



SUPPLY CHAIN AUTOMATION AND E-COMMERCE FOR BREAKFAST DELIVERY IN NORWAY

“ *StoneLabs* was engaged to build upon a homebread e-commerce/logistics system for our Norwegian startup company.

They have been showing great technical knowledge and business understanding.

Thom Mikail S. Berre,
Brødboksen co-founder

The company

Norwegian company BRØDBOKSEN TWD AS directed by Arnulf Refsnes delivers fresh bread for breakfast to the citizens of Oslo and some other counties of Norway.

BRØDBOKSEN facts

BRØDBOKSEN is an automated supply chain and e-commerce platform which offers a wide assortment of bread, spreads and other products. The company was founded in 2014 and has already become well-known in Norway. By July 2017 BRØDBOKSEN TWD AS counts 159 employees.

A unique idea of "bread boxes" emerged from the necessity to get fresh bread for breakfast. On BRØDBOKSEN website www.brodboksen.no you can choose the type of bread or other bakery foods, as well as freshly squeezed juice, jam, and some other products and the days when they are to be delivered and get a specially formed bread box before the start of the day next early morning. During the delivery a courier leaves a "bread box" at the door; the customer pays for the service once a month.

Business objectives

- create conditions to allow the business to grow with minimal expenditures through business process automation

Date completed

August 2016

Time terms

1 year

The team

- Business Analyst
- Project Manager
- Tech Lead
- Full-stack developers
- Quality assurance specialist

Technologies

- Ruby on Rails
- PostgreSQL
- Heroku

Communication tools

- Slack
- Sprint.ly

Software development approach

Agile (Scrum)

“ We built a module system, which can operate in a number of districts, and made it scalable and centralized

The problem

BRØDBOKSEN is a great idea and there was a target market in Norway ready to take it in. The company had already existed for 2 years and the main goal was to provide conditions for its rapid growth. The number of customers was growing, there was a necessity to add new delivery routes, predict the demand and extend business to other districts, as well as lessen the amount of manual work. We had to deal with a complex problem, which included online ordering and inbound/outbound logistics. The system processes implied several steps:

- A customer chooses a breakfast set and schedule for getting this or that option.
- A certain amount of bread is made by bakers. (There were 2 bakeries with different specialties at the start, and the number of them grew with the system expanding). One breadbox request can include bread from different suppliers.
- A certain amount of juice and spreads is prepared.
- Bread and other items are delivered to the warehouse and sorted by category.
- A bread box is filled with the products.
- The box is delivered to the customer.

The duration of the whole baking-to-delivery cycle for one particular order can be less than 6 hours.

