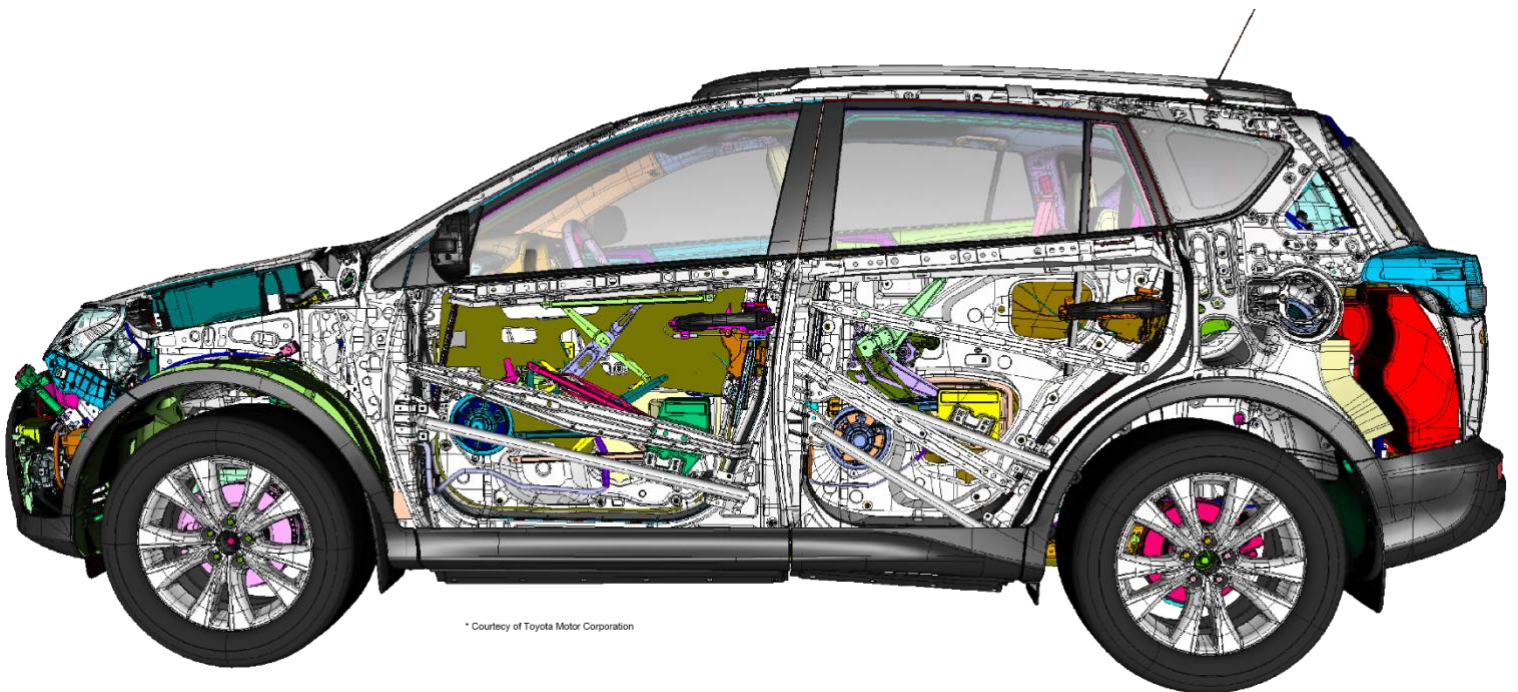




# LATTICE3D

## XVL WHITEPAPER

**How manufacturers are leveraging their 3D CAD data to lower costs, improve quality and accelerate time-to-market**



\* Courtesy of Toyota Motor Corporation

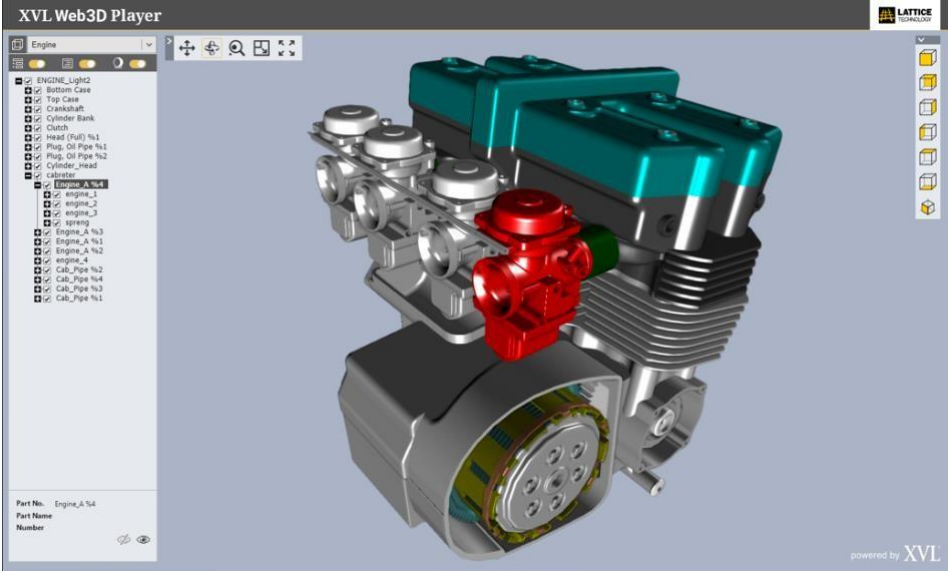
*Lattice Technology provides an end-to-end solution from authoring to sharing of 3D-based product data for collaboration and technical documentation*

# Executive Overview

XVL solutions from Lattice Technology are for companies that have large, complex designs in 3D CAD and would like to increase their use of this data into downstream functions beyond product development; for instance, into manufacturing, technical documentation and service.

There are two sides to XVL, the authoring of content directly from the 3D CAD models and the consumption (or usage) of this content. Authoring includes use cases for creating manufacturing Bills of Materials (mBOMs) to validating assembly processes to creating detailed interactive work instructions. Consumption enables secure access to interactive model data for all downstream stakeholders through standard web browsers, Microsoft® Excel®, dynamic web pages and more, which are all free to the person viewing the data for use cases such as design reviews, shop floor assembly work instructions and service instructions.

