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RETHINKING ANALYTICS APP DESIGN WITH THE **THINK WAVE** FRAMEWORK

Best Practices to Design Analytics Apps

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Traditionally, dashboards were designed to present a consolidated picture of a business's health. Analytics apps today have assumed the even larger role of providing businesses with a way to make informed, data-driven decisions. But are we building the analytics solutions that will facilitate this data-driven decision-making process?

A closer look reveals that the methodologies of decades-old business intelligence (BI) software are still present throughout most organizations. Due to many companies' technology limitations, BI projects are still organized around a traditional layered architecture approach. This approach involves gathering available data, determining how to cleanse and work with it, loading the data into an analytic structure, and then using the data to determine what reports and dashboards people want to see. As a result of these antiquated methods, too many static dashboards and long reports are required to get even the most basic business data you need.

Businesses move at a blistering pace in today's big data world, making decisions on the go and closing complex deals with just a few smart phone taps. We need to shift our mindset about analytics solution design and alter the underlying premise of design goals to a more integrated, streamlined, user-friendly experience.

Old Way of Analytics	New Way of Analytics
Self-managed, server-based data management	Outsourced, cloud-based data management
Self-managed security	Cloud-based security
Multiple data sources	Consolidated data
Inability to access data on mobile	Mobile first

Only 30% of business intelligence projects meet objectives. And only 30% of users adopt business intelligence.

– Gartner ,,

## Creating a New Generation of Analytics Apps

How do we go about creating excellent analytics apps? A well-designed analytics app is a product of both art and science. Simply replicating your old BI dashboards on a modern analytics product like Salesforce Einstein Analytics won't get the job done. That's like putting a 150hp engine in a Lamborghini and then expecting F1 performance.

An effective dashboard should carefully balance and align two distinct objectives: to provide a broad overview so that stakeholders can instantaneously understand progress on key business objectives, and to provide sufficient detail so they can quickly get to the root of the problems that arise. Although balancing these two goals seems counterintuitive, the WAVE framework can help create dashboards that meet both goals simultaneously.

Four Key Steps to Designing Effective Dashboards

Dashboards work best when they are designed with the end user in mind. Every dashboard must answer at least one business question, and should be designed keeping its function in mind; the form of the dashboard must follow its function.

To ensure that form follows function, Salesforce has developed a four-step framework based on user-centered design principles. We call it the "Think WAVE" dashboard design framework.

Think WAVE Dashboard Design Framework

W	A	V	E
Who, Why, and What	**Architecture**	**Visual Communication**	**End-User Engagement**
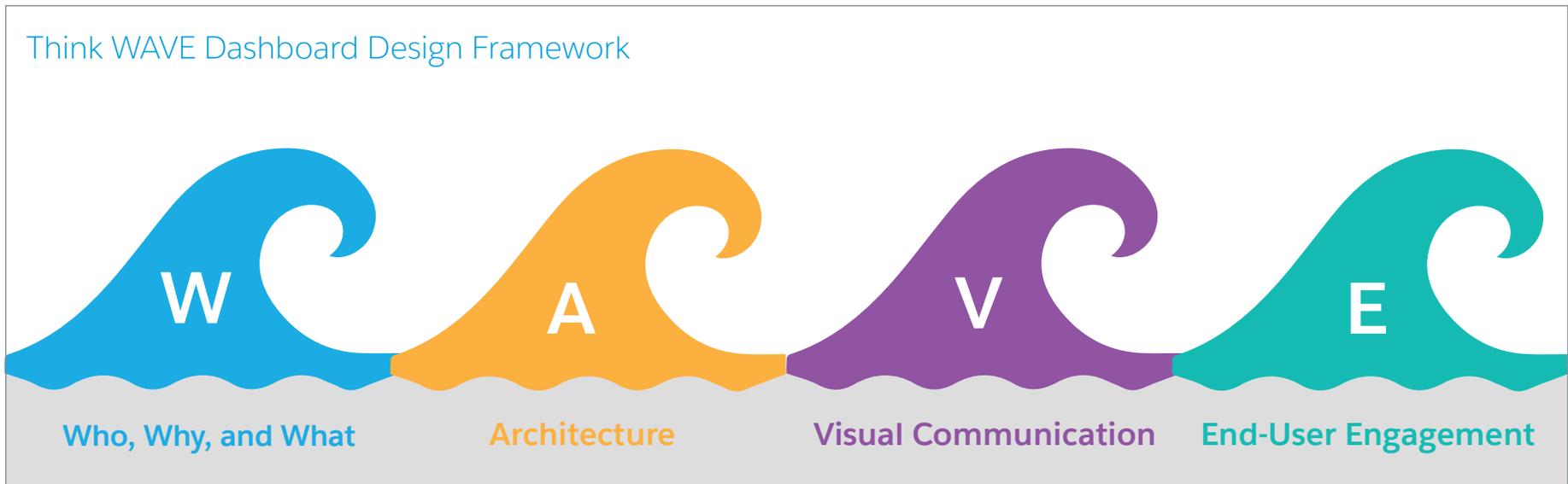
W – Who, Why, and What

