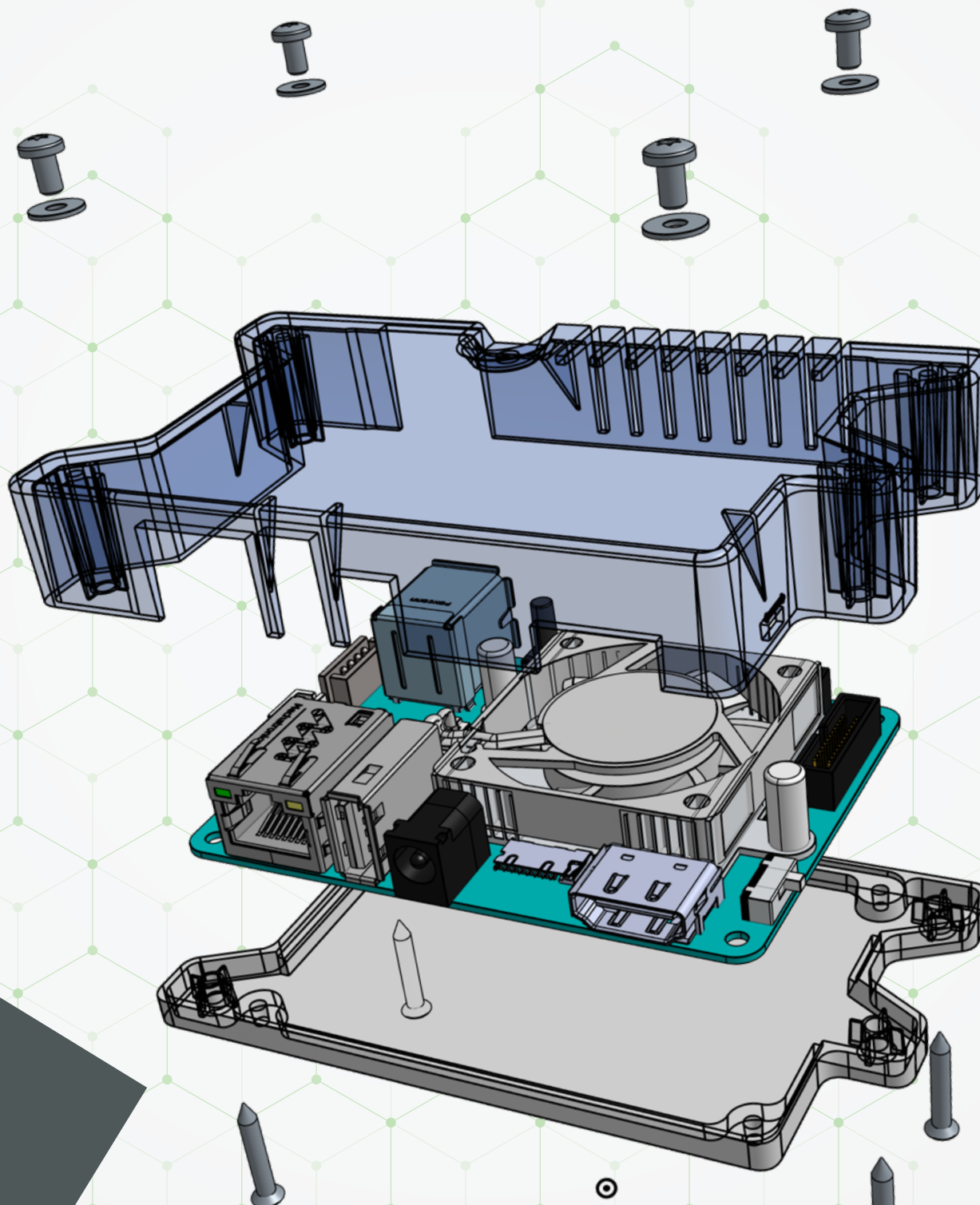# Modernizing Your CAD

7 Criteria to Consider

Buying a Modern CAD System

Today, product development teams are recognizing the shortcomings of legacy file-based CAD systems, which include version control errors, lack of remote access, and lost or corrupted data.

