

SALLA NORTHUP | IAN PALMGREN | DANIEL SEBRING | ANTONY ZHONG

Behavioral/Structural Analysis & Design

System Diagramming (Existing)

To begin our behavioral analysis for this project, we started by creating several different types of assets. We decided that the most effective means of portraying an accurate presentation of their current system as it stands was to utilize two different activity diagrams; one to illustrate the process Wild Wing Studios currently goes through to onboard clients, and one to show the process of adding additional features to a pre-existing client. We also performed a walkthrough-analysis of invoicing customers to identify bottlenecks and existing issues, which is highlighted in a screenshot series below.



Adding Custom Payment Requests



Wild Wings Studios Current System for Onboarding New Clients

Test-Run through the System (Existing)



This website is secure. Your personal details are safe.

Secure Checkout

| Item | Unit Price | Quantity | Subtotal | SAFEHA U.S DEPARTMENT OF |
|---|------------|------------------------|-----------|------------------------------------|
| Base Website Bills every 1 Month(s) Until Cancelled | \$69.00 | 1 | \$69.00 | |
| SEO Optimization Bills every 1 Month(s) Until Cancelled | \$15.00 | 1 | \$15.00 | Change Langua English |
| Social Media Bills every 1 Month(s) Until Cancelled | \$10.00 | 1 | \$10.00 | USD — U.S. Do |
| Custom Email Domain Bills every 1 Month(s) Until Cancelled | \$15.00 | 1 | \$15.00 | Questions? |
| Customer Reviews Bills every 1 Month(s) Until Cancelled | \$10.00 | 1 | \$10.00 | 425.610.91 |
| Custom Dev Bills every 1 Month(s) Until Cancelled | \$20.00 | 1 | \$20.00 | Refund Policy Wild Wing Studios |
| | Current To | otal (USD): \$1 | 39.00 | Seattle, WA 9810 United States |
| | | | | Cart Summa |
| | Cont | tinue to Billing Inf | formation | All Items (6) |
| 2 Billing Information | | | | Total (USD) \$ |
| Payment Method | | | | |

Screenshot of a checkout page for a Wild Wing Studios client.

| Review Cart | | We self-certify compliance with |
|--|--|---|
| 2 Billing Information | | U.S. • EU SAFEHARBOR U.S DEPARTMENT OF COMMERCE |
| Country * | | |
| Choose Country 🔻 😮 | Your country is required. Please select your country from the dropdown. | Change Language English ▼ |
| Full Name * | | Change Currency |
| | Your full name is required. Please enter your full name. | USD — U.S. Dollar V |
| Address 1 * | Your address is required. Please enter | |
| Address 2 | your address. | Questions? |
| | | Privacy Policy |
| City * | | Refund Policy Wild Wing Studios |
| × | Your city is required. Please enter your city. | Seattle, WA 98105 United States |
| State/Province | | Cart Summary |
| | | All Items (6) \$139.00 |
| Postal Code | | Total (USD) \$139.00 |
| Phone | | |
| | | |
| Phone Extension | | |
| | | |
| Email Address * | Your email address is required. Please | |
| Upon completion of your purchase, a receipt will be sent to this e-mail address. | enter your email address. (Example: john.doe@example.com) | |
| | | |
| | Continue to Payment Method | |
| Payment Method | | |

Screenshot of billing information page that a Wild Wing Studios customer must fill out to make a purchase.

| Wild Wing | |
|--|--|
| Secure Checkout Review Cart Billing Information Review Mathed | This website is secure. Your personal details are safe. Verified by MasterCard. VISA MesterCard. SecureCode. We self-certify compliance with USA • EU SEFECTARENT OF COMMERCE |
| Credit/Debit Card PayPal | Change Language |
| Credit/Debit Card Number * | USD — U.S. Dollar V |
| Expiration Date * v 20 CVV Code * Image: Comparison of the second | Questions? 2 425.610.9105 Privacy Policy Refund Policy Wild Wing Studios Seattle, WA 98105 United States |
| Submit Payment By completing my purchase, I agree to the Payment Terms, Terms of Use, and the Privacy Statement. Payment support available in English. | Cart Summary All Items (6) \$139.00 |