The first part of redefining an analytics dashboard design is a well-crafted strategy. The first step is to conduct thorough user research. You will typically encounter four types of target audiences for dashboards:

- A particular user – e.g., CEO or CFO
- A particular user role – e.g., all sales managers
- A particular user group in marketing departments
- A general audience – all fitness enthusiasts or all health insurance – e.g., customers

It is relatively easy to design dashboards for a particular user because you may know details about him or her that will help you build customized dashboards. Similarly, designing dashboards for general audiences requires that you find out minimum common requirements and let end users add or customize their personal dashboards. However, designing for user roles or user groups will require doing user research and defining personas.

How to Conduct User Research and Create Personas

Once you have identified your target user base, it is important to know their intentions, goals, targets, pain points, and success criteria. You can learn more about your users – your team members or customers – by asking detailed questions and holding focus groups. We call this phase "user research" and one of its outcomes is developing user personas. A user persona represents the goals and behaviors of a hypothesized group. In most cases, personas are synthesized from data collected from those initial interviews with users.

1. Get into your audience's head.

- What do they care about?
- What does their typical day look like?
- What are their top priorities?
- What tools and devices do they use?
- With whom do they collaborate?
- How often do they travel?

2. Dig deep into how your audience wins.

- What will earn them an award, promotion, or bigger bonus?
- What do they consider success?
- What numbers must they follow daily?
- What must they get alerted to?
- Which metrics are they most interested in improving?
- Do they focus more on strategic metrics, operational metrics, or both?

3. Help them win more.

- What would make the biggest difference to their win rates?
- How can looking at data in a new way help them make that difference?
- How are the present tools helping or hindering their progress?

A Sample Persona: Jim High-Achiever

- Jim High-Achiever is a 35-year-old sales manager. His team's performance is the deciding factor in his continued job success. [Who is he and what motivates him?]
- He does not micromanage his team. He trusts them to use the tools at hand and report their results weekly.
- He wants to be able to run key strategic and operational analytics on the daily and weekly reports he generates while his team is in the field. [Which metrics is he interested in improving?]
- He is concerned about the current visibility into sales data, and being able to manage his team remotely to take advantage of leads and opportunities. [What's going to get him a bigger bonus, promotion, or award?]
- He wants his team to report via mobile from the field rather than waiting to return to the office to file reports. [What devices does the team use? What would help them improve results?]
- He wants to be able to report at the dashboard level and have the information customized, easy-to-use, and mobile-enabled for his sales team. [How can looking at data in a new way make a difference in sales?]

The Purpose of Personas

Refer to your persona information when making decisions around dashboards. For example, if you are designing dashboards for a sales manager, Jim's persona can help you prioritize key metrics for that position.

After defining who and why for dashboards, the next step is to create a list of required dashboards based on identified KPIs and requirements.

"At SpringML, we take design as a way to convey our core values. Data reveals facts and a proper design eliminates the need for explanation. In sum, UX is just not a checklist item, it's our success criteria."

