



Custom Fiori Applications in SAP HANA

Design, Develop, and Deploy Fiori Applications for the Enterprise

Sergio Guerrero

Apress®

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Texas, TX, USA

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Printed on acid-free paper

*To my wife, Amy, for her unconditional support,
and to my children, Oliver and Emma*

To Tony and Ivette Villafranca

To the Guerrero and Jimenez families

Table of Contents

About the Author	vii
About the Technical Reviewer	ix
Acknowledgments	xi
Introduction	xiii
Chapter 1: Fiori Applications in SAP HANA.....	1
What Is Fiori?	1
Fiori Design	4
Five Design Principles of Fiori.....	11
Getting Your System Ready for Fiori Applications	15
Understanding Elements, Layouts, and Floor Plans	29
Conclusion	35
Chapter 2: Consuming Data in Fiori Applications	37
Understanding Data and Mocking It When Not Available	37
OData and JSON Models	50
Consuming REST APIs	59
OData-Driven Design Approaches	65
Conclusion	80
Chapter 3: Building the Fiori Application.....	81
MVC.....	81
Tools for Developing and Debugging Fiori Applications	97
Integrating External JS Libraries into (SAPUI5) Fiori.....	108

TABLE OF CONTENTS

Browser Differences, Limitations, and Features 111

Fiori Application on Various Devices 116

Conclusion 118

Chapter 4: Unit Testing of Fiori Applications121

Unit Testing Frameworks 122

Fiori Application Unit Testing..... 123

QUnit 123

Nightmare JS 132

Puppeteer..... 138

Improvements Resulting from Unit Testing 153

Conclusion 158

Chapter 5: Deploying Custom Fiori Applications161

Preparing the Deployment and Software Versioning 162

Deploying to Different Platforms Such as SAP Cloud and AWS..... 180

GIT Repository..... 194

Automating the Deployment 197

Conclusion 198

Closing Thoughts on the Book..... 199

Appendix A: References.....201

Index.....203

About the Author



Sergio Guerrero is a passionate software engineer with 10+ years of experience in web and database development in various technology stacks such as .NET and SAP HANA. He is the author of *Microservices on SAP HANA XSA* (Apress). On non-working days, Sergio cheers for the Green Bay Packers and Tigres UANL (MX soccer) or can be found grilling.

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Jose worked as the main technical SAP Fiori reference for several implementations around the world, and has presented workshops and trainings since 2015.

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Introduction

For many years, creating software applications in the SAP ecosystem was a headache; however, Fiori applications have changed the game when it comes to developing enterprise business applications that are simple to develop and meet complex rules across the enterprise. With their initial release over seven years ago and their fast adoption by many customers, Fiori applications are continuing to gain popularity due to Fiori's delightful UX and proven capabilities. Many customers focus on application integration, application and data security, ease of use, business adoption, and features that are offered by other modern, high-quality, and competitive frameworks. SAP Fiori stands tall among its peers and offers a world-class framework to create similar products. This book walks you through the journey of designing, collaborating, developing, testing, and deploying Fiori applications to on-premise and cloud environments. Various IDE tools are showcased to inform the reader of the many available ways to develop, extend, test, and enhance Fiori applications. By the end of the book, the reader will have been informed of all the phases, tools, and features and will have completed a sample Fiori application developed in the SAP Web IDE and deployed to the SAP HANA XSA environments on-premise and also to the AWS Cloud Platform.

Chapter 1 provides an explanation of what SAP Fiori applications are and it presents the five design principles for Fiori applications.

Chapters 2 and 3 relate to consuming data from a remote OData service and also mocking data when it is not available. The data models are consumed and presented in a Model View Controller (MVC) design pattern, which is a common pattern used in Fiori applications. External JavaScript libraries are integrated into the Fiori applications and presented in various devices to show its responsive features.

INTRODUCTION

Chapter 4 shows and compares different unit testing frameworks used within the Fiori applications and also other open source frameworks, such as Nightmare and Puppeteer.

The book closes with Chapter 5 and the deployment of the sample Fiori application into an on-premise environment, and presents the steps to deploy the same application to the SAP Cloud Platform and also into Amazon Web Services.

All source code is available to readers on GitHub via the book's product page, located at www.apress.com/978-1-4842-6357-0. For more detailed information, please visit <http://www.apress.com/source-code>.

