

An Introductory Guide to Cloud-Native Product Development

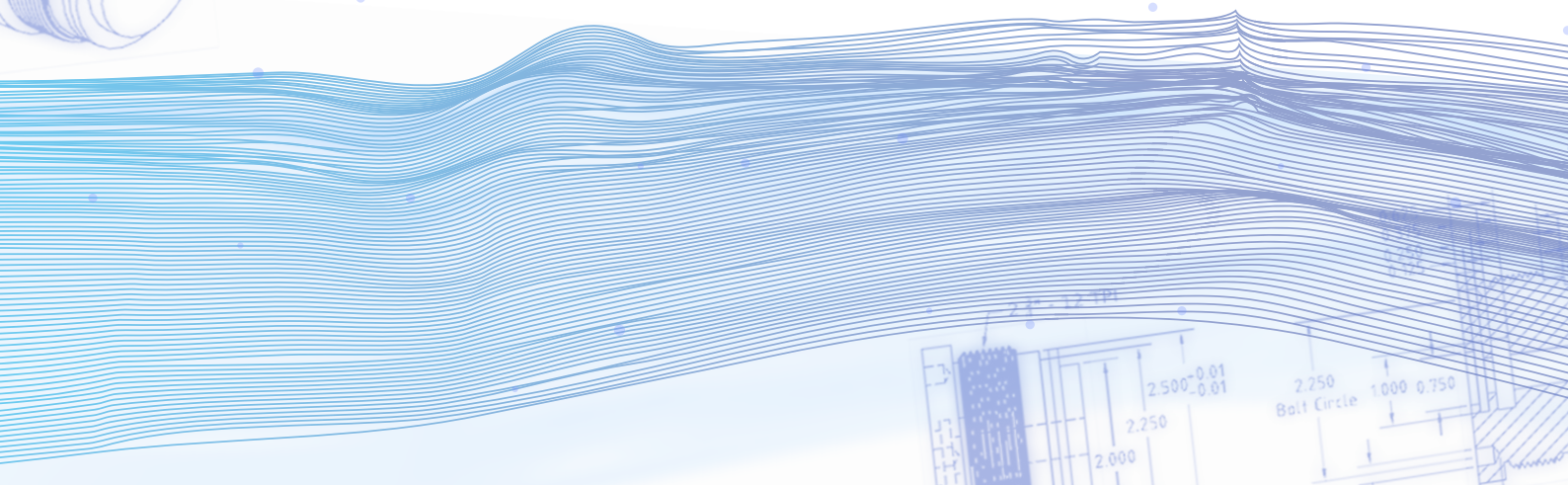
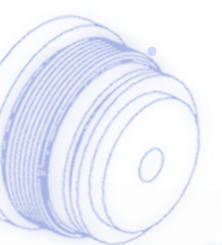
4 Reasons Why Software-as-a-Service (SaaS) Product Design Tools Should Be Part of Your Company's Digital Transformation Strategy



Onshape

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What's Your Digital Transformation Strategy?

Here's a prediction for the new decade: the "cloud" will be the dominant force in every company's digital transformation strategy, including all aspects of data storage, data processing and software delivery. You don't have to be a soothsayer to know that this prediction will come true – it has already happened in many companies and many industries over the past few years.

It's hard to believe that the phrase "paperless office" was first used over 40 years ago. The original motivation may have been to save trees (and we may not be anywhere near achieving that ideal just yet), but the proliferation of computers and the sheer processing power available has increased efficiency and throughput by an order of magnitude.

Computers reduce the bottlenecks previously caused by individuals, but have little effect on the bottlenecks created between individuals, teams, and a company as a whole. You may no longer need to sift through dozens of filing cabinets to find that one piece of paper that has the information you need, but desktop computers, laptop computers and departmental servers have become breeding grounds for proprietary, disconnected data silos.

The problem has just shifted from ink on paper to data in files, scattered across hard drives everywhere.

WHAT'S YOUR DIGITAL TRANSFORMATION STRATEGY?

Finding data when you don't know where to look may be frustrating and time consuming, but that's just the tip of the iceberg. Communication and collaboration are severely hampered while duplication of effort and conflicts are common. Data and conversations are communicated via email, with information limited to those in-the-know and locked in yet more data silos.

This "over the wall" approach to managing projects and data is not conducive to effective product development. However, these methods have been employed in industry for years, leading to unnecessary errors, rework, security issues and spiraling costs – all which can be avoided if all company data is stored in a central repository, readily accessible for those who need it.

Digital transformation is only complete once all company data silos are connected and compatible, providing new types of innovation and creativity instead of simply enhancing and supporting traditional methods.

This is what the promise of the cloud offers. But let's take a step back for a moment: What exactly is the "cloud" anyway?