Increasingly, forward-thinking manufacturing companies are seeking more modern cloud-based CAD and data management solutions that let teams work from anywhere, collaborate in real time and accelerate time-to-market. This buyer's guide provides essential criteria to consider when reviewing competing CAD platforms so you can make the best investment for your company.
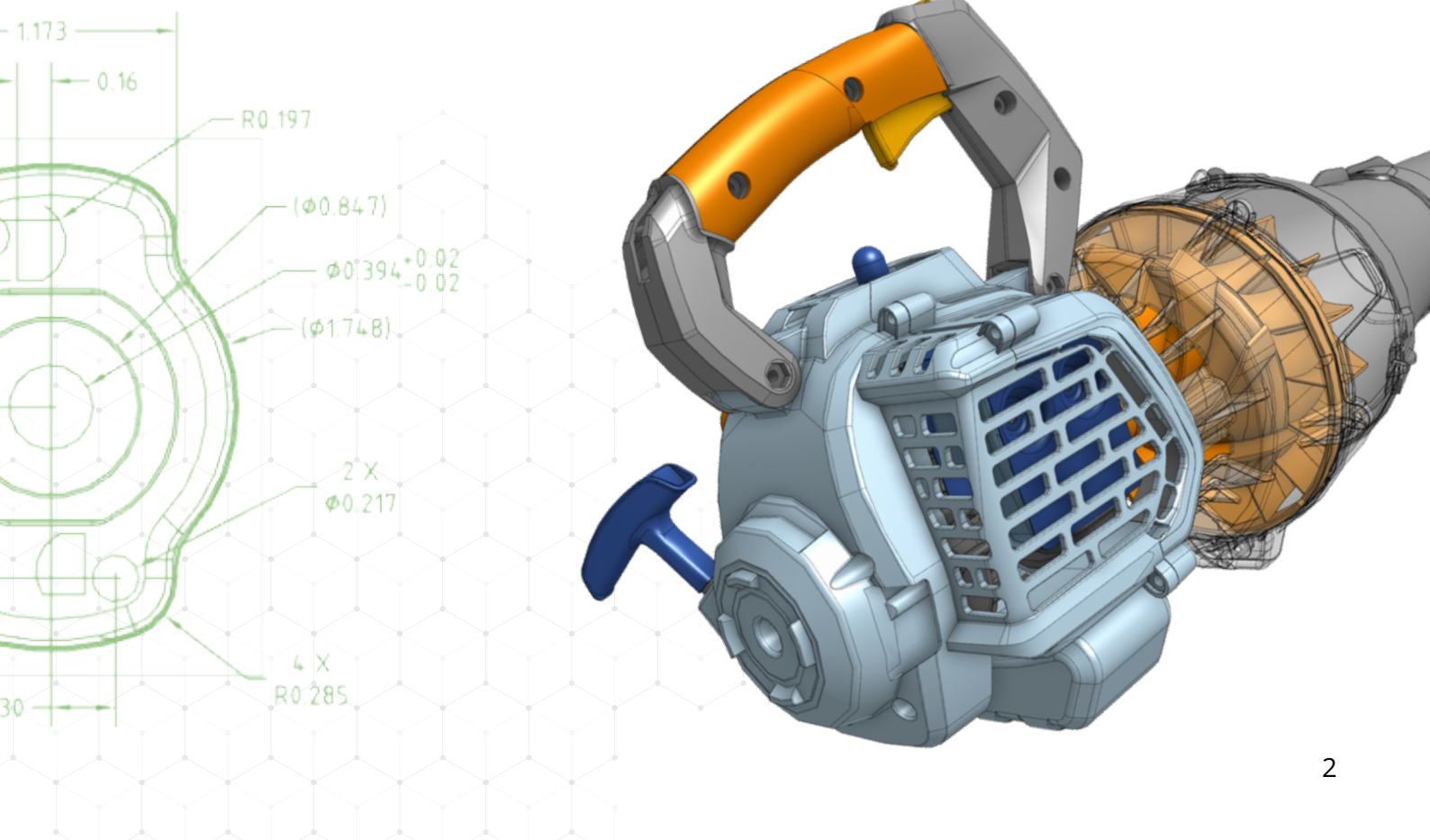
Seven Criteria for Evaluating a CAD System