CAD data accuracy is maintained in this extremely lightweight format that allows complete 3D models, including all parts and assemblies (with their structure), to be saved into a single file— CAD models are generally converted to 1% of their original size. This enables CAD models that are in the gigabytes to be converted to megabytes which can then be accessed at one time for authoring or consuming 3D content.



By using XVL, your company can provide unprecedented, secure access to 3D model data representing the entire product, regardless of the originating CAD system (even combining data from multiple CAD system formats). Productivity is increased for everyone who needs access to the 3D model without burdening the engineering department to assist them. Quality is increased because the actual 3D model data can be leveraged directly by those in the product delivery value chain; from planning and validating the assembly process to technical manuals and parts identification for reordering.

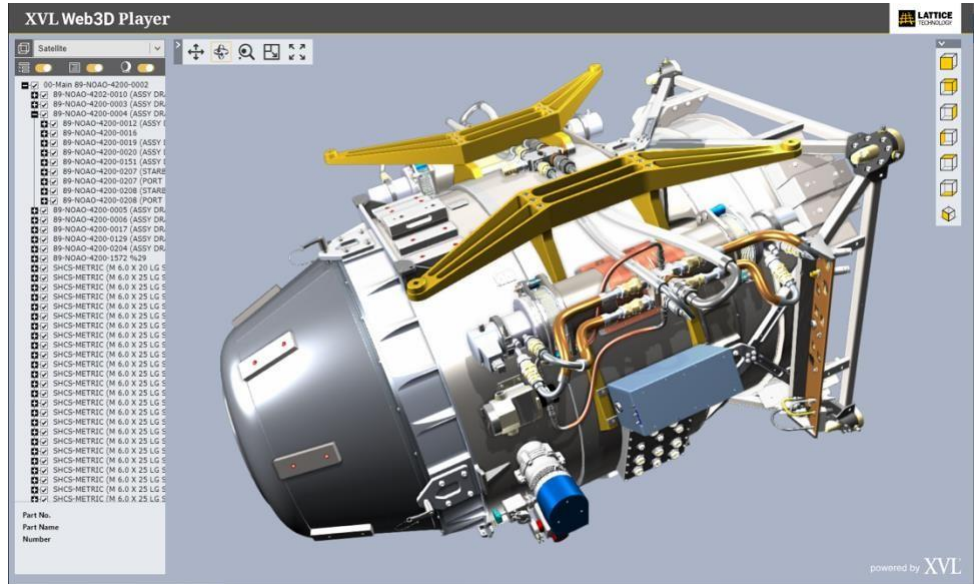
# Why XVL?