The term "cloud" is generally used to describe data centers that are hosted and managed by third-party providers via the internet, including "infinite" resources in terms of compute power and storage, requiring no setup and no IT knowledge by the end user. The benefit to companies from a financial, resource and infrastructure standpoint are considerable and these will be discussed in detail later.

From a software and services delivery standpoint, the cloud has yet to permeate every department in every organization. Sales, marketing, accounting, HR and many others have all taken the plunge – their highly-sensitive data and mission-critical software applications are easily accessible via a web browser and the cloud using the Software-as-a-Service (SaaS) delivery model.

WHAT'S YOUR DIGITAL TRANSFORMATION STRATEGY?

It's not that design teams don't want to embrace new technologies to make their lives easier. Rather, new technologies and new ways to streamline the product development processes have not been made available by their current software vendors. Basically, you don't know what you don't know.

It's important to note that product development is more than just product design.

Best-in-class companies focus on teams, rather than individuals, and the end-to-end product development process, not just design tools. Collaboration is greatly enhanced by implementing software tools that eliminate the old processes as much as possible. Getting rid of email, file servers and FTP sites is a great start. Services such as Slack for communication, Google Docs for document sharing and Dropbox for file sharing, significantly reduce miscommunication, keep data organized and keep everybody in the loop.

Product design data can also benefit from the same "team first" philosophy.

Halfway through the last decade, new emerging technologies have enabled cloud software and services to become mainstream for product design. Those software vendors who had not foreseen the market shift and the desire from their customers to utilize these new technologies, held out and continued to develop their desktop solutions, spreading fear, uncertainty and doubt about the cloud.

Their objection and one of the biggest urban myths surrounding the use of the cloud to create proprietary new product designs is the perceived loss of control over intellectual property (IP). If data is transmitted outside of your firewall to an unknown destination, then surely it's at risk, right?

Ironically, those same software vendors have witnessed the error of their ways firsthand and are now clamoring to jump aboard the cloud bandwagon. Strange how these data security issues have all but disappeared now that everyone offers "cloud" solutions.

Let's push aside that scaremongering for now and concentrate on the benefits of SaaS platforms.

Why Software-as-a-Service (SaaS)?

All cloud-native applications offer one common benefit – a single source of truth. This cliché refers to how data is stored, processed and accessed by all those who need it. If there is only one version of the data, then everybody sees the same data at the same time wherever they are. This provides untold benefits for communication and collaboration while minimizing errors and rework. This is all made possible by the underlying architecture of a typical SaaS application.

On the other hand, cloud-enabled applications (not to be confused with cloud-native) are desktop applications with a cloud storage capability. This implies that a copy of the data is stored and processed locally and can therefore become out of sync with the master copy in the cloud. Different people may now possibly see different, modified versions of the same data. Other than providing unlimited storage and automated backups, this delivery method defeats the object of the cloud entirely and should be avoided.

In product development, out-of-date or out-of-sync data can be catastrophic.

If you've already started down the path of digital transformation or you're early in the planning stages, knowing the difference between cloud-native and cloud-enabled is fundamental to the future of your business.

One way to encourage teams to work together is to provide the tools that make it easy to do so. If the barriers to finding information, sharing data and collaborating on the same projects are removed, then product development becomes more natural.

With cloud-native applications, collaboration is no longer forced and teams start to work together as one. With more transparency across teams and across projects, there is less stress, less resistance to new ideas, and fewer mistakes.

WHY SOFTWARE AS A SERVICE? (SaaS)

This is especially true if teams are not physically co-located. When project teams are all in the same office, walking over to a colleague's desk for a quick chat can often spark new ideas and solve design problems. Of course, this is not possible when design teams are spread across multiple locations, continents and time zones. Though email remains a popular communication medium, it is disconnected from design data and project teams. Email conversations are often easily missed or buried, leading to delays and potential rework.

A cloud-native application can be accessed via a web browser on any computer or via a dedicated mobile app on a smartphone or tablet. This ensures that data can be accessed from anywhere where there's an internet connection and on any available device. Not only does this make data easier to access in a normal workplace setting, but also when a user is at a customer site, in a taxi or at the airport. Sales can show customers the latest updates to their product lines, managers can sign-off on major design decisions, and field engineers can make changes on-the-fly as and when required. All data is live, so everybody gets notified of any changes immediately.

A single source of truth, no matter what the application, enables concurrent modification of data with changes updating instantly for every contributor. For example, writing a product specification using Google Docs enables all project stakeholders to review, comment and add further details in real time. Nobody ever works on out-of-date information and everybody is encouraged to contribute.

The cloud also encourages teams to make changes to product design data early and often, especially during the earliest stages of development where the cost of design changes is minimal. This results in shorter and less costly development cycles and better overall product quality.

