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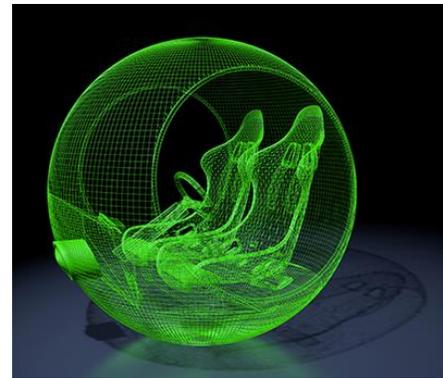
Volume 17, Issue 8

Accelerating Innovation with Cloud CAD Collaboration

By: [Jon Hirschtick](#)

Take a quick look around your home. Nearly every object in your field of vision, from the ballpoint pen on your desk to the car in your garage (and even the garage door opener) first existed as a digital 3D model. Computer-aided design (CAD) software is the invisible backbone of the economy, shaping nearly every manufactured object on earth.

One of the most disruptive innovations in the product development world happened in the early 1990s, when CAD technology evolved from simple wireframe and 2D drafting to 3D solid modeling.



At the same time, the computing platform migrated from mainframes and proprietary terminals to UNIX workstations and Windows PCs. Allowing engineers to work on desktop personal computers was revolutionary, making CAD newly accessible to millions of engineers whose companies previously could not afford the technology. In the early days, one CAD seat cost hundreds of thousands of dollars, as it was sold as a “turnkey system” including the software, the hardware, and even the desk and chair. The concept of installing software on the computer of your choice didn’t exist.

Surprisingly, it took another three decades before there was another seismic change in the CAD world: the recent migration of product development tools to cloud software-as-a-service (SaaS) and mobile platforms. Cloud SaaS platforms allow multiple engineers to simultaneously collaborate in real time on product designs, enable the freedom to work from anywhere in the world on any computer or mobile device (iOS and Android), and completely eliminate all the traditional CAD overhead of installations, upgrades, service packs, servers, and special hardware.

But before we explore how cloud SaaS platforms eliminate delays in product development, it is important to understand why installed on-premise CAD systems significantly slow down the design process.

Legacy software blocks collaboration

Collaboration is at the heart of all product innovation—and product development is the ultimate team sport. More talented people (across all departments) contributing ideas leads to more design iterations, which result in more incremental innovation. In today's hyper-agile economy, the pressure to innovate never ends, and some companies even view their flagship products as works-in-progress. Tesla Motors, for example, continually releases incremental software updates every 30 to 60 days with new driving features and improvements.

Legacy file-based CAD systems, which are tied to individual computers and licenses, were meant for the era when the vast majority of products were designed and manufactured in one location. This was a time when engineering colleagues could lean over each other's shoulders or walk down the hall to discuss a design. Today, it is far more common than not for design and manufacturing teams to be spread between offices in multiple locations across the country or around the world. The Boeing 787 Dreamliner aircraft, for example, involved collaboration between 17 design teams in 10 countries.

Product development companies today face collaboration challenges in three main categories. The first is the **core design team** and is about empowering individual users (designers and engineers) to work more productively together. These core users require the tools to better share ideas and iterate on designs to improve product innovation.

The second is the **extended internal team** and concerns how to connect and improve collaboration between the core design team and an array of internal company stakeholders. This extended internal team may include executives, operations, and manufacturing team members who provide crucial input and approvals.

The final category is **external partners** and the challenge is about improving the way the company shares critical purchasing and manufacturing information with external supply and manufacturing partners.

In all three categories, the simple act of sharing a 3D CAD model with a colleague or outside partner is a headache when using on-premise file-based systems. Getting feedback on a design involves sending static files or screenshots back and forth by email or uploading to Dropbox, versus the immediacy of a real-time conversation. Manually sharing CAD designs often involves emailing lengthy written instructions back and forth, causing further delays in the communication flow. There's also the issue of CAD access, as coworkers and partners without a CAD license cannot open the file. Conversely, when using a cloud SaaS platform, anyone with the proper email permissions can open a live, up-to-date CAD model and comment in the margins like they might do with Google Docs. This universal access enables departments like sales, marketing and customer service to share their input about products very early in the development process, whereas historically they have been shut out of the design feedback loop.

