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1 Introduction

Analytics has become a foundational requirement for any application.

More than 85 percent of software teams have embedded some form of analytics, dashboards, or reports within their applications, as shown in our <u>2018 State of Embedded Analytics Report</u>.

Embedding analytics in software presents some unique opportunities—and poses unique challenges—to application teams. What are best practices when designing the UI and UX of embedded dashboards, reports, and analytics? What should application teams know about implementing security that works with the rest of their products? What should product managers keep in mind when adding an analytics project to their roadmap? We talked to experts about what it takes to build a successful application with analytics at its core.

No matter where you are in your analytics journey, get advice from experts on:

- > When to add or enhance new features such as analytics
- > How to interview customers for vital insights
- > Ways to optimize the user experience
- And much more...



2 Embedded Analytics is Transforming Product Roadmaps

Every application team today—whether they're an Independent Software Vendor (ISV) working on a commercial application or an IT team working on an internal application—faces the challenge of delivering more valuable software to end users. One way to do this is with embedded analytics. But does it work? Embedded analytics has become so important that teams estimate it contributes 51 percent of an application's total value. In the 2018 State of Embedded Analytics Report, 96 percent of respondents said it has increased overall revenue for their organizations.

As a result, the pace of innovation has vastly accelerated as companies seek the next great feature to differentiate their software and drive customer value—leading to seismic shifts in analytics. We talked to industry leaders who discuss emerging capabilities in the analytics space. What trends can we expect to see for 2020 and beyond?

How are data-driven services transforming business models?

Expert advice in this chapter:



The Data Divide
Wayne Eckerson
Founder and Principal Consultant,
Eckerson Group



Best Practices for Data Storytelling Mico Yuk
Founder, Bi Brainz



Data-Driven Services
Are Taking the Lead
Doug Henschen
Vice President and Principal
Analyst, Constellation Research

The Data Divide

Wayne Eckerson

Founder and Principal Consultant, Eckerson Group

Wayne is an internationally recognized thought leader in business intelligence and analytics. He is the founder and principal consultant at Eckerson Group, a full-service consulting firm that provides thought leadership and education to help organizations get more value from data and analytics.



> What trends do you see for business intelligence (BI) and analytics in 2020 and beyond?

The "Data Divide" has replaced the "Digital Divide" in determining winners and losers in the new economy. Organizations that fail to master data and analytics are now falling behind competitors who do. The winners use data to proactively capitalize on opportunities and address problems while losers react after the fact, doing too little too late until they can no longer compete cost- effectively with fleet-footed rivals.

> How is buyer behavior evolving?

It has moved up the chain to business executives. Digital, data, and analytics is becoming an imperative— it's "transform or die," basically. We are seeing the rise of C-suite titles such as Chief Data Officer, Chief Analytics Officer, etc.

"The "Data Divide" has replaced the "Digital Divide" in determining winners and losers in the new economy."

Wayne Eckerson, Founder and Principal Consultant, Eckerson Group



> What are some emerging capabilities in the analytics/BI space?

We're seeing AI in everything to facilitate self-service, data prep, anomaly detection, root cause analysis, remediation, and optimization. We are quickly moving from human intelligence to augmented intelligence to automated intelligence. Machines will make most of the decisions in the future.

How is embdded analytics different than BI?

Embedded analytics is typically more operational, embedded charts, tables, and even entire self-service environments inside operational applications, like Salesforce. We are also seeing the rise of custom analytic applications where the analytics is built into a custom application that is mission-critical to the company.

> Should application teams develop a "product" vs a "project" mindset?

Yes, especially when trying to monetize data or analytics. To create a revenue- or customer-facing product, you need to engage many other parts of the business: sales, marketing, legal, support, etc. and have a clear product plan and rollout strategy.

"To create a revenueor customer-facing product, you need to engage many other parts of the business."

Wayne Eckerson, Founder and Principal Consultant, Eckerson Group

Data-Driven Services Are Taking the Lead

Doug Henschen

Vice President and Principal Analyst, Constellation Research

Doug focuses on data-driven decision making. His Data-to-Decisions research examines how organizations employ data analysis to reimagine business models and gain a deeper understanding of their operations and customers. His research acknowledges the fact that innovative, data-driven applications require a multi-disciplinary approach, starting with integration and orchestration technologies, including next-generation data platforms, continuing through business intelligence and advanced analytics, and increasingly harnessing machine learning and cutting-edge data science.



> How is embedded analytics different from business intelligence?

Business intelligence has typically been in the descriptive analytics vein, like a report that is very rearview mirror. We have moved to the analytics part of that and we're getting much more active, exploratory, and diagnostic. Not just what happened, but why did it happen? If you add the embedded, that means it's available in the context of work. It's not a separate analytic interface that you go off to but right there within the context of your transactional or working interface. You're seeing much more concise, granular, analytic information in the context of something you're doing very specifically.

"Business intelligence has typically been in the descriptive analytics vein, like a report that is very rearview mirror."

Doug Henschen, Vice President and Principal Analyst, Constellation Research



"People are looking to cross that divide from descriptive and diagnostic into more predictive and prescriptive."

Doug Henschen, Vice President and Principal Analyst, Constellation Research

> What are the benefits of embedding analytics for the end user?

The BI and analytics world of vendors has focused a lot on this idea of democratization. Not everybody wants to be a data analyst and go off into a separate place—they want to get their work done. Embedding is a route to democratization and a route to getting to more business users because they don't have to go off to a separate interface and interpret. They can get much more concise information that supports the decisions they're trying to make and what they're trying to understand in the context of their work. They're getting information that supports a deeper understanding and supports driving towards actions.

> How important is it that users can act immediately based on the insights?

Business people don't want to sit there and interpret. They want to know what to do.
Embedding is a way to be more outcome based, not only because you have more



concise information. People are looking to cross that divide from descriptive and diagnostic into more predictive and prescriptive. What's required to get to predictive is a more concise context.

> Where do you see the market currently? Is there a desire to move more towards outcome or are people still trying to levelset with the rearview mirror?

There are the pioneers, fast followers, laggards, and cautious adopters. Pioneers and fast followers are the software companies and analytics is a big part of their service offering. Banks are looking at aggregated information and providing benchmark information to businesses and credit card companies offer insight on an aggregated basis on local spending patterns to businesses like retailers and restaurants.

Data-driven services are leading innovative organizations in their digital transformation. It's helped them change their business model and differentiate themselves from competition. It helps with their profitability

to have something that makes them stickier, offers more value, and distinguishes them from everybody else. If you can differentiate your business with a data-driven product or service, you're going to become stickier and you're going to be less prone to being pressured on costs because you're not just like every other provider.

"Data-driven services are leading innovative organizations in their digital transformation. It's helped them change their business model and differentiate themselves from competition."

