

EBOOK

# GRABCAD PRINT: THE WHY



GRABCAD

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# Introduction

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Before we officially launched GrabCAD Print, we wrote monthly “teaser” blogs that either described something that frustrated us about the current 3D printing process or alluded to a feature that would appear in the Beta release. For the sake of argument, let’s say that you didn’t read every single teaser blog over the course of five months. No problem. We’ve compiled those blogs here so you’ll have a metric ton of context before you dive in and download GrabCAD Print. Go on. Get after it.

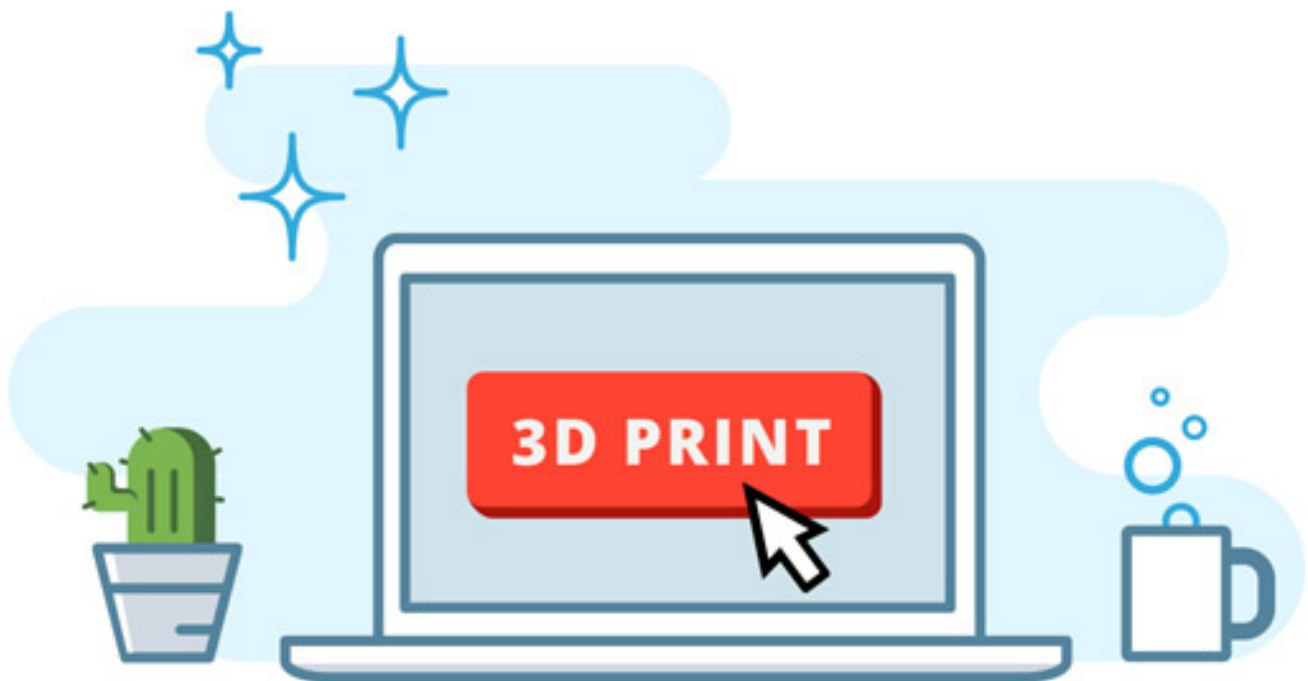
Click print

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**Brian Neville-O'Neill**

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Just click print. Three words - a lifetime goal for anyone in the modern printing business. It literally crosses dimensions, and not in a vague science fiction way. Today we're talking about 3D printing, but 15 years ago 2D printing was a giant hassle. Peter, Michael, and Samir's [enduring legacy](#) isn't for no reason. "PC load letter" was enough to drive anyone over the edge. Years from now it's not unreasonable to think that a Michael Bolton facsimile will zero in on another cultural touchstone, this time with filament jams. Less paper. More filament. One more dimension.



