SPK
and Associates

The Definitive Guide to Accelerating Product Delivery with
vCAD

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Virtual CAD

vCAD

was designed and created by SPK and Associates in response to the pandemic. Our customers had a higher remote working demand and could no longer access their on-premises solutions. To continue product development and ensure many in-demand industries, including medical device manufacturers, could deliver consumer critical products we created vCAD. A cloud-based solution for their engineers to continue design, research and development. We developed a platform that empowers and accelerates small and medium businesses. A high-end system that facilitates engineer productivity.

After using and testing it with our own customers, we saw a huge opportunity for this solution. And we continued to develop and deploy updates tailoring them to the end customers' needs. At the start of 2022, we released vCAD to the wider market as a solution for other businesses globally that also needed a more agile solution to match the economic landscape.

Since releasing vCAD to our customers and the wider market, we have continued to discover new use cases that enable accelerated product development. In this white paper, you will discover the key use cases to date.

HOW DOES vCAD WORK?

Firstly, vCAD is a virtual engineering design development platform. It differs from an online CAD program because whilst you can use it as a standalone program, you can also use it to replicate your existing CAD solution. This enables you to work remotely while integrating with existing IT architecture.

vCAD provides the ability to create virtual workstations in the cloud. These are powered by AWS.

It works by replicating re-configured workstations from a template allowing for easy and fast deployment. This is particularly helpful for small and medium businesses that need to flex and scale both tools and resources.

vCAD also enables clients to self-serve by deploying their own environments and resetting test environments without the need for IT engagement. We'll cover these topics in more detail below.

vCAD ISN'T JUST AN ONLINE CAD PROGRAM

In a recent report by Siemens, they highlighted how In all areas of business there is a growing need to lower costs and increase collaboration. SMBs who are willing to embrace a digital transformation will be able to optimize production, and foster collaboration and innovation, all while protecting their margins.

vCAD helps solve each of these key points in one single platform.

Over the past year, we've discovered more use cases for vCAD. Now, we're uncovering the realm of benefits small and medium businesses can reap.

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MORALE AND PRODUCTIVITY

Balancing having motivated enough, productive people with training new staff to be productive can be a balancing act for any small and medium business. One of the ways to address this problem is to remove the tasks they don't want to do (while still ensuring the work gets done) and give them more tasks that motivate them. So how can vCAD address this?

When we created vCAD, we didn't just want to create an online CAD program. One of our core outputs was to create a platform that also removed unnecessary labor time. We wanted to streamline the need for IT to be involved in basic tasks such as resetting environments or tests. We understood that engineers wanted to own their tasks and that adding more people, including IT, for basic tasks adds to the overhead.

With vCAD software engineers become more empowered. They run computers in the cloud. They spin up and spin down. The engineers can do this themselves while the business also saves costs. vCAD makes work convenient in software engineering. It removes the headache and disassembles the "too hard to be bothered with" basket.

Our first use case for creating virtual CAD software was "SolidWorks users don't need to have a high-powered laptop or workstation like Nvidia. They should be able to access from wherever, whenever."

After trialing vCAD with select users, it eventually spread like wildfire. People were excited to use it. It spread through software engineering groups and mechanical engineering groups and is now becoming the preferred solution in many of our client's businesses globally.