Doug Henschen, Vice President and Principal Analyst,
Constellation Research

Best Practices for Data Storytelling

Mico Yuk

Founder, Bi Brainz

Mico is the founder of <u>BI Brainz</u> and the Analytics Data Storytelling Framework methodology, where she has trained thousands globally on how to strategically use the power of data visualization to enhance the decision-making process. Her data storytelling framework fuses the art of data storytelling and visualization to drive users to take action. Mico's ability to help companies gain ROI from their analytics investments has been sought out by Fortune 500 companies such as Shell, FedEx, Nestle, Kimberly-Clark, and more. Rated as the 7th most influential entrepreneur in BI by Onalytica, she is also an author, global keynote speaker and podcaster.



> What are the best practices for data storytelling in the context of embedded analytics?

When telling data stories, there are three key things to keep in mind:

- Focus on anecdotes, not personas Focus on anecdotes and not personas, as my good friend Ryan Goodman points out, to ensure that you capture the most important stories within a broad audience.
- > Forget metrics, think story parts Good stories have four parts, a goal, a KPI/metric snapshot, trends, and most importantly actions. Just randomly placing cool charts on a screen to show a specific metric adds no value. Identify clear story parts in your



"Good stories have four parts, a goal, a KPI/metric snapshot, trends, and most importantly actions."

Mico Yuk, Founder, Bi Brainz

analytics to provide a clear path for the readers.

- > Forget fancy, instead KISS Keep It Simple Superstar. When it comes to visualization use charts that are familiar and require no translation, such as bar and line charts. Fancy charts can lead to more confusion than conclusion.
- How should application teams think about data story when they're embedding dashboard reports as compared to a more standard BI Instance? Is it different?

Embedded analytics has the advantage of being available directly in the end-user workflow process as opposed to having users access a separate application to view their data. With that said, from a visual perspective, I believe the application team and BI teams alike should focus on the four-story parts I outline as they answer the four fundamental questions users have:

- A. Why?
- B. What?
- C. So What?
- D. Now What?





Depending on where the analytics appear in the workflow, ensuring that your application answers at least two of those questions will make them useful. If you can get to all four then you have actionable analytics.

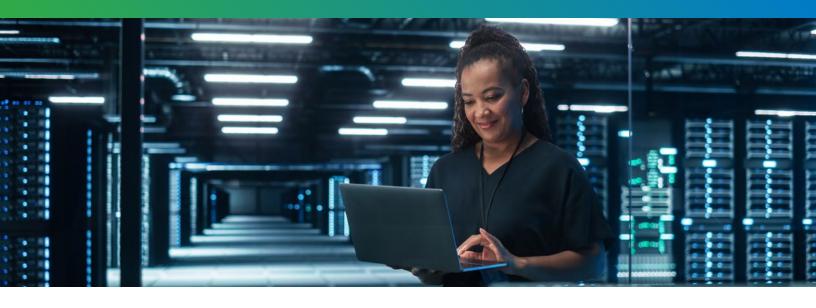
> Are there common data storytelling mistakes you see application teams making, and what can they do to avoid this?

Most applications that I've seen fall within two extremes. Focus on simplicity—some applications don't provide enough data while others provide too much. Embedded analytics has the advantage of being more dynamic than traditional BI reports. Instead of focusing

on putting everything on one screen, focus on presenting just the data that is needed at a specific point in the workflow.

In addition, I don't see enough personalization. There are opportunities to use relatable indicators like emojis to communicate binary results like up vs. down, good vs. bad, and more. Keep your analytics simple and relevant to the exact step in the workflow. Last but not least, ensure that the analytics are consistent across the process in look/feel even though the data changes.

If not, the users may get confused or spend extra time trying to figure out what has changed. That's not useful—it's distracting.



3 Designing Dashboards

A dashboard serves as a visual display of the most important information needed to achieve an objective. They transform raw data into critical information, rich stories, and easily understandable data visualizations for your users, who can comprehend and act on it in a fraction of the time it would otherwise take them.

Dashboard design can mean the difference between users excitedly embracing your product or ignoring it altogether. Great dashboards lead to richer user experiences and significant return on investment (ROI), while poorly designed dashboards distract users, suppress adoption, and can even tarnish your project or brand.

Expert advice in this chapter:



Dashboards as Guides for Decision Making Laura Klein Product Manager and Author



Designing
With a Purpose
Midori Nediger
Product Designer at Ven



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Speaking the Language of Your Customer

Tristan KromerInnovation Coach and Founder of Kromatic

Anteo Quiroz Innovation Coach and Head of Sales Kromatic

Dashboards As Guides for Decision Making

Laura KleinProduct Manager and Author

Laura is a product manager and the author of Build Better Products and UX for Lean Startups. She has worked as an engineer, UX designer, and product manager at startups and large companies in Silicon Valley. She blogs about UX, research, product management, and lean startups at www.UsersKnow.com.



> What are the risks of bad UX design for embedded dashboards/reports in applications?

Generally speaking, dashboards should be guides for people who want to make decisions. In most products, they exist to give users a quick overview of what's going on so that they can choose what needs their attention. For example, a dashboard might tell the head of sales which sales reps are missing their targets so that they can make early changes rather than be surprised by bad numbers at the end of the quarter.

When dashboards are hard to understand or don't have the right data, users can't rely on them to make good decisions. In the sales example, a confusing or hard to use dashboard could cost the company money by making it harder for the head of sales to get a quick overview and make better decisions.

> How can product teams tell if their dashboard UX is good or bad? What are the signs of good/bad UX design for analytics/ data visualizations?

No product is good or bad in a vacuum.

A dashboard is only good if it makes the people using it more effective without hurting other people. You can tell you've got a great dashboard the same way you'd find out if you had a great product. First, you need to make sure that you know what the goals are for the dashboard. Then you need to figure out if the dashboard is helping users reach those goals. You can do that with qualitative and quantitative user research.

Does your sales dashboard help your head of sales make better decisions about how to allocate sales reps? Does it help the company sell more products on a long term basis? Does it save money or time? Does it help the rest

of the company know what's going on? It's probably a good dashboard.

Once you know the concrete and measurable goals of the people using the dashboard, it's much easier to understand whether your dashboard is any good.

> Are there common mistakes you see product teams make when they design dashboards/reports for their applications?

I see three common mistakes when designing dashboards:

- No follow up. A lot of dashboards are very static things that don't give users a next step to take. When a dashboard is integrated into the rest of the product correctly, there will be obvious calls to action. For example, if you have a dashboard showing server errors across a system, a great dashboard will give the user a very clear way to jump immediately to the biggest problem and fix it.
- No drill down. Dashboards are, by their nature, high level things. They generally summarize a lot of data and provide it at a glance. Unfortunately, a lot of dashboards don't make it easy to investigate further. Maybe the marketing dashboards shows a sudden drop in email opens over the past four weeks. Does it also give the user the ability to drill down into the underlying information so they can start to investigate why that drop might have happened?
- No context. Most dashboards are made up of aggregate numbers of things.