The age-old concept of concurrent engineering, where everybody works together in parallel, is intended to identify and solve issues early on. It yields more creative solutions because more people have the opportunity to identify, review, and solve a given problem together. Teams often have diverse skill sets and their combined knowledge can be used to great effect if everybody can provide input throughout the product development lifecycle. With more team members involved in every aspect of the design, a certain level of redundancy and reduced risk is built-in for when team members are out sick or on vacation.

WHY SOFTWARE AS A SERVICE? (SaaS)

Teams connected via cloud-native design applications are intrinsically linked – everybody sees what everybody else is working on, in real time, so everybody can provide input and guidance for a true concurrent engineering experience. This also includes working with suppliers, contractors and manufacturing partners who are external to your organization. By including partners with domain expertise early in the design, problems that would normally be encountered later during manufacturing can be identified upfront, helping to keep costs to a minimum.

This is all achieved by the single source of truth that is a cloud-native, SaaS database in a central server location. This data is not stored in individual files and never leaves the server, making sharing data easy. The sender does not have to prepare anything, attach anything or worry about anything. The receiver need not be concerned about issues such as having the correct version of the same software to open it. To share data, all a user needs is the recipient's email address, who is then notified that a document has been shared with them. Click on the link, the data is displayed in a browser window, and all users are instantly collaborating in real time without skipping a beat.

The background image shows a white industrial robotic arm in a factory setting, performing a welding task. Bright orange sparks are visible at the point of contact between the welding torch and the metal workpiece. Overlaid on this image are various technical drawings and dimension lines in white. These include a large circular flange with multiple bolt holes in the upper right, a cross-sectional view of a mechanical part in the lower center, and various dimension lines with numerical values such as 1.173, 0.16, 0.87, 0.59, 0.80, and several diameters (φ) like φ2.256, φ0.845, φ0.396, φ1.718, and φ0.217. The overall color scheme is a cool blue, which serves as a backdrop for the white text and technical lines.

4 Benefits of a SaaS Infrastructure

Onshape

In addition to all the benefits enjoyed by product design teams, project managers and engineering executives, SaaS platforms are especially attractive to the CIO and their IT teams.

Many companies are being driven by their CIO's cloud-first strategy to streamline business operations, improve employee productivity, drive cost savings and keep the company competitive. Moving as many business processes to the cloud is saving companies, and specifically IT teams, significant amounts of time and money.

SaaS tools offer:

1

Scalability

As companies grow, the need for more employees, contractors, and the software solutions required to support them grows too. SaaS, by the very nature of not having to install software, enables rapid deployment with instant provisioning and de-provisioning of users from a central administrative console. New users can be up and running within minutes, compared to hours or days, with on-premise solutions. This enables project managers to reallocate engineering resources quickly to ensure that projects are finished on time. When a contractor's term expires or a project is completed, users can be de-provisioned in seconds and their access to company data revoked instantly.

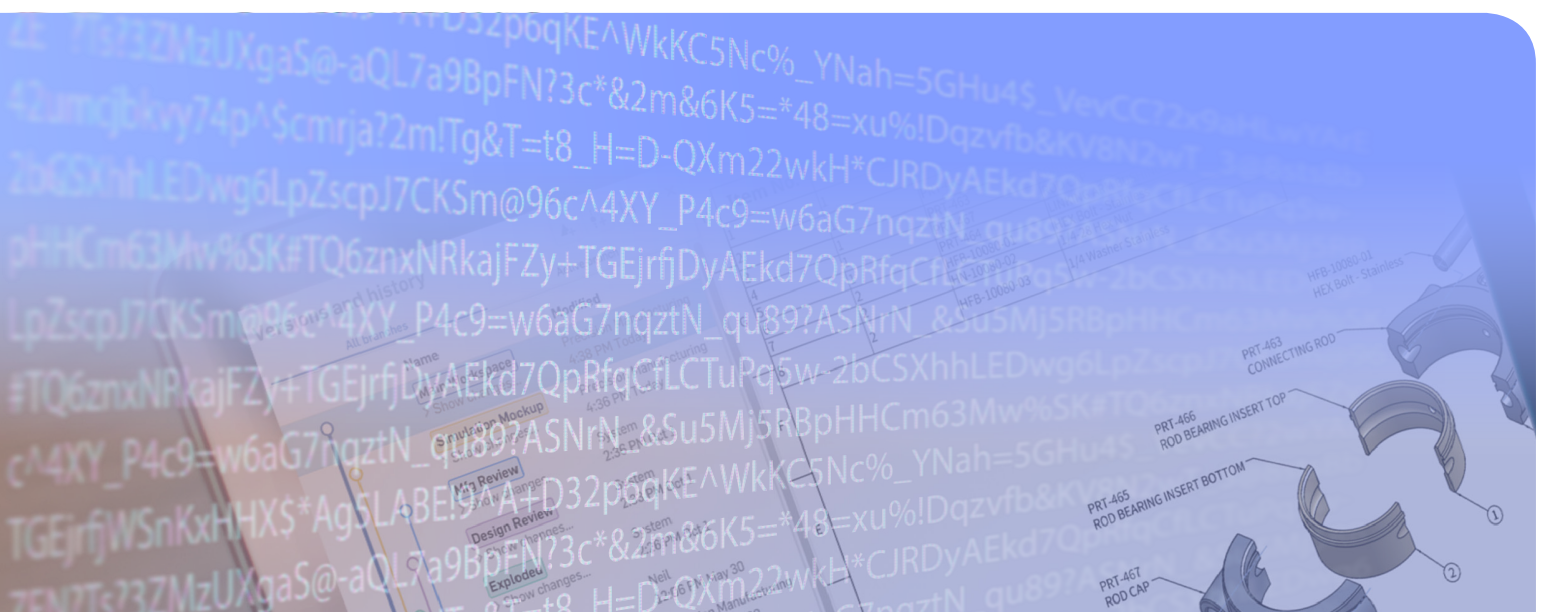
The elastic nature of the cloud enables SaaS providers to allocate more compute and storage resources based on global demand. As workloads increase and more users are added, more resources can be added on-the-fly. This is all taken care of automatically. With "unlimited" storage and compute power, IT teams don't need to worry about managing and maintaining their own servers, networks and storage.