Watch the full use case of this example here.
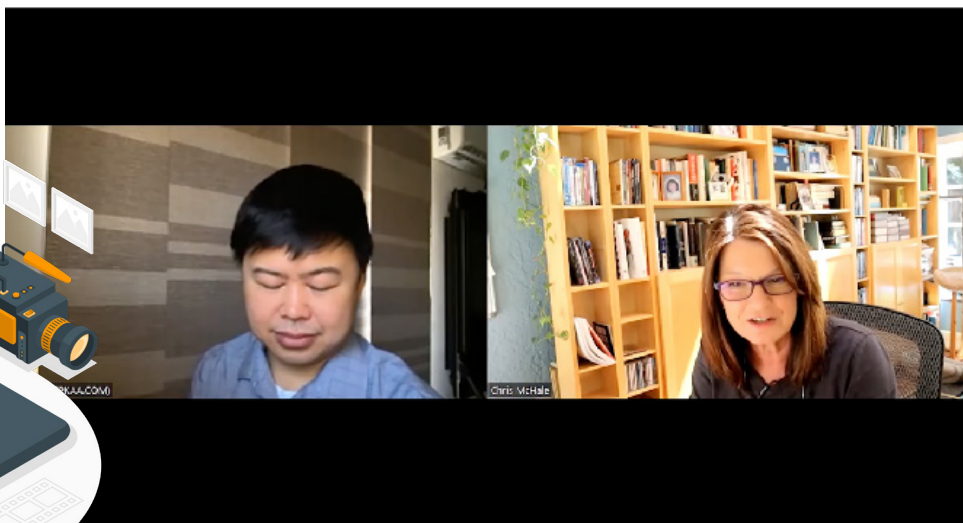
02

PRECONFIGURED ENVIRONMENTS

Software engineers need to generate new computers. They need to generate a specific environment. When onboarding an employee, you might budget the first day or two of the first week for multiple software installations. This includes attaining the correct version of the software or the correct libraries. These things account for unproductive time. And unproductive time costs a lot of money.

With vCAD, you start everything from a "template". This template is a pre-configured image of the specific environment needed. Now, you've got consistency and ease of deployment. You hit a button and get a clean machine perfectly configured. if you want two, four or eight of that machine you keep clicking the button. It always comes out the same. It also frees up valuable software developer time for more productive tasks and onboarding your new employee faster, generating even more productivity.

Redeploying resources to more meaningful and revenue-focused tasks also circles back around to point one: improving the morale of your workforce. Ask yourself whether you would rather have your resource spending weeks onboarding staff. Or would you both rather have them write code? This is just one example of how vCAD can better support software engineering.

vCAD provides clean, quick onboarding that's scalable.

IMPROVE YOUR SECURITY WITH VCAD

Mechanical engineers relying on contract manufacturers may be at risk of IP challenges. Particularly, within other countries or far away. There are plenty of stories and lawsuits about IP theft from contractors and more who have misused on-prem and online CAD software.

With vCAD Instead of giving them access to your systems from their computer, you:

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Provide access via the cloud.

Can control and limit access.

Limit their ability to upload or download from other websites.

Immediately cut access without asking them to send back a laptop or trusting

Immediately remove the vCAD machine and can see exactly what's on it. They don't have access anymore. It's a big deal.

Software engineers can also benefit from improved security too. For example; protecting IPF from a security standpoint. Because the computer comes from a template, you can:

Configure security and firewalls.

Configure it correctly to be secure.

Create replica environments from a template that is secure from hackers, and from incoming attacks.

Benefit from block network access that is also isolated.

We generally take these VPNs, put them in the cloud or isolate them from our internal networks. Alternatively, we work our VPNs to get into our internal networks. Now, this way if it does become compromised, it becomes limited. This is because these are assuming that IP is lost through external attacks.

ACCESS AND TEST IN MULTIPLE OPERATING SYSTEMS

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vCAD is available with any operating system. It also means you can work across and test multiple operating systems from the same machine. One of the many reasons it's not just another online CAD program.

For example, software developers running Mac OS need a way to test an application on Windows and Linux. With vCAD, they have the ability to click a button and access a Windows pre-configured, ready-to-go machine. Input binary with no setting up updates, no drivers, no nothing. You can run your Windows apps inside of your mac OS.

There's also an evolution happening within artificial intelligence and machine learning data science. There are big data sets that need data translation and migration. Then developers have to wait hours for it to process. For data scientists who are training a deep learning model vCAD offers two key benefits:

01   You need to run CUDA because that's going to go a thousand times faster.

02   If you run it on a vCAD VM, your laptop can also now turn off.

MECHANICAL AND CFD SIMULATION

Cloud solutions have become less expensive and more easily accessible in recent years. So, people are leaning more towards the cloud rather than investing in new infrastructure. However, cloud adoption has also highlighted new challenges Including configurations.