And while destroying hardware makes for better visual humor, it's not like 2D software at the time was much better. Remember hunting down and manually installing drivers? Do you miss that? We doubt it. There's a time and place for precise, human control in software. But most of the time people want whatever it is to just work.

Easy. Accessible. Accurate. Is that so much to ask?

## **3D printing and the scourge of “prep”**

Consider the process the average design engineer has to endure before they send the model to a 3D printer. First, and perhaps the greatest of all sins, the native CAD file must be converted to an STL. [Wikipedia](#) is remarkably diplomatic on the subject: “The results are not predictable, but [they are] often sufficient.”

Gross.

The engineer just spent a considerable amount of time building the perfect part with even more perfect geometry and the first step to 3D printing asks that same engineer to make due with a file format that removes much of that perfection straight away. As a reminder, the STL format was created in 1988 and

hasn't changed a whole lot since – primarily because it's totally abandoned. Nobody is hard at work making a better STL.

Strip away the intelligence and end up with a file older than dirt. I can think of a few professionals who might find that acceptable. Engineers are not among them.

Now that you have a less than perfect STL, the machine operator is then expected to “fix it.”

Fix the holes in the mesh. Look for potential collisions. Check for reversed normals, bad edges, flipped triangles, and noise shells. Make sure everything is “water tight.” Even if all of this stuff doesn't seem especially bothersome, it's tough to make the argument that it's the most efficient process.

## **Coping with the reality of model prep**

So even if it's not ideal, what choice is there? If the model isn't fixed it isn't getting printed. Thankfully, a host of software providers have risen up to meet the challenge over the last 25 years. You know the names by now – Magics, Netfabb, Meshlab, and so on. These are amazingly powerful software packages that can perform herculean tasks with STL files. Without today's model

prep software, 3D printing wouldn't even have a "PC load letter" warning. The machine would just stare at you.

But the fact remains that somewhere along the line, someone is duplicating work without much value add (we haven't gotten to tray optimization or vertically stacking print jobs yet). Herculean efforts are undoubtedly impressive, but isn't it better to avoid procedural steps that require an operator to perform wizardry?

We think so.

## **Wouldn't it be amazing if you could just print your CAD file?**

What if you could print your 3D model the same way you print a text document? Click "print," select a printer, and move on with the business of the day. No converting. No messing around with the original file. If you want something custom – we know many of you can't help but click "advanced properties" – it should be something you opt into. And we're working on it.

Thanks for reading. We can't wait to tell you more about what's coming.



# The business of 3D printing: visibility, efficiency, and cost recovery

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**Brian Neville-O'Neill**

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Writing about 3D printing's potential is so easy. It's objectively cool – design for additive manufacturing (DFAM), multicolor, printing on the International Space Station – all of it. Thing is, right now, printing doesn't really need any more “cool.” What it needs is accountability. Not the illusion of accountability, but real accountability – the kind that comes from actual data behind each and every claim of machine performance.



Why?

Because how the heck are you supposed to make a case to the bean counters when you don't have any real visibility into printer operations? Quick. How many jobs did you run last year? Ballpark isn't good enough to justify a six-figure expenditure to the CFO.

And if you do have an exact number at the ready, how easy was it to get that number? My guess is not very.

But what if you could find that number easily? What if you could just pop into an application to queue up prints or get updates on printer availability and status? Wouldn't it be nice to have something that effortlessly cranked out reports on your printer operations? Wouldn't that help you do your job better and save you some time?

Bean counters love to count beans. Numbers in reports are the next best thing. Give them that, and now you can justify increased investment in 3D printing next year.

In a world where presentations that explain how to justify the cost of a 3D printer are gobbled up by user group attendees, it's kind of weird that no one's working on making the engineer's relationship with the finance department easier. No one until

now, that is.