Wild Wing Studios customers must add their billing information every time they make a new purchase or a change to their web page.

| INVO | ice u | enera | ator |
|---------------------|------------------|------------------|--------------|
| | Wild Wing | Studios | |
| | | | |
| | | | |
| Subscription | Elements | | |
| Base Website | SEO Optimization | HTTPS Encryption | Social Media |
| Custom Email Domain | Customer Reviews | Ad Integration | Ecommerce |
| | | Monthly Total: | \$119 |
| | | | |
| Custom Elem | ents | | |
| Custom Dev | | 20 Recurring | x |
| + | | | |
| | | | |
| liri | | | |

A screenshot of the portal used by Wild Wing Studios to generate an invoice for customers. The shortcode is given to customers so they can fill out billing information.

| OUT | List Reguest Invice | Fraud Review | | | E ? |
|--------------------|--|----------------------|-----------------------|-----------------------------------|--------------------------|
| Sale # 1054738751 | 110 | | | | |
| Transaction | Customer S | Shipping | | IP Informat | llon |
| Total (USD) | Customer ID | Internible Colo | | IP Address | |
| \$188.00 | 105473875116 Name | No Shipping | • | 104.32.101.133 (United States) | |
| Refund | Daniel Finfer | | | Location Los Angeles, CA | |
| Refund Sale | Address 173 N Anita Ave Los Angeles, CA 90049 | | | Country | 5) |
| Method | United States | | | Area Code | -) |
| Card Mask | Phone | | | 310 | |
| | dhfinfer@gmail.com | | | | |
| AVS CVV | | | | | |
| Language | | | | | |
| en Channel: | | | | | |
| Dynamic Checkout | | | | | |
| Unknown Parameters | | | | | |
| | | | | | |
| | 205501062485 | | Send payment receipt | Issue Par | tial Refund |
| | 2000002400 | | | | |
| | For | HTTP Refer | rer: | | |
| | Wild Wing Studios | Unknow | n | | |
| | 202235597 | | | | |
| | Order Date 2015-02-07 02:24:21 | | | | |
| | Payout Status Paid 2015-02-11 | | | | |
| | | | | | |
| | | | (US D | ollars) | (US Dollars) Customer |
| | SEO Optimization Installment 2 (Pille Euror 1 Month(c) for Economy | Refund | | \$ 15.00 \$ 15.00 | \$ 15.00 |
| | Next Recurring Bill Date: 2015-03-07 | | | | |
| | Base Website Installament 2 (Bills Every 1 Month(s) for Forever) Next Recurring Bill Date: 2015-03-07 | Refund | | \$69.00 \$69.00 | \$ 69.00 |
| | Social Media Installment 2 (Bills Every 1 Monthls) for Forever) Next Recurring Bill Date: 2015-03-07 | Refund | | \$ 10.00 \$ 10.00 | \$ 10.00 |
| | Stop this Recurring | Total | at | 100 .0100 | -04.00 |
| | Invoice | Check | send payment received | +.00 \$94.00 | s 94.00 |
| | 105473875320 | | | | |
| | For Wild Wing Studios | HTTP Refer Unknow | rrer: N | | |
| | Seller 202235597 | | | | |
| | Order Date | | | | |
| | 2015-01-07 22:42:08 Payout Status | | | | |
| | Paid 2015-01-14 | | | | |
| | | | (US Dollars) | | (US Dollars) |
| | ID Description SEO Optimization | Refund Refund | Your Amt \$ 15.00 | USD Amt \$ 15.00 | Customer Amt \$ 15.00 |
| | Installment 1 (Bills Every 1 Month(s) for Forever) Recurring Billing Completed | | | | |
| | Base Website Installment 1 (Bills Every 1 Month(s) for Forever) | Refund | \$ 69.00 | \$ 69.00 | \$ 69.00 |
| | Recurring Billing Completed | Refund | \$ 10.00 | \$ 10.00 | \$ 10.00 |
| | Installment 1 (Bills Every 1 Month(s) for Forever) Recurring Billing Completed | | | | |
| | | Total at Checkout | s 94.00 | s 94.00 | s 94.00 |
| | | | | | |

This screenshot show the current interface that Wild Wing Studios sees when a customer makes a payment within the 2CheckOut