1. The Modeling Tools

First and foremost, you'll want to make sure a CAD system's modeling tools can accomplish your day-to-day tasks and projects. That means if you work with sheet metal, you'll want to check out its sheet metal tools; if you often create variations of designs, you'll want to see how it handles part configurations; and if you frequently work with fastener stacks, you'll want to spend time evaluating its standard part libraries. Make sure the tools do what you need them to do, and do it well.

Some parametric modeling tools have existed for over 30 years, but haven't lived up to the promise of easier top-down design. For example, in-context editing can lead to unexpected changes to models; assemblies can generate a lot of extraneous files to manage; defining mates in multipart design can break relationships between parts. Find out what, if anything, each vendor has done to make these tools work for the designer, rather than the other way around.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ **How do your parametric modeling tools handle tough tasks such as part configurations, in-context editing, or multi-part design for assemblies?**

✓ **Show me how your CAD system would handle a specific task from the last project we worked on, such as checking a sheet metal design for collisions.**

✓ **Where can I see videos or a demo of your CAD tools in action?**

"In modeling parts alone, we've saved a lot of time. One engineer did a side-by-side comparison and estimated that Onshape was three times faster to model a part compared to our old CAD system. It's also much faster to onboard new members to the team. (You can be) up and running in a matter of minutes instead of days or weeks."

Mark Yerdon,
Senior Mechanical Engineer, Google

Google

2. The User Interface

"More buttons" does not necessarily equal "more features." As CAD systems have evolved, so have their interfaces. To judge an interface as objectively as possible, consider these three areas:

Usability - Many CAD vendors have replaced massive rows of toolbars with more elegant, contextual controls. Since engineers are often reluctant to leave their familiar design tools, the best way to evaluate a CAD system's usability is to sign up for a trial version and get comfortable with the user interface.

Productivity - Look for ways that the CAD system lets engineers focus on doing their best work, versus ways that it encumbers them with administrative concerns. Compare how much time your engineers will be forced to spend installing software, updating and upgrading software, and interacting with high-overhead Product Data Management (PDM) systems.

Accessibility - In today's mobile-first, highly collaborative, virtual teams environment, it's now expected that designers can show and share their work with customers, manufacturers, and other team members. Check out the performance of the CAD system's mobile client, for not only viewing designs while in the field, but also for creating and editing models on the go. Find out what the process is for sending files between engineers, or whether built-in workflows facilitate communicating and collaborating within the software.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ How can we try out the desktop and mobile versions ourselves for a few weeks before we buy?

✓ What additional systems should I buy or set up for effective data management?

✓ How do users share design views with other collaborators?

"Whenever I describe Onshape to anybody, I always say, 'It's like the Google Docs of CAD,' and they're instantly like, 'Oh, that makes so much sense. Why haven't they (the CAD industry) done that already?'"

Robert Futch, CTO,
Delta Development

DELTA
DEVELOPMENT TEAM

3. Total Cost of Ownership

Though price-per-seat is often the first number evaluators look at, CAD buyers are best served by considering the Total Cost of Ownership (TCO) – the direct and indirect costs associated with adopting a new CAD system. Consider costs across four categories:

Software - CAD software, often priced per-seat, can have upfront and recurring costs. Some systems have license requirements beyond the CAD software itself such as PDM systems or file backup software. Some add-on components such as simulation licenses or standard content libraries may require separate license fees as well. Mobile clients may also have additional costs. CAD systems sold indirectly often have additional maintenance and support fees that go to the reseller to provide upgrades, service packs, and technical support.