## **You're an engineer, of course you love efficiency**

You know what's easier than writing about innovative design? Writing about efficiency. No engineer on the planet is all that interested in an awesome design if the manufacturing process wastes a ton of material or doesn't even try to batch process.

So if that's true, why are we tolerating so many manual 3D printing processes? Why is it so difficult to get access to basic business intelligence data? BI exists nearly everywhere else, what's so special about 3D printing? Furthermore, why is it so difficult to coordinate print jobs and ensure that the entire build tray is in use where appropriate? Are we really ok with emailing requests to a machine operator who then has to keep all of the scheduling and geometry variables in her head? Sounds crazy, doesn't it?

But not as crazy as having to physically look at the printer to check the status of a print. I like poking fun at the industrial webcam as much as the next guy, but at least it saves someone a trip to the office on a Saturday. But shouldn't the print software offer a "go/no go" view that you can check from the couch, the

lawn mower, or soccer practice?

## **Making the business side easier so you can focus on printing**

The more time you spend pulling together operations numbers that affect the budget, the less time you spend helping internal clients get the prints they need. Or the less time you spend at home with your family.

That's crazy. It is 2016. You should be able to see business critical data, in real time, from almost anywhere.

Use the data to track your printer and material usage. Calculate real time expenditures by print, project, team, and business unit. See the data you need to manage and recover your costs.

It's common sense stuff. We get it. And we're working on it. Stay with us.

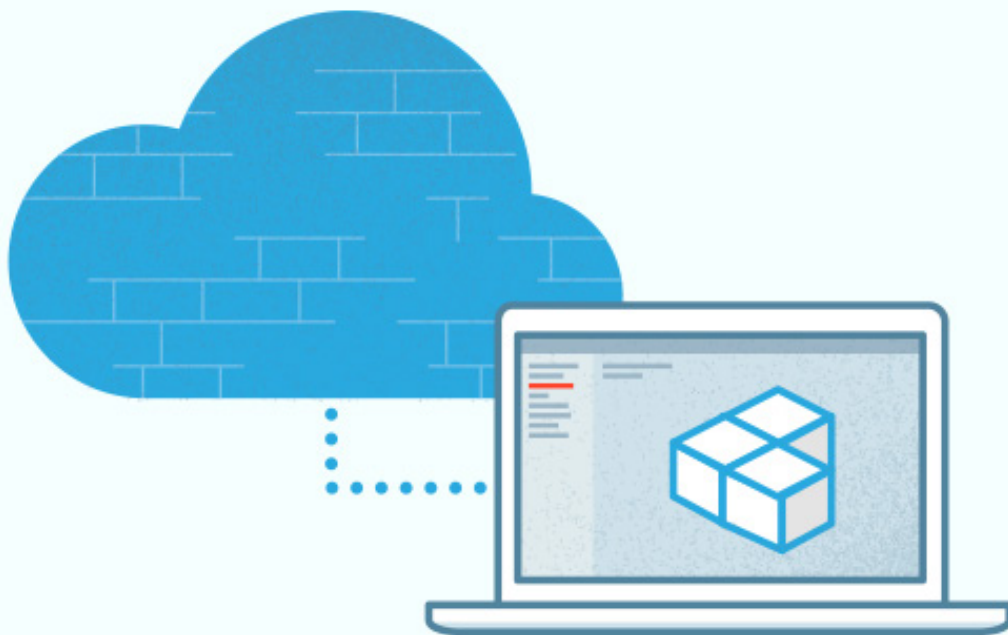
The cloud isn't scary,  
is it?

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**Brian Neville-O'Neill**

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Today we're going to talk about why the cloud is great. It's convenient, safe, and probably better than whatever you've got going on now. Even companies with the world to lose have come to the conclusion that "yeah, the cloud is the best way to achieve our goals." Most people who object to the cloud have something to say about purported security vulnerabilities. If it feels like we've had this conversation before, it's because [we have](#). A [couple of times](#), actually.