XVL solutions can bring enormous benefits to the way your company leverages 3D CAD model data enabling simple and secure access to all stakeholders for authoring content, interrogation and viewing of 3D model data.

## Manage large 3D CAD files with ease

Lattice Technology's products enable manufacturers to convert files from any standard 3D CAD system of any size. Native CAD files from multiple systems can be converted into a single XVL file, which is an ultra-compressed, highly accurate format that reduces files to approximately 1% of their original CAD file size.

## Heterogeneous 3D CAD system format support



Multiple CAD formats can be combined into a single XVL file. In large companies, often more than one CAD system is used, or perhaps, subcontractors use a different system. With XVL, this is not an issue. So, whether you are using Autodesk Inventor, CATIA V4, CATIA V5, Creo Elements/Direct, Creo Parametric, JT, NX, Parasolid, Solid Edge, SolidWorks and others, all of these formats can be converted into a single XVL file.

Note: all trademarks are the property of their respective owners.

## Easy and secure access

All stakeholders can access the 3D models using a standard web browser and other options including Microsoft® Excel®, dynamic web pages, the Apple® iPad® and others. All viewing technology options are free for the consumer.

## Version control

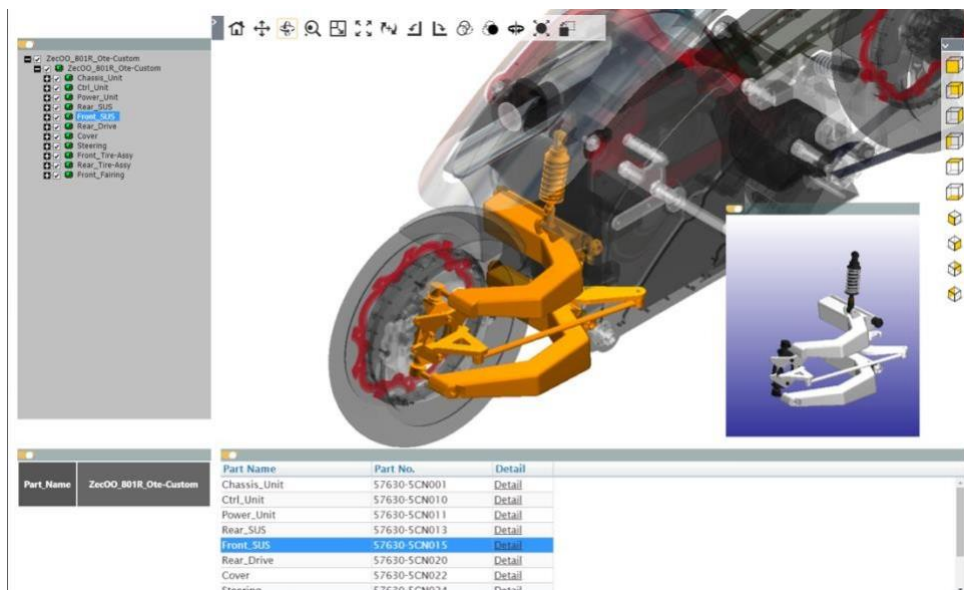
XVL Content Manager includes a vault that works directly with your CAD system/s and your PDM/PLM systems (if used). Content from multiple sources are gathered together here for access by all stakeholders downstream from product development. XVL manages the metadata (from the CAD, PDM, PLM and ERP system/s) and XVL Content Manager manages the XVL.

## Concurrent workflows that enable parallel work

With XVL, handling Engineering Change Orders (ECOs) is part of the standard process. For example, manufacturing process planning can begin before the design is fully complete. When a design change is made, the net change can easily be identified, and changes implemented without large amounts of rework.

