



Construction Software's Next Big Thing

The Platform

PROCORE

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I. Where We Are Today: Construction and Technology

Your company's growth is always constrained by the amount of work you and your crew can effectively manage.

YOU PROBABLY GAINED GREAT EFFICIENCIES WHEN YOU WENT FROM A PAPER-BASED SYSTEM TO ONE BASED ON SPREADSHEETS AND OTHER SOLUTIONS, AND YOUR BUSINESS GREW ACCORDINGLY.

But if you're like many companies, your momentum then slowed as a result of using too many different software products: one for estimating, one for billing, and so on.

It's easy to end up with so many of these programs installed on your company's computers. Every new product that hits the market comes with the promise of solving some nagging issue, so the temptation to buy is strong. Perhaps you've recently decided to invest in software packages promising to deliver a multifaceted solution: combining accounting, scheduling, and document storage, for example. You buy the package... only to discover the hard way that some of the programs included in the suite don't quite match your company's needs. Most likely, you'll end up augmenting, once again, with another new software purchase.

And so, as the software applications multiply, your office routines—and perhaps even your field routines—involve what has become a familiar experience for computer users: You click and open... click and open... click and open. Then, you copy and paste... copy and paste... and so on. That's what it takes for information to be consistent across all of your programs.

But what if the transfer of information was automatic? It may seem that boundaries between various software packages are inevitable. With each program tailored to meet a specific need, and each one the proprietary product of an individual company, it's not intuitive that diverse programs would ever be able to interface. But systems are emerging which break down these barriers, allowing data transfer—and consequently, project management—to become easier.

THE CLOUD

The cloud vastly expanded possible solutions for this situation.

The first wave of technology adoption put computing power into every office in the form of individual computers. And that worked out well for a long time—office computers are secure and powerful, and completely transformed basic business functions like accounting and design.

But as the business world made bigger commitments to computerization, and digitized more data and functions, weaknesses of standalone computing became apparent. In addition to integration and fragmentation problems, standalone computing was also difficult to scale—as businesses and data sets got bigger, standalone solutions couldn't keep up with the multiple office locations and larger files, and routine chores like data backup, software upgrades, and software customization turned into potentially business-crippling challenges. In response, computers began to connect via networks and the Internet. The latest and most useful way to connect computers is the cloud.

Cloud computing transfers the 'heavy lifting' of calculation and data storage to remote computers and

servers that are considerably faster and more powerful than available standalone computers. It can seem a little counterintuitive to improve business performance by relying on remote computers, but, in fact, cloud computing has been adopted quickly because it is extremely reliable and makes vast amounts of computing power available to small businesses and individuals. For example, voice recognition on smartphones is made possible by cloud computing.

One method of using cloud computing is Platform-as-a-Service (PaaS). PaaS describes a particular category of cloud services, where a cloud service provider facilitates the delivery of multiple, related applications with dedicated hardware and consistent development tools. Application end users do not have to install software on their own computers, and those computers do not have to be especially powerful.

PaaS also offers a proven way to make separate software solutions work together by providing common interfaces, automatic data transfer, and faster development of custom features. In the construction industry, PaaS can be used to integrate solutions as

varied as project management, tenders and estimation, quantity calculations, and accounting.

WHY IS IT CALLED A PLATFORM?

A computer “platform” is an underlying system that supports the running of individual applications, or programs. Like platforms in the built environment, these metaphorical platforms provide a base structure, or scaffold, onto which multiple components can attach.

The earliest platforms were operating systems, the fundamental programs that run on every personal computer. Now, a computer platform can refer to a variety of systems.

The applications that we’ve become used to installing on our personal computers are single “point” solutions: they typically perform only one type of task. But the user-end drawbacks to single point software solutions include:

- + Redundant, repetitive, and inconsistent data entry.
- + No way to implement real-time data entry in field.
- + Time-consuming training and support requirements across multiple software solutions.
- + Software upgrades, compatibility, and version control are major challenges.
- + Large data sets are in legacy ‘silos’ so their value can’t be leveraged. (Legacy systems are those programs or computer languages that are no longer kept current and are potentially outdated.)
- + Data backup and maintenance is complicated due to incompatible data formats.
- + Development of custom, business-specific features is difficult.
- + And more...