"A dashboard is only good if it makes the people using it more effective without hurting other people."

Laura Klein, Product Manager and Author

Unfortunately, a lot of times, single numbers aren't at all useful out of context. What does it mean if you sold 20 items yesterday? It depends a lot on how many you sold yesterday and the week before and the year before, etc. Does 20 items represent a 10x increase over what you sold yesterday? A 1000x drop? To have a truly useful dashboard, you need to show numbers in cohorts that make sense to the end user. You need to show whether numbers are going up or down and, if possible, help the user to understand why those things are happening.

> What are the most important steps or best practices application teams can take to improve their analytics experiences?

Building useful dashboards requires the same skills as building any great product. Spend time observing users and understanding their ultimate goals. Don't just ask what they want to see. Figure out what they're trying to do, and then build things that help them do it.

Speaking the Language of Your Customer

Tristan Kromer

Innovation Coach and Founder Of Kromatic

Anteo Quiroz

Innovation Coach and Head Of Sales Kromatic







> What are some of the most common ways you have seen dashboards used?

Dashboards have a few common uses:

- > Warnings: When your oil pressure gauge indicates a dangerous situation, you'd better pull over and take action. If you don't, your car will pull over on your behalf.
- Analytics: Automobile dashboards are not designed for the driver to double click on the "check engine" light while in motion, which would be dangerously distracting. Much in the same way, the level of drill- down information in Google Analytics can be very distracting, severely reducing productivity. Nevertheless, today's business dashboards can (but not necessarily should) provide a level of analysis by incorporating pivot tables, GANTT charts, and more. Once a warning is triggered, users can conduct further analysis to either decide on a course of action or dismiss the red alert altogether.
- > PR / Morale: I admit it—I've kept track of a few vanity metrics over the years. Sometimes you need to show something like "total value of potential sales in our CRM," even though there's no action to take and you pretty much always want it to be higher.
 Sometimes it helps to easily collect numbers for an annual stockholder meeting (or all-hands staff meeting) that make everything look good, and there's no shame in that.
 Morale is important.

> Situational Awareness: Agilists like to use the term Information Radiator to describe any artifact that one simply cannot help but absorb data from just by being in the same room. When Captain Picard calls for red alert, the information radiators spring into action, and it is impossible for anyone on the Enterprise to not know that the red lights and sirens mean they'd better get to battle stations.

Some dashboards are designed to keep organizations aligned by maintaining a constant level of awareness around certain KPIs so no one can claim ignorance. This includes that "This facility has gone 5,843 days without an assimilation" sign. As Locutus of Borg might say, resisting this information is futile.

How can products team ensure that customers understand the dashboard?

You speak a very specific language than your customers—that of your product.

Probably very well. But you also need to speak the language of your customer who uses the product.

If our earlier reference to "This facility has gone 5,843 days without an assimilation" left you stranded at a starbase, you probably don't speak Trek. If our recent assimilation dashboard is meant for Trekkies, that might not be a problem. But specialists in any domain tend to invent their own language very quickly, and it becomes second-nature to them, forgetting that no one else speaks the language of Star Fleet.





One startup I worked with had a clear value proposition for small businesses—to "increase your CLTV"—a very important metric. But after a round of discovery testing, they quickly realized that their small business Mom and Pop customers didn't know what CLTV stood for. By testing the language, they were able to figure out that simply saying "keep customers around for longer, buying more" was going to be more effective with their target audience.

Dashboards are the same. Your fancy icons might make sense to you and save precious space, but to the customer, your dashboard is an incoherent mess. You have to make sure you didn't just build the world's most elaborate Christmas tree ornament.

The clearest, most easily understood dashboard should make sense to the customer.

> How can product teams know which features to include?

Many high-level business dashboards are relatively static since the data isn't changing moment by moment, so interaction and usability are often secondary considerations. Even when it comes to the analytics use case, there is often a design assumption from engineers that the analysis is being done by a power user who will want a ton of features and doesn't mind struggling with a ton of dropdowns.

But a lot of folks, myself included, just want something simple. You have to set up a dashboard before you use it, and setting one up is a fairly traumatic process—particularly if you're a senior executive who struggles activating "the Snapchat."

Out-of-the-box configurations and a good onboarding flow can help get the user to that first moment of happiness when they actually see something that's important to them. So, know what the job-to-be-done is, and make sure the customer can find that happiness as quickly as possible.

Designing With a Purpose

Midori Nediger

Product Designer at Venngage

Midori is an Information Designer at Venngage.
She designs visual solutions to communication problems in science and medicine. She also writes and speaks with the aim of helping non- designers improve their visual communication skills.



> What are some common mistakes to avoid when presenting data?

One of the most common mistakes I see in data visualization is the misuse of color. Because color has such an impact on the aesthetics of the design,

designers often choose color schemes based on their own personal preferences or the requirements of the brand they're designing for. But color naturally carries meaning in data visualization—it communicates information about relationships within the data and can be used to guide the viewer's eye within the design. Color choices should be made with intention with presenting data, especially when designing complex dashboards.

Another common mistake is using charts that don't reflect the structure of the data they're displaying or the goal we're trying to achieve, like using a bar chart to show a trend over time. We can expect viewers to be familiar with the conventions of basic charts, and we have to make our design choices with those conventions in mind.



"Your first step in any dashboard design project should be to clearly define the purpose of the dashboard, because you'll never be able to design a dashboard that is all things for all people."

Midori Nediger, Product Designer at Venngage

- > What are some best practices for dashboard design?
 - 1. Design with a purpose: Your first step in any dashboard design project should be to clearly define the purpose of the dashboard, because you'll never be able to design a dashboard that is all things for all people. Each dashboard should be designed for a specific purpose, and cater to the needs of a specific end user.
- 2. Use visual hierarchy to guide your viewer's attention: Visual hierarchy is important in any UI, but it's critical in dashboard design, where the content of the design can be particularly dense and complex. Fortunately, using visual hierarchy in a dashboard is no different than using visual hierarchy in product design—the size, color, and weight of each element should reflect the importance of that element within the

- entire display, and the order in which you expect the viewer to view each element.
- 3. Make the most of progressive disclosure: A useful tactic to help you avoid putting too much data into a single dashboard is to use progressive disclosure. That is, show a high-level snapshot of the data up front, while allowing the user to drill down deeper if they want to. This can help ensure your viewers won't be overwhelmed with too much data.
- > What are steps that you can take to ensure that an analytics dashboard or report is useful and usable?

Like I mentioned earlier, every dashboard should be designed with a specific end user in mind. The best way to ensure the dashboard is useful and usable is to involve those end users in the design process. Just like you would when designing a product, talk to your users to learn about their workflows, their pain points, their needs, and their wants.