Hardware - Recommended workstation requirements often include high-end video cards and CPUs, as well as solid-state hard drives or extra RAM to bring performance up to acceptable levels. CAD software that relies on PDM systems, file sharing, or other add-ons may introduce server requirements for extra file storage and additional software. Check on any requirements for mobile devices. Cloud-based systems maintain milder hardware requirements.

People - Some CAD systems, especially those with additional server requirements, also require IT employees dedicating their time to maintaining your hardware, provisioning licenses and workstations for new users, and applying upgrades and patches. Find out how much IT support each CAD system needs.

"We were excited to try Onshape for its cloud-based capabilities. While we weren't originally looking for a new program, as an engineer, you're always learning and trying to make your design time more efficient – and with Onshape, we can do just that."

Michaelina Dupnik,
Project Manager, Vivonics

Time - Though it's an indirect cost, it's worth ascertaining how a CAD system will affect your team's overall productivity. CAD systems with complex installation and maintenance requirements may introduce downtime for upgrades and backups, and may cause you to lose even more time from crashes or recovering data. Easier-to-learn, modern CAD systems with faster onboarding and turnaround times for designs may actually decrease the effective cost of the system. Peer reviews can give you a sense of whether a given CAD system has saved or lost them time.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ Besides the CAD system's upfront and recurring license costs, what other software licenses, such as PDM systems, backup, or content add-ons, are required?

✓ How much does hardware with your recommended specs cost for workstations, PDM servers, and storage space?

✓ What are the requirements for mobile devices?

✓ How many IT full-time resources do your customers usually retain to manage licenses, to apply service packs and upgrades, to handle backups and server maintenance, and to recover from crashes or lost data?

"Onshape probably cuts our design time in half because we're designing our parts together in one place versus flipping back and forth between files. We can make changes without worrying about breaking the assembly."

Philip Taber, VP of Hardware Engineering, Silverside Detectors

4. Getting Help

Whether upgrading your current CAD system or switching to a new one, your CAD users may need external help, such as:

Technical support - Explore what support options each CAD system offers. In particular, in-app support can prevent you from falling into a tech support black hole. If possible, talk to current users about their support experiences. Get a sense for how many layers are in place between your source for technical support, which may be an outsourced agency or a reseller, and the engineers who would fix any actual software defects.

Onboarding and training - All CAD systems naturally have a learning curve, but the best CAD companies will guide adoption, often with the help of dedicated customer success teams. In addition, the best CAD systems have built up an extensive array of online self-paced courses, technical briefings, and virtual instructor-led training available for both novice and experienced CAD users.

Peer support - Sometimes the most valuable help comes from fellow engineers. Look for a vibrant community of users who contribute to online forums and weigh in daily.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ If I report a bug or a software issue, how soon can I expect my problem to be resolved?

✓ Once I buy, what is the onboarding process, what training resources are available, and how do you help?

✓ Where is your online community forum and in general, how long does it take to get a response?

"Making sure our vendors have the most up-to-date drawings provides immediate savings. Anytime we get a manufacturing mistake, it could cost several thousand dollars. Making sure the vendors are on the latest revisions puts the onus on them and not on the purchase agent. I don't even know how to begin to put an exact dollar amount on it, but the clarity that Onshape gives us in our communications with vendors is invaluable."

Matthew Kibler, Senior Mechanical Designer, FHE

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5. Staying Up To Date

Technology marches forward, and so do the life cycles of operating systems, industry standards, and CAD software. Modern CAD systems with more frequent release cycles can better stay up to date with the changing macro environment.

Watch out for CAD software with longer, 12-18 month release cycles as they often have painful upgrade processes. Researching service pack instructions and upgrade blog posts can give a better idea of what's required to stay current and avoid version conflicts. Ensure that a new CAD platform can take data from your existing system.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ How often do you release new versions of the software?