CHAPTER 1

Fiori Applications in SAP HANA

Welcome to building custom Fiori applications in SAP HANA. In this introductory chapter, I will explain what Fiori is, what concepts are important when starting the development of a product, why the initial design is very important, different design methodologies, understanding its current and future users, and how users will utilize the product during a process. Eventually a product moves from design into development and deployment. This book will conclude with a full exercise showcasing an entire Fiori application developed with all the concepts discussed throughout the book.

What Is Fiori?

Fiori refers to the User Experience (UX) design language created by SAP and adopted in their current and all future software products: for example, the Fiori Launchpad in S/4 HANA, the Fiori application library, the SAP HANA Cockpit for XSA, just to mention a few. An example is shown in Figure 1-1.

CHAPTER 1 FIORI APPLICATIONS IN SAP HANA

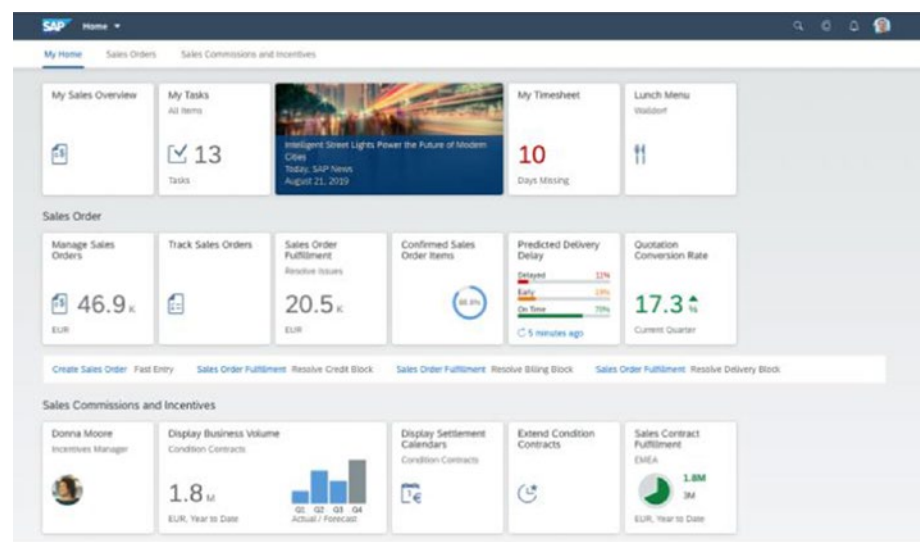


Figure 1-1. Sample SAP Fiori application

SAP Fiori had its initial version in 2013; since then, three major versions have been released, and their themes are known as Gold Reflection (black & gold), Belize (blue), and Quartz (silver). The latest improved version, known as Fiori 3, was released in 2019, and it has the look and feel as shown in Figure 1-2.