By enabling common interfaces and automatic data transference between multiple existing solutions, PaaS

directly addresses all the challenges listed above by reducing training and support costs, sharply reducing data entry time while eliminating transcription errors, and facilitating enterprise-wide use of acquired data and knowledge. For example, some construction businesses have been able to apply decades-worth of project management data directly to their tendering process.

API: THE TECH ACRONYM THAT WILL GROW YOUR COMPANY

The ultimate promise of PaaS is to make relevant data—no matter how specialized it is or how it's formatted—flow from program to program to wherever it's needed in your firm, like water flowing from field to orchard to garden and fostering growth wherever it's directed. This information flow takes place via Application Program Interfaces, commonly called APIs. APIs are software development tools—standards, protocols, and software routines—that allow one software solution to access other solutions.

You are probably already familiar with some of the ways APIs assist you. Think about how e-commerce sites use proprietary software to host their shopping pages, while allowing you to pay with PayPal and then switch to a FedEx, UPS, or USPS site to track shipment status. Historically, large businesses like PayPal have harnessed the power of APIs either by developing their own APIs or paying a fee to use third-party online software sharing tools. Such tools sometimes offered seamless stitching together of various software programs, but they were also known to hit snags, stalling rollout of new features and causing substantial budget overruns.

But like most software tools, continuing development of APIs has led to simpler, more reliable solutions that can be implemented by most firms in most industries—data flow between programs continues to improve as APIs become more common and best practices emerge. For construction managers, a tendering program could use an API to 'ask' a company's project management software for historical data on labour

hours for particular kinds of projects, and receive the information in a compatible format that allows more precise labour estimates for prospective work. Over time, this kind of data sharing will make tendering more precise, and give users better information on project profitability.

The computer conventions affecting APIs are now standardized, typically open source, and developers routinely include APIs (with clear documentation) when developing new applications. Like keys that open doors into new areas, APIs are used to create open communication between solutions used in a given enterprise, even if some legacy software is not API-enabled.

Open communication between existing software can quickly reduce cutting and pasting, as well as data re-entry with all its associated transcription errors and headaches. But that's just the beginning; API-enabled data flow is already adding new value to legacy systems in dozens of important ways, and new applications are being implemented weekly.

One exciting development in the current technology ecosystem is 'industry-specific platforms'. When a platform developer understands the specialized needs of a particular industry—in other words, when the developer knows what tasks businesses need to complete on a regular basis, and where value exists in legacy data—he or she can build a platform that enables interoperability. In addition to providing out-of-the-box integration among various industry standard applications, companies that provide APIs are creating the opportunity for software developers and IT staff to create solutions that are more efficient and powerful within particular industries or firms.

So open-source, code-based APIs allow creativity to flourish; any developer can build upon the platform to extend the utility of existing software and bring new solutions to the overall user base.



II. Too Many Competitors Results in Too Few Integrated Systems

Market fragmentation, or the idea that the market for a given product can be divided into distinct segments with specific needs and wants, can become the business owner's worst enemy.

And many experts in the tech industry have begun to argue that extreme fragmentation is a potential pitfall even for software providers.

TOO MUCH COMPETITION AMONG COMPANIES CAN RESULT IN AN OVERABUNDANCE OF INDIVIDUAL PRODUCTS.

Business owners, especially the small business owners common in the construction industry, are unable to invest in a myriad of different – though sometimes similar – products. Moreover, the various software products that they do purchase often don't work well together.

Early software vendors saw this problem crop up when their independent, boxed software sets, and later their fee-per-user licenses, began to reduce product sales. All the tech developments in the world can't support businesses if they are entirely standalone and involve spiraling costs for the user.

The Architecture/Engineering/Construction (AEC) sector, in particular, tends to generate multiple users

of multiple overlapping solutions, possibly due to the divide between field and office staff, the management of multiple large projects, and the fact that work sites physically change as projects are completed and new projects get started. Each project team keeps its own data set. Numbers and information that should be synced project-wide end up scattered throughout various in-house systems.

The challenges presented by unintegrated software solutions may be one reason for this sector's notorious lag in productivity gains in recent decades, compared to manufacturing. Put simply, construction firms are not benefitting as much as they should be from computerization. Even though individual processes, like payroll and estimating, are greatly improved, lack of interoperability creates friction that acts as a brake on the organization as a whole.