✓ How much work and time is required to apply service packs, patches, and upgrades?

✓ What is the workflow for collaborating with others on older versions of the software?

"Onshape's FeatureScript programming language is game-changing for us. This is something I've never seen in any other CAD system. Our software engineers can create our own custom CAD features that are unique and suited just for our applications."

Azizi Tucker, CTO
XING Mobility

6. The Ecosystem

The most valuable CAD systems are not only applications, but also full platforms with growing ecosystems extending the core product's functionality.

Integration with apps - CAD systems must often interact with related software for functionality such as rendering, CAM, or stress analysis. Find out how each CAD vendor helps you find and install third-party software if it has different requirements, terms, and billing processes. Look for companies that facilitate vendor integrations by publishing a full API, and that let users "try and buy" compatible apps from a single marketplace, similar to app stores from Google or Apple.

Customization - CAD users can speed up common tasks if they can customize their CAD software. While macros can automate geometry in pre-defined contexts, look for CAD platforms that offer a more powerful programming language to make time-saving tools more broadly applicable. That way you can create context-aware custom features that look, feel, and behave just like built-in features.

Peer-contributed content - Customer-created, publishable customizations remove your dependency on the CAD developer to answer your feature requests. Look for publicly available libraries of user-developed features using available tools, with frequent contributions from active customers.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ Where can I find apps that work with your platform?

✓ How can we customize features for our company?

✓ Where's your API or scripting language documentation?

"Onshape has become a central part of our IT department, and in so doing we've brought engineering and IT together to design and develop the product in a collaborative sense. The combination of cabinet-specific custom CAD features and configurable, pre-developed product models allows us to rapidly detail our custom projects instead of doing it manually."

Sheldon Horst, President,
Premier Custom-Built Cabinetry

PREMIER
CUSTOM-BUILT CABINETRY

7. Security and Reliability

Safeguarding your intellectual property means both controlling access and protecting against data loss — both challenges for some CAD systems. That's because giving file access to customers and vendors means they can then copy or redistribute those files to others. To prevent data loss, file-based CAD systems often recommend additional file management software to mitigate the risk of lost or corrupt data files.

In contrast, cloud-based CAD systems, which securely store your models in a central database, can grant roles and privileges for access to models without ever leaving files behind. Find out how each CAD vendor gives you control over access to your proprietary data, and how they reliably ensure your data is safe.

? QUESTIONS TO ASK EACH CAD VENDOR

✓ What safeguards protect IP when sharing models with customers and vendors?

✓ How do you monitor, change, and revoke access privileges to your CAD data?

✓ What's your recommendations for data backup and disaster recovery?

"What we're able to do with Onshape is give our clients a living link. They can watch us work and see all the changes we're making. We do this freely because we want all of our clients to see how good, bad and messy the development process can be sometimes. We believe the more information they have, the better they're going to understand us and the better clients they're going to be."

Lucas Lappe, Head of Product, Doris Dev

doris dev

Grading the CAD Systems

Use this chart to rate and compare different CAD systems.