2

Security

Sending sensitive data over email or by any other medium is a potential security risk. This includes employees' laptops or any remote computer that needs to download data in order to work with it. Once data has been transmitted outside of the company firewall, there is no way to know where it is or who has it. An unknown number of uncontrolled copies can sit on servers and computer hard drives in an unknown number of locations. This may be acceptable if those locations are known to be within a trusted network, but that cannot be guaranteed. Uncontrolled copies can also lead to incorrect versions of data being used to make business decisions or to manufacture components, amounting to millions of dollars in scrap and rework every year.

SaaS delivers the software application and associated data together from the cloud. No data is transmitted or downloaded locally to any user's computer. All data processing operations are carried out remotely and the results are displayed on the end user's device. Even when sharing design data with others, there is no actual transmission of data. This keeps sensitive IP secure at all times. SaaS applications are secured by strong cryptographic cipher suites, encrypted storage, single sign-on (SSO), two-factor authentication (2FA) and other security measures that go way beyond what most companies are able to implement (or afford) [on their own](#).



3

Profitability

The SaaS delivery model eliminates many IT overheads. Equipment such as workstations, dedicated servers (as well as the installation and maintenance of server rooms with adequate cooling, fire protection and physical security), network infrastructure, firewalls, VPN, storage, backups and disaster recovery plans are no longer needed – and utility costs are greatly reduced. Software maintenance such as downloads, installs, upgrades, service packs, license codes and all the troubleshooting and downtime that goes along with those activities are a thing of the past.


SaaS licensing is based on an annual subscription model, shifting the cost from high capital expenditure to [low operating expenditure](#), lowering the total cost of ownership and reducing financial risk. This frees up IT capital for other investments and improves strategic planning and visibility.



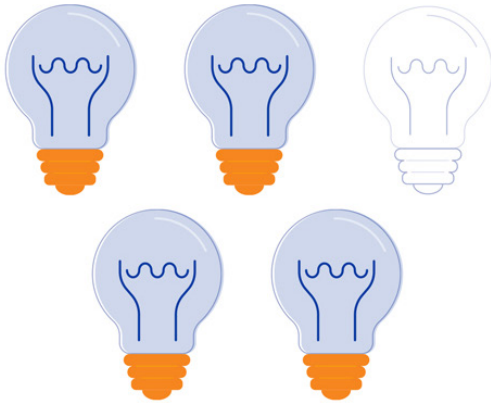
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Reliability

Cloud reliability is often raised as a concern, as an outage could mean that important software and services are unavailable and a business may not be able to operate while that key service is offline. Unlike desktop software that may crash and lose or corrupt data, SaaS platforms are built to withstand system failures. Data is saved automatically and replicated across multiple geographic regions, and redundant servers are queued ready to take over should a failure occur. Often a user will not even notice that there was a problem as these failover systems automatically take over in a matter of milliseconds.



A true SaaS platform will never have any planned outages or downtime, and software updates are applied automatically every few weeks requiring no IT intervention.



4 out of **5** companies
that rate themselves as “excellent”
for innovation have embraced
cloud-based productivity tools.