– Prabhu Palanisamy, Co-Founder, SpringML

A – Architecture

Architecture has a broad meaning. Here, we limit the scope to user-experience (UX) architecture. Once you have a fair understanding of your target audiences and a list of dashboards, the next step is UX architecture. Architecting your WAVE framework app requires you to define its flow, charts, and drill paths.

Flow – A well-designed flow maps well to how users want to navigate within the analytics app. Once you have a list of dashboards, you need to think about how they all fit together. This means defining dashboard hierarchies and their interlinkages.

We recommend creating an overview dashboard for every app. The overview dashboard will include the KPIs for business questions and links to additional detailed dashboards to help you get to the root of your previously identified business problems. You can also link one dashboard to another, so think of designing a flow as an exercise in creating a sitemap for your analytics app – similar to a website wireframe – where every page is a separate dashboard and the home page is the overview dashboard.

Charts – The importance of charts in dashboards cannot be emphasized enough. Our brains are wired to interpret visual representations of data more efficiently than a list of numbers. However, to ensure that these visualizations display the right insights, you need to choose charts wisely. Start by asking, "What will provide the most important insights for a particular situation?" Based on your answer, pick one of the charts from the list. The graphic on the left can give you a good idea of how to select the correct chart.

Drill paths – Drill paths are the paths users follow to go from charts to details to actions. As you define your layouts and charts, it is important to think how the end user will interact with dashboards to act on the insights they see. One method is to display all the data on one dashboard, but this can quickly become cumbersome and hard to interpret.

Einstein Analytics functionalities such as filters, facets, bindings, and its action framework provide a user-friendly way to display minimum data with maximum exploration possibilities. This allows your end users to choose only the relevant data they want to see and hide all the other unnecessary details. Users can then slice and dice the relevant data to figure out root causes for the problem at hand. Once a problem's cause has been identified, the user should be able take action right from the dashboard.

An effective drill path aligns with the target user's mental models. For example, if sales managers start by asking their teams aggregate-level questions, managers can drill through to a particular region, select a specific user, and then map those into the dashboard drill path to help disclose and present information that maps well to users' expectations.

V – Visual Communication

Visual communication conveys ideas and information in forms that can be read or viewed. It also explores the idea that a visual message accompanying text has a greater power to inform, educate, or persuade an audience. If done properly, visual communication will help your end users intuitively associate meaning with every visual element on the dashboard. Once users associate meaning with visual dashboard elements, they infer information from data more efficiently and tend to make fewer mistakes. Take the example of traffic lights: We all interpret green, yellow, and red in the same way because the meaning of these visual signals is well set in our brains.

Within visual communication, we want to focus on two key ideas – layout and graphic design.

Layout – Layout refers to the structure of the dashboard. Layout is extremely important to visual communication because it guides information organization. Having information scattered all over dashboards prevents the user from inferring insights efficiently. We recommend qualifying your dashboard with a "20-second rule": A target user must be able to get key insights within 20 seconds of looking at the dashboard. This rule will help you prioritize and organize information properly on the dashboard. To create a good layout, we recommend that you focus on sections, order, and size.