Behavioral Analysis

The current process Wild Wings Studios uses to add new customers to their system works, but it's a bit menial. There are too many steps, and too much action required by Wild Wings Studios employees to successfully onboard a new customer. Currently, a prospective customer has to find Wild Wings Studios on the internet (or be referred by an existing customer) and then file a request to work with them. Wild Wings Studios looks at their request and determines if they would be a good customer to take on. If they decide they're a customer they want to work with, they will then initiate a conversation to discuss their options and rates for what the customer needs implemented. Once they've decided on what services the customer will subscribe to, an employee from Wild Wings Studios generates an invoice with a custom written Node and jQuery app that interacts with a billing system called 2Checkout. The app is written so that the Wild Wings Studios starts with a base website fee, and the employee can select specific add-ons and custom charges as additional elements. The app generates a 2Checkout URL that's stateless and contains all the information that goes to the billing system. When a customer goes to click the link, they see all their custom options and can enter their customer/billing information. To make the system more convenient for their customers, the custom app also generates a hash of the URL and stores it as a short link so it's simpler for the customer to get there. The customer clicks on the short link, which takes them to the 2Checkout website customized with their invoice. They enter their information on 2Checkout, which processes their information and charges them and sends the money to Wild Wings Studios. The system allows for recurring payments, but each one isn't associated with any others (there's no way to correlate data so that you can see all payments by one customer, etc.) In addition, the data is never stored into a new customer profile, so if they ever want to change their billing they have to regenerate a URL and the customer has to re-input all of their information.

As a whole, Wild Wing Studios has given us an interesting scenario to work with. While we actually did find a fair amount of success with how things stand right now, there were many subtle problems underlying the overall system as a whole that are starting to manifest as larger problems than previously anticipated. While 2Checkout is an adaptive and growing company, and has been beneficial for Wild Wing Studios as a starting point, it hasn't been the one-stop solution they've hoped for. One of their original, main requirements was that they had to have recurring payments as an option from the get-go (which 2CheckOut has been excellent for), but the drawbacks invoked by using this system are starting to build up, and they would like to identify a new solution before the issues start compounding upon each other and cause problems further down the line. Primarily, they're facing 3, core issues: that invoices generated by 2CheckOut are not associated with a domain name (the key identifier for a client, even more so than a particular name), that if the customer adds on additional features, they are required to fill out an entire new invoice again, and that if a client adds an additional features, new invoice shows up as entirely different invoice in the system (they're not associated with any "name" or "domain").

Using a third party system to generate billing has in turn created some redundancies. One particularly redundant part of the current process is that Wild Wing Studios has to regenerate a new invoice for a customer every time a service is added or dropped, or a one-time transaction needs to occur. With the 2Checkout system, there is no editing capability of scheduled billing.

There are two current workarounds that are not ideal for several reasons. The first one involves simply adding the service as another recurring payment. Now clients are receiving multiple charges from Wild Wing Studios each month which is in itself inefficient and difficult to keep track of both for the customer and Wild Wing Studios. The second workaround is actually deleting the recurring payment and creating a new one with the correct charges. This would create potential errors in overlap from the last month to the new month with a new recurrent payment system, which, again, is not ideal for either the customer or Wild Wing Studios. Every time a new invoice is generated, the customer has to fill out the same billing information again. This whole process could averted if we found a third party system that can handle edits to recurring payment systems efficiently and gracefully.

Although the above issues are more annoying than problematic, there are a couple places that introduce real error to the Wild Wings Studios system. Since the system doesn't store customer information (billing, contact, or website information), every time the customer wants to change the services they subscribe to, or even just get some custom work done on their website, both sides of the transaction requires human input and time. A Wild Wings Studios employee has to create the invoice in their custom app. This requires clicking on every service and if anything is customized, inputting the name of the service and the cost of the service. There is no "double check" system in place, so they just create it and send it off to customers. If any data is incorrect and the customer doesn't look closely, they could be filling out a bad invoice. In addition, the customer has to re-input their customer and billing information once they get the invoice, and every time this happens it leaves windows open where they could accidentally mistype or put incorrect information. A final error-prone problem with the system is that if the customer wants to add anything after already being billed for the month, Wild Wings Studios has to generate a new invoice (they can't add to the other one), so they put the customer through two transactions and charge them twice in one month and future months.