Many companies already use cloud-based software for business-critical areas such as accounting, sales, cybersecurity and human resources. Product development teams are now finding the same efficiency and productivity benefits when managing their designs in the cloud as well.

Digital Transformation in Product Development

A digital transformation strategy often calls for company financials, customer data, employee records, and other sensitive data to be stored in the cloud. Arguably, that data is even more sensitive than product design data, yet there is still a reluctance from engineering to trust the cloud with their IP.

The users of these other SaaS tools don't give it a second thought. The data is there when they need it, without having to expend too much energy trying to find it or work with it. Compare that to engineering, where it is estimated that an engineer can spend up to 30% of their time searching for data. Would those other areas of the business put up with those levels of productivity? Of course not. It would be impossible to get anything done. So why should engineering tolerate such inefficiency?

For established companies moving a business system from on-premise to the cloud, the process can be fairly simple or more involved. For HR systems where employee data fields such as name, address and social security number are fairly standard, the transition is not so difficult. For product development, where data, data formats and process workflows are unique for each company, there is no off-the-shelf solution to migrate legacy data.

Therefore, it is recommended that when implementing a new product design platform, all new projects should be started on the new platform and existing data still be kept in the old systems. Data can then be migrated on an as-needed basis when existing parts need to be reused. When old designs need to be modified or maintained, it is prudent to keep at least one license of the old software.

Existing product development processes and data management workflows are often developed around the capabilities of a legacy system. Since all systems are different, trying to replicate the same processes as before can lead to frustration and disappointment when implementing a new solution. Just because a specific process has always been used, doesn't mean that it should continue to be used with a new tool. Many product development platforms have workflows that will address most of the design processes you currently employ, and some will do things differently. It's best to regard this as an opportunity to revisit your business processes if a particular workflow makes more sense.

Startups have no such problems. There are no legacy systems to weigh them down, so it makes sense to go for the cloud right from the get-go. More often than not, startup teams are dispersed geographically and have limited budgets, so the cloud makes perfect practical and financial sense.

How Long Has Your Software Vendor Been Talking About the Cloud?

Trying to shoehorn existing desktop software into the cloud just doesn't work. Having thousands of customers on legacy applications doesn't help either, so you can understand how and why this transition to the cloud has been difficult for traditional software vendors.

Designing cloud-native applications doesn't happen overnight. Getting the underlying architecture just right is the result of years of extensive research and development. Many software vendors either lack the resources to fully commit to a cloud-native development program or have simply not recognized the requirement for a new technology foundation to support their evolving customers' needs.

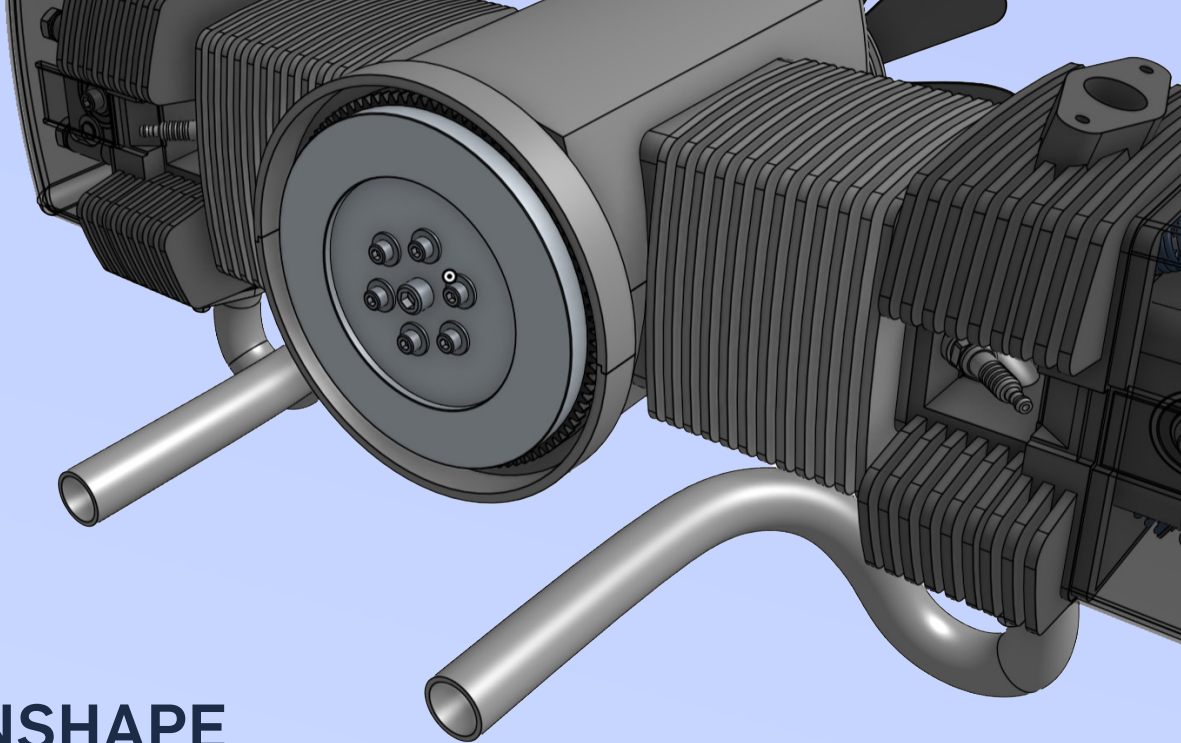
These vendors are now playing catch-up, so beware of [cloud-washing](#).