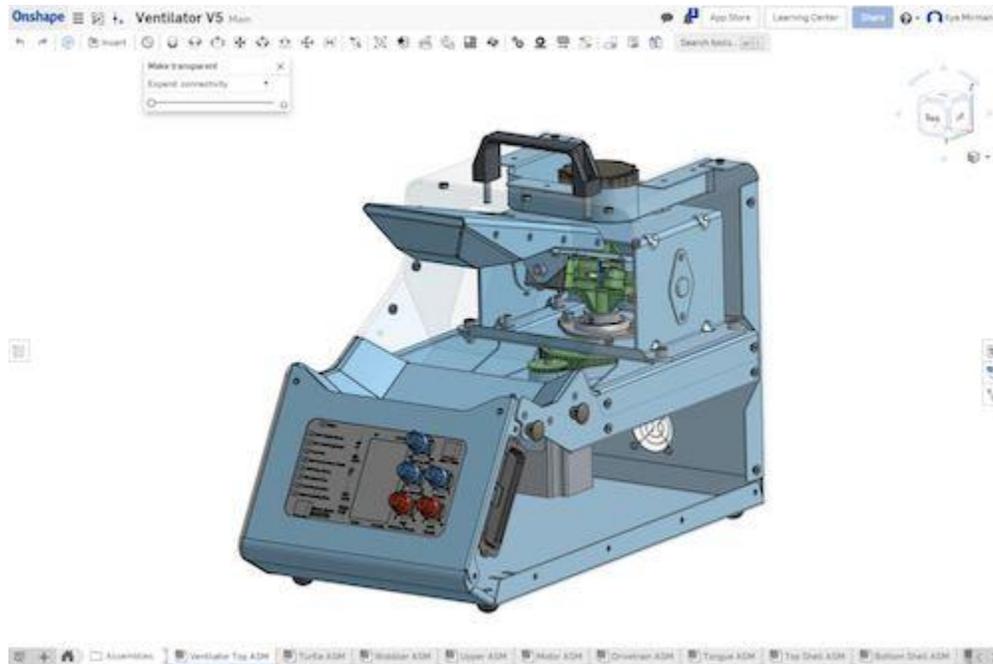


Figure 1: RISE Emergency Ventilator

Accelerating innovation with cloud CAD collaboration

Perhaps the most dramatic example of cloud CAD collaboration tools being an absolute game-changer is the development of the [Rise Emergency Ventilator](#). In March 2020, during the early days of the pandemic, hospitals were projecting massive shortages of ventilators to help COVID patients breathe. Meter, a Boston hardware startup in stealth mode, took on the challenge of designing a more affordable ventilator without relying on specialized parts already in high demand to repair existing ones.

Including a core team of a dozen engineers, about 50 people—most forced to work from home by shelter-in-place mandates—were involved in the development of the Rise Emergency Ventilator. The extended team included 3D-printing experts, hospital clinicians, software developers and sheet metal fabricators. Using a cloud CAD

platform allowed for multiple engineers to work simultaneously on the same designs and enabled real-time feedback loops. The Rise team went through six design iterations before manufacturing the final product in only 21 days, a process that usually would take many months.

The Rise Emergency Ventilator is an outlier story, particularly because the core design team devoted three nearly sleepless (and unsustainable) 120-hour weeks to the effort. But the unprecedented achievement proved what's possible when you eliminate the software barriers blocking CAD collaboration.

In another compelling example of innovation, [OceanGate](#), a Seattle-based company that designs and manufactures submersible vehicles for deep sea exploration and adventure travel, is now

moving ahead with plans to bring “citizen explorers” to survey the Titanic wreck site this summer. The company has been collaborating with [NASA’s Marshall Space Flight Center](#) in Huntsville, Alabama, to develop and manufacture a new aerospace-grade carbon fiber hull for its five-person explorer subs.

OceanGate’s core engineering team includes four engineers based in their Seattle office and another five contractors spread between four other states. Using cloud-based CAD, the engineers can not only work on the same design simultaneously, but they can also refer to an edit history that tracks who made what change and when. Using this history, the team can instantly revert back to any prior stage of the design if desired.

“It’s really collaborative,” says Dan Scoville, OceanGate’s Director of Engineering and Marine Operations. “It’s also valuable for getting quick feedback from our CEO. We can both be in the model and he can say what he likes, what he doesn’t like, bring up issues and offer suggestions.”

Scoville recently told the [National Association of Manufacturers](#) that he estimates that using a SaaS design platform saves his company \$60,000 to \$70,000 a year in administrative costs. He attributes the savings to the reduced IT overhead of not having to maintain servers or have a full-time person managing a product data management (PDM) system for version control.

When the engineering team doesn’t have to worry about spending time on administrative tasks, they can devote more time to what they love to do most (and were hired to do): designing innovative products.

Expanding the talent recruitment pool

In today’s ever-changing business environment, agility has become the new competitive advantage. The most resilient companies are able to quickly pivot when needed, and achieving this flexibility requires the right culture and the right technology.

In addition to boosting collaboration and innovation, ultimately resulting in better products, companies that have adopted cloud-based CAD platforms are experiencing an unexpected dividend. Using cloud tools can also improve the quality of the product development team itself.

Certainly, not every product development job can be done from home—many hands-on positions on the manufacturing floor immediately come to mind—but there are numerous design roles that are well-suited for remote work. Having the remote CAD collaboration tools to support these roles dramatically changes the recruitment and hiring process.

As your company grows, hiring the right talent is one of the most critical factors in determining success. Instead of limiting your candidate search to a 50-mile radius or expecting candidates to leave their homes and communities for better career prospects, your talent pool can now be expanded to every corner of the planet. This means that you don’t have to settle for the best engineers in your city when you can hire the best in the world—and drive innovation with cloud tools.