As we've detailed above, a prevalent issue with the data entry is that there is a need to continuously re-enter information from the customer end if they constantly add new features onto their website (a fairly common occurrence). 2Checkout does not allow for easy modification with transactions, as new features would lead to a renewal of the customer information input process. In doing so, this means that every time a new feature is added, the current customer is treated as a new customer by the 2Checkout system. If data regarding the services that each customer has purchased becomes more flexible and automated, then this would lead to less errors in double billing. Also if the data associating the customer's information can be linked to their product (in particular, their website domain) in an automated manner, then there would be less management needed for billing, and easier-to-avoid duplicate billing.

As Wild Wing Studios relies upon 2Checkout, for data tracking, invoicing, and payments, the brunt of data management and security responsibilities falls upon 2Checkout's shoulders. While 2Checkout's website doesn't specifically quantify or provide details on backup plans, as a major player in the payment game, it is fairly safe to assume that they have automatic data security and backup management systems running over their client's information. Additionally, 2CheckOut proudly states that they meet the highest level of PCI Compliance, which means that they store and archive client logs for a minimum of 10 years. This gives clients (and Wild Wing Studios) confidence that their existing service, while not perfect for what they're currently

doing, does have measures in place designed to ensure data integrity is maintained and their data is backed up.

Not everyone at Wild Wings Studios has access to the information they need when they need it. Information at Wild Wings Studios isn't stored centrally, so it's hard to share information between different employees when they need to get it. Customer information is stored with 2Checkout, but they don't keep billing information from invoice to invoice (this is why Wild Wings Studios needs to generate a new invoice with each new custom request or subscription change). Employees don't have access to the customer information from 2Checkout, so they have to go back to earlier conversations to keep up contact. In addition, Wild Wings Studios assigns one employee to each project, and they are the one who has all the information about the customer, their custom options, and their domain information. It's not stored centrally, so if the customer requests a change and the employee who is in charge of their domain is away for some reason, they have to do a lot of maneuvering to get the information to the people who can make changes.

There are mainly two forms that the user interacts with when they interact with Wild Wings Studio for a website, the screening application form and the invoice payment form. Sign-up forms for Wild Wings Studio is created with the intent as an application form for potential customers. This form is currently simplistic, but contains all the necessary information for the screening process. Also, 2Checkout has a user interface that is intuitive and allows for quick changes to adding options, this allows for convenience with invoice payment form.

Proposed Changes/Solutions

After analyzing the current way Wild Wing Studios operates, we decided to take an iterative approach to finding a solution by working through our client's requirements (listed in the table below) and identifying core requirements from which we could judge each service on. Our client made it clear in the beginning that their ideal solution would dropping their current provider, 2Checkout, and moving to a new 3rd party solution (as opposed to a custom-coded solution). With this in mind, and a list of specific features to look for derived from our requirements list, we developed a table that we cross-analyzed each service against. This included the results of each requirement (if it met it or not) and any relevant notes associated with each requirement.

After looking at over 12 different possibilities, we decided the best strategy moving forward was to narrow our results down to 4-5 key players we felt represented feasible possibilities (listed below). Between now and the end of the quarter, we will continue to analyze the pros and cons of each service, and our final presentation to Wild Wing Studios will include a list of the top 3 services we feel will best meet the needs of Wild Wing Studios, based upon our current analysis and the outlined requirements and desires. Of the identified possibilities (listed below), our goal is to pick a solution that solves the most pressing issues Wild Wing Studios faces now, as well as hitting as many of the minor/lesser requirements. We also created a proposed activity diagram outlining the flow with an ideal system in place. As our ERD was also based on an "ideal" world scenario, we only instantiated one design that represented the target of a plausible, realistic solution.