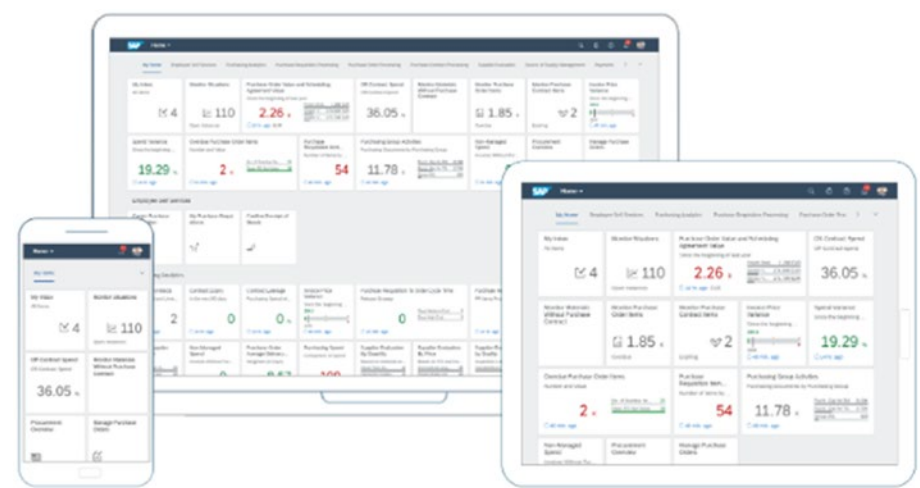


Figure 1-2. Fiori 3 UX

The Fiori UX has also been extended to be included in mobile platforms such as IOS and Android for native devices. Developing applications for these devices requires additional programming languages, language runtimes, and simulators depending on the desired platform (as well as licensing if developing on the IOS platform). IOS devices use the SAP Fiori for IOS Guidelines and can be found here: <https://experience.sap.com/fiori-design-ios/>, while the Android devices use the SAP Fiori Guidelines for Android and can be found here: <https://help.sap.com/doc/c2d571df73104f72b9f1b73e06c5609a/Latest/en-US/docs/index.html>. Furthermore, there are hybrid applications that maintain the look and feel of the Fiori UX, and they are relevant due to the fact that they enhance and leverage the functionality provided by the mobile features.

Keep in mind that applications being built for IOS devices are required to be submitted to the app store for verification on the app store's specific rules, licensing, and other platform-dependent checks before they can be published. There are various types of IOS licenses that need to be considered if this is the desired end goal. Licenses for IOS apps can be found on the Apple developer website: <https://developer.apple.com/support/compare-memberships/>.

For the purpose of this book, only the web version of the SAP Fiori UX will be covered, and I point out the URLs for native development for the reader to learn where to find additional information related to specific mobile platform versions. Whether you are developing a Fiori application for web or mobile platforms, the following steps will be similar. Let's begin!

The first and foremost important step of any product is the **Design** step. It does not matter if the product is a consumer product, a software product, or any other type of product: all products should go through this step. I cannot emphasize this step enough – cutting corners during this step will result in additional work later.

Prior to creating a product, market research has to take place: Q&A sessions with possible users to see how the product will be utilized, how it can be beneficial for the users, and how to improve an initial prototype and

eventually get as many details needed to help a company feel comfortable before starting to produce the product. The same concepts should also apply when creating a software product such as a Fiori application for the enterprise. Unfortunately, if you have been in the industry for a few years, you are probably familiar with some of the struggles that some development teams face when starting a new software application. If you noticed the last sentence, I went from analyzing a product, its users, and its potential uses to drastically showcasing a development team struggling, as is the situation in some companies. The reason I mentioned that is because it is a cruel reality that many teams face, and as developers working in the enterprise, we need to make sure we understand users' needs before starting any development efforts to minimize rework and increase software adoption in the long run. Software adoption is not easy, and it needs to be done carefully.

Fiori Design

As mentioned in the previous paragraph, design is a fundamental key component of the many steps to make a product succeed or fail. The more time invested upfront, the better prepared teams will be to develop products that will be adopted by users.

Design does not only imply that there has to be only a graphic designer prototyping, sketching, or performing any other type of drawing; designing means that there are design thinking sessions using Post-Its, whiteboard drawings, and whatever it takes to understand the use and/or flow of the product by its user(s). Do not attempt to solve a problem or try to come up with a solution at this point yet. This activity is strictly to understand a users' needs. (**Note** for developers) There will be enough time for solution solving later.

It is very important that during this step the entire team (technical and nontechnical resources) can participate. Using tools such as a plain **Whiteboard** can benefit the product team and the business as they can and should all participate in design ideas. With this approach, the design can easily be changed, and the design team should be able and open to receive constant feedback. This exercise may seem too simple sometimes; however, it is crucial for the contributors of any new product to gather ideas and quickly change things before committing to sketching or prototyping to understand the business need. This is shown in Figure 1-3.