Before you start designing, make sure you have a thorough understanding of how the dashboard is going to be used. And as soon as you have a design in mind, show it to those users and get start getting feedback!



4 Product Strategy for Analytic Applications

A golden rule of product management is to focus on what your customers want to achieve, instead of the features or tools they're requesting. It's no different when it comes to embedded analytics—product managers need to think about what users really want from their dashboards and reports. While your users may be attracted to the "eye candy" of dashboards, you need to focus on the job your customer is trying to do.

Whether you're adding new analytics capabilities to your product or another feature entirely, you need to consider many of the same steps and roadblocks. In this chapter, our experts provide detailed advice on conducting customer interviews, navigating changing user requirements, and distinguishing a need from a want. When it comes to your product roadmap, it's all about the journey.

Expert advice in this chapter:



Articulating Your Product Strategy Janna Bastow

Co-Founder, Prodpad



Data as an Accelerator
John Cutler
Product Evangelist, Amplitude



An Application
Fit for Use
Ben Linders
Independent Consultant,
Ben Linders Consulting



The Job Behind the Feature David Bland Founder, Precoil



Mapping for the Persona Annette Franz CCXP, Founder + CEO, CX Journey Inc.

Articulating Your Product Strategy

Janna Bastow Co-Founder, Prodpad

Janna is the co-founder of ProdPad, a software that helps product managers plan and deliver better products. Janna also organizes ProductTank events around the world, including Mind the Product, a global community of product managers. She likes to inspire great product conversations by asking: "What problem are you trying to solve?"



> How do user requirements change over time?

When you first start building a product, you attract a certain type of user: The early adopter. This type of user tends to appreciate cutting edge technologies and can stomach being part of a beta program. If done right, they make great advocates and will help you immensely with reporting early bugs and pointing out any areas where your first versions of the product fall short.

But users change. You won't always attract early adopters, and as your product matures, the type of users that you acquire will have different, and often more difficult, requirements. Later customers have the benefit of a wider range of competitors to choose from, and have little tolerance for the fast and furious releases that set you apart in your early MVP days.

And because your incoming customers change, your overall customer base changes. Over time, you'll find yourself having to cater to a mix of customers. You'll have the increasingly advanced users who've been using your product since the early days and know all the shortcuts and just need that 'one extra feature' to make their lives complete, as well as the brand new customers who've just signed up and need to quickly understand the breadth of your feature set. So managing user requirements for a mature product can become exponentially more complicated than managing them for a newly launched product.

> Any advice/tips for PMs who want to stay ahead of changing user requirements, and/or make sure they're aware of them early?

You can stay ahead of changing user requirements by building in time for validation and learning. Many teams simply focus on building feature after feature, which is great for your cadence, but

"Instead of thinking
of your roadmap
as a perfect plan of
everything you'll
achieve, think of it
instead as a prototype
for your strategy"

Laura Klein, Product Manager and Author

really ineffective for making sure that you're continually solving the right problems. The best product teams make room for learning, and make structured validation a key part of their process, rather than an afterthought. This way, if user requirements change, the product managers are clued into it as soon as possible and can update their roadmap to reflect the new needs of the market. Validation at every step of a feature build ensures that the final feature actually solves the problem it set out to solve, rather than, quite commonly, diverging from the original need into a spec of its own making.

> How can product teams be strategic when adding new features and planning their roadmaps?

A good product strategy ties in both top down and bottom up thinking. Top down means looking at the company vision and company level objectives, and outlining the obstacles and problems you'll need to tackle along the way. Bottom up means listening to the market and your customers, and understanding all of the opportunities in the field. The best product managers combine these approaches, and stitch together a plan that involves finding the best opportunities that the market presents which also tie back to the company level goals. This then culminates into a product roadmap which helps to articulate the product strategy.

When planning your work ahead, think about your total work in terms of pie. Every new feature that goes in there is taking up a slice of the pie. But you'll also need slices left over for validation, discovery and iteration, so don't cram your roadmap full of features. Each time you commit to something, you're having to say no to any number of other things, so you're better off leaving blanks in your roadmap rather than trying to fill up every available space. Instead of thinking of your roadmap as a perfect plan of everything you'll achieve, think of it instead as a prototype for your strategy: A way to draft out and check your assumptions on what you think needs to be achieved, what opportunities you think you can take advantage of, and what order you think you should tackle them in, in a format that you can bring to other stakeholders to get their input on it. After all, the value of roadmapping is less about the final roadmap and more about the process of roadmapping itself.

The Job Behind the Feature

David BlandFounder, Precoil

David is an author and founder based in Silicon Valley. In 2015, he founded Precoil to help companies find product market fit using lean startup, design thinking and business model innovation. David has helped validate new products and services at companies such as GE, Toyota, Adobe, HP and Behr. Prior to advising, David spent over 10 years of his career scaling technology startups.



> How do you know if you should add a new analytics feature to your product?

One of my all-time favorite quotes is from Theodore Levitt. "People don't want to buy a quarter-inch drill. They want a quarter-inch hole." This mindset not only applies to drills, but it also applies to your software.

Behind every tool or feature request you receive is a customer job to be done. It's a task they are trying to accomplish but unfortunately, they may not be able to clearly communicate that to you.

Most likely you only see the tip of the iceberg as the customer requests come in through your sales team, customer support, email and social media. It's your responsibility to get to the job behind that feature request, determine if it's a mutually beneficial feature to build and then turn that learning into action. Luckily, there are a few ways you can approach this dilemma, rather than simply building what they request.

> What are some best practices for conducting customer interviews to get to the job behind the feature request?

Customer interviews are deceptively hard to do well, but by following a few guidelines, you'll become an expert in no time.

> First, you'll need to write down what you'd like to learn in the form of a hypothesis. It may sound trivial, but writing what you'd like to learn down will help you anchor your interview in validated learning.
Ad hoc interviews can be useful at times, but often they turn into a long conversation that doesn't help you come to a decision. It takes time to find customers to interview, schedule a mutually agreed upon time, conduct the interview, take detailed notes, synthesize the feedback and come to a decision.

You'll want to make the most of it. I recommend using the "We believe that..." format for your hypothesis. For example,



- "We believe that customers need to sort inventory by stock value."
- Second, you'll need to write an interview script. While this sounds intimidating, it isn't meant to be. The script simply gives you a guideline to follow so that you try to extract as much learning as you can about the hypothesis. I recommend to keep it short and sweet, follow a basic flow to get your customer talking and you listening.
- Third, you'll need to conduct the interviews. I recommend doing them in pairs, so you can focus on conducting the interview while your team member takes notes. I've found it very difficult to ask questions, take detailed notes while actively listening and think of the next question to ask as a follow up. Having another team member makes it so much easier. The scribe who takes notes should write down exact quotes, instead of paraphrasing. When you paraphrase,

- the bias starts to sink in early instead of being objective. The scribe should also take note of body language, which is why I recommend doing these in person or over video. Once the interview is over, quickly debrief after and decide if the script needs to be updated.
- > Finally, you turn your interview notes into learning. If you perform 15-20 of these interviews, it can generate quite a stack of notes. Don't pick out the quotes you want to hear and then go build the feature. Instead, write each quote down on a sticky note. Then put all of the sticky notes onto the wall. Ask your team, "Which of these are the same or are saying the same thing in a different way?" Then group those into clusters and label them. This will help you sort all of the feedback into themes in order to make an informed decision.