All software was originally designed to run on-premise, that is, on a computer or server within a company's facilities or at least accessible via a dedicated network. Moving an on-premise solution to the cloud is just moving the problem from one place to another. So unless your software vendor started down the cloud-native path at least a few years ago, it is likely that their technology will be lagging behind.

Evidence of cloud-washing (and cloud-enabled software) is having to install an application locally on your computer. These applications save data to the cloud via some automated synchronization method, with files in certain folders being constantly uploaded, downloaded and synchronized with everybody else. While this makes sending data to others easier, it does not offer the extra security, simplicity and flexibility of a true SaaS architecture, where the data structure is not visible to anybody other than the software that delivers it via the web.

There is also the possibility that data files could become out of sync, corrupt or overwritten. As one user is working on their local copy of the file, somebody else could be making changes to another copy of the file. When both files are synchronized back to the cloud, conflicts will occur (or the last sync wins and all previous efforts are overwritten). Application crashes during a local save could also upload the corrupted file to the cloud and overwrite the last good save. These issues are the same ones experienced with traditional on-premise, file-based software used in conjunction with a commercial file-sharing application like Dropbox.

If your current software vendor introduces a new cloud product, does it address your current issues? Is it compatible with your current on-premise product? If the answer to either of those questions is "no" or unclear, consider exploring an alternative solution such as Onshape.



ABOUT ONSHAPE

Built from scratch, Onshape is the only cloud-native product development platform using the latest cloud, web, and mobile technologies to complement the way today's professional design teams, engineers and manufacturers really work.

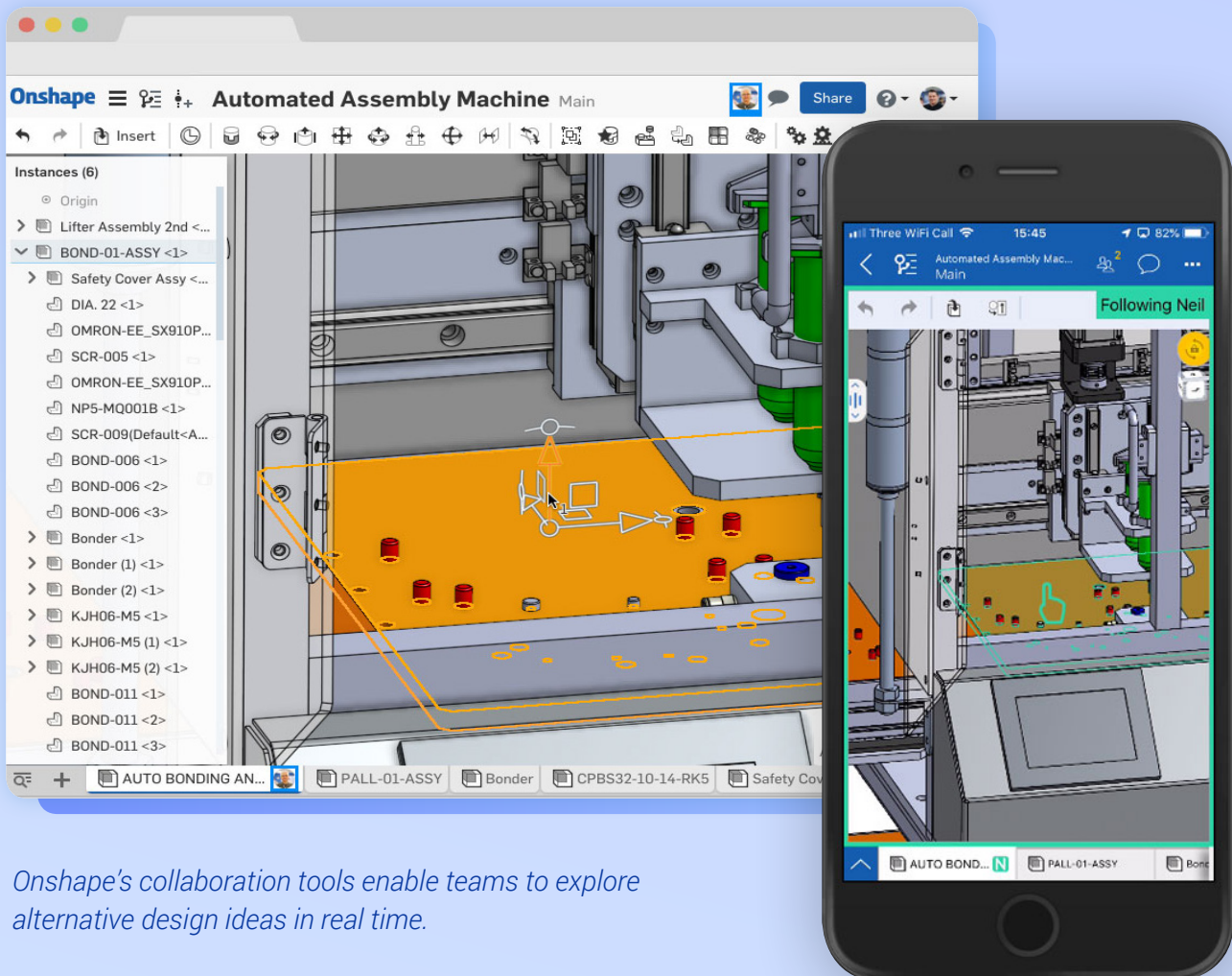
Onshape's founders each had decades of firsthand experience working with engineering teams from many different industries. In conversations with those companies about how their design tools could be improved, new features and new ways to create geometry were rarely at the top of their wish lists. Few complained about the way they modeled parts and assemblies, or how they created production drawings. What frustrated users the most? CAD administration, CAD deployment, and CAD files.