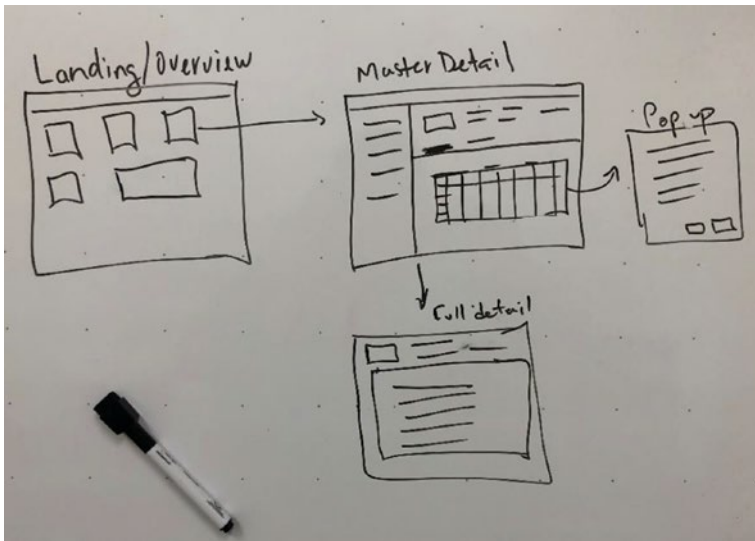


Figure 1-3. Whiteboard design

If the product team already has enough confidence in some of the design patterns for SAP Fiori, then they could proceed and move into sketching. There is one method called **Low-level design**, shown in Figure 1-4, which means that sketching can be achieved, and a designer usually mocks up what the screen high-level components will be (boxes, grids, lists, and other placeholders). Designers can also show application navigation from this type of design. Because it is simple enough and it

gives the idea, it can be a quick gain for product teams. In the other hand, one of the drawbacks for this type of design method is that the customer may not fully understand the low-level design and they could become overwhelmed by not seeing the clear and wider picture of the prototype. Often, in our day and age where we have so many tools and applications that can be leveraged for this purpose, customers like to see what their product will look like. In my opinion the low-level design has a lesser adoption rate than the whiteboard or high-level design approach, which is discussed in the next paragraph.

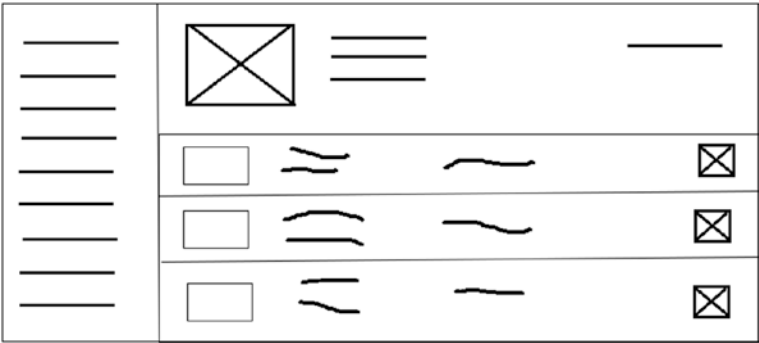


Figure 1-4. *Low-level design*

A third method of design is **High-level design**, and it is shown in Figure 1-5. This type of design means that a designer or a developer can start putting application controls (SAPUI5) on the screen and quickly build prototypes. Some RAD tools (Rapid Application Development) can be used for this purpose. This approach quickly shows the quicker application design to the customer. Most importantly, it shows exactly what the application will look like (not necessarily its behavior yet). Quite often customers wish to see exactly what they will receive at the end of development, and they assume that due to the prototype being done, then there is nothing else to do: wrong! Your team must let the customer know ahead of time about the prototype, and that development efforts are

still needed on data integration, data binding, consuming data from web services, and moreover, adding any custom behavior such as business rules on the Fiori application.

Tools such as the SAP Web IDE (Integrated Development Environment), SAP Build (shown in Figure 1-6), and others can help you quickly complete high-level design prototypes using drag-and-drop features within these tools or WYSIWYG (What You See Is What You Get) editors.

Each of the tools mentioned here may require some license for production use. Please verify license requirements before using these tools.