## Mistakes happen

Again, it feels a little strange to write about the advantages of cloud backup in 2016. Didn't we all more or less agree five years ago that our photos, office docs, etc. were more difficult to lose in the cloud than they were in an external hard drive on your desk? It turns out that we didn't all agree on that. People lose their kids' baby photos thanks to a bad HDD all the time. People also accidentally [delete their entire company](#), too. The cloud may seem scary, but your IP isn't going anywhere.

## GE and Autodesk are on the cloud

Still need convincing? Would it help if I described how a few of the world's most innovative companies use the cloud? You got it.

**GE moving 9,000 apps to the public cloud** - In October of last year, GE [started to move](#) 9,000 apps to the public cloud. They made the decision for quite a few reasons, "challenges of demand spikes without sufficient capacity" not least among them. "We had the desire to burst out to external cloud to solve these problems by leveraging a hybrid cloud. However, if we were able to burst out to the external cloud to support our applications then why were we running the applications internally at all?" Why indeed?



**Autodesk's transition to SaaS** - Autodesk is transitioning from on premises perpetual (desktop) licenses to a SaaS based model. Autodesk is transitioning its flagship product to the cloud. Let that sink in for a minute.

## **So what, specifically, does the cloud have going for it?**

Faster software updates, your data is safely secured and backed up, and you don't need on premise hardware and the costs/headaches that come with it.

Let's take them one at a time:

**Faster software updates** – When a new feature goes live or a bug is fixed, cloud solutions can update automatically. No waiting around to download stuff, install stuff, restart stuff, and so on. Faster is better.

**Data safely secured and backed up** – You don't have to worry about a folder being deleted or losing an older version of a design. And you don't need to rely on IT to help you access or retrieve your work – the cloud solution provider is already taking care of that for you in the background. Is the cloud safe? It's at

least as safe as whatever on premise solution you've got now. Anyway, as I mentioned we've talked about this. The cloud just plain isn't as scary as some people think.

**You don't need on-premise headaches** – Imagine never again having to talk to IT about needing more capacity and more resources. Instead, you can tell them that you've freed them up to do less integration and maintenance. A cloud solution will handle all of this for you quietly in the background.

Makes sense, right? Great.

The feedback on these little notes has been great. Thanks so much for the kind words. We're so close to telling you what we've been up to. And we're just as excited as you are.

Sit tight. It's worth it.