The solution

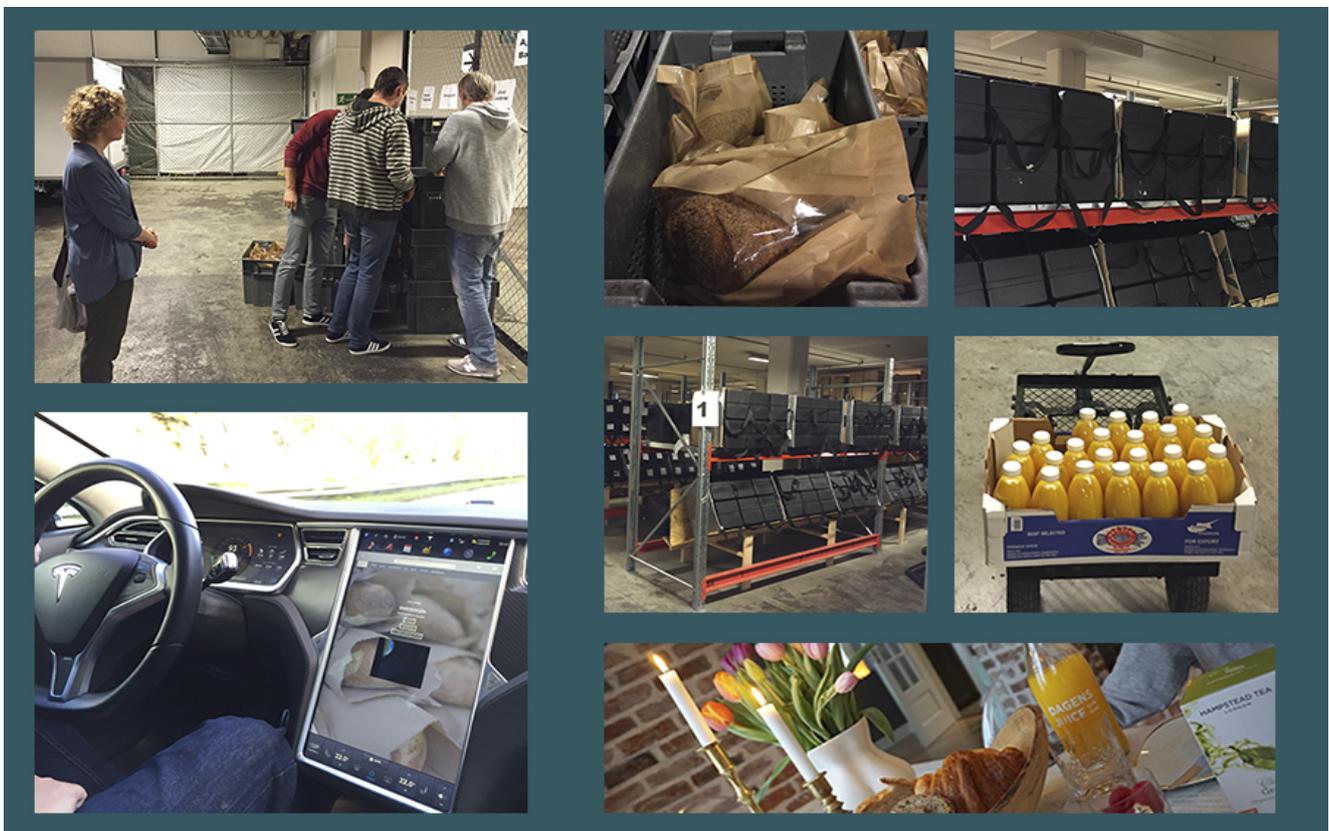
Given this, we optimized the automated supply chain module system that made the process more efficient and helped save the budget. The system consists of the modules built for every region (as suppliers and users differ in each area) with centralized management of the whole system (super-admin). The following table shows our approach to dealing with the various aspects of the task.

Requirements	Solutions
facilitate the onboarding process	<ul style="list-style-type: none"> • simplify the registration procedure • make the social networks registration
optimize the online ordering process	<ul style="list-style-type: none"> • create a dynamic calendar for orders • customize products according to user's location
automate raw materials ordering	<ul style="list-style-type: none"> • make a prediction model to forecast the products demand for the following week to automatically distribute raw materials requirements to the numerous suppliers
automate inbound logistics	<ul style="list-style-type: none"> • create report forms for different parts of the process • systematize a list of orders according to product categories • automate box labelling • automate the procedure of checking products in boxes at control points
automate outbound logistics	<ul style="list-style-type: none"> • create a dynamic delivery map for couriers • make a list of tasks for couriers (deliver a new order, take back an empty box)
extend business to other districts	<ul style="list-style-type: none"> • build a module system which can operate in a number of districts • make the module system scalable and centralized

Step 1

As there were several stakeholders in the project, and business processes are connected to their certain relevant locations, we visited Norway and had a look at the process on our own. We visited the warehouse where the products were sorted by category and then put in individual boxes to be delivered. We noticed that the inbound logistics was accurately planned. Every box in the warehouse got a label with the type and amount of products, the address, and extra notes. The products were put in boxes according to their categories. In the warehouse the control points (the points where the warehouse workers control the amount of products being put in the boxes) were set. We were able to try the bread for breakfast and to be immersed into the local culture.

That gave us the right understanding of the business idea and the vision of the project.



«BRØDBOKSEN was a lean startup, so there were some changes every day as the project dynamic was quite intense».

(Business analyst)

During our on-site visit we had found and proven the following business rules:

- Orders need to be allowed to be placed until 12 a.m. as the placed orders are processed at night. However, the bakers should get the information about the amount of the bread needed and its type 2 days before baking.

- The processed orders in heat seal boxes are delivered to door in the morning.