Stakeholder-Defined Requirements List

| Stakeholder Group | Description |
|-------------------|---|
| Owners/Managers | Brennen and Mariah need a way to view all client accounts in a centralized location. The data which they would need to access is who the client is, what their contact information is, and all associated billing information. |
| Owners/Managers | Brennen and Mariah desire a way to view revenue information and overall performance over variable time increments. Their current payment provider, 2CO, provides raw data, but no statistical information. This may need to be a separate system, as many CRM systems do not provide this dashboard. However, in an ideal world financial data would be able to be tied back to clients. |
| Owners/Managers | Brennen is tasked with onboarding new clients when they sign up to Wild Wing. Currently, it is a very manual process to generate invoices, setting up box accounts, and sending/signing the TOS. An automated system to provision clients within the CRM would be an eventual requirement. |
| WW Employees | The developers need a method to share data and gain access to admin portions of client websites. Until they get these credentials, they are unable to perform any work. Right now, the current request process is sending an Owner an email request, which must be processed manually. A request system, or ticketing system, would be ideal so that certain requests could be processed in a more time sensitive manner. |
| Clients | Clients currently have to fill out an invoice online, which sets up recurring payments, and then manually print out a document, sign it, and send back the last page. This is not an ideal solution, as clients often do not have scanners or printers. It is also a very manual task to place upon a client. Ideally, everything would be handled in a single, or two steps online to reduce churn time. |
| Clients | Currently clients have no way of accessing their billing and invoice details - it is managed in the backend of 2CO and is not exposed to clients. Providing a dashboard with basic information about their billing cycle along with allowing modifications of data and invoice information is a critical element missing from Wild Wing Studios' current information system. |

PayWhirl

"Earn recurring revenue through your website by processing subscription payments online. Let customers manage their own subscriptions, credit card information, user profiles and more."

| Requirement | System Rating/Notes |
|--|---|
| Storing Customer Information in a Centralized Repository | Yes. Customer information is retained and all invoices are directly associated with their unique profile |
| Payment Analytics Platform | No. Direct analytics platform, but the customer database can be outputted into a CSV file for further analytics by Wild Wing Studios |
| Simple Customer Onboarding | Yes. Customer registration is extremely easy and fast |
| Recurring Payments / Automated Invoicing | Yes. PayWhirl offers recurring payments |
| Multiple Admin User Access | No. Single user sign for admin |
| Customers Can View Billing and Invoice System / History | Yes. They can see their billing information/profile directly through the embeddable widgets |
| Everything in one transaction (including add- ons) | Yes. |
| Edit Billing, Payments, and Feature Add-On Mid-Cycle | Yes. Single payments (or additional recurring payments) can be added on at any time. |
| Budget: \$50 per Month / \$2 per Client | Yes. \$49/mo + 1% per transaction |
| Do not allow customer to deal with invoice system | Yes . Customer can access their information, but all billing and invoicing is handled by Wild Wing Studios ahead of time. |
| Have to deal with credit card information | No. customers enter their information one time, and that's it. All present and future invoices are associated through their account. |

MoonClerk

"You're just 5 minutes away from accepting recurring payments and one-time payments online. Explore for Free. No credit card required."

| Requirement | System Rating/Notes |
|--|--|
| Storing Customer Information in a Centralized Repository | Yes. Stores info and can change recurring invoices or charge that customer at any time. |
| Payment Analytics Platform | Yes. Has analytics, can be used for gathering custom information. Data can be exported. |
| Simple Customer Onboarding | Customer has no interaction with the system except for payment |
| Recurring Payments / Automated Invoicing | Yes. Templates can be generated and automated payments are an option (as well as one time payments) |
| Multiple Admin User Access | No. Only single administration access |
| Customers Can View Billing and Invoice System / History | No. No customer interaction with their billing history |
| Everything in one transaction (including add- ons) | Yes. Allows for add-on and one time payments as well as modifying transactions |
| Edit Billing, Payments, and Feature Add-On Mid-Cycle | Yes. You can change any invoice or add any feature to their recurring payment on the fly. |
| Budget: \$50 per Month / \$2 per Client | Yes. \$50 monthly fee (based on revenue) + (2.9% + \$0.30 / transaction) |
| Do not allow customer to deal with invoice system | Yes. Only payment system, just like 2Checkout |
| Have to deal with credit card information | Yes. Managed by MoonClerk |

PaySimple

"PaySimple is a leading provider of small business merchant accounts, mobile payments, electronic payments, and ACH processing services. Get started today!"