# Announcing GrabCAD Print

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**Brian Neville-O'Neill**

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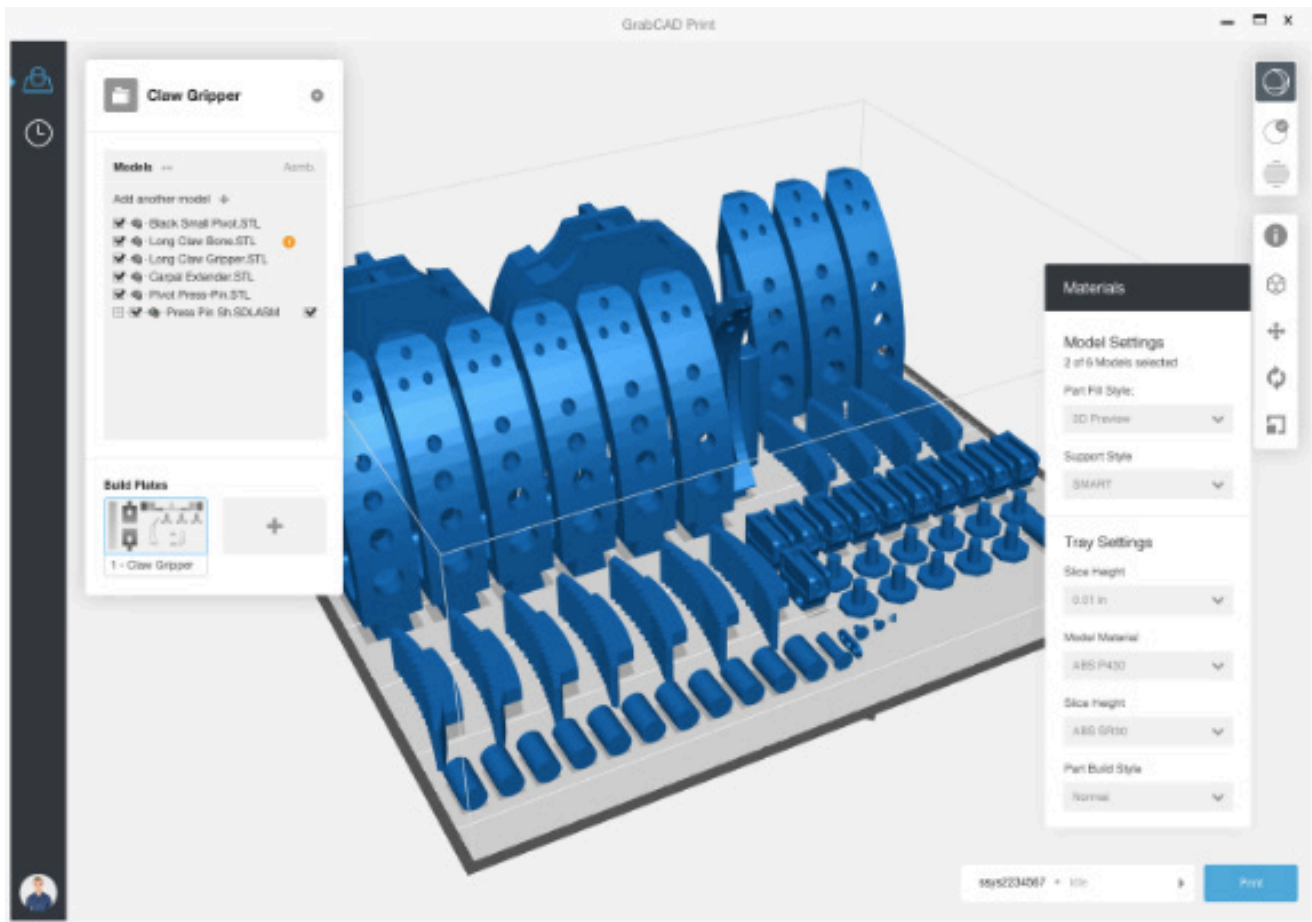
Here we are, at long last. Three months of teaser blogs is enough by most standards. More than a year of whiteboarding, customer interviews, site visits, and board presentations is enough by any standard. Your continued, sometimes fervent, interest and curiosity is very much appreciated. So without further ado, let me tell you about what we've built over the last year.



First things first – there's a bit of housekeeping on the agenda. You may remember reading something a while back about Stratasys acquiring GrabCAD. That's true. Don't believe me? Scroll to the bottom of this page and look at the footer. See where it says "Stratasys?" Doesn't get any more official than that.

Stratasys is best known for making truly incredible professional 3D printers. GrabCAD is best known for making really awesome

software that makes the lives of professional engineers a lot easier. You see where this is going. Great 3D printers deserve equally great software. Enter GrabCAD Print. Let's jump into the details.



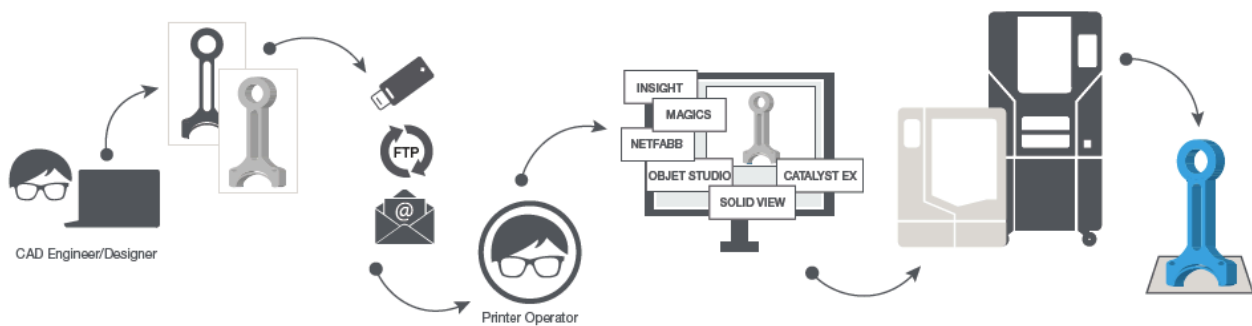
## What is GrabCAD Print?