In frustration, many firms have made commitments to particular vendors with large 'menus' of software offerings, assuming that the various solutions on offer will at least have common interfaces and intuitive ways to share data. But this is not usually the case; in their

attempts to offer every business solution needed, large parent firms have often bought smaller firms with reasonably good technology—and then failed to integrate or adapt that technology so that it works well with their existing solutions.

So construction firms have not really gained anything with the 'one firm' strategy, because solutions used are still effectively separate and unintegrated. Moreover, by making an exclusive commitment to one software vendor, construction firms often miss out on genuinely innovative solutions for particular parts of their business. It's like asking your concrete subcontractor to also provide drywall crews; it might work out sometimes, but usually you'll wish you had experienced drywall guys working on the drywall.

Another choice, also born of frustration, is to keep implementing new solutions piecemeal, make them work as well as they can via training and customization, and stick with those solutions long after they become outmoded. This isn't a great way to leverage the power of technology, and it fails to capture the real productivity gains made possible by new software...

after all, software developments generally improve upon earlier solutions by leaps and bounds, and can really be amazing in terms of positive impact on your business procedures and bottom line. But, as a stop gap, it's considered good enough by many firms.

APIs and PaaS offer a path that leads to real interoperability and productivity gains. By providing a software platform that readily connects with most of the solutions now being used by your firm, including most legacy solutions (with their large, useful datasets), PaaS allows you to make better and more productive use of your current portfolio of solutions, while greatly lowering the risk and cost of investing in new solutions. Interfaces can be standardized, data redundancy can be eliminated, and relevant data can be used in multiple business areas. Over time, IT needs are reduced as APIs are implemented, and data flows are streamlined.



III. How do Construction Managers Benefit from PaaS and APIs?

Construction managers benefit immediately from virtually any implementation of PaaS and APIs, and the benefits expand synergistically as data flow is extended to more and more existing software solutions.

When all information—plan sets, tenders, quantities, hours, subcontractor fees, project milestones, deficiency lists, change orders, etc.—lives in a single, cohesive environment from project inception through closeout, and is available thereafter for continuing asset management, contractors can realize massive efficiency gains and cost savings.

OPEN SOURCE APIS AND PAAS CAN BE USED TO CONNECT AND INTEGRATE:

- + Accounting Software
- + Estimating Software
- + Tendering and Change Order Systems
- + CRM Systems
- + BIM Solutions
- + Payroll
- + Time Tracking Software

- + Business Intelligence Software
- + Data Warehousing Systems
- + Custom Applications Developed In House

In fact, because most large software developers have embraced APIs, solutions for connecting the above applications already exist.

Perhaps best of all, construction firms don't have to start over when implementing API-based solutions; value derived from training and software customization is preserved, extended into other business areas, and thus leveraged—the hard work put in over decades by your IT department continues to serve your firm. And of course, projects are completed more efficiently and more profitably, with better results for project owners.

New investments always require due diligence, of course, and investment in software will always require some training and customization. But by preserving

the value of your existing software solutions, and increasing integration among previously separate business concentrations, PaaS and API-enabled interoperability is among the safest and most potentially rewarding investments in today's IT landscape.

The ways in which software interoperability benefits construction firms are multi-pronged. Not only do executives and field staff see improvements in their day-to-day operations; clients see them too. And improved client experiences translate back into more business.

CLIENT BENEFITS

Because interoperability can bring together previously separate business functions like accounting and quantity takeoffs, it's possible for your clients to receive much more detailed 'dashboard' style updates on construction progress, and for these updates to be near real time. For example, in pre-construction phases, an update on quantities of earth moved, compared to total expected quantities per phase, gives

clients a satisfying measure of progress in a previously opaque area. This raises their confidence level in the contractor's progress, and gives them a sense of what they're being billed for. Generally speaking, providing high quality information derived from multiple software solutions that were previously in their own 'silos' can make client communication more efficient, reduce the need for change orders (while also making change orders more understandable and evidence-based), and give them greater insight into construction progress and unavoidable delays.