| Requirement | System Rating/Notes |
|--|---|
| Storing Customer Information in a Centralized Repository | Yes. Very easy to add new customers (tracks billing + contact information and notes about the customer). Searching for existing customers super easy |
| Payment Analytics Platform | Yes. Full-fledged platform with customizable options |
| Simple Customer Onboarding | Maybe. Very simple form to fill out, can integrate into Wild Wing Studios site |
| Recurring Payments / Automated Invoicing | Yes . Very easy to pull up all recurring payments and edit them |
| Multiple Admin User Access | Maybe. Not clear based on demo |
| Customers Can View Billing and Invoice System / History | Yes. Easy to set up personalized invoices, recurring invoices |
| Everything in one transaction (including add- ons) | Maybe. No clear way to distinguish between base and add-ons |
| Edit Billing, Payments, and Feature Add-On Mid-Cycle | Maybe/Yes. Easy to edit recurring payments, unclear what happens if edit is made mid-month |
| Budget: \$50 per Month / \$2 per Client | Maybe. \$39.95 per month + transaction fees Credit Card Processing: 2.39% + 29 cents ACH/Check: 55 cents per transaction, \$3 minimum |
| Do not allow customer to deal with invoice system | Yes. Web forms can be generated for customers to fill out, not sure about integration |
| Have to deal with credit card information | Yes. Stores billing information for each customer, handles charging |

FreshBooks

"FreshBooks customers spend less time on paperwork, freeing up 2 days per month to focus on the work they love. What would you do with that extra time?"

| Requirement | System Rating/Notes |
|--|--|
| Storing Customer Information in a Centralized Repository | Yes. Stores client profiles that correlate with invoices |
| Payment Analytics Platform | Yes. Has 6 report options, on individual customers accounts and the company as a whole |
| Simple Customer Onboarding | Sort of. On creation of the first invoice it creates a profile but that is entered by Wild Wing Studios, not the client. (needs client info before creating invoice) |
| Recurring Payments / Automated Invoicing | Yes. |
| Multiple Admin User Access | 2 for the \$25 level, 4 for \$40 (and \$10 for each additional) |
| Customers Can View Billing and Invoice System / History | No. Clients can only see invoices, nothing else. https://www.freshbooks.com/support/what- does-my-client-see-when-i-bill-them |
| Everything in one transaction (including add- ons) | Yes. Can specify different things (FreshBooks saves those for other invoices) |
| Edit Billing, Payments, and Feature Add-On Mid-Cycle | Maybe. Unclear on website and FreshBooks Customer Service has yet to get back to me. |
| Budget: \$50 per Month / \$2 per Client | Yes. Up to 25 clients, one person operating account : \$20 Unlimited clients, two staff accounts: \$30 Unlimited clients, 5 staff(\$10 each additional): \$40 2.9% + 30 cents for credit card transactions |
| Do not allow customer to deal with invoice system | Yes. Only Wild Wing Studios creates invoices, customers do very little. |
| Have to deal with credit card information | Yes. FreshBooks stores that and doesn't require anything from Wild Wing Studios. |

Chargify

"Chargify is the best online billing software for all of your Recurring Billing needs. Learn more about simplifying your Subscription Billing today."

| Requirement | System Rating/Notes |
|--|---|
| Storing Customer Information in a Centralized Repository | Yes. Customer tab that contains searchable customer information |
| Payment Analytics Platform | Yes. Business Dashboard gives users basic analytics |
| Simple Customer Onboarding | Yes. Very flexible integration of forms |
| Recurring Payments / Automated Invoicing | Yes. Claims to handle any recurrent payment situation |
| Multiple Admin User Access | Maybe. Not clear but seems like this is the case |
| Customers Can View Billing and Invoice System / History | Yes. Fully fledged customer portal |
| Everything in one transaction (including add- ons) | Yes. Tracks both base prices and add-ons, EXTREMELY flexible |
| Edit Billing, Payments, and Feature Add-On Mid-Cycle | Yes . Very flexible with recurrent payment plans |
| Budget: \$50 per Month / \$2 per Client | No. Definitely over budget |
| Do not allow customer to deal with invoice system | Yes . Very flexible about the customer portal and what customers can and can't see |
| Have to deal with credit card information | No. Completely handled by Chargify |

System Diagramming (Proposed)

For our proposed changes, we updated our previous diagrams to reflect an ideal system flow. This manifested in two new activity diagrams, one to represent a best-case scenario of onboarding and invoicing a new customer, and one to represent an ideal flow for adding on an additional feature to an existing client. Additionally, we also created an ERD depicting how things would work in a "perfect-world" scenario.