GrabCAD Print is a cloud-based solution that brings connectivity and accessibility to 3D printing. Anyone who's ever used a 3D printer knows that we don't yet live in a world where you can print at the click of a button.

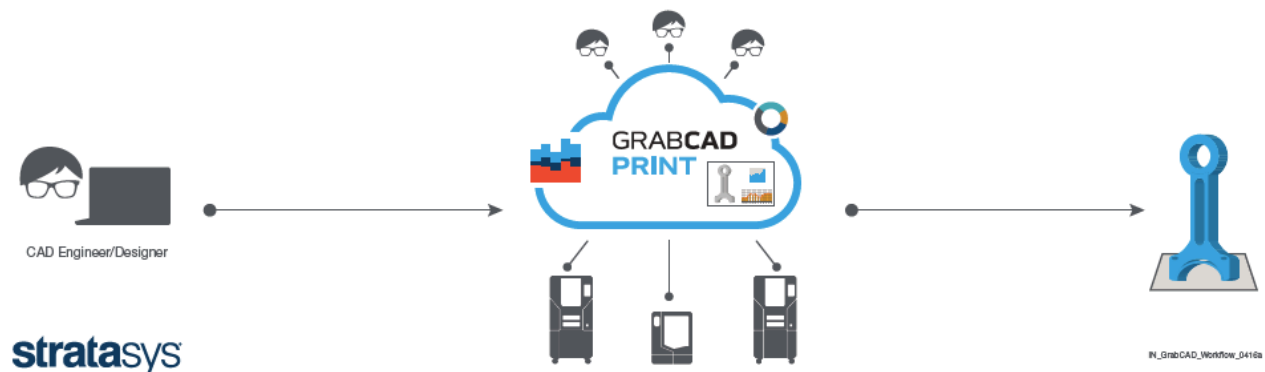
In fact, if you ask anyone who uses 3D printers regularly about their workflow, they're likely to tell you that they have as many as five or six programs open just to prep the model and tray.

That's crazy. Let's change that.

### Conventional Design-to-Print Workflow



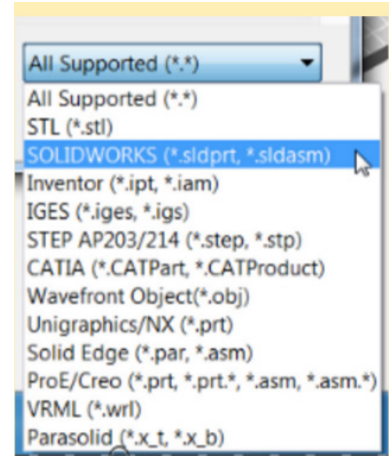
### Streamlined Design-to-Print Workflow with GrabCAD Print



# Let's talk about features

## *Less STL, More CAD*

You know what else is crazy? STLs. I went on at length in the [first teaser](#) post about why the STL is inferior. I'll spare you a rehash.



