is set to the correct indenture level. (Refer to image, top next column).

Using the following example, an Outline Level setting of 'Level 1' should be applied to heading 1.0, which will create the first indenture of the requirement specification. Think of

the specification as the top-level design item ID. All requirements follow starting with bill-of-material in level 2. Also note that if numeric headings are used within MS Word such as 1.0, 1.1, 1.1.1, these will NOT import correctly into Requirements Manager using Teamcenter 8.3. Siemens acknowledges this functionality will be provided starting with Teamcenter 9.1, which is scheduled to be released this year.

## Requirements Manager Structure Based on MS Word Headings



Once the requirements are successfully imported from the MS Word document, we suggest associating the source document as a dataset under the specification revision. Refer to the example below. Notice that the MS Word document 'Requirement Level Structure' version A is attached as a dataset under the specification item. (Refer to image at bottom of page).

One of the key benefits of Requirements Manager is the flexibility provided for adding attributes for the business users to contribute key information associated with each requirement. Any user can create views within Teamcenter with various attributes for display to efficiently edit values, or for export to many formats including MS Excel via a 'Live' integration. This 'Live' integration allows the attribute information updated within a familiar tool like Excel to be instantly stored back into Teamcenter.

Based on experience, it is recommended to keep attributes to a reasonable number because the performance of loading views within Teamcenter deteriorates quickly as the attribute population increases. Views containing a handful of attributes can help, but if a program manager requires a report based on a view of all the attributes, that can take a while to open if more than 15-20 attributes are included.

For example, one of our automotive clients that manufacturers complex vehicle sub-systems uses Teamcenter Requirements Manager to track requirements provided by their OEM customer. The client project team configured attributes associated with cross-functional, and cross-system teams to manage and disposition requirements based on their business processes.

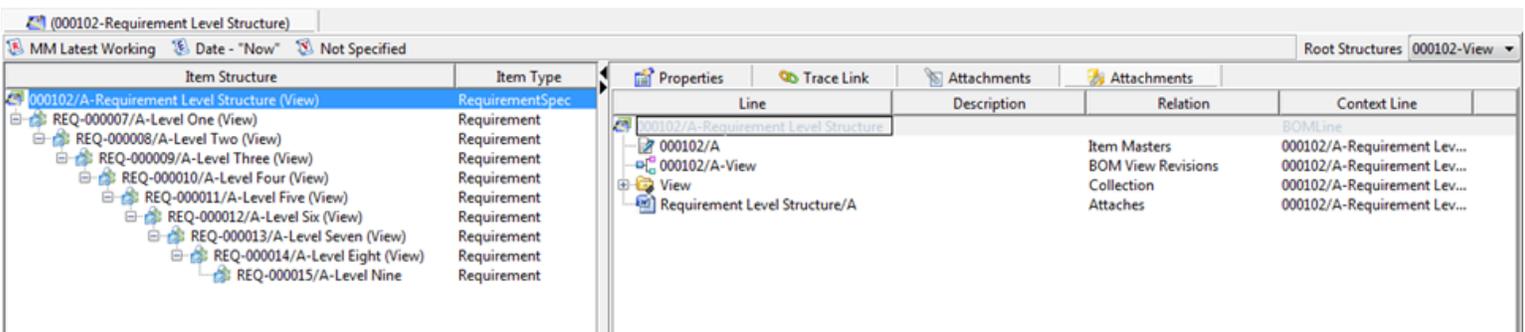
Further, an unlimited number of templates can be configured in Teamcenter to link against MS Excel to create a flexible, yet robust reporting vehicle. Custom reports can also be developed using the Teamcenter ITK tool kit.

A multi-step workflow was also configured for them within Teamcenter as a mechanism for each functional area to alert the program manager when they finished reviewing and dispositioning each applicable requirement by managing the requirement's status. The use of status icons is a quick and simple way for all requirement contributors to know the state of the requirement along its lifecycle. If necessary, workflows can also be configured to lock down requirements from being changed unless a new revision is created. In addition, users can query against requirements by using status.

Establishing the linkages between customer requirements and testing requirements is part of the next step in configuration work within Requirements Manager for the client. Linkages between the requirements and engineering design are also part of that step. This can be very complex because the linkage mapping must support future reporting and requirement data management needs. Linkages are created within Requirements Manager using a functionality called Trace Linking.

"Trace linking allows traceability between requirements and design (CAD BOM) or documentation (specification or test plans) and other requirements (validation or regulatory)," said Hering. "For example, these linkages will graphically show the impact of changing a requirement upon other systems, documents, and requirements. This helps program teams stay aligned as changes are made throughout a project's lifecycle."

### Source MS Word Document Stored as Dataset Under Specification



We encourage any organization that needs robust requirement management to look at a formal requirements management tool. If you are a Teamcenter user and are considering the Requirements Manager module, contact us at [www.mercurypm.com](http://www.mercurypm.com) for more information and implementation best practices.

### Mercury PLM Services Unique Perspective

Mercury's differing approach concentrates on understanding your process as a must for success. A process-centric approach requires businesses to review and question existing work streams to understand "why," "what," and "how" work should be done to establish efficient cross-functional work flows that are consistent, repeatable and scalable for growth.

Mercury also offers a unique perspective for helping organizations that are considering a Product Lifecycle Management implementation because Mercury lives and breathes PLM from a manufacturing business user's vantage point.

Because Mercury works in a dynamic, global product-development environment that supports a worldwide manufacturing footprint, Mercury has a user's perspective that helps drive results and realize improvements. Several of Mercury's experts also have been deeply involved with our ISO 9000 certification effort, as well as configuration management, and engineering document-management practices. ■

## PLM OFFERINGS

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			<u>Manufacturing</u>	<u>Implementation</u>
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