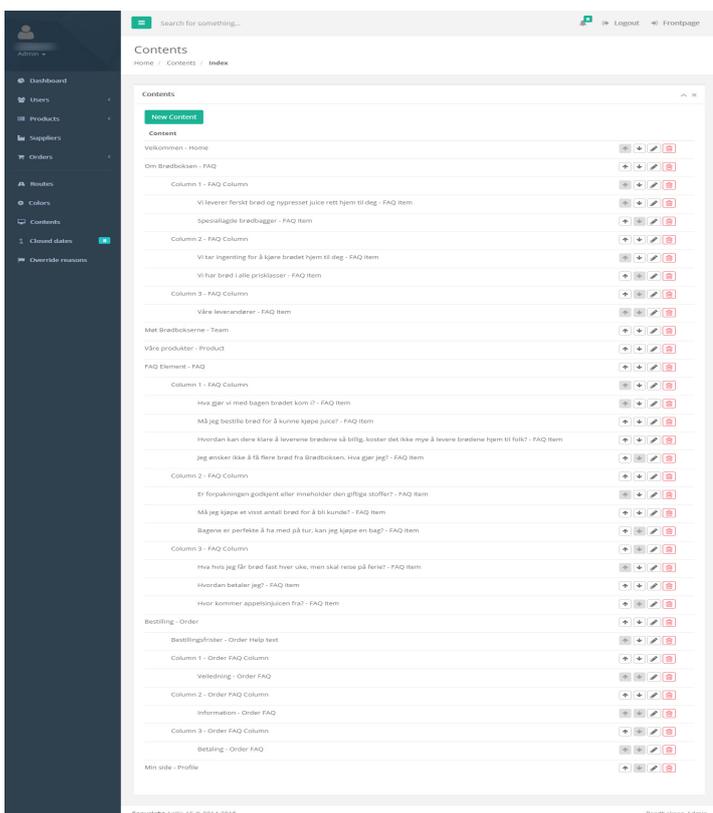
Having collected all the requirements, we proceeded to the system optimization.

Step 2

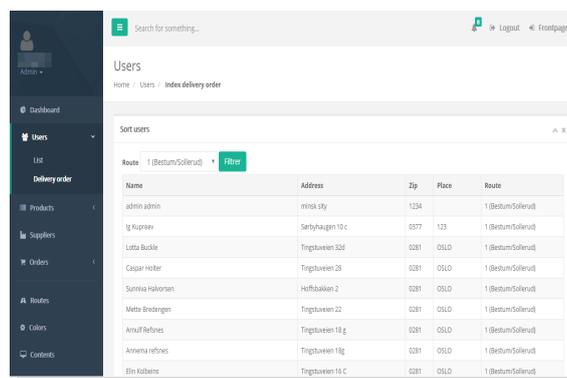
Firstly, we found the areas, which had to be optimized. On the one hand, it was the user experience in terms of onboarding, and ordering process; on the other hand, these were the internal processes of inbound and outbound logistics as well as there was contribution to be made into the infrastructure that would involve all the elements into one system. It would connect customers, suppliers, warehouse workers, couriers, and managers.

According to the plan of optimizing customer's experience, we first worked on the improvement of the calendar and the ability for customers to choose a type of bread, its amount and the days it should be delivered. There was also an opportunity to choose juice, spreads, and other grocery products. According to the stakeholders' requirements we also made an option which allowed to change the set of products on a certain day. It was achieved by a dynamic calendar of orders that allowed, on the one hand, to plan the users' order packages for a coming week and build all the supply chain out of it; and on the other hand, allowed users change their order sets for separate days, not affecting the internal processes.

Within the scope of work of improving the user experience in ordering, we also built-in the location customization to show the users the locally available products; and also got the step back and improved the authorization process, to include as many sign-in options as relevant, and making the onboarding process generally simple.

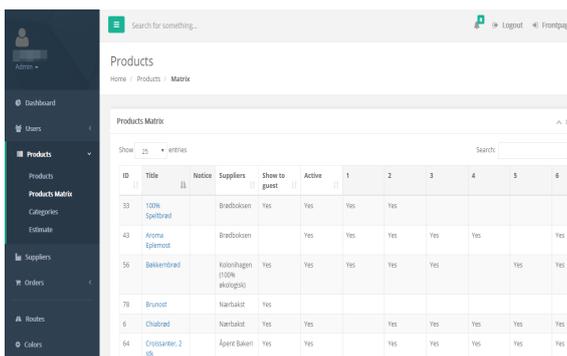


The screenshot shows the 'Contents' management page. It features a search bar at the top, a sidebar with navigation options (Dashboard, Users, Products, Suppliers, Orders, Colors, Contents, Closed dates, Overview resources), and a main content area with a 'New Content' button. The main area lists various content items, each with a title, a 'Column' (e.g., Column 1, Column 2, Column 3), and a 'FAQ Item' description. Each item has a set of icons for editing and deleting.