FIELD STAFF

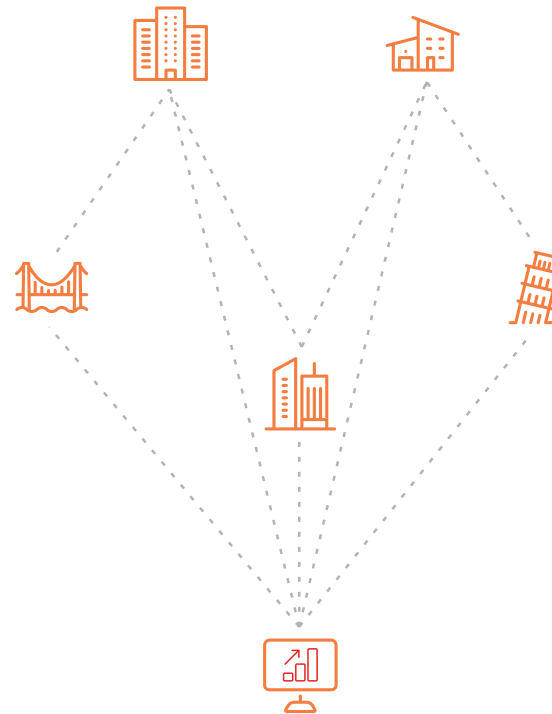
Unavoidable office time is practically a requirement in today's construction environment. Field staff will usually visit the office before and/or after the day's field work to perform what basically amounts to data entry—time sheets, work logs, quantity updates, etc. And, because of the disconnected state of today's construction management solutions, much of this data entry is repetitive and redundant. Skillful use of APIs can immediately eliminate redundant data entry, which minimizes both errors and office time. And usually,

APIs can be used to create and implement mobile front ends for existing solutions. So, field staff can commute from their home directly to the project site on most days. Perhaps more importantly, critical project management data can be entered, from the field, as soon as it becomes available—this makes the data more valuable and useful, and gives managers more immediate information on construction progress.

EXECUTIVES

Good use of PaaS and APIs can 'close the gap' between office and field. While it's always a good practice to physically visit job sites, it's also a practice that consumes time and can feel like wasted effort. Real time data entry, as described above, can alert managers and executives to problems or delays that need attention, so that they can respond quickly enough to make a difference. And by combining data and analysis from multiple, enterprise-wide software solutions, managers have access to comprehensive dashboard displays that bring together relevant, real-time data that applies to one or several projects. Furthermore, projects can be compared to each other

so companies can develop useful metrics of, for example, productivity gains caused by new technology implementation.





IV. The Solution: an Integrated Platform

When confronting the inefficiencies and multiple frustrations of separate software solutions that can't be integrated, adopting a cloud-based software platform—as opposed to a single software vendor—emerges as a best practice for most construction firms.

It future-proofs your organization by facilitating relatively easy adoption of new, best-in-class solutions as soon as they roll out, and leverages your investment in legacy software by enabling data sharing and data migration, and by supporting mobile extensions. You can have, in other words, the best of both worlds; better performance of existing solutions, and the ability to move easily to better solutions as they are invented.

A comparison can be made to smart phones. The smartphone is a platform that supports multiple applications from many developers. So if one feature isn't working for you, all you have to do is change out that individual feature, not the entire smartphone. (Don't like the weather app that came with your phone? Don't go out and buy a whole new phone; purchase and install a better weather app!)

Likewise, as a contractor, you want to choose the single platform that offers you the most potential for mobility, security, flexibility, and collaboration.

IN A WORD, YOUR PLATFORM SHOULD OFFER FREEDOM.

And ideally, your platform will be designed with the specific needs of contractors in mind. For example, it should be oriented toward easy implementation on mobile interfaces for use by field staff, while also integrating field-produced data with basic business functions like accounting.

PLATFORM SOLUTIONS: A PROVEN TRACK RECORD

How do you know that a workflow with seamless software integration is really possible? Because it's already happened in other industries. For example, by providing a platform specifically tailored for sales, the customer relationship management (CRM) solution, Salesforce, was a game changer for many firms. Salesforce provided a common language that was useful for any firm focused on marketing and sales. It helped various players come together and synergize, each amplifying the others' efforts and improving overall outcomes.

Procore is doing this now for contractors—we're the construction industry's first and best platform. When it comes to contracting, our secure, cloud-based, API-rich platform is the best way to join the future, and to stay productive as the industry, and its digital tools, continues to evolve.

Is Your Platform Integrated?

Fill out the checklist to find out.

BUYING CRITERIA	HAVE ONE?	INTEGRATED?
CRM Solution		
Tender and Procurement Solution		
Financials		
Project Management		
Collaboration Software		
Drawing Management		
Mobile Solution		

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