Configuring different systems that easily talk to each other can become complex. This becomes an extra headache for engineers who may already need to meet deadlines or run mechanical simulations simultaneously. They may also already be juggling between working on a laptop and a desktop to run these simulations on time. Or they may not even have the computational resources to run more cases. Another example is when an engineer needs to deliver something instead of waiting for a simulation for three days to run and you want to run it in seven hours or five hours.

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With vCAD, engineers can fire up a computer platform and run multiple simulations simultaneously from the same machine. Then close it down when it's not in use. vCAD eliminates the need to buy additional infrastructure to run multiple simulations in less time.

When it comes to CFD simulation, one of our clients, who is a global leader in medical device manufacturing, highlighted the benefit of vCAD looking like your usual computer. It gives you the same experience as if you were opening up Ansys and running it on your local machine. This is a big advantage for engineers who need:

✅ **The residuals.**   ✅ **The flow field.**   ✅ **The skill functions and so on.**

With some of the other existing cloud applications, you can only submit a batch file. This means you're not able to see or visualize it as it solves the equations. With vCAD you can both run the test and visualize as it solves the equations.

You can watch the full video of this use case here.

vCAD Use Cases
Part 3 For Simulation

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INTEGRATIONS

vCAD is versatile too. It opens up a breadth of integrations with a variety of platforms and easily integrates with mechanical engineers' tools.

An engineer's time is one of the most valuable resources within the manufacturing industry. Equally, they don't want to wait 25 hours for a simulation to run. They want to design and they want the right tools for the job. And they want to access their suite of tools easily through integrations.

vCAD	Non-cloud solutions (i.e., Ansys)
Provide the ability to run multiple simulations simultaneously from one machine. Engineers can spin up multiple computers, and get back to the designing task at hand. Equally, mechanical designers can also view the simulations. Enables multiple machines to spin up without the need for additional computational core, RAV and GPU.	Uses optimization tools that are available inside the software. Runs multiple simulations back to back without you visualizing it. Requires a computational core and RAV and GPU.
Can integrate with multiple products and different CAD applications at the same time such as PTC Creo and SolidWorks. Any design work is done within vCAD and the data is transferred	Can integrate with a variety of products and different CAD applications such as Creo and SolidWorks.

SET UP AND TESTING

One of our big medical company clients was completing a CSV (computer system validation). They had to run a series of tests on a new version of MCAD software Creo. They were upgrading to the latest and greatest. Then they ran a series of tests which failed. vCAD allowed them to identify:

When they were running some tests, it broke the computer. They discovered some tests couldn't be run twice because the first test required deletion. But the second time they ran the test, they could no longer delete it.

By using vCAD, we allow people to reset their test bed by themselves without interruption or the need to involve IT. It only takes two or three minutes to reset. This removes additional unnecessary labor and test-delay time saving revenue and increasing productivity in teams. Other online CAD programs lack this capability.

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EASE OF FLEXIBILITY

With vCAD when you want more tools you get more tools. And when you need more resources fast, you can quickly enable them.

With vCAD you can quickly dial up and dial down the resources and tools needed. For example, if you need testing done, you simply send an email link to the preconfigured template ready for your testers to download and start testing. If you need more testers, it's as simple as sending an email link. And when you no longer need their resource, you simply remove the access via vCAD. Now because of vCAD, what they did was they started with one person and set up the image. When you no longer need the tools or resources, you simply delete them and only pay for what has been used.

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TRAINING

THE BEST CAD SOFTWARE NEEDS NO TRAINING

We specifically designed vCAD to be both comprehensive and easy to use. With our customer's input, we designed a solution that is so easy to use it doesn't require training on the actual platform. This removes the experienced engineer's headache of just wanting things to work so they can work, and the new trainee's nerves of having to learn another system.

KEEPING TRAINING ON TRACK

However you may need to train your staff on another system, i.e., SolidWorks. Now, you need 20 workstations with GPUs for two hours, as an example. But that additional infrastructure for minimal time can be a hard request for small and medium businesses. So you decide to save some money and say "you can bring your own laptop". Then when your trainees arrive armed with their own laptops ready to learn, you discover everyone's laptop is configured a little bit differently. Somebody is bound to get left behind. Unproductive and money wasted regardless.