"There's a big difference between looking at something versus looking for something. Make sure your investment in new features is built on a foundation of customer evidence."

David Bland, Founder, Precoil

> Do you then build the feature?

Customer interviews are one way to get to the job behind the feature, but it doesn't necessarily mean you should rush off and immediately build the feature. Sites like Google often incrementally invest in new features by first running more experiments. They may paper prototype features with customers, show them clickable dashboards without any of the backend infrastructure in place or release a feature stub on the live site. The feature stub is essentially a link to a feature, but when clicked shows a "We're not ready yet" message.

All of these options and more are available to you. Remember, there's a big difference between looking at something versus looking for something. Make sure your investment in new features is built on a foundation of customer evidence.



Data as an Accelerator

John Cutler

Product Evangelist, Amplitude

John works as a product evangelist at Amplitude. As a former UX researcher at AppFolio, a product manager at Zendesk, Pendo.io, AdKeeper and RichFX, a startup founder, and a product team coach, John has a perspective that spans individual roles, domains, and products.



> What are some best practices for holding user interviews and/or gathering user requirements?

People converge too quickly in their mind on a solution. And that guides their question asking. Allow your teams to be a lot more divergent in the beginning. Some people say, "Okay, we're going to go out and interview five users. And then, we're going to know what's going on." But by the third interview, because of the pet solution they had in their mind, all their questions are biased to that solution. Create a learning backlog and be pretty rigorous about not pulling everything in progress at once. Start with very specific questions.

How do you know what capabilities your users need versus what they just want?

The customer is always right and they're always wrong. Especially in B2B, people know and understand the job they need to do, deeply. A lot of times, their vision of their job might be constrained by how that job has been done for the last 20 years or so.

For instance, an accountant is always used to manually going through and reconciling everything. So the job is perfect reconciliation and reducing risk. It's not going through all their individual items. If you go in with this idea, you might have some innovation on how to do that. Customers are not skilled UX researchers or business analysts. It's not to discount the customer, but you go in and really respect their knowledge of their job. With this perspective, it becomes much more empowering.

How can product teams validate their users' requirements throughout the development phase?

It boils down to getting it in front of them as quickly as humanly possible. Some things are more important to de-risk than others. The word "requirements" is very loaded. Who is requiring what? We want a Boeing airplane to stay in the air. So there's requirements when it comes to building a guidance system for Boeing. But with a lot of B2B things, what

is a requirement? What it boils down to is prioritizing areas of risk. And that risk might be technical. We don't know if this thing will stand up and if we've picked the right tools.

How does a product team know it's time to add new dashboards, reports, or data visualizations to their product roadmap?

You need dashboards as early as humanly possible.

You need a way to communicate, and it's often through means related to data. Any time you need to make sense of a problem, or understand an opportunity, you will need a lot of qualitative and quantitative data. The earlier you can introduce that to build a shared language about work and share an understanding, the better.

> How can product teams establish that there's a demand for their dashboard? Should they be adding a new analytics feature entirely?

Often, if you have a fancy dashboard and a user catches a hint of it, they'll think it's amazing or great. The eye candy is powerful. But when it comes to the UX side, the product side of things, you really need to think about the job that your customer is trying to do and think about presenting data to them as just an accelerator to get that job done. Because the risk that you run is putting generalized analytics into your product.

Everyone says it's helpful to them but it doesn't really help your customers be better at what they do.

"Any time you need to make sense of a problem, or understand an opportunity, you will need a lot of qualitative and quantitative data."

John Cutler, Product Evangelist, Amplitude

In a B2B context, especially, you need to service the jobs your end users need to do. You can be a lot more efficient about introducing features. Instead of needing to present generalized analytics about everything and being everything to all your customers, you can be much more iterative. That's where the value of your product comes in, because you shouldn't have to reinvent the wheel to get a lot of this stuff embedded in your products. Once you know what job needs to be done, this gives you a way to push it out there a lot faster.



Mapping for the Persona

Annette Franz

CCXP, Founder + CEO, CX Journey Inc.

Annette is Founder/CEO of CX Journey Inc., a boutique consulting firm specializing in helping clients ground and frame their customer experience strategies in/via customer understanding. Her passion lies in teaching companies about customer experience and helping them understand the importance of the employee experience to a great customer experience. She has 25 years of experience in the customer experience space, helping companies improve customer satisfaction and retention as well as the employee experience.



> What are some best practices for holding user interviews and/or gathering user requirements?

People converge too quickly in their mind on a solution. And that guides their question asking. Allow your teams to be a lot more divergent in the beginning. Some people say, "Okay, we're going to go out and interview five users. And then, we're going to know what's going on." But by the third interview, because of the pet solution they had in their mind, all their questions are biased to that solution. Create a learning backlog and be pretty rigorous about not pulling everything in progress at once. Start with very specific questions.

> Are there common mistakes you see product teams make when collecting customer feedback?

Three most most-common mistakes I see are as follows. I think they are all intertwined.

- 1. The first mistake I see is to not collect customer feedback or bring feedback into product design. Allowing the product to be designed by software engineers based on internal requirements without first understanding who the customer is, use cases, problems to solve, etc. happens more often than anyone cares to admit.
- 2. The second mistake I hear about is getting feedback after the design, i.e., finding a customer for the product rather than designing a product for the customer.

I've had several conversations with folks working at startups who have developed a product and are now trying to find customers for their products.

- 3. And the third mistake is thinking that product focus is different from customer focus. I've shared many times about a question I heard on a webinar last year where the listener asked: "But if I focus on the customer, won't that take away from my focus on the product?" I suppose this ties in a bit with #2. If the two don't go hand in hand, if you don't bring in the customer and her voice while your designing the product, then for whom are you designing.
- > What are some tips for creating a customer journey map?
- Map the journey from the customer's viewpoint with the customer. The customer must be involved in the mapping process.
- There are many journey mapping frameworks, but they all include what the customer is doing, thinking, and feeling. If you're not including these three things, then you're not journey mapping.
- On that note, mapping just lifecycle stages or touchpoints is not journey mapping. Don't get stuck in that trap and call in journey mapping. Mapping at that high level doesn't help you understand the customer experience at all.
- Start mapping by identifying the persona for which you're mapping, as well as a clearly defined scope for the map.

Three most most-common mistakes in Customer Experience

#1

Not collecting customer feedback or bringing feedback into product design.