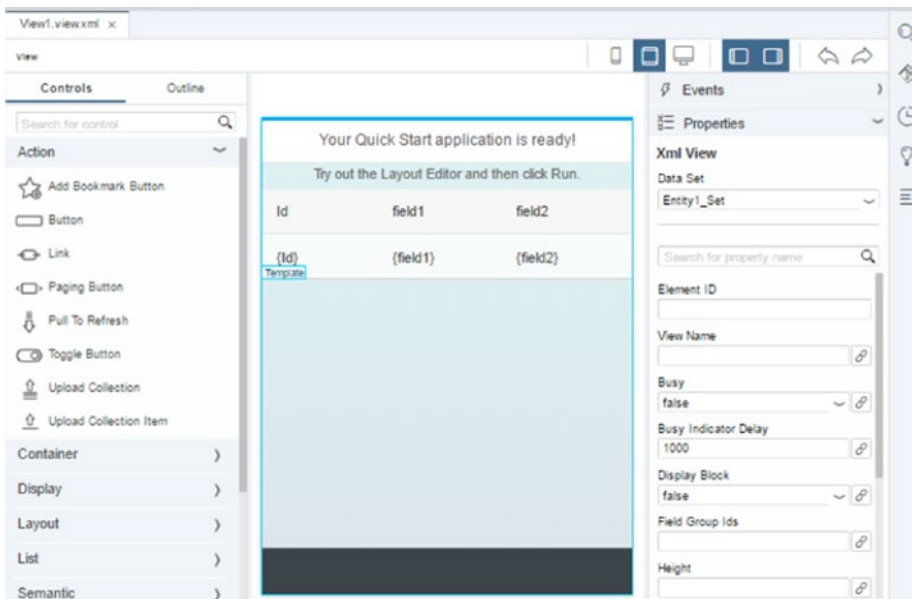


Figure 1-5. SAP Web IDE layout editor

If you decide to use the SAP Build tool, you will need to create an account and verify the license choices. The benefit of using the SAP Build tools is that you can prototype some of these applications, and including router navigation can also be achieved. SAP Build is simple enough to

use even for nontechnical users. Many customers like the idea of having less technical dependency and having self-service tools; I think SAP Build could be a good tool for that purpose. There is a great feature within the SAP Build tool that allows the user to upload a spreadsheet to include data and immediately reflect it on the prototype that is being built. Once the prototype is close enough to what is needed, then it can be passed to the technical team to be integrated into the rest of the technical world.

With the paid license of the SAP Build tool, a user may create multiple projects and keep them in their account. These prototypes/projects can then be imported into the SAP Web IDE where a web developer can continue their work by adding JavaScript code to the rest of the application. Also, if the user has not had a lot of exposure with SAP Build or SAP Fiori, there are some templates in the Gallery section that can be leveraged as starting points of someone's prototyping learnings. There are also blogs, and a community page where users can participate, ask questions, and even benefit from blogs. With the free trial license in SAP Build, designers/developers can only create one application project. There are plenty of online resources to become familiar with and join in these online communities. If you do not know where to begin, explore within the SAP Build community.

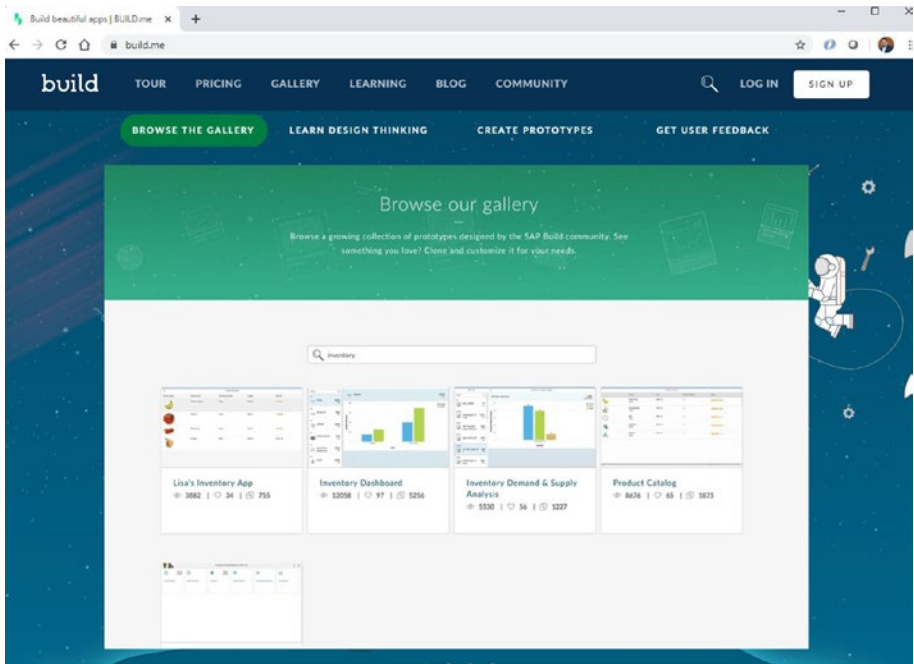


Figure 1-6. SAP Build tool

Whether the design is done with a whiteboard or a low- or high-level design, the end goal of this step is to understand users and how they will interact with a product; therefore, your team needs to focus on such a goal. It is beneficial to include targeted audience users and create a fictitious persona.