The screenshot shows the 'Users' management page. It includes a search bar, a sidebar with navigation options, and a main content area with a 'Sort users' dropdown and a 'Filter' button. Below is a table listing users with columns for Name, Address, Zip, Place, and Route.

Name	Address	Zip	Place	Route
admin admin	mitre1 styt	1234		1 (Betum/Sollerud)
Ig Kupper	Serbyhaugen 10 c	0377	133	1 (Betum/Sollerud)
Lotta Buckle	Tingstuaen 35d	0281	OSLO	1 (Betum/Sollerud)
Cagar Høller	Tingstuaen 28	0281	OSLO	1 (Betum/Sollerud)
Summa Halvorsen	Hoffbakken 2	0281	OSLO	1 (Betum/Sollerud)
Matte Brødengen	Tingstuaen 22	0281	OSLO	1 (Betum/Sollerud)
Arnulf Redres	Tingstuaen 18 g	0281	OSLO	1 (Betum/Sollerud)
Annema refines	Tingstuaen 18g	0281	OSLO	1 (Betum/Sollerud)
Ein Kobens	Tingstuaen 16 c	0281	OSLO	1 (Betum/Sollerud)



The screenshot shows the 'Products' management page. It includes a search bar, a sidebar with navigation options, and a main content area with a 'Products Matrix' table. The table has columns for ID, Title, Notice, Suppliers, Show to guest, Active, and a grid of checkboxes for days 1 through 6.

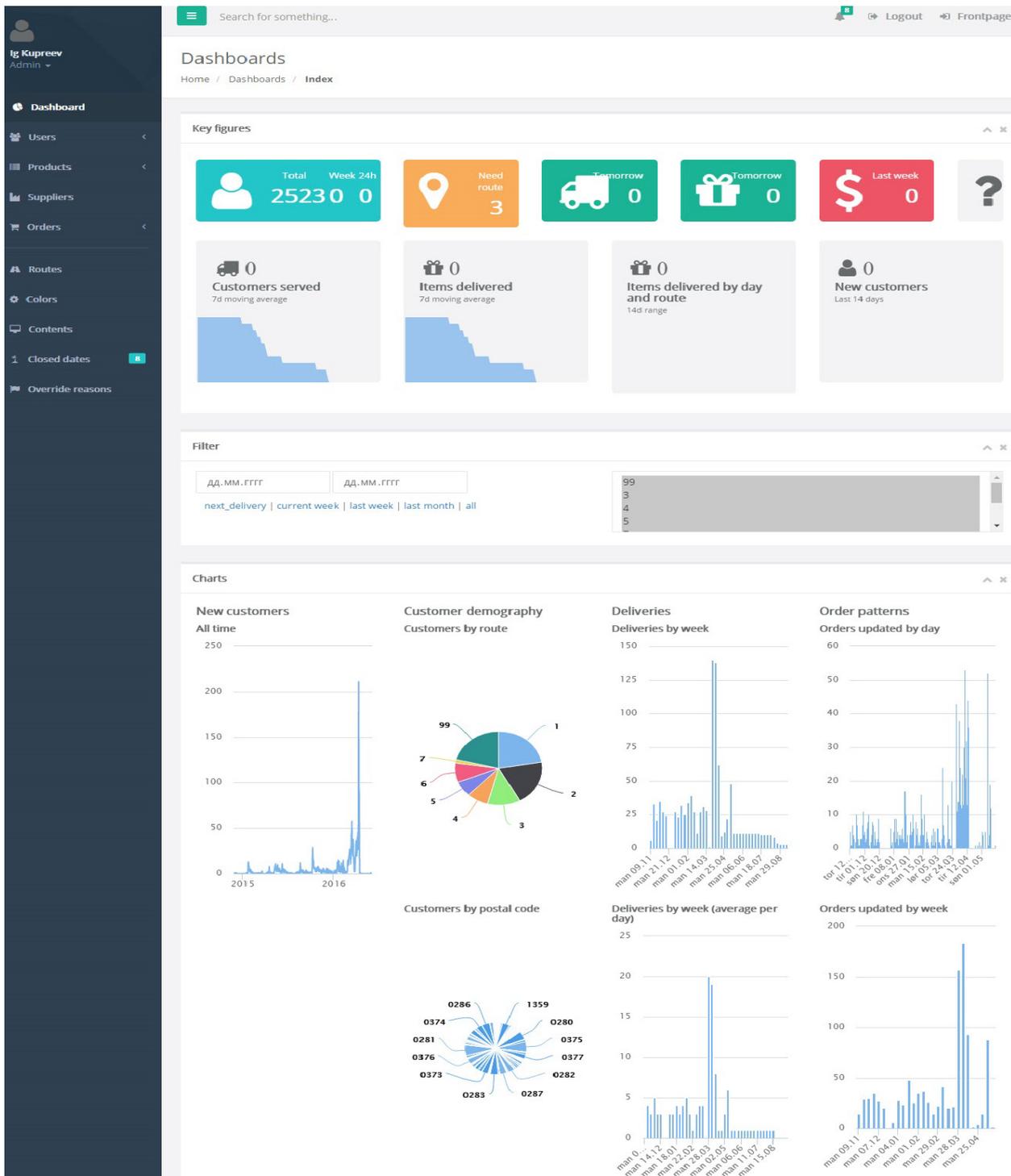
ID	Title	Notice	Suppliers	Show to guest	Active	1	2	3	4	5	6
33	100% Speltbrød		Brødboksen	Yes	Yes	Yes	Yes				
43	Aroma Eplemos		Brødboksen	Yes	Yes	Yes	Yes	Yes	Yes		Yes
56	Bakkembrød	Kolonihagen 1006 elvølogisk		Yes	Yes	Yes	Yes	Yes		Yes	Yes
78	Brunost	harpukaet	Yes	Yes							
6	Chiabrød	Narbutat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	Crossantier: 2 0%	Åpent Bakeri	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The process