## Single source

Consider XVL as the intermediary format between product development and all stakeholders who need to author content such as work instructions, interrogate for use cases such as design reviews or to simply view 3D CAD models. Convert large, native, heterogeneous 3D CAD files to one lightweight XVL file for all downstream users to access. Remember, the XVL representation includes the product in its entirety including all subassemblies and parts.



# Use Cases for XVL

## Share and collaborate

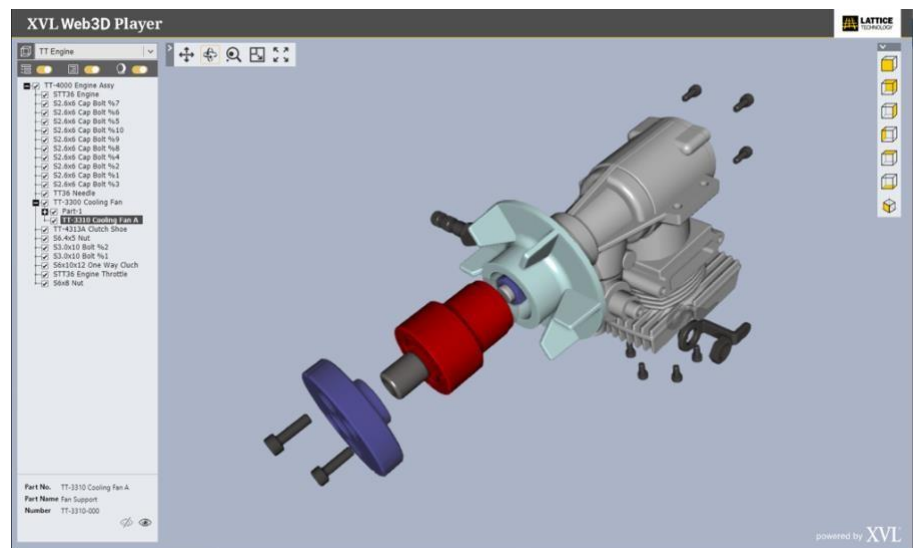
Many companies try to leverage 3D CAD data across the entire enterprise using their 3D CAD system. XVL fills this need better than CAD for a variety of reasons; here are a few:

- 1) For complex designs, CAD files can be enormous, and it **may be impossible to examine complete products** in a CAD system because of file size.
  - a. XVL model sizes are approximately 1% of the original CAD models
- 2) Using 3D CAD modeling programs requires a **high-degree of training and expertise**.
  - a. XVL offers many options for accessing the 3D model data, from web browsers to Microsoft® Excel® to Apple iPads.
- 3) Many companies have a **heterogeneous CAD environment**, making it very difficult to examine an entire product from one file source.
  - a. Multiple files from multiple 3D CAD systems can be combined into a single XVL file representing the entire finished product.

XVL's unique capability to represent all parts and subassemblies for even extremely large models (even gigabyte file sizes) in a single file and session, can enable any stakeholder who needs this data to perform their job.

## Bills of material (manufacturing and service)

Now your stakeholders can easily work with the entire product, which includes all subassemblies, parts and metadata, from one comprehensive file. This single XVL file can be used to author Bills of Materials, using the simple drag-and-drop interface based on the Engineering Bill of Materials (eBOM) from the originating CAD system.



## Plan and validate the assembly process digitally

XVL Studio allows you to simulate and ultimately validate the assembly process for the entire product which could involve tens of thousands of parts and thousands of steps.

Product manufacturability can be visually tested in a digital environment, avoiding downstream—and potentially expensive—surprises and delays.

## **Create assembly work instructions**

After the assembly process has been virtually planned and validated, this same information is directly leveraged to create the assembly work instructions that will be used on the shop floor. Interactive 3D part images are linked to parts in the parts list. The process instructions are written and attached to the part images and parts. These work instructions can be delivered in electronic 2D or interactive 3D.

## **Author technical documentation**

XVL Studio provides the tools to generate complex technical illustrations quickly and easily—directly from your converted 3D CAD models. And, because the XVL file can be viewed and leveraged by all stakeholders in the product development chain, work instructions, service manuals, technical documentation and more can be produced without engaging engineers and designers in product development.

## **Enable parts identification for parts ordering**

Since XVL can represent the entire model, parts can be identified and viewed at any level. This capability can be used by your service department or partners, customer service or customers.