A **persona** identifies an ideal fictitious user, their working environment, their gender, their tasks, how they will use the product, and any external factors, impediments, possible restrictions, or other metadata about this user in relationship to their interaction with a product (in our case it is software) as shown in Figure 1-7. In addition to understanding the user needs, there also must be some research about any pain points that are currently encountered by the user community and how this new product can minimize, or even better, eliminate them. The goals for a Fiori design are to make the best and most efficient product that users are glad to have and that they will enjoy using to accomplish their day-to-day tasks.

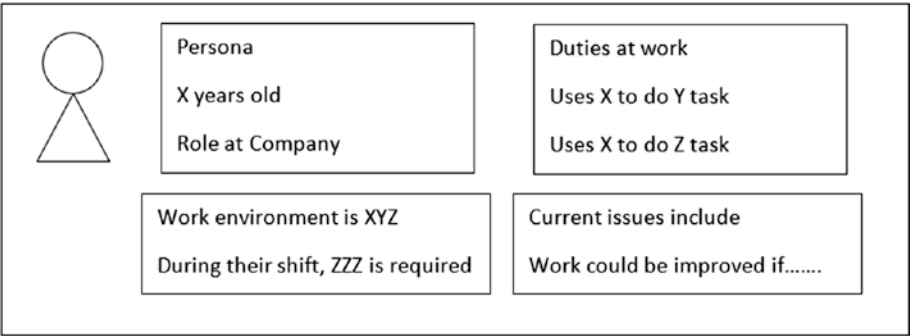


Figure 1-7. *Persona*

Although this book is related to software, the same principles apply to any other products, so let us analyze some successful products currently in the market. People may wonder, why are some of these products so successful? Overhead research and good design result in great ROI (return on investment).

One product brand I would like to analyze is one that builds power tools, construction tools, and tool storage, just to mention a few. These tools are of very high quality and they can last for a very long time. These tools are the choice of most construction professionals. They are on the higher end of products of their industry. When I got married over a decade ago, I acquired different types of tools for home improvement projects. My first set of tools was great when I started learning how to do some of the smaller home projects. As I have gained experience and learned more about tool quality, I have noticed that the right tool will get the job done correctly. Yes, I could have had a cheaper tool, but it is not the same as using the correct tool. I started investing in more of these black and yellow tools. The latest toolkit I got was a set of drills and impact drills with a battery charger and two batteries. Compared to my older tools and throughout the years, the new tools have gotten lighter, they have more power than before, the battery life has been improved, and some of different tools can share batteries. In my opinion, this company has done extensive UX research, tool design, and a vast number of improvements on their tools, resulting in customer

satisfaction, increasing product adoption, and returning customers; all of this is what most companies want to see. All these satisfactory measures resulted in great ROI for this company. I do not mind spending a few extra dollars to be able to get a good-quality tool. As you can read in this paragraph, there were possible personas (construction professionals), customer research as to how customers use these tools, and identifying some of the pain points for these users such as tool weight, battery life, and compatibility of tool parts between tools. All these concepts are part of the design to development and production of a product. Such a process is also recommended by SAP; it is known as design thinking and it is a proven process that spans throughout the life cycle of creating a product. The design thinking process starts in the discovery phase, where things are presented and analyzed, and many notes are taken when creating a product; the design phase includes various methods of presenting and prototyping an idea to see how it will be used and observed by many collaborators in the team with the purpose of providing feedback and capture how users will use this product: basically all hands on board. Develop is the part in which the people create the product, present it to their customer counterpart for feedback, and enhance it during several iterations; and finally Deliver, which is the rewarding part of the process when the product leaves the team and is put into productive use.

Five Design Principles of Fiori

The Fiori UX has five design principles that must apply to all applications, and they are shown in Figure 1-8:

- 1) Role-based
- 2) Coherent
- 3) Simple
- 4) Responsive
- 5) Delightful