In fact, the number one request for improving the product development process was to find better ways to share data and collaborate effectively with others.

With advancements in cloud, web and mobile technology, Onshape's opportunity to address those frustrations presented itself. Engineering teams were not looking for yet another CAD system – there are plenty of very capable systems that have been around for 25 years or more – they were looking for ways to reduce the administrative burden of desktop design tools. They were seeking to reduce their IT overhead and eliminate the everyday hassles associated with managing and sharing CAD files with others.

From the very beginning, Onshape was architected as a cloud-native application by experts in distributed non-relational databases, big data applications, and multi-tenant architectures. As a true SaaS platform, where the software and the data are served from a central location, issues such as security, lost references, crashes and corrupted data are things of the past.

Onshape is an all-in-one solution that addresses the needs of design teams and engineering companies of all sizes, bringing together design, data management, collaboration tools and real-time analytics. No other product development platform has this level of capability with this level of flexibility.



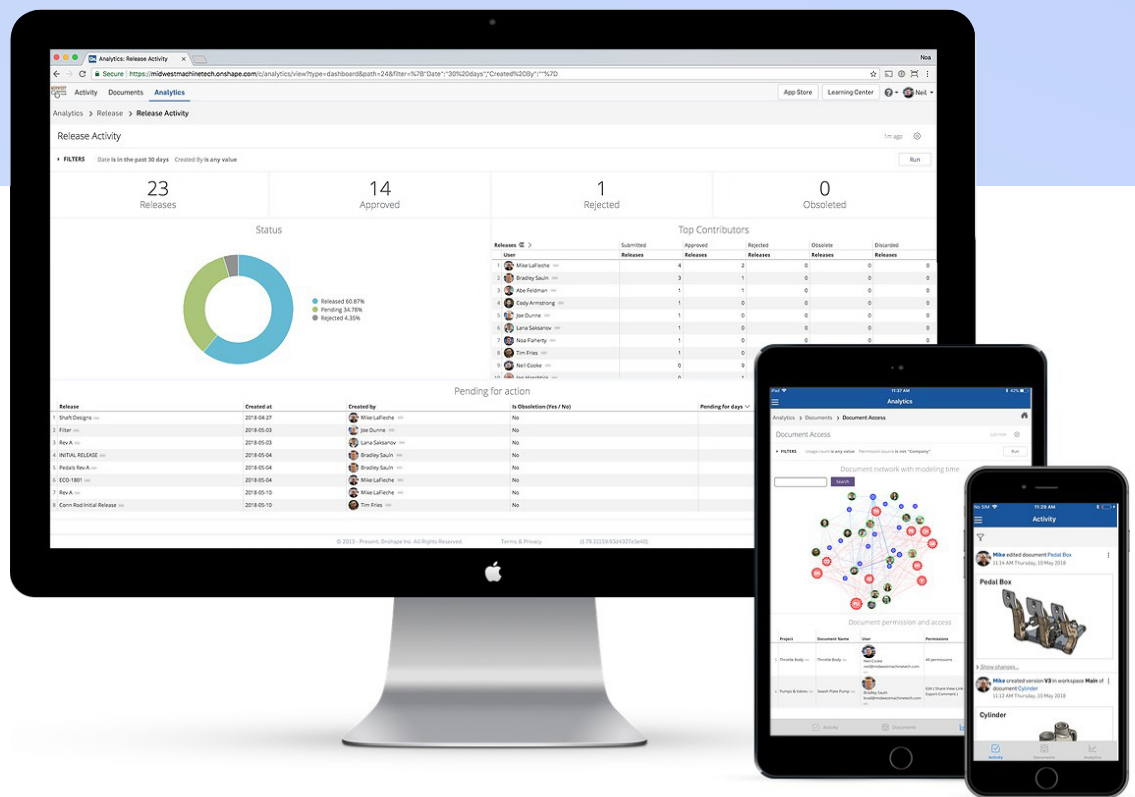
Onshape's collaboration tools enable teams to explore alternative design ideas in real time.