# Implementing XVL

## The XVL Solution



### Convert

Convert 3D CAD to XVL



### Author Content

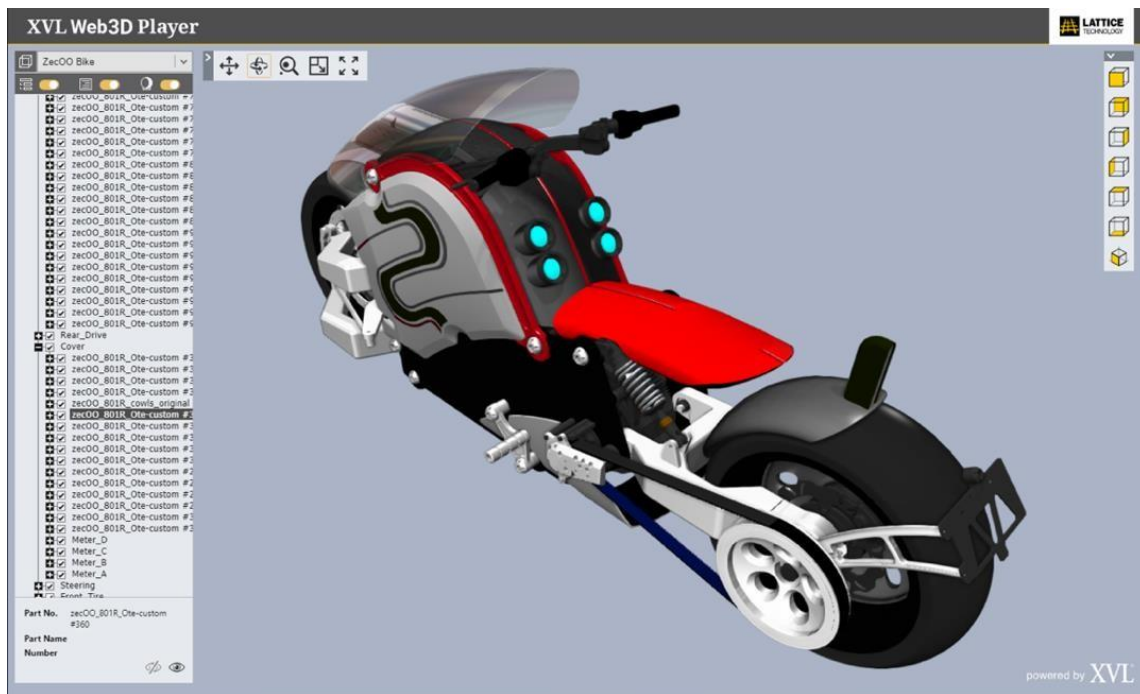
Such as Traditional Illustrated Work  
Instructions or Interactive 3D Work  
Instructions



### Publish

To industry standard formats such as  
Microsoft® Excel®, HTML or 3D PDF and to  
computers and tablets like the Apple®  
iPad®

In summary, XVL solutions from Lattice Technology enable the enterprise to make greater use of its 3D model data, regardless of the originating CAD systems. The use cases span multiple functional areas from manufacturing to service. The data is ultra-lightweight, which enables the entire finished product to be worked on at one time. Since XVL retains CAD-level accuracy, real work can be performed including use cases such as design review.



## Learn More

Get the eBook: [Using 3D Data to Improve Manufacturing Processes](#)

Learn how manufacturing companies are leveraging their 3D CAD model data beyond development in order to increase quality, productivity and profits.

For a manufacturer to succeed in the global marketplace, it needs to use IT innovations such as **XVL to develop optimized processes** and implement these processes as standards throughout the organization.

If you are responsible for optimizing your manufacturing processes, this eBook is for you. You will learn how leveraging your 3D models can provide big paybacks.

- **Chapter 1:** Global Manufacturing Renaissance
- **Chapter 2:** Winning in the Global Market
- **Chapter 3:** XVL, A Fundamental Technology for Maximizing the Value of Design Assets
- **Chapter 4:** Strategies for Using 3D CAD Data to Support Global Manufacturing
- **Chapter 5:** Winning Global Competitions with Constant Improvement