Start with listing logical sections that you can create in your dashboard. In a marketing-lead dashboard, you might use sections like web campaign leads, event leads, and inbound leads. Each of these sections can feature different charts, but clearly defining them helps the user read the dashboard in a structured way. Similar sections can be created for all the KPIs, filters, and navigation elements. Selecting background colors, section separators, and section headlines helps visually distinguish these separate sections.
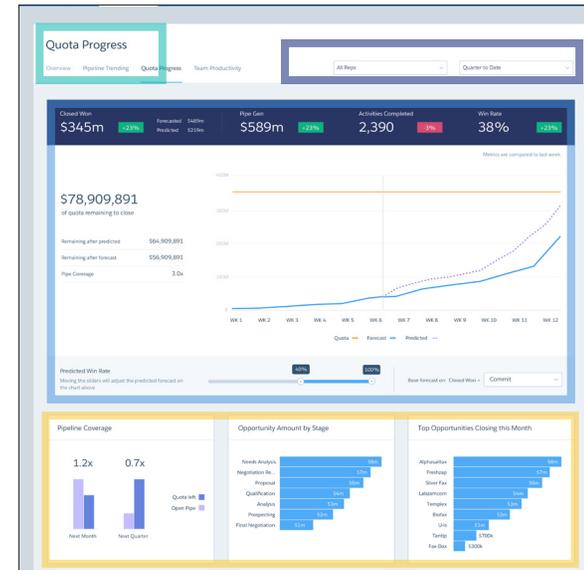
Arranging dashboard elements in the right order will help users interact with the dashboard in the intended way. Most global languages read from top to bottom and left to right. This same principle applies to dashboard design: Users will read the dashboard from left to right and top to bottom. This is why it makes more sense to place action features like filters on the left or top of the dashboard, and results like charts and tables on the right or bottom. Similarly, if there is a formula or relationship between multiple numbers, it is best to order numbers in the right way to reduce the time required for users to infer and connect these numbers. For example:

Best Practice

Other key elements to designing optimum dashboard layouts are screen size and scroll. While most users prefer vertical scroll over horizontal scroll, scrolling in general can make data discovery difficult. It is always helpful to have all the required information on one screen, but don't compromise information to avoid scrolling. We recommend a middle path of progressive disclosure. Einstein Analytics features like binding and faceting can help users find key information where they need it.

Graphic Design
– Graphic design is the process of visual communication and problem solving through the use of typography, space, image, and color. Graphic design elements are used to communicate branding, visual identity, emotions, priority, and connections.

Here are some key graphic design elements and guidelines to consider:

Color
– Color plays a critical role in graphic design. We recommend considering the four Cs when choosing colors: consistency, context, contrast, and constraint.

If you use colors **consistently** across your dashboards, your users will easily be able to assign meaning to those colors. Additionally, we recommend keeping your dashboard color palette consistent with your company's brand colors.

Using colors in **context** helps users notice alerts and quickly take action. For example, if red is used across your organization to represent underperformance, extend that color context to your dashboards.

There should be sufficient **contrast** between colors in the foreground (data, charts, and text) and the background. Reading data and interpreting insights becomes very difficult when there is inadequate contrast between the data and its background. This problem is magnified when data is displayed on big screens using low-resolution projectors.

Finally, colors should be selected with **constraint**. Using too many different colors defeats the purpose of associating meaning with color. There is no particular maximum number for a good color palette, but in cognitive psychology, seven (plus or minus two) is considered the golden number for what people can easily retain in their memories.

If you are building your organization's first set of dashboards, we recommend you invest the time to come up with a color palette that aligns well with the four Cs. This will reduce a lot of work later, since colors and their meanings will already be consistent across all your dashboards.

| Sample Alert Colors		Sample Dashboard Header Colors			
D6404F	86BC4B	3BAFDA	FC6E51	E8AE37	9173DD
Negative	Positive	Sales	Service	Marketing	IT

All chart titles and text on the dashboard should use #00244D color except additional information provided below headlines. Additional information should use #464646.

Space – White space is a design element that typically takes a backseat when dashboards are packed with lots of information. White space, by definition, is the space that is not occupied by text, numbers, charts, or other graphic elements. Although it is often neglected, white space can actually provide a significant aesthetic and usability value to your dashboards. It is important not to clutter your dashboards with too much information because high data density reduces the ability to gather insights from the visual and data noise.

White space provides a good separator between sections, columns, and charts, and also helps in creating a grid for laying out various dashboard elements. Additionally, white space can help direct a viewer's eye through the intended flow.