Ideal Add-On Flow





Ideal Customer Onboarding and Invoicing Diagram

Structural Analysis (ERD)



Structural Analysis

For our project with Wild Wing Studios, there was no prior-existing database system to analyze. According to our client's requirements, we needed to design a database that could efficiently track client information and associate that information to their respective projects. Our team decided to build a new database ERD that associated customer information with both project and employee details. Each customer entity has a customer ID that has contact information listed as attributes. Each customer is associated with a domain name and an order. The order entity tracks the services that are currently being provided for the customer. At Wild Wing Studios, each project has an employee that monitors and maintains the services being offered, and also works directly with the customer. Accordingly, with every order there is an employee ID associated with it which allows users to track employees (along with their relevant contact information) and the projects they are working on. This vital relationship between domain, customers, orders (projects) and employees is what we attempted to capture with our database. Ideal use for this database would revolve around querying existing contact information for clients and the projects that Wild Wing Studios currently works on for them (along with a list of employees associated with that project).

The ERD we designed represents an "ideal" situation, one in which we have all elements of our system integrated into one system that effectively summarizes their business processes. In our research, we analyzed several different systems attempting to find a service that would meet all of these requirements. Although nothing from our research fits every requirement, there were many that we felt met almost all of the requirements Wild Wing Studios had outlined for us and represented viable solutions. The two persistent problems we encountered were that in our ERD we had a "Domain" entity associated with every customer, yet none of the services we looked at were we able to find a great way to represent that. However, we believe that when creating the payment forms on the back end of these services, Wild Wing Studios can add a "Domain" as a required input field, which would then leave each customer with a field that specified their associated domain/website. While not an ideal solution, it's an effective substitute for the time being, and as this was not a huge priority for Wild Wing Studios, we are confident that they will be satisfied with this as a solution. The second problem was that they desired a way to associate an employee with a particular customer/website. Unfortunately, none of the services had any type of feature along this line without merging into CRM territory (something that Wild Wing Studios has specifically wanted to avoid for this particular portion of the business) and so we had to leave this request out of our final list of potential companies. Again, however, this was not a top priority, and merely an "it would be nice" request, so we believe the services we have to recommend represent very promising solutions to solving their core business issues.

The data model does a very good job of describing the ideal system and showing how that would look. Our earlier activity diagrams show a disjointed and complicated system, out of which stemmed many of their problems with scale and too much manual work. The ERD we designed shows the best possible scenario -one where everything is one system, with customers linked to their websites and the employees who operate them. There's no billing information in our ERD, because Wild Wings Studios has been adamant about that they don't want to handle customer payment information. To them as a small business, it's not worth the risk given the systems that are out there that can handle this safely and efficiently for a nominal

fee (like the current one they use, 2Checkout). This is something that needs to be captured, but not by them. Wild Wings Studios would rather utilize an external payment system to capture that kind of information, so that they don't have to worry about their security. If they get hacked, the worst that could happen is that customer's emails would be exposed. But if the system they use gets hacked, they would have guarantees and insurance from the company they were using. They would rather stay with 2Checkout and not deal with customer payment information than change systems and be forced to store it. The cohesive ERD where all information is linked and accessible does a good job of showing the idea behind a perfect system: linked together, all information is accessible by employees, and no payment information is on file.

The current limitations of the data model prior to our design had the limitation of not being able to associate the customer with their product (website). If this important aspect was not tracked, the customer's relationship to the company will be lost as the company continues to grow, thus causing a strain in information management between employees, customers, and administration. Another limitation to the current data model is the lack of connection between customer information, projects, and employees. Customer information is retrieved from administration from employees after being assigned to a project, this causes a latency in the development of the project as supposedly accessible information is not accessible due to a lack of centralization. In our new data model we account for this by providing employees with access to information on the project and the customer contact information thus reducing latency.