Criteria		onshape	CAD #1	CAD #2
Tools to get work done	• Parametric modeling tools • Mates and assemblies • Fits day-to-day requirements			
User interface	• Usability, based on trial • Productivity barriers • Collaboration accelerators			
Total Cost of Ownership	• Licenses: core & add-ons • Hardware, storage, and backup • Ongoing maintenance fees • Dedicated IT employees			
Staying up to date	• Release frequency • Upgrade process • Data migration			
Getting help	• Technical support • Onboarding & training • Peer Community			
Ecosystem	• App store • Customizable features • Peer-contributed recovery			
Security and Reliability	• Safeguards to protect IP • Roles and privileges • Backup and recovery			
	TOTAL SCORE			
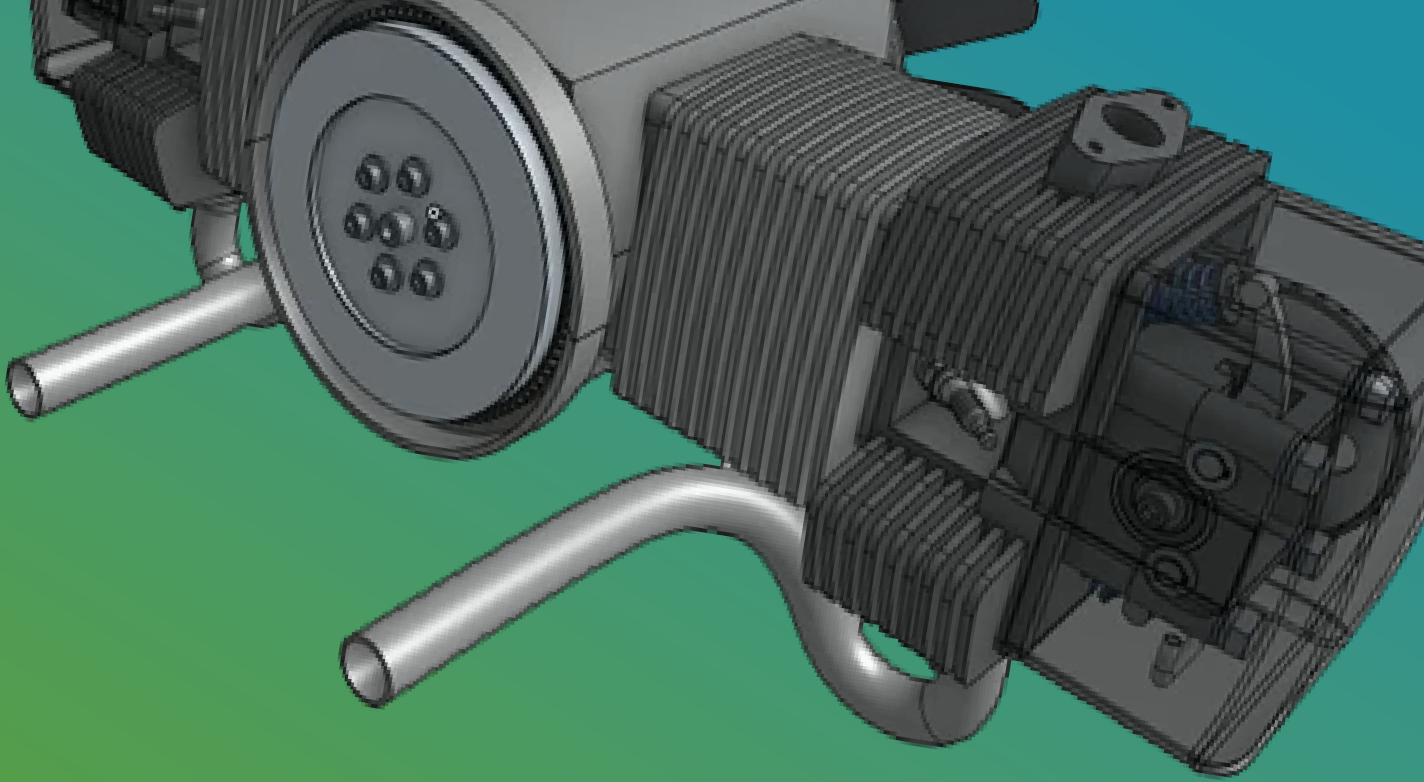
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Onshape is the only Software-as-a-Service (SaaS) product development platform that combines powerful CAD tools with real-time data management, collaboration, and business analytics. Executives and managers can get up-to-the-minute progress reports on a project's status and built-in version control prevents costly delays and manufacturing errors.

Sign up for a free Onshape Professional Trial and experience the benefits of cloud-native product design today!

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