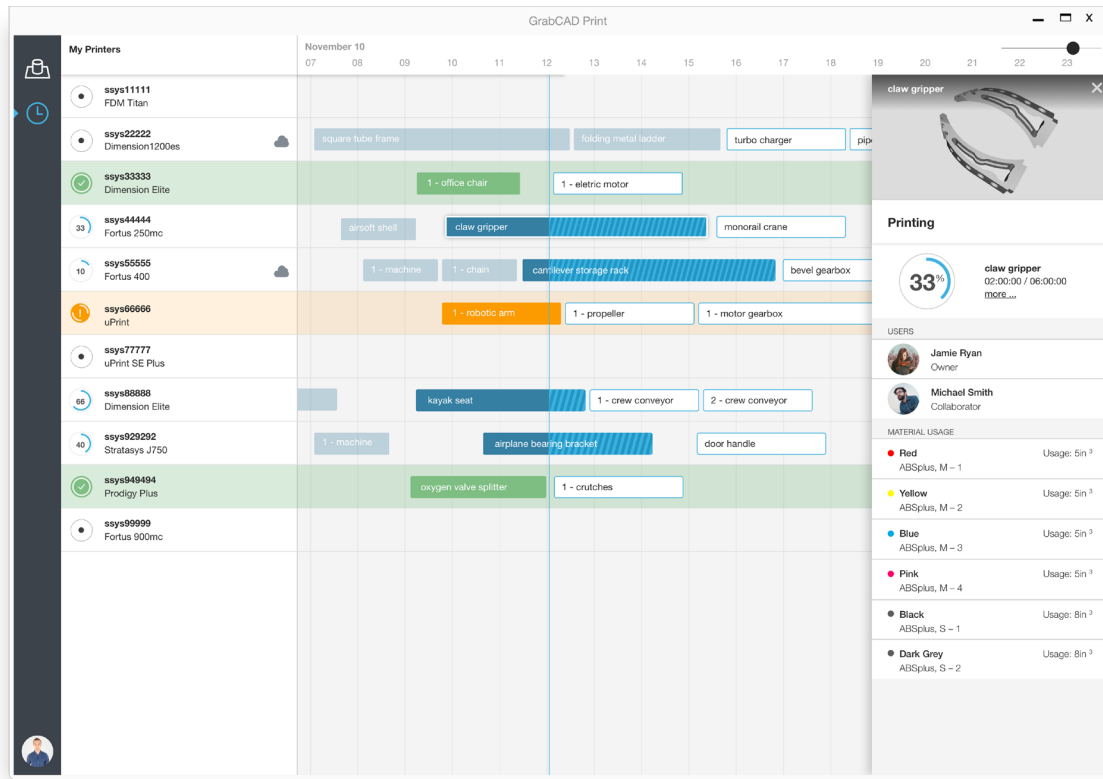
GrabCAD Print lets you print directly from your CAD file. If you don't want to mess around with an STL, you don't have to. The choice is yours to make.

## *Business Intelligence, finally*

Professional 3D printing is a serious investment. It deserves serious, industrial strength reporting. GrabCAD Print gives engineers, operators, and stakeholders the data they need to justify new investments and report on current ones.

Want to know how many print jobs you ran last year? Or which department is using which printers most often? Want to know precisely how much material each department is using so you know where to send the bill? GrabCAD Print lets you see all of that and more.

## Scheduling and monitoring



Multiple printers with multiple users in a shared office setting without an easy way to see who is printing what on which 3D printer is a recipe for disaster. GrabCAD Print solves that problem with a unified scheduler view and a proper queue manager. Now you don't have to wonder who started a 56-hour print job on a Wednesday afternoon. Instead, you can find that person and have a pleasant chat about printer etiquette.

And you also don't need to come into the office on the weekend just to see how a print is doing. You can just look at your phone. Or open your laptop from your couch. It is 2016 after all.



## Learn more / How do you get it?

Nobody really wants to read a blog post to learn about every single software feature. I know that. Fortunately, there's [a video you can watch](#) with a list of features that's a little easier to digest.



GrabCAD Print beta will be available this summer. We're so close to giving it to you. But not quite yet. [Sign up at the bottom](#) of that info page and be the first to be know when GrabCAD Print goes into public beta for the world to see.