Can you see the difference?
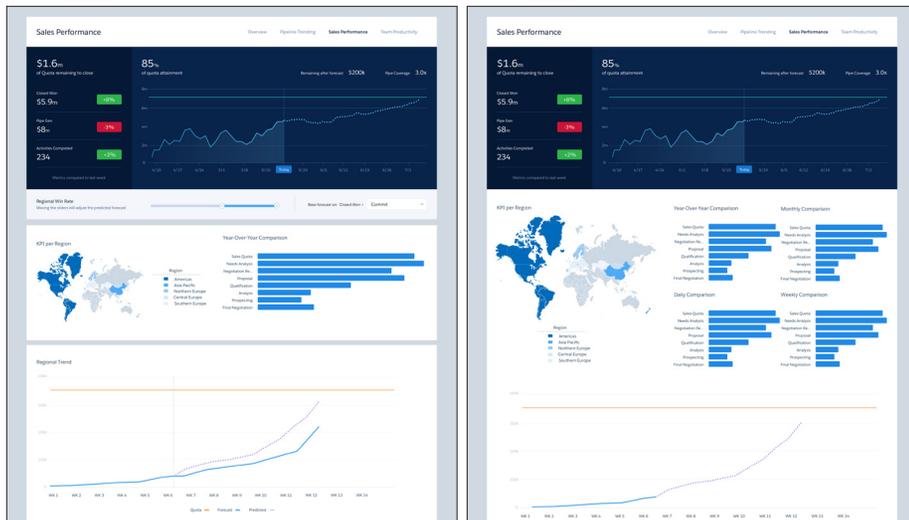
The dashboard on the left is much easier to read than on the right.

Type – Typeface or font is a key graphic design element that helps highlight important information and also provides a visual hierarchy for written content. To make dashboards aesthetically pleasing and easy to read, we recommend that you define the font size, weight, color, and alignment for major content types such as dashboard titles, KPIs, chart titles, links, or additional secondary information.

Dashboard Title
Size 32 / Weight: Regular / Color: 00244D / Align: Left

KPI Number
Size 28 / Weight: Regular / Color: 00244D / Align: Center with KPI title

Chart Title
Size 24 / Weight: Regular / Color: 00244D / Align: Left

Link Text
Size 20 / Weight: Regular / Color: 00244D / Align: Center

Additional Information
Size 16 / Weight: Regular / Color: 464646 / Align: Left

If we're serious about fixing data in the business, we need to radically rethink how we design analytics solutions. We've turned our scoping methodology on its head with Einstein Analytics – we ask about the pains of users, not specifications of data. Instead of just telling salespeople what their quota is, we build tools to help them hunt the next deal or make the next call.

– John Cosgrove, Principal Director of Data & Intelligence, Accenture

E – End-User Engagement

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The last step of the Think WAVE framework is ensuring that the dashboards facilitate end-user engagement. Compelling content, architecture, and visual design play a crucial role in designing a successful analytics app. However, it is important the designer considers ways to engage end users to support data-driven decisions. Here are some ways you can consider for promoting end-user engagement and adoption.

" With Einstein Analytics, sales managers can now better track sales and business performance, more easily review pipeline forecasts and trends, and identify sales opportunities and risk indicators. "

– Brian Wickham, VP Sales Operations and
   Business Intelligence, Houghton Mifflin Harcourt

Embedding Dashboards – In analytics, context is extremely important. Providing contextual insights can boost data-driven decisions. During a busy workday, it is much more efficient if insights come to users rather than users searching for insights. Embedding dashboards in applications that your customers use will help them explore data right where they work and make decisions in context. For example, you can embed all your Einstein Analytics dashboards in Salesforce Aloha, Visualforce, Lightning pages and the Service Console. By embedding an Einstein Analytics dashboard into these pages, you can provide an interactive presentation of your data on a Salesforce page. You can also set filters so that the dashboard shows only contextually relevant data without noise. Users can then drill down and explore the dashboard to find second- and third-order answers.

Adding Action – What good is an insight if you can't do anything with it? A BI tool might provide fancy visualizations but if it doesn't let users act on those insights, it is a dead-end analytics tool. Users should be able to act immediately on problems that they uncover through data exploration. Because Einstein Analytics is built on Salesforce's Customer Success Platform, you can drive CRM actions such as opening a new case, creating a new opportunity, logging a call, or creating a new task as you explore your data. We recommend that dashboard designers add actions onto dashboards, so users don't just slice and dice data, but can act immediately on the uncovered insights to achieve desired results.