Onshape enables teams to co-design complex parts and assemblies in parallel without having to be physically in the same location. As design changes are made to a project, every action is recorded in the database and instantly updated wherever it's used. There's no "Save" button, no check-ins / check-outs, no accidental overwrites, and no waiting around for someone else to finish their work before you can start yours. Unlimited undo/redo and a complete audit trail of who did what and when simplifies conflict resolution.

Built-in release management and approval workflows, customizable to address most companies' business processes, enable all project-related design data to be independently revision controlled following a predefined release schema. Multi-tier and multi-approver workflows provide notifications to designated individuals who are able to review and sign-off designs from any computer or mobile device without having to install any software.

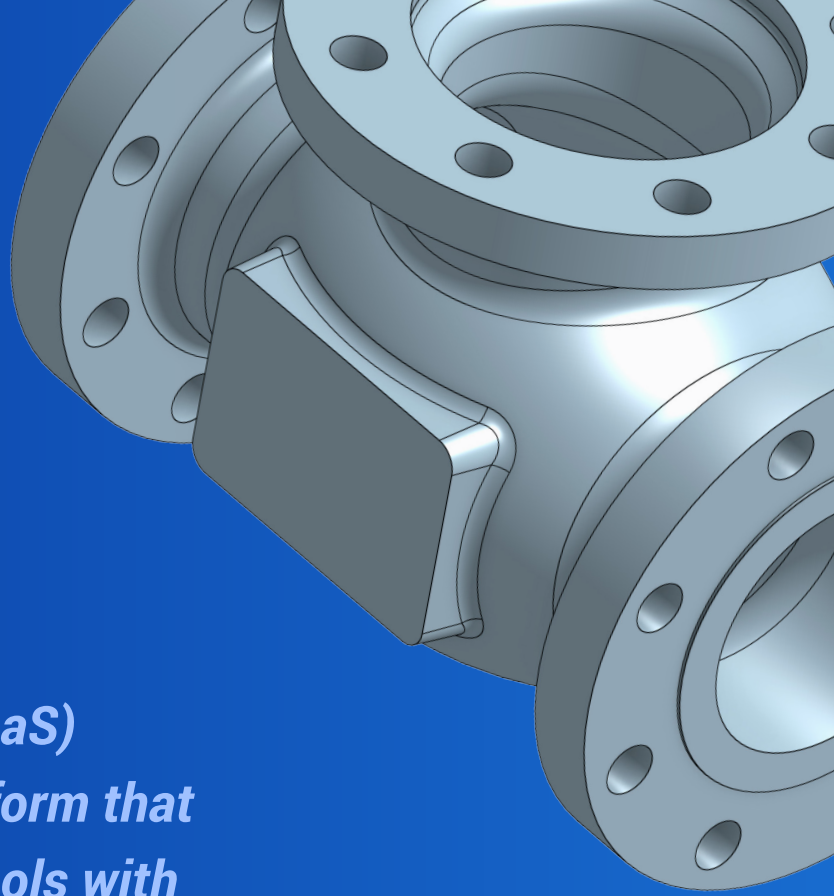
There's no need to independently manage multiple software components, everything is included.

Onshape Enterprise enables companies to make informed, data-driven business decisions from anywhere on any device.



Onshape Enterprise records project details, duration, release status, team activity, supplier access, and more. In short, any activity that touches your data is logged and presented in easy-to-read graphs, tables and charts. This gives you complete visibility into who did what and when, how engineering efforts are trending over time, and who is contributing in what ways, enabling you to allocate more resources to get a project finished on time if needed.

Onshape is a [PTC](#) Business.



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!

GET STARTED