With vCAD those problems disappear. Now you can access multiple workstations without having to request additional infrastructure. And they are all configured the exact same. Then when the training is over you simply reset the state and keep it closed (not charging you money!) until the next training intake. This also means you can now effectively deliver remote training without dispatching hardware. Or everybody working on different versions leading to a few people being left behind.

ENCAPSULATED TRAINING ENVIRONMENTS TO REDUCE RISK

vCAD provides a more secure environment for your business. How? Well, one of the issues we always have is that we want people to practice, doing ECO's. However, you don't really want 20 training ECO's in your shared system. There are multiple risks here including...

- Duplicate file names;
- File deletion;
- Training getting derailed

With vCAD, we encapsulate the entire training system. That way everyone is logging into their own system identically. The training always goes smoothly because it's always from the same state. Then at the end of the training, that state gets reset to its original state.

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COST OPTIMIZATION

If we haven't already convinced you that vCAD is going to revolutionize your business, we're sure this section will help.

MANAGING COSTS

We understood that cloud costs were a big consideration for our clients. That's why we introduced scheduling into our vCAD platform. You can set up 'timeouts' if you don't touch the machine. Or, say you're not working with machines, people went home for the day after clocking out but forgot to close off their laptops. vCAD is created to automatically check for this absent activity and automatically shuts off unused machines after a certain period to prevent unutilized spending. Additionally, you can run cost reports that show things like: seven people finished validation testing for a total of $185.

REDUCING LICENSING FEES

A vCAD workstation can be created, and a standalone engineering platform (i.e., SolidWorks, Matlab) license loaded and configured on it. And then... the magic happens.

This one standalone vCAD station can now be shared amongst various users and stretches your licensing fees further. The users can use their own logins, but they can share the same license, legally and effectively from one engineering workstation. Of course, they can only use the station one at a time, but this typically isn't an issue.

vCAD also helps with Creo, Cadence, Mentor Graphics, and other engineering software.
And it's not just these engineering applications that vCAD helps. This use case works with many other applications, where a user needs only "light" use. Sometimes the "high cost" isn't necessarily the license, but the cost is loading the application, configuring it for the company environment, and then keeping it updated. Doing this on a template, and allowing light users to create a virtual station and then use the applica-
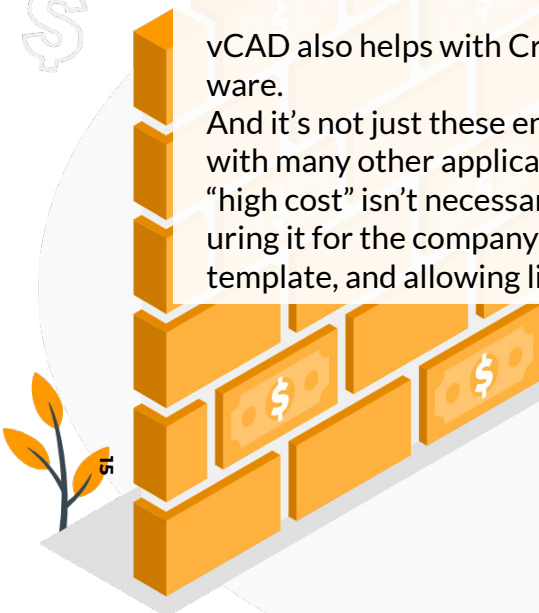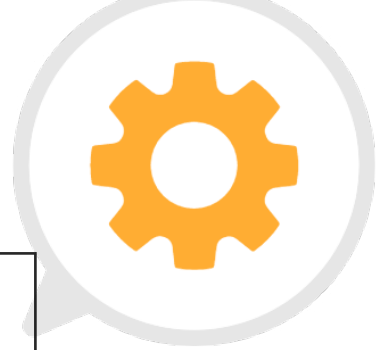
REMOTE ACCESS AND MULTI-DEVICE

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For us, developing the best online CAD software also meant staying ahead of the times. With vCAD you can access everything on a desktop, laptop, mobile phone and iPad. It even works on a phone connected to a monitor creating the ultimate agile accessibility experience whether you have an Android or iPhone.