Collaborating with Your Team – Collaboration helps to increase productivity by shortening turnaround time for uncovering valuable insights. When a BI product offers collaboration capabilities, you have fewer emails, instant answers, better participation from remote employees, and shared success with your team. Einstein Analytics is integrated with the Salesforce Customer Success Platform, allowing you to collaborate with your colleagues by posting your insights and dashboards to Chatter. Your audience can then view, explore, collaborate, and act on those dashboards immediately. Why have another dashboard review meeting in the office when it can be done online, in real time, with improved participation from your team?

10

Collaborating with Your Distribution Partners –
Sometimes, to derive the right outcomes from the insights, you should extend the collaboration capabilities beyond your internal teams. For examples, sales is a collaborative effort and should extend beyond your internal sales teams. Companies in industries like manufacturing, high-tech, CPG, and financial services rely on an extensive network of resellers, distributors, brokers, franchises, and agents to drive growth. You succeed when your channel partners and resellers succeed. So the insights shouldn't just be limited to your internal sales team but should also extend to your channel partners.

For example, with Einstein Analytics, you can arm partners with the same sales insights that a company's own reps leverage to accelerate growth. Einstein Analytics dashboards can be populated with data from any source, and security permissions can be personalized to control visibility of data with specific partners. This will supercharge your partner community and extend the benefits of your BI products to your whole partner ecosystem.

Sharing Externally with Partner Community – With
Einstein Analytics, external users can view apps shared with them via Einstein Analytics dashboards embedded in Visualforce pages in their community. This allows not only your employees but your partner community users to see the relevant data and sales or service. Sharing through your partner community helps your entire organization to see contextualized data from a single source, keeping your business moving forward.

W–the who, what and why; **A**–the architecture; **V**–the visuals; and **E**–end-user engagement. Think of WAVE as a design framework that businesses can use to create user-centered analytics applications to succeed in today's business environment.

To learn more visit **salesforce.com/analytics** or call 1-800-NO-SOFTWARE for a personalized demonstration.

The Think WAVE framework was designed by Suyog Deshpande. The framework was inspired by and evolved from his experience working with several Einstein Analytics customers. Suyog has designed several analytics products and has trained teams on best practices for analytics apps design. He has a bachelor's degree in design and a master's in human computer interaction and information economics. Suyog currently works on the Salesforce Einstein Analytics product marketing team.

Dashboard Examples

Rep Overview – Mobile

Sales reps can see their forecast and how they're tracking toward quota wherever they are.
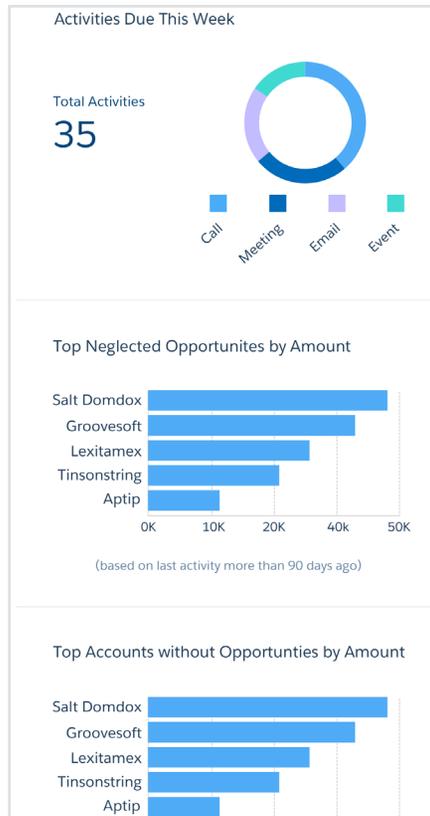
Manager Overview – Desktop

Sales managers get a quick overview of how they are performing for a given time period.