#2

Getting feedback after the design, i.e., finding a customer for the product rather than designing a product for the customer.

#3

Thinking that product focus is different from customer focus.



- > Know that journey mapping is a tool and a process. The process entails more than just creating the map. You've also got to conduct root cause analyses and create the corresponding service blueprint, which identifies the people, tools, systems, policies, and processes internally that support the experience the customer is having. And then you've got to ideate and co-create the future state experience with the customer.
- > Why is CX design important when an application team is building a new dashboard/report for their product?

The customer experience is important to consider when designing or building any type of product, including a dashboard or report. You have to remember that the customer is the one buying and using the product.

So, understand who the customer is and what problems she's trying to solve or jobs she's trying to do—and develop the product with that in mind.

When the customer and her experience aren't considered when you're building a product, resulting in the product not meeting her needs or doing what she thought it would do, that means she's going to call customer service. Chris Zane said that "customer service is what happens when the experience breaks down." This is so true. When you design for the customer, the business benefits in many ways, not the least of which is reduced call volume in the contact center.

"The customer experience is important to consider when designing or building any type of product, including a dashboard or report."

Annette Franz, CCXP, Founder + CEO, CX Journey Inc.

An Application Fit for Use

Ben Linders

Independent Consultant, Ben Linders Consulting

Ben is the author of several publications including <u>What</u>
<u>Drives Quality</u>. As an adviser, trainer, and coach, he helps
organizations with effectively deploying software
development and management practices. He focuses on
continuous improvement, collaboration and communication,
and professional development, to deliver business value
to customers.



> Product teams want to build quality applications. But what does that mean?

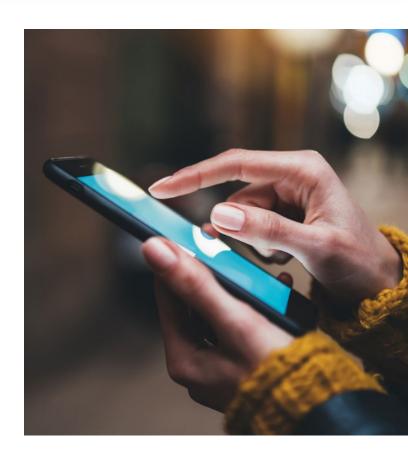
My definition of the quality of an app is how much it satisfies the needs of the people who use it and the value that it delivers to them.

This definition takes an external view, putting quality in the eyes of the beholders (the users) who decides if a software product or service has sufficient quality or not.

If the quality of an app is insufficient according to the users then they will not use it. This is what makes it so important to design quality in from the start and don't deliver earlier versions of apps with insufficient quality.

> How do you know that your application is providing value?

To deliver value, an app has to fit the purpose. It has to do what users need and expects it to do.



"To deliver value, an app has to fit the purpose."

Ben Linders, Independent Consultant, Ben Linders Consulting

Defining the needs for apps may include activities like user experience (UX) design or user interface (UI) design. The aim of such activities is to help teams to produce a software product that is easy to use and does what users expect that it would do. Developers and testers need to communicate closely with the designers doing UX/ UI activities to understand how the product should look and how the users will be using it.

> What are some key considerations for designing an app that is "fit for use"?

Fitness is a relative thing, it's not binary. Usually, apps don't cover all needs, one app might have a better fit for you than another one.

A technique to design apps for fitness is personas. They can be used to represent and understand typical users of your app. Each persona describes a specific category of users and explores how they use the app, their values, expectations and needs, background, role, and responsibilities, etc. My experience is that personas make it easier for teams to identify with the users.

You have to be connected with your users, communicate as much as possible with them, and collaborate to increase your understanding of their needs and deliver apps that are fit for use.





5 Predictive Analytics Is the Future

While every application has a minimum requirement to "offer analytics," forward-thinking companies recognize the opportunity to differentiate themselves. They're going beyond basic capabilities like interactive dashboards and data visualizations and embedding sophisticated features such as predictive analytics. Predictive analytics uses historical data, machine learning, and Artificial Intelligence (AI) to help users act preemptively. But it's a complex capability, especially when you're an application team trying to embed predictive analytics in your software. When companies take a traditional approach to predictive analytics (meaning they treat it like any other type of analytics), they often hit roadblocks.

Companies that succeed say predictive analytics makes their applications infinitely more valuable, separates software from competitors, and offers new revenue streams. We interviewed predictive analytics experts who share insights on new opportunities, common challenges, and ways your end users can benefit from this capability today.

Expert advice in this chapter:



Improving the
Value of Analytics
Marcus Borba
Founder, Borba Consulting





Decision Support vs.
Decision Automation
Eric Siegel, Ph.D.
Founder, Predictive Analytics World

Improving the Value of Analytics

Marcus Borba Founder, Borba Consulting

Marcus has more than three decades of in-depth information technology experience, and more than 20 years of experience developing data-driven solutions for companies.



> What are the benefits of embedding predictive analytics into an existing business application?

Embedding predictive analytics helps improve the value of analytics in existing business applications, enabling users to access all the data they need at the right time and context, more efficiently, enabling valuable insights, helping streamlining internal business processes, monitoring latent risks, identifying trends, and also creating mechanisms for continuous improvement.

How can end users use predictive analytics to upsell customers?

Predictive analytics can help you to upsell customers in many ways: enabling qualified lead generation, more information about your ideal customer profile, information to adjust services or products according to customer tastes, better information for marketing campaign targeting, and finding the best channels to reach your target audience.

> For companies interested in predictive analytics, where should they begin their journey?

In my opinion, a good way to start applying predictive analytics to a business is in its marketing and sales strategy. All customer relationship actions can benefit from more accurate information—from engaging audiences to customer loyalty. As generated leads become paying customers, data collected from new customers influences the next actions taken, improving the whole marketing and sales process.

"All customer relationship actions can benefit from more accurate information—from engaging audiences to customer loyalty."

Marcus Borba, Founder, Borba Consulting

Decision Support vs. Decision Automation

Eric Siegel, Ph.D.

Founder, Predictive Analytics World

Eric is the founder of the Predictive Analytics World and Deep Learning World conference series, and executive editor of The Predictive Analytics Times. He is the author of the award-winning Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die, a former Columbia University professor who used to sing to his students, the host of The Dr. Data Show, and a renowned speaker and educator



> How do you define predictive analytics?

Predictive analytics is basically a synonym of machine learning. Although, it's a bit of a subset: learning from data in order to make predictions for each individual in order to render all large scale operations or activities undertaken by organizations more effectively. Each individual prediction, such as whether someone would respond to an upsell offer or whether they're going to cancel their ongoing subscription, directly informs the operation.

> What are the benefits of embedding predictive analytics?