What about the fact your mobile phone isn't a high-powered machine you ask?

You're right. The hardware or the compute resources that you need to run some mechanical CAD tools can be intensive. But because the horsepower of vCAD is run through a remote server and powered by AWS, you no longer need that same high-powered, high-spec machine. Now you can both access and run applications such as SolidWorks or Creo with around the same efficiency as in the office.

Another benefit is, if you're working from home or on vacation, you've always got that same consistent machine with the same performance.

Another benefit of vCAD living in the cloud is that you can also pass it around and collaborate easily. You might want to show someone something and can say "here's my laptop, right-click this button. Now you've got it please do something on it, like fix XYZ." Or, please look at this and then give it back to me." With all the work from home, it's nice to have another way to synchronously share a screen.

ACCESSING COMPUTATIONAL RESOURCES

When we originally deployed vCAD, a lot of the benefit was granting or having access to GPU resources within the cloud for mechanical CAD engineers. This is also helpful in the software engineering world. It's one of the things that's unique about vCAD. It has these GPUs like NVIDIA and Tesla T4. Therefore, if you have a project that uses CUDA or KUDE, those projects translate work in an Ubuntu environment. For example, vCAD.

Many of our customers have now switched to using vCAD and are utilizing it around 8 hours per day as a replacement for their desktops already. Additionally, it is helping save time for overseas staff because it's actually speeding up their experience. The application and GPU are based elsewhere instead of on their machine. Think of it like streaming a video or a movie. All the horsepower is happening elsewhere. vCAD simply feeds you the design access.

And because vCAD is powered by AWS infrastructure, there's no need to worry about whether your RAM or CPU will get full.

Watch the full vlog that covers the benefits of accessing computational resources and the benefits of using vCAD for training here.
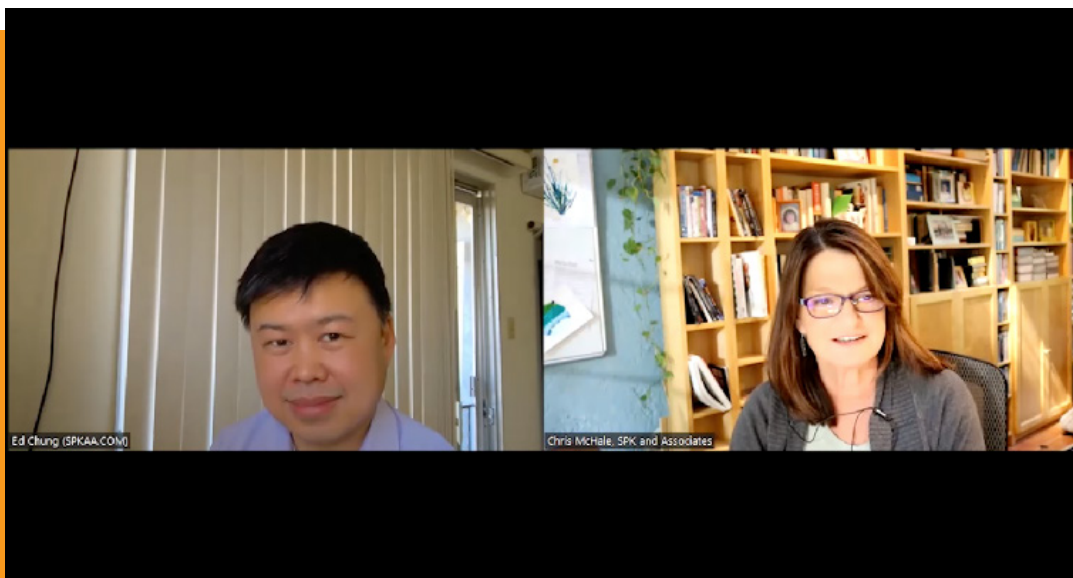
USE CASES

We've been capturing use cases discovered for vCAD in our vlog series. You can watch a few of these use cases here, or explore an overview of a few others in this section.