Digital manufacturing is here, we just have a connectivity problem. We're going to fix that. We've also got a bold new software strategy that's based around the GrabCAD platform:

- Community for sharing, learning, and innovating
- Workbench for CAD collaboration
- GrabCAD Print for unifying 3D printing ecosystems.

Digital manufacturing isn't going anywhere without GrabCAD. We can't wait to keep going.

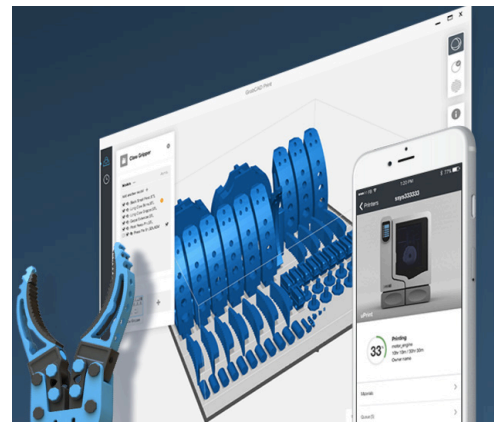
The GrabCAD Print  
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**Brian Neville-O'Neill**

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Last month we finally [spoke publicly](#) about GrabCAD Print. While it was a great feeling to [let the cat out of the bag](#), we know that engineers only start to really care about things when they can get their hands on it. Well, buckle up. Today is that day. We're psyched to announce that the GrabCAD Beta is no longer private. [Click here](#) to get started. Keep reading to find out what the private beta participants thought about our new software.



What's GrabCAD Print? It's a 3D printing software solution that offers a simplified CAD-to-print workflow and makes professional 3D printing easier and more accessible.

Here's GrabCAD's own [Marc DiGregorio](#) with more.

It's worth mentioning that we finished the public beta way ahead of schedule (you weren't scheduled to see it until later this summer). We're serious about making 3D printing easier and smarter right now.

## What the private beta testers had to say

We were fortunate enough to have a bunch of companies help us get GrabCAD Print ready for public consumption. No amount of thanks is enough for their contribution and willingness to mess around with new software in an environment where time is most certainly money.

So what did the private beta users have to say about GrabCAD Print? Quite a bit, actually. Take a look.

## Workflow

“ In the 3D printing workflow, the biggest annoyance is manually going back and forth between software. With GrabCAD Print you can print your CAD assembly immediately and seamlessly.”

– *Bob Terhune, Sr. Mechanical Engineer, 4moms*

“ When keeping up with fast paced development, frequently things will change in the last minute. In the past when a build had to be switched to a different printer I’d have to do a clean restart – redo all of that file preparation work. With GrabCAD Print it’s easy to switch between printers within a single app. That’s a huge step forward in improving the workflow.”

– *Jimmy Callaway, Design Engineer, Joe Gibbs Racing*

## No more cobbled together solutions

“ We average about 50 jobs a week for 10 different teams , scheduled to 6 different printers. I typically have at least 5 different software tools open just to prepare jobs. For an organization that prides itself on being efficient, it's tough to rely on cobbling a bunch of disconnected tools together. And that doesn't include printer scheduling or trying to provide reporting/visibility to management – that's a whole separate manual effort I have to go through as well.”

– *Kyle Sarty, R&D Machinist, Consumer Electronics*

## UI

“ The user interface is a million times better than what I currently have.”

– *Kyle Sarty, R&D Machinist, Consumer Electronics*

“ With GrabCAD Print you get everything you need in one place. It also has a clean, user-friendly interface. ”

– *Jimmy Callaway, Design Engineer, Joe Gibbs Racing*

## What are you waiting for?

If that's not enough to make you drop everything and give a GrabCAD Print a try, I don't know what is. Head on over to [grabcad.com/print](https://grabcad.com/print) to get started.

This is just the beginning. There's so much more to come.



Give a GrabCAD Print a try  
**Go to [grabcad.com/print](https://grabcad.com/print)**