«Our main task was to optimize the system, so we had to work with the existing code providing a series of improvements»

(Tech lead)



Step 3

Our next step was to plan and automate the inbound and outbound logistics of the system. The inbound logistics process included several steps:

- take the product from the supplier
- accept it at the warehouse
- sort it by category
- put it in individual customer boxes
- deliver to door

We optimized the system so that it could provide a systematized list of orders, form and print the labels, create report forms for all parts of the process including control points – everything in the automated fashion. It reduced the amount of manual work in the warehouse, made the process of sorting easy, and allowed to manage the delivery more efficiently, by creation the lists of tasks and delivery maps for couriers.

Step 4

There was a necessity to make a prediction model, as one of the stakeholders' requirements was to predict the amount of bread and its type 2 days before baking, while, as indicated earlier, sometimes we had less than 6 hours passing between the incoming order, and the necessity to have the bread baked for it. The model had to be accurate because it was inappropriate to predict less bread than it was necessary, and in case the predicted amount was bigger, all unused bread had to be paid and then thrown away, which was not a good solution either.

Therefore, we built a model that could predict the amount and type of all products for the following week. We analyzed the placed orders and the customer's behavior in the certain period and created a collection table, which we used as a basis for our prediction model. The model predicts the amount of bread and other products one week before the day of delivery, so that each supplier gets a daily production plan in advance and can plan the purchase of the raw materials accurately.

As a result, we got an accurate model, which was successfully applied in the system.

Step 5

One of BRØDBOKSEN ambitions is to extend its business, which was already on the way of achievement, while we had started with one district in Oslo; and by the end of our involvement covered whole Oslo, and partially - 3rd most populous municipality of Norway - Stavanger. As baking bread is a local-oriented process, for every new district we had to repeat the whole system, which has centralized management. To achieve that, we introduced a new role of a super-admin (a super-admin is in charge of the whole system, while admins are responsible for their districts) and broke down the systems into modules.

To help a customer easily enter the system we created a fast verification, which also shows whether a customer can be included/not included into the system according to his/her geolocation. This allows keeping customers in the system even when their district is not included in the service area yet and lets them know about the perspectives of using Brødboksen in future. In that case, they get the news about the company and will be invited into the system as users as soon as their district is included into BRØDBOKSEN service area.

Another step towards achieving the scalability of the growing business was the technical work of making the system sustainable at high loads. Throughout all our involvement, a lot of work was done towards reinforcing the software, through series of code re-factoring efforts, and long-term thinking approach in planning the architecture of new features.

Conclusion

The project had already existed before we started our work, so our task was to improve and optimize the business process. In order to achieve that we modernized a registration system, optimized an online ordering process by creating a dynamic calendar for orders and making a product filter. We also automatized inbound/outbound logistics by making a prediction model to forecast the products demand, creating report forms and route maps for couriers. To help the business extend more rapidly we built a module system, which can operate in a number of districts and made it scalable and centralized.

Due to a series of our improvements and of enormous efforts in business development at the stakeholders' side, the company was able to make a massive leap in growth and sales, the result we are now proud of.



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