01

MECHANICAL ENGINEERING

Our medical device manufacturing client discovered that vCAD is exceptional for Mechanical Engineering and CFD simulation.

More businesses and employees are leaning towards cloud adoption. But with this, many new challenges arise, including the configuration of complex systems and getting them to easily talk to each other. It creates an extra headache for engineers who may already need to meet deadlines or run mechanical simulations simultaneously. Who may also already be juggling between working on a laptop and desktop to run these simulations on time. Or they may not even have the computational resources to run more cases. Additionally when an engineer needs to deliver something instead of waiting for a simulation for three days to run and you want to run it in seven hours or five hours.

The medical device engineering team discovered how virtual CAD allows engineers to fire up a computer platform and run multiple simulations simultaneously from the same machine. Then close it down when it's not in use. Thus eliminating the need to buy additional infrastructure to run multiple simulations in less time.
When it comes to CFD simulation, the team highlights the benefit of vCAD looking like your usual computer. It gives you the same experience as if you were opening up Ansys and running it on your local machine. This is a big advantage for engineers who need:

- The residuals.
- The flow field
- The skill functions and so on.

Additionally, with other existing cloud applications, you can only submit a batch file. Meaning you're not able to see or visualize it as it solves the equations. vCAD overcomes this problem, allowing engineers to both run the test and visualize as it solves the equations. An engineer's time is one of the most valuable resources within the manufacturing industry and they want the right tools for the job. They want to access their suite of tools easily through integrations and how virtual CAD enables this. You can watch Shahib discussing the use case in depth [here](#).

REDUCING MEMORY CONSUMPTION AND ACCELERATING SPEED

Our client in the aerospace industry is responsible for making window shades. Commonly, their customers will send them CAD files of the entire aircraft. Then they design the window component. However, this presented an issue with Solidworks. It created high memory consumption and slow times in opening the files.

The issue was so severe that users' existing laptops and workstations could not operate on those customer files at all; they were inadequate.

To overcome this issue, we set our client up with vCAD access By accessing the files via vCAD, our client reaped the following benefits:

Laptops and desktops no longer needed upgrades This was highly beneficial at a time when the industry was impacted by chip shortages and hardware procurement was a challenge in itself.	**They were up and running immediately.** Virtual CAD doesn't have any lead time.	**vCAD workstations with very large memory footprints could be provisioned.** Our client became productive with a GPU-enabled instance with 64GB of RAM instantly.

Additionally, the larger instance initially led to other Solidworks-related crashing issues. Because of SPK's extensive experience with Solidworks, combined with our special relationships with Solidworks VARs, as well as our systems experience, we were able to resolve the instability issues quickly and efficiently.

Through the adoption of vCAD, our client saved over $9k in capital costs from not having to procure 3 x high-end workstations. They also garnered increased productivity as they didn't have to wait for workstation procurement for the job to commence.

CONCLUSION

vCAD isn't just another online CAD program. It's a platform that empowers small and medium businesses to accelerate product development. Anywhere. Anytime. Anyhow.

For mechanical engineers and software engineers, having the ability to access powerful computational resources directly through their web browser in a few seconds opens up a realm of opportunities. vCAD is resourceful. It doesn't just save on infrastructure and licensing fees, it also reduces labor time by accessing and driving their workflow with ease.

Virtual CAD enables productivity, improved security protocols, reduced costs, happier staff and more.

By using vCAD you can save time, drive revenue and improve quality. Large enterprises no longer have a competitive edge. With platforms like vCAD, small and medium businesses can accelerate their product development and speed to market just as effectively.

You can access it from a range of devices from anywhere, train new staff, remove additional infrastructure costs and only pay for what you use. Virtual CAD is the ultimate opportunity for SMBs driving an agile approach to accelerate their business.

vCAD is changing the landscape for designers and engineers all over the world. Contact our expert team to get the templates set up for your business and revolutionize the way you work.

SPK and Associates is focused on improving Engineering with smart information technology solutions. SPK understands the systems, processes, data and applications critical to successful product development, and dedicate ourselves to helping clients build, test, and release products faster and better. For 25 years, we have helped our customers harness technology to optimize engineering and accelerate product delivery.

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