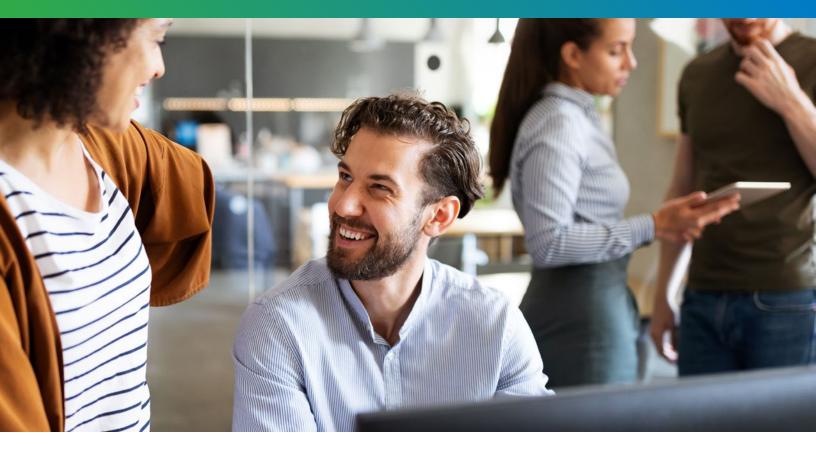
When you're talking about embedding analytics, it refers to a case where the analytics are delivered to a human. From the end user perspective, it might be a customer service agent on the phone with a customer who might be a prospect for upsell. If we're

talking about delivering analytics to humans, then in the case of predictive analytics and machine learning, we're talking about decision to support rather than decision automation.

The value propositions of those two different directions are essentially the same. Some cases are more focused on decision automation. Decision automation would be where it doesn't get delivered to a human, the predictive analytics just automatically makes

"Predictive analytics is basically a synonym of machine learning."

Eric Siegel, Ph.D., Founder, Predictive Analytics World



a decision. For example, whether to include a customer on the contact list for a marketing campaign. You might have a prospect list of 100,000 and then the predictive model scores the probability alongside each individual customer record to tell us how likely they are to respond to this particular marketing campaign.

How would you recommend someone start their predictive analytics journey?

You want to assess the greatest opportunities which are basically anywhere there's large scale operations, such as mass marketing, and you think that could be done more effectively. With the probabilities output by pick the model, pick model is the thing generated by machine learning. It's the thing, it's the new intelligence gained from historical data. The thing it learns and that thing, that predictive model, which is because it's a pattern, rules or formulas that has been

determined over historical data, now can be applied to current data and make predictive probabilities or predictions for each individual. These predictions aren't generally accurate in the conventional sense of the work up.

They're significantly better than guessing. It's a huge win to apply it systematical over large numbers or decisions. The lowest hanging fruit for an organization is often targeting customer retention by predicting who is most at risk of departure or defection is.

This is human behavior. You can't look at an individual and say, "I know like a crystal ball that this person is definitely going to cancel next month." But you can put the odds on it. And when those odds are applied systematically over large numbers of individuals, that's where these large scale operations are rendered more effective. It's a question looking at what are the operations occurring and unmask.

> What is the business value of predictive analytics? How can it affect a company's bottom line?

Sales has to start with the value proposition first and focus on the technology second. The value proposition is often a very simple arithmetic forecast. For targeting marketing, it's simple arithmetic to show that if we only expend the cost of contact to the top 25 percent of customers most likely to actually make the purchase as a result of the marketing treatment. First, we cut the marketing cost by 75 percent we also lose some business.

But if the predictive model is doing its job, then the majority of positive responses are concentrated within that top 25 percent. So simple arithmetic, you take your marketing budget, you slash it by 75 percent, you cut the actual sales by whatever it ends up being, 20 percent, and then you look at what the bottom line is. And in some cases it's multiplied by many times over, a few times the return on investment of a marketing campaign could multiply by three or five depending on the circumstances and what your baseline is. Mass marketing in that case, but the same kind of thing applies to all these value propositions. You just want to show operationally this is what's going to happen. Instead of applying this treatment over this many people, we're going to be more selective and applied over a smaller subset. Here are the business results, whether they're in terms of profit or some other business metric. And then you can say, this is how we're going to do it.



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Advanced Capabilities

Ronald Van Loon

Director, Adversitement

Ronald helps data-driven companies generate business value. He has been recognized as one of the top 10 Global Big Data, IoT, Data Science, Business Intelligence Influencer by Onalytica, Data Science Central and Klout and top 10 Predictive Analytics influencer by Dataconomy, is author for leading Big Data sites like The Economist, Datafloq, Data Science Central Dataconomy and is public speaker at leading Big Data, Data Science and IoT events.



> How can embedded predictive analytics increase value in existing applications?

Embedded predictive analytics can work perfectly within existing applications, as it can increase the value associated with them.

To begin with, these applications can empower business users and increase user adoption. This will not only ensure that you have more users, but will also make sure that users are satisfied while using the application. The use of embedded predictive analytics will also deliver improved UX to users.

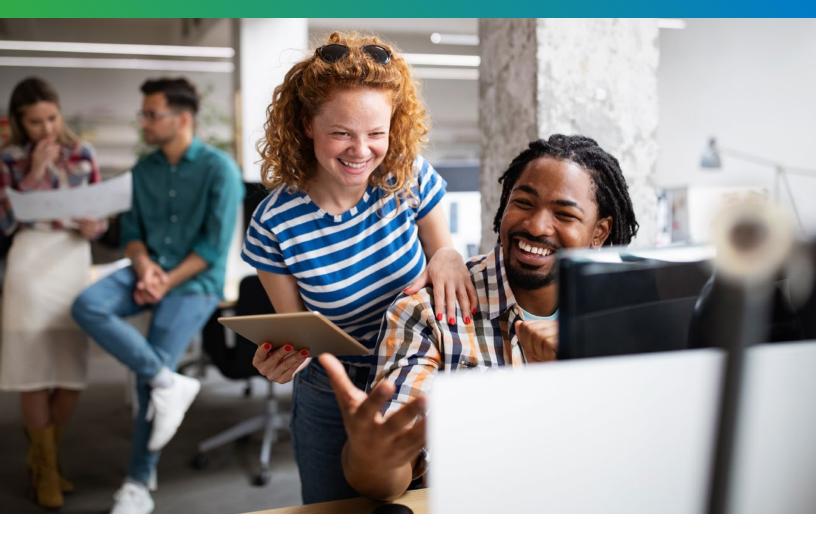
Business applications that have embedded analytics will stand out in the market because of faster processes and improved UX. By embedding predictive analysis in business applications, businesses can achieve faster revenue growth and increase operational efficiency.

The business application can also help reduce customer churn by focusing on the customer.

Once you include predictive analysis within your application, your team can work together to achieve advanced capabilities. Insights that require quick action can be handled immediately based on the gravity of the situation.

"Once you include predictive analysis within your application, your team can work together to achieve advanced capabilities."

Ronald Van Loon, Director, Adversitement



> What are other benefits of embedding predictive analytics?

Predictive analytics presents a complex challenge, which when mastered can help multiple industries around us.

The first challenge is of experience, which can impact action integration. Experienced workers are required to make sure that everything remains exciting. The presence of experienced workers will help your app stand out. Moreover, model development is required for all predictive models in play within the application. Finally, information distribution is also a must.

> What are some industry-specific benefits of embedding predictive analytics?

The industry-specific use cases for embedded predictive analytics include usage in healthcare for proper documentation and analysis of patient records, retail for inventory check, and eCommerce for tracking.

Other industries include hospitality, finance, and manufacturing.

Regardless of the industry, the shift towards embedding predictive analytics can help provide solutions for numerous high-value business problems. It can also help businesses keep in pace with the market innovations around us. The end result is that of increased business intelligence, which every organization is striving to achieve today.



6 Security Is Crucial

For application teams, security scenarios can be complex and have very precise requirements. If you don't start with security, nothing else matters.

Embedding a third-party product—such as a platform for embedded dashboards, reports, and analytics—can raise new security challenges. Other products have their own security frameworks and may not integrate seamlessly with your setup, or they may even introduce new risks or gaps in security. This can lead to delays in your release cycle and negatively impact your ability to grow and maintain your product over time.

In this chapter, application security experts outline key considerations for choosing and embedding a third- party product in your applications. What are the risks of not asking the right questions early on?

Expert advice in this chapter:



Preparing for Proper Deployment Edwin Kwan

Application and Software Security Team Lead, Tyro Payments



Identifying Risks and Vulnerabilities

Tal Melamed

Head of Security Research, Protego Labs

Preparing for Proper Deployment

Edwin Kwan

Application and Software Security Team Lead, Tyro Payments

Edwin is the Application and Software Security Team Lead for Tyro Payments. His approach toward application and software security is to raise security awareness, provide light touch controls to the software development life cycle to increase visibility of security issues and work closely with engineering teams to quickly develop secure applications. He has presented at a number of events, including RSA, All Day DevOps, AppSec Day and DevSecOps Leadership Forum. Edwin started out as a software engineer and transitioned into the application security role to lead a range of security initiatives when the company was working towards obtaining an unrestricted banking license.

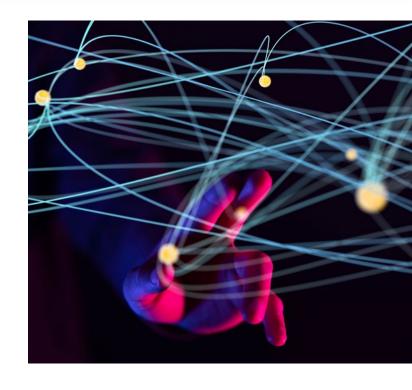


> When embedding a third-party solution in your software, what are some key considerations that you need to think about?

It ultimately boils down to CIA. CIA is the Confidentiality, Integrity and Availability of the data/service.

Some questions to ask about them are:

- 1. What is the impact if a breach to confidentiality occurred?
- 2. What is the impact if the service of data being used has suffered a breach?
- 3. What is the impact if the service being provided is not available for an hour? What about a week? What would the impact be?



"Not asking the right questions early might result in the business investing in rolling out a third party product that might not be the right fit or properly deployed."

Edwin Kwan, Application and Software Security Team Lead, Tyro Payments

From those questions, you'll be able to drive deeper down to more fine-grained questions like "How do they deal with discovered vulnerabilities in open source libraries?"

> What are the risks of not asking these questions from the very beginning?

Not asking these questions early might result in the business investing in rolling out a third party product that might not be the right fit or properly deployed. The consequences of that is delays in the project due to additional work that needs to be done.

> What are some common security mistakes people make when integrating a thirdparty platform (such as embedded analytics) with their application?

I have seen people integrate platforms with multiple authentication systems. This usually results in users having multiple credentials, which is a nightmare to manage especially when adding new users or removing them as a part of the exit process when they leave the company.



Identifying Risks and Vulnerabilities

Tal Melamed

Head of Security Research, Protego Labs

Tal has 15 years' experience in the information security field, specializing in security research and vulnerability assessment. Prior to being the Head of Security Research at Protego, Tal was a tech leader at AppSec Labs, leading and executing a variety of security projects for serverless, IoT, mobile, web, and client applications, as well as working for leading security organizations, such as Synack, CheckPoint, and RSA. Tal is also a keen speaker; training DevOps and hackers around the world, as well as lecturing at major security conferences; and a neat developer, experimenting daily with offensive and defensive security.



> What are some common security mistakes people make when integrating a third-party platform with their application in order to add a new capability (such as dashboards and reports)?

The main problem is new vulnerabilities being introduced into the system and there is always this risk when integrating a third-party. Even after going through due-diligence, and achieving compliance with most standards, there is a chance that the third party has a known or unknown vulnerability in the system that will now become your problem as well. As for vulnerabilities that are introduced through common libraries, it is important to integrate security for your applications, either in the cloud as a SaaS solution or even in the local stations for developers that will analyze the application code in search for these known vulnerabilities prior to deployment. They then should monitor the application code in search for anomalies and vulnerabilities.

> What are security requirements to look for when you're evaluating platforms or vendors to add new features to your application?

In terms of security, the most important requirements are regulations and standards. You do not want to integrate a solution that will interfere with your compliance requirements (e.g. HIPAA, GDPR) and security posture. For example, what are the vendor's capabilities and policies for protecting data? If you can, makes sure to ask the third party to provide you with a penetration-testing report that shows that they have put efforts into making their system secure.

Also, their dependencies become yours now. Not only should you watch out for the introduction of vulnerabilities by their applications into your system, but you also need to access their support. Good support could help you resolve security and nonsecurity issues quickly. If the third party tends not to be responsive, you could be left with some security issues that no one will address. In addition, check out their documentation.

Good documentation is a testament to their overall product management and support.

> When integrating third party technology into your application's existing tech stack, what are key considerations you need to think about from the very beginning?

When introducing new features and technologies to your application, you first need to make sure you have a have well defined and documented requirements.

"In terms of security, the most important requirements are regulations and standards. You do not want to integrate a solution that will interfere with your compliance requirements (e.g. HIPAA, GDPR) and security posture."

Tal Melamed, Head of Security Research, Protego Labs

What are the business processes will you be supporting? What standards and regulations are you subject to?

Do your research, a few hours in Google is not enough.

You want to be sure that you maintain your security posture.

If you have the resources, assign a vendor selection team that will lead the full process. Weigh in cost, architecture, support, security and compliance to come up with the best solution for your organization. You can compromise on each of these aspects, but make sure you take responsibility for the risks.

Logi Embedded Analytics: Purpose-Built for Software Teams

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Learn more at insightsoftware.com/logi-analytics/

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